Bemak

BALLUFF

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Products and Services

QUALITY DOWN TO THE LAST DETAIL

innovating automation

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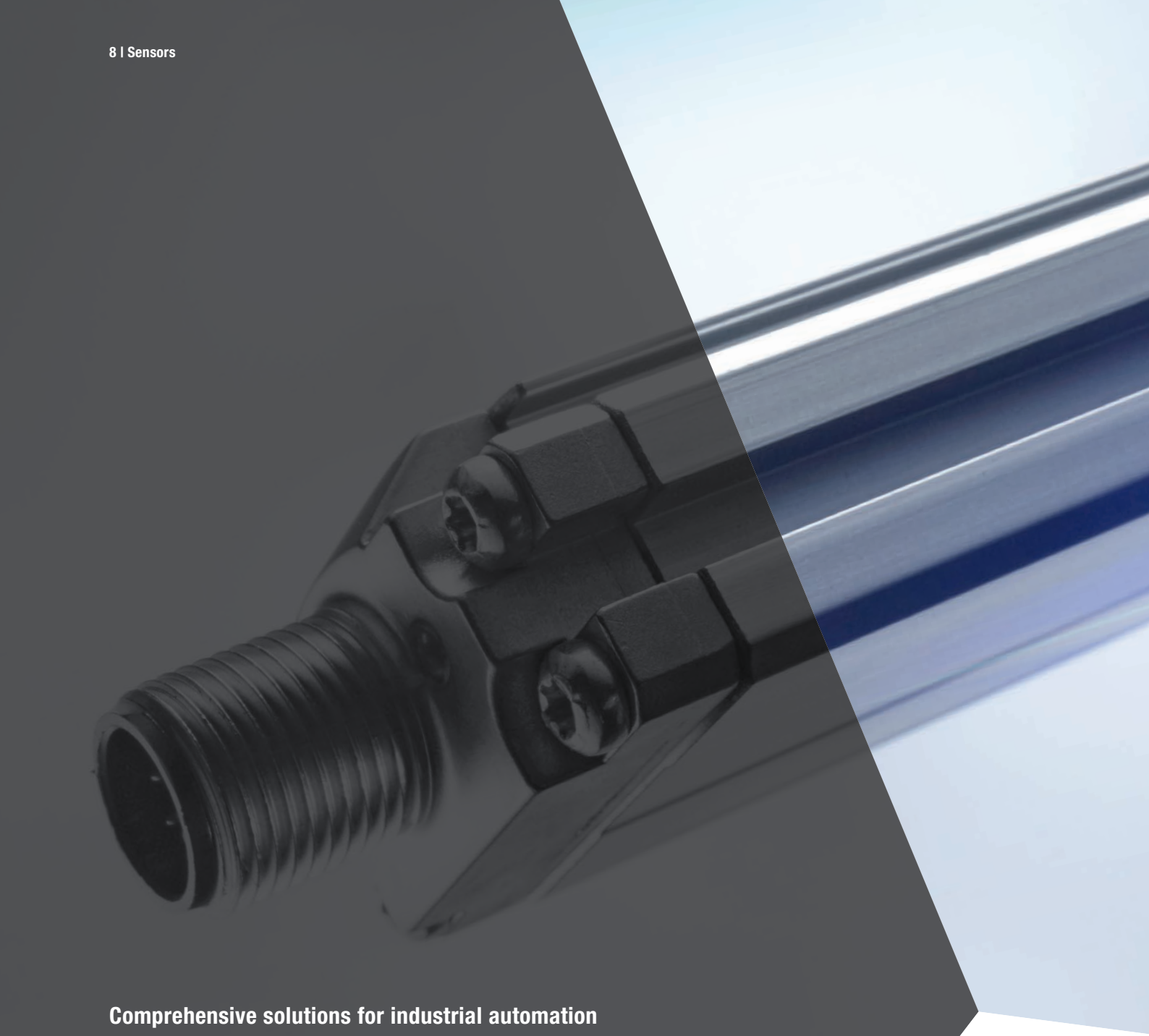
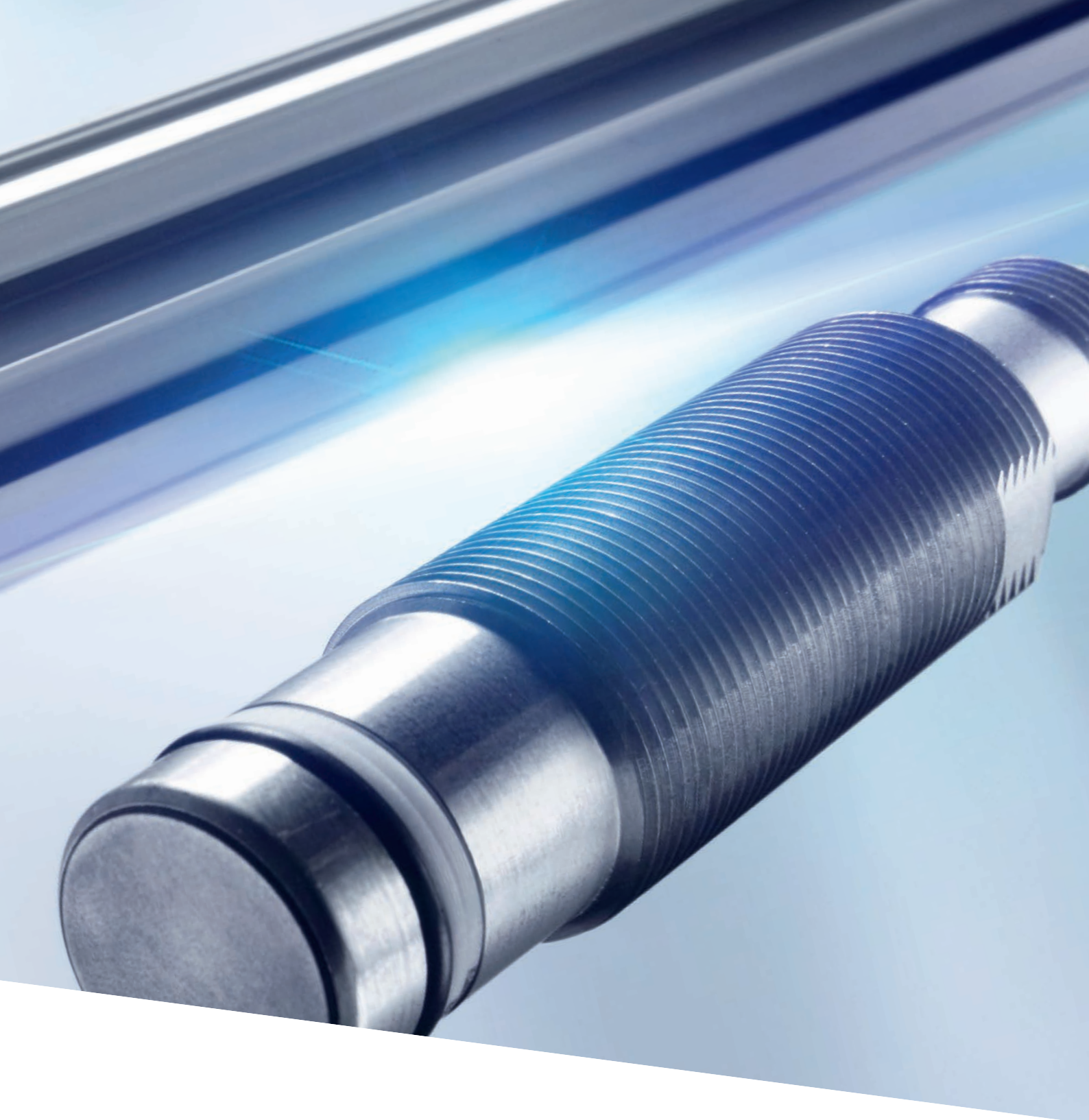


Comprehensive solutions for industrial automation

SENSORS.

innovating automation



In the field of sensor technology, Balluff handles the entire range of technological diversity with our various operating principles. We offer high-value sensors for any application or requirement: from linear measurement to object detection to level, temperature and pressure monitoring. For everyday industrial uses as well for tough applications in critical environments.

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

Your Balluff solutions

- Inductive sensors
- Photoelectric sensors
- Capacitive sensors
- Magnetic field sensors
- Ultrasonic sensors
- Mechanical cam switches
- Magnetostrictive sensors
- Magnetic encoders
- Inclination sensors
- Pressure sensors
- Temperature sensors

Highest quality and precision for a variety of applications

INDUCTIVE SENSORS

Exact, non-contact position detection is essential for processes in automation technology. Inductive sensors from Balluff reliably monitor, regulate and automate sequences and statuses in the highest quality. Every sensor is optimized for its respective application: from standard to extended sensing distance, from temperature- and high-pressure-resistant up to Factor 1, from mini to maxi. They are always wear-free, resistant to dirt and short-circuit-proof.

Features

- Suitable for a variety of applications
- Contact-free and therefore wear-free
- Resistant to dirt
- Short-circuit protected
- In form factors from Ø 3 mm to 80 × 80 mm square dimensions

PRODUCT OVERVIEW

innovating automation

Product family		
BES Global sensors for object detection 	**Globally proven solutions for controlling, positioning and monitoring** Our inductive Global sensors for object detection in metal areas are rugged and reliable. With a wide range of over 500 series, we offer the right inductive sensor for every application. The technology, which is in use worldwide, has an optimum price/performance ratio and can also be delivered in large quantities with a short lead time.	**Features** ■ Cylindrical sensors in Ø 6.5 mm, M8, M12, M18, M30 and bock-style design 40 × 40 mm ■ Shielded and unshielded versions ■ Flush ranges up to 15 mm ■ Non-flush ranges up to 30 mm ■ Connector or cable connection
BAW distance sensors 	**Reliable measurement of position, distance and differentiation of materials** Our inductive distance sensors measure various positions and distances. They also reliably differentiate various material types. They work without contact and are therefore wear-free and feature long service life. Initial installation is quick and easy. And when a sensor needs to be replaced you benefit from short down-times. Included among the important fields of appliction for our distance sensors are the monitoring of movements in joining, pressing or clamping equipment used for machine construction or the detection of imbalances and expansions of axles.	**Features** ■ Tubular types from Ø 6.5 mm to M30 and many block-style housings ■ Compact, solid and reliable ■ Contact-free and therefore wear-free ■ Absolute measuring principle ■ Measurement range from 0.2 to 50 mm, also teachable ■ Short response time, high reproducibility and linearity ■ Broad temperature range, minimal temperature drift ■ Simple to use with absolute analog voltage, current or IO-Link signal

Product family		
BIP position measuring systems 	**Can be perfectly integrated even when there is little space** The inductive positioning system is also impressive in constricted installation conditions: perfectly integrable, it measures the position of metallic objects with maximum precision in a contact-free and therefore wear-free manner. The measurement values are output via IO-Link or analog. Included among the most important areas of use are monitoring of drive spindles and clamping devices or detecting linear motion – for example punch depth, gripper positions, roller positions or valve positions.	**Features** ■ Measurement ranges adjustable from 0…133 mm ■ No mechanical adjustment is necessary ■ Contact-free and therefore wear-free ■ Reliably detect travel using a simple target – a simple machine member can be used as the target ■ High repeat accuracy and precise positioning ■ Analog and digital interfaces
BES mini-sensors 	**Powerful and compact for position sensing in harsh environments** Inductive mini-sensors guarantee position sensing in harsh environments and in the tightest of spaces. Their electronics are fully integrated, making external amplifiers unnecessary. The low sensor weight enables applications with extreme acceleration. Pick-and-Place is easy to achieve as a result. Mini-sensors are simple to install and can be fully integrated in space-constricted assemblies. This enables position detection in places that formerly allowed no room for a sensor.	**Features** ■ Sensors with very small diameter: 3 mm, 4 mm and 5 mm ■ The shortest inductive sensors on the market: with a housing length of just 6 mm ■ Switching distances up to 5 mm ■ Position sensing in harsh environments, in the tightest of spaces ■ The most compact mini-sensors on the market: fully integrable ■ Low weight (0.7 g) for extreme accelerations ■ Unsurpassedly slender and unbeatably short ■ Optimal price/performance ratio
BES sensors with stainless steel housing and sensor front 	**Extremely rugged for use in harsh environments** The especially resistant stainless steel inductive sensors are custom developed for use in very harsh environments. The housing and sensor front are made of stainless steel and resistant to impact, mechanical loads and abrasive media. For welding applications versions with PTFE and ceramic coatings for resistance to weld spatter are available. This reduces your maintenance costs and increases the up-time of your equipment.	**Features** ■ Form factors from M8 to M30 and block-style housings ■ Switching distances from 1.5...8 mm ■ Extremely rugged ■ High switching distance ■ Factor 1 sensors and selective sensors (ferrous/non-ferrous) ■ Resistant to abrasive media and cleaning agents ■ Different models and sizes

Product family		
BES Factor 1 sensors 	**More flexibility for your production** The inductive Factor 1 sensors can be used wherever dissimilar metals must be identified uniformly and with high precision. These all-rounders reliably detect all metals without a reduction factor at the same sensing distance: ferrous and non-ferrous metals, steel, brass, aluminum, etc. They are also magnetic field immune and can be used in strong electromagnetic fields. Also available: versions with PTFE coating to protect against weld spatter.	**Features** ■ High sensing distance without reduction factor for all metals ■ Magnetic field immune ■ Installation in different metals possible ■ High-precision and flexible use ■ Different models and sizes ■ Weld splatter resistant versions available
BES magnetic field immune sensors 	**Magnetic field and weld field immune – for flexible use in harsh conditions** In areas with strong electromagnetic fields, such as in welding and induction hardening equipment, magnetic field immune sensors work with the greatest precision. They are insensitive to magnetic fields arising from electric welding currents up to 25 kA. And with their additional ceramic coating, they are resistant to metal spatters, slag and combustion residues. This extreme ruggedness reduces your maintenance costs and increases the up-time of your equipment.	**Features** ■ Extremely rugged ■ Magnetic field immune ■ Weld spatter resistant ■ Resistant to abrasive media and cleaning agents ■ Different models and sizes
BHS high-pressure resistant sensors 	**Perfect for use in hydraulic cylinders and valves** Our pressure-rated inductive sensors withstand a pressure of up to 500 bar. They are perfectly suited for position monitoring of your hydraulics, such as for end position verification of hydraulic cylinders or monitoring valve position. This capability is a result of media-resistant housing materials and special sealing. For individual applications we offer a comprehensive line of various housing diameters and thread sizes.	**Features** ■ Pressure-resistant to 500 bar ■ High-temperature-resistant up to 120 °C ■ Appropriate for use in explosion-protected areas ■ Overall dimensions from M5 to M18 ■ Short and long configurations ■ With and without fixed stop

Product family		
BES hygienic sensors 	**Long service life even under difficult environmental conditions** Our hygienic sensors are extremely resistant to abrasives and aggressive media. Even the part label is protected against abrasion and chemicals. The LED indicators cannot be destroyed. And the housing construction was optimized for safe cleaning, so that the products do not get dirty. For use in extremely aggressive environments, variations completely in PTFE are available.	**Features** ■ Custom stainless steel, such as 1.4404, 1.4571 ■ High chemical resistance ■ High degree of protection IP67 to IP69K ■ Extended temperature range available ■ Ecolab, FDA certifications available ■ Safe cleaning (CIP) ■ Different models and sizes
BES temperature-resistant sensors 	**Highest precision even at high temperatures** Our temperature-resistant sensors are designed for temperatures up to 160 °C: this is due to their special housing and cable construction as well as their fully integrated electronics. We also offer high-pressure rated sensors, so that you can make use of a broad application spectrum.	**Features** ■ No sensing distance drift under temperature ■ Temperature ranges to 160 °C available ■ High IP68 rating ■ Stainless steel housing 1.4571 ■ Different models and sizes
BES sensors for potentially explosive areas 	**Also highest approval in Ex zones** You can use wear-free inductive sensors in various Ex zones: in areas in which an explosive atmosphere is a rare occurrence (Category 3G/3D). Or in explosion hazard equipment or Zone 1 (Category 2G/1D). In this case combined with a NAMUR isolating amplifier. For flexible use, we offer a comprehensive portfolio of common sensor housings, thread sizes and the option of molded-on cables or connectors.	**Features** ■ Applicable for zones 2G/1D and 3G/3D ■ Pressure-resistant to 500 bar ■ High-temperature-resistant up to 120 °C ■ Can be combined with NAMUR amplifiers ■ Contact-free and therefore wear-free ■ Resistant to dirt ■ Short-circuit protected ■ Media-resistant

Product finder and more technical details:
www.balluff.com/go/**inductive-sensors**

Generous detection range for high reliability

PHOTOELECTRIC SENSORS

Photoelectric sensors from Balluff reliably recognize the presence of objects. They check shape, color, distance or thickness equally reliably. This is because they have a significantly greater detection range compared to inductive or capacitive technology.

In the area of photoelectric sensors we offer a huge product variety. Sensors using all light types from red light to infrared to laser technology. Sensors with the most different ranges, with and without background suppression, as well as many different form factors. For specialty applications, mini-sensors, color sensors, light band and contrast sensors round out our portfolio. With Balluff you achieve not only the highest reliability, but also the greatest flexibility.

Features

- All light types, all principles
- Different ranges from near to far
- Tailored to the requirements of automation, mounting and handling
- Robust and reliable even under adverse environmental conditions
- Flexibility for planning and installation through well-conceived technical data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PRODUCT OVERVIEW

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Product family		
BOS standard sensors 	**Versatile, proven solutions for reliable detection** In the area of photoelectric sensors, we offer a multiplicity of well-tested standard solutions for reliable and secure detection in numerous applications.	**Features** **Through-beam sensor** ■ Ideal for positioning tasks with excellent repeatability ■ Large function reserve, very resistant to dirt ■ Reliable detection independent of surface, color or material – flawlessly recognizes even very shiny objects ■ Ideal for large ranges **Retroreflective sensor** ■ Simple alignment thanks to generous mounting tolerances ■ Large reflectors for high ranges ■ Reliable detection independent of surface, color or material ■ With polarizing filter for detecting shiny objects **Diffuse sensor, energetic** ■ Ideal for contrast detection – regardless of surface, color or material ■ Economical and easy to install ■ Shorter ranges as compared to retro-reflective and through-beam sensors **Diffuse sensor with background suppression** ■ Reliable detection virtually independent of surface, color and material – also suitable for the detection of objects in front of a very close background, and for dark objects in front of a light background ■ Almost constant pulse width even with different reflectance

Product family		
BGL through-beam fork sensors 	**Unmatched high precision and reliability** Our fork sensors with transmitter and receiver in one housing are pre-adjusted. That reduces your expense, saves valuable time during start-up and supports reliable processes. Our fork sensors are unsurpassed for accuracy, small parts and detail detection, and operating reliability. The broad product offering also ensures reliable solutions even for challenging applications – such as transparency detection, water detection and web edge control.	**Features** ■ Different light types (red light, infrared, laser) ■ Rugged metal housing ■ Simple alignment to the object ■ High optical resolution and repeat accuracy ■ Fork widths from 5…220 mm with standardized mounting holes ■ Identical mechanical and optical axes ■ High process reliability since the transmitter and receiver are firmly aligned with each other ■ Save time and expense – only one electrical connection is required
BWL angle sensors 	**Precise detection of all angles and corners** Angle sensors are used for demanding applications – for example, in feed monitoring of objects or in counting and detection in complex feed systems. The form factor and beam geometry enable the approach and detection of objects from almost every direction. They are quick to install – even in tight mounting spaces because the emitter and receiver are permanently aligned with each other.	**Features** ■ Ideal for every application thanks to different light types (red light, infrared, laser) ■ Rugged metal housing ■ Its angled form allows extremely flexible mounting ■ High optical resolution and reproducibility ■ Identical mechanical and optical axes ■ High process reliability since the transmitter and receiver are permanently aligned with each other ■ No time-intensive adjustment ■ Large selection of different shapes and sizes
BOW optical window sensors 	**Dynamic or static area checking within a stable frame** Our optical window sensors are useful where objects are to be checked not only at discrete points, but also within a range. Thanks to their multitude of beams arranged in parallel, they can detect objects within a broad window. Optical window sensors are available in a variety of dynamic and static versions. The dynamic version detects only moving objects. Feed equipment does not affect detection, so that fast and randomly falling objects can be counted.	**Features** ■ Uniformly high resolution over the whole area of the frame ■ Small parts detection to 0.8 mm diameter ■ Robust metal housing with M8 standard plug connector ■ Adjustable sensitivity and output signal length ■ Dynamic and static versions ■ Modular construction kit with numerous frame sizes

Product family		
BOS mini-sensors 	**Detect small parts at a distance of up to 3 m with precision** Photoelectric mini-sensors from Balluff are the right choice when small parts need to be detected in limited space with precision and long ranges are important. With their wide range of product variants, they are a reliable solution to all applications and offer a great degree of freedom in design. Advanced laser technology, homogeneous red light or innovative pinpoint technology stand for high process accuracy. Diffuse sensors with background suppression reliably eliminate interfering influences.	**Features** ■ Long ranges of up to 3 m ■ Large range of product variants ■ High process accuracy ■ Easy to operate
BOH MicroMote® sensors 	**Especially flexible system having a plurality of sensor heads for your specific requirements** The MicroMote system is especially small and, therefore, can be very flexibly used. It combines an external amplifier with unusually small photoelectric sensor heads. As a result it is suitable even for extremely constricted spatial conditions and moving machine elements. A variety of housing styles ensures especially high design freedom, while precise photoelectric components ensure high process accuracy in any application.	**Features** ■ Large selection of sensor heads with maximum precision: MicroSpot, NanoSpot, lasers, infrared, classic red-light LEDs ■ Amplifier for analog, digital, dynamic ■ Display indication of target and actual values ■ Convenient operation ■ Extremely flexible sensor cable ■ Outstanding technical parameters ■ Rugged, for challenging environments ■ Ideal for use in grippers ■ Elegant, seamless integration into machines
BFS color sensors 	**Reliably determine color and contrast – better than the human eye** Use color sensors to simplify and accelerate your automated processes. For example in detecting color nuances in textiles, or painted sheets as well as colored markings on packaging or labels. They ensure consistently high product quality and contribute to reliable production sequences. The true-color sensors differentiate even subtle color nuances and evaluate the quality of the finished pieces – objectively and absolutely unerringly.	**Features** ■ High switching frequency ■ With or without display ■ Robust and industrial grade ■ High ranges to 400 mm thanks to a strong white light ■ Optional with IO-Link interface for simple parameterization ■ Differentiation between any number of objects (255 can be directly learned) ■ Very high color resolution ■ Application-specific parameterization
BKT contrast sensors 	**Fast detection of print markings and slight contrast differences** Contrast sensors are high-resolution diffuse sensors that distinguish objects based on their gray values. Balluff's rugged contrast sensors recognize even small differences in contrast, have a high switching frequency up to 30 kHz and are therefore particularly fast. They enable high positioning precision and are appropriate for a variety of applications, for example, in the printing and packaging industry.	**Features** ■ For fast processes thanks to highly accurate switching – high switching frequency up to 30 kHz ■ Different light types (laser/red/green/blue or white light) ■ Large ranges with laser ■ Highly visible light spots ■ Pulse stretching ■ Outside Teach-in possible ■ Also available with analog output signal ■ Available with display for simple setup ■ Different models for different applications

Product family		
BLT luminescence sensors 	**Reliably detect invisible marks and markings** Our luminescence sensors, with their UV light sensor, detect objects that an unaided human eye cannot see. They are useful for detecting invisibly marked products. Or when lubricants which have been previously enriched with luminescent particles need to be tested.	**Features** ■ UV light – no external lamp or light source required ■ Programmable with the touch of a button – without separate software ■ Robust, industrial-grade designs
BLA light array 	**Identify parts, determine positions and count objects with high precision** Our multifunctional, high-resolution BLA light array combines up to three different parallel measurement results in one device: you can identify parts, determine positions and count objects. Numerous measurement modes are available, such as testing object diameter, position, gap width and position, edge position and object quantity. Using the simple and intuitive control panel, you can teach in and output up for six different objects through digital outputs.	**Features** ■ Applicable for zones 2G/1D and 3G/3D ■ Rugged metal housing ■ 50 mm wide light band ■ Distances up to 2 m possible ■ Excellent resolution from 0.01 mm ■ Two freely configured analog outputs ■ Three programmable digital outputs ■ Intelligent noise contour suppression ■ Self-contained device – no additional accessories such as controller, PC or software required ■ Consistent, homogeneous light array
BLG light grids 	**Count objects and measure large areas** Our light grids are ideally suited for scanning larger areas, for counting parts, for detecting stack heights (of paper, for example) or for measuring the height of pallets. This makes them superior to traditional through-beam sensors that typically scan only selectively at points. Balluff's light grids feature a switching output – for counting, for example – and an analog output for measurement tasks.	**Features** ■ Different lengths available ■ Also suitable for large objects up to a range of 2.1 m ■ Ideal for counting due to its short response time ■ Rugged metal housing ■ Invisible infrared light ■ Switching output (PNP) and analog output (0…10 V) ■ Simple connection, easily-assembled installation without additional equipment ■ Ready to use – no parameter setting necessary
BFB fiber optic sensors 	**Maximum flexibility thanks to plastic or glass-fiber optics** Fiber optic sensors are used where traditional photoelectric sensors are too large or inflexible. Our fiber optic sensors are combined with plastic or glass fiber optics for a complete sensor. This gives you the maximum flexibility for any application: plastic fiber optics are used for lesser requirements in ruggedness, temperature and chemical resistance – but we also offer high-temperature plastic fiber optics. Glass fiber optics feature non-crush, temperature and chemical resistant properties.	**Features** ■ For detecting low contrast differences ■ Very fast – up to 8 kHz ■ High positioning precision ■ Flexibly mountable, simple to install ■ Mechanically rugged ■ With one-way or detecting principle ■ Straight or angled optics ■ Compact configuration for mounting on DIN rails ■ With or without display ■ Different light types (red or infrared) ■ Also optionally with analog output signal ■ For glass or plastic fibers

Product finder and more technical details:
www.balluff.com/go/**photoelectric-sensors**

Object and level detection with patented technology

CAPACITIVE SENSORS

Balluff's capacitive sensors detect fluids, granulates and powders in direct contact or through a non-metallic container wall. As stick-on sensors, they fit flexibly to the housing shape and are easily removable. Moisture, foam and deposits of any kind are compensated for, even through glass and plastic walls up to 10 mm thick. This makes them ideal as level detection sensor for conductive media while guaranteeing high application security.

Our capacitive sensors are available in various form factors, even especially small ones.

Features

- Contact-free and therefore wear-free
- Bounceless output signal
- Foam and residue compensation

PRODUCT OVERVIEW

innovating automation

Product family		
BCS level sensors 	**Reliably detect liquids with or without media contact** Our fill level sensors register fluids optionally in contact with the media or through non-metallic container walls. Moisture, foam and deposits of any kind are compensated for, even through glass and plastic walls up to 10 mm thick. This makes them ideal for use with conductive media. PTFE- and PEEK-housings also ensure the best possible chemical resistance.	**Features** ■ Foam and residue compensation ■ Pressure-proof designs ■ Plug and cable variations ■ Economical designs available ■ Optionally with IO-Link
BCS sensors for object detection 	**Reliably detect objects – using a straight-line electrical field** Our capacitive sensors for object detection feature a straight-line electrical field. Using this, they recognize even media with a low dielectric constant at a long distance. These sensors detect liquids as well as solid bodies such as wafers, printed circuit boards, cardboard packaging, stacks of paper, bottles, plastic blocks and boards.	**Features** ■ Compact designs from Ø 6.5 mm ■ Flat designs or disc shapes with a sensing distance of up to 25 mm ■ Flush installation ■ Plastic and stainless steel designs ■ Economical designs available ■ Adjustable via potentiometer or cable teach-in ■ Plug and cable variations ■ Optionally with IO-Link
BCS global sensors for object and fill level detection 	**Precision with a high level of EMC protection** Capacitive global sensors for object and fill level detection are just as precise as they are efficient. The product line has already been proven numerous times and a large selection is available. The high-quality technology with optimum EMC protection has an excellent price/performance ratio and a high level of insensitivity to electromagnetic interference.	**Features** ■ M12, M18, M30 and block-style variants in cable version or with M12 connector ■ Flush ranges up to 20 mm ■ Non-flush ranges up to 25 mm ■ PNP and NPN versions normally open or normally closed ■ Power-on indicator ■ Output function indicator ■ Available with a plastic or stainless steel housing

Product family		
BCW sensors with analog output 	**Registers objects and levels in analog without contact** The capacitive sensors with analog output contactlessly scan objects – without any mechanical contact with the object. Measurement results are also not influenced by color or surface roughness. The sensors are suitable for, among other uses, material selection, for measuring coating thickness on all materials, product thickness monitoring, height measurement or for determining diameters.	**Features** ■ M18 ■ Stainless steel housing ■ Flush installation ■ Current interface 4...20 mA
BCS passive sensor heads 	**For extreme temperatures or under the highest pressures** Our passive sensor heads are used wherever a sensor with integrated electronics would not function optimally because of the environment. For example, in extreme temperatures or under the highest pressures. Capacitive high-pressure and temperature rated sensors therefore use a triax sensor cable and a separate amplifier. The housing is stainless steel, and the sensor head PTFE. They detect levels of liquid, paste or powdery media even under extreme conditions.	**Features** ■ High-temperature-resistant up to 250 °C ■ Pressure rated to 6 bar at 180 °C ■ High-pressure rated to 150 bar at 180 °C ■ Connects with 2 m oscillator line ■ Convenient adjustment and evaluation via a separate capacitive sensor amplifier ■ IO-Link available
BCS mini-Sensors 	**Detect all materials regardless of external influences and the properties of an object** Capacitive mini-sensors are the right choice for measurement in difficult environments where dust, reflections or the properties and color of an object can influence the result. They monitor stack heights and detect solids and liquids with extreme precision through glass or plastic container walls up to 4 mm thick or in direct contact. Fine adjustment of the capacitive mini-sensors is easily performed by means of a separate sensor amplifier.	**Features** ■ Generous switching distance ■ Rugged stainless steel housing ■ Very rugged thanks to active surface made of Teflon® ■ Flat disc shapes, require very little installation space while providing a large switching distance ■ Suitable for all materials ■ Simple remote adjustment via separate capacitive sensor amplifier ■ Precise measurement through container walls up to 4 mm thick or in direct contact
BCS adhesive sensors 	**Easiest mounting and handling** The special feature of our capacitive adhesive sensors is their quick, simple and cost-effective mounting: As adhesive sensors, they fit flexibly to the container or pipe shape, and are easily removable. Adjustment and evaluation are conveniently done via a separate sensor amplifier.	**Features** ■ Flexible, quickly attached and economical ■ Convenient adjustment and evaluation via a separate capacitive sensor amplifier ■ Analog evaluation possible ■ IO-Link available

Product finder and more technical details:
www.balluff.com/go/**capacitive-sensors**

Sure position detection even at high speeds

MAGNETIC FIELD SENSORS

Our magnetic field sensors are used chiefly on cylinders and grippers for monitoring the piston position. The sensor thus recognizes the field of the magnet integrated into the piston through the actuator wall, even at high travel speeds.

With their non-contact position detection the magnetic field sensors from Balluff work absolutely reliably and wear-free: no contact burn, no bouncing, just clean switching points.

Features

- Contact-free and therefore wear-free
- No double switching points
- Reliable even at high travel speeds

PRODUCT OVERVIEW

innovating automation

Product family		
BMF sensors for pneumatics and hydraulics 	**Versatile solutions for almost every operational area** The cylinder walls of pneumatically and hydraulically driven actuators and drive units are typically provided with slots. This is where the magnetic field sensitive sensors are attached. We offer solutions for all common C- and T-slots. Adapter elements enable reliable attachment to rods, tubes and other shapes. These sensors – which are among the smallest on the market – also fit in miniature cylinders with short slot lengths. For short-stroke cylinders you can choose versions with two sensors on one plug.	**Features** ■ Contact-free and therefore wear-free ■ Reliable position determination for all common cylinder drives ■ A small number of basic types assures universal implementation ■ Configurations with fixed or adjustable switching points ■ All common switching outputs and connection types ■ Configuration with two sensors on one connector ■ IO-Link versions with maximum operating range ■ Product families with flexible mounting systems and adapters for a variety of mounting solutions
BMF cylinder sensors for T-slot 	**Firm grip and high flexibility** Magnetic cylinder sensors detect the piston position without contact through the cylinder wall. Our magnetic cylinder sensors for C-slots stand out with their especially firm holding capability. If you require maximum flexibility, we also offer extremely short form factors. For use in harsh environments, around weld spatter or flying sparks we offer versions in a metal housing. Or with magnet-sensitive electronics for industrial environments with high welding currents.	**Features** ■ Reliable switching process thanks to precise switching points ■ Contact-free and therefore wear-free ■ Insensitive to contamination ■ Thanks to the especially bright LEDs, they reliably recognize the switching state of the sensor even at a long distance

Product family		
BMF cylinder sensors for C-slots 	**Firm grip and high flexibility** Magnetic cylinder sensors detect the piston position without contact through the cylinder wall. Our magnetic cylinder sensors for C-slots stand out with their especially firm holding capability. They mount flush so that they are suitable for space-critical applications. Since all our C-slot sensors can be inserted from above, they will also fit where the slot ends are closed off. We also offer extremely short designs that perfectly fit every gripper and short-stroke cylinder.	**Features** ■ Reliable switching process ■ Precise switching point ■ Contact-free and therefore wear-free ■ Insensitive to contamination ■ Low hysteresis
BMF cylinder sensors for round cylinders 	**Secure mounting with mounting bracket and hose clamp** Our cylinder sensors for round cylinders are securely integrated into different applications with the appropriate hose clamps and mounting brackets. The well thought-out mounting bracket concept is suitable for most types of cylinder up to 80 mm piston diameter. Piston position is registered contactlessly through the cylinder wall.	**Features** ■ Up to 80 mm piston diameter ■ Reliable switching process thanks to precise switching points ■ Contact-free and therefore wear-free ■ Insensitive to contamination ■ Firm grip ■ Mounts quickly
BMF teachable cylinder sensors 	**More flexibility and comfort through adjustable multiple switching points** Our cylinder sensors for C- and T-slots with adjustable multiple switching points enable quick integration of pneumatic and hydraulic cylinder drives. Attach our teachable sensors in their approximate position. The switchpoint(s) is/are then determined using the teach key. This allows two different switching points to be set on the same cylinder, even up to eight with the IO-Link version. One sensor can thus replace multiple traditional sensors. For you this means more convenience, greater flexibility and significant cost savings.	**Features** ■ Contact-free and therefore wear-free ■ Individual installation of the switching points without tools ■ Applicable for cylinders and grippers with radial or axial magnetic polarization ■ Remote-Teach of up to 8 switching points via IO-Link ■ Adjustable hysteresis for each individual switching point ■ Extremely large, 60 mm travel path ■ Status indication via multiple colored LEDs ■ Captive switching points even after a power outage

Product family		
BMF single-connector version with two cylinder sensors 	**Save mounting costs with only one plug connector for two sensors** Two magnetic sensors are often necessary for smaller pneumatic hydraulic cylinders or grippers in order to determine the position of the piston. With our cylinder sensors you reduce your installation and wiring effort: the electrical connection for two sensors is made using a single 4-pin plug. Only one slot is therefore required to connect to the distribution box. This saves time, effort as well as procurement and inventory costs.	**Features** ■ Tie rod diameter up to 17 mm ■ Reliable switching process thanks to precise switching points ■ Contact-free and therefore wear-free ■ Insensitive to contamination ■ Mounts quickly
BMF mini-sensors for mini-actuators 	**The smallest cylinder sensors – especially for short-stroke cylinders** Balluff has developed miniature cylinder switches especially for short-stroke cylinders and mini-grippers. Our mini-sensors are among the smallest on the market and have an exact switching point. They thus guarantee the highest precision even with minimal switching paths.	**Features** ■ Reliable switching process thanks to precise switching points ■ Contact-free and therefore wear-free ■ Insensitive to contamination ■ Firm grip ■ Mounts quickly ■ Variations that connect to two sensors via only one plug ■ For BMF 103 with slot nut: With upright mounting, only a short slot length is required (also available with one plug for two sensors)
BMF cylinder sensors with metal housing 	**The reliable all-rounder for the harsh environment of metalworking** Our cylinder sensors with metal housing were developed for use in harsh environments and are especially designed to resist weld spatter and flying sparks. They withstand high temperatures to 105°C without problems. Welding current up to 25 kA have no effect on the sensor function. Weld-immune cylinder sensors distinguish between magnetic fields used for position detection of the piston, and alternating magnetic fields which surround the current-carrying cables for the welding.	**Features** ■ Rugged metal housing ■ Resistant to temperatures of up to 105 °C ■ Immunity to magnetic welding in types with W attribution ■ Exact position detection even at high temperatures ■ Reliable switching process thanks to precise switching points ■ Wear free, since contactless and without moving parts ■ Insensitive to contamination

Product family		
BMF cylinder sensors for tie-rod cylinders 	**Classic mounting system for versatile use** Magnetic cylinder sensors detect the piston position without contact through the cylinder wall. Our magnetic cylinder sensors for tie-rod cylinders can be reliably integrated into a variety of applications. The mounting design ensures this: the sensors are completely traditionally mounted with mounting brackets on cylinders with tie rods and DUO rails. The well thought-out mounting bracket concept is suitable for most common types of cylinder with any piston diameter.	**Features** ■ Tie rod diameter up to 17 mm ■ Reliable switching process thanks to precise switching points ■ Contact-free and therefore wear-free ■ Insensitive to contamination ■ Firm grip ■ Mounts quickly
BMF cylinder sensors for trapezoidal slot and trapezoidal guide 	**Firm grip and high flexibility** Our magnetic cylinder sensors for trapezoidal slots can be easily mounted using mounting brackets and adapters. The well thought-out mounting bracket concept is suitable for most types of cylinder with trapezoidal slot or trapezoidal guide. In addition, we offer sensor variants which fit directly on a cylinder with a 60° and 90° trapezoidal slot without a mounting bracket. The sensors detect piston position contactlessly through the cylinder walls.	**Features** ■ Reliable switching process ■ Precise switching point ■ Contact-free and therefore wear-free ■ Insensitive to contamination ■ Simple to install

Precise, flexible all-rounders

ULTRASONIC SENSORS

Whether for position detection, distance detection or detection of powdery and fluid media – our ultrasonic sensors are precise all-rounders. They measure fill levels, heights and sag without making contact as well as count and monitor the presence of objects. These universal sensors work regardless of color or surface composition and are unaffected by transparent objects with strong reflection. Fog, dust and impurities are also not a problem for them. Their high resolution and small blind zones guarantee the highest precision. Since they offer a generous detection range, they also work reliably at greater object distances.

Ultrasonic sensors from Balluff are available as switching or analog output types. Depending on the output signal you can either reliably detect and count objects or determine distances with high precision. These sensors therefore have versatile uses.

Features

- Contactless detection
- Reliable in critical environmental conditions such as fog, dust and impurities
- Irrespective of color, transparency, reflection properties and surface finish on the object
- Precise detection of even smaller objects
- Rectangular and cylindrical heads allow for greater freedom of design
- Can be used as normally open or normally closed – various output functions

PRODUCT OVERVIEW

innovating automation

Product family		
BUS M12M tubular design 	**The smallest ultrasonic sensors with M12 threads – nothing shorter** Our ultrasonic sensors are among the smallest on the market. With a switching output they have a housing length of just 55 mm, and the analog versions are just 60 mm long. Influences from intrinsic heating and installation conditions are effectively compensated – with the same exact measurement results shortly after switching on the operating voltage as in ongoing operation.	**Features** ■ M12 housing, 4-pin M12 plug connection ■ Entire length including plug only 55 mm ■ Two pulse widths, measurement range 20...350 mm ■ Switching output in PNP or NPN configuration ■ Analog output 4...20 mA or 0...10 V ■ Teach-in via Pin 2
BUS 18M tubular design 	**Extremely compact and very flexible – with IO-Link** With a housing length of only 41 mm, these ultrasonic sensors are extremely compact. Using a narrow sound beam, a blind zone of only 25 mm, angle head variations and three different output stages, they offer flexible application possibilities. The most important benefit of the sensors is the comprehensive support of the IO-Link interface. The sensors can communicate with an IO-Link enabled control or an IO-Link master via the switching output. The sensors can be synchronized, so that they do not interfere with one another.	**Features** ■ Two housing variations – straight and with a 90°angled head for individual installation situations ■ Automatic synchronization and multiplex operation for simultaneous operation of up to ten sensors ■ Four sensing ranges with a measurement range from 25 mm to 1.3 m ■ Push/pull switching output PNP/NPN ■ Analog output 4...20 mA or 0...10 V for distance measurements ■ Teach-in via control line
BUS M30 tubular style 	**Especially versatile and easy to service via the display** The sensor family in metal or stainless steel housings includes five variations and covers the most diverse applications with one measurement range from 30 cm to 8 m. All variants are available with either one or two switching outputs in PNP or NPN, a current and voltage output 4...20 mA and 0...10 V or as a combination with switching and analog output. This handles virtually any application. The sensor can be preset. During operation all measurement values are immediately displayed.	**Features** ■ Display with direct measurement value results and complete numerical presetting possibility ■ Automatic synchronization and multiplex operation for simultaneous operation of up to ten sensors ■ Five sensing ranges with a measurement range from 30 mm to 8 m ■ Simple, menu-driven start-up via 2-button Teach-in ■ Variants in stainless steel housing available

Product family		
BUS M30E2 tubular-style housing 	**Chemical-resistant and for up to 6 bar** Ultrasonic sensors measure fill levels without contact at normal pressure as well as in tanks and containers at up to 6 bar. Through the combination of switching and analog output, you can even conduct fill-level and overflow protection simultaneously. A PTFE membrane and the stainless steel housing protect the sensor from aggressive liquids. Custom software filters also enable use in containers which are filled from the top or through an agitator.	**Features** ■ Stainless steel housing for use in the food industry ■ PTFE membrane ■ Pressure rated to 6 bar positive pressure ■ Pressure sealed installation in a tank is possible ■ Measurement range from 30 mm to 1.3 m operating range, 5 m range limit ■ Switching outputs in PNP configuration ■ Analog output plus switching output for measurement that is proportional to distance with an additional limit value
BUS R06K block-style housing 	**Highest precision for a variety of critical applications** Small ultrasonic sensors in a block-style housing work with high resolution for the highest precision. Their many variations with switching output or current or voltage output in five operating sensing ranges predestines them for many application possibilities. They have the same shape as many optical sensors and therefore offer a good alternative for critical applications.	**Features** ■ Version with 250 Hz switching frequency and short response lag for detecting fast processes ■ Five sensing ranges with a measurement range from 20 mm to 1 m ■ Switching output in PNP or NPN ■ Analog output 4...20 mA or 0...10 V ■ Teach-in via a button ■ Focusing element for tricky measuring tasks (optional)
BUS Q62 block-style housing 	**Compact sensors with UL approval and IO-Link interface** These ultrasonic sensors have a compact PBT plastic housing with a surface of 62 × 62 mm. They meet all UL requirements and standards for the US and Canada. IO-Link variations are available.	**Features** ■ Compact housing dimensions (62.2 × 62.2 × 36.7 mm) ■ PBT plastic housing ■ 8 m limiting scanning range ■ 1 push/pull switching output or 2 PNP switching outputs ■ Analog output 4…20 mA and 0…10 V with automatic switching between current and voltage output ■ Teach-in via two buttons

Many series and form factors for the greatest flexibility – the classics for metalworking and automotive

MECHANICAL CAM SWITCHES

The cam switches from Balluff are used on machine tools, presses, in flexible manufacturing centers, robots, assembly and conveying devices and in machine and equipment construction. Here they serve as command transmitters for automatic controls, for positioning and for end-of-travel switching.

The design principle of the devices, their variety of possible switching actions as well as consistent quality inspection guarantee consistently high quality and reliability.

At Balluff you can choose from nine different series and five plunger types each: Chisel, ball, roller, roller bearing and chisel with wiper plate. A large number of connection varieties is also available.

Features

- Reliable and rugged, even in harsh environments
- Flawless functionality in the event of vibrations, shock loads, temperature swings, aggressive cooling lubricants and heavy chip accumulation
- Maintenance-free, self-lubricating ram guide with plain bearing bush
- High-quality Viton seals
- Protection class IP67
- Also available with inductive switching points

PRODUCT OVERVIEW

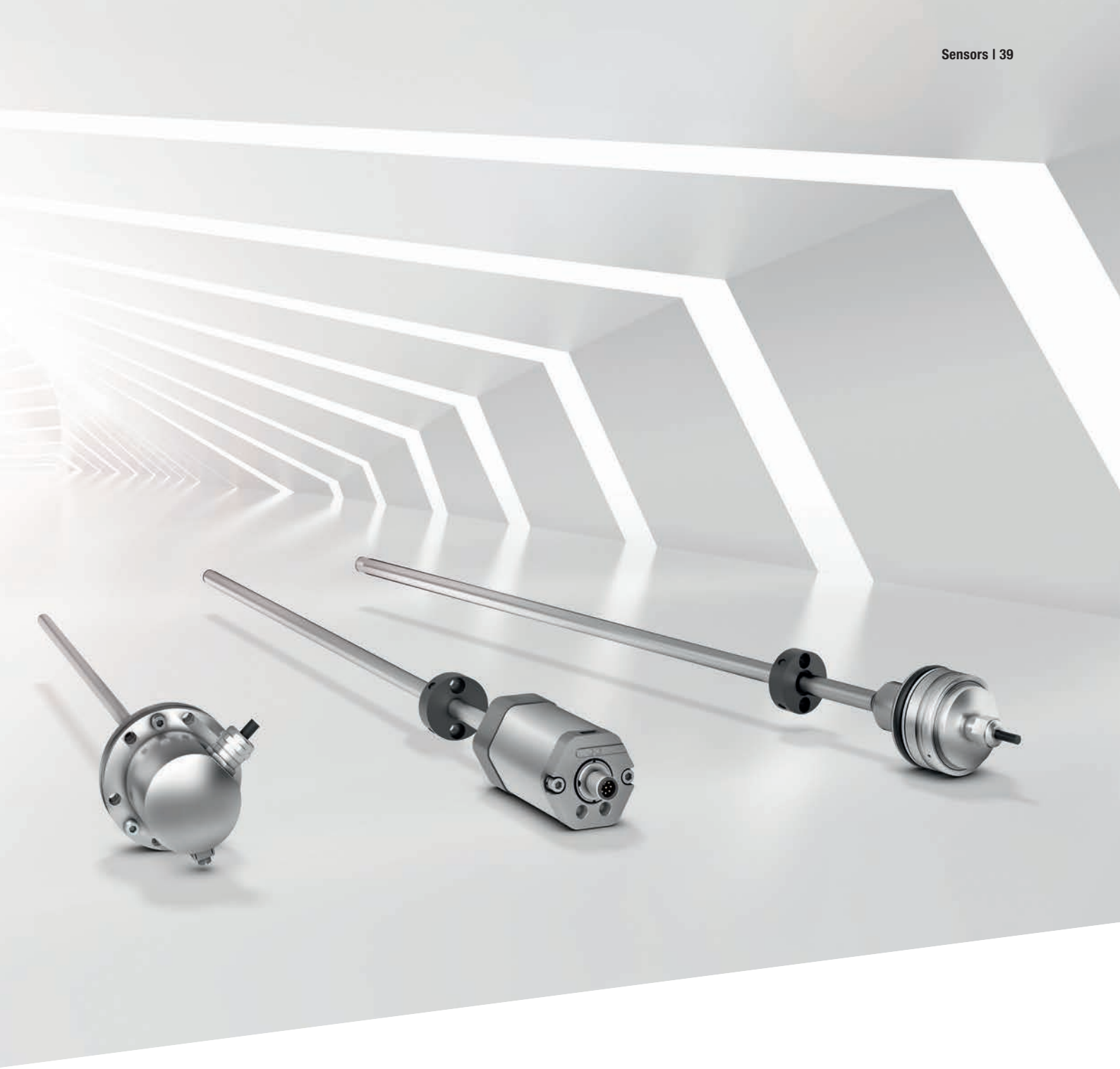
innovating automation

Product family		
BNS mechanical single- and multiple-position limit switches 	**Counter with rugged housing for extreme applications** In mechanical single- and multiple-position limit switches a telescoping plunger performs the switching action. With its help, a mechanical switching element is switched in a separate sealed chamber. This dual-chamber system with IP67 protection and a maintenance-free, self-lubricating plunger guide with slide bearing bushing guarantees long service life. Choosing the right plunger style for the application combined with our cams guarantees long service life.	**Features** **Standard series** ■ Robust housing for extreme applications ■ IO-Link adaptable ■ Optional: Function indicator **With positive opening** ■ Reliable switching even with welded contacts thanks to rigid plungers ■ Freely selectable number of switching points with positive opening **With interchangeable plunger unit** ■ Short service times thanks to simple assembly ■ Fast exchange of individual ram or the entire unit directly on the machine ■ Low repair costs, no wiring mistakes **Ultra-high temperature rated series** ■ Reliable at temperatures from –5…180 °C **With safety switch positions** ■ Safe positive opening even with welded contacts thanks to rigid plungers ■ Safety functions per DIN EN 60204-1/ VDE 0113 and DIN EN 60947-5-1
BNS inductive single- and multiple-position limit switches 	**Non-contact and wear-free operation** Inductive single- and multiple-position limit switches combine the advantages of an inductive sensor with those of our mechanical housing series: we use the same rugged housings as for the mechanical versions, a reliable inductive switching element carries out the switching function – without contact and wear-free. The compact form factor and generous switching distances are further advantages of this series.	**Features** **Standard series** ■ Standardized mounting dimensions ■ IP67: Resistant to aggressive cooling lubricants ■ LED function display for each switching point **Increased sensing distance and area monitoring for robots** ■ Extended switching distance of 4 mm, up to 12 mm switch position spacing ■ Area monitoring for robots: crossed wire short detection possible
BNS multiple position limit switches with mixed assembly 	**Mixed assemblies and individual solutions tailored for your requirements** For applications in which you need to meet varying demands the mixed assembly switches are ideal. Contact us if you need a multiple position limit switch with different plunger types, switching elements, plug connections or special wiring. Almost anything is possible.	**Features** ■ Different needs can be met ■ Individual solutions suited to your requirements

Product finder and more technical details:
www.balluff.com/go/**mechanical-cam-switches**

Reliable even over long stroke lengths and in harsh conditions

MAGNETOSTRICTIVE SENSORS



Magnetostrictive sensors come into use wherever high reliability and precision is demanded in position and speed measurement. Also over long stroke lengths.

Our contact-free and absolute measuring systems are suitable for all industry-standard interfaces for a wide range of applications. Even under extreme surrounding conditions, they guarantee a high machine and system availability.

Features

- Precise, absolute measurement without a reference run
- Contact-free, so wear- and maintenance-free
- Resistant to shock, vibration and contamination
- Hermetically sealed housing
- Highly dynamic control applications through synchronized measurement data
- High durability and long service life
- Flexible installation and handling

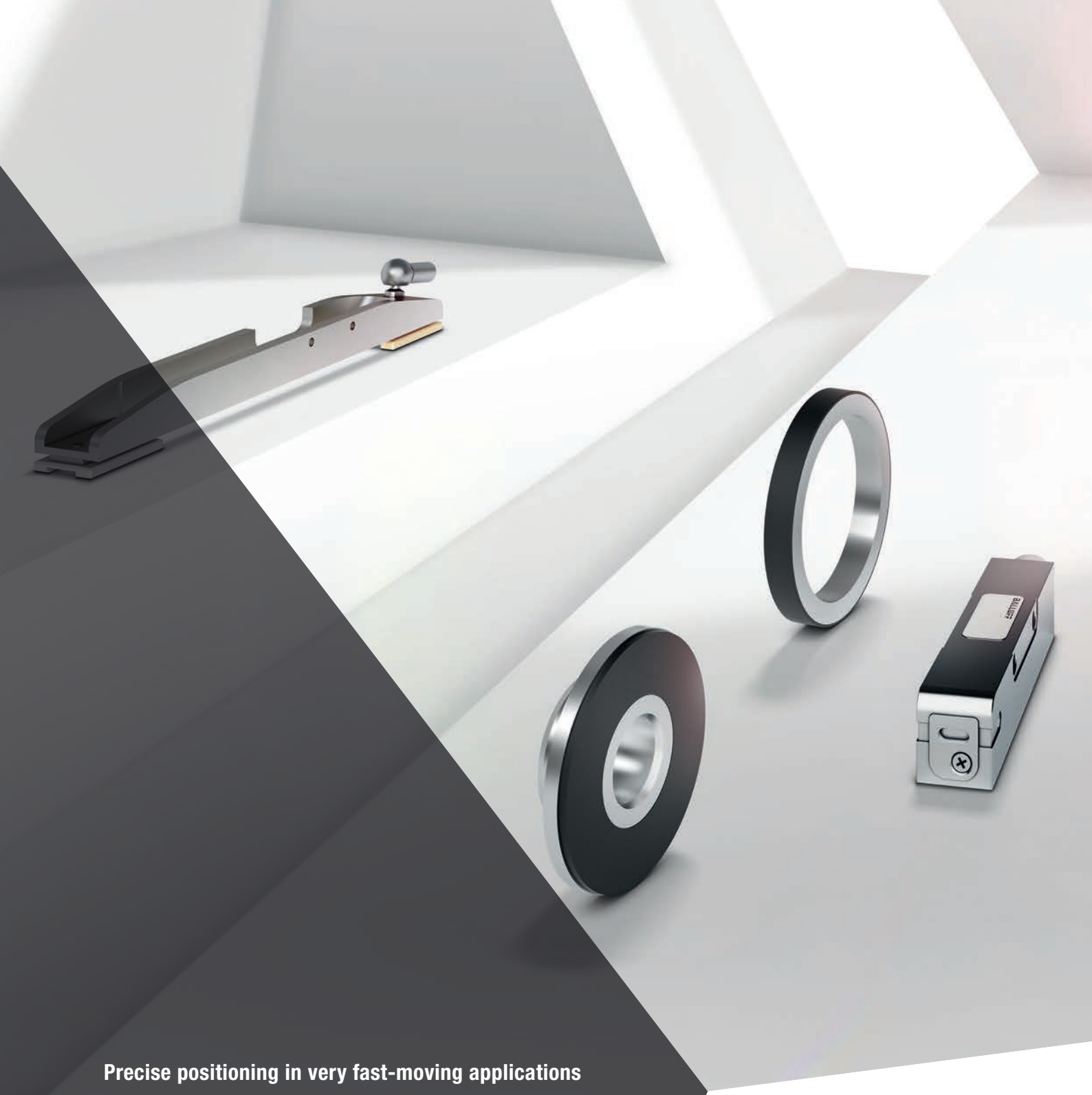
PRODUCT OVERVIEW

innovating automation

Product family		
BTL linear position sensors in profile design 	**Maximum flexibility with installation and use** These magnetostrictive linear position sensors with a profile design are contact-free and absolute measurement systems for the precise detection of one or more positions. They deliver convincing performance in harsh environments, for example in presses, injection molding machines or gantry robots, because they are made of a hermetically sealed IP67 aluminum housing. The magnets of the position encoder act on the measurement element through the wall of the aluminum profile.	**Features** ■ High resolution of up to 0.5 µm ■ Measuring lengths up to 7620 mm ■ Measures several positions and speeds at the same time ■ Contact-free, therefore wear-free – no downtimes, long service life ■ Easy system integration via a range of interfaces – e.g., IO-Link, Profinet, EtherCAT, SSI and analog ■ Programmable output signals – invert, configure and document the measuring range ■ Three housing variants for flexible and fast installation depending on the space requirements and application ■ Floating and captive encoders
BTL linear position sensors in rod design 	**Pressure-resistant measurement systems for a variety of cylinder applications** The most important application for our magnetostrictive linear position sensors in rod design is in hydraulic drive units. They are exceptionally well-suited for use in hydraulic cylinders for position feedback, for molding lines and rolling mills or in wind power applications. Because the sensors are installed in the pressure area of hydraulic cylinders, they must have the same pressure resistance as the cylinder itself. The measurement element is installed in a pressure-tight tube made of non-magnetic stainless steel. The flange seals the high pressure area using an O-ring. The electronics are integrated in a protective housing outside of the cylinder on the flange of the rod.	**Features** ■ High resolution of up to 1 µm ■ Measuring lengths up to 7620 mm ■ Measures several positions and speeds at the same time ■ Programmable output signals – invert, configure and document the measuring range ■ Flexible installation with various thread types ■ Contact-free, therefore wear-free – no downtimes, long service life ■ Expanded measuring possibilities with multi-magnet technology ■ Easy system integration via a range of interfaces – e.g., IO-Link, Profinet, EtherCAT, SSI and analog

Product family		
Rugged BTL linear position sensors 	**Cylinder feedback systems for the toughest environmental conditions** Whenever you need to measure with absolute precision, you can count on the rugged linear position sensors from Balluff. These systems are made completely of stainless steel and are designed in protection classes up to IP69K or for high pressure cylinder applications up to 1000 bar. This guarantees you the highest degree of reliability and precision, even under the most extreme ambient conditions.	**Features** ■ Rugged stainless steel housing ■ Exceptionally shock- and vibration-free ■ Extreme waterproofness, IP69K ■ Temperature range of –40 to +85 °C ■ High-pressure resistant rated to 1000 bar ■ Resolution of up to 1 µm ■ Measuring lengths up to 7620 mm ■ Contact-free and therefore wear-free – no down-times
Redundant BTL linear position sensors 	**Maximum system availability and safety, even in harsh environments** Our multiple redundant position measurement systems meet the highest requirements for security and availability, even in harsh environments, for example, when used in safety-relevant valves and hydraulic cylinders. They offer up to three independent measurement systems in the same housing and thereby ensure increased safety during operation. The different interfaces enable diverse redundancy.	**Features** ■ Double- or triple-redundancy design ■ Temperature range of –40 to +85 °C ■ Analog and digital interfaces ■ Flexibly adjustable measuring range and signal inversion via software ■ Settings can be copied to all three measurement channels ■ Durable thanks to rugged mechanical construction ■ Contact-free and therefore wear-free
BTL linear position sensors for explosive atmospheres 	**Pressure encapsulated linear position sensors for all Ex Zones** For use in Ex Zones 0 and 1 we offer pressure encapsulated rod styles with various performance profiles. Depending on the application, you can choose variants for areas with gas or dust hazards. Magnetostrictive sensors are also available for Zone 2. Rugged and pressure encapsulated versions with easily and quickly replaced electronic modules meet the specifications of the oil and gas industry for high reliability and simple service.	**Features** ■ Suitable for Zones 0, 1 and 2 ■ Measurement ranges up to 7620 mm ■ Absolute output signal with high resolution of up to 5 µm ■ Pressure-resistant to 600 bar ■ Range of interfaces available ■ Fast commissioning through characteristic curve adjustment ■ Many international certifications, such as IECEx, ATEX and CSA
BTL level measuring systems 	**High-precision fill level measurement for maximum hygiene standards and excellent filling results** The fill level sensor continuously performs precise measurements in applications in which exceptional hygiene is required. The measurement system is made of corrosion-free stainless steel. With a high surface quality and rounded edges, it meets the highest international hygiene standards for you to easily implement, for example, the strict requirements of the food industry.	**Features** ■ 100% stainless steel for unbeatable hygiene standards and a long service life ■ Safe for sterilization (SIP) and cleaning (CIP) ■ Continuous precise measurement in the µm range for excellent filling results ■ Reliable fill level values thanks to foam compensation system ■ International certificates such as 3-A Sanitary Standard, FDA and EHEDG ■ Tri-clamp mounting

Product finder and more technical details:
www.balluff.com/go/**magnetostrictive-sensors**



Precise positioning in very fast-moving applications

MAGNETIC ENCODERS

Balluff's magnetic encoders were developed for precise positioning and speed detection in very dynamic applications. The highly-precise, fast-response encoders are optionally equipped with magnetic linear or rotational measuring elements. They are appropriate for linear as well as rotational applications, for incremental or absolute position detection.

Their rugged design makes them ideal in extreme ambient conditions. They also ensure high up-time of your machines and equipment.

Features

- Contact-free and therefore wear-free
- Incremental or absolute interfaces
- High resolution to 1 µm
- Measurement lengths to 48 m
- Flexible installation and handling
- Long operational life, since very rugged

PRODUCT OVERVIEW

innovating automation

Product family		
BML absolute magnetic encoder for linear applications 	**Dynamic and precise positioning with high repeatability** Our absolute magnet linear encoders provide absolute position feedback in any location or orientation, even after loss of power supply and restarting the system.	**Features** ■ Best machine performance via quick and precise measured value determination with high repeatability ■ High system availability thanks to durably stable magnetic tape with Permagnet® technology ■ Long operational life through its rugged metal housing ■ Simple, quick installation with calibration software
BML absolute magnetic encoders for rotational applications 	**Highest-precision positional feedback for the most flexible use** Absolute magnetic encoders for rotary applications can be used immediately – with no homing move required. Our encoders also work with high accuracy on large diameters, are extremely compact and easy to integrate into motors.	**Features** ■ Energy saving through high precision and accuracy, low overall costs ■ High system availability thanks to durably stable magnetic tape with Permagnet® technology ■ Long operational life through its rugged metal housing ■ Simple, quick installation with calibration software

Product family		
BML incremental magnetic encoder for linear applications 	**Precise and flexible – for a broad spectrum of applications** The incremental linear magnetic encoders can be used for a broad spectrum of uses and for almost every measurement length. For example, the sensors assure precise positioning in energy production, in the beverage industry and in many other sectors where precise positioning is demanded. Using standardized digital and analog interfaces, our encoders can be integrated into almost all controllers.	**Features** ■ Best machine performance via quick and precise measured value determination with high repeatability ■ High system availability thanks to durably stable magnetic tape with Permagnet® technology ■ Long operational life through its rugged metal or plastic housing
BML incremental magnetic encoder for rotational applications 	**Precise positioning and speed control of rotating axles and shafts** Our incremental rotary magnetic encoders are used for precise positioning and speed control of rotating axles and shafts. We offer the appropriate sensor for almost every shaft diameter. Using standardized digital and analog interfaces, our encoders can be integrated into almost all controllers and also provide the proper drive in torque motors.	**Features** ■ Lower process and inventory costs through flexible use of the measuring element in a circular segment ■ Low total costs ■ High system availability thanks to durably stable magnetic tape with Permagnet® technology ■ Long operational life through its rugged metal or plastic housing ■ Saves space with optimum ease of integration

Product finder and more technical details:
www.balluff.com/go/**magnetic-encoders**

Precise deviation measurement for numerous industries

INCLINATION SENSORS

Many applications require precise position control as well as continuous tracking and monitoring of rotary movement. Inclination sensors from Balluff measure the deviation from horizontal or vertical axes up to 360°. The sensors are available with two different measuring principles, making them ideal for numerous industries and applications.

Features

- Contactless and absolute
- Capacitive measuring principle and MEMS
- Direct inclination measurement without costly special constructions
- Interfaces: 4…20 mA, 0…10 V and Modbus
- Appropriate for use in harsh conditions with high protection class IP67
- Measuring range up to 360°
- Simple mounting and integration in your facility
- For use in many industries: factory automation, energy, hydraulics, packaging, plastics, rubber, tires, life sciences

PRODUCT OVERVIEW

innovating automation

Product family		
Fluid-based BSI inclination sensors 	**360° high precision – so that nothing gets out of balance** Our fluid-based inclination sensors are perfectly suited for optimum process control. They measure with an extremely high precision from 0.1° and allow deviation from the horizontal on an axis of up to 360°. The sensor's fluid-based measuring cells have, among others, four capacitors and are filled with a special fluid as the dielectric. The inclination is determined by the degree of coverage of the capacitor plates through the fluid.	**Features** ■ Measurement of deviation from horizontal along an axis up to 360° ■ Outstanding resolution for precise angle measurement ■ High precision from 0.1° ■ Modbus and 4…20 mA interface available ■ High repeat accuracy and precision ■ Extremely low temperature drift ■ Expanded temperature range from –40…+85 °C ■ Robust and compact metal housing ■ Simple mounting – four mounting holes in the housing
MEMS-based BSI inclination sensors 	**Measure two axes with only one sensor** Our MEMS-based inclination sensors measure the inclination with the help of a MEMS chip. These compact chips include micro-electromechanical structures which move under the effect of gravity according to the inclination. The sensor output is comprised of two components: the inclination component (static) and the acceleration component (dynamic). Using this principle, our sensors continuously detect rotational movements in one axis and take the machine component position in two axes, as well. In comparison with fluid-based inclination measurement, vibrations have less influence on the sensors. The result is optimum precision for your tasks.	**Features** ■ UL and CE approval ■ Interfaces: 4…20 mA, 0…10 V ■ Measure two axes with just one sensor ■ Large selection of different measurement ranges ■ Centering function (calibration) for ease of installation ■ Two versions for different requirements ■ The compact configuration saves space ■ Maintenance-free operation

Product finder and more technical details:
www.balluff.com/go/**inclination-sensors**

Compact and convenient measurement and monitoring

PRESSURE SENSORS

Our high-end pressure sensors are optimally suited for pressure monitoring and pressure measurement of gaseous, fluid and viscous media. With their rotatable housing and the simple, VDMA-compliant programming, they can be flexibly mounted as well as conveniently serviced. The bright LED display always gives you an overview of the current system pressure.

Features

- Compact and rugged as a transmitter
- Convenient to operate, with a very legible display
- Pressure range –1…600 bar
- Process connection G½", G½", R¼", NPT¼"
- Flush with the front surface in G½" and Tri-Clamp 1½"
- Output 4…20 mA, 0...10 V,
  switching points (NPN/PNP) and IO-Link
- Fluid temperature –40…+125 °C
- Enclosure rating IP67
- UL approval
- Compact with M12 connection
- Stainless steel or PVDF process connection
- Dual rotation – easily installed
- Pressure values directly via IO-Link

PRODUCT OVERVIEW

innovating automation

Product family		
BSP pressure sensors and BSP pressure transmitters with IO-Link interface 	**Direct pressure monitoring in production on-site** Process media such as coolants and lubricants, hydraulic fluids and pneumatics can be monitored conveniently and precisely using our pressure sensors. IO-Link continuously provides you with all the key measurement values and diagnostics information and sends them to the controller. The transmitters are parameterized via IO-Link. This means they can be located where the action is happening, in the best position for measurements and perfectly matched to the machine design. IO-Link pressure transmitters guarantee fast and precise results, save cost and reduce the maintenance effort immensely.	**Features** ■ Convenient with a very legible display ■ Compact and rugged as a transmitter ■ Pressure range –1…600 bar ■ Measuring principle: relative pressure ■ Stainless steel or PVDF process connection, G¼", G½", R1/4", NPT¼" ■ Flush with the front surface in G½" and Tri-Clamp 1½" ■ Output as IO-Link or in SIO mode ■ Additional analog output or switching point (NPN/PNP) ■ Pressure value and switching points directly settable via IO-Link ■ Fluid temperature –40…+125 °C ■ Ceramic or stainless steel measuring cell ■ UL approval
BSP pressure transmitters without display 	**Compact and rugged thanks to a stainless steel housing** The BSP pressure transmitters without display are easy to install as well as extremely compact and rugged with stainless steel housing.	**Features** ■ Pressure range –1…600 bar ■ Measuring principle: relative pressure ■ Process connection G¼", G½", R¼", NPT¼" ■ Front flush with Tri-Clamp 1½" ■ M12 connection ■ Output 4…20 mA, 0...10 V or IO-Link with switching output (NPN/PNP) ■ Output 4…20 mA as a two-conductor system ■ Expanded temperature range (fluid temperature –40…+125 °C) ■ Ceramic or stainless steel measuring cell ■ Extended input voltage range 8…32 V DC ■ UL approval

Product family		
BSP pressure sensors with display 	**Convenient installation, clear information** Pressure transmitters with a display are especially convenient to read. The compact housing design can be rotated two ways, making it simple to install. The orientation can be adjusted for overhead installation. Parameter setting is according to the VDMA standard.	**Features** ■ Pressure range –1…600 bar ■ Measuring principle: relative pressure ■ M12 connection, independently rotational ■ Stainless steel or PVDF process connection, G¼", G½", NPT¼" ■ Output 4…20 mA, 0…10 V, switching outputs (NPN/PNP) ■ Switching point and analog output combined ■ IO-Link interface or operation in SIO mode ■ Expanded temperature range (fluid temperature –40…+125 °C) ■ Ceramic or stainless steel measuring cell ■ UL approval
BSP front flush-mounted pressure sensors 	**High-end sensors** Front flush-mounted pressure sensors are ideally suited for pressure measurement in viscous, paste-like, crystallizing or solids-containing media. For example, with glues, greases, sealing compounds or frequently changed media. With their flush-mounted, welded stainless steel membrane, the sensors have no dead spaces and are particularly easy to clean.	**Features** ■ Convenient with a very legible display ■ Compact and rugged as a transmitter ■ Pressure range –1…400 bar ■ Process connection in high-end stainless steel G½" or Tri-Clamp 1½" ■ IP67 or IP69K ■ Output 4…20 mA, 0...10 V, switching points (NPN/PNP) and IO-Link ■ Pressure values directly via IO-Link ■ Expanded temperature range (fluid temperature –40…+125 °C) ■ UL approved, material test certification 3.1 (EN10204)

Reliably detect and measure hot objects

TEMPERATURE SENSORS

With our non-contact infrared temperature sensors you can monitor high temperatures without contact even in inaccessible or hazardous areas. They detect hot – even moving – objects and reliably measure temperature values.

Features

- Rugged M30 stainless steel housing with IP67 protection
- Temperature range 250…1250 °C
- Numerous functions and settings using the IO-Link interface

PRODUCT OVERVIEW

innovating automation

Product family		
BTS infrared temperature sensors with IO-Link 	**The cool way to detect hot objects** Infrared temperature sensors from Balluff monitor temperatures from 250...1250 °C. They feature a multi-function display and automatic display orientation for convenient handling. The IO-Link interface allows parameterizing of the sensor remotely, e.g., by the host controller or from the control panel. A variety of setting possibilities and functions opens up a wide range of applications – for example, in foundries, forges, steelworks or in the ceramics industry.	**Features** ■ Temperature range 250…1250 °C ■ Non-contact – does not touch the object ■ Reliably detect even moving objects ■ Option with 4...20 mA interface available

Product finder and more technical details:
www.balluff.com/go/**temperature-sensors**

Automatic identification and tracking in production

RFID – RADIO FREQUENCY IDENTIFICATION.

innovating automation

Our BIS industrial RFID systems help to give you the overview in a modern production facility. Objects can be automatically identified and traced using RFID. To do this, a data carrier that functions as a memory is attached to the object to be identified. The data are transferred between data carrier and read/write head and via the processor unit to the controller.

Balluff offers a broad selection of innovative products for the low frequency (LF), high frequency (HF) and ultra-high frequency (UHF) range. With the BIS V frequency-independent processor unit, all systems can be flexibly combined with each other.

Your Balluff solutions

- RFID system HF (13.56 MHz) BIS M
- RFID system LF (70/455 kHz) BIS C
- RFID system LF (125 kHz) BIS L
- RFID system UHF (860/960 MHz) BIS U


BALLUFF
BIS0045
BIS M-111-02/L
BALLUFF
BIS VM
BALLUFF
BIS M
122-01/A
Power
MS
NS
L1
A1
L2
A2
CP
BALLUFF
BIS M
Identification Systems
EtherNet/IP™
Power
Port 1
Port 2

High transmission speed for large volumes of data

RFID SYSTEM HF (13.56 MHZ) BIS M

The RFID system BIS M supports global ISO standards and scores with a high transmission speed for large volumes of data. Through various combination options of data carriers and read/write heads, the system can be used for a variety of applications. The system is ideal, for example, in close-range parts tracking or for applications in production control such as palletizing or recording data on the workpiece.

Features

- 4-pin standard wiring and IO-Link components
- In combination with passive data carriers of average ranges up to a max. of 400 mm
- Seamless integration in applications through global RFID standards ISO 15693 and ISO 14443A
- All bus systems commonly used on a global basis available
- Easy, fast commissioning
- Balluff high-speed components (up to eight times faster than ISO 15693)
- Customer-specific developments
- A variety of accessories for an easy integration available at all places of use

PRODUCT OVERVIEW

innovating automation

Product family		
BIS V processor unit 	**Reliable data exchange with the controller** With our BIS V RFID processor unit, you can simultaneously use up to four read/write heads. This unit processes multiple frequencies at the same time to enable mixed operation. Different processor units are no longer necessary, thereby simplifying inventory management. For an industry-independent use, the processor unit is available with all globally standard bus systems.	**Features** ■ Perfect EMC due to the robust zinc die-cast housing ■ All connections are easily accessible from the front ■ Variable mounting concept for installation on DIN rails or extrusions ■ Integrated IO-Link master port for the connection of IO-Link-capable sensors and actuators ■ Web server for status monitoring ■ Function modules for many different controller manufacturers ■ Integrated 2-port Ethernet switch for line and ring topology ■ USB interface for rapid commissioning without bus link ■ Read/write head configurable independent of interface with PC-based software tool BIS Cockpit ■ Power supply via rugged 7/8" plug for harsh industrial environments
BIS M read/write heads and antennas 	**Data carrier communication partners** Application-specific read/write heads from Balluff in industrial-grade design enable easy integration in your system. They support the global standard ISO 15693 and in part ISO 14443A. Thanks to a rugged housing with protection class IP67, they are also suitable for use in harsh environments. Their range depends on the combination of read/write head and data carrier that is used. RFID heads with IO-Link interface are also available. These address applications in which – with little data – production progress, batch number or quality data must be economically logged.	**Features** ■ Easy startup, minimal down-times: status indicators directly on the read/write head ■ Up to four read/write heads can be connected to the BIS V processor units ■ Connection via M12 plug connectors, cable length 50 m ■ Read/write heads for flush installation in metal ■ M12 designs with integrated antenna ■ Special read/write heads, for example, for transfer systems for simple assembly without additional mounting brackets ■ HF loop antennas for long ranges up to 400 mm ■ Customized designs possible ■ Tool ID components available in the same design as the BIS C read/write heads

Product family		
BIS M data carriers 	**Information directly available on the object** Data carriers accompany the workpieces through the entire production process. In this context, they are in part exposed to extreme conditions from high temperatures, metal enclosure and environmental influences. Our data carriers withstand such environments with no questions asked. The wide product range from Balluff offers you the right product for virtually any requirement.	**Features** ■ Passive data carriers: The data and the required energy are inductively coupled by the read/write head ■ All data carriers have a unique identification number (Unique ID) ■ Can be used all over the world thanks to ISO 15693 conformity ■ EEPROM data carrier, up to 992 byte memory ■ FRAM data carrier with up to 128 kB for almost unlimited feed cycles ■ Attachment by adhesion or screws ■ High level of protection up to IP68/69K ■ A wide variety of properties, such as installation on metal, high temperature, etc. ■ For time-critical applications: High-speed components, up to eight times faster than ISO 15693 ■ Special key data carriers for transfer systems that are read/write on two sides ■ Databolts are easy to attach to the object and can then be quickly detached
BIS M handheld device 	**Comfortably record data using a handheld** Our handheld devices are designed for BIS M data carriers. They are outstandingly suited for use in the manual quality testing or for the documentation of the maintenance procedure. They reliably detect all data even in poor lighting conditions as well as in harsh environments. The data is transmitted via WLAN, Bluetooth or cable-connected USB port. The handheld devices are modularly expandable with 1D or 2D barcode readers.	**Features** ■ Windows CE® V6.0 operating system ■ Various antenna designs available ■ Range depends on antenna variant ■ Includes charging adapter and stylus ■ Base device is the powerful Zebra Workabout Pro 4 Mobile Computer ■ Pre-installed Balluff software ■ Touchscreen with large color display ■ Optional: Docking station and pistol grip ■ Customer-specific software on request
BIS M read/write heads with integrated processor unit 	**Everything in one housing** Read/write heads with integrated processor unit are the mediators between data carrier and PC or the controller. Benefit to you: because antenna, electronics and interface are located in one housing, an additional processor unit is eliminated. In addition, easy integration saves on installation expense. Variants with separate electronics are also suitable for tight installation conditions and provide leeway during the installation.	**Features** ■ Available interfaces: Serial RS232, RS485/Subnet 16, RS422, USB ■ New also with bus interface: Connect All-in-One RFID Reader BIS M-4008 direct to Profinet ■ Reliable use in harsh environments: rugged IP67 housing ■ Status displays directly on the housing of the reader facilitate the commissioning and minimize down times

Product finder and more technical details:
www.balluff.com/go/**HF-BIS-M**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Tool identification even at short ranges

RFID SYSTEM LF (70/455 KHZ) BIS C

Especially high-performing and flexible are the BIS C low-frequency RFID systems with reliable tool identification in coolant- and lubricant-heavy machining centers. Exact positioning is not always necessary: Many data carriers can be dynamically read and described in passing.

The LF RFID system (70/455 kHz) is also the first choice for tool identification over short ranges. Other areas of use are tool transport with conveyor systems, FTS and pallet transport systems as well as assembly technology and resource organization.

Features

- Great variety of data carriers and read/write heads for very diverse applications and difficult operating conditions
- Wear-free, maintenance-free and insensitive to dirt
- High noise immunity and assured data transfer with special checking software in the processor units
- All bus systems commonly used on a global basis available
- Memory capacity up to 8 kB

PRODUCT OVERVIEW

innovating automation

Product family		
BIS V processor unit 	**Compact processor unit for all frequencies** With our BIS V RFID processor unit, you can simultaneously use up to four read/write heads. This unit processes multiple frequencies at the same time to enable mixed operation. Different processor units are no longer necessary, thereby simplifying inventory management. For an industry-independent use, the processor unit is available with all globally standard bus systems.	**Features** ■ Perfect EMC due to the robust zinc die-cast housing ■ All connections are easily accessible from the front ■ Variable mounting concept for installation on DIN rails or extrusions ■ Integrated IO-Link master port for the connection of IO-Link-capable sensors and actuators ■ Web server for status monitoring ■ Function modules for many different controller manufacturers ■ Integrated 2-port Ethernet switch for line and ring topology ■ USB interface for rapid commissioning without bus link ■ Read/write heads configurable independent of interface with PC-based software tool BIS Cockpit ■ Power supply via rugged 7/8" plug for harsh industrial environments
BIS C read/write heads and antennas 	**Read/write heads for multiple applications** Our application-specific read/write heads in industrial-grade design enable easy integration in the system. Depending on the need, various versions with cable or plug connection are available. The read/write range depends on the combination of read/write head and data carrier that is used. This is additionally influenced by the operating mode (static versus dynamic), the assembly material and the open zone for metal.	**Features** ■ Special tool ID read/write heads in Ø 14.5 mm or M16 for flush installation in metal ■ Robust housing in IP67 ■ Cable available in 1 m, 5 m and 10 m (cannot be trimmed) ■ BCC0FCK connection cable required for connection to the BIS V processor unit ■ Individual customer designs possible

Product family		
BIS C data carriers 	**Information directly on the object – even in harsh environments** Data carriers accompany the workpieces through the entire production process. Here they may be exposed to extreme conditions such as high temperatures, metal enclosure or environmental influences. Balluff data carriers handle this easily: They are insensitive to interference in metallic surroundings, high-performing in a refrigerant- and lubricant-heavy environments and suitable for use in de-ionized water in an autoclave and in a vacuum.	**Features** ■ EEPROM data carriers with 511, 1023, 2047 byte memory capacity ■ FRAM data carriers with 8 kB for practically unlimited read/write cycles ■ Installation: Glue-on or screws ■ 10 mm Tool-ID data carrier: Millions in use, the global standard ■ Corner data carrier with double coils avoids pallet rotations in the pallet identification ■ Data carriers can be programmed to your specifications
BIS C handheld device 	**Reliable even in poor lighting and under harsh conditions** Our read/write devices are ideally suited for mobile reading and writing of BIS C data carriers. They are used with manual quality control or in the documentation of maintenance procedures. The data is transmitted via WLAN, Bluetooth or cable-connected USB port. The handheld devices are expandable with 1D or 2D barcode readers.	**Features** ■ Windows CE® V6.0 operating system ■ Various antenna designs available ■ Range depends on antenna variant ■ Includes charging adapter and stylus ■ Base device is the powerful Zebra Workabout Pro 4 Mobile Computer ■ Pre-installed Balluff software ■ Touchscreen with large color display ■ Optional: Docking station and pistol grip ■ Customer-specific software on request
BIS C data couplers 	**Contactless bridging of air interfaces** Data couplers from Balluff ensure a maximum degree of flexibility. They securely transmit the data via two air interfaces. In so doing, they handle the contactless bridging of the two transitions instead of a fixed data transmission. Our data couplers are used wherever a double mechanical interface is indispensable, for example, with rotary tables, replaceable workpiece holders or gripper arms.	**Features** ■ Data couplers work like an extension cable ■ Maintenance-free transmission without mechanical wear ■ Fast and secure signal transmission ■ Cable lengths 1 m, 2 m and 5 m ■ Easy wiring of rotary tables, exchangeable punch heads, ■ Increase in function queries, even in previously inaccessible places
BIS C Read heads with integrated processor unit 	**Everything in one housing** Our read heads with an integrated processor unit combine antenna, electronics and interface in one housing. For quick and easy data carrier programming, you can use the free PC software BIS Cockpit. It is also possible to program the data carrier via a processor unit with a serial connection and Balluff 007 protocol.	**Features** ■ The simplest read-only system for uncomplicated applications ■ Makes available the 8-bit information in parallel without additional components ■ 3 bytes per value are always used starting with address 0 ■ The remaining bytes on the data carriers are also usable for other purposes (with the corresponding processor units)

Product finder and more technical details:
www.balluff.com/go/**LF-BIS-C**

Cost-effective solution for simple identification tasks

RFID-SYSTEM LF (125 KHZ) BIS L

Our low-frequency RFID systems BIS L are suitable for applications that involve just the identification and require less data processing. For example, often only a (read-only) code is required for tracing. The 125-kHz systems function reliably up to ranges of 100 mm and are relatively neutral with respect to materials such as water, textiles, wood and aluminum.

Features

- Data carrier memory limited to 192 bytes
- For sending smaller quantities of data
- Wide range of data carriers
- Unique ID with 5 bytes, read-only
- Read-only data carriers available (protection against manipulation)

PRODUCT OVERVIEW

innovating automation

Product family		
BIS V processor unit 	**One processor unit for up to four read/write heads** With our BIS V RFID processor unit, you can simultaneously use up to four read/write heads. This unit processes multiple frequencies at the same time to enable mixed operation. Different processor units are no longer necessary, thereby simplifying inventory management. For an industry-independent use, the processor unit is available with all globally standard bus systems.	**Features** ■ Perfect EMC due to the robust zinc die-cast housing ■ All connections are easily accessible from the front ■ Variable mounting concept for installation on DIN rails or extrusions ■ Integrated IO-Link master port for the connection of IO-Link-capable sensors and actuators ■ Web server for status monitoring ■ Function modules for many different controller manufacturers ■ Integrated 2-port Ethernet switch for line and ring topology ■ USB interface for rapid commissioning without bus link ■ Read/write heads configurable independent of interface with PC-based software tool BIS Cockpit ■ Power supply via rugged 7/8" plug for harsh industrial environments
BIS L read/write heads and antennas 	**Data carrier communication partners** Our application-specific read/write heads in industrial-grade design enable easy integration in the system. Up to four read/write heads can be connected to BIS V processor units. Especially small read heads in the M12 or M18 size with separated evaluation electronics are available for constricted spaces. Moreover, Balluff offers read heads with IO-Link interface. They are often used if only detection (read-only) is required for the backtracing.	**Features** ■ Robust housing in protection type IP67 ensures reliable use in a raw environment ■ Range depends on the combination of read/write head and data carrier that is used (see data sheet for the respective read/write head) ■ Connection via M12 plug connectors, cable length 50 m ■ Flat design available

Product family		
BIS L data carriers 	**Availability of the information directly on the object** Data carriers accompany the workpieces through the entire production process. If you need a large number of tags for the realization of your application, LF data carriers from Balluff are an economical and reliable choice. Data carriers with read-only functionality prevent manipulation and ensure high data security.	**Features** ■ Round data carriers in various sizes: Ø 12.4 mm, Ø 20 mm, Ø 30 mm, Ø 50 mm ■ Chemically resistant glass data carriers ■ Data carriers for read only (3 or 5 bytes) or read/write with 192 bytes ■ Installation: Glue-on or screws ■ Two versions of read-only data carriers available: with a 5-byte fixed Unique ID or custom programmed with 3 bytes of data to your specification
BIS L data couplers 	**Secure data transmission via air interfaces** Data couplers from Balluff ensure a maximum degree of flexibility. They securely transmit the data via two air interfaces. In so doing, they handle the contactless bridging of the two transitions instead of a fixed data transmission. Our data couplers are used wherever a double mechanical interface is indispensable, for example, with rotary tables, interchangeable workpiece holders or gripper arms.	**Features** ■ Maintenance-free transmission without mechanical wear ■ Fast and secure signal transmission ■ Various cable lengths: 1 m, 2 m and 5 m
BIS L handheld device 	**Mobile data recording – simple and comfortable** Our handhelds are outstandingly suited for mobile reading and writing of BIS L data carriers. They are used with manual quality control or in the documentation of the maintenance procedure. And they are absolutely precise and reliable even under poor lighting conditions and harsh environments. The data is transmitted via WLAN, Bluetooth or cable-connected USB port. All handhelds from Balluff can be modularly expanded with 1D or 2D barcode readers.	**Features** ■ Windows CE® V6.0 operating system ■ Various antenna designs available ■ Range depends on antenna variant ■ Includes charging adapter and stylus ■ Base device is the powerful Zebra Workabout Pro 4 Mobile Computer ■ Pre-installed Balluff software ■ Touchscreen with large color display ■ Optional: Docking station and pistol grip ■ Customer-specific software on request
BIS L read heads with integrated processor unit 	**Reading and evaluation with a device** Our read heads with an integrated processor unit combine antenna, electronics and interface in one housing. Easy installation saves time and money. Versions for tight mounting conditions. Read heads with separate electronics create leeway for the installation. The rugged housing in IP67 ensures reliable use in a harsh environment.	**Features** ■ Available interfaces: Parallel and serial (RS232, RS422) ■ Additional processor unit eliminated ■ Status displays directly on the housing facilitate commissioning and minimize down times

Product finder and more technical details:
www.balluff.com/go/**LF-BIS-L**

Continuous transmission security and data transparency

RFID SYSTEM UHF (860/960 MHZ) BIS U

The BIS U UHF systems from Balluff ensure data transparency and traceability of your automation processes. UHF is a standard technology for identification solutions covering all processes. They help to achieve fast detection of tag information and continuous transmission security. By querying decentrally stored product- and process-data, UHF is a central component of traceability applications. Our UHF BIS U systems thereby provide permanent data transparency in your entire delivery chain.

Features

- Problem-free integration in applications via globally used standard interfaces
- Corresponds to the global standard ISO 18000-6C and EPC Gen2 Class1
- Flexible use due to a wide range of different combinations of data carriers and antennas
- Ranges up to 6 m and more
- Bulk capture for simultaneous scanning of many data carriers (tags)
- Suitable for attachment to traditional control systems via bus interfaces and higher level IT systems
- Complete tailored system solutions realizable
- Many accessories for integration into a variety of applications

PRODUCT OVERVIEW

innovating automation

Product family		
BIS V processor unit 	**Easily and reliably collect, process, and forward data** With our BIS V RFID processor unit, you can simultaneously use up to four read/write heads. This unit processes multiple frequencies at the same time to enable mixed operation. Different processor units are no longer necessary, thereby simplifying inventory management. For an industry-independent use, the processor unit is available with all globally standard bus systems.	**Features** ■ Ranges up to 6 m and more ■ Perfect EMC due to the robust zinc die-cast housing ■ All connections are easily accessible from the front ■ LCD display and pushbuttons for simple startup ■ Different versions certified for country-specific use ■ With integrated IO-Link master port ■ Web server for convenient remote condition monitoring ■ Function modules available for many common controller manufacturers ■ USB interface for rapid commissioning without bus link
BIS U read/write heads and antennas 	**Communication via the air interface** Our read/write heads are scalable and allow flexible configuration and realization of your identification task, for example, with conveyor lines or gates. Different versions are available for different ranges and applications. The range here depends on the combination of read/write head or antenna and data carrier that is used and on the configuration of the processor unit.	**Features** ■ Variants for frequency ranges EU (865...868 MHz) and US (902...928 MHz) ■ Rugged housings up to IP67 ensure reliable use in harsh environments ■ Status LEDs directly on the read/write head ■ Startup and configuration in seconds with Auto-Setup function ■ Connection via coax cables or M12 connectors ■ Data carriers can be detected in practically orientation ■ Read ranges up to 6 m and more possible ■ Read/write head and antennas mountable directly on metal

Product family		
BIS U data carrier 	**Reliably readable tags for harsh environments** Data carriers or tags, mark the object to be identified and furnish it with additional information. This means they store the product, process and quality data to provide reliable information about the product life cycle. Our modern data carriers withstand high temperatures, humidity, chemical substances and are still reliably detectable even in metallic surroundings. In contrast to barcodes, RFID tags are also readable without optical line of sight and are resistant to soiling.	**Features** ■ All data carriers have a unique, unalterable identification number (TID) and an individually programmable EPC (Electronic Product Code) ■ Global standards ISO 18000-6C or EPC Gen2 Class1 ■ Freely describable user memory range up to 112 bytes ■ Installation: Glue-on, potted-in, or screws ■ Variants for direct mounting on metal ■ Very cost-beneficial self-adhesive Smart Labels available for one-time applications (for remaining on the product) ■ Mass applications via low-cost tags also realizable ■ Special silicone-free data carriers for the automobile industry ■ Special tags, temperature-resistant up to 220°C ■ Custom-tailored versions possible
BIS U handheld device 	**Quickly and comfortable record data using a handheld device** Our handhelds are conceived for the mobile reading and writing of BIS U data carriers. They are used with manual quality control or in the documentation of the maintenance procedure. The data is transmitted via WLAN, Bluetooth or cable-connected USB port. All handheld devices from Balluff are modular for adding 1D or 2D barcode readers and are absolutely reliable even in poor lighting conditions and harsh environments.	**Features** ■ Windows CE® V5.0 operating system ■ Includes charging adapter and stylus ■ Pre-installed demo software ■ Ideal under poor lighting conditions and in harsh environments ■ Touchscreen with large color display ■ Docking station and pistol grip for ergonomic working ■ Customer-specific software on request

Product finder and more technical details:
www.balluff.com/go/**UHF-BIS-U**

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 error, check the 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

Quality assurance with industrial grade image processing

MACHINE VISION

Machine Vision from Balluff ensures quality and flexibility in modern production facilities. Through the use of industrial image processing they provide reliable defect detection and thereby ensure exact quality control. All functions of the sensors can be flexibly combined.

Features

- High cost-effectiveness and potential for cost reduction
- Less scrap thanks to early defect detection
- High system up-time when changing batches

PRODUCT OVERVIEW

innovating automation

Product family		
BVS-E Standard vision sensor 	**Globally proven solutions for controlling, positioning and monitoring** With our standard series of vision sensors, you control the quantity of your production process in a cost-conscious and precise manner. You can use a total of seven testing tools that can be employed independently of each other and simultaneously check multiple product features. Up to twenty storable inspections can easily be activated via the PLC. This supports continuous production even with changing workpieces. The Standard vision sensor is suitable for simple tasks in error detection.	**Features** ■ Cost savings using one vision sensor for multiple tasks ■ Early defect detection ensures the highest quality ■ Fast format changing through simple switching of inspection functions
BVS E Advanced vision sensor 	**Reliable monitoring of product quality** Advanced vision sensors efficiently and reliably monitor your production process. The identified position of the objects and the detected process data are output via Ethernet TCP/IP interface. The rapid processing of data and the combination of individual test results ensure a precise and reliable monitoring of the product quality. The wide application range for a single vision sensor saves real money. This is because a vision sensor simultaneously handles multiple inspection tasks.	**Features** ■ Quality control also on parts with random rotational position ■ Simple changing of the inspection task for changing lots means high system availability

Product family		
BVS-E Universal vision sensor 	**An all-rounder with a wide range of applications** The versatile Universal vision sensors feature especially high-performance, contour-based image processing tools. They localize, inspect and count parts in any rotational orientation. The sensor can transfer the part orientation and position via the interface. The Universal vision sensor reads bar and data matrix codes especially quickly and precisely. It reliably checks up to 40 codes per second.	**Features** ■ Checking of part orientation or position reduces expenses in part management ■ Quality control also on parts with random rotational position ■ Simple changing of the inspection task for changing lots means high system availability
BVS E Infrared vision sensor 	**Greater security and precision through infrared light** Fluctuating light conditions can impair the checking reliability of common vision sensors. At the same time, employees are often irritated by their flashing light. BVS E vision sensors provide the solution: the infrared light is invisible to humans. Simultaneously, its firmly integrated light filter prevents ambient light from influencing the testing of the objects. This contributes to greater process security.	**Features** ■ Spurious ambient light is blocked ■ No disturbance of employees ■ Light intensity 10% higher than comparable red light sensors
BVS SC SmartCamera 	**Traceability and quality control – simple and flexible** Our easy-to-operate SmartCamera from Balluff has all the functions needed for visual traceability and quality control tasks. It reliably identifies objects by code. And it reads 1D, 2D and stacked or directly marked codes just like plain text (OCR). Production objects are reliably found and checked in the process. And the results are forwarded via standardized industry interfaces to higher-level systems. With the SmartCamera you can directly control IO-Link devices.	**Features** ■ Smart data management for limiting the load on Profinet ■ Simple integration into the production environment through IO-Link ■ Secure, customer-specific result management for the controller or for the server ■ Robust, industrial-grade design

Secure identification and decoding of objects

OPTICAL IDENTIFICATION

Optical identification via 1D and 2D barcodes is an established way of identifying components and objects and flawlessly managing systems and processes. Our broad range of offerings in this area includes stationary barcode readers, mobile handheld readers and accessories for standard and industrial grade applications.

Features

- Reliable traceability of products and assembly
- Application areas: controlling supply processes (e.g., Kanban system), production control, optical tool identification
- Simple startup

PRODUCT OVERVIEW

innovating automation

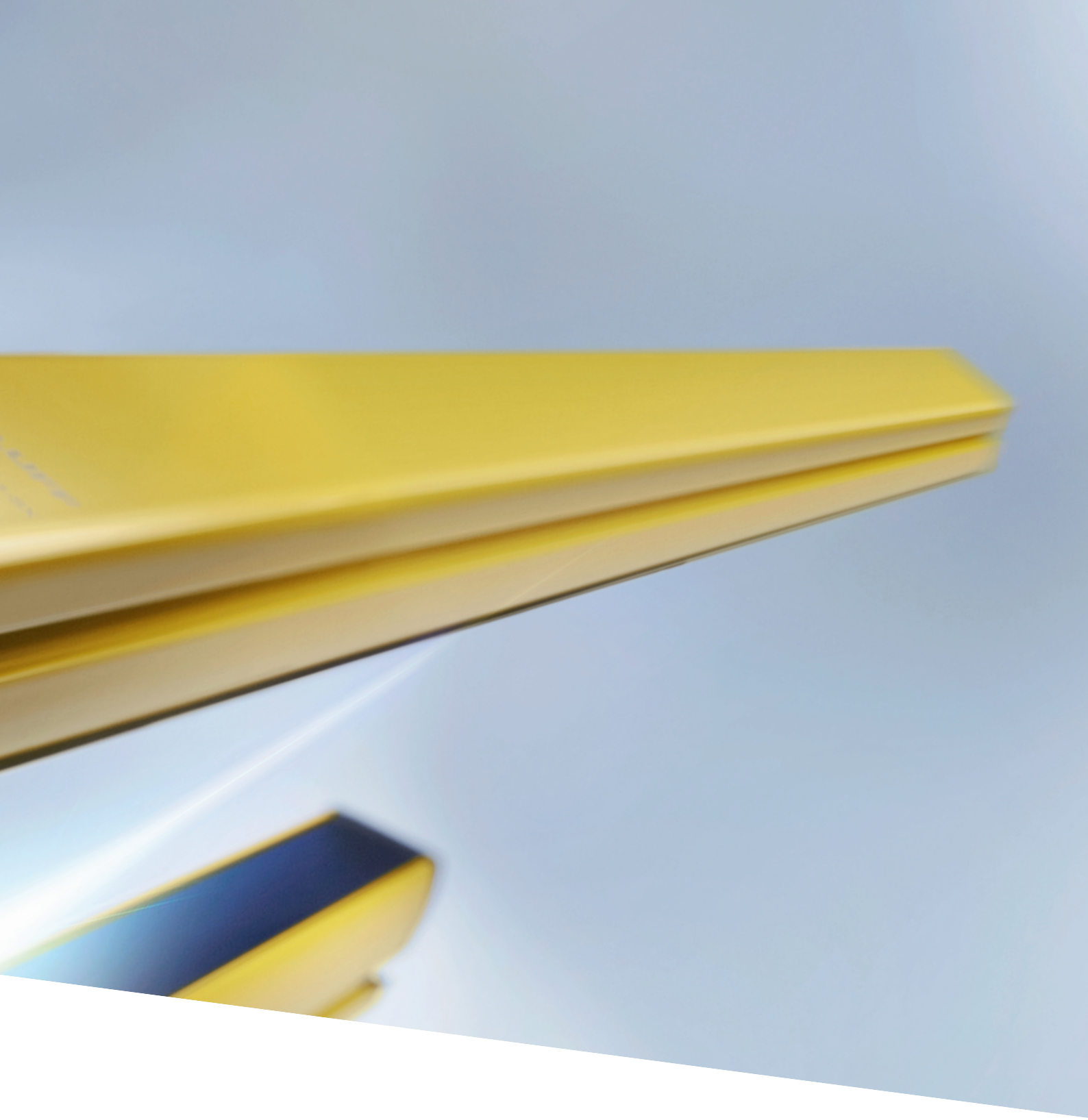
Product family		
BVS-E Identification vision sensor 	**Reliable identification in the compact housing** The Identification vision sensor uniquely identifies your products. It reliably reads 1D or 2D codes and stacked codes – up to 40 times a second. In this it makes no difference whether the codes were adhered with a label, printed on, lasered or directly marked. Nor are position deviations a problem for the sensor. In addition you can use the vision sensor to check ISO standard Sensor Identification Codes or verify texts and number sequences, such as in monitoring expiration dates.	**Features** ■ Simple, self-explanatory operation ■ Simultaneously and securely read multiple codes ■ Easy linking to PLC via RS232 and Ethernet interface ■ Compact design ■ Different optics available ■ Optionally available with built-in red or infrared light source
BVS HS-P handheld barcode readers 	**Industrial grade handhelds with outstanding reading performance** These handheld barcode readers read all standard 1D, 2D and stacked barcodes from documents, plastic labels, circuit boards and metal parts. The readers are robust and combine maximum reading performance with user friendliness. The reader offers IP65 protection and also withstands multiple falls onto concrete from up to 2 meters. This means they can be reliably used in industry, logistics and inventory control. The wireless versions with Bluetooth provide users with maximum freedom of movement. This is because reliable data transmission is possible in a surrounding area of up to 100 m around the base station.	**Features** ■ Reliable read confirmation via acoustic signal, 2 green LEDs and projection of a green LED spot on the code that has been read ■ Intuitive aiming system using a highly visible laser marking frame ■ Charge once – up to 30,000 read cycles using lithium ion rechargeable battery ■ Work without fatigue thanks to low weight and ergonomic shape ■ High-Density versions read high-resolution codes (up to 2.5 mil for 1D) as well as large areas (up to A4) ■ Maximum read ranges up to 110 cm

Product family		
BVS HS-Q handheld barcode readers 	**Handheld readers for versatile use in the warehouse and in logistics** The handheld readers in this series read all standard 1D, 2D and stacked barcodes as well as postal codes in every rotary position up to 40° tilt and while moving. Reading under more difficult conditions – such as displays and against a slightly reflective background – does not present any difficulties for them. The readers are suitable for reading codes on documents or code labels and offer maximum read ranges of 40 cm. The ergonomic shape and maximum 200 g weight eliminate fatigue and are easy on the user's hands.	**Features** ■ Automatic adaptation to different read situations ■ Reliable read confirmation via a green LED and an acoustic signal as well as projection of a green LED spot on the code that has been read ■ Intuitive aiming system with highly visible blue LED marking
SmartCamera BCS SC 	**Traceability and quality control with easy, flexible operation** Our easy-to-operate SmartCamera from Balluff has all the functions needed for visual traceability and quality control tasks. It reliably identifies by code and reads 1D, 2D and stacked or directly marked codes just like plain text (OCR). The results are forwarded via standardized industry interfaces to higher-level systems. The SmartCamera is also equipped with functions for integrated test creation as well as inspection views and statistics. The SmartCamera allows direct control of IO-Link devices. Another plus: you can create any test plan for using the camera more flexibly.	**Features** ■ Smart data management for limiting the load on Profinet ■ Simple integration into the production environment through IO-Link ■ Secure, customer-specific result management for the controller or for the server ■ Rugged, industrial-grade design

Safety with Balluff quality

SAFETY

innovating automation



Automation requires safety. And safety is based on reliability. The Balluff safety concept consists of products and solutions that fulfill their tasks over the course of years with the same reliability and precision. With Safety over IO-Link from Balluff you enjoy the proven benefits of IO-Link now for the safety of people and equipment as well. By linking automation technology and safety technology, you get full machine security in one system, because IO-Link communicates down to the last meter and provides both sensor/actuator details as well as safety information.

Your Balluff solutions

- Safety I/O module
- Protective devices

Safe signal acquisition and communication over IO-Link

SAFETY I/O MODULE

To increase the efficiency of safety concepts and integrate them into the control system, we have developed the Balluff Safety Hub – the first integrated solution using IO-Link.

This new safety I/O module is simply linked to the IO-Link master. Since the system is open all the way to the sensor level, you can connect nearly any safety device. The safety I/O module from Balluff is simple to integrate, has fast response and can replace the control cabinet.

Features

- Safety was never so easy, now with IO-Link
- An infrastructure for automation and safety technology
- Simple to integrate
- Can be connected to virtually any device
- Safe communication with Profisafe over Profinet

PRODUCT OVERVIEW

innovating automation

Product family		
BNI safety I/O Module 	**Automation and safety technology using IO-Link for the first time** The new safety I/O module combines automation and safety technology using IO-Link for the first time. With Safety over IO-Link, you get the best of both worlds. And the integration of safety technology becomes easier than ever before. Parameters are configured centrally using the controller. Safety-related information is sent directly through the master to the controller. Using Profisafe over Profinet guarantees secure communication with the controller.	**Features** ■ Infrastructure for automation and safety technology up to PLe / SIL3 via IO-Link ■ Low maintenance costs in case of service thanks to comprehensive diagnostics and easy device replacement ■ Cost savings thanks to uniform M12 single-ended cordsets ■ Fewer IP addresses necessary ■ Standardized wiring concept, reliable guard locking devices can be connected directly ■ Nearly any safety device can be connected

Product finder and more technical details:
www.balluff.com/go/**safety**

Safety for man and machine

PROTECTIVE DEVICES

Our safety concept includes many products and components that help you to minimize the risks to persons and production equipment. They are easy to integrate into your control system: our safety light barriers detect fingers, hands or other body areas and stop hazardous machine movements. Safety switches with a separate actuator secure access to hazardous areas. The E-Stop device initiates an immediate stop command when needed as a supplementary safety measure.

Features

- Reliable personal safety using photoelectric securing of hazardous locations
- Machine and personnel protection using rugged, reliable interlock and guard devices
- Safe shutdown ensured by E-Stop with high protection rating

PRODUCT OVERVIEW

innovating automation

Product family		
BLG safety light curtains 	**Photoelectric danger zone protection for detecting people** Safety light curtains are photoelectric, non-contact guard devices. They detect fingers, hands and other body parts and are used in work areas where machines present potential hazards. They stop hazardous movements in these areas.	**Features** ■ Better use of space by saving on protective fence designs ■ Fast interaction between human and machine ■ High level of manipulation protection ■ Safety parameters: PLe / SIL3 ■ Defined safety zone with protective infrared field ■ Hazardous movements are stopped reliably
BID safety switches 	**Rugged and reliable locking and guard locking devices** Safety switches with separate actuator offer both personnel and machine protection. Together with a machine control system and a protective barrier, they safeguard access to the hazardous areas. You can use our safety switches without guard locking, with mechanical guard locking or with electrical guard locking – completely according to your requirements.	**Features** ■ Sturdy metal housing with status display ■ Rotatable actuator head with two insertion openings ■ Plug-in M12 connection ■ Guard locking device available with either open circuit principle or bias current principle ■ High holding forces of up to 2500 N ■ Option of switch with or without a mechanical lock or an electric lock
BAM emergency stop device 	**Emergency stop device in compact housing for easy installation on various machines and systems** The emergency stop function must be available at all times for an automated system. As a supplementary protective measure, the emergency stop device initiates an immediate stop command whenever necessary. Therefore, it can be used for personal protection functions. The device must be visible and easily accessible at any time to permit a stoppage in the event of an emergency.	**Features** ■ Reliable disconnection of the power supply ■ Positive opening operation per IEC 60947-5-1 ■ Pluggable connection with M12 (5-pin) ■ Turn-to-release mushroom pushbutton ■ High degree of protection against dust and water ■ Compact housing, easy installation

Product finder and more technical details:
www.balluff.com/go/**safety**

Reliable information exchange across all levels

INDUSTRIAL NETWORKING.

innovating automation

The 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 if high protection ratings, robustness, use at high temperatures or special interfaces and connections for maximum security are needed.

With an intelligent combination of high-performance industrial networking technology and the IO-Link communication standard, Balluff makes flexible and smooth communication possible in the greatest variety of applications.

Your Balluff solutions

- Network blocks
- I/O blocks
- Network switches
- Memory modules
- Inductive couplers

Extraordinary parameter setting and diagnostics capabilities

NETWORK BLOCKS

Balluff has developed a new generation of network blocks for perfect linking of sensors and actuators. The system features highly versatile parameter setting and diagnostics possibilities that can be carried out via display, LEDs and an integrated Web server.

The status LEDs on the modules are large, bright and easy to read and interpret. This saves you time in setup, maintenance or troubleshooting. With an output current of up to 2 A, the Balluff network blocks are capable of driving almost any load. Each output also offers overload protection with LED indicator and a memory feature for easy troubleshooting and the rugged, full-jacket enclosure also withstands high mechanical loads.

Features

- High performance in all networks
- Faster, simpler connection
- Reliable even in harsh environments, shock and vibration resistant
- IP67 design and rugged full-jacket enclosure
- Integrated Web server
- Line topology construction

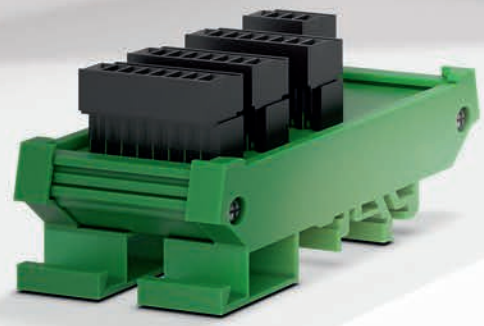
PRODUCT OVERVIEW

innovating automation

Product family		
Profinet 	**Fast, economical and robust for industrial automation** With Profinet, you directly link drives and safety technology to the network environment. The system, which is Ethernet-based, is significantly faster than Profibus, but can readily be combined with it. The same applies to connections with IO-Link. This will save you time and money. And it will ensure improved process quality through connectivity. Profinet can be integrated consistently from the control level to the drive. Even in harsh environments.	**Features** ■ Freedom of installation ■ Simple wiring ■ Full diagnostics and centralized parameter setting with IO-Link
Profibus 	**Efficient field land process communication** Balluff offers a wide range of components for optimal Profibus use. Regardless of the controller manufacturer, you will find the optimum solution in our range of products. Profit from more efficient field and process communication, simple wiring, direct installation in your equipment and the possibility of rapid reconfiguration. Even in harsh environments. Another plus: Our Profibus solutions are IO-Link capable.	**Features** ■ Thorough diagnostics: no system failures ■ Centralized parameter setting: systems quickly go back to being operational ■ Time and cost savings ■ Simplified system expansion and greater investment security through IEC 61158/EN 50170 standardization
CC-Link IE/Field 	**Highly functional and practical modules** Especially for automation requirements in the Asian region, Balluff has been able to link communication on the machine and equipment level with sensor/actuator communication: CC-Link IE/Field modules for the equipment level on one hand and direct linking with the sensor/actuator level on the other. For perfect linking of I/O systems to the open, deterministic high-speed network CC-Link IE/Field there are highly functional and practical fieldbus modules available.	**Features** ■ Display, LEDs and integrated SLMP access (Seamless Message Protocol) for diagnostics and configuration

Product family		
CC-Link 	**High-performance control topologies** CC-Link is a standardized fieldbus designed to integrate the most diverse automation components of a wide range of providers. CC-Link is already the principle fieldbus technology used in Asia. CC-Link is an effective integral system that will absolutely meet your requirements. Utilize our extensive, high-quality CC-Link portfolio to implement your own powerful control topologies using products from a single source.	**Features** ■ Powerful diagnostic system for clear identification of problem areas ■ Constant data throughput, even when processing large data volumes ■ Reliable real-time control ■ Controls are programmable via a network ■ Network stations can be switched on and off during operation ■ Network stations can be restored automatically
Ethernet/IP 	**For high system performance** High efficiency is only feasible with an optimized network. For your high-performance system, we offer a comprehensive Ethernet/IP program. Ethernet/IP is a globally recognized standard for network technology and has replaced DeviceNet in many areas. The technology based on Ethernet is significantly faster and enables the integration of drive technology. Our Ethernet/IP modules also score points with their high operator-friendliness.	**Features** ■ Time- and cost-saving: fast installation and simple integration into existing networks ■ Easy module replacement through innovative address plug ■ Lock and protect IP addresses – for greater security and simpler maintenance
DeviceNet 	**Optimal components for efficient DeviceNet use** Balluff offers the entire range of high-performance networking technology. We can provide all modules required for efficient DeviceNet applications in the USA. Regardless of the controller manufacturer, you can choose from our portfolio based on your needs and utilize a comprehensive and sophisticated networking and connectivity program. You can thus choose an efficient field and process combination and save both time and money.	**Features** ■ Simple installation, fast integration, fast modification ■ Regardless of the controller manufacturer
EtherCAT 	**Powerful technology for full flexibility** EtherCAT provides full flexibility: from free topology selection to the possibility of connecting and disconnecting devices and segments during operation, to the performance redundancy of the ring topology. The technology is suitable for both centralized and decentralized architectures. It supports master/slave, master/master and slave/slave communication.	**Features** ■ Outstanding performance at low cost ■ Flexible topology and ease of handling ■ Supports up to 65535 slaves located at up to 100 m from each other ■ International standard since 2007

Product finder and more technical details:
www.balluff.com/go/**network-blocks**



**Reliable signal transmission,
even under extreme conditions**

I/O BLOCKS

I/O blocks from Balluff connect binary and analog sensors and actuators to the control level via a bus. By using our modules you can significantly reduce the number of cables required. The Balluff I/O blocks also offer additional functions for signal preprocessing and expanded diagnostic options. Various form factors and connection technologies provide solutions for the widest range of requirements even under extreme ambient conditions.

Features

- Simple to install
- Efficient configuration
- Continuous diagnostics
- Individual solutions through a variety of designs and connection techniques
- Suitable for use under extreme conditions

PRODUCT OVERVIEW

innovating automation

Product family		
BNI sensor/actuator hubs with IO-Link, plastic 	**For high efficiency** Our sensor hubs are an especially efficient way to expand your machine installation. You can conveniently connect standard sensors using 8 or 16 standard inputs. Each input can be programmed as normally closed or normally open using a parameter set. This adds significant flexibility to your installation. Communication with the IO-Link master takes place in COM2 mode (38.4 kbaud) on the standard 3-conductor cable. And gives you a complete process image in as little as 2 ms.	**Features** ■ Many variations: M8 or M12 connection, 3-pin, 4-pin and analog or configurable, with 8 or 16 standard inputs, IP67 protection ■ IP20 sensor/actuator hubs for installation in control cabinets, with screw terminals
BNI sensor/actuator hubs with IO-Link, metal 	**Ideal for use in harsh environments** These I/O blocks in rugged housing are ideal for use in industrial environments. They are easy and economical to install. The port-specific single-channel monitoring detects short circuit and overload as well as a cable break at the port. This selective diagnostic makes the I/O blocks unique. Other versions combine two modules: with a maximum sensor load current of 500 mA and up to 2 A on the output, they are ideal for applications with high current demand hydraulic valves.	**Features** ■ Robust housing ■ Powerful inputs ■ Powerful outputs ■ Extended temperature range

Product family		
BNI IO-Link valve interface 	**Simply connect decentralized valve terminals** Our valve interfaces also offer the advantages of IO-Link. Now it is utterly simple to connect decentralized valve terminals and the control level.	**Features** ■ Direct plug-in to the valve terminal ■ Compact adapter housing for minimal space requirement ■ Compatible with pin assignments of various valve terminals ■ Optimized wiring by connection at the control level using standard 3-/4-wire sensor cable ■ Controls up to 24 solenoids
BNI universal IO-Link connection 	**Unlimited possibilities** All devices are open to IO-Link with up to 16 in/outputs via the universal IO-Link interface. Connect pumps, signal lights, control panels, valve terminals, switching units, transfer units, etc. to the control level. The module offers the fast IO-Link connection through the standard sensor cable and an open-ended cable. This integrates up to 16 in/outputs into the controller environment.	**Features** ■ Compact adapter housing for direct connection to different devices via IO-Link ■ Universal, fieldbus-neutral ■ Linking to the control level using standard sensor cable ■ Variants available with 8 or 16 input/output signals ■ No cumbersome multiple cabling ■ Saves space, time and money through the lean cabling concept

Product finder and more technical details:
www.balluff.com/go/**io-blocks**

System solutions for an efficient network design

NETWORK SWITCHES

Ethernet-based network systems are increasingly gaining significance in industrial automation.
To enable you to easily link all Ethernet system components with Ethernet, with Balluff you receive a complete system. We offer you a multiplicity of Ethernet-based systems and network components for machine and system outfitting – for example, Profinet and Ethernet/IP. This means: optimum infrastructure for complex networks.

Features

- Variety of Ethernet-based systems and network components
- Complete system for linking Ethernet system components with Ethernet

PRODUCT OVERVIEW

innovating automation

Product family		
BNI unmanaged switches 	**Precise recognition of all angles and corners** With our unmanaged switches, 5-port and 8-port Ethernet devices can be star-connected on a component. The unmanaged switches satisfy both protection classes IP67 and IP20 and support the 10 and 100 Mbit/s transfer rates.	**Features** ■ Transfer speed automatically adjustable via Auto-Negotiation function ■ Wiring errors eliminated by Auto-crossing function

Product finder and more technical details:
www.balluff.com/go/**switches**

Important parameters for optimized processes

MEMORY MODULES

Our memory modules have a built-in data storage memory and thereby fulfill the function of a removable data carrier. Many parameters can be logged and saved on the IO-Link memory module: from the operating data of a tool through the histogram of the temperature level during operation and of the required power level to the number of tool cycles and error messages in the tool.

Features

- Built-in data carrier
- Logging and saving many different parameters
- More efficient maintenance/repair, since supplementary information is available

PRODUCT OVERVIEW

innovating automation

Product family		
BNI memory modules 	**The built-in data memory** Many parameters can be logged and saved on our memory modules. This provides you not only with operating data but also additional information for maintenance or repair.	**Features** ■ Logging and saving many different parameters ■ More efficient maintenance/repairs, since supplemental information is available from data storage

Product finder and more technical details:
www.balluff.com/go/**memory-modules**

Efficient communication without wear

INDUCTIVE COUPLERS

Fixed wiring of sensors and actuators comes with drawbacks: cable and contacts are often severely loaded in automation, and cables can fatigue and break. In the worst case this can result in a machine failure. Our inductive coupler BIC transmit data and power contactlessly across an air gap. Thus no mechanical wear is produced. The system availability is higher, the cycle times are shorter, the sequences are more flexible. The units can quickly be disconnected, are easy to handle and maintenance-free enabling you to meet new demands quickly.

Features

- No mechanical wear
- Higher system availability, shorter cycle times, more flexible sequences
- Quickly disconnectable, easy to handle, maintenance free

PRODUCT OVERVIEW

innovating automation

Product family		
BIC inductive couplers for IO-Link signal transmission 	**Transparent, contactless data exchange between master and device** With inductive couplers, power and data are transferred contactlessly across an air gap. This renders mechanical plug-in contacts superfluous. If our bidirectional coupling system is used with IO-Link, the data can also be transmitted in both directions. Contact-free signal transmission using the IO-Link Standard is transparently structured and requires no parameter setting. You can very easily integrate the coupler between IO-Link master and IO-Link device and communicate immediately. Events, parameter data and process data are directly exchanged between master and device.	**Features** ■ Simultaneous control of actuators and gathering of sensor signals ■ AUX power for actuators can be switched on and off ■ No configuration needed – simple installation via Plug and Work ■ IO-Link functionality up to the device ■ Flexible process data length

Product family		
BIC inductive couplers for signal transmission 	**Reliably transmit signals in both directions** Our BIC inductive coupler system is designed for up to eight sensor signals and eight actuator drive signals. The system is bi-directional and transmits signals in both directions. Its remote unit can drive on an individual basis and operate clamping units. Up to eight signals can be transferred from the base. Drive four channels independently of each other.	**Features** ■ Send signals in both directions ■ Remote unit drives individually and operates clamping units ■ Transfer up to eight signals ■ Drive four channels independently of each other
BIC inductive couplers for power supply 	**Contactless power transmission guarantees fast format change** Fast gripper changes are critical on robots for high productivity. Plug contacts often make those changes difficult. Our inductive couplers transmit power contactlessly across an air gap. Mechanical plug contacts are therefore superfluous. This ensures freedom from wear, guarantees prompt tool change and provides great flexibility.	**Features** ■ Wear-free – contactless power transmission across an air gap ■ Prompt tool change ■ High flexibility

Product finder and more technical details:
www.balluff.com/go/**inductive-couplers**

Standardized and tailor-made connection components

CONNECTIVITY.

innovating automation

At Balluff, you get everything from a single source including a comprehensive range of connectivity components for every area of automation from a variety of materials, for various requirements and applications. Connectors and double-ended cordsets from Balluff are available for high temperatures up to 180 °C and for low temperatures down to –40 °C. Designs with Ecolab approval or in IP69K are especially suitable for sensitive fields such as the food industry. All products are suited for rugged use in the industrial environment. Common to all are simple installation and rapid integration for fast startup.

Your Balluff solutions

- Single-ended cordsets
- Double-ended cordsets
- Field attachables
- Bulk cables
- Junction blocks

Reliable transmission of signals, data and power

SINGLE-ENDED CORDSETS

In our comprehensive product range of single-ended cordsets for every industry, you are guaranteed to find the right connection for your application. Signals, data and power are always reliably transmitted. We also offer various cable types and connectors for great flexibility in making your selection.

Features

- Large selection for every industry
- Various cable types, various plug connectors
- Robust and industrial grade

PRODUCT OVERVIEW

innovating automation

Product family		
BCC single-ended cordsets for individual requirements 	**High performance at high temperatures** Our offering of single-ended cordsets covers a wide range of technical areas, guaranteeing that we will meet your individual requirements. The single-ended cordsets with coated retainer nuts and special plug materials withstand temperatures of up to 800 °C for brief periods. This also makes them suitable for use in harsh industrial environments. The mechanical protection of the lines guarantees secure connection even in the presence of flying sparks and metal spatter, and when subject to mechanical wear and impacts.	**Features** ■ Suitable for high temperatures (up to 800 °C for brief periods) ■ Protection against mechanical influences, flying sparks and metal spatter ■ Coated retainer nuts ■ Special plug materials
BCC single-ended cordsets for the food industry 	**High-quality single-ended cordsets – optimized for the food industry** Our single-ended cordsets are exceptionally well-suited for the requirements of the food industry. This is because they were intensively tested and optimized for the highest demands. They are best matched to our sensors and systems used in the food industry.	**Features** ■ Best suited for use in the food and beverage sector ■ Straight and angled connectors ■ Various cable-sheathing materials ■ Proven PUR cable qualities ■ Protection type IP69K ■ Stainless steel nuts ■ For high hygiene requirements
BCC single-ended cordsets for junction blocks 	**Wide product range for high flexibility of application** At Balluff you find the right single-ended cordsets for junction blocks in M12 and M23. 8-, 12- or 19-pin versions are available, with PUR or PVC cables, angled or straight plugs. All lines are resistant to shocks and vibration, conform to the protection type IP67 and are made of high-quality materials.	**Features** ■ Resistant to shocks and vibration ■ High-quality materials ■ Protection class IP67

Product family		
BCC power single-ended cordsets 	**7/8“ power cables for Profinet modules** Balluff offers you a wide product range of 7/8" power single-ended cordsets for push-pull connections. You have the choice between lines for 3-, 4- and 5-wire cables, in PUR, PVC or TPE, with angled or straight plugs. All power single-ended cordsets are resistant to shocks and vibration, conform to the protection type IP67, are made of high-quality materials and are flexible in application.	**Features** ■ Resistant to shocks and vibration ■ High-quality materials ■ Protection class IP67
BCC plug connectors for Profinet push-pull modules 	**For optimized data transmission** Our double-ended cordsets for the new push-pull variants of the Profinet modules are especially fast and easy to assemble. For your data transmission, you have the choice between copper and fiber optic lines. All available double-ended cordsets deliver convincing performance with a large transmission bandwidth and a high length range. In this way, your data-intensive applications from power supply to data transmission are optimized.	**Features** ■ Wide transmission bandwidth ■ High longitudinal range ■ Resistant to shocks and vibration ■ Protection class IP67 ■ Fast and easy mounting
BCC single-ended cordsets for sensors 	**Wide, flexibly applicable product range for connecting your sensors** Our M5, M8 and M12 single-ended cordsets are used for connecting your sensors. We have 3-, 4-, 5- and 8-conductor cable to choose from. Whether PUR, PVC, or TPE, with or without LED, angled or straight – our wide product range offers great flexibility with your applications. All single-ended cordsets are resistant to shocks and vibration, are made of high-quality materials, have bright LEDs and conform to the protection type IP67 (optionally IP68).	**Features** ■ PUR, PVC and TPE cable ■ Versions with and without LEDs ■ Angled and straight versions ■ With socket and plug ■ Resistant to shocks and vibration ■ High-quality materials ■ Bright LEDs ■ Protection type IP67, optional IP68
BCC valve connector single-ended cordsets 	**Easy assembly for secure connection** Our valve connector single-ended cordsets can be mounted especially quickly via their central screw. Our large product range includes various designs, DIN and industry standard, and various protective circuits. All our single-ended cordsets are resistant to shocks and vibration, are made of high quality materials and have bright LEDs. A sealing lip is integrated.	**Features** ■ Different protective circuits ■ Designs A, B and C ■ DIN and industry standard available ■ Resistant to shocks and vibration ■ High-quality materials ■ Bright LEDs ■ Fast installation with one central screw ■ Integrated sealing lip

Product finder and more technical details:
www.balluff.com/go/**single-ended-cordsets**

Safe and reliable transmission with rugged cables

DOUBLE-ENDED CORDSETS

With our robust double-ended cordsets, signals, data and power are transmitted continuously and securely in every industry and in every application. At Balluff you can choose from various cable types and connectors.

Features

- Always the right connection for your application
- Various cable types, various plug connectors
- Reliably transmit signals, data and power
- Robust and industrial grade

PRODUCT OVERVIEW

innovating automation

Product family		
BCC fieldbus double-ended cordsets 	**Certified bus cables for common fieldbus systems** At Balluff you will find certified fieldbus double-ended cordsets for connecting to all common fieldbus systems: Profibus, Profinet, Devicenet, Ethernet, CC-Link. For maximum flexibility, we offer injection-molded and assembled, as well as straight and angled plug connectors. Various cable sheathing materials and drag-chain compatible versions round out our extensive product range.	**Features** ■ Certified bus lines ■ Suitable for all standard commercially available fieldbus systems ■ Injection-molded and assembled plugs ■ Straight and angled connectors ■ Various cable-sheathing materials ■ Cable-carrier-suitable versions
BCC double-ended cordsets for individual requirements 	**Specially developed for high temperatures and hard environments** In our wide portfolio of double-ended cordsets, you will certainly find the right product for your individual requirements. Our double-ended cordsets, are resistant to mechanical wear and impacts and can withstand up to 800 °C for brief periods. High temperatures, flying sparks and metal spatters, such as in welding applications are no problem for them.	**Features** ■ Best suited for welding applications ■ Reliable also at high temperatures (up to 800° for brief periods), when there are flying sparks and metal spatters ■ Rugged resistance to mechanical effects, wear and impacts ■ Coated retainer nuts ■ Special plug materials
BCC couble-ended cordsets for the food industry 	**High-quality double-ended cordsets – optimized for the food industry** Our double-ended cordsets are exceptionally well-suited for the requirements of the food industry. This is because they were intensively tested and optimized for the highest demands. Thus, they are best matched to our sensors and systems used in the food industry.	**Features** ■ Best suited for use in the food and beverage sector ■ Straight and angled connectors available ■ In various cable sheath materials ■ Protection class IP69K ■ Stainless steel nuts ■ For high hygiene requirements

Product family		
BCC double-ended cordsets for junction blocks 	**Robust lines in different versions** Our PUR- and PVC-double-ended cordsets for junction blocks are suitable for M12 and M23 plugs in 8-, 12- or 19-pin versions. We offer angled and straight variants. They are all shock-resistant and vibration-resistant, are made of high-quality materials and conform to protection type IP67.	**Features** ■ 8-, 12-, 19-pin ■ PUR and PVC ■ Angled and straight variants ■ Resistant to shocks and vibration ■ High-quality materials ■ Protection class IP67
BCC power double-ended cordsets 	**Extra power for 7/8"- and push-pull connections** We have a wide product range of power double-ended cordsets 7/8"- and push-pull connections. Here you can select among 3-, 4- and 5-wire PUR, PVC and TPE cables – in angled or straight versions. All power double-ended cordsets from Balluff are shock-resistant and vibration-resistant, made of high-quality materials and conform to protection type IP67.	**Features** ■ Suitable for 7/8"- and push-pull connections ■ 3-, 4- or 5-wire ■ PUR, PVC and TPE lines available ■ Angled and straight versions ■ Resistant to shocks and vibration ■ High-quality materials ■ Protection class IP67
BCC double-ended cordsets for Profinet configurable blocks 	**Wide transmission bandwidth and length range** Double-ended cordsets for Profinet push-pull modules ensure especially fast and easy installation. Copper or optical fiber cables are available to you as options for data transmission. All available double-ended cordsets deliver convincing performance with a wide transmission bandwidth and long lengths. Optimize your data-intensive applications from power feed to data transmission.	**Features** ■ Wide transmission bandwidth ■ High longitudinal range ■ Resistant to shocks and vibration ■ Protection class IP67 ■ Fast and easy mounting
BCC double-ended cordsets for sensors 	**Robust cables in various configurations** Our M5, M8 and M12 single-ended cordsets are used for connecting your sensors. We have 3-, 4-, 5- and 8-conductor cable to choose from. You can choose from cables with or without LED, in right-angle or straight versions. All our double-ended cordsets are resistant to shocks and vibration, are made of high-quality materials, have bright LEDs and conform to the protection type IP67 (optionally IP68).	**Features** ■ Angled and straight versions ■ Resistant to shocks and vibration ■ High-quality materials ■ Versions with and without LEDs ■ Protection type IP67, optional IP68
Valve connector double-ended cordsets BCC 	**Rapid to assemble, rugged cables for secure connection** Balluff offers you a wide product range of valve connector double-ended cordsets with different protection circuits. We carry types A, B and C, each with either M12 or M8 plug connectors. The valve connector double-ended cordsets from Balluff are shock-resistant and vibration-resistant, made of high-quality materials and have bright LEDs. They can be quickly mounted via the central screw.	**Features** ■ Different protective circuits ■ DIN and industry standard ■ Resistant to shocks and vibration ■ High-quality materials ■ Fast installation with one central screw ■ Integrated sealing lip

Product finder and more technical details:
www.balluff.com/go/**double-ended-cordsets**

Reliably transmit signals, data and power

FIELD ATTACHABLES

Balluff offers you an extensive product range of field attachables for the secure transmission of signals, data and power all without cable. From various designs and housing materials, you can select exactly the product that fits your application. All plug connectors are extremely robust and industrial grade.

Features

- Large selection for every industry
- Various designs
- Various housing materials
- Secure transmission of signals, data and power
- Robust and industrial grade

PRODUCT OVERVIEW

innovating automation

Product family		
BCC field attachables 	**The right plug connector for every industry** We offer the proven Balluff quality that you can and should expect from us. A variety of form factors and housing materials are available: a broad range for any industry.	**Features** **7/8" plug connectors** ■ Plastic versions ■ Straight and angled connectors ■ Female or male ■ 3-, 4-, 5-pin ■ Protection class IP67 ■ Resistant to shocks and vibration **Plug connectors for field buses** ■ For all common fieldbus systems: Profibus, Profinet, Devicenet, Ethernet, CC-Link ■ Straight and angled connectors ■ Female or male ■ Plastic and metal versions **Plug connectors for the food industry** ■ Best suited for use in the food and beverage sector ■ Optimized for sensors and systems used in the food industry ■ Straight or angled connectors ■ Female or male ■ Protection type IP69K ■ Stainless steel nuts ■ Ensured hygiene **M8 and M12 plug connectors** ■ 3-, 4-, 5-, 8- and 12-pin ■ With socket, plug ■ Straight and angled connectors ■ Plastic and metal versions ■ Various connection methodologies ■ Resistant to shocks and vibration ■ Protection class IP67 **Plug connectors for junction blocks** ■ For M12 and M23 plug connectors ■ 8-, 12-, 19-pin ■ Straight and angled connectors ■ Female or male ■ Resistant to shocks and vibration ■ Protection class IP67

Product finder and more technical details:
www.balluff.com/go/**field-attachables**

Proven quality and the best suitability for industry

BULK CABLES

Balluff offers you bulk cables with the proven quality of our assembled cables. The bulk cables product range includes different materials with different cross-sections.
Therefore, you are guaranteed to find the correct line for your application and in any case a robust and industrial grade solution. Moreover, with all of our cables, you benefit from increased flexibility due to the freely adaptable line length.

Features

- Proven quality of our assembled cables
- Various materials and cross-sections available
- Robust and industrial grade
- Line length freely adaptable

PRODUCT OVERVIEW

innovating automation

Product family		
BCC bulk cables for individual requirements 	**Very robust at high temperatures** With an especially wide product range of robust bulk cables, Balluff will meet your individual requirements. Our bulk cables are best suited for use in welding applications because they tolerate high temperatures, even up to 800 °C for brief periods. Even flying sparks and metal spatters cannot harm them. Because of this robustness, our bulk cables can be used for a long time and they withstand mechanical wear and impacts.	**Features** ■ Especially wide product range ■ Best suited for welding applications ■ Robust resistance to high temperatures (up to 800 °C for brief periods) ■ Protected against mechanical influences, flying sparks and metal spatters, mechanical wear and impacts
BCC bulk cables for junction blocks 	**Wide product range for M12 splitters** With Balluff you can choose from a wide product range of PUR and PVS bulk cables for junction blocks. This includes hybrid cables in different versions and bulk cables with different numbers of wire strands. These bulk cables are suitable for junction blocks in the M12 size.	**Features** ■ PUR and PVS cables ■ Different numbers of wire strands ■ Suitable for M12 splitters ■ Wide range of products ■ Flexibly applicable
BCC cables for sensors 	**Wide product range for the right connection** Select from a wide product range of PUR and PVC cables. In particular for the American market, TPE cables are also available to you. All our cables are available in 3-, 4- and 5-wire versions and are made of exceptionally high-quality materials.	**Features** ■ 3-, 4- and 5-wire ■ PUR, PVC and TPE ■ High-quality materials ■ Wide range of products ■ Flexibly applicable

Product finder and more technical details:
www.balluff.com/go/**bulk-cables**

Universal use, even under harsh conditions

JUNCTION BLOCKS

Junction blocks from Balluff connect sensors and actuators to the controller. They are especially suited for all applications where coolants and lubricants are used and also are ideal for harsh conditions. The fully encapsulated housing offers a high degree of media resistance and an outstanding resistance to shock and vibrations.

Features

- Easy connections
- Low space requirements
- High media resistance and precision fit with metal screw inserts
- Flexible mounting options

PRODUCT OVERVIEW

innovating automation

Product family		
BPI junction blocks boxes 	**Industry compatibility guaranteed** Junction blocks from Balluff are vibration- and shock-resistant and can be attached to all standard profiles and base plates. The mounting holes are placed in the center. Additional mounting holes on the side allow flexibility in mounting. The rugged design and metal screw inserts mean you can integrate our junction blocks accurately into any machine or system.	**Features** **M12 port plug connection** ■ Connection with 12-pin and 19-pin M23 plug connector ■ Variants for one or two signals per port ■ 4-way and 8-way versions of PNP, NPN and variants without LED available **M12 port cable connection** ■ Various cable lengths ■ Variants for one or two signals per port ■ 4- and 8-way versions ■ Variants for PNP and NPN sensors and variants without LED **M12 port hood-type outlet** ■ Connection via plug strips ■ Galvanic isolation of the power supply for the sensors and actuators via jumpers possible ■ Variants for one or two signals per port ■ 4- and 8-way versions ■ Variants for PNP sensors **M8 port cable connection** ■ Various cable lengths ■ Variants for one or two signals per port ■ 4-, 6-, 8-,10-way versions ■ Variants for PNP and NPN sensors and variants without LED **M8 port plug connection** ■ Connection with 8-pin or 12-pin M12 plug connector ■ Variants for one or two signals per port ■ 4-, 6-, 8-,10-way versions ■ Variants for PNP and NPN sensors and variants without LED

Product finder and more technical details:
www.balluff.com/go/**junction-blocks**

All the information you need at a glance

HUMAN MACHINE INTERFACES.

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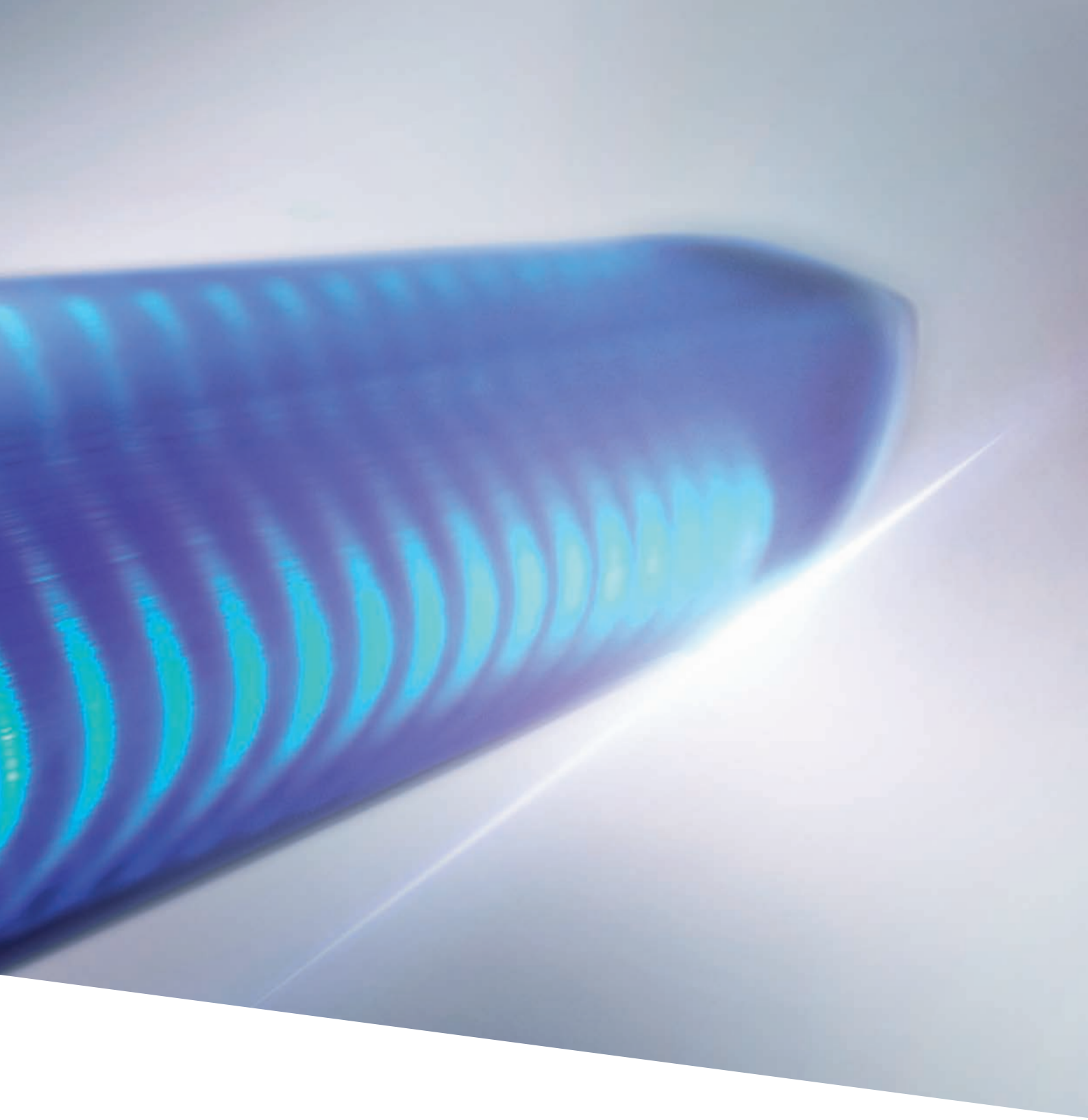


With our signaling and display devices, you know at all times what/where things stand with production and exactly where a tool is located.
You can reliably monitor the state of machines and systems and display the sensor output signals.

Your Balluff solutions

- Signaling and display devices

Capture operating status with displays and SmartLight

SIGNALING AND DISPLAY DEVICES

Our displays and the LED signal light, SmartLight, display physical variables. They allow you to know the operating status of your machine at a glance. The displays give you the choice between analog, SSI and pulse inputs. The SmartLight visualizes progressions and trends. With the special advantage that you can correlate different colors and modes without any mechanical modifications. Through the IO-Link interface it is easy to install and configure.

Features

- Flexible
- Easy to install
- Displays for analog, SSI or pulse input signal
- SmartLight with IO-Link and individually correlated colors and modes

PRODUCT OVERVIEW

innovating automation

Product family		
BAE digital display devices 	**For visualizing various input signals** Balluff displays can be used in the control cabinet. They offer you the choice of displaying analog or axis values or using with display modules and rotary cam switches. The displays also feature simple and intuitive operation. The decimal position, the zero point and the combination of inputs and outputs can be set via the function keys on the front side depending on the application.	**Features** ■ Display modules: SSI interface or digital pulse interface ■ Axis displays: one or two axes can be displayed, different input frequencies ■ Rotary cam switch: integrated encoder power supply
BNI SmartLight 	**LED stack lights with IO-Link interface** The LED stack light with IO-Link interface uses a flexible color spectrum with multi-color LEDs to indicate operating states such as temperatures, levels or the position of a slide in a linear displacement system. You can individually define the colors and have important or critical machine states displayed. The color scale indicates trends and progressions of physical variables.	**Features** ■ Easy to install ■ Up to 20 separately controllable LED circuits ■ Highly flexible since it can be modified on-the-fly – no mechanical alterations ■ Optional with integrated sound module for acoustic signals

Product finder and more technical details:
www.balluff.com/go/**hmi**

Wide range of voltages and power levels

POWER SUPPLIES

innovating automation

With our power supplies you can power any of your applications: Whether single-phase, three-phase, for parallel or series wiring, whether for the control cabinet, in compact form for automated machines or for harsh conditions directly in the field. At Balluff you will find a wide selection of voltages and power levels for reliable and efficient power supply. Our devices are approved according to CE/TÜV, UL or CCC.

Your Balluff solutions

- Switching power supplies

Reliable and efficient power supply

SWITCHING POWER SUPPLIES

Balluff offers high-performance power supplies to ensure that your systems run efficiently and without interference. Our power supplies for the control cabinet withstand overload and have especially long service life: up to 800,000 hours (91 years) to ensure the availability of your machines and equipment.

Our power supplies with the Heartbeat® function provide continuous function information about the internal device condition and indicate the current load situation and demand on the internal components. And the Lifetime display gives you warning for preventive maintenance. The diagnostics function can be applied anywhere in the system via IO-Link.

All the devices are available in several versions and output voltages. Heartbeat® versions for use directly in harsh environments are also available in IP67.

Features

- Complete line – everything from a single source
- Safety in case of short circuits and overloads in industrial environments
- Long service life for reliable operation
- High system availability of all equipment
- Comprehensive approval packages for global use

PRODUCT OVERVIEW

innovating automation

Product family		
BAE compact power supplies 	**For direct installation in automated systems and machine housings** Our reliable and efficient power supplies are suitable for the direct installation in automatic devices and in the machine housing. They provide sensors, controls, HMIs and PCs with the appropriate power level in any application. These are optimal for the compact and space-saving application. Our power supplies for the automatic devices are approved for worldwide use. Various voltages 24 V, 5 V, 12 V or 15 V are freely selectable.	**Features** ■ Single-phase ■ 20…160 W ■ Short-circuit protected ■ Regulatable output voltage ■ Wide-range input 88…264 V AC ■ Parallel operation for the flexible adaptation to the application (type-dependent) ■ Especially low residual ripple on the output voltage ■ Hiccup mode in the event of a short circuit ■ Metal or plastic housing
BAE power supplies 	**Reliable power supply for installation in the control cabinet** Power level for every application. Diagnostic outputs are available for incorporation in machine diagnostics. Our short-circuit-proof power supplies for automation are approved for worldwide use. Different voltages from 24 V, 12 V up to 48 V can be selected.	**Features** ■ Single-phase or three-phase ■ 18…960 W, connected in parallel up to 2.8 kW ■ Regulatable output voltage ■ Ready-/Alarm-LED and output (digital) ■ Parallel and series operation for flexible adaptation to the application (type-dependent) ■ Also available as a Class 2 version ■ Especially low residual ripple on the output voltage ■ Forward or hiccup mode in the event of a short circuit ■ Metal or metal/plastic housing

Product family		
BAE Heartbeat® power supplies 	**Optimal supply voltage for efficient automation** Our Heartbeat® power supplies ensure reliable and efficient power supply of sensors, actuators, controllers and HMIs. They are distinguished by especially high-quality components, long service life and integrated monitoring. The Heartbeat® status indicator LED gives local, three-color indication on the current load situation, the degree of device wear and the remaining service life of the power supply.	**Features** ■ 24 V, single phase ■ 60, 120, 240 and 480 W ■ Short-circuit proof with PowerBoost 150 % ■ Regulatable output voltage ■ Especially low residual ripple on the output voltage ■ Heartbeat® supports preventive maintenance and condition-based maintenance (Industry 4.0)
BAE Heartbeat® power supplies with IO-Link interface 	**For demanding applications and preventive maintenance** Handle critical applications with high demands on quality, long service life and diagnostics capability. Balluff offers Heartbeat® power supplies – now also with IO-Link. Alarm, stress level and lifetime are output through the digital outputs. Using IO-Link you can call up detailed diagnostic and status information about the device, the operating parameters and history.	**Features** ■ 24 V, single phase ■ 60, 120, 240 and 480 W ■ Short-circuit proof with PowerBoost 150 % ■ Regulatable output voltage ■ Especially low residual ripple on the output voltage ■ Heartbeat® supports preventive maintenance and condition-based maintenance (Industry 4.0) ■ Processing of all Heartbeat® information in higher level systems via IO-Link ■ Extra-narrow IP20 versions for the resource-optimized control cabinet ■ IP67 versions for power in decentralized structures directly at the consumer

High-quality gear for virtually any application

ACCESSORIES.

innovating automation

Our great selection of high-quality accessories supports you in the optimum embedding of the sensor in machines and systems. Through easy assembly and installation, exact positioning and high machine availability. The wide Balluff product range offers the optimum gear for nearly every application.

Your Balluff solutions

- Fastening technology
- Lighting for Vision Systems
- Reflectors, fibers, optics
- Mechanical protection
- Communication adapters and signal converters

Everything for fastening, optics, light, protection and communication

ACCESSORIES

The Balluff fastening solutions are simple to mount and adjust – for exact positioning. Our accessories for optical applications include reflectors, reflective tape, plastic and glass fibers as well as diaphragms, lenses, filters and deflector mirrors. For installation spaces and tasks we offer a wide range of rugged auxiliary lights with energy-saving LED technology. Mechanical protection is provided by our protective caps, protective housings, protective covers, protective tubes and anti-sabotage protection. The signal converters and communication adapters from Balluff are ideal for converting analog into digital signals or the reverse as well as for implementing various communication protocols.

PRODUCT OVERVIEW

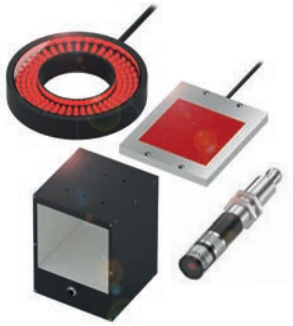
innovating automation

Product family		
BAM fastening technology 	**Versatile and flexible mounting solutions** With our assembly systems and brackets, you can adapt the sensors and equipment to your particular task. Simple to install and adjust, these provide – in addition to attachment – exact positioning, even under difficult conditions. Balluff mounting solutions are distinguished by high-quality materials and exact processing.	**Features** **Clamp mounting with and without fixed stop** ■ Versions with and without fixed stop ■ Sensor replacement without readjustment ■ Also tool-free versions ■ Secure protection and precise positioning ■ Various sizes from M5 to M30 and versions in steel, stainless steel and PTFE ■ Assembly and protection combined **Welding-spatter-proof sensor holder** ■ Suitable for dirty environments ■ Reliable protection and simple fastening ■ Also tool-free version available ■ Versions from M8 to M30, made of steel and stainless steel with PTFE coating ■ Reliable and long-lived ■ Sensor is easily replaced for cleaning and maintenance **Sensor holder** ■ Can be combined with the BMS mounting system ■ For tubular (M8 to M36) and block-style, made of stainless steel, zinc plated steel, anodized aluminum or wear-free, oil-resistant plastic ■ Designed and tested for Balluff sensors ■ Precise, long-life and flexible ■ Optimal price/performance ratio **Individually configurable assembly system** ■ Rugged and flexible ■ With base holder, mounting rods, cross-connectors as well as versatile sensor and mounting bracket reflectors ■ Versions in anodized aluminum, chrome plated zinc, stainless steel or high-quality plastic ■ Individually configurable and adjustable ■ Installation on base plates and profiles

PRODUCT OVERVIEW

innovating automation

Product family		
BAM reflectors, fibers and optics 	**High-quality accessories system for optical applications** Our accessories for optical applications include round and square reflectors and reflex films. Moreover, you can obtain plastic and glass fibers as well as diaphragms, lenses, filters and deflecting mirrors. The combination of various jacket and housing materials and high-quality optical materials makes demanding applications possible. The optical accessory system is qualified for Balluff sensors and available in different versions.	**Features** **Glass and plastic fibers** ■ Various lengths and diameters ■ Crush-resistant and oil-resistant ■ High function reserve ■ Coaxial fiber arrangement as an option ■ Field-attachable versions available **Optics** ■ Different sizes and focal lengths ■ Homogeneous optical properties **Reflectors and reflective foils** ■ Precise and robust ■ Attachment by adhesion or screws
BAM mechanical protection 	**For sensors and devices** Our protective caps, protective housings, protective covers, protective tubes and anti-sabotage protection prevent any mechanical damage to the sensor or a device. Select from different versions – even for demanding welding and press applications. They are high-quality and long-lived as well as simple to install.	**Features** **Sensor with fixed stop** ■ Rugged design for harsh applications ■ Set consisting of sensor, housing and springs ■ Ideal for contaminated environments **Protective tubing for cable** ■ Flexible rugged cable protection made of silicon ■ Chemical resistance ■ For temperatures up to 250 °C **Protective covers and protective housing** ■ Rugged protective housings, protective caps, protective nuts and banking screw/cushioned mount ■ Temperature and chemical resistant
BAE signal converters and communication adapters 	**Efficiently transport signals with signal converters** Our signal converters store an incoming signal in a specific format and output it in a different format. Frequently, such modules are used in the conversion of analog signals into digital signals or vice versa. Likewise, you can convert different communication protocols using signal converters. Installation is simple and can be in the control cabinet or directly at the sensor.	**Features** **IO-Link analog converters** ■ Cost reduction through simple, unshielded 3-conductor cables ■ Maximum signal variance and signal neutrality ■ High resolution, 14 bits ■ Inputs and outputs **Signal converter** ■ Change output signals or counting and time functions simply and easily ■ Analog switching devices, signal converters, signal amplifiers and sensor controllers

Product family		
BAE lighting for vision systems 	**Optimum lighting conditions for your application** Image processing always depends on the right lighting. Balluff offers a wide array of robust auxiliary lights for your different installation spaces and tasks. The energy-saving and long-lasting LED technology is impressive with homogeneous optical properties. Balluff lights are reliable, bright and quickly installed. Choose from red light, white light, infrared light or laser versions. Eye safety is in accordance with IEC 62471.	**Features** **Dark field light** ■ Reliably check for scratches, pits and impurities on surfaces ■ Light field size Ø 90 mm ■ High-quality housing, IP54 **Background light** ■ Check dimensions and shapes regardless of material or surface properties ■ Various light field sizes from 25 x 25 mm to 300 x 200 mm available ■ Extremely flat design ■ High-quality housing, IP54 or IP69K ■ Also available in stainless steel **Coaxial lighting** ■ Ideal for highly reflective, imprinted or dirty surfaces and for needled codes ■ Light field sizes 50 × 50 mm and 100 × 100 mm ■ High-quality housing, IP54 **Strip light** ■ Check features using generated shadows ■ Light field sizes 10 × 95 mm to 10 × 195 mm ■ Almost rimless design, making stacking and arrangement in rows possible ■ High-quality housing, IP54 ■ Mounting bracket makes it possible to configure as a square or rectangle or frame **Line lasers** ■ Detect and measure defects, diameters, edges, gaps and levels ■ Can be triggered, focuses and modulated ■ Line, grid, matrix, point and cross projection in red, blue and green ■ M18 and M12 versions ■ High-quality housing, IP67 ■ Laser Class 1M or 2M ■ Inspection distances up to 2000 mm ■ Adjustable brightness and zoom **Ring light** ■ The additional incident light with powerful LEDs ■ Light field size Ø 100/60 mm ■ High-quality housing, IP65 ■ Large inspection distances realizable ■ Diffuser attachment for preventing interference reflections available **Spotlight** ■ Illuminate areas with point accuracy ■ Various sizes M12, M18, M30 ■ Generous inspection distances ■ High-quality housing, IP67