



Innovations 2020

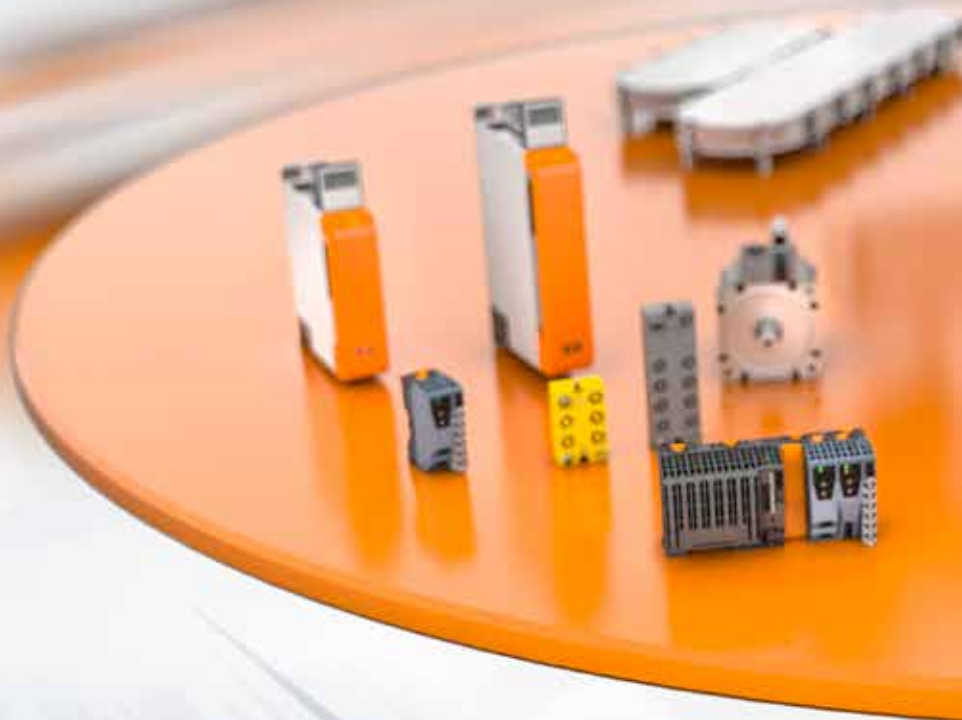
PERFECTION IN AUTOMATION
A MEMBER OF THE ABB GROUP



Table of contents

Integrated robotics.....	04
Machine vision.....	16
Industrial communication.....	30
Industrial IoT.....	40
Track technology.....	46
Motion control.....	60
Control technology.....	76
PC and panel systems.....	84
Software.....	98
Safety technology.....	110
Mobile automation.....	116
Process and factory automation.....	126

Integrated robotics





Robot and machine become one

B&R now offers ABB robots as an integral part of its automation system. Customers benefit from unprecedented precision in synchronization between robotics and machine control.

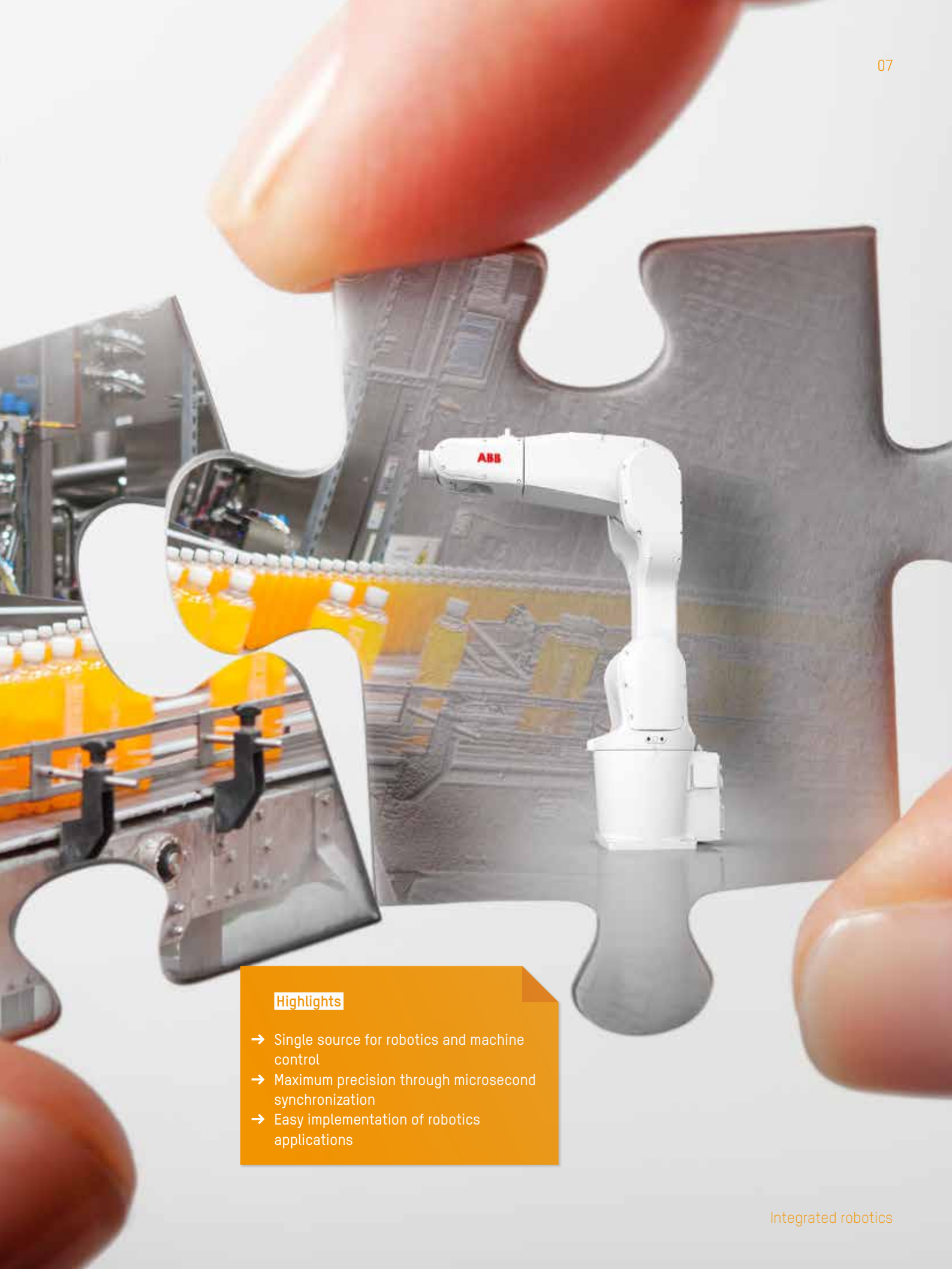
OEMs will be able to draw robotics and automation from a single source and need only one controller and one engineering system for development, diagnostics and maintenance. This lowers the threshold for those looking to implement robotics.

The ABB robots are programmed in B&R's universal engineering environment just like all other automation components. The robotics controller is an integral part of the machine control application. This merging of the two systems allows movements to be synchronized with microsecond precision.

Easy application development

B&R provides numerous functions that simplify creation of robotics applications. With the ready-made software components of mapp Technology, developers are able to quickly set up and configure the machine application, including robotics – without needing any knowledge of special robotics languages. Even safe robotics applications are easy and straightforward to implement.





Highlights

- Single source for robotics and machine control
- Maximum precision through microsecond synchronization
- Easy implementation of robotics applications

Extensive robotics portfolio

B&R customers will be able to choose from up to 40 different ABB robots. These include articulated arm, SCARA, delta and palletizer robots in various sizes and with various payloads.

From smaller models with a four-kilogram payload and a half-meter reach, to large palletizer robots that move payloads of up to 250 kilograms around a three-meter radius.

ABB has installed over 300,000 robots worldwide, and B&R customers are now able to profit directly from this extensive know-how.

Highlights

- Large selection of robot types
- Scalable size and payload capacity
- Proven ABB mechanics


Robot type

	Reach	Payload
6-axis robot	0.475 - 3.2 m	4 - 300 kg
Palletizer robot	3.15 m	180 - 250 kg
Delta robot	0.8 - 1.6 m	1 - 8 kg
SCARA robot	0.45 - 0.65 m	3 kg

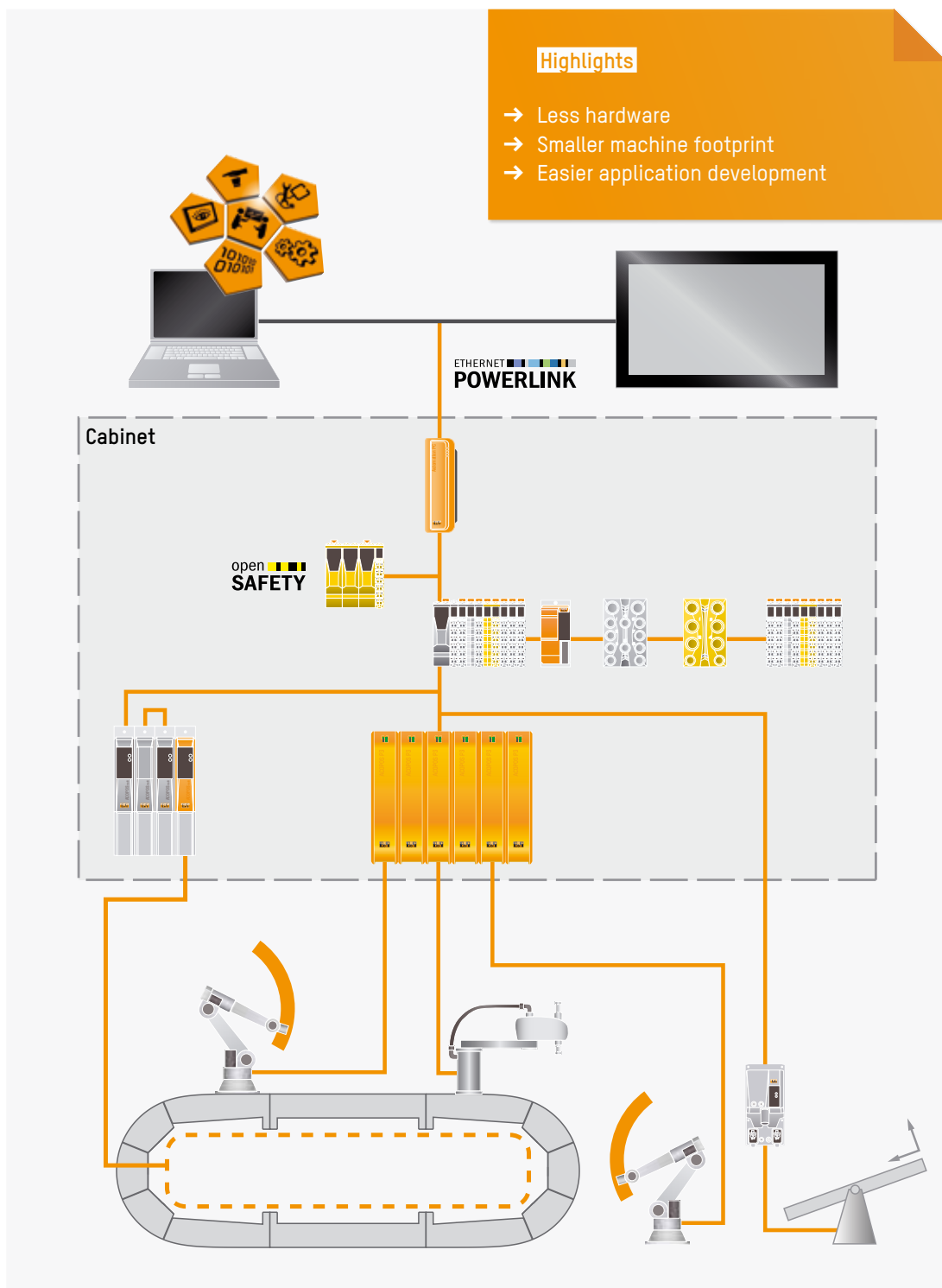
Full integration, zero compromises



Robots, intelligent track systems and other automation components can be synchronized with microsecond precision.

The ABB robots are programmed in B&R's universal engineering environment just like all other automation components. The robotics controller is an integral part of the machine control application. For machine developers, it makes no difference whether they have to integrate a single motion control axis or an entire robot into the machine. The tools, the engineering environment and the B&R contact person are always the same.

Since the robot no longer requires a dedicated controller, all interfaces between the machine and the robot are eliminated. The movements of the robot and all of the machine's motion control axes can be synchronized with microsecond precision. Thanks to the integration, the robotics no longer require a separate control cabinet and operator panel. Hardware costs, development overhead and machine footprint all shrink dramatically.



Like all other automation components, the ABB robots are fully integrated in the B&R system.

High precision

Complete integration of robotics and automation allows for unprecedented precision in the synchronization between ABB robots and other machine components. This becomes possible when you no longer need to use separate hardware, separate communication networks and separate applications. The fact that all axes and sensors communicate on a common network increases precision to the previously unimaginable microsecond range.

A workpiece on a workpiece table, for example, used to be positioned and come to a complete stop before being machined by a robot. Now, the machining can take place while both table and robot are in motion. The machine application automatically calculates optimized motion profiles that significantly reduce the overall processing time. Productivity goes up.

The same principle also applies when you combine an ABB robot with a track system like ACOPOStrak. The robot can process a workpiece while it moves at high speed along the track. The track becomes simply an additional axis that is included in the calculation of the motion profile.

Highlights

- Greater precision
- Higher output
- Increased productivity

Synchronization with sensors

Synchronization between sensors and robot motion also becomes easier. The result of a quality inspection with a B&R vision camera can be converted into a control command for the ABB robot in less than a millisecond. Defective workpieces can be removed from the line without any manual intervention or slowing down the manufacturing process. This approach significantly increases the machine's output.

Integrated simulation

Of course, the comprehensive simulation options available in the B&R system are available for the robotics as well. With a digital twin, the user can simulate and optimize all of the machine's motion sequences, including the robotics, before the it is even built. Development becomes both faster and cheaper.



Synchronization between sensors, robots and other motion control axes with microsecond precision can significantly boost a machine's productivity.

Robotics application in just a few clicks



Robotics applications can be created without any knowledge of specific robotics languages. The user has access to all the familiar machine programming languages like Ladder Diagram, Structured Text and C/C++.

B&R provides pre-configured software modules that make robotics functions even more accessible and robotics applications even easier to create. B&R's mapp Robotics includes standard functions for control and commissioning as well as advanced functions such as feed-forward control, compressor and workspace monitoring. The user can implement complex and highly dynamic applications without having to write countless lines of code. They don't need any knowledge of specific robotics languages.

Seamless links between mapp Robotics and other mapp components like those for user management, alarms and web-based HMI help to shorten development times dramatically. Even safe robotics applications are easy and straightforward to implement.

Highlights

- No specialist knowledge required
- Ready-made software components
- Familiar development environment



BSR offers an array of ready-made software components for creating robotics applications that don't require any knowledge of special robotics programming languages.

Machine vision





The eye of the machine

B&R has developed a machine vision solution from the ground up as an integral element of its control system. Vision applications can now be implemented faster and at lower cost. For the first time ever, control technology and machine vision come from a single source and no third-party components are required.

The vision solution consists of a lighting system, cameras and intelligent image processing algorithms. Lighting elements are available integrated in the camera or as an external device and are synchronized with image capture. This ensures that even rapidly moving objects are perfectly illuminated with maximum precision and strobe intensity. With the strobe controller integrated directly into the lights, no additional hardware is required.

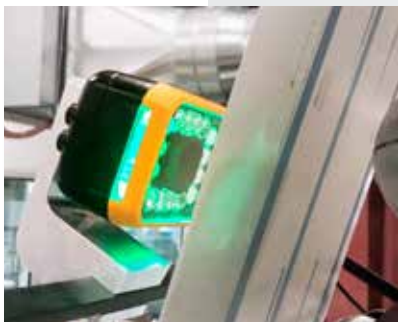
The unprecedented depth of integration opens up new possibilities that go far beyond quality

inspection. Information from the vision system can be fed into control loops in real time to provide advanced machine control. The camera is synchronized with axis movements with micro-second precision.

Integrated into the machine network via an M12 hybrid connector, which also supplies the necessary 24 VDC power, all hardware components require only a single cable. A second hybrid connection enables daisy-chain cabling with other vision components.

Highlights

- Increased productivity
- Shorter development time
- Lower costs
- Synchronization with μ s precision



Pilot application – Registration mark detection

Task	Detect small, freely positioned registration marks (up to 1 mm)
Technical data	13 μ s exposure Many exposure colors, can be changed at runtime
Advantage	Reliable detection, even with low-contrast print colors Cost savings through reduction of materials and waste
Made possible by	Complete integration of the camera in the control system



Pilot application – Product tracking

Task	Read data matrix codes on fast-moving metallic parts
Technical data	Product speed 56 m/s (202 km/h) Reflective surfaces
Advantage	Reliable reading at high speeds Integrate into automation system and put into operation in a few hours
Made possible by	Powerful lighting and tight synchronization



Pilot application – Labeling machine

Task	Position label based on bottle seam or embossing
Technical data	Rotation: 450 rpm Throughput: 180 bottles per minute
Advantage	Easy configuration of optimal imaging angle Good contrast for fast detection
Made possible by	Switch between area and line-sensor mode on the fly

The perfect camera for every application

B&R offers a comprehensive portfolio of cameras and vision sensors. The extensive selection of image sensors, lenses and software functions, B&R covers the vast majority of machine vision applications.

Customers choose exactly the apertures, power levels, image sensors and flash LEDs that fit their needs. All camera types feature multi-core processors and integrated FPGA image preprocessing. This enables sophisticated functions such as text recognition based on AI and deep learning algorithms.

Line-scan camera

The image sensors are available with resolutions from 1.3 to 5 megapixels. The 1.3-megapixel sensor can also be operated as a line-scan camera with very flexible configuration options. The line width can be configured freely – up to the entire width of the image sensor. This can be particularly helpful with long products that can't be captured with a single image.

Since the camera, lighting and motion control are all elements of the same control system, the process can be synchronized with micrometer precision without any external encoders. This of course also applies in the case of bottles and other rotating products. The products can move very quickly without any negative effect on image quality.

B&R's image processing functions are available for all of the camera variants. A Smart Sensor can be used to implement a single vision function, while a more powerful Smart Camera permits multiple functions simultaneously. This lets you do things like read a code printed on the product while at the same time measuring its length and orientation.

Smart Sensor

- For single task (read, measure, locate, etc.)
- Function defined freely in project, not by selected camera type
- Simple configuration replaces complex programming

Smart Camera

- Simultaneous use of multiple functions
- Easy graphical links between functions
- Switch from a Smart Sensor with no parameter changes

Highlights

- Complete portfolio of cameras, lighting and software
- Custom configuration
- Integrated FPGA image preprocessing

Lens	Image sensor	Camera type	Processor	LEDs
4.6 mm	1.3 megapixels / 90 fps	Smart Sensor	Dual core	Blue
6 mm	1.3 megapixels / 165 fps Line-scan sensor possible	Smart Camera	Quad core	Red
8 mm	3.1 megapixels			UV
12 mm	5 megapixels			IR
12 mm macro				White
16 mm				Red, Green, Blue, Lime
25 mm				White, Red, IR, Blue

Interfaces

2x M12 hybrid connection,
each with POWERLINK and
24 VDC
1 DI, 1 DO

Front cover

- Polarized with broadband AR coating
- Polarizing filter
- Diffuser
- Glass or plastic



Pilot application – Sheet metal forming

Task	Final product quality inspection
Technical data	Capture products up to 1.2 meters in length Resolution <math><300\ \mu\text{m}</math>
Advantage	High resolution and flexible changeover through integrated recipe management
Made possible by	1280 x 4096 pixel resolution in line-scan mode

**Pilot application – Production of personal care products**

Task	Detection of print features to control register and cutting
Technical data	Product speed >8 m/s Cycle time 16.1 ms
Advantage	Fast production cycles Fast and easy implementation
Made possible by	Microsecond synchronization and fast FPGA image preprocessing

**Pilot application – Product tracking**

Task	Read ID (barcode or QR code) under challenging conditions
Technical data	Damaged/dirty product ID Partially wet surfaces or mist
Advantage	Reliable code reading (1D and 2D) without external lighting Integrate into automation system and put into operation in a few hours
Made possible by	Homogeneous lighting and robust algorithms





The perfect lens
for every situation



B&R's Smart Camera and Smart Sensor are now available with a C mount – the industry standard for interchangeable lenses. They can be used with specially designed B&R lenses or third-party lenses – for example when applications require a telecentric lens.

Along with the new cameras, B&R is introducing five C-mount lenses. They cover a focal length range from 12 to 50 mm and are specially optimized for the image sensors used to achieve maximum resolution and detail contrast.

Special IP67 covers are available for the camera that ensure a tightly sealed housing without detracting from the imaging performance.

Highlights

- Suitable for telecentric lenses
- Specially designed lenses
- High imaging quality

The perfect lighting for every capture

B&R has developed a comprehensive lighting system for its vision solution. Lighting control is synchronized with the automation system in the sub- μ s range.

The selection of flexible light bars, ringlights, backlights and camera-integrated lights ensure optimum results even in difficult lighting situations. Each light has an integrated strobe controller, so no external hardware is required. The controller ensures a precise pulse current supply to the powerful LEDs. This enables light pulses of at least one microsecond duration at maximum intensity.

Consistent high performance

The flexible light bars are available individually or arranged as ring lights in groups of four, six or eight. The backlights are available in six sizes. Each light can feature up to four different LED colors at a time, and the lighting color can be selected during operation – from white and various visible colors to infrared and ultraviolet. This makes it possible to achieve just the right contrast, color, illumination and intensity for any application.

Immune to extraneous light

The advantages of high-performance lighting are

not only that it allows fast exposure of rapidly moving objects, but also that it minimizes sensor noise and virtually eliminates the influence of extraneous light – an often underestimated source of errors. Suppression of extraneous light is a crucial factor in the quality of inspection and measurement results, as well as for ensuring that machines perform reliably regardless of where they are installed.

Runtime flexibility

Many machine vision applications require very precise alignment of the light source to achieve good results. That's why B&R equipped its light bars with electronic angle adjustment from -40° to $+90^\circ$. When producing multiple products on the same machine, the lighting angle can be automatically and reliably optimized for each batch.

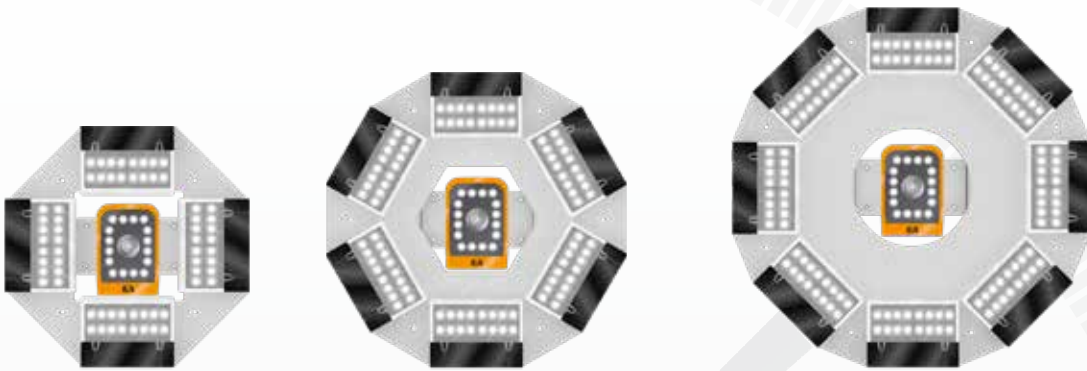
Highlights

- Lighting control with μ s precision
- Immune to extraneous light
- Automatic adaptation to every situation
- Integrated diagnostics

LEDs	Light variants	Protection class	Backlight cover	Light bar cover
Blue	Backlight	IP54	Plastic diffuser	Glass without AR coating
Red	Light bar	IP67	Plastic with telecentric filter	
UV	Ringlight			
IR				
White				
Red, Green, Blue, Lime				
White, Red, IR, Blue				



Ringlights



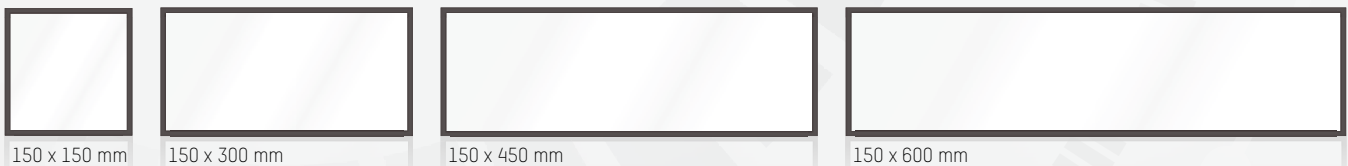
Ringlights are comprised of either four, six or eight barlights, and provide exceptionally homogeneous illumination.

Light bars



The light bars can be ordered individually or in assemblies of two, three or four.

Backlights

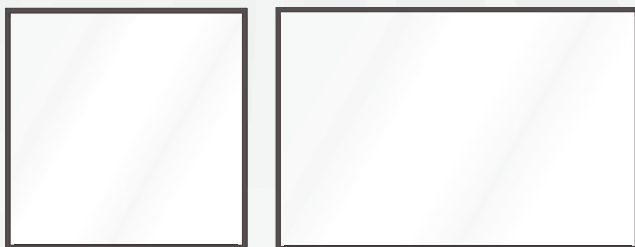


150 x 150 mm

150 x 300 mm

150 x 450 mm

150 x 600 mm



300 x 300 mm

300 x 450 mm

Six backlight variants are available to allow flexible adaptation to the task at hand.



Pilot application – Blow molding

Task	Real-time control of extruder parameters
Technical data	Synchronized IR backlight Vision fully integrated in the control loop
Advantage	Boosted OEE Machine vision and HMI implemented in less than a week Synchronized measurement data acquisition during runtime
Made possible by	Precise synchronization between machine control and vision



Pilot application – F&B pick-and-place

Task	Detect products on conveyor belt
Technical data	Backlight with 25,000 cd/m ² Axis-synchronized image processing <1 μs
Advantage	Easy data handling and integrated HMI Added detail through synchronous back and front lighting
Made possible by	Extremely powerful illumination through conveyor belt Optional addition of synchronized camera lighting



Pilot application – Paper roll production

Task	Detection of defective or misaligned rolls
Technical data	Product speed 50 m/min Synchronized mechanical sorting
Advantage	Adaptability to product color changes with configurable lighting colors Prevention of downtime
Made possible by	Easy synchronization of motion control and camera system



Machine vision made easy with mapp Vision

B&R's new machine vision system is fully integrated in its mapp Technology software environment. Project development, control and diagnostics are all handled in mapp, making it easy to implement and link with other mapp functions.

Functions like image capture and triggering are part of the machine application. They can be synchronized just as easily and precisely as I/O signals and axis movements. With the ready-made software components of mapp Vision, it's simply a matter of configuring the links between the individual functions. There's no need for the programming work that would traditionally be necessary.

Just a few clicks

Data such as position and orientation is available

as real-time variables in the machine application without time-consuming mapping. This makes it easy to synchronize motion control and image capture, allowing you to pick out defective products with a robot arm only milliseconds after performing quality inspection at full production speed.

Highlights

- Integrated with other mapp components
- Simple programming
- Easy commissioning
- Easy diagnostics



Code detection (identification)
 1D and 2D codes
 Self-optimizing



Text recognition (OCR)
 Also for dot matrix fonts
 Integrated deep learning algorithms



Shape detection (blob)
 Size, center point and average grayscale value
 Orientation, width and height



Object comparison (matching)
 Shape, position and orientation
 Independent of rotation



Measurement
 Lengths, radii, angles and distances
 Sub-pixel precision



Calibrate
 Standardize
 Deviations



Measure
 Length
 Area



Orientation
 Edges
 Objects



Inspect
 Shapes
 Surface



Read
 Data code
 Text
 Numbers



Find
 Position
 Orientation



Preprocess
 Filter
 Transform



Compare
 Geometry
 Colors

The five vision functions integrated in the BSR machine vision system can be combined to implement any required function in the application.

Industrial communication







B&R products speak OPC UA over TSN



B&R is among the first manufacturers to launch a comprehensive portfolio for communication using the open, real-time capable OPC UA over TSN communication solution. With high-performance X20 controllers, bus controllers, industrial PCs, panel PCs and a TSN machine switch, B&R enables standardized, vendor-agnostic networks for modular, adaptive machine designs. Truly economical batch-size-one production is now a reality.

With a standardized OPC UA over TSN network, the days when OEMs had to offer an array of machine

variants with different control and bus systems are over. From a multitude of interfaces, only a single one remains – an interface that exchanges standardized data between all the nodes in the network. Machinery and plants become substantially easier to develop and operate.

More room for innovation

Configuration of OPC UA over TSN devices and the network itself, as well as assignment of access rights, is all handled in B&R's Automation Studio engineering software. Not only does that allow the configuration to take place automatically, the



ready-made software blocks also minimize the amount of programming involved in developing modular machines. You can connect drives, controllers and other devices from different manufacturers without any additional overhead. Rather than writing code, all that remains for the developer to do is set a few parameters.

Highlights

- B&R portfolio of OPC UA over TSN devices
- Standardized vendor-agnostic network
- Single interface
- Vastly simplified machine development and operation
- Automatic configuration
- Ready-made software components

TSN machine switch for converged real-time networks

B&R has added a real-time Ethernet switch to its portfolio. The new machine switch can be used to set up networks using the vendor-agnostic communication solution OPC UA over TSN. Its design and form factor fit perfectly into the B&R portfolio for space-saving mounting in the control cabinet.

The TSN machine switch allows cycle times under 50 μ s. It offers four real-time capable TSN ports and one standard Ethernet port – to connect an HMI device, for example. The switch also opens up the possibility of star, tree or ring topologies in addition to daisy-chaining. Multiple switches can be cascaded in order to reach remote cabinets or implement large, complex real-time networks. Non-TSN nodes can also be incorporated in the network via the switch. Implementing modular machine concepts is now faster and easier than ever.

Speed and security

The TSN switch is based on standardized, vendor-agnostic TSN mechanisms to ensure the fastest possible cycle times and optimal bandwidth utilization. It is compatible with the current TSN profile for industrial automation defined by the joint international working group IEEE / IEC 60802. Mechanisms for fast data forwarding make it possible to exchange data quickly and directly between sensors and actuators located on different branches of the network. The TSN machine switch was developed in accordance with the latest IEC 62443 cybersecurity standard.

Automatic configuration

The switch is completely integrated in B&R's Automation Studio engineering environment. Configuration occurs automatically. The device fully supports a centralized approach to hardware and software management. Application development and machine-specific configurations can be performed either offline or online. The TSN switch can also be used as a conventional unmanaged switch for non-real-time networks. No special configuration is required.

Compact design

Since the TSN machine switch is designed in the X20 form factor, it takes up minimal space in the control cabinet, mounted right alongside the X20 control and I/O system. The switch can be mounted in two different positions, depending on the cable outlet. This allows it to be installed in tight spaces.

Highlights

- Vendor-independent real-time capability
- Faster implementation of modular machine designs
- For large converged machine networks
- Integration of non-TSN devices
- Automatic configuration
- Compact design



TSN machine switch

	Technical data
TSN ports	4x
Standard Ethernet ports	1x
Cycle time	<50 μ s
Time synchronization (jitter)	< \pm 100 ns
Scalable bandwidth	100 Mbit/s and 1 Gbit/s
Short machine startup times	<10 s
TSN standards (IEEE)	802.1AS-2019 802.1Q 802.1Qbv 802.1Qav 802.1Qcc 802.1Qbu 802.1Qci 802.1CB
Security	Integrated TPM module

Bus controller with OPC UA over TSN for easy communication

B&R was among the first manufacturers to present an OPC UA over TSN enabled bus controller. Truly transparent vendor-agnostic solutions for real-time field-level communication are now a reality. The X20BC008T also supports multiple cycle times for optimal network utilization.

The bus controller is just as easy to integrate into machines as POWERLINK components. Users benefit from the familiar environment and workflow and enjoy continual advancements with every new version. Thanks to the OPC UA standard, the X20BC008T can be used in multi-vendor environments. The application determines whether

the high-performance TSN real-time mechanisms with publisher/subscriber should be used, or if a parallel client/server connection should be established.

Equipped for any application

With TSN mechanisms and gigabit physics, the OPC UA over TSN enabled bus controller is equipped to meet the needs of applications well into the future. The X20BC008T bus controller functions as an OPC UA server and automatically provides all information about connected I/O modules to OPC UA clients from any manufacturer in real time.

OPC UA[®] OVER TSN



The bus controller supports the following standards: IEEE802.1AS/AS-2019 - Timing and synchronization for time-sensitive applications, IEEE802.1Qbv - Different time windows for different traffic classes and IEEE802.1Qav - Forwarding of prioritized time-sensitive streams.

Precise, high-resolution big data applications

The bus controller is based on a new hardware platform that enables fast data processing with highly precise OPC UA timestamps. Even complex Industrial IoT applications can be implemented directly. This is important for many technical processes in the microsecond and millisecond range, such as spot welding on an automotive production line.

Highlights

- Any application, from I/O level to cloud
- Interface-free, vendor-independent real-time communication
- Ethernet TSN mechanisms
- High-precision OPC UA timestamp
- Equipped for future applications



Get started fast and easy OPC UA over TSN

B&R makes it easy to implement communication networks based on the OPC UA over TSN solution. Setup and configuration are simple and straightforward in B&R's Automation Studio engineering tool. No additional settings are required for the real-time TSN component.

With the integration of OPC UA over TSN in Automation Studio, B&R demonstrates how new technology can be made intuitive and transparent for the user. Configuring OPC UA over TSN creates no additional overhead. OPC UA over TSN and the new publisher/subscriber communication mechanism are easy to integrate in a machine design.

Just a few clicks

Setting up OPC UA over TSN communication requires only two steps in the engineering tool: Configuring the hardware components and enabling the OPC UA nodes.

Users can set up their machine network by simply dragging and dropping between the components. OPC UA over TSN is highlighted in Automation Studio's System Designer editor.

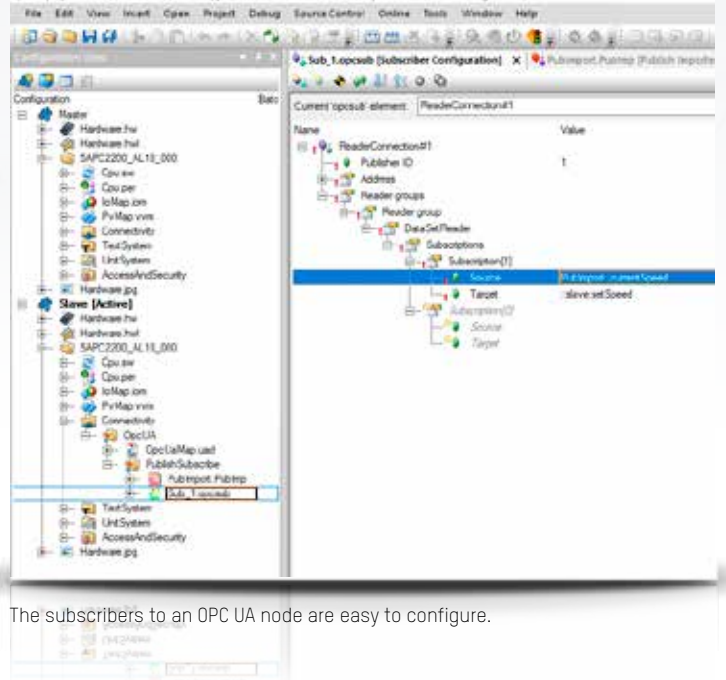
The user can switch to the OPC UA overview and select which variables should be available to all the nodes in the network. Variables enabled for OPC UA nodes are indicated by color.

Embedded and preconfigured

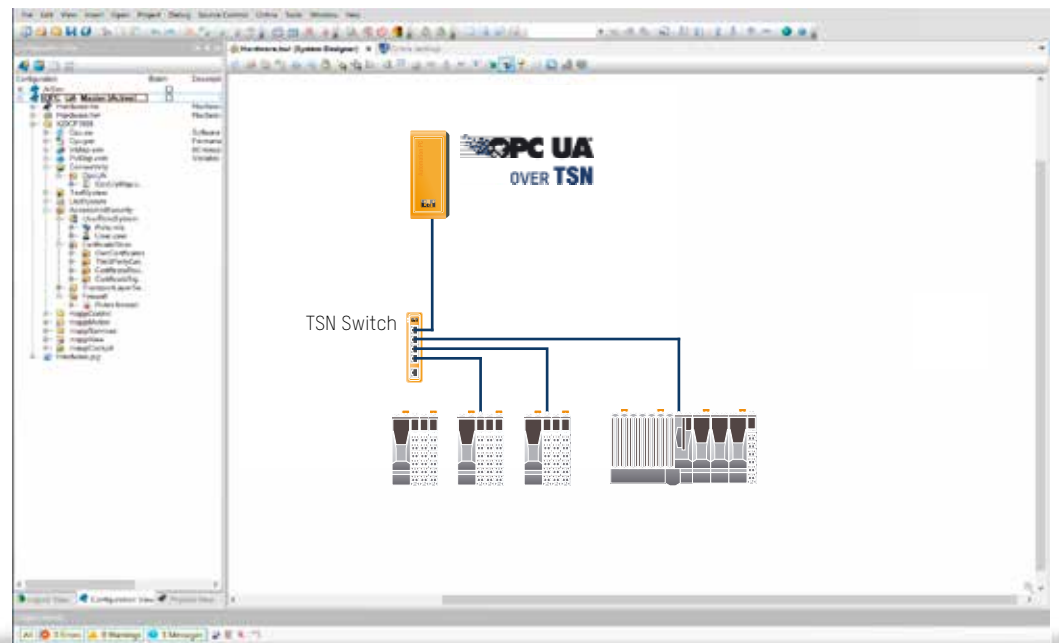
The real-time extension of the Ethernet standard with Time Sensitive Networking (TSN) includes a variety of standards and mechanisms. B&R has embedded these in its Automation Studio engineering tool and Automation Runtime operating system and preconfigured them so that there is no additional work for the user to do.

Highlights

- No additional TSN-related settings
- All necessary parameters calculated automatically



The subscribers to an OPC UA node are easy to configure.



Configuration of OPC UA over TSN communication in Automation Studio is easy and straightforward.

Industrial IoT





Asset Performance Monitor – Machine analysis at the push of a button

B&R's Asset Performance Monitor app has new functions. With new automatic detection and configuration, all machines can be found at the push of a button. With the multitenant architecture, the cloud application is easy to expand.

Around the clock and around the world, Asset Performance Monitor delivers data such as production rate, energy consumption and temperature. OEMs can see immediately how their machines are being operated and monitor their status. This allows them to respond more quickly to service issues to reduce service costs. The cloud application indicates where maintenance is necessary and provides the basis for tailor-made maintenance service. This B&R solution has been expanded with two new functions that make it more efficient and powerful than ever.

Automatic detection and configuration

All the machines in a network can be found and integrated in Asset Performance Monitor at the push of a button and are configured automatically. Asset Performance Monitor reads all the data provided by the machine and automatically detects whether an industry-specific standard such as PackML or Euromap 77 is used. The semantics of the data is also recognized and allows automated creation of dashboards, reports and alarm overviews. An entire machine fleet can be monitored at the push of a button.

Multi-tenant architecture

Asset Performance Monitor also supports multitenancy. The machine builder can add their customers to the cloud application and resell it to them. Asset Performance Monitor provides the necessary security and data protection.

The Asset Performance Monitor cloud application is based on a flexible IoT platform that can be quickly and easily expanded. End-to-end solutions are easy to implement – from the machine controller over an edge device and into the cloud. The cloud application collects machine data and customer-specific data around the clock and around the world. Advanced data acquisition and analytics can substantially improve manufacturing performance.

Highlights

- From the machine to the cloud at the push of a button
- Automatic data structure recognition
- Automatically find, connect and analyze a machine fleet



Easily in touch with your machines

By giving OEMs a reliable overview of all their machines in the field, Asset Performance Monitor allows them to identify potential improvements, take service operations to the next level and unlock new business models and revenue streams.

Around the clock and around the world, Asset Performance Monitor delivers data such as production rate, energy consumption and temperature. OEMs can see how their machines are being operated and monitor their status at a glance. This allows them to respond more quickly to service issues while at the same time reducing service costs. The cloud application indicates where maintenance is necessary and provides the basis for tailor-made maintenance service.

New revenue streams

Asset Performance Monitor opens up new business models for OEMs. In addition to maintenance, they can offer performance-based service level agreements, continuous machine upgrades and function updates as a service. The application also provides the baseline for service level agreements to boost machine performance.

Open IIoT architecture

To collect data from the machine, an Automation PC is installed on site as an edge device. It receives data from the machine controller via OPC UA and passes it on to the cloud using the MQTT

protocol. The connection between the machine and the cloud is established automatically. The software required for the application on the edge device is also installed automatically. The OEM gets access to the cloud by simply logging in with a username and password.

ABB Ability platform

B&R cloud applications are based on ABB Ability, the unified, cross-industry digital offering from ABB. The Ability platform is based on Microsoft Azure. ABB Ability allows businesses to harness the power of industrial data.

Security and privacy

The Asset Performance Monitor application provides a secure and reliable connection. Security and data integrity are guaranteed by state-of-the-art security standards and transfer protocols.

Highlights

- Clear overview of all machines
- Easy evaluation of key performance indicators
- Data storage on premises or in the cloud
- Easy configuration
- State-of-the-art security standards



Identify potential areas of improvement



Compare KPIs across machines



Identify patterns, target improvements



Seamless transparency



Custom-tailored maintenance service

Track technology





Maximum productivity with a compact footprint

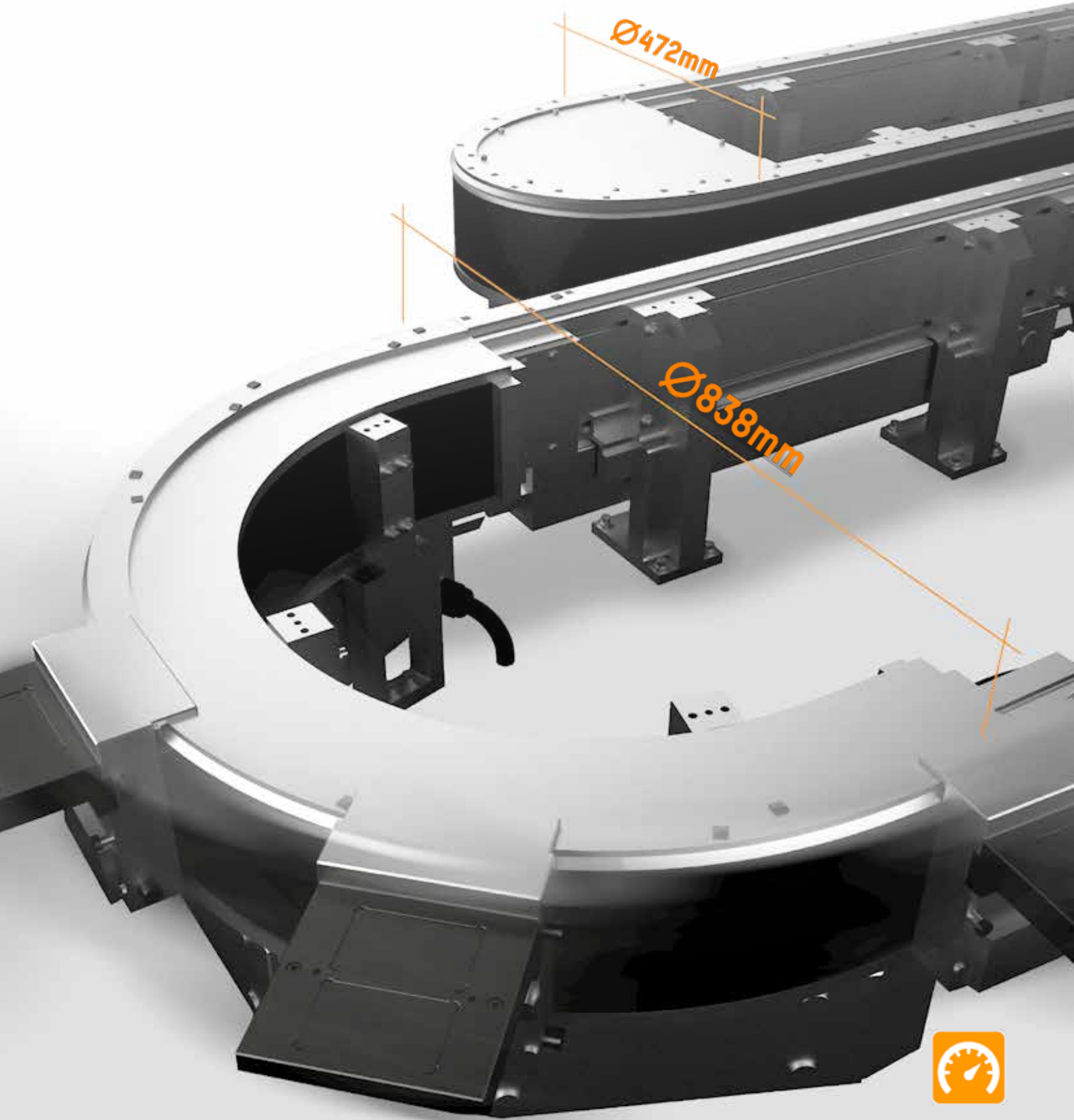
The intelligent SuperTrak track system now includes a new 180° curved segment. The new curve allows higher shuttle speeds and greater holding and propulsive forces. This boosts the productivity of the entire system.

At a width of 838 mm, it is significantly wider than the previous variant. The curve is particularly suitable for automated assembly lines, where larger assemblies have to interact with the track system. The curved segment fits seamlessly into existing machine layouts, replacing elements such as a rotary indexing table. The machine gets a substantial productivity boost in a minimal

amount of space. In order to allow more design freedom in the machine layout, the track system is now also available with power supply cables in lengths of five and eight meters.

Highlights

- Big productivity boost with a small footprint
- Higher shuttle speeds
- More freedom for machine layout
- Higher payload



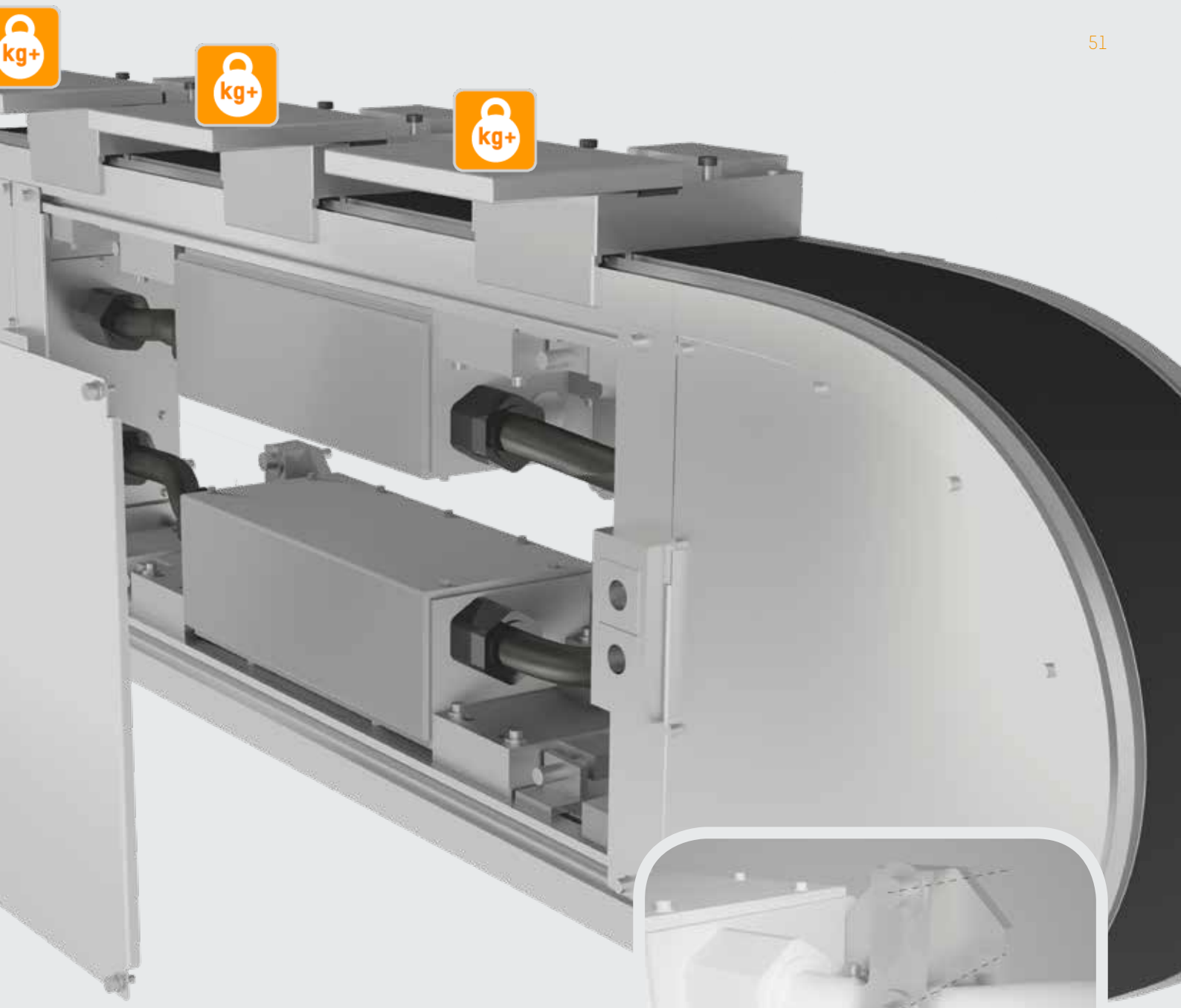
Vertical mounting saves space

The intelligent SuperTrak track system is now also available in a variant designed for vertical mounting. This helps to optimize the output per square meter of floor space. It also makes it much easier to access the electronics.

In the vertical orientation, the shuttles have a much higher payload capacity. If products are only transported on the upper side of the SuperTrak, the weight is not supported magnetically. Instead the load is transferred directly to the rollers. In addition, a vertical track orientation simplifies assembly and provides maximum stability.

Highlights

- Easier access to power electronics
- Easier installation
- Higher payload
- Optimized output per square meter of floor space



The vertical mount variant offers easy access to the track system's mounting assembly, making it quick and easy to put into operation.

ACOPOStrak for washdown

An IP69K-rated variant of the intelligent ACOPOStrak system is now available. The new version of the track can be pressure washed at temperatures of up to 80°C. This makes it suitable for use in industries like food and beverages and pharmaceuticals with the highest demands on cleanability.

Not only is the new track protected against high-pressure cleaning, it is also completely protected against dust. With IP69K protection, the track system is perfect for primary packaging applications. It can be used in both dry and wet areas of complex installations.

Corrosion protection for shuttles and segments

The shuttles and segments of the new track variant are made of stainless steel, securely welded and thus resistant to corrosion. The stainless steel housing enables the transport of corrosive products and operation of the ACOPOStrak in corrosive atmospheres such as salt spray. All surfaces are chemically resistant, preventing particles or fluids from penetrating into the interior

of the shuttle or segments. The shuttles' magnet unit is completely protected against high-pressure cleaning.

Absolute flexibility

With the IP69K version of the ACOPOStrak, B&R enables economical batch-size-one operation with the efficiency of mass production – even for industries with strict cleanability requirements. ACOPOStrak can be expanded flexibly by adding track modules and processing stations. This makes machines scalable enough to adapt to changing production requirements at any time.

Highlights

- Suitable for high-pressure cleaning
- Resistant to cleaning with hot water up to 80°C
- Corrosion resistant
- Suitable for industries with strict cleanability requirements



IP69K

Stainless



Back on track in seconds

B&R has integrated the Safe Torque Off (STO) safety function into its intelligent ACOPOStrak track system. After an emergency stop, all shuttle positions and motion sequences remain stored. This enables the track to start up again right where it stopped. Downtimes and non-productive trips are kept to a minimum, and the availability of the system increases.

Generally, activating the emergency stop cuts off the power supply to the entire system. The machine stops and loses all information. It must then be emptied by hand and restarted from scratch. This procedure can take as long as several hours. With the intelligent ACOPOStrak, the emergency stop activates the STO safety function. Safe pulse disabling only interrupts the power being sent to the drive. This prevents electrical torque from being generated, so the track cannot start up unintentionally. The function is certified for safety level SIL 2 / PL d / Cat. 3.

Minimal Mean Time to Repair (MTTR)

The emergency stop process with STO does not interrupt the power supply for control and position detection. All the shuttle positions, motion profiles and product payload data is retained. The track system can be started up in seconds and

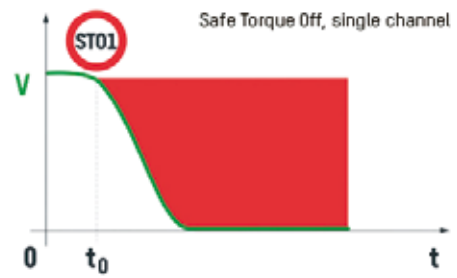
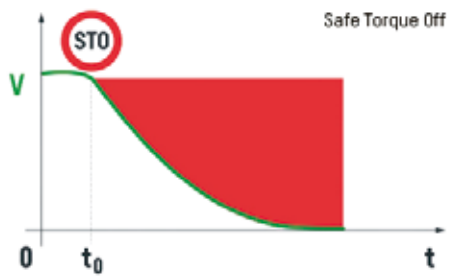
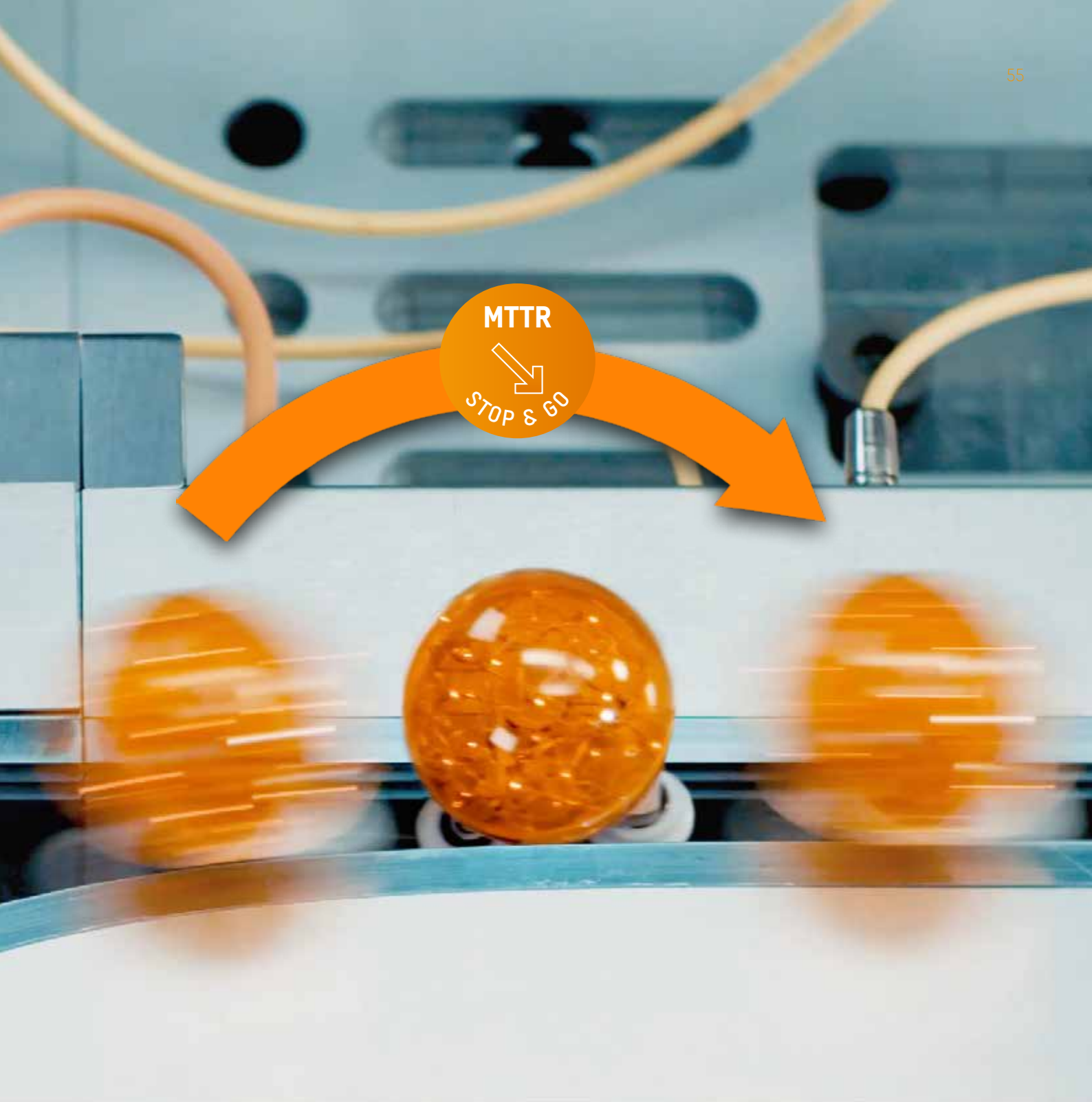
picks up right where it left off. In addition, the effort involved in risk analysis is reduced to a minimum since the STO safety function is already pre-certified. Products can be brought to market faster. The function is certified for a period of 20 years and makes the track system future-proof.

Minimal footprint

ACOPOStrak has a maximum safe error response time of only six milliseconds. In the context of risk analysis, the error response time is a decisive factor in the calculation of safety clearances. With its extremely short response times, ACOPOStrak allows clearances to be kept to a minimum, and the machine can be built very compactly around the track. All safety requirements of the Machinery Directive are met.

Highlights

- No data loss on E-stop
- Minimal Mean Time to Repair (MTTR)
- Increased system availability
- Fast safety responses enable compact design



Faster implementation of track systems

B&R's mapp Trak software offers three new design tools for the intelligent ACOPOStrak track system. They simplify the mechanical, electrical and thermal design of the track. The costs of cooling and power consumption can be kept low while simultaneously increasing throughput. The engineering overhead for the track system is reduced considerably.

The shuttles are held on the track by magnetic force. To ensure that they do not lose their adhesion even at high speeds, mapp Trak offers a mechanical design tool for calculating the maximum shuttle speed. The software shows how fast the shuttle can accelerate and at what speed it can enter a curve. With the integrated simulation options in mapp Trak, the developer can also run tests to identify the optimum number and speed of shuttles to maximize productivity. Costly and time-consuming hardware tests are no longer necessary.

Power requirements in detail

mapp Trak also offers an electrical design tool. This new function detects the amount of electrical power required at any given point in the track system. The software shows exactly where power peaks occur. Early in machine development, it is possible to see how much power the track requires per section and in total. The power supply can be planned and designed accordingly. The machine's energy efficiency is optimized.

Customize the cooling system

The thermal design tool calculates the amount of heat that each track segment generates and releases into the environment. These calculations can be used to design the cooling system for the entire machine. It is also possible to derive the most effective cooling approach for the surrounding area in the production hall.

Simulation for efficient operation

The results of the design tools' calculations flow immediately into mapp Trak's integrated simulation. The developer can play through many scenarios on their office PC without the constraints and risks of a real system. The simulation behaves exactly like a real ACOPOStrak system. This software is identical to the system software later used on the controller. It's possible to switch back and forth between simulation and real operation at any time.

Highlights

- Reduced programming overhead
- Optimized shuttle speed
- Optimized energy efficiency
- Simplified electrical design
- Individually adapted cooling



Hot performance through smart cooling

Motor segments for the intelligent ACOPOStrak system are now also available with built-in liquid cooling. This extends the track's performance capacity. The cooling system is integrated directly in the motor segment, so the cooling system requires no additional installation.

In highly dynamic applications, large numbers of shuttles accelerate and brake on certain track segments. This generates heat. Motor segments with integrated cooling can provide targeted relief in these cases. ACOPOStrak motor segments are available with or without a built-in cooling system, and the track can be put together modularly. This makes it possible to minimize cooling costs, since cooling is limited to the segments that actually need it.

The liquid cooling system pumps cooling water through a cooling circuit. This absorbs heat from

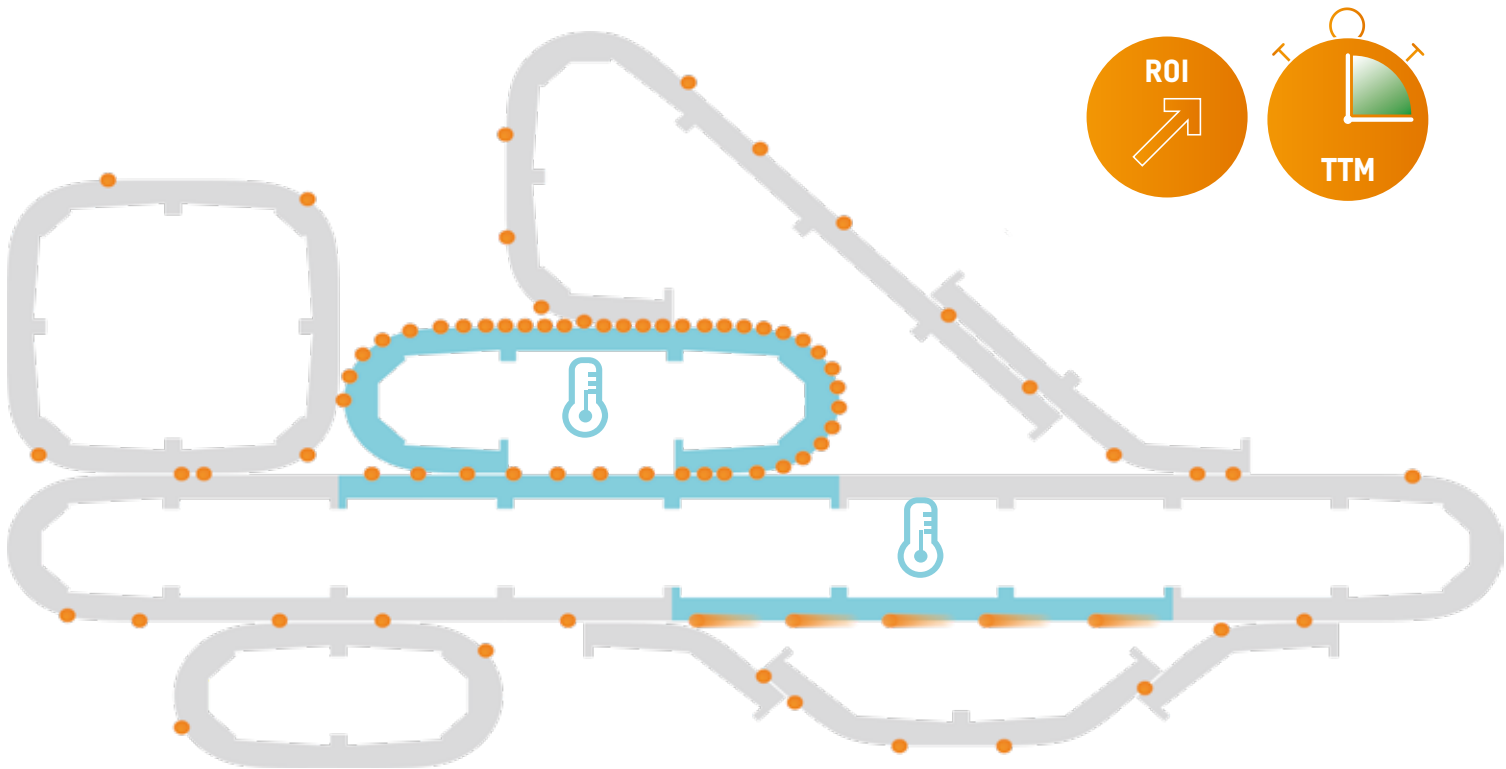
components and releases it into the surrounding air via a heat exchanger.

Thermal calculations made easy

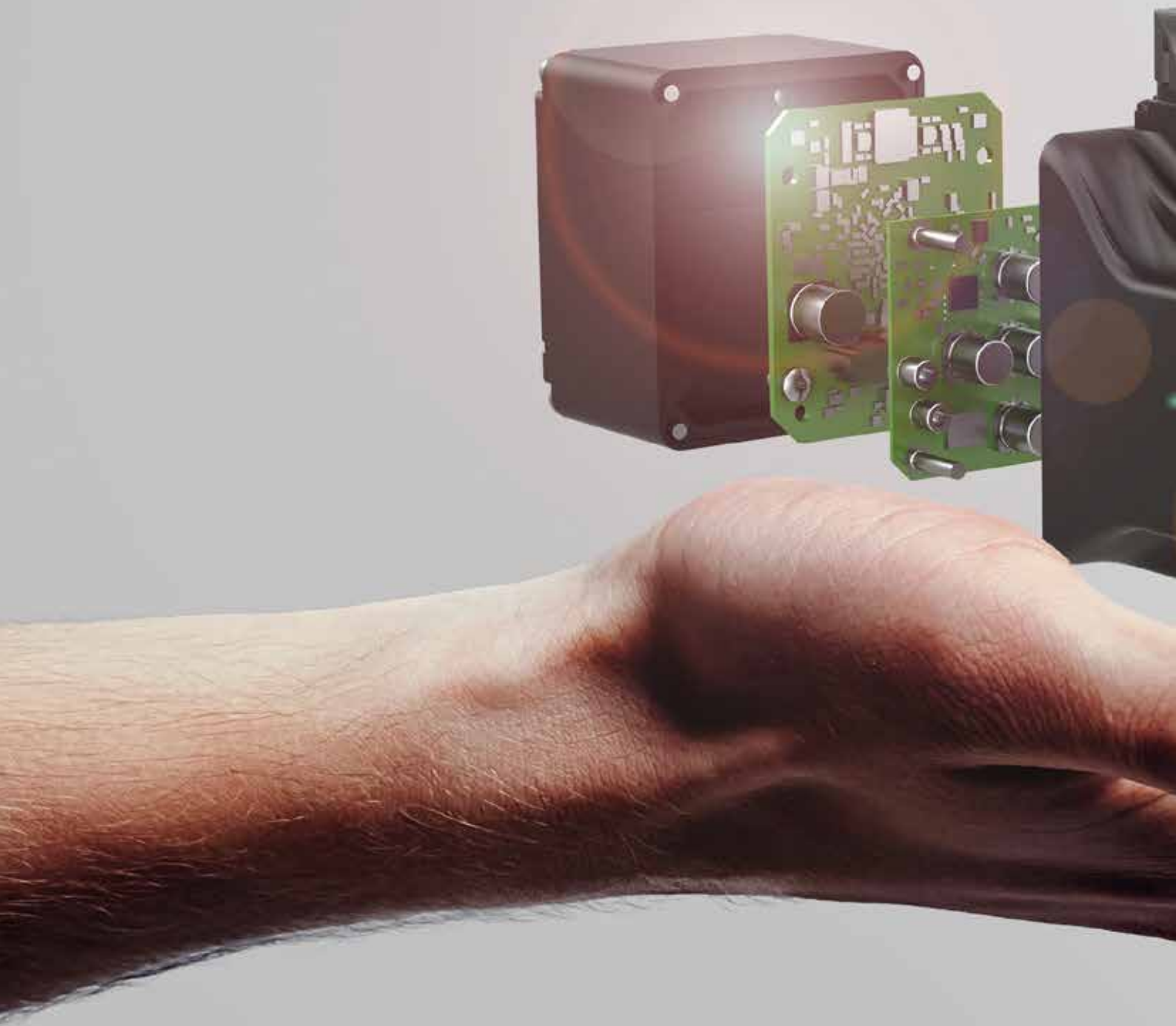
The mapp Trak system software calculates exactly where the track system's power requirements are the highest. From this information, it is able to determine how much heat will be generated in each track segment. In the simulation of the software, it becomes visible which parts of the track require cooled motor segments.

Highlights

- Increased performance
- No additional installation
- Modular system
- Cost savings



Motion control





Modular machines
with decentralized
compact drives



B&R is adding two new sizes to its series of motor-mounted drives. The two new additions to the ACOPOSmotor series facilitate development of modular plants and machinery. They reduce installation costs and save cabinet space.

The new devices cover a power range up to 0.35 kW, and the smallest version measures just 60 mm x 90 mm (w x h). Despite their compact dimensions, they have a full-fledged integrated servo drive with control loop cycle times as fast

as 50 μ s. The motors are optionally available with an integrated gearbox.

Daisy-chaining

The devices have two connections for hybrid cables, so only a single cable is required to connect to the control cabinet. The hybrid cable transmits both the power supply and POWERLINK communication. Additional ACOPOSmotor units are easily added on via daisy-chain cabling.



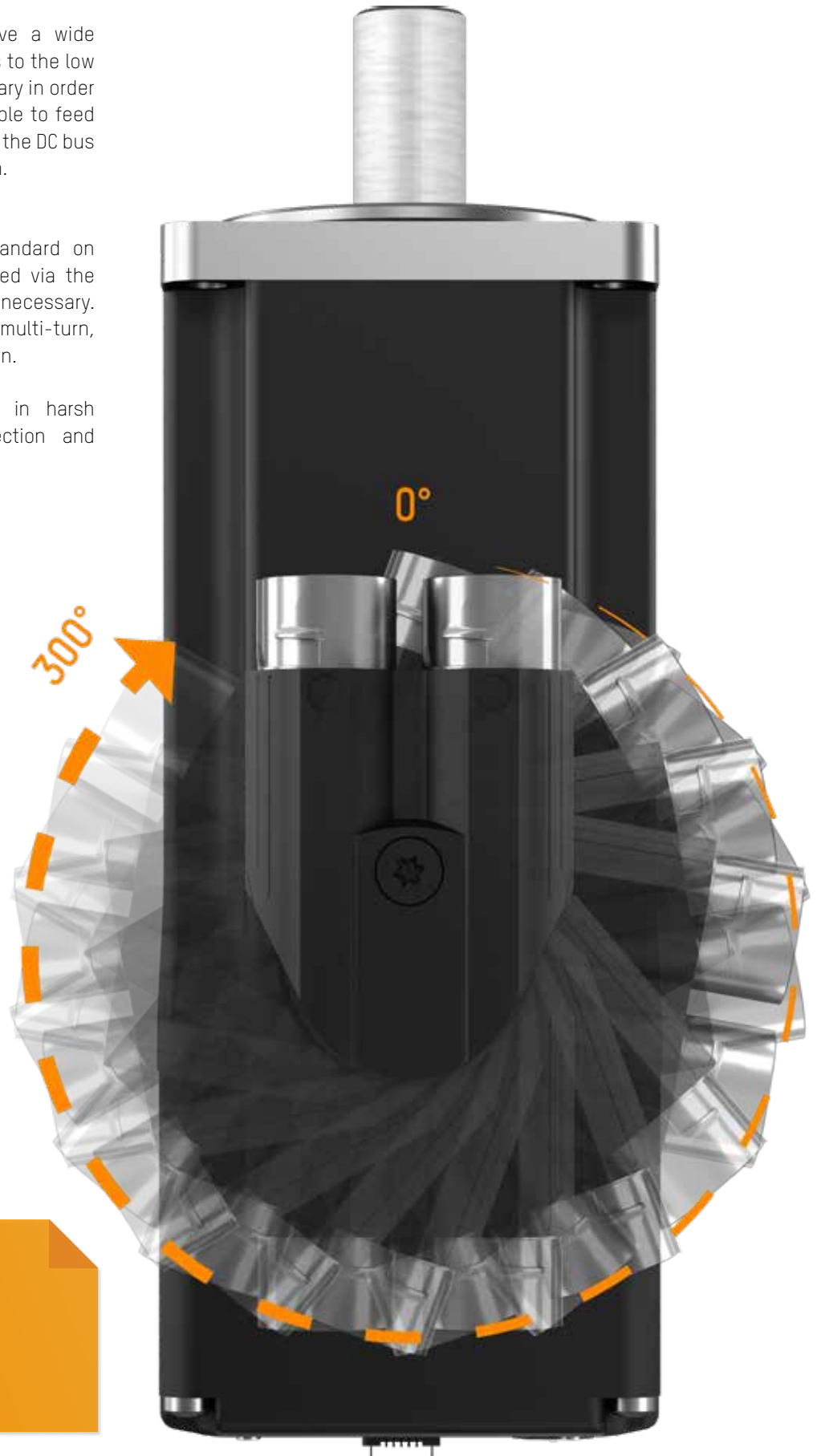
The new ACOPOSmotor variants have a wide voltage range of 24 to 60 VDC. Thanks to the low voltage, no special training is necessary in order to exchange devices. It is also possible to feed regenerative braking energy back into the DC bus to reduce overall energy consumption.

Integrated safety

The STO safety function comes standard on motor-mounted drives. It is controlled via the hybrid cable, so no extra wiring is necessary. Available encoder variants include: multi-turn, multi-turn with battery and single-turn.

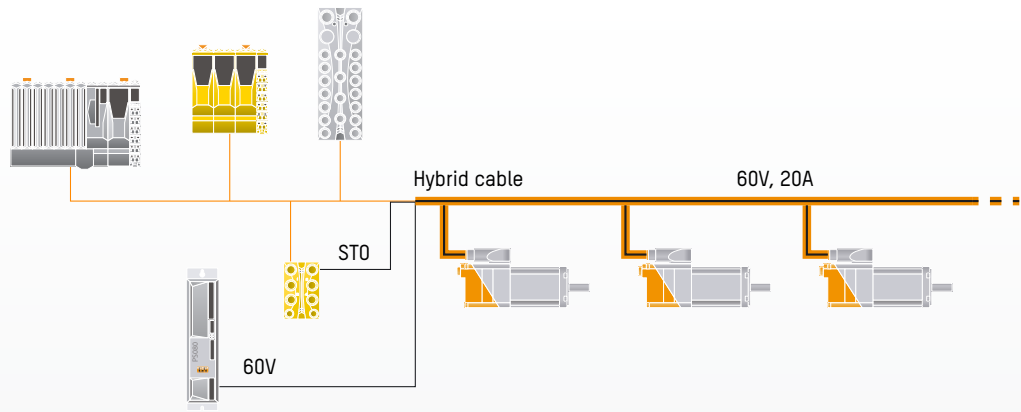
ACOPOSmotor is designed for use in harsh environments. It offers IP65 protection and requires neither fans nor heat sinks.

The new ACOPOSmotor variants feature unique 300° swivel connectors that make installation considerably easier. Especially in tight spaces, the savings in the time and cost of cabling are substantial.

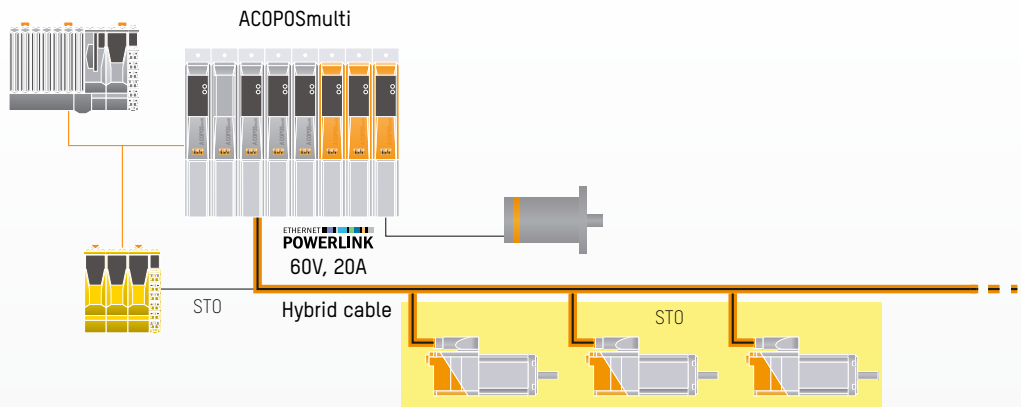


Highlights

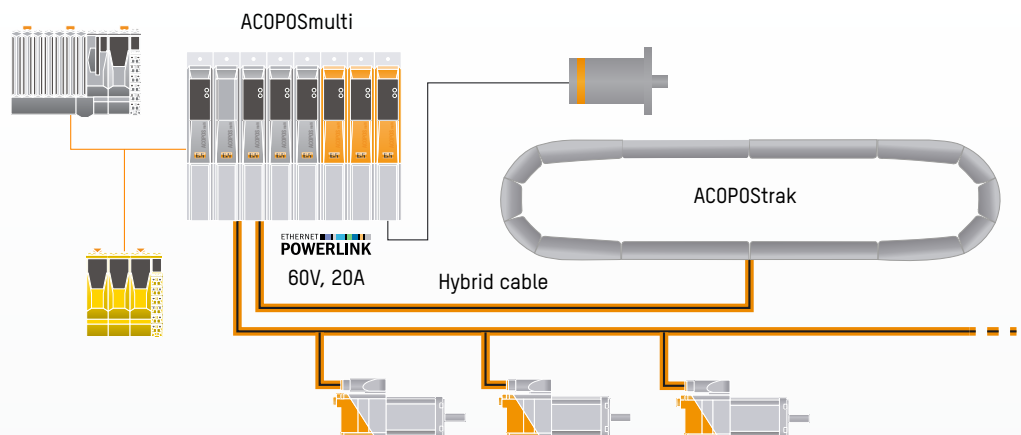
- Minimal footprint
- Perfect for modular machinery
- Simple installation
- Low maintenance



Topology 1: The compact ACOPOSmotor variants do not require an additional servo drive. The ACOPOSmotor is simply incorporated into the POWERLINK network. Power is supplied via an ACOPOSmulti power supply.



Topology 2: The compact ACOPOSmotor variants can be integrated into an ACOPOSmulti architecture. Power is supplied via the DC bus.



Topology 3: The compact ACOPOSmotor variants can be connected directly to the ACOPOStrak power supply. This greatly simplifies cabling for processing stations along the track. The ACOPOSmotor doesn't need an extra power supply.

The image shows a close-up of an orange servo motor terminal block. A grey connector strip is attached to the block, featuring six numbered terminals (1-6) on the left side. The terminals are arranged in two columns of three. The background shows the orange plastic housing of the servo motor with various slots and screws.

The connector makes the difference

B&R is equipping its ACOPOSmulti servo drives with new connectors. For each pin there will now be two terminals.

The new connector makes it much easier to wire the power through. Cabling becomes cleaner and easier.

Highlights

- Simple installation
- Clean cabling
- Effortless through-wiring



Intelligent power supply

An intelligent new module optimizes the supply of power to ACOPOStrak, ACOPOSmicro and the compact new ACOPOSmotor variants. It also allows regenerative braking energy to be fed back into the DC bus.

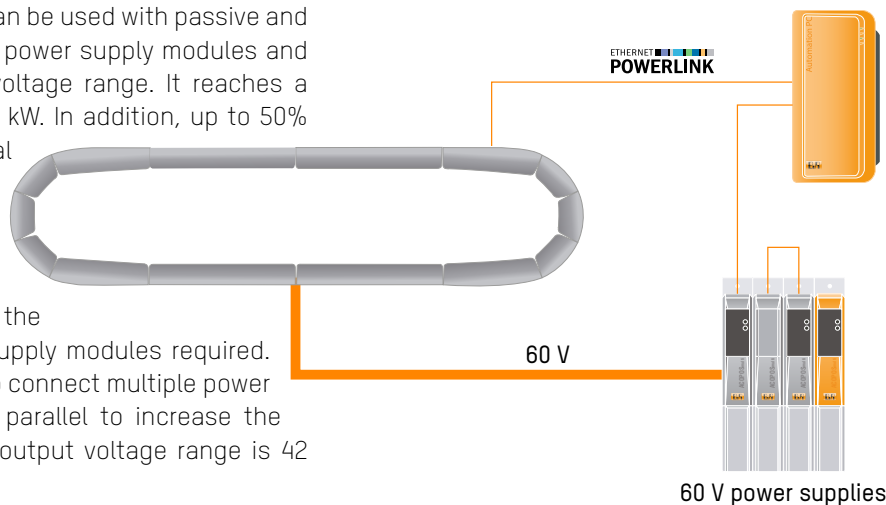
The intelligent module is equipped with current and temperature sensors, enabling power monitoring in real time. POWERLINK communication makes the data available directly in Automation Studio, where it can be used to optimize power consumption and distribution. Power supply costs are reduced significantly.

Highlights

- Optimized power supply for ACOPOStrak, ACOPOSmicro and compact ACOPOSmotor variants
- Real-time power monitoring
- Optimized power distribution

Fewer power supply modules

The power supply can be used with passive and active ACOPOSmulti power supply modules and has a wide input voltage range. It reaches a nominal power of 2 kW. In addition, up to 50% above the nominal power and current values can be used temporarily. This makes it possible to reduce the number of power supply modules required. It is also possible to connect multiple power supply modules in parallel to increase the output power. The output voltage range is 42 to 60 VDC.



ACOPOS P3

defies environmental influences

With the ACOPOS P3, B&R is setting new standards for protection against harsh environmental conditions. The electronics of the compact servo drive will now come standard with a special coating that provides protection against external factors. This will make them suitable for use under harsh atmospheric conditions and at temperatures as low as -25°C .

The servo drive can easily be used under extreme conditions like those faced by wind turbines and other offshore applications, as well as in particularly dusty conditions like those in the textile industry. Applications in cold rooms are also possible.

Comprehensive testing

B&R conducts extensive environmental testing to ensure the robustness of its hardware. The tests are carried out in a fully accredited in-house testing laboratory and in certified external testing facilities in accordance with international standards and regulations.

Highlights

- Use down to -25°C
- Impervious to dust
- No special hardware required

No disruptive noises in quiet environments

B&R's ACOPOS P3 servo drives now feature a quiet mode. The fan switches itself off automatically when the drive is idle. This eliminates background noise that can be disruptive in quiet environments like theaters or clean rooms. It also allows for extended intervals between maintenance and cleaning.

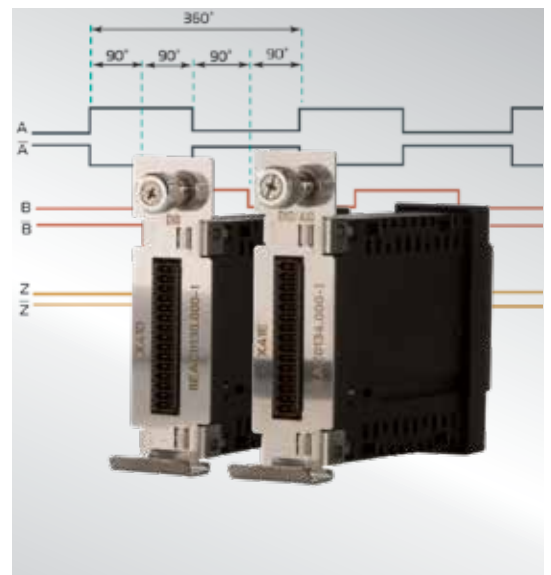


Tamagawa support for ACOPOS P3

The ACOPOS P3 servo drive now supports Tamagawa encoders. This increases the number of different motor types that can be controlled with the P3. To implement the Tamagawa support, all that's necessary is a simple firmware update. Then the P3's digital multi-encoder interface can also be used for this encoder type.

Communication between drives and peripherals

Plug-in I/O modules 8EAC0130 and 8EAC0134 for the ACOPOS P3 servo drive can now also be used as inputs and outputs for incremental encoder signals. This makes it easier to synchronize movements between different machines. There is no need for a shared bus system or any additional interfaces. The P3 can emulate an incremental encoder and communicate directly with any device that has an interface for incremental signals. All that is needed is a simple encoder cable. The inputs of the plug-in I/O module can now also be used as an event counter.





Hiperface DSL Safety



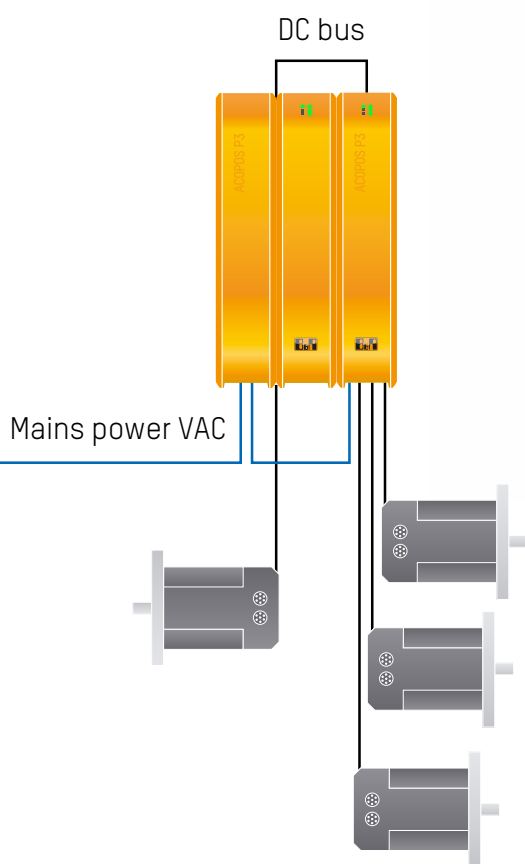
The safety functions of the B&R ACOPOS P3 servo drive are now also available for motors with a safe Hiperface DSL encoder.

Machine builders now have a much broader selection of motors when implementing safe motion control applications. HDSL Safety support is available with an easy firmware update.

Highlights

- Larger selection of motors
- Available via firmware update
- Compatible with all B&R safety functions

Optimize power with ACOPOS P3



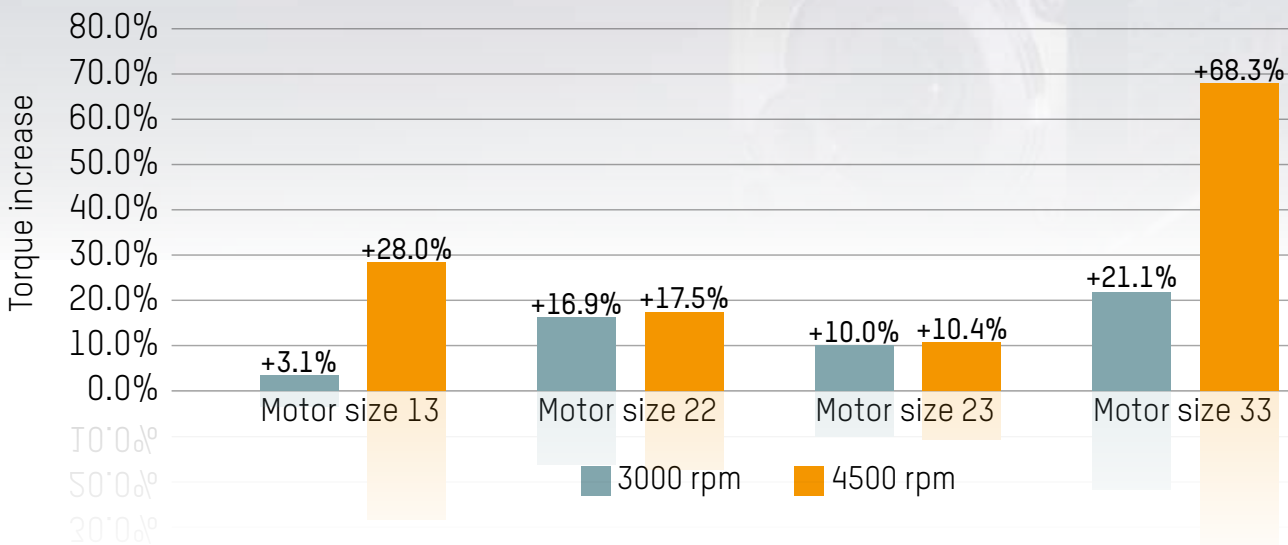
DC connection for more power

B&W is expanding the power connection options on its ACOPOS P3 servo drive. In addition to alternating and three-phase current, direct current from the DC bus can also be used. This increases the maximum power available to an ACOPOS P3 by 100%.

Highlights

- Increased power
- More connection options
- Use DC bus voltage

More torque in less space



Depending on speed and motor size, the new 8LWA servo motors, paired with an ACOPOS P3 servo drive, achieve up to 68% higher torque than comparable motors.

With the 8LWA, B&R presents a servo motor from a new series with an especially high torque density. A new internal design helps the 8LWA, paired with an ACOPOS P3 servo drive, achieve 25% higher torque than comparable motors.

The new 8LWA servo motors can also be operated at altitudes above 2,000 meters without derating. The motor connection has been redesigned to allow the use of a smaller connector. The power, encoder signal and brake signal are all transferred

over a single hybrid cable. The new motor takes up less space on the machine than previous motors.

Highlights

- Very compact motors
- Ideal for high altitudes
- Lower cabling costs



Dust and dirt don't stand a chance

Hybrid cables can now be run more easily from the motor to the drive in the control cabinet. B&R has developed a special housing feed-through that enables fast cabling and at the same time provides a perfectly sealed bushing through the control cabinet wall.

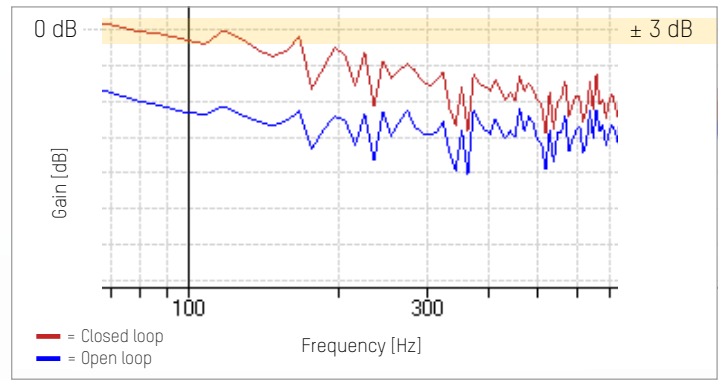
The control cabinet can be wired entirely in advance, and the hybrid cable to the motor is simply connected to the housing bushing on site. This accelerates commissioning and

effectively protects the interior of the control cabinet against dust and dirt.

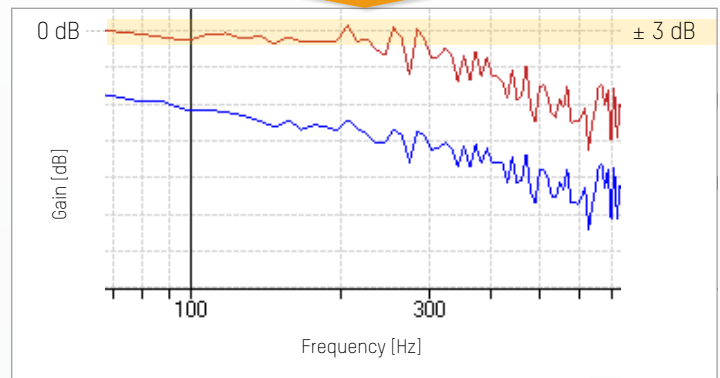
Highlights

- Protection against dust, dirt and moisture in the control cabinet
- Simplified on-site cabling
- Faster commissioning

Drive control optimization



Model-based filter

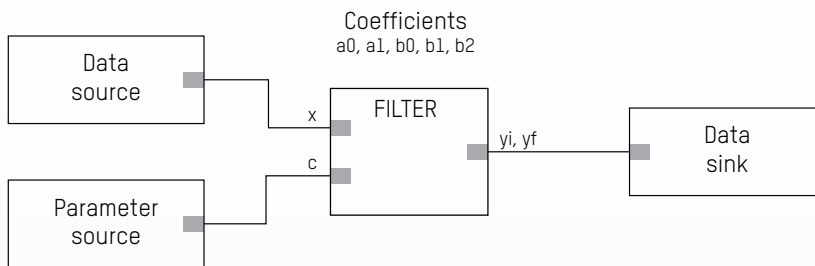


Higher precision with model-based filters

With a model-based speed filter, B&R offers improved control loop performance for the ACOPOS servo drive. A mathematical model estimates the future speed to prevent delays in the control loop.

Low motor speeds and low encoder resolutions have a significant negative impact on the quality of the speed controller. A filter is therefore used

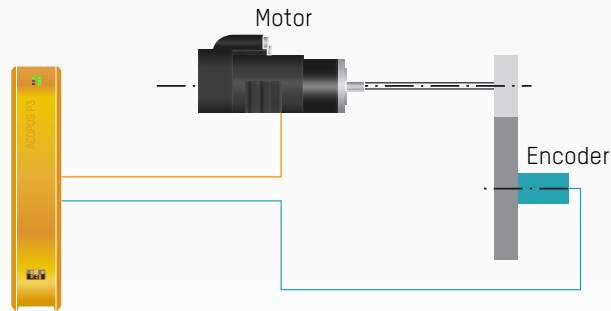
to smooth out the signal. Applying the filter to the signal, however, causes a delay in the control loop. The mathematical model is therefore now used to generate a virtual encoder signal that compensates for the delay.



Filter noise in real time

B&R is adding new real-time filters for its ACOPOS servo drives. Among the benefits is the ability to smooth noisy position setpoint signals that occur when axes are coupled to externally measured positions. Control precision is increased while reducing motor losses and wear.

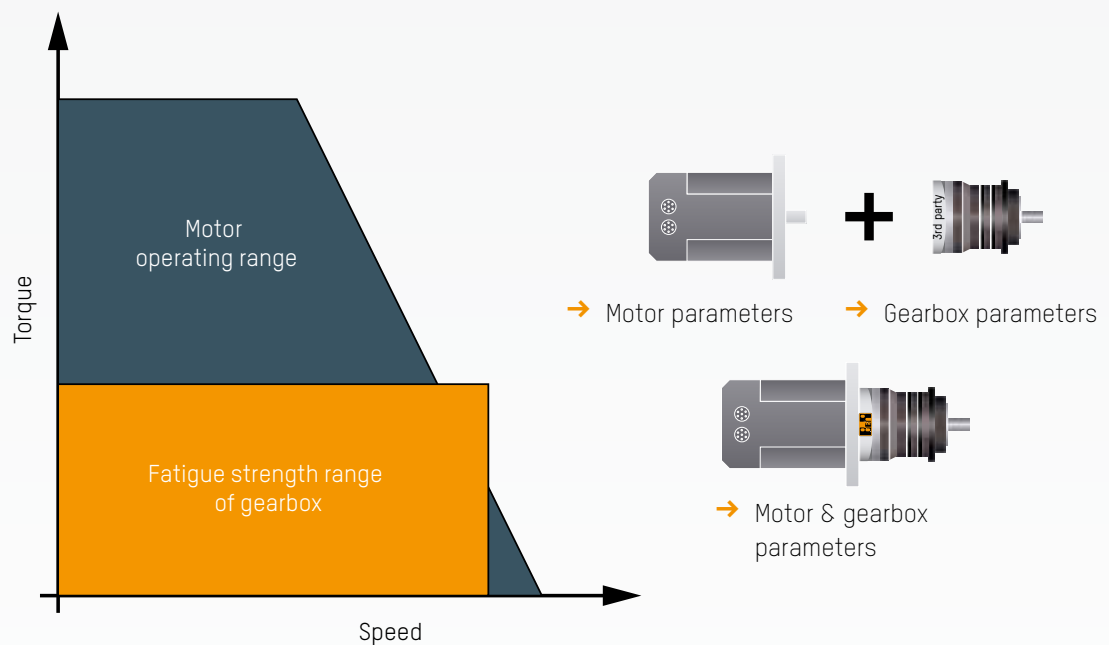
Users can choose from filter types such as low-pass and band-stop. The filters can be integrated flexibly at various positions in the control loop. Signals are filtered in real-time with minimal filter latency. It is possible to adjust the filter settings or change the filter type at any time during operation.



Precise control without an internal encoder

B&R now supports the operation of motors with encoders mounted to the gearbox – particularly helpful in cases where mechanical constraints don't allow the encoder to be mounted on the motor itself or the motor shaft. This significantly improves the quality of drive control compared to open-loop solutions.

The gear ratio of the gearbox and the position of the encoder are configured in Automation Studio, so they are automatically taken into account by the drive control system. It doesn't matter if the encoder is mounted to the load shaft or a gearwheel. Encoderless synchronous or induction motors can be used.



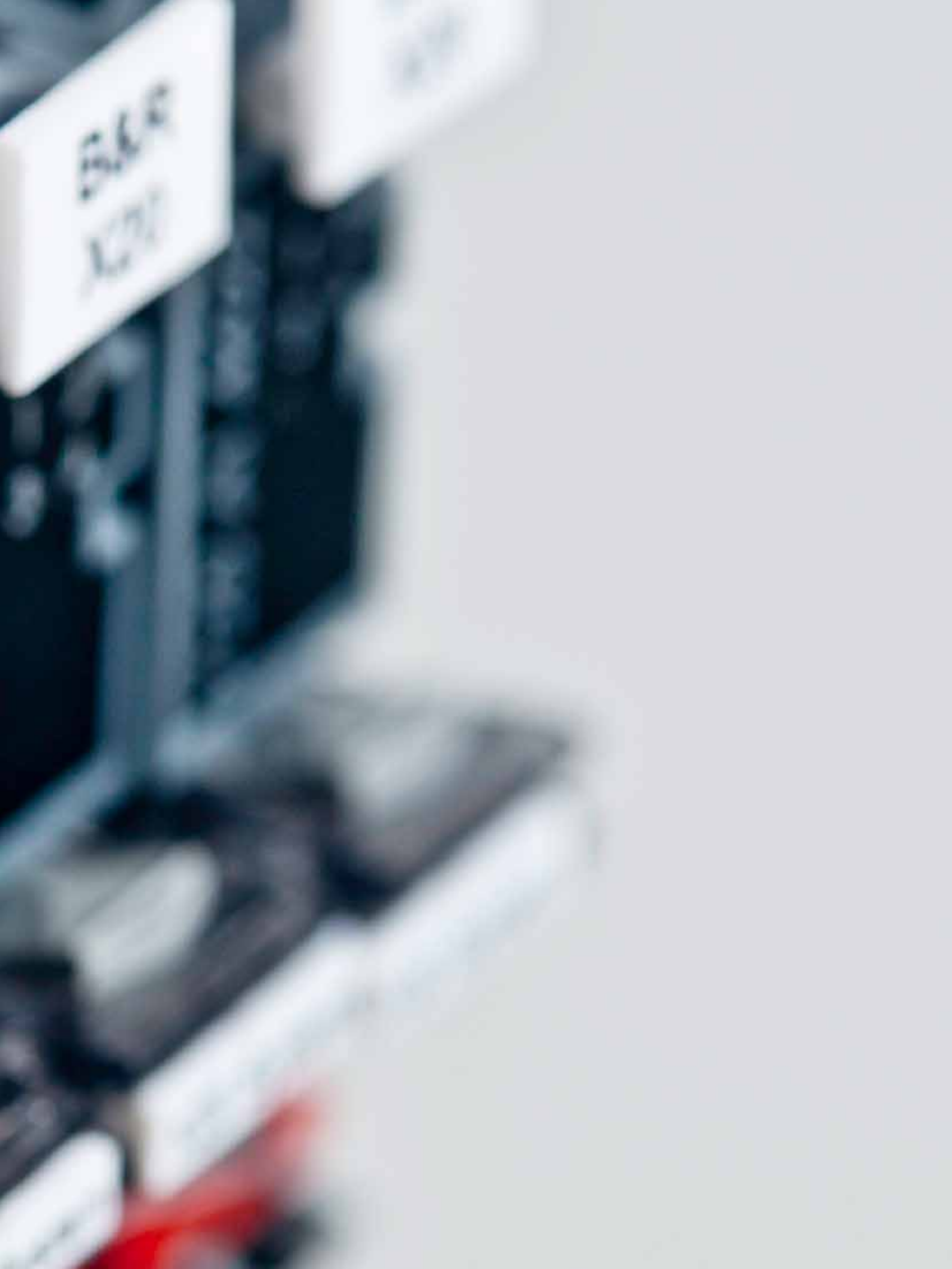
Effective protection for gearboxes

Gearboxes can now safely be used with motors that supply more torque than the gearbox is designed to withstand for extended periods of time. All that is needed is to store the parameters of the motor and gearbox on the motor encoder. This allows the ACOPOS servo drive to calculate exactly how much torque the motor-gearbox combination can handle, effectively preventing excessive wear and tear. B&R's factory-assembled motor-gearbox combinations are preconfigured with the correct data for the motor and gearbox.

The motor and the gearbox will often have different operating limits, so there is a risk of excessive strain on the gearbox. Until now, the motor's torque had to be limited manually in such cases, either in the application software or with a hardware torque limiter. With the new firmware function, the software now handles this automatically. The automatic torque limitation remains active in the event of an emergency stop.

Control technology





New X20 generation for the future of automation

B&R presents a new generation of X20 controllers with Intel Apollo Lake I processors. The new controllers are distinguished by significantly higher performance, additional RAM and integrated onboard flash memory. In addition, this generation of controllers supports OPC UA over TSN and can be used as a field-level master in corresponding networks.

The new controller generation offers considerably more processing power than older X20 generations with the same compact design. The controllers are equipped with high-speed Intel processors and enable cycle times as fast as 100 µs. They also offer a large L2 cache, a faster floating point unit (FPU) and faster RAM access for optimal command processing.

Integrated flash memory

The new X20 controller generation has integrated flash memory. This allows them to be optionally operated without a CompactFlash card. In this case, the integrated flash drive replaces the functionality of the CompactFlash card.



As with all X20 controllers, up to 250 I/O modules can be connected directly to the controllers and line up seamlessly. The entire system saves a large amount of space in the control cabinet. Even with its compact design, the controller has a built-in power supply for itself and the connected I/O modules.

POWERLINK, TSN-enabled standard Ethernet, CAN, RS232 and USB are available as integrated interfaces. Additional interfaces can be added via interface modules.

Highlights

- Supports OPC UA over TSN
- Broad power spectrum
- With or without CompactFlash

X20 PLCs

	X20CP3684 X20CP1684	X20CP3685 X20CP1685	X20CP3686X X20CP1686X
CPU	0.4 GHz (comp.)	0.8 GHz	1.3 GHz
Fastest cycle time	400 µs	200 µs	100 µs
RAM	512 MB		1 GB
Non-volatile RAM	1 MB		
Integrated flash memory	1 GB		2 GB
Removable memory	Via USB flash memory and CompactFlash		
Ethernet	1x 10/100/1000BASE-T (TSN)		
POWERLINK			
OPC UA over TSN			
USB 2.0	2x		
Interface slots	3x/1x	3x/1x	3x/1x
RTC buffer time	Battery backed		

The power of a PC

With the new X20CP3687X PLC, B&R is taking industrial controller performance to a whole new level. It combines the performance of an industrial PC with the compact design of the X20 controller series. With powerful processing, additional RAM and integrated onboard flash memory, the high-performance controller can handle complex control algorithms or even robotics applications that previously would have called for an industrial PC.

With a TSN-enabled Ethernet interface, the X20CP3687X is perfectly equipped for the future of automation. It is fully prepared for communication using the manufacturer-independent communication standard OPC UA over TSN.

The controller comes standard with connections for USB and POWERLINK. Additional interfaces can be added via interface modules. Despite its powerful capabilities, the new module has exactly the same design and dimensions as all the other controllers in the X20 series.

Highlights



- For high-performance applications
- Compact design
- Supports OPC UA over TSN
- Future proof





X20CP3687X

Technical data

CPU	1.6 GHz
Fastest cycle time	100 μ s
RAM	2 GB
Non-volatile RAM	1 MB
Integrated flash memory	2 GB
Removable memory	Via USB flash memory and CompactFlash
Ethernet	1x 10/100/1000BASE-T (TSN)
POWERLINK	ETHERNET  POWERLINK
OPC UA over TSN	 OPC UA OVER TSN
USB 2.0	2x
Interface slots	3x
RTC buffer time	Battery backed

Double the storage capacity

B&R is expanding its Compact-S series with an additional compact controller. The new X20CP0484-1 is equipped with 512 MB RAM and 2 GB internal flash memory. It offers twice the RAM capacity of older Compact-S models and is ideal for applications that require a large amount of memory and high performance.

With a width of only 37.5 mm including the power supply, the X20CP0484-1 is a part of the compact controller portfolio. The controller achieves cycle times of up to 400 μ s. With Ethernet, POWERLINK, USB and RS232, the controller offers plenty of communication options. An optional CAN interface is also available. With no fans or batteries, it is also maintenance free.

Highlights

- Double the RAM
- Extremely compact
- Maintenance free
- Future proof



Cost-effective motor/valve control with PWM

The new digital output module X20D04332-1 has integrated pulse width modulation and is a cost-effective alternative to motor modules.

Pulse width modulation (PWM) is mainly used for controlling larger loads, such as motors. Instead of using electronics to regulate a continuous input voltage down to the desired motor voltage, the motor is controlled by the width of the switching pulses. This process saves a considerable amount of energy.

In addition, the module offers a dither function that prevents valves from sticking. This is particularly common when valves are held for extended times at a constant position, especially in liquids. When using the dither function of the X20D04332-1, the valve oscillates slightly around the position setpoint to prevent it from sticking. The X20 module is equipped with 4 outputs with 3-wire connections and offers a nominal output current of 2 A.



Highlights

- Power savings with PWM
- No valve sticking
- Low-cost alternative to motor modules

PC and panel systems





Operator terminal for high-end applications

B&R has added an operator terminal to its Power Panel T-Series for demanding web-based HMI applications. The new Power Panel T80 is equipped with a multi-touch glass front and is available in display diagonals ranging from 7" to 15".

The powerful Intel Atom processor enables versatile, dynamic web-based HMI and, in combination with the elegant glass front, is suitable for high-end machine design. Integrated edge protection safeguards the glass front during harsh everyday operation. The shallow installation depth makes the devices easy to mount in either a control cabinet or swing arm system.

Easy configuration

The Power Panel T80 comes with an integrated service page. This opens without having to be installed and allows configuration of the IP address, DHCP server and screen saver. These settings can easily be saved on a USB flash drive and copied to other Power Panel T80 devices.

Easy operation

The multi-touch technology makes it possible to integrate commonly used gestures like swiping and zooming for intuitive, clearly structured user guidance. The projected capacitive touch screen

responds precisely and reliably, even when operated while wearing thick leather gloves.

Optimized operating system

The Power Panel T80 operating system is optimized and completely protected against unwanted changes made by application programs. At runtime, application data is stored exclusively in the volatile random-access memory. Data fragmentation therefore poses no risk to the performance and stability of the operating system, even after years of operation. In addition, the operating system is protected from tampering.

The T80 rounds off the upper end of B&R's operator terminal portfolio. Together with the T50 and T30 variants, B&R offers a comprehensive portfolio that is scalable over a wide range in terms of cost and performance.

Highlights

- Modern web-based HMI
- Easy operation
- Easy configuration
- Elegant design





Power Panel T80 – Powerful operator terminal

Easy handling

Projected capacitive touch screen
Elegant glass surface
Gloved operation

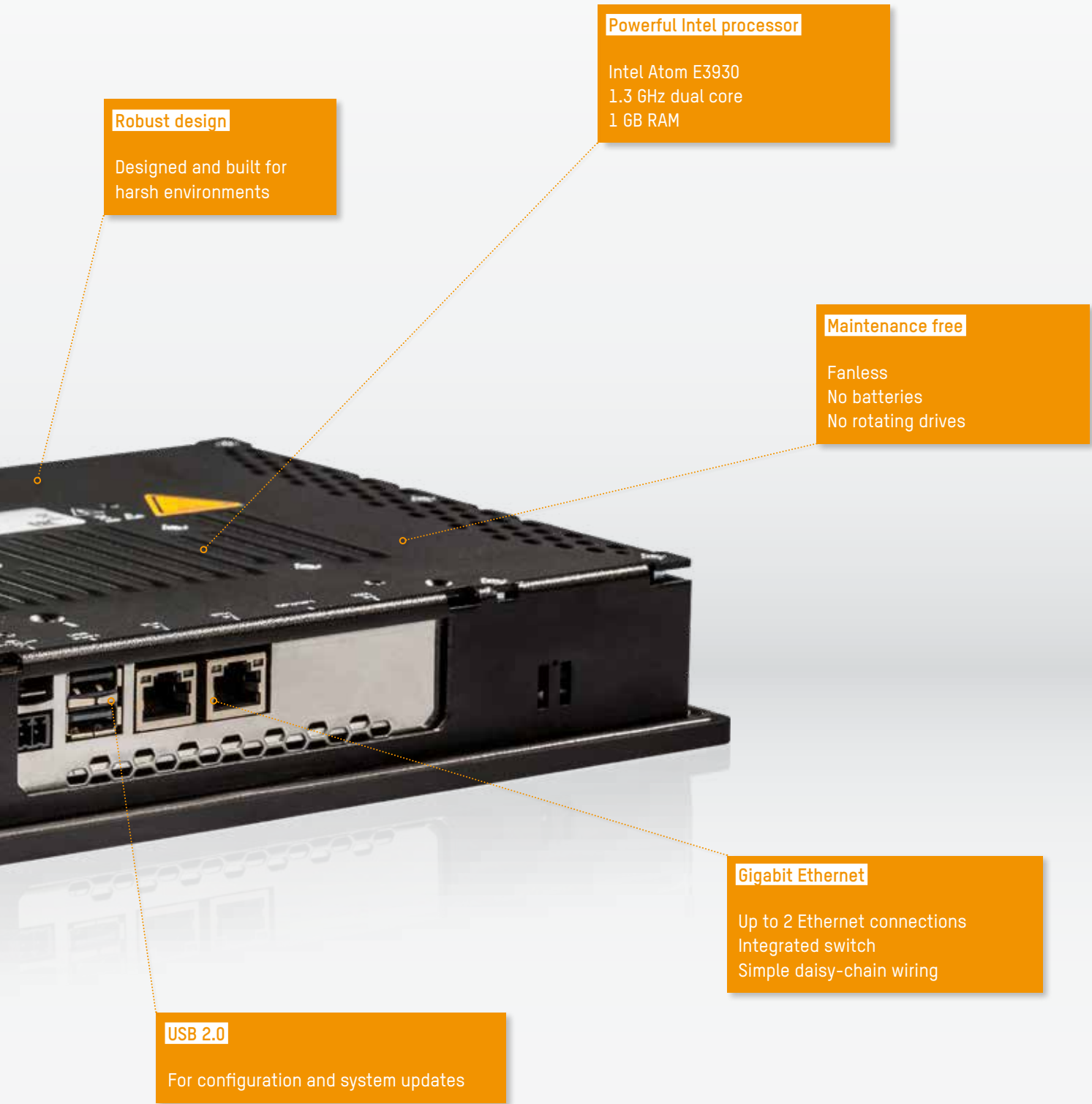
Versatile

Widescreen displays
7.0" / 10.1" / 12.1" / 15.6"

Convenient configuration

Using the integrated service page





Robust design

Designed and built for harsh environments

Powerful Intel processor

Intel Atom E3930
1.3 GHz dual core
1 GB RAM

Maintenance free

Fanless
No batteries
No rotating drives

Gigabit Ethernet

Up to 2 Ethernet connections
Integrated switch
Simple daisy-chain wiring

USB 2.0

For configuration and system updates

Power Panel C80 with integrated controller

The Power Panel C80 offers the combined advantages of a powerful controller and a modern operator terminal in a single HMI device. The C80 is installation-compatible with the Power Panel T80 and B&R Automation Panels. This gives users free rein to optimize the performance and costs of their machine.

On the powerful Intel Atom processor, B&R's Automation Runtime real-time operating system runs parallel to a Linux operating system for the HMI server. This is made possible by B&R Hypervisor, which allows the two operating systems to share processing resources without impacting each other's performance.

I/O modules, motion control axes and safety components can be connected directly to the panel. There's no need for additional controllers. The front of the panel provides IP65 protection, making this device extremely well-suited for harsh industrial environments.

The C80 comes with two USB interfaces, one Ethernet interface, one POWERLINK interface and one X2X Link interface. Connections for CAN and RS232/RS485 are available as optional add-ons. The panel is completely maintenance-free, fanless and does not require batteries.

Versatile

Widescreen display
7.0" / 10.1" / 12.1" / 15.6"
Projected capacitive glass touch screen
Gloved operation



USB

For program and system updates
Freely available for control applications

POWERLINK

Connection of I/O modules, axes and safety equipment
Completely free choice of topology



Powerful processor
Intel Atom E3930
1.3 GHz, dual core
1 GB RAM
64 KB for remanent variables

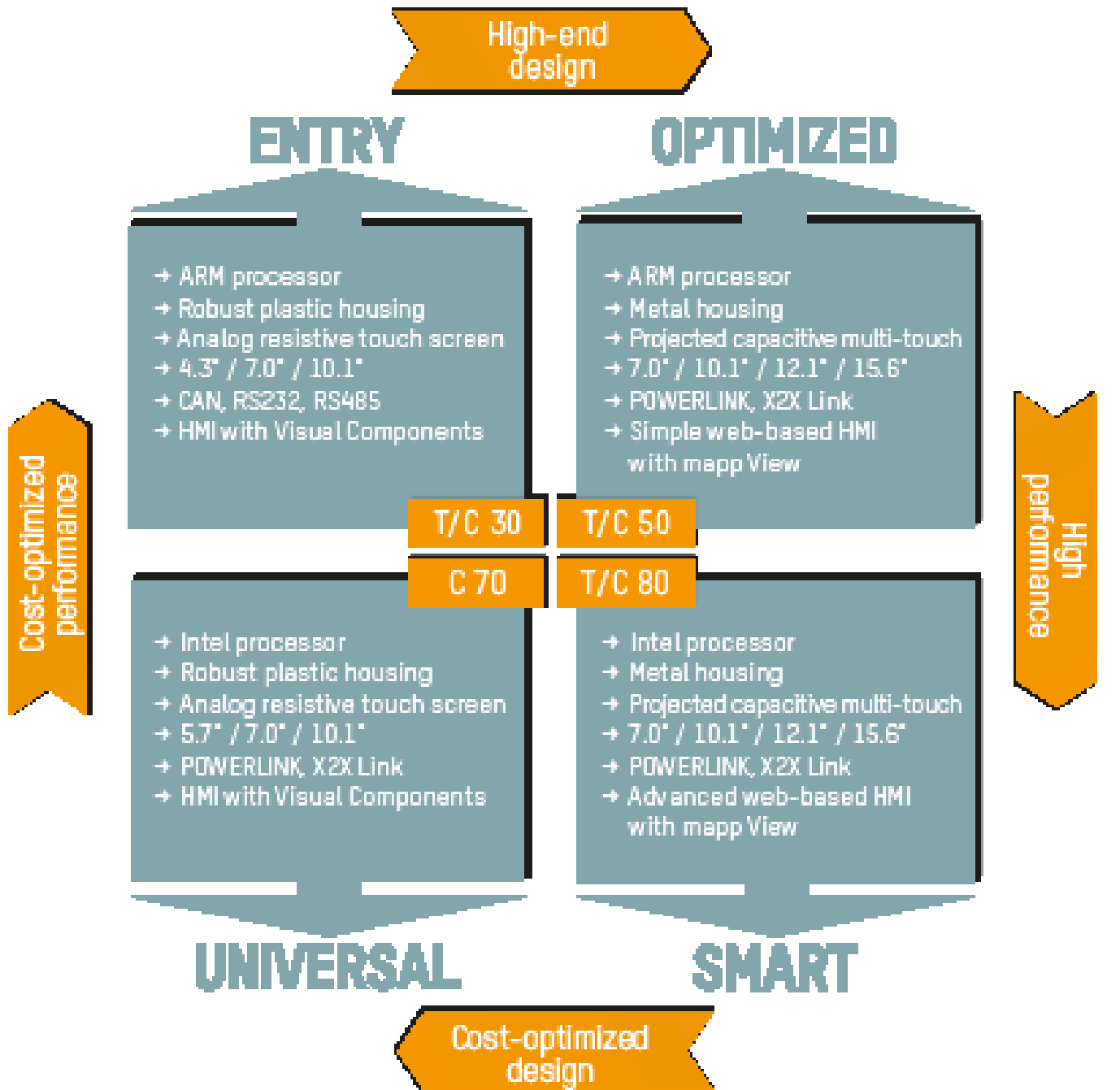
LED status indicators
Easy on-site diagnostics

Maintenance free
Fanless
No batteries
Nonvolatile real-time clock

Local expansion
Connection to X20 and X67 I/O modules
Span up to 100 m

Optional connections
CAN
RS232, RS485

Ethernet
Higher-level communication, e.g. with
OPC UA





Using the advantages of mapp View

The powerful C80 and T80 Power Panels are ideal for running mapp View HMI applications. With the mapp View software package, B&R offers direct access to the wide world of web technology right from the engineering environment. Automation engineers have all the tools they need to create powerful and intuitive HMI solutions. There is no need to deal directly with HTML5, CSS and JavaScript technology.

B&R has encapsulated the HMI functions in widgets, which the developer can simply drag and drop onto the desired page and configure them there. mapp View is based entirely on web standards, ensuring optimal viewing on any device. The display content can easily be customized for different users and user groups.

Ultra-thin Power Panels for swing arm systems

B&R now also offers its Power Panel T-Series and C-Series for swing arm mounting. The compact terminals feature all-round IP67 protection and are perfectly suited for use right at the machine. The devices are available in widescreen format in five sizes from 5.0" to 21.5". With an embedded browser, Power Panel T50 Field HMI terminals are well-suited for displaying web-based mapp View HMI applications.

The devices are either 16.5 or 26 mm deep, depending on the display diagonal, and designed for mounting on a swing arm, where they can be easily swiveled into the operator's preferred position. The Power Panels can also be installed on VESA mounting units. The FT50 terminals have a Power over Ethernet (PoE) connection, which means only a single cable provides both power supply and network communication.

Easy operation

Power Panels are easy to configure and perfectly complement a high-end machine design. The multi-touch technology makes it possible to integrate commonly used gestures like swiping and zooming for intuitive, clearly structured user guidance. The projected capacitive touch screen responds precisely and reliably, even when operated while wearing thick leather gloves.





The ultra-thin widescreen devices are available in five sizes from 5.0" to 21.5".

The right info at the right time

With a Power Panel FT50 running a web-based mapp View HMI application, operators have access to the information they need, when and where they need it. mapp View allows automation engineers to create easy-to-use HMI solutions without any background in HTML5, CSS or JavaScript programming. With just a few clicks they can set up features like two-hand confirmation for critical operations.

Highlights

- Easy operation right at the machine
- Space savings
- Simple installation

Efficient data processing with M.2 memory card

Automation PC 3100 and Panel PC 3100 industrial PCs will now have additional mass storage options. In addition to CFast cards, it is also possible to use M.2 modules with up to 1 TB of memory. This type of memory offers fast access and an especially long lifespan.

M.2 memory modules are very compact and are based on MLC technology. Their high throughput makes them particularly attractive for data-intensive applications. Together with the two CFast slots, each PC can now be equipped with a total of three mass memory modules.

Easy configuration

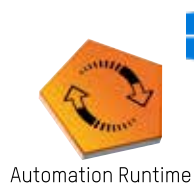
The M.2 memory is available in the form of an interface module. It can be factory-installed or added on by the user.

Future-proof and reliable

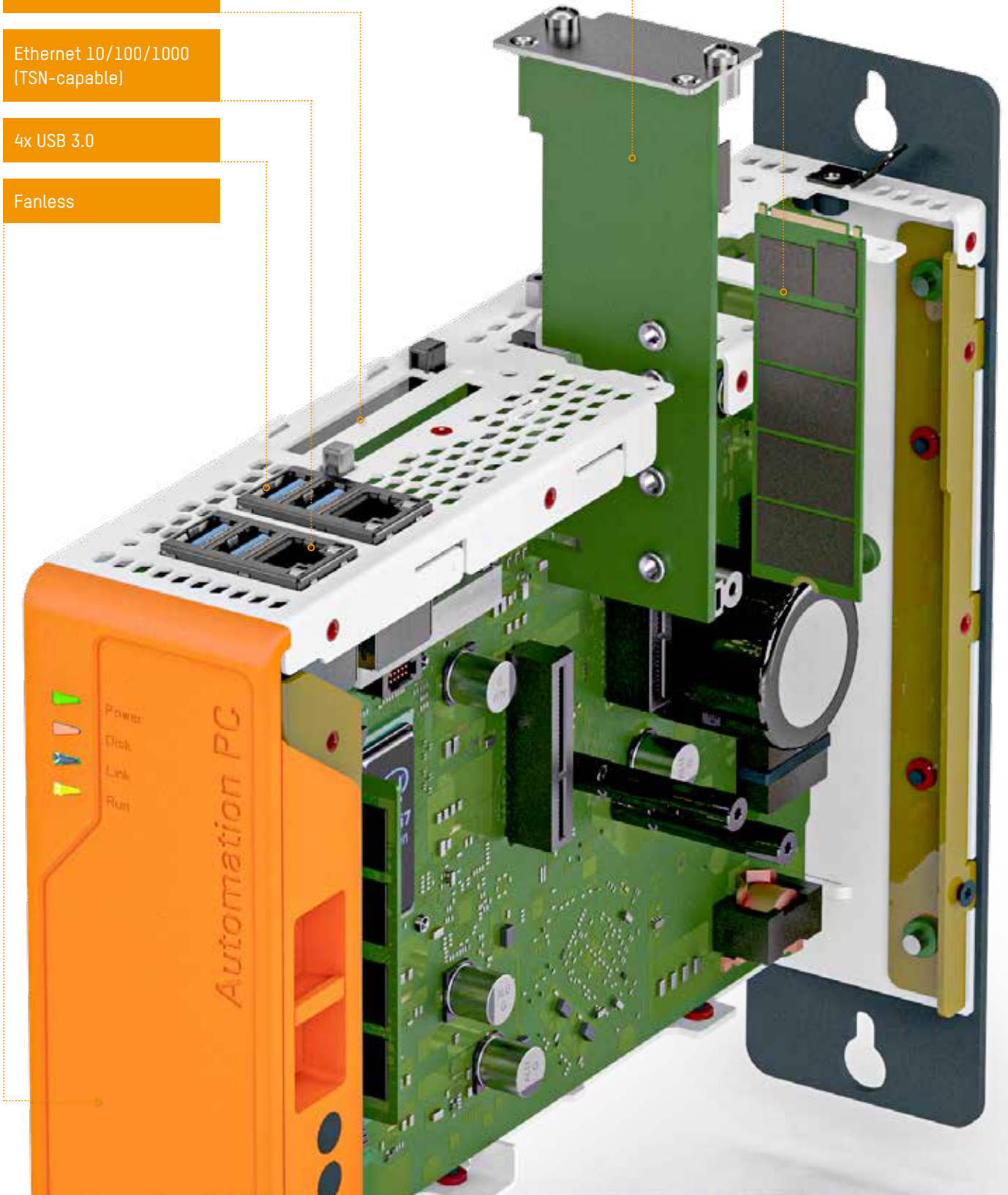
B&R's industrial PCs boast a fanless design that allows for maximum robustness in industrial applications. Each PC and panel is subjected to comprehensive function testing prior to shipping. This makes them an extremely future-proof investment.

Highlights

- Up to 1 TB of mass storage
- High-speed data processing
- Long-term availability



- Interface card with M.2 module
- 2x CFast
- Ethernet 10/100/1000 (TSN-capable)
- 4x USB 3.0
- Fanless



Software





Software engineering



Electrical engineering



Mechanical engineering



Modular development

Parallel development

IEC 61131-3

Control

Motion control

Safety technology

HMI

New possibilities with mapp View

Creating a powerful web-based HMI application is now easier than ever. The new features available in mapp View simplify and accelerate the entire development process. A new visual editor makes it easy to quickly program logic for the machine HMI.

Simply connect the different blocks and create logic with just a few clicks. In addition to being able to combine actions and events as needed, event-based programming allows domains to be managed as separate logical entities, keeping things as clear as possible. The event-based logic can even be debugged via the web-based interface, with all triggered actions and events clearly depicted across a timeline.

Custom keyboards

To further improve the user experience, new functions are also being introduced that allow you to define the keyboard layout and other basic input methods. In addition to the standard BSR keyboards, users can now configure their own custom keyboards. From input validation to layout and design, the keyboard can now be fully tailored to your requirements.

Dynamic widget sizing

The ability to have widgets resize dynamically is an essential requirement to ensure important data is always displayed clearly. mapp View is taking dynamic resizing to the next level with the introduction of the new FlexLayoutPanel widget and a new AutoSize function.



Widgets resize automatically and the content adjusts to match, preventing truncated texts and jumbled layouts. The result is a clear and attractive user interface at all times.

Displaying historical data

The new OnlineChartHDA widget displays historical values of process variables. This widget collects data from an OPC UA-HDA interface for display in advanced graphs. The data itself is sampled on the OPC UA server and transferred to the HMI application over the standard OPC UA-HDA interface. All settings, including the sampling time and buffer size, are configured on the server.

Once the data is collected by the widget and displayed in a clean graph, advanced controls make it possible to quickly and easily navigate and zoom through the data to get exactly the information you need. And it's not just useful for viewing historical information from mapp View; real-time process data is also displayed.

Highlights

- Fast programming with machine visualization
- Custom keyboard layouts
- Dynamic widget sizing
- Visualization of historical data

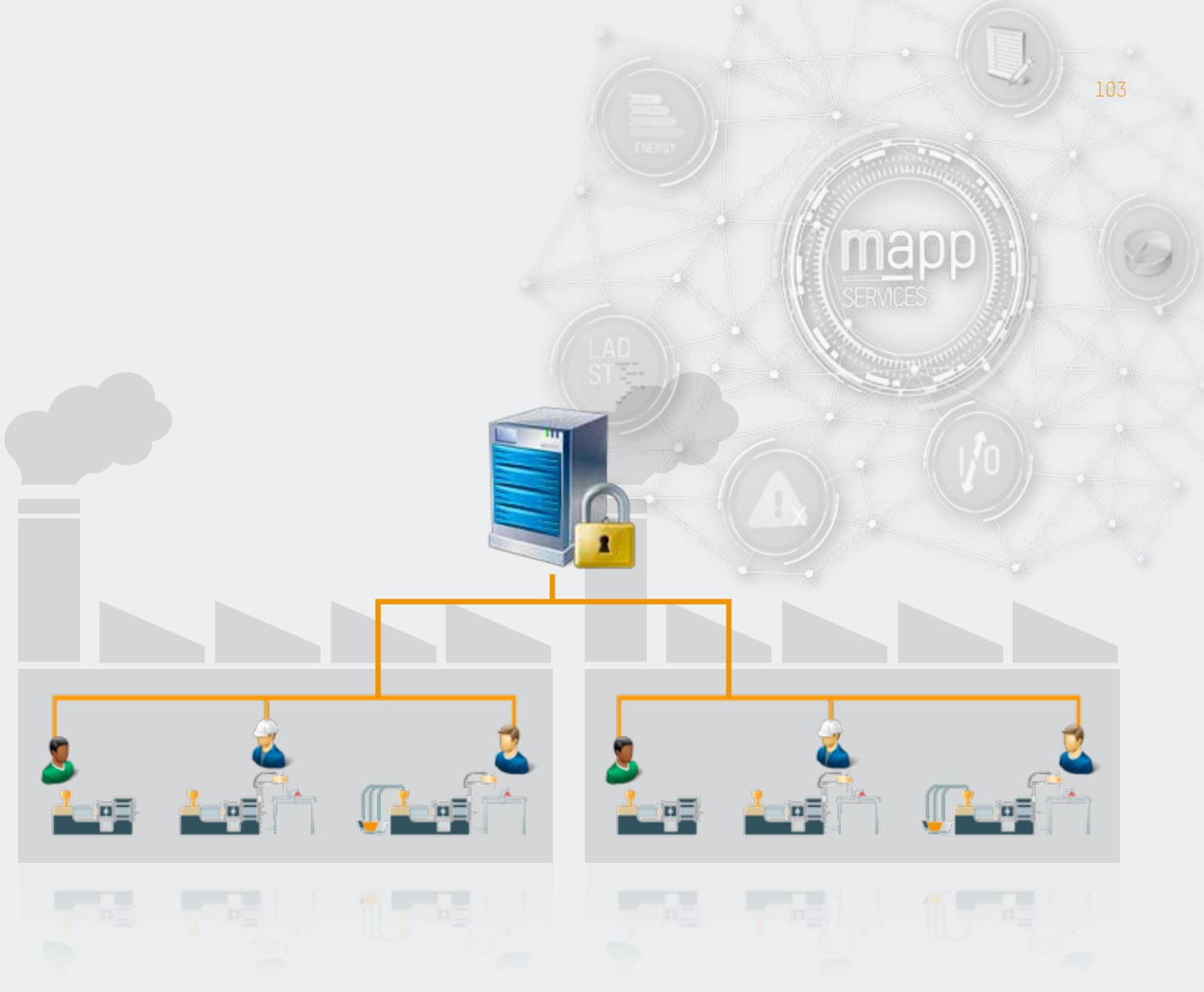
Centralized user management with mapp Services

Every machine has its own unique configuration. This includes user accounts and login data. Keeping track of users, credentials and configurations for a large machine park can be a challenge. With the new mapp UserX Central User Management solution and Microsoft's Active Directory, this challenge can be overcome through the use of simple individual and group policies.

mapp UserX Central User Management makes it possible for the machine itself to log into an Active Directory server; in addition, users no longer have to be defined directly on the machine. Instead, all users and user groups are defined

centrally on the Active Directory server, which is also responsible for managing the different accounts and permissions.

This way, users can log into and operate any machine within the corporate network and perform any operations authorized for their respective group and role. Active Directory groups and user roles can be defined using either Automation Studio or mapp Cockpit. An intuitive, web-based setup tool makes it easy to assign which groups are allowed to perform which actions on a particular machine – opening up a wide variety of possibilities for user/role management throughout the plant.



Once deleted from Active Directory, a user is immediately disabled and thus no longer able to operate any of the machines on the network. Active Directory can also be used to store additional user data. This allows machines to access user profile pictures, email addresses, language preferences and any other information or settings stored in Active Directory.

If mapp Audit is also used, the machine can log user management events such as when a user logs in or changes a password. All other events recorded by mapp Audit also contain information about the user who was operating the machine at that time.

Highlights

- Centralized user management for all machines
- Logging of all events
- Easily enable and disable users

Increased precision with mapp Control

All control functions – from a basic PID controller to a highly complex crane or hydraulics controller – are accessed via a uniform, easy-to-use interface with mapp Control. The new functions make creating applications easier and faster than ever.

Highlights

- Grouping of pumps and zones
- Faster commissioning
- Once created, software can be used for all machine types
- Increased control precision with new algorithms

mapp WEB HANDLING

Shortened commissioning time

The mapp Web Handling package is being expanded with a new multi-zone tension control feature that makes it possible to group multiple zones together for more consistent control performance. Consistent control across all zones makes it possible to respond faster to

deviations. The advanced autotuning function makes it easy to identify the optimal controller parameters for closed-loop tension control – automatically and quickly – substantially reducing machine commissioning times and optimizing product quality.

mapp HYDRAULICS

Easy configuration

mapp Hydraulics now makes it possible to group and control pumps as a single unit. From simultaneous autotuning to more balanced load distribution, this helps optimize the overall performance of the hydraulics system. An entire machine with hydraulic drives can now be designed and put into operation through confi-

guration alone, drastically reducing the programming overhead. If a process that previously required three pumps now only requires one, for example, this can be handled by simply changing a few parameters. Out-of-the-box solutions for both simulation and autotuning further reduce machine commissioning times.

mapp PLASTICS

One software for all machine types

mapp Plastics provides a full spectrum of functions for designing hydraulic, electric and hybrid injection molding machines. This includes functions such as movement profile generation and mold protection, which can be implemented directly on fully electric injection molding machines. Whether the machine is fully electric, hydraulic or a hybrid of the two is easily defined in the configuration – the

interface is the same for all types. Once the software has been programmed, it is available as-is for all machine types. This way, it is possible to reduce the number of applications to maintain by managing a single project. The system – part of the mapp Control software package – manages all communication that takes place during the process as well as any interactions with mapp Motion.

mapp TEMPERATURE

More precise temperature control

Continued development of the mapp Temperature algorithms brings further improvements in control performance, delivering precision that meets the requirements of the most challenging heating and cooling processes. A newly developed autotuning process now allows tuning to be started at any time, even while the machine is running. Minor adjustments to the temperature around the operating point help identify the optimal control parameters for suppressing disturbances or

optimizing alternating heating/cooling control. In addition, a new ramp-up procedure has been implemented in the temperature controller that gives the user more freedom to configure the temperature process. It's possible to set an intermediate temperature, how long it should take to reach it and also how long it should stay there. This is critical for materials that must be heated gradually to prevent undue strain or allow for evaporation.

Detailed machine analysis with mapp Cockpit

mapp Cockpit is a modern, easy-to-use tool for machine commissioning and diagnostics. It features a web interface for high-precision signal analysis as well as numerous options for performing in-depth analysis of changes to variable values recorded over time by Universal Trace. You therefore have everything you need without having to install an extra tool.

mapp Cockpit provides a clearly organized interface where users can do things like operate axes and axis groups from mapp Motion. The commands for the components – which are otherwise available as function blocks – are easily executed with the simple push of a button. The behavior of the components can be observed live via the Watch window. Here, all relevant values are displayed in graphic form.

Universal Trace function

A systemwide Universal Trace function allows for a very detailed analysis of a machine's behavior. Machine data with different sampling rates can be recorded and evaluated together. Data from mapp components can be combined as needed with information from drives and variables from the controller. A sampling time as fast as 50 μ s can be achieved.

Trace analysis

When it comes to analyzing complex interrelationships, a simple overview of how signal values change over time is rarely sufficient. The mapp Cockpit web interface offers functions such as differentiation, integration and the possibility of viewing values in a specific frequency domain. Resonant frequencies thus become visible and can subsequently be damped with the aid of filters. Data can also be displayed in logarithmic scales. This makes analysis not only more simple, but much faster as well.

Support for new mapp Technology packages

The current focus of mapp Cockpit development is on integrating new functions. This makes it possible, for example, to confirm a safety-relevant module exchange via the web interface and to adapt machine operation to changing situations.

Highlights

- Integrated analysis tool
- New mapp functions supported
- Intuitive operation





New simulation possibilities with Automation Studio

With a bidirectional interface between the MATLAB/Simulink simulation tool and B&R's Automation Studio engineering tool, B&R has significantly reduced the development overhead for new machines. New functions for Automation Studio Target for Simulink include the ability to feed condition data from the real machine back into the Simulink simulation, as well as new analysis options and an optimized testing environment.

The new Hot-Plug function enables direct data exchange between a MATLAB/Simulink model and any B&R target system – without the intermediate step of code generation. This allows real machine data to be transferred in real time to the MATLAB/Simulink environment for analysis and greatly simplifies data management.

MATLAB/Simulink toolboxes for deep learning, statistics, machine learning and predictive maintenance are easier and faster to use for real machines in the field.

Predictive maintenance

The ability to draw real machine data from the field into the simulation model helps optimize maintenance cycles. Comparing the behavior of the real machine against that of the model makes it possible to identify early signs of impending failure, such as worn or damaged bearings. Data is prepared and pre-processed in MATLAB/Simulink, and can then be transferred to the cloud via a B&R Edge Controller. OEMs can apply the newly gained insight to their entire machine fleet all around the world.



More possibilities for analysis

With B&R's new WebView function, the MATLAB/Simulink model can be exported either as generated code or a block diagram. The programmer can then open the block diagram in Automation Studio's web interface. The model running on the target system can be analyzed using a simple web browser, without needing any special software.

Optimized test environment

The WebView function also extends the options available in the Automation Studio testing environment. Quick verification of the generated code is often required. This function not only reads and writes input and output variables, but also analyzes the values of signal waveforms.

The Hot-Plug and WebView functions make it even easier to perform reproducible tests and virtual commissioning of a new machine as well as to analyze and optimize the machine's overall performance. The functions can also be used during operation to help prevent failures through early detection of deviations, faults and defects.

Highlights

- Link to any target system without code generation
- High-speed processing of machine data
- Easy to use
- Optimized testing environment

Safety technology





Full safety following network failure

B&R is now equipping its drive technology portfolio with a Blackout mode. This enables coordinated, safe machine control in the event of a network failure. Even without costly redundancy solutions, machine downtime can be prevented and maximum availability guaranteed.

The Blackout function enables the safe variants of B&R servo drives (ACOPOSmulti, ACOPOSmotor or ACOPOS P3) to continue operation in the event of a network failure. Safety functionality remains intact.

Maximum availability

To avoid the painfully high cost of stopping production, machinery needs to have availability designed in from the ground up. Intelligent safety technology plays a critical role in preventing downtime and production outages.

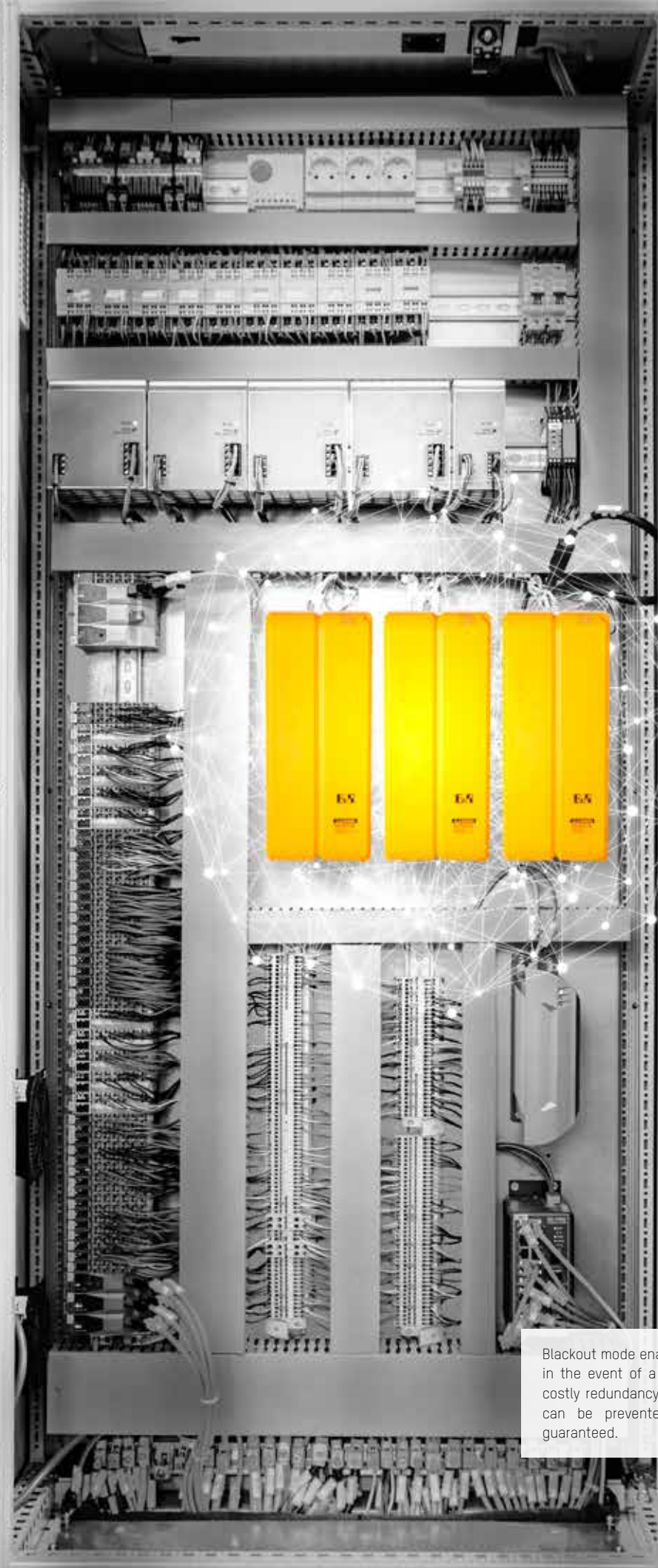
With the new Blackout mode, B&R helps ensure maximum system availability even in the event of a network failure.

Controlled shutdown

Blackout mode allows configuration of simple safety sequences. Applications in lower-level systems continue execution even after a network failure. An axis group, for example, can be brought to a stop or moved to a defined position.

Highlights

- Avoid machine damage
- Maximum availability
- Controlled shutdown



Blackout mode enables coordinated, safe control in the event of a network failure. Even without costly redundancy solutions, machine downtime can be prevented and maximum availability guaranteed.

A perfect match – ABB Jokab sensors and B&R safety technology

ABB Jokab's proven range of innovative safety sensors can now be used directly with B&R's integrated safety technology. The ABB Jokab safety portfolio includes a complete set of safety guard locking devices, light curtains and safety mats.

With the integration of the ABB Jokab safety portfolio, B&R users have access to a sensor portfolio that is compatible and coordinated with B&R safety technology. The wide range of safety sensors will make it easier than ever to implement safety concepts. Products from the ABB Jokab safety portfolio are simply wired to the safe I/O channels of B&R safety controllers. The combined portfolios open up many new possibilities in the area of integrated safety technology.

Maximum reliability

Both B&R and ABB Jokab safety products satisfy the requirements of ISO 13849-1 up to PL e / Cat. 4. The highest level of certification guarantees maximum safety.

Reduced costs

ABB Jokab safety sensors support the wiring of a safety function with multiple different sensors connected in series. This could be used, for

example, to connect a series of safety gates. This approach reduces cabling and installation costs immensely and thus also reduces the number of safe input channels required. The series connection does not change the maximum safety level of PL e / Cat. 4.

Revolutionary technology

ABB Jokab safety offers a comprehensive range of safety components that greatly simplify the design of protection and safety systems. The proven range of innovative safety products includes the well-known Eden series of inductive gate switches and Safeball devices for two-hand control.

Highlights

- Compatible and coordinated sensor portfolio
- Easy implementation of safety concepts
- Proven products: Eden, Safeball and many more
- Series connection of sensors with PL e / Cat. 4



Safeball can be used for two-handed applications and minimizes the risk of accidental activation.



The non-contact Eden safety sensor ensures that a machine stops when a safety gate or hood is opened.



The ABB Jokab safety portfolio includes a complete set of safety guard locking devices, light curtains and safety mats.

Mobile automation





Powerful PC for mobile machinery

A powerful PC with an Intel Core i processor rounds off B&R's portfolio for mobile machines. The Automation PC mobile 3100 offers IP69K protection and is specially designed for use in harsh environments. Its high performance makes it optimally suited for smart machines that communicate with each other and with the cloud.

The Automation PC mobile 3100 features a 7th-generation Core i processor from Intel. Performance can be scaled from a 2.2 GHz Celeron processor to a 2.8 GHz Core i7. It offers up to 16 GB RAM and 480 GB of flash memory, and is equipped with a TPM module. It also supports standard operating systems like Windows 10 IoT Enterprise and Linux. The PC's computing performance enables implementation of semi or fully autonomous machine functions.

Used in harshest environments

It has a particularly robust construction and is resistant to shock, vibration, salt, UV light and oil. Despite the housing being completely sealed, it is

also fanless. A specially developed temperature management system allows it to be operated from -40 °C to +85 °C surface temperature.

Modular expansion

The PC is insensitive to voltage fluctuations. In addition to a broad standard voltage range from 9 to 32 V, it also has integrated load dump protection. This compensates for peaks in the supply voltage to protect the electronics and ensure uninterrupted operation. Two internal slots allow the PC to be expanded modularly with additional communication interfaces.

Highlights

- Suitable for use in harsh environments
- Standard operating systems: Windows and Linux
- Scalable performance up to Core i7 processor (2.8 GHz)



The PC for mobile machinery has two ports each for USB and Fast Ethernet, as well as two slots for PCIe option boards.



Full ISOBUS integration

B&R offers an ISOBUS stack for agricultural equipment, providing standardized communication between tractors and implements. ISOBUS is a CAN-based communication protocol that enables machines from different manufacturers to exchange data. As a member of the Agricultural Industry Electronics Foundation (AEF), B&R offers an optimal solution for the industry with the new ISOBUS stack.

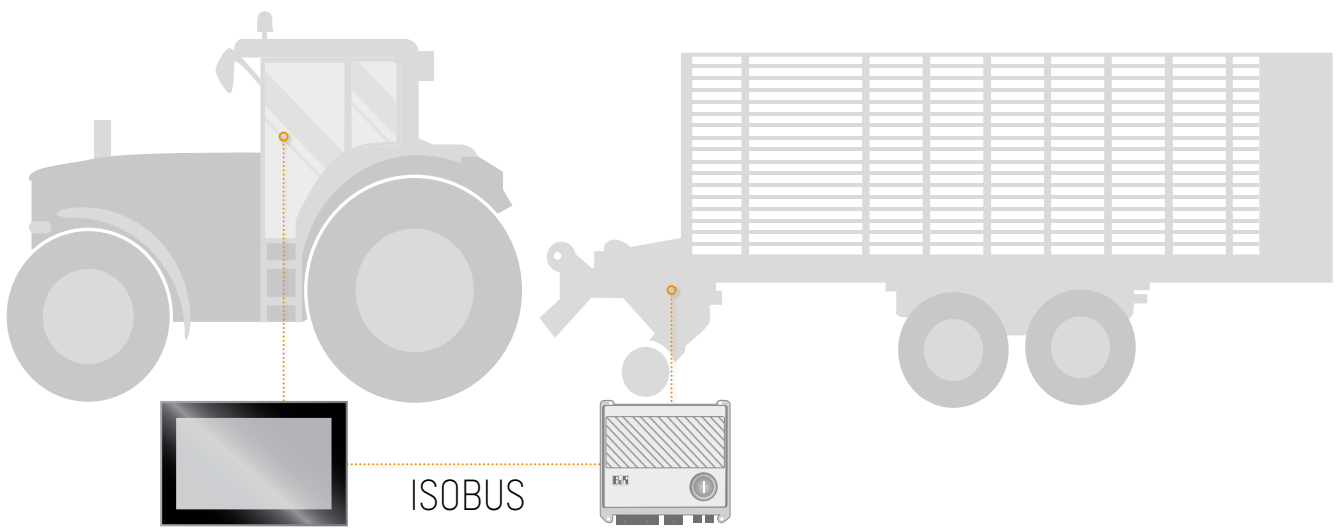
The ISOBUS stack from B&R covers all the relevant aspects of the ISOBUS standard. That includes Universal Terminal, Auxiliary Control, Task Controller (basic and geo-based), Task Controller Section Control and Basic Tractor ECU. The stack is being expanded with new functions all the time and tested for compatibility at ISOBUS plug fests. B&R offers comprehensive development support and a selection of training courses and seminars. Extensive simulation possibilities facilitate efficient and cost-effective project development.

Certified hardware

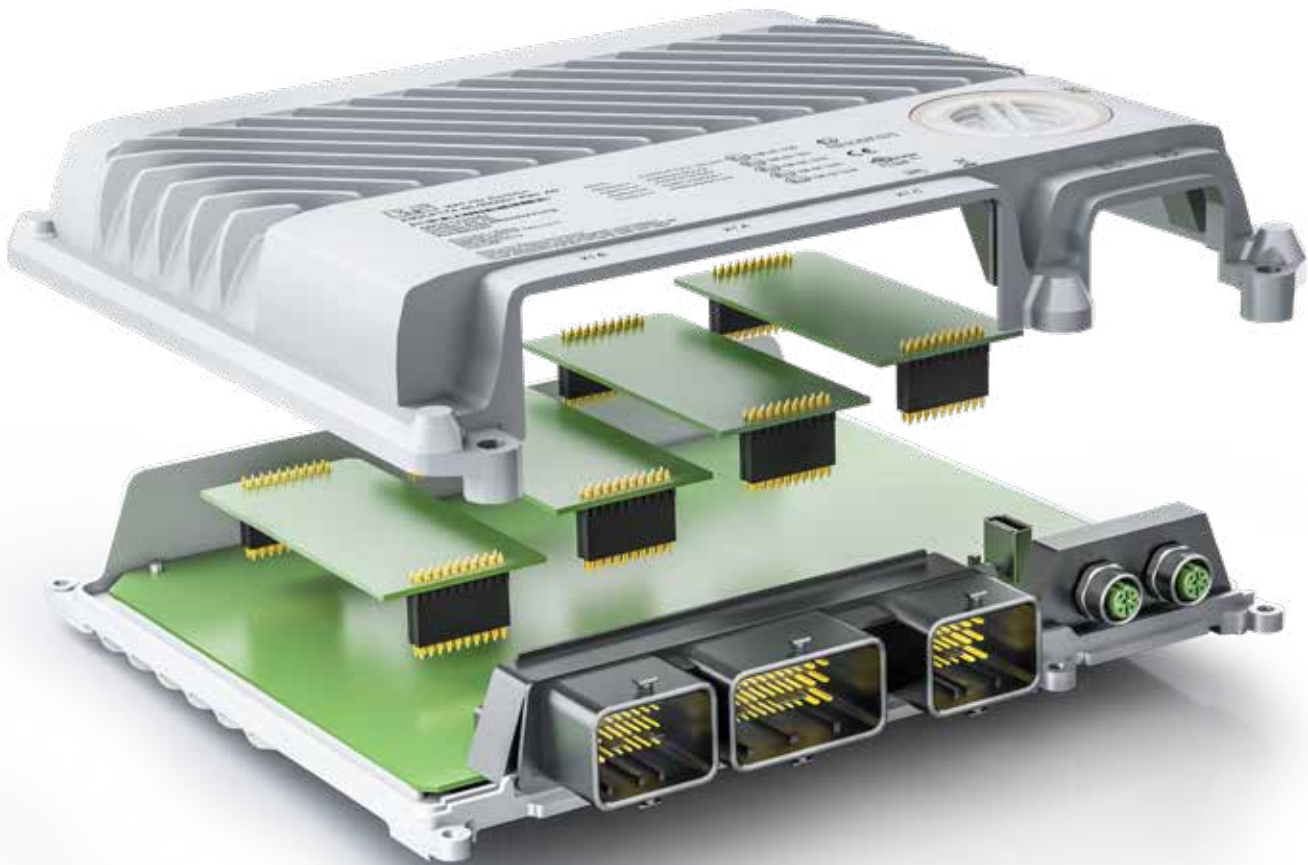
In addition to the software, the X90 control hardware also complies with the requirements of the ISOBUS standard. B&R has therefore had its system verified by the independent ISOBUS Test Center (ITC). The lab tests confirmed that the X90 controller is suitable for use as an ISOBUS task controller.

Highlights

- Vendor-independent communication between agricultural machines
- Simulation tools for efficient project development
- Certified hardware



New possibilities with X90



B&R is expanding its mobile automation portfolio with two new option boards for the X90 controller. They make it possible to connect stepper motors and IO-Link sensors. There are also new software functions available for the controller. They can be used to do things like measure resistance. The available PWM outputs allow configuration of dither and H bridge functions.

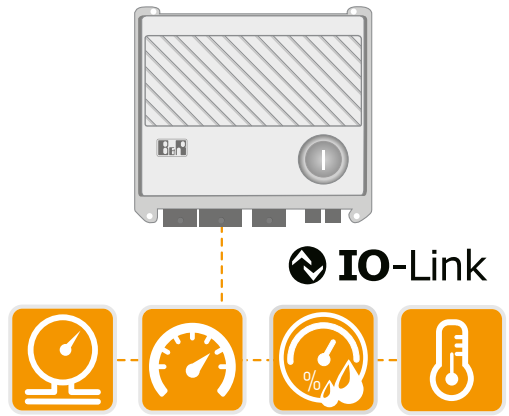
Highlights

- IO-Link master for intelligent sensor connections
- Integrated stepper motor control
- Easy temperature measurement



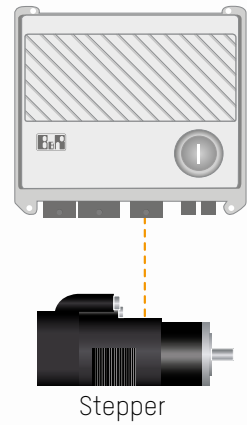
Intelligent sensor connections with IO-Link

B&R is expanding its portfolio of option boards for mobile automation to include an IO-Link master module for communication with up to four intelligent IO-Link sensors. This bidirectional digital communication interface allows IO-Link to exchange parameter data and diagnostic information, thus making it possible to intelligently connect sensors and switching devices to the X90 controller. This makes IO-Link the ideal addition to real-time Ethernet POWERLINK and to CAN-based networks.



Direct control of stepper motors

With the X90 module, B&R is expanding its product range to include an additional X90 option board for direct control of stepper motors. No external hardware is required. Unique on the market, the option board can be used to operate two stepper motors with operating voltages from 9 to 48 VDC at nominal currents up to 4 A.

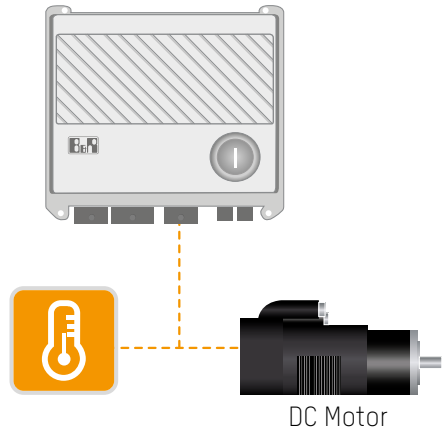


Stepper



Expanded I/O driver functionality

The functionality of the I/O driver is being expanded to measure resistance from 0-50 kΩ. This makes it possible to measure temperature without the use of option boards. It also allows direct control of DC motors via an H bridge circuit. To improve controllability of hydraulic valves, the PWM fundamental frequency of 1 kHz will be raised to 4 kHz. The dither function is easy to configure.



DC Motor



B&R controls for railway vehicles

The X90 product line can now be used on railway vehicles. The system has been certified by TÜV SÜD Rail in accordance with EN 50155 (electronic equipment on railway vehicles) and EN 50657 (software used on railway vehicles). The requirements include high product quality and a high level of robustness to harsh environmental conditions.

Among other topics, EN 50155 describes how electronic open and closed-loop controllers used

on railway vehicles are to be installed and documented with regard to environmental and EMC conditions. EN 50657 specifies the process and the technical requirements for software development.

Optimal for use under extreme conditions

B&R's X90 series stands up to the demands of use in railway vehicles. That includes resistance to shock and vibration as well as electromagnetic compatibility. X90 products also offer IP69K



protection and are resistant to moisture, salt, UV light and oil. They can be used in a temperature range of -40°C to $+85^{\circ}\text{C}$.

Independent support

TÜV SÜD Rail cooperates with B&R and is familiar with the X90 product line. This greatly simplifies the certification process for specific applications and for complete railway vehicles.

Highlights

- X90 products for railway applications
- Designed for the harsh conditions faced by railway vehicles
- TÜV SÜD Rail as independent partner

Process and factory automation





Intelligent lifecycle management for maximum security

B&R has updated its lifecycle management strategy for the APROL industrial control system. In addition to the usual main releases and security patches, B&R will now also provide monthly operating system updates. APROL is now better prepared than ever for the implementation of modern cybersecurity strategies.

Modern industrial control systems (ICS) rely on commercial off-the-shelf software products (CTOS). This increases their susceptibility to cyberattacks. Measures must therefore be taken to reduce this risk to an absolute minimum.

Cybersecurity strategy

Well-planned lifecycle management is an important component of an overall cybersecurity strategy. Regular installation of patches, firmware updates, BIOS updates and security certificates ensure that any vulnerabilities are quickly eliminated.

Each release of B&R's APROL software remains in the "Active" phase for four years. As soon as a new release is available, the status of the previous release changes from "Active" to "Classic". In both of these phases, B&R provides security updates for the Linux operating system. New functions are made available annually with a new build of the



current release. In the subsequent "Limited" phase, updates are no longer provided.

The APROL system software is maintained through the installation of patches. Each patch is created for a specific build and contains all of the available bug fixes. The interval with which this occurs depends on the severity of the bugs to be fixed.

Regular updates

For the underlying Linux operating system, B&R now provides monthly updates. B&R tests the available updates for the Suse Linux Enterprise Server together with the APROL system software

intensively prior to releasing them.

For each (annual) APROL build version, the monthly update occurs 14 times, after which four more updates are provided at a six-month interval. They are provided in the form of an AutoYaST DVD, which can be downloaded as an ISO image.

Highlights

- Software always up-to-date
- Improved security
- Regular addition of new functions

Security cells protect against cyber threats

B&R has updated the user management functionality of the APROL process control system. Each multi-runtime server now has its own LDAP server (389 Directory Server). Distributed autonomous systems with security cells are now easy and efficient to implement – without losing system continuity.

Large systems are divided into security cells to protect them against cybersecurity threats. This ensures that any damage from a potential attack is contained within the cell, while at the same time increasing system availability. When planning the security cells, the system is first divided into process cells, before implementing security measures that divide it into security cells.

Process cells represent certain production-relevant zones, sections, partial areas or partial plants, which must be capable of operating autonomously for a certain period of time without a connection to any other cells. All network communication in these cases is exclusively local.

A security cell comprises one or more process cells. Access to the security cell is restricted to authorized personnel. Both people and devices must be authenticated and authorized.

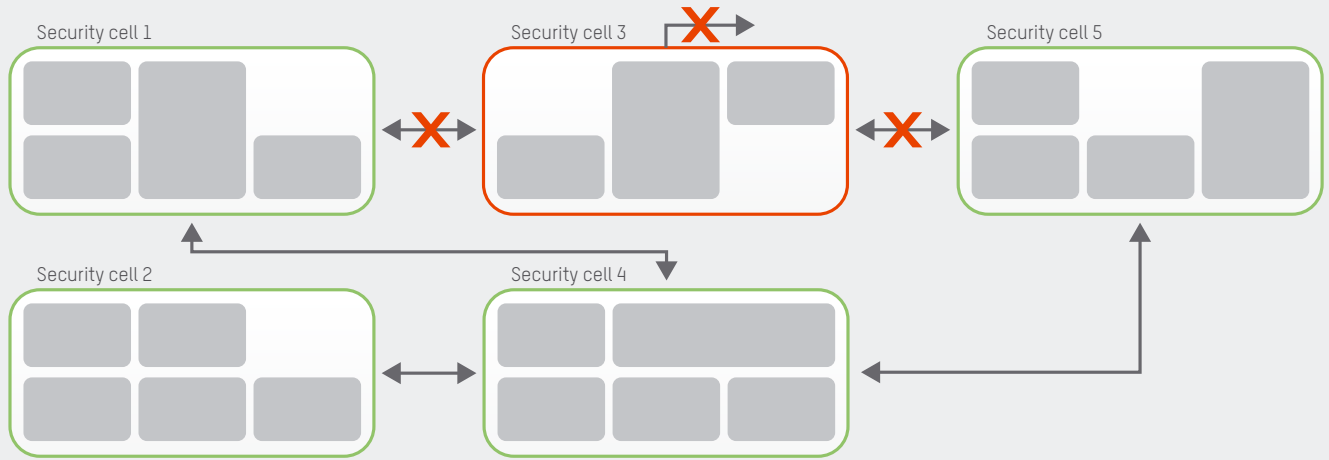
APROL supports this decentralized approach with its multi-runtime server architecture. A multi-runtime server contains all the systems it needs to operate autonomously, including HMI and orchestration as well as trend, alarm and reporting systems. Data archiving can also be implemented locally. This allows the security cell to be decoupled for extended periods of time. APROL's flexible client/server architecture supports up to 64 security cells.

LDAP for each runtime server

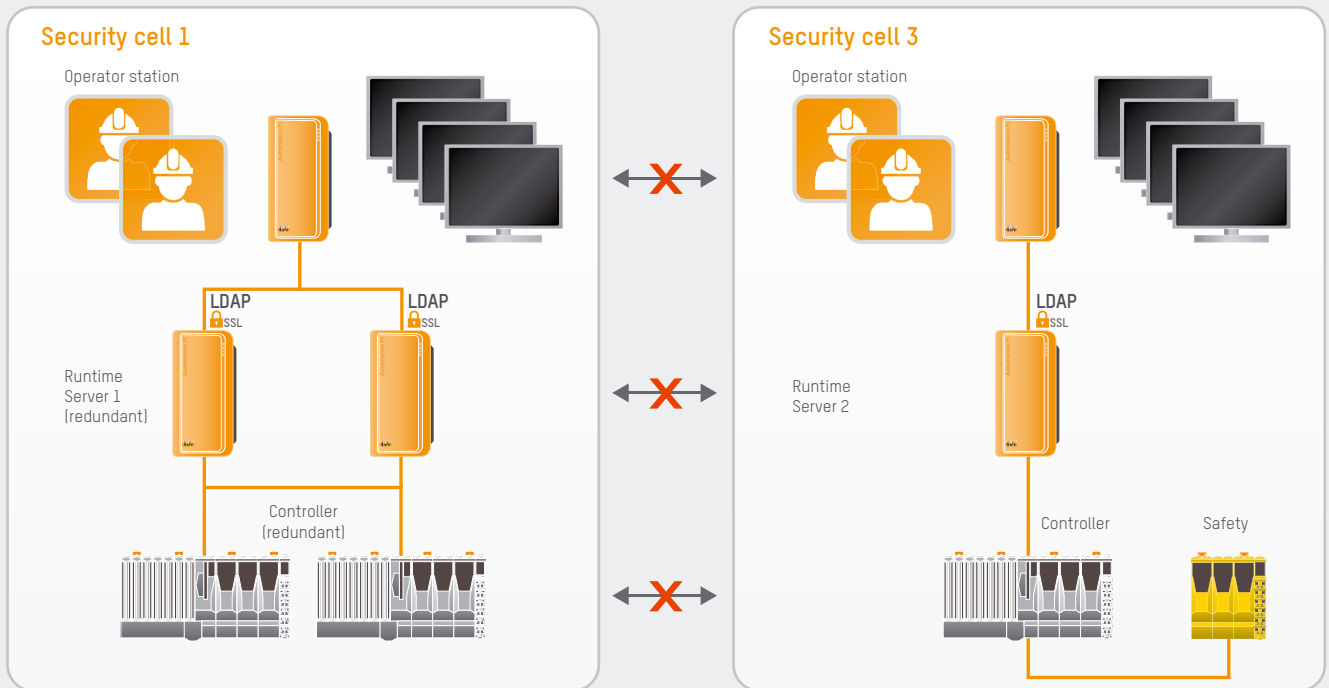
To ensure cybersecurity, a dedicated LDAP server is available on each runtime server. Operators and their assigned groups are set up on a project-specific 389 Directory Server, which is replicated on the local 389 Directory Server on the runtime server. This way, it remains possible to change operators within the security cell, even when it is decoupled.

Highlights

- Autonomous security cells
- Engineering continuity remains intact
- Increased availability

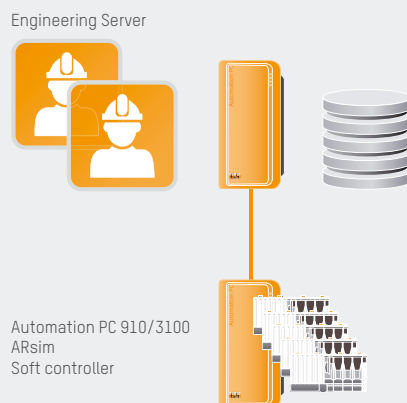


If one security cell is compromised, all the other cells can continue to run unimpaired.



Since each runtime server can be operated autonomously, systems within a security cell work even without a network connection to the outside.

Engineering



Easily simulate controller configuration

APROL now allows an unlimited number of controllers to be simulated on an Automation PC. Any controller configuration can now be thoroughly tested before being transferred to the real hardware in a security cell.

For every industry

Automation Studio is the ultimate integrated automation software for every industry. When it comes to efficient and sustainable software engineering for machines and systems, Automation Studio offers the power and versatility to optimize every horizontal and vertical aspect of your system and the openness to secure its value long into the future.

Manufacturers face unyielding pressure to raise the level of automation in their production lines, with individual machines becoming increasingly automated as well. When it comes to integrating handling equipment, robots and the transport systems that connect them, it makes no difference whether you're running a production hall or processing plant. The logical next step is to merge individual subsystems with automated control of the entire system at a supervisory level to close any gaps between processes.

Methodological differences from industry to industry are fading. Control algorithms and production sequences have many similarities, whether processing metal or wood, whether printing on textiles, plastic or paper or converting them into packaging,

or whether producing or packaging pharmaceutical, food and beverage or tobacco products. On the other hand, there are most certainly industry-specific differences, as indicated by different applicable standards.

The Automation Studio development system integrates every aspect of automation, providing uniform solutions for open and closed loop control, motion control and safety technology as well as hardware and software for operating and monitoring entire systems from the highest supervisory level down to individual sensors and actuators. The features it provides and the systems it is used to create are suited for all industries, support compliance with relevant standards and are certified by the respective industrial governing bodies.

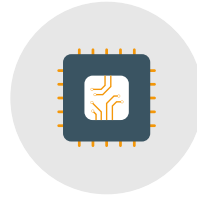
A selection of technology packages provides pre-programmed open loop, closed loop and motion control technology as well as visualization solutions for typical industry-specific system components, making it easy for software developers to create solutions optimized for particular industries.



Automotive



Printing



Electronics | Semiconductors



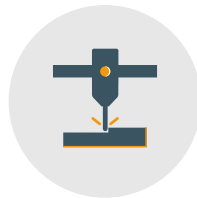
Energy



Plastics



Maritime | Offshore



Metalworking



Mobile automation



Food | Beverage



Oil | Gas



Pharmaceuticals



Robotics | Handling



Textiles



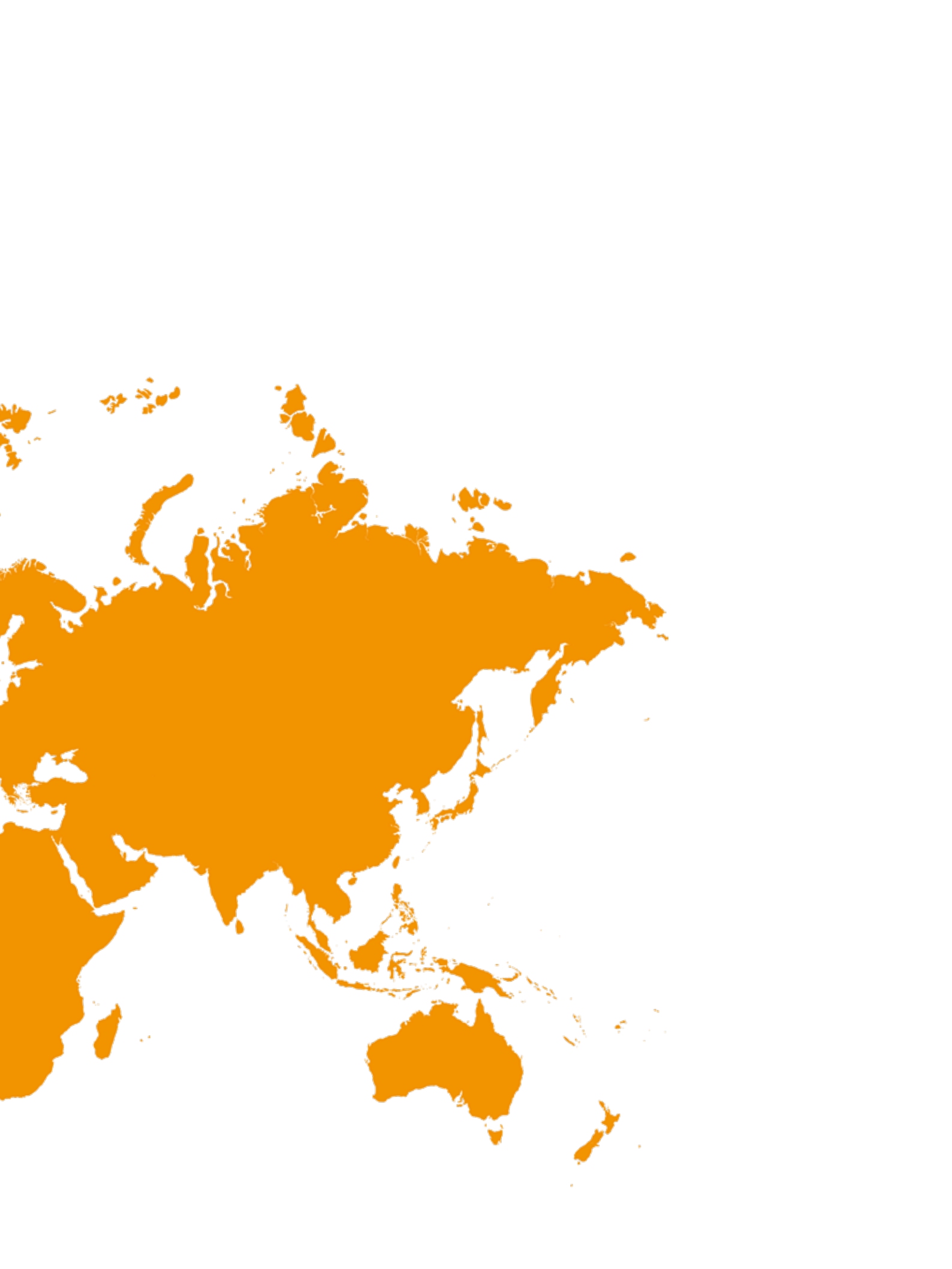
Environmental | Recycling



Packaging

A global network
for local support





Integrated automation
Global presence
Solid partnership



OPC UA
OVER TSN

ETHERNET
POWERLINK

open
SAFETY