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In 2017/2018 ARCA celebrated the one hundred year anniversary of the company foundation. Its success builds on an innovation that was filed for patent protection by Ragnar Carlstedt back in 1917. See this month’s cover story for more on the variety of flow control solutions available from the group today.

### FEATURES

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The IIoT edge is evolving

In its IIoT context, the edge is traditionally understood to be a kind of half-way point between the plant and the cloud. Physically hard to define, the edge acts as a repository for data collected from the plant’s smart sensors and actuators, prior to sending it on to cloud-based analytic applications for processing and interpretation.

The cloud, while also physically hard to define, is conceptually better understood by non-IT personnel. It’s a place away from the plant, a server farm for instance, where masses of computing power and data storage capacity are available on a for-hire basis. The potential drawbacks with cloud-centric strategies in a processing environment usually have little to do with the cost though, but involve things like latency, bandwidth, OT protocol support and information security.

The question then becomes, which data is better processed in the cloud, and which at the edge? In some cases the answer is clear cut, in others not so much. For instance, it’s unlikely that anyone would risk putting critical safety related applications at the edge? In some cases the answer is better processed in the cloud, and which at the edge? In some cases the answer

and environmental monitoring may be ideal for cloud-based implementation due to their less stringent real-time and security requirements. I’m not suggesting environmental disasters of themselves cannot be catastrophic, just that the early warning signs are usually detectable long before things actually become critical, which means latency of even minutes is probably acceptable here. An example of a monitoring application that could easily be hosted in the cloud is the level in a dam, say, which only needs to be monitored once per day.

The edge then is a conduit to the cloud, but it can also act as a data processing destination in itself, in line with the mantra: ‘edge where you can; cloud where you can’t’. This evolving ‘duality’ in the nature of the edge has given rise to the terms ‘thick-edge’ and ‘thin-edge’. Thick-edge refers to architectures where data processing happens at the edge (vs in the cloud), while thin-edge refers to an architecture optimised to transfer large amounts of data to and from the cloud.

In these refined edge-to-cloud setups, industrial Ethernet switches are expected to remain firmly rooted in their connectivity role at the thin edge of the emerging multi-tiered stack, with continued reliance on thick edge devices for edge computing. See the ARC Advisory Group article on page 38 for more on how decentralised, autonomous plant operation can be facilitated through distributed communication and advanced network infrastructure.

All the best for 2020

On behalf of the team at SA Instrumentation & Control, welcome back to all our readers and advertisers – 2020 is going to be another challenging year and we wish you all the very best in your endeavours.
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Royal Holloway, University of London, has officially opened its new Beatrice Shilling Building which includes state-of-the-art teaching laboratories in partnership with Tektronix, a leading worldwide provider of educational measurement solutions, and Rapid Electronics, one of the UK's leading distributors of educational test equipment.

The new 160 seater stations, across two laboratories, allows first and second year students to perform practical electronics experiments on 80 benches under the supervision of their instructors and laboratory managers. Each bench is equipped with Tektronix and Keithley products, including basic and mixed domain oscilloscopes, arbitrary function generators, power supplies, digital multimeters (DMMs), source measurement units (SMUs), battery simulators and USB based real-time spectrum analysers.

**University of London opens electronics laboratory based on Tektronix solutions**

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**Rockwell Automation named a leader in Manufacturing Execution Systems**

Rockwell Automation has announced its recognition as a leader in the Gartner Magic Quadrant for Manufacturing Execution Systems for the second consecutive year. Since the 2018 report, Rockwell Automation improved its position in the Leaders quadrant in both its ability to execute and completeness of vision. The report evaluated 16 vendors across criteria spanning 15 different elements.

“We believe that Rockwell Automation’s recognition as a leader in this year’s Gartner Magic Quadrant validates our vision and innovation for supporting digital transformation in the industrial sector,” said John Genovesi, senior VP of enterprise accounts & software at Rockwell Automation. “As a company, we are highly focused on supporting our customers’ diverse digital journeys, enhancing how they leverage operational data to empower their teams and transform factory floors into highly optimised and scalable production management environments. We are very pleased to receive this recognition and hear the positive statements from our vast global customer base.”

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**SKF acquires industrial AI company**

SKF has signed an agreement to acquire Presenso, a company that develops and deploys artificial intelligence (AI)-based predictive maintenance software. Presenso’s capability enables production plants to find and act on anomalies that were previously difficult to detect, automatically and without the need to employ data scientists. Presenso’s competence will be used to strengthen SKF’s Rotating Equipment Performance offering.

Victoria Van Camp, CTO and president, innovation and business development, says: “SKF is all about reliable rotation, technology leadership and solving real world challenges. Today, we are welcoming a team of world-class AI developers with a production-ready analytics solution into SKF. Together we will change the way industry looks at reliability and make AI an integral part of production.”

Presenso is based in Haifa, Israel.

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**Don’t miss the February issue which will feature**

- Process variable measurement
- Wireless & telemetry
- IT in manufacturing (incl. Industry 4.0/IoT & AI)
- Control systems (incl. PLCs, DCSs, scada & HMI)
- Condition monitoring (incl. vibration)
- Electrical power & energy-efficient systems
- Agriculture, food, beverage & pharmaceutical
- Packaging & bottling
- Building management
- Control valves, actuators & pumps
- Enclosures, cabling & accessories

[www.instrumentation.co.za](http://www.instrumentation.co.za)
Bosch Ulwazi hosts 2019 Engineer in Training function

Bosch Ulwazi’s 2019 Engineer-in-Training (EIT) Conference was recently held in Mt Edgecombe. At this annual event, graduates are given an interactive platform to showcase the knowledge and skills they have acquired from projects they have worked on during the year.

“Bosch Ulwazi’s EIT programme was developed to provide opportunities for candidates to boost their practical engineering competency, to meet the Engineering Council of South Africa’s (ECSA’s) requirements for professional registration, over a period of three years from graduation,” explains Balan Govender, managing director, Bosch Ulwazi.

“Although this programme focuses on the development of graduate engineers and project managers, the course content is also re-modelled for graduates in other disciplines, including human resources, quantity surveyors and financial graduates. The programme also assists experienced engineers and project managers with their professional registrations.

“We are very proud to play an important role in education and skills development in South Africa, particularly in light of the current shortage of skills. The implementation of skills development programmes and compliance with accredited quality management systems, has been central to expanding our capabilities to include multi-disciplinary consulting, project engineering and operational management services – not only in Africa, but globally.”

A highlight of the EIT programme is the annual conference, where graduates give presentations on projects they have been involved in. This year’s winner was Aury Livingstone, for his presentation on ‘Thinking big in a small economy.’ Second place went to Stuart Boysen, for his address on ‘So uhm, could you please explore an alternative solution?’ Portia Malindi won third prize for her topic, ‘Mitigating big losses on small projects.’

Managing director of Bosch Holdings, Mike Gibbon, had this to say: “The quality of the presentations at the 11th Bosch EIT conference was of an exceptionally high standard and I was particularly impressed with everyone’s passion for innovation and making a lasting impact on our communities. For the second year in a row, the majority of engineers involved with the programme are ladies. This is a really encouraging trend and bodes well for the future diversity of our group.”

For more information contact Balan Govender, Bosch Ulwazi, +27 31 535 6000, govenderb@boschulwazi.co.za, www.boschulwazi.co.za

Smart cities embrace 4IR

Smart cities rely on smart grid technology that includes traditional and renewable energy sources in its mix of power supply. Driven by the advanced technology of the fourth industrial revolution (4IR), the smart grid technology is able to include coal-based and renewable energy sources to create a seamless analysis of power usage and problems.

“In the new dynamic of an integrated energy mix, the renewable wind and solar systems have different distribution areas, which results in a more complex grid,” explains Taru Madangombe, vice president of power systems, Anglophone Cluster for Schneider Electric. “To mitigate this, we need smart grids to direct the distribution systems on the network. Smart grids allow power flows to go in different directions to avoid breakdown of the network.

“We need to widen our vision and see the potential of smart cities, built on smart grid technologies. Smart cities are where people have access to public services such as hospitals and transportation services, as well as governmental departments, all optimised through digital tools for efficiency and efficacy.

“Energy and mobility are the twin pillars of this transformation and both require radical adaptation to meet demographic and economic growth, without increasing congestion and pollution. Infrastructure is key to making sure that everyone has access to the smart cities concept and government can help bridge this gap by making basic services and products such as data and smartphones more affordable.”

Smart can go rural

The idea of creating smart cities does not have to take place only in traditional urban areas, but can also be in rural and remote areas, where people do not have access to basic electricity or water.

There is a need for off grid and mini-grid systems so that the basic needs of electricity, running water and other services can be provided to areas that lack these services. Providing power is more than just lights on; it is a means towards economic development.

“South Africa has a need to provide low cost energy to millions of people and the concept of micro-grids, smart grids and smart cities can bring economic development.
**Cummins boosts production at two glass manufacturers**

Standby power systems from Cummins are providing extra protection at two glass-manufacturing facilities in Lahore, Pakistan, allowing production lines to always be on, and operations to continue seamlessly even in the event of a power outage. In both cases, Cummins offered a quality, reliable product at a price that couldn’t be beaten. Cummins authorised distributor, Orient Energy Systems, provided the project engineering and sales support, with technical expertise from the engineering team.

Ghani Glass is nearly doubling its production capacity at its Model Town Extension plant, from 300 to 550 tons/day. Five Cummins C1400DS gensets provide standby power for the facility, which is being renovated and expanded. It manufactures float glass, used widely in construction and consumer products such as windows, doors, furniture, and mirrors, along with glass containers for pharmaceuticals, food and beverage. It is the No. 1 glass brand in Pakistan, and exports to over 26 countries.

Glass tableware is the cornerstone of Tariq Glass Industries, but the company launched its float-glass division five years ago. Tariq Glass is increasing the capacity of its Lahore Sheikhupura Road, Sheikhupura location, where it is building a new float-glass plant.

As a new customer, Tariq Glass noted the brand reputation of Cummins, along with strong customer service from the OES team as its main reasons for entering into this partnership, which will assure reliable power at the new float-glass division for years to come.

For more information contact Deepa Rungasamy, Cummins, +27 11 589 8512, deepa.rungasamy@cummins.com, www.cummins.com

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**North American EtherCAT Plug Fest offers opportunities**

The 2019 North American EtherCAT Plug Fest recently took place in Denver, USA. Numerous well-known manufacturers of EtherCAT devices came together over two days to test the interoperability of their products in one network with devices from other manufacturers and to exchange ideas with the EtherCAT experts on site.

With more than 35 participants, the event was a resounding success. In addition to the highly productive learning environment, participants particularly liked the fact that they were able to meet so many high-ranking manufacturers of EtherCAT devices.

A total of seven controllers from different manufacturers and 16 EtherCAT field devices, were tested. In addition to extensive interoperability tests, many discussions took place with the EtherCAT experts in attendance. The opportunity to exchange technical ideas during the development phase is one of the major benefits of the Plug Fests.

“The 2019 North American EtherCAT Plug Fest was very productive and successful for everyone involved,” said Robert Trask, North American representative for the ETG. “We were glad to welcome many new Plug Fest participants as well as those who have attended multiple previous events.”

EtherCAT Plug Fests take place several times a year all over the world.

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

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**EM Bloemfontein offers accredited training courses**

The Bloemfontein branch of supplier ElectroMechanica (EM) plans to make significant inroads in the Free State region thanks to its fully-equipped training facility, focusing mainly on automation products such as PLCs, HMIs, and servos.

With its inaugural training session already completed successfully, branch manager Anton Nortje explains that it aims to conduct one major training session each month, with ad hoc training provided as and when required.

EM aims to empower customers not only to have the know-how to best use the products they acquire, but also how to optimise them for maximum benefit. Another advantage is that the training is accredited in terms of Continuous Professional Development (CPD).

“They major advantage of this is to expose our customers to our broader offering and also to make them aware of capabilities and synergies that they might not have previously known about,” comments Nortje. “Now customers know they can approach us for customised solutions to specific requirements.”

The Bloemfontein branch also serves to bring EM closer to its customers in the region. Nortje concludes that training is a critical focus for EM: “Training is knowledge, and we pride ourselves on our capability in this regard.”

For more information contact Karen Zottor, ElectroMechanica, +27 11 249 5000, karenz@em.co.za, www.em.co.za
Professional Forum
An exciting time to be in engineering in South Africa.

What is the Professional Forum?
South African engineers are sought after around the world, globally respected for their "can-do" attitude. Why then do we so frequently seek international assistance on South African projects? That question keeps us up at night. Join us at the Professional Forum, a platform for us to explore how South African professionals are bringing a "can do" attitude to solving industrial problems.

Who should attend?
"Can do" engineering professionals. A variety of single and multidisciplinary projects will be discussed.

Who are affiliated members and why do they get special treatment?
A strong engineering fraternity is at the heart of what we believe can help create a brighter future in South Africa. As a company, Proconics takes pride in being associated with affiliate organisations. As a result, we will sponsor 50% of the entry fee for any affiliated member who would like to attend the Professional Forum.

Affiliate members viable for a discounted entry are:
- ECSA Registered Professionals
- SAIMC Members
- SAIMechE Members
- SAIEE Members
- SAICE Members
- PMI Members

Speakers to look forward to:
Herman Warren, Network Director, Africa, The Economist
Roula Inglesi-Lotz, Professor of Economics, University of Pretoria
Elizma van der Walt (Pr.Eng), Proconics

A word from our CEO
"When I cast my mind back to why I decided to become a chemical engineer the overwhelming memory is one of excitement. I was going to get to build monuments, do projects, change the world. The reality is more exciting than I could have imagined. Can't wait to rub shoulders with other "can-do" engineers."

Melvin Jones
Schneider Electric announces local manufacturing and reduced lead times

Schneider Electric South Africa has announced that its PIX Easy Air Insulated Switchgear, previously 100% internationally manufactured, will now have a 68% local finishing process, reducing the customer waiting period from 12 weeks to 4 weeks, and boosting local manufacturing and empowerment.

“This is only the second local manufacturing licence on this particular offering that Schneider Electric global has signed and represents a major step for Schneider Electric South Africa and our Gauteng-based RWW Engineering partner,” said Taru Madangombe, vice president of power systems, Anglophone Cluster for Schneider Electric.

“Through this partnership, we are able to service our customers quickly, with the certain knowledge that the local assembly meets the stringent global requirements and standards of Schneider Electric.

“This type of deal is crucial to grow the South African economy and boost our exports, as we are now able to reach other markets outside our borders, as evidenced with the projects that we have already done in Ghana with RWW, subsequent to the signing of the PIX project.

“President Ramaphosa is pushing for support of local manufacturing and design and this is key to our organisation in terms of making sure that we transfer the knowledge and skills to our own people in the country. We are committed to increasing this local content, possibly even aiming as high as 80%.”

“This has been a long and involved design process,” added Jeremy Woods, director of RWW Engineering.

“Safety is a prime concern with switchgear and PIX Easy is locally made to meet international safety requirements. I believe that this kind of high-quality equipment will be well received in the market.”

The PIX Easy Air Insulated Switchgear adapts to all electrical power distribution requirements up to 17.5 kV. It is metal enclosed, intended for medium voltage applications such as those found in HV/MV or MV/MV substations, buildings and industries.

“PIX Easy is essential for electrical utilities and smart cities,” concluded Madangombe. “It is utilised in the food and beverage, automotive, water and wastewater, small industries and life sciences.”

For more information contact Prisca Mashanda, Schneider Electric SA, +27 11 254 6400, prisca.mashanda@se.com, www.se.com/za

F’SASEC launches second training centre at Sedibeng TVET College

Representing an important milestone in its access to education journey, the French South African Schneider Electric Education Centre (F’SASEC) network has launched a second practical training laboratory at the Sedibeng TVET College (Sebokeng Campus) in Vanderbijlpark, Vaal Triangle.

The new laboratory was unveiled at the F’SASEC Electrical Artisan Acceleration Day, hosted at the college. Addressing attendees, Zanelle Dalglish, Head of Sustainable Development and Academy for Anglophone Africa, at Schneider Electric South Africa, emphasised the importance of practical training in the F’SASEC network’s efforts to provide access to education.

“Female empowerment is a focus to encourage gender diversity within the network,” explained Dalglish.

“The network also places emphasis on a holistic approach to training: a lot of time is spent on life skills at the F’SASEC Centre of Excellence at the VUT, for example, we teach our students how to present themselves during interviews and develop CVs. If you look at the F’SASEC students, they are well rounded individuals, which is an important differentiator when entering the job market.

“Attention is given to digital artisan training at F’SASEC, which includes exposure to industry automation. This is important to us as an energy management and automation leader with a focus on digitisation and the Fourth Industrial Revolution.”

The F’SASEC network spans six prominent South African tertiary education providers: Vaal University of Technology (VUT), University of Johannesburg (UJ), Cape Peninsula University of Technology (CPUT), Sedibeng TVET College, College of Cape Town (CCT) and Eastcape Midlands College (EMC). The network has already expanded beyond South Africa’s borders to include an agreement with Don Bosco in Mozambique where two training laboratories are being supported by the Schneider Electric Foundation and Schneider Electric South Africa.

Delegates and students at the F’SASEC Electrical Artisan Acceleration Day.

For more information contact Prisca Mashanda, Schneider Electric SA, +27 11 254 6400, prisca.mashanda@se.com, www.se.com/za
SEW-Eurodrive supplies Movigear units for German project

SEW-Eurodrive has supplied 64 Movigear servo motors from its Cape Town branch to a major OEM based in Paarl, H.G. Molenaar, which in turn supplied a weighing conveyor system to a German-based leader in the frozen fish and vegetable packing sector.

The Movigear solution was ideal for this application due to its 200:1 speed range, together with the fact that these units are designed specifically for the strict hygiene requirements of the food-and-beverage industry. In this regard, the units have no sharp edges or corners where bacteria can accumulate, in addition to featuring a special H200 protective coating. This was added to the surface of the unit to protect against all types of chemical cleaning agents.

“The gearbox and motor are a single sealed unit, together with all of the electronic controls,” explains SEW-Eurodrive’s Paul Strzalkowski, who heads up mechatronic sales at the Cape Town branch. “This equates into a significant saving in terms of the panel size required.”

Another feature is on-board I/O control that interacts directly with the Movigear electronics, meaning no additional wiring to the master PLC. Thus, all control is via the SBus protocol directly from the master PLC, daisy-chained to the drives themselves.

In addition, the system had to contend with a temperature range from -25 to 25°C. Special oil for food-and-beverage applications was also required to protect against harm caused in the unlikely event of a leak developing.

Commenting on the feedback received to date, Strzalkowski says that the client is particularly happy from a commissioning point of view, due to the considerable saving on wiring and installation time. Another pleasant surprise was the significant improvement in energy consumption – 50% lower than anticipated.

“The beauty of Movigear is everything is prewired,” concludes Strzalkowski. “Each unit is daisy-chained, which results in the reduction in cabling required. This was a flagship project for the flexibility and cost-saving benefits of the solution.”

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

BMG’s comprehensive range of bearings extends from precision miniature bearings used in machine tools and electronics applications, to giant size bearings that meet the demands of steel and mining industries.

The company has 105 branches throughout southern Africa and continues to expand on the continent. BMG has become Africa’s leading distributor of bearings, seals, power transmission components, drives and motors, as well as belting, hydraulics, pneumatics and filtration. The company also supplies valves, lubrication systems, instrumentation, fasteners and gaskets. An important area of growth for BMG, is in the tools and equipment sector.

“BMG’s specialist divisions have advanced technical skills to support the company’s commitment to applying technical knowledge and depth of experience to maximise the efficiency and profitability for every customer,” says Wayne Holton, business unit manager, bearings division, BMG. “The company has secured distribution and service agreements with some of the world’s most respected manufacturers of bearings, including NSK, NTN, Timken, IKO and Rollix. Our extensive bearings portfolio is carefully selected in terms of consistent quality controls, compatibility, standardisation, reliability and extended service life.

“To enhance performance of bearings and for added protection, BMG has developed specialised sealing systems for bearing housings, to suit specific operating conditions. Added to this, associated bearing maintenance products include installation and removal tools, induction heaters, adaptor and withdrawal sleeves, as well as lubricants, lubricators and lubrication systems.

“The company’s technical resources division is committed to enhancing process plant operating reliability in every industrial sector. Specialist services encompass technical applications consulting, product and system design, on-site process analysis, product quality control and assurance, as well as condition monitoring services.”

The BMG team is committed to working closely with customers in all industries to investigate the source of bearing problems and to provide cost-efficient solutions for optimum productivity of machinery, extended service life of the system and minimal maintenance requirements.

For more information contact Wayne Holton, BMG, +27 11 620 8428, wayneh@bmgworld.net, www.bmgworld.net
In 2015, Rand Technical Services, formed in Pretoria in 1989, was strategically divided into two sister companies – RTS Africa Engineering and RTS Africa Technologies. RTS Africa operates from a small central office in Brooklyn Pretoria and a factory in Silverton, supplying specialised technologies throughout Africa. The company has vast experience in supplying spin filtration, laser-based gas detection and electrolysers for hydrogen production.

“We provide specific systems integration services with these technologies,” says managing director, Ian Fraser. “For instance, we have been involved in undertaking the local upgrade of automation systems on the hydrogen generators supplied by our principals – NEL Hydrogen in Norway. As projects demand, we expand our staffing levels by insourcing trusted consultants and contractors, to accommodate the work on hand.”

RTS is the sole representative for numerous companies in Europe, the UK and US including NEO Monitors (gas and dust analysers); H2Scan (hydrogen leak detection and process gas measurement solutions); IMR (environmental equipment); NEL (hydrogen generators); Nafco (air, gas and liquid filtration systems); and Procon (boiler tube leak detection).

RTS Inertial Spin Filter

In addition to an internationally recognised range of products, RTS also offers its own locally designed and developed RTS Inertial Spin Filter. These self-cleaning filters, which are engineered locally, contain a module imported from the US. Metalworking is outsourced to a local company and assembly is undertaken at the RTS factory. The factory also includes a calibration facility, developed primarily for hydrogen instruments, but which is now being expanded to cover other product types.

RTS Inertial Spin Filters provide an effective maintenance-free solution to dust problems in MCC rooms, transformer rooms, control rooms, for example. The filtration principle is based on highly efficient cyclone technology and dust reduction is 98% of 15 µm and larger particles, and ensures that no secondary filtration is required. This eliminates the need for expensive, complex, high-maintenance bag houses.

“The spin modules are made from high-density polypropylene and are highly resistant to wear,” explains Fraser. “Modules supplied by RTS have been in service for over 20 years. Since the system is self-purging, there is no filter element that can become blocked from dust overload.”

The company provides sales and services throughout sub-Saharan Africa, and is also available for NEL Hydrogen service support in South America. “We would like to expand our operations in the markets in which we currently operate while maintaining our high service level standards,” says Fraser. “The company has a number of clients in the mining, chemical, petrochemical and industrial sectors, and a growing market for RTS is the hydrogen sector. Hydrogen will soon replace fossil fuels as a primary energy transfer medium and we are well positioned to provide technology and services in this industry.”

Recent projects that the company has completed include major overhauls of hydrogen generators at various locations including power stations and sugar mills. It has also supplied large inertial spin filter ventilation and SO2 stripping systems for mine control rooms in the platinum industry.

Customer service and satisfaction is paramount at RTS. Fraser says that the team will go the extra mile to provide an effective solution to problems, since satisfied customers are the best advertisement.

“Our policy is to provide a holistic end-to-end service and engineer solutions to each individual application,” he concludes. “We are a small, niche company that can undertake large projects by applying adaptability in our approach terms of technical acumen and by utilising third-party resources.”

For more information contact Ian Fraser, RTS Africa Technologies, +27 12 433 6335, info@rtsafrica.co.za, www.rtsafrica.co.za
TRAINING

**FESTO**

- Mechatronic Engineers
- Maintenance and Repair Staff

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Durban 22-24 Jan 2020

**PN100 – Intro to Modern Industrial Pneumatics**
Port Elizabeth 29-31 Jan 2020

**PN111 – Modern Industrial Pneumatics – Basic**
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**PN142 – Fault-Finding in Industrial Automation**
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For more information contact Sammy Kanye, Festo, +27 11 971 5586, DidacticTaC.za@festo.com, https://www.festo-didactic.com/za-en/training-and-consulting/

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**MECOSA**

- Radiation Protection Officers

Radiation Protection Officers – Training Course on the Use of Radioactive Isotopes in Industry
Johannesburg 11-12 Feb 2020

For more information contact Michelle Ramphal, Mecosa, +27 11 257 6100, michelle@mecosa.co.za, www.mecosa.co.za

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**SIEMENS**

- Automation Engineers

**PI-FLOW – Process Instrumentation – Flow Meters**
Midrand 3-5 Feb 2020

**TIA-MICRO1 & 2 – S7-1200 Micro Course**
Midrand 3-7 Feb 2020

**PI-LVL – Process Instrumentation – Level Measurement**
Midrand 10-13 Feb 2020

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

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**VEGA**

- Automation Engineers

Measurement Solutions – Level, Pressure and Nucleonic Measurement
Roodepoort 22-23 Apr 2020

For more information contact Claudia Olver, VEGA Controls SA, +27 73 172 1437, claudia.olver@vega.com, http://www.vega.com/

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

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

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

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

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

This year, I challenge you to try something that you are truly passionate about. In 2019 I took the plunge and bought an entry level 3D printer. It changed my life completely. I am now only limited by my imagination as to what I can produce on it. It also sparked a higher level of creativity and fun within our home, as we can now produce customised artefacts.

People still ask me what I do with it, and how I justified buying it? Well, I saved money every month while looking at my options and waited for the best deal I could find. The first thing I printed was the default print, went through the learning curve, and figured out how it all works.

Then the next thing I printed was for my four-year-old niece, who saw the printer for the first time. Nobody told her how it works. She just heard it could print anything, and she immediately asked me if it could make her a pink puppy. From there, there were no limits on customised things I could print.

I hope this year you can find something for yourself, be it a committee where you serve to change the specifications in our industry, or mentoring youth and assisting them with ECSA registration. Or how about buying an Arduino and building stuff with your children? Be brilliant and find your passion. Take the plunge. Do things you know in your heart you should be doing, but never have the time for.

Opportunities within the SAIMC

There are always opportunities to get involved within the SAIMC. This year, you will see our structure change and the transition is aimed to ensure that the SAIMC is the ultimate guiding voice in industry, and also to provide opportunities to be part of a life changing technical community committed to excellence. I invite you to get involved.

The SAIMC has eight branches across South Africa. Please attend one of the AGMs and let your voice be heard as a member on who the leadership for your branch should be. Branch leadership is an entry point for individuals who want to be on council, and we welcome fresh ideas.

Yours in automation,
Annemarie van Coller.
The November technology evening was on the topic of shutdown planning, which was clearly of interest and attracted an audience of over sixty members and visitors to the usual venue at the Durban Country Club. Several members, who had been upgraded, were presented with their certificates by Hennie Prinsloo before the technical presentation began.

Alassandro Macedo, director of Instroworx, gave an informative talk as he took an attentive audience through the sequence of planning, execution and critique of work involved when a process plant has to be shut down for maintenance or upgrading.

Pre-shutdown work, essential for developing a successful plan, was the starting point of this presentation where typical activities were demonstrated together with timelines. After answering questions on some of the details, Alassandro moved on through the materials procurement and handling phase, for which the importance of having a multi-disciplinary and experienced team was shown to be critical for a successful outcome.

Next there came the actual shutdown, for which there were key points highlighted as requiring attention, and an example shown of a check list for work execution. Finally he covered post-shutdown activities, noting that there are always learning points throughout the process that could benefit future shutdowns.

What of the future for shutdown planning and implementation? A video demonstrated potential to use connectivity between the field workforce and a centralised information system, which can be used to supply data plus loop and hook-up drawings, while tracking actual versus planned progress so that resources can be optimised.

After a final question and answer session, Alassandro was thanked by Hennie who also thanked Instroworx for co-sponsoring the evening. The evening concluded with some lively networking over a meal and drinks.

Interested readers can find an in-depth article on the subject on page 32.

Golf day winners WIKA Instruments.

The year's last technical evening was sponsored by the SAIMC. Vaal branch manager Juaandré Heyneke gave an in-depth presentation on the SAIMC, where he explained the goals of the organisation, both nationally and at branch level. The main goal of the SAIMC is driving the recognition of automation as a separate engineering discipline, together with the Automation Federation, to get our youth equipped to make use of the technologies and designs of the Fourth Industrial Revolution. In 2019, the SAIMC spent 21% of its membership fees on developing the youth via the FIRST Tech Challenge and the MyFuture 4.0 exhibition.

The evening was capped off with recognition given to the most faithful Vaal Branch members who attended technical evenings throughout the year:

• Platinum certificate – Poon Schoeman.
• Gold certificate – Elwil van Jaarsveld, George Papadouris.
• Silver certificate – Albert van Wyk, Piet van der Berg.

Golf day
The branch ended the year on a high note by successfully hosting the 2019 Golf day on 8 November. Juaandré Heyneke thanks all committee and SAIMC members who contributed to making this day a resounding success.

The 4-man scramble format was hosted at the picturesque 18-hole Heron Banks course. The event was well attended by Patron members and other control and instrumentation organisations. The day concluded with a prize giving and a braai, where everyone could network.

Congratulations the winners:

• 1st place – WIKA Instruments.
• 2nd place – Metso.
• 3rd place – ifm.

The branch would also like to thank all the organisers at the Heron Banks Golf Estate for making this such a memorable event.
Consulting engineers, system integrators & project houses

Abacus Automation
Abacus Automation supplies innovative, custom-developed technical solutions using standard PLCs, drives, scada and motion control equipment and is Siemens approved for crane automation. With 22 years in the industry, this award-winning and internationally acclaimed company has highly qualified, experienced and professional staff. It operates out of offices in KwaZulu-Natal.

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sales@abacus-automation.co.za
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Autotronix
Autotronix is a recognised leader in industrial automation design and implementation having attained its ISO 9001 certification. Autotronix offers its clients turnkey control system integration services for energy management, PLC/HMI/scada/VSD, manufacture of control panels, applications for water distribution and manufacturing. The company operates from offices in Gauteng and KwaZulu-Natal.

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EHL Consulting Engineers
EHL Consulting Engineers offers comprehensive C&I services across all industries including control system design, software development and system integration; legacy system upgrades and replacements; process automation and optimisation; and IS and SIL services.

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Iritron
Iritron is a new millennium technology company providing quality solutions in the fields of electrical instrumentation and control systems engineering, systems integration and simulations. It has a proven ability to manage projects efficiently and produce high quality results. It has an extensive track record of successfully implementing plant infrastructure reticulation, designs, and automation and information systems. 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.

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Control Software Solutions - CSS
Customer-centricity allows CSS to attain a high percentage of repeat business from its growing customer base. With a solid 16 years’ experience in designing customised C&A solutions, CSS partners with customers in relationships thriving on information sharing and open communication enabling them to enhance customer operations. Supplier Certification provides customers with the assurance that the CSS team is completely up to date on current trends and technology as indicated by a number of prestigious awards.

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Moore Process Controls
Moore Process Controls provides process automation and optimisation solutions to realise the maximum potential of your plant and assets. Our offerings include DCS, PLC, scada, compressor control solutions, MES, production management and predictive maintenance systems, control loop optimisation, alarm and energy management systems, plant security and access management systems, Matrikon OPC, OSI Soft, dashboards and historians, wireless and data solutions including digital twin, process simulators and training simulators and cloud-based IIoT solutions.

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Moore Process Controls

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.

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Afrilek
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 for projects, panel manufacturing, support and services, training as well as product distribution. With experience in MES, MIS, DCS, PLC/scada, IoT, networks and security; Afrilek has a solution for you. Afrilek is a proud BBBEE, ISO 9001 and CIDB accredited company.

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What began as a small South African engineering firm is now a global leader in Engineering, Procurement and Construction Management (EPCM), and Engineering, Procurement and Construction services (EPCs).

EHL has embraced the principles of broad-based black economic empowerment. We are Level 2 B-BBEE, ISO 9001:2015, CIDB. Siemens, Schneider, Wonderware and Rockwell certified. Automation Innovation, it’s the new AI.

The Group restructured and created three operating entities, each focused on delivering best-of-breed projects while offering a complete value chain solution.

At the same time a vibrant, contemporary corporate identity was launched in celebration of the positive shift in ownership.

For 40 years, not a lot has changed. Until now.

Over the past four decades, EHL has grown into a multi-disciplinary engineering group, with world-class skills and experience across the mining, minerals, industrial, telecoms and petrochemical industries.

But not everything had to change. EHL continues to offer the market:

- Professionalism, integrity, reliability, value and service,
- Turnkey solutions tailored to clients’ needs, with a unique end-to-end approach,
- Seamless, dynamic communication between the planners, engineers and on the ground project managers ensuring that an agile problem-solving approach is adopted throughout a project.

BORN IN AFRICA. GLOBALLY ACTIVE.
ARCA: masters of innovation and variety in control valve solutions

Dating back to 1918, ARCA Regler has earned global recognition for specialising in control valves, manufactured and marketed around the world primarily for the chemical, food, power, petrochemical, steel, pharmaceutical and oil and natural gas industries.

ARCA’s Ecotrol control valves: committed to perfection in every detail
ARCA’s Ecotrol range offers a wide variety of innovative solutions designed to fulfil all control task requirements. Whether housing, inner valves, valve seats, stem seals, actuators, or positioners, every detail benefits from the know-how of expert engineers with many years’ experience in a wide range of applications. Factors such as efficiency, control precision, price/performance ratio, weight, and lifecycle costs are all optimised to suit user requirements in order to deliver high control precision and lower operating costs.

Ecotrol offers a wide range of process tailored valve internals, including standard parabolic plugs (either metal seated or with the patented ARCA soft seal system), multistage low-noise perforated as well as double-guided valve plugs.

**ARCA: masters of innovation and variety in control valve solutions**

**High-performance valve actuator**
The pneumatic multi-spring actuators, with robust construction and integrated explosion protection, are characterised by short actuating times, optimised actuating forces, and reliable tight sealing. Valves are also available with electric or electrohydraulic actuators.

**Multi-functional positioner**
The ARCAPRO digital positioner is a multi-functional interface with integrated bus support for the controller or process control system. Installation and mechanical connection to the valve actuator are compliant with VDI/VDE 3847 guidelines for open, non-proprietary concepts.

**Reliable stem seals**
From the stuffing box to the hermetically-sealed bellows, this stem seal can be tailored exactly to the process fluid, pressure and temperature required. The design, stem surface and packing material complement each other perfectly to avoid problems with friction, corrosion and emissions.

**Fixed-form housing seal**
The design connects the valve housing and the bonnet in force bypass and the seal is clamped in place preventing it from yielding. This housing/bonnet design also ensures that the valve seat and plug are not subject to any lateral forces, which helps prevent leakage.

**Robust, high-precision valve trims**
These are specially designed for the prevailing flow conditions in a plant. The shapes of the throttle valves and seats, and the materials from which they are made, are optimised to meet user requirements. Valve seats integrate the unique quick-exchange system and can be replaced without special tools. The float-mounted clamping seat and the metal or soft seal for the valve seat ensure leak-tight, reliable sealing.

**Ecotrol in action**
A number of ARCA Ecotrol control valves were supplied on a project to Sasol South Africa a few years ago, including the 28” (DN 700) Ecotrol valve seen on the cover. These valves stand some 3 m tall and weigh 5100 kg.

On another project ARCA Flow Controls in Houston, Texas, the US subsidiary of ARCA Valves Germany, recently received an order for the delivery of several large anti-surge control valves. The specialised valves, designed for several compressor lines in Mexico, went online early in 2018. The anti-surge globe-type control valves were designed from the proven Ecotrol modular parts system and tailored to prevent the
compressors from pumping under stressful conditions in the plant. They also prevent any disruption at the compressor blades in order to preclude damage.

Integrated in the bypass section of turbo-compressors, the valves reliably carry out multiple tasks simultaneously, for instance, assisting during the start-up and shut-down phases of the compressor. Excess amounts of gas are diverted or blown off at critical points, or when the machine must be kept operating at constant speed as consumption fluctuates. The most important function, however, is that of a safety valve as used to provide protection for the compressor stage. Proven ARCA valves reliably prevent pumping action when a stall is encountered or a minimum flow rate is undershot.

The compressor lines in Mexico each consist of one single-screw compressor driven by a gas turbine. Two lines were installed in a pipeline station in La Laguna in the Mexican federal state of Coahuila. The other three lines are at a pipeline compressor station in Villa de Reyes in the federal state of San Luis Potosi.

The pipelines will deliver natural gas to CFE (Comisión Federal de Electricidad) power stations as well as industry plants. The compressor station’s output serves a pipeline of about 1500 km, which transports the natural gas from the north into the country’s interior.

When choosing the anti-surge valves, various things were considered including ARCA’s vast application knowledge and reliability record, as well as the easy to maintain clamping seat design. ARCA offers advanced solutions for anti-surge control valves and the continuous development of the Ecotrol modular parts system further satisfies the growing demands of the compressor manufacturers’ market. A high flow rate, low noise level, fast reaction times, as well as high control accuracy, are among the many advantages of this modular valve system.

The ARCA Flow Group: a never-ending search for a better solution
The success of the ARCA Flow Group builds on an innovation that was filed for patent protection by Ragnar Carlstedt back in 1917. Today, this spirit lives on and has become an inseparable part of the organisation’s history and corporate culture. The ARCA group includes ARCA ARTES, von Rohr, WEKA and Feluwa. In 2017 / 2018 ARCA celebrated the one hundred year anniversary of the ARCA patent and of the company foundation.

All the answers for perfect control
In addition to the products of the Ecotrol range ARCA’s expertise extends to the design and manufacture of a variety of control solutions as demonstrated in its numerous patents.

The extent of this expertise is ably demonstrated in the variety of valve and actuator solutions available for high pressure, angle pattern, pressure reducing, and desuperheater applications:

- High pressure: in all thermodynamic processes ARCA three-way valves are applied for example in high pressure applications for transferring, compressing and pre-heating stations, as well as in overheating processes in power stations. In use for several years now, these valves have demonstrated excellent performance, delivering long service life under the harshest operating conditions. Furthermore, they can be applied in gas pipeline systems.
- Angle pattern: ARCA developed its angle valve series for use in difficult working conditions. In sonic relevant applications, for instance, it is often recommended to use angular valves because the flow of the medium is turned only once by 90°, contrary to single or double seated valves. The process medium flows into the angle control valve from the side or the bottom and exits after just one deflection.
- Pressure reducing: pressure controllers of ARCA’s Roboter series can be used anywhere pressures of fluids, gases and steams are to be kept constant. Special features include the flexible adaptation of measuring range and the variety of mounting options. The reversible actuator of these pneumatic control valves enables the choice of safety function for the control plant (spring to close/open).
- Desuperheater: in contrast to other valves that operate according to the stroke principle, ARCA’s desuperheater utilises quarter-turn movement. As the valve stem is turned, the ball contour located directly behind the water connection opens and flow to the desuperheater lance is enabled. Water flows through the hollow stem and reaches the nozzles through openings designed in such a way that there are no ‘steps’ in the characteristic transfer curve. By using nozzles with different bore diameters, any characteristic curve can be realised – fine-tuned to the user’s application.

Other innovations that round out the valve programme from ARCA include:

- Modular parts system with standardised components.
- Flow-optimised housings.
- Optimised valve trim comprising cones and seats for all applications.
- Standardised interface to valve actuators.
- Valve trims can easily be completely removed and plugs and stems replaced.

For more information contact Desmond Delport, Valve & Automation, +27 11 397 2833, sales@valve.co.za, www.valve.co.za

www.instrumentation.co.za January 2020 17
The demand for raw materials is rising, which means reserves should be dwindling. Producers around the world are thus working toward the goal of generating more with less. The result, which seems contradictory at first glance, is that reserves are increasing thanks to technological innovations.

While our planet boasts a wealth of natural resources, industrialised nations and the large emerging ones, especially China and India, are developing an ever-increasing appetite for raw materials. Furthermore, the reserves – those resources that can be extracted economically and with today’s technology – are often distributed unequally. Most of the large deposits have already been developed, while cannot be economically used since they are too finely dispersed to be easily extracted or lie in inaccessible regions.

The resource crisis in perspective
Under pressure from all sides, the phrase ‘resource crisis’ is used on a regular basis, sometimes with a focus on scarce or uncertain supplies, other times with concerns about the price structure. Geopolitical issues play a role as well, given that access to the deposits is often confined to narrow geographical areas, and on the markets national trade policies consequently meet global industry structures. On the other hand, the way in which metals and minerals are wrested from the earth often concerns environmentalists. The objective is to make the extraction of raw materials more sustainable by reducing both energy consumption and the impact on nature. As a result, raw materials producers are feeling pressure from all sides. Although demand for their products is high, geopolitical frameworks, price sensibility and political demands are making the business anything but simple. Approval processes are becoming more complicated, the necessary investments are increasing and yields are sinking, such as with gold, which can be found in nearly all electronic products in tiny amounts.

The technical trends are already becoming visible. In mining, for instance, complex chemical processes or bioleaching with bacteria aims to make it easier to release the minerals from the rock. The underground mining sector is also seriously considering highly automated extraction methods. Real-time mining, an EU-sponsored research and innovation project, has named two major objectives: decrease environmental impact; and increase resource efficiency. Achieving these goals will require continuous process monitoring and highly selective mining operations, thus resulting in less energy consumption and less excavated material. If the industry is successful in making this transformation, reserves will continue to grow. This is a trend that has long been observed as a consequence of new exploration and technological advances, such as with copper. In 1970, usable copper reserves were estimated at roughly 280 million tonnes. That number has since risen to between 600 and 800 million tonnes, despite the fact that the industry mined around 520 million tonnes over the past five decades.

Recycling raw materials
Reserves also increase when the recycling loops are effectively closed. In contrast to other raw materials, metals can be recycled over and over because they are used, not consumed. A third of copper production is already covered through recycling today. At around 800 million tonnes a year, steel is the world’s most recycled material. However, the much-discussed concept of urban mining – the process of recovering raw materials from used products,
Mineral & Metals

UWT has taken a traditional method of content measurement in silos and storage hoppers and remastered it to enable seamless integration with modern-day control systems and PLCs. The UWT NivoBob continuous level measurement system offers a high-tech version of a simple and reliable measurement principle, which works as follows:

• The sensor weight drives down on a measuring rope/tape.
• The rope/tape length is electronically measured by the rotation of the internal roller.
• Material contact stops movement.
• The motor changes the direction of rotation.
• Sensor weight is driven back to the upper stop position.
• The distance is measured, and signal outputs are activated (pulse/relays/4-20 mA/Modbus/Profibus).

Application example

The challenge: level measurement to be carried out in storage silos for gypsum powder. The finished product is conveyed pneumatically into the storage silo after production. The overall production planning is difficult if the fill level monitoring of the storage silos is missing. The operator previously had to climb onto the silo roof and carry out a manual level measurement with a rope and a weight. This yielded inaccurate results and caused stock losses due to poor management and control. The task was to automate the level measurement and to avoid manual interventions.

The solution: the UWT system Nivobob 3200 in the tape version fulfils these extreme requirements. The integrated tape cleaner prevents contamination of the band interior. The Nivobob 3200, thereby, provides a reliable measurement that can be trusted. Neither dusty nor clumpy conditions adversely affect the system. The electromechanical sensor NB3200 is developed for dusty applications and for high process temperatures and is the best solution in this gypsum storage application.

Note: when it comes to ignoring the cone after filling or the upside-down pyramid after draining the silo/bunker, and achieving reliable, accurate measurement results, experience play a role. The NivoBob must be mounted one third in from the radius of the silo to accurately cancel out the cone effect.

For more information contact Morton Controls, 086 100 0393, sales@mortoncontrols.co.za, www.mortoncontrols.co.za

Data is the key

Although the primaries industry operates in a markedly physical world, the various segments have one thing in common: to implement the necessary innovations, precise and continuous data is required – and it has to be linked so that all of the individual processes can be flexibly controlled in minute detail. “There are a number of things that we could use this data for, such as faster mine planning, more efficient system operation, automation of the extraction process and improving the processing technologies,” concludes Michelle Ash, chair of the Global Mining Guidelines Group, which is driving the transformation of the global mining industry. “Generally speaking, developments suggest that the real catalyst for fundamental change in the way materials are produced could be cyber-physical systems. Maybe resource scarcity won’t result in bad times for the industry after all. Perhaps it’s just the opposite, a brighter future through better technology.”

For more information contact Natlee Chetty, Endress+Hauser, +27 11 262 8000, info@za.endress.com, www.endress.com

Level measurement in silos

Electronic scrap stored at old and new waste disposals is viewed as a major source of secondary raw materials for the future. However, it is still unclear how these resources can be systematically developed, not to mention the fact that the mixture of substances requires exceptionally complex separation processes. Recycling is a topic of discussion in cement manufacturing as well, where enormous quantities are needed to produce concrete for growing cities around the world.

The fields of application for recycled materials are limited, but there is much that can be accomplished in other areas. At 65 to 75 percent of the variable manufacturing costs, energy is a critical factor in the burning of the cement clinker. Alternative raw materials, secondary fuels such as sewage treatment sludge, and more efficient kilns, can help to drastically reduce the consumption of rock and fossil fuels, and thus carbon emissions.

Steel is no different. Up to 40 percent of the production costs are tied to energy utilisation. Both industries are under pressure to develop new solutions to satisfy more stringent environmental regulations around the world. This applies to the mining industry as well, with emerging future technologies changing the needs of the market. Because of the electro-mobility boom, for instance, the demand for lithium, cobalt and nickel is growing. To date, however, the vast amount of nickel extracted from mines is not suitable for electric vehicle batteries, which is forcing mine operators to change their processes to satisfy the growing demand.

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BMG’s Spanjaard lubricants, oils and greases have been developed with the latest formulations and technologies, to meet the demands of all sectors, including mining, automotive, marine, general industry and consumer applications.

“Included in this range are mining lubricants and allied chemicals, that offer solutions for the most difficult lubrication problems,” says Marc Gravett, BMG’s business unit manager, seals and gaskets division. “Spanjaard lubricants and allied chemical products have been formulated to improve performance of equipment and machinery; to minimise operating costs and reduce maintenance requirements in heavy-duty applications.

“Lubrication-related failures in machinery are generally preventable and can be avoided with the application of the correct product. Multipurpose grease is adequate in many applications, but more arduous operating conditions demand the selection of the correct lubricant and lubrication system. BMG takes cognisance of factors such as speed of relative movement, ambient and operating temperatures, loading, vibration and the environmental operating conditions.

“The effects of friction and the resulting wear of moving components are significantly reduced by effective lubrication. The purpose of any lubricant, which may take the form of oil, grease or a solid, is to separate the mating surfaces and thereby reduce friction and wear. For this reason, lubrication is considered to be one of the most important aspects of industrial equipment and machinery maintenance programmes. Not only do oils and greases extend the service life of machinery and equipment, but they also play an important role in enhancing performance of components, like bearings and industrial chain.”

**Products for all applications**

BMG’s range of Spanjaard industrial products includes anti-seize compounds and penetrants, assembly and disassembly products, chain lubricants, transmission oils, cleaners and degreasers, electrical maintenance products, plastic moulding and cutting compounds, as well as engineering and fabrication materials. Also available are a number of Spanjaard greasing solutions, including open gear lubricants and wire rope dressings; bearing and synthetic bearing greases, as well as other general grease products.

Spanjaard EP2 multipurpose grease is an all-purpose lithium-based product, which is fortified with rust and oxidation inhibitors and is suitable for lubrication of plain, needle, ball and roller bearings in mining equipment.

“Lubrication-related failures in machinery are generally preventable and can be avoided with the application of the correct product.”

Spanjaard 1345 wire rope dressing penetrates deep into the core of the rope for continued lubrication of the wire strands and protection against fretting. This dressing contains solid lubricants and anti-corrosion additives, to resist displacement by high-load pressures and water.

Also in BMG’s Spanjaard range is an electric motor cleaner, which is a high flash-point safety solvent, specially developed for removing deposits on electric motor windings. This cleaner dissolves oil and grease and removes dust and grime from electrical and mechanical components and quickly evaporates, to minimise downtime.

Spanjaard chain oil 718 is a medium viscosity chain lubricant, which is used on heavy plate conveyors and is also effective on creasing and cutting machines. This chain oil is based on a highly refined mineral oil and contains MoS2 that acts as an anti-wear agent and extreme pressure additive, providing lubrication when the chain is subjected to shock loads.

The range also includes chain and linkage spray that contains low-friction, soluble molybdenum in a special lubricating base that penetrates like oil deep into linkages and lubricates like grease. This water-resistant spray is suitable for standard and ‘O’ ring type chains, linkages and cables. 360° valve technology allows spraying at all angles, including upside down. This non-staining spray resists fling-off and remains adhered to surfaces in inaccessible places to give long-lasting protection in demanding conditions.

For more information contact Marc Gravett, BMG, +27 11 620 1575, marcg@bmgworld.net, www.bmgworld.net

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**Oils and greases for mining applications**

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Also in BMG’s Spanjaard range is an electric motor cleaner, which is a high flash-point safety solvent, specially developed for removing deposits on electric motor windings. This cleaner dissolves oil and grease and removes dust and grime from electrical and mechanical components and quickly evaporates, to minimise downtime.

Spanjaard chain oil 718 is a medium viscosity chain lubricant, which is used on heavy plate conveyors and is also effective on creasing and cutting machines. This chain oil is based on a highly refined mineral oil and contains MoS2 that acts as an anti-wear agent and extreme pressure additive, providing lubrication when the chain is subjected to shock loads.

The range also includes chain and linkage spray that contains low-friction, soluble molybdenum in a special lubricating base that penetrates like oil deep into linkages and lubricates like grease. This water-resistant spray is suitable for standard and ‘O’ ring type chains, linkages and cables. 360° valve technology allows spraying at all angles, including upside down. This non-staining spray resists fling-off and remains adhered to surfaces in inaccessible places to give long-lasting protection in demanding conditions.

For more information contact Marc Gravett, BMG, +27 11 620 1575, marcg@bmgworld.net, www.bmgworld.net

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**Oils and greases for mining applications**

BMG’s Spanjaard lubricants, oils and greases have been developed with the latest formulations and technologies, to meet the demands of all sectors, including mining, automotive, marine, general industry and consumer applications.

“Included in this range are mining lubricants and allied chemicals, that offer solutions for the most difficult lubrication problems,” says Marc Gravett, BMG’s business unit manager, seals and gaskets division. “Spanjaard lubricants and allied chemical products have been formulated to improve performance of equipment and machinery; to minimise operating costs and reduce maintenance requirements in heavy-duty applications.

“Lubrication-related failures in machinery are generally preventable and can be avoided with the application of the correct product. Multipurpose grease is adequate in many applications, but more arduous operating conditions demand the selection of the correct lubricant and lubrication system. BMG takes cognisance of factors such as speed of relative movement, ambient and operating temperatures, loading, vibration and the environmental operating conditions.

“The effects of friction and the resulting wear of moving components are significantly reduced by effective lubrication. The purpose of any lubricant, which may take the form of oil, grease or a solid, is to separate the mating surfaces and thereby reduce friction and wear. For this reason, lubrication is considered to be one of the most important aspects of industrial equipment and machinery maintenance programmes. Not only do oils and greases extend the service life of machinery and equipment, but they also play an important role in enhancing performance of components, like bearings and industrial chain.”

**Products for all applications**

BMG’s range of Spanjaard industrial products includes anti-seize compounds and penetrants, assembly and disassembly products, chain lubricants, transmission oils, cleaners and degreasers, electrical maintenance products, plastic moulding and cutting compounds, as well as engineering and fabrication materials. Also available are a number of Spanjaard greasing solutions, including open gear lubricants and wire rope dressings; bearing and synthetic bearing greases, as well as other general grease products.

Spanjaard EP2 multipurpose grease is an all-purpose lithium-based product, which is fortified with rust and oxidation inhibitors and is suitable for lubrication of plain, needle, ball and roller bearings in mining equipment.

“Lubrication-related failures in machinery are generally preventable and can be avoided with the application of the correct product.”

Spanjaard 1345 wire rope dressing penetrates deep into the core of the rope for continued lubrication of the wire strands and protection against fretting. This dressing contains solid lubricants and anti-corrosion additives, to resist displacement by high-load pressures and water.

Also in BMG’s Spanjaard range is an electric motor cleaner, which is a high flash-point safety solvent, specially developed for removing deposits on electric motor windings. This cleaner dissolves oil and grease and removes dust and grime from electrical and mechanical components and quickly evaporates, to minimise downtime.

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For more information contact Marc Gravett, BMG, +27 11 620 1575, marcg@bmgworld.net, www.bmgworld.net
Oils and greases for mining applications

Pneumatic components for the Mining Industry

#SMCRaisesTheBar
Contact us for a free consultation on +27 11 100 5866 or zasales@smcza.co.za

www.smcza.co.za

Join the conversation on SMC Corporation (South Africa)
Schneider Electric brings digital competence to mining applications

Schneider Electric is dedicated to the deployment of digital technologies in mining to address the rising pressures on business sustainability and reduced energy consumption.

“The organisation has invested significantly to develop a specialised competence in mining applications,” explains Marc Ramsay, vice president industry business unit at Schneider Electric South Africa. “We believe that technology integration combining energy management, process automation and software through our IoT enabled platform, EcoStruxure, leverages an enabled, open and interoperable architecture to deliver true digital transformation. EcoStruxure enables customers to maximise the value of data and edge control, which translates into actionable intelligence for better business decisions.

“One of the challenges has always been to make real-time decisions based on information that is spread across disparate databases locked within mining hierarchical disciplines. With that in mind, we believe that our technology provides a high level of value through breaking down operating silos both vertically and horizontally across the mining value chain. Connected devices can now be safely and reliably accessed from the cloud and product deliveries can be traced in real-time.”

A truly unique time in mining
“Operational efficiency is still below global benchmarks and plagues our mining industry,” outlines Ramsay. “The management of asset utilisation is a core focus for Schneider Electric’s mining team. Whether we are reducing the mean time to repair of our medium voltage switchgear, or using augmented reality for embedded equipment fault diagnosis, we are dedicated to reducing operating costs and improving the efficiency of equipment and workforces.

“We believe that an important aspect of digital transformation is the human aspect, and while autonomous operation continues to be a compelling and necessary aspect of mining operations, future workforce integration should not be neglected. Already our customers are benefiting from the adoption of EcoStruxure Augmented Operator Advisor, which combines contextual and dynamic information for mobile users. The technology enables them to experience a fusion of the physical environment with an added layer of virtual objects and critical information.

“The mining industry is also a large consumer of electrical energy. Our mining teams work with customers to manage their energy footprint and consider all aspects of the efficiency of the mining process to serve this requirement. Schneider Electric has been delivering complete solutions for the mining industry from low and medium voltage equipment, to transformers and grid automation, for over 150 years. The latest integrated IoT-enabled power management architectures enhance connectivity, network security, real-time operational reliability, and smart analytics for peace of mind and significant financial benefits.”

According to recent studies conducted by independent research companies, autonomous and mechanised mining can have a significant impact on extending the economic life of existing operations, as well as the profitability. But one needs to be cognisant of the impact on jobs, despite the improved safety related aspects of autonomous operations. Schneider Electric has already experienced digital transformation in its own teams and the impact that a digital frontier requires on different working methods. Therefore, the technologies it develops are always with the digital worker in mind, along with the built-in capability to integrate a mobile or transient workforce. Studies have documented that the workforce of the future will on average not stay in their jobs for more than 36 months, and this transition will be amplified in the mining environment, which requires a new level of induction and orientation, along with the workforce having on-hand access to latent or ‘hidden’ operational knowledge. The good news is that digitisation is not only driving operations, but also enabling internal research and development teams to incorporate previously inaccessible technologies in a plug-and-play fashion. Open standards and the adoption of industry protocols has always been the company mantra.

“Of all the trends impacting the mining industry, few will be as critical as effective digitalisation,” concludes Ramsay. “It will affect every aspect of industrial operations and provide the greatest potential for improving business and operational efficiency. The rewards are significant for those willing to explore the potential. It has been estimated that in the next five years, mining industry leaders will achieve their most significant improvements by embracing digital technologies such as the IoT, advanced analytics and augmented reality that harness the power of big data in a secure way.”

For more information contact Prisca Mashanda, Schneider Electric SA, +27 11 254 6400, prisca.mashanda@se.com, www.se.com/za
Micromine assists mining operations in the Industry 4.0 era

Global trends such as Industry 4.0 are transforming the traditional methods deployed to extract ore from rock. Mining operations are instead looking at innovations such as automated drilling in high risk areas underground to enhance safety. This is where software solutions like Pitram from Micromine can assist mining operations to automate, and thereby boost efficiency dramatically.

As a leading software solutions provider for the mining industry, Micromine strives to stay ahead of the curve in terms of trends such as Industry 4.0, commonly referred to as the Fourth Industrial Revolution. Industry 4.0 refers to the current trend in automation and data exchange in manufacturing technologies, including cyber-physical systems, IoT, cloud computing and cognitive computing.

“Currently Pitram is being developed with AI and machine learning functionalities in the software in order to take the product to the next level,” says Africa marketing coordinator, Craig Sternslow. “Pitram is a fully-configurable solution that captures, monitors and reports on operational and production data.”

According to global marketing manager Kate Gilbey, there is an ongoing trend towards increasing automation and even AI to assist mining operations in terms of smart optimisation. In an industry such as mining, where improving productivity is crucial to profitability, even small improvements in yields, speed and efficiency can make an extraordinary impact. AI and machine learning can assist mining companies to find minerals to extract, a critical component of any smart mining operation. Although AI and machine learning are still relatively new in the mining industry, many companies are excited about the prospect of being able to reduce personnel risks, obtain real-time data and make processes more efficient through these types of advances.

“As a client’s operation evolves and needs change, our solutions can be adapted to evolve with the mine. This represents a capital saving to clients, as they can continue using elements of their original, familiar application. Our solutions span the entire mining process, from exploration through to mine production, and cater for all mining operation needs through the provision of our suite of products, friendly and customer-driven staff, services and post-implementation support,” she explains.

Micromine’s research and development teams work around the clock to forecast what its clients and future clients will need in their software toolkit. “This means we have to think about where the industry is going. Our products are evolving constantly. Every major update comes with multiple service packs to fine tune that product,” Sternslow adds.

In this regard, Micromine is developing new underground mining precision performance software that uses machine learning to refine and enhance loading and haulage processes. Using the processes of computer vision and deep machine learning, onboard cameras are placed on loaders to track variables such as loading, hauling, dumping and travelling empty time. The video feed is processed on the Pitram vehicle computer edge device, following which the extracted information is then transferred to Pitram servers for processing and analysis.

In environments where network connectivity is intermittent or does not exist, field computers become critical for computations and integration. Geobank Mobile is designed to operate in this edge computing environment. It has the ability to integrate directly with field measurement devices to deliver a practical and efficient solution to the user. “An exciting new development in terms of Geobank Mobile is its integration with DSLR cameras to capture imagery of the drill hole core,” Gilbey continues. For example, AngloGold Ashanti Australia is using this technology with a camera mounted to a mechanised track that sits above the chip tray. It automatically takes photographs of drill hole geological chip samples. Through seamless integration, these photographs are fed from the camera to the Geobank Mobile solution, which has been configured to rename the file based on the hole identifier.

“As an industry leader in mining software, with offices located strategically all over the world, we are trusted advisors to our clients and can offer sound advice as well as solutions for every need throughout the mining cycle. Our main aim as a software provider is simply to ‘Make Mining Easier’. Mining operations must not be afraid to change and to adapt to the changing mining environment;” Sternslow concludes.

For more information contact
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Sliding gate valves are true all-rounders in the valve technology field and can be used for high-precision control purposes in the fields of natural gas applications, combustion and firing installations, and burner applications. The sliding gate valves from Schubert & Salzer Control Systems have successfully passed the DVGW (German Technical and Scientific Association for Gas and Water) testing according to DIN EN 16678.

Thanks to their special design, which consists of two slotted discs sliding on and sealing against each other, sliding gate valves combine high control accuracy for gas flow with near-zero leakage. Furthermore, the central throttle element, represented by the slotted discs sliding on each other, is subject to little wear so that long service life can be achieved even under extreme conditions.

Thanks to different versions designed with different materials, and the possibility of being combined with all common positioners, the valves can be used in almost all areas of gas processing, distribution and utilisation. For years, the sliding gate valves had a DVGW certification according to the DIN 3394, but, due to the updated regulations of DIN EN 16678 (safety and control devices for gas burners and gas burning appliances), sliding valves have been re-examined by the DVGW and granted the new certification.

The certification covers type GS1 sliding gate valves with both pneumatic diaphragm and pneumatic piston actuator. Consequently, all sliding gate valves of the 8021, 8043 and 8044 series are covered by the new DVGW certification.

The maximum systemic control stroke of a sliding gate valve amounts to only 8 mm. This very short stroke ensures an opening and closing time of 100 ms for the entire stroke at a resolution of 0.1% of the stroke position. This very high dynamic not only improves the regulation quality, but it also forms the basis for control circuits with very short reaction times. This has proven the key to precision and therefore highly economic gas control functions. Sliding gate valves are manufactured with the current DVGW certification in the sizes DN 15 to DN 150, for pressures up to PN 40 and for fluid temperatures from -60 to 350°C.

Top-mounted positioner with optional Ex certification

In addition to the type 8047 analog, electro-pneumatic positioners, Schubert & Salzer Control Systems also offers the 8049 digital positioner, which allows the positioning of these pneumatically driven controllers to be performed. Both the 8047 and the 8049 positioner are top-mounted. This means that the positioner is mounted in a centred position on top of the valve actuator and so does not require additional space on the side. Furthermore, this very compact design keeps all moving parts inaccessible, which maximises operational safety.

If needed, both the 8047 analog, electro-pneumatic positioner (also in the intrinsically safe Ex II2G EEx ib IIC T6 version) and the 8049 digital, electro-pneumatic positioner (in the two wire version, also applying the IS protection class according to ATEX II 2 G Ex ia IIC T3/ T4) can be combined with the DVGW certified control valves.

Thanks to the DVGW certification according to the new DIN EN 16678, the sliding gate valve with its numerous advantages can keep being used as a certified component for gas installations, natural gas applications, combustion and firing installations, or burner applications.

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THIS IS PARKER

Parker enables its partners in the Oil & Gas industry to minimize equipment downtime, increase productivity and protect the environment. This reflects Parker’s commitment to helping solve the world’s greatest engineering challenges.

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RTS Africa Technologies (RTS) is a specialised Tshwane-based company focused on supplying engineered solutions to problems experienced by process engineers in industry.

Efficient combustion saves money
A major problem today is the control of harmful emissions from process plants – including refineries. A significant component in controlling emissions is to ensure that combustion processes are efficient. In order to achieve efficient combustion it is necessary to ensure that air is fed into the process in the correct proportion to the combustible products present. Unfortunately, most of the problems encountered in controlling combustion processes are due to inadequate control of the air mixture entering the process. Control of these combustion processes is essential, not only to reduce polluting emissions but also to optimise fuel efficiency, which can have a significant effect on operating costs.

While it is not the only gas component critical to this process, a primary indicator of incorrect combustion mixtures is the oxygen remaining in the flue gas. In theory, in a perfect combustion process, there would be no oxygen remaining in the flue gas. In practice, a significant reduction in noxious emissions can be achieved by controlling oxygen content in the flue gas to below – at worst 4%, and preferably to below 2%. In practice, we regularly measure oxygen content in flue gasses at over 12%. (Note that there are other indicators of combustion efficiencies such as carbon dioxide and carbon monoxide content in the flue gas.)

The reason for this is that in most combustion processes an operator will go out on the plant and take a spot measure of (say) oxygen. (s)he will then manually adjust the air registers until they get a good (low) oxygen reading. This will probably then not be re-checked for anything up to a week or more. In the meantime, the combustion process is not static, but is affected by changes in the feed stock to the burner and also by changes in the air feed that can be caused by alterations in atmospheric pressure, impact of strong winds, etc.

Elimination of these problems requires accurate and reliable instrumentation and control systems. Over the years RTS has assembled a portfolio of tried and tested technologies that offer cost effective solutions to these problems.

Gas analysers and other solutions
RTS has represented NEO Monitors for nearly two decades. Neo Monitors is a Norwegian company that pioneered the application of laser technology to gas analysis. These instruments have no probes and are capable of measuring one, and in some cases two, gasses (carbon dioxide and carbon monoxide, for instance) in a soup of hydrocarbon and other gasses. The instrument is tuned to detect a specific absorption line for the gas to be measured. It detects only the selected absorption line and is ‘blind’ to any other gasses that may be present. There is therefore no possible cross interference from other gasses that may be present. Installation of a single LaserGas oxygen analyser on the stack with a PID control system to automatically control the air registers can provide constant regulation of the combustion process in real time.

A more conventional, but also effective solution is provided by another RTS principal – US-based IMR. Using conventional probes and integrating a variety of readings in a central continuous emissions monitoring system (CEMS), this range of instruments offers an economical solution to combustion-related operational problems.

IMR’s CEMS are particularly useful for regulating emissions into the atmosphere due to their ability to provide in-situ gas monitoring for multiple gasses within a process stream. Utilising extractive measuring principles, the gas is conditioned before any analysis is performed. The instrument is typically installed in safe areas which are easily accessible to
reduce the risk of injury to personnel when calibration and maintenance procedures are required.

**H2scan hydrogen analysers in catalytic reforming processes**

Catalytic reformers represent a large portion of a refinery or petrochemical plant’s costs, converting low octane feed into high-value reformates. This process both produces and consumes hydrogen; how that hydrogen is managed can have a major impact on profitability. Current technologies used in the CRU are either inaccurate due to the complex background gases, or are only capable of sampling periodically.

H2scan hydrogen analysers provide a continuous, real-time measurement of hydrogen purity in the recycle stream. This allows operators to maintain careful control of the hydrogen/hydrocarbon ratio in the process feed, preventing coking of the catalyst and avoiding the consumption of excess hydrogen. This creates opportunities for:

- Eliminating the need to recycle more hydrogen than absolutely necessary: larger volumes of hydrogen can be supplied as feed to other processes, decreasing the demand for hydrogen.
- Decreasing plant operating costs: by reducing the recycle hydrogen volume, significant energy savings can be achieved at the recycle compressor.

These operational improvements can have a significant financial impact. One Gulf Coast (USA) petrochemical plant has been using H2scan hydrogen analysers to measure hydrogen purity in their reformer recycle stream for over four years. By maintaining the specified hydrogen to hydrocarbon ratio accurately, this plant has saved approximately $2 million per year in hydrogen generation and energy costs. How this translates into ROI:

- Annual savings: $2 000 000.
- Daily savings: $6 000 (assumes 24/7 operation, 48 weeks per year).
- Installed cost of HY-Optima 2730: $75 000 (approximate cost assumes analyser and new sample conditioning system).
- ROI in 13 days (even if the annual saving is only $1 million, ROI is still less than 1 month).

H2scan’s HY-Optima 2730 hydrogen specific analysers measure hydrogen in complex, varying gas streams. The solid state, non-consumable sensor technology used provides real-time continuous hydrogen purity data with no cross-sensitivity to any other gases in the stream. No reference or carrier gas systems are required to report real-time hydrogen concentrations based on fast response times.

For more information contact Ian Fraser,
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**Instrotech** now offers Keller’s range of intrinsically safe electronic pressure gauges for use in areas subject to gas explosion risks. The type approvals are compliant with the ATEX Explosion Protection Directive regarding explosive gases. The electronic design of these devices is trimmed to minimise energy consumption, so it is also possible to replace the batteries inside areas with explosion risks.

The simplest version, model ECO 1 Ei, offers high resolution and reproducibility for both measuring ranges (-1 to 30 bar and 0 to 300 bar), together with accuracy (typical) of 0,5% FS and an integrated min/max memory. The application range as per the ATEX directive is defined by identification markings Ex ia IIC T5 or T6.

Keller’s type Leo 1 Ei and LEO 2 Ei electronic pressure gauges feature microprocessor-assisted compensation to ensure an extremely narrow total error band (including temperature errors) of 0,2% FS over the entire range of operating temperatures from 0-50°C. The zero point can be selected freely within the four measuring ranges and an automatic switch-off function guarantees energy efficiency. Both models feature sampling rates of 2 Hz and integrated min/max memories. The special feature of the Leo 1 Ei is its additional memory for peak values. In peak mode, even extremely short-lived peak values for system pressure are registered with a sampling rate of 5000 Hz. For both these pressure gauges, the application range as per the ATEX directive is defined by identification markings Ex ia IIC T5 or T6.

Another version of the Leo type electronic pressure gauge, the Record Ei, is equipped with an integrated data memory to record pressure and temperature progressions in the measuring medium. Outside of areas with explosion risks, the data can be transmitted via an RS-485 interface to a PC for evaluation with the Logger 4.X software. The instrument can register pressures of up to 1000 bar with a total error band of 0,1% FS. With a capacitive sensor, this type is also available for very low measuring ranges starting from 30 mbar. The application range as per the ATEX directive is defined by identification marking Ex ia IIC T4.

Featuring accuracy of up to 0,01% FS, the Lex 1 Ei electronic pressure gauge is a genuine reference and precision measuring instrument that has been specifically equipped with a 5-digit display for calibration and testing purposes. Pressure measurement ranges of between -1 and 1000 bar are available. This device also offers a min/max memory and a digital interface to generate PC protocols. The application range as per the ATEX directive is defined by identification marking Ex ia IIC T6.

Features that are shared by all Keller digital pressure gauges include simple parameterisation and operation with only two buttons, while the pressure display can be shown in various physical units that are freely selectable.

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

Ease of flow monitoring with low maintenance benefits is a given with the compact plug and play EGE SNS 450 thermodynamic flow sensor from Countapulse Controls – the sole southern African agent for EGE’s full range of flow sensors and controllers. According to managing director, Gerry Bryant the innovative screw-in adaptor on the EGE thermodynamic flow sensor allows for universal use in a variety of applications. The adaptor is screwed into a T-piece or a welding sleeve and the probe is then secured in this adaptor using a union nut. Users are reassured of the integrity of the connection, which is sealed up to 100 bar.

The EGE sensor, which includes an LED display for ease of use, can function in temperatures from -20 to 80°C and is suitable for controlling the flow of fluids such as water, glycol mixtures and chemicals. Ingress protected to IP67 standards, the design of the sensor, which features no moving parts, is focused on elimination of any failure that would be caused by oxidised bearings, torn impellers or deflector deformation. With a robust construction, the EGE flow sensor is resistant to corrosion and is ideal for use in both liquids and air, as well as in hazardous environments. “This is a welcome addition to the Countapulse Controls product line-up and complements the company’s existing range of sensing solutions. All are geared around reliability and longevity, combined with uncompromising accuracy,” says Bryant.

Countapulse Controls offers a comprehensive range of sensing, measurement, counting, switching, monitoring and positioning instrumentation, with customer support provided through a round-the-clock technical advisory service hotline.

For more information contact Gerry Bryant, Countapulse Controls, +27 11 615 7556, bryant@countapulse.co.za, www.countapulse.co.za

Magnetic inductive flowmeter in stainless steel

Instrotech has announced the introduction of Kobold’s MIM magnetic inductive flowmeter. MIM features IO-Link, a short distance, bi-directional, digital, point-to-point, wired, industrial communications networking standard used for connecting digital sensors and actuators. It is now also available in a remote version for temperatures up to 140°C.

The new flowmeter was developed for measuring and monitoring smaller and medium-sized flow of conductive liquids in pipes and operates according to the electromagnetic measurement principle. Faraday’s Law of magnetic induction states that a voltage is induced in a conductor moving through a magnetic field. The electrically conductive measuring agent acts as the moved conductor. The voltage induced in the measuring agent is proportional to the flow velocity and is therefore a value for the volumetric flow. The flowing media must have a minimum conductivity. The induced voltage is picked up by two sensing electrodes which are in contact with the measuring agent and sent to the measuring amplifier.

The flow rate is calculated based on the cross sectional area of the pipe. Measurement does not depend on process liquid properties such as density, viscosity and temperature. Two given outputs can be set to be switch, analog or frequency. A dosing function can also be selected, where output 1 is set as switch NPN/PNP/PP and output 2 is set as control input. Other features include:
- Coloured, multi-parameter configurable TFT-display, rotatable in 90° steps.
- Bidirectional measuring.
- Intuitive setup menu via 4 optical touch keys.
- Resettable totaliser.

For more information contact Instrotech, +27 10 595 1831, sales@instrotech.co.za, www.instrotech.co.za
ABB has expanded its digital analytical measurement range of solutions with the launch of the AWT420 transmitter. The new four-wire, dual channel analytical instrument measures multiple parameters in a single device, optimising process performance for efficient water usage and treatment. It is simple to integrate, is data secure and fast to upgrade in the field.

Capable of measuring multiple parameters including pH/ORP, conductivity, dissolved oxygen and turbidity, the AWT420 is versatile and user-friendly. Key to the transmitter’s versatility is its use of interchangeable communications and sensor modules enabling the transmitter to be upgraded as required without having to purchase additional units. Modules for HART, Profibus, Modbus or Ethernet communications and ABB’s digital EZLink pH/ORP, conductivity, dissolved oxygen or turbidity sensors are available.

Each pluggable module is factory calibrated and can be removed and exchanged via the transmitter’s hinged door, allowing fast upgrading in the field. The transmitter’s intuitive interface, simple set-up menus and one-button calibration routine also eliminate the need for specialist installation or commissioning expertise.

Additional operational flexibility is provided by the transmitter’s dual channel design. Users can opt for analog or digital sensors or a mixture of the two, providing the convenience and associated cost savings of using a single device for multiple measurements. The inclusion of integrated PID enables the transmitter to provide direct or reverse acting control. In pH applications, this function can also be used to provide dual acid/base control.

When it comes to installation, wall, pipe and panel-mounting options enable the AWT420 to be fitted virtually anywhere. With a choice of corrosion-resistant polycarbonate or durable metal versions, plus a safe, non-incendive design with cULus and ATEX / IECEx approvals, the AWT420 provides a single solution for both standard and hazardous applications in the utility, process, power and marine sectors.

For maximum usability, the transmitter incorporates a host of features enabling quick and easy access to measurement, diagnostic and audit data. It’s easy-to-navigate full-colour TFT display means sensor data can be quickly located and viewed in-situ via the device’s display or saved onto an internal SD card for analysis using ABB’s DataManager Pro tool. The inclusion of Bluetooth technology also enables operators to obtain up-to-the-minute information and technical support via a smartphone using ABB’s EZLink connect app.

To avoid data tampering, multi-level security access prevents unauthorised configuration or calibration changes. Password protection ensures that changes can only be made by authorised users, with the details of any alterations, including dates, times and the person responsible, stored in an audit trail. Multi-level security access also ensures that users can only perform tasks within their specific profiles, with a choice of read-only, calibrate and advanced security access levels.

For more information contact Sumaya Abdool, ABB South Africa, +27 10 202 5617, sumaya.abdool@za.abb.com, www.abb.com
In order to monitor the process of reverse osmosis and ensure that deposits do not clog up membranes and reduce system efficiency, Martens, a member of the GHM Group, has joined the forces with its Condix 4623 digital 4-electrode conductivity converter and the GHM-ONE multi-function HMI controller.

The conductivity device detects whether the untreated water is unsuitable for operation in the system, whilst the multi-function device provides the measurements to the superordinate PLC via a Profinet fieldbus, where it is easily integrated by means of a GSDNL device description file.

Reverse osmosis does not only produce the permeate that is the filtered raw water, it also produces retentate, a concentrate that is unable to pass the membrane. It is an effect that can reduce the efficiency of the system and result in damage if the scaling effect of dissolved contents exceeds the solubility limit and deposits accumulate. An over-saturation of calcium carbonate must also be prevented.

In order to counteract both of these effects, an antiscalent is added to reduce the precipitation level and the water to be treated is adjusted to an acidic level in order to prevent oversaturation with calcium carbonate.

Jan Grobler, managing director of GHM Messtechnik South Africa says, “The pH value at this point is the measured variable for the correct dosing. The objective is to minimise the use of additives with maximum filter effect.

The development of ammonia, which is toxic for fish, must be avoided. The concentration increases and decreases analogously to the prevailing pH value, therefore, the pH value is monitored in the process input and upstream from the discharge and conditioned as necessary.

“The combination of the Condix 4263 and the GHM-ONE multi-function controller offers a superior analysis technology specifically for process water monitoring in order to prevent membrane clogging and system under performance. Accurate analysis protects the material of the system from undesired deposits that require cleaning with the benefits of reduced downtime and increased productivity.”

The relevant results are visualised by the GHM-ONE, which is connected to the measuring probes via RS-485 (Modbus RTU) and the measured values can be read at any time on its display, so that conclusions can be made about the system status throughout the entire process cycle.

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

**Digital float switch**

As its first instrument of this kind, WIKA has launched a float switch with a PNP/NPN output signal. The model GLS-1000 detects the level of liquids with an accuracy of 1 mm or less.

The digitised float measuring principle of the new level switch is implemented using semiconductor sensors, which enable an unlimited number of switching cycles. Users can define up to four switch points with a minimum distance of only 2,5 mm. Thus the instrument reacts to even the smallest changes in level. At the same time, the GLS-1000 can monitor the temperature of the medium via a temperature output with a Pt100/Pt1000 resistance.

Even with the electronic circuitry, the digital float switch is also an economical measurement solution due to its similarity in design to its conventional counterpart. With the GLS-1000, traditional PNP/NPN limit level switches can now also be replaced by a float switch.

For more information contact WIKA Instruments, +27 11 621 0000, sales.za@wika.com, www.wika.co.za
CIP cleaning facilities are primarily used in those installations where hygiene and product safety are paramount, for instance breweries and food production. Throughout the process the complete production facility, including tanks and conductors, are purged and rinsed with cleaning agents and water in several cycles. The aim of CIP is to remove product residues and microorganisms from all wetted surfaces inside tanks, pipework and filling machines, while not disassembling the plant. To warrant optimum and economical cleaning, all parts in direct contact with the product must be made according to the principles of hygienic design. Anderson-Negele’s motto “Hygienic by Design” is an expression of commitment that sensors fulfill this superior demand of the food processing industry in an exemplary manner.

How Anderson-Negele’s ILM-4 can help
Analysis of the return media is one of the most important steps for an environmentally friendly and cost-efficient CIP process. The ILM-4 inductive conductivity meter plays a central role in precisely determining the phase separation: during the discharge of the liquids at each cleaning stage the media are differentiated with cost-saving accuracy. Reusable cleaning agent that flows off after cleaning can thus be returned to the tank to the maximum possible degree. For permanent optimum cleaning result, its concentration is adapted to the specified ideal value by re-dosing with detergent and fresh water in the cleaning agent tank. The ILM-4 conductivity meter also ensures the precise measurement of conductivity and temperature required here.

The instrument is designed for controlling of CIP processes (e.g. phase separation detergents/water) in hygienic applications in food, beverage and pharmaceutical manufacturing. It is currently equipped with the IO-Link, which offers important benefits over analog technology when it comes to reliably controlling processes with a variety of measuring points, control and operating elements.

For more information contact Morton Controls, 086 100 0393, sales@mortoncontrols.co.za, www.mortoncontrols.co.za
It is inevitable in that in some shape or form, all plant workers will at some stage be involved in the shutdown of a facility. Planning is essential to ensure that this shutdown is executed within both the time and budget constraints. In practice, the phases are divided between pre-shutdown and the shutdown itself.

Pre-shutdown phase
In pre-shutdown, workshops and work scopes are the starting point in the cycle. Once scopes are identified, required resourcing as well as prescribed timings to execute the work are entered into an agreed upon shutdown plan. In this phase, a quality control methodology needs to be established of how the work will be checked and accepted by the relevant parties prior to restart. Budgets are also then created from vendor inputs to determine the realistic cost of executing the turnaround.

The first step to a successful shutdown is to determine as accurately as possible the scope of all field, rack and software requirements. Once derived, a SWOT workshop is conducted to determine the strengths of the team e.g. experience of staff, preciseness of work etc. Weaknesses could also present in the form of site databases not reflecting as built conditions, or potential procurement weaknesses. Opportunities could establish the need to assign expert contractors for certain deliverables. Threats could be late placement of orders on vendors, as well as using contractors not familiar with the relevant site implementation standards.

In the pre-shutdown phase it is essential to engage with suppliers timeously once work scopes have been reviewed and approved by the relevant parties. Shutdowns rely heavily on the assistance of suppliers to supply the correct equipment identified timeously to meet the critical path timelines. Once equipment is received, ensure upfront that it is all correctly identified for installation in the plant, and setup correctly with required ranges etc, where practically possible, in order to save time during the shutdown.

Engage with on-board field installation contractors some time beforehand, in order to ensure they are aware of the exact scope of the work to be performed, as well as in which areas, prior to the actual shutdown commencing. They can also start installing related infrastructure without affecting plant production prior to the shutdown, in both the rack room and the field, thus saving valuable time. Where practically possible, do off-line testing of software implementations to ensure they are vetted and accepted by plant representatives prior to implementation of the shutdown.

The shutdown and post-shutdown phases
During the shutdown, daily feedback is required from all the parties to ensure that the management team know exactly where they are, i.e. ahead or behind schedule, in order to allocate resources accordingly. Items to monitor during this phase include:

1. Ensure hold points are adhered to for work process flow.
2. Ensure contractors/field staff have the correct documentation packs – all too often this is ignored.
3. Ensure correct equipment (flow transmitters etc.) is identified and pre-configured for installation.
4. Interact with all disciplines (mechanical, electrical etc.) to ensure all relevant feedback is required to assess the scopes of work.
5. Ensure all QCP documentation has been filed in correctly prior to handover.

A shutdown post mortem is highly recommended to discover which tasks went well as well as identifying areas for improvement at the next shutdown. Discuss with suppliers positives and negatives, as well as with other disciplines were applicable.

Shutdowns of the future
Plants should have Wi-Fi installed throughout the facility to enable a connected workforce, which has all shutdown related work scopes in the palms of its hands e.g. loop and hook-up drawings etc. When the work is complete it automatically signals the associated supervisor for that area that work is ready for checking and automatically rolls up progress reports in the associated shutdown software.

This also allows management to determine the critical path of the shutdown, and where resources need to be allocated to ensure that things remain on track. This is all in real-time and reduces the requirement for multiple paper copies of the same report.

The shutdown data can then also be statistically referenced to determine resource loading and scoping for future shutdowns.

For more information contact Instroworx, +27 31 818 0345, info@instroworx.co.za, www.instroworx.co.za
Accurate results with rugged Fluke thermal camera

Leading an industrial maintenance team requires a unique combination of communication skills, industry knowledge and technical expertise. Implementing standard work and a preventive maintenance programme is more than just good for business – it also aligns the team with a common goal of safely and efficiently keeping the plant up and running.

Choosing the right tools can make a significant difference in the success of these types of programmes. Comtest is pleased to announce Fluke’s new Ti300+ infrared camera for reducing unexpected breakdowns and improving work execution by helping maintenance teams to find issues before they actually become problems. The Ti300+ has the resolution and accuracy needed to clearly reveal temperature differentials or demonstrate progressive heat changes over time.

With LaserSharp AutoFocus the camera ensures focused images, every single time. With the touch of a button, the built-in laser distance meter calculates and displays the distance to the designated target on the camera screen and takes the image in focus. Most importantly, temperature readings from images are highly accurate. The Ti300+ enables the team to get clear images with touchscreen simplicity, while maintaining a safe distance from operating equipment. Other Features include:

• 320 x240 resolution.
• Measures up to 650°C.
• Engineered and tested to withstand a 2 metre drop.
• Manual or automatic focus.

In conjunction with Fluke Connect desktop software for connectivity, the Ti300+ is able to generate professional reports in minutes, while efficiently capturing full radiometric data to support the maintenance programme:

• Edit and optimise images.
• Combine infrared and visible images for simpler analysis.
• Create detailed reports.
• Access thermal images from cloud storage.
• Organise and search images by asset, severity and title.

For thermal images to illustrate an issue, users need to know the equipment and understand the subtle difference between normal and abnormal operating temperatures. Also, confidence in the ability to capture accurate thermal images plays a significant part, and having a Fluke Ti300+ thermal camera with LaserSharp AutoFocus makes everything much easier. Finally, users need a thermal camera that is rugged enough to capture quality infrared images even if it gets dropped.

For more information contact Comtest, +27 10 595 1821, sales@comtest.co.za, www.comtest.co.za

Inline sensor status indicator

Machine downtime can be costly for any company and identifying the problem can be time-consuming. The S15L series inline sensor status indicator can be mounted on a sensor for 360 degree-visibility of power and status. With its highly-visible body, it allows workers to identify and troubleshoot problems faster, which decreases downtime. Response time is quicker since the S15L is easily accessible, can be mounted anywhere, and is easy to use. Inline connection allows for simple problem identification.

Simple setup and management

The indicator enables rapid integration into existing applications. It can be applied not only to Banner sensors, actuators, and touch buttons, but also a wide variety of industrial 4 and 5-pin devices. It can be connected directly to the quick disconnect of most sensors, so no additional hardware is necessary. A double ended cable can also be used to connect the S15L anywhere in-between the sensor and the power source. Whether it is used for jam-detection on a conveyor belt or to pinpoint a sensor with active output status and is hidden within a machine, its over-moulded design is reliable and rugged to withstand harsh industrial environments.

The 4 LEDs contained in the device produce two colours, green and yellow, to identify power and output status. Its low-profile design makes it ideal for bright indication in tight spaces. For example, the S15L can be placed in line with part in place sensors that may not be visible to the operator to indicate that the sensor power is on (green) or that the part is in place and the output is active (yellow).

Applications

The indicator is an ideal accessory in industries that require highly visible indication, such as automotive, material handling, and general assembly. It improves safety, productivity, and quality in a wide variety of applications including:

• Bright indication to mimic sensor power and output status.
• Two colours – green for power and yellow for sensor output active status.
• Rugged over-moulded design meets IEC IP66, IEC IP67, and IEC IP68.
• Connected directly to a sensor or anywhere in-line for easy visual indication.
• Models available with PNP and NPN inputs.

For more information contact Brandon Topham, Turck Banner, +27 11 453 2468, brandon.topham@turckbanner.co.za, www.turckbanner.co.za
Martec launches new asset health solutions

Condition monitoring specialist Martec has announced the inclusion of two new services to complement its range of condition monitoring (CM) solutions. The Asset Health Portal and Reliability Nerve Centre (RNC) will form the backbone of the in-time monitoring services and reliability improvement initiatives, in support of sustained plant integrity.

Managing director Johannes Coetzee explains that, traditionally, most CM companies would support the client’s needs by selling handheld CM assessment tools with training related to the application of the tools. In some cases, they would also offer a service where they take samples and data (of mostly mechanical phenomena) at a set frequency on behalf of the client. The data is then presented as a static report, but many of these reports never get the needed attention or action due to being a one-sided interpretation.

He continues: “We enhanced this model by adding specialised electrical CM assessments (i.e. partial discharge, dissolved gas analysis, power quality, etc.) on critical plant assets such as transformers, switchgear, large motors, large generators, HV and MV cables, and by performing quality assurance inspection plans prior to the commissioning of these assets. The latest addition to our offering is the in-time CM monitoring service which is backed by the Asset Health Portal and RNC.

“Advances in the IIoT and sensor technology has made it cost effective to acquire the full set of trending and diagnostic data required to run an effective CM programme on critical assets, whilst mitigating health and safety risks and eliminating inaccurate data acquisition practices posed by using an individual to manually collect this data.”

Arveen Gobind, asset reliability executive responsible for the RNC, says it is effectively a control room that monitors, diagnoses and triggers alarms with recommended actions: “The RNC is an online monitoring solution where key parameters are selected and monitored, and which provides insight to the assets condition and risk, related to defect development and potential asset failure.”

Coetzee adds that authorised Martec and client employees can remotely access the system from anywhere in the world: “The data obtained from the monitored parameters are turned into useful information, utilising engineered algorithms. These algorithms even provide automated digital notifications with recommended actions based on failure modes, to improve reliability and availability. Furthermore, a team of experts support the client and system by performing advanced diagnostic analysis on critical alarm levels – being significant deviations or breached thresholds. This is a huge benefit as more than one parameter is usually monitored on a critical asset, which requires an expert’s understanding of when the combined result of these parameters require the asset to be pulled for maintenance. Such informed interventions are key in the prevention of unplanned outages that could result in significant production and financial losses for the organisation”.

The newly introduced Asset Health Portal manages various asset documents such as drawings, manuals, modifications, commissioning tests, optimisation settings and periodic assessment reports. Gobind elaborates: “The periodic assessment results are presented in an easily interpretable dashboard per sub-plant with risk level indicators. These risk level indicators are updated and trended with every assessment. Our team also uses additional static data as inputs to provide an overall risk ranking of the asset. Comments and recommendations are posted on the platform, indicating where the client should focus their attention on reliability improvement.”

Coetzee believes these new services will have a significant impact on clients: “Our clients will have visibility of their assets’ condition together with quantified risk levels in real-time, 24/7. Reliability engineers can adopt predictive maintenance tactics, which will inevitably lead to reduced downtime and maintenance costs. Simply producing vast amounts of data can be overwhelming. We believe that turning the data into useful information in an easily accessible and interpretable form relates directly to bottom-line value.”

In today’s competitive world, ensuring a sustainable business entails empowering employees with outstanding information, knowledge and skills. Martec’s services and tools are supported with SAAMA accredited training courses based on detailed studies of what organisations are looking for in accordance with industry job profiles.

Coetzee concludes: “As a member of the Pragma group of companies, Martec is committed to delivering world class reliability enhancement products and engineered asset management solutions to asset intensive enterprises. We pride ourselves in having a highly qualified engaged workforce with a single focus to deliver excellent service to our clients, giving them peace of mind 24/7.”

For more information contact Martec,
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www.martec.co.za
BAMR is a Cape Town-based company that supplies, repairs, services and calibrates instruments, especially in the coatings, corrosion, physical paint testing and allied industries. It has been the supplier and distributor of Elcometer instruments and equipment since 1947 in South Africa and the rest of Africa.

BAMR is a third-generation family business that was started on 22 May 1946 by Fred Duk, a former SADF airforce pilot. The offices were in Spin Street, Cape Town. The company also had an office in Johannesburg, which it was forced to close after the tragic death of Fred’s older son, Donald, who died in 1961. Six months later, Fred also passed away, and his youngest son Frank took over the business and continued to work at BAMR for 47 years until his retirement. The company moved to Newlands in 1973.

British American Manufacturers Representatives

In 1998 Graham Duk joined BAMR and has succeeded in growing the business into what it is today. Frank retired in 2008 and Graham, who is the eldest of three sons, has been running the business ever since. “The company name is an abbreviation of what was initially British American Manufacturers Representatives,” Graham explains. “As the company expanded and increased its supplier base, the name was changed to British Allied Manufacturers Representatives, but is still known by the abbreviation BAMR.”

BAMR has placed more focus on its online presence over the last five years, and mainly uses its website and print media to reach new business. It currently employs six staff members, which has doubled over the last two years due to growth in the company, and its sales expansion into sub-Saharan and most of the rest of Africa.

“Although we get a lot of referrals from satisfied customers, our distributor network is a key component of our strategy to reach new markets and industries. BAMR is a small family business and we have mostly relied on word of mouth for sales and marketing. We don’t have FAEs or sales reps, as most of our client base and reputation as a thought leader in the industry has been built over the last 73 years of being in the business. We have a good relationship with our distributors, situated throughout South Africa, who promote our products to existing and potential clients,” Graham says.

BAMR offers training on a regular basis, in partnership with the company Elcometer, which comes out from the UK for the purpose. These training courses are conducted in the main cities around the country, as well as in Namibia, Botswana and potentially Zimbabwe soon. It also does in-house training for its bigger clients, and in March this year it appointed a key accounts manager who works from Northcliff in Johannesburg.

“BAMR has steadily grown over the 73 years of being in the industry. We have gained new suppliers and let go of others. Our main supplier, Elcometer, made its first export sale in 1947 to BAMR and has always been our biggest supplier. Our product focus has always remained the same: supplying quality control instrumentation to the industry. We represent some of the market leaders in the world in southern Africa and strive to combine quality products at competitive prices, with personalised service.”

Graham says Elcometer gauges are considered the best value-for-money gauges in the industry, and has recently launched equipment specifically for the abrasive blasting industry. On an interesting side-note, the first ever coating thickness gauge that was manufactured by Elcometer was used in an early James Bond movie.

“Our vision is to maintain our position as a thought leader in the industry and a leading supplier of quality coatings and corrosion measurement instrumentation and equipment in Africa. We want to be the best in what we offer,” he concludes.

For more information contact BAMR, +27 21 683 2100, sales@bamr.co.za, www.bamr.co.za
I recently attended the MESA conference held at the Zulu Inyala Country Manor. Run over two days, this was the 11th instalment of this meeting of the minds in industry, and more importantly, a sizable amount of end users who utilise MES and MOM in their businesses.

People, productivity and profitability
This was my third attendance at a conference, which, over the years, has followed the direction of industry very well. This latest event had a focus on people – a lot of focus on people. The conference flavour was Vision 2020 – People, Productivity and Profitability, with the presenters all touching on these three topics somewhere in their respective presentations.

The overarching message was that people are concerned about people in the digital age, and I was somewhat set at ease considering my future in this 4IR evolution we’re experiencing right now. With the focus on people came the reification that the current employee will not and should not be cast aside in favour of another who embodies the requisite set of skills, as long as the current employee is willing to be retrained to meet the demands of 4IR.

The presentations were on point, relevant, and some were also funny and very engaging, something I enjoy. Often, conferences can drag on with somewhat boring slides about a very interesting topic, but this event reinvigorated the 4IR interest in me. Seeing that totally left field businesses, such as PwC were now dabbling in 4IR and digitalisation was inspiring. I think this is what a conference should aim to achieve, to inspire the audience to take back what they’ve learnt and adopt it within their organisations. The digitalisation flavour was as strong as expected, and the winning presenter from Exxaro, Eje van Jaarsveld, really took us through his journey showcasing digitalisation at work via an autonomous drill. Another stand out presentation was PwC’s Vinesh Maharaj and their digital upskilling strategy and implementation. PwC enables employees to learn for the digital skills requirement; they identify skills and then enable their employees to learn at their leisure from content relevant to the digital age.

Sasol’s Jairus George and Louis van der Walt explained how they overcame a barrage of regulations and red tape, flying drones in dangerous environments such as petrochemical plants and mining operations for graphical map displays, digital map interactions and pipeline and tank inspections. OSIsoft’s Wade Potts explained the intricacies of a cow’s life analysed in minute detail, which farmers did not have

11th annual MESA Africa conference
Lance Turner
Lance Turner is an MES specialist employed at Sasol's Secunda plant. He has an honours degree in Information Systems with a focus on Enterprise Architecture design and solutions. A certified MESA MES/MOM student, his passion is amalgamating general IT across the manufacturing spectrum. Lance’s vision is for a converged IT and manufacturing discipline that will become the reality of Industry 4.0. His team motto is MES services that are always available, always stable, and always dependable.

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access to before, via ‘fitbits’ for cows relaying data. Charlotte Botha from Distell gave us some helpful and insightful pointers on the implementation of an MES solution at one of their larger distilleries.

Conclusion
What I always remember about a conference are the food, venue and the guest speakers, and the 11th edition of the MESA conference did not disappoint. The guest speaker list was top tier both from an inspirational aspect as well as an industry knowledge viewpoint. Rich Mulholland got everyone’s attention on day one when he reminded us that 4IR is not a revolution it’s an evolution, and that we will get through it. Archie Moore reminded us that we define the culture in our organisations and we should embrace each other’s differences. I could relate this by peering over the crowd as I made notes for this review. The conference indicated to me that the manufacturing industry is opening up its doors. I never saw so many females at this typically male dominated gathering. I also saw a good mixture of cultures. What I’d like to see going forward is a mixture of generations, there are very few young professionals at these events, I’d like to see more youngsters attending MESA conferences in future, as this is a good platform to learn from the industry’s trendsetters.

Overall it was a most enjoyable two days. I expected a bombardment of knowledge that would have no bearing on my current work reality. I was wrong. The user presentations really made this event, one learns so much from another company’s implementation and use of technology. I encourage organisations from both private and public sectors to attend next year’s event to get insight into how others are embracing the notion of 4IR and digitalisation, networking with industry professionals, and, of course, enjoying the food, drink and laughter – it’s definitely worth it!

“What I’d like to see going forward is a mixture of generations, there are very few young professionals at these events, I’d like to see more youngsters attending MESA conferences in future, as this is a good platform to learn from the industry’s trendsetters.”
Industrial Ethernet switches reflect ongoing evolution at the IIoT ‘thin edge’

By Chantal Polsonetti, ARC Advisory Group.

Today’s digital transformation strategies require data connectivity throughout the architecture to fulfill the quest for improved operations. These requirements necessitate extracting meaningful data from devices, assets and processes. This is needed not only to automate processes, but also to provide input from ancillary functions such as energy management, environmental monitoring, and related performance variables with the potential to generate operating improvements.

In the machine building realm, OEMs increasingly leverage industrial Ethernet capabilities to add value, differentiate offerings, gain competitive advantage, and meet customer requirements related to Industry 4.0 and the IIoT.

While 5G networks offer tremendous future potential, industrial Ethernet wireline networks are the current technology of choice to achieve connectivity in both industrial and infrastructure applications. Ethernet’s advantages in core performance areas, such as speed, bandwidth, and capacity remain compelling relative to legacy fieldbus and most existing wireless alternatives.

Continued advancements in Ethernet technology expand its reach and capabilities. Some of the most important developments include faster speeds, higher bandwidth, higher wattage PoE (Power over Ethernet), and the prospect of standard real-time deterministic Ethernet.

Serving the thin edge of IIoT architectures

Digital transformation strategies have evolved from cloud-centric architectures to those that increasingly rely on the industrial edge. Customers look to the edge to address shortcomings of cloud-centric strategies in areas such as latency, bandwidth, OT protocol support and security. This leads to strategies that emphasise “edge where you can; cloud where you must.”

The edge concept itself is evolving in response to refined edge-to-cloud relationships, including ongoing tiering into a connectivity-centric ‘thin edge’ vs. a compute- and-store-oriented ‘thick edge’, characterised by greater capability inherent in products such as industrial edge servers.

ARC anticipates industrial Ethernet switches (IES) to remain firmly rooted in their connectivity role at the thin edge of this emerging multi-tiered stack, with continued reliance on gateways, routers, and thick edge devices for edge-to-cloud integration and edge computing. This is reflected in the strategies of most leading IES suppliers, many of whom rely on thick edge devices for edge-to-cloud integration. Market share leader Cisco is an exception, with the company’s Iox edge compute platform supported in its IE 4000 switches and throughout its network infrastructure portfolio.

Ongoing evolution at the network infrastructure tier

The thin edge or connectivity tier is undergoing profound change due to continuing technology evolution and standardisation. This is true regarding not only the expanding number of available devices that meet industry-specific requirements in segments, such as transportation (EN50155), electric power T&D (IEC 61850-3), and surveillance (PoE); but also in technology areas such as Gigabit Ethernet, Time-Sensitive Networks (TSN), IIoT, and network management, among others.

Continued advancements in Ethernet technology expand the reach and capabilities of industrial Ethernet architectures. Speed
and bandwidth continue to increase, and suppliers are responding by introducing switches supporting GB, 2.5 GB, and 10 GB speeds. PoE standards, important for powering edge devices ranging from wireless access points to video cameras used in surveillance applications, are similarly evolving, with devices supporting the new 90-watt IEEE 802.3bt standard ratified in 2018, already becoming available.

IEEE 802.1 TSN with or without OPC UA
IEEE 802.1 TSN and the associated joint IEC/IEEE 60802 TSN Profile for Industrial Automation have the potential to deliver a common real-time industrial Ethernet at the lower layers of the network hierarchy. This would eliminate the need for proprietary implementations to enable deterministic performance in even the most demanding applications. These developments have the potential to overcome decades of fragmented proprietary technologies, but could face their own challenges with complexity and interoperability due to differing vendor implementations of the multi-part standard.

Industry efforts are under way to extend the possibility of a unified industrial network stack by combining the OPC UA publish-subscribe specification with TSN. The ‘Shapers Group’ within the OPC Foundation is a primary force behind this effort, whose ultimate impact is expected to take longer than TSN implementation. Readers interested in further information on IEEE 802.1 TSN as well as the efforts to combine it with OPC UA pub-sub are encouraged to reference the extensive coverage on ARC’s website.

Enabling further process decentralisation
Ongoing addition of incremental industrial Ethernet capabilities will enable organisations to pursue decentralised, even autonomous, operation by distributing communication away from central processors. This will enable more direct communication between machines capable of controlling their own logic and initiating subsequent process steps. Availability of redundancy mechanisms, such as DLR (device level ring), MRP (media redundant protocol), PRP (parallel redundancy protocol), and HSR (high-availability seamless redundancy) in managed switches furthers this possibility.

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RS Components introduces 4ZeroBox IIoT development system

RS Components has introduced the 4ZeroBox IIoT unit from Italian manufacturer TOI. 4ZeroBox is the hardware component of TOI’s 4ZeroPlatform, a plug-and-play data gathering, processing and reporting system designed to optimise Industry 4.0 smart manufacturing and factory-maintenance processes.

IIoT is both an opportunity and a challenge for large and small enterprises alike. Manufacturers typically need to capture and process data from new and old machines produced by different vendors, while machine developers and system integrators aim to differentiate their designs with diverse IoT communications functionality. Complex interfacing and data management issues have to be overcome to unlock advantages such as full process visibility, lower maintenance costs, and effective integration with ERP (enterprise resource planning) and MES (manufacturing execution systems) software.

4ZeroBox is a versatile modular IIoT unit that can be installed into both legacy and modern industrial equipment, allowing rapid integration with sensors, actuators and cloud services. Based on a 2.4 GHz Espressif Systems ESP32 microcontroller with 4 Mb of flash memory, it comes in a DIN-rail mountable case with industrial-grade sensor channels and support for WiFi, Bluetooth, Ethernet, LoRa, CAN, RS-485, RS-232, SD card, JTAG, I2C and SPI. 4ZeroBox can be extended using any of hundreds of MikroElektronika click boards via two onboard MikroBus sockets. The product includes a Zerynth Virtual Machine premium licence, so it can be programmed in Python or hybrid C/Python. Zerynth includes a compiler, debugger and editor, as well as tutorials and example projects for easy learning.

Also included is a one-year subscription to TOI’s 4ZeroManager, a cloud-based or on-premises device management service for organising, monitoring and remotely updating connected devices at scale. 4ZeroManager includes a web interface to control connected devices and customise data forwarding to other services such as ERP and MES.

4ZeroBox finds application in a wide variety of industrial contexts, from production plants to industrial refrigeration, waste management, precision agriculture, transportation and logistics, energy and utilities, retail, and smart homes and buildings.

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IFS study reveals AI investments looming on the business horizon

Global enterprise applications company, IFS, has announced the findings of a research study into the attitudes and strategies towards artificial intelligence (AI) among business leaders.

The study polled 600 business leaders, across a broad spectrum of industries, involved with their companies’ enterprise technology including ERP, enterprise asset management (EAM), and field service management (FSM).

Key findings
• About 90 percent of respondents reported at least some plans to implement AI in various parts of their business. Industrial automation was the most commonly reported area of investment with 44.6 percent planning AI projects, while customer relationship management (CRM) and inventory planning and logistics tied for second place at 38.9 percent.
• When asked how they plan to use AI, 60.6 percent said they expected it would help them make existing workers more productive. Just under half, 47.9 percent, said they would use AI to add value to products and services they sell to customers. About 18.1 percent said they would proactively use it to replace existing workers.
• While a majority of respondents anticipated productivity increases from AI, 29.3 percent anticipated AI would lead to a reduction in headcount in their industry. To manage this, 56 percent of respondents stated that society could best prepare by changing educational programmes to prepare workers to make direct use of AI tools to increase their own productivity. Another 23.4 percent said they expect the market to create new jobs for people displaced by AI, while 15.4 percent suggested a shortened 30-hour work week.

“AI is no longer an emerging technology. It is being implemented to support business automation in the here and now, as this study clearly proves,” said IFS VP of AI, Bob De Caux.

“We are seeing many real-world examples where technology is augmenting existing decision-making processes by providing users with more timely, accurate and pertinent information. In today’s disruptive economy, the convergence of technologies such as AI and IoT is bolstering a new form of business automation that will provide companies which are brave enough with the tools and services they need to be more competitive and outflank larger competitors.”

An early adopter of industrial automation solutions that makes use of robotics to transform its business strategy is leading North American packaging manufacturer Cheer Pack, which deployed a fleet of AI-powered autonomous vehicles to robotise material movements in its US factory. It has already seen strong returns on the investment.

Cheer Pack director of IT, Alex Ivkovic, noted:
“We expect the cost savings to be over $1.5 million per year. In addition, each and every employee will be retasked to a higher-skilled position, helping us with our labour shortage.”

De Caux concluded: “The findings of the study and the real-world scenarios being realised by our customers point to the conclusion that the time is right for companies to reap both business and financial benefits from automation technology. Falling for the hype of AI is easy, but success requires disruption to existing business models. The technologies themselves are not a panacea, nor are they a universal solution to any problem. However, with the right data model and viable use cases, AI can support improved productivity and deliver significant benefits to both operations and the wider business. AI will be used by the vast majority of organisations in some form in the near future, extracting real value from intelligent processes for the long-term.”

The complete study: ‘How are companies planning to adopt AI and adjust to resulting disruptive change’, can be downloaded at https://tinyurl.com/sjyrfsq.

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New Mindsphere app from Siemens

Comprehensive service package
Predictive Services for Drive Systems comprises a comprehensive service package where first a digitalisation check is carried out and then the connection to MindSphere is established. The MindSphere Predictive Service Assistance app supports customers continuously by providing an overview of assets and service triggers, for example defined KPIs and operating hours based on predictive analytics. The app also offers transparency and detailed information for spare parts depending on the configuration of the drive system and for recommended and pending service work. In addition, it includes an assistant for planning, implementing and documenting maintenance activities and offers an easy ordering function via the Siemens ServiceMall and the Global Service Platform (GSP).

With Predictive Services for Drive Systems, customers benefit from increased productivity and reduced downtimes for their machines and plants. With support from the associated MindSphere app, they can also enjoy full transparency for spare parts and maintenance activities to reduce risk through simple weak-point analysis. In addition, the app makes maintenance more efficient and streamlines the ordering process.

Using digital services, Siemens is supporting digital transformation all the way from consulting through to implementation. The company is therefore assisting customers on the path to digitalisation – from strategic consulting for industrial digitalisation through to solution consulting to improve productivity.

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www.siemens.co.za

With Predictive Services for Drive Systems, Siemens presents a standardised extension to local service agreements. Based on the new MindSphere Predictive Service Assistance app, it makes maintenance more efficient for Sinamics drive systems and Simotics motors in the low voltage range.

Through the new service portfolio, including MindSphere app, Siemens is focusing on the operative demands of machine users who are looking for full transparency for spare parts and servicing. Thanks to digital support via the MindSphere app, the company can offer customers optimised service cycles, increased service efficiency, easy and streamlined documentation, plus full transparency for historical service activities.
As mentioned in earlier articles, the integral (or I term) in the controller is a brilliant thing. It is an extremely elegant and simple solution for eliminating offset in control. However, like everything else in this world, it has its bad side as well. In the case of the I term, its bad feature is that it never gives up trying to get rid of offset, even when it cannot be eliminated.

 Integral windup

Many control problems can stem from the integral, continuously working to try and eliminate offset. Some examples of these are stick-slip cycling on self-regulating processes, and continuous cycling on integrating processes with hysteresis on the valve, all of which have been discussed in earlier articles. In addition, another problem can arise from the same cause, known as integral or reset windup.

Integral windup occurs when a continuous error exists that cannot be eliminated. For example, imagine that an isolating valve in series with the control valve is closed, and the controller is left in automatic. At this point let us imagine that the PV (process variable) goes to zero. The integrator in the controller will immediately start integrating to try and eliminate the error. This will result in the PD (controller's output) increasing at the ramp rate of the integrator. As the error cannot be reduced, this will continue until eventually the PD reaches a maximum limit (20 mA in most controllers).

However, it must be remembered that in theory, the integrator's output will continue to carry on ramping for as long as the error exists. In reality, in the old days of analog controllers, this could only continue until a physical limit was reached. At this point it was said that the integrator was 'saturated' or fully 'wound up'.

The situation is different in a digital computer. The integral is now not a voltage or pressure, but a number, and modern computers can deal with extraordinarily high numbers. Therefore, unless the controller manufacturer does something about it, the integrator could carry on until the output reaches a value close to infinity. This is illustrated in Figure 1.

Eventually, when the isolating valve is reopened, the fluid will flow through the fully open control valve, and the PV will then start rising towards set point. However, due to the nature of an integrator, the PD cannot start reducing, and hence the control valve cannot start closing before the set point is reached. Essentially, the integrator's output cannot be reduced until the error signal on its input changes sign. This is because the integrator's output will always rise as long as any positive error exists. If the error reduces to zero, the integrator's output then remains constant. It can only start moving down after a negative error signal occurs. This means that the integrator can only start responding again once the PV has moved through the set point. Figure 2 helps explain this.

Some practical examples

If the integrator has wound up, it means that it may take a long time for its output to drop far enough to allow the PD to start moving down again, and at that point, it would allow the control valve to start closing. By then, an enormous process overshoot could have occurred, with long delays before the controller can start actually controlling again.

To cite an extreme example, a senior instrument technician on a gold mine gave me
Figure 2.

Figure 3.

an example of one of their control loops that wound up after a plant trip occurred, and on restarting the plant, the output of the controller remained at full output for nine hours before it started moving down.

A second interesting example I encountered recently was in a refinery. The problem was in a demineralisation plant with a water pressure controller. It occurred periodically when clean water was introduced to perform a rinse. The incoming water was at a much higher pressure, which backed off the controlled pressure and limited it to a value well below set point. This resulted in the integral action ramping up the PD to 100% (wind up). When the unit went back to normal operation, the pressure jumped above set point, and it then took many, many minutes for the output to get back down to the normal area where control could resume.

The result is that when the cleaning water is shut-off, the controlled pressure immediately jumped some 15% over set point. Although the proportional action does immediately drop the PD a bit, it took the integral a further 7.5 minutes to get the control back down to set point! The closed loop test annotated in Figure 3 shows it very well.

The problem can be eliminated by freezing the integral when the rinse begins, or else putting the controller into manual for the rinse period.

During the course of my career, I have encountered quite a few problems caused by integral windup, and since in my experience very few people understand the workings of their controllers, the problem is not identified properly. In one particular case at a plant that made explosives, a cheap PLC controller that did not have any built in reset windup protection almost caused a serious explosion, as under certain conditions, the controller integral wound up resulting in potentially serious temperature overshoots. Luckily the high temperature trip system worked whenever this happened.

Two important points to remember to avoid reset windup:

1. As a general rule, integral action should always freeze when further movement of the controller’s output can have no further effect on the control.
2. In particular, in every case of an oversized valve, the integral should be frozen and a limit placed on the controller’s output where further movement of the valve can have no further effect on the PV. This will help prevent both reset windup, and valve windup. This is an important point as many plants have cases of (sometimes) hugely oversized valves or pumps.
RO-BER Industrieroboter of Kamen, Germany, develops automation solutions based on area and linear gantry robots for intralogistics. These solutions, including the new Twin-Gantry robot system, are characterised by high performance, reliability and flexibility. As a highly scalable control and drive platform, PC-based control forms the ideal basis for solutions that can be tailored to individual application requirements. In addition, the system supplier benefits from the universal integration of PLC, CNC and safety functionality in PC control technology to implement diverse system architectures.

Another reason for the switch to Beckhoff was the high performance of the communication technology, first, because EtherCAT is a fast bus system and second, because it facilitates the implementation of many different topologies. There is another aspect, according to RO-BER’s managing director, Elmar Stöve: “What was really important to us was the system philosophy on the one hand and the control system openness on the other. With the EtherCAT Terminal portfolio, PC-based control from Beckhoff covers an extremely large range of applications, which means that there is a choice of one or even several I/O products for almost all electrical or communication-related tasks. Above all, when it came to electromechanical components such as pneumatic components, we greatly appreciated the easy integration of third-party devices via EtherCAT as well as via CAN, Profinet or other protocols. In addition, Beckhoff gave us great support from the outset and even integrated new functions into TwinCAT that are important for our application.”

Tailor-made intralogistics solutions harness scalable control and drive technology

Transporting large load carriers with high reliability and precision.

Control technology as an innovation driver

Safety technology can also integrate seamlessly into the I/O system with TwinSAFE terminals. Stöve explains: “In this way we were not only able to reduce the wiring requirements of the systems, but also to significantly increase flexibility. For our customers, this flexibility is reflected in higher system uptime. Compact drive technology with the EL72xx Servo Drives in I/O terminal format offers another advantage. They made the implementation of the numerous actuating and gripping functions in the fork and layer grippers so much easier, and in addition, new gripper concepts can be developed with low cabling effort. In the current project, PC-based control was an overall enabler for the design of the completely new Twin-Gantry robot system. The
core advantage of it is that two axis systems can move independently of each other on the one hand, while on the other they can also rejoin the interpolation group at any time following an independent movement – including all key functions such as optimised path control in relation to the cycle-time. This new development also enables the use of the robots for handling of long loads.”

RO-BER relies on TwinCAT HMI software for the visualisation. Stöve adds: “As a web-based system, TwinCAT HMI makes display possible in any web browser on the most diverse platforms. Support of the HTML5 standard also makes it future-proof and open. Furthermore, TwinCAT HMI provides a complete library of functions for the optimum design and generation of customer-specific HMIs. That enables us as the machine supplier to standardise on the HMI, but still provide individualised designs for dedicated applications.” The hardware displaying the HMI is the CP2921 multi-touch Control Panel from Beckhoff. According to Stöve, the 21.5-inch operator interface makes it ideally suited to clearly display all necessary information both in text and graphic form. “On account of today’s multi-touch applications, which are familiar, for example, from smartphones, it was important to us to provide similar operator guidance functions in order to achieve higher user acceptance. The multi-touch capability, for zoom functions among other things, is very important for that. The CX2040 Embedded PC employed has also proven itself for the required CNC applications and has not approached the limits of its performance.”

The robot systems are commonly used for palletising and order picking, for storage and for connecting machines and plants. Corresponding manipulator technologies form the centrepiece of the systems. RO-BER develops and manufactures clamping, fork and vacuum grippers, among others, to handle different products in individual, multiple or layer grip mode. The areas of use are just as varied as the products themselves, including automotive, food and beverage, logistics for grocery retailers and wholesalers, and the pharmaceutical and chemical industries.

In a current intralogistics project, large load carriers such as pallet cages in different sizes and configurations that hold weights of up to 1500 kg are delivered via a conveyor system. These containers must subsequently be recognised by the robot system and transferred to tugger trains, which ultimately supply production facilities. According to Stöve, implementing the handling technology required solutions to several challenges: “Up to now, RO-BER has not had a robot that could manage such heavy loads. On top of that, the load carriers to be handled also have a large footprint, so they must be picked up from two sides. For these reasons, both the robot system and the gripping system had to be redesigned. With the robot, we took great care to ensure that modules from the existing modular system could still be used. Similar to a forklift, the new gripping system consists of a pair of fork tines that can be adjusted with respect to each other through servo control. Several CAN-networked axes are also integrated in the EtherCAT-based drive technology, which was no problem at all even with regard to the communication system. Due to the openness of PC-based control, the system was virtually plug and play.”

In total the newly developed twin-gantry robot system is comprised of five axes: a horizontal X-axis and two additional horizontal Y-axes with two vertical Z-axes. The Y/Z-axes can move both individually and within the axis group, and they can be coupled to and decoupled from the axis group dynamically.

PC-based control: the universal and open platform
Handling specialist RO-BER has been using Bus Terminal I/O from Beckhoff for many years. According to Stöve, this was a good starting point overall for the switch to PC-based control: “In 2015 we decided to replace the control and drive technology we were using at the time and to kick off corresponding market research. In 2016 we decided to go with PC-based control technology from Beckhoff, because it unites all the automation technologies we use in one system. In addition to classic PLC, our gantry robots also require CNC and safety functions. TwinCAT software provides a universal programming environment for these functions, offering a high-performance tool to make development simpler and more transparent. As we are operating our systems in intralogistics environments, seamless communication with higher-level material flow or warehouse management systems is key. Here, the open PC-based control technology from Beckhoff offers numerous advantages.”

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HoloLens, mobile phones, 3D printing and smart glasses – the gadgets that captured the public imagination in the blockbuster movie ‘Back to the Future’ over 30 years ago have now become a reality, all thanks to digitalisation. Industry 4.0 is rapidly automating the modern working world and helping the machine and system building sector reach new heights.

“At Festo, we support our customers with digital solutions at every step of the value chain and thus also guide them along their digital customer journey,” emphasises Kershia Beharie, head of market management at Festo South Africa. “We also make a coherent software infrastructure available for customers, thus reducing their process costs.”

Designing software à la carte
Examples of these intelligent software solutions are the Handling Guide Online for fast design and ordering of axis systems, the Festo Design Tool 3D for combining individual components into pneumatic modules, the product key for the clear identification of each component and use as a digital twin, and the app-based products such as the Festo Motion Terminal.

FluidDraw 365 enables designers to build up circuit diagrams more efficiently to document machines and installations fast, and easily conforming to standards. Via an annual subscription, users always have access to the latest version available on the Festo App World.

Condition monitoring in the cloud at the press of a button
With the CPX-IoT gateway, Festo is paving the way for a secure cloud solution, which will enable machine builders and end customers to improve their overall equipment effectiveness. The IoT gateway CPX-IoT connects components and modules from the field level, such as the valve terminal CPX/MPA, the energy monitoring module MSE6-E2M or handling systems, to the Festo Cloud via their OPC UA interface.

The cloud makes it possible to process and monitor the data, which, in turn, enables trend analysis and early warning systems with automatic notifications set up in the event of incidents. The IoT gateway connects the cloud to a controller and ensures that the relevant information is communicated in the right format at the right time.

With the IoT gateway CPX-IoT, it is possible to have preconfigured dashboards for each Festo component – with additional customisation. The dashboard is viewed in a Web browser and includes diagrams and traffic lights. Specific widgets – user interface components and graphs for energy monitoring and preventive maintenance, as well as key performance indicators for the process and the improvement of overall equipment effectiveness – provide clarity. The condition monitoring solution improves error diagnostics and fault identification, creates transparency regarding energy consumption, delivers clear information in graphical format and offers historical data.

Digital maintenance management
Predictive plant maintenance is a time-consuming process, which, for the most part, is still documented using pen and paper. With Smartenance, Festo’s digital maintenance manager, this process becomes easier, faster and safer. The software enables precise scheduling and analysis of plant maintenance. Therefore, it provides quick and easy access to digital maintenance for production managers and system operators, available for download as an app. Smartenance is the first purely digital product from Festo. It is available to download as a mobile app for smartphones and tablets in the Apple and Google app stores.

The dashboard for production managers is conveniently available in a Web browser. Smartenance enables end customers to schedule, monitor and evaluate system maintenance. A digital maintenance schedule makes maintenance easier, quicker and more reliable. Reciprocal checking by system operators and production managers provides more excellent reliability and eliminates many processes and the need for coordination.

Smart products
With smart digital solutions, Festo has combined its extensive knowledge of industrial applications with the latest developments in information technology to realise online applications for industrial automation practice. Festo is also using digital communication to support its customers throughout their digital journey. This digital journey guides customers reliably and comprehensively through the Festo portfolio, from information procurement and configuration through ordering and delivery to commissioning and maintenance, or even to the technical training offered by Festo Didactic.

For more information contact Kershia Beharie, Festo, 086 003 3786, kershia.beharie@festo.com, www.festo.co.za
DURABILITY AND PRECISION MEASUREMENT

LTF Series Time of Flight Laser Distance Sensors are designed to accurately measure targets at distances up to 12 meters. They provide reliable detection regardless of colour or material, even at an angle, providing a reliable solution for challenging targets. They solve a broad range of industrial measurement applications, including part-in-place, part profiling and positioning, and roll diameter and web tension control.

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Engineers from the older generation will remember the days when machine design had to be based around catalogued electromechanical actuators. Variations from standard were rare, in addition to being expensive. Fast forward around 40 years and the modern experience is somewhat different. Today’s machine designers not only desire highly configurable and adaptable products, they expect them.

With this in mind, many leading motion technology suppliers have developed their product portfolio specifically for machine designers. Explained below are some key factors that will aid the selection of electromechanical motion products for use in the machines of today.

### Stroke capacity
Among the fundamental questions to ask is: Does the actuator offer various stroke lengths as standard? A product using a ball or lead-screw drive is commonly restricted to stroke lengths up to around two metres maximum for practicality. There are some actuators offering strokes to four metres, however at lengths such as these, speed is often limited due to screw ‘whip,’ so the product that achieves a particular speed at one stroke will not usually achieve that speed at a longer stroke length.

Very long stroke lengths can, however, be achieved by belt drives, which perform to a similar level regardless of stroke length, but lack the precision of a screw-driven product.

A further option is linear motor-driven products, which provide performance levels that scale extremely well with increases in stroke. In addition, linear motors do not demonstrate speed restrictions at longer strokes and offer the same repeatability over the full stroke.

### Scalability
With regard to scalability, machine builders should determine if the actuator is available in a number of different frame sizes or widths. Having a family of products to select from allows the project to be cost-optimised. Moreover, many multi-axis applications demand different loading for each axis.

Having multiple drive train choices in the same product is often overlooked, but the availability of screw or belt options within a given product can prove extremely useful to a machine designer.

In the same form factor, designers can tailor the drive train to specific requirements, be it thrust density normally obtainable from a screw-type drive, or speed from a belt drive. The ability to bounce between the two without having to rethink the machine’s layout can be highly beneficial.

### Modularity and performance
It is a common requirement for electromechanical actuators to be connected to other actuators or mechanical devices. The ability to combine linear actuators into XY, XZ, or XYZ assemblies quickly and effortlessly is vital. As a result, most modern electromechanical products can be bolted together like building blocks, without the use of transition plates for XY systems (plates are often unavoidable for the Z or vertical axes to maintain stability).

A further factor here is performance-to-size ratios, which should be considered carefully. Using a product that is highly condensed leaves more space for machine designers to include end effectors and tooling. For this reason, metrics such as thrust or rated load per height-by-width become important.

### Selectable resolutions and encoder types
To retain good servo control, an actuator should have 5-10 times more resolution available than the repeatability of motion required. With this in mind, having multiple options is the optimum solution as high-resolution encoders can be quite costly.

Being able to adjust the resolution is also important. Some of the latest encoder products can vary their resolution through a relatively simple hardware change. A further approach is to deploy analog feedback devices and compatible servo drives. In using analog feedback signatures (typically 1 V peak-to-peak), two analog signals are passed from the encoder to the drive, 90° out of phase with one another. Equivalent resolution is established within the drive, and is dependent upon the pitch of the linear scale and resolution of the drive’s analog input.

### Flexible encoders
As well as flexible resolution, the availability of flexible encoder technologies is another major benefit. Optical encoders with glass scales have been a popular choice for many years, but today there are many alternative technologies that provide competitive resolutions and costs.
For example, in applications that do not require especially high levels of precision, magnetic encoder technology is a cost-effective option, while applications that do require high precision but not long stroke lengths benefit from the very high resolutions of capacitive encoders. Inductive encoders are often popular for applications directly exposed to heavy contamination, such as coolant from a machine tool. Applications which require constant positional information regardless of an axis being homed will require an absolute feedback source.

With regard to communications, until recently, most encoder protocols were based on embedded propriety signals, which meant that designers had to use a limited list of manufacturers. Today, open standard protocols such as the single cable Hiperface DSL solution allow design engineers to use a variety of products and even reduce installation and cabling efforts.

**Digital design**

In cutting-edge design software, finite element analysis (FEA) can be used to understand not only the deflection characteristics, but also the thermal or magnetic variations within the product. Naturally, these simulations cannot give results with 100% certainty as they are only as good as the algorithms and assumptions that are used, but modern machine design is starting to leverage these digital design methodologies more heavily to expedite development.

**Metrology test data**

Test data from metrology can be used to take ball-screw backlash into account, and improve overall system accuracy. For applications with very specific requirements, these tests can be performed to mirror the actual application characteristics. Cleanroom applications are a good example as there are many characteristics, such as speed, acceleration, orientation and air flow, which can greatly impact product performance. Selecting products from a design partner that understands the mission-critical aspects of the application and tests will prove particularly advantageous.

**Summary**

Today, the demand for faster turnaround time on machines has become critical. The same design engineer who might have allowed for a machine to be developed in several months, now expects it in weeks. Key to the machine-building race is selecting the right product from a manufacturer which understands the daily design hurdles and has systems in place that allow for rapid machine development.

Factors such as breadth of product, range of options, modularity and product test data should be taken into account when designing the machines of today. This strategy will enhance the machine builder’s ability to respond to customer needs, and provide faster ROI.

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**Motion controller with integrated drive control**

Siemens has expanded its product portfolio of technology CPUs with the Simatic Drive Controller. The new controller combines a Simatic S7-1500 controller with motion control, technology and safety functionality, as well as a Sinamics S120 drive control in one space-saving device. This makes it easy to implement requirements for powerful, compact and flexible automation solutions. The high performance of the new controller is particularly beneficial for applications with many axes where a multi-axis drive system is used – for example in packaging, printing and textile machines.

The controller is available in the two performance classes CPU 1504D TF and CPU 1507D TF. Thanks to integrated safety functionality for the controller and drive, even demanding requirements regarding operator and machine safety can be met.

The integrated device is equipped with extensive interfaces, including three Profinet interfaces and one Proibus interface for communication with, for example, HMI, I/O and other drive systems as well as on-board technology I/Os. This permits the efficient implementation of dynamic motion control applications.

With the ‘Cross-PLC synchronous operation’ function, which is now available in all technology CPUs, it is also possible to implement gearing and camming across CPUs, so that there are virtually no limits to axis quantity structures. In addition to the performance distribution among several CPUs, modular automation concepts can also be easily implemented with cross-PLC synchronous operation. Engineering is carried out conveniently and efficiently in the TIA Portal Engineering Framework.

**Background information**

Individual products require machines and production lines that can be quickly and easily adapted to different formats, sizes, product types, and production processes. Especially in production, maximum flexibility, efficiency, precision and availability are required. The reliable monitoring of all movements in producing machines also plays an essential role. Siemens offers a full range of technology solutions based on the Simatic Advanced, Distributed and Drive Controllers.

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www.siemens.co.za
As a preferred supplier to the agricultural industry due to proven reliability and performance, Varispeed designs, manufactures and distributes constant pressure solutions. With a good knowledge of the industry, it has insight into the system challenges and their unique requirements.

Agricultural irrigation systems require precise pressure control in the distribution of water systems to ensure constant pressure; this constant pressure also ensures energy savings. Varispeed’s irrigation solutions are specifically designed to protect electrical motors, pumps and piping systems from damage, overloads or pressure surges, all whilst keeping the need for constant pressure, system reliability and energy efficiency top-of-mind.

How it works
Three 55 kW 400 VAC dual VSD modernised pressure control panels are used to control six pumps that pump water from the river into two holding dams. The system on the first dam distributes water onwards via eight single VSD panels which in turn control eight pumps, pumping the water out to irrigations blocks at 6-13 bar water pressure, user selectable based on the farmer’s requirements.

Pumping water from the second dam are eight Dual 55 kW 400 VAC VSD panels that control sixteen pumps. The system distributes water into irrigation blocks at 5-16 bar. This configuration is made up of eight sets of two pumps in series that incorporate Varispeed’s simple and reliable suction and pressure control software solution, embedded directly into the VSDs thus eliminating the need for costly additional controllers.

Modernised software for a modern problem
Varispeed was approached to provide a reliable irrigation pumping scheme that supplies constant water pressure to grow table grapes. Based on this brief, it was able to produce a system that exceeded all the reliability and performance expectations.

“Our team was able to offer the customer a complete engineered solution that exceeded the performance and reliability requirements they required,” concluded Varispeed managing director, Ralph Real.

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

A high-speed railway operator built a fibre Ethernet backbone for data transmission between its operational management centre and railway stations to ensure high network availability. The customer used around 30 Moxa industrial rackmount switches (IKS-G6524) to connect to the existing Layer 3 networks. The customer also required industrial network management software to use throughout the network management lifecycle for installation, operation, maintenance, and diagnostics. The software had to be usable on mobile devices as the railway operator’s network administrators need to leave the control room to patrol within and around the stations.

MXstudio is Moxa’s industrial network management tool that can be used to monitor and manage industrial networks. Part of this solution is MXconfig, which the rail operator was able to utilise when performing the initial mass deployment. Instead of manually configuring the MAC address and assigning IP addresses one by one, the operator was able to use MXconfig to configure the IP address, VLAN, and redundancy protocols for a batch of switches simultaneously. MXconfig’s Link Sequence Detection function makes mass configuration easy by using the physical proximity of each switch to the computer to assign IP addresses. In this way, it is easy to tell which switch belongs to which station, which reduces the amount of time engineers need to spend configuring switches.

The use of effective network management applications can help network administrators accomplish tasks efficiently during different stages of the network management lifecycle. As business environments continue to evolve and improvements are made to mobile device technology, a mobile app that supports network monitoring allows administrators to be efficient, effective, and responsive when monitoring and maintaining an industrial network.

By using the MXview ToGo app, administrators can view the status of the network and each device as well as receive real-time alerts on their mobile devices. In addition to mobile monitoring, MXview ToGo also supports smart device search and an identification function. When in the field, automation engineers can view detailed device information and can find a specific device among the racks quickly, which shortens the amount of time required to perform maintenance as well as minimise downtime.

For more information contact RJ Connect, +27 11 781 0777, info@rjconnect.co.za, www.rjconnect.co.za
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Complete Process Control Solutions and Services Provider
Motor system efficiency for reduced carbon emissions

With electric motors consuming almost 70% of industry’s energy, companies are always looking for better motor efficiencies. For many years, motor efficiency has been well defined; however, when driven by a variable speed drive (VSD), the VSD efficiency and the combined efficiency of the VSD and motor have not been well understood. Choosing the right product combination can also be difficult as manufacturers’ data is not always easily comparable. This is where the international IEC61800-9 standard comes to the rescue, according to global motor and VSD manufacturer WEG.

The IEC61800-9 standard – based heavily on the previous EN 50598 standard – gives manufacturers a clear framework for grading a complete motor system. End-users can compare the overall efficiency of a manufacturer’s products, irrespective of design and component selection.

**Switchgear + VSD + motor**

The IEC61800-9 standard uses the extended product (EP) approach. This considers the efficiency of the motor system, which is comprised of the motor, the basic drive module (BDM), and the complete drive module (CDM). Together, these make up the power drives system (PDS), which also includes any switchgear and controls.

This terminology, while it sounds confusing, is just a technical way to say: switchgear + VSD + motor. The efficiency levels are defined by considering eight different operating points, covering low to high speed and torque. The user can easily compare his application load and speed requirements to the motor system defined speed and torque points.

The EP approach employs a semi-analytical model to calculate the efficiency of each of the components at the operating points of the driven equipment. The calculations are also based on tested and verified values. This results in the most efficient component selection for the application.

Using this standard, users may be assured that:
- A motor complies with the defined motor efficiency levels of IE1, IE2, IE3, IE4 or IE5.
- A VSD complies with VSD efficiency IE0, IE1 or IE2.
- The manufacturer’s motor and VSD used in combination will meet or exceed a system energy standard of IES0, IES1 or IES2.

Using this EP approach, the European Commission expects the increasing use of more efficient systems to help achieve its targets for carbon dioxide reduction. In line with these efforts, WEG VSDs and IE2 motors in combination achieve IES2. And significantly, WEG’s VSDs and IE3 efficient motors exceed the highest system levels of efficiency. Additionally, WEG has product lines that exceed even IES4 and IESS classifications.

**Reduced carbon emissions now a priority**

Recognising that global population growth and economic development is driving up energy demand around the world, the European Union has set stringent targets to reduce carbon emissions. These aim to cut emissions by 40% by the year 2030. This means creating more renewable energy sources, and also increasing the energy efficiency of industrial systems. Studies suggest that almost half of global energy consumption comes from industry – followed by commercial and residential use.

The EC’s regulation 640/2009 already requires that all electric motors operated from a variable speed drive or inverter must adhere to a minimum of IE2 to be eligible for sale. Fixed-speed applications must meet a minimum of IE3 to comply.

Where a motor does not operate at its nominal torque and speed, the variable speed drive represents a significant opportunity for energy optimisation. In addition, the greater the range of speed variation results in a greater PDS efficiency. Using WEG’s IE2 motors with any WEG variable speed drive can achieve an efficiency classification of IES2. However, using other WEG lines of motors with the right drive, much better levels of efficiency can be reached.

WEG has a complete line of variable speed drives which exceed the IE2 requirements outlined in the IEC61800-9 standard. When combined with its robust and reliable motor line, the products create an integrated solution for all applications.

For more information contact Zest WEG Group, +27 11 723 6000, info@zestweg.com, www.zestweg.com
Siemens contributes to Coca-Cola Beverages Africa’s digitalisation vision

The Nairobi Bottler’s Embakasi Plant based in Nairobi, Kenya, a fully owned subsidiary of Coca-Cola Beverages Africa (CCBA), received a Totally Integrated Automation (TIA) training rig from Siemens Digital Industries South Africa to enable skills development in digitalisation technologies.

The training rig, complete with an extensive portfolio under TIA, will serve a pivotal role in training apprentices and current employees to understand the current and future value of food and beverage manufacturing plant operations. It will prepare engineers and technicians to take complete value from the latest automation solutions, and develop themselves to carry out technical activities related to migration and management of S7-1500 PLC, HMIs, servo drives etc. This rig was configured and supplied in conjunction with International Energy Technik (IET), a local Kenyan company and a Siemens Partner.

As Eric Nyakundi, Electrical Engineer at CCBA’s Embakasi plant, explains, “It perfectly fits into our business goals and overall strategy of capability development and asset care strategies. The bulk of our control systems are based on Siemens products, hence the direct transfer of skills and knowledge acquired in training for our manufacturing facilities. This is in line with the new supply chain philosophy of growing and developing engineering capacity and an overall asset care strategy.”

Nyakundi continues, “The automation teams, the machine specialists, the electrical artisans and the apprentices at CCBA will be trained on this rig. These teams are responsible for supporting the manufacturing facilities in realising the company’s manufacturing business goals.”

“The soft drink market is characterised by frequently changing and often short-lived trends,” adds Ralf Leinen, senior vice president for Siemens Digital Industries, southern and eastern Africa. “Soft drink manufacturers must always be able to adapt their production to new requirements, always working efficiently to produce optimal quality. Digitalisation gives them the flexibility they need to accomplish this, while also boosting energy efficiency. Siemens and CCBA have a historically successful partnership in Africa, where Digital Industries has contributed towards a fully automated solutions that can assist with engineering skills.”

Siemens also created a 3D point cloud scan of the entire plant. This data from the scan can be utilised with Siemens NX platform tool to analyse and plan projects. This is a step closer towards digitalisation, where engineering time will reduce thereby reducing time to market. Automation products, showcased in the rig, help to collect the necessary data from process and packaging lines, which ultimately can add valuable information in the NX tool for further analysis.”

“Ongoing education and training have a positive effect for both business and society,” concludes Sabine Sabine Dall’Omo, CEO, Siemens southern and eastern Africa. “At Siemens we believe in investing in the long-term and creating value for our customers and the societies we operate in. We will continuously support CCBA’s vision in shaping their digital future.”

For more information contact Jennifer Naidoo, Siemens Digital Industries, +27 11 652 2795, jennifer.naidoo@siemens.com, www.siemens.co.za
The importance of up-to-date alarm annunciators

At 1.23 pm on Sunday, 24 July 1994, twenty-six people were injured when an explosion erupted through an oil refinery in an otherwise quiet corner of South Wales in the United Kingdom. The site was occupied by two companies: Texaco's Pembroke Refinery and the Pembroke Cracking Company (PCC), a joint venture between Texaco and Gulf Oil. The incident started just before 9 am, when an electrical storm in the area caused lightning to strike the crude distillation unit that provided feed to the PCC units. This resulted in a fire that caused disturbances which affected the vacuum distillation, alkylation and butamer units, as well as the fluidised catalytic cracking unit (FCCU).

What followed was a cascade of failures that highlighted severe shortcomings in the plant’s safety and control systems. The report produced by the UK’s Health and Safety Executive (HSE) following an investigation into the events concluded: “The direct cause of the explosion that occurred some five hours later was a combination of failures in management, equipment and control systems during the plant upset. These led to the release of about 20 tonnes of flammable hydrocarbons from the outlet pipe of the flare knock-out drum of the FCCU. The released hydrocarbons formed a drifting cloud of vapour and droplets that found a source of ignition about 110 metres from the flare drum. The force of the consequent explosion was calculated to be the equivalent of at least four tonnes of high explosive. This caused a major hydrocarbon fire at the flare drum outlet itself and a number of secondary fires.”

The HSE investigation found several causes of the incident: a control valve was shut when the control system indicated it was open; control panel graphics did not provide the necessary process overviews; a modification had been carried out without assessing all the consequences; staff attempted to keep the unit running when it should have been shut down; and the company failed to take the necessary overall perspective, concentrating instead on the local, immediate symptoms rather than looking for the underlying cause. The 14 subsequent recommendations that were given included everything from improved safety management systems, human factors, protection systems, plant layout, inspection systems and emergency planning.

Two things stood out in the HSE report. The first relates to human factors, where it mentions that “display systems should be configured to provide an overview of the condition of the process.” The second relates to protection systems, where it explains that “the use and configuration of alarms should be such that: safety critical alarms, including those for flare systems, are distinguishable from other operational alarms; alarms are limited to the number that an operator can effectively monitor; and ultimately plant safety should not rely on operator response to a control system alarm.”

Update your alarms

Part of the planning to meet these recommendations is that plant managers employ the relevant technical measures to control the process and prevent the loss of containment of dangerous substances. In part, this can be achieved through safety instrumented systems, and alarm systems that include fire and gas detection. The problem is that, while many plants have visualised alarms in their control systems, their physical alarm annunciators are severely out of date – many in use today were installed more than 30 years ago – so may not meet current IEC 61508 safety integrity levels (SIL).

Because operator response times are an important part of this rating, it is vital that alarms maximise, rather than impede, the operator’s ability to respond quickly. Managing a mix of critical and non-critical alarms in a control system interface can quickly become overwhelming, so physical alarm annunciators must be up to date. They must also only display the safety, health and environmental alarms that the plant operators need to respond to.

It is important to hardwire alarms into the process. Sensors that detect tank levels and are designed to protect against overfill can be hardwired to high priority alarms. In emergencies, these alarms give visual indication and provide a horn output before a fuel leak has the chance to vapourise and become an ignition source. Plant and safety managers updating their alarm annunciators should check for a few key things. They should ensure that the alarm annunciator is hardwired into the sensor, and that it has a panel of windows permanently dedicated to specific processes to enhance situational awareness for the operator.

Each alarm should be well justified and suitably prioritised, and each window should be colour coded to match the severity of the alarm. Additional benefits to look out for include the ability to network the alarms to scada systems and the cloud, and to benefit from SMS and GSM alerts, so everyone onsite can be immediately notified in the event of imminent danger. By taking suitable precautions, tank farm managers can learn from the past and give themselves the best chance of preventing such disasters from happening again.

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Ian Loudon, Omniflex, +27 31 207 7466, ianl@omniflex.com, www.omniflex.com
Fluke’s 914X Series Field Metrology Wells (Fluke 9142, Fluke 9143, Fluke 9144) extend high performance to the industrial process environment by maximising portability, speed, and functionality with little compromise to metrology performance.

Field Metrology Wells are packed with functionality and are remarkably easy to use. They are lightweight, small, and quick to reach temperature set points, yet they are stable, uniform, and accurate. These industrial temperature loop calibrators are perfect for performing transmitter loop calibrations, comparison calibrations, or simple checks of thermocouple sensors. With the ‘process’ option, there is no need to carry additional tools into the field. The optional built-in two-channel readout reads resistance, voltage, and 4–20 mA current with 24 V loop power.

High performance for the industrial environment
Field Metrology Wells are designed for the industrial process environment. They weigh less than 8.2 kg and have a small footprint, which makes them easy to transport. Optimised for speed, they cool to –25°C in 15 minutes and heat to 660°C in a similar time.

The process range options make transmitter loop calibrations easy. The sensor is placed in the well with the reference PRT and the transmitter electronics are connected to the front panel of the instrument. With 24 V loop power, users are able to power and measure the transmitter current while sourcing and measuring the temperature in the well. This allows for the measurement of as-found and as-left data in one self-contained calibration tool.

Unlike traditional dry-wells, Flukes Field Metrology Wells maximise speed and portability without compromising the six key metrology performance criteria: accuracy, stability, axial (vertical) uniformity, radial (well-to-well) uniformity, loading, and hysteresis.

For more information contact Comtest, +27 10 595 1821, sales@comtest.co.za, www.comtest.co.za

The Fleetguard FK36000 portable fuel cleanliness analysis kit is a reliable solution for testing fuel cleanliness in the field, according to Cummins Filtration mining sales manager Tinus Naude. Testing can identify dirty fuel, and more importantly the source of the contamination through supply, delivery, storage, handling, and other practices.

It also allows for on-site testing of fuel cleanliness, with immediate results. In addition, no power source or batteries are required to perform the test. Most tests use only a litre of fuel, and require five to ten minutes. Results are interpreted immediately, and also relate to the ASTM D2068 FBT number.

“Clean uncontaminated fuel is key to optimal fuel system performance and longevity for engines in the mining industry. Without high-quality fuel filtration and regular servicing, fuel contamination can lead to costly repairs and engine downtime,” comments Naude. “The better the fuel quality the better the engine performance through the fuel system, component life will also be extended.”

Naude explains that a global fuel cleanliness study has revealed that more than 50% of fuel used does not meet the suggested industry cleanliness levels. “By testing the fuel source on-site, clients in the mining industry in particular are able to prevent dirty fuel from ever reaching valuable equipment or bulk storage tanks.”

The Fleetguard FK36000 portable fuel cleanliness analysis kit consists of a hand-operated pump, four fuel cups, a litre fuel container, replacement NanoNet media patches, and a test result interpretation card.

NanoNet is an advanced filtration media that traps and retains contaminants, even under real-time vibration and flow surge. The technology leads to greater protection of fuel injection equipment, resulting in extended service intervals of up to 2000 hours, improved engine efficiency and fuel economy, and reduced downtime and maintenance costs.

For more information contact Deepa Rungasamy, Cummins, +27 11 589 8512, deepa.rungasamy@cummins.com, www.cummins.com

For more information contact Comtest, +27 10 595 1821, sales@comtest.co.za, www.comtest.co.za
Refrigeration compressed air dryers

The R Class range of compressed air refrigeration dryers and RSXW chemical adsorption dryers have consistently low dew points, with an attractive entry price and a low cost of ownership once in operation. The design of the Mimic display panel is deliberately simple, showing the status of the essential temperature. Along with the freon HP and LP pressure gauges, it provides all the information that is necessary for the operator or service engineer. The Mimic panel does not control the dryer, it merely provides operator information. The actual control of the dryer is through a simple electromechanical system that is very easy to maintain and exceptionally reliable, with a low cost for replacement parts. There are no complicated control panels or PLCs on these dryers that can lead to downtime through control panel or controller malfunction.

The smaller R class units are fitted with a 3-pass stainless steel plate-to-plate heat exchanger and condensate separator. The larger PD series has a proven nano-coated aluminium plate and 3-pass exchanger. Nano-coating repels dirt that would otherwise coat the inside of the exchanger. Nano-coatings also assist in keeping the pressure drop to a minimum. The exchangers have an agglomerator pad type separator. This design of condensate removal provides superior liquid condensate extraction performance under a wide variety of compressed air flow rates. Condensate drainage is through an intelligent level controlled or timed automatic drain. Both dryers are fully supported by Artic Driers.

For more information contact Allen Cockfield, Artic Driers International, +27 11 420 0274, allen@articdriers.co.za, www.articdriers.co.za

Gas detector for multiple applications

Comtest, the local representative of Industrial Scientific, global leader in gas detection, has announced a new version of the Ventis Slide-on Pump. The new pump is compatible with both Ventis MX4 and Ventis Pro series multi-gas monitors, and is ideal for workers who typically wear their gas monitors for personal protection, but occasionally require a pump for confined space entries or remote sampling applications.

The Ventis Slide-on Pump reduces the need for workers to carry two or more gas detection instruments at one time. Additional benefits include:
- Convenient sampling – draw air samples from up to 15 metres away.
- Easy set-up – no tools are required to attach or remove the pump from the monitor.

For more information contact Comtest, +27 10 595 1821, sales@comtest.co.za, www.comtest.co.za

RS Components adds double-acting air cylinders

RS Components has expanded its offering from factory automation manufacturer Festo to include new double-acting pneumatic cylinders in the DSBC product range. Aimed at both machine builders and maintenance engineers, DSBC air cylinders are convenient, reliable and economical linear motion generators featuring patented self-adjusting cushioning technology.

Double-acting cylinders feature dual compressed air ports to develop a linear output force during extension and retraction, as well as a braking force toward the end of each stroke. However, setting them up manually does not necessarily optimise for individual applications, resulting in setting errors in up to 80% of cases.

With Festo’s self-adjusting end-of-stroke pneumatic cushioning method, known as PPS, the cross-section of the air ports is adjusted automatically to vary the braking effect according to changing loads and speeds. PPS even reacts to changes in friction and working pressure, optimising cushioning without the need for manual adjustment. This saves time during both installation and maintenance of DSBC cylinders, while minimising wear, noise and vibration and allowing continuous operation over a long service lifetime.

A magnetic high-alloy steel piston rod allows contactless position detection via proximity sensors in the cylinder body, while further enhancing service life.

The DSBC range comprises over 300 variants, with stroke length and cylinder bore size configured to suit a broad range of applications via a quick online selection tool. The round actuators of the DSBC range conform to ISO 15552 specifications, providing interchangeability with commonly used hydraulic and pneumatic cylinders such as Festo’s previous-generation DNC and DNCB series. Optional mounting accessories allow the cylinder to be attached with a swivel bracket for free movement, foot mounted to support high loads, or combined with other actuators to give a wider range of movement.

For more information contact RS Components SA, +27 11 691 9300, sales.za@rs-components.com, www.rsonline.co.za
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<td><a href="mailto:enquiries@varispeed.co.za">enquiries@varispeed.co.za</a></td>
<td><a href="http://www.varispeed.co.za">www.varispeed.co.za</a></td>
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<tr>
<td>Wika Instruments</td>
<td>+27 11 621 0000</td>
<td><a href="mailto:sales.za@wika.com">sales.za@wika.com</a></td>
<td><a href="http://www.wika.co.za">www.wika.co.za</a></td>
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<tr>
<td>Zest WEG Group</td>
<td>+27 11 723 6000</td>
<td><a href="mailto:info@zestweg.com">info@zestweg.com</a></td>
<td><a href="http://www.zestweg.com">www.zestweg.com</a></td>
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</tr>
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