

FEBRUARY 2015



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At about this time of the year we need to look for the positive signs.

This is one: All across the globe, and in particular in developed economies, youngsters are steering clear of career choices that involve maths and science. In fact, it is in many of the economies built up by an absolute commitment to developing maths and science skills over the past decades that there seems to be evidence of this trend.

Why is this happening? One of the reasons seems to be that maths and science are being actively promoted as tough subjects. This is not a view expressed by parents alone – it also seems to be a view expressed by teachers and career guidance advisors.

Look, maths and science are not trivial – but they are most certainly not hard! It all depends on the teacher – in my humble opinion. But, South Africa seems to be bucking that trend.

I am not suggesting that we have excellent maths and science education. In fact, all the evidence I can find suggests that our maths and science education is completely pathetic.

However, the interest is there. I have made this point before: we need to capitalise on the interest being shown by our youth in these two 'hard' subjects. If we can get that right, then we will slowly but surely rise to the top of the pile.

Here is another bit of good news. It seems that there is a realisation that the decision to run open cycle gas turbines the way we have been doing needs urgent review.

There is a trade-off between keeping the lights on, at the expense of being able to maintain a system, and actually damaging that system significantly.

It also seems that there is a growing sense within Eskom that maintenance is actually something that has to be taken exceptionally seriously – no matter how bad the inconvenience. The trick is to ensure that we are transparent about what is happening, and why it is happening.

I will bet that this year we start making the right choices – as it is becoming quite clear that no new capacity (including an urgent nuclear build) is coming on line any time soon.

Let me conclude this comment by making what is probably an obvious observation. I think, however, that it has been lost, possibly because much of the comment around Eskom has been less than well informed.

The challenge we face as a nation, and indeed as a sub-continental region, is not when Medupi and Kusile produce energy – or how, exactly we will be able to absorb that energy (or fractions of it) onto the grid: We know that by 2030 it is predicted that we will need to have around 90 000 MW available on the grid.

Simplistically, this suggests more than doubling the current generating capacity over the next 15 years – or building over 54 000 MW of capacity.

That is not the problem. The problem is that it is likely that we will need to replace the vast majority of our current plant by then. This implies that what we need to be speaking about, in fact, is how we are going to build 90 000 MW of capacity over the next five years.

From 2007 to now, remember, we have not been able to get one turbine at Medupi to deliver energy. But, of course, that has only been seven years.



*Ian*

**Ian Jandrell**

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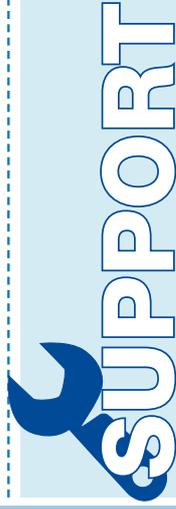
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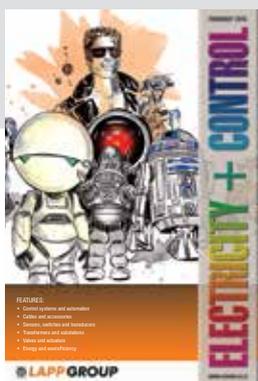
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**Cover**

Robots will soon be as integral a part of our everyday lives as they are in major industrial sectors. Scientists and journalists are dubbing the 21<sup>st</sup> Century as 'the age of artificial intelligence'. *Read more about robots on page 15.*

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# Ethernet - the communication infrastructure for your safety system?

By D Kowensky, H3ISquared

*The presence of a proper, reliable safety system is becoming mandatory in order to properly monitor and protect the site and personnel.*

A safety system comprises four main components: People, procedures, documentation and devices. The people component is made up of the actual safety engineers, technicians, workers and any other personnel that would be on or involved with a site. Any personnel who are admitted to the site must have knowledge of the safety aspects and procedures in place. This is where site induction procedures come into play. Inductions must constantly be reviewed and changed, as necessary, to keep up with ever evolving sites. The procedures component of the system consists of details regarding what actions must be taken at various sections of the site. These relate to normal operating procedures (e.g. checking a conveyor belt or generator is clear before starting it up) as well as various emergency procedures (such as emergency escape routes in the event of a substation fire). These procedures must be documented in an easy-to-understand manner, as well as being easy to find (and in the cases of emergency procedures, should be clearly visible at all times). Documentation is always critical for any system, and particularly so for a safety system. In the event of any incident, the responses required from various personnel on the site should be easily obtainable, and everyone should know their role. For this reason it is important that safety documentation is easily available and that site personnel, as well as third party companies and contractors, are aware of what is required of them at all times. The next component that makes up a safety system, and the component that this article will focus on, is the actual physical end devices of the system. These include devices such as PLCs, SCADA servers, fire detection hardware, CCTV systems etc. We will look at these in more detail in the rest of this article.

## Components of a safety system

### End devices

Now we will start looking in more detail at some of the physical devices one would find as part of a safety system, and how the communications system will cater for the entire safety system. General end devices such as RTUs, HMIs, PLCs etc will make up the bulk of the system. These end devices will be used for control and monitoring of the site through programmed logic functions, and as such require interlocking amongst each other, as well as communications to a central control room for applications such as SCADA.

### Camera system

Next, one can start to look at safety 'sub-systems' within the overall system. One of

these that is becoming crucial on a safety system is a camera system. Previously camera systems were mostly used for security reasons and perimeter control. However with the move towards a central control room to run the site, one needs a means of getting visuals of an area, especially before remotely starting or stopping heavy and dangerous machinery.

Previously camera systems would generally be analogue based, however due to the physical size of modern sites and the distance restrictions on analogue camera cables, a more feasible camera system needs to be used. IP cameras are becoming more popular these days as the industries move towards Ethernet as the network of choice. IP cameras allow easy installation and less cabling requirements. All one needs is a connection point to the network, and once installed on the network it can be controlled and monitored remotely. This also provides the benefit that multiple users can view the cameras from different locations simultaneously, unlike an analogue system which can only be viewed from a single location where their cables have been terminated.

Modern software is available allowing for bandwidth control of camera feeds, meaning that these feeds can be implemented straight into the existing control or production networks without creating traffic bottlenecks and overwhelming the network. These software packages often allow for direct integration into SCADA systems, meaning that if an event occurs, visual footage of the area can automatically pop up to give visual reference.

### Telephony system

Now that we have discussed the visual aspects of the safety system, we need to look at the audible communications system required, i.e. a telephony system. Using VoIP (Voice over IP) as opposed to the more traditional analogue telephony systems means once again less wiring is required, as well as increased ease of future expansion. As long as a VoIP telephone can get physical connection to the network it can be integrated into the VoIP system. This allows engineers and technicians at remote sites to easily communicate to one another as well as to the control room. A VoIP system will also not be affected by adverse weather as can a walkie-talkie or cell phone (as long as it is travelling on a wired system and not wireless). Having a strong, reliable telephony system across the site allows users to react more quickly to incidents, as well as facilitating rapid troubleshooting as personnel can communicate effectively.

### Fire detection

Another important component of the safety system is fire detection. Traditional fire detectors need to be wired directly to a fire alarm panel, meaning once again multiple cables run to a single point. IP based fire detectors are becoming available that can send a trigger notification to a central server over the IP network. This facilitates easy expansion of the system due to less cabling and distance limitations, as well as allowing coverage of a larger geographical area with fire detectors all reporting back to a single central control room (while

PLC	– Programmable Logic Controller
RTU	– Remote Terminal Unit
SCADA	– Supervisory Control and Data Acquisition
CCTV	– Closed Circuit Television
HMI	– Human Machine Interface
GOOSE	– Generic Object Oriented Substation Events
HSR	– High-availability Seamless Redundance
IEC	– International Electrotechnical Commission
IP	– Internet Protocol
IRIG-B	– Interrange Instrumentation Group (B – time code)
LAN	– Local Area Network
NTP	– Network Time Protocol
PC	– Personal Computer
PCB	– Printed Circuit Board
PRP	– Parallel Redundancy Protocol
PTP	– Precision Time Protocol
RSTP	– Rapid Spanning Tree Protocol
SNTP	– Simple Network Time Protocol
TCP/IP	– Transmission Control Protocol/Internet Protocol
VoIP	– Voice over Internet Protocol
RRRP	– Virtual Router Redundancy Protocol

## Abbreviations

- o The amount of automation on industrial and utility sites is rising.
- o Control of the various outlying areas takes place from a central control room.
- o Ethernet is a fit for mission critical safety system for the protection of the site and its personnel.



take note

at the same time allowing detectors to report to multiple different control rooms over the IP network if required). One of the problems with traditional fire detectors (roof mounted smoke detectors) is that it can take some time for enough smoke to collect near the ceiling to trigger the sensors. In this time the fire could have doubled or tripled in size. There are IP cameras available that use video analytics of an area to detect smoke and flames rather than a physical sensor. These can detect fire much quicker than a traditional fire detection system, which can save large amounts of productivity and assets, as well as provide increased safety and warning time to personnel in the area. These should be used as a back-up to an existing system, as video analytics are not 100 % accurate, however as a back-up system fire detection using video analytics can be a great time and money saver.

### Access control

The next important component of a safety system is the access control and access logging taking place on the site. Using biometric access control and access logging one can prevent against unauthorised access to controlled areas, as well as prevent (or at least log) possible malicious tampering by an authorised user. On a fully integrated system access logs can also be real-time, meaning that one can determine which personnel are in a given area. This can be crucial if there is an incident on the site to ensure all personnel have exited the area safely or if rescue teams need to be dispatched. This makes access control and logging essential from both a safety point of view, as well as from a security point of view. Once again, an access control and logging system can be integrated over the communications network, to provide a single system monitored from a central location.

So as we can see by looking at each of these components that may be found on a safety system, a communications network is essential and can be looked at as the central nervous system of your safety system. We will now look at using Ethernet with TCP/IP as the

communications technology, and how this technology caters for the various requirements of a safety system.

### **Requirements of a safety system** ***Reliability and uptime with low latency***

Probably the most important requirement of the communications network for a safety system is the reliability and uptime of the network. As the safety system becomes such an important part of the site, one needs to ensure that the system is reliable and experiences as little downtime as possible, even in the event of cable/hardware failure or theft. A key point when selecting hardware for reliability and uptime is the ruggedness of the hardware itself. The environment that the hardware will be running in must be taken into consideration. For instance, if the unit is going to be mounted on or near heavy machinery, it must be able to handle the vibration and G-forces involved. For hardware at the coast or in dusty/humid areas, conformal coating can be used. This is a process whereby the PCBs (Printed Circuit Boards) in the hardware are coated in a silicon layer so as to protect from contact with dust or moisture. It is also important to order hardware without moving parts in industrial areas, as dust and other airborne contaminants can clog up and break these parts. Selecting the right hardware is important in order to save money and ensure maximum uptime. There are various standardised redundancy mechanisms available within Ethernet, and many manufacturers also have developed their own redundancy protocols. When selecting a redundancy protocol, it is recommended to choose one that is openly standardised, as this will not vendor lock you into using hardware from only one manufacturer. One of the most commonly used standard redundancy protocols is Rapid Spanning Tree Protocol (RSTP). RSTP provides cable redundancy that will automatically recover the network in the event of cable failure by activating a previously redundant link. There are also two new IEC standards, namely HSR (High-availability Seamless Redundancy) and PRP (Parallel Redundancy Protocol) which provide completely bumpless network recovery (i.e. no loss of data packets at all).

Another redundancy protocol that is recommended in certain applications is VRRP (Virtual Router Redundancy Protocol). This is a mechanism by which two physical routers can be 'combined' into a single, virtual router. If one of the physical routers fails the second can take over automatically without any reconfiguration required on end devices. In order to provide minimal latency for critical traffic, we make use of the Prioritisation mechanisms in Ethernet. There are different ways to prioritise data, but in the end they will all provide various traffic flows one of four priorities, normal, medium, high or critical. The networking hardware will then be set-up to prioritise the transmission of this data. This can be done in one of two ways. The first is using a queuing method called strict-or-starve. In this method all critical data is sent before less important data. This means that as long as there is critical data in the queue no other data will be for-

warded. Although this method does give the best priority to critical traffic, there can be times where due to constant incoming critical traffic, all other traffic is indefinitely delayed. A more commonly used queuing method is weighted fair queuing. In this method, a percentage of the queue is dedicated to critical priority traffic, a percentage to high priority traffic etc. In this method, although critical traffic is given the largest percentage, all traffic will get a fair chance to be sent.

### ***High synchronicity***

The next point that must be addressed is having synchronicity between devices on the network. Synchronicity is achieved by using one of the many built in functions of Ethernet. Two commonly used protocols for time synchronicity are NTP (Network Time Protocol) and SNTP (Simple NTP). These are supported by most if not all Ethernet devices, and work by simply requesting the current time from a time server (This can be a device on the LAN or in some cases an internet based time server). For more accurate time synchronisation one can use PTP (Precision Time Protocol), as well as converting the signal into IRIG-B (a point-to-point serial connection, not Ethernet based) using certain hardware. PTP is accurate to within micro-seconds, and due to the extra accuracy requires special hardware rather than simply firmware. However, once synchronised a PTP network can cater for most extremely time sensitive applications, such as seismic monitoring or GOOSE messaging.

### ***Integration and protocol normalisation***

As we have discussed, Ethernet is an open standard transport method and thus already various Ethernet devices are compatible. However there are protocols that are vendor unique, which can lead to problems as devices cannot intercommunicate. There are solutions to this however. Software and hardware devices are available that can perform protocol translation or normalisation. These components will take various protocols and normalise them across the network, allowing all devices to talk to one another using a common protocol through the translator. For instance on a utility network all proprietary protocols could be normalised into IEC 61850 [1] traffic. As many legacy devices speak only serial, one can use serial device servers, hardware that will encapsulate serial data within an IP header and allow transmission of this data over the Ethernet network. This can be used to standardise on Ethernet, or even just as a way to extend serial runs.

### ***Device and activity logging***

One of the key components of a safety system is the ability to keep logs of all devices and activities on the network. Once again Ethernet provides, in the form of mechanisms such as syslog transmission. This is a function by which a device can be automatically set to send all system logs through to a central server. This server should then be set to store these logs for a given time duration. Being able to review these logs at a later stage serves two main purposes. The first is troubleshooting in the event of an incident on the site. Being able to retrace what various devices were experiencing at the time of the incident will allow an engineer to more easily narrow down the problem to a specific device or device group. This can lead to great savings

*Ethernet is becoming more and more complex with the addition of newer functions and protocols.*

in both time and money. The second use of these logs is to be able to trend network activities over time. This way a user can try identify problems (such as very high utilisation on a device) and address them before they escalate. With the time synchronisation methods already discussed, these logs can also be synchronised with each other to facilitate easier troubleshooting and analysis of the entire system.

### System monitoring

A safety system will monitor a site, including processes, personnel, assets etc. However we still need to properly monitor the safety system itself. A failure of a component of the safety system could lead to more serious incidents not being addressed in a timely fashion. This can lead to asset damage, productivity losses due to downtime and even loss of human life. Using SNMP (Simple Network Management Protocol), another protocol standardised within Ethernet, NMS (Network Management Stations) can interrogate Ethernet devices about various statistics, such as bandwidth transmission, traffic errors on the device, and even physical characteristics such as temperature of the CPU. Along with this, the devices themselves can be set to send SNMP Traps, which are simply notifications sent to the NMS about possible problems the device is experiencing. The NMS will then be set to bring up a notification alerting engineers to the event (which can take place on screen or via email/sms). This allows possible problems to be addressed before escalating into large problems that cause downtime and productivity losses, thus allowing engineers to be more pro-active rather than re-active.

### User monitoring

Finally one also needs to be able to monitor the users of the safety system (this refers to users who are actively involved with devices, such as technicians, operators and engineers). Software systems exist that can monitor what is taking place on various end devices and HMIs on the site, as well as the controller PCs in the control room. These software systems range from simply collecting logs about details such as login attempts and usage time, to packages that can record exactly what is happening on an operators screen, including mouse tracking and clicks. Again this type of system serves multiple purposes. The first is troubleshooting. By being able to find out exactly



what action was taken on various devices on the network, one can narrow down where the problem occurred and address it. Another use is for training. Console recordings during specific incidents on the site can be stored and showed to trainees in order to display the correct (or incorrect) actions that were taken during the event. This can lead to operators being more prepared for any problems, as well as preventing the same problems from occurring again in the future.

### Conclusion

As we can see, Ethernet is definitely a fit for mission critical safety system, as long as it is planned, installed, configured and maintained correctly. Ethernet can save time, money and productivity, as long as the users are aware of the available mechanisms provided by Ethernet, and how these mechanisms can benefit the system. However all of the above is only as reliable as the security on your system. This includes both physical security (access control) as well as logical security, which is provided by firewalls and other security hardware and software. As Ethernet is becoming more and more complex with the addition of newer functions and protocols, planning and commissioning a network for a safety system does require a working knowledge of Ethernet and the functionality it provides.

### Reference

- [1] IEC 61850. 2013. Communication networks and systems in substations.



Doron Kowensky has been working with Industrial Ethernet and IP-based systems for over 10 years and has intimate knowledge of the design, implementation and maintenance of such mission critical applications. He started H3iSquared in 2006 to better serve the industry with products that are leaders in their class. Enquiries: Email [doron@h3isquared.com](mailto:doron@h3isquared.com).

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## Technical advantages with Firmware update

The FOUNDATION Fieldbus Diagnostics Module is a very open and easy solution to permanently check the condition of the H1 physical layer – and a recent firmware update unlocks an extra set of possibilities. A Live List is added to the already easy to use interface. The Live List shows all operating devices in one overview. Importantly, the type of device is shown in the oscilloscope images.

The web server that is used for the Live List also sends out email notifications when a critical situation occurs. Thanks to this service users can be informed on time to prevent down-time. The email notifications and already existing remote access provide an entrance in multiple

ways to monitor and control networks. All of these technical advantages can reduce the costs for maintenance. All telegrams are scanned by the FF module. The status of all devices can now be displayed in one overview. Different background colours are used to show the status of the device. Since the **ComBricks** FOUNDATION Fieldbus Module is not an active device it does not require an address. The network condition is measured passively, therefore it can be wired parallel or series to/in an existing H1 segment.

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## New capabilities embedded in intelligence software

Manufacturers now have the freedom to use any digital device to easily access optimised performance metrics and data analytics from plant floors and machines. This is due to new capabilities embedded in the FactoryTalk VantagePoint EMI v6.0 software from Rockwell Automation. The VantagePoint v6.0 software now includes VantagePoint mobile, a component that enables users to create displays and interact with data across any HTML5-compliant browser and mobile platforms, such as iOS and Android. Users can now easily log in to the VantagePoint system and automatically view Web-based KPI content that is responsive to the device they are using – from smartphones to tablets to PCs. This is a significant change from the conventional, costly and time-consuming approaches that enable desktop or mobile access to manufacturing data.

“The VantagePoint mobile component

instantly detects the type of device being used to access information and adjusts the user experience for that screen,” said Angela Rapko, product manager for FactoryTalk VantagePoint software, Rockwell Automation. “This out-of-the-box solution will enable more users to access valuable operational insight while lowering the cost of delivering that data.”

Another new key capability is the ‘composer’ feature. This allows VantagePoint v6.0 users to browse through data and easily customise content based on individual roles, priorities and viewing preferences. Using the software’s drag-and-drop interactive tools, users can create personalised displays to quickly find the information that is most important to them. The ‘favourites’ capability also allows users to configure KPI data in the visual formats they prefer, from bar graphs to gauges to plant maps. They can

then save the data or share it with a group using the VantagePoint mobile component. “Customers have expressed a big need to drive usage of data across their organisation for frictionless productivity,” said Kyle Reissner, mobility platform leader, **Rockwell Automation**. “With portability in mind, we wanted users to be able to move between devices seamlessly, allowing them to be more responsive and reducing time to solution. The VantagePoint mobile component is now at the core of the FactoryTalk VantagePoint software to deliver this ease of use.”

**Enquiries:** Christo Buys. Tel. 011 654 9700 or email [cbuys@ra.rockwell.com](mailto:cbuys@ra.rockwell.com)



## Compact 7-inch HMI and all-in-one controller

The CP6606 ‘Economy’ Panel PC is ideally suited to the requirements of machine builders and manufacturers in cost-sensitive market segments. The all-in-one compact controller combines a TFT touch display (800 x 480 WVGA) in 7 inch format with a powerful 1 GHz ARM

Cortex A8 CPU and 1 GB DDR3 RAM. The fanless CP6606 designed for control cabinet installation, is ideally suited for use as a compact, inexpensive Control Panel. In combination with TwinCAT automation software,



the Panel PC becomes a flexible automation controller for small and medium-size machines, production plants or buildings. With TwinCAT OPC UA support the Panel PC can also be used as an OPC UA Client or Server, thus offering extensive connectivity and remote access functions. “Beyond the high-quality colour touch screen, the CP6606 Panel PC impresses with its robust housing with aluminium front and sheet-steel rear cover, surpassing the quality and durability of the plastic panels typically found in the low-cost marketplace,” explains Frank Teepe, industrial PC product manager at **Beckhoff**. The slightly curved front panel of the CP6606 further enhances the attractive appearance of the device.

With an operating temperature range from 0 to 55 °C (storage temperature range -25 to +65 °C) plus the panel front with IP 54 protection and the rear side with IP 20 protection, the CP6606 can also withstand demanding plant environments.

**Enquiries:** Email [KMCPerson@beckhoff.com](mailto:KMCPerson@beckhoff.com)

## Ping-pong tech



Omron Corporation has developed the technology that can play ping-pong with the human being. The spider-like robot, can predict the ball's path from its human opponents, with a few misses which here and there which makes it a thorough ping-pong player. Omron's three legged robot has been armed with five motors to control paddle movement, it is also programmed to serve the ball in a way that makes it easy for the player to return. Recently, in October 2014, Omron Corporation's ping-pong robot was awarded with the Grand Prix in the Innovation Awards, as selected by United States (US) Journalists at the CEATEC. CEATEC Japan (Combined Exhibition of Advanced Technologies) is the biggest exhibit of the latest IT and electronic technologies in all of Asia. "This ping-pong robot is a really a demonstration of how a robot can interact with a person and react in an appropriate manner," says Takuya Tsuyuguchi, an Omron manager in Japan. "We envision this robot perhaps being used in a factory or production line - interacting with a worker to do or build something. This would involve the robot understanding the needs of its human counterpart and behaving appropriately." Victor Marques, general manager of Omron South Africa adds to this by indicating that as leaders in automation and industrial machinery, **Omron** is developing the core technology for the next generation of robotics. "The ping-pong robot was a thought experiment; our endeavours are to develop robots that can perform a variety of tasks in a changing environment."

*Enquiries: Michelle le Roux. Tel. 011 5792600 or email michelle.le.roux@eu.omron.com*

The advertisement features a Siemens logo in the top left corner. The background shows a futuristic car body on a production line, with orange robotic arms and digital screens. One screen displays "Simulate and optimize operation" and another displays "We need five doors". The text at the bottom reads: "We don't know what the car of the future looks like. But we know how it will be built. Making things right. Answers for the future of manufacturing."

To ensure long-term success in the automotive market, production has to react flexibly to its changing needs. Nowadays it is about more than just the mere manufacturing process – product design, production planning, and service performance are also key factors. Volkswagen has already collaborated with Siemens to make production more intelligent. In the future, machines will learn to communicate

independently and to optimize production steps. The goal is to simplify the manufacturing of different car models. The benefits include greater flexibility, increased efficiency, and improved global competitiveness. The answers for the future of manufacturing exist. And now is the time to make things right. Because the world of tomorrow needs answers that last today.

## Ultra compact block I/O for analogue signals

**Turck** has added several ultra-compact Ethernet block I/O devices with four analogue in- or outputs to its TBEN-S series. The analogue inputs of the Multiprotocol Ethernet modules can process four different types of input signal. Besides voltage and current signals, it also processes PT100 signals from temperature sensors or millivolt signals, as are typically output by thermocouples or measuring bridges. This enables the user to respond flexibly to the particular input signal requirements in the field.

The TBEN-S series enables applications that previously required three different block module types to be implemented with just one.

The fully potted IP67 modules are slim with a width of only 32 mm and a short length of only 144 mm, and allow assembly directly on the machine. With their extended temperature range from -40 °C to +70 °C degrees, the devices are highly versatile in application. Despite the compact design every TBEN-S module can be operated without additional gateways in each of the three Ethernet systems Profinet, Modbus TCP or EtherNet/IP.

Thanks to the Turck Multiprotocol technology used in this series, the devices recognise the protocol in use automatically by

listening to communication during the start-up phase. An integrated switch allows the use of the devices in a line topology. Besides the versions with four in- or outputs there are also six variants with digital inputs and outputs available.

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[industrial.omron.co.za](http://industrial.omron.co.za)

## Flagship control system for mine in Namibia

**Rockwell Automation** has been selected as the supplier and integrator of the automation control system for Swakop Uranium's Husab mine near Swakopmund in Namibia. The Rockwell Automation control system will enable control of the complete array of automated leaching plant processes through a 5 500 I/O architecture. The planned 18 month integration phase began in July 2014.

The Rockwell Automation portion of the contract includes the supply and integration of the control and visualisation hardware and software. Rockwell Automation was able to guarantee specific timeframes that were in line with strict project delivery requirements. Its solution follows a standardised approach, which enables a high degree of implementation certainty and reliability through strong domain expertise and one of the largest teams of control system engineers in the region. The Husab Project's plant areas will be controlled by ControlLogix controllers via a complete Ethernet/IP network layer. Through the Rockwell Automation fully-integrated PlantPAx process

automation system, which encompasses the entire control topology from the visualisation layer down to the device layer, the complete set of processes constituting the leaching plant will be controlled. This includes everything from the conveyor feed into the leaching plant, the crushing of pulverised rock, and the calcining of U3O8 through agitated acid leach.



**Enquiries: Michelle Junius.**  
Tel. 011 654 9700 or  
email [mjunius@ra.rockwell.com](mailto:mjunius@ra.rockwell.com)

*At the awarding of the Swakop Uranium automation control system contract are Rockwell Automation South Africa managing director Barry Elliott (right) with then-project director Rodney Voigt.*

## Control system order for oil refinery in China

**Yokogawa** China, has received an order from Petro China Yunnan Petrochemical Co to deliver control systems for an oil refinery that is being built in China's Yunnan Province. With an annual output of 10 million tons, this will be one of the largest refineries in southwestern China.

As most of China's oil refineries are located along the country's east coast, the high cost of transporting oil products to inland regions is a concern. As a national priority measure, a pipeline is being constructed that will transport 23 million tons of crude oil annually from Myanmar to China. To receive and process the oil from this pipeline, multiple oil refineries (total annual capacity: 20

million tons) and an ethylene plant (annual capacity: one million tons) will be built in Yunnan Province, with work on these facilities to be completed by 2020. The refined oil products and ethylene from these plants will be sent on to other plants in Yunnan Province and other inland regions, significantly reducing transportation costs.

In the first stage of this project, Petro China Yunnan Petrochemical is constructing an oil refinery (annual capacity: 10 million tons) in the Anning Industrial Park, 40 kilometres from Kunming City. This will be one of the largest refiner-

ies in South Western China, and it will start operation in 2015.

**Enquiries: Christie Cronje.** Tel. 011 831 6300 or  
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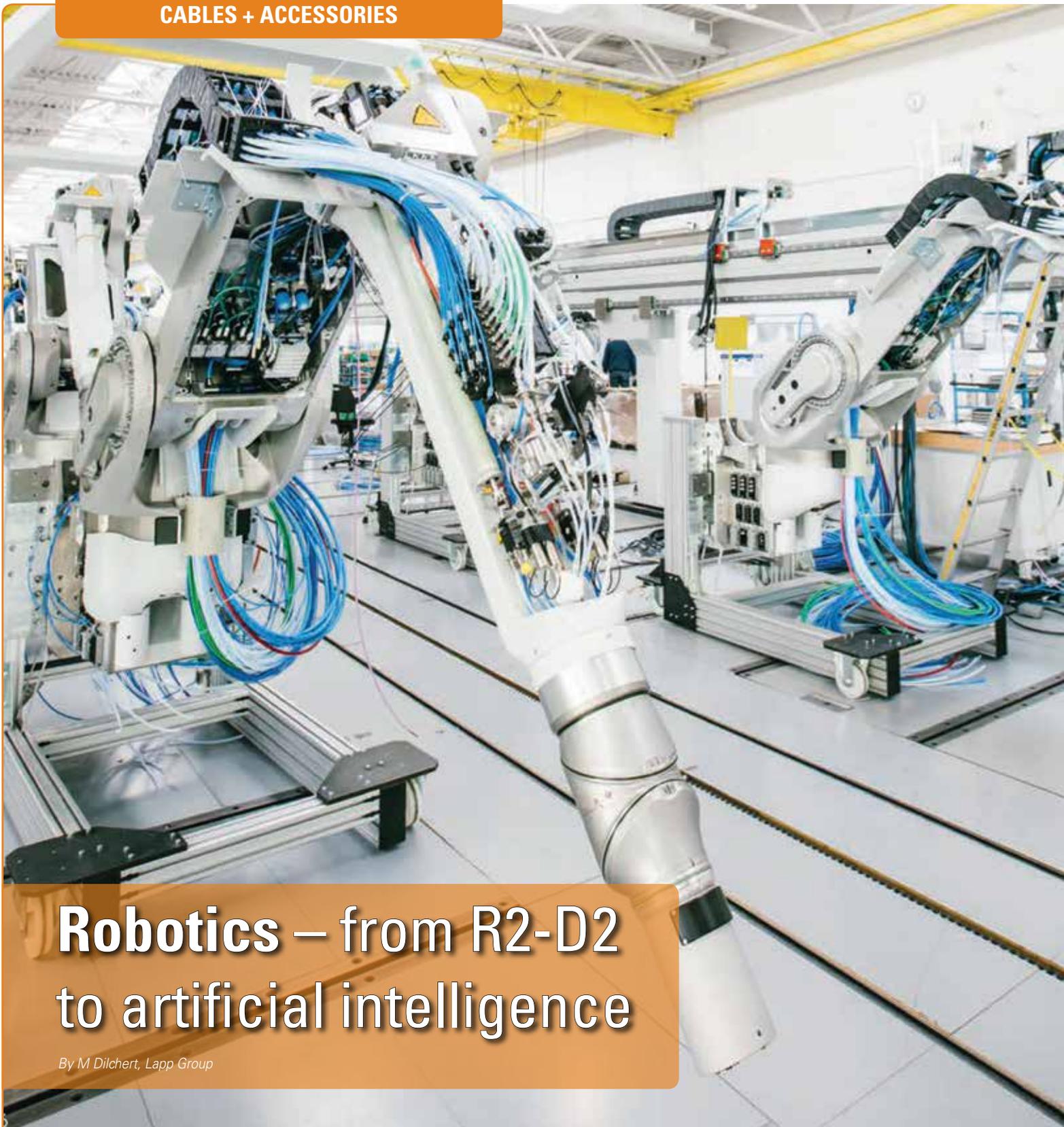
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# Robotics – from R2-D2 to artificial intelligence

By M Dilchert, Lapp Group

*Thinking back to the late 1970s when George Lucas created R2-D2 in Star Wars... who imagined that one day we would see this as reality?*

**D**id anyone ever think that R2-D2's head would turn in the same direction numerous times and still operate? More recently, Wall-E (Waste Allocation Load Lifter Earth-Class) came along, designed to clean up the abandoned earth's waste allocation lifter – earth class which had operated for many years and needed many parts to continue. What if he had used Lapp Group solutions – what would have been in the container? From the robot that searched the World Trade Centre for survivors – to the flying drones that will be delivering parcels to our homes in the future, robots will soon be as

integral a part of our everyday lives as they are in major industrial sectors. It is no wonder that scientists and journalists alike are dubbing the 21<sup>st</sup> Century as 'the age of artificial intelligence'.

## **Robotics rapidly advancing**

Forecasts suggest that in 2015, annual sales of industrial robots will exceed 200 000 units. This boom will come about because robotics has developed in giant steps. Today's intelligent helpers are much

EOM – End Of Market  
 OEM – Original Equipment Manufacturer

## Abbreviations

*“Anyone who joins a tour at the Museum of Communication in Berlin will be amazed, not just by the superb exhibits on display there, but particularly by the museum guide. The job is done by a robot. This is just one of the many examples of how robots are now firmly established as part of our day-to-day lives. Contrary to most science fiction scenarios, humans and machines live a peaceful and productive coexistence”.*

*Andreas Lapp*



easier to programme and teach than just a few years ago. They can be flexibly and individually used for a huge variety of different tasks with extremely short set-up times.

These high-tech descendants have little in common with their great grandfathers, who packed bottles into boxes back in the 1960s. Robots are not only used in production, logistics and storage these days. Wherever there are jobs that are too dirty, too dangerous, too strenuous or simply impossible for humans, smart companies are relying on artificial intelligence. The best example of this is service robots. Service robots include remote-controlled vehicles that inspect or weld underwater oil and gas pipelines; robots that ensure drinking water quality in hot regions; or even tiny robots that are sent into sewage systems to clear and repair them.

### Robotics – the supreme discipline for cables

As demanding as the tasks performed by robots are, the requirements for the cabling are equally stringent. This is why robotics is a major focus in the Lapp Group. Building on a wealth of manufacturing expertise within the company, while the French subsidiary (Lapp Muller in Grimaud) has specialists with more than 25 years’ experience in robot and drag chain applications.

This know-how creates competence. Ultimately, competence is exactly what it takes to be successful in robotics, with its countless range of applications and individual designs. It is an area where practically no two applications are the same. This means that every cable solution has to be unique, whether it is to provide a specific power supply for robots or high-performance data transmission, for example, when building robots with high resolution camera systems.

However, for many robot applications, the outer material of a cable is just as crucial as what is inside. The cable may need to be able to withstand mechanical abrasion and chemicals, or requirements might include resistance to harsh working environments, or extreme tensile strength. Whatever people demand from a robot as an indefatigable worker, they demand exactly the same from the cables.

### Industrial robots

- o Articulated robots with four to six axes are flexible to use and can do everything from handling to assembly tasks to welding, loading and unloading. Painting and coating robots are a special form, providing efficient and precise bonding, dusting and painting. A painting robot can switch from one paint colour to another in

10 seconds with minimal wastage. Dürr has managed to reduce the inevitable paint loss to around 10 ml per colour change (two teaspoons or a half-full shot glass)

- o Swivel arm robots carry out ‘pick and place’ tasks, moving materials in a limited radius at high speed
- o Parallel kinematic robots with opposing arm systems are primarily used in the food and beverage sector

- o Robots will soon be an integral part of our lives as they are in major industrial sectors.
- o Scientists and journalists are dubbing the 21st Century as the age of artificial intelligence.
- o Competence is what it takes to be successful in robotics.



### Artificial intelligence increases efficiency

Dürr is a system provider supplying cleaning systems for the production of engine and gearbox components, as well as balancing systems and products for final assembly. However, Dürr’s main role is in planning and building paint shops for the automotive industry. In other words, this means workstations for robots.

Indiana red, Misano red, Tornado red – all automotive manufacturers have their own specific colours. Many of these have something in common, namely that all the vehicles are often painted by robots supplied by Dürr. Visiting the company’s headquarters in Bietigheim-Bissingen, we find a football team of 6-axis robots lined up, ready for their functional test and nearly ready for use.

The robots’ destinations are already decided – Melfi, Dingolfing, Shanghai. Many of them are going on a world trip, as the company has a significant international focus. One of them is marked RPL (Robot Paint Low). Its taller colleague has the code RPE – E being Elevated as some painting robots are built higher. These robots not only paint cars throughout the world, but also their big brothers – commercial vehicles.

### High-tech helpers

When it comes to painting vehicles, both drivers and car manufacturers alike have very specific expectations. Frequent changes of model, innovative vehicle designs and new paint systems demand a high level of flexibility and innovation from Dürr. These days, painting is

very much a high-tech sector. A painting robot has the job of moving the nozzle during painting, at a constant vertical distance from the body surface. This ensures an even application of paint. To achieve this, Dürr constructs and programmes not only moving and stationary painting robots for exterior and interior painting, but also so-called handling robots, which are small, intelligent helpers that can open, hold and close car doors and bonnets.

*Whatever people demand from a robot as an indefatigable worker, they demand exactly the same from the cables.*

## Art of reduction

Under Dürr's logo is the phrase: 'Leading in production efficiency', while their flag shows a simple formula: Less is more: Less time and distance, less material required and less energy consumption. Wherever Dürr can reduce colour changeover times or minimise paint and solvent losses, the global market leader is increasing its customers' production efficiency. Their robots use cables that are subjected to huge loads. There are torsional movements that the cable simply has to be able to cope with. Not twice – but millions of times. 'Cope' in this case means that the cable needs to have a dynamic bending radius equivalent to 10 times its outer diameter, capable of approximately 180 °m of torsion. Lapp cables are tested for 10 million bending and torsion cycles.

The extreme mechanical and chemical loads or even the demanding technical requirements are not the only challenges. Because no two robot applications are ever the same, every cable is a special solution to a certain extent.

## Quantum leap in production

Fully automatic, reliable processes based on robots – with its new metal processing centre, the Lapp Group has one of Europe's most modern plants for manufacturing rectangular industrial connectors. For the Lapp Group, robots are not just on the customer list, they can be found in the building.

Since mid-2013, some tasks that were previously carried out by hand on a lathe are now being performed by autonomous machines in the new metal processing centre. As well as ensuring effective process flows and quality at Lapp, this is helping to safeguard Germany's future as an industrial location. Thanks to the new metal processing centre, Lapp has managed to bring production from the Czech Republic back to Germany.

This is a good example of how industrial production of high grade components can help the country remain competitive internationally in this age of globalisation. The new plant not only achieves higher volumes, it can also manufacture all variations in the product range flexibly and with short lead times. Four Fanuc robots, two metal pro-

cessing machines, a fully automatic riveting station with loading and unloading station and a washing system are in use around the clock. They turn 54 housings blanks into around 580 industrial versions of EPIC rectangular and circular connectors. Production of the inserts for the connectors is also automated.

## Fully automatic quality control

While quality control for the EPIC connectors was previously performed manually, the entire process is now fully automatic. Robots use a scanner to measure each individual part, then calculate any dimensional variation and tolerance and resolve any discrepancies immediately.

They find the new zero point for the hole automatically or separate out a part if its tolerance variation is too high. Everything runs fully automatically in the subsequent riveting station too. The bolts are individually fed to the riveting unit according to their type and position, then positioned and riveted. The riveting point is corrected automatically where necessary.

At the same time, the riveting pressure is monitored, and the values are documented and stored. This guarantees traceability at all times. By combining full automation with digital quality control, optimum repeat accuracy and high quality are achieved. Translated into added value for the customer, this means a high, dependable quality level and, thanks to increased flexibility in production and faster processing times, also shorter delivery times.

## Conclusion

For many years the Lapp Group has provided solutions to the End Of Market (EOM) as it is an integral part of their process towards the end solution. As a trusted partner to this sector, Lapp Group manufacturing expertise within the company provides the customer with a complete 'end2end' solution developed in-house.

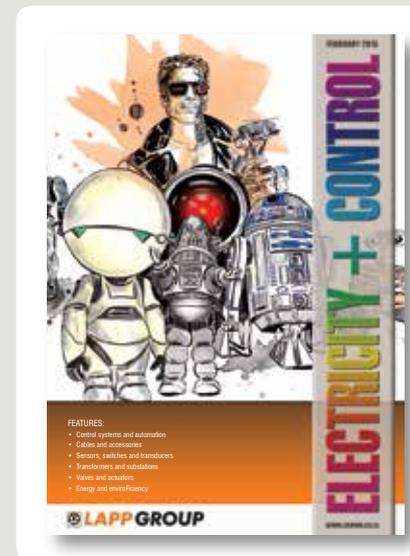
Lapp Group not only supplies complete solutions for the robotics environment to cover power cables, data cable, servo cables sensor cables, hose systems, energy chains, connectors and more, but focuses on the whole Original Equipment Manufacturer (OEM) and machine-building environment from a box drop solution through to end2end design of complete harnesses on a plug and play option with guarantees to suit.



Mark Dilchert is the managing director of Lapp Group Southern Africa. Enquiries: Tel. 011 201 3200 or email [mark.dilchert@lappgroup.co.za](mailto:mark.dilchert@lappgroup.co.za)

# LAPP GROUP

## Robotic Q and A



*"The future is not far away," says someone who sees it every day. Wolfram Burgard, is a Professor at the Institute of Informatics at the University of Freiburg, head of the research laboratory for autonomous intelligent systems and winner of the Gottfried Wilhelm Leibniz Prize – the most important research prize in Germany.*

**Q Professor Burgard – You specialise in research into intelligent systems and mobile robots. Is the future already here?**

**A** To be honest, we are not far away from it. There are already autonomous mobile robots, for example for cleaning floors, vacuuming or mowing the lawns. In industry, we have transport robots that can move objects autonomously. Autonomous driving is also a result of research in the field of mobile robotics. In the future, vehicles will take on more functions, making driving significantly safer.

**Q How do you actually develop a robot? Is it more science than fiction?**

**A** Typically, we start with a specific problem, for instance the question of whether a robot can navigate autonomously through city centres. We ask ourselves what mechanical properties the robot will need to have and which sensors will be the best suited. Then we build the robot and equip it with sensors and computers. Then we start adapting the process for the robot system. In some cases we have to create totally new processes.

**Q Robots in the home, robots in health care, robots that support operations – what will be next?**

**A** Cars will carry out an increasing number of tasks autonomously, reducing our workload when driving. I have great expectations of autonomous systems in an industrial context for performing transportation tasks more effectively. But in the future we will also see more robust systems for simple manipulation tasks, starting in an industrial environment. As soon as they have established themselves there, it will not be long before there are handling robots for the home.

**Q Which other fields will robots conquer in industry?**

**A** At the moment, there are mobile transport systems and static manipulation robots. In the near future, these two areas will be combined by developing mobile manipulation robots. These will be robots that can assemble components while moving, a major advantage over conventional conveyor belts.

**Q Should we be scared of robots? Or all worried about our jobs?**

**A** No. I'm a fan of systems that can carry out tasks independently. But we are so much better than robots when it comes to manipulation tasks combined with perception that there will still be enough work options for us in the future.

**Q Is there anything that robotics cannot construct?**

**A** Of course there are limits, both mechanically, in electrical engineering and in software engineering. Currently, there are not yet any robots that can move quickly while simultaneously going up or down a kerb. When it comes to developing grippers and hands, we are lagging way behind nature, to say nothing of the issue of batteries, which are still too heavy for the capacity we require. There are also shortcomings in sensor technology, for example in robust three-dimensional perception. Finally, we lack reliable software solutions for detection of objects.

**Q What will a robot never be able to do?**

**A** Be like a person.



**Enquiries: Mark Dilchert, Managing director,  
Lapp Group Southern Africa  
Tel. 011 201 3200  
Email: mark.dilchert@lappgroup.co.za**

## VdS approval for metal enclosure fire system horn sounders

**E2S Warning Signals** has gained VdS approval and CPR compliance to directive 3015/2011/EU for its AlertAlarm D112 alarm horn sounder by testing to EN54-3. It combines the field-proven electronics of its AlertAlarm A Series with a robust, corrosion resistant marine grade LM6 aluminium alloy enclosure, giving greater mechanical and UV protection.

The D112 has a maximum SPL of 119 dB(A) @ 1 m at the nominal 24Vdc fire

alarm system operating voltage; the CPR compliance is valid for operation from 18 – 30 Vdc.

The 48 Vdc version is also compliant. The VdS approval covers the five most commonly used fire alarm warning tones and also confirms that the units operate to specification under conditions of dry and damp heat, cold, shock and vibration.

The aluminium enclosure complies with Type B environmental category making it

suitable for outdoor installation, and so supporting the extension of a fire detection system into areas beyond the relatively benign office environment, improving safety. Other tests include EMC, SO<sub>2</sub> corrosion resistance and dust and water ingress.

UL approved versions for general signalling use are also available. For this version, the aluminium enclosure is sealed to IP66, NEMA Type 4, 4X and 3R.

**Enquiries: Email [sales@e2s.com](mailto:sales@e2s.com)**

## SEMINAR

### Best practices in lightning safety and lightning protection

Industry specialist consultants **INNOPRO** are presenting their updated one-day industry-briefing seminar on 'Best Practices in Lightning Safety and Lightning Protection of Structures and Systems' in Centurion (Gauteng, South Africa) on 27 March 2015. "Lightning safety and lightning protection is a topic that is often misunderstood, with inappropriate management, strategies, techniques and methodologies being applied as a result. The consequential effects can be severe, both in terms of direct effects and injuries, and in respect of indirect and consequential impacts (including on lost production and other effects)."

"The appropriate application of effective lightning safety and lightning protection strategies and solutions for infrastructure, industry and other sectors is therefore of critical importance". This was noted by Ian McKechnie, managing director of specialist consultants and forensic engineers INNOPRO. The seminars will be presented by Ian Jandrell and Ian McKechnie, both directors of Innopro. Ian Jandrell is also a Personal Professor, CBI-electric Professor of Lightning, and Dean of the Faculty of Engineering and the Built Environment, at the University of the Witwatersrand. Ian McKechnie is also an Honorary Research Fellow in the School of Electrical and Information Engineering at the University of the Witwatersrand.

These seminars are validated for Continuing Professional Development (CPD) with the Engineering Council of South Africa (ECSA) by the South African Institute of Electrical Engineers (SAIEE) and attendees will earn one credit in the compulsory Category 1.

McKechnie noted that the briefing seminars are aimed at industry practitioners at all levels and will be beneficial to persons involved in the design/engineering, management, operation, insurance, risk assessment and/or maintenance of infrastructure and systems that can be affected or influenced by lightning and related electromagnetic interference. He added that health and safety practitioners and other persons responsible for safety at facilities and activities will also find the seminar beneficial. Limited space - pre-booking is essential. Registration forms are available on [www.innopro.co.za](http://www.innopro.co.za).

**Enquiries: Ian McKechnie. Tel. 012 663 4804 or email [learning@gafrica.com](mailto:learning@gafrica.com)**

## Cable and pipe sealing systems for flood protection

The UK subsidiary of global safety seal manufacturer Roxtec has provided cable and pipe sealing systems for a major flood protection project at a UK nuclear power station.

Graham O'Hare, managing director of Roxtec's UK arm, said the firm worked with EDF Energy which operates the Dungeness B nuclear power station on the coast of Kent, England.

He said: "Roxtec products were used to seal pipes and cables in existing underground trenches to protect the power station's diesel generators. The generators are extremely important because they are needed to provide emergency back-up. Furthermore, the trenches go under bund walls, which provide an important secondary line of protection or containment.

"Roxtec was chosen because our seals protect against multiple hazards. The penetration seals meet an IP67 rating for water ingress, H class fire rating and can protect against diesel splashes. Traditional sealants will only protect against one particular hazard and therefore could not meet the demands of this project."

As part of its service, Roxtec engineers visited and surveyed the Dungeness plant then came up with the required designs. Roxtec then manufactured retrofit products which means they can seal around existing cables and pipes so as not to disturb the surrounding infrastructure.

Construction of the Dungeness B power station began in 1965 and power generation started there in 1983. Today the site employs 550 full-time employees along with 200 full-time contractors. Its total supply to the UK's national power grid is 1 040 MW.

**Enquiries: Visit [www.roxtec.com](http://www.roxtec.com)**

*Graham O'Hare, managing director of Roxtec UK.*



## Static connectivity to sensors and other applications

**Molex** Incorporated has introduced the Flamar-Flex cable designed for both static connectivity to sensors and dynamic applications, such as those found in chains and robotics equipment. Featuring a permissible bending radius of 5x outside diameter, the cable can operate reliably and safely in extremely small bending radius applications.

"The Flamar-Flex cables can be stripped back easily to the desired length and provide excellent insulation properties," says Ricky Comini, director business development, Industrial Products, Molex. "In addition, the low cable capacitance (pF) helps ensure enhanced electrical characteristics over comparable cables available on the market today." The Molex Flamar-Flex cable is UL/CSA approved (style 21209/21757) for temperature ranges of 50 to +90 °C (static), -40 - +80 °C (dynamic and -30 to +60 ° (drag chain). Featuring an abrasion, tear and UV resistant pure PUR, ether-based out jacket, the Flamar-Flex cable is oil-resistant (EN 50363-10, VDE 7472-803/B and UL1581/758), flame-retardant (IEC 60332-1, VW1, FT1, UL Vertical Flame Test) and Halogen-free (IEC 60754-1, EN 50267-2-1, VDE 0472-815).

**Enquiries:** Email [ahusson@technical-group.com](mailto:ahusson@technical-group.com)



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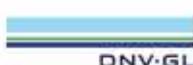
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## Engineering students to explore the food and beverage industry in 2015

With the 2014 PneuDrive Challenge Engineering Design Competition having been concluded, **SEW-EURODRIVE** and **Pneumax**, co-sponsors of the competition, have announced that students will need to design a 'Game Changer' for the food and beverage industry in 2015.

DTI statistics for commodities associated with the food and beverage industry report that the industry was valued at more than R 132 billion in 2013. It is also an industry that the South African government has identified as one of the top three priority areas for creating jobs, with a plan to see the creation of 145 000 jobs in the agro-processing by 2020. By challenging young mechanical, electronic and mechatronic engineering students to design applications that can improve productivity, reduce wastage and ultimately improve the bottom line for businesses in this industry, SEW-EURODRIVE and Pneumax have created a valuable platform that brings academic potential and the real needs of business closer together.

### Game changers needed

Food and beverage companies are under pressure worldwide. Small, medium and large businesses in this constantly changing and competitive industry face a myriad of essentially unpredictable challenges. Adverse weather conditions, legislation changes, rising commodity prices, higher transportation costs and consumers becoming increasingly conscious of what they purchase are a few to mention. Large companies have more resources and better access to capital to address challenges. However, it is the small-to-medium size processors and manufacturers that have to proactively find solutions to these pressures if they want to maintain or grow market share. Small-to-medium size businesses, which often lack easy access to finance, need to unlock potential growth opportuni-

ties by implementing efficient and well-managed systems. It is here where innovative ideas from talented engineering students could play an important role.

### Technology + Innovative Engineering + Talent = Growth Potential

The importance of offering students access to the latest in drive and pneumatic technology, and how these can be used practically in business, cannot be stressed enough. With the rollout of the competition to universities around the country at the beginning of each year, the co-sponsors typically find that students have very limited, if no knowledge at all, about the latest drive and pneumatic technology that is available. This suggests not only a lack of technology awareness that universities obviously cannot keep up-to-pace with, but a serious gap in student understanding of how the technology can be used to improve business and manufacturing processes.

Started in 2008, the PneuDrive Challenge has proven itself as a successful model that can accelerate the introduction of young engineers into industry. In 2015 the competition organisers will be on the lookout for talented young engineers brave enough to think out of the box, and with the potential to design applications that could make a big impact in the food and beverage industry. Roadshows, technology workshops and coaching interventions through the year will aim to introduce, support and nurture students so that they can take a step into industry with confidence.

The winners of the competition will receive a ten day all expenses paid trip to Germany and Italy where they will have an opportunity to present their designs to the head offices of the sponsor companies. SEW-EURODRIVE and Pneumax also offer more than R300 000 worth of equipment to competing universities to ensure that future students are afforded the opportunity to experiment with the latest in drive engineering and pneumatic technology.

**Enquiries: SEW Eurodrive: Rene Rose. Tel. 011 248 7000 or email [pneudrive@sew.co.za](mailto:pneudrive@sew.co.za)**

**Pneumax: Nicci Solomons. Tel. 011 923 7000 or email [pneudrive@pneumax.co.za](mailto:pneudrive@pneumax.co.za)**

*PneuDrive Challenge 2014 theme logo and mascot.*



*With more than 2 billion can ends being produced annually by Nampak DivFood alone, engineering students who take part in this year's competition are going to need to jump into the deep end of the food processing and manufacturing industry if they want to compete well.*

## Portable labellers aimed at increased productivity

Identifying electrical wires and cables, components, circuit breaker boxes, patch panels or terminal blocks can be quite a time consuming job that does not make the most of an electrical installer's skills and expertise. However, well identified wires and circuits greatly increase the speed of any electrical follow-up job. "That is why **Brady** offers top market printers that can identify any electrical wire, cable, component or circuit breaker box in mere minutes, greatly increasing productivity," says Cindy Van den Bremt, product manager portable



systems at Brady. Brady portable printers have been developed with electrical, datacom and telecom installers in mind. The BMP21-PLUS, BMP41, BMP51 and BMP71 are all designed to enable professionals to identify any wire and component faster, easier and with confidence. "Apart from variations in label width, all Brady portable printers offer quick cartridge loading, printing on continuous label rolls and sleeves, a built-in label cutter, built-in graphics and industry symbols and a multi-lingual menu.

Installers often work in conditions that can be quite challenging for man and machine. "We take special care to build dust- and shock-proof printers that last. Any new printer model needs to pass a drop test before it enters the market to make sure our printers are as tough as their job requires." Every Brady port-

able printer can work with a rechargeable battery. "Spare rechargeable batteries are available so you will always have the juice to get the job done."

### Labels that last

Through research and experience, Brady built a vast knowledge base from which the best materials and adhesives are selected to construct labels that last in challenging conditions. "Every Brady portable printer works seamlessly with our advanced labels that can resist prolonged UV-exposure and weathering. The main advantage of Brady's engineered labels is that once they are applied, they don't fall off. There's a label construction available for any context to avoid labels coming off inadvertently, making sure you never have to re-identify anything without purpose."

**Enquiries: Email [a.hardaloupas@mepax.com](mailto:a.hardaloupas@mepax.com)**

## Newly launched loco management system

"**Becker Mining South Africa's** loco management system, combines all guard and loco signals on the user displays, acts as a driver and guard communications system to enforce operational procedures for improved safety during operation of underground trains," says Andrew Trentelman, senior general manager: electronics, Becker Mining South Africa. "This LMS system allows the flow of traffic during safe operating conditions and has programmable parameters that automatically intervene in potentially dangerous conditions. "Although the loco driver is always responsible for controlling the locomotive, the LMS is programmed to check the operator, acting as a driving aid to prevent tramming accidents. This system

is equipped with a global emergency stop facility and is able to halt other locomotives within radio range remotely from the guard car, loco or via handheld units. The LMS advises drivers when to slow down, bring the loco to a halt, or do an emergency stop. Parameters, which measure true speed, are programmed for different areas of haulage and for various speed limitations as required." The LMS also provides reliable proximity detection and collision avoidance warnings between locomotives, trackless machines and pedestrians. Various events during operation and important parameters are logged as real time data and downloaded for analysis and evaluation. The user interface, which comprises an LCD

screen and six function buttons, connects to the main unit via an umbilical cord. A colour display indicates relevant information, including the speed of the locomotive in km/h, battery conditions and proximity detections, as well as errors and events. A battery operated handheld unit mimics the locomotive's user interface.

**Enquiries: Andrew Trentelman. Tel. 011 617 6300 or email [info@za.becker-mining.com](mailto:info@za.becker-mining.com)**



## Fire collars for light conduits

Cable and pipe seal specialist Roxtec has designed and tested tailor-made fire collars for a manufacturer of natural light systems which maximise daylight into buildings. **Roxtec** worked in partnership with Solatube Daylighting Systems to customise and test large-sized fire collars for light conduits – special aluminium tubes which convey light into buildings. Fire collars are fitted around the lighting tubes as they pass through interior fire walls and locations with a risk of fire – including homes, offices and factories, schools, hospitals or even police cells. Gavin Cornall, construction and power manager of Roxtec's UK arm based in Greater Manchester, said Roxtec was chosen because it



could provide large-sized fire collar seals along with the required testing. He said: "The light conduits are good examples of green technology, providing environmentally-friendly lighting in a variety of buildings. They help customers reduce their energy consumption, costs and carbon footprint while people inside the buildings get the benefits of natural daylight. "In this project, our products needed to be customised for Solatube and we worked in partnership with them to create the solution. This is an example of a specialist firestop product which brings increased safety to the construction sector. This was a unique application and special fire testing was required. "The benefits of working with Roxtec include the use of our dedicated fire testing facility, our expertise and track-record across different sectors, and our bespoke engineering solutions."

**Enquiries: Visit [www.roxtec.com](http://www.roxtec.com)**

## Distribution and motor control switchboard up to 6 300 A – in South Africa

Blokset, Schneider Electric's modular low voltage switchboard for electrical distribution up to 6 300 A and for motor control, fully withdrawable up to 250 kW, is now available in the southern African region.

Blokset follows a global design and is type tested and certified according to IEC61439-1 and IEC61439-2, guaranteeing the safety of both the installation and the operator.

"Blokset has become the reference switchboard for a large number of panel-builders, industrial site managers and maintenance managers. One of the main reasons for this is that the distribution and motor control switchboard comes with the certainty of rapid return on investment, and the switchboards have long guaranteed the durability and availability of several tens of thousands of installations worldwide," says Ernie Smith, vice president: Low Voltage Division at Schneider Electric, a global specialist in energy management. He adds that Blokset technology has never ceased to

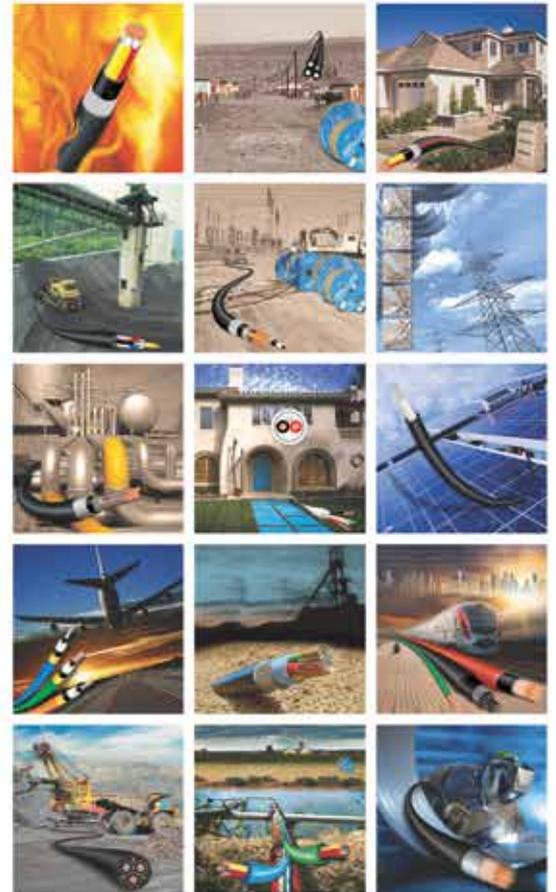
satisfy end-users in their search for optimised solutions for better, faster and more economic production, and panel-builders in their search for equipment that is more reliable and easier to install and maintain.

"In a constantly changing industrial and economic world, you need to be able to upgrade your installations at all times to remain competitive. The Blokset modular switchboard is able to overcome these challenges," he says. Both green and safe, all the components of a Blokset switchboard are designed and produced by Schneider Electric. Blokset incorporates state-of-the-art Schneider Electric components, such as conventional and intelligent motor control centres (MCC/iMCC), variable speed drives and soft-starters. As such, it offers a unique global design with local implementation, allowing flexibility in project management, adaptability to local project habits and end-user needs.

"A great advantage is that Blokset is manufactured close to the end-user exclusively by Schneider Electric or **Schneider Electric** licenced partners. This guarantees the best delivered quality," says Smith. Referencing the earthquake earlier in 2014 around Orkney in

South Africa, Smith highlights that Blokset offers an extremely high level of reliability even in the most difficult conditions. "Blokset offers internal arc withstand in accordance to IEC 61641, earthquake and seismic zones withstand, as well as corrosive ambient protection – making Blokset ideal for mining applications," he adds.

**Enquiries: Ntombi Mhangwani. Tel. 011 254 6400 or email [ntombi.mhangwani@schneider-electric.com](mailto:ntombi.mhangwani@schneider-electric.com)**



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HPA – Health Products Association  
 ICRA – Infection-control Risk Assessment  
 MGPHO – Medical Gas Professional Healthcare Organisation  
 NFPA – National Fire Protection Association

Abbreviations/Acronyms

# Remote locating of transducers

By J Lucas, Tri-Tech Medical, Inc

As a design engineer, hospital facilities engineer or hospital administrator, you should be concerned about the installation location of the transducers for area alarm panels.

**W**hy is this? The long range cost and safety risk aspects of testing will be increased drastically if alarm transducers are installed above the ceiling.

Many project drawings have notations made by the design engineer for the area for alarm transducers to be installed remotely (not in the alarm back box) on the medical gas pipelines. It is then left up to the installing contractor to determine the exact location

on the pipeline. Unfortunately, in most cases the result is the transducers are installed above the ceiling. Initially this may be a seemingly cost effective way to install the transducers, as opposed to installing them in the alarm back box or in the zone valve box – but the long term testing costs and safety aspects involved with the testing will prove much more costly to the facility.



Left: E Z Backfeed.

NFPA 99 requires periodic testing of the area alarm panels which for most facilities is once a year. Proper testing requires that the transducers be physically disconnected from the pipeline to allow the pressure to fall below the low pressure alarm set point and then connected to a pump which raises the pressure above the high pressure set point.

This means that the certification and testing company will need to:

- o Find the correct ceiling tiles to remove for each alarm
- o Put a man on a ladder carrying test equipment, tools etc
- o In many facilities – erect a HPA or ICRA containment area tent and wear protective gowning and a breathing mask

‘Improving medical gas systems through innovation’.

If your facility has 20 area alarms, multiply the above additional costs by 20 and then by the number of years the system is installed. These are all additional long-term perpetual costs and safety risks that could have been avoided by simply installing the transducers in the alarm back box or in the zone valve box.

## Conclusion

Recognising this need, the company that the author represents, invented the E Z Find retro-fit kit and new installation products to help facilities lower their costs and improve safety. In addition, it should be noted that the initial installation cost is minimised because the E Z products eliminate the need to braze fittings (risers and tees) onto the pipeline above the ceiling or in the alarm back box.

## Reference

- [1] NFPA 99. 2015. Healthcare facilities code.

- o NFPA 99 requires annual testing of the area alarm panels.
- o There is cause for concern regarding the installation and location of transducers for area alarm panels.
- o A retrofit kit and new products are available for safe and cost-effective installation of transducers.



take note

Jim Lucas is vice-president for sales and marketing at Tri-Tech Medical, Inc. He is a member of the NFPA 99 technical committee on piping systems and a member of MGPHO (Medical Gas Professional Healthcare Organisation). Enquiries: Email jim.lucas@tri-techmedical.com

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Enquiries: Tel. 011 314 1391. Visit [www.za.krohne.com](http://www.za.krohne.com)

## Precise in all positions

**ifm electronic's** JN sensor for mobile applications features adjustable zero point, counting direction and limit frequency. The inclination sensor provides reliable measurement of angles of inclination. The unit has a high precision across the total angular range in two axes and an extremely low temperature drift of  $\pm 0,002$  °K. The JN sensor is designed for levelling mobile machinery (2-axis position detection and zero-point levelling), automatic adjustment of solar panels or levelling of wind turbines, for example. Since zero point, direction of counting ( $\pm 180^\circ$  or  $0 - 360^\circ$ ) and limit frequency can be set for a stable output signal (20, 10, 5, 1, 0,5 Hz), the sensor can be adapted precisely to different applications. The sensor with CANopen interface and bus capability allows complete CAN integration according to the communication profiles CANopen CiA DS-301 and CiA DSP-410. Connection is made using M12 connectors with clearly visible LEDs. Enabling the terminating resistor is optional. In addition, the sensor has E1 approval and provides the signals, among others, as perpendicular or Euler angle. The inclination sensor guarantees optimum reliability with maximum precision.

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## Sensors for fluid engineering

Wenglor, has introduced a new state-of-the-art sensor measuring product range dedicated to fluid engineering. Based on a patented process which is unique in the field of flow sensor technology allows the WenglorFluid devices to be mounted regardless of position and flow direction and still provide precision measurements.

### UniFlow sensors

These ascertain the flow velocities of oily and aqueous media in closed piping systems. They do not have to be aligned to the direction of flow during installation as heating and the temperature sensor are located in the tip of the device.

### UniBar pressure sensors

The sensor measures the relative pressure of any desired media in closed systems within a range of -1 to +600 bar. Wenglor pressure sensors with metallic membrane are highly suited for areas with strict hygiene requirements such as in food and pharmaceuticals. They are flush-mounted and therefore compatible with pipe cleaning devices.

### UniTemp temperature sensors

The measure the temperature of liquid and gaseous media and make it possible to monitor temperature within processes. They can be used under greatly varying ambient conditions as the switching points can be individually adjusted within a measuring range of 0 to 200 °C. Wenglor is exclusively represented by Randburg-based company, ASSTech.

**Enquiries: Anastas Schnippenkotter. Tel. 011 708 9200 or email info@asstech.co.za**



## Safety light curtains – linked versions

Leuze MLC 500 safety light curtains are now also available as linked versions, says Gerry Bryant, managing director, **Countapulse Controls**. "In those instances where multiple-sided access guarding is required or point-of-operation guarding is to be combined with area protection as stepping-behind protection, the use of cascaded MLC devices reduces the cost of installation and cabling considerably." Rigid L and U-shaped connections as well as variants with flexible cable connections can be used. The host-guest variants are Type 4 devices that provide reliable protection without dead space and with maximum availability. A particular feature is that they are unusually slim (29 mm x 35 mm) and extremely sturdy due to the slightly set back front screens, reinforced side walls and metal end caps. Installation of the MLC safety light curtains is very easy due to the large variety of possible mounting brackets. The Leuze MLC 500 series includes the newest generation of extremely

sturdy Type 4 safety light curtains. Three function classes – Basic, Standard and Extended – enable the most efficient use of devices from simple standard applications to complex controlled special safeguarding processes. The devices can be used universally, due to metal end caps, a flexible fastening concept and the option of form-locking installation. There are also variants which have an AIDA-compliant pin assignment. AIDA is an acronym for Automatisierungs-Initiative deutscher Automobilisten, or the Automation Initiative of German Automobile Manufacturers. The basic version of the Type 4 safety light curtains provides the most important functions such as range reduction on the transmitter, reversible transmission channels, a LED display and automatic start/restart interlock. Features include the prevention of mutual interference of the sensors by selectable transmission channels and range reduction, if applicable.

**Enquiries: Gerry Bryant. Tel. 011 615 7556 or email bryant@countapulse.co.za**



## Ac current transducer with large window

NK Technologies of San Jose, California, has released a new series of large split-core ac current transducers. The large window measures 86 x 58 mm and is available in four current ranges from 800 A to 1 600 A with the industry standard 4 – 20 mA looped powered output.

Available from **Denver Technical Products**, the ATR series incorporates a TRMS processor and will accurately read distorted wave forms. The AT series is a lower cost average responding unit.

**Enquiries: Tel. 011 626 2023 or email denvertch@pixie.co.za**





The replacement of original sensing, measuring and monitoring devices represents a perfect opportunity to assess a specific application and the suitability of the equipment. "A more fit for purpose solution, based on the incorporation of new technology, could be considered at this stage," Gerry Bryant, managing director of Countapulse Controls, says. "It is entirely possible that selection of the original units occurred with one particular machine, rather than the entire process, in mind. When replacing these units, it is then possible to achieve a more holistic overview of the process. In so doing, the supplier will be able to provide a far more cost efficient and plant related solution. This is becoming ever more critical as process plants and manufacturing operations are facing increasing pressure to cut costs," Bryant comments. Business methodologies have had to adapt as sensing and measuring technology itself has developed. In keeping with this transformation, **Countapulse Controls** has evolved from being a supplier of technologically superior sensing and monitoring devices to a solutions provider offering advanced technology packages that incorporate high

## Fit-for-purpose solutions

level support. This is underpinned by assistance in both the selection of application appropriate and cost effective solutions, as with the installation of total systems. "When one considers a customer's application, it is best to look beyond a single problem area. A more structured approach is needed in order to obtain a general overview of the customer's specific requirements. By considering the overall operation of the plant, one will be able to find a solution that will encompass any unforeseen needs within the process," Bryant says. "It is important to comprehend that selecting sensors is not as simple as matching a model number to a requirement. One needs to assess the operating environment and gain a comprehensive understanding of the elements that need to be monitored and what would be the most appropriate product from a 'big picture' perspective." Parameters that need to be taken into account include the range of the sensor, the speed of the automatic process, the background conditions and type of product, auxiliary equipment and the circuits within the process. An example is selecting a photo electric sensor that is suitable for various switching distances within a plant. "The customer then has the option of standardising on one sensor type, as opposed to having different devices throughout the process, which will reduce parts inventory

and associated operating costs," Bryant says. A failure to understand the full capabilities of a specific device could result in the selection of a far costlier sensor, when a more cost effective option would suffice in a particular application. Technical acumen and experience play a large role in reducing the effects of human error, which could result from uninformed product choice and the absence of appropriate technical counsel. This is where a dedicated technology and solutions provider like Countapulse Controls plays a vital role. "Each application has unique, specific needs. In order to provide a balanced solutions driven approach, it is advisable to select a supplier with extensive industry knowledge and a diverse portfolio of customers." Countapulse Controls is able to provide its local customers with the latest technology and innovations being introduced into major international markets such as Europe and the US. "By maintaining excellent relationships with our principals, in addition to an intimate understanding of the local market, we are able to identify those products that are most suited to the southern African context. This differentiates us from online suppliers that are merely selling boxes, as opposed to application specific solutions," Bryant concludes.

**Enquiries: Gerry Bryant. Tel. 011 615 7556 or email [bryant@countapulse.co.za](mailto:bryant@countapulse.co.za)**



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# 'Transforming' transformer monitoring technology

By R Gouws, Powertech System Integrators

*Effective early warning systems ensure that transformers can be monitored and appropriate action can be taken; meaning that outages, maintenance and even replacements can be planned.*

The good news is that there are a number of monitoring techniques that can be utilised – including thermal modelling, frequency response analysis and partial discharge analysis. Dissolved gas-in oil analysis (DGA) – the analysis of transformer oil to help determine the presence of dissolved gases - is recognised as an effective (and often preferred) method of obtaining valuable diagnostic information, symptomatic of a transformer's 'health'. So which methodologies are most effective and which tools are available to assist in the process?

## Keeping watch

While in operation, transformers are under constant stress owing to the heat effect of the current flow and electrical stress. These stresses are dissipated by a combination of the paper insulation and the insulating oil carrying heat to a heat exchanger. Under regular operation, condition stresses are normal and a feature of equipment use. However, these stresses can be aggravated by the loss of mechanical strength owing to ageing; the loss of electrical strength due to moisture in the paper or oil; the build-up of sludge in the tank and particulate matter, which may be suspended in the oil; and the poor circulation of the oil and hence poor dissipation of the heat generated in the transformer. Overly stressed transformer insulating systems can lead to deterioration of the mechanical strength of the paper insulation and, as a result, reduced structural strength of the transformer itself. With structural loss, the possibility of a collapse of the core exists, which could potentially cause a catastrophic failure to occur, resulting in total loss of the asset. In order to prevent this, being aware of the condition of transformers in a fleet, even less critical ones, is essential and will ensure that managers are able to determine when services need to be conducted or when transformers need to be replaced; ultimately increasing efficiency. Unplanned outages are also minimised, as advanced warning enables planning (people, spares) and ultimately reduces the length, cost and consequences of the outage.

- o When in operation, transformers are under constant stress.
- o Dissolved gas-in-oil analysis (DGA) provides a non-intrusive, virtual window into a transformer's internal operating conditions.
- o DGA has become an industry standard.



## The 'ABC' of DGA

It goes without saying that DGA has become an industry standard and provides a non-intrusive, virtual window into a transformer's internal operating conditions. When a transformer thermal or electrical fault occurs, oil and paper insulation will break down generating gases that dissolve back into the insulating oil. DGA assists in identifying the type of gas present and, consequently, the nature of the fault. The rate of increase in the gases then indicates the severity of the fault. As the global transformer fleet ages, DGA has become a prevalent and important technique, increasing the reliance on DGA systems. Numerous standards now exist to guide users in performing DGA and then interpreting the results and ensuring that asset management is efficient and cost effective. These standards are produced and supplied by, among others The American Society for Testing and Materials (ASTM), The Institute of Electrical and Electronics Engineers (IEEE) and The International Electrotechnical Commission (IEC). An effective DGA monitoring programme allows power suppliers to:

- o Extend asset life through advance warning of developing faults
- o Reduce maintenance costs through convenient and efficient scheduling of repairs
- o Maximise asset capability by monitoring the effects of increased loading
- o Implement end of life 'intensive care' timeously, reducing the possibility of unexpected and costly failures

*Knowing how transformers are faring at every point in their lifecycle is essential.*

Furthermore, online DGA has additional benefits:

- o Constant monitoring of the entire system for incipient faults
- o No waiting for results back from the laboratory
- o Earliest possible detection – real time analysis
- o Access to data off-site and the ability to remotely diagnose incipient faults
- o First actions can be taken immediately, without the need for a visit to site
- o Multiple communication methods on online monitors facilitate integration to Supervisory Control And Data Acquisition (SCADA) computer and other operational systems

- ASTM – American Society for Testing and Materials
- DGA – Dissolved gas-in oil analysis
- GLA – Gas Level Alarm
- IEC – International Electrotechnical Commission
- IEEE – Institute of Electrical and Electronics Engineers
- PAS – Photo-acoustic spectroscopy
- PD – Partial Discharge
- RTU – Remote Terminal Unit
- SCADA – Supervisory control and data acquisition

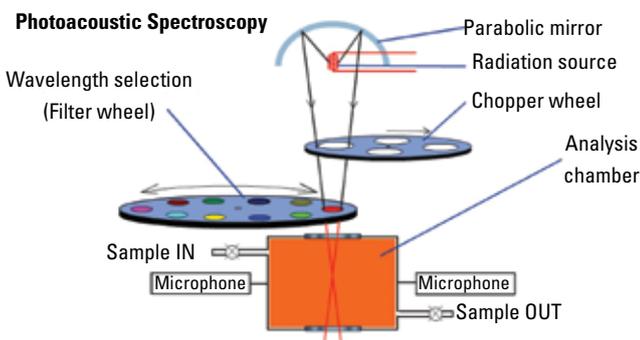
## Abbreviations/Acronyms



- o Access to powerful modern software tools to store, monitor and analyse data on transformer fleet

### The 'how to' of extracting gases

For critical and high-cost transformers online multi-gas monitoring can help identify individual fault gases and provides remote, automated diagnostics together with communications to enable operational decisions without going to site. Multi-gas units make use of photo-acoustic spectroscopy (PAS), where gas is removed from the oil prior to quantification. After removal from the oil the gas sample (containing key gases) is passed to the chosen detector such as a photo-acoustic spectrometer. Measured quantities of gas are then related back to gas-in-oil according to standard calculations based around the particular gas extraction technique employed.



A device such as the Transfix unit makes use of the PAS methodology and continuously monitors the discrete concentration of eight key gases /moisture in the insulating oil of transformers, the estimated concentration of nitrogen, the transformer load current and the ambient temperature. It will alert personnel of fault conditions at an early stage and provide vital health information on the transformer.

This system can be further enhanced by connecting the Intellix BMT 300, which provides a more comprehensive view of a transformer's overall condition. This integrated solution allows for the monitoring of DGA and moisture content in oil, bushing insulating deterioration and will also detect partial discharge (PD). The diagnostics can be downloaded and visualised utilising comprehensive diagnostics software (such as using GE's PERCEPTION software package), simplifying the analytical process.

### The 'H' factor

For lower-end transformers that are typically left unmonitored, keeping track of hydrogen levels specifically is not only a cost effective

method, but also an accurate indicator that other gases may soon be present. Nevertheless, if hydrogen is the main gas being produced in significant quantities, the likely causes may be stray gassing of the oil or partial discharges in the transformer. These are both occurrences that are important to take note of and act upon.

This is why the GLA100, a small intuitive and innovative fault gas level alarm, is such a reliable warning solution that assists with just that. Using a composite gas sensor, the system responds 100 % to hydrogen (general fault gas) and is also sensitive to carbon monoxide (overheated paper insulation). Hydrogen present in transformer oil is indicative of mineral oil decomposition, thermal faults, partial discharge and arcing. The GLA100 instrument sends out a warning signal when levels of hydrogen are detected, enabling further investigation of the developing fault condition. The device can communicate directly with a laptop or can be connected to the SCADA computer system via the remote terminal unit (RTU). For added benefits, the GLA100 is best paired with a portable eight gas monitoring unit, to ensure for the most comprehensive, on-site DGA readings.

### Conclusion

The fact remains that transformers are a critical (and costly) component of an electrical grid – in order to have a robust, reliable and sustainable network, knowing how they are faring at every point in their lifecycle is essential. DGA is now widely accepted as one of the most effective method of assessing the health of a transformer. Critical generation and transmission transformers should be equipped with comprehensive online multi-gas monitoring systems, which provide diagnostics instantaneously. As a transformer becomes less critical the number of gases monitored decreases. This is why single gas units offer a cost effective way to monitor transformers that would normally be overlooked. The advantages of accurate and effective transformer monitoring cannot be discounted – being able to focus asset replacement strategies, extend asset life, effectively budget for future expenditures and, ultimately, reduce maintenance costs and the risk of catastrophic failure and planned outages.

Rudi Gouws is a business development engineer at Powertech System Integrators (PTSI), a subsidiary of the JSE listed Altron Group. He holds a diploma in mechanical and electrical engineering and is a qualified electrician. He has over 20 years' experience in the industry, having worked in both private and public sectors. His focus areas include DGA, project management, electricity distribution network system design and planning, cable installation and technical management and support. Rudi is a member of the South African Institute of Electrical Engineers (SAIEE).  
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## Current measurement – three phase

ProSys of the UK have released a new series of 3Ø micro-flex Rogowski current probes – available from **Denver Technical Products**. There are three current ranges, 10 A/100 A/1 000 A, with a frequency response of 20 Hz to 10 kHz (-2 dB). The battery life is typically 1 000 hours. The probe aperture diameter is 50 mm, there are however other models available up to 100 mm. The three separate coax output cables are terminated with a safety BNC connector. Battery life is typically 1 000 hours.

*Enquiries: Tel. 011 626 2023 or email [denvertch@pixie.co.za](mailto:denvertch@pixie.co.za)*



## New high resolution spectrometer – elemental analysis

**SPECTRO** Analytical Instruments has introduced its new SPECTRO ARCOS high-resolution ICP-OES spectrometer, the first and only spectrometer featuring the fast and convenient selection of axial plasma or radial plasma observation in a single instrument – without any optical compromise.

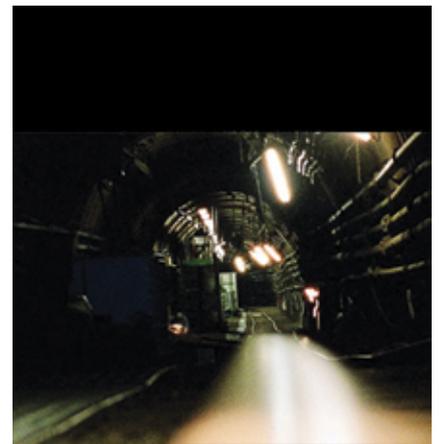
Designed for use in the most demanding elemental analysis applications in industry, science, and academia, the new SPECTRO ARCOS easily surpasses the performance limitations of conventional ICP-OES instruments – dramatically improving sensitivity, stability, and precision, while lowering operating costs with the introduction of innovative components, unique capabilities, and optimum flexibility.

The new SPECTRO ARCOS establishes a new ICP-OES performance class for complex analytical tasks – resolving a wide array of inherent problems in traditional spectrometer design – and caps 30 years of SPECTRO experience in developing advanced solutions for the elemental analysis of metals, chemicals, petrochemicals and other materials.

Features of the new SPECTRO ARCOS include:

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- No external cooling system

*Enquiries: Email [spectro.info@ametek.com](mailto:spectro.info@ametek.com)*



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## Mains-powered BL 513 standard signal isolator

The BL 513 standard signal isolator and amplifier from Knick's BasicLine series is a high-end yet very affordable device for reliable signal conversion and transmission in common applications. It features reliable galvanic three-port isolation of input, output, and auxiliary power supply, which prevents measurement errors or distortion.

The BL 513 range is designed for a 300 Vac/dc working voltage and supports easy handling. The calibrated range selection function makes manual adjustments unnecessary. Furthermore, DIP switches allow for easy configuration while being protected against accidental changes. Thanks to an integrated wide-range power supply the isolator can be operated both

with 24Vdc supplies and 100-230Vac mains supplies. The BL 513 is CE-compliant and UL-certified. Knick provides a three-year warranty for the device. Strictly concentrating on basic functions, leaving all extras aside, Knick has tailored BasicLine devices to mechanical engineering companies that need precise and reliable yet cost-optimised isolators for large-scale applications. Notwithstanding the attractive price scheme, the devices feature Knick's characteristic high level of manufacturing quality and precision as well as complete galvanic isolation. BasicLine comprises transducers for all major control cabinet requirements: Current, voltage, or temperature measurement, conversion of standard

signals or measured values, signal isolation, and set-point monitoring.

**Mecosa** is the sole agent for Knick Elektronische Messgeräte in Southern Africa.

**Enquiries: Tel. 01111 257 6100 or email e-mail: [measure@mecosa.co.za](mailto:measure@mecosa.co.za)**



## New relays make safety simpler

With just three models, safety relays in the new G9SR range from **Omron** cover virtually all common control system safety requirements in standalone applications. With built-in intelligence that maximises their flexibility, the new relays feature front-panel DIP switches for fast, easy configuration and customisation, together with LED indicators for at-a-glance status monitoring and fault diagnosis.

Key characteristics of the new safety relay modules include certification to category PLe in line with EN/ISO 13849-1, fast response time to ensure minimum stopping times, solid-state outputs for long-life wear-free operation, compact housings to save space in control panels and removable spring-type terminals to ensure rapid straightforward installation. All units are equipped with an additional monitoring output to provide diagnostic information for use by the standard control system.

The basic unit in the G9SR family is just 17,5 mm wide and has single- or double-channel safety inputs, plus double-channel solid-state safety outputs. The outputs are rated at 2 A, which makes them suitable for direct switching of even large contactors.

Complementing the basic unit is the advanced unit, which is 22,5 mm wide and has single- or double-channel safety inputs plus double-channel safety relay outputs rated at 5 A. For applications where input expansion is needed, each advanced unit can control up to two G9SR basic units that are configured as additional safety inputs to the same safety function.

**Enquiries: Michelle le Roux. Omron. Tel. 011 5792600 or email [michelle.le.roux@eu.omron.com](mailto:michelle.le.roux@eu.omron.com)**



## Rugged cellular router offers Broadband wireless connectivity

**Siemens Ruggedcom RX1400** is a multiprotocol intelligent node which combines Ethernet switching, routing and firewall functionality with various WAN connectivity options. The device is IP40 rated, does not use fans for cooling, operates continuously within a -40 °C to +85 °C temperature range and comes with a rugged metal housing that supports DIN rail, panel, or rack mounting. The Ruggedcom RX1400 provides a high level of immunity to electromagnetic interference, heavy electrical surges, extreme temperature and humidity for reliable operation in harsh environments. The integrated GNSS (GPS/GLONASS) functionality allows the device to report its location as necessary for asset tracking purposes in large scale deployments.

The Ruggedcom RX1400 is designed to support primary communications over commercial LTE networks and leverage LTE's enhanced capabilities for QoS (Quality of Service) management. For reliability purposes the device is able to rollback to 2G and 3G wireless connectivity. In addition the cellular router is equipped with a Dual SIM card slot which enables automatic failover in case of interruption in the communication. The device can also be used with two optional small form factor pluggable fibre optic transceivers (SFPs), to establish wireline communication in areas where fibre is available.

**Enquiries: Email [keshin.govender@siemens.com](mailto:keshin.govender@siemens.com)**



## LV panel range successful in latest IEC standard testing

**Shaw Controls**, a member of the **ZestWEG Group**, has successfully concluded a programme of product tests on its low voltage range of panels at the SABS-NETFA laboratory. Tests were performed in accordance with the latest IEC protocols, namely IEC 61439-2 Ed 1 / SABS 61439.

“Shaw Controls has recognised a trend in the market whereby clients are requesting 690 V as their primary voltage, and in that regard we have taken the initiative of testing our product range at 690 V. The successful tests demonstrate Shaw Controls’ engineering capability and build quality, which reaffirms our commitment to the industry,” Bevan Richards, managing director at Shaw Controls, says.

The latest certification not only gives the company a significant advantage in the local market, but boosts the capability of the Zest WEG Group to offer a total solutions approach to its customers.

**Enquiries: Kirsten Larkan. Tel. 011 723 6000 or email [kirstenl@zest.co.za](mailto:kirstenl@zest.co.za)**



*Santos Ferreira, Product Development Specialist at Shaw Controls, facilitated the testing of the Motor Control Centre (MCC) panels submitted for IEC testing.*

## High pressure waterblast hose ensures operator safety

Power management company **Eaton** has launched the new Safeshield EC910 high pressure waterblast hose for their customers in Africa. This engineered hose is designed to ensure the highest levels of safety in settings where workers are performing non-polluting industrial cleaning, stripping and removal of corrosion, paint, chemical and organic residues.

“With pressures high enough to meet even the most stringent waterblast applications, the Safeshield EC910 hose is the latest in Eaton’s long line of high-quality waterblast hose assemblies,” said Leonard Myburgh, product manager, Eaton, Africa.

“This next generation hose is custom designed to perform at five times the industry impulse cycle life requirement, demonstrating Eaton’s dedication to reaching the highest levels of reliability, operator safety and commitment of building a more energy efficient Africa,” he added.

Capable of withstanding operating pressures as high as 1 100 bar (16 000 psi), EC910 meets and exceeds the International Organisation for Standardisation (ISO) 7751 requirements. It is constructed with heavy steel wire reinforcement, featuring Eaton’s highly abrasion resistant Dura-Tuff hose cover, providing excellent flexibility,

long service life and ease of handling in the field. EC910 is available in sizes -08, -12 and -16, approved for working pressures from 1 100 bar to 690 bar (16 000 psi to 10 000 psi), respectively, with a burst factor of 2,5 times the normal working pressure. Eaton’s waterblast hoses are assembled by professionally trained personnel to ensure the highest quality available. These hoses are also available in 15 m (50 foot) and 20 m (66 foot) lengths, with the following qualified hose fitting styles: male NPTF, DKO, and BSPP.

**Enquiries: Leonard Myburgh. Tel. 011 961 2400 or email [LeonardMyburgh@Eaton.com](mailto:LeonardMyburgh@Eaton.com)**

## Controlled access and high level of cleanliness

**LH Marthinusen’s** Johannesburg transformer manufacturing and repair facilities needed to ensure that entrance to their winding shop was subjected to a controlled access process to guarantee the highest levels of cleanliness. Based on Apex Strip Curtains & Doors’ reputation and product offering, LH Marthinusen selected their SR 9000 heavy duty insulated impact traffic door. Apex delivered and installed the two double doors and two single doors after assessing the optimum solution for the facilities. “By ensuring that the lowest possible amounts of dust and other contaminants enter the section where winding assembly takes place, we are able to improve transformer lifespan. Our existing barriers included wooden doors, which were unable to ensure the high levels of cleanliness we required. One of our larger clients regularly performs site inspections and the inclusion of superior



quality heavy duty doors formed a focal point of our ongoing improvement programme to retain preferred supplier status,” says Corné Pretorius, electrical planner for large transformers at LH Marthinusen. Pretorius is particularly pleased with the durability provided by the bull nosed edge on the perimeter edges of the door.

“The doors are subjected to a fair amount of knocks and bumps and have to date shown absolutely no signs of wear. This is an important factor, contributing to the reliability and longevity of the door, which in turn ensures that the environmental impact on the insulated winding facility is kept to a minimum over extended periods of time.” High bumpers are also fitted to the door panel to further absorb impact from forklift trucks and carts and reduce stress on hardware and mount assemblies.

**Enquiries: Wim Dressing. Tel. 011 452 8723 or email [WimSnr@apexstrip.co.za](mailto:WimSnr@apexstrip.co.za)**

# Control valve redesign to increase productivity

By E Ermel, AZ-Armaturen South Africa

*Do you have inaccurate control? Abrasion or corrosion? Costly maintenance? Are these familiar control valve problems?*

It happens too often, that the valve selection is based on the principle: 'What you can get to do the job' instead of: 'What is best to do the job?'. AZ-Armaturen (referred to in the article as the company) has recognised the need for a flexible control valve solution which simultaneously offers high accuracy, extraordinary abrasion and corrosion resistance and low maintenance cost. The company's redesigned control valve range RH combines these features in order to provide more flexibility and increase productivity.

The construction of the RH control valve range is based on the standard cavity and maintenance free plug valve with a sleeve or chemical resistant lining. This rotary valve makes it possible to use any kind of quarter turn pneumatic, electric or hydraulic actuator and is not limited to any specific type of positioner. This offers the end-user the flexibility to use this control valve with their standardised types or brands of actuators and positioners. The company's quarter-



turn control valves suit hazardous, aggressive, erosive, abrasive, coking, solidifying and other hard-to-handle mediums. They are commonly used for control or throttling purposes in process, chemical, refining, mining, pulp and paper, power, and food industries.

*Figure 1: Control valve RH-Series with pneumatic actuator and electro-pneumatic positioner.*

The most outstanding innovation of the redesign is that every valve size is available with ten different plug forms, consisting of five linear and five equal percentage control characteristics. This offers the flexibility to choose the plug with the correct Kvs/Cv value for every valve size to provide best possible control accuracy.

This feature helps in the case of existing installations because the Kvs/Cv value can be changed without amendments to the pipeline

and it also helps for new installations because the complete detailed design can be done and at the very end the final decision about the necessary Kvs/Cv value of the valve can be made. Additionally, if the process requires a specific control characteristic which cannot be reached with one of the standard plug shapes, for example if the valve must fulfill control properties but also have a free passage if fully open, customer specific characteristics can be calculated, simulated, designed and manufactured.

In case of very large flow rates the type 'extra' full bore plug valve with an equal percentage characteristic is recommended. The 'extra' valve has a Kvs/Cv value which is between four to six times higher than a conventional globe valve.



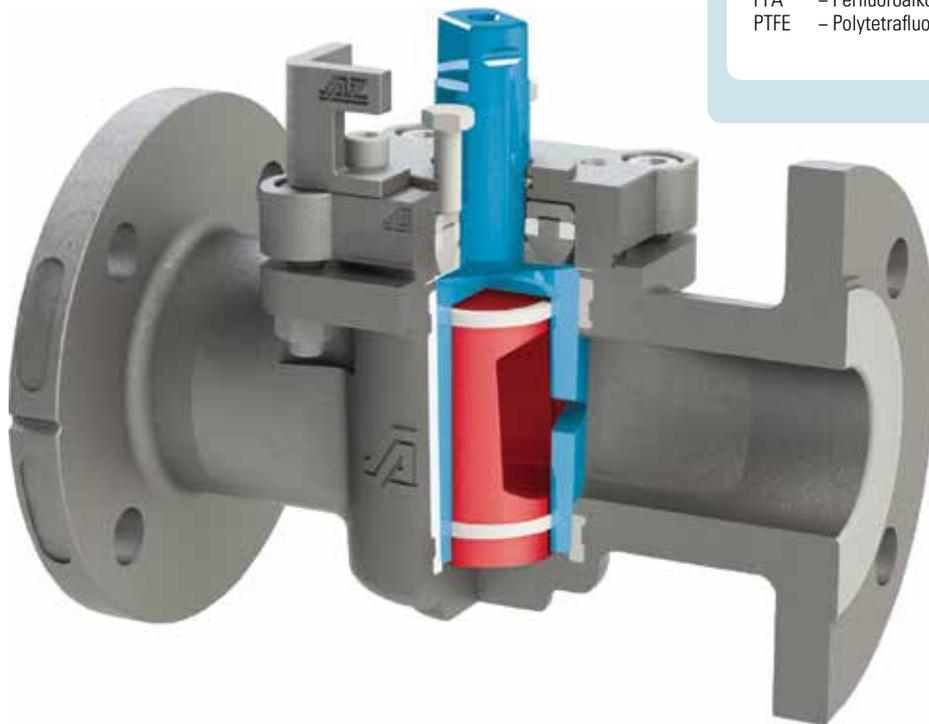
*Figure 2: Control Plugs, fully PTFE lined with equal percentage and linear characteristics.*

The experience of the company as manufacturer of valves for corrosive and abrasive processes makes it possible that a wide range of materials for housings, plugs, as well as for sleeves and linings are available for different areas of application. Ceramic plugs and tungsten coated materials are also used for highly abrasive processes. Therefore, the valve can be used in various chemical and petrochemical processes with aggressive fluids, powders, slurries or gases.

The complete valve can either be manufactured in special materials or a fully PFA/FEP/PTFE lined version can be provided where all parts which are in contact with the media are protected with a lining. Using the plug valve in hazardous and aggressive environment is also supported by the fact that three independent sealings/ packings make sure that the valve offers reliable tightness to atmosphere. The company's plug valves are certified according to the high fugitive emission standard TA-Luft VDI 2440 [1]. Tests with up to 60 000 switching cycles and temperature ranges from -20 °C up to 220 °C were carried

FEP – Fluorinated Ethylene Propylene  
 PFA – Perfluoroalkoxy Alkanes  
 PTFE – Polytetrafluoroethylene

## Abbreviations



*Cut-away control plug valve with protection insert.*

out according to operation and test conditions of ISO 15848-1 [2]. In order to provide the correct sealing for the various applications, all the company's safety sealing solutions are available for the control valves as well. This includes fire-safe sealing, different executions for fluctuating temperatures as well as for toxic and hazardous mediums.

The RH-S series is fitted with an additional internal protection insert. This protection insert, often also called a cage, is recommended for protecting the sleeves when there is a high flow velocity, a high pressure drop and abrasive and solid containing mediums.

The design of the protection insert allows the plug to rotate freely around it within the body. The cage is stationary in the body while the plug rotates. The protection insert can also contribute to an increase in service life.

*There is a need for a flexible control valve solution which simultaneously offers high accuracy.*

The RH control plug valve is suitable for many different applications. This valve is available in pressure classes ANSI 150 and ANSI 300 (PN 10-40), temperature ratings of -100 °C to 300 °C and sizes from ½" to 24" (DN15 – DN600). Furthermore, the control plug valve can also be supplied with a heating jacket.

- o Valve selection should be based on the question: 'What is best to do the job?'
- o A flexible control valve solution –with high accuracy, extraordinary abrasion and corrosion resistance and low maintenance cost – is necessary.
- o This company has introduced a solution which offers all that is required.



take note

## Conclusion

The complete valve range provides mounting dimensions according to ISO 5211 [3] so that it provides the necessary flexibility to mount any kind of quarter turn actuator. This feature makes it convenient for the end user who might have a standardised type of actuator or positioner. The company will be able to dimension the correct actuator size and choose the right positioner with the necessary features to provide a fully functional control unit which will be mounted and tested in the company's workshop and delivered with the relevant test and material certificates. Actuation solutions for ATEX areas, with fail safe functionalities, for high-temperature environment, with partial stroke testing, with fieldbus-communication, are available and are only a smattering of the many different technical options which can be offered.

## References

- [1] VDI 2440.2000. Guideline - refers to average gas-like emissions for differing gasket systems but these are not upper limits.
- [2] ISO 15848-1. 2006. Refers exclusively to valves and describes, independent of the guidelines of TA Luft and VDI 2440 respectively, detailed tests for determining leakage and the creep behaviour of valves.
- [3] ISO 5211. 2001. Industrial valves – Part-turn actuator attachment.



Erich Ermel runs AZ-Armaturen South Africa which is situated in Boksburg, Gauteng, South Africa. He is a Swiss National and has a mechanical engineering degree and an MBA. Enquiries: Tel. 011 397 3665 or email sales@az-armaturen.co.za

### Extending the range of diaphragm valves

Originally, this specially sealed version was developed from the GEMÜ 601, 612 and 673 basic types to suit particular customer requirements, and the new GEMÜ 673P9 version will now extend the current portfolio.

The manually operated valve is available in nominal sizes DN 8 to DN 50, and has an additional seal provided by silicone O-rings which seal the interior of the bonnet housing from the outside. This prevents, among other things, lubricant which is normally used for lubricating the spindle, from leaking when autoclaving. It also prevents moisture and dirt from entering the bonnet interior. The GEMÜ 673P9 diaphragm valve is autoclave-capable and sterilisable, as well as CIP/SIP capable.

As with the basic types, a standard seal adjuster and optical position indicator are also integrated in the new version. Thanks to their compact design, the valve bonnets are also suitable for use on multi-port valve blocks and tank valves.

Enquiries: Email [eva.zink@gemue.de](mailto:eva.zink@gemue.de)



### Steam jackets for valve bodies

Mitech designs, fabricates and tests its steam jackets to ANSI B16.34 - 1998. The steam jackets are designed to keep the valve body at a set temperature.

A hot fluid such as steam, is circulated around the valve body keeping the fluid inside both warm and in a liquid state.

The steam circulates in the annular space between the jacket and the vessel walls and allows heat to be transferred through the wall of the vessel.

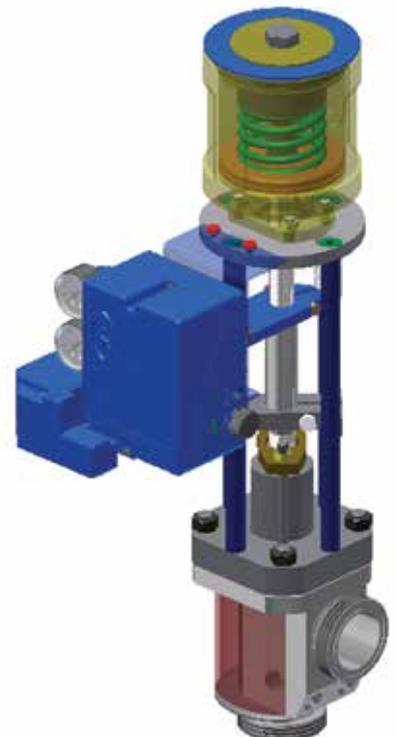
Mitech's hub end Inline Globe Control valve body is used as a base and is modified to incorporate the steam jacket.

Flange ends become integral, while the flange drilling incorporates blind tapped holes.

All valves are pressure and leak tested before and after jacketing.

There are numerous jacketing considerations, including flange size, full or partial coverage, types and locations of heated medium connections, materials, bonnet jackets or additional heat coverage for specific areas.

Enquiries: Pieter Badenhorst.  
Tel. 011 927 4850 or email [enquiries@mitech.co.za](mailto:enquiries@mitech.co.za)



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## New benchmarks for pneumatic valves

With the compact, lightweight design of its AV series, **Aventics** (formerly Rexroth Pneumatics) is setting new benchmarks for pneumatic valves. The AV05 valve system, the latest addition to the AV family, is designed to allow a closer mounting to actuators, lowering compressed air requirements! Its specialised designs optimise air-channelling for increased flow volume, up to 700 l/min, in minimal space. The result is the AV05 that provides air flow channelling performance that is the best in its class.

As with its already available 'little brother' AV03, the AV05 features an up to 45 % more compact size compared with similar valves on the market. "But the modular range consists of much more than the two valves," emphasises Wolf Gerecke, head of product management at Aventics. "Customers who last saw the AV03 one year ago will be surprised at all the new features the AV system offers today – we have consistently added new options."

Compared with previous valve systems, the AV series features fast switching times, a low weight, and a small size. As with the AV03, the flow in the AV05 valve system was also optimised. "The valves can be mounted closer to where compressed air is required," explains Gerecke. The decentralised Advanced Electronic System (AES) field-bus connection also does its part. The AES processes analogue as well as digital signals and allows for fast assembly and flexible use.

"We called all known principles of design, materials, and assembly into question during the development of this AV series," Gerecke reports. Firstly, the valve components in the housing are arranged

diagonally, saving up to 45 % more space and secondly shorter distances between the actuator and valve allow for compressed air savings of up to 20 %.

"These unique designs clearly show the innovative leap our AV family takes in pneumatics," says Gerecke. The concept required much more work and expertise than simply the idea of using the maximum length in a specified geometry. For example, high-tech polymers were implemented and a new injection-moulding process was developed specifically to be able to realise the design principle. These new materials make the product up to 40 % lighter.

**Enquiries: Erika Bennion. Tel. 011 971 9400 or email [erika.bennion@tectra.co.za](mailto:erika.bennion@tectra.co.za)**



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The most recent Electricity+Control Face Values feature Ian Jandrell with his February 2015 'comment' – and Rene Rose, SEW-EuroDrive's general manager (communications) who discusses the 2014 PneuDrive Challenge with a few people who were involved in this exciting engineering talent competition.



**Enquiries: Wendy Izgorsek, Editor, Electricity+Control  
Tel. 011 622 4770 or email [ec@crowm.co.za](mailto:ec@crowm.co.za)**

## Custom-designed actuators

**Mitech's** Pneumatic Rotary Actuators can be utilised in many industrial, R&D, laboratory, production and quality inspection applications which require rotary motion. These pneumatic rotary actuators can handle small to medium size payloads with rotation up to 90 ° and can be mounted and operated in any direction. By using the actuators, productivity is improved and costs are reduced. The Pneumatic Rotary Actuators are custom designed and require little maintenance. They are available with either a double crank mechanism for modulating control or a scotch yoke mechanism for on off duty. The actuators are field reversible from clockwise-to-close to clockwise-to-open. With their pneumatic piston design, the actuators are offered in large sizes and can be engineered and fitted to

most valves up to a 250 000 Nm torque. By utilising a square drive, the actuators can be mounted perpendicular to or inline with the pipe work and the adjustable end stops can be externally adjusted in both the open and closed position to within 7 °. The single spring design which is pre-stressed in a detachable pack make the actuator easy to assemble and disassemble. Pressure seals are all simple 'O' rings reducing maintenance costs.

**Enquiries: Pieter Badenhorst.  
Tel. 011 927 4850 or email [enquiries@mitech.co.za](mailto:enquiries@mitech.co.za)**





# New world of energy

## Digital, local and consumer focused

By J-P Tricoire, Schneider Electric

*Two main factors are causing the massive transformation in our energy world.*

The energy world is changing. From a concentrated and centralised system discovered in 1888, the energy system is evolving to a decentralised system with diverse energy generation sources. There are two main factors causing this transformation: the introduction of information technology in the energy sector, and the emergence of alternative energy generation sources at scalable levels.

### Convergence of IT and energy

In the past 20 years, internet has connected 2,5 billion people together. In the coming six years, this number will double. Concurrently the internet will connect 40 billion machines to those five billion connected people. The next stage of connectivity is about machines. The combination of IT software with electrical devices and products provides customers with real-time information and smart services that allow all stakeholders an opportunity to implement active energy efficiency, share better energy, and consume at the right moment across smart grids.

### Alternative energy generation sources

From the shale gas boom in America, to the rise of renewable in the energy mix, energy sources are widening and reaching scalability. The price of crystalline silicon photovoltaic cells for instance, has gone from USD 78 per watt to USD 0,72 in less than four decades (1978 to 2013, BNEF [1]). Policy driven markets have facilitated the deployment of these technologies that are reaching grid-parity in many markets. As of the first quarter of 2014, there are 79 countries where the price of photovoltaic electricity is equal to or less than the grid average price

[2]. This wider choice in energy generation sources, combined with the emergence of information technologies in the energy sector, are redefining the energy eco-systems on demand and supply side, and paving opportunities of increased efficiency at all levels, from people to power plant, to ensure a complete optimisation of the supply chain.

### Impact on entire energy chain

For consumers, the connection of energy systems, phones and machines, in everyday life provides real-time information on consumers' needs and offers an opportunity to control their consumption. It reduces the consumers' energy bill, and increases their purchasing power within a very short pay back. Access to real time information and flexible, connected devices, allow consumers to change their consumption patterns. They are empowered to choose when, what and how they consume energy, presumably when electricity is cheap and green. At the utilities and regional level, energy efficiency enables increasingly reliable supply and provides hedging against black-outs. It also saves significant amounts in investments costs by avoiding the creation of new plants. Energy efficient technologies also save significant amounts by increasing resilience, security and anticipation of extreme weather conditions. Utilities can connect supply and demand,

*The combination of IT software with electrical devices and products provides customers with real-time information and smart services.*

BNEF	– Bloomberg New Energy Finance
EU	– European Union
IT	– Information technology
OFCE	– Observatoire Francais des Conjonctures Economiques (French Economic Observatory)

## Abbreviations /Acronyms

and offer new services to their customers, so that they consume less and at a more optimal time. At a country level, the implementation of higher energy efficiency levels creates an economic opportunity for reduced public expenditure as Governments balance their energy trades that are causing major strains on the economy.

The EU energy balance has multiplied by six in 10 years, with oil imports alone reaching USD 500 billion in 2012 [3]. This is higher than the entire GDP of a country like Poland. The Efficient World Scenario put forward by the World Energy Outlook of the IEA, highlights that there could be USD 570 billion positive effect of the Energy Balance of five key regions, with China seeing USD 190 billion and India USD 110 billion of positive effect, through the implementation of a higher energy efficient scenario; as well as a huge potential for job creation, with estimates ranging from 800 000 to one million jobs by 2025 in a country like France [4].

### You and me

Individuals are at the centre of this new energy world – where roles are redefined. No doubt, utilities must keep their central role in this evolution and they are already rethinking the way they operate and address customers. Customers are changing in needs, behaviours as well as demands. This transition needs solid change management to avoid over-production. All stakeholders, utilities, cities, facility managers, technology suppliers, should be prepared to continue an evolution in their roles, in business models and in technology offers. The transformation places consumers at the centre and opens the way for new models of consuming energy and managing resources. A reliable and simple technology is needed to guide all through the various transitions.

### Technologies harness efficiency

Technologies exist to harness this efficiency at all levels. The evolution of technologies, through software and the internet of things, is opening new means of optimising the overall energy chain through systems of integration. Such systems ensure that energy is safe, reliable, green, and efficient for the least amount of money. Already, by using the internet to connect people to their environment, and their environment to the smart grid, by switching off automatically, by promoting consumption when energy is cheap and green, at least 30 % savings is achieved through energy efficiency measures that

- o Information technology and alternative generation sources are causing transformation in the energy sector.
- o Internet has formed the first stage of interconnectivity.
- o The next stage is about machines.



take note

do not involve major renovations or disturbances to the end-users. All this with paybacks of under three years. Software now allows the curtailment of peaks. As an example, Schneider's EnergyPool has curtailed over 1,7 GW of energy since its inception – equivalent to one nuclear reactor. Customers in buildings, industry, data centres and infrastructures, are offered a range of technologies, from products to systems and solutions, that restrain energy use and allow saving energy throughout the entire chain. While we should embrace cost-effective tactics to confront some of the major challenges of our generation – from resource scarcity, traffic congestion, pollution, and an increase in extreme weather conditions, as well as energy poverty and competitiveness – estimates show that over two thirds of energy efficiency's cost-effective potential is still not being implemented.

### Conclusion

It is clear that 'change is now'. Market failures and resistance to change explain this untapped potential. Payback times are short, within a few years, and investments are refunded by savings. Governments should create environments to facilitate the implementation of energy efficiency and smart grids. They should enforce a level playing field and ensure that all energy markets are free and competitive, notably by halting subsidies of fossil fuel technology. (Estimates show that there are still yearly subsidies of over USD 500 billion in fossil fuel generation and some renewable subsidies are no longer justified).

Transitions can be long. But this one is worthwhile and should be happening faster as it brings benefits to all – carbon emissions' reduction, consumer purchasing power, job creation, and country balance of payments and capital expenditure avoidance. It is time to power the people and unleash a new world of energy that is digital, local and consumer-focused.

### References

- [1] Bloomberg New Energy Finance (BNEF).
- [2] Al Gore; <http://www.politico.com>.
- [3] Enerdata, 2013.
- [4] Ademe, OFCE, 2013.



Jean-Pascal Tricoire joined Schneider Electric in 1986. He was appointed president and chief executive officer (CEO) in 2006 and named chairman and CEO in April 2013. His career at Schneider Electric has developed largely outside France in operational functions in Italy, China, South Africa and the USA. He served as vice executive president of the International Operating Division from 2002 before being appointed to chief operating officer (COO) in 2004. Jean-Pascal has been president of the France-China Committee since 2009. Jean-Pascal holds a degree in Electronic Engineering and a MBA. Enquiries: Véronique Roquet Montegon. Tel. +33 (0)1 41 29 70 76. Visit [www.schneider-electric.com](http://www.schneider-electric.com)

## First of its kind in Africa

The South Africa Department of Energy (DOE) awarded preferred bidder status for a 100 megawatt (MW) Concentrating Solar Power (CSP) project to a consortium led by **SolarReserve**, a leading global developer of utility-scale solar power projects and advanced solar thermal technology, and International Company for Water and Power Projects (ACWA Power), the Saudi water and power developer, owner and operator. The project was developed in response to the DOE's Round 3 (CSP) Renewable Energy Independent Power Producer Procurement Programme (REIPPPP). The Redstone Solar Thermal Power project, with the lowest tariff bid to date from any CSP project in the country, is scheduled to achieve financial close later in 2015 and commence operations in early 2018. The first of its kind in Africa, the Redstone Solar Thermal Power Project features SolarReserve's world leading molten salt energy storage technology in a tower configuration with the capability to support South Africa's demand for energy when it is needed most - day and night. The 100 MW project with 12 hours of full-load energy storage will be able to reliably deliver a stable electricity supply to more than 200 000 South African homes during peak demand periods, even well after the sun has set. Fueled completely by the sun, with no back up fuel required, the project also features dry cooling of the power generation cycle as an important element to minimise water use. The project technology will be based on SolarReserve's successful Crescent Dunes project in the US, which is complete with construction and currently in final commissioning.

*Enquiries: Email [Mary.Grikas@SolarReserve.com](mailto:Mary.Grikas@SolarReserve.com)*

## Real-time calculation and report output for work efficiency

**Yokogawa Electric Corporation** has introduced GA10 software, a PC based data-logging program that is used in the development and production processes in many different industries to collect, display, and record temperature, voltage, current, flow rate, pressure, and other types of data from instruments such as recorders, temperature controllers, and power meters. With this software, a system can be



built to collect data from Yokogawa data acquisition and recording devices and measuring instruments as well as third-party devices that support the Modbus general-purpose industrial communications protocol. This eliminates the need for advanced, but expensive system solutions such as SCADA software and DCSs.

- o Real-time calculation: GA10 release 2 has a function that can perform calculations using data from multiple channels and display the results in real time. No special knowledge of computer programming is required: users need only to enter a formula for the calculation in a spreadsheet cell.
- o Customised reports: While the earlier version of the GA10 software can printables containing data from multiple sources, GA10 release 2 can also print reports that contain graphs, text, and images. This function allows users to customise their reports for purposes such as filing to government authorities and reporting on product evaluation tests for their customers.
- o Improved connectivity with host systems: For improved connectivity with other companies' SCADA systems and higher-level databases, GA10 release 2 supports the OPC-UA industrial communications protocol.

*Enquiries: Tel. 011 831 6300 or email [Christie.cronje@za.yokogawa.com](mailto:Christie.cronje@za.yokogawa.com)*

## 3-Step energy management Smart Panel system

**Schneider Electric**, the global specialist in energy management, has announced the local availability of a Smart Panel system that will assist in fostering sustainable energy savings in small to mid-size buildings, such as public and commercial offices, retail premises and hotels.

Founded on Schneider Electric's energy management principle of 'measure, understand and save', the Smart Panel is an easy-to-deploy solution that addresses the urgent need to cut energy costs and meet regulations for green buildings. 'Measure and collect' is the first step, with the automation of energy consumption metering at source. Over the last decade, Schneider Electric has revolutionised low voltage switchboard technology to produce the Smart Panel, which is intelligently embedded with metering, control and communication capabilities. It not only simplifies daily operations, but also eliminates the traditional error-prone manual data gathering. The second step, 'collect to understand', is enabled by the Energy Server Com'X 200, a smart data logger that gives timely and secure access to the consolidated energy data. As facility managers need access to energy analyses to execute the third step, 'understand and save', Schneider Electric says that its StruxureWare Energy Operation service helps deliver energy savings and identify areas for continuous energy efficiency. As a cloud-based Software-as-a-Service (SaaS) solution, Energy Operation is cost-effective and users have access to the tailored-to-audience reports from anywhere and at any time for informed actions in order to meet energy goals.

*Enquiries: [Ntombi Mhangwani](mailto:Ntombi.Mhangwani@schneider-electric.com).  
Tel. 011 254 6400 or email  
[ntombi.mhangwani@schneider-electric.com](mailto:ntombi.mhangwani@schneider-electric.com)*



## Environmental audit for new Bokpoort CSP power plant

The ACWA Power Solafra's New Bokpoort Concentrating Solar Power (CSP) Plant is not only being built to harness solar power to supply into Eskom's grid to assist in alleviating the country's power crisis, but will also satisfy one of the National Development Plan's most crucial agendas and that is job creation in an area that sorely needs it.

**Royal HaskoningDHV** was appointed in 2010 to carry out the Environmental Impact Assessment (EIA) for the R 5 billion ACWA Power Solafra Bokpoort Concentrated Solar Power Plant situated at Bokpoort, which is 25 kms north of Groblershoop in the Northern Cape. In addition to this Royal HaskoningDHV was appointed to carry out two Basic Assessment Processes for the water supply pipeline from the Orange River. In 2013 Royal HaskoningDHV was appointed as the Environmental Control Officer (ECO) at the start of project construction which culminates in December 2015.

The approved EIA is for a 75 MW CSP Power Plant and currently a 50 MW plant is being constructed utilising parabolic trough technology which is the more suitable CSP technology option for the environment, especially avifauna.

Malcolm Roods, market segment leader, environmental services at Royal HaskoningDHV says, "When applying for an EIA it is important to ensure that the application is for a large enough area; as well as that the maximum capacity together with all relevant EIA listed activities are applied for". The EIA took just 11 months, with the recent basic assessment process taking only four months.

Roods believes that these good timeframes were only achieved with the help of the National Department of Environmental Affairs who assisted in achieving a much faster turnaround time, and that they should be commended. It is also important to involve all the relevant and affected stakeholders during the public participation process, like in this case Transnet, Eskom, etc.

Elton Julies, HSEQ manager ACWA Power Africa Holdings, states, "Bokpoort is different from other solar projects in that we can generate electricity from the solar power system during the night. We have 9,3 hours of storage capacity suitable for base load generation".

"The heat from the huge salt storage tanks is used to generate electricity for up to 9,3 hours during the night".

**Enquiries: Hillary Erasmus. Tel. 011 798 6000 or email [hillary.erasmus@rhdhv.com](mailto:hillary.erasmus@rhdhv.com)**



## 'Lima call for climate action'

The major outcome of the Lima (Peru) conference held from 1 – 12 December 2014, was the adoption of the 'Lima call for climate action' which captured progress made in the negotiations of the fair, inclusive and ambitious legal post 2020 climate change system to be agreed in 2015 in Paris and implemented beyond 2020. This decision focused on two key aspects, firstly, an agreed set of information required to underpin and inform each country's intended nationally determined contribution to the global climate change effort for the period beyond 2020; and secondly, the elements of the draft negotiation text that needs to be finalised in Paris next year. The significant proposal that South Africa made for the need to assess the contributions that will be made before Paris with a view of determining the aggregate effect of such contribution on the climate system was also agreed to.

**Enquiries: Email [Mediadesk@energy.gov.za](mailto:Mediadesk@energy.gov.za)**

## Integrated strategic management of rhinos

The Minister of **Environmental Affairs**, Edna Molewa, reported back on progress with regards to the integrated strategic management of rhinoceros in South Africa at a media briefing on Thursday, 22 January 2015. Cabinet approved the integrated strategic management on 6 August 2014. Key aspects of the integrated strategic management of rhinoceros include:

- o Managing rhino populations
- o Compulsory interventions
- o International and national collaboration and cooperation
- o Long-term sustainability measures

The Minister said significant progress has been made with regards to the implementation of the interventions.

**Enquiries: Email [Mediadesk@energy.gov.za](mailto:Mediadesk@energy.gov.za)**

## Minister meets with Energy Intensive User Groups

The aim of the meeting was to consult these key players in regard to the challenges of electricity supply, and to further strengthen the partnership in tackling these through collaborative approaches. In opening the meeting the Minister called on industry to do what it could to provide solutions, and committed the government to building and sustaining the industrialisation of the country. Various options, including co-generation and independent power producers (IPPs) would be pursued, as well as demand management strategies. IPP programmes would be accelerated, and the Minister undertook to address any legislative and regulatory constraints. The **EIUG** in turn committed its members to contribute its expertise to finding solutions, as it was currently doing through its participation in the Energy War Room.

**Enquiries: Johannes Mokobane. Email [Mediadesk@energy.gov.za](mailto:Mediadesk@energy.gov.za)**

## Bizz Buzz

### CESA CEO resigns

**Consulting Engineers South Africa (CESA)** President Abe Thela has stated that CEO Lefadi Makibinyane has unexpectedly resigned. Makibinyane said that it was not an easy decision for him to make, but he found it to be the most optimal decision to make at this time in his professional career. He thanked CESA for the opportunity and support it gave him over the past 18 months of his tenure, wishing CESA and the sector it represents all the luck going forward. "CESA acknowledges Lefadi Makibinyane's contribution to the organisation. We wish him well in his future endeavours, especially as the new CEO of Amatola Water," says Thela.

**Enquiries:** Dennis Ndaba. Email [dennis@cesa.co.za](mailto:dennis@cesa.co.za)

### Unlocking Africa's energy potential

Join the **Africa Energy Projects** Roundtable on 19 February 2015 to find out about current energy projects on the continent that would benefit from your private sector involvement. Come and meet with others whose goal is also the development and support of private-sector led economic growth in African countries through the development and efficient utilisation of presently untapped energy projects and resources. Learn about real, bankable projects and meet those from across the continent that are developing them.

**Enquiries:** Email [info@energyindaba.co.za](mailto:info@energyindaba.co.za)

### Victory as Shell finally pays out £ 55 M over Niger Delta oil spills

Oil giant **Shell's** long-overdue compensation pay out to a community devastated by oil spills in the Niger Delta is an important victory for the victims of corporate negligence, said Amnesty International and the Centre for Environment, Human Rights and Development. Six years after two oil spills destroyed thousands of livelihoods in the Bodo area, legal action in the UK has driven Shell to make an out-of-court settlement of £ 55 M to compensate the affected community. "While the payout is a long awaited victory for the thousands of people who lost their livelihoods in Bodo, it shouldn't have taken six years to get anything close to fair compensation," said Audrey Gaughran, director of global issues at Amnesty International. "In effect, Shell knew that Bodo was an accident waiting to happen." The wait has taken its toll on Bodo residents, many of whom had their fishing and farming livelihoods destroyed in the spill.

**Enquiries:** Email [louise.orton@amnesty.org](mailto:louise.orton@amnesty.org)

## World's first woman Snell Thermography instructor

Jeanrie Mellanby, with Comtest Technologies in Johannesburg since 2007, is the first woman worldwide to become a certified Snell Thermography instructor. She is also one of only seven women worldwide to have attained Snell Level III Thermography. Mellanby has trained with TSG's American infrared expert, Ron Conner, since 2013 to become a Snell Authorised Licensee.

Jim Fritz, TSG's president/ chief executive officer, says, "We are very pleased to welcome Jeanri as a TSG Instructor. All her hard work and efforts have paid off, as we recently authorised Jeanri to present Level I courses independently, as a Snell Group Authorised Licenced Thermography Trainer. As it stands today, there

*The next IR Thermography Level I course will be held in Johannesburg from 16 – 20 February 2015.*

are five Level I and one Level II classes scheduled to be presented by Jeanri over the next 14 months in Johannesburg. We hope that many would-be thermographers will have the opportunity to work with her in person, both in South Africa as well as in the USA."



Mellanby's exposure to infrared began in 2005 at an electrical contracting company where she conducted full-time electrical and mechanical inspections. A few years later she included building and equine inspections.

With **Comtest**, she has undertaken a wide variety of inspections for a broad base of customers throughout southern Africa. She has also written several papers, and presented them at various SA conferences.

**Enquiries:** Jeanri Mellanby. Tel. 010 595 1821 or email [sales@comtest.co.za](mailto:sales@comtest.co.za)

Jeanrie Mellanby

## Control systems order for coal-fired thermal power plant - Vietnam

**Yokogawa's** subsidiary, Yokogawa Engineering Asia, has received an order from Toshiba Plant Systems and Services Corporation to deliver control systems for the Thai Binh coal-fired thermal power plant in Vietnam. Toshiba Plant Systems and Services will be responsible for installing the electrical and other facilities at this power plant.

The Thai Binh coal-fired power plant is being built in the Thai Thuy district of Thai Binh province in northern Vietnam by Vietnam Electricity (EVN), a national power company. With two 300 MW units, the plant will have a total output of 600 MW. The first unit is scheduled to start operation in October 2017.

For the control of the boilers in each unit and the integrated control and monitoring of the boilers, turbines, and auxiliary facilities throughout the plant, Yokogawa will deliver the CENTUM VP integrated production control system and the Exaquantum plant information management system. Yokogawa Engineering Asia will be responsible for the engineering and delivery of these systems, and will provide support with installation, commissioning, and operator training. The delivery of all systems for unit 1 will be completed by September 2016.

**Enquiries:** Christie Cronje. Tel. 011 831 6300 or email [Christie.cronje@za.yokogawa.com](mailto:Christie.cronje@za.yokogawa.com)

## New series high performance sensors

Eaton has introduced its new E75/E76 series of high performance photoelectric sensors. Sensors with field-adjustable background suppression and a considerably extended sensing range are also being released for the first time. The key to this is the IntelliView technology. It enables a number of new sensing techniques for colour, contrast and luminescence sensing for particularly demanding applications requiring increased precision over large distances in challenging conditions. The high precision combined with the improved background suppression make the E75/76 sensor series into a flexible, high performance solution for a wide range of applications. Through the small number of sensing errors, the devices contribute even in the most difficult environments to increasing the productivity of machines and plants. In the E75/76 series, Eaton is presenting a photoelectric sensor with field-adjustable background suppression. It detects objects precisely at a distance of up to 190 cm and at the same time suppresses for example container edges. Besides the broad application range, the sensor stands out on account of its simple installation. This enables users to put the device easily into operation and adapt automatically to the individual requirements at the site of

installation. Eaton has also developed laser distance sensors with increased sensing depth, especially for the E75/E76 IntelliView series. These distance sensors output a signal from 0 - 10 V which changes within the operating range proportionally to the distance between the face of the sensor and the target. The integrated class II laser detects objects in a range between 0,3 and 4 m. In addition to analogue outputs, the sensors are provided with two PNP outputs

that can be programmed so that they switch at the set distances. Eaton's series E75/E76 photoelectric sensors are divided into colour, contrast and luminescence sensors. The colour sensors feature a new 'chromaticity plus intensity' algorithm. This provides increased sensitivity for colour tone variations and improves the differentiation of grayscale tones.

**Enquiries: Dean Nurden. Eaton Electric South Africa. Tel. 11 874 4315 or email [DeanNurden@Eaton.com](mailto:DeanNurden@Eaton.com)**



## Latest in radar sensors for bulk solids

January saw the launch of VEGA's latest offering in radar sensors to the market (see 'social engineers' page 43).

The level transmitter operates at a frequency of 79 GHz, which allows a considerably better focusing of the transmitted

signal. This is a distinct improvement on the previous model which operated at 26 GHz. In containers and silos with many internal obstructions, this enhanced focusing helps to reduce the influence of background 'noise'. This means that reliable measurement is also possible even with complex internal structures.

New microwave components allow the sensor to detect even the smallest reflected signals. Products such as plastic powders or wood chips, which until recently were very difficult to measure because of their poor reflective properties can now be measured with very high reliability. This considerably extends the application range for radar technology in the bulk solids industry and opens up new application areas as well.

With a measuring range of up to 120 metres and an accuracy of +/- 5 mm, the sensor has sufficient performance capability even for the out of the ordinary tasks such as level gauging in mine shafts or distance measurement on conveyor systems. Despite its large measuring range, the sensor is also an ideal solution for small hoppers or containers; the different antenna designs enable the optimum solution to meet the application needs. Completely unaffected by dirt and build-up, the innovative lens antenna guarantees maintenance-free operation even in harsh environments. To make set-up and commissioning easier, an intelligent App for smartphones has been developed. It allows quick and easy alignment of the sensor on a swivel holder. By entering the vessel height and the distance from the discharge opening, the App automatically calculates the optimum tilt angle.

**Enquiries: Chantal Groom on 011 795 3249 or email [chantal.groom@vega.com](mailto:chantal.groom@vega.com)**



*Clemens Hengstler, VEGA product manager (radar) demonstrates VEGA's new radar sensors for bulk solids.*

## Expansion opportunities in hydraulics and automation

The 50 % acquisition of **Hytec** by **Bosch Rexroth** offers greater expansion opportunities into sub-Saharan Africa's hydraulics and automation markets. The joint venture came into effect on 1 October 2014, concluding the first phase of agreements signed on 15 May 2014.

The Hytec/ Bosch Rexroth merger represents the next step in a relationship that began with Hytec's accreditation as the sole importer of Bosch Rexroth products into South Africa since the 1960s. With the

region's mining, oil and gas, power and general support industries identified as a key growth market, the joint venture enables each entity to leverage the core offerings of the other to provide superior automation solutions for the region. The closer affiliation with the Bosch Rexroth brand will position the Hytec Group as the recognised service, repair and refurbishment OEM partner of Bosch Rexroth components, such as pumps, cylinders, motors, filters and valves.

"This will enhance our service support capabilities for the region's industrial projects, and allow us to better fulfil the needs of our customers," explains John Wingrove, chief executive officer, Hytec Holdings.

**Enquiries: Willem Gijzelaar. Tel. 011 979 4630 or email info@hyhold.co.za**



### **Hytec Rexroth Management**

From left to right: Management team for the Hytec Group/ Bosch Rexroth joint venture: Roland Keller (deputy chief executive officer, Hytec Holdings), John Wingrove (chief executive officer, Hytec Holdings), Dr. Karl Tragl (president Bosch Rexroth), John Dunmow (group finance controller) and Andrew Castle (chief finance officer).

## Partnership

In order to pursue substantial growth opportunities, particularly on larger heating projects in Africa, unitemp has entered into an agreement to become a wholly owned subsidiary of **Thermon**, a global leader in the industrial heating market and a channel partner of unitemp for many years.

"We are excited about this new development. We believe that the combined company will enable us to strengthen our product ranges, expand our services and assist us in becoming a stronger partner to our valued customers, distributors and suppliers," says Hans Hitzeroth, chief executive officer and member of unitemp.

The acquisition will be completed by a newly formed entity called Thermon South Africa, which is currently in the process of being formally registered in South Africa.

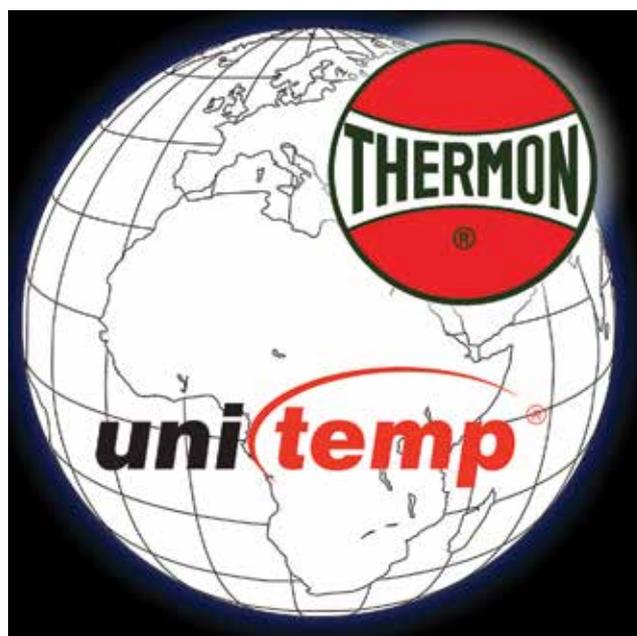
"Other than a change in company name, we do not foresee any material changes to our business from the way it is conducted today. We anticipate that the brand name unitemp will continue to be utilized for many of the products we sell in South Africa. Our management team and staff will remain in place following the closing of the transaction and we will continue to

offer the same product ranges and services going forward."

Through its global network, Thermon provides highly engineered thermal solutions, known as heat tracing, for process industries, including energy, chemical processing and power generation. Thermon's products provide an external heat source to pipes, vessels and instruments for the purposes of freeze protection, temperature maintenance, environmental monitoring and surface snow and ice melting. Thermon is headquartered in San Marcos, Texas. Thermon generated annual revenue of USD \$277 million in its most recently completed fiscal year and has offices in more than 15 countries around the globe.

The unitemp team would like to thank all clients across sub-Saharan Africa for their continued support during 2014 and we are looking forward to becoming part of the global Thermon operations in 2015.

**Enquiries: Hans Hitzeroth. Tel. 021 762 8995 or email info@unitemp.com**





## Comtest - a decade celebrated... and a new CEO

The Comtest Group recently celebrated its 10 year anniversary with dealers, suppliers, partners and staff at an informal lunch at their Linbro Park offices. From modest beginnings in 2005, with key partners Fluke and Midronics, Comtest has burgeoned. In 2010 Comtest acquired In-strotech and Calog, effectively launching them into the process control industry. Barend Niemand, newly appointed chief executive officer, succeeds Peter Verwer, who retires in March 2015.

**Enquiries: Tel. 011 608 8520 or email [info@comtest.co.za](mailto:info@comtest.co.za)**



Barend Niemand, Val and Peter Verwer.



Enjoying success – the Comtest team.

## Introduction to VEGAPULS 69

At a presentation at the Roodepoort Country Club on 16 January 2015, customers were introduced to the VEGAPULS 69 by Clemens Hengstler, product manager (radar), from VEGA Grieshaber KG, Germany. Clemens demonstrated the latest innovations of the new technology. After listening to customers' needs the Shiltach-based company has researched and developed the VEGAPULS 69, a sensor that takes a big step closer to the ideal of an all-round radar level measuring instrument for bulk solids. (See 'latest in radar sensors for bulk solids' on page 41).

**Enquiries: Chantal Groom on 011 795 3249 or email [chantal.groom@vega.com](mailto:chantal.groom@vega.com)**



Clemens Hengstler, product manager (radar), from VEGA Grieshaber KG, Germany and John Groom (managing director, VEGA South Africa).



Stephen Smith (Anglo Platinum Training) and Donovan Blake (VEGA).



Trekker Coetzee (Sylvanian Metals), Tshepo Malema (Sylvanian Metals) and Jean-Luc Mukuna (VEGA).



**Aberdare Cables**



*Mishack Matla, sales, marketing and distribution director*

**Schneider Electric**



*Rebone Seleokane, vice president, human resources, southern African region*

**Lafarge**



*Praveen Bechoo, general manager for aggregates.*

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Lapp Group.....	OFC		

**Hygienic design of food processing plants**

10 - 11 February (Cape Town),

21 - 22 April 2015 (Johannesburg)

Enquiries: Email [andrew.murray@mweb.co.za](mailto:andrew.murray@mweb.co.za)

**7<sup>th</sup> Annual Africa Energy Indaba**

17 - 18 February 2015, Sandton Convention Centre

Enquiries: Email [mbali@siyenzaevents.co.za](mailto:mbali@siyenzaevents.co.za)

**Cable Anti-theft Technologies Summit**

24 - 25 February 2015, Emperors Palace, Gauteng

Enquiries: Email [amandab@mogorosicomms.co.za](mailto:amandab@mogorosicomms.co.za)

**Power & Electricity World Africa 2015 featuring the Solar Show Africa**

24 - 25 March 2015, Sandton Convention Centre, Johannesburg

Enquiries: Email [marketing@go.terrapinn.com](mailto:marketing@go.terrapinn.com)

**Practices in Lightning Safety and Lightning Protection of Structures and Systems**

27 March 2015, Centurion, Gauteng, South Africa

Enquiries: Tel. 012 663 4804 or email [learning@gaf-rica.com](mailto:learning@gaf-rica.com)

**Domestic Use of Energy (DUE) - Towards sustainable energy solutions for the developing world**

30 March - 1 April 2015,

Cape University of Technology

Enquiries: Email [due@cput.ac.za](mailto:due@cput.ac.za)

**15<sup>th</sup> annual African Utility Week and Clean Power Africa conference**

12 - 14 May 2015,

International Convention Centre, Cape Town

Enquiries:

Email [nevenka.ristic@spintelligent.com](mailto:nevenka.ristic@spintelligent.com)

**Energy Training Foundation (EnTF) courses 2015**

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## **PASSIVE INFRARED (PIR)**

Passive infrared sensors provide the best solution for major motion detection. These sensors use a specially designed lens to divide the space into separate zones. When a person crosses between these zones, the sensor detects occupancy. Passive infrared sensors are perfect for small, enclosed spaces with frequent occupant movement.



## **ULTRASONIC (US)**

Ultrasonic sensors provide the best solution for detecting minor motion such as typing, reading, and writing. These sensors emit a safe, inaudible sound wave into the control space. Minor movements cause frequency shifts in the emitted waves which are detected by the sensor. Because ultrasonic sensors are volumetric and do not require a clear line of sight, they are ideal for hallways or restrooms with stalls.



## **DUAL TECHNOLOGY**

Dual technology sensors combine passive infrared and ultrasonic technologies for maximum reliability. Both technologies must detect occupancy to activate lighting, and only one technology is required to keep lighting on. Dual technology sensors are the best solution for most applications.



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# Blackbox G 4000 Power Quality Analysis Series

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### ACTIVAR

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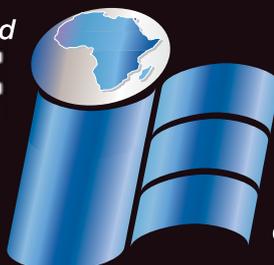


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