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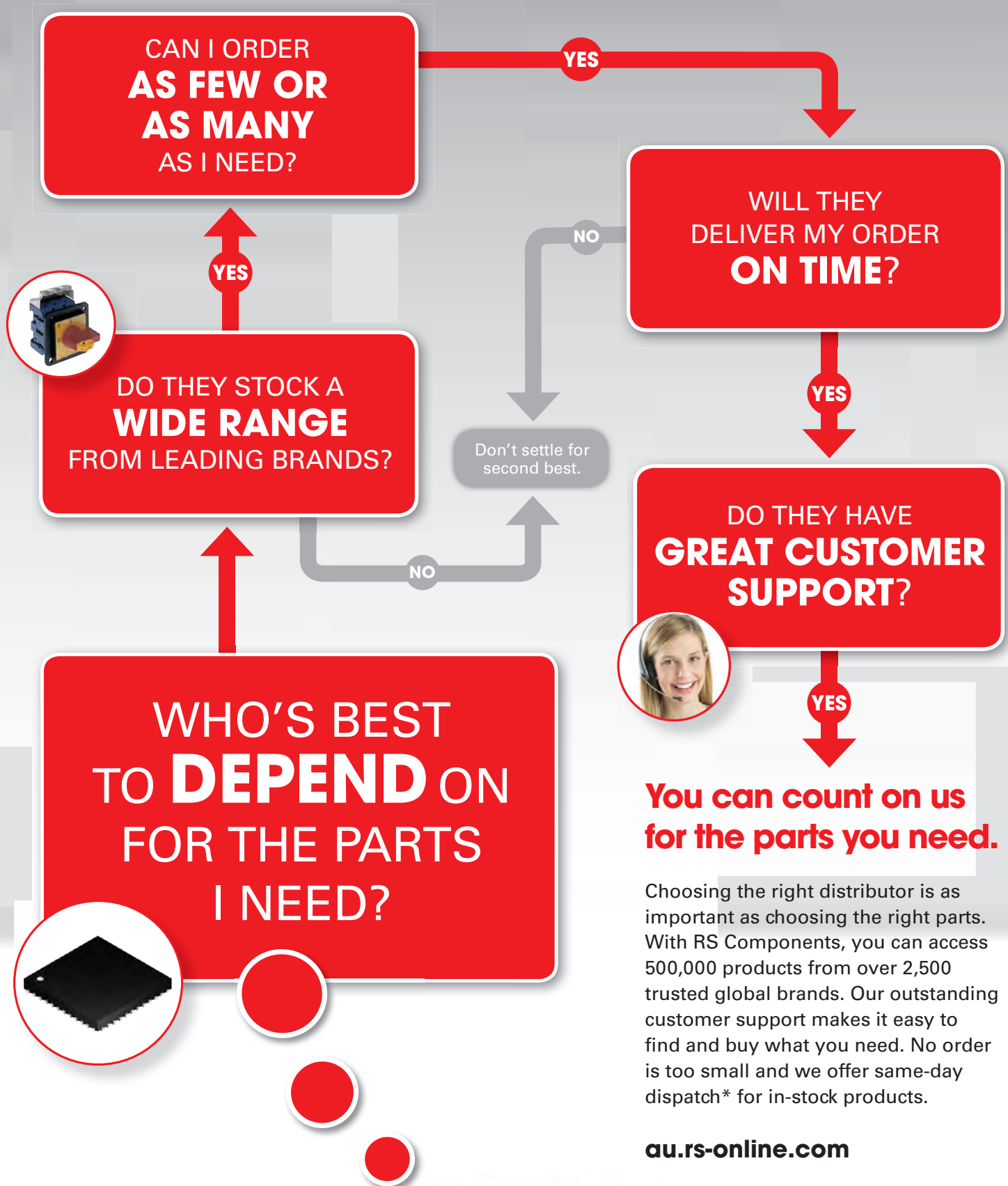
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Field metrology wells offer accuracy, portability and speed for nearly all field calibration applications. These units are packed with functionality and are easy to use, lightweight, small and quick to reach temperature setpoints. Their stability, uniformity and precision ensure they are suitable for transmitter loop testing, comparison calibration or a simple check of a thermocouple sensor. There is no need to have to carry additional tools into the field as the 'process' option offers a built-in readout for resistance, voltage and mA measurement, 24 V loop power and onboard documentation. Field metrology wells also interface directly to the Fluke 754 Documenting Process Calibrator for fully automated calibration. The Fluke 754 is a rugged tool for calibrating, maintaining and troubleshooting HART and other instrumentation. Its built-in HART interface is capable of performing nearly all the day-to-day tasks users now perform with a separate communicator. By combining the automating and documenting capabilities of the Fluke 754 Documenting Process Calibrator with Fluke Calibration's intelligent and stable family of field drywells and micro-baths, users now have the capability to test the entire loop. This combination of equipment allows users to easily verify the characteristics of the temperature sensor and measurement electronics. Using this information, the entire loop can be adjusted to optimise system measurement performance.

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POSITION SENSING

DIRECT LOAD POSITION
SENSING WITH SECONDARY
FEEDBACK ENCODERS

*Henry Menke**



In closed-loop motion control systems, direct load monitoring using secondary feedback encoders eliminates common sources of position error - mechanical backlash, non-linearity and hysteresis - and saves money along the way.

Motion control systems consist of mechanical hardware coupled to a prime mover, the operation of which is governed by a computerised controller that compares the command position to the indicated load position, and typically the indicated load position comes from a rotary shaft encoder or linear position encoder. In response to a difference between the command position and indicated load position, the controller generates a drive signal that is fed to the device that regulates the speed and direction of the prime mover - for example, an electronic amplifier driving a servomotor.

This process of reading position, comparing it to the command position and then driving the prime mover until it is positioned correctly is called closed-loop motion control. Besides position, other controlled variables such as velocity (the mathematical derivative of position) or force can also be measured.

With respect to position and velocity, the accuracy of the controlled motion - from the perspective of the load - is highly dependent on how closely the indicated load position matches actual load position. The indicated position is always a facsimile of the actual load position - due to various error-inducing factors the indicated load position never exactly matches the actual load position. The nature of the induced position errors depends on the architecture of the position encoder and how it interacts with mechanical drive hardware.

Typical rotary encoder-based positioning systems

For electric, closed-loop motion control systems, common system architecture features an electric motor as the prime mover directly coupled to a rotary shaft encoder as the load position sensor. The load may be connected to the electric motor through a variety of mechanical elements such as acme, lead or ball screws, rack-and-pinion systems or toothed sprockets with toothed drive belts.

In this architecture, the true standard of measurement is not the rotary encoder, but the drive system itself. The rotary encoder accurately indicates (within its specifications) the drive motor's shaft position. To implement closed-loop position control, an assumption must be made that X revolutions of the motor/encoder result in Y units of displacement at the load. For example, it may take 1800 revolutions of the motor for the load to travel 30 cm, which can also be expressed as $1800 \text{ rev}/30 \text{ cm} = 60 \text{ rev/cm}$.

Factors contributing to inaccuracy in rotary encoder systems

The relationship between motor revolutions and load displacement is only an average, calculated figure. The actual relationship along any given segment of the positioning system is dependent on the drive system's mechanical precision: a high-quality leadscrew may closely follow specified revolutions per centimetre, whereas a lower quality screw may deviate more substantially from the nominal value. Any deviation away from the ideal linear relationship between revolutions and displacement is called nonlinearity.

In addition to that of the screw itself, there are other sources of nonlinearity, such as mechanical compression or tension of the leadscrew under dynamic conditions of acceleration and deceleration, as the load inertia resists the impulses of the drive system. This type of loading can also dynamically stretch drive belts and cause dynamic torsional distortion of drive shafts. More dynamic motion and heavier loads magnify how much these factors contribute to overall system nonlinearity and resulting errors in load position or velocity.

Depending on the application's accuracy requirements, thermal expansion

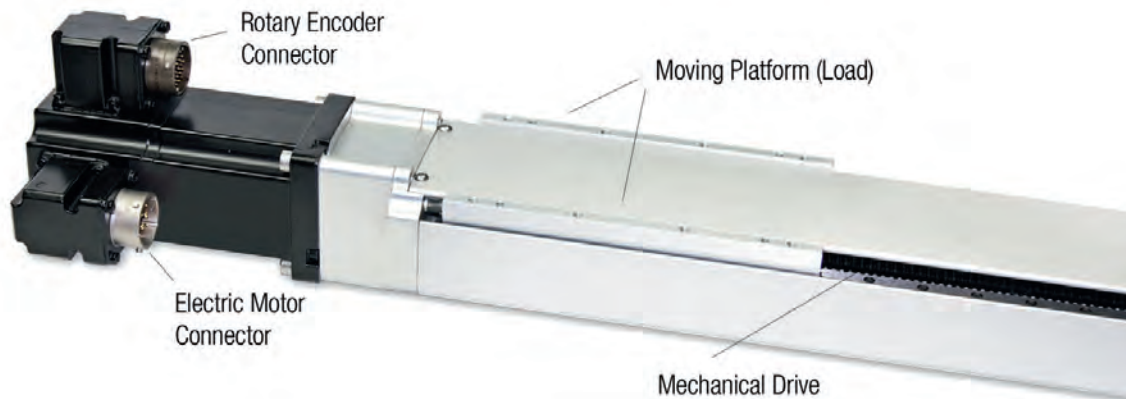


Figure 1: The indirect load monitoring system includes an electric motor directly coupled to a rotary shaft encoder, which acts as the load position sensor

and contraction of the drive system creates position deviations that must be quantified and compensated to maintain performance tolerances. Even in zero-backlash drive systems with little or no mechanical play, reversal of drive direction can impart a significant mechanical hysteresis error that arises from frictional forces and drive component compliance in shafts, leadscrews, thrust bearings and so on.

Cost drivers in rotary encoder systems

The precision of this type of motion control architecture is at its peak when the system is brand new. However, as the system wears in and tolerances open, accuracy begins to deteriorate and continues to decline over the system's lifetime. This means that the system must be designed to deliver excess initial system performance in order to guarantee specified performance over time, resulting

in a higher initial system cost. Furthermore, because motion control system accuracy is determined by the quality and precision of the mechanical drive system - and not the rotary shaft encoder - it follows that tighter accuracy specifications force tighter specifications on the drive mechanism, imposing a cost premium for higher-end mechanical components.

Once the system is in operation, mechanical failures can result in large indicated position errors that might go undetected until bad parts are produced. For example, a drive belt might slip or jump a tooth, a shear pin might break or a rack-and-pinion gear might wear enough to slip out of synchronisation. In these cases, the shaft-mounted rotary encoder has no way of knowing that the nominal relationship between shaft revolutions and load position has been completely invalidated.

Performance limitations

This motion control architecture - in which a rotary encoder is coupled to the shaft of the drive motor - is an example of indirect load monitoring. By locating the position encoder at the back end of the drive system instead of at the load itself, the system accuracy is inherently limited by the imperfections of the mechanical drive system.

A better way: linear encoders as secondary feedback

An alternative architecture for closed-loop motion control systems eliminates or minimises the influence of any nonlinearity that may exist in the mechanical drive system. By simply relocating the primary position data collection point from the motor shaft to the linear motion axis itself, drive-system stack-up errors can largely be ignored. (Bear in mind, however, that extremely sloppy

Indirect load monitoring Primary feedback only Motor-mounted rotary encoder only	Direct load monitoring Primary + secondary feedback Motor-mounted rotary encoder + load-mounted linear encoder
Rotary encoder itself is accurate	Immune to catastrophic position errors caused by broken or slipped drive belts, damaged or worn leadscrews/gearboxes, and broken shafts or couplings
Rotary encoder correctly reports shaft position	Supplements standard motor-mounted rotary encoder
Shaft position is only an estimate of actual load position	Load position is directly reported
Accuracy affected by mechanical factors such as backlash, leadscrew quality	Backlash, non-linearity, and hysteresis are eliminated as sources of inaccuracy
Thermal effects must be compensated	Less subject to thermal effects when designed correctly
System accuracy decreases as wear and tear increases	Constant position accuracy over time regardless of drive wear and tear
Initial accuracy limited by precision of drive mechanism	Accuracy of indicated position is independent of actuator drive precision or backlash
High-precision drives increase system costs	Can implement less precise, less expensive mechanisms without loss of accuracy

Table 1: Summary of key points.

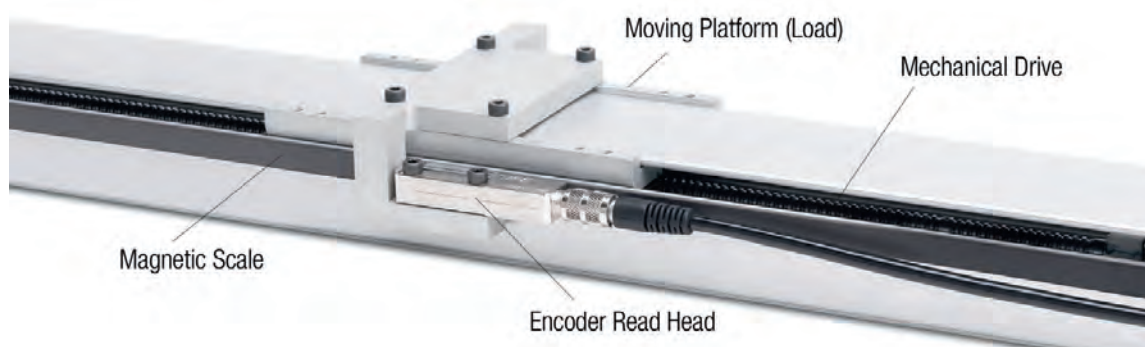


Figure 2: By simply relocating the position data collection point from the motor shaft to the linear motion axis itself, drive system stack-up errors can largely be ignored.



DIRECT LOAD MONITORING OFFERS SEVERAL ECONOMIC AND PERFORMANCE BENEFITS. FOR STARTERS, THE INDICATED LOAD POSITION IS NOT AFFECTED BY MECHANICAL FACTORS SUCH AS BACKLASH, DYNAMIC COMPRESSION OR TENSION, DRIVE WEAR AND TEAR OR ROTATION REVERSAL HYSTERESIS.

mechanisms are always hard to tune.) In this arrangement, motor shaft revolutions do not need to be directly proportional to load position, because the linear encoder is now directly reporting load position. This system architecture - where a secondary linear encoder is located along the controlled motion axis - is an example of direct load monitoring.

Advantages of direct load monitoring

Direct load monitoring offers several economic and performance benefits. For starters, the indicated load position is not affected by mechanical factors such as backlash, dynamic compression or tension, drive wear and tear or rotation reversal hysteresis. Nor is linearity compromised by the quality or accuracy of the leadscrew or other drive system components. By relieving the mechanical drive system of the burden of maintaining overall system accuracy, less precise or lower cost drive mechanisms can be employed as part of the original design. Because wear and tear no longer degrades system accuracy over time, there is no need to build in excessive upfront performance in order to guarantee accuracy over the system's life expectancy: system designers can save costs by more closely matching initial performance specifications to long-term performance expectations.

With direct load monitoring, the accuracy of the indicated load position is largely a function of the linear encoder's accu-

racy. Linear encoder specifications can be closely matched to application requirements, eliminating unnecessary cost. Direct load monitoring architectures are also largely immune to drive failures that may result in catastrophic position errors. Even if a belt slips or a gear breaks, the indicated position coming from the linear encoder still closely represents actual load position.

Each encoder plays to its strengths

The motion controller now has two independent sources of dynamic feedback: the rotary encoder mounted on the motor and the linear encoder mounted on the moving load. The rotary encoder still provides an excellent source of data regarding the speed and direction of the motor itself. This is very important information that is needed by the motion controller to ensure precise control of position and velocity of the driven load. At the same time, the secondary feedback provided by the linear encoder provides rock-solid position data as well as speed and direction. The combination of these two data sources allows the motion controller algorithms to deliver motion that is smooth, accurate, responsive and adaptable to varying loads.

Monitor mechanical drive wear and tear

By comparing the indicated positions of the rotary and linear encoders to one another, the motion control system can monitor mechanical drive wear and tear over time. As the drive begins to exhibit increasing play

and slop, the amount of deviation between the two readings will increase and provide valuable information for preventive maintenance and predictive failure. If and when a catastrophic mechanical failure occurs, the large differential between the rotary and linear encoder readings provides instant notification of the problem.

A note on thermal effects

Heat affects all mechanical positioning systems. Indirect load monitoring systems are subject to position error from thermal growth or contraction of the leadscrew. Controllers can partially correct for these effects with known expansion coefficient values, but direct load monitoring does not require this compensation; as motion axis components (and the work piece itself) expand with increasing temperature, so does the linear encoder. If the thermal expansion coefficient of the linear encoder closely matches the coefficient of the drive components and work piece, no relative position error is introduced, and the system is self-compensating with respect to temperature. To this end, many linear encoders are delivered with metallic base materials that closely match the expansion characteristics of the metal surfaces on which they are mounted.

Summary of key points

The key differences between indirect position sensing using rotary encoders versus direct position sensing are summarised in Table 1.

Balluff Pty Ltd
www.balluff.com.au

Henry Menke is the position sensing marketing manager for Balluff North America, based in Florence, Kentucky. Henry's blog posts can be read at: sensortech.wordpress.com.

UPDATED PROCESS CONTROL SYSTEM

Siemens has released a significant upgrade to its Simatic PCS 7 process control system featuring 70 technical innovations. The upgrade further enhances the user-friendliness, performance and efficiency of the process control system throughout the entire life cycle of process engineering plants, from planning to maintenance.

Version 8.1 of Simatic PCS 7 offers a higher level of integration of standards and technologies, making it a suitable fit for any industry from oil and gas, hydrocarbon processing and chemicals, through mining and minerals, cement, glass, paper, water and wastewater, up to pharmaceuticals and food and beverage.

The software package offers high reliability levels with flexible redundancy, connectivity over standard communication protocols, meshing seamlessly with Ethernet TCP/IP, Profinet, Profibus DP/PA, Foundation Fieldbus, DNP3, IEC61850 and others.

The latest version of Simatic PCS 7 combines a scalable architecture with powerful engineering tools and a wide variety of additional functions such as alarm management, process safety and asset management, all of which can be integrated into any existing environment.

The latest version also significantly extends the overall system capacity in terms of controlled process objects (increased 40%) and operator stations (both local and web-based).

Other highlights of the software package include integrated safety certified to IEC61508 SIL3; an integrated process historian; embedded advanced process control (APC); integrated plant asset management (PAM); batch and route control functionality; and the integration of PLCs, third-party equipment and packaged plants.

Siemens Ltd

www.siemens.com.au



MINE HOIST ASSESSMENT SERVICE

ABB has launched a service product called Hoist Performance Fingerprint to help its customers assess and optimise the condition of their mine hoists. It consists of a structured audit of complete hoist systems - covering all electrical and mechanical parts to ensure reliable and safe hoist operation.

Hoist Performance Fingerprint is a consulting and audit service developed and performed by highly experienced ABB service experts. The entire hoist system is assessed, analysed and tested using data collected from over 20 predefined points and a structured tailored analysis tool. This data forms the backbone for any further analysis done after leaving the site. All results, findings, as well as corresponding recommendations for optimisations and improvements are then presented to the user in a detailed report for follow-up.

A mine hoist system is an intensive and important carrier in the mining process. It is not only essential to keep production running, it also transports mining staff below ground. Therefore, its reliable and safe operation is key for mine operators, particularly, as many countries have special legislative requirements in place defined by the respective mining authorities. The expert concept of the Hoist Performance Fingerprint ensures that all these requirements are met allowing users to focus on their daily business.

ABB Australia Pty Ltd

www.abbaustralia.com.au



DCS VIRTUALISATION

With the release of DeltaV Virtual Studio v2.3, Emerson has expanded the virtualisation capabilities in the DeltaV distributed control system (DCS) for easy implementation and management of online production and offline development, test and training systems.

While many large manufacturing companies have used virtualisation for years in their IT departments, DeltaV Virtual Studio is designed specifically for process control systems, with a workflow and feature set that is intuitive and familiar to automation engineers. Prebuilt virtual machine templates enable easy virtual machine creation without software instal-

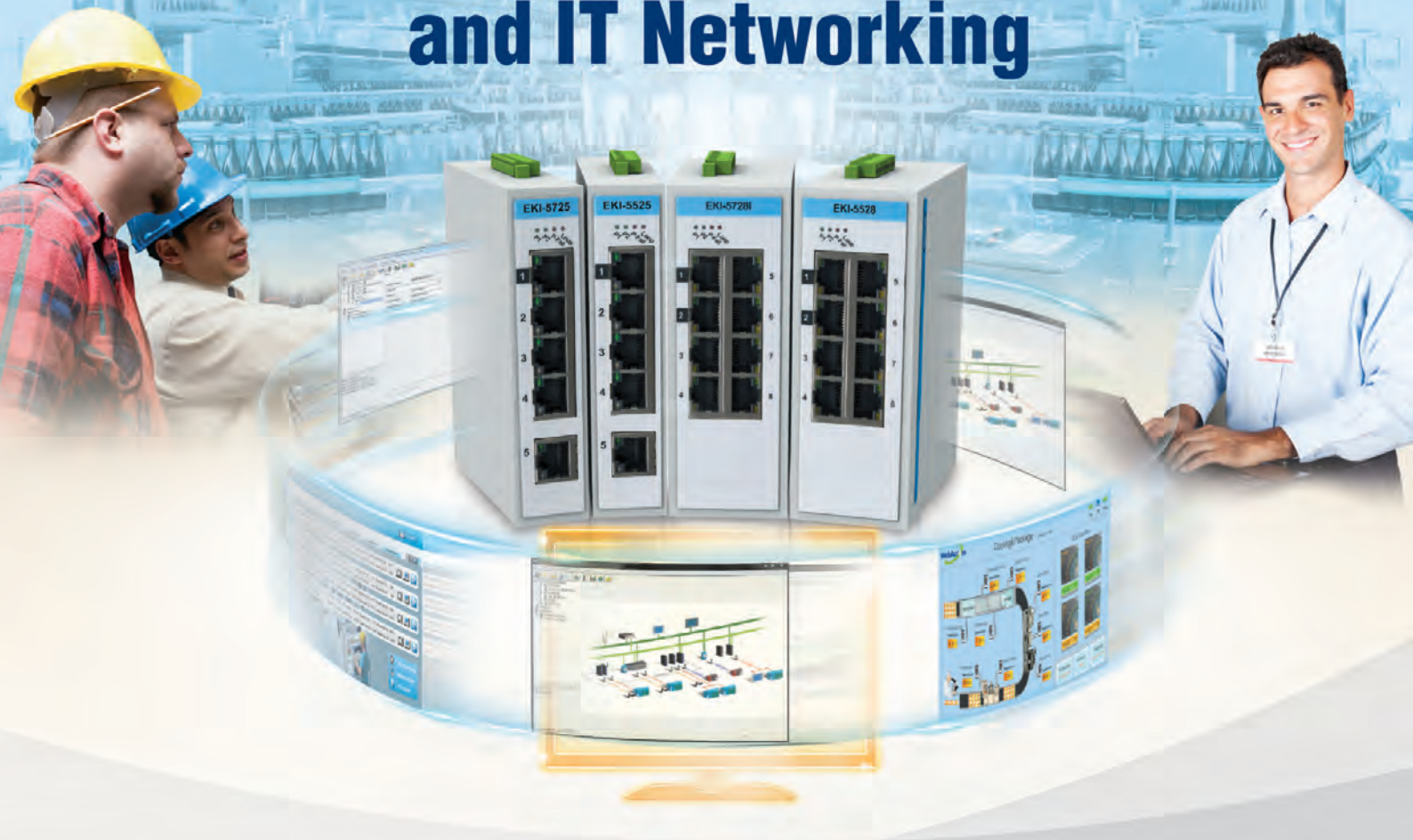
lation. Every virtual machine created comes with all standard DeltaV system operating settings and network connections predefined to ensure consistent, error-free configuration and implementation.

The latest DeltaV Virtual Studio release also includes enhanced high availability and disaster recovery options. Various architecture and hardware solutions let facility managers pick the level of availability their system needs in response to any possible disruptive event. Also new in DeltaV Virtual Studio v2.3 is the ability to live migrate critical applications from affected hardware to minimise downtime during system maintenance or hardware upgrades.

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ProView Switch

MES SOFTWARE UPDATE

Designed primarily for mining, minerals and metals industries, StruxureWare Plant Operation Ampla 2014 is designed to help improve operational performance. Ampla's operation management functionality delivers real-time visibility of plant and business information so users can improve competitiveness in global markets. By driving the optimisation of production, processes and performance, Plant Operation Ampla increases operational efficiencies and reduces energy consumption.

The update introduces the concept of material classes and test specifications to its Material Model. Materials can be categorised based on the amount of processing they have undergone - for example, from un-prepped ore to blended ore. Material classes can be used together with structured material naming to allow material origins to be readily identified when data from multiple sites are combined. The result is fewer configuration points while delivering greater visibility into the entire value chain.

The update also delivers enhancements to its planning module with easy comparison of planned and actual figures. The tool delivers visibility of processes and performance - deviations from plan can be highlighted, providing an initiation point for root-cause analysis.

Support for larger sites has also been improved, as well as for distributed systems and higher numbers of users accessing data. To improve performance and scalability, the update enables load distribution through SQL Server Always On which, combined with many other internal optimisations, improves performance and scalability. In addition, the expanded use of web services and service oriented architecture (SOA) reflects an ongoing commitment to reduce the TCO for users.

**Schneider Electric
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www.schneider-electric.com

RUGGED TABLET PC

RuggON's 10.4" IP65 rugged tablet PC, the PM-522, is designed for field and vehicle applications. The product meets the MIL-STD-810G rating for shock and vibration and can be dropped from 1.8 m onto plywood on a concrete surface. It is fully sealed against the ingress of liquid and dust damage (IP65) and has an operating temperature rating of -20 to +50°C.

The LED backlit screen with integrated 10-point capacitive multitouch screen features a display brightness of 700 nits, offering sunlight-readable functionality for outdoor applications. The PC is based on Intel's Atom E3827 1.75 GHz dual core CPU and includes 4 GB of DDR3 SODIMM and 64 GB of upgradeable mSATA solid state disk. The hot-swappable dual batteries offer up to 9 h of battery life.

A 5 MP webcam with an LED flash and auto-focus is embedded in the rear bezel and a 2 MP camera with audio input is in the front panel. Seamless communication is available via the onboard Wi-Fi 802.11 ac/a/b/g/n, Bluetooth 4.0 and GPS plus optional 3.5G or 4G LTE modules.

Multiple connectivity interfaces include 1x USB3.0, 1x USB2.0, 1x Audio Jack, 1x Micro SIM slot and 1x Ethernet port. For user flexibility, two programmable function buttons are located on the front panel. Vehicle and desktop docking stations are available as an optional accessory.

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OFFSHORE CABLE CARRIER

The igus Chainflex cable range with GL certification is approved for use in offshore and mining applications.

The Chainflex (350 mm interior link height) was specifically developed for the most demanding applications where electrical cables and large hydraulic hoses must be guided and protected on mission-critical equipment.

With attributes such as its high strength-to-weight ratio, resistance to grease, oil, sea water, dirt, other debris, sun and temperature, it is a suitable alternative to traditional heavy-duty steel carriers.

This addition to the E4 range of heavy-duty plastic cable carriers combines the features and benefits of its predecessors in the E4 range, such as low noise, modularity, and ruggedness into the "All for One" energy chain.

The new-generation cable management system offers design improvements such as a 33% increase in the unsupported span capabilities of the energy chain and a 133% increase in tensile strength.

Other performance enhancements such as enlarged wear surfaces for extending life, noise-dampening features and accessories including the Push Pull Detection System (PPDS), which monitors forces on the chain during operation, offer a complete solution for machine builders.

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Spray Nozzle Engineering

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SAFETY HINGE SWITCHES

The TESK series safety hinge switches feature freely adjustable switching angles and the option to select up to four contact configurations with cable or plug connections.

Control Logic Pty Ltd

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MES FOR TERMINAL MANAGERS

Emerson's Syncade Suite manufacturing execution system Version 4.9 provides terminal managers with increased security tools and improved control of material movements and inventory.

Emerson Process Management

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SAFETY CONTROLLER

With a width of 45 mm, the Samos PRO COMPACT safety controller is suitable for universal use by offering safety for all kinds of machine and industrial applications. It is complemented by the graphic programming tool Samos PLAN5+.

The compact module comes with 16 safe inputs, four safe outputs, four safe configurable I/Os and an exchangeable 512 Mb program memory.

The SD memory card is easy to handle, thus saving time during commissioning, copying and in case service is required, and a library of certified function blocks is available for programming the system using the Samos PLAN5+ software.

Integrated USB and ethernet interfaces enable system access at any time. Industrial Ethernet protocols are integrated, and other additional gateways for fieldbuses make integration into a wide variety of industrial networks simple and straightforward.

The Samos PRO COMPACT can be used under harsh ambient conditions due to its switching capacity of 4 A at every output and a temperature range of -25 to +65°C. It also features modular expandability for up to 168 safe inputs and outputs and, to ensure safe operation of the system, all inputs and outputs feature unambiguously assigned visual displays.

The Samos PRO COMPACT module meets all the relevant safety standards, including SIL CL 3 according to EN 62061 and PLe/category 4 according to EN ISO 13849-1.

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FLUID FILTER ELEMENT

Optimicon filter elements by HYDAC are optimised in terms of filtration efficiency and energy efficiency. The HELIOS filter mesh pack geometry contributes to a stabilisation of the pleats and an increased free flow surface. The main advantage is a better flow behaviour and hence a lower differential pressure.

The high-performance micro glass media as the core of the filter element offers a high separation efficiency and a lower differential pressure over the entire element service life. They are also available in 1 and 15 µm.

The improved structure of the filter mesh pack and the interaction of up to seven filter layers lead to a strong decrease of the differential pressure. The upstream drainage layer for example – with asymmetric fibre strength as the first layer – causes a straightened fluid transport and in the same time a laminar and soft support of the other media. Also the next-to-last filter layer, the so-called integrated drainage layer, brings a straightened flow duct and prohibits impact loss, dead spots and swirls, which can occur when a single wire mesh builds the last layer.

Depending on the element size, up to 30% lower differential pressure can be achieved compared to Betamicon 4 filters. This lower differential pressure over a long element service life means energy and cost savings.

Optimicon filter elements are suitable for all industries where high filtration efficiency and cleanliness levels as well as energy cost savings and sustainable filtration are an important requirement.

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Health screening for industrial machines

Germany's Industry 4.0 initiative aims to develop industrial machinery with built-in intelligence based on smart self-monitoring functions. Researchers have now come a step closer to the ideal of a self-maintaining machine. A technology developed as part of the iMAIN project provides real-time online monitoring of unprecedented quality.

Metal forming machines have to withstand considerable forces and yet remain in operation for a long time. When cold forming parts for automobiles, washing machines, refrigerators and the like, the exerted pressure can easily amount to several thousand metric tons. This operation has to be repeated hundreds of thousands of times in the complete lifetime of a machine. If the machine fails, it can cause substantial damage. Worse still, because the machine is usually integrated in a series of production steps, the failure can cause the entire production process to come to a standstill. Depending on the extent of the damage, the repairs could take up to a month - accompanied by a high loss of revenue. If it were possible to predict such failures, either of the entire machine or a single component, companies would know precisely when they ought to maintain the machine or replace specific components, preferably in coordination with the production schedule.

Researchers at the Fraunhofer Institute for Machine Tools and Forming Technology IWU in Chemnitz aim to change this situation. In the future, the machines themselves will be capable of detecting problems and predicting failures. As part of the EU-sponsored iMAIN project (www.imain-project.eu), the scientists have developed a prototype of an information-based predictive maintenance system that enables operators to determine when a component or entire plant is likely to fail. The distinctive feature of this technology is its use of virtual sensors. These receive input both from computer-simulated models of the machine and from real sensors that provide information on the strain occurring in individual components.

"Using mathematical models and a minimum of actually installed, real sensors, it is possible to realistically simulate strain scenarios for the entire machine in real time. This in turn provides the basis for an entirely new and innovative approach to predictive maintenance," says Markus Wabner of Fraunhofer IWU.

Until now it has been customary to carry out plant maintenance according to a fixed schedule or on an ad hoc basis in response to failures. Certain manufacturers already equip their machines with real sensors, but solutions that rely exclusively on these devices are not ideal: they are expensive and complicated to implement, require their own error monitoring system, and measure stress and strain only at the points where they are installed - and nowhere else.

"In our opinion, the use of virtual sensors is the only conceivable and economical way to obtain a complete picture of the forces acting on the material," says Wabner.

While algorithms, simulations and mathematical models can often provide a reasonably good image of reality, even the most precise calculations are subject to errors. This is why the researchers constantly compare the virtual data with real measurements recorded while the machine is in operation. "If there is a wide discrepancy between them, we modify the model accordingly," says Wabner.

A cloud site accessible to internal users via a wide range of interfaces - including smartphones, tablets and laptops - serves as storage of information on the stress history of different manufacturing plants.

"The more data we collect, the easier it is to know the right time to implement preventive measures. We develop algorithms that enable machines to learn from experience and decide on the right time to replace components or determine when they have reached their optimum stress loading. The real data are compared with a simulated model that can be used to calculate the breaking

point of the material," explains Wabner.

The EU-sponsored iMAIN project was launched in September 2012 and brings together manufacturers, industrial users, computer scientists and engineers in a concerted effort to develop new, advanced technologies for the maintenance of industrial machines.

"The virtual sensors have long since passed the proof-of-concept stage and are already being successfully used in real-life applications. And the private cloud solution for data sharing has reached the test stage," reports Wabner. A prototype version of the system is being used by a project partner in Slovenia - the Gorenje Group, which manufactures home appliances - for the condition monitoring of a universal press supplied by Litostroj Ravne, another project partner. This factory forms metal panels used in the construction of washing machines, refrigerators and other appliances.

"Since this system was introduced, Gorenje has better information enabling it to predict possible outages in advance, and also facilitate and optimise press operations by monitoring the stress and strain on the machines. We regularly compare the recorded data with the results of tests conducted at our facility at Fraunhofer IWU," says Wabner.

The ultimate aim is to be able to produce a system capable of predicting the stress-related failure of components in practice by the time the project ends in 2015.

Fraunhofer Institute for Machine Tools and Forming Technology IWU

www.iwu.fraunhofer.de/en.html





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LASER DISTANCE SENSORS

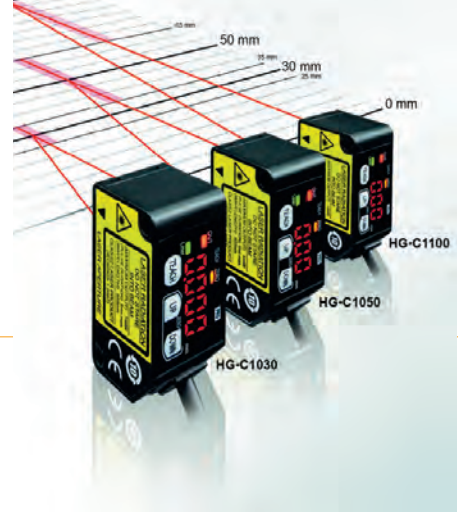
Panasonic has released a range of laser distance sensors with built-in amplifiers. They are available in three sensing distances of 30, 50 and 100 mm, and are suited to applications that require highly precise measurements in the order of 1/100 mm with a precision down to 10 μ m.

The HG-C series sensors incorporate an optical system with a built-in mirror, which allows for a more compact sensor and higher measurement accuracy compared with equivalent displacement sensors.

The sensor not only indicates measured values in mm, but also produces a 0-5 V analog voltage output so that various calculations and logging can be performed when the output is passed to a PLC or control system.

Control Logic Pty Ltd

www.control-logic.com.au



GWR LEVEL TRANSMITTER



Honeywell Process Solutions (HPS) has added the SmartLine Guided Wave Radar level transmitter to its SmartLine industrial transmitter family. The device can measure the level and volume of liquids inside processing tanks up to 48 m in height.

The high-performance level transmitter also introduces the Application Validation Tool. The online tool allows users to input technical data about their specific process tank and to validate that the correct level transmitter application is delivered to the site, ready to install out of the box.

The level transmitter features a choice of a basic alphanumeric display or an advanced graphics display. The advanced graphics display, capable of showing process data in graphical formats and communicating messages from the control room, also offers multiple languages and full integration with the company's Experion process control system.

Honeywell Ltd

www.honeywell.com.au

RADAR LEVEL TRANSMITTER FOR BULK SOLIDS

Emerson Process Management has released a version of its Rosemount 5400 series of non-contacting radar level transmitters aimed specifically at demanding bulk solids level measurement applications. The Rosemount 5402 high frequency 2-wire radar uses Rosemount Radar Master software and unique algorithms to overcome the specific challenges of solids level measurement in vessels, bins and silos, such as inclining or sloping surfaces, low dielectric properties and high filling rates.

Inclining or sloping surfaces deflect energy away from the radar and can generate several small reflections. The 2-wire radar overcomes this by a signal processing algorithm that has been developed to address this specific challenge. For applications involving dry solids with low dielectric properties that create very low reflections and thereby can result in an unstable level measurement, sensitivity is increased, noise cancelled out and echo strength increased. The measurement difficulties caused by high filling rates are met by increased sensitivity and echo traceability.

Innovations such as Dual Port technology, which ensures a strong signal back to the transmitter, advanced surface tracking, and condensation-resistant antennas make the radar reliable, even in the most demanding applications.

User-friendly graphical interfaces with wizards and suggestions for application-specific configuration help users easily integrate the transmitter into new or existing control systems.

The radar offers connectivity to a range of communications protocols including HART, Foundation fieldbus, FISCO and Modbus. The device has ATEX, IECEx, FM, CSA, CRN, Inmetro, DIBt, GOST and NEPSI approvals.

Emerson Process Management

www.emersonprocess.com.au



Rental vs Purchase

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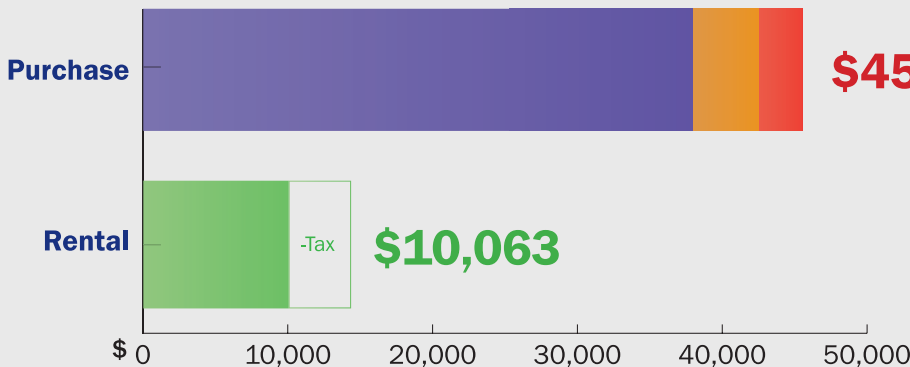
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Please see the chart below which illustrates the benefits of rental over ownership for the GE Everest Ca-Zoom 6.2 Remote Visual Inspection System

GE Everest Ca-Zoom 6.2 Remote Visual Inspection System



Figures displayed represent costs at the end of the **first year**.
All rental rates quoted are based on a 3 year period.



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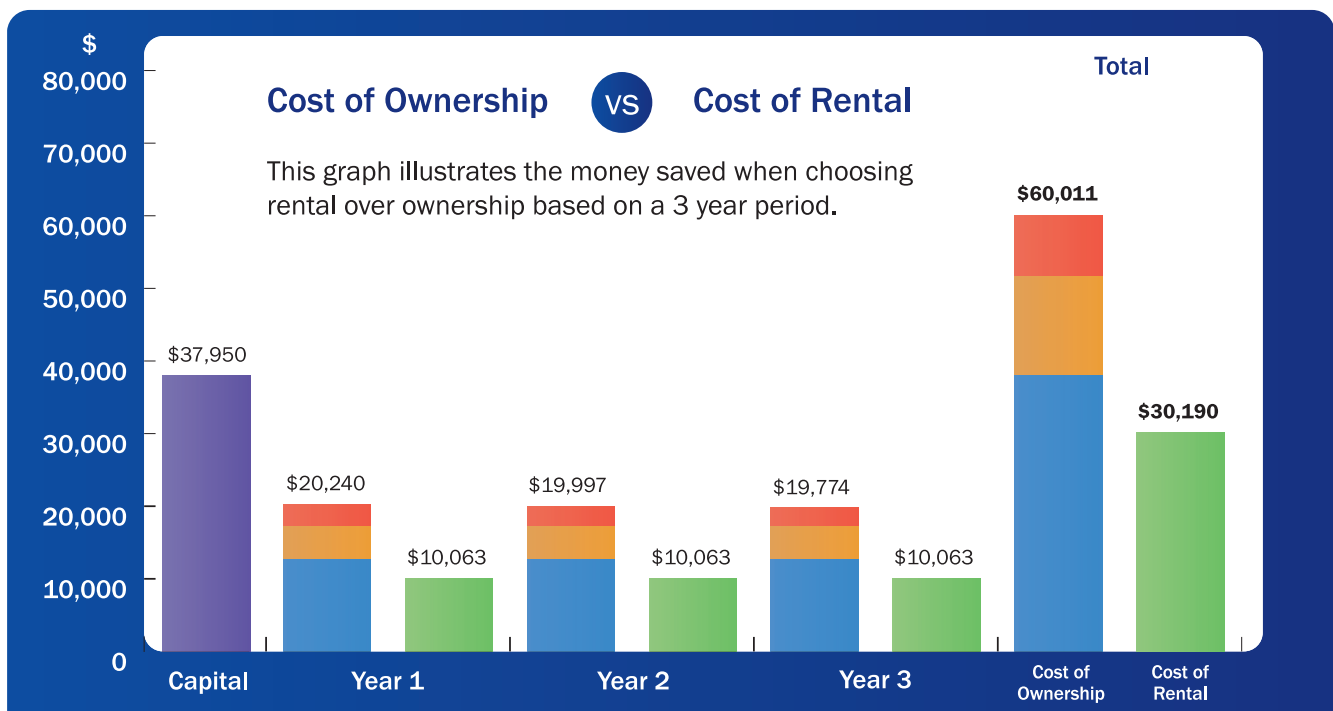
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Rental vs Ownership for the GE Everest Ca-Zoom 6.2 Remote Visual Inspection System



*Please ensure you obtain independent professional taxation advice. Prices shown are accurate as of date of publication and are subject to change. Terms and conditions of rental apply as shown on www.techrentals.com.au. Prices exclude GST. Figures shown have been rounded to the nearest dollar.

EXTRACTING HART DATA

FROM SMART INSTRUMENTS



A simple and cost-effective solution for gathering HART information is to use a HART interface device. These HART interface devices make acquiring HART data a fairly simple proposition.

According to the FieldComm Group (formerly the HART Communications Foundation), there are more than 30 million HART-enabled instruments installed in chemical and process plants worldwide, and nearly most process transmitters made today are HART compatible.

HART-enabled transmitters, valve positioners, flowmeters and other 'smart devices' superimpose a digital signal on their 4-20 mA process signal. The HART digital signal often contains additional process measurements and other variables that may include instrument status, diagnostic data, alarms, calibration values and alert messages.

Many HART field transmitters are hard at work measuring process parameters and producing a 4-20 mA signal that is being used for process control by a DCS, PLC or some other control system. In many cases, HART instruments were installed simply because they could be configured and diagnosed easily with a HART handheld communicator (HHC). For a variety of reasons, the rest of the HART data often goes unused. One reason is because of the prohibitive cost of installing a plant-wide HART monitoring system and lack of familiarity with alternatives.

A simple and cost-effective solution for gathering HART information is to use a HART interface device. These devices make acquiring HART data a fairly simple proposition. This HART data is then made available to the control system via analog signals, discrete outputs or serial communications.

Extracting HART data

A HART interface module can be installed across any termination point on a 4-20 mA process loop. The installation does not interfere with the 4-20 mA signal to the control system, nor does it interfere with a handheld HART communicator or a plant-wide HART monitoring system if present. It can be used with any HART-enabled field device.

In the case of a mass flow transmitter, for example (Figure 1), the 4-20 mA signal carries the primary variable (flow) while the HART digital signal carries up to three additional process variables - often temperature, pressure, differential pressure, density or raw flow - plus discrete data, such as alarms, status, etc. Some HART instruments can generate a dozen or more variables, all carried by the digital HART signal.

The HART interface module is configured by the user to extract the variables of interest. In Figure 1, it is configured to extract three process variables, a high alarm and a fault alarm. Essentially, the HART interface monitor strips out the variables of interest from the HART digital signal, converts them to 4-20 mA and discrete signals, and sends that data to the process control system or other receiving devices, such as a chart recorder or PLC.

Outputs from a HART interface module can be directly wired into the I/O rack of the control system as analog and digital signals, or they can be sent as a Modbus RTU signal. The in-

terface module can also be connected to a wireless device, for transmission via RF.

Advanced HART applications

The use of HART interface modules on the market today allows engineers to assemble some interesting and useful HART applications.

HART alarms

HART-enabled instruments almost always have built-in diagnostics, and the diagnostic information is contained in the HART digital signal. A HART alarm module can be installed across the 4-20 mA signal to monitor diagnostic data and sound an alarm when process conditions warrant it. A typical HART alarm module continually reads the HART diagnostic data, examines the Field Device Status byte, and sends a fault alarm to an annunciator or control system if it detects alarms such as Field Device Malfuction, Analog Output Saturated, Variable Out of Limits, etc.

Valve monitoring

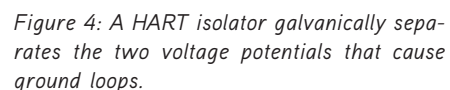
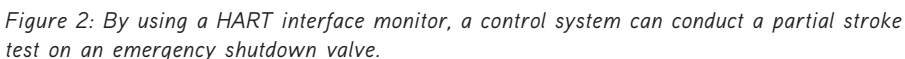
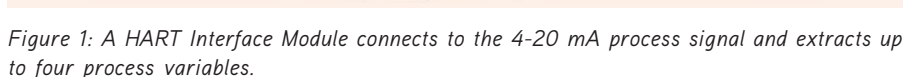
A HART interface module can be connected to a HART valve positioner to monitor valve performance. Some HART alarm modules have multiple relay outputs, which can be tied to specific valve diagnostic and position data. For example, the monitor can provide relay outputs to indicate open or closed valve position, low actuator pressure, positioner temperature or any other values that indicate valve problems. Installing a HART monitor is a simple and effective way to get position feedback from a smart positioner without the expense of running additional signal wires to the positioner in the field.

Emergency shutdown (ESD) valve testing

Using the capabilities of HART and an appropriate HART monitor, partial stroke testing of emergency shutdown valves can be performed without the need for a technician standing by or the need to install limit switches. Instead, use a HART monitor (Figure 2) to extract stem position from the HART data and send it to a PLC or DCS. The controller then commands the valve to close, monitors data from the HART monitor to determine that the valve is closing and then opens it again, thus verifying that the valve works.

Monitoring multi-dropped instruments

HART instruments can be installed individually - where a single HART transmitter connects via a twisted wire pair to a control system - or in a multidrop HART network, where up to 16 HART instruments communicate digitally over a single twisted pair. For a multidrop system, a HART Concentrator System (HCS) can extract HART digital data from any or all of the 16 field instruments (Figure 3) and transmit the data to a control system via a Modbus RTU connection. This allows the control system to treat the 16 instruments almost like a fieldbus system; that is, it can obtain primary process variables from the instruments on



one wire pair and status, diagnostic and additional process variable data from the instruments on a fieldbus-like 'segment'.

4-20 mA HART signals are subject to problems from voltage surges, spikes, transients and grounding problems. Although 90% of HART instruments are isolated, problems still occur. In the 10% that are not isolated, a simple ground loop can cause problems. A HART isolator galvanically separates the two voltage potentials causing the ground loop.

In some cases, it is desirable to share both the analog output and HART data from a transmitter with two different hosts. For example, a refinery may want to isolate and share the analog signal and HART data from a transmitter with a DCS and an emergency shutdown system (ESD). While standard off-the-shelf analog isolators are designed to block noise, including HART signals, an isolator designed to pass HART (Figure 4) makes this possible. A HART isolator passes the HART data from the input side of the loop to the output side of the loop, making it available to HART handheld communicators and asset management programs.

HART monitors provide an economical and effective way to take advantage of data that is already installed throughout your plant. Often this additional HART data can be obtained without having to run new wires or installing new transmitters. HART data can also be collected wirelessly, using a HART wireless adapter.

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Thermal imaging cameras help prevent fires in waste plants

Waste management is a key industry in most industrially developed countries throughout the world and is currently undergoing significant modernisation and an increase in the use of waste energy. The whole cycle for the storage of waste, through sorting and recycling, up to the effective conversion to electricity in some cases, carries a high risk of fire, causing possible hazards for both personnel and the environment. To counter this, the company Workswell has developed a complete thermal imaging solution, called Waste Bunker Monitor, designed for the continuous inspection of solid waste using FLIR Systems' thermal imaging cameras.

Workswell is a Czech technology development and trading company. Its main activities include solutions delivery in non-contact temperature measurement in many industries such as glassworks, foundries, cement plants, municipal waste incinerators and thermal power plants.

The amount of waste worldwide continues to increase. Currently in the Czech Republic, 75% of the municipal waste is stored in landfills. Approximately 400,000 tons of that waste is thermally processed in municipal waste incinerators, amounting to a total heat supply of about 2.3 million gigajoules and a gross electricity production of about 18,000 MWh. The advantage of thermal treatment of waste is, in addition to energy gains, the dramatic reduction in waste volume (approximately 10-15% of the original weight). The ZEVO plant at Malešice has been operational since 1998 and takes care of the transformation of waste into thermal and electric energy. The acquired energy is used as heating of domestic water and residential buildings.

Fires are a genuine threat in waste plants, and this is also true for ZEVO Malešice. The most common causes of such fires are spontaneous chemical combustion of waste; heat from vehicles that collect the municipal waste; and fire or devastating explosions due to the increased concentration of methane released from the waste during the decay process. In order to reduce the risk of fires, the ZEVO Malešice plant decided to invest in the Waste Bunker Monitor system from Workswell.

The waste at the ZEVO Malešice plant is imported into a storage tank, used for the homogenisation of materials and to ensure sufficient reserve of waste so that the plant can be operated continuously. In this case, Workswell opted for two FLIR A615 cameras with a resolution of 640 x 480 pixels and with an 80° lens. These cameras monitor the storage tank for hot spots that indicate the possibility of a fire starting.

The Waste Bunker Monitor system from Workswell combines the non-contact measurement technology from FLIR Systems with



proprietary software which presents plant operators with the critical areas that have an increased risk of fire.

"The whole system is scalable and can consist of several thermal imaging cameras with high spatial resolution and with thermal sensitivity better than 0.05°C," commented Jan Kovář, managing director at Workswell. "We have found that the FLIR A315 or FLIR A615 cameras are the best fit for our system. We always determine the number of cameras, their resolution and visual field of view in relation to the smallest detectable temperature difference."

The monitored area is divided into zones in which the temperatures are evaluated several times per second. Consequently, the automatic system reports any area with an increased surface temperature to the crane operators.

At the head of the thermal imaging system is control and visualisation software that displays the images and temperatures coming from the FLIR thermal cameras. The software also provides operator visual and audio alerts whenever the temperature exceeds a certain value. Next to the thermal image, the software presents operators with an area map, divided into sectors, making it easier for operators to pinpoint the exact location of a hotspot.

"Luckily, we haven't witnessed any fires yet at the ZEVO Malešice plant," says Kovář. "But we are very confident that the system and the thermal imaging cameras from FLIR will do a good job. We performed several tests before the actual deployment of the system and the results were much better than we expected. In addition, the thermal cameras are very affordable, and thus they contribute to the overall cost-effectiveness of the Waste Bunker Monitor system."

FLIR Systems Australia Pty Ltd

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RADAR LEVEL METER



The OPTIWAVE 5200 C/F is a 10 GHz FMCW radar level meter for liquid applications in up to a 30 m measuring range. The 2-wire loop-powered device measures level and volume in storage or process tanks with process conditions up to 250°C and pressures up to 40 bar, and can be used for general-purpose or hazardous locations (Class 1/Div 1). The OPTIWAVE 5200 C/F has been designed and developed for use in SIL 2 safety-related systems according to IEC 61508.

The OPTIWAVE 5200 C/F electronics are compatible with a wide selection of antennas. The PP and PTFE wave horn antennas are process sealed by their antenna material instead of a traditional process seal construction with O-ring gaskets. These gasket-free antennas are suited to extremely corrosive environments. The PP antenna can be mounted on process connections as small as 38 mm. The metallic horn and waveguide antennas use a dual seal mechanism, which is a combination of O-ring gaskets with Krohne's Metaglas process interface design, for a completely hermetic seal in highly toxic or explosive applications. Metallic horn antennas range in sizes from DN 80 to DN 200.

The modular design of the housing with its bayonet locking system and antenna extensions ensures suitability for a variety of mounting positions and applications. To make the display screen easy to read, the quick coupling system permits a 360° housing rotation. The remote converter version OPTIWAVE 5200 F features full display and configuration capability up to 100 m away from the antenna.

Krohne Australia
www.krohne.com

ACCELEROMETERS



Every rotating machine has its own unique vibration characteristics. Problems such as unbalance, or rolling element bearing damage cause the vibration characteristics to change. Accelerometers can be used to analyse these vibrations to provide an early warning of any potential failure.

The Monitran MTN/2200 is an accelerometer suitable for general-purpose vibration monitoring. Its top-entry design makes it easy to mount in difficult spaces and it gives a frequency range of 0.8 Hz to 12 kHz. It is sealed to IP67 and has an operating temperature range of -55 to 140°C. The internal electronics are isolated to minimise noise and offer good bias voltage stability.

For high temperature, the accelerometers that can be mounted on surfaces up to 250°C.

For hazardous areas, where there is a risk of explosion, the company has a range of IECEx-certified accelerometers. These have been especially designed for reliability in unforgiving environments, such as mines. Specifically designed side-entry versions, such as the MTN-1100IS series require less headroom and offer streamlined cable routing from the sensor.

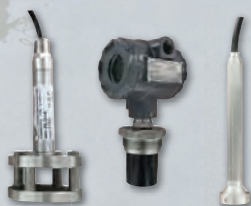
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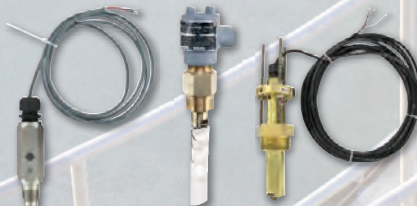


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INFRARED TEMPERATURE SENSORS

The Micro Epsilon CSVideo and CTVideo series video pyrometers are used for temperature measurement from 50 to 2200°C in hard-to-reach areas such as targets that are not visible and in high-temperature applications. The CTVideo sensors with external controller are available for spectral ranges of 1.0, 1.6 and 2.3 μm .

The CSVideo sensors with integrated controller and 2-wire output provide a spectral range of 1.6 μm . The scope of supply of the CSVideo M2 includes the CompactConnect application software that enables the automatic recording of snapshots (time- or temperature-dependent), graphic display and recording of the measurement values, and parameter set-up.

The sensors are equipped with a USB 2.0 standard interface. The measurement data are output via an analog 4-20 mA or 0-5/10 V interface.

The temperature sensors are available in two lens versions: standard focus (SF) and close focus (CF). Response times from 1 ms enable them to integrate easily into the process. Vario lenses allow for stepless focusing from a measurement distance of 90 mm, and objects as small as 0.5 mm can be reliably measured.

The pyrometers can be used in ambient temperatures up to 70°C without any additional cooling.

Bestech Australia Pty Ltd

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MAGNETIC FLOWMETER FOR UTILITY APPLICATIONS

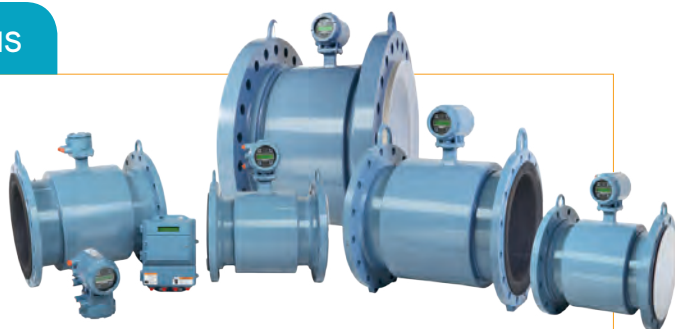
Emerson Process Management has introduced the Rosemount 8750W magnetic flowmeter for water, wastewater and utility applications. The robust, easy-to-use flowmeter is designed to help utility operators reduce life-cycle costs and unplanned shutdowns. It offers diagnostics that help users take advantage of improved installation, maintenance and process management practices, by allowing meter verification, monitoring of stability in noisy applications, and ground and wiring fault detection.

The Smart Meter Verification diagnostic available with the product allows users to verify calibration without shutting down the process and without the need for complicated external equipment, reducing the time and cost associated with meter verification procedures. The Smart Meter Verification diagnostic proves the health of the magnetic flowmeter system as required by regulatory agencies and also provides the necessary documentation required by environmental agencies for regulated flow measurements. The diagnostic also provides the documentation needed for critical applications like effluent flows. To simplify use, all diagnostic information can be quickly accessed through the easy-to-use Local Operator Interface (LOI), the 475 Field Communicator or AMS Suite predictive-maintenance software.

The fully welded construction of the sensor with isolated terminal blocks and hermetically sealed coil compartment make the product dependable for utility and water applications. In addition, the dual-compartment transmitter housing and self-draining conduits keep the electronics isolated from moisture and contamination.

Emerson Process Management

www.emersonprocess.com.au



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MOISTURE ANALYSER FOR NATURAL GAS



The Michell Instruments OptiPEAK TDL600 is a moisture analyser for natural gas that offers a high accuracy with a lower detection limit of less than 1 ppmV.

Because tuneable diode laser spectroscopy (TDLAS) analysers measure the reaction of molecules to specific frequencies of light, changes in the background composition of the gas usually requires that the analyser is adjusted to maintain its accuracy. Michell has developed the Dynamic Methane Compensation System (D-MET) to overcome this problem. With D-MET, the OptiPEAK TDL600 is able to measure moisture reliably in natural gas with varying compositions (such as blended gas from multiple fields or following biometane or regasified LNG injection) without the need for manual software correction factors to be made.

Michell has also developed a laser lock system which automatically monitors the optical profile of the gas absorption peaks to ensure the laser remains locked to the correct water-absorption signal, maintaining a high integrity measurement at all times.

The device provides a fast response because the optical measurement technology is non-contact. There are no wet-up or dry-down times, and none of the sensing components are subjected to the gas stream, protecting them from aggressive compounds and harmful contamination.

Calibrated traceable to NPL (UK) and NIST (US), the analyser also has worldwide hazardous area certification, including ATEX, IECEx, cMETus, TC TR Ex.

The analyser has also been designed for minimum cost of ownership. With an integrated sampling system and small footprint, it can easily be retrofitted into existing plant infrastructure.

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SAFETY LIGHT CURTAINS

The Schmersal SLC/SLG 445 series of multifunction safety light curtains and safety light grids offer features such as fixed blanking, floating blanking, fixed blanking with movable edge region, double reset, contactor control (EDM), automatic mode, restart mode and beam coding, as well as multi-scan and muting.

The multi-scan function offers multiple evaluations of the protection zone. This increases the availability of the safety light curtain by suppressing temporary disturbances like flying burrs, steam clouds and flying insects, thus preventing false triggering.

The mute function allows safe time-limited bridging of the safety light curtain for objects to be transported into or out of the danger zone. Up to four muting sensors can be connected easily via a field distributor with integrated cable, reducing effort and increasing the availability of the system.

Set-up is simplified via a single pushbutton and the seven-segment display, with no need for software and a PC. The compact construction, in a rugged and weight-saving 28 x 23 mm profile, allows SLC/SLG445 to be used in tight installation situations.

The SLC445 and SLG445 series are suitable for use in safety circuits up to Type 4 to EN 61496-1, PLe (EN 13849-1) or SIL3 (EN 62061).

Control Logic Pty Ltd

www.control-logic.com.au



INFRARED PYROMETERS

The SPOT line of infrared pyrometers from AMETEK Land uses a pulsed green LED to confirm spot size and focus, eliminating the safety concerns found with laser-based sighting.

There are eight models spanning temperatures from 250 to 1800°C with wavelengths ranging from 1.0 to 1.6 μm . The choice of measuring range and wavelength makes them suitable for numerous applications in iron and steel production, metal forging, heat treating and cement production among others.

SPOT pyrometers combine ethernet, Modbus TCP, analog inputs and outputs, and alarm contacts within a single device; no separate processor is required. Configuration settings and readings are available on a rear display, remotely via a web browser or through proprietary SPOTViewer software. They are designed for simple installation and are interchangeable with older pyrometers.

Fibre-optic versions allow the optic head to be mounted in a hostile environment, with the detector and electronics enclosure located several metres away. This permits viewing of targets that are inaccessible or in areas with high RFI or ambient temperatures where water cooling is not possible.

SPOTViewer software allows users to configure, display and log data for up to 254 different pyrometer locations. The software permits effective use of the pyrometers in smaller operations where traditional process control systems are absent.

OneTemp Pty Ltd

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PRESSURE TRANSDUCER

The ESI LP1000 series of pressure transducers are designed for low-pressure applications, maintaining high performance with operating ranges down to 0-50 mbar. The design of the sensor ensures low hysteresis and high long-term stability.

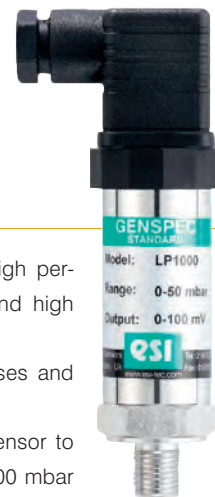
The LP1000 pressure transducer is specifically designed for use in media such as air, non-corrosive gases and various liquids compatible with silicon.

The stainless steel housing, fluorosilicone seals and silicon sensing element help enable this pressure sensor to maintain accurate performance and give good durability. It is available in pressure ranges from 0-50 to 0-1000 mbar and with electrical outputs of 0-100 mV, 0-5 VDC, 0-10 VDC and 4-20 mA.

The ESI LP1000 pressure transducer is suitable for applications such as laboratory and test, air and gas pressure monitoring, leak detection, low-pressure liquid and hydrostatic pressure measurement.

ADM Instrument Engineering Group

www.admtech.com.au



ANALYTICS TRANSMITTER



Mettler Toledo Process Analytics has announced the M100 2-wire transmitter for liquid analytics in the pharmaceutical and chemical industries. It is claimed to be the world's first transmitter for analytical measurement based on a compact head mount design, and without a local interface. The transmitter has global approvals for hazardous area use and combines multiparameter measurement with remote access to predictive sensor diagnostic tools over the HART communication protocol. The transmitter covers pH/ORP, dissolved oxygen and conductivity measurements.

The possibility of remote access to sensor diagnostics over HART or the transmitter's second analog output increases the communication capability and helps to avoid unplanned shutdowns. This leads to improved productivity and a reduction in operating costs. In addition, the M100 2-wire series includes the connection of Mettler Toledo's digital ISM sensors.

ISM enables sensors to be calibrated away from the process in a convenient location such as a workshop and quickly swapped in the field. This feature, called plug and measure, means measurement point start-up is fast and error-free, and can be accomplished without significant know-how. Because of plug and measure, the M100 does not require a local interface. The support of all major asset management tools such as AMS (Emerson), PDM (Siemens) and the open standard FDT/DTM ensures the widest compatibility and remote access to sensor diagnostics.

The M100 transmitter series is designed for use throughout the chemical industries and therefore has approvals based on explosion-proof/flameproof and intrinsically safe protection for installation in hazardous areas.

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Come and learn from international process safety expert, Luis Garcia, in a special one-day seminar.



Luis Garcia is a Process Safety Expert for Siemens and Keynote Speaker at the upcoming 5th Safety Control Systems Conference. Luis is a CFSE & TUV/SUD Certified Expert, ISA Instructor & Tank Farm Committee Chairman.

Constant protection of people, the environment and assets is the basis of sustainable success. How will digitalization and the transition to the fourth industrial revolution affect process safety? Join us for an interactive seminar covering 'Eight Frequently Asked Questions about Process Safety' and the core challenges of operating in an increasingly complex plant environment.

Lead by Luis Garcia, an international expert with more than 30 years of industry experience, the seminar will provide the opportunity to refresh your knowledge and challenge your understanding of safety instrumented systems. Typical applications like ESD, BMS, HIPPS and FGS will be discussed including demonstrations of example solutions.

Register your interest

Seminar: '8 FAQs about Process Safety'

Perth

Monday, 23rd March 2015.
9:00am – 5:00pm

Melbourne

Tuesday, 31st March 2015
9:00am – 5:00pm

Visit www.siemens.com.au/process-safety to learn more or to register your interest today. Places are limited.

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Australian access control system wins global acceptance

An innovative Australian access control system is winning the support of leading companies around the world. The inexpensive, easy-to-use AccessPack technology significantly reduces both OHS and business risk associated with industrial equipment use.

First aimed at high-risk equipment, it is now being installed on a variety of equipment across a range of industries around the world due to its simplicity and versatility. Major existing users of AccessPack include companies such as Schlumberger, BHP Billiton, Rio Tinto, FMG, Weatherford, UGL, Komatsu, Hitachi, Disney, Rolls Royce and the Whiting Corporation.

AccessPack, from Western Australian company CASWA, uses smart card technology to prevent unauthorised operators from using high-risk or critical equipment. This improves OSH outcomes by requiring users to have current and appropriate 'tickets' including qualifications, accreditation, training or inductions in order to operate the equipment. It records who uses the equipment, which creates and maintains a culture of operator accountability and typically improves availability as authorised users instinctively take greater care, says CASWA. It also provides HSE staff with access to information required for effective incident investigation and proactive training needs analysis.

AccessPack is radically different from typical access control systems that are designed to prohibit use by merely restricting perimeter access. Not only do these systems need expensive communications infrastructure to work (between the control point and a backend computer), once people have passed security, there is typically nothing to actually stop them from operating any individual machine they can get their hands on.

"AccessPack, however, is fitted to the actual device you want to manage. So it will only operate for individual persons that have been authorised to do so, and only for the period that this authority is valid. Machines will simply not start for anyone else," says the technology's developer, Paul Kelly, managing director of CASWA.

"Most importantly, however, our hardware is simple and hassle-free to use. After you fit an AccessPack to a machine, the operator just replaces pressing a start-switch with swiping a card. Thus we don't get much push back from users," says Kelly. The system also prevents unqualified personnel from being pressured into using hazardous equipment by overeager or time-stressed supervisors. "So it's win-win for everyone."

Other features of AccessPack include the ability to track when maintenance or servicing is due, thus keeping equipment in good working condition and further ensuring operators' safety. Equipment can also be tagged out if this is required for any reason, or if mandatory maintenance intervals are not done in the required period. In this mode, no operator, certified or otherwise, can physically use the equipment until it is safe to do so.



Administration is just as simple. A secure web interface enables access rights to be granted or changed using a few drag and drop actions.

Recently, CASWA signed a licence agreement with the Whiting Corporation, a major manufacturer of overhead cranes, foundry equipment and rail maintenance lifting equipment in the US, for distribution throughout North America.

Whiting Corporation Product Director Joel Phelps said: "The technology is brilliant. It is simple to install and use and is already proven in service in some of the most challenging markets and physically challenging locations on earth."

The system consists of a 'control puck' (sensor assembly containing an RFID reader and other smart electronics) fitted to the machine and programmed with relevant information about the machine and its location. Machines will work only when the user swipes the puck with a valid RFID card. As soon as the logged-in user finishes using the equipment, smart sensors and electronics within the AccessPack detect this event and they are automatically logged out to prevent usage by unauthorised personnel.

RFID cards are programmed with 'tokens' for each respective piece/type of equipment that a particular operator can use, based on the person's inductions, training, certifications and associated expiry dates.

Unlike traditional access control hardware that relies on communication between the access control point and a central management computer running a database of permissions, AccessPack is a standalone system with all the information required to grant/deny access being contained on the user's RFID card. This is the key to its wide applicability and cheap installation.

A wide range of applications kits has been developed so AccessPack is currently able to be fitted to any equipment powered from 2 to 415 V, AC or DC.

CASWA Pty Ltd

www.caswa.com.au

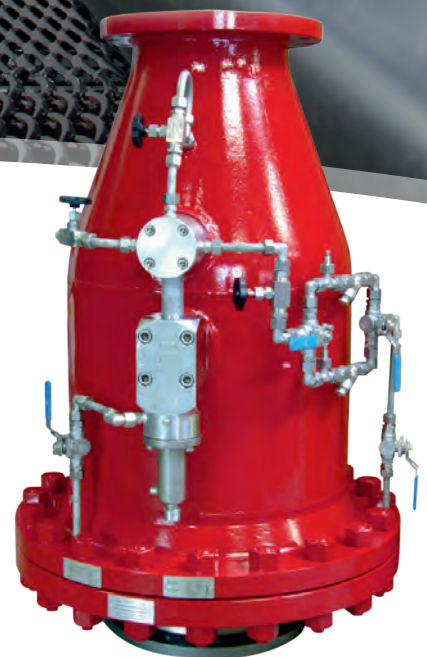


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EMISSION MONITORING

BENEFITS FOR POWER PLANTS

John Immelman

Monitoring and measuring the emissions of all process plants can give an indication of the levels of pollution being exhausted into the atmosphere and, as importantly, the degree of efficiency of the plant. In many cases, if the plant efficiency is improved, the emission of pollution is significantly reduced; win-win for everyone.

Although each state and territory has its own anti-pollution agency, the overarching national guidelines emanate from the National Environment Protection (Ambient Air Quality) Measures (NEPM). The desired environmental outcome of this Measure is “ambient air quality that allows for the adequate protection of human health and well-being”. The Measure specifies the pollutants; carbon monoxide, nitrogen dioxide, photochemical oxidants (ozone), sulfur dioxide, lead and ‘large’ particulates (PM10). Additionally, the Measure specifies what reductions are desired by what date.

Other pollutants that are under review are water vapour, oxygen, HCl gas, ammonia, carbon monoxide and more. Typically, water

vapour and oxygen are monitored as a measure of plant efficiency and not as an environmental pollutant.

Also in the crosshairs are smaller particles (dust) - PM2.5 - emitted into the atmosphere, normally from the stack. This monitoring is also a direct reflection on the efficiency of the plant, as well as an emission issue.

Local regulators and interested groups

Because pollution through emissions is such an emotional and controversial global topic, there are many local and international interest groups. Greenhouse gases, also in Australia, which make up the majority of the pollutants, are tracked by international



institutions like WWF (World Wide Fund for Nature) and Carbon Monitoring for Action. Localised regulators such as each state and territory Environmental Protection Authority (EPA) monitor the greenhouse gases, as well as particulate emissions.

Penalties and fines for transgressions vary from region to region and are enforced with differing levels of urgency, but are generally expensive and time-consuming to resolve.

It is strongly advised that every producer that could cause emission pollution implement a strategy to monitor and measure the emission levels and work with the authorities towards a reduction before the fines are enforced.

Industries of interest

All process and manufacturing industries pollute the atmosphere to a certain degree, some significantly more than others. At the lower end of the scale are the food and beverage producers, water and wastewater plants and various manufacturing facilities. Conversely, the higher end emission polluters are paper and pulp mills, ce-

ment plants, iron and steel mills, chemical producers, refineries and thermal power stations. In general, coal-fired thermal power stations are the worst polluters and are under constant pressure from the community and regulators to 'clean up'.

Coal-fired thermal power stations

According to the Australian Bureau of Resources and Energy Economics (BREE), coal continues to be the major fuel source for electricity generation, comprising about 64% of the fuel mix in 2012-13. However, this share has decreased from 77% in 2003-04, accounting for much of the decline in total electricity generation. In 2012-13 coal-fired generation declined across all states in Australia, with black and brown coal-fired generation dropping to their lowest levels since 1997-98. This decline in 2012-13 is most likely due to the increase in the relative costs and uncertainty of coal-fired electricity generation under carbon pricing.

Nevertheless, there are 25 coal-fired power stations nationally, varying in capacity from 2880 MW base-load generators down to 150 MW localised generators, and they each require increased emission monitoring and measurement to reduce emissions and increase efficiency.

What coal-fired power plant processes should be monitored?

Coal-fired power plants comprise similar sections/processes, some more sophisticated than others, but the emission measurements are similar for all. The sections that interest emission monitoring are:

- coal bunker, hopper, coal mill, pulverised fuel (PF) mill, coal conveyers
- steam generator, boiler drum, combustion control, superheater
- flue gas denitrification (DeNOx plant)
- precipitator, bag-house, de-dusting
- flue gas desulfurisation, scrubbers (FGD plant)
- stack, emission monitoring

Coal bunker, PF mill, conveyors

Pulverised coal (PF) is typically used to fire the boiler of power plants. For safety reasons, monitoring of CO in coal bunkers and coal mills is a critical measurement. CO is an odourless and very toxic gas and poses a serious explosion threat at levels above 8 vol.% in air. Elevated CO concentrations may indicate a source of smouldering and require immediate counter measures. In addition, O₂ concentrations provide significant information for coal pulverising plants which are operated under inert purging conditions: an increasing oxygen concentration value monitors the entrance of false air into the system and thus protects against the risk of explosion.

Situated in the process, an in-situ O₂ measuring sensor, using laser spectroscopy, provides immediate warning of pending problems. To monitor both CO and O₂, a remote sampling system is preferred.

Steam generator, boiler drum, combustion control, superheater

Power plant efficiency requires continuous monitoring and optimising of the combustion process. Supply of combustion air is a primary task because it delivers the required amount of oxygen, which must be optimised and controlled carefully to ensure safe and efficient combustion, to minimise fuel consumption as well as reduce the emission of pollutants like CO, CO₂ and NO_x. Reliable



ALL PROCESS AND MANUFACTURING INDUSTRIES POLLUTE THE ATMOSPHERE TO A CERTAIN DEGREE, SOME SIGNIFICANTLY MORE THAN OTHERS.

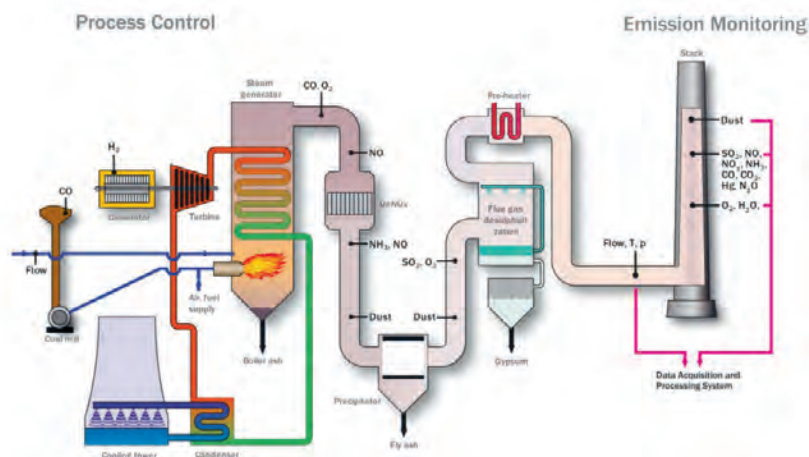


Figure 1: Emission monitoring points in a coal-fired power station (Image courtesy of SICK).

and accurate monitoring of primary combustion air volume flow at the boiler inlet is therefore a very important responsibility.

Due to the harsh conditions in this process, the O_2 is best measured with an in-situ zirconium dioxide sensor and the CO and CO_2 with a cross-duct in-situ gas filter correlation probe.

Flue gas denitrification (DeNOx plant)

Environmental regulations demand efficient reduction of the NO_x content of the flue gas before it is released into the atmosphere. The selective catalytic reduction (SCR) process is typically implemented using an added reagent such as ammonia (NH_3), which converts nitrogen oxide (NO) into water and nitrogen over a catalyst at approximately $400^\circ C$. NO concentration is measured at the inlet of the DeNOx plant to determine and control the required amount of ammonia. At the outlet of the DeNOx plant NO and NH_3 are measured: the NH_3 concentration (ammonia slip) indicates the efficiency of the denitrification process while the NO concentration is controlled to ensure compliance with the environmental regulations.

Typically, the NO_x content is monitored using UV spectroscopy technology as a direct measurement. The NH_3 concentrations can also be measured with this technology, but experience has shown that diode laser spectroscopy is the preferred in situ method.

Precipitator, bag-house, de-dusting

Flue gases from coal-fired combustion processes are loaded with particulate matter (PM) and, due to environmental regulations, must be cleaned before release into the atmosphere by passing a de-dusting device. Baghouse filters, where the particles are collected by passing through a tightly woven fabric, are common practice. Alternatively, electrostatic precipitators can be used, in which particles are deposited on electrodes when passed through an electric field. The correct operation of the dedusting plant and compliance of the residual dust content with the regulations is ensured by continuously monitoring the dust concentration after the filter.

Opacity is a measure of the dust concentration and the most cost-effective technology is cross duct transmittance measurement for medium to high concentrations.

Flue gas desulfurisation, scrubbers (FGD plant)

Wet scrubbing systems are typically used for flue gas desulfurisation. After leaving the dust removal plant, the flue gas enters a

tower where it is sprayed with a calcium-based slurry (scrubbing liquid, eg, ground limestone in water) that is fed from a tank. The gaseous pollutants such as SO_2 are dissolved in the liquid and react with the liquid to form calcium sulfite or sulfate, which is removed by dewatering and settling into a thickener. Alternatively, calcium sulfite is oxidised to form gypsum by bubbling compressed air through the sulfite slurry.

SO_2 can also be measured using UV spectroscopy technology.

Stack, emission monitoring

Depending on the type of fuel and local environmental regulations, a number of gas components, predominantly CO, NO_x and SO_2 , are to be monitored continuously in the flue gas at the stack along with dust (particulate matter, PM), gas flow, temperature and O_2 (frequently H_2O as well). In case of co-incineration of alternative fuels, additional components such as HF, HCl, Hg and VOC may be required to be monitored as well (emission monitoring in waste incineration). Measuring data are transferred to a specific data acquisition system for further processing and reporting to the authorities.

Since the stack is the final interface between the power station processes and the environment, these measurements are critical for avoiding penalties and ensuring optimum plant efficiency. It is important to quantify the volumetric flow rate to establish the amount of discharge. This is best achieved with a time-of-flight ultrasonic flowmeter. All other parameters to be measured have been monitored earlier in the process so the same technologies are suitable for these stack measurements.

Time to act

The thermal coal-fired power station has been used as an example of what can be measured and what benefits can be derived through investment in the most suitable probes and sensors. But the same strategy can be applied to all process and manufacturing industries since they all pollute the atmosphere to a certain degree, some significantly more than others. The pressure to 'clean up' will continue to increase and if it's not measured it cannot be managed.

Now is the time to implement an emission pollution strategy sanctioned by top management.

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LED SIGNAL TOWER

The multicolour LED element of the PSD signal tower from Phoenix Contact enables signalling of machine and system states with up to seven colours.

Selection of the colours red, yellow, green, blue, white, violet

and turquoise is via the three control lines. In comparison to 5-level signal towers, two less digital outputs are required, and when compared to 3-level signal towers, one less digital output is required. The multicolour element, which can be used universally, also reduces storage costs, as optical elements in various colours do not need to be kept in stock.

The LED technology offers low energy consumption as well as a long service life of 50,000 h. The latter reduces maintenance costs in comparison to optical elements with light bulbs, which need to be replaced more often.

Phoenix Contact Pty Ltd
www.phoenixcontact.com.au

SCADA MANAGEABLE SWITCHES

The ProView range of SCADA manageable switches uses Modbus/TCP to communicate with the SCADA software and SNMP to communicate with the NMS (network management system) at the same time, thereby allowing full read control over the devices either for control engineers or for IT. There are initially eight models in the ProView series: the EKI-5525/I and EKI-5528/I are 5- and 8-port 100 Mbps switches and the EKI-5725/I and EKI-5728/I are 5- and 8-port gigabit switches.

ProView series Ethernet switches with the port-based QoS VIP port for deterministic data transmission allow the priority ports to prioritise the traffic coming over those ports and delay the less immediately necessary data over the remaining ports. This is especially useful for high-bandwidth applications such as video streaming where latency would cause problems.

These switches have an operating temperature of between -40 and 75°C along with Level 3 EMS protection.

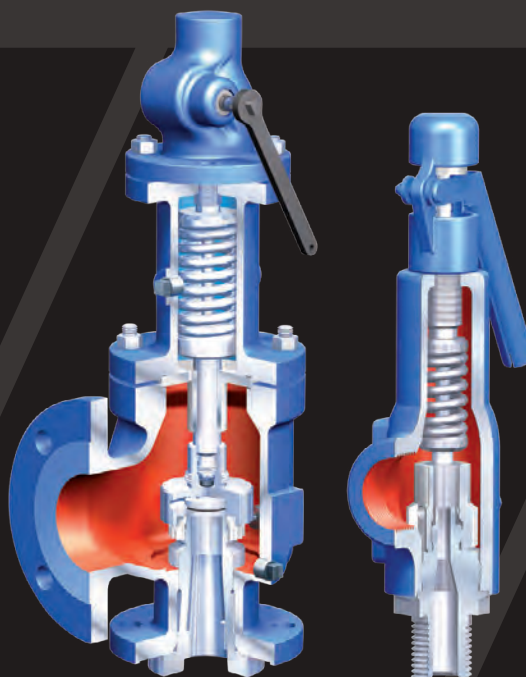
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HIGH-FORCE ROD ACTUATORS

The Tolomatic RSA-HT high-force, rod-style actuator is designed for high duty-cycle performance in demanding applications while delivering the added control and consistency of an electric drive actuator. The Tolomatic RSA-HT actuator, which can also be considered as a replacement for hydraulic applications, triples the maximum force capabilities of the standard RSA line from 17.96 to 57.38 kN.

Key features of the RSA-HT design include an IP67 option, standard purge/breather port and a lubrication system. The IP67 static rating option makes the RSA-HT actuator dust- and water-tight for outdoor applications or other environments where dusts or liquids are present. All RSA-HT actuators include a grease zerk for easy lubrication without disassembly, significantly extending the operating life of the lead screw and the actuator. In addition, a purge/breather port allows positive pressure to be applied to the actuator to help keep contaminants out and to function as a breather port in high-speed

applications where internal pressures may exert additional forces on the actuator if sealed.

RSA-HT actuators with reverse-parallel configurations have an improved high-torque belt design for driving maximum force output. An improved polyurethane timing belt with carbon tinsel cords is available in 1:1 or 2:1 reduction configurations. The 1:1 configuration allows for reduction gearbox mounting, which significantly reduces the overall footprint of the actuator. Tolomatic RSA-HT actuators are available in three sizes (32, 50 and 64) and are available in strokes up to 1524 mm.

Pneumatic Products

www.pneumatics.com.au



WIRELESS BRIDGES

After the acquisition of the wireless gateways from u-blox/connect-Blue in September, HMS Industrial Networks can now present an expanded suite of Anybus wireless bridge products for connecting industrial devices wirelessly. The increased range now consists of: Industrial Ethernet over WLAN (point-to-point) at 2.4 or 5 GHz; Industrial Ethernet over Bluetooth (point-to-point or multipoint); and serial over Bluetooth (point-to-point or multipoint).

By connecting industrial devices and networks over a wireless link, the Anybus Wireless Bridge family makes life easier for system integrators and automation engineers needing to create connections through (for example) hazardous areas, hard-to-reach locations, or moving installations where cables are not desirable. The Anybus Wireless Bridge is a solution to bridge popular Industrial Ethernet standards such as Profinet, EtherNet/IP, BACnet/IP and Modbus TCP, as well as serial networks, and provides users with a robust and maintenance-free wireless connection.

Depending on architectural needs, the Anybus Wireless Bridges can be used for point-to-point cable replacement as well as for connecting several wireless nodes.

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COMBINED RTU AND PAC

By combining the functionalities of an RTU and a PAC, the SCADAPack 500E series rPACs allow operators of remote assets in the oil and gas, water and wastewater, and renewable energy industries to monitor and control assets through a single device.

One of the main features of the SCADAPack 500E series rPACs is the increase in execution speed. It is fitted with a 32-bit processor sequenced at 500 MHz and more than 250 MB of high-speed

memory. It is claimed this allows the SCADAPack 500E to be at least 20 times faster than a standard RTU while still able to be powered from solar panels, batteries or wind turbines.

SCADAPack 500E series rPACs use open standards and programming environments to provide flexibility and versatility. Using a 20,000-point database and various open standard telemetry and industrial protocols, it can connect with up to 29 active SCADA masters, 100 remote/local slave devices and 100 remote Distributed Network Protocol (DNP) devices in peer-to-peer configuration.

A data concentrator and protocol converter in each rPAC allows devices to communicate whether using DNP3, Modbus or DF1 protocols.

Schneider Electric Industry Business
www.schneider-electric.com

ENCODER

The TSW80P low-cost encoder has been developed to work in high-EMI and harsh environments. Due to the design of its housing, it avoids interference from electrical noise induced from motor and inverter equipment.

The shaft closing is made via a clamp collar and the interchangeable bushing fits all mechanical mounting requirements in applications from simple motor automation to more complex lift technology machines.

Features and benefits of the encoder include short-circuit protection and erosion-resistant bearings. The body diameter is 80 mm with a maximum length of 28 mm.

The device offers LD, LD2 and PP2 interfaces and comes in two standard resolutions of 1024 and 2048 ppr, with other resolutions available to order.

Treotham Automation Pty Ltd
www.treotham.com.au

ERNTEC Enclosure Solutions

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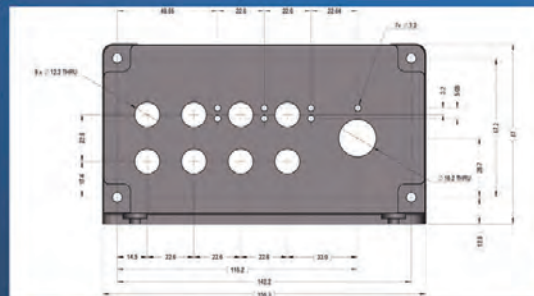
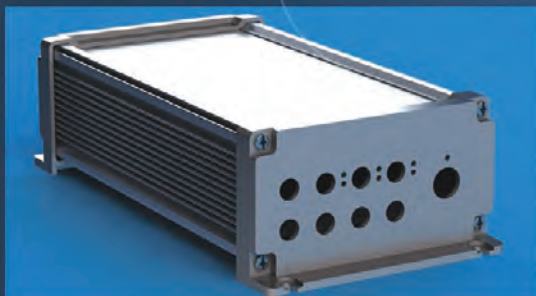
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Electrostatic motor under development

A tabletop motor using an entirely new driving principle is under development at the headquarters of C-Motive Technologies, a start-up business that is commercialising technology from the College of Engineering at UW-Madison.

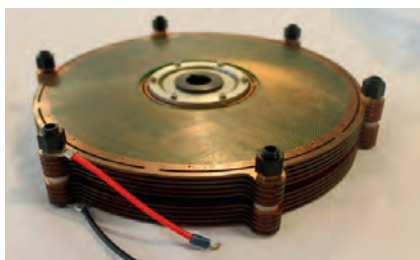
"We have proven the concept of a new motor that uses electric fields rather than magnetic fields to transform electricity into a rotary force," says company co-founder Dan Ludois, an assistant professor of electrical and computer engineering at the UW. The distinction may sound minor, but it could solve a number of practical problems while saving money, he explains.

Actually, the concept is not entirely new: Benjamin Franklin and others described and built motors based on electrostatic forces back in the 18th and 19th centuries, but none achieved practical operation. Since the widespread adoption of electric motors a century ago, magnetism has been the only practical source of rotation. Magnetism is easier to exploit than electrostatic fields due to the properties of naturally occurring materials and simple engineering techniques. However, new advances in materials, mechanical engineering and advanced manufacturing may enable electrostatic motors.

In 2011, while Ludois was finishing a PhD thesis at UW-Madison, he realised that instead of relying on magnetic fields, he could achieve a similar result by manipulating electric fields to create a motor based on electrostatic attraction. The new technique, he realised, could deliver major advantages in weight, material cost, operating efficiency and maintenance requirements.

In the motor on display, nested stationary and rotating plates are held hairs-width apart by a unique air-cushioning strategy. An electric voltage delivered to the fixed plates creates an electrostatic field that attracts the rotating plates in a way that forces them to spin.

"A charge builds up on the surfaces of the plates, and if you can manipulate the charge, you can convert electricity into rotary motion or



transfer electric power from one set of plates to the other," says Ludois.

This type of coupling can be used "to power things that move without touching", Ludois adds.

The breakthrough relies on electronics that precisely control a high-voltage, high-frequency electric field and fluid mechanics to keep the surfaces close without touching.

"Nothing is touching, because you are using electric fields to couple the stationary and rotating parts," Ludois says. "There is no contact, and no maintenance.

"Rather than magnetism, we are using the force that holds your clothes together when you take them out of the drier - electrostatic force. This technique can power anything that needs to move, and that you don't want to touch while it's moving."

Because motors and generators are essentially mirror images of each other, the invention may first meet the market in the form of a generator for wind turbines, an application for which C-Motive Technologies received a Small Business Innovation Research grant for development and research from the US National Science Foundation in 2014.

By saving weight and materials, and boosting efficiency, the new design should give the company a bottom-line advantage. The new design avoids the use of precious 'rare earth' metals and substitutes aluminium for the more expensive copper found in magnet windings of conventional motors and generators.

When C-Motive was founded, Ludois and co-founders Justin Reed and Micah Erickson were all PhD students. "It's really hard to beat the world, especially when you start out as three graduate students," Ludois says.

University of Wisconsin-Madison

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The Banner Engineering

EZ-LIGHT K90 Series multicolour indicator lights feature a large, 90 mm indicator housing and deliver bright and uniform illumination from all directions and at longer distances, while a highly visible illuminated dome ensures easy-to-see operator guidance.

The K90 Series indicators provide enhanced flexibility with up to five colours - green, red, yellow, blue and white - available in one device. Available in two models, operators can select from the K90TL, which alternates between colours when multiple inputs are active, or the K90L, which has an auxiliary input line for flashing an active input.

For use in harsh environments, the K90 Series features a rugged IP67-rated design and can operate in temperatures ranging from -40 to 50°C. All models offer 12-30 VDC operation.

Micromax Pty Ltd

www.micromaxsa.com.au

I/O MODULES FOR EXTREME CONDITIONS

The Axioline F I/O system from Phoenix Contact for signal acquisition in the control cabinet now includes versions with an extended temperature range of -40°C to 70°C.

The robust modules with the XC (extreme conditions) extension are based on standard versions. In addition to bus couplers, they also include digital and analog input and output modules as well as a range of function modules. The PCBs used are coated with a special paint which improves their resistance to moisture and corrosive gases. This means that the XC versions are suitable for use in applications with harsh ambient conditions, such as wind power plants or solar parks in regions with extreme climates.

The XC versions follow in the footsteps of the complete Axioline F I/O system, with particularly high immunity to interference up to 8 kV, rapid signal acquisition and a highly robust design, which means they can handle mechanical loads such as shocks up to 30 G.

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PEPPERL+FUCHS



WIND FARM

TURNING BIG DATA INTO SMART DATA

Australia's latest wind farm includes diagnostic data acquisition technology, providing data that is monitored and analysed continuously to achieve optimal efficiency and asset management for wind farms worldwide.

More than 800 sensors strategically positioned on the wind turbines at Australia's newest wind farm will play a key role in ongoing research by Siemens to optimise performance and minimise the need for potentially costly maintenance.

Every rotation of the ninety 3 MW turbines at Snowtown II wind farm is continually monitored off-site to develop key target values that can evaluate potential errors and correct them remotely. It is another example of the state-of-the-art technology incorporated into Australia's latest renewable resource power plant and demonstrates the engineering expertise available in Australia.

"This is a wonderful example of the benefits of continually developing the engineering talent we have here in Australia so they can be part of the exciting work that is going on at a global level," said Engineers Australia Chief Executive Officer Stephen Durkin.

"It's another example of how Siemens and Engineers Australia are working together to advance the engineering profession for the benefit of the communities we serve," Durkin said.

Siemens Ltd CEO Jeff Connolly said it also represented a graphic illustration of the transformation of big data into smart data and the move towards a digitalised economy in preparation for the fourth industrial revolution.

"The information from Snowtown II is fed to our monitoring centre in Denmark, which collates similar data from Siemens' wind farms around the globe. Last year the database contained 97 terabytes of data. That will grow to 268 TB by 2015.

"Ten years ago it would have taken 1000 years to produce five billion gigabytes of data. Today, we can produce that amount in 10 minutes and the data captured from Snowtown II is part of that growth," Connolly said.



"The challenge is turning that information into meaningful information to enhance productivity. We call that smart data, and the Siemens wind power service centre is an excellent example of digitalisation for efficiency.

"This is a good illustration of where digitalisation technology is being used to help efficiently electrify the world. It's an example of Industry 4.0, where software and data play a much bigger role," Connolly said.

The huge amount of data collected from Siemens wind farms is used to remotely monitor tiny variations and identify potential defects long before any service work is required.

"In some cases, our engineers can detect defective main shaft bearings up to a whole year before they have to be replaced. This means our technicians can anticipate damage before it actually makes itself felt," Connolly said.

Digitalisation technology - how it works

Data from the Snowtown II site flows continually to the diagnostic centre of Siemens Wind Power Services in Brande, in western Denmark. The facility collects and evaluates all the operating data from more than 7500 Siemens wind turbines all over the world.

This flood of data is collected by the SCADA and Turbine Condition Monitoring (TCM) systems from Siemens. While the SCADA system collects the turbines' electronic and mechanical data as well as information about weather and power grids, TCM is a vibration recognition system.

Each wind turbine nacelle contains up to nine sensors that measure the vibrations of the turbines' key components: the transmission case, the generator and the main shaft bearing at the rotor blades. Each turbine at Snowtown II is equipped with TCM, which monitors them 24 hours a day, 365 days a year.

After the vibration data is collected, it is transmitted to a reference database in Brande. The centre automatically processes this data to create sample values for the normal operation of the various types of wind turbines and continuously compares these target values with the current operating data of active turbines.

The vibration sensors can detect even tiny deviations that indicate a potential defect. This enables the system to discover a damaged gear wheel, for example, long before the transmission breaks down. When needed, Siemens engineers can remotely switch off the affected wind turbine and send someone for repair work.

The centre measures more than 2500 anomalies every week. The 100 analysts at the facility investigate these error messages and transmit more than 100 early warnings to the service technicians every week. If a case is serious, the technicians go directly to the affected turbine to take care of the matter after the centre has provided them all of the information about the turbine and its operating history.

The flow of extremely detailed data is the key to the system's success because it enables diagnostics experts in Brande to precisely determine what kind of defect they are dealing with and whether or not a service team needs to be sent out to the affected turbine.

For example, if individual turbine components exceed or drop below temperature tolerance ranges, the wind turbine in question automatically shuts down. However, if the off-site technicians come to the conclusion that the anomaly is not serious, they can remotely restart the wind turbine as soon as the temperatures have returned to their normal values.

Performance data from the remote monitoring system is impressive. Siemens' engineers can remotely solve issues affecting 80% of the stopped turbines within 10 minutes.

A further 5% of the problems take somewhat longer to solve, but do not require technicians to be sent to the defective turbines. In only 15% of the cases do service technicians actually have to go out and work on the affected wind turbines.

Siemens Wind Power Services has long been an advocate of using the advantages of smart data. In 1998, Siemens became one of the first companies in the world to install sensors in its wind turbines as standard procedure.

Snowtown II background information

Officially opened by South Australian Premier Jay Weatherill on 2 November, Snowtown II will produce 989 GWh annually - enough to provide clean, emission-free power for 180,000 homes.

Construction on the \$439 million Snowtown II project began in August 2012 and involved about 500,000 man-hours. Siemens provided a full turnkey project solution for the wind farm including the associated 275 kV high-voltage substation.

The 90 turbines at Snowtown II represent the largest installation of Siemens' Direct Drive technology commissioned to date. The Direct Drive technology uses half the moving parts of a conventional geared turbine, resulting in reduced complexity and increased reliability.

Each turbine is driven by three blades, ranging in length from 49 to 53 m. They are of a single piece construction, made from fibreglass-reinforced epoxy resin. As a result, all glue joints - the potential weak points that could expose the structure to cracking, water ingress, ice formation and lightning - are eliminated.

Weighing in at 10 tonnes, each turbine rotor spins at up to 16 rpm, resulting in a tip speed of over 300 km/h, similar to the top speed of a Formula 1 race car or a high-speed train. In total, the swept area would cover a site more than eight times the size of the Adelaide Zoo.

Transporting the blades was one of many logistical issues Siemens' engineers had to overcome. Laid end to end, the 270 blades would result in a road train more than 14 km long. Over the course of several months, each of the 950 pieces constructed off-site were transported, with about 500 requiring a police escort. The size of the project site required construction of 50 km of new roads, providing an added benefit with increased access for Country Fire Service volunteers.

Siemens extensively utilised South Australian businesses to help deliver the project. Local supply and services contracts in



excess of \$75 million were awarded, including fabrication of 20 towers by Whyalla engineering firm E&A Contractors and civil and electrical installation works by a consortium of Civil and Technical Constructions and Consolidated Power Projects, both of Adelaide.

Siemens Ltd
www.siemens.com.au

NEW PRODUCTS

SECURITY FIREWALL OS UPDATE

Belden has introduced the next version of its Hirschmann Security Operating System known as HiSecOS. With HiSecOS Version 2.0, users have greater levels of insight into network data, as well as the ability to more easily create network routes and connect to multiple secure sites.

HiSecOS 2.0 offers simpler network configuration options through the Open Shortest Path First (OSPF) dynamic routing protocol, which allow customers to set up network routes without any manual configuration required. The OSPF protocol also offers a seamless connection to the network's backbone.

Safer, more secure remote connections to the network are available via encrypted virtual private network (VPN) communication. The VPN connection also makes it possible for customers to connect to two different secured sites using corporate networks.

An intrusion detection system (IDS) also enables the analysis of ambiguous traffic, early detection of issues and prevention of those issues from replicating by identifying the root cause.

HiSecOS 2.0 is developed with Hirschmann's multiport firewalls, the EAGLE20-0400 and EAGLE30-0402, in mind - to heighten overall network performance and offer more robust security features. The multiport firewalls with router redundancy and wide area network (WAN) interface are said to save

significant time and costs, while helping achieve maximum network availability and reliability for industrial settings.

Belden Australia Pty Ltd
www.belden.com





BLOWER SYSTEMS

The EBS series screw blowers from Kaeser are designed to use up to 35% less energy than conventional rotary blowers.

The high-efficiency blower airends combine a wide control range with near-constant specific power. Equipped with Kaeser Sigma Profile rotors, the airends found in the series screw blowers, ensure maximum air delivery while keeping power consumption to a minimum. In addition, the rotors are not coated, which means that efficiency essentially remains consistent after many years of operation.

The series screw blowers come with integrated Sigma Control 2 controller as standard. This controller provides comprehensive and efficient blower control and system monitoring.

For additional optimisation, these blowers can be supplied with a Sigma Air Manager (SAM) master control system. Due to its high level of data integration and multiple interface options, SAM can be easily integrated into advanced production, building management and energy management systems.

The series of screw blowers are suitable for a wide range of applications, including wastewater treatment, pneumatic conveying systems and energy production to the food and beverage sector as well as the pharmaceutical and chemicals sector. They are simple to install and have been designed for dependable, continuous operation. With a logical component layout, the blower systems can be installed next to a wall or even side by side.

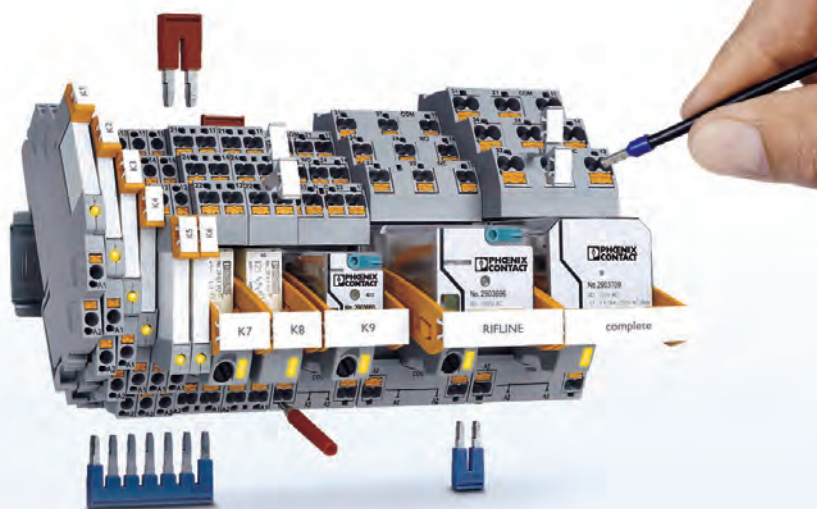
The series screw blowers are available with motor power 22-75 kW and maximum free air delivery up to 35.8 m³/min.

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VISIBLE-BLADE DISCONNECT SWITCH

Rockwell Automation has announced a universal visible-blade disconnect switch with global ratings of UL, CSA, CE and CCC. The Allen-Bradley Bulletin 1494U visible-blade disconnect switch is designed for applications with switched currents up to 30, 60 and 100 A. A 600 A version will also be available in 2015.

The visible-blade disconnect switch provides visible confirmation that the switch is in the 'on' or 'off' position as it isolates motors, motor controllers and other loads from a supply circuit.

The switch covers all applications, thereby reducing needed inventory. Users can choose from a number of styles and options to meet their specific application needs, including non-fusible or fusible versions, and the fusible version provides short-circuit protection. The switch can also be connected for rod or cable operation. With the cable option, users also have the flexibility to mount the switch anywhere in the panel, regardless of the handle's location.

The disconnect switch saves users panel space with a 30% smaller footprint than previous models. In addition, the company says the switch, mechanism and multitap lugs together have a footprint that is almost 50% smaller than the footprint of previous combinations.

Aluminium lugs are standard on the universal disconnect switches, and accept copper and aluminium wiring for easier installation. Fuse clips are pre-installed for the fusible styles. With the multiport lug connector, users no longer have to wire through a distribution block and can instead connect wires directly to the disconnect switch.

Rockwell Automation Australia

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ETHERCAT SLAVE I/O MODULE

The ICP DAS ECAT-2045 is an EtherCAT slave I/O module with isolated 16 digital outputs. It is suitable for robotics, printing machines, assembly systems, injection moulding, packaging, metal forming and semiconductor tools applications.

The ECAT-2000 Series is equipped with the EtherCAT protocol and installed by daisy-chain connection which permits the flexibility in device installations and reduces infrastructure and operational costs. All the modules can be deployed in the network topologies such as star, line or ring. The isolation input and output design protects the ECAT-2000 against harmful interference and the environment.

The ECAT-2045 has 16 built-in isolated digital outputs. Users can obtain the input and output status not only via the process data but also from its LED indicators. The ECAT-2000 Series has been verified by the conformance test tool, therefore an eligible EtherCAT Master or configurator can easily implement various applications.

ICP Electronics Australia Pty Ltd

www.icp-australia.com.au

DIGITAL WEIGHT INDICATOR

Rice Lake Weighing Systems' 880 Performance Series compact panel-mount indicator can be used as a stand-alone controller, or connected with a range of networking protocols and PLCs. The onboard Ethernet TCP/IP supports two simultaneous connections, one as a server and the other as a client for either streamed or polled data. The expanded communication capabilities of the device allow users to configure, calibrate and update firmware through the built-in USB or serial port.

The device also features over 20 time- and weight-based set points, standard RS232/RS485 and Ethernet TCP/IP ports, and up to five option cards can be added for expanded communication protocols. The 880 also offers filter settings for light, medium and heavy noise to ensure that the output displays are fast and stable.

For maximum flexibility there are option slots available for EtherNet/IP, ProfiNet, ModBus TCP, DeviceNet, Profibus DP, analog output and 4-channel relay.

The company says the panel mount indicator gives users function, adaptability and expansive communication possibilities.

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HART INTEGRATION DEVICES

ICP Electronics Australia has expanded its range of HART integration solutions with a range of HART converters, gateways and remote I/O modules from ICP DAS.

HART Field Communications Protocol extends the 4-20 mA standard to enhance communication with smart field instruments. The protocol preserves the 4-20 mA signal and enables two-way digital communications to occur without disturbing the integrity of the 4-20 mA signal. Unlike other communication technologies, the HART protocol can maintain compatibility with existing 4-20 mA systems with a backward-compatible solution.


ICP DAS has developed a range of products, including HART converters, HART gateways and HART I/O modules. The HART

converter can be used to access HART devices via COM, USB or ethernet interfaces. The HART gateway can integrate HART communication to different protocols such as Modbus and Profibus. The HART I/O module can be used to access or control HART devices directly.

These devices allow users to easily and quickly integrate HART devices allowing data acquisition into SCADA, HMI or PLC systems. This design feature allows users to widely integrate this device into a number of applications such as remote data acquisition, control, process automation, and factory automation.

ICP Electronics Australia Pty Ltd

www.icp-australia.com.au



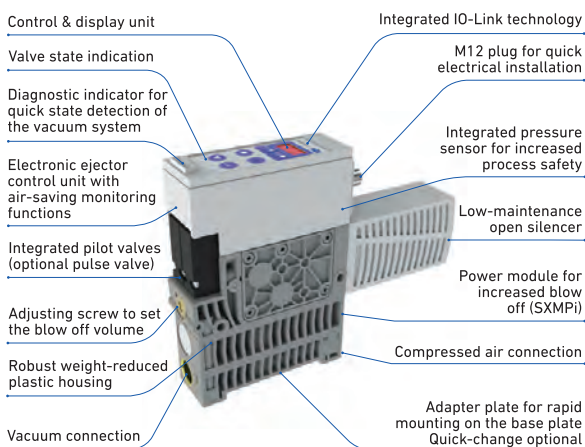
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MV DRIVES WITH SAFE TORQUE OFF

Allen-Bradley PowerFlex 7000 medium-voltage drives offer a safe torque-off op-

tion to help industrial manufacturers and equipment builders simplify their functional safety design and meet the demands of international safety standards. Safe torque-off technology allows users to reliably remove power from the motor without removing power to the drive, enabling a faster restart of the system after a safe state is reached.

When a safe torque-off command is issued in the drive, from a user or a demand on the functional safety system, the drive immediately removes rotational power to the motor, ceasing the process. The drive stays powered and reliably monitors this safe state, ensuring no unintended operation of the motor is possible.

Suitable for industrial applications, such as material-handling conveyors and grinding mills, the drive with safe torque off is TÜV certified. It is also certified to SIL 3 of IEC 6150, and PLe, Category 3 of ISO 13849-1, the highest levels achievable for drives.

Rockwell Automation Australia

www.rockwellautomation.com.au





PRP/HSR REDBOX

Moxa PT-G503-PHR-PTP series redundancy boxes (RedBoxes) are compliant with the latest IEC 62439-3 standard, making them suitable for electrical substation automation and process automation systems that require zero recovery time

to ensure the highest system availability and data integrity.

The PRP/HSR all-in-one device supports Gigabit ethernet, coupling, and QuadBox for versatile and scalable zero switch-over time networks that are easy to manage and deploy. These benefits enable efficient network management and fast error detection.

The RedBox is IEC 62439-3 Clause 4 (PRP) and Clause 5 (HSR) compliant. Hardware-based IEEE 1588v2 PTP is supported, as is an MMS Server for integration with power SCADA systems. The unit also offers Moxa's Fiber Check fibre-port monitoring technology, and is NERC CIP compliant.

Madison Technologies

www.madisontech.com



ROTARY OIL SEAL PROFILES

The Oz Seals BP3C, BP3DC, BPHPA and BPHPB rotary oil seal profiles can be used for rotary applications for any industry, and can be designed for speeds of up to 10 m/s and up to 100 bar pressure. They can be used in a wide variety of industries and applications, including food, beverage and drug, underground mining, drill rigs, air motors, mixers, pumps, engines, hydraulic pumps and boats.

The recommended materials for these profiles are NBR, HNBR, Oz Super Red Polymer (ORSP), Viton and Aflas Extreme, depending on the media. They may be accompanied with TMCF or Oz Monyt Super Polyurethane carriers, which hold the elastomeric part, prevent rotation and lock it stationary into the housing. They can be produced in any size required.

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BULK BAG FILLER WITH METAL DETECTION

Flexicon has released a stainless steel, sanitary bulk bag filler that detects and separates metal as it fills bulk bags by weight, dust free.

The filler frame is a Twin-Centrepost design that maximises strength, reduces cost and improves accessibility to bag hooks. It is equipped with an integral metal detector/separator that detects metal in the free-fall stream of material entering the filler, and then ejects it through a chute that discharges into a removable drum at the rear of the unit.

The filler also incorporates: fill head height adjustment to accept all popular bag sizes; an inflatable cuff forming a high-integrity seal to the bag inlet spout; a blower to remove bag creases prior to filling; load cells for filling by weight; a vent port for dust-free air displacement during filling; pneumatically retractable bag hooks; and an automated vibratory deaeration/densification system to maximise capacity and stabilise the bag for storage and shipment.

It is constructed of 316 stainless steel, finished to sanitary standards and configured with full-length forklifting tubes allowing it to be moved throughout the plant. It can be integrated with optional conveyor feed systems including Flexicon flexible screw conveyors, Flexi-Disc tubular cable conveyors and Pneumati-Con dilute-phase pneumatic conveying systems, as well as existing plant conveyors or overhead storage vessels.

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I/O EXPANSION SYSTEM

Automation Group has released the Oleumtech RS485 I/O Expansion System.

The system is compatible with any Modbus RS485 Master device but unlike most other solutions requires no software configuration.

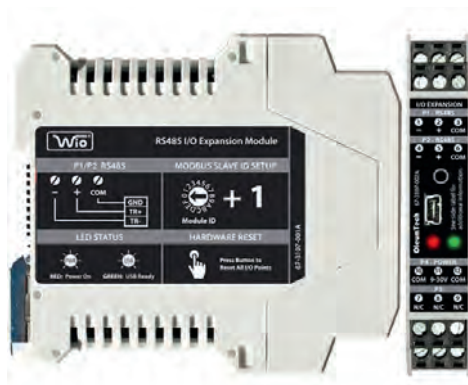
The expansion module can support up to 16 I/O modules in any combination and can be used with any Oleumtech WIO I/O modules. Users can choose from digital, 4-20 mA, or 0-10 V I/O modules to create a customised solution to suit their application.

It can be deployed with tool-free mounting on a 35 mm DIN rail making it easy and quick to install.

The system is said to be an economical solution for industrial applications in a variety of industries including, water and wastewater, irrigation systems, mining, oil and gas, and utilities.

Automation Group

www.automationgroup.com.au





PATCHING AND TERMINATION SOLUTIONS

Belden has released a range of structured modular industrial patch panel (MIPP) products for harsh industrial applications.

The three industrial-strength MIPPs include: the MIPP Fiber Splice Box, the MIPP Copper Patch Panel, and the MIPP Mix.

The MIPP Fiber Splice Box is designed to efficiently terminate various types of fibre cabling in a wide range of industrial applications. A single MIPP Fiber Splice Box allows for termination and patching of up to 72 fibre cables, saving customers both space and costs, especially in closed cabinets where space is a premium.

The MIPP Copper Patch Panel helps to improve reliability for both industrial Ethernet and Profinet networks. Together, through Belden's MIPP and DataTuff patch cords, copper cables can be terminated and linked to active equipment in an organised and structured manner. One MIPP Copper Patch Panel can terminate and patch up to 24 copper cables.

For networks using both fibre and copper cabling, the MIPP Mix integrates the connection of both cabling infrastructures in one single solution. With high port density and flexibility, the combination of copper and fibre ports can include up to six modules per device.

Each of the MIPPs are constructed of lightweight, high-strength aluminium in order to securely protect the cabling connections under the harshest industrial conditions. The products' rugged design and UL 1863 certification are suitable for use by network engineers and system installers in environments like power transmission and distribution, transportation, alternative power generation, machine building and automation.

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AS I SEE IT



HOW TO MAKE YOUR LEARNING STICK

Whether you like it or not, we are all in a feverish state of learning new things. Whether it is to learn how to use a new process at work, calibrate a new instrument, use a new Windows operating system or how to handle a new automated torque wrench - we are all learning and have to then recall this knowledge at a later stage. Particularly in engineering and instrumentation, there are a ferocious number of new technologies and approaches hitting us almost every day - all which we need to learn and remember if we want to keep up to date in our career.

The tragedy is that most people are learning the wrong way, so here is a short note on how to do it right, save yourself a huge amount of time and get much better results. And as you know, if you are good at learning you will definitely have an advantage in life and business.

First of all, there are some bad learning techniques that should be avoided. Probably the most commonly used technique is that of rereading text (and cramming) until you believe you can remember a particular segment. This undoubtedly makes you feel familiar with the material and makes you believe you can achieve mastery, but unfortunately you tend to have difficulty applying this form of learning to a particular situation and also tend to forget this material very quickly.

Intuitively we also tend to believe that massed practice of material again and again is the way to go. However, this also doesn't stick and you quickly forget it.

So here are a few suggestions on highly effective learning techniques.

Probably the most effective one is **retrieval practice**. This is where you quiz yourself after completing the reading of a section of text. The harder it is to recall the material, the greater the benefit for you and the longer you will remember it.

You should also **space out your retrieval sessions**, allowing some time to elapse before quizzing yourself on a particular section. The longer the time gap between reading a sec-

tion of text and self-quizzing, the stronger the longer term memory will be.

Another thing to do is to **mix up your study materials**. If you are studying a new HVAC system, for example, mix up your study of the mechanical, electrical and control aspects of the problem.

Other ways to fire up your learning to new heights is to use the four steps of **Elaboration** (finding new meanings or ways of understanding the material); **Generation** (trying to explain a particular piece of material before studying and then comparing what the approach really is); **Reflection** (pondering on the materials); and **Calibration** (comparing your real understanding of a situation with what actually occurs).

Finally, where possible try to **apply your knowledge to a real situation**. After studying how to tune a process control PID loop, actually tune a loop on a real plant and see what happens.

You can also, where possible, **teach what you have learned** to a keen and eager student. When teaching you will uncover all sorts of problems with what you have learned.

References

Brown, PC, Roediger, HL & McDaniel, MA 2014, *Make it Stick: The Science of Successful Learning*, Belknap Press.



Steve MacKay PhD has worked mainly in the industrial automation and data communications fields across the world for the past 30 years and is currently Technical Director with IDC Technologies (www.idc-online.com), a growing engineering training and publishing firm operating from offices throughout the world, which he founded in 1992.



A.B.N. 22 152 305 336

Head Office

Cnr. Fox Valley Road & Kiogle Street,
(Locked Bag 1289)
Wahroonga NSW 2076

AUSTRALIA

ph: +61 2 9487 2700 fx: +61 2 9489 1265

www.westwick-farrow.com.au

Editor

Glenn Johnson
wnipt@westwick-farrow.com.au

Chief Editor

Janette Woodhouse

Publisher

Geoff Hird

Art Director/Production Manager

Julie Wright

Art/Production

Tanya Scarselletti, Odette Boulton

Circulation Manager

Sue Lavery
circulation@westwick-farrow.com.au

Copy Control

Mitchie Mullins
copy@westwick-farrow.com.au

Advertising Sales

National Sales Manager/NSW/QLD

Nicola Fender-Fox

ph: 0414 703 780

nfender-fox@westwick-farrow.com.au

VIC/SA - Lachlan Rainey

ph: 0402 157 167

lrailey@westwick-farrow.com.au

WA - Mandy Grubisin

ph: 0468 840 739

mgrubisin@westwick-farrow.com.au

NZ - Mark Ryu

ph: 0800 44 2529

mryu@westwick-farrow.com.au

Asia - Lachlan Rainey

ph: +61 (0) 402 157 167

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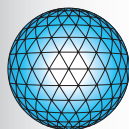
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