This year, Beckhoff will again exhibit numerous innovations in all technology areas at Electra Mining Africa 2018. As an expert in industrial PC design & in-house manufacture, the new generation of ultra-compact IPCs (the best price-performance ratio available) will be on display. Also shown is: One Cable Automation, where users can reduce installation and material costs significantly with the OCT and EtherCAT P technologies, Beckhoff’s extensive range of explosion-proof components providing comprehensive solutions for barrier-free system integration right into Zone 0/20, upcoming TwinCAT Vision (integrated in Visual Studio ® ), as well as TwinCAT HMI will be highlighted. Lastly, extremely accurate, fast and robust EtherCAT measurement modules and solutions for Industry 4.0 and IoT are on display.

See you at Electra Mining Africa 2018, NASREC, Hall 7, Booth A18!

Beckhoff Automation (Pty) Ltd
Randburg 2169, South Africa
Phone: + 27 (0)11 795 2898
info@beckhoff.co.za

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OUR COVER 20

Since inception, the GHM Group has constantly sought to add layers of expertise and competence through the development and acquisition of brands that not only offer precision measurement, but also bring synergy to customers. See this month's cover story on page 20 for more on the solutions available thanks to this investment in innovation.

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Ignition software, innovation or market disruptor?

Innovation itself does not transform a company into a market disruptor, but it is forever a prerequisite. According to Forbes, all disruptors are innovators, but not all innovators are disruptors. Generally speaking, disruptive organisations are those that deploy new ideas in ways that completely upset the balance of power in their chosen markets. Innovative companies, on the other hand, simply look to strengthen their position in an existing market through ‘doing things more efficiently’.

Airbnb is an example of a disruptive company. What Brian Chesky, Joe Gebbia and Nathan Blecharczyk identified was the opportunity to use an existing communications technology – the Internet – to create an entirely new concept in the hospitality sector. Very soon, every interested homeowner with a laptop and a spare room was transformed into a hotelier. Innovation had created a completely new market which, almost overnight, catapulted the inventor to the status of a global player in the hospitality industry.

However, the disruption did not happen because Airbnb developed an app. It happened because Airbnb identified a growing market demand and was then first to come up with a convenient way of connecting needy travellers to suited hostelry providers, anywhere in the world. The truly brilliant part is how Airbnb seized control of the customer interface without actually ever having to deliver accommodation facilities itself.

According to the ARC Advisory Group, the market for industrial software is another that is ripe for disruption. In the HMI/scada sector, for instance, solutions are evolving from standalone components into integrated platforms designed to improve overall business performance. Despite these innovations, ARC believes the market is fragile, particularly in the areas of ease of use and total cost of ownership.

In response to this potential ‘gap’ developing in the market, California-based Inductive Automation launched its Ignition technology in January 2010. Ignition is an open industrial software platform with a variety of web-based modules that can be combined to create custom HMI/scada and MES solutions.

According to company founder Steve Hechtman, Ignition is designed to be different. It’s a new paradigm in scada, rather than a scada with new features. Most importantly, it addresses the ease of use and total cost of ownership issues identified as vulnerabilities by ARC.

The software, built on Java and SQL, will run on almost any operating system, and since it is web-based, clients can easily be added across the plant network and also over the Internet. It includes ERP, MES, asset management and track and trace capability, and uses either OPC-UA or MQTT protocols for data translation. Deployment times are quoted in minutes rather than hours, and since the system is modular, client applications can be tailored exactly, and modified as and when required.

The licensing model is also revolutionary – one fixed price no matter how many clients or tags are used. Essentially, the software is licensed by the server and provides unlimited free runtime clients, tags and development clients.

On the surface, Ignition has the characteristics of a disruptor. It is unquestionably innovative and brings with it a business model that threatens to turn the established market upside down. What remains to be seen is whether Inductive Automation can wrest control of the customer interface the way Airbnb did. With end users ExxonMobil and others in the Open Process Automation Forum concerned about the status quo in the present market for control systems, it could very well be successful. Craig Resnick’s report on page 52 provides a more detailed analysis of the Ignition technology and its potential in the industrial software market.

Industry guide

Posted with the magazine this month is the 2018 edition of the Technews Industry Guide: Industrial Internet of Things & Industry 4.0. Whether we like it or not, digitalisation is upon us and undermines the layers of marketing hype that surround it, there are some very real benefits on offer. We hope this handbook serves as a useful reference to help you separate the fantasy from reality.

Steven

Editor: SA Instrumentation & Control steven@technews.co.za
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Locally manufactured, standard & non-standard / OEM pressure gauges, branded with your company logo. Made to order with short lead times. Repairs and calibration certificates to all other brands.
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**ABB powers e-mobility with launch of 350 kW car charger**

With the number of electric vehicles on the road rising, the global demand for powerful and energy-efficient vehicle charging stations is ever increasing. At Hannover Messe 2018, ABB launched its newest EV charging solution, the Terra HP, a 350 kW product with a charging time for a range of 200 km of just eight minutes.

Ideally suited for use at highway rest stops and petrol stations, Terra HP’s ultra-high current has the capacity to charge both 400 V and 800 V cars at full power. The charger delivers a number of additional benefits for consumers, including an intuitive, easy-to-use touchscreen display and multiple payment options.

**Rockwell Automation to supply integrated power systems to Irving Consumer Products**

Irving Consumer Products, a Canadian-based manufacturer of household and store-brand paper and personal care products, recently broke ground on a new, state-of-the-art plant at a site in Georgia. Multiple production lines are planned for this plant, the first of which will have Allen-Bradley PowerFlex 7000 and PowerFlex 755T integrated power systems from Rockwell Automation. The integrated systems will help control speed, torque, direction and power to the motors that run the machines on the production line, as well as aggregate data to manage energy usage.

The scope of the project also includes low and medium-voltage motors as well as a complete portfolio of integral services and support throughout the duration of the project, which is expected to be complete in 2019.

**Emerson agrees to buy Aventics**

Emerson has agreed on terms to acquire Aventics from Triton for a cash purchase price of €527 million. Aventics is among the global leaders in smart pneumatics technologies that power machine and factory automation applications. Emerson is a leader in fluid automation technologies for process and industrial applications, and Aventics significantly expands the company’s reach in this growing $13 billion market. “With Aventics, we will gain a valuable footprint in Germany, a key market for automation technology and investment,” said Mike Train, executive president of Emerson Automation Solutions. “Aventics also brings opportunities for Emerson to better serve customers in hybrid markets, like food and beverage, providing intelligent devices and solutions from processing through packaging.”

The acquisition is expected to close in the fourth quarter of fiscal 2018, subject to regulatory approvals, Aventics’ finalisation of necessary consultations and other customary closing conditions.

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**EtherCAT breakfast seminar series**

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. With over 4700 members from 65 countries, the EtherCAT Technology Group has become the world’s largest fieldbus organisation since it was founded in 2003. EtherCAT is the Ethernet-based fieldbus with the highest adoption rate. It is characterised by low costs, ease of use, flexible topology and outstanding performance.

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

- Durban – 10 October (Durban Country Club)
- Port Elizabeth – 11 October (The Beach Hotel)
- Cape Town – 16 October (D’Anna Wine Estate)
- Johannesburg – 17 October (The Fairway Hotel)

**Attendance is free of charge.**

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

For further information on sponsorship opportunities and attendance please email: jane@technews.co.za or call on +27 (0)31 764 0593
ParkerStore opens in Limpopo

Parker Hannifin has opened a new state-of-the-art distributor facility in Limpopo. This is the fifteenth Parker Hannifin distributors worldwide. The executive mayor of Polokwane, Thembi Nkadimeng, and Limpopo Economic Development MEC, Seaparo Sekoati, helped cut the ribbon at the grand opening event on 18 May. “We are pleased to bring quality Parker products to our growing customer base in the Limpopo area,” said executive director, Brian Munetsi. “My entrepreneurial venture was born 11 years ago on my dining room table. Since then we have gained vast industry experience that sets us apart from our competitors.” ParkerStore offers a local source of hydraulic and pneumatic products, backed by the knowledge and application expertise of store teams that are focused on building on-demand hose assemblies to minimise downtime and maximise production uptime and efficiency for its customers. ParkerStore Limpopo was established to answer the demand in the province for hydraulic hoses and fittings, as well as pneumatic, filtration, sealing and shielding components, instrumentation and spare parts for heavy to light duty equipment and machinery. Applications are in the aerospace, mining, construction, agriculture, transportation and heavy and light transportation manufacturing industries. The modern purpose-built facility covers over 800 m², with strong stockholding of all products. “Our goal is to improve your productivity and profitability by delivering everything you need for your motion and control-related applications in one place. ParkerStore Limpopo supplies complete turnkey solutions to OEM specifications for hydraulics, hoses, fittings, pumps, motors, valves and pneumatics,” Munetsi continued.

ParkerStore Limpopo does not stop at supplying reliable products. It has knowledgeable internal sales personnel on hand and a technical team is available to answer all questions 24/7 through the Hose Doctor field services unit. A Hose Doctor is a workshop on wheels with qualified technicians able to do fabrication at any location. “Providing solutions to your motion and control challenges is at the core of what we do,” concluded Munetsi.

For more information contact Brian Munetsi, ParkerStore Limpopo, +27 (0)15 298 8512, brian@parkerstorelimpopo.co.za, www.parkerstorelimpopo.co.za

Beckhoff Automation substantially increases turnover

Beckhoff Automation generated global turnover of €810 million in 2017, an increase of 19% year over year. New products, a larger distribution network, enhanced production capacities and solid growth among Beckhoff customers contributed to these developments. “This was a very successful year for our company. We are pleased that the growth extended across all geographical areas in 2017,” says managing director, Hans Beckhoff. “The robust global economy affected all industries, from general manufacturing systems engineering to building automation.”

To accommodate this growth, Beckhoff is significantly increasing its production capacity. For example capacity in primary manufacturing, which includes circuit board assembly, increased by more than 70%. Secondary manufacturing, i.e. final assembly, was also expanded in all product categories. The company has also built a special servomotor production facility at its Marktheidenfeld, Germany location for its Drive Technology division. By producing motor shafts and cases for its servomotors in-house, it can significantly increase its vertical production capabilities.

Beckhoff offers comprehensive automation solutions in various performance categories. With a high level of scalability, the company’s control and drive products can be adapted to a wide range of applications. A major advantage is the fact that the TwinCAT automation software combines all machine functionalities – PLC, motion, robotics, measurement technology, scientific automation, vision, communication, IoT functions and HMI – in a single software package. This delivers a high degree of functionality and enables customers to deploy leading edge technology while keeping costs in check. Beckhoff engineers integrated machine-based vision into the control functionality in the form of TwinCAT Vision software as another functional machine component.

Hans Beckhoff reports that 2018 is already off to a very good start. “In the first quarter we once again posted double digit growth,” he says. “We expect this to remain at a high level. We believe that we are superbly positioned in terms of both technology and distribution.”

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

From l: Evershree Mathadeen, country distribution and retail manager, Parker; Seaparo Sekoati, Limpopo Economic Development MEC; Tebogo Macheke, board chairperson, ParkerStore Limpopo; Brian Munetsi, executive director, ParkerStore Limpopo; Thembi Nkadimeng, executive mayor, Polokwane; Lehlogenolo Masoga, legislature deputy speaker, Limpopo; Jacob Mothobi, technical director, ParkerStore Limpopo; John Domba, senior manager, Ivan Plats; Tebogo Brian van Wyk, director, ParkerStore Limpopo; Eugene Nortje, new business development manager, Stefanutt Stocks Mining Services.
Successful year for Endress+Hauser

Endress+Hauser increased sales and profit in 2017. The Group benefited from stronger industry conditions and introduced a wide range of product innovations, including the first digital services offering. Numerous new hires, substantial investments and great strides in the area of sustainability underscore the Group’s balanced growth.

In 2017 net sales rose 4.8 percent to 2,241 billion euros. However, the appreciation of the euro against most other currencies distorts the picture. “When adjusted for local currencies, we grew at a 6.5 percent and the instrumentation business enjoyed 8 percent growth,” said CEO Matthias Altendorf during the Group’s annual media conference in Basel. “We are confident that Endress+Hauser has strengthened its market position.”

Broad-based growth

A strong consumer business environment, stabilising oil prices and low interest rates in 2017 led to greater investment activity in the process industry. “Apart from having to expand capacity, companies were looking for ways to produce more competitively, reliably and sustainably,” said Altendorf.

The business performed well across practically all regions and industries. Two of the three largest markets, China and the US, grew dynamically. In Germany, the Group’s top market, sales by the year-end had yet to catch up with the rise in incoming orders. The solid growth was supported by a wide variety of industries, with the oil and gas contributing to growth yet again. Development in the power and energy sector was driven in particular by the area of renewable energy.

Impetus from digitalisation

Digitalisation is playing an increasingly important role. With concepts of the IoT taking shape, Endress+Hauser introduced its first digital service for analysing and managing the installed base of field devices. “Our customers have realised that the Industrial Internet of Things is changing their value chains,” explained Altendorf. “A new degree of transparency makes it possible to optimise processes and gain in efficiency.”

Solid outlook for the current year

Endress+Hauser is off to a good start this year with a strong increase in incoming orders. The Group is planning growth in the mid-single-digit range and anticipates profitability remaining at the current level without extraordinary effects. 223 million euros have been set aside for investments and the Group plans to create up to 500 new jobs worldwide. “Incoming orders are currently tracking above our target,” concluded Altendorf. “We expect 2018 to be another good year for Endress+Hauser.”

Fifty years of powering the world

Schneider Electric is celebrating 50 years of automation transformation, with its invention in 1968 of the first PLC. Prior to the introduction of the PLC, the level of real-time measurement and control was limited to the most basic levels due to technology constraints.

“The 50th anniversary of the invention of the first PLC, it would be hard to imagine where our industry would be today without the PLC system. It is used in transportation, manufacturing, energy management and so many other industries. I am proud to have this legacy and be part of Schneider Electric’s DNA,” says Schneider Electric chairman and CEO, Jean-Pascal Tricoire.

The invention initiated the effective use of digital computer technologies in industrial automation, which triggered a massive transformation to the pervasive use of digital technology to deliver industrial measurements, controls and real-time information management.

The use of digital technology introduced capability well beyond basic measurement and control to expand system functionality by utilising the computing power of this innovative technology. Today the use of digital technology is so pervasive that new engineers find it almost impossible to imagine an industrial automation world without it. However, it is important to take a step back occasionally and remember the achievements that made our current capabilities possible, and this is one of those times.

Throughout the 50 years following the invention of the PLC, the expansion of capabilities and functions that were not previously considered possible. These include advanced process control, process optimisation, manufacturing execution systems, inferential measurement systems, safety control, condition management, process historians, real-time accounting, real-time profitability control, and many others.

Industrial automation is a relatively recent technology field, which continues to undergo major transitions and advancements. It is exciting to look at new inventions that drive new levels of operational and business value. Customers can start their journey to new levels of productivity, safety and cybersecurity by upgrading their PLC automation systems to the latest Modicon EcoStruxure Control Expert based platforms, formerly known as Unity Pro.

The PLC upgrade and migration solutions preserve customers’ automation hardware and software investment, whether they are starting from the legacy Modicon, SquareD, Telemecanique PLCs or from many other third-party platforms. Software conversion solutions preserve the look and feel of the original application to streamline investment and promote staff familiarity.

For more information contact
Jason Ullbricht, Schneider Electric SA,
+27 (0)11 254 6400,
jason.ullbricht@schneider-electric.com,
www.schneider-electric.co.za
Smart manufacturing and the digital enterprise
It’s happening fast. Everywhere we turn, processes, machines and devices are becoming more connected and intelligent. Production machines, turbines, and even thermostats, all stream data. Refineries, oil platforms, mines, production plants and vehicle fleets are optimising the operating efficiency, effectiveness and performance of their assets.

Broader deployment of operational technology is expanding the use cases into non-traditional industries. Resource shortages are impeding faster progress. Blurring boundaries between IT, OT, and IoT are increasing the need for more integrated, collaborative systems and strategies.

MESA Africa’s 10th Annual Conference will attempt to answer the following:
• How will disruptive technologies change existing products, processes and plants?
• Can cybersecurity threats be overcome?
• How will edge and fog computing change control architectures?
• How will end-users deal with the tsunami of clouds coming along with new production machines?
• Will there eventually be a cloud standard?
• When will machine learning and artificial intelligence transform operations?
• Will open source solutions impact traditional software and automation domains?
• How will a digitally-enhanced workforce stem the loss of tribal knowledge?
• How to deal with batch size = 1 unit for extreme individualisation?
• How do connected products create opportunities in aftermarket services?
• What steps can organisations take to foster innovative thinking?
• Will OPC UA and TSN supercede today’s variety of fieldbuses?
• Why do machine builders develop their own IT platforms?
• Will multi-agent controls replace today’s central PLC-focused controls?

Call for papers
• MESA Africa is pleased to invite interested parties to submit papers for the 2018 conference. To enable the conference committee to select a balanced programme, submit an abstract of 250 words to conference@mesa-africa.org.
• All abstracts will be considered by the committee and rated against the theme content and relevance. The review process will aim to develop an industry focused programme which:
  • Is of high quality and excites conference attendees.
  • Reflects innovation and diversity of industry research, operational practice, professional issues and industry education.
  • Reflects a balance between the many areas of global industrial best practices.
  • Maintains the MESA ethos of being vendor-agnostic and non-commercial.

The call for papers closes on 31 July.

For more information contact
Jane Collett, MESA Africa,
+27 (0)82 528 1238,
jane@mesa-africa.org,
www.mesa-africa.org
BMG’s Port Elizabeth RSC

BMG’s Regional Service Centre (RSC) in Port Elizabeth, offers critical solution services to diverse sectors, including the automotive industry, power and petrochemical plants, manufacturing, marine, agriculture and general engineering. “Through the consolidation of BMG’s workshop facilities and field services into a centralised hub in the Eastern Cape, this dedicated RSC is able to assist customers who are faced with a lack of engineering expertise, costly machinery repairs and unnecessary downtime periods,” explains fluid technology business unit manager, David Dyce. “Advantages for customers include improved service, repair and delivery efficiencies, centralised technical support and easy accessibility to BMG’s comprehensive range of quality branded engineering components.”

An important focus of this service centre is on fluid technology services that integrate quality branded components, advanced hydraulic engineering and contamination control, as well as a test and repair facility, to ensure optimum performance and extended service life of every hydraulic system. BMG is able to assist with design, manufacture and assembly of all hydraulic and pneumatic systems, whether it is for a workshop improvement or a hydraulic system for an entire new plant. The highly experienced team works in consultation with customers to ensure the most efficient solution – for example, from small multi-purpose power packs to large power packs for mining and industrial applications.”

BMG follows stringent ISO-accredited procedures to ensure the integrity of every hydraulic system. Each repaired component is assessed by the company’s testing facility and certificates are issued as assurance that equipment has passed the strictest performance standards. These products include variable and fixed displacement pumps, industrial and mobile valves, low and high speed motors, as well as cylinders and accumulators.

A critical element in any hydraulic system is contamination control. BMG’s systemic approach to fluid analysis emphasises the benefits of a system that is maintained through the use of high quality filtration equipment, coupled with a regular sampling and testing programme. An efficient fluid analysis service ensures improved performance, extended life of components and reduced maintenance costs.

BMG’s mobile field service team conducts breakdown and routine maintenance on the plant and carries out troubleshooting and advises on possible productivity improvements, for the highest level of plant output and reliability.

The company’s service to the hydraulics sector also includes a mobile workshop that is fitted with tools, equipment and quality branded spares to be able to efficiently perform functions like troubleshooting, on-site repairs, installations, commissioning and system flushing. This service also incorporates on-site fluid analysis and hose and pipe assembly.

For more information contact
Lauren Holloway, BMG, +27 (0)11 620 7597, laureenhy@bmgworld.net, www.bmgworld.net

SEW-Eurodrive supplies Zambian copper mine in record time

When a major copper mine in Zambia required a 110 kW VSD urgently for a slurry application, it turned to SEW-Eurodrive, which was not only able to supply the unit on a fast track basis over the Christmas 2017 period, but also assisted with on-site commissioning.

As this was the first time that SEW-Eurodrive had supplied this mine with a VSD, the company went the extra mile by dispatching an electronics field service technician to site to assist with the commissioning and setup. “We also provided basic operator training as part of our support service,” says export sales engineer Philip Steyn. “This project was a major achievement for us, not only due to the large size of the unit, one of the biggest VSDs we have ever supplied, but also due to the fact that we have introduced this mining producer to our electronics line-up.”

A particular advantage of the VSD supplied is that the mine did not have to upgrade its control system in order to have it connected and running as soon as possible. “Changing out a VSD is not as simple a process as changing a motor, but the modularity and ease of use of our products makes this a quick and efficient procedure. This is a clear example of our class-leading technology giving us a leading edge in the market,” he comments.

Such has been the success of the project that the mining producer is looking to procure a second VSD as a backup unit – which SEW-Eurodrive already has on hand if needed. “Our significant stockholding is a critical factor in our success. It is all about being able to not only deliver what you promise, but going above and beyond what is required,” Steyn adds.

A major advantage in this regard is the company’s Exports Department, which facilitates cross-border projects such as this one in the Zambian Copperbelt. “The backup and support service offered by our Exports Department is crucial, especially as we cannot be on site constantly. However, the necessary support structure is in place, and we do conduct regular in-country visits,” he continues.

This contributed to the success of the Zambian project, where the mining producer was essentially unaware of the electronics side of SEW-Eurodrive’s product line-up, despite having a large number of its gearmotors on site. “It is important for us to look at a customer’s entire operation and to see where we can best add value by incorporating additional SEW products to make for a total package,” Steyn says.

The success of this project not only increases SEW’s installed base in the Zambian Copperbelt itself, but further entrenches the company as a supplier of solutions that make for the lowest total cost of ownership. “For example, we have just sold an additional two gearboxes to the same mining producer, with a further two on order. The benefit for customers at the end of the day is that they have peace of mind that all our products come with comprehensive technical assistance and backup support, even in Africa,” Steyn concludes.

For more information contact
Jana Klut, SEW-Eurodrive, +27 (0)11 248 7000, jklut@sew.co.za, www.sew-eurodrive.co.za
For 46 years, Electra Mining Africa has been winning the minds and hearts of mining and related industries. Delivering an effective platform to showcase the latest innovations, technologies and trends, it is more than a show – it’s a tradition.

Taking place from 10-14 September at the Expo Centre in Nasrec, leading players in the mining, manufacturing, electrical and power industries are looking forward to engaging with visitors and sharing information on their latest products, services and solutions.

“There will be an exciting line-up of new products and services, live demonstrations and free-to-attend seminars at this year’s event, and visitors will benefit from the insight and information they will gain,” says Gary Corin, managing director of Specialised Exhibitions Montgomery, organisers of the show. “New technologies and innovation are influencing the way we do business and it is imperative that those in the industry keep up-to-date with these trends.”

One of the highlights at Electra Mining Africa will be the Artisans Training Centre, developed in partnership with The SAJ Competency Training Institute and the South African Equipment Export Council (SACEEC). This will be a fully functional workshop where learners will demonstrate the skills they have learnt at SAJ. Artisans visiting Electra Mining Africa can test their skills against the highest standards of industry, and could win a prize.

Top industry speakers will present at the conferences hosted by leading industry associations SAIMM, LEEASA and WIMSA, which will be taking place alongside Electra Mining Africa. Further knowledge and learning will be central to the SAIMechE hosted daily free-to-attend seminars.

For more information contact Leigh Miller, Electra Mining Africa, +27 (0)11 835 1565, leighm@specialised.com, www.electramining.co.za
Tshwane University of Technology career exhibition

Through sponsorship obtained, TUT is pleased to announce that its 2018 career exhibition will be hosted free of charge to all interested industry partners. The purpose of the event is to give students the opportunity to interact with people from the industry to find possible placement for either work integrated learning, internships, or even permanent placement.

Exhibition date: 1 August
Exhibition times:
opening of venue 06:30
Setting up 07:00
Event starting time 09:00
Event closing time 15:00
Venue:
Pretoria, Soshanguve South and Garankuwa Campuses

For more information contact Lorika Kruger,
Tshwane University of Technology, +27 (0)12 382 5074, krugerl@tut.ac.za, www.tut.ac.za

Innovation spirit remains high in the Endress+Hauser Group

In 2017, the Endress+Hauser Group once again invested more than seven percent of sales in research and development. “With 261 patent filings, as well as 467 approved patents, we are innovating at a high level again this year,” says Angelika Andres, head of the patent law department at Endress+Hauser.

Many of the developments stemmed from liquid analysis, level and flow measurement technologies. “In order to strengthen the Group’s position in this competitive environment, we protect our innovations with patents in the very early stages,” says Dr Andreas Mayr, corporate director marketing and technology at Endress+Hauser.

2017 saw several new innovations as Endress+Hauser introduced 57 new products to the market, including the self-calibrating iTHERM TrustSens thermometer and the Promass Q, which delivers highly precise mass flow, volume flow and density measurements.

Strengthening the spirit of innovation

Apart from the extensive research and development activities, close cooperation with select universities and research institutes is another factor that helps the Endress+Hauser Group maintain a high level of innovation. The company also established a sensor automation lab on the campus of the University of Freiburg, where a team of scientists, researchers and developers will be tasked with creating innovative sensor technologies for the Group.

Annual recognition

Endress+Hauser, a provider of measurement and automation technology, has traditionally placed a high value on research and development. Employees who make significant contributions to a patent filing are invited to an annual Innovators’ Meeting. Patents with particularly high business impact are recognised with special awards. This year’s event was held in mid-April in Denzlingen near Freiburg, Germany.

For more information contact
Natlee Chetty, Endress+Hauser, +27 (0)11 262 8000, natlee.chetty@za.endress.com, www.za.endress.com

ABB automates Africa

With the commercial launch of more than 210 solutions and services, ABB South Africa is unlocking value for the African continent. In particular, ABB Ability creates powerful solutions and services that create the opportunity to increase productivity and cut costs in countries that could then leapfrog outmoded western models of industrialisation and become digital leaders.

ABB Ability works by gathering and analysing data from customers’ operations and applying to that data the knowledge and expertise gained from ABB’s vast global installed base of 70 million connected devices and 7000 control systems. With the resulting intelligence, ABB’s customers can optimise their operations and use the insights gained to develop new business models, for instance by using digital technologies to overcome distance and operate across borders.

“Africa has a historic opportunity to accelerate growth and development and realise its full potential with the emergence of new technologies,” said Chunyuan Gu, ABB’s president for Asia, Middle East and Africa. “As a pioneering technology leader serving utilities, transport and infrastructure providers, ABB is the ideal partner to help customers in Africa realise the tremendous productivity and performance improvements that digitalisation delivers.” Underlining ABB’s key role in unlocking value for its customers through automation is the 40% rise in 2017 orders across all its divisions, sub-regions and channels.

On the power side, renewables, high voltage transmission technologies, digital grids and microgrids are extending access to electricity. The microgrids can be monitored and controlled remotely via an ABB Ability wireless network. In addition, automation and robotics are driving productivity increases, helping businesses to be competitive in regional and global markets, while digital technologies are providing access to those technologies and markets.

For more information contact
Clayton Duckworth, ABB South Africa, +27 (0)10 202 8533, clayton.duckworth@za.abb.com, www.abb.com/za

ABB automates Africa

With the commercial launch of more than 210 solutions and services, ABB South Africa is unlocking value for the African continent. In particular, ABB Ability creates powerful solutions and services that create the opportunity to increase productivity and cut costs in countries that could then leapfrog outmoded western models of industrialisation and become digital leaders.

ABB Ability works by gathering and analysing data from customers’ operations and applying to that data the knowledge and expertise gained from ABB’s vast global installed base of 70 million connected devices and 7000 control systems. With the resulting intelligence, ABB’s customers can optimise their operations and use the insights gained to develop new business models, for instance by using digital technologies to overcome distance and operate across borders.

“Africa has a historic opportunity to accelerate growth and development and realise its full potential with the emergence of new technologies,” said Chunyuan Gu, ABB’s president for Asia, Middle East and Africa. “As a pioneering technology leader serving utilities, transport and infrastructure providers, ABB is the ideal partner to help customers in Africa realise the tremendous productivity and performance improvements that digitalisation delivers.” Underlining ABB’s key role in unlocking value for its customers through automation is the 40% rise in 2017 orders across all its divisions, sub-regions and channels.

On the power side, renewables, high voltage transmission technologies, digital grids and microgrids are extending access to electricity. The microgrids can be monitored and controlled remotely via an ABB Ability wireless network. In addition, automation and robotics are driving productivity increases, helping businesses to be competitive in regional and global markets, while digital technologies are providing access to those technologies and markets.

For more information contact
Clayton Duckworth, ABB South Africa, +27 (0)10 202 8533, clayton.duckworth@za.abb.com, www.abb.com/za

Innovation spirit remains high in the Endress+Hauser Group

In 2017, the Endress+Hauser Group once again invested more than seven percent of sales in research and development. “With 261 patent filings, as well as 467 approved patents, we are innovating at a high level again this year,” says Angelika Andres, head of the patent law department at Endress+Hauser.

Many of the developments stemmed from liquid analysis, level and flow measurement technologies. “In order to strengthen the Group’s position in this competitive environment, we protect our innovations with patents in the very early stages,” says Dr Andreas Mayr, corporate director marketing and technology at Endress+Hauser.

2017 saw several new innovations as Endress+Hauser introduced 57 new products to the market, including the self-calibrating iTHERM TrustSens thermometer and the Promass Q, which delivers highly precise mass flow, volume flow and density measurements.

Strengthening the spirit of innovation

Apart from the extensive research and development activities, close cooperation with select universities and research institutes is another factor that helps the Endress+Hauser Group maintain a high level of innovation. The company also established a sensor automation lab on the campus of the University of Freiburg, where a team of scientists, researchers and developers will be tasked with creating innovative sensor technologies for the Group.

Annual recognition

Endress+Hauser, a provider of measurement and automation technology, has traditionally placed a high value on research and development. Employees who make significant contributions to a patent filing are invited to an annual Innovators’ Meeting. Patents with particularly high business impact are recognised with special awards. This year’s event was held in mid-April in Denzlingen near Freiburg, Germany.

For more information contact
Natlee Chetty, Endress+Hauser, +27 (0)11 262 8000, natlee.chetty@za.endress.com, www.za.endress.com
TwinCAT 3 Training: PLC Programming
TwinCAT 2 Training: PLC Programming – TwinCAT 3 and TwinCAT 2 Training
Johannesburg 14-16 Aug 2018
Cape Town 14-16 Aug 2018
Port Elizabeth 21-23 Aug 2018
Durban 21-23 Aug 2018

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

PLC281 – PLC Programming Using CoDeSyS
Port Elizabeth 11-13 Jul 2018
ED811 – Servo Motors and Controllers
Cape Town 18-20 Jul 2018
PN211 – Electro-Pneumatics
Durban 22-24 Aug 2018

For more information contact Sammy Kanye,
Festo, +27 (0)11 971 5626,
 DidacticTaC@festo.co.za, www.festo-didactic.com

IWP2 – Industrial Wireless & ProfiCloud
Johannesburg 16 Aug 2018
SCPS2 – Signal Conditioning & Power Solutions
Johannesburg 30 Aug 2018
SLP3 – Surge and Lightning Protection
Johannesburg 6 Sep 2018

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

MC-SMO-SYS – SIMOTION Systems & Programming Course
Midrand 30 Jul – 3 Aug 2018
PI-FLOW – Process Instrumentation – Flow
Midrand 6-8 Aug 2018
PI-LVL – Process Instrumentation – Level
Midrand 13-16 Aug 2018

For more information contact Vanessa Bonhomme, Siemens Southern Africa,
+27 (0)11 652 3206, vanessa.bonhomme@siemens.com,
www.sitrain-learning.siemens.com/za

MECOSA

Measurement Solutions – Level, Pressure and Nucleonics
Roodepoort 17-19 Jul 2018

For more information contact Claudia Olver,
VEGA Controls SA, +27 (0)173 272 1637,
 claudia.olver@vega.com, www.vega.com
When considering a topic for my letter this month, so many things came to mind. The SAIMC is growing at a dramatic pace. We see improvements and initiatives that our members are driving, which develop and improve continuously. It makes me so proud to be a part of it all.

But I find myself thinking about the bigger picture, that which lies beyond the scope of engineering – how the future will affect us all. Lately, I am much more involved in conversations surrounding digitalisation, Industry 4.0 and the IIoT. But not with other automation professionals: no, I consciously force myself to have these conversations with individuals that I encounter in my daily life who are in industries like HR, teaching, administration, sales, and the parents of the future employees of South Africa and the world.

Are you able to explain the concepts of the fourth industrial revolution to someone who is not an automation professional? Can you explain to them why Industry 4.0 will have a profound impact on how their children will experience the workplace one day? Are you able to engage in conversation with them on what they should consider when preparing the youth who will have to work in a different technological landscape in the future? Are you able to address the fears they have regarding these changes in order to point them in a positive direction to reskill or upskill themselves? As leaders, we have a moral obligation to reconcile advancements in technology with the contextual factors that exist in society. With this approach, we believe success is inevitable.

Personally, I think that we should be conversation-starters on this subject in all areas of life in order to help people make more informed decisions about future possibilities in the exciting age of digitalisation. Each individual you meet will most probably have questions and would love to engage with you in discussion. After all, most people want to know what the future holds regarding technology. You have the ability to positively influence the current decision makers in many areas of society through meaningful conversation about the benefits of automation.

At the SAIMC, we are taking huge strides to keep up with change, leading and guiding how it should materialise. We are sponsoring the first robotics initiative and also engaging with the academic fraternity to adapt the currently available degrees to align with industry needs. We are also meeting with students on a tertiary level.

I invite each one of you to start engaging the people around you on these topics. Fears of changing technology and the innovation and adaptation that is required for the future is best explained by informed professionals like you, who work in the industry and are intimately acquainted with its concepts. Let’s invite people to take this journey with us by having meaningful discussions with them on a topic that we are all passionate about.

Additionally, if you are not yet part of the SAIMC and would like to become more involved, please contact us to see which initiatives would be the best fit for you.

Yours in automation,
Annemarie van Coller.
Secunda branch

The SAIMC Secunda Branch Technology evening for May was presented by Kallie Bodenstein from Yokogawa. He gave a very informative presentation that touched on all aspects of Distributed Control Systems (DCS) including I/O, controllers, HIS (Human Interface Station), communication protocols, graphics, as well as the network that connects everything.

A DCS is used for process control and an ESD (Emergency Shutdown Device) or safety system is used to protect people, resources and the environment. Emphasis was placed on redundancy of all aspects in a PAS (Process Automation System). This will allow for high availability of the control system/safety system. The evening was ended with a live demonstration on a plant simulator. We would like to thank Kallie Bodenstein for his informative presentation.

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

- 14 June 2018.
- 05 July 2018.
- 02 August 2018.
- 06 September 2018.
- 11 October 2018.
- 01 November 2018.

All the Secunda SAIMC presentations will earn CPD points for ECSA registered persons and any enquiries can be directed to the branch chairman, Johan Maritz, at johanmaritz260@gmail.com or +27 (0)82 856 3865.

Tshwane branch

Technology evening

Recently, the branch was fortunate to be invited to The National Laboratory Association (NLA) in Lynwood, where Steve Sidney and John Wilson presented on 'The role of technical infrastructure organisations in South Africa'. This doubled as both a technical evening presentation and a site visit to the laboratory. The topic of 'Technical infrastructure' was introduced and one of the aspects which stood out was its role in terms of protecting against 'Technical barriers to trade'. Differentiation was made between physical and paper standards. Also touched on was the role of regulatory organisations, along with concept of traceability and quality assurance. It was noted that the NLA has more than 300 organisations as members and, furthermore, trains around 400 people a year in different aspects, such as metrology, analytics, etc. and in due course will also present on process measurement, which will include electrical, temperature and pressure. The presentation is available upon request and the branch thanks the NLA for its hospitality and looks forward to more engagement in due course.

Internet of Things (IIoT) portfolio/forum

At present we are looking at representation within ISO/IEC JTC 1/SC 41, the scope of which is 'Standardisation in the area of Internet of Things and related technologies'. To get involved with the activities of ISO/IEC JTC 1/SC41, you will need to join SABS TC 001/SC27 and SABS TC 001/SC 31. The latter ones focus a bit more on cybersecurity. For the moment, however, anyone interested in participating should contact the committee for an application form.
Durban Branch

The June technology meeting of the Durban branch of the SAIMC was held on 6 June, as usual at the Durban Country Club. Krzysztof Lapacz, business development manager for the Industrial Networking department at IFM, presented on the subject of IO-Link solutions for factory automation. Judging by the record attendance at the evening, this topic certainly aroused people’s interest and Krzysztof’s presentation didn’t disappoint, covering:

- What is IO-Link
- Features of IO-Link
- Previous technology
- Future technology
- IO-Link master modules
- Parameterisation of IO-Link sensors
- IO-Link network architecture
- Industry 4.0 and IoT with IO-Link
- Real-time maintenance with Industry 4.0
- A small live demo of IO-Link sensors and IO-Link masters

Krzysztof Lapacz started his career in instrumentation at Sasol Secunda in 2005. As a process and analytical instrumentation technician, he was responsible for the maintenance of pneumatic and electronic process instrumentation loops all the way from the DCS systems down to the final control elements such as valves. In 2012 he joined Rand Instruments as a service and technical engineer before joining IFM ZA in 2015 as a product specialist in the Industrial Networking department, focusing on the pre-sale, in-sale and after-sales of ASI and IO-Link networking solutions. In 2017 he was appointed as the business development manager for the Industrial Networking department and he was still focused in the area of ASI and IO-Link networking solutions but also overseeing the activities of the department, so he was well qualified to present to us.

We’d like to thank IFM for its kind sponsorship of the evening.

Johannesburg Branch

At the last technology evening Gavin van Rooy from Comtest hosted and presented on the topic entitled ‘Temperature Measurement and Calibration what every Instrument Technician should know.’

Temperature is the most commonly measured physical parameter in the world. In industrial automation the commonly use methods of measuring temperature are thermocouples, platinum resistance thermometers resistance temperature detector (RTD), pyrometer and infrared. It is important to note temperature measuring instruments’ specifications with regards to accuracy and calibration methods. Inaccuracies can lead to costs and losses such as production downtime, high defect rate and safety hazards. Two important components of accuracy are repeatability and resolution.

NMISA is South Africa’s National Metrology Institute responsible for South Africa’s national standards to ensure that measurement instruments and other measurement used for economic, safety and process industry are transparent and correct. To ensure that temperature measurements are consistent around the world each country has adopted the ITS-90, a temperature scale defined by the BIPM (International Bureau of Weights and Measures). These measurements are part of a chain of comparison to measurement standards of a higher accuracy.

The SAIMC would like to thank Gavin van Rooy for his informative and well received presentation.
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www.alcommatomo.co.za

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As solution providers in the industry, Afrilek’s extensive skills encompass all aspects of electrical, control and instrumentation design; implementation and operation. The company provides complete automation and electrical solutions in projects, panel manufacturing, support and services, training as well as product distribution. Afrilek is a proud BBBEE, ISO 9001 and CIDB accredited company.

Tel: +27 (0)11 372 9340
sales@afrilek.com
www.afrilek.com

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or +27 (0)16 422 7644
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www.autotronix.co.za

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info@ctcontrolsystems.co.za
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pieterv@cs-solutions.co.za
www.cs-solutions.co.za

Hybrid Automation
Hybrid Automation is an approved Siemens system integrator and partner for automation and drives, process instrumentation as well as motion control. This enables it to provide its clients with the latest technology and solutions. Its client base includes major blue chip companies and has gained a strong foothold in virtually all the engineering verticals.

Tel: +27 (0)31 573 2795
info@hybridautomation.co.za
www.hybridautomation.co.za
**Iritron**

Iritron, a TUV accredited ISO 9001:2008 technology company, is able to offer its clients PLC, DCS and Scada software and hardware, as well as electrical and instrumentation design, engineering, project management and commissioning services. The company’s fields of expertise encompass all the levels in the automation hierarchy.

Tel: +27 (0)12 349 2919  
alwyn.rautenbach@iritron.co.za  
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.

Tel: +27 (0)11 394 5412  
systems@process-dynamics.co.za  
www.process-dynamics.co.za

**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.

Tel: +27 (0)11 803 0570  
info@sam.co.za  
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**Moore Process Controls**

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Tel: +27 (0)11 466 1673  
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  
www.psy-intl.com

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www.instrumentation.co.za July 2018 17
RCL Foods’ Pongola sugar mill is situated in northern KwaZulu-Natal and was operating a proprietary DCS that was installed in 1980. This obsolete and antiquated system resulted in unacceptable production delays due to excessive downtime, aggravated by a lack of production information and limited diagnostics.

The client requested Control Software Solutions (CSS) to institute a phased-in system that would allow the RCL team to run the plant with minimal support. In addition, it needed to be scalable, it had to provide detailed trip diagnostics and sufficient production information to ensure the optimisation of the process by process engineers, as well as being equipped with an effective disaster recovery plan. “It was essential that there was an adequate knowledge transfer to the RCL employees to ensure that they could take over the running of the system, allowing them to maintain and expand it as needed in the future. Aligned to this was the requirement for the system to provide a 25% improvement in lost time availability, together with an increase in production throughput,” says CSS’s Pieter Venter.

Scalability was a driving factor, since the project was planned to take place in various phases over an eight-year period. A number of other requirements outlined by RCL included the improvement of software standards with additional functionality in terms of industry-specific control modules; a user-friendly interface; redundancy in order to secure plant control and information; and intuitive reporting that was easily accessible and with traceability throughout the system.

The solution provided by CSS included System Platform, which would unify all of RCL’s applications and its management in a central hub and InTouch for supervisory interface, together with Historian for data storage and Historian Client for system diagnostics and production analysis. WIS and FLOW software is used for production efficiency reporting, TOP Server provides device connectivity (including for legacy systems) and Unity allows for all PLC configuration. Systems diagnostics and first-up alarming was built into critical control areas of the plant to assist in root cause analysis. In addition, the project team had to develop and document the plant control philosophy from the existing software and old plant manual, as this did not exist.

Once control documentation was finalised, all software coding was performed off site with regular remote collaboration taking place with RCL systems and operation personnel. Technical review meetings ensured the alignment with customer expectations and the CSS solution. Full system simulation was natively built into the system to assist during the FAT testing, which was conducted with the entire team from RCL’s operations, training, maintenance and systems departments. Plant operators were trained in the simulated environment, thereby allowing them to become a part of the commissioning team with a resultant reduction in the time to start-up.

Not only was there a requirement for a new system, but furthermore for old data on the existing system to be transferred to this new system. CSS used the TOP Server OPC DA Driver to extract the legacy data, thereby allowing them to present unified reports on information from both the old and new systems.

The implementation of the new system has contributed immensely to the extremely attractive statistics between 2015 and 2017:

• 40% improvement in lost time availability.
• 20% increase in cane crushed vs budget.
• 39% increase in sugar production vs budget.
• 0,7% reduction in bagasse moisture to boilers.
• Almost zero unplanned blackouts.

“There was a visible improvement in the working relationship between the production and maintenance personnel. All the noted benefits contributed to the plant being awarded two improvement awards from the RCL Group in 2017,” says Venter.

For more information contact Pieter Venter, Control Software Solutions, +27 (0)31 914 0040, pieterv@cs-solutions.co.za, www.cs-solutions.co.za
Fieldbus, government interference and news from the UK

The German organisation Profibus & Profinet International (PI) publishes annual statistics on the numbers of devices installed with interfaces equipped with their communication technologies, which also include Profinet and IO-Link. The trend towards Profinet increased in 2017, with 4.5 million new nodes installed, an increase of 25% on the previous year figure, which brings the total number installed to 21 million. Possibly because of the rise in Profinet systems, the Profibus DP numbers added seem to have reached a plateau over recent years, with a population of 60 million. 

Profinet PA and Profinet node numbers are growing strongly in the process automation field, with the Profinet adoption growing 25% in the year, adding two million nodes to reach nine million in total. Similarly, IO-Link device numbers installed in the year increased 50%, adding 2.8 million to achieve a population of 8.1 million, linking sensors and actuators to a PLC as a subsidiary network below the fieldbus/Profinet level. PI recently published an IO-Link wireless specification, and demonstrated the technology at the Hanover Trade Show earlier this year.

Government interference

Legislative rulings have affected businesses and consumers across the EU recently, with the European Union’s General Data Protection Regulation (GDPR) causing avalanches of newsletters or promotional messages into EU financial penalties, if they send out emailed email asking for a subscriber’s permission to be re-registered with every firm they have ever dealt with, to allow them to record the fact. Even companies from outside the EU will face financial penalties, if they send out emailed newsletters or promotional messages into EU subscribers, without having these permissions confirmed, registered and recorded!

In the US, the EPA, under the Trump administration, has dropped most of the more Draconian measures that they had originally proposed to impose on chemical plants, after the explosion at West Fertilizers in Texas that killed 15 fire-fighters and injured 260 people. The CSB report on the incident also listed 19 other Texas facilities that store large amounts of ammonium nitrate fertiliser, and are located within half a mile of a school, hospital or nursing home. One regulation that will be introduced in Texas is that local fire marshalls will inspect all sites storing ammonium nitrate, once a year. Hopefully, this might help prevent any further explosions that might result in large off-site consequences.

The changes that were proposed by the EPA and that will not now be introduced, include (1) the need to evaluate options for safer technology and procedures that would mitigate hazards; (2) the requirement to conduct a root-cause analysis after a catastrophic chemical release or potential release incident; and (3) performing a third-party compliance audit after an accident at a plant involving the release or potential release of chemicals.

In the UK, Barclays Bank, rather than the government, is reassuring UK exporters worried about Brexit and trading afterwards, with a survey that shows 39% of international customers would be more inclined to buy a product if it displayed the Union Jack. This was especially true for consumers in Asia and the Middle East (India, 67%; UAE, 62%; China, 61%), and also for younger consumers generally, where nearly half said this would encourage them to make a purchase. For over 55-year-olds (who maybe had more life experience) the figure dropped to a quarter. It’s all statistics!

Research projects

Splitting water into hydrogen and oxygen was first demonstrated by Fujishima and Honda using a titanium dioxide electrode. Since then, scientists have been on the hunt for the ideal material to perform the task, as hydrogen is a very useful, green fuel for portable power. Now, a team from Exeter University has made a significant hydrogen energy breakthrough, developing an electrode that splits water using only light. The photo-electrode, which is made from nanoparticles of lanthanum, iron and oxygen, absorbs light before initialising electrochemical transformations to extract hydrogen from water. The team is currently working on further improving this material to make it more efficient, to produce more hydrogen.

At the Drives & Controls Exhibition in the UK this year, all the motor manufacturers were showing the condition monitoring capabilities of their offering, usually measured by vibration monitoring sensors. Possibly ABB went one step further, showing a sensor assembly that can be attached to almost any low-voltage motor, existing or on a new project. Transmitting information over Bluetooth, the sensors require no wiring, and are attached directly to the motor’s frame. Within the unit, sensors collect vital data points like vibration, sound and temperature, and upload that information via an ABB gateway or smartphone to the cloud, where it is analysed. The results are sent back for optimising performance and predictive maintenance, just like a roving maintenance engineer.

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
Success through measurement expertise and product innovation

Since inception, the GHM Group has constantly sought to add layers of expertise and competence through the development and acquisition of brands, which not only offer precision measurement, but also bring a dynamic cross-over of synergies to customers.

Over the years the group has brought on board leaders in the field of instrumentation, control and measurement, such as Honsberg, Delta OHM, Greisinger, Val.Co, Imtron and Martens, all offering unique centres of competence.

Greisinger
Greisinger devotes a great deal of effort to compact designs and is a specialist for handheld measuring devices, indicators, regulators, and temperature transducers and sensors, all of which combine technology with measurement precision. Over 100 000 devices are delivered yearly to customers.

As a German-based centre of competence for measuring devices, indicators and regulators, as well as temperature sensors, Greisinger bundles the extensive know-how of experienced specialists under one roof. Market trends are tracked by the company and taken into account in the development of new technologies.

Honsberg
For decades, the centre of competence, Honsberg in Germany has been regarded as a top address for measuring and monitoring flow, fill level and pressure in industrial applications. Dependable application engineering and innovative know-how from Honsberg specialists, coupled with product quality and reliability, have made the company a major contributor to the success of customers, as it is one of the best performers in the global marketplace.

Martens
Sensors are vital to industrial production. This idea is sharpened at Martens’ centre of competence in Germany, where the special need for measurement precision and inclusion of specific customer requests are developed. The entire spectrum of modern analysis and industrial measuring technology enables GHM to offer product versatility for a broad range of applications.

Martens’ sensors are utilised in building technology, plant engineering and the food and pharmaceutical industries, where almost all physical variables are measured, recorded and evaluated.

Imtron
As a manufacturer of metrological components for industrial applications the Imtron brand stands tall, and its centre of competence in Germany, is one of the most well-known providers in the market. The company specialises in stationary and mobile testing procedures, which assure activity in the power and automotive industries through components and systems.

Imtron’s hardware and software provide important data and facts concerning all measured parameters on stationary test stands in the auto sector, and in mobile applications for test runs and test flights. This extends to power management and seamless monitoring of solar power plants and wind farms.

Delta OHM
In no other area can the collection of data take on such a decisive role as in the field of environmental measuring technology. Delta OHM’s centre of competence in Italy has over 40 years’ experience in the supply of state of the art sustainable components for the field of meteorology.

Measuring instruments, data loggers as well as environmental and weather stations for the capture of acoustic information, vibrations, micro-climate data, air quality, water analysis, relative humidity, wind speed, photometry and light temperature and pressure have earned international recognition for Delta OHM innovation and product technology.

Val.Co
Founded in 1982, Val.Co has quickly made a name for itself as a specialist in the field of fill level measuring technology due to the quality and reliability of its instrumentation.

The company is regarded as a key player in the industry due to the experience and expertise of its technicians and has obtained ISO 9001 quality management accreditation.

Val.Co’s centre of competence near Milan enables it to draft, engineer and manufacture all of its products and systems, which are used in industrial processes for the storing of mineral oil products, refineries, lubrication systems, cooling equipment as well as electricity generation plants and galvanic systems for the beverage industry.

Specialists by competence
The entire GHM Group offering of specialised
measuring instrumentation is available via GHM Messtechnik South Africa, based in Alberton, Johannesburg. Managing director, Jan Grobler, commented: “We talk quality-based solutions for industrial applications. With such an array of reputable instrumentation and technologies, we believe that we are able to meet all industrial measurement requirements effectively, whether it is via standard or customer specific designs.”

“In addition to focusing on local markets and trends, we at the GHM Group need to adapt to globalisation and keep up with the associated megatrends in order to maintain our successes and innovative research and development,” added GHM Group CEO, Johannes Overhues.

“I believe that local competences must be bundled to meet the requirements of markets throughout the world. We absolutely believe in our motto of ‘Think global, develop local and manufacture fast’.”

The GHM Group is renowned globally for the manufacture of high-quality precision measuring and regulating technology. Since the group’s inception, it has expanded from the original foundation of a small yet successful measuring technology manufacturer from Germany and northern Italy.

Today, the Group has grown into a medium-sized corporation with a combined depth of added value based on more than 200 years of combined experience. The South African office for the GHM Group opened in 2016.

“The GHM Group comprises excellence in innovation from iconic brands such as Honsberg, Delta OHM, Greisinger, Imtron, Val. Co. and Martens,” commented Overhues. “From the development of specialised measuring processes to the complete production of sensors and key mechanical elements, to data loggers, firmware and software programming, we manufacture measuring devices that find application across all industries. The emphasis of our growth is found in the general machine construction, building technology, measurement data recording and communication, as well as in the food production industry, meteorology and general environmental measuring technology sectors.

“Through the Group’s acquisitions and expansion, more than 40 experienced specialists at six centres of competence bring their know-how from respective areas of expertise to our multidisciplinary team, which can then quickly and flexibly develop precisely those products or adaptations that meet the requirements of our customers. Our focus on complete customer satisfaction is what drives the company’s constant desire to be at the forefront and cutting edge of innovative technology.”

The South African operation
“Our goal since opening the South African office of GHM Messtechnik has been to offer a personalised and solutions-driven service to our customer base,” explained Grobler.

“Our products are high-quality, high-accuracy sensors and instrumentation, hygienic design instrumentation, laboratory instrumentation, industrial electronics, process measurement technology, data acquisition equipment and environmental/water analysis instrumentation. These technologies and products have wide ranging applications for general industry, mining, food and beverage, brewery industries, power generation, renewable energy, pharmaceutical, laboratories, oil flow measurement and hydraulic related sectors.

“The South African market has many areas of uniqueness, and the GHM Group will continue to use South Africa for the development of extremely robust products. Our tough environmental and plant conditions initiate new challenges for our European centres of competence to design appropriate and effective instrumentation that is suitable for these challenging applications.”

**GHM synergies**

With such well-known brands, the company is in a position to offer optimal assistance and consultation in all matters relating to measuring, control and closed-loop technologies, and has the capability to offer complete product portfolios for requirements of the broadest range of applications such as:

- Process, industrial, test-stand and laboratory measurement technology.
- Industrial electronics/closed-loop control technology.
- Customer specific developments.

The GHM Group has three strategic business units:

1. **Industrial – sensors and electronics.**
2. **Environmental technology – areas of metrology and mobile measuring devices.**
3. **Testing and services.**

All products are manufactured to the exact standards expected of German engineering. “We see great potential for market expansion in South and southern Africa,” concluded Grobler. “Our instrumentation is precision engineered to the highest calibre and our high measurement accuracy has been achieved by investment in innovation. We offer solutions that add value to our customer’s applications.”

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
For over sixty years, Krohne has been active in the water industry. In fact, the German-based company first introduced its electromagnetic flowmeter (magmeter) for water, wastewater, additives and sludge in 1961. Since then, it has not only developed a complete portfolio for flow measurement, including partially filled pipes, but also level, pressure, temperature and process analytics to equip waterworks, sewage treatment plants and all networks in between.

Since magmeters remain the standard in water measurement, Krohne has widened its Optiflux portfolio to include many different liners for applications from clean water to sludge with high solid content. However, the development of standalone, battery-powered electromagnetic water meters has mostly taken place in the last ten years. Although it was demanded by customers as an alternative to mechanical meters for points where no mains power is available, the development of these meters depend on a special design of the measuring tube. Introduced in 2009, the Waterflux battery-powered flowmeter (certified to MID MI001 and OIML R49) has been a very successful product in the potable water market. It features a unique rectangular measuring tube design that does inlet or outlet sections, which allows for compact installation and a small overall footprint. Even better, there is no need for grounding rings because, as standard, the flow sensor has a reference electrode for grounding and a special coating allows for subsoil (IP68) installation.

**Operation in remote locations**

As water meters are often installed in remote locations, reducing the frequency of visits to the sites and the time spent on set-up and maintenance is crucial. This relies on aspects such as a simplified installation, integrated diagnostics, a long battery lifetime, remote communication options and low overall maintenance requirements of the meters. The features and options of Waterflux contribute to these targets and the device is continuously updated to keep up with modern requirements.

In terms of installation, the polycarbonate converter housing with protection class IP68 rating is now standard for both the compact and the remote version, that is, for temporarily flooded measuring pits. It features IP68 Mil connectors that do not require wiring on site, and a small installation footprint to fit into electrical cabinets. For locations where mains power is available, Waterflux is now offered with an external FlexPower unit to connect the meter to a power source on site, e.g., electrical grid, solar panel or a small windmill.

**Integrated pressure and temperature sensor**

The integrated pressure and temperature sensor allows the use of Waterflux for various tasks in drinking water networks: Flow and pressure measurement data are an important input for pressure monitoring, maintaining the water balance, district zoning (DMA) and for leak detection when comparison of pressure and flow values are used as methods. Eliminating the installation and wiring of external pressure sensors, the integrated device can provide an alarm when a programmed upper or lower limit is reached. The same applies for the integrated temperature sensor that can serve for quality monitoring of potable water, also without the need to open the line a second time. Alarms can be generated via the status output or via Modbus when critical limits for pressure or temperature are exceeded.

Current communication options meet water companies’ increasing demand for more measurement and status data. The Modbus RTU output offers an alternative to the two-pulse and two-status outputs. Transferred data includes measurement information (sum, forward and reverse counters, flow rate), status data (battery lifetime, meter status), actual values for pressure and temperature, and alarms. In addition, remote data communication solutions are also available off-the-shelf.

*For more information contact Deon Rampathi, Krohne SA, +27 (0)11 314 1391, d.rampathi@krohne.com, www.za.krohne.com*
How well do you really know your water infrastructure?

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Water is a scarce and valuable resource, and management of wastewater is coming under increased scrutiny. Water operations face increasing pressure to deliver more quality water with fewer resources in the face of higher costs, increasing regulations and growing populations. Many operators are looking to maximise profitability while also meeting this growing demand with ageing, disparate and inefficient systems.

**Water today**

As in all industries, data is increasingly important in the water industry. Information gaps lead to decreased water quality and operational inefficiencies. Overburdened operators rely on personal experience to perform difficult manual data collaboration tasks, which can introduce operational errors. Changes in source water decreases treatment consistency with large process swings. Manual records on ageing assets create unpredictable downtime and service interruptions. Lack of distribution water data encourages expensive over-treatment and allows quality to vary by customer location. Old control systems don’t offer the built-in security for the latest cyber threats.

The statistics in South Africa on water losses are largely inconclusive since the data collection layer is poor. By simply collecting data about water losses, municipalities could realise monumental savings and proactively monitor and maintain water distribution infrastructure.

**Intelligent water**

Water utilities can be transformed through Industry 4.0 by harnessing data if infrastructure is connected and able to communicate seamlessly. Connected water and wastewater control solutions can lower operational risk and cost of water through:

- **Edge apps** that leverage operator experience to analyse and optimise the process control under varying real-world conditions.
- **Outcome optimised controllers** that can receive weather forecasts from the Cloud to better handle storm surges.
- **Historical data from the Cloud** that can be analysed from multiple sites and assets to determine the optimum operation and execute proactive maintenance, reducing downtime.
- **Field agents** that monitor remote water quality allowing for inline distribution, reducing chemical use by nearly 20% and providing consistent water quality to all customers.

The combination of Cloud analytics and edge apps running on local controllers can provide up to a 30% energy reduction for pumping and process operations. The latent potential of intelligent and connected water infrastructure can unlock these savings and even more value.

**Solutions to meet today’s challenges**

To compete and win in today’s changing water and wastewater market, end-users need smart, scalable and connected solutions that reduce costs and improve water quality for customers. GE knows that increasing profitability means improving efficiency, lowering training costs and applying the right products at the right points in the processes. All this must be done while improving the quality of water and carefully monitoring the entire operation.

While the added value of intelligent water infrastructure is high, security and integrity of the system itself is of paramount importance. Intelligent water must be secure by design and should have a hardware root of trust as the foundation of all the security constructs in the control system. GE’s IICS portfolio of controllers now come with Trusted Platform Module (TPM) technology that enable hardware root of trust. All boot firmware is signed by GE with the private key stored in the TPM module to ensure only GE signed firmware will run on the hardware. In today’s connected environment, securing operations is more important than ever.

For more information contact
Motion Control Systems,
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A more measured world of water

Water is subject to strict regulations worldwide and keeping our water supplies clean and safe is our top priority. Find out how a more measured world of water ensures water quality is maintained in the safest, most cost-effective way.

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Water specialist, NuWater has developed a two megalitre desalination plant at a smelter plant in KwaZulu-Natal. Rockwell Automation, through its PartnerNetwork program participants, CraigCor Distribution and system integrator M&M Electronics, supplied automation products and conducted programming and HMI development for use on this plant. It facilitates continuous smelter operations in the face of water shortages caused by the severe drought that saw local dam levels drop to alarming low levels.

NuWater incorporated the Integrated Architecture system into its automation and control development by means of Rockwell PLCs, HMIs with visualisation control software, VSDs and industrial network equipment, as well as the powering switchgear componentry. Integrated Architecture system enabling products included a ControlLogix L73 Processor, Distributed I/O Model through a quantity of 10 stations that utilise POINTIO modules, one main Network Redundancy through Device Level Ring (DLR), 22 PowerFlex 755 VSDs (up to 110 kW) and Rockwell Moulded Case Circuit Breaker Switchgear.

“As water-stressed nations turn to seawater desalination as a solution for process and drinking water, we are leading the way in terms of our product offering,” says NuWater’s chief business development officer, NJ Bouwer. He adds that most of the equipment offered to the smelter was refurbished to help make sure that the short lead times required could be met. “The existing equipment already had MCCs and control centres, which we decided to refit with the latest Rockwell Automation product portfolio. Although many manufacturers have similar product offerings, it is hard to find robust and reliable equipment that can withstand the rigours of working in these often wet and humid environments.”

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

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

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

“Water industry professionals around the world face an increase in challenges due to stringent government regulations and ageing control systems,” says Rockwell account manager, Jacques Jacobs. “This causes tighter water quality standards and rising labour, operating and maintenance costs. The Rockwell Automation vision of The Connected Enterprise helps overcome some of these challenges. Through the Integrated Architecture system and the connection of smart devices, new windows of opportunity into processes open. Data and analytics enable better and faster decision-making, while seamless connectivity spurs new collaboration.”

For more information contact
Jacques Jacobs, Rockwell Automation, +27 (0)21 527 2900, jjacobs1@ra.rockwell.com, www.rockwellautomation.com/en_za
Rotating vane flowmeter

The Vane Technology Principle, a method of measuring and monitoring the flow of different media through piping, has been proven worldwide. Kobold flowmeters and monitors work with this proven principle. Instrotech is offering the Kobold DFT rotating vane flowmeter, the equipment of choice whenever traditional impeller technology is to be used for the measuring or monitoring of volumetric flow rates.

The modular design of this type makes the system universal in use, inexpensive and space-saving in operation.

The DFT completely fulfils requirements for efficient and low-cost production methods. Due to the option of a PTFE housing, users get a resistant and highly reliable measurement system for operation in aggressive media.

The wide measuring range of 0.2–2.0 l/min up to 3–60 l/min means that DFT rotating vane flowmeters can be used for a wide variety of applications. With a maximum operating temperature of 80°C and a maximum pressure of 16 bar (if the brass housing is used), this device can be used for almost all process conditions.

The heart of the Kobold impeller is a securely embedded ring magnet, which is hermetically sealed against the respective medium. It transfers the rotation of the impeller to a Hall sensor fixed to the housing with a space-saving attachment. This sensor in turn transforms the rotational movements into a frequency signal in proportion to the volumetric flow. The downstream Kobold electronic evaluation unit then transforms the signal into either a digital display or an analog normalised signal, or it can be used to switch up to two limit contacts. LEDs show operational readiness and switching state of the limit value relay. Also, counter or dosage electronics can be used.

In combination with the Kobold electronic unit this system provides extremely accurate measuring results under difficult conditions. Typical applications are in cooling water monitoring, general mechanical engineering, wastewater treatment, heavy goods and in the chemical industry.

For more information contact Instrotech, +27 (0)10 595 1831, sales@instrotech.co.za, www.instrotech.co.za
The pressure to improve energy efficiency is constant and intense, particularly for electric utilities, since changes to power production and distribution can have a cascading effect that influences the energy efficiency efforts of both utilities and consumers. In this quest for improvement, it is easy to lose sight of why you should want more energy-efficient operations.

The opportunity to cut costs is always a motivator for change, and for utilities the rewards for reducing network losses are immense, as annual electricity transmission and distribution (T&D) losses are substantial. At the end of the 2016/17 fiscal year, Eskom reported an average of 8.85% in total energy losses with a significant deterioration in distribution losses from 6.43% in March 2016 to 7.55% in 2017.

Eskom, which supplies about 95% of South Africa’s electrical energy, is planning on reducing these losses by implementing an early warning system, with regular and targeted meter audits through automated analysis on their networks.

Advanced distribution management systems (ADMS) is a solution that can be implemented to estimate and minimise losses, manage peak demand, and automated fault location, isolation, and service restoration.

Reducing electricity network losses requires smart strategies that improve active and passive energy efficiency,” says Taru Madangombe, Schneider Electric’s Energy BU vice president for southern Africa. “By planning, measuring and improving transmission and distribution network efficiency and installing digital technology that is more accurate and connected, electric utilities take a big step towards increasing energy efficiency and reliability whilst reducing operating costs.”

ADMS is Schneider Electric’s EcoStruxure solution that provides electric utilities with leading critical grid management capabilities to improve outage response, optimise evolving grid operation and manage distributed energy resources (DER) impacts. It simulates the impact on the reliability of supply, losses and voltage management with the use of algorithms that calculate optimum configurations based on data that comes from sensors, smart meters and switch operations.

DERs, which place a strain on a utility’s ability to maintain its contractually agreed upon voltage levels, are being injected into the grid and can cause the voltage to increase in one section of the network while it decreases in another.

“Traditional voltage control tools are no longer adequate for managing these demands and fluctuations, so utilities are deploying new solutions and sensors to finely tune the voltage control infrastructure to minimise technical losses and reduce costs,” continued Madangombe. “There are smart sensors, virtual sensors and remote terminal units (RTUs) to aid in this process.”

A monitoring system where the low voltage (LV) networks have three phases and a neutral wire can collect data, such as substations and feeders’ daily load, voltage and temperature profiles to provide a detailed analysis of MV/LV level performance data. This type of LV monitoring system can accommodate more DER since it addresses problems such as load imbalance and works to decrease energy loss, which can improve a substation’s output and reduce joule losses in cables.

Reducing losses is a prime concern for utilities and there are many strategies for going about this, including the addition of smart energy meters and sensors that identify the source of losses and quantify them so that network operators can start energy efficiency improvements. EcoStruxure ADMS, an industry benchmark used by over 78 utility companies that serve over 100 million end-user customers around the world, represents the evolution of control room technology by merging the distribution management system (DMS), outage management system (OMS), and supervisory control and data acquisition (SCADA) system into one comprehensive network management solution.

For more information contact Jason Ullbricht, Schneider Electric SA, +27 (0)11 254 6400, jason.ullbricht@schneider-electric.com, www.schneider-electric.co.za
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- Grab sample measurement capability
- Low maintenance
Optimise chloride and sulphate monitoring in power plants

Chlorides and sulphates cause pitting and stress corrosion in expensive power plant components, such as turbines and boilers, leading to extensive maintenance and unplanned shutdowns. Monitoring these ions at low ppb levels is therefore a key measurement in power plant chemistry. Mettler Toledo’s 3000CS sulphate and chloride analyser can provide online ppb level detection of chlorides and sulphates in power plant water to help control corrosion and minimise damage.

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

Typically, chloride and sulphate measurements are done with offline technologies, such as ion chromatography and inductively coupled plasma. The 3000CS provides accurate chloride and sulphate measurements continuously, delivering a rapid return on investment by eliminating the need for costly internal or external lab tests. The unit features semi-automatic calibration and an intuitive touchscreen interface. ISM Intelligent Sensor Management technology provides diagnostics that predict when maintenance or replacement of consumables will be required.

For more information contact Darren Prinsloo, Microsep, +27 (0)11 553 2300, darren.prinsloo@microsep.co.za, www.microsep.co.za

Trafo dry-type transformers for DRC mine

Alphamin Resources’ remote Bisie tin mine is being supplied with fit-for-purpose dry-type transformers by Johannesburg-based Trafo Power Solutions, in a fast-track project that will see the complete solution manufactured in just 12 weeks.

Bisie’s location, some 160 km north-east of Goma in the Democratic Republic of Congo’s North Kivu province, places constraints on the transformers’ installation that had to be taken into account during selection and design.

“With a difficult access road to the operation, the substation and transformers have been custom-designed to withstand the many stresses expected during transport,” says Trafo Power Solutions managing director, David Claassen. “To deal with the extreme heat and humidity of over 90%, we have also designed the ventilation and airflow inhouse.”

The delivery will involve the movement of two 3000 kVA cast resin transformers, housed in six metre high cube containers. The consignment will also include the ventilation systems, lighting and small power equipment. These transformers will be used for stepping up the supply from a diesel powered generator plant from 400 V to 11 kV to feed the mine.

Project scope also includes two 100 kVA Dyn11 dry-type lighting transformers for application outdoors.

“The design of these dry-type transformers makes them suitable for the climatic conditions at the mine,” says Claassen. “They require only a minimal movement of air across the windings to cool them, although forced air options can also be employed where necessary if ambient temperatures rise too high.”

The high efficiency of the cast resin design means that heat losses are lower, along with cooling requirements. This efficiency also reduces the energy consumed by these transformers, and hence will reduce diesel consumption in this application.

An important advantage in this remote location is that dry-type transformers are almost maintenance-free and could last for 25 years without significant attention,” adds Claassen. “Oil-filled transformers require regular maintenance including oil sample analysis to ensure operational consistency and safety.”

With no oil required as a coolant, the dry-type transformer is simple, safe and installable indoors without the need for its own civils infrastructure, such as bund walls and structures to ensure safety and environmental protection.

“Trafo Power Solutions works with customers to engineer technically appropriate and proven solutions for their applications,” concludes Claassen, “the fact that we could design and manufacture within this project’s tight deadline is further evidence of our ability to meet demanding schedules.”

For more information contact Trafo Power Solutions, +27 (0)11 325 4007, david@trafo.co.za, www.trafo.co.za
Remote monitoring and telemetry at power station water plants

The wireless ability to manage pumps remotely over long distances is now available using Omniflex's Teleterm M3 Radio RTUs. This full functionality IEC61131 PLC enables both control and wireless communications to exist in a single package with flexible I/O and subnet communication interfaces for VSDs and other serial devices including power meters.

The system comprises as many Teleterm M3 Radio RTUs as required, each housed in a weatherproof enclosure with a built-in PSU and standby batteries. A unit is installed at the (local) remote control side with all the I/O dedicated to control inputs and pump feedback statuses, while at the field side at the pump (remote) a unit with all the I/O dedicated to control outputs and pump feedback inputs is installed.

The built-in radio allows up to 20 km line-of-sight communication between the two sets of controls, allowing flexibility. The system supports peer to peer communications allowing multiple stations to be integrated into one control system. This allows easy plug and play with only the wiring of the power supply and the control circuits required. Optional HMIs can be provided to do the control of the pump and to indicate statuses. The on-board Ethernet port also allows connection to an existing scada or DCS system, thus saving on additional hardware. Big screen options are also available to visualise the entire water plant in real time for a control room, ensuring operators are not blind to outside plant statuses.

A communications link indication is provided to ensure the system is up and running, while alarm logging can be included so that status can be recorded for historical purposes.

Even the speed of the pump can be controlled, as the unit includes both a 4-20 mA input and a 4-20 mA output.

Low power consumption makes the system suitable for use in a solar powered environment if required, and a battery can be included in the event of a mains power failure. Water quality as part of environmental responsibility is a key element to triple bottom line reporting with water licensee operators needing to provide data for licensing authorities and compliance data for reporting.

For more information contact Ian Loudon, Omniflex Remote Monitoring Specialists, +27 (0)31 207 7466, sales@omniflex.com, www.omniflex.com
Foxboro’s 871FT conductivity sensors are a comprehensive family of flow-through, non-invasive electrodeless assemblies that measure the conductivity of almost any conductive liquid. The 871FT sensors are available in several line sizes from 12 to 100 mm and there is a wide choice of wetted parts materials and end connections, including both industrial and sanitary types. Featuring a built-in calibration port, the sensors can be calibrated inline to improve applications with aggressive chemicals and those in industries such as pharmaceuticals where the process line cannot be broken.

A typical application
Hydrofluoric acid (HF) is a key component in products ranging from petrochemical and pharmaceutical intermediates to industrial lubricants. HF is highly corrosive to equipment and extremely hazardous to humans. It is a weak acid, but diluting its concentration increases its corrosive properties and the presence of water in anhydrous HF will seriously corrode the process equipment. In chemical processing, equipment replacement costs can run into the hundreds of thousands of rands for labour and materials, especially when replacement includes premium-performance metal alloys such as Monel and Inconel. Furthermore, downtime and loss of production during equipment repair can erode profits for chemical manufacturers.

The Foxboro solution
By enabling Foxboro technology on this HF application, the 871FT conductivity sensors assist in the water extraction process by using changes in conductivity as an index to changes in concentration. By engaging this unique industrial flow-through technology, in which the process fluid actually passes through the toroidal sensing, the head acts as a section of the process pipeline. Conductivity detection is rapid, reliable and accurate.

Conductivity measurement is in the 500 μS/cm range as required for this application, but the 871FT is also suitable for applications with measurements ranging from 10 μS/cm – 2000 mS/cm.

Another advantage of the flow-through sensors is that they enable calibration inline, which significantly reduces scheduled maintenance time and related exposure of personnel or the environment or aggressive and dangerous chemicals. Traditional conductivity calibration involves pulling the probe, capping or sealing off the line, doing the actual calibration, reinstallation and then clean-up, which can be tedious, dangerous to personnel, and costly. As part of the design, the Foxboro 871FT features a calibration port that eliminates the need to break into the line, thus eliminating associated costs and safety concerns.

Additional benefits
- Reduced material and maintenance costs.
- Improved production yields and reduced equipment corrosion.
- Reduced exposure of personnel to a potentially deadly chemical.

With more than 40 years’ experience in conductivity measurement, Foxboro offers a complete range of instrumentation. The proven reliability and robustness of the Foxboro conductivity flow-through sensor helps improve process performance, increases production yields and reduces equipment corrosion.

For more information contact Johan van Jaarsveldt, EOH, +27 (0)87 803 9783, johan.vanjaarsveldt@eoh-pas.co.za, www.eoh-pas.co.za
Whether dealing with the concentration or the mixing ratio, the density of liquid media is of high importance in processes such as the food or chemical industry. Kobold’s DWF mechanical density meter is designed specifically for the monitoring and continuous measurement of liquid media and 2-phase liquids. Once it is calibrated to the respective medium, the density is measured by means of a float and transmitted to the outside without magnetic contact. Even multi-phase media can be safely managed with this measuring principle.

At 1% of the measuring range, repeatability and linearity of the robust field device are very high. The stainless steel or Hastelloy instrument can stand medium temperatures up to 150°C and pressures up to PN 40. Three different sizes ranging from a maximum of 2500 l/h to a maximum of 10 000 l/h make it possible to adjust the system optimally to the respective task. The nominal widths of the process connections are DN 25 for the smaller device and DN 50 for the two larger devices.

An easy to read mechanical indicator is located directly on the measuring device. The electrical output signal 4... 20 mA is for remote transmission. Additional limit value contacts can also expand the application possibilities as needed with the respective switch outputs and a transducer with communication protocols such as HART, Profibus PA or Foundation Fieldbus. With an IP65 degree of protection, the high quality and robust measurement instrument is very well designed for a harsh process environment. It fulfils industrial norms and standards and is certified for use in explosive areas.

The DWF’s main features include:
- A large spectrum of wetted materials.
- Magneto-resistive signal transmission.
- High temperature application option.
- High pressure application option.
- Excellent heat tracing technology.

The DWF is used for density metering of liquid media in pipes. The scale on the device shows the density rate expressed as grams per litre or kg per mN. Applications include density metering, monitoring and control of liquid media. The DWF is excellent for processes operating under difficult and rough operating conditions. The device is also available with additional electrical equipment for process monitoring and control.

For more information contact Instrotech,
+27 (0)10 595 1831, sales@instrotech.co.za, www.instrotech.co.za
**Battery powered digital temperature gauges**

Kobold’s DTE series of digital temperature gauges offers a wide range of industrial and analytical possibilities for applications where high accuracy and clear indication is required, and where alarm control and displayed messaging is either useful or a requirement, as in controlled environments such as hospitals and scientific laboratories. In addition, the DTE also incorporates data-logging, is accessible via NFC interface with mobile devices, and is USB PC configurable.

One of the key aspects of the DTE series for engineers, is the mechanical case-mounting options that follows the traditional Bimetal, Nitrogen Actuated, and Mercury (now prohibited) mechanical gauges. The Universal Pt100 Class A and Class 1 thermocouple sensors offer not only accuracy and flexibility regarding sensor options, but in the event of the sensor being damaged in service, instead of replacing the entire instrument, only the sensor needs to be replaced. The instrument may also be reused for other applications where a different type of sensor specification is required.

The advanced features and versatility of the DTE offer new solutions for many applications. Typical examples are process and plant engineering, scientific, hospitals and care facilities, storage, building management systems, research and development, water industries, food and beverage, chemicals, HVAC, steam/heat and cooling, process and biomass.

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

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**Emerson expands its pressure gauge portfolio**

Emerson has introduced the Rosemount Smart Pressure Gauge to help users gain better visibility of field changes. It utilises industry-proven Rosemount pressure sensor technology to deliver reliable pressure readings. With the flexibility to accommodate changing process conditions, the Smart Pressure Gauge gives up to 150X overpressure protection and provides a safer field environment. By utilising two layers of process isolation, it can help prevent process failures from becoming dangerous by preventing employee contact with process fluid by keeping it safely inside the pipe.

Rosemount pressure sensor technology replaces 100-year-old bourdon tube gauge technology, eliminating weak points common to mechanical gauges. Mechanical gauges are plagued with quality and reliability issues associated with overpressure, vibration, corrosion, extreme temperatures and accidental damage, and can contribute to numerous reliability and safety issues in plant environments. Additionally, mechanical gauges are unable to communicate device status.

With up to a 10-year life, which reduces maintenance costs and time, and increased visibility from a large 11 cm face with status indicator light, the gauge provides easy field visibility and expands Emerson’s gauge portfolio. “Industry response to the Rosemount Wireless Pressure Gauge has been positive, and now with the addition of the Smart Pressure Gauge, our customers have even more options for upgrading their problematic gauges,” said Sven Hendrickson, product manager for pressure gauges.

For more information contact Rob Smith, Emerson Automation Solutions, +27 (0)11 451 3700, rob.smith@emerson.com, www.emerson.com
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- **Field Xpert SMT70:** The tablet PC allows mobile device configuration and plant asset management, even in hazardous areas.

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www.za.endress.com/oil_gas
Endress+Hauser’s Picomag flowmeter

With its Picomag flowmeter, Endress+Hauser impressed the jury of the Red Dot Design Awards to receive the Red Dot seal of quality in the product design category. The smart plug-and-play instrument scored equally well for its functionality and compact design. The Red Dot is an internationally recognised award for products that feature high-quality design and optimally meet the needs of customers. “We are pleased that the Picomag persuaded the jury with its compact format, flexible installation possibilities and intuitive operation,” said Dr Bernd-Josef Schäfer, managing director of Endress+Hauser Flowtec, the Group’s centre of competence for flow measurement technology, based in Reinach, Switzerland. Professor Dr Peter Zec, initiator and CEO of the Red Dot Award, congratulated Endress+Hauser: “The winning products are marked by outstanding functionality and an attractive appearance, which proves that the designers understood their customers.” Among other things the products are evaluated according to the level of innovation, functionality, design quality, ergonomics and durability. A roughly 40-person jury selected the winners from 6300 objects that were submitted for consideration.

Pocket-size flow measurement technology
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 these requirements and can be deployed across all industries. It measures not only the flow in electrically conductive fluids, but also the 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.

Red Dot Design Award
The Red Dot award is one of the world’s biggest design competitions. The award, which stands for outstanding design quality, is divided into three categories: product design, communications design and design concept. Winners were honoured at the beginning of July during the Red Dot Gala, held at the Opera House in Essen, Germany. All the winning innovations were displayed during a special four-week exhibition and also presented in the Red Dot Design Yearbook.

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

EXERGEN Global
Industrial Sales

Exergen’s innovative family of infrared non-contact sensors are unpowered, have no drift and have high repeatability and interchangeability, giving them the edge needed to increase production process speed and quality.

TEMPERATURE CONTROLS (PTY) LTD
EST. 1952
HEAD OFFICE: +27 (0)11 791 6000
www.tempcon.co.za
CAPE TOWN: +27 (0)21 510 0405
sales@tempcon.co.za
KWAZULU-NATAL: +27 (0) 31 705 3704
“OVER 60 YEARS IN THE PROCESS MEASUREMENT & CONTROL INDUSTRY”
High reliability in temperature measurement

With Sitrans TH320/420 and TR320/420, Siemens introduces a new generation of reliable HART temperature transmitters for a wide range of sensor types, suitable for mounting in sensor head and rail mounting. They feature high availability of the measurement signal and ease-of-use. Due to the safety integrity level (SIL) 2/3 certification according to IEC 61508, the temperature transmitters are particularly suited for safety-critical applications. The devices also have a large number of country specific explosion protection certificates for all zones. They provide reliable results, even under extreme conditions down to -50°C. Main application areas include industries such as chemical, oil and gas, marine and power generation.

With fast and accurate sensor and transmitter tuning, the use of the Callendar-van Dusen method or 60-point-curve ensures highest measuring accuracy. Deviations can be detected and monitored through the drift detection with dual-channel transmitters, e.g. for preventive maintenance. Electronic device descriptions (EDD, DTM and FDI) allow the new transmitters to be used in all current distributed control systems. A quick start wizard is just one example of their user friendly features. Measurement values, device functions and visual alarm signals can be displayed and operation planning and implementation is very convenient using special visualisation components for Simatic PCS 7 (Sitrans Library).

When a sensor fails in operation, for example due to disconnection or short circuit, measurement failures may result in loss of control or production stops. To avoid this and to ensure high measurement availability through reliability and long term stability, maintenance planning is essential. The Sitrans TH420 and TR420 sensor backup function, drift detection and alarming make this possible. Using the four-wire connection for both sensors increases data accuracy and reliability as it allows a seamless transition to the second sensor in case the first sensor fails. The continuous balancing of the two independent sensors measuring in parallel, while detecting and monitoring measuring value deviations, allows the scope of maintenance to be planned as required, following the description above, and production stops to be avoided. Balancing the sensors using the Callendar-van Dusen method also meets the challenge of sensor inaccuracy caused by individual deviation from standardised Pt100 curves or by ageing. Outstanding transmitter accuracy and sensor balancing enable simpler calibration of the sensors directly in the transmitter and provide for highly precise individual values.

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
Traffic signals are controlled dynamically along tunnel sections so that the traffic flows safely and without delays. In and around the Cholfirst Tunnel in Schaffhausen, Switzerland, easy managed switches from Phoenix Contact ensure that the necessary data is transmitted reliably between the traffic facilities and control engineering.

The Swiss A4 highway is an important transit route for north-south traffic. Every day, over 25 000 vehicles use the northern section of the A4 that also serves as the Schaffhausen expressway and is a central part of the regional traffic system. The two lane section between Schaffhausen-Nord and Flurlingen comprises several tunnels and crosses the Rhine between the individual tunnels. When driving through, the drivers of cars and trucks and motorcyclists barely see anything of the technology that is installed within these structures. This operating and safety equipment ordinarily ensures that the traffic flows smoothly. If, however, there is a power failure, fire or accident, these technical systems can also save lives. The operating and safety equipment is divided into different utility systems – such as energy supply, lighting, ventilation and traffic management – each with its own independent control technology.

No effects on the traffic flow or operations
The Schaffhausen section of the A4 was opened back in 1996, and, as a result the technology installed at that time was becoming outdated, and in some parts no longer met current requirements. Therefore, the Swiss Federal Roads Office (FEDRO) initiated a refurbishment programme to increase the safety of the tunnel. The Swiss company, Ticos Engineering & Software, based in Feuerthalen in the canton of Zurich, was commissioned with renovating and modernising the operating and safety systems in the Cholfirst, Fäsenstaub and Schönenberg tunnels.

As a system integrator, Ticos realises control, regulation and management systems for tunnel, building, and process automation. The company specialises in tunnel and traffic control technology and has built up extensive project experience over the years, with its regional focus in Switzerland. One of the challenges when realising tunnel applications is that they should, in the best case, be implemented without affecting the smooth flow of traffic or operations. Tunnel closures are the absolute exception and if necessary must be planned long term, and for periods of off-peak traffic flow. Against this background, the individual phases of the respective projects as well as their timely execution have to be planned in detail well in advance.

The control engineering system for traffic control in the 1260 metre long three lane Cholfirst Tunnel was modernised during the first project phase. To ensure that the work had as little impact on the traffic flow as possible, the control engineering system was renovated successively during ongoing operations. As a part of the project, Ticos replaced the system control installation and several local controllers. The associated control cabinets are situated in the engineering rooms or respective sub-distribution stations of the two tunnel portals. All of the existing and a multitude of new traffic signals are connected to the traffic control engineering system here. The Ticos employees gradually transferred the signals from the existing over to the new controller. Ethernet-based communication was also installed at the field and control level as part of the modernisation of the control engineering system.

Redundant Ethernet ring using fibreglass technology
A redundant Ethernet ring based on single-mode fibreglass technology was installed to cover the large distances involved and to ensure high availability. Ticos selected Managed Ethernet Switches of the FL Switch 2200 series from Phoenix Contact as the infrastructure components. A key factor in this decision was the easy handling of the devices. The switches can be set up in a redundant ring topology without any further configuration. As the control network had to be set up quickly, it was an advantage that no further time-consuming configuration work was necessary. This is because the basic function of a plug-and-play switch is already assured in the necessary ring topology. This simplifies startup because the network is available again quickly after a rework operation or an extension.

The 2206-2FX-SM switches have two single-mode fibreglass interfaces with SC Duplex...
connectors, as well as six twisted pair copper interfaces with RJ45 connectors. The single mode ports are connected to the fibreglass installation via FO patch fields. The fibreglass cables run in parallel between the two tunnel portals below the carriageway service duct. Here the signal and communication cables are routed on cable racks alongside the supply lines for water and energy. The switches are mounted in the transverse control boxes in the tunnel service duct from where they are coupled to the fibreglass ring. The main and local controllers installed in the substations are connected to the switches via RJ45 ports. The components are installed in the engineering rooms of the two tunnel portals. Switches with single mode uplinks are expanded in the substations with versions that have eight twisted pair ports so that further communication devices can be integrated into the network.

Fast migration and expansion of the field devices
The traffic control system includes the lighting of static signals, indicators, traffic lights, and lane and switching signals. The scope of the traffic control engineering system includes the tunnels, their entrance zones and the associated open roadway sections. A rerouting system is operated in the project section of the A4. This means that the transit traffic is able to be diverted to the nearest possible connecting route in the event of a scheduled tunnel closure or when the tunnel has to be closed at short notice. Two alternative routes have been identified for this purpose, each of which are displayed via prism rerouting signs. Rerouting signals such as the prism rerouting signs were previously connected in parallel to the control engineering system. With the new solution, it is now possible to couple to the switches directly or via serial/Ethernet converters, depending on the version. The use of Ethernet technology thus supports both the migration of existing field devices and their expansion.

While the switches installed in the engineering rooms can be accessed easily by the service personnel, the devices installed in the service duct stretching for kilometres can only be reached after a correspondingly long walk. Accessing the switches via which the rerouting signals are controlled also involves considerable effort. These are installed on the masts and gantries in the entrance zones and in the open roadway sections. Therefore, the Ticos employees can use the central Network Manager startup tool from Phoenix Contact to assign the devices an IP address. Should further settings be necessary, these can also be configured via the software. Employees can thus configure all of the installed switches and perform diagnostics from the engineering room. Furthermore, the Network Manager can be used to maintain and archive the configuration data of the switches used in the project.

Future expansion to other tunnel sections
To date, Ticos has only had positive experiences with the FL Switch 2200. “We are particularly impressed with the easy handling of the components,” says division manager, Armin Spiess. “Therefore, we are also going to expand this networking concept to other tunnel sections, as well as any potential follow-up projects once approved by the client. There is thus nothing standing in the way of free-flowing traffic around Schaffhausen and the German-Swiss border.”

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

IO-Link is playing a major role in the development of smart factories and smart data. The communication standard offers digitalisation right down to the sensor level. The growth figures of recent years impressively demonstrate its popularity. Nevertheless, many users associate the transition with higher costs. This is the case even though IO-Link allows expenditure for hardware and installation to be significantly reduced, particularly when it is used as an overall system.

IO-Link has rapidly penetrated the market over the past years. Whilst the number of IO-Link nodes was 2.19 million in 2014, it had already increased to 5.3 million by 2016. Exponential growth is also expected for the coming years. As a digital communication standard, IO-Link is designed as the integral component for the last metre of the smart factory. However, this is precisely the problem. Many users associate the technology exclusively with future applications that they have not yet defined. Sometimes they even assume that the transition would also require basic proximity switches to be replaced with expensive variants. However, the opposite is the case. Furthermore, not every switch in an IO-Link system has to have an IO-Link interface. In several applications, IO-Link firstly reduces costs. The customer therefore benefits immediately. At the same time, it establishes the basis for new applications that will arise through Industry 4.0.

Digital instead of analog

Hardly one sector sticks so closely to analog signal transmission as the automation sector. Digital information here requires considerably less bandwidth than analog. At the same time, digital transmission is more robust. IO-Link offers a bidirectional point-to-point connection with up to 230.4 kbaud, ensuring very reliable communication via unshielded standard cables. IO-Link sensors are often cheaper than their analog counterparts, as they do not require a D/A converter. This firstly enables the user to make savings in wiring and secondly in terms of the device itself. Another benefit is the fact that the IO-Link master channels are downward compatible with conventional binary sensors with one or two switching outputs. Compared to analog inputs, spare channels can mostly still be used.

From the passive junction to Ethernet and IO-Link

In most applications, binary I/O signals, such as from inductive proximity switches, represent the most frequently used signal type. Even today, these are frequently collected in the field by passive junctions (IP67) and routed via multipole cables in control cabinets to central or decentralised I/O modules (IP20). In order to save costs for devices and wiring, more modern concepts use active decentralised IP67 I/O modules in the field. These can collect the signals as closely as possible to the action and transfer them directly to higher-level controllers via Industrial Ethernet (or other fieldbuses). This eliminates the need for decentralised modules in the control cabinet, which itself can be designed with smaller dimensions. An additional benefit is the cheaper wiring via Industrial Ethernet. This architecture with IP67 I/O modules, which collect signals directly in the field, plays an important role in automation, particularly if only a few signals are collected in situ, for example on robots.

IO-Link can also reduce the costs in applications with a high I/O density. I/O hubs enable up to 16 additional signals to be compressed and transferred via IO-Link. IO-Link masters with four or eight ports collect this data over distances of up to 20 metres and transfer it to the controller in bundles via an Ethernet cable. In this variant, users make savings three times over: Compared to Industrial Ethernet modules, I/O hubs are cheaper; instead of shielded Ethernet cables, unshielded standard cables are used; and as IO-Link requires only one cable for data and power, separate power supply cables become unnecessary. A further benefit is the fact that IP addresses are only required for each IO-Link master and not for every I/O module.

With actuators to the IO-Link overall system

It was thought for a long time that any smart actuators or sensors would be based in future on Industrial Ethernet. However, current engineering practice shows the limits of Ethernet in automation. Ethernet, with a transfer rate of 100 Mbit/s or even 1 Gbit/s and a minimum frame size of 64 bytes, is simply over-dimensioned for many devices. Ethernet interfaces are also comparatively expensive and produce a lot of heat. IO-Link can technically fill this gap with a very good cost-benefit ratio. Although IO-Link is often defined as a smart sensor interface, the technology was specified from the beginning for communication with sensors and actuators. This gives it a critical advantage over Ethernet, since power and communication are transferred in a single cable.

One of the best known examples of field devices with an IO-Link interface are valve blocks. All major manufacturers now have IO-Link valves and valve blocks in their portfolio. Complex
connections using adaptors with Sub-D multipole connectors can be replaced by inexpensive standard cables. Gripper systems, motors, first frequency inverters and I/O hubs with digital outputs are other examples of actuator modules using IO-Link.

Turck’s TBEN-L-8IOL IO-Link masters were specially optimised for actuator operation. Unlike other manufacturers, they provide up to 4 amperes at two ports. Users particularly benefit from the possibilities that IO-Link offers, such as with signal indicators with several segments. The connection of light indicators with more than two segments using digital multipole cables was already very complicated. However, IO-Link lights with configurable colours for each segment, audible signals and several additional functions can be wired and operated easily via a standard cable.

Integration in higher level systems
Different options are available for the configuration and integration in higher-level systems. Devices can firstly be assigned via IO-Link masters or USB masters or USB adaptors with the help of configuration tools. Alternatively, the configuration can be carried out with function blocks in the controller. This makes it possible, for example, to change the configuration of a device during operation as part of a profile change.

Cost benefit of the overall system
If the change to IO-Link is made dependent on an individual component, IO-Link masters can be seen to be a disadvantage due to the overhead costs for IO-Link masters. However, if the system is considered in its entirety and a change of sensors and actuators and I/O systems assessed as well, considerable costs can be saved with IO-Link. The cost-saving benefits of IO-Link do not become fully apparent until the time required for wiring and cable assembly are taken into account.

The many Industry 4.0 scenarios, which frequently involve connection with the intelligent interface, are unnecessary. However, the IO-Link system makes users well prepared for these scenarios. The more flexible setting of sensors from the controller or the querying of sensor data for predictive maintenance can be set up at a later time. Not only IO-Link devices – the capabilities of the master are also critical for using the system intelligently at a later time. However, the devices of the manufacturers also vary here, although the communication standard is the same. The Turck IO-Link masters installed in multiprotocol I/O modules can thus also be accessed with Modbus TCP in parallel with Profinet. This enables the transfer of data to higher-level I4.0 or IIoT systems such as SAP PCo, Microsoft Azure or IBM Bluemix.

Outlook
The IO-Link product landscape already offers all components today for the economical implementation of complete solutions for automation. The latest activities of the IO-Link community show how IO-Link also equips customers for the future. The IO-Link Safety Specification makes it possible to also implement safety concepts in future for all aspects of IO-Link. The IO-Link community also has specifications under way that enable standard access to IO-Link masters and devices from higher-level I4.0 systems.

For more information contact Brandon Topham,
RET Automation Controls, +27 (0)11 453 2468,
brandon.topham@reautomation.com,
www.reautomation.com

CANwireless connection to the machine
Using the latest technologies, such as WiFi 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 shared with the other connected network participants. 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 WiFi 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 WiFi 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
Industrial control system cybersecurity

Part 4: Network security monitoring in ICS environments.

In the last three articles on cybersecurity in ICS environments, we have covered risk assessments, asset discovery and vulnerability management, and environment hardening. In this month’s article, we will look at how to start monitoring industrial control system networks, in what is called network security monitoring (NSM). NSM is not confined to security monitoring though, as most system owners’ state, the best return on investment for a NSM tool is often through finding incorrectly configured ICS devices and gaining a more in-depth understanding as to how the ICS assets communicate.

The benefits of NSM tools in the ICS environment

NSM deployments are not very common in ICS environments, but we are starting to see an increase in the number of customers implementing these solutions as their systems become more digitised, driven by the IIoT and Industry 4.0. Owners and operators are slowly starting to see the benefit of deploying such a system to help them gain more insight and visibility into their ICS networks. The golden rule of cybersecurity is that you cannot protect what you cannot see, and NSM helps you to ‘see’ your networks, thus enabling you to build stronger cybersecurity controls.

The NSM tool will enable you to collect, analyse, and correlate data across your ICS network(s), which will help to not only detect potential security risks, but also to identify network connectivity issues and configuration problems. NSM tools do present some challenges though, but that is an entire article on its own. These challenges are extremely well documented online and need to be investigated and, more importantly, understood before implementing any NSM tool. I would, however, like to highlight two of the main challenges that I often come across, these being: the massive amount of data that is collected by the monitoring tools; and the amount of time required to correlate and disseminate this data, to turn it into intelligent actionable information.

Now that I’ve told you about NSM tools, you’re probably starting to ask: “Well where do we start? And what do I need to begin monitoring?”

Both are valid questions. If you bring on too many information sources you and your team will be inundated with information, bring on too few, and you will leave areas of your network potentially exposed. The most effective way to implement NSM is to bring on segment by segment, or zone by zone. If you have already implemented the Purdue Model (PERA), the hard work of segmenting into zones is mostly completed. If you have not yet adopted this architecture, look for current established zones, like your perimeter, the engineering workstations, etc, and start collecting the data from those sources. This data will then be ingested into the NSM solution, and intelligence will be built and tweaked over time, to provide actionable reports. This process can then be repeated for each new segment/zone that is added to the current established zones, like your perimeter, the engineering workstations, etc, and start collecting the data from those sources. This data will then be ingested into the NSM solution, and intelligence will be built and tweaked over time, to provide actionable reports. This process can then be repeated for each new segment/zone that is added to the NSM solution.

Recommendations

There are a few very good NSM solutions that are available commercially, which have the ability to ingest specific ICS data. These solutions also come with great support options from the respective vendors and partners. There are also quite a few options for open source solutions, specific to control systems, which are well documented online: including Security Onion, BroIDS, OSSEC and Snort, to name a few. These were initially developed for IT systems, but they have since evolved to include support for ICS networks. However, there is no ‘one solution that fits all’. What we have found works very effectively is a combination of the tools mentioned above, and some others. One of the better guides I have read in this regard is from The Spanish Security and Industry CERT, certsi_ , which has published a fantastic research piece on not only NSM, but also intrusion prevention/detection (IPS/IDS) https://tinyurl.com/y95roj4b. I strongly recommend that you download this guide and share it with your team.

Conclusion

In closing, whilst there are a number of NSM tools available, it is strongly recommended to combine these with industry best practices, for effective monitoring of an ICS network infrastructure. There are quite a few practitioners/vendors out there who claim that a SIEM (security information and event management) is the same as network monitoring, but it is not. Be careful and do your homework – there are only a limited number of vendors whose products are proven to work in an ICS environment.

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
In an ever-changing digital world, for everything from new business models and new consumer technologies to new infrastructure, energy and power systems, the digital transformation is inescapable. The fourth industrial revolution, or smart manufacturing, has accelerated the move to digital technologies that offer a competitive advantage to every company and every geographical zone that adopts them.

Augmented reality, the IIoT, machine learning and predictive maintenance are making companies more efficient and boosting their competitive advantage. Schneider Electric, the global leader in the digital transformation of energy management and automation, recently took to Hannover Messe 2018 to showcase its latest innovations for industrial companies.

Digital technologies enable more efficient use of resources

As energy and automation develop into a more digitally connected environment, these new technologies are capable of ensuring that power-sensitive automation equipment remains operational, boosting power reliability and cost savings by improving the speed and accuracy of the processes they control.

Bridging the divide between complexity and human capabilities by using control devices and technology for automated operation and control, digitisation allows for better support and faster decision making by providing operational insight, encouraging efficient use of resources to maximise assets and production output, simplifying tasks, and integrating the implementation of plant strategies.

“At Schneider Electric, we believe that integrating power and automation systems through the IIoT has the potential to bring together the best features of both systems, enhancing processes while introducing safer, more reliable, efficient, sustainable, and connected power,” said Marc Ramsay, vice president for the industry business unit at Schneider Electric South Africa.

EcoStruxure for Industry

As the leader in powering and digitising industry, Schneider Electric is uniquely positioned to drive the digital transformation of today’s growing industrial automation markets and assist industrial customers in their conversions. Significant changes are fundamentally accelerating this movement in the industrial space.

“With EcoStruxure for Industry, Schneider Electric offers a truly unified engineering approach that can be deployed across multiple industrial segments,” added Ramsay. “Leveraging our unique partnership with AVEVA, we can offer an unmatched set of solutions covering all aspects of digital asset management from process simulation to design, construction and manufacturing operations management and optimisation."

EcoStruxure for Industry offers open, interoperable, IIoT-enabled system architecture and platform, where users benefit from enhanced value around safety, reliability, efficiency, sustainability, and connectivity.

Leveraging all advancements in IIoT technology, including mobility, sensing, cloud, analytics, and cybersecurity through connected products, EcoStruxure has been deployed in over 480 000 sites around the world.

“With the support of 20 000 system integrators and developers, EcoStruxure currently has 1,6 million assets under management, and that figure is expected to grow by 25% year-on-year for the foreseeable future,” explained Ramsay. “This figure ties in with Accenture’s recent report, citing that at present, 64% of executives believe that a failure to leverage digital technology will cause their companies to struggle for survival.”

Strengthening its commitment to digitising industry, Schneider Electric also unveiled EcoStruxure Machine Advisor during a presentation at Hannover Messe, 2018. This platform now makes it possible to track, monitor and fix machines in the field while reducing support costs by 30 to 50%.

“Where managers struggle to track the history of the many machines that fall under their scope of responsibility, or when parts need replacing, production is interrupted, and the downtimes are much too long, maintenance technicians often spend far too much time attempting to locate different sets of documentation before they can begin productive work on fixing the machine,” concluded Ramsay. “Schneider Electric’s recent breakthrough with this technology is now directly addressing these challenges by providing new ways of gathering, centralising and displaying machine-generated data.”

For more information contact Jason Ullbricht, Schneider Electric SA, +27 (0)11 254 6400, jason.ullbricht@schneider-electric.com, www.schneider-electric.co.za
Local manufacturing firms continue to face headwinds from heightened global competition from countries such as China and India, to sluggish demand and macroeconomic conditions, to critical skills shortages and labour issues. However, technology can help to relieve one of the most common pain points, the stubbornly high cost of production. By using the right digital tools, manufacturers can sustainably reduce their production costs, breathing new life into their margins and ensuring profitable operations.

Three areas in which this can be achieved are:

1. **Raw material inventory and production planning**
   By using digital tags like RFID, plant operators can gain greater insight into materials, equipment, parts and other assets. Combine this with other datasets and it is possible to build up a rich picture of materials as they flow through a factory to eventually become finished products. By knowing exactly where everything is, it becomes easier to plan production, as data is automatically piped into a manufacturing execution system or production lifecycle management system. This means faster logistics and greater throughput of products, as well as increased levels of uptime and productivity – ultimately driving down input costs.

   Rapid advances in 3D printing mean that certain parts and materials that are required urgently can be created on-site and at short notice, even further enhancing the management of materials.

   One of the leaders in this space is General Electric. The company is reinventing itself with a variety of strategically connected technologies. These include lean manufacturing, additive manufacturing (also known as 3D printing) and advanced software analytics to enhance productivity. At Grove City, GE has used these technologies to reduce unplanned downtime by 10 to 20%, improve cycle time and reduce costs.

2. **Predictive maintenance and predictive analytics**
   With sensors gathering key data on each machine – from humidity, heat, wear and tear, usage times, oil levels, and various other data points – it is possible to start predicting when a machine is likely to fail or require servicing. This principle, known as predictive maintenance, helps to curtail the cost of managing industrial equipment and reduces unexpected downtime as services, repairs and refurbishments can all be scheduled to avoid interrupting production lines.

   With findings suggesting that downtime costs the average factory between 5 and 20 percent of its productive capacity, predictive maintenance can be one of the most crucial weapons in the fight against ballooning production costs.

   It is possible to extend the principle of predictive maintenance to encompass predictive analytics across the entire factory operations. With predictive alerts coming in from all corners of the factory, it becomes possible to orchestrate the operations more dynamically, changing the daily plan according to fresh data that comes in from along the production line.

3. **Proof of concept prototypes**
   In traditional manufacturing, creating a new prototype for a particular product was a lengthy and extremely expensive endeavour, particularly when the concept turned out to be the wrong one and never progressed into full-scale production. But with cutting edge digital simulations, 3D representations and holograms, it becomes possible to play around with various new prototype designs, testing them with users and getting a tangible feel. By creating sophisticated prototypes in these new ways, the dramatic upfront costs of producing a single unit on the production line are greatly reduced. In this way, rapid prototyping and proof of concept can cut out another layer of cost.

   As traditional manufacturers evolve towards smarter and more digital production lines, it is not always easy to know where to invest first to get the greatest ‘bang for your buck’. But by focusing on these three areas, and then building from these foundations and gradually connecting other technologies, manufacturers can address the most pressing pain point, input costs, and set themselves well on the way to reducing the cost of production.

For more information contact Dereshin Pillay, T-Systems South Africa, +27 (0)84 671 5284, dereshin.pillay@t-systems.co.za, www.t-systems.com/za/en
Emerson has released Quality Review Manager, an application designed to reduce the time it takes to release therapies to patients by decreasing the time and effort required for product quality reviews. Delivered as part of the Syncade manufacturing execution system (MES), this new tool helps life sciences companies more easily adopt review-by-exception operating approaches, allowing quality and manufacturing personnel to safely release batches faster, reducing inventory and time to market.

Quality Review Manager significantly reduces the length of reviews by simplifying the process of accurately documenting all actions taken when responding to exceptions. Today, most review teams must wait until after an entire batch is complete before reviewing process exceptions. With Quality Review Manager, the quality department can review process exceptions as they occur and while the batch is still in process, providing a more accurate and timely response. Exception reviews can be completed within hours of the exception occurring, rather than weeks after the batch has been completed, eliminating potential delays in releasing product to patients.

Providing a single environment for reviewing exceptions, Quality Review Manager speeds up the process of managing exception documentation by autogenerating data that provides context for each exception. Exception dashboards help prioritise reviews while focusing on the most critical exceptions affecting the process. After all exceptions are closed, Quality Review Manager supports an automated release methodology by immediately releasing finished batches once all exceptions are resolved, thereby reducing the lag between production, product release and patient delivery.

The web-enabled tool, accessible through traditional workstations and modern mobile devices (e.g. tablet or smartphone), facilitates collaboration among stakeholders and quality personnel by making documentation and other relevant information available anywhere. “Quality is paramount in the life sciences industry, so exception reviews must be supported by fully connected systems that deliver data integrity,” said John Nita, vice president of sales and product management for Emerson’s life sciences business. “Quality Review Manager provides a single source of the truth, helping to streamline exception reporting and resolution, ultimately improving operating performance and helping medicines reach patients faster.”

For more information contact Rob Smith, Emerson Automation Solutions, +27 (0)11 451 3700, rob.smith@emerson.com, www.emerson.com

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- Packaging & bottling
- Control systems (incl. PLCs, DCSs, scada & HMI)
- Control valves, actuators & pumps
- Condition monitoring (incl. vibration)
- Vision systems

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Differences between PLCs and DCSs – a discussion from a practical control point of view.

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

Eliakim Muskiki read one of my articles in SA Instrumentation and Control and emailed me to ask what the differences are between PLCs and DCSs. I started replying to him and then thought that it would make an interesting article, as I am often asked why I always prefer working in plants which run their analog feedback control systems on a DCS rather than on a PLC. To understand this, one must go back into the history of the development of these devices.

A friend of mine recently commented that he was born BBC. Translation: ‘He was born before computers.’ Feedback control, as developed by mankind and used in plants for almost a century before the digital computer came on the scene, is also BBC. It was developed into an engineering science by several brilliant mathematicians in the early part of the 20th century, and really came into general plant usage with the development of pneumatic technology. The technology then remained pretty much static until the mid-1960s when electronic instrumentation and control systems came into commercial use, and took over from the old and relatively crude pneumatic equipment.

Enter the electronic era

The electronic era was a marked leap forward for control equipment, as electronics is far more accurate and much easier to configure.

At this stage there were two departments dealing with controls in most plants, namely C&I (control and instrumentation), and electrical. The former dealt with the feedback control systems, and the latter with on/off controls like motor starters, etc. and with sequencing and interlocking of various machines and drives, which was accomplished by the use of devices like electro-mechanical relays, and special rotary switches when it came to sequencing. Electro-mechanical timers were also employed.

For simplicity, and before going further, I would like to define the two different systems as ‘analog control systems’ for feedback and feedforward type controls, and ‘digital control systems’ for on/off and sequencing type controls.

Obviously today, everything is done digitally in computers, and this makes things much easier.

Digital computers came into commercial use in the 1960s, but it was really only in the 1970s that they started moving into the two control fields. It should be noted at this stage that the computers being used for control systems were heavily ruggedised and had extremely high reliability, as plant operation was completely reliant on their operation. This is still the same today with the exception of scada systems, which will be discussed later.

Analog control field

The first major development in digital computing control systems occurred in 1975 when Honeywell and Yokogawa introduced their DCS (distributed control system) platforms to the market. Most of the major C&I manufacturers followed suit fairly quickly.

The important point of these DCSs is that they were, and still are, manufactured by companies with many years, if not decades, of experience in producing feedback control systems. Bearing in mind that the average human being is resistant to change, and that at that stage many of the C&I practitioners and plant operators were not very conversant with computers and were quite scared of them, the DCS manufacturers tried to make the transition from the old analog to the new digital equipment as painless as possible.

Operators were used to controllers and recorders sitting in large panels and being able to read the information on them quite easily on meters or pens on the front of the instruments. The DCS manufacturers accordingly built specialised screens on computer monitors that more or less showed the same type of displays and operating controls that the operators were used to. As far as configuring control loops was concerned, the manufacturers tried to make loops configurable in a way that was similar to the old loop configuration. In addition, they built many safeguards into the software to prevent errors in programming.

Another extremely important point is that they very carefully ensured that the actual implementation of the PID controllers in the software was correct, so that controllers would operate dynamically in exactly the same way as the old analog controllers. The result of all this is that plants changing over from the old electronic and pneumatic systems did so with a minimum of problems.

Digital control field

The first computerised digital (on/off) control system was introduced by Richard (Dick) Morley, an employee of Bedford Associates, a company involved in the automotive industry. He proposed something called a modular digital controller (Modicon) to a major US
car manufacturer. This was the birth of the first programmable logic controller, now commonly referred to as a PLC. There were huge advantages to this device as it eliminated the cost of the expensive electro-mechanical components, as well as the need for complex physical wiring. In particular, it was extremely easy to configure the programs, and to make changes, which previously took a lot of time and effort. Aside: in the early 1970s, and after PLCs really took off in the market, Bedford Associates changed its name to Modicon PLC.

Once again the manufacturers of PLCs tried to make the system easy for practitioners of digital control systems. The first units were programmed by ladder logic, which is almost exactly the same as the wiring drawings used for the old electro-mechanical devices.

**Initial differences between PLCs and DCSs**

There were no displays for the early PLCs, and the use of push-buttons, rotary switches and indicating lamps mounted on control panels continued for quite a few years.

Thus, the two control fields carried on separately for several more years, but obviously people started querying why two expensive computer systems were needed in a single plant. Surely a single computer could combine both functions, especially as computing power had grown exponentially?

The DCS manufacturers were quite quick to start incorporating ‘digital’ capabilities into their machines, but there was a problem for the PLC people. There was no ‘easy’ analog operator interface on their devices, whereas the DCSs had operator screens as an integral part of the system. Some of the PLC manufacturers offered special interfaces for PID controllers, for example a panel-mounted module with a front display, which had the capabilities for an operator to switch between as many as eight PID loops. However, these displays were expensive and not terribly user friendly.

A solution to this problem appeared in the early 1980s, when an engineer, Steve Rubin, who owned a company called Intellution in Boston, US, started wondering why people were using expensive ruggedised computers for control. When I met him he said that as far as he was concerned, the ordinary desk PC had all the power and reliability to run plant controls, and they were a fraction of the cost of the control computers being used. He then developed an extremely clever system for use on desktop PCs to operate both analog and digital controls. The best part of his system was that it was extremely easy to configure ‘screens’ to display any type of control device, for example from PID controller faceplates to alarm screens, to on/off control buttons and indicators, and he also included powerful trend and real-time recording and logging.

He introduced this system, which he called ‘The Fix’ (fully integrated control system) at an ISA show in Houston in 1984. This was the world’s first configurable PC-based HMI/scada software programme.

From the actual plant control point of view, very few people ever agreed with Rubin that desktop PCs were reliable enough to run a plant, in fact I have only ever come across two small plants where everything ran off a PC. However, the scada part took off like a rocket. Here at last was the easily programmable and configurable HMI interface the PLC makers needed to be able to introduce a full variety of analog control systems into their products. Fairly quickly the PLC manufacturers also started offering a full menu of both analog and digital controls in their machines.

So, from the analog control point of view, what are the differences between the two systems?

The thing to note is that the DCS manufacturers had a background of decades in making PID controllers and ensured that they could be configured and operate correctly. The PLC people on the other hand had very little if any experience and knowledge in this complex field and they put controllers into their PLCs that on the whole caused all sorts of problems. My own experience, over many years of working in all types of plants, is that 85% of the time when I go into a plant using PLCs for control, their controllers are set up incorrectly. Therefore, whenever I am called into a plant using PLCs for control, the first thing I do is to test the controllers to see if they are working correctly – before even looking at loops.

The cost to plants with control systems working incorrectly can be unbelievably high. My most classic example is of a pharmaceutical plant in the UK that was losing an estimated £14 000 000 per year all because they had not set up a PID controller correctly. I have come across three plants in South Africa running for many years on PLCs with the PID controllers not really working at all, so that actual operation was done in manual control. In most PLC plants the controls are causing many problems because they are not set up correctly. Many plant people do not really understand their control systems properly and often think their problems are caused by poor tuning. They don’t realise the controllers are not doing what they are supposed to do. People find these things hard to believe, but I have seen all these problems first-hand.

The lack of knowledge of the analog control side, and the fact that PLC/scada systems are unbelievably wide open so people can program pretty much anything they like, has caused many serious problems. PID control programming is in fact very complex and few people have the knowledge of how to set up the normally basic PID blocks provided in PLCs so they operate correctly.

I have also found that programming personnel find it much harder changing things around in a PLC than they do in plants with DCSs. However, on a positive note, things have started to improve in recent years. Several of the big PLC manufacturers have started incorporating DCS software into their products so the controllers work correctly.

From my point of view though, I am still far happier working in plants using pure DCSs rather than PLCs.
Miniature laser sensors

The new O300 miniature laser sensors with IO-Link by Baumer are ideal for the reliable detection of very small objects and gaps. Thanks to a laser beam which focuses to within 0,1 mm and the high repeat accuracy of 0,1 mm, objects can be positioned with high precision and follow-up processes controlled exactly. Thanks to the extremely short response time of less than 0,1 ms, the sensor reliably detects even closely spaced objects, thus allowing fast processes and high throughput rates. A big advantage is the exact alignment of the laser beam to the fixing holes by design, qTarget. Thanks to qTarget, detection with pinpoint accuracy can be guaranteed over the entire series. The wear-free teach-in method, qTeach allows easy, user-friendly commissioning of the laser sensor. The weak point of the pushbutton or potentiometer is ruled out with the tamper resistant qTeach teach-in method, thus offering maximum reliability and system availability.

The O300 laser product portfolio impresses with its great diversity, offering tailor-made solutions for precise detection tasks. Among the five sensor principles to choose from, SmartReflect, the original light barrier without a reflector, stands out. Even reflecting objects with a size of 0,5 mm can be reliably detected within a sensing distance of 250 mm. Stainless steel variants in a rugged washdown and hygienic design extend the typical applications of the O300 laser sensors for packaging plants in the food and pharmaceutical industries.

Thanks to IO-Link integration, the O300 laser sensors are ready for Industry 4.0. IO-Link allows the quick and easy configuration of sensors for all applications using standard network components. In addition, available additional data, e.g. for predictive maintenance processes, can be evaluated.

Slurry control valves for level control

In order to improve the froth level control at a flotation concentrator in Rustenburg, eDART was recently commissioned to replace the froth level control valves on the secondary cleaner.

Froth level control is extremely important on flotation machines as it directly relates to efficiency of the plant. If the froth level is too deep then the grade of the concentrate will increase and at the same time recovery drops off. When the froth level is too shallow the recovery will improve but a lot more concentrate will be produced at a lower grade. The aim is to produce concentrate at the optimum grade, which will result in the highest efficiency of the plant.

From a control point of view, the most efficient point of a control loop is when the level is on setpoint and there is no error. Where error is recorded there is an opportunity to improve the control. The Rustenburg customer is using an advanced controller to control the froth level at the flotation plant. As flotation froth levels are influenced by more than one variable, a simple PID controller cannot offer the good control results required which more modern controllers do.

A human operator will give the setpoint a step change and then leave it constant for a long period, and the signature of the more advanced controller is the gradual change to the setpoint point. As the advanced controller considers multiple variables in calculating the valve position, it can respond a lot quicker than a standard PID controller. If the output, or valve signal, represented by the blue line, is compared to the level signal (PV) represented by the red line, it can be seen that the ratio of the output signal to the process signal is approximately 2 to 1; this is the gain of the loop. With conventional PID controllers, the gain of the loop is seldom greater than 1. With the use of the advanced controller, the valve responds at least twice as fast to bring the level back to setpoint.

This is one of the major advantages of advanced controllers over standard PID controllers, in that they are 100%–200% faster than the best a simple PID controller can achieve. If the gain on any control loop is too high, it will lead to instability of the control loop, as the level will overshoot/undershoot the setpoint.

The final control element, or valve in this case, in any control loop is the limiting factor on how good the control can be. The valve has to be correctly sized. Looking at this trend it can be seen that the valve is approximately 45% open on average to maintain the control, which is evidence that the valve is correctly sized for the application. Any valve problems will result in a drop off in performance of the control loop. As the advanced controller is adjusting the setpoint continually, so the control valve is responding rapidly to keep this control loop in control.

eDART has developed their range of slurry control valves to meet the exacting demands of modern advanced controllers, the end result being vastly improved plant performance for their customers.

For more information contact
Afrivalve, +27(0)11 791 1411, sales@afrivalve.co.za, www.afrivalve.co.za

For more information contact
Temperature Controls, +27 (0)11 791 6000, sales@tempcon.co.za, www.tempcon.co.za
Use excess gain to choose an optical sensor

Understanding excess gain in optical sensors – and how much your application requires – is an important part of choosing the right sensor technology. This article explains what excess gain is, how it is measured, and general guidelines for how much excess gain is needed for sensing applications in various industrial environments.

What is excess gain?
Excess gain is a measure of the minimum light energy needed for reliable sensor operation. The light signal that your sensor emits is factory-calibrated to a certain level of performance. However, contaminants in the sensing environment, such as dirt, dust, smoke and moisture can cause signal attenuation. Excess gain may be seen as the extra sensing energy available to overcome this attenuation.

Excess gain can be expressed as the following formula: excess gain = light energy falling on receiver element/sensor's amplifier threshold (where threshold is defined as the level of sensing energy required by the sensor's amplifier to cause the sensor's output to switch 'on' or 'off').

Why excess gain is important for optical sensors
An excess gain curve, an important part of every photoelectric sensor specification, is plotted on an x/y axis. It shows the excess gain available for a particular sensor or sensing system, as a function of distance. Excess gain curves are plotted for conditions of perfectly clean air and maximum receiver gain.

Choose a sensor that will give you the optimal excess gain for your application
If the general conditions of a sensing area are known, the excess gain levels that follow may be used as guidelines for ensuring that the sensor's light energy will not be entirely lost to attenuation. These guidelines include a safety factor for subtle sensing variables such as gradual sensor misalignment and small changes in the sensing environment.

Clean air – 1.5x excess gain (EG)
For a perfectly clean operating environment, an excess gain of 1.5x (50% more energy than the minimum needed for operation) is suggested. Some environments that have ‘clean air’ are those found in the semiconductor or pharmaceutical industries. In these environments, no dirt builds up on the sensor lenses or retroreflectors.

Slightly dirty – 5x EG
An office or a clean factory might be characterised as a ‘slightly dirty’ environment. This means sensor lenses or retroreflectors may experience a slight build-up of dust, dirt, oil or moisture. Lenses are cleaned on a regular schedule. In a slightly dirty environment, the excess gain should be five times more than minimally required for sensor operation.

Moderately dirty – 10x EG
In a ‘moderately dirty’ environment, obvious contamination can be seen on lenses or retroreflectors. These environments are also likely to have periodic washdowns. Moderately dirty environments can be found in heavy industry, food processing, or the automotive industry. For such environments, Banner recommends an excess gain 10 times more than minimally required.

Very dirty – 50x EG
Some environments like those found in foundries, mining operations, tile ovens and outdoors are considered ‘very dirty’. This is because lenses and retroreflectors become heavily contaminated and are subject to minimal cleaning. There may be heavy fog, mist, dust, smoke or oil film in the environment. Banner recommends 50 times more excess gain in these types of environments. However, it is important to note that at excess gains above 50, sensors will begin to see through paper or other materials with a similar optical density.

For more information contact Brandon Topham, RET Automation Controls, +27 (0)11 453 2468, brandon.topham@retautomation.com, www.retautomation.com
New concepts for operator workstations in hazardous areas

For production control and process control systems, visualisation software is an integral component of the system control, which is typically located outside of the production area. In these situations, there is a need for operator workstations where the production steps and plant images can be displayed and operated remotely.

Introduced by Pepperl+Fuchs 10 years ago, network-based VisuNet Remote Monitors are state-of-the-art today. The latest generation of VisuNet operator workstations is the GXP series for ATEX and IECEx Zone 1/21, Zone 2/22 as well as for NEC Class I/II Div2 and Class I/II Zone 2. One of the many innovations and new features is the option to set up a standard fibre optic network connection, even in Zone 1/21, without the need for an Ex-approved counterpart station on the controller side. Thus the network infrastructure is simplified and costs are reduced.

The VisuNet GXP systems are available with a 49 cm display or 56 cm 16:9 Full HD display, meeting most of the requirements of today’s demanding process industry visualisation. The VisuNet GXP is available as a remote monitor and as a PC monitor.

A further innovation of the VisuNet GXP series is its modular design. The display module, processing unit (PC module or thin-client module) and the power supply (AC or DC power module) are individually Ex-approved and connected to each other via plugs and cables. As a result, in the rare event of a defect, the defective module can be identified and easily replaced. The Ex-approved devices can be repaired at the customer location by trained personnel simply swapping a module outside the hazardous area. This significantly reduces the repair time and therefore the downtime of the VisuNet GXP monitors on the production plant.

The mouse pointer can be moved with an optional PCAP technology touchscreen, which has significant advantages over the previous resistive touchscreen films made of plastic. The sensors behind the glass allow a display surface made of durable, chemically resistant glass. The latest generation of these PCAP touchscreens also allows the use of many glove types common in the process industry.

The touchscreen interface is resistant to interference from objects or dripping liquids. Multi-finger operation is supported by the existing version of the visualisation software. As with the other VisuNet monitor series IND, GMP and XTA, a variety of housing and mounting components are available for the VisuNet GXP, and even customer-specific solutions via one of the Pepperl+Fuchs Solution Engineering Centers. This enables them to meet the wide variety of demands from an on-site location. The robust keyboard can be configured with three integrated variants for cursor control: with an easy to clean touchpad mouse, a simple, intuitive trackball mouse or a robust joystick, depending on the operational conditions.

Zone 1/21-approved PScan barcode readers can be connected as peripherals via a cable or wirelessly. These are functionally integrated into the monitor, so that the barcode data can be read and transferred directly to the controller application, using the network protocol.

Since the number of ground stations in the process industry is constantly increasing, it has become necessary to manage these remote monitors and PC monitors centrally from a standard PC. The requirements are configuring and managing the monitors, as well as offering the operator in the plant support without needing to go into the plant in person.

For this purpose, Pepperl+Fuchs has developed the VisuNetCC Control Center management software. VisuNetCC simplifies the commissioning of all monitors. Once a configuration has taken place locally on the service PC using VisuNetCC and its comprehensive additional functions, this can be saved and transferred to other monitors. During operation, the status of all VisuNet monitors on the network can be seen and clearly represented. If necessary, updates can be installed centrally. Through a screen-mirroring function for monitors at the plant, help can be provided to the site from afar, should the operator have any questions regarding the on-screen process image. This is conducted using a service PC with the VisuNetCC software. The operator is also able to take control of the on-site remote monitor if required. User administration allows such functions to be enabled or disabled.

The new GXP series monitors, together with the VisuNetCC management software, open a new chapter for operator workstations in international explosion-hazardous zones: easy installation and commissioning, comprehensive functionality of the parameterisable firmware (RM shell 5), new connection and operating concepts, as well as simple service, support and repair. Together with the modular system of mounting and accessory components, suitable operator workstations can be configured for various applications in the process industry.

For more information contact Pepperl+Fuchs,
+27 (0)87 985 0797, info@za.pepperl-fuchs.com,
www.pepperl-fuchs.co.za
Data to the desk without the need for expensive cabling

Permasense® provides complete non-intrusive sensor-based solutions for continuous corrosion or erosion monitoring. We develop, manufacture and deliver permanently installed monitoring systems that can operate in extreme temperatures and environments, and the remotest of locations.

Ageing plant, greater fluid corrosiveness, tightening health and safety requirements, and the environmental costs of a leakage are all challenges with which we are familiar. Direct, accurate and sufficiently frequent measurement of pipework thickness to accurately identify trends is rarely feasible with manual inspection methods.

Coupled with this are the challenges involved with manual inspection, such as accessibility and avoidance of safety risks to personnel. Continuous corrosion monitoring provides asset and integrity managers with an up-to-date picture of how infrastructure is coping with the demands placed upon it.

The reliable, accurate wall thickness data delivered by Permasense systems informs decision making about the timing of maintenance and replacement. It also informs optimisation of corrosion prevention and mitigation strategies, and furthers understanding of the impact of feedstock decisions.

We have developed sophisticated data management and viewing software as an integral part of the Permasense solution to support data interpretation, this software offers both an overview of all locations monitored at a facility, and drill-down functionality.
In the last several decades, disruptive technologies have fundamentally changed many industries. The term ‘disruptive technology’, coined in 1997 by Harvard Business School professor, Clayton Christensen, describes the phenomenon by which a new technology displaces an established one, often in an unexpected way. It is more than an improvement to an existing technology, and it means more than being innovative, since a product can innovate without being disruptive.

Clearly, the industrial software market is ripe for disruption. In one potential example, in January 2010, a startup software company in northern California launched ‘Ignition by Inductive Automation’, an industrial software platform with a variety of modules that can be combined to create custom HMI, scada and MES solutions. The company objective was not just to improve existing technologies, but to introduce disruptive technologies and business models with the potential to fundamentally change the industrial software market.

Product differentiation in a mature industry may be attributable to more than just features, pricing, or other quantifiable factors. Inductive Automation is positioning Ignition’s differentiator to be the disruptive nature of its technology, licensing and business model.

What makes a technology disruptive?
The distinguishing hallmarks of a disruptive technology are its ability to redefine its category, change how business is done, and create new markets. A disruptive technology can be so unexpected that, initially, it may not seem to fill an identified market need or niche because there is not yet a market for it. The value of a disruptive technology product might be hard to recognise at first because it seems quite different from what most people have become accustomed to.

The unexpected nature of disruptive technologies tends to blindsight incumbent companies, which usually focus on operating in established markets and making incremental improvements to existing products. This is why incumbents can fail to recognise the benefits and opportunities that disruptive technologies can bring, and why slow adopters can be caught off guard when a competitor finds a way to leverage a new technology.

A historical example of a disruptive technology in the consumer sector is that of cellphones, which not only caused many people to stop using landlines, but have evolved into smartphones, which converge phoning and computing. New technologies are also causing disruption in the manufacturing sector. Big Data and analytics are challenging companies to not only handle exponentially larger amounts of data, but also to convert it into actionable information. The Cloud is changing IT as we know it, shifting a large amount of data storage and computing tasks off local physical servers to web-based cloud services. The Internet of Things will connect a wide network of intelligent devices that will increase automation in factories and offices. Mobile and social technologies are bringing web-based connectivity to the workplace and every other facet of life.

These technologies all share certain commonalities. Each is driven by data, increases access to information, and enables real-time connection between human and non-human assets. They facilitate greater collaboration across departments, companies and industries. Cumulatively, these disruptive technologies are shaping what the manufacturer of the future will look like: a highly connected and automated environment in which more data is available to more people at more points throughout the enterprise.

Disruptive technology for HMI/scada and MES
The global HMI/scada market continues to evolve to meet the needs of both discrete and process users and OEMs. Rather than being just a standalone component, the platforms are evolving into integrated solutions that help solve user and OEM problems to improve business performance. Despite these evolutionary changes, ARC believes that this market is ripe for disruption, particularly as it relates to ease of use and total cost of ownership.

Although technological advancement will continue to be an important
fundamentally different in a number of ways. Inductive Automation designed Ignition to be HMI/scada software systems. That is why that is not the case for many traditional become increasingly web and cloud-based, While enterprise-level technologies have Ignition software, disruptive by design the convergence of HMI/scada and MES platforms. Increasingly, these converged platforms help users visualise both key automation and business metrics and KPIs, such as OEE and energy savings, to help maximise the productivity and profitability of their businesses. Users and OEMs alike are all too aware of global competition and escalating energy costs, as well as the need for automation solutions that can help companies achieve more flexible production while reducing environmental impacts. These platforms will become a primary building block for industrial automation systems in many manufacturing plants. Increasingly, however, users and OEMs want the converged platform to serve not only as an operator interface window into the application, but as an enterprise integration tool. As the trend toward open systems in the automation and enterprise markets continues to unfold, the converged platform needs to emerge as a single device to support a wide range of applications. This opens the door for new technologies, such as Ignition, that can change the way that data and information is made visible and actionable across the plant floor and throughout the enterprise.

Ignition software, disruptive by design While enterprise-level technologies have become increasingly web and cloud-based, that is not the case for many traditional HMI/scada software systems. That is why Inductive Automation designed Ignition to be fundamentally different in a number of ways. While this is changing to a certain degree, there has often been a technological gap between traditional HMI/scada software systems and IT systems. Once the software is installed, the user can face issues, such as flat file storage with time-series data only, individually installed clients, a lack of database applications, limited and proprietary connectivity, simple trending information, decentralised maintenance, and limited security options. Ignition software uses a different approach. It is web-based, which can make it quicker and easier to install and use with faster downloading and without requiring users to install a driver. It can be set up on a cloud network or on a local network and launched to any computer or device with a web browser. It connects to structured query language (SQL) databases, runs on web servers, and enables users to develop their own database applications. According to Inductive Automation, by converging IT and control technologies, Ignition helps close the gap between the plant floor and the enterprise, allowing data to flow throughout the business. This helps improve efficiency, security, productivity and reliability.

HMI/scada software typically communicates with a specific type of database. In contrast, the developers of Ignition designed a database-agnostic solution. This allows unlimited connections that can interoperate with any type of database and support any database server. This is a desired connection point between different software applications. Ignition can leverage SQL databases, the most commonly used type of database. This allows users and OEMs to put PLC/ PAC data into a relational database, integrate HMI/scada with existing MES and ERP systems, and log historical data in a SQL database. The Ignition SQL Bridge Module enables users to bridge the gap between OPC data and SQL databases. The modular nature of the Ignition platform allows for a high degree of customisation. Users can connect different Ignition modules on the unified foundation to increase its range of functionality with each module they add. The platform handles non-specialised functions such as deployment, development, security, licensing and connectivity. Modules can be added or upgraded on-the-fly, causing only minimal downtime. Adding modules to Ignition is similar to downloading a new app onto a smartphone or tablet. And much like an app store, Ignition has a module store, the Module Marketplace, for which third-party developers can create software applications and Ignition users can try and then buy any module. In this manner, Ignition provides the flexibility to develop solutions that transcend the neatly defined categories of HMI, scada and MES.

A new model in software licensing Another traditional HMI/scada software approach is to charge users by the client, point, report, etc. The revenue models for most such systems are designed based on the number of tags or clients used. Runtime clients and offline designers are sold separately, installed separately, and sold by the seat. This type of licensing model can make it expensive for many users and OEMs. In response, Ignition developed a potentially disruptive, IT-like licensing model. The software is licensed by the server and provides unlimited free runtime clients, tags and development clients. This allows users to add on to their system without spending more on software. Users no longer need to worry about how many people are using the system simultaneously, or need to justify buying a more expensive seat license every time they want to add a user.

“Inductive Automation designed Ignition to be fundamentally different in a number of ways.”

Ignition can also be connected to a range of devices and works with MES or enterprise resource planning (ERP) systems, allowing data to flow through an organisation. By allowing users to add unlimited tags, clients and connections to their HMI/scada systems and to scale it without the constraints of licensing costs, Ignition allows its customers to increase the usage of their systems without a subsequent increase in costs.

Conclusion From the beginning, Inductive Automation’s mission was to employ disruptive technologies to reinvent HMI/scada software, not simply to make incremental improvements to existing models. In many respects, Ignition’s web-based, database-centric, modular, Java-built, cross-platform solution goes beyond what is traditionally thought of as HMI/scada.

Through its licensing, Ignition has also reinvented the industry’s business model. Rather than selling pre-packaged software to users and charging them for additional tags, clients, seats, screens, etc, the company sells an open-ended platform that encourages customisation and innovation. Instead of charging integrators for support, the company offers free support to integrators and caters to many of their needs, making them an extension of its own sales force.

Ignition provides discrete and process users and OEMs with opportunities to innovate and become disruptive forces in their own right.

For more information contact Paul Sikhakhane, Mzukulu Technologies, +27 (0)31 303 1708, paul.sikhakhane@mzukulu.co.za, www.mzukulu.co.za Craig Resnick, ARC Advisory Group, cresnick@arcweb.com, www.arcweb.com,
Yokogawa has added a network function to the UM33A digital indicator with alarms, a product in the UTAdvanced controller series. With this function, a single UM33A digital indicator can receive, process and sequentially display data from up to eight sensors. The enhanced UM33A is an easy to install and cost effective solution that enables the monitoring of data from multiple field sensors. By improving the functions of its UTAdvanced product line, Yokogawa aims to satisfy the latest customer needs and expand its controller business.

In recent years, there has been a growing need to strengthen the monitoring of data from field sensors. For safety and other reasons, operators need the ability to remotely monitor data from sensors that are installed high up, in confined spaces, and other locations where it is difficult to visually check the readings on the sensor displays. The UM33A digital indicator that Yokogawa has been offering until now accepts analog data from sensors that measure parameters such as temperature, pressure, and flow rate, converts this data into digital signals, and displays the readings. It can also issue an alarm if an input signal falls outside a preset range. However, it is only able to accept data from a single sensor. To check data from multiple sensors, it is necessary to install and configure other equipment such as a touch panel with an embedded controller or some other type of user interface used in combination with a programmable controller (PLC). This equipment is both expensive and requires a lot of engineering.

Yokogawa has strengthened the functions of the UM33A to satisfy the needs of customers who want to check measurement data from multiple sensors in the field. The enhanced UM33A can be installed easily and at a lower cost.

**Features**

Easy to introduce improved monitoring of data: the enhanced UM33A supports the master function and the data monitoring function of the Modbus/RTU communication protocol, and is able to connect with up to eight sensors and sequentially display data from those devices. The UM33A is thus able to monitor data from multiple field sensors without requiring the installation and engineering of a separate device with user interface and controller functionality. It can also function alongside already installed systems that employ such specially configured hardware. With its ability to remotely connect with multiple sensors throughout a site, the enhanced UM33A makes it easier for plant personnel to check measurement data from these devices.

Thanks to its functional enhancements, the enhanced UM33A can handle both digital and analog communications with sensors, and is thus well positioned to facilitate the introduction of field digital solutions at plants.

**Applications and benefits**

The UTAdvanced series controllers are mounted on furnaces and other types of heat related industrial facilities for the measurement, display and control of operating variables such as temperature, pressure, and flow rate. The controller comes standard with a sequence control function based on the ladder logic programming language widely used by engineers. Improved design efficiency and elimination of the need for relays and other peripherals has resulted in a lower price. The line-up includes:

- Program controllers that control based on patterns that are preset along the time axis (program-pattern control): UP55A, UP35A, UP32A.

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

Air velocity and flow measurement in system ducts

Kimo manufactures a new system to measure air velocity and airflow in ducts. The Debimo measuring blades can easily be installed inside any circular or rectangular duct and the streamlined design avoids any air loss and turbulence inside the duct. This system is based on a differential probe – also called an averaging Pitot tube – and can measure dynamic pressure at different locations.

This pressure is measured with the new generation of Kimo CP300 transmitters. These models have the accuracy required to measure differential pressure, to calculate air velocity from 2 to 100 m/s and to control airflow in ducts.

When the duct sizes have been configured the system enables the user to:

- Compensate air velocity and airflow according to air temperature.
- Enable different setpoints on 2 relays.
- The data can be sent through two 4-20 mA or 0-10 V analog outputs, or through the RS-485 Modbus digital output.

For more information contact Anastas Schippenkotter, ASSTech Process Electronics & Instrumentation, +27 (0)11 708 9200, info@asstech.co.za, www.asstech.co.za
The Arca angle style control valves series 350 and 380 are proven under critical process conditions. If used in steam or other process gas applications at high pressure and temperature, in cavitation-free relaxation of liquids at high pressure differential or in handling of fluids with high solid content, the modular system of valve housings, bonnet and trim styles, in combination with a large range of materials, always offer an ideal solution.

The combination of high pressure ratio and solid-containing fluids is one of the most critical challenges for sizing, selection and design of a control valve. Due to the high pressure ratio, multi-stage valves are indispensable to avoid severe cavitation damages. However, as soon as the fluid contains solid particles, besides the normal fluid-dynamic sizing (determination of the number of throttling stages and their individual flow coefficient), the grain size of the particles has to be taken into account. The cross-section area of each flow channel in the valve must be the size and shape to allow all particles in the fluid (assumed to be of spherical shape) to pass.

**Flow channel optimisation**

Since the cross sectional area of each throttling stage is explicitly defined by the flow coefficient calculated from the fluid-dynamic valve sizing, only the shape of the flow channel remains to be optimised.

It is obvious that a circular shape is the optimum with regard to the permeability of spherical particles. The newly developed multistage trim MS4, which has only one flow channel at each stage, milled as a spherical calotte into a rigid, multiple guided control rod, approximates this ideal shape and is superior to any multistage parabolic plug in this regard.

Another special feature of this trim style is the protection of the seating surface (which is the most sensitive area in terms of erosion) against over-stroke of the valve. This ensures that the control stage of the valve only opens under conditions of low pressure differential and with a small flow velocity at the seating surface.

The rigid multiple guidance of the control rod is an effective prevention of the valve against mechanical vibrations and the resulting wear, even at extremely high pressure differentials.

Series 350 and 380 are available in sizes up to DN 250 and ratings up to Class 2500 (PN 400). Depending on the process conditions, MS4 trims can be delivered in valve sizes up to DN 100.

For more information contact Desmond Delport, Valve & Automation, +27 (0)11 397 2833, desmond.delport@valve.co.za, www.valve.co.za
Monitoring of stacked workpieces

Simple, flexible and cost-effective machine safety implementation.

IMA Klessmann GmbH of Lübbecke, Germany is an international manufacturer of trend-setting manufacturing machines for the woodworking and craft furniture industries. In 2017 the company modernised a complex, multi-track transport system for wooden workpieces for one of France’s largest kitchen cabinetry manufacturers, Fournier of Thônes. In the process, a reliable monitoring system that prevents unauthorised entry was implemented in an extremely simple, flexible and cost-effective way using analog sensors and TwinSAFE SC safety technology (TwinSAFE Single Channel) from Beckhoff.

In the plant area concerned, board-shaped workpieces for kitchen furniture are removed from a sorting warehouse and stacked on pallets in two picking stations according to job lists. The finished stacks are subsequently transported out of the order-picking areas via appropriate conveying equipment to the downstream machines. Following destacking, these machines then receive the necessary parts in precisely the right order to assemble a kitchen cabinet as efficiently as possible. The two picking stations, which are among the safety risk areas due to their operating principle, each have six gates to discharge the workpiece stacks.

According to Michael Gube, the software developer at IMA who was responsible for the startup of this project, the requirement for this kind of application is that it must never be possible for a human to enter the risk area. There is a high safety risk involved on account of the high dynamics of the transport portals located in this area and the large masses that are moved. The conventional method to control access to such plant areas is to use safety light barriers and muting functions. However, such measures alone were deemed insufficient in this case. For structural reasons the safety light barriers could only be installed immediately before the risk area. Unauthorised entry would be reliably detected by the light barriers, but there would not be sufficient time to stop hazardous movements quickly enough, even if the maximum possible braking ramps were activated. Other measures, for example the use of safe service brakes, would place an extreme load on the mechanical system and in the long term once again represent a safety risk while endangering the process safety.

**Two-stage safety concept provides solution**

One of the requirements, therefore, was to guarantee personal and process safety through a second safety device. If anyone attempts to gain unauthorised access to the picking area, they must pass through two devices. As soon as they pass the first, the portal switches to the Safely Limited Speed (SLS) mode. As the person approaches the second device, the machine is stopped from the safe speed.

The first safety device consists of three standard transit time sensors. There is always a safety risk when there is either no material stacked in the area of these sensors or when the material stack is not moving in this area. The entry risk during this phase is reliably avoided by the following way: As soon as a board stack moves underneath the transit time sensor area and is subsequently stopped, the transit time sensors measure the current stack height once (latch). If the stack moves completely out of the area, the stack height is given the value 0. The values of the three sensors determined at a standstill are transmitted to the safety controller and continuously compared to the actual values of the transit time sensors. Now if someone attempts to gain entry when no stack is present or by climbing over a stationary stack, at least one of the three actual values deviates from the latched position. This immediately causes the portals to switch to Safely Limited Speed (SLS) mode.

Once a person has overcome the first safety device, he or she must additionally overcome the second set of devices, safety light barriers placed immediately in front of the picking area. If they detect entry, then the axes which are already moving at a safely limited speed are finally brought to a standstill.

**Analog value processing saves considerable costs**

For Gube, the prerequisite for an efficient safety solution was the analog signal processing capability of the EL6910 TwinSAFE Logic terminal: “Previously there was a safety deficit on this machine, even though the roller conveyors were manufactured to be inaccessible. However, access was still possible in individual cases, for example if only a base plate normally used underneath a stack was transported. The safety light barriers used for protection were too close to the moving portal, which meant it couldn’t be stopped fast enough in case of imminent danger. The initial solutions considered, such as safety doors or the use of radar scanners, would only have been possible with considerable mechanical rework and cost expense. The alternative with TwinSAFE SC and transit time sensors proved considerably simpler and more flexible for us, while being much more cost-effective.”
Safety function blocks for analog sensor signals

According to Gube, the safety functions based on the analog signals from the transit time sensors can be implemented very conveniently in TwinCAT 3 software with the appropriate safety function blocks, which are above all extremely scalable. The complexity of the system is also not a problem. It consists of two machines with identical hardware and software, each of which makes use of a Beckhoff CX9020 Embedded PC, an EL6910 TwinSAFE Logic terminal and six EL3124-0090 TwinSAFE SC analog input terminals (one for each roller conveyor). Bettina Keller, application/support from Beckhoff, adds: “In addition, each machine uses four EL1904 TwinSAFE digital input terminals for the safety acknowledgement and dual-channel muting inputs and one EL2904 TwinSAFE digital output terminal to control the safety contactors. All necessary functions such as the maximum permitted duration of a muting procedure can be configured conveniently with TwinSAFE function blocks in TwinCAT.” This is also confirmed by Gube, “The most diverse safety functions can be realised simply and quickly with the safety function blocks. A particular advantage of this is that it applies universally, even to the more complex analog input signals.”

Keller explains the building blocks for such a streamlined safety implementation: “The core is the EL6910 TwinSAFE Logic terminal with its extended safety functionality. In addition to the safety function blocks from the EL6900, it offers certified safety function blocks to process analog signals, among other things. These also include more complex functions such as counters, limit value and comparison. In addition, the EL6910 supports the TwinSAFE SC technology, and only this technology makes it possible to securely transmit data from standard EtherCAT/Os via their TwinSAFE SC extension to the EL6910. As a result, analog signals can now be analysed, checked for plausibility and evaluated within the logic, although for safety reasons at least one of the data sources must be a TwinSAFE SC component.”

Demand-based solution is scalable, yet integrated

The fine scalability of PC-based control technology from Beckhoff resulted in one of the biggest advantages in the installation of the new safety solution, as Gube explains: “The entire production facility is controlled by TwinCAT 2 software. However, the TwinCAT 3 software generation is required to connect the analog sensors directly via the EL6910 TwinSAFE Logic terminal. The modular Beckhoff control technology is scalable to suit the application demands and it allowed this by simply and cost-effectively realising new safety functions via a subsystem that consists of the CX9020 Embedded PC with TwinCAT 3 as well as the TwinSAFE and TwinSAFE SC terminals.”

This solution has proven to be extremely flexible in a further regard for Gube. He says: “According to the applicable safety regulations, the hazardous area must be monitored over its entire width in 250 mm intervals. Therefore, we use three transit time sensors on each of the 700 mm-wide roller conveyors. If it should prove necessary in the future to use wider roller conveyors due to larger workpieces, we only need to increase the number of sensors accordingly. The adaptation of the safety functionality can then be configured with little effort via TwinCAT software, especially since safety engineering under TwinCAT 3 is very convenient and efficient.”

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

Extech to distribute i.safe Mobile in sub-Saharan Africa

Extech Safety Systems has partnered with GoRugged to distribute i.safe Mobile products in sub-Saharan Africa. The ISS20.1 is an industrial smartphone with current technology for use in Zone 1/21. It combines modern design and the latest mobile technology with the robustness of an industrial product. The IS910.1 is a tablet device with an 8” screen for use in zones 1/21. Key features for both ranges include: Android 7.1, 4G (LTS), Bluetooth 4.1 LE, near field communication, capacitive touchscreen, 2 cameras (8 MP rear camera with autofocus and 2 MP front camera, MicroSD-card slot up to 52 GB and quick charge functionality. As options, lone worker protection and push to talk functionality can be provided.

For almost 30 years, South Africa-based Extech has been providing instrumentation, especially intrinsic safety, for hazardous area operations in southern Africa. “Extech Safety Systems is now proud to announce that it is an authorised reseller for i.safe Mobile in sub-Saharan Africa,” said company sales director, Gary Friend. “The i.safe Mobile products complement our existing hazardous area instrumentation and industrial networking ranges, offering a comprehensive solution for industrial applications.”

As sole agents for MTL, Beka Associates, Extronics, MercuryHMI and authorised reseller for AEGEx, CorDEX, i.safe Mobile and XPlore Technologies in southern Africa, Extech Safety Systems can assist with the following applications: IS Zener barriers and galvanic isolators, HART and other fieldbus interfaces, industrial security, wireless networks, visualisation, IS and flameproof cameras, smartphones and tablets, hazardous area Exd access points for zone 1, hazardous area CCTV cameras for Group I and II, hazardous area barcode scanners, RFID tracking, surge protection, process alarm equipment, and hazardous area access control systems.

For more information contact Gary Friend, Extech Safety Systems, +27 (0)11 791 6000, sales@extech.co.za, www.extech.co.za
Next year will be the twentieth year since Alien Systems & Technologies (AST) was incorporated in South Africa. During that time the company has developed an array of products that have successfully saved its customers from the ravages of fire, whilst expanding its business into Europe, Australia, Far East, Africa and the Americas.

A case in point has been two recent incidents at large corporates where fire broke out. In April, a large multinational insurance company in Sandton’s CBD experienced a fire in its server room. A UPS flashed and quickly escalated into a full fire. The smoke detection system operated and then AST’s Pyroshield gaseous fire extinguishing system kicked in. The fire was quickly extinguished and the event was reduced to a minor incident.

Without Pyroshield protection for the server room, the IT backbone of the business could have been wiped out.

A few weeks later, another fire broke out in a computer room in Isando at an international logistics and shipping company. Once again AST’s Pyroshield system was activated and extinguished the fire, reducing the consequences of the outbreak to minimal.

These are just two recent incidents where AST’s award winning Pyroshield system has saved customers many millions of rands in recapitalising infrastructure and minimising operational losses.

AST’s Pyrogen Aerosol fire extinguishing system has operated countless times on mines over the last 17 years. Most recently, a substation would have burnt down at a Portland Cement facility. The cost in production losses would have amounted to many millions.

Such is the efficacy of the Pyrogen solution in extinguishing fires that there is virtually no mine in South Africa that does not have Pyrogen installed somewhere to protect its electrical reticulation systems.

AST also designs and supplies the Cirrus Hybrid aspirating fire and smoke detector. Such devices are installed where normal point type smoke detectors are impractical, such as in high bay warehouses or in areas where high airflows from cooling systems are present. This device actively samples the air for the earliest signs of an impending fire threat and is able to discount false alarms that plague optical only detectors, for example from dust.

During the construction of a large blue chip data centre in Johannesburg, a fire broke out during the night when a heater bank was left on after load testing the air cooling system. The Cirrus Hybrid detection system, although not properly commissioned, still detected the fire and sounded the fire alarms. A security guard was able to extinguish the fire. This system ultimately saved the project and ensured that the client could deliver the data centre for cloud hosting purposes on time.

There was a fire on a very large, several hundred million rand printing press in Jet Park. The client’s insurance company recommended AST for an effective solution since the existing system did not work adequately. The fire was extinguished, but only after severe damage. AST responded with an automatic fire detection and CO₂ extinguishing solution in an extremely volatile environment with ink bath stations that have flammable solvents with low flash points. There were two further fires on the machine since the AST system was installed three years ago and each time the system was activated and extinguished the fire without any significant damage to the machine. Downtime was limited to a day or two in each case. This is in comparison to the six months loss in production after the first fire due to the poorly designed and ineffective competitor solution.

The client is required to deliver on multimillion rand contracts by using this particular press and cannot afford not to have this machine running.

With a vast range of products and solutions, ECSA registered engineers on its design team, and a history built on success, AST is able to deliver virtually a wide range of turnkey and integrated systems for all kinds of client needs. Applications include conveyor belt systems, data centres, building fire detection and alarm systems, mining machines such as stacker/reclaimers, printing press machines, hydraulic lubricating oil packs, intrinsically safe systems, sensitive document stores, prestigious buildings, museums and warehouses.

Built on knowledge, research, development and engineering principles, AST is looking forward to celebrating its forthcoming twentieth year with its ongoing commitment to deliver high quality products and integrated turnkey systems and to save its clients from the destructive effects and life-threatening power of fire.
Variable speed drives in Europe’s largest underground carpark

Parker Hannifin has recently completed a project to replace all the motors supporting the operation of ventilation systems in Europe’s largest underground carpark, situated under La Défense, Paris, with units from its AC10 compact variable speed drive family.

The renewal of the entire ventilation system in the underground carpark, serving the largest European business district, was not limited to the simple replacement of filters and some mechanical components. This operation involved a vast project requiring advanced technical expertise, particularly in terms of defining and selecting drive solutions and supporting their integration, installation and commissioning.

The objective of the drive systems for the variation of ventilation speed was two-fold. Firstly, it was a question of ensuring the effective evacuation of exhaust gases. Secondly, much faster removal of smoke was required in the event of a fire. The previously installed system had become obsolete because it was only equipped with two-speed motors without drives.

Parker worked with EDF and Inov Industrie on the project. The company was selected for its technical abilities with respect to drive systems, but perhaps more importantly, for its know-how in the control of energy consumption/optimisation of energy efficiency. The project presented multiple challenges that had to be overcome. First of all, the project concerned the most extensive carpark in Europe, incorporating 22 000 spaces, spread over 16 different sites. Then, due to the underground location of the carparks, below the towers of La Défense at a complex, major road junction, there were numerous access constraints. To this was added the problem of dimensions: the systems selected had to fit into existing cabinets and be adapted to the protocol already in place.

All of the disassembled components being replaced had to be removed and recycled. Finally, and perhaps most importantly, the fire safety system needed to allow the forced operation of the drives at maximum speed in order to evacuate fumes reliably in the shortest possible time. For safety, the new systems also needed to be equipped with an automatic restart and be directly connected to the emergency fire services.

The nature of the project meant that work had to be completed quickly and efficiently under intense time-pressure. The scale of the project meant that a total of 60 drives with power ratings from 5.5 to 180 kW had to be commissioned in a very short space of time. Inov Industrie, with its 20-year working relationship with Parker Hannifin, turned to the motion and control specialist, opting to specify units from the company’s AC10 compact drive range.

Given the scale and importance of the project, Parker expanded its range to 180 kW to meet Inov Industrie’s requirements. "This demonstrated Parker’s flexibility as a dedicated technical partner," said Inov Industrie’s Thierry Foulon.

The suitability of the AC10 range for this significant and challenging project was enhanced due to some new features, such as fire mode input/output and its wide range of power ratings – all in a compact package. The AC10 range is characterised by its simplicity of installation, setup and commissioning, thanks in particular to a fast parameterisation. With its enhanced functionality, the AC10 drive is able to control asynchronous motors incorporating both simple and complex types of application such as pressure and flow control. The ‘small sequential’ function (sequencing on and off) avoids the need for an additional PLC. It is also possible to obtain information relating to system power consumption and other parameters such as the occurrence of dirty filters.

For more information contact Lisa de Beer, Parker Hannifin SA, +27 (0)11 961 0700, lisa.debeer@parker.com, www.parker.com/za
SAFETY SYSTEMS

IR windows improve safety and reduce cost

Thermal imaging is a well-established and proven method of preventative maintenance for electrical equipment. But the process does not come without risk. Removing panels to gain access to switchgear for thermal inspection is a very risky business. The danger of arc flash – a short circuit through the air that creates a fireball explosion – is huge. Simply dropping a hand-tool or a cover-panel can make accidental contact with energised parts. Changing the state of equipment is another common trigger. The results can be fatal.

The use of an IR window effectively allows the switchgear to remain in an enclosed and guarded condition, so that the IR scan becomes a non-invasive task. Infrared passes through the window’s transmissive polymer lens without compromising the IP65/NEMA 4X seal on the enclosure panel.

This not only keeps personnel safe, but it also allows the system to be thermally inspected under normal load conditions. As a result, both quantitative and qualitative data can be acquired on the status of the electrical system. Furthermore, applications previously considered to be too hazardous for thermal imaging can be brought into the regular inspection schedule.

Stansted Airport has to be open for business 24/7. Stansted’s engineers previously had four hours a night in which to conduct predictive maintenance on electrical equipment. The entire inspection cycle was protracted and no system could be checked under load. Also the airport is classified as a strategic airport, thus having to take redirected traffic at any time of the day or night. Any deviation from this ability is detrimental to air traffic safety around London and comes with large fines. Engineers had to find a way to reduce inspection turnaround time without compromising safety.

Chelmsford-based IRISS, clinched a deal with the airport to construct and install 72 custom-made infrared windows which allow the engineers to complete more efficient safe inspections of the fuses that feed terminal systems, such as computers and baggage belts.

Stansted Airport’s engineering compliance manager, David Potter, who spearheaded the project, said: “Previously, the entire inspection cycle was a very long process and took engineers two nights to shut down the system and inspect just one electrical panel by hand. With the installation of IRISS infrared inspection windows and the help of a thermal imaging camera, we can carry out checks of all the panels in just five hours, making huge savings in survey times and equipment costs. The windows are really well constructed and the overall service from IRISS was second to none. Nothing was too much trouble and their engineers were extremely professional.”

By facilitating closed-panel inspections, the use of IRISS infrared windows eliminates 99.9% of arc flash triggers during IR electrical surveys and helps companies to comply with NFPA and OSHA mandates. IRISS infrared windows are unique in the market, being made of polymer instead of crystal. They are shatterproof and can be manufactured in any shape or size.

For more information contact R&C Instrumentation, 086 111 4217, info@randci.co.za, www.randci.co.za

New Mining iWap107 released

Extech has announced the approval and supply of the first mining approved iWap107s to Sedna Industrial IT Solutions.

The iWap107 contains a Cisco access point and Ethernet switch, allowing for copper RJ45 Ethernet connection and DSL. Options for fibre optic are also available. Using the iSolate501 Galvanic Exi isolator for antenna connections, the antennas can be classified as simple apparatus, allowing for some flexibility.

The iWap107 provides WiFi in the 180 metre outbye area of an underground coal mine, which opens up opportunities for:
• Tagging and tracking of personnel and equipment
• Communications with approved cell phones and tablets
• Video collaboration
• Access to documentation on tablets

This allows for improved production, efficiency and importantly offers a significant improvement to safety.

For more information, contact Gary Friend, Extech Safety Systems, +27 (0)11 791 6000, sales@extech.co.za, www.extech.co.za
AUTOMATED FLEXIBILITY FOR MOBILE VEHICLES AND CARTS.
THIS IS SICK
Sensor Intelligence.

Industry 4.0 is picking up speed. Our modular solutions portfolio for mobile platforms now makes it possible to implement line guidance, navigation, positioning, environmental recognition, security and load handling with ease. And allows them to adapt to your requirements with flexibility. Putting your processes on the right track. We think that’s intelligent. www.sick.com/mobile-platforms
New drive range for energy-intensive applications

In difficult economic times, rising energy prices have an increasingly negative impact on production costs. This is seeing energy-intensive industries under increasing pressure to improve energy efficiency by adopting the best available technologies. With this in mind, Schneider Electric has extended its range of Altivar Process drives to include a solution for energy intensive applications in the oil and gas, mining, minerals and metals sectors – the Altivar 960 variable speed drive.

“Energy efficient drive systems can assist energy intensive sectors in several ways,” says Marc Ramsay, vice president for Schneider Electric Southern Africa, Industry Business. “They help to boost business performance by reducing commissioning time and considerably improving production uptime. Moreover, they are specifically tailored to optimise energy usage during production, which lowers costs, and reduces CO₂ emissions.” According to Ramsay, Schneider Electric customers are now able to use Altivar Process drives for applications and projects across the board, from single drive projects to the most complex multidrive applications that have advanced load sharing functions.

The Altivar range of drives connects to industrial networks, bringing process information right to the user for optimisation of individual industrial processes such as conveyor belts in mines, pumps for oil wells or process cranes used in steelworks. In addition, the drives have the ability to communicate real-time data as they feature built-in Internet connectivity. This allows users to adjust their operations, lowering energy usage and improving production outputs. The system also communicates performance data, enabling operators to anticipate and identify any possible maintenance issues.

Specific applications

Ramsay says the range is ideal for oil production as it boosts efficiency due to its enhanced application control and data connectivity. Users now have the ability to control production from a central location. Moreover, downtime for pumping operations is limited, even during power outages, and users have direct access to troubleshooting information. The product’s drive enclosures were specifically designed to withstand even the most extreme weather conditions.

For the mining, minerals and metals sectors, the drives offer better control for conveyors, stackers, reclaimers and process cranes, boosting energy efficiency and uptime. Other benefits include drive-to-drive load sharing to lower strain on individual drives, as well as high resistance to load and higher available current for improved motor reactivity and stability. Finally, in a world where new cyber threats are targeting these industries daily, the Altivar range boasts enhanced safety and cybersecurity due to its compliance with the latest standards.

Innovative features

The Altivar 960 also features other innovations, including new technology for lower harmonics. In addition it addresses a variety of user concerns, including extended equipment life cycles and tight space requirements. The new low-harmonics 3-level technology is a first on the market. This low harmonics concept is based on a 3-level technology that lowers the total current distortion factor (THD(i)) to a value less than 5% in accordance with IEEE 519.

Extended motor life is another benefit. The solution features a common-mode structure that lowers voltage stress and peaks in voltage for a smoother waveform, in turn reducing stress on the motor and extending its life considerably. With space at a premium these days, its space-saving design is another benefit. “Schneider Electric’s harmonics engineering has resulted in internal filter components being significantly smaller than the conventional 2-level low-harmonic technology. In this way, the drive takes up far less space on the floor.”

Installation and operation have also been simplified. The company’s engineers went to great lengths to ensure that installation and operation were as smooth and simple as possible. The enclosure arrives ready to connect and meets the need for total current distortion factors.

In terms of adaptability, the system meets power needs of 110 – 800 kW. Schneider Electric has plans to extend this to 1500 kW. Engineering begins with a base model that employs standard enclosures and is ready to connect. However, its modular construction allows the enclosure unit to be tailored to individual needs, making planning easier, and installation and commissioning faster than ever before.

“There’s no doubt that energy is becoming a strategic factor in competition around the world, with energy-intensive industries increasingly considering the efficiency of the products they use. There simply isn’t another solution on the market that can match the performance and energy savings of the Altivar 960. As the demand for innovative, greener technologies grows, businesses wishing to succeed and remain competitive need to seriously consider solutions that are innovative and sustainable,” concludes Ramsay.

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

NASA’s fifth Mars rover will collect soil samples, seal them and deposit them on the Martian surface for future collection and transport back to earth. Swiss drive specialist, maxon motor, will supply several drives specifically developed for the task to the Jet Propulsion Laboratory, which is building the Mars 2020 rover for NASA.

The maxon drives are being used for mission critical tasks. The plan is for the rover to take dozens of soil samples, seal them in containers and deposit these in caches on the surface of Mars, where a future mission may retrieve and return them to earth. Nine BLDC motors from Switzerland are responsible for the rover’s sample handling. The drives can be found in the sample caching system, including the end-effector sample tube holder. The sample handling arm moves the sample containers from station to station within the sampling system. Additional motors are used to assist with obtaining the samples and sealing the containers.

For this project, maxon motor uses brushless flat motors from the standard range (EC 32 flat and EC 20 flat combined with a GP 22 HD planetary gearhead). However, the drives have been modified specifically for the mission. They need to survive a dynamic entry, descent and landing sequence, as well as the harsh daily conditions on Mars with sandstorms and temperatures ranging from -130 to +70°C.

From the outside, the Mars 2020 rover looks similar to its predecessor, Curiosity, which is still operating on Mars. However, the upcoming mission will have several new instruments on board that will deliver unique new data for scientists. A key mission goal will be to search the environment for bio-signatures. Another instrument on board will test whether it is possible to generate oxygen from the atmosphere as a precursor for future human visits. However, the most significant innovation is the capability to take rock samples in several locations and prepare them for return to earth.

Currently, maxon motor is involved in several projects destined for Mars. NASA’s InSight Lander launched on 5 May to measure its seismic activities and temperature. A maxon DC motor will power the mole that hammers the measuring sensor into the ground.

Two years later, both NASA and the European Space Agency (ESA) will send rovers to Mars. More than 50 maxon drives are installed in ESA’s ExoMars vehicle, including some complex actuator systems that were assembled in maxon’s high tech manufacturing facilities. These actuators provide the main drive and steering systems for the vehicle. Additional precision motors are used in the drill head, the onboard laboratory and the camera mast.

For more information contact
Hans Burri, DNH Tradeserve,
+27 (0) 11 468 2722,
hans.burri@dnhtrade.co.za,
www.dnhtrade.co.za

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

Vacuum tube lifter for starter batteries

The new Schmalz vacuum tube lifter, JumboFlex Battery provides a complete solution for the ergonomic and safe handling of starter batteries. It ensures the reliable commissioning of starter batteries for system suppliers and distributors. Batteries that are commissioned edge-to-edge on a pallet are difficult to remove, especially for models without handles. These batteries, weighing up to almost 30 kilograms each, have to be manually removed and transferred because they cannot be mechanically gripped.

The JumboFlex Battery vacuum handling system grips, lifts and transports starter batteries of different shapes, sizes and weights without any physical exertion for the user. The ergonomic operator handle is designed to be operated with one hand and is easy to use. The lifting unit consists of a flexible hose that provides the required suction flow to hold the batteries securely and the system is completed with a responsive aluminum crane used as a jib crane or as an overhead crane system. In addition to commissioning starter batteries for system suppliers and distributors, the JumboFlex Battery ensures they are supplied to automotive manufacturers in the correct sequence.

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

Smart sensors are facilitating the manufacturing sector’s shift to Industry 4.0. The latest smart sensors are able to share information with the controller via technologies such as IO-Link. They can also receive commands and parameter information from the controller and adapt to new requirements on a continuous basis. The upshot for manufacturers is an improvement in efficiency, alongside greater flexibility and better maintenance planning.

This applies to all kinds of smart sensors, including those used for pneumatic and hydraulic cylinders. The latest feature intelligent functionality and comprise one of the three parts of smart pneumatics, namely sensors, processors and communications protocols. Smart sensors on cylinders offer fast, accurate, high resolution and contactless sensing of the piston’s position. Direct detection of the piston magnet is achieved without the requirement for separate position encoders or additional mechanics.

Cylinders with intelligence
Among the latest sensors are those such as the new PBS CPS sensors from Parker Hannifin, which continuously supply data via analog signals, IO-Link process data or flexible switching point. The continuous transfer of position data serves to upgrade the functionality of pneumatic cylinders, making them more intelligent and more versatile. It is now possible to solve engineering challenges in areas such as quality monitoring and process control, particularly in consumer goods markets like packaging.

Among the principal benefits of continuous position sensing is the ability to monitor quality, deliver process control and support optimisation, especially in tensioning applications like paper or film processing, where quality, repeatability and speed are vital to profitable operations. Here the remote reading of data from position sensors permits process deviations to be seen fast and acted upon, therefore retaining process optimisation and promoting predictive maintenance strategies.

Numerous other applications can also benefit, including materials handling, consumer packaging, small component assembly, machine building, and tasks in the renewable energy industry such as the positional control of solar panels as they track the sun. Offering the appropriate resistance to shock, vibration, moisture, chemicals and water ingress, continuous position sensing can be deployed reliably in demanding operating environments over extended time periods.

Two-way communications
The key to smart functionality is two-way data flow. Using traditional discrete or analog signals, the monitoring of sensor data is simply one-way communication, which may be sufficient to allow the remote monitoring of automated processes, for instance. However, in order to adopt Industry 4.0 strategies, two-way communication is required, meaning connection to a network such as Profinet or IO-Link. With regard to CPS sensors on pneumatic cylinders, implementation would include not only monitoring, but automatic configuration at startup and during replacement as part of maintenance routines.

The shift to predictive, rather than preventative or reactive maintenance, is one of industry’s principal current trends and is an area where smart sensors can add significant value.

Specification and selection of smart sensors
The potential application benefits of smart sensors are significant. However, to maximise the gains, engineers need to consider several factors.

Firstly, the sensor needs to be able to fit securely on the cylinder body. External profiles may include linear slides, T-slots and dovetails. Alternatively, a combination screw combining an Allen key head and slotted screw can provide a convenient, simple and fast method of locating and securing the sensor. Alternatively, retaining ribs on the side of the sensor can hold the device in the desired position before the screw is tightened.

Rugged design is a requirement for a smart sensor operating in an environment with wide variations in temperature and vibration, and exposure to aggressive fluids or chemicals. Smart sensors may be offered with specific IP ratings to denote suitability for use where exposure to moisture is an issue. Automated applications where the smart sensor operates 24/7 make operation more demanding, and sensor failure leading directly to downtime can be extremely costly. So smart sensors must be easy to change to keep costly downtime to a minimum. This operation must be completed without removing cylinder end-caps or any other strip-down of the assembly.

During installation and at points in the sensor’s operating life, adjustment and configuration of operating parameters will be necessary. Typical approaches are either via the IO Link, or a portable teach pad. The ready availability of a supply voltage for the sensor is also an absolute requirement, and a visual cue of an active state or output in the form of an LED is of value to operators.

For more information contact Lisa de Beer,
Parker Hannifin SA, +27 (0)11 961 0700,
lisa.debeer@parker.com,
www.parker.com/za
Eddie Hall

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Eddie is the world’s strongest man. Eddie understands the importance of dedicating yourself to the pursuit of excellence in one area. The importance of being a specialist. Just like Control Techniques. Our British-made drives have been leading the way on the global stage since 1973. Our strength lies in our specialism. Just like Eddie.

DRIVE SPECIALISTS SINCE 1973
Compact new servo drives from Control Techniques

Control Techniques, a Nidec company, is a world leader in the design and production of electronic variable speed drives for the control of electric motors. The company has revealed its new generation of advanced servo drive technologies. The new Digitax HD series (0.7 Nm–51 Nm with 153 Nm peak/1.5 A–16 A with 48 A peak) delivers ultimate motor control performance and flexibility from a uniquely compact package. Targeting high axis count automation systems, the Digitax HD provides all of the benefits of a modular system with a common DC bus, with standalone drive flexibility. The new series is focused on high overload, pulse duty applications, but also provides continuous servo control plus induction motor control and is initially available with two functionality levels.

The version M753 is designed as an optimised amplifier for high-performance centralised control with EtherCAT integrated on-board and simple rotary switches for fast network address assignment. Alternatively, the flexible M751 Base option allows design engineers to add up to two option modules from the existing Unidrive M range, such as Profinet, Ethernet/IP or an IEC61131 high-performance motion controller for decentralised machine control.

For both single and multi-axis configurations, the Digitax HD series offers industry-leading compactness – the M753 EtherCAT variant is just 40 mm wide – that is five axes across the width of an A4 piece of paper with 10 mm spare, or seven axes if turned to landscape.

The drive is also designed to fit within shallow 200 mm cabinets. Digitax HD is the most compact 400 V servo drive available in the world. Its patented Ultraflow system allows machine builders to further reduce cabinet size by up to 50% through expelling heat from the drive directly outside the cabinet. This approach offers the further benefit of enabling drives to be stacked without the need for a large air channel between them.

High dynamic applications will benefit immensely from Digitax HD’s 300% peak performance pulse-duty overload capabilities, along with its 62 µs current loop and 16 kHz switching frequency. Its flexible speed and position feedback interface supports a wide range of feedback technologies, from robust resolvers to the latest single cable digital encoder technologies.

Digitax HD also boasts a wealth of features and accessories designed to make installation and commissioning as easy as possible. Features include easy access pluggable connectors and a dedicated multi-axis paralleling kit for rapid installation; integrated braking resistor and electronic motor name plate for faster setup; and quick commissioning using the Unidrive M Connect PC tool or an optional SD card. Machine Control Studio provides a flexible and intuitive IEC61131 environment for programming automation and motion control features.

The Digitax HD servo series flexibly adapts to your architecture of choice, be it centralised motion control, distributed intelligence, or any combination of the two. Support for all main industrial fieldbuses guarantees easy integration into any production line. Working in tandem with the Digitax HD series, the Unimotor HD is a high dynamic AC brushless servo motor delivering class-leading performance. With a wide torque range, from 0.72 Nm up to 85 Nm with 255 Nm peak, rated speeds from 1000 to 6000 rpm, several inertia levels and a broad selection of feedback options, Unimotor HD offers the perfect fit for high dynamic applications.

For more information contact Ryan Chetty, Nidec Industrial Automation Southern Africa, +27 (0)11 462 1740, info.za@mail.nidec.com, www.nidecautomation.com
The incessant need to reduce energy consumption is an ever present fact for all plant engineers. It is estimated that compressed air production and compressed air treatment amount to approximately 30% of an average production plants power consumption. SPX Flow, through Artic Driers International has introduced a radically new approach to compressed air drying.

The PCM compressed air dryer, (Phase Change Material) provides low dew point air via a unique and patented 4 in 1 heat exchanger. The PCM material housed within a plate to plate heat exchanger possesses a high latent heat property that enables the material to melt or freeze at constant temperature. The phase change material will absorb heat from warm moisture laden compressed air without a significant change in temperature. The PCM material stays colder for longer periods of time. This system allows the Freon compressor within the dryer to cycle the Freon compressor with long off-time periods, resulting in great cost savings.

Energy Savings – The PCM dryer lowers the air system power costs and improves productivity by matching power consumption to compressed air demand. C/air loads fluctuate in any production facility. The PCM dryer cycles the power load to match c/air demand with great effectiveness.

As the load fluctuates the power requirement to dry the c/air is matched in proportion to the demand. As a comparison a non cycling dryer uses a constant 96% under any operating load. A PCM dryer when operating at 60% load only consumes 60% of its full load energy.

When compared with current non-cycling, variable speed drives, and older thermal mass type compressed air dryers, the PCM offers superior power savings, without the need to use complex VSD drives, coolant pumps or glycol tanks.

Along with all other quality air treatment packages and filtration systems manufactured by SPX Flow Busan, South Korea, Artic Driers provides the expertise and aftercare support to southern Africa as it has for the last 17 years. Whilst the markets and importers may have changed radically over the last three decades, Artic Driers core competency has grown and matured.

Artic Driers International, a family owned and operated c/air treatment supplier has provided support and compressed air treatment products since 1991.

For more information please contact
Allen Cockfield, Artic Driers International,
+27 (0)11 420 0274, allen@articdriers.co.za, www.articdriers.co.za
Siko’s SGH wire-actuated encoders measure cylinder stroke as well as speed in hydraulic cylinders with impressive efficiency, flexibility and robustness.

The technology
SGH sensors use a wire draw mechanism that is integrated directly into the cylinder to measure the stroke. The wire is secured to the piston head. When the cylinder extends, the wire wound on a wire drum is pulled out. The resulting rotation of the drum is detected by the contactless sensor system and converted into a linear position. This means that precise and absolute position or speed tracking of the cylinder is possible at any time. The magnets used to measure the rotation are scanned by the contactless sensor system through the pressure resistant base plate of the SGH sensors. The electronic components are fully encapsulated and located on the non-pressurised side of the system. The entire measuring system is therefore incorporated into the cylinder and optimally protected against external environmental influences. The advantage is that in contrast to measuring systems mounted externally on the cylinder, the sensor system cannot be damaged, negatively affected or even destroyed by environmental conditions.

Developed for tough conditions in mobile hydraulic applications
The SGH sensors were designed and developed in line with the strict specifications of renowned hydraulic cylinder manufacturers. Market demands ensured that Siko met its requirements regarding robustness, durability and functionality. Siko worked closely with cylinder manufacturers to define and satisfy the specifications regarding service life, shock and vibration resistance, EMC and compatibility with various hydraulic media. All specifications were tested and confirmed in endurance tests at the facilities of cylinder manufacturers, or in external accredited laboratories.

Intelligent sensors for smart cylinders
The SGH technology transforms hydraulic and telescopic cylinders as well as piston accumulators into smart cylinders and hydraulic systems. A suitable sensor is available for all applications. With measuring lengths of up to 5000 mm, a wide selection of interfaces as well as high flexibility for integration of the sensors, the SGH family offers a wide range of possibilities. Redundant options and sensors for performance levels of up to PLd are available for safety critical applications.

Reliable position tracking
Smart sensors take mobile hydraulics to a new level of safety and efficiency. Functional safety is a term that is being widely discussed. Safety concepts for mobile machinery have been a topic of interest since the implementation of the new Machinery Directive EN 13849. Sensors in the Siko SGH range help implement intelligent safety concepts for mobile machinery and meet the requirements of the specific safety standards for different utility vehicles.

The safety versions of the SGH25 and SGH50 sensors meet the requirements for use in applications up to Performance Level d (PLd). Safe and redundant design in compliance with CAT3 as well as a safe mechanical design means Siko products are pre-destined for use in safety-critical applications, also under unusual conditions.

In addition, the sensors supply process data which not only serve to satisfy safety requirements, but also offer an added value for the machine. The process data can, therefore, provide insight into an impending seal maintenance interval. Flexible support tracking in crane and lifting applications extend the working ranges of the machine. Memory functions in industrial trucks save time and make work safer. All these are examples of how SGH sensors not only make machinery safer, but also more efficient.

Advantages of the SGH encoder include:
• Absolute detection of the cylinder position.
• Direct integration into the cylinder.
• Measuring range up to 5000 mm.
• Can be used in safety applications up to PLd.
• No drilling of the piston required.
• Can also be used in telescopic cylinders.
• Perfectly protected due to protection category IP69K.
• Durable and robust. – developed in line with mobile hydraulic requirements.
• High EMC.

For more information contact Instrotech,
+27 (0)10 595 1831, sales@instrotech.co.za, www.instrotech.co.za
More and more vehicle manufacturers, integrators, and operations managers are setting their sights on top quality innovations. Everyone wants the added value that came to be standard within industrial automation long ago: the encoder needs to gather status and process information.

In future, precise, high performance position measurement is set to come with the added option of performing detailed analyses on the basis of sensor information. This will make it possible, for example, to provide support for assistance systems, avoid sudden machine failures, optimise maintenance routines, and improve machine availability. The linear encoders in SICK's MAX product family are currently the only devices of their kind to offer this added value within the field of hydraulic measurement technology for mobile automation. They operate in line with the robust operating principle of magnetostriction, provide extensive diagnostic functions and offer added value for mobile machines.

**Innovation with magnetostriction**

One key feature of the new SICK linear encoders is their full mechanical compatibility with existing cylinder constructions that are already prepared for integration into a path measurement system. Integration into hydraulic cylinders is therefore guaranteed to be a quick and easy process.

Inside these linear encoders, there are various technologies and innovations. On the basis of more than 25 years of experience in linear path measurement technology for mobile machines, SICK developed a radical new sensor concept. The main features include the use of magnetostriction, the optimisation of the power density by minimising measurement dead zones, and the integration of diagnostic and prognostic functionalities that can be used to avoid machine downtimes and improve operational plans and maintenance routines for entire fleets.

Magnetostriction technology offers a number of benefits when linear encoders are used in hydraulic machines. Position measurement is absolute – the precise piston position is detected as soon as on-board voltage is supplied when the machine is started up. There is no need for a reference run, as is the case with incremental sensors.

During operation, magnetostriction is exceptionally reliable, wear-free, and even robust, proving particularly resistant to mechanical stress and extreme electrical influences such as those caused by radiated or coupled faults in the on-board power supply of a vehicle. The high level of operational safety of the MAX linear encoder as a device within vehicles that requires approval is certified by the E1 approval mark issued by the German Federal Motor Transport Authority.

For more information contact Mark Madeley, SICK Automation Southern Africa, +27 (0)11 472 3733, mark.madeley@sickautomation.co.za, www.sickautomation.co.za

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**Eldon extends floor standing enclosure range**

Easy engineering and assembly are two of Eldon’s central development drivers. One recent example is the further development of the successful mild steel single and double door compact floor standing ranges, MKS and MKD. More standard dimensions have been added, while Eldon’s combinable floor standing accessories make it possible to engineer and build almost any indoor configuration.

The compact new enclosures have a four-times folded and seam welded frame and are well-suited for residential automation and control solutions, or for integration into larger processing systems or machines. The double door version, MKD, is especially useful in confined spaces, where a single door would take up too much space in front of the enclosure when the door is opened.

Many different available dimensions make it easier to engineer a solution that meets the requirements and eliminate the need for manufacturing special versions, which in turn reduces cost. The fact that accessories for the compact range are fully compatible with Eldon’s combinable floor standing range also contributes to making engineering and creation of the actual configuration easier and more cost effective. For distributors this makes stock keeping easier and cheaper. Profiles integrated into the enclosure design eliminate the need for dedicated accessories, which also help ease engineering and reduce cost.

Eldon has not only considered simplifying the engineering of a configuration, easy assembly and access to components are crucial as well. The MKS and MKD enclosures have roof, rear and bottom plates, which are removable to allow easy access when mounting components. Machining also becomes easier and installation time can be reduced. The high protection degree is not at risk, despite the removable parts.

These compact enclosures are often used in systems or on machines in environments requiring various certifications. The MKS and MKD ranges hold certifications such as CSA, Lloyd’s Register, CE, GOST, KEMA KEUR and cULus listed.

*For more information contact ATI Systems,*
+27 (0)11 383 8300, sales@atisystems.co.za, www.atisystems.co.za

**Pocket-size infrared thermometer with circular laser**

The TIR9PEN is designed to measure temperatures at close range or at a distance. Simple and easy to use, this device is especially suitable for the heating, ventilation and air conditioning (HVAC) sector, simplifying rapid troubleshooting and preventative maintenance of cooling systems.

The pocket-sized thermometer is activated by pressing the measurement button and pointing the pen at the target area via a circular laser located at the tip. Once the reading has been taken, the button is released with maximum and minimum readings of the laser area displayed on the LED backlit screen.

The TIR9PEN comes with a simple user interface for easy operation and can be used alongside the T151 non-contact IR thermometer, which will detect the area needing attention if the pen has detected a discrepancy in the maximum and minimum temperatures. The 9:1 optical ratio makes it ideal for finding hotspots on distribution boards or larger machinery, while the ergonomic double injection casing provides a comfortable grip for measuring.

*For more information contact*
Ryan Burger, HellermannTyton South Africa, 27 (0)11 879 6600, jhb.sales@hellermann.co.za, www.hellermannyton.co.za

**Suction cup for optimal sheet metal handling**

Tectra Automation has introduced the new SAX bell-shaped suction cup from Schmalz to its range of vacuum components. This is a single-piece suction cup with a vulcanised connection nipple made of reinforced plastic. Available with various connection types, it comes in seven sizes with suction diameters of 30, 40, 50, 60, 80, 100 and 115 mm.

The wear resistant Elastodur construction provides the SAX with a service life considerably longer than that of comparable materials, providing product longevity. The cup’s long stroke allows it to conform perfectly to complex workpieces and shapes, making it particularly well-suited for the handling of car body parts, for destacking metal blanks and for loading and unloading both CNC metal and laser cutting machines.

The addition of the SAX suction cup to its range extends Tectra Automation’s range of Schmalz vacuum cups and accessories to over 50.

*For more information contact*
Malan Bosman, Tectra Automation, +27 (0)11 974 9400, malan.bosman@tectra.co.za, www.hytecgroup.co.za
SKF’s range of disc couplings in a variety of configurations offers cost-effective, lubrication-free service in medium to high torque applications that require torsional rigidity. They consist of two hubs and a laminated stainless steel disc pack, secured by a series of fitted bolts retained by nylon insert lock nuts. The couplings feature a capacity range up to 178 kNm in a variety of configurations, including single disc, double disc and spacer for both horizontal and vertical mounting, delivering benefits to a wide range of applications.

“In many applications, the challenge posed by exposure to the elements requires quality parts that continue to operate smoothly,” says global technical manager for power transmission, David Beggs. “The SKF disc coupling offers robust performance, with all-steel machined components that allow for high-speed applications to be handled with ease. With two-plane dynamic balancing, higher speeds are often permissible.”

The couplings minimise the need for maintenance because they offer some allowance for misalignment and do not require lubrication. Single disc couplings accommodate angular offset, while double disc pack units with a spacer allow for angular, parallel or combined offset. The disc pack or spacer may be removed and re-installed radially, meaning the prime mover and driven machine need not be moved at all. With hub pilot bores to simplify boring to requirements, the disc couplings bring cost-effective high performance to a range of applications and industries, including petrochemical (direct drive fan drives, pumps, compressors), printing and paper (positioning), plastics, power generation (high-speed turbine type drives, alternators, pumps), refrigeration (compressors) and marine.

RS Components has introduced two new series of switches that target maintenance engineers and machine and panel builders, and deliver intuitive machine safety control in a wide variety of industrial applications. Developed by EAO, a leading vendor of intuitive and reliable HMIs, are the Series 61 compact emergency-stop switches (E-Stop) and the Series 45 industrial switches.

Designed to reliably protect people and equipment against injury and damage, the Series 61 E-Stop is ideally suited for use in handheld control units; alternatively, it can be mounted within easy reach or directly on to a machine. Capable of withstanding harsh industrial use, the Series 61 is made from hardy materials and has a robust build quality that meets IP69K, as well as providing IP66 protection. Typical applications include handheld control units, production and plant machinery, construction machinery, and agricultural machinery and vehicles, as well as control panels in a range of industrial equipment and devices.

Ideal for use in space critical applications, the Series 61 also has a robust mono-block design, and a foolproof trigger action compliant with EN 60947-5-5 and EN 13850, as well as a green indication ring to show switch actuation. Other key features include a highly compact back-panel depth of only 21.2 mm, and an optional high-brightness 24 V DC LED, which makes the product clearly visible even in low light levels.

The Series 45 switches are designed for easy assembly and installation into 22 mm or 30.5 mm cut-outs and are available in a plastic, shiny metal or matt metal finish. The 30.5 mm mounted metal version has a low profile, flush mount design. The series is robustly constructed and offers an IP69K protection rating and long life LED illumination. Features of the switch include a mechanical life of one million switching cycles and reliable switching from 5 to 500 V. In addition, the double-break slow-make switching element is available with either screw- or spring-type terminals and can be equipped with a maximum of six switching elements.

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

For more information contact Samantha Joubert,
SKF South Africa, +27 (0)11 821 3500,
samantha.joubert@skf.com,
www.skf.com
**Precision pressure calibrators**

Fluke’s 721 precision pressure calibrator has dual isolated sensors for gas custody transfer applications for pressure calibration and temperature measurement. This allows for simultaneous static and differential pressure measurement within a single tool.

The rugged, high-quality 700G31 precision pressure gauge calibrator delivers fast and accurate test results. It is easy to use and its reliable construction allows for precision pressure measurement from 1 to 690 bar with an impressive 0,05% accuracy. It is compatible with most hydraulic and pneumatic test pumps and can be combined with one of the Fluke test pump kits (700PTPK or 700HTPK) for a complete pressure testing and calibration solution. The 700G/TRACK Software allows for the upload of over 8000 pressure measurements logged in the field to a tablet or PC.

**Abrasives for metalworking and industrial applications**

RS Components has introduced 3M’s new Silver portfolio of portable bonded abrasives for use with a wide range of cutting and grinding tools in metalworking applications. New products in the Silver portfolio include depressed centre grinding wheels and cut-off wheels. Abrasives are vital in a wide range of applications, including structural metal for buildings; bridges and oil and gas infrastructure; rail and shipbuilding industries; construction of machinery and equipment for many industries; and in general metalworking applications.

The new 3M Silver abrasives combine the use of 3M’s Precision-Shaped Grain technology to slice through metal and deliver faster and cooler cutting with longer life when compared to conventional grain products. The highly durable material also delivers a consistent cut through its complete life. The Silver range balances cutting ability with product wear, resulting in lower abrasive costs for applications that do not require 3M’s high end abrasives such as the Cubitron II.

**Heavy-duty pressure switch**

From pumps through hydraulic systems to autoclaves, WIKA’s new model PSM-550 heavy-duty pressure switch has been designed for superior industrial applications.

The new instrument switches electrical loads up to AC 230 V/10 A with a non-repeatability of the switch point of ≤1%. The high accuracy ensures that the machine operates optimally and hence safeguards the quality of the manufactured products.

The pressure switch can be delivered both with setting ranges for gauge pressure (0 … 300 mbar to 10 … 30 bar) and with vacuum setting ranges (-1 … 0 bar and -0.8 … 5 bar). It is thus also suitable for monitoring vacuum circuits, such as with cleaning processes. The robust instrument has an ingress protection of IP67. Furthermore, the PSM-550 comes in a version for medium temperatures up to 170°C, which has wetted parts from stainless steel.

**For more information contact WIKA Instruments, +27 (0)11 621 0000, sales.za@wika.com, www.wika.co.za**
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<td>ASTech Proc. Elec. + Instr.</td>
<td>+27 (0)11 708 9200</td>
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<td><a href="mailto:sales@elonics.co.za">sales@elonics.co.za</a></td>
<td><a href="http://www.elonics.co.za">www.elonics.co.za</a></td>
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<td>Emerson Automation Solutions</td>
<td>+27 (0)11 451 3700</td>
<td><a href="mailto:rob.smith@emerson.com">rob.smith@emerson.com</a></td>
<td><a href="http://www.emerson.com">www.emerson.com</a></td>
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<tr>
<td>Endress+Hauser</td>
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<td><a href="mailto:frans.vandenbergen@za.endress.com">frans.vandenbergen@za.endress.com</a></td>
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<td>Endress+Hauser</td>
<td>+27 (0)11 262 8000</td>
<td><a href="mailto:natlee.chetty@za.endress.com">natlee.chetty@za.endress.com</a></td>
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<td>EOH</td>
<td>+27 (0)87 803 9783</td>
<td><a href="mailto:johan.vanjaarsveldt@eoh-pas.co.za">johan.vanjaarsveldt@eoh-pas.co.za</a></td>
<td><a href="http://www.eoh-pas.co.za">www.eoh-pas.co.za</a></td>
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<td>Extech Safety Systems</td>
<td>+27 (0)11 791 6000</td>
<td><a href="mailto:sales@extech.co.za">sales@extech.co.za</a></td>
<td><a href="http://www.extech.co.za">www.extech.co.za</a></td>
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<td>GHM Messtechnik SA</td>
<td>+27 (0)11 902 0158</td>
<td><a href="mailto:info@ghm-sa.co.za">info@ghm-sa.co.za</a></td>
<td><a href="http://www.ghm-sa.co.za">www.ghm-sa.co.za</a></td>
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<tr>
<td>HellermannTyton South Africa</td>
<td>+27 (0)11 879 6600</td>
<td><a href="mailto:jhb.sales@hellermann.co.za">jhb.sales@hellermann.co.za</a></td>
<td><a href="http://www.hellermannytuton.co.za">www.hellermannytuton.co.za</a></td>
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<td>+27 (0)11 462 8752</td>
<td><a href="mailto:sales@helukabel.co.za">sales@helukabel.co.za</a></td>
<td><a href="http://www.helukabel.co.za">www.helukabel.co.za</a></td>
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<td>ifm electronic SA</td>
<td>+27 (0)12 450 0400</td>
<td><a href="mailto:info.za@ifm.com">info.za@ifm.com</a></td>
<td><a href="http://www.ifm.com">www.ifm.com</a></td>
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<td>Instrotech</td>
<td>+27 (0)10 595 1831</td>
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<td>Krohne SA</td>
<td>+27 (0)11 314 1391</td>
<td>d.rampathikrohne.com</td>
<td><a href="http://www.za.krohne.com">www.za.krohne.com</a></td>
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<td>Macsteel Fluid Control</td>
<td>+27 (0)31 581 7800</td>
<td><a href="mailto:kamil.maharaj@macfluid.co.za">kamil.maharaj@macfluid.co.za</a></td>
<td><a href="http://www.macsteel.co.za">www.macsteel.co.za</a></td>
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<td>Michael Brown Control Eng</td>
<td>+27 (0)82 440 7790</td>
<td><a href="mailto:michael.brown@mweb.co.za">michael.brown@mweb.co.za</a></td>
<td><a href="http://www.controlloop.co.za">www.controlloop.co.za</a></td>
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<td>Microsep</td>
<td>+27 (0)11 553 2300</td>
<td><a href="mailto:info@microsep.co.za">info@microsep.co.za</a></td>
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<td>Motion Control Systems</td>
<td>+27 (0)11 450 3344</td>
<td><a href="mailto:info@motioncontrolsystems.co.za">info@motioncontrolsystems.co.za</a></td>
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<td>Mzukulu Technologies</td>
<td>+27 (0)31 303 1708</td>
<td><a href="mailto:paul.sikhakhane@mzukulu.co.za">paul.sikhakhane@mzukulu.co.za</a></td>
<td><a href="http://www.mzukulu.co.za">www.mzukulu.co.za</a></td>
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<td>Nclose</td>
<td>+27 (0)11 463 0096</td>
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<td><a href="http://www.nclose.com">www.nclose.com</a></td>
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<td>Nidec Industrial Automation</td>
<td>+27 (0)11 462 1740</td>
<td><a href="mailto:info.za@mail.nidec.com">info.za@mail.nidec.com</a></td>
<td><a href="http://www.nidecautomation.com">www.nidecautomation.com</a></td>
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<td>Omniflex Remote Monitoring Specialists</td>
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<td><a href="mailto:sales@omniflex.com">sales@omniflex.com</a></td>
<td><a href="http://www.omniflex.com">www.omniflex.com</a></td>
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<td>Parker Hannfin (SA)</td>
<td>+27 (0)11 961 0700</td>
<td><a href="mailto:lisa.debeer@parkerr.com">lisa.debeer@parkerr.com</a></td>
<td><a href="http://www.parker.com/za">www.parker.com/za</a></td>
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<td>Pepperl+Fuchs</td>
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<td>Phoenix Contact</td>
<td>+27 (0)11 801 8200</td>
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<td>R&amp;C Instrumentation</td>
<td>086 111 4217</td>
<td><a href="mailto:info@randi.co.za">info@randi.co.za</a></td>
<td><a href="http://www.randi.co.za">www.randi.co.za</a></td>
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<td>RET Automation Controls</td>
<td>+27 (0)11 453 2468</td>
<td><a href="mailto:brandon.topham@retautomation.com">brandon.topham@retautomation.com</a></td>
<td><a href="http://www.retautomation.com">www.retautomation.com</a></td>
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<td>Rockwell Automation Controls</td>
<td>+27 (0)21 527 2900</td>
<td>jj <a href="mailto:Jacobs@ra.rockwell.com">Jacobs@ra.rockwell.com</a></td>
<td><a href="http://www.rockwellautomation.com/za">www.rockwellautomation.com/za</a></td>
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<td>RS Components SA</td>
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<td><a href="http://www.rsline.co.za">www.rsline.co.za</a></td>
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<td>SA Gauge</td>
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<td>SAIMC</td>
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<td><a href="mailto:admin@saaimc.co.za">admin@saaimc.co.za</a></td>
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<td>Schneider Electric SA</td>
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<td><a href="mailto:jason.uilbricht@schneider-electric.com">jason.uilbricht@schneider-electric.com</a></td>
<td><a href="http://www.schneider-electric.com">www.schneider-electric.com</a></td>
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<td>SICK Automation Southern Africa</td>
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<td>Siemens Digital Factory and Process Industries and Drives</td>
<td>+27 (0)11 652 2795</td>
<td><a href="mailto:jennifer.naidoo@siemens.com">jennifer.naidoo@siemens.com</a></td>
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<td>Tectra Automation</td>
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<td><a href="mailto:malan.bosman@tectra.co.za">malan.bosman@tectra.co.za</a></td>
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<td><a href="mailto:desreishill@t-systems.co.za">desreishill@t-systems.co.za</a></td>
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<td><a href="mailto:christie.cronje@za.yokogawa.com">christie.cronje@za.yokogawa.com</a></td>
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<td>Zest WEG Group Africa</td>
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<td><a href="http://www.zestweg.co.za">www.zestweg.co.za</a></td>
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This year, Beckhoff will again exhibit numerous innovations in all technology areas at Electra Mining Africa 2018. As an expert in industrial PC design & in-house manufacture, the new generation of ultra-compact IPCs (the best price-performance ratio available) will be on display. Also shown is: One Cable Automation, where users can reduce installation and material costs significantly with the OCT and EtherCAT P technologies, Beckhoff’s extensive range of explosion-proof components providing comprehensive solutions for barrier-free system integration right into Zone 0/20, upcoming TwinCAT Vision (integrated in Visual Studio®), as well as TwinCAT HMI will be highlighted. Lastly, extremely accurate, fast and robust EtherCAT measurement modules and solutions for Industry 4.0 and IoT are on display.

See you at Electra Mining Africa 2018, NASREC, Hall 7, Booth A18!