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Wonderware Southern Africa’s 26th annual User Conference, X-Change 2018, will return to the picturesque Champagne Sports Resort, from 15-18 April. X-Change has been a success for a quarter of a century because it has always delivered three consistent values: business and networking opportunities; the key to improved operational benefits; and an unequalled insight into the technologies and approaches that drive it all. See this month’s cover story on page 18 for more.

Define your game plan for digital transformation at X-Change 2018

Cummins Africa, HellermannTyton, Microsep, FLIR Systems, Autonics

Legrand SA, Gail Norton Instrumentation Agencies, RJ Connect, RS Components SA


Michael Brown Control Engineering, Beckhoff Automation, Rockwell Automation, Omniflex Remote Monitoring Specialists, RS Components SA, ASCO Numatics, Yokogawa South Africa

nClose, Pepperl+Fuchs, Rockwell Automation

RJ Connect, RET Automation, ASSTech Process Electronics + Instrumentation

Yokogawa South Africa, Schneider Electric SA, ifm electronic SA, RS Components SA, Corporate Communication Services

GHM Messtechnik South Africa, Comtest, Sperosens, Energas Technologies, R&C Instrumentation, Rockwell Automation

Omron Electronics, Parker Hannifin SA, Nidec Industrial Automation Southern Africa, SEW-Eurodrive, Festo, BMG

SICK Automation Southern Africa, RET Automation
Optical fibre promises so much more than just bandwidth

Pervasive sensor networks and ubiquitous connectivity are among the ‘edge’ technologies required to unleash the era of efficient manufacturing proposed by Big Data. The most likely savior for the connectivity problem is optical fibre, which first emerged as a viable telecommunications medium in the late 1970s. Today, some eighty percent of the world’s long-distance voice and data traffic is carried over fibre optic cables. Now, it seems, the technology can also be used to revolutionise the sensor industry in any process where the measured parameter changes the transmission properties of the fibre material in some fundamental way.

As it turns out, light travelling through the core of the fibre is modulated by changes in the surrounding medium. The neat thing is that these modulation-inducing changes are associated with many commonly measured process parameters such as temperature, pressure, strain, humidity, vibration, pH, etc. Also, the extent of the modulation – in the form of changes in the shape or wavelength of the light waves – is correlated to the extent of the change in the measured parameter.

Commercially, two implementation methods are under research: point sensing, where the active portion of the fibre is less than 10 mm; and distributed sensing, where the entire fibre, perhaps tens of kilometres long, is the sensor. The point sensors are more complex to produce since the fibres incorporate tiny wavelength-dependent optical filters, which must be implanted using nanotechnology. They are, however, extremely precise and provide high-speed data acquisition. For the distributed sensors, standard fibre optic materials can be used, but at the expense of lower signal fidelity and slower data acquisition.

Perhaps the most obvious benefit of the technology is that the optical fibre acts as both the sensing element and the communication medium – ideal in an IoT context. When one adds to this the advantages of being electrically passive (low power, Ex applications), wide dynamic range and freedom from electromagnetic interference, the prospects look bright for future sensor networks communicating at high data rates over long distances without the need to convert between electronics and photonics along the way.

One of the difficulties however, which also applies to non-optical sensors, is interference from multiple effects i.e. a sensor intended to measure pressure may also be temperature dependent. In the case of mechanical or electronic sensors, the nature of this dependence is well understood and can therefore be compensated either in hardware or software. In the case of optical fibre technology, intense R&D efforts over the last five years have yielded significant progress, but more insight is still required for some applications. In other cases, the limitations imposed by cross-effects do not cause problems and the technology is ready for use, particularly the capability to implement distributed temperature sensing over long distances.

Hot roller detection in mine conveyors is a good example. For this application, a passive optical fibre cable can provide accurate temperature measurement along the entire length of the belt, which enables effective monitoring over even the longest conveyor runs. The cable acts as a distributed type sensor that allows hotspots to be detected within a few degrees Celsius, and localised with an accuracy of about one metre. This is more than enough information for a manager to use as input to a reliability-centred maintenance strategy, and it also acts as a potential fire hazard warning.

See the article on page 58 for more on AP Sensing’s innovative use of this new technology.

Technews Industry Guide

Speaking of maintenance strategy, the 2018 edition of the Technews Industry Guide: Maintenance, Reliability & Asset Optimisation will be posted with next month’s magazine. This auxiliary publication is designed to provide maintenance professionals with a one-stop definitive resource that covers everything from in situ sensor-based solutions for condition monitoring, through handheld portable devices for periodic maintenance-related checks, through software solutions for analysis and reporting, and on to customised services like reliability management consulting and training. Our hope is that the information we gather will help personnel to solve maintenance-related problems that they may be struggling with on their own particular plants.

Contact Jane or Laura if you would like to participate.

Steven Meyer
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Rockwell Automation recently announced its investment in The Hive, a Silicon Valley innovation fund and co-creation studio, to gain access to an ecosystem of innovators and technology startups with a focus on applications of artificial intelligence (AI) to industrial automation.

“Smart manufacturing requires the use of new and disruptive technologies such as AI to create the future industrial plants and supply networks that are flexible, efficient, responsive and secure,” explains Christo Buys, business manager control systems, Rockwell Automation Sub-Saharan Africa. “We continue to create partnerships with leading innovators, such as this one with The Hive, to advance the ideas of Connected Enterprise, our vision for realising unprecedented industrial productivity from the integration of plant and enterprise operations.”

“Rockwell Automation’s investment in The Hive will provide it with earlier visibility to AI technology from companies fostered by The Hive’s technology team,” says T.M. Ravi, managing director and co-founder of The Hive. “These include AI-powered applications for the cognitive enterprise, edge intelligence, security, and smart machines.”

Yokogawa Electric Corporation has announced that its subsidiary, Yokogawa China, has received an order from the Dushanzi Petrochemical Company to deliver a control system for its water source facilities. This system will monitor and control various plants managed by the company in the Dushanzi district of Karamay, a city in China’s Xinjiang Uyghur Autonomous Region.

Yokogawa wins control system order for water facilities in China’s Dushanzi district

The Dushanzi Petrochemical Company manages four sources that annually produce approximately 650 million cubic metres of water for use by its petrochemical complex and other consumers in the Dushanzi District. The company wants to replace an existing control platform with an up to date system that will more efficiently monitor and control its water source facilities, which consist of 84 wells, 8 reservoirs and 10 pump stations. In this project, Yokogawa will supply a Centum VP integrated production control system, and Yokogawa China will oversee all project implementation activities, including engineering and commissioning.

Emerson completes acquisition of Prosys

Emerson has announced that it has acquired ProSys Inc., a global supplier of software and services that increase production and safety for the chemical, oil and gas, pulp and paper, and refining industries. By building intuitive processes for plant operators, these solutions make everything from everyday operations to responding during abnormal situations easier.

“Adding ProSys’ differentiated technologies and expertise allows us to help our customers improve plant performance, safety and profitability by optimising their human and automation resources,” said Mike Train, executive president, Emerson Automation Solutions. “With ProSys, we can provide innovative control and operator performance capabilities to make control room operators far more effective.”

ProSys complements Emerson’s May 2017 acquisition of MYNAH Technologies, which added dynamic simulation and operator training software to the portfolio. Together, these technologies embed expertise to help operators navigate plant systems safely and efficiently, and prepare customers to accommodate the changing state and age of the industrial workforce.
Efficiencies delivered through new technology can protect mining jobs

The new technologies unfolding in the Fourth Industrial Revolution can drive the advancement of one of the oldest industries in South Africa – mining – and make a critical contribution to improved efficiency, which in turn, will protect jobs in this labour intensive sector.

“Using IoT technology provides mines with an interoperable data platform that can use legacy and non-legacy equipment to drive system efficiency,” said Eric Croeser, IoT.nxt director of partnerships: mining. “This leads to the improved overall efficiency of a mine, reducing operational costs, increasing operating margins and profitability; and ultimately protecting jobs and the lifespan of a mining operation.”

IoT.nxt partnered with global consulting powerhouse Deloitte, in association with enterprise resource planning company MineRP to introduce its strategies and innovative technologies for the mining industry at the African Mining Indaba, the world’s biggest annual mining business event, hosted in Cape Town during February.

“Digitalisation is one of the key themes of the 2018 Mining Indaba as the industry looks at new and innovative ways to improve its operations and ultimately profitability,” added Croeser. “Despite job losses during 2017, the mining industry remains a large employer in South Africa and continues to make a notable contribution to GDP.”

During the Indaba, IoT.nxt and Deloitte set up a live mining operation at Deloitte’s Greenhouse in Cape Town to provide actual demonstrations of how IoT technology is implemented across an entire mine. “A shift manager manages four inputs: people, materials, work areas and machines,” explained Croeser. “Previously, responses to change in any of these elements were reactive. Using IoT strategies and solutions makes it possible to be proactive, and assess and adapt as situations change. This makes the entire operation more efficient and speed up decision making.”

A concern for mining companies, and most other industries considering the introduction of new technology, is whether existing systems and machines can be integrated into a new platform. “IoT.nxt’s innovation has made interoperability possible, which means it is not necessary to replace any older technology, thus delivering significant business value,” concludes Croeser. “South Africa operates some of the oldest mines in the world and faces additional challenges as many of them operate deep underground. Not only will the use of new technology make even these older mines more efficient, it will also improve safety, which will always be a major concern.”

For more information contact Daleen van Wyk, IoT.nxt, +27 (0)83 302 0827, daleen.vanwyk@iotnxt.com, www.iot.nxt.com

Changes at Endress+Hauser South Africa

In April of this year, Endress+Hauser South Africa’s current managing director, Rob Mackenzie, moves to the Endress+Hauser head office in Reinach, Switzerland, to take up the position of corporate director sales excellence. After just more than ten years as MD of the South African operation, he has been invited to head up the sales excellence project team for the global operation.

This is an exciting opportunity for me and also for our organisation here in South Africa,” says Mackenzie. “Over the last ten years we have built an incredibly strong team of leaders and processes. I am the fourth managing director in the thirty-eight-year history of Endress+Hauser in South Africa, during which we have remained the market leader for process instrumentation in the region. We have built an organisation of more than one hundred and twenty people, we have assisted more than two hundred instrument technicians and engineers to complete their training, and we have employed more than one third of them. Now is the time for a new person to take Endress+Hauser South Africa to the next level.

“I am of course extremely pleased to be staying in the Endress+Hauser organisation. This incredible company has become my home. Our vision is to be a successful family company in laboratory and process automation, whose customers around the world trust our products, solutions and services to improve their processes, and thus their products, sustainably. This is a vision that is very dear to me. My years of working in the southern African region, in a successful Endress+Hauser organisation, have put me in a place where I believe we can take our global message to every corner of the world. I hope to take a good portion of our South African culture, friendliness and commitment to succeed along for the ride.

“In the years that I have been in this role I have made many good friends and business partners – I hope you will keep in touch through LinkedIn or other media. Certainly, I still have family and friends in South Africa and I look forward to returning whenever I get the opportunity.”
**Technews to bring EtherCAT Technology Group seminars to SA during October**

Technews Publishing (publisher of SA Instrumentation and 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.

The seminars, an extension of those conducted by the EtherCAT Technology Group (ETG) around the world, focus explicitly on the EtherCAT technology and its applications – delving deeper than an ordinary product lecture. 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 the 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 the 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 over 4600 members from 65 countries, the EtherCAT Technology Group 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 promote, support and advance the EtherCAT technology.

**Endorsed by the SAIMC**

In line with the SAIMC’s objective of elevating the profile of bus technologies in South Africa, the SAIMC is proud to endorse the 2018 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 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 re-industrialisation of our region.

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

**Save these dates**

- Durban – 10 October
- Port Elizabeth – 11 October
- Cape Town – 16 October
- Johannesburg – 17 October

*For more information contact Jane van der Spuy, Technews, +27 (0)31 764 0593, jane@technews.co.za, www.instrumentation.co.za*

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**M&C Zambia now offers in-house balancing service**

The largest balancing machine in Zambia was recently commissioned at Marthinusen & Coutts’ Zambian operation in Kitwe. The fully upgraded Schenck machine is capable of balancing rotors up to 12 tons at operating speeds up to 3300 r/min, 5.5 metres in length and with diameters of up to 2.2 metres.

Careful planning and execution by Marthinusen & Coutts, a division of ACTOM, ensured that the machine was successfully installed, calibrated and commissioned. The local M&C team received training to ensure optimum operation of the machine.

The in-house ability to precision balance rotors to very high accuracy is a valuable service to customers in the region, and it will no longer be necessary to transport large components across border to South Africa for this work to be done. This local dynamic balancing service also expedites the repair process, reducing delivery time, and avoiding the risks associated with long distance transportation. All this translates into a bottom line cost reduction for customers because of the quicker turnaround times.

The service should prove to be invaluable to customers and OEMs operating in the Copperbelt region, and underpins Marthinusen & Coutts Zambia’s position as a leading electro-mechanical repair facility in the region.

Over a period of four years Marthinusen & Coutts Zambia has successfully upgraded its test facilities, which can now accommodate both AC and DC motors. The facility also boasts a temperature-controlled burnout oven, curing ovens and vacuum pressure impregnation (VPI) tank. Furthermore, winding verification ensures that stators and rotors are wound to international and OEM specifications. Upgrades have also been implemented to the mechanical repair shop, which also offers machining, milling and submerged arc welding.

*For more information contact Richard Botton, Marthinusen & Coutts, +27 (0)11 607 1700, richardb@mandc.co.za, www.mandc.co.za*
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The Association of African Exhibition Organisers (AAXO) recently hosted Southern Africa’s most reputable exhibitors and organisers at the annual ROAR awards. The purpose of the glamorous evening was to celebrate outstanding work in a broad range of categories relating to the exhibition industry. With a high volume of entries, the ROAR awards reiterate the high level of professionalism at a standard the industry strives to maintain.

The awards have become renowned for the opportunity they offer for industry players to unite in celebration of their successes, enjoy recognition for their excellent work, and gain credibility at the same time. An overwhelming amount of entries were judged with almost one third being in the new categories of Social Media and Africa Bound. This year’s event highlighted the level of professionalism in the African exhibition industry yet again. Not only was there an increase in quantity, but the quality of entries received was outstanding. Both the Exhibitor and Organiser categories were judged on pre-set criteria such as successful exhibition strategy incorporating marketing, activation, stand construction and ROI.

Africa Automation Fair, a proud member of AAXO and Reed Exhibitions, hosted exhibitors and industry media, to give insight into the scale and professionalism of the exhibition industry, and were exceptionally proud to have Beckhoff Automation and Endress+Hauser receive awards for Distinction in Exhibiting. This is awarded based not only on stand design, but also pre-, during and post-show marketing and company representation. The stand awards were judged by prominent industry leaders and experts, with the Exhibitor category judged by Projeni Pather (vice chairman, AAXO), Leatitia van Straten and Dee Reuvers (board members, AAXO) and Jaqui Reynolds (member, AAXO). Africa Automation Fair would like to encourage more exhibitors to enter the competition in future.

The full list of winners can be viewed at https://tinyurl.com/y7e7ys4q

For more information contact Reed Exhibitions, +27 (0)11 549 8300, teresa.desousa@reedexpoAfrica.co.za, www.reedexpoAfrica.co.za
From 0 to 100 in 65 years. During this time, Endress+Hauser has grown from a two-man operation to a global group with more than 13 000 employees. Today, the family company is one of the world’s leading providers of process and laboratory measurement technology, automation solutions and services. The company’s history is equally marked by change and continuity.

The cornerstone of this success was laid by Swiss engineer Georg H Endress and German banker Ludwig Hauser on 1 February 1953. With a small company focused on selling innovative electronic level measurement instruments, the two men discovered a market niche. It wasn’t long before Endress+Hauser developed its own devices and entered more and more new fields of activity and marketplaces.

Today, Endress+Hauser offer sales and support in 125 countries and produces in every major economic region of the world. The company has been a full-range provider of process instrumentation for many years. Recently the Group strengthened the area of process analysis with acquisitions, and tapped the laboratory analysis market through the takeover of German company Analytik Jena. Apart from this strategic focus, the company’s development is being spurred heavily by digitalisation.

The family company’s structure and culture continues to provide a high degree of continuity, which serves as a framework for growing the business over the long term and stimulating innovation. At the same time, the company is built on a foundation of clear principles and strong values. From the beginning, Georg H Endress emphasised customer focus through his motto ‘First serve, then earn.’ His trust in people and their abilities is still ingrained in the company today.

Matthias Altendorf has been CEO of the Endress+Hauser Group since 2014, replacing Klaus Endress who took over as president of the Supervisory Board after 19 years at the helm of the company. He represents, together with his brother Hans-Peter Endress, the interests of the family, which continues its involvement in ensuring the company’s ongoing success.

Marthinusen & Coutts recently executed the sub-assembly of six gearless mill drives for Minera Panama’s remotely situated Cobre Panama project in record time, and as a result was able to hand the machine over to the mechanical teams for assembly well ahead of schedule.

Minera Panama, the Panamanian subsidiary of First Quantum Minerals, is currently developing the Cobre Panama project in the country’s Colon province. The mine life has been estimated at more than 30 years and will produce around 300 000 tons per year copper, 100 000 ounces per year of gold and 2 500 tons per year of molybdenum.

Of the six ABB gearless drives being installed, four will power ball mills and the other two will drive SAG mills. Importantly, these massive machines are among the largest ever installed in the world and were transported in quartered sections to site for assembly.

Commenting on the role that Marthinusen & Coutts played in this project, divisional CEO Richard Botton said that a team of six highly competent and skilled technicians was responsible for the completion of the project within extremely tight time schedules. “The depth of experience and technical competence within our team proved vital to the successful completion of the work, especially given the various challenges encountered on a daily basis,” he added. “The average execution per machine took just 28 days.”

Another major challenge that the team had to contend with was adverse weather conditions at the location. This region receives between five and seven metres of rain per year, with ambient temperatures often exceeding 35°C and humidity levels above 80% on a daily basis.

Botton says that working closely with the ABB on this project, was also vital to its success. He pointed out that it is not unusual for Marthinusen & Coutts to partner with OEMs on projects such as this.

For more information contact Richard Botton, Marthinusen & Coutts, +27 (0)11 607 1700, richardb@mandc.co.za, www.mandc.co.za

For more information contact Su-Anne Willems, Endress+Hauser, +27 (0)11 262 8080, suanne.willems@za.endress.com, www.za.endress.com
Beckhoff Automation and EPLAN present Process 4.0 – the first ‘Fourth Industrial Revolution’ seminar for process in South Africa

This 2018 series of breakfast seminars is aimed at industry segments such as oil and gas, petrochemicals, chemicals, water and wastewater, food and beverage, mining and metals, plastics, woodworking, pharmaceuticals, biotechnology and pulp and paper.

Process 4.0 is the next-generation of process automation and seminars and will cover the following topics: integration of HART devices through FDT/DTM into PC-based control systems; ultra-thin integration of intrinsically safe field devices; multi-touch control panels and panel PCs for hazardous locations; big data analytics; and remote data access in the cloud.

Dates and venues are as follows:
- Durban – 23 July.
- Cape Town – 25 July.
- Secunda/Sasolburg – 26 July.
- Johannesburg – 27 July.

Attendance is free of charge and will earn CPD points.

For more information contact Aimée Schumacher, Beckhoff Automation, +27 (0)11 795 2898, aimees@beckhoff.co.za, www.beckhoff.co.za

Appointments

Hytec Group has appointed Tillmann Olsen as deputy chief executive.

Hytec has appointed Abrie van der Merwe as general manager of Hytec Hydraulics in Botswana.

Hydraulic & Automation Warehouse (HAW) has appointed Werner Joubert as general manager.

The Magnet Group has appointed Devashan Naidoo as external sales engineer, Magnet Electrical Supplies, Durban.

The Magnet Group has appointed Sizwe Mthabela as junior lighting designer, Magnet Energy, Durban.

Yokogawa South Africa has appointed Douglas Mbatha as junior FSD sales proposals.

Yokogawa South Africa has appointed Bafana Msibi as EPC sales proposal specialist.

Yokogawa South Africa has appointed Sonja Coccioni as service administrator.

Yokogawa South Africa has appointed Thandeka Simelane as sales specialist for mining.

Yokogawa South Africa has appointed Morris Yoko as junior sales proposal specialist.
TC1001 – Process Measurement and Instrument Configuration 1
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TC1002 – Process Measurement and Instrument Configuration 2
Sandton 26-29 Mar 2018

TC1003 – Process Measurement and Instrument Configuration 1 and 2
Sandton 19-29 Mar 2018

For more information contact
Nico Marneweck, Endress+Hauser,
+27 (0)11 795 2898, training@beckhoff.co.za, www.beckhoff.co.za

PN121 – Pneumatics (2) Maintenance
Durban 11-13 Apr 2018

PN111 – Pneumatic (1) Basic
East London 18-20 Apr 2018

HY511 – Hydraulics (1) Basic
Johannesburg 24-26 Apr 2018

For more information contact
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For more information contact
Vanessa Bonhomme,
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CT Control Systems is a recognised leader in industrial automation design and implementation having attained its ISO 9001 certification. Autotronix offers its clients turnkey control system integration services for energy management, PLC/HMI/SCADA, VSD, manufacture of control panels, applications for water distribution and manufacturing. The company operates from offices in Gauteng and KwaZulu-Natal.

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www.iritron.co.za

Process Dynamics

Process Dynamics specialises in industrial automation and process control. The company is one of Africa’s leaders in turnkey automation projects and process dynamics, and specialises in the integration of scada (Wincc, Wonderware, Citect) and PLC (Siemens, Schneider, Allen Bradley) as well as panel manufacturing and installation.

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SAM – Systems Automation and Management

Systems Automation and Management is a supplier of data acquisition systems and innovative automation solutions and is one of the leading integrators of PLC, scada and fieldbus systems in South Africa. The company’s comprehensive range of capabilities includes industrial networks, automation and control, scada, custom solutions, information delivery, data warehousing, hardware and software, BMS, MIS and MES.

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info@moore.co.za
www.moore.co.za

PSY International

PSY International specialises in industrial automation and process control. As an approved ABB Authorised Value Provider for softstarters, VSDs and UMCs, it guarantees supply of high quality and technologically advanced products for energy measurement and monitoring. Its core competencies include system integration; control panel building and commissioning; automation design and supply; maintenance and breakdown service; PLC and scada software development and building management systems.

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paul@psy-intl.com
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Saryx Engineering Group

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Executive Planning Session
At the upcoming Executive Planning Session, the SAIMC will discuss various issues that need to be addressed. Some of these include:
• Driving education standards to address the needs of industry, including but not limited to, introducing international education programs and qualifications. For too long our industry has had to retrain graduates before they become useful to an organisation in a C&I capacity. If industry gets its act together, we could very soon see students qualifying that could hit the ground running in this regard.
• Students are hampered by a lack of relevant practical experience. There is no coordinated effort by industry to ensure that students receive the experience they require to register as professional engineers/technicians/technologists.
• Revisit the benefits to our members and patron members (branch and national), based on the feedback we have received from surveys.
• The impact of the Internet of Things (IoT) and Industrie 4.0 on South Africa and the responsibility of the SAIMC in this regard.
• Registration of an Automation category. A lot of work has been done in this regard and the time has come for the SAIMC to take the next step regarding the education, training and professional registration of C&I personnel. As an industry we have some choices to make and now is the time!

After this session these actions will be documented and prioritised to shape our actions for the future with a focus on what is most important.

In closure, the time for new leadership at the SAIMC has come, both at the branch level and on council. This is an exciting time. Leadership changes, the SAIMC has always taken us into new territory. We have evolved from an obscure organisation into an international player working with the Automation Federation to establish automation as a separate engineering discipline and we are excited to take you along with us. The time is now!

Yours in automation,
Johan Maartens
Chief Operating Officer, SAIMC.

From the President’s desk

Tshwane branch
The plan for the year is to focus on technical evenings, site visits (Aerosud is a possibility but still to be confirmed), publishing technical papers, hosting training and speaking at events. Of course this does not mean that there won’t be social events, the branch is firmly committed to these as well.

The new committee members are as follows:

Feedback on recent developments
Council:The main matter to report back on is that we have a strategic planning session scheduled for 9 March, ahead of the national AGM. The second point of note is that an Internet of Things portfolio has been discussed with the exact scope still to be defined. More information about leadership succession will also be shared at the AGM.

FIRST Robotics SA: It is understood that the MoU has been signed and the next step is to make payment to FRSA as per agreement. It is hoped that respective parties will continue to promote the programme. It will also be appreciated should any members wish to get involved in their private or professional capacities.

Events: So far there is interest from the following companies to present at the technical evenings: IFM, Metso, WIKA, Beckhoff, VEGA, Yokogawa, Swagelok and Proconics. Topics still to be finalised as well as the timing.

Witbank: Nothing to report other than that we are investigating the feasibility of starting the branch this year.
Secunda branch

AGM
The branch AGM was held on 18 January at Honeywell HUB in Secunda. All the successes of 2017 were discussed and the new committee for 2018 was elected as follows:
- Johan Maritz (chairman, golf day, marketing and education).
- Annemarie van Coller (vice chairman, high tea and year-end function).
- Gerhard Swarts (treasurer and media).
- Xandri Cornelissen (secretary, publications, high tea and year-end function).
- PJ Truter (technology evenings, training courses and technical papers).
- Iddo Japhta (site visits and golf day).
- Andrew Barnes (webpage).
- Lizwe Sikunyana (roadshows).
- Johan Grobler (newsletter and electronic communication).

Technology Evening
After the AGM, Ian van Rensburg from Mitech kicked off the first Technology Evening on the topic: How to deal with cavitation in a control valve successfully. Ian described cavitation as the rapid formation and collapse of vapour bubbles, which can cause destruction in a valve through pitting damage on the internal body and seat. It is important to eliminate cavitation as this measure can reduce the downtime on a plant, as well as reducing the maintenance costs.

There are four methods to deal with cavitation:
1. The valve should be constructed of a hard-faced material. This method will not eliminate cavitation but will delay the onset of repair for the valve.
2. Installation of downstream choke plates. This method will move the cavitation area downstream and away from the valve, causing damage to the plates rather than the valve.
3. Install a cage guided valve. This method will reduce the pressure drop across the valve eliminating cavitation.
4. Severe service trims can be installed around the valve in order to reduce the pressure drop across it, similar to a cage guided valve.

The branch thanks Ian for his informative presentation.
All instrumentation and control related mechanicians, technicians and engineers are invited to attend the monthly Technology Evenings. The planned dates for the rest of the year are as follows: 1 March, 5 April, 3 May, 7 June, 5 July, 2 August, 6 September, 11 October and 1 November.

Presentations earn CPD points for ECSA registered persons and any enquiries can be directed to Johan Maritz, johanmaritz260@gmail.com, 082 856 3865.
The branch AGM was held on 7 February at the usual Durban Country Club venue. Whilst AGMs never seem to attract the same attendance as technology evenings, we were happy with the turnout and, as usual, there was a good buzz and great interaction and networking. The committee would like to thank those who attended and for their continued support in the branch activities.

Kevin McElroy kicked off proceedings with the treasurer’s report – going through in fine detail the expenditure and income. The branch bank account shows a healthy balance, whilst still contributing funds towards technology evenings, school visits and training. Our big income generators are the branch patron members (of which we have to date 17) and again, our thanks to these companies without whom we would not be able to contribute as much to the C+I industry as we do. Our golf day also continues to show a good profit and the organisers (Dean Trattles, Howard Lister and Steve Sanders) received a round of applause for their efforts.

Chairman, Hennie Prinsloo, then went through the year’s activities and highlights and thanked the committee for their dedication and hard work. He reported that technology evening attendance was gratifying and that all our meetings for next year had been filled. The October slot has been allocated for an end-user presentation and if anybody is interested in presenting here, they should contact the branch directly. 2018 will see more training in the form of CPD-accredited courses, more colourful and exciting technical evenings and a revised/rescheduled mini-exhibition.

We were fortunate enough to have council representation from Vinesh Maharaj – past president of the SAIMC and past chairman of the Durban branch. Vinesh started off his SAIMC journey in Durban, so it was wonderful to welcome him back and have him present the president’s message on behalf of Oratile. The focus of Vinesh’s presentation was the structure and mechanism of council, which everybody found really informative.

He ended off by saying that without the branches, the SAIMC wouldn’t exist and they are the ears and eyes of the organisation – understanding the areas in which they operate, which in turn feeds initiatives and thinking from council. Finally he thanked the Durban branch for their efforts during 2017 and for continually raising the bar.

The online election process was completed ahead of the meeting, duly audited by Rob Moxham and the new committee is as follows: Hennie Prinsloo, John Owen-Ellis, Prof. Ralph Naidoo, Jane van der Spuy, Howard Lister, Dean Trattles and Kevin McElroy.
Plant control systems and the Internet

It is a common saying that the pace of technology change accelerates with time: although possibly as the observers get older, they become set in their ways, and cannot keep up. Well, one of these is certainly true, in my experience. It is not only the pace of such changes, but the speed at which the changes spread across the ‘world market’, that makes new technologies so rapidly applied and, sometimes, profitable.

In consumer markets, the effect is most evident, with the spread of mobile phones and mobile computing: possibly this would all not have come to pass without the availability of the Internet fuelling the spread of information. But for automation, and industrial sensors, has the technology change been rapid? I believe it has, and believe it is now, accelerating ever faster taking advantage of the advances made to meet the demands of other users. This has been evident, and mentioned in these columns, in referring to wireless sensors, batteries for self-powered devices, and self-power from solar or vibration or heat energy. There are many more developments that should be included in that list.

But how are the major sensor and automation companies driving this growth into their businesses using advances in technology: what are they researching? Where are they investing to get a business advantage? I think that their business planners are having a difficult time at the moment.

Around ten years ago, the big new technology coming to the fore was wireless communication from battery powered sensors. The large automation companies, like Emerson and Honeywell, invested heavily into this technology, and there was the inevitable confrontation between two rival systems – WirelessHart and ISA100. The automation marketplace thrives on such confrontations, for example the spat between Foundation Fieldbus and Profinet. It happens in other markets too; think of Blu-Ray and standard DVDs, PAL and NTSC TV systems etc.

Other perceived growth areas

After the wireless investments blossomed, the Internet was looming, and everyone believed they had to take advantage of the data that could be collected, and networked. Certainly Emerson and ABB went heavily into power network control systems, but ABB had major product availability and systems installation capability in the power industry and has made real progress. Emerson eventually sold out of this network power business, but retains the Ovation DCS used for thermal power station control on site.

Automation companies also bought into the long-established, relatively dormant and slow market of condition monitoring systems, by acquiring the companies quoted to be ‘active’ in the field, who had the ‘black art’ knowledge of industrial condition monitoring. Personal experience, back in the ‘70s, has taught me what a hard sell and difficult market even the simpler condition monitors offer, monitoring bearing wear etc, and that hardly suits the major project potential that might be of interest to big contractors. Complex systems, such as those applied to turbines in power stations, did offer potential, but needed real specialist back-up. Additionally, the people in the business, such as Schaeffler perhaps (once again the product suppliers with the customer base), slowly developed their own bearing monitoring systems, ranging from portable hand-held units to bigger wired/wireless systems – these are the ones that I believe will succeed in this market.

An alternative approach adopted was based on wireless technology developments, which needed a central monitoring system, the ultimate goal for the automation guys. Sensors for steam trap monitoring were designed by majors such as Emerson, to expand their plant control systems into condition monitoring for the plant engineers. Sure enough, after a slower start, steam trap companies such as Anderson (US) and Spirax Sarco (UK) developed their own systems, and had the market entry with the customers using their traps.

The opposite approach was adopted by Yokogawa, which is the pioneer of ISA100 industrial wireless systems. They created alliances with people like Bently Nevada, the bearing condition monitoring sensor people, and with Spirax Sarco on steam traps. Maybe this was to be able to reverse-sell them the back-up products and technology for wireless systems, or maybe to hope for the potential of a plant monitoring control system supply.

Software systems

Most of the automation majors have alliances with the large software and computing companies, like Cisco and HP. The current approach seems to be to use these alliances to piggy-back a 24/7 plant monitoring system using the Internet, supplied as a service across the world. Again, I believe the companies with the product on the ground, the stuff that needs monitoring, will be the major players. Here it looks like GE, monitoring its own brands of refrigeration compressors, large pumps and gas turbines at power stations and offshore etc. are best placed.

The future

The quandary is where the Internet will help the industrial control systems and sensor suppliers expand their businesses in the future. The answer deduced above is stick to what you know and what you are known for. The irony is that the major with the best potential now is Rockwell Automation, with its systems based around Ethernet communications, interfacing with anything, plus their onsite Ethernet hardware, with control systems already configured to deal with such varied inputs. Maybe this was why Emerson made an abortive take-over offer for Rockwell late last year. The potential has also been seen by Profinbus, who are pushing forwards with their Profinet, and where they go, Siemens will always be in the background.

Nick Denbow’s European report

Nick Denbow spent thirty years as a UK-based process instrumentation marketing manager, and then changed sides – becoming a freelance editor and starting Processingtalk.com. Avoiding retirement, he published the INSIDER automation newsletter for 5 years, and then acted as their European correspondent. He is now a freelance Automation and Control reporter and newsletter publisher, with a blog on www.nickdenbow.com
Define your game plan for digital transformation at X-Change 2018

Wonderware Southern Africa’s 26th annual User Conference, X-Change 2018, will return to the picturesque Champagne Sports Resort, from 15-18 April. X-Change has been a success for a quarter of a century because it has always delivered three consistent values: business and networking opportunities; the key to improved operational benefits; and an unequalled insight into the technologies and approaches that drive it all.

This year, X-Change will address the addition of Schneider Electric’s solutions to the portfolio and will also feature industry-specific tracks for mining & metals, food & beverage, oil & gas, water & wastewater, as well as industrial manufacturing.

Technology drives opportunity
Industries and businesses around the world are faced with an enormous amount of pressure across multiple dimensions. Declining commodity prices create pressure in terms of investment ability. Heightened regulatory compliance creates challenges that business has never faced before. The modern workforce is shifting in terms of how work is performed, while the modern enterprise strives to retain as much institutional knowledge as possible. And improving safety remains paramount across all facets of the enterprise.

Digital transformation merges technology innovation with domain expertise. This enables not only the contextualisation of new and existing data, but also delivers actionable insights and information that the enterprise can execute upon to close the loop of continual process improvement.

Unique customer experiences, not IoT hype.
To illustrate the point that such technologies are business enablers, a dozen presentations by end-users will illustrate how Wonderware is helping them achieve their operational and business goals. But this is only a fraction of the dozens more presentations that will address key issues across most industrial domains.

What’s in it for you?
In short, your game plan to improve productivity and return on capital, enable insights across enterprise value chains, enhance competitiveness, improve customer experience, and cut through the hype.

X-Change provides in-depth information sharing, education and unparalleled networking opportunities in a power-packed three day event. Attend product roadmaps, solution and industry-specific tracks, and deep-dive technical breakouts. X-Change also features two days of demonstrations, displays and complimentary hands on training courses at the Collaboration Expo.

The event is open to everyone and not only to Wonderware users. On offer are solutions that feature extensive integration facilities to help users get the most from their existing assets. It is no coincidence that many of the world’s leading industrial companies make use of Wonderware, as they know that this remarkable suite of inclusive solutions safeguards their past investments.

X-Change by numbers
- 350 delegates will get to see how their colleagues are addressing the ever-increasing challenges their industries face. They will meet like-minded people from Africa’s top mining companies, leading food & beverage producers, top manufacturing companies and major utility providers, allowing them to see how the problems they are confronted with are being addressed.
- 45 top-rated technical presentations by local and international industry experts will address various topics of interest to industry, including what to expect in the near future, and how to turn this into bottom-line profits. But they are not just at the speaker’s podium; they are available for
one-on-one meetings about specific issues as well.

- 12 end-user presentations will demonstrate the value Wonderware and Schneider Electric Software solutions have delivered to South African companies in the areas of scada/HMI, manufacturing operations management and industrial information management.

- 24 exhibitors from the best system integrators and solution providers in southern Africa will show the depth of knowledge and expertise available right here and now. Every year, these industry solution providers choose the unique opportunities offered by X-Change to network with existing and potential customers and to showcase their capabilities. From instrumentation to software and from consulting to system integration, these solution suppliers are at the top of their game and combine their skills, knowledge and experience with Wonderware and Schneider Electric Software solutions to provide world-class implementations for industry.

**Industrial software platform**

Digital transformation, with a true industrial software platform at its core, is now enabling organisations to gain a full 360° actionable view across the entire value chain. The need to securely and seamlessly connect different and complex data points, across the entire, multi-vendor value chain is only the first step.

The company’s view in terms of a technology platform is how does it all come together? How does one maximise the information that is available and start to get it to work together in the context of the business life cycle, the asset life cycle and ultimately the operational life cycle? Wonderware is not new to this space. With 4000 industrial companies using System Platform today, there are 160 000 developers working on 2 million licences at over 100 000 sites around the world. Some 20 billion operating parameters are currently monitored in the installed base with about 4 trillion transactions processed and stored every day.

This true industrial software platform is more than a sum of products, more than just a technology. It is a foundation that truly enables organisations to be successful, and delegates can experience this firsthand at X-Change 2018.

**Conclusion**

X-Change is designed to help delegates address today’s challenging issues, whether they are in the mining, manufacturing, food & beverage or utility sectors. Brochures can only go so far and often fail to tell it like it is. X-Change presents an opportunity to ask searching questions, so visit the Champagne Sports Resort, from 15-18 April and get the answers from those best qualified to supply them.

To book a seat, do a presentation or reserve an exhibition stand, please visit www.wonderware.co.za/x-change

For more information contact Jaco Markwat, Wonderware Southern Africa, +27 (0)11 607 8303, jaco.markwat@wonderware.co.za, www.wonderware.co.za
Simulator demonstrates complete power systems

Cummins Power Generation has officially launched a new simulator, at the Cummins Training Centre in Johannesburg, to demonstrate its entire product line as an integrated solutions approach, from genset controls to annunciators, remote monitoring, digital master control (DMC), and transfer switches.

The simulator covers the broader African market, joining a similar setup in Dubai for the Middle East and north Africa, with another simulator mooted for Nigeria in order to cater for central and west Africa, Cummins Africa director, Alok Joshi, explains that the plan is to have these simulators located in key markets for the benefit of consultants and customers.

In particular, the PowerCommand Control Panel, an autonomous microprocessor-based control for paralleling, load sharing and protection is showcased, while DMCs come into play in complex systems such as those for data centres, healthcare facilities and wastewater treatment plants.

Simulating real-time scenarios

“These are all critical applications in terms of standby power,” highlights Joshi. “We are now able to simulate such real-time situations and demonstrate how our products respond under such conditions. This simulator is aimed specifically at customers in the power generation sector that specialise in backup or prime power supply.”

The simulator also provides essential information related to electricity failure under varying circumstances. “If you have a single grid and it fails, and you need to share the load between different generators, for example, how do you simulate that?” questions Joshi.

Cummins Power Generation is now able to demonstrate how its range of master controls can be used to configure a particular generator, and how that generator can be synchronised with other units on the grid. “It is a fantastic tool,” stresses Joshi. “Of course, the generator or grid is not live, but users are able to simulate particular conditions in order to see what might happen.”

Developed through global collaboration

The technology behind the simulator has been developed by Cummins globally. “The architecture was discussed in terms of what we needed to demonstrate for customers,” elaborates Joshi. “This is testament to both our flexibility and innovation in responding to specific needs and applications.”

The simulator will be operated by internal Cummins Power Generation staff, which means additional training will not be required as they are already familiar with the extensive product range and its capabilities.

Depending on the complexity of the system, different types of master controls are offered. “For multiple generators on a single grid, we can offer one solution, with a slightly different configuration for customers who want to have multiple generators on two grids, for example, with the addition of load management,” points out Joshi. “We can effectively customise any type of solution depending on the criticality of the application.”

The benefits of the simulator for customers are twofold: firstly, to showcase the solution capability of Cummins Power Generation, and secondly, to familiarise customers with its product range. Joshi adds that a major competitive advantage of Cummins is its ‘Power of one’ philosophy, which means that the company designs and manufactures all system components itself, from the controls to the engines and alternators, as well as peripherals such as turbocharger fuel systems.

“The bulk of the critical components are made by Cummins,” adds Joshi, “thus, we have the benefit of experience with everything that goes into a generator system. The simulator gives us an overview from a controls perspective on how we can synchronise a range of grids with different generators.”

On the product side, the simulator can be tailored for the application at hand, from fast transient response for a data centre, to prime power situations where fuel efficiency and low emissions are paramount. “What we wish to achieve in the context of the new simulator in Africa is to educate our customers about our capabilities, and to ensure that they know who we are and what we can achieve for them,” concludes Joshi. “Cummins is a very strong brand globally. Now, we want to bring that strength to bear in Africa as well.”

For more information contact
Palesa Ramodibe, Cummins Africa,
+27 (0)11 589 8400,
palesa.ramodibe@cummins.com,
www.cummins.com

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HellermannTyton’s TBM878 multimeter, insulation and earth continuity tester

The TBM878 Multimeter 3 in 1, is a true RMS digital multimeter with the added functionality of an insulation tester and earth continuity tester combined into a single, compact, handheld unit. This multipurpose CATIV 600VV unit provides maximum versatility for compliance testing, troubleshooting and preventative maintenance.

The TBM878 has the ability to determine the state of insulation material and earth continuity. Furthermore, it has a convenient remote probe that inhibits testing on live circuits and hands-free lock feature for continuous testing.

The instrument offers five test voltages: 50, 100, 250, 500 and 1000 V in order to measure resistance levels from 0 Ω to 25 GΩ for insulation as well as 200 mA high current test for earth continuity. The true RMS of the TBM878 is ideal for non-sinusoidal waveforms of complex voltage or current signals and has an intelligent auto power off function to extend battery life. Additional features include:

- Beep-jack – beeps against improper terminal plug in (decreases risk of damage)
- VFD V & Hz (variable frequency drives) measures fundamental voltage and frequency of most variable frequency drives
- Smooth mode – smooth out unstable insulation resistance readings
- X-Speed capacitance – measures up to 30 mF in only a few seconds, 1 kV protection
- LCD Display (counts) – 6000
- Analog bar graph
- REC – recording max, min, max/min and avg
- Splash and dust proof.
- Certification – UL, IEC610010-1
- Temperature -50 to 1000°C.

Applications include CoC testing, motors, generators, cables or switch gear.

For more information contact
Ryan Burger, HellermannTyton,
+27 (0)11 879 6658,
ryan.burger@hellermann.co.za,
www.hellermannyton.co.za

Online chloride/sulphate analyser

Mettler Toledo’s Thornton 3000CS analyser is an online instrument for direct measurement of the corrosive ions found in power plant water and steam. The analyser continuously monitors these highly corrosive contaminants to assist in corrosion control, thus minimising damage to critical power plant equipment. Early, unambiguous detection of trace levels of chloride and sulphate ions is provided with minimal operator supervision.

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 has therefore been identified as key in power plant chemistry.

The 3000CS uses microfluidic capillary electrophoresis, an ionic separation technology, to provide an alternative to expensive offline methods, such as ion chromatography and inductively coupled plasma.

The analyser automatically performs direct chloride and sulphate measurements in the water/steam cycle. The most important point in the cycle is at the turbine inlet, to ensure that only acceptable levels of chlorides and sulphates enter the turbine along with the steam. For boiler feedwater monitoring, the analyser ensures low ppb (parts per billion) level contaminants. For condensate monitoring, it detects breakthrough of contaminants and deterioration of sulphated cation resin. Low chloride and sulphate levels are ensured in makeup water by monitoring them after all treatment stages, before the water is sent to the storage tank that feeds the water/steam cycle.

The unit features semi-automatic calibration and an intuitive touchscreen interface. Intelligent Sensor Management technology provides diagnostics that predict when maintenance or replacement of consumables will be required.

The 3000CS provides accurate chloride and sulphate measurements continuously, delivering a rapid return on investment by eliminating the need for costly internal or external lab tests.

For more information contact
Darren Prinsloo, Microsep,
+27 (0)11 553 2300,
darren.prinsloo@microsep.co.za,
www.microsep.co.za
Let's write the future
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ABB’s measurement solutions give everyone the results they’re looking for. Whether you’re an instrument engineer, company CEO or simply someone in Africa expecting the lights to come on when you turn the switch.

Measurement Made Easy. www.abb.com/measurement
FLIR recently announced the CM275 industrial thermal imaging clamp meter, which combines thermal imaging with electrical measurement features in one powerful inspection, troubleshooting, and diagnostic tool. Offering electricians a visual way to identify hotspots and overloaded circuits, the meter makes inspecting and servicing plant equipment and facilities safer and more efficient.

FLIR’s IGM (infrared guided measurement) uses thermal imaging technology to guide users to the precise location of a problem, pinpointing issues faster and more efficiently. Bluetooth wireless connectivity allows for direct communication with the FLIR InSite professional workflow management app (optional), while a robust package makes this clamp meter suitable for any rugged environment.

The new advanced 600-Amp AC/DC clamp meter offers 160x120 thermal resolution (19,200 temperature measurements), to highlight areas of concern. It has a wide range of measurement functions, plus a narrow jaw, built-in worklights, and a screen that is more than 40-percent larger than the previous model. Onboard data storage is available for 10 sets of 40 k scalar measurements (100 images), with recall function for data review.

Flexible battery options include the long-life Li-Poly rechargeable battery and/or standard AA batteries. A no-tool battery compartment door ensures quick and easy battery changes. The CM275 comes with a 10 year limited warranty on both the product and the detector.

Efficient three-phase solid state relays

Autonics has released the new SR(H)2/3 series three-phase solid state relays for application in high power systems. The relays are offered in 2 and 3-pole types for controlling two-phase and three-phase loads. Standalone SSR type (SR2/3) and integrated heatsink type (SRH2/3) models are available.

Two mounting hole types (U-type, O-type) are available on all models, to allow flexible installation and mounting on various types of heatsinks. The built-in overheating alarm function provides safe and reliable operation by providing users with alarms or disconnecting output signals in case of overheating due to product damage or over current. The clear and bright green LED input indicators also allow users to identify the operating status. The relays also feature high heat dissipation efficiency with ceramic PCB and integrated heatsinks, and select models feature high dielectric strength of up to 4000 VAC.

The SR(H)2/3 series is available in various models to fit diverse application environments. Users can select from rated input voltage (4-30 VDC, 24 VAC, 90-240 VAC), rated load voltage (24-240 VAC, 48-480 VAC), and rated input current (15 A, 30 A, 40 A, 50 A, 75 A) options. Users can also choose between zero cross turn-on and random cross turn-on models. The heatsinks on the integrated heatsink models offer high heat dissipation to maintain lower temperatures, and can be removed or attached as needed, making it easier to replace in case of damage or failure. A diverse lineup of single-phase solid state relays is also available.

Autonics Corporation is a leading manufacturer and exporter of industrial automation products in South Korea. With strategic plans to increase distribution of its products and services to southern Africa, the company is looking for qualified local distributors as partners. Inquire about becoming a business partner and experience all the benefits of working with Autonics.

For more information contact Dean Choi, Autonics, +82 51 519 3232, sales@autonics.com, www.autonics.com

For more information contact Reynhard Heymans, FLIR Systems, +27 (0)11 300 5622, reynhard.heymans@flir.com, www.flir.com
Legrand's lighting and motion management systems encompass a wide range of sensors designed to make buildings more energy efficient by automatically reducing the amount of time lighting is left on unnecessarily. According to the company, reduced lighting consumption not only lowers operating costs, but also reduces lamp replacement and maintenance requirements, and helps decrease greenhouse gas emissions. Motion and lighting management sensors can operate in occupancy mode where lights are automatically switched on or off according to occupancy, or in vacancy mode for additional energy saving, where lights are manually switched on and automatically switched off when the person leaves the area. These sensors can also use passive infrared technology (PIR), ultrasonic or dual technologies.

Suitable for harsh environments
Lighting management sensors are suitable for areas of a building with or without natural light, including passages, corridors, hallways, staircases and restrooms, and also for offices, storage rooms and warehouses. Additionally, these sensors are available with advanced features for installation outdoors and in humid areas of domestic, commercial and industrial buildings.

Legrand's lighting management sensors for controlling a single circuit in outdoor and damp areas with natural light have automatic on/off controls, manual adjustment of the light level threshold and time delay via a potentiometer. PIR direct wall/surface mounting motion sensors, with a recommended 2.5 m fixing height, have 360° infrared detection and an 8 m range. These sensors have adjustable light level thresholds from 10 to 1 275 lux and an adjustable time delay between 10 s and 10 minutes. Standby consumption is 0.75 W. PIR sensors for wall or ceiling mounting, with a directional head, have a 360° infrared detection and standby consumption of 0.9 W. The light level threshold is adjustable from 1 to 1000 lux and the time delay is between 12 s and 16 minutes. The minimum fixing height is 1.7 m and the optimum distance between sensors is 6 m. PIR technology direct wall/surface mounted 180° sensors have a front range detection of 6 x 15 m and consumption of 20 mA on standby. Connection to the controller is via a cord or RJ 45 cable.

Legrand's lighting management systems have been designed and manufactured to avoid energy waste as the building only consumes the energy it needs, when it needs it. The solutions for outdoor areas and humid areas also include sensors for managing multiple circuits.

For more information contact
Legrand SA, +27 (0)11 444 7971, legrand.south-africa@legrand.co.za, www.legrand.co.za

The Space Motion Series SMM 01 from Telco Sensors operate on the Doppler radar principle to detect motion in a defined area by means of microwaves using the latest sensor technologies. With its compact housing, it can be placed behind plastic constructions and completely hidden from view.

The sensor distinguishes objects that are in motion towards or away from it, for example, in places with multiple elevator doors next to each other, where people move from one to the other. In addition, the measuring range is divided into ‘low’ and ‘high’ speed zones for fast- and slow-moving objects.

The redistribution of these zones is all adjustable from 0 to 100% as is the maximum range of the sensor itself. Background suppression can also be set to continuous movement to filter, for example, the moving handrail of escalators.

For more information contact Gail Norton Instrumentation Agencies, +27 (0)31 701 4861/2, telco@telcosa.co.za, www.telcosa.co.za
For many applications, embracing the IoT has paid big dividends. One noticeable trend is the migration of a large number of serial devices to Ethernet-based networks, allowing plant managers to tap the full potential of their legacy devices by unlocking previously unused data. However, adding value to these serial devices comes at a cost in terms of time and effort, especially when dealing with a large-scale Modbus network. For example, let us take a look at how the complicated nature of this type of network presents itself in building automation, where hundreds to thousands of serial-based temperature controllers communicate via Modbus RTU protocol. These temperature controllers need to be controlled and monitored in a control room, which uses Modbus TCP. At this point, the non-interoperability of protocols becomes an issue. A tried and tested solution to overcome non-interoperable protocols is installing high port density Modbus gateways that convert serial to Ethernet, as well Modbus RTU to Modbus TCP, and vice versa. However, engineers still have to figure out how many gateways need to be installed and how many serial ports are needed on each gateway. Therefore, planning a network’s topology that involves a large number of Modbus devices to achieve full-fledged connectivity can really test designers.

Reality bites
To engineers, spending too much time and effort on planning a Modbus network’s topology is counterproductive. For example, they find it especially time-consuming to set up a Modbus slave ID routing table, which lists the connections of Modbus devices (Modbus slave IDs) to specific serial ports on a gateway. Adding to the frustration is a high possibility that things might not go according to plan in the field. Connectivity errors at field sites can undo all the meticulous planning in the office within moments, sending engineers back to the drawing board. A crucial aspect of planning Modbus network topology is to eliminate these connectivity errors when dispatching a large number of Modbus requests to the serial devices that are connected to a Modbus gateway. Life would be so much easier for engineers if they did not have to worry about which serial devices were connected to which serial ports on a Modbus gateway. In an ideal situation, they would be able to send out Modbus requests to a Modbus gateway, and the latter would automatically find the correct serial port that connects with the target device. This would iron out many problems, even when adding new devices to a system or connecting existing devices to a different serial port.

The key challenges
Serial-based device response times are generally slower than those of Ethernet-based devices. Their slower response time is even more evident when they are connected to a gateway in a daisy-chain topology, as the one-request-one-response nature of a Modbus protocol leads to a longer polling time. In these types of setups, a one-port Modbus gateway delivers better performance because a scada system can communicate independently with each gateway, thus shortening the communication gap between a large number of devices and the scada system. However, the management of multiple Modbus gateways is complicated. Hence, multiport Modbus gateways are more adept at managing a large number of Modbus devices. For example, one 16-port gateway can replace 16 one-port units. This frees up physical space and also only requires one power cable and one Ethernet cable. In addition, the large number of IP addresses needed for 16 one-port gateways can be consolidated into a single IP address.

But multiport gateways are not exactly a breeze when it comes to the management of multiple Modbus devices. Engineers first need to segment all the devices into groups and then connect them to a specific port. This is why a well created Modbus slave ID routing table is so important, but creating an efficient routing table is time consuming.

Dispatching a large number of Modbus requests
Unlike Ethernet switches, where routing is accomplished automatically through an ARP table, the routing mechanism for Modbus gateways with multiple ports is much more intricate. Currently, two types of routing...
For engineers who care about connection routing table significantly.

As previously mentioned, this reduces cabling fees and do not need to monitor devices in segments, a more popular option is using a Modbus slave ID routing table. The main purpose of the routing table is to indicate which Modbus device (Modbus ID) is connected to which serial port on a gateway. Once a gateway receives a Modbus request for a specific device, it can dispatch this request via the referring Modbus slave ID routing table to the serial port that connects to the target device. A scada system benefits by using only one IP address or TCP port to communicate with all the Modbus devices that are connected to a gateway, easing the management of devices and reducing connection fees considerably.

However, creating and maintaining a Modbus slave ID routing table is laborious. Also, it needs to be stressed that when engineers come in contact with a Modbus gateway for the first time, it would be as if they are climbing a mountain as they would be completely unfamiliar with routing table settings. They have to bundle the Modbus slave IDs into groups and then connect each group to a different serial port. For example, slave IDs 1-5 are connected to serial port 1, slave IDs 6-10 are connected to serial port 2, and so on. According to this method, they will have to set the routing rules 16 times for a 16-port gateway. The situation becomes a lot more taxing if the configuration and maintenance of a gateway's Modbus slave ID routing table a thing of the past. This function features in Moxa's MGate MB3000 Series, which consists of high-performance Modbus gateways with 2,4,8, or 16 serial ports. The series also supports routing by IP address or TCP port.

Routing by an IP address or TCP port
Some Modbus gateways perform the serial-port mapping functionality via an IP address or TCP port. This mechanism is suitable for engineers who want to monitor field devices in segments. All the Modbus slave devices that are connected to the same serial port through daisy-chain wiring correspond with a specific IP address or TCP port. That is, each serial port on a gateway corresponds with a unique IP address or TCP port. Furthermore, a high-port-density gateway can be used instead of a large number of low port density gateways. As previously mentioned, this reduces cabling significantly.

A drawback is that engineers have to configure as many IP or TCP connections as the number of serial ports available. In large-scale Modbus environments, systems usually adopt a large number of multiport Modbus gateways, making configuration a time-consuming task – not to mention the extremely high connection fees involved.

Furthermore, serial-port mapping with IP addresses or TCP ports needs to be manually maintained by an engineer, which requires the engineer to identify the serial port that a device is connected to, and the corresponding IP address or TCP port.

Routing by using a gateway’s Modbus-ID routing table
For engineers who care about connection fees and do not need to monitor devices in segments, a more popular option is using a Modbus slave ID routing table. The main purpose of the routing table is to indicate which Modbus device (Modbus ID) is connected to which serial port on a gateway. Once a gateway receives a Modbus request for a specific device, it can dispatch this request via the referring Modbus slave ID routing table to the serial port that connects to the target device. A scada system benefits by using only one IP address or TCP port to communicate with all the Modbus devices that are connected to a gateway, easing the management of devices and reducing connection fees considerably.

However, creating and maintaining a Modbus slave ID routing table is laborious. Also, it needs to be stressed that when engineers come in contact with a Modbus gateway for the first time, it would be as if they are climbing a mountain as they would be completely unfamiliar with routing table settings. They have to bundle the Modbus slave IDs into groups and then connect each group to a different serial port. For example, slave IDs 1-5 are connected to serial port 1, slave IDs 6-10 are connected to serial port 2, and so on. According to this method, they will have to set the routing rules 16 times for a 16-port gateway. The situation becomes a lot more taxing if the configuration and maintenance of a gateway’s Modbus slave ID routing table a thing of the past. This function features in Moxa’s MGate MB3000 Series, which consists of high-performance Modbus gateways with 2, 4, 8, or 16 serial ports. The series also supports routing by IP address or TCP port.

Just one click
A new leading-edge technology that automatically detects the Modbus requests from a scada system and sets up the Modbus slave ID routing table provides the answer. The Auto-Device Routing function only requires a single click to help the gateway detect which serial port is connected to a target Modbus device, allowing it to automatically dispatch a Modbus request to the correct serial port. It automatically creates the routing table, saving significant time and costs as engineers no longer need to create the Modbus slave ID routing table, eliminating possible human error in the process. Furthermore, it eliminates the effort needed to double-check the actual connections at field sites. Also, there is no need to refer to a historical Modbus slave ID routing table when adding or removing devices, saving time and effort.

By automatically creating a routing table, the Auto-Device Routing technology makes the configuration and maintenance of a gateway’s Modbus slave routing table a thing of the past. This function features in Moxa’s MGate MB3000 Series, which consists of high-performance Modbus gateways with 2, 4, 8, or 16 serial ports. The series also supports routing by IP address or TCP port.

For more information contact RS Components SA, +27 (0)11 691 9300, sales.za@rs-components.com, www.za.rsc-online.com

Web-based access control system for facilities

RS Components has announced availability of an IoT web-based system from ABUS that delivers superior access control management for small to medium-sized commercial and industrial buildings.

A winner of the IF Design Award 2017, the ABUS wAppLoxx is an innovative solution for professional access control that can manage access to as many as 20 doors in a building or facility. The easy-to-use system allows companies to manage access rights and quickly modify parameters for changes in staff or new employees. In addition, use of a dedicated app even makes it possible to adjust system settings using a smartphone or tablet. The wAppLoxx combines the advantages of traditional access control flexible and smart online management via the Web or via an intranet. Quick and easy creation of access rights is enabled for up to 150 people, for example, providing separate access rights for individual offices, archives or sensitive areas in building such as laboratories, medication storage facilities, warehouses or industrial complexes. In addition to providing access control, alarm systems can be connected via a cable to the wAppLoxx, thereby preventing false alarms and optimising overall building control.

The system includes a control unit, which can be connected to 20 wAppLoxxx electronic double-knob cylinders featuring a sturdy design with high-quality stainless steel knobs and a synthetic cap. These cylinders integrate write-protected MIFARE DESFire transponder tags and connect with the control unit via 128-bit AES-encrypted wireless communications. Two types of cylinder are available: one for access control and a second that is also suitable for alarm system control.

For more information contact RS Components SA, +27 (0)11 691 9300, sales.za@rs-components.com, www.za.rsc-online.com

www.instrumentation.co.za March 2018 27
In industrial process measurement and automation, demand is steadily rising for simple, reliable and maintenance-free measuring instruments in a pocket-sized format. The new Picomag from Endress+Hauser fulfils such requirements, making no compromises. Not only does it measure the flow of electrically conductive fluids, but also their process temperature. In addition, Picomag offers customers easy commissioning with Bluetooth using its SmartBlue App, as well as seamless system integration thanks to IO-Link technology, which makes Picomag Industrie 4.0 ready.

Whether it is for quantity measurement or process monitoring of cooling, heating or process water, due to its compact design, Picomag can be installed easily into any pipe up to 50 mm in diameter, even in confined spaces. For this purpose, there are various process connection adaptors available, such as NPT-thread, R-thread, internal thread, Tri-Clamp or Victaulic. Picomag is a cost-optimised solution for applications where the focus is on high repeatability and thus reliable measured values e.g. for correctly measuring water flows or for minimising energy costs in utility applications. It is suitable for process temperatures between –10 and 70°C and for pressures up to 16 bar.

Key features
Clear display with diagnostics field
The large and user-friendly display allows an instant local process reading of flow, temperature and total values. Errors occurring during operations, e.g. a partial pipe filling or an exceeded temperature limit, are displayed via diagnostic symbols in accordance with NAMUR recommendation NE 107. The screen rotates automatically depending on the installation position (horizontal, vertical), which guarantees optimal readability at any time. Configuration parameters can be called up and monitored by simply knocking on the device.

Wireless configuration and commissioning via Bluetooth
With Bluetooth connection, it is possible to carry out wireless configuration or data retrieval over a distance of 10 metres, even at installation sites which are difficult to access. The SmartBlue App from Endress+Hauser, which provides the user with quick and easy navigation through all device and diagnostic functions, is available for both Android and iOS.

Optimal system integration with IO-Link technology
Another highlight of the Picomag is the digital data transmission to process control systems via IO-Link technology. This communication standard has been established for ten years and can be combined with all conventional fieldbus systems. Thus, it offers maximum flexibility of installation into existing system infrastructures. The IO-Link master as an interface allows users to have comprehensive data access through the control room. Other advantages of the IO-Link technology include the automatic transfer of parameters after a device replacement as well as low wiring effort as compared to conventional wiring.

For more information contact Frans van den Berg, Endress+Hauser, +27 (0)11 262 8000, frans.vandenberg@za.endress.com, www.za.endress.com

IRt/c setup with auto-tune temperature controllers

In many applications, heating elements are employed to heat a product in an oven, furnace, or with jets of hot air. Conventional control devices using contact thermocouples measure and control the oven air temperature, IR heating element or air jet temperature, in an effort to maintain the correct product temperature and, therefore, quality. But often, the results are less than satisfactory.

Replacing the contact thermocouple (measuring, for example, oven temperature) with a non-contact IRt/c to measure the product temperature directly, will ensure that the correct temperature is maintained. Some readjustment of the controller parameters may be required because of differences in sensor response times – an IRt/c is much faster. After installing the IRt/c and calibrating the controller reading using a Microscanner D-Series, initiate the self-tuning cycle of the controller and check to see that the control is stable and accurate. If it will not self-tune properly, manually adjust the control coefficients to achieve stable control. Because the product temperature is likely to change more slowly than that of the original sensor, start by slowly increasing the ‘D’ factor of the PID coefficients.

For more information contact Temperature Controls, +27 (0)11 791 6000, sales@tempcon.co.za, www.tempcon.co.za
The Netherlands is among the world’s leaders when it comes to digitalisation and networking. But to enable deployment of smart technologies, two factors are vital: a mains power supply and Internet access. What companies working in sectors, such as ground water management, require is technology which is available even where these two conditions cannot be met. The Dutch company Distrimex, a sales partner to pump manufacturer BBA Pumps, has developed a device for this type of application that works independently of the power grid: the Smart Handy. This intelligent metering solution combines a robust protective housing with components from the Sitrans process instrumentation portfolio from Siemens.

The device is designed to allow reliable meter readings to be performed particularly on building sites with no mains power supply or hardwired Internet access. The technology allows not only precision measurement, but also remote access to the data, which eliminates the need for onsite meter readings, saving time and money.

**Automatic meter reading**

The Smart Handy uses the electromagnetic flowmeter Sitrans FM MAG 8000 from Siemens, which is capable of measuring with an accuracy of 0.2 to 0.4 percent. The meter is fitted with a long-life lithium storage battery and was designed without moving parts, which eliminates the need for regular calibration or certification. The wireless communication module optionally integrated in the MAG 8000 enables remote configuration over SMS. Updates can also be sent to the user over SMS or email.

Wellpoint dewatering company, Henk van Tongeren, is among a large number of Dutch contractors who rely on the solution. One application where the Smart Handy is in use is the building site for a new parking lot, where ground water has to be continuously pumped off due to excavation work. The metering device is installed in the discharge pipeline and four times daily it sends measurement data to a web platform linked to the Smart Handy. This allows the customer to access project data in real time and intervene immediately in case of a fault, for instance, a sudden change in the flow readings. For van Tongeren, the greatest benefit of the smart solution is the convenience of automatic meter reading, which used to be performed manually and had to be done onsite. This solution not only saves the operators a considerable amount of time travelling to and from sites to read meters, but also makes it quick and easy to gain an overview of the complete project at any time.

For more information contact Jennifer Naidoo, Siemens Digital Factory and Process Industries and Drives, +27 (0)11 652 2795, jennifer.naidoo@siemens.com, www.siemens.co.za
Bimetal temperature switch UL approved

WIKA has designed the new bimetal temperature switch model TFS135 for a wide range of applications. It is suitable for switching voltages of up to 250 VAC/2,5 A and has UL approval for the North American market.

The TFS135 conforms to the EU low voltage directive and has been designed for switching temperatures of 50-130°C, selectable in stages of 5°, and set permanently on delivery. With a vibration resistance of up to 10 g, the switch operates reliably, even under harsh conditions, while electrical plug connections make it easy to commission.

The new model is primarily used to protect plants and end devices against overheating. The bimetal disc detects the temperature and triggers the switch contact (normally closed) on reaching the nominal value. After cooling to the reset temperature, the circuit is closed once more and the monitored item is placed back into normal operation.

For more information contact WIKA Instruments, +27 (0)11 621 0000, sales.za@wika.com, www.wika.co.za

Temperature transmitter for demanding applications

The new Jumo dTRANS T07 device series is a two-channel temperature transmitter with HART communication available in a B-head or DIN-rail housing version. Models with Ex and SIL approval enables safe use in demanding process applications.

The configurable transmitter transfers converted signals from RTD and TC sensors as well as resistor and voltage sensors to the galvanically isolated 4-20 mA current output with HART-7 protocol. Internal sensor monitoring functions and device error detection allows for a high degree of measuring point availability. An optional plug-on display can be used on the B-head variant to display the current process value. The version with SIL approval enables safety-related applications up to SIL 2/3 (hardware/software).

The configuration of the transmitter takes place via the HART interface with a HART communicator and associated Jumo Device Description (DD). Alternatively, the configuration can also be easily set through a PC with a field device tool frame application and the Jumo device’s Type Manager in connection with a HART modem.

The dTrans T07 series is customised for all industries that require safe and reliable temperature measurement. Applications include the chemical industry, energy suppliers, power plants and the oil and gas industry.

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

On the safe side with differential pressure measurement.

Pressure vessels and process tanks have to meet high safety requirements. Continuous monitoring of the differential pressure plays a major role in minimising the risks from hazards such as excess pressure, leaks or dust-explosive substances. VEGABAR series 80 pressure transmitters have proven to be very effective for this task. And the method is simple: just put two of them together.

Thanks to innovative technology, two of these pressure gauges can be quickly transformed into a perfect electronic differential pressure system. Two sensors of the VEGABAR series 80 determine the process pressure with the help of two measured values: the tank pressure and the total pressure resulting from the pressure of the medium and the overpressure. The user can simply take a pressure transmitter from stock, order another identical sensor with electronics version 'slave' and have an electronic differential pressure system up and running in a jiffy.

As opposed to conventional differential pressure systems, electronic differential pressure measurement with VEGABAR series 80 is not affected by the ambient temperature or strong vibration. And it has another impressive feature: in the version with oil-free ceramic CERTEC measuring cell, the pressure transmitter is completely resistant to temperature shocks. In fact, this extremely high overload resistance factor of 200 can be found nowhere else on the market. Its simple operation based on the proven instrument platform plics and optional 'second line of defense' make it the ideal solution for differential pressure measurement.

More information contact Chantal Groom, VEGA Controls SA, +12 (0)11 795 3249, chantal.groom@vega.com, www.vega.com
Endress+Hauser has launched the iTHERM TrustSens TM371 compact thermometer for the food, beverage and life sciences industries. It features unique sensor technology with fully automated inline self-calibration function for hygienic and aseptic applications.

**100% compliance – 0% effort**

The new iTHERM TrustSens TM371 (also available as imperial version TM372) enables continuous, traceable monitoring thanks to its fully automated inline self-calibration function without process interruption, which results in improved product safety, increases plant availability and helps reduce risk and costs. The hygienic thermometer is designed for users in the pharmaceutical, and food and beverage industries, which require absolute compliance with FDA and/or GMP regulations.

At the heart of the temperature probe is a unique sensor unit consisting of a primary Pt100 temperature sensor and a highly accurate integrated reference with long-term stability. The reference sensor uses a physical fixed point on the basis of the Curie temperature and therefore serves to calibrate the primary sensor. The self-calibration is triggered fully automatically at a temperature of 118°C (Curie point of the integrated reference), a process typically occurring during each steam sterilisation (SIP) of the plant. This makes it possible to access device and process history, which can be used as a basis for predictions and the early determination of trends. These features guarantee continuous, fully autonomous device self-diagnostics. The iTHERM TrustSens is therefore ready for Industrie 4.0 applications.

The TM371 is supplied ex-works with a calibration certificate for the fixed-point reference integrated in the sensor, which ensures the traceability of the calibration chain to the ITS-90 International Temperature Scale. Years of extensive load tests over many thousands of cycles, both in the lab and in the field, have confirmed that the solution is well developed.

The device also has the following international approvals and certificates: Hygienic guidelines in accordance with EHEDG, ASME BPE, FDA, 3-A, 1935/2004, 2023/2006, 10/2011, CE, CRN, TSE, CSA General Purpose.

### Heartbeat Technology in temperature measurement

The integrated smart electronics feature varied diagnostics functions, which are categorised in line with the NE107 NAMUR recommendation and transmitted via HART communication. Furthermore, status signals are indicated locally by means of the LED integrated in the device. In addition to the automated calibration, and therefore verification of the thermometer’s measuring accuracy, data from the last 350 calibrations is stored directly in the device. This makes it possible to access device and process history, which can be used as a basis for predictions and the early determination of trends. These features guarantee continuous, fully autonomous device self-diagnostics. The iTHERM TrustSens is therefore ready for Industrie 4.0 applications.

### Significant advantages for the life sciences and food and beverage industries

The self-calibrating TrustSens technology is a major innovation especially in the strictly regulated GMP environment. In addition to a clear rise in process reliability thanks to the self-calibration before every new batch, the availability of the plant is also significantly increased. This in turn results in an immense potential for reducing effort and costs, as well as a higher production yield. Due to the expected high frequency of calibration cycles, the iTHERM TrustSens also enables an unprecedented level of process transparency. Audit-compliant calibration data is available for complete documentation at all times: a valid calibration certificate can now be produced with a simple mouse click (e.g. with the Endress+Hauser FieldCare software).

Led by iTHERM TrustSens, Endress+Hauser now offers a complete, globally available range of products for temperature measurement technology, system products and services, specially developed for the hygienic and aseptic requirements of the pharmaceutical, and food and beverage industries. The comprehensive portfolio, consisting of compact, modular and highly precise thermometers, secure data managers and process display units, fulfils even the most demanding requirements in these industries.

**For more information contact**

Benjamin Mlangeni, Endress+Hauser, +27 (0)11 262 8000, benjamin.mlangeni@za.endress.com, www.za.endress.com
Kobold's newly released ZOE electronic unit is specifically designed for the calculation and display of flow rates and volume flow of flowmeters. Whether users have external power supply or need a battery-powered device, and when a back-lit display is required (or not), the ZOE can be set for an extensive range of applications.

The electronic unit shows flow rate, resettable daily and total counter (mass units can also be set), and all customised program settings remain saved, even after a battery exchange. The instruments are suitable for harsh indoor and outdoor environments and comply with EU electromagnetic compatibility directives. ZOE’s UV-resistant, glass-fibre reinforced nylon housing is weather resistant and has CAT IP66/67 Nema 4X protection.

Electronic flow measurement ZOE’s specifications include:

• Battery operation or external DC power supply
• Configurable, LCD-display layout with background lighting
• Universal pulse input (PNP, PNP, NAMUR, reed switch)
• Scalable pulse output
• Sensor supply
• Free scaling
• Housing for wall or pipe mounting

The ZOE can be connected with flowmeters with pulse or frequency output. Users can choose either the compact version, in combination with Kobold's DON and DOT flowmeters, or the remote version. Both devices assure users of an outstanding price/performance ratio.

For more information contact Instrotech, +27 (0)10 595 1831, sales@instrotech.co.za, www.instrotech.co.za
Measuring the level of bulk solids presents a challenge, since providing just a level measurement does not necessarily represent the total quantity of product stored due to irregular surface of the bulk material.

However, determining the exact volume is important for production management and related logistics processes, which can have a direct impact on the efficiency and profitability of a company. Calculating volume is often based on inaccurate estimates from single point measurements, or by complicated and slow manual methods. Such inaccuracies often lead to companies holding an unnecessarily high product reserve, or an underutilised storage capacity.

**New technology**
The APM 3D scanner for bulk materials uses low frequency acoustic waves to make its measurement. The advantage of this is minimal attenuation in dusty environments. To obtain a three-dimensional map of the surface, the scanner uses the 3D phase radar principle, similar to that used in aviation. The map-points returning from the surface are refined using an advanced self-learning fuzzy logic algorithm, which is applied to dimensions of the silo to take into account the repose site angles. The acoustic bandwidth used is between 2,3 and 7 kHz. The energy attenuation created by dust is low in this band and therefore the measurement is practically immune to the dust.

The acoustic signal sits within the audible band, however, the noise levels fall far below the set health and safety guidelines. The intensity of the noise prevents dust from settling on the inner surface of the waveguides, sensors and membranes.

Short acoustic pulses with different frequencies are alternately transmitted from three piezo sensors and the respective waveguides route them to the surface of the material. Irregularities in the surface of the bulk material create multiple reflections, which are then electronically processed. By using advanced filtration methods, the individual signal reflections are detected and converted into a map of the surface.

The 3D scanner is capable of covering a wide surface area depending on the height at which it is located. To cover very large areas multiple scanners may be used. The correct location of individual scanners is important for accurate measurement, which is why installation and commissioning is supported by qualified APM specialists.

**Comprehensible output**
The APM 3DVision software provides data processing and visualisation. It provides general information about the quantities of products stored, but also a detailed view of the situation in an individual silo. The same software can also prepare reports of stocked materials at defined times.

Thanks to the self-cleaning ability of the acoustic signal, dust does not build up in the active parts of the waveguides.

**Applications**
The 3D scanner technology is useful in all sectors of industry where there is a need to monitor the volume and status of bulk materials. The unit allows accurate measurement of virtually any bulk material with a density of 200 kg/m³ in silos up to 70 m high.

For more information contact Sean Frost, Dupleix Liquid Meters, +27 (0)11 457 0500, sales@dlm.co.za, www.dlm.co.za
Plug-and-play flowmeter for utilities

Picomag

Reliable and easy
- Simultaneous measurement of flow and temperature
- Flexible integration into all fieldbus systems via IO-Link
- Commissioning and operation via Bluetooth and SmartBlue App

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*Refer to website for sales and supply conditions.

Complete product information:
www.e-direct.endress.com/picomag

Tel: 0061 363 737 (0861 endres)
24 hr Helpline: 082 443 4214
Service Hotline:
0861 347 378 (0861 ehserv)
info@za.endress.com
www.za.endress.com
Case History 159
Bad valves again hampering control.

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 (0)82 440 7790, michael.brown@mweb.co.za, www.controlloop.co.za

It still fascinates me that so many control problems are caused by poor operation of control valves. I have encountered and recorded hundreds of cases of such problems. What is amazing is that many plant people still do not realise that these control problems are valve related, and in most cases, waste a lot of time trying to resolve the problems by playing with the tuning knobs.

This article shows two more examples of controls being completely hampered by the valve performance.

Example 1: Flow control in a refinery
The first example is of a very important flow control in a refinery. The operators were complaining that the loop was not controlling and they even had trouble trying to control it in manual. They wished to control the flow between 25% and 35% of the measuring range.

They reported that they had no real problem with the control once the SP was above 32%, but they found they could not get any control below that point.

The initial test one always does is with the loop in automatic, without changing any of the tuning parameters or other controller settings. This test is shown in Figure 1. It can be seen that the control initially looked fine and followed a SP step change upwards and back again reasonably well. Then after a while the flow started spiking downwards. This was intermittent until the SP was stepped down a few percent and then the spiking became continuous.

The reasons for this can be seen by looking at the values of the PV and the PD (controller output) at the point where the spiking starts. The PV is at approximately 31% and the PD is at 2%. If the valve/positioner combination had been calibrated correctly then it means that the valve is just about shut. Now control valves should never be operated in a control region with their position close to seat. For a variety of reasons valve manufacturers are not able to get valves to operate successfully at very low openings. An old lore of control suggests that for reliable control you should always operate valves above 20% of opening.

Problems with valves operating close to the seat
Two of the main problems with valves operating close to seat are firstly, from the linearity aspect, it is very difficult to get a valve to follow its design characteristics when the valve is really near the seat. And secondly, and probably in this case even more important, many valves when installed in the line have increasing differential pressure as the valve moves towards the closed position. If the actuator is not powerful enough to deal with the differential pressure...
near seat then cycling commonly occurs, which is probably what we are seeing here, and would support the proposal that the valve is in fact calibrated correctly.

The next thing to consider is why the flow is at 31% when the valve is at 2%. This may be better answered by looking at Figure 2, which is an open loop test performed by placing the controller into manual and removing any filters (damping), if there are any, in both the transmitter and control system, and then making a series of step changes.

The first thing that one should determine is if the transmitter calibration is correct. (Unfortunately in the plant where these tests were being carried out, for several reasons, it was not possible to have an instrument mechanic standing by to answer these questions on the spot, and our reports were passed to their department for the problems to be sorted out as soon as they can manage to do so.) It would, however, appear that there is definitely something wrong with the valve, as the flow does drop to zero when the PD drops below 2%, so it doesn’t appear that the valve is passing. However, the instant the PD rose over 2% the flow jumps straight to around 31%. This is very strange and our recommendation was that the valve should be checked thoroughly, as there may be a problem in the positioner or actuator.

The next thing seen from this open loop test is that there appear to be non-linear installed characteristics, since as the PV steps increased in size as the PD moved up in steps of equal magnitude. Unfortunately we were not allowed to move the flow up past 50% to examine this in more detail, which would also have given us an idea if the...
The valve was sized correctly, and also allow confirmation of the non-linearity. It would appear likely however that the valve is very oversized.

In any event, the tests confirmed that no proper control can be achieved until the problems with the valve, and possibly the measuring system, are resolved.

Example 2: Cacaded level control
The second example of a poor valve is a flow loop that was a cascade secondary to a level control. The level had to be tuned ‘tightly’ to try and keep it on SP as closely as possible under all conditions. The operators had noticed that the flow control was not working well and said they would welcome an improvement in its performance. They stated that the level control itself was still reasonable.

Figure 3 is the ‘as found’ closed loop test, which is similar to the first test described in the previous example. It showed that the PV did follow SP, albeit quite slowly.

Three conclusions drawn from the test results
Firstly, the PD (controller output) moved significantly more than the resultant moves in the PV. There could be two reasons for this. The first is that the process gain of the loop is very small which is usually caused by a transmitter with too wide a span. The second is that the valve is extremely sticky. In view of the fact that the PV readings were above 60% in this case, it is more likely that the valve is sticky.

Secondly, the response of the PV to step changes in SP were quite slow, which is probably due to poor tuning.

Thirdly, one can see that when the PV over or undershoots the SP, it took quite a while for the PD to correct the error. The very last step in the test illustrates this extremely well. The PV moved slightly above the SP. The PD then started ramping down to bring the PV back again, and actually moved several percent before any effect was seen, which was the PV slipping down very quickly under SP. This is a definite sign of a valve with hysteresis and/or stickiness.

These observations were confirmed by the open loop test shown in Figure 4. It can be seen here very nicely how the valve was very sticky at times, but seemed to move better when closing. However, when stepped in the opening direction it responded extremely slowly. This valve is definitely sticky. (No real evidence of hysteresis can be seen in the results of this test.)

Once again the valve needs work before good control can be obtained. However, it should be noted that if the level did not have the secondary flow loop, and was going directly to the valve, it is very unlikely that any proper level control would have been achieved. Even with such a bad valve, cascade secondary flow control helps to overcome the problems unbelievably well.
Sophisticated control implementation

Beckhoff’s PC-based control eliminates the need for regular defrosting in meat freezers.

Tekloth, a German-based specialist for technical building systems, used PC-based technology to develop the complete control system for a compound CO2 refrigeration system. The installation is used as a cooling unit for a deep freezer for smoked and cured pork. After the meat has been smoked, it is shock-frozen at a temperature of -18°C. But, because it is still warm, a large amount of moisture is introduced into the process which collects on the evaporator where it freezes. As a result, conventional systems must be defrosted in regular intervals.

Since defrosting requires considerable energy, Tekloth completely redesigned the compound refrigeration system to be more efficient. The company’s Marco Möllenbeck explains: “Due to the special system design and corresponding control functions, our solution does not require regular defrosting like conventional installations. What makes it special is a switching valve that allows changeover from regular cooling (RC) to deep-freezing (DF) operation.”

Two operating modes combined in a single system

With the switching valve, the system can be operated for regular cooling in the so-called ‘transcritical’ range, or as a booster with DF and RC compressors. Tekloth’s Christoph Holtschlag elaborates: “By switching operating modes, the system initially cools and dehumidifies at an evaporation temperature of about 6°C. The elevated RC evaporation temperature keeps frost on the evaporator to a minimum. When the room temperature reaches 4°C, the system switches to the RC-DF booster mode.”

The RC mode provides energy-optimised cooling in the regular cooling temperature range, while dehumidifying most of the product surface – all with minimal freezing of the heat exchanger in the evaporator. After the circulation defrosting stage and switching to RC-DF booster mode, the chamber and the product are cooled to -18°C. Depending on the product quantity and the time it stays in the chamber after the target temperature has been reached, the need for intermediate defrosting may be completely eliminated.

PC-based control as an open and flexible control platform

Stefan Bollmann, who works in project planning and sales at Tekloth, believes there are many good reasons for implementing the complex sequence control with PC-based control technology: “We benefit from the ability of Beckhoff control technology to meet industrial requirements in all our projects. In addition, the systems’ modular structure and open programming environment make them flexible and enable an exceptional degree of innovation. As a result, we were able to program the sophisticated controls for this compound refrigeration system ourselves, which allowed us to maintain total control of the machine software. In addition, system changes and modifications in response to customer requests can be implemented quickly and easily.”

Another benefit is the consistent use of PC-based control technology across platforms, as Holtschlag explains: “Whether we build heating, cooling, ventilation or building automation systems with individual or centralised controls, we can implement all open and closed-loop control requirements with Beckhoff hardware and software. This kind of universal applicability allows us to employ our software modules in all areas. The system openness and its support for a wide range of bus types used in buildings is another contributing factor. The Beckhoff platform offers everything we need to keep our processes in-house, implement them efficiently, and deliver added value to the customer compared to standard offerings on the market. This absolutely applies to the compound refrigeration system, because no standard refrigeration controller provides this switching capability from regular cooling to deep-freeze mode.”

Optimised closed-loop process control

A Beckhoff CP2716 multi-touch panel PC serves as the operator interface hardware for automation, data recording and visualisation tasks. The modular I/O system is custom-configured with digital and analog bus terminals that collect data from all sensors and actuators as well as control-relevant values. The control system integrates components such as PT1000 sensors, high, medium and low-pressure sensors, temperature sensors and CO2 sensors. It also handles operation feedback from the various units as well as target and actual values and closed-loop control values.

The system acquires over 150 data points, with value changes in one-minute intervals, to provide a complete image of the process status. If a malfunction occurs, data changes are registered in one second intervals and can be buffered at this high resolution for up to one hour. “As a result, the process is under total control,” concludes Holtschlag. “The flexible implementation with PC-based control was critical to ensure our ability to accumulate the necessary knowledge in-house and advance our refrigeration technology. We conducted much electrical and software engineering to reflect the refrigeration process in our control technology and provide it with many new features compared to standard refrigeration systems. Making this possible were the many additional features available with PC-based control technology, such as graphical user interfaces, data trend mapping, fault signal logs and email notifications. Features like these enable us to implement individual customer requirements in the best possible manner.”

For more information contact Michelle Murphy, Beckhoff Automation,
+27 (0)11 795 2898, michellem@beckhoff.com, www.beckhoff.co.za
Digital transformation in process operations requires seamless and secure connectivity between the device and the enterprise. The PlantPAx distributed control system from Rockwell Automation has long helped make this connectivity possible through its alignment with plant-wide automation technology and use of open communication standards. Now, Rockwell Automation is revealing new enhancements coming to the platform to help process operations capture more value across the entire plant and enterprise.

“During 2018, new innovations to the PlantPAx DCS will help users create smarter, more secure, robust and productive operations,” said Christo Buys, business manager control systems, sub-Saharan Africa, Rockwell Automation. “The next release of our PlantPAx DCS will again leverage valuable input from process users and align with preferred industry standards to deliver increased value to the process industries. These innovations help companies leverage their systems more easily to capture benefits from plant-wide integration in the Connected Enterprise.”

The next PlantPAx DCS release will help users reduce unplanned downtime and improve system availability. This includes support for parallel redundancy protocol (PRP), an industry standard for redundant Ethernet, enabling more secure controller and I/O communications.

The next release will also feature updated HMI and trending tools to help increase productivity, and improve effectiveness of operations and maintenance functions. This includes an enhanced Library of Process Objects to align with industry display design standards. The expanded library also includes intuitive integration with electrical protection devices, leveraging both EtherNet/IP and IEC-61850 communication standards. This further extends plant-wide control capabili- ties and connects electrical management and control, reducing infrastructure duplication resulting in easier implementation and lower total cost of ownership.

For more information contact Christo Buys, Rockwell Automation, +27 (0)11 654 9700, cbuys@ra.rockwell.com, www.rockwellautomation.co.za

**PlantPAx DCS roadmap**

Supporting smarter, more secure process operations.

**Omniflex saves on signal conditioners**

Twelve hundred signal conditioners on the plant. How many spares should you keep? This is a situation familiar to many end users. How does one balance the cost of holding spares against plant downtime? Different inputs and different ranges all add to the overall critical spares inventory problem. Using Omniflex’s TXBs can change all this, since one unit does all saving the expense of money tied up in inventory and eliminating a lot of aggravation.

The Omniterm TXB is a fully isolated DIN Rail mounting 4-wire transmitter that can be powered from a 20-30 VDC supply. Any input type to any output type is the name of the game. Thermocouples, RTDs, voltage and current are accepted directly, and users choose the output range you require: 4-20 mA, 1-5 V, 0-10 V etc.

Other features include:
- Three port isolation to 1500 VAC.
- Software configurable.
- Sensor lineairisation standard.
- Output overload detection and indication.
- Custom lineairisation.

For more information contact Ian Loudon, Omniflex Remote Monitoring Specialists, +27 (0)31 207 7466, sales@omniflex.com, www.omniflex.co.za
The Information Revolution
the intelligent production floor.

We believe access to information should be simple!
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The 'Internet of Things' is driving the convergence of integrated control
and information technologies. The Connected Enterprise helps advanced
industrial operations be more productive, reliable, secure and sustainable, and
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From print and packaging to food and beverage and pharmaceuticals,
The Connected Enterprise delivers a single network and control
infrastructure to enhance your production floor’s performance.
RS Components has added a range of the most popular industrial automation devices from Pro-face to its extensive portfolio of HMI products, including 10 touch-displays from the GP4100 series and two touch-PLCs from the LT4000M series.

The Pro-face Connect system delivers an Industry 4.0 IIoT network topology that enables remote access to factories and machinery. The system provides engineers or technical maintenance staff with the ability to access the local network of a factory or production environment and control HMI devices, PLCs or motor drives, as well as many other network-connected devices such as cameras, servers or even PC applications. Users can therefore control or monitor machinery, collect data or perform system maintenance remotely from anywhere in the world via the Internet with a PC, tablet or smartphone. This can save costs by either eliminating the travelling time and expenses for technicians or shortening production downtime with quick remote intervention in machine operations.

Designed for high efficiency, the Pro-face GP4100 HMI series of colour touch-screen TFT-LCD displays offers a large range of connectivity with a wide range of industrial controllers. This initial launch of Pro-face products available from RS includes 10 touch-screen displays with various screen sizes. Extensive connectivity options include Ethernet, RS-422C, RS-485, SD Card, and Mini-B and Type A USB 2.0 interfaces and ports.

Also available are two touch-PLCs from the Pro-face LT4000M series. These are compact all-in-one units that provide integrated I/Os and can be installed in a 22 mm hole for easy panel mounting. For easy troubleshooting, the devices allow the display unit or the control unit to be replaced separately.

RS also stocks accessories for the Pro-face range including disposable and dirt-resistant screen-protection sheets for use with the displays and the touch-PLCs, as well as a selection of cables, cable kits and programming software.

For more information contact RS Components SA, +27 (0)11 691 9300, sales.za@rs-components.com, www.za.rs-online.com
Drilling advancements have transformed oil and gas operations from simplistic single-well pad fields to more complex multi-well pads. In turn, operators and equipment builders can modify their control systems approach to optimise these changing applications. The Well Manager solution from Rockwell Automation provides oil and gas companies a single solution for all control functionality throughout a well pad, resulting in easier implementation, real-time data visibility, production efficiency, and reduced costs.

Traditionally, oil and gas companies built multi-well pads using different controls and locations throughout a single pad. The Rockwell Automation solution leverages just one controller for all well pad operations – including rod pumps and plunger lifts, electrical submersible pumps, progressing cavity pumps, natural flowing wells and more. Shifting all operations to one controller from a single vendor reduces maintenance costs, helps with revision control and streamlines training and support.

"Today’s modern, multi-well pads resemble small production facilities," said Michelle Junius, marketing communications specialist, Sub-Saharan Africa, Rockwell Automation. "As such, traditional approaches for well monitoring and control using RTU technologies have become cost prohibitive and require a high level of integration effort. This makes our Well Manager solution an ideal fit for multi-well pad applications. Modular and scalable, this solution helps ease integration with existing systems and other Rockwell Automation applications, including energy management and intelligent power integration. It also helps lower costs and cut installation time for improved lifecycle management."

The Well Manager solution is delivered pre-engineered to speed integration of a multi-well pad. It is scalable and can support up to 32 wells in one location with flow management, artificial lift control, and site-wide data visibility. Because data is pulled directly from the control system, it has higher integrity than operations that leverage manual data reporting. The solution is built with expansion in mind, ready to support wells and equipment that might be added to a site years after initial implementation.

The solution also enables self-declaring wells to be automatically discovered and integrated into the production environment. This auto-discovery feature removes human interaction, reducing risk of error and dependencies on special skill sets. It also speeds the time it takes to bring a new well online to mere minutes, allowing producers to get valuable production data out of the well more quickly.

The Well Manager solution is part of the broader ConnectedProduction offering from Rockwell Automation that can help connect all existing automation systems and intelligent field equipment from the wellhead and surface processing to custody transfer. Users can select specific solutions as needed, and monitor ROI to justify scaling up for broader usage. Each added segment of the solution is purpose-built for connectivity to help transform data into useful intelligence. The offering makes use of current investments, and does not require a complete infrastructure overhaul.

For more information contact Michelle Junius, Rockwell Automation, +27 (0)11 654 9700, mjunius@ra.rockwell.com, www.rockwellautomation.co.za

Multi-well solution cuts costs for oil and gas producers
CONTROL SYSTEMS

Proportional valves are suited to a wide variety of applications in machinery, basic processes and simple or complex hydro-pneumatic systems. They provide a cost-effective and compact solution for controlling flow or pressure at relatively low flow rates.

There are many different designs and styles of proportional valves for varying operating pressures and flow rates, with either electric or electro-pneumatic actuation. To the uninformed, there can be a confusing amount of choice. When choosing the right valve for the job, it is important to understand the demands of the application and the relative merits of each valve type. A respected supplier will work with customers to determine the ideal valve, but having a working knowledge of proportional technology will speed up the process.

Before a valve can be selected for proportional control some basic information about the application must be determined:

- What are the maximum and minimum pressures that the valve is likely to experience?
- What is the flow range?
- Will the set point be static, dynamic or step-by-step, and how will it be adjusted?

**Set points**

A static set point is one that will generally be fixed and there will only be infrequent changes. A typical application would be where a valve is used to control pressure to a cylinder that applies the pinching force – such as spot welding. The pressure will be set dependent on the material type and thickness being welded, and will remain fixed until the machine is set up for a different material.

Another application is when a fixed pressure is applied to a component to check for soundness – such as leak testing. The pressure will generally be fixed for a specific type of component but has provision for adjustment when the application is changed.

**Dynamic set point**

A dynamic set point is one that changes frequently. A typical application includes pressure control valves connected to cylinders operating a flight simulator. Signals from the simulator control system constantly adjust the pressure in the cylinders to move the simulator cabin. Material testing is another common application, in which the pressure output of a valve is steadily increased until the material under test fails.

**Step-by-step set point**

A step-by-step set point is one that changes at a low frequency. A typical application is a filling system where, as the container being filled approaches the required level, the flow rate is adjusted down so that the final filling happens at a slower rate. It is also applicable for the control of gas to a burner on a cooker, for instance, requiring different flow rates of gas dependent on the amount of heat required.
Adjusting the set point
When selecting a proportional valve, it is a good idea to consider how
the set point will be adjusted, whether it is a pressure or a flow rate.
Some valves enable users to adjust the set point by sending an analog
control signal over the power cables or by using fieldbus communica-
tions. Others have a local interface, and some, such as the ASCO
Numatics Sentronics, enable communication with the device via a PC
and an RS-232 interface. Having a PC interface often enables a far greater
degree of tuning and optimisation to take place, enabling users to get
the most out of their process.

Operator
Proportional valves can be operated by different means such as sole-
noids, pulsed pilot valves or piezoelectric elements. In addition the
valves may be pneumatically operated and controlled by a positioner.

Proportional solenoids
Direct operated proportional solenoids adjust valve position based on
a varying voltage across the coil. The higher the voltage, the greater
the magnetising current and the more the valve spindle will move.
A common operator type, proportional solenoids tend to give short
response times and have an extremely low hysteresis.

Pilot operated proportional valves
Pulsed pilot valves use small solenoid valves that load and unload pres-
sure in a control chamber, allowing the valve to open and close. With
power consumption of less than 2 W, pulsed pilot valves are ideal when
low power is required. A typical application of such a compact and low
power rating valve is to control the flow of a booster. By using a propor-
tional valve operated by a pulsed pilot valve, a much larger flow can be
controlled.

Piezoelectric elements
Piezoelectrically operated valves are ideal when very low power con-
sumption is required. Their highly compact size makes them ideal for use
in portable and table top machines such as medical equipment, measur-
ing systems and gas analysers. The valves have very low power consump-
tion and can even be operated by batteries or solar cells.

Choosing the right supplier
In practice, there are several additional factors that may need to be
taken into account when choosing the best proportional valve for an
application.

Many of these decisions will be made in conjunction with a supplier’s
application experts, so it pays to know what to look for in a supplier.
There are hundreds of valves and many companies supplying them, so it
can be a challenge to wade through competing solutions.

As a general rule, it is best to seek out a comprehensive and credible
manufacturer ahead of a ‘quick-fix’ merchant selling on price. The process
industry in particular should be especially wary of false economy. Look
for a supplier with a broad range of technologies, sizes and operator
types. Seek evidence of an established industry position, proven special-
ist knowledge and long-term customer relationships. But do not go on
name alone.

A well-known brand is important, but be satisfied that your poten-
tial partner has the in-house expertise to specify the perfect solution,
regardless of application, flowing media or other conditions.

For more information contact ASCO Numatics, +27 (0)11 796 7600,
rfq.asconumatics.za@emerson.com, www.asco.com
Yokogawa Electric Corporation has announced the release of an enhanced version of the Stardom network-based control system. This version will include a new E2 bus interface module that has been developed for use in FCN-500 autonomous controller extension units. This enables the construction of systems that have more I/O points and cover a wider area.

Stardom is a network-based control system that consists of the FCN autonomous controller, the VDS web-based HMI, and the FAST/TOOLS scada package. Since first releasing Stardom in 2001, Yokogawa has continued to improve the functions of the system to satisfy its customers’ evolving needs.

One such recent need is for the collective monitoring and control of applications where many different input and output devices are distributed over a wide area, in locations where conditions are often harsh. Other needs have included the reduction of wiring and maintenance costs, while ensuring high reliability. Based on its twin goals of achieving excellent scalability and excellent reliability, Yokogawa has sought to satisfy these needs by strengthening the functions of its Stardom system.

**Enhancements**

**Excellent scalability:** three times the number of connectable units, one hundred times the transmission distance

The FCN-500 is a modular-type controller. It consists of a control unit with a CPU module mounted on the unit’s base module. (An additional CPU module may be installed for dual redundancy.) Extension units that accommodate I/O modules can also be utilised. To connect a control unit with an extension unit, Yokogawa has developed the E2 expansion bus. The E2 bus consists of an E2 bus interface module that is installed on each unit and a general-purpose Ethernet cable. With this bus, up to nine units can be connected (including the FCN-500 control unit), a threefold increase. As a result, the maximum number of allowable I/O points has been tripled. Using the high-speed CPU module that was released in March 2016, a much larger system can be constructed, based on the FCN-500.

In addition, the maximum possible transmission distance between individual units has been increased to 100 metres. Therefore, with a nine-unit configuration, the maximum transmission distance is 800 m, which is 100 times longer than what was previously possible. Using commercial fibre optic cables and media converters, a Stardom system spanning distances of several kilometres can be constructed. The installation of extension units near sensors reduces wiring costs and maintenance workload.

Three different types of base modules are available: a long base module with slots for 10 modules, a short base module with slots for five modules, and a new compact base module with slots for three modules. Customers can combine these three different base types depending on the required number of I/O points and the amount of space available for installation.

**Excellent reliability:** duplexing of bus and improved environmental resistance

The new E2 bus, as well as the CPU, power supply, control network, and internal bus of the FCN-500 can all be duplexed. Thus, even when a large system is configured using the E2 bus, high reliability is assured.

Maintenance is also a key factor in ensuring high system reliability. As with previous versions, it is possible to check the operating status of the modules in the extension units and quickly detect any malfunctions using the VDS HMI, FAST/TOOLS scada, and other means, and any damaged modules can be replaced without having to shut down the FCN-500 controller. In addition, the new extension bus interface module has been built to withstand ambient temperatures as extreme from -20 to 70°C. (The existing interface module supports a range of 0-55°C.) This enhancement will make it possible to install extension units in locations where environmental conditions are extremely harsh.

For more information contact Christie Cronje, Yokogawa South Africa, +27 (0)11 831 6300, christie.cronje@za.yokogawa.com, [www.yokogawa.com/za](http://www.yokogawa.com/za)
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Industrial control system cybersecurity

Part 2: Asset discovery and vulnerability management.

In Part 1 in the series of cybersecurity articles for 2018 (http://www.instrumentation.co.za/58931n), we looked at risk assessments within industrial control systems (ICS), including creating an ICS cybersecurity policy. In Part 2, we look at asset discovery (and continuing to do so), and vulnerability management on an ICS.

Vulnerabilities in the ICS environment represent a significant risk to organisations that run control systems, be that a manufacturing, mining or critical infrastructure organisation. These vulnerabilities are becoming more widely exploited by cyber criminals as was evident with the recent Triton and CrashOverride malware variants.

Asset discovery
The best way of understanding your assets is by keeping a comprehensive asset (PLC, HMI, engineering workstations, etc.) register. Without a comprehensive asset register, it will be difficult to protect your systems effectively, as the asset register will assist you in understanding your network by defining the assets (i.e. vendor, model number) and defining how the assets communicate.

In Part 1, we discussed conducting a risk assessment (RA) and if the RA is conducted correctly, you should have a great base to work from. There are various tools that can assist you with identifying assets, such as Grass Marlin (discussed in Part 1), Wireshark and if you are really brave, there is arp-scan that will allow you to identify live hosts. As a cautionary note, please make sure that you are familiar with the tools mentioned above, or that you have tested the tools in an offline environment, as incorrect use could result in unwanted results and failures on the ICS systems. ICS asset scanning can fill a whole book on its own, but scanning can fill a whole book on its own, but and failures on the ICS systems. ICS asset incorrect use could result in unwanted results tested the tools in an offline environment, as (discussed in Part 1), Wireshark and if you are please make sure that you are familiar with the tools mentioned above, such as Grass Marlin from. There are various tools that can assist you with identifying assets, such as Grass Marlin (discussed in Part 1), Wireshark and if you are really brave, there is arp-scan that will allow you to identify live hosts. As a cautionary note, please make sure that you are familiar with the tools mentioned above, or that you have tested the tools in an offline environment, as incorrect use could result in unwanted results and failures on the ICS systems. ICS asset scanning can fill a whole book on its own, but the use of these aforementioned tools is well documented and there are plenty of in-depth articles available to assist. There are also some great commercial-off-the-shelf (COTS) solutions available, and most of these solutions tend to offer more than just asset identification and tagging, some going so far as to map out the entire ICS network. The asset register will also help with effective network segmentation (which we will cover in Part 6), network security monitoring (which we will discuss in Part 4), and vulnerability management, which we will discuss next.

Vulnerability management
Vulnerability management, or should I say effective vulnerability management, which includes scanning for vulnerabilities and patching them, is a critical component in protecting both hardware and software systems. In OT/ICS systems however, this gets a little trickier, which I will elaborate on now. The first problem is that of finding the vulnerabilities, as most control assets are not designed to be ‘interrogated’; as is the case for IT assets. The second problem is that if you have managed to identify vulnerability, you are not able to patch it as most control networks operate 24/7/365.

So, if we are unable to scan our assets and cannot patch the vulnerabilities, what do we do? An effective cybersecurity strategy for applying patches combined with specifically developed ICS vulnerability scanning solutions can help. First, one needs to identify the different components of the ICS network(s), and as discussed above, an in-depth asset register will help in this regard. Each set of components will require a different strategy, and then these need to be documented and implemented in the overall cybersecurity program.

Putting things into perspective
Scenario 1
The engineering workstations are only utilised daily between the working hours from 07h00 to 17h00. This would potentially allow us to scan for vulnerabilities, identify which patches need to be applied and then patch the engineering workstations during off peak hours. (As a cautionary note, and in line with industry best practice, it is strongly recommended that patches are tested before applying them.)

Scenario 2
The control room workstations and the PLCs are used 24/7. We are therefore unable to scan these machines for vulnerabilities, and also unable to patch them. For this, we need to look towards non-intrusive passive scanners such as OpenVAS, or my personal recommendation of the Bandolier Project, which is a joint initiative between Digital Bond and Nessus from Tenable. In a nutshell, a passive scanner monitors network traffic at the packet layer to determine services and to identify and assess vulnerabilities, without affecting asset or network performance.

Patching is bit more difficult as the only real time slots we would have to apply these is during a shutdown. Generally, these occur between 1 and 5 times per year, and this period provides an ideal opportunity to patch the effected systems. The problem is that these times are normally reserved for engineers and vendors to make their changes, and to slot in new assets. This is where you need to fight for your piece of the pie and get board-level management buy in, so that you are allocated a time frame to apply your fixes.

Conclusion
To effectively manage vulnerabilities, you need to understand your assets and continuously monitor them for any changes, along with understanding your network(s). Vulnerabilities are not just classified as hardware or software flaws, they could also arise through incorrectly configured devices such as PLCs, industrial switches or control systems and other engineering workstations. This means that it is no longer just the ICS networks that are at risk, safety systems just became vulnerable as well.

Tommy Thompson
Tommy Thompson is a passionate cybersecurity professional with some 15 years’ experience. Starting as a firewall engineer in 2001, Thompson has assisted a variety of companies in numerous roles with their cybersecurity problems. He holds a BComm degree in Information Management from Oxford Brookes University (UK) and he is certified by PECB (Canada), as a Scada Security Professional (CSSP).

For further information contact Tommy Thompson, +27 (0)11 463 0096, tommy@nclose.com
Machine performance analytics

Bring OEM expertise into the producer’s digital environment.

The IIoT has increased the availability of information throughout the enterprise by orchestrating data from multiple sources and applying machine-learning applications. But the power of new IIoT tools to improve machine performance is limited when those with access to information are not experts on the machine, leaving powerful machine information untapped.

To connect industrial producers with expertise outside their production environment, Rockwell Automation offers the FactoryTalk Analytics for Machines cloud for OEMs. Cloud-enabled analytics provide machine data organised in intuitive dashboards that pull from machines deployed across the globe.

“By bringing the expertise of OEMs into a producer’s ecosystem, smart machines perform better, and critical process anomalies can be quickly resolved,” said Christo Buys, business manager control systems, Sub-Saharan Africa, Rockwell Automation. “Cloud-based machine analytics give OEMs real-time and historical insights into how their equipment is operating, so they can collaborate from anywhere with customers to help reduce downtime.”

An IIoT-enabled packaging machine from Cama Group showcases the value of increased collaboration to both OEMs and end users. The machine offers independent cart technology for fast changeovers, while the FactoryTalk Analytics for Machines cloud relays critical KPI data to the cloud. Real-time performance insights are displayed to Cama Group service engineers in five, easy-to-navigate screens.

A primary display shows a global map indicating every machine at all customer sites the OEM has subscribed to the service. In addition to the display is summary information on machine status and recent OEE performance. A simple search function then allows service engineers to filter by specific end users, locations or machine types, for further analysis. At the machine level, OEMs can also view information about machine states, top events, production counts, cycle time attainment, and custom process variables and counters, for the last three months on pre-configured dashboards and drill-down screens.

The system requires minimal setup from the OEM, and can be deployed and fully functional in a matter of minutes. A subscription-based model allows OEMs maximum flexibility and low, predictable costs.

The FactoryTalk Analytics for Machines cloud is part of a larger, expanding ecosystem of analytics offerings from Rockwell Automation.

For more information contact Christo Buys, Rockwell Automation, +27 (011) 654 9700, cbuys@ra.rockwell.com, www.rockwellautomation.co.za

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How industry benefits from digital mobile solutions

The networking of people, processes, machines, and systems will not just shape the markets of the future, it is the biggest challenge and opportunity of today’s world. Companies that make use of the possibilities of digitalisation will benefit from more effective production, work and maintenance processes, as well as streamlined decision-making that leads to higher margins. However, to exploit the productivity and profitability made possible by Industrie 4.0, no single component is crucial; rather, an integrated, compatible portfolio of solutions based around the networked ‘mobile worker’ is required. At last year’s Hannover Messe, ecom, part of the Pepperl+Fuchs Group and a manufacturer of explosion-protected mobile devices such as smartphones, tablets, handhelds, and peripherals, presented its comprehensive Mobile Worker Concept alongside a large selection of hardware and partner-software products for industrial companies.

The newest devices for use in Zone 1/21, an explosion protected 4G/LTE Android tablet Tab-Ex 01, a 4G/LTE Android smartphone Smart Ex 01, plus the Windows Tablet PC and Desktop expansion Pad-Ex 01, connect mobile users with the control centre and backend systems. These devices mean that a variety of powerful applications can be used anywhere onsite, including hazardous areas. Professional software solutions for data acquisition such as the ecom CamScan Keyboard app allow users to increase the quality of data acquisition. Designed especially for frequent scans, and for scans from a distance, ecom offers various hardware-based solutions from the barcode/RFID reader Ident-Ex 01 to the intrinsically safe PDA i.roc C70 -Ex.

The company has also taken advantage of new fields of innovation through beacon technology. The Loc-Ex 01 BLE Beacons, which were developed especially for hazardous areas, are used together with mobile devices, resulting in an innovative business intelligence and localisation solution.

For more information contact Pepperl+Fuchs, +27 (018) 985 0797, info@za.pepperl-fuchs.com, www.pepperl-fuchs.co.za

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For more information contact Christo Buys, Rockwell Automation, +27 (011) 654 9700, cbuys@ra.rockwell.com, www.rockwellautomation.co.za

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Protocol gateways connect Modbus devices to Profinet

Moxa's newly launched MGate 5103 and MGate 5111 industrial protocol gateways enable fast and easy protocol conversions between Modbus devices and Profinet or Profibus-based scada systems and PLCs. These stand-alone protocol gateways also allow a distributed network architecture that maximises flexibility and scalability. In addition, they also extend the lifetime of field devices, consequently reducing costs. The gateways convert a variety of protocols to Profinet or Profibus, and furthermore, they also help integrate Ethernet/IP PLCs into such systems.

Fast and easy configuration
"Configuration is often an arduous task, especially when adding PLCs for protocol conversion as it requires extensive coding," says KS Hsu, a product manager at Moxa. "Therefore, we spend a lot of design time making sure that our protocol gateways are easy to set up and use. The MGate 5103 and 5111 have a user-friendly interface with quickly set up protocol conversion routines for most applications, doing away with tasks such as implementing detailed parameter configurations one by one. In addition, with Moxa's configuration wizard, users can easily access protocol conversion modes and finish the configuration in five easy steps."

Easy troubleshooting to reduce maintenance efforts
Moxa's two new protocol gateways provide a variety of powerful built-in troubleshooting tools, including protocol diagnostics and traffic monitoring, which offer engineers a shortcut to find the root cause of a network breakdown. In addition, the status monitoring and fault protection functions help to reduce downtime. The status monitoring function alerts the scada system when a Modbus slave device is not responding, and fault protection prevents incorrect actions downstream if the upstream connection is lost.

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

Turck adds IO-Link to ultrasonic sensors

Turck has added a variant with an IO-Link output to its basic Compact series of ultrasonic sensors. Users can use IO-Link for the process values or continue to use the switching output of the sensor. The switch point is taught via IO-Link or via a teach adaptor as before. Besides the known benefits of IO-Link, such as inexpensive wiring, intelligent data retention and predictive maintenance, the sensor offers a special mute function feature. This enables the selective switching on or off of the sonic transducer via the IO-Link master. This simplifies the synchronised or staggered operation (multiplex) of several sensors via the controller. Synchronous or multiplex operation was previously only possible by using complex wiring solutions.

The compact RU-U sensors with IO-Link are available as diffuse mode or retro-reflective sensors in the M18 housing in straight or angled designs with ranges of 40 and 100 cm.

Turck's RU ultrasonic sensor series consists of three product lines: the compact version, the standard version or the high end version. The three lines have different sets of functions and output options. The optimised control electronics gives the entire series large ranges with short blind zones. The smooth sonic transducer front prevents the collection of dirt and moisture.

For more information contact Brandon Topham, RET Automation, +27 (0)11 453 2468, brandon.topham@retautomation.com, www.retautomation.com
IO-Link master for Industrie 4.0

With its new EP0L001 IO-Link master, Wenglor offers an ideal, multiprotocol module for consistent communication right up to field level. Eight IO-Link compatible sensors and actuators in accordance with IO-Link standards can be incorporated into the control level via industrial Ethernet with this innovative product.

In the context of fully networked Industrie 4.0 production and logistics centres, as well as smart machines and process optimisation by means of predictive maintenance, the new IO-Link master is the ideal interface between the controller and intelligent devices. Particularly for the new generation of photoelectronic sensors included in the PNG/smart series with high communication, high-performance sensors, it’s the perfect connection module for linking up to higher network levels. Participants exchange real-time data about system status during the running process which can be dynamically adjusted to changing operating conditions. This allows continuous process optimisation, assures production quality and avoids system downtime.

Eight configurable ports
The eight IO-Link compatible, freely configurable M12 ports offer the greatest possible flexibility where module allocation is concerned, and reduces the costs of each channel to a minimum. Four of the ports are laid out as class B variants to enable increased load current availability, as frequently required by actuators. Even powerful actuators are not left in the lurch due to continuous load current of up to 2 A per class B port (total: 8 A). Supply power to all components is assured by the new L-coded M12 plugs that also provide for connection of additional field modules. In the event that a terminal device should fail, electrical isolation ensures that module communication is not interrupted and disturbances are quickly eliminated. A total of 12 digital inputs, eight outputs or configuration by means of eight IO-Link compatible ports offer connection diversity and efficient use of the master.

A further advantage is its ability to communicate with the Profinet and EtherNet/IP protocols. These can be selected at the master with the rotary encoder switch, making additional devices superfluous. The two switch ports permit connection via line or ring topology. Depending on the utilised protocol, the IO-Link master fulfils functions such as fast start-up, shared device and device level ring, and supports the media redundancy protocol.

The extremely rugged and compact zinc die cast housing is ideal for harsh industrial conditions due to IP65/IP67/IP69K protection. Whether under hot or cold ambient conditions, the device link master works reliably at temperatures between -20 to 70°C. Its minimal weight of just 500 g also allows for moving applications or mounting directly to machines. A range of suitable connection components can also be supplied.

For more information contact
Anastas Schnippenkotter, ASSTech Process Electronics + Instrumentation, +27 (0)11 708 9200, info@asstech.co.za, www.asstech.co.za
Adding wireless communication to vibration monitoring

By Shuji Yamamoto, technology promotion manager, Yokogawa Electric Corporation.

Vibration cannot be eliminated entirely, but it can be measured. Sensors are available to characterise and quantify the amount of vibration, and to capture characteristic patterns, often referred to as signatures. These vibration monitoring systems typically use a piezoelectric sensor to create and transmit a signal proportional to measured vibration.

Vibration sensors have been available for many years, but older systems were costly to install, limiting their deployment to the most expensive and critical rotating equipment. For other installations, technicians carried portable units on routine inspections of the plant, manually checking bearings, seals and other critical points. Sophisticated portable systems could capture historical information and compare specific installations over time, but the readings were still performed at potentially lengthy time intervals, and depended on operators carrying out the inspections. Performing such rounds has always been expensive and time consuming, and when plants have minimal manpower, they can be delayed or skipped when more pressing tasks emerge.

Advantages of continuous monitoring

Short of a catastrophic failure of some component, vibration problems do not usually advance drastically in a brief period of time. This fact is usually cited to support the idea of periodic inspections. Unfortunately, vibration problems may increase slowly until they reach a critical point, and then the climb becomes much steeper toward failure, which can easily happen before the next scheduled manual inspection.

Continuous monitoring can detect those situations when the vibration curve begins to climb toward a failure point, informing maintenance technicians while there is still time to respond before a failure and outage. Software can spot those kinds of movements and sound alarms appropriate to the urgency of the situation and criticality of the equipment.

Less expensive vibration sensors have made permanent installations more practical for more pieces of equipment, but the cost of wiring a sensor has not gone down, and in many situations has become even more expensive. One of the biggest technological advances of the last decade has been the emergence of effective and practical wireless instrumentation protocols, including ISA100 Wireless. Yokogawa has expanded its range of wireless field instruments used to measure basic process variables such as pressure, temperature, level and flow, and now wireless vibration sensors are part of their product offerings.

A new wireless vibration sensor

Yokogawa has created a sensor and wireless transmitter system designed specifically for continuous monitoring of the rotating equipment commonly used in process manufacturing facilities (Figure 1). The system is designed for easy installation on a wide variety of equipment.
The piezoelectric acceleration sensor is compact and easy to install near the device’s bearings (Figure 2). A cable connects it to a wireless communication module, which can be mounted wherever it is convenient, and where it can be clear of obstructions able to interfere with its signal propagation.

The complete system is self-powered using a battery in the communication module. With a one-minute data update rate, one set of batteries can run for up to 10 years. The data is sent via the wireless network to the system gateway. If other ISA100 Wireless field devices are already in use in the facility, the vibration monitors can become part of the same network, communicating with the gateway just like any other communication module or sensor. Data from the units installed throughout the plant can be directed to a control or monitoring system to inform operators and maintenance personnel as conditions change with the equipment being monitored.

### Vibration analysis methods

The piezoelectric vibration sensor is an accelerometer capable of measuring velocity and acceleration. The nature of the vibration and the type of equipment helps determine which analytical method is best when the primary objective is determining equipment condition. The rule-of-thumb suggests that where frequencies are low, velocity is the preferred measure, but when frequency increases, it is better to measure acceleration.

Plant personnel can make the determination of how frequently readings should be taken, and what analytical techniques should be used for each installation. Ranges of what is considered tolerable vibration versus dangerous have been published by various sources, but the ultimate guidelines for a given piece of equipment in each plant may need to be established in cooperation with the equipment OEM.

While the sensor can send a new reading as often as every 10 seconds, the need for such rapid refreshment is rare, and it comes at the cost of battery life. Switching to an update rate of once per minute can extend battery life significantly, while still providing more than enough data for most applications.

If more sophisticated analysis is required, software packages are available from third-party vendors to look for patterns and identify sources of abnormal vibration. This type of work is done in the host system rather than the individual devices, and often combines signals from multiple sensors deployed around the equipment to pinpoint sources of trouble.

### Launching a vibration monitoring program

Implementations of vibration monitoring programs are usually incremental, working down the list of installations beginning with the most critical. In this context, ‘critical’ takes different forms, the foremost of which typically involves the likelihood of production being interrupted due to an outage. If the process cannot run without a given pump and there is no spare ready to switch over, it is critical, regardless of its cost. Most plants are aware of those installations, particularly if they have a history of problems.

Secondary and tertiary levels can get more complex. Some organisations select based on equipment cost. At the same time, other considerations, such as difficulty of repair or availability of spare parts, enter into the picture, but they are more difficult to quantify. Ultimately it is important to include a variety of measures from different viewpoints when making such decisions.

It is also important to select an appropriate asset management platform to gather and process the data from the sensors around the plant. Once more information is available, questions emerge as to how it is used and where it goes. Who should receive alarms? Maintenance? Control room operators? If a highly critical installation is beginning to show signs of a problem, the control room may need to be informed if operators need to take action before the situation is turned over to maintenance for repair. An effective asset management system can handle these sorts of situations.

### The combination of effective technologies

Process manufacturers can benefit from this combination of economical sensors combined with wireless networks. Working together, they provide critical information to operators and other plant personnel to warn of potential problems before the plant suffers damage or lost production. In some situations, the avoidance of a single outage saves enough money to pay for monitoring many pieces of equipment. This approach is highly flexible and scalable, allowing a facility to begin in one area, and then expand as needs and circumstances permit.

For more information contact Christie Cronje, Yokogawa South Africa, +27 (0)11 831 6300, christie.cronje@za.yokogawa.com, www.yokogawa.com/za
Schneider Electric introduces PowerTag

Wireless energy sensor adds connectivity to miniature circuit breakers.

Schneider Electric has introduced PowerTag, its smallest wireless energy sensor, designed to enhance the monitoring of electrical assets. PowerTag is built to connect to a miniature circuit breaker, to add connectivity, and to provide building owners and facility managers with precise, powerful, and real-time data to increase the health of a facility’s strategic assets.

Designed for any type of building, the energy sensor easily monitors and measures currents, voltages, power, power factor and energy. This first of its kind connection enables greater availability of electrical assets by providing the ability to manage critical loads, leading to higher reliability and efficiency of the electrical installation. Data is sent wirelessly to a concentrator for display via in-built web pages, or provide data for larger energy management systems or BMS. Data can also be leveraged to create customised e-mail alarms to assist facility managers with remote monitoring of their assets.

“Customers are demanding new solutions to meet the critical challenges of building asset and energy management," said James Calmeyer, vice president for buildings, Schneider Electric South Africa. “PowerTag provides the innovation to make asset and energy management simpler. The majority of circuit breakers can now be tagged, bringing electrical distribution connectivity to a new era. The tag can easily be fitted without the need for complex wiring or additional space requirements – in reality it’s a five-minute installation to get connected.”

The compact, space-saving auxiliary fits easily in new and existing distribution boards and is natively integrated into Schneider Electric’s Acti 9 Communication System to provide customers an all-in-one monitoring and control solution.

For more information contact Lebohang Thokoane, Schneider Electric SA,
+27 (0)11 254 6400,
lebohang.thokoane@schneider-electric.com,
www.schneider-electric.co.za

CANwireless supports Industrie 4.0

Using the latest technologies, such as Wi-Fi supporting the 2.4 and 5 GHz frequency bands as well as Bluetooth, multiple ways of connecting to the machine via radio are possible. CANwireless allows wireless connection directly from the existing ifm tools for mobile control systems, such as Codesys or the Maintenance Tool.

In addition to the connection between PC or mobile end device and the mobile machine, machines can also be connected to each other and exchange information. The device thus supports the technologies of Industrie 4.0 and the IIoT to make machines even more intelligent.

Functions and features

CANwireless enables a wireless connection to the CAN bus in a vehicle or machine. With the two basic operating modes ‘Infrastructure’ and ‘Mini Access Point’, the module is able to create a connection in different ways.

In the operating mode Infrastructure, a CANwireless is configured to connect to an existing Wi-Fi infrastructure. When connected to the network, the device can connect automatically to another network participant (client) or listen to incoming connection requests (server). CAN bus data can be exchanged with other connected network participants.

Configured as Mini Access Point, the device will create its own Wi-Fi network to which multiple other devices CANwireless devices, PCs, smartphones or tablets can connect.

As in the Infrastructure mode, the device can act as both client or server in its own network. Data on the CAN bus of the Mini Access Point device will be shared with the other connected network participants.

Tools like Codesys and the Maintenance Tool, allow the use of CANwireless as interface to the machine. If required, CANwireless devices can filter data to be transferred by radio, which reduces the data load and increases the operational reliability.

For more information contact ifm electronic SA,
+27 (0)12 450 0400,
info.za@ifm.com,
www.ifm.com
Smart RFID readers for industrial applications

RS Components has announced the availability of OsiSense XG smart RFID-tag antennas from Telemecanique Sensors. These new devices target access control use in industrial machine and control panel applications, as well as deployment in production workshops or traceability systems.

Using RFID cards to determine authorisation, these RFID readers can offer a secure access control: for example, allowing the display of information according to the operator’s profile, such as whether they are a manager or a maintenance operator.

In certain instances it is not possible to connect network components utilised in industry with a fibre connection. Therefore, as an alternative, wireless connections must be made available.

“When wireless connections are needed for the networking of devices i.e. the Internet of Things (IoT), there are two key options to choose from, namely narrow-band IoT (NB-IoT) and broadband IoT,” says Bradley Hemphill, director, EES Live.

EES Live is an ISO 9001:2008 compliant company that provides network, electronics and electrical services and solutions. It specialises in the integration of multiple system infrastructure including ICT, data centres, security, audio visual, building automation systems and special systems coordination.

“NB-IoT is a low power wide area network (LPWAN) technology that has been designed for devices which require small amounts of data to be sent over long periods,” explains Hemphill.

“It is also used for mass connections of devices. Broadband IoT is characterised by its high throughput and low latency. The technology has been designed to ensure anti-interference as well as a performance increase over WiFi.”

The technology developed for NB-IoT is eLTE-IoT and for broadband IoT is eLTE-U. They are both based on unlicensed spectrum frequency bands that have been set aside for industrial, scientific or medical applications.

The eLTE solution is suitable when it is not feasible to install last mile access fibre and network connectivity is needed.

“eLTE-IoT devices are lightweight and easily deployable, and also able to connect to existing application platforms which are in accordance with standards and protocols, such as smart meters. This makes it an ideal solution for enterprises to set up their own private narrow-band IoT networks,” says Hemphill.

eLTE-U technology provides reliable and stable connections on an unlicensed band. Wireless modules can easily be integrated into video surveillance cameras, wildlife protection cameras, and a multitude of third-party devices for eLTE-U data backhaul.

Which system for which technology?
Each type of network structure has different strengths and weaknesses. The following are examples of fibre access network rollouts for different systems.

CCTV: As CCTV cameras are found in external environments, the recommended system would be the eLTE-U. Due to the high frequency and unlicensed spectrum, an entity is able to place the cameras a distance from one another (3 km) and not need a frequency spectrum licence. Also, the system has low latency and high anti-interference technology, and therefore would be the most useful for CCTV cameras.

Private networking: eLTE-IoT is a good option for entities wanting to create their own private networks. This is due to the large number of connections and large radius it is able to cover.

Metering: For most metering systems, such as electricity, water, gas metering, the eLTE-IoT system is recommended. This is due to its low power consumption, large area coverage, large number of connections, and easy deployment.

Parking systems: The eLTE-IoT system is recommended due to the large number of connections needed and the low power consumption.

Rapid deployment network: If a system needs to be rapidly deployed for instances where public network infrastructure is not operational, a network can be created through eLTE-IoT. The network has a deployment time of 15 minutes, with high performance of 100 users and 40 groups with a six kilometre radius.

Each IoT system has its own attributes and as both are on unlicensed spectrum, they are easily installed. Both technologies meet third-generation partner project (3GPP) standards.

For more information contact Annabel Eaton, Corporate Communication Services, +27 (0)21 702 3550, eatona@netactive.co.za, www.eeslive.com

www.instrumentation.co.za  March 2018 55
Safety limiter for critical thermal applications

The GHM Group’s Safety-TL4896 offers a first in digital safety devices for temperature limiting applications.

Signifying a breakthrough in digital safety limiters for thermal applications, Martens, a member of the GHM Group, has introduced the Safety-TL4896 for switch panel installation. “The Safety-TL4896 is innovation at its best, offering users a host of cost and resource savings,” comments Jan Grobler, managing director of GHM Messtechnik South Africa.

Representing a first in digital safety temperature limiters available worldwide, the Safety-TL4896 complies with all relevant European safety regulations. It has a reaction time of 0.5 seconds, shutting down the system if it detects an unsafe condition, and will ensure continuous operation with the added feature of a pre-alarm in the event of temperature fluctuation. A front panel LED indicates alarm conditions, complemented by information on the backlit display that identifies the cause in plain text.

The Safety-TL4896 satisfies all DIN EN14597 requirements and has been issued with a SIL2 certificate. Other key features include:

• The instrument operates as an indicator since it can be installed directly in the control panel instead of on the top rail. Therefore, any additional indicator element can be omitted.
• The integrated temperature output signal eliminates the need for additional interfaces to the PLC or scada.
• The reset function is executed directly on the device, thus no additional control element is needed.
• Configuration of the unit takes place directly from the front buttons and graphic display, eliminating the need for any additional interface devices and software.

“The Safety-TL4896 represents a first for thermal applications that enhance plant performance within the bounds of compliance to local regulations,” concludes Grobler. “The addition of the pre-alarm, which triggers before the actual alarm limit is reached, makes it possible to initiate corrective active at an early stage thus avoiding unnecessary plant shut-downs.”

For more information contact Jan Grobler, GHM Messtechnik South Africa, +27 (0)11 902 0158, info@ghm-sa.co.za, www.ghm-sa.co.za

Intrinsically safe industrial temperature calibration

Fluke has introduced the 1551A Ex and 1552A Ex Stik Thermometers, engineered to give temperature calibration specialists the durable, intrinsically safe digital instrument they need for precision temperature calibration. The Fluke 1551A and 1552A Stik instruments provide a highly precise and durable digital replacement for mercury-in-glass thermometers.

They are intrinsically safe (ATEX and IECEx compliant), so they can be used safely where potentially explosive gases may be present. More durable than mercury-in-glass instruments, they can be used reliably outdoors or on the production floor.

The 1551A covers a temperature range of -50 to 160°C. The model 1552A covers a range of -80 to 300°C. Both models are accurate to 0.05°C over their full temperature range. Process manufacturers of chemical, pharmaceutical, food or petroleum products require accurate temperature measurements. Since temperature sensors are subject to drift with time, regular calibration or verification against a reliable reference thermometer is required. Finding a reference thermometer that is accurate, repeatable and robust was a challenge to the manufacturer.

Although accurate and repeatable, mercury thermometers are fragile. The risk of a mercury spill poses potential hazards to the environment and to health. Many of the U.S. States and European Union countries have banned their use in industrial applications.

The stainless steel probe and digital readout of the new Fluke thermometers are fixed together and calibrated as a system. The accuracy specification is easy to understand since it includes all uncertainty components, including drift, for up to one year. The large backlit LCD display rotates 90 degrees, making for easy reading from any angle. A user-configurable stability/trend indicator lets the technician know when temperature is stable enough to record an accurate measurement.

A settable auto-off function extends typical battery life to three hundred hours. A low-battery indicator and Stop Measure function prevent erroneous measurements from being made due to low battery life. A simple three-point calibration function allows the operator to calibrate the devices. Data logging to internal memory of up to 10 000 time-stamped measurements is available as an option.

For more information contact Comtest, +27 (0)10 595 1821, sales@comtest.co.za, www.comtest.co.za
Imagine 10 000 temperature readings, monitored at one central point, using one fibre optic cable!

AP Sensing can monitor temperature under harsh conditions over long distances to optimise maintenance, detect fires and overheating, and measure environmental temperature.

THE SOLUTION INTEGRATES EASILY INTO YOUR EXISTING MANAGEMENT PLATFORM (SCADA SYSTEMS) BY DRY CONTACTS AND/OR Communicating directly over Ethernet (TCP/IP), USING STANDARD PROTOCOLS.

APPLICATIONS INCLUDE:
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- Cable racks and many more

ADVANTAGES:
- Accuracy
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- Very little maintenance over an exceptionally long lifetime
- Minimal operational costs
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UP TO 10KM OF FIBRE OPTIC CABLE CAN BE USED TO SENSE HEAT ON EACH 1M SECTION TO 1°C ACCURACY ENABLING USERS TO MONITOR 10 000 TEMPERATURE READINGS FROM ONE CENTRAL POINT USING ONE 10KM FIBRE OPTIC CABLE.

AP SENSING’s linear heat series minimises your operational costs and performs extremely reliable by using a standard fibre optic cable which has no active components or electronic sensors within the exposed zone. Fibre optic cable is also immune to electromagnetic interference.

Distributed Temperature Sensing (DTS) utilises laser light and fibre optic cables to measure temperature. An infrared LASER PULSE is sent through the fibre. The incident energy is back-scattered from the glass molecules throughout the entire length of the fibre. These minute light signals contain information about the temperature of the glass at any given point in the fibre, in accordance with the Raman Effect. The back scattered light is measured and then analysed for temperature.

The POSITION of the temperature reading (along the fibre length) is determined by measuring the time delay of the returning light pulse, similar to a radar echo.

Do not hesitate to contact us for additional product information and re-seller opportunities.

www.spero.co.za • info@spero.co.za • +27 12 665 0317
Fibre optic sensors for detecting hot rollers on conveyors

Fire in the mining environment can cause damages to valuable assets, downtime and loss of lives. A proper fire protection installation is made more complex when the area is affected by harsh environmental conditions. Industrial facilities frequently produce dirt, dust, humidity and corrosive atmospheres in the production, storage or transport of goods.

The use of modern fibre optic sensors based on DTS (distributed temperature sensing) technology has established itself as a proven method for fire detection and temperature measurement. A passive fibre optic cable can provide accurate temperature measurement along the length of a conveyor belt, which enables effective monitoring of even very long conveyor routes. Fires and overheating, which can occur during operation, are quickly detected and localised to within one metre accuracy, allowing the safety countermeasures to be quickly activated. Heat detection for rollers requires proper installation of the sensor cable and configuration of the alarm zones. This article is based on conveyor belt tests and case studies, and describes the potential of fibre optic based DTS technology with regard to fire and hot roller detection along conveyor systems.

Thousands of FO-LHD (fibre optic linear heat detection) systems have currently been installed and consequently this technology is now solidly established in fire protection. But a new distributed sensing technology has appeared on the horizon, which may improve the protection of assets in conjunction with FO-LHD. This technology utilises the optical fibre as a distributed microphone, meaning it measures not only the temperature, but also the acoustics along the asset. Adding another level of information helps better identify potential sources of danger and improves the overall goal of fire prevention. Particularly on conveyors, this new technology is gaining interest for hot roller detection, one of the major causes of conveyor fires.

Raman OTDR (optical time domain reflectometry)

Most commercially available FO-LHD systems are based on Raman-DTS, which utilises the OTDR method. Light pulses are coupled into the fibre of the sensing cable and the backscattered light contains information about the temperature of the optical waveguide and thus the surroundings. The backscatter spectrum consists of the so called Raman Stokes and anti-Stokes lines, which are shifted to the lower (Stokes) or higher (anti-Stokes) wavelength due to an inelastic collision of photons with atoms that form a temperature dependent electromagnetic oscillator. While the intensity of the Stokes line is nearly independent of the temperature, the anti-Stokes line shows temperature dependence. The quotient of both intensities constitutes a measure of temperature in the optical waveguide.

Measuring the backscattered signals as a function of time, together with the speed of light, one can calculate the distance, and thus a temperature profile along the optical fibre.

Using distributed sensing on conveyors

Nearly all open fires in mines are caused by externally supplied ignition. The most frequent sources are disturbances in active conveyor belt systems, and thus many fires develop in the proximity of conveyors. A few examples of these faults include stuck or defective rollers, grinding of the belt, slipping of the belt and misalignment. The initial smouldering stage is difficult to detect with conventional technologies and requires very tuned alarm algorithms. In addition, many conventional smoke/gas detectors do not work properly because of the high air currents.

Fire detection

FO-LHD appears to be a good solution for
detecting the early stages of fires in the proximity of conveyor systems. A fibre optic based distributed temperature sensing system has several advantages during normal operation and in the case of a hazardous situation:

- Cable design is robust and resistant against dirt and dust.
- Fully certified systems (FM, UL, VdS and ATEX/IECEX).
- Long range up to 10 km and up to 4 measurement channels monitor multiple conveyors with one system.
- Virtually maintenance-free.
- Mechanically robust cable design.
- Precise localisation of fires/hot rollers enables targeted intervention.
- Reliable fire detection despite unfavourable environmental conditions.

**Smouldering fires**

In spite of all the security technology currently used in conveyors, it is sometimes not possible to prevent the ignition of coal smouldering fires in close proximity to conveyors. For this reason, a monitoring system is required which is able to detect the thermal radiation from a smouldering fire through permanent monitoring of the area allowing hot spot detection at an early stage.

A good example of an advanced fibre optical temperature sensing system for early detection of smouldering fires at conveyors has been installed in the mine Prosper Haniel in Bottrop, Germany. This installation shows above all that it is possible to install fibre cable at a conveyor and permanent operation under practical conditions. A fibre optical sensing cable about 3500 m long was mounted on the lower side of the conveyor.

Under test conditions, the FO-LHD system successfully monitored the detection of a coal dust smouldering fire with an area of 0.25 square metres at a distance of 1.8 m (distance between surface of smouldering fire and sensing cable) at a weather speed of up to 4.5 m/s.

**Hot roller detection**

Rollers on conveyor belts can become overheated and a source of danger when bearings suffer enhanced friction due to wear over time. Conveyor systems that transport heavy loads or work at high speeds are more likely to overheat. These systems are often used in harsh environments where hazardous materials, dirt, dust and vibration are present. Apart from the danger of personal injury and asset damage should a fire occur, the downtime of the line could result in significant financial loss. Extensive laboratory and field tests have been carried out for hot roller testing, in addition to experience gathered from a wide range of conveyor belt system installations.

When a DTS solution is used to detect hot rollers on the conveyor belt, the placement of the sensor cable becomes crucial. A solution has been developed to mount the sensor cables with a special clip that ensures a simple and secure installation, but also improves heat detection of small hot spots. Once installed, rollers can still be accessed for maintenance or exchange without affecting the sensor cables.

DAS (distributed acoustic sensing) is another promising solution for detecting defective rollers in idler stations. Wear out of bearings increases friction and thus an intensified rolling noise, which is detected and localised by the DAS system. However, background noise caused by the operation of the conveyor, as well as from the working environment, is a challenge for a trouble-free utilisation of acoustic sensing. Specialised algorithms and analysing acoustic patterns, frequencies and amplitudes are required to minimise the nuisance alarm rate.

**Conclusion**

Distributed sensing technologies are widely used to protect transportation systems and the characteristics of FO-LHD are ideal to improve the safe operation of conveyor systems. One system can cover multiple long-distance conveyors, the sensor cable is robust, passive and easy to install and no additional wiring is required. Fires and overheating are detected quickly at an early stage and are localised with accuracy down to 1 metre. Furthermore, it has been shown that FO-LHD is able to detect and localise hot rollers and different methods have been developed and tested. For safe operation of FO-LHD it is recommended to use systems which are certified according to internationally recognised standards and are safe in explosive atmospheres, even when the system is compromised. In addition, distributed acoustic sensing can contribute to the safety of a conveyor by detecting defective rollers before any overheating may cause a fire.

Technology is continually progressing to help address the dangers of underground mining and the complexity of the harsh environments in which the monitoring systems must operate. The latest innovative AP Sensing fibre optic systems offer innovative new solutions to these challenging applications.

For more information contact Marihette Hattingh, Sperosens, +27 (0)12 665 0317, marihette.hattingh@spero.co.za, www.spero.co.za
Detonation flame arresters from Energas

Technology is developing fast, and while innovation is taking centre stage, versatility remains right up on the checklists of both manufacturers and end users alike. With that in mind, the new Protectoseal Series 26000E/36000E bi-directional overdriven/unstable detonation arresters, now available in southern Africa through Energas Technologies, which usher in a new era in flame arrester technology with their versatility, allowing them to withstand both deflagration and detonation flame fronts.

Deflagration and detonation are two forms of combustion. If the combustion process propagates outward at subsonic speeds and pressures less than 0.5 bar, it’s a deflagration. If the explosion moves outward at or above the speed of sound it is a detonation, a dramatic, often destructive form of an explosion. Detonation is divided into two types: stable and unstable. Stable detonation is characterised by the speed of sound (343 m/s), while unstable detonation is characterised by supersonic speeds up to 2000 m/s, with significant overpressure of up to 40 bar. In piping applications, selecting the right flame arrester, whether for deflagration or detonation, often involves the trouble of determining the probable type of combustion, location and other factors.

“The beauty of our new series detonation arresters is that the flow and pressure drop performance for these units are extremely competitive compared to other devices,” says Lavenda Sekwadi, process engineer, Energas. “Protectoseal’s Series 26000E/36000E detonation flame arresters are designed to withstand deflagrations as well as stable and overdriven/ unstable detonations. These arresters are bi-directional, capable of stopping a flame or detonation approaching from either direction of a piping system. Available sizes range from DN50 to DN300, and the new range has a maximum operating pressure of 1.22 bar and operating temperature of 60°C.”

Features in detail

The Series 26000E/36000E detonation flame arrester designs utilise improved-flow, crimped metal flame arrester elements. The range comes with a robust welded housing, both hydrostatically and pneumatically tested. All detonation arresters are suitable for short-time burn when additional external safety equipment is properly used in accordance with the requirements of EN ISO 16852. Short-time burn arresters are equipped with two FNPT taps for the installation of ATEX-approved IS temperature probe assemblies. The probes are used to detect a burn on the flame arrester element and send a signal that will trigger emergency functions within a specified time.

Stable vs. unstable detonation arresters

Unstable detonation arresters are required for safety in piping containing flammable vapours, as encountered in vapour recovery or manifold tank systems. “A confined flame front will accelerate from the point of ignition, quickly reaching the speed of sound in the pipe run,” concludes Sekwadi. “During the unavoidable transition period from subsonic to supersonic speeds, flame front pressures and velocities are far greater than before or after the transition – an unstable detonation.

“Devices approved under ISO 16852 as ‘stable detonation arresters’ have not been tested against the severe mechanical and thermal effects of multiple unstable detonations. The use of stable detonation arresters is based on the premise that, firstly, it is unlikely that the unavoidable high pressure and velocity transition will occur as the flame front reaches the detonation arrester, and secondly, all of the independent safety systems required to be installed when stable detonation arresters are used will function as required."

For more information contact
Lavenda Sekwadi, Energas Technologies,
+27 (0)11 397 6809,
lavenda@energas.co.za,
www.energas.co.za
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In many industries, there are certain areas that are classified as hazardous or Ex areas. This is an area that contains, or may contain, combustible substances such as gas, vapour or dust. Typical hazardous areas include coal mines, grain silos, chemical and petroleum plants, offshore and onshore oil and gas rigs, oil refineries, pharmaceutical plants and paint shops.

During the coal mining process, byproducts in the form of coal dust and methane are produced. The build-up of either of these can be extremely dangerous. Even a tiny spark can set off a disastrous explosion. Similarly, grain silo dust ignited by a spark, has led to tragic explosions.

Safety measures in hazardous areas
In order for ignition to occur, two things are needed: the combustible atmosphere as described above, and a trigger i.e. a spark or flame. Remove one or both of these conditions and an explosion cannot occur.

Removing combustible dust and vapour
Ventilation equipment can dilute or remove dangerous substances from an enclosed area and as a result reduce the risk of explosion. This method is extensively used in the mining and chemical industry.

No trigger
Apart from ‘No Open Flame’ signs, precaution must be taken to prevent electrical equipment from being a source of ignition. A simple electrical switch, for example, can generate an electrical spark every time it is thrown – depending on the type of load. This spark may be enough to act as a trigger for an explosion in a hazardous area. In a similar fashion, sparks can be created by portable electronic devices. In order for devices to be safe for use in hazardous areas, safety precautions have to be built into the design.

Intrinsically safe (IS) instruments
There are several aspects in the design of IS electronic devices, of which reducing or eliminating switch sparking is but one. Other considerations include, fast fuses, controlling component temperatures, eliminating tight component spacing that could lead to a short circuit, and reducing circuit current and energy storage.

R&C Instrumentation is geared to supply a considerable range of intrinsically safe instruments, for instance the Raytek MT4-IS handheld non-contact thermometer for the temperature range -18 to 400°C, the Raytek Mi3-IS 4-wire system fixed pyrometer and the Raytek TX-IS 2-wire loop powered system fixed pyrometer.

As part of the recently launched range of vibration sensors, there is also a wide range of ATEX IEC and Ex certified versions available. Additionally, due to a special request from a mining client, there is now also the UT390B+IS laser distance meter available from stock.

For more information contact R&C Instrumentation, +27 (0)86 111 4217, info@randci.co.za, www.randci.co.za

Electronic instruments in hazardous areas

Safe torque-off option simplifies machine design

Rockwell Automation has introduced a networked safe torque-off option module, allowing safety and non-safety functions to share the same EtherNet/IP network. Designed for the Allen-Bradley PowerFlex 755 and PowerFlex 755T AC drives, this safety option helps protect personnel and equipment by removing rotational power from the motor without removing power from the drive. This functionality allows a quick restart after a demand on the safety system.

“The ability to integrate safety into a control system over EtherNet/IP reduces wiring and equipment redundancies associated with hardwired safety systems,” said Adrian van Wyk, business manager for power and components, Rockwell Automation, Sub-Saharan Africa. “It also provides access to real-time data that can help customers improve application productivity.”

Compatible with both Allen-Bradley GuardLogix and Compact GuardLogix controllers, the option module allows customers to leverage one IP address for the safety and control functions, reducing the number of ports required. The networked safe torque-off option module is compliant with global industry standards, providing a SIL 3/PLe Safety Integrity Level rating, and can be used for hardwired and networked safe torque-off applications.

Additionally, with the safety functions integrated over EtherNet/IP, customers experience reduced hardware and installation costs, improved productivity and a reduced panel footprint. The networked safe torque-off option module has the flexibility to be field-installed when the functionality is required.

Appropriate for a wide variety of applications requiring safety, the option module is well-suited for almost any industry.

For more information contact Adrian van Wyk, Rockwell Automation, +27 (0)11 654 9700, avanwyk@ra.rockwell.com, www.rockwellautomation.co.za
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As with many other industries in the world today, food and beverage manufacturers are under immense pressure to increase productivity and sales, while keeping manufacturing costs down. A normal reaction to this dilemma would be to increase production. However, there is pressure from consumers demanding a wider variety of products, new flavours, sugar or gluten-free varieties, or different portion sizes. Increasing production runs is not the simple solution it used to be. These conflicting pressures have forced the food and beverage manufacturers to adapt production lines to try to satisfy customer demands, without sacrificing productivity. Some manufacturers are looking to install smaller, dedicated lines, while others are trying to ramp up production, adding new lines. In both these cases, the amount of testing required increases. There is also an increased need to transport smaller amounts of produce around the factory. These additional complexities introduce several problems with current production lines.

Identification and traceability

An increase in the number of test samples creates an issue with identification and traceability, which, in turn, requires a robust tracking system be put in place. Furthermore, the need to transport product around the factory is generally accomplished by hand, meaning that the efficiencies gained from automation are being eaten away by additional staffing costs. One alternative method of transporting goods is by using automated guided vehicles (AGVs). These mobile robots can carry a tote from one set position to another. They generally use physical guides to navigate, such as magnets embedded in the floor, or painted lines. The downside to AGVs is that when they are asked to do a different task, the physical navigation guides have also to be moved, which can halt production.

Autonomous intelligent vehicles

One way to solve both these challenges can be found in a new generation of mobile robots. Autonomous intelligent vehicles (AIVs), such as Omron’s LD platform, use sensors to create a static map of their surroundings, so they have no need for physical guides. Initially, all that is required is to take the robot to different positions on the factory floor and let it scan its surroundings. From the map, the AIVs can work out the optimal route between any two points. The sensors are then used to detect moving objects, such as humans, in the AIV’s path. Vertical sensors are also incorporated to ensure the AIV avoids any obstacles, such as spillages on the plant floor, or the overhang from forklifts. AIVs can work in fleets of up to 100 mobile robots, and the workload is controlled by fleet management software, which can also assist the AIV’s navigation by reporting any busy routes or blockages on the factory floor. If the management software is integrated into the production management system, as is the case with Omron’s Sysmac software, all pickups and drop offs are automatically logged. The AIV can also check it is picking up the correct package by interrogating the machine using WiFi or optical networking. This comprehensive system ensures that the information required for testing is accurate and reliable, cutting down errors and reducing the risk of an expensive quality failure.

AIVs offer different configurations, giving them the flexibility to accomplish a number of tasks in the food and beverage manufacturing plant. For instance, they can have a fixed top, either flat or a lock box, to carry totes, but in this case, they have to be loaded and unloaded by hand. Other fully-automated configurations include conveyors and cart transporters, including Omron’s LD Cart Transporter range, released at the start of 2017.

“For manufacturers and distribution centres, having the flexibility to release manpower from repetitive jobs to more productive employment, while being able to provide comprehensive, fully automated traceability, will be a real game changer in fast paced food production and supply environments,” concludes Adam, Omron mobile projects director, Europe.

For more information contact
Omron Electronics,
+27 (0)11 579 2600,
info.sa@eu.omron.com,
www.industrial.omron.co.za
The benefits of easy access to accumulator services

Modern industry needs far more from its suppliers than straightforward product sales. Instead, today's technology providers must support their customers with accessible and targeted services that, for example, aid plant and equipment efficiency and reliability and minimise disruptive downtime.

One area where this is relevant is with gas-loaded hydraulic accumulators, which store energy or smooth out pulses or shocks when installed within a hydraulic system. A system with an accumulator can use a smaller pump because the accumulator stores energy during periods of low demand. This energy is available for instantaneous use, released upon demand at a rate many times greater than could be supplied by the pump alone.

Regular maintenance
When properly applied in a hydraulic circuit, accumulators can have a long and reliable life, but regular maintenance is critical in order to maintain production efficiency and control cost.

To minimise the risk of downtime, engagement with an accumulator service team that offers fast and efficient service will provide numerous benefits. These can help combat and even eliminate a number of potential technical and performance issues that can affect accumulators in service.

Selecting a competent supplier of accumulator services is paramount, and there are several factors to consider for those seeking comprehensive support. Only consider suppliers with a dedicated resource for accumulator services as this will help guarantee the necessary expertise and experience. When a hydraulic system begins to underperform or fail, it can prove extremely disruptive, so a professional support team is vital.

Legislation
New directives, including the Pressure Equipment Directive 2014/68/EU, place requirements on manufacturers and those who 'place equipment on the market' and national regulations require most accumulators to be independently checked and recertified on a regular basis. However, despite the financial and legal risk, it is estimated that 80% of accumulators in Europe are not fully compliant with legislation.

Parker Accumulator Service Centres
Parker Accumulator Service Centres have been established with certified Parker distributors to optimise customer systems by combining industry-leading products backed by quality service to deliver stress-free accumulator management, which maximises performance, efficiency and safety. With training and certification provided by Parker, Accumulator Service Centres offer detailed product knowledge and expertise. Customers benefit from services such as system improvement, as well as accumulator maintenance, recertification and pre-charging, complete with audits, scheduled inspections and replacements.

Integrated solutions
With locations across Europe, Parker Service Centres offer an integrated solution that combines products, services and technologies, whether on an in-house (at the Service Centre), mobile or onsite basis. With an in-house service solution, the accumulator is sent to the Service Centre, while for mobile solutions the Service Centre travels, with equipment, to the customer facility. For onsite solutions, a fully equipped container workshop is established on location.

Aside from preventing any loss of system performance or failure, support can help to protect employees from accidents. Moreover, compliance with legal requirements is assured, while warranty validation and preventative maintenance reduces downtime and increases productivity.

With regard to the use of original spare parts, tangible benefits include shorter inspection time and the reduction of complexity in logistics (tracking systems, data monitoring and recording) and documentation, both of which help to lower costs and save time.

The service utilises the Parker Tracking System (PTS) which helps schedule accumulator maintenance, providing automated notifications on inspections and replacement parts. In automobile MRO operations, appointing an accumulator service provider could also help to make the production performance fit for Industrie 4.0. Further potential asset management activities include energy and efficiency audits, risk assessment and servicing for safety equipment, and asset condition monitoring and prognostics (sensors).

The implementation of preventative maintenance, improved reliability, extended application possibilities and reduced total production costs are among the benefits available to hydraulic systems in production plants.

For more information contact Lisa de Beer, Parker Hannifin SA, +27 (0)11 961 0700, lisa.debeer@parker.com, www.parker.com/za
How drives are revolutionising the printing industry

Whether it’s for actual printing press machinery or supplementary systems, such as inserters, reel stands and cart loaders, many in the print industry are taking steps to replace DC drives with AC drives in a number of core processes. The latest variable speed AC drives offer advantages that include an attractive price-to-performance ratio. For example, matching a variable frequency drive with a high-efficiency asynchronous motor as part of a complete three-phase main drive on an offset printing press will yield many benefits, not least high performance and reduced energy consumption. However, there are more factors to consider here. Take compatibility for instance. Many print shops will have an entire range of DC drives employed by their machinery, which are considered the driving backbone of the presses. So when beginning a transition project to AC drives, always check for complete compatibility between the two.

Further factors to check include Ethernet and EtherCAT interfaces, as well as the availability of various optional modules and interface units that allow the drive to integrate seamlessly with existing systems. Such modules might include those offering feedback, communications, applications (onboard PLCs), I/O and enhanced safety functionality.

When selecting suitable AC drive technology, ensure it has onboard real-time Ethernet and can provide high-level motor control. Ultimately, any drive for print industry applications should be capable of optimising system performance, ideally through integrated motion control for 1.5 axes. This is vital for high speed, round-the-clock operations, such as printing shops.

To ensure superior motor control, engineers should seek out drives with high bandwidth algorithms to suit various motor types. This enables maximum machine throughput in every application and with every motor, from standard closed-loop induction motors to dynamic linear motors, and from energy saving permanent magnet motors to high-performance servo motors. Furthermore, flexible speed and position feedback interface can support a wide range of feedback technologies from resolvers to high resolution encoders.

Inherent drive flexibility should also help design engineers looking to create centralised and decentralised control systems as required, while versatility can be assured by AC drives offering Safe Torque Off (STO) functionality and both analog and digital I/O.

Another common reason why printing shops are seeking out the latest AC drive technologies is the obsolescence of existing drives. In such instances there exists real opportunity not just to avoid any potential for production downtime, but upgrade to AC drives offering compact dimensions, a flexible interface and an in-built PLC; perfect for machines such as inserters, which feature a lot of rotating equipment and fast-moving grippers.

For inserters, motion has to be perfectly synchronised, which is where the on-board PLC comes into play as it eliminates the requirement for I/O. However, check that programs are fast and easy to develop, and ensure the software is user-friendly and conforms to industry standard IEC 61131-3 programming languages. This way it will be possible to build highly flexible and productive systems.

Of course, open-platform technology should be at the heart of any successful drive solution. With this in mind, check that the drive supports a wide range of industry standard technologies and protocols, not just IEC 61131-3, but open fieldbuses and networks including Ethernet/IP, EtherCAT, Profinet and Profibus, as well as Ethernet protocols including PTP protocol for clock synchronisation to IEEE 1588 V2. This open approach provides significant benefits to machine builders and OEMs, as well as engineers and end-users who many want to expand the system in the future.

Compatibility is again a prerequisite with inserters in order to avoid excessive machine hardware changes and code modifications to the controller. A high degree of compatibility also streamlines the replacement process into a short period of time. Further benefits for busy print shops include a flexible interface on the AC drive. This design capability allows printers to use different Profinet modules or different encoders, for example, thus simplifying communication with other equipment. Also, the interface can determine what motor is deployed and link to it immediately, which means print shops are not restricted to using one motor type.

The demands placed on modern printing machines are increasing almost continuously. Today’s print shops are looking to maximise performance, print quality and machine availability (uptime), while at the same time reduce scrap and waste. This is why increasing numbers are turning to technology suppliers with industry-leading know-how of drive and automation solutions, in particular AC drives.

For more information contact Ryan Chetty, Nidec Industrial Automation Southern Africa, +27 (0)11 462 1740, ryan.chetty@mail.nidec.com, www.nidecautomation.com
Cost-cutting boosts uptake of IE3-compliant motors

Rising energy costs, increasingly stringent international regulations, and a global drive to reduce carbon emissions has resulted in pulp and paper customers opting for SEW-Eurodrive South Africa’s highly energy-efficient IE3-compliant DRN motor range.

These premium efficiency motors comply with the highest level of EU standards in terms of energy efficiency (directive 2009/125/EC Regulations (EC) 640/2009, 4/2014). “This, along with its long history of ensuring world class delivery, and an unwavering commitment to its customers, is what sets SEW-Eurodrive South Africa apart from its competitors in the pulp and paper industry,” comments Richards Bay sales engineer, Jacques Swart.

“Our projects department gets involved at the very beginning, right from the enquiry or tendering stage, whereby we ensure we select the correct products to meet all of the requirements,” he stresses. Once the customer accepts our proposal, we proceed with planning and management, until the project is completed. We always supply the best and most suitable solution.”

SEW-Eurodrive South Africa offers customised solutions based on customer requirements to ensure that an application is successful and achievable. “If pulp and paper customers require a specific solution for a particular application, this can be achieved successfully,” highlights Swart. “Our involvement commences from the inception of the process when the raw material arrives onsite, utilising conveyors powered by SEW drives, to the motors and industrial gearboxes used in the processing plants themselves.”

A significant benefit for pulp and paper customers is the standardisation of their operations on SEW-Eurodrive equipment, which gives them full confidence that, in the event of any issue arising, they have full technical and service support available. “Our long-standing relationship with our customers extends throughout the lifespan of our equipment, from installation to commissioning and aftermarket servicing,” notes Swart. The company’s involvement in the pulp and paper industry has been fairly extensive to date. For example, in 2015 it supplied four industrial geared units and about 30 motors for the conveyor system of a hard pulp section at a new plant in KwaZulu-Natal. “We also have a full consignment stock of spares to cater for contingencies, which reduces our turnaround time dramatically, and increases uptime significantly for our customers,” comments Swart.

With the global demand for paper, SEW-Eurodrive South Africa is well-positioned to support the ongoing growth of this sector with the latest energy-efficient technology.

For more information contact Jana Klut, SEW-Eurodrive, +27 (0)11 248 7000, jklut@sew.co.za, www.sew-eurodrive.co.za
MOTION CONTROL

Just as PCBs have successfully managed to pack an increasing amount of power into a smaller space, developers of plug connectors are working to accommodate more power and a higher contact density into smaller, lighter plug connectors. The family-owned British manufacturer, Harwin, relies on Festo automation to safeguard the quality and flexibility of its production using equipment such as the servo press kit YJKP and the compact handling system YXMx.

Harwin’s connectors are high quality, reliable and durable and can thus be used in harsh ambient conditions. They do not only fit the bill for customers in industry sectors such as cost-conscious consumer electronics, but also in the ultimate performance seekers such as aerospace, motor sports and the automotive industry, where extreme operating temperatures between –65 and 150°C, as well as severe vibrations, are the order of the day. This means the connectors have to be manufactured to very high standards.

High standards

The response by Harwin to these market requirements has been to launch the Gecko range of connectors. These advanced connectors have a pin pitch of only 1,25 mm and are half the size and 75% lighter than micro D connectors. Their robust screw connection makes them extremely safe and reliable and able to withstand countless mating operations without damage.

The Gecko connector manufacturing process has been continuously refined from an initially manual operation to today’s highly automated solution, capable of producing hundreds of thousands of connectors a year with a wide range of configurations ranging from 4 to 50 pins, and many PCB mounting options.

Modular concept

Harwin started developing a new manufacturing line with the aim of making the production of the Gecko series more efficient. Both a high level of automation and a high degree of flexibility were needed to produce differently shaped and sized connectors on one line. “That is why we developed a modular concept together with Festo,” explains Paul McGuinness, operations director at Harwin.

The new assembly lines are built around the servo press kit YJKP and the compact handling system YXMx from Festo. The handling system takes care of the XY movements of the workpiece carriers and the plastic housings assembled in several of the system stations. The servo press kit, which provides easy-to-configure position and force controlled movement along the Z-axis, is used for press-fitting and bending the contact pins.

Standard parts

In all stations, the electric and pneumatic drives are each controlled by their own controller together with a valve terminal. “These Festo systems enable maximum standardisation and modularisation, as standard parts are used everywhere. This makes commissioning and maintenance easier,” explains McGuinness.

One of the assembly lines for manufacturing the connectors consists of multiple stations for inserting, press-fitting and bending the contact pins. In the first station, the workpiece carriers are equipped with the connector housings, which are positioned using the compact handling system so that the contact pins can be inserted. In the second station, the servo press presses the contact pins into the connector housing. The precision gripper from Festo locates the workpiece carriers while the pins are fitted.

The handling system and the servo press kit are also used in the last station for bending the contact pins to the required angle. The CoDeSys software in the controller allows comprehensive control of the servo press profile, providing position and force control throughout the cycle. The application software supplied with the servo press makes programming extremely easy thanks to an intuitive graphical user interface.

Three valve terminals controlled by the master controller actuate the numerous electric and pneumatic grippers and actuators. “The automated modular concept ensures low production costs and high reliability, precision, repetition accuracy and flexibility,” concludes McGuinness. “This makes it easy to adapt the press profile to the different connector variants without the need for special programming skills.”

For more information contact
Kershia Beharie, Festo, 086 003 3786, kershia.beharie@festo.com, www.festo.co.za
The electronic controls business unit of Parker Hannifin has released new functional safety controllers for mobile machinery applications. As well as offering high levels of robustness and straightforward system integration, the new RISE (SP) certified IQAN-MC4xF controllers have been developed to provide a more cost-effective way of meeting the safety standards required for heavy mobile machinery. Typical applications include reach stackers, aerial platforms, refuse truck loaders, mobile cranes, steer-by-wire forestry equipment and construction machinery.

Designed for controlling hydraulic valves and certified to IEC 61508 SIL2, the controller is an ideal choice for mobile machinery applications where safety functions up to SIL2/PLd are required. The Machinery Directive states that control systems must be designed to prevent hazardous situations, and with the EN ISO 13849-1:2015 update, there is now a precise limit for safety functions where safety ratings (SIL/PL) by the controller manufacturers is required. IQAN-MC4xF is suited for use in applications where non-certified controllers were previously accepted.

The new device builds on the success of Parker’s earlier MC4x versions, with full pin compatibility, and incorporates a significant amount of monitoring functionality to meet application requirements. Extended diagnostics measures have also been introduced, such as the run-time diagnostics of dangerous faults, along with extensive start-up tests. Further features include the execution of safety-related applications in the lockstep core, ECC-protected RAM, and the implementation of a safety-certified real-time operating system.

Parker offers three versions of the new controller: the MC41FS, which is designed for one or two safety functions in support of cost-efficient, task-oriented control; the MC42FS, which offers a higher number of safety outputs for mid-size applications and I/O distribution; and the MC43FS, a large centralised controller for applications involving multiple safety functions.

Delivering precise, real-time control of hydraulic systems, Parker’s IQAN-MC4xF controllers are based on the same robust hardware as IQAN-MC4x performance-optimised standard versions featuring state-of-the-art automotive grade safety components. Scalable feature sets, connectivity and the same pin configuration facilitate easy up or downsizing of applications.

The new controllers have been designed to simplify and ease implementation in customer applications allowing faster development of new machine functionality. This is supported and enabled by full compatibility with the established IQANdesign platform which provides an intuitive tool for programming, simulation, testing, production, service and maintenance.

For more information contact Lisa de Beer, Parker Hannifin SA, +27 (0)11 961 0700, lisa.debeer@parker.com, www.parker.com/za
BMG’s extensive range of sealing products encompasses Spanjaard lubricants, oils and greases, which are suitable for industrial, automotive, marine, mining and consumer applications.

“The effects of friction and the resulting wear of moving components are significantly reduced by lubrication,” says Marc Gravett, business unit manager, seals, BMG. “Not only do lubricants extend the service life of machinery and equipment, but they also play an important role in enhancing the performance of components like bearings and chains.

“Lubrication-related failures in machinery are generally preventable and through the application of the correct lubricant, at the right time. A multipurpose grease is adequate in many applications, but more arduous operating conditions demand the judicious selection of the correct lubricant and lubrication system.

“Although lubrication constitutes a small percentage of a company’s maintenance budget, the correct use of appropriate lubricants results in minimal downtime, extended service life of components and significant operational cost savings.”

BMG’s extensive portfolio of locally manufactured Spanjaard lubricants and allied chemical products have been principally formulated to improve performance of equipment and machinery and to enhance maintenance in heavy-duty applications.

These industrial products include anti-seize compounds, assembly and disassembly products, chain lubricants, transmission oils, cleaners and degreasers, electrical maintenance products, plastic moulding and cutting compounds, as well as engineering and fabrication materials.

Also available are a number of Spanjaard greasing solutions, including open gear lubricants and wire rope dressings; bearing and synthetic bearing greases, as well as other general grease products.

BMG’s technical resources team offers an oil analysis service, which consists of laboratory-based sampling and analysis, as well as on-site analysis and filtration and flushing. Other services include technical applications consulting, product and system design, product quality control and assurance, as well as condition monitoring services.

The company’s mobile technicians, with specialist technical skills, conduct breakdown and routine maintenance on plant. This group also carries out trouble shooting and advises on possible productivity improvements, to ensure the highest level of plant output and reliability.

The company’s recently upgraded distribution centre — BMG World — centralises functional and support operations onto one site, which enables the team to provide high levels of operating efficiency and service, in line with the continued growth of the business.
SICK launches a new generation of photoelectric sensors

SICK has streamlined its portfolio of object detection sensors and improved individual sensor performance by introducing new technologies. The new smart sensors represent a significant improvement, especially insofar as usability is concerned. What remains is the reliability customers have come to expect.

By focusing on the essentials, SICK has made its photoelectric sensors fit to face future challenges. The new W16 and W26 product families are the result of a consistent simplification and streamlining of the comprehensive product portfolio. They are technically optimised and equipped with everything that makes work easier and processes safer for the user. Moreover, as smart components within networked production and control processes in complex machine environments, they are key to the industrial future in the context of Industrie 4.0. The product ranges are not only consistent in terms of housing size, but also with respect to their equipment. From choosing the right sensor to subsequent commissioning and particularly during operation as all features are completely consistent across both product families, users can rely on all of the benefits of this technology to ensure seamless, reliable production in every situation.

Perfect application specialists, thanks to newly developed technologies

TwinEye-Technology offers the very highest levels of operational safety for high-gloss, reflective and high-contrast objects, all of which are commonplace across a wide range of industries. This technology uses one sender and two receivers. The sensor only changes the output state if both receivers (eyes) produce the same assessment. Should the light beam be deflected as a result of the uneven or high-gloss surface, the sensor maintains the status until the second receiver can no longer detect the object either. Switching errors are therefore reliably prevented.

LineSpot technology ensures that perforated, textured and uneven objects can be reliably detected. The light spot, which has been extended to form a line, allows optical information to be provided about irregularities, such as gaps or rough surfaces.

The ClearSens technology ensures an optimal view when it comes to transparent objects, such as glass or plastic bottles, ampules, pipettes, transparent films, trays, etc.

The operating element can be rotated to set the required mode intuitively depending on the object characteristics, and then pressed to carry out the sensor teach-in for the reflector. If dirt during production process reduces the amount of light emitted by the reflector, AutoAdapt technology compensates for this by adjusting the switching thresholds. This allows cleaning intervals to be extended and the availability of the sensors to be increased.

Depolarising objects, such as foil-wrapped containers or rolls of adhesive tape, place particularly high demands on sensors. The new photoelectric retro-reflective sensors from SICK filter the received signal geometrically and can therefore reliably differentiate between reflectors and depolarising objects to avoid switching errors.

However, the new sensors are not only application specialists. They also provide the input required by every process chain on the route toward Industry 4.0. They are all equipped as standard with IO-Link and, as smart sensors, they can play an active role in end-to-end automation networks. This ensures a significant optimisation of costs and processes along the entire value chain in smart factories.

Optically and mechanically rugged

While digital production processes are getting smoother, conditions in the analog environment remain harsh. Therefore, the significantly improved optical and mechanical ruggedness of the new sensors is a clear advantage. Ambient light in the form of direct sunlight, LED illumination, or reflections from high-visibility vests has, until now, led to switching errors or even machine downtime. SICK has equipped the W16 and W26 product families with a newly-developed OptoFilter, which means sensors are no longer dazzled and see only what they have to see.

Furthermore, the mechanical ruggedness of the sensors has improved as well. The Vistal housing from SICK is made from a special glass-fibre reinforced plastic and is resistant to extreme loads caused by thermal, chemical, or mechanical influences, resulting in an increased service life. Last but not least, the sensors’ laser inscription allows clear identification of the device type, even after years of operation. The printed QR code takes the user directly to further product information.

Usability is the priority

The usability of the new sensor ranges creates a ‘cockpit’ feeling in the machine room. SICK product developers conducted a survey to find out how selected users rated the new features. BluePilot, the new operating concept, was voted in first place. The new blue LED alignment aid enables faster alignment of sensors and reflectors as well as senders and receivers for through-beam and photoelectric retro-reflective sensors. No further setup is required.

In live operation, the LEDs in these device classes also offer a diagnostic function: should a change in detection quality arise as a result of contamination or vibration, the LEDs indicate the degree of impairment by slowly increasing...
or decreasing the dimming. In this way, the machine operator can detect the fault at a glance early on and thus find a solution before it comes to production failures caused by standstills. Setting up the new photoelectric proximity sensors with BluePilot is just as intuitive a process. To this end, the advantages of the teach-in button and potentiometer have been combined in one operating element. This allows the sensing distance – which is in turn visualised by the blue LED ring – to be configured in a matter of seconds.

Additionally, the sensor data is displayed on mobile devices, such as tablets or smartphones, via a Bluetooth interface so the production staff can keep an eye on the machine status and, if required, optimise the sensor settings in just a few clicks.

**Sensor manufacturing with Industry 4.0**

With the help of a new smart production system, SICK has been manufacturing W16 and W26 sensors since July 2017, close to the company headquarters in Waldkirch, Germany. Production cells enable the manufacture of bespoke product variants within the context of a modular system under the same conditions as serial products – in a traceable manner, with a serial number for indexing and cross-linking. The material flow is made transparent by track and trace. The multi-agent system is self-teaching and self-optimising, adapts the sequence of production orders with priority rules, organises transport jobs for raw and work-in-progress materials, and controls the process in the production modules.

**For more information contact**
Robert de Scánde, SICK Automation, Southern Africa, +27 (0)10 060 0550, robert.desande@sickautomation.co.za, www.sickautomation.co.za

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**Fibre optic sensing technology**

Fiber optics is used to transmit light energy over long distances. Optical fibres are thin, transparent strands of optical quality glass or plastic that can be as thin as a strand of hair. In photoelectric sensing, these fibres are used to transmit or receive light from the LED of a sensor.

The fibre consists of a glass or plastic core surrounded by a layer of cladding material and, for plastic fibres, jacketing. Glass fibres are arranged in bundles, and plastic fibres are usually packaged as monofilaments. Glass fibres do not have jacketing. Instead, the bundles are packaged in sheathing that is usually stainless steel flexible conduit, but may be PVC or some other type of flexible plastic tubing. A protective steel coil can also be used beneath the sheath to protect the fibre bundle.

**Types of fibres**

*Glass fibre optics*

Glass fibre optics is made up of a bundle of very small (usually about 50 micron diameter) glass fibre strands. A typical assembly consists of several hundred fibres, protected by a sheathing material, usually a flexible armoured cable, which are mostly used in challenging environments, such as applications with high temperature, corrosive substances, or moisture.

*Plastic fibre optics*

Plastic fibre optics usually have a larger, monofilament core. It is not always bundled, and comes in a single strand of material typically 0,25 to 1,5 mm in diameter. Plastic fibres are typically used for more general purpose applications where they can tolerate extreme bending and be cut to length to fit in setups where space is limited.

**How a fibre optic system works**

How optical fibres transport light rays can be explained using the principle of total internal reflection. This states that any ray of light hitting the boundary between the core and the cladding (which have different densities) will be totally reflected, provided that the angle of incidence is less than a certain critical value. The light beam is transported all the way through the tiny fibre by reflection, exiting at the same approximate angle as it entered the fibre.

There is, however, a tendency for the signal to degrade over distance. Attenuation of the signal will occur, depending on the purity of the core material.

**Fibre optic assemblies**

A fibre optic assembly determines the sensing mode. Therefore, the type of fibre that is chosen determines the assembly required by the application.

*Individual fibre optic assemblies*

Individual fibre optic assemblies simply guide light from an emitter to a sensing location or from the sensing location back to a receiver. The configuration determines the sensing mode and individual assemblies are usually used in pairs for opposed-mode applications.

*Bifurcated fibre optic assemblies*

Bifurcated optics conducts the emitted light together with the received light via two branches, consisting of different fibres, within one fibre optic assembly. This allows a single sensor to both illuminate and view an object through the same optic assembly.

If an object appears in front of the sensing end of a bifurcated assembly, light from one branch will be reflected off the object and back to the receiver through the other branch. Bifurcated assemblies are typically used in diffuse mode sensing and can also be used in retro-reflective sensing applications.

**Typical applications for fibre optics**

Because of the inherent attributes, fibre optics are ideal in the following applications:

- Vibratory feeders
- Conveyors
- Pill counting
- Small object detection
- Ovens
- Robotic arms and moving machines

**For more information contact Brandon Topham, RET Automation, +27 (0)11 453 2468, brandon.topham@retautomation.com, www.retautomation.com**
The unambiguous marking of electrical components and equipment is an essential element of modern control cabinet construction. The topic has received further importance with the introduction of standard EN 81346. As a result, the need for professional marking of electrical components and equipment has increased significantly.

Selecting a suitable system
For the purpose of precise identification of electrical components at a later time, there are different methods of equipment marking that should be taken into account early in the planning process. After completing the documentation of all required reference markings in the circuit diagram, the next step is to select a suitable marking solution for the specific application.

Due to the large number of different marking options available on the market, the control cabinet manufacturer is spoilt for choice, but a hasty decision can easily prove to be wrong later. After the selection of the equipment marking, control cabinets are usually subjected to conversion, modernisation or maintenance measures during their service life, long after their manufacture, delivery and commissioning. In most cases, this is done locally in the field. For maintenance work, the equipment marking must be checked in the field and, if necessary, overhauled or completely replaced. In order to ensure consistent equipment marking – especially for live components – assembly teams around the world are servicing the control cabinets on site. For this reason, decision-makers are placing more and more emphasis on implementing larger and more complex equipment marking projects as quickly and easily as possible, directly in the field.

Control cabinets are sometimes used in the field for more than ten years and during this time, it can happen that equipment marking becomes unreadable, or even detaches from the surface. In such cases, it must be replaced directly in the field. For such maintenance work, mobile thermal transfer printers are mostly used. However, this type of printer quickly reaches its performance limits, as it is generally not fast and precise enough for more extensive repairs in the field. Here too, users are increasingly looking for new mobile solutions.

Marking goes digital
The Marking System app by Phoenix Contact now makes this possible. By means of the structured search assistant or integrated barcode scanner, the user easily finds the right solution.

Among the 3000 marking solutions and eleven different printing systems – subdivided into three marking technologies – practically every user will find the right marking solution for their application. The app is clearly structured and intuitive to use, and also includes search assistants for marking materials.

With the help of a filter function, the right selection is quickly found, even without any specific product knowledge. In addition, the search assistant allows access via four main equipment marking categories: terminal block, conductor, device and system marking. The integrated Application Guide also solves another problem: it knows all about the markings with regard to required permissions, environmental requirements and material properties. Newly integrated selection criteria simplify the user’s search, and the selection takes place automatically.

Significant increase in productivity
Equipment marking projects can be easily created and subsequently converted in the office using the Clip Project marking software. The converted project file can be emailed to the user on site. This approach is very useful, as the user on site rarely has time for the complete and tedious preparation of the equipment marking. Finally, the print project is printed entirely with the handheld Thermofox printer. This digital solution in the form of an app speeds up processes as early as the planning phase, and makes them safer as well. Due to the highly up-to-date underlying digital data, the user will always choose the correct marking solution. In combination with the high flexibility in the field, this digital solution is an ideal tool for industrial marking. The Marking System app is available free of charge for smartphones and tablets from the Google Play and Apple iTunes stores.

For more information contact
Sheree Britz, Phoenix Contact,
+27 (0)11 801 8200,
sbritz@phoenixcontact.co.za,
www.phoenixcontact.co.za
BMG’s filter elements for hydraulic oil systems

BMG’s fluid technology services include solutions for hydraulics and pneumatics, lubrication, fuel and industrial filtration systems, hydraulic hose and fittings, as well as instrumentation, pumps and industrial valves.

The extensive range now encompasses EcoPart filter elements for stationary and mobile hydraulic systems from the Filtration Group. These components, with defined filter performance and purity class, comply with stringent DIN and ISO standards and have all other necessary standard industry approvals.

The FG EcoPart series, which includes a wide range of pressure filter and return filter elements, is available in various grades of fineness. These components are suitable for diverse hydraulic applications, as well as gear oil treatment. Filter elements are designed to reduce the solid particle contamination to the prescribed contamination class, to prevent the ingress of dirt from the environment and maintain the properties of the hydraulic fluid for an extended time period.

In addition, BMG supplies FG coalescer filters, which are used in the fuel line for the efficient operation of marine diesel engines. The company also offers the design and commissioning of diesel and lubrication systems, inline diesel and oil conditioning and particle monitoring and filtration training. Optimum filtration performance, combined with lower differential pressure of the system, significantly reduces energy consumption, which is critical to maximising production efficiencies.

For more information contact Steve Louw, BMG, +27 (0)11 620 1607, stevenl@bmgworld.net, www.bmgworld.net

Sick’s photoelectric sensors: the highflier in object detection

SICK Automation’s W16 and W26 photoelectric sensor product families represent a new generation of photoelectric sensors. The company has streamlined its portfolio of object detection sensors and improved the performance of the individual products by introducing new technologies. During the process of upgrading the product families, the company has focused primarily on improving usability and on developing a completely new operating concept known as BluePilot.

This new operating and display concept is an assistance system that enables easy, accurate and quick setup. Depending on the type of sensor, BluePilot sends a message confirming the sensing distance that has been selected and the reception signal. It also allows different operating modes to be chosen.

The W16 and W26 product families: the highflier in object detection

As a result of SICK’s newly developed technologies, the W16 and W26 sensors are application specialists and can resolve almost any problem, however complex. The patented TwinEye technology provides the highest level of operational safety in the case of high-gloss, contrasting and uneven surfaces, using one sender and two receivers.

LineSpot technology ensures that perforated, textured and uneven objects, in particular, can be reliably detected. The light spot, which has been extended to form a line, allows optical information to be provided about irregularities, such as gaps or rough surfaces.

In the case of transparent objects, ClearSens technology gives the best perspective. If dirt produced during the production process reduces the amount of light emitted by the reflector, AutoAdapt technology compensates for this by adjusting the switching thresholds. This allows cleaning intervals to be extended and the availability of the sensors to be increased.

However, the new sensors are not only application specialists. They also provide the input required by every process chain on the route toward Industry 4.0. They are all equipped as standard with IO-Link and, as smart sensors, they can play an active role in end-to-end automation networks.

For more information contact Robert de Scande, SICK Automation Southern Africa, +27 (0)10 060 0550, robert.desconde@sickautomation.co.za, www.sickautomation.co.za

Stainless steel sensors offer optimum protection

The new full-metal sensor ranges from ifm are used wherever an application presents particular challenges to the mechanical design. In the food industry, for example, not only rapid changes of temperature but also aggressive media used for daily cleaning stress the housing material. The same applies to applications in machine tools and plants where the sensors are permanently exposed to coolants and lubricants.

In the steel and automotive industries, however, weld spatter is not only a strain on the sensing face but also on the threaded sleeve. In this context the full-metal design with non-stick coating and the robust sensing face are the ideal solution to ensure safe operation.

Moreover, the robust stainless steel design offers optimum protection against abrasive parts in metal cutting and machining. Additionally, the compact and short design permits use in even the smallest spaces.

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

Ready for any application – the W16 and W26 photoelectric sensors

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For more information contact ifm electronic SA, +27 (0)12 450 0400, info.za@ifm.com, www.ifm.com
Machine and equipment builders are already using tight integration between the HMI and controller to help increase productivity in large applications. With the new Allen-Bradley PanelView 5310 family of graphic terminals, they can now bring these integration benefits to smaller applications as well.

The new terminals deliver the same usability benefits and enhanced integration with Logix 5000 controllers as the PanelView 5500 family, but are specifically designed for applications of up to 50 HMI screens. The terminals are available in 7”, 9” and 12” display sizes, with a 6” option available soon.

“Engineers can use the PanelView 5310 family to scale a tightly integrated automation system down to smaller applications,” explains Christo Buys, business manager control systems, Rockwell Automation Sub-Saharan Africa. “This can help make design, operations and maintenance tasks more efficient. For example, engineers can now reuse controller alarms without creating HMI tags, which can help them reduce configuration time.”

Companies can also use the enhanced integration to create high-speed jog buttons in place of cumbersome hard-wired buttons. These auto-diagnosing buttons can interact with the controller at I/O speeds to help reduce downtime and improve productivity. Other productivity benefits include the following:

- The intuitive Rockwell Software Studio 5000 design environment allows users to create reusable faceplates, screens and custom graphics to help reduce development time.
- Emulation capabilities allow engineers to test-run projects in the development environment.
- VNC connectivity allows operators to monitor operations via a smartphone, tablet or personal computer.
- Engineers can load projects onto the PanelView 5310 graphic terminals directly from removable media to make project updates without needing to use the Studio 5000 View Designer application.

For more information contact Christo Buys, Rockwell Automation, +27 (0)11 654 9700, cbuys@ra.rockwell.com, www.rockwellautomation.co.za

Instrotech now offers the compact pyrometer Optris CSmicro 2W LT, equipped with an innovative, miniaturised stainless steel measuring head for limited or narrow spaces. Its high ambient temperature rating, up to 180°C without cooling, makes it the ideal measuring device in hot ambient environments.

The pyrometer has been designed for a temperature range from -40 to 1030°C and is equipped with an LED display for alarm signalling, target assistance, self-diagnosis or temperature-code display. It can be operated using simple two-wire installation, or be plugged via USB.

Areas of application
The CSmicro 2W LT was designed for the measurement of non-metallic surfaces. Since the IR thermometer offers a temperature resistance of up to 180°C without cooling, it is ideally suited, for example, to the surveillance of surface temperatures during lamination processes in vehicle interiors, typically in temperatures of about 120°C.

In the plastics industry, the pyrometer works perfectly for temperature regulation during the thermoforming of foils, where it monitors defined measurement points. In the manufacture of circuit boards, it is ideal for performing function tests once the boards are equipped, registering thermal behaviour quickly, and without influencing delicate measuring objects.

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

Swiss manufacturer LEM now provides compact split-core, low-cost AC current transducers to provide a RMS 4-20 mA output from an external 20-30 V power supply (loop powered). Separate units are available with full scale readings of 5, 10, 20, 50, 100 and 150 A.

The transducers can accommodate conductors up to 16 mm in diameter. The 5 A units are particularly useful in providing a 4-20 mA output from existing CTs with a 5 A output. LEM also offer self-powered versions with 0-10 V or 0-5 V output, corresponding to the same primary currents listed above.

For more information contact Denver Technical Products, +27 (0)11 626 2023, denvertech@pixie.co.za, www.denver-tech.co.za
Optris, specialists in non-contact temperature measurement, has on offer the Optris PI Lightweight, a market innovation that allows for radiometric recordings of video imagery from the air. The combination of a miniature lightweight PC and a light version of the Optris PI thermal imager weighs only 380 g. The PI Lightweight is therefore ideally suited for maintenance work and quality inspections of solar and wind power systems, and also for thermographic surveys of buildings.

Mounted on a UAV, the Optris PI Lightweight allows recording of radiometric IR images and videos. The flight thermography system is therefore eminently suitable for error detection and quality inspections of solar farms and wind power systems. The innovative combination of a lightweight mini PC and a thermal imaging camera is also ideally suited for thermographic analyses of hard-to-reach places, like roofs of buildings (building thermography) and it is already in use in agriculture where fields are being inspected before being mowed (presence detection).

Optris PI camera head specifications:
- Measuring range: -20-900°C.
- Spectral range: 7.5-13 μm.
- Accuracy: ± 2 %.
- Thermal sensitivity (NETD): 40/80 mK (depending on camera model).
- Optics: 13°-90° HFOV.
- Resolution: 640x480p/382x288p.
- Dimensions: 46 x 56 x 90 mm.
- Operating temperature: 0-50/70°C (PI 450).

New features:
- The PI Lightweight can be used with the Optris PI 640 camera (VGA resolution).
- Radiometric videos with maximum frame rate (Optris PI 4xx up to 80 Hz/Optris PI 640 up to 125 Hz in VGA sub-frame mode).
- GPS and GoPro support.

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

Pressure instrument calibration is a significant part of the maintenance workload in process plants and requires a high level of accuracy and repeatability. Fluke has recently launched the new Fluke 729 automatic pressure calibrator, simplifying the calibration process by automating pumping to the precise test pressure, improving calibration integrity by compensating for minor leaks, and automatically documenting the pressure calibration process to meet compliance and regulatory requirements.

With the rugged, portable 729, technicians simply input a target pressure and the calibrator automatically pumps to the desired set-point while the internal fine adjustment control stabilises the pressure at the requested value, delivering more accurate results and speeding the calibration process. Other features include:
- Automatic pressure generation and control for multiple tests to 20 bar. Fill in a test template and the 729 automatically pumps to and documents a multiple-point pressure calibration test.
- Easy calibration documentation using defined templates for transmitters and switches. Input the starting and ending test pressures and number of test points and the calibrator documents the applied pressure, measured mA, and percentage error for each test point. The colour graphical display flags out of tolerance test results in red.
- HART communication enabling mA output trim, trim to applied values, and pressure zero trimming of HART pressure transmitters. Technicians can also perform light configuration tasks such as changing a transmitter tag, measurement units, and ranging.
- Measurement of mA signals on transmitter outputs and sourcing and simulation of mA signals for testing I/Ps and other mA loop devices. It includes a 24 V loop power supply for testing and powering transmitters in standalone tests disconnected from the control system.
- As part of the Fluke Connect reliability platform, the 729 allows technicians remote monitoring of calibrations using the Fluke Connect mobile app as well as manage, store, and share pressure measurements and logging events.
- Documented calibration results can be uploaded to the included DPCTrack2 calibration management software, to manage instrumentation, create schedule tests and reports and organise calibration data.

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