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Internet of Things (CPX-IOT with OPC UA)

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CPX-AP-I is a decentralised IO system that provides seamless connectivity from the field level right through to the cloud, making digitalisation incredibly easy. It integrates IO Link, high speed data transfer to the cloud and intelligent connectivity to the host PLC in one simple package. This allows integration of I/O link masters and valve terminals into major host systems in a flexible and scalable way, no matter which industrial automation network is being used. This combination of capabilities offers some significant advantages over existing alternatives for machine builders, system integrators and the end user.

What has inspired Festo to develop this product?
We want to help our customers deliver on the Industry 4.0 vision of the smart factory: a highly automated environment in which every component, every device, every system and every site is digitally connected via the cloud. To deliver this requires seamless communications and a standardised approach to machine architecture that can handle potentially massive amounts of data in real time. Right now, industry is in a state of transition, where the benefits of Industry 4.0 connectivity are beginning to take hold but the standardisation required at all levels is not yet fully realised. We see CPX-AP-I as an enabling technology that can deliver the seamless communications and high data speeds necessary for smart factory automation.

Is network communications a new departure for Festo?
While we are probably best known for our pneumatics expertise, Festo has a long history of innovation in many aspects of industrial
automation, as well as a central involvement in the development of common communication protocols for Industry 4.0. For example, the company is currently participating in the FIND (future industrial network architecture) research project, which is working to develop the foundation for the industrial Internet of tomorrow, based on the latest network technologies from the fields of industrial automation, Internet and 5G communications. It has applied this combination of skills in the development of the new CPX-AP-I communication platform.

What was the biggest single challenge in developing CPX-AP-I?
The biggest challenge for us was finding a way of achieving the level of standardisation and connectivity required without compromising on design flexibility. Achieving network neutrality was a key element to developing a viable solution. PROFINET, Ethernet/IP, EtherCAT® and Modbus are the most commonly used networks in industrial automation, but customers may combine these network options with other communication standards to share information across different parts of their business. For example, a machine can carry IO Link at the base layer, PROFINET in the middle automation layer and OPC-UA over Ethernet with the communication to the cloud. This makes standardisation very complex for machine builders and system integrators. CPX-AP-I makes it much simpler.

How does CPX-AP-I work?
CPX-AP-I is based on Festo’s new Automation Platform (AP). Essentially, it consists of a fieldbus module which will connect to networks such as PROFINET, PROFI-BUS, Ethernet/IP, Modbus and EtherCAT®, ensuring that customers can integrate the system irrespective of their host PLC of choice. Below this fieldbus module, the system then becomes standard and communicates on the Festo Automation Platform. Offering genuine network neutrality, CPX-AP-I therefore ensures that customers can maintain a standardised architecture and bill of materials, with all I/O seen as being on the host network – irrespective of the customer’s choice of PLC.

What data speeds are possible with CPX-AP-I?
This system achieves impressive speeds of 200Mbaud/sec on each of the ASIC’s three ports. To put this into perspective, that is twice the speed of equivalent industrial Ethernet based networks available today. These speeds have been achieved by embedding the AP protocol, which is the backbone of the new system, directly on the silicon. So, unlike solutions based on IO Link, CPX-AP-I is always synchronous to its host PLC.

How does improved data speed benefit the customer?
The data speeds that CPX-AP-I can deliver enable higher productivity due to faster overall cycle times and deliver real-time system
behaviour. The Festo AP protocol is fast enough to deal with data-hungry formats such as video, and its multichannel approach ensures that the user can parameterise the size of the cyclic data channel and the non-real time data channel. This ensures the cyclic data is never adversely affected and deterministic behaviour is guaranteed, which has benefits for predictive maintenance features such as monitoring cable quality or actuator travel times. The customer can use these tools to minimise maintenance costs and to optimise machine availability and cycle times.

Improving functionality often means adding more interfaces. Is this true for CPX-AP-I?
Quite the reverse. CPX-AP-I offers the ability to incorporate more devices using fewer interfaces. The new system has the flexibility of connecting up to 500 different devices, each containing the AP ASIC, to the same network node: so the limiting factor is never the AP protocol. Modules available include digital I/O, analogue Inputs, incorporating temperature measurement, IO Link masters and – unique to Festo – pneumatic valve terminals with embedded connectivity. Integrating valve terminals in the system reduces the integration cost and complexity for customers. It also allows machine builders to avoid connecting hardwired valve terminals to remote I/O or adding costlier PROFINET or Ethernet/IP valve terminal modules. This reduces the number of devices required, simplifying installation and shortening delivery times.

What other improvements does CPX-AP-I offer?
Each module is connected via a CAT6e cable that meets the high electromagnetic requirement of a 125MHz system and is already prepared for high speed cable chains. Separate 24V DC power connection allows more power to be run through the system network – up to 4 Amps – so larger valves and loads than previously can be switched. Separating the protocol and load supply also allows designers greater flexibility on the system behaviour during an emergency stop. For example, if a loading door is opened, devices inside can be isolated without interrupting data communications.

How easy is it to integrate CPX-AP-I?
CPX-AP-I follows plug-and-play principles. The system is prepared for tree, line and star topologies with a maximum cable length between modules of 50 metres. In combination, the decentralised connectivity and generous cable length offered by CPX-AP-I means that modules can be fitted wherever groups of devices need connecting – offering so much more flexibility for machine builders.

How can users optimize their CPX-AP-I system?
The Festo Automation Suite forms the basis for parameterising, programming and maintaining devices from Festo in a single software package, addressing protection and TIA V15 auto detection and other capabilities – such as a valve cycle counter and IoT connectivity – will be added shortly. Future diagnostic tools are likely to include dashboards, cable quality monitoring, actuator position monitoring and I/O time stamping, to name a few.

What next for CPX-AP-I?
CPX-AP-I represents a significant step forward in the provision of decentralised digitalisation, moving beyond what has previously been possible with simple IO systems. It represents the first part of a whole platform providing different types of RIO families (decentral, modular IP65/67/20), which will include motors, single valves, service terminals and new valve terminals. As we constantly develop new automation products like servo drives, motion controllers, pneumatic valve terminals and sensors, integrating the ASIC becomes simple: enabling real time behaviour and the collection of big data with very little additional cost.
The debate on democracy – to the moon and back...

I’ve just finished reading a novel that promised much but delivered very little. The picture on the front and blurb on the back hinted at one story; the content delivered another entirely. It promised a murder on the moon, three people caught up in the turmoil – a classic who-dunnit. The actual plot exposition in a sentence? Journey to the moon, escape from the moon, back to the moon, escape from the moon, return to the moon, escape from the moon; under arrest, escape custody, rearrested, escape custody – and so on, ad nauseam.

The plot, in fact, seemed entirely secondary to a debate about the politics of China, and the possible scenario under which a population in excess of a billion might come together to drive change. And as a discourse on politics and socio-economics, it had some merit. As a murder mystery, though, it was seriously lacking. The deed itself, depicted in the opening chapters, was finally wrapped up 400 or so pages later at the very end of the book in an “oh, by the way” moment, in a story that didn’t even have the decency to conclude satisfactorily, instead brazenly inviting the reader to beg for a sequel.

Suffice to say, I shan’t be begging, and if it wasn’t for our own general election I’d be even less charitable about the book. But the discussion of Chinese politics was timely, as was the reminder within the narrative of the quote from Winston Churchill: “Democracy is the worst form of government, except for all the others.” We live in a representative democracy, capped with a parliamentary democracy.

We elect politicians supposedly more qualified than ourselves in tackling the key issues of our society, to represent us within the halls of government. But the Brexit referendum laid bare the question of how those politicians should represent us: do they carry out the explicit wish of their constituents, or do they do what they believe is best for the constituents, even if those two things are diametrically opposed? And beyond that where there might be further conflict of interest, do they toe the party line or do they do what they think is best for their own careers?

The trap in opening up a key issue such as Brexit to direct democracy via a referendum is that it’s then very difficult to get the genie back in the bottle and return to a meaningful representative democracy. Maybe you can trick the genie back into the bottle, and certainly political parties have fallen over themselves to promise ever-greater sums of money to make our lives better over the course of the next parliament.

Perhaps if there is one small crumb of comfort that we can draw from the Brexit fiasco and the general election, it is that we have not yet become that dystopian society where politics is the playing of the mega corporations, because big business by and large is a remainder. But it makes you wonder if perhaps we are about to enter a new chapter in British politics, driven by a deep dissatisfaction among the populace in a system that has let us down one time too many. What might that future look like? Throw in a murder mystery, and it’s a book I’d happily read.

Mark Simms
Editor
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Report shows the true scale of Brexit impact on manufacturers

New Make UK/Squire Patton Boggs research shows 64% of manufacturers say Brexit delay and uncertainty has slashed profits in last two years. Almost half have already seen a negative change in EU customer/supplier appetite for doing business with them.

Research from Make UK, the manufacturers’ organisation, and Squire Patton Boggs, the global law firm, shows the extent to which manufacturers have taken a financial hit during the last two years as they struggle to prepare for an unknown trading environment post-Brexit. Nearly half have already experienced a noticeably negative change in EU customer/supplier appetite towards doing business with them. 76% of manufacturers feel that a no-deal Brexit would have a negative impact on the appetite of their EU customers/suppliers to do business with them. And almost two thirds cite Brexit delay and uncertainty as having had a negative impact on their company’s profit margin in last two years.

Businesses had already made a costly U-turn in the run up to 29 March 2019, when stockpiling activities reached the highest level ever recorded in the G7. Demand for warehousing space rocketed by an unprecedented 32%. This surge was followed by an inevitable slump and since then almost half of companies have seen a noticeable negative change in EU customer and supplier appetite to do business with them because of continued uncertainty.

According to the survey 76% of manufacturers said that a no-deal Brexit would be disastrous to their businesses, with a negative impact on the appetite of both EU customers and suppliers to do business with them. Some 60% of manufacturers would increase product prices and a third would cut staff.

The government’s proposed zero tariff plan in the event of no-deal was also viewed negatively with 73% of companies saying it would bring about a cost hike for their businesses. The scheme would see 87% of imports by value eligible for zero-tariff access to the UK compared to the 80% which are already tariff free. Just 3% of companies think they will see a saving from the new regime in the event of a no-deal Brexit.

The default leaving date of October 31st might have passed, but fewer than a third of manufacturers had prepared for the new customs processes which would have come into force in the event of no-deal, and which still would come into force should no deal be the outcome next year. The survey further showed that while nearly two-thirds (64.1%) of respondents understood that changes would be introduced to produce labelling, fewer than half have taken any steps to enable them to comply with the new rules which will allow them to continue to trade with the EU. Commenting, Stephen Phipson, chief executive at Make UK, said: “The research must serve as a wake-up call to Government – business needs clarity and stability going forward, but that does not mean leaving the EU at any cost. No deal would leave manufacturing facing tariffs on the import of goods and just in time delivery logistics would become inoperable. Furthermore, business would be unable to access the people to ensure British companies can fill vacancies where they have skills gaps or, send workers to the EU for service contracts and other commercial opportunities. We must also see a commitment to maintain mutually recognised, close regulatory alignment with the EU, supported by a system of arbitration and standard setting to ensure that British firms can produce goods that can easily be traded across Europe with clear protections in place.

“We have already seen major companies voting with their feet and taking their planned business operations away from the UK while many businesses are losing out on new contracts with EU customers because of the uncertain future trading arrangements. This is only going to get worse until a deal with a sensible transition period is agreed.”

Huge challenges
Jeremy Cape, partner in the Brexit team at Squire Patton Boggs, added: “A no-deal Brexit presents huge challenges to the UK’s manufacturing sector and the immediate implications for businesses in terms of cost and disruption will be serious. In particular, it is widely expected that many manufacturing businesses, particularly those that rely on just in-time supply chains within the EU and those who may be impacted by the imposition of new tariffs, may scale back or close their UK operations.

“Whilst it is impossible to know the macroeconomic consequences of a no-deal Brexit, it is vital that UK manufacturers do what they can to be fully prepared. It is clear from the research findings in this report that many companies have not planned anything like as fully as they should. No one likes to spend time and money preparing for outcomes that may not occur, but the impact of a no-deal Brexit is such that a small investment in preparation is critical.”

Phipson added: “The first and foremost priority for the next Government must be an agreement with the EU that also passes through Parliament as soon as possible, which removes ‘no deal’ and ensures four key outcomes to safeguard the future prospects for manufacturers.”

These key outcomes are frictionless trade, regulatory alignment, access to labour and a lengthy transition period that allows business time to adapt to change. “This is absolutely essential to avoid leaving without an agreement which would be catastrophic for industry,” said Phipson. “Beyond that, what the public and business want to see is not the narrow-minded, blame-driven politics we have witnessed in the last few years but a grown-up vision of where we are going as a country and, an economy.

“The last few years have been largely wasted. Beyond the immediacy of a sensible agreement with the EU, we need to move on quickly and ensure Government works with industry to deliver a better balanced economy and sustained growth. Manufacturing will be central to delivering this and addressing the major societal and technological challenges we face. “Some important groundwork has been laid through the industrial strategy. It is now vital the next government, however it is made up, commits to immediate policies which will ensure the UK remains an attractive place to do business, encourage growth, boost private sector investment and job creation.”
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**Transition to ISO 9001:2015 brings benefits to businesses**

The updating of the ISO 9001 standard has brought with it new requirements including: identification, monitoring and review of external and internal issues relevant to purpose and strategic direction; identification of interested parties relevant to the QMS, and monitoring and review of their needs and expectations; and determination of the ‘scope’ of the QMS. In other words, the revised standard covers the way a business is run as well as how it manages quality. So how has it impacted the businesses which have transitioned to the new standard?

Heat treatment specialist Flame Hardeners is one company which has managed the transition, and managing director Roger Haw comments: “When we were required to follow a transition from ISO9001:2008 to ISO9001:2015 we voiced some criticism of the new standard as we felt that the 2015 standard focused heavily on management rather than being a quality management system.”

To assess the impact of the standard on its business, the company carried out a review 18 months in. “The 2015 standard has changed the way that we maintain contact with our customers, and we now have much more interaction with them when assessing their needs and requirements,” Haw explains. “Although we have always maintained a very good personal relationship with customers (we are on first name terms with 85% of them), we previously relied on annual customer satisfaction surveys to either listen to and respond to their requirements, or to give ourselves a pat on the back if they were extremely complimentary. We now make random checks with customers throughout the year to get their impression on how we performed on particular orders.

“Another form of systematic analysis has been initiated to examine our internal performance, with a monthly summary providing a review of our actual performance against our declared targets for quality and delivery. It has shown that we maintain a general customer satisfaction ratio of 96%, and a satisfaction ratio of 94% for speed of response to enquiries.”

The analysis breaks down the reason for any delay in delivery into one of the following categories: waiting for approval from customer of test piece or sample; delay at subcontractors; capacity problems; processing time; plant repairs/failures, material issues; staffing problems; and customer errors.

“Review of the above enables us to look for elements of continual improvement, as required by the standard,” continues Haw. “It also helps as a management tool in identifying any specific areas that require our attention in any particular period. Surprisingly, material issues (either material not to specification or material supplied by customer not being the correct material) accounted for 15% of delays in the previous twelve months, while customers supplying incorrect process specifications or instructions accounted for 9% of delays in delivery.”

Internal publication of this analysis, together with results of customer satisfaction surveys, on a specially created ‘Quality Bulletin Board’, informs company members about its performance and allows for feedback from them to improve the situation.

“We have concluded, therefore, that, by obliging us to consider a broader approach to maintaining good customer relations, the revised standard has, in fact, assisted us in having a greater appreciation of our customers’ needs and requirements, and also in building a more effective internal team,” summarises Haw.

**Smart factories will boost global economy**

A new study from the Capgemini Research Institute has found that smart factories could add at least $1.5 trillion to the global economy through productivity gains, improvements in quality and market share, along with customer services. However, two-thirds of this overall value is still to be realised: efficiency by design and operational excellence through closed-loop operations will make equal contributions. According to the new research, China, Germany and Japan are the top three countries in smart factory adoption, closely followed by South Korea, United States and France.

The report entitled “Smart Factories @ Scale” identified the two main challenges to scaling up: the IT-OT convergence and the range of skills and capabilities required to drive the transformation including cross-functional capabilities and soft skills in addition to digital talent. The report also highlights how the technology led-disruption, towards an ‘Intelligent Industry’, is an opportunity for manufacturers striving to find new ways to create business value, optimise their operations and innovate for a sustainable future.

According to the report, organisations need to learn from high performers (10% of the total sample) that make significant investments in the foundations – digital platforms, data readiness, cybersecurity, talent, governance – and well-balanced “efficiency by design” and “effectiveness in operations” approach, leveraging the power of data and collaboration.

Jean-Pierre Petit, director of digital manufacturing at Capgemini said: “The move to an Intelligent Industry is a strategic opportunity for global manufacturers to leverag the convergence of Information Technology and Operational Technology, in order to change the way their industries will operate and be future ready.”

www.capgemini.com/gb-en/research/smart-factories-at-scale/
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ABB proves world first subsea power technology system

Oil and gas production now feasible in far out and deep ocean environments, thanks to new power technology from ABB

ABB’s pioneering subsea power distribution and conversion technology system is commercially viable, bringing groundbreaking potential for cleaner, safer and more sustainable offshore oil and gas production, following the completion of a 3,000-hour shallow water test. For the first time worldwide, energy companies will be able to access a reliable supply of up to 100 megawatts of power, over distances up to 600 kilometres and down to 3,000 metres water depth, at pressures that could shatter a brick. This is all achievable with a single cable with little or no maintenance for up to 30 years, making oil and gas production feasible in far out and deep ocean environments.

The $100 million research, design and development Joint Industry Project (JIP) between ABB and Equinor with its partners Total and Chevron was initiated in 2013. The validation of the shallow water test at a sheltered harbor in Vaasa, Finland, means the majority of the world’s offshore hydrocarbon resources are now in reach for electrification.

“This milestone marks an outstanding achievement and is the culmination point of an inspirational technology development achieved through tremendous dedication, expertise and perseverance. It is the result of intensive collaboration by over 200 scientists and engineers from ABB, Equinor, Total and Chevron in a multi-year, joint effort,” said Dr Peter Terwiesch, President of ABB’s Industrial Automation business. By powering pumps and compressors on the seabed, closer to the reservoir, ABB’s subsea power distribution and conversion technology can significantly reduce power consumption. There is potential for substantial energy savings, with reduced carbon emissions using power from shore. ABB’s subsea power technology can connect to any power source, enabling future integrations with renewable energy, such as wind and hydro power.

Based on a specific field development case, the new technology could offer CAPEX savings of more than $500 million, if eight consumers, such as pumps or compressors, are linked through a single cable over a distance of 200 km from other infrastructure.

Having fewer people offshore will reduce risks and improve overall safety. Against a backdrop of digitalization and increasing autonomy in offshore operations, new opportunities are also anticipated in the ocean ecosystem.

“Moving the entire oil and gas production facility to the seabed is no longer a dream. Remotely operated, increasingly autonomous, subsea facilities powered by lower carbon energy are more likely to become a reality as we transition towards a new energy future,” said Dr Terwiesch. Previously, only the transmission cable and subsea step-down transformer were proven to operate underwater. Today, ABB’s complete subsea power distribution and conversion system includes a step-down transformer, medium voltage variable speed drives and switchgear, control and low voltage power distribution, and power electronics and control systems. ABB’s flagship distributed control system, ABB Ability System 800xA, controlled the rigorous testing.

www.abb.com

Report shows rise in the UK’s decommissioning competitiveness

The UK’s decommissioning sector’s growing competitiveness is revealed in the 2019 Decommissioning Insight report from OGUK. Now in its tenth year of publication, the report forecasts the UK’s decommissioning activity and expenditure over the next decade, revealing that while activity on the UK Continental Shelf (UKCS) is expected to increase, expenditure will remain consistent at around £1.5 billion per annum, demonstrating the sector’s improving efficiency performance.

Decommissioning now represents just under 10% of the oil and gas industry’s overall expenditure, and to date, 9% of all the platforms installed on the UKCS have been decommissioned.

Commenting on the report, OGUK’s decommissioning manager Joe Leask said: “With a firm grip on cost management, environmental and safety standards, our tenth annual Decommissioning Insight shows a healthy sector well-positioned to realise some £15bn of opportunities over the next decade. Our report underlines the significant intellectual capital anchored here in the UK. Ensuring this is shared is key to maintaining the competitiveness of the sector, enabling this homegrown industry to capture the lion’s share of an emerging global market some four times greater. “We’re already seeing exciting new companies emerging as specialists in decommissioning, either offering full-scope solutions or focusing on specialising in areas including offshore well decommissioning and onshore dismantling and disposal. These innovative business models offer industry real choices whether operators carry out decommissioning themselves or pass the scope to those companies offering increasingly competitive solutions.”
As a leading manufacturer of flow solutions, SPX Flow understands that equipment for offshore applications should be engineered to minimise downtime. The company’s ClydeUnion Pump CUP-BB5 range features an innovative cartridge retention design that means a complete rotor change-out can be completed in under eight hours.

The CUP-BB5 range comprises radially split, diffuser type, multi-stage pumps specifically designed for the oil and gas market. With capacities up to 2,800m³/hr (2,330 USgpm) and delivery heads up to 4,100m (13,450 ft), typical applications for the CUP-BB5 range include produced water injection, seawater injection and main oil lines.

CUP-BB5 pumps require no specialist tools or additional training, making maintenance straightforward and minimising downtime. The shear ring locking system ensures rapid change-out and minimises pump downtime because it does not require the use of high torque equipment to assemble/dis-assemble.

With two main variants of in-line impellers (CUP-BB5i) or a back-to-back impeller arrangement (CUP-BB5b) the pumps are available as engineered-to-order solutions, fully compliant with the latest API 610 and API 682 requirements and customer specifications. The CUP-BB5 can also be packaged with various types of drive equipment to suit customer requirements.

Typical options include fixed or variable speed electric motors, combustion engines and gas or steam turbines. Packaged systems are further equipped with a range of pump healthcare monitoring equipment to enable measurement and analysis of performance data in order to aid preventative maintenance and increase availability.

For specific applications SPX Flow can offer a dynamically stiff rotor design. This rotor design is based on achieving maximum sustainable hydraulic efficiency, extending mean time between overhauls and delivering reliability in operation. The resulting high critical speed margins and low static deflections reduce internal wear and increase reliability.

Customers who specify SPX Flow products and systems can further benefit from total lifetime support services, ranging from design, installation and commissioning through inventory and spare parts management, to aftermarket servicing and upgrades.

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Pumps help to minimise downtime in oil and gas market

Rapid change-out of rotor without the need for specialist tools simplifies maintenance to help reduce downtime in oil and gas exploration
Improve the ROI on your drives installation

Paul Streatfield discusses his top five ways to improve ROI on industrial drive technology

Industry 4.0, smart manufacturing, factory of the future – call it what you will, the evolution of manufacturing is underway, at least for some UK manufacturers. Across the country, businesses vary drastically in their adoption of these smart technologies. Some have been embracing digitalisation for years, with forward-thinking factories harnessing technology to automate processes or gather and analyse data to improve production, while others are watching from the sidelines, yet to take the leap.

Yet if you read about smart manufacturing or factories of the future, promises of greater productivity, quality and efficiency are commonplace. So, why are manufacturers yet to fully embrace the new dawn of connected manufacturing? For many, the answer lies in the cost – or the perceived cost – of digitalisation. The initial investment in smart technology can be enough to put many manufacturers off making the move to a smarter way of working, but the benefits of real-time quality check, continuous improvement and equipment maintenance will undoubtedly lead to cost savings and productivity improvements.

Let’s explore some of the benefits of investing in smart drive technology.

1. Manufacturing agility: Get products to market, fast. In the past, improvements to any manufacturing facility were carried out on the basis that they would improve the efficiency, quality and effectiveness of either the manufacturing process or the product itself. However, customer demands are changing and the manufacturing industry and technology is being forced to adapt to keep up. More and more often, products need to be produced in small, highly customised batches, putting pressure on businesses to reduce their time-to-market and adapt to changes in demand. To do so, businesses need to invest in technology that gives them the flexibility to adapt quickly to fulfil demand.

In older, less agile manufacturing environments, changes in production processes required an investment in new technology and resulted in significant downtime while a changeover was implemented. In today’s world, critical drive and control technology can be configured at a digital level rather than a physical one, enabling manufacturing facilities to support customisation of products and meet customer demand in a far quicker and more cost-effective way without significant downtime.

2. An investment in energy efficient technology. Reducing carbon footprint, saving the world or making cost-savings by reducing energy bills? Whatever your motivation, investing in systems that reduce energy usage is a win-win situation.

By moving to cabinet-free drive technology, users can actively reduce energy consumption in a number of ways. Until recently drive technology has been designed in such a way that drives and related wiring were enclosed within a cabinet. To avoid overheating, fans or AC units had to be used to cool the high temperatures within the enclosure. With cabinet-free drive technology, the cooling hardware – and the energy required to run it – becomes completely redundant.

The system also features energetic coupling via the hybrid cable - at a basic level, this means it is able to generate energy which can be put back into the system. If, for example, one drive brakes, the energy created by the brakes can now be used to power another drive within the machine. An additional ‘Smart Energy Mode’ on the power supply evens out the surges in power demand reducing the peak loads of the machine. This added energy efficiency helps to realise energy savings of up to 50 per cent.
3. Open core: a new era in automation programming. As with all manufacturing processes, machine manufacturers often look for ways to speed up time-consuming tasks and shorten delivery times. Bosch Rexroth’s IndraDrive technology features Sequential Motion Control (SMC) – a function which reduces users’ programming and commissioning time by up to 90% compared to PLC programming.

Using open-core software engineering opens up new opportunities – both by enhancing processes by creating bespoke software tools and by tapping into a whole new skillset. High level software languages, or even standard PC packages such as Excel, can be used to produce common data collection programs that are run at the IT level, and not at the machine PLC level.

As well as making it far simpler and faster to collate production data from a number of machines without the need for time-consuming PLC coding on each individual machine, open core helps to bridge the skills gap by opening systems up to a range of programming languages. The result is increased flexibility and a quicker time to market - saving time and money in the process.

Additional efficiencies can also be realised out-of-the-box. Using a series of pre-defined commands stored in a function library, users can easily achieve a range of common functions - from positioning axis, master and slave axes couplings, synchronous axis operation, cam profile applications and sequential movements. With no need for an external motion control system, hardware costs are reduced and system integration is simplified. The result is a far faster turnaround and an increase in ROI.

4. Reduce downtime using machine diagnostics. Another hot topic - and one anyone in manufacturing is aware of - predictive maintenance. While there has been a definite shift in recent years, many facilities are still trying to reduce the impact of downtime by repairing equipment before strictly necessary. The cabinet free drive technology we provide at Bosch Rexroth can collect and record data such as vibration, temperature, torque, position and speed via the motor and the decentrally-wired sensors.

This data is collected, stored and analysed in order to detect issues before they result in failure. In doing so, manufacturing facilities can avoid unplanned downtime, or even complete shutdown of equipment, all of which can have a catastrophic impact on the company’s bottom line.

5. Reduce initial outlay with simple installation. Intelligent system design can reduce both the cost of the initial components and the installation time itself. Rexroth’s IndraDrive Mi technology allows machinery manufacturers to relocate their complete drive technology - including mains connectivity - from the control cabinet directly into the machine itself. As a result of this clever design, the system uses 90% less wiring - reducing hardware costs and installation time. By using cabinet free drive technology which essentially combines drive electronics and motor technology into a single unit - the system uses less hardware and takes up less space on the shop floor.

In conclusion: outlay versus ROI
While ROI can be a way of building a solid business case for investment in technology - including the cost savings associated with faster turnaround, easier programming and reduction in downtime - it focusses purely on what happens after an investment has taken place. What it fails to take into account is the business impact of not making the investment at all.

Changes in consumer demand, a requirement for a fast turnaround and increased personalisation have resulted in a huge shift in the way companies operate. Businesses that fail to invest are running the risk of being unable to meet demand and falling behind competitors. When it comes to ROI, there can’t be a much stronger argument for investment.

Paul Streatfield is industry sector manager at Bosch Rexroth

www.boschrexroth.co.uk
With its unique concept, SPS covers the entire spectrum of smart and digital automation – from simple sensors to intelligent solutions, from what is feasible today to the vision of a fully digitalised industrial world. The focus is on practical solutions for your specific business area, and can find answers to your current needs on-site, as well as possible solutions for the challenges of tomorrow.

Despite the challenging economic climate, the SPS once again proved itself to be the leading exhibition for solutions for the challenges of tomorrow.

Control Techniques announced the release of two new variants of its Unidrive M700 and M702 high performance drives. While Control Techniques' drives have always been multi-protocol in their nature, being able to support Real-Time Motion over Ethernet (RTMoe) simultaneously with Ethernet/IP and Modbus/TCP/IP communications, this new variant adds Profinet RT capability to the list of protocols supported by the Unidrive M700 and M702. The changes also bring about performance improvements to the Modbus and EtherNet protocols.

Previously, the ability to implement Profinet systems has required using Unidrive M in conjunction with an SI-Profinet option module. The new multi-protocol variants remove that requirement, thus freeing up access to all three option module slots on the drive. Now, by utilising option modules offering EtherCAT, Profibus, DeviceNet, CANopen and CNTnet, the user can create complex integrated systems from multiple protocols on a single network.

Stephen Turner, global product management director, said: “We’re pleased to announce the introduction of these two multi-protocol drives to our Unidrive M portfolio. The ability of our drives to perform coordinated motion between multiple axes, for only the additional cost of an Ethernet cable, remains an advantage over our largest competitors. “By bringing Profinet RT onboard, our drives now enable users to have the same flexibility to simultaneously support multiple protocols. We feel this further strengthens our reputation for producing products with integration and connectivity at the heart of them.”

Mitsubishi Electric is completing its range for robotics beginners and cost-conscious users with the MELFA RV-8CRL articolated arm model, which was shown for the first time in Europe at SPS 2019. This robot is an addition to the RH-CH Series SCARA robots, which also cater for low-to-medium complexity applications. Cost-effective systems can be identified as an important trend in robotics, alongside safety, collaboration and programmability. To meet these demands, while reducing the investment required by existing and future customers, Mitsubishi Electric has developed the RV-8CRL articulated arm model.

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“To ensure that the total cost of ownership matches market demands, we have made sure that the quality and longevity of these cost-effective series models are in no way inferior to those of our high-end devices,” said Oliver Giertz, product manager for servo/motion and robotics for EMEA region at Mitsubishi Electric. “To be able to offer the RV-8CRL at an attractive price, we have optimised some manufacturing details. For example, we saved over 200 screw connections in this design and we are passing on this cost advantage to our customers.”

With a load capacity of 8kg and compact and functional design, the new medium-level model is suitable for a wide range of general applications. As far as user-friendliness is concerned, the new system does not differ from its top-of-the-range siblings: as with all MELFA robots, programming is carried out via the intuitive RT ToolBox 3 software.

Picking up on the theme of IT meets OT, Lenze launched a new generation of controllers to cater for the growing demands of Industry 4.0. The heart of the new c500 series is Intel’s most powerful CPU currently available for highly compact designs. These processors redefine the upper performance limits for controllers. This means that the new controller series can easily keep pace with the rapidly increasing requirements for general controller tasks and motion applications made by Industry 4.0. For machine builders, this means you don’t necessarily have to adopt a PC platform: instead, you can use your know-how in a familiar environment and also make use of the intelligent standard software modules of the Lenze FAST Application Software Toolbox.

Also new from Lenze was the The c750 model which blurs the edges between programmable logic controllers and industrial PCs. This controller covers applications in which Windows applications are mandatory. The OpenSystem architecture that Lenze enables with this model splits the computing power between two independent operating systems. The real-time Linux is responsible for control tasks while the open Windows 10 IoT Enterprise is available for customised applications.

Analog Devices announced the release of new robust industrial Ethernet physical layer (PHY) products to help manufacturers address key Industry 4.0 and smart factory communication challenges surrounding data integration, synchronization, edge connectivity, and system interoperability. The ADIN1300 is a low-power, single port Ethernet transceiver with industry leading power and latency specifications primarily designed for time-critical industrial Ethernet applications up to Gigabit speeds. As industrial automation increases the adoption of Ethernet and pushes in the boundaries of data rates, the ADIN1300 is designed to operate reliably in harsh industrial conditions over extended ambient temperature ranges.

ADIN1300 is the latest technology developed for the ADI Chronous Ethernet portfolio, ADI’s newly expanded portfolio of industrial Ethernet solutions. ADI Chronous Ethernet solutions – which include the ADIN1200, a low-power single port 10/100 robust Ethernet PHY for today’s real-time industrial Ethernet networks – encompass a range of advanced industrial Ethernet technologies from real-time Ethernet switches, PHY transceivers and protocol processing to complete network interface products.

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Multi-purpose drives herald new era for Fuji Electric in the UK

After over 20 years solving some of the most challenging drives applications in the UK, Fuji has turned its attention to the wider market and has launched a new range of multi-purpose drives.

It wasn’t that long ago that the drives range from Fuji Electric was being talked about as one of the biggest challenger brands to some of the names that were perhaps better known to engineers in the UK. Packed with innovative technology and regularly outperforming other brands in comparative tests, the drives looked set to firmly establish on these shores a company that had enjoyed continued success in Japan and which today has a global turnover in excess of €8bn.

If it feels as if the company has been a bit quiet of late, that’s not because it abandoned the UK market; quite the reverse in fact. Fuji Electric has been busy tackling some of the most demanding drives applications in some admittedly niche markets, providing performance solutions where engineers were experiencing real problems. That capability has seen Fuji Electric drives applications extend from the company’s original prime focus of the passenger lift and cranes sectors to areas such as biodigesters, vertical farming and desalination plants.

Firmly established in those markets in the UK, Fuji Electric has turned its attention again to the wider market, and has launched new multi-purpose variable speed drives intended for general purpose applications, as well as special applications such as solar pumping, heavy duty crane/hoist, HVAC and conveyors. The Frenic-Ace and Frenic-Mini variable speed drives promise performance, flexibility and a comprehensive set of safety features – all at a cost-effective price.

The Frenic-Ace has been designed to offer the highest levels of performance in a small package, while being rugged enough to be used in many different environments. The device has customisable logic (up to 200 steps) and offers a wide variety of functions to ensure it can be tuned to offer the best performance match for each individual application. It can operate at a number of output capacities from 0.1 kW to 315 kW with the capability to deliver 150% for 1 minute or 200% for 0.5 seconds or 120% for 1 minute in a quadruple rating selection. A range of motor control options are also on offer, such as V/F control with slip compensation, dynamic torque vector control (open loop), closed-loop vector control and PMS motor sensorless control.

Communications options

The Frenic-Ace drive has CANOpen and Modbus RTU communications built in to allow the device to be quickly and easily added to existing networks or to establish full communication with Fuji’s HMI series. For safety-critical applications, the device has STO (Safety Torque Off), is compliant to EN/ISO13849-1, SIL3, cat.3 and meets the highest safety level – Performance Level e (Ple).

The flexibility of the Frenic-Ace is enhanced by a range of expansion cards to provide Fieldbus support, as well as additional functionality. To ensure the drive can be used in almost any industrial network or topology, cards are available to add DeviceNet, CC-Link, RS 485, PROFIBUS-DP, CANopen, or Ethernet based protocols such as Profinet-RT, Modbus-TCP, Ethernet IP and EtherCAT protocols. Extra features are also provided through dedicated expansion cards, with digital and analogue I/O interface cards for the connection of sensors or other components; 5V and 12/15V Encoder (PG) interface cards for external control; superior human interface options through cards providing a remote multi-function touch panel or a remote touch panel with RJ45. All of these features provide the user with a simple and adaptable drive solution and peace of mind with a 3-year warranty, as standard, and a 10-year life cycle.

A variant of the Frenic-Ace has been specifically designed for HVAC applications and building automation projects. Features that are required in such applications include integrated PID, multi pump control, power conservation and “Fire Mode” which is used for smoke extraction in the event of an emergency evacuation situation.

Alongside the Frenic-Ace, Fuji Electric is also launching the Frenic-Mini, offering high levels of flexibility in a small, tough package, with power ratings from 0.1 to 15 kW. Designed to be cost-effective and efficient to operate, maintenance-free and easy set up and use, the drive provides high performance with the fastest CPU in its class.

www.fujielectric-europe.com/en/drives_automation
Rotary encoders for demanding applications in machine building and automation.
Planetary gear units from Stober

Stober has developed the third generation of servo geared motors, which it claims are the most compact and versatile drive solutions on the market in their power range. To make this possible, Stober has significantly reduced the length of the new gear units. What’s more, all Stober motors can be directly attached without an adapter, in any desired size.

As a consequence of the compact unit size, users benefit from lower weight, higher torque, and an increase in power density of up to 65%. There is also a space-saving benefit to installation. Another real advantage of the integrated motor gearbox for the customer is that as a motor adapter is no longer required the mass moment of inertia is reduced, which allows the full dynamics of the drive to come into play.

Additionally, the highly robust new generation range also features high backlash stability. And with excellent gearing quality, high torque acceleration, operational accuracy and precision are also achieved. In fact, users benefit from an increase of acceleration torques of 60%, an increase in speed of 45% and an increase of the torsional stiffness by up to 50%.

Stober’s UK director, Martin Preece says: “The most impressive feature of this new generation of planetary gear units is its enormous versatility. Not only can these gear units be combined with different Stober motors via direct attachment, they can also be attached to all third-party motors of any size with our modular adapter range.” Depending on the application, another big advantage is the option of selecting the output bearing configuration.

Geared motors deliver smooth performance for small bone orthopaedic applications

Surgeons performing small bone orthopaedic surgery need total control over the tools they’re using. In an environment where success and failure can be measured by millimetres, there is no margin for error. Portescap has released three new surgical motors designed for orthopaedic saws, drills and reamers. The compact motors offer controllable, precise torque and have been tested to withstand 1,000+ sterilisation cycles.

Orthopaedic surgery is a broad category that treats a range of musculoskeletal conditions arising from trauma, sport injury, bone diseases, degenerative diseases, infections, etc. Where procedures are performed on small bones – such as vertebrae or those found in the radiocarpal or talocrural joints – precision is key with every action. The surgical tools used need to deliver power in a smooth and controllable manner to ensure a positive outcome for the patient.

Portescap is a leading manufacturer of miniature motors for performance-critical applications. It’s at the forefront of sterilisable motor technology; having committed decades to research and development in the medical fields, its motors have been used in millions of surgeries around the world. The latest additions to its range have been designed specifically with small bone orthopaedic applications in mind. The B0912N1016 small bone motor (9.6V, 38k rpm), B0912N4023 small bone gearmotor (9.6V, 1.1k rpm), and B0912N4024 small bone gearmotor (9.6V, 12.8k rpm) are sterilizable brushless DC (BLDC) motors that provide optimal torque and speed for drills, saws and reamers. They are well-suited for traditional surgical tools – in addition to robotically assisted surgical devices – and can be paired with a Portescap sterilizable controller for battery powered applications.

The motors deliver high peak torque capable of powering through the densest bones and feature customisable voltage to accommodate precise control for the surgeon. The 22mm diameter motors are lightweight and produce low noise and vibration to improve the ergonomic comfort and control in the hand – essential in long surgeries where fatigue may set in. To ensure reliability and cost efficiency the motors have all been tested to withstand 1,000+ sterilisation cycles as well as exposure to saline and other foreign materials.

For design engineers looking to specify one of the motors in a prototype, standard motors are available with a short lead time. Where a customised solution may be required, Portescap’s R&D engineers are well-versed in medical device integration and are eager to collaborate. Typical customisation options may include hollow/cannulated shaft designs for wire drivers, custom shafts or housings or bevel gears to provide positional flexibility within the tool.

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Making sense of sounds: how AI can boost machine uptime

Anyone familiar with the necessity of maintaining a machine knows how important the sounds and vibrations it makes are. Proper machine health monitoring through sound and vibrations can cut maintenance costs in half and double the lifetime. Implementing live acoustic data and analysis is another important approach for condition-based monitoring, says Sebastien Christian.

We can learn what the normal sound of a machine is. When the sound changes, we identify it as abnormal. Then we may learn what the problem is so that we can associate that sound with a specific issue. Identifying anomalies takes a few minutes of training, but connecting sounds, vibrations and their causes to perform diagnostics can take a lifetime.

Analog Devices set out to build a system able to learn sounds and vibrations from a machine and decipher their meaning to detect abnormal behaviour and to perform diagnostics. The result of this work, OtoSense, is a machine health monitoring system that enables what 'computer hearing', which allows a computer to make sense of the leading indicators of a machine’s behaviour: sound and vibration.

To be robust, agnostic, and efficient, the OtoSense design philosophy followed some guiding principles:

- Get inspiration from human neurology. Humans can learn and make sense of any sound they can hear in a very energy efficient manner.
- Be able to learn stationary sounds as well as transient sounds. This requires adapted features and continuous monitoring.
- Perform the recognition at the edge, close to the sensor. There should not be any need of a network connection to a remote server to make a decision.
- Interaction with experts and the necessity to learn from them must happen with minimal impact on their daily workload, and be as enjoyable as possible.

The process by which humans make sense of sounds can be described in four familiar steps: analogue acquisition of the sound, digital conversion, feature extraction, and interpretation.

Analog acquisition and digitisation in OtoSense is performed by sensors, amplifiers, and codecs. For feature extraction, OtoSense uses a time window that Analog Devices calls ‘chunk’, which moves with a fixed step size. OtoSense shows a graphical representation of all the sounds or vibration heard, organised by similarity, but without trying to create rigid categories. This lets experts organise and name the groupings seen on screen without trying to artificially create bounded categories.

From sound and vibration to features
A feature is assigned an individual number to describe a given attribute/quality of a sound or vibration over a period of time (the time window, or chunk, as we mentioned earlier). A portion of the OtoSense platform’s two to 1024 features describe the time domain. They are extracted either right from the waveform or from the evolution of any other feature over the chunk. Some of these features include the average and maximal amplitude, complexity derived from the linear length of the waveform, amplitude variation, the existence and characterisation of impulsions, stability as the resemblance between the first and last buffer, skinny autocorrelation avoiding convolution, or variations of the main spectral peaks.

The features used on the frequency domain are extracted from an FFT. The FFT is computed on each buffer and yields 128 to 2048 individual frequency contributions. The process then creates a vector with the desired number of dimensions – much smaller than the FFT size, of course, but that still extensively describe the environment. OtoSense initially starts with an agnostic method for creating equal-sized buckets on the log spectrum. Then, depending on the environment and the events to be identified, these buckets adapt to focus on areas of the spectrum where information density is high, either from an unsupervised perspective that maximises entropy or from a semi-supervised perspective that uses labelled events as a guide. This mimics the architecture of our inner ear cells, which is denser where the speech information is maximal.

Outlier detection and event recognition with OtoSense happen at the edge, without the participation of any remote asset. This architecture ensures that the system won’t be impacted by a network failure and it avoids having to send all raw data chunks out for analysis. An edge device running OtoSense is a self-contained system describing the behaviour of the machine it’s listening to in real time.

The OtoSense server, running the AI and HMI, is typically hosted on premises. A cloud architecture makes sense for aggregating multiple meaningful data streams as the output of OtoSense devices. It makes less sense to use cloud hosting for an AI dedicated to processing large amounts of data and interacting with hundreds of devices on a single site.

From features to anomaly detection
Normality/abnormality evaluation does not require much interaction with experts to be started. Experts only need to help establish a baseline for a machine’s normal sounds and vibrations. This baseline is then translated into an outlier model on the OtoSense server before being pushed to the device.

Two different strategies are used to evaluate the normality of an incoming sound or vibration. The first is called ‘usualness’ where any new incoming sound that lands in the feature space is checked for its surrounding, how far it is from baseline points and clusters, and how big those clusters are. The bigger the distance and the smaller the clusters, the more unusual the new sound is and the higher its outlier score is. When this outlier score is above a threshold as defined by experts, the
corresponding chunk is labelled unusual and sent to the server to become available for experts.

The second strategy is very simple: any incoming chunk with a feature value above or below the maximum or minimum of all the features defining the baseline is labelled as extreme and sent to the server as well. The combination of unusual and extreme strategies offers good coverage of abnormal sounds or vibrations, and these strategies perform well for detecting progressive wear and unexpected, brutal events.

From features to event recognition
Features belong to the physical realm, while meaning belongs to human cognition. To associate features with meaning, interaction between OtoSense AI and human experts is needed. A lot of time has been spent following our customers’ feedback to develop a human-machine interface (HMI) that enables engineers to efficiently interact with OtoSense to design event recognition models. This HMI allows for exploring data, labelling it, creating outlier models and sound recognition models, and testing those models.

An unusual sound or vibration above the defined threshold triggers an outlier notification. Technicians and engineers using OtoSense can then check on the sound and its context.

These experts then label this unusual event.

A new recognition model and outlier model that includes this new information is computed and pushed to edge devices.

(Above) The OtoSense system
OtoSense has been designed to learn from multiple experts and allow for more and more complex diagnostics over time. The usual process is a recurring loop between OtoSense and experts:

An outlier model and an event recognition model are running at the edge. These create output for the probability of potential events happening, along with their outlier scores.

An unusual sound or vibration above the defined threshold triggers an outlier notification. Technicians and engineers using OtoSense can then check on the sound and its context.

These experts then label this unusual event.

A new recognition model and outlier model that includes this new information is computed and pushed to edge devices.

www.analog.com

Sebastien Christian is AI engineering director at Analog Devices
Global concern for the environment continues to drive developments in green technology and this is particularly notable in the increase in demand for electrical vehicles. As uptake of electric vehicles (EVs) increases, the EV battery industry has needed to grow in tandem. The specific benefits of HepcoMotion’s V guide system have proved invaluable in satisfying the requirement for new production facilities and processes.

Linear motion expert HepcoMotion is currently excelling with applications in the expanding EV sector. With a dedicated sales office in South Korea, UK-based HepcoMotion specialises in high quality linear and circular solutions and automation components. Celebrating its fifty-year anniversary this year, HepcoMotion has gained a reputation for its high-end, low maintenance products. The top three companies in Korea’s battery market are investing heavily in the production of EV batteries worldwide and HepcoMotion is supplying to all of them; SK Innovation, LG Chemical and Samsung SDI.

**Vertical closed loop track system**

The composition of an EV battery varies depending on the type of electric vehicle, but generally, EV batteries are composed of individual battery cells and modules which come together to form a pack. The battery for a BMW i3 for example comprises of 96 battery cells. Twelve cells are combined into one module and eight modules come together to form one pack. The manufacture of EV batteries therefore requires many elements to be combined together making it particularly suited to long line manufacturing. Space is often at a premium however, making a compact, space-saving system high on the agenda. Production formats vary but the key EV battery manufacturers all use a vertical closed loop track layout, which offers significant benefits by optimizing the space in a 3D capacity. The footprint remains the same but production can be doubled by having two productions lines running in parallel, vertically aligned, one above the other. A small length of track, vertically moved by an actuator connects the lower and upper tracks. Not only is this system space saving but it also maintains the product in a single orientation; advantageous in EV battery production.

With a vertical closed-loop track layout there is a small gap between the main production line and the short length of track that moves vertically to connect the upper and lower tracks. A traditional conveyor system or a ball rail system for example, are not able to cope with this gap. Indeed, it can be challenging for many linear guidance systems to cope with gaps and provide the seamless guidance required for the carriage to traverse. Hepco’s V guide systems are able to traverse joints or gaps making them a popular choice in EVB applications.

**Cutting-edge production by key Korean conglomerates**

SK Innovation, South Korea’s leading oil and chemical company, has been mass producing EV batteries since 2012 and is set to increase its EV battery production capacity with expansions into Europe and the US. Producing pouch type EV batteries for customers such as Volkswagen, SK Innovation is one of the top battery suppliers for electric vehicles. In South Korea, SK Innovation utilise an impressive 104 metres of Hepco’s core GV3 track, arranged in a vertical closed-loop track layout, 50 metres long and 2 metres high. Well suited to long lengths, GV3 can be specified to any length, supplied as butted sets to fulfil longer length requirements such as this. GV3 is a superior V based linear motion range designed to serve a diverse range of automation and linear applications.

Typically operating at 1m/s with a 20kg payload, the movers move around the system via dynamic track sections that vertically align with adjacent tracks, providing a sizeable flow process through various stages of production. SK Innovation use Hepco’s 6 bearing carriages, which are able to traverse gaps as four bearings are always in contact with the rail when traversing the gap, keeping the carriage parallel. A centrally mounted linear motor unit independently moves the carriages, providing complex sequences of movement for individual carriages.

Leading Korean Chemical company, LG Chem also use Hepco’s GV3 linear guide in their automated system producing EV battery film. Again a vertical closed-loop system is employed and the GV3 linear guides are supplied as butted sets to fulfil the 20m circuit. With a wide portfolio of products and a variety of different configurations ideally suited to EV battery manufacture including single-edged slides, 6 bearing carriages, and assembled carriages with added top-plate, HepcoMotion has a solution to meet practically any requirement.

**Low maintenance**

One of the biggest challenges in the EV industry is producing the output to match the
This is an exponentially growing market and as with all applications requiring high throughput, low maintenance is core to optimizing production processes. A low maintenance solution means less manpower, less downtime which equates to a significant cost saving. Conveniently, when a Hepco V system shows sign of wear, the process is simple and does not impinge too much on production time. The eccentric adjustment facility of the V bearings can be used to quickly and simply remove any play that has occurred. Moreover, when the V bearings reach the end of their calculated life, they can be replaced individually, and not as an entire set, saving both time and money. A key point to note is that a V guide system will not fail catastrophically meaning excessive downtime and a complete system change will be avoided.

**Corrosion resistant**

The chemicals involved in the manufacture of EV batteries means that corrosion resistant materials are often required. One of the key benefits of Hepco’s V guide systems is that stainless steel is a standard choice. Hepco’s SL2 stainless steel linear guide is not priced as a ‘special’ and not subject to long lead times. Furthermore, HepcoMotion provides a range of stainless steel and corrosion-resistant elements that can be mixed and matched so that the optimum combination of hygiene, wear and performance can be achieved.

HepcoMotion’s SL2 is a core component in systems for South Korean electronic component maker, Samsung SDI, the world’s largest supplier of lithium-ion batteries. 2 x SL2s are arranged in parallel, supplied as joined sets to fulfil the 20m circuit, where a number of key processes are performed. This application requires a consistent level of precision to ensure SL2 carriages, which carry the product are aligned correctly to production equipment and processes.

Operating at 2m/s with an 80N payload, this is a high duty application.

**Adaptable**

Flexibility is also a key factor in the production of EV batteries as manufactures need to produce different batteries for each model car, and as such the system needs to be able to accommodate different sizes quickly and efficiently. As the movers are individually controlled with linear motor technology, the movers can easily be programmed to suit the different requirements of the various batteries. Conveniently, this can all be done without having to re-configure the system, saving production time and thereby increasing product throughput.

**Compliance**

A further reason why Hepco is often favoured in this type of application is due to its high compliance. Mounting to an uneven surface can be time-consuming and costly. The unique design of Hepco’s V bearing allows it to perform when mounted to un-machined or uneven surfaces. GV3 twin bearing are constructed from two pieces, and therefore allow a small amount of compensation for deviation in mounting surface flatness. Ball rail systems cannot tolerate any deviation in mounting flatness, and require surfaces to be machined prior to installation. For customers such as SK Innovation that use 2 x 50 metre guides, the ability to operate effectively without machining these surfaces is a big time saver.

As electric vehicles continue to move towards becoming a viable choice for mainstream drivers, the long-term outlook on the electric vehicle battery market looks positive. With end users including SK Innovation, LG Chem and Samsung SDI, Hepco’s V guide systems meet the demanding needs of the biggest EV battery producers, and are a key production element contributing to a cleaner, environmentally friendly future.
A condition monitoring test rig which monitors vibration and temperature of bearings and gears in gearboxes and axles has cut maintenance costs on trains, and costs significantly less than installing complex onboard monitoring systems.

Local public transport with regional rail vehicles is part of a railway operator’s core business in Asia. Low maintenance costs and high train availability are crucial factors for the operator. Any downtime or delays can mean considerable costs and financial penalties. To ensure the best possible availability, the gearboxes and wheels of all the wheelsets of a train, including its axle and gearbox bearings, are regularly inspected, overhauled or replaced. The customer was therefore looking for a solution that would ensure the reliability and accuracy of checks, while also minimising the downtimes of the trains.

With its special condition monitoring test rig for railway gearboxes and axlebox bearings, Schaeffler implemented a cost effective solution optimised for the customer’s specific application. Schaeffler SmartCheck sensors are simply attached to the components to be monitored using magnets and undertake precise measurements of vibration and temperature without a requirement for further installation outlay. Components monitored include gears in gearboxes, gearbox bearings, wheel axles and axlebox bearings.

The sensors are directly connected via a Schaeffler SmartController to the input and output terminals such as an HMI touchscreen control panel, an external monitor, and alarm and data processing systems. The axes are driven by means of an integrated electric motor for the test runs. In addition, the system can reliably check whether the bearings were correctly mounted, for example, after bearing replacement. Parameters monitored include vibration, temperature, speed and bearing end position.

Eliminating unplanned downtime

For the customer, the integrated solution for the inspection of gearboxes and wheelsets is an important tool in eliminating unplanned downtimes and malfunctions in rail applications. The investment in the test rig is also significantly lower compared to the cost of complex onboard monitoring systems, which are often used in long distance trains.

The customer is also benefiting from reliable and very precise condition monitoring, with simple and full integration to the customer’s infrastructure. The system offers user-friendly and efficient operation, enabling inspection of gearboxes without dismantling and changing the oil, and inspection of bearings without dismounting and replacing the seals. It also enables a mounting check after maintenance or replacement of bearings.

Unplanned downtime of trains can always result in direct and indirect costs for rail operators. The reputation of the operator can also be damaged, particularly in public transport applications. In this particular case, there is an additional significant risk because any downtime or delays in rail traffic is penalised in the form of severe financial penalties stipulated by national regulations. Following the positive experience with Schaeffler’s test rig, the customer is now planning to use the system at other locations.
Cable management technology helps loudspeaker arrays fly

Sophisticated acoustic modelling helps sound engineers in theatres and concert halls achieve optimal clear sound and sonically uniform coverage around the venue. However, some flexibility is needed within the fixed installation to allow for the different audio projection needs of visiting performers. Traditionally, this has been achieved by connecting the fixed and moveable audio elements through slip rings, however their operation depends on breaks in the conduction paths. In high power, high quality systems this break can have an adverse effect on reliability and potentially signal quality.

The solution offered by Igus is the e-spool cable management system, which provides no-break connections between the amplifiers and speakers, eliminating reliability and signal quality issues. In the system, an e-chain carries the cables from the amplifiers guided by one roller, which maintains the correct length and tension via an integrated retaining spring. The twisterband connects the roll to the shaft block, which acts as the interface between the linear motion and the fixed end. Other benefits of the e-spool system are that there is never any tensile load on the cables and cable droop is eliminated to save space and keep working areas clear.

Readychain assembly

Igus is a leader in e-chain carriers, and indeed on the dynamic cables that run within them. The technical application definition for KEB was as follows: a hoisting gear with a load capacity of 110 tonnes presents to the audience, depending on the stage situation, an 80m³ pool, a 50m² ice surface or two other stage settings. As another variant, a mobile ground floor of 190m² is used that provides space for 410 visitors and tables.

The centrepiece of the automation concept is the powerful KEB CombiControl Compact II embedded control system and the ‘Yaw Library’ with software components for the coordination of loads on distributed drives. The flexibility of the hardware and software of COMPACT II is another important element in the overall solution for the stage technology, where super-ordinated master computers communicate serially with CAN-Bus and, on the other side, the actual motion profiles of the drive axes are controlled in real time via the EtherCAT protocol in synchronous communication. The KEB Combivert F5 drive controllers are universally suitable for the operation of different motors and possess the integrated safety function S70 according to IEC 62061 – SIL3.

With fundamentals gained from the torque-sharing methods used in offshore wind turbines, it was possible to design and implement a powerful stage system within a short time. The high quality of the torque control and precise positioning of different elements on hoisting and running gear will ensure over the coming years an active stage setting full of motion in the cabaret.
Bicycle testing technology ensures cyclists’ safety

One of the leading providers of bicycle testing technology is EFBE Prüftechnik from Waltrop, Germany. When building its test stands, EFBE makes the most of the stability that aluminium construction profiles offer.

With strict regulations covering their manufacture, it is critical to know how bicycles, e-bikes and components behave under various conditions and loads. A test rig featuring high-precision, force-controlled servo pneumatics is being used by EFBE in Germany to simulate how a bicycle will behave over the years when put through its paces by a customer. And the rig is constructed using aluminium profiles.

EFBE was established in 1995 as an academic spin-off of RWTH Aachen University by graduates with a passion for cycling. Over the years, bicycle testing technology from EFBE has garnered an outstanding reputation and is used by leading bicycle manufacturers worldwide. “We don’t just carry out tests, we also develop our own, such as the EFBE Tri-Test, because we, of course, want to play an active role in shaping development in this area,” says Marcus Schröder, managing director of EFBE.

The company’s business model centres on three core areas: firstly, manufacturers can have their models tested on site in the EFBE bicycle testing laboratory – regardless of whether they’re frames, forks, handlebars, stems, entire bicycles or e-bikes. Secondly, EFBE manufactures test stands for the bicycle and e-bike industry. Thirdly, EFBE is becoming increasingly involved in supporting production processes, not least thanks to its subsidiary in the industrial metropolis that is Taichung in Taiwan.

Both the test stands used in the EFBE laboratory and the bicycle testing technology the company supplies use the MB Building Kit System from item. The profiles and fasteners create a solid foundation on which the test axles are then positioned. The test stands are subjected to heavy, highly dynamic loads on a daily basis, simulating roads, trails and downhill routes. As a result, the components used must be adequately robust and durable. One test stand from the early days is even still in use today.

What’s more, the system is able to grow with the company: “For us, the key advantage is its modular design, not to mention how quickly it can be adapted and the long service life it offers. The bicycle industry is constantly changing, especially in the e-bike market. That’s why we have to adapt our testing technology quickly. Thanks to item, we’re more than capable of doing just that,” explains Schröder.

The entire bicycle industry is constantly changing. Just a few years ago, Taiwan was still the centre of manufacturing. The focus has since begun to shift more towards Vietnam, Cambodia and Indonesia, with organisational decisions still being made in Taiwan. EFBE has had a presence in Taiwan since 2016 so as to better serve the manufacturers based there. “This means we can assist our local customers as early as the production stage and, of course, offer the best possible support through our local staff,” says Schröder.

Besides its testing services, EFBE’s quality management skills are in high demand in Taichung, more than anything else – and these really come into their own in production-related services such as audits and training courses.

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The exhibition is free to attend, free to park and easy to get to. Doors open at 9.30am on Tuesday 11th February.
Thousands of new hardware products added to range

Essentra Components has announced thousands of new catalogue products focused on the needs of its industrial manufacturing customers. The additions include 5,000 new SKUs of standard machine parts including handwheels, knobs, levers, handles, control knobs, and indexing plungers. Alongside new PA, PP, POM and PF offerings the company also has steel, stainless steel and aluminium choices and customisable colour options to suit customer build applications.

Other extended ranges to make things easier for future machine builds include hygienic feet, handles, locks and nuts. The new easy to clean, chemically resistant, 3-A standard range of products are said to be ideal for healthcare and food industry equipment manufacturing. 3-A is a standard to promote hygienic equipment design.

This set of feet, handles and knobs all incorporate polished 304 stainless steel, silicone gaskets and smooth surfaces to reduce dust and dirt build-up. Polished 304 stainless steel nuts prevent air, dust and liquid ingress by obscuring threads.

Anti-vibration bell mounts are available in a range of thread sizes from M8-M16. These light to medium duty mounts are made from steel and shore rubber hardness 60 ISO isolate vibrations. Safe break options are also available.

Other new products include: toggle clamps – an extended range of vertical and horizontal, hold-down, push/pull, safety lock and stainless steel clamps stocked in industry standard sizing; accessories for hydraulic systems – oil level indicators, breather caps with splash guard and column level indicators for checking fluid levels in hydraulic systems; and tube clamp connectors for connecting, assembling and clamping elements in machine building and tube connecting.

Expanded range of imperial machine elements

WD Component Parts is expanding the range of imperial sized components it offers, supporting its continued growth in those markets, regions and sectors that prefer non-metric dimensions. While it has always carried imperial products in its catalogue, mainly in the bolts and fastening section, now the company is making and supplying new version of studs, swing bolts and insulated hand knobs in Imperial dimensions and threads with plans to steadily expand its Imperial offering with new sizes of many of its metric products.

“We are already established in America, which is probably the largest single market for imperial components, but we want to grow our presence there significantly,” explains John Marshall of WDS. “Interestingly, while most people think of the US as being imperial, in fact they work with metric quite a lot too, sometime mixing both systems on one project. WDS is not only able to supply both types of product but we have considerable expertise in converting between the two and of using them side by side.”

Other regions that use imperial measurements include large parts of Asia Pacific and parts of South America. It is also notable that some industries still have a need for Imperial parts, especially those that rely on long-life capital equipment, such as mine and quarry conveyors.

“It is a bit of a Euro-centric view that metric is the main system of measurement,” says Marshall. “If you take a worldwide view, the balance between metric and Imperial is much more finely balanced.”

In the UK and Europe, WDS supports many heritage industries, including organisations that run steam railways and historic industrial sites, with Imperial products. Marshall says: “WDS are popular with such groups because we provide them with exactly the same service levels we offer to our commercial and industrial clients.”

WDS has a very comprehensive range of engineering components, most of which are available in different sizes, formats, materials and configurations so suit many different applications.
NEW: Telescopic (monitor) support arm

RK Rose+Krieger has expanded its support arm system for its RK monitor mounting with a telescopic support arm (basic length 495mm). In its extended state (720mm), it is designed for monitors, display devices and operating terminals weighing up to 5kg. With its new swivel arm, RK Rose+Krieger expands its combination options and enables greater ergonomic adaption of end devices to the working environment.

For use as in individual support arm or as multiple support arm systems together in combination with RK monitor holders. This makes them ideal for use in control rooms where multiple monitors and display devices are frequently placed above or next to one another. The support arm telescope enables the quick and easy ergonomic arrangement of any number of monitors in a range of formats.

The monitors can be flexibly height adjusted, swivelled, extended and fixed... all without the need for tools.

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Making the connection: OT and IT infrastructure in manufacturing

New business models that improve how we design, build, sell and operate industrial services and machines are being created by improved connectivity between the operational technology (OT) and the IT system.

One of the key challenges for today’s businesses engaged in the process of digitalisation is connecting shop floor OT with IT infrastructure. But it’s important to address these challenges because it that connectivity between OT and IT which is key to enabling companies to achieve the competitive boost that they need to thrive in the modern business environment.

The first step in optimising OT/IT connectivity is processing and using the large amount of data made available by shop floor equipment, such as sensors and PLCs. The new edge computing solutions from Mitsubishi Electric, the MELIPC series demonstrates both capabilities. It offers Edge computing functionality combined with OPC UA compatibility. Data can be pre-processed locally and aggregated to create valuable information locally and can seamlessly connect the shop floor with higher level IT systems such as MES and ERP platforms.

This capability enables machine builders to offer valuable services that can be adapted to suit many different IT environments and has already been demonstrated working with Oracle, SAP, IBM and Microsoft Azure. The technology can create competitive advantage by predicting maintenance requirements and identifying anomalies to improve productivity or simply improve the efficiency of existing equipment.

Another application utilising the advantages of OT/IT connectivity is a new web-based ‘software as a service’ (SaaS) predictive maintenance tool which is under development in conjunction with e-F@ctory Alliance partner Schaeffer. It is planned to be launched during 2020. It has been made possible by the e-F@ctory concept which is comprised of the e-F@ctory Alliance Network and the knowledge that the partner network provides, coupled with Mitsubishi Electric’s expertise and experience with industrial automation.

The improved control and visualisation of manufacturing processes is another example where OT/IT crossover is in demand. Mitsubishi Electric’s SCADA system, MAPS achieves this by collecting and aggregating production data for both shop floor use and IT management systems. The recent acquisition of ICONICS has extended the company’s portfolio in this area and will be able to provide more value by exploiting the data even further.

Classic OT benefits

The OT equipment offered by Mitsubishi Electric that is generating valuable data includes the latest PLCs. For machine builders looking for increasingly compact control solutions, the MELSEC iQ-F PLC series offers fully integrated control from one small unit. At the opposite end of the scale the MELSEC iQ-R PLC series enables total control over a much larger machine, or a complete production line. Highly dynamic motion control for up to 264 axes of movement by the iQ-R is made possible using one single network, CC-Link IE TSN.

In addition to connectivity concepts for OT/IT and shop floor automation equipment, Mitsubishi Electric is also supporting humans with robotics that adapt safely to limited space on the shop floor. To enhance and extend human collaboration with robots Mitsubishi Electric has developed a new collaborative robot (cobot), the MELFA FR Assista. The cobot is designed to offer maximum safety for close cooperation with humans, combined with added durability. It also allows for ease of use and programming while maintaining very high positional repeatability.

Another robot application allows a standard industrial robot from Mitsubishi Electric to work around obstacles such as personnel to reach a position without collisions. This demonstration is being made possible by Realtime Robotics ‘motion planning’ software which will determine an optimised motion path for a standard robot arm in real-time.

Linking the portfolio of OT automation products such as robotics and PLCs with IT systems is essential and requires a suitable network technology. This is why all new relevant products from Mitsubishi Electric Factory Automation launched during 2020 will be compatible with the latest CC-Link IE TSN gigabit Ethernet. It offers time-sensitive networking which allows all connected OT equipment to be fully synchronised, maximising production speed and efficiency while also taking advantage of seamless data exchange with IT infrastructure.

gb3a.mitsubisheimlectric.com
**Servo drive features machine learning**

The Arcus Tital-SVH-ETH from LG Motion is a single axis servo motor controller with advanced feedback that is able to drive motor types of servo motor. Along with its advanced servo functions, it also includes a motion ‘edge intelligence’ solution called 2nsSight.

With this, titan is able to perform complex machine learning, smart analytics, and comprehensive monitoring to achieve a truly intelligent motion system for the emerging Industry 4.0 market.

The Titan controller works universally with most types of servo motors, including stepper, brushless servo, linear, shaft, DC, and voice coil. It supports most commonly used communications: Ethernet, USB, and RS485. And it includes many advanced motion control features including auto parameter detection, auto tuning, force/torque control, and multi-thread motion programming. The controller uses the intuitive and easy-to-use Titan software that enables anyone to start-up the servo motion system within minutes.

www.lg-motion.co.uk

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When something isn't working optimally, excess heat is commonly a tell-tale sign. This simple fact has led thermal imaging to become an important inspection tool in many industries including dairy farming.

The National Animal Disease Information Service (NADIS) reports the cost of mastitis to farmers is between £70 and £250 per cow per annum. Thermal imaging is proving highly effective in automated milking parlours for the early detection of mastitis in cows and providing cost savings to farmers. Indeed, the ability of a thermal camera to 'see' inflammation in this way is being considered for detection of other diseases in farmed animals such as sheep.

Ongoing university research is evaluating the use of thermal imaging to address lameness in sheep. Aside from the welfare concern, lameness causes significant financial loss. According to NADIS, the problem currently costs UK farmers £28m per annum. The main cause of lameness is a bacterial hoof infection and early detection is not only essential to lessening the severity of the symptoms and other health issues, but also to preventing its spread throughout the flock.

To manage and minimise the problem, farmers routinely gather and pen their sheep to examine their hooves. Those showing signs of lameness are then separated and treated appropriately. This is both a time-consuming task and one that can be distressing for the animals.

To find a solution the university is working with Stanbury’s, a company that primarily specialises in building surveying and estate management. Thermal imaging is vital to its efficient diagnosis of faults in building fabric. This experience has led the company to diversify into the provision of thermography services and Flir infrared camera sales in other industries.

"A thermal imaging camera is designed to detect infrared energy and build a picture based on the different temperatures emitted by the target," explained Allister Pirrie, a level 2 thermographer with Stanbury’s. "It is a non-contact technology that can be used effectively over distance and has great potential in farming applications."

To measure temperature accurately over distance depends on several factors with two of the most important being the resolution of the detector and the chosen camera lens. Stanbury’s therefore recommended the Flir E85 for the sheep foot-rot detection research.

"The Flir E85 is a hand-held thermal imaging camera with intelligent interchangeable lenses, laser-assisted autofocus modes and area measurement functionality. The company’s patented MSX image enhancement technology is standard on the Flir E85 as it includes UltraMax, an embedded super-resolution process that improves effective resolution by four times and thermal sensitivity by up to 50%.

Pirrie concluded: "Initial trials have gone brilliantly. The FLIR E85 has consistently provided fast and effective spot diagnosis of sheep while they are grazing in the field. This allows the vet to spot trauma at a distance and localise an individual for examination and as it is a non-invasive and non-contact method, there is no distress to the animal."

Trials are on-going and it has already become evident that the benefits of thermal imaging could extend beyond initial diagnosis of foot disease. The Flir E85 is now also being evaluated as a non-invasive method for observing how sheep are responding to treatment for injuries and disease. This means that the animals do not have to be penned, enhancing their welfare and saving farmers costs.

www.flir.com
Protecting industrial environments through applying **ergonomic design**

A report from the Health and Safety Executive in 2018 estimated that 6.6 million working days were lost in the UK in 2017/18 due to work related musculoskeletal disorders. This accounts for nearly a quarter (24 per cent) of all working days lost due to work related ill-health in the UK, with an average of 14 days lost in each case.

Man handling, awkward or tiring positions and repetitive action are estimated to be the main causes of work related musculoskeletal disorders. Interestingly, 82% of these cases affected the back, hand, wrist, arm, shoulder or neck. In terms of occupation, skilled trades’ occupations, process plant and machine operatives had significantly higher rates than other occupations.

Health and safety, employee wellbeing and greater productivity benefits, make ergonomic working an essential consideration in today’s workplace. This means not only ensuring that machines and equipment satisfy safety requirements but also making sure that they are as easy to use as possible – ideally effortless, strain-free and offering suitable adjustment for each operator.

**Operator terminals**

One example where manual handling can easily be optimised for process plant and machine operatives is the operator terminal on machines, which needs to be flexible and easy to position using support arm systems. The support arms must be adjustable to allow the terminals to be comfortably positioned for operators of different heights.

Rittal is now offering a height-adjustable support section for its CP support arm system. Two weight ranges are available within the CP support arm system: 4–30kg or 10–60kg. Weight can be adjusted within these ranges to ensure that the enclosure remains at the set height over long periods of operation without any re-adjustment – a feature comprehensively tested by Rittal in the laboratory over 30,000 cycles.

Designed for a maximum height difference of 600mm and smaller than its predecessor, the new height-adjustable support section allows integration into the support arm system without adding an adaptor. The wide range of height adjustment ensures maximum comfort for operators of different heights, in both seated and standing positions.

As with all Rittal support arm systems, single-person assembly is possible. The weight of the height-adjustable support arm is set via an easy-to-access screw and does not require the dismantling of any components to access the screw, simplifying the system adjustment. Screws at the joints can be reached even after assembly while a removable side panel ensures easy access to cable routing.

**Ergonomic panel building**

In the panel building and OEM environment Rittal has incorporated ergonomic design into all of its standard products. The new AX and KX wall boxes reduce dis-assembly work during initial modifications because the door, mounting plate, locks and gland plates are provided but not fitted. Furthermore, features such as retrospective earthing and simplified wall mounting ensure improved, flexible and efficient use.

Fitting AX accessories also needs relatively little manual operation. The interior installation rail with 25mm pitch pattern allows accessories to be fitted inside without any vibration/force caused by drilling, which in turn means the operator is safer as are the components inside (because the IP rating is protected).

The VX25 baying enclosure system has several ergonomically designed features. The new frame section now offers access from all sides as well as inside and outside. It is now possible to fit mounting plates from the back; particularly useful when heavily populated mounting plates are being installed. The additional 20mm installation depth provides more manoeuvre room within the enclosure for particularly deep installations.

Installing mounting plates in the VX25 is now easier with new protective slides. Until now, it was often difficult to fit very heavy mounting plates – lifting them with a hoist and then fixing them within the enclosure was an awkward process. With the VX25, protective slides ensure that the mounting plate can be easily positioned and screwed in place after it has been lowered down by the hoist.

**Reducing manual impact and fatigue**

The highest proportion of musculoskeletal disorders identified in the 2018 HSE report were found to be caused by heavy lifting and material manipulation. One way to substantially lessen the likelihood of manual strain and damage to employees is to consider introducing further
Enclosures, Cabinets & Cases

Electrical Equipment & Design

semi- or fully-automated tools into the workshop. Rittal Automation Systems (RAS) offers a wide variety of semi-automatic and automated solutions to significantly decrease the required amount of manual handling and material manipulation. Perforex machining centres deliver fully automated, fast, precise and reliable machining – drilling, thread-tapping and milling – of mounting plates, doors, roof plates, side panels, gland plates or complete enclosures.

The machines allow optimal handling of all parts and all materials commonly used in panel building – such as steel, stainless steel, aluminium, copper and plastic – may be machined very cost and time effectively, with savings of up to 80%. It’s far more precise than traditional manual processes and will replicate that accuracy as often as required. It also, of course, causes far less physical impact on the hands and wrists in particular. Almost all common CAD and E-planning systems can be used for remotely programming machine operation, while programmed job sheets can be re-used to avoid repetition of work. The enhanced performance package offers less vibration, faster feed rate, reduced noise emission and prolonged tool life.

The Perforex LC Laser Centre is a 3D-laser cutting machine designed for the machining of stainless steel and sheet steel, as well as powder-coated metals such as enclosure doors, side panels, etc. Spray-finished metal parts are cut with visible paint damage or discoloration, and there is no tamishing of the cut edges when machining stainless steel. It ensures ergonomic working, thanks to the retractable locating surface for enclosure machining.

Furthermore the machine is contactless, it allows simultaneous machining of five surfaces, it operates with low-vibration, it has no tool wear and - because there is no physical force applied to cut the workpieces - it can machine 3D cubes without the user either repositioning the workpiece or clamping it. The Perforex LC takes minutes to machine each piece, saving multiple hours of effort and time per enclosure.

The Secarex cutting centre is simple and convenient to use. It cuts wiring ducts, cable duct covers and support rails (DIN rails, etc) to length quickly, precisely and reliably. It saves time and effort spent on measuring and cutting, plus it eliminates any complicated handling. It lowers cutting waste, delivers significant time savings compared to manual cutting, reducing costs and speeding up the overall process. Easy handling is provided through guides and a built-in automated length stop.

Semi-automatic wire processing machines are also available, offering length cutting, stripping, as well as combined stripping and crimping. All of these machines expedite and reduce manual repetitive work and strain.

Safe handling equipment
The Rittal portfolio of handling equipment offers assembly frames, storage and transportation trolleys, solving both manual handling issues and easing the strains of working in awkward positions.

The Rittal functional trolley’s fold-out system allows it to switch from transport function into a convenient work table, making it the ideal solution for assembly technicians and service personnel. It has an integrated seat, high stability and durability and can be used for a maximum load of 20kg as a handcart and 30kg as a table.

The storage and transport trolley for flat panels has eight compartments and can accept a maximum load of 500kg. The compartments are individually height adjustable to provide ease of accessibility and loading.

The ergonomically co-ordinated Assem blex frames for the assembly and wiring of mounting plates and enclosures are movable, position lockable and offer adjustable working height from 0.8-1.1m and tilt angle up to 80°. The most advanced version is adjustable via battery-powered electric motor and can hold a maximum load of 300kg. Users can incline the assembly frame to allow machining whilst seated which, combined with the other adjustment features, allows the operator to adjust their position and work in optimum comfort.

Summary
The ergonomic design of industrial environments, machines and equipment, as well as their sub-component parts, can have a significant impact on human operator performance. Designing tasks, equipment and work stations to suit the user can reduce human error, accidents and ill-health. Failure to observe ergonomic principles can have serious consequences for individuals and for the whole organisation. Effective use of ergonomics in your workplace ensures a safer, healthier and more productive environment.

www.rittal.co.uk
Enclosures for UK’s deepest mine

Over a kilometre under the North Sea, 8 miles from dry land, sits a Spelsberg GRP enclosure. Installed at the face of the UK’s deepest mine as part of an Air Spectrum dust suppression system, this is an environment so alien that NASA rovers, dark matter experiments and underground labs all call this place home. This is Boulby Mine, the frontline of Cleveland Potash Limited’s polyhalite mining operations.

Boulby Mine varies in depth from 1,100 to 1,400m. A former potash mine, Boulby now primarily produces polyhalite, a rare earth mineral that can be used as fertiliser. Underground laboratories also form part of the site: researching the big questions surrounding dark matter and providing a proving ground for NASA space rovers.

In 2018, 450,000 tonnes of polyhalite were extracted from Boulby Mine, with operator Cleveland Potash looking to expand operations and output over the coming years. Mining at this extreme depth under the sea presents challenges: darkness, equipment reliability, access, ventilation and – of pertinence to this application – dust.

As polyhalite is mined at the face, the auger produces large amounts of airborne dust. Failure to suppress this dust can cause it to spread down the shaft, presenting safety risks to miners and potentially harming equipment. To ensure this dust is suitably controlled at the face, Cleveland Potash approached Air Spectrum, a leading provider of dust control systems, to deliver a solution.

Matt Edmonds, operations and engineering manager at Air Spectrum, explained the system: “Our dust suppression system constitutes a series of 12 air and water atomising nozzles that spray above the auger as it mines. Water is pumped into each nozzle along with compressed air, mixed in a secondary chamber to form a very fine mist, then fired out of the nozzle in a cone. The reliability of the system is paramount, as mining cannot continue without it. Therefore, we knew that when it came to choosing an enclosure for the system, we needed an optimum solution.”

With Boulby Mine looking to improve output, keeping the mine running is paramount in meeting exacting targets. Commodities are susceptible to price fluctuations, so insuring against this requires Cleveland Potash to continually extract large quantities of polyhalite to protect profit margins. Due to the remoteness of the face, it also takes time for maintenance crews to reach stricken equipment, which adds further urgency to the reliability requirements. Therefore, ensuring equipment can operate reliably between scheduled maintenance checks is incredibly important.

Air Spectrum turned to Spelsberg, which selected a highly durable GRP (glass reinforced polymer) enclosure measuring over a metre high. Available with an ingress rating of IP68, the enclosure was ideal for resisting dust and moisture off the shelf, especially important as it was installed within 10m off the face itself. Well within the range of the auger cutting through the seabed, this exceptional environmental resistance ensures electricals are not at risk from the grime produced as part of the mining process. Its durable chassis also meant that the harsh conditions of mining do not compromise its integrity.

Edmonds commented: “The enclosure offered a good IP rating, increased durability, correct specification and the right size to accommodate everything we needed. Overall, it ticked all the boxes, while also offering value. We’ve tried other enclosures in this application, but Spelsberg offered a high level of technical proficiency right out of the box, which is what we need for these specialised systems. We carried out the installation of the enclosure at the face ourselves and it has been operating well ever since.”

Chris Smith, area sales manager at Spelsberg concluded: “We hold a lot of stock in the UK ready for rapid delivery. In this case, we could take a specialised GRP enclosure straight off the shelf and deliver it to Air Spectrum on a reduced lead time. We also offer customisation services to Air Spectrum if a standard solution doesn’t fit, so we can be flexible in terms of meeting their requirements – even if that’s providing a solution for over 1km below the sea.”

www.spelsberg.co.uk
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This is thanks in particular to a frame profile with a 25 mm pitch pattern that is symmetrical across all levels. The VX25 is also infinitely extendable and accessible from all sides – even from the outside.
The life-saving spring in airbag bicycle helmets

A novel airbag bicycle helmet, that is worn like a collar, deploys in 0.1 seconds, providing superior protection against head injuries. Key to its operation is wire detail and a leaf spring from Lesjöfors

Concussion is one of the major causes of brain injury. Hence the need importance of a helmet for cyclists. But airbag technology specialist Hövding believes that the world’s safest bicycle helmet may not be a helmet at all. In 2016, a scientific research of Hövding’s airbag technology was conducted and the test results showed that Hövding’s unique design – an airbag that in the event of an accident expands to become both thicker and softer than a traditional helmet – reduces the risk of concussion up to eight times and almost completely eliminates the risk of skull fracture.

The airbag is designed like a hood and made in an ultra-strong nylon fabric that won’t rip when scraped against the ground. Hövding protects nearly all of the head, while leaving the field of vision open. The inflated airbag covers a much larger area than a traditional cycle helmet and is designed according to current accident statistics. To date, a total of 185,000 Hövding helmets have been sold, in 16 markets across Europe and Japan.

Components from Lesjöfors are often key parts in products that demand high safety, strength and functionality. When the third generation of the Hövding airbag bicycle helmet was being developed, the makers therefore turned for assistance to Lesjöfors. They needed help and support in the design and material choice for both a wire form for the airbag’s activation mechanism and a spring clip, from the leaf spring range. The leaf spring is required for fixating the gas generator that inflates the airbag in the event of an accident.

The challenge was to develop two components that would work well mounting wise and at the same time meet the requirements for strength and retained functionality in different weather conditions and user situations – for example, if the cyclist accidently drops the product into the ground.

“At an early stage, we could study the design drawings of the desired functionality of the springs. We immediately saw that the wire form for the activation mechanism best could be manufactured by our factory in Nordmarkshyttan, so we involved them, while the leaf spring was perfect for our operation in Värnamo,” says Johan Gannerud, technical sales at Lesjöfors Banddetaljer.

While engineers in Nordmarkshyttan improved the wire form further, a close collaboration process began for developing the leaf spring. The two engineering teams discussed drawings, tried different materials and thicknesses and carried out rigorous testing. A handful of prototypes with different contours, thickness and tensile strength eventually came down to one clip with all the desired characteristics.

Hanna Risén, mechanical design engineer at Hövding comments on the collaboration: “Hövding presented an initial drawing with specific design features and functionality of the leaf spring. Lesjöfors was a great speaking partner and we got superior support in our collaboration including flexibility and expertise from prototype and tool makers.”

Production of both wire form and leaf spring started in the first half of 2019 and so far, the both factories have delivered about 60,000 items. Marie Hult Johansson, strategic sourcing at Hövding comments on the process: “Despite a very hectic time period right before summer holidays and an overall tight schedule, communication and deliveries from Lesjöfors have worked out flawless. We look forward to our continued collaboration.”

Jan-Eric Nordh, plant manager at Lesjöfors Industriägdr in Nordmarkshyttan, is happy for Hövding's success and anticipates a great future for the rapidly growing company: “We are proud to contribute to such an innovative product that saves lives all around the world. This project is also a very good example of how we work together within our group for an optimal solution for the customer.”

www.lesjoforsab.com
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CLOCK TYPE SPRINGS

For over 100 years EMO clock-type springs have been the first choice for re-winding and counterbalancing applications and are now produced in a wide range of sizes and materials including exotic nickel alloys. Open-coiled, close-coiled and pre-stressed close-coiled designs are all available to meet every possible application.

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DESIGN • DEVELOPMENT
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Installing a coiled spring pin

There are a number of options when installing a spring pin, including hammer, manual press and automatic installation equipment. But which is the best for any given situation. The experts at Spirol explain

Coiled pins were designed with assembly in mind. Compared to other pins, their square ends, concentric chamfers and lower insertion forces make them ideal for easy installation. Additionally, coiled pins can accommodate wider hole tolerances than any other pin because they compress during installation and conform to the shape of the hole. All in all, coiled pins are the easiest type of pin to install and are designed to be serviceable.

The coiled pin’s nominal diameter represents the recommended hole size for the product into which they are being installed. Coiled pin design guidelines will provide the recommended hole tolerance range. The coiled pin is designed so that the pre-installed diameter is greater than the hole size, and the chamfer diameter is smaller than the hole. During installation, the swaged chamfer helps align the coiled pin with the hole and facilitates compression of the coils as it is being driven into position.

Installation options

Most manufacturers prefer to use a hammer when only a handful of prototype assemblies are needed. However sometimes, particularly when the pins are too small to hold while hammering into the hole, they may opt to use a pin driving chuck so that they don’t have to hold onto the pin while the pin is being inserted. Automatic pin inserters are preferred for high production volumes because they provide a significant return on investment over time. Additionally, automatic pin inserters are preferred for small diameter pins that are difficult to handle.

Hammer: The simplest coiled pin installation method is to use a hammer. First, align the coiled pin up to the hole by hand. Next, simply hammer the coiled pin into the hole as if it was a nail. Drive the pin to the desired insertion depth and be careful not to damage the host.

Using a hammer is great for prototyping a handful of assemblies or trying out a coiled pin for the first time. However, this installation method is not recommended for short pins or pins with small diameters because it can be difficult to hold these pins in place by hand.

Manual press or air hammer with pin driving chuck: Coiled pins can be installed manually with a press or air hammer by using a pin driving chuck. First, secure the pin driving chuck into the press or air hammer. Next, manually insert the coiled pin into the end of the driver. Then place the exposed end of the pin into the hole and complete the installation by advancing the press handle or actuating the air gun.

Presses and air hammers with pin chucks allow for better axial alignment, control, and quicker cycle times compared to a hammer. These are great solutions for small to medium volume production. Additionally, pin driving chucks are cost-effective and versatile tools that allow manufacturers to control alignment and insertion depth. Furthermore, the chuck will hold the pin securely in place prior to and during installation. The pin driving chuck has an internal punch with a diameter smaller than the hole but greater than the pin’s chamfer diameter. This is critical for effective installation.

Automatic installation equipment:

Automatic pin inserters are ideal for efficient, high volume production. Automatic inserters are completely self-contained. The fastener is oriented in a vibratory feeder and fed to a shuttle mechanism that positions the fastener directly underneath the insertion quill. The shuttle is mounted on a retracting mechanism that positions the pin exit bushing as close to the assembly as possible for insertion, then retracts for unobstructed loading and unloading.

The installation steps with an automatic pin inserter are simple. The operator will load the assembly onto the fixture, activate the machine to insert the pin, and then remove the assembly from the fixture. Periodically the supply of pins in the feeder bowl must be replenished. The operator does not need to handle the pins throughout any part of the installation process as he/she simply has to pour the pins from the shipping container directly into the feeder bowl as required.

There are many add-on features available to customise the automatic inserter to suit the manufacturer’s needs, such as: adjustable work station, infrared safety light curtain, force monitoring, distance monitoring, part presence sensing, rotary index tables, feeder bowl level monitoring, drilling and pinning combination, multiple pin insertion per cycle, etc. The feeder bowl can also be designed to sort errant product or debris.

Additional considerations

Fixturing: Fixtures are designed to hold, support and align components during installation. This is a critical element to the performance of the installation equipment and therefore the quality of the final product. Effective fixturing also improves cycle times, reduces the risk of scrapped assemblies, and poka-yokes the beginning of the assembly process.

Spring-loaded alignment pin: The use of a spring-loaded alignment pin is recommended for assemblies with through-holes to ensure alignment is maintained between the pin and the holes of the assembly components throughout the entire installation process. A spring-loaded alignment pin is fixed on the installation table and is used for alignment of the assembly prior to and during installation.

Spring-loaded alignment pins have spring mechanisms so they retract as the pin is inserted into the assembly as shown in Figure 1. If the fixture used the periphery of the assembly components as datum bars rather than a simple disappearing pin, the manufacturer would have to hold tighter tolerances on the parts to maintain proper alignment. This would result in higher manufacturing costs without adding any value over using a disappearing pin for assemblies with through-holes.

www.spirol.com
Heavy duty die springs open up new application possibilities

Strong, resilient and low-cost die springs let you take a different approach to typical applications

Lee Spring says its heavy duty die springs are not like an average spring; they’re made from different shaped wire from traditional die springs for starters, and they work in slightly different ways. But different is a good thing and as a result these springs offer a number of benefits for typical applications such as die presses, engineering machinery, brakes, clutches, soft drive mechanisms, agricultural equipment.

In an independent test conducted by the Institute of Spring Technology, Lee Spring’s heavy duty die springs demonstrated a life-expectancy at least equal to traditional rectangular wire die springs, but they are up to 50% cheaper than the rectangle coil versions, offering a serious saving.

Performance characteristics
High quality production processes involved in die spring production feature: shot-peening for extended life, pre-setting to prevent length loss in operations, plus grinding of closed ends to provide squareness and adequate large bearing surface appropriate for use in applications where heavy duty compressions are called for.

They are available in Music Wire or Chrome Silicon alloy, and powder coated for general corrosion resistance.

www.leespring.co.uk
Utilising its vast experience of serving the worldwide plastics sector, BFPA member Shell Lubricants has detailed four tips to effectively select, apply, and manage hydraulic oil products for your business.

Ensuring your operation runs like a **well-oiled machine**

Hydraulic fluid choice is a key consideration for plastics injection moulding operators. From securing peak efficiency to cutting significant costs by mitigating downtime risk, effective lubrication can help to protect the bottom line for businesses.

With that in mind, let’s look at some of the top tips for enhancing the power of lubrication in your injection moulding operation.

**Top tip 1 – Reconsider the importance of lubricants:**
Frequent offenders such as corrosion, contamination, and wear are real challenges for today’s injection moulding machines. Many operators blame equipment when encountering problems, yet surveys indicate that 50 to 70 percent of equipment failures relate to ‘improper hydraulic fluid condition’.

Hydraulic fluid represents less than two percent of the overall operating cost of an injection moulding plant, although, optimising this small percentage could generate big results. For example, investing in a high-performance lubricant can enhance equipment protection while mitigating risks of costly breakdowns.

**Top tip 2 – Adopt the best lubricant for your hydraulic system:**
Hydraulic systems need the right tools and materials for optimum performance especially in tough conditions, fluctuating temperatures, and high pressures. Prioritising lubrication within a balanced maintenance strategy will help to lower the total cost of ownership (TCO) in the long term, while helping machines reach peak operating conditions faster.

**SM Global**, a leading plastic processing company, switched to hydraulic fluid Shell Tellus S4 ME. It achieved energy savings of 3.4 percent, shorter cycle times, and doubled its oil drain interval (ODI) which resulted in annual savings of over €50,650.

**Top tip 3 – Utilise your provider’s lubricant-related services:**
Lubricant suppliers, such as Shell Lubricants, offer lubricant-related services to customers including Shell LubeChat, LubeAdvisor, LubeAnalyst, and more, to provide bespoke customer support.

From answering on-demand queries to advice from regional technical helpdesks or field-based engineers, plastic production plants can use Shell Lubricants’ services to help maximise equipment lifespans.

**Alpha Group**, a world leader in the development and production of plastic packaging, benefitted from Shell LubeAnalyst oil condition monitoring programme. Upgrading to hydraulic fluid Shell Tellus S3 M and utilising Shell LubeAnalyst, the company extended oil life from 5,000 to 15,000 hours, reduced equipment downtime and achieved annual savings of over USD$16,500.

**Top tip 4 – Staff training and upskilling:**
For operators to maximise its benefits, employees need to adopt proper lubrication maintenance, and this can only come through the application of education and training. As new technologies come to the fore in operations, this is becoming increasingly important. Shell Lubricants has comprehensive training programmes, like Shell LubeCoach, which delivers a workshop-based course by technical experts.

These top tips are essential for lowering TCO and leveraging saved costs into innovation. While hydraulic fluid is a fraction of a plant’s maintenance budget, it can help contribute to savings far higher than the lubricant’s fee.

www.bfpa.co.uk
Going beyond just servo valves for auto test labs

Virtually every automotive testing laboratory knows Moog for its long-lasting servo valves. Yet the company also wants test lab managers to know about its new electric multi-axis test systems (EMATS), the Moog Test Controller with new data acquisition modules and a series of hydraulic, electric and hybrid actuators – technologies which Moog presented at the Automotive Testing Expo in Germany.

“Auto Test engineers need tools for a wide variety of fatigue and strength tests,” says Craig Lukomski, solutions commercialisation manager for simulation and test at Moog. “Our EMATS is plug-and-play ready, requires no hydraulic oil and consumes energy only when a lab wants to run a test, so it’s less costly and cleaner to operate than hydraulic systems.”

Electric Multi-Axis Test Systems (EMATS) have become more commonplace in recent years because labs want to move away from the complex infrastructure, higher maintenance, and risk of leaks posed by hydraulic test systems. Moog developed its EMATS with the building blocks the company has used to design and manufacture previous test systems. EMATS employs leak-free electric actuators with servo motors that deliver improved motion-control performance over similarly sized, slower-responding hydraulic designs.

Moog’s new test controller includes two built-in, fully integrated data acquisition units (DAQ) that test lab operators can use to collect a few channels or dozens of channels during a test. These units include all the features for signal conditioning a wide variety of transducer signals. “Moog’s test controller has built-in control loop compensators to automatically change command signals during a test, which means easier tuning during set up and completing accurate tests faster,” adds Lukomski.

For test rigs, actuation is a core component, and an actuator’s lifespan is linked to use and maintenance. But Moog can extend actuator operating life and reduce maintenance with four solutions for lab managers who are either expanding operations and buying new test rigs or reconditioning equipment.

- Moog’s hydraulic servo actuator, which is the workhorse for fatigue or structural-durability testing of, for example, automotive suspensions.
- Moog’s electro-hydrostatic pump unit, or EPU, is the heart of an electric and hydraulic actuation system that offers hydraulic power under the command and control of electric servo motors for power only when a lab needs it.
- Moog’s electromechanical actuator (EMA) is a durable, plug-and-play system generating forces up to 36,287 kg (80,000 lb) and speeds up to 41 cm/sec (16 in/sec).
- Moog’s linear motor is a high-performance actuator that can provide input in excess of 100Hz.

“We can show lab managers how these actuation technologies work seamlessly with our controller and EMATS,” says Lukomski. “If a test lab conducts strength and fatigue testing and is upgrading or expanding a lab, or just protecting against obsolescence, Moog has the complete solution.”

www.moog.com
Mitsubishi’s new FX5UC PLC is small and mighty

Mitsubishi Electric has released its smallest and most powerful compact PLC to date, the FX5UC series Premium Micro PLC. Its diminutive size is set to help machine builders and manufacturers pack ever more functionality into a smaller space – while also providing the web access and network connectivity demanded by the latest Smart Factory applications.

This super compact PLC features a program memory of 64,000 steps and a large device memory. In addition, it has an execution speed of 34 ns, resulting in extremely fast machine responses and increased productivity. Even more, the FX5UC PLC can perform positioning and advanced motion control functions for up to four axes, eliminating the need for dedicated controllers that would increase hardware and maintenance costs, programming time and equipment footprint.

www.mitsubishielectric.com

Stylish IP68 wall mount or desktop plastic enclosures

Hammond Electronics has announced its new 1557 family. Initially available in four plan sizes, each in two heights, it is available in polycarbonate, sealed to IP68, and ABS, designed to meet IP66. The sizes are 80 x 80 x 45 and 60mm and 120 x 120, 160 x 160 and 200 x 200 in heights of 45 and 70mm. All versions are available in black and RAL 7035 grey.

Rounded corners and top face give a modern smooth style, and environmental sealing allows the enclosures to protect the housed equipment against dust and water entry in dirty and damp environments. The 1557 can be used as a free-standing enclosure when fitted with the supplied feet, or it can be wall-mounted with either four visible fixings or two hidden ones.

www.hammonدمfg.com

Safe cable management on top drives with e-loop

Igus has introduced the e-loop energy chain for safe cable management on top drives for deep drilling rigs. The new modular system, which is made of high-performance plastic, ensures a defined minimum bend radius of the cables and withstands adverse weather conditions, as well as vibration and shock. In addition to use on deep drilling rigs, the corrosion-resistant e-loop is suitable for a range of suspended applications in the offshore industry, as well as construction machinery, shore power and wind turbines.

The e-loop is a round three-dimensional modular system that can move cables with a defined bend radius and provides strain relief. The modular energy chain can be opened from the outside and filled at any time.

www.igus.co.uk

Intelligent safety for small brakes

The ROBA-brake-checker module from Mayr Power Transmission is not only able to monitor and supply safety brakes without the use of sensors. It also supplies data, and therefore provides intelligent safety. Even small brake sizes can be monitored with the module. This opens up new possibilities for brake monitoring – in particular for safety brakes in servomotors and for applications in the fields of robotics and automation.

A typical example is to couple the checker module with a Mayr ROBA servostop brake. A special hollow shaft design in slim constructional design and of a low weight has been especially tailored to requirements in robotic applications.

www.mayr.com

Applying to tools to harness the IoT

With its BB-400 Controller, Brainboxes is launching businesses around the globe to the forefront of the smart technology revolution. The BB-400 offers the flexibility of PC systems with open source programming options to make integration and customisation user friendly. An edge controller that can read inputs and control outputs, whilst communicating with remote systems, Brainboxes’ device could be the perfect automation solution for Industrial applications.

Capabilities can be extended via Brainboxes module range to provide additional inputs/outputs as needed, and out of the box integration with cloud platforms like AWS mean the sky really is the limit when it comes to expansion.

www.brainboxes.com
Compact and precise linear rail guides

Ewellix, formerly SKF Motion Technologies, has launched a series of compact precision rail guides that are low noise, have precision accuracy and require minimal maintenance due to self-lubricating features for industrial and laboratory applications.

The all-stainless steel LLS Series includes a unique ball retention plate at the bottom of the carriage for additional robustness as well as a ball recirculation system that facilitates easy and secure carriage mounting by ensuring that the balls are retained in place during assembly and storage. The carriage is factory pre-lubricated and a reservoir supplies long-term guide rail lubrication, for smooth operation. The carriage end-cap seals have also been specially designed to ensure that contaminants are excluded.

www.ewellix.com

Ultra-slim and lightweight slewing bearings from Igus

Rotational movement in a confined space; these are often the requirements for slewing ring bearings in automation or stage technology applications as well as in control panels. For such compact applications, Igus has now developed a new ultra-slim slewing ring bearing range for medium loads.

The PRT-04 slewing rings are not only maintenance-free and wear-resistant, thanks to the use of high-performance polymers, they are also 50% thinner and 60% lighter than standard PRT-01 bearings with a 100mm inner diameter. The new PRT-04 range is available directly from stock with inner diameters of 20 to 300mm. In addition, Igus offers a wide range of accessories for the slewing ring bearings.

www.igus.co.uk

Circuit breakers offer higher performance

ABB has extended its range of moulded case circuit breakers (MCCBs) for the UK with the new SACE Tmax XT that offers higher performances, protection, metering and connectivity features up to 1600A. SACE Tmax XT breakers set new standards for extreme breaking capacity for heavy-duty applications. The devices are designed to work far beyond the normal constraints, maximizing the capacity of installations.

The XT family’s built-in connectivity links smartphones, tablets and PCs to data analysis tools on the ABB Ability cloud platform in real time. The extreme precision of the data measured means users have access to accurate information anywhere and anytime, making it easier to monitor resources and identify savings opportunities.

www.abb.com

Kistler’s NCFE module delivers cost effective simple joining processes

The new Kistler NCFE servopress solution is specifically designed for simple joining processes to deliver a cost-effective alternative to conventional pneumatic or hydraulic systems. Compared to hydraulic or pneumatic units, the NCFE module offers impressively low energy consumption, simple handling and fast commissioning for applications in the measuring range from 10 to 80kN.

The NCFE module is a cost-effective, off the shelf joining system using integrated sensor technology that gives users the benefit of complete end-to-end monitoring and control of the entire joining process.

www.kistler.com

Mobile robot moves payloads up to 250kg

Omron as launched a new mobile robot, the LD-250. With a payload capacity of 250kg, the LD-250 is the strongest and newest addition to the company’s LD series of mobile robots. Together with the Fleet Manager, which enables the control of multiple mobile robots with different payloads through one system, it will contribute to realising a more flexible and optimised autonomous material transport system.

The mobile robot LD series can autonomously avoid people and obstacles while automatically calculating the best routes to transport material. The LD-250 is built with sturdier metal skins that can withstand unintended external impacts and more demanding duties.

www.omron.com
Southern Manufacturing & Electronics returns to Farnborough from February 11th to 13th 2020. The show, which is the longest running annual engineering show in the UK, is already approaching full occupancy of the 20,000m² Farnborough International Exhibition Centre and the organisers are confident of surpassing the record numbers of visitors achieved in 2019.

The popularity of Southern Manufacturing should come as no surprise given its location. London and the South East is by far the largest economic region. It accounts for nearly 25% of UK-manufactured exports, the largest of any region, and 15% of the UK’s overall Manufacturing output. Easily accessed from London, the show’s catchment area also extends west along the M4 corridor to the South West, an important centre of transport equipment and aerospace manufacture, and Wales, the UK’s largest manufacturing region, accounting for 17% of the total UK output.

Farnborough itself is the epicentre of the UK aerospace business, with almost a quarter of the UK’s £35bn aerospace industry based within a 50 mile radius, accompanied by a considerable number of major international manufacturers, for example Lockheed Martin, Gulfstream and Airbus Space & Defence.

All of these industries are dependent on a thriving supply chain of suppliers, often highly specialised, the vast majority of whom are classed as SMEs. Southern Manufacturing’s long-established track record and its highly accessible format have long made it a favourite for these kinds of businesses, resulting in a uniquely vibrant atmosphere and a highly diverse range of exhibitors that supplied chain of suppliers, often highly specialised, the vast majority of whom are classed as SMEs. Southern Manufacturing’s long-established track record and its highly accessible format have long made it a favourite for these kinds of businesses, resulting in a uniquely vibrant atmosphere and a highly diverse range of exhibitors that has tremendous appeal across a wide variety of industrial activities.

Southern Manufacturing & Electronics 2019 received 8,644 individual visitors, drawn by an impressive exhibitor list covering everything from advanced materials, Industry 4.0 and high-tech machine tools to electronic components and subcontract services. The 2020 show will introduce a similarly large selection of companies from all over the UK, along with an appreciable quantity of international exhibitors from across Europe, Asia and the Far East.

The exhibition is split approximately equally between manufacturing and electronics. In the former, the Machinery area is among the most popular, offering visitors the opportunity to view the latest offerings from an excellent selection of the UK’s leading suppliers. Matsuura will exhibit its best-selling single table 5-axis MX-520 CNC machine tool and HP Multi-Jet Fusion 580 3D printer. For the show, Matsuura will be machining live on the MX-520, utilising fixtures and work-holding printed on the HP Multi-Jet Fusion 4200 3D printer, working in harmony to demonstrate the hybrid additive and subtractive production strategies now available to UK manufacturers. Hurco will be showing its two most popular machines at Southern Manufacturing. The versatile and compact Hurco VM10i machining centre, with a working volume of 660 x 406 x 508 mm, and the Hurco TM8i 2-axis CNC lathe. The performance of this compact, accurate turning machine is complemented by its popular Max5 control. Simple, easy-to-follow graphics guide the user through all operations and tooling selection. The new XP model enhancements mean that concurrent programming, improved graphics and roller guideways are now standard features.

Trumpf returns to Southern Manufacturing 2020, presenting its wide range of sheet metal fabrication machinery and industrial lasers, together with 3D printing systems, power tools and electronics. Boford will be showing one of the latest in its range of CO2 laser cutting and engraving machines, as well as a fully enclosed, fibre laser marking system. The latest addition to the Boford laser range is the BFM110 Fibre Marking Laser, a compact, but extremely powerful bench top machine capable of permanently marking and engraving a wide range of metals, coated metals and some non-metals.

Identification and marking
Brady will have two stands at the show this year, demonstrating its wide range of products for wire identification, labelling materials and tools for wire and cable marking in the electrical, electronic and telecommunication markets, high performance identification products, labels and signs that remain legible and highly adhesive even in harsh environments. VisionAid will be showcasing a range of exceptionally high quality, 1080P 60fps Scandinavian digital magnifiers, microscopes and inspection solutions with maximisation up to 750x.

Southern Manufacturing & Electronics is an excellent place to discover specialist components such as sensors, EMC products, displays and thousands of others. Hamamatsu Photonics, a manufacturer of optoelectronic components and systems will be showcasing a range of products at Southern Manufacturing including X-ray cameras and sources for NDT, to laser systems for plastics welding, printed electronics sintering and light measuring devices for many LiDAR applications. Micronel will be showcasing its new range of IP67 ruggedised miniature DC blowers, aimed at a wide variety of industrial and process control, pressure or suction/vacuum applications. Other notable names present for 2020 include Wurth Electronics, TDK Lambda, Luso Electronics, Easby Electronics – the largest single exhibitor at the show – and Yamaichi Electronics.

Alongside the hardware, Southern Manufacturing is a vitally important marketplace for subcontract services of all descriptions, from contract electronics manufacture to highly specialised precision engineering and finishing. Electronics service providers include Shenzhen X-Mulong Circuit, European Circuits, Heber, the Carfulan Group, Nemo, SouMac, Coritech and many others. Engineers taking part include Orbital Fabrications, Fife Fabrications, Hammond Manufacturing, Havant Sheet Metal, Perfect Bore Manufacturing.

Together with the exhibition and demonstration areas, the complementary seminar programme is a tremendously popular feature. Two programmes run in parallel in two theatres, focused on manufacturing and electronics respectively. Subjects tackled include technology, innovation, business management, marketing and a look at current industrial legislation and policies. Complimentary access to this variety of high-calibre technical and business knowledge is yet another compelling motive for manufacturing professionals to attend the exhibition.

Farnborough International Conference and Exhibition Centre provides free car parking for 3,500 vehicles and is well-served by road and public transport links. A regular free shuttle bus service operates from both of Farnborough’s mainline railway stations directly to the event. The venue itself provides a high standard of facilities including a complimentary WiFi service in the foyer area and high quality catering outlets.

Southern Manufacturing & Electronics 2020 opens from February 11th to 13th. Admission to the show is free of charge.

www.industrysouth.co.uk
Create your own drive specification quickly and easily

STOBER Drives has just released its new online Configurator, an innovative tool that allows Motion Control and Power Transmission drive designers and engineers to create their own drive specification in real time.

Using the new Configurator, specifiers can create many different configurations, integrating products from the STOBER motion product portfolio, with just a few clicks. Once the specifier has used the fast and easy configuration interface to build the optimum drive for their needs, the data and drawings can then be downloaded, and a quote requested from STOBER.

The powerful Configurator has the most popular 3rd party servo motor brands inside for quick selection of a STOBER gear unit to suit, or you can take the complete STOBER Geared Motor Solution.

The new Configurator allows mechanical and design engineers to save a considerable amount of time, as until now, they had to gather and compare extensive manufacturer-specific documents. Now, they can use this new online tool to quickly and easily construct the right solution from gear units, geared motors, motors, drive controllers, motion controllers and matching software.

The intuitive and practically designed interface allows users to quickly design their own unique solution in real time with just a few clicks. Numerous filters and comparison options are available within the online Configurator.

https://configurator.stober.com

Connectivity

Get connected and start your IoT journey

Sense, sort and send your machine data:
Minimise downtime, speed up response times and maximise profits

Unlock the potential of your application with simple, robust connections for equipment of all types and ages.
- Rapid retrofit robust hardware
- Easy install and setup – Great software APIs
- Use I/O lines and existing sensors
- Get machine data onto the network
- Get results from single device – scale as needed

For an enhanced machine connection, the BB-400 Smart Controller with edge processing offers flexible intuitive software options to get you up and running fast. Brainboxes are specialists in Serial and Remote I/O communication that meets high specifications.

Over 30 years of smarter technology
All Brainboxes products are designed and built in the UK – offering you uncom- promising quality and first-rate support. Customers choose Brainboxes time after time because they "just work"

www.brainboxes.com

Valves

Configurator for process valve units – fast and easy

From manually actuated process valves to fully automated ones, the new configurator for butterfly valve units makes it quick and easy for you to find the right solution.

Free and easy to use, simply enter the key parameters for your application and you’ll see the first set of suggestions for your solution straight away.

Configured process valve units are tailored and delivered ready to install, with all components perfectly matched: butterfly valves, quarter turn actuators, pilot valves, sensor boxes, positioners, adapter kits and hand levers.

- Simple, fast and reliable configurations
- CAD data and documentation directly downloadable
- Units delivered assembled and ready to install

www.festo.com/kzva

Fastening and Joining

GESIPA goes Industry 4.0 with iBird® Pro riveting tool

GESIPA extends its Bird Pro series by a networked battery-powered setting tool, the iBird® Pro. This device has been particularly designed for integration into IoT/Industry 4.0 and lean production environments.

The iBird® Pro tool can be connected to the iBird® Pro App on up to three devices simultaneously that keeps the operator informed about setting processes as well as the operating status of the setting tool at any time.

Easily connected via a QR code, the app keeps a log of the setting processes using various rivet counters. A countdown function, indicators for battery level and maintenance as well as a display of the process keep the operator up to date during the setting process. In addition, it also advises the operator on how to handle the device as well as instructions for maintenance and repair that can be recalled at any time in order to answer any questions.

As an option to be equipped with a premium software package, the iBird® Pro can provide a setting process assistant that supports the operator in analysing the results of the setting process. Successful riveting configurations can be stored and then be combined into any job list as required.

www.gesipa.co.uk/ibird_pro
Compact and versatile

You want easy and seamless connectivity? You are looking for lasting and compatible concepts? We connect the present to the future.

→ WE ARE THE ENGINEERS OF PRODUCTIVITY.

Intelligent communication:
that’s what connectivity with Festo is about!
The powerful automation system CPX-E with EtherCAT® master controller and motion controller with IP20 protection provides central control of automation solutions in handling technology. Several bus modules are available so that it can be configured as a compact, low-cost remote I/O.

www.festo.com/cpx-e