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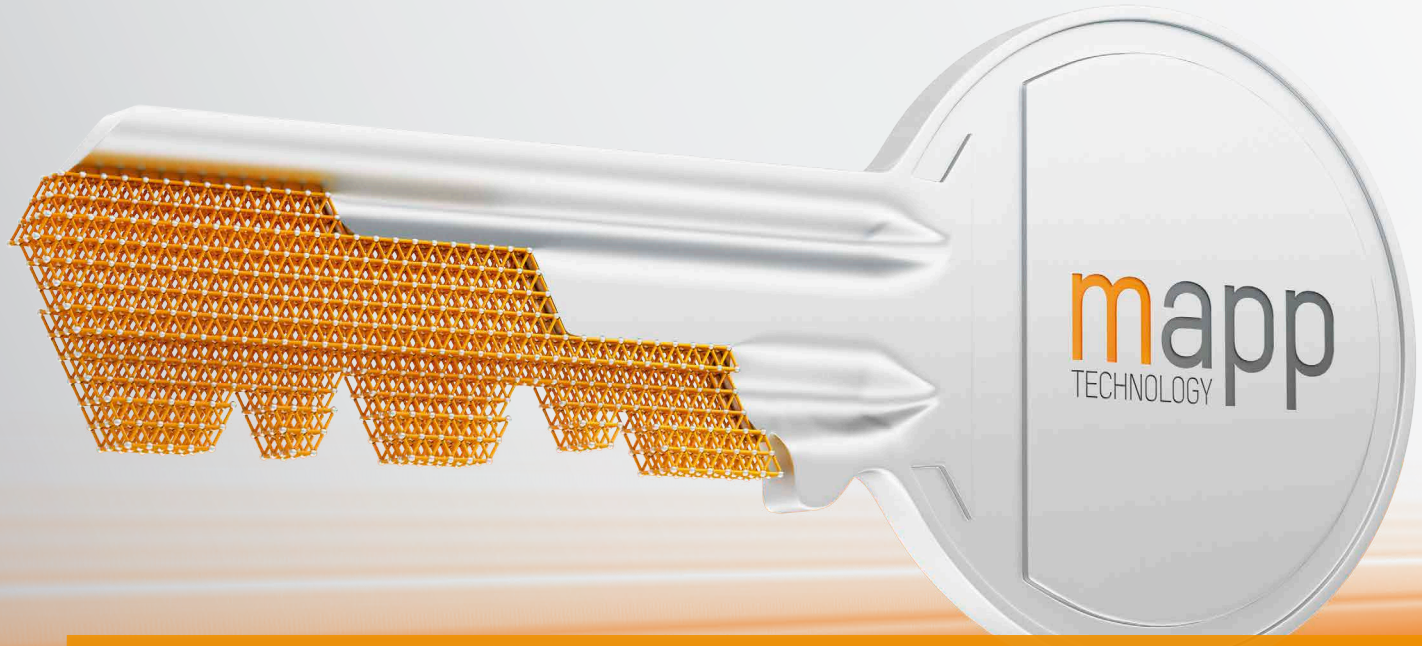

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Tel.: +43 (0) 7748/6586-0
redaktion@automotion.info

Managing Director: Hans Wimmer

Editor: Alexandra Fabitsch
Editorial staff: Craig Potter
Authors in this edition: Eugen Albisser, Gernot Bachler, Yvonne Eich, Stefan Hensel, Franz Kaufleitner, Peter Kemptner, Stéphane Potier, Olivier Rambaldelli, Martin Reichinger, Franz Joachim Roßmann, Raimund Ruf, Thomas Schmertosch, Nicole Wittmann

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Dear Reader,

The Industry 4.0 transformation is fusing together technical and industrial processes through advances in IT and communication technology. From the plant floor to the control room – as factories grow smarter, conventional fieldbus technologies have an increasingly difficult time coping with the flood of data being transmitted and processed at every level. Check out page 04 to find out how POWERLINK can be the answer.

Industry 4.0 was also a central topic at the 5th annual MIT Europe Conference held in Vienna by the Austrian Federal Economic Chamber (WKO) and the Massachusetts Institute of Technology (MIT). Titled "Minds, Machines & Management", the event offered 450 companies, managers, scientists and top MIT researchers numerous talks on an extremely diverse range of complex topics, including urban agriculture, commercial drone applications, private and industrial 3D printers, and applications for artificial intelligence. B&R used the opportunity to give a presentation on the future of robotics in the context of Industry 4.0. Check out page 32 to learn more.

In this issue of *automotion*, you'll read about Industry 4.0, POWERLINK and much more.

Happy reading!

Dr. Gernot Bachler
Technical Manager, Motion Business Unit

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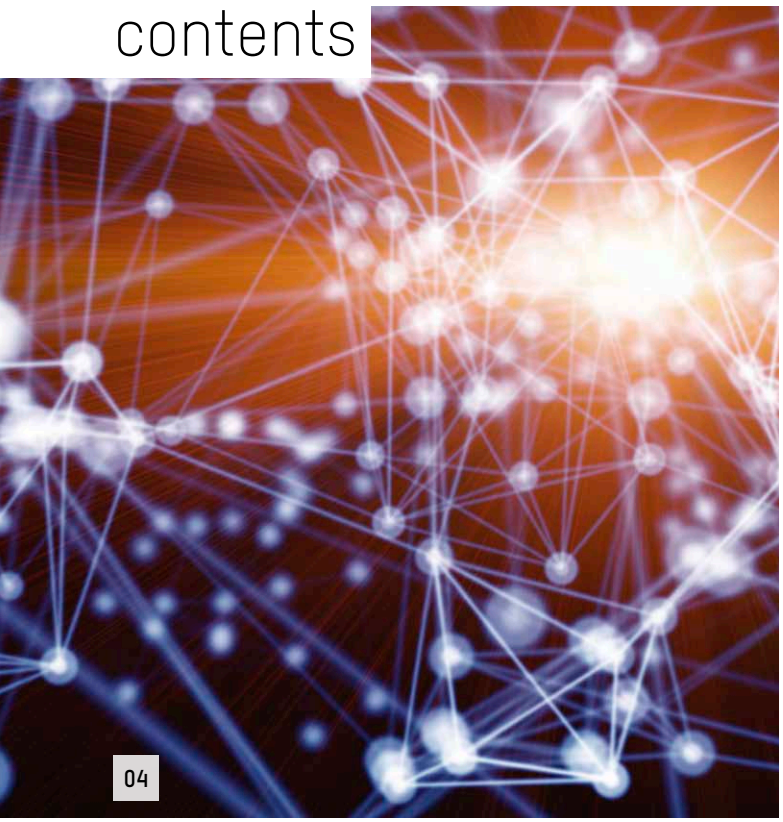
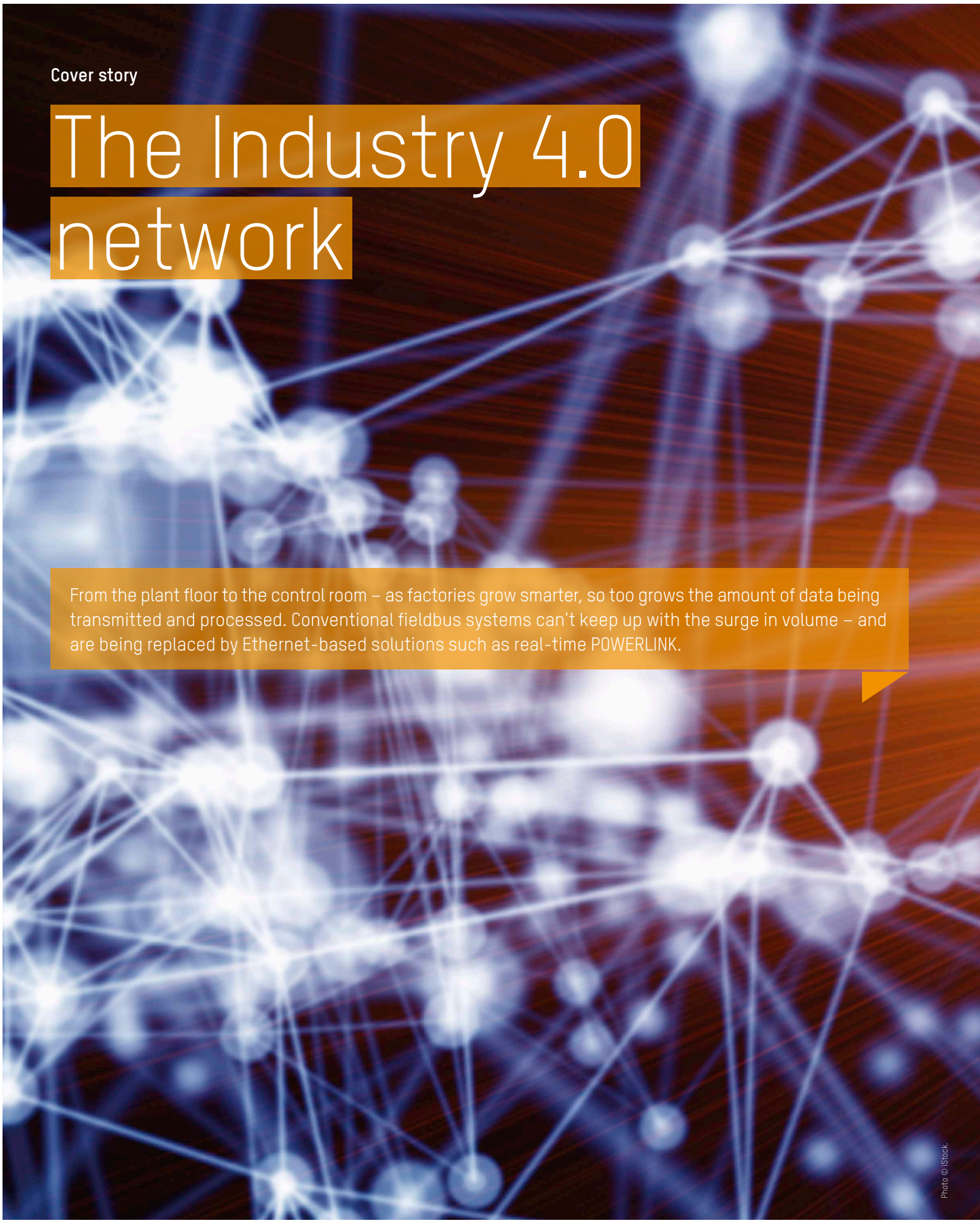
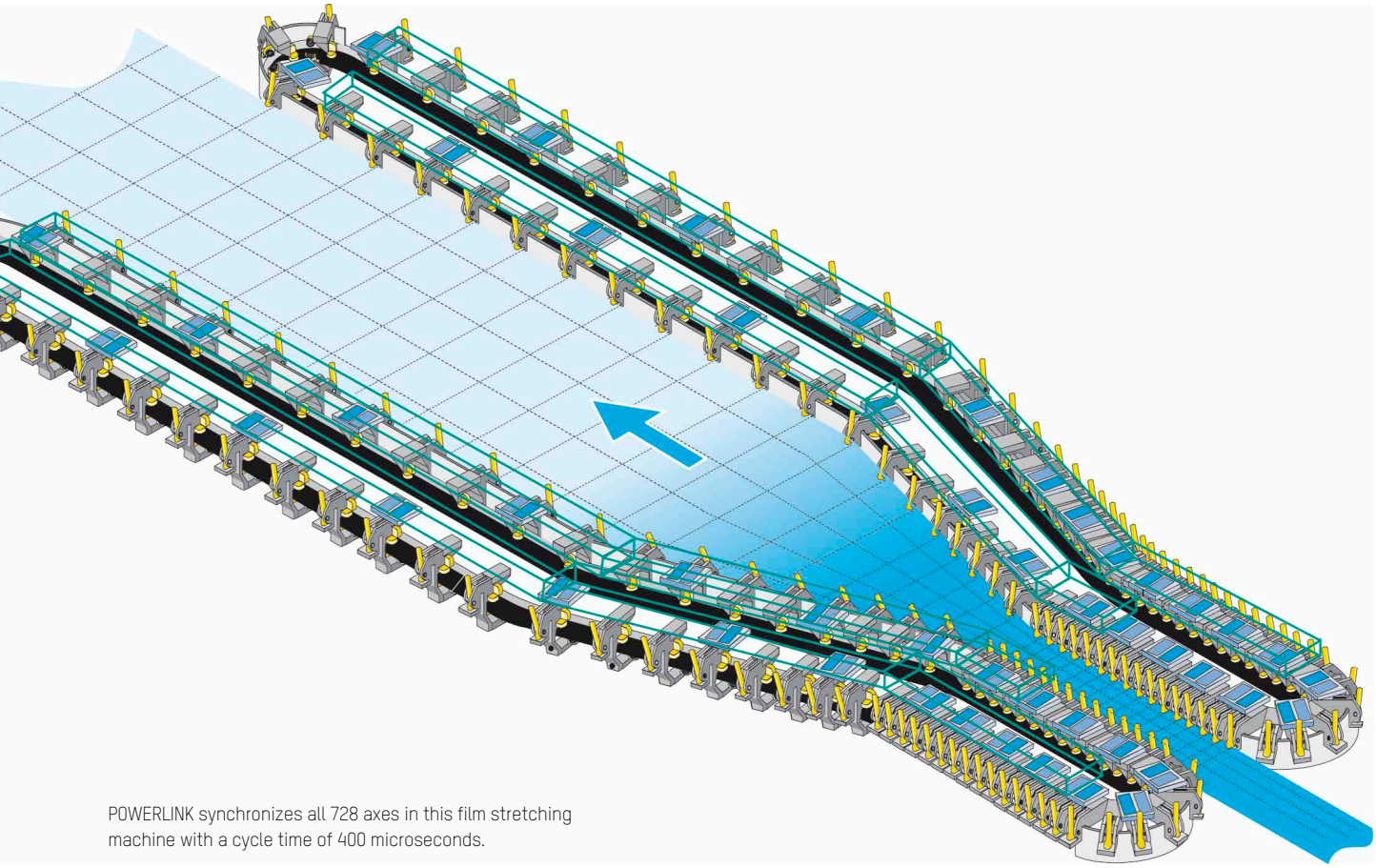


report

The Industry 4.0 network

From the plant floor to the control room – as factories grow smarter, so too grows the amount of data being transmitted and processed. Conventional fieldbus systems can't keep up with the surge in volume – and are being replaced by Ethernet-based solutions such as real-time POWERLINK.





POWERLINK synchronizes all 728 axes in this film stretching machine with a cycle time of 400 microseconds.

For machine manufacturers who take advantage of this unprecedented flexibility and productivity, the transition could be a profitable one. "This means more than just boosting the level of automation, however," explains Stefan Schönegger, managing director of the Ethernet POWERLINK Standardization Group (EPSG) and B&R's marketing manager. "It also means pursuing a more dynamic, networked approach to production."

Fieldbuses at their limits

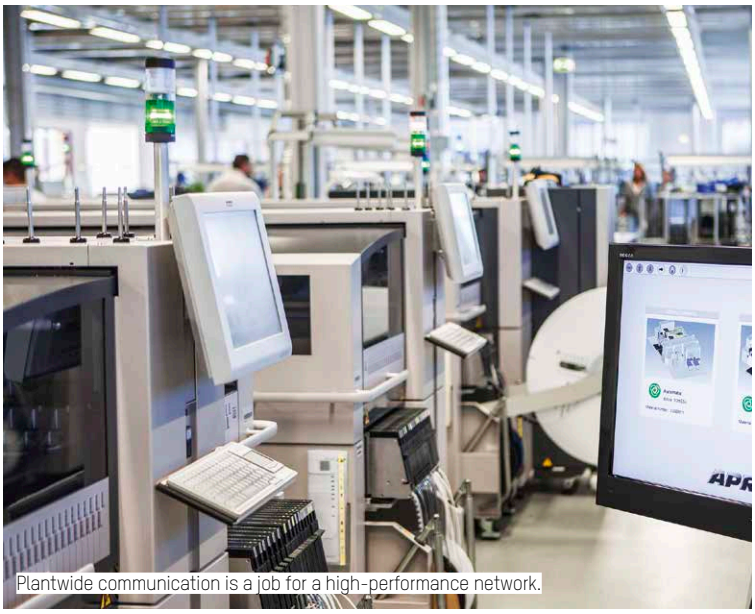
Conventional fieldbus systems were not designed to handle the deluge of big data. Nevertheless, many machine manufacturers have attempted to get by with conventional fieldbus technology – laying out separate networks for motion control, safety and sensor data. "Not only are these parallel systems expensive and high-maintenance, they are also difficult to synchronize and prone to errors," describes Schönegger. This explains the increasing popularity of more powerful Ethernet-based networks.

"In terms of both speed and bandwidth, industrial Ethernet runs circles around conventional fieldbus systems," says Schönegger. As the fourth industrial revolution progresses, however, another problem is becoming evident. The number of network nodes found in each machine is exploding – thanks to the proliferation of intelligent sensors, auxiliary axes and the extensive safety solutions needed for human-robot collaboration. Typically, as you increase the number of network nodes, systems become slower as a result.

POWERLINK is different. By broadcasting data simultaneously to every station in the network, this technology eliminates the delays that occur when all traffic is funneled through a central location. The deviation from the clock signal, known as jitter, is less than 1 microsecond. "Even for a real-time network, this is an outstanding level of precision," says Schönegger.

Room for big data

Not every industrial Ethernet protocol is cut out for Industry 4.0. Some were developed with the focus solely on cycle time, ignoring the huge volumes of data that a bus system must sometimes transmit. A large share of the data in a real-time network is not time-critical, however. This includes service data for device configuration and diagnostics, process data for archiving, and safety data or video data from a surveillance camera – all of which contribute to the general trend known as big data. POWERLINK transmits this data during its asynchronous phase, a part of the cycle



Plantwide communication is a job for a high-performance network.

ETHERNET
POWERLINK

"POWERLINK is the ideal network for Industry 4.0 communication." **Stefan Schönegger, Managing Director, EPSG**

that has no influence on time-critical data. If necessary, protocols such as TCP/IP can be implemented in this asynchronous phase.

Adaptable network tailored to the machine

Typically, a machine or plant will have only a small number of truly time-critical processes, such as motion control tasks. Using a procedure known as multiplexing, it is possible to poll the time-critical nodes in every cycle, whereas general status information such as temperature values can be read much less frequently. This optimizes data volume and perfectly adapts the duration of a cycle to the application at hand. "There's one particularly impressive example of how effective this concept can be," recounts Schönegger. "On a two-dimensional film stretching machine from Brückner Maschinenbau, we synchronized 728 axes with a cycle time of 400 microseconds using POWERLINK. That's a world record."

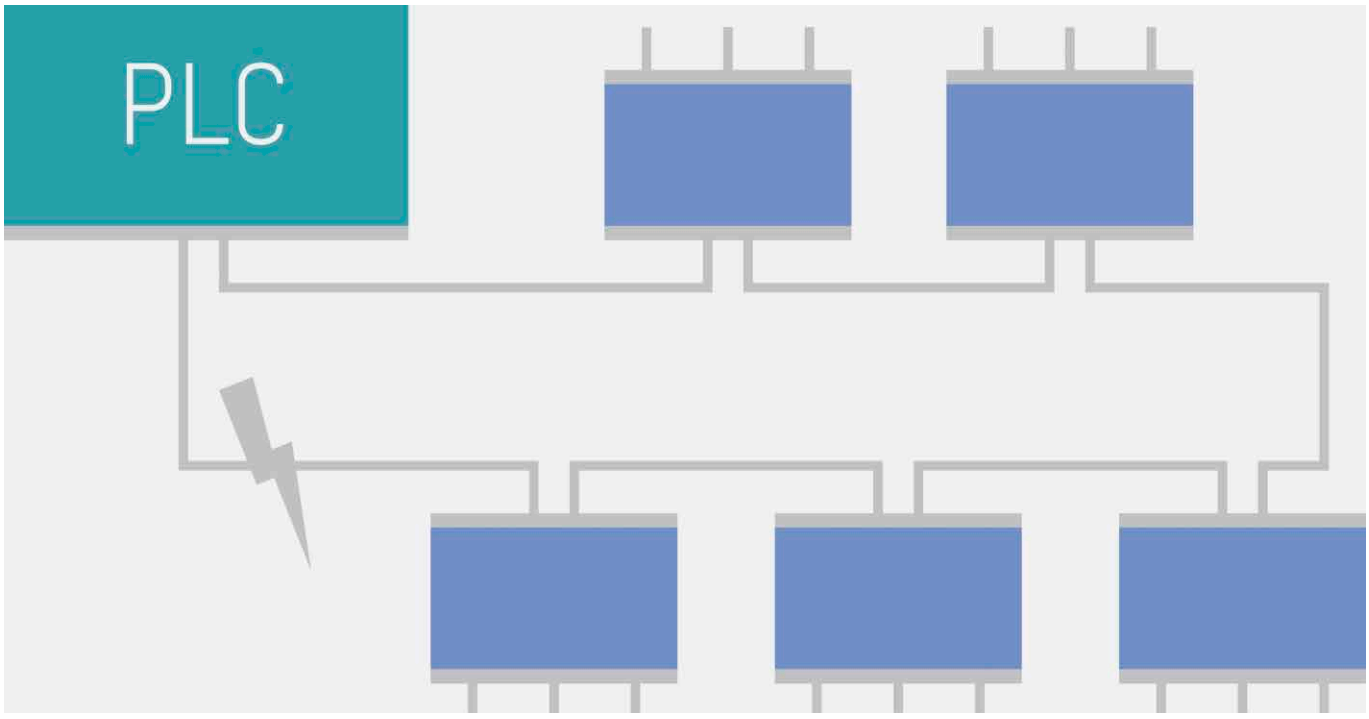
Free choice of topology with no special hardware

Although Ethernet itself places no constraints on topology, most industrial Ethernet systems require special hardware to implement certain types of networks. With POWERLINK, complete freedom of topology comes with no hardware strings attached. Bus, ring or tree structures can be mixed, matched, modified and expanded as needed to tailor the network to the layout of the machine. "Nodes can even be added to or removed from the network on the fly during operation," says Schönegger. "In an age of agile manufacturing, modular machinery and distributed intelligence – the hallmarks of Industry 4.0 – this is a factor that should not be underestimated."

The increasing levels of flexibility and modularity often demand a distributed control system, which is no problem for POWERLINK. Since data isn't funneled through a central location, any node in the network can communicate with any other node – directly and without delay. Of course, the high performance of a POWERLINK network means centralized control systems are equally possible. As Schönegger puts it: "POWERLINK leaves the design of the control system right where it belongs – in the hands of the machine manufacturer."

Ring redundancy with one extra cable

In critical applications, a network failure can result in costly damages or even endanger human operators. Such machines and systems are frequently equipped with extensive redundancy solutions to ensure that this cannot occur. "With POWERLINK, ring



With POWERLINK, basic ring redundancy comes at the cost of just one extra cable. Network disruptions are detected and circumvented via the redundant communication path from one cycle to the next.

redundancy can be implemented at very little cost," explains Schönegger. All that's needed is an extra cable to close the line into a ring. Network disruptions are detected and circumvented via the redundant communication path from one cycle to the next. POWERLINK is also remarkably robust against electromagnetic disturbances, which further contributes to high machine availability and allows the network to include slip rings and wireless connections. With slip rings from the companies Cobham or Schleifring, POWERLINK can even transmit data at 100 Mbit/s alongside the 24-volt power supply and the 750-volt DC bus without any impairment in network stability. Nothing stands in the way of a seamlessly networked smart factory.

100% open

In order to operate reliably and optimize costs, machine manufacturers place high value on the independence to choose between alternative suppliers. "POWERLINK is one hundred percent open technology," notes Schönegger. The protocol stack is published as open source software under the BSD license and has already been downloaded more than 30,000 times from the SourceForge platform (www.sourceforge.net). Through its openness, POWERLINK offers maximum investment protection. As a pure software stack, POWERLINK can run on any hardware platform. The network infrastructure can be built from commercially available Ethernet hardware as needed for the application. This results in a lower total cost of machine ownership than with any other industrial Ethernet.

Safety all down the line

openSAFETY is the ideal complement to POWERLINK. The open source protocol is a global IEC standard that ensures fast and deterministic transfer of safety-related data regardless of the controller and fieldbus being used – providing a unified safety standard across entire machine lines.

Implementing openSAFETY technology has many advantages. Combining faster response times with smaller safety clearances means increased productivity. Owners of machinery and equipment also profit from faster commissioning and changeover times thanks to automated parameterization and configuration services. openSAFETY also greatly simplifies the process of certifying safety-related machinery and equipment. TÜV Rheinland and TÜV Süd have both awarded the safety standard SIL 3 certification for satisfying international IEC 61508 requirements. ←

The advantages:

- Minimum cost of ownership
- Maximum investment protection
- Maximum system performance
- Maximum freedom for the user

Powerful computing for bridges and offshore systems

Industrial PC from B&R awarded DNV GL certification

The Automation PC 910 has been certified for maritime applications by the DNV GL organization.

Photo © B&R

B&R's Automation PC 910 has been awarded DNV GL certification for maritime applications. The industrial PC has been certified in accordance with GL 2010, IACS UR E10. Additionally, DNV GL confirms its compliance with IEC 60945, including the specified Compass Safe Distance.

The Automation PC 910 is now available for use in many maritime and offshore applications. The rugged construction of B&R's industrial PCs has clear advantages when installed on vessels and in harsh maritime environments. The Automation PC has no internal cable connections and does not require shock absorbers or any other auxiliary installation equipment.

Countless potential applications

Typical applications for the Automation PC 910 include highly integrated bridge systems, electronic chart display and information systems, vessel information systems and voyage data recorders. It is also used in distributed vessel control systems, offshore monitoring and control applications and dynamic positioning systems, as well as to provide condition monitoring for power transmission and power distribution systems or serve as the master or SCADA station in integrated automation systems.

The Automation PC 910 guarantees exceptional long-term availability. With a selection of processors ranging from Celeron to Core i7, the performance can be scaled to any application. The flexible interface options range from Gigabit Ethernet to USB 3.0, as well as POWERLINK, CAN and RS232/422/485 for use with real-time operating systems.

Paper cutting

Safety makes the cut

Photo © iStock.

Notepads, business cards, banknotes – if it's produced in stacked sheets, odds are it also needs to be cut to size with great precision. This is usually done manually on a paper cutting machine. With razor-sharp blades slicing thick stacks in rapid work cycles, these machines place serious demands on safety technology.

The cutter bar glides gracefully through a stack of paper centimeters thick, leaving behind a cleanly cut edge. Even before the blade completes the movement back to its original position, the operator has spun the stack into position for the next cut. In the meantime, the back gauge has automatically moved to the next position defined in the cut program. This is the most hazardous step for operators because their hands are directly in the path of the cutter. If the blade were to come down at the wrong time, the resulting injuries would be severe. "For this process state, the cutting machine satisfies Category 4 requirements, the highest safety category. This was a decisive consideration when evaluating the automation technology," emphasizes Stefan Junker, electrical systems designer at Schneider Senator.

Quality is not a coincidence

In the northern German town of Buchholz, Schneider Senator has been building guillotine paper cutters of the highest quality for over 65 years. In 1948, they presented the world's first high-speed cutter with a hydraulic clamp and mechanical blade drive, and in 1977 they were the first to introduce a guillotine cutter equipped with a microprocessor. Since being acquired by Gerhard Busch GmbH in 2009, they are now able to supply complete single-source lines with integrated waste removal, loading and bundling technology. "Our machines are exceptionally durable. There's not a single machined part that we didn't produce ourselves. That's the only way we can deliver the quality our customers expect," reasons managing director Burkhardt Busch. Schneider Senator machines also stand out in areas such as energy efficiency and noise emissions. The cutting process itself is no secret. A stack of paper is aligned on a vibrating table, or jogger, and then fed into the cutting area either automatically or manually. To ensure a uniform cut through the entire stack, a hydraulically driven clamp presses out any air trapped between the sheets. As the blade slices down through the material, the quality of the results depend on the machine's ability to maintain consistent speed and pressure. The trick to achieving this is one of Schneider Senator's most important trade secrets.

Changing markets demand new ideas

The general market trend toward increasingly individualized products has implications for paper cutting as well. Smaller print runs force manufacturers to design more flexibility into their machines and operator controls. "It used to be that a brewery would

More speed, more precision, more efficiency – that's the Senator S-Line H. Its hydraulic direct drive design sets new standards in cutting machine performance.

Burkhardt Busch
Managing Director, Schneider Senator

"Our new B&R control system gives us the opportunity to develop new functions and expand our core competencies."

The display on the cutting machine provides a central operator interface.

The intuitive, state-of-the-art user interface makes the machine more efficient and enjoyable to work with.

order a year's supply of labels in only a couple batches," recalls Busch. "But not anymore." How quickly you can change over between batches, how efficiently you can operate the machine and how easily it can be integrated into a the overall printing workflow all become critical factors. On top of that, in pursuit of fulfilling specific customer requirements, machines are growing closer and closer to being one-of-a-kind productions. The previously used single-board controller was fundamentally unsuited for providing that kind of flexibility. Requirements for safety, modularity and reliability therefore came to feature prominently in the specifications for the new control system. Systems lacking integrated and scalable safety technology were not even considered. Longterm availability and backward compatibility also played a decisive role, as Schneider Senator intended to use the new control solution on all of its machine lines.

B&R offers a complete solution

At the end of the day, the design presented by B&R proved to be the best fit. The integrated Smart Safe Reaction functionality alone makes it possible to dynamically link safety functions to the machine's operating state. As the blade returns to its starting position after each cut, for example, the operator is able to reach into the workspace safely. Intelligent safety technology has benefits in maintenance as well. In the event of an emergency stop, for instance, rather than halting mid-cut with its sharp edge exposed, the blade returns safely to its starting position. This allows the operator to rectify the error in the open workspace without risk of injury.

Being able to form mechatronic units for various electrical or hydraulic blade drives offers more than just added production efficiency. It also allows the operator to expand the solution later on without needing a new controller.

New software and HMI design

With the support of B&R's experts, the software was designed from the ground up to allow a single version of the program to run on all machines. "This enables employees to install the application program from a memory card during commissioning without assistance. The only thing left to do on the machine is configure any optional equipment," emphasizes Junker.

What users notice about the new PCC (Power Cutting Control) is the modern, intuitive user guidance. Cutting programs can be created on the machine or using an identical graphical interface on an office PC. The 15" operator panel provides a clear overview using simple graphical elements. The integrated documentation offers additional assistance right where it's needed. "This control system gives us the freedom to focus on developing new functions," says Busch with confidence. At the top of the agenda are alternative drive concepts and integration into the overall flow of print shop data. These innovations will ensure that Schneider Senator's customers are well prepared for the onset of Industry 4.0. ←

Don't break a leg: openSAFETY takes the stage

Photo © Sopinne

With a production budget topping €10 million, *The Wyld* is the most extravagant performance currently to be found at any venue in Europe – but the Friedrichstadt-Palast in Berlin is not just any venue. Home to the largest theater stage in the world, it also features the most sophisticated movable stage technology. Working behind the scenes to keep the performers safe, 67 SafeLOGIC controllers from B&R comprise the most complex application ever built on the basis of openSAFETY and B&R's integrated safety technology.

open SAFETY

Since the fall of 2014, Berlin's Friedrichsstadt-Palast is home to the most complex application ever built on the basis of openSAFETY and POWERLINK. A total of 67 SafeLOGIC controllers, connected via a single POWERLINK backbone, ensure safe operation of movable platforms and other stage elements with a cutoff time of 10 milliseconds.

Georg Schosser, **Managing Director, Gietec GmbH**

"Conventional hardwired circuits would have given us response times of around 500 milliseconds, which is just not enough to guarantee safety on stage. B&R's solution delivers response times of about 10 milliseconds – more than enough to satisfy safety standards now and into the foreseeable future."

The latest production of Berlin's famed Friedrichstadt-Palast tops anything that has ever been seen on the stages of Europe. The historic venue – also known as "Europe's Show Palace" – spared no expense to ensure that *The Wyld - Out of This World* is as spectacular as its name suggests. The €10 million invested in the show is a sum that even legendary Broadway theaters can only dream of. Judging by ticket sales, the investment has paid off. More than 130,948 tickets had been pre-ordered before the show's premier on October 23, 2014, and less than four months into the season, ticket sales for *The Wyld* had exceeded the 250,000 mark.

Records broken on stage and in the ticket booth are not all *The Wyld* has to offer. While the theater enthusiasts among you may know that "The Palast" is home to the largest stage in the world, you may not be aware of another record broken off stage. Well hidden behind the scenes, a network of 67 safety controllers comprise the world's most extensive safety installation based on openSAFETY and network-based safety technology from B&R.

A safe transformation

This cutting-edge safety technology ensures that the performers can safely rely on the 55 motorized platforms that transform the stage over the course of the show, at times even forming steps.

To do this, the safety controllers read signals from pressure-sensitive safety strips installed around the circumference of each step. If a performer comes in contact with the edge of a moving platform, this system ensures that the platform and associated step elements are halted immediately. This reaction must take place extremely quickly since the platforms are raised and lowered up to 170 millimeters per second by a ballscrew scissor lift driven by an AC motor.

Each step has a dedicated programmable controller called a "Stage Mover". Developed and built by stage technology specialist Gietec in close cooperation with B&R, the Stage Mover controls the electric drive axis and evaluates the signal from the safety strips. In a single rack-mount housing unit, it combines all the elements needed to control the movement of a single electric axis.

Drive modules with integrated safety

At the heart of the Stage Mover is an energy-efficient X20CP1583 PLC with a POWERLINK interface and integrated I/O modules from B&R's X20 system. The PLC is accompanied by a digital SLX410, which, in addition to its safe inputs and outputs, also performs the functions of a safety controller. With the PLC's integrated POWERLINK interface communicating with the higher-level controls, Gietec's engineers added a separate X20 POWERLINK interface module for the ACOPOSinverter P74 inverters. This internal POWERLINK bus reduces the load on the command bus to the higher-level controls. The encoderless AC motor that drives the scissor lift as well as the draw-wire encoder and limit switches on the stage elements are incorporated via a Harting multiconnector. The only other connection to be made is the 400 V mains power cable, and the stage elements are ready for their performance.

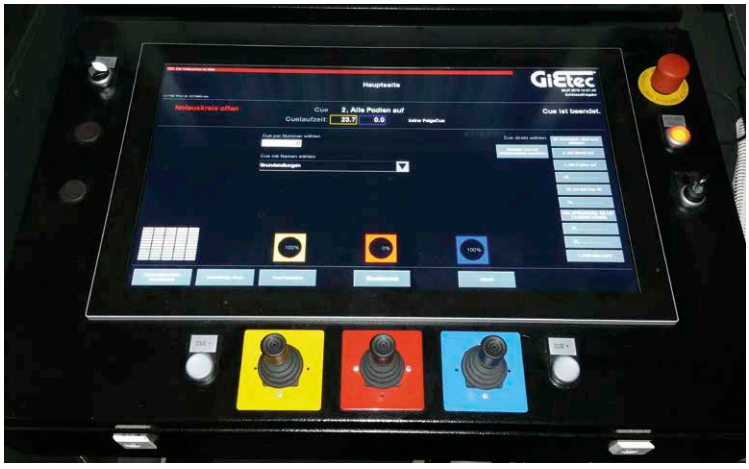
"You don't get a modular design like this without some extra effort," notes Gietec's founder and managing director Georg Schosser. "But this way, at the end of the season, we have no problems using the Stage Mover to solve completely different drive requirements in other shows." In addition to the Stage Mover for electric axes, there is also a variant for controlling the hydraulic or pneumatic axes that also contribute to the extensive range of dramatic staging effects present in *The Wyld*.

One software project for three hardware variants

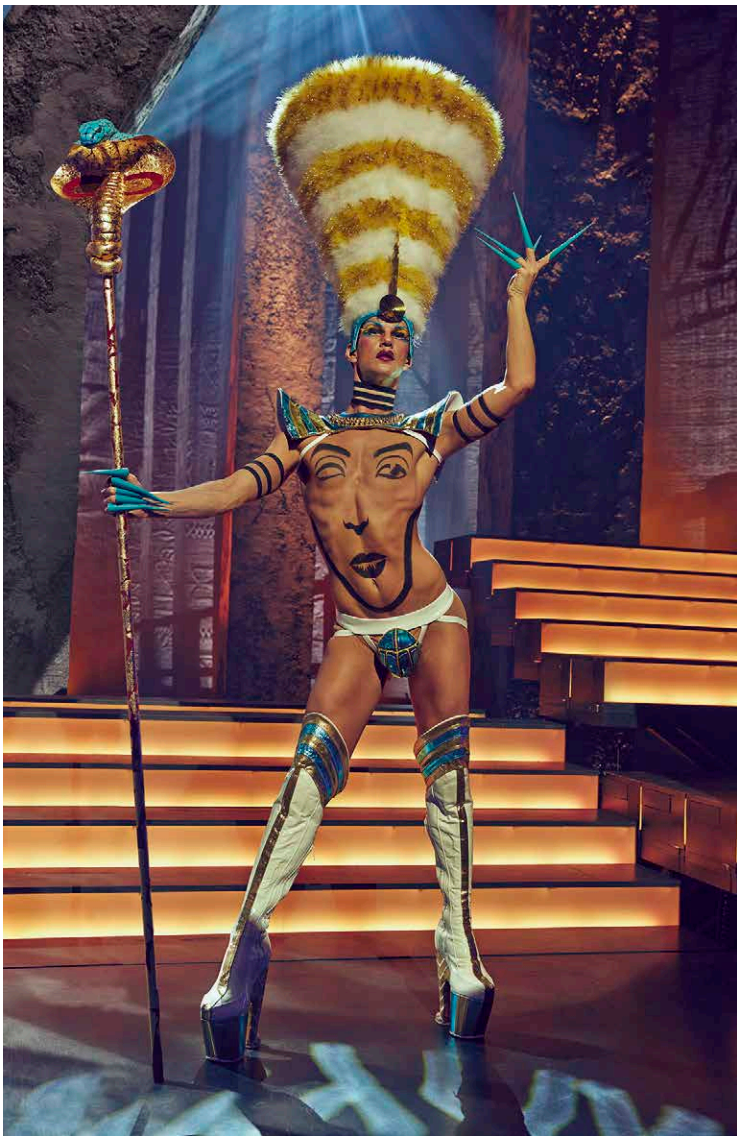
The control head containing the safety controller and safe I/O modules is identical for all three variants. The only difference in hardware are the components required to control the different types of axes and the X20 modules used for standard communication. "Although our Stage Movers have a variety of hardware to support the different axis types, we're still able to manage it all in a single software project," says Schosser. "That makes the system easier to set up and the software more efficient to update and maintain. It was a key argument in favor of B&R's solution."

For Gietec, the application hinged on two decisive criteria: the short response times that could be achieved with network-based openSAFETY communication and the complete flexibility offered

Working closely with B&R, Gietec developed modular, networked controllers with integrated safety technology to control electric, hydraulic and pneumatic axes.



Two identical, multi-purpose Stage Controllers from Gietec, based on a Panel PC 900 with a projected capacitive 24" touch screen serve as control consoles for the 55 movable platforms that transform the stage during every performance of *The Wyld*.



In Europe's most expensive stage production – *The Wyld* – movable platforms safeguarded by openSAFETY transform the stage and bring the stars into position.

by the SafeLOGIC safety controllers. "Conventional hardwired circuits would have given us response times of around 500 milliseconds, which is just not enough to guarantee safety on stage," notes Schosser. "Even given the daunting task of monitoring signals from 55 safety strips as well as various other safety equipment, B&R's solution delivers response times of about 10 milliseconds – more than enough to satisfy safety standards now and into the foreseeable future."

67 networked safety controllers

The safety controllers in the 60 Stage Movers used at the Friedrichstadt-Palast are coordinated by a cascade of 7 master safety controllers from the SafeLOGIC family B&R has since released a high-end SL8101 model that could handle this task on its own). Despite the huge volume of data to be managed on the POWERLINK backbone, Gietec was able to do without a cascaded bus architecture, which kept the number of components and cabling effort to a minimum. For master control of the system, Gietec developed the "Stage Controller" – based on a B&R Panel PC 900 with a projected capacitive 24" touch screen. All application software for this multi-purpose control console, including the HMI application and Stage Mover software, was developed using Automation Studio. The Friedrichstadt-Palast uses two Stage Controllers – one dedicated to HMI and the other controlling the stage elements – connected via B&R's SDL3 digital display transmission technology.

"B&R provided exemplary support throughout this project," commends Schosser. "As usual, we were able to contact B&R's well-trained support team, who have the admirable quality of working to find real solutions rather than offering up half-baked speculations." The management and guests of Friedrichstadt-Palast have been more than pleased with the results so far. And for all *The Wyld* shows to come, in the name of openSAFETY, we offer the performers the traditional blessing with a twist: "Don't break a leg!". ←

Safe pressing made easy

B&R implements library of PLCopen function blocks

With the SafeDESIGNER library for press applications, B&R is one of the first manufacturers to offer a complete set of the function blocks specified in PLCopen part 4. As a result, users working with safety-critical press applications will have a much easier time setting up the necessary safety functions.

Vendor-independent specifications

Over the past several years, PLCopen has worked intensively on a specification for function blocks in press applications, with B&R playing an instrumental role in this development. The result is part 4 of the PLCopen safety specification, which defines safety aspects of mechanical, electrical and hydraulic presses. Also defined in this specification were the corresponding vendor-independent function blocks for the safety application. PLCopen specifications provide solutions for machine manufacturers that are open to all, not just a few manufacturers. The PLCopen Safety working group brings together engineers from leading industrial automation companies as well as experts from certifying institutions who work closely with safety-related technology. For many years now, B&R has been involved in this consortium.

B&R is one of the first manufacturers to offer a set of the function blocks specified in PLCopen part 4 for press applications.

Photo © B&R

B&R supports OPC Foundation's real-time working groups

OPC UA is to become a real-time capable communication standard.

B&R will be supporting the OPC Foundation's new working groups, whose goal is to add real-time capability to the OPC UA communication standard. This will involve two key additions to the OPC UA standard. The first is a publisher-subscriber model; the other is utilization of the IEEE 802.1 standard for time-sensitive networking (TSN).

B&R will be contributing its real-time expertise to the working groups. "The updates to the OPC UA standard will benefit from our years of experience in developing real-time solutions," says Stefan Schönegger, marketing manager at B&R.

Higher speeds

OPC UA already features a familiar client-server architecture. The publisher-subscriber model will add one-to-many and many-to-many communication that will have decisive benefits for communication speed in large distributed systems. "This is a fundamental requirement for the M2M communication you find in integrated systems such as packaging lines," explains Schönegger. POWERLINK is also based on this same architecture.

Real-time capability for the OPC UA standard

In order to fulfill real-time requirements, the OPC UA standard will make use of the IEEE 802.1 TSN standard. "At the moment, TSN is still a working title for a group of new IEEE standards designed to provide native real-time capability for the IEEE 802 Ethernet standard," says Schönegger. This would allow for a seamless transition to substantially faster Ethernet standards such as POWERLINK for field-level communication and demanding motion control tasks. Beyond the automation industry, TSN is currently also being evaluated by the automotive and telecommunications industries. "The first cars based on TSN are expected to hit the market in the very near future," reports Schönegger. This would help secure the widespread availability of this technology.

In addition to B&R, the new OPC working groups will be also supported by other leaders in the field of automation, as was announced by KUKA on April 13, 2015.

Total package: OPC UA and POWERLINK

OPC UA already plays a central role in the IT-related areas of modern production systems. "The addition of TSN and the publisher-subscriber model will greatly expand the range of potential OPC UA applications," says Schönegger. Paired with the open standards POWERLINK and openSAFETY, the result is a total package for safe and consistent Ethernet communication all the way down to the sensor level.

Photo © B&R

Interview

"The entry barrier for programmable safety technology has fallen."

At the Hannover Messe, B&R presented a new series of safe digital mixed modules from its X20 SafeIO family that has broken down the entry barrier for programmable safety technology. With these new modules, integrated safety is now no more expensive than a conventional relay solution. We sat down with B&R's safety technology manager, Franz Kaufleitner, to find out more about these new modules and the advantages of programmable safety technology.

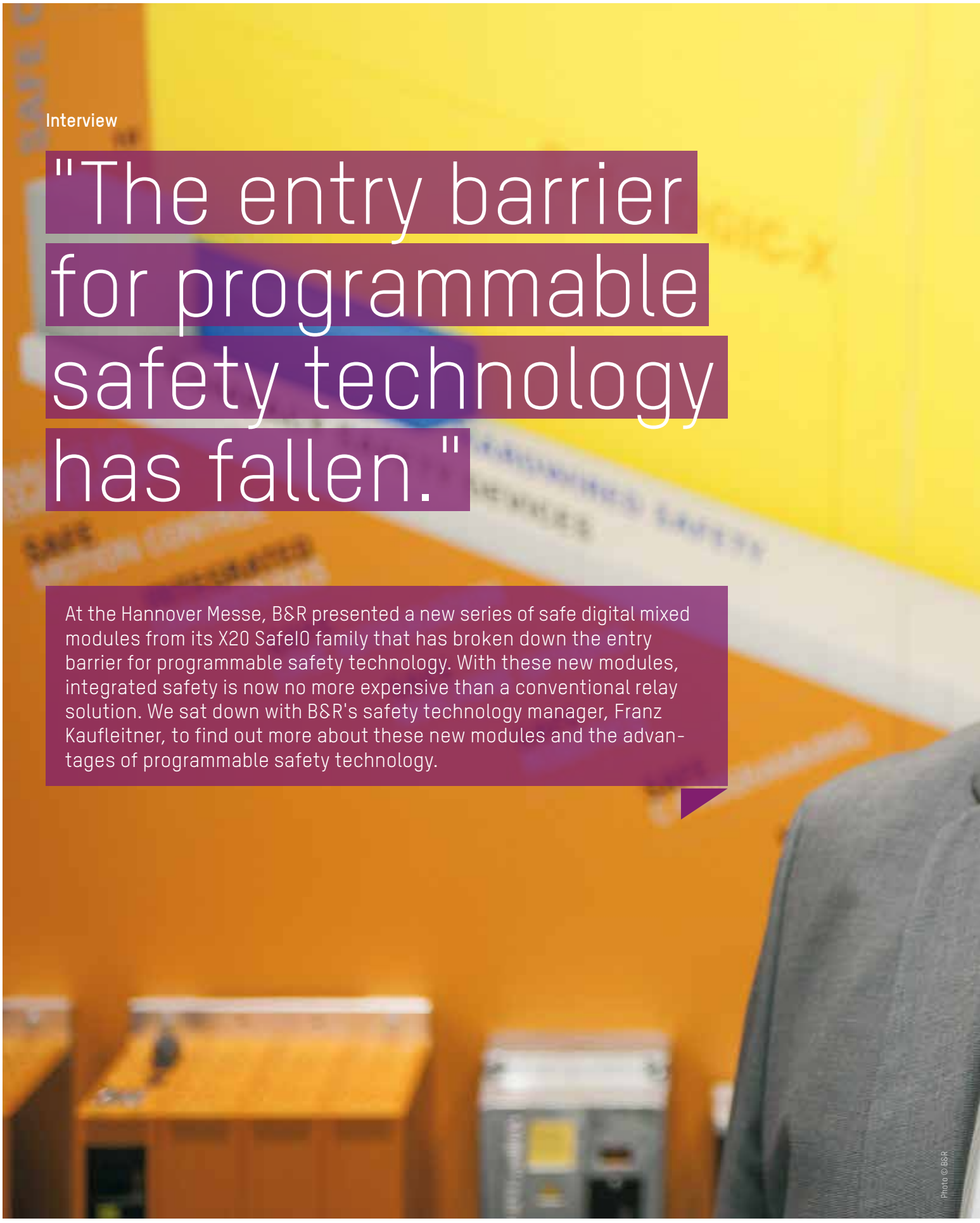


Photo © B&R

Franz Kaufleitner, Safety Technology Manager, B&R

Implementing programmable safety technology in a machine or plant has traditionally been associated with considerable expense. How has B&R managed to change that?
Using just one of our new safe mixed modules, you can implement a solution with all the functions offered by B&R's integrated safety technology at a price comparable to a hardwired relay solution.

B&R's commitment to absolute scalability is nothing new. From entry level to high end – all B&R hardware is fully interchangeable without affecting basic functionality. With our new mixed modules, we've taken scalability one step further at the low end of our safety portfolio.

Why should a machine or plant manufacturer who is accustomed to hardwired safety technology switch to a programmable solution?
There are a number of reasons. Generally, hardwired safety technology has very limited functionality and close to zero flexibility – it really only offers one way to react to any problem: shut down the machine.

This results in downtime, empty runs and time-consuming startup procedures, not to mention the risk of damaging the machine. Which brings us to another problem – one that people don't like to talk about: When an operator knows that by opening a safety door he'll be stopping production for an extended period of time, it's very tempting to bypass the switch on the safety door. Not only is this kind of tampering against the law, it can also result in serious injury.

How can programmable safety technology prevent that from happening?
In many cases it's enough to limit production to a safe speed in response to a safety event. If you take away the hassle of stopping the machine, you take away the motivation to tamper with the safety equipment.

Programmable safety technology allows you to take all types of parameters into consideration, so you can much more accurately determine whether a situation is safety-critical or not. Since B&R's safety technology is fully integrated in the overall control solution, it has access to all sorts of data that can be used to tailor the safety responses to a particular machine or plant.

Where is B&R safety technology used?
Since it was first introduced in 2008, B&R safety technology has been implemented in many thousands of machines. Our products even defy the harsh conditions of offshore wind farms 24 hours a day, 7 days a week. Which brings us to another advantage of integrated safety technology: remote diagnostics.

Safety products with electronic components must be able to periodically test and monitor themselves. These processes generate diagnostic data such as operating temperature and fluctuations in supply voltage – information that can indicate broken or pinched cables or misaligned door switches. With an integrated web server, B&R safety technology allows service technicians to access all of this data via a web browser from anywhere in the world.

Isn't programmable safety technology so complicated to use that it only makes sense for highly complex machines?
The extra effort required pays off quickly, even for a small machine series. The technology is so scalable that a machine builder can equip every variant of a machine with a uniform yet cost-effective safety solution. Consider an injection molding machine, for example. The most basic design for this type of machine typically includes an E-stop button and a safety door switch. All it takes to implement a full-fledged safety application on this type of machine is one of our new mixed modules; a dedicated safety controller is not necessary at all. You only have to program the application once, whereas a hardwired solution would need to be wired and tested separately on each machine built.

For machines that offer optional add-ons, however, programmable safety technology becomes more involved.
The optional add-ons must of course be programmed and tested. Yet unlike a hardwired solution, this only needs to be done once. When installing the machine, the desired add-ons can simply be selected from the list of available options.

B&R's new digital mixed modules break through the cost barrier: Programmable safety technology is now no more expensive than a conventional relay solution.

When you increase the complexity of the electronics, don't you shorten the lifespan and increase the response times?

No, quite the opposite. Our modules use only semiconductor components that are not subject to wear, which gives them a very long service life. The service life of safety products with mechanical components such as relays is always limited by how frequently they are switched. They often have to be replaced after only a few years.

Another advantage of semiconductor-based safety technology is the speed. Programmable safety technology from B&R is significantly faster than relay-based solutions. For particularly time-critical safety applications, you can also use our reACTION technology. With a safety response time of 100 microseconds, B&R offers the fastest programmable safety solution on the market.

Changes to legal regulations are constantly placing new or changed requirements on safety solutions. How does B&R deal with that?

Our customers can rest assured that we always lead the way when it comes to adapting to new legal regulations. With a system that is so integrated and scalable, changes aren't that hard to make. These same qualities benefit machine manufacturers who build multiple versions of a machine. Whether a machine is equipped with a very basic safety solution using just one of our new mixed modules, or whether it features a more in-depth safety solution with a powerful, dedicated safety controller – the application is always developed, controlled and diagnosed using the same software. Once a safety function has been programmed, it can be used over and over again in any configuration of the machine. A decision for B&R safety technology is a decision for a long-lasting, future-proof solution. ←

Active flood control

In 2002, devastating floodwaters reached 370 of the 500 homes in the Austrian municipality of Mitterkirchen im Machland. Since completion of the Machland Dam in 2012, the region can breathe a sigh of relief.

Photo © Municipality of Mitterkirchen

The Machland Dam protects the people, homes and historic landmarks of the Machland floodplain from the destructive effects of Danube flooding. With nearly 130 fully automated pumps, sluice gates and power supply stations connected in a redundant ring network stretching over 36 kilometers, the system is anything but static and passive. Indeed, it represents one of the largest interconnected automation solutions in Central Europe. The project was carried out by Electro & Electronic Landsteiner, an automation company with extensive environmental engineering experience, using B&R systems.

Photo: © P. Kerbpuner

The Machland Dam is anything but static and passive. Spanning over 36 kilometers, it comprises 100 sluice gates and pump stations as well as 24 stations that supply electricity and emergency power.

Rushing rivers where there should be streets and town squares. Boats and helicopters struggling to bring trapped residents to safety. Unfortunately, these are all too familiar sights in Austria's Machland region. The Danube river floodplain between the towns of Mauthausen and Grein owes its famed fertility in large part to frequent flooding. Plans for more comprehensive flood control measures existed long before the devastating flood of 2002, in the wake of which entire villages were razed and relocated to higher grounds.

The original plans had been drawn up following the flood of 1991 – but had to be fundamentally revised a decade later in light of the shocking experiences of the 2002 flood. Completed in 2012, the Machland Dam boasts a total length of over 36 kilometers, making it the largest flood control project Europe has ever built. At a cost of nearly €182 million, the historic structure now protects around 22,000 people from future calamities.

Fully automated and highly available

The Machland Dam is anything but static and passive. In addition to around 29 kilometers of earthen levees, 7 kilometers of protective walls (some of them mobile) and a flood channel nearly 9 kilometers long, there are also 32 retaining structures that can be closed on demand to fill the remaining gaps. The system's 72 pump stations contain 248 pumps that are capable of moving a total of 50,000 liters of water per second from the surrounding area into the confines of the levees. The structure is supplied by 24 stations able to deliver up to 8.8 megawatts of power. Normally operated as transformer stations, they are also equipped with diesel generators for the event of a power outage.

"In an emergency, these systems need to kick in fully automatically with absolute reliability," says Anton Wahlmüller, managing director of the dam's operating company. The instrumentation and controls were managed by Manfred Brunner at an external planning office for

The redundant master computers in the central control room use a separate X20 I/O controller to communicate with each segment of the system.

Each of the 120 stations, connected in a redundant ring network, is controlled by a remote PLC from B&R's X20 series with approximately 100 I/O channels. Locally, Power Panel 45 terminals are used for monitoring and operation.

Anton Wahlmüller
Managing Director,
MDB Machland-Damm Betriebs GmbH

"We need this system to operate reliably for many decades, so it's important that we can rely on the long-term availability of B&R's devices and components, as well as their famous support."

three years. "That's why we have standardized our pumps and designed in an exceptional level of operational safety." Demanding requirements were also placed on the system's control technology.

Monumental automation project

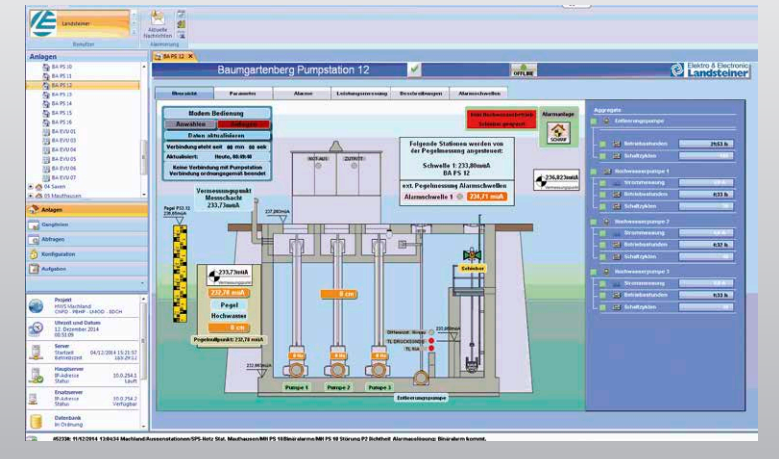
Like all publicly funded projects, the contracts for the Machland Dam were put to tender EU-wide. The instrumentation and controls contract for all eight dam segments was awarded to Electro & Electronic Landsteiner as part of joint bid from a group that also included mechanical engineering and steel hydraulics construction companies. A family business founded in Amstetten, Austria, in 1966, Landsteiner manufactures power distribution and control systems as well as type-tested switchgear and controlgear assemblies. The company has decades of experience equipping industrial and environmental systems with electronics, instrumentation and controls, as well as process control technology and HMI systems. Using the most advanced technology available, they pioneer sophisticated solutions with maximum operational stability. "Although we have plenty of experience in this field, the Machland Dam was a unique challenge due to its shear size," recalls Franz Reisinger, who has been in charge of machine and process control at Landsteiner for 15 years. "With the segments of the system spanning nearly 40 kilometers, it is the largest single automation project in our company's 50-year history."

Redundant, distributed intelligence

The central control room is found at the headquarters of the dam's operating company in the district capital of Perg. From here, each segment of the system has a secure, redundant VPN connection to the telecommunications network. In the event that both lines should fail, they can also switch to a wireless connection. The individual stations within each segment are interconnected via fiber optics. The controllers along the length of the dam communicate with matching controllers in the central control room. They handle data exchange between the individual segments and the two redundant servers of the master computer. All in all, Machland's active flood control solution is a single system comprising nearly 130 controllers connected in a resilient redundant ring network.

Proven distributed control technology

The local control stations have their own challenges to master. Over 100 I/O channels monitor and compare measurements from redundant sensors. These sensors measure the water level of the Danube and its tributaries, positions of sluice gates, status of pumps as well as alarm signals and the fuel reserves of the emergency generators. They also control various displays. A powerful level control loop also runs on the local controllers. The power measuring instruments at each station and the drives for the pumps and sluice gates are connected via PROFIBUS, while communication to the supervisory level takes place over TCP/IP. The control hardware is mounted directly in each sluice gate, pump or power supply station – some of these have their own buildings, while others require outdoor control cabinets. The key selection criteria for the system components included a compact, robust design, and – considering the potential need to operate them with an emergency generator – low power consumption. The automation specialists at B&R provided PLC and I/O modules from their compact X20 series for distributed control, as well as Power Panel 45 terminals with 5.7" touch screen displays for local monitoring and operation.



All the data converges in the master control system. To support maintenance, documentation for all B&R components is kept there in digital form. It is also possible to view any of the local HMI terminals at the individual stations.

In stations not enclosed in a building, the controls are installed in outdoor control cabinets at the crown of the levee.

Advanced technology and the support to match

For many years, Landsteiner has relied exclusively on B&R for its automation systems and components. "The versatile X20 system is not only very compact and extremely robust, it also has a nearly unbeatable price/performance ratio," explains Reisinger. "Their Automation Studio environment brings together all the tools we need to develop and test the entire solution – controls, HMI, communication, everything – as a single, integrated unit." The dam's operating company, MDB Machland-Damm Betriebs GmbH, emphasizes other qualities of the B&R solution as well. "We need this system to operate reliably for many decades," says Wahlmüller, "so it's important that we can rely on the long-term availability of B&R's devices and components, as well as their famous local support – free from any cultural or language barriers."

Franz Reisinger
Head of Machine and Process Control, Landsteiner

"The versatile X20 system is not only very compact and extremely robust, it also has an unbeatable price/performance ratio."

Future-proof automation

To ensure that there are no unpleasant surprises when maintaining or expanding an application, B&R offers an unprecedented degree of compatibility. "You don't need to worry about what CPU the program is going to run on while you're developing," Reisinger is happy to report. "And the question of what channels will be used for communication doesn't need to be answered during programming – that's simply a matter of configuring the respective bus controller." In cooperation with B&R, Landsteiner created a single program containing all the technical functions for the pump and sluice gate stations. The controllers simply retrieve the station-specific parameters they need automatically.

New or modified functions are programmed and tested at Landsteiner and then sent to the flood control system via remote data transmission. The ability to develop self-contained program modules allows modifications to be integrated without any disruptions. They can added to the existing system without having to revalidate all the other components.

Practice-proven

"When the Danube's tributaries start to rise, so does our blood pressure," reports Wahlmüller. "But when severe flooding occurred again in 2013, the world's largest interconnected X20 system provided an impressive demonstration that it was more than up to the task." ←

All the software for the Machland Dam, including all control, HMI and communication systems, is developed and tested in Amstetten using the Automation Studio engineering environment and delivered to its destination using remote data transmission. The ability to develop self-contained program modules and add them to the existing system allows modifications to be integrated without any disruptions. Since the software can easily be transferred to any other B&R PLC, the Machland Dam is ensured suitable replacement hardware across many generations of controllers.

Process optimization

Revolution in rotary labeling

Weiler Labeling Systems (WLS) masters the most demanding pharmaceutical labeling requirements – blinding speed, exacting precision, advanced printing and vision systems – with its state-of-the-art rotary pressure-sensitive labelers. When it came time to expand into the cut-and-stack market, WLS wanted to avoid the drawbacks of traditional cold-glue label application. By merging its decades of rotary labeling expertise with innovative glue-free technology from NuLabel, WLS is now able to offer a cleaner, more efficient cut-and-stack labeler. To meet these industry-specific requirements as well as universal demands for increased flexibility, efficiency and ease of changeover – all while remaining price-competitive with conventional solutions – WLS relies on automation technology from B&R and the deterministic synchronization of POWERLINK.

By eliminating the need for glue, WLS cut-and-stack labelers give customers the low cost of cut-and-stack labels combined with the higher efficiency of pressure-sensitive labelers.

A quarter century of experience designing, manufacturing, integrating and supporting advanced rotary pressure-sensitive labeling solutions has established Weiler Labeling Systems (WLS) as a leader in the pharmaceutical industry, where labelers require increasingly sophisticated printing and vision capabilities for serialization coding. The most advanced of these applications require that complex codes be printed and inspected at speeds exceeding 500 pieces per minute while being positioned within an unforgiving tolerance of +/-0.5 millimeters. Solutions in this area are typically accomplished with pressure-sensitive labels applied by the company's RL-420 or RL-760 rotary labelers.

A new approach for a new arena

Having honed its rotary labeling technology in the field of pressure-sensitive labeling, WLS decided to expand its business into a whole new area: cut-and-stack labeling. Used heavily in the food and beverage industry, cut-and-stack labels are inexpensive and versatile, but the traditional method of application using cold glue is a messy and labor-intensive process that requires downtime for clean-up and maintenance between runs. Wanting to offer something special with its new line of rotary cut-and-stack labelers, WLS partnered with NuLabel Technologies, who has developed a revolutionary activatable adhesive technology. The adhesive is pre-coated onto the label during label production and then activated by a water-based spray just before it is applied to the container. Thanks to this glue-free technology, the RL-840N labeler gives customers the versatility of cut-and-stack labels while achieving the efficiency and appearance of pressure-sensitive application.

The RL-840N offers WLS customers the flexibility of programmable recipes for quick changeover, as well as a smaller footprint and higher performance-to-cost ratio thanks to B&R stepper motor technology.

Centralized machine control, distributed I/O and motion

Both the RL-420/760 pressure-sensitive labelers and the RL-840N cut-and-stack labelers are extremely motor-intensive machines that demand incredible speed and accuracy as well as real-time deterministic communication. To achieve this, WLS turned to automation technology from B&R. B&R's solution combines centralized machine control with distributed I/O and motion control that all communicate over POWERLINK. This decentralization allows WLS to use much smaller electrical enclosures compared to their existing PLC-driven labelers. The RL-840N features 12 to 24 stepper platforms on its turret, as well as a number of servo motors that drive the feed screw, the turret and the machine's cut-and-stack modules. "B&R's stepper motors offer similar functionality to servo motors, while being both smaller and lower priced," explains Philippe Maraval, vice president of sales and marketing. "As a result, we're able to offer our customers pricing comparable to a traditional mechanical cam machine with the flexibility of a servo machine."

Microsecond accuracy with POWERLINK

To match the performance of a mechanical cam machine, all of the servo and stepper motors must be synchronized with microsecond accuracy. The same high precision is also required for in-line vision and printing equipment. POWERLINK vastly improved communication times and trigger accuracy as well as product tracking, helping to solve many of the challenges associated with high-speed coding and labeling. The ability to integrate third-party de-

"The incredible level of synchronization was made possible by POWERLINK technology's microsecond communication, which allows the motors to talk efficiently and reliably – even through the slip-ring on the turret. POWERLINK also allows us to achieve the results we need with high-speed inline vision inspection and printing." **Ted Geiselman, President, WLS**

The RL-840N from WLS utilizes B&R control technology distributed throughout the machine – including ACOPOSmicro servo drives, ACOPOSmicro stepper drives, X20 and X67 I/O modules – to deliver a scalable and cost-competitive solution.

Driven by a B&R servo motor, the cut-and-stack module on the RL-840N labeling machine picks up labels, activates their adhesive and places them onto the containers.

vices over POWERLINK also reduced the amount of wiring required to incorporate them into the machine control system.

Safe and secure

An Automation PC 910 and Automation Panel 900 multi-touch display were selected to provide the machine's computing and HMI performance. This approach allows WLS to control access to machine functions based on each user's login credentials. Users can be restricted to any combination of basic operations and advanced maintenance functions or granted full administrator capabilities. B&R's integrated safety technology further reduced the amount of wiring compared to earlier WLS labelers while providing fully programmable safety reactions with multiple machine configuration options. In addition, the modular PC and HMI integration provides extreme flexibility for scaling the processing performance and accommodating future machine updates.

Smaller footprint, competitive performance

WLS labelers are typically integrated into packaging lines prior to final packing. The RL-420/760 and RL 840N offer WLS customers the flexibility to use programmable recipes for quick changeovers and help achieve a smaller footprint with a higher performance-to-cost ratio thanks to the cost-effectiveness of B&R's stepper motors.

"The flexible and expandable hardware topology built on POWERLINK communication allows us to implement a distributed control architecture tailored to our exact machine specifications," notes WLS president Ted Geiselman. "This reduces the overall size of the electrical enclosure and improves performance."

WLS currently relies on B&R hardware and software for its pressure-sensitive and cut-and-stack rotary labelers. "In the future, we will be expanding our B&R offering, starting with our in-line labeler and our topserter, and then continuing with other platforms over time," concludes Geiselman. ←

A video of the RL-840N in action can be found on B&R's YouTube channel:

Minds, Machines & Management

B&R at the 2015 MIT Europe Conference in Vienna

For the fifth time, the Austrian Federal Economic Chamber (WKO) partnered with the Massachusetts Institute of Technology (MIT) to hold a conference entitled "Minds, Machines & Management" in Austria. B&R was invited to present alongside top researchers from MIT in front of 450 Austrian companies, managers and scientists. Topics at the conference varied widely – from urban agriculture, commercial drone applications and industrial 3D printers to applications for artificial intelligence. There were also plenty of opportunities available to exchange innovative ideas, view new models and discuss interesting questions with renowned professors and experts from MIT as well as successful Austrian companies and scientists.

The panel of renowned MIT professors and experts included:

- Michael Schrage (MIT Center for Digital Business)
- Nicholas Roy & Thomas Poggio (Computer Science and Artificial Intelligence Laboratory)
- John Clippinger & Caleb Harper (MIT Media Lab Human Dynamics Group)
- George Westerman (MIT Sloan School of Management)
- Wojciech Matusik (MIT Department of Electrical Engineering & Computer Science)
- Sangbae Kim (MIT Department of Mechanical Engineering)
- Vikash Mansinghka (MIT Intelligence Initiative)
- Devavrat Shah (MIT Department of Electrical Engineering and Computer Science)

Dr. Gernot Bachler represented B&R at the conference with a presentation entitled "Evolution and Trends in Human and Robotic Interaction in Production Industries". As technical manager of B&R's Motion business unit, he is responsible for R&D in the area of CNC and robotics. In his address, Bachler discussed developments in the field of industrial robotics with a particular focus on the challenges of Industry 4.0. State-of-the-art automation technology alongside tightly integrated robotics, as offered by B&R, provides a perfect foundation for all types of machinery and equipment with applications in nearly every industrial sector. When talking about robotics, handling tasks are generally the first thing that comes to mind; however, robots are also seeing increased usage in processing applications such as sheet metal bending and spray painting. These robots may not always look like the classic 6-axis articulated arm. More and more, they feature a highly specialized arrangement of serial and parallel kinematic structures optimized for a particular task.

This is where integrated robotics solutions from B&R really pay off. Any combination of kinematic structures can be linked to the path-generating functions of the robotics software via standardized interfaces – without having to modify the core functionality. Augmented by specific technology functions and a flexible programming interface with a configurable robotics programming language, B&R's integrated robotics technology provides machine builders and integrators the perfect foundation for the automation solutions of the future. Integrated safety plays a key role as well. The extreme flexibility required in many production industries often means that humans and machines must work closely together without being encumbered by safety gates and enclosures. Monitoring functions such as Safely Limited Speed at the Tool Center Point (SLS@TCP), the implementation of boundaries for the workspace and the orientation of the tool itself are essential in developing optimal safety solutions.

Safety functions from the area of SafeROBOTICS can be combined with single-axis monitoring functions with extremely fast response times as well as traditional SafeLOGIC controller function blocks in order to create the perfect safety solution. All safety functions offered by B&R are TÜV-certified and field-proven.

As technical manager of B&R's Motion business unit, Dr. Gernot Bachler is responsible for R&D in the area of CNC and robotics. His presentation was entitled "Evolution and Trends in Human and Robotic Interaction in Production Industries".

Cable winding

The fast and flawless future of rewinding

Many companies still find themselves manually winding cables onto reels or into coils. The reason? Cables tend to have a mind of their own, and machines have a hard time reacting fast enough to handle the unpredictable dynamics. But now, a leading Swiss manufacturer of cable feeding systems, Ramatech, has developed a system that ensures a perfect wind every time – an accomplishment owed in large part to automation components from B&R.

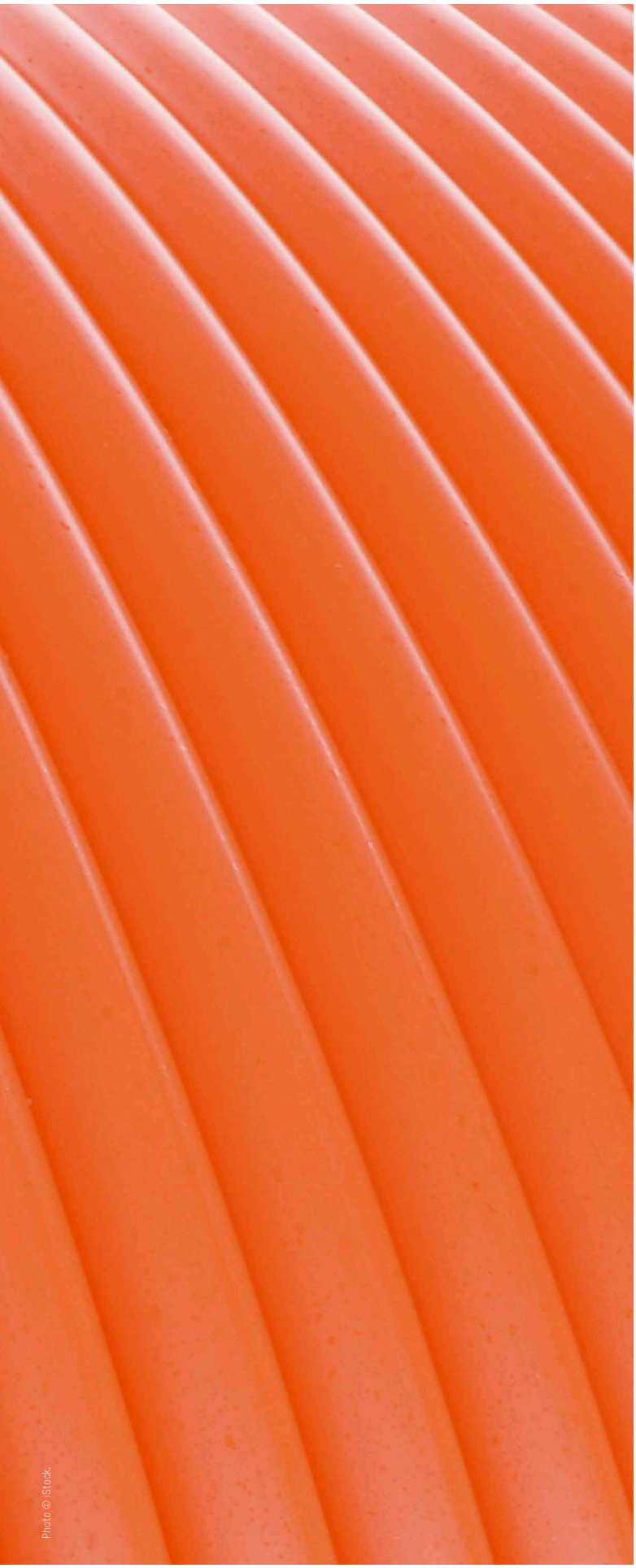


Photo © iStock.

Cable rewinding is not a high-profile market. An Internet search for industrial cable rewinders produces rather limited results. "It's a market with relatively few competitors," explains Erika Randegger, who founded Ramatech in 1988 together with her husband, Kaspar. With 20 employees, Ramatech is a pioneer in several areas of winding technology. "We lead the market in automatic cable feed systems for processing multipolar cables such as unwinders, reel storage systems and – of course – rewinding systems," says Randegger.

Unwieldy cables

Cable rewinders can be used to transfer cable from large reels to smaller ones, from reels to coils or from large coils to smaller ones. These systems are offered in various dimensions to accommodate reels of all sizes, which can weigh anywhere from 300 to 8,000 kilograms. The basic principle sounds simple enough: unwind it from here and wind it up over there. Yet the reality is much more complex, particularly when precision matters. "Here at Ramatech, we want to optimize the quality of the winding results so that the cables don't come loose," says Timo Kessler, Ramatech's electrical and software engineering manager.

Wound perfectly at 3 meters per second

A well-wound cable is a seal of quality. The cable should be wound as densely as possible with no gaps or overlapping. This level of precision represents the primary challenge for cable winders. Ironically, the main source of frustration is the cable itself. "Cables have a mind of their own," Kessler is convinced.

When a flawless appearance is important, many companies still resort to winding cables by hand. Experienced workers know how to guide the cable and are able to make quick adjustments. With so many companies still relying on manual winding, there is a great deal of market potential for machines that can automate the process with sufficient quality.

Premium cables from Huber+Suhner must be wound flawlessly – to both protect and display their high quality.

The layering unit and winding axis are controlled with precise synchronization. The optimized ergonomics of the operator console – featuring a B&R touch screen – ensure a clear overview at all times.

That's where Ramatech comes in. Accomplishing a feat that previously required skilled human hands, Ramatech's highly stable machines combine perfectly synchronized drives and countless algorithms to achieve flawless winding – at a speed of 3 meters per second.

Implementing highly complex control loops

To achieve their lofty quality targets, Ramatech's developers work with B&R components. Kessler knows exactly why his company has chosen to work with the Austrian automation specialists and their local team in Frauenfeld, Switzerland. "B&R's servo technology is extremely competitive with regard to both performance and pricing." The sophisticated B&R components are put to good use in Ramatech's rewinders. Two reels with different diameters are rotated in perfect synchronization as the drives gradually ramp up from 0.1 to 3 meters per second. Once the drives settle at this speed, the controller must continuously execute extremely complex control loops to compensate for the distortions caused by the unpredictability of the cable and oscillations caused by the machine. They must do so, however, without slowing down the process, which needs to maintain the certified speed of 3 meters per second.

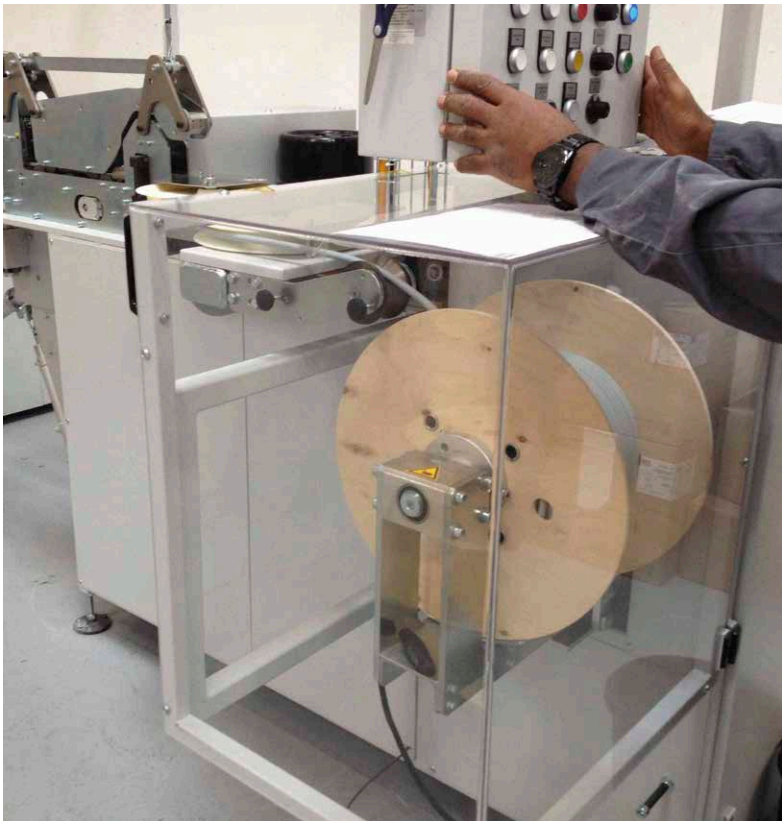
When it comes to programming processes of this complexity, small and medium-sized companies can quickly run up against their limits with regard to know-how, time and budget. "One of the big advantages of the B&R components, though, is that even the most complex calculations are very simple to program," says Kessler. The shift from tedious programming to simple parameterization has long been a central theme of working in the Automation Studio engineering environment.

End users: Huber+Suhner

Companies that purchase rewinder systems include cable assemblers, electrical wholesalers and cable manufacturers. The majority of these systems are customized for specific applications, so the most efficient way to build them is by starting with a common base and then solving the wide variety of requirements by adding modular options.

Huber+Suhner is one such customer who has ordered customized machines from Ramatech for their location in Pfäffikon in the Swiss canton of Zürich. They recently installed a reel-to-reel rewinding system featuring a dereeler and rewinder that can each accommodate reels up to 1,260 millimeters in diameter. They also have a second system for reel-to-coil rewinding. The reels can weigh up to 1,000 kilograms. Features of these systems include cable return stops, automatic cable diameter sensing, end of cable detection and cutting units.

The speed and precision of B&R's servo drives allow the rewinder to achieve its certified speed of 3 meters per second.



The control console can be moved as needed to give the operator an optimal overview of the winding process.

In addition to ensuring optimal layering, another important feature of these systems is certified length measurement. "This actually makes it a bit difficult to develop new machines or use new components," explains Kessler, "because the certification is expensive and is valid for ten years. Any alteration – even switching out a single component – requires recertification."

Major upgrade: integrated safety technology

"That's not to say we never make any improvements. For the first time, Huber+Suhner's system now also features B&R's integrated safety technology. That's something new for us," says Kessler. Although the aspect of safety itself is nothing new, previous solutions relied on hardware. "We could have continued with the cheaper option, or we could have found more flexible alternatives for certain components, but with B&R's integrated safety technology we finally have remote access to our safety technology," explains Kessler. "We're known for our perfect service, and we introduced remote maintenance some time ago – so we're very happy that we can incorporate the safety aspect into that as well."

Intelligent, decentralized and integrated safety technology from B&R with extremely short response times opens up a new realm of safety concepts. It contributes substantially to both the flexibility and availability of machinery and equipment by providing safe service and diagnostics, systemwide safe communication and the ability to program machine options instead of hardwiring them.

When in doubt, better call B&R

Getting up to speed with new components – the way Ramatech did with B&R's integrated safety technology – often comes with its share of obstacles. "While customers do complete the training, they often end up spending a lot of time experimenting around because of something they missed," notes Kessler. That's why he always says: When in doubt, better call B&R. "Calling B&R's drive specialists has always been the quickest and easiest solution to any problem we've had. And by now they're familiar with our products, which makes cooperation that much more efficient." ←

Timo Kessler
Electrical and Software Engineering Manager, Ramatech

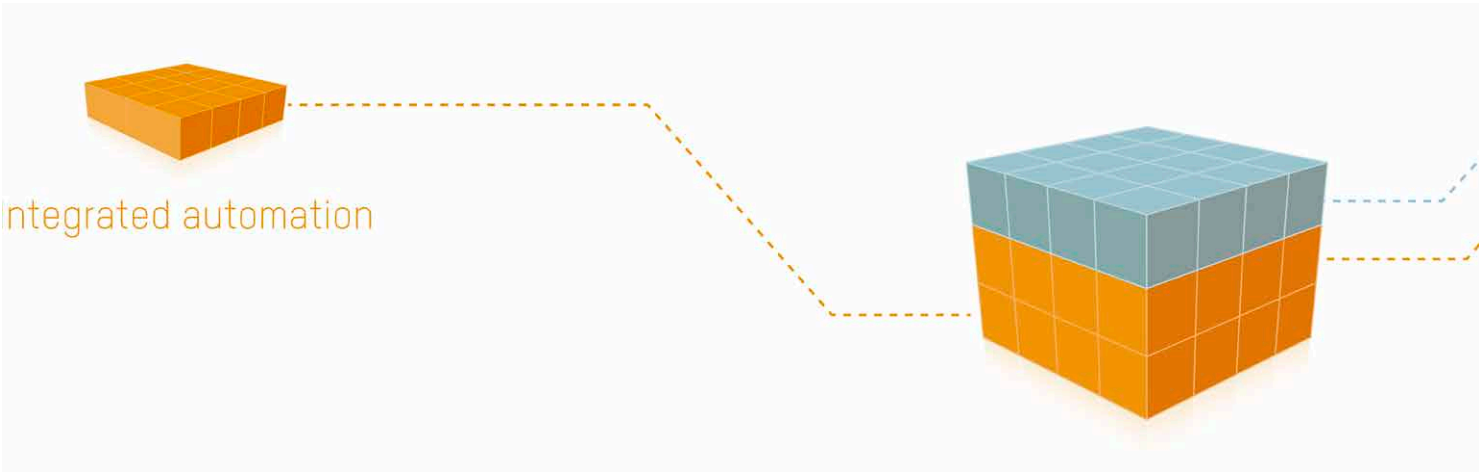
"B&R's integrated safety technology finally gives us remote access to our safety technology. We're known for our perfect service, and we introduced remote maintenance some time ago – so we're very happy that we can incorporate the safety aspect into that as well."

Stefan Schönegger, Marketing Manager, B&R

"A whole new generation of automation"

The field of machine manufacturing stands before some monumental challenges. Increasingly flexible production systems and mass customization are causing an explosion in the number of machine variants each manufacturer offers. In turn, automation technology takes on an increasingly significant role, as a recent trend study by the VDMA confirms. B&R's marketing manager, Stefan Schönegger, explains how his company intends to help machine manufacturers overcome these new challenges with Scalability+.

Photo © B&R



Stefan, for a number of years now, the idea of integrated automation has been something of a silver bullet in your industry. Does the focus on Scalability+ mark the end of this era?

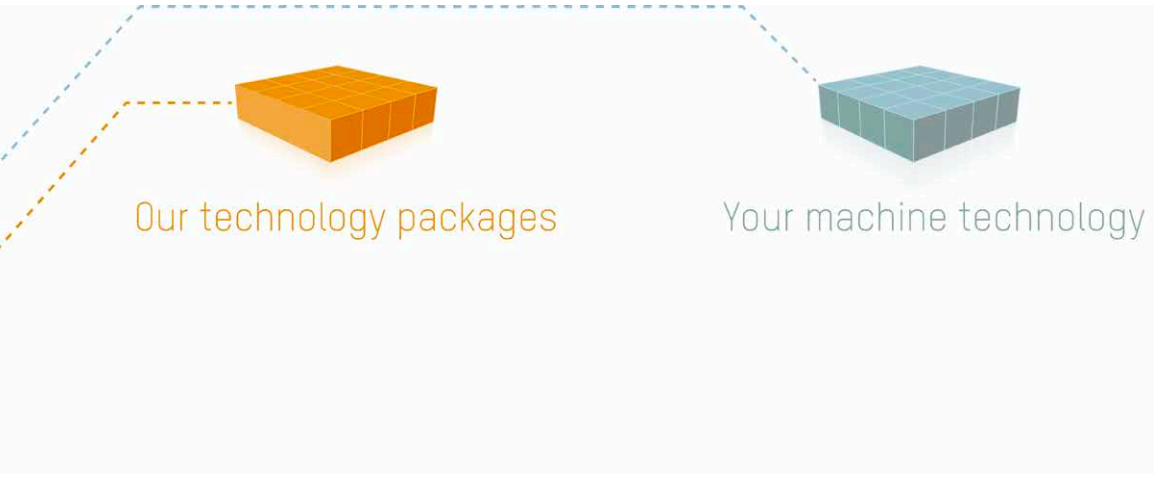
Not at all. Integrated automation – the seamless interplay between PLC, HMI, motion control and safety components – is the very foundation of Scalability+. Only when customers are able to select exactly the products they need to build their ideal machine can they expect long-term success on the market. What's also important is that they are able to develop, diagnose and maintain their automation solution with only a single tool.

These days there are many automation suppliers out there with quite extensive product portfolios, so B&R is no different than other manufacturers in that regard.

That's only partially true. Most of them specialize in a particular area, such as motion control. There are certainly a number of manufacturers with a full portfolio in that area. When it comes to areas like PLC and safety technology, on the other hand, the selection is much thinner, and the user is always forced to make compromises in one way or another. For most machines, this is not acceptable. What's more, the different systems aren't even always compatible with each other. With B&R you don't have these problems. Our solutions are built from a fine-grained selection of homogeneous products that cover every area of automation. And whether you're talking about a standalone machine, an integrated production line or an entire factory, they are implemented using the same universal software tool: Automation Studio.

For a long time, IEC 61131 was all you needed to program an automation solution. Is that still the case?

IEC 61131 continues to be a core element of any open automation system, but by no means is it the end-all, be-all solution. Functions based purely on IEC 61131 don't even make up 10% of what a modern B&R controller offers. The other 90% is added value for our customers. It can generally be said that the capabilities of an automation system extend far beyond those of the



hardware alone. With the growing complexity of machines and plants, software is taking on an increasingly important role in the development process. This is where the second layer of Scalability+ comes into play. An extensive range of software function modules makes it easy for our customers to integrate CNC, robotics, motion control or safety features into their applications. They can also take advantage of complete closed-loop control libraries for things like hydraulics, temperature and pressure control. Communication technologies such as OPC UA, POWERLINK and IO-Link, as well as our newest additions, mapp and reACTION, bear mentioning here as well. These all follow the same underlying principle: By removing burdens and simplifying processes for our customers wherever we can, we allow them to focus on their machines' core functionalities. At the same time, we reduce their costs since many of their dedicated hardware solutions are simply no longer needed.

How much freedom do customers have in implementing these software packages?
They have as much freedom as they want – our system is completely open. We provide all the tools they need to convert their know-how into a world-class machine. They can use an IEC 61131-3 language, C or C++, and they can choose whether or not to use object-oriented programming. They can use any of the available PLCopen function blocks or take advantage of our mechatronics libraries. Or they can go up a level of abstraction and use mapp to get things done even faster. Our customers can design every process exactly as they want it, or they can leverage existing functions, technology packages and libraries.

All of these approaches can be mixed and matched as needed, too. You can use a mapp block for the alarm system, implement the motion control application using PLCopen and develop a special closed-loop controller for a particular machine function in C code or as a MATLAB model. Our products perfectly complement the customer's machine, and that's where Scalability+ comes full circle. When you bring together our integrated automation, our software packages and the customer's own technology, what you get is a whole new generation of automation. ←

Focus on optics

Kay Trumpler and his company TMS are dedicated to precision optics. Well established in the field of servicing and retrofitting optical manufacturing equipment, TMS recently began constructing its own CNC machines for milling, drilling and cutting optical glass. The automation for these new TMS machines – like all other automation technology installed by the company since its founding in 2008 – comes from B&R.

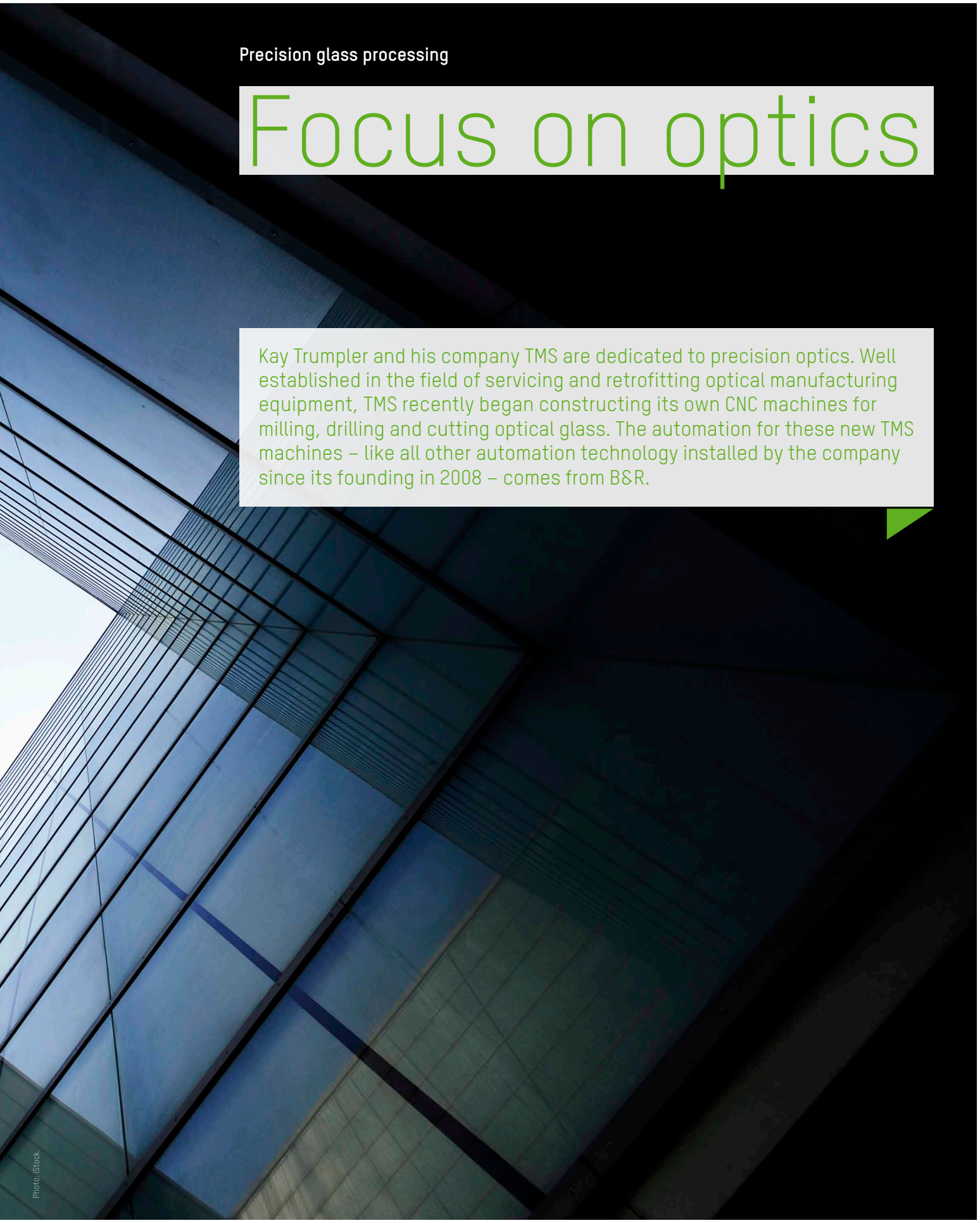


Photo: iStock.

The TGB 300 glass machining center uses integrated safety technology from B&R with safely limited speed functions that allow the safety door to be kept open during setup.

The CNC panel from B&R combines a touch screen display, key switch, keyboard and E-stop to provide all the control elements needed for a CNC machine in a single, ergonomic housing.

For Kay Trumpler, a trained machinist and industrial foreman with decades of experience in the optics industry, there are clear reasons for choosing a B&R automation solution for his machines, whether retrofit or new constructions. "Particularly in retrofitting jobs, we have to deal with all sorts of unique automation challenges. To cover such a broad spectrum, we need a highly integrated, extremely flexible automation solution. That's exactly what we get with B&R." Since retrofitting is generally only a feasible option for relatively simple machinery, the complexity of the task is kept within reasonable limits. Constructing new machines is a whole different story. New machinery has complex automation architectures that integrate safety functions, CNC, motion control and sequential control. "The exceptional scalability and seamless integration of B&R's solutions have been pivotal in our smooth transition into product-based business," says Trumpler.

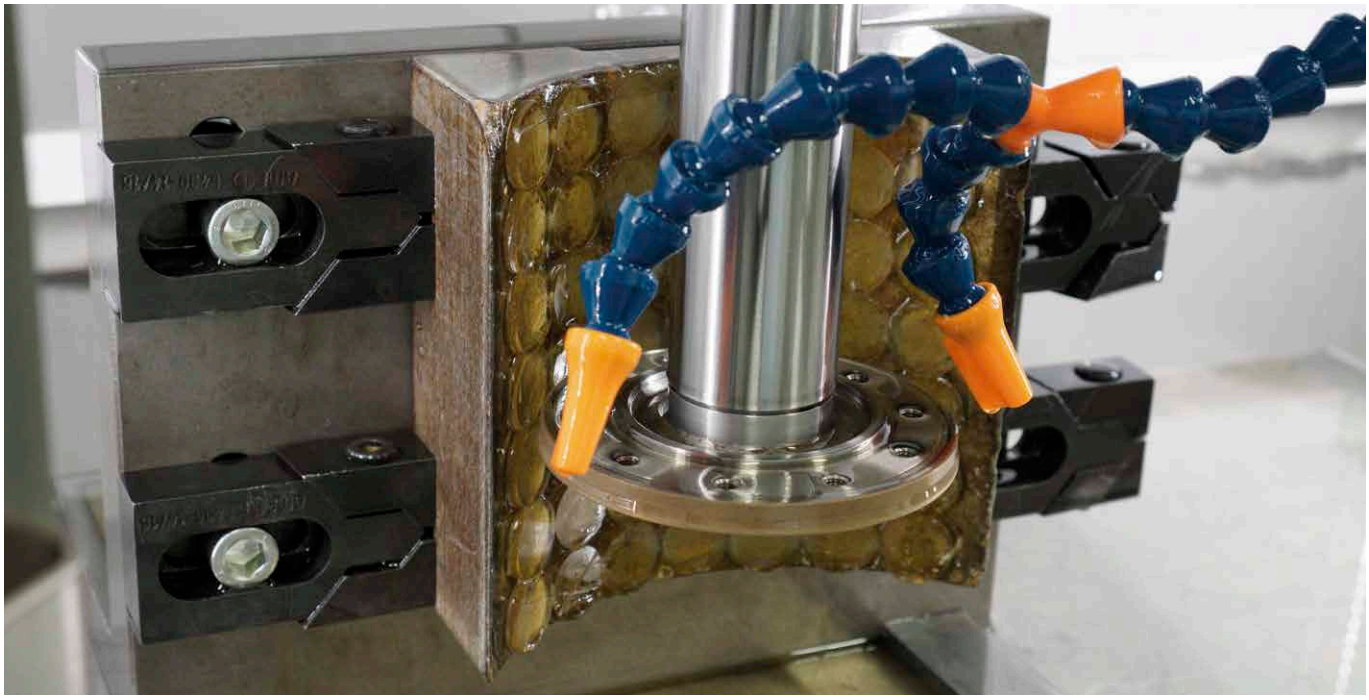
One engineering environment for the entire project

As a smaller company, TMS has to be especially careful about how it uses its personnel and resources. "That's where we really benefit from the universal engineering environment in Automation Studio," says Trumpler. With Automation Studio, TMS is able to handle everything from communication and HMI to CNC and machine control with a single software package, regardless of which hardware is used. "And we can do all this without constantly having to purchase new licenses and upgrades," adds Trumpler. "That and B&R's outstanding support make it easy for us to get up to speed on new topics, lower our expenses and complete projects more quickly." With this support, TMS successfully transitioned into the new construction business with a low-cost centering machine – in under a year and with only five employees. Positive feedback from the market inspired TMS to begin development of an entire product family based on a shared machine platform. The first products from this new family are the TGS 300 glass cutter and the TGB 300 glass processing machine.

Universal glass milling machine

The TGB 300 allows optics producers to mill workpieces out of glass blocks measuring up to 300 millimeters in diameter for in-

TMS retrofits optical manufacturing equipment for other manufacturers as well as building its own glass processing machinery. The small team of engineers is confronted with a broad spectrum of automation challenges ranging from basic controllers to complex, multi-axis CNC machines with safety functions. That's why TMS chose to work with Automation Studio, because it allows them to program every aspect of the software – from communication to CNC and HMI – in a single environment.



The TGB 300 universal glass processing center from TMS relies exclusively on B&R automation technology to handle its wide range of potential applications, such as production of cylindrical lenses.

Kay Trumpler
Owner, TMS e.K.

"The ability to unite CNC, PLC, motion and HMI on a single software platform is one of the most remarkable aspects of the B&R solution."

house production of prototypes and small batches. "This type of task used to require three separate machines," explains Trumpler. "Now all you need is one TGB 300." This is the first processing solution for optics production that offers all the functionality of a universal milling machine for metalworking, but is designed for the specific requirements of glass. For example, TMS completely encapsulated the machining center and eliminated all guides and metal blinds to provide immunity for the machine against the abrasive glass-diamond residue created during processing. The TGB 300 is equipped with up to five CNC axes (X, Y, Z, rotary table and indexing head) controlled by ACOPOSmulti servo drives. To keep the machine accessible during setup, the servo drives feature B&R's integrated SafeMOTION technology, which allows the axes to be operated safely at reduced speed. The machine's safety equipment, such as its E-stop buttons, are all integrated via safe I/O modules from the X20 system.

Real space savings with a virtual safety controller

The safety functions are controlled by B&R's virtual safety controller, the SafeLOGIC-X. "The virtual controller supports all the same SafeMOTION functions as the more powerful safety controllers," explains Fabian Hölzel, who worked with Trumpler on the design and construction of the machine. He was the one responsible for programming all of the control and application software, including the CNC and HMI applications, in Automation Studio. "The software is absolutely modular and is identical for both machine types," explains Hölzel. "The only adaptation required is to change a few parameter settings." Users can also easily adapt the HMI application to their requirements so that even semi-skilled workers are able to operate the machine.

For its operator interface, TMS selected an operator panel from B&R that combines a touch screen display, key switch, keyboard and E-stop in a single, ergonomic housing.

A powerful Automation PC 910 provides a high-performance hardware platform for the machine control, CNC and HMI applications. "The ability to unite CNC, PLC, motion and HMI within a single software platform is one of the remarkable aspects that sealed the deal for the B&R solution," concludes Trumpler. ←

Software development

mapp your way to simpler software

To run the ultra-integrated smart factories of Industry 4.0, programmers are having to write increasingly complex software. As they do, the cost of developing and maintaining this software is skyrocketing. Intelligently linked mapp technology components allow you to create and support even the most complex solutions faster and easier – and keep mountains of software from becoming bottomless money pits.

Photo © iStock.

Christoph Trappl
International Applications Manager, B&R

"mapp technology takes the modularity of function blocks to a whole new dimension. The intelligent links between the individual components are what give mapp the power to combat software complexity."

"When it comes to Industry 4.0 implementation, machine builders and owners face a serious challenge: They have an increasing amount of very complex software to manage," says Christoph Trappl, international applications manager at B&R.

As we continue to move beyond the limits of what can be achieved with a purely mechanical solution, more and more of a machine's processes are being implemented in software form. Today, software already accounts for around 50% of a newly developed machine. At the same time, it's important to remember that the lion's share of software costs have nothing to do with development. Over the lifecycle of a machine, approximately 70% of the software costs go toward maintenance.

Function blocks fall short

Function blocks and preprogrammed task-specific modules make it easier to write application software but have a limited impact on overall complexity. "That's why we took mapp technology to a much deeper level conceptually," explains Trappl.

One of the central features of mapp technology are what's known as *mapp links*, which work according to a client-server model. Each mapp component provides data that can be queried as needed. This lets you do things like set up an entire energy management system with a few mouse clicks. When you add the *mapp energy* component to the application, it automatically retrieves the energy data it needs from all the axes. If you add a new axis, *mapp energy* incorporates its energy data automatically. This makes it unbelievably easy to work with machine variants and options.

Immense savings potential with mapp

mapp energy prepares energy data according to the user's preferences. The graphical editor allows the user to create custom reports and perform dynamic analysis. Relationships between batches, individual products and energy data can be identified, for example, and used to optimize production. "It may sound trivial," concedes Trappl, "but it harbors an immense potential for savings." Programming an energy management solution used to take days of labor and countless lines of code. The interfaces between each axis and the energy management system had to be programmed individually. "With mapp we've all but eliminated this type of glue code,'" explains Trappl. According to a benchmark study by the independent LIAM institute[1] mapp was able to reduce the amount of source code by 83%.

For more details on the mapp benchmark test, check out the white paper:
www.br-automation.com/LIAM

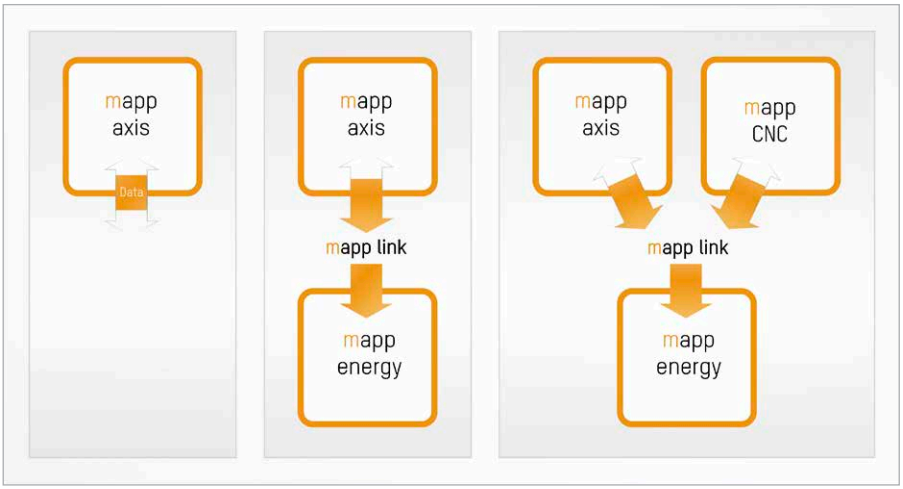
Modular concepts for Industry 4.0

"The benchmark test was based on a flying saw application," notes Trappl. "With a modular machine design the potential savings is even greater." If new axes are added, the *mapp link* ensures that *mapp energy* incorporates their energy data automatically – even during operation. The other mapp components all work in a similar way. "That's what real Industry 4.0 modularity looks like." A modular design is necessary, for example, if you want to be able to add or remove optional equipment quickly and efficiently. This requires software that is arranged in mechatronic units, which is no problem at all with mapp. "A great way to illustrate this is by looking at the alarm system for a packaging machine," says Trappl.

Traditionally, if you wanted to add a robotic palletizer to your packaging machine after a year of operation, the code for the palletizer would have to be included in the machine software from day one. Otherwise, you would have to rewrite the software, perform new testing and possibly even obtain new certifications. The packaging machine can only react to alarms generated by the palletizer if it is programmed to do so in the software.

Manage options without programming

The mapp architecture, on the other hand, gives the robotic palletizer its own alarm system – but its data is also available to the alarm system on the packaging machine. The packaging machine can read this data and react to it, even if there were no plans or preparation for the palletizer

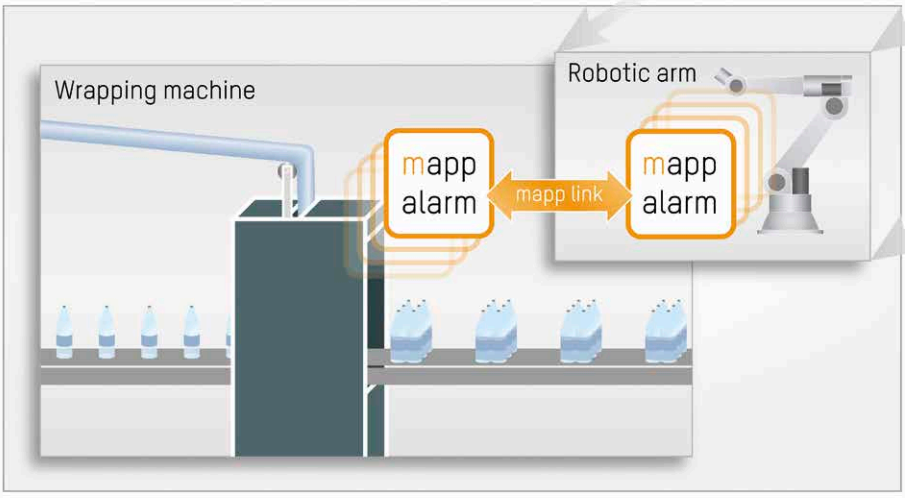


When you add the *mapp energy* component to the application, it automatically retrieves the energy data it needs from all the axes. If you add a new axis or even a multi-axis CNC machine, *mapp energy* incorporates their energy data automatically.

when the machine was first installed. "You never need to touch the packaging machine software," emphasizes Trappl.

"Hello, service technician, this is the machine speaking"

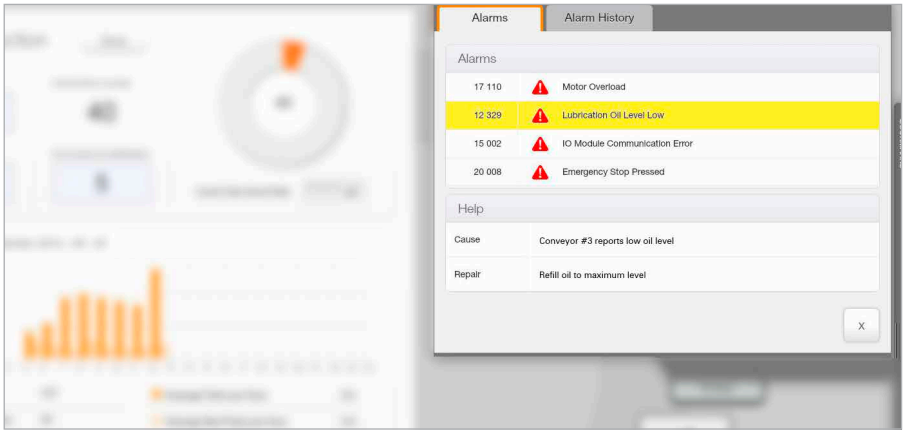
mapp alarm itself offers many functions that can help minimize downtime. One of them is the ability to have the machine send an automatic text message notification in the event of an alarm. If the recipient fails to respond within a defined period of time, the notification is forwarded to another person. The list of people to be notified can be defined freely and even changed on the fly.



If you add a robotic palletizer to a packaging machine, there's no need to reprogram the machine software. Thanks to the *mapp link*, the packaging machine's alarm system automatically incorporates the alarm data from the palletizer.

mapp makes room for innovation

mapp's commitment to the modularization of machinery offers decisive advantages for the transition to Industry 4.0. In spite of its increasing complexity, a machine's software remains manageable over its entire lifecycle. Even when production shrinks to batch size 1, machine builders and owners can continue to boost overall productivity. mapp technology reduces software maintenance costs in two different ways. First, the mapp components themselves simplify the entire machine software and make the code easier to understand. With a code base that is 83% smaller, errors are much easier to find. On top of that, B&R subjects every mapp component to extensive testing and ongoing maintenance. New mapp components are being added all the time and can be integrated seamlessly into existing systems with no additional effort. ←



mapp technology makes it easy to set up an alarm system. If you add a piece of optional equipment, its alarm messages are automatically incorporated into the existing alarm system.

Prestigious labels go digital

A label tells the consumer much more than simply what to expect when they open a package. It also says a lot about what makes the product unique and is a powerful statement of brand identity. As brand owners continually craft and fine-tune this message, production batches shrink in size and increase in variety. To support the growing range of finishing options and increase uptime despite more frequent changeovers, SMAG relies on the full integration and complete scalability of B&R automation technology.

Photo: Rodney Strong vineyards

SMAG's new Galaxie Digitale is an ideal complement to digital label production equipment that features unwinding, cutting, slitting and rewinding processes as well as finishing options ranging from flexo and screen printing to cold foil, hot foil, embossing and lamination – all automated by B&R.

As brand owners strive to create labels that effectively communicate the quality and uniqueness of their products, label producers are switching to digital printing and finishing equipment that offers both greater flexibility and higher output in small batch sizes. "Over the past decade, digital presses have brought the number of labels our machines convert per batch from thousands down to a few hundred," explains Pascal Mercier, technical manager and co-owner of SMAG, a French manufacturer of post-digital label finishing equipment. "We've adapted our label finishing machines to allow users to change jobs very quickly. We also offer them all types of finishing options so they can select exactly the decoration and customization effects they need to differentiate their products."

In-line and modular

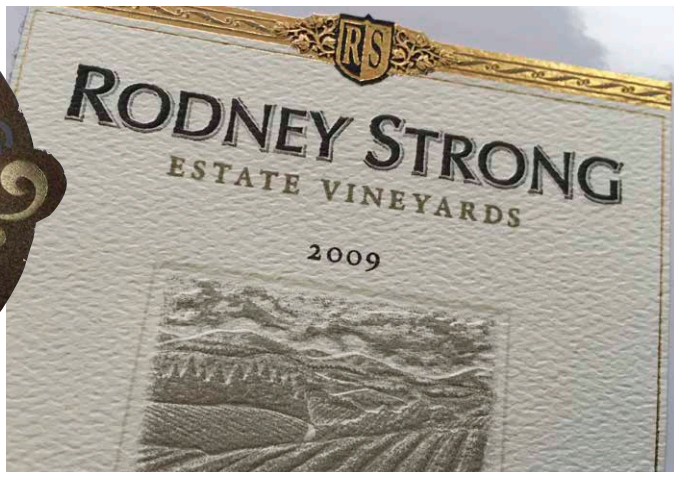
SMAG focuses on innovation to keep pace with the latest in post-digital printing technology and relies on state-of-the-art automation to make its label converting and finishing equipment more flexible. SMAG's newest creation – the Galaxie Digitale – is an ideal complement to digital label production equipment, featuring integrated unwinding, cutting, slitting and rewinding processes as well as versatile finishing options ranging from flexo and screen printing to cold foil, hot foil, embossing and lamination – all automated by B&R. The Galaxie Digitale owes its exceptional modularity to the combination of SMAG's mechanical know-how and the scalability of B&R's systems. Each process is performed by a module that can easily be added, removed or rearranged according to the user's needs. "This modularity enables us to meet our customers' requests more quickly," stresses Mercier.

The machine modules are all equipped with B&R's latest servo drive technology and linked via POWERLINK to each other and to a B&R Power Panel that serves as the central controller. The processes performed by the Galaxie Digitale operate in perfect synchronization with a minimum number of automation components. Having experienced the hard real-time performance and high bandwidth of POWERLINK, SMAG is now working on integrating vision equipment directly into the real-time network in order to automate inspection tasks currently being carried out by human operators.

Fast changeover through self-configuration

Depending on the exact layout of the machine, Galaxie Digitale users can complete multiple short runs with changeover times of only 5 to 20 minutes. This big step forward in changeover times is owed primarily to the application software developed in cooperation with B&R, which reduced line configuration and setup to no more than a few touch actions on the Power Panel.

Newly added machine modules set themselves up automatically, including automatic hardware definition, consistency checks and automatic axis initialization based on the operator's entries. In ad-



Prestigious labels made by SMAG machines.

Pascal Mercier
Technical Manager and co-owner, SMAG

"Continuous innovation is critical to keep a competitive edge in the fast-changing label industry. Thanks to our strategic partnership with B&R, we are able to keep a leading position in this industry and deliver best-in-class machines to our customers."

dition to rapid setup through self-configuration, the new machine software also brings substantial improvements in software maintenance, since all the machine variants and optional equipment in the SMAG portfolio are now managed in a single project. The success of the software engineering process was made possible not only by the modularity of B&R's integrated engineering environment, Automation Studio, and the autotuning capabilities of its ACOPOS servo drives, but also by the close partnership between SMAG and B&R's engineering teams.

Easy remote maintenance

SMAG also implemented the newest B&R solution for remote maintenance based on VPN networks, firewalls and specific gateways. Their service technicians can now support all customers all around the world remotely via a totally secure connection, while enjoying full access to the extensive diagnostic possibilities offered by the System Diagnostics Manager (SDM) web application. "With B&R's remote maintenance solution, we can successfully support a customer starting a line in Australia directly from our office using a simple Ethernet connection," reports Mercier.

Scalability+ for tool-free machines

SMAG has also begun implementing tool-free machine modules, representing yet another leap forward in the reduction of commissioning time. The newest version of the Galaxie Digitale features a laser cutting module from SMAG's new partner, Spartanics, an American laser converting equipment manufacturer. SMAG has also established a partnership with MGI, a French specialist in digital finishing solutions, in order to further expand its range of tool-free solutions.

Thanks to the modularity and scalability of B&R's automation systems, integrating these tool-free modules into the Galaxie Digitale is effortless. "Our newest digital converting and finishing equipment based on B&R's Scalability+ solution pave the way for smart and interactive label production," summarizes Mercier. ←

Automation Studio
Developed in close cooperation with B&R in the Automation Studio engineering environment, SMAG's new machine software provides self-configuring machine modules for rapid setup and changeover, as well as substantial improvements in software maintenance thanks to the ability to manage all variants and options in a single project.

Photos: SMAG

reACTION: Turbo-charged safety technology

B&R presents reACTION technology for ultrafast safety applications

reACTION reduces response times for safety applications to 100 microseconds – an astonishing 100 times faster than conventional solutions.

B&R is heralding a breakthrough in response times for safety technology. At the Hannover Messe, the automation specialists presented programmable safety technology with the world's fastest response times. reACTION technology achieves safety response times down to 100 microseconds.

With this advancement, B&R is extending the use of reACTION technology into the area of safety applications. This technology makes it possible for time-critical subprocesses to be executed directly in the I/O modules, which reduces response times by a factor of 100 or more. What's more, no expensive special hardware is needed to use reACTION technology, and programming is just as easy as it is for conventional control solutions.

Relief for controller and network

The reACTION module handles a portion of the processing, relieving both the controller and the network and in many cases allowing them to be scaled down without affecting response times. In most cases, the resulting savings more than outweigh the added cost of the reACTION modules.

Photo © B&R

Compact and dynamic

8LS motor series from B&R now even more powerful

B&R has completely revamped the 8LS series of motors and implemented numerous improvements in the process.

Photo © B&R

Motors from B&R's 8LS series have been completely revamped and are now more powerful than ever. A more compact housing, optimized design and additional sizes are only some of the features that make these motors even more attractive and universal.

Size 2 and 3 motors with the same technical data are now much more compact, guaranteeing maximum compatibility with a higher power density. Size 5 and 7 motors are available in additional lengths, thereby offering more flexibility in terms of dynamics and torque.

Safety included

8LS motors use new inductive encoders that deliver extremely precise data compared to previous encoders. In combination with the digital EnDat 2.2 interface, the most common safety functions can also be used with hybrid motor cables where the encoder and motor cables are grouped together, reducing wiring effort and costs. The most commonly used 8LS series motors are also available as preferred motors. For B&R customers, this means an unbeatable price/performance ratio and reduced delivery times. If necessary, these motors can be ready on short notice and dispatched using express delivery.

HMI

One-glance machine operation

Attractive design, intuitive navigation and state-of-the-art touch screen technology can make a machine both more valuable and easier to use. Weber certainly took this idea to heart when it developed its new user interface, Weber Power Control, and has been awarded for the accomplishment several times over. At its core, the HMI solution features a high-performance PC and operator panel from B&R.

Photo © iStock.

Weber's new HMI solution, Weber Power Control, has received several awards for its outstanding design.

Spacious, stylish and straight-to-the-point. That's the impression you get the first time you see Weber's new HMI solution. With its 18.5" diagonal, the display would offer plenty of space to cram in loads of information. Yet the designers deliberately chose a minimalist design in order to focus the operator's attention on the system's most significant parameters. They eliminated distractions – and all but the most essential lines of text – relying instead on large, self-explanatory graphical elements. At a glance, and from a distance, operators can quickly assess the status of the system's vital processes.

Hidden around the edges of the central dashboard are additional panes containing more detailed information and parameter settings. These panes can be viewed by tapping or swiping, so no important setting is more than a single touch away. By allowing users to customize the selection and arrangement of parameters and integrating help tools that provide assistance for diagnostics and troubleshooting, the developers of Weber Power Control were able to minimize the number of steps required to perform any given operation.

Managing complexity

"As an innovative company, we're constantly improving the performance of our solutions to match our users' needs," says Alexander Burk, manager of software and electronics development at Weber. "This inevitably makes the system more complex. But if we do our job right, the operator will never even notice – and can continue to work without distractions. With Weber Power Control, we relied on B&R hardware to create a clearly structured, intuitive user interface that accomplishes this like no other solution on the market."

The members of the Red Dot Design Award jury agreed with Burk's assessment and awarded the HMI solution with the coveted prize in the Communication Design category. Weber also received the iF Communication Design Award in 2014 and was nominated for the 2015 German Design Award.

The software structure was programmed using web technologies and also uses OPC UA as middleware. This allows it to be connected effortlessly to all types of machine and line control systems.

B&R delivers all-round performance

Considering the amount of thought and attention to detail that Weber put into designing its HMI software, the company was equally meticulous when it came to selecting a hardware platform to go along with it.

After looking intensively at what the market had to offer and evaluating solutions from a number of providers, B&R came through as the clear winner. "It was really the total package that convinced us," explains Burk. "Particular highlights included the performance of B&R's Industrial PC, their large portfolio of suitable multi-touch panels and the way B&R designs all of its hardware to be absolutely scalable."

Combined with a responsive software design, this scalability is what enables Weber to adapt its HMI solution to machines in a wide variety of market segments with minimal effort. The Weber group has already capitalized on this feature by adapting the new solution to machines built by its subsidiary TEXTOR.

Scalable in every way

Instead of the 18.5" displays used for Weber Power Control, TEXTOR machines use a 12" variant. Decisive for Weber was that the panels are available in 16:9 format and suitable for use in the food industry. To accommodate Weber's specifications, B&R custom-

Alexander Burk
Software/Electronics Development Manager, Weber Maschinenbau GmbH

"It was really the total package that convinced us. Particular highlights included the performance of B&R's Industrial PC, their large portfolio of suitable multi-touch panels and the way B&R designs all of its hardware to be absolutely scalable."

ized a Power Panel 900 with an IP69K-rated stainless steel housing that is free of dirt-collecting edges, easy to clean and meets the highest hygiene standards.

While Weber Power Control is designed for swing arm mounting and features a grip that allows the operator to position it as needed, the TEXTOR variant is designed to be mounted directly on the machine. B&R also overlaid the glass plate of the projected capacitive multi-touch screen with a shatter-proof membrane to meet food industry requirements.

Yet customizing its already extensive range of displays isn't the only way B&R makes managing machine options painless for its customers. The same level of scalability also exists when it comes to PC technology. "Since every B&R PC in a given generation or family uses the same chipset," says Burk, "you can swap out the hardware and still use the same software image."

Abundant computing power

Weber Power Control places heavy demands on computing performance with state-of-the-art HMI features such as gesture control. That's why Weber's engineers opted for an Automation PC 910 featuring a Core i7 processor. In spite of its unmatched performance, this robust cabinet-mounted industrial PC has no need for active cooling.

The new HMI solution was unveiled at IFFA 2013 in Frankfurt, and Weber plans to introduce it successively on all of its slicers and infeeders at all Weber group locations. The first step was made early in 2014 with the high-performance Slicer 906. "The positive feedback from customers has even motivated us to offer an upgrade version for systems already available on the market," Burk adds contentedly. ←

Weber Power Control gives machine operators a one-glance overview of vital process parameters. The interface owes its exceptional responsiveness to a powerful industrial PC from B&R's Automation PC 910 series equipped with a Core i7 processor.

The customized operator panel, based on a B&R Power Panel 900 with an IP69K rating, meets the most stringent hygienic requirements.

Commission robots quickly and easily

B&R expands mapp technology portfolio to include blocks for robot kinematics.

Robots can be commissioned much more quickly and easily with mapp technology.

B&R is expanding its already extensive mapp technology portfolio to include function blocks for all the most commonly used robot kinematic systems. Not only does this allow users to commission robots much more quickly, it also makes maintenance and diagnostics substantially easier. The new robotic functions in mapp include both serial and parallel robot kinematics, such as SCARA and delta robots. The user interface is based on familiar IEC 61131 programming methods. The robotic functions integrate seamlessly into the overall system, so there is no need for a dedicated robotics controller.

Configuring, not programming

The robot kinematics themselves are configured graphically in a convenient web interface. Programming in the conventional sense is not necessary. The mapp blocks can even handle manual operations such as jogging and point-to-point movement of the tool center point. Technicians can run diagnostics on the robot via the easy-to-use web interface. mapp technology consists of individually encapsulated blocks that streamline development of new software.

The blocks provide basic functionality and are configured graphically. Each mapp component retrieves the data it needs from other components using a client-server model. With mapp technology, development of application software is accelerated by an average of 67%.

Photo © B&R

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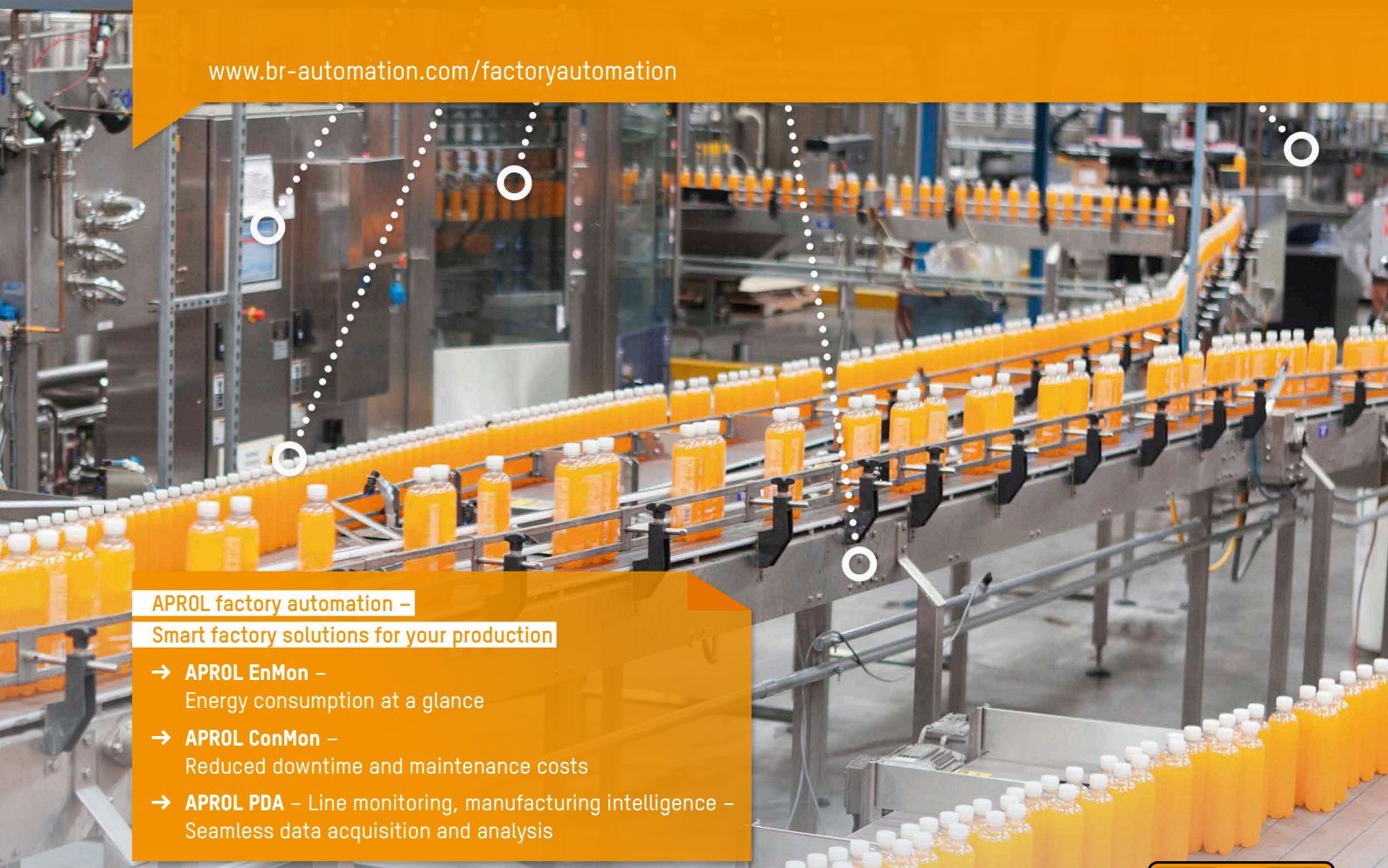

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