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Since feedback is available at fast update rates even in high vibration environments, magnetostrictive technology makes accurate linear position measurement possible in virtually any application. See this month’s cover story for more on MTS Systems’ Temposonics range of magnetostrictive devices, which are rapidly becoming the standard for many of its customers.
The power of 23

Have you ever looked back on a year and wondered how you survived it? For the majority of South Africans, 2019 was such a year. It started benignly enough, cosily wrapped in the blanket of Ramaphoria that enveloped us all at the end of last year. By the beginning of February though, the blanket had worn thin, and by March, it offered little comfort against the chill of bad news sweeping the country.

No sooner had we recovered from the misery of Stage 4 load shedding, than an unprecedented outbreak of looting and xenophobic violence left Johannesburg reeling in horror. State capture hearings dominated the news bulletins, along with gloomy forecasts of lower than expected economic growth, failed state owned enterprises, and a burgeoning unemployment problem.

It culminated on Saturday 2 November in a headline to the effect that ratings agency Moody’s had revised its assessment of South African government debt from stable to negative. More bad news; next step, a downgrade to junk, and an inevitable increase in taxes. But this time there was a glimmer of hope. The Springbok team had made it all the way to the final of the rugby World Cup and head-coach, Rassie Erasmus, had just named the squad of 23 players to face co-finalists England later in the day.

The English were favourites, but, captained by Siyamthanda Kolisi, the Springboks looked in formidable condition. The entire country united behind them, desperate for a win to restore a semblance of national pride. The rest is history. During eighty pulsating minutes under the floodlights of a packed Yokohama Stadium, 23 Springbok heroes played their hearts out and did more for 57 million South Africans than their entire government had in the last decade. Refreshingly humble during a post-match interview, the Springbok captain thanked all South Africans for their support and attributed the team’s success to their belief in each other and their shared commitment to become stronger together. Imagine then what we could achieve as a nation if only we could find 23 such committed politicians, and a hero to unite us…

Thanks to sport, we South Africans end a difficult year filled with pride. So let me use the opportunity on behalf of the team at South African Instrumentation & Control to wish all our readers and advertisers a relaxed and joyful holiday season. Come back safe, rejuvenated and ready to face the challenges of 2020

#StrongerTogether.

Steven Meyer
Editor: SA Instrumentation & Control
steven@technews.co.za
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www.controltechniques.com
Honeywell has announced that Braskem Idesa has adopted a hands-free, wearable connected technology solution at its plant in Veracruz, Mexico. Honeywell's Intelligent Wearables will allow Braskem Idesa to improve productivity and compliance with process procedures, capture the expertise of experienced workers and provide critical insights and information effectively to trainees and support workers in the field.

Honeywell has delivered a complete outcome-based solution that tracks specific key performance indicators and integrates hardware, software and services, and a full WiFi infrastructure to support use of the solution across the plant. The wearable technology will also accelerate training and ensure safety for field operators at the facility.

The Braskem Idesa petrochemical complex is one of the largest such production sites in the Americas.

Lonza has selected Rockwell Automation for the turnkey implementation of the strategic vision to bring the digital factory to nine facilities that manufacture drug capsules. The Swiss-based company, founded in 1897 with approximately 15 500 employees, chose Rockwell Automation's PharmaSuite Manufacturing Execution System (MES) software to digitise the operations in its manufacturing environments. Specifically, the solution is designed to help avoid disruptions during high volume periods of just-in-time orders for on-demand production, ushering in a new era of operational efficiency.

"Digital transformation is bringing new levels of operational efficiency to process automation and employee productivity in pharmaceutical companies globally," said John Genovesi, senior vice president, Enterprise Accounts and Software, Rockwell Automation. "We’re proud to be working with Lonza as they evolve their products, operations and workforce towards their maximum potential through the use of our innovative software solutions."

The Bloodhound LSR car has arrived at Hakskeenpan, the dry salt lake bed in South Africa’s northern Cape province, where over the next month a 25-strong crew will run tests that may see it exceed 800 km/h.

Within 12 to 18 months the team behind the project plans to beat the world record and then attempt to top 1000 mph, said Jules Tipler, a spokesman for the UK-backed project.

The high-speed testing will be conducted using the car’s Rolls-Royce EJ200 jet engine, usually found in a Eurofighter plane, producing a thrust equivalent to the power produced by 360 standard-sized cars.

The world record is currently held by Thrust SSC, a British-built jet-powered car that became the first land vehicle to break the sound barrier in 1997 at Black Rock Desert in Nevada.

Don’t miss the January 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)
- Industrial computer hardware
- Safety systems (incl. hazardous area equipment)
- Mining, metals & quarrying
- Oil & gas
- Laboratory & analytical
- Maintenance, test, measurement & calibration

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Europe's largest-ever Emerson Users Conference to be held in Milan

The largest-ever Emerson Global Users Exchange in Europe will be taking place in Milan, Italy, in 2020. The biennial conference will be held at the Milano Convention Centre from March 18 to 20, with current and potential users of Emerson automation technologies, products and services attending from across Europe, the Middle East and Africa. The theme for the event is ‘Discover, Design, Deliver’ and delegates will be able to learn how the latest automation technologies can help in digitally transforming operations and improving asset efficiency.

An unprecedented number of presentations have been submitted by users – more than 300 in total, from 30 different countries. This is an increase of 25% over previous Exchange conferences held in Europe, demonstrating the significant level of interest in the 2020 event. Representatives from 15 industries including food and beverage, oil and gas, chemical, power, pharmaceutical and discrete manufacturing will deliver presentations on current project solutions and application successes. This includes companies such as ADNOC, BASF, BP, Dow, EDF Energy, Equinor, GE Healthcare, Novartis, SABIC, Shell, Södra Cell, Total and Yara.

“The fifth Global Users Exchange in Europe will be the largest and most innovative to date,” said Roel van Doren, group president of Emerson’s Automation Solutions business in Europe. “It will offer a greater opportunity for delegates to discover new technologies, services and work practices, before returning to their companies armed with the knowledge to deliver improvements that can increase their business performance.”

Highlights include keynote addresses by Roel van Doren; Richard Mortimer, VP engineering, Global Projects Organisation at BP; and Vidya Ramnath, president of Emerson’s Automation Solutions business in the Middle East and Africa. User presentations from 20 subject tracks will focus on topics including addressing industry losses and meeting business performance targets; dramatically enhancing safety and compliance; reducing capital and engineering costs; increasing profitability through effective energy management; making sustained improvements through process optimisation; justifying a predictive maintenance programme; creating successful system migration and lifecycle management paths; and solving difficult measurement and control challenges.

The event will also feature an 8 000 square metre solutions expo. A highlight of the expo will be a demonstration of the incredible potential of digital solutions for improving shutdown, turnaround and outage planning and execution. Delegates will be able to enjoy an immersive 360-degree video and virtual reality experience. The expo will also feature over 30 technical partners including Cisco, Microsoft and Informetric.

For more information contact Devesh Roopnarain, Emerson Automation Solutions, +27 11 451 3700, devesh.roopnarain@emerson.com, www.emerson.com

World record for Festo’s BionicOpter

The Festo BionicOpter will be included in the 2020 Guinness World Records. The chapter ‘Robots’ presents the most amazing records from the world of super robots and artificial intelligence. The Festo BionicOpter, an ultralight flying object based on the dragonfly has scooped the world record title for the biggest flying robotic insect.

“It is fascinating what we can learn from nature,” says Karoline von Häfen, head of Corporate Bionic Projects at Festo. “Curiosity and joy in innovation drive us to keep trying new things. We are very pleased to be included in the Guinness World Records – it is great validation.”

Inspired by dragonfly flight

After bird flight had been deciphered with the SmartBird in 2011, the developers took on their next big challenge in the Bionic Learning Network: modelling the dragonfly at a technical level. The BionicOpter is an ultralight flying object. Just like its model in nature, the BionicOpter can fly in all directions and execute the most complicated flight manoeuvres. Its ability to move each of its wings independently enables it to slow down and turn abruptly, to accelerate swiftly and even to fly backwards. This means that for the first time there is a model that can master all the flight conditions of a helicopter, plane and even a glider. Despite its complexity, the highly integrated system can be operated easily and intuitively via a smartphone.

The principles of ultra-lightweight construction are applied throughout the flying object. With a wingspan of 63 cm and a body length of 44 cm, the model dragonfly weighs just 175 grams. The wings consist of a carbon-fibre frame and a thin foil covering. The intelligent kinematics corrects any vibrations during flight and ensures flight stability. In order to stabilise the flying object, data on the position and the twisting of the wings is continuously recorded and evaluated in real time during the flight of the dragonfly.

For more information contact Kershia Beharie, Festo, 086 003 3786, kershia.beharie@festo.com, www.festo.co.za
BMG’s Food & Beverage Expo voted a success

BMG’s recent Food & Beverage Expo, held at the BMG World distribution and engineering facility, has been voted a great success.

“Highlights of the event included presentations from guest speaker, Linda Jackson, director of Food Focus, who stressed the importance of knowing the latest standards for equipment in the food and beverage sector, to ensure food safety,” said Mark Barbour, group product and sales manager, BMG. “It is critical that equipment suppliers to the industry understand the complexity of food production environments and have a thorough understanding of the key processes necessary to achieve stringent food safety requirements, by avoiding contamination risks.

“This two-day expo was the ideal forum for the BMG team to collaborate with industry leaders and to network with customers. We also focused on recent changes in legislation, which include the new R638: regulation governing general hygiene requirements for food premises, the transport of food and related matters.

“The event concentrated on the importance of investing in the correct equipment to prevent food safety hazards, what the risks associated with food safety are, and what food safety auditors look at when they audit equipment.”

On display were BMG systems and components that assist manufacturers to achieve compliance with new specifications and deliver on food safety and environmental and energy-efficiency initiatives.

BMG exhibited power transmission components, light materials handling and belting products, gearboxes, motors and variable speed drives, seals and bearings, valves, tools and equipment, as well as fasteners, lubricants and maintenance chemicals.

This show not only highlighted the company’s extensive range of engineering components and expertise, but also focused on how BMG integrates its vast product range and extensive technical services into tangible operational efficiencies.

The company’s solutions for the food and beverage sector extend from processing, where raw ingredients are transformed, to packaging, where products are enclosed and protected for safe distribution.

BMG intends to follow this success with other specialist industry events including water and wastewater, power generation and mining.

For more information contact Mark Barbour, BMG, +27 82 468 4597, markb@bmgworld.net, www.bmgworld.net

BI leverages synergies across Hudaco Group

As part of the Hudaco Group, Bearings International (BI) is able to leverage synergies across a broad range of companies, meaning it can offer a complete product basket across its branch network countrywide.

In order to maximise this leverage across diverse industries, BI has successfully implemented a new Business Development Leader (BDL) management structure, with a dedicated and focused approach the core market segments of mining, agriculture, sugar, OEMs, steel, FMCG, automotive, services and infrastructure, wholesale and retail, cement, pulp and paper and chemicals.

In addition, BI has appointed Victor Strobel as offer marketing manager, reporting directly to BI business unit head at the Parkhaven head office. Strobel oversees the product management team with the goal of consolidating marketing efforts for profitable growth.

“BI’s approach is to target existing and potential customers at grassroots level,” he explains. “The BDL team, on the other hand, will look specifically to nurturing cooperative relationships with all relevant internal and external stakeholders.”

From bearings to variable speed drives (VSDs), motors, gearboxes, sprockets and chains, BI offers total solutions for a diverse range of customers, applications, and industries. Tier 1 automotive OEM applications, for example, are serviced from BI’s warehouse in Parkhaven, which also features a bonded store facility.

An example of the diversification into ancillary products is adding electronic motor control solutions from Varispeed to the extensive offering. Varispeed has just launched its VDrivePlus and AlphaDrive-Micro VSDs onto the market.

The Varispeed VSD’s are supplemented by the Bauer electric motor range from BI. “For BI, it is all about the breadth of our product offering, which extends far beyond our customers’ core focus,” concludes Strobel. “This is because we look at customer requirements holistically, which is a great way to introduce our customer base to the larger Hudaco Group.

“While the customer bases are different, there are definite synergies that we can tap into. It is all about positioning ourselves as a total solutions provider that is a single point of contact for all customer needs, as well as making them aware of everything else we are able to offer. This is where BI’s focus on customer service and support is critical, as we are able to back-up all of our products with the necessary technical expertise and experience.”

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

Victor Strobel.
Control Techniques has launched a free, five-year warranty for its Commander range of general-purpose drives. Anyone who purchases a drive from the Commander range will now be able to register to extend the products’ warranty from two years to five, at no extra cost.

The new offer relates to the Commander C200 and C300 general purpose drives designed for ease of setup and installation. The firm states the move to extend the warranty from two to five years is testimony to the products’ exceptional track record for reliability and durability. Users can now buy with confidence, safe in the knowledge that their purchase comes with the security a five-year warranty offers.

Due to an on-board PLC, both series have embedded intelligence – removing the need for an external controller – and the 0.25 kW to 132 kW power range makes the products suitable for lower and high-power applications. Noted for its robust design and resilience to harsh environments, the Commander range has the smallest footprint in its class, making it ideal for machine and original equipment manufacturers.

For more complex applications, both models are compatible with Control Techniques’ plug-in option modules. The Commander family of drives was reintroduced to the company’s portfolio at the end of 2018. Anthony Pickering, president of Control Techniques said: “To increase the warranty period for our Commander Drives signals our confidence in the product and gives drive users added security. We are particularly proud to be in a position where we can offer this.”

For more information contact Jacqui Gradwell, Nidec Industrial Automation Southern Africa, +27 11 462 1740, jacqui.gradwell@mail.nidec.com, www.nidecautomation.com

DEFINITION
Techopedia defines this as: a technological solution that enables automating the bulk of electronic, electrical and technology-based tasks within a home. It uses a combination of hardware and software technologies that enable control and management over appliances and devices within a home.

Coming soon and proudly brought to you by the publishers of SA Instrumentation & Control – a monthly electronic news brief covering all aspects of home automation. We know our readers are already automation-crazy – now we’re extending this to the home environment too.

For more information contact: jane@technews.co.za
**African mines gear up with SEW-Eurodrive’s new service**

A convenient and cost-effective option for ageing African mines, some of them 50 to 60 years old, is to have their geared units professionally refurbished by SEW-Eurodrive. Supplementing its refurbishment capability, the company can also offer a drop-in gearbox replacement service. Geared units are particularly difficult to refurbish or modify on mines, as their large size means that production has to be halted temporarily in order to gain access. This has a negative impact on any mining operation’s bottom line, thus many mines hold out on replacing these essential high-capex items for as long as possible.

The major advantage that SEW-Eurodrive can now offer its mining clients is that no modification to, or adjustment of, the original geared unit is required. “The drop-in replacement is based on a fabricated case that matches all critical dimensions of the existing gearbox exactly, and with improved mechanical and thermal ratings,” highlights national sales and marketing manager, Norman Maleka.

What makes the drop-in replacement service particularly attractive, in conjunction with refurbishment, is that the cost of repairing a worm gear unit usually exceeds its replacement cost. Factors that need to be taken into account are the associated downtime when the unit is out of service, together with the total removal, repair, and replacement cost.

Since orders for drop-in replacements can be generated in advance, when an ageing unit is ready to be replaced, a modern drive can be delivered and installed at the same time as the old drive is removed. “One must bear in mind that the drop-in replacement is a completely new unit, in addition to being the latest in efficient technology,” elaborates Maleka.

Another advantage is that as the client is already familiar with the old unit, specialised technicians or support is not required for the drop-in replacement. SEW-Eurodrive has focused on this drop-in replacement service as a means to add maximum value to its clients’ operations by supplementing its refurbishment capability, as well as keeping them up to speed with the latest technology advances. “Service and support are key differentiators, especially in the prevailing market where margins are constrained, meaning that factors such as energy-efficiency become increasingly important to curtail costs,” concludes Maleka.

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

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**DEHN Africa provides 3D laser scanning for lightning protection design**

3D laser scanning delivers many benefits for industrial and engineering projects, providing precise and reliable data which allows for improved planning and scheduling. Without physically touching what is being measured, 3D scanning creates clear and precise digital records of existing conditions. Laser scanners send out a beam that is subsequently reflected off the structure or being scanned. The distance and reflectivity of each return signal is measured and recorded, creating a point cloud.

Hano Oelofse, MD at earthing and lightning protection company DEHN Africa, says this 3D imposition helps to protect plants and other constructions, explaining: “3D laser scanning makes it easy to take the exact measurements of complex objects and building structures. With the help of a laser scanner, existing plants and structures can be recorded and digitalised. At DEHN Africa, we are able to offer this service not only for lighting protection systems, but for any building, structure or plant that needs precise drawings of the complete layout.”

3D scanning works as follows:

- Point clouds are then processed and consolidated using appropriate software.
- The result is a detailed 3D model.
- Oelofse continues: “The intricate detail of the points means that an exact measurement anywhere in the point cloud can be obtained. DEHN Africa is able to use laser scanning to put together a lightning protection design for an existing building or plant. The process of creating the lightning protection design also gives a 3D model of the plant itself, which can then be used for other types of planning and processing.”

Oelofse says the advantages of the DEHN 3D offering include the following:

- Recording the as built situation creates an accurate design.
- While the preliminary planning stage benefits from time saving, time-consuming redesigns that are based on old as-built drawings are also no longer necessary.
- Different formats are available for further use.

For more information contact DEHN Africa, +27 11 704 1487, info@dehn-africa.com, www.dehn-africa.co.za
Local panel manufacturer stays at the cutting edge of technology innovation

As a leading electrical control panel manufacturer, WEG Automation Africa stays at the cutting edge of innovation through its research and development driven approach which sees continuous product improvement—setting benchmarks within the industry sector. The company was previously known as Shaw Controls and is part of the Zest WEG Group which is, in turn, owned by Brazil-based WEG Group.

According to Tyrone Willemse, business development manager at WEG Automation Africa, the focus throughout the process is on safety and quality as well as local manufacturing capability. The company manufactures a range of low voltage (LV) and medium voltage (MV) electrical switchgear as well as LV fixed and withdrawable motor control centres (MCCs).

“Our fixed pattern boards have three configurations—front entry, back entry and back-to-back,” explains Willemse. “We can supply these in top or bottom busbar, or cable supply entry, to suit the customer preferences.”

WEG Automation Africa’s latest family of fixed pattern boards is internally arc classified at the highest level—Class C in accordance with IEC 61641 guideline. Willemse says this makes it possible to conduct an assessment and repair of the board after a flash and then it can be returned to temporary use after a dielectric test, to minimise unscheduled downtime. He notes that the IEC61641 guideline is starting to be introduced into LV designs to enhance safety.

“The fully withdrawable MCC option offers the major advantage that operators do not work on a live board in front of the bucket,” he says. “This allows the technician to take the bucket out and move it to a safe environment before working on it.”

Significantly, WEG Automation Africa has introduced a new, fully-withdrawable MCC compliant with both IEC61439 and IEC61641 guidelines. While initially sourced from WEG’s manufacturing facilities in Brazil, the model is being considered for local build.

With the use of Solidworks modelling computer-aided design and engineering software, the MCC chassis is pre-punched to reduce wiring time. All digital components are loaded onto the system and carefully placed in the design of MCCs, so that equipment can be assembled and replicated to the highest standards.

“Our closed-loop project planning and control system also contributes to ensuring optimal efficiencies in the manufacturing line, saving both time and money for our customers,” he says.

WEG Automation Africa’s extensive facilities at Robertsham in Gauteng also manufactures a variety of supplementary equipment for use on process and other plants. These range from custom-designed PLC panels, standalone starter panels, junction boxes, remote isolator panels and control desks. Panels are designed and produced for indoor and outdoor applications, whether skid-mounted, in a sub-station, in a container, or in a prefabricated room or specially constructed E-house.

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

BMG appointed distributor by HEKO Ketten

BMG has been appointed by HEKO Ketten as official distributors in southern Africa of Heko conveyor components, including round link chains.

“High wear-resistant HEKO components for bulk material conveyors, which are manufactured in Germany to pristine quality standards, enhance BMG’s extensive range of chain products,” explains Carlo Beukes, business unit manager, power transmission division, BMG.

“Through the supply and support of HEKO products, BMG boosts its solutions service to its broad customer-base, by optimising the efficiency of bulk material conveyor systems.

“Of importance to the local market are round link chains, which have been developed by HEKO for bucket elevators and chain conveyors. These components are suitable for use in various sectors, including mining and quarrying, cement, chemical and incinerating plants, paper production, food and beverage, as well as artificial manure and general machine industries.”

HEKO chains—known globally for high fatigue strength and close length tolerance of chain pairs—are manufactured from durable materials, including manganese, chrome-nickel and fine grain chrome-nickel alloy steels. Advanced computer-controlled heat-treatment processes are employed to produce tempered or case-hardened chains.

Advantages of case hardening include a high breaking load, resulting from a tough, fine grain core and high wear-resistance, from a minimum surface hardness of 800 HV. In addition to six standard hardening depths, BMG also offers Heko products with hardening depths to suit specific requirements. The range comprises round steel chains, bucket and scraper attachments, chain wheels, buckets and shafts, as well as complete return and tensioning units. Heat-resistant ring kiln chains for rotary kilns are also available.

BMG’s national branch network offers a technical advisory service on correct chain selection, which is a critical factor in power transmission systems.

For more information contact Carlo Beukes, BMG, +27 11 620 7558, carlob@bmgworld.net, www.bmgworld.net

www.instrumentation.co.za December 2019
Vert Energy has appointed Jacques Opperman as sales and support engineer for DEIF power management products.

Elonics recently donated an LSIS Automation Kit to UKZN’s electrical engineering department, which included the XEC Series PLC with HMI including programming software and necessary cables. Final year BSc electrical engineering student, Nathaniel Francis (right), will be using the donated kit for his final design project – PLC-based temperature control system.

For more information contact Elonics, +27 31 702 6242, sales@elonis.co.za, www.elonis.co.za

Curtailing youth unemployment in the Fourth Industrial Revolution

The Minister of Communications and Digital Technologies and coordinator of Government’s 4IR programme Ms Stella Ndabeni-Abrahams, in partnership with MICT SETA, has launched a pilot skills development programme in its commitment to create one million new jobs by 2030.

President Ramaphosa has appointed the 4IR commission to address, amongst other things, the skills gaps to future proof SA’s economy and reduce youth unemployment, a challenge partly due to technological disruption and structural inequalities.

The pilot phase of the project aims to train and equip 1000 unemployed youth with the 4IR ICT skills necessary to secure learnerships, employment and ultimately, start new businesses.

The skills development programme has been segmented into seven streams: data science, digital content production, cybersecurity, cloud computing, drone piloting, 3D printing, and software development. The 3D printing and software development streams were recently launched at the University of Johannesburg (UJ).

Over and above the core technical skills to be acquired, this intake of 259 learners from Gauteng and Mpumalanga will now be exposed to work readiness programmes and entrepreneurship skills.

FIRtech has partnered with the Ministry of Communications and Digital Technologies to deliver parts of the overall 4IR Skills Programme. With decades of experience, the company offers a unique blend of expertise that can help shape and implement all facets of a 4IR strategy. Other partners to the programme include UJ, Boston City Campus and Microsoft South Africa.

“The fourth industrial revolution has changed the way we work and interact with each other,” said FIRtech CEO, Ugan Maistry. “The soft skills of working with teams and service orientation are critical success factors and we plan to impart these skills during our work readiness programmes. These programmes have the potential to change the lives of hundreds of thousands of unemployed youth by leveraging the opportunities of the Fourth Industrial Revolution.”

For more information contact Fanie Botha, FIRtech, +27 82 451 5593, fanie@firtech.co.za, www.firtech.co.za

Dry-type transformer specialist Trafo Power Solutions has supplied four purpose-designed units to the University of Witwatersrand (Wits) as part of the institution’s electrical infrastructure upgrades on both its Braamfontein and Parktown campuses.

According to the company’s managing director David Claassen, Wits decided to replace the original oil-cooled transformers with dry-type, cast-resin units. These are safer and more environmentally-friendly due to the absence of oil in the system.

“The high safety factor associated with dry-type transformers has an impact on flexibility and cost,” adds Claassen. “Also the user can be more flexible in terms of where units are installed, as they can be placed indoors, in basements or in other confined spaces for convenience. This also means the cost of building special infrastructure for outside installations, a requirement of oil-cooled transformers, can be avoided.”

Trafo Power Solutions was closely involved right from the proposal stage of this project, providing the necessary application engineering to ensure the appropriate design for the generator company responsible.

“As specialists in transformer technology, our expertise is not just in the product that we are installing but also in understanding the bigger picture, the infrastructure requirements as a whole,” outlines Claassen. “Any successful installation is a close collaboration between Trafo Power Solutions, the engineering company, the consultants and the contractors to ensure that the final result is fit for purpose and serves the customer’s needs.”

With the growing installed base of dry-type transformers in the global marketplace, the price differential between this design and that of conventional transformers has become insignificant. This has opened the door for users to take advantage of the numerous benefits of dry-type transformers.

For more information contact David Claassen, Trafo Power Solutions, +27 11 325 4007, david@trafo.co.za, www.trafo.co.za

Trafo supplies and installs dry-type transformers at Wits University
DRH Components was started in Durban in 2015 when Rob Hare and Kay Goutham retired from CHI Control (now Eaton), after four decades of service. The company has offices in Durban and Pretoria.

Venture Measurement Group, owners of Bindicator, a sensor manufacturer for dry bulk and liquid level measurement, subsequently cancelled its distributorship with Eaton and appointed DRH Components as its official sub-Saharan Africa distributor. The distributorship region includes South Africa and the SADC countries.

In addition to marketing the entire range of Bindicator products, DRH has also introduced a range of conveyor safety switches and earth fault relays. Hare explains that both he and Goutham have an intimate knowledge of the products on offer and have extensive experience in the industry: “We are not bogged down with company procedures and we can respond timeously to customer requests and needs. We have a good rapport with our principal suppliers and enjoy a healthy commitment from them to supply and support the products we sell.”

Quality and safety compliance are important to DRH. “Being of American design, the Bindicator product range has an inherent design service factor,” says Hare, “which offers peace of mind. The product range that was introduced in 1935 has been upgraded over the decades but the current model still has the same physical size and fixing dimensions. Bindicator is at the forefront in bulk measurement and offers all the different types of technology to cater for a wide range of applications.”

DRH holds IA Certification for the conveyor safety switches and Ex certification for many of the popular Bindicator products. The company is very active in the heavy industry market as well as in the mining, steel and paper mill sectors, having recently supplied product into Kusile and Elkem Ferroveld.

The Binder range
Bindicator is a full service supplier of point and continuous level sensors for industrial applications. Established 83 years ago, its bin level indicators are responsible for preventing overflow spills, controlling surge bins, detecting plugged chutes and providing on/off control of pumps and conveyors in the dry bulk industry.

The range of point and continuous level measurement products include the Roto-Bin-Dicator PRO paddlewheel and the VRFII Series capacitance probe. These durable, simple devices require minimal maintenance and are easy to install and set up. Hare says that the Roto-Bin-Dicator rotating paddle type bulk material level sensor is extremely popular in the sub-Saharan Africa region. Two other products that are used extensively are the Auto Diaphragm and the Bin-Flo aerator.

The Binder range from DRH Components is designed and manufactured for ease of installation and calibration, and the level instruments are designed so that they can be customised to suit the most challenging customer applications.

For more information contact Rob Hare, DRH Components, +27 76 331 0005, robh@drhcomponents.co.za, www.drhcomponents.co.za
EHL is an engineering, procurement and construction management (EPCM), and engineering, procurement and construction services (EPCS) company that began operating in 1980.

Manager of automation at EHL, Steve Elliott, explains that the company identified a gap in the market to provide an electrical consulting service to the mining industry. It has since grown and evolved to, firstly, incorporate control and instrumentation and, later, multidisciplinary EPC engineering.

Headquartered in Johannesburg with branches in Pretoria, Rustenburg and Vanderbijlpark, the company is involved in projects from the conceptualisation and design phase, through commissioning and project handover, right up to post-completion service maintenance and support. EHL is Dekra ISO 9001:2015 certified and complies with OHSAS 45001:2015.

EHL Engineering Group has three interrelated divisions:

• EHL Consulting Engineers: Providing comprehensive design, consultation and project management expertise, as well as customised supply and optimisation solutions to all market sectors globally.
• EHL Energy: Providing comprehensive solutions and managing the associated risks in electricity-dependent projects for power generation, transmission, distribution and renewable energy.

“Our collaborative approach, commitment to clinical problem solving, extensive experience and long-standing associations ensure that any contracting arrangement with the EHL Group is as risk-free as it gets. We have a wealth of expertise which allows us to provide unique bespoke solutions and we are also a relatively small company, which means that we can react and mobilise our team quickly,” says Elliott.

Elliott explains that the company’s project leaders take ownership of projects to ensure that the best outcomes are achieved. “Teamwork is critical to successful projects and, throughout the project process, we implement an open communication channel between the planners, engineers and on-the-ground project managers. This results in exemplary problem solving which ultimately delivers cost-effective creativity and functional excellence to every project.”

The company provides systems integration for both Rockwell and Siemens and is currently in the process of considering onboarding the supply of handpicked products in addition to its current service offerings.

A two-step approach is taken to training of the company’s clients. Firstly, training is provided by EHL’s suppliers at the supplier’s facilities and, secondly, EHL conducts onsite add-on and refresher training for operators and technicians, as required. Similarly, EHL employees are sent to the company’s suppliers for training that provides a basic understanding of products and then further, specific EHL training is conducted in-house.

The company works in the major SADC region countries as well as internationally in Portugal, USA, Mongolia and Australia, amongst others. Projects are facilitated by using the services of a combination of local labour as well as EHL employees from South Africa.

Current and recently completed projects include the design and management of the Electrical, Control and Instrumentation (E, C&I) design and implementation for the underground expansion, upgraded process plant and smelter retrofit at a major copper producer, the E, C&I design and implementation at a major platinum mine outside Rustenburg and various elements at a developing copper mine in Arizona, USA.

For more information contact Steve Elliott, EHL, +27 11 370 7400, selliott@ehl.co.za, www.ehl.co.za
What we are offering
(through a twelve monthly renewable subscription):

- Name, contact details, logo and brief description of your business solution will appear in each issue of *SA Instrumentation & Control* magazine for the next 12 months.
- Two A4 in depth editorials OR, two half page display advertisements – content of your choice.
- All articles will also be hosted on our website and appear in a prominent position in one of our electronic newsbriefs.
- PDF copies of the articles (to be used for your own purposes) will be provided after publication.
- Your listing will be published in a new “Choose Your Automation Professional” section of the annual *SA Instrumentation & Control Buyers’ Guide* and a link to your company web page in all directory listings.

Contact: jane@technews.co.za
### Consulting engineers, system integrators & project houses

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<th><strong>Afrilek</strong></th>
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<td>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. Tel: +27 31 702 5767 <a href="mailto:sales@abacus-automation.co.za">sales@abacus-automation.co.za</a> <a href="http://www.abacus-automation.co.za">www.abacus-automation.co.za</a></td>
<td>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. Tel: +27 11 372 9340 <a href="mailto:sales@afrilek.com">sales@afrilek.com</a> <a href="http://www.afrilek.com">www.afrilek.com</a></td>
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<th><strong>Control Software Solutions - CSS</strong></th>
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<td>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. Tel: +27 31 705 0400 or +27 16 422 7644 <a href="mailto:sales@autotronix.co.za">sales@autotronix.co.za</a> <a href="http://www.autotronix.co.za">www.autotronix.co.za</a></td>
<td>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&amp;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. Tel: +27 31 914 0040 <a href="mailto:pieterv@cs-solutions.co.za">pieterv@cs-solutions.co.za</a> <a href="http://www.cs-solutions.co.za">www.cs-solutions.co.za</a></td>
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<td>Hybrid Automation is an approved Siemens system integrator and partner for automation and drives, process instrumentation as well as motion control. This enables it to provide its clients with the latest technology and solutions. Its client base includes major blue chip companies and has gained a strong foothold in virtually all the engineering verticals. Tel: +27 31 573 2795 <a href="mailto:info@hybridautomation.co.za">info@hybridautomation.co.za</a> <a href="http://www.hybridautomation.co.za">www.hybridautomation.co.za</a></td>
<td>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. Tel: +27 12 349 2919 <a href="mailto:alwyn.rautenbach@iritron.co.za">alwyn.rautenbach@iritron.co.za</a> <a href="http://www.iritron.co.za">www.iritron.co.za</a></td>
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<th><strong>PCS Global</strong></th>
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<td>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. Tel: +27 11 466 1673 <a href="mailto:info@moore.co.za">info@moore.co.za</a> <a href="http://www.moore.co.za">www.moore.co.za</a></td>
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Process Dynamics specialises in industrial automation and process control. The company is one of Africa’s leaders in turnkey automation projects and specialises in the integration of scada (WinCC, PCS7, Wonderware, Citect) and PLC (Siemens, Schneider, Rockwell) as well as MCC and control panel manufacturing and installation. Process Dynamics is ISO 9001:2015 accredited as well as a registered CIDB company.

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

SAM – Systems Automation and Management

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

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www.sam.co.za

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

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Saryx Engineering Group is an award-winning company whose focus lies in offering its clients the best solutions and services, taking into account their business objectives, current infrastructure and product knowledge investments. Its solutions are delivered at a value that makes sense to the client, by bringing forth industry standard best practices, intellectual capability, knowledge and infrastructure. Saryx is a BBBEE, 7EP CIDB and ISO accredited company.

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Hybrid Automation was approached by one of its clients, a leading South African FMCG company, to provide an automated solution for an existing plant in the factory. Being a popular confectionary manufacturer, the challenge faced with was to implement more control and monitoring functionality on one of its ovens, which was completely hard wired with all manual control.

The oven required plenty of operator intervention to run. Motors and burners had to be switched on and off manually. There was no interface to control the system or view alarms. If there were faults with electrical equipment or instruments, these were very difficult to fault find, which led to lengthy downtimes on the line, loss of production, and wastage.

The Hybrid Automation solution
The client requested that Hybrid Automation perform an upgrade on the system to automate the oven control. This would entail the control of four gas burners in four double tempering zones for a closed temperature control loop, as well as control of motors and safety monitoring.

The key beneficiaries of the upgrade were the production and maintenance teams. For the production team, it meant they would have a more productive oven with less downtime, and for the maintenance team, it meant that work would be more efficient.

For the biscuit manufacturer, the rewards achieved by the nature of this upgrade were prodigious. This upgrade would create much easier operation, a more automated and controlled system, and an easy to understand central operator interface panel where all operations and faults can be monitored.

The equipment specified in design for this project was as follows:
- A Siemens S7-1500 PLC used for the automation and control: this modular, scalable, and universally usable system is a preferred choice for many automated solutions as it delivers high performance with excellent usability.
- A Siemens TP1200 Comfort touch-screen HMI: the high performance and functionality of this HMI provided a perfect platform for operator control, alarming, trending and maintenance.
- Danfoss FC302 Profinet VSDs: these were used to control the motors as they were the recommended site standard for drives.

Implementation
The specified equipment along with motor protection, switchgear and other electrics were housed in a six-door electrical control panel built and supplied by Hybrid Automation. In addition to this Hybrid also provided field sensory devices and various electrical components. The existing gas burners however, were retained.

The system control was used to run a 40 metre steel oven belt through four double tempering zones for a defined time. This is the baking time for the product and determines the product to travel time from zone 1 to zone 4. The product is baked during the travel and exits onto an unloading conveyor that cools the baked product during transfer to the cream line where it gets creamed and packaged. The operator has full functionality to modify and select recipes, which contain baking times, zone temperatures, damper settings and motor speeds.

PID loops were used to control the temperatures in the four double tempering zones according to the recipes. K-type thermocouples were used to measure the temperature in the four zones and the burners were used to maintain the temperature under control of the PLC. Dampers control the air flow in all four zones.

Ongoing support is provided to the client in terms of improvements and system maintenance.

The success of this project was determined in terms of results required. It was rated a success as the system runs according to the functional specification, there is more control to the system, and all operations and faults can be monitored at the central HMI. The manufacturer now reaps the benefits of an automated oven control system, yet another achievement for Hybrid Automation.

For more information contact
Hybrid Automation, +27 31 573 2795,
info@hybridautomation.co.za,
www.hybridautomation.co.za
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I would like to highlight some of these achievements to thank the team. We have become the voice of automation in industry:

- The Industrial Instrumentation Group (IIG) has joined the SAIMC as the SAIMC Supplier Advisory Council, a huge step forward for the industry in South Africa.
- We have been working on a new Operations Manual for the SAIMC and the following important changes were made:
  1. Our National Patron Members are now called our National Patron Members and strong ties with the SAIMC at national level.
  2. Our Branch Patron Members are now called our Regional Members to reflect the huge contribution and strong ties with the SAIMC at regional level.
  3. Our Branch Chairs are now called Branch General Managers as their contributions are no longer limited to chairing meetings but supporting the local industries in various ways with the assistance of their brilliant teams.
- A board has been established that will be operational as from the AGM in 2020 as per the CIPC registration of the company.
- In 2019 the SAIMC had to reapply as a Voluntary Association of ECSA in terms of Section 25 of the Engineering Professions Act of 2000 under the new framework Gazetted in May 2017. We were accepted and our certificate can be seen on the web home page.
- The SAIMC is well represented in SABS technical committees.
- We are participating in the Presidential Commission on the 4th Industrial Revolution – Policy and Regulation Work Stream Policy and Regulatory Work Stream Stakeholder and Industry.
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- Our members have presented at various conferences.
- We have submitted the first of the seven (7) automation career options – the Enterprise Integration Engineer – to ECSA as a special category. This gives us time to finalise curriculums for a formal automation discipline while we work on the other six options.
- Our new website is up and running with a forum. You are welcome to visit it and contribute in the various activities of the SAIMC.
- Without the people working passionately within the SAIMC, we could not have achieved any of this. Thank you to each person who contributed, the sacrifice and time you put in is amazing. It is what allows us as a collective to change our industry for the better.

I would also like to thank Johan Maartens for his work as our COO and also Ina Maartens for her work as the secretariat. There is so much daily operational work and support that goes into every initiative that we undertake. Thank you for your commitment – it truly goes above what is expected. Your love and passion for our industry is admirable.

Yours in automation,
Annemarie van Coller.

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<td>Council: Ina at <a href="mailto:admin@saimc.co.za">admin@saimc.co.za</a>, Mobile: +27 82 440 8957, Tel: 08610 72462 (08610 SAIMC)</td>
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From the President’s desk

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- We are participating in the Presidential Commission on the 4th Industrial Revolution – Policy and Regulation Work Stream Policy and Regulatory Work Stream Stakeholder and Industry.
- The DTI has requested that SAIMC lead the Intsimbi Board diversification initiative.
- We are a member of the proSET (Professionals in Science, Engineering and Technology) sector of the National Science and Technology Forum.
- Our members are involved at ECSA with the assessment of candidates that would like to register as professionals.
- We participated in the Gauteng Technology Innovation Forum Focus Group through the NSTF.
- We arranged automation pavilions for our National Members at various exhibitions.
- We are a Board Member of IFPTI.
- We are a Board Member of the Automation Federation.
- We are participating in the world-wide establishment of an automation discipline with the members of the Automation Federation, concentrating on factory and process automation. (The Automation Federation represents more than 130 countries.)
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**Durban branch**

**Technology evening**

At the last technology evening, Beckhoff Automation’s Gareth Taylor (sales engineer, Durban) presented on the topic ‘Open PC-based control technology in a world of modular process automation’. He expertly took us through the developments of IIoT and the role that Beckhoff plays in shaping what the future of automation will look like.

His informative presentation also included information on the integration of HART devices through FDT/DTM into PC-based control systems, ultra-thin integration of intrinsically safe field devices, multi-touch control panels and panel PCs for hazardous locations, as well as big data analytics and remote data access in the cloud.

We were pleased with the good attendance at the meeting, including lots of enthralled students, and everybody enjoyed the presentation, the networking and the fine Durban chicken curry for dinner.

Vice chairman Paul Sikhakhane (left) thanks Gareth Taylor for his presentation.

**Secunda branch**

At the technology evening on 10 October, Jacques Parrott, from SICK Automation SA gave a presentation on ‘Measurement of greenhouse gas emissions’, which also touched on the issue of carbon tax.

The greenhouse phenomena is related to IR wavelength emitted by the sun. These shafts of sunlight will be reflected by the greenhouse gases, while lower wavelengths will not be affected. The primary greenhouse gases in earth’s atmosphere are water vapor ($H_2O$), carbon dioxide ($CO_2$), methane ($CH_4$), nitrous oxide ($N_2O$) and ozone ($O_3$).

Without greenhouse gases, the average temperature of earth’s surface would be about $-18°C$, rather than the present average of $15°C$. Managing carbon is not just good for the environment and critical to combat climate change, it’s also a way for businesses to save money, cut risks, and create new business opportunities.

For example, the greenhouse gas emissions (GHG) of a mine are continuously monitored in the ventilation shafts. Precisely measuring GHG emissions provides data that is used as the basis for calculating the tax liability. High-precision sensors and analysers are used to measure gas, flow, temperature and pressure. An option to measure moisture can also be integrated. Customer-specific reporting software can also be deployed to create emissions reports for submission to the tax authorities.

This branch thanks Jacques for this informative and interesting presentation.

All instrumentation and control mechanicians, technicians and engineers are welcome to attend our monthly technology events next year. The planned dates for 2020 will be made public after the AGM on 16 January 2020 (venue to be confirmed). All enquiries can be directed to branch chairman Johan Maritz +27 82 856 3865.
Vaal branch

At the last technology evening, Robert de Scande from SICK Automation gave a presentation on the subject of IO-Link. IO-Link offers new options for communication between the system control and field levels: sensors and actuators become active process participants in an end-to-end automation network. As senders, they independently report errors and statuses to the control. As receivers, on the other hand, they receive signals and process them. The result is cost and process optimisation across all applications and industries.

It involves a point-to-point connection that may be located underneath any given architecture for communicative integration of the lower field level. Sensors are integrated into the overall automation system through an IO-Link master, the device description and function blocks. IO-Link is integrated as a fixed feature in smart sensors with features that create the foundation for a forward-thinking automation system in the context of Industry 4.0.

Johannesburg branch

The October technology evening was hosted by Extech Safety Systems. Sales director Gary Friend presented an interesting take on the relationship between new technological advances, and the never-ending job of standards bodies to keep up with and, where necessary, regulate the implementation of these.

For instance, a fairly deep understanding of the technology is necessary before standards can be set. There is also the temptation to over regulate, which results in unnecessary expense. Under-regulation, on the other hand, results in corners being cut with obvious safety implications. Gary mentioned several examples of where mining and industry were working off different versions of the same standard.

In some cases, standards are not keeping pace with technology, resulting in an unnecessary reduction in safety. Examples Gary gave were in mining, mobile communication, access to standards and documentation while underground, CCTV, mobile HMIs, tagging and tracking, and several others. If these technologies are not adopted due to tardiness on the part of regulators, the result is reduced safety in applications where these technologies have the potential to improve it.

While regulation is undoubtedly necessary, it needs to be addressed intelligently, and above all, timeously.

The branch thanks Extech Safety Systems for sponsoring the evening.
What a lot of fun!

By Kim Roberts

The annual SAIMC gala dinner was once again a glittering affair. Led by MC Robert Wright, who entertained guests with his Friday Fun Facts, the occasion was a huge success. Platinum sponsors were Beckhoff (red carpet photos), WIKA (arrival drinks) and RJ Connect (wine). Gold sponsors were ifm (dessert) and Reed Exhibitions (entertainment). Guests were entertained by the band Delaney & Beukes, and were also kept in stitches by comedian Schalk Bezuidenhout.

President Annemarie van Coller’s address had the theme Celebrating 2019.

“The SAIMC is built on its people and we want to show you what we have done to help change South Africa,” she said. Covering the SAIMC’s vision for 2023, she went on to say that all the branches have shown sustainable growth. Guests were given insight into ‘the year at a glance’, with highlights including the partnership of the Industrial Automation Group (IIG) with the SAIMC as a supplier advisory council. The SAIMC is rapidly becoming a guiding voice in the industry, and other achievements include playing a leadership role on the Intsimbi board and representation on the Presidential Commission on the Fourth Industrial Revolution, as well as industry standards organisations such as ECSA.
What a lot of fun! The annual SAIMC gala dinner was once again a glittering affair. Led by MC Robert Wright, who entertained guests with his Friday Fun Facts, the occasion was a huge success. Platinum sponsors were Beckhoff (red carpet photos), WIKA (arrival drinks) and RJ Connect (wine). Gold sponsors were ifm (dessert) and Reed Exhibitions (entertainment). Guests were entertained by the band Delaney & Beukes, and were also kept in stitches by comedian Schalk Bezuidenhout.

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COO Johan Maartens gave an update on IIG as a supplier advisory council and the development of an automation curriculum. The SAIMC has a mission to create educational and upskilling opportunities for youth and automation professionals in South Africa, and he described the progress made to date. The SAIMC is investing in the future, and has spent a quarter of its funds on youth by supporting the FIRST Lego League – a huge amount. Sibling students Heike and Maike Kabutz talked about the road they have travelled on with the FIRST Tech Challenge, and what it has meant to them. They said that they have learnt about creativity and teamwork. It has also helped them to get involved in the community, and as Heike said, “it has pushed my passion for robotics”.

There were also some big milestones to celebrate: WIKA for 40 years in the industry, Endress+Hauser for 35 years of innovation in Africa, and ifm for 50 years in the business globally.
All in all, it was impossible not to think that the SAIMC is just getting better and better by the year.
The SAIMC would like to thank all the evening’s sponsors

Beckhoff implements open automation systems based on PC Control technology. The product range covers IPCs, I/O and Fieldbus components, drive technology and automation software.

Products that can be used as separate components or integrated into a complete and seamless control system are available for all industries. The Beckhoff ‘New Automation Technology’ philosophy represents universal and open control and automation solutions that are used worldwide in a variety of different applications, ranging from CNC-controlled machine tools to intelligent building automation.

The sub-Saharan subsidiary, Beckhoff Automation, is located in Johannesburg (est. 2006), Cape Town, Durban and Port Elizabeth branches cover their respective regions.

Beckhoff sub-Saharan Africa has highly-competent sales and technical teams, fully-equipped Training Centres and a Level-1 Service Centre.

RJ Connect has grown to become a specialist in industrial communications and is known for its commitment to innovation. Having secured the Moxa distributorship in 1999, RJ Connect has evolved to become a leader in the supply and support of industrial communication equipment, industrial redundant Ethernet networks, fibre-optic converters, data networking products and serial to Ethernet device servers in sub-Saharan Africa. RJ Connect has worked extensively in various vertical markets namely; water and waste, transportation, mining industries and power utilities and has built relationships with a number of blue chip companies who have supported them over the years. Managing director, Rob Wright, is not only dedicated to providing high quality products and customer service, but also strongly believes that a world-class company is built through integrity, mutual respect, customer focus and execution.

WIKA Instruments (WIKA South Africa) is a wholly owned subsidiary of WIKA Alexander Wiegand SE & Co. KG of Klingenberg, Germany.

The WIKA group was founded in Germany in 1946 as a manufacturer of mechanical pressure and temperature measuring instrumentation. It has since grown to become the world’s foremost manufacturer of pressure instrumentation for the southern African market. More recently, WIKA South Africa has also set up production lines for stainless steel level switches and level transmitters; and also manufactures various primary flow elements such as orifice plates, flow straighteners and flumes.

WIKA is also setting the standard for level, flow and force measurement.

There are currently 15 manufacturing subsidiaries in the WIKA Group. One of them is WIKA South Africa. Established in 1979, WIKA South Africa initially manufactured pressure and temperature instrumentation for the southern African market. More recently, WIKA South Africa has also set up production lines for stainless steel level switches and level transmitters; and also manufactures various primary flow elements such as orifice plates, flow straighteners and flumes.

Africa Automation Fair is Africa’s premier and most effective networking platform to reach automation and smart control industry professionals. Africa Automation Fair has always worked closely with the IIG, SAIMC and Technews Publishing to plan and execute a focused networking platform for the automation and smart control industry.

Owned by Reed Exhibitions, Africa’s top exhibition organiser with access to global trade and consumer event organising expertise serving 44 industry sectors active in 42 countries.

Having established an excellent reputation over three decades we pride ourselves in delivering world-class events year on year.

Customer value is our key focus which we continue to improve using data analytics, thus gaining better insights into our exhibitors and visitors.

As organisers we continue to re-invent ourselves in this ever-changing market, staying relevant to specific markets, strengthening and building our exhibitions in terms of content, experiences and target audience. Reed Exhibitions is the pioneer in ensuring our events are trend setting, industry-leading and the ‘must attend’ event in our specific market sectors.

Ifm is a world leader in industrial factory automation with the following products which include position and process sensors, sensors for motion control, industrial communication and imaging, safety technology, identification systems, condition monitoring systems as well as systems for mobile machines, connection technology and various ifm accessories.

Even though we have grown into a big company we have still maintained the virtues of the founding years: The flexibility and individuality of a small enterprise and the quality and professionalism of a group. Our customers are still today in the centre of our work – close to you!

Ifm is always in motion. Constantly, innovations are developed, products optimised and system solutions adapted. Professional perspectives and career opportunities are to set standards and ensure a safe future. Ifm – close to you!
Robust absolute linear position measurement

Magnetostrictive position sensors for accurate position feedback.

Traditionally, linear displacements were measured using linear voltage displacement transducers, LVDTs. More recent developments in magnetostrictive technologies can attain accurate absolute linear position feedback in virtually every application. Further, the position information is available at fast repetition rates, even in high vibration and high pressure applications.

Temposonics, an MTS Systems company, is a leading supplier of magnetostrictive sensors, which are rapidly becoming the transducers of choice in many applications.

Magnetostriction – the principles
In the transducer a strain pulse is induced in a specially designed magnetostrictive waveguide by the momentary interaction of two magnetic fields. One field comes from a moving magnet, which passes along the outside of the transducer tube, and the other field is generated from a current pulse which is applied to the waveguide. The interaction between these two magnetic fields produces a strain pulse which travels along the waveguide until the pulse is detected at the head of the transducer. The position of the moving magnet is precisely determined by measuring the elapsed time between the application of the current pulse and the arrival of the strain pulse. As a result, accurate non-contact position sensing is achieved with absolutely no wear to any of the sensing elements.

A detailed description of the physics can be found at https://tinyurl.com/yywtlwke

The characteristics
Magnetostrictive sensors combine the strengths and overcome the weaknesses of other technologies in one measuring system. Temposonics sensors offer non-contact absolute measurement at great accuracy and repeatability in extreme environments. This includes areas of mechanical extremes like high shock loads vibration and pressures. Samples of position information are available at very high updates, allowing for real-time control. Various mechanical variants are available, and lengths of more than 20 metres are possible. The units also come equipped with analogue, fieldbus and Ethernet interfaces.

A world of applications

Level measurement
Many interesting applications for the technology exist outside general industrial use. Who would think a level sensor used in a petrol tank could be used in an operating theatre in a hospital?

A leading manufacturer of hospital and general medical appliances uses the name Neptune for a portable instrument for collecting body liquids. Unlike many other uncritical applications, liquids from the human body in the operating room may require handling with special care, i.e., utmost accuracy of volume measurement is a must – liquid lost by a human body during operation must be replaced by transfusion. Moreover, an excessively filled collecting tank could be dangerous for septic reasons.

Factors that make magnetostrictive transducers suitable in these applications include:
- A temperature coefficient better than 50 ppm.
- Fully encapsulated stainless steel construction.
- Easy sterilisation.
- High measurement accuracy and repeatability.
- Battery operation.
- High inherent system reliability.
- EMC features.

Electromagnetic compatibility is a feature which had to be given particular attention for these special environments. Transducers must be immune to interference from the multitude of other hospital equipment and must not affect other laboratory instrumentation or even a pacemaker.

Reducant measurement capabilities
Applications exist where a transducer failure will have disastrous effects on safety and cost. For these applications critical variables are measured by means of two or three independent, functionally identical measurement systems. Each measurement system comprises a basic sensor element, evaluation electronics with separate output signal and supply voltage. The basic elements are accommodated in a pressure-resistant stainless steel pipe for direct stroke measurement, which can be in a hydraulic cylinder. The position magnet
travels freely along the sensor rod which emerges into the open piston and marks the measurement point through its wall. The position measurement validity is checked by totals formation with inverse output signal programming (4–20 mA, 20–4 mA; total = 24). Alternatively, the control system monitors the difference between the measured position values (difference = 0). If variations are detected, remedial measures can be taken immediately. The measurement systems are completely independent and can be switched on individually. The sensor version with three redundant measurement systems allows redundant measurement without immediate replacement.

Linearity is better than 0.02% and repeatability is better than 0.001%. Due to high linearity even minimum measurement differences are identified, whereby the error tolerance can be adjusted individually and adapted to the application.

Shock resistance
In harsh shock and vibration applications, the mechanical noise frequently causes measurement problems in sensing systems, and without good sensor data, it is impossible to control motion accuracy.

MTS has developed a Temposonics sensor with increased resistance to shock and vibration for heavy duty machinery. These sensors offer best-in-class performance with vibration up to 30 gav and single shock up to 100 g, without affecting the accuracy of the measurement signal. This high level of resistance to external influences is due to a sophisticated waveguide system, which is the heart of magnetostrictive measurement technology. In conjunction with the advantages of non-contact measurement physics, the shock and vibration resistant sensors open a multitude of accurate measurement application not possible with other technologies.

The forces applied during punching, pressing, nibbling or cutting in the metal working industry now have little or no influence on measurement accuracy. Previously linear encoders were used, with their known limitations on shock and vibration at machine interface level.

Pressure-resistance
Magnetostrictive sensors are available for high pressure applications. Normal operating pressure up to 800 bar is possible with peak pressures reaching 1200 bar. Protected by a specially reinforced stainless steel pipe, Temposonics sensors are able to measure positions with high reliability and accuracy under high pressure.

These high pressure options have the advantage of low sensor deflection, eliminating the need for supporting structures. The unique high resistance to pressure offered by Temposonics permits operation of the sensor in industrial and mobile applications where the use of high-accuracy measuring instrumentation was not possible before. Lifting building blocks by means of heavy load lifting equipment, intelligent building monitoring, deep-sea applications and heavy machinery construction are only a few examples of the possibilities.

Features
Magnetostrictive sensors are normally packaged as a sensor head attached to a pipe which houses the measurement wave guide. Magnetostrictive sensors are available in a flexible format in lengths up to 20 metres or more. The Temposonics flexible version, is a Teflon-sheathed stainless steel hose of 8.7 mm diameter with a maximum bending radius of 250 mm, ideal for curved measurements or applications where space conditions are restricted.

Multiposition measurement
From one sensor using 16 magnets it is possible to get 16 independent position measurements. Machine manufacturers, for example, need only a few sensors to measure and process all axes and displacements. This highly accurate sensor is ideal for machine tools, milling and metal presses where high-accuracy measurement of each individual position is a required.

For more information contact
ATI Systems, +27 11 383 8300, technical@atisystems.co.za, www.atisystems.co.za
Advances in blockchain technology could enable the food and beverage industry (F&B) to enhance traceability. In the US alone, food recalls and food-borne illnesses cost some $77 billion per annum, including discarded products, loss of revenue, damage to corporate reputations and healthcare costs. Better traceability could significantly reduce these.

“Blockchain comes into its own when the data needs to be highly secure, or if smart contracts are to be managed,” says Marc Ramsay, VP Industry Business Unit, Schneider Electric South Africa. “If an F&B manufacturer is handing off a finished product to a logistics company, which then delivers it to a retailer that stores it within a cold storage facility, the F&B stakeholders want to make sure that the logistics company does not damage the product and that it gets to its destination on time.

“Blockchain technology gives F&B organisations the ability to be much more precise in how they track their goods, and could simplify the execution (invoice/payment) of supply contracts. When an issue occurs, they can be more accurate about what needs to be removed and what can be kept in the food distribution pipeline.

“Verifications could all be dealt with within blockchain through smart contracts. At the IIoT level, sensors could be placed on transportation devices, such as pallets and packages, allowing variables like temperature and vibration levels to be monitored and the data stored in the blockchain.

“Stakeholders would then have real-time visibility into the stipulations of that contract and whether or not any of the agreed rules had been breached. This powerful tool provides traceability, security, transparency and real-time access to contracts that affect the upstream and downstream supply chain.”

**Blockchain process unpacked**
In a blockchain process, networks of computers use consensus mechanisms and cryptography to allow each participant on the network (or along the supply chain) to update a distributed ledger in a highly secure manner, without a central authority. (For a hacker to breach one of the blocks in the chain would be difficult; to breach all the links at the same time would be nearly impossible.)

In a private blockchain, this can be complemented by access rights rules, defined by each participant of the blockchain based solution, making it difficult to access the ledger data without the proper access rights. Moreover, some blockchain technologies have ‘smart contracts’ capability, which allows defined rules to be executed on the data in a secure way.

As a result, the level of trust built into such a system is high. When working within a trusted system, the time and cost associated with lengthy back and forth business processes is reduced. The ability to track movements across the various stages of a product lifecycle become much more acute, thereby improving the efficiency of the entire supply chain, i.e. defective products can be quickly traced and loss of revenue or damage to reputation limited.

**More work to be done**
“Although the use of blockchain in this type of application is still in the experimental and pilot stages, Schneider Electric is prototyping new ways to leverage its expertise in plant automation and process control to build and develop solutions that improve traceability across product life cycles,” concludes Ramsay.

“By partnering with blockchain technology specialists, such as Microsoft and IBM, we are assessing its contribution to the development of blockchain-based solutions that will support a multitude of key manufacturing and process industry requirements.”

**For more information contact Prisca Mashanda, Schneider Electric SA, +27 11 254 6400, prisca.mashanda@se.com, www.se.com/za**
Fishery relies on Siemens process management

The fishery in Steinach, Switzerland, breeds fish species which are under threat so that they can be released into domestic waterways in the canton of St. Gallen. The quality and temperature of the water, light, and food all have a significant role to play in breeding, not to mention the requirements to be met for each fish species. To comply with these demands, the fishery relies on modern technology to monitor the breeding tanks. At the heart of the solution is a Siemens controller. End-to-end automation also secures the operation, even in the event of a power failure, and contributes to high survival rates amongst the breeding stock.

Around two thirds of fish and crab species native to Switzerland are threatened by extinction or no longer appear in the wild. The Amt für Natur, Jagd und Fischerei (Office for Nature, Hunting and Fishing) in the canton of St. Gallen has the task of maintaining and promoting biodiversity. The fishery, which opened 12 months ago in Steinach, is making a significant contribution in this area. Approximately 100 cubic metres of water are treated every hour in the fish breeding plants in order to meet the creatures’ requirements with respect to quality, oxygen content and water temperature. This process is controlled by a Siemens Simatic S7-1500 controller with two processors, CPU (Central Processing Unit) 1515-2 PN and CPU 1511-1 PN.

Comprehensive process management

The water in the total of four tanks is drawn directly from Lake Constance and is extracted at a depth of 40 metres, then filtered, degassed and sterilised with UV radiation. Precise pressure control by the controller ensures that the pump motors are ramped up and down slowly. Were this not the case, pressure surges would occur in the pipework due to the significant difference in height when switching on and off due to the weight of the water column. This could damage the drives. It was important that the WinCC visualisation software provided extremely easy and transparent visualisation and archiving of the process during operation. A redundant Simatic CPU 1211C monitors and controls the continuous power supply and notifies fishery employees by SMS in the event of a disruption.

The end-to-end Siemens automation solution provides employees at the fishery with the necessary support to maintain biodiversity in Swiss waters. The survival rate of breeding stock in the centre remains high thanks to this reliable technology.

For more information contact
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Zest WEG Group has been servicing the agricultural sector for more than 35 years with its range of robustly engineered products.

All products, designed using modern technology, offer farmers optimum reliability coupled with excellent energy efficiency. From WEG Premium Efficiency electric motors to WWash electric motors with WEG Variable Speed Drives, all have developed a reputation for solid performance in the most demanding conditions. Low maintenance requirements as well as ease of serviceability allow reduced total cost of ownership to the agricultural sector.
Extending the life of a kiln refractory as well as preventing disastrous failures requires a good understanding of the condition of the refractory material. The easiest way to monitor the gradual degradation of the material and to detect damaged or fallen bricks is to monitor the temperature of the kiln shell. Infrared technology has long been favoured to perform this task and sophisticated user interfaces have been designed to make the data easier to analyse and understand. Recent demands have prompted the development of even more complex products that do a lot more than just measure temperature.

Perhaps the most critical step in the cement manufacturing process takes place in the rotary kiln. Here a flame that can reach temperatures of 1900°C heats the raw materials to about 1500°C. The material becomes partially molten and a series of physical and chemical reactions converts the calcium and silicon oxides into calcium silicates, cement’s primary constituent. At the lower end of the kiln, the raw materials emerge as red hot particles called clinker.

By monitoring the temperature of the entire kiln shell, the operator can determine the effectiveness of the refractory material. Any fallen bricks will be quickly detected and appropriate action may be taken to prevent further damage. Combining temperature measurement capabilities with a database of historical images allows the engineer to examine the temperature trends and to predict when the refractory will reach an unsafe condition. Scheduled maintenance can then be planned to replace the refractory with the minimum of downtime. Thus the refractory life can be extended to provide economic benefits and emergencies can be averted. Also, close monitoring of temperature will allow the operator to see the effect of the process on the refractory. Settings can be optimised to maintain the best possible combination of high production throughput and extended refractory life. It is no wonder that this technology has been widely embraced by the cement industry for more than twenty years.

There are several systems available on the market today with a variety of specifications and features. All however use infrared scanning technology to gather the temperature data. All objects emit infrared radiation and the intensity of this radiation increases along with the temperature of the object. Measuring the intensity of this infrared energy provides the temperature of the target. Infrared temperature sensors, widely used in many industrial applications, contain a detector that will generate a current when exposed to energy of a specific wavelength in the infrared range (1 to 20 μm). As the intensity increases, so too does the current and thus the temperature of the object can be determined. Usually these sensors utilise a range of optical elements and are focused on a specific point on the target and hence are termed ‘point sensors’. By rotating a mirror, angled at 45 degrees to the sensor, the energy from a wider field of view can be projected onto the sensor and thus the temperature of an entire line on the target can be measured. These units, commonly known as infrared lines scanners, are at the core of all kiln shell monitoring systems in use today.

When used to monitor rotary kilns, one or more line scanners working in parallel will gather data from a line along the kiln axis. As the kiln rotates, each new line of data is generated and thus the entire surface is mapped. This data is transferred to a PC with application specific software that converts the stream of raw data into a two-dimensional image.
thermal image of the kiln surface. A trigger signal may be used to indicate each complete revolution of the kiln and the images will be updated upon the completion of each rotation.

While all infrared kiln shell scanning systems offer the basic functions outlined above, newer systems address many other customer needs and offer expanded functionality. One added function addresses the concern of shadow areas along the length of the kiln. With the wide field of view (FOV) of the scanner, which can range from 80 to 120 degrees, it is not uncommon to have several obstructions, which essentially prevent the scanner from seeing the entire kiln shell. These obstacles may be buildings, power poles, other equipment, etc. Further, the drive wheels or tires have a diameter significantly larger than the kiln itself and at the outer edges these too can produce areas shadowed from the line scanner.

The newest systems, incorporate the use of single point sensors that are located such that they can see the areas shadowed from the primary sensor which will always be a line scanner. The data from the point sensor and that from the line scanner are knitted into one seamless thermal image. Up to 32 point sensors can be installed and utilise multi-drop communication so that only one connection is needed back to the PC. Since the software is integrating the data from multiple sensors into a single image, ‘dirty lens’ warnings can be easily provided as an added feature.

Another new function involves monitoring the temperature of the clinker at the hot end of the process inside the kiln. An infrared point sensor looks through a viewing port into the hot end of the kiln and monitors the clinker temperature. The data is displayed on the same screen as the kiln shell thermogram, allowing the operator to monitor both steps of the process simultaneously. Since the environment inside the kiln is extreme with many combustion by-products between the sensor and the target, a special two-colour sensor is used. This type of sensor views the target at two wavelengths and thereby returns a value that is the true temperature of the target rather than the temperature of the combustion gases.

One interesting innovation does not even involve temperature measurement. The kiln is typically driven from one end and its huge size and mass make homogeneous rotation quite a challenge. Particularly during speed changes, there is a tendency for some of the rotational energy input by the motors to cause the kiln to torque or twist rather than to rotate. While a small amount of torquing is acceptable, too much twist will cause damage to the relatively fragile refractory material. The typical kiln monitoring system uses a sensor to measure each rotation of the kiln and to trigger the display of each subsequent image of the kiln shell. By installing additional sensors, one at each tire, the rotational speed of several points along the length of the kiln can be monitored. If the rotational speed varies along its length, this is an indication that twist is occurring. During configuration, limits can be assigned and the system will trigger alarms when these limits are exceeded.

Of course, at the end of the day, the purpose of the infrared kiln shell scanning system is to monitor and report on the condition of the refractory lining within the kiln. Most programs on the market today offer some degree of refractory management. Usually this takes the form of a location within the program to record the type of refractory used along each segment of the kiln. Viewing this information alongside the temperature trend data provides the information needed to make educated decisions on how to modify the kiln settings to maximise refractory life or on when to schedule downtime to replace the brick. Some systems offer advanced refractory management capability where the user inputs some critical data on the refractory type and the system will then monitor the condition of the brick and report on refractory wear. While these systems are useful, great care should be taken to ensure that the data entered into the program is accurate. Since all installations are inherently different, wear rates too will differ. Since plant downtime can lead to costs of seven figures per week, making decisions based solely on the predictions of such a system is unrealistic for most cement professionals.

There are many true-life case histories that demonstrate the capability to extend refractory life through careful monitoring of kiln shell temperatures. Infrared temperature scanning systems have shown their usefulness in cement plants across the world. Modern systems are adding ever more functionality in an effort to provide the cement professional with timely and complete data. In an era where everyone is asked to deliver higher and higher efficiency, infrared scanning systems are becoming an essential part of the toolkit.

For more information contact R&C Instrumentation, +27 11 608 1551, info@randci.co.za, www.randci.co.za.
Emerson has introduced the AMS Asset Monitor edge analytics device, which digitalises essential asset data and analytics for better operations performance and improved decision making. AMS Asset Monitor provides actionable insights into essential assets that were previously monitored only with infrequent assessments. The new edge analytics device will connect with Emerson’s Plantweb Optics asset performance platform to provide key operations personnel with instant asset health details for operations and maintenance decision making.

Plants typically monitor the condition of essential assets such as pumps, fans, and heat exchangers only every 30 to 60 days. The longer the gap, the more likely that a defect goes undetected and results in an unexpected failure with significant impact on production, product quality, and plant efficiency. The new AMS Asset Monitor combines easy deployment, embedded logic-based analytics, and intuitive health scoring to make it easier for organisations to monitor and maintain essential assets. For instance, AMS Asset Monitor’s analytics and visualisation can help plant personnel effectively plan maintenance during scheduled shutdowns and turnarounds and reduce or eliminate unplanned downtime.

Unlike typical analytics devices that send data to a historian or the cloud to be processed later, AMS Asset Monitor provides analytics at the edge, performing calculations at the device. This capability reduces the time, complication, and expense of adding analytics to a plant’s assets. Each device collects data continuously and uses embedded logic to identify and diagnose common reliability issues. Individual issues such as imbalance, misalignment, bearing faults, lubrication issues, or fouling are consolidated into an overall asset health score. AMS Asset Monitor then communicates these health scores via a web browser or – when integrated with Plantweb Optics – through real-time persona-based alerts on mobile devices. Plantweb Optics also enables enterprise-wide visibility and expands edge analytics and digital intelligence throughout the organisation, keeping personnel aware of essential asset health.

The small device footprint, along with wired or wireless Ethernet connectivity, makes it easy to install and new applications can be supported by simply adding the relevant logic-based analytics.

For more information contact Devesh Roopnarain, Emerson Automation Solutions, +27 11 451 3700, devesh.roopnarain@emerson.com, www.emerson.com

WIKA’s model TGS55 is a stainless steel bimetal thermometer which offers high reliability and long service life.

Wherever the process temperature has to be indicated on-site and, at the same time, circuits need to be switched, the bimetal thermometer with switch contacts finds its application. Switch contacts make or break circuits dependent upon the pointer position of the indicating measuring instrument. The switch contacts are adjustable over the full measuring range. The instrument pointer moves freely across the entire scale range, independent of the setting.

The set pointer can be adjusted via the window using a removable adjustment key (mounted on the terminal box). Switch contacts consisting of several contacts can also be set to a single set point. Contact actuation is made when the actual value pointer travels beyond and below the desired set point. Inductive and electronic contacts are available for switching.

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

Whether in the life sciences or in biotechnology, whether in the food or chemical industries – global competition is steadily increasing. Ever more companies are implementing their process facilities in a very short time by following a ‘modular principle’. The production units and skids required for this include a wide variety of measurement and control technology devices fitted into the smallest possible space. Therefore, customers require more and more compact and space-saving devices without limitations on functionality. This also applies to electromagnetic flow measurement. The Promag 100 from Endress+Hauser was specially designed for such applications.

Ultra-compact transmitter design
Promag 100 combines a decades-long proven sensor technology with ultra-compact transmitter electronics without any compromise. As a multivariable flowmeter, it also opens unimagined possibilities for optimal control and monitoring of individual process units, e.g. for heating, cooling, distillation, fermentation (bioreactors), product filtration, phase separation or inline cleaning.

High transparency and security in the process
The Promag 100 has a new feature: in addition to volume flow, the fluid conductivity as well as the temperature can now be measured directly. This makes it possible to monitor the process comprehensively and with high accuracy around the clock with the following benefits:

• Accurate measurement and dosing of substance amounts.
• Assured compliance with guidelines and regulations.
• Reduction of operating costs by means of proven, space-saving measuring devices.

Innovative measuring electronics in miniature format
The miniaturised measuring electronics in ultra-compact format not only have the same functionality as a traditional device, but also include a web server for intuitive operator access. This opens up completely new service and commissioning options. Examples cover simple access to measuring instruments and diagnostic data, on-site configuration of instrument functions without additional interfaces, or upload and download of configuration data for commissioning other identical measuring points. Permanent self-diagnostics (Heartbeat Technology) and a service-friendly data storage concept (HistoROM) guarantee safe operation around the clock. The electronics housing is available in aluminum or stainless steel, as well as in an ultra-compact hygienic version with pre-configured plug connectors.

Seamless system integration
Promag 100 is adapted for every environment. The seamless system integration via HART, Modbus RS-485 or EtherNet/IP is as straightforward as the wide variety of process connections, such as weld neck, hygienic clamp connections, couplings, threaded adaptors or flanges. The wide range of approval types (Ex, EHEDG, 3A, ASME BPE, FDA, etc.) ensures the highest level of safety in operation and compliance with specified regulations.

Industry-optimised sensors
All Promag 100 measuring devices are tested and certified on accredited, fully traceable calibration facilities (ISO/IEC 17025). This guarantees greatest measuring accuracy and repeatability, even in long-term operation.

Both the Promag H and the Promag P sensor are available with different equipment packages, allowing them to be matched optimally to the process conditions. These variants include corrosion-resistant linings made of PFA or PTFE, various measuring electrodes made of acid-resistant materials or SIP- and CIP-compatible seals for the Promag H.

Both Promag sensors offer full functionality where space is at a minimum, simultaneous measurement of multiple process variables, excellent and traceable accuracy and a long record of proven performance in the field.

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

Turck has launched its new PS+ series pressure sensors, a modular range that enables access to reliable measuring instruments with intuitive operation. The sensors are easily commissioned and overhead mounting is possible thanks to the 340° rotation range of the sensor head. After the sensor is connected, it automatically registers whether the controller or the bus module requires a PNP or NPN, current or voltage signal. A compatibility mode is also provided for the integration in IO-Link systems. The operator interface with capacitive touchpads and a bicolour display enables settings to be carried out quickly in plain text (in accordance with the Turck or VDMA standard) and is protected from accidental operation by a locking mechanism.

The hermetically sealed keypad ensures greater resistance to dirt and liquids, so that the sensors meet the requirements of ISO protection to IP67K and IP6K9K. The PS+ series is designed for pressure ranges up to 600 bar and is available with proven ceramic measuring cells (PS310) and also metal measuring cells (PS510). The latter devices come with an overpressure resistance of up to seven times the nominal pressure. The sensors can optionally be fitted with peak pressure restrictors.

Turck will be adding temperature and current measuring to its new fluid sensor portfolio over the course of the year: as all the sensors are based on the same platform, they come with a very similar appearance and operating principle.

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Pressure measurement converter for harsh conditions

Kobold’s PNK pressure measurement converter is used for the remote electrical transmission of pressure signals. For use in heavy machinery, engines, shipbuilding and automotive engineering, this robustly constructed unit must work reliably whilst withstanding strong vibrations and widely varying ambient temperatures. Physical size must also be kept as small as possible, so that several of the units can be arranged in confined spaces.

Principle of operation
When subjected to pressure, the Bourdon tube deflects laterally. The degree of deflection is converted into a proportional electrical measurement using a contact-free differential transformer. The integrated amplifier offers an analog current output of 0(4)-20 mA or a voltage of 0-10 V.

The compact PNK unit comprises a pressure measuring element (Bourdon tube), the inductive tapping system and the downstream amplifier. The electrical supply is connected via screwed cable glands. The aluminium alloy casing is saltwater-resistant and is designed for easy access to pressure connections, cable entry points and terminals. Other features include:

- Measuring ranges: -1 to 0 bar and 0 to 100 bar.
- Measuring accuracy: 1% of full scale.
- Pressure: maximum 160 bar; temperature: maximum 80°C.
- Process connection: M16 x 1,5 with conical nipple, R1/4 R11/2, 1/2" NPT.
- Material: brass connection, salt-water resistant aluminium casing.

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Mobile wireless network standards, starting with 1G, have been shaping our mobile communication for years. While previous developments have focused on improved usability in the public sector, the new 5th generation standard (5G) is all about the benefits and potential applications in many different industries. Essentially, it deals with greater bandwidth, improved reliability, lower latencies and a greater number of connected devices. Siemens has therefore committed itself to this new communication standard from the outset and is supporting standardisation and industrial implementation.

Everyone is talking about 5G and industry is, above all, anticipating many benefits and future-oriented potential from the new mobile network standard. However, this development has not simply ‘dropped in industry’s lap’. In fact, the 2G to 4G mobile phone generations have already had a significant impact on industrial progress. For example, 2G enabled RTUs to send text messages and 3G provided remote access, e.g. for remote maintenance. 4G finally allowed high-performance remote mobile access to plants. 5G will provide substantial increases in bandwidths and network reliability and delays will drop to almost zero. The 3rd Generation Partnership Project (3GPP) which, amongst other things, is responsible for global standardisation of mobile networks, created a vision for 5G which has three key scenarios. The first, enhanced Mobile Broadband (eMBB), covers improvements in bandwidth compared to 4G. The main objective is the realisation of data-driven applications which require high data rates with global, large-scale network coverage. A typical example is the growing need for HD high-quality streaming of music and videos on mobile devices such as smartphones. It is also possible to envisage augmented-reality applications for industry which would support field engineers.

The second scenario, Ultra-Reliable Low-Latency Communication (URLLC), offers high reliability and low latency for demanding industrial applications. Typically, this includes mobile robots, autonomous logistics, driverless transport systems (DTS), or even safety applications.

The third scenario, massive Machine-Type Communication (mMTC), focuses on connecting a large number of devices in a small space. In practice, this frequently means applications for the IIoT, where a unit area typically has a high device density. The devices continuously send or receive the data but over longer intervals so that only an extremely low bandwidth is utilised. Another example could be the process industry where many sensors are installed (e.g. for temperature, pressure, flow) to support process monitoring in a plant.

Step-by-step to the new standard
Despite all the euphoria, it is worth remembering that not all 5G functionalities will be available immediately. In fact, a sequence of releases already exists with, for example, Release 15, with the focus on eMBB, being adopted in 2019. Releases 16 and 17 will support the two remaining scenarios and have more relevance for industrial applications.

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Banner Engineering’s QM30VT series sensors build on the capabilities offered by the QM42VT Series sensors they replace. They maintain all the same functionality, registers, and scaling, however, their ultra-compact design (30 mm x 30 mm x 13.25 mm) and rigid metal construction reduces resonant interference, enabling superior measurement accuracy. They are available in IP67 and IP69K-rated models and are some of the smallest sensors available on the market. The thin, flexible cable and easy-to-use bracket options simplify installation, even in hard-to-access locations.

Early identification of problems

Machine vibration is often caused by imbalanced, misaligned, loose, or worn parts. QM30VT Series sensors provide greater levels of accuracy in measuring RMS velocity and other vibration characteristics. They will detect even slight changes in machine performance, so potential problems can be identified early, before an issue can cause additional damage, machine failure, and costly unplanned downtime.

The new vibration and temperature sensors can be used on any machine with rotating motion or vibration to:

- Expose machine performance issues caused by misalignment, unbalance, bearing failures, pump cavitation, blade damage, etc.
- Reduce downtime by providing predictive insights to potential issues before a failure can occur.
- Establish more strategic scheduling of equipment maintenance.
- Reduce spare parts inventories by having predictive insights into future failures.
- Monitor machines and collect data in industrial applications, as well as in challenging environments where exposure to wash down is possible. In combination with the Wireless Solutions Kit for Temperature and Vibration, the sensors can be used to view graphs of vibration data, create alerts, store, and analyse data from multiple assets. Or create your own solution using Banner’s Connected Data Solutions cloud software in combination with the sensors, radios and a DXM series wireless controller.

Instrument Area Network

A New approach to wireless sensor networks.

Modern plant managers and operations professionals can save time and money through a robust condition and preventative maintenance model enabled by wireless Instrument Area Network devices. Instrument Area Network from Schneider Electric is an ultra-reliable wireless sensor network that gives actionable insight into the condition of high-value assets, allowing users to best protect and optimise their operations.

System architecture

Instrument Area Network comprises physically separated wireless end nodes for measurement and control, wireless concentrators for relaying data to or from a plant area wireless network (upstream network), and an administrative node, which is a customer supplied user interface such as a tablet or smartphone with WiFi capability and a standard web browser.

Extended autonomy

Instrument Area Network is a unique IIoT solution that maximises battery life and optimises wireless mesh network data flow. The network of transmitters is enabled with ultra-low-power BLE (Bluetooth low energy) radios that provide increased reach into challenging areas, reducing power requirements and extending battery life and reliability.

Increased flexibility

Instrument Area Network increases free path communications and installation flexibility by communicating with installed sensors via a hybrid network of WirelessHART on the mesh and BLE at the local transmitter locations. Unlike other mesh networking solutions, the Instrument Area Network architecture optimises radio paths to ensure deterministic data flow through all network nodes.

Users gain efficiency, reliability and cost effectiveness with Schneider Electric’s Instrument Area Network through:

- Access to data points that were previously too costly to consider.
- Quick insight into asset health for more timely response and scheduled maintenance.
- Substantial cost savings through implementing a preventative wireless monitoring program.

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Dome protects communication sticks

With the new CU8210-M001 cabinet dome, the USB port of an industrial PC can be fed out of the control cabinet and still be well protected. In this way, reliable and powerful wireless connections to the control computer can be established without having to use attenuation-prone antenna cables. When combined with the appropriate CU8210-D00x USB 2.0 sticks from Beckhoff that are available for WLAN or 4G mobile communication, the cabinet domes support efficient and globally usable wireless solutions for PC-based control technology.

The cabinet dome is designed to house industrial WLAN and mobile communication components and complies with IP66 protection rating in the installed state. The components inside the housing dome, such as the USB 2.0 sticks for wireless communication, are completely protected against physical contact, dust, spray water and water jets. The cabinet dome can therefore be mounted both in the panel of the control cabinet but also directly on the machine or on top of control cabinets. The material, which is suitable for radio applications, is characterised by high stability and impact resistance and thus offers a high level of protection against deliberate and accidental damage. Locking the dome in place from the inside of a control cabinet provides additional security, ensuring it cannot be removed from the outside.

The cabinet dome, which measures 54 x 100 x 54 mm, has a USB 2.0 socket type A and is designed for operating temperatures from -40 to 60°C. Increasing the dome placement options for the industrial PC and the respective application, different versions offer the choice of USB cables in lengths of 1, 3 or 5 m. Beckhoff offers several WLAN and 4G/3G/2G USB sticks for wireless communication.

USB 2.0 sticks for WLAN

The WLAN sticks from the CU8210-D001 series provide a high-performance wireless client and enable encrypted data exchange via WEP and WPA/WPA2 (TKIP/AES). The sticks are compatible with all earlier and current standards and support 20, 40 and 80 MHz transmission bandwidths.

The 4G USB sticks can dial into a mobile communication network via a common SIM card. Industrial PCs that require a wireless connection over longer distances can thus be retrofitted to address those needs. LTE as well as the 2G, 3G and 4G bands are supported.

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Foxboro Wireless Sensor Networks Technology @ Work

Wireless asset management, condition monitoring and preventative maintenance

Instrument Area Network
Robust and Reliable Designed by Experience
- Optimized mesh topologies, balance data flow throughout the network.
- 10 years+ battery life provides maintenance-free operations
- Deploy monitoring points at substantially less cost than a wired system.

Extend autonomy
Instrument Area Network is a unique IIoT solution that maximizes battery life and optimizes wireless mesh network data flow.
The network of transmitters is enabled with ultra-low-power BLE (Bluetooth Low Energy) radios that provide increased reach into challenging areas reducing power requirements, extending battery life and reliability.
AI in manufacturing – revolutionary opportunity or well-trodden path?

Artificial Intelligence (AI) has become a catchphrase used by marketers that attributes the characteristics of human intelligence to a computer system. AI incorporates concepts like machine learning and pattern recognition. It is impressive that facial recognition can help you identify one of your friends in an old school photograph, or see what you will look like in 10 years’ time. Fun aside, there is of course enormous economic potential to use AI in industry. Improved quality control, better equipment design, improved efficiencies, streamlined supply chains, predictive maintenance, safer plants, and intelligent/safe collaborative robots are all benefits of AI correctly applied. But the popular assumptions around AI should also be challenged in order to gain an understanding of some of the limitations of the concept.

Is AI really that new?
In the chemicals industry, I have seen software used for decades to design plants and optimise production processes. Chemical engineers who designed their first heat exchanger using a slide rule will appreciate the time saved by using finite element analysis on a computer. I also remember first putting together heat and mass balances in 1986 using a software program called SPEEDUP which was used for steady state and dynamic modelling of process streams. The ability of software to calculate steady state and dynamic modelling of process and mass balances in 1986 using a software I also remember first putting together heat and mass balances in 1986 using a software program called SPEEDUP which was used for steady state and dynamic modelling of process streams. The ability of software to calculate steady state and dynamic modelling of process and mass balances in 1986 using a software mean that process and equipment design became quicker and far more efficient. These systems certainly improved (augmented) an engineer’s capabilities to design complex process plants, but they were really CAD (computer aided design) and not real AI.

If real AI requires an element of self-learning, do any well proven examples already exist in manufacturing? The answer is yes. In a running oil refinery neural networks have been used for decades to take a set of input variables (such as trends of temperature, pressure and composition) to predict the output of a complex system like a distillation column. These networks are initially ‘trained’ with data and then set up to ‘learn’ so that the predictions became better over time. Once the neural network can reliably predict performance, it can be used to simulate the future. These techniques are proven, but also limited in that they operate in closed, well-defined systems.

AI is an evolving technology that utilises advanced techniques to self-learn. Real AI is not just CAD or simulation; it seeks to augment human problem solving and judgement where the inputs are uncertain and when it is not possible to reliably determine the best course of action. In most industrial applications, AI is most likely to be used to enhance human decision making, and not simply replace or codify it.

Distinguishing AI from automation
In order to try and better understand the future manufacturing plant, it is also important to distinguish AI from automation. Automation repeatedly produces a desired result without any human intervention; provided that the inputs fall in a defined range, the output parameters can be reliably determined and executed.

An automation application can be engineered to operate in a defined system for years. On the other hand, an AI application is continuously evolving and relies on ongoing human interaction in order to learn, accommodate change, make better recommendations and come up with better outcomes. In the beginning it can be quite basic (remember Clippy, the Microsoft paperclip aide for Office). Later it evolves (think Cortana, or Apple’s Siri). As the technology evolves, our trust and reliance on it also increases.

This distinction from automation impacts on the way we should approach an AI project in business. You can apply proven techniques to design and embed automation into a plant so that it runs without any further effort. However, when embarking on an AI project, you need to be prepared for an ongoing process that will iterate and evolve over time.

You also need to consider and provide for the human/machine interaction both now and in future scenarios where the next generation workforce is on-board.

Unpredictable human behaviour is the biggest challenge
To illustrate the unpredictability of human behaviour, back in 1988 I worked on a project to try and optimise the production across a fairly complex factory. The site comprised of over a dozen continuous processing plants all interlinked and dependent on each other for raw materials. There were several constraints (like steam supply and rail networks) that prevented certain combinations of plants running at full capacity. If any plant shut down and buffers ran empty the ripple effects were very costly. We used computer simulation to gather historical patterns of raw material supply and production to determine the optimum levels of inventory and production rates of the various plants. The optimum ensured that no plant was ever starved of raw materials or energy. As new raw production data became available the model was updated and improved. I remember presenting the results of the initial study to a room full of production managers, business representatives and engineers. Everyone seemed to agree that the technique made sense and committed to it for production planning.

Gavin Halse

Gavin Halse is a chemical process engineer who has been involved in the manufacturing sector since mid-1980. He founded a software business in 1999 which grew to develop specialised applications for mining, energy and process manufacturing in several countries. Gavin is most interested in the effective use of IT in industrial environments and now consults part time to manufacturing and software companies around the effective use of IT to achieve business results.

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However, a few months later very little had come of the initiative. Not because the simulation was inaccurate, but because the software could never truly account for individual behaviours (the human element). Production managers seem to be conditioned always to run their plants a little harder to get ahead of their targets and collect their production bonuses. Why would a production manager deliberately throttle back his plant just because of a computer simulation run by a junior engineer? It took just one strong willed maverick to fall out of line and the whole system became unstable again. This led to the credibility of the simulation model being questioned and before long everyone had resorted back to their old chaotic habits. The problem had moved from the realm of engineering to become a HR issue.

I had a similar experience decades later when we modelled the supply chain for an FMG manufacturer. Most production managers ignored the results of the simulation in favour of “gut feel and experience” because they did not understand the complex logic and therefore could not ever get comfortable with the simulated results.

Conclusion
The point of these examples is to highlight how important it is to consider the human response when building any AI system. AI does not simply better automate routine tasks; it should also augment human decision making. A computer is very good at rapidly doing repetitive calculations (such as aiding equipment design or doing production simulations). People are much better at judgement calls requiring intuition and uncertainty and building relationships. Manufacturing AI will in the short term find traction in restricted areas like quality control/inspections, CAD, condition monitoring, augmented reality, etc. But there is a very long road ahead before we have autonomous production plants capable of reconfiguring themselves to meet new production requirements.

Is AI in manufacturing truly the revolution punted by futurists and marketing people? Yes and no. Arguably AI has come a long way already and from an engineering and industry perspective we are in for a continued evolution of what has been done before. However, the human and social dimensions around AI are still poorly understood and will, I believe, become the real challenge. This factor will impact on manufacturing in many unpredictable and disruptive ways. The next few years are certainly going to be an exciting and at times uncomfortable ride!

Digital twin allows process simulations

The high-tech company Grenzebach’s portfolio includes the simulation of material flow in complex plants in the glass industry, which it achieves using Siemens simulation solutions. Together, the two companies have developed the most recent product from Grenzebach, the tin-air speed stacker, a machine for stacking all types of glass sheet. This expertise has produced a Siemens digital twin that allows all the functions and permutations of the stacker to be simulated, while simultaneously developing the initial motion control program to provide an optimum starting point for virtual commissioning. By running what were previously sequential development steps in parallel, it was possible to reduce both development times and costs significantly.

The stacker is a three-axis system that can selectively pick up glass sheets, from the tin side or the air side, and place them vertically on a glass rack – up to 20 times a minute. This represents a 30 percent improvement in stacking performance and makes the tin-air speed stacker the most powerful of its type. The motion control is provided by a Simotion D445 system with the Handling Advanced universal library, as well as Sinamics S120 modular converters and Simotics S servomotors. Grenzebach was venturing into completely new ground with this development. “In order to get to grips with the potential singularities of the kinematics, which were similar to those found in articulated robots, we decided to build a digital twin for the first time,” explains Roland Jenning, head of Innovation at Grenzebach.

Erring on the side of caution
The digital twin was produced using the NX Mechatronics Designer from Siemens PLM Software. The initial motion control programs were created at the same time as the digital twin, which reduced the development time and time-to-market significantly. To make the simulation of the programmed movements in the digital twin as close to reality as possible, Grenzebach chose a ‘hardware in the loop’ design in which the control is connected to the kinematic modal in NX via a Simit simulation unit. The program is then tested using the Simotion Scout engineering system: Simit picks up errors and highlights weak points. This allows processes to be optimised long before the first actual commissioning. However, this is not the end of the digital twin’s usefulness. Future modifications to the plant or changes to the product can be played out virtually in advance and checked for errors without disrupting operations.

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With digitalisation creeping into the mining industry and transforming day-to-day operations, this sector is enhancing its Industry 4.0 operation and process compliancy. As a preferred supplier of premium brand products and services to customers in the mining sector, SKF South Africa has aligned with this revolution to assist customers increase their productivity and profitability.

“One of the challenges in industry today is gathering information from different sources in the plant and extracting meaningful data that can be viewed and displayed in a manner that makes sense to various stakeholders,” states Zulfikar Umar, Remote Diagnostic Centre manager at SKF South Africa. “Digitalisation enables different data streams, which would have traditionally been compartmentalised, to be collated and analysed from a macro perspective allowing for smarter decisions, quicker reaction times and better planning of operations.”

As the implementation of new 4IR technologies is a costly exercise, mines tend to be cautious in adopting change, but online condition monitoring specialist at SKF Group, Lourens Zeelie, says that it is worth the investment. By moving from old to new technology, South Africa’s older mines can achieve significant savings, through energy reduction for example. These digitalised technologies, which offer continuous monitoring and expert analysis to detect and correct faults before they negatively impact the mine, are a far more cost-effective option compared to replacement of equipment.

**Online condition monitoring enhances productivity**

One such technology is SKF’s IMx8, an online condition monitoring system that assists mines to enhance productivity. IMx8 enables operators to remotely view real-time data of equipment performance and, through cloud computing and smart devices, improve production processes.

Zeelie points out that condition monitoring using vibration is already being widely utilised across the mining sector. It is crucial for operators to have the full picture of their machine’s health in order to prevent unexpected failures leading to costly machine damage and unplanned downtime.

Supporting Zeelie’s sentiments, Umar shares more of SKF’s advanced technological solutions such as Data Collect which records vibration and temperature and enables visual inspection routes to be captured digitally. “All this information is fed back to SKF’s Remote Diagnostic Centre where it is analysed, assessed and represented in a report format or even through online dashboards for customers to have at their fingertips,” he explains.

Without the two key elements of data and connectivity, mines would not be able to reap the full benefits that digitalisation brings to the table. Digital systems on mines are predominantly cloud-based which means that customers have 24 hour access to information. According to Zeelie, the SKF IMx16PLUS has built in WiFi and 3G capabilities to support cloud connectivity, eliminating the need for customers to purchase any hardware such as a server for data storage. These digital systems remove operators from hazardous areas whilst still enabling them to have a clear view of operations.

Equipped with all this relevant, targeted data, customers require specialised analytics to be able to fully understand and utilise this information to its full potential. Recognising this need, SKF has placed its focus on Big Data and operates nine Remote Diagnostic Centres. The drive behind these centres is focused on creating a uniform methodology of data collection and management, as well as analysis and reporting. Umar elaborates that the goal in the not-too-distant future will be for plant equipment to self-diagnose impending faults and predict lead times to failure. This will enable the equipment itself to order critical components for replacement early in the failure curve, thereby assisting in alleviating logistic issues related to long lead times. The knock-on effect will be leaner stock holdings, just-in-time delivery and well planned maintenance windows, all of which will bring financial savings, while increasing overall plant efficiency.

The advantages gained by incorporating digitalisation into equipment cannot be underestimated. Digitalisation not only contributes to overall enhanced efficiency, but also to significant cost savings in the long run. The mining sector is poised to benefit from the integration of these cutting-edge technologies, and SKF is geared to provide game-changing solutions.

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Protect critical infrastructure and manufacturing plants

As manufacturers around the world analyse and embrace the importance of being interconnected come with a warning, and companies need to protect their plants from being hacked. The Institute for Business Value (IBM IBV) showed that industrial companies are not doing enough to protect their plants from being hacked. This is according to Stefan van de Giessen, general manager: cybersecurity at Networks Unlimited Africa, who adds: “The Internet of Threats, and also that for industrial manufacturing, chemical, oil and gas, and utilities, security breaches can lead to wide-scale contamination, environmental disasters, and even personal harm.

Another IBM IBV research document found that almost 90 percent of the automotive companies surveyed were using these technologies without fully evaluating the risks or preparing effective responses, thereby leaving themselves vulnerable to cyberattacks,” continues Van de Giessen. “I believe we could take this as a proxy for other manufacturing industries, and even if the numbers don’t play out exactly the same, this points to the new reality of the threat of cyberhacking in the manufacturing industry, and the critical need for organisations to protect themselves.”

The Indegy solution

To this end, Networks Unlimited Africa recently partnered with Indegy, a leader in industrial cybersecurity that protects industrial control system networks from cyberthreats, human error and malicious insiders. Networks Unlimited Africa now brings Indegy solutions to South Africa and throughout the continent.

Indegy undertakes to protect industrial control systems from cyberthreats,” elaborates Van de Giessen. “External threats bring the most risk potential. A well-planned cyberattack will usually cause significant destruction, which can include physical damages, financial costs and reputational threats for the business.”

In the manufacturing sector, Indegy was recently involved in securing the scada network of a large cement producer in Israel, which has production sites at different locations. Together, these sites produce about 60 percent of the cement used by Israel’s construction industry. With the introduction of connected technologies, Nesher realised that its scada network could potentially be exposed to cyberthreats that could jeopardise the safety and productivity of its factories. Therefore, determined to reduce risk and also minimise production downtime, the management team chose Indegy after deciding to invest in a dedicated industrial cybersecurity solution.

Nesher CISO Roy Shalev elaborates: “With cement furnaces operating round the clock at 1200°C, Nesher’s most important operational concern is safety. The furnaces and other critical equipment are managed by industrial controllers, which, if compromised by a cyberattack, could lead to an explosion and possible loss of life. From a business standpoint, a cybersecurity event in Nesher’s scada environment could bring cement production to a halt. Such an incident would cause a major cement shortage in Israel’s construction market, as well as revenue losses of millions of dollars and reputational damage.”

Nesher required full visibility of its complex scada network, together with real-time 24/7 alerts on any changes to its controllers. This level of visibility is crucial for enabling early detection of security risks before they have a chance to impact on productivity or safety. The system implemented by Indegy offers maximum visibility using proprietary technology that actively queries devices in Nesher’s industrial environment, ensuring that its scada engineers are aware of all changes to all assets in the environment. Additionally, the Indegy user interface design makes it easy for Nesher’s engineers to control traffic and operations in the network, while the accuracy of the alerts means that the security analysts can focus their efforts on investigating real threats, with a minimum of false positives.

“A solution like Indegy allows security operators and engineers alike the comfort of knowing that their plant is protected from cybersecurity threats according to the highest standards available,” concludes Van de Giessen.

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Extending analytics to EAM and operations users

By Ed O’Brien, research director, ARC Advisory Group.

Today’s manufacturing operations and maintenance teams generate vast amounts of data in all forms. As a result, finding the right information, at the right time, and making it accessible to the right people is critical to keeping these functions operating at optimum levels. Companies trying to understand how to make better use of their data are turning to various types of analytics for answers. These include how best to manage the data, how to determine what data is truly valuable, and when and how to align technology and people to assist with making meaningful conclusions.

Finding nuggets in a mountain of data

With digital transformation initiatives increasing the amount of data created and shared within today’s industrial organisations, making use of all this data can be a challenge. It’s not that this data isn’t relevant, but often some of the more meaningful and actionable nuggets are hidden within a mountain of disparate data, both structured and unstructured.

It becomes increasingly difficult to make meaningful use of all the data being generated. This is particularly true for end users on the shop floor looking to expand their predictive maintenance and predictive analytics capabilities.

Data that was often managed separately in silos simply cannot be managed that way today. The implication is that maintenance and operations will need to have a much more cohesive vision around shared data and analysis. This is why many industrial organisations seek analytics solutions that can be used by operations and maintenance personnel alike.

Accessing data at the edge

As industrial organisations adopt smart manufacturing methodologies, there is a growing need to acquire, access, and share equipment and sensor data, and then transform all this data into actionable information when and where it is needed.

This data is typically generated at or near the edge layer (close to the point of origin), and processed, stored, and accessed at the database and Big Data layers. Moving forward, data will need to be managed closer to the origin point and then made accessible throughout the organisation.

The emerging democratisation of analytics

With all of this data being streamed and stored in a wide variety of locations and systems, making practical use of it can be a challenge, since mining such disparate data can be difficult. Until recently, most software programs available required specialised expertise and investments in traditional and often costly analytics solutions. These solutions also have all the attendant services costs such as implementation and maintenance. In addition, the skill sets needed to use these solutions have traditionally been left to trained data scientists and statisticians assigned to organisations’ quantitative staffs.

“Data that was often managed separately in silos simply cannot be managed that way today.”

For years, analytics solutions were deemed suitable only for large organisations with dedicated quant staffs. These teams commonly consisted of people with skills that ranged from report writing, business intelligence (BI), and SQL programming expertise, and experts skilled in various forms of predictive and quantitative analysis. Consequently, many industrial organisations have been reluctant to fund analytics projects at the operations and maintenance levels.

More recently, however, new analytics solutions have been introduced to the market that are designed for other users within the business, such as operations and maintenance staffs. These users typically have limited quantitative skills and these newer solutions can provide value for a broader range of users within an industrial enterprise. As industry undergoes a digital transformation, non-data-science users now have more powerful and accurate tools at their disposal. They can now run various operations-specific predictive models and scenarios, and in near-real time if necessary, a capability not generally available until recently.

The time is right for maintenance and operations staffs to make better use of analytic tools to improve industrial asset availability and performance. A change is under way with software, as new, intuitive, and powerful products are being introduced by established and emerging business intelligence, analytics, and data visualisation providers.

In addition to being relatively easy to use (compared to traditional solutions), some of these new solutions enable users to construct models intuitively via visual representations of the data. These solutions are both powerful and intuitive and can allow business users the ability to create queries and some models without the need to write and sequence SQL (structured query language) queries. Other solutions require text-based commands using SQL.

What makes these new solutions accessible to a broader set of users? With these solutions, the rules and sequences for data evaluation are often set by manipulating visual elements (much like setting joins and formulas in some report writer programs), with the underlying SQL code available for those experts who want, or need, to review in greater detail. The result has been a new class of data visualisation analytics products that are powerful, yet intuitive and easy to use.

While sometimes derided by analytics experts as being too much like ‘black box’ solutions (because the underlying code when constructing and evaluating data models is largely hidden), they can nonetheless guide users with pre-configured code for common analyses. While these easier-to-use solutions do not necessarily replace the highly trained and experienced quant personnel, they allow operations and maintenance users to conduct ‘what-if’ modelling and analyses and make better use of analytics experts’ time to validate the underlying methodologies and models.

Many of these solutions also offer open APIs and other options to allow connectivity options to a wide range of data sources. In many cases, SaaS solutions are available, which can offer rapid time to implementation and a lower total cost of ownership compared to on-premise variants that require the purchase of perpetual licenses and associated hardware.

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When using the principle of triangulation for navigating automated guided vehicles (AGVs), vehicles are often equipped with two different scanners – one for safety and one for navigation. Now there is a more cost effective alternative, the new Leuze RSL 400 safety laser scanner.

This innovative safety laser scanner not only ensures that AGVs are operated safely by means of protective and warning fields, but also simultaneously captures the measurement values for the navigation software. This means that only one scanner is needed for both safety and navigation.

**High accuracy optimised for navigation**

Available from leading sensor specialist, Countapulse Controls, the scanner makes use of the latest technology resulting in measurement values with an extremely high angular resolution and accuracy.

The measurement value output of the device is optimised for navigation software that functions according to simultaneous localisation and mapping (SLAM). These characteristics allow the Leuze RSL 400 to precisely determine the position of the AGV.

The navigation software contains an image of the operating area including all fixed boundaries. The current position of the AGV is calculated by comparing the measurement values to this map. This concept is referred to as natural navigation.

With each revolution of its deflection unit, lasting 40 milliseconds, the safety laser scanner emits 2700 light pulses. These are scattered in all directions, and parts of the scattered light are transmitted back to the scanner. These are used to calculate the distance to an obstacle.

The more detailed and exact the measurement values of the scanner, the more precisely the AGV can navigate. With an angular resolution of 0,1, the Leuze RSL 400 can capture the environment in detail over the entire measurement range up to 50 metres.

This is achieved through a particularly narrow laser spot that maintains its perpendicular shape over the entire scanning angle. It also reduces incorrect measurements, the likes of which can occur on edges.

In addition to the angular resolution, distance values are also important. The scanner offers an error accuracy of less than 30 mm resulting in high precision. Use of technology in the device has ensured that the values are not affected by the reflectance of the object, whether it is a reflector or a black wall.

The additional output of the received signal strength value for each beam allows autonomous detection of reflectors by the navigation software. When beams strike a reflector, the values differ greatly from any other environment. This makes simple and reliable detection possible.

**Safety is also optimised**

The device offers up to 100 switchable protective and warning field pairs. The protective fields can be adapted to the respective movement and load conditions of the AGVs.

For example, in 4-field mode with 50 switchable field sets, the Leuze RSL 400 device can monitor up to four protective fields simultaneously. This enables safe and reliable reduction of the speed of the AGV. With its scanning angle of 270°, the device can also cover the front and side areas of the AGV at the same time, i.e. it can see around the corner.

With these features and a maximum operating range of 8.25 metres, even large AGVs can be fully safeguarded and used only two scanners.

Available models with nine functional variants, three of which have data output for AGV navigation, the Leuze RSL 400 safety laser scanner offers four operating ranges: 3.0, 4.5, 6.25 and 8.25 metres. Models available with Profisafe/Profinet interfaces make it easy to integrate the devices, particularly when many different protective field configurations are used.

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Electronic position indicator with Ethernet interface

Instrotech now offers the Siko AP20 position indicator, equipped to detect the position of spindle adjustments in machines. It displays the corresponding positional data to the operator and passes it on to the machine control system. Simple system integration in combination with modern interfaces is all that is required. On the one hand, this ensures the shortest possible downtime, while on the other the interfaces provide loss-free data communication between the position indicator and the machine control system.

The compact system is particularly suitable for flexible manufacturing with production machines such as packing, woodworking, printing and machines for further processing of printed products. Wherever manual adjustment is carried out on production machines, bus-compatible Siko position indicators are able to optimise the production times during product changeovers are kept to a minimum. Once installed, position indicators provide 100% process reliability.

During product and size changeovers, incorrect machine settings and the associated risk of damage to tools or batches with defects can be eliminated consistently with the AP20.

Wide range of control system integration options

In addition to the SikoNET5 and CAN interfaces already on offer, Siko is now extending its AP series position indicators to include the most common industrial Ethernet interfaces, namely Profinet, Ethernet/IP, EtherCAT and Powerlink, thus meeting requirements for easy integration into almost any current control system from a wide range of manufacturers without any other accessories. Compared to a converter solution, the variety of components is reduced, as is the space required in the machine. This significant gain in flexibility ensures loss-free communication between the machine control system and position indicator at all times, in particular for systems that run a complex production process and for which, as a result, a large number of sensors or long cable lengths are required. Two M12-D coded bus connections for a bus line design that protects the cable mean that star-shaped wiring to the control system is no longer essential.

Industry 4.0 and smart factory ready

The AP20 must achieve a certain level of connectivity to satisfy the requirements of Industry 4.0. For the smart factory of the future, pure exchange of operational process data is no longer adequate. Comprehensive diagnostic options extend evaluation of the device status in this connection and convert position indicators such as the AP20 into intelligent automation systems. The latest network technologies and the electronic type plate take care of this. The latter serves to identify the device type, serial number and current software version. Additional integration aids, function modules, libraries and add-on instructions make installation and commissioning easier and provide maximum efficiency in application and job set-up.

Compact form and intuitive usability

The performance features of the AP20 combine the functionality of a high-precision multi-turn absolute value encoder with a position indicator, but still in an extremely compact form with dimensions of 48 x 88 x 61 mm. It can be installed in the machine in an area roughly the size of a credit card. In view of its dimensions, the AP20 is therefore particularly suitable for size changeovers on machines that are operated in limited space.

The AP20 also has numerous advantages from the perspective of the operator. The option of displaying the target and actual position directly on the adjusting spindle significantly increases convenience and usability for the machine operator. The inverted backlit display plays a part in this, as it makes the information displayed easy to read even under the most unfavourable lighting conditions. Two-coloured status LEDs also aid intuitive user guidance. In addition to the positioner status (InPos or OutPos), the LEDs indicate the direction of rotation required to reach the intended target position. Product and size changeovers can therefore be carried out very quickly and without much work.

All Siko position indicators feature a hollow shaft, which facilitates the easiest assembly possible. The basic configuration of the AP20 comes with a hollow shaft with a diameter of 20 mm. Hollow shaft diameters up to 25.4 mm are also possible without changing the compact dimensions of the product.

Also for pharmaceuticals, food and beverage applications

The hollow shaft of the AP20 is made of stainless steel. In conjunction with the protection rating of IP65, the position indicator is also suitable for applications in the food industry, drinks manufacturing and the pharmaceutical sector.

This absolute indicator with industrial Ethernet interface enables process-capable and intuitive positioning for manual machine adjustments in hygienic applications. The display and evaluation of target and actual values ensures monitored format adjustment.

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Enabling IIoT connectivity for virtual power plants
By Daniel Lai, Charles Chen and Sean Wang, Moxa.

Declarations of climate emergencies in many countries around the world have created awareness for the need to switch to clean energy sources, which in turn has prompted the power industry and governments to take action or set definite goals. Many governments now provide incentives to individuals, industries, and communities who are interested in generating and using power from renewable sources such as solar and wind energy.

The power grid has seen many changes that have enabled the integration of power from distributed energy sources (DERs). In the new power economy that is emerging, virtual power plants (VPPs) are showing the way by making it possible to aggregate power from different DERs and providing an efficient platform for energy trading. Catalysed by these developments, a new ‘prosumer’ class is emerging that consists of consumers who not only consume power from the grid but also produce their own green power and might have excess to sell. In this white paper, we discuss the challenges faced by VPPs and how IIoT connectivity can help them overcome these challenges.

Virtual power plants for predictable supply
A virtual power plant (VPP) works remotely to combine a number of independent energy resources from disparate locations into a network that provides reliable power 24 hours a day. VPPs are a departure from the traditional in that they do not solely rely on a centralised power source. Unlike traditional power plants, they combine a number of distributed renewable energy resources with traditional ones. Aggregating power from different energy resources can help meet the spike in energy consumption during peaks, meaning the utility company does not need to build an additional power plant, which is neither efficient nor economical, to achieve demand-supply balance. Software-based technologies are being deployed to plan, schedule, monitor, and bid for distributed energy resources to make the power grid more reliable. In many regions, this has translated into infrastructure and process improvements that have facilitated the integration of distributed energy resources (DERs) into the main grid. Another goal of virtual power plants is to make it easy for producers to use clean energy portfolios comprising grid-scale and behind-the-meter renewable energy resources.

Key challenges in virtual power plants
The idea of virtual power plants that are able to solve all power issues of the future sounds encouraging. However, deploying the devices and technologies that are required by a virtual power plant is an uphill task. Even if the technology is in place, a change in stakeholder mindset is required to make virtual power plants work. Some of the challenges faced by operators are discussed below:

Integrating DERs into the grid
Integrating power generated from distributed energy resources into a grid is easier said than done. High penetrations of DERs in the grid can introduce a variety of detrimental conditions, including voltage swings, and reverse power flow, which can cause grid instability. Most grids have to be retrofitted to be able to integrate power from DERs, increase hosting capacity, and optimise power from DERs. Consumers also need a convenient way to buy power from DER aggregators at an economical price.

Controlling and monitoring devices at the grid edge, especially those associated with DERs, is a major issue. Traditional substations have relied on centralised utility technologies and systems like power supervisory control and data acquisition (pscada), energy management systems (EMS) and distribution management systems (DMS). However, as DERs have proliferated at the edge of the grid, the requirements for visibility and control of these resources have surpassed the capabilities of traditional centralised systems. VPPs need the capability to collect and process data from the edge so that the operators know what to expect. Edge devices, such as inverters, need to be monitored for better integration of the system and to prevent grid instability. The ideal percentage of DERs in the total composition of energy sources, including traditional sources, is about 20%. However, operators are finding it more economical to use power from renewable energy resources because of the increase in demand for green power and a steady supply from producer-consumers.

Virtual power plants require seamless communication solutions to maintain the stability of the grid: northbound communication to acquire data from power devices such as inverters and southbound communication to monitor and control the devices. IIoT gateways, with their computing power and integrated communication interfaces, can help provide the platform for seamless data acquisition and processing. Data acquired from inverters, meters, transformers, and other edge devices can be sent to a DER management system to maintain the grid in a stable state and meet the energy requirements of customers.
Estimating the power from renewable energy sources

A key factor in the success of the virtual power plant model is the ability to estimate the power from renewable energy resources that is required to meet the requirements of consumers. In addition, some countries have regulations requiring suppliers, such as solar farm operators, to provide power output forecasts for at least three days in advance to ensure demand-response balance and stability of the grid. Most operators do not have a way to gain insight into the power supply. To be able to correctly estimate the power generated, data from aggregators as well as utilities need to be combined together to get the whole demand-supply picture.

Being able to provide power output forecasts is dependent on the ability to acquire multiple weather parameter values (e.g. ambient temperature, relative humidity, and wind speed), data on the wear and tear of equipment in the field, and conversion efficiency of inverters, among other things. But, solar farms are usually spread over a large area and distributed over different locations. Each farm could return around 20-50 kB of data per minute. Existing systems may not be able to deal with the large amount of real-time data that needs to be processed and hence the response time may be slow. Other problems that the operators have to deal with include data integrity, data loss and data security.

A solution consisting of an IIoT gateway and remote I/Os can be used to acquire data from various edge devices, such as PVs, located in remote and harsh environments. Solar farm operators can instantly access huge volumes of data from inverters and weather monitoring devices, and use AI technology to forecast the amount of power that is required from renewable energy resources to be able to meet the energy requirements of consumers.

Implementing and managing demand-response programs

Energy aggregation is a good way to connect energy producers to the grid so that the excess energy produced can be sold back to the grid. This model helps maintain the demand-supply balance. To prevent wastage, the excess energy produced can be stored in batteries and only released to the grid when required, for example during peak consumption. Another way of conserving energy is to shift or eliminate the peaks in energy consumption through demand-response programs, especially in heavy-load applications. For example, significant peak shifts can be achieved if there is a way to bundle industrial consumers together so that they can shift or optimise their power usage periods during the day to avoid peaks in energy consumption. Demand response (DR) can be defined as the incentive payment received by consumers (or demand aggregators) to reduce their electricity consumption during high energy rates and increasing the electricity consumption at times of low energy rates. However, one needs to be cautious and avoid disrupting critical industrial processes.

Monitoring power consumption is key to maintaining the demand-supply balance. In order to provide an efficient platform for energy trading, virtual power plants require advanced metering solutions. IIoT gateways, with their built-in communication and computing capabilities and multiple interfaces, can enable advanced metering solutions in virtual power plants, thereby maintaining demand-supply equilibrium.

Case in point – building energy self-sufficient communities

Although the idea of creating a virtual network of power resources that is equivalent to the capacity of a power plant is still in the works, there are several examples of communities that have adopted the virtual power plant model to become self-sufficient in energy. For example, a community of solar energy ‘prosumers’ (consumers and producers of a product) can use the infrastructure provided by the grid to trade excess energy with each other or sell the excess energy back to the grid. A solar panel manufacturer could be part of this arrangement such that the manufacturer installs solar panels free of cost in each household and in return the householders agree to buy the solar energy generated for a nominal price.

For this business model to work, a reliable network is important to ensure that the solar energy company can monitor the end users’ energy consumption in real-time to ensure accurate data billing. Furthermore, the solar energy company needs a way to

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In order to prevent loss of data, the IIoT gateways need to have a failover mechanism whereby the network communication will switch automatically to the secondary transmission method (cellular) if the primary transmission method (Wi-Fi) fails. When a failure occurs, the solar energy company can fix and update the Wi-Fi settings remotely via their self-developed maintenance applications over a large geographical area.

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**Leveraging IIoT connectivity in VPPs**

High data speeds and quick response times are essential in any modern production facility. This is true for VPPs and the ecosystem that consumes and supplies power. In these complex ecosystems, where the roles of producers and consumers are often interchanged, a key to maintaining the stability of the system is zero network downtime. 4G-LTE and now 5G technologies are helping build stable networks for VPPs so that they can connect to remote sites and assets. On the other hand, cloud connectivity is enabling the use of cloud-based energy management systems for better management of resources and maintenance of demand-supply balance. In addition to instrumentation, VPPs are highly dependent on computing and communication technology to facilitate smooth procurement of power from DERs and integrate it into the main grid without endangering the stability.

**Moxa’s solution**

In order to acquire large volumes of data in real time and send this data to the cloud for processing and storage, reliable northbound and southbound communication is critical. Moxa’s IIoT gateways are industrial-grade computers that provide reliable data acquisition and computing capabilities at low power consumption, without maintenance complexities, and with the capability to reliably perform at a temperature range of −40 to 70°C in a harsh environment. Moxa’s remote I/Os help users easily acquire data from edge devices – such as sensors – for further analysis.

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**DIN rail power supply for demanding applications**

Automated production systems require power supplies with high stability and safety protection. DIN rail power supply series for such demanding applications are available from Delta Electronics, distributed locally by leading supplier ElectroMechanica.

The CliQ DIN rail power supply series offers state-of-the-art design to withstand harsh industrial environments, while rugged metal or plastic case is both shock- and vibration-resistant in accordance with IEC 60068-2. The range has an IP20 protection level and is designed with high power density and smart overload protection features. All the models are encased in rugged yet lightweight, corrosion-resistant aluminium casings.

Delta’s Chrome DIN rail power supply series is designed for use in compact cabinets, which are adopted widely in home automation applications and the food and beverage industry. Available specifications include 5, 12, and 24 V output voltage, for power ratings from 10-100 W.

The Chrome series features universal AC input range, and is certified in accordance with IEC/EN/UL 60950-1 for information technology equipment (ITE) and UL 508 for industrial control equipment (ICE). The series is also fully compliant with RoHS Directive 2011/65/EU for environmental protection. NEC Class 2 and limited power source (LPS) approvals are available for selected models.

The Delta DRS Series Sync DIN rail power supply is compact, and designed for industrial applications requiring a highly reliable power supply that, in addition, must fit in a small space. The Sync series operates with universal AC input range, offering full power from −10 to 55°C. The output is adjustable, with up to 89.0% efficiency.

The Delta DRL Series Lyte DIN rail power supply series is convection cooled with full rated power available from −10 to 50°C at 230 V AC. The overcurrent protection feature is designed to operate in constant current mode, which makes the series ideal for inductive and capacitive load applications. Electromagnetic radiated and conducted emissions are compliant with EN 55022, Class B.

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The uptake of dry-type transformers in South Africa is now well beyond ‘niche’ applications, with local specialist Trafo Power Solutions installing a range of sizes across various sectors. “In recent months, we have been involved in projects with small 50 kVA low voltage lighting transformers, right up to 4,5 MVA medium voltage customised units,” says David Claassen, managing director of Trafo Power Solutions. “These have been installed in healthcare facilities, commercial buildings, educational institutions, mines and data centres, as well as at solar energy plants.”

Among its recent contracts, the company has supplied a number of lighting transformers. It has also provided outdoor instrument transformers to facilitate measurement of voltage on overhead lines. These cast-resin voltage transformers (VTs) typically have 33 kV, 22 kV and 11 kV primaries with 110 V secondaries with between 50 VA and 500 VA burden.

In the mining sector, a recent contract was the installation of 200 kVA dry-type transformers. This is often a corrosive environment in terms of water and dust, so a high ingress protection (IP) rating was applied. Claassen adds that a range of materials and paint can also be specified by the customer to further withstand corrosion.

Data centres are a fast growing aspect of the country’s digital economy, and Trafo Power Solutions is supporting this segment with its cast-resin transformers. It recently delivered and cold-commissioned two 2 MVA units for a data centre in Cape Town.

“These facilities obviously require the highest levels of reliability and protection from their electrical and electronic networks,” says Claasen. “The windings and core of our units were designed for a K factor of 13, given the high non-linear load. An electrostatic shield was also installed, along with surge protection of the highest order.”

He notes that there was substantial time pressure to complete the contract, but flexibility and responsiveness at Trafo Power Solutions ensured on-time delivery.

At three small-scale solar plants, Trafo Power Solutions is providing three 800 kVA transformers which will step up power from 400 V to 22 kV. These applications involve a solar inverter for the 100% non-linear load, as well as an electrostatic shield between the primary and secondary windings.

Claassen emphasises that the business prides itself on the level of application engineering for each customer’s specific requirements. “We understand what we are supplying and the risks faced by the customer and we design the solution accordingly,” he concludes. “Industry is certainly showing their faith that dry-type transformers can be applied in a growing range of applications.”

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Dry-type transformers go mainstream
In-mold labelling (IML) is ideally suited to meet today’s customer requirements in the plastics industry, especially in the packaging segment. Companies need high-quality, durable machines with maximum availability that can produce a wide range of packaging designs with great flexibility and minimal cycle times. To implement such systems efficiently, Swiss specialty machine manufacturer Beck Automation implements PC-based control and drive technology from Beckhoff as its standard automation technology.

“Family-run Beck Automation in Oberengstringen, Switzerland, founded in 1934, is a pioneer in the field of in-mold labelling systems with more than 30 years of experience,” says Nino Zehnder, head of sales and a member of the executive management team. To meet the needs of its customers all over the world, the company’s product portfolio ranges from cost-effective basic machines to custom-tailored systems. A current example of innovative solutions from Beck Automation is a six-way IML system for decorating plastic lids. Zehnder explains: “This machine is for plastic containers used in the food industry. The most common items being made with it are lids to cover 1-litre containers for products such as yogurt, but the same machine can also decorate the body of the container.”

**IML as a particularly flexible process**
With in-mold labelling, a previously printed label that has the same base colour as the final product (for example, the lid of a yogurt container) is placed in an injection mold. When the plastic is injected, cools down and hardens, it combines with the label to form the finished product. This process is more flexible than affixing printed labels, says Zehnder: “IML is especially suitable for packaging design in the age of Industry 4.0 and lot sizes of one because you don’t need to modify a printing machine for every change, which is expensive and time-consuming.”

The Beck Automation system can produce up to 5000 plastic lids per hour, each with its own design or even an individual QR-code if necessary. For precision and durability, the IML system is mounted on a solid welded steel frame. The system attaches laterally to an injection molding machine so that its servo-controlled shuttle arm can reach into the mold. When the shuttle arm moves into the open injection mold, it picks up six finished lids on one side while simultaneously inserting six new labels for the next injection molding process. During this process, the IML machine inspects the lids with a vision system for quality assurance before stacking them. During the stacking process, the machine also separates the next six labels in order to place them on the main shuttle arm for the next insertion pass into the injection mold.

Zehnder points out the performance capabilities of the IML machine: “The entire cycle with six plastic lids takes only about four seconds. The machine also features exceptional flexibility. It can be adjusted for other lid sizes, shapes or quantities very quickly and easily. Another advantage is the automatic magazine changeover, which makes it possible to refill the labels without interrupting the process.”
Advantages of PC-based control technology

As Christoph Jenni, head of software development, explains, Beck Automation first decided to use PC-based control technology in 2011: “Even back then, PC-based control technology impressed us with several basic advantages such as the ease with which you can implement remote access for effective customer support. Another outstanding feature of PC-based control from Beckhoff was the ability to make system changes online. Compared to the previous PLC-based solution, we also benefited from the powerful axis control with extensive diagnostic capabilities as well as from the fast and easy-to-use EtherCAT communication standard, which replaced the traditional individual wiring.”

Zehnder also points out the benefits of a Windows-based software system: “Its openness ensures maximum flexibility. For example, we can easily export data as an Excel file or use Windows' many capabilities for a user-friendly operator interface.”

According to Zehnder, the worldwide availability of Beckhoff technology and support is also important for a globally active company like Beck Automation: “Since our systems are extremely durable, we must also make sure that the components are available for the long term. Even after 10 years or more, spare parts and newer, yet fully compatible products are still readily available.” Another factor is the exceptional modularity and scalability of PC-based control, adds Christoph Jenni: “Depending on the machine's size and features, the control technology can be optimally adjusted without requiring much additional engineering. For example, we can easily adapt the number of servo axes to the respective requirements. And unlike other systems, PC-based control offers an unlimited number of I/O channels, which leaves all options open.”

Servo drive technology increases machine flexibility

Beck Automation also employs Beckhoff servo drive technology throughout its new six-way IML system. Its easy configuration results in significant benefits, particularly during setup changeovers. The machine features four AM8000 series servomotors, which are controlled by TwinCAT 3 NC PTP software via two single-channel AX5103 and AX5118 Servo Drives, or a two-channel AX5203. The AM8063 servomotor with 29 Nm of standstill torque makes for a highly dynamic main axis.

In addition, the servo drive technology is much less jerky than pneumatics, which increases the machine's durability due to the reduced inertia forces. The other servo axes are used to take the labels from the magazine and to stack the finished lids. “Another positive feature is the one cable technology (OCT) from Beckhoff,” explains Jenni. “OCT reduces the wiring and assembly effort significantly, and the electronic type plate makes it much easier to commission, troubleshoot and possibly replace devices.”

A Beckhoff CX5130 Embedded PC with an Intel Atom processor running at a clock speed of 1.75 GHz provides sufficient performance for all control and motion sequences. The broad spectrum of the Beckhoff Industrial PC portfolio is another critical advantage. Jenni elaborates: “Depending on the requirements or the size of the machine, you can easily deploy more powerful IPCs or multi-core processor technology without having to change the control software. This makes us highly flexibly as far as the system design is concerned. “The same applies to the TwinCAT software. The existing motion control library has met all our requirements so far. We could even implement special features like data exchange via OPC UA very easily with the help of a corresponding TwinCAT function. Plus, the integrated TwinSAFE solution has delivered additional efficiencies, because the EL6900 TwinSAFE Logic terminal and the optional AX5801 TwinSAFE cards for the drives made it possible to significantly reduce the wiring and the space requirements for the safety doors and the emergency stop function.”

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How cable categories relate to data transmission speeds

Customers often ask about data cable categories and what they mean. For many end-users, engineers and purchasing agents, who do not work with these types of cables on a daily basis, the different categories can seem complicated and overwhelming. However, what appears to be complex at first glance, can be simple to understand with a couple of tips. The category positively correlates with the data speed. i.e. the higher the category, the higher the possible frequency and the higher the frequency, the higher the possible data rate.

**Data cable basics**

One can compare category cables to a multi-lane road; the more lanes a road has, the more vehicles that are able to travel on this road concurrently. The standards are generally based on a maximum cable length of 100 m. This cable length consists of 90 m of installation cable and 10 m of patch cable. After the initial 100 m a repeater/extender is added to the cable system, which strengthens the signal and prepares it to be transmitted an additional 100 m as needed to connect the machine or its apparatus, and the control unit. Additionally, category data cables have to fulfil decoupling values of the pairs, e.g. near end cross talk (NEXT).

For Cat 5 cables, the decoupling of the pairs is realised in the cable construction with different twisting lengths of each pair. That means for four pairs, one has four individual twisting lengths during production.

Cat 6 cables allow users to choose between two technical designs. The relevant decoupling values of Cat 6 can be achieved with a plastic cross that creates distance between the pairs. Another way is to use a pair in metal foil (PIMF) construction. The thickness of the aluminium foil influences the effectiveness of the screen. Many people think that a screen in the construction protects the cable from environmental influences. However, it also has the opposite effect – the screen keeps the electrical signal in the cable and avoids negatively influencing other equipment in the vicinity.

For even higher categories, such as Cat 7, 7e, and 7A, a copper braid is mandatory to fulfil the standardised electrical values because an aluminium foil alone is not enough. Furthermore, each screening material has advantages and disadvantages.

Aluminium foil is inexpensive, but by itself this material does not perform well in applications that require flexible, track or torsion cables. If one moves a metal foil again and again one starts to see cracks, which decreases the effectiveness of the screening in the cable. This is the reason why some manufacturers construct cables that move frequently or are located in electromagnetic vulnerable (EMV) areas using both an aluminium foil screen and a copper braid. This applies even to cables that are ‘only’ Cat 5 classification.

For cables with high amounts of bending cycles and small bending radii, some manufacturers use an additional metalised tape to fulfil effective screening. This is similar to a woven tape with integrated metalised parts, which offers longer lifespan without cracking compared to a standard aluminium foil.

**Core material options**

Let us now turn to a variety of possible core options, from both a material and stranding perspective. In most applications, bare copper is the preferred core material to use. However, in specific applications, such as the railway industry, a tinned copper core is preferred due to its higher corrosion resistance.

In terms of core stranding, solid cores are typically used in fixed installations, while flexible applications require a more nimble core which typically consists of seven strands. Flexible cores are used for drag chains and...
ETG officially supports EtherCAT G

The Technical Committee of the EtherCAT Technology Group (ETG) has accepted EtherCAT G as an addition to the EtherCAT standard. Moving forward, EtherCAT G, which extends EtherCAT technology to 1 and 10 Gb/s, respectively, will be supported and promoted by the ETG.

EtherCAT G was introduced by Beckhoff Automation in 2018 as an extension of the EtherCAT standard. Beckhoff recently presented the gigabit technology addition to the ETG, and after thorough review, the organisation’s Technical Committee accepted it. Dr Guido Beckmann, chairman of the ETG Technical Committee, explains: “EtherCAT is already the fastest industrial Ethernet fieldbus, and will remain so due to its special functional principle. With EtherCAT G, particularly data-hungry applications, such as machine vision and high-end measurement technology, can now also be integrated, which extends the range of applications.”

The well-known 100 Mb/s EtherCAT technology remains the proven solution for the majority of applications. However, EtherCAT G offers additional user advantages, especially in applications where particularly large amounts of process data must be transported per device. This can include, for example machine vision, high-end measurement technology or complex motion applications that go beyond the scope of classic drive control. Existing devices designed for 100 Mb/s can be seamlessly integrated into an EtherCAT G system, and EtherCAT G devices in a 100 Mb/s EtherCAT system behave like classic EtherCAT devices.

The central element of EtherCAT G is the use of EtherCAT Branch Controllers, which essentially fulfill two functions: On the one hand, they act as a node for the integration of segments from 100 Mb/s devices; while on the other, they enable parallel processing of the connected EtherCAT segments. This significantly reduces the propagation delay in the system, which increases system performance.

The integration of EtherCAT G is simple as the extension is fully compatible with the IEEE 802.3 Ethernet standard, and no software adaptions in controllers are required standard modes. “The advantages of EtherCAT are well known and include processing on the fly, comprehensive diagnostics, simple configuration and integrated synchronisation,” concludes Beckmann. “These attributes are of course fully retained when EtherCAT G is used.”

Cable quality

Finally, it is highly recommended to have data cables that have had their mechanical capabilities extensively tested to withstand the rigors of operating in continuous-flex (drag chains) and torsion (robotics) applications. Data transmission rates can lessen, or signal quality could erode, due to cables that are unable to withstand strenuous operating conditions. Manufacturers should use a combination of test equipment, such as drag chains, torsion apparatuses, ovens and freezers, and, in some cases, specific application testing rigs, such as towers that mimic the strain and load on cables found inside wind turbines.

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Advanced controller for data acquisition

The ioThinx 4530 series is an advanced modular controller product with a unique hardware design, making it an ideal solution for a variety of industrial data acquisition applications. The controller has a unique mechanical design that reduces the amount of time required for installation and removal, simplifying deployment and maintenance. In addition, it supports Moxa Industrial Linux and a built-in Azure/AWS/Alibaba cloud SDK, so that users can easily save field data to different cloud accounts.

Easy tool-free installation and removal
The ioThinx 4500 Series has a unique mechanical design that reduces the amount of time required for installation and removal. In fact, screwdrivers and other tools are not required for any part of the hardware installation including mounting the device on a DIN-rail and connecting the wiring for both communication and I/O signal acquisition. Furthermore, no tools are required to remove the device from a DIN-rail. Removing all of the modules from a DIN-rail is also easy using the latch and release tab.

Built-in Azure/AWS/Alibaba cloud library
Saving field site data to the cloud to improve overall equipment effectiveness (OEE) or implement predictive maintenance is an important aspect of IIoT or Industry 4.0 applications. To help users to connect to the cloud more easily, the ioThinx 4530 series has Azure/AWS/Alibaba cloud SDKs built in, saving engineers time when developing cloud connectivity applications.

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

Project-based learning challenges the modern engineering student

Projects that inherently challenge students to use innovative design thinking often involve interacting with an unknown process or device. Students are encouraged to understand the unknown through theory, simulation and experimentation. However, projects that introduce the unknown in messy, multisystem environments tend to challenge the students to be more innovative.

“Designing a test in this style requires not only knowledge of the specifications, equipment limitations, and fundamental concepts being applied, but also the ability to contend with outside factors and grasp how one change can have a cascading effect on the experimental setup,” says Stephen Plumb, sales manager at Test Dynamics.

He adds that engineering students must see the concepts they are taught in the context of real systems to fully understand them. They must explore fundamental topics used in engineering systems, while working in teams, and apply them in practical designs quickly and effectively.

A collaborative environment
NI ELVIS unites software, hardware, instrumentation, and control in a collaborative environment to prepare the next generation of engineers. With its hands-on approach, the system helps educators teach students practical, experimental engineering skills. Built on the concept of teamwork, this solution connects students to their experiments, enabling them to collaborate using the same technology as over 35 000 companies worldwide. It combines the precision and accuracy of seven benchtop instruments with the speed and customisation of industrial embedded controllers in one single platform. Students can use its easy, prebuilt interfaces to customise at a level not available in any other educational laboratory equipment.

“To effectively analyse concepts this way, students need the ability to not only instrument and analyse the experiment but also precisely control and manipulate the type and behaviour of the inputs to the system,” points out Plumb. “NI ELVIS III is an engineering laboratory solution that combines seven traditional instruments with fully customisable I/O to enable the complete implementation of the concepts in this approach.”

Because the platform is network connected, it enables collaboration on experiments through multi-user access. Each of the seven instruments can be accessed simultaneously by different students connected wirelessly to the system. Also, the control I/O can be programmed independently by students accessing the instrumentation. This means that in a group of students, each individual can interact to perform part of an experiment, so everyone is involved in a completely collaborative experimentation environment.

Similarly, since NI ELVIS III can be remotely accessed, teaching assistants find assessing student work much simpler. Rather than designating time to meet in person with each student, the TA can be a remote resource logging in to each device after students complete the assignment.

“NI ELVIS III removes barriers to collaboration and enables more students to progress through a laboratory in less time,” concludes Plumb. “This increases student satisfaction and makes the best use of teaching staff resources.”

The team at Test Dynamics believes that this teaching aid will change the way that both lecturers and students look at engineering studies. Demonstrations are available on request.

For more information contact Stephen Plumb, Test Dynamics, +27 62 217 0063, stephen.plumb@testdynamics.co.za, www.testdynamics.co.za
Space chair automation

The Euro Space Centre adventure park in Transinne in Belgium is home to a number of different simulators, including the original NASA multi-axis chair dating back to the 1960s which was used to familiarise astronauts with the sensation of disorientation. Today, visitors to the park have the chance to tread in the footsteps of the early space pioneers for a few moments. To make this possible, the chair has been automated using the latest technology, with a control system supplied by Siemens. Every child has dreamt of following in the footsteps of Neil Armstrong or Buzz Aldrin and discovering space as an astronaut. It has now been made possible to at least experience some of the same sensations, if only for a short time, in the Euro Space Centre. Using simulators, visitors can experience the moonwalk or find out what a disorientation exercise felt like on the multi-axis chair. This chair was used by the National Aeronautics and Space Administration (NASA) to prepare astronauts for life in space, and the original is now in operation in Transinne. The former manual control of the chair, which swivels around three axes using two aluminum rings, has now been replaced and automated using the Logo! 8 logic module from Siemens.

Always perfectly oriented
“Our employees always used to have to start the simulator, then regulate the speed, decelerate the chair and stop it using a simple hand wheel,” recalls Catherine Vuidar, marketing manager of the Euro Space Centre. The use of Logo! 8 has not only improved equipment handling for the operators, it has also increased the chair’s steerability, efficiency and safety. Placed in charge of upgrading the chair was the company Heinen, which did the calculating, testing and adjusting of the settings for the new control program. “To improve the system’s safety, we mounted two sensors at precisely defined positions in the simulator,” said head development engineer, Marc Radoux. The sensors are connected to Logo! 8, and ensure optimum positioning of the chair both at the start of the cycle and, most importantly, when stopping. This prevents errors such as the chair coming to a standstill with the visitor upside down.

Additional projects in the pipeline
The turning movement itself is powered by an induction motor with a maximum speed of 3600 revolutions per minute (rpm) which is connected to a frequency control. The current program offers three speed levels – slow, fast and very fast – with up to 30 revolutions of the chair per minute. This is enough to challenge the stomach and equilibrium organ of any test candidate. The chair can be brought to a standstill at any time using an emergency stop button, and the voltage and speed parameters can be viewed in real time at the control system’s display panel throughout the sequence. “The project has been so successful that we’ve actually developed a mobile multi-axis chair, and a third one is currently in progress,” concluded Radoux.

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FieldEcho: the future of integrated IO-Link technology

Integrated IO-Link technology that enables full data accessibility and transparency across all platforms is here with the FieldEcho from SICK Automation. IO-Link is an increasingly used manufacturer-independent communication standard that provides significantly more information, configurability and control. From installation to operation and even maintenance of an automation system, integrated IO-Link technology provides clear advantages over analog solutions.

Continuity of information
This technology brings continuity of information from the sensor level to the automation and web worlds, and is an enabler for innovative sensors. Sensors and actuators become active process participants in an end-to-end automation network. The FieldEcho ensures the data availability demanded by Industry 4.0 and the IIoT. SICK’s FieldEcho gives users platform-independent access to all IO-Link devices in an automation system with only one software tool.

Now, with simple sensor technology, plant owners can establish a reliable communication channel integrated into any existing network to supply a wealth of real-time information. Using FieldEcho, engineers can parameterise, diagnose and monitor all the IO-Link devices that are integrated into a machine or plant. From commissioning and runtime, to device replacement and maintenance, they can monitor all IO-Link devices with a few clicks from any Internet browser, throughout the plant’s entire life cycle.

Regardless of which programmable PLC, fieldbus or IO-Link master is used, FieldEcho automatically finds connected IO-Link devices. Thanks to the remote access function, all relevant IO-Link device data can be easily accessed from anywhere in the world. With the FieldEcho, remote diagnosis is possible, which minimises maintenance costs and reduces downtime. Manual download of IODD is no longer necessary, which saves time and increases efficiency.

The FieldEcho provides unlimited, bi-directional communication access to the IO-Link device. Covering the globally recognised PLC standard, it allows data to be exchanged between all configured IO-Link masters and devices clearly and conveniently using a modern interface. This software tool can also be used in browsers or integrated in HMIs.

Valuable process and service data is available in the operational management level (MES), the enterprise level (ERP), for various cloud services and any customer-specific applications. The data can be efficiently used for subsequent processing e.g. for inventory, predictive maintenance or data analysis. There are numerous advantages to support Industry 4.0 solutions. The FieldEcho IO-Link software enables continuous digital data transmission, allows standard non-shielded cables to be used, is capable of receiving new parameter sets within seconds, and makes plug-and-play a reality. Different parameter settings can be visualised, tested and optimised during integration and commissioning. It is also possible to store different parameter sets in the automation system and upload them to the sensor during operation without any delay. With the FieldEcho users can automatically and remotely configure sensors installed in locations that are difficult to access.

IT access to IO-Link
FieldEcho’s REST API grants IT access to IO-Link device data for applications like ERP, MES or cloud-based services and bridges the shop floor and Industry 4.0. Only one line of PLC code is required to call up the generic function block delivered with the FieldEcho, which exchanges data with the PLC via OPC UA. Neither special hardware nor a special protocol is required for use of the system, making time and cost-intensive programming of the PLC unnecessary. A self-structuring dashboard rounds out the product.

SICK Automation has met the challenge of matching automation technology with the Internet world. In line with Industry 4.0 standards, the FieldEcho software tool ensures all relevant plant information is globally available regardless of the platform used. Thanks to SICK’s intelligent sensors and sensor solutions, accessing a plant’s process and service data is a click away from any Internet browser.

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AI module improves industrial production

Industrial workers can now use the data from their equipment more easily to predict production issues and improve processes with their existing automation and control skill set. The new FactoryTalk Analytics LogixAI module, formerly known as Project Sherlock, uses artificial intelligence (AI) to detect production anomalies and alert workers so they can investigate or intervene, as necessary.

Many existing analytics technologies require deep expertise in both data science and industrial processes. This add-on module for ControlLogix controllers reduces that burden by doing the job of a data scientist. It fits directly into a control chassis and streams controller data over the backplane to build predictive models. It can continuously monitor a production operation, detecting anomalies against its derived understanding.

“The FactoryTalk Analytics LogixAI module makes predictive analytics more accessible to help more workers make better production decisions,” said Christo Buys, business manager control systems, Rockwell Automation. “The module learns your ControlLogix application and tells operators and technicians when things are changing in unexpected ways. This can help them get ahead of product quality issues and protect process integrity.”

The module can, for example, help operators spot performance deviations in equipment like mixers that could affect product quality or lead to downtime. It can also be used as a virtual sensor. Instead of workers taking a reading, like the humidity of a packaged food product, the module can analyse variables from line assets like sprayers, dryers and burners to predict a measurement, virtually. Workers can then be notified of problems by configuring alarms on a human machine interface (HMI) or dashboard. Future features of the module will go further, helping workers focus their problem-solving or automate the optimisation of a process.

The FactoryTalk Analytics LogixAI module for ControlLogix controllers is the newest addition to the FactoryTalk Analytics portfolio from Rockwell Automation. The portfolio includes FactoryTalk Analytics for Devices, which learns about an automation system's structure to tell workers about problems with individual devices. The LogixAI module expands on this by learning about an automation system's application and helping identify anomalies with its overall function.

Both products work individually, but each will benefit the other in future iterations. The FactoryTalk Analytics platform aggregates multiple sources of data, so workers can discover new insights. FactoryTalk Analytics for Devices and the LogixAI module will both be data sources for the platform going forward.

For more information contact Christo Buys, Rockwell Automation Sub-Saharan Africa, +27 11 654 9700, cbuys@ra.rockwell.com, www.rockwellautomation.com

Superior Filtration relies on Movidrive

An industrial water filtration specialist that has used gearmotors from SEW-Eurodrive for many years has adopted its Movidrive inverters with CMP servo motors and customisable iPOS software for its latest self-cleaning GraviFilter screen filters. “This is an example of a longstanding client relationship that has progressed from a standard product to the latest automation technology as the client develops and transforms its product range,” comments SEW-Eurodrive engineer, Dylan Enslin.

The new gravity screen filter has been designed for cost-effectiveness and to reduce its manufacturing complexity. Consisting of sheet metal that is easy to laser-cut and bend, the quantity of welding needed has also been reduced. In addition, the use of the Movidrive inverter with the CMP servo motor allows for effective repeatable positioning of the spray assembly.

“In terms of our iPOS software, we were able to assist with a customised program to control the machine and also a GUI for the client to adjust basic settings via a laptop,” explains Enslin.

Advanced automation functionality

The advantage of Movidrive is that it essentially replaces the functionality of a PLC, from servo positioning to switching pumps and solenoids. Using the drive for positioning, for example, also does away with the old-fashioned crank system, in addition to being able to control extra peripherals.

“We have used SEW-Eurodrive gearmotors for many years,” says Superior Filtration’s technical director, Laurence Sachs, “but this is the first time we have done something more advanced and automated. We are very thankful for the programming and all the extra effort with our prototype unit.”

The latest GraviFilter prototype is being trialled at a citrus-processing plant, where fruit pulp is very difficult to filter. “We have received good feedback to date on the performance of the prototype,” concludes Sachs. “Now, the latest version with even more improvements is on the cards.”

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

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RS adds self-adjusting 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 both 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

Rugged IR thermometer

Comtest now offers the Fluke 64 MAX IR thermometer with internal memory, unattended monitoring, improved accuracy, increased battery life, as well as the precision needed to do the job accurately. Designed and tested to survive a 3 metre drop, this lightweight, compact infrared thermometer works in the harshest of environments and even when unattended.

Features include:
- Precise laser technology for more accurate and repeatable measurements.
- Temperature accuracy of up to 1% of reading.
- Flashlight and large, easy-to-read backlit LCD display for easy viewing even in dark environments.
- IP54 rated for extra protection against airborne contaminants.
- Set time and desired interval between measurements and Auto Capture will capture spot temperatures unattended.
- 99 data point logging.
- Displays the minimum, maximum or average temperature, or the difference between two measurements.
- Hi and Lo alarms for rapid display of measurements outside set limits.
- Rotating lasers to help identify area to be measured (measurement area is between the dots).

Applications are found in industrial maintenance and the electrical and HVAC industries.

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

Ultra-compact soft starter with protection

The Tele Christian P4.0/RL/TP/IC electronic soft starter is, with all of its integrated functionality, designed for ultra-compact installation. It helps to reduce wiring material, installation time and space in electrical cabinets and industrial plants. A complete soft starter, reversing unit, 3-pole motor contactor and thermal protection relay is integrated in the 22,5 mm housing.

The aim of the soft starter is to minimise the high inrush current during the start of a 3-phase squirrel cage motor. This protects the supply and electrical installations from overload. In plants with multiple motors, the use of a soft starter reduces the dimension of wire sizes, protection systems and limits maximum supply power. Due to the highly integrated functionality and protection circuitry of the Christian P-4.0/RL/TP/IC, users do not need to install any other classic motor protection. The installation requires only line fuses to protect the wires.

For more information contact Vepac Electronics,
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