

CONTROLS, DRIVES & AUTOMATION

ISSUE:
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**IIOT AND SMART
TECHNOLOGY**
MACHINE
LEARNING
PAGE 16

**POWER
TRANSMISSION**
NUCLEAR
FACILITIES
PAGE 22

**DRIVES AND
MOTORS**
INCREASING
PRODUCTIVITY
PAGE 28

CONTROLS
HIGH ACCURACY
BALL VALVES
PAGE 33

AUTOMATION
COBOT SAFETY
PAGE 36

**MACHINE BUILDING
AND ENGINEERING**
SAFETY
ENGINEERING
PAGE 44



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CONTENTS



SUSTAINABILITY

10 SUSTAINABILITY AND SAVINGS GO HAND IN HAND
How companies can reduce costs as well as become more sustainable



AUTOMATION

- 36 BE ON GUARD FOR COBOT SAFETY**
Safety legislation surrounding the use of robots
- 38 ADVANTAGES OF OPTICAL SENSORS IN CMMs**
Modern optical sensors for use in coordinate measuring machines

IIoT & SMART TECHNOLOGY

- 16 NEXT LEVEL MACHINE LEARNING**
MTC implements world first Guided Analytics demonstrator
- 18 AI TECH COMES INTO FOCUS**
AI enables line-scan cameras to infer increasingly complex insights



DRIVES & MOTORS

- 28 OPENING THE DOOR TO PRODUCTIVITY**
Renowned door manufacturer sees threefold increase in productivity
- 30 DRIVE SYSTEM COMBINATION**
Complete system for a machine that straightens, cuts and deburrs thin tubes

MACHINE BUILDING & ENGINEERING



- 42 NAVIGATING HAZARDOUS AREA SAFETY REQUIREMENTS**
The key requirements concerning hazardous environments
- 44 ARE YOUR SAFETY ENGINEERING PRACTICES REALLY SAFE?**
How to recognise and deal with common 'trip-ups' in safety engineering

POWER TRANSMISSION

- 22 CERAMIC VS HYBRID BEARINGS**
The specifications, capabilities, and differences
- 24 POWER TRANSMISSION GOES NUCLEAR**
Nuclear installations require the highest quality power transmission solutions



CONTROLS

- 33 ACCURACY BAKED IN**
Industrial bakery increases product and reduces production costs



TECH SUPERPOWER ON THE HORIZON?

THOSE OF you with half an eye on the news may well be aware of the government's latest scheme to boost UK science and technology – the Science and Technology Framework.

Recently launched with much aplomb by the Prime Minister and Technology Secretary, it is the first major piece of work from the newly created Department for Science, Innovation and Technology and aims to “challenge every part of government to better put the UK at the forefront of global science and technology this decade through ten key actions – creating a coordinated cross-government approach”.

On the face of it this sounds fantastic, but after further consideration I can't help but be somewhat underwhelmed. I won't detail each of the ten actions included in the plan, but suffice to say, on reading through my first thought was: is the UK not already doing everything on the list, and if not, why not? For example, one of the points is “building on the UK's talent and skills base” – well, duh! And I'm not entirely sure what the government halving inflation has to do with a science and technology framework, but that's one of the things that the Technology Secretary Michelle Donelan chose to talk about in her foreword, so who am I to question?

I know I'm probably being too cynical and of course, the full document outlining the plan does include lots of sensible ambitions that, if fulfilled, could indeed help cement the UK as a science and technology superpower, although whether this will be possible by 2030, which is the aim, is a different matter.

Another notable aspect of the framework is that it fails to even mention association with the €95.5b Horizon Europe research programme. This seems odd, particularly as the announcement of

the Windsor Framework could pave the way for UK involvement, which had previously been blocked by the EU. Indeed Donelan has now said that a deal for the UK to associate to Horizon Europe would need to be on “acceptable and favourable terms” and has declined to guarantee that the UK will definitely join the programme.

It has also been reported that the Prime Minister is keen on an alternative research programme put together by ministers, known as “Plan B”. This would be a UK-led programme involving collaboration with non-EU as well as European nations. This comes on the back of the Department for Business, Energy and Industrial Strategy returning £1.6b of funds to the Treasury, which had originally been set aside for UK involvement in Horizon Europe.

While I so try to see the potential upsides of the UK forgoing involvement in Horizon Europe in favour of a more worldwide home-grown alternative, I can't help looking at the post-Brexit trade deals that have been achieved and feeling thoroughly disenchanted about the whole situation. If the government is serious about making the UK a science and technology superpower, I would propose a starting point of just two key actions – provide the necessary funding and join Horizon Europe.

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NEW RELIABILITY SERVICES PROGRAMME FROM ROTORK

ROTORK HAS launched a new Reliability Services programme that increases the dependability of site assets. The service offering aims to ensure that the most appropriate response is provided based on the criticality of the customer's application. The new three-tiered approach provides the customer with options on the level of cover. These tiers are:

Basic (Health Check) – non-intrusive assessment of the condition of assets relative to the design spec and operational use. Through this, Rotork can help the customer identify the condition of their assets from the visual inspection and suggest appropriate maintenance.

Standard (Planned Maintenance) – includes the activities within 'Basic' and adds an intrusive inspection that provides an improved level of insight into the health of site assets. Corrective maintenance is performed per customer direction, and consumables are changed as necessary.

Premium (Enhanced Maintenance) – encompasses everything the previous two tiers include and adds condition-based monitoring, all parts (exclusions apply), and Rotork's Intelligent Asset Management

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SCHAEFFLER ACQUIRES ECO-ADAPT SAS

STRENGTHENING ITS predictive maintenance offering, **Schaeffler** has announced the acquisition of ECO-Adapt SAS, which offers innovative solutions for condition monitoring based on electrical signal analysis and systems for the optimisation of energy consumption.

The acquisition expands the Industrial division's portfolio of lifetime solutions and strengthens its position in the field of digitally-based predictive maintenance. The Lifetime Solutions portfolio contains an extensive range of service offerings for industrial maintenance of machines throughout their entire operating life – from heating devices, alignment tools and condition monitoring solutions through to a wide selection of lubricants and matching automated lubricators.

Complementing existing OPTIME solutions with functions



based on electrical signal diagnosis OPTIME Condition Monitoring now offers a reliable predictive maintenance solution for industrial machinery based on signal analysis of vibration and temperature data. ECO-Adapt completes this scope by offering maintenance information on the basis of electrical signal analysis, providing additional security against potential failures of electrical components. Operators have the advantage of covering both mechanical and electrical issues with a holistic predictive maintenance system. This is a significant step towards the more sustainable operation of machines.

www.schaeffler.com
Tel: 0121 313 5830

SIEMENS BRINGS TOGETHER MOTORS AND LARGE DRIVES IN NEW COMPANY

Siemens is combining its business activities in the areas of low- to high-voltage motors, geared motors, medium-voltage converters and motor spindles, under the new name of **Innomotics**.

The portfolio includes an innovative solutions and digitalisation portfolio and a broad range of service offerings. The related businesses were previously assigned to the units Large Drives Applications and Digital Industries and to the legally separate Siemens companies Sykatec and Weiss Spindeltechnologie.

Effective 1 July 2023, Innomotics will operate in Germany as a legally separate company, with operational headquarters in Nuremberg. The carve-out in Germany will be completed effective the same date. The designated management team comprises Michael Reichle (CEO), Christoph Salentin (CFO) and Hermann Kleinod (CTO). The global carve-out is to be largely completed by the start of the new fiscal year on 1 October 2023.

"With its size, its broad portfolio and our highly motivated people,



Innomotics will be a trailblazer in the market and capture a leading competitive position. We'll profit from the strong growth potential driven also, in particular, by the sustainability-oriented demand for more efficient electrification and energy consumption in industry and society. I'm convinced that Innomotics will provide us with the optimal setup to leverage this potential," said Reichle.

Innomotics will continue to collaborate closely with other Siemens businesses through partnerships in the areas of technology and sales and in

trade relationships.

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SCHNEIDER ELECTRIC EXTENDS PARTNERSHIP WITH WARBURTONS

SCHNEIDER ELECTRIC has announced a multi-year extension to its technological partnership with Warburtons to improve production at six of its manufacturing sites across the UK and mitigate the rising cost of energy and raw materials.

Using leading analytics technology developed by Schneider Electric and information technology company AVEVA, Warburtons – which produces over 2 million baked goods each day – can securely visualise data across all operations in a single information stream. The highly advanced AVEVA System Platform is designed to break down silos and provide a unified, real-time view of the respective facilities. This enables better system design and maintenance, more agile decision-making, and more efficient, flexible, and profitable manufacturing.

System implementation is being conducted by NeoDyne, a certified Schneider Electric Alliance Integration Partner. The 24-month

roll-out of the system started in late 2022 and is expected to be completed in 2024. Implementation at Warburtons' Stockton-on-Tees facility has already been completed, with engineers reporting positive feedback from the site.

Schneider Electric will be responsible for capturing, recording, and reporting on real-time process data, allowing Warburtons to optimise operations, improve quality, and reduce costs across its business.

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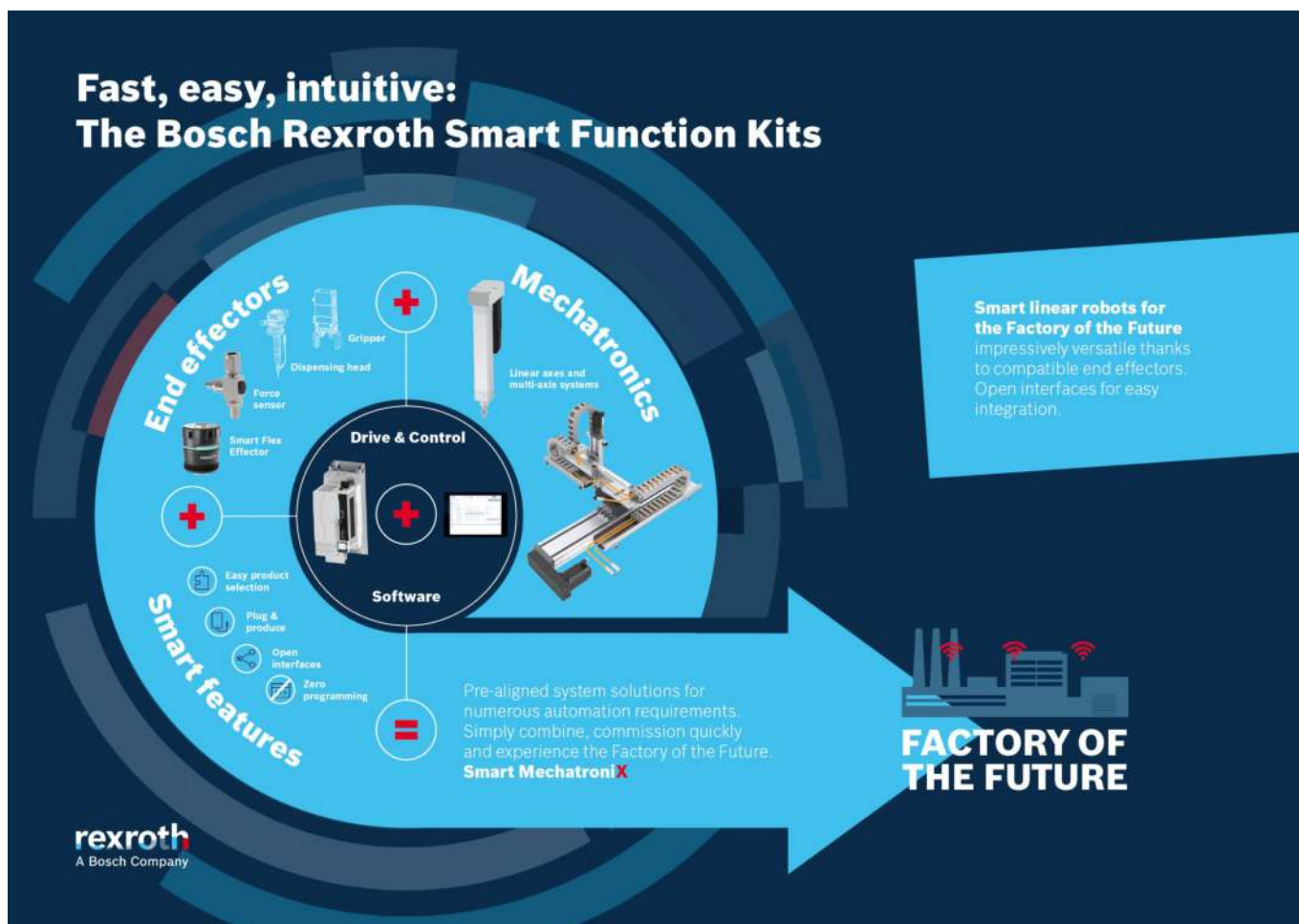
ECO-RAIL-2

by Murrelektronik

These units provide basic functionality and help to monitor the overall costs in the control cabinet

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- Cost efficiency through an excellent price-performance ratio
- Flexibility due to the range of versions and adjustable output voltage
- Excellent mains failure bridging time up to 130 milliseconds
- Practical handling during installation and commissioning



CONSTRUCTING LINEAR MOTION SYSTEMS CAN BE A DRAWN-OUT, EXPENSIVE PROCESS. IT'S TIME TO CHANGE THIS WITH SMART MECHATRONIX.

Do you sometimes feel like Sisyphus who has to carry out the same laborious task over and over again? If you dimension, configure, programme or commission subsystems for assembly or handling processes, you'll know exactly what we mean. But this is now a thing of the past!

AN ECOSYSTEM FOR SMART MECHATRONICS

Bosch Rexroth has now broken the cycle of process adjustments, time shortages, high programming costs and interface losses. How? With an ecosystem for mechatronic solutions and subsystems, in short: Smart MechatroniX. The first two systems, the Smart Function Kit Pressing and the Smart Function Kit Handling are revolutionizing engineering and the commissioning of typical

applications for pressing, joining and handling. These factory automation tasks can now be carried out quickly and easily with no need for complex mechanical engineering, time-consuming catalogue research, error-prone media disruptions and costly programming.

SELECT, CONFIGURE, GO ONLINE

Another reason why the new ecosystem is so innovative is

the fact that it's made up of tailored, standardized modules and components, which can be put together quickly to form smart subsystems. Simply select and adapt the basic type online, configure and order it and commission it with software guidance. This way, best-in-class components can be used to create smart mechatronics solutions for the Factory of the Future and with minimal use of resources.

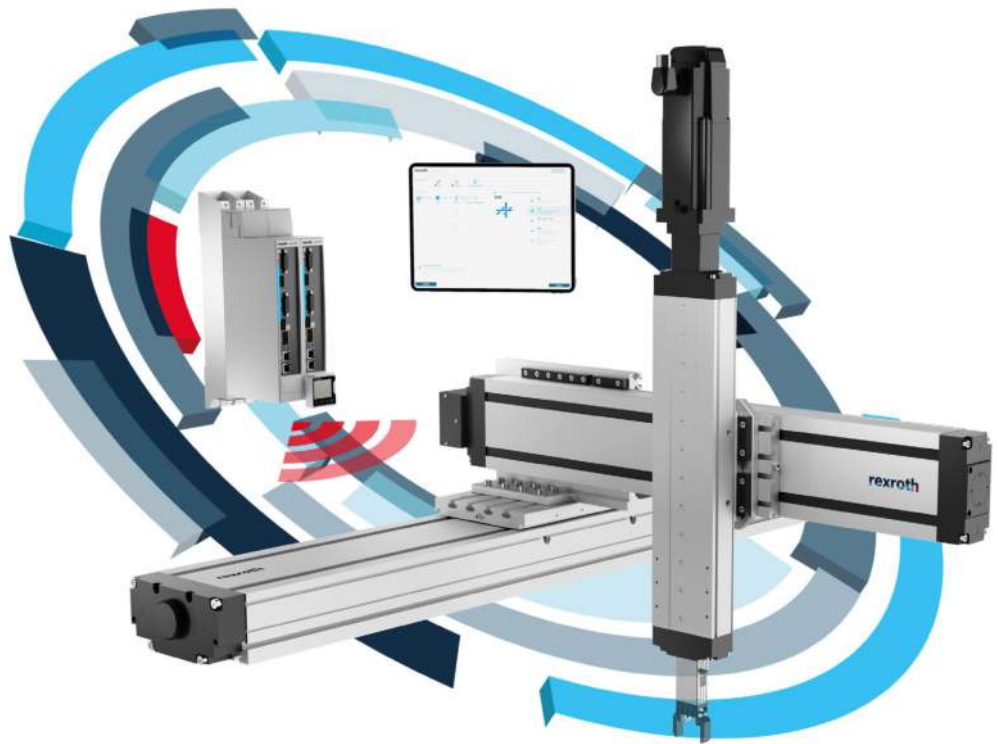
EVERYTHING FITS TOGETHER AND FITS IN SEAMLESSLY

Whether it be a handling robot from linear axes or an electromechanical press solution – the online configurator offers users exactly the right motors, servo drives, mechanic and control systems. The “heart” of the subsystem, a piece of preinstalled operating software, guides users intuitively through the commissioning process. Thanks to visual programming, there is



no longer any need to type in lines of code. The drive controllers automatically parameterize themselves as soon as they are connected. In the case of the Smart Function Kit for Handling, the software can even reference the linear axes.

WITH THE SMART MECHATRONIX SOLUTIONS PLATFORM, BOSCH REXROTH IS FOLLOWING THE MARKET TRENDS IN FACTORY AUTOMATION AND PAVING YOUR WAY TO THE FACTORY OF THE FUTURE



PROGRAMMING WAS YESTERDAY

Users define what the subsystem is to do within the machine or line with the help of ready-made functional modules. These are simply selected from a library, arranged in the correct order via drag and drop and given the correct parameters. With plug and produce, Bosch Rexroth meets a key requirement

when it comes to modern-day factory automation. Integration into higher-level systems and larger IoT environments is also straightforward thanks to open interfaces and ready-made functional modules. An overview of the most important properties and benefits:

- Easy product selection, dimensioning, configuration and ordering via e-tools.

This saves time, money and hassle. Everything fits together perfectly.

- Plug and produce: Commissioning wizard, automatic drive parametrization and axis referencing speed up the time to market and the ROI.
- Zero programming: Intuitive graphical user guidance makes process configuration easier and requires no costly expertise.

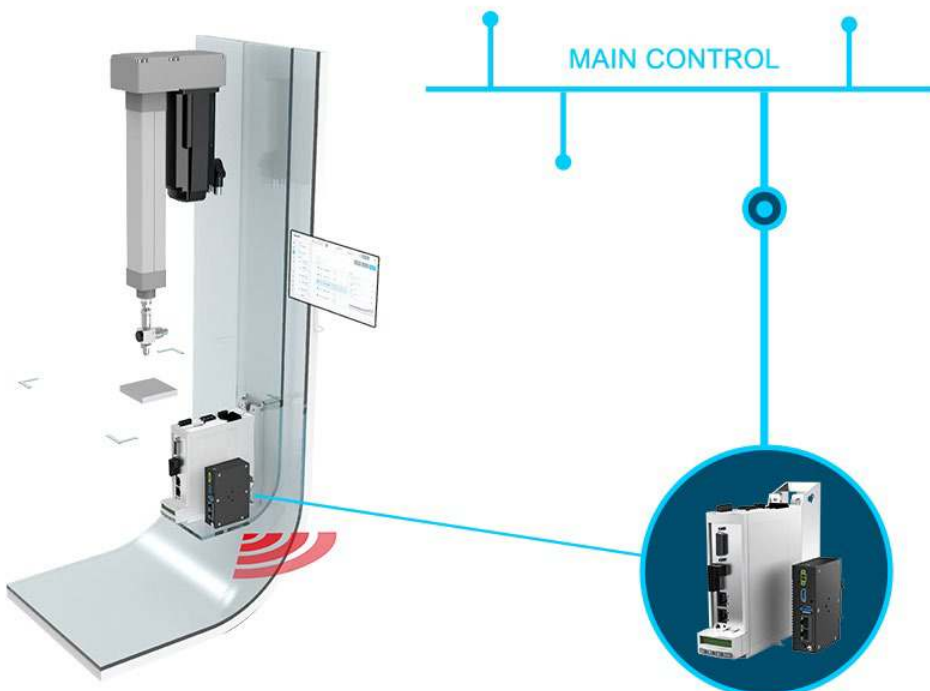
- Open interfaces make the subsystems IoT-capable and allow them to be integrated quickly into higher-level control and IT systems.

ARE YOU READY FOR A LEAP IN EFFICIENCY?

With the Smart Function Kits for pressing, joining and handling tasks, production companies can save huge amounts of time, avoid island solutions and pave the way to the Factory of the Future. But the development work goes even further. After all, Bosch Rexroth is gradually extending the Smart MechatroniX ecosystem to cover other areas of application. Already lined up: The Smart Function Kit Dispensing for dispensing tasks and the Smart Flex Effector, which gives linear and folding-arm robots almost human sensitivity and thus opens up completely new automation scenarios. The toolbox for smart mechatronics is growing, but the aim remains the same: fewer resources, greater flexibility and a minimal time to market. ■

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SUSTAINABILITY AND SAVINGS GO HAND IN HAND

Sustainability doesn't have to come at a cost, in fact many companies are finding that climate-friendly initiatives are saving them money. Tony Coghlan looks at three broad areas where companies can reduce costs as well as become more sustainable

THERE IS no doubt that sustainability is an issue that can no longer be ignored. This, combined with the huge hikes in energy prices we have seen recently, means that many businesses are looking to increase efficiency and in turn reduce energy use. As a company, Truck Banner has identified production efficiency, energy management and supply chain management as particular areas where gains can be made. Here we will look at four different applications in the production efficiency category and how products and equipment from Truck Banner is being leveraged

to aid optimisation: Increasing yields in meat processing; Increasing efficiency in assembly stations; Edge Guiding to reduce waste; and Picking solutions to eliminate errors and returns.

THE OPERATOR RECEIVES DIRECT FEEDBACK REGARDING ALL STAGES OF THE ASSEMBLY



INCREASING YIELDS

In one application Truck Banner has been called upon to look at a large meat processing company supplying meat products to over 50 countries has teams of highly skilled butchers, processing over four million sheep and cows per year. As every butcher and every animal is unique, achieving the highest meat yield from each animal takes skill. To identify which butchers achieve the highest yields, every animal is tracked throughout the whole butchery process using RFID tags embedded in the containers which carry the parts.

At every stage the bone and fat removed are put into separate containers which are also tracked and weighed. At the end of the process the exact amounts of the retail meat, fat, bone and any other waste is known for every animal. This data also shows which butchers are able to achieve the highest yields from which areas of the animal. Utilising this information allows butchers to be placed where they are most productive and to pass on their skills to other butchers. Higher yields ultimately result in less waste, less animals required, and

with less time and energy spent producing the retail product.

Assembly station efficiency
Many applications involve assembly stations where workers need both a constant supply of parts and somewhere to put the completed product. Both are equally important to maintain maximum efficiency. Empowering operators to call for parts and collection when they feel it necessary is the first step in maintaining optimal production speeds. However with no acknowledgement that the request has been received, and that a forklift or AGV is on its way, the "call" is often far too early, resulting in congestion around the workstation which slows production.

By utilising wireless illuminated touch buttons which change colour to indicate progress, the operator receives direct feedback regarding all stages of the assembly. Illumination is off at the beginning and end of the process and changes colour with each step, firstly indicating that the button has been pressed, then that the AGV is in transit. Finally the operator touches the button to acknowledge the AGVs arrival



with parts, or its departure with a pallet of completed products.

Timed data from each button press, combined with detection of each completed part provides the data required to allocate resources and optimise manufacture. Wireless communication and position tracking between the AGV and work station enables the system to direct the AGV in the most efficient pattern. This not only results in increased productivity but also the mileage on the AGVs and forklifts is reduced, saving energy and maintenance costs.

EDGE GUIDING

The delicate clear film used in dye sublimation printing has to be handled very carefully, as any blemishes in the film will be transferred to the printed images. The film has to be guided very precisely to avoid wrinkles or tears but if the detection method is too close there is a risk that the film may be damaged by touch. A special low contrast light curtain placed up to 375mm away from either side of the film is able to precisely detect the clear edge and issue instructions to gently guide the material through the machine.

The same light curtain is used in carpet manufacturing to detect the two edge transition on the carpet web. The first transition is air to selvage (the substrate material of the carpet), the second transition is selvage to tufting. Automatically measuring and adjusting these transitions as close to the tufting

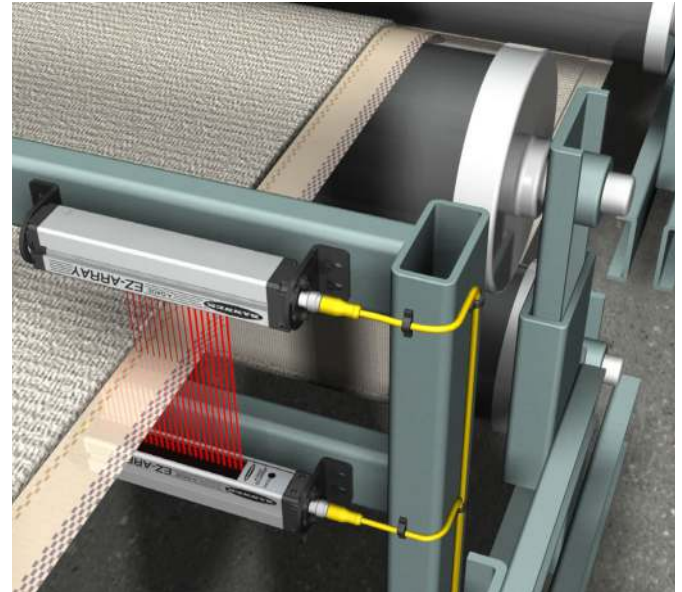
process as possible greatly reduces any waste that previously occurred in post manufacturing inspections.

PICK-TO-LIGHT

The correct supply of a modular product requiring a specific attachment from hundreds of nearly identical attachments, to fit something that their customer already owns is a challenge. For example, supplying roof bars with the correct fitting for one of thousands of different car models and makes. The chance of picking wrong parts in a continuous stream of orders, each requiring different combinations of parts, is extremely high. Ensuring correct parts are picked from a paper list is a very slow process and still prone to errors.

Turck Banner has seen this problem in industries ranging from car accessory manufacturers to fast food outlets. Pick-to-light systems solved the problem in almost all cases. One such system involved installing devices with both a bright indicator and a numeric display on over 400 part locations. When each operator was assigned their own colour all they had to do was see which location was illuminated in their colour, and pick the quantity displayed on the device. After touching the illuminated button to acknowledge that the part(s) had been picked, the system would then illuminate the next location in the order sequence.

Unlike the old paper list that would be picked in the order it



was printed, the system chooses a pick sequence to minimise the distance that the operator has to move, and sequences the heavy or bulky items last. Orders are picked more quickly, with no errors, resulting in far fewer returns. This in turn reduces transport costs and pollution etc. Not printing picking lists saves on paper and printer ink, filing and recycling.

These are just four examples where careful investment in the right products can have a significant impact on both short and long term savings, at the same time making the product or process more sustainable. ■

**ORDERS ARE PICKED
MORE QUICKLY, WITH NO
ERRORS, RESULTING IN
FAR FEWER RETURNS**

Tony Coghlan is managing
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KEY POINTS

- *Turck Banner sees potential efficiency gains in production efficiency, energy management and supply chain management*
- *Wireless illuminated touch buttons at assembly stations increase productivity and reduce AGV/forklifts mileage*
- *Picking from a paper list a very slow process and prone to errors; Pick-to-Light systems solve these issues*





SUSTAINABLE DEVELOPMENT

When an OEM selects an automation partner, it's increasingly important that they ensure the organisation can demonstrate the right credentials across the sustainability spectrum, asserts Gerard Bush



SUSTAINABILITY IS NOT JUST ABOUT THE ENVIRONMENTAL OUTCOME; AT ITS CORE IS PEOPLE

SUSTAINABLE INDUSTRIAL development heavily focuses on environmental factors, from CO2 footprint to the raw materials used in production. Of course, this is crucial to ensure stability for the global population of the future. It's also a growing requirement from consumers. In turn, this means that it's vital that technology end-users with brands to protect can demonstrate their sustainability credentials; and demand for sustainability is increasingly requested by OEMs to their partners through the supply chain.

Innovators in industry investing in automation technologies have a lot to gain. Automated motion systems are intrinsically sustainable by virtue of their capacity to increase an end-user's operational efficiency. The continued proliferation of robotics is not only increasing energy efficiency in production, but its uptake is also significantly minimising errors, meaning less material waste and lower consumption.

REMOVING BARRIERS

The challenge is ensuring that the innovators – the market-leading OEMs of today and tomorrow – are able to access this technology and use it to best effect. A barrier to

OEMs introducing robotics has been time of development, hence the focus of motion technology specialists like Kollmorgen in speeding up this process for broader robotics deployment. Artificial Intelligence (AI) and machine learning are developing the ability to drastically reduce the complexity of robot design and integration. Kollmorgen has over 50 years' experience in motion, and its motors power thousands of robotics joints globally. This data set, combined with extensive engineering insights, is enabling Kollmorgen's engineers to partner with OEMs and train their models for mass-scaling of robotics.

Also important for sustainable development will be this approach of openness in development with OEMs and wider partners to create the opportunity for collaboration. Sustainable industries will increasingly mean deploying the most suitable robot technology for each application, ensuring the

technology operates seamlessly. For Kollmorgen, a collaborative approach with OEMs is key.

SUSTAINABLE PROCESSES

Technology development that enables innovators to create more sustainable solutions must also comprise materials from sustainable sources. For example, reputable technology vendors have provisions in place that prevent the use of conflict minerals. These include raw materials such as tin and gold used within technology manufacture that come from global areas of conflict that surrounding mining and trading. Responsible OEMs will increasingly ask tech providers to demonstrate that their own supply chain is sustainable.

Moreover, sustainability is not just about the environmental outcome; at its core is people. This includes people involved in the supply chain around the world, so for example, it's crucial for OEMs

to ensure that their suppliers have processes that prevent child or forced labour, as well as ensuring fair treatment of the labour force. A sustainable supplier model also ensures equality, removes discrimination, and seeks to prevent all forms of corruption.

When selecting a motion technology partner, the ability to develop solutions that optimise efficiency is of crucial importance. To make these gains achievable, the automation provider must also offer technologies that ensure fast development. Underpinning this, it's crucial that the automation vendor can show that its own processes are based on a sustainable model. INMOCO is the UK distributor for Kollmorgen, and as a result, faces its own robust audit of sustainability. INMOCO's engineering team regularly works with UK-based OEMs to develop sustainable solutions.

The market is demanding a sustainable future. For OEMs to deliver this, ensuring sustainable partnerships isn't just the right thing to do, but will ensure long-term commercial stability. ■

KEY POINTS

- Automated systems are intrinsically sustainable due to their capacity to increase an end-user's operational efficiency
- The technology behind sustainable solutions must also comprise materials from sustainable sources
- An automation vendor should show that its own processes are based on a sustainable model

Gerard Bush is sales application
CO

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GAUGING THE RIGHT LEVEL OF AUTOMATION

George Thompson, chairman of the British Automation and Robotics Association (BARA) looks at some of the misconceptions about automation, particularly among SMEs

I WAS recently on the panel of a BARA (British Automation and Robot Association) roundtable on how we could potentially use Automation to help drive sustainability. We had a fantastic discussion and covered a number of points, however, we couldn't answer all of the questions asked by the attendees during the live event. One of these questions has stuck in my mind as it was something that I have answered in various forms throughout my career. The question was about the opportunities for automation for SMEs and that the common misconception that Automation is only for larger companies.

This made me stop and think about how I offered an answer to this question. For me, it seems an obvious answer, but I guess this proves the saying that "You don't know what you don't know..."

In my answer, I offered that "some degree of automation could be utilised by most production facilities, even those labelled as cottage industries. Automation doesn't always need to be large complex systems. Sometimes the right level of automation is a label application unit, case erector, case taping unit, case packer, or perhaps a semi-automated pallet wrapper. Maybe it's a combination of any number of these items. The more important thing is to implement the right level of automation for the current business needs, at the right time, with a plan for growing the automation in line with, or just ahead of the business needs".



I have been involved in discussions with companies where they indicate that they produce one small batch of a product at a time and then change over to a different product. Later in the conversation, it will emerge those products are produced on a daily, weekly, or monthly basis. This new piece of information changes the answer from 'it's not viable' to 'this will work'.

IT DOESN'T HAVE TO BE COMPLEX

The perception that automation is only for larger companies, in my opinion, often stems from the thought that automation is centred around complex robot programming and that you need to be a rocket scientist to understand how it works. Reality could not be further from the truth! Almost anyone can be taught how robot programming works and how to make basic changes. That wouldn't make them a robot programmer, but more of a robot operator.

Robots are not the only part of automation that needs to be considered, and in some instances, are not even the right solution for a company's needs. As I have already indicated, simple automation can make significant improvements to production efficiency. This first step can then be built on, and added to, as

the company grows and frees up personnel to perform more value-added activities.

Another misconception is that automation is only for specific industries, like automotive manufacturing. Again, this isn't correct. The reason that the automotive industry is highly automated is that they have a goal of removing manual interventions wherever possible. The products are designed to make automation possible. There is a tremendous amount that other industries could learn from this ethos and lots that other industry sectors could also teach Automotive companies. From an automation perspective, there is little difference between handling a car body side or suspension component and handling a product in a packet or putting a box onto a pallet.

If you would like to start your automation journey, but don't know where to start – I would highly recommend visiting the BARA website as detailed below where we have outlined several topics under the Expert Advice section to give some initial information. While you are there, why not register for our next

Tel: 020 8773 8111



SOLUTIONS FOR CONNECTIVITY AND CLIMATE NEUTRALITY

Hannover Messe 2023 will cover not only technologies for connected, climate-neutral industry, but also provide a forum for a global policy discussion among industry, government, science and social representatives

THE LIST of challenges facing industry is long: climate change, energy shortages, disrupted supply chains and a shortage of skilled labour. From the digitalisation and automation of complex production processes and the use of hydrogen to power factories and the use of software to register and reduce carbon footprints, Hannover Messe offers a holistic picture. At the world's leading trade fair for industry, some 4000 companies from the mechanical engineering, electrical and digital industries as well as the energy sector will showcase solutions for production and the energy supply of the future. The lead theme is 'Industrial Transformation – Making the Difference', a reference to how companies from the mechanical engineering, electrical and digital industries as well as the energy sector are driving change to tangibly reduce CO2 emissions on a major scale.

Exhibiting companies include global tech corporations such as Amazon Web Services, Microsoft, Google, SAP, Siemens, Bosch, NOKIA, ServiceNow and Schneider Electric, as well as medium-sized technology leaders like Beckhoff, Festo, Harting, ifm, Pepperl+Fuchs, Phoenix Contact, Rittal and SEW. Renowned research institutes such as Fraunhofer or the KIT (Karlsruhe

Institute of Technology) as well as more than 300 startups promise cutting-edge technologies and completely new business models.

The event will be opened by German Chancellor Olaf Scholz and Indonesian President Joko Widodo. Indonesia is this year's Partner Country at the industrial fair.

INDUSTRY 4.0 & MANUFACTURING X

Large amounts of data are needed to tap the full potential of Industry 4.0 – data that can be accessed by all companies involved in the value creation chain. A new interconnected data ecosystem – Manufacturing X – is part of the solution. This vision of a sovereign and secure data platform is being driven forward by the industry associations BDI, VDMA and ZVEI, among others. The first steps towards implementing Manufacturing X will be presented at Hannover Messe in close cooperation with the German Federal Ministry of Economic Affairs and Climate Action.

AI AT THE FORE

Artificial intelligence (AI) is playing an increasingly important role in industry. In addition to optimising processes, the manufacturing industry is increasingly relying on AI in simulation and

product development. So-called generative AI will also find its way into industry. Systems such as ChatGPT or DALL-E can already support text generation, programming and design today. On the subject of AI, Hannover Messe offers a comprehensive range of visitor tours, forums and presentations of AI tools and use cases from exhibitors.

SMART ENERGY

The interaction between software and machines creates considerable energy-saving potential. Smart energy monitoring solutions from Hannover Messe exhibitors help to identify and optimise energy consumption at the machine level, thereby reducing the carbon footprint.

Green hydrogen is all the rage right now. Industry wants to use it to free itself from dependence on fossil energy and reduce carbon emissions. Still, there are challenges. Producing hydrogen is a complex and expensive process. Questions of availability, transport and large-scale storage still need

to be resolved. More than 500 companies at HANNOVER MESSE will be showcasing solutions for the use of hydrogen in industry.

Users from industry and political decision-makers can get a holistic picture of the potential of this energy carrier in Hannover and see the course that needs to be set on the road to hydrogen-based industry. ■

To register for a ticket visit: www.hannovermesse.de

THE FIRST STEPS TOWARDS IMPLEMENTING MANUFACTURING X WILL BE PRESENTED AT HANNOVER

KEY POINTS

- Running 17-21 April, Hannover Messe 2023 will be opened by Olaf Scholz and Joko Widodo
- 4000 companies from across industry will showcase technologies and solutions for a connected and climate-neutral industry
- There will be a comprehensive range of visitor tours, forums and presentations of AI tools and use cases from exhibitors



NEW DEVELOPMENTS IN SAFETY AND AUTOMATION

THE SCHMERSAL Group will be attending Hannover Messe, focusing on automation and safety solutions for intralogistics as well as for packaging and food processing machines.

Using a model that depicts different process steps and technologies, including filling, conveyor and palletising technology as well as robotics, Schmersal will be demonstrating components and systems that not only contribute to occupational safety, but that meet the stringent requirements of intralogistics in terms of fail-safe operation and plant productivity.

A robot carrying out palletisation operations will be safeguarded with solenoid interlocks that keep guard doors locked until hazardous movements have come to a halt. Intelligent safety components, such as the AZM201 solenoid interlock with integrated AS-i-SaW interface, help to minimise downtime thanks to comprehensive diagnosis functions.

Schmersal will also demonstrate a brand new technology for the first time, which involves the position

and stacking height of boxes/crates palletised by robots being monitored by a ToF camera. The Time-of-Flight (ToF) procedure can be used to create a 3D image of the scene that is available as a point cloud. The scene can then be used to determine the positions and dimensions of objects. Software that can be used to define and monitor three-dimensional zones in space opens up a wide range of automation solutions in logistics and production-line production.

ToF cameras enable efficient, real-time data evaluation, such as when carrying out measurement tasks in fill level monitoring or volume determination of piece goods. **Hall 9 Stand D9**

www.schmersal.com
Tel: 01684 57 19 80



ADVANCED COMPRESSED AIR SOLUTIONS



AT HANNOVER Messe, ELGi will showcase the following energy-efficient compressed air solutions:

ELGi AB Series portfolio of oil-free air compressors offering the highest level of air purity and significant gains in energy efficiency and sustainability, at a low total cost of ownership.

ELGi OF Series of air compressors with integrated Heat Recovery Systems for optimal energy reuse in the form of hot water. The units provide Class '0' oil-free air to a broad range of compressed air applications and feature an in-house designed and manufactured oil-free airod.

ELGi EG Series air compressors with 2-stage compression and new drive motors to improve efficiency.

These electric lubricated screw high-performance air compressors are designed for reliability and ease of maintenance, backed up with an industry-leading warranty of up to 10 years.

ELGi LD Series, lubricated direct drive reciprocating air compressors, an innovation in piston air compressor technology.

The company will also showcase data-driven, end-to-end compressed air system audit assessment and remote monitoring tools that enable operators to identify areas of air loss or inefficiencies, resulting in increased system performance, sustainability, reliability, and cost

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NEXT LEVEL MACHINE LEARNING

Home to some of the most advanced manufacturing equipment in the world, The Manufacturing Technology Centre (MTC) is taking machine learning to the next stage with a world first Guided Analytics demonstrator supported by SolutionsPT, AVEVA and Reekoh. David Baskett talks about the project

THE MTC is a high-quality environment for the development and demonstration of new technologies on an industrial scale, and provides unique opportunities for manufacturers to develop new and innovative processes and technologies. The MTC's mission to reach engineering excellence through technology is what aligns the organisation so well with leading industrial IT solutions partner and distributor of AVEVA software, SolutionsPT.

David Baskett, technology and management strategy at SolutionsPT, says: "Working with the MTC is a perfect fit for SolutionsPT. Not only because of the opportunity to work with their skilled engineers to create demonstrators that showcase the very latest software capabilities in practice, but because their drive to help the UK manufacturing sector matches so closely to our own vision of digital transformation success for every UK enterprise. I have been involved in multiple projects with the MTC and they always lead to impactful, beneficial results. The Guided Analytics demonstrator is one I am particularly excited to be talking about."

As part of the AVEVA Insight Cloud Platform for Industrial Operations, Guided Analytics takes machine learning to the next stage of its evolution and brings the technology within reach of a much broader cohort of industrial enterprises.

Machine Learning (ML) is a branch of artificial intelligence (AI) and computer science which focuses on the use of data and algorithms to imitate the way that humans learn, gradually improving accuracy and enabling (or automating) better decision making, powered by big data.



SLOW UPTAKE

Industry has an ever-increasing reliance on data and those enterprises not putting this data to work risk becoming uncompetitive. However, uptake of ML in industry has been slow, partly due to its complexity. ML algorithms traditionally require an in-depth understanding of data science which is outside of the skill set most industrial enterprises have at their disposal. It is here that Guided Analytics can help by bringing powerful ML capabilities into the domain of IT and OT operators already working in industrial companies.

It is important to note that Guided Analytics is not a predictive analytics add-on, it is an in-built feature of AVEVA Insight. It is also not to be confused with

Automated Analytics, the default Insight training model, which is based on unsupervised machine learning. Guided Analytics is supervised ML, that enables the creation of custom training models where the user builds unique anomaly detection models without the pre-requisite of extensive data-science or coding experience.

Once the on-boarding process is complete, an end user can enable Guided Analytics and begin training their model in just a few clicks through the configuration-based low-code environment. This was one of the many reasons AVEVA Insight was chosen for the MTC demonstrator. Enabled through AVEVA Technology Partner Reekoh, plug and play integration between IT, OT and the business layer means immediate support out of the box without coding expertise needed onsite.

"This out of the box connectivity really sets the system apart and has benefits that reach far beyond the demonstrator. Creating an edge to enterprise connectivity approach, the system will seamlessly connect to the Enterprise Asset Management (EAM) while adhering to all certified security requirements, bringing in data from all IoT

devices through the Message Queuing Telemetry Transport (MQTT) no matter how geographically spread those assets are," says Baskett.

"Showcasing the potential of Guided Analytics was the driving force behind the demonstrator model. The technology testbed shows the use of intelligent anomaly detection and its potential for wider industry use on a range of assets and processes. Spotting anomalies means unplanned downtime events can be avoided, operators can be alerted of sudden energy spikes or even the smallest change in a number of variables, and Overall Equipment Effectiveness (OEE) can be improved dramatically.

As industry adopts a more data-led approach in the era of digital transformation, machine learning will be an integral technology. Guided Analytics is the output of machine learning, an easy-to-use way to build data models, and, more importantly, a straightforward way to get valuable, tailored insight from them. Using a cutting machine as the data source, the demonstrator shows an in-depth understanding of the state of the asset. Learning towards an intelligent predictive maintenance model, the data describes the health of the machine from several inputs including energy consumption, temperature, and vibrations.

"As is often the case in manufacturing facilities, it is not easy to immediately see the area that is contributing to anomalies or failure conditions. If that was the case, you would simply deploy maintenance there and then. Guided Analytics works for complex production processes. This gives operators the tools

UPTAKE OF MACHINE LEARNING IN INDUSTRY HAS BEEN SLOW, PARTLY DUE TO ITS COMPLEXITY



they need to assess and maintain every asset on the factory floor, whether there are two machines or two hundred. The implications for improving Overall Operation Effectiveness (OEE) places AVEVA Insight and its Guided Analytics functionality at the forefront of digital transformation technologies.” Says David

HUMAN DATA LOAD

As industrial leaders know, an abundance of data can be a help or a hindrance; when it helps, it informs efficient operations, but if it is too complex, it can cause operator overload, which undermines its usefulness.

To help ensure that Guided Analytics prevents data overload for operators, cloud graphics are available straight out of the box with no extended coding necessary. This functionality also helps overcome the skills issue often implicated in the take-up of new digital technologies. The demonstrator proves the remarkable ease of use, with configuration of a Guided Analytics model literally taking seconds, and with no time spent on coding or pipeline configuration.

The graphics act as a data filter, ensuring the operator is only seeing what is necessary to complete their job function with the opportunity to drill down for further detail through simple, intuitive dashboards. Previously, this high-level of machine learning would have required a data scientist to create the models along with reams of code, but the simple-to-use demonstrator shows how these models can be applied by operators with even the most basic IT or OT background. The low code integration approaches enables Guided Analytics to deliver insight and show benefits within a few clicks, capabilities previously unheard of in the control system industry.

SolutionsPT and the MTC both agree that most valuable asset of any production facility is the human workforce. But for that human workforce, their most valuable asset isn't a high-cost piece of equipment, it's time. Since time cannot be made, only be saved, Guided Analytics offers a valuable insight into the productivity

benefits of digital transformation.

Machine learning is vital to the future of industry and Guided Analytics offers a direct pathway to the benefits. Companies don't need to bring in data scientists or make huge time investments into complicated coding. The simplified model enables access to asset operating conditions whilst reducing the cognitive load on operators.

Guided Analytics shows the potential of machine learning within industrial settings, it also shows that the benefits associated with machine learning are within reach for most companies. There is no need for a data scientist or mountains of code to set algorithms and enable advanced maintenance strategies.

Manufacturers can see Guided Analytics in action with the MTC, providing a low-risk environment to explore the benefits, advance digital transformation and be supported by the experts at every stage. ■

David Baskett is technical
SolutionsPT
Tel: 0161 495 4600

**THERE IS NO NEED FOR
A DATA SCIENTIST OR
MOUNTAINS OF CODE TO
SET ALGORITHMS**

KEY POINTS

- Industry has an ever-increasing reliance on data and those enterprises not putting this data to work risk becoming uncompetitive
- Guided Analytics brings machine learning within reach of a much broader cohort of industrial enterprises
- Using a cutting machine as the data source, the demonstrator shows an in-depth understanding of the state of the asset

AI TECH COMES INTO FOCUS

Tech advancements such as sophisticated sensor technology, Artificial Intelligence (AI) and faster microprocessors are converging to make line-scan camera technology a compelling option in a host of new areas says Paul Wilson

LINE QUALITY control of web printing processes is one of the most established fields of application for line-scan imaging – these fast cameras can often be found inspecting printed sheets or textiles for defects such as ink spot marks, embossing defects and mis-registered colours.

Beyond the printing industry, however, their use has been limited to niche pockets of application. In the electronics industry, for example, line-scan cameras are deployed for inspecting printed circuit boards, and in the food industry, they can be found on nut sorting lines, scanning product flows as they cascade in a curtain past the camera.

Essentially, in scenarios where a moving, continuous material needs to be analysed for faults or defects, line-scan cameras will generally provide a better solution than conventional area-scan cameras, owing to fundamental differences between the two cameras.

AREA-SCAN VS LINE-SCAN

Area-scan cameras capture the data for an entire image in one go and the dimensions of the resulting image correspond to the number of pixels on the sensor. Line-scan cameras, on the other

hand, use a single row of light-sensitive pixels to constantly scan moving objects at a high frequency, capturing lots of 'slices' of an image which it then combines to construct the final image. Because of this, area-scan cameras are not as suited to very fast web based applications but are easier to install and use than line-scan cameras, making them ideal for straightforward machine vision tasks.

That said, the advent of bigger, faster and more sensitive area-scan sensors means that it is not unusual to see a CMOS area-scan sensor being used where a line-scan camera would have been the default option. The ability to adjust the active area on the sensor means that a line-scan camera can be emulated in some cases.

The complexity of implementing line-scan cameras can be offsetting. Although capable of higher speed processing, line-scan cameras are more complicated and costly to install, mainly because the line rate of the camera must be synchronised to the speed of the object being detected.

However, tech advancements in the last few years have meant that industries such as food, pharmaceuticals, e-commerce and logistics can no longer afford to

ignore the performance advantages of line-scan cameras.

Advancements in Image Signal Processors (ISPs) are facilitating higher quality and faster processing of 3D images in more demanding environmental and lighting conditions. This enables the cameras to detect more critical detail and capture higher resolution images.

For example, HIKROBOT, represented by Scorpion Vision in the UK and Ireland, earlier this year launched a 16K line-scan camera that is capable of detecting minute defects in PCB, EV battery, semiconductor, print and film inspection applications.

At the same time, system designers are harnessing GPUs (Graphics Processing Units) from the gaming industry for image processing. This PC graphics hardware can reduce algorithm and data processing time and enables the use of AI-powered analysis.

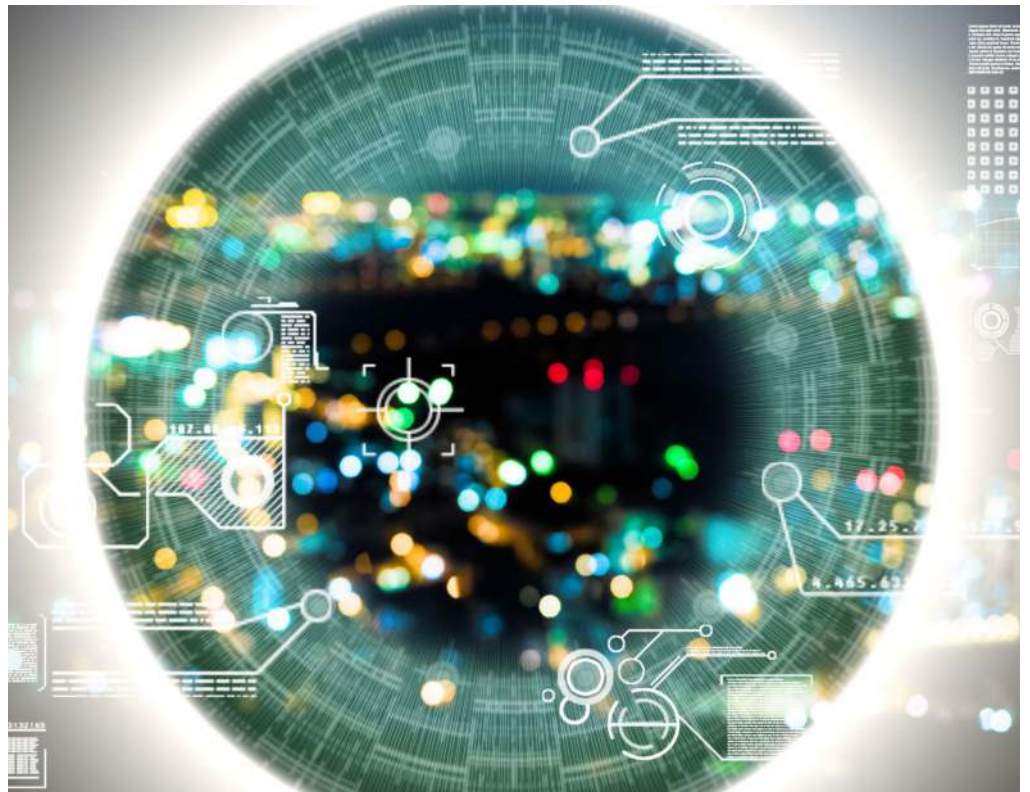
USING AI TO IMPROVE PATTERN MATCHING CAPABILITIES IMPROVES AND ACCELERATES INSPECTION PERFORMANCE

Using AI to improve pattern matching capabilities improves and accelerates inspection performance. The combination of advanced image sensor technology and AI is enabling line-scan cameras to infer increasingly complex insights from the vast amounts of vision data they capture.

Sophisticated sensor technology has also provided solutions to the problem of adjusting the line rate

KEY POINTS

- Line-scan cameras use a single row of light-sensitive pixels to constantly scan moving objects at a high frequency
- Advancements in Image Signal Processors (ISPs) are facilitating higher quality and faster processing of 3D images
- The combination of advanced image sensor technology and AI enables line-scan cameras to infer increasingly complex insights



to match the speed of the material under inspection, enabling accurate, meaningful 3D analysis of the image at high frequencies using software algorithms.

MAKING MINCEMEAT OF BURGER INSPECTION

Scorpion Vision has recently designed an AI-powered line scanning system to inspect IQF burgers for visual abnormalities and defects. The bespoke system, which incorporates two Scorpion 3D Stinger cameras above and below the conveyor belt, ensures that every single burger that passes through the line is visually perfect - to meet the increasingly stringent presentation demands of

both consumers and retailers. The camera system will check each frozen burger is exactly the correct shape and size, shows no signs of discolouration, freezer burn or ice crystal formation and is free from unsightly visual abnormalities such as large lumps of fat.

There are two reasons why a line-scan camera is the best solution for this application. Firstly, the inspection needs to take place while the frozen burgers are being transported to a robotic pick & place packing system on a very fast moving conveyor belt. An area-scan camera would not be able to perform the required imaging at this high speed. The line-scanning system designed

by Scorpion is able to locate, inspect and measure the burgers in real time.

Secondly, an area-scan camera would only be able to image the surface that faces upwards, not the underside of the burger. With the line-scan system, the burgers are passed over a very narrow gap between two conveyors and two cameras (one above and one below the conveyor) build up a 3D image of the complete burger as it passes over the gap.

The scanning unit incorporates two 3D Stinger cameras built into enclosures with internal polarised light sources, an arrangement that enables robust acquisition of images on reflective surfaces.

Scorpion Vision's proprietary AI-optimised software analyses these images in real-time for reference features that have been established through deep learning, and any burgers that exhibit abnormalities are immediately rejected from the line.

This is only the start of what is possible when AI is combined with fast scanning technology, but it demonstrates how AI-enabled line scanning systems are breaking new ground in speed, accuracy and repeatability. ■

Paul Wilson is managing director



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RETROFITTABLE SECURITY FOR IOT DEVICES

WITH THE PU-50n iShield HSM series, **Swissbit** offers a reliable solution for storing security keys for identification, authentication, and registration of devices in the Internet of Things (IoT). The retrofitable plug-and-play USB hardware security module (HSM) closes security gaps that can occur with software-based storage of cryptographic keys.

Manufacturers of connected devices, as well as system integrators for building and industrial automation, benefit from the 'Made in Germany' security, the ability to easily upgrade and update the security feature. iShield HSM stores the device's private key and certificate so securely that they cannot be disclosed or duplicated in software. The compact, rugged, high-quality USB key supports PKCS#11 and PKCS#15 public-key cryptography standards and is compatible with an open-source software stack (e.g., OpenSC).

A Secure Element (CC EAL6+) is embedded in the iShield HSM hardware using chip-on-board technology, making it tamper-proof and suitable for harsh operating environments.

www.rutronik24.com
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SWARM INTELLIGENCE COMMUNITY PROJECT

PHOENIX CONTACT has announced the latest project in the PLCnext Technology community: The Beehive – with swarm intelligence towards the future of sustainable automation.

The Beehive is a Phoenix Contact PLCnext Technology community project. With the help of technical specialists, a community project is set to get underway and anyone can participate. In order to make

life easier for honey bees and make a sustainable contribution to the environment, the goal is to develop an innovative solution for a fully automated hive through intelligent automation. Based on the various problems and challenges faced by bees and beekeepers, five categories have emerged. These provide a guide and distinguish between the different approaches for improving bee culture, namely Bee Care, Support the Beekeeper, Enhance the Beehive, Bee Environment, and Bee creative.

For example, to contribute to bee-friendly beekeeping, the Enhance the Beehive category looks at how automation can help simplify manual processes through OT, AI, IT, cloud, or data. Based on these five approaches, the community can decide individually how it wants to

Tel: 0845 881 2222

IO-LINK MASTER WITH OPC UA INTERFACE

THE SMART combination of the IO-Link sensor interface and the OPC UA communication protocol in a single device gives Pepperl+Fuchs new opportunities to offer complete, seamless, and transparent communication 'from the sensor to the cloud'.

Continuous data communication from the lowest sensor/actuator level to the cloud is becoming increasingly important across the entire industrial environment. For the logistics sector in particular, where adherence to deadlines is a key requirement, it is essential to know where packages are located, how long processing will take, and where potential plant malfunctions can lead to delays.

The IO-Link sensor interface represents the first step toward this level of transparency. In addition to process data from the sensor, IO-Link provides information for identifying, configuring parameters for, and diagnosing the sensor. Combining IO-Link and OPC UA now allows this data to be easily transferred to higher-level computer- or cloud-based systems.

This is the second and most decisive step toward complete data transparency since the data is accessible beyond the central control system. Decision-makers can now access the data without the need for complex workarounds. Pepperl+Fuchs is reported to be the



first provider to combine IO-Link and OPC UA in one device, thus creating new opportunities for the digital future of its customers.
www.pepperl-fuchs.com
Tel: +49 621 7761215

OT NETWORK VISIBILITY ENABLED

IMPULSE EMBEDDED is now able to offer the security benefits provided by Cisco Cyber Vision. Cyber Vision is a suite of products and services aimed at providing OT network visibility and actionable insights. The implementation of Cyber Vision helps IT and OT teams collaborate towards a shared goal.

The visibility offered by Cisco Cyber Vision enables three key value propositions:

- **Network insights** – Improve network performance and security

by identifying all devices connected to an OT industrial network to drive segmentation projects and troubleshoot issues. Also highlights security issues to identify and prioritise risks.

- **Reduce downtime** – Monitor all OT events to spot device problems before they disrupt production and troubleshoot operational issues faster, and gain insights into the industrial process.

- **Security posture** – Reduce the attack surface. Identify risks to take early corrective actions and implement best practices to maintain system integrity and production continuity.
www.impulse-embedded.co.uk
Tel: 01782 337800

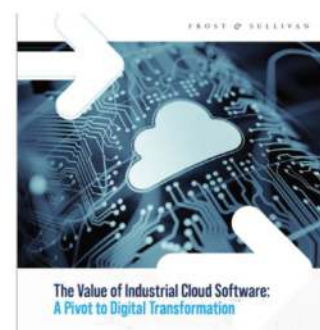


CLOUD-BASED SOFTWARE UNDERPINS DIGITAL TRANSFORMATION

ROCKWELL AUTOMATION has announced the availability of a whitepaper from Frost & Sullivan that explains the value of cloud-based software, especially in light of digital transformation.

The whitepaper looks at the challenges and opportunities from multiple perspectives – industry, customer, technology and operations – and explains why agility and adaptiveness across all facets are essential in the face of increasing adversity and industry disruptions.

The report goes on to cite the Plex smart manufacturing platform – a



modular, multi-tenant SaaS solution from Rockwell Automation, which is available Microsoft Azure, public cloud. Suitable for operations of all sizes, Plex is an industry-proven platform for companies looking to undertake a digital transformation.
www.rockwellautomation.com
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CERAMIC VS HYBRID BEARINGS

Chris Johnson explains the specifications, capabilities, and differences between full ceramic and hybrid bearings

CERAMICS ARE primarily used in bearings due to the material's corrosion and temperature resistant properties. Ceramics are inert, whereas metals are reactive, making ceramics resistant to corrosive materials such as seawater and many chemicals, including acids and alkalis. As ceramic bearings do not corrode, they require less maintenance than their steel alternatives and can be used in highly hostile environments.

Unsurprisingly, these corrosion resistant properties allow for ceramic bearings to be used in many industries, ranging from food and chemical production, to marine and underwater applications.

However, there is some confusion. Often, what people refer to as ceramic bearings are actually hybrid bearings. So, what's the difference between full ceramic and hybrid options?

CERAMIC BEARINGS

Full ceramic bearings have ceramic rings and balls and either a synthetic cage made from PEEK or PTFE or no cage at all. They are highly resistant to acids and alkalis and are therefore suitable for use in very corrosive environments. Silicon nitride (Si₃N₄) bearings can be heated to temperatures of 800 degrees Celsius when used without a cage. Pairing these qualities with their light-weight nature, at 45 per cent of the weight of steel bearings, they are incredible substitutes for traditional metal bearings. Full ceramic bearings are also non-

magnetic, meaning they can be used in medical devices such as MRI scanners, or any application where there is a strong magnetic field. However, the greater hardness of ceramic bearings also means greater brittleness and as such, they do not tolerate shock loads well.

HYBRID

When most people think of ceramic bearings, they are usually actually referring to hybrid versions. Hybrid bearings sit between full ceramic and steel options. While they use ceramic balls, these bearings are paired with metal inner and outer rings. Using this combination allows for higher speeds than full ceramic options, as the less brittle metal rings are not as prone to sudden catastrophic failure under high speed or load.

Despite the small difference in design, hybrid bearings' requirements differ quite extensively from full ceramic bearings. For example, while full ceramic bearings do not require lubrication, hybrid bearings do.

However, although the ceramic balls will still abrade the steel rings, hybrids will cope with marginal lubrication better than steel bearings due to the low friction coefficient and lightness of the balls.

Lubrication may not be required when using hybrid bearings at very low speeds. However, as these bearings are often selected for higher speed applications than full ceramics, suitable lubrication is advised. Precision hybrid bearings with a high speed cage are capable of very high speeds hence their use in, for example, machine tool spindles.

The corrosion resistant properties of the bearing are also affected when choosing a hybrid version over full ceramic. While the ceramic balls are highly resistant, the overall level of corrosion resistance is reduced due to the use of metal rings, even if they are stainless steel.

Decisions on whether to choose ceramic bearings or hybrid bearings will come down to cost, the application and the hostility of the environment in which the

bearings are to be used. While your application may not require ceramic bearings with the extreme temperature resistance of the NASA Space Shuttle, a better understanding of the different types should make your decision a little easier. ■

Chris Johnson is managing

Tel: 01993 842555

OFTEN, WHAT PEOPLE REFER TO AS CERAMIC BEARINGS ARE ACTUALLY HYBRID BEARINGS

KEY POINTS

- Full ceramic bearings have ceramic rings and balls and either a synthetic cage made from PEEK or PTFE or no cage at all
- Hybrid bearings sit between full ceramic and steel options; they use ceramic balls paired with metal inner and outer rings
- Decisions on whether to choose ceramic or hybrid bearings will come down to cost, application and hostility of environment



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POWER TRANSMISSION GOES NUCLEAR

With the global shift to low carbon sources, nuclear power is very much back on the energy agenda. These complex, high value installations require equipment of the highest quality to ensure reliable operation. And this equipment often needs innovative power transmission solutions, says David Brooksbank

AS OF 2021, 439 nuclear reactors were operational worldwide, providing around 10% of the world's electricity. Until recently it was a sector in slow decline, but the global drive to reduce carbon emissions and ensure a diverse energy mix has spurred new nuclear projects utilising the latest reactor technologies.

Furthermore, governments and operators are extending the design life of existing sites in response to increasingly volatile energy markets. Obsolete equipment at these facilities is now being replaced by new. Another factor is decommissioning. Once a plant reaches the end of its useful life, the recovery and storage of radioactive materials is labour intensive over the long-term.

This rejuvenation of the sector means demand for cranes, pumps and drives for nuclear applications is increasing. From construction to operation to decommissioning, nuclear projects require the very best power transmission products.

PRESSURES ON SUPPLIERS

Nuclear power generation is one of the most demanding industrial sectors to provide equipment for. Supplier accreditation, rigorous quality control, total traceability and extensive documentation are the minimum standards. Reliability and security of operations are paramount in all areas of the facility, especially in the handling of radioactive

materials. Operators and contractors are looking for suppliers who can provide the ultimate in quality, redundancy and custom engineering capability.

The high upfront costs, long lead times, great complexity and tight schedules of nuclear projects put pressure on suppliers too. Consequently, contractors prefer suppliers who can provide turnkey solutions, local support from experienced personnel and excellent product availability. Failing to deliver equipment on time can delay the schedule and risk the project going over budget, so local responsiveness and capacity is key.

A NUCLEAR FAMILY

Leading brands of Altra Industrial Motion Corp. including Ameridrives, Bibby Turboflex, Formsprag Clutch, Nuttall Gear and Stromag are all proven suppliers of innovative power transmission solutions for the nuclear industry.

Providing brakes, gearing, couplings, drives, power units and monitoring systems to new power stations, lifetime extension and decommissioning projects – these brands are experts in demanding nuclear applications. Altra products are utilised in reactor buildings, fuel storage and waste handling cranes, all types of pumps, cooling fans, generators and other rotating equipment. The brands work closely with operators, contractors and OEMs to deliver specialised solutions.

For example, Nuttall provides speed increasers for Westinghouse pressurized water reactors, while Stromag installs EDF C3 approved crane braking systems for use in advanced pressurised water reactor buildings. Formsprag was instrumental in the development of long-life Anti-Rotation Devices (ARDs) for reactor coolant pumps in pressure water reactors, while Ameridrives and Bibby regularly provide high performance couplings for cranes, generator sets and boiler feed pumps.

FAMILIAR WITH THE INDUSTRY

Each brand has the production capacity and stock availability to meet the supply demands of large-scale projects. Furthermore, each has the custom engineering capability to deliver assemblies and components to the required quality and redundancy standard. This is evidenced by the familiarity of each brand with the requirements of the industry. Experience providing the correct quality documentation, traceability and product testing assures customers that power transmission equipment will perform as reliably in even the most demanding applications.

THE NUCLEAR OPTION

The global reach of Altra also ensures that brands offer localised support to nuclear facilities worldwide. This includes new power stations in Europe, lifetime plant extensions in the

US and beyond. Altra's single-supplier, localised approach helps to simplify procurement and expedite project schedules. Expert personnel are ready to respond to any on-site requirement.

With Altra's engineering capability, industry experience and high service level throughout the product lifecycle, new power station, lifetime facility extension and decommissioning projects have comprehensive, turnkey power transmission support. This helps to ensure reliability across all operations, improving return on investment (ROI) for these high value undertakings that represent the pinnacle of engineering. ■

David Brooksbank is director of marketing at Altra Industrial

Tel: +1 781 917 0600

KEY POINTS

- From construction to operation to decommissioning, nuclear projects require the very best power transmission products
- Supplier accreditation, rigorous quality control, total traceability and extensive documentation are the minimum standards
- Failing to deliver equipment on time can delay the schedule and risk the project going over budget



The new 2D-Vision Sensor Dualis.

Combined vision technology for next level quality control.



2D

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The new 2D vision sensor, Dualis, analyses object surfaces and contours taking 2D quality control to the next level.

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HIGH TORQUE GEARHEAD

The R26HT high torque gearhead is the latest addition to Portescap's robust motor accessory portfolio and pairs perfectly with the company's existing 22mm brushless slotless motor technologies.

Offering up to 4Nm continuous torque within a 26mm frame size, the R26HT delivers 30% to 50% more torque than similar-sized competitive gearbox solutions while simultaneously providing higher efficiency levels of 85%.

This power-packed gearhead has been designed to withstand maximum input speeds of 18,000 rpm, making the R26HT the ideal solution to withstand the very high input speeds associated with brushless DC motors. This unique feature, combined with its high torque output, makes it well-suited for applications within the Robotics and Industrial Power Tools markets, including screwdrivers, nut runners, grippers, and AGVs. The R26HT is also ideal for those looking to transition from brush DC to brushless DC motors.

www.portescap.com

Tel: +41 (0) 32 925 62 40



MORE EFFICIENT PLANETARY GEAR UNIT DESIGN

STOBER HAS partnered with FVA-Workbench, the leading software solution for the calculation and parameter modelling of gear systems for faster, more efficient planetary gear unit design.

Using the FVA-Workbench for the sizing and verification of its standard drives, Stober can now create client-

specific applications and custom gear units more easily. This means that the company can meet a wide range of design goals, including load capacity, vibration, power loss, and efficiency.

For the design of planetary gears, Stober's development team must take various geometrical

restrictions into account, for instance, installation space, manufacturing and cost-efficiency, whilst characteristics such as load capacity, power loss, or vibration are largely influenced by the gear geometry. At this point, customer-specific requirements for planetary gear design can easily be integrated.

Having the ability to perform extensive calculations during gearbox design helps Stober engineers create optimal gearbox solutions. In preparation, variable parameters such as the helix angle, module, centre distance, addendum modification and load information are defined and prepared using individual calculations for each variant. Bearing and component stiffnesses can also be included in

Tel: 01543 458858

MACHINE FAILURES REDUCED TO ZERO

REGULAR BEARING bearing failures in a concrete floor manufacturing machine were leading to extensive downtime, costly lost production, and high maintenance costs. To rectify the problem, the customer turned to NSK, which redesigned the wheel hub and stub axle assembly with correctly specified bearings. This action reduced failure rates from 20 a year, to zero, providing savings for the customer of €68,607.

The solution was far from straightforward, requiring NSK to completely redesign the wheel hub and stub axle assembly, including a sealed roller bearing unit selected



specifically for the machine's loads. By incorporating NSK's full-complement sealed bearing units, secured by circlips in the outer ring, it was possible to increase the load

rating. Integral seals provided greater protection for the bearings.

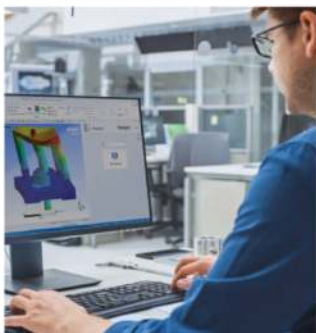
NSK's full-complement cylindrical roller bearings offer improved contact seals to prevent the ingress of foreign particles and water, a high load rating (radial and axial) and a corrosion-resistant phosphate coating to ensure suitability for external environments. The bearings are pre-lubricated with lithium grease and offer easy replenishment via inner and outer ring re-lubrication holes. If required, a snap ring (DIN 471) can be applied to the outer ring.

www.nsk-europe.com

Tel: +49 2102 4811280

BEARING ANALYSIS STREAMLINED

WITH THE new SKF Bearing App for Ansys Mechanical, design engineers have instant access to accurate stiffness data on more than 10,000 bearing designations. The app is available in the Ansys Store free of charge.



"With this new integration, we are taking the burden of bearing simulation away from the user's system and doing it ourselves" explains Hedzer Tillema, product manager engineering software at SKF. "Our calculations consider the detailed contacts between the rolling elements and the raceways of the bearing, and full details of the micro-geometry."

In the Ansys integration, the user first selects their chosen bearing using a user-friendly wizard. The App then communicates with a SKF cloud server to obtain a predictively accurate representation of the stiffness of a real bearing.

www.skf.com

Tel: 01582 490049

SLEWING RING BEARING FOR FOOD CONTACT

IGUS HAS made available a hygienic-type iglidur PRT slewing ring bearing that enables fast and residue-free cleaning. Classic bearing designs present bacteria with a lot of 'attack surface' and are usually not easy to clean thoroughly, sometimes requiring more development work for a hygienic cover, which means more time and costs.

"We wanted to offer a simpler solution and have therefore developed a hygienic version of our iglidur PRT slewing ring bearing," says Rob Dumayne, drytech director at igus UK. "It is made of stainless steel and FDA-compliant wear resistant polymer and is designed in such a



way that it can be cleaned without residue and, importantly, without having to be removed from the machine. This eliminates the need for additional protective covers."

During the design and manufacture of the new bearing, igus engineers were guided by the European Hygienic Engineering and Design Group (EHEDG) guidelines. There are no 90° corners, welds and edges; all components of the slewing ring bearing are rounded.

www.igus.co.uk

Tel: 01604 677240



QUANTUM DRIVE SERVICE PARTNERSHIP DELIVERS AN 86% COST REDUCTION FOR MAINTENANCE DEPARTMENT YEAR ON YEAR

Did you know the average cost of one hours lost production in UK manufacturing is £15K?



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- Extends the life of your drive assets
- Unlimited calls and site visits
- Reduced overheads
- Minimise your VSD downtime
- Largest stock in UK

- Remote access options
- Exclusive discounts
- First visit, first fix guarantee

WHAT ARE MY OPTIONS?

At Quantum, we have two types of service contracts, OneCall and Total Contract. Our OneCall contract is reactive to any issue you may incur, whereas our Total Contract focuses on preventative maintenance whilst remaining reactive to any breakdowns you might have.

THE 'ONECALL' CONTRACT

With OneCall, will do everything possible to get you up and running in the event of a breakdown, offering fast, reliable on-site repair services at your facility. This enables you to minimise downtime by getting your out-of-service equipment up and running as quickly as possible, it offers the following:

- 24/7 direct telephone access to our fully qualified engineers
- Immediate 'engineer to site' request

- Our unique 'first visit first fix' guarantee
- All variable speed drives installed on your site covered under one contract regardless of make, type and power rating
- Access to the UK's largest stock of variable speed drives, spares and hire units
- Unlimited calls and site visits
- Official service partner to major manufacturers

THE TOTAL CONTRACT

The Quantum Total Contract aims to do everything possible to prevent breakdowns, it includes all the features from the 'One Call' Contract and the following:

- Includes onsite maintenance days
- Recommended maintenance and life cycle extension reports
- Online Drive Asset Management System (DAMS) access
- Quarterly contract reviews
- Your own dedicated Account Manager
- Resilience reports
- Recommendation reports

OUR SERVICE PARTNERSHIP HAS REDUCED OUR YEAR-ON-YEAR SPENDING BY 86%

SIE Industrial are a UK abrasive specialist with over 100 rental machines in their UK Fleet. Each rental machine has a variable speed drive fitted. The rental machines are supplied through the UK and need regular maintenance to ensure continuous failure free operation.

Prior to their Drives Service Partnership with Quantum, SIE experienced regular drive failures on their machines, this proved costly for both SIE and their customers in addition to negatively impacting their previously untarnished reputation. Gareth Bowen, Managing Director felt there had to be a better way of improving efficiency and reliability to his customers.

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OPENING THE DOOR TO PRODUCTIVITY

A renowned door manufacturer has seen a threefold increase in its productivity, thanks to its latest collaboration with Mitsubishi Electric, headed up by Michael Cafferkey

PROFILE DEVELOPMENTS, manufacturer of the Palladio Collection of premier composite doors for external applications, has been delivering durable, safe and stylish products to customers in Ireland and the UK for decades. The company's manufacturing site in Glin already had a number of Mitsubishi Electric's automation components installed across the facility ensuring availability and efficiency, including for its door press application line. Therefore, when the company wanted to build a new panel gluing unit to ramp up productivity, the selection of a suitable automation vendor was straightforward.

Michael Cafferkey, automation engineer at Mitsubishi Electric, visited the plant and discussed what new technologies were available, providing an insight into the components that would be best suited to deliver a comprehensive solution that would address Profile Developments needs.

In effect, the production of a door involves multiple components that are layered together at separate stages. More precisely, monocoque models from the Palladio Door Collection require the two fibreglass-reinforced door outer skins to be glued, joined and pressed together.

MAKING AN ENTRANCE

Similar to the existing setup, the new line was developed along a conveyor, which moves the doors through different stages. The products are sent to a glue machine, an assembling station where the frames are added and a roller press. With each part of the conveyor system powered by a motor, the speed of which has to be controlled by an inverter, a total of 19 drives were required to complete this project. To deliver the high level of accuracy needed for this application, Mitsubishi Electric's FR-E series was selected for the unit.

Cafferkey explains: "It is really important that the movement of the conveyor is controlled accurately so that a door doesn't miss a stage or spends the wrong amount of time in any production process. For example, the duration of the gluing and pressing processes has to be incredibly precise to ensure quality. The FR-E inverter range is ideal to address these exacting needs, as it offers advanced motor performance, precise control and

high levels of reliability. It also features a compact design, which can be beneficial when many units have to fit onto a single production line.

To control the 19 VSDs, Profile Developments selected Mitsubishi Electric's iQ-R series PLC, which comes with in-built CC-Link IE Field Basic network protocol as standard, allowing quick and easy communications with all VSDs.

In addition, the controller sends key information to an intuitive and user-friendly GT2510 widescreen HMI to maximise process visibility and accessibility. In effect, it helps operators monitor and interact with the drives, enabling adjustments to their speed when needed, helping to identify anomalies and interpret alarms as well as provide logs of production data.

To ensure compatibility and seamless data transfer, Mitsubishi Electric integrated with an existing third party remote I/O station, leveraging its products' ability to comply with different communications protocols and communicate easily over EtherNet/IP.

LINE SET-UP

Mitsubishi Electric played a key role in implementing, integrating and assisting in the setup of the new production line, in particular by supporting the PLC programming activities.

The entire project was completed without incurring any downtime and, with the new line processing up to 12 doors per hour, Profile Developments has tripled its throughput. In effect, the plant in Glin can now produce 20-24 units every hour. Uptime has also improved, as the HMI helps users to be more

proactive, in line with smart manufacturing frameworks.

Cafferkey concludes: "We highly value long-term relationship with customers, such as Profile Developments, and strive to help them continuously advance and futureproof their operations by leveraging the latest innovations in automation. The new system that has been developed is driving the competitiveness of Profile Developments while also being scalable, ensuring that it can support the future needs and ambitions of the company." ■

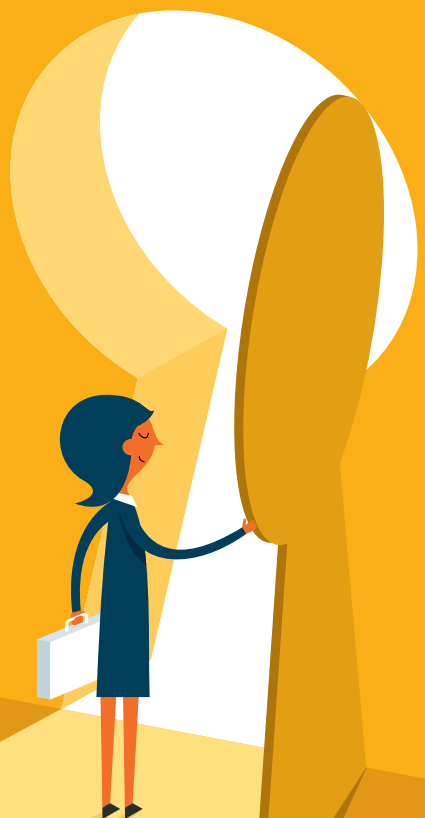
Michael Cafferkey, Automation Engineer

Tel: 01707 288780

THE DURATION OF THE GLUING AND PRESSING PROCESSES HAS TO BE INCREDIBLY PRECISE

KEY POINTS

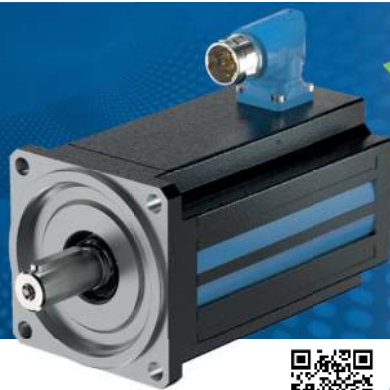
- When Profile Developments wanted to build a new panel gluing unit to ramp up productivity, it turned to Mitsubishi Electric for a solution
- With each part of the conveyor system powered by a motor, a total of 19 drives were required to complete the system
- To deliver the high level of accuracy needed for this application, Mitsubishi Electric's FR-E series was selected for the unit





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NORD
DRIVESYSTEMS



DRIVE SYSTEM COMBINATION

International machine manufacturer, Ravni Technologies, has specified a complete drive system from Stober for a machine that straightens, cuts and deburrs thin tubes

THE COMBINATION of planetary, helical bevel and offset helical gear units, along with Stober's servo and lean motors of the EZ and LM series, has enabled Ravni to benefit from robust precision components that can be installed in tight spaces and reduce manufacturing costs. Stober has also supplied compact drive controllers that can control both simple and complex axes.

The unique Ravni system with the Stober drive, straightens, cuts and deburrs thin tubes used in refrigeration and is in operation at one of the World's largest copper companies in New York, and is the only one on the market that can cut up to 100 of these thin tubes per minute and deburr them at the same time.

To increase performance, the machine manufacturer wanted the drive technology for this system to come from a single source, which is why it turned to Stober at the design phase. Modern manufacturing requirements place high demands on the motors used – both with and without gear units – and as the system requires a total of 18 driven axes, loads on the motors vary widely.

COST SAVINGS AND ENERGY EFFICIENCY

The starting material is wound on a spool. The spool, weighing about 2.5 tons, is located on a winding station that unrolls the copper tube and feeds it to the next station, using a control system to ensure that no tension is created during the process. The Stober lean motor from the LM series was

specified to do this.

To obtain a perfectly straight tube, the machine has horizontal and vertical straightening rollers and helical bevel geared motors, with helical gearing ensuring that the system transports the material precisely.

The Stober components feature an impressively high-power density and gear efficiency of 97%. They are dynamic, lightweight and extremely compact owing to the angular transmission. This means they also fit perfectly into very tight installation spaces, as required in this application.

An encoder installed on the straightening line records the exact position of the tube, the information being transmitted directly to the downstream flying saw, comprising three saws arranged in parallel.

To separate the material, the system pushes it forward and positions it accurately to the nearest hundredth, using Stober EZ series synchronous servo motors for this task. The synchronous servo motors are extremely compact and offer maximum torque, high dynamics and low torque ripple. They have a mechanically robust design and are extremely reliable in demanding applications.

COMPACT WITH THE SENSORLESS LEAN MOTOR

Finished tube sections are stacked to the left or right of the conveyor line, a task that needs precise movement and a robust, compact drive design. The lean motor fulfils both these

requirements as it can be used at high temperatures and its windings can withstand up to 155°C.

Speed and torque can be controlled infinitely from a stalled position to maximum speed with full torque control – and the lean motor operates completely without encoder or sensor.

This means that only a single-shielded standard power cable is required, which reduces installation effort considerably. And because neither sensors nor fans are installed, it is also significantly more robust. With an efficiency of up to 96%, this series achieves energy efficiency class IE5.

Costs are reduced further by using multi-axis SI6 drive controllers that reduce the space required in the control cabinet. These drive controllers are suitable for high-efficiency multi-axis applications, among others, and at a slim 45mm, the highly dynamic drive component works inconspicuously and reliably in the background, even during demanding movements.

STO (Safe Torque Off) and SS1 (Safe Stop 1) functions are integrated in the SI6 series, being certified for PL e, cat. 4 in accordance with EN 13849-1 and can be used without function tests that interrupt production. A single



drive controller can control up to two axes.

Quick DC-Link modules connect the individual devices with each other and with the PS6 central supply module quickly and easily. This highly dynamic series achieves short recovery times with fast set value changes and load jumps. ■

Tel: 01543 458858

THE LEAN MOTOR OPERATES COMPLETELY WITHOUT ENCODER OR SENSOR.



KEY POINTS

- When Ravni needed drive technology for a unique system to straighten, cut and deburr tubing, Stober provided the solution
- The Stober components are dynamic, lightweight and extremely compact thanks to angular transmission
- Speed and torque can be controlled infinitely from a stalled position to maximum speed with full torque control

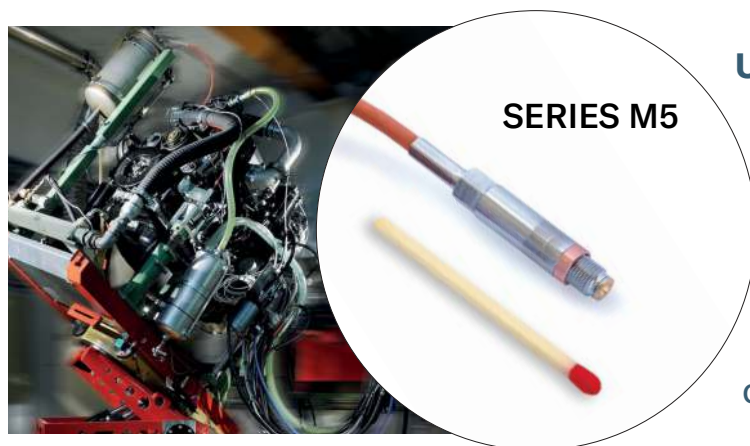
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www.invertekdrives.com/cooler-planet



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FIELD TEST GENERATOR SETS

MENZEL ELEKTROMOTOREN supplies complete rotary converter sets for test fields, with motors and generators from its own production, frequency converters, transformers, all accessories, controls and software

programmed in-house. The German manufacturer, which specialises in large machines, does all the calculations for the individually required performance profile as well as optional inspection and

acceptance as a complete system. This service covers capacities up to 20MVA and voltages up to 13.8kV.

The latest project is a 7.5MVA generator set for a transformer test stand. The system weighing a total of 60 tons is currently being shipped to Egypt where Menzel will see through its commission. It was important to the customer that Menzel especially configured the rotary converter set for this application and supplied it completely from a single source.

The 7.5MVA synchronous generator and the 2.3MW squirrel-cage motor are Menzel products featuring high efficiency and robustness. The frequency converters and transformers come from reliable partner companies and the control cabinets are supplied by Pawils Elektromaschinenbau, a member of

Tel: +49 30 349 9220

HELPS BUILD HIGHER EFFICIENCY DRIVES

VARIABLE SPEED drives already offer users substantial power savings, as they reduce the power input when driving motors at less than the maximum rated load.

Drive manufacturers are improving the performance of their devices still further by introducing faster switching capabilities. One such company is KEB Automation, which is using Yokogawa's WT5000 Precision Power analyser to develop the latest generation of frequency converters for variable speed drives, ensuring they meet the latest EU energy efficiency regulations.

The company's latest challenge is to meet the requirements of the EU's Ecodesign Directive, which



introduces tough new regulations governing the energy efficiency of drives and automation equipment.

Following a rigorous comparison with other products, KEB selected the Yokogawa WT5000. Analysis of its performance showed KEB

engineers that the currents due to common mode noise were at an extremely low level, outperforming KEB's previous analyser, which was also a Yokogawa product.

www.yokogawa.com
Tel: +31 (0) 88 464 1803

SERVO DRIVES HELP PROTECT CASTORS

YASKAWA'S SIGMA-7 series servo-drives and a SLIO-series controller have played a key role in the development of an automated system specifically designed to fit protective plastic caps onto office chair castors at Gross+Froelich.

The castors consist of two wheels with a protective cap pressed onto each – a process which is now performed automatically at speed, enabled in part by three of the pneumatic drives installed in the machine being replaced with more dynamic Yaskawa Sigma-7 series electrical servo drives.



Yaskawa's Sigma-7 series was already proven in many similar applications and impressed Aramis, the machine builder. Features such as rapid commissioning, high production capacity and maximum operational reliability, in addition to the responsiveness of the AC motors, were the key factors. Compact dimensions and quiet operation were also important.

www.yaskawa.co.uk
Tel: 0330 678 1990

OPPORTUNITIES TO DOUBLE EFFICIENCY

LEADING PAN-European distributor of industrial products and services, Rubix has released a new 'Quick wins to cut energy waste' report, which addresses inefficiency issues in motor-driven systems.

Rubix' 'Quick wins to cut energy waste' report sets out opportunities for efficiency improvement across the system. These include retrofitting variable speed drives to existing motors to ensure they only use as much energy as they need for the job they are doing. Using the correct motor size for the application, switching to energy efficient models and correctly regulating their speed will also increase efficiency.

When it comes to mechanical equipment, specifically gearboxes,

MOTOR DRIVER DESIGN ENHANCED

BASED ON **Oriental Motor's** BLV series, the LV-R series of BLDC motors and drivers offers improved positional feedback, DC voltage range, STO (safe torque off) ability, speed range and speed stability. It is also engineered to be smaller and to have lower power consumption.

The BLV-R series is specifically designed for the automated guided vehicles (AGVs) market and other new and emerging applications. Gearhead options are a parallel shaft or hollow shaft and gear ratios range between 5:1 to 200:1 to deliver a wide range of output speed and torque options.

Operation speed can be as low as 1r/min. Output power for the BLV-R series is 60W, 100W or 200-400W, depending on the variant and torque from 0.43 to 108Nm, depending on the motor and gearhead combination. Usable voltage range is 15VDC to 55VDC, and speed control range is 1:4000rpm, enabling a range of voltage changes.

www.oriental-motor.co.uk
Tel: 01256 347090



these can be made more efficient, reducing lost energy, by right-sizing the gearing for the application, replacing worn gearboxes and using energy-efficient lubricants.

Driven applications can be improved by fixing leaks in compressed air systems, using intelligent pumps with variable speed controls and replacing worn pulleys.

www.rubix.com
Tel: 020 7009 7000





ACCURACY BAKED IN

An industrial bakery has increased product quality and reduced production costs after installing high accuracy ball valves, as Kieran Bennett outlines



AT A large industrial bakery in the UK that produces a wide variety of products, the plant's liquid improvement system demands accurate doses of additives into dough mixtures. These additives are essential for the baking process, and impact attributes such as taste and shelf life. The liquid additives include water, vinegar and oil, as well as ingredients suspended in liquid solutions, such as yeast.

Accurate dosing is a vital aspect of industrial baking, and imprecise levels of ingredients can impact product quality, including taste, form and shelf life. Moreover, this reduces efficiency with a higher level of inferior product and wastage. The unnecessary addition of expensive ingredients also increases the cost of production.

INACCURATE DOSING

The bakery works with 500kg batches of dough, while adding ingredient quantities as little as 100g. As a result, an error of just 3-4g can significantly impact the

end product. The bakery was equipped with an automated system, but it was providing insufficient accuracy. The primary cause being angle seat valves that generated excessive dosing volume as well as variability, creating inconsistent dosing. As a result, the bakery and its engineering partner turned to Bürkert to upgrade the valve system.

The engineering team integrated its PLC-based system with a suite of Bürkert electromotive ball valves with high-speed actuators in ½" and 1" dimensions. Various spring combinations were tested with the fast acting, rapid-closing valves before the optimum shut-off rate was achieved.

The result was vastly improved flow regulation, enhancing the speed, accuracy and consistency of dosing control. For the bakery, this meant an increase in product quality and a reduction in production costs.

The primary challenge in establishing dosing accuracy came from the type of valves originally

installed. Angle seat valves were previously specified but they didn't provide sufficiently fast or consistent closure rates to ensure flow control accuracy.

The valves' seats had also deteriorated over time and changed their form, which meant an inconsistent flow rate that was exacerbated under high flow conditions. A previous attempt by the plant's engineering team to improve accuracy by installing stroke limiters to restrict the valves' orifice sizes was insufficient to resolve the issue.

Analysing the situation, Bürkert advised that integrating a ball valve and actuator combination would achieve a significant increase in dosing accuracy. The valve's fast-closing action could provide high-speed control over the inflight allowance, with rates of accuracy lower than $\pm 1g$ from a 100g ingredient dose.

REPEATABLE PERFORMANCE

Predictability of the valve closure rate is an important factor for dosing consistency, but it had to be matched with an impermeable barrier. Seepage when the valve is closed also impacts dosing accuracy. However, Bürkert's ball valves were also specified as they provide optimum sealing, preventing any penetration even against the most aggressive solutions found in the process.

A secondary benefit of the valves' fast closure rates is that if the system experiences a shutdown due to an unexpected power

loss, the closure rate is extremely rapid. This secures the media and prevents unwanted excess flow.

Within the bakery, orifice plates have also been installed to restrict flow to specified areas. These restrictors aid control accuracy, stabilising flow and reducing variation. Combined with the new valves, hammer effect has also been removed, contributing to a reliable and robust installation.

Crucially for the bakery, high accuracy valve control has not only decreased the cost of production, but product quality has also been optimised. This has increased value for supermarkets and retailers, and ultimately, has improved satisfaction for consumers. ■

Kieran Bennett is industry account manager, food and

01285 648720

KEY POINTS

- Accurate dosing is vital aspect in industrial baking; imprecise levels of ingredients can impact taste, form and shelf life
- Bürkert advised that integrating a ball valve and actuator combination would achieve a significant increase in dosing accuracy
- The ball valves specified also provide optimum sealing, even against the most aggressive solutions





ACTUATORS IMPROVE RELIABILITY

THIRTY THREE 33 **Rotork** ROMpak electric actuators have been installed at a Sisecam glass factory in Turkey, allowing for efficient combustion and reduction of emissions.

The ROMpak units replaced existing under-performing actuators to operate butterfly valves, controlling the flow of hot air at the heart of the glass manufacturing process.

ROMpak actuators offer quiet and reliable operation for smaller ball and butterfly valves. They have a continuous position indicator that is always available and can work in an ambient temperature of up to +70° C (158° F). Importantly in a glass application, they are watertight and dust-proof to IP68 10m for 100 hours.

www.rotork.com/en
Tel: 01225 733200



VARIABLE SPEED ACTUATORS OPEN NEW APPLICATION OPPORTUNITIES

VALVE ACTUATORS are often misconceived as relatively simple devices that perform a straightforward function. There are, however, significant opportunities and substantial savings available to the control engineer through the smart deployment of actuator technologies.

A variable speed actuator, such as the **AUMA SIPOS SEVEN**, gives the control engineer the opportunity to specify the speed of actuation at different points in the cycle. The usual way that this is employed is to move the valve quickly through

the majority of its cycle, slowing it down as it nears the close position, alleviating water hammer problems and extending the life of the valve seat. For emergency situations a 'fast close' speed can be specified.

AUMA's SIPOS SEVEN also has a multiple speed/set point capability. This can be used to provide near linear performance from low cost non-linear valves. A further interesting benefit of a variable speed system with a clever built-in inverter, like SIPOS SEVEN, is that it provides high start-up torque without peak start-up current and low overall



power. What that means in practice is that cables, even on long runs, can be specified for the nominal currents and remote, even solar powered applications become possible.

Tel: 01275 871141

VIRTUALISED PROTECTION AND CONTROL SOLUTION

ABB is launching what is reported to be the first virtualised protection and control solution – Smart Substation Control and Protection SSC600 SW. The virtualised product enables customers to use the hardware of their choice and gain access to the same proven protection and control functionality as with ABB's turnkey solution.

SSC600 SW is the virtualised version of the Smart Substation Control and Protection SS600 device. In 2018, ABB introduced this revolutionary approach to protection

and control (P&C) in distribution networks, where all the P&C functionality is centralised into one single device. One SSC600 device can handle the tasks of 30 protection relays. Centralising this functionality



in the substation reduces network complexity and supports optimal, lifelong asset management and up to 15% savings in substation life cycle costs.

Customers can now choose SSC600 SW and are no longer tied to specific hardware allowing them to optimise their IT infrastructure. With many systems accommodated on one platform, they can reduce the number and type of devices and hardware in substations.

global.abb/group/en
Tel: +41 43 317 71 11

BRIDGING THE PERFORMANCE GAP

LEADING PROVIDER of linear motion control solutions, **Thomson** has introduced a high-capacity, high-performance electric linear actuator that bridges the performance gap between electric and hydraulic actuators for loads up to 25kN.

Among the many new features of the Thomson Electrak XD linear actuator are load handling up to 25,000N, depending on configuration, for a combined power output of more than 450W. The Electrak XD can also achieve operating speeds of up to 75mm/sec (3 in/sec), and duty cycles up to 100%.

"Machine designers who are looking to eliminate messy, space-consuming hydraulic systems, while also adding high controllability,



can now do so for an expanded set of material handling and factory automation applications," said Håkan Persson, global product line director – linear actuators at Thomson.

"Compared to our previous offerings, the new Electrak XD actuators more than quadruple the load handling and speed, while delivering other benefits that would have previously required hydraulic systems or purchase of ultra-high-precision electric actuators."

Electrak XD linear actuators offer a high-power, zero-maintenance alternative that is simpler, cleaner and more controllable than hydraulic alternatives.

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GEARBOX SOLUTIONS ON THE ROAD

APEX DYNAMICS is taking its innovative solution to tackling customers' motion control problems, The Gearbus, on the road around the UK this year. The servo gearbox technologies specialist noticed declining attendance at exhibitions and was concerned it wasn't reaching all potential customers.

Putting the dynamic into Apex Dynamics, The Gearbus was born out of an idea for a convenient demo facility that could go directly to customers, and it's now out

and about taking problem solving straight to them.

Solving control challenges in-situ means solutions can be tailored to customers onsite without taking much time out of their day – they can hop aboard The Gearbus for just 10 minutes or for 30 minutes or more. Visits are pre-booked and planned so customers get the best opportunity to identify the right motion control solutions for their needs.

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BE ON GUARD FOR COBOT SAFETY

While robots designed for use in collaborative applications offer exciting possibilities for industry, they are not without particular safety considerations. Stewart Robinson looks at the relevant legislation



ISO 8373 DEFINES an industrial robot as: "An automatically controlled, reprogrammable, multi-purpose manipulator programmable in three or more axes, which may be either fixed in place or mobile for use in industrial automation applications." Robots are now being specifically designed to work alongside humans in a 'collaborative workspace', so they can perform tasks simultaneously with the robot often operating in the human-occupied workspace without safety guarding.

However, not all 'collaborative robots' are guard-free, depending on their function and related safety

requirements. Besides the robot itself, the collaborative application will include an 'end effector', that is the tool adapted on the robot arm with which the robot performs tasks, and the objects moved by it. In tandem with this new way of working, there of course comes new safety concerns.

As well as manufacturing, there are many other sectors where collaborative applications deliver distinct advantages, including:

- Medical (where robots are used during various medical procedures including surgery)
- Healthcare (where robots perform tasks such as assistance with mobility)

- Service (both domestic and professional applications)
- Space (for example on the International Space Station)
- Defence (for example robots assisting in bomb disposal and wearable robots for enhanced mobility).

The increased need for adequate protection of people from the safety risks associated with industrial robot systems led to the development of EN ISO 10218:2011, an international and European standard which covers the safety requirements for industrial robots. The standard replaced the 2006 version, and is in two parts:

- EN ISO 10218-1:2011 Robots and robotic devices — Safety requirements for industrial robots — Part 1: Robots.
- EN ISO 10218-2:2011 Robots and robotic devices — Safety requirements for industrial robots — Part 2: Robot systems and integration.

In order to ensure that humans are not exposed to unacceptable risks when working collaboratively the current standards describe four separate measures that can be used to provide risk reduction. It is required that at least one of these is fulfilled, in addition to having visual indication that the robot is in collaborative operation.

STANDARDS DESCRIBE FOUR SEPARATE MEASURES THAT CAN BE USED TO PROVIDE RISK REDUCTION

The four measures are:

1 SAFETY-RATED MONITORED STOP

This measure requires that when it is detected that a human has entered the collaborative workspace, the robot shall be stopped. The stop condition shall then be maintained until the human leaves the workspace.

2 HAND GUIDING

In this mode the human can guide the robot at the end effector by hand. Additional requirements for safety include safe-limited speed monitoring, a local emergency stop, and the use of an enabling device, which is a three-position device that has to be held in the centre position.





3 SPEED AND SEPARATION MONITORING

In this mode, the robot must maintain a specified separation distance from the human and operate at a predetermined speed. This measure requires careful risk assessment and needs to take account of safety distances, which should include the consideration of approach speeds of parts of the human body as described in EN ISO 13855.

4 POWER AND FORCE LIMITING BY INHERENT DESIGN OR CONTROL

In this mode the power and force of the robot actuators need to be monitored by safety related control systems to ensure that they are within limits established by a risk assessment.

It is required that at least one of these requirements needs to be fulfilled, in addition to having visual indication that the robot is in collaborative operation. In all four of the measures described above, the safety-related control system that provides this functionality needs to meet either:

- Safety Performance Level d (PLd), with Category 3 architecture (the identified level to which the safety related parts of a control system resist faults and their subsequent behaviour if a fault occurs) as outlined within the standard EN ISO 13849
- Or
- Safety Integrity Level 2 (SIL 2) with hardware fault tolerance (HFT) 1, as set out in EN IEC 62061.

SAFETY FIRST

While EN ISO 10218 contains some guidance on collaborative applications, with the rapid pace of technological development, it was widely acknowledged that this guidance needed to be enhanced. Consequently, a Technical Specification (ISO/TS 15066 Robots and robotic devices — Safety requirements for industrial robots - Collaborative operation) was published in 2016.

ISO/TS 15066 covers:

- The design of the collaborative workspace
- The design of the collaborative operation
- Methods of collaborative working
- Changing between: Collaborative/non-collaborative; and different methods of collaboration
- Operator controls for different applications.

The methods of collaborative working 'speed and separation monitoring' and 'power and force limiting' are particularly elaborated on in ISO/TS 15066. This includes recommendations for 'biomechanical limits' of pain thresholds for specific parts of the human body.

There are also working groups of the standards organisations reviewing various aspects of human-machine interactions, which will also inform the development of future standards. For example the next version of ISO 10218-2 will almost certainly contain not only significant parts of ISO/TS 15066 but also guidance on the testing required to verify Power and Force Limiting (PFL). But for now, EN ISO 10218 Parts 1 and 2, and the ISO/TS 15066

specification defines the safety requirements for the sphere of collaborative robots, with the most relevant published guidance being contained in EN ISO 10218.

GUIDELINES FROM HSE

Published in 2012, a Health & Safety Executive (HSE) Research Report, (RR906) - Collision and injury criteria when working with collaborative robots, also offers some useful guidance.

The introduction to the HSE report states that "this study explored the safety, reliability and evidence for the force limits defined by the draft TS 15066, and of the methods for testing them. It also addressed whether the proposed approach in the draft TS 15066 is likely to adequately protect people from the risks. Risk assessment of potential collision scenarios, human reliability and behaviour issues, and equipment failure modes and rates are discussed, as is the adequacy of personal protective equipment against collision injuries."

The report identifies several areas that the HSE considers need more consideration within ISO/TS 15066. For example, it concludes that the psychological, behavioural and organisational aspects affecting the level of human-robot collision risk, along with the effects of human movement velocities, are not strongly represented in ISO/TS 15066. The HSE also points out that the frequency of injury is not included in the criteria for acceptable collision limits.

Robots designed for use in collaborative applications are now expanding the possibilities of automation and, as they are

IT IS VITAL THAT A COMPLETE RISK ASSESSMENT IS UNDERTAKEN BEFORE A COLLABORATIVE APPLICATION IS DEPLOYED

a core element of Industry 4.0, manufacturers are integrating greater numbers of such applications factory wide.

While the advent of collaborative applications offers exciting possibilities for industry, some end-effectors may create hazards, especially as contact between the collaborative robot and the operator can lead to the possibility of collision. It is therefore vital that a complete risk assessment is undertaken before a collaborative application is deployed, as you would with any machinery in the workplace. This must cover the intended use of the robot, as well as any reasonably foreseeable misuse, with the basis for this risk assessment being EN ISO 12100, in order to provide a presumption of conformity with the Machinery Directive in the European Union and the Supply of Machinery (Safety) Regulations 2008 in the UK. ■

Stewart Robinson is principal engineer and functional safety

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KEY POINTS

- Not all collaborative robots are guard-free, depending on their function and related safety requirements
- EN ISO 10218:2011 is an international and European standard covering the safety requirements for industrial robots
- HSE Research Report (RR906) Collision and injury criteria when working with collaborative robots offers useful guidance





ADVANTAGES OF OPTICAL SENSORS IN CMMs

Modern optical sensors such as laser triangulation sensors, laser scanners and confocal sensors are particularly suitable for use in coordinate measuring machines, says Glenn Wedgbrow



USED FOR high precision quality and parts inspection, coordinate measuring machines (CMMs) detect the geometrical properties of workpieces in detail. For many years, measuring systems were equipped with tactile sensors, but these are increasingly being replaced by optical sensors. Optical sensors offer numerous advantages over tactile measurement technology. Laser triangulation sensors, laser scanners and confocal chromatic sensors measure the target without making contact and as such do not have any influence on the measuring object. The measurements are performed with micrometer accuracy, normally faster than contact methods.

Micro-Epsilon offers a broad sensor portfolio that is proven in numerous measuring machines. The sensors are used in various systems for both measurement and precise positioning.

FINE POSITIONING

For positioning of the measuring head, optoNCDT 1900 laser triangulation sensors measure the distance to the target or baseplate. This allows the CMM's geometry data acquisition systems to be aligned with maximum precision.

The laser sensors are integrated into the measuring head system, which is typically attached to the vertical z-axis – the quill. The laser sensor delivers maximum signal stability and due to its compact design, is easy to integrate. The lightweight, robust laser sensor makes it ideal for measurements with high accelerations. The sensor operates at measuring rates of up to 10 kHz and offers a linearity of $\pm 1 \mu\text{m}$ and a repeatability of 0.1 μm . The measurements can be started via the encoder pulse of the CMM, thus achieving absolute time-synchronous values.

In terms of resolution and measuring rate, confocal chromatic sensors are among the most powerful measuring systems in optical metrology. For example, they are used for high-resolution distance measurement on various surfaces and for roughness measurement. The confocal sensor systems from Micro-Epsilon combine state-of-the-art technology and easy integration. The sensors allow a tilt angle of up to $\pm 30^\circ$ and offer a high numerical aperture. This enables high resolution and small light spots. Curved and structured surfaces can therefore be detected precisely and reliably. In this way, gears or external threads can also be detected. Due to the

non-contact measuring principle, the sensor does not affect the target object, which enables wear-free measurements.

3D MEASUREMENT

scanCONTROL 3D laser scanners from Micro-Epsilon scan large measurement areas at high resolution and are ideal for use in CMMs due to the low sensor weight. Data acquisition measuring rates are up to 10kHz. As a result, a complete 3D point cloud is available, which allows precise evaluation, quality inspection as well as further processing. The scanCONTROL laser scanners are based on the latest GigE Vision and GenICam standards and can therefore be integrated in a wide range of image processing environments.

Among other things, laser scanners are used for prototype scanning, with the sensor being guided by a robot arm or integrated in a measuring table.

The scanner measures the component while being moved over the component from all sides, providing a 360° image. To enable high-precision measurements, the measurement data must be perfectly synchronised with the measurement position. Conventional sensors are often triggered externally and detect the profile with a time delay that causes inaccurate position data. The scanCONTROL laser scanners from Micro-Epsilon, on the other hand, offer a special CMM trigger for this purpose. This is a parameter output optimised for CMMs. The sensor can therefore send trigger pulses in the middle of the exposure time and thus assign the profile to an exact measuring position. ■

Glenn Wedgbrow is business development manager at Micro-

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KEY POINTS

- Optical sensors are extremely flexible; they measure distance, dimensions, position, angles, shape, roughness and even 3D profiles
- Laser triangulation sensors, laser scanners and confocal chromatic sensors measure the target without making contact
- Measurements are performed with micrometer accuracy and are normally faster than contact measurement methods



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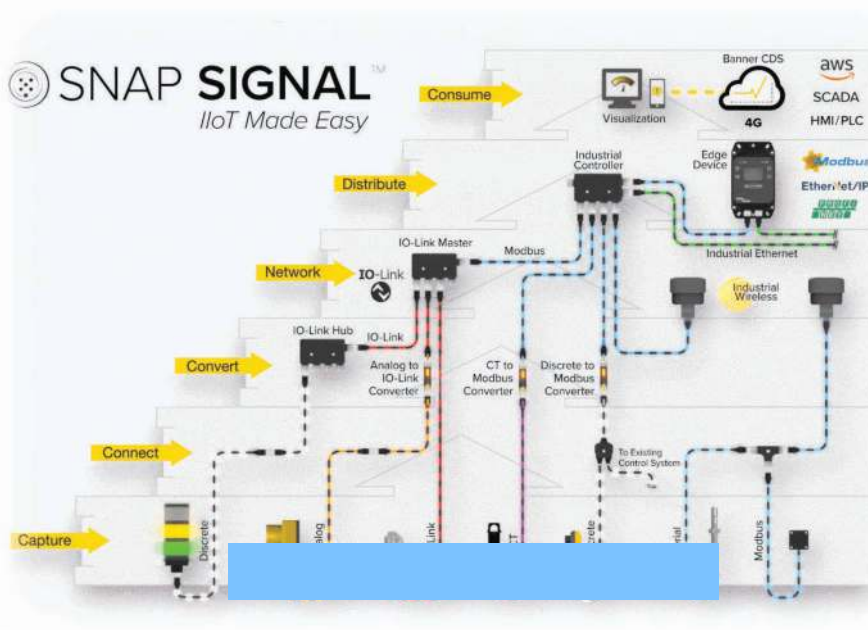
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GET A GRIP ON PALLETISING

AS A Robotiq Expert Partner, Robotiq's new PowerPick gripper and Multipick software feature enable RARUK Automation to

meet the needs of UK businesses with higher payload and throughput palletising requirements.

PowerPick is a gripper designed for robust tasks, capable of lifting 11.5kg on a Universal Robots UR10e collaborative robot, while the Multipick software feature unlocks higher throughput at the end of the line and enables a UR cobot to pick up multiple boxes at the same time.

Combining PowerPick and Multipick can help businesses speed up production lines. For instance, users could install four PowerPick grippers onto the end of a robot arm and each gripper would be capable of lifting two small, equal payload boxes. As a result, it would be able to pick up eight boxes at once.

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WITH THE new VSE9xx diagnostic modules from **ifm electronic**, vibration monitoring and analysis can be carried out directly in the field, eliminating the need to route signals from accelerometers back to the control panel.

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Modules in the VSE9xx range accept inputs from up to four acceleration sensors, and also have two auxiliary inputs – one pulse, one analogue – which can be used to collect additional information related to condition monitoring, such as speed and temperature. They can accept accelerometer inputs covering the frequency range of 0 to 12 kHz, with a sampling rate of 100 kHz.

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ENABLING REAL-TIME COLLABORATION

ABB HAS enhanced its industry-leading RobotStudio robot programming and simulation software with cloud-enabled functionality. The new RobotStudio Cloud enables individuals and teams to collaborate in real-time on robot cell designs from anywhere in

the world, on any device. New features such as automatic version control increase transparency and productivity across teams. The software's simplified interfaces and intuitive navigation allow users of all skill levels to work on robotic projects.

New features in RobotStudio Cloud include version control, which allows users to keep track of changes and have full transparency of any amendments. With complete knowledge of who edited the program and when, developers can cut the time needed to resolve errors and performance issues.

Incorporating RobotStudio's cloud-based virtual controllers, developers have a rapid and powerful robot simulation tool to tune and test programs. By producing an exact digital twin, the virtual controllers give developers complete confidence that – once installed in the real world – the robot will move as precisely as in the simulation. This allows for the fine-tuning and optimisation that can help minimise waste or problems when production begins.

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INTERNATIONAL SUPPLY chain solutions provider **TouchPath** is launching the latest version of its 'Touch WMS' warehouse management system, for which it is claiming a number of industry firsts centred on performance optimisation. Advanced, drag and drop load planning now ensures that pallets are loaded onto a trailer in the correct sequence to match the relevant load plan, avoiding costly incorrect loading.

The Touch WMS 'power picking command centre' is now highly

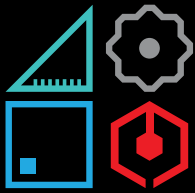


granular, allowing individual picks to be assigned to an individual picker, tracking their progress in real time. Users can now also include three unique KPI performance screens of their choice with their Touch WMS system, to optimise the tracking and measurement of their priority warehouse processes.

Touch WMS can now be integrated with a number of leading ERP systems including Microsoft Dynamics 365 Business Central, Microsoft Dynamics GP and Microsoft Dynamics Nav; Infors LX and M3; SAP; and Oracle.

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NAVIGATING HAZARDOUS AREA SAFETY REQUIREMENTS

Peter Rawlinson looks at the key requirements concerning hazardous environments, what they cover and how they relate to each other

WHERE SAFETY and compliance in hazardous environments are concerned, there are a lot of acronyms relating to standards, directives, and regulations. To those unfamiliar with how the whole legislative landscape operates, it can easily and quickly become confusing.

Before we get into specifics, it might be helpful to outline how different types of requirements compare briefly.

- A **Standard** is a technical specification covering aspects such as dimensions, capacity, ratings etc. It is not a legal requirement but is widely considered best practice.

- A **Regulation** in EU terms is a piece of law universally applicable to all EU member states.

- An **EU Directive** is a legislative act outlining objectives

that all EU member states must translate into their national legislation.

- A **Statutory Instrument** is similar to an EU Directive and is the principal form in which delegated legislation is made in Great Britain.

- **Certification** is the process of certifying that products, processes and people pass performance and quality assurance tests outlined in relevant standards and legislation.

COMPLIANCE IN HAZARDOUS AREAS

The first acronym we will look at is IECEx, (International Electrotechnical Commission System for Certification to Standards Relating to Equipment for Use in Explosive Atmospheres). This aims to 'facilitate international trade in equipment and services for use in explosive atmospheres,

IECEx IS THE STARTING POINT THAT ENABLES THE EASE OF GAINING ATEX AND NOW UKEX

while maintaining the required level of safety'. The IECEx system started as a product certification scheme but has since expanded to cover personnel certification offering competence training for people working in explosive atmospheres.

IECEx has a broad global reach and is sometimes referred to as a passport scheme in so far as it is accepted by many countries prima facie, while some may accept it but require signing up to a local scheme. Indeed, the IEC scheme is the starting point for the development of the standards for EX equipment, and use.

Because of its international scope, the Ex Repair training

offered by the Association of Electrical and Mechanical Trades (AEMT) follows unit Ex 005 of the IECEx Recognised Training Provider Programme (RTPP), which focuses on the BS EN IEC 60079-19 standard on repair, overhaul and reclamation of Ex equipment, alongside the BS EN IEC 60034-23 standard "Rotating electrical machines - Part 23: Repair, overhaul and reclamation".

The ATEX directives are two EU directives describing the minimum safety requirements for workplaces and equipment used in explosive atmospheres, which must be applied in law by EU member states. There are, in fact, two directives. The ATEX 'equipment' Directive 2014/34/EU covers equipment and protective systems being used in potentially explosive areas. The ATEX 'workplace' Directive 1999/92/EC covers the minimum health and safety measures that need to be in place to protect people working in hazardous areas.

UKEX is a UK Statutory Instrument. This is a direct transposition of the ATEX equipment directive into UK

KEY POINTS

- The IECEx system started as a product certification scheme but has since expanded to cover personnel certification
- Ex repair training offered by the AEMT follows unit Ex 005 of the IECEx Recognised Training Provider Programme (RTPP)
- It is unlikely that there will be a divergence between UKEX and ATEX despite the pending Brexit Bill and its impact on UK legislation





law under the new post-Brexit regime. This is driven in the UK by the UKEX AB (Authorised Body) group. The members of this group are also ATEX and IECEx certification bodies. It is in their interest for there to be ongoing alignment between the directives, and so it is unlikely that there will be a divergence between UKEX and ATEX despite the pending Brexit Bill and its impact on UK legislation.

DSEAR is also a UK Statutory Instrument and is a direct transposition of the ATEX workplace Directive into UK law. However, it also covers the requirements of the Chemical Agents Directive.

So, in essence, as far as regulation of hazardous area equipment and environments is concerned, IECEx is the starting point that enables the ease of gaining ATEX and now UKEX. As such, if IECEx is amended, the amendments will automatically be adopted by the ATEX Directive and UKEX regulations by means of the acceptance of such amendments being “state of the art” for explosion protection.

Finally, you may come across CSA, UL or FM certification. This is a broad system to ensure the safety of products used in North America, including Canada, whereby an OHSA or SCC-accredited Nationally Recognized Test Lab (NRTL) can certify that a product complies with specific North American

safety standards.

There are several standards which apply to hazardous areas under the North American system; for example, FM 3615, UL 1203, and CSA C22.2 No. 30 are the standards for Explosion-Proof Equipment, while UL 674 and CSA C22.2 No. 145 cover “Electric Motors and Generators for Use in Hazardous (Classified) Locations”. Some N American explosion protection standards are harmonised with the IEC, ATEX and UKEX systems, and others are not. In addition, the North American system follows a different environment classification system.

COMPETENCY IN HAZARDOUS AREAS (CompEx)

While not a mandated safety standard, CompEx, (Competency in Ex atmospheres) is an exam-based competency certification scheme set up in the aftermath of the Piper Alpha disaster. Developed initially for operatives in the oil and gas sector, the scheme now operates globally, covering all personnel operating in potentially explosive atmospheres. CompEx currently offers 13 qualifications spanning a range of roles and environments. ■

Peter Rawlinson is a safety compliance expert and

AEMT Lecturer

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ARE YOUR SAFETY ENGINEERING PRACTICES REALLY SAFE?

Hollie Dixon gives advice about how to recognise and deal with some of the most common 'trip-ups' in safety engineering

FACILITIES MUST be safe in accordance with applicable laws, but do we consider the effect management style and company culture can have in a workplace, shaping employees' attitudes and behaviour towards safety? With cost and productivity pressures affecting every organisation, many employees feel pressurised into finding 'shortcuts' to save seconds, such as overriding door interlocks with little consideration of the consequences.

Modern safety devices, including light-curtains and scanners, can reduce the need for physical guarding but need careful consideration as they do not prevent accidentally ejected parts or materials and do require periodic inspection and testing to ensure they are working correctly. Guidance can be found in the free-to-download HSE Guidebook HSG180.

ENGINEERING PRINCIPLES

Good engineering principles should be the starting point of any design or modification. However, many engineers don't know where to find information on what good principles are or aren't. The best place to start

is with the many national and international standards that detail an engineer's approach. An additional benefit is the presumption of conformity to the relevant legislation using designated or harmonised standards. Incorrect specification or selection of equipment is one of the biggest causes of failure/unreliability in the factory and consequences resulting from incorrect selection of a safety component could result in injury/death.

Specification Standards for safety related controls include BS EN ISO 14119-2013 and BS EN ISO 13849-1:2015. Safety interlocks are designed/installed to prevent unsafe operation/startup, e.g. when an operator requires access for cleaning. Not all interlocks are the same, e.g. the relevant standards wouldn't suggest a washing machine door switch for a power press access panel. For door locking, there are generally three methods:

- Energise-to-Lock (Open circuit principle)
- Energise-to-Unlock (Closed circuit principle)
- Bi-stable operation (Energise to lock and unlock).

Incorrect locking is often used in machinery with residual risk,

i.e. ramp-down times. Here, it would normally require an energise-to-unlock solution meaning if power is lost or the isolator switched off, doors will remain locked, preventing access to the hazard. This is documented

GOOD ENGINEERING PRINCIPLES SHOULD BE THE STARTING POINT OF ANY DESIGN



within EN14119-2013, although unfortunately often overlooked.

Another consideration where door locking is used is the protection of others. Could someone be locked inside a manufacturing cell unnoticed? Solutions could include devices with a clear escape release being adopted, like Euchner's CTA range of interlocks.

Interlock selection also needs careful consideration. Characteristics including operating environment, water ingress, door holding/retaining force, size, material, and electrical characteristics including coded or non-coded, solid state, electro-mechanical and RFID all make a difference to device performance and ease with which it can be overridden or manipulated.

PREVENTION OF DEVICE MANIPULATION

In safety engineering terms, manipulation refers to intentionally defeating a safeguard or related component by, for example:

- Removing/unscrewing components or actuator
- Using a second or incorrectly mounted actuator



- Bridging contacts

The machinery directive considers the prevention of manipulation at design level with the operating principle in 14119:2013, which specifies how to select the correct level of coding through the actuator arrangement. This helps designers remove potential frustrations or possible motivation to defeat the safety systems, leading to safer environments for operators.

We often see guarding systems overridden by removing the actuator from the door or flap therefore actuators should be positively mounted using rivets, positively fixed by welding, or use safety screws that can only be removed using special tools. Other safeguard measures should also be considered to reduce manipulation, including strategies like hold-to-run controls or reducing machine speed if access to the dangerous zone is required.

Another area of concern is with physical guarding itself, which is often seen as an afterthought and outsourced to a local fabricator to produce and who may not consider relevant standards when designing/manufacturing guarding.

Guarding has many unknown characteristics to the general fabricator, and these can be found in relevant standards including 14120:2015 or 13857:2019. For example, simple considerations like horizontal mesh sections should always be fitted inside the guard to prevent their use as a foot grip for climbing. The standards also specify the gaps around the guarding, an often-overlooked consideration. E.g. for most applications of perimeter guarding the gap should be no greater than 180mm. In many cases, this is too big, leaving potential access for human intervention. If you can roll a football through, it's too big!

ADEQUATE TRAINING

Anyone working with safety systems, from design concept through to maintaining safety related aspects, must be competent. But what makes them competent? Competency is defined within many of the guidance documents but essentially it is made up from experience, formal/informal training, and knowledge.

Engineers and designers also need to keep abreast of new technologies and legislation changes. A recent example is the transition from European requirements to local regulations, e.g. UKCA. Employers have a legal duty to undertake a suitable/sufficient risk-assessment and for organisations employing five or more people, this must be well-documented. It may be beneficial to include different departments to undertake assessments and include the operators and maintenance teams too, which will ensure future safety concepts will be adopted by all. ■

Hollie Dixon is business development manager at 

Tel: 0114 256 0123



KEY POINTS

- *Incorrect specification or selection of equipment is one of the biggest causes of failure/unreliability in the factory*
- *Safety interlocks are designed/installed to prevent unsafe operation/startup, e.g. when an operator requires access for cleaning*
- *Employers have a legal duty to undertake a suitable/sufficient risk-assessment and for organisations employing five or more people*

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DESIGNSPARK ENTERS NEXT PHASE

RS Group has launched of the next phase of its fast-growing online community for engineers, DesignSpark, offering a suite of design tools and resources

THE NEXT phase in the DesignSpark engineering community has been designed to present an enhanced and increasingly personalised experience for members. The new DesignSpark will offer three subscription levels, respectively called: 'DesignSpark Explorer', 'DesignSpark Creator' and 'DesignSpark Engineer', which will enable members to select their own level of access according to their requirements for design tools and resources.

DESIGNSPARK EXPLORER

Likely to suit students, makers, and designers, DesignSpark Explorer will enable members to retain the same community access and award-winning tools and design resources that they enjoy today – completely free – enabling them to quickly make the leap from concept to prototype.

Key tools available in DesignSpark Explorer include: DesignSpark PCB, the award-winning rapid-prototyping tool for circuit design that allows the creation of schematics, transfer to a PCB layout and preparation for production, all backed by pre-built component libraries and tools to ensure error-free PCBs; and DesignSpark Mechanical, a direct modeller that requires no prior experience with 3D CAD software and enables users to freely create and modify geometry. Excellent for prototyping and conveying requirements to the engineering team, DesignSpark Mechanical enables the rapid prototyping or reverse engineering of any physical object.

In addition to engineering support and public forums within the DesignSpark community, DesignSpark Explorer subscribers will continue to have access to more than 100 million 3D models



and 2D symbols for circuit design, and the ability to perform searches on one billion parts, accessing data sheets and part lifecycle status information.

DESIGNSPARK CREATOR

For users looking for even more advanced tools and resources, further DesignSpark options are now available featuring design tools with enhanced features. For example, and ideal for serious makers, pro-makers and SMEs, DesignSpark Creator, at a price of £9.99 per month, will offer the same tools and resources available in Explorer, but will also provide an enhanced version of DesignSpark Mechanical. This will include a 3D Mirror tool and detailing tools to annotate parts and create manufacturing drawings, and enhanced part libraries that provide further intelligence on component capabilities and status. In addition, there will be skills and learning videos, tutorials and tips contributed by experts from the DesignSpark community.

DESIGNSPARK ENGINEER

Additionally, DesignSpark Engineer, at a price of £14.99 per month, brings the ultimate in design creativity and flexibility for the most demanding users, making it ideal for professional-level design engineers. DesignSpark Engineer offers the same enhanced features of DesignSpark Mechanical available in DesignSpark Creator and expands significantly on DesignSpark PCB with a new advanced feature set, including the use of blind and buried vias for high-density PCB design, custom pad shapes, differential pair routing for high-speed signals, a panels editor, and hierarchical schematic block capability. As well as the high support levels

available in Creator, DesignSpark Engineer also provides even more parts intelligence data, including export compliance data and PCN/EOL notifications, plus aid with component alternatives.

The full suite of capabilities available to paying subscribers would be typically worth an estimated £1000. Through the subscription model, RS is now able to offer these at an entry price level equivalent to a Netflix subscription per month.

FREE TRIAL PERIOD

In addition, as part of the launch, RS is introducing a free trial period to allow all DesignSpark members to try out the 'Creator' and 'Engineer' subscription options with their more advanced and fully featured versions of the DesignSpark tools, enabling them to assess these additional capabilities before deciding which option will best suit their needs. The free trial period will run until 31 March 2023.

DesignSpark Explorer, Creator and Engineer – and access to the free trial – are available at rs-online.com/designspark/home, enabling members to discover for themselves which subscription can best meet their needs. The DesignSpark tools are supported by the DesignSpark software team and by the online DesignSpark engineering community, which now has 1.3 million members. ■

Tel: 03457 201201

KEY POINTS

- The new DesignSpark will offer three subscription levels enabling members to select their own level of access
- RS is introducing a free trial period to allow all DesignSpark members to try out 'Creator' and 'Engineer' subscription options
- Subscribers will continue to have access to more than 100 million 3D models and 2D symbols for circuit design



INDUCTIVE SENSORS WITH ROTATABLE HEAD

NEW FROM Carlo Gavazzi, the IRC40 range of sensors features a five position rotatable head for accurate and reliable detection of actuating parts in applications such as conveyor systems, materials handling, agriculture and escalators.

The IRC40 is offered in a 40x40mm rectangular housing



with IP69 enclosure rating protects against any water and moisture penetration during the washing cycle and provide an extended sensing distance up to 40mm, making it highly suited to conveyor systems. Operating temperature: -25 to +80°C (-13 to +176°F) provides a consistent and reliable operating performance.

The push unlock mounting system presents an easy and flexible installation whilst the LEDs on all four corners ensure excellent visibility from all directions providing status monitoring for diagnostic functions.

www.carlogavazzi.co.uk

Tel: 01276 854110



ADVANCED HMI ENCLOSURES

ROLEC'S ADVANCED HMI enclosures now include multiPANEL, profiPANEL and profiPANEL STANDARD – giving industrial electronics designers more choice.

Elegant multiPANEL is suited to small-volume applications requiring advanced functionality and cutting-edge aesthetics. Versatile profiPANEL is for higher-volume

applications, notably machine building. Both models enable virtually borderless, flush-fit installation of a front plate or glass. Aluminium profiles construction enables custom sizes from 150 x 150mm to 800 x 800mm.

Smart, modern multiPANEL (IP 65) is available in depths of 70mm and 85mm, each in three variants offering different rear doors. The front plate is connected permanently to the main body. Anodised silver profiPANEL (IP 65) enclosures offers more depths from 60 to 300mm.

An economical ex-stock option is profiPANEL STANDARD (IP 65) which is 60mm deep and available in four plan sizes from 400 x 400mm to 600 x 520mm.

www.rolec-enclosures.co.uk

Tel: 01489 583858

MACHINE STATUS REPORTING

DISTRIBUTED BY Switchtec, Sirena's Automax range of signalling towers is reported to be an essential component in the

production process, control, and industrial automation.

Commonly used to report the status of a machine or process



to operators, technicians, and production manager, they help increase in productivity and enable better management of machine failures.

The IP66 Automax signalling columns are available in 35, 50 and 70mm diameters, either round or elliptical in shape making them suitable for use across a range of applications – in particular large plants with the need for visible signalling from a distance and industrial areas where personnel work near machines or heavy industries.

The Automax offers further versatility thanks to the numerous mounting solutions, including wall brackets and extensions of different lengths and materials (TWS accessories). The latest multifunction LED technology allows different lighting effects, and there is also the option to add an acoustic signal. Modular and pre-assembled versions are

Tel: 01785 818600

CUTTING ENERGY CONSUMPTION IN COMPRESSED AIR SYSTEMS



FPS Air Compressors can provide a number of tips and initiatives to reduce the energy consumed by compressed air systems. In particular, the company offers the new NOBEL PM series of oil-injected rotary screw compressors, which feature IE4 permanent magnet motors, variable speed drives and an extended airflow range for the highest level of energy efficiency and quiet operation.

NOBEL PM models provide high maximum capacity figures: For example, the 22kW NOBEL 24 DVPM has an FAD performance delivering over 4500 l/min, which is almost 10% better than industry peers, claims the company.

The high efficiency levels combine with a direct transmission system featuring a flexible coupling that minimises component wear and reduces noise, and optimised controls in the form of the new and intuitive LOGIN multicolour touchscreen controller.

www.fps-compressors.co.uk

Tel: 01865 892620

SAFELY CONTROL AND BLOCK LASER BEAMS

LASER COMPONENTS offers a range of beam dumps from Kentek which are used wherever a laser beam must be blocked in a safe and controlled manner.

There are several aperture options including: ¼, 2 and 4in (the 4in version is the largest aperture currently available on the market). Power levels of up to 50W can be

controlled using the air-cooling method. These beam dumps can handle power levels from 1 to 1,000W and are suitable for both CW and pulsed lasers from UV to IR, they are available with or without a stand.

The beam dumps can be used to control any laser types and all laser wavelengths. They can be mounted

to walls or optical tables.

www.lasercomponents.com

Tel: +49 8142 2864 85





LASER WELDING TECHNOLOGIES FOR THE MEDICAL SECTOR



THANKS TO its power, flexibility, precision, and performance laser technology has been adopted across a wide range of medical sector applications. In particular, laser welding is now reported to be well established as the process of choice for many manufacturers.

Lasers are capable of precisely joining individual items to create a structural bond, or to generate a hermetic seal where required to

avoid leakage or ingress, and even extremely small parts can be welded with high levels of precision.

The ability to precisely control laser energy makes it possible to weld metals which have high melt temperatures or high thermal conductivity. In addition, materials that are otherwise difficult or impossible to weld by other means, can often be successfully joined using a laser.

UK and Ireland distributor for ALPHA Laser, **TLM Laser** has a comprehensive range of laser welding technologies available, including the new AL Q laser welding system. This has been developed for the high specification, high quality production environments found within the medical sector. This Class 1 closed laser system is available with a choice of 450W or 600W fibre lasers, with either water or air cooled modules available. The system includes an electrically operated door with a laser safe window, and has been designed for safe operation.

Tel: 01527 959099

ULTRA-COMPACT SENSORS



RECENTLY INTRODUCED by **Baumer** is a range of compact inductive distance measuring sensors designed to detect objects and distance within a 10mm range.

IF200 Dual Channel sensors offer the key benefits of delivering the largest sensing range combined with excellent precision, reported to result in outstanding inductive sensor performance across a wide range of automated manufacturing applications.

Though miniature in size (W 20mm x L 42mm x H 15mm) these sensors provide ultra-precise linearised measured values within a 10mm range with up to 3 micron resolution, via either IO-Link or as

analogue voltage signals. There is also a retrofit option available with exactly the same pinout which ensures easy connectivity when replacing Baumer's existing conductive measuring IWFK sensors.

In addition to their range capability and precise performance a robust plastic housing means the sensors can withstand increased ambient temperatures in more challenging applications up to 75°C. Also, as a result of the proven Baumer sensor technology they provide exceptionally low temperature drift of just 2% across the entire sensing range.

www.baumer.com/gb/en/

Tel: 01793 783839



HOLLOW-SHAFT ENCODERS OPEN UP UNIVERSAL COMPATIBILITY

SICK HAS unveiled its next-generation family of large-bore hollow-shaft incremental encoders, the **SICK DGS80**.

An innovative design concept has opened up versatile integration possibilities for the DGS80 across wide-ranging industrial automation applications, aided by a radically-streamlined specification process and easy installation.

The **SICK DGS80** incremental encoder spans a broad range of shaft diameters up to 42mm, all within an extremely compact and rugged IP65-rated 81mm diameter housing. Starting with standard 30mm or 42mm diameter bores, the shaft size can be reduced with a large range of specially-designed insulated collets

to ensure a secure connection to the application.

SICK's new large bore hollow-shaft encoder family therefore gives end-users and machine builders the confidence of universal machine compatibility while stocking minimal inventory. The **DGS80** is also ideal for AC asynchronous motor feedback applications, capable of measuring speeds up to 3600 revolutions per minute, with a resolution of up to 8192 pulses per revolution.

The plastic collets also offer the advantage of isolating the bearings from the motor current, ensuring long encoder life.

www.sick.com

Tel: 01727 831121

NEW X-RAY SUITE PRODUCTS

SPECIALIST IN advanced linear motion technologies, **Ewellix** has developed a package of modular lifting column platforms developed specifically for medical applications. In particular, they are designed for use with patient tables, ceiling stands and wall/floor units in X-ray suites and other medical imaging modalities.

One of the challenges for X-ray departments is positioning relatively heavy X-ray tube heads or detector systems, which are often mounted on overhead or wall/floor frames. Each head or detector system can typically weigh up to 50kg, yet has to be moved easily and precisely to target the appropriate area of the patient's body.

The solution developed by **Ewellix** is based on its patented 'Effortless Technology'. This eliminates the traditional approach where counterweights are used to balance the head or the detector. Instead, the **Ewellix** system incorporates an intelligent 5-stage lifting column fitted with servo motors and a force sensing unit. Controlled as part of the **SmartX** digital platform, this modular construction allows the X-ray head or detector to be moved at speed - up to two metres in a few seconds with the lightest touch from an operator.

www.ewellix.com

Tel: 01582 496747





NEW SUPPORT FOR CARLO GAVAZZI CUSTOMERS

CARLO GAVAZZI UK is extending its Sales team to support the demands of the fast-growing Switch and Sense range as well its established controls products. David Pickles joins the company as regional sales manager responsible for the Northern Counties and Scotland.

Will Darby, managing director of Carlo Gavazzi UK commented: "The Switch and Sense product range is evolving rapidly on a global scale whilst our controls products continue to be in demand. The appointment of David will enable us to continue developing and supporting our Northern customers. I am positive that David brings the drive and determination to the team that will strengthen our business in this market."

Pickles will take responsibility for sales in the northern region and will work closely with the dedicated distributors and OEMs on all Carlo Gavazzi products. www.carlogavazzi.co.uk
Tel: 01276 854110



LASCAR ELECTRONICS CELEBRATES ONE MILLION DATA LOGGERS SOLD

LEADING PROVIDER of data logging solutions, **Lascar Electronics**, has sold over one million data loggers, marking a significant achievement in its mission to provide reliable and affordable monitoring devices to customers around the world. Lascar Electronics was founded in 1977

and has since been dedicated to producing high-quality data-logging products that cater to the needs of various industries.

With over four decades of experience, the company has established itself as a reliable and trusted supplier of data loggers, with an extensive range of products that

can monitor a variety of parameters, such as temperature, humidity, voltage, CO2 and current.

The company's order book demonstrates the widespread adoption of its products, which are used in a wide range of applications, from healthcare to agriculture, and from manufacturing to transportation. Lascar Electronics has an established presence in Europe, North America, and Asia, and their data loggers are used in over 100 countries worldwide.

Commenting on the milestone, Richard Cameron, Lascar Electronics' MD said: "We are thrilled to have reached this significant milestone in our business. It is a testament to the hard work and dedication of our team, who have always been committed to

products

HI-LINE REPORTS SALES GROWTH AND MAJOR PLANS FOR 2023

HI-LINE Industries, a UK-based leader in the design, manufacture and installation of energy-efficient compressed air purification equipment, is reporting continued growth in year-on-year sales, with results for the last quarter well ahead of forecast.

To support its growing sales, Hi-line has completed a management reshuffle; following the appointment of Steve Smith as MD in May 2022, Brad Beesley is now general manager, Darren Sims is the company's new technical director, and Craig Watson is business administration manager.

Spring 2023 will see the start of an extension to the company's UK headquarters in Burton-upon-Trent, while the technical department will implement new software to will further enhance the company's CRM (Customer Relationship Management) activities. The new software suite, which will be of great benefit to Hi-line's service contract customers, will integrate with the company's cloud-based Xero accounting software.

Hi-line also takes its corporate sustainability responsibilities extremely seriously, which is why the company is currently installing a



series of electric vehicle chargers at its Burton-upon-Trent facility. www.hilineindustries.com
Tel: 01283 533377

MENZEL MARKS TOPPING OUT AT NEW MOTOR PLANT

DECEMBER 2022 saw **Menzel Elektromotoren** celebrate the topping out of its new headquarters on the outskirts of Berlin, Germany. The modern electric motor plant being built on a 24,000m² plot will accommodate approximately 8500m² of production area, along with spacious offices and a cafeteria.



The new factory will feature the capacity to manufacture and test larger, heavier drive systems. The production flow will be optimised, and Menzel will create numerous new jobs. The family-run company manufactures large AC and DC motors up to 20MW for industrial facilities all over the world and, thanks to its huge inventory, can also adapt drives for any requirements at short notice.

The team provides individual and reliable service, first-rate product quality and expert advice on drive applications in all kinds of industries. www.menzel-motors.com
Tel: +49 30 349 9220

NEW CHIEF ENGINEER AT TÜV SÜD'S MACHINERY DIVISION

TÜV SÜD UK's Machinery division has appointed Ian Wright as its new Chief Engineer. Wright has more than 30 years' experience in the machinery industry, first starting his career with Pioneer Electronics as a machinery technician. Ian is also a technical certifier for accreditation body TÜV SÜD BABT, providing certification support for UKCA and CE marking.

Darren Hughston-Roberts, head of machinery safety at TÜV SÜD, said: "Ian has an excellent reputation within the machinery industry. His appointment to Chief Engineer will ensure that our customers continue to receive the excellent service they



deserve in an ever changing and demanding regulatory and technically complex landscape. His 30 years of expertise in machinery is a real asset to the TÜV SÜD business." www.tuvsud.com/uk
Tel: 01489 558100

LITERATURE UPDATES

L60+ THERMOCOUPLE & FINE WIRE WELDER AND ACCESSORIES

The L60+ Thermocouple & Fine Wire Welder, manufactured by Labfacility, is a compact, simple-to-use instrument designed for thermocouple and fine wire welding.

It is primarily designed for use by sensor manufacturers to produce commercial grade thermocouple junctions; it is ideal for producing large numbers of exposed junction thermocouples for test and development laboratories. The L60 Thermocouple Welder is ideally suited to transducer and RTD extension lead attachment.

Use of the Thermocouple Welder does not require special skills and most operatives will be capable of producing quality work with little practice. The instrument is supplied with a full range of user accessories including a footswitch. Suitable for use with wires of up to 1.1mm diameter an argon gas shield facility is included but a satisfactory thermocouple junction is produced without the need for argon. The output energy of the L60 Thermocouple Welder can be varied up to 60 Joules.

- Simple to use Thermocouple Welder
- Designed for the production of commercial grade thermocouple junctions
- Also suitable for other fine wire work
- Front panel or footswitch operation
- Argon gas shield facility

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