

BALLUFF

For efficient
automation

PRODUCTS + NEWS



 *innovating automation*

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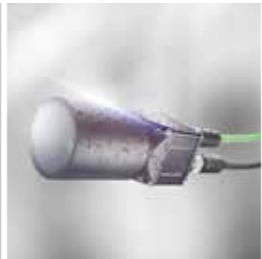
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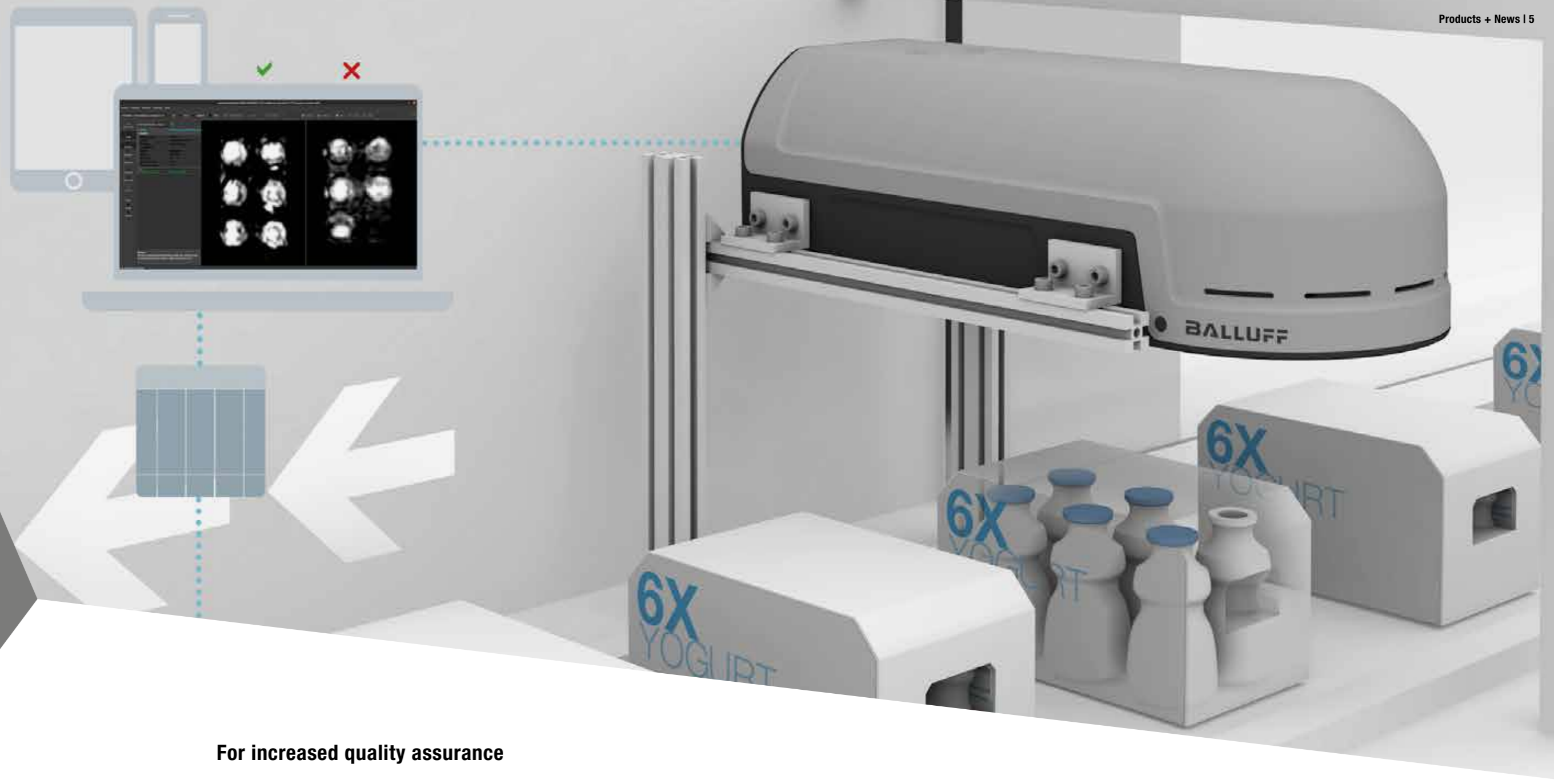


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For increased quality assurance

MAKING THE INVISIBLE VISIBLE: RADARIMAGER

Quality assurance is a crucial factor for many companies. Furthermore, they face the challenge of testing products efficiently, automatically and without in any way damaging product quality. Only by ensuring product quality, a manufacturing company will achieve maximum output.

This is precisely where Balluff's RadarImager comes in. This industrial 3D imaging system - based on radar technology - screens a wide variety of packaging. It allows you to scan all kinds of otherwise "hidden" objects to make anomalies visible. With the RadarImager you can check packaging for completeness and product integrity, identify foreign bodies, and take quality control to a new level.

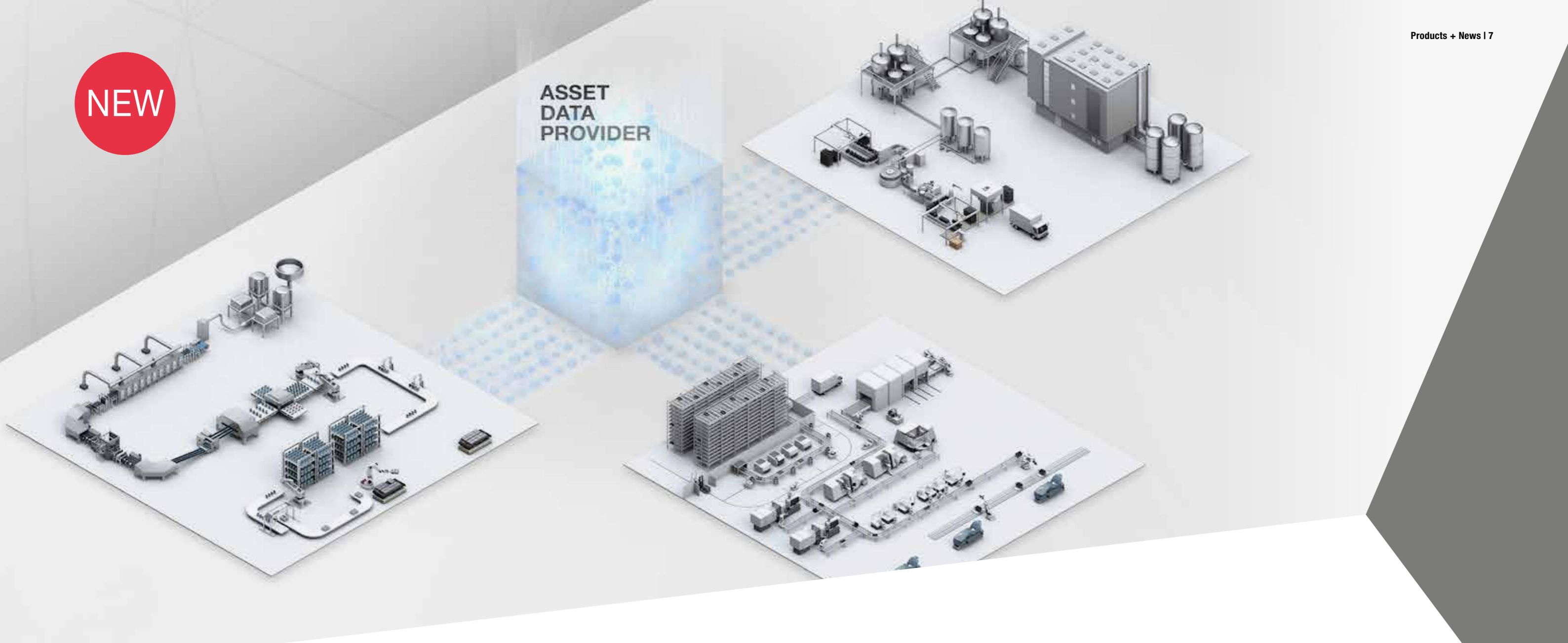
Possible areas of application

- Check for completeness
- Detection of impurities and foreign bodies
- Detection of surface condition

Features

- Making the invisible visible with a modern imaging radar system
- Scanning through non-conductive materials, such as foils, cardboard and plastics, among others
- Anomaly detection based on image and data analysis
- Light independent

NEW



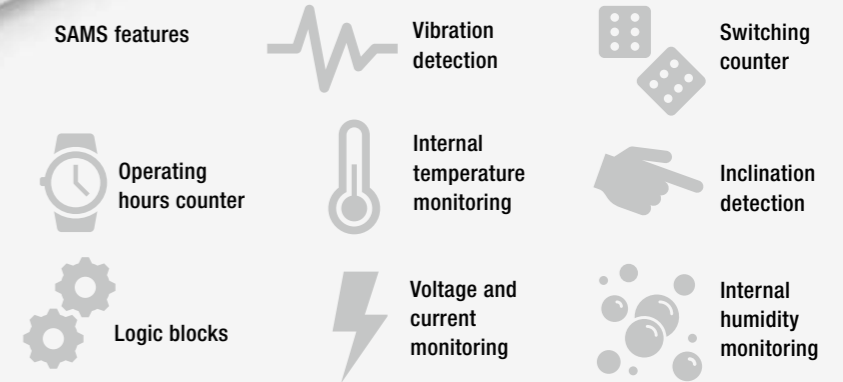
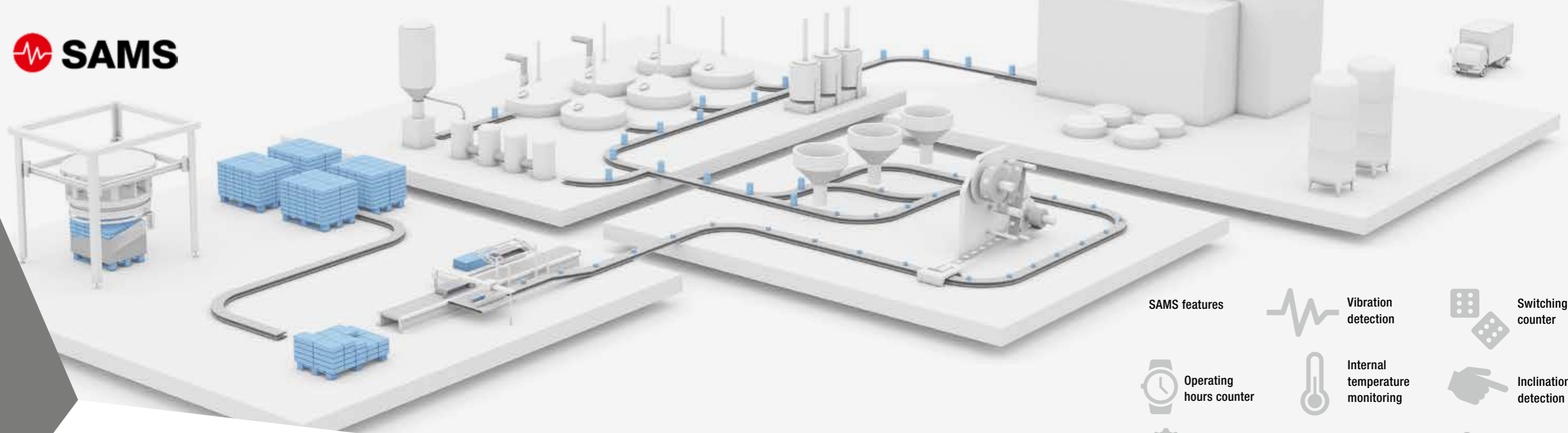
Driving digital transformation through intelligent IIoT software

ASSET DATA PROVIDER

The industrial world is changing: more and more companies are turning to digitalization and automation to make their production more efficient, flexible and future-proof. The key to this lies in the Industrial Internet of Things (IIoT), which enables intelligent networking and communication between machines, plants, sensors, systems and the Cloud.

But despite this great potential, industrial companies repeatedly encounter challenges that make the successful implementation and operation of IIoT solutions difficult. With the Asset Data Provider, Balluff offers an integrative solution to overcome these challenges and accelerate digital transformation. The Asset Data Provider is a software solution for the collection, pre-processing and provision of data to IIoT applications generated, for example, by industrial assets such as machines, plants and sensors at the operational technology (OT) level.

CHALLENGE	ASSET DATA PROVIDER	ADDED VALUE
IT/OT teams face bottlenecks: High skills barriers, lack of talent, and slow pace of digitalization	Low code and Drag and Drop	Agile development enables low barriers and easier development of integration workflows
Limited data access, encapsulated data, multiple data types, stale data, data distributed across many sites, systems and assets.	Any data: streaming data, APIs, files. Any location: edge, on-premises, cloud	Integrate all data: Break through data silos with intelligent workflows for horizontal and vertical integrations
Poor data quality, no common data model, large volumes of raw data, and no actionable data	Advanced data transformation	Non-experts are empowered and can innovate without depending on IT
Very high hurdle in terms of IT infrastructure, skills and DevOps to execute advanced logic	Hybrid-first: distributed edge nodes	Future-proof infrastructure enables scalability. Any real-time and data workflow usecase can be implemented
Insufficient centralized control over distributed teams, data and software	Centralized control and governance	Centralized control reduces risk and increases efficiency for large rollouts
High cost, long term projects, difficult to calculate ROI	Intelligent data workflows including AI/ML	Low TCO: Low cost of development and lifecycle changes, low IT workload, and lower cloud costs



Switch to optimal performance now

SMART AUTOMATION AND MONITORING SYSTEM

High-performance, multifunctional solutions are required to increase the efficiency of machines and plants. Solutions that not only serve to control the machine, but also provide data on the condition of the machine. With the information gained from this, you can optimize the performance of each machine and thus of the entire plant by designing processes efficiently and flexibly. The innovative Smart Automation and Monitoring System (SAMS) from Balluff provides you with a system that enables you to implement automation of the entire production line in a uniform manner.

Your Balluff SAMS solutions

- Inductive sensors
- Photoelectric sensors
- Digital position indicators
- RFID
- Network blocks
- Inductive couplers
- I/O blocks
- Magnetostrictive position measuring systems

Look and Feel

With a consistent housing, connectors and mounting design, SAMS components are easy to install and connect. The consistent operating and configuration concept increases machine flexibility and availability, because all devices can be parameterized and configured via standard data profiles and even taught in contact-free with a mobile terminal. Machine damage and production downtime due to incorrect handling are thus reduced to a minimum.

Smart Features

Once commissioned, the devices with additional functions become data sources that you use to ensure the reliable operation of your plant – e.g. via temperature monitoring, humidity and tilt detection, vibration monitoring, signal quality display, operating hours counter or time functions. These features provide additional monitoring capabilities without the need for additional specialized devices to gain an overview. In addition, each component can be clearly localized in the plant via device recognition, so that, a sensor can be quickly located in the plant.

Health

Our intelligent components open up new possibilities, such as condition monitoring of machines and systems or predictive maintenance. The status data of your machines is available to you uniformly, everywhere and immediately – whether via colored LED signal display directly on the device or on dashboards for further analysis. In this way, you remain informed about every single sensor, every machine and the entire production, recognize trends and can significantly improve the performance of your production on a secure basis. In combination with powerful network technology and cloud computing from Balluff, smart manufacturing in the sense of the Industrial Internet of Things (IIoT) becomes a reality.

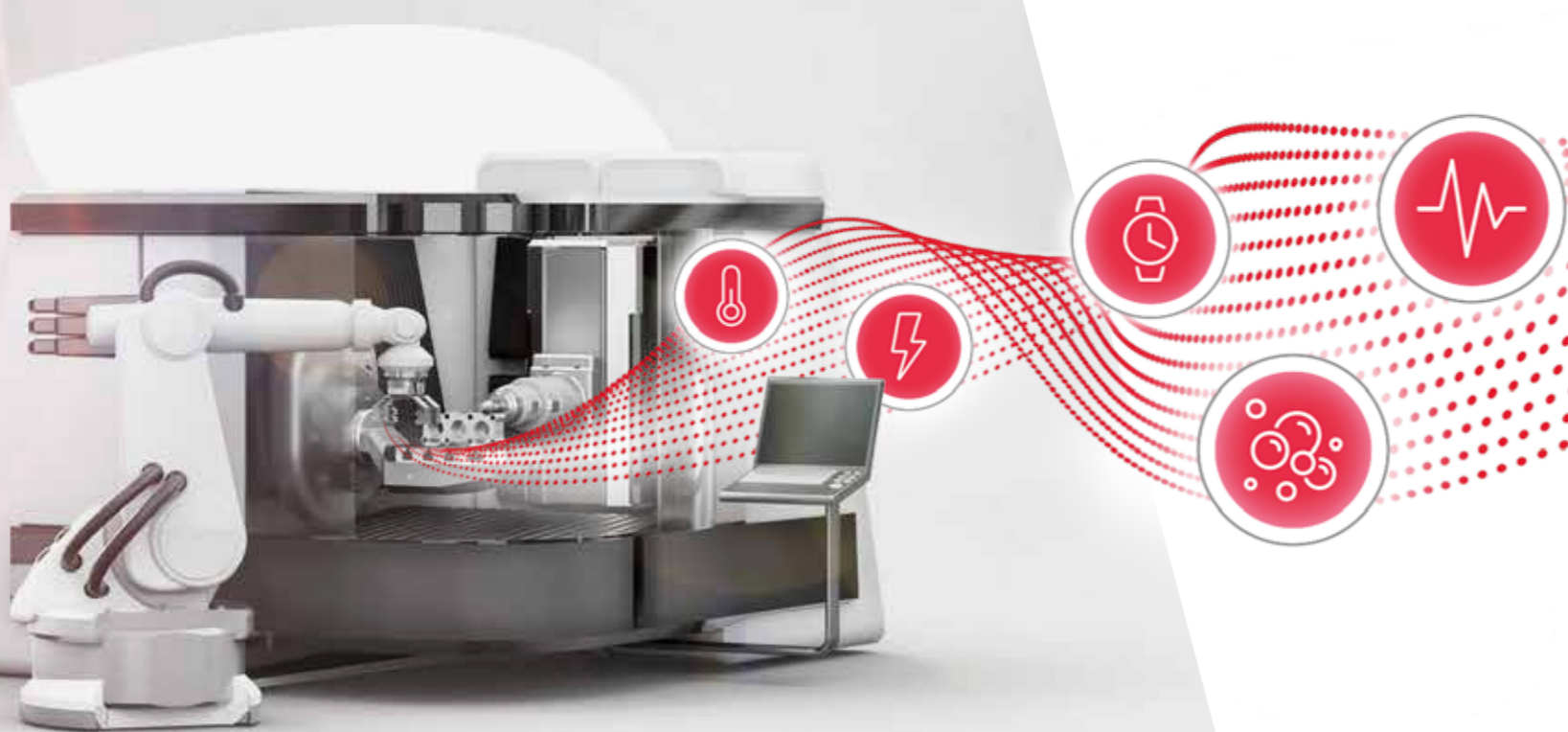












Continuously monitor the condition of machines, plants and processes

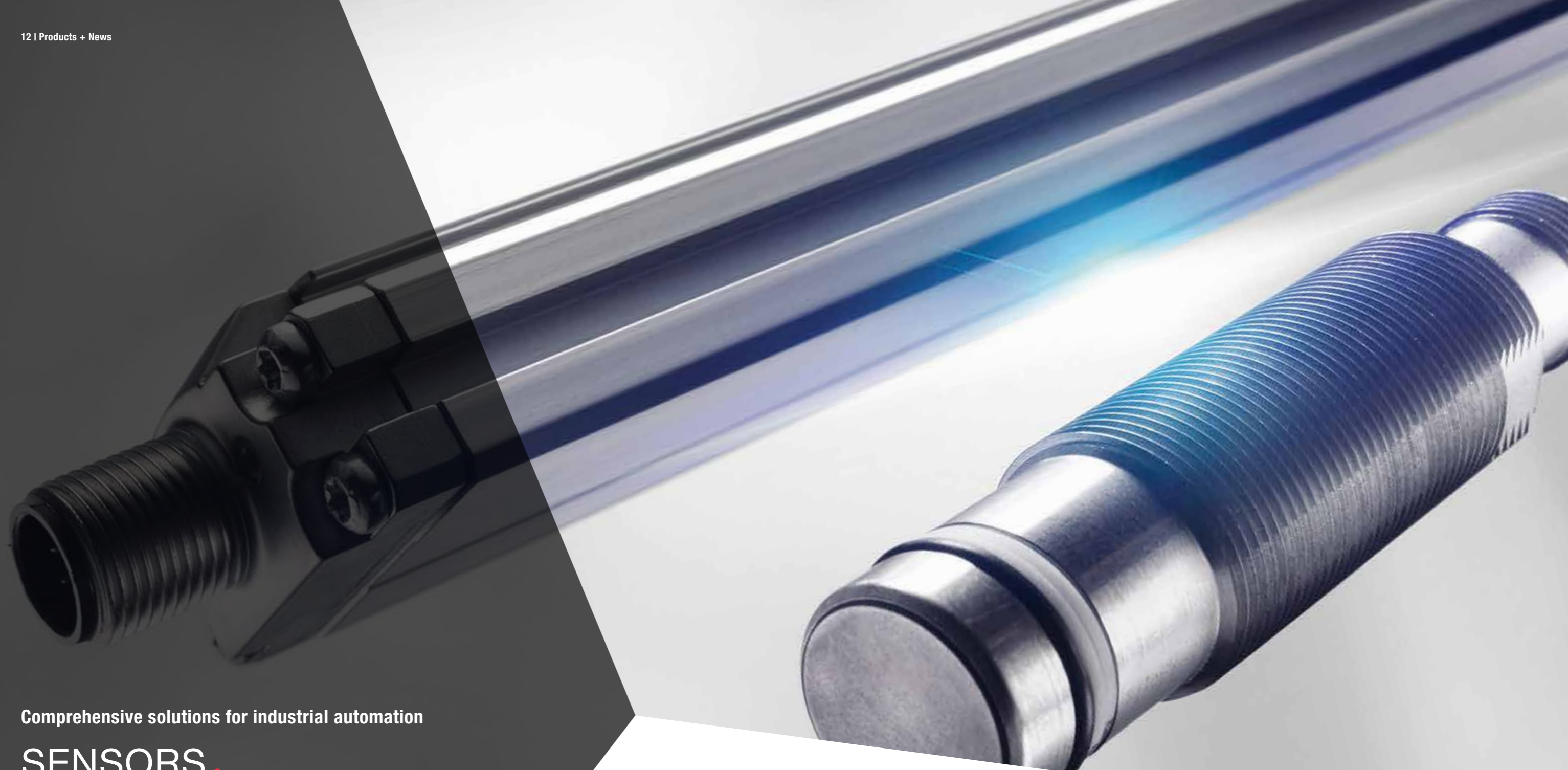
CONDITION MONITORING

Condition monitoring systems and their components contribute to the efficient and trouble-free operation of machines and plants in industry. Disruptions in the production process due to unplanned downtimes can be prevented by using sensors. Monitoring devices such as vibration, temperature, pressure and level sensors, provide data on the condition of a plant. When processed, this data provides information for the upkeep of machines and thus enables preventative and predictive maintenance. These condition monitoring systems allow changes, such as wear on individual components, to be detected more quickly and machine maintenance to be better coordinated.

The goal is to increase reliability in the automation and digitalization of your production, and Balluff offers the right solution for monitoring your machines and systems. From a simple standardized solution to the mapping of individual complex systems, our condition monitoring solutions set the standard.



WHAT IS MEASURED/ MONITORED	TYPICAL MACHINES/ASSET TO BE MONITORED	SENSOR TYPE
 Vibrations, oscillations and accelerations	Motor, bearing, conveyor, pump, fan, spindle, compressor, gearbox, robot, machine tool, press	Condition monitoring sensors Smart automation and monitoring system sensors
 Temperature	Motor, bearing, conveyor, pump, fan, spindle, compressor, gearbox, machine tool, electronics cabinet, oven, furnace	Temperature sensors Condition monitoring sensors
	Internal sensor measurement	Smart automation and monitoring system sensors
 Pressure	Lubricant, coolant or hydraulic fluid reservoir or line, pump, valve	Pressure sensors
	Cabinet, container or vessel ambient air pressure	Condition monitoring sensors Smart automation and monitoring system sensors
 Flow rate	Coolant, lubricant, hydraulic fluid or pneumatic line, pump, valve	Flow sensors
 Humidity	Electronics cabinet, packaging machine, dryer	Condition monitoring sensors
	Internal sensor measurement	Smart automation and monitoring system sensors
 Voltage and current	Internal sensor measurement	Smart automation and monitoring system sensors Power supplies
 Speed	Motor, conveyor, pump, fan, spindle	Encoders Inductive sensors
 Level	Lubricant, coolant or hydraulic fluid reservoir, leak detection, pump, valve	Capacitive sensors Ultrasonic sensors Magnetostrictive sensors
 Displacement and distance	Machine tool, press, robot, conveyor	Inductive sensors Ultrasonic sensors Magnetostrictive sensors
 Inclination	Conveyor, press, machine tool	Smart automation and monitoring system sensors Inclination sensors



Comprehensive solutions for industrial automation

SENSORS

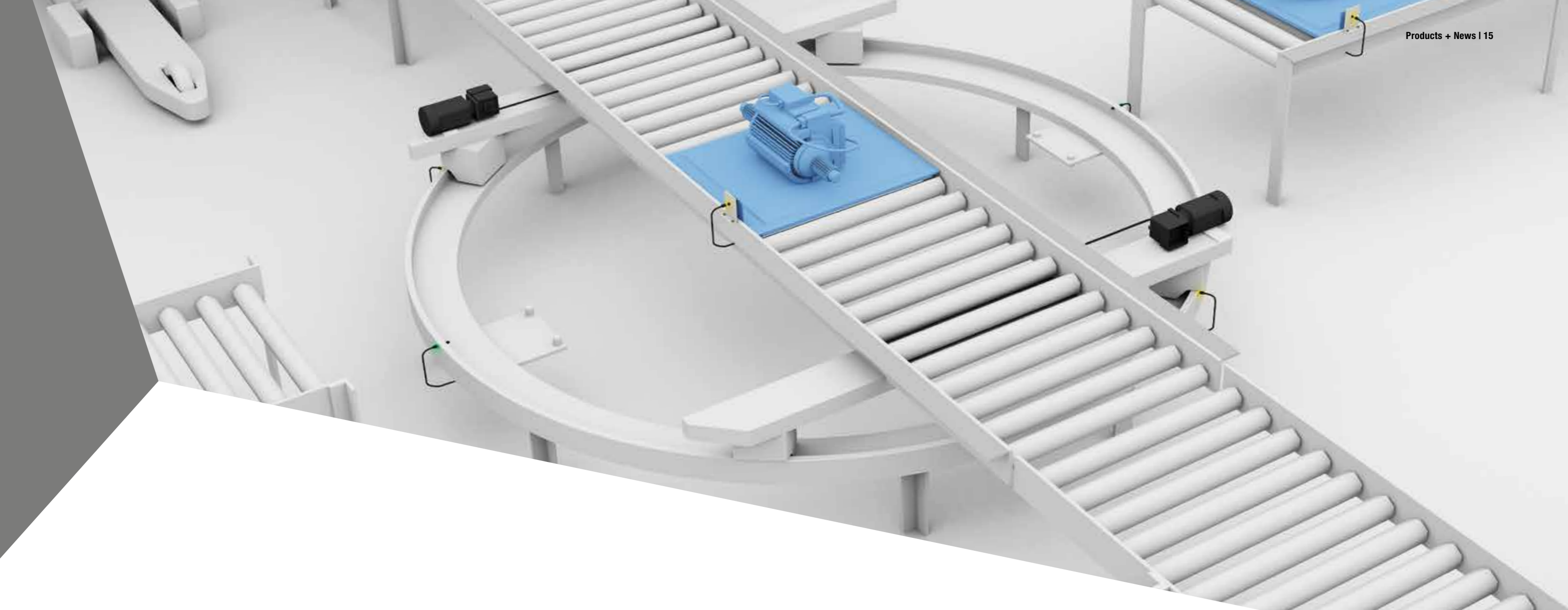
 *innovating automation*

In the field of sensor technology, Balluff offers a complete portfolio to meet the diverse array of sensor operating principles, modes, and form factors needed to dependably meet your application requirements. We offer high-value sensors for any application or requirement: from linear measurement to object detection to level, temperature and pressure monitoring. We can fulfill all of your sensor needs, for everyday industrial uses as well as for tough applications in critical environments.

Our quality management regime is DIN EN ISO 9001:2015 certified. All Balluff sensors are tested in our in-house, accredited laboratory. They also meet regional and international standards and are successfully used in applications around the world.

Your Balluff solutions

- Inductive sensors
- Capacitive sensors
- Photoelectric sensors
- Magnetic field sensors
- Cam switches
- Ultrasonic sensors
- Magnetic encoders
- Magnetostrictive sensors
- Inclination sensors
- Pressure sensors
- Temperature sensors
- Flow sensors
- Condition monitoring sensors
- Position indicators
- Encoders



Simple and good

THE STANDARD PORTFOLIO FOR INDUCTIVE SENSORS

From mechanical engineering and electronics manufacturing to intralogistics, assembly and handling technology, woodworking and textile processing, automation is hardly conceivable without inductive sensors. Wherever automation takes place, detecting the presence of metallic objects, operating without contact or wear, and high reliability are in demand. You can now choose from a new entry-level portfolio of BES inductive sensors from Balluff.

These precise sensors are designed for normal factory environments and offer an excellent price/performance ratio. This makes them particularly suitable for applications that are not technically demanding, but which are more demanding in terms of price and volume, like in material handling or (intra-)logistics.

After the sensor has been mounted easily with its simple clamp holder, its specially developed plastic backend with LEDs gives you a 360° functional display of the sensor status. In addition to the switching status, it also shows the power supply status and the fault condition, e.g. short circuit. This means you have everything in view to identify errors more quickly, reduce downtimes, and increase system availability.

Features

- Universal use in normal factory environments
- Optimal performance for price point
- Reliable object detection due to double switching distance
- Optimized visual monitoring with operating voltage display and 360° light
- Easy to mount and replace using clamp holder with fixed stop (optional)
- Environmentally friendly multi-piece packaging for higher quantities (from 25 sensors)



INDUCTIVE SENSORS



	BES060N	BES060T	BES060R	BES060U	BES060P	BES060M
Dimension	M8 × 45 mm	M8 × 65 mm	M12 × 45 mm	M12 × 65 mm	M18 × 45 mm	M18 × 65 mm
Installation	Flush		Flush		Flush	
Range	2 mm		4 mm		8 mm	
Switching output	PNP NO		PNP NO		PNP NO	
Switching frequency	600 Hz		350 Hz		300 Hz	
Housing material	Nickel-plated die-cast zinc		Nickel-plated die-cast zinc		Nickel-plated die-cast zinc	
Material sensing surface	PBT		PBT		PBT	
Connection	Connector, M8 male, 3-pin		Connector, M12 male, 3-pin		Connector, M12 male, 3-pin	
Operating voltage U_b	10...30 V DC		10...30 V DC		10...30 V DC	
Ambient temperature	-25...70 °C		-25...70 °C		-25...70 °C	
IP rating	IP67		IP67		IP67	
Approval/conformity	CE, UKCA, cULus		CE, UKCA, cULus		CE, UKCA, cULus	

When red light sensors reach their limitations

BOS 6K PHOTOELECTRIC SENSORS WITH BLUE LIGHT TECHNOLOGY



The newest addition to the Balluff BOS 6K portfolio delivers the same reliable detection principles the photoelectric sensor family is known for but with a new technology.

The sensors come equipped with blue light technology for background suppression, making them ideal for reliably detecting transparent and similarly tricky objects.

These new sensors join the already strong 6K portfolio. All sensors in the family share a variety of common features, including their cubical housing shape, IO-Link communication standard, and operating principle.

This uniformity considerably simplifies the parameterization and integration of the sensors. Combined with the intelligent PNP/NPN output, this also reduces the number of variants required.

Easy detection of hard-to-see objects

The use of sensors with blue light is particularly recommended in applications where red light reaches its physical limits.

Since blue light has a shorter wavelength than other colors of visible light, it scatters less and the light beam is better focused. The lower scattering means that blue light sensors can detect finer details and, depending on the application, work even more reliably than their red light counterparts.

In addition, blue light penetrates less deeply into materials compared to other light wavelengths. This minimizes interference with other objects and surfaces and makes object detection even more precise. Even difficult materials or surface textures, for example in the case of transparent or dark and shiny objects, are detected more reliably than would be possible with red light.

Finally, the sensors are impressively robust. The dust- and waterproof IP69 protection class of the blue light sensors, like all of the BOS 6K sensors, prepares them for use in harsh, industrial environments.

Features

- Uniform space-saving housing shape for all variants
- Uniform operating concept and simple integration thanks to IO-Link
- Reliable object detection even in difficult conditions
- Detects a wide range of materials and surface structures
- Robust, dust- and waterproof for industrial environments



BOS 6K SENSORS WITH BLUE LIGHT TECHNOLOGY



	BOS02FU	BOS02FW	BOS02FY	BOS02FZ
Series	BOS 6K	BOS 6K	BOS 6K	BOS 6K
Special optical feature	FixFocus	FixFocus	FixFocus	FixFocus
Range	0...80 mm	0...80 mm	0...80 mm	0...80 mm
Light type	Blue light	Blue light	Blue light	Blue light
Beam characteristic	Focused at 60 mm	Focused at 60 mm	Focused at 60 mm	Focused at 60 mm
Light spot size	Ø 2 mm at 60 mm	Ø 2 mm at 60 mm	Ø 2 mm at 60 mm	Ø 2 mm at 60 mm
Interface	Pin 4: PNP NO/NC selectable Pin 2: Teach	Pin 4: NPN NO/NC selectable Pin 2: Teach	Pin 4: PNP NO/NC selectable White: Teach	Pin 4: NPN NO/NC selectable White: Teach
Switching hysteresis	~ 1 %	~ 1 %	~ 1 %	~ 1 %
Switching frequency	≤ 1000 Hz	≤ 1000 Hz	≤ 1000 Hz	≤ 1000 Hz
Connection	Connector, M8 male, 4-pin	Connector, M8 male, 4-pin	Cable, 4 wires, 2 m	Cable, 4 wires, 2 m
Operating voltage U _B	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
Dimensions	34 × 20 × 12 mm	34 × 20 × 12 mm	34 × 20 × 12 mm	34 × 20 × 12 mm
Housing material	ABS	ABS	ABS	ABS
Material sensing surface	PMMA	PMMA	PMMA	PMMA
Approval/conformity	CE, UL, UKCA	CE, UL, UKCA	CE, UL, UKCA	CE, UL, UKCA

BOS 6K SENSORS WITH BLUE LIGHT TECHNOLOGY



	BOS02F8	BOS02F9	BOS02FA
Series	BOS 6K	BOS 6K	BOS 6K
Special optical feature	Background suppression	Background suppression	Background suppression
Range	0...200 mm	0...200 mm	0...200 mm
Gray value shift (20%/90%)	≤ 5 %	≤ 5 %	≤ 5 %
Light type	Blue light	Blue light	Blue light
Beam characteristic	Divergent	Divergent	Divergent
Light spot size approx.	10 x 10 mm at 150 mm	10 x 10 mm at 150 mm	10 x 10 mm at 150 mm
Interface	IO-Link 1.1, COM 2	IO-Link 1.1, COM 2	—
Output function	Pin 4: AutoDetect (PNP/NPN) NO/NC selectable Pin 2: Teach	Black: AutoDetect (PNP/NPN) NO/NC selectable White: Teach	Pin 4: AutoDetect (PNP/NPN) NO/NC selectable Pin 2: Teach
Switching hysteresis	≤ 5 %	≤ 5 %	≤ 5 %
Switching frequency	≤ 700 Hz	≤ 700 Hz	≤ 700 Hz
Connection	Connector, M8 male, 4-pin	Cable, 4 wires, 2 m	Connector, M8 male, 3-pin
Operating voltage U _B	10...30 V DC	10...30 V DC	10...30 V DC
Dimensions	34 × 20 × 12 mm	34 × 20 × 12 mm	34 × 20 × 12 mm
Housing material	ABS	ABS	ABS
Material sensing surface	PMMA	PMMA	PMMA
Approval/conformity	CE, UL, UKCA	CE, UL, UKCA	CE, UL, UKCA

The BOS 6K photoelectric sensor family continues to grow.

In addition to the standard red light and laser variants, Balluff now also offers sensors equipped with Time-of-Flight (TOF) technology for long-distance sensing. They can detect objects safely and reliably at longer distances despite their small housing.

Sensors in the 6K portfolio use a variety of light sources, including red light, blue light, and laser variants, to perform all relevant detection principles. All sensors in the family share a variety of standard features, including their cubical housing shape, IO-Link communication standards and general operating principle.

This consistency significantly streamlines the parameterization and integration of sensors. When combined with the smart PNP/NPN output, it also minimizes the number of necessary variants.

Multi-talented sensors with Time-of-Flight technology

The new BOS 6K sensors with TOF are a precise, fast and versatile solution for distance measurement. Their Time-of-Flight technology sends light pulses and measures the time they take to travel to the object and back. This is particularly advantageous for background suppression, as it means that even a background close to the object can be reliably distinguished from the object and the distance precisely measured.

The Time-of-Flight method also works reliably at greater distances, which means that the sensors can be used for distances of up to 1.5 m despite their compact design. This opens up completely new possibilities in the design of automation systems and makes the sensors very flexible to use. These sensors achieve significantly better performance with a much smaller design than was previously possible with considerably larger sensors.



Another major advantage of TOF sensors is their versatility: they can be used in different environments, as their operation doesn't depend on the surface of the object. They reliably detect both smooth and rough surfaces. In addition, they operate largely independent of color, making them equally suitable for detecting light and dark objects.

Finally, the sensors are impressively robust: These dust- and waterproof Time-of-Flight sensors with their IP69 protection class, like all the BOS 6K sensors, are ready for use in harsh, industrial environments.

Features

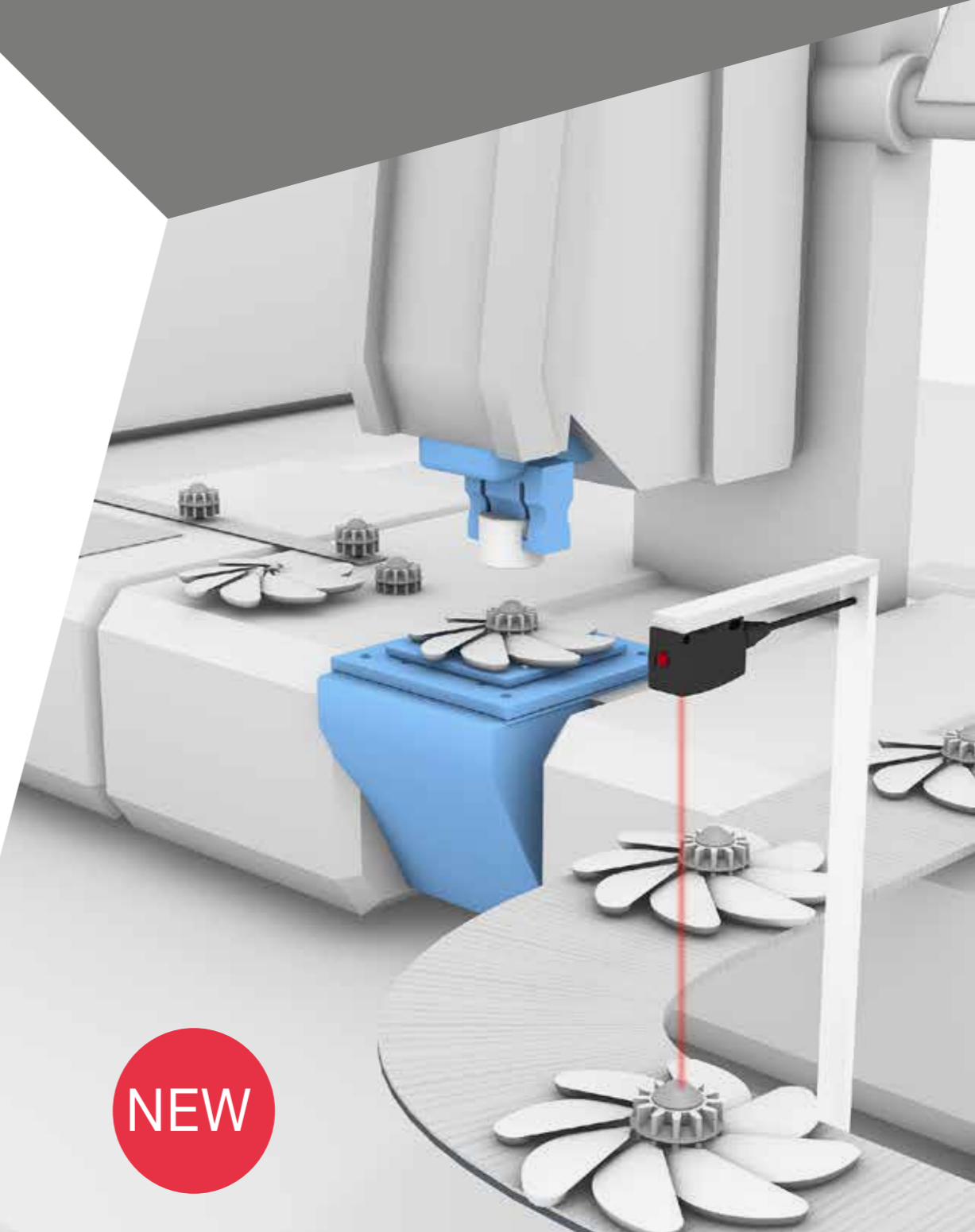
- Uniform space-saving housing shape for all variants
- Uniform operating concept and simple integration thanks to IO-Link
- Time-of-Flight sensors for precise distance measurement up to 1.5 m
- Object detection independent of object surface and color
- Robust, dust- and waterproof for industrial environments

BOS 6K SENSOR WITH TIME-OF-FLIGHT TECHNOLOGY

	BOS02EK
Series	BOS 6K
Optical operating principle	Background suppression
Range	0...1500 mm
Gray value shift (20%/90%)	≤ 15 mm
Light type	Laser red light, 655 nm
Laser class	1
Beam characteristic	Collimated
Light spot size	2 × 3 mm at 1500 mm
Interface	IO-Link 1.1.3 COM 2
Output function	Pin 4: AutoDetect (PNP/NPN) NO/NC selectable, Pin 2: Teach
Switching hysteresis	4...7 mm (at switching frequency 5 Hz)
Switching frequency	5...500 Hz
Connection	Connector, M8 male, 4-pin
Operating voltage U _B	18...30 V DC
Dimensions	34 × 20 × 12 mm
Housing material	ABS
Material sensing surface	PMMA
Approval/conformity	CE, UL, UKCA

Precise, fast and high range

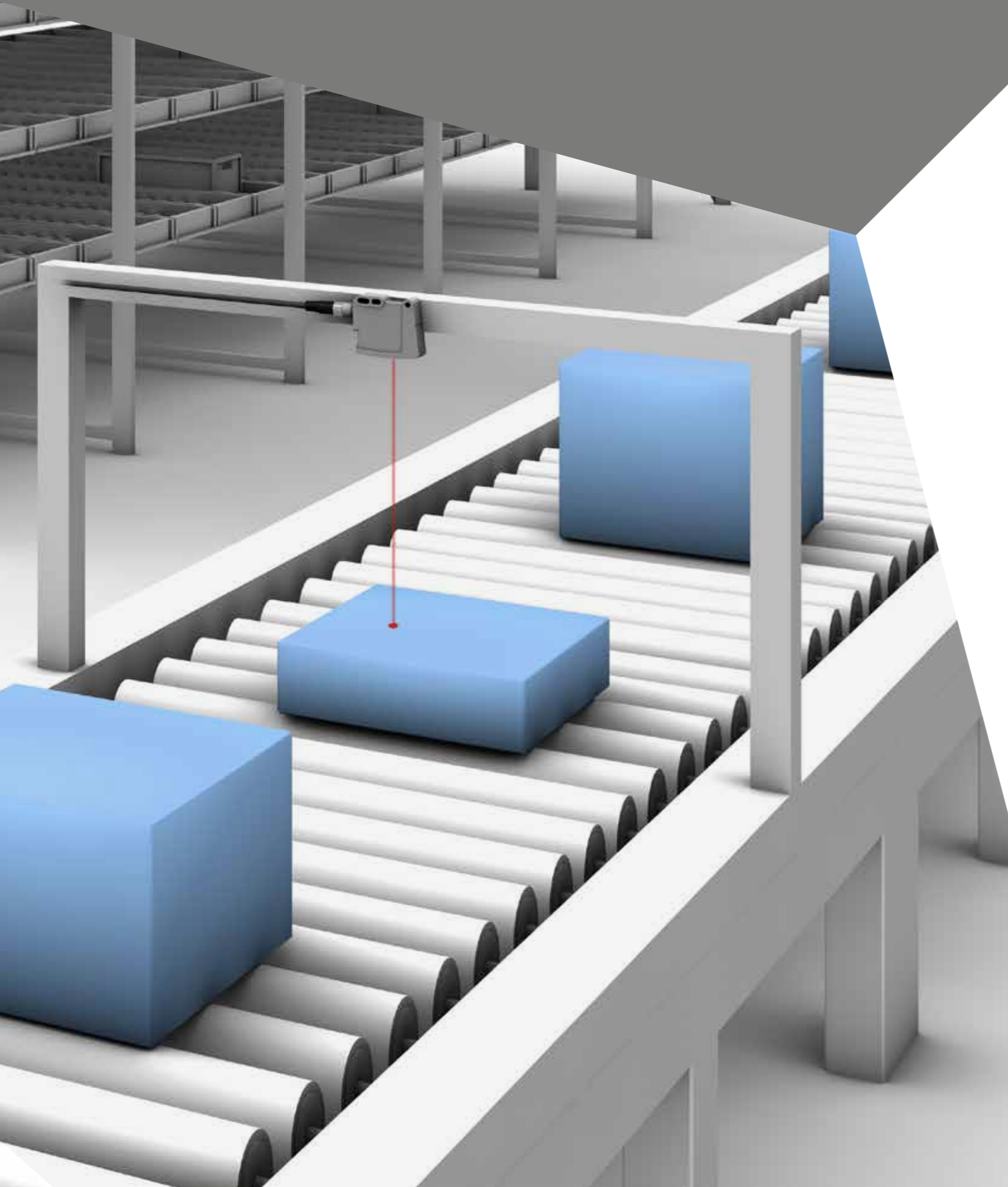
BOS 6K SENSORS WITH TIME-OF-FLIGHT TECHNOLOGY



Smart Automation and Monitoring System

PHOTOELECTRIC SENSORS WITH CONDITION MONITORING

NEW



SAMS (Smart Automation and Monitoring System) stands for Balluff's comprehensive automation philosophy. On the one hand, the Smart Automation and Monitoring System comprises a large number of additional functions and additional information for each individual component while, on the other hand, it is characterized by its uniform and standardized operating, configuration and diagnosis concept.

Part of this system is our new BOS R254K photoelectric sensor for reliable detection of objects like bottles, containers and pallets in the food industry and in the packaging sector. Designed for demanding applications, it is ideal wherever cleaning involves aggressive media and high pressure. Resistant to cleaning agents (Ecolab), it has passed the cleaning cycle according to the high Balluff standard. IP67 and IP69K ratings enable use in critical applications with harsh ambient conditions, especially in factory automation.

Another plus: its numerous additional functions provide for comprehensive condition monitoring. The sensor is self-monitoring while also providing helpful diagnostic data. You also gain valuable information related to the installed location including the application itself. All in all, the sensor ensures greater equipment uptime.

The sensor family includes diffuse sensors with background suppression, retroreflective sensors and through-beam sensors. A particular highlight is the laser photoelectric proximity switch with a range of 1000 mm, which operates with Time-of-Flight technology. This technology enables both virtually object-independent object detection and reliable small part detection. The laser retro-reflective sensor with autocollimation is characterized by high switching accuracy and optimized small part detection even over long distances.

Features

- IO-Link V1.1 (Smart Sensor Profile 2)
- Additional functions: various operating modes also for demanding object detection (averaging, time and counting functions, dynamic switching threshold variation, preset switching thresholds, emitter LED monitoring, recording of extreme values)
- Designed for harsh ambient conditions
- Sensor monitors itself and its environment: temperature, humidity, vibration, inclination, contamination, function reserve



PHOTOELECTRIC SENSORS

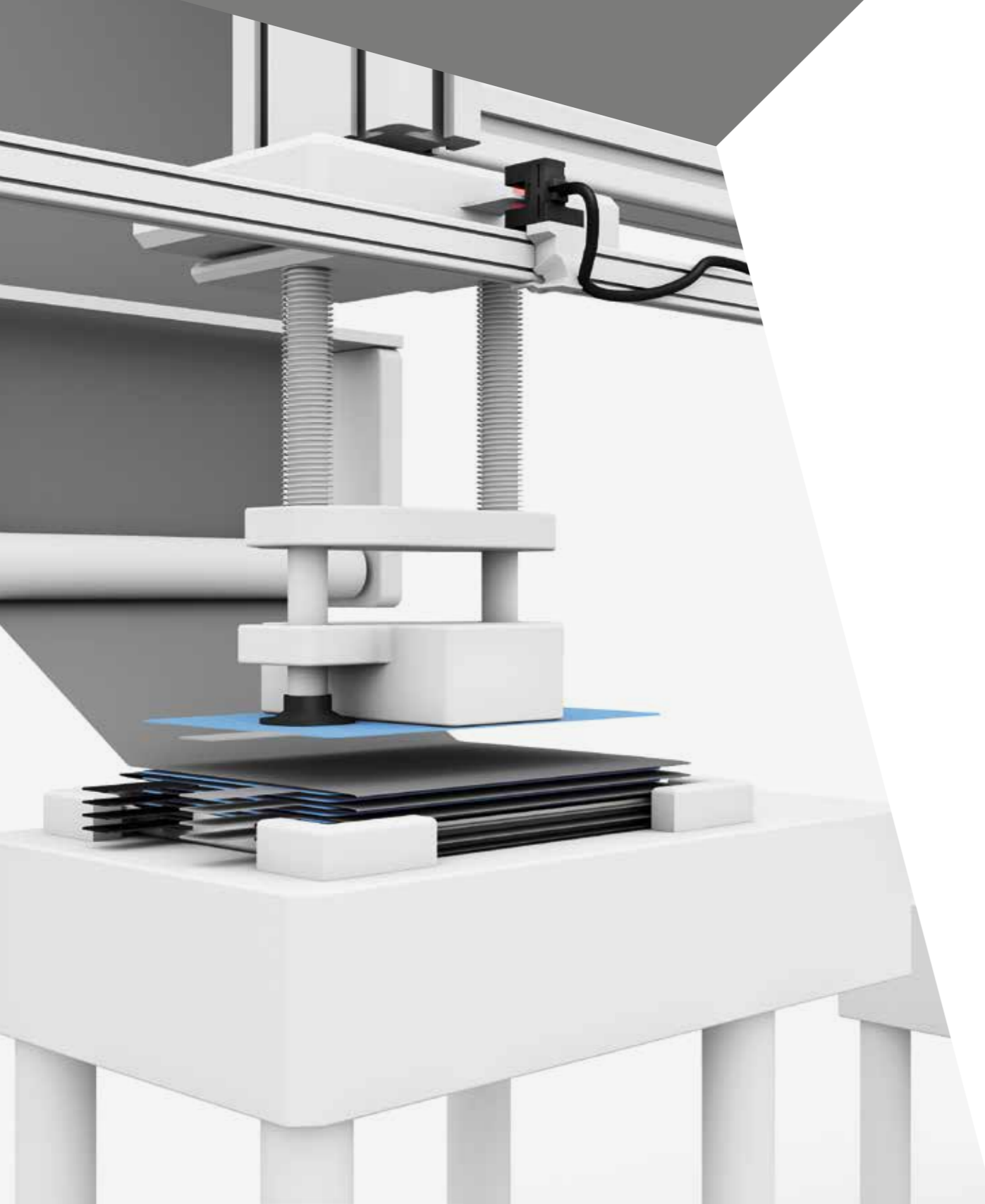


DIFFUSE SENSOR, TIME-OF-FLIGHT (TOF)	BOS02C1									
DIFFUSE SENSOR, TRIANGULATION		BOS02C3	BOS02C4	BOS0285		BOS02C2				
RETROREFLECTIVE SENSOR							BOS0286	BOS02C0		
THROUGH-BEAM SENSOR, RECEIVER									BOS0288	BOS02C5
THROUGH-BEAM SENSOR, EMITTER									BOS0289	BOS02C6
Series	R254K	R254K	R254K	R254K		R254K	R254K	R254K	R254K	R254K
Dimension	20.4 × 62.7 × 49.5 mm	20.4 × 62.7 × 49.5 mm	20.4 × 62.7 × 49.5 mm	20.4 × 60.3 × 49.5 mm		20.4 × 62.7 × 49.5 mm	20.4 × 60.3 × 49.5 mm	20.4 × 62.7 × 49.5 mm	20.4 × 60.3 × 49.5 mm	20.4 × 62.7 × 49.5 mm
Interface	IO-Link 1.1	IO-Link 1.1	IO-Link 1.1	IO-Link 1.1		IO-Link 1.1	IO-Link 1.1	IO-Link 1.1	IO-Link 1.1	IO-Link 1.1
Switching output	Pin 4	Push-pull NO/NC	Push-pull NO/NC	Push-pull NO/NC		Push-pull NO/NC	Push-pull NO/NC	Push-pull NO/NC	Push-pull NO/NC	Push-pull NO/NC
	Pin 2	PNP/NPN/push-pull NO/NC	PNP/NPN/push-pull NO/NC	PNP/NPN/push-pull NO/NC		PNP/NPN/push-pull NO/NC	PNP/NPN/push-pull NO/NC	PNP/NPN/push-pull NO/NC	PNP/NPN/push-pull NO/NC	PNP/NPN/push-pull NO/NC
Special optical feature	Background suppression	Background suppression	Background suppression	Background suppression		Background suppression		Autocollimation		
Beam characteristic	Collimated	Divergent	Divergent	Focus at 400 mm		Collimated	Divergent	Collimated	Divergent	Collimated
Light type	LED red light	LED red light	LED red light	Laser red light		Laser red light	LED red light	Laser red light	LED red light	Laser red light
Range	10...250 mm	10...250 mm	30...500 mm	30...250 mm		30...500 mm	8 m	0...8 m	0...20 m	0...70 m
Connection	Connector, M12 male, 4-pin	Connector, M12 male, 4-pin	Connector, M12 male, 4-pin	Connector, M12 male, 4-pin		Connector, M12 male, 4-pin	Connector, M12 male, 4-pin	Connector, M12 male, 4-pin	Connector, M12 male, 4-pin	Connector, M12 male, 4-pin
Teach-in	via IO-Link	via IO-Link	via IO-Link	via IO-Link		via IO-Link	via IO-Link	via IO-Link	via IO-Link	via IO-Link
Housing material	PA 12, PA PACM 12	PA 12, PA PACM 12	PA 12, PA PACM 12	PA 12, PA PACM 12		PA 12, PA PACM 12	PA 12, PA PACM 12	PA 12, PA PACM 12	PA 12, PA PACM 12	PA 12, PA PACM 12
Material, sensing surface	PA PACM 12	PA PACM 12	PA PACM 12	PA PACM 12		PA PACM 12	PA PACM 12	PA PACM 12	PA PACM 12	PA PACM 12
Operating voltage U _B	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC		10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
Approval/conformity	CE, cULus, Ecolab	CE, cULus, Ecolab	CE, cULus, Ecolab	CE, cULus, Ecolab		CE, cULus, Ecolab	CE, cULus, Ecolab	CE, cULus, Ecolab	CE, cULus, Ecolab	CE, cULus, Ecolab

Discover SAMS, the innovative Smart Automation and Monitoring System for optimal performance: Page 8

Flexible in the smallest space

MINISLOT MINIATURIZED FORK SENSORS



Balluff BGL fork sensors are known for precise object detection. Our comprehensive portfolio scores points with reliable solutions even for difficult and specialized applications. Now we are expanding our range to include particularly compact and versatile sensors for space-critical automation applications.

Simple setup, reliable sensing

The new BGL MiniSlot fork sensors from Balluff can be used very flexibly with their different mounting and connection options. Their good visible beam makes them simple to place correctly and adjust. The sensors are fully potted, which makes them resistant to vibrations, shocks and other environmental influences, and guarded with a IP64 protection rating. The bright LEDs also indicate the switching status and allow you to accurately read its diagnostics.

Flexibility defined

With their particularly compact size, the new BGL require significantly less installation space than conventional fork sensors. In addition, six different designs and a wide variety of connection options make the sensors even more flexible to use in a wide range of applications.

Features

- Six different designs for flexible use
- Cost-effective, robust solution for space-critical applications
- Precise detection and high repeatability
- Status indication with bright LEDs
- Unified slot width 5 mm
- Easy connection with 4-pin M8 plug, flat connector or cable
- Switching frequency up to 3 kHz for fast processes

FORK SENSORS WITH DIFFERENT CONNECTION TYPES



M8 CONNECTOR, 4-PIN WITH 0.2 M PVC CABLE	PNP NO/NC	BGL006F	BGL006R	BGL006L	BGL006N	BGL006J	BGL006U
	NPN NO/NC	BGL006E	BGL006P	BGL006K	BGL006M	BGL006H	BGL006T
FLAT CONNECTOR, 4-PIN WITH 0.5 M PVC CABLE	PNP NO/NC	BGL006C	BGL0069	BGL0063	BGL0061	BGL0065	BGL0067
	NPN NO/NC	BGL006A	BGL0068	BGL0062	BGL0060	BGL0064	BGL0066
PVC CABLE, 1 M	PNP NO/NC	BGL005R	BGL005T	BGL005U	BGL005Y	BGL005W	BGL005Z
	NPN NO/NC	BGL005J	BGL005K	BGL005L	BGL005N	BGL005M	BGL005P
Series		K-Typ	T-Typ	F-Typ	R-Typ	L-Typ	Y-Typ
Slot width		5 mm					
Standard target/hysteresis		> 1.2 × 0.8 mm / < 0.05 mm					
Light type		LED infrared (855 nm)					
Operating voltage/output current max.		5...24 V DC/50 mA					
Switching frequency		min. 1 kHz					
Ambient temperature		-25...+55 °C					
IP rating		IP64					
Housing material		PBT					
Approvals/conformity		CE, UKCA					

FORK SENSORS WITH CONNECTION TYPE CABLE



PVC CABLE, 1 M	PNP NO/NC	BGL005A	BGL005E	BGL005C	BGL005F	BGL005H
	NPN NO/NC	BGL0055	BGL0057	BGL0056	BGL0058	BGL0059
Series		K-Typ	U-Typ	L-Typ	F-Typ	R-Typ
Slot width		5 mm				
Standard target/hysteresis		> 1.2 × 0.8 mm / < 0.05 mm				
Light type		LED Infrared (855 nm)				
Operating voltage/output current max.		5...24 V DC/50 mA				
Switching frequency		min. 1 kHz				
Ambient temperature		-25...+55 °C				
IP rating		IP64				
Housing material		PBT				
Approvals/conformity		CE, UKCA				

With the BFD ultrasonic position sensor with media contact, we are expanding our portfolio to add an innovative way to directly monitor hydraulic short-stroke cylinders. A reliable and economical solution for workpiece clamping.

Direct response to increasing production requirements

Existing solutions for monitoring workpiece clamping are either cost-intensive, inflexible or less reliable. As a result, they cannot always meet the increasing demands on machine safety.

Our new ultrasonic position sensor provides a remedy: By emitting ultrasound into the hydraulic fluid, the BFD monitors the clamping process of the workpiece directly, continuously and quickly. This generates reliable information on the clamping status and lets you detect critical deviations early on, like problems with the oil supply, casting errors, contour deviations, insertion errors and deformed workpieces. By monitoring the entire clamping process, you can also spot pressure fluctuations in the hydraulic unit, defects in the swivel mechanism and defective seals in ample time to take action.

Easy integration and scalable use

Thanks to its small form factor, standardized interface that can be configured as required, and continuous compensation, the sensor is easy and flexible to integrate and can be used plug and play in different media. Together with standard system components from Balluff, this makes for an exceptionally economical, complete solution.

Relevant additional information is provided through IO-Link. This allows you to detect critical changes in the medium, e.g. due to air or particles in the hydraulic system.

Features

- High-performance measurement over the entire measuring range of 0...80 mm: high repeatability of $\pm 50 \mu\text{m}$, linearity deviation of $\pm 250 \mu\text{m}$
- Continuous compensation to adapt the measurement to the type, composition and quality of the hydraulic fluid
- Flexible integration via IO-Link, as analog transmitter or as two-stage switch
- Firmware functions to provide additional data for condition monitoring

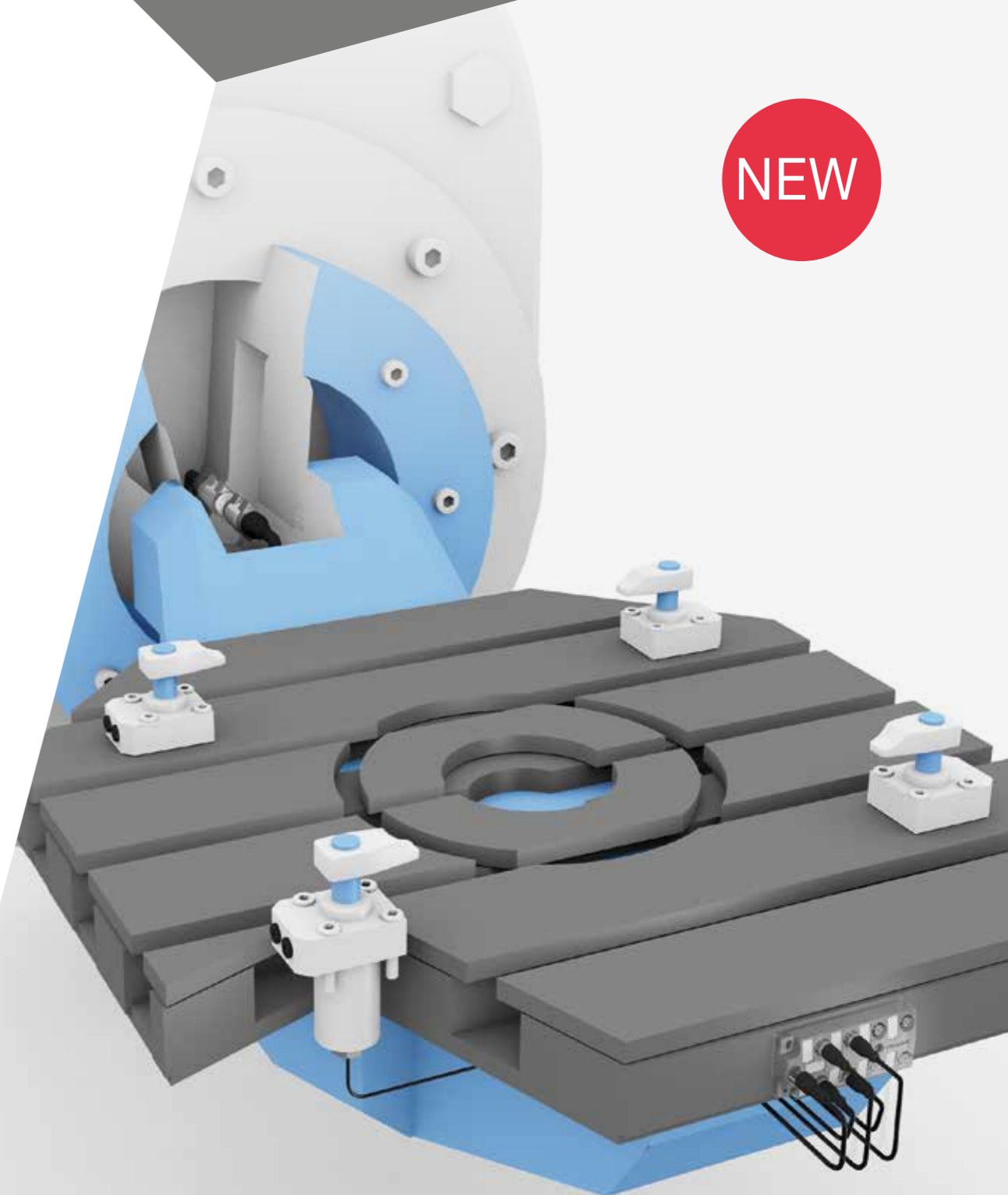
BFD ULTRASONIC POSITION SENSORS



	BFD0002	BFD0001	BFD0003
Measuring range	0...80 mm		
Non-linearity	$\pm 250 \mu\text{m}$		
Repeat accuracy	$\pm 50 \mu\text{m}$		
Pressure rating	350 bar		
Interface	IO-Link 1.1, COM3 (230.4 kBaud)		
Analog output	Analog, voltage 0...10 V/Analog, current 4...20 mA (selectable)		
Dimension	$\varnothing 30 \times 30.9 \text{ mm}$		
IP rating	IP67		
Secondary features	<ul style="list-style-type: none"> ▪ Identification ▪ Device discovery ▪ Switching profiles ▪ Signal quality ▪ Signal delay ▪ Switching counter ▪ Basic statistics ▪ Logic blocks ▪ Operating hours counter ▪ Boot cycle counter ▪ Voltage and current monitoring ▪ Variant configuration ▪ Pin assignment ▪ Internal temperature monitoring 		
Connection	0.3 m TPU cable with M12 connector, male, 4-pin	0.3 m TPU cable with M8 connector, male, 4-pin	2 m TPU cable

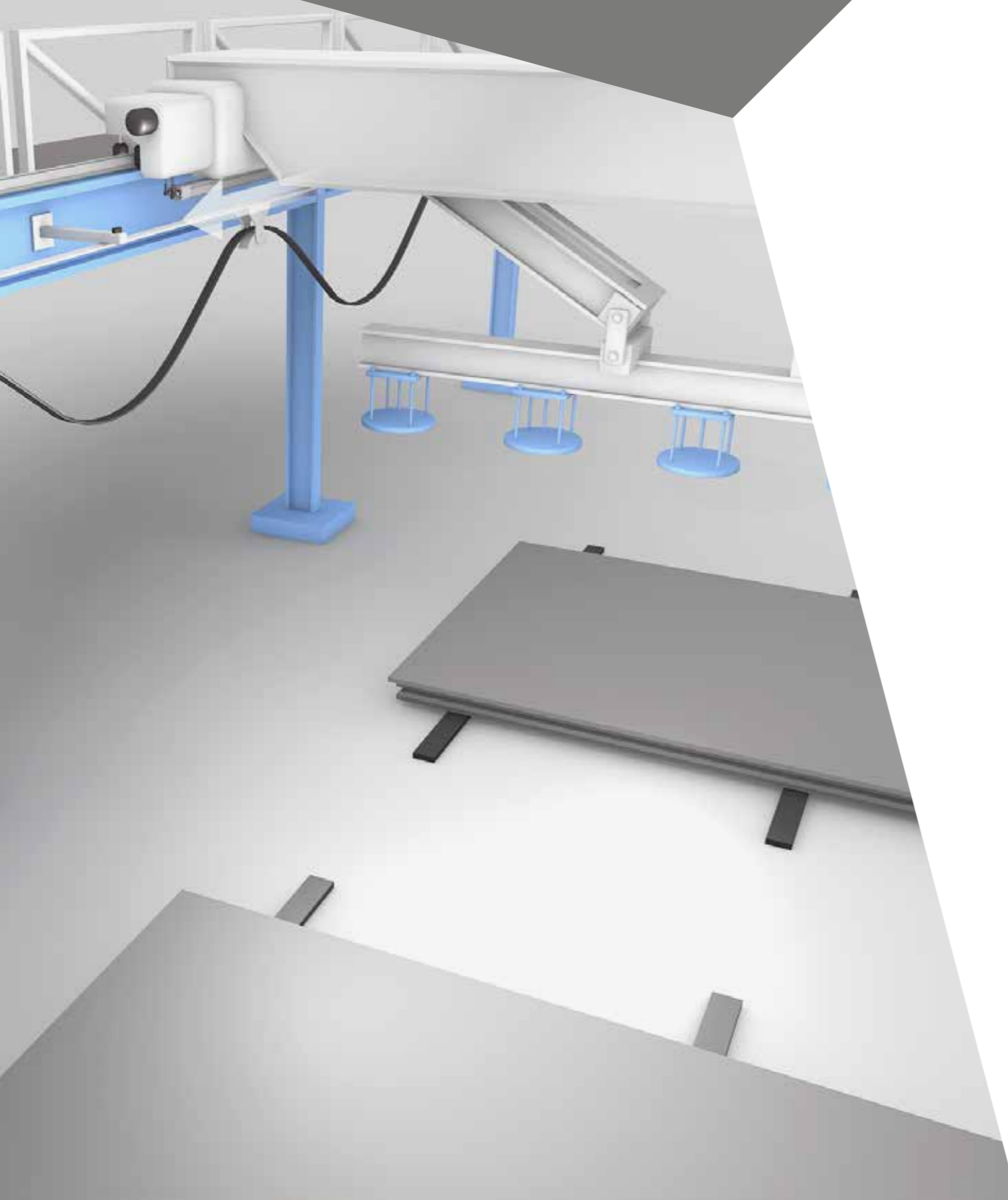
A milestone in the field of metalworking

ULTRASONIC POSITION SENSOR DIRECTLY MONITORS WORKPIECE CLAMPING



Automation using reliable, intelligent and flexible position measurement

MAGNETOSTRICTIVE LINEAR POSITION SENSOR WITH A MEASURING RANGE OF UP TO 1.5 KILOMETERS



Our new intelligent BTL LDPS magnetostriuctive linear position sensor (Long Distance Positioning System) is designed for applications where the absolute position of an object needs to be determined over great distances and with high accuracy. When used with our rugged position measuring system, it provides precise and reliable position information over a measuring range of up to several hundred meters. This makes the system ideal for typical applications on traveling cranes, overhead cranes, avoidance controls, as well as crane and trolley movement.

The measuring system is also available with a failsafe operating option – with redundant markings along the measuring track –, so that the efficiency, reliability and quality of your application is even more enhanced.

How does such precise position measurement work over long distances? The BTL LDPS long distance position measuring system includes magnetic markers installed along the track of the crane and whose position is read by the magnetostriuctive sensor installed on the crane. Information about the position of the markings relative to the sensor are sent to the controller, which, in turn, calculates the absolute coordinates of the crane position with high accuracy. Reliability is, therefore, always ensured.

The position measuring system consists of a magnetostriuctive sensor with a Profinet interface, several magnets and a software function block for incorporating it into a Siemens controller.

Features

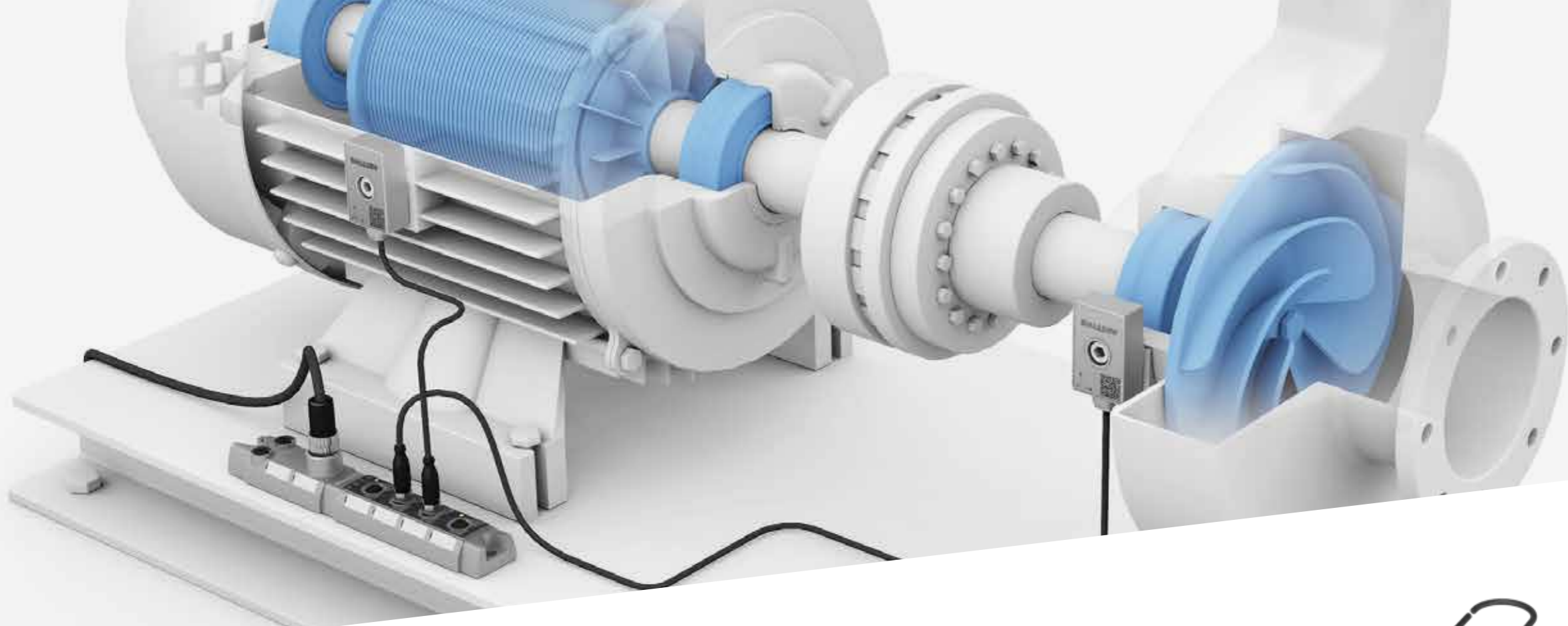
- Absolute linear position measuring system with a measuring range of up to 1.5 kilometers
- High reliability and low maintenance with a non-contact and wear-free operating principle
- Resistant to harsh industrial environments (IP67)
- System automatically adjusts to the magnetic marking
- Repeat accuracy up to ±0.5 mm



BTL LDPS MAGNETOSTRICTIVE LINEAR POSITION SENSORS IN PROFILE DESIGN

CONFIGURABLE SET		BTL7-V50_-M_ _ _ _-P-SA447/479 LDPS						
Application distance	with BAM014T	0...50 m	0...100 m	0...200 m	0...250 m			
	with BAM041Y	0...50 m	0...100 m	0...200 m	0...250 m	0...400 m	0...750 m	0...1500 m
Recommended sensor measuring range	with BAM014T	3000 mm	4000 mm	4500 mm	4500 mm			
	with BAM041Y	3000 mm	3500 mm	3500 mm	4000 mm	4000 mm	4500 mm	4500 mm
Maximum required number of magnets ¹	with BAM014T	39	57	97	121			
	with BAM041Y	35	109	184	230	367	587	1156
Style		Profile series						
Mounting		Mounting clamps						
Housing material		Aluminum						
Connection 1		M8, 4-pin						
Connection 2		M12, 4-pin, D-coded						
Connection 3		M12, 4-pin, D-coded						
Interface		Profinet Encoder Profil V4.1						
Operating voltage U _B		10...30 V DC						
Ambient temperature		-40...85 °C						
IP rating		IP67						
Approval/conformity		CE, cULus, UKCA						

¹ The number of the required position magnets results from the specific application distance and the measuring range of the sensor.



Smart condition monitoring at a new level

CONDITION MONITORING SENSOR BCM GENERATION 2

Unplanned downtime and disruptions in the production process can be efficiently avoided with BCM condition monitoring sensors from Balluff. These intelligent sensors provide condition data that you can use to automate costly manual inspections. At the same time, this additional data is an important building block for highly automated and networked production. A standardized IO-Link interface combined with integrated intelligent data pre-processing – the new generation of the popular BCM now sets another milestone in the field of smart IO-Link sensor technology. From condition monitoring of critical components and assemblies through to the detection of critical process states and the detection of relevant process parameters for inline process optimization: With the BCM Generation 2 you solve your condition monitoring applications optimally.

Upgrade instead of update

The new condition monitoring sensor is more than an iterative further development of the first generation. Rather, it is a completely new platform with different hardware and firmware. The significantly improved measurement performance in combination with more sophisticated algorithms allow the sensor to detect the smallest changes in condition even earlier and more precisely than before. Thanks to the new, convenient mounting design with just one screw, it is also even easier to install. The small, round mounting surface makes it much simpler to set about mounting on curved surfaces. This offers you enormous advantages, especially for retrofit solutions.

In short: Compared to the first generation, the new BCM scores with an even significantly higher performance level, intelligent algorithms and a sophisticated and efficient mounting design.

Features

- Smart condition monitoring sensor with standardized IO-Link interface
- Multiple measured variables in one device: vibration and temperature
- Very high performance of vibration measurement with a frequency range of up to 6 kHz in three measurement axes
- Early and targeted detection of critical condition changes through integrated frequency analysis
- Simple and efficient installation and retrofitting due to sophisticated mounting design
- Sensor self-monitoring with Balluff Smart Automation and Monitoring System (SAMS)

CONDITION MONITORING SENSOR BCM GENERATION 2



	BCM0003	BCM0004
Function modules	<ul style="list-style-type: none"> ■ Vibration time domain analytics ■ Vibration frequency domain analytics ■ RPM input ■ Contact temperature 	<ul style="list-style-type: none"> ■ Vibration time domain analytics ■ Contact temperature
Vibration	Measuring range	-16...16 g
	Measuring axes	3
	Frequency range	2...4000 Hz (±10 %) 2...6000 Hz (3 dB)
	Evaluation time domain	<ul style="list-style-type: none"> ■ RMS ■ Peak ■ Max ■ Crest factor ■ Skewness ■ Kurtosis
Evaluation frequency domain	<ul style="list-style-type: none"> ■ Amplitude spectrum (FFT) ■ Envelope spectrum (FFT) 	
Interface	IO-Link 1.1.3, COM3 (230.4 kBaud)	IO-Link 1.1.3, COM3 (230.4 kBaud)
Operating mode	IO-Link Mode, SIO-Mode	IO-Link-Modus, SIO-Modus
Ambient temperature	-40...+80 °C	-40...+80 °C
IP rating	IP67, IP68, IP69K	IP67, IP68, IP69K
Housing material	Stainless steel 1.4404	Stainless steel 1.4404
Dimensions	34 × 22 × 12 mm	34 × 22 × 12 mm
Connection	1.5 m PUR cable with M12 male, 4-pole	1.5 m PUR cable with M12 male, 4-pole
Secondary features	<ul style="list-style-type: none"> ■ Identification ■ Device discovery ■ Signal delay ■ Switching counter ■ Basic statistics ■ Operating hours counter ■ Boot cycle counter ■ Voltage and current monitoring ■ Variant configuration ■ Pin assignment ■ Internal temperature monitoring 	<ul style="list-style-type: none"> ■ Identification ■ Device discovery ■ Signal delay ■ Switching counter ■ Basic statistics ■ Operating hours counter ■ Boot cycle counter ■ Voltage and current monitoring ■ Variant configuration ■ Pin assignment ■ Internal temperature monitoring

Automatic identification and tracking in production

RFID – RADIO FREQUENCY IDENTIFICATION

 innovating automation

Our BIS Industrial RFID systems provide you with the key technology for implementing the essential features of a modern manufacturing facility. Using RFID lets you categorize objects unambiguously and trace them at any time. Processes become transparent.

Industrial identification contributes to the interplay of all the levels involved in production and clears the path for self-controlling processes. That makes autonomous systems an important component of the Smart Factory and the IIoT.

At Balluff you have access to the entire spectrum of RFID technologies with low (LF), high (HF) and ultra-high (UHF) frequency operation for virtually unlimited application. One special feature: with our BIS V multi-frequency processor unit, you can combine all our RFID systems flexibly with each other.

Another plus: our RFID Configurator lets you assemble your custom system online. And it's easy to use. Simply let yourself be guided by your own application, and in just a few clicks, you're there.

Your Balluff solutions

- UHF (860...960 MHz) BIS U
- HF (13,56 MHz) BIS M
- LF (70/455 kHz) BIS C
- LF (125 kHz) BIS L
- RFID configurator

Assemble your own system online
www.balluff.com/go/rfid-configurator

Traceability for LF, HF and UHF applications

RFID GOES MOBILE

NEW

Clearly assign objects and products and track them at any time. Our traceability solutions allow you to read data tags in your production line.

However, there are times when data must be read, visualized or changed away from the line or machine and handheld readers are a more efficient solution.

Our BIS V RFID handhelds provide a more flexible option for manual processes – e.g. for inventory or warehouse management, rework, quality control or even service and maintenance work. And swappable antennas allow them to be a complementary counterpart to any Balluff fixed reader.

Mobile, multifrequency, modular

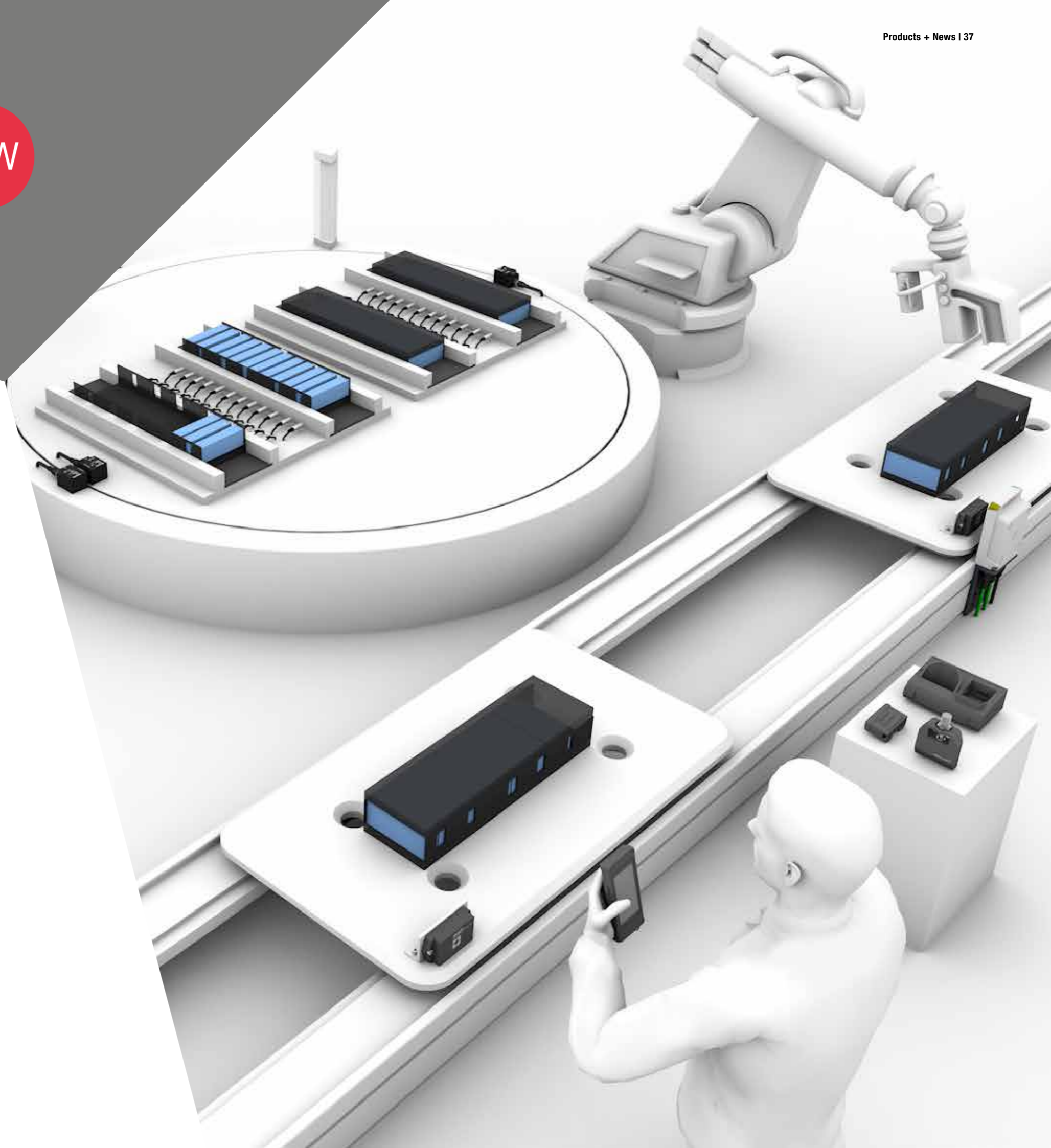
Our RFID portfolio is extremely diverse. Our handhelds with smartphone design are at least as diverse. For reading/writing data tags – whether HF, LF or UHF – with just one device, the handheld BIS V is an ideal choice.

Create the handheld reader just right for your application by combining a base device, a suitable plug-on module and one of our read/write heads. And with an app that can be individually configured, you can visualize and edit data content flexibly at any time.

In addition to RFID functionality, the reading of 1D/2D barcodes is also possible, thanks to the optional integration of a 1D/2D scanner and camera, with or without the addition of a NFC antenna.

Features

- Multi-frequency base unit, individually and modularly combinable
- Modern smartphone design with Android operating system
- Optimal visualization of data carrier contents
- Various detachable modules for all RFID families, can be combined with existing read/write heads
- Flexible reading of different RFID data tags and (optional) 1D-/2D-codes with single base device
- Visualization and editing of data content in configurable App





RFID MOBILE DEVICES:
HANDHELD

	BIS01FU	BIS01FW	BIS01H2
Operating system	Android™ 9.0*		
Display	5" TFT color display with LED backlight, 1280 × 720 pixels, 400 cd/m², capacitive touch, surface hardness 7H		
Battery type	Quick-change battery, Li-Ion with 22.8 Wh (6000 mAh/3.8 V)		
IP rating	IP65		
Approval/conformity	CE, UKCA, cCSAus, FCC, IC		

Additional features

Integrated barcode scanner		1D and 2D short-range scanner integrated in the housing (scanner buttons on the side)	1D and 2D short-range scanner integrated in the housing (scanner buttons on the side)
Integrated camera		5 MP autofocus camera with lighting	5 MP autofocus camera with lighting
Integrated HF-RFID reader			NFC reader 13.56 MHz

RFID MOBILE DEVICES:
UHF READ/WRITE
MODULE



	BIS01FY	BIS01FZ
Antenna type, polarization	Dipole, integrated linear polarized	
Output power adjustable	10 dBm...27 dBm	
Standards	EPCglobal™ Class 1, Gen 2, ISO 18000-63, DRM (Dense Reader Mode) support	
IP rating	IP65	
Approval/conformity	CE, UKCA, cCSAus	cCSAus, FC, IC

RFID MOBILE DEVICES:
HF/LF READ/WRITE
MODULE



	BIS01HC	BIS01HE
Supported RFID technologies	LF 125 kHz (BIS VL), HF 13.56 MHz (BIS VM)	LF 70/455 kHz (BIS C)
Connection	Connector, M12 female, 5-pin	
Number of read/write heads	1	
Approval/conformity	CE, UKCA	CE, UKCA, FCC, IC

ACCESSORIES



	BAM0421	11042600
Description	Charging cradle	Spare battery



Smart Automation and Monitoring System

UHF READ/WRITE HEAD WITH INTEGRATED IO-LINK PROCESSOR UNIT

Powerful, smart sensor technology and multifunctional solutions form the basis for increasing the efficiency and effectiveness of your machines and systems.

Through Smart Features, our intelligent components provide you not only with process and condition data, but also with valuable and uniform diagnostic data, such as temperature and signal quality monitoring, as well as other multifunctions. This opens up completely new possibilities for you – from monitoring the condition of the machine and entire plants (condition monitoring) to predictive/preventive maintenance and even completely new business models.

The Smart Automation and Monitoring System (SAMS) thus represents Balluff's comprehensive automation philosophy. Thanks to its standardized operating and configuration concept, long commissioning times, high training costs and time-consuming troubleshooting in the event of unexpected device failure are also a thing of the past.

An essential component of the SAMS portfolio are our new UHF read/write heads with integrated IO-Link evaluation unit (860...960 MHz), which are used especially for identification in format part recognition. They are optimized for close range and reliably detect objects at reading

distances of up to 50 cm. Their IO-Link interface enables smooth integration by connecting to SAMS BNI master components. And thanks to the compact M30 cylinder housing, the system can also be easily installed in confined spaces.

Features

- Washdown Plus promise: Exceeds IP69K protection rating and withstands 1000 cleaning cycles
- Hygienic material (stainless steel 1.4404/PBT)
- H₂O₂-resistant
- IO-Link interface with advanced smart features

INDUSTRIAL
RFID SYSTEMS

 SAMS PRODUCTS



	BIS01E4	BIS01E8	BIS01E9
Working frequency	865.6...867.6 MHz	902...928 MHz	920.5...924.5 MHz
Radio approval	Europe	USA	China
Dimension	M30 × 98 mm	M30 × 98 mm	M30 × 98 mm
Antenna type	Patch	Patch	Patch
Polarization	Circular	Circular	Circular
Output power adjustable	-9.25...+13.75 dBmERP	-7...+16 dBmEIRP	-9.25...+13.75 dBmERP
Connection	M12 male, 4-pin, A-coded	M12 male, 4-pin, A-coded	M12 male, 4-pin, A-coded
Housing material	Stainless steel, PBT	Stainless steel, PBT	Stainless steel, PBT
Interface	IO-Link 1.1, COM 3	IO-Link 1.1, COM 3	IO-Link 1.1, COM 3
Process data IN/OUT	32/32 bytes	32/32 bytes	32/32 bytes
Operating voltage U _b	24 V DC LPS Class 2	24 V DC LPS Class 2	24 V DC LPS Class 2
Ambient temperature	0...+70 °C	0...+70 °C	0...+70 °C
IP rating	IP68/IP69K	IP68/IP69K	IP68/IP69K
Approval/conformity	CE, ETSI EN 302 208, cULus, EAC	FCC Part 15, IC RSS-210, cULus, EAC	CMIIT-Radio Transmiss. Equipm., cULus
Condition monitoring features	Vibration detection, inclination detection, internal temperature monitoring, voltage and current monitoring, signal quality check, extreme environment status, LED diagnostics		
Multi-functions	Operating hours counter, boot cycle counter, ping for visual localization of the device, Pin 2 for output of internal digital signals		


 Discover SAMS, the innovative Smart Automation and Monitoring System for optimal performance: Page 8



Image processing devices for reliable detection and recording

MACHINE VISION AND OPTICAL IDENTIFICATION.

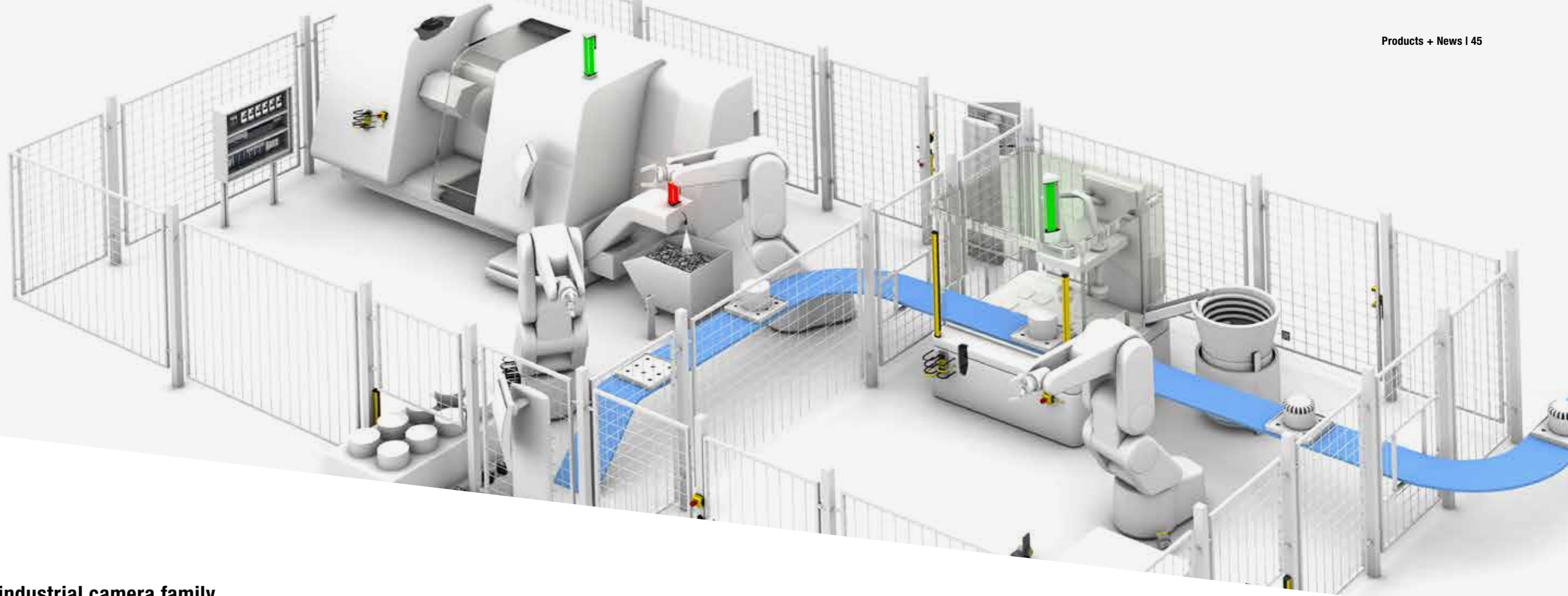
 *innovating automation*

The demands on modern production equipment are high: they must be extremely productive and flexible, while achieving maximum quality. Our Balluff Vision Solutions are designed precisely to meet these requirements. They reliably detect errors, check quality, and are suitable for reliable reading and verification of codes. They scan objects, 1D and 2D barcodes, and plain text.

The sensors are extremely flexible for parts checking in assembly or parts tracking in production. Their standardized interface mean the devices are simple to integrate and easy to use.

Your Balluff solutions

- Industrial cameras
- Smart Vision
- Optical Identification
- 3D Machine Vision
- Embedded Vision
- Machine Vision Software
- Optics
- Lights for vision systems and machines



GigE vision industrial camera family

THE INDUSTRIAL CAMERAS FOR STANDARD APPLICATIONS IN IMAGE PROCESSING

Equipped with Sony global shutter CMOS sensors and a resolution of 0.4 to 20 MP, the GigE vision industrial camera family series provides great flexibility. And thanks to the GigE Vision standard, you can quickly, easily, and cost-effectively integrate them into your application and implement sophisticated image processing systems with one or more cameras.

Use up to 100 meters of standard Cat5e cable – no router required. With standard network technology, you can link several cameras into a flexible system and carry out inspections from different perspectives. Synchronization is achieved via IEEE1588 Precision Time Protocol (PTP) and Ethernet. Further simplification of system cabling is possible with four digital high-side outputs. Peripheral devices such as lighting can thus be controlled and supplied with power directly from the camera.

The camera design completes the package: a robust camera body with multiple mounting options, status LED on the back, removable filter and a C-mount lens with adjustable flange focal length.

Features

- Camera series with excellent price-performance ratio
- Sony CMOS sensors for optimum image quality
- Easy integration with the GigE Vision standard
- Robust product design and internal image memory
- System simplification thanks to four digital high-side outputs



GigE VISION INDUSTRIAL CAMERA

	BVS CA-GX0 – (xxxxxx) – (1) (2) (3) (4) (5) (6) – 001
Interface	GX0 – GigE Vision
Sensors (xxxxxx)	Sony IMX series, 4...31.5 MP, global and rolling shutter, CMOS
Handling (1)	1 = Standard 2 = Extended temperature range
Lens holder (2)	1 = C-Mount, adjusted backfocus, fixed square filter 2 = C-Mount, adjustable backfocus, round filter with screw ring Ø 23.2 mm 4 = CS Mount, adjustable back focus, filter Ø 20 mm 5 = C-Mount, adjustable back focus, filter Ø 23.2 mm
Filter (3)	0 = Without filter 1 = IR cut filter 2 = Glass filter Other filters on request.
Housing (4)	1 = Standard C = IP67C compact housing
I/O (5)	2 = Standard I/Os 3 = Optically isolated I/Os 4 = Optically isolated input, high-side switch OUT, M12 connections 6 = Galvanically isolated input with PLC logic level, high-side switch OUT
Software (6)	0 = Standard



10GigE interface: Camera series for more details and high speeds

HIGH FRAME RATES FOR INDUSTRIAL ENVIRONMENT



The GigE Vision compatible camera range allows you to use the performance of the state-of-the-art image sensor technology, like that of the Pregius S Gen4 CMOS line from Sony. With the global shutter technology with backside illumination, the Gen4 sensors have more precision and a higher resolution per sensor surface.

With PoE+ both the power supply and the data transmission are made possible via one cable connection, thus reducing the complexity of the wiring, as well as the necessary space for the installation. Accessories such as motorized camera lenses, illumination, or control units, can be easily controlled via the camera, thereby reducing the number of necessary system components. Transmission of the images to several computers allows parallel processing of the data. The integrated image memory of 2048 MB ensures reliable data transmission.

With protection class IP67, as well as industrial plug connections, the camera series is designed for use in harsh environments. It is also available with active air cooling.

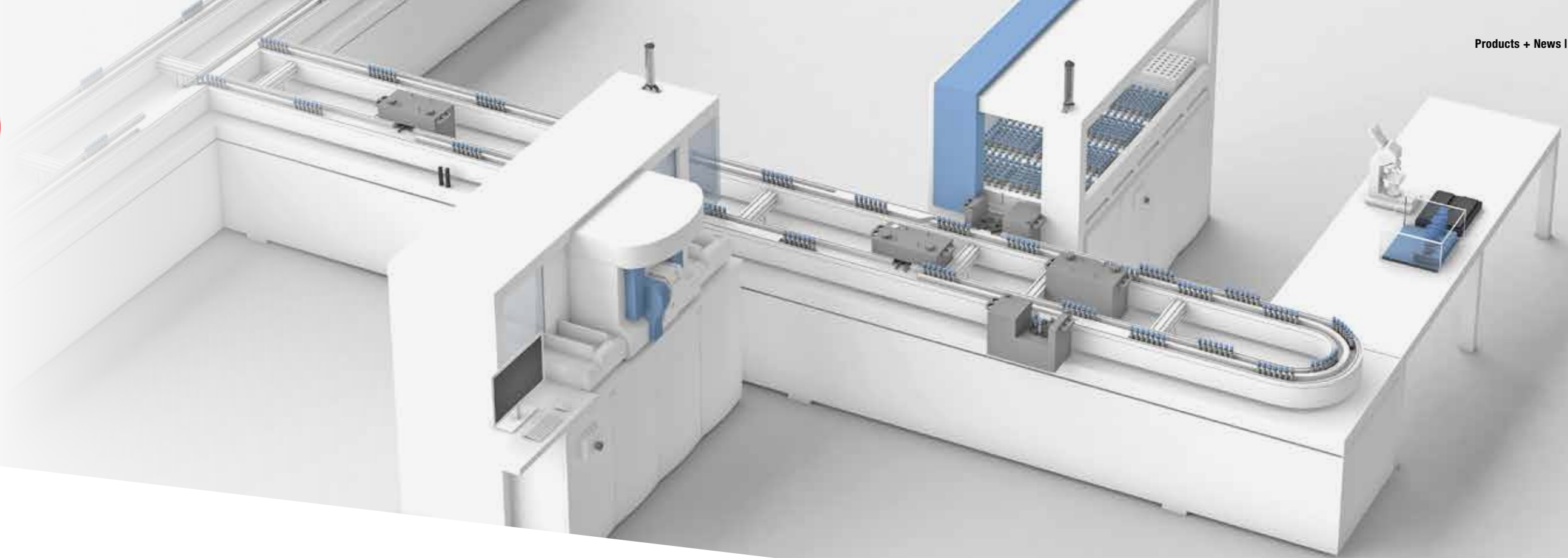
Features

- Sensors with up to 24.6 MP
- High net data rate of up to 1245 MB/s
- Compact IP67 housing
- Robust industrial connector
- Secure image transmission with 2048 MB image buffer
- Power supply through PoE+
- Precise synchronization with Precision Time Protocol (PTP) i. a. w. IEEE1588
- Identical API for Linux and Windows
- GenICam and GigE Vision compatible



10GigE INDUSTRIAL CAMERA RANGE

	BVS CA-GT1 – (xxxxxx) – (1) (2) (3) (4) (5) (6) – 001
Interface	GT1 – 10 GigE Vision
Sensors (xxxxxx)	IMX487 (8.1 MP, 2848 × 2848 pixels, 2/3" global shutter UV CMOS, 2.74 µm pixel size) IMX530 (24.6 MP, 5328 × 4608 pixels, 1.2" global shutter CMOS, 2.74 µm pixel size) IMX531 (20.4 MP, 4512 × 4512 pixels, 1.1" global shutter CMOS, 2.74 µm pixel size) IMX532 (16.2 MP, 5328 × 3040 pixels, 1.1" global shutter CMOS, 2.74 µm pixel size) IMX535 (12.4 MP, 4128 × 3008 pixels, 1/1.1" global shutter CMOS, 2.74 µm pixel size) IMX536 (8.1 MP, 2856 × 2848 pixels, 2/3" global shutter CMOS, 2.74 µm pixel size) IMX537 (5.1 MP, 2472 × 2064 pixels, 1/1.8" global shutter CMOS, 2.74 µm pixel size)
Handling (1)	1 = Standard
Lends holder (2)	1 = C-Mount, fixed square filter
Filter (3)	0 = Without filter 1 = IR cut filter 2 = Glass filter Other filters on request.
Housing (4)	1 = Standard housing F = Standard housing with fan
I/O (5)	4 = Optically isolated input, high-side switch OUT, M12 connectors
Software (6)	0 = Standard



Hi-res USB 3.0 industrial camera for every detail

THE INDUSTRIAL CAMERA WITH 31 MP HI-RES SONY CMOS SENSORS

The USB 3.0 vision compliant cameras have generous FPGAs with many smart features, which are carried out directly in the camera and thus relieve the host system. With the 2/4 digital inputs and outputs, the cameras can be triggered, or subsequent processes can be controlled. The cameras are primarily designed for use in the sectors of mechanical engineering, traffic engineering, surveying and inspection.

Features

- Compact form factor
- Reliable image transfer thanks to 256 MB image buffer
- FPGA based smart features reduce system load and simplify the overall system
- More details using large sensors with sizes greater than 1"
- Higher resolution and frame rate
- Identical API for Linux and Windows

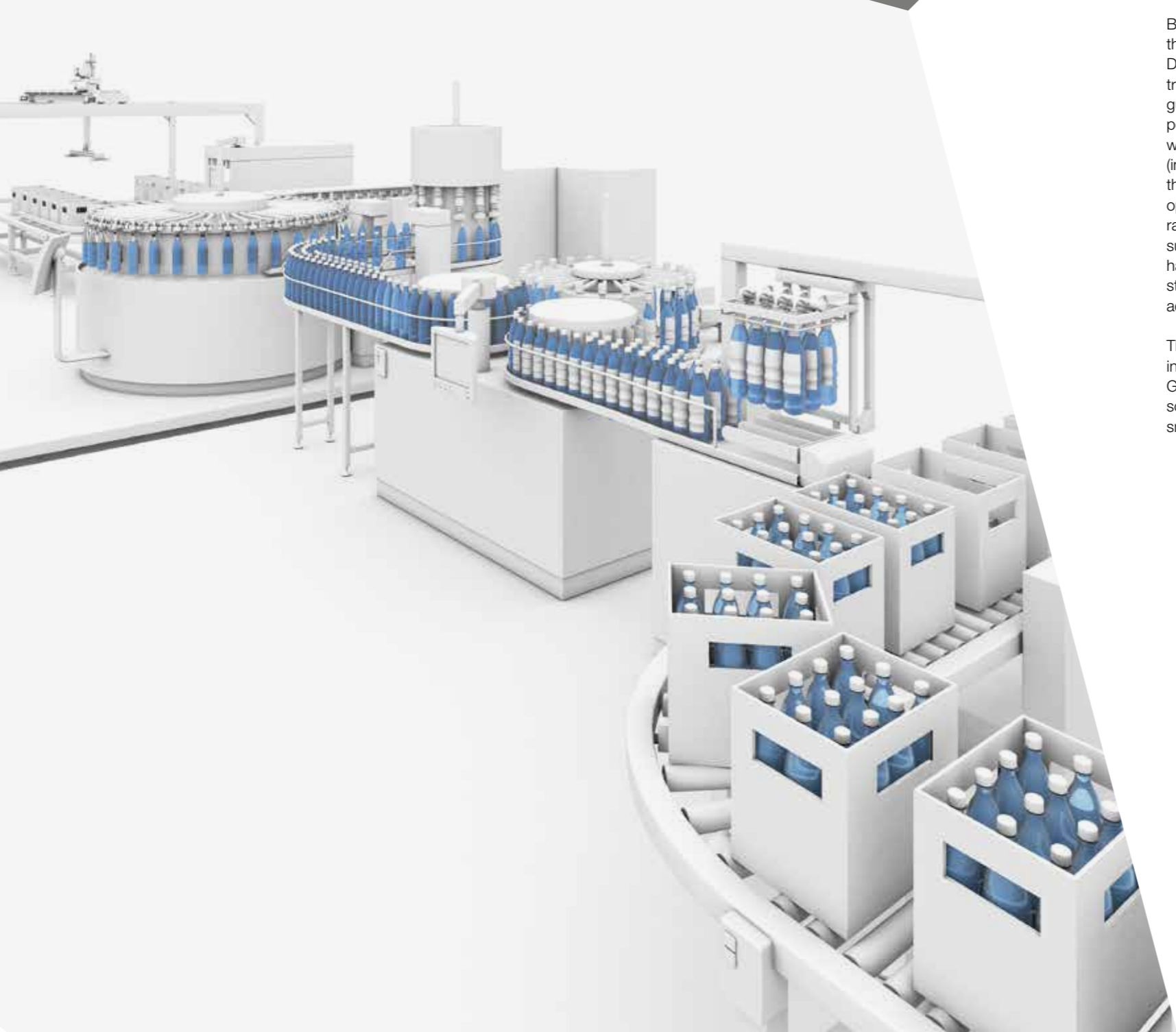


USB 3.0 INDUSTRIAL CAMERA

	BVS CA-SF4 – (xxxxxx) – (1) (2) (3) (4) (5) (6) – 001
Interface	SF4 = USB3 Vision
Sensors (xxxxxx)	IMX342 (31.5 MP, 6480 × 4856 pixel, APS-C global shutter CMOS, 3.45 µm pixel size) IMX367 (19.6 MP, 4432 × 4432 pixel, 4/3" global shutter CMOS, 3.45 µm pixel size) IMX387 (16.9 MP, 5472 × 3080 pixel, 4/3" global shutter CMOS, 3.45 µm pixel size)
Handling (1)	1 = Standard 2 = Extended temperature range
Lens holder (2)	N = M42×1 mount, backfocus 12 mm, fixed square filter P = M42×1 mount, backfocus 45.5 mm, fixed square filter Q = F mount, backfocus 46mm, fixed square filter T = TFL mount, backfocus 17.5mm, fixed square filter
Filter (3)	0 = Without filter 1 = IR cut filter 2 = Glass filter Other filters on request.
Housing (4)	1 = Standard housing F = Standard housing with fan
I/O (5)	0 = Without I/Os 2 = Standard I/Os
Software (6)	0 = Standard

Compact camera modules featuring a scalable PCI express interface for complex applications with a maximum transfer rate

TOP PERFORMANCE FOR EMBEDDED VISION APPLICATIONS



By using the platform-independent PCI express interface (PCIe), the camera module family offers very high transfer rates at low cost. Due to a direct connection of the image sensor, an almost latency-free transfer is possible. Transfer of image data directly into the memory is guaranteed (DMA – Direct Memory Access). Applications with high performance requirements regarding resolution and frame rate are served with high image quality. Larger bit depths and FPGA- based debayering (in a 5 × 5 matrix) can be realized at low system costs. Here, the models of the camera module family stand out with an even faster sensor connection, optimized for the Gen4 sensors of the Pregius S series. PCIe makes a wide range of processor architectures based on NVIDIA Jetson, ARM and x86 suitable, enabling optimal scalability in terms of performance. The camera hardware is connected using its own screwable flex cable (30 cm) or a standardized OcuLink signal cable with a length of up to 1 m. Appropriate adapter boards are available for the respective computer platforms.

The Impact Acquire software development kit (SDK) supports our cameras in the same way as all other industrial cameras. In addition, the included GenICam GenTL Producer ensures full compatibility with existing customer software as well as 3rd party image processing packages and allows a smooth change of platform if required.

Features

- Platform independence – universal and scalable integration thanks to PCI express
- Low system costs through camera on-board image pre-processing functions
- Shorten your time to market through fast integration and flexibility in platform selection
- High investment security due to the PCIe interface and the standardized GenICam software interface
- High efficiency and minimal latency due to a direct image sensor connection and FPGA-based preprocessing



PCI EXPRESS
CAMERA MODULE SERIES

	BVS CA-BN2 – (xxxxxx) – (1) (2) (3) (4) (5) (6) – 001
Interface	BN = PCIe
Sensors (xxxxxx)	IMX250 (5.1 MP, 2464 × 2056 pixels, 2/3" global shutter CMOS, 3.45 µm pixel size) IMX252 (3.2 MP, 2064 × 1544 pixels, 1/1.8" global shutter CMOS, 3.45 µm pixel size) IMX253 (12.4 MP, 4112 × 3008 pixels, 1.1" global shutter CMOS, 3.45 µm pixel size) IMX255 (8.9 MP, 4112 × 2176 pixels, 1" global shutter CMOS, 3.45 µm pixel size) IMX273 (1.6 MP, 1456 × 1088 pixels, 1/2.9" global shutter CMOS, 3.45 µm pixel size) IMX540 (24.6 MP, 5328 × 4608 pixels, 1.2" global shutter CMOS, 2.74 µm pixel size)
Handling (1)	1 = Standard
Lens holder (2)	1 = C-Mount, fixed square filter 5 = C-Mount, filter Ø 23.2 mm
Filter (3)	0 = Without filter 1 = IR cut filter 2 = Glass filter Other filters on request.
Housing (4)	1 = Standard housing
I/O (5)	1 = Standard I/Os H = OCuLink interface, 4 optically isolated I/Os, 2 non-isolated I/Os
Software (6)	0 = Standard



PCI EXPRESS
CAMERA MODULE SERIES

	BVS CA-BN4 – (xxxxxx) – (1) (2) (3) (4) (5) (6) – 001
Interface	BN = PCIe
Sensors (xxxxxx)	IMX530 (24.6 MP, 5328 × 4608 pixels, 1.2" global shutter CMOS, 2.74 µm pixel size) IMX531 (20.4 MP, 4512 × 4512 pixels, 1.1" global shutter CMOS, 2.74 µm pixel size) IMX532 (16.2 MP, 5328 × 3040 pixels, 1.1" global shutter CMOS, 2.74 µm pixel size) IMX535 (12.4 MP, 4128 × 3008 pixels, 1/1.1" global shutter CMOS, 2.74 µm pixel size) IMX536 (8.1 MP, 2856 × 2848 pixels, 2/3" global shutter CMOS, 2.74 µm pixel size) IMX537 (5.1 MP, 2472 × 2064 pixels, 1/1.8" global shutter CMOS, 2.74 µm pixel size)
Handling (1)	1 = Standard
Lens holder (2)	1 = C-Mount, fixed square filter 5 = C-Mount, filter Ø 23.2 mm
Filter (3)	0 = Without filter 1 = IR cut filter 2 = Glass filter Other filters on request.
Housing (4)	1 = Standard housing
I/O (5)	1 = Standard I/Os H = OCuLink interface, 4 optically isolated I/Os, 2 non-isolated I/Os
Software (6)	0 = Standard

Generate, transport, visualize data –
create added value

SOFTWARE

 *innovating automation*



The future of automation is increasingly interlinked and digital. The growing diversity of technology, including in the private sector, means the expectations of many users are increasing while the demands on industry rise.

In order to be able to cope with the increased demands, the merging of classic automation technologies (OT) with information technology (IT) is necessary and the increased use of software is the next logical step.

Balluff therefore offers you the most diverse types of software, which together with our IIoT-capable hardware brings real added value. The Balluff Engineering Tool (BET) is available for easy configuration and commissioning of IO-Link devices. And easy operation of our camera systems is served by the clearly designed user interface BVS-Cockpit.

Your Balluff solutions

- Simple commissioning and configuration

Configure IO-Link devices quickly and easily

BALLUFF ENGINEERING TOOL



Industrial networks with the IO-Link communication standard support versatile and efficient digital production, with IO-Link ensuring seamless communication from the sensor to the Internet. With an increasing number of devices in use, configuration and diagnostics are very time-consuming and require special skills. To simplify the commissioning tasks of engineers, programmers, and maintenance staff, an increase plant efficiency, making use of powerful software such as the Balluff Engineering Tool offers considerable added value. This is because it enables manufacturer-independent and centralized commissioning, configuration and parameterization of IO-Link devices according to the IO-Link standard for sensors and actuators.

Features

- Reduced commissioning time due to faster setup of IO-Link devices, even without a PLC
- Avoidance of wiring errors and reduction of time-consuming troubleshooting by testing the IO-Link wiring before commissioning
- Reduction of the complexity of IO-Link networks and simple, intuitive operation
- Central access to parameterization of all IO-Link devices and overview of the connection status of the entire IO-Link topology
- Higher efficiency – only one software for all IO-Link sensors and actuators independent of the manufacturer and for all Profinet and Ethernet/IP IO-Link network modules from Balluff
- Increased system availability due to reduced maintenance times

Simple operation

This easy-to-use software provides central access to parameterize all IO-Link devices in a network. It provides an overview of the status of all IO-Link devices and informs you about events and errors. The user can easily document the current status of the network and, without a programmable logic controller (PLC), test inputs and outputs to avoid wiring errors.

Faster commissioning

In addition, the Balluff Engineering Tool IO-Link allows device settings and even entire machine or system configurations to be saved and reused. This simplifies and speeds up commissioning and helps to quickly change settings on a device when wiring problems are detected and when testing the machine.

Shortened maintenance times

The software also helps with the maintenance or servicing of IO-Link networks: missing or incorrectly connected devices can be quickly detected, and changes in the parameterization of a device can also be analyzed and easily rectified. And if a device should ever fail, the saved parameters can be restored after a device replacement. This reduces maintenance times and increases system availability.

Ordering example: **BAI-BET-12-UDN-00-DW-STOF**

License duration	License type	Number of licenses	Payment method
P Perpetual	C Concurrent Network	0001 Single user license	1 Single payment
S Annual	N Single user license		3 Annual license, annual payment

For network licenses:

0005 max.	5 users
0010 max.	10 users
0020 max.	20 users
0050 max.	50 users
0100 max.	100 users

Balluff

YOUR PARTNER FOR SUCCESS IN AUTOMATION



B *innovating automation*

Balluff is a leading supplier of high-quality sensor, identification and image processing solutions, including network technology and software for all automation requirements. Family-run for more than 100 years, the company today employs about 3900 employees in 38 subsidiaries within sales, production, and development locations worldwide, all of whom are committed to your success. Together with our representatives, we guarantee the highest quality standards in over 60 countries so that you always get the best.

We deliver innovative solutions to increase your competitive ability. Our consistent digital orientation drives our joint progress, and our innovative spirit factors directly into your success.

We adhere to our motto "innovating automation" as pacesetters of automation, refiners and new developers, and technical trailblazers. In our strategic incubation programs (SIPs), we develop new sustainable business models according to the lean startup principle. Open exchange with associations, universities and research institutes also helps us in this process. In this way, and in close contact with our customers, we create innovative industry solutions for automation. In doing so, we dedicate ourselves not only to the classic automation areas, but also to the development of digitalization and IIoT applications for an increasingly digital and networked world.

We have the future firmly in view in everything we do. We plan with foresight, handle resources carefully and offer you long-term prospects.

You can rely on us, our commitment and Balluff quality – all in the name of a mutually beneficial partnership.

WORLDWIDE

In more than 60 countries
with 3600 employees

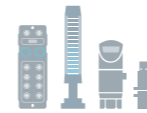
Thanks to an optimally connected worldwide presence, we guarantee our customers best-in-class delivery times, high on-time delivery reliability, transparent material flow and unambiguous responsibilities. Agile working methods are our success factor here. And we do this while maintaining consistently high quality, because that is crucial for our customers.

In addition, our local presence in these respective locations enables us to respond with particular flexibility to regional market requirements and thus meet the needs of customers and markets efficiently and with an eye to the future.



- Subsidiaries and representatives
- Distributors
- 🏭 Production facilities

Comprehensive **portfolio** of sensor, identification and image processing solutions including network technology and software



More than **30000** customers and partner worldwide



On site in over 60 countries: with own subsidiaries and numerous representatives **38**

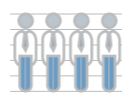
AT A GLANCE

More than **100** **YEARS** since 1921

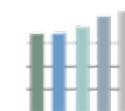


Experienced manufacturer with **7** production sites worldwide

4. generation family-owned company



567 million EUR in group sales 2022



about **3900** employees worldwide

A high quality assortment of enormous range

PRODUCT PORTFOLIO



Sensors

In the field of sensor technology for machines and systems, Balluff offers the entire technological diversity with its different operating principles. We offer high-quality and precise sensors and systems for every application and requirement, from displacement measurement and identification to object detection and fluid measurement. Sensors for everyday industrial applications as well as for use in extreme and harsh environments. In addition, we offer you the best network and connection technology as well as an extensive range of accessories. Our sensor technology forms the basis for the automation and digitalization of your machines and plants. We offer sensors in highest precision and best quality for your processes.

Your Balluff solutions

- Inductive sensors
- Capacitive sensors
- Photoelectric sensors
- Magnetic field sensors
- Cam switches
- Ultrasonic sensors
- Magnetic encoders
- Magnetostrictive sensors
- Inclination sensors
- Pressure sensors
- Temperature sensors
- Flow sensors
- Condition monitoring sensors
- Position indicators
- Encoders



RFID

Our identification solutions BIS, offer you the key technology to implement essential requirements of modern manufacturing. With RFID technology, objects and products can be clearly assigned in the company and traced at any time. RFID systems are used to make all production steps transparent and traceable and are therefore an essential component for implementing the requirements of modern production and always keeping an eye on all data.

For unique identification and immediate traceability, a data carrier (RFID transponder) is attached to the object to be identified, which acts as a memory. The data is transmitted between the RFID transponder and the read/write head (reader) and passed on to the controller via the evaluation unit or an IO-Link network module. Our RFID solutions can be operated with almost any common controller and the evaluation units support all frequency ranges. And that is exactly what is special about RFID - the contactless exchange of information between RFID transponder and reader.

Your Balluff solutions

- UHF (860...960 MHz) BIS U
- HF (13,56 MHz) BIS M
- LF (70/455 kHz) BIS C
- LF (125 kHz) BIS L
- Multi-frequency RFID processors
- RFID configurator



Machine Vision and Optical Identification

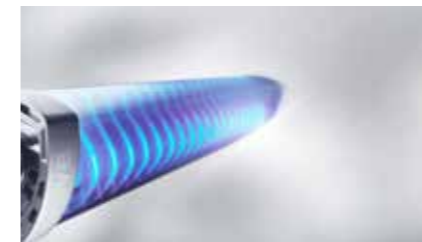
The requirements for modern production systems are high: High productivity and flexibility to maintain maximum quality. Our Balluff Vision Solutions (BVS) image processing devices are designed to meet these requirements.

They reliably detect errors, inspect quality and are suitable for reliably reading and verifying codes. Their functions include the detection of objects, 1D and 2D barcodes and the detection of plain text. With this range of capabilities, these sensors are extremely flexible.

Balluff Vision Solutions are used both in part-checking during assembly and in part-tracking during production. With standardized interfaces, the units can be easy to integrate and operate.

Your Balluff solutions

- Industrial cameras
- Machine vision
- Optical identification
- 3D Machine vision



Human Machine Interfaces

Digitalisation has long since arrived in industrial production. In order to always be up to date, it is important to be able to rely on automated processes. With our signalling and display devices, you know at all times what the status of production is. They reliably visualise the status of the machine and system components to be monitored by converting the output signals of the sensors optically and acoustically. For example, a display device such as our SmartLight can be used to monitor the temperature at defined points on your machine or system. If the temperature exceeds a critical level for your machine, this is immediately indicated by the predefined optical warning signal. If the temperature continues to rise, this can also be signalled visually via the indicator.

Your Balluff solutions

- SmartLight – LED stack lights
- Displays



Industrial Networking

To reliably control and monitor your machines and systems, you need professional industrial communication and network technology. The requirements for industrial networks are extensive and diverse. The ever-increasing volume of data and complex communication require powerful and reliable components that are capable of transporting information across all levels.

This is especially true when high protection classes, robustness, use at high temperatures or special interfaces and connections for the greatest possible safety are required.

The intelligent combination of powerful industrial networks with the IO-Link communication standard enables the reliable and flexible exchange of information in a wide range of applications.

Balluff thus enables you to optimally network your network components and provides an important building block for the industrial automation of your company.

Your Balluff solutions

- IO-Link Wireless
- Network blocks
- Switches
- I/O modules
- Inductive Couplers



Connectivity

Flexible and reliable - for us, these are essential characteristics of good connection technology. At Balluff, you get everything from a single source: sensors, systems and network technology as well as suitable connectors and connection cables for a wide range of requirements and optimal use in your industry. With our diverse, flexible and reliable connection technology, we support you with rapid integration and ensure quick and easy commissioning of your machines and systems. In our product range you will find various connection cables, distributors and connectors for reliable sealing as well as signal and data transmission. The connections are used in both mobile and robust applications in all areas of industry.

Your Balluff solutions

- Single-ended cordsets
- Double-ended cordsets
- Bulk cables
- Y-splitters Receptacles
- Tees
- Field attachables
- Bulkheads
- Receptacles
- Adapters
- Terminating resistors
- Junction blocks



Safety

The safe operation of machines and systems is elementary for employee protection, safeguarding productivity as well as liability security. To ensure both the safe operation of your machines and systems and to meet the safety requirements for machines and systems in industry, Balluff offers a comprehensive portfolio and solutions for your safety. This enables you to meet and reliably comply with the requirements of ISO 13849-1 Functional Safety as the standard for the safety verification according to the Machinery Directive 2006/42/EC.

With the installation of protective devices on machines and systems, important machine safety measures are already implemented in accordance with the Machinery Directive. From guard locking devices, safety sensors to control devices such as emergency stop and optoelectronic protective devices to safe I/O modules, Balluff enables you to create unique safety concepts for your company that provide a high level of safety up to the highest safety level PL e (Performance Level e according to ISO 13849-1:2006).

Your Balluff solutions

- Safety I/O modules
- Safety switches and safety sensors



Power supplies

With us you will find a wide selection of voltages and power levels and thus the right power supply for a reliable and efficient power supply.

For applications in the control cabinet, you can obtain 1- and 3-phase solutions in IP20 design with a wide power range from 3.15 A to 40 A and an optimum price/performance ratio.

With the new generation of our intelligent IP67 field power supplies you get the best from one source: 1 and 3 phase devices in high power classes, IO-Link functionality for condition monitoring and remote parameterization and multiple outputs, available as 7/8" and M12 variants.

Intelligent solutions with predictive maintenance are also offered by our Heartbeat® products. Here, too, the extended diagnostics can be used plant-wide via IO-Link.

Your Balluff solutions

- Heartbeat® power supply units
- Heartbeat® power supply units with IO-Link interface
- Power supplies for the control cabinet
- Field power supplies with IO-Link interface



Accessories

With our accessories you succeed in easy mounting, installation and exact positioning of our sensor technology, RFID systems, cameras as well as signalling and display devices for high machine availability. Our large selection of high-quality accessories supports you in the optimal mounting of hardware in machines and systems. The wide Balluff product range offers the optimal equipment in various designs, for almost all applications.

We not only offer accessories for precise sensor mounting, but also a wide range of machine accessories, such as protective housings or accessories for lighting, to optimally illuminate your machines, making it easier to use certain sensors and systems. The extensive portfolio of accessories is optimally matched to each version of our components and thus simplifies the design and installation of your machines and systems as well as your production processes. In addition to a wide range of reflectors and fibers for optical systems, we also offer signal converters and adapters to transport signals efficiently.

Your Balluff solutions

- Fastening Technology
- Lights for vision systems and machines
- Reflectors, Fibers, Optics
- Mechanical Protection
- Signal Converters and Communication Adapters



System Solutions

We offer our customers IIoT capable hard- and middleware in combination with powerful software. This means you benefit from system solutions for the widest variety of requirements in your production environment.

You get solutions for condition monitoring of your machines, for monitoring your production equipment or systems for tool management on injection molding machines or machine tools.

Your Balluff solutions

- Tool Management
- Monitoring



Software

The future of automation is increasingly interlinked and digital. The growing diversity of technology, including in the private sector, means the expectations of many users are increasing while the demands on industry rise.

Meeting these increasing demands necessitates the merging of traditional automation technology (OT) and information technology (IT). The increased use of software is the next logical step.

Balluff offers you a variety of software that, combined with our IIoT capable hardware, represents true added value.

Your Balluff solutions

- Setup and configuration

At home in many sectors INDUSTRIES

Balluff sensor solutions and systems represent individual products that are optimally adapted to your industry, your application conditions and requirements. Our comprehensive sensor and networking expertise provides technological variety for use all around the globe.





More than just an online store

MY BALLUFF – WHY YOU SHOULD BE THERE

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Designed to support both existing and new customers, My Balluff users can check live stock, prices, create quotations and orders, track deliveries and download documents.

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As a registered customer you have access to your individual conditions in the webshop.

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Are you a new customer or haven't ordered online yet? After entering your e-mail address, you will receive your personal access data from us. As an existing customer you benefit directly from your individual conditions.

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- Obtain customs tariff numbers
- Use your own part numbers
- Quick Entry parts list
- Add frequently used part numbers to favorites

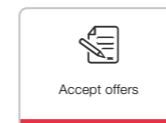
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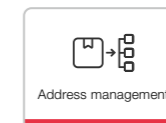
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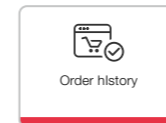
Register and take advantage of all the advantages of our My Balluff customer portal



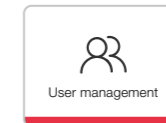
Request and manage offers



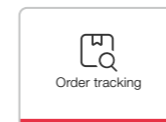
Change the Billing or Shipping address



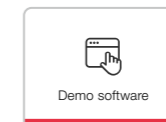
Use order history to view current and past orders



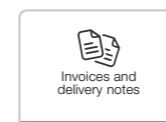
Manage team members access



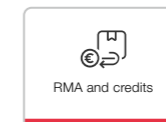
Track your delivery and get information about the current delivery date



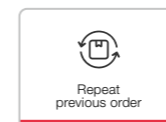
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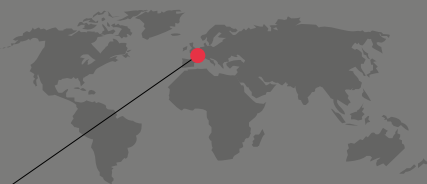


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