PROCESS TECHNOLOGY

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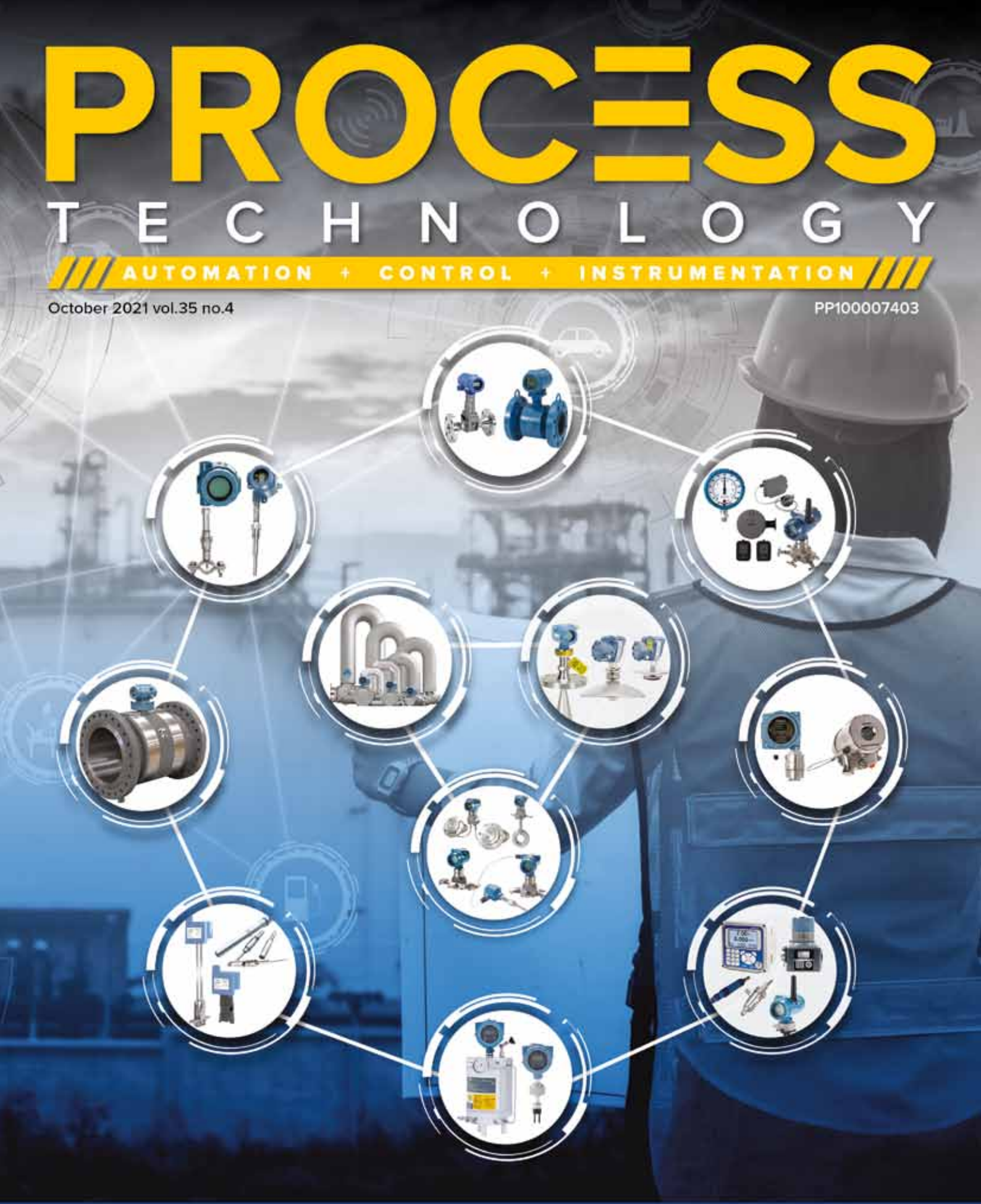

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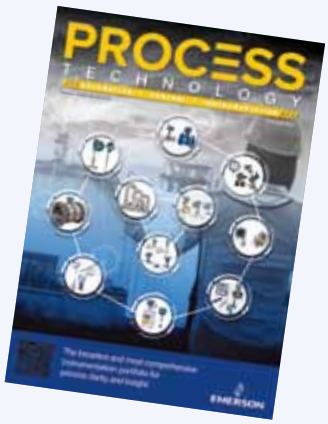

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KNOWLEDGE IS POWER

Treat maintenance as an asset, not an expense, by designing a data-driven strategy that improves asset and worker performance.

Today's manufacturers face increasing expectations for asset management capabilities. According to the ARC Asset Management Trends November 2019 report[1], these expectations are driven largely by new requirements to support digital transformation initiatives. The result is a need for greater connectivity, visibility and information sharing both from within and outside of enterprises.

Additionally, you must maintain low operating budgets while increasing efficiency, and you need to optimise operations to sustain success.

One way to address such challenges is investing in a comprehensive asset management strategy. By executing a well-planned, comprehensive approach and implementing the right technology, manufacturers can transform maintenance from an expense into a strategic, competitive asset.

According to the ARC Strategies July 2019 report[2], Rethinking Asset Performance Management, successful asset management requires close cooperation between the maintenance, reliability, process engineering and operations functions in an industrial facility. New digitalisation tools can help make that cooperation easier.

Focusing on an asset management strategy can improve a range of metrics, such as overall equipment effectiveness (OEE) and return on net assets (RONA).

In turn, these metrics contribute to aggressive productivity targets, including various forms of risk mitigation, data-driven decision-making, workforce empowerment and predictable expenditures.

Research shows why asset management must be a priority

Many manufacturers struggle to prioritise the time and investment needed to put a comprehensive asset management strategy in place, simply because so many other expenses compete for their limited budgets. But trends in manufacturing employment and other factors are converging to make asset management a major priority.

As an example, the US Bureau of Labor Statistics estimates a shortage of more than 2 million manufacturing workers by 2025, with more than 10,000 baby boomers retiring daily. According to LNS Research in its 2019 Connected Worker eBook[3], this impacts manufacturers as valuable skills, experience and institutional knowledge are lost. Although this intelligence gap appears daunting, an asset management strategy is relatively simple to initiate — especially if you rely on existing relationships with components distributors and vendors to develop customised, scalable solutions.

Some of the benefits of comprehensive asset management include:

- **Overall equipment effectiveness (OEE):** Driving uptime is key to a smart asset management strategy because it's focused on assuring the people, parts and processes are optimised to support the equipment. It also provides trend data visibility into asset performance by both machine and shift, which helps drive continuous improvement priorities.
- **Return on net assets (RONA):** Reducing inventory, maintenance costs and the number of downtime events raises productivity, while driving financial performance and predictability.
- **Empowered and engaged employees:** With fewer maintenance workers, those who remain need the right technology and tools to make good decisions about supporting plant performance. According to LNS Research, the next generation of employees entering the workforce and advancing through the ranks are digital natives with an entirely new set of perceptions and expectations regarding technology and attitudes about work in general.

Maintenance is central to operations

Because equipment maintenance is one of the largest single controllable expenditures in a plant, it must be included in a life cycle plan. It also should be an integral part of any reliability improvement program, because it's critical to machine throughput, availability and essential spare-parts stock.

Once you've organised your storeroom and have a repair strategy in place, you can optimise spare parts inventory and reduce the number of unnecessary parts. Digitally enabled platforms provide ongoing visibility into your installed base.

Also, data gathered and analysed as part of the process can be used to implement future improvements, such as developing a roadmap for managing the obsolescence and migration of ageing equipment.

To justify capital expenditure projects, maintenance needs to be considered central to productivity. Your storeroom is the starting point for strategic maintenance improvement practices, such as minimising equipment life cycle cost and maximising production equipment performance.

Getting started

Evolving asset management into a proactive, strategic component of better-managed manufacturing facilities can be done in phases, following three steps.

Step 1: Evaluate needs, set goals

The first step in any asset management strategy is examining your current situation while keeping in mind your business priorities, such as process validation over uptime or environmental impact over rate.

To establish a baseline for improvement, first understand your operation's process hierarchy to determine equipment priority and thus risk.

Second, understand your equipment's serviceable components and their life cycle status. For example, are the components new, available, repairable, replaceable or obsolete?

Finally, understand your storeroom content and identify all other locations holding spare parts.

This data will inform future decisions and allow immediate inventory optimisation. It also will support risk mitigation on the most critical equipment and provide the basis for all future management of your plant assets, including preventive maintenance (PM) program optimisation, storeroom optimisation, machine-builder changes and warranty capture.

Once you have completed data collection, assess critical areas of concern, outline needs for improvement and define your objectives so you can build an attainable asset management plan.

Step 2: Design an asset management strategy

Your goal-setting activities will yield the building blocks for your asset management strategy design, which likely will include these elements:

- Maintenance, repair and operations (MRO) process management redesign
- Reporting and dashboard creation
- Excess spare parts burn, sell-off and/or vendor-managed agreement
- PM activity changes

MRO process management redesign

A critical step is establishing best practices for part repair or replacement. Minimising your stock, optimising your repair process and building an actionable reporting structure is the most sustainable way to maximise your automation investment.

Reliability improvement uses a process risk assessment to track and understand the consequences of process and equipment failures, and recommend priority actions.

Optimising your repair process involves keeping track of where each individual component is in its life cycle. When a component on the line fails, you document where, when and why it failed, and determine if it's under warranty.

To keep track of warranty detail and ease the process, the labelling system in your storeroom should include warranty information for each part to track its eligibility. Effectively managing your organisation's warranty recovery can significantly contribute to the operation's bottom line. Parts also should be tracked when sent for repair.

Typical savings categories for effectively managing MRO repair include:

- Repair price versus new
- Warranty recovery
- Inventory and carrying cost reduction
- Administration
- New purchase and repair reduction
- Increased production uptime

Having a person electronically track this data can help identify opportunities for system and process simplification or improvement.

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Reporting and dashboard creation

This phase can come in many forms and be accomplished in many ways. You might decide during the evaluation and goal-setting stages that an OEE information system is a necessary investment to create dashboards showing uptime, production rate and quality. The MRO process management redesign mentioned earlier also can provide significant information to be built into a usable and actionable reporting tool.

Excess spare parts burn, sell-off or vendor-managed agreement

Inventory reduction is a popular productivity target because it frees up budget for other assets. Remove or burn off excess or inactive inventory while filling in critical gaps you've found during the assessment.

Remember that you may have resources to help with your storeroom goal. For example, your local distributor may be able to help supply half of your needed parts from its available stock, leaving you to identify a plan for the remaining half. Also, your equipment vendor could implement an onsite parts management agreement, allowing you to avoid purchasing the remainder of the spare parts until they're needed.

PM activity change

The more aware you become of your facility's needs and challenges, the more fine-tuned and efficient your PM activities will become. You might choose to use vendor specialists with the resources to develop and sustain a PM program through scheduled service visits, fully warranted replacement parts and 24/7 remote troubleshooting — freeing your personnel to operate the equipment and manufacture products.

Step 3: Implement your unique solution

After establishing the right baseline of your facility and designing a plan that supports your business needs and mitigates your risk priorities, your asset management investment will be pointed, graduated and impactful.

The structure of your plan determines the implementation path. For example, you might be able to use your existing staff and processes to implement simple, immediate point solutions such as inventory disposition or burn-off. But when it comes to more complicated process implementations or redesigns, such as an MRO process redesign, seeking an external specialist to design and execute the right implementation plan might be an option.

Step 4: Measure and continuously optimise the process

The most successful asset management strategies evolve as equipment, process and people change. Therefore, be sure to investigate digital technology tools that provide a visual dashboard of critical plant assets and equipment changes.

After equipment purchases or retrofits, be sure to adjust inventory accordingly. This effort provides measurable data you can turn into actionable information to help inform future decisions to achieve continuous productivity gains.

The role of a reliability specialist

When production is lagging, unplanned downtime is mounting, maintenance budgets are shrinking and plant staff are overburdened, an asset management evaluation might be a good investment to help you regain your competitive edge and achieve your business goals.

With fresh eyes, an outside experienced professional can provide guidance that encompasses everything from inventory management, to employee training and workforce development, to plant-wide optimisation.

By understanding your environment, the consultant can help compare it to applicable industry standards and specifications, such as ANSI, TIA, ODVA, NIST, ISO, IEC, CE, OSHA, NERC CIP, Energy Star and DOE1. From there, your consultant provides recommendations for remediation and improvements to address any gaps, hazards and cost-savings opportunities, plus the applicable cost–benefit analysis.

In the case of a strategic maintenance consulting engagement, an asset management professional starts with a detailed evaluation of your current operation to understand your business priorities and company-wide goals, and to identify any potential inhibitors to your plant's success.

Once those are identified, reliability solution consultants can develop a risk mitigation plan to help you increase production output while reducing costs through improvements to equipment and process reliability.

Often, a comprehensive mitigation plan includes safety improvements and reduced environmental impact. For example, when evaluating downtime during a risk assessment, an asset management professional analyses any potential fallout from such an event. If downtime endangers the environment or worker safety, the incident can pose far greater concerns to a company's public image.

The goal is to transform maintenance from an expense into a strategic, competitive asset.

The right strategy

Leaders at smart companies know that successful asset management programs maximise uptime and offer other profitability benefits. With the right asset management strategy in place, you can achieve sustained growth and competitiveness.

Resources

1. ARC Advisory Group 2019, *Asset Management Trends*, ‹https://www.arcweb.com/blog/asset-management-trends›
2. ARC Advisory Group 2019, *Rethinking Asset Performance Management*, ‹https://www.arcweb.com/blog/rethinking-asset-performance-management›
3. Bussey P 2020, *Connected Worker: Connecting People and Systems to Transform Frontline Operations*, LNS Research, eBook.

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www.rockwellautomation.com/en-au.html

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Artificial intelligence: saving water the smart way

VA SYD is one of Sweden's largest utilities, which invests heavily in sustainable water and wastewater treatment, and pushes for environmentally smart solutions in community building. The company supplies more than 546,000 customers with drinking water in the regions around Lund and Malmö in the south of Sweden.

At VA SYD, non-revenue water accounts for 10% of all water supplied to customers. The reason: leaks in the pipeline network. VA SYD now relies on artificial intelligence to more efficiently detect and reduce leaks in water pipes.

"Treating natural resources with respect is a way of life in Sweden, and water use should be no exception to this practice," Victor Pelin said. "Even if here in Sweden there is not a water-scarcity problem in general, wasting water just feels wrong. Plus, lifting, treating and pressurising water consumes energy, and energy is a major cost factor," Simon Granath added.

Granath and Pelin work as development engineers at VA SYD and have been responsible for the design and implementation of the leakage detection system.

VA SYD operates a total of around 5000 km of pipelines, 2000 km of which are for drinking water. Pinpointing leaks is a complex task.

"Until very recently, we could detect only the largest leaks that led to service disruptions. In fact, it is the smaller, slower leaks, often from small service pipes, that are responsible for the lion's share of non-revenue water," Granath said.

"We have to maintain a lot of pipelines in a large area, and we wanted to improve our ability to pinpoint leaks through smart metering zones. For this purpose, we set out to find an AI-based solution," Pelin said.

VA SYD evaluated several systems over recent years, looking for a solution that was state of the art. It would also have to make optimum use of the available flowmeters and smart meters in the area that had been chosen for the proof of concept. In the end they chose Siemens' SIWA LeakPlus system.

"But when it came to the implementation concept, we ran into some obstacles," Granath said. "We had to find a way of using the AI-based leakage detection in an on-premises set-up instead of a cloud environment. We then had some in-depth discussions with Siemens, their cooperation partner BuntPlanet, and our IT and OT departments about the best approach to install the SIWA LeakPlus solution in our own data centres.

"To my knowledge, this is the first time something like this has been done in the Swedish water industry — and we managed to get the job done."

The next step was to refine the hydraulic models for the pipelines and link the data from the metering systems and pump stations with SIWA LeakPlus using OPC UA. VA SYD was then ready to perform the first tests.

Pelin explained: "We used the system to simulate different leaks and then evaluated the data. We were able to detect leaks as small as 0.5 litres per second — a huge improvement over the previous solution, which provided no means of detecting small leaks at all."

SIWA LeakPlus is one of the Siemens Water (SIWA) applications specifically developed for the water and wastewater industry. The solution uses an AI-based algorithm to identify and classify anomalies in the pipe network. To perform reliably, SIWA LeakPlus is first trained with historical flow and pressure data so that it learns to separate anomalies from regular operation and assign the correct cause to each anomaly.

"In the coming weeks, we will introduce a further developed variant of leak detection, which will allow us to determine the exact location of the leak," Pelin said. "Then we will have the means to really go out there and fix all those small issues efficiently."

With the proof of concept in its final stages, Pelin and Granath are also working on scaling up the solution to other parts of the network. The next area to benefit from SIWA LeakPlus will be the town of Lund, where VA SYD is currently installing additional flowmeters to provide more data from the pipeline network.

"A smarter leakage detection system requires less data from the pipelines, so we can reduce the number of installed meters. This immediately pays off," Pelin said.

Economic benefits aside, SIWA LeakPlus has already helped VA SYD take the next steps towards another ambitious goal: by 2030 the company wants to become a climate-neutral, energy-saving water utility with zero unplanned service disruptions.

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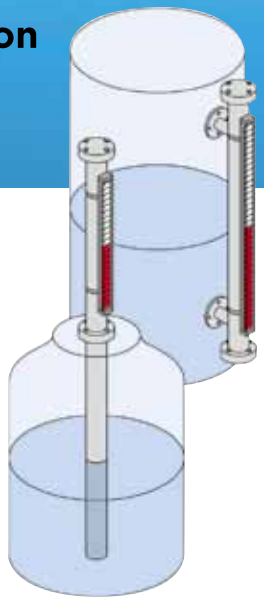

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Endress+Hauser has developed the Proline Promag W 800 magnetic flowmeter for applications in remote areas where there is no possibility of supplying instruments with energy or transmitting data via cable. With battery operation, it is designed to allow maintenance-free, long-term operation for up to 15 years as well as worldwide secure data transfer via cellular radio.

The product has a backlit display that makes reading the measured values easy, and the SmartBlue app is used for operation and comprehensive data retrieval on site. The device is also available with various drinking water approvals such as KTW/W270, WRAS BS6920, ACS or NSF 61. The instrument offers a maximum measured error of ±0.5%.

The transmitter includes measuring electronics, batteries, a data logger and a cellular radio module to send and receive data via LTE Cat M1, LTE Cat NB1 or EGPRS. The cellular module can be used to call up measured values and status messages online, such as flow, pressure, totaliser, device and process status, alarm messages and level of battery charge. End-to-end encrypted data transmission offers security in data transmission. In addition, the extended data logger safely stores up to 50,000 measured values or entries.

Users can order the unit with a specially certified corrosion protection (EN ISO 12944) and IP68 (Type 6P) degree of protection, which completely prevents water ingress. The instrument also supports Endress+Hauser's Heartbeat Technology to remotely monitor functionality and calibration.

Endress+Hauser Australia Pty Ltd

www.au.endress.com

RADAR LEVEL TRANSMITTER WITH IO-LINK

To meet the need for highly accurate level measurement in hygienic applications, Emerson has developed the Rosemount 1408H Level Transmitter, which the company says is the world's first non-contacting radar device designed specifically for the food and beverage industry.

Non-contacting radar is a suitable level measurement technology for applications that require stringent hygienic facilities and equipment. It has a top-down installation that reduces the risk of product loss through leakage, and it is unaffected by process conditions such as density, viscosity, temperature and pH. The compact form of the Rosemount 1408H makes it a suitable solution for the small tanks and space-constrained skids commonly used in food and beverage production. The hygienic antenna is flush with the process connection in order to facilitate the removal of process residue during clean-in-place and sterilise-in-place processes.

The Rosemount 1408H uses 80 GHz frequency modulated continuous wave technology on a single electronic chip with embedded smart algorithms. This enables stronger radar beam focusing, so that internal tank obstructions such as agitators can be avoided and greater measurement accuracy achieved. Fast sweep technology also means collecting up to 40 times more information, increasing accuracy. The technology also enables measurements all the way to the top of the tank by eliminating radar dead zones.

The Rosemount 1408H is also said to be the first non-contacting radar transmitter with connectivity via the IO-Link communication protocol, making it easy to integrate with any automation system. The transmitter provides conventional analog 4–20 mA, switch outputs and digital high-speed communication.

Emerson Automation Solutions

www.emerson.com/au/automation

FRONT-FLUSH LEVEL SWITCH

VEGA has developed the VEGAPOINT 24 front-flush level switch especially for use with very sticky, viscous or abrasive products, particularly in the beverage, food and pharmaceutical industries. The company says that even with the strongest build-up, it reliably detects the level of coverage and indicates it with a coloured illuminated ring that is visible from a distance.

The VEGAPOINT 24 is a plug-and-play sensor that can be installed easily with a few simple steps. Flexible production systems with frequent and fast product changes benefit from the fact that it detects all media with the help of the default setting without adjustment. Extended functions, such as interface detection or foam blanking, can also be configured easily.

The front-flush design of VEGAPOINT 24 is designed to allow more application possibilities. Cleaning pigs can work safely alongside the sensor due to its flat metal measuring tip that is said to even cope with sandblasting.

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ELECTROMAGNETIC FLOWMETER WITH PoE

ABB has incorporated power supply through Ethernet connectivity on board its ProcessMaster electromagnetic flowmeter.

Power over Ethernet (PoE) omits the need for a separate DC power infrastructure, providing power and communications via the same cable. This brings new agility as flowmeters can be installed wherever needed. In addition, ABB 4-wire Ethernet combines classic outputs with future communication protocols. Offering a modular design allows the combination of both worlds and helps ensure that devices are futureproof, increasing the longevity of the flowmeters.

Flowmeters with Ethernet connectivity increase simplicity, flexibility and reliability for operations in process automation, while enhancing real-time visibility of data. Previously hidden data in field devices, such as measurement values on density, conductivity or concentration of the medium, can be made available. This in turn will help users identify redundant measurement points in their plants to achieve savings along the way.

Combining 4–20 mA or digital outputs with new 1- or 2-port Ethernet helps makes classic instrumentation futureproof, with speeds of up to 100 m/s. The flowmeters use various Ethernet-based communication protocols, such as simple Modbus TCP or EtherNet/IP. This prepares them for IT/OT convergence, cloud connectivity and the requirements needed for secure and encrypted communication in the near future.

ABB Australia Pty Ltd
www.abbaustralia.com.au

CORIOLIS MASS FLOW METERS

The smallest quantities of substances have to be measured and controlled reliably and precisely for applications in thin film coating technology, test benches, micro reaction technology and the food and beverage industry, for instance when dosing aromas or fragrances.

The Type 8756 mass flow meters from Bürkert Fluid Control Systems are based on the Coriolis measuring principle, which determines the mass flow independent of pressure and temperature. They are characterised by their high flow measuring accuracy of ±0.2% in the measuring range ±0.0014 kg/h and operate with a high level of repeatability, even at very low flow rates. The sensor is suitable for a flow range up to 25 kg/h for water or media with similar dynamic viscosity and offers a fully usable measuring range of up to 1:250.

All parts which come into contact with media are made of high-quality stainless steel (AISI 316L), thus ensuring a high level of chemical resistance, even for aggressive media. The devices can be used for any kind of liquid with dynamic viscosities between 0.3 mPa·s and 200 mPa·s, which reduces the number of components and simplifies storage. Type 8756 is available as a plain mass flow meter (MFM) or mass flow controller (MFC) with integrated micro annular gear pump. The MFC is able to readjust any deviations from the setpoint value in less than 1 s.

Burkert Fluid Control Systems
www.burkert.com.au

ELECTRONIC FLOW SWITCH

The model FSD-4 electronic flow switch from WIKA is designed to offer flexibility in monitoring and controlling flow based on the velocities of liquid media.

The switch points of the model FSD-4 can be freely configured via the 3-button operation directly on the instrument or optionally via IO-Link.

The flow switch can output both absolute values in various units and relative flow values and display them on the digital indicator. While a flow rate value is assigned to the first switch point, it can be defined at the second switching output whether the switch should switch at a second flow value or at a specific temperature value for the medium.

In addition, the FSD-4 can be fitted with an analog output for flow or temperature values. The wide range of parameterisation options makes the model FSD-4, with only three basic variants, a suitable flow switch for a wide variety of applications and installation situations.

WIKA Australia
www.wika.com.au

LASER LIGHT BAND SENSORS

The BLA series laser light bands are designed for when different objects have to be identified in various production, packaging or quality control situations.

The IO-Link through-beam sensors offer numerous measuring modes such as object diameter, object position, gap width, gap position and edge position. Various light band sizes allow the user to perform nominal/actual comparisons even with narrow objects like wires or wider objects such as shafts. Users can simultaneously use the built-in operating hours counter to monitor processes and display maintenance intervals.

IO-Link enables centralised data management and storage and, with it, simple and fast configuration, making it possible to easily change formats during the production process. Processed analog signals can also be easily transmitted.

The series can be used for tasks such as precise position detection, object classification and simple part sorting by size or diameter. Variables like object height, gap dimensions or holes can be monitored for quality assurance. Precise detection of web edges is also possible, even with semi-transparent materials. With a large selection of housing sizes, they can be mounted in applications with tight spaces and in hard-to-reach sensing positions.

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MEASURING CONSISTENCY FROM LABORATORY TO PROCESS

DIGITAL SENSORS IN THE BIOTECHNOLOGY INDUSTRY

Bo Ottersten, Business Development Manager, Endress+Hauser Conducta

Ensuring measurement consistency when a process is scaled up from the laboratory to production can be made easier with digital sensor technology.

> WHEN A PROCESS IS SCALED UP FROM THE INITIAL LABORATORY FERMENTATION TO PILOT AND TO FULL-SCALED PRODUCTION, IT IS IMPERATIVE TO KEEP ALL CONDITIONS UNCHANGED, AND IT IS PREFERRED TO KEEP THE IDENTICAL SENSORS DOWN TO BRAND AND TYPE.

In the biotechnology industry, analytical sensors are commonly standardised in terms of brand and type during process development. This helps to maintain data consistency when the process is later scaled up. Despite this, companies can still run into considerable problems caused by unreliable sensor signals and disparities concerning the signal algorithm and sensor handling. Digital sensors offer a solution to guarantee data consistency and a way to easy, uniform sensor management.

The importance of measuring consistency from lab to process

It is vital in creating the right conditions in the bioreactor during trials and in the up-scaled process to allow microorganisms or cells to thrive. Correct environmental conditions will ensure that the yield is maximised in a stable and predictable manner.

Two of the most critical parameters during a fermentation process are pH and oxygen, and both need to be controlled carefully. pH and dissolved oxygen values out of specification lead directly to a loss of yield. For some specific cells, typically mammalian cells from humans and animals, the pH value is highly critical and needs to be controlled in a range better then ±0.1–0.2 pH units to obtain the expected yield. The oxygen concentration also gets critical for the batch if it is too low — for example, less than 20–25% — as there is not enough oxygen for respiration. On the other hand, too much oxygen risks the yield as some bacteria tend to grow in size at the expense of the production of the wanted molecules. It is also a waste of expensive sterile oxygen.

When a process is scaled up from the initial laboratory fermentation to pilot and to full-scaled production, it is imperative to keep all conditions unchanged, and it is preferred to keep the identical sensors down to brand and type. This is to ensure that no measuring discrepancies occur when the process is up-scaled that could risk a decrease of process yield.

Measuring behaviour and performance between different sensor brands can occur due to several reasons such as different compensation algorithms, different material performance or different sensor design. Despite standardisation of the sensors, however, discrepancies are still common. They usually can be related to the analytical sensors themselves or to the electrical signals from the sensors.

Below we will explain different reasons behind errors related to the electrical signals and show how those errors can be eliminated by using digital sensors.

Challenges concerning consistency of pH measurements

One of the largest challenges, especially for pH sensors, occurs with the bioreactors in the laboratory. During the autoclaving process, both the glass fermenter and the sensors are exposed to high temperatures in combination with steam. If humidity remains on the sensor contacts this will later result in unreliable and unstable measured values.

It is a well-known fact that the high impedance mV signal from a pH sensor is very sensitive to any humidity or oxides on the metallic cable contacts. Signal drops will result in unpredictable measurement errors and, depending on the environment, they can occur randomly. The biggest challenge is if they only appear occasionally, as this makes them hard to detect.

An ideal pH sensor has a zero point at pH 7.00. In other words, in a pH 7.00 solution, an ideal pH sensor provides a 0 mV signal. In a pH 8.00 solution the same pH sensor will provide a -59.16 mV signal (at 25°C). Under perfect conditions this signal is measured without interference and converted into the pH value by the transmitter. But when corrosion, humidity or oxides are present on the sensor and cable contacts, part of, or in the worst case all of, the -59.16 mV will disappear, and the signal gets closer to 0 mV (pH 7.00). In this case, the signal from the pH sensor would indicate a lower value than there is in reality and the controller in the fermenter would continue to add reagent to increase the pH. The result would be an overdosing of reagents which results in a pH value out of specification and likely a wasted batch.

> THE ADVANTAGE OF DIGITAL ANALYTICAL SENSORS IS THAT THEY PROVIDE 100% SIGNAL INTEGRITY, IMPROVING THE RELIABILITY OF THE MEASUREMENT VALUE.

Comparability of measurements in the laboratory and in the process

During all the development steps it is common to control and even adjust the online pH value in the fermentation by grab-sample analysis, where a relatively small sample is analysed with a laboratory pH sensor. This is the second challenge regarding consistency of the pH-measurement: it is common that measuring discrepancies occur also between measurements in the laboratory and in the process. There may be several reasons for this. But even high-end pH sensors tend to show discrepancies in measurement if the measurements are carried out with sensors of different brands or types.

Typical reasons for this can be:

- Diffusion potentials in the pH sensor due to different reference systems.
- Nonlinearity at high/low pH-values because of different membrane glass.
- Different temperature behaviour dependent on the isothermal point.
- Different compensation algorithms in the pH-transmitter.

Challenges concerning consistency of dissolved oxygen concentration measurements

There are two types of measuring technologies available for dissolved oxygen measurement: the traditional amperometric and optical florescence technology. Amperometric oxygen sensors provide a very small nA signal proportional to the oxygen concentration. Commonly a freshly maintained sensor provides 0 nA at 0 mg/L (%) and 60–70 nA at the saturation point (100%). This small nA current measuring signal requires a sophisticated controller to detect variation in the process.

In contrast the optical measuring principle is based on fluorescence quenching, where oxygen-sensitive molecules are integrated into an optically active fluorescence layer. By applying light energy at a specific wavelength, a response in the form of fluorescent light is received. The decay time and intensity of the response signals are inversely proportional to the oxygen content in the solution.

The optical sensor technology has several advantages compared to the traditional amperometric method:

- No fragile membrane and no electrolyte.
- No polarisation time required.
- Very easy maintenance and handling.

The challenge with optical and amperometric oxygen sensors is mainly the interference of air bubbles at the O_2-sensitive membrane when the sensor is top-down mounted. A dissolved oxygen sensor should measure the concentration of oxygen that is dissolved in the solution and that can be employed by the bacteria and the cells. It should not be sensitive to the oxygen of the air bubbles in the solution. The oxygen concentration in the bubbles is completely different to what is dissolved.

The top-down installation of the oxygen sensor in a laboratory fermenter raises the risk of bubbles tending to stick on the membrane. The influence can be minimised with electronic filters and damping of the sensor signal. However, this will slow down the sensor response.


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In a pilot and larger fermenter, the oxygen sensors are installed from the side slightly angled from a horizontal line. In this position the influence of air bubbles is negligible. The next challenge arises when values from those two applications are compared. The best solution on the market so far is to use an oxygen sensor with a convex sensor tip. It minimises the risk that bubbles get stuck and also enables top-down installation.

Advantages of digital sensors

Digital sensors can solve the challenges of pH measurement. In a digital sensor the actual sensing part of the sensor is analog and identical to a conventional analog sensor. The difference is that digital sensors include an additional component in the form of a microprocessor that processes measuring signals. Generally, several signals need to be processed and considered in parallel.

The advantage of digital analytical sensors is that they provide 100% signal integrity, improving the reliability of the measurement value. Compared to a measurement loop with analog sensor technology, there is no risk of signal loss between the sensor and the displayed measurement value. Moreover, humidity and oxides on contact surfaces do not cause any issues for the measurement. Either you receive a correct measurement or no measurement at all. This is a great step forward for all fermenter applications in the laboratory, as any remaining humidity on the contact surfaces after the autoclaving process will no longer cause distorted or unstable values.

Measuring consistency means maintaining the same sensor brand and type, as well as keeping the calculation algorithms behind the measurement values unchanged when a process is scaled up from the laboratory to pilot and full process capacity. Standardisation of digital signal processing is much easier between different transmitters when using digital information as opposed to analog signals.

Sensor adjustment and sensor handling

A second great benefit of digital sensors is that sensor handling and sensor adjustment can be standardised between the laboratory and the process. The adjustment of an analog pH sensor can be challenging at the measuring point as buffer and cleaning solutions need to be brought from point to point and additional documentation needs to be done. Digital sensors carry their own adjustment data, which means that they can be cleaned, calibrated and adjusted offline in a stable environment and later installed in process or in laboratory applications.

Sensor adjustment in the laboratory provides several benefits. Beside the time-saving aspect, also the measuring reliability can be improved. The high concentration of protein molecules in the fermentation can easily contribute to clogging of the pH sensors reference diaphragm. This will eventually shorten the sensor lifetime and contribute to measuring errors if it is not cleaned properly.

For reliable measurements from batch to batch, the sensor needs to be carefully maintained with an acid in combination with a pepsin solution. This maintenance can be done more easily in the laboratory compared to the measuring point. The direct result of sensor maintenance in the laboratory is better performance, higher measuring accuracy and in many cases a prolonged lifetime.

By using digital sensor technology that in parallel provides the possibility to use a software for sensor maintenance and management, all handling can largely be standardised and simplified. Digital sensor technology also minimises the risk of discrepancies between the grab sample and the online measurement.

By using the identical digital sensor and signal technology in parallel with appropriate sensor handling, any risk for incorrect values is minimised.

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OPINION

INCREASING THE SAFETY AND RELIABILITY OF AGEING FACILITIES WITH SINGLE LOOP LOGIC SOLVERS

The process industries have experienced significant growth in Functional Process Safety applications. An increased awareness of destruction of property, injuries and loss of life associated with tragic events (which are widely publicised by worldwide media) has driven much of this growth. Ultimately, companies have a moral and legal obligation to limit the risk posed by their operations and the costs of litigation, for when these types of events do occur damages can measure in the billions.

Not surprisingly, operations and plant managers have come to recognise the importance of utilising a properly designed process system that optimises reliability and safety. Companies are therefore actively taking steps to comply with various local and worldwide safety standards such as IEC 61508/61511. They look to equipment specifically designed and approved for Safety Instrumented Systems (SIS), which are used to implement one or more Safety Instrumented Functions (SIF) intended to achieve or maintain a safe state for a process with respect to a specific hazardous event. A SIS is comprised of any combination of sensors, logic solvers and final control elements for the purpose of taking a process to a safe state when predetermined conditions are violated.

Many of the large process plants in Australia operating in the oil and gas and chemical industries were built more than 40 years ago. Much of their infrastructure is ageing rapidly, thus increasing the risk of failure. Such facilities need to demonstrate they have systems and processes in place to maintain continuously safe operations and meet safety standards. Routinely, plant managers will engage their engineering and operations teams to conduct a risk assessment for the process hazards that exist onsite. This will include a review of their safety case documents to make sure they accurately reflect the current systems and processes in use at their facility. These types of Hazard & Operability (HAZOP) studies will identify all potential threats and determine the Safety Integrity Level (SIL) for a specific process. This will help ensure there are adequate control measures to reduce the risk to "as low as reasonably practicable" (ALARP).

With the ongoing efforts to extend the viability of many older plants in Australia, the HAZOP studies will often determine that the existing process control infrastructure may not effectively mitigate process safety risks to meet the required SIL. To mitigate hazards affecting personnel, plant and community, engineering and operations teams will therefore introduce new SIFs or enhancements to existing control and safety measures. These will likely include straightforward steps like installing new hardware including transmitters, sensors, valves and logic solvers that keep the plant's processes within safe operating limits. Often the HAZOP study may find that the primary BPCS or safety system cannot handle additional process points or logic overhead without an expensive overhaul or replacement. The challenge in upgrading existing hardware and software at many of these process facilities is that they rely on expensive and proprietary infrastructure to run their operations, and the expense of doing a complete retrofit can be extremely cost-prohibitive.

To avoid enormous capital expenditures, process facilities look to safety-certified devices that can be integrated into their legacy systems at a fraction of the price. This is where single loop logic solvers have proven to be an effective yet affordable way to meet the demands for safety systems that adequately reduce risks and meet desired SIL requirements. Single loop logic solvers are independent devices that monitor a temperature, pressure, level, flow, position or status variable. If the input exceeds a selected high or low trip point, one or multiple relay outputs warn of unwanted process conditions or provide emergency shutdown or on/off control. An example of this would be to slam shut or open a valve that mitigates a dangerous process condition.

Safety and reliability are all about reducing risk and increasing resilience. Meeting safety requirements can often be achieved with the simple architecture of single loop logic solvers, and where needed 1oo2 or 2oo3 voting for higher SIL requirements or increased availability. This simple voting approach that employs wiring relays from multiple single loop logic solvers in series is well proven, easily understood, compliant with IEC 61511 and readily expandable. These incremental and cost-effective investments into the process and associated safety and control systems will yield more efficient, safe, and compliant operation at process facilities. Plant owners understand that it takes years to build a reputation, yet one serious operational failure can destroy it.

Michael Carolan is the General Manager for Moore Industries-Pacific Inc. and is responsible for sales and marketing activities within the Asia–Pacific region. He has worked with industrial instrumentation for nearly 40 years as both a user and supplier, across all industry sectors, starting as an instrumentation technician in process plants. Michael has been with Moore Industries for 30 years.

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Developments in product design and advancements in technology mean that at some point, different elements of a piece of equipment will become redundant. When equipment is designed to last for decades or more, this can become problematic as parts age and repair, or replacement becomes necessary.

The Sydney Sullair Australia team experienced exactly this recently, and with the help of a long-term partner in Fluid Dynamics Melbourne, were able to customise a solution. The challenge began when Sullair was approached by its client, which has a pumping station onsite, delivering an essential utility to a consumer base. Their issue arose from a small hole in the oil/aftercooler, in a Champion Ci75 duplex compressor unit. Onsite the compressed air is used to power pneumatic controls and instrumentation involved in pumping.

This unit is an engineered product, installed onsite in the early 2000s and now discontinued, with replacement parts unavailable — including the oil aftercooler. In addition, replacement of the entire unit was not an option; it was too difficult to remove this particular machine from its current location for repairs to be made off-site, and it couldn't be taken out of service as it is critical infrastructure.

Sullair Service Business Consultant Brett Dunlop oversaw the project, with the Sydney Spares and Service Team, and realised they needed to think creatively to develop an alternative solution. Because of the age of the equipment, along with it being designed overseas, there were no blueprints available for the parts to design from. In discussions with Sullair's engineering unit, it was established that the only solution would be to have the part redesigned and remade from scratch, with an Australian supplier.

The first step towards this was to generate some drawings, so Dunlop reached out to a long-term Sullair partner — Fluid Dynamics in Melbourne.

"We didn't have a blueprint or drawing, or an old example that we could manufacture from, and we couldn't take the one that was onsite, so we were left with no choice but to draw it ourselves," he said.

Fluid Dynamics designs, manufactures and provides heat exchange solutions, so was perfectly placed to assist Sullair in customising a solution for their client.

"We measured the cooler's exact dimensions — where its mounting brackets were and its physical dimensions — and we drew it up on paper," Dunlop explained. "Fluid Dynamics sent us the unit they designed from those initial drawings, and after a little tweaking, it was installed and was the perfect fit. The benefit of the Australian-based supplier is that refinements could be made and turned around quickly."

Once the solution was installed, the customer expressed concern that the same issue might arise with the other cooler. The unit is a duplex, so there is a second oil aftercooler in the other cooler also. With the failed cooler now removed, it was available to be sent to Fluid Dynamics, giving them an exact model to design from moving forward.

"Fluid Dynamics used that as the blueprint instead of using the drawings, so the customer holds a brand-new spare in stock now, in the event that the cooler in the second compressor meets the same fate as the first one did," Dunlop said.

The service offering here provided double benefit in that not only was the client's initial problem solved but a preventive measure was also identified and implemented. The client has the spare in stock and can immediately action the solution in the event of a future failure. They can also order custom-designed spares in the future if either of the replacement coolers has issues. Dunlop said that having a local supplier to collaborate with enhanced the service delivery on this project.

"From an Australian manufacturer's point of view, it was fantastic: it showed us why we would try and use Australian manufacturers when we can."

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SafeGas Monitoring Systems supplies specialised oil and grease detectors that analyse a small sample of the lubricant to detect small traces of steel dust and abrasives in the oil or grease.

The Cosmos SDM-72 and SDM-73 analysers are portable test instruments that allow oil and grease lubrication to be analysed on-site with results given within minutes. SafeGas recommends analysing the bearing or gearset lubricant regularly to help monitor its condition and if necessary replace the lubricant in an effort to prolong the bearing or gearset life.

SafeGas Monitoring Systems
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EXPLOSION PROOF ENCLOSURES

The stainless steel SR series of Ex e enclosures from Pepperl+Fuchs have been released to complement the GR series made of glass fibre reinforced polyester, both designed to offer flexible control and distribution solutions for different types of protection.

With over 30 enclosure sizes that can be used both horizontally and vertically, the SR series offers various dimensions for a wide range of applications. Optional 90° rotating mounting brackets and up to four gland plates allow for quick and easy mounting.

To increase cost efficiency, the IP66/Type 4X enclosures are reduced to a basic design. Any accessories, such as flange plates, hinges, mounting brackets or lid security, can be integrated according to user specifications. Due to various international approvals, global use in an extensive variety of applications is possible.

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MACHINE VISION COMPUTER

The Neousys Nuvis-7306RT series is an all-in-one machine vision computer incorporating functionality needed for machine vision applications, and is powered by the Intel 9th/8th-Gen Core i7/i5 processors.

The Nuvis-7306RT integrates a 4-channel constant-current lighting controller, isolated 4-channel 12 V camera trigger output, encoder input for position information and 8-channel DIO to connect sensors and actuators. It is designed to overcome latencies between the sensor input and the trigger output, offering microsecond-scale real-time I/O control that supports in-time or in-position image capture.

For deep learning vision applications, the Nuvis-7306RT can accommodate an NVIDIA 120 W TDP GPU to leverage object detection and classification of neural network models.

It also offers four Gigabit PoE+ ports with screw-locks and eight USB 3.1 ports, also with screw locks.

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SUBSCRIPTION SET TO DRIVE SERIOUS DISR AND TRANSFORMATION IN INDUSTRIAL AUTO

It's an extremely exciting time within industrial automation, an industry that has been renowned for pushing the boundaries of computer and information technology for almost half a century, and we are now reaching a tipping point. Innovations in technology are driving newfound levels of advancement in process automation and control — and at speed. The advent of cloud, big data analytic platforms, data centres and new communication protocols supporting the Industrial Internet of Things (IIoT), are pervading the industrial and infrastructure landscape. And with the convergence of information and operational technology, coupled with new commercial models helping break down silos and deliver new levels of integrated intelligence, manufacturers and operators are being forced to rethink their technology and transformation strategies.

This rapidly changing landscape warrants new thinking in terms of the traditional rigidity of industrial software licensing, an area that is ripe for disruption with Gartner predicting that by 2020 all new entrants and 80% of historical vendors will offer subscription-based business models, regardless of where the software resides. Whilst subscription is increasingly inherent within our day-to-day lives with almost all of us subscribing to at least one or a combination of smart phone, entertainment, transport, communication and cloud solutions, industrial automation has been slower to respond with software dissemination largely based on traditional perpetual licensing models. However, the vast majority of enterprise software buyers are already considering or have begun transitioning to subscription products, citing flexibility and the ability to manage costs as the main motivators driving this change.

Whilst AVEVA has been offering a variety of subscription solutions for some time, the introduction of AVEVA Flex is the market's first end-to-end industrial software subscription program, offering customers complete commercial and technical flexibility in accessing its comprehensive software portfolio to leverage transformative technologies and expedite business value. Leveraging its leading Monitoring and Control portfolio to help connect the asset and operations lifecycle, AVEVA Flex includes a variety of subscription options that empower customers to focus on their competitive position into the future by adopting the solutions they need from the outset, with the agility to revise software and license allocation as needs and demands evolve.

Case in point: SCG Chemicals, Thailand

SCG Chemicals is one of the largest petrochemical companies in Thailand and a key industry player in Asia. The company's integrated operations include

upstream production of olefins and downstream production of polyethylene, polypropylene, and polyvinyl chloride. With its tightly integrated business, the company was at risk that individual equipment failure could shut down the entire production chain with direct implications for top and bottom line financial performance. To address this risk, SCG Chemicals pursued a digital transformation initiative to harness data to build an advanced asset performance management (APM) solution to monitor critical assets and predict failure towards a goal of zero plant shutdowns. The company partnered with AVEVA to develop a Digital Reliability Platform (DRP), a complete asset performance management solution to predict equipment health, monitor performance, and enable advanced maintenance to eliminate unplanned downtime. Using a mix of on-premise and cloud-based applications, the solution integrates online and offline equipment data to visualise plant performance, enhance workforce efficiency, and apply artificial intelligence (AI) for predictive maintenance and resolution. SCG Chemicals validated the Digital Reliability Platform and commissioned its Digital Reliability Center, the company's central hub for data collection, analysis, visualisation, and maintenance operations, through a five-month pilot project, enabled by the AVEVA Flex subscription program. With the success of the DRP, SCG Chemicals is easily scaling up the platform to its 15 plants as well as its joint ventures.

Platform requirements for asset reliability

SCG Chemicals envisioned a Digital Reliability Platform to apply digital innovation to management and maintenance processes. In addition, the approach matched the company's broader digital transformation imperative to become a data-driven organisation to advance its position as a leader in the petrochemical industry. In evaluating technology partners for its APM strategy, SCG Chemicals focused on three factors:

- End-to-end solution — the ability to deliver a complete APM solution to integrate and analyse data, visualise performance, and manage maintenance activity.
- Workforce enhancement — providing tools for teams to access data quickly and guide actions to perform maintenance tasks using enhanced information via tablet, video wall, and mobile operator rounds.
- Strategic partnership — a technology provider with the deployment expertise, deep knowledge of process manufacturing, with a subscription program that gives full flexibility to access a solution ecosystem.

The Digital Reliability Platform utilises digital innovations to increase maintenance efficiency. The solution provides SCG with an enhanced ability to maintain equipment in various plants within its business, both in Thailand and abroad. The central components of the Digital Reliability Platform include predictive analysis, data centre, smart workforce and advanced maintenance and a 3D virtual plant.

Plant reliability increased from 98% to 100% and significant cost saving delivered

SCG has identified some key areas where its AVEVA solutions are delivering business value:

- Asset reliability and performance optimisation — plant reliability has increased from 98% to 100% through catch identification to avoid asset failure costs. The ROI from this saving was 9X, making it a best-in-class solution.
- Standardised work execution and safety risk management — maintenance costs have decreased delivering savings of 40% through greater operational and workforce efficiency, as well as improved work scheduling.
- Asset strategy optimisation and remediation — reduced/optimised planned maintenance through use of data from IIoT sensors and real-time analytics, reducing costs by up to 30%.
- Access to information and visualisation — the time to retrieve actionable information has reduced to less than 10 seconds, through the single source of truth, single data platform and automated reporting.
- Real-time information on software usage — the central license management portal facilitated the software scaling to SCG's evolving needs, either by allocating credits across teams and sites or adding new credits to the existing AVEVA Flex contract.

At AVEVA subscription is seen as a shared commitment in innovation with customers. With the industry continuing its progression towards Industry 5.0 technologies and AVEVA Flex already gaining traction with a number of its key customers, AVEVA is now successfully advancing with solid investments in artificial intelligence, predictive analytics and cloud technologies while working closely with customers to help redefine what the industrial landscape may look like in the future.

AVEVA Schneider Electric

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https://bit.ly/2XYMdSe

CONNECTORS WITH PUSHPULL TECHNOLOGY

The metric version of the circular connectors plays an important role for industrial termination techniques. Their termination type usually results from their shape and metric dimension. The best known representatives here are the M8 and M12 sizes. The circular connectors use different coding to carry out their power supply or data interface tasks. While the classic variant has a screw cap, HARTING has configured its M12 connectors with a more modern and fast PushPull locking mechanism.

With PushPull locking, an audible click during the tool-free assembly process signals that a correct connection has been established. The assembly density (eg, on switches) can also be significantly increased, which supports the I4.0 trend towards miniaturisation by meeting the demands of device manufacturers whose housings continue to shrink.

HARTING's circular connectors, with both screw-on or PushPull locking mechanisms, come in M8 (M8 D-coded), M12 and 7/8″ versions, and are suitable for all purposes, including data, signal and power. They are available with multiple termination techniques, for both the cable and device sides.

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The VEGAMET series of controllers for level and pressure measurement are designed to be highly visible and ready to use out of the box. They come in different designs for whether the controller is be installed inside a switching cabinet, in a front panel or standalone in the field.

A high-contrast display offers options for a clear, well-arranged visualisation of measurement data that can be read from a distance and in broad daylight. Users can also access the controller via a smartphone or tablet with Bluetooth, so that they can parameterise the device remotely and monitor measured values away from hazardous zones.

In addition to managing data acquisition, visualisation and storage, controllers nowadays have to make measured values and histories available. The VEGAMET series 140, 340 and 800 controllers also offer more complex tasks such as pump control, flow measurement, totalisation, data logging and calculation, including differential, summing and averaging.

When used outdoors, VEGAMET 800 controllers can be fitted with a suitable sun shield for good readability in direct sunlight. If it's necessary to protect the instrument from vandalism and prying eyes, the display can also be programmed to switch off automatically after 2 min.

VEGA Australia Pty Ltd

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MODULAR OPERATOR WORKSTATIONS

VisuNet FLX is a range of flexible operator workstations and monitoring systems from Pepperl+Fuchs for ATEX/IECEx Zone 2/22 and Division 2 (global certifications pending), and non-hazardous areas. The platform is tailored to the needs of the petrochemical, chemical and pharmaceutical industries.

Due to the fully modular design, HMI solutions can be configured to maximise functionality and the platform can be quickly and easily customised in the field. Thin client units, display units and power supplies can be easily upgraded and replaced in the field, keeping downtime to a minimum.

In combination with the numerous pending certifications (eg, ATEX, IECEx, NEC500) and the global Pepperl+Fuchs partner network, the VisuNet FLX series offers a flexibly scalable, expanding platform for HMI solutions that can be used worldwide. Three basic configurations — mostly based on thin client technology — are available and are supplemented by an expanding range of peripheral devices: a HMI system, a panel PC and a box PC. Users can choose from a wide range of preconfigured FLX solutions that are quickly available or from a fully customised solution from one of Pepperl+Fuchs Solution Engineering Centres.

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NEW PRODUCTS

COMPACT EMBEDDED COMPUTER

The Neousys POC-400 is a compact fanless embedded computer for industrial applications. It utilises the Intel Elkhart Lake platform Atom x6425E 4-core CPU that can deliver 1.8x CPU and 2x GPU performance improvement, compared to the previous generation.

In addition to the performance boost, the POC-400 features a compact design that can easily fit into restricted spaces. The system comes with a DIN-rail mounting chassis and many front-access I/O interfaces. Featuring three 2.5 1000base-T Ethernet ports with IEEE 802.3 PoE+ capability, they provide higher data bandwidth for devices such as Nbase-T cameras. It also has two 4K DisplayPort ports, two USB3.1 ports, two USB 2.0 ports and COM ports for general industrial applications.

Supporting Neousys's proprietary MezIO interface for function expansion, functions can be added, such as isolated DIO, RS-232/422/485, ignition control and 4G/5G by installing a MezIO module. The POC-400 comes with an internal M.2 E key socket for a Google TPU or an Intel Movidius VPU module to transform it into a lightweight AI inference platform at the edge.

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www.backplane.com.au

MODULAR AUTOMATION SYSTEM

MOVI-C from SEW-Eurodrive is a modular automation system composed of the four necessary elements: drive technology, inverters (both centralised and decentralised), control technology and engineering software.

The efficiency and integration of the modular MOVI-C range is designed to cut costs and improve performance in the food and beverage, logistics and automotive industries, and in baggage handling at airports.

A single-source automation system for all-in-one solutions, MOVI-C provides flexibility, whether the need is to implement single-axis or multi-axis applications, complex motion control or customised automation solutions. It combines decentralised installation with the flexibility of a modular design, saving space and reducing costs in the process.

The key to this is diversity, brought about by a range of gear units that come in different sizes and with different outputs, speeds, torques, designs and varied finishes, all combined with asynchronous or synchronous AC motors. Linear motors, electric cylinders, brakes, built-in encoders and diagnostic units can also be added.

SEW-Eurodrive Pty Ltd

www.sew-eurodrive.com.au

CONTROLLER

A simple applications controller, the Mitsubishi Alpha Series 2 PLC uses the common DIN rail mount with screw terminations.

The product features an operating temperature range between -25 and +55°C, a program memory of 200 blocks and three-level security protection with a security code.

The large LCD display supports bar graphs and moving text, and the system supports mathematics calculations, automatic status reporting, analog signal processing and I/O expansion.

The compact frame of the PLC includes a real-time clock, high current switching, relay and analog outputs, and 100 h of backup memory.

Automation Systems and Controls Pty Ltd

www.asconline.com.au

MORE EFFICIENCY AND LESS PRODUCT WASTE IN FOOD PRODUCTION

Flowmeters with surface acoustic wave technology offer precise detection of media changeover.

Strict quality and hygiene regulations must be adhered to in food and beverage production. Therefore, production plants need to be cleaned regularly when changing over batches or products. At the same time, the production process should be carried out as efficiently as possible. The FLOWave flowmeter from Bürkert Fluid Control Systems now offers extended functions, including the extremely fast and precise detection of media changeovers. As a result, production steps can be clearly separated from each other and waste can be reduced without negatively impacting on hygiene.

The FLOWave flowmeter enables the precise detection of changeovers between different liquid types during food production. Especially in rinsing processes, rapid differentiation between product and rinsing water ensures efficient process control and a high level of quality. The device thus continuously measures the temperature-independent density factor. Based on this measured value, valuable products such as milk can be quickly and reliably differentiated from the cleaning liquid. Compared to conventional time-controlled processes, product waste can be minimised and costs saved. In addition, the amount of wastewater treatment required is reduced as less product enters the wastewater.

Reliable media changeover for beer and pre-mixed alcoholic beverages

The flowmeter works according to the SAW method. This patented technology can also be used to measure the transition between beer or pre-mixed alcoholic beverages and water. FLOWave utilises the propagation speed of the surface acoustic waves in the liquid for this purpose. The speed increases with the addition of alcohol and sugar. This also leads to an increase in the density factor of the liquid compared to water. However, the actual density of the liquid hardly changes depending on the alcohol and sugar content, since sugar increases the density while alcohol reduces it. The transition between beer or pre-mixed alcoholic beverages and water is therefore often very difficult to measure with conventional density meters.

Measuring relevant fluidic parameters with one device

The density factor not only indicates the media changeover between product and water, it also differentiates between liquids with varying contents of sugar. The SAW technology allows additional data to be obtained from the medium. In addition to the temperature, the flowmeter automatically detects possible gas bubbles and outputs the values in percentage terms. Possible process faults can thus be eliminated quickly and effectively.

SAW technology — hygienic and low-maintenance

SAW technology does not require sensor elements in the measuring tube. This means there are no pressure drops, sealing problems or dead spaces that would otherwise interfere with cleaning. The sensors thus meet the highest hygiene standards and facilitate the qualification and validation of production and cleaning processes. The Bürkert device platform EDIP (Efficient Device Integration Platform) guarantees simple transmission of FLOWave sensor data to all common fieldbuses. The maintenance-free, lightweight and yet robust meters can be mounted in any position.

bürkert
FLUID CONTROL SYSTEMS

Burkert Fluid Control Systems
www.burkert.com.au

ABB robots increase automation in the solar industry

Swedish company Absolicon manufactures solar concentrators for industrial heating applications, helping industries to change from fossil fuels by providing an easy-to-install and emission-free energy solution for using solar thermal resources.

The company's latest solar collector is the Absolicon T160. With an operational temperature of up to 160°C, the T160 can supply heat and steam to a wide spectrum of processes and industrial segments. However, the challenge in enabling the transformation to a sustainable society is that the production of solar collector panels must be precise, highly efficient and cost-effective.

To achieve this, Absolicon and ABB have developed what they say is the world's only complete solution for the mass production of concentrated solar collectors, in Absolicon's factory in Härnösand, Sweden.

The degree of automation has increased production drastically. Absolicon's robotic production line now uses two ABB robots to produce a solar collector panel every six minutes, compared with up to only three units per day using previous manual production methods.

"Developing an automated production process enables our global business case by radically reducing the price of our solar collectors, while manufacturing them consistently to a very high quality," said Joakim Byström, CEO of Absolicon. "The productivity offered by ABB's robots means we can make solar energy compete on price with conventional industrial heating for the first time.

"Our new automated production line can produce a complete solar collector every six minutes, so while competitors rely on a manually intensive manufacturing process, we can now do it with five people, two robots and a fraction of the components."

Absolicon has been developing sustainable solar technology for 20 years and produces parabolic solar collectors that are said to be the most efficient in their class, generating heat and steam up to 160°C for industrial companies and district heating networks.

"We're pleased that ABB's robotics solutions are accelerating the productivity, quality and cost efficiency of Absolicon's production line to enable them to bring a renewable energy product to market at a competitive price," said Sami Atiya, President of ABB Robotics & Discrete Automation. "In helping Absolicon to accelerate their production from three units a day to one every six minutes, our robotics solutions are playing a key role in accelerating the global adoption of sustainable technology, ensuring Absolicon's production partners are able to consistently produce solar collector panels globally."

"Our vision is to enable a cost-effective mass production of solar collectors across the world, to produce heat directly from sunlight," said Byström. "Our work with ABB to create this automated production process is a key enabler to realise our vision, while ABB's global service organisation will be a very valuable resource for our new customers as we roll out our new automated production line globally."

The next phase of the project involves supplying complete robotic production lines to manufacturing partners across the globe, and ABB and Absolicon have agreed they will collaborate on the development, sales and marketing of the robotic production line worldwide.

The first installation has already been delivered to a partner in China, and framework agreements for the acquisition of robotic production lines have been signed with businesses in a dozen countries, with ABB supplying the robots for all new installations.

ABB Australia Pty Ltd
www.abbaustralia.com.au

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BRX Do-more PLC, 120-240 VAC powered | Ethernet and serial ports | microSD card slot | Discrete Input: 20-point, AC/DC | Analog Input: 4-channel, current/voltage | Discrete Output: 16-point, sinking | Analog Output: 2-channel, current/voltage

LADDER PROGRAMMING

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- FTP Client
- Modbus RTU Master/Slave
- Modbus TCP
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- EtherNet/IP explicit messaging scanner/adapter
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Four unique form factors that each provide a strong system design to fit precise application requirements, while keeping the cost of the system to a minimum.

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MOBILE INDUSTRIAL ROBOT

Konica Minolta Australia has announced the availability of the MiR250 mobile industrial robot, through its partner Mobile Industrial Robots (MiR).

The MiR250 is said to be simple to set up for improved productivity. With a smaller footprint and increased adaptability, it is designed to help optimise internal logistics without changing layout in industries such as manufacturing, FMCG and defence.

The MiR250 has a footprint of 580 x 800 mm and is only 30 cm high. It can move up to 250 kg at speeds of two metres per second.

It also has a fast charge rate of 0-80% in one hour with an operating time of 13 hours at full charge, and has the ability for a fast battery swap to support 24/7 operation. Top modules can also be mounted on the MiR250 for a complete solution to tow carts and shelves and lift and transport shelves.

The MiR250 signals with light and sounds to demonstrate its status. The LED light band indicates its current operational state such as emergency stop, mission paused, path blocked, or mapping. The MiR250 also has signal lights that work similarly to lights used on cars: white at the front, red at the back, and indicating a left or right turn by blinking. Signal lights suggest the immediate motion plans by signalling forwards, backwards, braking, and left and right turns.

Konica Minolta Business Solutions Australia Pty Ltd
www.konicaminolta.com.au

ASYNCHRONOUS MOTORS

Bonfiglioli's BX Heavy Duty Series of asynchronous motors is designed to meet the requirements of demanding industrial applications. Both the IEC and Compact motor are available in IE3 efficiency classes according to the international standard IEC 60034-30.

The motors are equipped with features such as a cast iron frame, C3 corrosion protection, regreasable bearings and shock pulse measurement predisposition as standard on all sizes.

Heavy Duty BX can be personalised and adapted to users' needs due to a wide range of available options. The motors can be equipped with options including: protection class up to IP56; tropicalised, corrosion-resistant paint; and anti-condensation heaters. Motors in the BN/M and BX/MX series are also available in the brake motor version, with a selection of AC or DC brakes. To maximise e-motor flexibility, all motors can be controlled with inverters.

The BX series withstands environments up to IP65 and can resist extreme temperatures (with bimetallic or PTC components). Incremental and absolute encoders are optional.

Bonfiglioli Transmission Pty Ltd
www.bonfiglioli.com.au

IoT GATEWAY DEVELOPMENT KIT

The Neousys IGT-22-DEV is an industrial-grade gateway development kit that provides the resources needed for developing a gateway.

IGT-22-DEV provides a ready-for-use software environment featuring Debian Buster, Docker CE, Node-RED, Python3, GCC and an IoT platform agent configured with sensors and cloud connection. With minimum provisioning on the IoT platform, a web-based dashboard becomes available and can be accessed on a desktop computer, tablet or mobile phone. The IGT-22-DEV has Node-RED pre-installed for intuitive graphical and local logic control of the built-in DO, allowing prompt responses. Unlike the standard IGT-22, the USB port of IGT-22-DEV is specifically set to OTG mode to provide serial and LAN functions over USB, so users can choose to connect to the IGT-22-DEV with a USB cable.

IGT development kits not only demonstrate the capabilities of the IGT series but their ready-for-deployment and plug-and-play characteristics make them suitable for compatibility or performance evaluation without starting from scratch.

Backplane Systems Technology Pty Ltd
www.backplane.com.au

ELECTRONIC CIRCUIT BREAKERS

The PULS PISA-B electronic protection module offers eight completely separated, individually adjustable channels to provide protection for load circuits with different demands in 24 V systems.

The series offers several control features, such as remote monitoring of channel states by individual signalling contacts or resetting all channels that tripped at once from a remote location. Diagnosis in the field is made easy with channel status visible at first sight and the utilisation of each channel able to be determined without using a current probe, due to an LED matrix display. Push-in terminals make wiring simple and tripping currents of each channel can be configured individually via push-buttons.

Control Logic Pty Ltd
www.controllogic.com.au

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www.turck.com.au
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PROTECTING SENSORS IN WELD CELLS

THE FASTEST WAY TO DRAMATICALLY INCREASE WELD CELL PRODUCTIVITY

Improving sensor survivability in weld cells is one of the easiest and fastest ways to reduce unplanned downtime and lower cost.

When it comes to sensors, cables and connectors in weld cells, weld cell management people are so used to the high cost of constant replacement, downtime and lost productivity that they begin to think it's natural that weld cells are just that way. Sensors are constantly damaged by loading impact. Slag, weld debris and heat ruin not only the sensors, but their associated connectivity.

It gets to the point that most people involved with weld cells start thinking there's not much you can do about the wastage but put in a vending machine or some kind of sensor dispensing system close at hand — as if having replacement parts nearby is a viable process improvement.

It's time to break the high sensor wastage paradigm

It's time to dispel the myth that maintaining weld cells equals high costs, constant replacement and frequent maintenance episodes.

The reason that many weld cells have such high sensor replacement costs is that the sensors used may not match the application, or they are incorrectly placed in the cell, insufficiently protected from heat, slag and impact. And it doesn't end there. Often connectivity is supplied using the wrong cable jacketing material. Sensor mounts are often of the wrong design for weld cell service or they are manufactured from the wrong materials such as lightweight plastics that are vulnerable to weld hostilities.


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Problem: Heat and slag

High ambient temperatures and weld debris, also known as weld slag or weld berries, attack sensor enclosures, faces, connections and flimsy plastic mounting brackets.

Solution 1: Choose the right sensor

Choose the right sensor for the right application in every cell location, taking into account the type of welding being accomplished. Sensors are rated devices and are application-specific. MIG, TIG, laser and resistance welding all have their own unique set of characteristics. Not every cell location can accept the same sensor type.

Coated sensors provide a thermal barrier and resist weld debris, slag accumulation and, to a degree, resist impact on the sensor face, while steel-faced sensors tend to be more robust and impact resistant.

Try to use only flush (shielded) sensors in weld cells. They can be surrounded or encapsulated in metal and there's less potential of shearing off the exposed coil as with tubular non-flush types. Sensors with one-piece gun-drilled stainless steel housings stand up to major incidental impacts, and some have long-range characteristics which, combined with PTFE coatings, give them long-term survivability in tough weld cell applications.

Solution 2: Protect your sensors and connectivity

Protect your sensors by applying a total heat and slag solution to your sensors, cabling and connectors.

An application-specific coating applied to the face of a proximity sensor repels weld slag accumulation and protects it from damage even in the most severe welding environments. For the connectivity, start with a high durability TPE cable, and then cover the cable, sensor and its protective products with silicone tubing and weld wrap. This system guards the cable and secures the jacket in its proper location while sealing remaining connectivity components against harsh, hot weld spray.

PVC jacket material on connectors should never be used in a weld environment. PVC burns through quickly and can become extremely brittle in a short period of time. PUR styles (polyurethane) offer a better degree of nick resistance, flex characteristics and resistance to welding debris, but TPE (thermoplastic elastomer) takes the positive aspects of PUR to a higher degree of performance.

While TPE cables have outperformed other cable materials such as PVC and PUR, there are additional steps that can be taken to protect connector cables. Tubular silicone jacketing, cut to length and applied to the cables back from the connector will protect the cabling from ambient temperatures of up to 260°C as well as prevent slag build-up on the cabling.

There is also silicone wrap, which is a self-bonding, non-adhesive silicone tape that once applied like tape on a hockey stick, will protect the sensor and connector from slag and heat just as well as silicone jacketing. Once applied, the wrap bonds to itself, becoming a solid barrier to heat and slag, protecting anything it is applied to.

Problem: Parts loading impact

Parts to be joined, or completed components that are loaded and unloaded either manually or by robot, are often dropped on exposed and vulnerable sensors, physically destroying the sensor or the entire sensing system. If an inductive proximity sensor located on a clamp is hit by metal to be joined, usually through loading impact, extensive sensor damage and premature failure may result.

Solution: Impact protection

Bunker and protect! Mechanical protection is central to the integration of any sensor in hostile manufacturing environments. Mechanical accessories provide a means of rapid change-out and act as a heatsink, while guarding against the heaviest of direct impact and weld debris.

Figure 1: Sensor with weld slag and connector damage.

Figure 2: A sensor damaged by impact.

Figure 3: Silicone wrap protects the cable and connector.

The greater the protection, the longer the sensor life. Using a bunker block in conjunction with a quick-change prox mount protects the sensor body and face from debilitating physical damage. Prox mounts and bunker blocks are made of machined aluminium or steel and can be PTFE coated. PTFE coating significantly prolongs sensor life by providing a thermal barrier to protect against heat. It also retards the build-up of weld slag spatter and spray, and eases removal of surrounding deposits of weld debris during scheduled maintenance periods.

Problem: Sensor connection failure

Sensor cable connections are a major point of failure. Connectors need to be designed to withstand the hostile weld cell environment. If a sensor cable's connection has too much stress from slag build-up or if it has the wrong angle, tension and pressure on the connection will cause premature failure. Heat, slag accumulation and flexing of the cable cause connectors to break at the most vulnerable location.

Most sensor types are generally hard-wired to M12 DC Micro or M8 Nano-style connectors. One of the largest problems with sensors in weld cells revolves around the issue of cable and connector burn through.

Solution: Connector protection

Use only the highest grade of connectors available. TPE exhibits excellent chemical, lubricant, flex, heat, nick, coolant and pinch resistance. There are several models that can function with every sensor found in the typical weld facility, facilitating standardisation and transparency in the organisation. Follow proper cable exit geometry to avoid creating stress on the cable connection, especially in the presence of heat and other weld hostilities.

Once again, seal your entire sensor+connector+mounting system with self-fusing, self-bonding silicone wrap that's rated to 260˚C. It is clear so LEDs can be observed, and it guards connections against fine weld spray, while eliminating the need for hose clamps (which attract weld berries) and vulnerable zip ties for attachment.

Problem: Inadequate mounting brackets

Plastic mounting brackets deteriorate rapidly in welding environments. This contributes to false sensing, no sensing or increased vulnerability of the sensor itself. Moreover, with these brackets, sensor bodies are usually not encapsulated, exposing them to high heat, weld debris spray and impact.

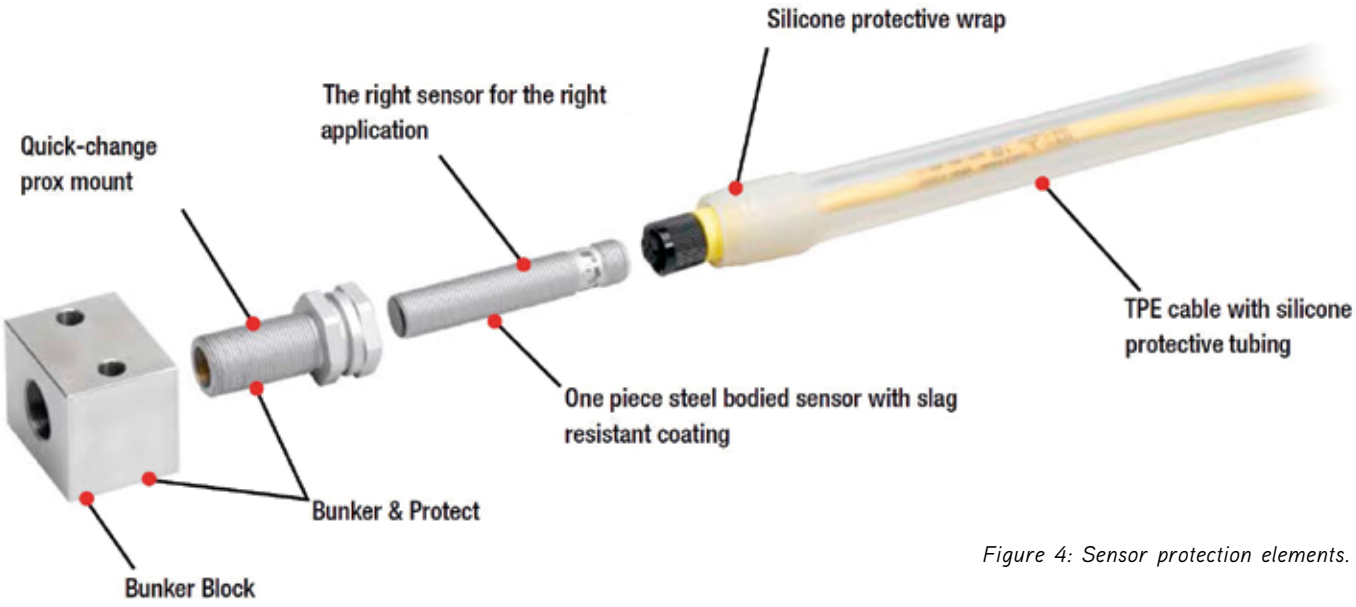

Figure 4: Sensor protection elements.

Solution: Protective mounting

Don't use plastic mounts in the weld cell environment. Instead, use bunkered aluminium or steel mounting solutions. Bunkering protects the sensors from impact, and heat. Then, once the sensor and the bunker are protected with silicone wrap, slag build-up will be drastically impeded, increasing the intervals between maintenance as well as decreasing downtime during maintenance.

Problem: Incorrectly applied photoelectric sensors

Photoelectric sensors require attention to perform well in welding environments. Plastic-body photoelectric sensors must be protected from parts loading impact. In addition, just as with a pair of glasses, if the optical lens becomes excessively occluded, photoelectric sensors cannot perform their function.

Solution: Choose the right photosensors and protection

Choose only robust photoelectric sensors with heat and mar-resistant lenses. Choose devices with high excess gain properties that can sense through dense weld smoke and debris. Use lens blow-off shields or air knives to create a positive air pressure in front of the sensor, lengthening the time it takes to fog over and reduce frequent maintenance wipedowns. Bunker all photoelectric sensors as you would any inductive proximity type. Avoid fibre optics. Both glass and plastic fibre-optic bundles are frequently broken in welding cells, while one speck of debris and the fibre lens is usually rendered useless.

Vending machines: Detours on the road to productivity

Vending and other dispensing solutions may offer increased convenience, but they do nothing to lower operational costs — in fact, they tend to do the opposite. Vending machines make it easier to sacrifice sensors to a replacement process that actually may be out of control, with little tracking of sensors as to where, why and how often they are being installed. Before even more dispensing machines are installed, get to the root cause analysis of failure and fix the problems first. Worry about supply-chain management after sensor wastage problems have been fixed.

Streamline your storeroom MRO inventory. After you've gotten your arms around sensor-related problems, consolidate the number and types of sensors in stores, and weed out what you don't need or will never use again. How many electrical stores carry totally obsolete sensors and connectors? How many times has the wrong device been installed causing another downtime issue?

How to get started towards a more efficient weld cell production process

Arrange for a thorough weld cell audit. If you're experiencing what you believe to be heavy consumption of sensors used in your day-to-day welding process, or you believe maintenance time is out of the ordinary, an audit of each individual sensor in every weld cell location may be warranted. In almost every instance, you will dramatically increase production, reduce machine downtime, reduce material and maintenance costs, and increase profitability by integration of even a few of these recommended weld cell improvement methods.

Understand through a documented weld cell audit, how every sensor in every location on the plant floor is performing, where recurrent problems occur and why, and where maintenance people are constantly replacing sensors. Get a handle on the problems and regain control of your processes. Remember, the definition of insanity is doing the same thing over and over again and expecting a different result.

The bottom line

Once you've got your sensor problems straightened out, your stores will be current and organised. Resolve to never get into this situation again: on your next weld cell order, be certain that you meet with your most able sensor manufacturer representative and review sensor designs with that individual. Spend a little extra money on the front end for the best bunkering and protection, rapid change-out mounts, application-specific sensors and connectivity systems you can find and you will ensure sensor longevity.

Balluff Pty Ltd
www.balluff.com.au

SENSORLESS STANDSTILL MONITOR

The Schmersal SSW300HV is a sensorless standstill monitor developed with a wide-range power supply for all common AC and DC operating voltages, from 24 VDC and 24 VAC to 230 VAC. As a universal device it replaces 14 variants of the previous range, making product selection and spares management simpler.

The product is compact at 45 mm wide and has pluggable, coded connecting terminals for rapid, error-free installation, while an additional signalling contact provides information on the error status of the module for control system integration. The operating temperature range is -25 to +55°C, which increases potential installation in harsh locations.

The standstill monitor operates entirely without sensors, so no allowance or space is required for mounting external sensors. The safety module is connected directly to a three-phase motor and directly measures the frequency of the induced voltage for rated motor voltages of up to 690 V. The safety contacts open as soon as the motor comes to a standstill.

The device can be used in safety circuits up to category 4/PL e in accordance with EN 13849-1 and SIL 3 in accordance with EN IEC 61508.

Control Logic Pty Ltd
www.controllogic.com.au

BULK BAG UNLOADER WITH DUAL SCREW CONVEYORS

Flexicon has released a bulk bag unloader with dual flexible screw conveyors that feed two downstream processes dust-free.

The BULK-OUT BFF Series Discharger features top-mounted receiving cups and a removable bag-lifting frame for forklift loading of bulk bags. Z-CLIP strap holders allow rapid, secure insertion and removal of bag straps from the lifting frame at floor level.

The bulk bag/hopper interface comprises a manual SPOUT-LOCK clamp ring for high-integrity bag spout connections, and a pneumatically actuated TELE-TUBE telescoping tube that exerts continuous downward tension on the clamp ring and bag spout as the bag empties and elongates, promoting flow and evacuation. Additional flow is afforded by FLOW-FLEXER bag activators that raise and lower opposite, bottom sides of the bag at timed intervals into a steep V-shape, and top-mounted POP-TOP extension devices that elongate the entire bag, promoting total discharge with no manual intervention.

The hopper is equipped with dual flexible screw conveyors that transfer free- and non-free-flowing bulk materials to downstream processes separately or simultaneously. The flexible screws are the only moving parts contacting material, and are driven beyond the point at which material is discharged, preventing material contact with seals.

The system is available in carbon steel with durable industrial coating, or stainless steel finished to industrial, food, dairy or pharmaceutical standards.

Flexicon Corporation (Aust) Pty Ltd
www.flexicon.com.au

OUTDOOR CABLES

Treotham now offers more LAPP PVC cables for data and signal transmission in the low-frequency range with a black outer sheath (BK) in its portfolio. This makes them suitable for outdoor use in accordance with DIN EN ISO 4892-2.

The black UNITRONIC LiYY BK has a compact design that enables small outer diameters despite the high number of cores. The classified fire behaviour properties are defined in accordance with EU Directive 305/2011 (BauPVO/CPR). This means that the new black UNITRONIC can be used universally on machine interfaces for many applications for data and signal transmission in the low-frequency range. For example for computer systems, electronic control and regulation devices, office machines or scales. It is suitable for fixed installation or for light mechanical stress and can be used in dry and damp environments.

The LAPP twisted pair UNITRONIC LiYY (TP) BK has short lay lengths so that the conductor circuits are well decoupled. A shielded version — UNITRONIC LiYCY (TP) BK — is also available, which due to its copper braiding protects against capacitive interference from electrical fields with a high degree of coverage.

Treotham Automation Pty Ltd
www.treotham.com.au

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6 STEPS TO DEVELOP A CYBERSECURITY PROGRAM FOR OT

Andrew Sheedy, Director OT Security Solutions, Fortinet

Operational technology (OT) comprises the systems, facilities, technologies, supply chains and networks that produce and manage goods and services in critical infrastructure (CI) sectors such as, power, gas, water, food, banking and finance, health, transport, defence, communications and education. These CI sectors provide essential services to businesses, governments and the community, as well as to other critical infrastructure.

They are vital to the social and economic wellbeing of Australia, including public safety and the ability to ensure national security.

A successful cyber attack on critical infrastructure that disrupts the provisions of essential goods and services can put public safety at risk, threaten economic security and, in a worst case scenario, compromise national defence.

In a rapidly evolving threat landscape, CI is a prime target for bad threat actors seeking financial profit via extortion or cyber espionage. But, with high stakes at play, hacktivists and disgruntled insiders are also incentivised to target critical infrastructure.

To build defences against CI threats and mitigate risks, cybersecurity programs of work are vital for OT and CI organisations.

Six key objectives of a cybersecurity program

To achieve a desired state of security maturity, OT organisations should adopt a program of work including six objectives in the security journey: risk assessment, strategy and governance, policy and procedure documentation in line with standards, implementation and security testing, monitoring, and staff training.

1. Risk assessment

The program should start with a risk assessment. This assessment should identify all assets in the architecture, assess risk using appropriate terms of reference or standard and have a scoring system to grade impact, likelihood and consequence. Results and findings should be numerically coded and transferred to the enterprise risk register and be nominated at the board's risk committee meetings. A remediation budget should also be requested.

2. Strategy and governance

The strategy and governance documentation should take the results of the risk assessment and list the major projects the organisation must complete to mitigate or remediate identified risks to an acceptable level. This documentation should include projects, funding and timelines.

3. Documentation

Organisations should create security policy, procedure and architecture documentation referencing an appropriate architectural model.

An ISMS can be built by the selection of a standard such as ISO/IEC 27001:2013, ISA/IEC 62443, NIST or the Australian Government Information Security Manual. Standards contain cybersecurity domain and controls that once implemented enable an organisation to achieve a strong cybersecurity posture.

4. Implementation and testing

The implementation phase of a security architecture builds and tests the specified architecture in its physical form in four phases:

- Proof of concept (POC)
- Factory acceptance testing (FAT)
- Site acceptance testing (SAT)
- Security testing with active and passive penetration testing of security controls

5. Monitoring and incident response

Monitoring and incident response planning confirm system visibility and alerting capability across architectures for operational and security events based on a series of rules.

It is advisable to collect key metrics from devices across the architecture to enable monitoring and reporting across four key areas: operations, applications, security and business objectives.

6. Training

Training is a critical step in the security program to impart knowledge and help build a security culture. The main two training types are: cybersecurity awareness, which covers basic security concepts, and training on policy documentation established in the documentation and architecture phase.

OT organisations should adopt a cybersecurity program of work that identifies the organisation's critical assets, assesses and documents risk, and maintains a risk register with remediation plans.

The security program should document the people, processes and technology of the operational architecture in line with appropriate standards. It should also warrant competent implementation with active and passive testing. While visibility of the architecture is key to incident response, cybersecurity awareness and policy training are imperative to building a strong security culture.

A robust cybersecurity program built on the six key objectives will enable a strong cybersecurity posture and compliance with the impending changes to the Critical Infrastructure Act.

Fortinet International Inc
www.fortinet.com

AS I SEE IT

DECARBONISATION AND DIGITALISATION: OUR INDUSTRY CAN TAKE THE LEAD

At this point in history, the big trends and issues that we see affecting the automation and control industry are twofold: decarbonisation and digitalisation. It is in these two areas that our industry can take the lead to drive successful outcomes.

The active mitigation of climate change risks is thankfully not just in the hand of our politicians. The reluctant commitment of our political leaders to achieve net-zero and the threat of being left behind by the rest of the world are certainly less than ideal. We see an increasing number of initiatives driven by large resources, energy and manufacturing companies to accelerate their efforts to decarbonising their processes and switch to clean and renewable resources for their energy needs, and I see our role within our industry as offering vital solutions in renewable energy (wind, PV, battery storage and green hydrogen).

In addition, using technology to reduce the energy demand for our manufacturing industry will optimise this industry's cost structure while reducing its carbon footprint. Decarbonisation also means replacing or at least dramatically reducing the need for fossil fuels for areas like transport, and the use of gas and coal in heat generation in industrial processes. While hardly anyone can solve all these challenges alone, we as an industry can contribute substantially.

Digitalisation, IIoT and Industry 4.0 have also for some time now been promoted as technologies that will shape the future of our process and manufacturing industries. As an industry, we now must move from using buzzwords to real-world action. If we can use digitalisation to improve productivity, we are less reliant on lot sizes and make investing in local manufacturing more attractive. If we use condition monitoring, machine learning and analytics smartly, we can reduce maintenance costs and increase the efficiency, safety and reliability of most processes. In addition, if we use the data we collect sensibly we are able to optimise energy usage and contribute even more to reducing our reliance on traditional energy sources and of course the associated costs.

While we cannot move away immediately from all uses of fossil fuels, we have in Australia only scratched the surface in making their use efficient. Future investments in oil and gas, LNG and coal (for example) need to drive efficiency and should go hand in hand with the eventual transition towards renewable and clean energy sources. Digitalisation is a key enabler in this field and our industry has a responsibility to optimise processes and engineering to drive sustainable outcomes.

Automation, instrumentation and process control are shaped by organisations with international footprints. As an industry, we have a body of knowledge, experience and capabilities that cannot be matched by individual organisations. Our industry has proven in the past that it can work together to drive common outcomes but also compete where needed.

If there is one thing that I learned from the challenges we have had during the COVID pandemic, it is the realisation that there is no time to wait. Our industry has a vital role in the big picture that is protecting our climate and our economic livelihood. The question is not "What are we entitled to?" but, "What can we do now to start change?"

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