Developed from solid rocket fuel technology, Pyrogen is designed to protect a variety of electrical cabinets, like switchgear, MCC and VSD cabinets. It almost instantly extinguishes the fire, using a cool discharge to prevent re-ignition.

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OUR COVER 18

The mining industry has never before faced the challenges it does now. It is in urgent need of transformation and SICK Automation has the technology to help. See this month's cover story for more on how the company draws on its experience as a market leader in application solutions to integrate its sensors into any system.

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Digital twins require digital threads and therein lies the rub

It’s interesting to see how the use of digital twins to drive production efficiency is maturing thanks to the cost-effective implementation technologies of the IIoT. One of the bottlenecks to wider adoption though is the diversity of data required to create the initial virtual model of a plant, process or product, and then keep it functional.

Since a digital twin is an exact cyber replica of some real-world physical asset (process, product etc.) it must contain all the as-built and operational data that defines the asset in question. The communication framework that supports the flow of data first to build the digital twin and then to keep it functional is known as the digital thread. The thread is therefore fundamental to the twin in the sense that it enables a seamless flow of data through all the disparate systems and silos that exist within a manufacturing organisation, across the asset’s entire lifecycle.

You’ve probably twigged by now that this is where things begin to get messy.

What makes the issue complex is the number and variety of stakeholders involved during the complete asset lifetime. If the asset is a plant then this timeline extends from the initial concept design phase right through to end of life, including all the upgrade phases along the way. Since the stakeholders include the plant owners, engineering and procurement staff, commissioning teams, operators and external contractors, any number of unrelated computer systems could be involved in the design, build and operation of the facility. This what means in practice is that while the benefits of a digital twin are captivating on paper, weaving the digital thread that ties everything together can be extremely complex in practice.

All is not lost though. What’s required of course is a set of compatible standards for data exchange in a manufacturing operation. One such initiative that shows promise is Data ExChange in the Process Industry (DEXPI), which aims to address interoperability between computer-aided engineering and other digital systems in use in the process industry. Contributing editor Gavin Halse examines the subject in more detail in the article on page 36.

The SAIMC has a new structure

It’s lovely to see how the SAIMC has evolved over the last few years to become the ‘voice of automation’ in southern Africa. Now, in a move to represent automation practitioners even more effectively in industry, the organisation has announced its restructuring into the SAIMC NPC, which will be run like a company in accordance with the Kings IV report on good governance. Congratulations to newly appointed CEO Johan Maartens and the first board of directors – everyone at SA Instrumentation & Control looks forward to an even closer working relationship with you in the future. Interested readers will find more detail in the CEO’s first letter on page 13.

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SKF launches Green Finance Framework

By engaging in green financing, SKF’s funding strategy will become more aligned with the Group’s climate objectives, to reduce carbon emissions from its own manufacturing and supply chain operations, as well as supporting customers to reduce their emissions.

Within the Green Finance Framework, SKF intends to finance investments that support the transition to a low-carbon, climate resilient growth and lower environmental impact.

CFO Niclas Rosenlew says: “Sustainability is integrated into our strategy and business models. Our products help to reduce friction, energy and water consumption. Our offerings have always had an impact in these areas and by making sure our financing structure also contributes to a more sustainable world, we are taking the next step in our sustainability strategy.”

The African Drone Forum has announced the finalists of the first African Drone Business Challenge, a business plan competition for African entrepreneurs to uncover new commercial use cases for drone applications that demonstrate a high potential for local impact. The 10 finalists are: Drone Era (Benin), Africa Bees (ORC), Kenya Flying Labs (Kenya), MicroMek (Malawi), Global Air Drone Academy (Nigeria/USA), Upshore Robotics (Nigeria), Integrated Aerial Systems (South Africa), Jembe Kilimo (Tanzania), JCKEG Solutions (Zambia), and Alley Capital Group (Zimbabwe).

Finalists were selected from a competitive pool of almost 150 submissions. Applicants were asked to provide business concepts that focused on leveraging drone technology to generate new business opportunities. Proposals were evaluated by a panel of local and international judges and scored based on factors including: potential for growth and sustainability, focus on using drones for social good, and the economic empowerment of African communities.

Rockwell Automation recently announced that it has signed an agreement to acquire privately held Avnet Data Security, an Israeli-based cybersecurity provider with over 20 years’ experience in cybersecurity services. Avnet offers a full set of IT/OT cyber services and solutions ranging from assessments, penetration testing, network and security solutions and training, to converged IT/OT managed services. The acquisition will enhance Rockwell Automation’s ability to deliver IT/OT cybersecurity services globally.

Cybersecurity is one of the fastest growing parts of Rockwell Automation’s services business. As the manufacturing industry has evolved to become more connected, legacy physical security strategies are no longer enough to protect production operations. To help customers develop, maintain, and evolve proactive cybersecurity strategies, Rockwell Automation provides a comprehensive set of services and solutions. The extensive knowledge and experience of the Avnet team will support the strategic objective to achieve double digit growth in Information Solutions and Connected Services, by expanding IT/OT cyber and network expertise globally.
A further focal point was the integration of measurement instruments with the help of electronic device descriptions (EDD) or FDT/DTM technology. Today, Endress+Hauser Digital Solutions generally focuses on applications for Industry 4.0, including the Netilion IIoT ecosystem developed by the company’s specialists. This platform ensures simple connectivity in industrial plants and enables digital services via the Internet. Endress+Hauser has already rolled out Netilion to more than 20 countries.

“We have long grown accustomed to having access to digital services via our private smartphones,” says Birkhofer. In light of this trend, the managing director expects growing acceptance for cloud-based services among users of process automation and further growth for the company: “Plant operators can better exploit the potential of their device data with Netilion. That saves time, simplifies processes and prevents errors across the entire life cycle of a plant.”

**Focusing on the customer experience**

“For Endress+Hauser Digital Solutions, the mission of the future is clear,” concludes Birkhofer. “We will continue to develop digital services based on the Netilion platform, offer additional instruments and communications protocols, and provide our customers with a persuasive experience across all touch points in the digital world as well.”

**For more information contact Natlee Chetty, Endress+Hauser, +27 11 262 8000, info@za.endress.com, www.endress.com**
Varispeed is a proudly South African company and is part of the JSE listed Hudaco Trading group of companies. Varispeed was founded in 1984 and is a specialist partner in electronic motor control and automation solutions to many local manufacturers and end users in a diverse range of market segments.

Ralph Real, managing director at Varispeed South Africa, knows only too well the challenges facing business in the current economic climate. South Africans are generally resilient and always find the good, the humorous and the optimistic side of every situation. Although 2019 had some great nation building moments with the Rugby World Cup and Ms Universe wins, it was a trying year for many sectors in the economy.

“Superior value, tough competition and strong differentiation were critical factors for Varispeed South Africa,” says Real. “Customers require real value at competitive prices. The market is constantly changing and remaining dynamic, resilient and agile whilst exceeding our customers’ expectations are key factors to our ongoing success.”

Moving forward into 2020, Real believes that stability and reliability of state-owned service delivery will force businesses to adapt in order to remain viable and competitive: “2020 will be a challenging year as the market struggles to recover. In addition, we need to factor in our ongoing electricity crisis and the negative impact that this has on productivity, job creation and our competitiveness both locally and abroad.”

Increasing international focus on climate change and the overwhelming evidence of the urgent need for reforms in this area will spill into local business to provide energy efficient and sustainable solutions. Environmental groups will become more involved and these factors will become part of key performance indicators. Business will be held accountable for its part in climate change and it will be more and more pronounced in business agreements.

“We only need to look at the recent pressure placed on one of our competitors and the Adani Mining project by activists to realise that we can expect an increased level of scrutiny around climate change,” concludes Real. “Varispeed’s success in 2020 will be largely underpinned by our proven alternative energy and energy efficient solutions. We are also focusing more of our efforts on the mining and manufacturing sectors in the sub-Saharan region, as we have real value assist in these areas. Product reliability, performance and dependable expert service is what sets us apart. Varispeed remains close to the market and will continue to adapt and develop according to customer requirements to ensure that all objectives are met.”

For more information contact Varispeed, +27 11 312 5252, info@varispeed.co.za, www.varispeed.co.za

 SAVE THE DATE EtherCAT breakfast seminar series

Technews Publishing (publisher of SA Instrumentation & Control) is proud to announce that together with the EtherCAT Technology Group (ETG), it will organise a series of breakfast seminars in South Africa during October.

Be part of a series of EtherCAT breakfast seminars on the following dates:

- Cape Town – Thursday, 22 October
- Port Elizabeth – Tuesday, 27 October
- Durban – Wednesday, 28 October
- Johannesburg – Thursday, 29 October

Attendance is free of charge.

This presentation has been accredited and delegates will earn 0.5 CPE points.

For further information on sponsorship opportunities and attendance please email jane@technews.co.za or call +27 31 764 6593
SEW-Eurodrive supplies copper mining project in DRC

SEW-Eurodrive has supplied a comprehensive drive package to a major copper-mining project in the Democratic Republic of Congo. The package comprised nine drives in total, of which the five main 500 kW type weighed 12 t each. The remaining four consisted of two 90 kW drives on the decline sacrificial conveyor, and two 30 kW drives on the tip-truck sacrificial conveyor.

Working through a local project house with which it has a longstanding relationship, the company received the initial inquiry in August 2018. The final units were delivered to site in September 2019, followed by installation and commissioning.

Due to the hot and humid conditions near Kolwezi, the drives had to be installed with thermal sensors to monitor the input and output bearing temperature, as well as the oil sump temperature. This is to ensure optimal performance at all times. Positioning sensors were also installed, in addition to cooling units due to the size of the drives, and sun covers to protect the surface of the drives from the worst of the harsh sunlight.

The fact that this is an underground copper mine means that decline conveyors are integral to removing the ore. SEW-Eurodrive collaborated with the project house to ensure that all specific requirements for this particular application were met in the final design.

“The fact that this is a new mine means there is significant scope for our further involvement down the line,” comments project sales representative, Thato MR Sookane.

“Collaborating with project houses is a significant strategy for us to secure long-term work in Africa, ably assisted by our own project and exports department. The project house assists the client by providing a specific solution, and then approaches us to assist in turning its designs into a practical reality.”

SEW-Eurodrive has gained significant experience in the copper-mining industry, having also supplied a 110 kW VSD for a slurry application at a Zambian mine last year. This represented one of the largest VSDs supplied by the company to date.

Commenting on the current state of the mining industry, Sookane stresses that there are definite green shoots in Africa. While mining is an important driver for the company in terms of growth and profitability, it has also diversified significantly into other sectors such as food and beverage, pulp and paper, sugar and automotive manufacturing.

For more information contact Jana Klut, SEW-Eurodrive, +27 11 248 7000, jklut@sew.co.za, www.sew-eurodrive.co.za

Coal mine sees benefit in Trafo dry-type transformers

Trafo Power Solutions, experts in dry-type transformers, recently completed a contract as part of a significant upgrade at a Mpumalanga coal mine. This involved the design, supply and installation of two 200 kVA – 22 kV to 400 V – dry-type transformers, according to Trafo Power Solutions managing director David Claassen. Housed in specialised IP42-rated ingress protected enclosures, the units were specified by a design house on behalf of the end-customer.

“The contract demonstrated our application engineering capability and our experience in coordinating our solution within a larger project,” Claassen says. “This included meeting detailed specifications, and ensuring that our design for the transformers and their enclosures matched the requirements and constraints of the site.”

Trafo Power Solutions also equipped the units with the necessary earth fault protection and surge protection, as well as vibration pads.

“Dry-type transformers are well suited for the coal mining environment, with its hazardous areas and its regulations to mitigate fire risk,” adds Claassen. “The dry-type technology uses air to cool the transformers, doing away with the need to use oil as a coolant.”

Claassen emphasises that the absence of oil has advantages for safety, as the possibility of oil igniting is removed. The units can also be well protected against fine airborne coal dust. An added advantage is environmental, as there is no chance of an oil leak contaminating the ground or water.

For more information contact David Claassen, Trafo Power Solutions, +27 11 325 4007, david@trafo.co.za, www.trafo.co.za
PROCONICS BACKS LOCAL ENGINEERING TALENT AT PROFESSIONAL FORUM

South African engineers are sought after around the world and globally respected for their ‘can do’ attitude. Why then is international assistance on South African projects so frequently sought? This is a question that fascinates Proconics chief executive officer, Melvin Jones. “How can local engineers advance their careers without going into management?” he asked, during the opening address of the first Proconics Forum for Engineering Professionals, held on 30 January at the Lakeside Conference Centre in Benoni.

The Forum challenges the current status quo by giving engineers an opportunity to improve their self-image through peer-group interaction and exposure to experts from other disciplines that can broaden their perspectives.

The opening presentation set the example. Dr Geoffrey Heald, a senior lecturer in negotiation at the Wits Business School, addressed delegates on the methods of ‘Ideal Design and Interactive Planning.’ The critical point he made is that, in South Africa, collective bargaining is failing because 1 IR (First Industrial Revolution) methods are being applied to try and solve 4 IR problems. He stressed the importance of involving engineers in the process, since engineering answers are often required as part of the final solution. Heald left delegates armed, in bullet point form, with a toolkit to guide them through the thorny processes of deal making and conflict resolution.

During the second of the morning presentations, Proconics’ own Louis Hall talked about a number of electrical engineering projects undertaken by the company beyond the borders of South Africa. Hall outlined a basic structure common to all power stations, and then focused on sharing some general principles for successful project implementation in remote areas. As practical examples, he used a few renewable energy projects that Proconics recently completed in Ghana and Zimbabwe. He stressed the importance of logistics and how these can make or break a large project, outlining a few tips and tricks that delegates could try when attempting to keep costs down on their own projects.

After the lunch break, a lively technology display featuring drones captured the conference’s attention. Proconics’ Gert Niewoudt, Robert Theron and PC Annandale informed the session about the power of this newly emerging technology, and the multitude of regulatory compliances involved before a company can offer it as a service.

Other sessions involved economics professor Roula Inglesi-Lotz, who stressed the importance of diversity within a team as essential to formulating the right questions to ask. “We can’t work alone anymore,” she stressed. “What’s needed to solve the problems of the 2020s are multi-disciplinary, all-inclusive project teams.” The Economist’s Herman Warren rounded this out with commentary on the latest Economist cover stories, which contextualised the power struggles on the go in various regions of the world in an ‘Economics 101’ course for engineers. The message resonated well with the session in which Louis Hall discussed the Proconics engineering projects in Ghana and Zimbabwe. What Warren showed is that if one is prepared to keep an open mind, business opportunities are everywhere to be found, no matter how dire the headlines.

During the final session of the day Elizma van der Walt introduced a practical methodology for managing uncertainty in the execution of complex projects in existing industrial production facilities. She showed how creating a common purpose within engineering teams could be used to create unprecedented alignment between engineering disciplines created agility and served as a powerful response mechanism in dealing with the ‘unknowable’ within these factories. These concepts were then brought home through two case studies presented by Gerhard de Clercq and Paul Botha. These highlighted how Proconics had dealt with complex life-extension projects for South African petrochemical operators.

The day was a resounding success. The Proconics CEO closed the day with an undertaking that this would become a standing feature in the South African engineering calendar – an opportunity for engineers to gather and share stories that shine a spotlight on local engineers, solving local problems in a uniquely South African way. The projects presented throughout the day clearly highlighted how South African engineers are uniquely positioned to help solve South African problems. To do that Melvin made the plea that engineers need to lead the way, be positive, lean in and help us build a better tomorrow #imstaying.

For more information contact Elmarie Koen, Proconics, +27 16 982 7880, elmarie.koen@proconics.co.za, www.proconics.co.za

APPOINTMENTS

Hytect South Africa has appointed Jacques Lombard as new business development manager.

Hydraulic and Automation Warehouse (HAW) has appointed Siphiwe Nyalulungu as Durban branch manager.

Magnet has appointed Derek Ernest as project manager.

Magnet has appointed Syed Basha as external sales representative.
Technews to bring EtherCAT Technology Group seminars to SA during October

Technews Publishing (publisher of SA Instrumentation & Control magazine) is again proud to announce that together with the EtherCAT Technology Group (ETG), it will organise a series of breakfast seminars in South Africa during October.

The seminars, an extension of those conducted by the ETG around the world, focus explicitly on the EtherCAT technology and its applications – delving deeper into network specifics than an ordinary product lecture would. This includes a detailed introduction to the technology as well as user-oriented presentations covering a range of topics from installation and troubleshooting, through smooth transitioning from classical fieldbus systems to EtherCAT. All seminar content relates intensively to the practical use of EtherCAT, as well as the relevant benefits of the technology in comparison to traditional fieldbus systems.

ETG executive director, Martin Rostan, will host the South African presentations. For many years, Martin has travelled the world spreading the EtherCAT message through roadshows, and for him the benefits are clear: “EtherCAT combines Ethernet with the simplicity and the low costs of a fieldbus system. And, due to its outstanding performance and topology flexibility, it improves every automation application. This has made ETG the largest and fastest growing fieldbus organisation worldwide. Through our EtherCAT seminars, we strive to provide access to the benefits of EtherCAT to an even larger community. We are delighted to be back in South Africa again!”

A further highlight of the events is a table-top exhibition to take place in parallel with the seminars. Here, supporting companies will have the opportunity to show and explain their individual EtherCAT applications to interested delegates. The South African seminars will mainly address machine builders, OEMs and system integrators, and are free of charge to all attendees.

With 5690 members from 66 countries, the ETG has become the world’s largest fieldbus organisation since it was founded in 2003. Within the ETG, key end-users from various industries and leading automation suppliers join forces to support, promote and advance the EtherCAT technology.

Endorsed by the SAIMC
In line with the SAIMC’s objective of elevating the profile of automation, including bus technologies, in South Africa, the SAIMC is proud to endorse the 2020 EtherCAT Breakfast Series. The EtherCAT fieldbus technology is a very cost effective solution with fantastic performance. Such bus technologies are essential for the improvement and optimisation of manufacturing operations in our region. In the medium to long-term, this is a key enabler for Industry 4.0 and all the benefits that can potentially be realised by harnessing the Industrial Internet of Things (IIoT) and the Big Data that this type of technology brings. The

Martin Rostan.
SAIMC is excited about this event being hosted in South Africa again and is hopeful that a local EtherCAT Technology Group will be spawned post this event, to further collaborate with the SAIMC in driving bus technologies in the reindustrialisation of our region.

This presentation has been accredited and delegates will earn 0.5 CPD points.

Save these dates
Thursday 22 October – Cape Town
Tuesday 27 October – Port Elizabeth
Wednesday 28 October – Durban
Thursday 29 October – Johannesburg

For more information contact
Jane van der Spuy, Technews Publishing,
+27 31 764 0593, jane@technews.co.za, www.technews.co.za
Almost every bearing or power transmission application requires fasteners. In order to be able to offer a complete solution to its customers, Bearings International (BI) now stocks and supplies a comprehensive range of quality fasteners, including blind rivets, self-drilling screws, hexagonal nuts, bolts, and washers from FTS Boltworld.

“Ancillary products include anchors, grease nipples and roof sheeting fasteners, as well as specialised fasteners such as hook and straining eye bolts, u-bolts and gutter bolts,” explains BI offer manager, Victor Strobel. “The main benefit for our customers is point of sale convenience. BI can now offer them the full basket of products required for all their construction and maintenance needs, making us a favourable one-stop shop.”

Due to it being a popular consumable product used in most customer applications, across all industries and markets, the FTS Boltworld offering will be available across BI’s 48-branch network countrywide. “Our market research indicated a gap where we can grow revenue sustainably and innovatively, as well as satisfy customer needs more completely,” adds Strobel.

The latest offering also extends BI’s synergy with the broader Hudaco Group. Boltworld was acquired by group company FTS, with the new entity now known as FTS Boltworld. It recently relocated into the same building as group company Rutherford in City Deep, Johannesburg, a distributor of Makita power tools, Mercury engines, and survey instrumentation.

Victor Strobel.

For more information contact Bearings International, +27 11 899 0000, info@bearings.co.za, www.bearings.co.za

“SKF South Africa is committed to growing its extensive distributor network in order to deliver innovative bearing and rotation technology solutions to customers across the sub-continent,” says Christian Murman, SKF South Africa’s business development manager. “We only partner with like-minded companies that we are confident will uphold the renowned SKF brand and excel on service delivery. One such company is Namibian Lubrication Systems whom we proudly appointed as a SKF Authorised Distributor in September 2019.”

Namibian Lubrication Systems specialises in the supply of lubrication equipment and systems to the industrial and mining sectors across the entire Erongo, Khomas, Karas and Otjozondjupa regions of Namibia. The company was established by André Bezuidenhout in Oranjemund in 2000. In the same year Namibian Lubrication Systems was appointed as the sole distributor for Lincoln Lubrication South Africa, part of the SKF global group. What started out as a small family business quickly grew into a successful establishment, and in 2009, Bezuidenhout moved the company head office to Swakopmund.

“While calling on customers together with our new distributor, we received an enquiry from a gold mine for a replacement bearing for their stock for an upcoming project in Q1 2020,” explains Murman. “As a newly appointed SKF dealer, Namibian Lubrication Systems was still on a learning curve regarding SKF products and thus decided to call upon the expertise of SKF’s Engineering Department. Cody Petersen, junior project engineer at SKF was considered as the best person to assist.”

After putting heads together, the SKF 4176 EAK30/C3W33 replacement bearing was recommended. Namibian Lubrication Systems submitted a quote and the mine placed an order in November 2019.

Familiar with the world-class SKF brand, the customer was very happy to once again work with Namibian Lubrication Systems as an SKF Authorised Distributor. This highly successful project and seamless collaboration between the companies affirmed SKF’s decision to appoint Namibian Lubrication Systems as an Authorised Distributor. “The company has an excellent footprint within the country, boasts a stellar reputation for on-site service and has technicians on contract at most of the mines in Namibia who look after Lincoln products,” notes Murman.

Now, as a SKF Authorised Distributor, Namibian Lubrication Systems is responsible for delivering the comprehensive SKF product and service portfolio in Namibia focusing on a condition monitoring service delivered by the company’s technicians who have been specifically trained in this field. Namibian Lubrication Systems’ ultimate goal is to provide multi-skilled technicians that are able to offer customers a complete maintenance package, thereby securing all the Lincoln Lubrication and SKF product offerings.

For more information contact Samantha Joubert, SKF South Africa, +27 11 821 3500, samantha.joubert@skf.com, www.skf.com
Areas to be covered:

- Home automation of TV, audio, appliances etc
- Energy and lighting automation/control
- Temperature control
- Fire detection
- CCTV cameras
- Remote viewing of home and family
- Communications with home and security response company
- Alarm control and remote control/communication
- Access control and identification

Already covering factory automation and Industry 4.0 in our publication *SA Instrumentation & Control* (www.instrumentation.co.za), security in our publication *Hi-Tech Security Solutions* (www.securitysa.com), and the Internet of Things in our publication *Dataweek*, it was a logical next step to cover the subject of home automation and security, without diluting the focus of our existing technical publications.

The monthly *Smart Home Automation* news brief (to be launched in February) will cover product information relating to the hardware and software technologies that enable control and management over appliances and devices within a home.
TRAINING

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• Automation Engineers
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  TIA-TRB – TIA Troubleshooting and Diagnostics
  Midrand 14-16 Apr 2020
  ST-PLCINTRO – Introduction to PLC
  Cape Town 14-16 Apr 2020
  For more information contact Vanessa Bonhomme, Siemens Southern Africa, +27 11 652 3206, vanessa.bonhomme@siemens.com, http://www.sitrain-learning.siemens.com/za

VEGA

• Automation Engineers
  Measurement Solutions – Level, Pressure and Nucleonic Measurement
  Roodepoort 22-23 Apr 2020
  For more information contact Claudia Olver, VEGA Controls SA, +27 73 172 1437, claudia.olver@vega.com, http://www.vega.com/

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.
From the office of the CEO

Yes, you are at the right place – the president of the SAIMC position has been replaced by that of the CEO (yours truly).

I would like to thank Annemarie for the wonderful work she has done as president of the SAIMC, especially being ‘thrown to the wolves’ at such short notice. Fortunately our members are not wolves, and it was great to see how she was embraced into the leadership fold. Luckily she will not be lost to us as she has been called into a higher office as a director of the SAIMC.

Although the SAIMC NPC has been registered as a non-profit company since 2010, it was only ‘activated’ in 2014, and then it was still run like a voluntary association. This all changed last year when it was decided to run the SAIMC NPC like the company it is.

During January 2020, requests for directors were sent to all of the branches and to Council. According to the MOI registered with the CIPC, it is the responsibility of the current directors to identify those nominees that would be able to contribute as directors, and send those names out for voting purposes to the SAIMC members. Fortunately voting was not required and all nominees identified by the directors were approved. The new board is:

• Vinesh Maharaj – Chairman.
• Annemarie van Coller – Sustainability.
• Oratile Sematle – Automation.
• Johan Maartens – Public Officer.
• Marc Van Pelt – Government and International Relations.

During the same board meeting, I was appointed as CEO and as such, the only executive director. This means that the board is being managed by a majority of non-executive directors as per Kings IV Report on good governance.

The CEO will now be responsible to the board and see to it that the strategy and goals of the SAIMC are reached. These fall into three categories:

• Education and training.
• Growth.
• Thought leadership.

By the time of going to press, the Executive Council has not yet been finalised with the general managers of the board and the CEO being the first members of Exco. Various nominations for the various positions on Exco have already been received.

First automation category recognised by ECSA

The Enterprise Integration Practitioner special category has been approved by ECSA, making it the first automation position to be defined and approved. This paves the way for the other six automation positions, and eventually a formal automation discipline. The Enterprise Integration Practitioner is specifically aimed at those MOM/MES professionals who are doing engineering work according to the Identification of Engineering Work definition currently in progress, but do not have an engineering related qualification.

While registration with the various SETAs is in progress, the SAIMC is also formalising budgets to get automation formally included in the NTIP programme.

The Supplier Advisory Council has been created within the SAIMC and we are looking forward to great things in future, especially in education and training, as well as thought leadership.

Until we speak again, have a wonderful year and may you, your families and your businesses be blessed. Join the conversation on https://www.linkedin.com/company/saimc/about/

Yours in automation,
Johan Maartens.
The Durban branch AGM was held as usual at the Durban Country Club on 5 February. As is sadly often the case for AGMs, attendance was lower than we have come to expect at our normal monthly meetings, but the mood was upbeat and the members interactive and enthusiastic.

In keeping with our focus on students and education, the evening began with a short presentation from Ms. Vuyiswa Mazibuko (from MUT) who won the student prize for the second semester. With a full bursary from Sasol for whom she will shortly be working, this is a rising star to watch and we look forward to her progress. She won the award for her work on a PLC based automatic car washing system.

Secretary John Owen-Ellis went through the financials on behalf of treasurer Kevin McIlroy and these were accepted and approved. Members were reminded that we are not there to make a profit but to ensure we have sufficient cash reserves to give something back to the industry we serve – through technology evenings, student functions, training and social events.

Chairman Hennie Prinsloo said that overall it had been a successful year for the Durban branch and of course achieving platinum status was the highlight as it meant that the branch had achieved the benchmarks set to service the industry correctly. The year was not without a few lessons learnt though, especially in terms of timing for student-related events and spreading the committee’s workload out properly during the year. He thanked the outgoing committee for their hard work.

Johan Maartens took pride of place next and took us through the changes to the SAIMC – from a Non-Profit Organisation to a properly structured Non-Profit Company with an associated CEO and board of directors. He was as always, eloquent and well versed and his presentation elicited some lively interaction from the floor. For Johan’s first communication as the new CEO please see page 13.

Electronic voting for the new branch management team (formerly committee) had taken place earlier and John Owen-Ellis announced the results of the election. The new team is as follows: Hennie Prinsloo, John Owen-Ellis, Jane van der Spuy, Paul Sikhakhane, Ralph Naidoo, Howard Lister and Kevin McElroy. The Durban team has resolved to give some serious thought as to how best to implement a succession plan and evolve this committee, which has remained much the same for many years now.

The practice of co-opting other members to the committee has worked well in recent years and will be continued through 2020. The co-opted members will be invited and finalised at the first committee meeting, along with the branch management team portfolios.
On 16 January, the Secunda branch held its AGM. The elected committee members for 2020 are as follows: Johan Maritz (general manager), Iddo Japhta (vice general manager), Gerhard Swarts (treasurer), Lezahn Meiring (secretary), Lizwe Sikunyana, Andrew Barns and Xandri Cornelissen.

Johan Maartens (COO and director of the SAIMC) gave the members and visitors an overview of the SAIMC 2023 campaign, and progress on our goals. A vote of appreciation goes out to SAIMC Regional Member – Honeywell – for sponsoring the venue, snacks and beverages for all technical events.

All instrumentation and control related mechanicians, technicians and/or engineers are welcome to attend the monthly technology events in 2020, the planned dates until June are: Thursday 5 March, Thursday 2 April and Thursday 7 May.

Technical presentations at the SAIMC Secunda Branch will earn CPD points for ECSA registered individuals and all enquiries can be directed to Johan Maritz (+27 82 856 3865).

At the technology evening of 22 January, Dewald Smit from Festo presented on the choice: ‘Pneumatic vs Electric Automation Energy Efficiency’.

In these tough economic times, all of us would like to save money in our factories. In making the decision between pneumatic and electric actuators, there are some key questions to ask like: Are there more tasks than clamping and holding? Are there long strokes, high speed and shorter cycle times required? Is smooth motion required? If all the answers to the above questions are no, use pneumatic, if one answer is yes, use electric drives.

Both technologies have their strengths and weaknesses. Pneumatic is easy to install and cost efficient, yet there could be energy losses from leakages that cost money. Electric, on the other hand, requires higher initial investment, but is load dependent when it comes to use of energy, so a saving in the long run is possible.
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Digitisation and automation for mining: the only way forward

The theme for the Mining Indaba 2020 – ‘Optimising Growth and Investment in the Digitised Mining Economy’ – reinforced the need to focus on innovation, technology and automation. Technology, implemented alongside the correct logistics and strategy, makes a significant difference to age-old industries. The mining industry has never before faced such challenges as it does now. It is in urgent need of transformation.

SICK Automation has the technology capable of making that change.

SICK’s ‘Sensor Intelligence’ draws on its complete system expertise, supplemented by over 70 years’ experience as a market leader in sensors and sensor application solutions. SICK combines detailed application knowledge with reliable software architecture to optimally integrate its sensors into your system.

South Africa is leveraging technologies to improve mining efficiency and safety, and is fine-tuning the transformation from manual operations to more automated mining. SICK Automation is leading the way as a continual mining brand. Whether it is an underground or open-cast mine, the company has an automation solution that has been industry tested and optimised to suit South African mining conditions and needs.

A global specialist for factory automation, logistics and process automation applications, SICK Automation has over 44 000 products for the most challenging industry applications that require high precision proximity detection systems. Apart from its level, pressure, flow, presence detection, machine vision and other products, the company is an industry leader in the following fields:

**Laser and radar scanners**

SICK is globally renowned as a leader in laser scanner innovation and has been researching and developing this technology for over 40 years. Today, its laser scanners are used around the world for geo-mapping, exploring the universe at terrestrial space observatories, to protecting miners deep under the Earth’s surface.

Designed for indoor and outdoor applications, for day and night use, and with special weather filters, these laser scanners can go where humans cannot, and reach levels that no other product can. SICK’s extensive range of laser scanners provides intelligent scanning solutions for wide-reaching logistic and automation requirements. Applications for mining include:

**Material flow and volume measurement**

If users need to measure bulk materials on conveyor belts or in piles, the laser volume flowmeter Bulkscan offers a precise measuring procedure and an appealing alternative to a belt scale. The Bulkscan continuously measures the flow rate without making contact – regardless of weather conditions and the condition of the material. Intelligent additional functions on Bulkscan LMS511, such as measurement of the centre of gravity, height of the bulk, and belt monitoring prevent damage to the machines and conveyor belts – a definite benefit when optimising the flow of goods and efficiently controlling conveyor belts. The Bulkscan is exemplary in both maintenance and cost-effectiveness, and, thanks to a special alloy housing and integrated heating, it is robust and suitable for outdoor use.

**Driver assistance and collision avoidance**

Large vehicles within the mining industry pose a continuous challenge to life and infrastructure. Turning, cornering and reversing in close proximity to walls and drop offs or other equipment and people can result in damage or fatality. High precision
proximity detection systems monitor available distance and identify potential collision hazards.

Suitable for most underground mining vehicles, and using advanced laser scanner technology, underground vehicle operators are assisted to safely and efficiently manoeuvre within the tunnel. From front and rear-end detection, to corner cutting and overshooting, drivers receive visual feedback on a touch screen display as well as audible alarm warnings.

On surface mines, in dusty and harsh environments, the risk of collision is a reality. SICK has developed radar sensors that are able to withstand dirt and hostile weather conditions, as well as temperature fluctuations ranging between -30 and 50°C. These sensors provide reliable detection of any object which falls within their detection cones up to 20 metres.

Driver assistance systems, using 3D LiDAR or vision sensors detect blind zones around vehicles and warn the operator of potential sources of danger as well as providing navigation and steering support. The sensor detects up to 55 000 measurement points across four layers and emits three echo signals per measuring beam, increasing the number of measurement points to up to 165 000 per second.

Continuous emissions monitoring systems (CEMS)
The Carbon Tax came into effect on 1 June 2019 in South Africa, and will be phased in over a period of time to allow companies to comply and adopt cleaner and more efficient technologies. SICK has tried and tested technologies in use across the globe. Its CEMS solutions have been specifically designed for measuring emissions at mining and industrial facilities. These systems measure pollutants, reference quantities, and perform data processing on the results in accordance with relevant national or international legislation.

Conclusion
Technology has an important role in the mining industry. Countries that implement national initiatives that drive transformation and inclusive, broad-based development goals are far more enticing to investors. Research and development in the mining industry as well as the adoption of innovation are the keys to the sustainability of the industry in South Africa and the rest of the continent.

Whatever the distance, whatever the dimensions, for indoor, outdoor and underground applications, SICK offers consulting and design services so that its solutions are uniquely tailored to a mine’s specific requirements be it for the copper, coal, diamond or platinum sectors.

For more information contact Grant Joyce, SICK Automation Southern Africa, +27 10 060 0558, grant.joyce@sickautomation.co.za, www.sickautomation.co.za
EnI Electrical delivers at the sharp end of African contracts

Usually the last contractor on site, electrical instrumentation and control (EC&I) specialist EnI Electrical puts extra effort into helping clients around Africa meet their scheduled start-ups.

With decades of experience in mining and industrial projects on the continent, the Zest WEG group company understands the challenges that developers face, Russell Drake, general manager operations at EnI Electrical, says that among other mining projects, it is currently involved in a large copper mine expansion in Zambia.

“Large project implementation is complex, and is often made more challenging by the logistical constraints that many African projects face,” he adds. “There are invariably delays at various stages, which places more pressure on the EC&I contractor, who must in many ways ‘complete’ the roll-out.”

EnI Electrical works extensively with project houses and directly for mining companies, and is a preferred supplier to many of them. A key reason is the proactive attitude that underlies its depth of technical expertise.

Calvin Fisher, EnI Electrical overhead lines manager, emphasises the importance of on-time completion, combined with reliable electricity supply: “With the various issues that may delay stages of a project, there is usually growing urgency as the deadline date approaches. This is normally when EnI Electrical enters the project, so we are accustomed to working under extreme pressure. Our dynamic team actively looks for ways to advance the work, especially when the previous phases may not be quite ready for us to begin.”

He notes that the team often does not have all the site access they need, so it requires some innovation to push the job along.

“We may even collaborate with other contractors if we have spare resources, for example, to help them complete their work so that we can start ours,” he adds. “Our focus is on being part of the solution, and this is an approach that really helps clients meet their deadlines.”

The linking up of electrical infrastructure, connections and equipment is one of the final stages to allow any project to start operating. In this role, EnI Electrical installs a wide range of electrical infrastructure including medium and low voltage cable reticulation, motor control centres, lighting, earthing protection and energy management systems.

Its control and instrumentation work ranges from process instrumentation and plant automation, to custom control stations and fibre or copper networks. The company also designs and installs overhead power lines up to 161 kV and substations.

“Our permanent bases in countries like Zambia and Ghana with significant in-country investment in technical assets underpins the efficiency of our work,” says Drake. “We understand our working environment very well, so we can quote accurately and fairly. This is vital to eliminate variance, which can be disruptive to the client and the project.”

EnI Electrical’s experience and technical capability gives it the confidence to present the most cost effective solutions to clients, which provides certainty and reduces overall project risk. “We also take pride in developing local capacity in the countries where we are based,” elaborates Drake. Operating from locally registered entities also ensures legal compliance and maintains a social licence to operate.

EnI Electrical’s local operation in Zambia – established in 2002 – employs 188 local staff including highly skilled technical teams. In Ghana, ongoing investment in assets and skills gives that office the capability to run up to R300 million in contracts at any given time.

“Our success in Africa is built on our specialised expertise and experience, but what clients really appreciate is our willingness and ability to ‘take up the slack’ towards the end of their project when time is not on their side,” concludes Fisher. “Our close contractor interface and solution-driven approach allow us to do this.”

For more information contact Zest WEG Group, +27 11 723 6000, info@zestweg.com, www.zestweg.com
The recent installation of an impulse voltage generator at Zest WEG’s transformer manufacturing facility in Heidelberg will allow in-house testing of transformers, saving time and money for customers.

According to Ronaldo Bertoldi, engineering manager at the facility, the substantial investment in this specialised equipment positions Zest WEG well for growth within South Africa and the rest of the continent.

“The impulse generator is strategic equipment for us, providing an important service, especially for our larger customers,” Bertoldi says. “Where the transformer size is larger than the 72.5 kV class, impulse testing is a routine test as per IEC 60076-3. Customers have an option to do an impulse test in lower voltage classes as a type test.”

An impulse generator produces short, high-voltage surges to test the strength of electric power equipment against lightning and switching surges. It comprises multiple capacitors that are first charged in parallel through charging resistors by a high-voltage, direct-current source. These are then connected in series and discharged through a test object by a simultaneous spark-over of the spark gaps.

Sales team leader Stuart Brown highlights that the acquisition makes the Zest WEG transformer manufacturing facility one of only a handful of local OEMs with this testing facility in-house. This enhances local engineering capacity and entrenches global standards.

“Major energy utilities will often require that suppliers have this capability,” says Brown. “It is therefore a valuable resource as we expand the range of our transformers up to 50 MVA, 132 kV units.”

Bertoldi emphasises that impulse testing is important to establish that transformers can withstand surges on the network induced by lightning. “In particular, it tests whether the transformer’s insulation is capable of withstanding such faults;” he adds. “In a country like South Africa, where lightning flash density is high, this is a vital exercise.”

The impulse generator will also allow Zest WEG’s transformer facility to test its own new product prototypes. These are continuously developed with the technical support and shared resources of WEG’s research and development facilities in Brazil.

For more information contact Zest WEG Group, +27 11 723 6000, info@zestweg.com, www.zestweg.com
Sulphate and chloride monitoring

Chlorides and sulphates cause pitting and stress corrosion in expensive power plant components, such as turbines and boilers, leading to extensive maintenance and unplanned shutdowns. Monitoring these ions at low ppb levels is therefore a key measurement in power plant chemistry.

Mettler Toledo’s 3000CS sulphate and chloride analyser can provide online ppb level detection of chlorides and sulphates in power plant water to control corrosion and minimise damage.

Online, ppb-level chloride and sulphate monitoring

The innovative 3000CS analyser uses microfluidic capillary electrophoresis, an ionic separation technology, to directly measure trace levels of harmful sulphate and chloride ions. With online measurements every 45 minutes, the analyser automatically performs direct chloride and sulphate measurements in pure water and power cycle chemistry samples, for immediate detection of any contamination. The most important point in the cycle is at the turbine inlet, to ensure that only acceptable levels of chlorides and sulphates enter with the steam into the turbine.

Low cost of ownership compared to offline methods

Typically, chloride and sulphate measurements are done with offline technologies, such as ion chromatography and inductively coupled plasma. The 3000CS provides accurate chloride and sulphate measurements continuously, delivering a rapid return on investment by eliminating the need for costly internal or external laboratory tests.

Easy to maintain with ISM predictive diagnostics

The unit features semi-automatic calibration and an intuitive touchscreen interface. ISM (intelligent sensor management) technology provides diagnostics that predict when maintenance or replacement of consumables will be required.

For more information contact Darren Prinsloo, Microsep, +27 11 553 2300, darren.prinsloo@microsep.co.za, www.microsep.co.za

Legrand’s high-performance UPS systems

Legrand’s advanced uninterruptible power supply (UPS) systems ensure maximum continuity of service of essential electrical equipment, by providing reliable performance in terms of power and backup time, particularly during electrical network disturbances like load-shedding. An environmentally responsible approach to constantly changing global markets encompasses ongoing technological developments of the product portfolio, in terms of energy efficiency, quality power supply, optimum safety and enhanced aesthetics.

According to the company, innovative design, advanced electronic components and thorough testing of each unit, ensures dependability, energy efficiency and safety of the new UPS system. High performance batteries and an efficient charging system significantly extend battery life by up to 50%.

Three ranges

Legrand’s UPS systems, which provide superior power efficiency, encompass three ranges – Line Interactive, Conventional and Modular.

Line Interactive UPS systems comprise units from 600 VA up to 3 kVA single phase. This range is ideal for small office and home use.

Conventional UPS systems, for power from 0,8 kVA to 800 kVA, in single and three-phase, offer the commercial sector safe, efficient and innovative solutions, including reliable electrical redundancy. The design of this range offers flexibility in semi-modularity, whereby the autonomy and power can be expanded as required.

Legrand’s compact and lightweight Modular series, from 1,25 kVA to 800 kVA, is a flexible 3-phase system, comprising individual single-phase modules that can be added to existing configurations to increase the power supply or backup time.

An advantage of a 3-phase power supply system with single phase loads is that in the event of a failure of one of the modules, there is no loss of power. Power continues to be distributed over the other modules which are still operational. The modular functionality of the batteries enables the removal of faulty units, or to increase the autonomy by adding batteries as required.

A range of communications accessories has been designed for managing and configuring the UPS, as well as for remote control of the system. Communication and supervision software for accessing the operating parameters of the UPS and for carrying out full diagnostics and the configuration of specific functions is also available.

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Bringing critical power distribution infrastructure out of the dark

By Quintin Mccutcheon, Digital Transformation DCX+ EcoStruxure Leader – Anglophone Cluster.

As the trend towards digitisation becomes pervasive across many industries and operations, the benefits offered to power distribution systems should not be overlooked. However, due to the ageing infrastructure of facilities such as hospitals, airports, wastewater treatment plants, etc., electrical distribution has not been keeping up with the latest digitisation trends. As such, most facility teams are still working ‘in the dark’ by not leveraging available, proven IoT-enabled power management technology to its full potential to achieve optimal performance, safety and regulatory compliance.

Manage complexity
By using the right digital sensors, advanced controls, and analytic capabilities, it becomes easier to manage the increasing complexity and changing requirements of electrical distribution infrastructure. This enables smoother operations by detecting, diagnosing, and correcting issues before they cause mission-critical systems to fail. This greatly adds to system reliability and business continuity and is especially useful for critical applications such as in hospitals and data centres.

Gain deep insights
Touching every corner of a facility’s electrical network, the latest edge control software and mobile apps connect to smart devices to keep facility teams informed and reveal deep insights. These insights can assist operations in every aspect of facilities management including maintenance, compliance and performance.

As an alternative to interval-based maintenance, digitisation enables condition-based maintenance, meaning equipment can be serviced at the right times to improve reliability while saving time and money. A digitised power network also simplifies energy and emissions tracking and reporting for regulatory compliance, to support participation in carbon markets, or to publicly showcase energy performance.

Improve safety
Visibility into enterprise-wide power and equipment conditions means that it is easier to detect and mitigate hazards before harm is caused to staff or equipment. For example, electrical fires are commonly caused by improper maintenance. Fortunately, digitisation brings a sophisticated and continuous approach to monitoring. Wireless sensors installed in strategic locations can detect abnormal temperature rises due to high impedance connections on bus bars or in conductors, transformers, or breakers. Temperature data can then be wirelessly transmitted to the software or to an asset monitoring service bureau. This allows for near real-time alarming in case of a thermal problem before it results in an electrical fire destroying equipment or injuring people.

Boost efficiency and reliability
There are countless ways that a digitised distribution network can improve operational efficiency and reliability of not just the network, but of the business itself. For example, by constantly monitoring load trends through a facility, active load management can be used to prevent overloads and, in turn, business disruptions. This information can also be used to uncover unused capacity and for capacity planning for new facility expansions, avoiding overbuilding and minimising CAPEX.

Migration made easy
A deterrent in embracing new technology often lies in its adoption and implementation. However, the good news for facilities teams is that most newer power distribution systems already have the connectivity available, it just hasn’t been implemented yet. Installed devices simply need to be networked together. Working with older infrastructure? Well, even legacy systems have simple retrofit possibilities to add the appropriate devices and sensors. Migration to a digital system does not have to be complicated. What’s more, these upgrades are extremely cost-effective when considering the long list of benefits to the facility.

Quintin Mccutcheon.

For more information contact Prisca Mashanda, Schneider Electric SA, +27 11 254 6400, prisca.mashanda@se.com, www.se.com/za
Enabling an energy-efficient HVAC system for a hypermarket

Heating, ventilation and air conditioning (HVAC) is the technology of indoor and vehicular environmental comfort. HVAC systems are mostly used in hypermarkets to provide shoppers comfort and acceptable indoor air quality, but they also consume massive amounts of energy. In order to optimise energy consumption, traditional HVAC systems collect energy usage data at intervals. Although traditional systems are good at retrieving energy consumption data, they lack rules-based logic capabilities to interpret the data and determine further action. Therefore, most HVAC systems rely on human operators to manually adjust the system based on its current environmental temperature, as essential equipment, such as chillers, pumps, and fans, is not connected to a network.

Adopting sensors to acquire real-time data is not always that straightforward because of interoperability issues among the large variety of protocols in a network, making it a very costly upgrade to overcome this challenge. Another hurdle is translating data into a timely response through automatically adjusted settings to optimise energy savings. A hypermarket required an IIoT solution that connected chillers, pumps, fans, and sensors to enable automated demand response control of the HVAC system, based on the real-time temperature and business hours, to decrease the activation time of chiller systems and help the hypermarket save energy and reduce operating costs.

System requirements included:
- A timely response to automatically control the HVAC system based on business hours and the current environmental conditions of the hypermarket.
- Tracking energy usage anytime and anywhere to ensure continuous energy efficiency by acquiring and analysing data from the HVAC system (e.g., water-cooled chiller temperature, power consumption, etc.)

The Moxa solution: active energy efficiency with minimum programming effort

By deploying resistance temperature detector (RTD) sensors, power meters, and Ethernet remote I/O in the physical environment, real-time serial, digital, and analog data about the environmental temperature, water-cooled chiller temperature, pump speed, and power consumption can be acquired and transmitted to the database to determine further action. To automatically enable the settings adjustment of the chiller, pump and fan, based on the real-time temperature in the hypermarket, the commands to regulate the functioning of the smart HVAC can be set by Click&Go Plus, a programming-free control logic that is included in the Ethernet remote I/O (ioLogik Series). The DI channels monitor the machine status of the chiller, pump, and fan. The DO channels control the settings of the chiller, pump, and fan, based on the information provided by the Ethernet remote I/O (ioLogik E1260), which takes temperature readings around the hypermarket.

Click&Go Plus also benefits the hypermarket by allowing it to operate its HVAC system according to its business hours. Another key feature of Moxa’s solution is that the I/O and connected serial device’s data, e.g., power meters, can be sent to the MySQL database, displaying the system and energy usage status via the web server. By collecting field site OT data and sending it through Moxa’s data acquisition suite (MX-AOPC Suite) to the database reduces system integrators’ workload immensely. What’s more, it allows the customer to connect its legacy HVAC OT systems to IoT networks.

The hypermarket’s management can log into a web console that allows them to monitor the entire HVAC system and the amount of energy that has been saved. As the HVAC system can now be remotely monitored, engineers do not need to be dispatched for routine inspections. They are only sent out when a problem arises, which needs immediate attention. Both of these features help the end user to reduce total cost of ownership of the system.

Why Moxa
- Easy to use Click&Go Plus, a programming-free control logic to control the HVAC system based on current environmental conditions.
- Expansion capability by supporting various interfaces and protocols in one device (e.g., DI/DO, AI/AO, RS-485, Ethernet).
- Saves implementation as well as labour costs with daisy-chain topology.
- Supports active tags to send I/O and RS-485 meter data to the MX-AOPC UA server for HMI integration.

For more information contact RJ Connect,
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Monoblock for sampling and injection processes

WIKAs new monoblock has been designed to meet the requirements of the process industry. It is especially well suited to applications in natural gas and aggressive media.

The compact design integrates two shut-off valves to separate the process from the instrument side. The modular monoblock design allows using an arrangement of ball or needle valves. Injection valves also have an integrated non-return valve to prevent bidirectional flow. The integral probe is solidly attached to the valve and it is designed according to the flow condition in the pipeline.

The valve seat design and the redundant seals of the valve body ensure high durability and tightness. In case the soft valve seat fails, the metal-to-metal seat will ensure that the valve can still be operated and set to a safe position. The tightness is guaranteed for the connection between the process and the measuring instrument and towards the atmosphere.

The super-finished machining of the internal parts allows a very smooth and precise operation, even at high pressures and after long periods without valve operation. The surface finish is also minimising corrosion with aggressive media and makes it easier to clean.

For more information contact WIKA Instruments, +27 11 621 0000, sales.za@wika.com, www.wika.co.za

Thermal flow measurement with IO-Link

Honsberg has launched the new Omniplus-F thermal flow sensor measurement device enabling users to use only one device for applications which previously required three. Additionally, it has a uniquely designed larger screen giving a large high-resolution display with greater visibility. The new instrument enables measurement of flow, speed, temperature and volume of fluid media with one universal device.

The calorimetric measuring principle, which involves no moving parts, makes it practically wear-free and offers the ability to record media temperature in addition to flow measurement.

“The special arrangement of sensors developed by Honsberg, in combination with optimised software algorithms, makes the Omniplus-F one of the fastest and most versatile calorimetric flow sensors on the market” said Jan Grobler, managing director of GHM Messtechnik South Africa, the local subsidiary of the GHM Group.

“The new thermal flow sensor device has applications across a wide cross section of industries including water, oil, mining, pharmaceutical and food and beverage sectors. The newly designed screen gives real-time data readings in a clearly visible display.”

Industry 4.0 and technical features

The integrated IO-Link interface enables the digital transfer of all measurements and other sensor data and the complete parameterisation of the sensor. Therefore, nothing stands in the way of integration into larger sensor networks. The selection of various process connections offers a solution for nearly every installation situation, making the new instrument a good choice for Industry 4.0 applications.

Omniplus-F offers a flow measuring range of 2-300 cm/s. The temperature measuring range is -20 to 120°C. At a minimum flow speed a 2°C accuracy is achieved. Measurement mediums are H2O (adjusted), oil (adjusted), other liquids (configurable), as well as air. Outputs can be configured for 4-20 mA or 0-10 V and 2 switches for high/low monitoring conditions are integrated into the sensor. The device has an operating voltage of 18-30 VDC. A rotating multifunction ring enables the flow sensor to be parameterised without manual or connection to a PC.

“For the three measurement variables in a single device, intuitive operation and IO-Link functionality, the Omniplus-F device reduces costs in a newly enhanced design from Honsberg,” concluded Grobler.

For more information contact Jan Grobler, GHM Messtechnik SA, +27 11 902 0158, info@ghm-sa.co.za, www.ghm-sa.co.za
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Positive displacement vs Coriolis meters

Coriolis meters are the meters of choice in many liquid measurement applications. But, what about custody transfer applications in the oil industry where every drop counts?

Positive displacement (PD) is a practical and accurate method to achieve volumetric measurement of refined hydrocarbons, according to tests undertaken by Brodie International in the USA. Brodie is a world-class manufacturer of positive displacement technology metering solutions for liquid transfer applications in the energy industry.

The tests revealed that Brodie’s BiRotor Plus (BR+) meter can offer advantages over Coriolis meters for the highest accuracy and reliability. Here are the reasons:

• Moving parts: the measurement tubes of a Coriolis meter continuously vibrate at a high frequency, which can result in material fatigue and reduced life expectancy. The BR+ has two solid moving parts (the rotors) with no material contact, except for its hybrid ceramic bearings and timing gears, resulting in a field-proven life expectancy.

• Pulse generation: the relationship between the vibration of the tubes inside the Coriolis meter and its pulse output is complex with pulses calculated and generated by a microprocessor. This requires complex electronic filtering of the vibration signal and can cause a delay between flow and pulse output. The BR+ generates real pulses that originate directly from the rotor motion. The pulse output is uniform and works well with all proving methods including Small Volume Provers using pulse interpolation.

• Pressure drop and changes of pressure: Coriolis meters experience a high pressure drop due to the splitting of the flow into two smaller vibrating tubes. Although it handles the same flow rates, the BR+ is less sensitive to pressure changes.

Meter performance

• Linearity and repeatability: with a published linearity of ±0.075% and a repeatability of 0.02%, the BR+ is a highly accurate custody transfer meter. As with other PD meters, the accuracy of the BR+ improves with increasing viscosity.

Internal product residue

Residue can cause instability in Coriolis tubes, which has implications on the accuracy. Crude oils which contain paraffin wax often coat the inside tubes of the Coriolis meter. Likewise, viscous oil creates an internal layer on the tubes, the ‘boundary layer’. There are correction procedures in the software to correct this, but these need to be monitored and turned on or off. This adds another level of complication because the operator needs to know when it is needed and when it is not. The BR+ meter is self-cleaning by design and does not require compensation for residue.

Maintenance and proving

• Coriolis meters need to be taken out and sent to the manufacturer for repair. The tubes can suffer from fatigue caused by its high frequency vibration and their replacement is costly. With periodic maintenance, BR+ meters can last for decades and be repaired on site.

Test results obtained at Brodie calibration facility in May 2017, comparing a Micro Motion Elite 3” and a Brodie BiRotor Plus 4”
Digitisation has branched into industry under the keyword Industry 4.0. IO-Link offers significant advantages when it comes to reliably controlling the entire system technology in process control with a vast number of measuring points, control devices and operating elements. The new dimension of hygienic measurement technology is hybrid and modular.

Anderson-Negele’s ITM-51 incorporates flex-hybrid technology with IO-Link and 4-20 mA, which allows data from the sensor to be transmitted digitally, as an analog signal, or in parallel. The bidirectional communication enables status control and preventive maintenance at any time to avoid production downtimes. Installation and commissioning are time and cost-saving thanks to plug-and-play technology, and sensor replacement is easier thanks to ‘Smart Replace Design’ with automatic detection, configuration and parameterisation.

Modular sensor platform
IO-Link alone is a big step towards industry 4.0 in hygienic process technology. The flex-hybrid connection of digital and analog communication enables the simultaneous use of both to create flexibility. With its application-specific configuration, the modular sensor platform offers equipment that is tailored to requirements and cost optimised. It enables simple replacement of individual components such as display or electronics. The optional remote version also features separate sensors and electronics housings. The electronics are identical for all sensor types and recognise them independently, while each sensing device can be replaced simply by exchanging and connecting, and only one replacement unit of electronics housing and cable is necessary for all sensor types.

Benefits in the production process
ITM-51 enables active automated phase separation of milk and milk products, beer and yeast, by inline analysis of the turbidity and active switching of the process. The passive phase separation by means of time or volume control always needs a safety margin. Therefore, in every process step product is lost or quality is affected. Advantages with ITM-51 include:

• Minimisation of the loss of raw material and thus of value.
• The filling of tanks with incorrect medium is reliably avoided.
• Less cost for wastewater treatment.
• Best possible concentration and thus a constantly high quality of the product.
• Efficient separator control in breweries for uniform quality of beer.

Testing and results
The testing conducted by Brodie consisted of 10 repeatability checks at flowrates from 70 to 900 GPM in 100 gallon increments.

The linearity curve of the 4” BR+ meter was nearly flat. The linearity curve of the 3” Coriolis meter was a steady increase. On the meters tested, the linearity of the BR+ meter was ±0.033% vs ±0.106% for the Coriolis meter.

The 3” Coriolis repeatability spread constantly increased at flowrates greater than 500 GPM. At 900 GPM, the repeatability spread was over four times greater than at 500 GPM.

Based on the results achieved, Brodie calculated the implication on cost due to the uncertainties of both meters.

Assumptions
Application: truck loading rack.
Operating flow rate: 600 gpm (2270 lpm).
Operation: 10 hours/day; 365 days/year.
Annual volume: 131 400 000 gallons/year.
Gasoline cost per gallon: $ 0.70.

Uncertainty cost per year:
Coriolis: 1,00042 [max meter factor] – 1,00017 [min meter factor] = 0,00025 [uncertainty].
131 400 000 gallons x 0.00025 [uncertainty] = 32 850 gallons/year.

BiRotor+: 1,00030 [max meter factor] – 1,00016 [min meter factor] = 0,00014 [uncertainty].
131 400 000 gallons x 0.00014 [uncertainty] = 18 396 gallons/year.
Difference between both meters = 14 454 gallons/year i.e. a saving of $10 118/year using the BiRotor+.

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For more information contact
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• The zero-offset (during low or no flow) of a Coriolis meter needs to be checked and verified periodically. Errors can occur if the tubes become mechanically unbalanced due to coating or erosion. The BR+ does not require Zero setting.
• Complex electronic filtering by a Coriolis meter can cause delays in flow/response measurement. Therefore, a minor change in flow during a proof run can translate to poor repeatability in a Coriolis meter. The pulses of Brodie’s BiRotor+ are created in real-time directly from its pulse wheel, without electronic manipulation. This makes proving straightforward and easy.
Temperature measurement on ultra-thin glass

Touch displays, such as for smartphones and tablets, use ultra-thin glass that brings special challenges for temperature measurement technology during their manufacturing. For this application, Optris has brought out the new CT laser, which can precisely measure the surface temperatures of glass components in the range of 100 to 1200°C. The optimum spectral range, which for flat glass is normally 5 μm, cannot be used for extremely thin glass components due to the higher transmissivity of the material. This was the specific design criteria for developing the CT laser G7, which works at a special wavelength of 7.9 μm. This spectral range is optimised for low-reflection measurement on ultra-thin flat glass. Measurement errors caused by the transmission of radiation are therefore virtually eliminated. The measurement error is only 1% of the measuring value (or 1.5°C at low temperatures).

Double laser makes setup easier
The new infrared thermometer has an integrated double laser that marks the exact measurement location, making setting the application easier. The smallest size of the measurement spot at a measurement distance of 70 mm is just 1.6 mm, so that the temperature can even be measured on very small objects. With a standardised 2-wire interface, the measurement values can be transferred to a supervisory control system, for example a PLC, and the output can be adjusted to the exact requirements of the application. In this way, averaging, minimum or maximum value logging, as well as an extended hold function with threshold value and hysteresis, are possible.

The CT laser G7 is ideally suited to the environmental conditions that prevail during glass manufacturing. So, for example, with ambient temperatures up to 85°C, it works without additional cooling. For even higher temperatures, a matching cooling housing is available.

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

Ultra-compact weighing electronics

Siwarex WP351 is Siemens’ newest solution for intelligent weighing automation.

Measuring 20 mm width by 65 mm height, the module is one of the smallest weighing electronics units available. The device’s 1000 Hz sampling rate and processing time combined with a digital output response time of less than one millisecond guarantee high accuracy and repeatability. This capability represents, especially in case of checking scales and high performance filling machines, a big advantage as even within very short weighing times the dosing devices are controlled in an optimal way.

As an integral part of Simatic ET 200SP, Siwarex WP351 can be seamlessly integrated into Simatic and non-Simatic automation systems, making it a clever alternative to traditional weighing terminals. The intelligent firmware gives users the ability to control weighing processes directly from the module, thereby reducing the load on the connected PLC.

Through the Ethernet-connected web server, users can quickly commission and maintain the device – or gain emergency access to the scale in case of a failed or disrupted PLC. Seamless connectivity coupled with device status transparency and full access to all scale data ensures fast servicing that minimises downtimes.

Compatible with almost all analog strain gauge load cells, Siwarex WP351 is a versatile solution for demanding weighing applications such as mixing, filling, bagging, checking, or totalising. Available certification covers legal-for-trade operation according OIML R-51, R-61, R-76 or R-107.

For more information contact Jennifer Naidoo, Siemens Digital Industries, +27 11 652 2795, jennifer.naidoo@siemens.com, www.siemens.co.za
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Economical magnetic-inductive flowmeters

Instrotech now offers Kobold’s MIK, a compact, magnetic-inductive flowmeter, combining a large measuring range and six different measuring tube sizes – perfect for users with smaller to medium-sized measuring ranges. MIK measures the flow rates of electrically conductive liquids with a high degree of precision and is not influenced by the medium or its material characteristics (density, viscosity, or temperature). Particular advantages include uninterrupted flow of the medium, no moving parts, and installation in any desired position.

MIK has various material combinations for different media in the chemical industry. Flow housings are available in PPS with stainless steel electrodes and PVDF with Hastelloy electrodes. For extremely aggressive liquids, a combination of PVDF and tantalum is used. A variety of seals are available in NBR, FPM, or the highly chemically resistant FFKM. Installation is quick and easy thanks to practical material-specific connection possibilities, such as PVC glue-in, stainless steel weld-on or PVC hose connections. Other characteristics include:

- Suitable for a range of liquids, acids and caustic solutions.
- Pressure max: 10 bar; Temp max: 80°C.
- Advantages: no moving parts in the measuring tube; low pressure loss; any mounting position; short reaction time (a replacement for calomel flow switch).

Applications include the monitoring of additives or cooling agents, totalising, or batching, where devices which use the magnetic-inductive principle of measurement are an optimum and cost-effective solution. Matching electronics are offered for various tasks, from designs with only switching or analog output to those with counting and dosing electronics.

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

Slurry magnetic flowmeter platform

The new Rosemount Slurry Magnetic Flowmeter Platform is Emerson’s answer to the demands of high noise applications. The platform is made up of the MS magnetic flowmeter sensor for slurry applications, the 8782 magnetic flowmeter transmitter for slurry applications, and the 8785 calibration standard. Customers in the pulp and paper, metals and mining, and oil and gas industries have often sacrificed process control for stable flow signals by adding analog damping to their magnetic flowmeter measurements. This leads to increased costs of production in terms of additional waste, greater variability in product quality, and increased raw material usage.

The new Rosemount system helps address this by having advanced signal processing capabilities enabling better filtering of the noise to provide a stable flow signal. This allows for faster response time to real flow changes enabling automatic control of process loops thereby increasing quality consistency, reducing raw material usage, and reducing scrap and rework.

Rosemount 8785 Calibration Standard:
- Allows independent on-site validation of the transmitter.
- Used to perform a digital trim on the transmitter.
- NIST traceability for flow rate measurement validation.

Target applications
Pulp and paper: stock flows; white liquor, green liquor and black liquor lines.
Metals and mining: ore slurries, abrasive and non-abrasive flows (greater than 30% solids content).
Oil and gas: outlet of fracking blender service trucks (inlet application may also be a target for operators looking to standardise on a single product); coal gasification slurries; anywhere a typical electromagnetic flowmeter is providing a noisy flow signal as a result of process conditions.

For more information contact Automation & Control Solutions, +27 11 249 6700, rfq@aveng-acs.com, www.aveng-acs.com
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2020 IT trends by Rittal South Africa

Rapid upgrades to data centres and rising energy consumption are key factors to consider.

Market researchers at the International Data Corporation predict that humans and machines could generate 175 zettabytes of data by 2025. If this amount of data were stored on conventional DVDs, it would equate to 23 stacks of data discs, each of them reaching to the moon.

Adrian Buddingh, managing director for Rittal South Africa, says that an estimated annual growth rate of 27% will place major pressure on company infrastructure: “Storing this amount of data will prove costly and based on this, we are seeing an obvious trend in companies migrating towards the use of cloud technologies. While cloud technologies are now common practice overseas, the adoption rate locally has been slow but steady.”

A survey published earlier this year by Germany’s Bitkom ICT industry association showed that three out of four companies are already using cloud solutions: Buddingh notes a concern in this regard: “Businesses making use of cloud solutions from third-party providers tend to lose some control over their corporate data. That is why, for example, the US Cloud Act (Clarifying Lawful Overseas Use of Data) allows US authorities to access data stored in the cloud, even if local laws at the location prohibit this.”

According to Buddingh, future success in business will only be sustainable if businesses keep pace with full digital transformation and integration: “Companies should use their data more and more to provide added value in real-time. Retaining control over data is becoming a critical success factor for international competitiveness.”

Trend 1: Data control
The self-determined handling of data is becoming a key competitive factor for companies. “This applies to every industry in which data security is a top priority and where the analysis of this data is a key factor for business success,” explains Buddingh. “Examples are the healthcare, mobility, banking and manufacturing industries. Users are now faced with questions around how to process their data securely and efficiently, and whether to modernise their own data centre, invest in edge infrastructures, or use the cloud.”

Smaller data centres with open cloud stacks might be able to create a new class of industrial applications that perform initial data analysis at the point where the data is created and use the cloud for downstream analysis.

Trend 2: Standardisation in data centres with OCP
The rapid upgrade of existing data centres is becoming increasingly important for companies, as the volume of data needing to be processed continues to surge. Essential requirements for this growth are standardised technology, cost-efficient operation and a high level of infrastructure scalability.

“The OCP technology (open computer project) with its central direct current distribution in the IT rack is becoming an interesting alternative for more and more CIOs,” says Buddingh. “This is because DC components open up new potentials for cost optimisation. For instance, all the IT components can be powered centrally. This way, efficient cooling is achieved since fewer power packs are present. At the same time, the high degree of standardisation of OCP components simplifies both maintenance and spare parts management. The mean efficiency gain is around 5% of the total consumed current.”

Rittal expects that OCP will establish itself further in the data centre as a fully integrated system platform in 2020. New OCP products for rack cooling, power supply or monitoring will enable rapid expansion with DC components. Furthermore, new products will support the conventional concept of a central emergency power supply, where the power is safeguarded by a central UPS.

Trend 3: Heat recovery and direct CPU cooling
Data centres release huge amounts of waste heat into the environment. As the power density in the data centre grows, so too do the amounts of heat, which can then potentially be used for other purposes. So far, however, the use of waste heat has proven too expensive, because consumers are rarely found in the direct vicinity of the site, for example. In addition, waste heat, as generated by air-based IT cooling systems, is at too low a temperature (40°C) to be used economically.

“In the area of high-performance computing (HPC) in particular, IT racks generate high thermal loads, often in excess of 50 kW,” explains Buddingh. “For HPC, direct processor cooling with water is significantly more efficient than air cooling, so that return temperatures of 60–65°C become available. At these temperatures, for instance, it is possible to heat domestic hot water or feed heat into a district network.”

Trend 4: Integration of multi-cloud environments
“Businesses need to be assured that they can run their cloud applications on commonly used platforms and in any country,” says Buddingh. “This calls for a multi-cloud strategy,” concludes Buddingh. “From management’s point of view, this is a strategic decision based on the knowledge that its own organisation will develop into a fully digitised business.”

For more information contact Rittal South Africa, +27 11 609 8294, info@rittal.co.za, www.rittal.co.za
Cyber incidents (46% of responses) rank as the most important business risk in South Africa for the fourth time since the launch of survey in the country in 2016 and for the first time globally in the ninth Allianz Risk Barometer 2020, relegating perennial top peril at a global level, business interruption (BI) (40% of responses) to second place.

Cyber incidents ranked number one in 2016, 2017 and 2018 in South Africa. Awareness of the cyber threat has grown rapidly in recent years, driven by companies’ increasing reliance on data and IT systems and a number of high-profile incidents. Seven years ago, it ranked only 15th with just 6% of responses.

Changes in legislation and regulation (#3 with 29%) and climate change (#6 with 19%) are the biggest climbers globally underlining the US-China trade war, Brexit and global warming as increasing concerns for companies and nations including South Africa. The annual survey on global business risks from Allianz Global Corporate & Specialty (AGCS) incorporates the views of a record 2,718 experts in over 100 countries including CEOs, risk managers, brokers and insurance experts.

“The Allianz Risk Barometer 2020 highlights that cyber risk and climate change are two significant challenges that companies need to watch closely in the new decade,” says CEO of AGCS, Joachim Müller. “Of course, there are many other damage and disruption scenarios to contend with, but if corporate boards and risk managers fail to address cyber and climate change risks this will likely have a critical impact on their companies’ operational performance, financial results and reputation.”

**Cyber risks continue to evolve**

Businesses face the challenge of larger and more expensive data breaches, an increase in ransomware and spoofing incidents, as well as the prospect of privacy-driven fines or litigation after an event.

"Incidents are becoming more damaging, increasingly targeting large companies with sophisticated attacks and hefty extortion demands," says deputy global head of AGCS, Marek Stanislawski. Five years ago, a typical ransomware demand would have been in the tens of thousands of dollars. Now they can be in the millions.”

Extortion demands are just one part of the picture: companies can also suffer major BI losses due to the unavailability of critical data, systems or technology, either through a technical glitch or cyber-attack. “Many incidents are the results of human error and can be mitigated by staff awareness trainings which are not yet a routine practice across companies,” adds Stanislawski.

**Climate change**

Climate change rises to its highest-ever position of sixth in South Africa (and seventh globally) in the Allianz Risk Barometer and is already in the top three business risks for the Asia-Pacific region overall, driven by risk management experts in countries and territories such as Australia, Hong Kong, India and Indonesia. An increase in physical losses is the exposure businesses fear most (49% of responses) as rising seas, drier droughts, fiercer storms and massive flooding pose threats to factories and other corporate assets, as well as transport and energy links that tie supply chains together.

Further, businesses are concerned about operational impacts (37%), such as relocation of facilities, and potential market and regulatory impacts (35% and 33%). Companies may have to prepare for more litigation in future – climate change cases targeting ‘carbon majors’ have already been brought in 30 countries around the world, with most cases filed in the US.

“There is a growing awareness among companies that the negative effects of global warming above two degrees Celsius will have a dramatic impact,” says Chris Bonnet, head of ESG business services at AGCS. “Failure to take action will trigger regulatory action and influence decisions from customers, shareholders and business partners. Ignoring climate risk is more costly than grappling with it. Therefore, every company has to define its role, stance and pace for its climate change transition – and risk managers need to play a key role in this process alongside other functions.”

The full Allianz report can be downloaded at https://tinyurl.com/rosgv6a

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Finding the common thread in process industries

During the 1970s, the process industry was in the forefront of digitalisation. At the time, the vision of a single integrated system running on a database became what would later be known as ERP (enterprise resource planning). The earliest large-scale deployments of ERP systems originated in the chemicals sector and were quickly adopted in industries such as oil and gas and mining. ERP has continued to evolve until it now reached a point where it is impossible to run any modern business at scale without it. At the core of ERP is a single integrated database. Initially focused on financial management and MRP (materials resource planning), ERP has evolved to embrace the whole value chain, from vendor management, manufacturing, supply chain/logistics, customer relationship management and more.

However, anyone involved in an ERP implementation will realise that it is not a simple exercise. In practice ERP only partly fulfils the promise of a “single, integrated enterprise system”. Despite the systems having wide-ranging functionality, silos within the business are never completely eliminated. The lack of integration standards also meant that a single model of the total business value chain is only partly effective. It was also realised that in a tightly integrated system, data errors quickly propagate throughout and can lead to incorrect information and poor decision making. Many businesses, despite having implemented state-of-the-art ERP systems still operate as disconnected silos with a significant percentage of processes at the interfaces being manual. After some quick wins, the cost/benefit of more integration becomes more difficult to justify against the increased complexity and rigidity of a more tightly coupled system.

Notwithstanding the many failures in ERP, digital business systems still continue to evolve and get more complex. Industry 4.0 has raised the bar on connecting data from multiple sources across entire supply chain networks. Notwithstanding the effectiveness of their ERP system, manufacturers need to take these new technologies on-board just to remain competitive.

The digital twin and the digital thread

Two important Industry 4.0 concepts are starting to demand more attention. These are the digital twin and the digital thread.

A digital twin is a representation of the physical entities, processes and people in a business. This includes plant and business data from ERP systems. The digital twin model can be fed with near real-time data from sensors in the plant or through the Internet. In theory this allows the wide-ranging optimising of operations, as well as lifecycle tracking of products as they are designed, made and consumed by customers.

The digital thread is the framework that supports the flow of data that makes up the digital twin. The digital thread is fundamental to the digital twin concept. The digital thread will support data flows between disparate systems and across silos within the business.

Without this common thread, many of the concepts essential to Industry 4.0 will not be possible.

Not only should the digital thread be able to support near-real time data such as data from the IIoT, it should also be able to support the original design information. This includes, for example, process and instrumentation diagrams (P&ID), CAD models, equipment datasheets, maintenance instructions, and so on. The digital thread should also accommodate historical information from the construction, commissioning and operations.

A digital thread is, in short, the seamless digital connection that weaves its way through the entire operation.

The complexity of implementation

However, while the concept of a digital thread may seem captivating, it is by no means easy to implement. As an example of the complexity, consider the process industry. The product (for example a specialty chemical) is conceived in the early engineering stages of a project. Various stakeholders are involved, including owners, business development, engineering and procurement (EPC) contractors, commissioning teams, operators and so on. Most of the equipment design takes place during the project execution phase, with the deliverables of this phase being final piping and instrumentation diagrams (P&ID), equipment datasheets, mechanical design, drawings and instrumentation drawings. In a typical EPC environment, disparate computer systems are often used by the various disciplines to produce the design. The actual equipment is then manufactured by third parties, who in turn use another set of digital technologies. During construction of the plant there might be further changes, where again, another set of systems might be in use. And so it continues, throughout the commissioning of the plant and the subsequent operations.

Considering the challenges associated with
IT IN MANUFACTURING

ERP projects, can we not then expect the same challenges when implementing the digital thread? Is the digital thread concept simply too complex to be of any use?

I would argue that it is very early days still. However, several of the major control and instrumentation vendors are coming up with viable platforms for the digital twin/thread and I believe it important to take note of these offerings.

In the process industry, there are several initiatives underway to define common standards for data exchange. One such initiative is DEXPI (which stands for Data EXchange in the Process Industry). DEXPI is a working party of the ProcessNet initiative in Germany. The objective of DEXPI is to address the interoperability challenges between computer aided engineering and other systems in the process industry. One goal of DEXPI is seamless interoperability of design, operations and maintenance information between EPCs, owner-operators and vendors. DEXPI is currently working on a data exchange model based on the ISO 15926 standard.

So, what is DEXPI actually? It is an information model that represents the objects that appear in a P&ID diagram, such as vessels, heat exchangers, pumps, instruments, motors etc. The model is represented as entity classes, similar to UML in programming. The result is a standardised representation of all the physical entities in a manufacturing operation; in other words, it can serve as the foundation for the digital thread.

It takes time for big shifts to take place, and traditional process manufacturing can sometimes be slow off the mark. But with the support of major owners, vendors and EPC contractors, the investment in a universal model for the industry will make the goal of implementing a digital thread framework that much easier. I would recommend keeping an eye on these developments if you are in any way involved in manufacturing IT.

Smart engineering directly in the cloud

PC-based control offers a central, open and comprehensive machine control platform ideal for delivering highly efficient, IoT-based automation strategies. It enables machines, plants and production lines to be connected in ways that unlock their full efficiency potential across entire processes. In this context, TwinCAT Cloud Engineering adds a new dimension by providing users with an easy means of engineering TwinCAT instances and controllers in the cloud.

With TwinCAT Cloud Engineering, users can instantiate and use existing TwinCAT engineering and runtime products directly in the cloud. Quick and easy to access from the Beckhoff website with a web browser and requiring no additional software, the new solution enables registered users to work with the TwinCAT development environment even from previously unsupported devices such as tablet PCs.

The TwinCAT Cloud Engineering instances generated by users can be connected to physical control hardware over a secure transport channel. Users not only enjoy all the advantages of the TwinCAT control architecture, but distributed collaboration support through a source control repository as well. For new users in particular, having access to a TwinCAT Cloud Engineering instance in the cloud provides an ideal and comprehensive foundation on which to get to know the TwinCAT environment.

In addition, TwinCAT Cloud Engineering enables users to move their entire TwinCAT architecture to the cloud, the only difference versus a conventional TwinCAT environment being that they use a virtual machine instead of a local engineering PC. One advantage is that users need not get used to a new software environment but can simply continue to work in the same, familiar development environment. Another is that they do not have to install and maintain multiple software versions tailored to specific machine generations on their own PCs. Instead, users can run separate TwinCAT Cloud Engineering instances with different software versions, all of which they can access remotely whenever they need to. Project files are stored in a source code control repository which can be accessed directly from within TwinCAT Engineering.

Efficient team collaboration with source control

Based on modern source control features, connecting to Git-based systems and managing automation projects on them is easy. The TwinCAT multi-user functionality enables simple, seamless access to a source control repository without the need for special technical expertise. Here, TwinCAT Cloud Engineering enables multiple users to work together on a number of instances at the same time either by integrating a Git server into the instance or using a Git-based cloud service.

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www.information.co.za  March 2020  37
Breaking into the Industrial Internet of Things

IO-Link paves the way from the sensor to the cloud.

The question is no longer whether to enter Industry 4.0, but instead how best to do it. At the sensor and actuator level, IO-Link makes it possible to network production with a manageable degree of effort. It brings additional intelligence to the field level and enables the devices to be connected in end-to-end communication, which can extend right through to the cloud. New IO-Link masters, which also understand OPC UA and MQTT, help with this. The globally available and widely used IO-Link standard allows communication solutions to be implemented without the need for proprietary protocols.

Why use IO-Link?
Simple is successful: IO-Link is a great example of this principle. Through the use of the existing point-to-point connections and the standard three-wire system, IO-Link provides a downward compatible interface for binary standard sensors. Identical wiring maximises the utilisation rate for IO-Link masters based on the combined operation of IO-Link signals and digital signals. IO-Link sensors can also be connected to conventional digital inputs; the integration is fieldbus-independent and possible in any network. There were already over eight million IO-Link network nodes in the field at the start of this year. The standard has established itself as the basic technology on every continent and in practically all industrial sectors.

Since microcontrollers are integrated into practically all modern sensors, the basis for device intelligence is generally available in addition to the actual function. Not only do they provide the actual measured value or switch point, they also supply additional information about the signal quality and device health, for instance. Their on-board electronics can save parameter sets to adapt the sensor to the application in question. This means that settings can be changed even during operation and processes can be designed in a flexible manner. The cost-effective production of even the smallest batch sizes becomes a realistic option.

Intelligence connection
IO-Link has established itself as the communication protocol for the ‘last metre’ because it enables this potential of the microcontrollers to be fully exploited. It allows easy online identification of the device, as well as the configuration and modification of parameters. It is also used to transmit measuring and switching signals, enable diagnostic functions, and provide excellent process transparency overall. Complex sensor systems and closed fieldbus environments are no longer required to achieve this.

With these functions, IO-Link makes it possible to use important value-added functions. These include preventive maintenance, a simple restart procedure following sensor replacement, and, if necessary, a detailed overview of the plant as a whole. At the same time, it meets the requirement of vertical connection between the field level and the IT network imposed by Industry 4.0 by making the data available to higher levels. The IO-Link standard provides the basis for bidirectional communication with the field devices.

Clear profile for sensors
There is now a set of rules for the standardised transmission and mapping of sensor data available for IO-Link in the form of the Smart Sensor Profile. It includes identification, diagnostics, process data variables, switching signal, and teach-in. For these function classes, the read/write objects, such as the arrangement of the binary information for switching signals, have a fixed definition.

In the Legacy Profile, a basic data stock provides the basis for uniform device behaviour. In the Common Profile, data is stored for more detailed identification and diagnosis. They define identification parameters for the application, function, and operating location and offer significant added value for asset management. Basic diagnostic data that provides information about the state of the device and about upcoming events is also stored.

Different data profiles are defined for different categories of sensor (fixed switch point, configurable switch point, measuring) accordingly. The parameterisation therefore always follows a predetermined pattern, and the process values can be interpreted uniformly. This uniformity makes integration and operation much easier.

Opening up the field level to the cloud
In addition to this uniformity, IO-Link has also recently taken a big step in terms of communication options ‘upward’. The OPC UA for IO-Link companion specification was recently published. The connection of standard access to the Ethernet world via IO-Link means that a transition between the two areas is now possible without the need for proprietary protocols.

Pepperl+Fuchs Comtrol is the first provider to have brought an IO-Link master with a corresponding OPC UA interface to market. Components with an MQTT interface are also available. The new Pepperl+Fuchs subsidiary was established at the end of 2018 through the acquisition of business operations from Comtrol, a US company and pioneer of industrial networking. Its main focus is the integration of industrial applications on Ethernet and in the cloud. The portfolio includes a wide range of gateway components with IO-Link connection.

The combination of the IO-Link and OPC UA standard protocols paves the way for the retrieval of data from the field level without any restrictions. The hierarchy boundaries can be overcome with minimal effort. In addition, process data can be transferred in parallel through the OPC UA interface. The user receives a real-time overview of the production
ETG provides new developer tool

The EtherCAT Technology Group (ETG) offers manufacturers, developers and users comprehensive support services for EtherCAT technology. The EtherCAT Device Protocol Poster is an additional tool that specifically helps developers of EtherCAT devices successfully navigate the EtherCAT world.

The poster deals with the basics of EtherCAT technology, the EtherCAT Device Protocol (EDP), and provides a visual overview of EtherCAT. It describes the basic functional principles of EtherCAT, the structure of the frame and its processing in the EtherCAT Slave Controller (ESC). Additionally, it provides further information on the registers used by the ESC, the object model and references to relevant specification documents.

The target group for the EDP poster is primarily the developer community, and ETG intends for the document to serve as a basis for extended support for this group. Of course, the poster is also helpful for all who want to delve deeper into the EtherCAT technology. For example, students who want to get a general overview of the technology will find the document a helpful support tool.

Stephan Köhnen, the EtherCAT expert at ETG who was responsible for the EtherCAT Device Protocol Poster project, explains: “My goal for the poster was to provide EtherCAT device developers a visual basis for a deeper understanding of EtherCAT technology. Comparable to a geographic map, the poster helps to orientate oneself in the EtherCAT world.”

The poster is available for all free of charge, including those without ETG membership, and available in English and Japanese. It is available in printed form in ETG trade fair booths and at ETG seminars. Those who prefer the digital version can access the document free of charge at https://tinyurl.com/tewrhpu

For more information contact EtherCAT Technology Group, +49 911 540 56 226, press@ethercat.org, www.ethercat.org

Wireless connectivity for hazardous locations

Comtest – local representative of Industrial Scientific, global leader in gas detection – has introduced the RGX Gateway, which enables designated safety contacts to receive real-time alerts for gas hazards, panic, and man-down situations happening in-plant or in the field. A live map shows the location of workers and current conditions, improving response times and arming emergency personnel with critical information.

Designed for hazardous locations, the gateway is compatible with Ventis Pro series multi-gas monitors and Radius BZ1 area monitors. Through the Lens wireless instrument-to-instrument mesh communication system, the monitors share gas readings and alarms with one another and the RGX device. The gateway then transmits readings through cell, Wi-Fi, or Ethernet to iNet Now Live Monitoring software, which alerts key team members within seconds of an incident. The combination of Lens-enabled gas monitors and the gateway enhances the ability to get data to the cloud from complex locations such as confined spaces or plants where a typical wireless connection may be obstructed.

“The RGX is truly designed to go where the work is,” said product manager, Ryan Thompson. “With a Class I Div II hazardous classification and an ingress protection rating of IP65, the gateway can be used in hazardous environments as well as most weather conditions.”

The new gateway can be deployed for permit tasks that last hours, incidents that last days, or projects that last weeks, by using the rechargeable 7-day run-time battery. For longer, more permanent applications, the RGX is also compatible with a variety of external power supplies, allowing it to run indefinitely.

For more information contact Comtest, +27 10 595 1821, sales@comtest.co.za, www.comtest.co.za
Besides building self-driving industrial vehicles and logistics handling robots, Suzhou i-Cow Intelligent Logistics Technology develops control technology and software algorithms for laser-based navigation systems used in automated guided vehicles (AGVs). A comprehensive control solution from Beckhoff is not just enabling the Chinese tech company to develop better-performing products more efficiently, but is helping these products to meet the requirements of Industry 4.0 and the Made in China 2025 initiative as well.

As the industrial sector continues to evolve rapidly, the need for flexible and intelligent logistics systems is on the rise. Driverless transport systems have a hugely important role to play in this arena, and i-Cow has launched a broad range of driverless forklifts equipped with a laser-based navigation system, designed to meet the needs of automated warehouse logistics across industries as diverse as food and beverages, automotive and electronics manufacturing. The company also offers AGV manufacturers and integrators custom solutions for incorporating i-Cow’s core technology into their own hardware.

Laser navigation: a flexible and economical logistics tool
The core challenge for advanced AGV systems used in warehouse logistics is to navigate flexibly and efficiently through the racks of inventory. One solution here is computer-aided vehicle control based on laser technology, which not only lets vehicles navigate freely within the warehouse space but also offers cost advantages, because it does not rely on fixtures embedded in the floor. i-Cow’s laser-guided AGVs can automatically pick up and deposit goods on warehouse shelves. The laser navigation system works with just a single vehicle, but is also capable of supporting multiple vehicles when combined with a traffic management system.

To meet the tough technical challenges involved in this type of navigation, i-Cow’s system relies comprehensively on control components from Beckhoff. The system is controlled by a CX5130 Embedded PC with a dual-core Intel Atom CPU running TwinCAT 3 software and incorporates a CP6907 Control Panel with 5.7-inch touchscreen for visualisation and operator interaction. TwinCAT 3 PLC HMI provides a user interface for easy configuration of AGV parameters, AGV positioning, and troubleshooting problems occurring at rack locations in the warehouse. To achieve the levels of speed and precision needed for laser-based navigation, the system uses XFC oversampling terminals. Beckhoff has also supplied a TwinSAFE solution that integrates safety features seamlessly into the overall system.

A powerful control platform: the Embedded PC
The compact CX5130 Embedded PC handles all the control functions required for laser navigation. It replaces a conventional navigation-control system and communication module used previously, bringing down both space requirements and costs. The software functionality includes a laser navigation algorithm and a control loop for AGV drive and steering axes, both written in C++ code, plus control logic for a single AGV, the TwinCAT 3 PLC HMI for visualisation, planning software, and a TCP/IP communication program for the automatic charging station.

“We chose the CX5130 for its performance, range of interfaces and compact design,” explains Yongping Pan, head of R&D at i-Cow. As a DIN rail-mounted Embedded PC, it takes up much less space than the previous control systems. Another advantage is that the Beckhoff bus terminal system supports a variety of fieldbuses, including CANopen.
and Profinet, so it’s compatible with our existing peripheral devices. In addition, the Embedded PC has Ethernet ports and supports a variety of protocols, making it easier for us to implement wireless communication.”

**Precise, high-speed laser navigation with XFC**

When an AGV is navigating by laser, a built-in laser scanner performs rapid rotating sweeps to capture reflective markers located around the operating area. The exact position of the AGV can only be computed once a sufficient number of markers have been scanned. Precise, high-speed, scanning is crucial here. To achieve this, i-Cow uses an EL1262 XFC EtherCAT digital input terminal with oversampling. Capable of performing up to 1000 sampling operations in 1 ms – which corresponds to a sampling cycle of 1 μs – it supports exceptionally high-resolution target-value and actual-value acquisition that meets the high speed requirements of laser navigation.

**Versatile software for even higher performance**

The TwinCAT 3 control software complements the powerful hardware perfectly. One key benefit from i-Cow’s perspective is that TwinCAT 3 can be programmed in C++ and is able to call up modules. This simplifies both the development process in general and migration of the navigation control algorithm in particular. In addition, due to its flexibility and modular design, TwinCAT 3 is an efficient development environment suited to creating a range of software components, and enables i-Cow engineers to work collaboratively as a team.

“The ability to work with C/C++ as a programming language is really valuable for us because we’ve gained a lot of experience with it over the years and it allows us to implement complex function blocks,” explains Zhifei Yu, head of i-Cow’s development department. “If a process lets us code in C++, we can embed the function blocks quickly and easily in TwinCAT 3, as is the case with the laser navigation code, which is written in C++. TwinCAT 3 also allows individual program tasks to be distributed across multiple CPU cores. This means that the computing power of multi-core CPUs such as the CX5130’s can be leveraged to enable programs to execute faster.”

**Saving time and money with an integrated safety solution**

Although AGV systems with laser navigation can take on much of the workload in a warehouse, they still need to work alongside people. Collision protection is therefore a crucial function. Here, i-Cow has opted to deploy a comprehensive solution using TwinSAFE. This is implemented using an EL6900 TwinSAFE Logic EtherCAT terminal, an EL1904 TwinSAFE digital input terminal and an EL2904 TwinSAFE digital output terminal.

The AGV chassis is fitted with safety sensors all the way round that are scanned via the EL1904 input terminal. If the sensors detect an obstacle in an AGV’s safety zone while it is moving, the TwinSAFE system responds immediately, first engaging the emergency brake on the AGV’s drive axis, then cutting the power to the drive after a preset delay.

“Using TwinSAFE to fully integrate a safety solution into the control technology eliminates the need for a separate safety system and all the extra effort it would have involved,” elaborates Haixia Wang, i-Cow’s safety officer. “Our solution also reduces cabling costs and development time.”

**Working together to deliver future-proof solutions**

Since i-Cow began using Beckhoff components to implement laser-based navigation on its forklift AGVs in early 2016, collaboration between the two companies has steadily widened and intensified. Automation solutions from Beckhoff are now also being implemented in magnetically guided shuttles and in vehicles for smart rack systems, both currently under development.

“The PC-based automation platform’s openness and flexibility give us the latitude to solve a wide range of application problems,” concludes Wang Ping, i-Cow’s chief executive officer. Leveraging the exceptional performance of the PC-based control technology, we’ll be able to continue to meet the increasing requirements of control systems well into the future.”

**For more information contact Michelle Murphy, Beckhoff Automation, +27 11 795 2898, michelle@beckhoff.com, www.beckhoff.co.za**

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**Expert opposed-mode sensor**

The new QS18E offers superior ambient light immunity to prevent unintentional triggering and prevents the sensor from being tricked by ambient light sources, such as a lightbulb, flashlight, or other light-emitting industrial sensors used in the intelligent factory and automated distribution centres. In other words, the receiver will only be triggered by its own emitter.

Another key benefit of the QS18E opposed-mode sensor is crosstalk avoidance provided by optical synchronisation. This means that each sensor can be set to one of three different frequency channels, so that three sensor pairs can be mounted side-by-side with no crosstalk.

Expert Teach and Set methods ensure optimal gain and threshold for all applications, especially for high-speed or partial beam block (low contrast) applications. Configure the receiver using any of six methods to define the sensing limits. Choose from two-point static and dynamic Teach methods, plus Window, Light, Dark and Opaque modes for reliable long-range detection of very dark objects.

**IO-Link communication for easy configuration and diagnostics**

IO-Link is a point to point communication link between a master device and sensor. Use IO-Link to enable remote input function to configure the sensor remotely. There are many advantages of an IO-Link system, including standardised and reduced wiring, increased data availability, remote configuration and monitoring, simple device replacement, and advanced health diagnostics.

The new QS18E opposed-mode sensor allows users to determine how the sensor will perform. For example, users can use hysteresis sensitivity, on and off delays, offset percentages from Teach, as well as response speeds. In addition, users can set the sensor to Push Pull, PNP, or NPN so that one sensor can be used for any output type. Furthermore, users can control health thresholds to define when to trigger an alert for cleaning or maintenance or signal when a runtime threshold is reached.

**For more information contact Brandon Topham, Turck Banner, +27 11 453 2468, brandon.topham@turckbanner.co.za, www.turckbanner.co.za**
Both preventive and predictive maintenance programmes rely on regular inspections of the critical assets that comprise a plant or facility. These inspections range from visual inspections to non-destructive testing performed using a variety of instrumentation. While the methods vary, all inspections require plant personnel to visit each of the systems, machines or equipment within the plant to anticipate the need for preventive or corrective maintenance.

Many maintenance engineers consider infrared non-contact thermometers not only indispensable for such inspections, but possibly the most important tools in their everyday work. By scanning surfaces with these temperature inspection tools, users can quickly locate hot and cold spots, which could be indications of underlying problems, and focus their maintenance efforts on exactly what needs repairing. Defective components are often classified according to the severity of the problem, which takes into account the absolute temperature of the component, the difference in temperature from the component to its environment, or the difference to other components in similar load situations. Handheld infrared thermometers provide a quick, safe and accurate way to collect this data. By comparing the results of inspections over time, changes in the temperature of objects can be detected and analysed to determine if failure is likely.

**Mechanical systems**

Most mechanical systems generate some thermal energy during normal operation, and temperature monitoring can evaluate their operating condition. One of the biggest problems in mechanical systems is excessive temperature. This heat can be generated by friction, lubrication degradation, coolant loss, or blockages. Regular temperature monitoring of machinery components enhance the ability to predict failure and plan corrective action before a costly shutdown, equipment damage, or personal injury occurs. Temperature checks should be performed regularly to locate hot spots or heat imbalances on, for example, drives and motors, bearings and transmissions, as well as hydraulic components, pumps, pulleys, and conveyors. Electrical equipment has similar demands. Bus bars with loose or oxidised joints, for example, will rapidly exhibit higher than normal operating temperatures due to electrical resistance.

**Infrared inspection**

However, simply finding heat does not necessarily mean that a problem is present. To evaluate the presence of hot spots, the operating load and acceptable heat ranges must be known, as specified by the equipment manufacturers. However, normal inspection methods alone cannot always detect the slight temperature variations that indicate the start of a problem. This is where infrared inspection enters the picture – knowing the precise temperature is, in some cases, an absolute decision-making requirement. With tools such as handheld infrared thermometers, users can accurately measure small variations in surface temperature, taking into account all the variables of proper temperature measurement, such as emissivity and reflected temperature. Using infrared thermometers allows sound decision making about corrective maintenance repairs on the plant.

The Raytek range of handheld infrared thermometers, provide more than a temperature reading on a display, they include many features to support maintenance inspections, with models that include data logging, flexible display options and audible Hi /Low alarms to indicate temperatures above and below acceptable ranges.

*For more information contact R&C Instrumentation, +27 11 608 1551, info@randci.co.za, www.randci.co.za*
Wenglor’s light band technology

Based on a continuous, homogenous light band, Wenglor’s new retro-reflex sensors can reliably detect objects with irregular or asymmetrical shapes, for example in the field of intralogistics.

With three models for different light band heights, Wenglor provides high levels of user friendliness and special logistics functions in an economically efficient and easy to use solution such as for the prevention of bottlenecks and jams in warehouse processes. This results in improved productivity, increased system availability, more flexible production and reduced costs.

Retro-reflex sensors with light band P1EL 100 (27 mm), P1EL200 (42 mm) and P1EL300 (54 mm light band height) have been developed as 2-dimensional light barriers with homogenous laser light bands. They recognise objects with various shapes or perforated surfaces – even dark, transparent or glossy objects are accurately detected – at a range of up to 1.6 m. All the models can detect extremely small parts down to 4 mm throughout the entire range of 0 to 1.6 m.

Beyond this, smart functions integrated into the sensor such as suppression of uneven conveyor belt areas through the use of dynamic teach-in and dynamic readjustment of the switching threshold, as well as the very narrow housing with a width of just 27 mm, offer both application and installation advantages.

Quick and easy initial start-up with teach-in key

The sensors can be taught quickly and in an uncomplicated manner by simply pressing a key. In order to avoid inadvertent contact with the key and to permit flush mounting, it is located in a recessed area. External teach-in is also possible via the controller using a 24 V signal.

Diverse mounting options for any system

The sensors combine emitter and receiver in a single narrow housing with a width of just 27 mm, which can be mounted to the side panels of conveyor systems in just a few steps. The sensor’s plug can be rotated up to 180° for flexible installation and matching mounting brackets. M4 through-bolts and press-fit sleeves, as well as reflector sets, simplify precision installation and alignment of the retro-reflex sensors.

For more information contact Anastas Schnippenkotter, ASSTech Process Electronics & Instrumentation, +27 11 708 9200, info@asstech.co.za, www.asstech.co.za

Contour detection for inline quality checks

In assembly and handling applications, the PMD profiler from ifm electronic does not only verify the presence of an object, but it checks whether the correct component has been used and properly installed. A push of a button is all that is required to compare the contour of an object with the taught target contour stored in the unit’s memory. The photo-electronic line scanner reliably detects tiny differences between nearly identical components. Since distance is not relevant, the profiler does not require complicated positioning as is the case with 1D sensors. Thanks to the insensitivity to extraneous light, no screening or external illumination is required as is the case with camera systems performing to this high level of accuracy. With its user-friendly colour display and intuitive setting using only 3 pushbuttons, the sensor is ready for use within a few minutes without requiring any software. It is possible to either transmit information on the reject rate or the detected object profiles via IO-Link.

Region of Interest: high degree of accuracy

To make the determination of differences between nearly identical components even more reliable, the profile evaluation can be narrowed down to the relevant object area with two markings by using the Region of Interest function. The function can be used in the fixed mode to verify whether the object is accurately positioned. In the floating mode, the contour comparison is variable along the laser line. It is not necessary to position the parts to be tested in exactly the same way.

Quality assurance: definition of tolerances

The similarity between the reference and the target object is provided as a value between 0 and 100%. The threshold function can be used to define the value from which the reference object is no longer acceptable. Hence, a low tolerance value will guarantee the quality of assemblies that require great accuracy. Optional contour visualisation via software simplifies the failure analysis.

For more information contact ifm – South Africa, 086 143 6772, info.za@ifm.com, www.ifm.com
Is hydrogen gas really dangerous?

As with many things, the answer to this question is not a simple yes or no. The average person when confronted with the question of handling hydrogen gas immediately makes an association with two rather dramatic past events. The first was the appalling fate of the Hindenburg airship and its unfortunate passengers. This incident in 1937 brought to an end the short life of airships as serious passenger transport vehicles. The second is, of course, the dreaded atomic bomb, used to destroy the Japanese cities of Hiroshima and Nagasaki.

Before looking at the safe storage and usage of hydrogen in industry, let us look briefly at the fundamental risks that hydrogen technology involves. First of all, we can discard the hydrogen bomb concern. Splitting an atom of hydrogen to create a nuclear explosion is technically challenging and requires very sophisticated engineering. There is no possibility that hydrogen generated and stored in normal processes can in any conceivable way cause an atomic explosion.

However, as the Hindenburg incident demonstrated, hydrogen can burn and it burns easily; the energy required for ignition is extremely low. What then is the explosion risk? The primary risk of explosion occurs when a mixture of hydrogen and oxygen are trapped in an enclosed space – such as a pressure vessel. When pressure vessels are filled with hydrogen, the gas is monitored to ensure that no oxygen is present. If a pressure vessel is ruptured, the escaping gas may burn, but as long as it is allowed to disperse freely – it will not explode.

How does one mitigate the risks?

Firstly, in any environment where hydrogen may be used, stored, or generated, the first line of defence is to ensure that suitable ventilation is provided. This is simpler than it sounds. Hydrogen is the lightest element in the universe, and if it leaks, it disperses rapidly upwards as long as it is not trapped in spaces from which it cannot escape. Also, being such a small molecule, hydrogen can escape through extremely small holes. That said, if hydrogen is leaking, it is not easy to detect. Hydrogen is colourless and odourless. So, without reliable suitably designed instruments, it is difficult to tell if a dangerous situation is developing.

To summarise: one can generate and handle hydrogen without fear of fire or explosion provided some basic rules are followed:

1. Never allow a situation to develop where hydrogen can be trapped and mix with oxygen.
2. Install suitable hydrogen detection/monitoring equipment that will respond should a dangerous situation occur.

Instruments for the measurement and detection of hydrogen

RTS Africa Technologies and H2scan of California are specialists in the manufacture and application of instruments for measurement and detection of hydrogen in a variety of industrial and scientific environments. A typical application is battery rooms. When batteries are charged, hydrogen gas is generated. Battery rooms, by their nature, are frequently enclosed environments with inadequate ventilation. All battery storage facilities should be equipped with H2scan HY-Alerta Gen 5 space monitors. These instruments can detect hydrogen in air down to a fraction of 1%, and can be connected to alarms, additional ventilations fans, or whatever safety plan is implemented. This enables automatic and human response action to be taken, long before a dangerous hydrogen rich atmosphere is created. The new HY-Alerta is based on H2scan's recently announced Gen 5 system for distribution transformer monitoring, a first of its kind with a small-size, application specific integrated circuit (ASIC) hydrogen safety sensor that includes high accuracy, high-end features, and low cost in a compact instrument.

Another source of risk are hydrogen supply pipelines. Any air/oxygen entrained in hydrogen supply lines, whether due to leaks, process errors, or a variety of other possible reasons, can cause serious explosions. This is because, as mentioned above, a mixture of hydrogen and oxygen in a confined space such as a pipeline or pressure vessel creates a serious risk of explosion. Here H2scans HI-Optima online hydrogen gas analyser is a safety device that is essential in any environment where hydrogen is transported.

H2scan also manufacture analysers that can be used in processes such as oil refineries to monitor the hydrogen content in gas lines, and of course, any possible hydrogen leaks that may represent a risk to plant or personnel.

H2scan instruments also provide valuable safety devices in applications such as steel annealing plants, where an atmosphere consisting of a mixture of hydrogen and nitrogen is used to prevent oxidation of the hot steel plate during the annealing process.

For more information contact RTS Africa Technologies, +27 12 433 6335, info@rtafrica.co.za, www.rtsafrica.co.za
Quad-flow particle and gas respirators

RS Components has introduced the 3M Secure Click HF-800 respirator series, which uses a quadruple-flow filter/cartridge system to enhance breathability.

3M Secure Click is a range of reusable half-mask respirator products featuring a simple yet reassuring assembly mechanism for particulate filters and gas-vapour cartridges, which works rather like a seat belt. The wearer simply aligns the connections and pushes the filter or cartridge until an audible click indicates correct installation.

An easy one-touch user seal check button instils confidence that the respirator is fitted properly for comfortable breathing, especially when it is to be used for a long time. A silicone face seal with patented flex-joint nose bridge provides a soft, comfortable feel on the face. Head cradle buckles are easy to adjust; simply pull the straps to tighten and squeeze the buckles to loosen. An over-moulded design allows easy assembly and disassembly.

Breathing comfort is enhanced by the quadruple-flow gas and vapour filter combination, whereby two dual-flow cartridges are mounted on either side of the respirator to create four distinct airflow paths. Exhaled breath and moisture are directed in a downward direction towards the exhalation valve.

3M Secure Click HF-800 respirators offer an optional speaking diaphragm to facilitate clear communication in the workplace.

A primary application of 3M Secure Click is as personal protective equipment (PPE) for maintenance engineers in manufacturing industry, but it can also be used in the agricultural, construction, mining, drilling, pharmaceutical and transportation sectors to secure health and safety in tasks such as chemical handling and clean-up, casting, chipping, chiselling, grinding, machining, masonry, painting, sanding, sawing, welding, electroplating, furnace operation, laboratory work, batch charging, change-overs and hazardous waste handling.

The low-profile half-mask design provides a wide field of view and compatibility with various welding and grinding shields.

For more information contact RS Components SA, +27 11 691 9300, sales.za@rs-components.com, www.rsonline.co.za

HYDROGEN DETECTORS

HY-ALERTA MODEL 600B

For detecting hydrogen gas in confined spaces

RTS Africa Technologies (Pty) Ltd
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Simplified safety controller setup

Turck Banner’s new SC-XM3 external drive allows users to write the configuration for their safety systems once and then load it on to any additional devices requiring the same configuration. The configuration, network settings, and passwords will automatically download, allowing a single user to configure multiple safety controllers in a matter of minutes without a PC.

Simplify device swapout
Backup all safety system configurations to an SC-XM3 external drive, label appropriately, and store it in the micro USB slot on the safety controller. No safety system expertise is then necessary to load and apply the saved configuration to a replacement safety controller.

Using the SC-XM3 ensures consistency by eliminating the need to rewrite identical configurations for additional or replacement safety controllers. Users can save tested and perfected configurations, and reapply them without the risk of introducing errors or inconsistency into the configuration.

Guided safety acceptance tests

With Sinamics Startdrive commissioning software, Siemens supports machine builders in the validation of safety functions for Sinamics frequency converters with a guided acceptance test. With Sinamics Startdrive, Siemens offers a tool for the integration of drive hardware into the TIA Portal engineering framework. The integrated guided acceptance test for safety functions is available for Sinamics G and S series frequency converters and complies with EN ISO 13849-2 and IEC 62061.

The safety acceptance test is extremely user-friendly. A wizard guides the user step by step through the acceptance process and checks whether the safety functions have been parameterised correctly and executed correctly in the relevant application. For documentation purposes, a standard-compliant acceptance report is then created automatically. With the safety acceptance test integrated in Sinamics Startdrive, Siemens helps machine builders to carry out the legally required validation of safety functions easily and safely.

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For more information contact Brandon Topham, Turck Banner, +27 11 453 2468, brandon.topham@turckbanner.co.za, www.turckbanner.co.za
Empowering You to Do More with One Tool

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Complete Process Control Solutions
Case History 171

Instability in a metallurgical plant.

Michael Brown is a specialist in control loop optimisation with many years of experience in process control instrumentation. His main activities are consulting, and teaching practical control loop analysis and optimisation. He gives training courses which can be held in clients’ plants, where students can have the added benefit of practising on live loops. His work takes him to plants all over South Africa and also to other countries. He can be contacted at Michael Brown Control Engineering cc, +27 82 440 7790, michael.brown@mweb.co.za, www.controlloop.co.za

I have written several articles about the unique problems I have encountered, specifically in the mining processing industry. This article is about some experiences in a mining operation where recently I was asked to try and sort out a plant which was running in an unstable state, and production was being badly affected.

A new section of the plant had been built and had been designed to replace an old plant that was too small. The aim was to switch over from production from the old to the new plant without halting production. Therefore the commissioning had to be on the actual working plant running at full output.

Unfortunately, problems were immediately encountered on the new plant section after the switchover. When I arrived at the plant, I was hosted by a young process engineer who was responsible for the control systems. He told me that he had found some really horrific basic problems, most of which, but not all, he had managed to correct. These included control valves with underpowered actuators, valves that were not proper control valves (even some gate valves), and also really terrible problems with flow measuring elements that were not installed correctly, for example many were installed immediately downstream after the valve instead of upstream (a basic rule that is one of the first things taught to people learning about flow measurement in control systems.)

Fortunately for me, the engineer had managed to correct many of the problems before I arrived, so I was able to go about my job of optimising without having to try and sort out most of the basic instrumentation and valve problems.

The danger of not including C&I practitioners during the design phase

However, what is noteworthy is that these basic problems arose in a new plant designed by metallurgists and mechanical engineers, who obviously have little understanding of practical measuring techniques and feedback control. It is quite common for mining plants to be created by people with these disciplines who then put in the controls as an afterthought, and very strangely don’t get experienced instrumentation and control practitioners on board. Some of these people apparently have absolute faith that they know everything necessary about instrumentation and control, and cannot learn anything new.

I have had met mining plant designers and metallurgical process engineers who firmly believe that if there is a PID controller installed then it should be able to control anything, and it only needs to be properly tuned to achieve this, even if the control strategy is completely wrong. I have been told that valves in mining plants must be full line size, even though this usually makes them terribly oversized. Another metallurgist said to me that it is fine to use cheap (and usually inefficient) control and measuring equipment as they do not need to have such good control on metallurgical plants. Another time I was told by a man who designs and builds platinum concentrators that it’s quite acceptable these days to put small retention time sumps in mining plants, as modern controllers have computers in them that can easily control the level in the sump. He seemed completely unaware of the fact that the sumps are usually there to prevent surges in supply of material to downstream plants due to intermittent upstream production, and that the level control is really only there to prevent the tank from overflowing or running empty. In actual fact the level should be allowed to float around and one should rather keep a constant flow to the downstream units such as to the cyclones. It is all very frustrating to a control engineer that these designers always ‘know better’. A typical remark is that “we have been making plants this way for years, and they work fine”. However, it seems apparent that these designers have apparently never gone out after the plant has been built and spoken to the unfortunate people who have to run them.

Anyway, back to the present discussion. When I arrived at the plant, the control engineer said they were managing to run it but with some difficulty. The main problem was that they needed to keep the flow of a process fluid supplying the plant very constant, and also at a constant pressure. The system is shown in Figure 1.

Interaction between flow and pressure variables

The flow is measured and controlled via a magnetic flowmeter and variable speed pump. The pressure is measured downstream and a certain amount of fluid is recirculated via a control valve to keep the pressure into the plant at a desired value. This is not an uncommon type of control strategy, but in this case, as quite a large amount of fluid was being recirculated under the running conditions, the two controls were highly interactive. This resulted in a continuous cycle of both the flow and pressure variables, with each of them cycling with a period of approximately 100 seconds and cycle amplitudes of about 10%. This was hitting all the numerous other processes downstream and creating bad production. The recording of the ‘as found’ test is shown in Figure 2.

Figure 1.
Interactive cycling of this nature is a phenomenon that occurs quite frequently in complex process control systems, and unfortunately many people do not know how to deal with it. The magnitude of the problem obviously depends on the individual processes and in many cases is not too severe. However, in a case like this it presents quite a big problem.

Dealing with interactive control systems
There are two main ways to deal with interactive feedback control systems. The first is to use a technique called dynamic decoupling, which basically consists of inserting feedforward controls in each loop that cancels out the disturbance being caused by the other loop. This is very effective, but takes time and special engineering.

The second method is much simpler, although not quite as effective. Operators know instinctively how to do it. If two loops are cycling due to interaction, they quickly find out that if one of the loops is placed in manual the cycling stops. Now I sometimes define manual control as ‘the ultimate slow tune’ and basically what one can do is to tune the one loop as fast as possible and then to slow the tuning of the other loop down until the interaction stops. This does work, and in many cases is an acceptable solution.

In this case we tuned the flow loop fast and slowed the pressure loop down so it took about three times longer to respond. This effectively decoupled the loops and solved the problem.

Problems caused by spikes
The next major problem we found on the system was spikes in flow on the output of tanks in which the level was being controlled. We found this not to be due to tuning or valve problems, but caused by the measuring transmitters of the ultrasonic type.

Certain types of ultrasonic level transmitters do not give a nice clean continuously variable output, but move in steps. I have not been able to find out why they do this, but would guess that it is due to some sort of statistical filtering system built into them. Alternatively they may also be caused by the computer in the transmitter having an incredibly slow scan rate. Figure 3 shows the recording of the level signal being sent to the controller from one of these transmitters as the level is rising and falling in the tank. The signal moves in slow discrete and often non-uniform steps, many being of about 2% amplitude.

Level control often requires a fairly high proportional gain in the controller if you desire good control that keeps level at setpoint. This gain could be as high as 20, but is typically in the range 5 to 10. Now, if you have a gain of say 10, and the level steps 2%, this will immediately result in the controller output instantaneously stepping 20% – which why the surges in the output flow from the tanks were occurring.

The mine immediately made a decision to replace all these transmitters. In the meantime, we slowed down the tuning with smaller gains and in some cases used lag filters on the transmitters to try and smooth out the signals. This obviously results in less effective control.

Once again I appeal to mining plant designers to get experienced control engineers involved when working on new plant control schemes. It can prevent all sorts of problems and losses in production.

Figure 2.

Figure 3.
Digital transformation enables new solutions for valves and pumps

By David Clayton, ARC Advisory Group.

While digital transformation has been getting its fair share of hype in recent years, end users in the heavy process industries actually began digitising their plants decades ago with the introduction of smart/intelligent, digitally integrated process transmitters and final control devices. Today, the vast majority of process transmitters installed for greenfield and major upgrade projects are smart, if not always fully digitally integrated. However, historically, pumps and valves have tended to be the last field devices for end users to digitise in their plants.

Advanced diagnostics and bidirectional communications can help improve process performance, condition monitoring, and maintenance effectiveness; while reducing maintenance costs to a significant degree. This is particularly true for the traditional ‘bad actors,’ such as control valves. Smart valves and pumps could also help reduce fugitive emissions to improve environmental compliance, and – in the case of safety-related valves – enhance plant safety.

With the emergence of IIoT-enabled remote management solutions, process industry end users can begin to take full advantage of remote monitoring, analysis, and management services provided by valve and pump suppliers or third-party service providers. While leveraging the expertise of these external partners would appear to be a ‘no-brainer,’ ARC research indicates that many end users remain resistant to this concept.

Two examples of services that suppliers have developed to help their customers lower overall total cost of ownership (TCO) of their valves and pumps follow. Significantly, both services can also enhance plant safety and regulatory compliance.

Expertise as a Service for valve maintenance
Several years ago at an ARC Industry Forum in Orlando, Florida, Shawn Anderson, senior research specialist for Emerson Process Management, gave a presentation on how that company is leveraging the IIoT to help end users reduce valve-related unplanned downtime.

Anderson’s group initially began looking at adopting IIoT technologies as a way to collect more valve health data from the field and provide more realistic valve failure information than could be generated in a laboratory. It soon became apparent that IIoT technologies were a natural fit for developing a remote monitoring service geared at optimising customers’ valve maintenance practices. This takes the form of a connected services work flow.

According to Anderson, what end users really want and need is actionable control valve health information. End users want to know what they need to do and when they need to do it to keep operations up and running. ARC research confirms this.

Clearly, end users can benefit from partnering with a trusted valve supplier (or third-party services provider) that can help remove the burden of valve maintenance to enable them to focus on their core competencies. Innovative new service models such as Expertise as a Service (EaaS) in which remote monitoring and diagnostics services are bundled provide new options for end users lacking in-house valve experts.

To succeed, this typically requires close cooperation between the valve or third-party supplier that has the valve expertise, IT suppliers that can provide the secure IIoT platform, analytics suppliers that can provide the appropriate analytics and visualisation tools, and the end users themselves, who must be willing and able to provide the raw process data and, ultimately, act upon the information.

Machine learning provides advance warning of pump failures
At another ARC Industry Forum session, Rob Miller, general manager, Global Solutions for Flowserve, presented an example of how that company is implementing new maintenance and reliability practices for its valve customers by integrating advanced machine learning technologies. Flowserve has been evaluating machine learning capabilities to improve its equipment monitoring capabilities for the past twenty years, but the results had proven to be too costly and difficult to commercialise. However, technological advancements in data science, artificial intelligence, and computing power developed in the last five years have changed that paradigm.

As we learned, for nearly a decade, Flowserve had been eager to increase its asset performance and advanced diagnostics capabilities for its product portfolio. The initial approach was to increase data acquisition capabilities utilising wireless technologies to bring pump health analysis data up to the plant or cloud level, and eventually migrate to actively monitoring customer equipment. However, the company faced many challenges related to predicting equipment failures with adequate advance notice to allow its customers to react effectively to alerts.

Recent technological advancements have enabled Flowserve to refine its methodology
and introduce a step change in its equipment monitoring capabilities. Integration of machine learning techniques and cognitive analytics have enabled the company to provide more advance warning of impending pump failure to give customers enough time to prevent the failures before unplanned downtime could occur. According to Miller, other benefits achieved include increased scalability, increased adaptability, higher accuracy, improved security, and minimal false positives.

ARC research indicates that other device suppliers are developing similar approaches.

Where to Start?
Clearly field device digitisation, cloud computing, and new IIoT-enabled approaches offer opportunities for process industry end users to take advantage of supplier expertise in new and exciting ways. However, several roadblocks hinder widespread adoption.

Many end users hoping to reap the benefits of digitisation are asking themselves: “Where do we start and how do we roll-out successful pilot projects?” It is important for users to start small with a proof-of-concept project and not try to ‘end world hunger’ overnight. Before embarking on a large-scale roll out of digital valve management solutions, end users should develop a step by step plan, along with measurable goals for each step in the process.

The first step should be to focus on an existing problem negatively impacting day-to-day operations and not get caught up in the hype surrounding the new digital technologies. End users can begin by identifying the most critical assets that are prone to frequent failures and deploy a feasible digital solution for monitoring and maintaining those assets. Severe service valves typically have higher failure rates and offer the highest potential cost savings, making them likely candidates.

During this phase, it is important for end users to focus on the problems they are trying to solve with these solutions and the people who will be using these new solutions. One of the key stumbling blocks for end users during this step is not involving their internal IT groups in the discussion from the beginning. Not only is getting buy in from the company's IT group critical to success, it is also important to realise that IT groups are the in-house experts at scaling up solutions based on standards to a greater number of people. Even though the IT group typically will not know what is needed to optimise the process plant’s operations, they would play an integral part in ultimately deploying the solutions plantwide or even companywide.

Sitting on the fence no longer the safe option
End users currently sitting on the fence about embracing digital valve and pump management solutions must consider the accelerating rate of change we face today. It is vital for industrial organisations to stay educated regarding trends in the adoption of new technologies, so they can take advantage of these new solutions before they are displaced by competitors that have successfully embraced them.

‘Sitting on the fence’ to see how the new technological advances play out is no longer the safe option. To remain competitive in today’s rapidly changing market, companies must begin anticipating and responding to changes quicker than their competitors. It is also important to remember that the most disruptive competition you will face over the next several years is likely to come from companies you are not even aware of right now.

For more information contact Paul Miller, ARC Advisory Group, +1 781 471 1141, pmiller@arcweb.com, www.arcweb.com
New Allen-Bradley controller

Industrial workers can strengthen their grasp of production and make more informed operating decisions with the new Allen-Bradley CompactLogix 5480 controller by Rockwell Automation. The controller marries a Logix control engine and the Microsoft Windows 10 IoT Enterprise operating system in a single platform, allowing workers to view machine information at its source.

“The controller can collect raw machine data and reveal it to workers as useful information, right at the machine level,” said Christo Buys, business manager control systems, Rockwell Automation. “Providing these insights close to where they’re produced allows workers to make smarter and faster operating decisions. As a result, they can better react to issues and ultimately increase productivity in a Connected Enterprise.”

The controller can reduce latency by performing real-time data collection at the machine level. Users can view control information at its source, and other information can be sent upstream to the enterprise or cloud. The ability to run Windows applications on-premises can also reduce the need for a separate PC on the plant floor and shrink a machine’s footprint.

“Companies deploying Industrial IoT technologies no longer have the luxury of choosing between cloud or on-premises architectures – they need both,” said Matthew Littlefield, president and principal analyst, LNS Research. “The ability to access control-system data at the machine level and access insights from the cloud can deliver the agile decision-making that many companies desire.”

The CompactLogix 5480 controller can support applications with up to 150 axes of motion. This makes it ideal for large packaging and converting, printing and web applications that would benefit from a simplified architecture and smaller footprint. The controller also provides faster scan-time execution and motion-loop updates to help improve machine throughput.

The controller incorporates multiple security functions, including user authentication and authorisation, role-based access and digitally signed encryption.

The Windows operating system runs independently from the control engine, so any disruptions to the operating system will not affect machine or line control.

For more information contact Christo Buys, Rockwell Automation Sub-Saharan Africa, +27 11 654 9700, cbuys@ra.rockwell.com, www.rockwellautomation.com/en_za
There has long been a global movement underway towards highly automated factories equipped with largely unmanned robots, and in which many different items of equipment communicate with each other digitally – the so-called Industry 4.0 approach.

However, a new phenomenon is now already emerging, aiming to bring the human touch back into a wide range of manufacturing and production contexts. This trend has been dubbed Industry 5.0 – a term used to denote contexts in which robot capabilities and human skills converge.

Whereas Industry 4.0 setups are largely about consistency of quality, consistency of flow and data collection in larger scale manufacturing contexts based around largely unmanned robots, Industry 5.0 is about highly skilled people and robots working side by side to create individualised products, services and experiences – by pairing the technical capabilities and consistent repetitiveness of robots with the unique skills of craftspeople and other human specialists.

Unlike Industry 4.0 robots, Industry 5.0 collaborative robots (cobots) also have the big indirect advantage of keeping valuable knowledge in-house, close to the artisan, the producer and the manufacturer. For any commercial operation, this know-how and the painfully, slowly acquired experience and the craftsmanship touch represent a crucial, high value asset that’s a key differentiator from the volume production focus at the heart of Industry 4.0 robotics.

Best of both worlds
In most production processes, automation can be used to its fullest potential only when there’s also a spark of human creativity influencing and driving the more repetitive, routine processes. On its own, an automated production setup featuring traditional industrial robots will do only what it is told – and often only after long, complex and expensive programming efforts.

Cobots, however, work in sync with human employees. These two different kinds of workforce complement each other, because the human can add the ‘secret sauce’ of human skills, experience and judgement, while the robot moves things around, prepares the product for human attention or processes the product further. This empowers the human worker and enables him or her to use the cobot as a multi-functional tool – as a screwdriver, pizza dough mixer, seedling separator, packaging device, palletiser, etc. The robot is not meant to replace the human workforce, but to take over strenuous, repetitive or even dangerous tasks and to enable human workers to use their creativity on more gratifying tasks and more complex projects.

Transformation of modern manufacturing
The agenda behind Industry 5.0 is all about the transformation of modern manufacturing as well as a wide range of other processes – commercial as well as non-commercial – to enable man and machine to work collaboratively, pairing the exact and repetitive technical capabilities of robots with the unique, cognitive skills of workers.

This collaborative approach is essential for tackling new kinds of market requirements and consumer expectations, which often involve small batch exclusivity and greater degrees of personalisation, as well as customisation to individual preferences. The personal touch is both fashionable and an extremely effective way to match production capabilities with countless different configurations of customer preferences and requirements.

Creating value
At Universal Robots, the Industry 5.0 moniker is basically a question of cobots and skilled humans working closely together in myriads of different ways – many as yet unthought of and unexplored – to create maximum human value by getting the best of both worlds and both types of capabilities.

It is about combining people’s creativity and craftsmanship with the speed, productivity and consistency of robots, and exploring how to make the very best of the many possible overlaps to mould hitherto unseen commercial and societal capabilities – from more people-centric, individually customised products to craftsmanship and specialist skills made much more widely available.

With the Industry 5.0 mindset, robotic capabilities become a personal tool that members of any workforce can use to apply their distinctive creative skills more effectively, to provide greater human value.

For more information contact Cobots, +27 12 764 7284, sales@cobots.co.za, www.cobots.co.za
**Proximity sensors for pneumatic and electronic actuation**

Parker Hannifin has introduced a new family of proximity sensors for use with pneumatic or electric actuators in a wide range of automation and motion control applications. P8S magnetic cylinder sensors enable quick, precise and contactless sensing of a piston’s position in cylinders. The sensors provide an elegant and cost-effective solution in automated systems and are optimised to be especially easy to mount and incorporate in designs.

The sensor is designed to fit all standard 5 mm T-slots, regardless of cylinder profile or brand. This provides a simple, direct solution versus turn-in or slide-in concepts, plus a significant reduction in installation time.

Mounting is simplified further due to retaining ribs on each side of the sensor body. As a result, the sensor holds its position even before the locating screw is tightened. Quick and easy fixing of the sensor also means rapid replacement. As well as compatibility with all standard 5 mm T-slots, adaptors can be deployed to allow P8S proximity sensors to fit round-rod and tie-rod cylinders, along with cylinders featuring dovetail grooves.

Options for P8S proximity sensors include electronic PNP, NPN or electric Reed outputs; normally closed or open functions; two or three wires in 0.3, 3 or 10 m lengths; and M8R knurled nut connectors or flying leads. An LED indicates the output state, while the enclosure has an IP67 rating. ATEX-rated versions are also available for use in potentially explosive atmospheres.

For more information contact Lisa de Beer, Parker Hannifin SA, +27 11 961 0700, lisa.debeer@parker.com, www.parker.com/za

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**Machine manufacturer relies on Simotics**

Sankyo Seisakusho (Sankyo) is a Japanese provider of automation technology. The company relies on Siemens motion control solutions when developing new servo-driven belt feeders and indexers for presses. Sankyo’s new developments are primarily used in the production of engines for plug-in hybrid and electric vehicles. The Siemens technology allows Sankyo to combine two demanding technical systems, a feeder and an indexer while increasing the accuracy, efficiency and speed of its machines. The future-proof automation improves productivity and allows the technology company to maintain its position in the global market and to remain competitive.

The new servo-driven belt feeders and indexers integrated into the press allow the motor core to be arranged at an angle during stacking and the angle of rotation can be freely selected by the operator. A special vibration damping system increases operational safety. The challenge of this new solution was that the motors are cooled with compressed air instead of water in the press area. In order to ensure that the system was no more complicated than it needed to be while still adhering to international standards, Sankyo turned to Siemens for the motion control. The global company met all the Japanese manufacturer’s essential expectations.

**End-to-end solution**

The Siemens solution is based on a direct drive system comprising Simotics T-1FW6 high-performance torque motors for the main drive and Simotics S-1FK7 servo motors for the auxiliary. Sinamics S120 converters complete the drive. Control is provided by a Simotion D motion control system that is operated from a Simatic Comfort Panel TP1500 HMI (Human Machine Interface) supplemented by a local Simatic ET 200SP distributed I/O. Communication is via the open industrial Ethernet standard Profinet.

**Huge project success and plans for the future**

The Siemens solution allowed Sankyo to integrate two demanding, technical systems – a feeder and an indexer. It coordinates the individual movements of both systems and synchronises them with the main press. The new drive system optimises the machine characteristics of the feeder. Spurred on by the success of this project, Sankyo is already planning the next steps. Together with Siemens, the company intends to develop an even more powerful servo-driven feed unit for presses. The drive will still be based on Simotics motors and a Simotion motion control system, but the aim is to achieve shorter cycle times for material processing.

For more information contact Jennifer Naidoo, Siemens Digital Industries, +27 11 652 2795, jennifer.naidoo@siemens.com, www.siemens.co.za
SEW-Eurodrive sets Industry 4.0 benchmark

With the advent of Industry 4.0 set to change the face of industry and production, SEW-Eurodrive has a range of solutions for its concept of the Lean Sm@rt Factory. This is based on new technologies such as big data, embedded computing, the IIoT and cloud computing.

Movigear
The Movigear mechatronic drive system is designed for flexible use across various communication infrastructures, which is ideal for decentralised field applications. It is especially tailored for efficient use in the general materials-handling sector and is available in two sizes and three electrical performance classes. Energy savings of up to 50% are possible due to the seamless interplay between the IE4-rated motor, efficient gear unit, and integrated electronics.

“Perfectly-matched components, combined with the energy optimisation of the overall system, facilitate high system efficiency,” comments SEW-Eurodrive MD, Raymond Obermeyer. “These features make our mechatronic drive platform a cost-effective, power-optimised, total solution.”

Movidrive
Flexible, compact and intelligent Movidrive B drive inverters save space in the control cabinet. In addition, they are equipped with integrated IPOSplus positioning and sequence control as standard features. These inverters are ideal for asynchronous AC or synchronous servo drives.

Additional features are a broad power range from 0.55 kW to 250 kW, and a high overload capacity. Based on a modular concept, the inverters are ideal to improve the flexibility and efficiency of a range of applications.

Motion and logic controllers
SEW-Eurodrive also offers the freely programmable Movi-PLC motion and logic controller for solving complex tasks in a flexible manner. These scalable controllers are an ideal solution platform due to their universal operation and functionality. Interfaces are available for the external periphery and for visualisation purposes, so as to fully automate complete machines.

“The basic concept behind Industry 4.0 is to leverage information technology in order to integrate business and engineering processes for more flexible, efficient, and time-independent production in a range of applications and industries,” concludes Obermeyer. “At the same time, high quality and lower costs are a given. SEW-Eurodrive’s approach combines the basic tenets of Industry 4.0 with its benchmark-setting solutions and concepts.”

For more information contact Jana Klut, SEW-Eurodrive, +27 11 248 7000, jklut@sew.co.za, www.sew-eurodrive.co.za

Intermot radial piston motors

Axiom Hydraulics has added another high quality brand to its impressive range of hydraulic components. With proven high quality Italian engineering, Intermot’s IAM radial piston motors are perfect for slow speed shaft output applications. Backed by progressive research and development, they have peak pressure ratings up to 350 bar, so greater torque capabilities are easily achieved, even at low rpm. Displacement availability ranges from 80 up to 8000 cc/rev. Various shafts and porting selections are also available throughout the range.

Sustainability and cost efficiency are critical in these challenging economic conditions, and companies are continuously searching for the best way to reduce consumption. Thanks to over 30 years’ experience in the hydraulics industry, Intermot radial piston motors offer excellent mechanical and volumetric efficiency at higher speeds and pressures compared to competitors. The brand is one of the most well known in the hydraulic motors sector, especially within the plastic injection moulding industry.

The company’s core focus is the development, production and distribution of high quality radial piston hydraulic motors with a distinctive ‘star’ design. Its comprehensive research and development centre is highly regarded in Europe for its expertise and speed of development. With eight production sites worldwide it produces motors that feature unique quality standards, with speed and excellent lead time.

Axiom Hydraulics boasts a comprehensive stockholding of all aftermarket spares and in-house repair services.

For more information contact Fritz Kern, Axiom Hydraulics, +27 11 334 3068, fritz@axiom.org.za, www.axiomsa.co.za
RS Components unveils expansion of hand-tool portfolio

RS Components has announced a major expansion of its RS PRO hand-tools range, enabling maintenance engineers to purchase individual devices not previously available. The portfolio will see a significant increase with more than 300 new lines to complement the existing RS PRO toolkit offerings.

All of the products available in the contents of the toolkits are now being made available for individual purchase, enabling technicians and maintenance engineers to get access to spares and replacement parts as required. Not only will the introduction of the individual tools at the line level increase the lifespan of already purchased toolkits, but it will also provide customers with the flexibility to create their own bespoke toolkits to meet individual requirements.

Tools individually available in the RS PRO range include screwdrivers and screw extractors, pliers, hammers, punches, chisels, spanners and sockets, deburring and finishing tools, saws and planers, soldering and de-soldering tools, and cable accessories, among many other devices. In addition, customers can acquire cost-effective tool replenishment with the availability of foam-inlay-based kits.

For more information contact RS Components SA, +27 11 691 9300, sales.za@rs-components.com, www.rsonline.co.za

Simple and convenient flow measurement

Two new devices from Jumo provide simple and convenient magnetic-inductive flow measurement for a variety of media and processors. Jumo flowTrans MAG S10 is designed for standard industrial applications in nominal widths from DN 3 to DN 2000 and the flowTrans MAG H10 for hygienic applications in nominal widths from DN 3 to DN 100. Both devices can be used in liquid, conductive media with different properties such as viscosity, concentration, and density.

The universal transmitter electronics for various voltage supplies are new, while uncomplicated cabling enables simple and fast startup. Diagnostic messages can be displayed in plain text on the illuminated LCD display, which can be replaced if necessary.

For both versions, the conductivity of the measurement medium must be at least 20 µS/cm. The maximum temperature is as high as 130°C, depending on the version. Both flowmeters are available either as a compact device or with a separate transmitter.

With the availability of a wide selection of lining materials, nominal widths and measuring electrode materials, Jumo flowTransMAG devices can be used in the CIP/SIP field, as well as in corrosive and abrasive media or even slurries. As the sensors have no moving parts, they are less likely to wear compared to other measuring principles and therefore require less maintenance.

For more information contact Anatas Schnippenkotter, ASSTech Process Electronics & Instrumentation, +27 11 708 9200, info@asstech.co.za, www.asstech.co.za

Robust new dry-block calibrator

Suitable for on-site use, WIKA’s new Model CTD4000 dry-well calibrator has been designed for use in the severe conditions of the naval and marine sectors.

Their ease of use and compact and practical design make them suitable for industrial processes where the calibration of the temperature measurement systems is essential for the control of the process and the quality of the final product.

Special attention is paid to reduce weight, size and to reinforce robustness by using an aluminium body as well as aluminium and stainless steel for many internal parts. Each calibrator is tested in WIKA’s laboratory and calibrated with certified references in accordance with international standards.

The thermal part of these calibrators is made of a metal block heated with resistors or with Peltier thermoelectric modules. In the metal block there is one bore in which the interchangeable insert is placed. With the available standard inserts, the calibrators are versatile and can be easily adapted for the calibration of temperature probes with the most common diameters. Customer-specific inserts and bores are available on request.

For more information contact WIKA Instruments, +27 11 621 0000, sales.za@wika.com, www.wika.co.za
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