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Yokogawa’s unique best-in-class SCADA solutions comprise of the versatile Stardom network-based control system and the FAST/TOOLS supervisory HMI software. These building blocks can be deployed across various industries, particularly where highly distributed network architectures are required. See this month’s cover story on page 24 to learn more about the versatility and economy of this scalable control solution.
Emerson’s 2018 EMEA Exchange held at the World Forum in The Hague, The Netherlands, attracted a record number of delegates under its IIoT-themed banner of ‘Connect, Communicate, Create’. As one of the 1600, what impressed me most this year was the consistency with which the company has followed through on its mission to promote customers into the top 25 percent most efficient operations in their sectors.

I was first introduced to the idea of top-quartile performers at the 2016 event in Brussels. Here, Emerson introduced ‘Project Certainty’, a strategic approach to large capital projects that ensures completion on time, on budget and with plant operating at maximum efficiency from day one. In 2018, we took another step down the Emerson path to Industrial Internet of Things transformation. ‘Operational Certainty’ is a practical approach to help plant owners achieve maximum operating efficiency over the entire lifespan of their facilities. The foundations are the digital technologies of the IIoT deployed to ensure the highest levels of equipment reliability and energy efficiency through real-time asset health monitoring and analysis.

Something Emerson Automation Solutions’ president for Europe, Roel Van Doren, described as: “Putting the ROI in IIoT!”

Top performers understand the five competencies of digital transformation

Analysis of top-quartile performers identified five critical competencies necessary to realise value from digital transformation: automated workflow; decision support; workforce upskilling; worker mobility and change management. Little surprise then that these are the areas where Emerson is investing most heavily in new technology to support its Plantweb digital ecosystem.

Van Doren described how future value can be unlocked through automating mundane production tasks to provide operators with the metrics they need to add value through better informed decisions. At the edge, the plan is to develop sensors analogous to the five human senses of sight, sound, smell, taste and touch. At the analytics (Cloud) level, the data from these will then be processed and returned to the operator in the form of a ‘sixth sense’ perception of how well (or badly) the plant is behaving.

The ideas were powerfully brought to life later in the day when journalists were invited on a walk through the ‘Digital Workforce Experience’ in the Expo area, complete with miniature plant and operations room. I counted about fifteen different IIoT technologies that had been integrated to show how plant personnel would work differently in the near future, while exploiting the benefits of these next-generation digital tools.

The scenario involved a plant manager out enjoying an anniversary dinner with his wife (as plant managers are wont to do) when, out of the blue, a critical alarm on a distillation column is triggered. Immediately, he receives a message on his mobile phone and is connected to the operator in the control room, already busy going through a checklist that flashed up on one of the HMI screens. The most likely cause of the problem is identified as a sticky valve and the details are sent to a maintenance technician. When she gets into the area, she identifies the faulty device using RFID technology and is sent instructions on the required repair work. Once the repair is complete, the valve tests itself and sends an all clear signal back to the control room. Our plant manager, still busy enjoying his hors d’oeuvre, breathes a sigh of relief.

This little demonstration spoke volumes about the inherent power of IIoT technology, and the cost and time saving advantages it brings to those who deploy it intelligently. Yet, while many companies are struggling to formulate a plan for digital transformation, Emerson has this base covered as well. As part of its drive to become ‘a trusted adviser’ to customers, the company recently launched the Operational Certainty Consulting Group to help struggling organisations come to terms with the five core competencies of top-quartile performers identified earlier.

Emerson has taken an innovative approach to helping end users resolve operational plant issues using its IIoT technology and applications. What it demonstrated at Exchange 2018 is how cleverly it has joined the dots to reveal a blueprint for digital transformation based on Project Certainty, Operational Certainty and the Plantweb digital ecosystem.

Steven Meyer
Editor: SA Instrumentation & Control
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Honeywell and Equate agree to enhance productivity of petrochemical plants in Kuwait

Honeywell and Equate Petrochemical Company have announced the signing of a memorandum of understanding to further the development of innovative technologies to support operations at Equate’s industrial complexes. Equate is Kuwait’s first international petrochemical joint venture and the world’s second-largest producer of ethylene glycol.

“As a global automation company, Honeywell has supplied the petrochemical industry with leading technologies and services for decades,” said George Bou Mitri, president of Honeywell Kuwait, Iraq, Jordan and Lebanon.

“We are proud to work with Equate to build local petrochemical capability that supports the New Kuwait 2035 strategy to become a global hub for the oil, gas and petrochemicals industry.”

Honeywell has had a presence in Kuwait for more than 53 years and is one of the leading automation providers in the country. It has successfully delivered more than 2000 projects in Kuwait and services 50 sites daily.

Siemens backs digitalised production of batteries

Siemens facilitates the efficient large-scale production of batteries with a comprehensive solution portfolio of software-based systems as well as automation and drive technology spanning the entire value chain.

At important upcoming industry events, the company will present its ‘green field approach’ for competitive battery production. This means digitally developing an ideally scalable factory for battery cell production that enables smart control and creates transparency of performance with regard to quality and costs. As a lever for these requirements, Siemens relies on the integration and digitisation of the entire value chain, from designing the battery cell, to planning the production processes, to engineering, production and services. In this way the company aims to position itself as a preferred partner in current and future projects for battery production.

IIG chairman for 2018 appointed

Marc van Pelt, managing director, Pepperl+Fuchs South Africa, has been appointed chairman of the Industrial Instrumentation Group (IIG) for 2018.

“It is my privilege to be appointed as the chairperson of the IIG (Industrial Instrumentation Group) for 2018,” he said in response to the appointment. “With pleasure and dignity I will serve in this role and work together with my colleague suppliers who have plenty of experience and bright ideas about improving our position in the market place.

“In an era with rapid technological changes taking place it is of utmost importance that the IIG aligns itself with these new market requirements. In collaboration with the SAIMC, we need to create more awareness and improve the adoption rate of the latest technologies, to the benefit of South Africa and its people. We, the IIG, have a pivotal role in this discussion and we will generate and support any and all initiatives around Industrie 4.0.”
Automation industry calls for collaboration to make SA globally competitive

Speaking at the official launch of the Africa Automation Fair 2019, stakeholders noted that South Africa was emerging from turbulent times, but said that through collaboration to drive progress the automation sector could help fast-track economic growth and development.

The automation sector, now moving toward a digital Industrie 4.0/IIoT era, is poised to drive greater efficiencies and make South African enterprises internationally competitive, which will ultimately benefit all South Africans, they said.

Oratile Sematle, former president of the Society for Automation Instrumentation Measurement and Control (SAIMC), noted that the industry had already progressed to a point where its voice as a collective is now heard in government, institutions and various sectors. But knowing that if we use automation in the right ways, we can ultimately change the landscape of the South African economy and improve the lives of all people, we need to continue to collaborate to drive further progress, and make South Africa great again,” he added.

Marc Van Pelt, chairman of the Industrial Instrumentation Group (IIG) and MD of Pepperl+Fuchs elaborated: “As we seek to bring the country to new levels economically, we need to look to automation and smart manufacturing to make our industries competitive on a global basis. At the Connected Industries conference last year, the sector started the ‘Industrie 4.0/IIoT’ discussion, and the next question is: is the sector ready? As a country, we still have a long way to go.”

Sematle and Van Pelt encouraged industry stakeholders to step up collaborative efforts through forums such as the Africa Automation Fair and Connected Industries conference, where the sector is able to assess the automation industry’s challenges and seek solutions to support progress.

The Africa Automation Fair and the Connected Industries Conference will expand their reach in 2019, delivering Africa’s largest showcase of industrial automation and control technologies. Jayne Harley, GM: Technology & Business events at Reed Exhibitions, announced that in line with a rapidly-evolving environment, Africa Automation Fair 2019 will introduce new pavilions focusing on information security and system integration. The event will also expand its reach to buyers from across Africa, supported by extensive multi-media marketing and public relations campaigns and VIP buyer events.

Africa Automation Fair is a focused networking platform for the automation and control industry and works closely with other organisations including the IIG, SAIMC and Technews Publishing. The fair targets senior buyers from South Africa and Africa, and invites participation from international buyers. Presented by Reed Exhibitions, Africa Automation Fair and the Connected Industries Conference and will be staged from 4-6 June 2019 at the Ticketpro Dome, Northgate, Johannesburg.

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Endress+Hauser at Hannover Messe 2018

Visitors to this year’s Hannover Messe in Germany can learn how Endress+Hauser helps its customers implement their Industrial Internet of Things (IIoT) strategies. By using smart sensors, solutions and services in specific process scenarios to demonstrate that these applications are ready for the IIoT, Endress+Hauser’s goal is to work together with its customers and technology partners to unlock digitalisation’s new potential.

Smart sensors make digitalisation possible parallel to the measurement values. Endress+Hauser field instruments feature the connectivity required to transmit diagnostic information, such as the data generated by Heartbeat Technology to the cloud. Communication is carried out via an integrated WiFi/Bluetooth module or WirelessHART, thus eliminating the need to disrupt existing process control systems. For new installations, digital communication occurs directly via OPC-UA or an industrial Ethernet technology such as Profinet or Ethernet/IP. An edge device simplifies cloud solution connectivity.

Innovations for the future

Apart from digitalisation, this year’s exhibit will focus on new products and other innovations. Functional enhancements to Heartbeat Technology enable the concrete implementation of predictive maintenance. TrustSens, the world’s first self-calibrating temperature sensor, offers users a high degree of process reliability and system availability thanks to automated, inline self-calibration. For users who need cost-effective measurement instruments for basic applications, Endress+Hauser offers Picomag, a pocket-sized flowmeter that features simple Bluetooth operation and system integration, such as with I/O-Link, at an attractive price.

Automation, services and e-commerce

Endress+Hauser offers tailored solutions and services for every phase of the life cycle, from measurement point design, automation system programming and SIL-based commissioning, to on-site calibration and training. In order to optimise the measurement instrument order process, making it more customer- and future-oriented, Endress+Hauser has also added integrated online shop functions to its website to augment the existing e-commerce solutions.

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BMG appointed distributor for SAFi Thermoplastic Valve Solutions

BMG has recently been appointed by SAFi Thermoplastic Valve Solutions as sole distributors of SAFi thermoplastic industrial valves in sub-Saharan Africa. “BMG’s strategy to enhance its fluid technology division, incorporates the introduction of new products, with the latest developments in design technologies, materials and coatings that meet exact market demand,” explains Willie Lamprecht, national product manager, industrial valves. “Extreme care is taken in premium brand selection, to ensure product reliability, standardisation, flexibility, low maintenance and extended service life.”

New to BMG’s extensive valves portfolio, are SAFi thermoplastic industrial valves, designed to handle corrosive and abrasive materials in demanding industries, including chemical and petrochemical plants, mining, water treatment, transport and logistics, marine, food production, energy and agriculture. The SAFi range, which conforms to stringent international quality specifications, incorporates ball, butterfly, diaphragm and non-return valves, as well as strainers and tank fittings – all manufactured from high quality non-corrosive materials.

SAFi’s lightweight polymer materials are integrated with a robust valve design for reliable performance, easy installation and low maintenance, reduced operational costs and extended service life. These materials all have features for high corrosion and abrasion resistance. A critical advantage of thermoplastic materials over conventional alloy metals is resistance to corrosion by the most aggressive chemicals.

BMG specialists recommend SAFi thermoplastic ball valves for use in on/off regulation applications. These thermoplastic ball valves are maintenance free and have the ability to close faster, also ensuring extended service life. Typical applications for SAFi products in the mining sector are in heap leaching, electrowinning, solvent extraction and acid plants.

BMG’s extensive range of components for fluid technology systems and general industrial applications also includes valves, hydraulic hoses and fittings, accumulators, cylinders, heat exchangers, hydraulic motors and hydraulic plumbing, as well as pumps and reservoir accessories.

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Anglo American Platinum and Yokogawa forging a new way forward

Yokogawa South Africa has announced the signing of a distributor agreement with 3E Control and Instrumentation (3E C&amp;I) to support local business development with the supply of their wide range of instrumentation products in the North West and Limpopo regions. 3E C&amp;I is a 100% black-owned, 50% black woman-owned and 15% local-owned engineering company, which endeavours to empower host mining communities.

In keeping with one of its founding principles of contributing to society, Yokogawa was happy to appoint 3E C&amp;I as the reseller in the areas where Anglo American Platinum operates. Anglo American Platinum will continue to invest in the community by channeling procurement through this locally owned company in the sphere of industrial automation. “This is one of many approaches by Anglo American Platinum to increase local economic development, as well as realising a positive impact in the form of revenue and job creation for the Rustenburg community,” says Donald Mokomane, regional local procurement manager at Anglo American Platinum.

The joint commitment was celebrated with Anglo American Platinum on 7 December 2017 at its Rustenburg Multi-Purpose Hub. Yokogawa will work closely with 3E C&amp;I in order to ensure technical skills transfer to its employees takes place to ensure sustainability and excellent service delivery. “Yokogawa believes that this step and the faith shown in 3E C&amp;I will support our localisation objectives while ensuring business sustainability for Yokogawa in the region,” explains Fazel Majlessi, senior executive manager: sales, services and marketing.

3E C&amp;I offers a wide variety of products in the mineral processing and metals industry, including field instrumentation, analytical instruments, control systems, information management solutions as well as chemical and industrial engineering services. The company’s offices are located in central Rustenburg. “We are excited to be a part of this strategic alliance with Yokogawa South Africa and Anglo American Platinum. Our duty will be to ensure that we offer quality and cost effective products and services to Anglo American Platinum,” says Theko Letsie, business development director at 3E C&amp;I.

The proof of Yokogawa’s commitment to supporting the localisation objectives of the South African government has been demonstrated by the signing of several strategic reseller agreements with Level 1 B-BBEE entities across South Africa. Under the corporate brand slogan of ‘Co-innovating tomorrow,’ Yokogawa seeks to establish ever greater levels of trust with its customers and to work with them to create new value for a brighter future, both for its customers and society.

For more information contact Christie Cronje, Yokogawa South Africa, +27 (0)11 831 6300, christie.cronje@za.yokogawa.com, www.yokogawa.com/za
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New Automation Technology
ifm’s ten-year celebration

ifm South Africa recently celebrated ten years of doing business in South Africa at a sumptuous dinner held at Avianto, Muldersdrift on the 1st of March. MD Alwyn Skelton thanked ifm Germany for its commitment to ifm South Africa, for its fantastic product innovations, and for its commitment to education in the country through meaningful contributions to schools for the disabled, mental health institutions and art. He said that ifm had entered the South African market at a difficult time in 2008 at the height of the global recession. “We were 31 staff on our first day, we had premises, we had phone lines and computers, but not one direct customer account or even one account with service providers, let alone any credit rating to assist us,” he said. “Our success today is because we have always remained committed to and achieved our milestones. I congratulate all 57 of our current staff who have helped the company achieve its goals.”

As a global company ifm started in 1969 as a family owned business and will turn 50 years old next year. With more than 6500 staff in 80 countries, the company continues to maintain a family feel. “This feeling of being part of a family is not restricted to employees but includes our customers as well. This is in line with ifm's philosophy of ‘Close to You’. This has been paramount to our success over the years,” he continued. “Over the years I have seen many customers change the companies that they work for, but I have seldom seen customers change their ifm products.”

Looking to the future, Skelton said that ifm is in the business of instrumentation and automation and believes in ‘changing lives through technology.’ “We aim to change our business into an even more productive, efficient and profitable organisation, one that will grow and prosper,” he concluded.

For more information contact ifm electronic SA, +27 (0)12 450 0400, info.za@ifm.com, www.ifm.com

Zest WEG adds value in the HVAC space

With access to years of experience in the HVAC market, and its range of quality products to service HVAC applications, the Zest WEG Group can tackle any single product installation right through to a customised solution.

Zest WEG Group sales engineer Francois Liebenberg highlights the company’s fit-for-purpose products, WEG variable speed drives (VSDs), WEG low voltage switchgear for control boards and WEG electric motors, which add significant value to HVAC projects.

“Enhancing our product range is our high level of service, where we can dedicate one of our experienced project engineers to work with the customer during the roll-out of a project," he adds. “This streamlines the work and expedites implementation, and all queries can be directed to a single point.”

Zest WEG Group can also allocate an after-sales technician on a 24/7 basis to the customer to facilitate any maintenance, repairs and commissioning, before and after the project. When it comes to stock availability, the company maintains large volumes of stockholding, particularly of certain key components. Facilitating high levels of stock availability, either at the premises of the customer or at Zest WEG Group itself, helps to keep the project on track as there is no delay in sourcing parts, and downtime is kept to a minimum.

Key to the product offering for HVAC applications are WEG’s HVAC-dedicated variable speed drives (VSDs): the CFW701 model for applications up to 110 kW and the smaller WEG CFW501 unit suitable for applications up to 22 kW. The range includes capabilities such as harmonic mitigation, built-in PLC functionality, bypass, dry run, broken belt and sleep modes, as well as a fire mode. This functionality can be interfaced using the BACnet communication protocol, Metasys and Modbus RTU. The drives also feature C3-level RFI filters.

“The speed control provided by these VSDs delivers substantial savings in terms of energy consumption, and also offers comprehensive motor protection," concludes Liebenberg.

The company also supplies low voltage switchgear for the control panels in HVAC applications, as well as its WEG W22 smoke extraction motor – often used in basement fan installations. These high efficiency motors are IEC certified as well as SABS approved.

For more information contact Zest WEG Group Africa, +27 (0)11 723 6000, info@zestweg.com, www.zestweg.com
IoT.nxt secures partnership with listed Dutch group

South African innovator in IoT technology and solutions, IoT.nxt, has entered into a partnership with listed Dutch company, ICT Group as part of its ongoing expansion into Europe as demand for IoT applications and digitisation grows in this vast market.

“IoT.nxt’s hardware and software solutions in combination with ICT’s domain expertise in different industry verticals as well as the expert knowledge of cloud, machine learning, BI and IoT, will enable us – through this partnership – to completely shape the digital transformation journey of customers,” says IoT.nxt CEO, Nico Steyn.

Joe Bester, head of IoT.nxt’s Dutch office, says: “Digital transformation is now a business imperative and our companies will jointly assist businesses to embark on and fast-track that process. We believe our innovation, especially around interoperability and edge intelligence, will enhance their offering and deliver fast results for customers.”

According to Jos Bleje, ICT Group CEO, IoT.nxt’s technology agnostic platform offers horizontal integration of islands of digitisation with an unprecedented ROI. “By leveraging all existing devices and infrastructure into one single platform, visibility and new insights are provided that will open doors for new business models and strategic services,” he says.

Frank Snijders, business development executive at ICT Group, notes that the partnership will offer business grade IoT solutions for the digital transformation journey of ICT’s customers. “With this partnership, our customers can now be supported through one interconnected, interoperable ecosystem, transforming data into actionable information and business ROI,” he adds.

IoT.nxt focuses on delivering innovative software and hardware solutions for IoT. The company has developed an open platform framework that is used for rapid software development, integration and deployment in the IoT realm. The major strength of the IoT.nxt framework is that the solution is technology agnostic, which overcomes the challenge of connecting any and all devices or systems. This enables companies to deploy best of breed technologies but at the same time also achieve interoperability and interconnectivity between all the currently deployed systems and devices from the edge to the cloud. The IoT.nxt platform allows businesses to action an IoT strategy with little or no disruption to current operations.

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SEW-Eurodrive’s Cape Town assembly hub

SEW-Eurodrive South Africa now assembles drive units and associated electronic products locally, which gives customers a significant advantage in terms of lead times, while ensuring quality to the standard imported directly from Germany. “Gear and servo motors, plus a range of electronic products are all assembled locally at SEW-Eurodrive Cape Town, which represents the national electronics and technology assembly hub for the company,” reveals branch manager Jason Jackson.

While the Cape Town branch is smaller than the main Johannesburg facility, it carries a larger stockholding in terms of electronics specifically. Jackson explains that the power modules and control heads are imported as separate items, in addition to the option boards. The fact that the units assembled in Cape Town use mostly the same power sections reduces stockholding of different components, allowing for an accelerated turnaround time.

National sales manager Norman Maleka explains that local assembly is a strategy embarked upon globally by the company: “Obviously it has taken a while to institute this strategy in South Africa, as we first had to ensure we had both the capability and the demand to justify local assembly. The main benefit for customers is quicker delivery and guaranteed availability, which are critical factors in terms of increased productivity and reduced downtime.”

He adds that local assembly is also part of a longer-term strategy to cut costs and improve efficiencies even further. At the Johannesburg facility, for example, the company has made a significant investment in installing state-of-the-art ‘assembly islands’ to reduce turnaround time from order to dispatch of high-volume products such as gearmotors. The new islands reduce waste dramatically, as well as assembly errors, thereby boosting product quality.

The concept has been duplicated at the Cape Town facility. While the products are currently assembled in Cape Town and then dispatched to the various branches countrywide for delivery to customers, a future part of the localisation strategy is to deploy Cape Town as the main distribution hub as well.

“In future, we will be able to service the entire African market in terms of electronic products from our Cape Town facility,” concludes Maleka. “In the meantime, for quality control and logistics purposes, the products go to the respective branches and are dispatched from there. This will change once we are confident that the quality is one hundred percent and that we are able to oversee every single aspect of the local assembly process.”

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From l: Nico Steyn; Jos Bleje.

www.instrumentation.co.za April 2018 9
A solid year for Endress+Hauser

In its preliminary financial figures for 2017, Endress+Hauser reported a broadly supported growth in sales, solid profitability and a marked increase in employment. The company is a leading global provider of process and laboratory measurement engineering, automation solutions and services.

The group’s consolidated net sales rose 4.8 percent to €2.2 billion. Exchange rate impacts prevented the company from generating even better numbers for the year. “Expressed in local currencies, we grew more than six percent in 2017,” said chief financial officer, Dr Luc Schultheiss.

“The consumer-driven economic boom has now reached the capital goods industry as well,” said Matthias Altendorf, CEO of the group. Higher demand for the company’s products and services spurred a significant increase in new hires, especially in production. Endress+Hauser had 13,299 employees at the end of 2017, an increase of 296 percent over the prior year.

Following another upswing in the business during the fourth quarter, the measurement technology specialist entered the new year with a sizeable rise in backlog orders. For 2018, the family company expects to see growth in the mid-single-digit percent range.

The audited financial figures for 2017 will be presented on 8 May 2018 in Basel.

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SICK launches new premises

Sensor and automation specialist, SICK Automation Southern Africa recently held the official opening of its custom-designed, state-of-the-art premises in Lanseria Corporate Estate.

CEO Luxy Moodley, described the progress of this three-year project, a result of the company’s rapid growth since it set up in South Africa in 2010. “Our new premises are a symbol of our long-term commitment to southern Africa. We are here to stay and we will use South Africa as a hub,” she said.

Investment in training and competency is a priority for SICK and the company will now be able to offer comprehensive in-house training. “Our large warehouse facilities have also improved stockholding and we have 24/7 service support for our SLA customers,” she continued. “During 2017 we embarked on a targeted marketing plan. Previously we focused on products but now we are meeting our customers’ need for solutions.”

Michael Muller, senior vice president and chairman of global business centre systems went on to describe how the family-owned company has evolved into a leading producer of sensors and sensor solutions, with a presence in 32 countries and global revenue of R20 billion. He emphasised the importance of digitalisation and the contribution that SICK sensor intelligence is making in the evolution towards Industry 4.0.

The highlight of the morning was Justice Malala’s highly entertaining and cutting edge insight into South African politics, the water-shed developments taking place in the country, and what this means for business.

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Michael Brown’s Practical Process Control Training Courses and Loop Optimisation Services

Courses:
These well known courses are unique and invaluable to new comers as well as experienced practitioners and process engineers in the field of industrial regulatory control optimisation. The courses offer a new and very practical approach to this subject, which very few people really understand properly.

Courses are available on demand for six or more delegates and are suitable for instrumentation and control technicians and engineers, and for plant process engineers. Many chemical and mechanical engineers have attended the courses as well as metallurgists.

Even people with many years of experience in this field have found the courses a real eye opener.

Optimisation Services and Consulting:
Michael Brown has had 35 years of experience in control loop optimisation, and in that time has successfully optimised controls in many different types of plants, including pulp and paper, power stations, chemical and petrochemical, oil, steel, mining and metallurgical recovery, cement, brewing, glass, dairy, food, and sugar, both in South Africa and many overseas countries.
His work has proved invaluable to plants and has resulted in greatly improved performance and ROI.

MICHAEL BROWN CONTROL ENGINEERING CC
Schneider Electric has announced the completion of the combination between AVEVA and the Schneider Electric industrial software business. The combination creates a global leader in engineering and industrial software with scale and relevance in key markets as well as an unmatched set of solutions covering all aspects of digital asset management from process simulation to design, construction and manufacturing operations management and optimisation. It will enhance the value proposition of Schneider Electric’s industrial IoT platform (EcoStruxure) for industrial and infrastructure customers.

Following the closing of this transaction as per the terms set in the AVEVA prospectus, Schneider Electric owns sixty percent of AVEVA Group on a fully diluted basis. Emmanuel Babeau (deputy chief executive officer and chief financial officer) and Peter Herweck (executive VP industrial automation) of Schneider Electric have been appointed as non-executive directors of AVEVA Group, with Emmanuel Babeau additionally assuming the role of vice chairman.

AVEVA will be fully consolidated in Schneider Electric accounts within the Industrial Automation division, with a full-year operational margin accretive to the Group.

For more information contact Jason Ullbricht, Schneider Electric SA, +27 (0)11 254 6400, jason.ullbricht@schneider-electric.com, www.schneider-electric.co.za

Digitalisation and automation are driving South Africa towards the Fourth Industrial Revolution, where smart technology improves efficiency, upskills workers and creates new jobs. At the forefront is automation specialist PCMP. The Pretoria-based company boasts a team of 15 experts who conduct detailed analyses of their clients’ manufacturing processes, before providing customised state-of-the-art solutions for all areas of production. PCMP’s core objective is to provide a full turnkey industrial automation service under one roof. “Our engineers have the skills and expertise to integrate automation hardware and software from a variety of manufacturers. The end result is a highly efficient and integrated system designed to the exact specification of any application,” says PCMP director Matthew Cramb.

PCMP engineers are industry-leading specialists in the world’s top automation brands, including Siemens, Rockwell, Schneider, OPCSystems.NET, Invensys WonderWare and ifm. “Our industrial automation service offering includes engineering consulting, project management and design that guarantees measurable results and a positive impact on any business,” adds Cramb.

PCMP also specialises in the manufacture of electrical components such as motor control centres (MCCs), field panels and remote input/output (RIO) panels to exact client standards and specifications. PCMP electrical installation technicians also offer on-site installations and field commissioning.

As part of its value-added service offering, PCMP has invested in developing comprehensive service level agreements to ensure that the company fully understands every client’s unique operating environment, and that it delivers flexible service solutions that provide ongoing business value. “An increasing number of manufacturing businesses in South Africa are moving towards integrated automation solutions as the country continues its progression to Industry 4.0, and PCMP is helping them make the transition a seamless and profitable one,” Cramb concludes.

For more information contact Matthew Cramb, PCMP, +27 (0)12 665 0802, info@pcmp.co.za, www.pcmp.co.za

Industrial Data Xchange has appointed Sean Ogborne as sales engineer.

R&C Instrumentation has appointed Nevash Jagarnath as sales engineer.

BMG has appointed Darryn Wright as marketing manager.

For more information contact Jason Ullbricht, Schneider Electric SA, +27 (0)11 254 6400, jason.ullbricht@schneider-electric.com, www.schneider-electric.co.za
**BECKHOFF**

**Who will benefit from this training? Automation Engineers**

TwinCAT 3/TwinCAT 2 – Programming, Commissioning & Maintenance
- Cape Town 8-10 May 2018
- Johannesburg 8-10 May 2018
- Durban 15-17 May 2018
- Port Elizabeth 15-17 May 2018

*For more information contact Andrew Reinhold, Beckhoff Automation, +27 (0)11 795 2898, training@beckhoff.co.za, www.beckhoff.co.za*

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**FESTO**

**Who will benefit from this training? Mechatronic Engineers**

AUT211 – Mechatronic Systems
- Port Elizabeth 3-6 Apr 2018

HY142 – Hydraulic Maintenance
- Durban 4-6 Apr 2018

PN211 – Electro-Pneumatics
- East London 4-6 Apr 2018

*For more information contact Lucian Kirk, Festo, +27 (0)11 971 5531, didactic.za@festo.com, www.festo-didactic.com*

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**Endress + Hauser**

**Who will benefit from this training? Instrument Technicians and Engineers**

TC1001 – Process Measurement and Instrument Configuration 1
- Sandton 9-13 Apr 2018

TC1002 – Process Measurement and Instrument Configuration 2
- Sandton 16-19 Apr 2018

TC1004 – Understanding of Temperature Measurement Principles and Sensor Selection
- Sandton 24 Apr – 25 Apr 2018

*For more information contact Nico Marneweek, Endress+Hauser, +27 (0)11 262 8087, nico.marneweek.za@endress.com, www.za.endress.com*

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**ENERGY TRAINING FOUNDATION**

**Who will benefit from this training? Energy Management Professionals**

CEM – Certified Energy Manager
- Johannesburg 7-12 May 2018

CMVP – Certified Measurement and Verification Professional
- Johannesburg 9-12 May 2018

CEA – Certified Energy Auditor
- Johannesburg 14-18 May 2018

*For more information contact Yolanda de Lange, Energy Training Foundation, +27 (0)84 622 4770, info@entf.co.za, www.energytrainingfoundation.co.za*

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**VEGA**

**Who will benefit from this training? Automation Engineers**

Processing Solutions for Level, Pressure and Nucleonic
- Poortview 15-17 May 2018

*For more information contact Claudia Olver, VEGA Controls SA, +27 (0)81 072 3800, claudia.olver@vega.com, www.vega.com*

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**Phoenix Contact**

**Who will benefit from this training? Automation Engineers**

SLP2 – Surge and Lightning Protection
- Johannesburg 10 May 2018

EPFS1 – Explosion Protection & Functional Safety
- Johannesburg 24 May 2018

IWP2 – Industrial Wireless & Profi cloud
- Johannesburg 14 Jun 2018

*For more information contact Sheree Britz, Phoenix Contact, +27 (0)11 801 8200, sbritz@phoenixcontact.co.za, www.phoenixcontact.com*

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**MECOSA**

**Who will benefit from this training? Radiation Protection Officers**

Training Course on the use of Radioactive Isotopes in Industry
- Johannesburg 15-16 May 2018

*For more information contact Michelle Rampal, Mecosa, +27 (0)11 257 6100, michelle@mecosa.co.za, www.mecosa.co.za*

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By the end of 2017, The United Nations Conference on Trade and Development (UNCTAD) reported an estimated 60,000 imports of multipurpose industrial robots into Africa. From a South African perspective, the dominant sectors in multipurpose industrial robot adoption are the mining and automotive industries. This is in line with global figures (automotive occupying 35% share of the robotic market), published by the International Federation of Robotics (IFR) in the World Robotics 2017 report. The mining situation in South Africa closely mirrors that of Botswana, where robots are now employed to minimise safety risks in the recovery of diamonds at depths that impose safety risks to humans.

This rapidly growing automation trend in the form of robotics has instilled fear in the minds of many Africans, and more so, South Africans. At the core of this anxiety is the fear of the unknown with regards to employment opportunities and employability, based on current skill sets. However, many other people are excited about this development as it cultivates the belief that it will resuscitate the currently sluggish aggregate demand.

Consequently, the epistemological thought that inextricably holds my imagination, gave rise to the question: “If a machine can do it, why learn it, why not learn something else?” At the World Economic Forum in January 2018, Jack Ma, who was ranked second in the annual ‘World’s 50 Greatest Leaders’ by multinational business magazine Fortune, in 2017, made a profound remark. He postulated: “We need to teach our kids things robots cannot do. If a robot can do it, we need to think twice.”

At the core of their education, young and future professionals must integrate human constructs that are antithetical to the phenomenon of robots. There are plenty of these, but this article focuses on two, namely:

- **Creativity, innovation and entrepreneurialism**
  - Poetry, music, painting, drawing, dancing etc. are all arts that tap into innate human talents and deepened practice (formal and informal) of these activities has proven to be linked to what people term ‘innovation and creativity’. Robots, at least for now, cannot innovate and by their nature are not authentically creative.

- **Inherent human constructs**
  - Values, empathy, collaboration through emotional connection to others, teamwork, independent thinking, critical analysis, persistence, influencing, and leadership etc. are constructs that robots, at least the current generation, cannot learn.

On reflection, where can one learn these constructs? In our basic education program in South Africa, when you harness the talents, skills, and resources of other learners, it is called cheating. In the workplace it is called leadership (i.e. using your network). People who did this in school were called cheats. In life, they are called ‘connected’, ‘resourceful’ or ‘leaders’. Perhaps it’s a work vs education antithesis? This is something to ponder on going forward.

To conclude on this robot-human discourse, it is my belief that learning the above-mentioned human constructs, along with many other skills, will ease the ‘rivalry’ between humans and robots, and will lead to a more complementary approach between the two species.

**Oratile Sematle**

Oratile is the Electrical and Instrumentation manager at Sasol Group Technology. He holds a bachelor of science degree in electrical and electronic engineering as well an MBA from the University of Cape Town. As the former president of the Society of Automation, Instrumentation, Measurement and Control (SAIMC), he helps to drive the vision shared by council to address issues specific to the automation industry, and is partly accountable for the development of the automation engineering profession in South Africa. Oratile is a conference speaker and has spoken at engineering events such as Industry 4.0 and African Automation Fair. His ambition is to form cross-industry coalitions to tackle the social and educational problems experienced by disadvantaged communities.
Strategic alignment
On 9 March, the SAIMC held an executive strategy session where all stakeholders within the organisation were represented. The focus was to ensure that the correct strategic initiatives are in place for the next five years to enable the organisation’s appropriate response to change in the future.

That said, I must follow it with a thank you. Thank you to the past leadership and every individual who helped make the SAIMC what it is today, without you we would have nothing to build on. I would also like to thank each person who took the time to attend the session and ensure that all the issues requiring attention were raised. We had members travelling from as far as Zambia.

The focus areas that were identified will now be followed by implementation plans to ensure we deliver in all key areas, which include:

• Automation thought leadership – we need to ensure that we give relevant input to generate the required growth, governance and change in the automation industry.

• Training and development – here we will be involved to ensure that the education system aligns with industry requirements. We will also ensure that we look inward to our own members to facilitate education and skills development.

• SAIMC growth – we are proud of the branches that continue to do well and the members that participate, but we would also like to extend our reach. Growth will ensure that we have the capacity to deliver what is required to better our industry.

Following the strategy session, the AGM was held and the new council for 2018 announced. I would personally like to welcome each member to their new or continuing role, and am looking forward to working with all of you. The new council, along with branch committee members, supporting patron members and individual members, will enable us to drive progress going forward.

Woman in automation
I have had positive responses from females and young millennials in industry regarding the change they wish to see going forward. To you, I would like to say: “Please get involved! Be part of the change. Let your voice be heard and do not sit on the side lines.

As females, and also young millennials, you each bring a different perspective and it makes teams stronger when they have such diverse strategic input. In each initiative that we plan to drive, we need and want your opinions.”

FIRST Tech challenge
The FIRST Tech challenge held a South African qualifying tournament on 3 March. The SAIMC is proud to be a sponsor of this initiative and congratulates all participants, and, of course, the winners. Seeing what our youth can build is inspiring. I would like to thank all those who have volunteered their time to be part of this initiative, and invite those who still want to become a part of it to sponsor a team or get involved as a volunteer.

Looking forward
What I know is that the SAIMC and the change it is driving is bigger than all of us individually. We must ensure progress not only for ourselves, but also for future generations as we navigate the world of automation.

I have made the decision that I want to be part of the SAIMC and today can say that it has exceeded my wildest expectations. Because the SAIMC wants to be part of the future and is engaging to enable change, I can promise that you will not be disappointed. I invite everyone who is not yet a member to contact us at admin@saimc.co.za and become part of the legacy of the SAIMC, and the goals we are working towards. We need each person’s unique contribution. I also invite all companies who would like to join as patron members, both nationally and locally at branch level, to contact us and become part of the solution.

Yours in automation,
Annemarie van Coller.
The branch kicked off the year with a braai and Technical Evening presented by EOH Process Automation Solutions.

We were delighted to have outgoing SAIMC president Oratile Sematle at the meeting, inspiring us all for the year ahead. The branch would like to thank Lebo Vries, Paul Ganter and Juandre Heyneke for their service on the committee this past year. If there are any new volunteers for the Vaal branch committee please contact us.

Guest speaker for the evening, Jonathan Cowley, introduced EOH Process Automation Solutions. Jonathan is the sales manager for Foxboro at Schneider Electric, responsible for UK, Nordics & Southern Africa. He has worked for the group in various positions since 2007 and holds a B.Eng (Hons) in Materials Technology from the University of Surrey. He resides in Oxford, UK.

Jonathan introduced the audience to the latest Foxboro pressure transmitter technologies, as well as the latest Foxboro valve positioner, where he highlighted the ease of initial set-up and valve stroking capability, which makes use of the years of experience gained from Foxboro pneumatic to current technology.

It was a well-attended event followed by a good networking session where many technical questions were addressed.

The next Technical Evening will be held on 5 April at the Iscor Bowling Club in Vanderbijlpark. Pepperl+Fuchs will present ‘Keeping up with the demand for high-speed communication in the modern process plant’.

SAIMC Secunda’s second technology evening for 2018 was hosted by Aveng ACS on the 6th of February. Christo Basson presented on ‘How to optimise your intelligent smart devices in your plant’.

Christo gave a very informative presentation on what type of equipment is needed in order to create an environment within the industry where data can be made available on personal laptops via web interfaces as well as tablets or cellphones using application software. A concern was raised as to the safety of having this information available via web interfaces and applications. He assured the group that the very best access control methods are implemented when accessing the data to protect against cyber-attacks and he also explained that the data is read only and no feedback can be sent back to the plant from the different platforms. The purpose of having the data available on these platforms is to enable different types of data processing, which in turn can contribute towards more effective preventative maintenance strategies as well as predictive failure analyses.

We would like to thank Christo Basson for his informative presentation.

All instrumentation and control related mechanicians, technicians and/or engineers are welcome to attend our monthly technology events in 2018. The planned dates for the rest of the year are:

05 April 2018
03 May 2018
07 June 2018
05 July 2018
02 August 2018
06 September 2018
11 October 2018
01 November 2018

All the Secunda SAIMC presentations will earn CPD points for ECSA registered persons and any enquiries can be directed to the branch chairman, Johan Maritz at johanmaritz260@gmail.com or cell number 082 856 3865.

The Secunda SAIMC branch would like to thank Rickus Kriel for his ten years of service on the Secunda committee and all the contributions that he made during this time.

From l: Johan Maritz, chairman SAIMC Secunda; Christo Basson, Aveng ACS.

From l: Johan Maritz, chairman SAIMC Secunda; Rickus Kriel, Aveng ACS.

Dirk van der Walt (right) thanks Jonathan Cowley after the presentation.
Johannesburg branch

At the last technology evening, Frederik Langenhoven, solutions manager at Pepperl+Fuchs presented on ‘Keeping up with the demand for high-speed communication in modern process plants’.

Globally, the manufacturing industry is in the throes of a digital transformation.

Companies and their industrial processes need to adapt to these rapid changes, or they will be left behind by their competitors who embrace exponentially growing technologies.

Internet of Things (IoT) is a term from information technology. It is a network of physical devices and other items embedded with electronics, software, sensors and actuators enabled to connect and exchange data. IoT for the manufacturing industry is called the IIoT (Industrial Internet of Things or Industrie 4.0).

Industrie 4.0 includes cyber-physical systems, cloud computing and data analytics. It is commonly referred to as the fourth industrial revolution that will transform the future of manufacturing.

Process control architectures such as NAMUR Open Architecture (NOA) and Open Process Automation (OPA) are approaches to establish Industrie 4.0. However the challenge remains a direct need for speed and availability, considering the limitations of the Internet to meet these automation requirements. Topics covered by Frederik included:

• How to migrate existing plants to Industrie 4.0.
• Field instrumentation technology today.
• Industrie 4.0 with conventional barriers.
• Industrie 4.0 using Wireless HART parallel architecture.
• Industrie 4.0 with remote I/O.
• Industrie 4.0 and fieldbus.
• Advanced physical layer.
• Requirements of NAMUR.
• Ethernet for process automation.

The branch thanks Frederik for his informative presentation.

New chairman for 2018

Ann de Beer was nominated chairman for 2018 at the branch AGM. Other committee members that will be serving are Cheryl Hird, Elri Klee, Andrew Bharath, Tebogo Mulauzi, Jabulani Radebe, Laura Dorrington, Kudzai Mberi and Dean Floyd.
The March Technology Evening, held at the Durban Country Club, had the benefit of receiving a polished and informative presentation on the topic ‘Electrical explosion protection with focus on flameproof and increased safety enclosures’, by Frederik Langenhoven, the solutions manager from Pepperl+Fuchs.

Frederik provided a well-balanced overview of information critical to the selection and use of enclosures together with their associated equipment in hazardous areas. After giving a simplified and easily understandable overview of the types of area classification, he showed the types of enclosure and some alternative protective measures that are required to ensure safety. Some unusual examples of potential hazards such as energy from an ultrasonic source, and even from laser beams, were briefly covered before moving on to more specific requirements for enclosures.

His displays and samples were used to clearly show what is permissible when mounting equipment in each type of enclosure, and also the certification requirements for that equipment. Repeated references were made to the need for users to comply with requirements that are specified in the manual as supplied by the original equipment manufacturer.

The distinction between ‘Maintenance’ and ‘Repair’ activities with regards to equipment in hazardous areas was clarified, and his presentation concluded with details about the increased application of line bushings to segregate equipment in Ex d enclosures in combination with an Ex e enclosure.

His presentation gave rise to many questions and observations from the audience, clearly prompted by their own observations and experience in industry. They indicated that there are some commonly misunderstood definitions and procedures that exist in companies that manage hazardous areas. Hennie Prinsloo thanked Frederik for his interesting talk, and also thanked Pepperl+Fuchs for sponsoring the evening. Everyone then adjourned to networking over a delicious dinner and drinks.

Hennie Prinsloo thanks Frederik Langenhoven (left) after the presentation.

Pat Fowler of Honeywell (right) accepts the Patron Membership certificate from Hennie Prinsloo.

Hennie Prinsloo thanks Frederik Langenhoven (left) after the presentation.
Feedback from AGM
The Tshwane branch AGM was held on 7th February when a new committee was voted in for the year. The members are as follows: chairman and technology: Petrus Klopper (Ai2SA); vice chairman and marketing: Mark Taylor (DESSOFT); treasurer and science week and golf day projects: Jurie Weideman (Afrilek); secretary and student portfolio: Muhammad Babamia (private); tertiary, training and ECSA: Nico Marnewek (E&H); and special project – golf day: Archie Pitso (Levivi22). Pregs Naidoo will focus on the Rustenburg branch and on national issues.

Branch finances
At present there is about R16 000 in the bank and on average annual turnover has increased to just under R100 000. The main sources of income were the golf day, followed by presentation fees. All members are encouraged to participate by asking their companies to become branch patrons and by presenting at the technical evenings.

February presentation
Des Burrows, director of Rascals Automation provided some inspiration when he covered the subject of industrial training. Key inspirational figures he highlighted included Nick Vujicic, the late Dr Edwin Louis Cole, Gary Player and Madiba. Some quotes which appealed to the audience included:

- “In your life you have two choices, bitter or better. Choose better, forget bitter.” – Vujicic
- “Balance is the key to life, communication is the basis of life.” – Cole
- “Change is the price of survival.” – Player
- “Education is the most powerful weapon which you can use to change the world” – Mandela

The focus of the presentation was on customising training to client needs, with a case study presented on the benefits of this approach.

Zambia branch
Northern Technical College in Ndola relaunched its SAIMC branch at the college during February by electing a new committee to steer the branch into the new year. The new committee replaces students who graduated in December 2017. From left: Gilbert Mubita, member of staff; Wickson Musonda, chairman; Lweendo Mweemba, vice chairman; Chola Mulenga, secretary; Favour Mzumara, vice secretary; Jackson Banda, treasurer; Fridah Tembo, vice treasurer.
Wave energy research

Both the UK and South Africa have the potential for harvesting green energy from the surrounding sea, from ocean or tidal flows, or from wave energy. Some 15 years ago, when the UK Government was keen to encourage and invest in green energy technologies, the European Marine Energy Technology Centre (EMEC) was established in the Orkney Islands, off the north coast of Scotland. The EMEC is the only centre of its kind in the world: it exists to provide developers of both wave and tidal energy converters – technologies that generate electricity by harnessing the power of waves and tidal streams – with purpose-built, accredited open-sea testing facilities. Initial funding of GBP34m came from the UK and Scottish Governments, the Carbon Trust, the European Union and several Scottish local agencies and councils. By 2011 the EMEC had become self-sufficient, by selling its consultancy and site evaluation and testing services to would-be suppliers.

As an aside, becoming self-sufficient was probably very opportune in 2011, as other UK Government financed initiatives and incentives for green technologies, like the Carbon Capture and Storage demonstration project, and financial incentives for wind farms, were switched off very fast as harsh financial strictures were imposed on Government spending. Currently, the CCS demo project in Canada, supported by its national and local Government, Shell Research, and local industry, is performing better than the project expectations.

South African research

According to Professor Wikus van Niekerk, from the Stellenbosch University Centre for Renewable and Sustainable Energy Studies (CRSES), while South Africa has some limited potential for harnessing tidal current energy, particularly at the Knysna Heads and the Langebaan Lagoon, the country’s most promising renewable ocean energy potential lies in ocean currents and waves.

From the technology aspect, wave energy appears to offer the most potential in South Africa. CRSES research shows the Western Cape has the highest wave power generation potential, and a few wave energy projects have been tried. Indeed Stellenbosch University developed the Stellenbosch Wave Energy Converter (SWEC) in the 1980s. As recently as 2015 it appeared the cost of wave energy generation was significantly higher than the solar PV or wind turbine techniques, but cost and technology changes rapidly!

New wave energy devices

Now on test in the Orkneys with EMEC is a 50% scale model of the new Swedish design of the Wave Energy Converter, the C3 from CorPower Ocean. This unit resembles a large ‘skittle’, or long necked bottle. Under test at EMEC since January 2018, the C3 WEC will be connected to a floating Microgrid unit, which is designed to allow the C3 device to behave as if it were grid connected by providing a stable voltage and frequency reference, simulating the impedance of a typical grid connection, absorbing power from the device under test and providing power to auxiliary systems.

This style of the WEC would be aimed at providing off-grid operations to power islands, offshore installations or remote coastal locations, all around the world. Another unit previously tested by the EMEC is the Wello Penguin, designed in Finland. Wello has received its first order for a commercial wave energy park, to be installed next to Nusa Penida Island in Bali, Indonesia: it will be the largest wave energy park globally, with planned delivery at the end of 2018. Power output is 20 MW, using multiple Penguin generators.

The Wello Penguin floats on water and captures kinetic energy from the waves, which is then turned into electrical power. It is an asymmetrical ship, and a 600 kW unit would be 220 tonnes typically, 30 m long and 16 m wide, anchored to the ocean floor. It utilises the same components that are already in use in wind turbines, and is easily constructed in a shipyard, meaning the Penguin is cost competitive compared to offshore wind energy. The roll of the Penguin spins the rotator inside the device, directing the energy from the waves. This rotation drives the generator – it does not have any moving parts in contact with sea water, so the service needs are minimal. In relation to comparative costs, the CEO of Wello, Heikki Paakkinen, said “The cost of energy generated with Wello Penguin is already very competitive compared to offshore wind energy, and in serial production we aim for a further 50% cost reduction.”

In 2015, Blackbird International, in collaboration with WERPO, announced plans to develop a 500 MW wave energy power plant in South Africa. The original wave energy system designed by WERPO, from Israel, uses an anchored float normally installed on wave breakers or sea walls, which rises and falls with wave action.

Nick Denbow’s European report

Nick Denbow spent thirty years as a UK-based process instrumentation marketing manager, and then changed sides – becoming a freelance editor and starting Processingtalk.com. Avoiding retirement, he published the INSIDER automation newsletter for 5 years, and then acted as their European correspondent. He is now a freelance Automation and Control reporter and newsletter publisher, with a blog on www.nickdenbow.com
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An ABB TVOC-2 arc guard system installed on a motor control centre (MCC) panel by PSY Systems prevented an expensive plant shutdown for one of the company’s clients.

It was during the installation process that a cable arced unexpectedly. Ordinarily such an incident would ignite the wiring within the panel and continue burning as the current flowed from the upstream power supply. This would not only result in the destruction of the panel, but also put the entire plant at risk of an electrical fire. Even if the damage were only confined to the MCC itself, the complete system would have to be shut down until it could be replaced, a process that could take anything up to six weeks and cost the client both in downtime as well as equipment repair and replacement.

In this case, however, the arc guard had installed into the panel shut off the mains supply within 1,5 ms, preventing damage to the panel. The arc guard features an unshielded fibre optic sensor capable of detecting the intense light created by a developing arc anywhere in the panel. The unit’s hardwired shunt trip provides millisecond reaction time to arcs, shutting the system down.

The ABB arc guard is a flexible solution consisting of a central unit that can be used either in a stand-alone configuration or linked to other main and extension modules. In addition to two high-speed insulated gate bipolar transistor outputs for circuit breaker tripping purposes, the unit also incorporates a heavy duty relay output that can be used either as a circuit breaker failure protection or as an alarm output.

Paul Young, managing director for PSY Systems: “It was fortunate for the client to have the arc guard system installed. This particular incident could have cost the client R500 000 for a new MCC panel as well as losses in production due to shutdown. Now, all that was required was the replacement of the arc guard and a cleanup of the panel.”

PSY Systems, an ABB channel partner, provides process control and machine safety solutions for a broad spectrum of industry from iron and steel, food and beverage, milling and sugar to manufacturing, chemical, water and waste.

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Working-at-height safety solution

Rope-access specialist Skyriders has provided a working-at-height safety solution for a contractor undertaking maintenance at the Sappi Ngodwana pulp and paper mill in Mpumalanga. It follows an earlier successful project in 2016 whereby Skyriders undertook inspection and repair work on the ducting between the boilers and the smoke stacks as well as platform installations inside a smoke stack at the mill.

Marketing manager Mike Zinn explains that the rope-access specialist was called upon to assist a contractor undertaking maintenance on a tower crane platform. Due to the height of the platform, a working-at-height safety solution was necessary.

A senior Level 3 rope access supervisor and technical manager were dispatched to site to create an optimal solution. “We had a bracket system designed and then fabricated that was strapped to the vertical column of the tower crane itself, which the team could hook onto,” elaborates Zinn. “Thus they could undertake all of the necessary maintenance while attached to this temporary lifeline system that was essentially just bolted onto the tower crane.”

In addition, Skyriders briefed the team on basic working-at-height safety requirements, and how best to use the customised system it had devised for Sappi. The project was completed in January and represents an ongoing involvement with the pulp and paper giant.

Zinn comments that rope access has allowed Sappi to achieve significant cost-savings in terms of its maintenance and repair requirements: “Scaffolding on the other hand is costly and time consuming, and disproportionately expensive compared to the scope of the work.”

Given the successful working relationship between Sappi and Skyriders to date, Zinn is confident of Skyriders’ continued involvement with, and further diversification into, the pulp and paper industry. Additional projects include work on a new cellulose plant, as well as a recovery boiler.

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SEW-Eurodrive collaborates on systems integration

Electrical wholesale supplier and panel builder, Ptytrade 228 is a successful systems integrator that uses SEW-Eurodrive products in its electrical panels and motor control centres (MCCs). The two companies have forged a close working relationship that not only boosts business opportunities for both, but raises the bar for technical excellence and innovation in the industry.

“The systems integration approach is being encouraged by SEW-Eurodrive as a new business model to forge ties with companies like Ptytrade 228, which invariably supply projects that have specific customer requirements,” explains national sales manager, Norman Maleka. It is also an ideal opportunity to educate the market about both the latest technology and the complete solutions available from SEW-Eurodrive.

“Our relationship with SEW-Eurodrive is a mutually beneficial one, as we are both clients of each other,” comments Ptytrade general manager, Craig Peek. He explains that the company supplies all types of electrical equipment, from lighting to control components, world-renowned switchgear brands and associated products. “We predominantly cover the industrial spectrum, from automotive manufacturing to mining and commercial industries. We have clients in virtually every sector,” Peek adds.

This diversification allows the company to both spread its risk profile and switch focus when any sector is in an economic slump. While mining is down due to the global downturn in commodity prices, Peek points out that mines placed under care-and-maintenance provide an ideal opportunity for owners to effect upgrades and/or repairs.

The company has a fully equipped panel shop that focuses on building variable speed drive (VSD) starter panels tailored to specific client requirements. “The aim is to provide the best possible solution for the client,” Peek explains.

Here SEW-Eurodrive’s modular, integrated approach to product development is of great assistance to a company like Ptytrade 228. “The drives are ideally packaged, which means that our panels are more compact. This amounts to a significant cost saving for customers, as it reduces the customisation that is required.

We pride ourselves on our lead times,” he continues.

Maleka adds that the systems integration approach is also proving highly effective in getting customers to standardise on SEW-Eurodrive products for their total requirements, rather than relying on separate vendors. “We are finding that a lot of plants have mix-and-match solutions, which is not ideal from an integration standpoint. Collaborating with a company like Ptytrade 228 allows our customers to take advantage of the complete range on offer, from motors to VSDs and mechatronics.”

In addition, standardisation allows for a single point of contact for customers, giving them access to the multinational’s global-based experience. “From our perspective, it has been invaluable to have a company like SEW-Eurodrive work closely with us. We obviously do not have its full expertise in motors, gearboxes, and drives, and this assists us in being able to offer customers cutting-edge turnkey solutions,” Peek points out.

Maleka highlights: “We have everything in place to be able to offer a complete system specification, including a comprehensive project plan.”

“Many clients rely on suppliers like SEW-Eurodrive for comprehensive planning on upgrades and certain design aspects, especially when it comes to motors and gearboxes. Our role as system integrator is to facilitate these projects. We are a trusted advisor at the end of the day,” Peek stresses.

With the technical support offered by SEW-Eurodrive, Ptytrade 228 can respond to any breakdown or related issue within a two-to-four-hour turnaround time. “That is pretty much our standard. We have raised the bar in the industry. What sets any company apart, in the current market is its service levels.” Maleka points to SEW-Eurodrive’s 24/7 hotline as an example of its proactive approach to aftersales backup. Such attention to support is critical, as any plant stoppages have significant repercussions on downtime and lost productivity.

Peek concludes that the collaboration between SEW-Eurodrive and Ptytrade 228 is essential to boost business opportunities in an economic downturn. “This represents a groundbreaking relationship for both companies. It differentiates us from many of our competitors. We have become more than just a commercial partner; we are an extension of their business.”

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Norman Maleka

Craig Peek
Yokogawa’s revolutionary network-based control system

Yokogawa’s unique portfolio for best-in-class SCADA solutions comprises of the versatile Stardom network-based control system (NCS), and the FAST/TOOLS supervisory HMI software platform. This solution is deployed in applications across various industries, particularly when highly distributed network architectures will be required.

Applications like pipeline networks, telemetry infrastructure for remote pumping stations and low bandwidth networks with intermittent communication characteristics are no challenge for the platform. Besides such typical applications in the energy and water utilities supply chains, Yokogawa’s SCADA solutions are also suitable for typical process and factory automation applications. The system is flexible and scalable from a small footprint to large network architectures and capacities. The Stardom controllers, in combination with the FAST/TOOLS software, provide an extremely cost effective investment to achieve ‘Excellent scalability and Excellent reliability’ (the ‘E2 Concept’). It is the ideal combination of the reliability of a DCS, coupled with the versatility and economy of a PLC/RTU-based system.

Open network-based control

Stardom is an open network-based control system consisting of a field control node (FCN) autonomous controller with highly flexible I/Os and communication capabilities. It offers robust features where all core components (power supply, CPU, I/O rack communication and the control network) can be easily implemented in a dual redundant configuration, thus providing continuous high availability.

Yokogawa’s continuous investment in the Stardom FCN has produced the new ‘E2’ bus interface module, which enables up to eight I/O units to be connected to the FCN-500 control unit, thereby tripling the maximum number of allowable I/O points. In addition, the maximum possible transmission distance between individual units has been increased to 100 metres. Therefore, with a nine-unit configuration, the maximum transmission distance is 800 metres; 100 times further than was previously possible. Using commercial off the shelf fibre optic cables and media converters, a Stardom system spanning several hundreds of kilometres, can be constructed. The use of remote extension units near sensors reduces wiring costs and maintenance workload.

Remotely distributed units are easily maintained during operations using diagnostic features like module status indications and capability to hot swap modules. Remote diagnostics enable the system to detect any malfunctions. Field maintenance is facilitated by the simple use of a standard web browser. Stardom supports the following communication protocols: HART, Modbus, DNP3, Profinet, Foundation Fieldbus and ISA100. In addition, Ethernet is supported, as well as legacy protocols such as serial communications.

The Stardom model range includes the option of an intelligent RTU, which is used for applications that require communications over...
achieving operational excellence. A reduction in total cost of ownership, and enabling faster decision-making, realising and utility assets. This benefits customers by management, operation and monitoring of production and utility assets. This benefits customers by enabling faster decision-making, realising a reduction in total cost of ownership, and achieving operational excellence.

FAST/TOOLS has a master enterprise engineering database which is a central engineering environment containing all common enterprise definitions and deployment data. It has an open, event driven system architecture with web services technology. The software architecture scales from small deployments of a few hundred points to more than 10 million points to better match the demands of large enterprise topologies. A fully redundant disaster recovery concept is supported by triple or quadruple topologies. A fully redundant disaster recovery Virtualisation is supported across platforms thus separating the operating system (OS) from the hardware. A modern open scada platform should be able to bridge the legacy gaps between the IT and OT domains by leveraging OPC Unified Architecture (OPC UA), extensible mark-up language (XML) and direct database interfaces.

The support of the OPC UA enables the construction of simple and effective solutions for users who need to communicate with upper layer management systems. OPC UA is the latest version of the OPC standard, and it features a cohesive, secure, and reliable cross-platform framework for access to real-time and historical data and events.

The FAST/TOOLS server centric architecture allows clients to be deployed to any HTML5 compliant web-browser. Hence, users automatically receive the most recent version of an application and there is no need to manage licences and software installations on the client side. The platform can utilise any communication media for connection to other servers, applications or devices. LAN/WAN, serial, radio, microwave, satellite, fibre and many others are supported and can be simultaneously used within a single environment.

A fully integrated alarm system performance analysis (ASPA) function supports the alarm system performance improvement processes to avoid operator overload. This reduces the risk of critical alarms being missed, and therefore causing incorrect or delayed decisions. The system ensures safety as well as 24/7 production continuity and quality.

Conclusion
Recognising that most enterprises will take a hybrid approach in their management and control solutions, Yokogawa continues to pursue innovation in its key offering of Stardom and FAST/TOOLS for scada systems, which will ensure that customers are able to transform their data into meaningful information and maximise their return on investment.

Cross industry adoption
GAIL is India’s flagship natural gas company, integrating all parts of the natural gas value chain including exploration, production, processing, transmission, distribution, marketing and services. GAIL has built two major liquefied petroleum gas (LPG) distribution networks on the Jamnagar Loni LPG pipeline and the Vizag Secundrabad LPG pipeline, which transport gas to bottling plants. The company deployed Yokogawa’s network control system to manage this pipeline network.

PowerSeraya in Singapore built a desalination plant that converts seawater into drinking and service water for the existing boiler plants and utilities. All operations at this plant are monitored and controlled by an integrated Stardom system, which has proven to be highly reliable.

The Petanu Water Treatment Plant in Indonesia was commissioned by the Ministry of Public Works and Housing to satisfy the growing water needs of the tourism industry on Bali’s south-east coast. The plant started its commercial operation in May 2014 and produces 300 litres per second of drinking water. Yokogawa’s system was selected as a one stop solution to meet these urgent market demands.

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Pipeline integrity management

By Lars Larsson, senior product manager, Schneider Electric.

Prevent costly impacts to pipeline operations and protect the public and environment with OASyS DNA from the Aveva EPLMS suite of products.

Pipeline Integrity is a term that encompasses many things today, but basically means that the pipeline is working properly. Meanwhile, pipeline integrity management is defined as a comprehensive management programme carried out by pipeline companies to ensure a hazardous commodity is not inadvertently released, and to minimise the impact if a release does occur. Obviously, this is a top concern for all pipeline operators. As a result, pipeline integrity management becomes a layered process of prevention, detection and mitigation of failures. Although each of these categories is critical to minimising the harm to pipeline operations and the surrounding environment, regulators, pipeline companies and vendors have focused primarily on detection strategies and best practices from a real-time monitoring perspective.

In many ways, this makes sense, as most of the information gathered and actions associated with detection occur in real time. The consequences of failure in this area are predictable, immediate and often grave.

However, we must ensure that, as an industry, we continue to place a strong emphasis on attempting to prevent an unscheduled commodity release from occurring in the first place. Rather than focusing strategies and investment on reacting to potential issues, pipeline operators can be taking significant proactive steps in real time to avoid unscheduled commodity releases. As they say, the best defence is a good offence.

Getting it right during design and construction

Designing and constructing a pipeline sounds easy enough, but any pipeline engineer will tell you there are a number of moving parts associated with ensuring the right products can get from point A to point B efficiently, safely and without generating excess risk of a commodity release. Most importantly, construction needs to be undertaken by looking ahead to the full desired lifespan and operational breadth of the pipeline.

For example, terrain and weather have significant impacts on pipeline operation, with different effects on flow dynamics depending on the product being transported. A cheap and simple pipeline construction following the shortest route from supply point A to delivery point B may be more expensive for the operator in the long run if that route includes unsafe elevation changes, or if the pipeline will need to connect future supply points and transport additional products in the future. Operators need to consider the long-term design lifespan of a new pipeline to determine the varied potential supply and delivery points as well as commodity types that might travel through it. Using these variables, operators and their engineers can use steady state simulation tools to test and analyse the hydraulic profiles of multiple scenarios to select a route, and the right pipeline construction elements, that will provide maximum safety and operational efficiency.

This also will help operators consider other critical factors, such as internal and external corrosion protection, allowing them to properly estimate the need for corrosion inhibitors, coatings and cathodic protection.

One way to minimise external effects on pipeline integrity, such as weather or human activity, is to bury the pipeline, which is how the majority of pipelines are currently being constructed. Regulations do govern the minimum depth of cover depending on the land and environment crossed by the pipeline, but, even recently, there have been examples where leaks occurred because, unbeknownst to the operator, the cover over the pipeline had been reduced to dangerous depths. To prevent this and stay regulatory compliant, electronic equipment is now available to assist in monitoring pipeline depth in conjunction with GPS targeting to track the exact location of any identified issues and dispatch field crews.

Change is critical to achieving success during operation and maintenance

Once the pipeline is completed, operators need to ensure that pipeline integrity is maintained, or even improved over time. It is recommended the pipeline is exposed straight away to hydrostatic testing to prove the integrity of the materials used and to identify any potential leaks. Many pipeline companies perform the same type of hydrostatic testing on a yearly basis to verify the integrity of the pipeline has not deteriorated. Real-time hydraulic simulation models can assist during these shut-in scenarios.

While hydrostatic testing identifies potential risks through monitoring real-time data, getting a visual inspection of both the inside and outside of the pipeline is critical, either to identify the source of real-time data anomalies or to find previously unidentified risk areas. External integrity inspection has improved significantly with the installation of advanced...
camera systems and use of remote-controlled drones. Internal integrity inspection has improved significantly with the use of inline inspection (ILI) technology, often known as ‘smart pigs’. These smart pigs are transported periodically in pipelines and carry high-resolution visual equipment capable of detecting corrosion, dents and other integrity concerns. ILI vendors have increasingly advanced technology for assessing the data collected by the pigs, which when integrated with the data from the real-time hydraulic model during normal operation or hydrostatic testing can provide critical insights on maintaining pipeline integrity.

Maintaining proper calibration of monitoring devices is also critical to maximising the value of real-time prevention monitoring. Most measurement devices drift away from the original calibration settings over time. However, operators need to confirm whether this is a natural slide by the device, or indicative of a pipeline integrity issue, and respond accordingly. While this sounds like a simple task, with hundreds of monitoring devices per pipeline, having a maintenance programme in place to ensure instrumentation is being calibrated correctly with an acceptable frequency is very important, especially for pipeline companies that rely on real-time hydraulic models to assist them in monitoring their pipeline.

Scada combined with control room management are also essential operational tools for pipeline integrity management. A relatively new term in the pipeline oil and gas industry, CRM regulates safety requirements for controllers, control rooms and scada systems. The goal of these regulations is to reduce the number and consequences of shortfalls in control room management practices, as well as controller errors, when remotely monitoring and controlling pipeline facilities or responding to abnormal and emergency conditions.

However, to advance a pipeline company’s operation, it should take full use of the interoperability and open architecture of the scada system. Industry technology should be used to move past CRM regulations – currently functioning more as a compliance measure – and innovate. Minimising calls into the control room with greater mobile scada data accessibility is a great example of the room for growth in this area. In addition, people not only want control room information in real time, wherever they are, they want to view it on the same technology they use at home and in their daily lives. This has led to an increasing demand for HTML to give field workers a view of operator screens on web browsers and mobile apps.

**Training pipeline controllers is essential**

Fortunately, or unfortunately, humans are one of the most critical factors in leak prevention, either as the primary preventative measure, or the primary cause.

Pipeline companies can take significant steps to improve their pipeline integrity by adequately training and educating both their controllers and the general public, as well as providing controllers the early detection tools to keep commodity releases from occurring.

Controller training and their operating conditions are two prevention elements that are highly regulated, primarily because they also have a significant impact on detection and mitigation. Clear industry guidelines exist around proper controller training, specifically using tools to create a flight simulator environment where controllers train and retrain on replicas of the scada system and virtual pipeline models, in order that they experience specific scenarios imposed by the training officers. It is essential that these training programmes not only qualify controllers in the areas of detection and mitigation, but provide extensive experience for prevention.

Similarly, regulations and best practices governing controller information overload are first and foremost designed to ensure that controllers do not miss potential leak detection due to being inundated with too much additional information. However, it is also important to ensure that controllers do not miss conditions and alarms that indicate a commodity release that is about to occur. New human machine interface (HMI) design best practices have been built into the newest scada systems to ensure the operator can efficiently access the most critical information. The newest alarm management systems allow for highly customisable alarm hierarchies that also help operators ensure their controllers are able to achieve both goals of rapid detection and maximising prevention.

This is an excellent example of where prevention can be done both through periodic check-ups, but also through similar real-time monitoring strategies used for detection. Scada alarms can be set up in a hierarchy that differentiates alarms, signifying a likely product release from conditions that could cause a leak. Every pipeline has what is called a maximum allowable operating pressure (MAOP), sometimes converted to a maximum allowable operating head (MAOH) for liquid pipelines. Operators with scada infrastructure with real-time transient models that calculate the pressure or head at any point in the pipeline can set alarms for any transient exceeding MAOP/MAOH, signalling a potential stress point location for a commodity release.

However, embracing the technology that exists today and determining how it should be altered to attract and acclimatise inexperienced, young controllers will be essential to pipeline integrity as the imminent crew change takes place in the oil and gas industry.

The first step in easing this transition is to simplify displays and make them more user-friendly, even more so than they are right now. Scada systems from the 1990s and 2000s boasted complex, fancy 3D graphics that were used to entice the purchase of systems, but instead, inherently created more problems for pipeline operators. The ASM and API 1165 regulations did clarify this somewhat, but the question becomes whether the data and display layouts traditionally used are appropriate for millennials. Today’s technology should provide control rooms with easily deciphered displays that only highlight the things that warrant the controller’s attention. It’s all about making the most critical information understandable.

**Education is key for the general public**

Working with the general public to prevent commodity releases is another good example of prevention strategies. When looking at the causes of commodity releases, many are associated with what is called mechanical damage, in other words, somebody digging close to or tampering with, the pipeline. Newer intrusion detection technology has made it easier to detect if unsafe activity like digging is occurring near pipelines, or if a theft is being attempted, one of the primary causes of leaks in several countries.

Regulators, operators and vendors need to continue to invest heavily in detection and mitigation strategies, as leaks will continue to happen no matter their prevention efforts. However, having an integrity management programme (IMP) in place that incorporates real-time preventative strategies is essential to a proactive safety approach. Consistently adapting the IMP to meet new challenges and incorporate new best practices is essential, and many of the maintenance and real-time preventative tools can be very economical for the pipeline company, both from the perspective of low implementation costs, but, most importantly, preventing costly impacts to pipeline operation and public and environmental safety.

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Selection of cable glands in Ex areas

Cable glands are the most common means of leading cables into hazardous area equipment. There are several conditions to be considered when selecting the right cable glands for the specific application. In principle there are three main types of cable glands:

• Cable glands made of plastic or metal for use with non-armoured cables.
• Cable glands made of metal for use with shielded cables.
• Cable glands made of metal for the use with armoured cables.

Considering glands for armoured cables, the important selection features are type of armour, cable outer diameter, cable inner diameter, thread size and wrench size. The gaskets at the enclosure play an important role regarding IP-protection. Here the installer has to differentiate between screwing the glands into threaded holes where a normal O-ring guarantees the IP protection and installation in thru-holes with locknuts. In the latter case a flat washer gasket is required in order to compensate for the tolerances of such thru-holes.

Hazardous area protection method

The above mentioned types of cable glands can be designed for either flameproof, Ex d protection or increased safety, Ex e protection, or a combination of both. Usually all Ex d certified cable glands are triple certified including Ex e and Ex t protection by enclosure, which is used in hazardous dust areas. Cable glands designed for Ex e applications are also certified Ex t in order to suit for both gas and dust applications. All Ex d cable glands require a thread engagement of at least five full threads in order to ensure the functioning of the flameproof gap between the male and female threads. Although there is no official need for a hazardous area certification for cable glands to be used with intrinsically safe circuits, the state of the art is to use Ex e certified glands for such applications.

Barrier cable glands

Barrier cable glands are Ex d glands for armoured or non-armoured cables, filled with a compound sealing around the individual conductors of the cable in order to maintain the safety of the flameproof equipment in which it is fitted. When correctly installed, the compound will prevent a potential internal gas explosion from exiting through the cable gland. It is mandatory to use barrier glands when the inner design and outside installed length of the cable, in conjunction with standard cable glands, cannot guarantee the safety of the equipment. The specific installation norm IEC 60079-14 (Explosive atmospheres – Part 14: Electrical installations design, selection and erection) explains in paragraph 10.6.2 that the use of normal Ex d certified cable glands is only allowed when the following conditions are met:

• The connected cable is at least three metres in length.
• The cable is sheathed with thermoplastic, thermosetting or elastomeric material; it is circular and compact; any bedding or sheath is extruded; and fillers, if any, are non-hygroscopic.

Otherwise barrier glands have to be used. The most critical point during the verification, if the use of barrier glands can be avoided, is the construction and the quality of the cable.

Cable manufacturers hardly give official confirmation for compliance with one or even all of the above conditions. Also they usually cannot give statements on cables which are proven for use with normal non-barrier cable glands, although some combinations might have been tested in real-life laboratory explosion experiments. It is well known in the community of experienced installers of hazardous area equipment that the installation of barrier glands, as well as of normal Ex d glands for armoured cables, is a source of numerous potential installation errors. Even if executed in a perfect manner, the explosion protection can depend on an elastomeric seal of merely 10 mm in length.

Environmental conditions

Cable glands need to protect the equipment against environmental influences which might intrude via the cable entries. Typical minimum ingress protection nowadays is IP66/IP68. In the past rubber shrouds were used as an option to protect metal glands against moisture and corrosion. Such shrouds cannot be recommended any more because modern metal cable glands are highly corrosion-resistant. Even worse, water and moisture can gather between the shroud and gland, leading to the development of an unwanted biotope. Hazardous area cable glands usually have a wide ambient temperature range. Plastic glands typically are suitable for -40 to 60°C, whereas metal glands are suitable for -60 to 80°C. Special cable glands are available for temperatures up to 200°C and above, as well as for very low temperatures.

Installation considerations

Correct installation is key to a safe application. The simpler the gland construction, the fewer errors will occur on site. Good examples can be found with the installation of Ex d cable glands for armoured cables which contain up to ten different parts. These have to be combined in the right sequence and manner. Crucial requirements are the correct cutting of the armour, positioning the armour precisely at the end of the armour cone and the proper fixing of the armour by means of the corresponding tightening ring. A simple but common fault is the loss of inner components when disassembling the armoured glands prior to installation. That happens especially to the armour cone and tightening ring. Quality glands secure both parts with inner O-rings. As an additional advantage, the ingress of water is avoided. Using the correct tightening torques for each part of the installation is paramount, although in practice many installers prefer to rely on their experience rather than a real torque spanner.

Cable glands are among the most crucial components for ensuring a safe installation of electrical equipment in hazardous areas. Although everybody knows how they work in principle, errors can occur during the selection and installation process which can harm or even destroy the integrity of the explosion protection.

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Yokogawa Electric has released the Enterprise Pipeline Management Solution (EPMS) R1.03, the latest version of an enterprise level pipeline applications suite that was first released to the market in June 2015. The EPMS suite is the product of over 20 years of Yokogawa experience in implementing oil and gas pipeline management solutions across the globe.

Developed for deployment at the heart of the pipeline operations management environment, the EPMS supplements a core scada platform with specific gas and liquid applications that enable a pipeline operator to manage delivery contracts and associated logistics in a safe, cost effective and efficient manner.

**Development background**

Many pipeline scada systems that are in use today have been tailored to suit a specific set of circumstances. They lack both a standard system foundation for supporting pluggable application modules and a core design that ensures interoperability with enterprise IT environments and policies. The maintenance and upgrade of tailor-made applications that often have a complex system architecture for protection from security breaches pose increasing challenges for pipeline operators.

The EPMS suite is a sustainable solution made up of pipeline applications that may be used in combination with common supervisory and monitoring functions, and is based on a well-designed modular platform that is both IT friendly and secure. As no two pipeline applications are identical and operational philosophies can differ from one pipeline operator to the next, the EPMS suite allows the easy modification of templates and functions, without having to call in pipeline application experts. Furthermore, the EPMS can be offered in combination with advanced pipeline simulation solutions that both reduce commissioning time and enable the full simulation of the pipeline operations management environment for the training of operators.

**Enhanced interface management**

When transitioning from one product to another in a pipeline, a trans-mix that is of a certain volume and varies in quality will be formed at the interface between the adjacent fluids. With EPMS R1.03, multiple product cuts from the same interface can be performed for the easy management of quality gradations. Furthermore, the use of product density meters to detect variations in interface quality based on colour and sulphur content is now supported.

**Shared use of physical devices**

For the delivery of products to different tanks, EPMS R1.03 allows multiple flow paths to share use of the same physical meter. This is cost-effective as it reduces the number of physical meters that are required to cover a specific application.

**Enhanced batch management**

For greater flexibility, continuity, and energy efficiency, EPMS R1.03 supports side stream injection and stripping as a product batch passes an intermediate delivery or receiving site. The main benefits here are the opportunity to adjust the volume of a main batch easily and to manage sudden changes in demand more efficiently. For further optimisation, enhancements are provided for split/merge and local batch operations. “With multi-product pipelines, EPMS R1.03 will bring significantly enhanced flexibility in the management of batches, interfaces and scrapers,” says Shigetsugu Betchaku, Yokogawa’s global business development manager for the oil and gas midstream sector.

Yokogawa’s EPMS software suite is based on more than 20 years of experience in delivering oil and gas pipeline automation solutions around the globe. This suite of pipeline management applications incorporates the same knowledge and capabilities that went into the development of FAST/TOOLS R10.01, released in 2014. Functions handled by the EPMS suite include:

- Gas/liquid nomination and metering.
- Energy value calculation.
- Batch and tank management (multi-product liquids).
- Pipeline integrity monitoring.
- Compressor/pump energy monitoring.

Yokogawa is active in the industrial automation and control (IA), test and measurement, and aviation and other businesses segments. The IA segment plays a vital role in a wide range of industries including oil, chemicals, natural gas, power, iron and steel, pulp and paper, pharmaceuticals, and food. The main target markets for the EPMS are oil and gas upstream or midstream pipelines and associated facilities.

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Many applications in the oil & gas industry that require the use of absolute encoders are demanding, not just from a performance perspective, but also because of the operating environment. An example of this is where the encoder needs to be explosion-proof due to the dangerous atmosphere in which it operates. Another would be applications that involve harsh environmental influences such as offshore platforms where shock loads of over 100 Gs, or shaft loads of hundreds of Newtons, can be experienced. The Hengstler AX65 absolute encoder has been engineered to deal with all these requirements.

Certified explosion-proof, the Hengstler AX65 is built with marine-grade stainless steel and has a shock rating of 200 Gs, and shaft load of 300 N. This tough encoder is not only compact, but it also offers an exceptionally shallow depth and body diameter of only 59 mm. This means it can be installed in applications where other larger explosion-proof encoders cannot be used.

Carrying explosion-proof certification makes it ideal for offshore oil platforms, mines and chemical plants and, as well as other applications that require an encoder constructed from marine grade stainless steel. The shaft load rating eliminates the need for load modules, thus reducing costs.

This device can be installed quickly and easily due to its flexible, quick-connect terminal system. It comes standard with the choice of SSI or CANopen interface, and it is also possible to integrate the CANopen encoder in a ring network configuration.

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Machinery and moving equipment is a vital element in all areas of modern automated industry, but what happens when the atmosphere in the working environment is potentially explosive? In short, regulations and directives govern which machinery and equipment components can be used in such scenarios. This is particularly pertinent to motion control devices utilising pneumatics, hydraulics and electromechanical technologies. All motion creates friction on one level or another, which, if of sufficient magnitude, could provide a source of heat or ignition. Similarly, a simple switch could also be viewed as a potential ignition source. With these facts in mind, machinery and equipment OEMs must be sure only to use motion control components that are tested, rated and certified for safe use in potentially explosive atmospheres.

Hazardous environments
Explosive atmospheres in the workplace can be caused by flammable gases, mists or vapours, or by combustible dusts. If there is enough of the substance mixed with air, then all it needs is a source of ignition to cause an explosion.

ATEX (derived from the French term ATmospheres EXPlosive) is the name commonly given to the European directives for controlling equipment designated for operation in explosive atmospheres. Directive 94/9/EC (also known as ATEX 100a), which came into force in 2003, concerns equipment and protective systems intended for use in potentially explosive atmospheres within the EU, setting out the minimum safety requirements.

In 2016, Directive 94/9/EC was replaced by Directive 2014/34/EU without a transition period. Although there was little effect for safety requirements, Directive 2014/34/EU without a transition period. Although there was little effect for safety requirements, but what happens when the atmosphere in the working environment is potentially explosive? In short, regulations and directives govern which machinery and equipment components can be used in such scenarios. This is particularly pertinent to motion control devices utilising pneumatics, hydraulics and electromechanical technologies. All motion creates friction on one level or another, which, if of sufficient magnitude, could provide a source of heat or ignition. Similarly, a simple switch could also be viewed as a potential ignition source. With these facts in mind, machinery and equipment OEMs must be sure only to use motion control components that are tested, rated and certified for safe use in potentially explosive atmospheres.

Zones and classifications
There are three zones classifying the presence of a potentially explosive atmosphere: present continuously or for long periods (Gas Zone 0, Dust Zone 20); likely to occur in normal operation occasionally, typically between 10 and 1 000 hours per annum (G1, D21); and not likely to occur in normal operation but, if it does occur, will persist for a period typically less than 10 hours a year (G2, D22).

Equipment and protective systems earmarked for deployment in these zoned areas should be selected to meet the requirements of the Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations 1996 (EPS). EPS implements the ATEX directive within the UK, regulating the supply, but not subsequent safe use of, products intended for operation in these hazardous environments. However, EPS does require the supplier to provide instructions for the safe operation of the products.

To help with equipment classification, two classification groups have been established. Group 1 equipment is intended for use in underground mines and surface installations of such mines likely to be endangered by flammable vapours and/or dusts, while Group 2 equipment is intended for use in other places exposed to explosive atmospheres. The level of protection offered in each group can be classified into normal, high and very high categories.

Motion control solutions
There are many examples of potentially explosive atmospheres across industry, not least in sectors such as oil and gas, power generation, chemical, pharmaceutical, wood processing and paint spraying. Deploying motion control solutions in these industries means using a supplier with a thorough understanding of ATEX and products that can be operated safely and with confidence.

A broad choice backed by applications expertise is vital to end users seeking a safe and effective solution to motion control in potentially explosive environments. Parker offers many components suitable for use in ATEX environments, such as cylinders (including rodless types), valves, filters/absorbers, air motors, logic controllers, push buttons, solenoids, coils, limit switches and sensors.

The company’s product catalogues contain copies of the declaration of conformity demonstrating that the components meet the requirements of ATEX. However, the declaration is only valid in conjunction with the instructions contained in the installation manual relating to the safe use of the product throughout its service life. The instructions relating to the conditions in the surrounding area are particularly important, as the certificate is invalidated if adherence to the information has been ignored during product operation.

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Sealed bearings eliminate common failures in triple offset valves

Bearing failures are among the highest root causes of failure in triple offset valves (TOV) for tight shutoff applications. This issue is directly attributed to the need to have metal bearings with very tight tolerances when accepting the shaft diameter. Properly designed TOV’s are metal to metal torque seated type valves. Therefore, very little shaft deflection can be tolerated in order to torque the seal ring into the seat. Additionally, properly designed TOV’s should have the bearings located as close as possible to the centre line of the disc, which helps to deliver rigid support of the shaft on sealing.

**Potential problems in oil and gas applications**

In oil and gas and petrochemical applications, there are many potential problems associated with bearing failures. Many of these are obvious, such as sulphur tail gas and acid gas services within refineries and gas processing plants. Sulphur in the gas state will have a phase change to a solid at temperatures below 115°C. If the gas phase sulphur is trapped in the bearing cavities and there is a drop in the temperature, the sulphur will become a solid.

This causes bearing to shaft seizure, locking the disc in one position. When this situation occurs, the end user must apply a heat gun of some sort in order to unlock the valve. This procedure is not the best practice when operating a modern process facility. Most TOV valve manufacturers offer a welded on steam jacket in order to deliver heat to the bearing area. While this is good design practice, human error can negate this benefit if plant personnel turn off the steam to the jacket, or unhook the connections to perform maintenance and then do not reconnect the steam to the fittings.

Other chemical applications such as butadiene and styrene have the same issues as described above, except when these chemicals become trapped and dormant it causes a phase change and popcorn, or polymerisation, resulting in seizing of the bearings. Additional situations are also attributable to fouling, such as simple pipe scale.

Furthermore, during the start-up phase in new constructions when the pipes have not been properly flushed, debris can migrate into the bearing cavities. Improper designs can also add to bearing failures once in service. If a certain design has not taken into account the thermal coefficients of both bearing material and the tolerances accompanied by the cross sectional thickness, then the bearing could lockup during fast changing thermal conditions.

**The Zwick solution**

TOV valve manufacturers are keenly aware of these potential problems and in the early ‘90s some manufacturers introduced the bearing protection ring, which has now become the industry standard. However, this feature has proven fallable. A single ring of die-form graphoil installed into a groove in the ID of the bearing without a compressive load will flatten out and quickly become ineffective, even after only a small amount of cycles under pressure – graphoil has no memory.

Other manufacturers offer a dual packing set with a lantern ring sandwiched between them, in addition to a flush port with grease fitting located on the bonnet to allow for flushing of the bearings. Some even offer O-rings at the bottom of the bearing cavity. This design would be a good solution, but in the petrochemical market Fire-Safe designs are mandatory, and an O-ring in the bearing cavity would not be considered compliant.

German-based Zwicky, the manufacturer of the Tri-Con series, is particularly strong in special applications requiring several customised features. An example of this is a mechanical design which ensures that both the ID and OD of the bearings are protected without violating the Fire-Safe criteria. The design incorporates three rings of die-form graphoil packing at the very end of the bearing ID, and then three rings of the same on the OD, both are captured by machined edges and loaded by the packing, which keeps the graphoil rings from flattening out.

This patented design is called the sealed bearing feature. Besides the fact that it prevents any media from entering the bearing cavity, the advantage of minimal shaft deflection is preserved by this special design, which also functions as an additional packing seal to keep fugitive emissions to a minimum.

For more information contact Desmond Delport, Valve & Automation, +27 (0)11 397 2833, desmond.delport@valve.co.za, www.valve.co.za
World Water Day is celebrated on 22 March and each year it highlights a specific aspect of fresh water. This year’s theme is Nature for Water, and it will be amplified through the South African Department of Water and Sanitation’s National Water Week awareness campaign from 18-24 March 2018. “These campaigns serve as a powerful reminder of the value of water and the role it plays in Sustainable Development Goal 6, growth of the economy and the eradication of poverty,” says Marc Ramsay, vice president of Schneider Electric South Africa’s Industry Business Unit.

“Memorably, this year’s Water Day will be marked by the launch of the International Decade for Action: Water for sustainable development (2018-2028), by the UN General Assembly.”

Damaged ecosystems affect the quantity and quality of water available for human consumption. Today, 2.1 billion people live without safe drinking water at home, and this affects their health, education and livelihoods. Here are some of the realities:

• Water consumption is growing at 2.5% per year faster than world’s population
• 20% of the world’s population is without access to safe drinking water
• Demand is shifting to regions with already scarce resources
• There is a rising need for sustainable infrastructure solutions
• Industrial and municipal wastewater need higher treatment standards
• Cities and urban regions will be competing on water quality standards
• Water is involved in the production of all other forms of energy
• There is increasing water scarcity
• Energy expenses for water treatment are rising

Schneider Electric’s water management expertise

Through its EcoStruxure solutions for water and wastewater, Schneider Electric has succeeded in giving major water customers around the world up to 30% in energy savings, increased operational efficiency up to 25% and reduction in the total cost of ownership up to 20%.

The Water Corporation in Perth, Australia is the principal supplier of water, wastewater and drainage services in Western Australia to hundreds of thousands of homes, businesses and farms, as well as providing bulk water to farms for irrigation. Its services, projects and activities span over 2.6 million square kilometres, making this the world’s largest geographic area of any water utility. Through its Schneider scada alliance, it has invested $A$65 million over eight years, creating:

• 14 distinct schemes on full scale scada and 24/7 remote management
• 43 schemes on basic monitoring
• 3500 individual sites, of which 2800 have full scada (control, alarm monitoring, data collection capability)
• 280 000 measured control points

The Water Corporation’s data has now become a valuable asset. The company has achieved an excellent return on investment (ROI) in smart technologies such as critical control in complex process environments and management of water loss. EcoStruxure has also allowed it to keep controls such as high level alarms and chlorine alarms simple in remote locations.

Other international successes

Schneider Electric has helped a Chinese industrial water customer manage 14 waste-water treatment plants centrally, reducing its energy consumption by 52% and saving 5 GWh per year, with a ROI of 1.5 years.

In Qatar, Schneider Electric helped the Qatar Water and Electricity Corporation in Kahramaa to reduce its NRW by 39% between 2007 and 2011, resulting in savings of 14 million m3/year, with a ROI of 6 months.

With Schneider’s help, Las Vegas Valley Water District increased asset uptime by 15%, reduced maintenance costs by 25% and improved Regulation 6 compliance by more than 30%.

EcoStruxure systems allow customers to monitor their plants and pumping stations centrally, provide an energy benchmark and prioritise their capital and operational investment. This is achieved by field crew optimisation and prioritisation, using people as sensors to provide real-time update of IT/OT systems, with complete customer satisfaction.

With a global presence in over 100 countries and more than 36 000 customer installations, Schneider Electric is the leader in water and waste software and scada, with over 40 000 installed licences. It is a leader in telemetry, remotely controlling vast areas in many major markets. The company’s strong position in automation and control helps major cities such as Paris, London, Beijing, New York, Toronto and Sydney to achieve major savings in water and wastewater management.

For more information contact Jason Ullbricht, Schneider Electric SA, +27 (0) 11 254 6400, jason.ullbricht@schneider-electric.com, www.schneider-electric.co.za
Precise object detection under extreme conditions

The alternative for difficult surfaces
Ultrasonic sensors transmit and receive sound waves in the ultrasonic range. The detected object reflects the sound waves and the distance information is determined via time of flight measurement. As opposed to photoelectric sensors, the colour, the transparency and the object’s surface shine do not play a role. Blister packages in packaging technology or transparent plastic bowls in the food industry can reliably be detected.

High performance
Even in operating conditions with heavy soiling, dust or mist, the sensors detect objects reliably and without interference. The ifm ultrasonic sensors in the M18 design provide a particularly small blind zone and long sensing ranges which are usually only achieved by sensors of a considerably larger design.

These sensors can be utilised for water, wastewater and waste applications as well. For more information contact ifm electronic SA, +27 (0)12 450 0400, info.za@ifm.com, www.ifm.com
Reliable wastewater treatment with ultrasonic level controller

To update and optimise its wastewater disposal system, the authorities of the City of Edmonton in Alberta, Canada, opted to use level measurement technology from Siemens. Installing the Sitrans LUT400 ultrasonic level controller enabled precise measurements, despite adverse ambient conditions such as space restrictions and obstacles impeding the path of the echo beam.

Treatment of wastewater in Edmonton requires reliable pumping of the wastewater. Running the pumps dry results in costly repairs and not running pumps can cause flooding and costly environmental clean-up of sewage. The Siemens Sitrans LUT400 ultrasonic controller is able to run the pumps at the correct times by monitoring the level of wastewater in the wetwells; and the sophisticated auto-false-echo suppression features ensure obstacles in the wetwells are not an issue for measurement.

Success in the face of adversity
There were a number of aspects which determined the choice of an ultrasonic level controller rather than any other system. For one thing, the measuring devices had to be mounted in extremely cramped conditions and the installers were not necessarily able to place them in the ideal positions. Despite this, the measurement still had to be reliable and precise. Another challenge was that the transducer’s measurement beam intersected a number of different obstacles. However, as Siemens Echomax transducers feature a particularly narrow beam and a function to suppress false echo signals, the solution enabled precise results to be achieved despite the adverse conditions.

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Water quality monitoring for a large mining operation

Water quality as part of environmental responsibility is a key element to triple bottom line reporting, with water licensee operators needing to provide data for licensing authorities and compliance data for reporting. Omniflex has tackled the challenges for this type of remote monitoring application head on at a large mining operation and has dealt with a number of key issues:
• Remote unprotected and unmanned sites
• Solar power
• Vandal proofing
• Automated operation

The project required that monitoring systems be installed at key sites geographically spread over a few hundred square kilometres to track wastewater and mine water outflows back to the riparian system, ensuring that the mine had a complete view of its discharge and treatment of wastewater over its entire operation. Data collected was to be shared internally across the enterprise to processing plants and to a GIS system for open reporting and to the Department of Water Affairs.

Any analytical measurements required could be incorporated into the system. Typically the following were required: flow rate, totalised flow, dissolved oxygen, pH, conductivity and turbidity. All three of the above architectures were required for the client to manage data across the organisation and satisfy its management objectives.

Omniflex provides cost effective, adaptable and extensible solutions from single point small systems to large corporate enterprise monitoring, allowing the integration of existing equipment and legacy systems but at the same time providing the management tools to manage an aggregated view of the enterprise without a labour-intensive capture and collation process. This system also enabled automated reporting for compliance management and driving the environmental action plan reporting.

For more information contact Ian Loudon, Omniflex Remote Monitoring Specialists, +27 (0)31 207 7466, sales@omniflex.com, www.omniflex.co.za
Since potable water has become a valuable resource, all stages of water treatment must be monitored effectively and reliably. Applications such as quality/limit value monitoring in waterworks, quality monitoring in distribution networks, filter monitoring and disinfection control all use analytical sensors and systems for automated process control.

Krohne is a leading supplier for process instrumentation as well as inline analytical sensors and systems. The SmartPart series is the most recent innovation for easy handling of analytical sensors: SmartPart pH/ORP and conductivity sensors feature an integrated transmitter for direct 4-20 mA/HART 7 connection to the process control system, and allow for calibration either online (in the field) or offline (in a controlled laboratory environment).

Accessories such as buffer solutions, junction boxes, loop-powered indicators or operating units, together with mounting assemblies (static or insertion) round out the portfolio for one-stop shopping of process analytical sensors.

With the Optisens series, Krohne offers the same sensor types for use with an external transmitter e.g. for existing installations. The product line also features measuring systems for water applications: Optisys CL 1100 is a potentiostatic disinfectant measuring system for free chlorine, chlorine dioxide and ozone. It is used in bypass lines and comes readily mounted, pre-installed and tested with 3 x 4-20 mA outputs, chlorine sensor, valves, flow-through holders and an optional pH sensor.

Optisys TUR 1050 is an optical turbidity measuring system for potable water applications with cost-effective cuvette calibration and an automatic ultrasonic cleaning system. It offers multiple communication options, including 4-wire, 4-20 mA, 2 alarm relays or Modbus via RS-485. It is suitable for use in bypass lines in a range of 0-100 NTU/FNU (optional: 1000 NTU/FNU).

For more information contact Nirisha Harinarain, Krohne SA, +27 (0)11 314 1391, n.harinarain@krohne.com, www.za.krohne.com
Temperature profiling and logging

When employing heat treatment as part of a manufacturing operation, the critical information needed is the temperature of the product as it is taken through the heating process. Whether dealing with paint cure on a car body, heat treatment of an aerospace part or even preparing a fillet of steak at a fast food outlet, achieving the correct temperature for the correct time can significantly affect the quality of the product.

Measuring product time at temperature in heating applications has been an accepted industry practice for decades. The earliest temperature profiling systems plotted data on a chart that process engineers had to analyse laboriously. Today, profiling systems that are both sophisticated and easy to use can give a clear pass/fail finding. A profiling system generally consists of four elements:

- Thermocouples, which are either attached to the product or used to measure ambient air temperature
- A data logger, which captures data from the thermocouples
- A thermal barrier, which protects the data logger from the heat and cold
- A software package, which is used for data analysis

The temperature profiling process

Temperature profiling is the term used to describe the process of recording and interpreting the temperatures of products through a heating process. Temperature data are measured continuously using thermocouples connected directly to the product at different locations as it travels through the oven or furnace. The measured temperature readings are stored in a data logger, which moves along with the product and is protected from the hostile environment of the process by a thermally insulated box referred to as a thermal barrier.

Either during the process (using telemetry) or post-process, the profile data are retrieved from the data logger and transferred to a computer software package where they can be reviewed and analysed. Temperature data collected from the profiling operation provide a graph/profile showing what temperatures the product or oven experienced during the entire heating procedure. Such information creates a thermal fingerprint of the product and process, which is critical to the understanding of the heating operation. In its simplest form, this information tells how hot the product became, the time it took to get to that temperature, and how long it stayed at that temperature. Process engineers know what the perfect profile for their product should be. Variations from the ideal indicate a potential problem that can lead to or unacceptable product quality. Benefits of profiling include the following:

- **Control product quality:** Increased scrap, rework or customer returns means something has gone wrong in the manufacturing operation. Knowing precisely what is happening to a product during production results in easy reduction of rejects, rework, scrap and returns.

- **Rapidly setup new processes:** Routine monitoring of the process establishes a database of profile information, which will help develop new processes accurately and efficiently. This gives information on exactly what temperature settings and line speeds will result in the best quality product.

- **Find faults quickly:** When a problem occurs because of improper heating, the cause and location can be spotted quickly. The profile information can then be analysed to determine the necessary corrective action and run follow-up profiles to prove the changes were successful.

- **Increase productivity:** Analysis of temperature profiles will also show how and where operations can be optimised. By rebalancing the time at temperature and heat ratios, it is possible to increase line speed and product throughput; and by knowing exactly what is happening to the product in the process, it is possible to minimise time spent on test runs and process setups, allowing a greater number of profitable production runs.

- **Prove process control (QS/ISO9000):** A profiling system, combined with a well-designed software package, will go a long way to assist in reporting process control adherence to authorities and customers.

- **Minimise fuel costs:** Rising fuel costs can significantly impact the operating budget. Information retrieved from profiling can help cut down on excessive heat settings. Lower fuel costs mean higher profits, and reduced fuel consumption has a positive environmental impact.

Datapaq produces durable, accurate and user-friendly thermal profiling systems consisting of highly accurate temperature data loggers, rugged thermal barriers and easy-to-use analytical software. There are specially configured systems for metal heat treatment, automotive and other painting, food processing, plastics, ceramics, electronics and more. Customised systems are also easily configured for individual needs.

For more information contact

R&C Instrumentation,
+27 (0)11 608 1551, sales@randci.co.za, www.randci.co.za
A radar beam focused like a laser!

The future is 80 GHz: a new generation of radar level sensors

The latest cutting-edge technology from the world leader: the unsurpassed focusing of VEGAPULS 64. This enables the radar beam to be targeted at the liquid surface with pinpoint accuracy, avoiding internal obstructions like heating coils and agitators. This new generation of level sensors is also completely unaffected by condensation or buildup and has the smallest antenna of its kind. Simply world-class!

www.vega.com/radar
Conductive level switches

The latest in Kobold’s NEK range of conductive level switches is a complete, functional unit that reliably monitors the limit level of conductive media, even under heavy process conditions. Whether used for monitoring chemical or fresh water tanks, mixing vessels or for run-dry protection in pumps, the conductive level switches more than meet the demand for efficient and cost-effective measurement technology. The compact, space-saving but robust design means the devices can be integrated perfectly into existing industrial processes.

The compact device is designed as a complete functional unit that can be screwed into a tank. The compact housing with process connection has a hexagon and male thread for installation. The devices made of polyphenylene sulphide (PPS) can tolerate pressures of up to 20 bar, and those made of polypropylene (PP) tolerate up to 6 bar. Two electrodes made of stainless steel extend into the process. As soon as both come into contact with a conductive liquid, the electronics detect it and output a corresponding switch signal.

Two installation lengths, 36 and 73 mm, can be selected. The installation depth can be adapted individually by means of an additional protection tube. Installation of the device is possible from the top or from the side of the vessel. The protection class is IP68.

For more information contact Instrotech, +27 (0)10 595 1831, sales@instrotech.co.za, www.instrotech.co.za

Miniature camera-based sensor from Leuze

With the IPS 200i, Leuze electronic has introduced its smallest camera-based sensor for compartment fine positioning with high-bay storage devices in single-depth storage. The sensor offers some powerful advantages, among which are fast commissioning and simple alignment.

Speedy commissioning is one of the most powerful advantages of the new Leuze device. This is accomplished using a web-based configuration tool and adjustments are made directly on the small camera-based device itself. Engineered for optimum user friendliness, an alignment system with feedback LEDs provides additional support.

Due to its clever and compact design, the Leuze IPS 200i only needs a small space on high-bay storage devices. This enables quick, easy and accurate compartment positioning in either small part container storage warehousing, or in single-depth pallet high-bay warehouses.

Equipped with powerful ambient light independent IR LED lighting, a single device can be used for the entire working range of up to 600 mm. A model with integrated heating is also available for use in refrigerated warehouses where temperatures go down to -30°C.

Ensuring optimum reliability under all conditions is managed by an integral monitoring system with a quality score that identifies diminishing reading capacity of the sensor early on. This reduces downtime and improves the availability and cost effectiveness of the sensing systems.

For more information contact
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Keep your team connected, wherever they are.

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Fluke Connect™ works with over 20 different Fluke test tools and allows you to identify and diagnose problems quickly and confidently, while securely sharing your data when you want, with who you want.

When your measurements are automatically associated with equipment, there is no need to record in the field and then transcribe into an office computer. Make decisions quicker than before by viewing temperature, mechanical, electrical and vibration measurements from your test tools. Measure once, and cut out the paperwork with AutoRecord™ measurements.
Mass flow measurement of gases

Kobold offers the type MAS mass flowmeter that works according to the calorimetric method of measurement and was specially conceived for gas flow measurement. Since gases can be compressed, the volume changes with pressure and temperature. In practice this means that calibration should be done for a particular working pressure and temperature. This conversion is not needed with the MAS electronic mass flowmeter because only the mass flow of the gas is determined by measuring the heat transfer.

The gas is led through a sophisticated, laminar flow bypass that gives it a laminar stream. Due to the pressure difference that arises, a small quantity of gas branches off into the measuring pipe. With laminar flow, the distribution ratios of both gas quantities remain constant. This is important for the calculation of the flow volume. There are two temperature measuring points (RTD elements) in the measuring tube arranged in sequence (one behind the other). The gas flowing through is subjected to a constant amount of heat. The gas molecules absorb that heat and carry it away. This creates a temperature difference between the sensors that increases with the amount of gas that flows through. The temperature difference creates a resistance difference in the RTD elements. It is now only necessary to convert the temperature difference into the standard mass flow. A state-of-the-art electronic 180° rotating LCD display shows the corresponding volume flow in standard units per minute. The digital display makes it virtually impossible to make a reading error.

The low heat capacity of the measuring tube and the low mass of the auxiliary flow guarantees users a fast response time. Since pressure and temperature changes have only a small effect on the measurement, the mass flowmeter can be used within a large pressure and temperature range without need for adjustment. The standard equipment includes an analog output so that readings can be continuously processed further. Another advantage of the MAS is the large measuring range in different steps of 0-10 Nml/min up to 0-500 Nl/min. The MAS has small dimensions and can be used in any position.

Typical applications are in process control, laboratories, gas display tables, OEM applications, leakage rate testing, filter monitoring and gas flow calibration. The sophisticated measuring procedure and modern electronics make the MAS suitable for a wide range of applications and greatly simplify the measuring of gas flow.

For more information contact Instrotech, +27 (0)10 595 1831, sales@instrotech.co.za, www.instrotech.co.za
Fluke’s 1586A Super-DAQ precision temperature scanner has up to 40 analog input channels and scan rates as fast as 10 channels per second. It is ideal for applications such as thermal mapping, process sensor calibration, quality control testing, lifecycle testing, process monitoring and environmental testing that are common in industries such as pharmaceutical, biotechnology, food processing, aerospace and automotive. With the flexibility of both internal and external input modules, the 1586A is designed for use both on the factory floor where channel count as scan speeds are important, and in the calibration laboratory where accuracy and quick input connections are required.

The 1586A can measure thermocouples, platinum resistance thermometers (PRTs), thermistors, DC current, DC voltage and resistance. It offers best-in-class temperature measurement accuracy of ±0,005°C for PRTs, 0,5°C for thermocouples and 0,002°C for thermistors.

The Super-DAQ has a colour display with channels that can chart up to four channels simultaneously. It features four modes of operation (scan, monitor, measure and digital multimeter) and alarms that indicate when a channel measurement exceeds an assigned high or low limit. It has 20 MB of on-board memory for storing data and configuring files, a USB port to collect and store files to a USB drive and a LAN interface for easy connection to PCs and networks. It also includes a dedicated RS-232 interface to control Fluke calibration drywells or temperature baths for automated tests.

Level and temperature measurement via one cable

IO-Link is a standardised and fieldbus-independent interface for automation that provides the user with point-to-point connections without complex addressing. Binary switches that used to be limited to simple switching signals of analog values have developed into smart sensors. IO-Link transmits both level and temperature parameters as digital process values via one single cable. This means that only one input port is required on the controller. This allows simple and timesaving parameter setting.

Efficient and reliable thanks to IO-Link

Thanks to IO-Link, ifm Electronic’s new temperature and level sensor continuously transmits process values and other important data such as minimum and maximum temperature, allowing level and temperature values to be transmitted via one cable. Moreover, digital measurement results are more accurate because there are no conversion losses by D/A converters or external influences like cable lengths. Devices with preset measuring ranges (analog start and end points) are no longer needed because the real process value is transmitted. This reduces stockholding requirements. Soon conventional transmitters will be a thing of the past.

Applications

Typical applications are hydraulic power packs and machine tools. The advantage of this sensor is that the combined level and temperature monitoring with only one unit reduces the required number of sensors, mounting locations, stock-keeping and installation complexity.

There are variable installation lengths for flexible installation.

For more information contact ifm electronic SA, +27 (0)12 450 0400, info.za@ifm.com, www.ifm.com

For more information contact Comtest, +27 (0)10 595 1821, sales@comtest.co.za, www.comtest.co.za
SEVERAL BILLION + ONE IN A MILLION

Our complete portfolio in level instruments with all measuring principles sums up to several billion variations for our customers. Each product means $10^{18}$ order options with different combinations of measuring tasks, versions, interfaces and accessories. Our level experts find the one in a million product, which perfectly performs in each individual setting to optimise your process.

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Dhiren Naidoo
Industry Manager: Primaries and Metals
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www.yourlevelexperts.com
Common causes of thermocouple temperature measurement errors

Thermocouples are among the most popular temperature measurement instruments in industrial applications because of their versatility and ease of use. However, measurement errors can occur. They are robust temperature measurement devices that are accurate enough for many industrial and scientific applications. Relatively inexpensive compared to other temperature measurement technologies, thermocouples are valued for their ability to measure a wide temperature range from -200 to 1250°C.

Thermocouples measure temperature differentials, not absolute temperatures. Two wires, each made from a different metal, are joined at the tip. This is the measuring junction. At the other end, the wires are connected to a body of a known temperature, called the reference junction. A thermocouple works by taking the difference in voltage between the two junctions, explained by the Seebeck effect. The measured voltage is converted into a temperature unit, with the temperature reading displayed on a device or transmitted to a remote location.

Although thermocouples are reliable, temperature measurement errors can occur for various reasons. The following are the six most common causes of thermocouple measuring errors:

1. Selecting the wrong type of thermocouple on the transmitter
   Problems can occur if the wrong type of thermocouple is chosen when inputting the settings into the transmitter during installation. This is a common error as there are numerous types of thermocouples – types K, J, N, E, T, R, S, and B – each with a different range, accuracy and electrical output.
   Solution: Almost all thermocouples are colour coded by type, so all that is needed is to confirm the colour of the thermocouple jacket and match the settings on the transmitter.

2. Problems related to the thermocouple extension wire
   If the polarity of the thermocouple lead wires is accidentally reversed, the measured temperature will be incorrect by the difference in temperature of the two ends of the leads. The problem is understandable because red is the usual colour for positive charges, whereas the red wire in thermocouple cables typically contains the negative signal. This colouration is ANSI standard for thermocouples, but it is not what most people expect.
   Solution: Doublecheck the connection and, if necessary, swap the thermocouple lead wires.

3. Inherent variations in alloys
   No two batches of wires are exactly alike. As the alloy percentages vary a tiny bit during each manufacturing process, some error in thermocouple accuracy is unavoidable. Standard thermocouples get within approximately 1% of the actual temperature at the measuring junction, which is accurate enough for most applications.
   Solution: Order thermocouples with special-limit wires, which can improve accuracy twofold. These wires are manufactured at the highest tolerances to ensure the fewest possible impurities and the greatest consistency in alloy ratio.

4. Temperature variations around the reference junction connection
   Because a thermocouple measures temperature differentials, any temperature fluctuations around the reference junction (cold junction), which has the known temperature, result in an erroneous temperature reading.
   Solution: Make sure no fans or other sources of cooling or heating are located near the reference junction. Simple insulation can also protect the junctions from extreme temperatures.

5. Thermocouple grounded at more than one location
   A thermocouple should be grounded at only one location. If it is grounded at more than one location, a ‘ground loop’ can be created with current flowing through the thermocouple from one location to the other. This is likely to generate electromagnetic fields, which can lead to radio frequency interference related problems that can impact measurement accuracy.
   Solution: Ground either the transmitter (connection head) or the controller/recorder, but not both. Selecting transmitters that have internal isolation between the input, output and ground usually provides enough isolation to eliminate a ground loop. Loop isolators are also available and can be put in the loop wiring circuit to prevent this from happening.

6. Thermocouple age
   While thermocouples are reliable temperature measurement devices, they do drift with time. Maximum exposure temperature, cyclic measurements, and frequency of the cycles affect the metallurgy with a resultant drift, usually downward. Unfortunately, this drift cannot be predicted, but 5 to 10°C errors are common.
   Solution: The only solution is to replace the thermocouple periodically based on the user’s experience.

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Early Detection System for Oil on Water and Land

Oil spills and or leaks bring with them tons of pain for the guilty party with respect to government fines, environmental issues, negative publicity, costly clean up and product losses. To mitigate this pain one needs to continuously monitor for leaks, spills and or illegal dumping of oil.

ROW (Remote Optical Watcher), is an Autonomous non-contact sensor for detection of oil on water and land. ROW is highly accurate, easy to maintain, finds oil spills early so you can respond before things get out of hand.


ROW IS PERFECT FOR: Oil & petrochemical facilities, transport, logistics and maritime operations, power distribution and generation facilities, environmental monitoring of areas of ecological importance, water treatment facilities, remote onshore/offshore applications, mining, industrial applications and agriculture.

SCALABLE SYSTEM: ROW networks can be deployed to monitor every critical point across multiple sites to provide a full overview of your facilities in real-time.

TIME IS OF THE ESSENCE: An hour could mean the difference between a simple scoop-up job and an ecological disaster. ROW detects oil spills earlier and more reliably than any manual system ever could. Can you afford not to install ROW?

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Complete Process Control Solutions
The Model 73000 Sentry Visibility Sensor

The Young Sentry Visibility Sensor measures atmospheric visibility (meteorological optical range) by determining the amount of light scattered by particles in the air (smoke, dust, haze, fog, rain and snow).

Performance in all weather conditions is achieved with an integrated design that keeps all cabling internal to the sensor for complete protection from hazards. The sensor is made from anodised aluminium and rugged, UV-resistant fibreglass enclosures. Based on the proven field experience of the NWS and FAA, the sensor uses a 'look down' geometry to reduce window contamination and clogging from blowing snow. The optical windows have continuous duty anti-dew heaters. Optional thermostatically controlled external hood heaters are available for additional protection in extreme environments. All power and signal lines to the Sentry are protected with surge and EMI filtering to ensure uninterrupted service for the life of the sensor.

Installation and maintenance are simple with the Sentry. A sturdy mounting flange located on the bottom of the main enclosure mates with a user-supplied mounting pipe. Power and signal cables are installed through waterproof cable glands on the bottom of the main enclosure to terminal boards for simple but reliable connections. Calibration of the Sentry in the field is as simple as attaching a factory supplied calibration fixture and following a procedure that takes less than 30 minutes.

Model 73100 Sentry T optimised for operation in tunnels

The Young Sentry Tunnel Visibility Sensor’s sensitivity is optimised for reduced visibility in automobile and rail tunnels, typically caused by vehicle emissions.

Model 73200 Sentry EX for hazardous area applications

The Young Sentry EX Explosion Proof Visibility Sensor is designed for high performance in hazardous environments at petrochemical production sites, refining facilities and transportation terminals. The ATEX Zone 1 rated housing and offshore marine-grade sheathed cables ensure all-weather IP66 performance to monitor changes in visibility.

Operation

A LED emitter with 850 nm wavelength focuses on a measurement volume that intersects with the observation zone of an IR receiver, which measures the amount of ‘light’ that is ‘forward-scattered’ by airborne particles. The IR energy measured at the receiver is proportional to the ‘extinction coefficient’, which is inversely proportional to visibility. The airborne particles can be fog, rain, snow, smoke or dust.

Standard visibility units are either kilometres or miles. Forward scatter type sensors like the Sentry measure a sample volume of air close to the sensor, and using the assumption of air homogeneity, calculate the visibility, which could be as far as 16 km depending on the clarity of the air. Visibility sensors cannot measure what is happening 16 km away, but must assume that if the atmosphere between the sensor and distance is uniform, then an observer at the sensor can see a range of 16 km.

To reduce dust/ice/snow collection on the lens as well as reflection from other objects, the Sentry’s emitter and receiver lens face downward. The lens must be kept clean for an accurate measurement and a quick wipe with window cleaner is all that is required. The frequency of cleaning varies depending on proximity to dust, salt or other contamination sources. The typical service life of an LED emitter is 5 to 7 years.

Every Sentry has a lens heater within the emitter and receiver housings to prevent condensation. This is a standard feature. As an option, hood heaters may be installed to help prevent snow accumulation and icing on the housings. Hood heating is recommended for all applications in colder environments.

For more information contact Felie Le Roux, Inteltronics, +27 (0)82 445 2531, inteltronics@icon.co.za, www.inteltronics.co.za
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AI will change the world in our lifetime

Artificial intelligence (AI) development and uptake is past the point of no return, with digital skills in key areas such as data science becoming crucial in an AI-driven economy according to data science expert, Shourjya Sanyal. In the same way as the Internet gained critical mass and became ubiquitous, AI adoption is gaining momentum and is set to change the way the world looks over the next 20 to 30 years. Sanyal believes AI is still in its infancy in terms of impact, but that it is evolving rapidly. "Currently, we are just at the beginning of what’s possible. We're taking baby steps, addressing the easiest problems and producing solutions most likely to appeal to consumers. But these early moves will pave the way for us to address more complex problems over the next 10 years. And in 30 years time, AI will be to the world what the Internet is today – ever present," he says, adding that AI is bigger than the Internet, it is the final pinnacle of technology.

He says that AI will not only revolutionise daily life and work, it will actually change society. "Like the discovery of farming led to specialised jobs such as farmhands and distributors, AI will further democrise society. It will reduce the need for humans to perform repetitive, manual tasks and allow them to become innovators and experts in niche fields."

Like the Internet, AI is eventually going to disrupt almost every industry and reduce the cost of doing business. Automation saves time, money and resources, and reduces risks such as human error and fraud. Great progress has already been made in marketing and sales for example, where automation means pre-scheduling complex customer journeys and efficiently tracking response rates and customer sentiment. Then AI will make businesses more profitable by empowering C-level executives with better predictive analytics in terms of customer behaviour, inventory requirements and sales cycles. The first impacts are likely to be felt in industries like media, legal, finance, travel, retail, manufacturing and healthcare.

However the road to Utopia, in which AI takes on the hard labour and allows humans to focus purely on creation and innovation, could be paved with challenges. There are concerns about the potential negative impacts of AI on jobs, particularly in developing countries. Other negative impacts include a tendency towards blindly depending on AI for corporate decision-making. But Sanyal believes that the long-term gains of an AI-enabled world outweigh the challenges.

AI demands data science upskilling

To prepare for the inevitable change, businesses should upskill their talent pools now and prepare for the potential of AI in their sectors; and data science is at the heart of this challenge. Organisations should be cultivating an atmosphere where analytical thinking is celebrated. This will enable employees to better portray their challenges to the data science team.

With data science effectively at the heart of operations, organisations can immediately start addressing the low-hanging fruit and overcome challenges. Companies need chief innovation officers who work closely with a team of data scientists to chart out all the internal and external data sets available to the organisation. The next logical step is to identify the problems that can be solved in the shortest amount of time using the available data. This will help organisations take on board more challenging problems in the longer term, including predicting the behaviour of new customer segments.

Governments for example, like large businesses, are facing challenges when it comes to gaining an efficient understanding of citizen satisfaction, inventory management and optimisation of resource allocation. A data scientist team empowered by AI will be a strong capability for any government department of the future.

But upskilling goes even further than data science. In South Africa, where digital skills resources are limited, upskilling in digital innovation is tremendously important. It must be taken into consideration immediately to ensure organisations have the skills and knowledge to compete in an AI-driven economy. Training providers like Digital Skills Academy, which provides high level degree programmes, professional diplomas and short courses in digital innovation, are a wonderful opportunity for individuals and businesses alike to develop the necessary skillset through specialisation courses in data science or programming for big data. Digital Skills Academy’s Professional Diploma in Digital Innovation provides such specialisation modules. But most importantly, the 15 week, online and part-time programme equips participants with the digital mindset and transformational knowledge required to future-proof a career in the digital economy.

For more information contact Rebecca Beaty, Digital Skills Academy, rebecca.beaty@digitalskillsacademy.com, www.digitalskillsacademy.com
High I/O density rackmount computers for IIoT

With more and more companies implementing IIoT applications, the demand to connect hundreds or thousands of devices to industrial automation systems has increased dramatically. Moxa’s DA-720, a high-performance industrial-grade x86 platform, is ideal for such applications. It is based on the Intel 6th Gen Skylake processor and provides a high density of gigabit-Ethernet and serial ports in a 48 cm2U rack-mountable case, making it an ideal choice for IIoT applications in power substations, railways, factories and building automation systems.

High flexibility for versatile applications
The DA-720 comes with high performance Intel Core i5 or i7 CPU options that allow system designers to install the mSATA, RAM, and operating system according to their application requirements. The computer is also provided with expandable serial and Ethernet interfaces to enable easy connectivity with a multitude of field devices that have various data processing needs.

High reliability to ensure 24/7 operation
Moxa’s DA-720 series rugged fanless computers are designed to operate reliably in harsh industrial environments. They have passed rigorous tests for adherence to safety standards, including continuous exposure to high voltage, power surges and shock.

Easy maintainability to reduce system downtime
Automation computers are often located at unmanned or remote sites. To ensure maximum uptime, the DA-720 supports Moxa’s Proactive Monitoring utility, which provides real-time information about the status of the computer hardware and triggers alerts based on user-defined criteria for predictive maintenance. The Smart Recovery utility allows engineers to automatically trigger OS recovery at remote locations to minimise system downtime.

For more information contact RJ Connect, +27 (0)11 781 0777, info@rjconnect.co.za, www.rjconnect.co.za

Made for the makers
Experience the new way of business interaction.

The integration of Endress+Hauser’s online shop into the company website underlines its goal of providing support to customers to streamline their procurement processes and improve their buying experience. The company’s online presence has undergone extensive revision. More than just a redesign, a great deal of focus has been placed on maximising functionality and usability to create a comprehensive information and procurement platform.

A comprehensive purchasing tool
Integration of the online shop into the website has made it easier for planners, purchasers, engineers and maintenance personnel – in short, everyone – to discover and easily purchase from Endress+Hauser’s complete product portfolio. With the combination of product information and direct purchasing options, the procurement process is easier than ever.

Personalised information
Once logged in, a wide range of individual and detailed information is available, including personalised pricing and order history. All transactions of a company or a company branch can be viewed in one summary, irrespective of whether these were completed online or offline. The range of services includes integrated document management. Users are able to access all documents such as quotes, invoices and delivery information to obtain a comprehensive overview. All customers are able to assign role-based access rights and strategic purchasers have a multiple log-in option at their disposal.

For more business contact Deshini Govender, Endress+Hauser, +27 (0)11 262 8000, deshini.govender@za.endress.com, www.za.endress.com
Connected Services drive digital transformation

A great number of industrial companies are implementing digital technologies aimed at optimising operations. Whether targeting point solutions or undergoing a full digital transformation, most organisations need support to plan for, deploy and maintain new solutions, or to help them reap the most value from digitalisation. To meet these information infrastructure and security needs, Rockwell Automation employs its Connected Services offerings, and continues to expand this portfolio.

Connected Services include capabilities including infrastructure-as-a-service industrial infrastructure assessment, design, implementation, support and monitoring (IaaS), remote asset monitoring and predictive maintenance, cybersecurity threat detection and recovery, training and consulting. These software-powered services build on existing application and product support services to help organisations access and use production data to improve asset utilisation and productivity while reducing risk and time to market.

“Industrial operators have been using cutting-edge technology since the Industrial Revolution,” said Sherman Joshua, global portfolio manager for Connected Services. “Our customers understand that digitising operations or building a connected enterprise is about much more than rolling out new technology. They need the right infrastructure, process and people in place to transform operations and capture the value that new technology is unlocking. That value is huge. Our Connected Services are making it easier and faster for our customers to uncover it.”

According to ARC Advisory Group, the cost of unscheduled downtime in industrial operations exceeds $20 billion. Through traditional means of detecting, diagnosing and fixing downtime, approximately 76% of downtime occurs before any corrective action is undertaken. Connected Services can help users detect and resolve issues quickly, reducing downtime by as much as 30%.

Connected Services offerings start with building a secure information infrastructure. Network and cybersecurity services include assessments and design, technical support, IT/OT training, remote monitoring, threat detection and recovery, turnkey implementation, pre-engineered network solutions, and network monitoring and management. These services can speed the integration of new equipment and systems, vastly improve security and help reduce downtime with access to technical resources.

Remote support, monitoring and response services can prove especially valuable for critical processes through around-the-clock operations and remote operations. These services can complement onsite maintenance teams, providing everything from continuous machine monitoring and incident response to 24/7 remote support and software/firmware updates. Deployments can make use of the FactoryTalk Cloud gateway, on-premise industrial data centre servers, or a hybrid model that combines both options to help improve productivity and reduce downtime.

Data integration and contextualisation services can help capture a wealth of data and convert it into actionable information. These services can provide new opportunities to help increase productivity. Producers can reduce skills gap challenges by relying on Rockwell Automation to monitor, maintain and manage the network, equipment or entire applications. Connected Services offerings are also scalable, allowing producers to build ROI as they go, and rely more on Opex than Capex funding. Rockwell Automation can deliver and execute Connected Services offerings globally, giving organisations consistent support across operations.

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RS Components has announced availability of the new CEL RoboxPRO additive manufacturing 3D printer, which offers high-end specifications and exceptionally fast print speeds. The dual extrusion machine primarily targets professional users involved in creating designs that require advanced rapid prototyping capabilities to realise their product concepts in durable, engineering-grade materials.

A unique feature is the large interlocking door, designed to protect the printer’s fully enclosed build chamber with HEPA and active charcoal air filtration, which prevents unnecessary disturbance or damage to print builds in progress while ensuring users are not exposed to potentially toxic fumes. This important feature makes RoboxPRO highly suitable for professional or industrial environments and ideal for educational establishments such as universities, colleges or schools.

Using fused filament fabrication (FFF) 3D printing technology, a key differentiator of RoboxPRO is its patented needle-valve technology, which makes it one of the fastest and most efficient dual extrusion machines available. The dual-nozzle printing capability means the unit can print two different colours, two different materials, or with a dedicated material supporting the main part, including water-soluble or breakaway.

Like previous generation printers, RoboxPRO print heads are easily replaceable and can be upgraded to deliver extended and enhanced capabilities in the future, such as paste extrusion. The machine is designed for 1,75 mm filaments and is capable of printing a wide range of materials including PLA, ABS, PETG, TPU, PC and nylon. RoboxPRO is also the first 3D printer to include an Olsson Ruby nozzle in the box. This is one of the most unique FFF extrusion nozzles currently available on the market, designed to print highly abrasive materials while retaining the excellent heat conductivity of brass. Its tip is made from ruby, which means that the nozzle is much more durable when compared to other nozzles. It can print with demanding, high-performance materials including Kevlar or Tungsten-filled ABS and glass or carbon-filled nylons for a lot longer before it starts to wear away. In many cases, the ruby tip can also lead to an improved surface finish.

Another key specification includes a build volume of 210 x 300 x 400 mm and a wide choice of layer resolutions from 0,5 mm for ultra-fast printing, down to layers as small as 0,05 mm (50-microns). RoboxPRO uses onboard controls with an integrated, full-colour 5 in touchscreen display interface to enable users to change print settings, make build-plate calibrations and manage its connectivity options, which include Wi-Fi, Ethernet and USB.

Other features include a climate-controlled build chamber, which features a HEPA filter and active charcoal air-purification system; adaptive bed levelling with no manual calibrations; an interchangeable, hassle-free build plate with no glue or tape required; and the Robox SmartReel material recognition system, which greatly simplifies the printing process with automatic print settings and job costings. RoboxPRO is compatible with other brands of filament, however, including Verbatim.

Compatible with Windows, Apple and Linux operating systems, the unit is also supplied with the intuitive Robox AutoMaker software.

For more information contact RS Components SA, +27 (0)11 691 9300, sales.za@rs-components.com, www.za.rs-online.com
Energas Technologies has entered into a distribution agreement with R Schmitt Enertec, a German manufacturer of gas engines, generator sets and cogeneration sets, to offer highly efficient power generators to the local market. R Schmitt Enertec’s range of highly efficient and innovative power generators is now available in South Africa and neighbouring countries. Depending on customer requirements, Energas will offer Enertec’s wide range of generator sets with or without heat recovery and co-generation: the Energin, Energin Gen+ and Energin CHP units, ranging from 115 to 500 kW.

Energin generator sets are designed for power production in island or parallel mode with other generators and/or the utility. Based on the R Schmitt Enertec M Series gas engines, fuel options include natural gas, biogas, wood gas and LPG.

Energin Gen+ are gensets with heat recovery from engine jacket water, lube oil and first stage mixture cooling. Heat recovery in the Gen+ units increases the overall engine efficiency by 28% by utilising the thermal energy. More than double the energy used to generate electricity is wasted in the form of heat discharged to the atmosphere. Energin CHP units enable onsite electricity generation that captures heat that would otherwise be wasted, to provide useful thermal energy such as steam or hot water. Steam and hot water can be used for several processes such as space heating, cooling, domestic hot water and industrial processes. Through Energin CHP waste heat recovery, the total energy efficiency is increased above 90% compared to 42% in conventional technologies where only electric power is generated.

According to Laetitia Botha, Energas Technologies product engineer, Enertec’s range of gensets complements Energas Technologies’ existing product offering. “Energas specialises in the supply of specialised equipment to the natural gas industry in South Africa and neighbouring countries. Generation of power by making use of natural gas, biogas or waste gas, complements the existing product range in our stable,” she explains.

Enertec’s generator sets can be used for pure electric power generation or a combination of electricity and thermal energy generation when waste heat recovery is included. Typical applications are diverse and include chemical, refining, pulp and paper, biogas, printing, food processing, glass manufacturing, drying plants and RDF gas in the industrial industry; hotels, health clubs, nursing homes and office buildings in the commercial building sector; apartments, planned communities and other institutions; and municipal applications such as district energy systems and wastewater treatment facilities.

Unique product
Botha explains that a unique capability of Enertec generators is that they can also generate power from weak gas supplies. Most engines can only work with gas supplies of very good quality, but the Energin engines can adapt. Dependent on the gas analysis, Enertec can make the necessary adjustments as the manufacturer of the gas engines, the CHP unit, the control unit and the gas cleaning and drying skid. In comparison to other suppliers, the engines are not controlled to lambda 1 (ratio of the actual air/fuel ratio to stoichiometric) — because of a weak gas the lambda measurement is not exact enough. Instead, each cylinder in the engine has a thermocouple that measures the temperature inside (direct into the burning chamber).

Meanwhile, if the gas is weak, the temperature will decrease, and if the quality gets better the temperature also rises. With low temperature, the ratio of the gas/air mixture will be adjusted to get the same performance and a stable power output in the engine. The same principle is applied when a high temperature is measured. The temperature measurements and controlling of the gas/air ratio is very accurate and adjustments are made rapidly, which makes it very suitable for fluctuating gas qualities. “This technology gives Enertec’s engines a big advantage over other competitors,” adds Botha. “The arrival of these generators in the local market offers local customers new possibilities. Electricity in South Africa is no longer as cheap and reliable as it used to be. Industry needs to become more energy efficient and independent with its energy usage,” she concludes.

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RS Components has announced availability of the fourth generation of LOGO!Power power supplies from Siemens. These new ultra-narrow units have the same design as the Siemens LOGO!8 logic controllers and deliver up to 100 W for distribution boards, as well as being fully compatible with the third-generation range of devices.

The portfolio now includes two additional devices as well as additional functionalities and scope for a range of applications including: industrial automation, such as simple packaging machines, garbage presses, conveyor belts and sorting systems; and in building automation, such as lighting controls, heating control system extensions, or door and gate controls. The series also offers an extended operating temperature range from –25 to 70°C, enabling their use in cold environments.

Offering housing widths of 18 to 72 mm, the compact fourth-generation devices offer a reduced width with respect to the previous generation, which allows more flexible mounting on DIN rails in distribution boards, or directly on walls or ceilings. They can also be mounted side by side with other devices, for example, supplying power to adjacent LOGO! intelligent logic modules.

Providing outstanding energy efficiency both in standby and running operation, the series offers efficiencies of up to 90 percent over the entire load range, and no-load losses of less than 0.3 W. The integrated current monitor also helps during commissioning and servicing: current output can be read out in real-time as a voltage value using a measuring point. The disconnection of cables for conventional current measurement is no longer required and the system continues to be supplied with direct voltage without interruption. The series also offers a diagnostic LED ‘DC OK’ signal to indicate status.

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Magnet’s new A.Eberle high performance PQ Box 150 is a network power analyser, meter and transient recorder in one device. “This compact new instrument has advanced features for reliability and easy operation,” explains Brian Howarth, managing director of Magnet. “It has an expandable memory and a sampling frequency of 20 kHz, double that of the previous series.

The PQ Box 150 has been developed for mobile operation and is suitable for measurements in public networks up to 600 V CAT IV, as well as for measurements in industrial environments up to 1000 V CAT IV. The power analyser measures the voltage quality accordingly against stringent requirements for low, medium and high voltage networks. Various triggering options enable quick location of the fault.

This shockproof device has an IP65 index protection rating to guard against the ingress of dust and water and is equipped with a robust power supply unit and application specific settings, which are easy to program.

A clear display provides information about the correct connection of measuring cables and current clamps and indicates on-line data of voltage, current, THD and power. The number of events that have occurred during operation and the recorded measurement duration are also displayed for the user.

The PQ-Box 150 detects the connected current-clamp set via a coding in the plug and automatically sets the correct measurement ranges. The device does not need to be informed of the transformer mounting ratio.

Multiple sessions can be recorded consecutively, without having to transfer data to a PC at the end of each recording. A manual trigger button enables recording of the current network status of a system in the form of an oscilloscope trace and 10 ms r.m.s values. Two additional buttons can be used to scroll the display and to adjust the settings of the device, for example, transformers in the medium and high voltage networks.

A USB 2.0 interface and TCP/IP is available to transfer the data. This instrument has a large 4 GB micro SD card memory and a slot for an SD memory card 1 GB to 32 GB. Evaluation software, which offers numerous evaluation options such as load analysis, trouble shooting in the network and automatic EN 50160 reports, can be installed on an unlimited number of PCs.

Various accessories, which enhance performance of these devices, are also available from Magnet. The company supports the A.Eberle range with a technical advisory and maintenance service throughout the country.

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For more information contact RS Components SA, +27 (0) 11 691 9300, sales.za@rs-components.com, www.za.rs-online.com
Fluke has on offer two three-phase power loggers, the 1736 and 1738, giving users the data needed to make critical power quality and energy decisions in real time. They are specifically engineered to conduct energy studies and basic power quality logging, automatically capturing and logging over 500 power quality parameters for more insight into the data needed to optimise system reliability and savings.

The 1736 and 1738 are the first three-phase power loggers built with the Fluke Connect mobile app and software, enabling users to measure, capture and log all relevant characteristics of electric power and enabling management and analysis of large data sets.

They provide:
- More visibility: They automatically capture and log over 500 power quality parameters.
- Reduced uncertainty: Visibility through Fluke Connect enables users to view collected data to ensure the data being collected is correct, either at the panel or remotely. By powering the logger directly from the measured line and the intelligent verification function that digitally corrects common connection issues, measurement system errors are significantly reduced.
- Better decision-making capabilities: Data can be accessed and shared remotely via the Fluke Connect app to maintain safer working distances and make critical decisions in real-time, reducing the need for protective equipment, site visits and check-ins. Chart and graph measurements allow the user to create detailed reports with Fluke Energy Analyse Plus software.

The Fluke 1736 and 1738 have more power quality measurement capability than their predecessor, the Fluke 1730, a pure energy logger. This functionality is a subset of the Fluke 1736/1738. For users performing both basic power quality studies and energy studies, the 1736/1738 enables users to measure, capture and log all relevant characteristics of electric power and gives access to management and analysis of large data sets. The 1738 includes advanced limit based analysis (uses EN510160 limits), the capability to connect two Fluke Connect devices for logging of supplementary parameters and a Wi-Fi/Bluetooth (BLE) dongle.

The 1736 and 1738 feature:
- Key measurements: They simultaneously measure log voltage, current, power, harmonics and associated values as well as all three phases and neutral with four flexible current probes included.
- Connectivity on a portable power logger: Data can be viewed locally on the instrument via the Fluke Connect App or through the facility’s Wi-Fi infrastructure.
- Comprehensive logging: 20+ separate logging sessions can be stored on the instruments. All measured values are automatically logged for measurement trends.
- Capture of dips and swells: This includes event waveform snapshot, along with date, time-stamp and severity to help pinpoint potential root causes of power quality issues.
- Complete in-the-field setup through the front panel or Fluke Connect app: There is no need to return to the workshop for download and setup or to take a computer to the electrical panel.
- Convenient instrument powering: The instrument is powered directly from the measured circuit, eliminating the need to find a power outlet while allowing the instrument to be secured safely inside electrical panels.
- Fully integrated logging: Other Fluke Connect devices can be connected to the 1738 to log up to two other parameters simultaneously, and virtually any parameter available on Fluke Connect enabled digital multimeters.
- Two USB ports: One port is for PC connection and the other for quick, simple data download to standard USB thumb drives or other USB devices for in-place, undisrupted logging.
- Compact size.
- Highest industry safety rating: 600 V CAT IV/1000 V CAT III.
- Security: They are safeguarded from theft with an optional hefty, durable Kensington lock.
- Power Quality Analyse application software: Every detail of energy consumption and power quality can be downloaded and analysed with automated reporting.

Accessories for the 1736, the hanger kit and magnetic voltage probes are must-haves, making installing much easier. Additionally, the upgrade kit for the 1736 allows users to fully upgrade their 1736 to a 1738 with all the functionality and accessories included with 1738. The auxiliary input cable is very useful if users wish to log other parameters like temperature along with energy and, especially if there are a wide variety of circuit types and sizes, additional current probes would be most useful. If users are planning to fully integrate their measurements they can also buy FC3000 modules which can connect to the 1738 and log those measured values.

For more information contact Comtest, +27 (0)10 595 1821, sales@comtest.co.za, www.comtest.co.za
Stop the Enemies of Turbines
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Fully automated sodium and silica measurement systems give you:

• Reliable trace level monitoring
• Grab sample measurement capability
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CONTROL SYSTEMS

In process technology, analog signals are being transmitted in all the production processes. Electromagnetic interference and potential difference, however, adversely affect signal quality. The products from the comprehensive signal conditioner product range from Phoenix Contact are an ideal solution to counteract this effect.

Interference-free signal transmission plays a central role in the field of measurement, control and regulation (MCR) technology. The rising number of electrically-operated components, the increasing level of miniaturisation and packing density of the devices, the growing amount of wireless communication and control devices, as well as the increasing performance of digital systems that operate at higher transmission frequencies, lead to higher levels of electromagnetic and high frequency interference in this field. This interference influences the small voltages and currents that are supplied by the sensors installed in the field. In case the user does not sufficiently consider these disturbance variables, error-free signal transmission will be affected and so will the quality of products manufactured in the customer’s plant. Signal conditioners make a significant contribution to increasing signal quality. Phoenix Contact therefore offers the associated portfolio that consists of different product families. From highly compact signal conditioners to signal conditioners certified according to SIL 2, SIL 3 and PL d, right through to signal isolators for intrinsically safe circuits in the Ex area, the range of products includes the right solution for every requirement.

Versatile signal conditioners
Acquiring and processing analog signals of optimum quality.

Measured values can be represented flexibly
In the broadest sense, the Field Analog product family comprises all the components that can be used down to the field level. The new process indicators combine the features of classical signal conditioners and the advantages of flexible display devices. The multi-functional input can be used to record different analog values such as current, voltage, thermocouples or RTDs. The input additionally supplies the sensor, if required. The two relay outputs can be used for different limit value switching functions, while the signal is forwarded to downstream systems via the analog output. Thanks to flexible setting options, the display can be adjusted to meet the requirements of the user. Indication of the measured values can be scaled as desired, and the signal can be transmitted together with the required unit or the measuring point designation.

The Field Analog product family also includes loop-powered, HART-capable process indicators in addition to multi-functional devices. These process indicators are powered from the 4...20 mA signal circuit. However, the circuit is hardly loaded because of their low voltage drop of less than 0,9 V. This is a decisive factor for explosive atmospheres because here the energy must be reduced to prevent any explosion. The HART-capable display also allows for flexible measured value representation so that the data can be scaled and visualised with the required unit. Because the process indicator is designed as a HART master, the user benefits from the HART functions of the field devices, which have not been used before. In this way, up to four additional measured values can be displayed via the HART protocol. The multi-functional process indicators as well as the HART-capable process indicators are available with IP20 protection for the control cabinet and with IP67 protection for field installation.
Extended diagnostic information via HART or programming interface
The new loop-powered temperature transmitters can be used to process two thermocouples or RTDs and to convert a scalable 4...20 mA or HART signal. A few examples of selectable functions include mean-value generation, comparison, subtraction or sensor backup. In addition, up to four values that can be freely adjusted can be forwarded to the follow-up I/Os via the HART protocol. The temperature transmitter is characterised by its high degree of accuracy, reliability and long-term stability. Extended diagnostic functions are also available via HART or the programming interface. The device increases safety and availability of the system and minimises application risks because the hardware and software of the transmitter have been developed for the SIL 2 and SIL 3 safety categories according to IEC 61508 and certified for safe operation in the Ex area. The temperature transmitter is available in two different designs: in a housing for DIN rail mounting and for installation in a form B connecting head according to DIN 50446.

Cost-effective implementation of functional safety and explosion protection
One of the most important tasks in the production industry is reducing the risk of harm to humans. Standards like IEC 61511, IEC 61508 or EN ISO 13849 have been created to achieve this goal. The situation becomes even more complicated if explosion protection needs to be considered in addition to functional safety, or the sensor needs to be supplied additionally via the signal circuit. An expensive safety controller would be disproportionate for many applications because only a few signals need to be designed in a safety-related way. Phoenix Contact has developed the MACX Analog product family for this field of application.

This product family consists of one-channel and two-channel signal isolators with a width of 12,5 mm for intrinsically safe circuits up to zone 0 and zone 20 that additionally boost and safeguard the transmission quality of analog signals by ensuring accurate conversion, isolation, filtering and amplification. The devices are easily configured via the DIP switches on the front or an operator interface. The free software provides additional device and monitoring functions. Status LEDs and group error messaging allow for simple diagnostics in the event of an error. The DIN rail connector to which the MACX modules are snapped not only provides for fast power bridging but also simplifies module replacement during operation in addition to wiring and system extension. Pluggable coded terminals with integrated test sockets are also easy to maintain. Low self-heating of the signal isolators results in a long service life. Versions with wide range input enable worldwide use in all power supply networks.

Simple configuration via DIP switches, software or app
If the focus is on applications without functional safety up to Ex zone 2, the highly compact signal conditioners of the MINI Analog Pro product family are the ideal choice. Modern switching technology and high electrical isolation with 3 kV test voltage and 300 V rated insulation voltage ensure optimum signal quality. The devices also feature a large operating temperature range from -40 to 70°C and an extended supply voltage range from 9,6 to 30 V DC. Easily accessible terminal points and pluggable FASTCON Pro connection terminal blocks enable quick installation, startup and maintenance. The signal and power supply circuits can be disconnected using the disconnection function. The current signals can also be measured during operation without disconnecting the current loop. Large-surface marking areas permit complete loop identification with standard marking material.

The MINI Analog Pro conditioners and the MACX devices are provided with a DIP switch for easy standard configuration. A stand-alone software can be used for extended configuration and monitoring via PC. All MINI Analog Pro modules have an NFC interface for wireless communication. In case of service, they can therefore be configured locally via the corresponding app. The app can also be used to retrieve module information and DIP switch settings, and to monitor the process data of the multi-functional devices.

Fast and error-free signal connection to the automation system
The comprehensive signal conditioner portfolio is supplemented by smart system cabling. The Plug and Play solution allows for a large number of signals from the field to be quickly linked to the automation system without errors. Two different concepts are available. The gateway for the MINI Analog Pro product family integrates up to eight field signals of any type to industrial networks while saving space and being safely electrically isolated on each channel. This increases availability of the application. Because the use of expensive signal-specific I/O cards becomes unnecessary, the costs for cabling and material are reduced considerably. Currently, gateways with connections for the Modbus/TCP, Modbus/RTU and PROFIBUS DP are available.

The Termination Carrier concept is based on a specifically developed and patented aluminum profile with built-in DIN rail shape for holding the modules of the MACX Analog and MINI Analog product families and the safe PSR coupling relays. In contrast to motherboard solutions, the Termination printed-circuit board is decoupled mechanically from the interface modules and integrated safely into the profile. Thanks to mechanical decoupling, circuit path breaks can be avoided. This makes the Termination Carrier concept resistant to vibrations up to 2 g and resistant to shocks up to 15 g. The compact design and deep system connections allow for space savings of up to 30% when compared to standard commercial solutions.

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Emerson has expanded its Plantweb digital ecosystem with the launch of DeltaV version 14, a cybersecurity-certified control system designed to deliver new value in capital projects and make plant operations more connected and productive. The latest release provides significant innovations to the entire DeltaV architecture and was built with customers’ digital transformation initiatives in mind.

This major update to the automation system includes several meaningful enhancements to eliminate costs and reduce complexity in capital projects, plus improve productivity during operations through enhanced access to production and equipment data, improved usability and greater security.

“More than ever, an integrated plant data environment is essential to achieve digital transformation,” said Jamie Froedge, president of Process Systems and Solutions, Emerson Automation Solutions. “With DeltaV, we’re reducing the engineering effort required to connect plant, operational and information systems. Our customers will now have more capabilities in their distributed control and safety systems to help them successfully execute capital projects and optimise operations.”

Capital project flexibility
Continuing to advance the impact of DeltaV electronic marshalling on capital project engineering, CHARM I/O Block takes CHARMs – which achieved more than one million deployments at more than 1100 sites in only five years – closer to the field. Small enclosures with up to 12 CHARMs can now be installed closer to field devices, significantly reducing wiring and overall installation costs by as much as 60% and providing more engineering flexibility.

Smart Commissioning, launched in 2016, took one of the most engineering-intensive operations off a project’s critical path. Traditionally, commissioning has been a manual task that requires more than two hours per device for thousands of devices. Smart Commissioning reduced commissioning time to 25 minutes. Emerson is now expanding these capabilities and reducing device commissioning time to as little as 10 minutes, a nearly 93% reduction in costly commissioning time that could save several hundred-thousand dollars in engineering costs.

Mobility and user experience
DeltaV Live Operator Interface is a modern, built-for-purpose operations experience that is easy to understand and modify. The HMI comes pre-engineered with the industry’s best practices for user experience including ISA 101.01 and is based on research with the Centre for Operator Performance, a consortium of vendors and academia focused on human factors engineering. The HTML5 interface enables scalable graphics and gives operators the flexibility to adjust their displays to focus on process data that is most important for each situation. The new operator interface helps improve overall situational awareness and decision-making speed.

Emerson is making connecting a plant’s OT systems with IT systems seamless by expanding OPC UA access in its DeltaV hardware and software offerings. DeltaV is the pathway for most plant data and now using the IoT’s most prevalent protocol, OPC UA, DeltaV applications and servers can securely share data to cloud analytics applications, remote monitoring solutions, and third-party technologies.

Emerson announced the first two additions of its new DeltaV system last year with the DeltaV PK Controller and DeltaV Mobile. The DeltaV PK Controller enables plants to control skids and applications typically managed by PLCs with a standalone DeltaV controller or connect into an integrated full-scale DCS automation architecture or the cloud via embedded OPC UA. The DeltaV Mobile platform natively connects into DeltaV – securely and without additional engineering – to enable managers, engineers, operators and subject matter experts to monitor operations and have critical data and alarms at their fingertips, whenever and wherever they need it.

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The HMI product family offers the user different screen sizes, two different touch technologies and depending on the HMI product, a different number of device interfaces.

Two variants available:

**Basic-Line**: The devices of the Basic version have resistive touch, an aluminum front and panel sizes from 4.3 to 10 inches.

**Advanced-Line**: The devices of the Advanced version are available with capacitive multi-touch, a smooth user interface for optimum cleaning and panel sizes from 7 to 15.6 inches.

**Features:**

- Linux System
- Resistive Single-Touch (Basic)
- Capacitive Multi-Touch (Advanced)
- External changeable microSD card
- USB & Ethernet communication
- LCD TFT with LED backlight
- Usable for Web applications (HTML5)
Designing an automated system requiring any type of linear motion is no easy task. Selecting the correct technology behind the actuator really depends upon what the designer wants to accomplish with it. Like much in engineering, making the right selection is less about focusing on a single characteristic than finding a good balance of performance from a number of different factors. Costly mistakes can be avoided by weighing up the available options analytically while designing efficient and economical motion control systems.

The majority of electromechanical linear actuators are comprised of five common types of drive trains: ball screws, lead screws, timing belts, rack-and-pinion tracks and linear motors. Understanding the strengths and limitations of each type and weighing them against the design requirements is the most logical approach. After all, linear actuators can be used in a wide variety of applications, from automated packaging lines and pick-and-place operations to complex machines such as 3D printers, which require precision positioning accuracy.

The most common drive train types
In linear motion, drive trains offer a dual function. They are primarily used for repetitive positioning and therefore need to provide acceptable accuracy and repeatability (the ability to back to the same commanded position repeatedly) according to the purpose for which they are required. At the same time, they apply force over distance, which requires them to possess sufficient tensile strength.

Ball screws, a popular and widely used drive train consists of a threaded rod and matched ball nut with ball bearings between the nut and screw surfaces. Ball screws are an ideal solution for high duty cycle applications, as well as applications requiring high force density, precision and repeatability. The rolling ball bearings reduce friction and provide high mechanical efficiency, even when in constant use. They can achieve moderate speed.

Lead screws consist of a threaded rod and matching threaded nut sliding interface surfaces. They are suitable for low duty cycle applications, or applications requiring small adjustments. Lead screws are typically only about half as efficient as ball screws, so they require double the torque to achieve the same thrust output of the screw. However, they offer cost efficient and compact solutions for high force applications. Moreover, they are resistant to back driving, removing the need of using a brake to hold the payload under a power loss.

The timing belt, the most simple and common drive train for linear motion systems, consists of two cogged pulleys; usually one driven and one idler, connected to a timing belt with an attached carrier. Timing belts are a robust mechanism for high-speed applications requiring long life and minimal maintenance where precision greater than 100 microns is sufficient. They can be operated at 100 percent duty cycle and are available in longer lengths than screw drives, making them ideal for long stroke applications requiring high dynamics.

Rack and pinion systems consist of a machined linear gear and a round mating toothed gear. Typically, the round gear is mobile and the rack is stationary. This type of drive train is useful for very long travels requiring high speed, but is not known for its precision. They offer high force density but they require maintenance to maintain the lubrication of the system. In addition, removing system backlash from this type of drive train is not always possible, and they can also often be quite noisy in operation.

Linear motors are made up of a row of magnets – simply put, a ‘flattened’ rotary motor – which interface with an electromagnetic carriage to move the payload in a linear direction. They offer high speed, acceleration and precision. The main drawback is the cost of implementing this technology due to the cost of the magnets and linear feedback devices required. Force density is also lower than for the other drive system. The lack of a mechanical connection between moving and static parts of a linear motor makes the use of it difficult in vertical applications.

The PETS principle
The list of potential performance characteristics that a designer might be interested in is long, so to focus the selection process more precisely, the options can be classified into the following categories: precision, expected life, throughput and special considerations (PETS).

When weighing the options with a focus on precision, always start with an understanding of your needs relative to resolution. The other considerations are repeatability, followed by accuracy and finally velocity resolution. Linear motors and precision ball screws are typically the most superior for precision characteristics. (The majority of motion applications do not require these high levels of precision, which is why the timing belt remains the most commonly applied technology.)

Upon examining the expected lifespans of all the options, mechanical efficiency will be the number one consideration, unless the requirement is for a dirty or otherwise harsh operating environment. High efficiency of the drive train is synonymous with long life and lower energy consumption. Issues such as wear resistance, dirt resistance and maintenance requirements are also important factors to be considered in this category. Because of their high efficiency and limited maintenance needs, timing belts are the go-to drive train of choice in this category.

The category of throughput can be considered by first examining the speed and acceleration or deceleration characteristics of each technology – depending on the length of linear travel required. If you have a longer travel where more of the cycle time is spent at the top velocity, speed is the most important. If the application requires shorter moves, acceleration and deceleration characteristics will take precedence. Depending on the application also other criteria, for example frequency response,
duty cycle must be taken into account. Linear motors are unparalleled from a throughput perspective, due to their ability to achieve high speeds and accelerations, and given that they have no mechanical compliance, they have a high-frequency response.

Some special considerations to take into account when looking at each technology include material costs and implementation costs to ensure that the right combination of functionality is achieved at the minimum cost. Force density is also an increasingly important factor to bear in mind as machine designs continue to miniaturise, particularly when specifying end effectors or tooling mounted to an axis.

A precise balancing act
Some applications make the choice of a linear drive train relatively simple. For example, it’s clear to see from the above that timing belt drives are an ideal choice for long-travel applications requiring high linear velocity and acceleration. If the application travel length and required speed are moderate, but the acceleration should be high, or if a high positional accuracy is required, then a linear motor based drive would most likely be a better fit.

When the choice is not as obvious, all the available application parameters should be weighed carefully to make the best possible selection. If one key performance characteristic is optimised, it is likely that another performance indicator may be sacrificed. Analyse the requirements against the abilities of each technology using the PETS principle from the beginning, or contact the specialists at Parker Hannifin for specialist advice on modular linear drive solutions.

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Schneider Electric boosts dairy production

Schneider Electric's food and beverage solutions are increasing the efficiency and sustainability of the industry, and the company's dairy solutions allow users to seize new market and profit opportunities, thanks to zero waste and 100% traceable production. This is achieved through Schneider's EcoStruxure Hybrid DCS, formerly known as PlantStruxure PES, which helps customers manage their dairy processes in an easy, smart and energy-efficient way. The new platform improves the production monitoring and control system, while making provisions for the company's future expansion.

Dynamic and competitive, the current dairy market reflects an increased demand for safe and nutritious products. Innovation and flexibility are critical when growth hinges on the ability to meet consumer requirements, while striving for zero waste.

South African case study
Schneider Electric has excellent case studies from dairies as far and wide as the UK, USA, New Zealand, Australia, Thailand and South Africa. Woodlands Dairy, one of the largest manufacturers in South Africa in dairy farming plant, food and beverage, bought a second-hand powder plant from Denmark. However the control system was outdated and not suitable for the modifications required to adapt the process to the company's specifications. Top of the agenda was a single platform that could integrate all the disparate plants on site and preserve past investments in expensive assets and legacy systems, while making provision for future expansion.

SchneiderElectric's ArchestrA System platform consisting of the Application Server, InTouch HMI, Historian and Historian Clients trending and reporting tool was selected, as Woodlands Dairy had previous experience with these products. Other reasons included:
- Universal data connectivity that could cope with Woodlands Dairy's variety of PLCs.
- Object orientated technology software that was more maintainable than its alternative and also promoted standardisation.
- A distributed system
- Easy to create reports and easy retrieval of historical data.
- Full redundancy.
- Scalability.
- The level of support available in South Africa from Schneider Electric.

The total implementation took about six months, half of which was spent on the new powder plant, which was commissioned first. While the powder plant was a greenfields project, the processing plant upgrade and expansion was done live during weekly shutdowns, and the standards developed for the powder plant were rolled out for these projects.

Other process areas were also upgraded and these included a new Clean in Place (CIP) station, a new cream pasteuriser/butter plant, an upgrade to the milk pasteuriser, new pasteurised milk silo and milk lines, new pasteurised cream silo and a new milk reception area with its own CIP station.

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www.instrumentation.co.za April 2018 61
Fully automatic warehousing system for furniture fabrics

Short delivery times have become a decisive competitive requirement for consumer goods manufacturing. The consequence of that is that manufacturers have to fully optimise their production chains. One of the prerequisites for this is having a fully automated warehousing system. For example, where automatic conveying systems handle the storage and retrieval of fabrics in a furniture factory, not only manpower but also valuable warehouse space can be saved. Canadian solution provider Divel specialises in this market segment and develops fully automatic warehousing systems for the furniture industry.

The particular challenge facing furniture manufacturers today is the need to meet end customers’ individual wishes while at the same time maintaining profitability in production. Divel has developed a fully automatic fabric storage system for Canadel, a company founded in 1982 that manufactures home furniture from Canadian birch wood. The conveying system for material handling quickly and quietly zips between the extensive racks in which the furniture fabrics are stored. “High storage density, automated operation and minimal plant floor footprint were all key goals of Canadel,” says Louis Lupien, president at Divel. “Through the integration of leading-edge control technologies, and by leveraging our years of manufacturing experience, we struck a perfect balance in terms of performance and form factor.”

The warehousing system removes the fabric rolls, which can weigh up to 50 kg each, from the racks and takes them to the cutting machine, where the fabric is automatically cut to length for the respective order. It is subsequently trimmed exactly to size by a precision cutting machine and the fabric roll is then taken back to its location in the warehouse. The entire procedure is documented by an inventory management system.

PC Control platform reduces installation space

“A myriad of requirements had to be fulfilled when choosing the controller: these included reduced assembly and programming time, the integration of advanced programming methodologies, a variety of I/O signal types and reduced cabling requirements,” explains Jean-Sebastien Descôteaux, Divel operations director. For the automation of the fabric storage system, Divel selected a Beckhoff CP6202 Panel PC with a 38 cm touch screen on which the PLC, drive control and visualisation run. “The PC Control platform reduces the number of components and its compact size also decreases the required installation space,” Descôteaux emphasises. Apart from sequential control, the PC also handles data entry for the manual roll storage feed and withdrawal, alarm annunciation, sequence display, interface for manual operation and axis displacement, as well as inventory display and control.

TwinCAT software does not only automate the order in which rolls are put into storage. “With TwinCAT, we can also design dynamic graphical elements, such as on-screen push buttons, pilot lights, monitoring of actual values, recipe acquisition, data table displays, bar graphs and trends, among others. TwinCAT Modbus TCP Server is used to configure a communication path with the cutter for roll number orders and alarm advising. TwinCAT offers many advantages,” explains the Divel operations director. “The ability to use different programming languages represents a powerful advantage over other software options, since all programming challenges can be easily solved using the most suitable language for the task at hand. Built-in instructions and data conversion facilitate significant flexibility for data handling and management.”

Divel uses synchronous servomotors from the Beckhoff AM series and AXS2xx EtherCAT Servo Drives in the motion system. “In the Canadel project, two axes of motion had to be used in master-slave mode, in order to create a linear movement with a rotary axis and another linear axis, due to tightness of space. The compact form factor of the Beckhoff components was a welcome addition to combat the space-constrained nature of the project,” comments Descôteaux.

Time and cost savings create competitive advantage

Divel has implemented the Beckhoff PC platform as a standard offering in its various product lines over the past seven years. “The use of EtherCAT as a universal bus system from the I/Os to the safety components to the motion system is a great advantage for us,” Lupien emphasises, and continues: “The speed of the communication system and its reliability are one aspect, but we also reduce costs through the use of EtherCAT. For instance, we were able to significantly reduce the cabling costs and the commissioning time through the use of standard Ethernet cables. The compact size of the PC-based control architecture also helped us reduce the electrical cabinet height by an impressive 15 cm, generating instant savings on each machine.”

Descôteaux also highlights the significant value found within EtherCAT connectivity and the feature-rich TwinCAT development environment: “The openness of the EtherCAT platform enables streamlined connectivity with the vast majority of popular fieldbuses as well as simple data collection for analysis of power quality and energy consumption. Data exchange with external databases is easy with the appropriate TwinCAT libraries, reducing programming time and effort.”

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Solutions for semi-conductor wafer presence detection

Semiconductor wafers can be transparent or reflective, both of which can be challenging for sensors to detect. Because of this, it is important to use a technology that can detect both types of wafers reliably. Sensor mounting can also be a challenge when detecting wafers in a vacuum chamber. Banner Engineering offers several solutions that can be used to detect both clear and reflective wafers reliably in a vacuum chamber. There are three technologies that can be used to solve this application.

Dual mode laser distance sensor through window glass
The first type of sensor that can be used to detect wafers is a dual mode laser distance sensor mounted through a window glass. Laser sensors with dual mode capability like the Q4X from Banner detect not only changes in distance but also changes in light intensity from a stable background condition. This allows the Q4X to detect challenging targets such as clear and reflective wafers with a high level of accuracy.

A laser distance sensor with dual mode can detect not only when the target is present within a certain distance, but also when it returns a certain amount of light to the receiver. For this to work, a stable reference surface must be taught, and the distance and intensity of the reference surface are recorded and used as a baseline. The presence of a transparent or reflective wafer entering the sensing range of the beam alters the perceived distance and light intensity from the background condition. The Q4X from Banner is also able to detect through a glass window without interference.

Vacuum chamber-rated fibre
Finally, a fibre optic solution that is rated for use in a vacuum chamber can also be used to detect transparent or reflective wafers. With a fibre optic solution, the fibre amplifier is mounted outside of the vacuum chamber. A special pass-through fitting with a vacuum-rated glass fibre mounted inside brings fibre optic light into the chamber.

The fibre is then positioned so that the light shines towards a vacuum-rated glass reflector, detecting both glass and reflective wafers that pass between the fibre and the reflector.

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Proportional regulators optimise the use of compressed air

Precise and reliable dosage of compressed air is needed in the manufacture of container glass to ensure an optimal distribution of the molten glass within the mould. ASCO Numatics has developed a valve with an electronic proportional regulator for this specific purpose. It is characterised by ultra-high precision, functional reliability and great flexibility. Additional user benefits of this tailor-made solution are low maintenance and significant cost savings.

Compressed air dosing valves are most often placed close to the mould. At ambient temperatures of 70°C and higher, they are exposed to high stress which may cause problems, especially with soft-sealing valves with elastomers. Excessive wear and faulty air supply often result in cost-intensive production stoppages and increased reject rates.

The ASCO Numatics valve has an integrated electronic proportional regulator (Servotronic Digital) without any moving soft sealing elements. The input voltage varies in proportion to the intensity of an air flow between 0 and 10 bar at a nominal diameter of 14 mm and a maximal flow of up to 4000 l/min (ANR). Other pressure ranges are also available.

Long service life

The spool and sleeve technology is based on a Numatics patent which has proven itself over and over again. The assembly is composed of a tubular metal sleeve with radial bores into which a metal spool is precisely fitted. This design has no moving sealing elements as metal rests directly on metal. The air flow is controlled by the axial shift of the spool. This movement creates an air cushion between both components which minimises friction due to the air bearing principle and guarantees trouble-free service of over 200 million cycles. The simple but ingenious construction requires only a few components and ensures best functional reliability. The valves are of the hard-sealing type.

The precisely defined air pressure is controlled by electronics integrated into the valve control. The electronics communicate with an integral pressure sensor to query the actual value. A microprocessor then compares the value against the programmed setpoint values and adjusts it within milliseconds if necessary. If the pressure is too low, the input voltage at the proportional solenoid is increased. The proportional solenoid moves the core out, which causes a proportional shift of the steel spool in the spool and sleeve assembly. The higher the voltage, the more the valve position changes and consequently the pressure increases. A spring at the other end of the spool ensures just the right relation between voltage and pressure by means of counterforce.

Interplay for a precise distribution of air pressure

The pressure sensor immediately detects when pressure is too high and transmits it to the electronics. The electronics control a second solenoid over which the overpressure is relieved. All functions occur continually within milliseconds in an interplay between both spools. In this way, the complex system ensures the desired pressure at all times.

Microprocessor-based electronics developed in-house at ASCO are used for control. They evaluate the difference between the setpoint and actual value, calculate the control output (current) for both proportional solenoids and balance any deviations. Along with the valve’s robust mechanics, the control electronics form a high-performance unit. In addition, all control parameters can be quickly and easily adjusted via a PC connection, even during operation. At the same time, this network evaluates and optimises the pressure curve. With larger systems, the network enables remote adjustment from the control centre.

Digital electronics for quick and easy parameter setting

DaS is the free software for Servotronic Digital proportional valves and it simplifies all monitoring and control functions and increases manufacturing reliability. At the same time, the software supports routine maintenance work and fault diagnosis in changing environmental conditions. The software can be used with standard PCs and a serial interface. Functions of the DaS software include:

- Proportional valve control.
- Visualisation of output pressure and regulator status.
- Diagnosis.
- Parameter setting and optimisation of the regulator.

The control functions allow, amongst other things, the simulation of different pressure steps or ramps. As with an oscilloscope, the transient response can be watched in real time with the visualisation software. Since high-dynamic, pneumatic control valves sometimes tend to oscillate when not well set up, the zoom function, which allows any post-oscillation to be monitored, is a valuable diagnostic tool. If the factory settings of the PID controller are not yet optimally adapted to the specific application, the user can either select the parameters offered for another controller or define a set of user parameters. A display of all controller parameter variables allows the user to see quickly which parameter must be adjusted to obtain a good result. The wide adjustment range of each parameter provides good results, even in difficult control tasks. All new controller parameters can be transmitted by the user to the pressure regulator. Saved in a project file, these data can be used as a reference for servicing or preventive maintenance, for example. The project file can be sent via email to deliver remote support for diagnosis or parameter setting. The user can adjust the different controller settings required for different systems, thereby reducing the number of valve types needed for each system.

Visualisation software

Besides the pressure curve at the control valve’s output, the DaS visualisation software also displays all the controller’s input and output signals, such as pressure switch functions, auto-safe activation and ramp setting. Extras such as the ramp or pressure switch function are already a standard in the controller. If the output pressure is not reached after a preset time has elapsed, the valve’s integrated auto-safe function reduces the current to the solenoid in order to prevent the valve from overheating. The solenoid’s current is switched to 100% at regular intervals to check whether the pressure setpoint can be reached.

One valve – many applications

With its individual parameter setting options, the Servotronic Digital proportional valve can be programmed for different tasks. Besides PID controller parameter setting, the type of setpoint can be switched, for example, from 0-10 V to 4-20 mA. The pressure range can also be limited via the software without the need to apply pressure. The time consuming and expensive setup with measuring equipment that was previously required to adjust analog proportional valves is no longer necessary.

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Great things come in small packages – the new tiny O8 photocell.

Photoelectric miniature sensor with maximum precision

The new powerful O8 sensor is an optimum choice for applications where space is at a premium such as assembly and robotics. It might be small, but the sensor achieves very long ranges.

Moreover, the background suppression is extremely reliable and precise even for the detection of very small, flat or reflective objects. The O8 reliably copes even with constantly changing backgrounds, e.g. on robot arms.

Reliable and efficient thanks to IO-Link

IO-Link allows simple setting of the ranges and sensitivity, with the range adjustable to the nearest millimetre.

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Automation solution toolbox

Weidmuller is successively developing the open, individually scalable automation solution toolbox, u-mation. This allows digital transformation to be achieved independently of any platform. At the core of this system is u-control, Weidmuller’s innovative IoT controller. The benefit is that its integrated, web-based engineering tool, u-create requires only a HTML5 browser for programming in accordance with IEC 61131-3, allowing machine access from anywhere and with any end device.

In addition, the open web technologies enable freedom of choice with regard to devices and operating systems. Individual requirements can be loaded as additional software onto the controller via an app. Developed according to the principle of ‘security by design’, the system is reliably protected against external access.

As an interface between u-control and the field level, Weidmuller offers the popular, modular I/O system, u-remote. Fieldbus couplers for the most common bus and communication systems, as well as safety modules, provide solutions for a large number of applications. Weidmuller’s intuitive u-view multi-touch panels ensure optimal visualisation based on web technology. Industrial security routers and IoT gateways can be used to ensure secure channels of communication within the factory and into the cloud. Robust industry PCs round off the high performance automation solution toolbox.

The elements of u-mation: u-control, u-create, u-remote and u-view – are all perfectly coordinated, offering maximum flexibility together with the capability to develop perfectly tailored automation solutions.

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When to use radar sensors for vehicle detection

The ability to detect vehicles reliably offers significant advantages for asset management, resource allocation, site safety and traffic control. Radar sensors use frequency modulated continuous wave (FMCW) radar to detect moving or stationary targets reliably. These include cars, trains, trucks and cargo in extreme weather conditions. They have a number of advantages for vehicle detection:

- Long range detection: Radar sensors are ideal for long-range outdoor applications up to 40 metres. Many radar sensors can also be configured to detect objects up to a specified distance, ignoring objects beyond the set point and resulting in higher accuracy.
- Immunity to ambient weather conditions: Unlike photoelectric or ultrasonic sensors, radar sensors are not affected by conditions such as wind, rain, fog, light, humidity and air temperature. This results in accurate detection in outdoor environments. For example, trains create difficult environments for mechanical and technical equipment to operate properly. Passing trains create excess wind, dirt, debris, and potential for impact. A radar sensor can reliably detect the presence of trains even in harsh conditions. Similarly, a radar sensor can also be used to detect the presence of large trucks reliably at an outdoor loading dock even in extreme weather conditions.
- Flexible mounting: For train detection applications, a radar sensor offers many advantages including flexible mounting. Because a radar sensor does not need to be mounted on the train track, installation and maintenance are safer and easier compared to other sensing technologies. In addition, since radar sensors are not mounted on the tracks, the devices are at a lower risk of damage due to high impact.

It can be challenging for radar sensors to detect smaller targets as well as vehicles with little separation between them (such as in bumper-to-bumper traffic). For this reason, a common application of radar sensors is to detect train cars, which are both large and predictable.

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High-end computing power in an ultra-compact design

C6030 Industrial PC expands ultra-compact series with maximum processing power and up to 3.6 GHz per core.

With highly flexible application options, the new series of ultra-compact Beckhoff Industrial PCs that first launched with the C6015 has proven to be extremely successful. With the addition of the new, C6030, the advantages of small space requirements, universal applicability and flexible installation are now also available for complex applications with the highest performance requirements. The multi-core computer, with a size of only 132 x 132 x 67 mm, integrates Intel Core i-series processors of the 6th and 7th Generation to provide ample computing power and offer maximum performance with up to 3.6 GHz per core.

The ultra-compact C6030 IPC is only half the size of the closest comparable control cabinet PC, the C6930, yet it offers more interfaces even in its basic configuration. Depending on the features included, the C6030 offers price savings of up to 34% over comparable IPCs in the C69xx series.

This means that enormous computing power and a comprehensive range of features is available in the space-saving form factor of the C6030, which is able to accommodate almost any automation and visualisation task, including highly complex axis control, demanding HMI applications, large-volume data handling, and applications with extremely short cycle times. The onboard Ethernet adaptor with four 100/1000Base-T connectors, four USB 3.0 ports and two DisplayPort connectors make it ideal for networking and high-performance Ethernet-based control tasks.

Robust, high-quality device with flexible installation options

Both the new ultra-compact motherboard and the robust die-cast zinc and aluminium housing have been newly developed, taking into account all the typical Beckhoff design considerations such as: industrial suitability, as well as dependable reliability and a high quality look and feel. Due to an extremely long-lasting, controlled fan with double ball bearings, the unit is able to accommodate an ambient operating temperature range up to 55°C, depending on the selected CPU.

As the newest addition to the ultra-compact Industrial PC series, the C6030 also proves to be extremely flexible in terms of installation. It can be attached at its rear or side panel, vertically or horizontally as required, with free orientation of the connector level. This permits a wide variety of installation scenarios and efficient cable management, even in confined spaces.

For more information contact Michelle Murphy, Beckhoff Automation, +27 (0)11 795 2898, michellem@beckhoff.com, www.beckhoff.co.za
Fibre optic connector inspection system

Comtest’s latest offering from AFL is the aeRos connected FOCUS WiFi2, the next generation fibre optic connector inspection system that uses an Android or IOS wireless connection for live image video streaming, auto-focus and more. The FOCUS WiFi2 probe is ergonomic and lightweight, fitting perfectly and balancing naturally in the hand. The probe hardware has a single multipurpose button, a single multi-colour functional status LED, and a battery charging port for all day mobility. The status LED enhances workflow productivity by allowing rapid operator assessment of the cleanliness of the fibre endface – either passing or failing standard rules – as well as fibre not found error notification.

“According to industry studies, contaminated fibre endfaces typically account for 85% of optical network failures,” explained Maury Wood, product line manager for AFL’s Test & Inspection division. “With the advent of broadband and enterprise data centre links at 100 Gbps and higher, the universal adherence to best practice fibre cleaning and inspection methods is an operational imperative. AFL is the leader in the Internet of Test, and the FOCUS WiFi2 is clear evidence of this leadership.”

The FOCUS WiFi2 uses AFL’s large portfolio of inspection adaptor tips for both connectors and bulkhead sleeves, including all 2.5 mm (SC, FC, ST) and 1.25 mm (LC) ferrules, as well as multi-fibre connectors and bulkhead sleeves (MPO/MTP/MPO16). AFL offers an adaptor tip for high density LC PC/UPC optical distribution frames as well. The free FOCUS WiFi2 app (both Android and iOS) supports live image video streaming, auto-focus, IEC/IPC standard and user-customised pass/fail auto-analysis, pinch-to-zoom on endface images, report generation, multi-language GUI support and day/time stamped job saving.

FOCUS WiFi2 is the latest addition to AFL’s extensive inspection and cleaning product portfolio, which includes the OFS300 optical and VS300 video microscopes, the DFS1 digital microscope, the FOCUS WiFi PRO wireless fibre scope and the FOCUS Flex handheld Bluetooth inspection probe with integrated screen. The One-Click and CLETOP cleaners, the FCC2 cleaning fluid and the FibreWipes complete the product portfolio of fibre endface cleaning products.

RFID for reliable product traceability

SICK is showcasing completely transparent production based on the new RFU65x RFID read/write device. This product detects transponders at long range, recording the direction in which the objects are moving at the same time. The associated user data can be sent directly to an ERP or MES system. This reduces processing times and increases production efficiency.

Identification and location solutions that combine maximum availability with a transparent material flow are vital for effective product traceability. Conventional RFID devices record RFID tags over long distances depending on sender power, aperture angle, tag properties and application environment. Until now, directions of movement could only be derived by using additional external antennas and intelligent algorithms. With the new technology supported by the RFU65x, both position and angle can be determined and direction of movement can be detected. Even transponders which are moving in opposite directions at the same time can be detected and their directions of movement recorded.

The operating range of the RFU65x covers an angle of ±45° with a typical sensing range of up to five metres. RFID tags are recorded below a certain measuring angle in relation to the zero point of the reader. Algorithms can be used to derive instances of passage, including the direction of movement, from the various measuring points.

The RFU65x RFID read/write device thus saves space, time and money in applications for identifying vehicles and vehicle parts. Although objects with transponders that are located in the immediate vicinity are identified, they are filtered out as static transponders and only used if required for diagnostic purposes. As well as cutting costs, the RFU65x also simplifies and accelerates application processes in logistics and the automotive industry.

The ICASA-approved product family provides system integrators with the ability to install additional application software directly within variants of the RFU66x. The user can develop and manage device-specific application software through the SICK development environment and even transfer this to other devices. This can be facilitated via a range of programming techniques, including JAVA, LUA and C++ (in the planning stages). The platform thus offers maximum flexibility to support solutions for the IT tasks of the future.

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Climate change, urban air quality and the rising cost of energy have become the defining issues of the 21st century. With energy consumption and exhaust emissions from vehicles and transport being significant contributors to these issues, governments across the world are driving moves to secure a future where the air is safe to breathe and transport is more sustainable.

In the UK this has seen the introduction of the government’s draft clean air policy, along with the announcement that sales of petrol-only and diesel-only vehicles will be banned from 2040, bringing the role of hybrid and electric vehicles to the fore. In evolutionary terms, these technologies are still in their infancy. Instrotech South Africa represents Avid Technology, renowned leaders in the design and manufacture of electrified powertrain and advanced thermal management systems for heavy duty and high performance electric and hybrid vehicles. Its technology also improves conventional internal combustion engine efficiency through parasitic loss reduction, efficient thermal management, lubrication, electrified ancillary systems and waste heat recovery.

The company develops powertrain improvement solutions for a wide range of electric and hybrid vehicle applications, including high performance passenger cars, heavy duty buses and trucks, as well as motor-sport vehicles and off highway machinery. Its high efficiency electric motor and power electronics technology delivers class-leading electrified powertrains and propulsion systems.

In order to test and characterise the high performance electric motors used in electric and hybrid powertrains, Avid Technology designed and built a special purpose test rig. Central to the design of the test rig is an innovative wireless rotary torque measurement device from Sensor Technology. These non-contact surface wave acoustic (SAW) transducers offer significant advantages compared with strain gauges, magnetic torque sensors and optical devices that might be fitted to a conventional dynamometer for motor characterisation.

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Sensor Technology’s SAW-based devices are non-contact, robust and highly accurate. TorqSense torque sensors use two tiny SAW devices made of ceramic piezoelectric material containing frequency resonating combs. These are glued onto the drive shaft at 90 degrees to one another. As the torque increases, the combs expand or contract proportionally to the torque being applied. In effect the combs act similarly to strain gauges but measure changes in resonant frequency.

The adjacent RF pickup emits radio waves towards the SAWs, which are then reflected back. The change in frequency of the reflected waves identifies the current torque. This arrangement means there is no need to supply power to the SAWs, so the sensor is non-contact and wireless.

These characteristics make the TorqSense transducers ideal for use in the stepper drive test rig. Avid Technology sales director, Jordan Taylor explains: “The TorqSense transducer was chosen as it allowed us to use a fixed pedestal load motor and eliminate frictional losses and parallax errors from the load installation in the measurements. This allows Avid to produce very accurate performance characterisation results compared to a conventional motor dynamometer.”

Not only has the sensor delivered superior and more accurate characterisation results, it also enabled Avid to design a simpler test rig. The device has performed flawlessly in the application to date, and Avid Technology is confident that its test rig will be key in enabling it to provide even smarter powertrain electrification, delivering on its vision of a cleaner, greener world.

For more information contact Instrotech, +27 (0)10 595 1831, sales@instrotech.co.za, www.instrotech.co.za
The ability to detect vehicles reliably offers significant advantages for asset management, resource allocation, site safety and traffic control. Identifying the right technology for a vehicle detection application can be challenging, and many factors must be taken into consideration, including task, size of target, sensing range, sensor mounting and whether the application is primarily indoor or outdoor. This article explains how a wireless magnetometer can be used for vehicle detection and describes the top three advantages of the technology.

What is a magnetometer?
Magnetometers can be either wired or wireless, but for the purposes of this article we will focus on wireless magnetometers, which offer important advantages to the end user.

A magnetometer works by using a passive sensing technology to detect large ferrous objects such as trucks, automobiles, or rail cars by measuring the change in the ambient magnetic field. When a vehicle alters that magnetic field, the sensor detects those changes. As with other sensors, the range of the magnetometer will depend on the target.

Advantages of wireless magnetometers for vehicle detection
Cost-effective: A wireless magnetometer provides a cost-effective and convenient alternative to other sensing technologies. It requires no wiring or external control box, but achieves an accurate and repeatable response.

Minimally invasive: Wireless magnetometers are less invasive, less expensive and easier to commission quickly compared to inductive loops, because wireless magnetometer units are small, self-contained and don’t require extensive work under the concrete. The wireless M-Gage sensor from Banner, for example, can be installed above grade or below grade. Below-grade installation requires only a small 7.5 cm hole drilled into the concrete for each sensor location, which means less downtime for installation.

Low maintenance
A truly wireless magnetometer will not only offer wireless communication via radio, but will also be completely self-contained, including the battery. The long life of the battery ensures continuous performance for years at a time.

Important considerations
In order to detect reliably when the magnetic field is disrupted, a magnetometer must first be taught the typical ambient magnetic conditions. Therefore a vehicle must not be present when the sensor is being taught.

Another consideration when installing a magnetometer is that if the sensor moves out of alignment over time, it may cease to function properly. Because of this, a magnetometer must be rigidly fixed at the time of installation to ensure reliable long-term functioning.

Wireless magnetometers from Banner Engineering also feature an advanced algorithm that detects fluctuations and adjusts accordingly. Finally, in cold climates that experience large amounts of snow, it is often necessary to install the magnetometer below grade to avoid damage from snowploughs.

For more information contact Brandon Topham, RET Automation, +27 (0)11 453 2468, brandon.topham@retautomation.com, www.retautomation.com
ASSTech’s new range of 3-D Wenglor performance class profile sensors now include a total of ten innovative models providing more options for three dimensional object measurement. In particular they allow large visual field widths of up to 1350 mm in the X-direction, as well as increased laser power and even more extensive and faster profile detection.

As significantly larger objects can now be detected the sensors can be used for applications such as bin picking, pick and place, gap measurement, object counting and 3-D sealant bead monitoring. The sensors provide outstanding point cloud quality with a very broad visual field over a large distance.

The compact housing has dimensions of just 200 x 67 x 38 mm and the sensor weighs only 550 g. Variants with different laser classes including 2 M, 3 R and 3 B and red blue light also provide users with maximum diversity for product selection.

Other features include up to 3.6 million measuring points per second, CMOS technology, integrated CPU, fast measuring rate of 4000 Hz, intuitive display and Gigabit Ethernet.

For more information contact ASSTech Process Electronics+ Instrumentation, +27 (0)11 708 9200, info@asstech.co.za, www.asstech.co.za

The new function blocks for PC Worx, STEP 7 and the TIA portal make it possible to read out status and diagnostic parameters directly using a controller for the Radioline wireless system from Phoenix Contact.

Thanks to modern wireless technology, it is very easy to integrate I/O signals from distributed sensors over large distances into a controller from Phoenix Contact or Siemens. Function blocks can be used to integrate new functions or to transform devices into a fully fledged part of the control system. This reduces development times.

The Phoenix Contact hardware and software supported includes the Inline and Axioline controllers as well as the PC Worx programming software and the PC Worx Express PLC software. The Siemens controllers S7-3xx, S7-12xx and S7-15xx, as well as the STEP7 software and the TIA portal are supported.

For more information contact Sheree Britz, Phoenix Contact, +27 (0)11 801 8200, sbritz@phoenixcontact.co.za, www.phoenixcontact.co.za

Banner Engineering has released the 5 MP VE Series smart camera for detection of fine details on large or complex targets. This latest addition to the VE Series has the same ease-of-use, compact and robust housing and intuitive on-board display as other VE Series smart cameras, but provides finer levels of detection and a wider field of view.

Featuring a 5 MP (2592 x 2048) CMOS imager, this versatile smart camera can reliably detect very small objects as well as fine details and minute flaws on complex targets. The high levels of accuracy and precision offered make it an easy-to-use and cost-effective alternative to more complicated vision systems. The wide field of view makes it possible for a single camera to perform a detailed inspection over a large target area in one image capture. The ability to cover more area in one inspection can reduce or even eliminate the need for additional inspections as well as the equipment needed to perform those inspections.

VE Smart Cameras are also available in 2 MP (1600 x 1200 pixels), 1.3 MP (1280 x 1024 pixels), and WVGA (752 x 480 pixels) models. Also available is the latest version of Vision Manager, Banner’s easy-to-use software for VE Series smart cameras. Vision Manager provides a number of tools and capabilities that enable the cameras to solve a wide range of vision applications. The software includes runtime editing capability that reduces costly downtime, while the software emulator allows for offline building and troubleshooting of applications. The new version of Vision Manager (version 1.4.0) allows for the creation of multiple password protected user profiles. This empowers users to update inspections to facilitate a smooth workflow while restricting the changes possible to those included in an individual user’s profile.

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Advanced thermal imaging cameras

FLIR Systems has launched the FLIR E53, the latest addition to the Exx-Series of advanced thermal imaging cameras for electrical, mechanical and building applications. This is an entry level model in the Exx-Series, but offers the same image clarity and measurement accuracy, as well as many of the robust features found in other models in the Exx lineup. The E53 brings advanced thermal imaging within the reach of many more service professionals and contractors, who need these cameras to identify hot spots or building deficiencies before they lead to expensive repairs.

The FLIR E53 features a brilliant 10 cm touchscreen with a 160 degree viewing angle to ensure users always have a clear view of the thermal image from any angle. Like the other Exx-Series models, the E53 offers significant improvements to FLIR’s MSX technology, utilising a 5 megapixel visual camera for improved image clarity, perspective and readability. The E53’s 240x180 resolution detector offers more than 43 000 points of temperature measurement and a high temperature range up to 650°C.

FLIR built the E53 with a rugged, water-resistant design to ensure it can withstand the tough environments technicians and contractors face every day. An agile user interface delivers intuitive operation and useful features such as 1-Touch Level/Span, which allows the user to improve contrast on the target just by touching the screen. When coupled with enhanced Wi-Fi, Meterlink connectivity and customisable work folders, archiving and report generation have never been easier.

“With the FLIR E53, we’re making our Exx-Series line of advanced handheld cameras more accessible to industry professionals who would like access to this type of technology but thought it was out of reach,” said Rickard Lindvall, general manager of instruments at FLIR. “It offers the resolution, sensitivity and reporting tools they need to be able to quickly and accurately diagnose problems and prove they’ve made the repairs.”

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New rodless cylinder for compact machine design

Aventics has recently launched a new double-acting RTC rodless cylinder range for high performance applications that require a compact machine design. As with other Aventics double-acting rodless cylinders, at the heart of the RTC-SB (slide bearing) cylinder is its oval piston design. This design element enables the cylinder to offer high load capacities in relation to its compact construction, creating even more compact machine designs.

This innovative cylinder range is equipped with a lubrication-free slide bearing and wear-free magnetically attached exterior strip, scraper and sealing strip that make the cylinder resistant to water, chemicals and dirt, with zero maintenance requirements. In addition, thanks to the form-fit connection technology with standardised mechanical interfaces, machine design and assembly times are drastically reduced as no re-adjustments are necessary.

The new cylinder is designed for a maximum speed of 6,5 m/s with a maximum stroke of 6600 mm. Its adjustable pneumatic cushioning extends its operating service life and ensures precise and gentle operation. The RTC cylinder range completes the Aventics range of double-acting rodless cylinders. The new RTC-SB version with a piston diameter ranging from 25 to 40 mm closes the previous gap between the basic version (RTC-BV) and the versions designed for higher loads, the RTC-CG (compact guide) and RTC-HD (heavy duty).

For more information contact Malan Bosman, Tectra Automation, +27 (0)11 974 9400, malan.bosman@tectra.co.za, www.hytecgroup.co.za

Modular measuring device with Profinet

Within the Jumo range of sensor and automation products, available from ASSTech, is the Aquis touch P multi-channel measuring device for liquid analysis. The latest version features a Profinet interface and now also has DNV approval for the shipbuilding industry. Profinet uses TCP/IP and IT standards, is real-time Ethernet capable and enables the integration of fieldbus systems. With the DNV GL-approval, the device fulfills the requirements for safety and reliability that ships and mobile offshore units have to observe in international waters.

The Jumo Aquis touch P covers measuring, controlling, recording and displaying tasks with one single device. Two analysis parameters can be directly connected and an additional five can be connected as standard signals. The Jumo digiLine system can even process six parameters. Digital interfaces enable an additional eight external measured values to be loaded. Flow measurement, including quantity determination, is also possible. The parameters are displayed on the colour monitor with touchscreen where operation and settings of the device are handled.

The integrated paperless recorder allows up to eight analog and six binary signals to be recorded simultaneously. The storage of data is tamper-proof and enables official record keeping requirements to be met without additional devices. Stored data can be extracted through a PC via Ethernet or a USB flash drive. The data can then be further processed with separate software.

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<td><a href="mailto:c.duckworth@krohne.com">c.duckworth@krohne.com</a></td>
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