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# Knowledge is Power

TREAT MAINTENANCE AS AN ASSET, NOT AN EXPENSE, BY DESIGNING DATA-DRIVEN STRATEGY THAT IMPROVES ASSET AND WORKER PERFORMANCE.

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The new podcast “Automation Chat” features fun and educational discussions providing keen insights about the technologies and trends that affect today’s rapidly changing manufacturing environment.

Hosted by Theresa Houck, Executive Editor of The Journal From Rockwell Automation and Our PartnerNetwork™ magazine, the podcast is available on your iPhone Podcasts app, Google Play or Spotify, or listen at https://rokthejournal.podbean.com.

Here are some recent episodes:

**Where is Motion Control Headed?**
Matt Tellier from Advanced Micro Controls, Inc. chats with Theresa Houck about motion control. Learn how specialty I/O modules, position sensing and motion control technology has evolved, networking trends, and how the COVID-19 virus could create supply chain and just-in-time manufacturing challenges.

**What Can Robotics Do for Me?**
In this short, informative conversation, Theresa Houck chats about robotics with Scott Oakley, North American Manager - Motion/ICT for Rockwell Automation. Learn when and why to use them, what it takes to plan for and implement robotics, the role of mechatronics, and how digital twins help streamline process design. Theresa and Scott discuss the realistic way to evaluate robotic system costs vs. efficiencies and savings created. And hear about the surprising way manufacturers are looking to robotics to solve some problems created by the COVID-19 virus.
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MY KINSHIP WITH WELDING AND MAINTENANCE

Two job functions I have a special affinity for are maintenance and welding (and sometimes they go together). I have family and friends who are welders, and I know how hard they work and how what they do is vital to our nation’s infrastructure. As editor at a previous sheet metal magazine, my appreciation for welders deepened when I took a weeklong course on the basics of welding. As I performed different kinds of welding, I also gained a healthy respect for welders.

My kinship with maintenance has the same origins — family and friends who work in various industrial maintenance functions. That’s how I’ve known for years that maintenance and reliability are central to productivity and uptime. Often, though, manufacturers struggle to prioritize the time and investment necessary to put a comprehensive asset-management strategy in place, because so many other expenses compete for the budgets.

But changes in manufacturing employment and other factors are making company leaders realize that asset management needs to be a high priority. As you’ll learn in this issue of The Journal, these managers are developing comprehensive strategies and using digitalization tools that provide metrics like OEE and RONA so maintenance decision-making is data driven. That’s how you turn maintenance from an expense into a strategic, competitive asset. Until next time…. New!

Listen to our new podcast, Automation Chat, as I talk with interesting industry guests. Available on your iPhone Podcasts app, Google Play or Spotify, or listen here: https://rokthejournal.podbean.com.

Theresa Houck, Executive Editor
ROCKWELL AUTOMATION LAUNCHES REPORT, ONLINE HUB ON CORPORATE RESPONSIBILITY

Report showcases company’s impact across the three pillars of its corporate responsibility and sustainability strategy

Rockwell Automation, Inc. has released its 2019 Corporate Responsibility Report (CRR). The annual report reflects the company’s commitment to placing corporate responsibility and sustainability across three pillars focusing on sustainable customers, employees and communities.

The 2019 CRR (https://bit.ly/2YbpTRH) highlights the company’s successful initiatives to continue to build a more inclusive workplace for employees; help customers reduce emissions and waste; and be a catalyst for progress in local communities.

Rockwell Automation also launched a new corporate responsibility content hub (http://bit.ly/30iyFxp) that will feature new stories and updates on its corporate responsibility progress throughout the year.

“Helping our customers be more productive and sustainable has been our focus since our founding over a century ago, and I’m especially proud of the progress highlighted in our 2019 Corporate Responsibility Report,” said Rockwell Automation chairman and CEO Blake Moret. “As we navigate a world forever changed by COVID-19, our dedication to the health and safety of our people, our customers, and our communities is top of mind for us — and we remain steadfast in our commitment to expand human possibility both inside and outside of the company.”

The 2019 CRR showcases stories of the company’s impact across the three pillars of its corporate responsibility and sustainability strategy. Highlights include:

**Sustainable Customers:** In 2019, Rockwell Automation assisted a nonprofit organization combatting malnutrition around the world, by creating automated processes that helped the organization feed significantly more people. In 2019 alone, the organization saw a 20% increase in manufacturing capacity.

**Sustainable Company:** Rockwell Automation recycled or reused 8,500 tons of its 9,900 tons of waste generated in 2019. Rockwell Automation also earned a perfect score on the Human Rights Campaign’s Corporate Equality Index and was recognized as one of the Ethisphere Institute’s World’s Most Ethical Companies.

**Sustainable Communities:** Rockwell Automation gave almost $9M in 2019, with a focus on STEM education, talent and equity, and disaster relief and recovery programs. Rockwell Automation employees mentored 221 global teams through the For Inspiration and Recognition of Science & Technology (FIRST) program, an initiative aimed at inspiring young people to be science and technology leaders.

ENDRESS+HAUSER RECEIVES TOP RATING FOR SUSTAINABILITY

Rockwell Automation Strategic Alliance Partner Endress+Hauser has placed in the top ranking of companies in the EcoVadis sustainability audit for the fourth time in a row. The group again improved its overall result with 72 points, Endress+Hauser is now among the leading 2% of all suppliers in the comparison group.

Since 2013, EcoVadis has evaluated annually Endress+Hauser with regards to sustainability; the company has regularly achieved Gold Recognition Level ratings since 2016. Endress again scored well or very well in the areas examined, namely environmental protection, fair business practices, sustainable procurement, working conditions and human rights.
“The challenges of the future demand that we and our customers manage our businesses sustainably,” emphasized Matthias Altendorf, CEO of the Endress+Hauser Group. “We help our customers to increase their resource efficiency, reduce CO2 emissions, avoid waste and improve the circular economy through outstanding measurement technology and automation solutions.”

The company also makes its own contribution to keeping its ecological footprint as small as possible. For example, Endress+Hauser increasingly supplies buildings and infrastructure with sustainably generated energy or reduces travel, for example through virtual meetings. The EcoVadis report also highlights progress at management level, especially in dealing with issues such as environmental protection, working conditions and human rights and fair business practices.

EcoVadis uses 21 environmental, social and ethical criteria to evaluate companies worldwide in terms of their sustainability. In addition to an industry comparison, companies also receive suggestions for improvement. They can also use an internet platform to assess their own suppliers accordingly. According to EcoVadis, this network now encompasses 60,000 companies worldwide.

Endress+Hauser publishes detailed information on the EcoVadis report and the sustainability audit at www.endress.com/ecovadis

PARTNERNETWORK GAINS NEW MEMBERS

Rockwell Automation has added four new companies to its PartnerNetwork™ program that provides users with access to an expansive network of suppliers, distributors, system integrators and OEMs.

PartnerNetwork program members are companies that have experience delivering products or services that are designed to work with Rockwell Automation’s solutions. The collaboration among members helps to streamline a customer’s supply chain, simplify project implementation and provide better value for automation investments.

**Bartell Machinery Systems**, Rome, New York, has been named a Rockwell Automation OEM Partner. The company provides industrial manufacturing equipment for the Tire & Rubber, Oil & Gas and Wire & Cable industries.

OEM Program members help provide customers with an integrated team of engineering specialists and suppliers.

Through the Rockwell Automation Encompass™ Partner third-party product referencing program, customers can quickly locate products that solve challenges. Three companies have recently joined the program for the Americas region:

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**EPLAN Partners with Revere Electric.** Encompass™ Product

Partner EPLAN Software & Services LLC and Revere Electric Supply Co. have entered into a strategic partnership. The collaboration combines EPLAN’s electrical, automation and mechatronic engineering software with Revere’s electrical distribution products to deliver cost effective, efficient solutions to increase customer productivity. Revere Electric Supply Co. is an authorized Allen-Bradley® distributor.
Bray International, Inc., Houston, manufactures butterfly, ball, knife gate and check valves, actuators and accessories for the flow control industry.

Firebus, Webster, Texas, develops and delivers UL864 10th edition certified Fire & Gas systems embedded in Rockwell Automation PAC platforms. FireBus systems support both classified and nonclassified areas with addressable and point-to-point detection and initiating devices.

RealWear, Vancouver, offers its HMT-1 ruggedized head-mounted wearable Android-class tablet computer that frees a worker’s hands for dangerous jobs and helps improve safety and increase productivity at work.

AMCI AIDS COVID-19 VACCINE EFFORTS

Encompass™ Product Partner Advanced Micro Controls Inc. (AMCI), a manufacturer of motion control solutions, and R&DD Custom Automation (R&D), builder of custom automation machinery for the pharmaceutical industry, are teaming up to help fight the COVID-19 virus.

Under the Defense Production Act of 2020, AMCI and R&D are working closely to develop and manufacture essential automation machinery vital to the COVID-19 vaccine clinical trials and production, with the expectation that clinical trials for the vaccine will begin in August.

R&D is using AMCI’s SMD Series integrated EtherNet/IP™ stepper motors for their COVID-19 vaccine vial coating project to position the product during inspection. The machine’s automation requires smooth, precise motion control so the vials can be checked using line scan vision systems, which perform auto adjustments of camera positions based on the recipe.

R&D Custom Automation, located in Lake Villa, Illinois, typically uses advanced robotics, mechatronics, and vision systems in its equipment, and this project will include over a dozen Kinetix® 5500 Servos from Rockwell Automation.

Emerging from a field of more than 80 nominees, 20 women have been named to Putman Media’s 2020 Influential Women in Manufacturing (IWIM, www.influentialwomeninmanufacturing.com). Two of the honorees hail from partner companies in the Rockwell Automation PartnerNetwork™ program. They are:

- Emily Martin, industrial engineering manager, En-dress+Hauser, Strategic Alliance Partner
- Helen Kane, engineering manager, Advanced Energy Industries, Encompass™ Product Partner

Nominated by their peers and voted as IWIM by a team of Putman Media editors and IWIM alumni, the winners are recognized for their leadership in manufacturing and represent a range of industries, from pharmaceutical production to oil and gas to academia to industrial automation and intelligence.

Putman Media, publisher of The Journal From Rockwell Automation and Our PartnerNetwork™ and other business-to-business magazines covering the manufacturing industry, launched the award in 2018. The program recognizes the achievements of women who are effecting change in manufacturing and industrial production and engaging the next generation of manufacturing leaders.
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Featured Product NR60E2 EtherNet/IP Resolver

NR60E2 EtherNet/IP Resolver
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The 2020 Motors & Electrical Systems eBook is now available for free download at https://bit.ly/20motoreleceb. This educational resource helps electrical and mechanical engineers, safety professionals, operations and maintenance personnel and other technical staff to work with and maintain variable-frequency drives (VFDs), motors and electrical systems in efficient, safe and economical ways.

The eBook explains how to improve drive performance and motor efficiency; how drive-based predictive analytics help extend machine life; and how to use modular linear actuators in automated electromechanical systems. See how AC drives help boost safety, how shielded VFD cables help prevent motor failure and boost safety, and how to specify the right cable system. Also see how oil and gas firms can cut costs by modernizing electrical systems.


SOFTING JOINS ENDRESS+HAUSER PARTNER PROGRAM

Participating Rockwell Automation Encompass™ Product Partner Softing Industrial Automation has joined the Endress+Hauser Open Integration partner program that unites manufacturers to better streamline interaction of their products.

The partners test and document the integration of their products for typical process automation applications. This helps to combine the best products for each application and provide fast and smooth commissioning.

Thirteen companies currently belong to the program, including Rockwell Automation. Several others in the program also are Encompass™ Product Partners in the Rockwell Automation PartnerNetwork™ Program. They include: Bürkert, Festo, Pepperl+Fuchs, and now Softing. Endress+Hauser is a Strategic Alliance Partner in the Rockwell Automation PartnerNetwork Program.

THE JOURNAL LAUNCHES PODCAST ‘AUTOMATION CHAT’

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“Automation Chat” discussions are fun and provide keen insights about the technologies and trends that affect today’s rapidly changing manufacturing environment.

Topics include business challenges, trends and opportunities in digital transformation; digital technologies, analytics and remote monitoring; disruptive technologies; trends worth watching; networks and security; motors, electrical systems and power control; workforce development; and more.


MECCO Acquires Faro Photonics. Encompass™ Product Partner MECCO, Pittsburgh-based provider of laser and dot peen solutions for permanent marking and traceability, has acquired FARO Photonics. Located in Londonderry, New Hampshire, FARO Photonics designs and manufactures high-precision laser scan heads, EtherCAT-based vector controllers, and advanced processing software to provide an integrated steering solution for a range of advanced laser applications.

PartnerNetwork Brief

MECCO Acquires Faro Photonics. Encompass™ Product Partner MECCO, Pittsburgh-based provider of laser and dot peen solutions for permanent marking and traceability, has acquired FARO Photonics. Located in Londonderry, New Hampshire, FARO Photonics designs and manufactures high-precision laser scan heads, EtherCAT-based vector controllers, and advanced processing software to provide an integrated steering solution for a range of advanced laser applications.

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You face increasing expectations for asset management capabilities. According to the ARC Asset Management Trends November 2019 report, 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 optimize 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, you can transform maintenance from an expense into a strategic, competitive asset.

According to ARC Strategies July 2019 report, “Rethinking Asset Performance Management,” successful asset management requires close cooperation between the maintenance, reliability, process engineering and operations functions in an industrial facility. New digitalization 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.

Knowledge is Power

TREAT MAINTENANCE AS AN ASSET, NOT AN EXPENSE, BY DESIGNING DATA-DRIVEN STRATEGY THAT IMPROVES ASSET AND WORKER PERFORMANCE.
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 organized your storeroom and have a repair strategy in place, you can optimize spare-parts inventory and reduce the number of unnecessary parts. Digitally enabled platforms provide ongoing visibility into your installed base.

Also, data gathered and analyzed as part of the process can be used to implement future improvements, such as developing a roadmap for managing the obsolescence and migration of aging 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 minimizing equipment life-cycle cost and maximizing production equipment performance.

Getting Started
Evolving asset management into a proactive, strategic component of better-managed manufacturing facilities can be done in phases, following these 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 optimization. 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 optimization, storeroom optimization, 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.

**Role of a Reliability Solutions Specialist**

When production is lagging, unplanned downtime is mounting, maintenance budgets are shrinking and plant staff is 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 optimization.

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 DOE.

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, 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 analyzes 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.
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, selloff, and/or vendor-managed agreement.
- PM activity changes.

*MRO process management redesign:* A critical step is establishing best practices for part repair or replacement. Minimizing your stock, optimizing your repair process and building an actionable reporting structure is the most sustainable way to maximize 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.

Optimizing 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 labeling system in your storeroom should include warranty information for each part to track its eligibility. Effectively managing your organization’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 vs. new.
- Warranty recovery.
- Inventory and carrying cost reduction.
- Administration.
- New purchase and repair reduction.
- Increased production uptime.

Research Shows Why Asset Management Must Be a Priority

Many manufacturers struggle to prioritize 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.

Case in point: The U.S. 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 their 2019 Connected Worker e-Book, 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 customized, 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 optimized to support the equipment. It also provides trend data visibility into asset performance by both machine and shift, which supports 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 about technology and attitudes about work in general.
Having a person electronically track this data can help identify opportunities for system and process simplification or improvement.

**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, selloff and/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 might have resources to help with your storeroom goal. For example, your local distributor might 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 on-site 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 Optimize 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.

**Use Case of Improved Uptime**

A successful asset-management strategy helps you maximize uptime and minimize unnecessary costs, allowing them to focus on what they do best — producing quality products and keeping customers happy.

This was the experience of a leading heavy equipment manufacturer that previously struggled with a lack of clear metrics and inefficient inventory-management practices at its transmission manufacturing plant. Its inventory growth and stock inaccuracies were leading to higher carrying costs and frequently putting its Midwest plant at risk for incurring substantial downtime.

By relying on asset-management tools for its inventory management, the manufacturer realized an inventory reduction valued at $1.9 million. The storeroom assessment identified more than 41,000 specific line items, showing the plant was carrying about 20,000 more parts than managers realized.

**The Right Strategy**

Leaders at smart companies like this heavy equipment manufacturer know that successful asset-management programs maximize uptime and offer other profitability benefits. With the right asset-management strategy in place, you can achieve sustained growth and competitiveness.
The machine jerked to a stop and alarms blared, alerting Dave to another part failure. His frustration rose as he frantically worked to get the aging print-material binding machine back up and running. With multiple shifts and technicians, the sporadically updated manual logs left little visibility into when such failures might occur. In addition, the unplanned downtime could last minutes, hours or sometimes days, especially if a part wasn’t available.

Meanwhile, across the country at a similar bindery, John reviewed the detailed online maintenance logs and the plant’s predictive maintenance software. With his machines connected and communicating with the network enterprise, he knew immediately which assets needed attention before they failed. With this information, he planned ahead to make sure parts were on hand.

The Case for Better Maintenance

The two methods above show the stark contrast between reactive and proactive maintenance and the challenge many manufacturers face using traditional maintenance methods. With a combination of aging assets and pressure to increase efficiency and reliability, companies are looking across their organizations for places to improve operations, better manage their workforce and cut costs.

One such area to look is maintenance. Traditional maintenance has involved scheduled, hourly work on equipment, many times in reaction to something. When equipment or processes failed, a new part was ordered, or a note was made on a clipboard to record the event.

For both local and global manufacturers, this type of reactive maintenance means increased costs and unscheduled downtime.

An Asset Management Strategy

Long considered a cost center, maintenance has the possibility to drive profitability in an organization by improving quality, effectiveness, safety and other areas.

As a part of an overall asset management strategy, managing the maintenance tasks through specialized software and other tools can help reduce manual entry of device readings and share vital information with other areas of production.

For example, information from controllers, drives, switches and data centers can provide an alert that there

A smart, connected maintenance strategy can help enhance production quality, efficiency, safety and cost savings.

By Denio Leone, global product manager, Rockwell Automation
is a failure or record the number of failures over a period of time. Engineering, maintenance and storeroom personnel also can access historical data and know which assets may be nearing end of life or be able to detect patterns in their equipment. They can see usage and costs, making them more efficient in managing labor, time and capital.

Capturing event history for a specific device can help to determine the reason for the failure and reduce unscheduled downtime.

Average downtime of the device, maintenance history and other factors can help to determine the best path forward for operational efficiency.

**Strike a Balance**

With smart, connected devices gathering information, maintenance managers can prioritize maintenance activities, proactively manage the condition and health of their assets and improve mean time between failures. This improves the bottom line and value of the operations.

Leveraging information to help monitor assets and manage operations is critical to balancing between reactive and proactive maintenance.

To achieve efficiency between these two categories, look at the amount of data you are entering into systems and remove the non-value-added labor involved. By maintaining asset health in a proactive matter, you can help reduce risk in your organization and help to improve your operational effectiveness.

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**Webinar: Smart Motor Control for Smarter Machines**

The fourth webinar in the series on Smart Devices from Rockwell Automation discusses how you can improve productivity and help avoid motor failures with an integrated, data-driven approach. Join this webinar to learn how to optimize operations and production, and reduce operating costs. View the webinar at https://bit.ly/3br70PX.
Learn how a strategic digital transformation helped a steel producer connect multiple divisions while optimizing production and slashing downtime.

So many industrial firms are implementing smart technologies because getting connected has significant benefits. For example, smart manufacturing, the gateway to digital transformation, helps connected smart devices open new windows of visibility into processes. The resulting data and analytics enable better and faster decision-making. And, seamless connectivity spurs new collaboration.

Companies that recognize these benefits are positioning themselves for success in the long term. By making smart investments in The Connected Enterprise™, manufacturers are converging plant-level and enterprise networks, and securely connecting people, processes and technologies.

One of those companies seeing these benefits is a metals manufacturer. Comprising multiple divisions, this producer is both a supplier of raw materials and manufacturer of finished parts for a variety of consumer and industrial applications. The company melts, rolls and processes steel, and is committed to investing in the people and technologies that add value to its customers’ products.
While the individual divisions all serve the metals industry, each division has unique operating requirements and customer demands. This producer understood the importance of keeping up with modern technology and the opportunities associated with data-driven operations.

Digital transformation was a departure from traditional methods used within their operations, but the potential opportunity cost was too much to forego. The challenge would be to identify solutions that could be shared across the unique divisions yet deliver distinct results.

**Laying the Groundwork**

While the benefits of a digital transformation can be tremendous, the potential risks associated cause many manufacturing companies to tread lightly. As many as 85% of big data projects fail because of a number of factors — the top three being license to operate, the uncertain future of the current workforce and lack of buy-in company-wide. Anticipating these challenges and more, the metals manufacturer selected Rockwell Automation to help pursue their digital transformation objectives.

The Rockwell Automation team knew it was important to develop a singular strategy that allowed for strategic differences within the different divisions. Core stakeholder teams conducted operational assessments to develop a roadmap for implementation.

The implementation team consulted the executive, finance, operations, engineering and IT groups to deliver a solution that offered transparent similarities and differences across the divisions and aligned with corporate and individual needs. It was also important that these key stakeholders realized the benefits of digital transformation and were supportive to achieve long-term success.

**The Approach**

Using the Rockwell Automation Connected Enterprise framework, a team comprising Rockwell Automation engineers and the metal manufacturer’s stakeholders took several steps across the enterprise to develop recommendations, form a business case and establish a strategic roadmap for implementation.

- **Evaluation:** The team examined the organization’s existing strategies and infrastructure. They analyzed IT and operational technology (OT) information and networks. The results showed each division of the company to be in a different stage of their own digital investments.
- **Assessment:** The team conducted multiple division visits and workshops with diverse client stakeholders to assess potential gaps and roadblocks that could prohibit a successful digital transformation. On a divisional basis, they measured where each division was on their own journey and what they required to be successful.
- **Identification:** Next, the team quantified opportunities for business benefits and improved device connectivity across divisions, and put in place a plan to address these target areas with digital transformation. These targets were set to meet goals corporate-wide, while taking into account where each entity stood separately.

The team established a clear plan, developed around the organization’s goals. They chose each identified piece of
digital transformation for its ability to solve a specific business challenge and its capability to scale up organization-wide. While each division had its own unique requirements and objectives, the solutions had to fit with the metal manufacturer’s overall goals.

Smart Decisions, Smart Results
The individual divisions identified a set of tangible savings through digital transformation:
• Improved labor productivity by 8%.
• Reduced tooling cost by 10%.
• Lowered scrap by 13%.
• Cut downtime by 12%.

Digital solutions included modernizing current plant automation to allow for data access and connectivity across machinery. The team proposed edge analytics software to fulfill the need for monitoring and analyzing streaming process data for real-time anomaly detection.

Identified process improvements included augmented reality (AR) to access mobile data and for operator performance improvement, device analytics to alert to abnormalities and offer real-time device status, and model predictive control to optimize the melt process and energy usage.

From a corporate perspective, the team proposed a center of excellence that would allow the divisions to share their digital results with each other and provide a backbone for continued adaptation and success.

Several of the divisions have proceeded to implement these new solutions with Rockwell Automation and its partners in the PartnerNetwork™ program. With these updates, the metals manufacturer is positioning itself for long-term success and is prepared for the next phases of implementation. The producer already has seen significant improvements leading to optimized production, reduced downtime and money saved.

ENJOY THE JOURNAL’S PODCAST, “AUTOMATION CHAT”
Join Theresa Houck, Executive Editor of The Journal From Rockwell Automation and Our PartnerNetwork magazine, for our “Automation Chat” podcast.

Enjoy short, informative and fun conversations with industrial automation pros about technology, digital transformation, industry trends, workforce challenges and more.

Industrial Ethernet protocols are the top way to gather smart-instrument data, and advancements will allow better implementation with two-wire instruments.

By Keith Riley, national product manager – Pressure Products, Endress+Hauser

The Industrial Internet of Things (IIoT) is the use of smart instruments to enhance industrial processes through real-time analytics. It requires the generation of massive amounts of big data, which is collected and stored in host systems for evaluation. Main sources of this data are the smart instruments installed throughout plants and facilities.

These instruments transmit basic process variables — along with extended data such as calibration parameters, diagnostics and other information — over digital networks. This data becomes valuable when analyzed by end users in the context of a specific process, permitting them to perform predictive maintenance, reduce downtime and make other operational improvements.

This description assumes every smart instrument is connected via a digital network, but in many instances, the information present in the instruments is unavailable because of communication protocol limitations. Bridging the gap between smart instruments and data repositories is where industrial Ethernet protocols such as EtherNet/IP™ and PROFINET® enter the picture.

This data-gathering aspect of analytics is the focus of this article, showing why industrial Ethernet protocols are so popular. It explains why two-wire instruments with
power and data available via the same 2-wire Ethernet cable (commonly referred to as Power over Ethernet [PoE]) are not yet available, and then discuss developments with two-wire instruments to enable connectivity.

Industrial Ethernet Leads the Way
Most end users prefer industrial Ethernet protocols over other traditional industrial fieldbus protocols for three main reasons:
1. Facilitates unification of an Ethernet infrastructure throughout a plant or facility — single network from field to enterprise level.
2. Provides extensive bandwidth, enabling access to more information at a faster speed.
3. Supports ease and economy of setup and use due to widespread familiarity with and availability of Ethernet.

Will a plant be able to unify its operational technology (OT) and IT networks using industrial Ethernet? Yes, but only with the proper network architecture. Smart switches or routers expressly designed to manage the information traffic from both networks are essential.

One example is the Stratix® family of industrial managed Ethernet switches from Rockwell Automation. These switches separate office Ethernet TCP/IP traffic from industrial EtherNet/IP traffic by using freely assignable ports (see Figure 1).

Ethernet TCP/IP is a common IT network protocol, and several industrial Ethernet OT network protocols exist. All these protocols follow the same OSI Layer Architecture model and comply with the IEEE 802.3 communications specifications.

However, industrial Ethernet protocols modify the application layer. For example, with the EtherNet/IP protocol, the application layer in the OSI model is slightly different from IT protocols because it includes the Common Industrial Protocol (CIP™). CIP improves access to data used for control of network devices by separating it into implicit and explicit data packets, or messages (see Figure 2).

Explicit messages are for node-to-node communication and use TCP delivery. They move large amounts of data, with variable payload sizes, only as needed. Implicit messages are for compact high-speed communication and use UDP delivery. They are most commonly used for preconfigured high-speed input/output (I/O) messaging. EtherNet/IP adds this explicit or implicit distinction to the information packets to optimize performance for these types of transmitted data.

A standard IT Ethernet TCP/IP network communicates information upon request. Managing this traffic without negatively affecting network speed or resulting in significant delays is relatively easy through the strategic use of the switches and routers commonly applied in IT networks.

However, OT industrial Ethernet networks are used for both I/O and control, with information broadcast continually. If a system is trying to transmit both Ethernet TCP/IP and industrial Ethernet messages on the same network,
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it would quickly become overwhelmed and the speed would degrade to an unacceptable level. Therefore, proper management of the available bandwidth by using special managed switches or routers is crucial. Routers can be used to segment networks, and managed switches can be used to manage traffic on each segment.

**Plug and Play: Not Yet**

Industrial Ethernet protocols such as EtherNet/IP are useful for transmitting large amounts of data quickly, making them a good fit for smart instruments. While an EtherNet/IP network is user friendly, it hasn’t yet reached the same level of functionality most people have come to expect from a standard home or office Ethernet TCP/IP network.

Compared to the maturity of Ethernet TCP/IP, industrial Ethernet networks are still relatively young, meaning the critical mass necessary for the market to provide expected true “plug-and-play” functionality has not yet arrived.

If a plant has an EtherNet/IP network installed, the physical connection of four-wire smart instruments into the network is much like any other Ethernet device. The host system also is connected to this network and can process data from the instruments. Hosts can include control systems, asset management systems, process historians and others.

Integration of smart instruments directly into a host system requires coordination among the smart instrument, the host system and the smart switches. For example, three main tools are needed to easily integrate smart instruments into a Rockwell Automation PlantPAx® control system based on a ControlLogix® hardware platform:

1. **Add On Profile** (AOP) Level 3 is required data integration. AOPs are software packages loaded into the control system and are:
   a. specific to individual instruments.
   b. developed in coordination with the control system manufacturer.
   c. supplied to the end user or system integrator by the smart instrument manufacturer.

2. **Add On Instructions** (AOIs) are supplied as a preengineered function blocks, and each must be configured by the end user. AOIs are used to define data, arguments, parameters, algorithms and other functions required for processing data from the instruments.

3. **Instrument faceplates and Global Objects** are supplied to provide human-machine interface (HMI) visualization of instrument data, transparency of extended field instrument information and assistance with diagnostics. These typically are supplied by the control system manufacturer.

If multiple instruments from more than one instrument manufacturer are connected, then AOPs, AOIs and faceplate software will need to be loaded and configured for...
each type of smart instrument. In addition to the software requirements listed above, hardware connectivity considerations arise with two-wire instruments.

Connecting Two-Wire Instruments with Industrial Ethernet

Most users have heard of PoE, and many question why manufacturers have not implemented this functionality into their smart two-wire instruments. A PoE standard exists in the form of IEEE 802.3 AF/AT, and there are also commercially available switches on the market to manage and distribute PoE.

The main issue is that IEEE 802.3 AF/AT-compliant switches are rated for up to 52VDC at 2.5A. This relatively high level of power makes it difficult to use these switches in the hazardous areas commonly found throughout process plants and facilities. This is true regardless of whether the installation is designed using an intrinsically safe or explosion-proof concept.

Therefore, only areas classified as nonhazardous are viable for PoE installations, but even here, challenges exist. Per NEC® 500 (National Electrical Code), working on live energized parts operating with a voltage greater than or equal to 50V is a safety issue and requires the use of personal protective equipment (PPE). In many instances, the benefits of PoE implemented in compliance with IEEE 802.3 AF/AT simply don’t provide sufficient value to justify the effort or expense required for design, installation and maintenance.

Addressing the Two-Wire Instrument Issue

The problem of not being able to directly use two-wire smart instruments in industrial Ethernet networks has been recognized. A consortium of organizations including FieldComm Group, ODVA*, PROFIBUS*, PROFINET International and manufacturers of process instrumentation and control systems have joined to build upon the work of the IEEE P802.3cg 10 Mb/s Single Pair Ethernet standard. This consortium is referred to as the Ethernet Advanced Physical Layer (Ethernet-APL) Project.

IEEE P802.3cg 10 mb/s Single Pair Ethernet is a physical layer specification and management parameter for 10 Mb/s operation and associated power delivery over a single balanced pair of conductors (see Figure 3). Implementation of this standard will make Industrial Ethernet protocols suitable for use in hazardous area locations.

Ethernet-APL won’t affect the protocol stack, so it will be suitable for industrial Ethernet technologies such as PROFINET, HART-IP or EtherNet/IP Industrial Ethernet protocols, and opens their use to two-wire topologies.

Together, Ethernet-APL and IEEE P802.3cg 10 Mb/s Single Pair Ethernet will support industrial Ethernet-based
communication protocols for two-wire field instrumentation by:

- Allowing power and data to be carried on the same two-wire shielded cable.
- Permitting installation in plant areas classified as hazardous.
- Providing high bandwidth of 10 Mb/s.

The work being conducted by the Ethernet-APL Project is ongoing and expected to be finalized soon. Once this work is completed, instrument manufacturers and component suppliers can respond with the equipment necessary for a complete network.

Until this solution is available, the alternate method for integrating legacy two-wire instruments to an industrial Ethernet control system is through a gateway. While highly functional, this method does limit the data available from each instrument to typical primary or HART values. One example of a device with Industrial Ethernet gateway capability is the RSG45 from Endress+Hauser (http://bit.ly/2TWh4ds).

Summary

Smart instruments are a vital component for process owners to implement IIoT strategies. However, users can only realize the full value of these devices and the subsequent potential of IIoT analytics when their systems can quickly and easily access the growing amount of available data.

Industrial Ethernet enables this digital transformation by providing simple and fast access to the required real-time instrument and process data. Today, four-wire instruments can easily connect to industrial Ethernet networks, and traditional two-wire instruments can be integrated with gateways.

In the future, two-wire instruments will be able to connect more directly as a result of Ethernet-APL and IEEE P802.3cg 10 Mb/s Single Pair Ethernet. This will enable improved operations through the use of analytics applied to data gathered using industrial Ethernet networks.

Endress+Hauser, a global provider of process measurement instrumentation, services and solutions, is a Strategic Alliance Partner in the Rockwell Automation PartnerNetwork™ program. Together, Rockwell Automation and Endress+Hauser deliver integrated pre-engineered, pre-tested, supported, and maintain instrumentation and control and information solutions that provide plant-wide advanced diagnostics and process system life-cycle management.
Editor’s Note: This article is adapted from the eBook, “Industry 4.0 and the Food Processing Industry: Building the case for coding integration.” Visit https://bit.ly/3bbF8yu to download the full eBook to learn how smart manufacturing is changing food manufacturing and packaging operations and helping firms meet competitive pressures; how to get various components on a production line to talk to you and the other equipment; and how coding automation and integration into manufacturing execution systems can help improve productivity, streamline maintenance and avoid unplanned downtime.

> Simply put, Industry 4.0 is about smart manufacturing systems. On the plant floor, machines and sensors on the production line can share operational data with each other and with a central system located on-site or in the cloud. Just as smart thermostats, appliances and wearable devices are bringing the Internet of Things (IoT) to homes around the globe, the Industrial Internet of Things (IIoT) is connecting previously disparate machines and systems on the manufacturing floor.

HOW CODING AUTOMATION HELPS FOOD MANUFACTURERS

Industry 4.0 includes integrating coding and marking equipment with an MES to help improve productivity and maintenance and avoid unplanned downtime.

By Adem Kulauzovic, director of Coding Automation, Domino Amjet, Ltd.
This unprecedented level of connectivity allows information to be captured at every point on the production process and throughout the supply chain, and presents incredible opportunities for food processing and packaging operations. The resulting data can then be analyzed and managed to make every manufacturing sequence as fast and accurate as possible — from highlighting bottlenecks to indicating the need for maintenance before a failure occurs.

**Why Industry 4.0 Matters for Food Production**

Across all manufacturing industries, six major trends are driving plant-floor automation:
1. Lack of skilled labor/labor shortages.
2. Global increase in product demand.
3. Rising demand for flexible manufacturing.
4. Producing products with consistent quality.
5. Overall operating cost reductions.
6. Smart machine technology.

For food manufacturers, rising consumer demand for variety in flavors and styles has led to SKU proliferation, which results in fewer long, dedicated runs of one product and more frequent line changeovers.

Automation can help reduce the time needed for line changeovers overall, and it can help reduce the potential for errors when entering new coding data.

Even without integration into a larger manufacturing system, connected coding and marking equipment can alert operators when any parameters are approaching an out-of-spec condition or let them know ahead of time when consumables are running low or maintenance will be required.

**Reduced Coding Errors**

Coding and marking, which typically take place at several points along the manufacturing line, might seem like a relatively minor part of the whole process of turning ingredients into finished products. However, when errors are introduced, problems are created, such as the following:
- Production stops.
- Traceability is endangered.
- Deadlines and quotas are missed.
- Corporate liability increases.
- Waste and rework are created.

Consider the coding on a typical food processing and packaging line:
- Average message length: 6 characters
- Number of coders: 3
- Packaging production line count: 4
- Production changes per day: 2
- Days in a year: 355

That means, 52,560 characters are entered per year. Now consider that the average human makes one mistake for every 300 characters entered. You do the math.

So, you can see that integrating the coding equipment with a manufacturing execution system (MES) and automatically pulling codes from a central system can save a lot of headaches.

**Why the Food Industry has Fallen Behind**

Compared to other industries, food and beverage has been slow to adopt automation because of:
- Lower margins.
- A high degree of material variability.

Many plant managers of food production lines have a long-standing sentiment that, “If it’s not broken, don’t fix it.” And that’s understandable. A lot of time and effort goes into planning, implementing and maintaining a smoothly running line. And ever-greater customization
and faster line speeds are needed to meet increasing demand.

**Domino Amjet, Ltd., based in Gurnee, Illinois, is a participating Encompass Product Partner in the Rockwell Automation PartnerNetwork program. The company develops and manufactures coding, marking and printing technologies. Its complete end-to-end coding solutions span primary, secondary and tertiary applications and include ink jet, laser, print and apply, and thermal transfer overprinting technologies to apply variable and authentication data, bar codes and traceability codes onto product and packaging.**

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**LISTEN NOW!**
Founded in 1929 by Swiss immigrants Alfred Nef and Alfred Gozenbach, Valley Queen is a dairy manufacturer in Milbank, South Dakota. Valley Queen can produce 200 million lbs. of cheese from 2 billion lbs. of milk annually into a variety of natural cheeses, dried lactose, WPC80 and anhydrous milk fat, which are marketed and used by private-label and nationally branded food companies.

As one of the largest cheese producers in South Dakota and the largest employer in Milbank, Valley Queen gets milk from roughly 40 area farms, which supports the production of 500,000 lbs. of cheese per day.

In 2018, the company announced a $52-million expansion plan to increase processing capacity by 25% to more than 5 million lbs. of milk per day. The expansion project took place within Valley Queen’s existing footprint at the Milbank facility. By upgrading capital equipment and infrastructure, the company could maximize the existing operating systems and fund new technologies.

As part of this investment, the company hired more than 25 employees to handle the increase in manufacturing capacity, and currently has more than 300 associates.

As Valley Queen invested in its expansion, the need for efficient processes and effective communication became clear.

Before updating the plant-floor communication process, control room operators would view human-machine interface (HMI) screens from Rockwell Automation FactoryTalk® View Site Edition (SE) HMI and manually contact maintenance and operations via PTT on their Motorola analog two-way radios whenever an alarm occurred. Manually processing data was inefficient, and
it caused unresolved alarms and unplanned downtime, which negatively affected overall production.

Discovery at the Automation Fair Event
In 2017, several Valley Queen automation and IT staff attended the Automation Fair event hosted by Rockwell Automation, looking for an innovative communication solution that would maximize their investment in Rockwell Automation hardware and software.

After attending numerous technical sessions, including the joint presentation by Rockwell Automation Encompass™ Product Partners Motorola Solutions and our company SeQent, Valley Queen asked SeQent to update its plant-floor communication process. Valley Queen uses our notification platform to build a software bridge between their Rockwell Automation HMI/SCADA environment and Motorola Solutions MOTOTRBO™ two-way radios.

After the Automation Fair event, Allen-Bradley authorized distributor Border States Electric contacted SeQent to architect a solution for Valley Queen. At the same time, Valley Queen worked with its Motorola Solutions dealer, Electronic Engineering, to upgrade its radio system from conventional analog to a single-site digital trunking Capacity Plus system.

After seeing the value of the communication system, Valley Queen allocated capital for our software in early 2018. Electronic Engineering installed and continues to support the new Capacity Plus trunking system and programmed the repeaters and new XPR 7550e subscriber radios to receive automated text messages.

Implementations in Phase 1
Using a centralized architecture for deploying the software allowed Valley Queen to implement one instance of the core notification server software, despite having multiple HMI servers with alarms requiring dispatch. We provided our Industrial Automated Messaging and Alarm Notification Software product lines FirstPAGE and FirstPAGE Alarm Manager (see Figure 1).

We installed the FirstPAGE Alarm Manager Gateway for FactoryTalk View SE HMI on each primary HMI server, so that Valley Queen could bridge alarms requiring dispatch into the single instance of the alarm-management software. A copy of the gateway was also installed on each secondary HMI server to support FactoryTalk redundancy, ensuring that alarms will be communicated in the event of a failure.

Our professional services initially deployed a train-the-trainer program, and then on their own, Valley Queen was able to, with the click of one button, browse to any HMI alarm and configure it to notify a Motorola XPR 7550e radio when required. The radio communication application installed was the FirstPAGE Link for MOTOTRBO, and this application let Valley Queen discreetly notify any individual radio of an alarm condition as part of their MOTOTRBO Capacity Plus system.

Communication occurred from the Link application over a network connection to the radio MOTOTRBO™ Master Repeater. This provided the dairy manufacturer with a robust data-notification solution that could send messages to multiple destinations at one time.
Phase 2: System Upgrade

In early 2020, working with a Rockwell Automation Solution Provider, Cybertrol Engineering, Valley Queen embarked upon a major HMI/SCADA upgrade to FactoryTalk View SE Alarms & Events (see Figure 2).

SeQent provided an upgrade path to support the update from FactoryTalk View SE v.8 to v.11, which required conversion from HMI alarms to FactoryTalk Alarms & Events. SeQent replaced the FirstPAGE Alarm Manager Gateway for FactoryTalk View SE HMI with the FirstPAGE Alarm Manager Gateway for FactoryTalk View SE Alarms & Events. Unlike the HMI environment, only one instance of the gateway was required to access the alarms due to the nature of an A&E environment.

To support Valley Queen's redundant environment, we updated the architecture to include the installation of a second instance of FirstPAGE, FirstPAGE Alarm Manager, and Gateway for FactoryTalk View SE Alarms & Events to be fully fault tolerant. FirstPAGE Alarm Manager provided the dairy company with an import/export utility tool that supported efficient migration of alarms out of the initial configuration (HMI alarms) into the new configuration (FactoryTalk Alarms & Events).

In addition, we provided an application called Sync Server, which automatically synchronizes the configuration from the primary instance to the secondary instance, removing the need to maintain two environments.

Improved Communication and Efficiency

As a result of these communication improvements, Valley Queen transformed its plant-floor communication and improved overall efficiency. Our strategic partnership with SeQent, based in London, Ontario, Canada, is a participating Encompass™ Product Partner in the Rockwell Automation PartnerNetwork™ program. The software provider’s Alarm Notification Software, Andon-Visual Display Management, Industrial Automated Messaging, and Industrial Wi-Fi SMS Messaging Solutions build a bridge between industrial automation systems and communication devices.

Figure 2. In phase 2 of the upgrade in early 2020, Valley Queen implemented a major HMI/SCADA upgrade to FactoryTalk View SE Alarms & Events with the new SeQent Alarm & Event Gateway and redundancy.

Rockwell Automation and Motorola Solutions has provided the dairy manufacturer with a reliable manufacturing software solution that supports future growth.

Without having to process data manually, alarms are sent automatically to a variety of communication devices, allowing operators to resolve issues in real time without compromising production or product quality.

With real-time notifications and insight into its operations, Valley Queen can prevent costly incidents such as plant shutdowns and product waste. They’ve been able to improve alarm response time and increase employee safety and productivity by assuring notifications get sent to the right people at the right time with its fully redundant environment.

The new solution provided fast installation and implementation and produced immediate improvements through a user-friendly platform. The dairy manufacturer has maximized its return on their investment, experienced improved decision-making, and increased productivity, profitability and quality.
Hollow-Shaft Encoders Feature Battery-Free Multiturn Rotation Counter

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HMS NETWORKS
High Bay LED with Wireless Control

The Reliant LED High Bay fixture from Encompass™ Product Partner Dialight features a polycarbonate housing with a smooth surface that sheds dust and moisture, eliminating the aluminum fins that can collect dirt and debris. Its aluminum backbone design provides rigidity and stability while providing optimal thermal management. It carries an L-70 rating at 55°C and L-90 rating at 25°C for 100,000 hours.

The model is smart-lighting ready with factory installed or field upgradeable occupancy and daylight harvesting sensors. It integrates seamlessly with Rockwell Automation solutions via the wireless IntelliLED Connected industrial lighting platform. The system integrates LED lighting with the PLCs already in place to maximize plant safety, productivity, energy efficiency and cost savings.

Motor Protection Circuit Breakers

Engineers can use the Allen-Bradley® 140MP motor protection circuit breakers from Rockwell Automation to simplify motor protection. The circuit breakers, also known as motorprotective switching devices, can be mounted on Allen-Bradley 100-C or 100-K contactors to create a two-component motor starter. The devices provide magnetic short-circuit protection and thermal-overload protection up to 32A, and interrupting ratings up to 100 kA at 400V.

They are UL approved for use in group installation. This type of installation can reduce panel space, installation and wiring time, and overall costs by eliminating the need for individual branch short-circuit protective devices for each motor circuit.

Outside North America, these devices meet the IEC 60947-4-1 requirement for motor protective switching devices. They also meet the IEC 60947-2 requirement for circuit breakers.

PRODUCT SPOTLIGHT

Absolute Encoders with IO-Link Interface

Encompass™ Product Partner POSITAL-FRABA Inc. has expanded its family of absolute IXARC rotary encoders to include support for the IO-link communications interface.

IO-Link is a communications system designed to simplify connections between large-scale fieldbus or industrial Ethernet networks and sensor or actuator devices located on the factory floor. On one side of an IO-Link master gateway device is an interface to the plant-wide network, while the other side has multiple point-to-point connections to individual sensor devices.

The IO-Link interface for end devices removes the need to support complex communications protocols at the sensor/actuator level. IO-Link supports a variety of data types, including measurement data, device configuration instructions and information about operating condition parameters such as temperature.

IO-Link-connected IXARC encoders include two versions: single-turn (360° range, 14-bit resolution) and multi-turn (up to 1 billion revolutions). Single-turn variants can be converted to operate in incremental mode by making use of a different pin-out arrangement in the connector.

Multi-turn models include 16-bit resolution, the ability to output rotation speed directly to the controller and electronic cam/preset/reset functionality, making use of binary digital signals transmitted through pin 2 of the connector. Extended device diagnostics monitor temperature and vibration. Rotation of the device’s shaft powers the rotation counter, eliminating the need for backup batteries and helps to reduce maintenance costs.

The IO-Link connected sensors are available with a range of housing materials, levels of environmental protection (up to IP69K), shaft type/diameter and mounting flanges.
Enhanced Communication Module

The 1756-EN4TR ControlLogix® EtherNet/IP™ communications module from Rockwell Automation now includes primary and backup adapters for improved network resiliency. This new redundant-adapter functionality is provided through a recent firmware update.

In addition, when used with ControlLogix controllers and redundant switches, the communication module is no longer a single point of failure. This can improve uptime and productivity in continuous process applications.

The firmware enhancement also can be used with star or Device Level Ring (DLR) architectures. This gives users design flexibility.

An existing 1756 I/O chassis can be modified for redundant adapters. Slots 0 and 1 are used for the redundant adapters.

The 1756-EN4TR communication module implements network-based access control for users, devices and networks in a 1756 ControlLogix chassis. The module can increase performance in networked operations, with 1-gigabit-per-second communications speeds and the ability to support future network or infrastructure expansions.

Hands-Free Industrial Camera

Designed for safe operation in hazardous environments, the ecom CUBE 800 from Encompass™ Product Partner Pepperl+Fuchs is a portable, explosion-proof infrared and HD video camera for Zone 1/21 and Div. 1.

A magnetic auto-latch mount provides an easy and secure way to attach the CUBE 800 to hard-hat and headband accessories. Its multipurpose design allows for hands-free, handheld and monopod use to capture visuals in hard-to-reach places.

With dual cameras inside, users can choose between optical and thermal camera modes. The integrated thermal imaging camera provides infrastructure health analysis and trending information while the optical camera provides HD video and images.

The integrated light ring and laser aiming pointer allow high-quality visuals. The camera can be used to share live video and images during on-site collaboration sessions or to capture and securely store images and recordings offline.

PRODUCT SPOTLIGHT

High-force Electric Actuators

Encompass™ Product Partner Tolomatic’s extreme-force electric actuator family now includes the RSX128 actuator, rated up to 50,000 lbf (222.4 kN).

Ideal for replacing hydraulic cylinders and designed for 100% duty cycle, the actuator features precision-ground planetary roller screws for long, consistent operating life in challenging environments.

The new model represents a 60% increase in the bi-directional maximum force the RSX electric actuator family provides. Additional frame sizes include the RSX080 which provides 18,000 lbf/80kN and the RSX096P press-model optimized to extend force up to 40,000 lbf/178 kN.

Models are rated IP65 for protection against dust and water spray, with IP67 optional for improved resistance of water ingress. A modified food-grade version, designed for volumetric filling and other high-force food-and-beverage applications, is available with food-grade white epoxy coating and stainless-steel components to meet washdown requirements.

Construction includes heavy-duty tie-rods and Type III hard-coat anodized aluminum housings. A standard internal anti-rotate feature prevents the rod from rotating without external guidance.
OPC UA Embedded Toolkit

Encompass™ Product Partner Softing has enhanced its uaToolkit Embedded OPC UA publisher and subscriber with metadata and discovery announcements. The toolkit is designed for implementing embedded OPC UA servers with client/server and publisher/subscriber communication.

The publisher now sends the metadata for the published data set. The subscriber can use this data for decoding the published data set, which reduces the need for preset information in the subscriber. V1.31 also supports the latest Long-Term Support version (LTS) v1.1.1 of OpenSSL (LTS for OpenSSL v1.0.2 ended in 2019 but is still supported.)

The toolkit has been certified in the Compliance Lab of the OPC Foundation for the Nano Embedded Device Server profile, the Micro Embedded Device Server profile and the Embedded UA Server profile.

Its low memory footprint requires little computing power. This makes it suitable for firmware development of field devices, and also for use in control or remote I/O systems with limited resources.

Glass-Free ISFET pH Sensors

Rockwell Automation Strategic Alliance Partner Endress+Hauser launches Memosens CPS47D, CPS77D and CPS97D ISFET pH sensors for applications where glass pH sensors present risk of breakage in challenging process conditions. Made of unbreakable PEEK, the sensors are available with three different reference systems, providing a glass-free pH sensor to suit every requirement.

The CPS47D and CPS77D sensors are designed for hygienic applications. An increased chip surface makes them easy to clean. They deliver stable and reproducible measured values, even after sterilization and autoclaving up to temperatures of 275°F (135°C).

Approved for hygienic applications such as the food and life sciences industries, the sensors can last at least 25 CIP cycles. In addition, the CPS77D offers maximum bacteria tightness because of its microporous ceramic diaphragm.

Chemical processes at low temperatures, and where there is a high proportion of organic solvents or solids, pose specific challenges for pH measurement. The PEEK stem gives the CPS97D a fast response time even at low temperatures, and chemical stability.

PRODUCT SPOTLIGHT

PowerFlex 6000T Medium Voltage Drives

The Allen-Bradley® PowerFlex® 6000T medium voltage drive from Rockwell Automation shares the same control hardware and firmware as PowerFlex 755T low voltage drives. The 6000T also has an Add-On Profile in the Studio 5000® design environment.

The Add-On Profile is the preconfigured data translator, visual user interface and data configurator all rolled into one. It is also the primary tool that sends drive data to the common control system.

In addition to simplified operation and integration, the drive includes a larger 10-in. color touchscreen enhanced HMI, forensic data recorder functionality for faster troubleshooting, extensive input power monitoring capabilities for kW, kVA, kVAR, elapsed kWh, MWh, power factor, and quick and secure flash-over-fiber firmware updates for all main control boards and power cells from a single file.
**PUR and PVC Single-Cable Options**

The **Allen-Bradley® 2090 single cables** from Rockwell Automation that include halogen-free PUR and PVC options provide operators with more single-cable choices to help speed up installation times and reduce part inventories. A single cable can be used to provide both power and feedback between drives and motors.

The halogen-free options are ideal for applications such as food and beverage, where users want to reduce exposure to toxins, and for applications that need to meet IEC 60754-1.

The cables are designed for systems that use Kinetix® 5500 and 5700 servo drives, Kinetix VP-Series servo motors and Kinetix VPAR electric cylinders. The cables also have a smaller bend radius for continuous-flex and static applications and are available in a range of cable AWGs, types and connector options.

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**Digital Infrared Pyrometers**

The **Impact 6 from Encompass™ Product Partner Advanced Energy** is a series of stationary, digital infrared pyrometers for noncontact temperature measurement. The units include long temperature ranges, analog output, digital interface, focusable optics and an integrated LED display.

The line meets stringent quality standards and provides consistent temperature control for steel- and metal-making applications. The stainless-steel sensors withstand harsh environments and temperatures ranging from 50° to 3,000°C.

The four-digit LED display indicates current measuring temperatures or set measuring distances. It connects to a PC through an RS485-to-USB connection, enabling parameter adjustments using InfraWin software.

It also features a dirty-window warning and automatic emissivity determination. Compact in size, units range from 0.6 kg (1.32 lbs.) to 0.755 kg (1.66 lbs.).

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**PRODUCT SPOTLIGHT**

**Emergency Brake**

The **ServoStop emergency braking system from Encompass™ Product Partner STOBER Drives, Inc.** provides braking during power failures or emergency stops in hazardous situations. It meets the EN ISO 13849 safety standard and fits all standard servo motors.

Options for the ServoStop include electric or manual wear control and manual hand release. The servo motor can be dismounted even with the brake engaged. The ServoStop is compatible with Rockwell Automation GuardLogix® 5580 controller and Compact GuardLogix 5380 controller.

When an application requires engaging a load so it can safely be held, a safety brake can be used on the actuator. For example, a STOBER servo gearbox with a connected ServoStop safety brake can be mounted to a VPL servo motor.

While other brakes can allow sliding, ServoStop can brake at full speed, prevent accidental sliding or falling of vertical axes with gravity load, and provide reliable braking during emergencies and power failures.
RealWear introduces the HMT-1, a voice-driven, hands-free, head-mounted tablet for connected industrial workers. The wearable unit offers workers connectivity and hands-free flexibility for safer, faster and smarter productivity in harsh or loud field and manufacturing environments.

The tablet is designed for technicians and engineers in field services, equipment inspection, maintenance and complex manufacturing assembly. It operates solely through noise-robust voice control and head gestures to communicate via and access existing Android tablet and smartphone apps.

It is intended for remote video collaboration, technical documentation, industrial IoT data visualization, assembly and maintenance instructions, and streamlined workflow and inspections.

The GTM8B split multirange grommets from Encompass™ Product Partner iCotek enable the entry of preterminated cables into its KEL-QUICK system. Larger cables with clamping ranges up to 23 mm can be inserted. A variable clamping range of up to 3 mm makes installation easier if the exact cable diameter isn’t known.

Four different sizes of the grommets cover a clamping range from 14 to 23 mm and can be combined with the new KEL-QUICK frame sizes. The frames of the QUICK series come in five new versions and can be locked and assembled without screws.

The grommets and entry frames have an IP54 protection degree. Increased strain relief can be achieved by bundling them with a cable tie.
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