

# PROCESS

## TECHNOLOGY

OCTOBER/NOVEMBER 2024

VOL.38 NO.3 | PP100007403

AUTOMATION + CONTROL + INSTRUMENTATION



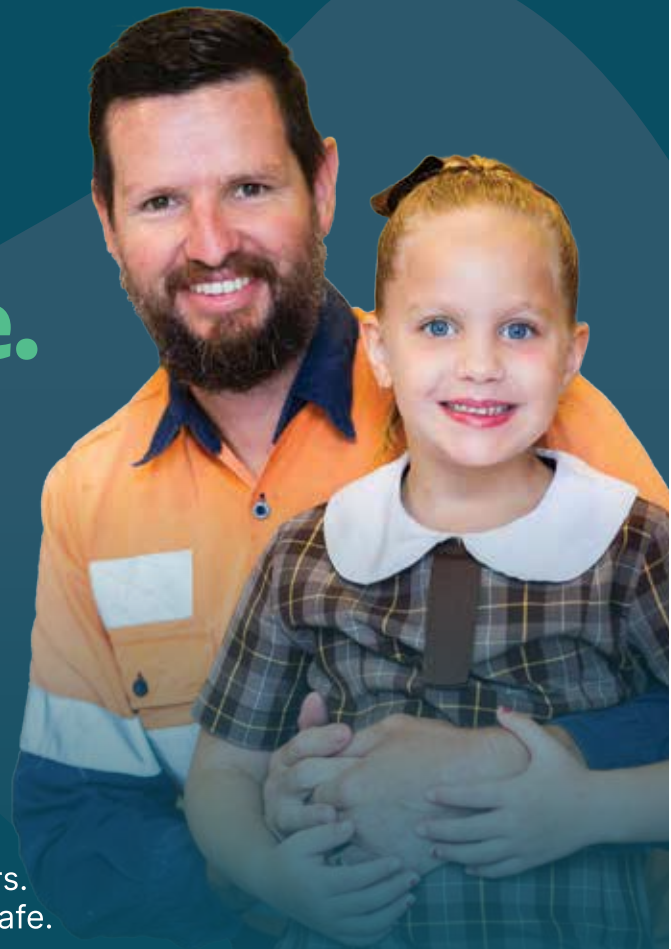
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# COVER FOCUS

SEW-EURODRIVE's modular automation portfolio, MOVI-C®, integrates all elements of motion control into a comprehensive system. Versatile and suitable for diverse applications and industries, the MOVI-C product portfolio encompasses components that function seamlessly to control AC motors, performing simple speed tasks through to complex motion demands.

The MOVI-C system provides flexible installation possibilities for the frequency inverter and control technology. It allows for the combination of centralised or decentralised installation topologies within the same project. The system ensures seamless integration by using the same engineering software and communication network.

The MOVI-C portfolio encompasses many product sub groups within the SEW-EURODRIVE range: modular inverter technology, enhanced control technology, simplified motion control, engineering software, fieldbus communication and advanced safety systems, featuring plug-and-play connectivity.

With the MOVI-C modular automation system, everything comes from a single source. The aim is to make complex, high-performance automation and drive technology simple enough to install effortlessly, operate it intuitively, and monitor it easily while maintaining the high-quality product and performance that SEW-EURODRIVE stands for.

The MOVI-C portfolio creates a seamless automation experience, making it a reliable choice for industries that prioritise performance and efficiency.

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# welcome



*The mineral processing element of the mining industry has long been a keen adopter of automation technologies, but one area where automation has traditionally been an afterthought is the mine water circuit. Traditionally reliant on manual data collection and operator experience to manage, it has not previously been a target for automation. But with water scarcity becoming a global challenge, water management is becoming a strategic necessity in the mining industry.*

*To that end, instrumentation, automation and data analytics are a growing need in mines — for the management of the water circuit and to better utilise this important resource.*

*However, with the rise of the IIoT, industrial cloud technologies and greater availability of open standards technologies, extending automation to a previously neglected part of the plant has become easier, even when it is difficult or costly to expand an existing control system.*

*In fact, there are now avenues for organisations across many industries to increase their automation capabilities at lower overall cost, and find their way out of vendor lock-in. Today, independent software vendors stand ready to assist in opening systems up to the new frontier of open systems integration. In this issue we have an article on just that: how independent software vendors can help manufacturers find more automation opportunities at lower cost, and to better utilise the data they have at their disposal.*

*We also have an article on the right way to take fluid samples from a process, safely and without contamination, and a product feature section on some of the latest in instrumentation and sensors.*

*As always, more detailed daily news and new automation products can be found on [processonline.com.au](http://processonline.com.au), and by subscribing to our bi-weekly email newsletter.*

**Glenn Johnson**  
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## Study explores the psychosocial risks of cobots

Collaborative robots are rapidly reshaping the Australian workplace, handling everything from heavy machinery to delicate surgical tasks, but a new study from Monash University Business School suggests that the use of cobots in the workplace may be having negative impacts on workers.

According to the study, the growing use of cobots may pose significant psychosocial risks to workers' mental health and their job security. However, the study suggests there are ways for organisations to smooth the transition.

Monash Business School Professor Herman Tse and his research team found psychosocial hazards, such as job insecurity and role ambiguity, are common issues that affect workers as part of the growing use of collaborative workspace technologies such as cobots.

To support a smooth transition to cobots in the workplace, and reduce these risks, the study emphasises the urgent need for organisations to consider employees' perception of collaborative robots and the stresses that arise from their growing use. It is hoped that this would lead to a broader organisational understanding about the importance of involving workers in the implementation process of cobots.

## Hawk Measurement Systems wins Resources and Energy Award

Australian instrumentation company Hawk Measurement Systems has been awarded the Resources and Energy Award at the 2024 Governor of Victoria Export Awards (GOVEA). The award recognises HAWK's achievements in providing world-class technology to the resources and energy sectors and its strong commitment to innovation and sustainability.

With this win, Hawk Measurement Systems is now also a national finalist in the 62nd Australian Export Awards. The company is in the running to receive further recognition on the national stage, with the possibility of being crowned the 2024 Australian Exporter of the Year.

"We are incredibly proud to have received this award, which is a testament to our team's hard work, dedication and innovative approach," said Les Richards, CEO of Hawk Measurement Systems. "Our technology empowers industries worldwide to operate more efficiently and sustainably, and this recognition further motivates us to continue pushing the boundaries of what's possible in measurement solutions."



## Rockwell provides training tech for Queensland advanced manufacturing lab

A \$3 million advanced manufacturing lab is being built by Applied Robotics for TAFE Queensland, funded through the Queensland Government's \$100 million 'Equipping TAFE for our Future' program.

The new lab, scheduled for installation in February 2025 at TAFE Queensland's Ipswich campus, will feature several key Rockwell Automation technologies, designed to train the next generation of Australian engineers, manufacturers and innovators.

The lab will focus on training students in areas such as robotics, CNC

machining, machine vision and learning, and automated logistics and storage.

In addition to providing industrial automation technologies, Rockwell also tailored its technologies to the educational environment, as well as providing digital twin software and OTTO Motors AMRs.



*Water treatment plant at a copper mine in Arequipa, Peru.*

# AUTOMATING WATER MANAGEMENT FOR IMPROVED MINING SUSTAINABILITY

*Bhargav Joshi, Senior Business Development  
Manager – Measurement Products, Emerson*

Water is fast becoming a precious commodity, and mine water management has shifted from an operational expense to a strategic input.

Water scarcity is a global challenge with a highly localised impact — and the metals and mining sector is particularly vulnerable. As a swelling global population and heightened effects of climate change drain existing freshwater resources, water itself has become a precious commodity. Even as the metals and mining industry puts greater pressure on its own sustainable water management, a water shortage exacerbates challenges. Water consumption by the industry has increased with the decline of ore grade, and the energy transition has ramped up production demand.

In this current landscape, the conversation around water management has shifted from an operational expense to a strategic input. Simply put, no water means no production — and a slowdown of the vital mining industry would have drastic repercussions.

As the industry seeks to enhance its water management across the mine water circuit, water reuse and improved efficiency are clear solutions. Yet these solutions can only be implemented at their fullest potential — an optimised mine water circuit — if fundamental issues are resolved.

>>

## USING AUTOMATION TO IMPROVE DATA VISIBILITY

Today's mine water circuits feature little to no automation. They are heavily reliant on manual data collection and operator experience to manage equipment control. The automation in use typically provides an overview of water circuit inputs and outputs, but little else. They therefore miss out on the potential of automation deeper in the circuit to help guide operations and enhance efficiency.

Wireless sensors, flow meters, valves, software and analytics help miners gain a full picture of how much water they use and what is being lost or wasted, while also streamlining and optimising control processes. Given the mining industry uses 1% of the world's water, improvements in efficiency translate into lower costs for operators and big wins for local communities. A 2020 study from McKinsey and Company<sup>1</sup> predicts water-related operating expenses for metals and mining businesses will increase by a 1% to 4% compound annual growth rate by this year, with a 4% to 7% CAGR expected for water-related capital spending.

## SMART FIELD DEVICES UNLOCK MORE OPPORTUNITIES TO SAVE WATER

A higher level of visibility is vital for truly optimised operations, and a proven solution — smart field devices — is readily available. Smart field devices help improve data integrity by continually capturing critical data that can be analysed to identify optimisation opportunities.

Companies can leverage wireless instrumentation across remote areas of the mine to create a digital snapshot of the entire water infrastructure. Using a combination of wireless and wired instrumentation, automation enables mine operators to design water management programs that integrate real-time data to optimise the entire mine water circuit — accurately quantifying water inputs, losses, consumption and recovery.

Automating data collection can streamline regulatory reporting as well. Currently, miners report water withdrawal and discharge on a regular basis and aggregate it into an annual report. Automation empowers real-time data, simplifying the process and enabling faster, more transparent sharing of information.

For example, many mining companies turn to flow metering systems to meet local water requirements but are challenged by the high costs associated with stopping the process to add proper measurements as well as instrumenting huge pipes to account for high flow variability.

When reviewing different flow meter technologies, companies must ensure the flow meters are suitable for moist and dirty gases and for pipes with non-bonded liners. Also, for operations with large, 100 cm pipes, some flow metering technologies are heavy and difficult to transport and install at remote mining sites. The cost to shut down operations to install these technologies can be more than half a million dollars a day.



To address some of these challenges, companies turn to non-intrusive flow measurements that are mounted on pipes and use ultrasonic signals emitted alternately from one transducer to another. The physical quantities are determined by the transit times of the ultrasonic signals; the transit time difference being proportional to flow velocity. Microprocessors control the entire measuring cycling and verify signals for measurement usability and reliability, and noise signals are eliminated.

In addition, many mines are turning to advanced electric valve actuators for remote tank applications, tailings networks and desalination plants, where the operation and maintenance of air systems for pneumatic valves is cost prohibitive. While electric actuators used to be less common due to torque limitations and electric power availability, the advent of much more efficient, high torque motors, spring failure options, robust diagnostics and wireless remote access has greatly changed the suitability and viability of electric actuators. The embedded controls and communication

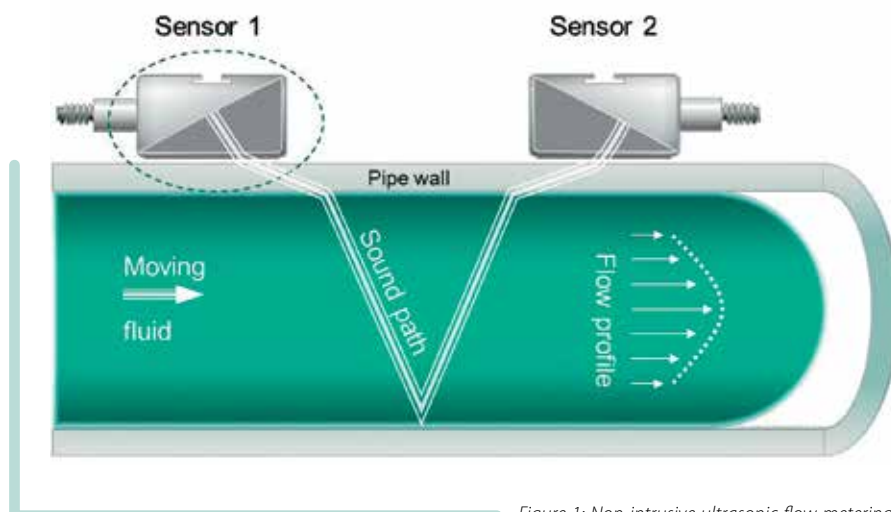


Figure 1: Non-intrusive ultrasonic flow metering.





options enable remote control and monitoring of far-flung tailing distribution networks even when power is limited.

### REINFORCING RELIABLE WATER CIRCUIT OPERATIONS

Water recovery is an important lever for a resource-intensive industry like mining, and automation can help drive significant efficiencies. Process control systems can be deployed to automate the mine water circuit, providing real-time visibility of water management operations, improving both operations and consistency of water recovery.

Advanced process control (APC) systems are also optimising key parts of the water circuit to boost water efficiency and recovery. At the same time, these technology solutions have significant potential to reduce tailings volume. Thickeners, charged with separating water from slurry or solid-liquid mixtures, are a prime example. Model predictive control technology helps address this by optimising the underflow rate based on density constraints while preventing rake damage. Using models of optimal

performance and engineering simulations, APC can reduce production variability, making efficient utilisation highly replicable.

Another area where advanced analytics assists is in desalination plants. In water-scarce countries a greater focus on water recovery is vital, and in many countries the mining industry has turned to large desalination plants to sustain operations. By using sophisticated control systems, these plants are fully integrated into the wider mining ecosystem and offer 24/7 visibility of water management operations.

Though desalination is extremely effective in protecting freshwater resources, salt water is highly corrosive, increasing the necessity for intelligent and predictive equipment health monitoring, helping operators predict and prevent equipment failure and increased maintenance costs. In addition, analytics software provides critical pump health monitoring, helping engineers detect and avoid breakdowns with the aid of machine learning. Conditions such as cavitation, bearing wear, shaft misalignment, seal leaks and other damaging conditions are detected



TODAY'S MINE WATER CIRCUITS FEATURE  
LITTLE TO NO AUTOMATION.

before impacting operation, and personnel are notified of what corrective action to take and how urgently.

Miners are constantly focused on extracting the greatest value from the raw materials they extract. That same stewardship and optimisation mentality is increasingly being applied to resources like water that are critical to their production processes. Mining leaders who adopt automated solutions for water management today are well-positioned to navigate waves of change well into the future, reducing costs while also freeing critical freshwater resources to support healthier communities around the globe.

1. McKinsey & Company 2020, *Optimizing water treatment with online sensing and advanced analytics*, <<<https://www.mckinsey.com/industries/metals-and-mining/our-insights/optimizing-water-treatment-with-online-sensing-and-advanced-analytics>>>

## COMPACT SAFETY GATE SYSTEM

The PSEnmgate safety gate system is compact and suitable for all types of safety gate.

**Pilz Australia Industrial Automation LP**  
<https://bit.ly/3zJXrNw>



## MOTOR SAFETY MODULES

Pizzato CS AM series safety modules are designed for motor speed and standstill detection.

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<https://bit.ly/3ZLebhY>



## EMBEDDED PC

The AVS-530 is an industrial embedded PC that is purpose-built for factory automation and machine vision applications.

**Interworld Electronics and Computer Industries**  
<https://bit.ly/3XN9TnC>



## POSITIVE DISPLACEMENT FLOWMETER

The FLOWPET-5G positive displacement flowmeter is primarily intended for use in boiler feed water and fuel oil metering applications.

**Slentech Pty Ltd**  
<https://bit.ly/3XMY2WO>



## Planetary gearbox supports global success of composting solution



In an effort to reduce the impact of waste on the environment, New Zealand's government has developed a waste management strategy with the goal of achieving a low-emissions, low-waste society, built upon a circular economy, by 2050. This in turn is prompting industries to proactively address their waste management and improve their resource recovery.

To this end Global Composting Solutions has developed its HotRot in-vessel composting solution. The HotRot is an odour-free solution that reduces waste and diverts it from landfill, helping to reduce methane emissions. It's ideal for those organisations that are seeking out an efficient waste management solution but don't want to build a composting plant. Designed to process anything from 250–10,000 kg of waste per day, it provides a scalable solution that transforms any waste into a valuable resource: compost.

The largest HotRot vessel is 18 m long, with an internal diameter of 3.5 m and a shaft that runs through the centre. The gearbox driving the mixing of waste is external to the vessel — internally it is driving a massive shaft. The 700 mm diameter shaft has tines attached to move the waste and incorporate air into the mix to help it break down faster. The shaft rotates at less than 0.5 rpm, with short cycles for two to three minutes before it stops. The shaft rotates in both a forward and reverse direction.

"At any one time you could have 100 tonnes of waste in the vessel which the shaft is working through," said Andrew Green, MD of Global Composting Solutions. "This means there is a massive torque requirement at low speed, so getting the gearbox ratio right is critical. We needed a gearbox that's fit for purpose.

"This is when Global Composting Solutions turned to long-time partner Bonfiglioli. By working with Bonfiglioli we were able to tailor a solution that suits our engineering requirements and application — not the other way around.

"Bonfiglioli recommended the 300M Planetary Series — and we secured the largest planetary gearbox they've ever sold in New Zealand."

The 300M Series industrial planetary gearmotor from Bonfiglioli has been standardised, tried and tested. The gearbox delivers 700–800 kNm of torque

and features a specialised 5-stage gearbox. The 321 L5 gearmotor with an axial locating plate has been customised to provide the speed required by Global Composting Solutions.

"One of the improvements we made was to utilise an FZP splined output. This was to enhance ease of installation and removal," said Paul Savage, Manager of Bonfiglioli New Zealand. "This gearbox weighs 3 tonnes — it's difficult to fit, so it has to be right the first time and must work reliably without too much interference or maintenance."

Green explained that the in-vessel composters run for years with very little intervention, due to the basic design of the solution, and the use of high-quality components.

"We build machines for a 15-year life but we have products with 15 years on them that are still running on the original gearboxes," he said. "The fact that Bonfiglioli is an international company is invaluable. When there are issues with the gearbox, they will send out a service technician and get it sorted quickly, no matter where the customer is located.

"This is rarely required as the gearboxes have very few failures. When we did have an early failure incident, Bonfiglioli fixed it in no time. They were very professional."

Green added that besides its prompt response to technical enquiries, Bonfiglioli is able to fulfil short lead times.

"Paul and his team at Bonfiglioli are good at giving us options so we can source from Bonfiglioli manufacturing and assembly plants around the world, to make it happen," he said. "To have good suppliers is critical, because we are in so many areas. We need a reliable product and network that backs us up with good service, technical expertise, stock and reliability."

*A longer, more detailed version of this story can be read online at: <https://bit.ly/4f7vUoI>*

**Bonfiglioli Transmission Pty Ltd**  
[www.bonfiglioli.com.au](http://www.bonfiglioli.com.au)

## RADAR LEVEL TRANSMITTERS

Krohne has released the OPTIWAVE 1520 and OPTIWAVE 1540 2-wire 80 GHz radar level transmitters with HART and Bluetooth for basic applications. The devices are compact and come with a flush-mounted antenna and a robust PVDF housing. Both devices are waterproof (IP68) and can be used for both liquids and solids.

The OPTIWAVE 1520 is suitable for use in confined spaces and in open-air applications. Typical applications include the measurement of sewage sludge, wastewater and treated water, such as in pumping stations, on screw lifts and above water basins. Due to its small beam angle, OPTIWAVE 1520 is also suitable for small silos with granulate solids such as sand, or for small tanks with internals as well as for level measurements that do not allow a dead zone. Within its measuring range of 0-10 m, it offers a measuring accuracy of  $\pm 5$  mm.

The OPTIWAVE 1540 is resistant to many chemicals and contaminated liquids and offers level measurement in mobile containers (IBC tanks), in chemical tanks (up to 5 bar), in water and wastewater applications and in granulate solids silos. It offers measuring accuracy to  $\pm 2$  mm over a measuring range of 0-15 m. The radar device can also be used as a simple flow meter in open channels to determine the flow based on the height and geometry of the venturi channel.

Using the quick setup wizard, both devices can be quickly set up and commissioned via Bluetooth using a smartphone or tablet and the OPTICHECK Level Mobile app.

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## ULTRASONIC SENSORS WITH ADJUSTABLE SOUND CONE

The Leuze HTU420B and DMU412B ultrasonic sensors in M12 housings are designed to be used for many different applications — for switching (HTU) and measuring (DMU) applications — and offer an adjustable sound cone.

The sound cone can be set via an IO-Link interface to the three ranges — narrow, medium or wide — to adapt to the respective application. They also detect glossy, reflective, very dark or transparent surfaces and liquids.

The HTU420B ultrasonic sensors (red housing) are suitable for challenging detection tasks. For example, two fill levels can be detected or two positions can be monitored simultaneously. The adjustable sound cone turns make the sensors more flexible: a narrow sound cone, for example, is suitable for detecting a fill level through small container openings, while in the wide setting, the sound cone in turn captures larger areas — useful in the case of bulk material or diffusely reflective objects with complex surface or structure. An interruption filter detects brief changes in measurement within a certain interval caused by interfering objects (such as an agitator) suppressing these interfering signals via the IO-Link interface.

The DMU420B and DMU412B ultrasonic distance sensors have an analog output (either current or voltage) and an IO-Link interface.

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## LONG-RANGE DISTANCE SENSOR

Acuity Laser's ultra-compact AR2700 eye-safe rangefinder has a measurement frequency of up to 40 kHz and can measure distances to natural targets up to 70 m away or to retroreflective targets 270 m away.

The AR2700 high-speed long-range sensor uses time-of-flight measurement principles to measure long distances at short measurement intervals at high sampling rates. This sensor can measure distances from 0.2 to 70 m to natural targets of low reflectance (10%). The accuracy is generally specified with an absolute linearity of  $\pm 60$  and a repeatability of  $\pm 25$  mm. The linearity will vary depending on sample averaging, temperature and surface reflectivity of the target surface.

The AR2700 sensor is offered as a ready-to-use device with industry standard IP67 housing. Designed for measurements of moving targets, the distance sensor is commonly used to detect objects in industrial automation or for monitoring defined areas in transport and logistics applications. Typical applications include bridge crane monitoring, trolley positioning and altitude measurements, amongst others.

The AR2700 sensor is supplied standard with serial output (RS232 and RS422) and analog 4–20 mA current loop output. The AR2700 has two limit switches for indicating alarms used for triggering an external device when a target reaches a set position. Data formats are available both in ASCII and binary with selectable termination characters. The sensor can also be triggered using an input signal wire or a serial command at rates up to 30 kHz.

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## INDUCTIVE SENSORS WITH IO-LINK

Turck is expanding its inductive sensor range with flush and non-flush mount inductive measuring sensors that have IO-Link and an analog output. Due to an integrated microprocessor, the BI11-CK40 and NI11-CK40 models offer improved linearity and accuracy with temperature compensation over a wide temperature range from  $-25^{\circ}\text{C}$  to  $+75^{\circ}\text{C}$ . The devices have a standard adjustable 0-10 VDC voltage output as well as an additional switching output that can be freely parameterised via IO-Link.

The simple parameter transfer via IO-Link facilitates sensor replacement in the event of a fault and minimises downtimes in production. With a long range of up to 25 mm and a linearity deviation of less than 1% for the flush version and less than 2.5% for the non-flush version, the robust IP67 sensors offer high precision and in a wide range of applications, for example in the mechanical engineering, packaging, and energy sectors. The rectangular CK40 design allows space-saving, flexible and easy to implement installation solutions. The sensor head can be positioned easily in five directions using the tool supplied.

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## TOTAL CHLORINE ANALYSER

The TC80 Total Chlorine Analyser from Electro-Chemical Devices (ECD) is designed to eliminate consumables, simplify installation and reduce maintenance with a self-cleaning design, lowering the total cost of ownership. The easy-to-use analyser is a panel-mounted unit that is ready to go out of the box.

The analyser is designed to monitor total chlorine in drinking water, industrial cooling and rinse water, wastewater or other freshwater samples containing chlorine in the range of 0–20 ppm. The Total Chlorine Sensor (TCS) is a three electrode amperometric sensor that measures all chlorine species in the water, combined chlorine and free chlorine in a range of 0.05 – 20 ppm Cl<sub>2</sub> (high range) or 0.005 to 2 ppm (low range). It also features a flow control device, a pH sensor and a T80 transmitter mounted on a PVC panel. The user connects the sample and drain lines, connects the power and outputs, and it is ready to use. The TC80 Total Chlorine Analyser is calibrated at the factory before shipment, and additional calibrations are accomplished by DPD comparison.

The TC80 Total Chlorine Analyser sensor technology and automatic pH compensation offer a reagentless design to keep the cost of ownership low without having expensive reagents.

Outputs include dual 4–20 mA output, Modbus and HART communication and three alarm relay outputs, and the system can be powered from 24 VDC or 110/220 AC power. An auto cleaning option is available to keep the chlorine sensor clean from contaminants for an extended period of time.

**AMS Instrumentation & Calibration Pty Ltd**  
[www.ams-ic.com.au](http://www.ams-ic.com.au)



## AI MACHINE VISION SENSOR

With the launch of the Inspector83x 2D vision sensor, SICK has enabled out-of-the-box AI machine vision inspections for common inline inspection tasks in high-speed production.

SICK says the teach-in capability of the Inspector83x can be used by non-specialists to configure high-precision AI inspections at full production speeds. By showing the camera a handful of examples, initial inspection results can be up and running quickly. Any product design or batch changes can be quickly added in the same way by an operator from the production line.

The Inspector83x offers up to 5 MP resolution and built-in illumination, and with a quad-core CPU and high-speed data transfer over industrial networks, the Inspector83x processes AI inspections directly on the device, and at significantly faster speeds than its predecessors.

Once set up, the image inference is carried out directly on the SICK Inspector83x and results are output to the machine control as pass/fail results or sensor values. The Inspector83x is optimised for rapid data transfer in industrial networks with dual ports for EtherNet/IP or Profinet integration. A dedicated high-speed Gigabit Ethernet port provides the capacity for high-resolution image data transfer as well as data logging or TCP/IP integration. A built-in export function can output customised configurations for common PLC types.

No external machine control is needed and typically, up to 15 inspections per second can be accomplished reliably for machine vision tasks such as defect and anomaly detection or classification.

**SICK Pty Ltd**  
[www.sick.com.au](http://www.sick.com.au)

## ELECTROMAGNETIC FLOWMETERS

Available at the end of 2024, the ABB ProcessMaster FEW630 is an easy-to-use electromagnetic flowmeter for municipal and industrial water and wastewater flow measurement. ABB says it is designed to simplify the selection, operation, maintenance and servicing of its electromagnetic flowmeters in response to the evolving needs of the water and wastewater industry.

The ProcessMaster FEW630 utilises a modular design that can be tailored to meet a range of specific requirements in municipal and industrial applications. Long-lasting, industry-specific wetted part materials offer resistance against abrasion and corrosion, prolonging sensor service life and enabling minimal maintenance in applications such as potable water, wastewater, sewage, sludge, thickened sludge, influent and effluent.

The instrument has been designed to be as easy as possible to install, use and maintain. The device features standardised configuration and operating procedures and clear text displays that enable parameters to be easily set, adjusted and checked. Setting up and commissioning the flowmeter is made easy by built-in smart sensor technology. On initial installation, the flowmeter performs a self-configuration, automatically replicating all data from the Sensor-Application-Memory into the transmitter.

Wiring up the flowmeter is also simplified by a four-conductor sensor cable. Easy and quick to connect, it uses colour coding to eliminate the risk of wiring errors.

Continuous self-monitoring of the sensor and transmitter and real-time diagnostic functions checking the transmitter, sensor and wiring enable quick and easy troubleshooting. Other functions include a built-in noise and grounding check that verifies the installation is correct.

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## ONLINE MOISTURE AND TEMPERATURE MEASUREMENT FOR SOLIDS.

ENVEA (SWR) M-SENS-3 was designed especially for continuous moisture and temperature measurements of bulk solids like powders, granulates, grains for the food processing industry. This microwave technology sensor is also designed to indicate material flow, which allows you to be sure that measured material is effectively flowing in your process. This increases the validity of the moisture measurement and allows you to quickly detect process failure, such as a defective screw conveyor, clogging, etc, via an alarm.



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# MAXIMISING AUTOMATION FLEXIBILITY

## WHY INDEPENDENT SOFTWARE VENDORS ARE CRITICAL TO MODERN INDUSTRY SUCCESS

*Patrick van Eybergen\**

Vendor lock-in has long been a significant barrier to innovation in the industrial sector, making integration with new technologies both difficult and costly.

In today's rapidly evolving technological landscape, industries face unprecedented challenges, from supply chain issues and vendor lock-in to the growing need for flexible and agile systems. As factories move towards smart manufacturing, the pressure to integrate new technologies, enhance operational efficiency, and remain competitive continues to intensify. Independent software vendors (ISVs) play a critical role in addressing these challenges by providing flexible, open and scalable solutions that allow industries to innovate and future-proof their operations.

However, successful integration into smart factory systems requires careful planning and strategic decision-making about the level of integration a manufacturer needs. This balance between flexibility, cost and the pace of adoption will define whether an industry can truly leverage the benefits of a smart factory. This article explores the pivotal role of ISVs in driving smart factory integration, how careful planning impacts the choice of

integration levels, and how open standards and platform-independent solutions are shaping the future of manufacturing.

### **BREAKING FREE FROM VENDOR LOCK-IN**

Vendor lock-in has long been a significant barrier to innovation in the industrial sector. When manufacturers rely on proprietary systems, they often find themselves restricted by the technology of a single provider, making upgrades, expansions or even basic integration with new technologies both difficult and costly. Switching to alternative software or platforms can carry significant risks, leading many companies to resist change, even when faced with more efficient or modern solutions.

ISVs offer a way out of this conundrum. By developing vendor-agnostic software solutions, ISVs enable industries to adopt flexible, future-ready systems that allow them to pivot between platforms with minimal disruption. This independence is

particularly valuable as manufacturers adopt cloud-based services, where concerns around data security, control and integration can make businesses hesitant to commit to proprietary solutions.

Incorporating ISV-driven solutions into smart factory environments allows manufacturers to operate with greater freedom. For example, ISVs that build solutions on widely supported platforms enable cross-compatibility with existing systems, regardless of the original equipment manufacturers. This gives engineers the flexibility to integrate new technologies seamlessly, supporting plant-wide upgrades without requiring a complete overhaul.

One of the most important enablers of smart factory integration is the use of open standards. In modern industrial environments, efficiency hinges on the ability to connect and communicate across a wide range of devices, controllers and machinery, often from different manufacturers. ISVs play a vital role by developing software that adheres to these







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open standards, ensuring that various systems can work together smoothly.

Fieldbuses such as Profibus, Profinet, EtherCAT and Modbus are key examples of open protocols that are widely used in industrial automation. These standards allow industries to source products from multiple suppliers, increasing competition and lowering costs. More importantly, the use of open standards simplifies the integration of new technologies into existing systems, giving manufacturers the flexibility to upgrade their operations in line with the latest advancements in automation, IIoT and machine learning.

For instance, ISVs developing automation solutions based on these protocols can ensure that new smart devices — such as sensors or robotics — can be integrated into a factory's control systems without disrupting existing operations. This approach helps manufacturers avoid the costly reconfigurations often associated with proprietary systems and enables them to maintain a higher level of operational efficiency.

From an engineering perspective, open standards reduce the complexity of integrating diverse systems. Rather than being constrained by the limitations of vendor-specific protocols, engineers can implement best-in-class solutions tailored to their needs, knowing that these systems will communicate seamlessly with each other. This also allows for more flexible process control, making it easier to optimise production lines and respond to changes in demand or technology.

### PLANNING SMART FACTORY INTEGRATION: CHOOSING THE RIGHT LEVEL OF AUTOMATION

The key to a successful smart factory transition lies in thoughtful planning and selecting the right level of integration. Not every manufacturer will need, or benefit from, fully automated systems, and determining the appropriate level of automation depends on the specific

needs, processes and constraints of the business. ISVs play a pivotal role in this process by offering scalable and adaptable solutions that allow manufacturers to tailor their approach to automation and smart integration.

One of the first considerations when planning a smart factory transformation is the current state of the factory's infrastructure. Many factories still operate with a mix of legacy equipment and newer technologies, and it's often not feasible or cost-effective to overhaul the entire system in one go. By working with ISVs, manufacturers can gradually implement smart technologies — starting with automating key processes or integrating specific IIoT devices — while maintaining overall system integrity.

The beauty of ISV solutions lies in their flexibility. Because they are platform-independent and built on open standards, ISVs can help companies introduce smart technologies incrementally. This allows



*BY DEVELOPING VENDOR-AGNOSTIC SOFTWARE SOLUTIONS, ISVS ENABLE INDUSTRIES TO ADOPT FLEXIBLE, FUTURE-READY SYSTEMS THAT ALLOW THEM TO PIVOT BETWEEN PLATFORMS WITH MINIMAL DISRUPTION.*

manufacturers to control the pace of their integration, opting for partial automation in the beginning and scaling up as the technology proves effective or as business demands change. A manufacturer might start with integrating sensor data for predictive maintenance and later extend the solution to integrate with the plant's overall production management system.

For example, a factory might initially focus on implementing smart sensors to monitor energy consumption and equipment health. Once the benefits of this data-driven approach are realised, the manufacturer can expand the smart factory system to include fully automated control of production lines, real-time data analytics, and ERP integration. The ISV-driven approach ensures that the factory can scale its smart operations while avoiding the financial and operational risks of an all-at-once implementation.

As industries transition towards smart factories, the need for platform-independent solutions has become increasingly important. Smart factories are characterised by their use of connected devices, sensors and machines, all communicating and sharing data to optimise production. However, one of the main challenges is the diversity of hardware and systems used in these environments. ISVs provide solutions that can operate across different platforms, ensuring that smart factories are not limited by the compatibility constraints of their equipment.

A common issue in smart manufacturing is the wide range of communication standards used by different machines, sensors and controllers. This diversity makes integration difficult, particularly when proprietary software is involved. ISVs, however, specialise in developing platform-independent solutions that bridge the gap between these

systems. For example, some ISV solutions support hundreds of communication protocols, allowing manufacturers to integrate diverse technologies into a unified control framework.

This flexibility reduces downtime and allows for the gradual implementation of new technologies, making it easier for manufacturers to adopt and scale smart factory solutions at their own pace. Additionally, the ability to integrate systems from different vendors ensures that manufacturers can future-proof their operations, knowing they are not tied to a single technology provider.

For engineers, the benefits of platform-independent ISV solutions are clear: they allow for more agile system design, enabling factories to experiment with new technologies and approaches without the risk of being locked into a single vendor's ecosystem. This is particularly important in fast-moving industries, where the ability to adapt to technological advancements can be a key competitive advantage.

## UNLOCKING VALUE THROUGH ERP INTEGRATION

Enterprise resource planning (ERP) systems are critical for managing everything from supply chain logistics to financial operations in industrial environments. However, these systems can often fall short when it comes to addressing the specific needs of individual industries. This is where ISVs excel, by offering tailored software solutions that extend the capabilities of ERP systems, providing functionality that is highly specialised for the demands of specific industries.

For example, an ISV may develop solutions that enhance quality control processes, provide advanced reporting, or integrate e-commerce functionality into an existing ERP platform. These extensions help

manufacturers optimise their operations and improve efficiency without the need for an entirely new ERP system.

From an engineering perspective, ISVs also enable smoother integration between ERP systems and operational technologies. By developing software that bridges the gap between business-level and plant-level systems, ISVs provide a unified platform for managing both production and administrative processes. This allows for real-time data exchange between ERP systems and industrial equipment, helping manufacturers make more informed decisions and improve overall efficiency.

ISVs also provide manufacturers with the flexibility to upgrade and enhance their ERP systems over time. By working with ISVs, manufacturers can add new features and functionalities as needed, avoiding the limitations of proprietary ERP systems and ensuring that their operations continue to evolve with the latest technological advancements.

## EMBRACING AN OPEN FUTURE

As industries embrace the future of smart manufacturing, the role of ISVs in enabling flexibility, integration and innovation cannot be overstated. By offering vendor-agnostic, platform-independent solutions that adhere to open standards, ISVs provide manufacturers with the tools they need to break free from vendor lock-in and future-proof their operations.

Thoughtful planning of smart factory integration is crucial, as not all businesses require full-scale automation from the start. ISVs help manufacturers choose the appropriate level of automation and allow for flexible, phased implementations. By controlling the pace of smart factory integration, businesses can avoid costly disruptions and ensure a smooth transition to more intelligent operations.

By embracing ISVs, industries can unlock the full potential of smart manufacturing, building flexible, scalable and future-ready operations — laying the foundation for long-term success in a competitive market.

*\*Patrick van Eybergen, Managing Director of Ti2 Group and co-host of the Industry X.0 Unplugged podcast, has a passion for driving innovation, and explores the rapidly evolving landscape of industrial technology while advocating for Australian manufacturing.*

# NEW PRODUCTS

## **SAFETY SYSTEM**

Rockwell Automation has announced the launch of Logix SIS, a safety instrumented system (SIS) designed to address the evolving needs of modern industrial environments.

Rockwell says the Logix SIS provides a modern and integrated safety solution, offering both SIL 2 and SIL 3 certifications for process and hybrid safety. Logix SIS provides all components of a safety instrumented system including the process logic-solver and I/O. The system is engineered to provide high availability leveraging the latest 1756 controller, FLEX 5000 I/O platform and Studio 5000 Logix Designer application for an integrated user experience.

The Logix SIS solution aims to deliver comprehensive safety across a wide range of industrial applications with high availability for continuous operation of critical processes.

Implementation is streamlined by leveraging familiar hardware and software, reducing engineering time to maximise efficiency through simplified design and configuration. The system can also be upgraded without requiring planned downtime, and is available through Rockwell Automation distribution channels worldwide.

**Rockwell Automation Australia**

[www.rockwellautomation.com/en-au.html](http://www.rockwellautomation.com/en-au.html)



## **HIGH-SPEED IMAGE STREAMING CAMERA**

SciTech has introduced the pco.dimax 3.6 ST high-speed camera from Excelitas Technologies.

With real-time image streaming, the pco.dimax 3.6 ST captures images with a recording speed of 2166 fps at 3.6 MP resolution, making it suitable for use in high-speed sorting, analysis and inspection applications including production control and analysis, quality assurance, research, process and material development, laser welding and inert gas welding, as well as automotive airbag and component testing.

It features a Camera Link HS data interface (CLHS FOL) that provides real-time, uncompressed, 10-bit data transmission over 8 x 10 Gbps fibre to maintain lossless image details. Other features include high sensitivity with 11 um pixel size, a high full well capacity of 60,000 electrons; a spectral range of 340–1100 nm; and sensor size of 21.8 x 19.8 mm or 29.5 mm. Each pco.dimax camera is provided with PCO software.

**SciTech Pty Ltd**

[www.scitech.com.au](http://www.scitech.com.au)

## **VALVE ACTUATOR WITH INDUSTRIAL ETHERNET**

Rotork has introduced a fully integrated Ethernet actuator, which is compatible with EtherNet/IP, Modbus TCP and Profinet protocols.

A data gateway is no longer required, enabling a direct, streamlined connection to Rotork's IQ3 Pro actuator. This reduces complexity and increases the volume and speed of data extraction, with transfer rates up to 100 Mb/s.

The solution is also housed within a robust weatherproof or explosion-proof enclosure and supports RJ45 and M12 connection standards. Compatibility extends to industry-standard protocols, with PI certification, GSDML files for Profinet, and ODVA certification with supporting EDS files for EtherNet/IP.

The Ethernet solution accelerates data transfer and enhances the capability for in-depth data analysis. By leveraging the Rotork Intelligent Asset Management (iAM) cloud-based system, operators can access insights from their operational data. This enables predictive maintenance, optimised performance, and informed decision-making.

**Rotork Australia**

[www.rotork.com](http://www.rotork.com)



## MICROGRIDS: MOVING TOWARDS CLIMATE CHANGE RESILIENCE

The problem of climate change has been ever increasing, and as more natural disasters affect every corner of the globe, we are no longer able to deny its existence and impact. The cost of doing nothing is also beginning to outweigh the cost of implementing measures that help drive change and provide us with a degree of resilience.

Across Australia and New Zealand in the past five years, we have seen major bushfires, significant storms, massive flooding and cyclones. Each occurrence critically damages the essential infrastructure that is relied upon for society to function normally.

The good news is that as we rebuild, we can apply more modern and smart investments to help mitigate the impact of future events. One such investment is the development of microgrids. Since the Black Summer bushfire events the Victorian Government announced that it supported the development of community microgrids.

A microgrid involves the inclusion of local storage and energy production capability, so that should a location be cut off in a storm event, a complete power outage is unlikely to occur. The communities that rely on power for firefighting, running water, sewerage and more, can therefore continue to function. This need is only going to be exacerbated as remote working post COVID-19 allows people to be more geographically dispersed.

These microgrids should utilise the latest in modern technology to ensure they are net carbon zero, through the use of solar, batteries and intelligent power control. Doing so can ensure they are available for extended periods without any reliance on diesel or other fossil-fuel generation. In some cases, a diesel generator might be included to ensure long-term supply, but considering the alternative is generators at each home, the carbon emission reduction is still improved.

Another benefit of these microgrids is that during normal periods they can help to support the grid as a whole. Such renewable resources and storage have the benefit of helping to minimise peak loads and improve power quality at remote locations. This means that money which may previously have been used to 'gold plate' the electricity grid can be used to create microgrids.

To see the positive effects of these microgrids, we don't need to look too far from our own backyard. Companies like Bellevue Gold,

in partnership with Zenith Energy, are putting in hybrid microgrids to support the next generation of mining. Bellevue Gold, having just completed commissioning of the hybrid components, is now running on 100% renewables during large portions of the day.

Another learning is in the Pacific islands where high diesel costs drive the need for innovation to try and offer some cost savings, meaning companies are more willing to try new things. In Guam it was proven that intelligent high-speed controls can not only support increased renewables, but can also drive significant power quality improvements (reducing under frequency load shedding and creating more stable power) and more importantly reduce diesel consumption through generator efficiency improvements.

As we transition to a hydrogen-focused future, power quality is even more important. Electrolysers are very dependent on stable power and don't like to ramp up and down quickly, meaning an even higher level of control is required, almost necessitating a microgrid. If that hydrogen is then being sold to Europe, the Carbon Border Adjustment Mechanism means that it needs to prove that the generated hydrogen is carbon neutral to avoid tax.

We can see that there are economic and social benefits to a microgrid and even a nested microgrid solution. The benefits go far beyond a natural disaster and can provide day-to-day advantages. The question for Australia is what it will take to drive some of the needed investment: industry is seeing the need due to global carbon commitments; however, more could be done domestically, and community microgrids are a very likely answer.

*Daniel Watson is an electrical engineer at Yokogawa Australia with a strong passion for renewable energy and achieving a better tomorrow. Having worked in power stations he understands the difficulties but also the needs around the energy transition.*





# How to optimise WWTP flow measurement for process efficiency

Whether a plant team is adding process measurements, replacing under-performing flow technologies, undertaking major automation upgrades, or designing new or expanded facilities, FCI has the right products for air and gas flow measurement, liquid and gas flow switching and alarms, and point level applications in municipal and industrial WWTP and WTP operations.

From wastewater aeration lines to digester gases, from potable water disinfection processes to pump flow protection, the right flow measurement instrumentation ensures optimal process operations and minimised maintenance that can save time and reduce expenses. With more than 10 unique and optimised flow measurement products, FCI has installed more air/gas flow meters and flow switch solutions in municipal wastewater and water treatment applications than any other supplier.

As a pioneer in thermal dispersion measurement technology, FCI thermal mass flow meters, thermal flow switches and level switches are the industry's most recognised and installed throughout the world. FCI developed and remains the leader in thermal flow sensing constant power technology, has innovated techniques such as equal mass sensor and is the sole provider of the industry's Vortab tab-type flow conditioners.

The simplicity and robustness of a thermal sensor in flow meter applications addresses many industrial technology concerns. The sensor is comprised of two platinum RTDs that are protected within thermowells. These sensors are fully welded to prevent migration of the measured gases into the instrument. One RTD is heated while the other provides a reference by measuring the process temperature.

This temperature differential is directly proportional to the mass flow measurement of the process.

For example one of the industry's newer renewable energy initiatives uses digester gas or biogas, which is measured with thermal flow meters, to help power co-generation and combined heat and power (CHP) systems. Depending upon the amount of digester gas or biogas produced at any given time, a supplemental supply of natural gas (NG) can be required. It is essential to understand the calorific value of the digester gas feed in order to supplement it with the correct amount of NG, maintaining a proper ratio to ensure the calorific value of the blended gas being fed to the engine ensures efficient, continuous operation.

In co-generation and CHP systems, thermal mass flow measurements maintain this proper ratio in order to achieve higher energy efficiencies. Capacity demand requires instrumentation with flow turndown capabilities as high as 100:1. Gas-specific calibrations ensure overall performance of the mass flow meter under actual field conditions. The use of FCI flow conditioners allows for reducing the footprint of meter runs in older crowded plants.

**AMS Instrumentation &  
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**AMS**

# NEW PRODUCTS

## DRIVES

The Danfoss iC2 Micro Drive has been released to meet the demanding needs of various industries in a compact and robust device that is designed to provide optimal performance and energy savings.

The Danfoss iC2 Micro Drive is suitable for applications where space is at a premium. With its compact size, the series delivers motor control in power ratings from 0.37 to 22 kW.

One of the features of the iC2 Micro Drive is its energy efficiency. Advanced motor control algorithms maximise energy savings, reducing operational costs and supporting sustainability. Installation and commissioning are made easy with a user-friendly interface and quick set-up guide.

The integrated programmable logic controller (PLC) allows for standalone operation and customisation without external devices. The drive supports various communication protocols, including Modbus RTU and BACnet, for seamless integration into existing systems. Designed to withstand harsh industrial environments, the iC2 Micro Drive features a robust enclosure and advanced protection features.

Upgrading to the iC2 Micro Drive is straightforward, specifically for those transitioning from the Danfoss FC51 Micro Drive, which it is designed to replace.

### Pacific Automation

[www.pacificautomation.com.au](http://www.pacificautomation.com.au)



## OPEN FRAME PANEL PC



ADLINK Technology has launched the SP2-IMX8 7"/10" open frame panel PC.

Based on ARM architecture, the system can also be configured as a media gateway or portable panel PC.

The SP2-IMX8 was designed to meet the demand for fast-track development, verification and validation. For ease of integration, it supports Windows, Android and Linux OS so that it is suitable for a wide range of edge devices and use cases.

Powered by an NXP i.MX8M Plus processor, the SP2-IMX8 has a 32 GB eMMC and external Micro SD slot for storage expansion with 12 VDC or 12–24 VDC input; and a physical recovery, reset with an optional power button. Additionally, it supports buzzer, optional speaker, mic-in, line-out and multiple I/O connectors, such as USB, COM, CANbus and 1 GbE LAN TSN. The SP2-IMX8 has also passed shock and vibration tests, withstands a broad range of operating temperatures and provides ESD 8K/15K protection for ongoing system operation.

Typical applications include system control panels, access control and kiosks in markets such as automation, manufacturing, and test and measurement.

Edge I/O enables the extra functions and interfaces, for instance, USB 3.2, I2C, SPI, 4GPI and 4GPO and others on request, to be customised to suit various vertical applications. Reduced power requirements and simplified circuitry support the design of smaller, more compact devices, making the SP2-IMX8 suitable for embedded use and industrial environments with limited space.

### ADLINK Technology Inc

[www.adlinktech.com](http://www.adlinktech.com)



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## INDUSTRIAL NETWORK SECURITY APPLIANCES

HMS Networks has launched its Anybus Defender range, a suite of industrial network security appliances designed to safeguard critical infrastructures.

The series provides a firewall to protect operational technology (OT) networks. Specifically designed for industrial control systems, the primary use cases are network segmentation in line with ISA/IEC 62443-3-3, network address translation with traffic filtering and deep packet inspection (DPI) on industrial protocols to enable protection of industrial assets. The range is suitable for machine builders who want to embed security in their offering as well as asset owners in manufacturing and critical infrastructures looking to upgrade their existing networks with new protection strategies.

The range features four models to meet diverse security needs. Anybus Defender Compact 1004 is a space-efficient solution for smaller industrial environments, offering robust protection without compromising on protection use cases. Anybus Defender 4002 is a firewall designed for medium-sized networks, combining advanced security features with ease of deployment. Anybus Defender 6004 is designed for larger installations — offering enhanced security capabilities and comprehensive network protection — while Anybus Defender 6024 is the flagship model, engineered for the most demanding industrial applications, providing extensive security and network coverage.

The products are designed for physical segmentation strategies and come with various port configurations, from RJ-45 Ethernet to SFP ports supporting copper or fibre connectivity. Anybus Defender 4002, 6004 and 6024 are available with three different licenses enabling various security use cases.

**HMS Industrial Networks**  
[hms-networks.com](http://hms-networks.com)



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# NEWPRODUCTS

## M8 AND M12 CONNECTORS

M8 and M12 connectors from Pepperl+Fuchs feature a rugged and durable design, while enabling simple installation and maintenance.

This is made possible by a number of technical features that have been optimised in the course of a renewal of the range. For example, the connectors have been equipped with a captive O-ring that is designed to ensure that the connection remains tight, even after many reconnections. The creepage distance between the pins in the contact carrier has also been increased beyond the market standard, which has been shown to increase tolerance to moisture ingress and contamination.

The design also facilitates maintenance and installation in the field: imprinted numbers for pin assignment prevent the cores from being mixed up during servicing.



**Pepperl+Fuchs (Aust) Pty Ltd**  
[www.pepperl-fuchs.com](http://www.pepperl-fuchs.com)

## IOT GATEWAY

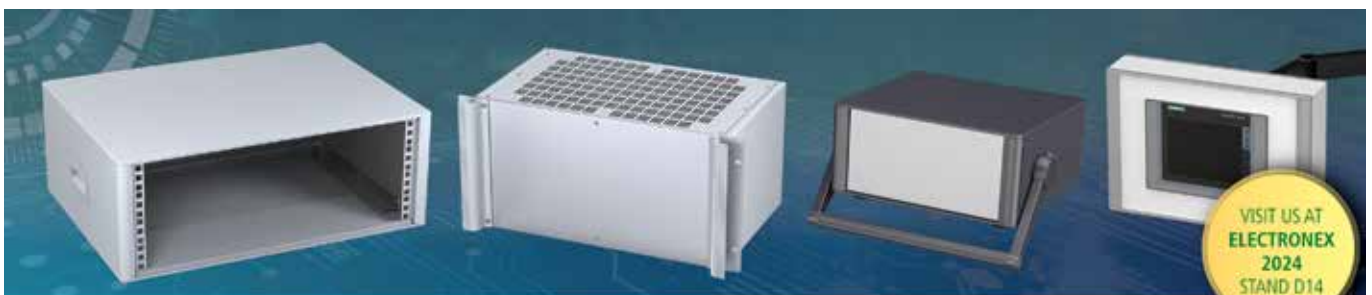


The VECOW AIC-110 is a robust industrial-grade IoT gateway engineered to facilitate seamless and secure data communication in challenging environments. At the heart of the AIC-110 is an NXP i.MX6ULL Arm Cortex-A7 processor that supports the gateway's connectivity and processing capabilities, making it a suitable choice for industrial automation applications.

The IoT gateway is designed to withstand a wide range of power supply conditions, with a 9-50 VDC power input tolerance. It features a variety of communication interfaces, including two LAN ports, one USB 2.0, and two COM RS-232/485 ports, as well as 12-bit isolated DIO with eight digital inputs and four digital outputs, alongside two CANbus interfaces.

For wireless communication it includes a Mini PCIe with a SIM socket supporting multiple protocols such as 4G/LTE, Wi-Fi, Bluetooth, GPRS, UMTS, and LoRaWAN, providing a range of coverage and connectivity options. The gateway comes pre-installed with Debian Stretch R01, and has a compact, cableless design.

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# Electrical control panels from HYDAC

Precision and reliability for modern industry

In today's competitive industrial environment, having a reliable, efficient, and safe control system is crucial. HYDAC, known for its expertise in fluid power and hydraulics, offers comprehensive electrical control systems designed to meet diverse industry requirements. HYDAC's range of electrical control panels is engineered for maximum flexibility, performance, and safety in a wide array of demanding applications.

## Meeting industry standards with AS/NZS 61439 certification

At HYDAC, quality and compliance are non-negotiable, which is why the electrical control panels are certified under the AS/NZS 61439 standard. This certification is a benchmark for low-voltage switchgear and control gear assemblies, ensuring that the panels meet the highest levels of safety, reliability, and performance. By adhering to these strict criteria, the products not only meet industry requirements but also provide peace of mind for customers, knowing that they are investing in systems built to last.

The AS/NZS 61439 standard sets stringent guidelines covering design, testing, and assembly, which are all integral to HYDAC's manufacturing process. With this certification, the panels are rigorously tested to perform under real-world conditions, guaranteeing consistent operation even in the harshest environments. By incorporating AS/NZS 61439 into the design and production process, HYDAC reinforces its commitment to delivering top-quality control solutions that are both safe and dependable.

## A streamlined approach to electrical control systems

HYDAC understands that each industry has unique operational challenges. That's why its electrical control systems are developed with a structured, customer-centric process that ensures tailored solutions. The process starts with in-depth consultation and planning, followed by custom design and assembly, with rigorous testing procedures at every stage. This approach guarantees seamless integration with existing systems, delivering optimal performance while minimising downtime.

From heavy-duty applications in mining and construction to precise control in manufacturing, HYDAC's electrical control panels are built to deliver reliable, long-term performance, even in harsh conditions. With HYDAC's solutions, customers benefit from reduced risks, enhanced safety, and improved operational efficiency.

## Featured products: Motor starters for every application

HYDAC's electrical control solutions include versatile motor starter panels designed for both complex and basic control needs. The assembled motor starter panels provide pre-configured solutions for precise motor control, with features like advanced motor protection, easy integration, and user-friendly interfaces. These panels are available in various configurations to meet different system requirements, ensuring reliability and durability in demanding environments.

For simpler setups, the ESPC Basic Motor Starter offers a straightforward yet robust solution, ideal for smaller-scale control systems. While it focuses on essential motor operations, it still maintains high performance with minimal maintenance. This makes it a cost-effective choice for businesses needing reliable, everyday motor control.

All HYDAC motor starters are designed to integrate seamlessly with HYDAC's control panels, creating a unified system that enhances overall operational efficiency. Whether the focus is on intricate motor management or straightforward control, the range delivers dependable performance across various applications.

## A holistic solution for industry

HYDAC's electrical control panels and motor starters are more than just individual products — they're part of a fully integrated control system. By providing complete support from design to implementation and maintenance, HYDAC ensures that systems run smoothly and efficiently. HYDAC's solutions are tailored to improve safety, streamline processes, and deliver superior control, helping your business thrive in today's competitive environment.

When you choose HYDAC, you're not just selecting high-performance products, you're partnering with a team committed to delivering long-lasting value and reliable support. Whether upgrading existing systems or planning new installations, HYDAC's electrical control solutions are designed to help your operations reach new heights.

**HYDAC International**  
www.hydac.com.au



# SAMPLING GASES AND VOLATILE LIQUIDS

## ESSENTIAL STRATEGIES

*Matt Dixon, Application Commercialization Manager, Swagelok*

Following gas sampling best practices can improve product output and reduce fugitive emissions.

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Sampling various industrial process fluids during a chemical plant's operation is crucial. It allows operators to decide whether adjustments need to be made to maintain high-quality end products. Additionally, regular testing provides insights into whether the analysis tools are working and can help plants remain safe and compliant with regulations governing accidental emissions. Finally,

regular sampling allows operators to control chemical costs by reducing leaks and validate process conditions.

Technicians who sample fluids frequently understand the process comes with challenges, and the measure of success is how well they navigate them. A set of overall best practices can streamline sampling procedures and provide technicians with the guidance they need to collect good samples every time.



## THE ESSENTIALS OF PROPER SAMPLING

If gases and volatile liquids undergo phase changes, it can lead to poor samples that do not accurately reflect the real-world conditions. There are four rules to follow to collect proper samples:

- 1. The sample must represent the process:** Use probes to draw samples from the middle of the process pipe and avoid phase changes during sample transportation.
- 2. The sample must be timely:** Minimise transport time from the draw point to the laboratory to help ensure process conditions are accurately represented.
- 3. The sample must be pure:** Avoid dead legs upstream of the sample container and allow for adequate purging and flushing of the sampling system to minimise the potential for contamination.
- 4. Sampling must be safe:** Grab sampling inherently involves a human operator interacting with process fluids, which often can be harmful if direct contact occurs. Following best practices and using well-designed sampling systems is essential — not just for sample accuracy, but also to operator safety. Enabling safety in sampling is about more than just the operator: it also relates to the environment and helping to prevent sampling operations from adversely affecting a plant's surroundings. A closed-loop sampling system can help reduce the possibility of fugitive emissions.

## REDUCING FUGITIVE EMISSIONS THROUGH CLOSED-LOOP SAMPLING

Fugitive emissions happen anywhere leaks occur. To protect the environment and workers, more regulations than ever govern the release of fugitive emissions, and it is incumbent on chemical plants to work hard to eliminate them as much as possible.

Fugitive emissions can happen during fluid sampling procedures, depending on how skilled the technician is. One potential cause of these leaks is the use of poorly constructed sampling systems or building them with substandard components. Fortunately, employing closed-loop sampling systems can help simplify the sampling process and significantly reduce fugitive emissions.

Closed-loop systems draw in process fluid and flow it through the sampling point where a portion of the sample is collected in a sealed container (a cylinder or bottle). The



Figure 1: To produce the most accurate samples of gases and volatile liquids, technicians should deploy sampling cylinders rather than unpressurised sample bottles.

system then returns the fluid to the main process. Because they can eliminate waste by returning fluid to the main process, and because they can shield both operators and the environment from exposure to the fluid, closed-loop systems often represent the best method to help operators reduce emissions and maintain safe working environments.

Below are a few features to look for when selecting a closed-loop system.

### System constructed from leak-tight components

A sampling system's quality depends on the quality of its components. For example, low emission (low-E) valves, which demonstrate through rigorous testing their ability to minimise fugitive emissions, may be incorporated into your sampling system's design to minimise the potential for unwanted leaks.

Certified low-E valves and other components are becoming increasingly common across industries and in various fluid system applications as emissions regulations become stricter.

### System designed and assembled to minimise potential leak points

Even the highest-quality valve or fitting has the potential to leak. However, by designing systems with as few connection points as possible, you can reduce the potential for unwanted leaks and resulting emissions. If leaks do occur where high-quality components have been used, this is typically a result of improper installation practices.

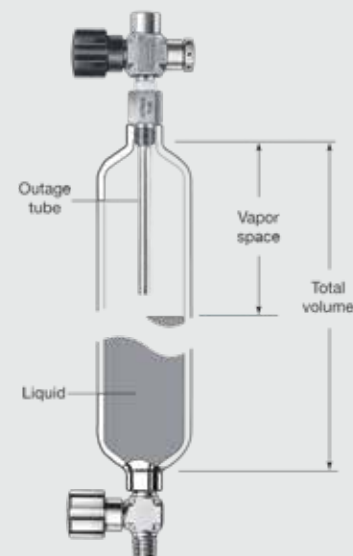


Figure 2: Technicians who are sampling volatile liquids should fill the cylinder from the bottom, which forces out trapped gas through an outage tube.

Be sure that your grab sampling systems have been assembled and tested by trained specialists to avoid these issues.

### Suitable sample drawing technology

The point at which the technician draws the sample into a bottle or cylinder container represents another point where leaks can occur. There are a few technologies that can help eliminate them. In a non-volatile liquid closed-loop system where samples are collected in bottles, the fluid is commonly dispensed via a needle that pierces a rubber septum. Ideally, as the needle is withdrawn, the rubber septum reforms a complete seal.

In gas or volatile liquid sampling systems where cylinders are used, cylinders that feature easily operable quick connects will allow for efficient and safe connecting and disconnecting from the sampling point.

Well-designed, closed-loop grab sampling systems can limit emissions by preventing exposure of process fluid to the environment. They can also reduce risk to sampling technicians by keeping process fluids fully contained. The right supplier can provide easy-to-use panels in standard, configurable designs that can be reproduced across a facility, not only minimising emissions and risk, but simplifying operator training and the potential for errors.

## CHOOSING THE RIGHT CYLINDER

Importantly, minimising fugitive emissions and enabling safety for operators during sampling activities requires careful consideration of



Figure 3: The more skilled the technician, the less likely it is that fugitive emissions will occur from leaks during the sampling process.

the vessels that will be used to capture and transport samples.

Operators should avoid sample phase changes between the process stream and the lab by keeping gases and volatile liquids pressurised in a sample cylinder instead of less expensive, unpressurised sample bottles (Figure 1). Additionally, cylinders offer more effective protection for technicians and the environment, particularly if the gas is toxic.

While most sample cylinders are constructed using seamless tubing, offer consistent wall thickness, and have similar size and capacity, differences do exist. Consider the following features when selecting a cylinder:

- Easily operable quick connects, allowing for efficient and safe connecting and disconnecting from your sampling point.
- A smooth internal neck transition, which can help eliminate trapped fluid and make cylinders easy to clean and reuse.
- Overpressure protection, which can provide higher levels of operator safety: rupture and relief valves are available in a tee or may be integral to the cylinder isolation valves.
- Proper material composition and finish, as special alloys or materials may be required depending upon the gas or volatile liquid being sampled.
- Incorporated bypass lines, which can be beneficial for purging toxic sample remnants and enhancing technician safety: if spillage occurs when the cylinder is disconnected the spill is composed of purge fluid rather than the toxic sample.
- Durable design and construction: sample cylinders must often be transported considerable distances for laboratory analysis.

Working with a reputable supplier will provide the support necessary to choose the right cylinder for specific applications.

### HOW TO FILL A CYLINDER

Hold the cylinder vertically as the filling takes place. Volatile liquids should fill the cylinder from the bottom to the top, which forces trapped gas in the cylinder out during filling, usually through an outage tube (Figure 2). Outage tubes also keep the cylinder from overfilling, which can cause rupture if the temperature changes precipitously.

For gases, technicians should fill cylinders from the top down, which prevents condensation build-up by pushing it out the bottom of the cylinder.

### MAKE SURE CYLINDERS ARE PROPERLY MAINTAINED

All industrial equipment risks deterioration though repeated use, and cylinders are no exception. Damaged or malfunctioning cylinders can put technicians at risk and make the sample process less accurate. That is why technicians must perform regular, proactive sample cylinder maintenance. Sample cylinders should be pressure-tested and inspected annually and recertified every five years.

In between the annual inspections, occasional damage may occur. Four common issues technicians should be aware of are:

- Leakage across key components, including valves and quick connects
- Corrosion resulting from compatibility issues with the sample
- Internal surface conditions, absorption
- Improperly installed components



TO PROTECT THE ENVIRONMENT AND WORKERS, MORE REGULATIONS THAN EVER GOVERN THE RELEASE OF FUGITIVE EMISSIONS, AND IT IS INCUMBENT ON CHEMICAL PLANTS TO WORK HARD TO ELIMINATE THEM AS MUCH AS POSSIBLE.

### REDUCING THE CHANCE OF HUMAN ERROR DURING SAMPLING

No matter how carefully technicians handle grab sampling, there is always the possibility they will make a mistake. Thankfully, it is possible to limit them via the following best practices

#### Documentation

Each grab sampling panel should have an engraved placard on it to provide technicians with instructions on how to use the panel. By providing detailed instructions, technicians should be able to draw a sample even if they have never used the panel before.

Explaining how to order replacement parts takes the guesswork out of maintenance.

#### Simplification

From the initial design to eventual operation, grab sampling systems should be as simple as possible to operate. A well-designed, intuitive system will enable technicians to do proper sample pulls every time.

Additionally, installing geared valve assemblies forces technicians to activate the valves in the proper sequence. Such a setup improves collection safety because it minimizes the opportunities for errors. Geared valve assemblies may also control the purge function, preventing purge fluids from accidentally being introduced into the process.

#### Automation

To eliminate the potential for human error entirely, designers may choose to automate sample collection. Eliminating all human involvement in sampling may cost more upfront, but it may pay for itself in error reduction. To achieve automation, grab sampling panels would typically be fitted with valve actuators and sensors for feedback, all controlled by a PLC. Be careful about installing wiring in hazardous areas.

Properly designed grab sampling systems should boost confidence about the overall consistency and quality of end products, which allows customers to have confidence in what they receive from the plant. Following established best practices throughout a facility will ensure high standards are met throughout the process.

## WHAT IS TSN AND DO WE REALLY NEED IT?

Two of the most significant innovations in industry since the 2000s have been the consolidation of fieldbuses into just a handful of open-vendor offerings (although some could argue there are still too many!) and the almost universal acceptance of Ethernet as an industrial networking standard.

That every fieldbus now utilises Ethernet is truly significant, as automation applications demand real-time performance for time-sensitive messaging — something that standard Ethernet was never designed to provide. Fieldbus designers have therefore had to adapt Ethernet to make it operate in real time.

Their hard work has paid off as the vastly improved fieldbuses we now enjoy can be attributed to Ethernet. Devices from different vendors can now communicate to each other, in real time, over a high capacity and relatively low-cost network.

### IMPROVING ETHERNET?

While real-time Ethernet has been successfully employed in C2D (controller-to-device) fieldbuses, the same could not be said for C2C (controller-to-controller) connections, where there's no predominant standard that can provide real-time capability.

Work has however been underway since 2012 to add real-time capability to standard Ethernet. It goes by the name of 'TSN', meaning Time Sensitive Networking.

The work, which is still ongoing, is being undertaken by the IEC/IEEE 60802 joint working group. It centres on Ethernet's data-link layer, the second of the seven-layer ISO communication model. Many different standards have been incorporated, mostly within the IEEE 802.1Q umbrella, to provide functionality such as time synchronisation, scheduling, traffic shaping and the selection of communication path.

Significantly though, TSN is not a new application layer protocol. Rather, it's an underlying technology; a transportation mechanism utilised by existing higher-level protocols to give them real-time capability.

### THE FIRST STEPS

The OPC UA FLC (Field Level Communication) initiative was founded in 2018. It's owned by the FLC group, a subgroup of the OPC Foundation (a vendor neutral organisation). More significantly, the FLC initiative has the backing of all major industrial automation players. Both are key ingredients for a standard to be successful in the marketplace.

By late 2022, the first phase of specifications was released. Called 'OPC UA FX' (Field eXchange), it extended the OPC UA standard to support real-time C2C connections. Work on the second phase started this year, focusing on C2D connections, although the first standards are not due for release until 2027.

One of the stated goals of TSN is to have one monolithic, unstructured network for all industrial communications. This would mean all nodes — everything from field sensor to the cloud — would have universal access to all data. This would replace the hierarchical 'pyramid' structure that is strongly favoured by virtually all automation providers today. While we don't have time to cover details, such an approach would be highly problematic, with no clear lines of responsibility, questionable performance and every node needing to manage its own security, to name but a few pitfalls.

### THE PROOF OF THE PUDDING...

Whether or not TSN becomes an industry-wide standard remains to be seen. The demand from users for an interoperable communication system between controllers that can provide real-time data is certainly there. Also, that all major vendors are behind OPC UA FX will undoubtedly aid its promotion.

Working against TSN is its complexity — the underlying standards it relies on are vast and their application difficult. TSN also requires significant new networking infrastructure and software, adding to the cost of implementation.

One thing that's become clear is that industrial applications need ever more real-time data, while most networks are already running at or near capacity. Some vendors have responded by trying to extract greater bandwidth from their existing networks, with or without TSN. They do this by increasing Ethernet's bit rate from the standard 100 Mb/s to 1 Gb/s and beyond.

While it's still early days for TSN, uptake so far has been sluggish, with vendor offerings limited and fragmented. This is despite the 'noise' that we sometimes hear from the marketplace.

*Harry Mulder is the Principal Automation Engineer at Beckhoff Automation. He has been involved in industrial automation for over 30 years and is fascinated by how new innovations keep affecting the direction of the industry. He really enjoys the practical element of his job, where he has a chance to get his hands dirty!*





# In a digital world, why is value still hard to find?

Steven Harding, Lead Developer, Oprix Pty Ltd

Organisations are gathering more data than ever before — but turning that raw information into value can be a major challenge.

At all levels of an industrial system, from the technician in the field to managers in the boardroom, there are a number of barriers that make it difficult to take advantage of the collected data, particularly in the fast-paced world of operational (OT) systems.

## Issue 1: Scattered and siloed information

The information businesses have tends to be scattered — not just physically (having to go to several different places on-site to access information), but also in the various role-specific systems and platforms in use.

It's important to note that this is not always a bad thing. Forcing people to use an unsuitable enterprise-level tool causes inefficiency and staff resentment — the staff deserve the right tools to do their jobs. But if you want to get a full understanding of the system or its parts, it can be quite painful to access all of these systems individually.

**Consolidation** is the process of gathering all of the various sources of information so they can be accessed in one, consistent place. This includes:

- Live sensor values
- Historical recordings
- Event databases and logs

- Documentation, manuals and training videos
- Downtime reporting and scheduling
- Maintenance information
- Staff and roster information
- Quality and inspection feedback
- Online databases (market rates, weather etc.)

A single point of data by itself isn't very useful, but when there is a variety of different types of information from many sources (including non-sensor information), a wide range of analytics can be performed — from simple calculations to building complex machine-learning models. From a basic trend to power-efficiency analytics that take complex system states into account.

## Issue 2: Complex identities

Some systems are well structured, so it's easy to find the needed information. Unfortunately, many others — particularly on sites that have been around for some time — have a huge number of data points with names that aren't readable, even to experts.

It's not uncommon to spend hours looking for the point of data needed, only to find that the one you thought was right was taken out of service several years ago.

Even the names of hardware can vary — a single part might have a different name for the electricians than it does to maintenance and process people.

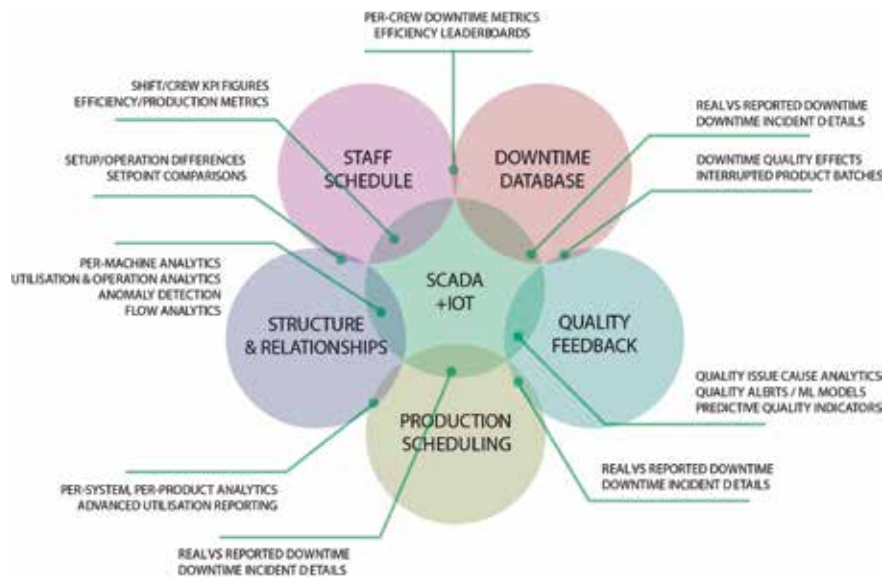


Figure 1: Scattered and siloed information.

This messiness makes it extremely hard for people to engage with the data collected, even for the most technical and long-serving staff. For those who are new to the system or less technical (such as analysts), it's impossible without needing the constant support of the engineering team.

It's good practice when consolidating data to ensure that it's *human readable*. Instead of having to know that the main tank temperature is PLC4.AIC1.42\_AI, an analyst can go to the 'Main Tank', an operator to 'TK\_04' and maintenance people to 'TK4' and they can see the temperature — along with all of the other details captured about the tank.

### Issue 3: Data ownership and replication

Your data is exactly that — *your* data. It's frustrating to come across vendor lock-in, where data is locked away or difficult to access. Or sometimes the opposite is true, and it is necessary to send the data up to the cloud and hand proprietary information to third parties, just to do relatively simple tasks that could easily be done on site.

Having data replicated in multiple locations causes its own unique issues. Which values should be believed when there are disagreements? How to deal with forecasts, which are based in the future and will change over time? If depending on feedback from the cloud, what happens to cloud data when the internet connection is down?

The ideal solution is that the consolidation system should *deliver* and not *replicate* the information. Instead of being yet another data store, a consolidation system should leave important data where it already is, so information is always up to date and reliable.

### Issue 4: The OT/IT barrier

The technology of the operational (OT) network is very different to that of your IT and enterprise networks.

Outside the usual firewalls that keep them apart, the biggest difference between the two is the *timescales* they operate at. Management decisions happen in days or weeks, but process decisions need to happen in *seconds*. In the OT network, data has to be brought in and shared fast enough to help those quick decisions.

That difference in timescale is why so many IT technologies fail in the OT network.

When consolidating information, the ability to gather data from a variety of different network layers and technologies is needed, from direct access to industrial hardware to cloud APIs. You also need to work with not only different time zones, but the radically different timing of enterprise and automation systems.

### Issue 5: Change brings chaos

Change is unavoidable. Over time, new sensors will be added, equipment retired and even pieces of the data backend replaced.

Unfortunately, many custom data-driven solutions end up being quite fragile to change — they fail when data points are renamed or sources of data are moved.

But custom solutions have huge potential to help find value in your specific systems, workflows and operators. If the fragility wasn't an issue, it would be possible to create unique value to uncover genuine commercial advantage.

A beauty of having consolidated, human-readable data is that it can help *abstract* the data, creating a 'buffer' between the sources of information and the data-driven values it can give (such as reports, analytics, AI and models).

The benefits of abstraction include:

- Data-driven solutions (alerts, reports etc.) can automatically include new and remove retired equipment, without any human intervention.
- Data backends can be changed or even completely replaced without disrupting any data-driven solutions.
- A single solution can be deployed across a number of similar facilities (such as multiple sites) without needing to make individual changes.

### Issue 6: Lack of openness

It is of course very important that this data be *open*. There are a huge number of open-source and publicly available tools to help with data analytics, and they've never been so easy to use.

Easy and consistent access to data through an open, consolidated solution means you can innovative solutions such as machine learning in your process systems.

### Bringing it all together

Consolidation is the first of the three key steps in turning data into business value. After this comes *analytics* (where value is added to the data) and *delivery* (where it is delivered into the hands of the people and systems that need it).

Fortunately, software systems like ARDI (from Australian company Optrix) are now available to help address the issues talked about, informing and empowering staff and driving quality, production, waste and energy improvements based on real-world data.

While many are still cloud-based and management-focused, there are new solutions, including ARDI, that are designed for low-level, high-speed process data. They run on site, are scalable for even small applications, and are focused on delivering real outcomes to people at all levels of the organisation.

# NEW PRODUCTS

## PNEUMATIC VALVES

Emerson's AVENTICS Series XV pneumatic valves are designed with interoperability in mind to provide machine builders across multiple industries and factory automation applications with a flexible valve platform. The valves are suitable for machine builders and end users that operate across the globe, with universal threads and other features that support regional standards and global availability.

Series XV valves provide higher flow rates in a compact valve package that enables more efficient and flexible pneumatic system performance for factory automation, and food and packaging applications. This helps manufacturers boost productivity and allows them to offer products customised for specific markets and customer preferences.

Series XV valves include the XV03, providing flow volumes up to 350 NL/min, and the XV05, scheduled for release in October 2024, providing up to 880 NL/min.

All valves in the Series XV line use proven AVENTICS core technology and include metal threads, parallel wiring, aluminium base plates and compact dimensions to make it easier to integrate them into production system designs.

Series XV valves use consistent interfaces and have wide connectivity from single wiring over parallel connections such as D-SUB connectors. They also support leading fieldbus protocols, including Profinet, EtherNet/IP, EtherCAT, Powerlink, Modbus TCP, IO-Link and AS-I, to simplify integration into machine control networks.

The AVENTICS online configurator supports system layout, providing useful information, while easy-to-understand system documentation in the design phase helps speed up machine development.

**Emerson**  
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## HIGH-SPEED ENCODERS WITH PROFINET

Turck is expanding its encoder range to include encoders with a Profinet interface for real-time applications, particularly in the logistics, food and beverage, and machine building sectors. The REM (multiturn) and RES (single-turn) encoders rely on the latest Profinet encoder profile (version 4.2) and offer 19-bit resolution for the single-turn devices and resolution of up to 24 bits for the multiturn devices. All encoders support Profinet features such as the Media Redundancy Protocol (MRP), Link Layer Discovery Protocol (LLDP) and Simple Network Management Protocol (SNMP).

The encoders provide virtually delay-free communication even in highly dynamic applications, due to the isochronous real-time mode (IRT) and minimum clock cycles of up to 250  $\mu$ s. Their high precision makes them suitable for applications such as multi-axis positioning.

The Profinet encoders are available in solid or hollow shaft variants and offer a wide range of configuration options. With different shaft diameters and flange types, they can be matched to the specific requirements of each application. Easy integration into Profinet networks enables fast commissioning and configuration.

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# AI in digitised asset management: driving the future of automation engineering

*Ella Averill-Russell, IICA Sydney Branch Manager*

Artificial intelligence (AI) is transforming digitised asset management, ushering in a new era for automation engineering. By optimising operations, reducing downtime, and enhancing asset performance, AI is revolutionising how engineers manage and maintain industrial assets. Integrated with technologies like the Industrial Internet of Things (IIoT) and digital twins, AI offers predictive insights and prescriptive actions that surpass traditional methods of asset management.

As automation engineers adopt these advanced tools, they are better equipped to handle the complexities of modern industrial operations, focusing not only on efficiency but also on sustainability and security.

## From predictive to prescriptive maintenance and autonomous asset management

Historically, predictive maintenance has been the focal point of asset management, with AI predicting potential equipment failures. However, the technology has evolved, now offering prescriptive maintenance solutions. This means AI not only forecasts failures but also recommends the best course of action to address them. Engineers can implement targeted strategies, reducing downtime, extending the lifespan of assets, and cutting operational costs.

AI's capabilities extend beyond mere predictions, optimising resource allocation and offering proactive solutions to mitigate issues before they occur.

In addition, AI is driving autonomous asset management, where systems can monitor and adjust assets in real time without requiring constant human oversight. These autonomous systems reduce the burden on engineers while ensuring optimal performance.

At the same time, AI can support human decision-making through augmented intelligence, providing real-time data and insights that enable engineers to make informed decisions. This collaboration between humans and AI aligns with the vision of Industry 5.0, which emphasises the fusion of human expertise and machine intelligence.

## The role of AI in sustainability and cybersecurity

AI's impact extends beyond operational efficiency, playing a crucial role in promoting sustainability within asset management. AI-driven systems can optimise energy consumption, reduce waste, and help organisations meet environmental, social and governance (ESG) objectives. By analysing real-time data, AI suggests adjustments to enhance both operational efficiency and sustainability, ensuring that industrial assets contribute to greener and more responsible operations.

In the increasingly interconnected world of industrial assets, cybersecurity is another critical concern. AI can be instrumental in protecting these systems, as it can be used to monitor for vulnerabilities, detect anomalies, and prevent or limit potential cyber attacks. Automation engineers can leverage AI to not only optimise asset performance but also safeguard their systems from evolving cyberthreats, ensuring the integrity and security of their operations.

## Conclusion

AI is reshaping the landscape of digitised asset management. Moving beyond predictive maintenance, AI now delivers prescriptive insights, enables autonomous asset management, and strengthens cybersecurity efforts.

By integrating IIoT, digital twins, and sustainability-driven practices, automation engineers can manage their assets with greater efficiency, security, and environmental responsibility. As AI continues to evolve, staying ahead of these trends will be essential for engineers looking to unlock the full potential of their assets in the modern industrial era.

## WHAT'S ON?

### October

International Mining and Resources Conference + Expo (IMARC)  
29–31 October 2024  
ICC Sydney  
[imarcglobal.com/](http://imarcglobal.com/)

### November

IICA Technology Expo Toowoomba  
13 November 2024  
Empire Theatres  
[iica.org.au/Web/Web/Events/Event\\_Display.aspx?EventKey=IICATWBQLD](http://iica.org.au/Web/Web/Events/Event_Display.aspx?EventKey=IICATWBQLD)

Dragos Compact Disc Australia 2024, ICS cybersecurity conference and training  
13–14 November 2024  
Sydney — venue provided on registration  
[hub.dragos.com/event-anz-disc-2024](http://hub.dragos.com/event-anz-disc-2024)

IICA: Bridging Innovation and Process Industry: Ethernet-APL  
13 November 2024  
Endress+Hauser, 50 Broughton Rd, Artarmon NSW  
[iica.org.au/Web/Web/Events/Event\\_Display.aspx?EventKey=IICAHPF](http://iica.org.au/Web/Web/Events/Event_Display.aspx?EventKey=IICAHPF)

Hydrology and Water Resources Symposium 2024  
18–21 November 2024  
Sofitel Melbourne on Collins  
[www.engineersaustralia.org.au/learning-and-events/conferences-and-major-events/hwrs](http://www.engineersaustralia.org.au/learning-and-events/conferences-and-major-events/hwrs)

Rockwell Automation Fair  
18–21 November 2024  
Anaheim Convention Center, Anaheim CA, USA  
<https://www.rockwellautomation.com/en-au/events/automation-fair/attend.html>

Digitalisation in Mining Australia  
26–27 November 2024  
Perth Convention & Exhibition Centre  
[mininginnovationnetwork.swoogo.com/dma24/4732029](http://mininginnovationnetwork.swoogo.com/dma24/4732029)

IICA Technology Expo Adelaide  
27 November 2024  
Ridley Centre, Adelaide Showgrounds  
[iica.org.au/Web/Web/Events/Event\\_Display.aspx?EventKey=IICAADLDSA](http://iica.org.au/Web/Web/Events/Event_Display.aspx?EventKey=IICAADLDSA)

### Next Year

AOG Energy  
11–13 March 2025  
Perth Convention & Exhibition Centre  
[aogexpo.com.au/](http://aogexpo.com.au/)

Australian Manufacturing Week  
6–9 May 2025  
Melbourne Convention and Exhibition Centre  
<https://australianmanufacturingweek.com.au/>

Robotics Summit & Expo  
30 May – 1 June 2025  
Boston Convention and Exhibition Center  
[www.roboticssummit.com/](http://www.roboticssummit.com/)

## MINERAL PROCESSING: A EULOGY FOR ANALOG

**A**nalog is finally dead when it comes to process technology in mining. Is this something of a future statement? No. We are now at the tipping point where analog technologies are no longer the 'easiest' or the 'most reliable' source of data in mineral processing plants.

The mining industry in Australia is undergoing a significant transformation driven by advances in instrumentation, process control and automation. Why? Maximising operators' environmental, sustainability and governance (ESG) credentials has become critical. Financial approvals for projects are now contingent on implementing class-leading initiatives for improving efficiency, safety and environmental sustainability. Share prices of mining companies that focus on building a 'green' brand perform better than those that don't.

This is one of the main drivers for the rise of big data, Industry 4.0 and advanced sensing in mining, which gathers additional data to support these automation-driven initiatives. Historically, one of the primary challenges in modern process automation is integrating the diverse data generated by smart instrument sources into a unified system. In processing plants, achieving real-time data connectivity across various instruments and systems is critical. Of course, this was possible with analog systems; however, these days sensors can deliver more than 10 variables, whereas in the past it was just one.

The implementation of advanced communication protocols like industrial Ethernet and wireless solutions can significantly enhance this data integration and capture. These protocols enable seamless communication between field devices and control systems, providing operators with comprehensive visibility and control over their processes. With sensors now available from leading vendors on the latest generation of digital communication configurations such as Ethernet-APL, it is much more cost-effective to utilise digital devices for every application.

Leading mines have already accomplished an automated, digitally connected mine and are reaping the benefits that all this additional data brings. In a major copper processing plant in South Australia, integrating industrial Ethernet-enabled flowmeters and pressure sensors improved data accuracy and reliability in their water distribution network. The integration facilitated real-time monitoring and control, enabling the plant to optimise throughput and reduce energy consumption. Integrating self-monitoring and verification software within the sensors allowed continuous diagnostics and scheduled, remote verification of the measuring instruments. This facilitates predictive maintenance, eliminating calibration requirements and ensuring compliance with stringent site standards. That is simply not possible with older analog devices.

One way to use this additional data from such smart sensors is to improve the reliability of each measurement point by implementing an advanced maintenance philosophy such as predictive maintenance. Predictive maintenance is revolutionising asset management by enabling early detection of potential failures, thus reducing downtime and maintenance costs. Data from sensors from vendors that focus on R&D in their sensor and instrumentation portfolio can be rich enough to bring valuable insights to optimise maintenance. Of course, all this is only possible via digital outputs.

The latest greenfield projects that are being carried out by leading mining companies passionate about their public image, safety record and profitability are adopting this latest technology, and you'll see it in their culture when you interact with them. Next time you're working on a project, why don't you ask yourself: "How can I further automate even the smallest sensing requirement with today's technology?" rather than just copying what had been done before, and before, and before?



*Taylor McKertich is the Regional Industry Manager for Mining, Minerals and Metals at Endress+Hauser Group in the Asia Pacific region, with a focus on process improvement, operational excellence and engineering solutions in the industrial automation field.*

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Printed and bound by Ive  
Print Post Approved PP100007403  
ISSN No. 0819-5447

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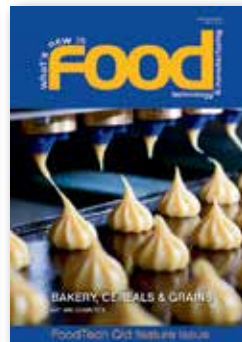
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**TRD-N360-RZWD \$370**

Koyo TRD-N series incremental (quadrature) rotary encoder, medium duty, 5-30 VDC, radial exit, push-pull (totem) output, 360 ppr, 8mm solid shaft, 50mm diameter body, IP65, 6.5ft/2m cable length, pigtail.



**TRD-GK100-RZD \$660**

Koyo TRD-GK series incremental (quadrature) rotary encoder, heavy duty, 10-30 VDC, axial exit, push-pull (totem) output, 100 ppr, 10mm solid shaft, 78mm diameter body, IP65, 6.5ft/2m cable length, pigtail.



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