

**BALLUFF**

# PRODUCTS + NEWS

For efficient  
automation

**B** *innovating automation*







#B\_IIoT

# SEIZE THE OPPORTUNITIES OF THE INDUSTRIAL INTERNET OF THINGS WITH BALLUFF

The future of automation is digital and interlinked. As your automation partner we accompany you step by step on the path to the smart factory. And all the while we keep your competitive ability in view. Build on our expertise and experience – we support you in exploiting the potential of the Industrial Internet of Things (IIoT).

#### For higher productivity, more efficiency and transparent manufacturing

When it comes to generating and transporting data, we have many years of experience with outstanding success. It is on this basis that Balluff provides you with a constantly growing portfolio of smart devices. Through the use of software, we generate true added value for your production environment. By combining powerful hardware and software, you get intelligent automation solutions – all with the goal of technological advancement.

#### Utilize the potential of the Industrial Internet of Things – together with Balluff

Our portfolio ranges from the IIoT capable hard- and middleware to software to intelligent system solutions. By using standardized interfaces and protocols we ensure that you can run our solutions in your existing IIoT infrastructure and on common platforms. To this end we of course make use of the communication standard IO-Link. Because IO-Link is ideally suited for the IIoT.

All this makes Balluff an enabler and solution provider for the Industrial Internet of Things.

Questions? Our experts are eager and ready to assist you.



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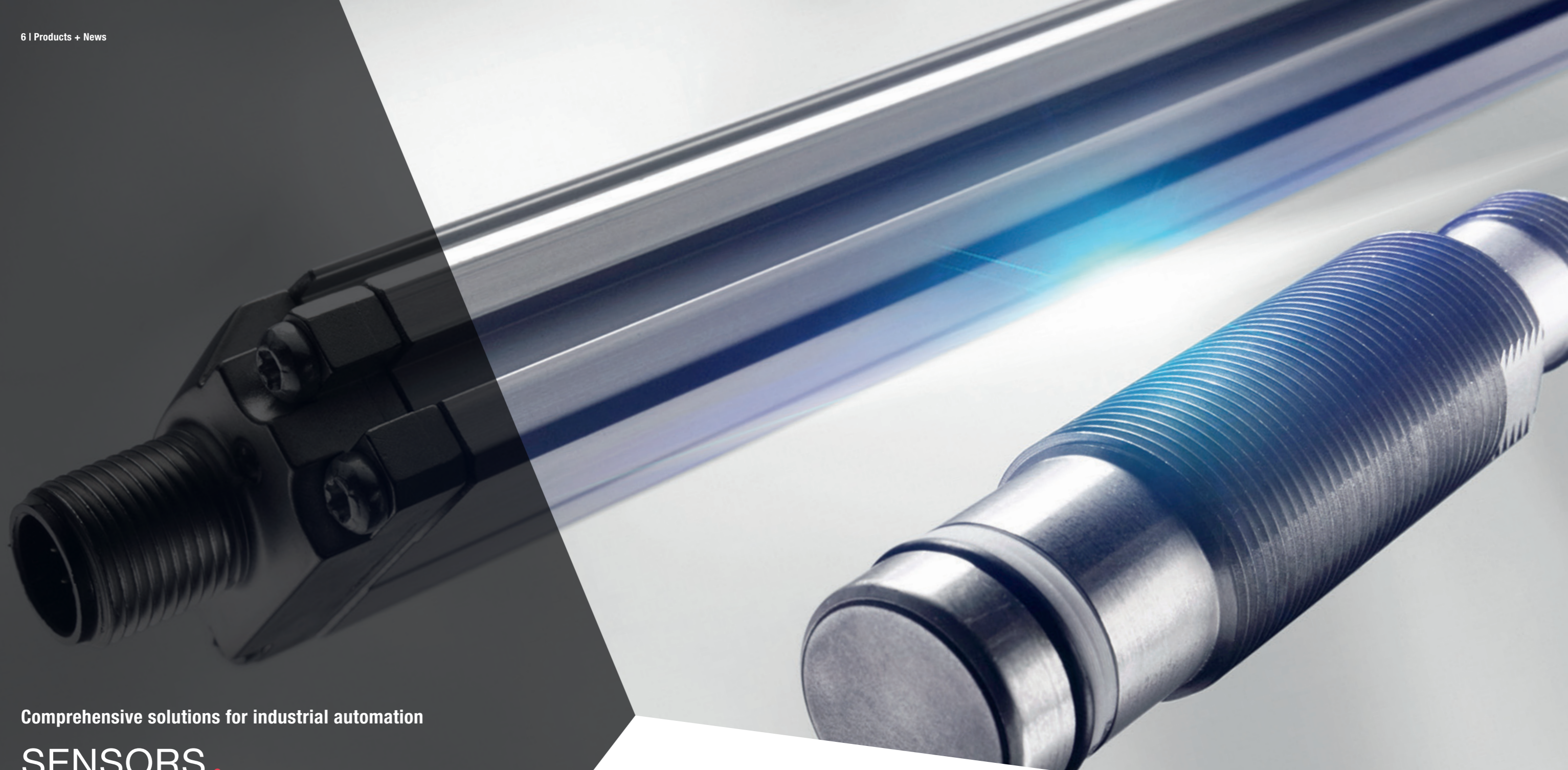


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Comprehensive solutions for industrial automation

# SENSORS

 *innovating automation*

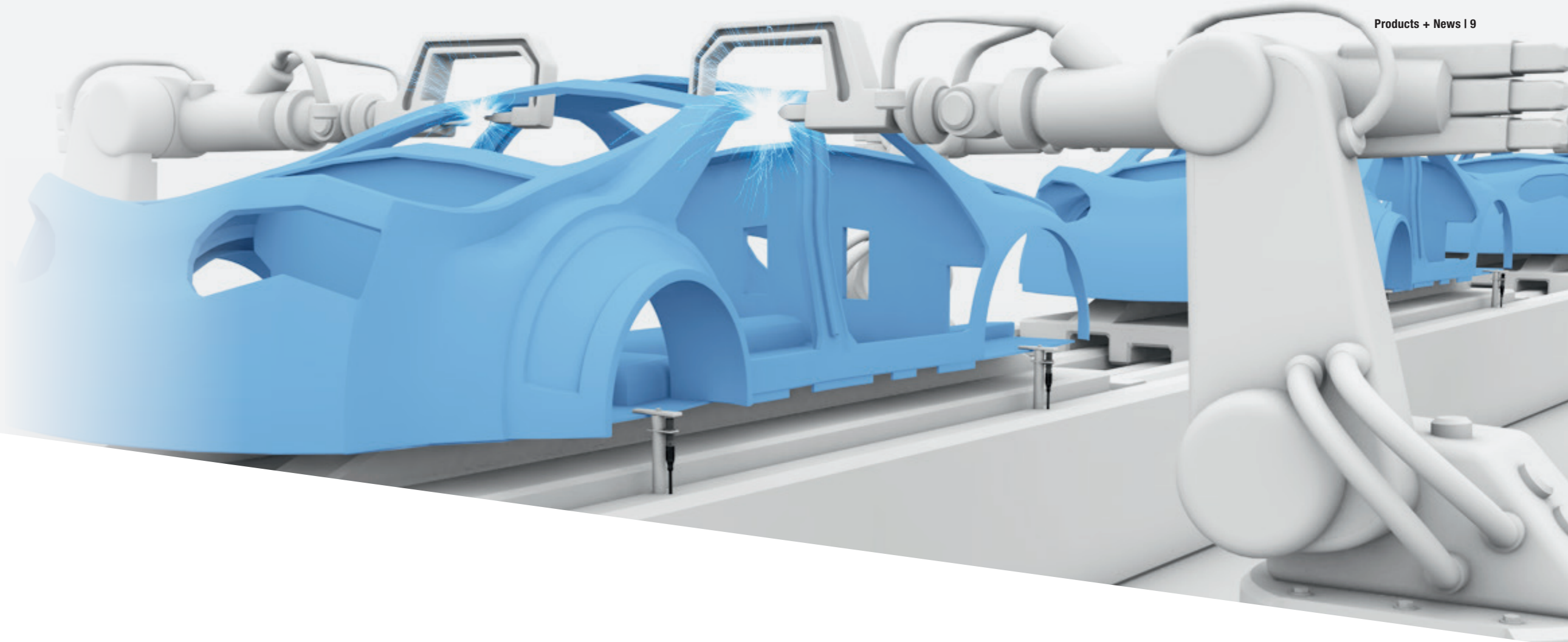
In the field of sensor technology, Balluff offers a complete portfolio to meet the diverse array of sensor operating principles, modes, and form factors needed to dependably meet your application requirements. We offer high-value sensors for any application or requirement: from linear measurement to 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





Sensor family for reliable and economical metal detection

# INDUCTIVE FACTOR 1 SENSORS

Our new inductive Factor 1 sensors detect all metals at an identical sensing distance (e.g. steel, aluminum or brass). This gives you the advantage of being able to reliably and economically detect objects with changing materials in one application. In addition to Factor 1 characteristics, Balluff sensors also have an extended temperature range and are also magnetic field resistant, which ensures trouble-free operation, even when strong electromagnetic fields occur. For applications in the immediate vicinity of a welding process, PTFE-coated variants can be used to support continuous operation in induction hardening or welding systems.

**Features**

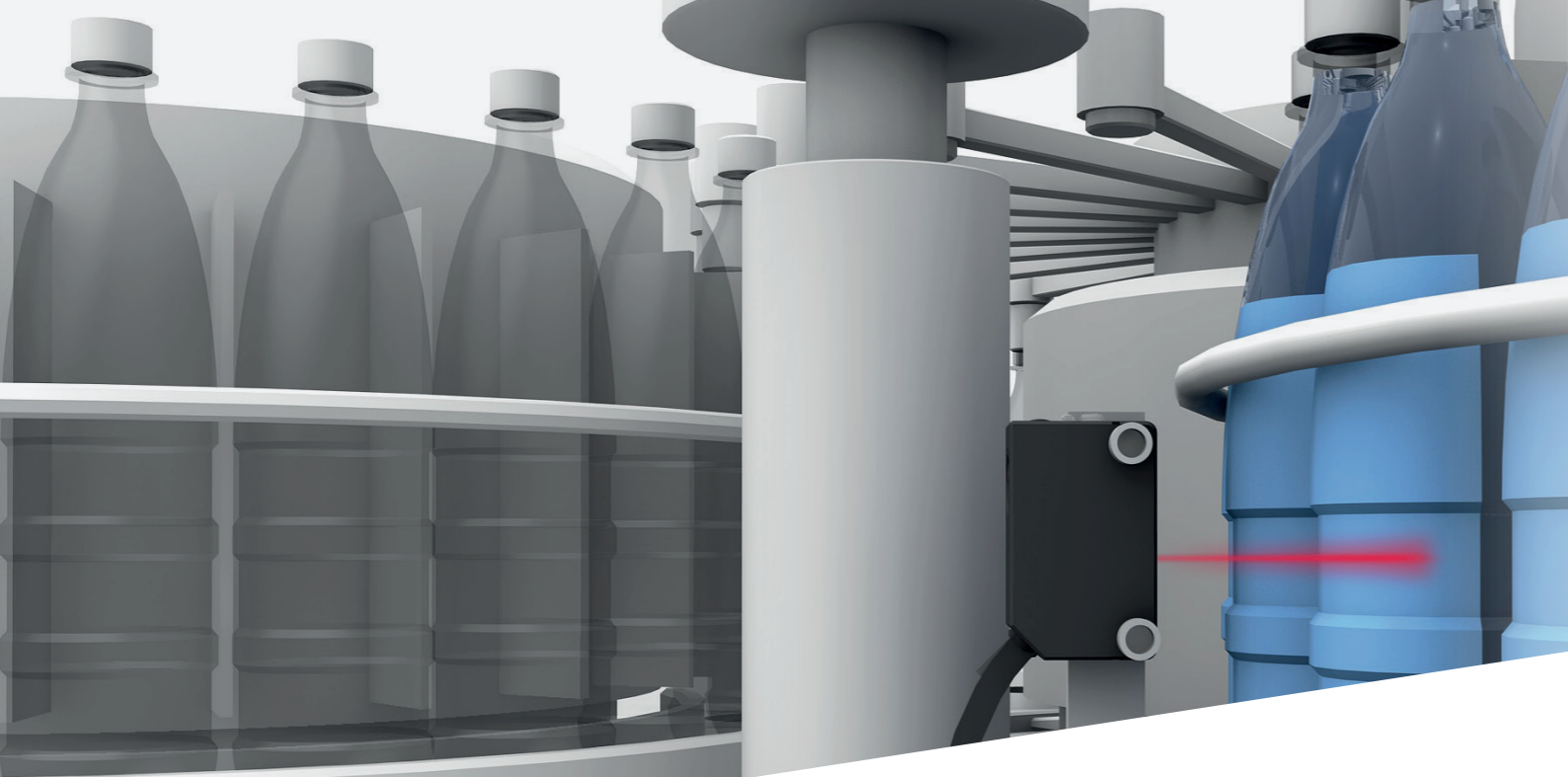
- No range reduction when sensing non-ferrous metals
- Magnetic field immune
- Expanded temperature range
- PTFE coating for harsh environments

BES INDUCTIVE FACTOR 1 SENSORS



	BES05ZY	BES05U4	BES05Y2	BES05WM	BES05Y1
FLUSH	BES05ZY	BES05U4	BES05Y2	BES05WM	BES05Y1
NON-FLUSH	BES05ZZ	BES05WC		BES05WN	
Style	M8 × 1	M12 × 1	M12 × 1	M18 × 1	M18 × 1
Output	PNP NO	PNP NO	PNP NO	PNP NO	PNP NO
Range					
flush	1.5 mm	2 mm	3 mm	5 mm	5 mm
non-flush	3 mm	4 mm		8 mm	
Operating voltage	24 V DC	24 V DC	24 V DC	24 V DC	24 V DC
Switching frequency	900 Hz	800 Hz	600 Hz	800 Hz	1000 Hz
IP rating	IP68	IP68	IP68	IP67	IP68
Ambient temperature	-25...70 °C	-40...+85 °C	-40...+85 °C	-40...+85 °C	-40...+85 °C
Housing material	Brass, nickel-free coated	Brass, nickel-free coated	Brass, PTFE coated	Brass, nickel-free coated	Brass, PTFE coated
Sensing face material	PBT	PBT	PBT, PTFE coated	PBT	PBT, PTFE coated
Approval/conformity	CE, EAC, cULus	CE, EAC, cULus	CE, EAC, cULus	CE, EAC, cULus	CE, EAC, cULus





Detect a wide variety of objects with photoelectric sensors

# BOS R090K SENSORS IN ROBUST CUBIC STANDARD HOUSING

With the latest generation of R90K-series photoelectric sensors, Balluff expands its globally established product family and offers users a universally applicable and reliable solution for object detection. Their compact and robust cubic standard housing includes all sensor principles – including photoelectric proximity switches with and without background suppression, retro-reflective sensors and through-beam sensors. The sensors are available with both invisible infrared light and a highly visible and easy-to-align red light.

The integrated wide beam with 100 mm range as well as the "small beam" with 50...150 mm range opens up maximum flexibility for you. The same applies to the simple switch that sets the sensor to be normally open or normally closed and the potentiometer, which makes quick and easy sensitivity adjustments possible.

Thanks to their versatile features, our sensors detect a wide variety of objects precisely, regardless of shape, color and material. Their field of application is correspondingly broad. In the food and beverage industry, you can check plastic bottles simply and reliably with photoelectric proximity switches. As through-beam sensors, on the other hand, they can be used to identify breakfast cereals or noodles in cardboard packaging. And in the automotive sector, such through-beam sensors detect car bodies over long ranges. Even before it is immersed in the primer, for example, or small components such as plastic trim are detected by a photoelectric proximity switch with background suppression.

### Features

- Established standard housing design in robust sensor design
- Variable range and high detection range via wide beam (optimized for non-uniform objects), "small beam" (improved small part detection) and long range (range up to 1 meter)
- Quick and easy sensitivity adjustment via potentiometer
- Flexible operation due to uncomplicated normally closed/normally open switch
- Diverse areas of use and freely designable applications thanks to integration of all essential sensor principles
- IP67 protection class
- UKCA approval and cULus approval



BOS R90K PHOTOELECTRIC SENSORS

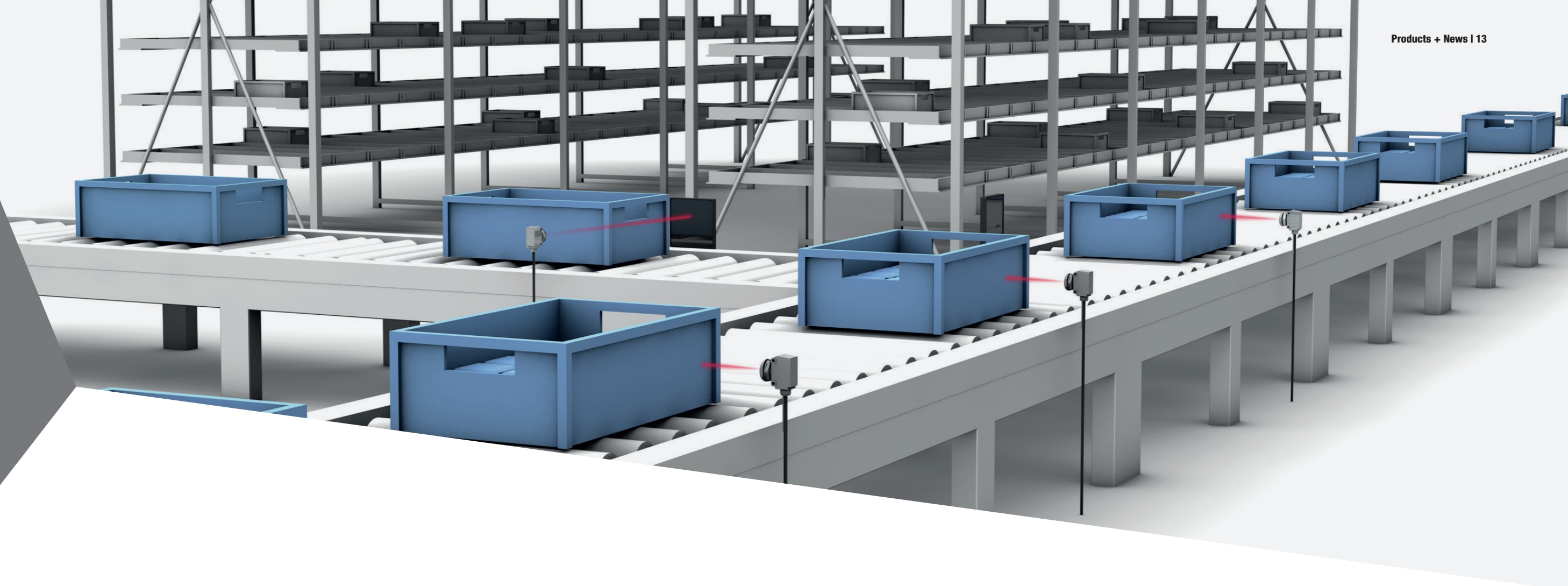
	BOS029M	BOS02AH	BOS02A9	BOS02AJ
Dimension	43.5 × 19.5 × 10.8 mm	43.5 × 19.5 × 10.8 mm	43.5 × 19.5 × 10.8 mm	43.5 × 19.5 × 10.8 mm
Principle of operation	Diffuse sensor with background suppression	Diffuse, broad beam	Diffuse, small beam	Diffuse
Light type	LED, red light	LED, infrared	LED, red light	LED, red light
Range	350 mm	100 mm	50...150 mm	500 mm
Connection	M8 connector, 4-pin	M8 connector, 4-pin	M8 connector, 4-pin	M8 connector, 4-pin
Operating voltage	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
Approval/conformity	CE, cULus, UKCA, EAC	CE, cULus, UKCA, EAC	CE, cULus, UKCA, EAC	CE, cULus, UKCA, EAC



BOS R90K PHOTOELECTRIC SENSORS

	BOS02AF	BOS02A3	BOS02AR	
Dimension	43.5 × 19.5 × 10.8 mm	43.5 × 19.5 × 10.8 mm	43.5 × 19.5 × 10.8 mm	
Principle of operation	Diffuse	Retroreflective sensor	Through-beam sensor	
Light type	LED, infrared	LED, red light	LED, red light	
Range	1 m	5 m	20 m	
Connection	M8 connector, 4-pin	M8 connector, 4-pin	M8 connector, 4-pin	
Operating voltage	10...30 V DC	10...30 V DC	10...30 V DC	
Approval/conformity	CE, cULus, UKCA, EAC	CE, cULus, UKCA, EAC	CE, cULus, UKCA, EAC	





**Object detection as simple as possible**

# BOS R81K SENSORS FOR UNIVERSAL TASKS

The BOS R81K optoelectronic series from Balluff is destined for area-wide use in your company. Available in all common operating principles, the high-luminosity sensors enable appealing ranges and guarantee perfect object detection.

**Fast mounting, universal use**

Balluff sensors of the BOS R81K series can be mounted quickly and easily thanks to their cubic housing shape with an M18 threaded nose. The potentiometer at the top is all that is needed for adjustment, without any time-consuming teaching process. Whether you choose the through-beam sensor, retro-reflective sensor or diffuse sensor, with the optoelectronic sensors of the BOS R81K series, you can optimally control and monitor conveyor systems and similar equipment.

**Detecting objects on the conveyor**

Due to their design, Balluff solutions are great performers in confined installation situations such as in conveyor systems. With their precise switching behavior, they reliably detect the presence of objects, regardless of their surface and over a wide range.

**Features**

- Flexible use due to a wide range of mounting options
- Quick and easy alignment thanks to large diameter red light spotlight
- Excellent price-performance ratio for all functional principles



BOS R81K PHOTOELECTRIC SENSORS

PNP	BOS0292	BOS0294	BOS0296	BOS0298	BOS029A	BOS029E	BOS028W	BOS0290
NPN	BOS0291	BOS0293	BOS0295	BOS0297	BOS0299	BOS029C	BOS028U	BOS028Z
EMITTER							BOS028T	BOS028Y
Principle of operation	Retroreflective sensor		Diffuse sensor		Diffuse sensor with background suppression		Through-beam sensor	
Dimension	15 × 35 × 31 mm		15 × 35 × 31 mm		15 × 35 × 31 mm		15 × 35 × 31 mm	
Light type	LED, red light		LED, red light		LED, red light		LED, infrared	
Range	0...3 m		50...300 mm		100 mm		0.3...20 m	
Light spot size	180 × 180 mm at 3 m		18 × 18 mm at 300 mm		8 × 8 mm at 100 mm		-	
Connection	2 m PUR cable	M12 male, 4-pin	2 m PUR cable	M12 male, 4-pin	2 m PUR cable	M12 male, 4-pin	2 m PUR cable	M12 male, 4-pin
Housing material	ABS		ABS		ABS		ABS	
Material sensing surface	PMMA		PMMA		PMMA		PMMA	
Operating voltage	10...30 V DC		10...30 V DC		10...30 V DC		10...30 V DC	
Max. output current	< 200 mA		< 200 mA		< 100 mA		< 100 mA	
Ambient temperature	-15...+60 °C		-15...+60 °C		-15...+60 °C		-15...+60 °C	
Adjustable	Yes		Yes		No		Yes (receiver)	
Approval/conformity	CE, EAC, UKCA, cULus		CE, EAC, UKCA, cULus		CE, EAC, UKCA, cULus		CE, EAC, UKCA, cULus	



Makes BOH sensor heads IO-Link capable

# NEW GENERATION OF BAE AMPLIFIERS

If you want to record, count and package precisely in small-scale processes in the filling and packaging industry, then BOH photoelectric sensors are the right choice for you. They work precisely and contact-free, which guarantees high process reliability. Supported by these new BAE SA-OH amplifiers from Balluff, you can also take your application to the next smart level, because all sensors in the BOH family can be parameterized, monitored and controlled centrally via IO-Link.

Another plus: Thanks to a wide range of amplifier variants and modes, you remain adaptable as your requirements change.

### Features

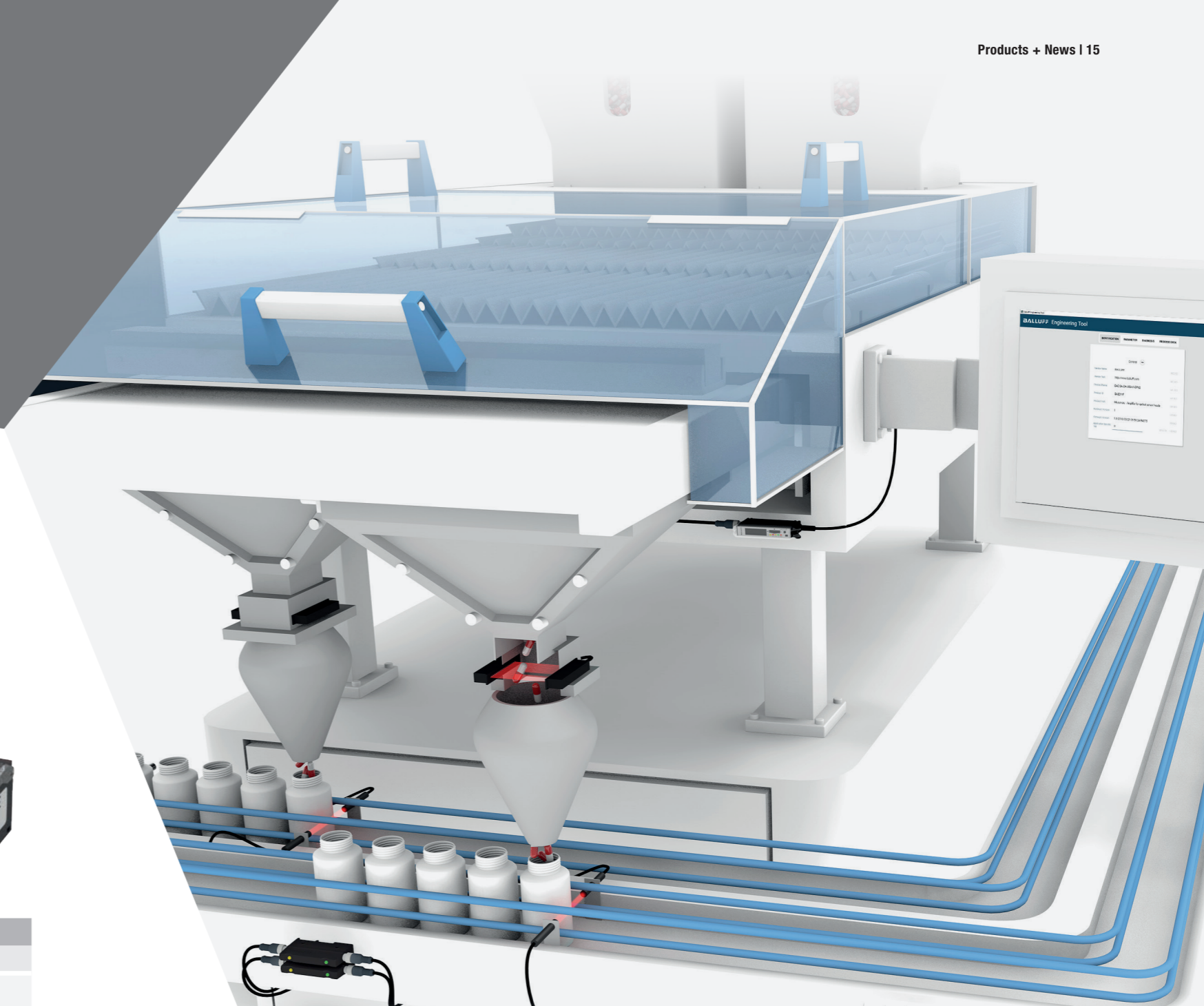
- Compatible with all BOH sensor heads and light bands
- IO-Link functionality includes counters and monitoring
- Intuitive usability ensures fast and efficient set up
- Various operating and speed modes to fit every use case
- Synchronization of up to 8 devices

BAE AMPLIFIER FOR MICROMOTE OPTICAL SENSOR HEADS



	BAE0119	BAE011C	BAE011U	BAE0120	BAE0123	BAE0127
Display	OLED Display		OLED Display	OLED Display		
LEDs	5 × Out, Out2, IO-Link, Sync and Alarm	2 × Out, IO Link	4 × Power, Alarm, Sync, Signal	4 × Power, Alarm, Sync, Signal	2 × Power, Out	2 × Power, Out
Switching channels	2 Switching signal channels with 2 set points each	2 Switching signal channels with 2 set points each	Analog	Analog	1 Switching signal channel with 1 set point	1 Switching signal channel with 1 set point
Switching frequency max.	4 kHz	500 Hz	8 kHz	8 kHz	500 Hz	500 Hz
Switching point modes	Single and two point, window, dynamic, limit value tracking	Single and two point, window, dynamic, limit value tracking			Single point	Single point
Setting	EasyTeach, Pushbutton, external, IO-Link	IO-Link, external	EasyTeach, Pushbutton	EasyTeach, Pushbutton	+/- Buttons, external	Potentiometer
Interface	PNP/NPN/ Push-pull IO-Link 1.1	PNP/NPN/ Push-pull IO-Link 1.1	Analog, Voltage	Analog, Current	PNP	PNP
Approval/Conformity	CE, EAC, cULus	CE, EAC, cULus	CE, EAC, cULus	CE, EAC, cULus	CE, EAC, cULus	CE, EAC, cULus
Ambient temperature	-5...+55 °C	-5...+55 °C	-5...+55 °C	-5...+55 °C	-5...+55 °C	-5...+55 °C
Connection	M8 male	M8 male	M8 male	M8 male	M8 male	M8 male

More variants available.

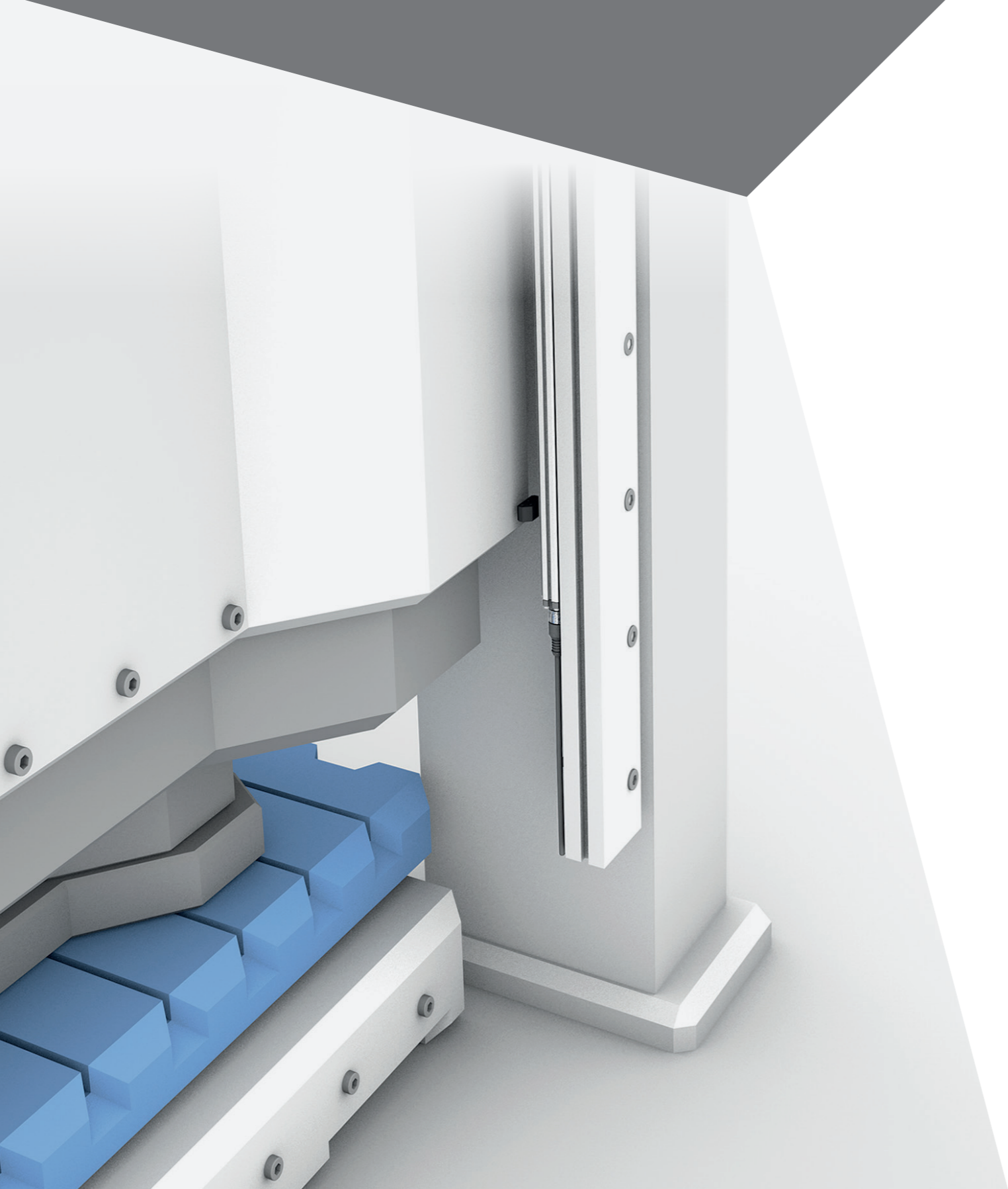


Compatible to all BOH Sensor heads



# BTL position measuring system in two optimized mechanical profile designs

## MAGNETOSTRICTIVE SENSORS INTEGRATED ON MACHINE PARTS



Where the highest precision is required for position measurement in confined spaces, Balluff offers a new generation of magnetostriuctive sensors in two optimized profile designs with analog and IO-Link interfaces.

The new BTL series from Balluff impresses with its compact design. The space-saving housing design enables easy integration on machine parts for position detection. And by means of IO-Link, states such as temperature and service life can also be recorded for intelligent condition monitoring.

Position measuring systems in profile designs are ideally suited for use in the control of hydraulic presses in the field of forming technology. Since the position encoder is mounted on the moving part of the press and the profile housing with its displacement measuring element is mounted in the stationary part, both are insensitive to mechanical shocks. Their high-precision measurement and measuring frequency remain stable in any case, so that machines can be used optimally.

### Features

- Fast and easy integration thanks to compact design
- Available with analog and IO-Link interface
- Easy parameterization via IO-Link
- Continuous monitoring of conditions such as temperature and service life for IO-Link-capable devices
- Simultaneous measurement of multiple positions and velocities
- Ideal for harsh industrial environments due to hermetically sealed IP67 aluminum housing
- Long service life, due to contactless operating principle

BTL MAGNETOSTRICTIVE LINEAR POSITION SENSORS IN PROFILE HOUSING

\* SAMS PRODUCTS



Ordering example	BTL P_400-...-1-...-...
Housing geometry	Round profile PA: Ø 30 mm Flat profile PF: 35 x 20.8 mm
Housing details	Zero point at 67 mm
Measuring length	0025...4000 mm
Performance class	B1, C1
Power supply	10...30 V DC, 18...30 V DC
Interface	Analog: 0...10 V, 10...0 V, 4...20 mA, 20...4 mA, 0...20 mA, 20...0 mA IO-Link: V1.1 COM2/COM3
Approval/conformity	CE, EAC, UKCA
Connection	PUR cable, M12 connector 4-pin, M12 connector 5-pin, M12 connector 8-pin, M16 connector 6-pin, M16 connector 8-pin

Configure your magnetostriuctive sensor using the online configurator on our [website](#).

\* Discover SAMS, the innovative Smart Automation and Monitoring System for optimal performance Page 44



BTL position measuring system in extremely compact rod design

# MAGNETOSTRICTIVE SENSORS TO INSTALL IN THE HYDRAULIC CYLINDER

The new magnetostrictive sensors in compact rod design feature both analog and IO-Link interfaces. For position feedback, the innovative and extremely space-saving housing design of their electronic head enables simple integration directly in the hydraulic cylinder. Via the IO-Link interface, you can additionally record conditions such as temperature, humidity and service life, which can be used for intelligent condition monitoring as well as predictive maintenance.

By determining the piston position, the mini-rod format BTL optimizes the machining process of long or heavy turned parts supported by steady rests for a simple reason: In steady rest positioning, the actuator and sensor move together.

**Features**

- Easy cylinder integration thanks to compact design
- Available with analog and IO-Link interface
- Simple parameterization via IO-Link
- Continuous monitoring of conditions such as temperature, humidity, and service life for IO-Link-devices
- Simultaneous measurement of several positions and speeds
- Long service life thanks to contactless operating principle

BTL MAGNETOSTRICTIVE LINEAR POSITION SENSORS IN ROD-STYLE HOUSING

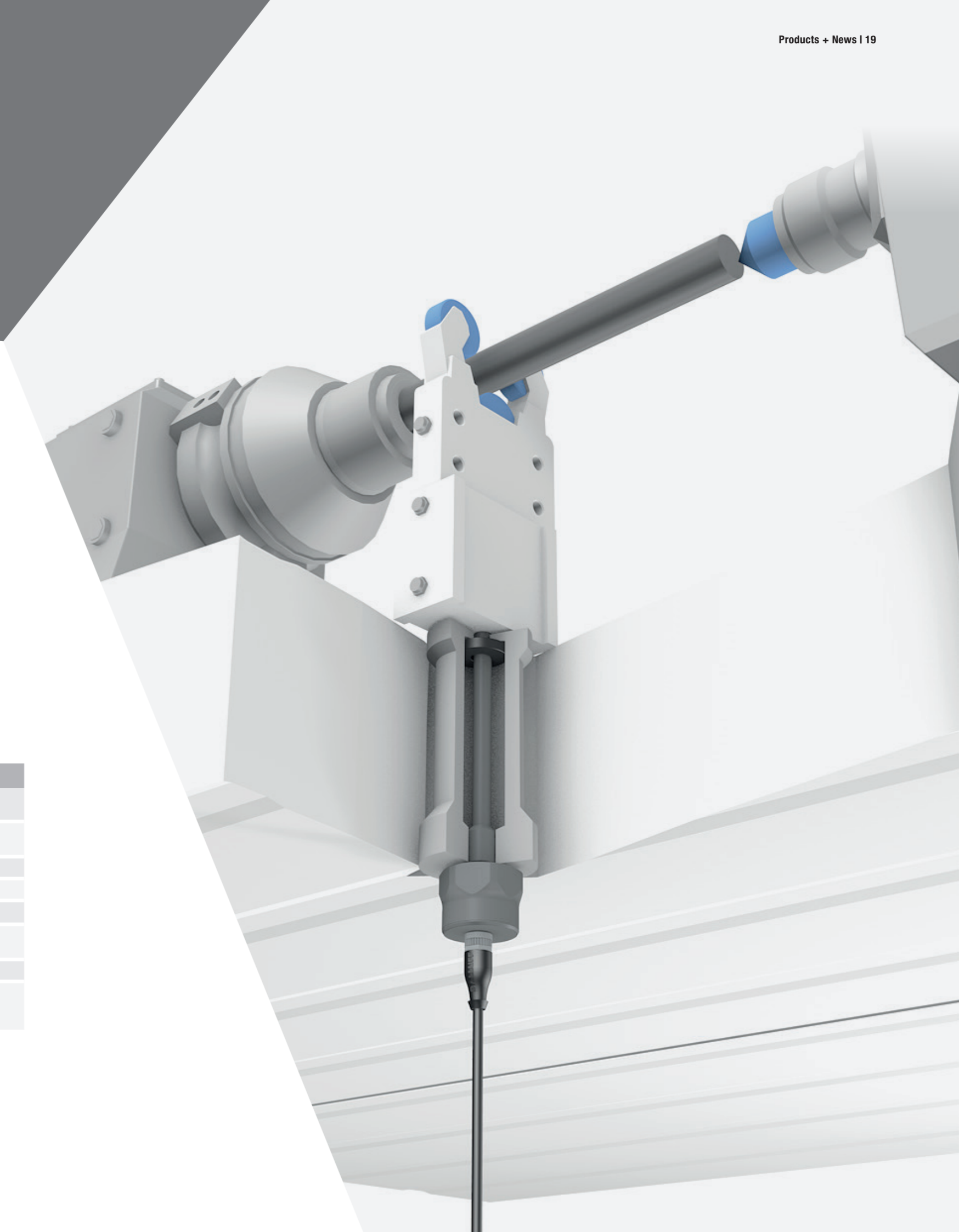
\* SAMS PRODUCTS



Ordering example	BTL_NC_00-____-1_____
Fastening	Rod with metric mounting thread M18 x 1.5 (BN) Rod with inch thread 3/4"-16UNF (ZN)
Housing details	Zero point at 30 mm and rod end with thread, Zero point at 50.8 mm and rod end with thread
Measuring length	0025...4000 mm
Performance class	B1, C1
Power supply	10...30 V DC, 18...30 V DC
Interface	Analog: 0...10 V, 10...0 V, 4...20 mA, 20...4 mA, IO-Link: V1.1 COM2/COM3
Approval/conformity	CE, EAC
Connection	PUR cable, M12 connector, 4-pin, M12 connector, 5-pin, M12 connector, 8-pin, M16 connector, 6-pin, M16 connector, 8-pin

Configure your magnetostrictive sensor using the online configurator on our [website](#).

\* Discover SAMS, the innovative Smart Automation and Monitoring System for optimal performance Page 44





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.

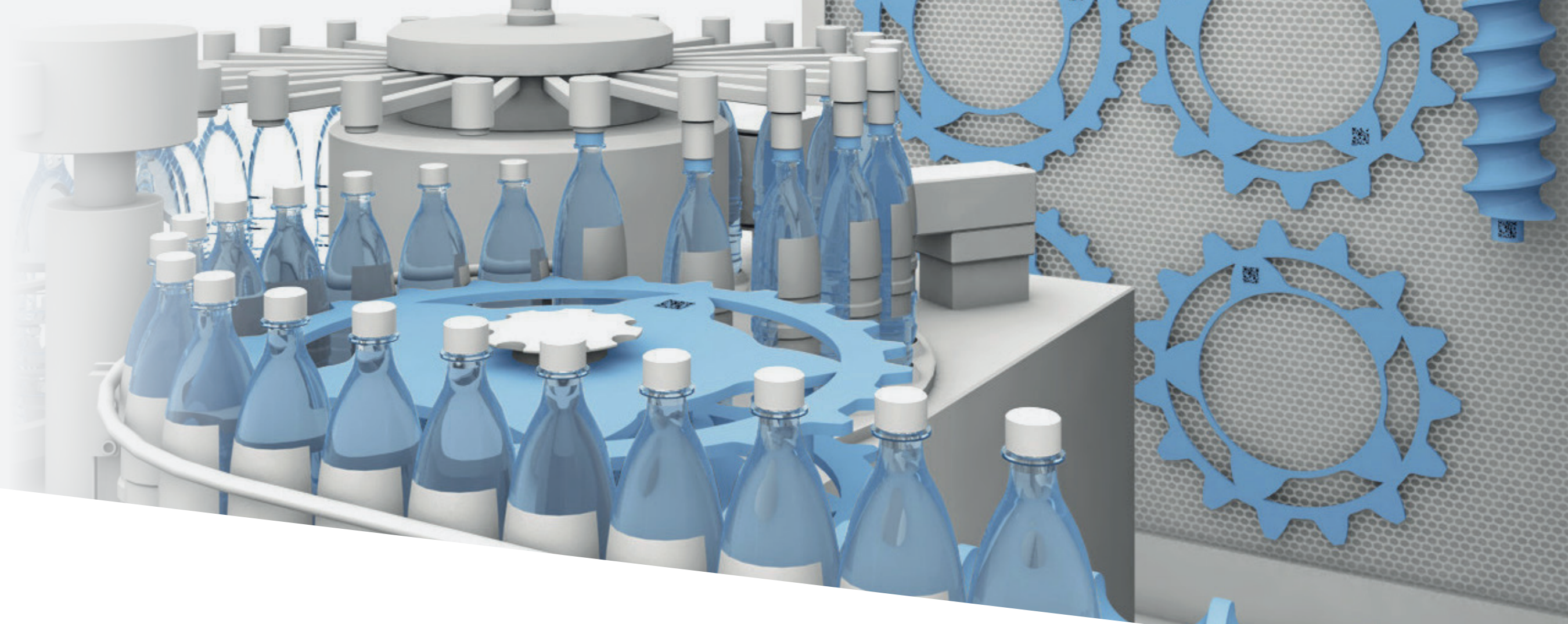
Another plus: our RFID Configurator lets you assemble your custom system online. And it's easy to use. Simply let yourself be guided by your own application, and in just a few clicks, you're there.

#### 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](http://www.balluff.com/go/rfid-configurator)





## 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)
- H<sub>2</sub>O<sub>2</sub>-resistant
- IO-Link interface with advanced smart features

BIS 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 <sub>o</sub>	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		



Image processing devices for reliable detection and recording

# MACHINE VISION AND OPTICAL IDENTIFICATION

 *innovating automation*



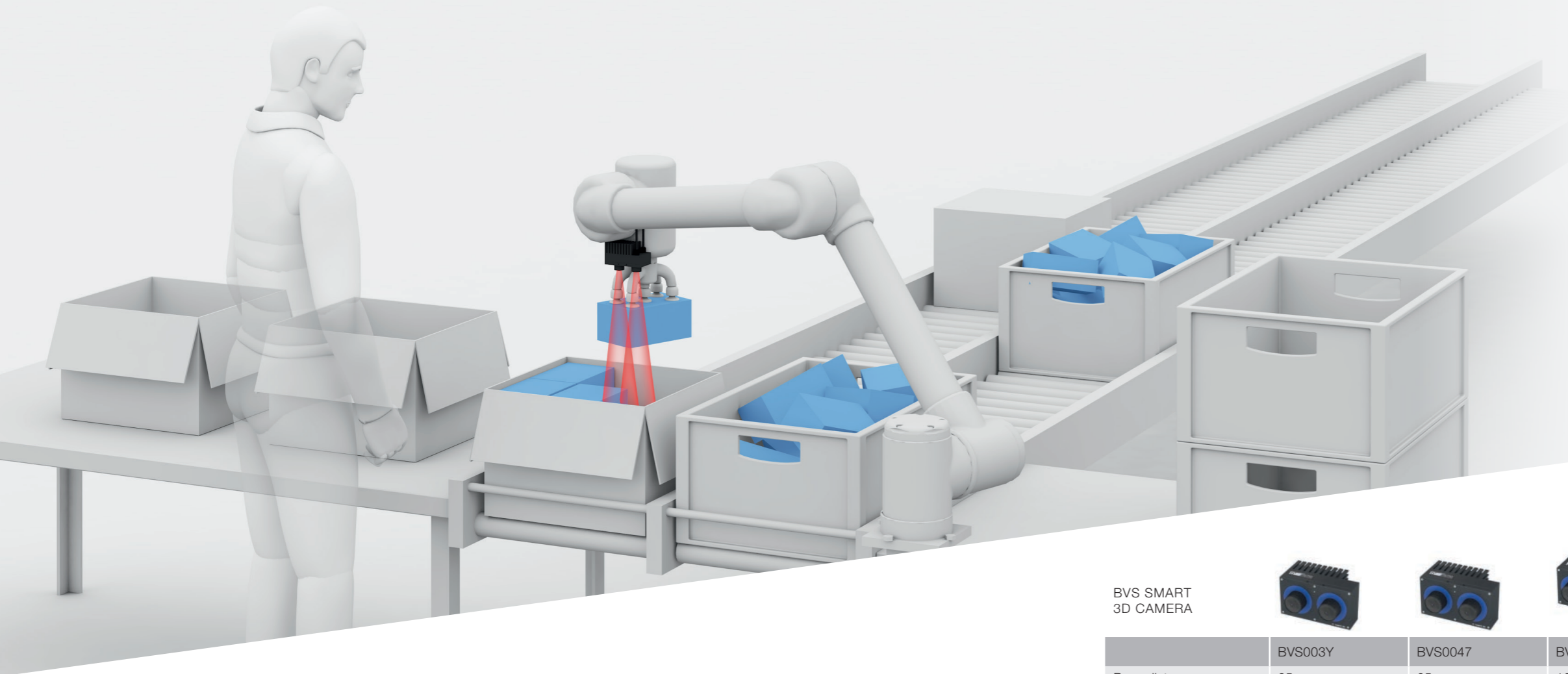
The demands on modern production equipment are high: they must be extremely productive and flexible, while achieving maximum quality. Our Balluff Vision Solutions are designed precisely to meet these requirements. They reliably detect errors, check quality, and are suitable for reliable reading and verification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

- Machine vision
- Optical identification
- 3D Machine vision





### Smart 3D camera family

# EASY AND FLEXIBLE USE OF 3D MACHINE VISION

Are you looking for a smart 3D camera family with an integrated processor and user-friendly user interface for stationary and mobile robot applications? Our product family of smart 3D cameras delivers on these promises, with low system costs, fast implementation and high flexibility in application.

With an integrated processor and application-specific software modules on the camera, offers autonomous 3D image processing and can thus be used as a 3D stereo sensor with particular ease. Processed 3D information such as pick points are passed on by the system directly to the robot application. Our solution is configured via a user-friendly web-based user interface. Connection to a PC for further data processing is also possible. And the GigE Vision interface can be used to create your own 3D applications based on the camera data.

The camera models capture up to 1.2 million 3D data points and, depending on the resolution, achieve frame rates of up to 25 Hz. Particularly practical: Various robot interfaces are already integrated for communication between the robot and the camera.

#### Features

- Quick implementation and easy to use thanks to user-friendly web-based user interface
- High application flexibility thanks to optional software modules and GigE Vision interface
- Low system costs and high system reliability with on-board processing and application-specific software modules
- Increased productivity thanks to smart software modules

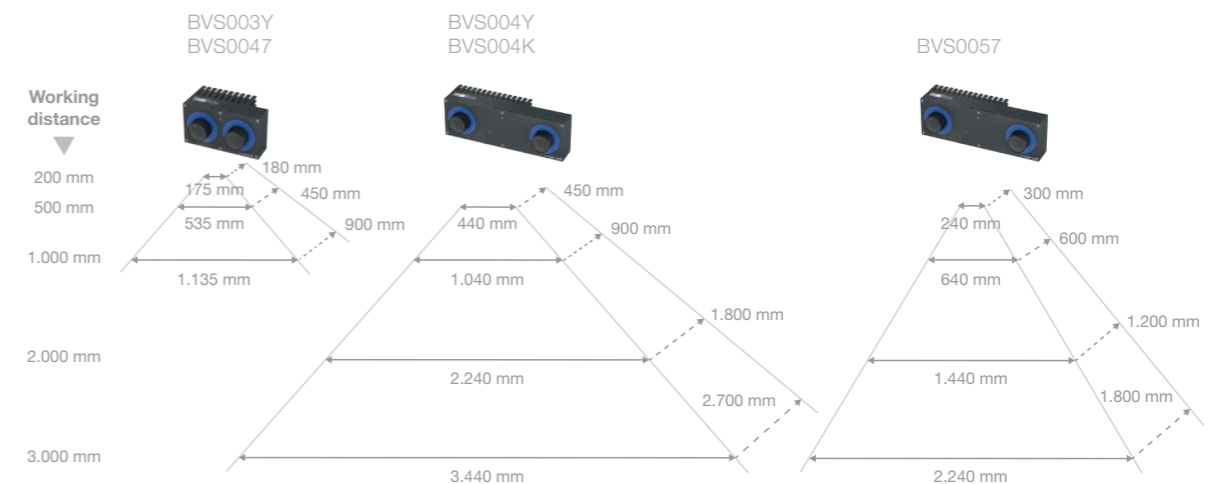
BVS SMART 3D CAMERA



	BVS003Y	BVS0047	BVS004Y	BVS004K	BVS0057
Base distance	65 mm	65 mm	160 mm	160 mm	160 mm
Focal length	4 mm	4 mm	4 mm	4 mm	6 mm
Sensor type	CMOS 1/3" color global shutter	CMOS 1/3" mono-chrome global shutter	CMOS 1/3" color global shutter	CMOS 1/3" mono-chrome global shutter	CMOS 1/3" mono-chrome global shutter
Image resolution	1280 x 960 pixels (1.2 MPixels)	1280 x 960 pixels (1.2 MPixels)	1280 x 960 pixels (1.2 MPixels)	1280 x 960 pixels (1.2 MPixels)	1280 x 960 pixels (1.2 MPixels)
Field of view	Horizontal: 61° Vertical: 48°	Horizontal: 61° Vertical: 48°	Horizontal: 61° Vertical: 48°	Horizontal: 61° Vertical: 48°	Horizontal: 43° Vertical: 33°
Depth of the measurement range <sup>1</sup>	0.2...1 m	0.2...1 m	0.5...3 m	0.5...3 m	0.5...3 m

<sup>1</sup> smart 3D camera can measure into infinite space. However, with the stereo method the accuracy is reduced as a square of the distance; hence we recommend the above measurement ranges.

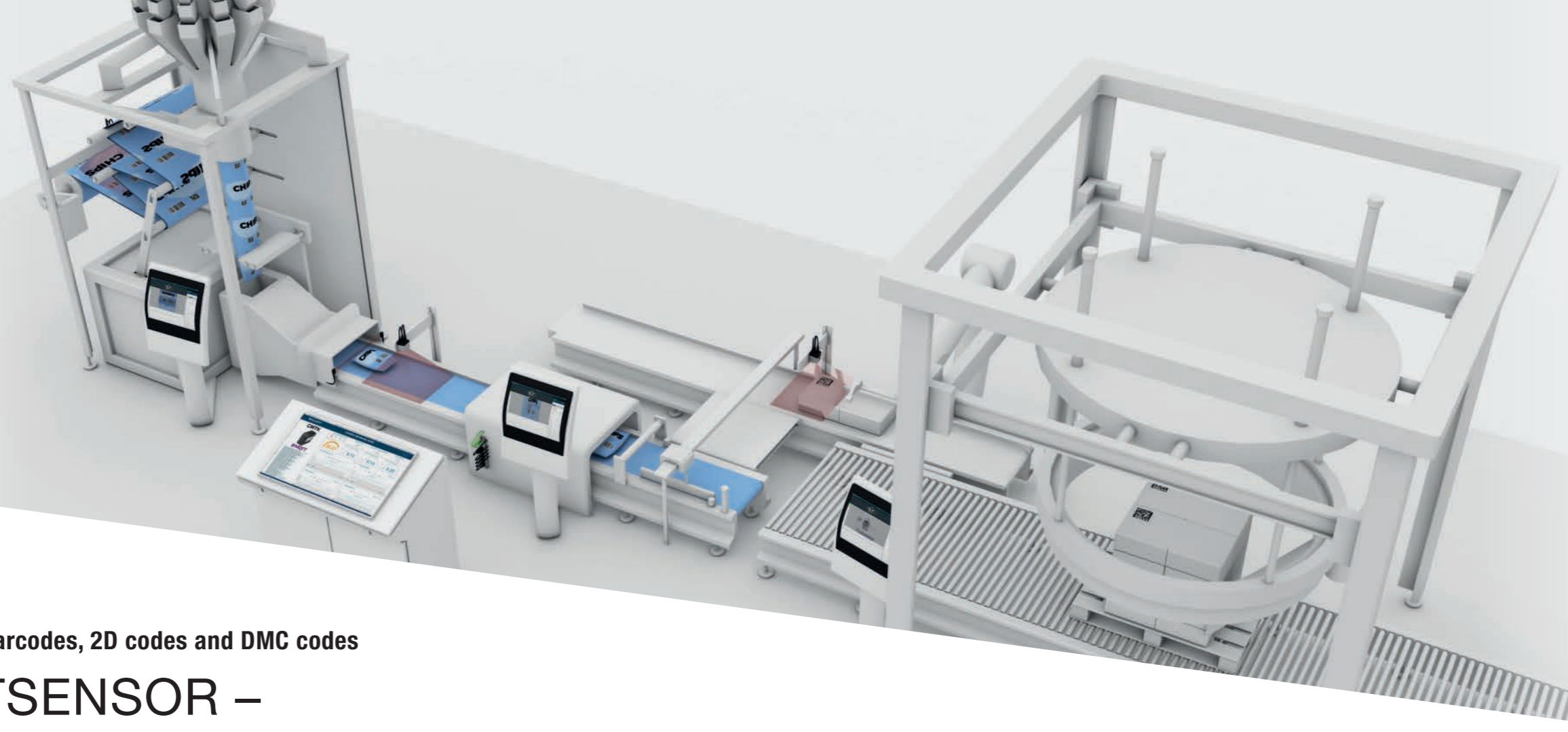
#### WORKING RANGE



#### OUTPUT DATA

- Processed 3D information: grasp points, object dimensions, load carrier position, load carrier fill level
- Camera data via GigE Vision: left and right camera image, depth image (disparity image), confidence image, error image





Developed for reading barcodes, 2D codes and DMC codes

# BVS IDENTSENSOR – FOR OPTICAL IDENTIFICATION

The new BVS IdentSensor expands the existing range of stationary code readers from Balluff. Designed for precise reading of barcodes, 2D codes and DMC codes, it provides simple and flexible communication interfaces to the process and IT network. Modern, forward-looking programming interfaces (REST API, MQTT) and dedicated industrial interfaces (IO-Link, TCP, UDP) as well as additional condition monitoring information make the sensor unique and ideal for use in fast and difficult processes in automated production.

### Reliably read out and transmit code contents

You can achieve reliable product identification in automated production and packaging settings via optical codes. The BVS IdentSensor from Balluff is especially suitable for these industries. Thanks to our solution, barcodes and 2D codes as well as DMC codes can be read easily, flexibly and reliably within production processes. Code contents and features as well as quality parameters are transmitted to the plant control system (PLC) or higher-level IT systems via industrial communication protocols. In addition, the BVS IdentSensor is part of Balluff's Smart Automation and Monitoring System (SAMS). So you can read out or automatically receive sensor parameters or additional condition monitoring information from the machine environment at any time via the REST API and MQTT. All in unique multi-talent within optical identification.

### Capture, verify and pass on optical codes pass on

For product identification within production or logistics processes, barcodes or 2D codes are located on the product packaging or directly on the components.

With the new IdentSensor from Balluff, such optical codes can not only be read, but – code contents and types can be verified and provided or analyzed with regard to their quality, depending on the application. The results themselves can be passed on quickly and easily to the PLC or IT systems via various interface channels. The bottom line is that you ensure efficient workflows in your automated production or packaging processes.

### Features

- Reliable code reading with the simplest operation
- IO-Link as process and data interface
- IIoT SAMS (Smart Automation and Monitoring System) features from Balluff
- Alternative, modern data interfaces: MQTT and REST API
- Additional condition monitoring information (vibration, temperature, code quality and operating time)



BVS IDENTSENSOR

\* SAMS PRODUCTS

	BVS0060	BVS0061
Supported codes	Standard Barcodes, standard 2D Codes	Standard Barcodes, standard 2D Codes
Functionality	Read optical codes, analyze, verify	Read optical codes, analyze, verify
Condition monitoring	Temperature, vibration, humidity, position, signal quality, operating time	Temperature, vibration, humidity, position, signal quality, operating time
Working distance	20...600 mm	20...600 mm
Sensor resolution	1280 × 960 Pixel	1280 × 960 Pixel
Integrated lighting	white / red	white / red
Process data interface	IO-Link, EtherNet (TCP, UDP)	IO-Link, EtherNet (TCP, UDP)
IIoT interface and protocols	GigE, MQTT, REST API	GigE, MQTT, REST API
User interface	Sensor app as web client	Sensor app as web client
Dimension	56 × 56 × 65.5 mm	56 × 56 × 65.5 mm
IP rating	IP67	IP67

\* Discover SAMS, the innovative Smart Automation and Monitoring System for optimal performance Page 44



Reliable information exchange across all levels

# INDUSTRIAL NETWORKING

 *innovating automation*

Demands on industrial networking continually increase: The rising quantities of data and ever more complex communication require high-performance components that can reliably transport the information across all levels. This is especially true when high protection ratings, robustness, use at high temperatures or special interfaces and connections for maximum security are needed.

With the intelligent combination of high-performance industrial networking technology and the IO-Link communication standard, Balluff makes flexible and smooth communication in the most varied application scenarios possible.

#### Your Balluff solutions

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



Let all connections play via radio

# INTELLIGENT, COMMUNICATIVE, WIRELESS: IO-LINK WIRELESS

The intelligent combination of industrial networks with the IO-Link communication standard is an essential building block for the factory of the future. Until now, sensors and actuators as well as binary and/or analog devices have been integrated via cables. IO-Link Wireless, on the other hand, is a promising, completely new standard for wireless communication in process and factory automation.

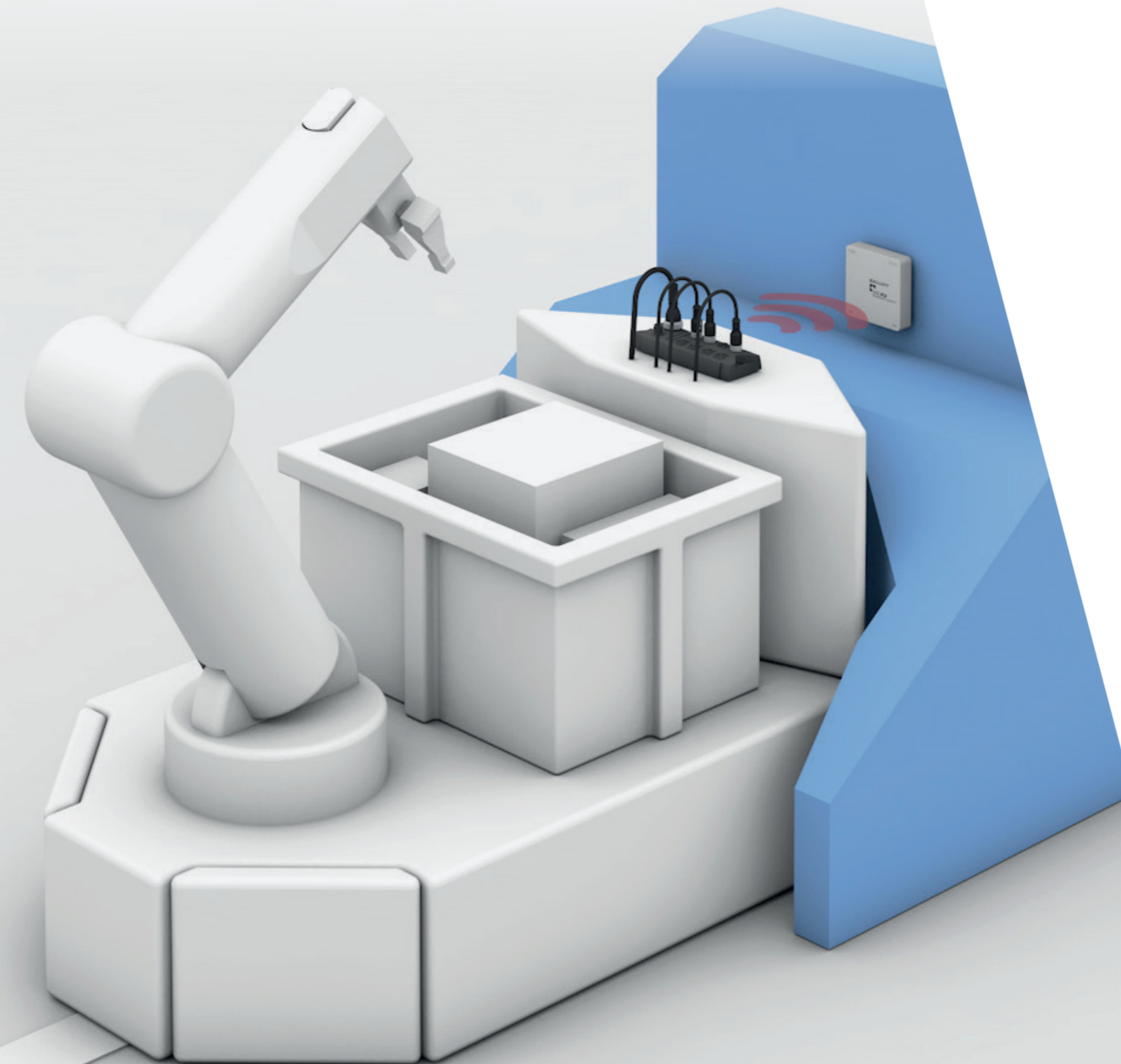
### No cables – many advantages

Our wireless system consists of a master, hub and bridge. The wireless master does not receive its data by cable as usual, but receives the sensor data wirelessly via a bridge or a hub. This brings decisive advantages over a wired system, including simpler planning and installation, more flexibility in design and mobility, and no wear and tear on connectors or cables. In addition, this technology makes it much easier for you to retrofit existing systems.

In short, intelligent communication through Balluff's wireless IO-Link allows you to integrate sensors and actuators even more flexibly with the proven reliability and performance of the wired IO-Link standard. For example, you can now place compatible sensors directly on the carriage in highly dynamic transport systems, enabling even more precise monitoring of carriage movements and positioning.

### Features

- Easy configuration via integrated web server
- Frequency range 2.4...2.483 GHz usable worldwide license-free
- Fast and reliable (latency 5 ms, error rate 10<sup>-9</sup>)
- Easily scalable and expandable by integrating additional devices (up to 120 devices)



BNI MASTER

	BNI00FE
IO-Link function	IO-Link master
IO-Link version	1.1
Interface	Profinet
Operating voltage	18...30.2 V DC
Ambient temperature	-5...+50 °C
Approval/conformity	CE, EAC, IO-Link
Radio license	Europe



BNI HUB

	BNI00FF
Principle of operation	Active splitter
IO-Link version	1.1
Process data cycle	5 ms
Ambient temperature	-5...+50 °C
Ports	8
Connection	M12
Approval/conformity	CE, EAC, UKCA



BNI BRIDGE

	BNI00H3
IO-Link version	1.1
Operating voltage	18...32 V DC
IP rating	IP67
Ambient temperature	-5...+50 °C
Connection	M12
Approval/conformity	CE



Smart Automation and Monitoring System

# PROFINET IO-LINK MASTER FOR WASHDOWN APPLICATIONS

The term 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 and, on the other hand, is characterized by its uniform and standardized operating, configuration and diagnostic concept.

Thanks to a new housing type in washdown design, our new BNI IO-Link network modules are needed wherever regular cleaning cycles are necessary in demanding environments. With our innovation, you can better manage such difficult conditions.

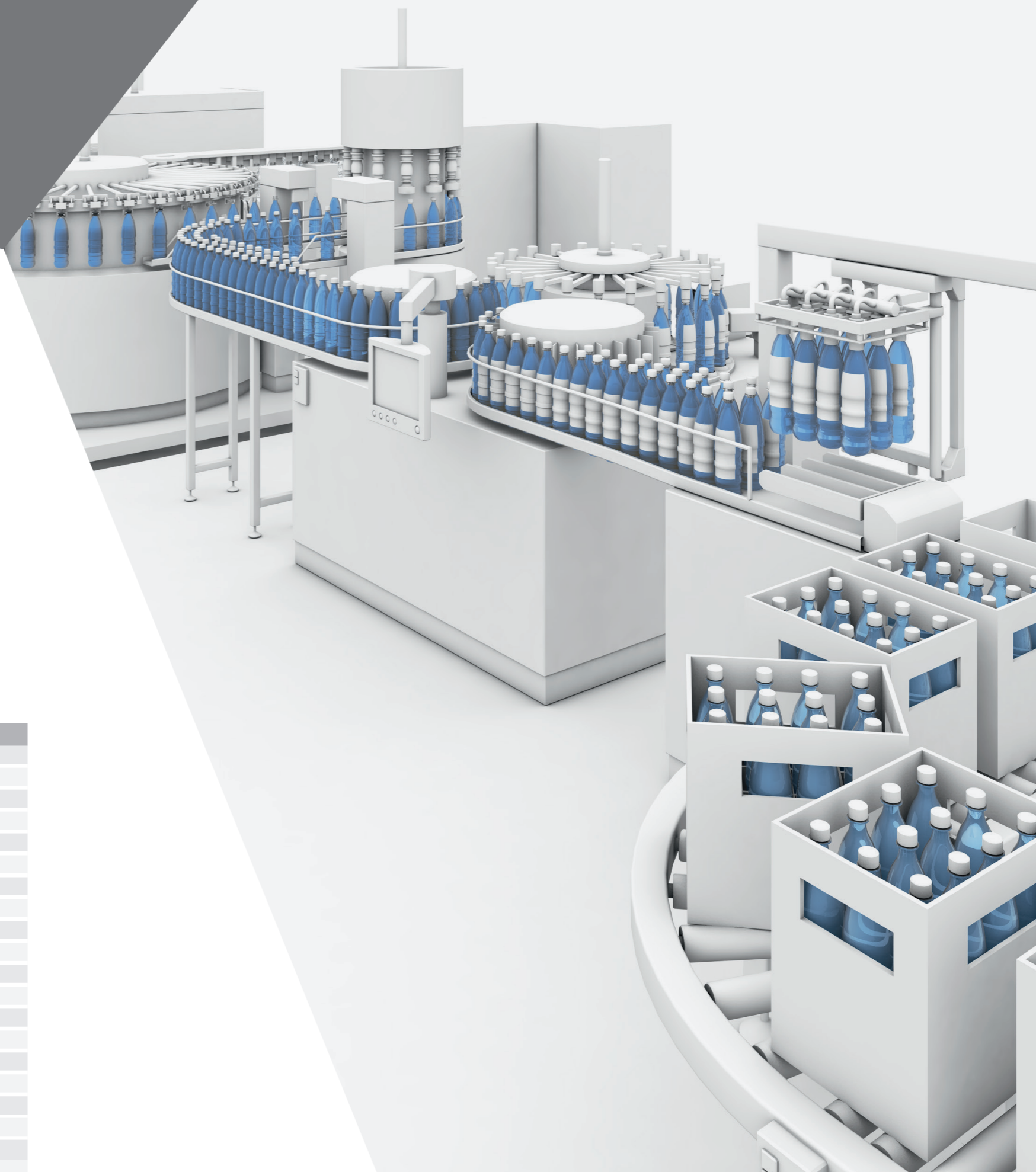
The optimized web server allows you to easily monitor status information. For example, you can continuously check operating hours or current and power. In addition, you have functions such as "user management" and "output test". We have integrated these and other helpful features directly into the web server, so they are easy to use.

The new IO-Link masters are equipped with M12 L-coded voltage supply connections. This allows a total current for sensors and actuators of up to 16 A.

In addition, our network modules offer a REST API as a programming interface. Thus, the data transfer to the IT level can be solved in many ways.

**Features**

- IP69K plastic housing suitable for washdown
- Ecolab certified
- Supply voltage using M12 L-coded plug
- Maximum output current up to 4 A per port
- Expanded web server
- REST API support
- Convenient diagnostics with IO-Link and status LEDs

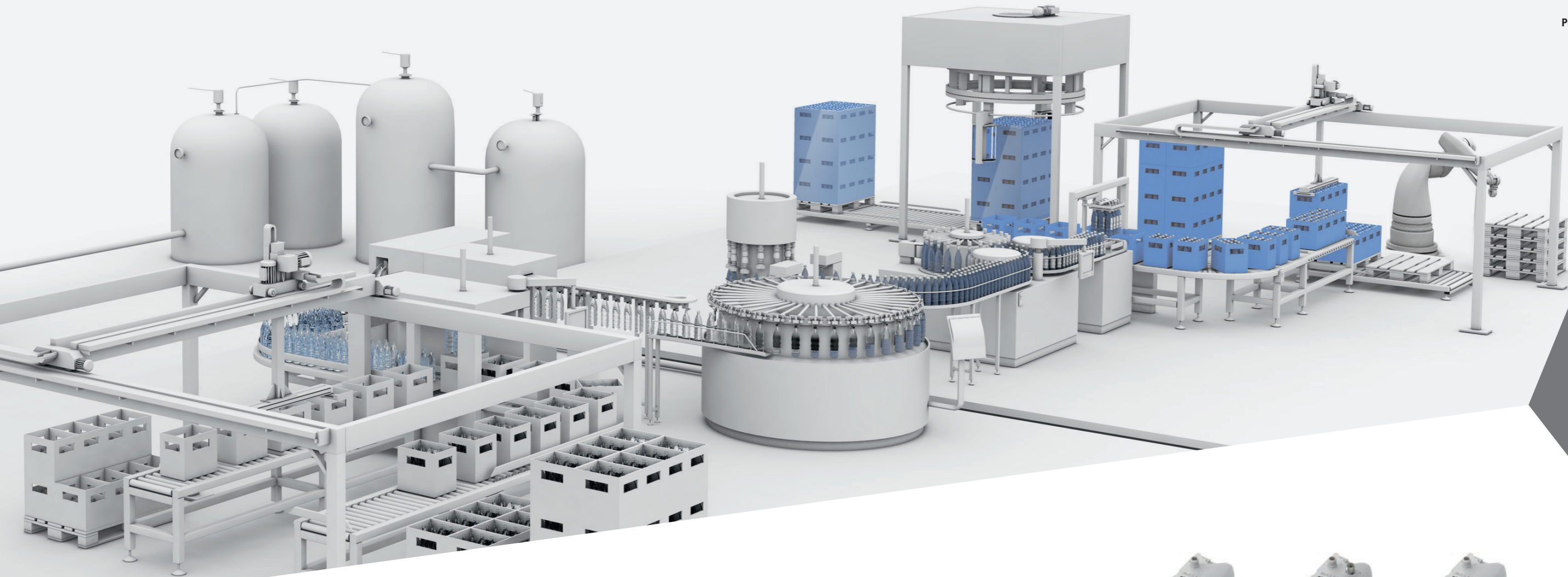


BNI NETWORK BLOCKS

**\* SAMS PRODUCTS**

	BNI00EK
Interface	Profinet
Operating voltage	18...30.2 V DC
Connection (COM 1)	M12 female, 4-pin, D-coded
Connection (COM 2)	M12 female, 4-pin, D-coded
Connection (supply voltage IN)	M12 male, 5-pin, L-coded
Connection (supply voltage OUT)	M12 female, 5-pin, L-coded
Connection slots	8 x M12 female, 5-pin, A-coded
Digital inputs	16 x PNP, Type 3
Digital outputs	16 x PNP
Configurable inputs/outputs	Yes
Max. output current per port	4 A
Current sum sensor/actuator	16 A/16 A
Housing material	PPS
Dimension	68 x 36.8 x 226 mm
Ambient temperature	-25...70 °C
IP rating	IP68, IP69K
Auxiliary interfaces	8 x IO-Link
IO-Link version	1.1
Port-class	Type A
Approval/conformity	CE, cULus, IO-Link, Ecolab





## Smart Automation and Monitoring System

# IO-LINK SENSOR/ACTUATOR HUBS FOR WASHDOWN APPLICATIONS

In addition to process and status data, the intelligent components of our Smart Automation and Monitoring System (SAMS) provide you with valuable, uniform diagnostic data. Part of this system is a new family of IO-Link hubs for digital inputs/outputs and analog input signals.

Simply choose the right device according to your needs and requirements. Depending on the application, you can then manage up to 16 digital inputs and outputs (with or without separate power supply for high load) or up to 8 analog signals. In addition, you have access to module status values such as an operating hours counter and vibration monitoring.

Good to know: Our new IO-Link network modules BNI can also be used in demanding environments, as even regular cleaning cycles cannot harm their washdown design housings. This allows you to keep your machines and systems under control in any situation.

### Features


- IP69K plastic housing suitable for washdown
- All modules Ecolab certified with convenient diagnostic option via IO-Link and status LEDs
- All ports can be independently parameterized
- Single-channel monitoring
- Digital inputs/outputs configurable
- Analog voltage and current signals
- Digital hubs with extension port
- Version with auxiliary power through M12 L-coded plug

BNI IO-LINK SENSOR/ACTUATOR HUBS

 SAMS PRODUCTS



	BNI00F6	BNI00F7	BNI00F9	BNI00FA
Interface	IO-Link 1.1	IO-Link 1.1	IO-Link 1.1	IO-Link 1.1
Operating voltage	18...30.2 V DC	18...30.2 V DC	18...30.2 V DC	18...30.2 V DC
Connection (COM 1)	M12 male, 4-pin, A-coded	M12 male, 4-pin, A-coded	M12 male, 4-pin, A-coded	M12 male, 4-pin, A-coded
Connection (supply voltage IN)		M12 male, 5-pin, L-coded		
Connection slots	8 × M12 female, 5-pin, A-coded	8 × M12 female, 5-pin, A-coded	8 × M12 female, 5-pin, A-coded	8 × M12 female, 5-pin, A-coded
Digital inputs	16 × PNP/NPN, Type 3/1	16 × PNP/NPN, Type 3/1	8 × PNP, Type 3/1	
Digital outputs	16 × PNP	16 × PNP	8 × PNP	
Configurable digital inputs/outputs	Yes	Yes	Yes	
Analog inputs			4 × voltage/current	8 × voltage/current
Single-channel monitoring	Yes	Yes	Yes	Yes
Extension port	Yes	Yes		
Housing material	Plastic	Plastic	Plastic	Plastic
Dimension	68 × 36.8 × 183.5 mm	68 × 36.8 × 183.5 mm	68 × 36.8 × 183.5 mm	68 × 36.8 × 183.5 mm
Ambient temperature	-25...+70 °C	-25...+70 °C	-25...+70 °C	-25...+70 °C
IP rating	IP68/IP69K	IP68/IP69K	IP68/IP69K	IP68/IP69K
Transfer rate	COM3 (230.4 kBaud)	COM3 (230.4 kBaud)	COM3 (230.4 kBaud)	COM3 (230.4 kBaud)
Condition monitoring features	Vibration detection, internal temperature monitoring, voltage and current monitoring			
Multi-functions	Operating hours counter, ping for visual localization of the device			
Approval/conformity	CE, cULus, IO-Link, Ecolab			

 Discover SAMS, the innovative Smart Automation and Monitoring System for optimal performance Page 44



Smart Automation and Monitoring System

# INDUCTIVE COUPLER WITH IO-LINK AND CONDITION MONITORING

New BIC Ø 30 mm high power inductive couplers have been developed for Balluff's Smart Automation and Monitoring Systems (SAMS). Designed for the contactless transmission of data and energy, they score with up to 1.5 A continuous output current and IO-Link interface.

The state-of-the-art technology ensures the smooth, transparent and fast exchange of data between IO-Link device and IO-Link master as well as supplying power for sensors or actuators. A unique feature is the second configurable IO-Link channel, which you can use for condition monitoring as well as for process and diagnostic data.

Thanks to the compact IP69K stainless steel housing with Ecolab and UL approval, our inductive couplers can be used more flexibly than ever. Thanks to the extended operating temperature range from -25 to +85 °C, they can even be used in harsh conditions. No wonder that these systems leave conventional inductive couplers far behind.

**Features**


- Transparent, bidirectional COM2-/COM3 IO-Link communication
- Second IO-Link channel for condition monitoring
- Output current 1.5 A (max. 2 A) at 0...3 mm
- Stainless steel housing with Ø 30 mm in IP69K with Ecolab and UL approval
- IP69K solves washdown requirements
- Operating temperature range -25...+85 °C

BIC INDUCTIVE COUPLERS

 SAMS PRODUCTS



	BIC0084	BIC0085
Function	Signal transmission bi-directional	Signal transmission bi-directional
Component	Base	Remote
Interface transparent channel	IO-Link 1.1	IO-Link 1.1
Interface diagnostic channel	IO-Link 1.1	
Connection	M12 male, 4-pin, A-coded	M12 female, 5-pin, A-coded
Rated operating voltage	24 V DC	24 V DC
Output voltage	24 V DC	24 V DC
Output current max.		1.5 A
Absolute output current max.		2.2 A
Transmission distance	0...5 mm	0...5 mm
Ambient temperature	-25...+85 °C	-25...+85 °C
Housing material	Stainless steel 1.4404	Stainless steel 1.4404
Material sensing surface	LCP	LCP
IP rating	IP67, IP68, IP69K	IP67, IP68, IP69K
Transfer rate transparent channel	COM2/COM3	COM2/COM3
Transfer rate diagnostic channel	COM2	
Dimension	Ø 30 × 85 mm	Ø 30 × 85 mm
Approval/conformity	CE, EAC, cULus, Ecolab	CE, EAC, cULus, Ecolab
Condition monitoring features	Vibration detection, internal temperature monitoring, extreme environment status	
Multi-functions	Operating hours counter, boot cycle counter, ping for visual localization of the device, Pin 2 for output of digital signals or as IO-Link diagnostic channel of the BIC system	

 Discover SAMS, the innovative Smart Automation and Monitoring System for optimal performance Page 44



More than a sum of its components

# SYSTEM SOLUTIONS.

 *innovating automation*

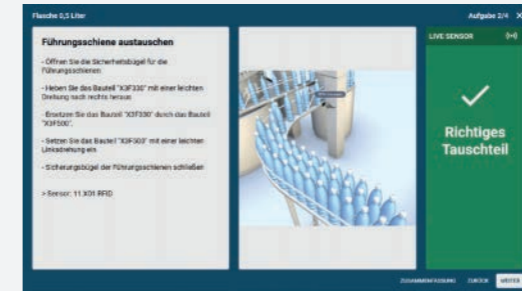
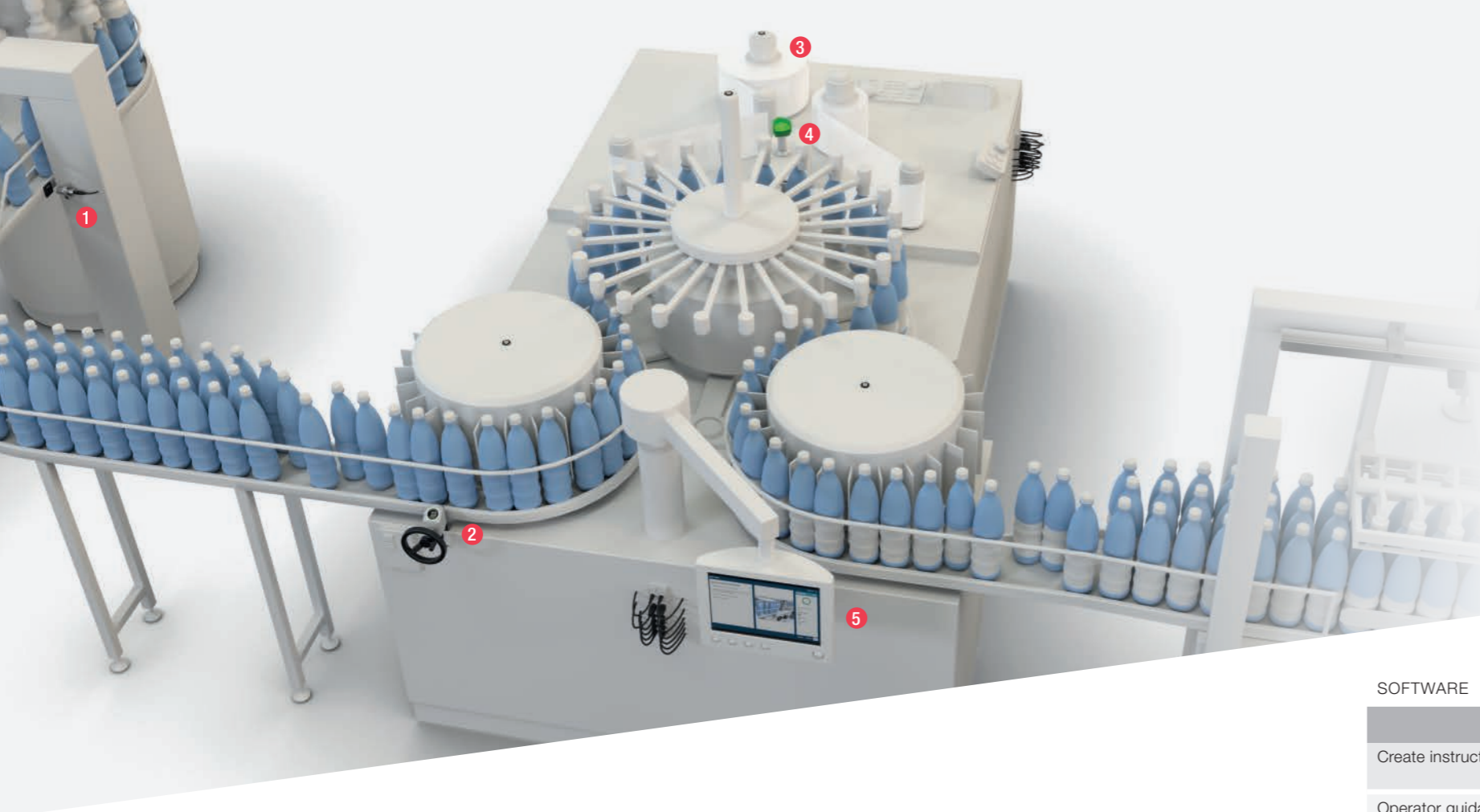
System solutions from Balluff are more than the sum of our wide array of data carriers, read/write heads and processor units. For our systems solutions we have combined this hardware with software into a closed system, which works only through their interaction.

Every system solution can be individually retrofitted and used regardless of the location or manufacturer. And best of all, our system solutions are economical.

**Your Balluff solutions**

- Monitoring
- Tool management





- 1 Permanent format part detection
- 2 Digital position recognition
- 3 One-time format part recognition
- 4 Status display at setup point
- 5 User guidance by means of software

## Increase overall equipment effectiveness (OEE)

# REACH YOUR GOAL FASTER WITH GUIDED CHANGEOVER SOLUTION

Changeover processes on a plant can cost a lot of time if settings have to be changed and change parts exchanged through painstaking manual work – a method that is not only tedious but also prone to errors.

The Guided Changeover Solution, on the other hand, makes format changes faster and easier, thus increasing your OEE. It saves you money and can be retrofitted at any time, even on existing systems. How does it all work? With the help of intuitive software, the operator is guided through the process step by step. In the process, the sensor technology immediately reports back whether lengths, widths and heights have been set correctly. RFID technology from Balluff also detects the required change parts and ensures that the correct format part is always used.

With the help of the Guided Changeover Software, even employees with little programming experience can make format adjustments more quickly, which reduces downtimes to a minimum. Time-consuming readjustments are a thing of the past, as are manuals and high training costs.

It only takes three steps to reach the optimal solution:

- Identify retrofit points
- Select and install sensors and devices
- Create retrofit instructions

### Advantages

- Increase in overall equipment effectiveness (OEE)
- Low changeover and ramp-up times
- Error prevention and minimization of rejects
- Continuous monitoring of changeover points

### Features

- Intuitive step-by-step operator guidance
- Easy creation and management of retrofit instructions
- Retrofit solution independent of company network or machine control

### SOFTWARE

		Standard software license	Advanced software license
Create instructions	Create step-by-step instructions for necessary adjustments to each change point	■	■
Operator guidance	During the format change, the operator is guided through each step and receives direct feedback on the setup	■	■
Monitoring	All parameters are monitored. When a parameter is changed, an immediate message is generated	■	■
Handshake to PLC signal transmission to the controller	Possibility to set up a signal for the PLC to start or stop production	■	■
Sensors	License to use 8, 32, 64 or an unlimited number of sensors	■	■
Multuser mode	Several operators can perform the format change simultaneously at different points of the line		■
History	Documentation monitoring of the format adjustment		■

### STARTER KIT

GCS incl. power supply + cable



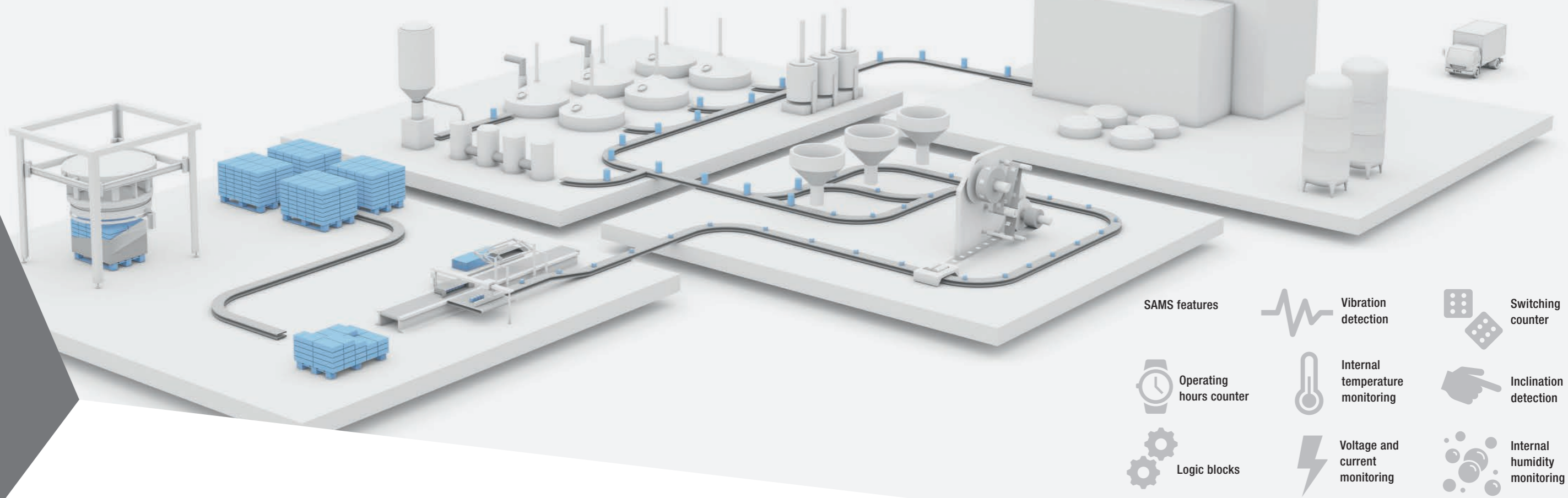
	BAI GCS	BNI00EK	BNI0088	BNI00E0
Description	Standard software license Provided on a gateway.	Network blocks for Profinet IO-Link 1.1	LED stack light SmartLight, IO-Link 1.1	Signal light SmartLight Indicator, IO-Link 1.1

### 6 sensors included in the order, possible selection from:

- Inductive distance sensors
- Inductive position measuring system
- Optoelectronic distance sensors
- Magnetostrictive position measuring system in profile design
- Digital position indicator
- HF read/write head (13.56 MHz)
- LF data carrier (70/455 kHz)







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.

[www.balluff.com/en-de/focus-topics/smart-automation-and-monitoring-system](http://www.balluff.com/en-de/focus-topics/smart-automation-and-monitoring-system)

## 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.



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 3600 employees in 37 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 61 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.

Headquarters  
Balluff GmbH  
Schurwaldstrasse 9  
73765 Neuhausen a. d. F.  
Germany



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