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Endress+Hauser raises the bar when it comes to products and services as is evident from the company's calibration centres around the world. The measurement technology specialist relies on globally proven, standardised procedures to optimise customer processes and improve their productivity and competitive position – regardless of the measurement parameter. See this month's cover story on page 20 for more.

Customised calibration and commissioning concepts ensure system availability

Macsteel Fluid Control, Siemens Digital Factory and Process Industries and Drives, Microsep, Instrotech

UIC Instrumentation, Gail Norton Instrumentation

Instrotech, Emerson Automation Solutions, R&C Instrumentation, Endress+Hauser, EOH

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SEW-Eurodrive, Parker Hannifin SA, BMG, Beckhoff Automation, SKF South Africa, Horne Technologies, Instrotech, Rockwell Automation, Festo

Michael Brown Control Engineering, RET Automation, Beckhoff Automation, Rockwell Automation, AC/DC Dynamics

Comtest, Siemens Digital Factory and Process Industries and Drives, Omron Electronics

SEW-Eurodrive, AT Technical Services, SKF South Africa
The IIoT is behind new developments in EAM software

In the manufacturing industry, a decisive shift is underway influenced by the need for better asset performance and optimised resource efficiency. These are the drivers behind the growth of the IIoT and other digital-era technologies. The ensuing convergence of cloud-based data algorithms with sensor and device networks is powering a creative new era in the expansion of traditional business models. At the same time, a more cautious approach to capital projects, since the fiscal meltdown in 2008, has seen market focus shift towards brownfield asset modernisation and the need to ‘get more from less’.

The trend is towards plant and asset optimisation based on better decision-making at all levels in the company. This has steered equipment providers in the direction of digital platforms as they strive to provide information-based tools that enable plant personnel to improve process efficiency in line with the KPIs set by their C-suite management colleagues. The resultant merge of OT (operations technology) and IT (information technology) has had a flattening effect on traditional (information technology) has had OT (operations technology) and IT (information technology) colleagues. The resultant merge of computerised maintenance management systems (CMMS).

In this month’s column from the ARC Advisory Group, Ralf Río examines the past, present and future trends in EAM and CMMS. Over the years, researchers have identified seven key aspects to EAM, namely: application focus, management objectives, breadth and footprint, scheduling capabilities, mobility for work orders, predictive maintenance adoption, and software deployment. By examining the path of EAM across these dimensions, the report presents a clearer view of the near-term future for EAM, CMMS and field service management (FSM) technologies.

Since most change, particularly in mature markets, occurs organically through the adoption of new technologies that expand the benefits of existing capabilities, it makes sense to study the past in order to try and predict the future.

As it turns out, technology adoption had a significant impact on the capability of past generations of EAM software. In the future, the report predicts that this will continue with the IT/OT convergence enables integration of the equipment data needed by maintenance with the process data used by operations. Many equipment vendors are therefore adopting digital strategies to utilise this data to lower operating costs and improve reliability. As organisations continue to digest the changes in EAM, new opportunities to optimise efficiency across all production-related processes will appear. This will then drive a business case focused on return on assets (ROA) that aligns with the existing executive metrics, as well as giving insight into future market direction. End users are well advised to consider these trends in EAM software development as input to their selection criteria. The full article can be found on page 36.

ETG seminars return to SA in October

There is good news for local control and instrumentation engineers looking for a more detailed understanding of the principles behind the EtherCAT fieldbus. During October, Technews – the publisher of SA Instrumentation and Control – teams up with the EtherCAT Technology Group to host a countrywide series of breakfast seminars aimed at advancing local knowledge and application of the technology. Delving deeper than an ordinary product lecture, executive director of the ETG, Martin Rostan, will discuss the concepts in detail, which will include user-oriented content from installation and troubleshooting, through to how to achieve a smooth transition from classical fieldbus to the EtherCAT system. Table top exhibitions that give sponsor companies the opportunity to highlight their individual EtherCAT achievements will add a practical element for the more action-oriented delegates. We hope to see you all there. (More details on page 4 or contact Jane if you are interested in sponsorship opportunities.)

Steven

Editor: SA Instrumentation & Control
steven@technews.co.za

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Parker Hannifin and Shell sign EFA for instrumentation products

Parker Hannifin Corporation has signed an Enterprise Framework Agreement (EFA) with Shell for the provision of a broad range of process instrumentation products over the next four years.

“Parker is proud to be associated with Shell,” said Andrew Spivey, general manager of Parker Hannifin’s Instrumentation Products Division in Europe. “Our engineering and commercial acumen demonstrate our capabilities as a key supplier in the energy market. We have already collaborated with Shell on engineering projects and this has given us a first-hand look at the emerging technical challenges in critical application areas.”

Over the last decade, Parker has invested heavily in innovation, and has made many significant advances in areas including safety, speed of installation and maintenance, and lowering emissions. In particular, Parker’s new products can dramatically reduce the number of potential leak paths in a fluid system’s technology, and improve ergonomics for instrumentation and maintenance engineers. Also important is Parker’s long experience in designing and manufacturing instrumentation using corrosion resistant alloys that optimise protection in upstream and downstream environments, a major problem for many current oil and gas projects.

Repsol standardises on Emerson’s Exploration and Production software

Emerson has announced a multi-year contract with Repsol to provide its Paradigm Exploration & Production (E&P) software suite across all Repsol global exploration operations to help identify and evaluate new and existing opportunities more accurately.

Repsol will leverage Emerson's E&P software suite, which is designed to help operators increase efficiencies and achieve Top Quartile performance on investment and operational goals within new and established oil and gas reservoirs.

“Emerson’s E&P Software business is focused on helping innovative technology leaders like Repsol extract the greatest value from their field assets,” said Mike Train, executive president, Emerson Automation Solutions. “We’re proud to collaborate with Repsol to provide their geoscientists the insights they need to find oil and gas and boost the bottom line.”

Emerson’s solution at Repsol includes seismic and quantitative seismic interpretation, petro-physical analysis, subsurface modelling and data management.

Schneider Electric releases its catalogues on Digi-Cat

As a digital platform leader, Schneider Electric has streamlined its business by offering its customers rapid access to any of the 7000 pages from its Industrial Automation and Control catalogues quickly and easily, through its Digi-Cat licence-free tool, which works online as well as offline.

In three clicks, customers can save on printing costs, support the Schneider Electric’s sustainability programmes and be kept informed about any updates.

To take advantage of the new digital features in order to facilitate a selection and get direct access to product technical data, visit http://digi-cat.schneider-electric.com/download.html.

EtherCAT breakfast seminar series

Technews Publishing (publisher of SA Instrumentation and Control) is proud to announce that together with the EtherCAT Technology Group (ETG), it will organise a series of breakfast seminars in South Africa during October. With over 4600 members from 65 countries, the EtherCAT Technology Group has become the world’s largest fieldbus organisation since it was founded in 2003. EtherCAT is the Ethernet-based fieldbus with the highest adoption rate. It is characterised by low costs, ease of use, flexible topology and outstanding performance.

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

- Durban – 10 October (Durban Country Club)
- Port Elizabeth – 11 October (The Beach Hotel)
- Cape Town – 15 October (D’Aria Wine Estate)
- Johannesburg – 17 October (The Fairway Hotel)

Attendance is free of charge.

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

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

www.instrumentation.co.za/ethercat

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The ultra-compact C6015 IPC.

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With the ultra-compact C6015 Industrial PC, Beckhoff is again expanding the application possibilities of PC-based control. Wherever space or cost limitations previously prevented the use of a PC-based control solution, this new IPC generation offers an excellent price-performance ratio in an extremely compact housing. With up to 4 CPU cores, low weight and unprecedented installation flexibility, the C6015 is universally applicable in automation, visualisation and communication tasks. It also makes an ideal IoT gateway.

- Processor: Intel® Atom™, 1, 2 or 4 cores
- Interfaces: 2 Ethernet, 1 DisplayPort, 2 USB
- Main memory: up to 4 GB DDR3L, RAM
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- Dimensions (W x H x D): 82 x 82 x 40 mm

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New Automation Technology BECKHOFF
**Endress+Hauser receives Global Market Leadership Award**

After extensive market and competitive research, Frost & Sullivan honoured Endress+Hauser with the Global Market Leadership Award at its recent awards gala in California. “Endress+Hauser’s success is tied to a strong customer focus and a high level of innovation,” says Frost & Sullivan industry analyst, Dr. Rajender Thusu.

The company invests heavily in research and product development to meet its customers’ requirements in the area of liquid flow measurements.

Frost & Sullivan also highlighted the close collaboration with customers. “Our aim is to help our customers run their processes in a reliable, safe, sustainable and economic manner. To do that, we work closely together with the customers from the very early stages of product design, to the operations phase and beyond,” says Dr. Bernd-Josef Schäfer, managing director of Endress+Hauser Flowtec, the Group’s competence centre for flow measurement technology headquartered in Reinach, Switzerland.

**Products and services for individual requirements**

The Endress+Hauser product portfolio of electromagnetic flowmeters guarantees precise measurement of volume flow without restricting production flow rates or causing any pressure drop. The result is less downtime and increased productivity, which contributes to lower overall operational costs. “Most of our customers value the combination of state-of-the-art electromagnetic flow measurement instruments and the wide range of services that we offer,” emphasises Schäfer.

Apart from the extensive portfolio of measurement instruments, Endress+Hauser also offers global support services that enable customers to optimise their processes over the plant’s entire lifecycle, thus making the company more competitive. This includes calibration, diagnosis, repair, engineering, commissioning and maintenance services.

**Leading technologies**

The electromagnetic flowmeters from Endress+Hauser, which feature advanced engineering such as Heartbeat Technology, support various communications protocols including EtherNet/IP and Profinet, which make the information easily accessible. Thanks to Heartbeat Technology, instruments such as the Proline flowmeter range have self-monitoring capabilities. By supplying process and instrument diagnostic notifications in line with NE 107, anomalies can be detected and rectified before impacting the process -- all while the process is running.

*For more information contact Su-Anne Willemse, Endress+Hauser, +27 (0)11 262 8080, suanne.willemse@za.endress.com, www.za.endress.com*

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**eltherm secures Kathu solar plant heat tracing contract**

eltherm South Africa has been awarded the electrical heat tracing (EHT) system design and installation contract for the 100 MW Kathu Solar Park CSP (concentrated solar power) plant in the Northern Cape. The company will deliver systems for the solar facility’s thermal energy storage (TES), heat transfer fluid (HTF) and balance of plant (BOP) equipment.

eltherm was also responsible for last year’s successful installation of the EHT system at Xina Solar One in Pofadder, and is currently involved with the maintenance and repairs of the heat tracing systems at Kaxu Solar One and Bokpoort CSP, also in the Northern Cape. Globally, it is among others responsible for the heat tracing at the Noor Ouarzazate Solar Complex in Morocco, as well as Ashalim Power Station in Israel.

Managing director Peter Stone comments: “The Kathu Solar Park contract undoubtedly reconfirms our strength in the South African CSP marketplace and we are excited to form part of eltherm’s significant growth and leadership in this important global market segment. EHT plays an important role in the successful running of CSP plants, which ultimately contributes towards renewable energy provision.”

**The Kathu installation**

EHT is required in CSP plants to maintain temperatures and prevent heat losses. The Kathu Solar Park’s EHT system will be managed by eltherm’s innovative TraceVision software and controllers that enable efficient and uninterrupted operations at the plant.

The TES, which features the plant’s molten salt storage capability, will compromise the majority of eltherm’s EHT installation where temperature classes of T1-T3 will be maintained. It is estimated that the plant’s parabolic trough technology will provide up to five-hour storage capacity, to meet peak energy demand after sunset.

Essentially, EHT maintains the correct temperature in pipes and other process equipment to avoid solidification of the hot fluids. It also compensates for the loss of heat when fluids flow to pipes with a lower ambient temperature. The eltherm EHT installation at Kathu Solar Park will take six to eight months to complete.

*For more information contact Rachel Paterson, eltherm South Africa, +27 (0)11 326 6475, rpaterson@eltherm.co.za, www.eltherm.co.za*
Electrocomp has announced its appointment as the local distributor for Coilmaster Electronics and the Schaffner Group.

Coilmaster is a professional supplier of magnetic components including high performance power inductors, high current inductors, power chokes, common mode chokes, chip inductors and LAN magnetics. In addition to the standard ranges, the company also designs magnetic components to suit specific customer requirements.

Schaffner is an international leader in the fields of electromagnetic compatibility, power quality and power magnetics supports with its components and solutions for efficient and reliable use of electrical energy. Through its products and services, the Group plays a key role in promoting technologies that support renewable energies, ensure the reliable functioning of electronic equipment and systems in compliance with all major quality and performance standards, and meet the requirements for greater energy efficiency.

For more information contact Andrew Dixon, Electrocomp, +27 (0)11 458 9000, andrew@electrocomp.co.za, www.electrocomp.co.za

Phoenix Contact recently held the official opening of its newly upgraded premises in Bellville, Western Cape.

In line with the company’s philosophy and growth strategy, it is continually investing in buildings and people throughout the world. Phoenix Contact ZA continues to do this in the local market. On the back of continued growth in the Western Cape over the last few years, an expansion and revamp of the existing operational facilities was well overdue there.

The new offices boast a state-of-the-art boardroom / training facility and an enlarged logistics area to accommodate the increased stock inventory. Added to this is a workshop/testing facility to support the increased engineering advice capability available through a recently appointed applications engineer. The expansion demonstrates Phoenix Contact’s commitment to developing and growing its business in the Western Cape region.

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

The Mentalist Experience
Mind-blowing Intelligent Entertainment – Gilan Gork

Date: Friday 26 October 2018
Venue: The Ballroom, Montecasino
Cost: R13 500 per table of 10

The Mentalist Experience is an intelligently entertaining experience in which Gilan demonstrates phenomenal abilities of influence, thought-decoding, psychological persuasion and even predicting audience’s thoughts before they’ve realised they will think them! The show comes after Gilan’s theatre production ‘Beyond The Mind’ toured around the country to sold-out audiences. The impact of this show saw Gilan featured extensively in the media, and Gilan has gone on to present his unique mentalist feats in over 20 countries.

Enquiries and bookings contact Ina Maartens:
admin@saimc.co.za or 062 440 8957
Sponsorship opportunities available
Rope access specialist Skyriders has been honing its non-destructive testing (NDT) expertise since 2002, having received approval from Eskom to conduct this specialist service at its power-station fleet.

NDT forms part of a holistic wear failure system that Eskom has in place for the maintenance and repair programme at its power stations. This ranges from visual inspection through to ultrasonic wall-thickness measurement (UT) and dye-penetrant or magnetic particle testing, to name a few. “All of these inspection methods are aimed at determining the current condition and any defects in the various components,” explains Skyriders marketing manager, Mike Zinn.

As a large electricity utility, Eskom has rigorous processes and procedures with regard to repair and maintenance. While the bulk of its NDT services are provided by contractors using traditional scaffolding, Skyriders comes into its own where confined spaces and difficult to reach areas are concerned.

The bulk of Skyriders’ work for Eskom is based on UT wall-thickness measurement and visual inspection, with dye-penetrant and magnetic particle testing a close second.

The importance of NDT for maintenance purposes is underlined by the fact that, if a power-station boiler experiences a tube rupture due to wear, it can cause extensive damage, which necessitates a shutdown for inspection and repair. This can translate into load losses for the national grid.

Skyriders offers a full suite of inspection services, from NDT to rope access. Its in-house expertise includes concrete repair, confined spaces, painting, bolting, rigging and welding, general work at height and the use of collision tolerant drones. “Our technicians are not only qualified and highly skilled in rope access, but also have expertise in critical inspection methodologies such as NDT,” concludes Zinn.

For more information contact Mike Zinn, Skyriders, +27 (0)11 312 1418, mike@ropeaccess.co.za, www.ropeaccess.co.za

The Tshwane University of Technology’s (TUT) Electrical Engineering Department recently undertook a major refurbishment of its electronic engineering laboratory. This involved scrapping the older, outdated instruments and replacing them with Tektronix AFG 1022 arbitrary generators, Tektronix TBS 1052B-EDU digital storage oscilloscopes, and GW Instek DC power supplies. The newly configured laboratory is used by some 450 electronics students for their design projects, with 42 students accommodated per laboratory session.

Head of department Professor Josiah Munda commented: “Our newly equipped laboratory is what any university of technology worth its salt should have. We would like every laboratory at TUT to have access to state-of-the-art equipment for the betterment of students in our country.”

An important component of the success of this model is the enlisting of two undergraduates to mentor and assist Electronics 1, 2 and 3 and design project students during the laboratory classes. “Mentoring and the assistance of students by fellow students during sessions has been found to be the most effective method of teaching in our laboratories,” added Munda.

Undergraduate students Jackson Chokoe and Remmington Seima, in addition to conducting laboratory sessions, also undertake the general maintenance of the laboratory equipment. Seima commented, “With new equipment, everything is so much more advanced and easier to maintain. For example, we are able to monitor every instrument individually while the class works. The big advantage is being able to assist and correct or change settings in real-time.”

Darius Opperman, the Comtest account manager responsible for the supply of the instruments added, “Probably the greatest value of the new equipment to the lecturers is the ability to manage and monitor students individually during sessions. Every instrument can be tracked while the student is performing set tasks. Not to mention the time saving aspect of updating all the firmware to prepare for a specific class. Instead of updating each instrument individually, this can now be done from the server, using Tektronix SmartLAB software.”

Section head, Livhuwani Ntsandeni concluded, “This is far more functional and technically advanced than anything we had previously. The students and lecturers, alike, are most impressed. We have now had two semesters using the new equipment and both students and lecturers are most impressed. The equipment allows us to produce appreciably more relevant engineering training.”

For more information contact Comtest, +27 (0)10 595 1821, sales@comtest.co.za, www.comtest.co.za
Data to the desk without the need for expensive cabling

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

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

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

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

We have developed sophisticated data management and viewing software as an integral part of the Permasense solution to support data interpretation, this software offers both an overview of all locations monitored at a facility, and drill-down functionality.
Zest gensets keep farms running smoothly

The rural and often isolated setting in which many farms operate make them particularly vulnerable to power cuts and damaged power lines. The result is that agriculture can suffer consequences as a result of power outages, which makes it a business imperative for every farm to have a sustainable and secure supply of energy.

The good news is that solutions are available to empower farmers to get the most out of their farming equipment without having to risk a power outage turning into a disaster. A good, dependable backup diesel power generator set can effectively keep everything running smoothly until mains power is restored. While a quality genset does require an initial capital outlay, the benefits and cost saving in the long run turns it into a positive investment.

Industry experts Zest WEG Group offer the experience and capacity to design and provide high quality agricultural generator solutions with top engine brands, for reliable backup or continuous power in various farming applications. The right solution begins with making the appropriate generator selection, by considering the load size, voltages, running cycles, access to site and delivery constraints.

Zest gensets can be supplied in stationary or mobile configurations from 10 kVA up to 3350 kVA, and their capacity can be increased upwards with multiple synchronised sets. All generator sets are supported by customised service and maintenance agreements.

Integrated packages that include mechanical and electrical manufacture and assembly as well as electronic design incorporating in-house control panel manufacture are available. The company also provides supply and installation of transformers, cabling, bulk fuel systems and sound attenuation with standby generators on a turnkey basis, together with project management, installation, commissioning and maintenance.

To keep costs down for farmers, Zest WEG Group also offers WEG softstarters and WEG variable speed drives (VSDs), which reduce the required genset power capacity.

VSD technology reduces the electric motor’s start-up current, which assists with peak load demands, and also eliminates the need to oversize the generator which would have been a requirement without a VSD.

Another important benefit of using VSDs is the power saved by controlling the output speed of the electric motor, ensuring that the customer uses less energy. Using a VSD allows for the right sizing of the generator which means that the diesel engine will run at its rated loads and maintenance and operating costs are significantly minimised. In many cases, engine capacity can be reduced, with reductions in oil and fuel consumption being realised as a result. Using a smaller engine will also have a positive effect on the cost of parts.

For more information contact Zest WEG Group Africa, +27 (0)11 723 6000, info@zestweg.com, www.zestweg.com

Siemens and Anglo American collaborate on digital skills development

Currently, one of the most debated topics influencing innovation is digitalisation and its impact on the future of employment. It is met with equal parts excitement and trepidation. No matter how you look at it, digital transformation and a truly connected global economy are already upon us.

Siemens has provided automation equipment and industrial networks to assist Anglo American’s Engineering Skills Training Centre (ESTC). One of the pillars of digitalisation is industrial networks and security, and it is crucial that engineers understand the role of this technology in the future of mining.

As a leader in automation, Siemens is continuously expanding its role in industrial digitalisation. There is an opportunity, especially in Africa, to embrace new technologies combined with human talent to accelerate industrialisation and drive economic growth. “We are proud to support Anglo American Platinum to advance skills and opportunities in Africa,” explained Sabine Dall’Omo, CEO for Siemens Southern and Eastern Africa.

Gary Humphries, Anglo American Platinum’s executive head for processing, was appreciative of Siemens’ completion of yet another skills project at the ESTC. In his address he said: “Siemens and Anglo American Platinum have been in partnership since 2010 and we have seen approximately 298 artisans successfully trained at this centre. This vital contribution by Siemens to ESTC will significantly contribute towards the development of the human resource capabilities of our artisans and will help broaden the thinking of the students to explore new career opportunities. We celebrate the handover of the Siemens Simatic Wall and look forward to the role it will play in training the current and next generation of skilled artisans.”

“We are ramping up our commitment to the region to meet customer needs, expanding our portfolio for digital enterprises, supporting our customers in the manufacturing and process industries with digitalisation, and investing in equipping future generations with the skills they will need,” concluded Dall’Omo.

For more information contact Keshin Govender, Siemens Southern and Eastern Africa, +27 (0)11 492 3789, keshin.govender@siemens.com, www.siemens.com
Trafo Power Solutions has extended the benefits of dry-type transformers by offering customised mini substations as a complete and customisable electrical distribution solution for users in mining, industrial, marine, commercial and residential applications.

“Using the well-proven dry-type transformer technology from global leader Hammond Power Solutions (HPS), we are now able to design and deliver mini substations that are specific to customer requirements,” says David Claassen, managing director of Trafo Power Solutions.

Mini substations are traditionally built with oil-cooled transformers, but the incorporation of dry-type technology makes the new offering safer due to less fire risk. In addition, dry-type units require less maintenance and present no possibility of environmental contamination through oil-spills. The units include a medium voltage switchgear for the incoming power source, a primary step-down transformer and a low voltage distribution board all contained within an enclosure.

“Customers have flexibility when it comes to the design and manufacture of the enclosure, as we can use various thicknesses of mild steel to suit the harshness of the conditions, and provide options for mobility such as a wheeled base or a skid-mounted base,” adds Claassen. “We also give the customer the freedom to choose their preferred brands on the medium voltage and low voltage switchgear.”

The capacity range offered is from 315 kVA up to 1000 kVA, with a variety of voltages from 3.3 kV up to 11 kV on the medium voltage side and from 400 V to 1000 V on the low voltage side.

“The transformer itself is specifically designed for Trafo Power Solutions by HPS in Italy according to our specifications, conforming to the IEC 60076-11 standard for dry-type units,” explains Claassen.

“Headquartered in Canada, HPS has over a century of experience in transformer design and manufacture, so have fine-tuned the application of transformers in mini substations for a range of environmental conditions. Trafo Power Solutions conducts the in-house design of the fit-for-purpose enclosure.”

An issue previously restricting the use of dry-type transformers in mini substations has been the provision for adequate cooling in an enclosure that is usually located outdoors. “The enclosure must be well sealed to prevent the ingress of dust and moisture, but must still allow sufficient air flow to cool the transformer,” concludes Claasen. “This challenge has been solved by the application of a specialised dual fan system, which pulls in fresh, cool air while simultaneously extracting the hot air.”

For more information contact Trafo Power Solutions, +27 (0)11 325 4007, david@trafo.co.za, www.trafo.co.za
**BECKHOFF**

**Who will benefit from this training? Automation Engineers**

TwinCAT 3/TwinCAT 2 – Programming, Commissioning & Maintenance
- Cape Town 5-7 Jun 2018
- Johannesburg 5-7 Jun 2018
- Durban 12-14 Jun 2018
- Port Elizabeth 12-14 Jun 2018

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

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**FESTO**

**Who will benefit from this training? Mechatronic Engineers**

PLC282 – PLC Analogue and PID Control
- Cape Town 5-8 Jun 2018

PLC281 – PLC CoDeSys
- Durban 20-22 Jun 2018

PN211 – Electro-Pneumatics
- Johannesburg 27-29 Jun 2018

For more information contact Tarren Smith, Festo, +27 (0)78 803 5459, tarren.smith@festo.com, www.festo-didactic.com

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**VEGA**

**Who will benefit from this training? Automation Engineers**

Processing Solutions for Level, Pressure and Nucleonic
- Poortview 15-17 May 2018

For more information contact Claudia Olver, VEGA Controls SA, +27 (0)73 172 1437, claudia.olver@vega.com, www.vega.com

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**VEGA**

**Who will benefit from this training? Automation Engineers**

TwinCAT 3/TwinCAT 2 – Programming, Commissioning & Maintenance
- Cape Town 5-7 Jun 2018
- Johannesburg 5-7 Jun 2018
- Durban 12-14 Jun 2018
- Port Elizabeth 12-14 Jun 2018

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

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**FESTO**

**Who will benefit from this training? Instrument Technicians and Engineers**

TC1001 – Process Measurement and Instrument Configuration 1
- Sandton 28 May – 1 Jun 2018

TC1002 – Process Measurement and Instrument Configuration 2
- Sandton 4-7 Jun 2018

TC1003 – Process Measurement and Instrument Configuration 1 and 2
- Sandton 28 May – 7 Jun 2018

For more information contact Nico Marneweck, Endress+Hauser, +27 (0)11 262 8087, nico.marneweck@za.endress.com, www.za.endress.com

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**VEGA**

**Who will benefit from this training? Instrument Technicians and Engineers**

PCIE – Certified Profibus Installers and Engineers Course
- Johannesburg 2-6 Jul 2018

PNE – Certified Profinet Engineers Course
- Johannesburg 24-26 Jul 2018

For more information contact Veronica Mtshoro, Industrial Data Xchange, +27 (0)11 548 9960, academy@idx.co.za, www.idx.co.za

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**VEGA**

**Who will benefit from this training? Energy Management Professionals**

BPE – Basic Principles of Energy
- Pretoria 31 May – 1 Jun 2018

MVST – Measurement and Verification Standard Training for Energy
- Johannesburg 4-6 Jun 2018

CBEP – Certified Business Energy Professional
- Johannesburg 4-8 Jun 2018

For more information contact Yolanda de Lange, Energy Training Foundation, +27 (0)84 622 4770, info@entf.co.za, www.energytrainingfoundation.co.za

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**VEGA**

**Who will benefit from this training? Radiation Protection Officers**

Training Course on the use of Radioactive Isotopes in Industry
- Johannesburg 15-16 May 2018

For more information contact Michelle Ramphal, Mecosa, +27 (0)11 257 6100, michelle@mecosa.co.za, www.mecosa.co.za

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Wind power, process plant safety and sensors

March saw the North of Europe suffering the ‘Beast from the East’, with freezing Siberian wind and rain, plus snow – even in the south of the UK. The high winds brought an unexpected benefit: the power generated by the many UK wind turbines reached 14 GW, or 34% of the UK power demand, during several periods. The wind power capacity installed feeding the UK grid is now 19 GW, the third highest in Europe: Germany has 56 GW and Spain 23 GW.

Safety concerns in process plants
The major concerns for Saudi Arabia are the continuing cyber-attacks. More information is emerging about the Triton malware attack, reported in this column in February. The latest news, published on the Cyberscoop and CyberArk websites, suggest the Triton attacks failed because of a flaw in the coding of the malware.

Because of the sophisticated nature of the malware and because many of the coding indicators have not been seen before, or used by any known hacking group, the conclusion is still that extensive resources were involved in creating and testing Triton, which could only have been provided by a nation state. Saudi Aramco assisted in the investigations, but say the plant attacked by this virus was not a part of their operations. Triton is confirmed to be specifically targeting the Triconex safety override systems, in an overt attempt to cause catastrophic damage.

The Schneider Triconex controllers are used in about 18 000 plants around the world, including nuclear and water treatment facilities, oil and gas refineries, and chemical plants. The reports also revealed that attacks in Saudi Arabia using the Shamoon virus have continued, with Sadara Chemicals and the Saudi National Industrialisation Company (Tasnee) both being attacked last year.

In the USA, the impression is that major plant incidents fall into three main categories: dust explosions, maintenance welding errors and transport pipeline fractures. Their ten year average for grain dust explosions is 9.3, so actually 2017 was below average with only seven explosions and five fatalities in the USA. The number is steadily declining, as better training and housekeeping take effect, and with the wider use of dust explosion venting and suppression systems.

It is my personal impression that maintenance welding errors seem to be a major cause of the plant and tank explosions reported in the USA, firstly during maintenance under hot work permits, but also in plant changes, when working on tanks where flammable materials were previously stored.

Despite this apparent laxity in grain handling and petrochemical plant operations, the US has a world leading accident investigation organisation, the Chemical Safety (and Hazard Investigation) Board. The CSB was established in 1998, and produces brilliant accident analysis reports, covering small hazardous events up to major disasters. They are the people that are responsible for detailing the causes of the major BP Texas City refinery explosions in 2005, and the Macondo blowout in 2010, both of which caused major loss of life.

The CSB can only make recommendations for legislative changes, which then have to be considered by OHSA and US State legislative bodies. Perhaps typically, president Trump promised to abolish the CSB when he came to office last March, presumably thinking it was a barrier to free enterprise etc., but thankfully he seems to have changed his mind!

New developments in sensors
Returning to sensors and the current development trends, it seems there is no specific focus for developments currently. Perhaps because of the US accidents with pipeline leaks and fractures, there is considerable attention being paid to corrosion and crack monitoring, but the development of point sensors seems to not be relevant for long pipelines.

At the University of California San Diego, a new ultrasonic sensor array has been built onto a flat silicone elastomer sheet, which can be wrapped round bends and corners that otherwise are difficult to inspect with flat probes. Initial applications are seen on structural steel in bridges, or for aircraft engine supports.

In Europe, Achema has launched its brochures in advance of the 11-15 June expo in Frankfurt: the last event was in 2015. Focused on process engineering for chemicals, pharmaceuticals and petrochemicals, maybe Achema will show the future routes of sensor development – notably however, cybersecurity and safety from hazards are not major topics in their agenda.

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

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From the President’s desk

Annemarie van Coller.

As South Africans, we are experiencing a lot of change at the moment. A big impact on us was the increase in VAT. It’s a change that affects everyone, but, as a resilient nation, we have to get it implemented and adapt. On a global scale, and on a more social note, every Facebook user was affected by the data scandal as the bubble burst on the impact regarding the power of data when used for decision making. Personally, I think we should sit back and evaluate the lesson behind it all:

• The power behind the decision-making capabilities that we have is undeniable. If the correct data is interpreted and applied effectively to the right application, the user generates a proven competitive advantage.
• Conversely, those making a decision without access to this data will always be at a disadvantage.

As most users have probably gone to download their own Facebook data to see what information is used, it is a sobering thought for us in the automation business that we must protect our industry data adequately, as any flaws in cybersecurity could prove detrimental. The SAIMC is involved in numerous industry specifications. If you would like to be part of this and use your specific skillset to contribute, please contact us to get involved.

SAIMC co-opted members

As it is the goal of the SAIMC to make an impact in the automation industry, we are proud to welcome Marc van Pelt and Steven Meyer to our team.

Marc is the chairman of the IIG for 2018. He is also the managing director at Pepperl+Fuchs, and was co-opted as he is the leader of the Industry 4.0 team. It is an honour to work with Marc to ensure that we are aligned and focus on the correct goals going forward. Good luck with your role within the IIG Marc. It is a privilege to work with you.

Steven represents Technews Publishing, and for those who do not know, South African Instrumentation and Control is the official publication of the SAIMC. Steven and the team ensure that we receive the required media exposure for our SAIMC endeavours. We are extremely proud of our association with Technews and look forward to our continued relationship and collaboration going forward.

Future events

There are many exciting events looming on the horizon. The branches have started to advertise the dates on which their various events will be held, which include monthly technology evenings, golf days and other industry initiatives. If you are not yet involved, I urge you to join one of the branches and become a part of our journey. It is a great way to network with industry peers and share knowledge about new and different technologies.

Then, in September, the Electra Mining conference will be hosted by Specialised Exhibitions. Recently, there has been groundbreaking work done in the mining industry regarding automation and we look forward to seeing the impact of our industry at this world-class event.

Until I write to you again,
Annemarie van Coller.
The latest technology evening was held at the Durban Country Club on 4 April. Eric Hore, director of advanced solutions for Moore Process Controls, gave a thought-provoking presentation titled ‘Energy optimisation is everyone’s responsibility’.

He showed how South Africa, where we rely heavily on our coal resources for electrical power generation, is a significant environmental contributor to a sub-Saharan temperature rise rate that is approximately 1.5 times higher than the global average. Another very important factor is the almost 1.5 litres of water consumed per kilowatt hour of generated electrical power sold to consumers by Eskom. Even if environmental arguments fail to persuade companies to invest in optimisation, there are huge potential economic benefits that can be achieved by those that optimise their energy usage.

Monitoring and data recording developments have enabled the acquisition of information that allows energy baselines to be derived in ways that accommodate changing factors such as ambient temperature, feed quality, operator influence etc. Eric outlined the application of ISO 50001 and displayed graphs showing how comparison of real-time plant energy usage against energy baselines can be used to set optimal maximum demand, as well as assisting with the optimisation of plant operation. He also gave examples showing startling figures for the economic benefits which can, and have been, achieved through energy optimisation.

With manufacturing and mining using between 53% and 63% of all energy consumed, engineers working in those sectors clearly have a significant role to play in optimising the use of energy.

The presentation concluded with a question and answer session, after which Eric was thanked by Hennie Prinsloo, who also thanked Moore Products for sponsoring the evening. Everyone then adjourned to enjoy some networking over a few drinks and another excellent meal provided by the Durban Country Club.
Site visit
The branch arranged its first site visit for 2018 to Sky Hill on 2 March. Sky Hill is situated between Secunda and Evander, and is an engineering company with expertise in the manufacturing of pressure vessels, heat exchangers, and fabrication of piping spools, structural steel and mechanical installations.

The manufacturing equipment makes it possible to construct different products as well as refurbishing equipment within a short turnaround time. Automated CNC machines are used to produce products with high precision and repeatability, which makes high production volumes possible. The aim is to ensure customers do not face long outages where critical equipment is needed.

The group witnessed the testing of one of Sasol’s gasifier units after a reworking process. The equipment that Sky Hill manufactures and refurbishes is big and one of the most interesting things to witness was the hoisting capability at this facility, which varies from 40-500 tons per lifting unit. The fact that they can move such large equipment without incident is testament to the safety management systems. The company also has a steady feed of new talent from the nearby training facility where about 400 students are being trained.

Technology evening
The March technology evening was presented by ESACO where Preshan Moodliar spoke on the subject of Ex Automation Interface Technology – Remote I/O. The presentation was informative and well attended.

All instrumentation and control-related mechanics, technicians or engineers are welcome to attend the monthly technology events. The planned dates for the rest of the year are: 7 June, 5 July, 2 August, 6 September, 11 October and 1 November.

Presentations are accredited with CPD points for ECSA registered persons. Enquiries can be directed to branch chairman Johan Maritz at johanmaritz260@gmail.com or 082 856 3865.

Resignation
Rickus Kriel, who served for 12 years on the Secunda branch committee, has decided to step down due to pressure of business responsibilities. The branch thanks Rickus for his years of dedication and involvement to the SAIMC during this period. We wish him all the best for the future.
At the last technology evening, Robert Wright, managing director RJ Connect and his team presented on ‘Connecting the Unconnected IIoT/Industry 4.0’.

Robert, accompanied by Johan Huisaman and Andries Mokoukoe, explained the requirements and processes involved in connecting IIoT devices to the cloud. The latest technologies, including MQTT and OPC UA interfaces into Microsoft Azure and Amazon AWS, were explored. The presentation was informative and interactive. A practical guide and display was given on how to access the cloud via different software and cloud servers. MQTT is an ISO standard publish/subscribe-based messaging protocol. It works on top of the TCP/IP protocol and is designed for connections with remote locations where a ‘small code-footprint’ is required, or the network bandwidth is limited.

The team gave the audience a practical guide on how to create an OPC UA network and a live demo using MQTT to connect devices to the cloud. Other topics covered were:
• OPC UA, what does this mean?
• What can clouds provide?
• How secure are clouds?

The branch thanks Robert and his team for their informative presentation and demonstrations.

At the March Technology Evening, Dhiren Naidoo from Endress+Hauser presented on “The benefits of Heartbeat Technology”, which include:
• In-situ verification and documentation of each measuring point without any interruptions.
• Devices continuously diagnose themselves and extend test cycles.
• Diagnostic messages provide precise instructions for maintenance.
• Process and device data show trends for predictive maintenance.
• Combined process and device parameters facilitate analysis for process optimisation.

The branch thanks Dhiren for this well received presentation.

The main interaction from Tshwane has been to look at ways to make the programme self-sufficient. The branch has engaged with ABSA which has funding available for education. It is envisaged, given the non-profit nature of FRSA, that main sources of income will be from grants and sponsorships and hence a business plan has to be developed. To this end, we received the following in an email from FTC leadership team (adapted):

“To grow FTC and expand the number of FTC teams in South Africa TUT would like to implement the following:
1. Rent-a-Robot for new teams: deposit R5000 refundable minus rental and broken part replacement cost plus R300 per month or R2000 for the season (August 2018 to March 2019). To reduce the start-up cost for Rookie FTC teams, they will rent out a total of 10 FTC robot kits to new teams.
2. Team training: to skill FTC teams FRSA is planning a 3-day workshop.
   Day 1: team business model, time planning, budget, outreach, volunteering and mentorship,
   Day 2: mechanical assembly and engineering notebook,
   Day 3: software setup, programming and autonomous mode.

Proposed dates are late November or early December 2018. This training could be presented by experienced FTC teams as part of their outreach and team fund raising.

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

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Endress+Hauser repeatedly raises the bar when it comes to products and services as is evident from the company’s calibration centres all around the world. The measurement technology specialist relies on globally proven, standardised procedures to optimise its customers’ processes and improve their productivity and competitive position – regardless of the measurement parameter.

Calibrating measurement instruments on a regular basis is key to ensuring that predefined tolerances are adhered to in quality-relevant processes. Using calibration, deviations can be highlighted at critical measurement points, which helps averts losses during production. The overall benefit is less wastage and superior product quality.

Endress+Hauser offers traceable, cost-effective and ISO 17025-compliant calibration services along the entire process, from onsite testing to fully accredited laboratory calibration. As a result, the company makes a significant contribution to quality assurance. A comprehensive calibration certificate, including a compliance declaration, verifies the accuracy of the measurement point and the process recording, and guarantees the reliability of the processes and the products.

Industry knowledge and manufacturer-independent calibration
With all industries facing increasingly stringent legal requirements, conforming to relevant local and international standards is an especially important factor. Thanks to in-depth industry knowledge and experience, Endress+Hauser can fulfil customer-specific regulatory and operational needs that cover efficiency, quality and accuracy. Utilising standard operating procedures (SOPs) and certified master measurement instruments, the company maintains a consistently high quality standard for both onsite and laboratory calibrations.

Production areas frequently have a high number of measurement points for quality assurance and metering applications, and, in many cases, the measurement instruments are not limited to one manufacturer. Endress+Hauser helps customers maintain an overview of the entire installed base and analyses all the instruments to determine the right calibration process, thus guaranteeing seamless and traceable calibrations of any measurement instrument, for maximum system availability.

Save time and effort by streamlined commissioning
Automation projects are under strong pressure to reduce costs from investment to start-up, and begin generating revenue as early as possible. Contractors and project leads typically follow KPIs based on time savings and cost reduction within a project, while comparing them to previous similar project experiences. Last minute changes in projects are common, e.g. adding new devices or changing configurations after the final order is placed, so it is important to be flexible and take an agile approach to managing these situations wherever possible. By using technology-enabled processes and smart DCS/PLC functions such as Device Templates, Pre-Configuration and Remote and Bulk Configuration,
Commissioning can be done faster and safer compared to conventional onsite processes. The result is drastically reduced commissioning time, risk and effort.

Expertise is the key to fast, smooth and solid plant start-up

Since commissioning is on the critical path for start-up and delays sometimes cost millions of Rands per day, customers are constantly searching for new ways to be more efficient during this phase.

Assuming an average time of 1,5 hours per device with conventional (device display, handheld or a service tool) commissioning, at a price of R1000/h, in a medium size project with 2000 devices, this task will take 3000 hours and cost R3 million. Taking the same project, but using Device Templates combined with a streamlined commissioning process, this task can be done in less than 500 hours at a cost of only R500 000. Typically, time savings result in 50-80% cost savings, mainly related to labour costs in projects with more than 200 devices and a good portion of intelligent devices.

In addition, most work can be completed more efficiently due to careful early planning, reducing the likelihood of any impact on the project's critical path. Moreover, this approach also avoids the risk of working on construction sites, as most of the work is done offline in safe workshop environments. All configuration and integration tasks are discussed and tested before the final commissioning of the devices, eliminating concerns of compatibility with the control system.

With conventional commissioning, device diagnostics like NAMUR NE107 and Heartbeat Technology are sometimes not considered and therefore not configured which often leads to false alarms in the decentralised control system (DCS) or asset management system (AMS). This often forces the customer to 'switch off' this functionality in the host system. This makes it impossible to utilise Heartbeat Technology and to adopt a preventive maintenance concept using sensor data as a source of information. To enable best practices, the optimum configuration of each device is therefore mandatory.

Another advantage of Smart Commissioning is that the process is clear, proven and well-defined. Consistent and optimum device configuration, including alarming and advanced diagnostics, is comprehensively applied to the instrumentation installed base across the entire plant. As a result, there will be no unpleasant surprises due to DCS device integration issues or alarm flooding during the critical start-up phase. In addition, with this approach, the quality of work is independent of a sub-contractor's (e.g. a field technician's) qualifications.

The smart factor is in the commissioning process

The essence of Smart Commissioning is to get involved as early as possible in the project discussions and make the best decisions at an early stage related to:
- Planning and preparing commissioning tasks in the engineering office.
- Efficiently performing commissioning in the field.

Figures 1a and b give an overview of the two main phases, as well as their associated deliverables.

Conclusion

Smart calibration and commissioning practices address the key customer concerns of meeting strict and shifting deadlines, as well as keeping tight control on budget. This combination enables faster and safer commissioning processes in comparison to conventional on-site methods and drastically reduces commissioning time, risk and effort. These value-added services are an integral part of Endress+Hauser South Africa’s extended project consulting and project execution services.

For more information contact Preston Reddy, Endress+Hauser, +27 (0)11 262 8000, preston.reddy@za.endress.com, https://eh.digital/2HdcDSx
Sliding gate valves in control at PVS

Belgium-based PVS Chemicals produces extremely pure chemicals for use in the semiconductor industry. One of the company’s outstanding innovations is the production of ultra-pure sulphuric acid. As the only worldwide producer, PVS is able to supply diluted acid at a consistently high level of purity in which any impurities are measured down in the ppt (parts per trillion) range. The purity of acid enables semiconductors to be manufactured in a way that allows the individual circuit paths to be placed even closer together, allowing electronic devices to be made smaller and lighter. Schubert & Salzer Control Systems’ sliding gate valves have proved to be outstandingly successful in the processing plant producing the sulphuric acid. The valves’ excellent control precision over a very wide control range and their extremely high corrosion resistance are the key to the manufacture of these ultra-pure acids.

The demands on highly pure acids increase continually: nowadays, the end-product has to be produced consistently for many applications in a precisely defined concentration with a tolerance band of less than ±0.05%. The dilution presents a special challenge in this process. One of PVS’s activities centres on the production of highly pure diluted sulphuric acid in which the addition of the sulphuric acid in the dilution process can vary between 0 and 100%.

“Producing such a high-quality product with minimal deviations in a continuous process presents a special challenge,” comments Kristof Spreutels, plant manager at PVS. “Across the world, we are the only one to have found the solution at such a high quality level. However, it has needed a control valve with exceptional characteristics to be able to compensate for the variation range of 100% in the basic medium with absolute accuracy. It is extremely important for us that the control valve can deal with any variations in concentration at the inlet with the minimal delay and the maximum precision for the end-product. Process parameters exist such that the control valve must compensate for variations on the intake side between 0 and 100%, followed by 0 to 80%.”

**Outstanding rangeability and excellent control quality**

The sliding gate valve handles this challenge with ease. At the heart of this valve are two slotted discs sliding against each other and forming a seal. One of the discs, a seal plate permanently secured in the body at right angles to the direction of flow, has a specific number of transverse slots of the same height. A second non-rotating disc with a similar slotted arrangement is moved vertically against the first, thus changing the flow cross-section. The pressure differential forces the moving disc against the fixed one. Thus the sliding disc valve seals itself without the need for a separate seat.

The sliding gate valves’ very fast response time to signal changes is a key factor in their accurate control quality. Short stroke, low moving masses and low actuation forces are the key parameters that enable fast response and a high resolution of the stroke position. The sliding gate valve offers all of these features in one package. The typical stroke between open and closed is only 6-9 mm.

Positioning of the pneumatically-controlled sliding gate valve is provided by the digital Schubert & Salzer 8049 positioner, twin-lead version, with IP65 protection. Since the positioner rests centrally on the valve actuator, it takes up no additional lateral space, as well as saving weight. As a result of this integrated design system, no moving parts can be accessed thus maximising operational safety and security.

**Surrounded by gold and PTFE**

The sliding gate valve’s resistance to corrosion is another aspect in which PVS refuses to compromise. “In our process, we provide resistance to corrosion by making exclusive use of high alloyed or even exotic materials like PTFE, glass, platinum or gold. That is why the control valve has to be made from Hastelloy C. Valves made from stainless steel or plastic would corrode away or dissolve in less than a week due to the wide variations in concentrations at the inlet in our process. As a result, the combination of control precision and high resistance to corrosive media is an absolute must for our process,” says Spreutels. “Since we have been using Schubert & Salzer’s valves for over 10 years in steam generation and distribution, for example, it goes without saying that we should also use the same expertise for this special application.”

Furthermore, sliding gate valves in their twin flange version are very compact and light. Therefore, they present no problems in installation, even in PTFE pipelines. At the same time, the stress on the pipes is so small that additional valve supports can be dispensed with.

“We use sliding gate valves wherever we want high availability, good control properties and low maintenance costs. Even in the most challenging acid dilution, the sliding gate valves have required no maintenance or repairs whatsoever up to now. Also, despite the extraordinary stress placed on them by the media, they are showing no signs of degradation. So, thanks to the Schubert & Salzer sliding gate valves, we are the only company in the world able to produce these products to such a high quality and we’ve even been able to reduce the variation range in the concentration of the end product to ±0,02%,” concludes Spreutels.

For more information contact Kamil Maharaj, Macsteel Fluid Control, +27 (0)31 581 7800, kamil.maharaj@macfluid.co.za, www.macsteel.co.za
Evonik Industries and Siemens are planning to use electricity from renewable sources and bacteria to convert carbon dioxide into specialty chemicals. The two companies are working on electrolysis and fermentation processes in a joint research project called Rheticus. The first test plant is scheduled to go on stream by 2021 at the Evonik facility in Marl, Germany, which produces chemicals such as butanol and hexanol, both feedstocks for special plastics and food supplements, for example. The next stage could see a plant with a production capacity of up to 20 000 tonnes a year. There is also potential to manufacture other specialty chemicals or fuels. Some 20 scientists from the two companies are involved in the project.

“We are developing a platform that will allow us to produce chemical products in a more cost-effective and environmentally-friendly way than we do today,” explains Dr Günter Schmid, technical project responsible of Siemens Corporate Technology. “Using our platform, operators will in future be able to scale their plants to suit their needs.” The new technology combines multiple benefits. It not only enables chemicals to be produced sustainably, it also serves as an energy store which can respond to power fluctuations and help stabilise the grid. Rheticus is linked to the Kopernikus Initiative for the energy transition in Germany which is seeking new solutions to restructure the energy system. The Rheticus project will receive 2.8 million euros in funding from Germany’s Federal Ministry of Education and Research (BMBF).

“With the Rheticus platform, we want to demonstrate that artificial photosynthesis is feasible,” adds Dr Thomas Haas, who is responsible for the project in Evonik’s strategic research department, Creavis. Artificial photosynthesis is where CO₂ and water are converted into chemicals using a combination of chemical and biological steps in a process similar to how leaves use chlorophyll and enzymes to synthesise glucose.

Siemens and Evonik are each contributing their own core competencies to this research collaboration. Siemens is providing the electrolysis technology, which is used in the first step to convert carbon dioxide and water into hydrogen and carbon monoxide (CO) using electricity. Evonik is contributing the fermentation process, converting gases containing CO into useful products by metabolic processes with the aid of special micro-organisms. In the Rheticus project, these two steps – electrolysis and fermentation – are scaled up from the laboratory and combined in a technical test facility.

“This research project shows how we are applying the Power-to-X idea,” says Dr Karl Eugen Hutmacher from the BMBF. “Using electricity to generate chemicals is an idea from the Power-to-X concept. As one of the four pillars of the Kopernikus Initiative, the idea is to help convert and store renewable, electrical energy efficiently. At the same time, the Rheticus platform also contributes to the reduction of carbon dioxide levels in the atmosphere, as it uses CO₂ as a raw material. Three tonnes of carbon dioxide would be needed to produce one tonne of butanol, for example.

Evonik and Siemens see great future potential in the Rheticus platform. It will make it simple to scale plants to the desired size, allowing the chemical to adapt them flexibly to local conditions. In future, they could be installed anywhere where there is a source of CO₂, power plant waste gas or biogas for instance.

“Its modular nature and flexibility in terms of location, raw material sources and products manufactured make the new platform attractive for the specialty chemicals industry in particular,” says Haas. “We are confident that other companies will use the platform and integrate it with their own modules to manufacture their chemical products,” concludes Schmid.

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Mettler Toledo’s weighing control terminal for chemical processes

The IND780 weighing terminal from Mettler Toledo can now interface with Profinet IO for seamless data exchange. The IND780 is a highly flexible terminal capable of supporting simple to complex stand-alone to integrated weighing and control applications. Now capable of communicating with Profinet IO, the terminal combines speed and performance with advanced communication options.

The IND780 with the Profinet IO interface has received a conformance certificate from a PI test laboratory, ensuring conformance to the latest specification for Profinet IO devices. A General Station Description file, as a sample for Siemens Step 7 PLC interface code, is available from Mettler Toledo to assist with weighing terminal implementation.

The IND780 provides interfaces for up to four independent measuring channels for scales or flow meters. In addition, it provides a wide range of communications interfaces, including 4-20 mA output, serial, Ethernet TCP/IP and USB. A simple operating system with an enhanced graphical display and SmartTrac, the IND780 improves the speed and accuracy of manual or semi-automatic operations with three display modes that graphically relate weight status to target.

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www.microsep.co.za

Ultrasonic sensor for remote level measurement

Instrotech has available the Senix ToughSonic Chem range of ultrasonic sensors, in service around the world in some of the most demanding and corrosive industrial environments. They measure a wide variety of materials including diesel fuel levels in rail locomotives and levels of liquid chemicals in the paper and food processing industries. These sensors are also used in object detection and other non-liquid level applications where corrosive gasses are present.

All devices are sealed in Kynar PVDF housings for protection against solvents and can withstand total immersion in harsh chemicals, both acids and bases, without damage. They include the same full-epoxy potting, heavy-duty electronics, ruggedised piezoelectric transducers, and UV-resistant cables that make these sensors robust and durable.

Several fully configurable and simultaneous outputs are provided, including serial data (RS-232 or RS-485), analog (0-10 VDC and 4-20 mA) and switches (configurable as sinking or sourcing). Up to 32 RS-485 models can be used in a multi drop addressable network using the Modbus protocol – a standard feature. ToughSonic Chem sensors offer the configuration and operational flexibility that all Senix sensors provide. Powerful extended features can be configured using SenixView software. ToughSonic general purpose sensors can also be used in liquid level applications where chemical resistance is not required.

For more information contact Instrotech,
+27 (0)10 595 1831, sales@instrotech.co.za,
www.instrotech.co.za
In today’s pulp and paper-making market place, consistency measurement is one of the most important ways to keep costs as low as possible without sacrificing quality or production throughput.

KPM’s KC/5 rotary consistency transmitter is one of the most advanced units in the market. With its revolutionary direct-drive servo motor KC/5 is a rotary transmitter that delivers excellent consistency measurement performance, lightweight design, simple installation and dramatically reduced maintenance requirements.

Thanks to the transmitter’s built-in gate valve assembly, it can be installed and removed while the process is running without having to shut down or drain the line. Through state-of-the-art torque measurement technology, the KC/5 provides quick and accurate consistency measurement applicable to all consistencies between 1.5–16%.

Installation cost is low, since it is easily completed, compared to traditional transmitters. It does not need a 3-phase power supply and neither a contactor nor a motor starter is required in the electric room. Only single-phase standard AC power supply is needed and automatic maintenance includes powerful self-diagnostics, friction measurement, and reverse rotation to check zero point and automatically loosen foreign objects.

KC/5 is field repairable with no training or special tools required. With no drive belt to change, KPM’s direct-drive servo motor is maintenance-free. No regular maintenance is required due to its unique mechanical seal system. KC/5 is easy to use and operate and start-up can be done by mill's instrument personnel. Start-up and service training is quoted as an option.

For more information contact Stuart Brown, UIC Instrumentation, +27 (0)31 468 2561, stuartb@uic.co.za, www.uic.co.za

Some of the toughest challenges for sensors are found in the pulp and paper industry. Here, high temperatures and a contaminated environment make it difficult for optical sensors to operate accurately and reliably. This is when Telco infrared sensors come into their own because of the five core features i.e. not affected by airborne contamination, alignment, vibration, extraneous light and water resistance better than IP67. A typical application is paper break detection.

A two-channel amplifier consisting of two sets of light transmitters (LT) and two sets of light receivers (LR) are mounted on the same side of the roll, or on opposite sides, whatever suits the customer to track the edge of the roll and the same mounting can be used for loop control.

A Telco diffuse proximity infrared sensor with an adjustable sensing range of 0-5 metres can be used in the application for paper break detection. The range is further extendable by using a reflector to achieve distances up to 12 metres. The sensors track and trace the reflector and are not hindered by steam, moisture or vibration. A simple adjustment of the potentiometer enables the devices to ‘see through’ the contamination with laser-sharp accuracy.

For more information contact Gail Norton Instrumentation, +27 (0)31 701 4861, telco@telcosa.co.za, www.gailnortoninstrumentation.co.za
Kobold has on offer the DOE oval wheel flowmeter for low and highly viscous liquids. Featuring a full stainless steel body, and temperature measurement for fuel consumption, the DOE offers different pulse output options including one to measure pulsating flow from e.g. peristaltic pumps. It measures liquids of different viscosities, up to 1000 cP, with an accuracy of 1% of reading under reference conditions.

**Principle of operation**
Oval gear flowmeters are categorised as positive displacement flow technology. When liquid flows through this type of meter, two oval geared rotors measure a constant volume per rotation within a precisely machined measuring chamber. With each rotation, a constant volume of liquid is measured. The rotation of the oval gears is sensed via magnets embedded within the rotors. These magnets transmit a high resolution pulse output. The output signal can be processed externally via a remote display controller or PLC, or via a variety of output/display options available as accessories attached to the flowmeters.

**Mini oval wheel flowmeter for tight spaces**

The positive displacement flow technology allows for precise flow measurement of most clean liquids regardless of the media conductivity. Other liquid properties also have a minimal effect on the performance of this type of meter. Flow profile conditioning is not required as with alternative flow technology options making oval gear installations simple to install in tight spaces and at an economical price.

The DOE finds application for all viscous, non-abrasive clean liquids like petroleum, diesel, oil, grease, pastes, chemicals, inks and water. It is also able to measure the fuel consumption of small aircraft, motor boats and mobile power generators. Stainless steel flowmeters are suited to most products and chemicals, whereas the aluminium meters are suitable for fuels, fuel oils and lubricating liquids. Due to an optional measurement of temperature using PT100, even high accuracy fuel consumption measurements are possible. An overview of the instruments main features includes:

- Measuring range: 0.5 l/h - 40 l/min.
- Temperature: max. 100°C.
- Pressure: max. 64 bar.
- Characteristics: Pulse output, integrated Pt100 (fuel consumption measurement).

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

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“OVER 60 YEARS IN THE PROCESS MEASUREMENT & CONTROL INDUSTRY”
Emerson’s new magnetic flowmeter transmitter

Emerson has introduced the Rosemount 8712EM wall mount magnetic flowmeter transmitter with additional protocols, powerful diagnostic capabilities and usability features to help users in the water and wastewater, metals and mining, and other industries gain quick and easy insight into their processes.

The meter’s local operator interface was designed using human centred design concepts, making it easier and faster for technicians to navigate in the field. According to Scott Dudek, product manager for Rosemount magnetic flowmeters, “The Rosemount 8712EM melds usability pioneered by Emerson’s Human Centered Design Group with the quality, capabilities, and reliability that customers have come to trust.”

The instrument’s diagnostic suite includes high process noise as well as ground fault detection, while the electrode coating diagnostic offers two set points to alert when coating is present and when it is affecting flow measurement, enabling preventative maintenance. The smart Meter Verification continuously monitors the health and performance of the meter for ultimate measurement confidence.

Universal transmitter capability allows the 8712EM to operate with any existing magnetic flowmeter sensor and allows backwards compatibility with all Rosemount magnetic sensors. This feature not only makes the transmitter easier to integrate with older units, but it also enables the use of the 8712EM’s advanced diagnostic features.

The Rosemount 8712EM supports HART 7 for 32-character-long tag capability for reduced start-up time, as well as options for intrinsically safe HART outputs and Modbus RS-485.

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Part of your business
After time, temperature is the most measured physical unit. In production, as well as in quality control and maintenance, temperature represents an important indicator of product quality or equipment conditions.

Users struggling with large maintenance bills for thermocouples, or the plant down-time required to replace regular contact-type temperature probes, can benefit by switching to non-contact infrared temperature measurement devices.

In fact, there are many advantages when using infrared thermometers:

- Fast response time (ms range), user gets more information per time period.
- Measure objects that move, rotate or vibrate.
- Measure high temperatures up to 3000ºC. Contact probes will not work or have a short lifetime.
- No mechanical damage or contamination of the surface (food, pharmaceuticals, painted surfaces, soft plastics etc.).
- No influence of objects with high thermal conductivity where object temperature would change if contacted (e.g. glass, wood, small or very thin objects).

However, to ensure accurate repeatable measurement users must consider the following:

- There has to be direct line of sight between the sensor and the object.
- The optics of an infrared thermometer need to be protected against dust or condensation.
- IR thermometers measure surface temperatures and the ability to emit thermal radiation depends on the kind of material and especially on the surface finish.

Emerging trends

Recently the IR sensor market has seen two major trends emerge:

Firstly, IR thermometers are significantly lower in cost. The most expensive parts of an infrared thermometer are the lenses and detectors. New lens materials, technologies and mass production of IR detectors for consumer products have resulted in lower prices for these two important components. Together, with the increased demand for industrial IR-thermometers, high volume production of standard sensors has resulted in greater manufacturing efficiency for the IR thermometer manufacturers.

Secondly, IR sensors are becoming smaller in size. In the past, the measurement of low temperatures made it necessary to use fast lenses with relatively large diameters in order to capture enough emitted energy. Progress in detector technology and the use of better detector performance, together with improved low noise preamplifier techniques have helped reduce the dimensions of the IR sensing head dramatically. As a result, lenses can have smaller diameters.

Due to the increasing expectations of users, and competition among manufacturers, infrared thermometers are continually being improved and electronic design is an area that has seen the most advances recently.

R&C Instrumentation covers the full range of IR temperature measuring devices. The Raytek range of portable units cover temperatures from -50 to 3000ºC. Fixed units from Raytek and Ircon are well known and the scanners from both companies can be supplied as complete applications packages with software to suit many industrial applications.

Continual innovation and new products like the Endurance series, designed in conjunction between Raytek and Ircon, ensure that solutions are available for all situations. There are many reasons to consider IR temperature measurement to maintain and control process plants and R&C’s application engineers are ready to assist.

For more information contact R&C Instrumentation, 086 111 4217, info@randci.co.za, www.randci.co.za
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Enhanced pressure vessel level measurement

Endress+Hauser’s Foxboro IMV31 density-compensated level transmitter provides a new approach to drum level measurement. This unique design was originally developed for flow measurement. The heart of the device is its ability to conduct on-board level calculations based on multiple measurements and fluid density calculations. The transmitter has an RTD input and can also use the saturation stream table’s temperature information along with the DP measurement to calculate an accurate density-compensated liquid level. The densities of both the water and steam are calculated separately, based on the pressure measurement and vessel temperature. The transmitter has an RTD input and can also use the saturation stream table’s temperature corresponding to the measured vessel pressure in calculating water and steam densities.

Results
Regardless of the size of the drum and the saturation pressure, the IMV31 significantly improves the accuracy of drum level measurement over conventional DP transmitters and automatically provides dynamic compensation for varying pressures and temperatures.

For more information contact Johan van Jaarsveld, EOH, +27 (0)87 803 9783, johan.vanjaarsveld@eoh-pas.co.za, www.eoh-pas.co.za

Ultrasonic flowmeter with temperature measurement

Endress+Hauser’s Prosonic Flow E 100, an ultrasonic flowmeter is of high-quality industrial design, which allows reliable monitoring of industrial water, cooling water or condensate, regardless of conductivity, and at temperatures up to 150°C.

The robust instrument 100 is made entirely of stainless steel and is perfectly suited for long term operation in rough conditions. Its range of operation generally allows for process pressures up to 25 bar as well as process temperatures up to 150°C. For the flow measurement of water in steam circuits this is the ideal flowmeter. In addition, the ultrasonic flow measurement ensures – independent of the prevailing pressure and temperature conditions – a high measuring accuracy as well as a high flow range.

Greater efficiency due to integrated temperature measurement
In steam circuits, plant operators place a great deal of value on achieving optimal energy and cost efficiency. As a multivariable flowmeter, Prosonic Flow E 100 does not just detect flow, but it also detects the fluid temperature, for example, of water in the condensate return to the boiler. This allows for permanent monitoring and controlling of feed water temperature, resulting in a higher process efficiency in the boiler.

Web server allows direct data access onsite
The Proline 100 transmitter is equipped with a web server as standard. Using an Ethernet cable and a laptop, users have direct and complete access to all diagnostic, configuration and device data onsite, without needing additional software or hardware. This enables targeted maintenance and service thus saving time.

Heartbeat Technology for the highest operational safety
A further highlight is Heartbeat Technology. Integrated into all Proline devices, this checking function enables permanent self-diagnosis, along with extensive monitoring of the values measured, and providing a traceable certificate for verification during operation. This reduces the complexity and risks involved in a plant and therefore increased safety.

HistoROM simply unforgettable
The unique data handling concept (HistoROM) ensures maximum data safety before, during and after a service call. All calibration data and transmitter parameters are stored securely on the HistoROM data memory and are automatically reloaded after a maintenance event. This makes the exchange of spare parts easy and reduces downtime.

For more information contact Frans van den Berg, Endress+Hauser, +27 (0)11 262 8000, frans.vandenberg@za.endress.com, www.za.endress.com
Control pumps remotely using Teleterm M3 RTUs

The ability to control a pump remotely over a long distance is now available using Teleterm M3 Radio RTUs. The system comprises two Teleterm M3 Radio RTUs each housed in a weatherproof housing with a built-in PSU. One unit is at the (local) remote control end with all the I/O dedicated to control inputs and pump feedback statuses. The other is at the pump (remote) side with all the I/O dedicated to control outputs and pump feedback inputs. The built-in radio allows up to 20 km line of sight communication between the two sets of controls, which allows easy plug-and-play operation with only the wiring of the power supply and the control circuits required. An optional HMI can be provided to do the control of the pump and to indicate statuses. The on-board Ethernet port also allows connection to an existing scada system thus saving on additional hardware. Other features include:

• A comms link indication to ensure the system is up and running.
• Alarm logging can be included so that statuses can be recorded for historical purposes.
• The speed of the pump can be controlled as the unit includes both a 4-20 mA input and a 4-20 mA output.

The low power consumption of the system makes it suitable for use in a solar powered option if required and a battery can be included to cover the event of a mains power failure. Water quality as part of environmental responsibility is a key element to triple bottom line reporting with water licensee operators needing to provide data for licensing authorities and compliance data for reporting. Omniflex has tackled the challenges for this type of remote monitoring application and has dealt with a number of key issues. The following benefits also make the solution ideal for other remote control pump applications:

• Plug-and-play operation.
• Distance up to 20 km wirelessly.
• Low power operation.
• Alarm logging.
• Easy installation.

For more information contact Ian Loudon, Omniflex, +27 (0)31 207 7466, sales@omniflex.com, www.omniflex.com
Adroit Scada validated as an IoT platform

Last year, Adroit Technologies expanded its offerings through its partnership with SqwidNet, the licensed Sigfox Internet of Things (IoT) network operator in South Africa. From the mid-March, Adroit has been certified as a Sigfox partner for devices and for its scada platform, which presents an opportunity for IoT applications and service providers to use the cloud-based scada system and industrial-automation platforms.

The company has demonstrated that it is a leading technology company with two important dimensions: a great understanding of the IoT world and technology, and a willingness to go the extra mile for customers. The new system allows data from sensors and devices to be delivered to the Adroit-hosted platform environment through the Sigfox IoT network, which is provided in South Africa by SqwidNet. Partners and end-users of Adroit will be able to connect and use it seamlessly as a data-acquisition and application-layer software solution.

Adroit Technologies has several IoT software objects already built and has committed to building others for partners wishing to list their products. This will assist customers to build cross-functional solutions and address the industrial, smart-city, smart building and asset tracking industries. It enables partners and end-users anywhere in the world to use Adroit’s technology seamlessly as a data-acquisition and application-layer software solution for IoT projects.

MD Dave Wibberley explains the company strategy: “A modern scada system is an ideal product to test and even build a digital or IoT solution. Adroit now certified as a platform, along with the sensors we have, will now enable partners and customers to come to us and purchase sensors and software that will work together and allow them, in a familiar industrial software environment, to build solutions.”

SqwidNet offers a network model that provides Adroit products with a long range, low cost, low power and secure networking solution. With SqwidNet as a network provider, typical connectivity costs R200 a year for a sensor that transmits data every 15 minutes. Wibberley explains that owing to these key network benefits, the company can now offer sensors with connectivity for less than R1000 per point of connectivity.

The IoT network allows for small packets of data to be transmitted in near real-time to the Adroit Scada for storage and analysis. The system provides industrial data acquisition, reporting and analytics, together with user-friendly development software for easy development of customised IoT solutions. Adroit encourages companies to take advantage of its cloud-based reporting, alarm management, asset management and performance management solutions.

For more information contact Adroit Technologies, +27 (0)11 658 8100, info@adroit.co.za, www.adroit.co.za

Rockwell Automation simplifies operations

Plant personnel have the difficult task of monitoring and maintaining a growing number of IoT devices on their networks. Rather than using complex or unfamiliar IT tools to do this, they can now use the new FactoryTalk Network Manager software from Rockwell Automation. It allows them to monitor the health of their Allen-Bradley Stratix managed switches, troubleshoot switch issues and quickly configure new managed switches and all from one easy-to-use software interface.

“Many plant-floor personnel struggle to piece together information about managed switches and devices from different sources,” said Lorenzo Majewski, product manager, Rockwell Automation. “With the FactoryTalk Network Manager software, they can access this information in one collective spot. In addition, real-time alarms and events from network switches can help them conduct faster, more precise troubleshooting.”

With potentially hundreds of devices in a large facility, users can get overwhelmed by the amount of information they need to manage. The FactoryTalk Network Manager software automatically discovers assets and their associated IP addresses, and creates a topology of these connected devices. The software’s intuitive interface offers grouping of equipment along with dashboard information, so users can organise devices into specific areas or analyse them individually.

The platform uses user-created configuration templates to get new switches up and running faster and more efficiently. These templates can be shared across an organisation, or with OEMs and system integrators to ease network deployment, commissioning and maintenance efforts.

The FactoryTalk Network Manager software provides role-based access control with auditing capabilities to help track user-specific activities and changes. It supports multiple protocols, including SNMP, CIP, Modbus, BACnet and Profinet. Access to the web-based platform is available via a personal computer in a control room or a mobile device on the plant floor.

As part of the Integrated Architecture system from Rockwell Automation, the FactoryTalk Network Manager software provides seamless integration with the Stratix family of industrial network switches.

For more information contact Christo Buys, Rockwell Automation, +27 (0)11 654 9700, cbuys@ra.rockwell.com, www.rockwellautomation.com/en.za
Emerson expands Plantweb digital ecosystem

New mobility and decision-support technologies plus services for operations empower top quartile performance.

As manufacturers accelerate digital transformation and workforce evolution, Emerson has unveiled significant enhancements to its Plantweb digital ecosystem, a comprehensive Industrial IoT automation platform.

“Manufacturing jobs are rapidly becoming data-centric roles, requiring immediately actionable information for experts across the enterprise,” said Peter Zornio, chief technology officer for Emerson Automation Solutions.

“Through a deep understanding of customers’ vision for organisational effectiveness and business performance improvement, Emerson is innovating breakthrough products and services to accelerate that organisational transformation.”

Identify clear business objectives

A 2017 Industry Week survey of manufacturing leaders revealed more than 60 percent of those surveyed indicated active pilot projects in IIoT, but only five percent identified clear business objectives at the heart of their programmes. Of the 205 industry executive respondents, 34 percent stated that lack of clear technology strategy was a barrier while 61 percent confirmed that a scalable approach to investment is preferred.

“A clear message from the industry is that a one-size-fits-all, vendor-prescribed IIoT approach won’t work,” continued Zornio. “They want to identify specific business challenges, target technology to improve performance and then scale up their investment based on results achieved. That is why we have architected Plantweb to enable companies to get started where they can gain the greatest near-term impact.”

Plantweb offers scalable solutions

Built on the foundation of best-in-class process control and safety systems, Plantweb expands on existing automation infrastructure to make the promise of IIoT scalable and achievable, with a broad portfolio of pervasive sensing technologies, an extensive suite of analytical software tools, secure and robust data infrastructure devices and expert services.

During the 2017 Emerson Global Users Exchange event in Minneapolis, Emerson introduced extensive enhancements to the Plantweb digital ecosystem portfolio, including:

- **Pervasive Sensing**: Emerson’s Pervasive Sensing is the foundation of the Plantweb digital ecosystem, providing enhanced visibility into process performance and asset health, so experts have the information needed to drive operational improvements.
- **Secure First Mile**: As global adoption of the IIoT increases demand for robust cybersecurity strategies, Emerson’s Secure First Mile provides secure transfer of actionable data from OT systems to authorised Internet-based applications, services or mobile users.
- **Plantweb Insight**: Emerson’s Plantweb Insight is a scalable and lightweight, web-based software platform that helps users make sense of plant data by leveraging sensing technologies and prebuilt analytics to provide relevant-time monitoring and identification of abnormal situations for specific asset classes.
- **Plantweb Advisor**: Emerson’s Plantweb Advisor is a scalable set of software applications that utilise deeper analytics to provide reliability and energy specialists with critical information about equipment health and efficiency as well as energy consumption and emissions.
- **Always Aware**: Formerly known as Always Mobile, Emerson’s new Always Aware suite of solutions builds on previous mobility capabilities, expanding them to focus on delivering role-based, relevant-time information and alerts to plant personnel, regardless of locations, enabling more effective collaboration and driving actions to improve asset and process performance.
- **Services**: Emerson is expanding its role as a trusted industry partner with consulting and service offerings that complement its leading portfolio of automation and IIoT-based technologies.

To help customers understand the impact these new technologies can have on personnel productivity and organisational effectiveness, Emerson brought the next-generation digital workforce to life with the ‘Digital Workforce Experience’ during Emerson Exchange. The immersive, role-based simulation demonstrated first-hand how various manufacturing roles are evolving and the impact they have on business performance.

“The industry’s technology evolution over the past 30 years has delivered tremendous improvements in efficiency,” Zornio said. “Now it’s time to fuel the next-generation workforce with the actionable insights they need to become even more strategic assets in their companies.”

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Industrial control system cybersecurity

Part 3: ICS environment hardening.

In the last two articles we covered risk assessments and asset discovery and vulnerability management, which are the first two steps in understanding and securing ICS systems. ICS environment hardening is the next part in our series on Cyber Security in ICS Environments. If you read the second article (http://www.instrumentation.co.za/59392n), we have already started the hardening process by patching and identifying vulnerabilities across our systems. In a nutshell, ICS environment hardening is the process to improve system and asset security by removing unnecessary components/services from the environment. This can be performed for an ICS network, an ICS device, an ICS operating system, or a single ICS application.

Reducing the risks
ICS environment hardening means changing the standard configuration of a networked ICS device to reduce or eliminate a potential risk. The most effective way of doing this is to securely configure the operating systems, restrict user accounts, secure applications and implement application whitelisting, and hardening networked devices like switches, firewalls, etc.

To reduce these potential risks, only services that are deemed essential or critical for use in a control system environment, for operations or maintenance, should be enabled. All other unused services in operating systems are possible entry points for cyber criminals to exploit. As an example, if you are not using services like FTP, SSH, SNMP, etc., disable them. If we delve a little deeper, most ICS environments will have some flavour of Linux OS and some version of Microsoft running in their environment, with certain applications running on these systems. By default, these systems come out the box insecure (default user accounts, limited/no patches, etc.), and they need to be hardened. Some PLCs also come prebuilt with web servers running, and unless it is a business/processing requirement to have web access to that PLC, the web server should be disabled. There are many tools and resources that can assist in the hardening process. The Centre for Internet Security (CIS) is strongly recommended as a starting point as it is a great resource for hardening guides, tools and more importantly benchmarking tool. CIS is generally free to use and these tools are developed and maintained by leading international cybersecurity experts. The Nessus tool from Tenable (mentioned in article 2) is another great tool that can assist in identifying configuration problems and baselining. There are also some freeware tools such as Linux Bastille and SELinux that are available. It is also recommended to engage with your ICS vendor(s) as many of them have released cybersecurity guides for their specific systems.

In addition to disabling services and features, it is also vitally important to make sure that the necessary user accounts only have the applicable permissions (and that unnecessary permissions are removed) in order for operators and engineers to perform their daily tasks. Default usernames should also be disabled (if possible) and on networking devices such as routers, switches, etc., default usernames and passwords should be disabled and/or changed. A strong identity and access management (IAM) solution combined with an effective privilege access management (PAM) solution will help to achieve this. Whilst both solutions are capable of running as standalone systems, it is strongly recommended to have these integrated. Most of the commercially available tools cater for UNIX/Linux, MAC and Microsoft systems along with support for most of the major ICS vendors.

Whitelisting
Application whitelisting (AW) is another step that aids the overall cyber security posture of an ICS environment. AW defines which applications and which files are known to be ‘good’; unlike an AV solution that defines what applications and files are known ‘bad’. The crux of an AW tool works by uniquely identifying an application by either a file name, the file size, the file path, and/or the SHA1 hash value. The better tools will use a combination of the above as it is more secure. Cyber criminals can replace a whitelisted application filename with a malicious one of the same name, but if the application has a hash value, it is more difficult to achieve this. Based on fingers getting burnt, it is also recommended to roll-out an AW tool in stages.

As a cautionary note, an AW tool can add latency to the system, so comprehensive testing is strongly recommended. Besides implementing an AW solution, it is also critically important to make sure that applications like databases are also secure, and that file systems have the correct permissions. Database security is an article on its own, but it is very well documented for both ICS and IT systems.

Conclusion
In ending, it is highly recommended to start with an established cybersecurity template from CIS/ISA/etc, instead of creating your own one. The main reason for this is that the more functions you change or configure, the more likely you are to break something. Many templates that are available from the likes of CIS/ISA/etc, have already been thoroughly tested and the bugs and kinks have been worked out. In theory, a system with a reduced amount of functions will have less risk and be more secure than a system with more functions.

Tommy Thompson

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

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Is industrial IT the next wave for Africa?

By Stephen du Preez, head of ENR, Asia, Middle East and Africa, BT.

Infrastructure projects, manufacturing and energy and resource companies may be facing some headwinds, but they are undeniably driving GDP growth and, as a result, are in the midst of a technological renaissance that is transforming their look, systems and processes. And it is a transformation that they cannot afford to ignore.

ICT as an enabler
Much has already been debated around the fact that the African economy can, and is, growing significantly as a result of ICT-enabled solutions – especially if these solutions are based in a platform of empowerment that provides access to education and job opportunities. The industrial sector is no different. IT solutions have become an enabler to mobilisation, automation and improving decision making.

Traditional views on technology have evolved over the past several years, thanks in part to its consumerisation. Increasingly, technology delivers on more than just products. Instead, it is focused towards offering solutions that span the corporate and consumer spheres. Phrases like the sharing economy, digitalisation, and collaboration, are driving us towards a new era of digital possible, which is especially true in the industrial space.

Take the mining sector for example, where East Africa has several mineral belts. Establishing visibility over far-flung global operations is critical and, while the long-term outlook is strong, the connected mine with integrated data flows is fundamental if miners are to meet the numerous short and medium-term challenges now facing the industry.

The infrastructure and cloud play
This, however, is easier said than done. Connectivity is a constant challenge for mine operators and as automation, process optimisation and integration with the IoT becomes critical for operational efficiency, an industrial IT centre with a solid IT infrastructure is required to support the amount of data generated. Just look at wearables. They are not just a fitness step-counter – apply them in the mining space and you have a device that interacts with you, showing your heart rate, elevated stress levels and even the gases you are exposed to. It’s about a connected workforce, but more importantly, information that can be used to drive safety, learning and operational effectiveness.

This data, however, needs to be stored somewhere and this is where the cloud comes in. For these industries, there are two cloud plays that can be considered. Firstly, with connectivity and IoT to really drive a competitive advantage, this information needs to be stored for analysis. The cloud is a perfect place for this and access is immediate for the analysis of trend leading indications and cross operational learning. Secondly, all non-mission critical applications can be strategically migrated to the cloud for consolidation and to reduce costs. Applied correctly, business will be able to obtain real insight and have the opportunity to understand its incremental cost of operations – and hence, the incremental value – at any given moment.

Convergence of IT and OT
So then, at a time of rapid change, this sector quickly needs to examine which technology investments will have the biggest positive impact on their businesses. And what is the value potential and return on investment of these new technologies? Furthermore, businesses need to start to look at how the convergence of IT and OT makes tech more relevant in the industrial space.

Industrialisation on the continent will be driven by three mega trends – natural resources, people, and infrastructure development. These industries are asset intensive and they need to be managed and driven effectively if we are to continue seeing growth across the continent. We need to bring all three media trends together, making them perfect candidates for industrial IT, which is driven by solid network infrastructure, connectivity, cloud, security and a partner that understands how these can make or break you.

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Past, present, and future trends in EAM and CMMS

By Ralph Rio, ARC Advisory Group.

What are the trends for enterprise asset management (EAM) solutions, and where is the domain going in the future? This ARC View examines the recent past and current trends to assess what the future holds across seven aspects of EAM: application focus, management objective, breadth/footprint, scheduling capabilities, mobility for work orders, predictive maintenance adoption, and software deployment. By examining the path of EAM across these dimensions, we can gain a clear view of the near future for EAM, computerised maintenance management systems (CMMS), and field service management (FSM).

EAM software suppliers can use these trends as a basis for product planning. Users should consider these trends in their software selection criteria.

Asset management perspectives
Most change, particularly for mature markets like EAM, occurs organically by adopting new technologies and building on existing capabilities. Examining technology trends for the recent past provides a guide to a probable future. ARC Advisory Group has been researching the EAM area for over 25 years and is thus well-positioned to provide this perspective.

Focus
In the past, a CMMS supplier tended to focus on a particular niche to differentiate itself from other suppliers. To serve its customer base and remain competitive, each supplier deepened its capabilities for a type of asset. These solutions evolved into the current day applications that tend to focus on asset types, i.e. EAM for plant equipment, FSM, facilities and fleet. However, nearly every business has a combination of these asset types. In the future, leading suppliers will offer one application that seamlessly manages all types of assets.

Objective
In the past, EAM focused on managing the resources within the maintenance function, including people, parts, and documentation. Now, the scope has grown to comprise managing the lifecycle of the asset, including financial aspects. In the future, IIoT-enabled remote monitoring and other capabilities will support asset optimisation across both maintenance and operations to enable overall asset performance management (APM). Trade-offs, including parameters like equipment capability, asset health, energy utilisation, and quality/yield, will be applied to meet production schedules with low risk and cost.

Breadth
CMMS focused on managing maintenance resources and each department could sometimes select its software supplier. Often, this became plant-specific, but sometimes it extended to each department within the plant. Now, a business unit will typically have a single instance on a corporate or hosted server that supports multiple plants. As equipment becomes increasingly complex, more maintenance will need to be outsourced (using IIoT) to the OEM or a service organisation specialising in that type of device. This trend will increasingly require visibility into the capabilities and status of those external resources which will need to be managed as an extended enterprise within EAM.

Scheduling
In the past, most maintenance was reactive. Schedules, typically established manually, lacked consideration for capacity and availability of resources, and thus were only followed loosely, if at all. Now, scheduling assesses skills and parts availability and includes some analytics for optimisation. In the future, scheduling will be automated and optimised using machine learning and cognitive computing.

Work orders
The business process for executing work orders by the technician is undergoing a digital transformation. In the past, the typical business process involved printing work orders, hand-written data entry by the technician when time permitted (sometimes at the end of the shift), and an administrative person entering the

Trends in asset management applications

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data into the EAM system. Data quality issues occurred for a variety of reasons, including the technician not valuing the data (it is used by someone else), poor handwriting, timing delays, and more. These data quality issues often cause supervisors to lose confidence in the EAM system which then devolves into a record of what was done, rather than a proactive planning tool.

ARC’s research indicates that 50 percent of technicians now use a mobile device for work orders. The technician enters the data while performing the work. The software provides pick lists, format identification, and other data validation that assures high data integrity. The administrative person is no longer needed for data entry, removing that source of errors. The corresponding EAM system becomes a trusted planning and scheduling tool with higher productivity for all those involved. In the future, ARC expects that nearly all work orders will be managed via mobile devices.

Predictive maintenance
Prior to IoT, adoption of predictive maintenance (PdM) was low since it involved an expensive and high-risk custom project. A development project included data acquisition, data management, analytics, and integration with other applications. The project team would use technologies that made sense at the time and then disband when the project was done. When something changed in the technologies deployed or integrated applications (like an upgrade), the PdM application would often break and, without the project team, the application would go away.

IoT provides lower development costs, and fewer technology risks. The IoT platform provides a sustainable IT infrastructure, and the development focuses on choosing services for building the application. Today, the underserved need for predictive maintenance has become the primary application of industrial IoT. With PdM, work occurs when truly needed, which reduces maintenance costs while also improving reliability. In the future, these business drivers and further ease-of-use improvements in the technologies will allow IoT and PdM to become pervasive.

Deployment
EAM, along with nearly all enterprise software domains, is migrating from an on-premises server to a data centre (private or public) and increasingly, to the SaaS model. This has improved IT resource utilisation by outsourcing commodity IT skills (like desktop software and server maintenance), and focusing them on applications that run the business.

Conclusion
Technology adoption had a huge impact on EAM software capabilities in the past. This will continue in the near future. IoT enables the addition of equipment data needed by maintenance to the process data used by operations. Nearly the entire EAM space is now adopting strategies to utilise the equipment data to lower costs and improve reliability. As organisations assimilate the changes in EAM, they will see opportunities to optimise across maintenance and operations for APM. This provides a business case focused on return on assets (ROA) that aligns with executive metrics, as well as insight into where the market will go in the future.

Note: This ARC View was prepared with input from Ron Wallace of IBM who has over 30 years of experience with EAM and CMMS applications.

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Alarm shelving is an important tool to help operators manage nuisance alarms. It is intended to temporarily hide alarms that operators feel are irrelevant or distracting, thus enabling them to maintain focus on those that require more urgent attention. The presence of nuisance alarms can desensitise operators causing them to ignore important alarms or to misdiagnose a situation. It is also a common contributor to alarm management incidents. With the release of the IEC 62682 standard ‘Management of alarm systems for the process industries’, alarm shelving has become a required control system functionality.

Yokogawa’s CAMS solution

Alarm shelving is a safe and secure way for the operator to temporarily remove a nuisance alarm from view until the underlying problem can be corrected. Much of the potential for nuisance alarms can be ‘designed out’ of the system via alarm rationalisation and application of advanced alarm design techniques. However, since processes and sensors change over time, it is inevitable that nuisance alarms will develop. Common causes include instrument malfunctions, temporary operating modes (start-up and shut-down), lack of maintenance, or operational changes (such as a different feedstock). Thus, alarm shelving is a very powerful, useful, and now required, alarm management tool. With CAMS (consolidated alarm management system), Yokogawa users have powerful and flexible alarm shelving capability built-in to their distributed control system.

Although the concept of alarm shelving has been around for some time, it has evolved over the years. The EEMUA 191 guideline contained a significant discussion about it when it was first released in 1999. Yokogawa was an early adopter of this functionality, introducing alarm shelving as part of CAMS in 2006. Shelving was codified with the release of the ISA-18.2 and IEC 62682 standards, which define alarm shelving as one of three forms of alarm suppression: the act of preventing the annunciation of the alarm to the operator when the alarm is active. The three types of alarm suppression are:

- Designed: alarm annunciation to the operator is prevented based on plant state or other conditions.
- Shelving: temporarily suppress an alarm, initiated by the operator, with engineering controls to reinstate the alarm.
- Out of service: state of an alarm during which the alarm indication is suppressed, typically manually, for reasons such as maintenance.

Shelving is characterised by its temporary nature (alarms are not suppressed indefinitely), the use of engineering controls to ensure the alarm is reinstated, and that it is initiated by, and under control of, the operator. Shelving
is different from disabling or deactivating the alarm (e.g., using ‘alarm off’ or ‘detection disable’ in CAMS). The act of shelving an alarm temporarily moves it from the alarm summary display to another predefined message display area called a shelf. It stays on the shelf until the maximum suppression time is reached or the alarm has cleared (configurable in CAMS). Thus, the alarm is never ‘gone’; it will automatically come back after a period of time. Its status is maintained, tracked, and visible within the CAMS system. This is different from when an alarm is ‘disabled’, in which case it must be tracked outside of the control system and if forgotten about, may never be re-enabled.

CAMS provides powerful capabilities for implementing, using, and controlling alarm shelving. To ensure shelving is used appropriately, operators should be well trained on the purpose and procedures. For instance, a review of shelved alarms should become part of daily operations using pre-defined reports. KPIs for the number of shelved alarms, total shelving duration, and number of times an alarm has been shelved should be established in the alarm philosophy, and evaluated regularly along with other alarm system KPIs. EEMUA 191 recommends that the number of shelved alarms be less than 30.

Alarm shelving an important tool for helping operators deal with nuisance alarms. Yokogawa was among the first DCS suppliers to provide alarm shelving with the CAMS system, which remains an industry benchmark for this type of functionality. CAMS is a powerful and flexible system that allows alarm shelving to be tailored to the requirements of plant operations.

The Alarm Shelving eBook from Yokogawa can be downloaded at http://bit.ly/YokoCAMS.

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HMI modular system for hazardous areas

HMI systems must satisfy the strictest requirements if they are to be used in explosion-hazardous areas. With this in mind, Pepperl+Fuchs has introduced a wealth of new developments for its VisuNet GXP portfolio, a modular solution offering perfectly coordinated solutions for even the most demanding applications.

A PC with Intel Quad Core processing unit and an open Windows operating system is a completely new addition to the GXP family. The user therefore has the option of installing their own software packages, such as scada applications, to visualise and control processes in hazardous areas. A large number of serial interface options such as RS-232, RS-485 and Ethernet also enable direct access from the area to the PLC or other peripheral devices. Thanks to the use of fibre optics, significantly longer distances can now be covered too, allowing even distant sections of a plant to be networked.

In addition to the PC unit, another display has been added to the GXP portfolio, meaning that Pepperl+Fuchs now offers an even more compact 19-inch screen alongside the 21.5-inch model. Depending on the industry, customer requests and requirements, these PC-based HMI devices are being supplemented by a new generation of smarter, thin client-based HMIs. The current firmware version has a number of impressive features, including a state-of-the-art Windows 10 IoT operating system.

In summary, the highly flexible GXP modular system now offers a combination of extra-light and compact HMI systems for explosion-hazardous areas that is unique on the market.

For more information contact Pepperl+Fuchs, +27 087 985 0797, info@za.pepperl-fuchs.com, www.pepperl-fuchs.co.za
SAFETY SYSTEMS

Becker Varis gas monitoring for Zimbabwe mine

Becker Mining South Africa, specialists in safety and communications technologies for the mining sector, is soon to install a robust atmospheric and environmental monitoring system at a mine in Zimbabwe. The high accuracy Becker Varis Smartsense gas monitoring system has integrated features for the detection of ambient temperature, humidity and barometric pressure.

“A dependable atmospheric and environmental monitoring system, which enhances safety and improves productivity in the mining sector, forms an essential part of critical underground and surface communications and safety systems,” says Andrew Trentelman, senior general manager: Electronics, Becker Mining South Africa. “This project in Zimbabwe will encompass the installation of 19 environmental points underground at the mine, where each Smartsense device becomes an environmental station, monitoring up to seven different parameters.

“Apart from the accurate detection and monitoring of ambient temperature, humidity and barometric pressure, every device will also monitor up to four gases, including oxygen, methane, carbon dioxide, carbon monoxide, hydrogen sulphide and nitrogen dioxide.

“An important advantage of the Becker Varis Smartsense SSFM-100 device over conventional monitoring systems, is all features are integrated into one compact device. There is no need for complex cable connections or troublesome programming or difficult calibration. Additional analog/digital input ports provide compatibility with other devices, to accommodate the mine’s expansion requirements. For example, an additional sensor could be connected to measure air flow.

“What is also important is that this system, which adheres to stringent local and international quality and safety regulations, is also certified for use in hazardous areas.”

Customisable system connected over fibre

In this project, the Smartsense system will be integrated over an existing Ethernet fibre backbone, to communicate measured levels in real time to the surface. The real-time information from the 19 monitoring stations, being available over TCP/IP protocol, enables integration to other related systems using OPC connectivity, i.e. scada integration over the existing LAN network.

This hybrid system is customisable to all installation requirements, including copper (RS-485/Ethernet) RF (UHF – VHF data radio/ Wi-Fi) and fibre optical data connectivity. There are various graphical representation methods to display data, including the Becker Mining application for smartphones or integration into existing scada systems. The system has also been designed for easy installation and effortless calibration and there is no need to remove the monitoring head for external calibration as the system can be adjusted during operation.

The Smartsense SSFM-100 fixed monitor has three fully programmable alarm set points for alarm and output controls, with a short-term exposure limit (STEL) and time weighted average (TWA) limits, displayed on a large LCD screen. It is possible to view the reading from up to five metres away and an adjustable backlight makes this device suitable for both underground and surface applications. An internal battery provides power backup for up to eight hours and robust industry power supplies ensure safe operation in harsh conditions. The low power system has an IP67 rating for protection against the ingress of dust and liquids.

The system, with its integrated controller functions, operates as a ‘black box’ and stores information that could be critical in post-accident investigations This includes the calibration record, alarm history and data logging. The ‘watchdog’ feature alerts the user of any system errors, for example, if the system has detected inaccurate measurements or calibration errors. This information is communicated both locally through a maintenance LED and remotely on the supervisory platform.

Preventative maintenance requires only simple procedures – between monthly and quarterly – to ensure optimum performance and extended service life. It is important that sensor intake areas are kept clean, with no obstructions. Three types of brackets are available for easy installation namely panel, roof bolt or cable mounting.

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Do not let untrained personnel maintain fire suppression systems

Alien Systems & Technologies (AST) takes great care to ensure that its fire protection systems are designed and manufactured to the highest quality standards. In addition, its personnel are highly trained and equipped with the latest maintenance technology for the peace of mind of customers. AST goes a step further by certifying its system integrators, which must undergo installation, commissioning and maintenance training. This is to ensure that all customer equipment is installed and maintained to the highest standards using only approved suppliers and genuine parts.

In South Africa, for example, all Pyroshield systems requiring hydrostatic pressure testing and/or refilling must be returned to AST for this service. No other facility has been approved to provide this service. This is to ensure that customers know that their cylinders are filled with the proper mixture of fire extinguishing gas, that the parts used are genuine, and that the personnel performing this work are competent and using the right tools. This is vital to ensure that Pyroshield fire extinguishing systems will perform reliably when called upon to do so.

Beware of uncertified imitators
AST has evidence of companies that, while attempting to refill Pyroshield cylinders, have damaged valves. In addition, it is uncertain whether the gas mixture used was correct. Furthermore, the persons doing the work had not undergone training from AST and were therefore not certified as competent. All of this poses a serious risk to customers who may think that their Pyroshield system is in perfect working order, when in fact it probably is not.

“So what can you do?” Anyone who has doubts about the integrity of their Pyroshield cylinders can contact AST and ask to speak to the sales department who will be able to verify whether the cylinders were returned for servicing. Should the cylinders not have been filled by AST, this poses a risk to customers and insurance companies alike, as the system is no longer a Pyroshield and falls outside of the control of AST, the manufacturer.

A major benefit when using AST to refill is a free hydrostatic pressure test is included. AST also offers a free refill on all Pyroshield cylinders that have discharged after a fire. Furthermore, the company offers a collection and delivery service.

Second-hand cylinders
“What if you have second-hand Pyroshield cylinders and want to use them?” Sure, but first contact AST so that these cylinders can be checked and verified for reuse. This will ensure that they carry the product manufacturer’s guarantee when using them on another system.

AST encourages anyone to notify them should they think that your Pyroshield cylinders are being refilled by someone not certified. In addition, customers can also verify whether their fire system installer/maintainer carries authentic training certification.

For some, taking shortcuts is a way of life. However, it has been shown time and again that this exploitative practice can put lives at risk. To avoid this, AST is standing by to assist anyone who wishes to verify that their Pyroshield systems are only being maintained by people who are competent to do so.

For more information contact Grant Wilkinson, Alien Systems & Technologies, +27 (0)11 949 1157, sales@astafrica.com, www.astafrica.com

Fluke simplifies safety compliance testing

Fluke has introduced a unique tester to the market that sources both AC and DC steady-state voltage for Hi-Z and Lo-Z instruments, thus simplifying safety compliance testing.

The Fluke PRV240 Proving Unit provides a safe and convenient method for ‘test before touch’ (TBT) verification of electrical test tools without placing the electrician or technician in potentially hazardous electrical environments, which would generally involve using known live voltage sources.

In contrast to using a known live source, using the PRV240 does not require personal protective equipment (PPE) for tester verification. Use of the PRV240 reduces the risk of shock and arc flash compared to verification of test instruments on high-energy sources in potentially hazardous electrical environments because the PRV240 provides a known voltage in a controlled, low-current state in accordance with safe work practices.

The pocket-sized PRV240 sources 240 V of both AC and DC steady-state voltage for testing of both high and low-impedance multimeters, clamp meters, and two-pole testers, eliminating both the need for multiple verification tools and the use of a known high-energy voltage source for test instrument verification. To avoid accidental contact, the voltage is supplied through recessed contacts that are activated only when test probes are inserted into the modules insulated access points. A single LED indicates the sourcing of the voltage to verify the test tool, simplifying test tool verification without the need for PPE.

The proving unit can perform up to 5000 tests per set of four AA batteries, and comes with a TPAK magnetic hanging strap for easy accessibility.

For more information contact Comtest, +27 (0)10 595 1821, sales@comtest.co.za, www.comtest.co.za
SICK Automation recently upgraded The RTT Group’s dimensioning, weighing and scanning (DWS) systems at the company’s Johannesburg and Durban operations.

The upgrade included replacing the older-generation DWS systems with the latest DWS Dynamic system that features new technologies to improve measurement accuracy. The new system also makes provision for increased spare parts availability for the logistics company. The next generation DWS Dynamic offers a complete packaged solution by enabling the simultaneous collection of parcel dimensioning, weighing and barcode scanning in one system.

With SICK’s DWS Dynamic, all three components are measured instantly as the parcel travels along the conveyor systems. The single-source DWS Dynamic solution combines an in-flight weighing conveyor belt, overhead scanners, laser-based volume scanners and image-based barcode readers to capture the size, weight, volume and barcodes of over 1 200 parcels per hour. All data is communicated in real time to RTT’s IT network via a secure connection.

“Logistics companies are constantly looking to improve the speed and accuracy of their warehouses and depots, and our DWS systems play an integral role in RTT’s operations,” says Danie Labuschagne, technical manager factory automation & logistics. “The original scanners were installed in 2009 and are still operating to spec. But as the range has been replaced with newer models, spare parts availability was becoming more difficult. This means that if a DWS system shuts down then RTT’s entire operation is forced into the time-intensive process of manually measuring, weighing and identifying each parcel, therefore spare parts availability is critical to reduce any possible downtime for the company.”

In order to minimise disruptions to operations during the installation process, SICK upgraded the two systems on the company’s quieter Monday evenings, which then became operational the following day. The Durban and Johannesburg installations were upgraded in July and August last year respectively.

SICK has also entered into a Service Level Agreement with RTT to ensure the timeous supply of spare parts and service for the new systems. This will minimise any potential downtime risks.

SICK is the sole supplier of DWS systems to RTT’s South African operations, with 15 DWS systems installed throughout Johannesburg, Durban, Cape Town, Port Elizabeth and Polokwane. The company has already upgraded 13 of RTT’s DWS systems with an additional two upgrades in the pipeline.

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The new range of speed sensors from ifm electronic has the evaluation electronics integrated into the sensor housing. This allows for low cost and easy monitoring of rotating as well as linear movements with respect to over and under speed. The limit at which the output switches is set via a potentiometer or IO-Link. As compared to its predecessors, these new sensors feature a robust metal housing for flush mounting.

A special version with ATEX approval is available for which no additional impact protection is required.

Operating principle and application
The integrated inductive sensor is damped by passing cams or other metallic targets. The evaluation unit determines the period or the frequency (actual rotational speed) based on the time interval between damping and compares it to the set switch point. The output is switched during the start-up delay and when the rotational speed exceeds the set switching value. An LED signals under speed and switch-off of the output.

Especially in the field of conveying technology the compact speed sensors can be used for various applications, for example for monitoring belt conveyors or bucket elevators. They are typically used to monitor under speed, blockage or standstill.

For more information contact ifm electronic SA,
086 143 6772, info.za@ifm.com,
www.ifm.com
DataLogic has the best technology and specifications, and provides the widest range of magnetic, inductive, capacitive and photoelectric sensors for universal and application specific purposes, such as colour, contrast and luminescence sensors, fork sensors for label detection, as well as encoders and devices for dimensional and distance measurement.

DataLogic also offers a complete line of type 2 and type 4 safety light curtains, control units and safety relays for machine safeguarding and access control in dangerous areas, with basic and advanced functions, such as integrated muting, override, blanking, cascading and configurable models.

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LED lighting for manufacturing

Save costs while improving productivity.

Savings money is an important consideration for most industrial users. Even if lighting does not account for a large share of the operating budget, every bit of savings helps the bottom line. Upgrading lighting can be an effective way to reduce facility and machine costs, while improving the productivity, safety, and functionality of a space.

**Initial cost of lighting**
The initial equipment cost for a lighting solution includes the housing, electrical equipment (e.g., the ballast or driver), and the light engine (e.g., the lamp or LED panel). Here, LED equipment is often more expensive than competing technology options, and the difference can be significant for certain applications.

Industrial users may also find that the initial cost of the lighting housing depends on the environment. As discussed below, some lighting can withstand the extreme conditions that are often present in industrial environments. These safeguards may increase the cost of the equipment, but the risk of damage or injury to people or other materials in the space is reduced, ultimately saving costs in the long run.

Industrial users should consider a redesign of the lighting system if any of the following situations apply:

- The existing lighting solution is in poor condition.
- The light distribution of the existing solution is uneven.
- The light distribution of the existing solution does not suit the use of the space e.g. if there have been changes in the design, components, furnishings, or conditions in the space.
- The desired illumination or distribution cannot be achieved with available retrofit options.

**Operating costs**
Small improvements in efficacy can result in significant operating cost savings over the lifetime of a lighting solution. Achieving appropriate levels of light for work areas by using focused task lighting can also add to the savings.

Efficacy ratings vary significantly among different technologies and applications, from less than 15 lumens per watt (lm/W) for standard 60 W incandescent lamps, to 150 lm/W for the latest LED area lighting. Generally, lights with higher lumen outputs have higher efficacy ratings. LEDs often have better efficacy than other technologies, but highly efficient fluorescent and HID options can provide better or similar efficacies for some applications. Reducing the lighting system’s power will also save on demand charges. When commercial or industrial customers significantly reduce their power draw, they should review their utility rates schedules to determine which schedule is most economically attractive.

**Maintenance costs**
Industrial users should understand the maintenance costs associated with a lighting solution. Having a plan in place for routinely replacing lamps and cleaning surfaces can reduce the total amount of labour needed for maintenance.

The performance of any lighting solution will deteriorate over time through the failure of lamps, ballasts, or drivers; gradual lumen depreciation and colour shift. To plan effectively, it is important to attempt to predict the lifetime of a given technology and understand how and when the lighting system will likely deteriorate. LED technology is treated differently in this regard. LED chips degrade slowly over time, producing less light and shifting their colour characteristics. The metric used to define the lifetime of LEDs is L70 lumen maintenance. This refers to the amount of time the LED will operate while maintaining at least 70 percent of initial output. Some LEDs will take longer to get down to 70 percent. The projected L70 value for LEDs can exceed 50 000 hours. In addition, the LED chips often last longer than the drivers that power them, which means that industrial users may need to replace drivers before the light engine.

**Cost of ownership**
When considering lighting costs, industrial users should recognise that the initial cost is only part of the life-cycle cost of the lighting solution. Maintenance and replacement costs depend on the lifetime of the equipment, and the energy costs depend on the equipment’s efficiency. For this reason, longer-lasting and more efficient technologies can produce significant savings, even if they are initially more expensive.

LED fixtures can have higher initial costs for a given application than other technologies. However, they are often also the most efficient option available and have the longest lifetime. Some industrial users may find fluorescent or HID technology better suited to their needs, but that may not be the case for much longer given the rapid pace of advancements in LED technology.

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Cylindrical sensors offer strength

Countapulse Controls reports that the Leuze cylindrical sensors offer a higher mechanical strength than standard sensors. Engineered for particularly arduous conditions, the Leuze 328 series sensor is based on the optical platform of the well-known Leuze 318B, however, the new device features a metal sleeve in the housing.

The operational sensors available in the new Leuze cylindrical series, which range from through-beam to retro-reflective photoelectric sensors and light scanners with sensitivity adjustment via teach button, are designed with the option of either a cable or plug connection. An adjustable retro-reflective photoelectric sensor model with a polarisation filter is also available for particularly tricky applications.

With ranges of up to 15 metres (throughbeam photoelectric sensors), six metres (retro-reflective photoelectric sensors) and one metre (light scanners), the new Leuze cylindrical sensors are ideally suited to a variety of applications for object detection in materials handling and packaging technology.

The cylindrical sensors are especially popular for integration into constricted production facilities as well as into assemblies in transport systems or other machinery. In many production processes and internal transport systems, these optical sensors are used for the detection of objects, and thereby control processes or partial steps. The highly visible light spot facilitates alignment and two anti-valent outputs expand the application options.

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Temperature sensor for soft soldering

For most temperature acquisition applications, platinum-chip temperature sensors are used. Manufacturing these sensors is a complex and technically demanding process. Specialist in this field, Jumo, has been making the small devices for many years under clean room conditions and now offers a new model with gold plated nickel connection wires.

Particularly suited for soft soldering applications, the Jumo PCA EG (economic gold) is also suitable for all other common processing methods. The sensor is designed for operating in a temperature range from -70 to 500°C. Numerous designs, such as Pt100, Pt500 or Pt1000 are available as standard, while special nominal values can be manufactured upon request.

During manufacturing, the platinum layer of the sensors is applied to a ceramic body and subsequently structured in a photolithographic process. Fine adjustment is carried out in a laser trimming process. A special glass layer is then melted on to protect the sensor against external influences and to provide insulation. The electrical connection is enabled through welded on connection wires. These wires can vary in both length and diameter. An additional glass layer applied to the contact surface fastens the connection wires and acts as a strain relief.

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**Pressure transmitters for hydraulic systems**

Turck has extended its line of PT2000 pressure transmitters with the release of a variant for use in hydraulic systems.

“With a list of features that includes an SAE fitting, stainless cell, gel filled housing, and an integrated snubber to reduce the damaging effects of pressure spikes, these transmitters provide an ideal solution for demanding hydraulic applications,” explained Rich Tallant, product manager for sensors.

The SAE #4 and SAE #6 process connections are particularly important, as they are commonly used for hydraulic equipment in North America.

The new transmitters, which offer a welded stainless steel measuring cell for increased durability and increased chemical compatibility, have no elastomer seals and all wetted materials are 316L stainless steel. Additionally, the housing is more compact than existing solutions, suiting it for applications with space constraints. The transmitters are available in multiple pre-scaled pressure ranges from 2 to 1000 bar.

The new variant also offers multiple output signals allowing the sensor to adapt to existing control circuitry including 4-20 mA, 0-10 V, ratiometric, 1-6 V, and 0-5 V. Additionally, it carries an IP67 rating and works with media temperatures up to 135°C.

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**Warp-speed productivity combination**

The development of metal cutting technology over the past thirty years has been remarkable and the latest developments in fibre laser technology are taking sheet-steel component production to even higher output and quality levels.

Bystronic, a leading provider of cutting and bending solutions, offers the steel industry the ultimate in productivity solutions. By linking its flagship ByStar 10 kW fibre laser to a ByTrans loader, it is now possible to automate production to a far greater level than was possible previously.

In South Africa, First Cut, a South African distributor of a range of cutting consumables and capital equipment, represents Bystronic exclusively and has done for many years.

The 10 kW ByStar is to date Bystronic’s most powerful fibre laser, which allows the new cutting head to deliver the highest part output over the full spectrum of sheet thicknesses, from thin gauge up to 30 mm, with impressive part accuracy. It will also cut other exotic materials such as aluminium, brass and copper without the need for deburring. In terms of productivity, it is up to five times faster than a 4 kW carbon dioxide laser. Even compared to a 6 kW fibre laser, the time to complete a job on 6 mm steel could be cut in half and the cost per part reduced by as much as 35%.

**Ground-breaking features**

As the ByStar was designed from the ground up to be the most productive of fibre lasers, it incorporates a number of other ground-breaking design features. A newly developed ultra-fast bridge frame, gives greater accuracy and better edge quality and ejection eye technology identifies the edge of the sheet in six seconds, allowing cutting right up to the edge with great accuracy. This significantly reduces a fabricator’s scrap rate.

However, the laser’s remarkable new levels of productivity would be diluted if the loading and unloading of the machine were not able to match its superior production rate. To maximise the ByStar’s productivity potential, Bystronic therefore developed a range of loading and unloading automation solutions. Notable among these, the Extended Loaders will automatically load sheets onto the laser’s shuttle table. After the cutting cycle is completed, they are able to unload finished parts as well as residual sheets.

The machine requires only 60 seconds in which to carry out the complete loading and unloading cycle, which allows the automation system to be faster than the cutting plan that is being processed. For fabricators or manufacturers, this means that the laser can cut uninterrupted for an extensive period of time. While one shuttle table is loaded, the laser can cut components from the raw material on an alternate one.

The ByTrans and the ByTrans Extended are operated using the ByVision touch screen. Bystronic has seamlessly integrated the control of the two automation systems into the laser’s operating software, which enables users to perform all the operating steps from a single HMI.

The development of these automation technologies is part of the company’s overarching aim to provide its customers with unsurpassed productivity solutions, ultimately leading to greater profitability.

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www.firstcut.co.za
INDUCTIVE SENSORS THAT MAKE PERFECT SENSE.
THIS IS SICK
Sensor Intelligence.

Look around you. Everyone is surrounded by many things that were designed to make life easier. Once you use them, you ask yourself how you ever lived without them. Introducing the inductive sensors from SICK. From the moment you place your order, the sensors make it their business to make yours more efficient. As compellingly durable as they are reliable, SICK inductive sensors let you sit back and relax thanks to fast delivery, rapid installation, and a reduction in maintenance and replacement costs you’ll really notice. Once installed, they boost your productivity, leaving you free to make better use of your time. We think that’s intelligent. www.sick.com/inductive_sensors
The latest trend in materials handling has seen sectors such as warehousing, packing and pick-and-place use cheaper components for light load conveyor applications in order to reduce total supply chain costs. In response to this latest customer requirement, SEW-Eurodrive South Africa has launched its new ECDriveS 24 V drive system.

“ECDriveS is an acronym for electronically commutated drive system, a brushless DC gearmotor,” explains SEW-Eurodrive South Africa national sales manager, Norman Maleka. “It also stands for ‘easy drive’, a simple and cost-efficient drive solution for roller conveyor applications.”

The latest drive solution was launched in Germany in 2017 following an extensive research and development programme and customer consultation, and is now being introduced to the South African market. “We have commenced with training to ensure our staff are familiar with the new product, and are currently assembling six units to go to all of our branches countrywide for customer demonstrations,” adds Maleka.

Features and benefits
A standout feature is that it is easily integrated into existing solutions as it features both Ethernet and Profinet communications for seamless interfacing. Other advantages are precise positioning with ramp up/down and the ability to vary the conveyor speed accordingly.

Sensor input and output is provided for easy monitoring, with an alarm triggered in the event of any problem. The drive system has an IP54 protection rating, in addition to an IP66 version for more demanding applications, such as food and beverage. The temperature range is –10 to 40°C, while the roller speed is up to 5 m/s. Gearbox speeds range from 8.5 to 645 rpm for added flexibility.

“This new system is easy to work with, set up, install, and maintain and is particularly suited to African operating conditions, where on-site technical skills are often limited,” comments Maleka. Set-up is either by dual in-line package (DIP) switches, or the drive system can be programmed using the SEW-Eurodrive proprietary software. It also has a built-in encoder for precise positioning.

The encoder allows for accurate positioning of items whenever the conveyor is stopped, which is of particular benefit to customers with sorting applications,” adds Maleka.

While the company has a wide range of products, particularly gear motors, the prevailing trend in materials-handling is for smaller, cost-effective solutions. ECDriveS is a compact solution, with roller size ranging from 300 to 1200 mm, meaning it is especially tailored for smaller conveyor applications. These are used mainly in pack houses in agricultural and farmers’ co-operative applications, where the bulk of the items are packed manually, and then placed on a conveyor to be loaded onto a truck. No parameterisation is required, which means no complex elements such as a PLC.”

In the past, we tended to focus on larger applications,” notes Maleka. “However, the introduction of ECDriveS means we can now compete effectively on smaller projects as well.”

The introduction of the ECDriveS is integral to SEW-Eurodrive’s strategy of offering a total solution. “We strive continuously to introduce products that add to our overall portfolio, and which complement our existing range,” concludes Maleka. “This is linked to our approach of targeting system integrators. At the end of the day, we want to make our customers aware that we can offer them complete end-to-end solutions and not just individual components.”

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BMG’s extensive range of Fenner power transmission components encompasses the Fenner Drive Alignment Laser instrument, designed for accurate pulley and sprocket alignment, to reduce wear on belts and pulleys and ensure drive efficiency.

“The portable system, suitable for both vertical and horizontal mounted machines, is quick and easy to use for accurate results,” explains Carlo Beukes, general manager, power transmission, BMG. “The laser line of this compact and lightweight tool, allows rapid adjustment to perfect alignment. Conventional alignment methods, which often require difficult, lengthy positioning of components, can prolong downtime and affect efficiency.

“The Fenner alignment system shows parallel and angular misalignment and as a result drive efficiency is improved and energy savings are increased. With minimal friction and vibration, the service life of chains, sprockets, shafts and bearings is extended and the costs of maintenance, repair and downtime are reduced.”

For maximum accuracy, the mounting unit is magnetised to attach firmly to sheaves or pulleys. In the case of non-magnetic sheaves, the instrument can be attached using double sided adhesive tape.

BMG’s Fenner range also includes synchronous transmission belts, pulleys and accessories, as well as shaft fixings, chain drives and couplings. BMG also supplies Fenner shaft mounted speed reducers (SMSRs).

For more information contact Lauren Holloway, BMG, +27 (0)11 620 7597, laurenhy@bmgworld.net, www.bmgworld.net
Kinetic sculpture interacts with water and light

A fascinating play of water, light and motion.

Development of sophisticated and technically challenging trick fountains that entertain and amaze has sparked the imagination of engineers for centuries. The interactive kinetic sculpture revealed for the first time in February 2017 at the ISE trade show in Amsterdam creates a magical interplay of water and coloured light. The 3D KineMatrix was developed by MKT Fine Exhibition Engineering, a proven expert in the design, development and implementation of interactive installations and kinetic sculptures. This project was completed in cooperation with HB-Laser, a world renowned specialist in laser shows, multimedia and video mapping projects.

“We set a goal to combine our experience and create something unique out of the individual products,” explains Axel Haschkamp, member of the board at MKT. The result is a magical 3D sculpture using water, light and motion. A white ball appears to float weightlessly above the water matrix, moving in oscillating and circular motions. At times, it balances on the tips of the water fountains. At other times, it submerges below the water. The kinetic sculpture is difficult to decipher, and viewers never tire of watching the interplay.

The sculpture is designed for indoor applications with limited space. These locations include hotel lobbies, malls, corporate foyers, airports, casinos and amusement parks. Essentially, it is ideal anywhere people want to create emotions, entertain or promote relaxation for spectators.

The product is based on the 3D HydroMatrix modules developed by HB-Laser. Equipped with 10 jets and 10 RGBW LEDs, they include all of the components required to create water and light installations. Depending on the location and scope of the application, multiple modules can be compiled in individual or serial configurations of any desired size as a star or square shape. According to Harald Bohlinger, managing director of HB-Laser, the flexible design and compact size are what make this interactive sculpture so unique.

There is currently no other system on the market that offers this 3D effect from such a short distance. In order to create this stunning effect, the system that we have implemented enables water jet spacing of only 50 mm, while conventional water fountains require a minimum spacing of 300 to 400 mm. Furthermore, the minimal spacing between the LED water fountains also enables the projection of videos or lettering onto the water with pixel-level resolution.

Both the water-light matrix and the kinetic assembly are flexibly scalable and can be adapted to the specific application scenario. Instead of a ball, any desired object can be moved three-dimensionally in the space above the 3D HydroMatrix in order to interact with water and light. The KineMatrix can also be flexibly combined with other media such as video, lasers, light, audio and fog.

Precision motion control makes a splash

A prerequisite for the modularity and scalability of the 3D KineMatrix is a compact control platform that can be scaled and adapted to individual project requirements in terms of dimensions and complexity. The three-dimensional movement of the ball, as used in the presentation at the ISE, is created by three winches. The motion control platform consists of a Beckhoff servomotor with an integrated holding brake, an EL7201-0010 servomotor I/O terminal with One Cable Technology (which integrates a complete servo amplifier, including encoder system in a 12 mm terminal housing), and a brake-chopper I/O terminal that provides brake resistance. A Beckhoff CX2030 Embedded PC serves as the central control unit. The control system contains the complete show procedure, with cable lengths and timings taken from an externally generated CSV file. TwinCAT NC PTP Motion Control software then carries out highly precise position calculations. A TwinCAT Camming function block performs the linear or spline interpolation of the master support points and the corresponding slave positions according to the position table. This creates a seemingly flowing motion for the observers. In order to synchronise the kinetics with the water matrix control sequence, which is saved on a circuit board, the control system sends the values to a higher level master PC via ADS. This master PC also runs the application’s visualisation software.

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Evaluation of bearing arrangement with SKF SimPro Quick

SKF SimPro Quick is a single-shaft bearing simulation tool that has been developed to evaluate the design of bearing arrangements and their field performance based on relevant application requirements and conditions.

Industrial manufacturers face new challenges every day when it comes to rapid design of more robust and more cost efficient machines. To maintain a competitive edge in product performance through innovation, design engineers are increasing the use of computer software all the way through their design cycle; exploring new design alternatives, including more parameters, and reducing time to market.

Design engineers recognise that critical bearing arrangements are fundamental for machine performance, especially with the increasing variety of application conditions. An effective evaluation of bearing performance without compromising on time and flexibility is crucial in order to choose the best possible arrangements for machine design.

SKF has core expertise in bearings, seals and lubrication, and more than a century of experience with applying bearings in rotating machinery in a wide variety of industries. SKF SimPro Quick is aimed to provide customers with more engineering knowledge and autonomy in order to accelerate the design process and optimise bearing choice.

Intuitive interface
The software tool has an intuitive interface to model the customer’s application, with relevant components such as shafts, bearings, housings, gears, lubricants, spacers and springs. A bearing selection dialogue enables the selection of bearings from the SKF catalogue. The rolling bearings database is updated on a regular basis.

Operating conditions such as speed, loads, lubrication and fits of shaft and housing are added to the application model. The load and speed conditions can be entered as a combined load cycle.

Once the customer has built the model he or she is presented with a choice to run a single load analysis or a full load cycle analysis, depending on machine operating conditions. In addition, a bearing preload optimisation analysis can be performed.

SKF SimPro Quick provides calculation results with a comprehensive range of useful performance output parameters such as bearing fatigue life, bearing load, loaded zone, contact stress, bearing displacement and misalignment, friction, bearing defect frequencies and shaft deflection. The output can be viewed in various graphical charts and in a 3D model. A report is created automatically, based on selected output results and is conveniently exportable in pdf, doc and html formats. Get registered at www.skf.com/skfsimpro.

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2020 is the year of the next rover mission to Mars. The main payload of the Russian Proton rocket is the ExoMars rover, developed by the European and Russian Space Agencies (ESA and Roskosmos). The plan is for the vehicle to be equipped with nine measuring instruments, including one that will be mounted on a two metre mast on the rover. The panoramic wide angle camera (WAC) will take stereo images of the planet. The PanCam features two rotating filter wheels which are mounted in front of its wide angle cameras to enable it to take three dimensional images of panoramic landscapes. Three stepper motors from Faulhaber drive the rotation shaft for the filter change system as well as the focus of the high resolution camera.

The requirements for equipment planned for use on Mars are so stringent that nothing quite compares to them. And if the mission goes according to plan, the rover built by ESA will start searching the surface of Mars for past or present biological activity as soon as it lands. Meanwhile, the ExoMars Trace Gas Orbiter will stay in orbit in order to help the rover phone home and ensure that the data it collects make it back to earth.

Improved images and protection from dust

The ambient conditions on Mars require every single piece of equipment to deliver unrivalled performance. For starters, the rover will be working under an atmospheric pressure of 0.00636 bar, which is equivalent to the pressure found at an altitude of 35 kilometres on earth. And temperature fluctuations go from 20 down to -120°C. Thanks to their residual torque. Moreover, the control in open loop gets rid of jittering effects so we obtain very sharp and clear images,” explains Faulhaber PRECiStep, sales manager, Sébastien Vaneberg. “In short, it is a simple and robust drive with outstanding capabilities, ideal for the harsh space conditions."

Faulhaber motors for Mars

With the filters in front of the WACs, the system will be able to take pictures at various wavelengths during the mission and use them to generate images with varying content. “The plan is to send 10 images to earth every day,” says Jonathan Jones, mechanical engineer at the Mullard Space Science Laboratory (MSSL) in London.

Stepper motors position lens filters

With 11 filters per wheel, it is possible for the Pancam WACs to take a wide variety of pictures under various light conditions. These filter wheels rotate in front of the two WACs, and must be brought exactly into position in order to obtain sharp images. For driving the rotating filter system, MSSL makes use of two stepper motors from the Faulhaber PRECiStep portfolio. These two units have been passing the endurance tests currently being conducted on them with flying colours.

During the development process, the MSSL engineers looked for motors that would not only be able to deliver reliable and precise positioning performance, but that would also be extremely compact. Stepper motors were the natural choice given these requirements, as they are not only able to precisely position objects with a resolution of 1280 steps per revolution without the need for a separate feedback system, but are also much sturdier and easier to use than conventional servomotors. The focussing mechanism of the high resolution camera is driven by a Faulhaber PRECiStep stepper motor. “It is the perfect solution for optical application as the motors can hold the lens position even without current thanks to their residual torque. Moreover, the control in open loop gets rid of jittering effects so we obtain very sharp and clear images,” explains Faulhaber PRECiStep, sales manager, Sébastien Vaneberg. “In short, it is a simple and robust drive with outstanding capabilities, ideal for the harsh space conditions."

Miniature motors approved for use on Mars

In each camera, each drive has a diameter of just 10 mm. The stepper motor counts 20 steps per revolution, and is combined with a precision gearhead of the same diameter with a gear ratio of 64:1. On top of this, Faulhaber worked closely with MSSL to further customise the engineering behind its two drives. The resulting changes include a dry lubricant and custom sintered bearings. “The motors need to be able to survive on Mars,” Jones says.

The MSSL is currently testing the components in conditions even harsher than those on Mars. The positioning drives must complete 5000 positioning cycles with temperatures oscillating between -130 and 30°C. “The motors are really showing what they’re made of;” Jones happily reports. During the development of the drives, there was nothing else on the market that could come even close to the Faulhaber units, not to mention the fact that Faulhaber is already a go-to partner for the ESA."

For more information contact David Horne, Horne Technologies, +27 (0)76 563 2084, sales@hornet.cc, www.hornet.cc
Instrotech has announced the availability of the new Siko AP20 position indicator, ideally equipped to detect the position of spindle adjustments in machines. It displays positional data to the operator as well as passing it on to the machine control system. Simple system integration in combination with modern interfaces is all that is required.

The compact system is particularly suitable for packing, woodworking and printing machines. Wherever manual adjustment is carried out on production machines, bus-compatible Siko position indicators are able to optimise the production process in such a way that costly refitting times during product changeovers are kept to a minimum. Once installed, these position indicators provide excellent 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 fieldbus 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 for which a large number of sensors or long cable lengths are required.

Industrie 4.0 and smart factory ready
The AP20 must achieve a certain level of connectivity to satisfy the requirements of Industrie 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 take care of this and 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.

Extreme convenience and intuitive usability for operators
The AP20 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. The inverted backlit display plays a part in this as it makes the information display 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 quickly and without much effort.

Installation compatibility and modular concept
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, but diameters up to 25,4 mm are also possible without changing the compact dimensions of the product.

The AP20 is also characterised by its excellent installation compatibility with other system solutions in the AP series. Thanks to the clearance of the torque support, DA04 and DA09S mechanical Siko position indicators can also be integrated with AP systems to create a solution with a modular format. The modular principle makes it easier to complete product and size changeovers that require manual monitoring and means that the AP20 is an attractive automation solution for production machines which have to be refitted relatively frequently, because of small batch sizes, for example. Changes affecting the design of the machine frame or the entire system are not necessary when fitting the AP20. The entire system and machine design can be retained.

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

For more information contact Instrotech, +27 (0)10 595 1831, sales@instrotech.co.za, www.instrotech.co.za
New soft starter with internal bypass

The new Allen-Bradley SMC-50 smart motor controller with internal bypass from Rockwell Automation brings greater operational control over motor starts and stops. As an extension of the soft starter family, the SMC-50 smart motor controller delivers greater functionality and efficiency across industries.

Soft starters traditionally use solid state, silicon controlled rectifiers (SCRs) to control voltage to the motor during start-up, runtime and shutdowns. The reduced torque and current slowly introduce energy to the motor, mitigating electrical and mechanical stress to the application. If these SCRs remain in the circuit once the motor is up to speed, the heat generated by these devices leads to electrical inefficiency.

"Now, users have the option of choosing the proper power structure for their application when purchasing the SMC-50 smart motor controller. For operations that run over an extended period, built-in internal bypass allows users to shift from solid-state switches to bypass contactors," said product manager for soft starters, Rick Anderson. "By switching over to the bypass circuit, users can save on energy and decrease operational costs by minimising excess heat build-up."

The SMC-50 smart motor controller with internal bypass provides access to several communication modules, including EtherNet/IP and DeviceNet networks. This connectivity, combined with its microprocessor platform, brings energy monitoring capabilities and protection features that make applications easier to troubleshoot and fix.

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Format change at the push of a button

Two Festo innovations enable fast and straightforward format changes on just one machine.

Fast and straightforward format changes on just one machine are at the top of the wish list of many packaging machine manufacturers and their customers. Innovations from Festo make these wishes a reality. Enter the new Festo Motion Terminal and the Multi-Carrier-System (MCS).

The ability to automate the production or packaging of custom products right down to batches of one, will really set manufacturers of packaging machines apart from the competition. This is exactly what can be achieved using the MCS and Festo Motion Terminal.

Multi-Carrier-System

This flexible modular transport system can be adapted to different formats via software at the push of a button. Different box sizes and the matching number of products are set directly in the MCS using the freely positionable carriers. The products can be individually transported, grouped or synchronously packaged on the carriers.

The MCS is flexible to install and operate. It is easy to integrate into existing logistics thanks to the infeed and outfeed of carriers without additional transfer points. Acceleration, speed, grouping and synchronous motion can be freely defined, even in the closed recirculating system of the carriers. The modular MCS is used only where it is needed by the process – within a station or in parallel with the process flow. Return transport of the recirculating carriers is ensured by an inexpensive servo-controlled belt drive.

Digital pneumatics

With the Festo Motion Terminal, pneumatic functions can be controlled via apps for the first time, without having to change or modify the hardware. From simple directional control valve functions to complex motion tasks, applications can be easily standardised.

The brand new Festo Motion Terminal VTEM catapults pneumatics into the age of Industrie 4.0 with apps that can replace more than 50 individual components. All this is made possible by the latest developments in piezo technology and software. Thanks to the fast activation of new functions via motion app licences, machine developers can create a basic machine type and then select the relevant apps to equip it with different functions and features as requested by the customer.

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SKF at the forefront of digitalisation

The ability to collect and manipulate vast amounts of digital information will catapult manufacturing into the future. By embracing digitalisation, SKF aims to enhance its core offering – bearings technology, and related services – so that customers can further boost the performance of their rotating equipment. Furthermore, by focusing on industrial digitalisation, SKF plans to drive the optimisation of cost and efficiency of the full value chain, including world class manufacturing and supply chain integration.

Growing expertise
Digitalisation will affect all parts of the value chain, from design and manufacturing through to purchasing and maintenance.

SKF has been monitoring equipment remotely for around fifteen years and currently has around 1 million bearings connected to the Cloud. Data from them is gathered and interpreted daily by experts. The ability to handle this data leads to enhanced analytics, allowing the early detection of potential failures in rotating equipment, and to get a better understanding of critical product and system design requirements.

There are various platforms available to help customers gather and interpret data. For instance, the Enlight platform helps operators visualise data from a variety of sources, using a device such as a smartphone or tablet – an easy way to put Big Data into an operator’s pocket.

The connectivity of the data runs in all directions, and can be used in many ways. At its simplest, it connects a sensor to a remote diagnostics centre. However, the data – on the health of a bearing, for instance – can be fed right back to the design stage, and used to help redesign a better product.

Increased digitalisation has also begun to allow more customised manufacturing. Because it can cut machine resetting times close to zero, there are fewer restrictions to making customised products. Recently, the owner of an aluminium mill required bearings that would allow increased output – through a higher rolling speed – as well as lower maintenance costs and the elimination of unplanned downtime. SKF was able to produce four-row cylindrical roller bearings complete with optimised surface properties and customised coatings to boost service life and robustness, as well as designing out product cost.

Paid for performance
A major shift in the future, aided by digitalisation, will be the way in which customers are served. While the usual ‘transactional’ model of providing hardware will remain important, it will start to be replaced by more performance-based contracts.

Here, SKF will be responsible for ensuring that the customer’s operations remain efficient. Supplying hardware like bearings will then be supported by services – from predictive maintenance to lubrication expertise – that deliver this extra efficiency.

Recently, the company agreed a five-year ‘Rotation For Life’ contract with Zinkgruvan Mining of Sweden. SKF will carry out remote monitoring of four mills at a Zinkgruvan enrichment plant for a fee based on whether productivity targets are met.

This arrangement relies on digitalisation technologies working in synchronisation. In one element of the contract, monitoring data from a conveyor belt is gathered automatically and a specialist analyses the deviations if necessary, while a distributed lubrication system keeps the line running at optimum efficiency.

The ability to correlate a wider variety of data can further improve performance. For instance, condition monitoring data can be combined with process data to make more informed decisions on maintenance and asset performance. For example, analysing both monitoring and process data might reveal that slowing a machine down by 3% would extend the maintenance period by four weeks. The customer can then balance a slight reduction in output with a longer production period – and make the best possible decision.

Self-replacement
Automatic detection of a failing bearing is a massive step forward in efficiency. However, the process of ordering the replacement still involves human intervention, which is why SKF is already gearing up for a future in which the faulty part effectively puts in an order for its own replacement.

This extends the ‘just in time’ manufacturing concept down as far as the individual component and could one day bring stock levels close to zero. This type of system is still under development. However, SKF is running pilots in specific areas of the supply chain. In the future, the plan is to join these together, allowing full, end-to-end digitalisation.

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In a recent assignment to sort out problems being experienced in a petrochemical refinery, I came across the following two examples:

**Drum pressure misbehaving**
The first was with the control of an overheads drum pressure which was behaving badly. In particular the cascade secondary flow control from the pressure was in an unstable cycle and was interacting with other loops causing all sorts of problems.

The flow loop was tested first. The tuning was very slow and it was found that a PV (process variable) filter with a time constant of 15 seconds had been used. This is a relatively huge filter for a flow loop and is definitely not recommended, particularly as one wants a cascade secondary loop to have really fast control, so that it does not interact with the primary loop. It was also seen that the loop was in a continuous unstable cycle when in automatic. This can be seen in the first part of the recording in Figure 1. It should also be mentioned that loop was badly tuned with a Proportional gain of 1.0, and an Integral of 0.12 minutes/repeat.

Figure 2 shows the open loop analytical and tuning test, which was performed with the PV filter removed. It shows:
1. The valve is about 5 times oversized. This can be seen by the relative step sizes of PV and PD (controller output). An oversized valve amplifies all the valve faults and cycling by the oversize factor, and such a large oversize is definitely not recommended.
2. The valve is suffering from about 2% hysteresis which when amplified by the oversize factor means that the control error is being increased to about 10%. (As a general rule of thumb, valve hysteresis should not exceed 1%). A rough definition of hysteresis is the maximum offset experienced when a valve is moved from a particular position to another, and then commanded to return to the original position.
3. On many steps the valve overshoots and then is slowly being brought back to the correct position by the valve positioner.

The valve’s performance is fairly repeatable even with such severe faults, which means that control of a flow loop that normally has relatively fast dynamics should be possible, although action could be taken when possible to repair or replace the valve. Therefore a new tuning was done which was designed to give a critically damped response to a step change on the PD, i.e. the fastest response to the step without overshoot. The reason for this is to minimise valve reversals, as each time the valve has to be reversed will necessitate the controller’s integral term having to ramp the output through the hysteresis band before the valve can start moving in the opposite direction, which can dramatically slow the control. The new tuning resulted in a Proportional gain of 0.05, and an Integral of 0.03 minutes/repeat.

The later part of the recording shown in Figure 1 shows how well the control worked with this tuning. Comparing the original and final tunings will clearly show why the loop was originally in a continuous unstable cycle.

An interesting fact is that control response is largely due to the product of Process Gain x
Controller Gain. Therefore a five times over-
sized valve means that the Process Gain is
about five. Therefore the Controller Gain needs
to be five times smaller than it would be if the
Process Gain was unity if stable and robust
response is to be attained.

Another interesting fact is that this is yet
another example which shows how effec-
tive cascade control is in overcoming valve
problems on processes with slow dynamics. In
this case, if the pressure controller had been
directly connected to the valve and not via the
flow loop, there is almost certainly no chance
that any pressure control could have been
obtained with the controller in automatic.

**Sticky valve in a flow loop**

The second example is of another flow loop
which is cascaded from a level control. Again,
it was a loop that had been flagged as per-
forming very badly by the operators. Figure 3
shows the open loop test.

The test shows very clearly how badly the
valve was performing. It is extremely sticky
particularly when closing, and sometimes
missed steps altogether. There is no way that
good flow control can be achieved with this
valve.

Another point of interest is that the
process gain appears to be very much smaller
than unity. This is normally a sign that the
transmitter span is far too wide, but if that
was the case here, then one would expect
the PV signal to be near the low end of the
scale, which it is not. This is definitely a case
where the calibrations of both the valve and
the transmitter need checking, apart from
servicing the valve and getting it to respond
properly.

Once again there is no way that they would
have been able to control the level in auto-
matic if the valve had been directly connected
to the level controller’s output. It is really
amazing what valve problems can be hidden
and overcome when using cascade secondary
flow controls on slower primary loops.
The next big thing for control

Turck has developed the next big thing for control: the Field Logic Controller (FLC). Turck’s FLC solutions are made possible by ARGEE (A Really Great Engineering Environment), a revolutionary web-based programming environment that allows users to set conditions and actions directly at the field level. By utilising HTML5, Turck provides a complete engineering environment for users to write, run, simulate, debug, and monitor code, all without requiring the use of a PLC.

Using FLCs, Turck’s multiprotocol block I/O products can act as simple I/O devices or as standalone logic controllers. While ARGEE programming is not designed to replace a PLC outright, it can be used to change the way we think about control, allowing FLC devices to:

- Be used without a PLC in standalone applications.
- Perform arithmetic functions, use timers, counters, and even toggle bits.
- Share data with a PLC via assigned I/O variables.

The technology
Using a simple ‘Condition” and Action’ principle that is integrated into a flow chart user interface, ARGEE allows users with little or no programming experience an easy way to configure and program their Turck FLC devices.

ARGEE challenges what an I/O device can do, by creating a hybrid between simple block I/O and higher level PLCs. The result is Turck’s FLC.

TwinCAT 3 Building Automation
The next generation in building control.

At Light + Building 2018, Beckhoff presented its new software generation for building automation: TwinCAT 3 Building Automation meshes with TwinCAT 3 modules for HMI and IoT, along with Analytics and Scope and bundles all important functions for building automation in one tool. Handling the engineering and control of all building systems on a single software platform uncovers significant benefits, such as simple IoT communication, cloud-based analysis of building data or the rapid creation of individualised operator interfaces.

With TwinCAT 3 Building Automation, users can now utilise the wide range of benefits of the TwinCAT 3 automation platform for building control: full Visual Studio integration, an integrated engineering environment, eight programming languages with interacting modules in a single runtime, simple reusability of source code, and scalability to suit different controller platforms. The meshing of TwinCAT 3 Building Automation with the numerous software modules available in TwinCAT 3 provides the system integrator with a comprehensive toolbox that covers all functions and systems found in building automation, improving system quality while reducing engineering work.

Using TwinCAT HMI software, users can quickly create customised operator interfaces and benefit from the simple orientation and intuitive navigation during operation. With TwinCAT IoT, cloud connectivity can be easily implemented from PC-based controllers in order to outsource individual building automation components to the cloud or to use cloud services. The analysis of cloud-based building data can also be integrated directly in PC-based controllers using TwinCAT Analytics. This offers maximum transparency, simplified predictive maintenance and increased security against potential failures.

As a big data oscilloscope integrated in the controller, TwinCAT Scope facilitates the clear visualisation of large data quantities and increases data transparency through fast comparison and evaluation of measured values.

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Industrial companies that want to use IIoT data to make better business decisions, must first make sure workers can access that data when and where they need it. New scalable compute offerings from Rockwell Automation give decision-makers access to real-time data to solve analytical challenges and adapt to changes at every level of an organisation. This helps improve productivity and efficiency in a Connected Enterprise.

At the device level
Rockwell Automation has introduced three offerings at the device level to help operators make faster, more informed decisions closer to the source of information. Each offering allows users to run applications in a Windows 10 IoT Enterprise environment to gain better insight into machines and equipment. The variety of platforms also gives users flexibility to meet individual application needs.

First, the Allen-Bradley ControlLogix compute module allows users to add Windows 10 IoT directly into the Logix system in existing applications and provides high-speed access to ControlLogix data across the backplane. As a result, users can combine Windows applications as close to the point of decision-making as possible.

Second, the Allen-Bradley CompactLogix 5480 controller combines Allen-Bradley Logix5000 control and Windows-based computing in one controller. The controller supports Windows applications, such as data collection, analytics and predictive computations. It is ideal for meeting the demands of high-performance production lines and information-driven smart machines.

Third, the Allen-Bradley VersaView 5000 industrial computers provide modern visualisation and data aggregation for smart manufacturing. The computers use an open architecture design, allowing users to install software specific to their applications. They are specifically designed to withstand the conditions of industrial environments. Rockwell Automation and partner applications run directly on the device, while allowing users to visualise this data on an integrated or external industrial monitor.

“Time is of the essence in industrial operations, so it’s critical that workers be able to consume data as close as possible to where it’s produced,” said Christo Buys, business manager control systems, Rockwell Automation Sub-Saharan Africa. “These new device-level compute offerings provide real-time, close to the source data access to help drive productivity in any industry.”

Rockwell Automation is also building IIoT and analytics into these computer offerings. For example, the recently released FactoryTalk Analytics for Devices software from Rockwell Automation delivers real-time asset health and diagnostic information to the VersaView 5000 industrial computers.

At the system level
Companies can use the system and plant-level computing capabilities of the VersaView industrial computers. In addition, the Rockwell Automation Industrial Data Center (IDC) tracks productivity and downtime data, and provides predictive maintenance. The scalable, pre-engineered IDC provides all the hardware needed to run multiple operating systems and applications from virtualised servers. Rockwell Automation can install, configure and manage the IDC as part of its Infrastructure as a Service (IaaS) offering.

At the enterprise level
At the enterprise level, companies can use the IDC as an IaaS offering or as a private, on-premises cloud platform. Rockwell Automation also provides the FactoryTalk Cloud, a public, remotely administered cloud platform powered by Windows Azure. The FactoryTalk Cloud platform can help industrial companies monitor remote assets, track historical data and analyse multisite performance. It also can help OEMs better monitor and support machines after they are deployed with customers.

“Azure provides a trusted and global platform to develop and power advanced IoT solutions from the edge to the cloud,” said Sam George, director, Microsoft Azure IoT, Microsoft Corporation. “Rockwell Automation is taking full advantage of Microsoft’s comprehensive IoT platform, from integrating Windows 10 IoT Enterprise at the device level, to managing advanced data workloads at the edge and in the cloud with Azure IoT, to centralising operations monitoring and production performance across time zones. This results in better business outcomes and improved worker safety.”

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Panel PCs and control panels for cost sensitive applications

The new price/performance class of touch panels from Beckhoff, first launched with 18 cm displays, has been expanded by three built-in devices with 26 cm wide screen displays. PC-based control technology in the cost-sensitive, lower to middle performance range can now be scaled more finely and precisely in line with individual application requirements.

The TFT touch display of the new panels in modern widescreen format with a resolution of 1024 x 600 WSVGA paves the way for comprehensive operating and visualisation options. Added to this is superior display quality with 16.7 million available colours on the 18 cm diagonal screen. The latest additions to the entry level class include two fanless panel PCs and a purely passive control panel, permitting the cost-effective implementation of control and visualisation tasks for small and medium-sized machines, production systems and buildings.

Equipped with a robust metal housing consisting of an aluminium front bezel and a steel sheet cover at the rear, the devices offer significantly higher quality and durability than the plastic panels typically offered in the low cost, entry level segment. In addition, the high quality materials and rounded front bezel lend a modern and appealing look to the panels, which can be used in the most diverse production and building environments at operating temperatures from 0 to 55°C.

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GIC’s PL-100 mini programmable logic controller

GIC’s PL-100 mini programmable logic controller is a real-time system designed for multiple input and output arrangements. The PL-100 can control a wide variety of devices to support the user’s evolving automation needs. The PL-100 monitors inputs and changes outputs as controlled by the user program, which can include Boolean logic, counting, timing, complex mathematical operations and communication with other intelligent devices. With its free software, compact design, flexible configuration and powerful instruction set, the PL-100 is a perfect solution for controlling a wide variety of applications in the industrial and commercial sectors.

Prominent features include:

- Programming using ladder diagram.
- Supports up to 112 I/Os including isolated digital inputs (sourcing and sinking), digital transistorised outputs with short circuit protection, high-speed inputs and outputs (PTO/PWM/S-profile) and analog voltage or current inputs and outputs.
- Programming is done through a USB port.
- Modbus RTU support.
- Stacking using FRC cable up to a maximum of six expansion modules.
- Rugged and designed to withstand electromagnetic interference, vibrations, temperature and humidity variations.
- Some of the software features include 128 time switches, multiple timers, counters including retentive counters, hour meters and many other function blocks.
- An independent scale converter block with various SFBs to convert the corresponding parameters. It supports up to 16 points conversion for various data types.
- The modified preset parameters of the SFBs configured in ladder, can be retained by selecting the ‘Retain SFB Set Value’.
- Complete with LED indication for inputs, outputs, run, stop and error.
- User-friendly software for online and offline simulation that supports regular firmware updates.

Users can now seamlessly and affordably implement automation in almost any electromechanical process.

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Four common pressure calibration pain points

1. Performing pressure calibration when a slow leak is present

Performing a proper pressure calibration requires equipment and connectors that are dependable. With a leaking pressure source, keeping pressure stable at the calibration point long enough to take a reliable reading can be difficult. Slow leaks can require constant fine tuning through pressure adjustment applied from a pump, which can make it difficult for the system to settle. After the desired pressure set point is reached, it is recommended that systems settle for several seconds, or even minutes, prior to testing, so a more accurate and repeatable test result can be performed.

While slow pressure leaks caused by damaged hoses, worn fittings, or improper connections are common, as there are several steps technicians can take to ensure a better calibration experience:

• Evaluate and debug pressure test systems before entering the field to reduce unnecessary trips back to the workshop.
• Try to decrease the number of pressure connections by using the correct hose length and removing extra fittings.
• Ensure that the test equipment is properly mounted.
• Mitigate leaks by using special-purpose test hoses.

2. Documenting pressure calibration requires multiple tools

Documenting pressure calibration results are important for the purpose of maintaining accurate instrument records, but the number of steps associated with the procedure can make the task difficult. For instance, a typical pressure calibration could require a pressure calibrator, pressure module or gauge for measuring pressure, a pump to generate pressure, and multiple hoses and fittings between the devices (including the connections to the pressure transmitter itself).

Before going to the field, not only do technicians need to prepare for specific calibrations by testing their setup and making sure the equipment is properly calibrated, they also need to carry all the appropriate test components with them. And before testing begins, technicians need to either write out the test procedure or fill in a method sheet. During the procedure, they must document the pressure being applied and the resulting current (mA) being measured, and then determine whether the unit under test passes or fails according to the determined criteria. If the unit under test fails, the technician will need to adjust the system as necessary and begin the testing procedure again.

Beyond having all the right components, the technician needs to ensure that the pressure measurement tool used is accurate enough to calibrate the transmitter or other device under test. The tools required and accuracy needed vary from one device to another, further compounding the difficulty. Special-purpose test hoses and connectors can make pressure connections easier and reduce the likelihood of leaks, eliminating one source of testing difficulty.

3. Manually generating and controlling the pressure for each test point

Pressure calibrations in process manufacturing environments rarely require testing to occur at a single test point. In fact, a typical pressure calibration can require anywhere from three to eleven pressure test points. Trying to adjust and fine tune system pressure for these specific points can be difficult and time consuming. Each individual point requires technicians to increase or decrease pressure by either pumping the system up or releasing pressure, and then to tune the pressure using the fine-adjust of the test pump.

This process can be simplified by carefully matching the selected hand pump to the pressure range of the transmitter being tested. For instance, some portable pneumatic pumps have pressure ranges that go up to 40 bar, but it can be difficult to increase pressure beyond 28 bar. There are, however, newer portable pumps that can easily be adjusted to over 60 bar if the primary calibration need requires higher pressure.

4. Achieving repeatability when calibrating a pressure switch

Calibrating a pressure switch can be a time-consuming task and repeatability is key to success. Achieving repeatability requires technicians to apply slow changes in pressure to the switch as it approaches its defined set or reset point. Not only do they need to determine where the switch sets, but they need to make sure that the fine adjustment mechanism of the test pump has the capability of varying the pressure up to set-point and then back to the reset point. Since these adjustments are manual, achieving repeatable measurements can be difficult.

With practice, technicians can get the fine adjustment of the pump within range of the set and reset point pressure with more regularity. This process can be further simplified by selecting a pump with a wide fine adjustment range, allowing you to more accurately make adjustments to meet your measurement needs.

The solution

The Fluke 729 Automatic Pressure Calibrator has been designed specifically with process technicians in mind for the purpose of simplifying the pressure calibration process while providing faster, more accurate test results. Technicians know that calibrating pressure can be a time-consuming task, but the 729 makes it easier than ever with an internal electric pump that provides automatic pressure generation and regulation in an easy-to-use, rugged, portable package.

The ideal portable pressure calibrator, the 729 will automatically pump to the desired set-point by simply typing in the target pressure. Technicians can then use its internal fine adjustment control to automatically stabilise the pressure at the requested value.

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In Pilatus, central Switzerland, the company Pilatus-Bahnen (PBAG) operates the famous Pilatusbahn railway. At a gradient of 48 percent, the world’s steepest cogwheel railway ascends to the peak of the 2 132-metre-high Pilatus mountain. To allow service engineers to maintain the rail cars in the shunting shed in safety, particularly in view of the risk posed by high-voltage catenary wires, automation technology from Siemens is used. This ensures the failsafe operation of safety functions such as reliable disconnection of the high voltage supply during movement of the sliding platform required for shunting the rail cars.

When faced with a gradient of 48 percent, even the best equipped off-road vehicle reaches its limits, to say nothing of the sensation of driving almost vertically on the way back down. The Pilatusbahn (PB) in Central Switzerland takes this incline in its stride several times a day during the season, overcoming an altitude difference of 1635 metres. The narrow-gauge railway copes with the 4,618 km route at a maximum speed of 12 km/h, as it has been doing for the past 130 years. To ensure that this doesn’t change, PBAG attaches great importance to regular maintenance of the nine and a half ton railcars. To guarantee the safety of maintenance personnel, controlled switching and grounding of the high voltage which courses through the catenary wires is essential. This task was previously carried out by hand. Now, automation technology from Siemens switches the high voltage on and off, and moves the 1888 vintage sliding platform weighing several tons which is used to shunt the rail cars.

Smart modernisation
PBAG commissioned Furrer+Frey, a leading supplier of catenary systems, with the modernisation of its maintenance plant. It quickly became evident to the experts that the electrical installation of the sliding platform used instead of points to shunt the PB rail cars into position was obsolete. It would not have been viable to install position sensors for safe switching of the high voltage, so instead Patrick de Gottardi, project manager at Furrer+Frey, suggested opting for modern technology from Siemens and at the same time updating the control system for the motors and sliding platform. A Simatic S7-1500 with integrated motion control functions is now used to control the sliding platform and switch the high voltage on and off. Operation takes place using a Simatic Comfort Panel TP700 HMI.

Safety first
A laser distance meter measures the position of the sliding platform to an accuracy of 0,1 mm. At the same time, a light barrier secures the area between the wall and the sliding platform, preventing any member of the maintenance team becoming trapped there. To ensure that small animals cannot trigger a false alarm inside the open shunting shed at night, the light barrier is deactivated after working hours and when the platforms are at a standstill. This solution is realised using a failsafe Simatic. The platform is driven by asynchronous motors (1,5 kW) from Siemens using Sinamics G120 converters, while programming and engineering for the entire solution take place using Startdrive in the TIA Portal. The new solution provides a guarantee of safe high voltage shutdown and control during essential maintenance work.

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Omron Corporation has introduced four series of condition monitoring devices for workers to monitor the operational status at manufacturing sites:

- **Motor condition monitoring devices** that predict the failure of 3-phase induction motors.
- **Power supplies** that can predict service life and failures when installed in a control panel.
- **Flow and pressure sensors** that monitor hydraulic oil and cooling water for presses and moulding machines.
- **Smart condition monitoring amplifier** that accelerates IoT use of existing analog sensors installed in facilities or machines.

The release of the condition monitoring devices is part of Omron’s effort to complete a 100 000 IoT-components line up. The devices visualise facility and equipment condition constantly in order to detect status errors in advance, thus maintaining productivity.

The condition monitoring devices monitor changes in power systems and circulation equipment in real-time. They inform replacement time of parts before failures through communication networks and contribute to prevention of unexpected facility stoppages and quality abnormality of products. Personnel are alerted to signs of abnormality or impending failures, which enables them to reduce losses due to unexpected facility stoppages, and enhance the accuracy of maintenance plans.

**Motor condition monitoring devices**

Motor condition monitoring devices detect errors caused by age related deterioration of three-phase induction motors used for many applications on production facilities including conveyors, lifters and pumps. The monitoring devices detect errors by status changes in vibration, temperature, current and insulation resistance. Monitoring is by display on the main unit, or remotely via Ethernet/IP communications.

**Power Supplies with network capability**

Power Supplies with network capability visualise the information necessary to maintain and control the supply of power to equipment in production facilities. These power supplies can provide information on output voltage/current, and boost current by remote control using Ethernet/IP communications and the main unit monitor, contributing towards solving the following issues:

- Advance notification of the need for replacement.
- Monitor the total runtime voltage and current to facilitate maintenance requirements.
- Use in combination with the dedicated software Power Supply Monitoring Tool visualises power supply condition on the derating curve.
- Extended service life through measures to improve installation environments and changing power demands.

**Flow and pressure sensors**

A single sensor can now measure both the flowrate and temperature of cooling water used for a welding or moulding machine. This enables operators to detect and capture warning signs in order to achieve more stable welding quality, and prevent defective moulding.

The pressure sensors simultaneously visualise the pressure and temperature of hydraulic oil for machining centres and press machines. They capture signs of packing deterioration through temperature rise, thus allowing corrective action to be taken before hydraulic oil leakage results. They also use temperature to detect changes of the oil viscosity, thus maintaining stable processing quality. Through sensing multiple parameters such as flowrate, temperature and pressure, these sensors provide cost effective facility monitoring.

**Smart condition monitoring amplifier**

The smart condition monitoring amplifier connects to general analog output sensors. Omron offers the N-Smart next-generation sensor series that connect to fibre and laser sensors. Now, by means of the smart condition monitoring amplifier, users can connect to general analog output sensors, enabling them to build inexpensive networks with various facility condition monitoring capabilities.

Previously, obtaining data of analog output sensors required system up with expensive data loggers and measurement equipment. The unit can synchronise up to 30 sensors for real-time data collection at the facility, thus enabling the capture of subtle changes in reliability, enabling optimum machine control according to facility status changes.

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CONTROL VALVES, ACTUATORS & PUMPS

From wine farms to mining, the new LTP-B Eco drive from SEW-Eurodrive is finding application in a range of sectors. This purpose-built drive is distinguished by the fact that different parameters can be set for a range of functions, from fan to pump control.

While the company does have general purpose units for fans, pumps, and even conveyors, it initially saw a niche for a unit specifically for the HVAC industry, targeted at building designers focusing on ‘green’ design, National sales manager Norman Maleka comments: “In terms of commercial buildings such as hospitals, the use of traditional drives often meant that fans had to operate continually at full speed. With the improved functionality of the LTP-B Eco HVAC drive, facilities managers can now control a fan by only running it according to demand, for example. This represents a major advantage in terms of energy saving, as it allows for total flow control.”

A broader range of benefits
The HVAC sector remains a focus, especially in the key building-design market of Cape Town, but broader energy benefits make it equally applicable to customers in other niche sectors, especially as the drive is available in a broad power range from 0,75 to 250 kW. In addition, it replaces the traditional electrolytic capacitors used in the DC link with film capacitors, which have reduced energy losses, as well as eliminating the need for AC, DC or swinging chokes, which boosts the overall efficiency of the drive by 4% compared with a standard AC drive.

Maleka reveals that SEW-Eurodrive was recently approached by a Nelspruit customer for a 160 kW unit: “We are hoping to be able to use this as a case study, as the more real-time application data we can obtain, the more we can promote the new drive.”

To date, the Cape Town office has also carried out small-scale projects relating to pumping applications for wine farms, which require mobile pumping stations. Maleka says that customer focus on fan and pump applications convinced them that they needed a dedicated HVAC drive.

“Even though we can use a multipurpose drive unit, there are some limits in terms of functionality,” he adds. “It is always best to have a dedicated product for specific sectors, as our customers prefer customised to generic products for various applications.

“In terms of fan and pump control for mining applications, the LTP-B Eco drive is ideal to ensure clean airflow underground. HVAC control in mining operations is also highly energy-intensive, which means the new efficient drive can make a significant contribution to total savings.”

Another benefit for mining operations in terms of enhanced health and safety is the drive’s fire mode, which allows for fans to run for as long as possible in the event of a fire, maximising smoke extraction and boosting evacuation time. In addition, the belt-break detection feature raises an alarm in the event of the belt slipping or any related fault occurring, in order to ensure continuous operation. Extra features include pump cleaning and pump agitation functions, which is particularly useful if a pump has been out of operation for a period of time and needs to be restarted. The sleep mode function allows for added energy-saving when the drive is inactive.

“All of these functions can be monitored directly from the drive itself, as all inputs can be fed back directly to the management system, with no direct interface required,” concludes Maleka. “With two LTP-B Eco drives already sold to customers in Africa, local growth opportunities for the new product look robust.”

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Test unit for control valves

Although plant designers tend to treat them as 'necessary evils’, it is obvious that control valves play a key role in process quality and reliability. Extreme care must be taken to avoid costly premature failures, possibly resulting in substantial loss and even plant shut-down. Periodical service and testing allows plants to operate for longer intervals.

AT Technical Services’ control valve test units are designed and equipped for:
• High pressure testing.
• Seat leakage classification according to the ANSI/FCI 70-2.
• Stroking of the valve and its controls.
• Total performance testing.

The company’s horizontal control valve test unit is complete with a strong clamping system for quick and easy positioning and clamping of all common Globe, Camflex and Waver type valves in the horizontal position (valve stem vertical). The U-shaped HC10 clamp generates a clamping force of 10 tons and the clamp ensures excellent accessibility for assembly and stroking. The stronger HC combines the above with high pressure liquid and gas testing. The standard HC is complete with sealing adapters for DIN/ANSI RF flanges, but is also accommodates the use of ‘inner seal’ adaptors for control valves with socket weld ends.

The unit is equipped with a variety of test systems for common control valve test procedures. Optional features include:
• Windows operated computer registrations system.
• Vacuum quick filling system, electronically controlled.
• Hand controlled test and operation systems for actuators.
• Automatic dynamic scans.
• Digital seat leakage measuring systems for gas and liquid.
• Torque test and measuring system 0-500 000 Nm.
• Valve support trolley, mechanically or hydraulically operated.

For more information contact Chantell Swanepoel, AT Technical Services, 086 100 2887, admin@atts.co.za, www.atts.co.za
Ignoring pumps is a risk because when these components break down, or run below optimum efficiency, the whole process suffers. Manufacturing and process companies are always under cost pressure, making it vital to maximise assets and maintain uptime.

SKF has identified four different ways to optimise pump performance:

**The right bearing**
Bearings in centrifugal pumps support hydraulic loads imposed on the impeller, the mass of the impeller and shaft, as well as loads due to couplings and drive systems. They also keep the shaft axial and radial deflections within acceptable limits for the impeller and shaft seal. The bearings often will face high axial loads, marginal lubrication, and high operating temperatures and vibration, all while the bearings attempt to minimise friction, which, if uncontrolled, can result in power loss, excessive heat generation, increased noise or wear, and early bearing failure. So, first and foremost, evaluate bearings (types, designs and arrangements) in the context of their anticipated operating environment. Suitable bearings are available to satisfy even the most difficult conditions faced by centrifugal pumps.

**Proper lubrication**
Improper lubrication accounts for more than 30% of bearing failures. Good lubricants prevent metal-to-metal contact and undesired friction. The common methods for the effective lubrication of pump bearings include: grease, oil bath, oil ring, oil mist and air-oil.

Oil mist generates the least amount of friction (allowing rotational speed to be based on the bearing design instead of lubrication limitations) and creates a positive pressure within the bearing housing (fending off invasive contaminants). Regardless of lubrication method, always specify lubricant according to the demands on vertical shafts and resistance to solids, pressure, temperatures, loads and chemical attack.

**Sealing the system**
Bearings in centrifugal pumps handle four crucial tasks. They retain lubricants or liquids, exclude contaminants, separate fluids and confine pressure. The choice of seal for centrifugal pump bearings depends on the unique demands and operating conditions of the application. Keep in mind, though, that the bearing and sealing arrangement represent an integrated system. Dynamic radial seals generally are the best choice for centrifugal pumps. These seals create the barrier between surfaces in relative motion. Seal selection ultimately must be based on a thorough review of application parameters and environmental factors.

Particularly in pump applications, for example, seals will be exposed to relatively constant pressure differentials, making pressure seals (in which the seal cavity is pressurised) the preferred choice. Seals usually provide a much shorter life than the components they protect so don’t fall into the common habit of scheduling seal replacement only at intervals dictated by requirements of other components such as bearings.

**Monitoring pump health**
Regular measurement and analysis of key physical parameters, such as vibration and temperature, can detect pump system problems before they occur. Basic instruments can assess and report on vibration, temperature and other parameters. More advanced tools include online surveillance systems and software that can deliver real-time data. Many problems will manifest as vibration, which is widely considered the best operating parameter to judge pump train condition. Vibration can detect problems such as imbalance, misalignment, bearing oil-film instabilities, rolling bearing degradation, mechanical looseness, structural resonance and a soft foundation. Vibration measurements are quick and fairly non-intrusive because pump equipment remains undisturbed.

Operators can also play a pivotal part in proactive maintenance strategies by serving as the ‘eyes and ears’ to detect equipment faults before problems escalate and performing basic maintenance activities.

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RS Components has announced availability of the new SSD 860 range of solid-state drives (SSDs) from Samsung. Based on the manufacturer’s latest flash-memory technology, the range improves on Samsung’s highly popular SSD 850 devices to deliver enhanced speed, reliability and capacity for users.

The new SSDs are available in two series: PRO, which targets use with high-end and enterprise computing devices, and EVO, which has been specially designed for general consumer computing applications.

The PRO drives have been designed to achieve highly sustainable and dependable performance and handle heavy data transfer workloads. The series also comes equipped with the company’s newly-designed MZJ controller for best-in-class read/write speed: up to 560 and 530 MB/s respectively. This level of performance starts to approach the theoretical bandwidth limitation of 600 MB/s for the legacy Serial-ATA (SATA) interface, which many SSD manufacturers have tried to reach over the years.

The EVO series targets use with mainstream desktops and laptops. Like the PRO, it comes equipped with the MJX controller and delivers sequential read and write performance up to 550 MB/s and 520 MB/s respectively, along with highly sustainable performance for everyday computing applications.

In addition, to meet the need for ever-faster data transfers and high performance over longer periods of time, the 860 EVO series integrates Samsung’s Intelligent TurboWrite technology, which automatically decides how much space to allocate to the TurboWrite region in accordance with system workload, which enables it to provide significantly accelerated write performance.

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

RS Components introduces solid-state drives from Samsung

Efficient machine tools increase productivity

Machine tools are indispensable in modern production processes. They are mainly used in the automotive industry, mechanical engineering and in drive technology. In practice, the machine tool sector is divided into two main areas: metal forming and metalworking.

Application: loading condition of conveyor belts

PMD (photonic mixer device) sensors with time of flight technology are used for detecting the loading condition. The O5D100 photoelectric sensor from ifm electronic detects if the conveyor belt is clear, which prevents possible collisions between parts, for example bales of scrap or vehicle components.

The sensor combines the following advantages: long range, reliable background suppression, visible laser light and high excess gain. It allows any angle of incidence and flexibility of mounting for simplified installation, while the setting parameters can be copied to a new sensor via IO-Link to save time and prevent possible setup faults.

For more information contact ifm electronic SA, 086 143 6772, info.za@ifm.com, www.ifm.com

New comparison test pump from WIKA

WIKA’s new model CPP100-M comparison test pump will generate pneumatic pressures up to 100 bar easily and precisely without the need for external pressure supply. It can also be used for vacuum generation to -950 mbar. The maximum pressure or vacuum achievable is dependent upon the connected test volume.

For accurate comparative testing, precise setting is possible using the fine adjustment valve. The reference instrument, as well as the instrument to be tested, can be mounted on the test connections at the side as both test connections feature a freely rotating knurled nut with an M20 x 1.5 female thread. The nut also enables the instruments to be aligned for convenient viewing. Two compatible adapters to G ½ female thread and ½ NPT female thread are also included.

For more information contact WIKA Instruments, +27 (0)11 621 0000, sales.za@wika.com, www.wika.co.za
Flush-mount pushbuttons for modern control panel design
RS Components has announced availability of more than 150 new lines of flush-mount pushbuttons from the Harmony XB5F range from Schneider Electric. Designed for control panels and targeting panel builders, machine builders and maintenance engineers, the new plastic range features a modernised design with no compromise on performance.

Aimed at a wide selection of industrial applications including use in the chemical industry, food and beverage production, packaging industry, automotive industry and building automation, Schneider Electric has focused on the robustness of the new XB5F range. The range has particularly been designed to meet the performance requirements of machines and electrical control panels in harsh environments and is compliant to IEC and UL international standards. Featuring IP ratings of IP66, IP67, IP69 and IP69K, and extended temperature ranges from -40 to +70°C, the range has also seen improved mechanical endurance and shock resistance characteristics.

As well as offering increased performance across the Harmony range, the latest devices also include an evolution in aesthetics with a redesign that offers a more modern look and feel. The XB5F range is available in a plastic body version and comes in a vibrant colour palette, including new blue and green caps for non-illuminated functions, to deliver a highly contemporary appearance to machine control interfaces.

In addition, Schneider Electric has also introduced a new series of illuminated buzzers, which target deployment in operator alarm systems and have been designed for mounting on a control panel in a standard 22 mm panel cut out. The new IP69-rated XB5K range of buzzers is available in illuminated and non-illuminated options and in red or amber colours.

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

Stakeless earth ground loop testing
Testing the grounding components of equipment in hard to reach spaces, including areas that are indoors or fully paved and do not permit driving auxiliary test stakes, is challenging. Comtest now offers the Fluke 1630-2 FC Stakeless Earth Ground Clamp, a high-quality, heavy-duty clamp jaw that stays in alignment and in calibration even in industrial environments. Identifying ground loop resistance without the need to disconnect and then reconnect the earth electrode from the system, is also now possible.

Stakeless measurement
The 1630-2 FC clamp measures earth ground loop resistances for multi-grounded systems using the dual-clamp jaw. This test technique eliminates the dangerous and time-consuming activity of disconnecting parallel grounds, as well as the process of finding suitable locations for auxiliary test stakes. Users can also perform ground tests in places that were previously difficult: inside buildings, on power pylons or anywhere there is no access to soil to place auxiliary test stakes.

Fluke Connect Wireless System
The 1630-2 FC supports the Fluke Connect Wireless System, which connects the clamp with an app on a smartphone or tablet. The app shows the ground resistance measurement on the smartphone or tablet display. These measurements, GPS location from the phone and images can be saved to Fluke Connect Cloud storage and shared with the project team. Other features include:
- Earth ground AC leakage current measurement: Identify AC leakage currents without disconnecting the earth ground stake from the grounding system – ideal for system troubleshooting.
- Rugged: heavy-duty clamp jaw stays in alignment and in calibration even in industrial environments.
- Logging measurements: the earth ground clamp saves time by automatically recording data at pre-set intervals and saves up to 32 760 measurements in memory at the set logging interval. Saves time by recording and storing measured values.

For more information contact Comtest, +27 (0)10 595 1821, sales@comtest.co.za, www.comtest.co.za

Intelligent groundwater abstraction
WellControl is a configurable solution from Phoenix Contact that carries out all the necessary control and regulation tasks for groundwater wells. Guided parameterisation without any programming at all ensures easy start-up.

The field devices are connected via the Waterworx process library from Phoenix Contact. Pre-programmed function blocks enable efficient engineering of the systems. A comprehensive surge protection and power supply concept ensures the required security of supply and allows servicing to be planned. The decentralised arrangement of facilities in a water treatment plant makes connection to a control centre indispensable. The easy-to-use, standardised IEC 60870-5-104 remote control protocol makes connecting the solution to the control centre easy.

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