

automotion

09.16

The B&R Technology Magazine

Plastics 4.0

The future of the technology:
Fast, innovative and reliable

EUROMAP Out-of-the-box interfaces

Software Develop faster with mapp Technology

PERFECTION IN AUTOMATION
www.br-automation.com



editorial

publishing information

automotion:

The B&R technology magazine, Volume 16
www.br-automation.com/automotion

Media owner and publisher:

Bernecker + Rainer Industrie-Elektronik Ges.m.b.H.
B&R Strasse 1, 5142 Eggelsberg, Austria
Tel.: +43 (0) 7748/6586-0
automotion@br-automation.com

Managing Director: Hans Wimmer

Editorial staff: Alexandra Fabitsch

Editorial staff: Craig Potter

Authors in this edition: Huazhen Song, Raimund Ruf, Stefan Hensel, Michael Werner, Franz Joachim Rossmann, Caroline Turesson, Ercan Cansever, Patrick Bruder, Alexandra Fabitsch

Graphic design, layout & typesetting:

Linie 3, www.linie3.com

Printing: VVA Vorarlberger Verlagsanstalt GmbH, Dornbirn

Edition: 100,000

Published at: B&R Strasse 1
5142 Eggelsberg, Austria

Cover photo: shutterstock

All articles published in this magazine are protected by copyright. Translation, reproduction and duplication are prohibited without the expressed permission of the publisher. B&R assumes no liability for any errors they may contain.

Follow us



Dear Reader,

Players in the plastics industry have made big investments over the years to improve the efficiency of their machines. Switching to servo pumps, for example, has drastically reduced the energy consumption of injection presses.

As the IIoT and Industry 4.0 widen the focus from the individual machine to the entire production process, this trend will only continue. The more networked machinery becomes, the more data it generates that can be used to identify potential savings.

For the plastics industry, these requirements are nothing new. The development of EUROMAP interfaces demonstrated an early understanding that connectivity – both among machine components and with higher-level systems – is the way of the future.

B&R's instrumental role in these developments has earned it a reputation as an expert partner for the plastics industry. What solutions does B&R offer for the future of the industry? Read on to find out more about this and other exciting topics, including the latest EUROMAP developments and revolutionary new ways to accelerate software development.

And don't miss your chance to see us at K 2016 from October 19–26 (Hall 12, Booth B16). We look forward to seeing you there!

Happy reading!

Patrick Bruder
Global Technology Manager – Plastics

contents



→ technology

02 Complex software, simple programming

Plastics machinery OEMs invest a great deal of time in developing software. The modular software blocks comprising B&R's mapp Technology promise substantial savings.

→ interview

14 EUROMAP out of the box

Fully functional EUROMAP interfaces are easy to implement with mapp Technology.

→ report

06 Connect and conquer

The robotics experts at **WEMO** have found an automation partner who shares their vision for uniting complex technology with simple usability.

10 Getting in form for global competition

Together with B&R, **Woojin Plaimm** ensures that its injection presses stand out in terms of usability, visualization and human-machine interaction.

16 Fast, faster, fastest

The search for a more refined alternative to troublesome manual calibration processes led **TwinScrew** to B&R.

18 Quality, quick

To get to market in record time without sacrificing functionality, quality or performance, **MikroSAN** turned to B&R.

Faster development

Complex software, simple programming

Plastics machinery OEMs invest a great deal of time in developing software. The modular software blocks comprising B&R's mapp Technology promise substantial savings.



For plastics machinery to meet demands for ever greater flexibility, OEMs are having to invest more and more resources in the development of application software. One way to achieve substantial savings is the use of pre-coded software blocks. This modular approach leaves developers with more time to optimize the machine's main process.



Modern plastics machinery is capable of producing a variety of products without extensive mechanical changeover work. This is only possible because an increasing share of the functionality is being implemented in software form. Also, instead of separate software projects for each machine or series, a single software project can now simply be adjusted to the requirements of any given machine.

More flexibility

"More intensive use of software gives machines an enormous boost in flexibility," says Christoph Trappi, B&R's project manager for mapp Technology. At the same time, OEMs are confronted with a massive increase in the time and resources consumed by software development. And that's exactly where the concept of mapp's modular software blocks comes in.

"Software programmers spend a large portion of their time on basic functions, which – although essential – do not contribute to the machine's main process," says Trappi. These include things like recipe, alarm and user management systems, as well as audit trail functionality.

Automatic data exchange

For all these commonly recurring programming tasks, B&R offers modular software blocks that can be set up with a few clicks of the mouse. Known as mapp components, these pre-coded functions exchange data using mapp Links. The audit trail component, for example, automatically retrieves the information it needs from the user management component, without ever having to write a single line of code. These mapp functions simplify the creation of all types of machine software, allowing developers to concentrate on the machine's main process.

"With our specially developed mapp components for plastics machinery, the potential savings in this industry is even greater," says mapp project manager Michael Werner. "An injection molding machine is a perfect example."

An injection molding machine closes and opens its mold at least once each cycle. In a hydraulic machine, this movement is performed by a hydraulic cylinder. To control the position of the mold you need a position measurement system – in the case of a hydraulic axis, this is generally a potentiometer.



Christoph Trappi
Product Manager –
mapp Technology, B&R

"A vast array of software solutions for the plastics industry can be developed faster and easier using mapp Technology."

This sensor delivers an analog input signal that must be scaled, and then movement itself is controlled using two setpoint curves for speed and pressure. The values from these curves serve as the inputs for a pump or control valve.

Automation with minimal effort

"The code for this whole process can get pretty complex and time consuming," says Werner. "But mapp allows you to automate the task with minimal effort." One component handles the scaling of the input signal, while another uses predefined stages for speed, pressure and position to plot curves for the pressure and speed setpoints. Finally, a third component reads these curves and passes on the setpoints for the speed and pressure of the pump system.

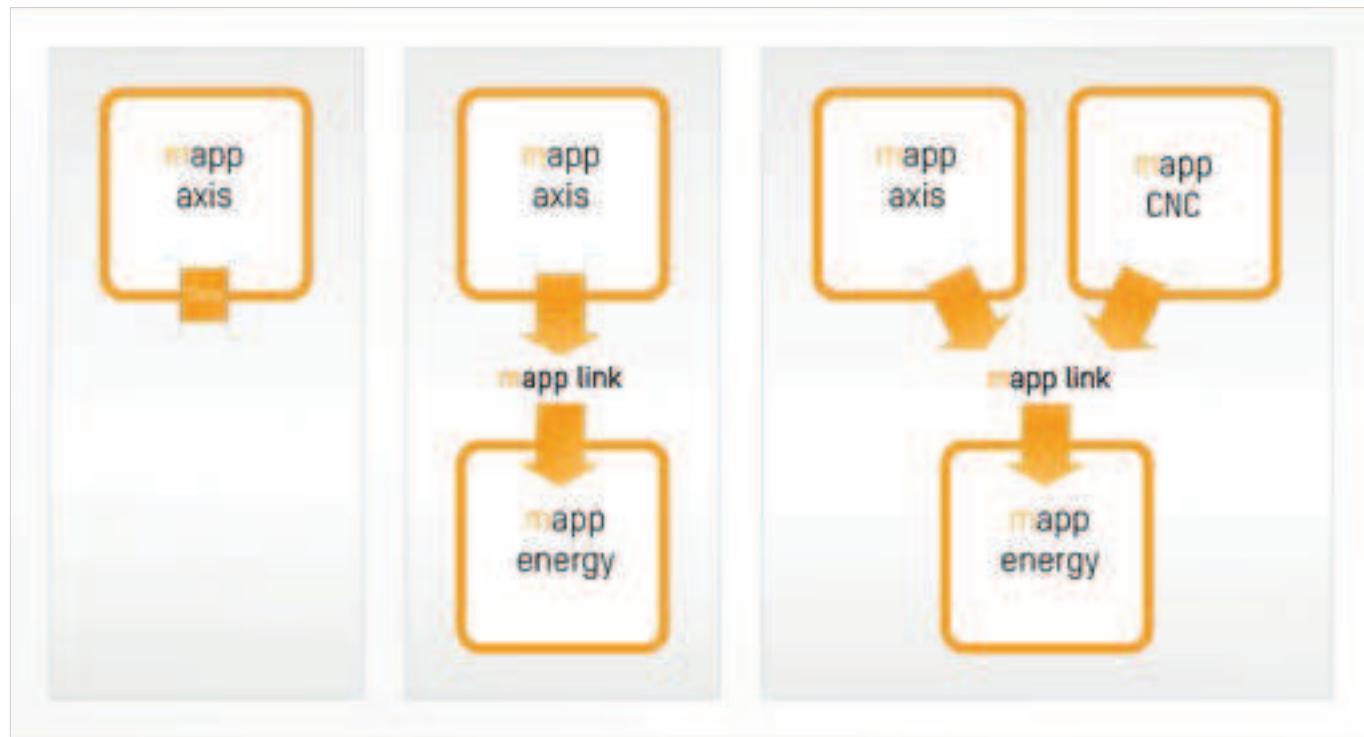
The setpoints can either be passed to the hydraulic system via analog outputs or handled by a servo pump driven by a B&R ACOPos

servo drive. "There's a mapp component for each of these tasks as well," says Werner. For machine variants with other requirements – a different type of hydraulic system, for example – the respective mapp components can easily be switched out.

Easy exchange

The modularity of mapp components allows any link in the chain to be swapped out by another component from the mapp portfolio at any time. If an encoder is used for position measurement instead of a potentiometer, you can simply replace the input scaling component without having to make changes throughout the rest of the application. OEMs can also replace any mapp component with code they've developed in-house whenever they want.

Numerous other standard functions of injection molding machines can be implemented in the same way: from the actuation of an ejector or the rotation of a plastification extruder to the movement



mapp components exchange data automatically using mapp Links.

of an injection unit or even the injection process itself. "Using mapp components allows the customer to implement their machines' unique processes more quickly and easily."

Easy sequence control

For each of these applications, there is a specialized mapp component able to plot the setpoint curve for pressure, speed and more. In the case of injection molding, this includes switching from a speed curve during injection to a pressure curve in the dwell pressure phase.

Yet, for a machine to function, you need more than just motion control. You also need logic to control, coordinate and monitor the sequence of its operations. "Many machine owners also want to be able to modify these sequences," explains Werner.

With its sequencer component, mapp has an easy answer for this as well. The sequencer allows you to put together custom sequences out of a prepared set of commands. Each step executes exactly one command, which itself can be configured. Joined together, the steps form a sequence that is then executed by the controller. The user can easily configure and parameterize the steps to create highly customized sequences quickly and reliably.

HMI included

The control component works together seamlessly with a corresponding UI widget that allows the user to create and configure sequences directly on the HMI panel. Working together, the widget and the control component provide an easy way to program a machine's sequences and visualize their execution. "Another standard requirement faced by plastics machinery OEMs is implementation of EUROMAP interfaces," notes Werner. Once again, there's a mapp component for that. "This is where you see one of mapp's biggest advantages," adds Christoph Trappl: "All ongoing development and maintenance of mapp components is handled by B&R." The impact this has on software maintenance costs is dramatic. "Not only that, but the OEM also doesn't have to worry about future updates to the EUROMAP standard. When the times comes, they can rest assured that we will update the respective mapp component."

Universally applicable

Injection presses aren't the only type of machine that can be developed a whole lot faster with mapp. A blow molding press, for instance, also needs a configurable sequence control solution. In these applications, the sequence can vary greatly from machine



Adding mapp components to your automation project is as easy as drag-and-drop.

to machine depending on what options are installed and what kind of item is being produced. With its freely programmable commands, the mapp sequence control solution is able to handle the requirements of any type of machine.

"And, of course, the task of generating a setpoint curve for a clamping unit or ejector is not limited to injection molding alone," emphasizes Werner. It could just as easily be used for the clamp or ejector on a blow molding machine. Standard requirements that are nevertheless machine specific - such as wall thickness control - can also be solved using mapp. ↪



Integrated robotics

Connect and conquer

BLs motors from B&R give WEMO robots the power, precision and complete integration they need for optimum performance.

Source: WEMO



How do you clear away the uncertainty surrounding an abstract concept like Industry 4.0 to reveal the real benefits to daily operation? This was the challenge facing the robotics specialists at WEMO Automation. Together with B&R, they proved how complex technology can provide ultimate simplicity and deliver the added value of transparent connectivity.



Standing on a small hill near the headquarters of WEMO Automation in the Småland province of southern Sweden – his gaze drifting from the field below to the lakes and vast forest beyond – a visitor from Spain once quipped: “Now I understand why you are such user-friendly software programmers here: there’s absolutely nothing to distract you!” Indeed, WEMO is situated far from the urban hub of Stockholm outside the town of Värnamo – an area long known for its impressive record of entrepreneurship and innovation.

These strengths were put to the test around the turn of the millenia. Having spent a decade refining the mechanics of its robotics solutions, WEMO found that increasing demands for productivity would require a more intense focus on digital production control. WEMO shifted its attention to topics that would come to be grouped under the concept of Industry 4.0. “For us, Industry 4.0 really never seemed like a fad or empty phrase,” explains Olof Ståhl, one of three brothers at the helm of the company. “We saw it as a continuation of what we had already been calling ‘smart automation’.”

The simplicity challenge

Some of WEMO’s customers had concerns about how such abstract concepts could be implemented in the field – and what economic and productivity gains they actually had to offer. WEMO realized that, to be successful, these new solutions would have to clear away the clouds of uncertainty to reveal the advantages on the horizon.

“It’s not about having to equip entire factory premises with wiring for unknown future uses,” explains Ståhl, “but rather about applying complex technology to make things simpler and faster and provide a more transparent overview.” For WEMO, the goal of making manufacturing equipment smarter and more communicative would therefore begin with the challenge of collecting data already being handled in various peripheral systems and integrating it in a central control system.



Olof Ståhl
Director, Technical Management,
WEMO Automation

"B&R was very receptive to what we saw as the future of the technology. They listened and responded, and that was crucial for us."



WEMO's Sven, Bengt and Olof Ståhl rely on B&R to achieve their goal of making manufacturing equipment smarter and more communicative.

The partnership prerequisite

Ståhl points to more intimate partnerships with both customers and suppliers as essential to achieving Industry 4.0 levels of efficiency and productivity. "As we shifted from production of robot mechanics to robot communication with increased attention to software," says Ståhl, "this focus on connectivity and partnership has become a pillar of our technological development."

By 2002, WEMO had identified B&R as the supplier that could provide the best controllers, I/O nodes and fieldbus solutions for its robotic systems. With a decade to go before the kickoff of Germany's Industrie 4.0 project, both WEMO and B&R were already working toward solutions for smart robotics and integrated systems. "B&R was very receptive to what we saw as the future of the technology," says Ståhl. "They listened and responded, and that was crucial for us."

In addition to sharing WEMO's vision, B&R offered a particularly attractive concept with a modular design that allows systems to be expanded step by step. Today, WEMO relies fully on B&R technology, with communication based on POWERLINK and openSAFETY, motion control utilizing advanced ACOPOS P3 servo technology, and Mobile Panels for hand-held operator control. A further advantage was their strong global presence at a time when WEMO itself was setting out to increase its exports.

Integrated communication

When B&R entered the picture, WEMO's robots were already sharing production data via I/O units. Linking peripheral equipment to a common data stream, however, remained a challenge. This task was approached through two technology concepts: WIAP 4.0, short for WEMO Integrated Automated Systems, and WIPS, WEMO Intuitive Programming System, where the machine architecture is based on hardware and software from B&R.

In 2015, WEMO faced a milestone challenge that would call upon all of its Industry 4.0 expertise. A customer requested a complex production installation, where a number of machine units were to be linked up in a single industrial information process. The task



WEMO's operator-friendly WIPS control system offers an intuitive user interface created using B&R's Automation Studio. With hardware based on B&R's Mobile Panel, these rugged hand-held units allow the operator to work wherever it is most convenient.

was to create a production cell where production orders from the ERP system would influence the movement patterns of several robots, as well as the mechanical setup, injection molding process, vibration infeed, milling machine and a camera unit.

Thanks to POWERLINK fieldbus communication, WEMO was able to integrate communication throughout the entire production cell, including its core element: the WEMO robot. WEMO was able to deliver higher productivity, smarter production and a successful project, all based on B&R equipment and software connecting the various equipment into a single information loop. Thanks to B&R's commitment to open communication, the various third-party units are all able to interact and be monitored, regardless of brand.

The practical gains have included shorter setup times, quicker changeover between jobs and secure failsafe operation setup. "The point was to connect systems that are already in operation into a common stream with the data that already exists," says Ståhl. "The data from multiple production units just had to be integrated and put to use."

A look to the future

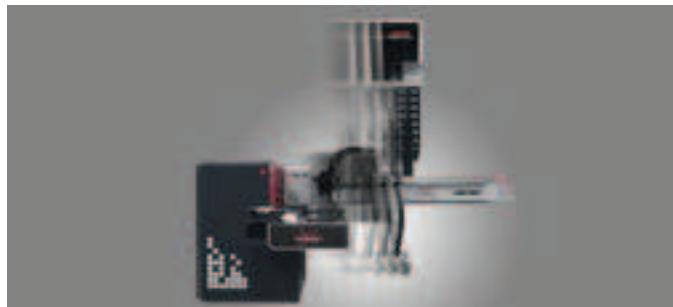
WEMO has undergone major transformations during its 30 years. New premises, a new technology focus, a Swedish-German company merger and establishment of a branch in India. On top of that, constant organic growth at the Swedish plant, where several hundred robots are sold and shipped each year.

So what are the main challenges for the years to come? According to Ståhl, one of the issues is adapting to a market with constant price competition. To him, this means never letting business rely on old technology.

The second challenge is what Ståhl calls connectivity transparency. With everyone talking about Industry 4.0, what he wants to do is show how it can be accomplished profitably on the factory floor and how complex technology can be used to make increased automation more simple. "Together with B&R, I think we have proven that these things are clearly possible." ↵



Thanks to POWERLINK fieldbus communication, WEMO was able to integrate communication throughout the entire production cell, including its core element: the WEMO robot.



WEMO takes advantage of B&R's ACOPOS P3 servo drives to achieve faster, more accurate and more precise positioning.



With its goal of making complex technology easy to use, WEMO found just what it was looking for in B&R's versatile and scalable X20 I/O and control system.

Getting in form for global competition





Injection molding is a hotly contested market. With hundreds of manufacturers delivering around 100,000 injection presses each year, the success of a machine relies heavily on differentiation through technological features. But Woojin Plaimm hasn't stopped there. Together with B&R, the injection molding specialist is ensuring that its DL and TE series also stand out in terms of usability, visualization and human-machine interaction.



Watering cans, toothbrushes, the dashboards of our cars – so many of the plastic products that shape our lives are themselves shaped by injection molding. In an injection molding machine, plastic granulate is melted and injected into a mold. Once it has cooled and hardened, the part can then be removed from the machine. Injection molding machines must meet a diverse set of requirements. Among them is the fact that the quality of the results depends heavily on the speed with which the material is injected. Repeat precision is also absolutely essential. In addition to the technical requirements, aspects such as energy efficiency, ease of operation and machine footprint also play an important role.

Close cooperation with B&R

Founded in 1985, Woojin Plaimm is Korea's largest manufacturer of injection molding machines, producing up to 2,700 each year. Woojin is exceptionally vertically integrated – from the casting and machining of the molds to the final assembly of the machine.

Long represented primarily in Asia, in recent years the company has redirected its international strategy to target the markets in North and South America and Europe. In the fall of 2014, Woojin opened a new 70,000-square-meter plant in Korea with an annual production volume of 6,500 machines.

Two years ago, the company also opened an R&D center in Leobersdorf, Austria. With the addition of this European location, systems engineering requirements – such as industrial control and IT systems and the acquisition and processing of production data – have moved into the foreground. In order to ensure optimal integration of European standards into the company's technology, the location in Austria has been expanded into a full-fledged European headquarters with its own sales and service center.

Woojin relies on B&R for complete solutions

The cooperation between Woojin and B&R began in Korea in 2008 with the all-electric TE series. The companies also collaborated on development of Woojin's hydraulic toggle-clamping TH series – followed by the TH-S variant.

The first big project implemented in Leobersdorf was a redesign of the DL series, a two-platen machine for high clamping-force requirements. "With its complete solutions, B&R is our preferred partner," says Dietmar L. Morwitzer, CEO of Woojin Plaimm's European headquarters. "B&R control systems have always been highly advanced, including technology specific to plastics and injection molding. With solutions that are state-of-the-art even by the highest European standards, we're able to



Dietmar L. Morwitzer
CEO, Woojin Plaimm, European
Headquarters

"With its complete solutions, B&R is our preferred partner. Their control systems have always been highly advanced, including technology

specific to plastics and injection molding. With solutions that are state-of-the-art even by the highest European standards, we're able to reach a whole new range of customers and compete with the top players on the international market."



The web-based HMI application was created using B&R's mapp View and the OPC UA communication protocol. (Source: Woojin Plaimm)

reach a whole new range of customers and compete with the top players on the international market."

Clear and intuitive HMI with mapp View

Current development efforts are aimed at updating Woojin's all-electric TE series and hydraulic DL series - both of which already feature complete B&R solutions. In addition to technological upgrades, the particular emphasis here is on usability and web-based HMI.

Machine operators are often overwhelmed by highly complex HMI applications. The solution therefore aims to implement a visual-based system that is much easier to use than a text-based one. At the same time, it should make data much easier to interpret and process than was possible with earlier solutions. The requirements for B&R were clear: The new HMI solution would need to be simple, straightforward and readily interpretable.

Setting the right course with OPC UA and web-based HMI

"We knew from the beginning that we'd be developing an entirely new HMI application with B&R. With the OPC UA communication protocol and B&R's new web-based HMI solution, I'm confident that we've set the right course for at least the next 20 years," says Richard Wagner, Woojin's R&D manager.

The web-based HMI application was created using B&R's mapp View. "Prior to mapp View, the HMI application was confusing to navigate, and customers often had to get out the user's manual to look up the meaning of certain values. We had decided internally that we wanted a new, web-based HMI solution - and then found out that B&R was already working on one. The timing worked out perfectly for us," says Wagner. Woojin is currently using mapp View to revise its alarm system. This is particularly important to customers because it helps them get the machine back up and running quickly.

New drive system: ACOPOSmulti

The DL-A5 650, a hydraulic two-platen machine with 650 tons of clamping force, has a dry cycle time of under three seconds. The



The servo pump that comes standard on the DL-series helps lower energy consumption because it is only needed for movement along the machine axis. The machines are available with a clamping force ranging from 550 to 3,300 tons.

servo pump that comes standard on the DL-series helps lower energy consumption because it is only needed for movement along the machine axis. The machines are available with a clamping force ranging from 550 to 3,300 tons. The new mechanical design places the hydraulic reservoirs near the cylinder for high-speed injection, while the pumps are positioned near the oil tank and left easily accessible for maintenance. Numerous other details were also optimized to increase accessibility for operators and service technicians.

The TE series was designed with a focus on performance. This includes executing movements in parallel – a clear advantage of all-electric machines. TE machines use an ACOPOSmulti servo drive, whose compact construction helps minimize the machine footprint. In addition to automotive parts, these machines are also used to produce components for medical devices and consumer electronics.

B&R Automation Studio for integrated diagnostics

B&R Automation Studio provides an integrated development environment, which Woojin uses for everything from machine and motion control to communication and HMI. This saves not only time,



Automation Studio: the ultimate diagnostics tool

B&R Automation Studio provides an integrated development environment, which Woojin uses for everything from machine and motion control to communication and HMI. This saves not only time, but maintenance costs as well. Woojin uses Automation Studio as a universal tool for measurement, programming and diagnostics.

but maintenance costs as well. "B&R's Automation Studio is the perfect tool for measurement, programming and diagnostics, offering enormous advantages in terms of time savings. To use a competitor's product – where the web-based HMI application would have to be developed outside of Automation Studio – would have added a considerable amount of overhead," explains Wagner.

With Woojin's increasingly international operations, it has also become necessary to handle certain service and diagnostics tasks either directly on the machine or remotely via the Internet. "This has enabled us to retrieve and exchange data much more quickly and easily. That's one of the biggest highlights of the new controller," reports Morwitzer.

In the starting blocks: 100% safety for human-machine interaction

Following the K 2016 exhibition, Woojin will once again be turning to B&R – this time for safety. The first project will begin with the company's VH series of vertical injection presses, which feature numerous light curtains. On a vertical machine, the operator typically places parts into the machine manually, so there is direct human-machine interaction. Compared to a machine with an automatic cycle, this makes it particularly crucial that there is safety technology in place to protect the operator. ↵



Richard Wagner
R&D Manager, Woojin Plaimm,
European Headquarters

"B&R's Automation Studio is the perfect tool for measurement, programming and diagnostics, offering enormous advantages in terms of time savings. To use a competitor's product – where the web-based HMI application would have to be developed outside of Automation Studio – would have added a considerable amount of overhead and other difficulties"

EUROMAP out of the box

EUROMAP recommendations have helped establish the plastics industry as a pioneer in the implementation of standardized interfaces for multi-vendor machinery and equipment. Patrick Bruder and Christoph Trappl from B&R explain how the vendor-independent communication standard is now getting a performance boost for IoT and I4.0 solutions – with OPC UA.



Patrick, a number of EUROMAP recommendations are currently under revision. Are the existing ones no longer sufficient?

Bruder: Production processes in the plastics industry are being improved all the time, so there are always new requirements popping up for the hardware and software as well as for communication between the various components. That's why the various EUROMAP working groups are currently updating some of the recommendations.

Which recommendations are affected?

Bruder: A lot of the focus is currently on two interfaces: One is EUROMAP 77, which deals with communication between injec-

tion molding machines and manufacturing execution systems. The other is EUROMAP 79, which defines the interface between injection molding machines and handling machines or robots.

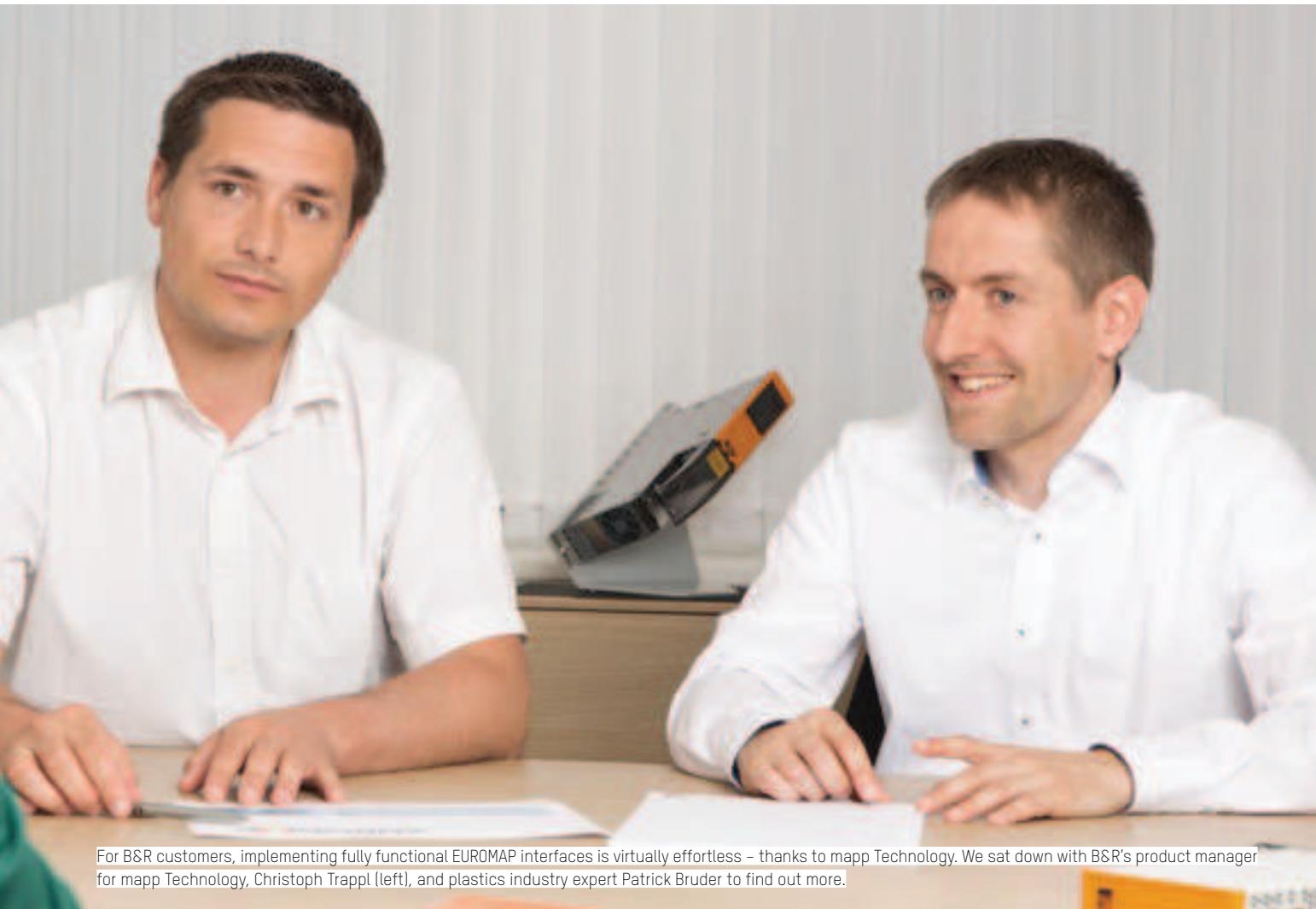
Are there any parallels between these two interfaces?

Bruder: Absolutely: both of them are based on OPC UA. The working groups quickly agreed that this vendor-independent standard would be a perfect fit for both applications – despite the stark differences in their communication requirements. We are convinced that OPC UA will be the go-to standard for the networked factories of the

future, so it was only logical for us to use it as the basis for the new EUROMAP recommendations.

Can OPC UA handle the time-critical communication between an injection molding machine and associated robots?

Bruder: It can. When combined with Time Sensitive Networking (TSN) that's no problem at all. Even in its early stages, the TSN Testbed has achieved remarkable cycle times with OPC UA TSN. In addition to B&R, other participants in the testbed include National Instruments, Cisco, Kuka, TTTech and Intel. The TSN Testbed was initiated by the Industrial Internet Consortium (IIC), of



For B&R customers, implementing fully functional EUROMAP interfaces is virtually effortless – thanks to mapp Technology. We sat down with B&R's product manager for mapp Technology, Christoph Trappi (left), and plastics industry expert Patrick Bruder to find out more.

which B&R is also a member. TSN technology enables deterministic real-time communication. With OPC UA TSN, injection molded parts can be extracted with levels of speed and precision that would have been unthinkable with the earlier EUROMAP interface.

Christoph, why is it that B&R – an automation technology company – is so actively involved in the development of interfaces for the plastics industry? Wouldn't that normally be more of a job for your customers?

Christoph Trappi: That's exactly the point: Our customers – manufacturers of plastics machinery – need to deliver machines that

comply with the EUROMAP recommendations. Otherwise, they'll have problems with market acceptance. That's why we've gone ahead and integrated the most widely used EUROMAP interfaces right into our system.

What does that mean, exactly?

Trappi: Well, for example, we offer mapp components for the interfaces. You just drag-and-drop these modular, pre-coded software blocks into the automation project and they're ready to go. All our customers have to do is set a few parameters and they've got a fully functional EUROMAP interface. That's exactly what we strive for

as a provider of automation solutions. We take the low-level programming tasks for basic functions off our customers' hands. This frees them up to focus on what they do best, which is translating their process-specific expertise into an optimally functioning machine.

So what happens, when – as is the case here – these interfaces get redefined?

Trappi: Even then, our customers can rest easy knowing that B&R will handle the implementation of a reliable new interface. We generally support all of the most widely used EUROMAP recommendations, including EUROMAP 27. ↵



Extrusion

Fast, faster, fastest

For extrusion pioneer TwinScrew, manual calibrations have been a notorious source of difficulties. Achieving the fine balance between the speed of the main extrusion head and the other systems was time consuming and required an experienced technician on site. TwinScrew began looking around for a more refined solution – and found it at B&R.



Customers' extrusion requirements change frequently. Different sets of requirements demand different machine configurations and different process parameters. It's an all too familiar challenge for extruder manufacturer TwinScrew. Their machines must therefore be especially adaptable to give users the flexibility they need to meet their production goals.

Perfect temperature control with Automation Studio

B&R's X20 controller and the temperature control functions integrated in the B&R automation studio development environment offer an optimal solution for the multi-zone temperature control processes in an extruder. Precise temperature control makes it possible to quickly compensate for disturbances without overshooting. The temperature control modules provide interfaces for trends, alarms and protocols for easy integration into the system. Library func-

tions simplify and accelerate the process of implementing new extruder requirements.

Perfect synchronization with POWERLINK

POWERLINK plays a decisive role when it comes to networking plant systems – providing, among other things, automatic configuration of automation components. When there are process changes on the machine, POWERLINK allows operators to reconfigure the parameters quickly and easily for maximum flexibility and minimum downtime.

Integrated development platform

Automation Studio provides a universal platform for all the most important development tasks. TwinScrew used Automation Studio to optimize the efficiency of its development process. From writing the machine and motion control logic to configuring the process and managing recipes – B&R offered state-of-the-art development for TwinScrew's state-of-the-art machines.

By enabling the machines to react quickly and flexibly to changing requirements, it also makes them more competitive.

Remote maintenance and diagnostics with B&R

Since TwinScrew sells its machines all over the world, remote maintenance and diagnostics capabilities are among the most important requirements. Efficient remote diagnostics lower maintenance costs dramatically. Based on an open platform, a web server and VNC server can be embedded in the X20 controller. The status of the machine, I/Os and motion control technology can be diagnosed quickly and systematically from a PC, tablet or smartphone with a standard web browser. All software can also be updated via the FTP server.

Advancing machinery into the future

In the course of development, TwinScrew engineers were able to rapidly turn their ideas for the extruder into working solutions. The existing weighing system, for example, has been integrated in other machines. But TwinScrew's ambitious goals don't end there. Other plans include implementation of EUROMAP functions to meet the most demanding customer requirements for extruder control and make TwinScrew more competitive on the European market. The B&R system offers all the software libraries they will need for this. ↵

Mercedes Su

Sales Representative, TwinScrew

"Our cooperation with B&R has put us on the right path going forward. The integration of software functions on a hardware platform allows us to not only expand the functionality of our machines, but also to reduce costs and fully integrate the machines into an overall production system. We are happy to be collaborating with an innovative partner like B&R."



Extrusion blow molding

Quality, quick

A reduction in time to market typically requires trade-offs – less time for innovative new features, less time for testing. Planning to introduce the first line of all-electric extrusion blow molding machines to its market, Turkish extruder specialist Mikrosan turned to B&R to ensure that accelerated development wouldn't come at the cost of quality or performance.





Injection blow molding machine automated by B&R and mapp Technology.



An extruder requires particularly efficient energy management to operate profitably. Mikrosan achieved exceptionally low energy consumption using ACOPOS-multi servo technology featuring active power regeneration.



A rapidly growing share of new machine functionality comes in the form of software, and demands for flexibility and performance are increasing every day. At the same time, the squeeze of time-to-market pressure threatens the performance and quality of the machine, not to mention the budget.

"We invest a considerable amount of time and resources in developing and maintaining our software," reports Mikrosan's electrical engineering manager, Erkan Akkortal. "Each new machine should



Naci Sönmez
Founder of Mikrosan

"Together with our strong and dedicated technical team, our cooperation with B&R has perfectly served our mission of bringing cutting-edge technology to our customers in a fast and reliable way."

outperform the previous generation while at the same time maintaining its quality-tested functions – that's quite a challenge."

When Mikrosan decided to introduce its first all-electric extrusion blow molding machine, the company knew that getting it to market as quickly as possible would be essential to its success. The question was therefore how to achieve this goal without compromising quality.

Fast development, reliable quality

The answer came from B&R, whose modular application development solution – mapp Technology – provided proven and reliable pre-coded software blocks for tasks such as motion control, recipe management, audit trail, file management and more. "The benefits of mapp Technology played a central role in our decision to go with B&R," recalls Akkortal. "It allowed us to future-proof the application software and shorten our time to market without sacrificing quality."

With mapp providing the basic functionality of its new software architecture, Mikrosan was able to leverage B&R's thorough field



With the machine's standard functions covered by B&R's mapp Technology, Mikrosan was able to implement advanced processing functionality while still completing development in half the time.



Erkan Akkortal
Electrical Engineering Manager, Mikrosan

"Not only were we able to have the new machine ready in about half the time we've achieved in the past, we had the time and resources to optimize the user interface for advanced status handling."

testing and ongoing maintenance for consistently reliable quality and reduced investment risk. "With fewer resources tied up performing repetitive low-level development tasks and maintaining existing solutions," continues Akkortal, "our developers are free to focus on implementing and optimizing machine-specific functions, such as sequence handling, which is what matters most in this type of machine." After all, it is the high-level features like this that differentiate Mikrosan's machines on the market.

Ultimately, Mikrosan was able to have the new machine ready in about half the time that would usually be required. Not only that, but they even had the time and resources to optimize the user interface for advanced status handling.

Extreme energy efficiency with ACOPOSmulti

With mapp Technology ensuring efficient use of engineering resources, the next challenge was to ensure that the machine makes efficient use of its energy resources. After all, the carriage translations and clamping units on an extruder have large masses and require particularly efficient and intelligent energy management in

order to operate profitably. Mikrosan's new machines offer exceptionally low energy consumption thanks to B&R's ACOPOSmulti servo technology featuring active power regeneration, a 750 VDC common DC bus and large capacitors. This efficiency can be monitored online with the help of a PLCopen power meter function block.

The advantages of using servo motors in extrusion blow molding machines are no doubt the speed, energy efficiency and quiet operation. By using B&R's state-of-the-art drive technology Mikrosan ensured that these advantages are maximized, while the drives' small footprint complements the mechanical design of the machine itself.

B&R: The reliable and dynamic partner

This highly successful partnership dates back to 2006, and Mikrosan already equips its extruder, coex, puller, saw, and more with B&R solutions. "Together with our strong and dedicated technical team, our cooperation with B&R has perfectly served our mission of bringing cutting-edge technology to our customers in a fast and reliable way," concludes Naci Sönmez, founder of Mikrosan. 