

PROCESS

TECHNOLOGY

AUTOMATION + CONTROL + INSTRUMENTATION

November 2018 vol.32 no.6

PP100007403



DataTaker intelligent data loggers
One logger, endless possibilities

ThermoFisher
SCIENTIFIC

We understand how critical it is to find sustainable business process improvements in an ever-changing world.

PERSPECTIVE + PERFORMANCE

You streamline and automate your processes while complying with regulations and minimizing risks.



Remain compliant and minimize risk.

"We help you focus on producing higher-quality products at a lower cost. To reach this goal, we provide a global calibration program, standardized for both on-site and laboratory calibration."

Kyle Shipps
Calibration Manager

Learn more about our calibration capabilities:
go.endress.com/au/calibration-capabilities

Endress+Hauser 
People for Process Automation



Available from Thermo Fisher Scientific, DataTaker is a range of multipurpose measurement and control data loggers. They are compatible with most meteorological, hydrological, environmental and industrial sensors. They offer extensive communications capabilities and deliver data by using user-preferred protocols.

With support for multiple SDI-12 sensor networks, Modbus for SCADA systems, FTP and web interfaces and a 12 V regulated output to power sensors, DataTaker is a totally self-contained solution. The loggers come in different variants that include models with integrated cellular modem capabilities, Wi-Fi and vibrating wire technology for geotechnical applications.

Temperature, voltage, current, 4–20 mA loops, resistance, bridges, strain gauges, frequency, digital, serial and calculated measurements can all be scaled, logged and returned in engineering units or within statistical reporting. Users can set up sampling, logging, alarm and control tasks to suit requirements while interfaces for smart sensors, GPS and other intelligent devices expand the system's flexibility.

DataTaker loggers are programmable, with user-friendly software, and are expandable to 300 analog inputs with an expansion module. They are also cloud enabled, so data can be accessed conveniently with DataTaker Live, a web-based intuitive graphical user interface that allows users to collect, process and share data across all platforms. Live dashboards display real-time sensor measurements, calculations and diagnostic information and alerts can be raised when abnormal conditions are detected.

ThermoFisher
SCIENTIFIC

Thermo Fisher Scientific
www.datataker.com

CONTENTS

- 4 Measurement data on the lookout for artificial intelligence
- 8 Hot Products online
- 12 New products
- 14 The benefits of on-site heat and power generation
- 16 Addressing the challenges of online monitoring
- 26 Autonomous systems — big data in products, services and operations
- 32 Three reasons to measure pH inline
- 40 Creating modular machines with plug-and-play connectors
- 42 Building the mine of the future



READ ONLINE!

*This issue is available
to read and download at*

www.processonline.com.au/magazine

MEASUREMENT DATA ON THE LOOKOUT FOR ARTIFICIAL INTELLIGENCE

Networked intelligence is the key to taking the process industries to the next level.

Industry 4.0 is the solution for everything — this is the general impression promoted today in relation to the efficient running of process plants. But there are grounds for doubt: Is it all just hype? Just something for the industry giants with a lot of IT manpower? This is not quite right either.

Every company that makes use of largely modern field and control engineering has it: large amounts of data that could be utilised to monitor things better and improve efficiency. It is therefore worth taking a detailed look at which solution suits which application. Implementation is easier than some might think — even when big data analysis and artificial intelligence come into play. New or modernised process plants should be fun places to work: they are equipped with reliable instrumentation; the latest control engineering makes operation easier; and ideally, they feature marking and wireless solutions that mean maintenance and inspection rounds can be documented electronically.

If you stop improving...

Now it's time to take the next step. A functioning, safe plant is the compulsory component. As for the additional element, over the years this has turned out to be a plant that offers high availability, where the equipment never has to undergo unscheduled maintenance, and which never fails at short notice. This may still satisfy the judges today, but in the global race for competitive product prices, it is the most efficient processes that will sooner or later win the race. And process owners cannot afford to ignore, in addition to the basic features already mentioned, commodities that they already have access to tons of: data, information and knowledge. Knowledge, if used correctly, can lead to even greater plant efficiency, even better safety and even higher reliability. So utilising the additional data becomes compulsory — in the medium term even in plants where, until now, highly qualified personnel with a great deal of skill have been teasing out every last drop of efficiency and thus creating a

competitive advantage. But due to skills shortages and demographic changes, this advantage will not last.

It's something that every plant operator is familiar with: they have been installing expensive fieldbus or HART-compatible measuring devices for years, which constantly provide more data in addition to the actual measured values. But, with the exception of some basic diagnostic data, the vast majority of this information is never used. It could do so much more; but where to start?

Start where it counts! A diligent analysis of any weaknesses simply cannot be avoided if an operator wants to improve things and use the available resources wisely and effectively. The good news is that some things can be set in motion with relatively little effort and expense. The analysis could start with the emergency showers and end with the rotating equipment, or start with the neglected manual valves, whose position is still recorded on a piece of paper... the list goes on. The team will definitely know where the recurring snags are, where additional monitoring would be appropriate or which variables that are already being recorded just need to be analysed properly. In fact, plant users, maintenance engineers, automation technicians, logistics specialists and process experts all have their own particular view of things — and their own particular needs when it comes to supplementary information.

Artificial intelligence and mass data: a fertile partnership

Many plants have a huge variety of diagnostic information available, but it is not all useful to the various user groups. Many monitoring solutions simply serve to notify the maintenance team of a malfunction, but there are also some application areas, such as motor monitoring, where the data from just one or a few machines does not provide the maintenance engineer with enough information to draw up a maintenance schedule.

Operating pumps or compressors, in particular, generate a huge amount of data,



Rotating equipment is subject to mechanical strain and therefore at risk of failure. Big data analysis and AI turn countless items of process and monitoring data into a reliable, forward-looking maintenance schedule.



Pipelines can also be monitored, via GSM, for example. This enables damage to be located quickly.

which must then be analysed in a time-consuming process. The operator gets the most benefit from this if the data is not just sent to the on-site notification system but is made available to a cloud platform, together with data from thousands of other pumps. Patterns can then be identified and investigated. Ultimately, artificial intelligence can turn a heap of measured data relating to vibrations, performance and other parameters into reliable predictions: when will which pump sustain what damage? When is

maintenance the appropriate course of action, and when a replacement? Data from the many becomes knowledge and advantages for all. Many pump providers have picked up on the potential here and are now offering corresponding online services, often linked to maintenance services.

The endless computing capacity that the internet is able to harness through outsourced cloud services enables it to provide predictive maintenance better than any on-site control system or application

could. But it is by no means always necessary to get the internet and artificial intelligence on board in order to make process plants more user-friendly and efficient to run. For other plant components, such as trace heating, you might simply want to know: does it still work? And for that, you don't need to analyse massive amounts of data. Monitoring — by measuring current, for instance — would be easy; whereas a failure noticed too late could be catastrophic.

Emergency shower alerts paramedics: data analysis can save lives

An emergency shower that is in good condition can save lives; no-one in need of emergency assistance would want to find out that it just happened to have failed right after the last regular inspection. What's more, this piece of first aid equipment is a good example of how not all information is equally important to everyone. The maintenance team needs to know whether or not the equipment is working; but if an emergency shower is activated, first aiders and paramedics need to get that information immediately.

So many different monitoring applications means that there is a need for one common thread: all roads lead to OPC UA. This open interface standard is a vendor-independent solution for data exchange — no matter whether it is HART data from the field device, the water pressure of the emergency shower or mass data from pumps. With OPC UA, the data is made available to whatever system needs it — be that the cloud, a local maintenance tool or a separate alarm system.

NOA and OPA need time. Brownfield plants cannot wait

Of course, one can throw money at the problem and assemble a large workforce to carry out additional monitoring and optimisation tasks. Structures such as those put forward by Namur (NOA, Namur Open Architecture) or Exxon Mobile (OPA, Open Process Automation) can be helpful here. Both approaches enable extra sensor signals to be retrieved via an open interface such as OPC UA, and several large corporations are currently in the process of laying the



Is the hand valve open or closed? Uncertainty breeds risk. Automatic recording is safer.

foundations to do just that. But for countless smaller firms, these approaches still seem a long way off.

But that doesn't have to be the case: every plant operator can do something for the availability of their plant and improved maintenance processes — and not necessarily just by shifting everything to the cloud. Where it is appropriate, plant operators could indeed do this with modest means, by dedicating a portion of their maintenance budget to it. If a plant already has full-coverage WLAN and performs paperless inspection rounds, it is not far away from taking the next step of introducing augmented reality to assist its fitters. And if this can be combined with a predictive maintenance solution, great! Then the maintenance engineer will not only be provided with the best possible support when servicing a pump, he will also be automatically guided to a unit which would fail sooner or later without his attention.

Monitoring wells: the maintenance team has better things to do

Big data analysis makes sense when it comes to pumps, because generally speaking, one should pay particular attention to the rotating equipment that is responsible for 50% to 60% of all unscheduled plant failures.

This is true for many plants, but not all however. For example, lots of maintenance teams in oil and gas spend a great deal of time regularly inspecting all the wells and shafts. But there is a simple solution that offers an alternative means of continuously monitoring the shaft, and which reports both

unauthorised opening and the level within the shaft. All it takes is one measuring device with a modem and a battery — the staff just have to pop by every six months to change that battery. Even better: personnel will be notified when it is time to carry out this task.

It is just as easy to monitor whether hand valves are in the open or closed position. Simple technical solutions are all that are needed to record the end position, based on a NAMUR limit switch, for example. The signal can be transmitted into the control system wirelessly, so errors made by production workers, whether from actuating the valve incorrectly or simply neglecting to enter information in the software, can be avoided.

Sending diagnostic data to the cloud! Untapped HART data is yesterday's news

Things become much more complex if a plant operator wants to squeeze maximum availability from valves and positioners, since these provide hundreds of items of diagnostic information that cannot be so readily assigned to an ageing process. But there are software tools that can make reliable predictions based on mass data analysis. If the provider of such a tool is granted access to the HART signals of all positioners, the software can warn of leaks or a deteriorating valve lift in good time. An app, which each user pays just a small fee for, facilitates the scheduling of maintenance work, thus optimising system availability.

The majority of field devices make diagnostic information available via HART, but this data is hardly ever utilised. Now this could finally change, thanks to digitisation and Industry 4.0. The computing capacity of control systems or a maintenance tool is necessarily limited, and systems are often not up to date — and there could be years to wait until the next migration. But in the cloud, things are different — even in a public cloud.

Network intelligence for columns! When APC reaches its limits

Networked intelligence could revolutionise how distillation columns are controlled, for example — an issue that, despite all the progress made with Advanced Process Control, has still not been solved satisfactorily. If technical specialists had access to all available variables and disturbance variables, they would be able to create the ideal closed-loop control. All they need are these variables and enough computing capacity. An IIoT gateway gives them access to both. Any online services the IT experts like can be used on the internet or an intranet. Some new setpoints are returned, eg, as Profinet variables or as a recommended action, depending on the application. Taking pump analyses as an example, diagnostic data is fed into the network as big data, and what comes back is this: please replace pump 27 within the next three months.

Even weather events can be accessed by the automation or control system, no matter how old it is. Gone are the days when personnel at the control board always had to keep one eye on the weather radar and adjust the system in response to every unusual weather event. In future, the weather forecast can be used as an online service; the plant will adapt automatically to strong rain from the west or a cold front from the north-east. Weather events become process variables. Other potential applications will be a welcome playground for IT and automation graduates joining the industry today.

Phoenix Contact Pty Ltd
www.phoenixcontact.com.au

HOT PRODUCTS

ON WWW.PROCESSONLINE.COM.AU THIS MONTH



UNIVERSAL FLOW METER

The AptiFlow is a universal flow meter designed to measure liquids, gases and vapours in a wide range of applications.

AMS Instrumentation & Calibration Pty Ltd

<https://bit.ly/2AteIcv>

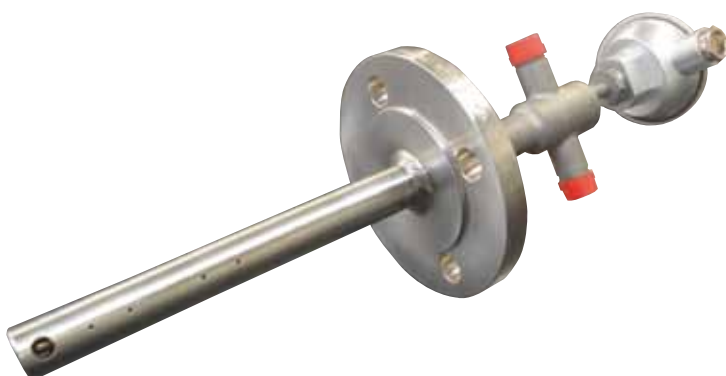


CORDSETS FOR FOOD AND BEVERAGE

Pepperl+Fuchs' latest range of hygienic cordsets offers smooth and easy-to-clean surfaces tailored to food production.

Pepperl+Fuchs (Aust) Pty Ltd

<https://bit.ly/2PCMdOu>



EMBEDDED SYSTEM WITH AI CAPABILITY

The ABOX-5100 Series is powered by a new generation CPU with AI GPU compute functionality, the AMD Ryzen.

Backplane Systems Technology Pty Ltd

<https://bit.ly/2OQEDUe>



MANAGED ETHERNET SWITCH

The MLB-E4202 is an industrial 10-port managed Ethernet switch with eight Gigabit auto negotiating copper RJ45 ports and two SFP 100BaseF fibre ports.

Interworld Electronics and Computer Industries

<https://bit.ly/2ArTsnb>



Dust and buildup on the antenna? No problem!

The future is 80 GHz:
a new generation of radar level sensors

VEGAPULS 69 is designed specifically for level measurement of bulk solids. Even in dusty conditions, it always provides precise readings. Dust in the silo or buildup on the antenna have no effect.

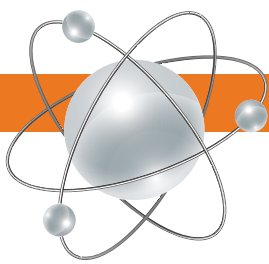
This radar sensor also features unrivalled focusing at a frequency of 80 GHz. Simply world-class!

www.vega.com/radar



Wireless adjustment via Bluetooth with smartphone, tablet or PC. Compatible retrofit to all plics® sensors manufactured since 2002.





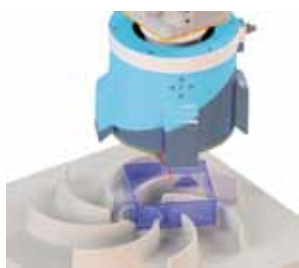
The robot eye with an all-round field of view

Where am I? Like humans, robots also need to answer that question, while they tirelessly glue, weld or apply seals to workpieces. After all, the production of precision products depends on robot control systems knowing the location of the adhesive bonding head or welding head to the nearest millimetre at all times. This means the robot needs some sort of eye. In the automotive industry and many other sectors, specialised sensors perform this function, most of which operate on the principle of laser triangulation. A laser diode projects a line of red light onto the workpiece, from which the light is reflected at a specific angle before being detected by a camera. From the position of the light striking the camera chip, the position and distance of the sensor with respect to the workpiece within the coordinate system can be calculated.

However, there is a problem with such systems: "Shadowing effects limit the flexibility of existing sensors," said Mauritz Möller, head of the additive manufacturing systems department at the Fraunhofer Research Institution for Additive Manufacturing Technologies IAPT in Hamburg. "They also restrict the freedom of movement of the robot systems and integrating them is very labour-intensive."

The only way to measure height with conventional sensors is to mount them along the direction of processing. With these sensors, however, the robot is blind when it changes its direction of movement. Having to predefine the processing direction significantly limits the flexibility of the handling systems. The only alternatives are to use several sensors or additional axes — either of which, given today's state-of-the-art technology, can sometimes cost more than the robot itself.

Mauritz Möller and his colleagues Malte Buhr, Vishnuu Jothi Prakash and Julian Weber have developed an innovative solution called SensePRO. This compact sensor system measures



The SensePRO sensor provides a 360° all-round field of view.
© Fraunhofer IAPT.

15 cm in diameter and is equipped with specially developed image processing algorithms, thus providing a shadow-free all-round field of view, and generating a 360° measurement field, offering complete flexibility with regard to the direction of measurement. No matter where the robot moves, at least one laser line is always optimally positioned, supplying precise positional information to the camera.



Conventional sensors limit the directional flexibility of robots.
© Fraunhofer IAPT.



This approach also solves another problem — shadowing of the laser light by components with complex shapes. The researchers have now patented the technique. No additional programming is required to integrate the new sensor system in existing robot systems. It can be employed completely flexibly and, above all, reliably in all adhesive bonding and welding processes. The technique significantly simplifies process control and quality assurance — with just one sensor.

To operate over long periods in harsh production environments, the sensor contains a cooling module, which utilises either water or air. To enhance cooling, the optical bench on which the laser diodes and cameras are mounted has an internal cooling structure. Due to its highly complex shape, the only way to produce it is by 3D printing. This intelligent thermal management system extends the sensor's service life. The sensor is designed to fit robots made by all leading manufacturers, from Kuka to Fanuc, and is well suited for any conceivable application scenarios. As a result, it can be easily integrated into existing production systems.

SensePRO is expected to be ready for full-scale production in 2021. Since no competing systems are currently available, SensePRO has a good chance to successfully establish itself in the rapidly growing industrial robot market. In Germany, around 1300 new robots for welding or adhesive bonding applications that require such a sensor are sold every year.

For Mauritz Möller and his colleagues, the aim of the project is to assess how SensePRO might be commercially exploited, for example, in a spin-off. With this in mind, the four pioneering researchers have applied for and received approval for EXIST funding. The Federal Ministry of Economic Affairs and Energy's EXIST program supports start-ups from universities and research institutions individually with up to one million euros in funding.

Fraunhofer Research Institution for Additive Manufacturing Technologies IAPT

www.futuream.fraunhofer.de/en/partners/Fraunhofer_IAPT.html



DRIVING YOUR INDUSTRY 4WARD.

THIS IS **SICK**

Sensor Intelligence.

Industrial automation is changing at an extremely rapid pace. As an innovation leader, developing cutting-edge sensor technology, SICK offers solutions today that are ready for the challenges of the future. With intelligent sensors that collect data, evaluate them in real time, adapt to their environment and communicate in the network. Enabling a new quality of flexibility, networked intelligence for efficient processes and reliable cooperation of humans and machines. We think that's intelligent. www.sick.com.au

CLOUD-BASED ANALYTICS SOLUTION

Seeq Corporation has announced the availability of its advanced analytics solutions delivered via software as a service (SaaS) on Microsoft Azure. Seeq enables engineers and scientists in process manufacturing organisations to rapidly analyse, predict, collaborate and share insights to improve production outcomes.

Seeq is already run by its customers on Azure and includes support for Azure-specific features such as Azure Directory Service. Seeq will now offer its SaaS application on Azure to address customer interest in cloud-based analytics solutions.

Recent releases of Seeq have focused on enabling larger deployments through scalability features, and making the Seeq applications easier to use. R20 features, recently released, include the ability to have live updates to Seeq Topics, which publish insights from Seeq to other users; expanded machine learning functionality for users doing predictive analytics with Seeq; and an improved query model for users accessing contextual data from SQL-based data sources to provide faster connections to big data sources.

Seeq partners with many leading process automation firms including Emerson Automation Solutions, Inductive Automation, Honeywell, Schneider Electric and OSIsoft.

Seeq also supports all leading data historians. Supported historians include the OSIsoft PI System, GE Proficy, AspenTech InfoPlus (IP) 21, Emerson DeltaV Continuous Historian and Ovation DCS Historian, Honeywell Uniformance PHD Historian, Rockwell Automation FactoryTalk Historian, Inductive Automation's Ignition Historian, DataParc Historian, Aveva's WonderWare Historian, Citec SCADA and eDNA Historian.

Seeq Corporation

www.seeq.com



INCREMENTAL ENCODERS

The Posital IXARC incremental encoders are now available with a housing that features a cable entry angled at 45° to the device axis. This compact design combines features of both axial and radial cable entries in a single unit, providing the installer with more flexibility when laying out the connection cable.

The core magnetic measurement technology is said to be rugged and accurate, with high dynamic response. A wide variety of flange and shaft configurations is available, reducing the need for costly adaptors or workarounds. A water- and dust-tight grommet around the cable entry ensures that these devices meet IP65 level ingress protection. The housing is 36 mm in diameter and 32 mm long.

IXARC incremental encoders are programmable, and resolution can be set anywhere from one to 16,384 pulses/turn in software without requiring any changes to the mechanical properties of the device. Similarly, pulse direction and the output driver — either push-pull (HTL) or RS422 (TTL) — can be defined through software parameters. Changes can be made quickly in the field or in the shop using Posital's UBIFAST programming tool.

Plant Control & Automation

www.pca-us.com.au

RUGGEDISED GPU COMPUTING PLATFORM

The Nuvo-7160GC rugged GPU computing platform from Neosys Technology supports Intel's 8th generation processors and up to a 120 W NVIDIA GPU.

The Nuvo-7160GC is a ruggedised GPU-aided edge computing platform designed for modern machine learning applications such as autonomous driving, facial recognition and machine vision. It supports up to a 120 W GPU, delivering 4–6 TFLOPS computing power for inference, as well as an Intel Coffee Lake 6-core/12-thread CPU, offering up to 50% CPU performance enhancement over previous versions.

Due to Neosys' Cassette Design and ventilation mechanism, Nuvo-7160GC can effectively dissipate

the heat generated by the GPU. By introducing the guided airflow from intake to exhaust with powerful fans featuring smart fan control, it allows a 120 W GPU to operate at 60°C ambient temperature under 100% GPU loading.

This system incorporates rich I/O functions such as USB 3.1 Gen2/Gen1, GbE, COM and MezzIO interface in its restricted footprint. It also leverages M.2 NVMe SSD Technology for over 2000 MB/s disk read/write speed or Intel Optane memory.

Backplane Systems Technology Pty Ltd

www.backplane.com.au



GRP ENCLOSURES

Pepperl+Fuchs' GR Series glass fibre reinforced polyester (GRP) enclosures have international approvals for a wide range of applications, while the unique housing design also simplifies installation and maintenance.

A DIN rail mounting grid (10 mm) enables unlimited mounting options and special spacers allow components to be installed at different heights in a single housing. Its design opens up a range of applications; an expanded temperature range down to -60°C makes applications in harsh environments possible and offers an alternative to expensive stainless steel enclosures.

Rugged hinge accessories and entry points for screwdrivers make it easier to open the enclosure lid, simplifying maintenance of the explosion-proof terminal boxes or control stations. Edge protection prevents damage to the gasket and rugged hinge accessories simplify maintenance. The integrated edge protection allows enclosures to be stacked safely and prevent damage to the gasket during maintenance, ensuring that the IP protection remains effective. Decoupled installation steps allow even large and heavy enclosures to be installed by just one person.

Pepperl+Fuchs (Aust) Pty Ltd

www.pepperl-fuchs.com



HYGIENIC CONDUIT AND FITTINGS

ABB has developed the JFBD nylon conduit to feature a corrugated design especially for the food and beverage industry. To meet ever more stringent demands for rapid and effective washdown, the JFBD conduit incorporates for the first time an over-extruded non-porous smooth jacket, delivering further enhanced cleanability alongside resistance to aggressive chemicals to ECOLAB standards.

The IP69-rated PMA cable protection range for the food and beverage industry offers a choice of two high-specification fittings. The JKNH nylon fitting is made from FDA-compliant material and offers both chemical resistance and quick installation without the need for tools. The JENQ single-piece fitting is made from 316L stainless steel and is suited to areas with the highest hygienic demands.

Treotham Automation Pty Ltd

www.treotham.com.au

Ready for the field?





AMS INSTRUMENTATION & CALIBRATION PTY LTD

Phone: +61-3-9017 8225
 Fax: +61-3-9729 9604
 E-mail: sales@ams-ic.com.au
 Internet: www.ams-ic.com.au

Being a field calibration technician is a tough job: you need to have many skills and carry multiple devices, environmental conditions can be challenging and constantly changing, documentation of data takes time and is difficult in the field and work efficiency requirements are demanding. However, having the right gear makes the work much easier and also more efficient. Learn more at beamex.com/readyforthe field



ISA
Strategic
Partner
Calibration



beamex
WORLD-CLASS CALIBRATION SOLUTIONS

www.beamex.com
info@beamex.com

THE BENEFITS OF ON-SITE HEAT AND POWER GENERATION



Sustainability has never been higher on the agenda for food and drink companies than it is now. Not only does operating in an ethical and environmentally responsible way make sense for both planet and pocket, but it's clear that this is what consumers want too. Research in the UK has revealed that 92% of shoppers think food companies should focus their efforts on securing the future sustainability of food, with many also believing that farmers should be paid more for their produce. So what more could Australia's food producers be doing to increase their sustainability credentials?

Making the most of waste

In recent years, some of the country's most forward-thinking food companies have developed a truly circular approach to resource use. Alongside minimising the volume of waste they generate, they are also turning the unavoidable fraction that does occur into renewable energy, for use in their on-site operations. Anaerobic digestion (AD) — in which organic matter is naturally broken down to produce energy and biofertiliser — has taken big strides in Australia over recent years, with more than 240 AD plants now in operation.

While the majority of the country's AD facilities process landfill, wastewater or agricultural feedstocks, a number are on site at industrial plants. These use waste from red meat processing and rendering, but the potential for the food industry to expand in this area is huge; making use of a variety of process residues, such as vegetable peelings, liquid malt waste and distillery by-products. The benefits for the companies operating these plants are multiple: reduced waste disposal costs; reduced energy costs; security of energy supply, with reduced reliance on fossil fuel-derived power; carbon mitigation; superior green credentials; and creation of a nutrient-rich biofertiliser. Furthermore, the fact that these plants have an on-site use for the power they produce means they are less affected by changes to state and federal legislation on renewable energy.

Take the heat

However, any AD facility that wants to maximise its return on investment also needs to be making use of its full heat output, not just its power output. The AD process generates plenty of surplus heat — most commonly heat produced by biogas combustion in a combined heat and power (CHP) unit, and also via digestate pre-heating, pasteurisation, biogas upgrading to biomethane and in digestate concentration. Ensuring this heat is used either within the AD process itself or within other on-site operations can make a big difference to a plant's efficiency and therefore profitability.

By using heat exchangers within an AD plant, surplus heat can be taken from one process or place and transferred to another. Two of the most common types supplied to AD plants are plate heat exchangers and tubular heat exchangers; however, there are many different models and refinements and it is advisable to consult a specialist who can explain the benefits of different types and perhaps offer different solutions.

Potential uses for heat in the AD process

When it comes to making full use of the heat, there are a number of options within the AD process itself, including the preheating feedstock; for pasteurising; to reduce the volume of digestate; or to upgrade biogas to biomethane. For on-site plants within the food industry, it can also be used for space heating, cooking, heating liquids, or pasteurising and sterilising foodstuffs. In addition, large sites may have significant office and staff facilities, where there may be the scope to install heating systems.

As the demand on resources increases, there will be a greater need for food companies to demonstrate sustainability across all areas of their business. On-site AD, where full use is made of both the heat and power generated by waste materials, offers an obvious solution.

Matt Hale is the International Sales & Marketing Director for HRS Heat Exchangers



2D/ 3D Laser Profile Scanner for Welding Quality Inspection



Highest Performing Profile Scanner with respect to accuracy and measuring rate

Compact, Integrated Intelligent Controller for detection and evaluation of different surfaces

Optional **Blue Laser** technology offers higher focused, higher resolution measurement for finer details with maximum precision. Also enabling a more reliable measurement on organic, red-hot glowing and transparent objects

To find our more, please visit our website at <https://www.bestech.com.au/laser-profile-scanning-2d3d/>

OR Contact us below

Email: enquiry@bestech.com.au

Phone: (+61)3 9540 5100

**GLOBAL TECHNOLOGY
LOCAL SUPPORT**

BESTECH
Sensors & Teaching Equipment



ADDRESSING THE CHALLENGES OF ONLINE MONITORING

Online condition monitoring involves a number of challenges aside from data collection: data management, analytics and systems management.

According to the Electric Power Research Institute (EPRI), online monitoring is the implementation of applications for monitoring, maintaining, and optimising assets from a centralised location. Such monitoring becomes necessary in today's fast-evolving global economy for companies that rely on assets as they face increasing reliability concerns. Unexpected downtime and maintenance can lead to significant cost and safety repercussions that can easily affect a company's bottom line.

More than ever, organisations need a dependable maintenance program that helps alleviate risks and can lead to millions of dollars in return on investment.

Reliability engineers and maintenance professionals are keenly aware of the optimal balance of plant safety, reliability, and financial returns. They know they must deploy maintenance strategies that address these three objectives:

- **Increase revenue** through the maximum uptime and optimal efficiency of machinery. With properly functioning assets, organisations can achieve maximal output within the constraints of the facility.
- **Reduce costs** by minimising downtime and scheduling maintenance only when necessary. Being able to identify developing issues

with enough lead time to properly schedule maintenance during planned downtimes allows maintenance managers to optimise the workforce and increase the mean time between failures.

- **Reduce risk** and increase safety through decreased worker contact with large, dangerous machines in potential hazardous environments. In addition, properly functioning machines can remove uncertainty in business operations, which prevents catastrophic failure and unforeseen outages.

Challenges in today's plant and asset maintenance

As maintenance managers build a maintenance strategy, they are challenged to address each of these objectives without spending more on a maintenance program. They report difficulty in finding enough experienced equipment specialists, spending too much time collecting data versus analysing it, feeling discouraged with inconsistent diagnostics and a lack of insight into overall reliability, and working with new technology that is more complex, expensive, and difficult to maintain. Often plant systems are custom-made packages. But over time, sustaining a custom package can be trying, especially when maintenance managers have limited resources.



As assets grow more important to the performance of a facility, maintenance managers use technicians to collect asset condition data through manual, route-based measurements. This data provides the context necessary to better understand asset health and allow organisations to schedule maintenance when necessary. As the number of assets that demand this attention grows in the facility, these technicians are spending upwards of 80% of their time collecting data and 20% analysing it to determine the root cause of issues. Further studies by the International Data Corporation (IDC) show that only 22% of data stored digitally is documented well enough to be analysed and that as little as 5% of data is actually analysed. In addition, organisations are finding it more challenging to locate, hire, and train new equipment specialists while today's experts are retiring at a rapid pace.

According to a survey performed by Allied Reliability Group, a global maintenance, reliability, and operational consulting organisation, 78% of maintenance managers are not happy with their current maintenance approach. Despite expending too many resources, organisations still failed to produce results that predicted equipment failures, and unexpected asset failures still occurred. The reality of budget cuts, workforce gaps, ageing equipment, expensive technology, and shrinking profit has forced maintenance managers to seek new technologies that allow organisations to scale and prevent costly failures in the future. This can be especially daunting as technology ages because plants and enterprises require systems that can accommodate needs for years to come. But on

the business side, plants and enterprises are constrained because monitoring systems are tied to equipment providers. So the trend is to seek platform solutions that are independent of equipment providers, thereby gaining the flexibility to have one system that can monitor equipment from any supplier and then integrate this for accurate diagnosis.

Gaps in current technology

Today, packages custom-built for the plant feature monitoring functions but lack flexible processing capabilities or I/O count. Or, on the other hand, they offer I/O count but limited programming options to customise the system behaviour.

As utilities and enterprises move toward centralised monitoring, the integration of advanced monitoring applications with existing monitoring efforts enables a plant-wide view of operations and maintenance along with the back-end integration into the enterprise. This can help reliability and maintenance managers achieve the optimal balance of safety, reliability, and cost returns.

Benefits of online monitoring

Managers need a predictive maintenance strategy that integrates with existing enterprise infrastructure and automates the collection of data on more assets to predict asset failure in advance of catastrophic and costly repairs. This strategy involves data acquisition and analysis systems that continuously acquire and compare key measurement indicators, such as vibration and power consumption, in order to baseline normal behaviour to pinpoint any equipment health degradation. When the systems detect this, they immediately alert operations staff to examine the issue. These condition indicators can help influence decisions about when to perform maintenance, which can lead to more revenue, reduced costs, and advance warning of impending risks of failure while increasing safety.

Companies are discovering that predictive maintenance strategies are a superior approach. EPRI compared the maintenance costs for a pump in US dollars per horsepower (hp) and found that a predictive maintenance strategy was the most cost-effective at only \$9 per hp. When compared to a scheduled maintenance strategy at \$24 per hp or a reactive approach at \$17 per hp, predictive maintenance offered attractive financial benefits and all but eliminated the risks of secondary damage from catastrophic failures. In addition, McKinsey & Company stated that organisations who use data and analytics in their operations can deliver productivity and profit gains that are 5% to 6% higher than the competition.

Though the financial benefits are attractive, additional industry trends such as lower cost sensors, automated monitoring systems, and the emergence of intelligent analytics are also fuelling the adoption of automated solutions for online monitoring.



Equipment monitoring systems are used to detect trends and anomalies for accurate diagnosis.

When compared with other maintenance approaches, online monitoring and diagnostics for predictive maintenance offer the following benefits:

- **Workforce optimisation:** Online condition monitoring helps ensure that the limited specialised personnel are spending maximal time on the highest value tasks such as assessing required maintenance rather than low-value tasks such as traveling to assets, setting up tests, and recording data.
- **Fewer gaps in data:** Online condition monitoring ensures data accuracy and provides continuous data collection. Manual measurements offer only a few snapshots of manually recorded data for any given asset every month, if any at all, which increases the possibility of data errors or missed events.
- **Improved diagnostics:** By using a single database with online condition monitoring, more historical trend and baseline data is available for predicting faults with greater statistical significance. This ensures consistent analysis and eliminates reliance on the experience and knowledge of an equipment specialist.

These online condition monitoring systems provide the greatest insight into overall reliability, which helps companies thoroughly understand their operations and make business decisions.

Top considerations

Before choosing a condition monitoring system, maintenance managers need to understand which assets and which failure modes should be monitored. They must make decisions based on the breadth and number of assets and the types of measurements needed to detect the failures.

Once the assets and necessary measurements have been identified, maintenance managers should consider the following when choosing a vendor for a condition monitoring solution:

- The ability of the solution to scale with evolving needs, such as support for new types of algorithms, a wide variety of I/O and emerging sensors, and expansion to large numbers of systems.
- An openness that allows for access to the raw engineering measurements so new and innovative analysis techniques can be adapted and the solution can be extended to meet the maintenance program requirements.
- Interoperability with third-party hardware and software packages so the solution can integrate with existing CMMS and

ERP systems and any data historians or process management enterprise software used.

- Rugged mechanicals and a breadth of available analysis algorithms.
- A monitoring hardware and software solution for a price that allows for the solution to scale to a larger percentage of fleet assets.
- The services to help facilitate the end-to-end solution from asset to IT infrastructure, either directly or through a network of partners.

When implementing an online condition monitoring system, there are three main technology factors. The first is data management, which involves using an appropriate data structure, database considerations for easily mining data, alarming capabilities, and the implementation of an ageing strategy to manage data volume.

The second is data analytics, which includes application specific algorithms and higher level predictive analytics or prognostics. It involves both real-time decisions and embedded intelligence closer to the sensor source and performing data analytics on servers using aggregated data from multiple assets.

As the number of data acquisition or monitoring systems increases, data management and analytics grow more complex. Then a third consideration becomes increasingly important: systems management. Remotely managing large numbers of monitoring systems helps to increase reliability, serviceability, and availability of the overall solution. These capabilities should help perform tasks such as viewing the health of asset monitoring systems, connecting to the network and acquiring accurate data, and remotely configuring channels and analysis functions.

Taking the next step

With online condition monitoring, organisations can achieve better insight into the health of their assets. They can use this data to drive predictive maintenance programs, which allows maintenance managers to schedule and plan maintenance only when necessary. This leads to more revenue, reduced cost, and advance warning of potential failures while increasing safety.

National Instruments Aust Pty Ltd
www.ni.com



PROPORTIONAL VALVES

Moog has launched an updated version of the D680 Series Proportional Valves — throttle valves for 2-, 3-, 4- and 5-way applications — suitable for electrohydraulic position, velocity, flow and force control in hydraulic systems. The D680 product range has integrated electronics and is suitable for applications with high dynamic response requirements.

The newly launched version in this series is a two-stage valve with a closed loop controlled D633 direct drive servo valve as the pilot stage.

This latest version provides increased dynamics and repeatability, and is more robust than the existing version, making it suitable for use in more demanding environments.

The D633 direct drive servo valve pilot stage with open loop control has been available for many years. Moog developed the new version in conjunction with machine builders in the plastics metal forming, presses and steel production sectors, better to meet the needs of these applications.

The Moog D680 Series Proportional Valve series is a design that provides repeatable control for machinery in industries such as injection and blow moulding, die-casting, steel production, metal forming and presses and timber processing. The range can be easily integrated in new designs and configured to meet the exact application and performance requirements of industrial machinery and equipment.

Moog Australia Pty Ltd

www.moog.com

Troubleshoot PROFIBUS Networks Through Stand-Alone Operation

Rent the Softing PROFIBUS Tester 5 from TechRentals

Combining a signal tester, storage oscilloscope, protocol analyser, master simulator, and cable test, the PROFIBUS Tester 5 is an 'All-In-One' diagnostic tool. It is battery-powered making it convenient and reliable, without the need for additional power supply. Test results are presented through a simple graphical display providing users with comprehensive outcomes.

Features:

- ✓ Test report generation
- ✓ Quick Test & User-Controlled Test
- ✓ Suitable for users of all experience levels
- ✓ Automatic baud rate detection from 9.6 kbit/s – 12 Mbit/s



LEARN MORE



1300 767 071

rent@techrentals.com.au

www.techrentals.com.au



TR2063



Brewery finds itself ahead of user requests

It's a strange problem when an IT department can put too many features on the system. Usually, it's the other way around: more often than not, it is the IT department that is overwhelmed with requests.

"We find that we can overload our users with new features," said David Lewis, business analyst for Sierra Nevada Brewery Co. "It's so easy to build stuff, we're way ahead of the user-curve. We have found that we have to wait for them to digest what we've built, and then wait for them to start asking for more."

Sierra Nevada Brewery Co is the sixth-largest brewery in the United States. Its beer is produced exclusively in Chico, California, and is distributed in all 50 states and exported to Europe and Asia. Its flagship product is Sierra Nevada Pale Ale, complemented by a year-round program of seasonal and specialty beers.

Lewis explained that before implementing Inductive Automation software, there had been a lot of requests — and those requests took a long time to develop. Accessing production system data was the biggest IT development hurdle. After implementing the new software, data was easily obtained from anywhere in the plant.

"Now, all of a sudden the data is all there," Lewis said. "It's the keys to the kingdom: we've now been able to manage some pretty heavy workflow problems."

But it wasn't initially easy to find those keys to IT bliss. Anytime IT makes a decision to put new software on a system, they need to proceed with caution to ensure no disruption to the plant's production.

"We approached the software with scepticism," Lewis explained. "There was no support among our automation engineers for using it as a control system for both philosophical and practical reasons: philosophically, because we treat our control system as a standalone system — completely unconnected from any other network — and practically, because our corporate Windows-based PC network had such a rotten reliability record."

"Fermentation is a 24/7 process, so our plant controls staff were in no mood to introduce Windows-style downtime to their lives. The Inductive Automation software was so inexpensive, however, that we decided to try it for data acquisition and production reporting — two areas where there were no good alternatives on the market."

The first experience with the software proved to be very user-friendly.

"It was easy to configure," explained Jonathan Swisher, system developer. "The reason it is easy is because I only had to install it on the server: it took me almost no time. There are no clients to install individually."

From a technical knowledge perspective, Swisher said the software had a very easy learning curve. It's familiar to individuals trained in standard office technology such as web, Java, SQL databases, etc.

"Most of it seemed intuitive," Swisher explained, referring to Inductive Automation's Jython scripting. "All the functions are well documented. Python is clean and concise, which makes Jython really familiar, and super easy to learn."



System developer Ron Mayfield said that various interactions with the company's SQL database had always been problematic in the past. When they rewrote all of the data to go through Inductive Automation's software, life got easier.

"Once we realised that this was possible — to work with the PLCs and other SQL production databases — we found we could bring it all together and put it on one screen," he said. "That kind of synergy of info was previously off-limits."

They could now help all departments communicate seamlessly. One example he gave was their filtration-to-packaging workflow.

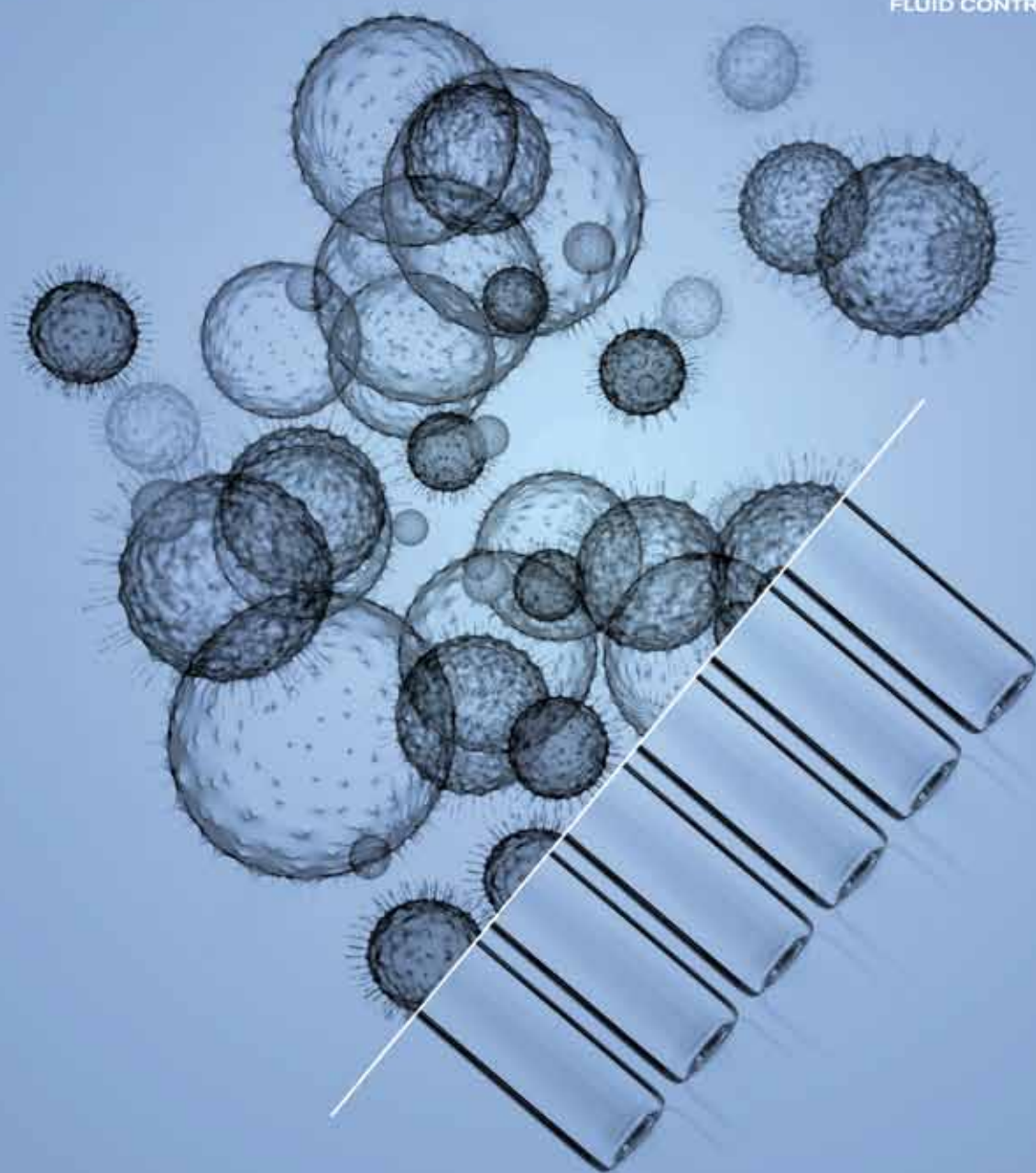
Before a tank of beer is ready to be packaged, it has to be processed by the filtration department and then sampled and tested by the lab. Test information was then handwritten onto a series of whiteboards around the plant. They faced a very simple problem: as the plant grew, people had to remember to write that information down in more and more places — a round trip of nearly half a mile.

Now, with web-launched client screens bringing together PLC data (tank statuses, etc), lab test data (from lab devices) and workflow data (approvals, comments, out-of-spec alerts), all the information is now available through any PC in the plant.

Lewis, Mayfield and Swisher agreed that changes aren't always easy. Especially when the IT department can make more features than their users can take in at a time. They've actually had to slow down the pace of how many features they add to the system, just so users get a chance to accept the new changes.

"But I think everyone agrees that the changes are good," Lewis said. "We're a growing company. Five to ten years ago when we had to make a production decision, we would simply walk over and talk to someone... but now you can't always find that person. Using Inductive Automation's software, we can always find the screen. Operation is much easier than before."

ESM Australia
www.esm.com.au



Stem cells and ampoules? The picture shows two success stories. Each originates in a different industry; each begins with a very specific fluidic challenge. But they have something important in common: In the end, the microfluidic task is mastered with precision – whether you work with stem cells or dose in microlitres. Find out more about our intelligent solutions and let yourself be inspired:

[www.burkert.com/
our-stories-have-flow](http://www.burkert.com/our-stories-have-flow)

We make ideas flow.





RFID MODULE WITH OPC UA

The TBEN-L5-4RFID-8DXP-OPC-UA is a compact RFID module with an integrated OPC UA server. Part of the TBEN-L range, this variant paves the way for increased operational efficiencies for product identification and tracking applications. Up to four Turck HF and UHF read/write heads — as well as sensors and lights — can be connected via eight digital I/Os.

The module is suitable for applications involving logistics, assembly and handling, and tool monitoring. The fully encapsulated housing and IP67/IP69K rating also allow use in harsh environments. The TBEN-L5-4RFID-8DXP-OPC-UA provides large volumes of data quickly and simply without requiring fragmentation or a reduction of the data volume. Additionally, the module supports optional commands from the Companion Specification, such as lock, kill and password functions for UHF.

OPC UA (Open Platform Communication Unified Architecture) is a global industry protocol for use on any platform or device, regardless of operating system or programming language. The protocol offers numerous advantages, including direct provisioning of information to higher-level systems (MES, ERP, Cloud, PLC, etc); a simple and seamless integration process, independent of manufacturer or platform; and built-in security protocols to protect data from unauthorised access.

Turck Australia Pty Ltd

www.turck.com.au

POWER SUPPLIES

The Phoenix Contact Quint Power range has been expanded with three devices including a 12 V unit with an output current of 15 A and two 48 V units with output currents of 5 and 10 A.

The SFB Technology delivers six times the nominal current for up to 15 ms and selectively trips miniature circuit breakers. Loads connected in parallel continue working. System expansion is simplified due to the static boost function, which continuously provides up to 125% of the nominal current. With up to 200% of the nominal current for 5 seconds, the dynamic boost function allows for the start-up of heavy loads.

The robust input side, featuring an integrated gas-filled surge arrester, ensures a high degree of noise immunity up to 6 kV for a mains failure buffer time of at least 20 ms. A full range of signalling options via analog, digital and relay contact increases availability. The preventive function monitoring feature warns of critical operating states before faults occur.

Signalling thresholds and characteristic curves can be adjusted using the NFC interface. Their wide operating temperature range of -40 to +70°C makes these units flexible when it comes to deployment.

Phoenix Contact Pty Ltd

www.phoenixcontact.com.au



Robust MAGNETIC PROGRAMMABLE Incremental and Absolute Encoders

Features

- Program with a mobile phone
- No software to install
- Wi-Fi connection to encoder
- Online storage of configuration
- Range of housing sizes 58 and 36mm Dia.

Options

- Incremental Only
- Absolute single or multi turn
- Gray or Binary Code
- Dual Incremental and Absolute
- Any values 1 to 16,384

PCA

www.pca-us.com.au

+ 61 2 9482 3733

**POSITAL
PRADA**

Configure with your mobile phone



CORROSION MONITORING SOLUTION FOR REMOTE PIPELINES

The Emerson Roxar FSM Log 48 Area Corrosion Monitor is a pipeline integrity management system that provides permanent, continuous online corrosion and erosion monitoring, enabling operators to track localised corrosion and ensure cost-effective pipeline health.

The Roxar FSM Log 48 — with 48 referring to the number of pins in the sensing pin matrix — is capable of distinguishing between localised and generalised corrosion, a feature that helps reduce the need for pigging and other costlier inspection methods. The Roxar FSM Log 48 has a total cost of ownership of just one typical smart PIG run of up to 10 km (although this can vary according to the PIG technology).

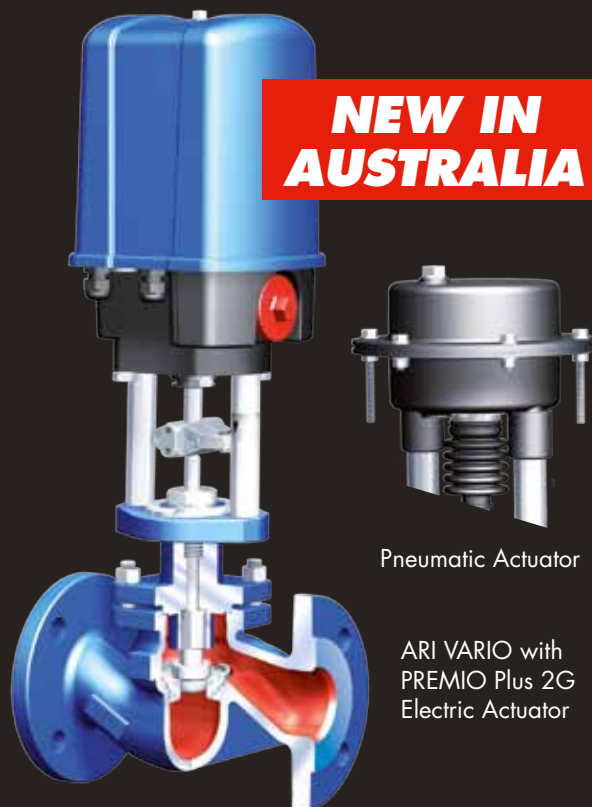
The Roxar FSM Log 48 continuously monitors corrosion in remote areas using WLAN and cellular data transfer protocols and has built-in solar power options that reduce maintenance and personnel requirements.

The Roxar FSM Log 48 uses the non-intrusive field signature method, in which an electric current is fed through the monitored length of pipeline to generate an electric field. The initial measurement sequence measures the voltage drop between pairs of sensing pins installed on the external pipe wall. Later measurements are compared to the field signature, where a uniform increase in voltage drops between all pin pairs indicates generalised corrosion, and a local increase in the values indicates localised corrosion. Typical detection sensitivity for generalised corrosion is 0.1% of wall thickness for outer pipeline diameters between 15 and 120 cm.

Emerson Automation Solutions
www.emersonprocess.com.au

SO COMPACT. SO RELIABLE. SO FLEXIBLE. 'ARI VARIO' CONTROL VALVE

ELECTRIC or PNEUMATIC ACTUATORS



Pneumatic Actuator

ARI VARIO with
PREMIO Plus 2G
Electric Actuator



- Multiple Plug Designs including Soft Seating
- Screw-In Seat Rings for optimal Kvs Values
- ARI Electric Actuators Fully Optioned One Touch Set-Up

WE HANDLE PRESSURE®



PRESSURE & SAFETY SYSTEMS

Tel: (03) 9699 7355

www.pressureandsafety.com.au



ENERGY CHAIN IDENTIFICATION WITH QR CODES

igus is now equipping its energy chains with a QR code. Integrated directly into the e-chain, it offers the machine builder online information about the chain, including assembly instructions, or how to identify and order spare

parts, with a scan using a smartphone or tablet. This connection of the offline and online worlds has a tangible benefit for the machine builder: faster information, easier assembly and spare part procurement via the internet.

To use the code, the engineer uses a smartphone or tablet camera to scan the QR codes, which are located on the crossbars and side parts. The engineer is directed to the online portal, where igus provides all the important information about the product. This includes photos and videos that show the engineer assembly instructions. Important assembly steps are shown in slow motion for better understanding. This helps engineers reduce set-up times and simplify initial installation.

The QR code also simplifies the process for ordering spare parts for energy chains. Intuitive illustrations on the website help the engineer to understand the structure of the igus part numbers and to recognise the different components.

Treotham Automation Pty Ltd
www.treotham.com.au

PANEL PCs FOR FOOD AND BEVERAGE

The FABS Series from APLEX Technology is a line of food-grade stainless steel HMI panel computers powered by Intel Celeron N2930 with 4 GB DDR3L 1333 MHz onboard memory. The FABS Series is available with screen sizes ranging from 7" to 21.5", and is supplied with a 7H anti-scratch, highly durable PCT touch screen.

The FABS Series has been optimised to meet the hygienic design requirements of DIN EN 1672-2 and DIN 42115, Part 2. Features such as SUS 304/316 grade stainless steel, IP66/IP69K rated water- and dust-proofing, food-standard silicone rubber strips and sealant material (FDA 21 and CFR 177.2600) and minimised grooves and gaps, allows liquid to freely flow over its surface preventing the accumulation of substances that cause contamination.

The FABS Series provides extensive I/O interfaces including two COM, two GbE LAN ports, two USB3.0 and more alternatives via internal expansion modules and cards. Communication and network options include 3G/4G LTE, Wi-Fi, Bluetooth, GPS, RFID, NFC and PoE. An easy accessible internal 2.5" SATA3 HDD allows the operating system and data storage to be upgraded if required. Support for panel and VESA mounting makes the FAB Series convenient to install.

The FABS Series offers a 9–36 VDC power input and an operating temperature range of 0 to 50°C. A wide range -20 to 60°C option is also available. Operating system support includes Windows Embedded 7 and 8.1, Windows 10 IoT 2016 and Linux.

Interworld Electronics and Computer Industries
www.ieci.com.au



3-BODY VALVE

The Alfa Laval Unique Mixproof 3-body valve with its modular, three-valve-body design is intended to provide reliable fluid handling and safety, making it suitable to use as a changeover valve for hygienic industries such as food, dairy, beverage and home-personal care.

It can be used to replace two or more valves of other types with a single 3-body valve. Two independent plugs and the fully balanced design enable two different fluids to pass through the same valve without risk of cross-contamination even in the event of pressure shock.

For safe and hygienic operation, the double-seat design avoids cross-contamination while the double lip seals provide added protection. Maintenance and cleaning are quick and easy due to a top-loaded design, no adjustable components, maintenance-friendly actuator and built-in leakage detection on all seals.

The Alfa Laval Unique Mixproof 3-body valve is always equipped with seat lift and seat push function to meet stringent hygienic standards.

Optimisation of the hygienic process is possible by customising the Mixproof 3-body to suit application needs. Its modular design also makes it easy to apply the double seat valve whenever process needs change while ensuring efficient, hygienic and continuous production.

Alfa Laval Pty Ltd
www.alfalaval.com.au



OIL CONDITION SENSOR

The HYDAC Lab HLB 1400 is a sensor for use in condition monitoring for industrial and mobile applications.

The recent version provides six output signals: the saturation level, temperature, absolute electric conductivity, change in conductivity, absolute dielectric constant and change in dielectric constant. LEDs enable the visualisation of the sensor and oil condition.

HLB 1400 sensors are compact, multifunctional sensors suited for the online determination of fluid condition. The user is kept informed of changes in fluid condition as they occur (eg, oil ageing or mixing) and can immediately react to the unpermitted operating conditions.

The standard version provides one switching output (warning or alert) and one reversible analog output signal (4–20 mA or 0–10 V) from which any measured values can be read out as a sequence.

The measured values can be visualised on various HYDAC display units.

HYDAC International

www.hydac.com.au

ROTARY LIMIT SWITCH

The TOP rotary limit switch from TER is suitable for most environments due to its waterproof and heat-resistant aluminium case. The case allows the switch to operate at temperatures as low as -40°C and up to +80°C.

The switch can be configured with many arrangements, with the capability of running up to 12 switching circuits that can be set in different positions and up to two potentiometers that may be used for position control. The combination of internal worm and helical gears allows for smooth operation and ratios of up to 9400:1 can be achieved.

Whether it's used for turning on and off motors or heavy-duty industrial equipment, the TER TOP rotary limit switch is suitable for most applications where rotary motion is involved.

Motion Technologies Pty Ltd

www.motiontech.com.au



Novaris

prepare yourself

Novaris appoints Control Logic as National Distributor



surge protection
for any application
reliable and
very high quality
australian owned
& manufactured

Control Logic has expanded its network to be the national distributor of Novaris - surge and lightning protection specialists, based on a successful 15 year partnership.

Proudly Australian, the Novaris range suits all electrical applications and includes power protection, instrumentation, process control, Ethernet and CCTV just to name a few! With full compliance to local Australian standards, Novaris is your reliable choice!

DON'T RISK IT. GET THE BEST.

for more information call 1800 557 705 or email sales@controllogic.com.au
www.controllogic.com.au

**control
logic**

AUTONOMOUS SYSTEMS

BIG DATA IN PRODUCTS, SERVICES AND OPERATIONS

Dave Oswill, Product Marketing Manager, MathWorks

What data scientists and engineers need to know when working with big data as they move from 'conceptualisation' to 'operationalisation' of their designs.

Businesses are greatly expanding the autonomous capabilities of their products, services and manufacturing processes to better optimise their reliability and efficiency. The processing of big data is playing an integral role in developing these prescriptive analytics.

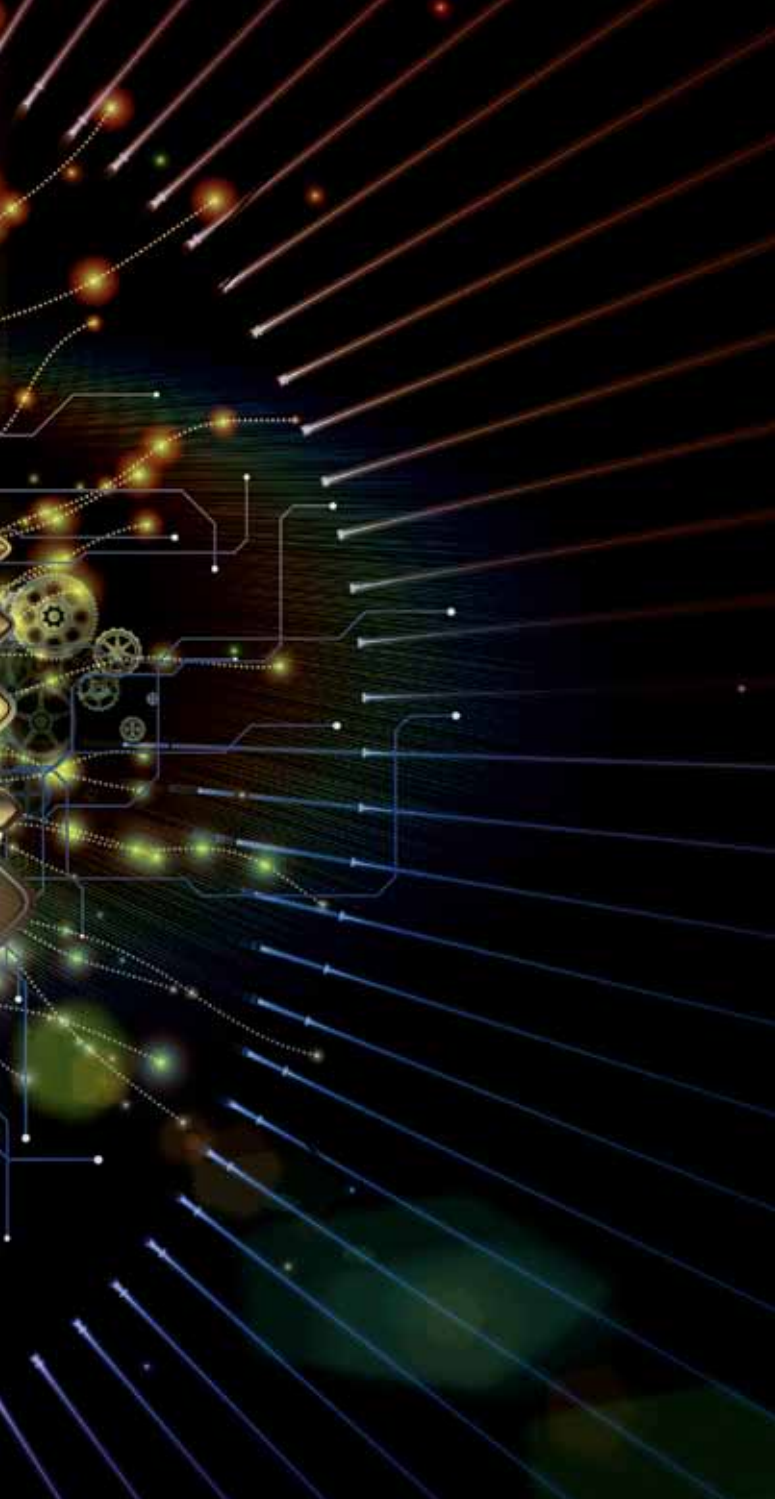
As a result, data scientists and engineers should pay attention to the following aspects of working with big data as they move from conceptualisation to operationalisation of their designs:

- Accessing data stored in various formats and systems.
- Finding and deriving relevant information in data.
- Using tools that scale to big data for both development and operationalisation.

By remaining mindful of when, where and how these challenges arise during the big data design process, data scientists and engineers will be better able to complete their projects on time and on budget.

Aggregating disparate data sets

One of the first steps in the development of an automated system is to select a scalable tool that can easily provide access to a wide



variety of systems and formats used to store and manage big data sets. Data is often scattered, making it time-consuming to collect and categorise. For example, sensor or image data stored in files on a shared drive may need to be combined with metadata stored in SQL or NoSQL databases. Data may also reside in large-scale distributed storage and processing frameworks such as Hadoop and Spark.

In other cases, data in disparate forms (delimited text, spreadsheets, images, videos and proprietary formats) must be used together in order to understand the behaviour of the system and develop a predictive model. Businesses should look to equip their team with data analysis tools that provide a platform and workspace where engineers and scientists can easily access and aggregate big data sets.

Understanding what's in your data

After the data is collected and aggregated, data scientists and engineers must interpret and transform that data into some form of actionable insight. Although any number of interpretive methods

can be used, several broad techniques make it easier for engineers to summarise variables in a data set and uncover meaningful trends:

- **Summary visualisations**, such as binned scatter plots, provide a way to easily view patterns and trends within large data sets. These plots highlight areas where data points are more highly concentrated and then use a slide control to adjust colour intensity, which lets the designer interactively explore large data sets to quickly gain insights.
- **Filtering** and other signal processing techniques not only enable developers to detect slow-moving trends or infrequent events spread across data that are important to take into account in the theory or model, but they also enable developers to derive additional information from a set of data for use in predictive models or algorithms.
- **Programmatically enabled data cleansing** allows bad or missing data to be fixed before a valid model or theory is established, and it allows the same data-cleansing algorithm to be deployed in a production application, service or product.
- **Feature selection techniques** help developers find the data that is most relevant for the theory or model, enabling a more accurate and compact implementation of predictive models or algorithms.

Working with large-scale data

Data processing at scale is another crucial consideration in the design of automated systems. Although many data scientists and engineers are most efficient when working on a familiar workstation, data sets are often too large to be stored locally and require a level of software analysis, modelling and algorithm development that only a cluster-based computing platform can handle. Modelling tools that allow developers to easily move between systems without changing code greatly increase design efficiency.

Data scientists and engineers should look for a scalable data analysis and modelling tool that builds in enough domain-specific features to allow them to conveniently access data and easily work with it using familiar syntaxes and functions. By providing tools the domain expert commonly uses with easy-to-use machine learning functionality, engineers can combine their domain knowledge with the tools of the data scientist, allowing them to make more effective design decisions, quickly deploy their models, and test and validate the accuracy of any given model.

Once a data scientist or engineer has walked through the process and the associated challenges of designing a big data system, a final consideration must be assessed: the ability to rapidly operationalise predictive models and algorithms for enterprise-scale applications.

There are scalable data analysis and modelling tools available on the market that can provide product development teams with the domain-specific tools they need. With these tools, engineers and scientists can rapidly develop and integrate algorithms into their automated and embedded systems without the need to manually recode in another language.

By anticipating these aspects of working with big data, data scientists and engineers will be better able to integrate automated systems into their project chains in order to more quickly adapt to changing environmental and business conditions and address market needs more effectively.

MathWorks Australia
www.mathworks.com.au

LASER MARKER

The Topmark NEO laser marker offers compact dimensions and easy operation via the integrated colour touch display, and can be used to create robust and high-quality industrial markings.

Equipped with a 20 W laser and an automatic stacking and unstacking function, the laser marker processes up to 250 labels/min. Over 650 different markers made of stainless steel, aluminium, Transply-ABS, polyacrylic and polycarbonate are available. The marking is either engraved, carbonised or tempered.

The printing data is entered directly at the device via the integrated marking software. The touch display also shows instruction videos for start-up, as well as maintenance and operating instructions. The laser marker can also be controlled using the Project Complete planning and marking software. All of the laser parameters are already saved in this program and the laser does not have to be set up separately.

The extraction unit, which can be purchased separately, guarantees environmentally friendly marking. It cleans the air in the marking area of vapours and particles, and returns the cleaned air directly to the surroundings.

Phoenix Contact Pty Ltd

www.phoenixcontact.com.au



Work smarter - not harder!
Calibrate ALL T/C & RTD Instruments

Features "EZ-Dial"
Preferred by Instru-techs worldwide
No more clumsy buttons!

PIE 525B

- Calibrate thermocouple & RTD instruments to 0.01°C
- Diagnose corrosion & broken sensor wiring
- In-built Cold Junction Compensation
- Compatible with pulsed excitation currents
- Half the weight and more accurate than competing products



**3 Year Warranty
& a hands-free
carrying case**



For sales & service:
(08) 9331 7500
sales@transtek.com.au
www.transtek.com.au

ANALOG INPUT MODULE

The ICP DAS M-2018-16 is an analog input module offering 16 differential analog input channels. The voltage input range can be from ± 15 mV to ± 2.5 V, the current input range can be either 4–20 mA, 0–20 mA or ± 20 mA, and types J, K, T, E, R, S, B, N, C, L, M and L DIN43710 thermocouples can be used for the thermocouple input. Overvoltage protection of up to 120 VDC is provided. The module also features per-channel open wire detection for the thermocouple input types, and provides 4 kV ESD protection as well as 3000 VDC intra-module isolation, even for applications that are subject to high vibration and shock.

This analog input module has a wide operating temperature range of -25 to +75°C and is suitable for use in building, factory and machine automation, remote maintenance and diagnosis or testing equipment.

ICP Electronics Australia Pty Ltd

www.icp-australia.com.au





VERTICAL PUMP

SPX Flow has introduced the CombiProLine OH3 vertical pump for applications that demand a small footprint without compromising performance.

The CombiProLine OH3 offers a space saving of up to 70% when compared to the equivalent OH2 horizontal pump. By eliminating the need for a baseplate, the CombiProLine is easier to install than horizontal pumps and offers a weight advantage that makes it particularly attractive for platform installations.

CombiProLine OH3 pumps can be used to move thin, clean or slightly polluted liquids as well as non-viscous and light viscous liquids at up to 300 mm²/s. Typical examples include offshore installations and crude oil extraction, petroleum refining and distribution, processing of hydrocarbons (such as butane and acetylene) and gas processing, including methane, butane, LNG and LPG. Its combination of space-saving and performance parameters also offers benefits in water treatment and general industrial liquids handling applications.

CombiPro pumps feature a number of design elements to prolong their working life and make maintenance simpler. For example, a robust, metal-to-metal fit between the pump cover and casing is achieved using a special gasket to ensure proper sealing and alignment. An oil-lubricated bearing arrangement is designed to ensure smooth operation, with the option of cooling the oil bath in high-temperature applications.

Re-assembly of the bearing section and the rotor set can be undertaken without the need to remove either the motor or pump and without disconnecting the pipes, minimising downtime, while standardisation of parts offers high interchangeability across the CombiPro range and greatly reduces spare parts holding.

SPX Flow Inc

www.spxflow.com/au

TURCK

Your Global Automation Partner



Industrial Ethernet Cables – Your Path to Smart Manufacturing

Smart machines need higher bandwidth to process the real-time data that optimizes your manufacturing processes. Turck's industrial Ethernet cables meet those needs with rugged, flexible, and multi-protocol solutions. With many options for customization and short lead times, Turck is your ideal partner for more cost-effective networks.

Call 1300 132 566
or visit www.turck.com.au



OIL-FREE COMPRESSOR

Gardner Denver's CompAir Ultima oil-free compressor has two high-efficiency, permanent magnetic motors that replace the traditional gearbox design. These two variable-speed motors are capable of achieving speeds of up to 22,000 RPM and directly drive the airend without the need for a gearbox.

The compressor uses water in a closed-loop circuit to cool a system's motors and airends, which allows greater heat transfer and cooling efficiencies and ensures as little oil as possible is used in the system for assured air purity. Water-cooling also places less stress on these components, limiting the opportunity for any maintenance issues and reducing servicing costs.

The compressor is offered as standard from 75 to 160 kW, with each unit fully upgradeable between this kilowatt range. This means that if a site's energy demands increase in the future, users can choose the optimal variant based on the increased capacity. There is no need to purchase a new compressor, eliminating the associated downtime or delivery wait that comes with upgrading to a new system.

It emits a noise level of 69 db(A), has a small footprint and can be installed easily at the point of use, rather than in a separate compressor room. Its efficient internal cooling also means adjacent compressors can be sited close to one another, optimising the space available.

It offers assured air quality and purity for those operating in production-sensitive environments, such as the food and beverage industry, electronics manufacturing and the pharmaceuticals sector.

Gardner Denver Industries Pty Ltd

www.compair.com



ALUMINIUM HELICAL WORM GEAR UNIT

NORD Drivesystems has redesigned its two-stage SK 02040.1 helical worm gear unit, replacing the previous cast iron product with an aluminium unit.

The one-piece die cast UNICASE housing ensures strength and rigidity, plus reduced weight. Aluminium is more corrosion-resistant than steel and can be further protected with additional measures such as the nsd tpuH surface treatment.

It has a power range from 0.12 to 1.1 kW and offers an output torque of up to 100 Nm. Its wide range of speed ratios (from 5.37:1 up to 330:1) enables optimum adaptation to the user's requirements.

It is available in a universal foot flange version and offers versatility with many equipment versions. Mounting options include flanges and torque arms.

All versions are available with solid or hollow shafts, and the motor can be mounted directly without the need for a coupling or adapter (IEC or NEMA). It can be quickly and simply configured for a wide range of applications.

NORD Drivesystems (Aust) Pty Ltd

www.nord.com

PoE INJECTORS

The PULS range of PoE injectors includes a DC-powered PoE module or an AC-powered unit with integrated power supply. The DC module is available in 4- and 8-port versions, while the AC unit is an 8-port version only.

All channels can provide continuous power without restriction to a maximum of 30 W on the output, which complies with the output of 25.5 W defined by the standard. This makes the PULS PoE plug-and-play ready, as there is no need for complex port power budgeting. The devices automatically detect the performance class of attached components with the added benefit of device protection in the event of a fault.

Designed for Gigabit Ethernet systems to meet the PoE+ (IEEE 802.3at) standard, PULS PoE injectors are suitable for a range of applications. The injectors offer a wide operating temperature range of -25 to +70°C for the AC-powered unit and -25 to +85°C for the DC unit, as well as 95.5% efficiency.

Control Logic Pty Ltd

www.controllogic.com.au





COMMS 2018 CONNECT

FREE
EXPO
PASS

MELBOURNE

Melbourne Convention
& Exhibition Centre

20-22 Nov 2018



Events for critical
communications
users and industry

- 1500+ USERS AND INDUSTRY EXPERTS
- 90+ EXHIBITORS • 75+ SPEAKERS
- 7 TRAINING WORKSHOPS • 3 CONFERENCE STREAMS

Last chance to register — don't miss out!

Industry and users are coming together to Melbourne for three days ... join the conversation, connect with your peers, and discover what's developed to solve your comms issues.

EXHIBITION OPENING TIMES:

Wed 21 Nov: 9.00am — 6.00pm

Thurs 22 Nov: 9.00am — 3.30pm

NETWORKING DRINKS: OPEN TO ALL

Wed 21 Nov: 5.00pm — 6.00pm

Platinum Sponsor



Gold Sponsors



Silver Sponsors



Innovation Partner



Networking Drinks Sponsor



Wireless Innovation

Lanyard Sponsor



Media Partner



Association Partner



Register online at www.melbourne.comms-connect.com.au



© Stock Adobe.com/au/Den

THREE REASONS TO MEASURE pH INLINE

Inline pH measurement is a far more reliable approach to process control compared with testing grab samples, but misunderstandings about pH sensors have led the chemical industry to lag behind in adoption.



Continuous measurement of process pH has long been an established method in fermentation and other biochemical processes, but adoption has lagged behind in the chemical industries. As a measurement often frowned upon, many process engineers and technology owners rely instead on laboratory analyses of process samples. However, their lives could be so much easier, for the three reasons explained below.

Reason 1: Real-time pH measurement allows better control

Of all analytical process parameters, pH is by far the most important and most widely used for process control — or is it? pH is a critical parameter in many aspects of production, from setting the conditions for a reaction to happen to the management of the reaction's process quality, and from sustaining process equipment integrity to avoiding environmental pollution and health hazards. And yet pH is not well understood. This is largely due to its logarithmic nature.

The fact that increasing or decreasing pH by one unit implies a tenfold difference in acid or alkali strength is not well grasped, let alone the fact that one would have to actually add 10 times the amount of acid or alkali to change the pH of a solution by one unit (and only if the solution is not buffering, in which case even more reagent would be required).

Although it provides the input for process control, pH instrumentation often has a bad reputation due to its perceived need for high maintenance efforts in harsh process conditions. Because of this, process control strategists often ignore the installed pH instrument or decide to remove it completely and find other ways to control the process; none of which is as efficient or reliable as inline measurement.

Most of the distrust towards process pH sensors finds its root cause in a misunderstanding of the implications of not measuring continuously. When properly implemented, using the real-time measurements from inline pH instrumentation can be one of the most cost-effective and efficient ways to control key parts of processes.

Reason 2: Offline pH measurement is subject to temperature influences

Contrary to physical parameters that, due to their nature, cannot be measured offline in a lab, offline too often seems to be the preferred way for many analytical process variables. pH values are important in so many areas in and around the process that the sheer number of grab samples required to efficiently run a process would take too much time to analyse. Combined with the dynamics of processes, continuous or otherwise, lab results would never be available in time to allow proper process control.

One of the most impactful variables that can be influenced by the grab-sample testing of pH is sample temperature. Samples taken from hot processes usually have cooled substantially by the time they are measured. And there is a common misconception between both process engineers and laboratory personnel in that they believe this will not be an issue because their lab pH meters are temperature compensated. It is very important to note that temperature compensation in a pH probe does not cancel out temperature differences between process and lab samples.

The reason why a good pH probe is equipped with a temperature sensor is because its output is both pH and temperature dependent. A pH probe generates a millivolt potential proportional to the pH of a solution. With a glass electrode, a pH sensor outputs 59.2 mV per pH unit at 25°C. At different temperatures the output changes, even if the solution pH remains constant. Only at neutral pH 7 will the sensor show a steady 0 mV at all temperatures. The temperature dependency of a pH electrode's output is clearly demonstrated in the Nernst Equation:

$$E = E_0 + 2.3 \frac{RT}{nF} \log(a_{H^+})$$

where:

E = measured potential

E_0 = constant

R = gas constant

T = temperature (Kelvin)

n = ionic charge

F = Faraday constant

What no pH probe can ever compensate for is the temperature/pH correlation or behaviour of a specific solution, as it is a characteristic property of each medium. So depending on the solution, pH changes related to temperature may be large or small. Therefore, no pH sensor is capable of identifying what the pH of a hot process solution was when measuring in the cold sample, and vice versa. This frequently leads to frustration with inline pH sensors, as although the measurement difference is due to the change in temperature of both solutions (assuming both sensors are operating correctly), the inline measurement is usually blamed for being inaccurate. As a result, the pH measurement from the lab sample tends to be used to control the process.

As mentioned above, a discrepancy of a single pH unit implies tenfold the acidity or 10 times the amount of chemical reagents required to control the process as needed. Relying on the lab pH measurement may not only pose a significant cost issue because of excessive chemical consumption, it may also create the conditions for severe equipment corrosion or adversely affect the process and product quality.

Another influence temperature has on pH is on the pH scale itself. That pH is measured on a scale of 0–14 is common knowledge. What is not so well understood is that the scale is applicable only at the standard temperature of 25°C. At higher temperatures things change, and at roughly 125°C the pH scale would actually be 0–12. This means that neutral pH is now at pH 6 and pH 7 would be alkaline! High temperatures are not uncommon in chemical processes such as in fertiliser production. In these cases, cold sample pH will differ substantially from the hot process value, leading to a different interpretation and therefore the very real risk of incorrect running of the process.

Reason 3: Advances in real-time diagnostics have extended sensor lifetime and reduced maintenance

While there are a lot of good reasons for measuring pH inline, the concerns that many processes engineers have for transitioning from offline to inline are not completely without merit. Any general-purpose pH sensor will fail rapidly in the demanding applications common to the chemical process industries and mining operations.

Finding the probes that are fit for the applications has always been a challenge. When selecting a sensor all process conditions need to be considered, not only temperature, pressure and flow but also the composition of the process medium, including characteristics such as abrasiveness and chemistry. The reference side of a pH sensor is vulnerable to poisoning by sulfide compounds and oxidant species in the medium. Hydrocarbons also have a great influence on the performance and longevity of a probe.

Nowadays the range of pH sensors available covers the widest spectrum — and the most severe — of applications. But even with the right sensor, there are still challenges for process engineers to overcome.

The amount of maintenance needed to keep sensors clean, accurate and in service has always been a concern. Ensuring a stable, reliable signal without interference has been another. As a result, process engineers usually only install inline pH measurement if no alternative means to process control are found.

To resolve this, modern pH sensors are available with digital technology integrated into analytical sensors. This boosts the measurement performance and reliability of the instrument to a level far exceeding traditional analog probes.



ALTHOUGH IT PROVIDES THE INPUT FOR PROCESS CONTROL, PH INSTRUMENTATION OFTEN HAS A BAD REPUTATION DUE TO ITS PERCEIVED NEED FOR HIGH MAINTENANCE EFFORTS IN HARSH PROCESS CONDITIONS.

Digital signal ensures reliability

In a traditional analog system, the transmitter has the task of calculating a solution's pH from the millivolt output of the attached pH sensor and a resistance thermometer. Digital sensors, on the other hand, calculate the pH value internally and output it as a digital signal. Shifting the calculation to the sensor and digitising the output signal ensures 100% signal integrity and provides a major improvement in both reliability and accuracy.

Outside influences such as moisture or electromagnetic fields no longer affect or corrupt sensor signals (a frequent issue with analog technology). Using digital sensors, the transmitter's role is reduced to its basic functionalities: to convert, to transmit and to be the human-machine interface.

Predictive diagnostics improve maintenance strategies

Digital probes can also run continuous performance diagnostics. Sophisticated sensor-specific algorithms keep track of process conditions, sensor glass membrane and reference status, and use the data to forecast when sensor calibration, cleaning or replacement should be performed. This enables the implementation of a true predictive maintenance program, ensuring probes are kept in top condition and avoiding use when one is no longer reliable.

Digital technology also counters the tedious cleaning and calibration activities in the field that analog sensors require. Using calibration software, maintenance becomes an easy and guided procedure and they can be conveniently calibrated in the maintenance shop. They retain their calibration settings and will immediately start measuring once reinstalled in the field. As the actual calibration process requires just a matter of minutes, maintenance time is typically reduced by a factor of 10.

Conclusion

Inline pH measurement is, by design, a far more reliable approach to process control compared with testing grab samples. The perceived drawbacks of inline measurement can easily be overcome by proper engineering of the measurement point and selecting the right sensor for the right application based on process conditions and composition of the process medium. High pH sensor maintenance requirements and their complexity are eliminated with digital sensors that allow for fully predictable maintenance and easy offline calibration in the workshop.

Mettler-Toledo Ltd
www.mt.com



ETHERCAT TO MODBUS RTU GATEWAY

The ICP DAS ECAT-2610 is an EtherCAT to Modbus RTU gateway. Serial RS232/422/485-based industrial devices and equipment can be interfaced to an EtherCAT-based control system without the need for any changes to the device.

The gateway performs an intelligent protocol conversion and presents the serial data to the Master PLC/controller as easily processed I/O data.

The device supports maximum 256-word input and 256-word output data, and a maximum serial data rate of 115,200 bps, allowing system integrators to retrofit older automation devices into modern EtherCAT communication systems. It requires no hardware or software changes to be made to the connected device. It is compatible with all PLCs with EtherCAT support, and now special Function Blocks are required.

ICP Electronics Australia Pty Ltd

www.icp-australia.com.au

GAS FLOW METER FOR DOSING

Designed for gas dosing and injecting applications, the ST75 air/gas flow meter from Fluid Components International (FCI) features a solid-state thermal dispersion mass flow sensing element with platinum RTDs. It measures virtually any gas or gas mixture, and can be calibrated to measure gases over a flow range from 0.07 to 950 NCMH, depending on line size, which is useful in low-flow applications requiring small doses.

For variable demand cycles due to small batch or other continuous process production requirements, the ST75 flow meter is factory preset to 100:1 turndown. It features a high accuracy to $\pm 1\%$ of reading with $\pm 0.5\%$ repeatability in line sizes from 6 to 51 mm.

The ST75 flow meters are designed with a choice of mounting configurations. They feature a full digital display and are also available with optional transmitter remote mounting up to 30 m away.

Where crowded equipment layouts exist and compromise straight pipe runs, the ST75AV meter features a built-in Vortab flow conditioner.

The ST75 flow meter's fully scalable, dual 4–20 mA standard outputs are user assignable to flow rate or temperature and a 0–1 kHz pulse output of total flow. Two-way HART bus communications are available, and the instrument can be ordered for input power with either 18–36 VDC or 85–265 VAC.

The flow meters withstand process temperatures from -18 to 121°C and operate at pressures up to 16.5 bar (g) with a standard t-fitting (NPT female) process connection. With a tube process connection, the meter withstands 41 bar (g).



AMS Instrumentation & Calibration Pty Ltd

www.ams-ic.com.au

CABLE TESTER

The HV Diagnostics HVA94 cable tester is a system designed for testing medium- and high-voltage cables. Providing a high power-to-weight ratio, the unit is capable of driving capacitive loads of up to $10 \mu\text{F}$ and can test cables up to 3300 m in length at maximum output voltage. The unit can test sinusoidal outputs of 0–94 kV peak or 66 kV RMS, DC ± 0 –90 kV and square wave 90 kV. It is available to rent from TechRentals.

The HVA94 offers various operating modes including cable testing, cable sheath/jacket testing, cable fault conditioning (burning) and vacuum bottle testing. It can store up to 50 test records and there is no thermal limitation for operating time. Additionally, the instrument includes various safety features such as emergency off button, signal lamps for active or inactive high voltage and 12 kV feedback protection.

TechRentals

www.techrentals.com.au



USB VIBRATION SENSOR

Dytran Instruments has announced the VibraScout 6DoF USB sensor for measurement and analysis of static and dynamic events.



The VibraScout 6DoF is a plug-and-play, portable data acquisition system that contains an 8-pole elliptical anti-aliasing filter and measures *x*, *y*, *z* acceleration, along with roll, pitch and yaw. In-field data collection, noise, vibration and harshness (NVH) studies, end-of-line testing, static angular measurements, ride quality, vibration measurement and diagnosis of rotating machinery are all possible. The VibraScout software is loaded on a laptop or tablet and the sensor cable is plugged into the USB port.

VibraScout 6DoF can plot recorded data, zoom and select a specific timeframe of recorded data for post-processing, reproduce interpolated oversampled data to provide better resolution of vibration signals, export multiple file types including time data, FFT, PSD and CPB in CSV, JPG, UFF58 and Matlab formats. An API is available for users who would like to build custom applications for the device. The API provides support for any NET-compatible client application. Custom application development is also available.

The variable capacitance (VC) triaxial accelerometer and gyroscopes are protected inside a small, hermetically sealed titanium housing weighing 25 g, making it suitable for use in harsh environments. The frequency range of the VibraScout 6DoF accelerometer is 0 Hz (DC) to 1000 Hz and the gyro sensor is 0 to 140 Hz. Units are ruggedised to 3000g shock.

Metromatics Pty Ltd

www.metromatics.com.au





The DCAP Hand Pump
helps technicians get the job done faster while precisely controlling pressure in multiple applications




Calibrating pressure transmitters

- Generate and control pressure easily and precisely — the same pump can be used to calibrate both the static and differential side of a DP transmitter
- Works with the **Ralston FieldLab** system to log the complete calibration

Setting a pressure switch

- The fine adjust piston lets the technician open and close pressure switches easily to quickly adjust set-points

Calibrating analog or digital pressure gauges

- Controls pressure efficiently without worrying about leaks
- Quickly connects to each adapter without a wrench or thread tape when used with the **Ralston Quick-test™** system of hoses and connectors

Custody transfer flow computer calibration in gas pipelines

- Low volume pump and hoses help save time getting to pressure
- Easily connects without a wrench or thread sealant using **Ralston Quick-test™** adapters

ISO 9001:2015 Certified • Made in the U.S.A.

For sales & service:
(08) 9331 7500
sales@transtek.com.au
www.transtek.com.au



PRESSURE RELIEF VALVES FOR OFFSHORE APPLICATIONS

The Anderson Greenwood 9300H low-pressure pilot-operated pressure relief valves offer a design that provides leak-free operation up to set pressure with an additional 10.5% flow capacity over other similar valves. The additional capacity reduces the required size of the valve providing initial purchase savings, with additional savings on the associated piping, fittings and expansion elbows.



Designed specifically for marine LNG tanks on ships, floating production or storage units, the valve allows ship owners and operators to efficiently fulfil their critical overpressure protection requirements with smaller-sized valves and associated piping. The 9300H provides the high performance and seat tightness of Anderson Greenwood POPRVs and utilises the Anderson Greenwood 93 Series pilot-mounted flush to the valve providing a rugged, low profile suitable for rough seas. The valve is field-adjustable for either modulating action to reduce product loss during a relief event or snap action to open completely at set pressure. The 9300H valves can be easily equipped with valve monitoring technology and are certified for liquefied gas carrier applications by all major classification societies, including Lloyd's Register, American Bureau of Shipping, Bureau Veritas and Det Norske Veritas.

Emerson Automation Solutions

www.emersonprocess.com.au

ROBOT FOR SMALL PARTS ASSEMBLY

ABB has announced the IRB 1100, its smallest, lightest robot to date, as part of its growing range of solutions for small parts assembly. The IRB 1100 was designed to meet the challenges of semiconductor, pharmaceutical and electronics manufacturers who need to handle small and often delicate parts while working at speed and maintaining both high productivity and quality.

The IRB 1100 offers up to 35% faster cycle times to maximise productivity and highly repeatable accuracy. Powered by ABB's OmniCore controller, the IRB 1100 is equipped with advanced motion control capabilities, making it suitable for supporting rapid assembly, pick and place, and materials handling applications.

Flexibility is another important small parts assembly consideration, as manufacturers need to increasingly accommodate smaller lots of greater variety in much shorter product cycles. The IRB 1100 has a 10% smaller footprint and a 20% lighter, slim body compared to previous robot generations, so that it can be flexibly deployed in confined spaces and into existing automation lines. In addition to improving production space flexibility, the IRB 1100 allows more flexible handling for heavy-load operations with complex tools or end effectors.

The IRB 1100 is also among the first of a range of robots built around ABB's flexible design approach, which will help introduce a wider variety of robot sizes and variants that can be combined into tailored solutions. IRB 1100 will be certified for cleanroom applications in the future and is available in two variants — one with a 4 kg payload with 475 mm reach and one with a 4 kg payload and 580 mm reach.

ABB Australia Pty Ltd

www.abbaustralia.com.au



ANGLE SEAT VALVES

Festo has introduced a highly adaptable angle seat valve, the VZXA. Featuring a modular product architecture, its wide variety of valve bodies and actuators can be freely combined for configuration flexibility. Engineers designing process applications in industries such as food and beverage, chemical, biopharma and industrial water can use the VZXA to control media flows.

The VZXA consists of an angle seat valve body, a piston or diaphragm actuator and a visual position indicator. The robust, flow-optimised valve body is made of easy-to-clean stainless steel and available in nominal sizes DN15 to DN65, and connection variants include threaded, clamped or welded. Its high flow rate makes the VZXA suitable for highly viscous media: liquids, gases or vapours.

Stainless steel actuators are available in three sizes, with the control functions NC, NO and DA (double-acting). The standardised interface between modules simplifies installation, allowing actuators to be replaced without having to remove the entire valve. Separation of valve bodies and actuators also makes installation of valves in pipelines easier and faster. The spindle seal is in the form of a cartridge, meaning it can be replaced simply without need for special tools.

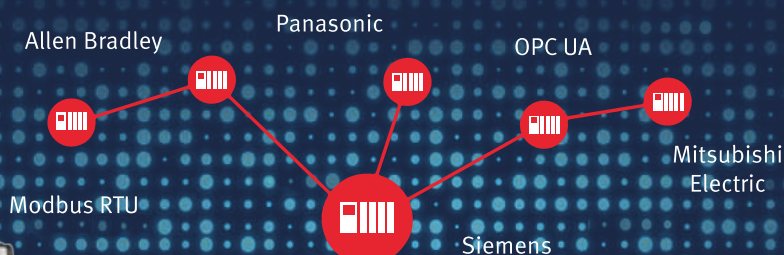
The VZXA is quick and easy to clean inside and out as it has virtually no dead spaces. Its modular construction means the actuator can be easily removed and sterilised in an autoclave, for instance.

Festo Pty Ltd

www.festo.com.au



PLC 2 PLC GATEWAY



Now different brands of PLCs can talk to each other via our new PLC to PLC gateways

www.plc2plc.com.au

Beijer
ELECTRONICS

GLOBAL
AUTOMATION



HYGIENIC CABLE GLAND

The SKINTOP HYGIENIC NPT cable gland is certified to NSF/ANSI 169 for 'food zone non-contact'. This makes it suitable for areas in food production where especially tough hygiene rules apply. The cable gland can be used for filling systems in dairies or breweries, as well as in the chemical and pharmaceutical sectors.

Most self-sealing pipe threads produced to food

production standards such as the American NPT standard usually have a gap at the intermediate connection, while part of the outer thread remains visible. This feature runs counter to the principles of hygienic design, which calls for surfaces to be as smooth as possible, without edges, corners and gaps.

By not having a gap when sealed, the cable gland therefore meets the latest directives of EHEDG, the European Hygienic Engineering and Design Group. It is resistant to cleaning agents in line with the requirements of ECOLAB. It also meets the standards of the American National Sanitation Foundation (NSF) and is UL certified.

The SKINTOP is available in all standard diameters with the corresponding counter nuts. An EMC version that conducts away unwanted emissions, the SKINTOP HYGIENIC SC NPT, is also available. LAPP also offers the SKINTOP INOX NPT, a more compact variant with NPT thread that is suitable for plants in which the cable gland is only used in the spray zone or non-product zone. This variant is also available with EMC protection as the SKINTOP HYGIENIC SC NPT.

LAPP Australia Pty Ltd
lappaustralia.com.au

UNMANAGED ETHERNET SWITCH

Interworld Electronics has released the MLiS MLB-E4119-16 16-port unmanaged Industrial Ethernet switch with 10/100 Mbps auto-negotiating copper RJ45 ports.

The MLB-E4119 is designed for industrial applications and features a rugged metal enclosure, fanless operation and a wide operating temperature range of -40 to +75°C. In addition, the Ethernet ports provide 1.5 kV (RMS 1 min), 2 kV surge protection allowing the MLB-E4119 to withstand high voltage transients that can be caused by heavy machinery or lightning strikes.

The MLB-E4119 provides dual-redundant 12-58 VDC power inputs with reverse power protection. DIN rail and wall mounting options along with a screw terminal power input block make the MLB-E4119 suitable for industrial installations.

Firmware features include Layer 2 line-speed switching fabric, multicast and a broadcast storm protection function.

Interworld Electronics and Computer Industries
www.ieci.com.au



DATA DIODE FOR INDUSTRIAL PLANTS

Belden has released the Hirschmann Rail data diode. The appliance secures mission-critical Ethernet networks through guaranteed one-way data traffic, while also transferring data out of the secure part of the system in a highly controlled, deterministic manner.

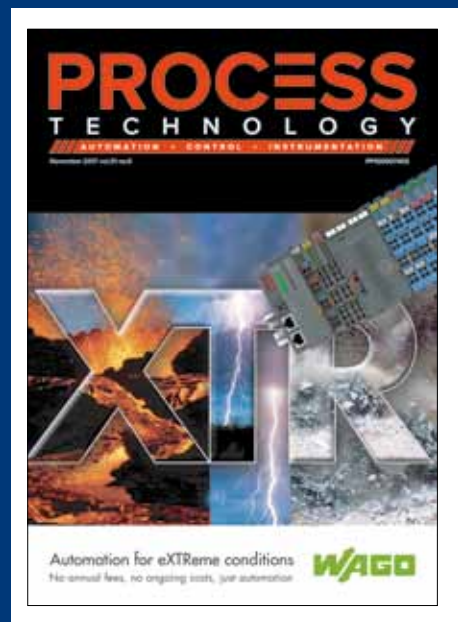
With the Hirschmann Rail Data Diode, industrial organisations can improve overall operations and control, and protect networks from external cyber threats through one-way data flow — securely transferring Ethernet data to the public internet without putting the system at risk. It also makes it possible to easily explain security functionality for simpler governmental approval processes.

The Hirschmann Rail Data Diode is best used in applications where data from mission-critical systems must be transferred via the public internet. The appliance is suitable for industries with vital applications, such as critical infrastructures in transportation, power and chemical plants.

Belden Australia Pty Ltd
www.belden.com

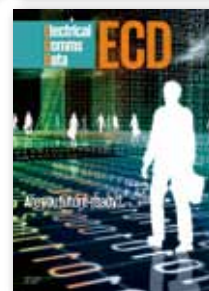
FREE

to industry and business professionals



The magazine you are reading is just **one of eleven** published by Westwick-Farrow Media.

To receive your **free subscription** (magazine and eNewsletter), visit the link below.



www.WFMedia.com.au/subscribe

CREATING MODULAR MACHINES WITH PLUG-AND-PLAY CONNECTORS

LOWERING WIRING COSTS AND MINIMISING DOWNTIME

Simon Pullinger, General Manager, LAPP Australia

The assumption that hardwiring industrial machines will minimise wire installation costs is based on some misconceptions. In fact, using connectors can produce lower-cost machines and considerably reduce downtime.

If you design or build industrial machines, you probably know all about hardwiring. It remains the most common way to bring power and signal to the machine because it offers perceived savings in installation costs.

But the cost savings are really just a mirage once you factor in the full range of wiring costs. These installation costs obviously include time and materials — the cost of the wire, cable, accessories and labour. Less obvious is the fact that you'll also incur hidden installation costs with their own labour and time-to-market considerations.

For example, many machines have to be disassembled for shipping and reassembled for start-up. So, you'll have to hardwire parts of the machine at least twice.

Then there's the cost of errors. Field wiring errors are common, especially when local electricians, unfamiliar with the machine, are handling the wiring. At best, these errors can cause delays in machine commissioning. At worst, they can damage the machine.

Finally, add in the cost of testing, which can be complex and expensive in hardwired systems. Keep in mind that the hidden costs will grow exponentially with the number of connection points on the machine.

Fortunately, you can avoid all these costs through 'connectorisation'. While connector components do require a bigger upfront investment, you will recoup that money and then some.

Connectors enable lower-cost machines

Using connectors gives engineers the flexibility to create modular machines that are faster and less expensive to build. In this approach to machine design, common subsystems and components can be pre-built, tested and stocked for installation.

Many machines can be designed from re-usable modules — including the control panels, junction boxes, populated cable tracks and motor assemblies. Sensors and actuators with prewired connectors are also increasingly available.

Connectorisation provides the plug-and-play assembly that makes modular machines so attractive from a cost standpoint. Not only will the connectorised modules be easier to assemble, but they also ensure wiring integrity. For example, when multiple connectors can be mounted side by side, they can be keyed so that each cable connector only mates with the right receptacle.

One criticism you'll hear about connectors is that they can't possibly cover all the scenarios addressed by point-to-point wir-



ing, which is inherently a custom approach. Nowadays, however, electrical connectors address just about every power, control, signal and data application you can imagine.

Some of these connectors are dedicated to a specific electrical specification and have a fixed number of contacts. And custom modular connectors can meet specific machine requirements not addressed by off-the-shelf dedicated connectors. These modular connectors can pack power and control contacts, fibre-optic contacts, pneumatic ports and data bus connectors into an environmentally protected housing.

Machines ship faster

When new, large machines get ready to be shipped, they have to undergo some disassembly. At the very least, cables to and from the control panel will need to be disconnected for shipping. With hardwired machines, this extra step can be time-consuming, expensive and fraught with error.

With connectorised machines, you simply unplug any cables from the panel's bulkhead connectors. Wire routing and connections internal to the panel remain undisturbed. The same holds true for junction boxes, motor assemblies, sensors and data cables.

Quicker commissioning

Once the machine arrives at its destination, all wires disconnected for shipment need to be connected all over again. In many cases, local electricians perform this crucial rewiring process using a set of wiring schematics. Since the electricians may know little about the machine and how it works, the rewiring process is notorious for costly mistakes and start-up delays. Machine builders sometimes minimise this risk by sending one or more factory technicians to complete the installation and travelling technicians will incur additional cost.

Connectorised machines, by contrast, have a true plug-and-play start-up process. The need to rewire the machine in the field, and therefore the possibility of wiring mistakes, is eliminated.

No wiring mistakes means no costly troubleshooting or replacement of damaged components. For large, complex machines, installation and start-up procedures that would take several weeks can often be reduced to a matter of days.

Ongoing savings

Machine buyers today expect and demand continuous, uninterrupted operation of their manufacturing and assembly lines. In large factory operations, even the briefest downtime can cost hundreds of thousands of dollars due to lost production. With a connectorised machine, replacement of a burned out motor, failed sensor or damaged component or cable takes place as quickly as the replacement parts can be installed on the machine.

Put differently, connectorised systems remove any wiring-related downtime.

Go modular for design flexibility and savings

Connectorisation usually makes a lot of sense compared to hardwiring, but what if you can't find an off-the-shelf connector that meets your technical requirements? That's where modular connectors enter the picture.

Based on plug-and-play modules in standard frame sizes, modular connector technology covers a wide range of power, control and data connections. These include high voltage, high current, thermocouple, Profibus and Ethernet. Modular connectors also support hose-connected pneumatics up to 145 psi.

The main benefit of using modular connectors is that they combine the best attributes of custom and off-the-shelf products:

- **Custom design flexibility:** By combining power and signal modules freely, you get all the design flexibility of a custom product. Often, modular connectors will allow you to consolidate what would otherwise have been multiple connectors, saving panel space and reducing installation costs. Modular connectors can also be pre-assembled, fully tested cable assemblies — for even greater savings in installation and replacement costs.
- **Off-the-shelf convenience:** Despite their custom nature, modular connectors have lead-times similar to off-the-shelf products, which helps you meet your delivery deadlines.

Conclusion

For machine builders, the ability to quickly ship, install and maintain machines represents an important selling point for their customers. While the upfront cost for connectors is higher, this one-time cost will be more than offset by the recurring and hidden costs associated with hardwiring.

LAPP Australia Pty Ltd
lappaustralia.com.au

AS I SEE IT



BUILDING THE MINE OF THE FUTURE

Picture this: a small robot scurries along a rocky surface, seemingly in search of something valuable — but this robot isn't probing the moon's craters or searching for life on Mars. In fact, it is looking for deposits of silver in Bolivia's Cerro Rico mine — considered one of the world's most dangerous mines.

The robot's task isn't just to find traces of silver at Cerro Rico, it is also identifying targets for mining and deciding what equipment would best fit the extraction. The robot then communicates with other smart machines that will enter the mine and start excavation. All the while, humans sitting many miles away are watching the robot's actions in real time.

This scene has been imagined, and thanks to technological advancements such as artificial learning and autonomous machines, it might soon become a reality.

Now is an exciting time for the global mining industry. Companies are using cutting-edge technology such as drones, sensors and wearable devices to collect real-time information and make better business decisions. Productivity, which had for long been elusive in the industry, is emerging — and companies have understood the potential of digitalisation to keep this momentum going.

Demand for new-age metals such as lithium and nickel — used in making batteries for electric vehicles — has spiralled. The opportunity has brought with it the challenges of understanding a nascent market with limited supply sources. How can a company gain an edge over competition in this promising market?

The digital mine might hold the answer. Digital technology is helping mining companies across the world realise the true potential of their assets in a safe and sustainable way, and the digital mine will come equipped with a full suite of capabilities that will take efficiency to the next level.

An example is mine location intelligence — a platform that allows companies to operate their mines from remote locations, while real-time positioning gives miners complete

control of equipment and reduces evacuation time. Such technology continuously monitors and analyses operations of core equipment such as the hoist, and detects abnormal safety conditions.

In the digital world, we are creating about 2.5 quintillion bytes of data every day. This pace is only going to accelerate as more devices are equipped with capabilities connected via the IoT. This vast data needs to be assimilated so that companies can gain insight into their operations and close the gap between data and action.

Mining companies should also be able to quickly detect anomalies such as equipment malfunction due to the risky and capital-intensive nature of the business. Unsafe mines such as the Cerro Rico have often led to miner fatalities, sometimes causing irrevocable damages for companies.

Technology also helps reduce the possibility of mining mishaps. Miners can use deep learning technology to predict maintenance issues for equipment. Once the issue is identified, operators can use intelligent scenario forecasting software to build and test various solutions on a digital simulation before deploying the best one on the actual mine.

While the world is far away from creating completely minerless mines, technology has reduced energy usage, downtime and noise, and reduced the need for on-site expertise, while increasing productivity and raising safety standards.



Ralf Eckert oversees ABB's team responsible for industrial automation and electrical solutions for industries such as mining, production, process control, aluminium and cement. He has over 25 years'

experience in plant automation and electrification, pulp and paper, mining, and industrial design, and over this time has been involved with sales, service and project management in automation and electrification projects.



Westwick-Farrow Media
A.B.N. 22 152 305 336

www.wfmedia.com.au

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

Editor

Glenn Johnson
pt@wfmedia.com.au

Publishing Director/MD

Geoff Hird

Art Director/Production Manager

Julie Wright

Art/Production

Colleen Sam, Wendy Blume

Circulation

Dianna Alberry, Sue Lavery
circulation@wfmedia.com.au

Copy Control

Mitchie Mullins
copy@wfmedia.com.au

Advertising Sales

Industrial Group Sales Manager

Nicola Fender-Fox – 0414 703 780
nfender-fox@wfmedia.com.au

Sandra Romanin – 0414 558 464
sromanin@wfmedia.com.au

Tim Thompson – 0421 623 958
tthompson@wfmedia.com.au

Subscriptions

For unregistered readers price on application.

If you have any queries regarding our privacy policy please email
privacy@wfmedia.com.au



March 2018 total CAB audited circulation (Aust + NZ)
4,754 readers (80% personally requested)



Contact the editor

Printed and bound by SOS Print+ Media Group
Print Post Approved PP100007403
ISSN No. 0819-5447

All material published in this magazine is published in good faith and every care is taken to accurately relay information provided to us. Readers are advised by the publishers to ensure that all necessary safety devices and precautions are installed and safe working procedures adopted before the use of any equipment found or purchased through the information we provide. Further, all performance criteria was provided by the representative company concerned and any dispute should be referred to them.

Information indicating that products are made in Australia or New Zealand is supplied by the source company. Westwick Farrow P/L does not quantify the amount of local content or the accuracy of the statement made by the source.

We all know that making or accepting change is difficult, but most changes that we make in life are for the good.

Many of us are empowered to make changes at work – especially relating to process performance and cost reduction, so here's a solution without any risk, for accurate and reliable positioning control of all types and makes of Control Valves – ONE POSITIONER that does fit all!



WELL PROVEN AND TESTED WORLDWIDE IN THOUSANDS OF APPLICATIONS GE-MASONEILAN'S SVI-IIAP!

FEATURES & BENEFITS

- A high performance Smart Positioner (HART and FF) that does not require a Hand-Held Communicator for Calibration/ Configuration;
- Single and Double Acting – the ONE Model fits all ROTARY AND LINEAR VALVES (down to 6mm stroke);
- Non-Contact Position Sensor that is not affected by close magnetic fields;
- Available with Basic to Advanced Diagnostics (Flash-Upgradeable) with 5-Position Sensors!
- Available with Analog Position Feedback (100 ms refresh) and Two Discrete Limit Switches;
- Indicating LCD Display with Push-buttons (or blind);
- Remote mounting option (same Unit);
- SIL-2 Compliant IEC 61508 (EXIDA);
- IEC EEX Certified Intrinsically Safe ('ia') and Explosion Proof ('d');
- High capacity Pneumatic Train (CV 2.2) to eliminate the need for Boosters and QE Valves;
- Low Voltage (9 VDC) and Low Current Compliance (3.2 mA);
- Allows Hot-Cutover;
- Set-Up of the Actuator independent from the Valve;
- Integration with many DCS and Asset Management Systems;
- Available with low Cu/Al and a full 316LSS Marine Enclosure.

**CONTACT OUR EXPERTS FOR PROMPT
TECHNICAL ADVICE AND SUPPORT**



Masoneilan



POWERFLO
SOLUTIONS

1300 658 701

sales@powerflo.com.au

www.powerflo.com.au



Industry has a new choice

Introducing APS Industrial:
your gateway to industrial success.

At APS Industrial, we're the gateway that connects the world's leading industrial manufacturers to the local industry. With exclusive local access to the market's broadest portfolio of industrial low and medium voltage electrical and automation products, we offer a true one stop shop that promises simplicity, security and connectivity.

In an industry landscape rapidly transforming through digitalisation, quality and a competitive edge matter. APS Industrial is the new choice that gives you both.

PROUD DISTRIBUTORS OF

SIEMENS

Weidmüller 

 **TDK**

RITTAL

 **KATKO**

apsindustrial.com.au