FEATURES:

- Control systems + automation
- Drives, motors + switchgear
- Sensors + switches
- Plant maintenance, test + measurement

IO Link Masters

Actuator Position Sensor

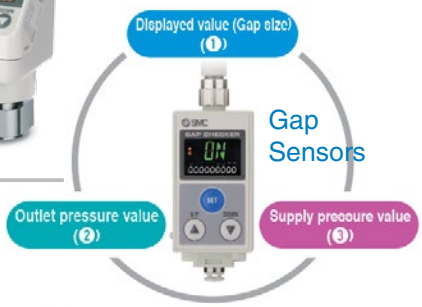
IO-Link

Pressure Sensors

Valve Manifolds

Water Flow Sensors

General Pressure Sensors



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Zest WEG is now assembling the **MTW05 medium voltage switchboards** locally in South Africa. Not only does this equate to shorter turnaround times, but also to the management process being done locally, offering flexibility in adapting to the different characteristics demanded by the market. It also meets the increasing local content requirements.

Developed for various market segments, WEG medium voltage switchgear meets the highest quality and performance requirements, being designed with a high standardisation rate. They offer simple assembly, installation, maintenance, future expansions and interchangeability. The MTW05 is internal-arc resistant. It is also air-insulated with reduced dimensions, allowing for smaller sized electric rooms.

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SMC Corporation has developed a range of IO-Link compatible products to ensure production lines and machines remain at the forefront of technology.
(Read more on page 3.)

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Maintenance is more than a once-off matter

In the South African context I find myself writing this comment as we approach the day for Municipal Elections. And of course I must always encourage everyone who has the right to vote to do so. This is as much about ensuring that the right folk are put into positions where they can make a tangible difference, as it is about a history where the right to vote was not a right at all: it was a privilege for a few.

So go and vote.

There is some intrigue and amusement around this. I was really pleased to receive a note, just the other day, from the city where I reside, telling me about all the good things being done to improve the city. This included, for instance, filling potholes, fixing lights – and so on.

Having damaged (as one does) two tyres in the past year on potholes, I was deeply encouraged and really delighted to hear about this new energy and attention to detail.

I did reflect for a moment, of course, on the fact that there has been no communication to me from the city for the past few years. Perhaps I just missed those? I guess these things do happen: so I am pleased to see I am on their mailing list again and that they are certainly aware of – and attending to – some of the issues that have been demoralising citizens for some time now.

However, what bothers me is that some cynics tell me this attention to detail is only because there is an election coming up. Could it be?

I doubt that is why maintenance suddenly becomes an issue. Surely not?

But, be that as it may: maintenance is not something you do when people are watching, or after it is too late; it is something you plan, manage and budget for consistently and continuously.

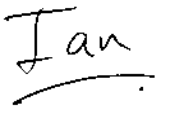
One hears a lot of talk about a failing state or a failing city – and it does make one reflect on how it can often be a series of small omissions that suddenly put one up the proverbial creek as it were. This applies equally to our sites, our industry, and our plants.

What I have become sensitised to of late is how often it seems that people with specific responsibilities are unable to see the obvious omissions that are so clearly visible to others.

Consider walking about your site: Do you pay attention to the state of the roadway? Do you look to see if there is excessive dust build up on instruments? Do you notice cables dangling from cable trays?

There are teams and individuals who are responsible for all of this; but extra eyes are crucial if we are going to get a handle on these and other maintenance issues. Supervision becomes an important aspect of the responsibility of site teams, doesn't it?

Notwithstanding that we can test and measure more and more, human observation is still a critically important element of everything we do.



Ian Jandrell

PrEng IntPE(SA), BSc(Eng) GDE PhD,
FSAAE FSAIEE SMIEEE

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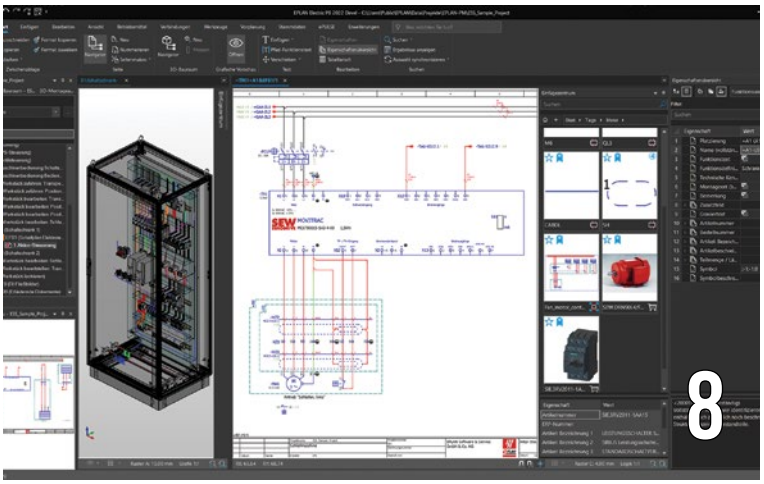

What exactly is IO-Link?

Shiven Singh, Senior Sales Engineer at SMC Corporation South Africa, explains that IO-Link is one of the more versatile communication protocol technologies, transforming factories by enabling integration and smart decision making. IO-Link is an open standard (IEC61131-9) that allows for cost-efficient point-to-point communication between sensors and devices and the fieldbus system. It can be used to communicate between any compliant IO-Link PLC or manifold modules, sensors, and other field equipment. This over a reliable, continuous, highly compatible two-way send and receive channel.

Data communicated can be used for control of field devices and to keep a central control system, PLC or SCADA updated on production levels, downtime, and machine health, among other things. This can be likened to the scene in *The Matrix* when the main character bends his body to avoid the incoming attack. In a production setting, live, accurate information from multiple sources is key to anticipate and trigger reaction, whether for planned or predictive repair or maintenance.

Process information, diagnostic information and sensor parameters are easily communicated and interpreted to evaluate your process at a snapshot and can guide you quickly to the root cause of a problem.

Singh highlights that IO-Link offers some key advantages over other device communication systems.

Reduced costs are achieved by the reduction in cabling required to set up an application when compared to a fieldbus or older wired systems. Multiple costly analogue and digital input and output wiring loops can be reduced or removed altogether in a hierarchical system. Communication from a device to an IO-Link master is over an unshielded M8 or M12 connector and cable. Channel and device parameters can also be quickly identified and set up within an IO-Link system, which allows for reduced commissioning time by costly integrators.

Reduced downtime is achieved if a component does fail. IO-Link devices automatically transfer their parameters to the master unit and when identical components are switched out, this can in most instances be a plug-and-play changeover. Setup, switch out and even system documentation time is therefore dramatically reduced.

This feature also makes changeovers easier for maintenance operators who are not specially trained to change out complex components.

Sensors can continuously send diagnostic data giving the operator feedback on the status and health of the device itself. This is ideal for preventive and predictive maintenance to minimise unplanned failures.

Why IO-Link?

The ability of an IO-Link system to identify a device and establish its setup parameters quickly, offers the user unrivalled advantages of control and a reduction in setup time when compared with traditional field devices. In almost all situations where a digital or analogue sensor is used, an IO-Link device can offer more in terms of diagnostic and process information. Considering total design, installation, commissioning, maintenance, and long-term plant operation, IO-Link should be a preferred consideration.

SMC Corporation has developed a range of IO-Link compatible products to ensure your line or machine remains at the forefront of technology. IO-Link master modules are easily configurable into our valve manifolds, to serve as a node, monitoring devices such as digital flow switches for air, gases and water, digital gap checkers for dimensional or position control, pressure sensors for air and general fluids, and of course actuator position sensors for pneumatic and electric actuators.

The evolution of production environments necessitates more diagnostic information. Technology strides forward and we are now able to determine not just process parameters but the health of our equipment, allowing us to predict and plan for maintenance before it is needed.

Take the leap and contact us to discuss IO Link's advantages. □

SMC offers a range of intelligent system solutions for automation, including pressure sensors, water flow sensors, air flow sensors and more.

For more information contact SMC Corporation South Africa.
Tel: +27 (0)10 900 1233
Email: zasales@smcza.co.za; zatechnical@smcza.co.za
Visit: www.smcza.co.za

Advancing automation at Maluti Mountain Brewery

As a long-standing technology partner to Anheuser-Busch InBev (ABInBev), the world's largest brewer, Siemens South Africa recently migrated Maluti Mountain Brewery in Lesotho from an old automation system in the brewing area to a central control and monitoring station which will combine the brewhouse and cellars and improve efficiencies under one control system.

For more than 40 years Braumat has been recognised as the standard for brewing and process automation in the industry.

Meeting current and future customer requirements quickly and with the highest quality is key in the food and beverage industry. ABInBev is a major beer manufacturer and its brewers want to produce beers with consistent quality for their customers. This project, implemented in partnership with Process Dynamics, a Solution partner to Siemens, features continuous innovation with Siemens' Braumat system. The software was required to have virtualisation capability and to provide for recipe control and management, trend and alarm management, batch reporting and controlled access.

Kamohelo Semuli, Brewery Specialist at Maluti Mountain Brewery (MMB) explains. "At Maluti Mountain Brewery we are passionate about brewing and the company has a long tradition of craftsmanship in making superb beer from high quality natural ingredients. Fast-changing recipes required us to be skilled with the new process quickly, which proved challenging. While we are creating the 'brewery of the future', it is important for us to deliver according to our customers' demands and for the system to provide us with full transparency of the production process.

"The Siemens Braumat system enables this flexibility. It manages the recipes and the process efficiently, minimises human intervention, and reduces extract losses.

"Graphical recipe management, route control possibilities, batch reporting, replay modes, efficiency, mobile working and other such features are valuable for our brewery of the future goals. We are confident that through our partnership with Siemens we will be able to achieve these goals."

Siemens is one of the leading technology suppliers to ABInBev globally. Munish Choudhary, Vertical Manager for Food and Beverage at Siemens South Africa says, "With our long history of engagement with the brewing world, we are making it easier for brewers to manage recipes, and helping them to optimise their use of resources such as water and energy in the brewing process."

At Maluti Mountain Brewery this new automation technology provides for centralised control of all operations, including the brewhouse and the cellars.

At a glance

- The Braumat system provides for recipe management, route control, and multiple production and resource efficiencies.
- The central control room allows for full transparency of the production process.

Process Dynamics has been involved with the MMB for some time and understands the requirements for such a system in the brewing area. Managing Director, Kobus van Niekerk says, "We have provided a recipe-driven system, which is supported with brewing parameter control and monitoring. All user operations are logged, so any deviations from the recipe can be easily traced. With this ability to analyse batch data, brewers can optimise recipes.

"We installed the latest Siemens PLC hardware S7-1500 and we used the existing Siemens PLC to establish a centralised control room."

Flexibility, time-to-market, speed and quality are all important factors in the brewing industry. Recipe control too is important, especially based on the changing tastes of customers, and on the changing of raw materials in the process.

Sabine Dall'Omo, Chief Executive Officer, Siemens Southern and Eastern Africa says, "For more than 40 years Braumat has been recognised as the standard for brewing and process automation. We are proud to have delivered on this project with ABInBev. With our Digital Enterprise solutions and Braumat, Siemens can help beer manufacturers be more flexible and more efficient. Digitalisation means we can enable our customers to adapt quickly to market situations and demands to expand portfolios with the highest standards. With our leading technology, we can provide substantially higher performance and transparency in the brewing and beverage industry." □

Problem solving is easier and quicker because the true root cause can be identified with all parties sharing the same information at the same time.

For more information visit: https://new.siemens.com/za

Namolele Lekhanya, Brewing Specialist at MMB, says the system improves efficiencies and reduces losses, supporting the achievement of key performance indicators.

Grid-friendly control for the power grid of the future

Wolf Schulze, Research Associate at IEH, and Nils Johannsen, Application Software Engineer, Beckhoff Automation

The Institute of Electrical Energy Systems and High Voltage Technology (IEH) at the Karlsruhe Institute of Technology (KIT) in Germany is researching ways to ensure system stability in transmission grids which are changing as a result of the transition to renewable energy.

In addition to simulative investigations, the behaviour of power plants and inverter-based generation systems is being emulated in an island grid used as a dedicated test environment. Here, researchers are implementing innovative new control methods on Beckhoff Embedded PCs running TwinCAT to validate their application in realistic scenarios.

In many transmission grids, the proportion of electricity from renewable energy sources is increasing. Unlike conventional synchronous generator-based power plants, wind energy and photovoltaic plants feed energy into the grid via an inverter. However, stability problems occur above a certain proportion of inverter-based operating resources when using conventional grid-following inverter controls. Consequently, innovative control methods are needed so that the integration of renewable generation systems does not have to be restricted. The aim of these grid-forming control methods, as they are known, is to provide grid-supporting behaviour – of the type that has been associated with synchronous generator-based power plants for more than 100 years – with inverters. The results of this include a demonstrated ability for wind turbines to provide instantaneous energy reserves.

Grid emulation

The investigation of the inverter behaviour at a strongly changing grid frequency is not possible in the European interconnected grid. Therefore, a grid emulation was built at IEH to emulate the realistic behaviour of large power plants and that of large transmission grids. This grid emulation consists of a synchronous generator with an excitation machine, which is driven by a variable speed drive system comprising a drive inverter and an asynchronous machine rather than a turbine. To achieve a moment of inertia comparable to that of a turbine in a power plant, there is also a flywheel on the shaft. Frequency dips can be generated by connecting loads, as these occur during disturbances in large transmission grids. By physically providing the instantaneous reserve, the grid emulation (in contrast to power electronic grid emulations) allows an instantaneous reaction of the resources connected in the island grid to the grid frequency.

Operation and monitoring of the grid emulation via TwinCAT HMI. © IEH/KIT

A CX5140 Embedded PC from Beckhoff serves as the central automation and control hardware, and various EtherCAT Terminals are used to measure mechanical and electrical variables. Encoders are installed in both machines to measure the rotary speed, and these are evaluated by EL5021 SinCos encoder interfaces. Torques can be established by means of two torque measuring shafts and an ELM300x analogue voltage measuring terminal. EL3783 power monitoring oversampling terminals in combination with current transformers capture the 3-phase voltage, current and power values. The CX5140 Embedded PC communicates with the drive inverter via EtherCAT. Excitation of the

EtherCAT. Excitation of the synchronous generator's excitation machine is effected by an EL2535-0005 pulse width current terminal. Power contactors are controlled by EL2634 relay terminals as further actuators.

The closed-loop control was designed in MATLAB®/Simulink® using model-based design and, after compilation, executed in real time on the Embedded PC using TwinCAT 3 Target for Simulink®. A convenient user interface for operating the test bed was implemented with TwinCAT HMI. Control parameters, setpoint values and limit values can be changed here during operation. In addition, measurements and the plant status can be displayed graphically. Measured values are visualised and recorded using TwinCAT Scope View.

Inverter emulation

The investigation of newly devised control methods for inverter-based generation plants calls for a flexible test facility that offers sufficient freedom with regard to how control methods are implemented. Since the first step focuses on the control of the grid side of the inverter, the behaviour of the modulation and the power semiconductors of a 3-phase inverter can be emulated by three linear voltage amplifiers. The voltage amplifiers act here as controlled ideal voltage sources. The control cabinet for the inverter emulation is located between the voltage amplifier and the island grid of the grid emulation. In addition to the control hardware, other items installed in this cabinet include the adjustable mains filter, voltage and current measurements, as well as contactors and circuit breakers.

An Embedded PC with numerous EtherCAT Terminals is also used as the central platform in this test bed. A CX2030 facilitates the execution of even complex programs with fast cycle times. Six EL3702 two-channel analogue input terminals capture the 3-phase voltage and current values by means of Hall-effect current sensors at several measurement points. The voltage setpoints are output by EL4732 analogue output terminals and transmitted to the voltage amplifier as voltage levels.

Comparable to grid emulation, control methods developed and validated in MATLAB®/Simulink® are executed in real time on the CX2030. The main difference is the short control cycle time of just 50 µs. In combination with the EtherCAT Terminals and the voltage amplifier, a dead time of just 150 µs is achieved for the entire control loop. The test bed is also operated and monitored by a user interface created with TwinCAT HMI. Essential here is the rapid monitoring of limit values, which leads to a safe shutdown if the limit values are exceeded.

Test environment

With the inverter emulation being used in combination with the grid emulation, an island-like test environment is available where the behaviour of new grid-forming control methods can be easily investigated. Investigations with the 'synchronverter' control method, which emulates the behaviour of a synchronous generator with an inverter, have already been carried out and published. Experiments have shown that inverter-based generation systems with an appropriate control system can provide instantaneous reserve and thus support the grid. In contrast to real-time emulators, it was also possible to prove here that grid-forming control can be implemented on a control platform that is already established for use in industrial environments.

Going forward, the development of grid-forming control methods will be continued with the aim of using them in inverter-based operating equipment, such as wind turbines. Since the investigation based on inverter emulation was successful, a test bed that represents the drive train of a wind turbine, consisting of a generator and full inverter in downscaled performance, is being set up. Here, the focus will be on the use of components used in wind turbines, such as control hardware and power semiconductors. Investigations will continue into how the implementation of a grid-forming control system in a wind turbine is possible. □

At a glance

- Unlike conventional synchronous generator-based power plants, wind energy and PV plants feed energy into the grid via an inverter which, above a certain level, can cause stability problems.
- Innovative control methods are needed to allow for the full integration of renewable generation systems into the grid.
- IEH has set up a test environment combining inverter emulation and grid emulation to investigate the behaviour of new grid-forming control methods, some already demonstrating success.

For inverter emulation, the CX2030 Embedded PC enables short control cycle times of 50 µs. © IEH/KIT

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For more information visit: www.ieh.kit.edu and www.beckhoff.com

Collaboration in the industrial automation ecosystem

The typical ecosystem of industrial automation design is characterised by many media disruptions during the processing and transfer of documentation. These issues need to be resolved within the development process for machines and plant systems – through targeted collaboration among all stakeholders and systems. Data created in the engineering process must be shared with everyone involved in the process.

Eplan Platform 2022 has been developed to enable machine builders and system integrators, control cabinet manufacturers, component manufacturers as well as machine or plant operators to work together in a collaborative network. In electrotechnical engineering all these players work together along the value chain, from the planning through to operating the finished machine or plant – and continually exchange information in the process.

The ecosystem of industrial automation

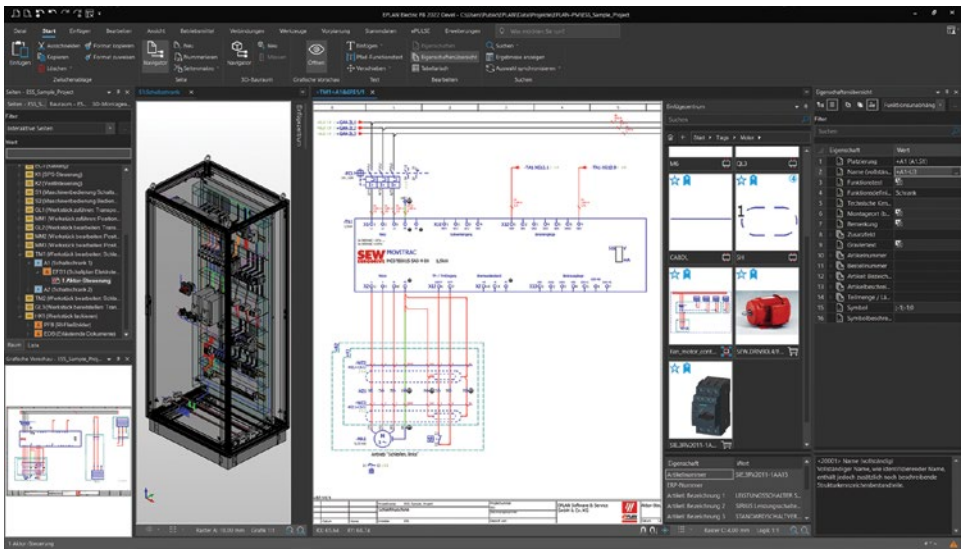
This collaboration among the various process participants typically entails an initial planning phase, where the characteristics of the required machine or plant system are described. If the company has particular supplier specifications, these are also detailed and passed on to the operator, who takes the specifications into account when designing the machine or system.

The planning phase is followed by a design preplanning process. Additional information such as devices, release lists from Excel, specifications in Word, or preplanning tools such as Eplan Preplanning are taken into account and, in turn, are used by the engineering designers to prepare a quote, for instance. In the case of more complex production lines, this is traditionally taken care of by a system integrator, who is also responsible for the detailed engineering and for generating electrical and fluid-power schematics.

Working on Eplan Project

The project created with systems of the Eplan Platform – Eplan Electric P8 or Eplan Fluid, for example – is then transferred to the control cabinet manufacturer. This manufacturer creates the virtual prototype of the switchgear system in the form of a 3D assembly of the control cabinet using Eplan Pro Panel. The control cabinet is built, approved and commissioned by the operator. With the delivery of the switchgear system, the control cabinet manufacturer's processes are complete. The company hands the Eplan Project, which has been enriched with data, back to the machine builder or system integrator, who then commissions the machine or plant system, based on the final project data. The project is then made available to the operator, who can access the current documentation, using Eplan eView, for instance, in the event that servicing or maintenance becomes necessary, and who can digitally document any changes using the redlining function as needed.

This process describes the daily work in this ecosystem of industrial automation. The challenge, however, has been that all the data for an automation project is created and added at various stations along the value chain. Often, all the project participants are working with partially inconsistent data, which ends up making the process more time consuming and error prone. For instance, the drive power of a motor may be changed at some point in a project, but this change isn't taken into account when the machine or plant system is commissioned. As a result, the documentation is not up to date.



The new Eplan Platform 2022 has a redesigned user interface: the practical ribbon bars using modern technology adapt to the application.

A central source of information

This is where Eplan comes in: the systems of Eplan Platform 2022, in

With all changes in a project centrally available in Eplan eView, project documentation is always up to date – along the entire product life cycle.

combination with the new Eplan eManage cloud service, network together machine builders and system integrators, control cabinet manufacturers, component manufacturers and the operators of machines or plant systems.

Eplan CEO Sebastian Seitz explains: "We connect companies with their clients and suppliers via the cloud, for easy and secure data sharing. The Eplan Project as the central, digital model of an automation solution, supplies all processes with the necessary data. What we're talking about is a sort of 'data container' that is fed from the systems of the Eplan Platform. This generates added value in the digitised collaboration of all participants – through secure data transfer and central access to the Eplan Project."

Another new feature is the connection to the cloud via Eplan ePulse, which also facilitates mobile working in design and engineering.

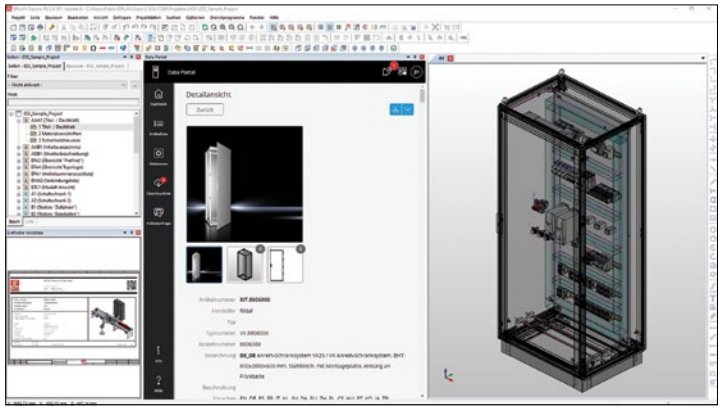
Cross-project collaboration via the cloud

Using the new Eplan eManage, projects can be uploaded to the cloud and managed and shared from there. More specifically, this brings together the worlds of on-premises software and the cloud. Clear access rights via role management ensure data security and provide flexibility for accessing projects. Users of Eplan Electric P8 and Eplan Pro Panel can conveniently upload their projects to the cloud and transfer them to the Eplan Platform for further processing. This is accomplished without the time-consuming sending of project data via email or using an FTP server. And the centralised availability in the cloud also enables all project participants to search quickly for specific content. With Eplan eView, all the changes in a project are centrally available. The advantages are obvious: project documentation is always up to date – along the entire product life cycle and into operation and service scenarios.

An important component of this method of working is device data, which is provided on the Eplan Data Portal. Seitz says, "What matters here is the quality and depth of the data, something we are intensively advancing with the Data Standard." Comprehensive, integrated and end-to-end digital data serves as a project accelerator. And importantly, the data is consistent and data transfer is secure.

At a glance

- In electrotechnical engineering of machines and plant systems, all players along the value chain need to work together, sharing the same information and data as it evolves through the design process.
- Eplan Platform 2022 and the new Eplan cloud service allow for such collaboration, supported by easy and secure data sharing.



Device data is an important building block and is provided on the Eplan Data Portal. Eplan is advancing the quality and depth of data with its Data Standard.

High-quality digital device data is a key factor in, for example:

- Processing orders in shop floor management and deriving production orders
- Controlling automated machine fleets
- Providing information to partially automated workstations (for instance, simplifying wiring processes with Eplan Smart Wiring).

Seitz continues: "With these optimised processes and increased efficiency, companies can optimise their machine and plant system design processes and increase the availability of their machines and plant systems. Collaboration among all participants increases the quality of the data and thus the added value."

Eplan Platform 2022

The new Eplan Platform 2022 now available includes a newly designed user interface, improved workflows and many additional functions. Overall, the new engineering software is characterised by its ease of use and high performance. It has been tested and put through its paces by a number of manufacturers and system administrators/customers, partners and suppliers who have confirmed its advantages and particular benefits.

The Eplan Platform 2022 is available exclusively as a subscription. This minimises the investment risk by allowing for low entry prices and more flexible planning possibilities for individual software use. With these subscriptions, Eplan is also strengthening its relationships with its customers to better address what they actually need for their daily work. □

For more information visit: www.eplan.co.za

Optimising control systems with simulation tools

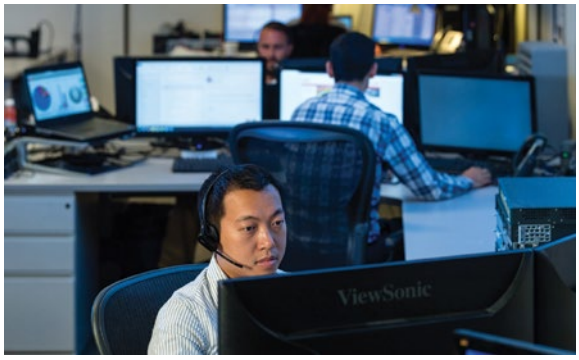
Rockwell Automation and Ansys recently announced that the enhanced Studio 5000 Simulation Interface now connects with Ansys digital twins. This gives automation and process engineers new ways to use simulation to improve the design, deployment and performance of industrial operations.

The Studio 5000 Simulation Interface connects Rockwell Automation industrial control systems with simulation and modelling tools. The latest release of the tool expands that connectivity to Ansys Twin Builder, a leading software used to create simulation-based digital twins – or digital replicas of physical assets. The software uses multi-physics to identify how real-world elements like flow rates, mechanical stresses and thermal profiles can impact equipment performance and health.

"By connecting a control system to Ansys Twin Builder, users can simulate complex physical processes and give realistic inputs to the control system," said Julie Robinson, Business Manager, Rockwell Automation. "This can provide insights throughout the equipment lifecycle. For example, running a simulation model in parallel with a physical system during production can reveal opportunities to optimise performance in real time."

Engineers can use digital twins and simulation to improve system design, delivery and performance by:

- Creating and testing equipment designs in a virtual space to save engineering time and reduce the need to build costly physical prototypes
- Commissioning equipment virtually to avoid surprises during start-ups at production sites
- Comparing simulated and actual system performance to identify adjustments that can improve efficiency, output and more
- Testing process changes in a virtual space, before they're made on a physical system, to boost throughput or other performance aspects
- Calculating the remaining life of components so they can be replaced before they cause unplanned downtime, as part of a predictive maintenance strategy
- Providing operator training in a virtual environment, where having equipment available isn't a factor and operators can be trained on uncommon or dangerous scenarios.



Studio 5000 Simulation Interface from Rockwell Automation now connects with Ansys digital twins.

"Connecting the digital and physical worlds with Studio 5000 Simulation Interface creates tremendous value for users," said Shane Emswiler, Senior Vice President of Products at Ansys. "It can help them go from conceptual designs to physical equipment faster and at a lower cost. It can provide useful new insights during production. For instance, users can apply what-if scenarios to understand the impact of changes on a process. They can create virtual sensors to estimate values that are otherwise too expensive or not possible to get today, and they can predict outcomes like failures that hurt the bottom line."

The Studio 5000 Simulation Interface allows users to connect a digital twin to either an emulated or physical controller. Connecting to an emulated controller can help them optimise production at the design stage before they have a physical controller or equipment. Connecting to a physical controller allows them to create a digital twin of how the equipment should run and compare it against actual performance.

For more information contact Rockwell Automation.
Email: mjunius@ra.rockwell.com
Visit: www.rockwellautomation.com

Multifunction timer allows remote setting

Using the TMM1 NFC, a multifunction, multiscale, multivoltage electric timer, machine builders – and end users – have the option to set timing and counting parameters on their application timers from their smartphone or tablet – without having to power the timer. The TMM1 NFC electric timer, with near field communication technology and app, facilitates precise programming of a timer quickly and easily. Engineered by Lovato Electric and distributed and backed locally by Electro Mechanica, the multifunction timer is ideal for applications that require serial programming and precise and repeatable settings.

A particular advantage of the timer is that, regardless of the timing function selected, a threshold on the number of closings of the relay output can be programmed. When that threshold is reached, the programmed function stops recording. The counter function can be used for numerous and various applications, such as counting the pieces passing under a photocell or commanding the activation of a turnstile with a limited number of accesses.

For more information contact ElectroMechanica.
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Intelligent drives in Industry 4.0

Sydney Govender, Danfoss Drives South Africa Senior Country Sales Manager

Sydney Govender, Danfoss Drives South Africa.

The fourth industrial revolution, or Industry 4.0, encompasses the combination of physical assets and advanced digital technologies that communicate, analyse and act on information, in turn enabling organisations and consumers to be flexible and make more intelligent, responsive, data-driven decisions. In automation systems this sees a migration from the conventional automation pyramid to networked systems.

Industry 4.0 has emerged as a result of the intelligent networking of computers, people and devices, driven by data and machine learning and using all possibilities of digitalisation across the value chain.

This significant change in technology has led to a whole new way of working in a digital world. It embraces the Internet of Things (IoT), artificial intelligence (AI), robots, drones, autonomous vehicles, 3D printing, cloud computing, nanotechnology, and more.

Industry 4.0 in automation systems

In automation systems, the impact of Industry 4.0 sees a migration from the typical 'automation pyramid' to 'networked systems'. This means the various elements of the system, such as motors, drives, sensors and controls, are interconnected and connected to a cloud-based data centre, where data is stored, processed and analysed, to inform decisions and actions.

In an automation network, the amount of data is a significant consideration. As data is produced mainly by sensors, the number of sensors in modern automation systems is increasing. Sensors are required to collect data from motors and motor-driven machines, such as fans, pumps and conveyors, and then connected to the data network by various means so the data can be used.

Modern variable speed drives open new opportunities in the Industry 4.0 automation network. Traditionally, drives have been considered power processors to control the motor speed. Today, drives are also part of the information chain, using the advantage of built-in processing power, storage capacity, and a communication interface within the drive itself.

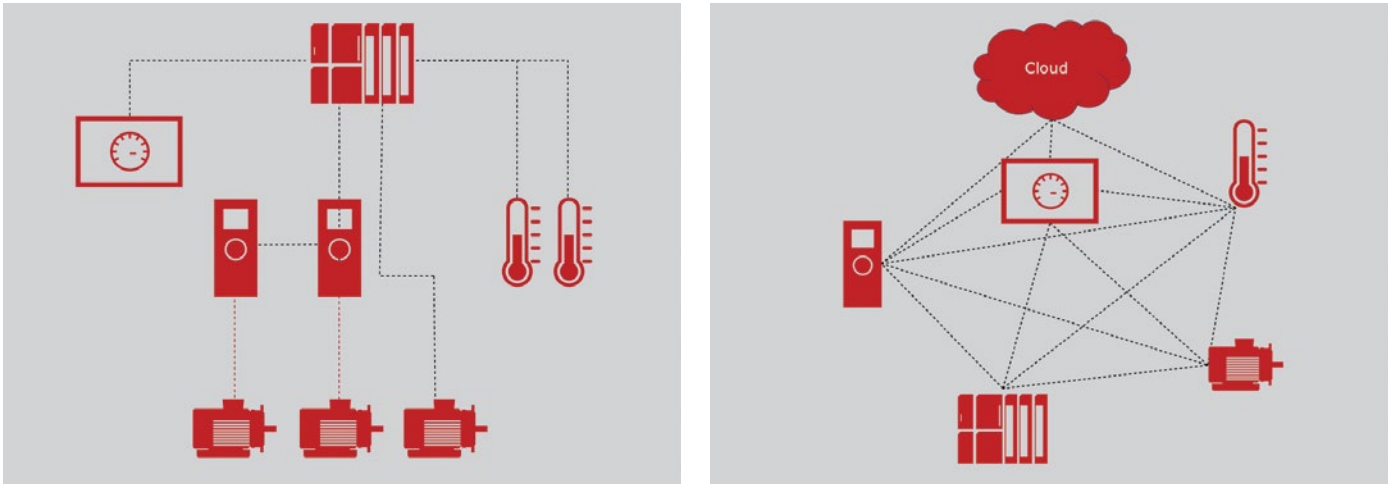
Intelligent drives

In the Industry 4.0 network, the intelligent drive plays an important role. It is characterised by a number of key features.

- Secure connectivity: The drive can connect to other elements in a secure manner. Other elements in the network may include drives, PLCs, sensors, and a cloud-based data centre.
- The drive as a sensor: The drive uses motor current and voltage signature analysis to sense the motor and application performance.
- The drive as a sensor hub: The drive acquires data from external sensors related to the process that is controlled by the drive.
- The drive as a controller: The drive can replace the PLC wherever application constraints allow.
- Smart connectivity: This uses wireless connectivity to smart devices such as smartphones or tablets.

Information from the drive can be identified as outlined below.

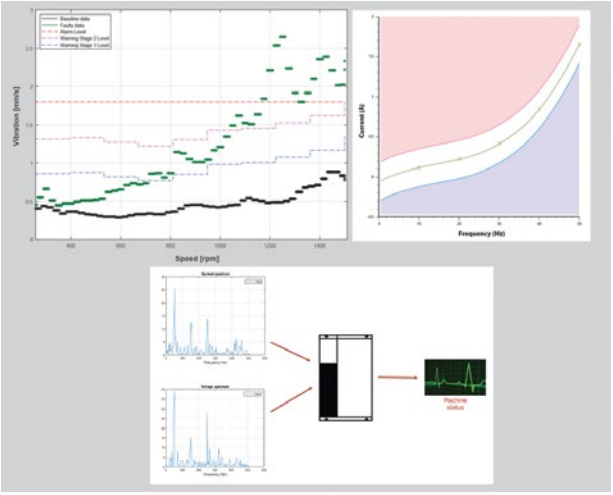
- Instantaneous signals: Signals which are directly



In automation systems Industry 4.0 has seen the shift from the conventional automation pyramid (left) to networked systems (right).

At a glance

- In the networked automation systems of Industry 4.0, various elements of the system are interconnected and connected to a cloud-based data centre.
- In such systems, the intelligent drive can be much more than a power processor, providing secure and smart connectivity and serving as a sensor hub.
- Data gathered from the drive itself and from networked sensors can be used to support condition-based maintenance.



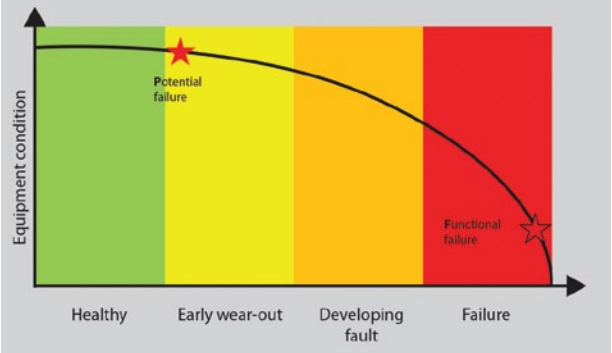
Intelligent drives, collecting data from multiple sensors, support condition-based maintenance of the drive, motor and motor-driven machines.

measured by the drive using built-in sensors. Data such as motor current, voltage, drive temperature, and their derivative, which is power as a multiplication of current and voltage, or motor torque. Moreover, the drive can be used as a hub to connect external sensors that provide instantaneous signals.

- Processed signals: Signals which are derived from the instantaneous signal and which can include statistical distribution (maximum, minimum, mean and standard deviation values), frequency domain analysis or mission profile indicators.
- Analytics signals: Signals which provide indications of the condition of the drive, motor and application. These signals are used to trigger maintenance or to inform system design improvements.

Motor current signature analysis techniques enable the drive to monitor the condition of the motor and application. The technique allows the system to potentially eliminate physical sensors, or extract early fault signatures that might not otherwise have been possible to detect. For example, motor current signature analysis makes it possible to detect winding faults in advance or mechanical load eccentricity.

The concept of the drive as a sensor hub involves connecting external sensors to the drive, thus saving the need for a gateway to connect the physical sensor to the data network. Vibration sensors, pressure sensors and temperature sensors, for example, can be connected to the drive. A further advantage of this concept is that it allows



As a sensor hub the intelligent drive also enables predictive maintenance, anticipating equipment failure and thus allowing for action to be taken to prevent downtime.

for correlation of the different types of sensor data present in the drive.

Supporting condition-based maintenance

Equipment and equipment components typically degrade over time. The introduction of Industry 4.0 and the availability of sensor data mean that condition-based and predictive maintenance are now possible. The idea of condition-based maintenance is to detect a potential failure before an actual failure occurs. Such maintenance strategies use sensor data to determine the condition of the equipment in service (to inform condition-based maintenance) or to predict future failures (enabling predictive maintenance).

In the implementation of condition-based maintenance data is acquired from the equipment itself and is used to monitor the health of the equipment in service. For this purpose, key parameters are selected as indicators to identify developing faults.

Using condition-based maintenance, maintenance actions and interventions can be planned. This supports: reduced downtime, the elimination of unexpected production stops, maintenance optimisation, and a reduced inventory of spare parts stocks.

Monitoring the condition of equipment requires a three-step procedure which entails:

- establishing a baseline
- defining thresholds
- and monitoring performance on an ongoing basis.

This provides the basis for condition-based maintenance.

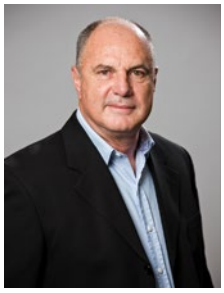
Today, drives are more than simple power processors – they are key elements in modern automation systems, with the ability to act as sensors and sensor hubs, and to process, store and analyse data, along with connectivity capabilities.

Drives are usually already present in automation installations and therefore offer a great opportunity to upgrade to Industry 4.0. As well as enabling performance monitoring this supports condition-based maintenance. The required functions are already available in some drives and early adopters are already using the drive as a sensor. □

For more information visit: www.danfoss.co.za

The switchgear solution for Africa's biggest retail distribution facility

Finding energy- and cost-efficient solutions to the operational challenges that the warehousing and distribution sector currently faces across Africa is a high priority, particularly for the continent's retail giants.



Marcel Buckner, Eaton Africa.

South Africa's national utility has been under immense strain in recent years, with ongoing load shedding causing outages across the country. Alternative power management solutions have become crucial for industry. This is the case too for large retailers that need to ensure optimum shelf life for perishable goods in cold storage.

With the opening of its 123 000 m² Whitey Basson Distribution Park in the Western Cape, Shoprite – Africa's largest food retailer – needed to find the right switchgear solution for the power distribution system at its most technologically advanced distribution centre. The centre consists of three warehouses, one of which is completely devoted to cold storage. It handles goods from some 500 suppliers and stores thousands of products.

Marcel Buckner, ESS Business Development Manager for Eaton Africa, says, "At the time the facility was designed, load shedding was causing an average of two power outages a day in the Cape Town area and at that rate, conventional switchgear, which generally lasts between 2 000 and 3 000 operations, would need to be replaced every three to four years. Shoprite would have incurred additional maintenance costs due to the unplanned outages. The installed Eaton Xiria E switchgear, offering the user a higher number of operations, has helped to alleviate this."

Professional engineering services consulting firm, WSP Africa, worked with the global power management solution company, Eaton, and developed a medium voltage (MV) power distribution system using Eaton's Xiria E extendible switchgear.

This would provide a 10 000-operation switchgear solution, also allowing for a more flexible power distribution system with a broad range of protection and control options, and the possibility for future extensions of the secondary switchgear system.

Saverio Talotti, Regional Director at WSP Africa explains that Eaton's Xiria E MV switchgear made the most sense economically, as well as environmentally, "both in terms of upfront costs and total cost of ownership – and made a huge difference that had a major impact on the project cost and future costs.

Eaton's Xiria E SF_6-free MV switchgear delivers reliability, durability and cost-efficiency for the Shoprite Distribution Centre near Cape Town.

At a glance

- Eaton's Xiria E SF_6-free MV switchgear was specified for the power distribution system at the retail warehousing facility.
- It was selected for its durability, providing a 10 000-operation switchgear solution, as well as cost efficiencies and environmental considerations.
- The switchgear offers a lower total cost of ownership compared to SF_6 containing switchgear as all the Xiria E systems, materials and components are recyclable at end of life.

"Eaton's vacuum interrupters are maintenance-free and are certified up to 30 000 operation cycles. The Xiria E MV switchgear also offers a lower total cost of ownership in comparison to SF_6 containing switchgear as the Xiria systems, materials and components are all recyclable at end of life.

"As sustainability continues to become increasingly important in the electric power industry, the move to SF_6-free switchgear is an imperative step towards lowering greenhouse gas emissions. The retail sector also has a role to play in reducing environmental impact," says Talotti.

The electricity industry uses some 80% of all sulphur hexafluoride (SF_6) produced globally, and in South Africa the cost entailed in end-of-life disposal of SF_6 switchgear can run upwards of 25% of the original cost of the equipment – adding substantially to the total cost of ownership. The problem with SF_6 is that it is 23 500 times more dangerous than carbon dioxide and tops the list of the most harmful greenhouse gases, remaining in the atmosphere for 3 200 years with a global warming potential (GWP) of around 22 800.

(GWP was developed to provide for comparisons of the global warming impacts of different gases. It is a measure of how much energy the emissions of 1 tonne of a gas will absorb over a given period of time, relative to the emissions of 1 tonne of carbon dioxide (CO_2)).

"Solutions like this can and should define the future of warehousing and distribution across sectors," says Eaton's Buckner. "Ongoing support is also essential for such projects and Eaton will provide the Shoprite Group with ongoing technical support. This includes emergency intervention, maintenance and life-extension services to ensure the system design is a sustainable solution for the group." □

For more information visit: www.eaton.com/za/

Ending the use of SF_6 switchgear

With the electric power industry responsible for around 80% of total annual SF_6 gas emissions, the move to alternative, more sustainable solutions has become more urgent. Of all the F-gases, SF_6 is the most potent, with a significant impact on global warming.

Following the adoption of the Kyoto Protocol* (initially in Kyoto, Japan in December 1997, it entered into force in February 2005) and the EU F-gas regulations (which were introduced to control emissions from fluorinated greenhouse gases (F-gases), including hydrofluorocarbons (HFCs)), SF_6 emissions did decrease progressively. However, from 2015, emissions reportedly began increasing again in parallel with the growth in demand for switchgear for decentralised electricity supply (in solar PV and wind energy plants) – making the shift to SF_6-free switchgear now more pressing than ever.

The dangers of SF_6-filled switchgear

SF_6 – sulphur hexafluoride – tops the list of the most harmful greenhouse gases (GHGs) as it is 23 500 times more potent than carbon dioxide (CO_2). It stays in the atmosphere for 3 200 years, and has a Global Warming Potential (GWP) of around 22 800. In effect, one kilogram of SF_6 leaked into the atmosphere has the same global warming impact as 23 500 kg of CO_2, making it the most polluting gas known.

When SF_6 gas is heated above 300°C, highly toxic by-products can be formed over the life cycle of the switchgear – typically 40 to 50 years. The issue of disposal of these by-products at the end of the equipment life cycle is a further serious concern.

Alternatives to SF_6 for switchgear

With its commitment to moving beyond the use of SF_6 in medium voltage switchgear, Eaton uses alternatives that are cost-effective, technically feasible, energy-efficient and reliable.

"SF_6-free switchgear has been around for 60 years, and it is better suited to scenarios where frequent switching is required. It has comparable current ratings, short circuit ratings and physical size. There is no technical barrier to its deployment," says Eaton's Marcel Buckner.

As the world strives to reduce carbon emissions, SF_6-free switchgear will help companies and countries meet their national and international commitments to combatting global warming.

**The Kyoto Protocol was an international treaty which extended the 1992 United Nations Framework Convention on Climate Change (UNFCCC) committing state parties to reduce greenhouse gas emissions based on the scientific consensus that global warming is occurring and that human-made CO_2 emissions are driving it. The Kyoto Protocol was adopted in Kyoto, Japan, on 11 December 1997 and entered into force on 16 February 2005. It implemented the objective of the UNFCCC to reduce the onset of global warming by reducing greenhouse gas concentrations in the atmosphere to "a level that would prevent dangerous anthropogenic interference with the climate system".*

The first commitment period for parties to the Kyoto Protocol started in 2008 and ended in 2012. A second commitment period was agreed to in 2012 to extend the agreement to 2020. This was known as the Doha Amendment to the Kyoto Protocol. By the time the Doha Amendment to the Kyoto Protocol came to an end in December 2020, it had been accepted by 147 states.

Negotiations were held in the framework of the annual UNFCCC Climate Change Conferences on measures to be taken after the second commitment period ended in 2020. This resulted in the 2015 adoption of the Paris Agreement, which is a separate instrument under the UNFCCC rather than an amendment of the Kyoto Protocol.

Acknowledgements to Wikipedia for background information on the Kyoto Protocol.

Gear units and conveyor drives for DRC mine

Precision-engineered industrial gearboxes were customised to meet the particularly challenging requirements for this DRC mine.

When a greenfield project for a major copper mine in the Democratic Republic of Congo required 55 conveyor drive packages and 25 spare industrial gear units for its underground in-plant and above-ground conveyors, the mine turned to SEW-EURODRIVE to supply this equipment for the demanding environment.

Mining, underground or above ground, always presents a challenging operating environment for precision-engineered industrial gearboxes. In this project, SEW-EURODRIVE South Africa found its well established capabilities and extensive experience tested to the full with the need to ensure the equipment would be capable of operating in an extremely hot and humid environment where heavy downpours of rain are common.

Whereas in South Africa and many other parts of sub-Saharan Africa, dust is typically the main challenge, this project required the company's engineers to develop bespoke solutions to cope with the particular needs of the DRC location.

Andreas Meid, Head of Department – Engineering says, "One of the key considerations was to ensure cooling was sufficient. Fortunately, our upgraded X.e-Series gearbox, together with the different cooling fans that we have available, were up to the task."

The X.e-Series was improved about two years ago, with the enhancements including better thermal characteristics and a longer operating life for the gearboxes.

"In all, there were six aspects which SEW-EURODRIVE looked at on the gearbox and improved. We are finding that these upgrades are benefitting our clients, enabling them to get more out of the gearboxes," Meid says.

The high humidity in the DRC also meant the standard breather used in the typical Southern African environment was unsuitable. "If we had used a standard breather – where the main consideration is keeping dust out of the gearbox – there would have been a risk of moisture getting inside the unit and reducing the life of the oil and components," he says. "The solution was to use a Des-Case breather, which removes the moisture from the air and prevents it from entering the gearbox."

SEW-EURODRIVE'S journey with this DRC mine began in 2018, when it was contracted to provide gearbox units for the underground conveyors bringing the ore out of the mine. There were subsequent orders for processing plant conveyors and above-ground conveyors.

The project was one of many large projects undertaken by SEW-EURODRIVE on the African continent. "We offered what we call a 'power pack', which comprises a gearbox, a motor and high-speed, low-speed couplings. These are then mounted on a common base plate," Meid explains.

"We imported the gearboxes from Germany and manufactured the base plates and everything else in South Africa to meet the customer's requirements. We put all the elements together and shipped them to the DRC site."

Prior to shipping, testing and special packaging was done at an independent facility with the client present. This offered the client peace of mind before the packs left South Africa for the journey to site.

Once the equipment arrived at the mine – in some cases a three- to four-week road trip, exacerbated by Covid-19 border regulations – SEW-EURODRIVE technicians were there to oversee installation and commissioning. The mine began operating in June 2021 and the next phase is being planned.

"It was not a simple project as the client's requirements were stringent and there were a large number of units involved. But we delivered to specification," says Meid.

For more information contact SEW-EURODRIVE.
Visit: www.sew-eurodrive.co.za

Surge protection for sub-distribution systems

The VAL-MS PT surge protective device is the first type 2 protective device available with Push-in connection technology.

The VAL-MS PT surge protective device from Phoenix Contact is the first type 2 protective device with Push-in connection technology. It is available for the globally widespread voltage level of 230/400 V, and is therefore particularly well-suited for protecting power distribution in sub-distribution systems.

If the distance between the upstream surge protection and the components to be protected is greater than 10 m, the IEC standard 60364-5-53 recommends additional surge protection. It is now significantly easier to realise this recommendation by installing the VAL-MS PT surge protective device. This protective device is available with and without remote indication contact.

Push-in connection technology enables fast installation and uniform connection technology in the entire control cabinet. Testing the recommended nominal tightening torque is no longer necessary. The protective device features two terminal points per position, enabling user-friendly through-wiring of the feed-in lines. This also saves additional installation material. Both flexible and rigid conductors up to a maximum cross-section of 10 mm^2 can be connected. A voltage test can be performed directly on the test point on each position. The protective device also features an optical status indicator integrated into the plug that displays the operational readiness of the product to the user.

For more information contact Phoenix Contact SA.
Tel: +27 (0)11 801 8200
Visit: www.phoenixcontact.co.za

Ettienne van Niekerk, Schneider Electric SA.

Quintin McCutcheon, Schneider Electric SA.

Advancing energy management and automation

Schneider Electric South Africa has recently launched three new product ranges as part of its EcoStruxure Power architecture.

Introduced to partners and customers in October via a Schneider Electric Innovation Talk Webinar, the ranges are the PrismaSeT LV switchboard, New Generation ComPacT NSX circuit breakers, and the TeSys Deca and TeSys Giga motor starters.

EcoStruxure Power encompasses Schneider Electric's continued strides towards protecting critical infrastructure and equipment from the risks of electrical failures, and allowing for advanced generation integration of clean renewable energy.

"Through product innovations such as these in PrismaSeT, New Generation ComPacT NSX, TeSys Deca and TeSys Giga, our EcoStruxure Power domain architecture offers improved efficiency, connectivity and power availability for buildings, healthcare facilities, data centres, industry and infrastructure," says Ettienne van Niekerk, Offer Marketing and Prescription Manager, Buildings Business, Schneider Electric SA.

"Our products under the EcoStruxure umbrella feature advanced cybersecurity, improved connectivity and predictive analytics working to reduce downtime while ensuring the safety of equipment and personnel," he adds.

EcoStruxure Power is also aligned with Schneider Electric's Electricity 4.0 approach which represents the convergence of electricity and digital technologies and their role in establishing smart energy measurement and waste reduction.

Quintin McCutcheon, Digital Transformation Leader at Schneider Electric SA, says: "Our world is increasingly digital and electric, with power becoming more distributed, more complex to manage, and more integrated into our everyday lives. With EcoStruxure Power, we are providing comprehensive IoT-enabled architecture and the platform is designed to digitise and simplify electrical distribution infrastructure."

ComPacT NSX Circuit Breakers

The new generation ComPacT NSX moulded-case circuit breakers feature a refreshed design

Interchangeability of large motors

When looking to replace large motors that were purchased and installed 20 to 30 years ago, companies often find that frame sizes are smaller – which means the new models do not fit on the old bases. The good news is Zest WEG has the answer: a custom-engineered adaptor plate which allows a smaller frame to fit on the existing base.

Floris Erasmus, sales specialist in HV motors at Zest WEG, says this solution overcomes the problem without requiring any physical changes to the base. "Many of the large motors operating in South Africa – in the larger size ranges of 400 to 500 kW and above – were manufactured according to the North American NEMA specifications – in inches," says Erasmus. "If they are replaced by a motor made to IEC specifications – in millimetres – the size of the frame will be different."

Where an old motor that needs replacing is on a base that is hard to modify, an adaptor plate offers a solution to fit a new motor more easily.

In addition, he says the dimensions of motors have generally become smaller over time, as efficiencies have improved. As a result the frame size of a new replacement motor – whether to NEMA or IEC specifications – will invariably be smaller than that of an older unit.

"The implication of this dimensional change is significant for customers, as it can become costly to adapt or replace the carefully constructed base," Erasmus says. "These large motor bases have been designed to handle heavy weights and considerable torque – often in excess of 10 000 Nm. To remove the existing base and build another of the correct size is usually time consuming and expensive."

There is also the height of the shaft to consider, he says. "Ideally, owners want the replacement motor to occupy the same footprint in the factory, mine or workshop as it occupies a specific place to power the required operation. Smaller dimensions may mean that the shaft height is too low. Fortunately, a well-designed base plate can generally accommodate this change as well."

Erasmus highlights that where an old motor needs to be replaced, Zest WEG will take the relevant measurements on the old motor and supply a specially machined, fit-for-purpose adaptor plate. This provides for the new motor to fit on the old base and ensures a fairly hassle-free installation for the customer. Parent company WEG's state-of-the-art facilities in Brazil, India and Portugal, where the large motors are manufactured, can also supply the adaptor plate, ensuring there is a precise match.

For more information contact Zest WEG.
Visit: www.zestweg.com

that retains the footprint of previous models, tailored for operational excellence and significant simplification of maintenance tasks.

The ComPacT NSX range is now supplied as connectivity-ready with modular plug-and-play accessories and expanded capacity for advanced monitoring capabilities. With the new units kept the same shape and size as previous models, electrical professionals can easily retrofit breakers already in use. Additionally, this allows them to expand the capabilities of ComPacT breakers trans-generationally to incorporate digital intelligence.

PrismaSeT LV switchboard

The new PrismaSeT is an optimised, tested and IEC (International Electrotechnical Commission) compliant solution, based on Schneider Electric's more than 30 years of experience in low voltage switchboards. In response to the need for advanced operational safety, the new PrismaSeT switchboard is designed to enhance fire prevention by combining the use of the innovative PowerLogic HeatTag sensor with the IEC 61439-1 & 2 type-tested functional units.

TeSys Giga motor starters

The TeSys Giga series has been reimagined with the latest smart digital innovations to deliver a simpler, more sustainable, safe and secure customer experience for panel builders, consulting engineers, system integrators, facility managers and original equipment manufacturers (OEMs).

The motor starters have been designed to meet the needs of machinery, water and wastewater, metals, minerals and mining, as well as various manufacturing and processing industries.

Tesys Giga reduces engineering time and complexity, while improving machine reliability and driving down maintenance costs and potential downtime.

TeSys Deca motor starters

The new generation TeSys Deca series offers a more robust and innovative one-stop solution, with new technical features, addressing the contemporary requirements of machine builders and panel builders in the HVAC, electro-domestic, elevator and harsh environment industries.

The new TeSys Deca contactors use higher grade plastics for better fire resistance, ensuring the units are compliant with the EN60335-1 standard for electro-domestic applications and the HVAC industry, and offering greater simplicity and efficiency in use.

For more information contact Schneider Electric South Africa.
Visit: www.se.com/za/en

Reliable signal processing and conditioning

The RN Series of interface modules from Endress+Hauser power the foundation of measurement instrument loops and safety instrumented systems built on the widely used analogue process control infrastructure.

The intrinsically safe signal processing and conditioning devices (up to SIL 2 (SC 3) in accordance with IEC 61508) ensure reliable power supply and safe operations in hazardous areas, establishing a reliable signal link between field instruments and the process control level.

Smart power

Smart functions such as NAMUR signal conversion, line fault monitoring, galvanic signal isolation, signal doubling, and output signal amplification with bidirectional HART transparency give operators control and flexibility in systems of any scale, protecting assets and safeguarding data signal integrity in the process.

The RN Series includes:

- RN22: (RN42*): Active/passive barrier; signal doubler
- RLN22: (RLN42*): NAMUR isolating amplifier
- RNO22: Output isolating amplifier
- RNB22: System power supply (single or redundant)
- RNF22: Feed-in and error message module

*These variants for wide range power supply (24-230 V ac/dc) will be available during Q4 2021.

Typical applications include:

2- and 4-wire (4 to 20 mA) instruments (such as Cerabar PMP71, Proline 200/300, ModuLine TM131)

- RN22 active barrier, sensor supply with HART transparency

Data managers (such as Memograph M RSG45)

- RN22 signal doubler

Point level switches (such as Liquiphant FTL51)

- RLN22 or RLN42 NAMUR isolating amplifier

Active components (such as control valves, actuators)

- RNO22 isolating output amplifier

RNB22 230 V/110 V ac to 24 V dc system power supply

- RNF22 Feed-in & error message module, redundant power supply

The compact interface modules in the new RN Series are designed to power, condition, isolate and protect analogue signal loops.

Seamless system integration

All RN Series interface modules integrate readily with Endress+Hauser instruments, and work equally seamlessly with instruments from other vendors. The compact, space-saving housings with up to two channels on 12.5 mm are plug-and-play ready for standard DIN rails and control cabinets.

The multi-platform T-connector bus system enables fast and easy commissioning and interoperability with compatible interface vendors.

The RN Series promotes simplicity every step of the way: from easy selection and supply, to installation, commissioning, service and troubleshooting. Irrespective of the industry, customers benefit from a single source partnership at all stages of the measuring device and process loop life cycle.

Thomas Müller, Global Product Manager, Endress+Hauser Temperature+System Products, says, “Measurement instrument loops built on analogue signal infrastructure are widely used across industries. As your expert partner for process automation, industrial instrumentation, services and solutions, Endress+Hauser offers customers a simple and cost-effective path to completing safe and reliable measurement applications – from sensors to the control cabinet and beyond.”

For more information contact Endress+Hauser.
Visit: www.endress.com

The tilt sensor is used for level monitoring in silos and other heavy-duty applications.

Tilt sensor for field applications

The new tilt sensor from ifm electronic is designed for heavy-duty applications and is used for level monitoring in silos (coal, ore, grain and more), material flow monitoring, level monitoring in transport chutes, or stockpile monitoring.

The device features a robust aluminium housing with a Teflon cap, making it suitable for indoor or outdoor use, and it is equipped with a capacitive IO-Link sensor. Adjustments for different materials can be made easily via IO-Link.

Operating at 10…30 V dc, the sensor has a connector cable of five metres and a rope length of five metres.

For more information contact ifm South Africa.
Tel: +27 (0)12 450 0400
Email: info.za@ifm.com
Visit: www.ifm.com

Is there a place for printed temperature sensors?

One major application area for printed temperature sensors could be in monitoring the batteries in electric vehicles.

Think of a temperature sensor – and a traditional glass thermometer, or perhaps a small thermistor would probably spring to mind. However, a new class of temperature sensors is rapidly emerging, offering spatial resolution together with a thin-film format.

This new class of temperature sensors are made from a solution-processable semiconductor that is coated between conductive rows and columns in a passive matrix architecture. Both the temperature sensing semiconducting layer and the conductors can be printed onto flexible substrates such as PET, enabling low-cost production of a wide range of shapes and sizes.

With the ability to provide spatially resolved temperature resolution at a low cost, it might seem surprising that printed temperature sensors are not already widely used. IDTechEx identifies two main reasons.

Firstly, existing temperature sensors are inexpensive, well understood, and very small. While conventional inorganic thermistors or platinum resistive temperature detectors (RTDs) are certainly not flexible, they are generally so small that incorporating them into a component or device does not present any form factor constraints.

Secondly, thermal diffusion is quite slow. This means thermal gradients are usually gentle, certainly when compared to spatial variation in force or light intensity, for example. Consequently, introducing measurement with fine spatial resolution is unnecessary in many cases, as a few thermistors or RTDs embedded in a thermally conductive layer provide equivalent insights.

However, while both these factors remain valid, emerging application areas mean that demand for printed temperature sensors – combining spatially resolved temperature measurement, low-cost roll-to-roll (R2R) production, and flexible thin-film format – is forecast to grow substantially over the next decade, with an increasing number of companies developing this technology.

Battery monitoring for electric vehicles

The anticipated increase in electric vehicle adoption, with multiple governments legislating to ban the sale of internal combustion engines for vehicles at set future dates, is a technological transition that is already creating huge opportunities for battery manufacturers.

Thermal management is extremely important for batteries (as anyone who has noticed their smartphone battery life plummet when subjected to heat or cold will attest). Batteries work best within a narrow temperature range, and hot spots can provide an early indication of malfunctions.

Keeping track of battery temperature to adjust heating or cooling as required of course requires temperature sensors. Printed temperature sensors are well suited to this purpose as they are lightweight, thin, inexpensive to produce in high volumes, offer good thermal contact with pouch cells, and can be laminated together with thin-film heaters to produce an integrated thermal management solution. Printed temperature sensors also lend themselves to potential applications in electronics, healthcare and other sectors.

The recently updated IDTechEx report entitled *Printed and Flexible Sensors 2022-2032: Technologies, Players, Markets* covers printed photodetectors, pressure sensors, gas sensors, and more.

For more information visit: www.IDTechEx.com

Air humidity and temperature sensor with IO-Link

The combined air humidity and temperature sensor is suitable for use across diverse industries.

Turck is offering its first combined air humidity and temperature sensor to facilitate cost-effective condition monitoring in the field and in IIoT applications. With its IO-Link interface the device is easy to integrate.

The combination of the two measured variables – air humidity and temperature – in a single device makes the CMTH-M12 ideal for use in the condition monitoring systems of machines and plants, or to monitor the climatic conditions in production halls and warehouses. It can be used across a wide range of sectors – from the automobile industry to the semiconductor and food industries, and in agriculture or agri-processing facilities.

The sensor monitors two limit values ranges, each with a minimum and maximum value, outputting a warning signal in the event of an out-of-range value. The bidirectional IO-Link interface can also be used for the transfer of cyclical user data as well as warning and status messages, such as operating hours. Conventional switching outputs are provided as an alternative.

When used in combination with Turck's multiprotocol I/O devices, user data and analysis data can be transferred over separate Ethernet protocols. While I/O modules transfer the user data to a higher-level controller via Ethernet/IP or Profinet, Modbus/TCP can be used as a parallel channel for analysis data. This information can also be provided for mobile access worldwide via Turck's edge gateways and cloud systems.

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Thermal imaging in materials testing

Fixed and portable thermal imaging instruments are available for wide-ranging industry applications.

New materials are being developed almost every day for use in the aircraft, automotive, military and industrial sectors, making products lighter, stronger and more durable. New alloys, composite materials, rubber, plastic and adhesive materials need to be tested in various ways to validate their performance in terms of the required deliverables expected of them. Variations in temperature over a product's surface – regardless of size, shape or material type – can assist in identifying fatigue and potential failure points, allowing for a more detailed understanding of the product's functionality and life cycle.

Using a fixed mount thermal imager technicians and engineers can:

- Identify hot spots or detect the direction of heat transfer over the surface of a material or part
- Analyse failure points of the part(s) or material due to overheating
- Identify when material properties change due to heat generation
- Design and develop more efficient materials by identifying high temperature or increased temperature variations.

Thermal imagers are used, for example, in:

- Supporting the development of new rubber compounds for protective covers on moving parts
- Testing of structural adhesives for rigidity and flexibility (for automotive, aerospace and industrial applications)
- Lifecycle testing in the development of new alloys
- Heat resistance testing in different materials.

The Raytek ThermoView® TV40 thermal imaging camera with ThermoView software is a good choice for such applications. It can be used in tensile strength testing and impact testing. Furthermore, the use of thermal imaging during lifecycle testing identifies how heat may develop in a product as it is being used in a designed application.

The Thermoview software allows flexibility, programmable AOIs (areas of interest) to cover various areas or an entire surface of the material or product. The AOIs can be linked to a global process alarm output controlling technician notification systems, initiating automatic shutdown procedures, or recording a video of the material or product at operating temperature or failure. The software package is easy to use by itself or integrated into an existing network. The imager can be used to monitor temperature throughout the test process, so any abnormalities, hot or cold, can be identified, recorded and corrective action can be taken.

Other features of the software allow the user to: collect and record images and videos for detailed product analysis, develop trend files for material/product analysis, and archive AOI data to separate spreadsheet files.

The fixed Raytek solution offers a number of advantages compared to portable thermal imagers and thermocouples.

- Safety – it allows for technicians and engineers to keep away from moving parts or machinery
- Automation – it enables automated thermal imaging for monitoring or control of continuous or stationary targets
- On-board Ethernet enables fast transmission of data
- Cost reduction in long-term use – there is no need to continuously replace thermocouples
- Repeatability – it can be focused on the same points through multiple tests
- Reduced setup time for repetitive testing processes
- Spots temperature variation on moving parts where thermocouples cannot be placed
- Provides 24/7 monitoring capability.

R&C Instrumentation is the sole sub-Sahara agent for Raytek, Ircon and Datapaq temperature monitoring instruments, now marketed under the Fluke Process Instruments umbrella.

For more information, contact R&C Instrumentation
Tel: +27 (0)11 608 1551
Email: info@randci.co.za
Visit: www.randci.co.za

Compact ultrasonic liquid flow meter/controller

The new ES-FLOW Ultrasonic Flow Meter is designed to measure low flow rates.

The new, compact ES-FLOW™ Ultrasonic Flow Meter/Controller Series ES-113C developed by Bronkhorst® was designed for the OEM market to measure or dose low-volume flows with high precision, high linearity and low pressure drop. Liquid flows from 2 up to 1 500 ml/min can be measured using ultrasound in a small bore tube. This technology functions independently of fluid density, temperature and viscosity. The instrument therefore does not require recalibration when switching fluids.

The combination of a straight sensor tube with zero dead volume and transducers positioned at the outer surface makes the flow meter self-draining and easy to clean. Wetted parts are made of stainless steel and the exterior design is rated to IP66/IP67.

The on-board PID controller can be used to drive a control valve or pump. This enables users to establish a complete, compact control loop. Moreover, the instrument features various fieldbus options, customisable I/O functions and temperature as a secondary output.

Typical applications for the new low-flow liquid flow meters and controllers are in the food, beverage and

Laser sensor detects difficult objects

OMRON has launched a new E3AS-HL CMOS Laser Sensor with industry-first sensing technology (according to OMRON's own research in September 2020) which significantly improves detection capability. A reliable sensor to detect typically difficult-to-detect targets helps reduce time-consuming installation and adjustment at equipment commissioning.

Detection using conventional reflective photoelectric sensors is affected by the target colour, material, or surface, and experience and skills are needed to design and adjust the sensor installation for each target. This issue often arises in the automotive and food industries where various targets with complex shapes and glossy surfaces need to be detected.

The new E3AS-HL CMOS Laser Sensor can reliably detect targets that cannot be detected with conventional reflective photoelectric sensors. It makes use of the triangulation principle and incorporates a laser emitter and a CMOS image sensor receiver. With its integrated sensing algorithm it can reach high-speed sampling at 10 000 times per second and OMRON's unique accumulation processing increases sensitivity by amplifying the slightest amount of light bounced off the target. The manufacturing technology adjusts the receiver lens position in the sensor to the micro metre level, enabling reliable detection of any target colour, material and shape.

The new E3AS-HL CMOS Laser Sensor can reliably detect targets that cannot be detected with conventional reflective photoelectric sensors.

The E3AS-HL Sensor can be used to detect curved and irregularly shaped glossy automotive parts and multi-coloured and glossy food and packages. It can be used where reflective photoelectric sensors were used previously and helps significantly to reduce the time required to adjust the sensor installation position and angle and the threshold values.

In addition, the sensor has an antifouling coating on the sensing surface to ensure stable operation even in harsh environments. It also incorporates an OLED display and teach function which enables easy, quick setting.

For more information contact Omron Electronics.
Tel: +27 (0)11 579 2600
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Visit: www.industrial.omron.co.za

New compact capacitive sensors

Instrotech, local representative of SELET, has available a new design series of SELET capacitive sensors with more compact dimensions than traditional sensors on the market. The devices measure 40 mm in total, of which 33 mm is the threaded section for the flush version, and 50 mm in total, for the non-flush version. New constructive technology played a large part in the development of the products. The sensitivity adjustment, instead of being done via a trimmer, uses a 'teach switch' located at the back of the sensor.

Key features of the K02 compact capacitive sensors include:

- Metal casing with a compact 18 mm diameter

The SELET K02 compact capacitive sensor.

- Dimensions of flush version: L = 40 mm (thread of 33 mm)
- Dimensions of non-flush version: L = 50 mm (thread of 33 mm)
- Automatic or manual teach-in mode for sensitivity calibration
- NO or NC output setting by teach-in
- Cable connection L = 2 m or L = 200 mm with M12 pigtail connector
- Versions: 3-cables PNP NO/NC, and 4-cables NO+NC.

SELET, based in Turin, Italy, produces components for automation fields with inductive sensors that address the limitations of mechanical switches in automation. SELET produces capacitive and photoelectronic sensors, as well as incremental and absolute rotary encoders. The company looks to develop customer-driven products and maintains a worldwide presence through its distribution networks and direct contacts.

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

pharmaceutical sectors (controlling additives, or sterilisation, for example), in medical and chemical sectors (for dialysis, catalysts, reagents, for example) and other sectors where high precision fluid handling is required such as for fuel consumption measurement and dosing of colourants or lubricants in diverse industries.

Mecosa (Pty) Ltd is the sole agent for Bronkhorst® in Southern Africa.

For more information contact Mecosa.
Tel: +27 (0)11 257-6100
E-mail: measure@mecosa.co.za
Visit: www.mecosa.co.za

Smart maintenance anytime, anywhere

Challenges like the pandemic, as well as personnel costs and a shortage of skilled workers, are putting increasing pressure on companies. It is becoming more difficult to maintain large-scale plants efficiently and in line with requirements, and to resolve problems in a timely way. Predictive maintenance is intended to remedy this situation, preventing failures and enabling more efficient use of time. Pepperl+Fuchs highlights the role of smart mobile end devices in efficient plant maintenance.

Smart mobile devices allow for remote support in tackling complex plant maintenance procedures.

Particularly in industries where many facilities or large-scale premises need to be inspected and maintained, the challenges of covering and carrying out the demanding work processes are becoming more apparent. Increasingly complex systems make it impossible for employees to memorise how to service each individual component. Experts are not always available at all facilities to the extent that they are needed.

A valuable benefit of using smart mobile end devices in industry is the option for access to remote support from off-site technicians when complex procedures need to be carried out. Video calls or augmented reality applications can be used in hazardous areas via smartphones or tablets. And technicians on-site can contact experts, or the manufacturer of the asset if necessary, and ask for support on complex matters. Overall, this saves time and resources.

Digital end devices are useful as more than just on-site eyes and ears. Such devices, like those developed by the Pepperl+Fuchs brand ecom instruments, have different functionalities – including an electromagnetic gyroscope, GPS, and cameras – that facilitate assessment of the on-site situation and enable experts from anywhere in the world to gain clear and precise insight into the circumstances. This in turn supports the use of digital step-by-step instructions and remote support or customer-specific tools that can serve various tasks – from plant inspection to maintenance to plant management, as well as delivering digital training courses.

Digital end devices can give plant operators and technicians instant access to the information they need to be quicker and better at their work, putting them in direct contact with the right support experts, and providing an overview of all open, in-progress, and closed cases.

Digital end devices for greater efficiency

To enable seamless support through digital drawings, a description of servicing steps, or through remote experts, the multifunctional end device must display even the most complex of applications without any problems, providing excellent image quality, even in strong sunlight. In addition to its smartphone series, ecom offers tablets such as the new Tab-Ex® Pro with 10-inch screen. Pogo pin charging and a powerful and replaceable battery with a capacity of 7 400 mAh for a runtime of up to 15 hours ensure smooth operation and a long operating time in the field. The high-resolution screen ensures a clear image when receiving support via remote servicing or in video tutorials.

Corresponding accessories for smartphones such as the Smart-Ex 02 and tablets allow workers to keep their hands free to execute tasks unimpeded on site. Workers can be guided through complicated applications in real time by experts and without being restricted, using suitable carrying devices, headsets and cameras. At P+F we understand the importance of a range of peripheral devices, which are tailored to the digital end devices of the brand and to the needs of those working in industrial or explosion-protected environments. These ensure that work processes can be carried out without errors and that faults can be quickly rectified by technicians on site.

The smart future of maintenance

To take remote support to a new level, ecom has been working on the development of additional products that can be used in combination with smartphones and tablets. Smart glasses have been the focus of development, as they can be operated optimally by the technician on site using hands-free voice control and allow remote experts to gain a clear view of the processes. The expert can provide support or guidance while information and written instructions are displayed live and directly in the worker's field of view. ecom pays particular attention to ensuring that the smart glasses and their functions are adapted for use in everyday industrial working environments and hazardous areas.

Unrestricted device communication

Digital products and services enable the staging, management and real-time monitoring of mobile devices. Providers rely on a combination of comprehensive mobile device management with corresponding device analytics. This offers a simple way to configure and manage the increasing number of mobile end devices. An analysis of historical and current data is accessible at any time and

Designed for industrial use, ecom devices enable remote support for on-site technicians.

At a glance

- A key benefit of using smart mobile end devices in industry is the option for access to remote support from off-site technicians.
- With additional functionalities smart mobile end devices facilitate assessment of the on-site situation, giving experts anywhere in the world clear insight into the circumstances.
- Comprehensive mobile device management with corresponding device analytics make historical and current data accessible at any time.

provides for conclusions to be drawn with regard to function-critical correlations. Enterprise mobility management systems that are managed centrally by the provider can present a complete overview of complex systems. This relieves the burden on IT departments and provides more security for ongoing operations.

Agile maintenance

Expert guidance from other facilities and digital workflows help technicians to perform complex tasks on systems directly, as part of a mobile solution. Integrating mobile end devices and tools is another step towards achieving digital production, servicing and repair.

Smartphones and tablets used in on-site maintenance need to provide support to technicians in their everyday work and they need to be suitable for the conditions in harsh industrial environments and hazardous areas. They also need to be usable worldwide. In addition to general availability, the devices are required to fulfil various requirements and must offer capabilities in a range of infrastructures and networks.

Mobile devices are more than just communication tools. As part of an overall digital solution, they provide mobile support for technicians, enabling them to query, record and analyse data and respond quickly to emerging scenarios. □

For more information visit: www.pepperl-fuchs.com/za

Genuine parts kits for Cummins-powered equipment

For customers using Cummins-powered equipment, the company recommends the use of Cummins genuine parts kits – Cummins Genuine Kits – whenever maintenance services are required.

Cummins supplies a comprehensive range of kits to meet the repair practices and budgets of its customers. "We can provide a one-stop solution – from service and repairs to major overhauls and rebuilds," says Bhavyata Gupta, Parts Product Manager for Cummins Africa Middle East, based in Dubai. "We have kitting and bundling options available that are much more cost-effective than buying the components individually."

In addition, Cummins Genuine Kits offer customers the benefit of simplifying and speeding up their own supply chain and ordering processes. The kits are made up using only genuine Cummins parts, engineered for specific engines and backed by a warranty offered by all Cummins authorised locations in the event of failure.

"There can be a minimum price difference of 10%, and up to as much as 30%, between buying the parts separately as opposed to using Cummins Genuine Kits," Gupta highlights. The main benefits for customers are the comprehensive selection of kits and parts available, and the ease of ordering.

Cummins supplies a range of kits to meet the maintenance service and repair needs of its customers.

"Our kits also ensure that customers have access to all the parts they need and do not risk not having a critical component on hand, which could hold up a service or overhaul. This can have a serious impact on productivity, engine performance and the customer's bottom line," Gupta adds.

In addition, Cummins Sales and Service locations always have the right tools and certified technicians to carry out major repairs like overhauls. Engine overhauls are dyno-tested to ensure the engine functions properly and continues performing at its best for the long haul. Genuine Cummins parts are built to meet or exceed the original specifications for performance, reliability and durability of Cummins' engines.

"If a customer needs a specific part that is not bundled in any of our kits, they can always contact us for assistance and expertise," Gupta says.

For more information contact Cummins Africa Middle East.
Tel: +27 (0)11 451 3433
Visit: www.cummins.com

IR windows facilitate safe maintenance

One of North America's leading bottled water companies – dedicated to providing customers with healthy hydration options and to keeping its employees safe – was looking for a cost-effective solution to help optimise consistent maintenance processes and asset life cycles across its facilities, and to adopt the technologies needed to support and sustain those processes throughout the US and Canada.

The company called in consultants to provide recommendations on placement, sizing and types of infrared windows to be installed at its Ontario, Canada facility. After an initial site survey, the consultants recommended the FLIR IRW-xPC series in various sizes for the project. The IRW-xPC series is a NEMA 4 / IP65 rated IR window and suitable for indoor applications. The IR windows are available in sizes of 6, 12, and 24 inches (about 15, 30 and 60 cm).

Analysis of inspection programme

The company developed a reliability and maintenance policy that includes a 3- to 5-year improvement plan. This was communicated to all employees. It outlined all essential reliability and maintenance elements, key performance indicators, why these are important and the importance of Reliability Centred Maintenance (RCM) and a Reliability Based Maintenance (RBM) programme for overall plant safety.

Through its own research the company had determined that it would retrofit the transparent polymer infrared (IR) windows – to provide a safer method of conducting inspections in compliance with standards. The reliability team decided to implement the large format infrared polymer windows for main switchgear bus connections, main breaker connections and fused switches, to help eliminate the hazard of live work by allowing for hot spots to be found through the IR windows.

As a result, more frequent routine inspections of energised equipment could be performed through the IR windows. The closed panel inspections with the windows in place do not require the elevated levels of personal protective equipment (PPE) mandated in NFPA 70E, thus reducing maintenance time and costs. Inspections could also now be performed more confidently on electrical equipment that had previously been considered 'uninspectable' due to high levels of arc flash incidents.

A bottled water company with sites around North America has implemented large format IR windows to make condition monitoring on electrical equipment easier and safer.

Thermal imaging was not new to the maintenance and reliability team as they had previously retrofitted some equipment with traditional round calcium fluoride windows. However, it was determined that a transparent polymer IR window, available in various large format sizes, would provide for both visual and thermal inspection with fewer units needing to be installed.

The polymer-based IR windows are unaffected by environmental and mechanical stresses that often impact IR windows fitted to electrical distribution equipment. By installing polymer-based windows, the company could help ensure that temperature data collected through the IR windows would be accurate and reliable for the life of the installation.

Industrial-grade IR windows also meet mandatory impact and load testing requirements of UL, CSA, IEEE and IEC.

Installation

The installation process proceeded smoothly and entailed the following steps.

- Pre-planning to identify the equipment and obtain approval to shut down
- De-energising the equipment with two electricians to make sure it was safely isolated, locked out and tagged out
- Once the equipment was de-energised, the two electricians removed all covers on the equipment
- The IR windows were installed using supplied drill/cut templates in the appropriate location and the covers were replaced
- The electricians put on appropriate PPE and the electrical equipment was re-energised
- Together with operations, the electricians confirmed the equipment was operating at normal load levels and allowed sufficient time for the equipment to become thermally stable
- The electricians then performed the infrared

The bottling company installed 24-inch IR windows in main breaker bus cabinets.

inspection on the equipment to establish baseline temperature data

- Any problems discovered were noted and addressed.

Results

The bottled water company has seen substantial savings in time and money with the implementation of the transparent polymer infrared windows in its condition-based monitoring programme. The use of polymer IR windows allows more convenient and frequent inspections resulting in the ability to catch and fix potential problems well before they turn into unexpected outages. In this way, it is expected that the bottled water plants at the different sites will see increased mean time between failure (MTBF) on their critical electrical infrastructure.

Based on the results at the first sites, the bottled water company is now implementing the IR windows at 29 of its sites around North America. The IR windows are supplied by Teledyne FLIR, a leader in intelligent sensing solutions for defence and industrial applications. □

At a glance

- The company decided to retrofit transparent polymer IR windows to provide for safer inspections on live electrical equipment.
- As a result, routine inspections of energised equipment could be done more often and maintenance time and costs could be reduced.
- The large format IR windows also provide for both visual and thermal inspection, with fewer units needing to be installed.

Incoming line connections were also fitted with 24-inch IR windows.

For more information visit: www.teledyneflircom

Test and inspection in challenging environments

Following a previous test and inspection project completed successfully at Eskom's Ingula pumped storage scheme on the escarpment of the Little Drakensberg in KwaZulu-Natal, Skyriders Access Specialists has again been appointed to undertake similar work at the utility's Drakensberg and Ingula pumped storage schemes and the Gariep hydro power station on the banks of the Orange River near Norvalspont in the Eastern Cape.

Periodic inspection of the various schemes by specialised structural, civil or mechanical teams has required Skyriders to deploy some of its most highly qualified and experienced technicians to provide the necessary assistance and access, says Marketing Manager Mike Zinn.

"One of the challenges presented by the pumped storage schemes is that we have to take the Mine Health & Safety Act into consideration, which means there are additional regulations and provisions with which we need to comply. It is quite a strict process, but we have been well-guided by the client's own safety team in this regard," says Zinn.

Although the schemes are among the most challenging industrial environments that Skyriders has worked in to date, the contract is a significant extension of the inspection, repair and access work that the company has carried out for Eskom over the years at many of its coal-fired power stations.

Zinn says Skyriders is keen to introduce the possibility of using its Elios SkyEye drone system to carry out inspection work at the pumped storage schemes. This will reduce the time required and reduce the risk for all personnel involved. "We are currently arranging for a demonstration of our drone service as the first step in the approval process – with a view to using this technology in such environments," he says.

Skyriders is providing access and standby rescue for inspection teams at a number of Eskom's pumped storage and hydro power schemes.

For more information contact Skyriders.
Tel: +27 (0)11 312 1418
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Visit: www.ropeaccess.co.za

Thermal imagers to support proactive maintenance

Fluke's new TiS75+ Thermal Imager makes it easier to log inspection images which help in preventive maintenance programmes.

Comtest, local representative of Fluke, has available the new TiS55+ and TiS75+ thermal imagers, easy-to-use infrared cameras which help to transform plans for preventive maintenance programmes into reality. The IR cameras offer technicians and contractors good quality images and supportive features for troubleshooting, intermittent inspection, and preventive maintenance needs.

Technicians usually make many inspections daily and it can be hard to remember what was seen and the inspection location. Clipboards to jot down notes are old-school. The new technology Fluke TiS55+ and TiS75+ are equipped with built-in personal assistants so technicians can have all the information they need, embedded in the images saved.

Supporting features include:

- Voice annotation - Record up to 60 seconds per thermal image, identify exactly what is seen, in real time
- IR-PhotoNotes - Take photos of asset numbers and other identifiers, and use these as a reference when looking at the thermal image on a computer
- Asset Tagging - Sort the thermal images by asset: scan a QR code on the asset, then start capturing thermal images. Images will automatically be sorted by asset, simply connect the camera to a computer to view them.

Focus is one of the most important aspects of a thermal image. Whether users are seasoned thermographers or new to thermal cameras, Fluke offers manual or fixed focus options.

- Manual focus - Seasoned thermographers can use the manual focus wheel to adjust the image based on how far they are from the target.
- Fixed focus - For quick scans or for users new to thermography, they can simply use the fixed focus and take images at one metre from the target; the images will be in focus every time.

For building inspectors, who always check for moisture, the Fluke TiS75+ thermal camera includes a dew-point calculation. When air is cooled to the temperature where it is saturated with water, moisture develops and this can be extensively damaging to buildings. Once dew point is calculated, the camera will display the Dew Point Colour Alarm. Everything the camera displays that is at the dew point temperature and below, will display as a thermal image. Everything above, will display as a visual light image. This allows users to see where in the image condensation is occurring, and a scale of how far objects are below the dew point.

Further features of the TiS55+ and TiS75+ thermal imagers include:

- 384 x 288 (TiS75+) or 256 x 192 (TiS55+) infrared resolution
- -20°C to 550°C temperature range
- 3.5" VGA touchscreen LCD display
- Water and dust resistant (IP54)
- Engineered to withstand a two-metre drop.

Fluke's TiS55+ ad TiS75+ infrared cameras are part of the growing system of connected test tools and equipment maintenance software.

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

Containerised test lab for Guinea mine

Starting its journey to Guinea, the mobile laboratory was collected from WearCheck's head office in Durban.

Earlier this year WearCheck South Africa produced a remodelled container laboratory to be shipped to a mining site in Guinea, West Africa, to enable technicians there to process used oil samples and handle other condition monitoring needs for a Guinean mining company. The portable laboratory was commissioned by a private mining group which will run the condition monitoring programme with in-house technicians trained on-site by WearCheck. Guinea's mining industry – focused mainly in iron, gold, diamonds and bauxite – accounts for over 50% of the country's exports.

The mobile laboratories are put together at Wear Check's head office in Westville, South Africa using repurposed shipping containers. They incorporate every available safety feature, including ventilation and air extraction systems, fire prevention systems and more. Each lab is fully equipped with the latest laboratory instruments and technology, as well as an uninterrupted power supply, air conditioning and burglar bars. As industry needs evolve, the mobile labs are redesigned to meet those needs.

Before dispatch, the laboratory instruments and movable components are carefully packed to prevent disturbance during transport and the container is sent either by road or by sea, depending on its destination. The container for Guinea was to be transported largely by sea from Durban to Conakry.

WearCheck Managing Director, Neil Robinson is determined to overcome the lack of infrastructure in certain mining regions in Africa by providing such mobile laboratories in converted shipping containers and placing them on-site. In this way, the local industries benefit from world class condition monitoring services which otherwise would not be within reach.

Extending NDT, inspection and safety into Africa

Johan Gerber, Managing Director at Dekra Industrial RSA.

Headquartered in South Africa's Mpumalanga town of Middelburg, Dekra Industrial RSA provides non-destructive testing (NDT), inspections, advanced NDT technologies, as well as safety and other training through its Institute of Learning (IOL). It serves a range of clients across industries from power generation and petrochemicals to steel processing, automotive manufacturing and others.

Johan Gerber, Managing Director at Dekra Industrial RSA says, "We have been at work in South Africa for the past 38 years, using our local footprint to service our South African clients and as a gateway into sub-Saharan Africa. We have a great base from which to reach the liquefied natural gas (LNG), power generation and other key infrastructure projects in the region, including those in southern Mozambique."

Notwithstanding the recent conflict in northern Mozambique, Dekra Industrial remains fully committed to its ongoing work in southern Mozambique, as well as across the sub-Saharan region and the rest of the African continent, with its many projects and possibilities.

Dekra Industrial has registered on several approved suppliers' forums and is authorised to provide accredited NDT services to organisations in the region. In addition, the company has cultivated a clear understanding of the cultures and procedures pertaining to testing systems and regulatory compliance requirements throughout Africa over the past 20 years.

Having achieved successes in countries such as Uganda, Tanzania, the Democratic Republic of Congo and Botswana, Dekra Industrial –which also has a registered company in Mozambique – is fully committed to pursuing new opportunities in the country's southern region and in "driving general awareness of NDT and compliance where it is needed most," Gerber says.

Mozambique, with several ports and key logistics corridors, is a principal gateway into the Southern Africa Development Community (SADC) countries. It is one of the top five countries in the world in new natural gas findings, coking coal, rubies and graphite, and offers a wealth of opportunities.

In southern Mozambique, the Maputo province is pivotal in providing growth opportunities for the industrial sector, resulting from the multimillion dollar LNG projects near the capital, as well as the establishment and ongoing development of various industrial parks. These host companies in manufacturing, maintenance and machinery, metals, downstream aluminium, construction, civil engineering, oil and gas and more.

Dekra Industrial has completed various projects in Mozambique successfully, including the provision of services on a gas project in Temane and on a South African petrochemical company's gas pipelines.

"As we expand our footprint into Africa, Dekra Industrial aims to become the preferred supplier of non-destructive testing, inspection and related expertise on the continent," says Gerber.

"We will also be sourcing and developing skills in local communities and will provide training and jobs where possible. It is important to us that wherever we go, we add value to the communities we serve, and job creation – particularly against the backdrop of the Covid-19 pandemic – is needed now more than ever throughout Africa," he adds.

For more information contact Dekra Industrial RSA.
Visit: www.dekraindustrial.co.za

Says Robinson, "Our aim is to make world class condition monitoring services as accessible as possible to operations on the African continent. The purpose-designed functionality of the container labs eliminates the need for basic infrastructure such as a building, electricity, internet signal, security and safety features. With these factors taken care of, WearCheck then places the designer lab within convenient reach of mining operations."

Once the mobile lab is on site, a WearCheck technician travels to the location to set up the laboratory and calibrate the instruments. Generally, a local lab manager undergoes training in an existing WearCheck lab and then takes over the reins of the mobile lab along with the necessary technicians. In some cases, the customer manages the laboratory independently.

To ensure that the laboratories always provide WearCheck's world class quality condition monitoring services, each mobile laboratory remains connected to the WearCheck South Africa LIMS (Laboratory Information Management System), which allows for quality control of the test results, and ensures that each sample is diagnosed by WearCheck's highly qualified team of diagnosticians. Results are reported via WearCheck's reporting system.

Offering a range of condition monitoring services for the mining sector – including oil analysis, coolant testing, diesel testing and a 24-hour sample turnaround time – the mobile labs are also available for use by other industries, such as quarrying, industrial, power generation, transport and shipping operations.

The Guinea-bound container laboratory is the eighth produced by WearCheck. Others are already operating successfully in Ghana, Mozambique, DRC, Mauritania, Namibia and Burkina Faso. WearCheck operates an additional 14 full-sized laboratories in built premises in nine countries around Africa and in India and Dubai.

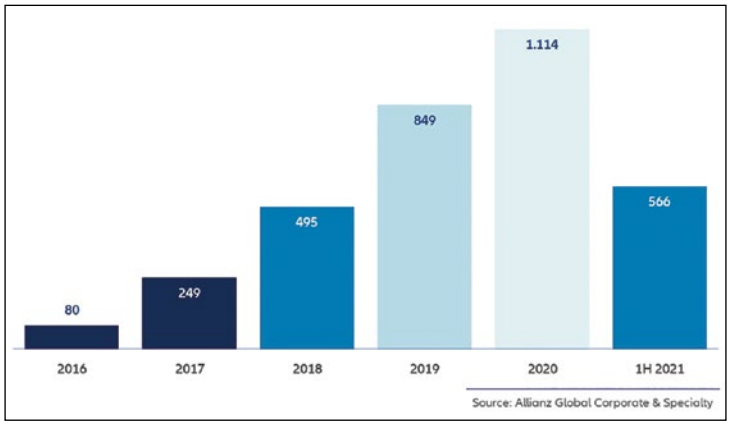
For more information contact WearCheck South Africa.
Tel: +27 (0)31 700 5460
Email: support@wearcheck.co.za
Visit: www.wearcheck.co.za

Best practice for cyber risk management

During the Covid-19 pandemic there seems to have been an outbreak of another kind in cyber space: a digital pandemic driven by ransomware. Malware attacks that encrypt company data and systems and demand a ransom payment for release of the data are surging globally. The increasing frequency and severity of ransomware incidents is driven by several factors: the growing number of different attack patterns such as 'double' and 'triple' extortion campaigns; a criminal business model around 'ransomware as a service' and cryptocurrencies; the recent skyrocketing of ransom demands; and the rise of supply chain attacks. In a new report global corporate insurance carrier Allianz Global Corporate & Specialty (AGCS) analyses the latest risk developments around ransomware and outlines how companies can strengthen their defences with good cyber protection systems and IT security practices.

Scott Sayce, Global Head of Cyber at AGCS says, "The number of ransomware attacks may increase before the situation gets better. Not all attacks are targeted. Criminals also adopt a scattergun approach to exploit those businesses that aren't addressing or understanding the vulnerabilities they may have. As insurers we must continue to work with our clients to help businesses understand the need to strengthen their controls. At the same time, in today's rapidly evolving cyber insurance market, providing emergency response services, as well as financial compensation, is now the standard."

According to Accenture, cyber intrusion activity globally jumped 125% in the first half of 2021 compared to the previous year, with ransomware and extortion operations among the major contributors to this increase. According to the FBI, there was a 62% increase in ransomware incidents in the US in the same period; that followed an increase of 20% for the full year 2020. These cyber risks trends are mirrored in AGCS' own claims experience. AGCS was involved in over a thousand cyber claims overall in 2020, up from around 80 in 2016; the number of ransomware claims (90) rose by 50% compared to 2019 (60). In general, losses resulting from external cyber incidents such as ransomware or Distributed Denial of Service (DDoS) attacks account for most of the value of all cyber claims analysed by AGCS over the past six years.



In a new report AGCS highlights the recent marked increase in cybersecurity related claims, particularly for ransomware attacks.

The company cites increasing reliance on digitalisation, the surge in remote working during the pandemic, and IT budget constraints, as just some of the reasons that IT vulnerabilities have intensified, offering countless access points for criminals to exploit. The wider adoption of cryptocurrencies, such as Bitcoin, which enable anonymous payments, is another key factor in the rise of ransomware incidents.

Five areas of focus

In the report, AGCS identifies five trends in the ransomware space, although these are constantly evolving and can quickly change.

- The development of ransomware as a service: This has made it easier for criminals to carry out attacks. Run like a commercial business, hacker groups such as REvil and Darkside sell or rent their hacking tools to others. They also provide a range of support services. As a result, many more malicious threat actors are operating.
- From single to double to triple extortion: Double extortion tactics are on the rise. Criminals combine the initial encryption of data or systems, or increasingly back-ups as well, with a secondary form of extortion, such as the threat to release sensitive or personal data. In such a scenario, affected companies have to manage the possibility of both a major business interruption and a data breach event, which can significantly increase the final cost of the incident. Triple extortion incidents can combine DDoS attacks, file encryption and data theft – and don't just target one company, but potentially also its customers and business partners.
- Supply chain attacks: There are two main types – those that target software/IT services providers and use them to spread the malware (such as the Kaseya and Solarwinds attacks), and those that target physical supply chains or critical infrastructure, such as the one which impacted Colonial Pipeline. Service providers are potentially prime targets as they often supply hundreds or thousands of businesses with software solutions and therefore offer criminals the chance of a higher payout.
- Ransom dynamics: Ransom demands have rocketed over the past 18 months. According to Palo Alto Networks, the average extortion demand in the US was $5.3 million in the first half of 2021, a 518% increase on the 2020 average; the highest demand was $50 million, up from $30 million the previous year. The average amount paid to hackers is around 10 times lower than the average demand, but the general upward trend is alarming.

- To pay or not to pay: Ransom payment is a controversial topic. Law enforcement agencies typically advise against paying extortion demands to limit the incentive for further attacks. In some cases when a company decides to pay a ransom, the damage may have already been done. Restoring systems and enabling the recovery of the business is a huge undertaking, even when a company has the decryption key.

Business interruption and recovery costs

According to AGCS' claims analysis, business interruption and restoration costs are the biggest drivers behind cyber losses resulting from ransomware attacks. They account for over 50% of the value of close to 3 000 insurance industry cyber claims worth around €750 million ($885 million) it has been involved in over six years.

It is reported that the average total cost of recovery and downtime – on average 23 days – from a ransomware attack more than doubled over the past year, increasing from $761 106 to $1.85 million in 2021.

The recent surge in ransomware attacks has triggered a major shift in the cyber insurance market. Cyber insurance rates have been rising and capacity has tightened. Underwriters are placing increasing scrutiny on the cyber security controls employed by companies.

Marek Stanislawski, Global Cyber Underwriting Lead at AGCS says, "Three out of four companies do not meet AGCS' requirements for cyber security. Companies need to invest in cyber security and losses can be avoided if organisations follow best practices. A house with an open door is much more likely to be burgled than a locked house."

A checklist for best practice

AGCS has published a checklist with recommendations for effective cyber risk management. "In around 80% of ransomware incidents losses could have been avoided if the organisations had followed best practices. Regular patching, multi-factor authentication, as well as information security and awareness training and incident response planning are essential to avoiding ransomware attacks and also constitute good cyber hygiene," says Rishi Baviskar, Global Cyber Experts Leader at AGCS Risk Consulting. "If companies adhere to best practice recommendations they are less vulnerable to ransomware attacks. Numerous security gaps can be closed, often with simple measures."

In the event of an attack, cyber insurance coverage has evolved to provide emergency incident response services that typically include access to a professional crisis manager, IT forensic support and legal advisory. Further offerings include IT security training for employees and assistance with the development of a cyber crisis management plan.

For more information visit: www.agcs.allianz.com

Driving innovation in extended detection and response

Lior Div, CEO and co-founder of Cybereason.

Cybereason, a leader in operation-centric cyberattack protection, and Google Cloud recently announced that they will collaborate to create and bring to market unprecedented Extended Detection and Response (XDR) – across endpoints, networks, cloud and workspaces – at record-setting speed.

Cybereason delivers what it describes as the most comprehensive protection available on the market today, analysing more than 23 trillion security-related events per week – five times the volume of any other solution in the market. Using its patented Malicious Operations (MalOps™) engine, it reveals the full attack story across every device, user identity, application and cloud deployment.

Google Cloud's cybersecurity analytics platform, Chronicle, takes in, normalises and analyses petabytes of data from the complete IT environment on planetary-scale infrastructure.

The combination of these capabilities delivers a cloud-native XDR solution, Cybereason XDR powered by Chronicle, that automates prevention against common attacks, guides analysts through security operations and incident response, and enables threat hunting with precision at a pace never before achieved.

Google Cloud's ability to hunt through petabytes of data at the speed of search, combined with Cybereason's correlation capabilities and behaviour-based detections delivers unparalleled speed and accuracy in the prevention, detection, and response to advanced attacks," said Cybereason CEO and co-founder Lior Div.

"We founded Cybereason with a mission to reverse the attacker's advantage and return the high ground to the defender, and we are excited to have Google Cloud partner with us in furthering the success of this mission."

Cybereason has succeeded in protecting customers and has seen impressive growth over the past year, being recognised as a leading innovator by respected third-party organisations. Where many solutions failed, Cybereason protected customers from headline-making attacks like SolarWinds, the Microsoft Exchange Server attacks, and crippling ransomware attacks from DarkSide, REvil and other ransomware gangs. That level of protection is why Cybereason was recognised on the CNBC 2021 Disruptor 50 list, and received top scores across every aspect of testing in the MITRE Engenuity ATT&CK Evaluations.

"Google Cloud is dedicated to delivering the industry's most trusted cloud to accelerate customers' digital transformation efforts with security products that meet them wherever they are. Cybereason continues to disrupt the market and deliver on its vision for a future-ready extended detection and response defence platform," said Thomas Kurian, CEO, Google Cloud. "We're pleased to partner with Cybereason to help customers quickly secure their hybrid and cloud environments with the combined capabilities of Google Cloud and Cybereason's XDR services."

For more information visit: www.cybereason.com

Investing in the next generation of engineers

General Electric (GE) has announced a five-year, $2.5 million investment in *Next Engineers*, Johannesburg, launching a global initiative focused on increasing the diversity of young people in engineering. Johannesburg was selected as one of four inaugural cities to host the initiative which aims to inspire more than 3 500 local students – aged 13 to 18 and in Grades eight to twelve – providing them with first-hand experiences in engineering, and awarding financial support to pursue further education in engineering.

GE is partnering with PROTEC, South Africa's leading non-profit organisation that empowers local students to pursue and grow in STEM-based careers (focused on science, technology, engineering and mathematics), to implement *Next Engineers* locally.

Earlier this year, GE committed up to $100 million to launch *Next Engineers*. Over the next decade, the goal is to reach more than 85 000 students across 25 locations globally. The company has been operating in the African market for more than 123 years, with Johannesburg being the first overseas office outside the USA. GE rises to the challenge of building a world that works, using its expertise and innovation in healthcare, aviation and power – and contributing to these key sectors in South Africa's economy.

Nyimpini Mabunda, CEO, GE South Africa, said: "Our growing global economy will require more engineers to solve society's most pressing challenges – from sustainable flight to quality healthcare and clean energy. *Next Engineers* allows us to expose students to the world of engineering at a young age through invaluable hands-on learning experiences. The programme will provide a platform for young people in Johannesburg and from different backgrounds to bring their unique perspectives to engineering, and empower them to foster the skills needed to build a world of the future that works. We recognise that for us to make a sustainable impact, we must be deliberate in our efforts to support social change."

Nyimpini Mabunda, CEO, GE South Africa.

Balan Moodley Chief Executive Officer at PROTEC, commented: "We are thrilled to be working alongside the GE Foundation and taking on the role of Lead Partner for its *Next Engineers* initiative in Johannesburg. It will transform the lives of so many within the programme and, of course, around the world, and we are excited to be a part of it. With an initiative like this, we aim to contribute towards changing the future of engineering."

Next Engineers is a programme of the GE Foundation, an independent charitable organisation funded by GE. The Johannesburg cohort of *Next Engineers* will begin in January 2022 and will offer three inspiring programmes for different age groups to engage students on their paths to engineering studies.

- Engineering Discovery: Students aged 13 to 14 in Grade eight will be provided with multiple, short, one-hour exploratory experiences and hands-on activities connecting them to real engineers to increase awareness of engineering as a viable career. Sessions will be delivered by volunteers, in the classroom and in the community.
- Engineering Camp: Students aged 14 to 15 in Grade nine will develop engineering identities through a week-long immersive camp experience during school holidays. Students will interact with experienced engineering faculty and staff, complete design challenges solving real-world problems, and interact directly with professional engineers and business leaders.
- Engineering Academy: Students aged 15 to 18 in Grades ten to twelve will enter a three-year further education readiness programme to guide and encourage them to pursue an engineering career path. The Engineering Academy will teach students to learn, think and act like engineers. This will provide 80 hours per year of out-of-school coaching, including longer challenges, a final year project, career coaching to expose students to different engineering pathways, and further education-readiness workshops. Students accepted onto engineering apprenticeships or for engineering degrees will also receive a funding contribution from the GE Foundation.

Next Engineers will begin accepting applications for the Engineering Academy in January 2022. Students, teachers and the community can obtain updates and more information from the website.

For more information visit: www.nextengineers.org or: www.gefoundation.com

PROTEC is a South African non-profit organisation, established in 1982, that provides holistic, high quality education and career support programme development in the fields of mathematics, science and technology, as well as life skills training and scarce skills, including engineering. PROTEC also runs a well-recognised teacher support programme in many of the programme's feeder schools. Based in Randburg, Johannesburg, the organisation has a network of nine branches and seven projects in six provinces around the country. In 2022, PROTEC will celebrate 40 years of successful educational and career preparation support for high school students in South Africa.

PROTEC was started in Soweto by a group of concerned engineers from the South African Institution of Civil Engineering, specifically to help high school children in disadvantaged communities prepare for successful careers in science, technology, engineering and mathematics. The programme began with 67 students, and has since provided opportunities for over 30 000 students to pursue engineering, science and a wide range of related careers. The early success of the project soon led to PROTEC's expansion into a national programme, and later included the addition of the teacher support programme.
For more information visit: https://protec.org.za/

Feasibility confirmed for SA's Hydrogen Valley

The country is moving closer to establishing South Africa's Hydrogen Valley, which has the potential to create up to 32 000 jobs a year by 2030.

This is according to the Hydrogen Valley Feasibility Study Report, which was launched by the Department of Science and Innovation (DSI) and partners on 8 October. According to the report, the job growth could be seen in sectors across the whole hydrogen value chain – from resources, production, transport and storage, to applications such as fuel cell manufacturing.

The feasibility study was completed in partnership with Anglo American Platinum, clean energy solutions provider Bambili Energy, and energy and services company ENGIE.

Estimates have placed the potential gross domestic product (GDP) impact, both direct and indirect, of the hydrogen projects at US$3.9 billion to US$8.8 billion should the full vision of the hydrogen valley be realised. In addition, the project could bring in US$900 million to US$2 000 million in tax revenue by 2050. "This revenue could be used to invest in the hydrogen economy and further magnify the positive impact," the report states.

According to the study, job creation through this project also has the potential to contribute to the just transition.

A national initiative

The DSI says the proposed hydrogen valley will serve as an industrial cluster, bringing various hydrogen applications in the country together to form an integrated hydrogen ecosystem. The initiative is also set to play a key role in supporting the Economic Reconstruction and Recovery Plan for South Africa.

Delivering the keynote address at the launch, the DSI's Director-General, Dr Phil Mjwara said the establishment of a hydrogen valley is an important national initiative. "The implementation of phase 3 of the Economic Reconstruction and Recovery Plan is driven by the core elements of reconstruction and transformation, and this entails building a sustainable, resilient and inclusive economy."

Mjwara believes that the hydrogen valley project has great potential to unlock growth and revitalise the industrial sector. In addition, this move will position South Africa to be an exporter of cost-effective green hydrogen to the world.

"And one of the things that I'm particularly excited about is that it is important to see this hydrogen valley as a place that will open up training for young people."

In other countries, such initiatives are used to promote clean emerging technologies and support emissions reduction. Hydrogen and fuel cell technologies offer an alternative source of clean electricity, and hydrogen itself allows energy to be stored and delivered in usable form.

"Using hydrogen as an energy carrier could potentially reduce South Africa's dependence on fossil fuels that cause global warming and reduce the country's reliance on imported oil."

Mjwara said implementing this complex initiative is not going to be achievable unless government continues with its ongoing partnerships.

The country's proposed hydrogen valley will start near Mokopane in Limpopo, where platinum group metals (PGMs) are mined, extending through the industrial and commercial corridor to Johannesburg and leading to Durban.

The hydrogen economy

Natascha Viljoen, CEO of Anglo American's PGMs business, said: "The opportunity to create new engines of economic activity through hydrogen has been validated through this feasibility study with our partners."

As a leading producer of PGMs, Anglo American Platinum has been working for some time towards establishing the right ecosystem to successfully develop, scale-up and deploy hydrogen-fuelled solutions, Viljoen said. "These include investing in innovative ventures and enabling technologies, as well as forging wide-ranging collaborations across industry, to fully harness the transformative potential of green hydrogen for our economy in South Africa," she added.

The feasibility study identifies nine hydrogen-related projects across the mobility, industrial and construction sectors that could be used as a springboard to establish the hydrogen valley. The projects will also facilitate the commercialisation of publicly funded intellectual property and contribute to the beneficiation of PGMs in targeted geographic areas.

ENGIE's Managing Director of Green Hydrogen, Michèle Azalbert, described the study as an essential first step supporting the South African Hydrogen Society Roadmap and making green hydrogen development concrete. "At ENGIE, we believe that working together on tangible projects and joining forces private and public will help to achieve scale and make this solution commercially viable quickly," Azalbert said.

CEO of Bambili Energy, Zanele Mavuso Mbatha, believes the project will bring significant public awareness around renewable energy solutions and contribute significantly to the national and provincial objectives for new investment, job creation, the development of renewable energy sources, and new export markets. "This initiative underpins a growth market for the South African economy and supports Bambili Energy's mission, which also serves to reduce global carbon emission levels," Mbatha said.

For more information visit:
www.sanews.gov.za or www.dst.gov.za

The Hydrogen Valley Feasibility Study Report, launched by the DSI and partners, confirms the initiative's significant potential benefits.

Could fewer sales mean higher profits?

Wale Arewa, CEO, Xperien

Businesses don't need to sell more products to increase revenues, they should rather focus on selling higher quality products with a longer life. The key lies in the circular economy, it promises higher profits and supports sustainability by enabling economic growth with fewer resources.

I look at the circular economy in terms of reducing electronic waste, recovering and reusing resources. It requires changing product designs and production where the e-waste becomes feedstock for new products. It's not a new concept, but it has received growing attention as solutions to climate change and the depletion of limited natural resources become increasingly urgent.

Less than ten per cent of resources that enter the global economy are recycled, the rest is discarded and often replaced with new items. There were more than 1.5 billion smartphones sold worldwide in 2019 and, according to a survey, almost half of the smartphone users in the US upgraded their phones before the phones stopped working. More concerning is that most of these discarded phones go to landfills.

The circular economy approach has real benefits for businesses and the planet. By recovering resources through recycling or remanufacturing, businesses can gain substantial returns. In addition, many businesses have realised increased benefits from making products from e-waste.

Discarded phones are full of valuable materials. There is reportedly 300 times more gold in a tonne of phones than in a tonne of gold ore. Unlike the linear economy, the circular economy captures the value of old phones so it doesn't become waste.

Manufacturing new phones is a resource and energy intensive process. Businesses need a culture-wide rethinking of the way they handle their manufacturing processes and their resources. The circular economy changes the conventional model. It keeps resources in the economic system for longer and at the highest value possible. Electronics keep most of their value when reused or recycled.

Consumers are also starting to embrace the idea of keeping products for longer, reusing products, or even purchasing recycled electronics. There is already an opportunity where people no longer need to purchase a phone or upgrade it every so often. When it comes to sustainability in smartphones, innovators like Fairphone have created modular phones that excel in the four areas of production, modularity, longevity, and recyclability.

More companies are now embracing circular business models to create more valuable businesses by using resources more efficiently and developing superior products and services. Improving asset usage by designing products that can be used more than once, can improve margins.

Adopting the circular economy will not only drive increased financial returns, it will also have a positive impact on society and the environment.

For more information visit: www.xperien.com

Recycling IT hardware for reuse

Motion plastics specialist igus reports a win-win initiative for employees and the environment in the project reguse, founded by igus trainees themselves. The igus trainees are processing disused electrical appliances and offering the recycled computers and other devices to colleagues in their own webshop – at a low cost and for private use. The proceeds will be donated to sustainable projects. Igus cites this programme as another example of how it actively promotes young talent initiatives.

On their own initiative trainees at igus headquarters in Cologne have established an IT hardware recycling business unit at the company.

For this, the company has now been recognised as one of the best MINT employers. (In Germany, the acronym MINT – with the first letters of the German terms for mathematics (mathematik), IT (informatik), science (naturwissenschaften) and technology (technik) – is roughly equivalent to the English acronym STEM (science, technology, engineering and mathematics).)

'Reduce, reuse, recycle' – this is the process the igus trainees have independently adopted in their reguse project. The IT trainees deal with the technology, the industrial business trainees handle the legal issues and a media designer trainee takes care of marketing.

€150 for a laptop, €50 for a monitor

The trainees offer the recycled products via their own web shop. "In just a few weeks we were able to generate sales of over 4 000 euros and our stock is currently sold out," says Matthias Mollerus, Industrial Business Trainee at igus. "The response from colleagues to the project has been great."

Following this successful start the trainees are refurbishing more devices, because the demand is high, as is their motivation. They are considering turning the business unit into a real company to increase the learning effect even more.

For more information visit: www.igus.co.za

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