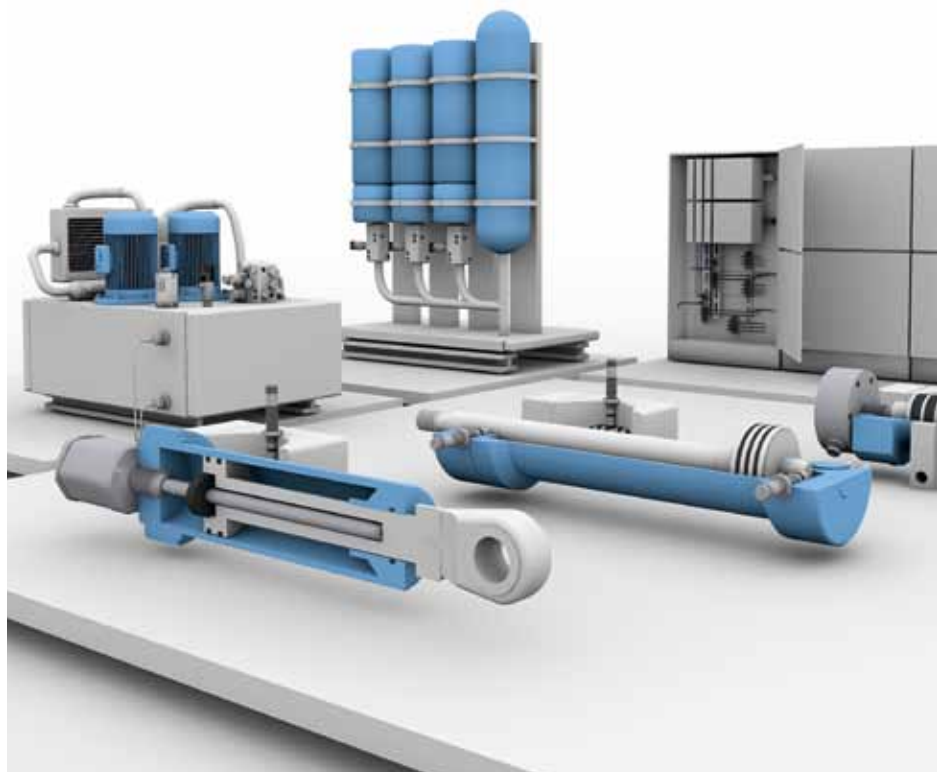
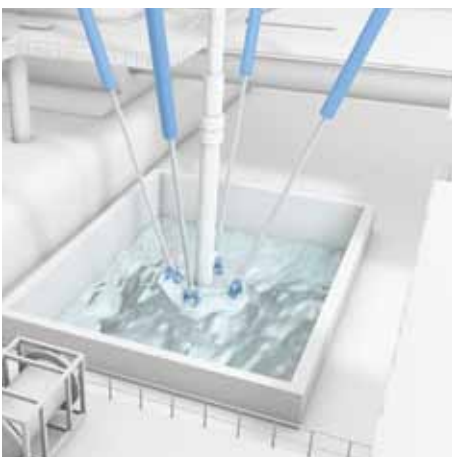
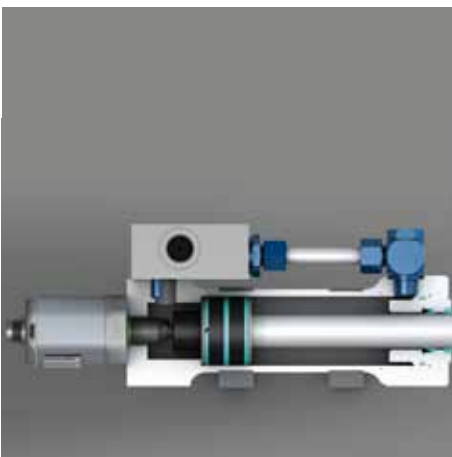


BALLUFF

sensors worldwide

Solutions for Hydraulic Systems

Position measurement systems and sensors for a wide range of applications





BALLUFF

As a leading sensor specialist and system provider with a company tradition of over 90 years, Balluff GmbH has been a recognized partner of factory automation and industrial hydraulics for decades. The global player has a strong presence with 56 sales branches and representative offices as well as nine production sites on all continents. The corporate headquarters in Neuhausen a.d.F. is located near Stuttgart.

Balluff masters the entire technological variety with various operating principles, including high-quality sensors and systems for position measurement and identification, as well as sensors for detecting objects and measuring fluids. The full-range assortment includes optimal network and connection technology and a comprehensive line of accessory products.

We offer innovative, first-class products tested in our own accredited laboratory and maintain certified quality management in accordance with DIN EN 9001:2008. Our technology speaks for itself in international applications, since it also meets regional standards.

Balluff is synonymous with application-specific customer solutions, comprehensive services, individual consultation and prompt service. Our staff of more than 2,600 employees is committed to providing outstanding service worldwide.

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Balluff Sensors Support High Power Density

First-class quality is durable, robust and has a wide variety of uses.

When great forces and torque are to be generated, hydraulic systems are used. They enable compact design and, therefore, high power density. They are self-lubricating, robust and provide long-term stability.

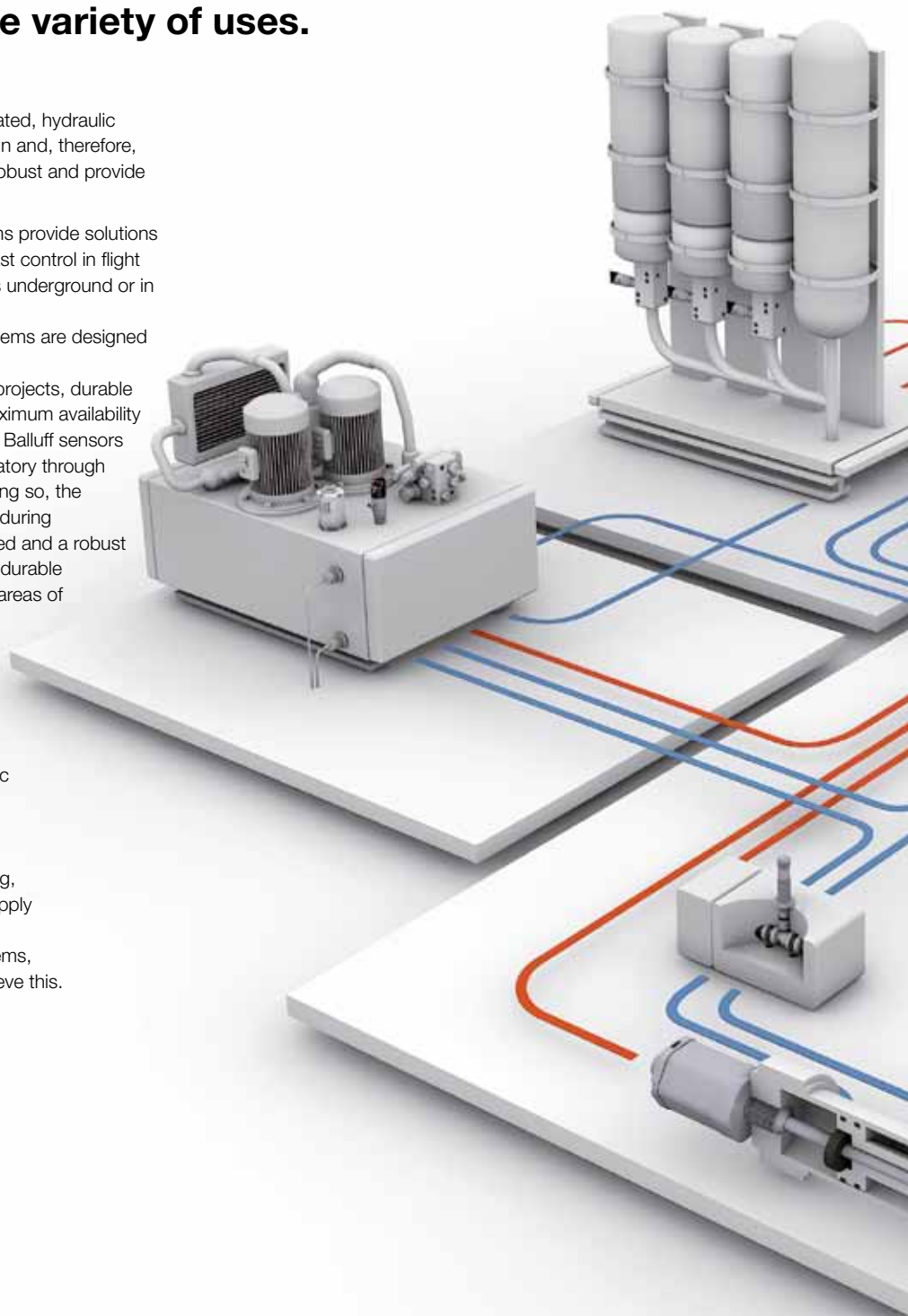
With the suitable sensors, the hydraulic systems provide solutions for almost every application. From the super-fast control in flight simulators to the most heavy-duty applications underground or in tunnel construction.

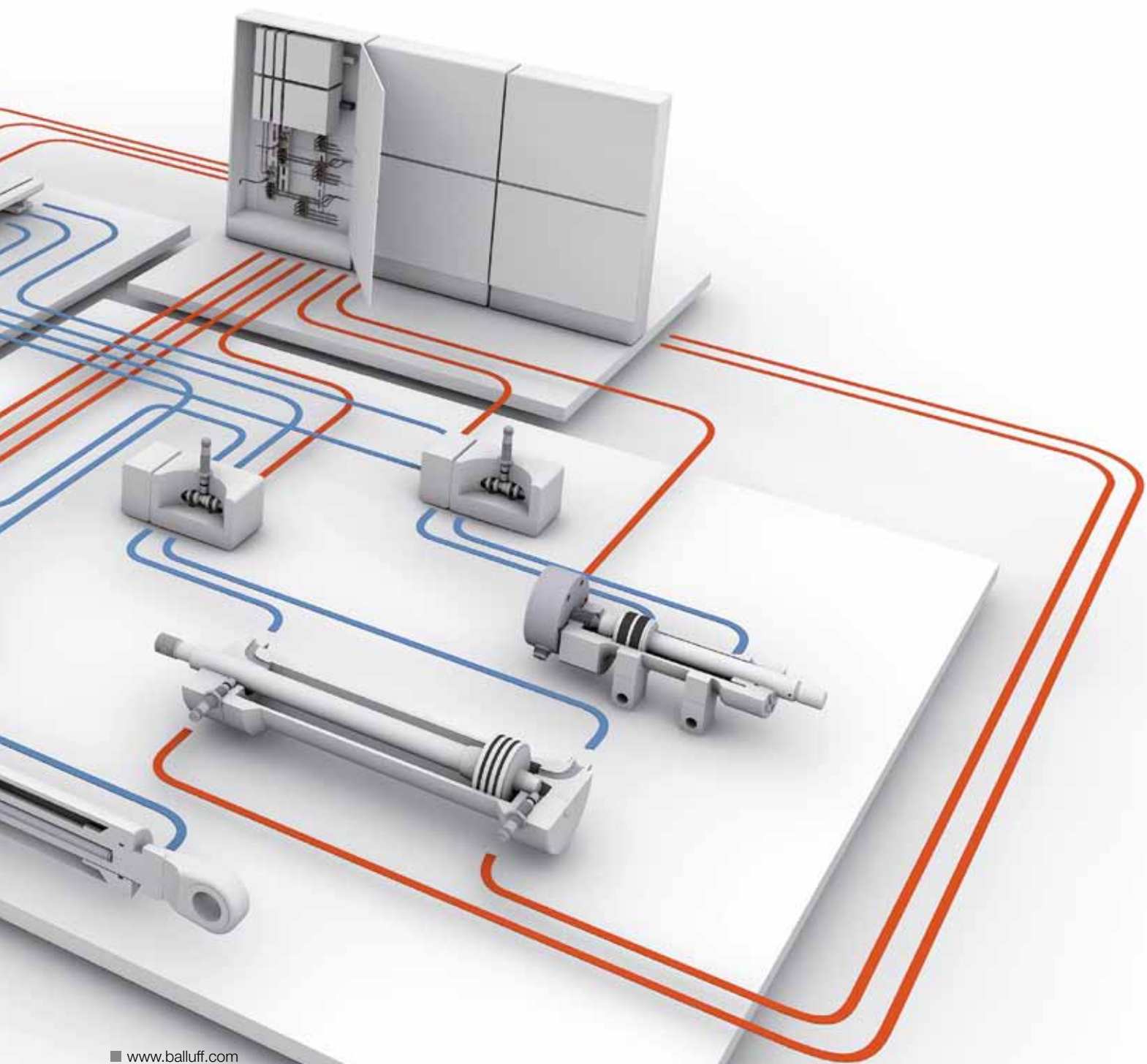
Balluff sensors and position measurement systems are designed for this wide range of applications.

Whether individual applications or large-scale projects, durable and robust Balluff technology supports the maximum availability of systems and supports their long service life. Balluff sensors are optimized in our accredited in-house laboratory through Highly Accelerated Life Tests (HALT). While doing so, the products are already subject to extreme loads during development, possible weak points are removed and a robust product design is ensured. Through extremely durable products, Balluff offers first class quality for all areas of hydraulics:

- Products for position sensing and end position detection in hydraulic cylinders and valves
- Capacitive sensors for monitoring liquids
- Pressure sensors for monitoring the hydraulic circuit
- Network and connection technology for industrial communication
- Worldwide locations with technical consulting, sales, after-sales service and spare parts supply

Balluff works closely with suppliers of subsystems, plant engineers and research institutes to achieve this.





Civil Engineering – Everything Under Control

When every second counts or when heavy loads need to be precisely positioned, high-quality technology offers long-term stability.

Constantly expanding our infrastructure is nearly unthinkable without hydraulics. With hydraulics, new waterways are accessible. Tides and level differences are controlled by locks and road networks are expanded. New tunnels and bridges are developed. Hydraulic systems are used all over the world for controlling machines and plants. Even under the most extreme conditions. Balluff position measurement systems and sensors offer perfection because they are highly precise and exceptionally durable.

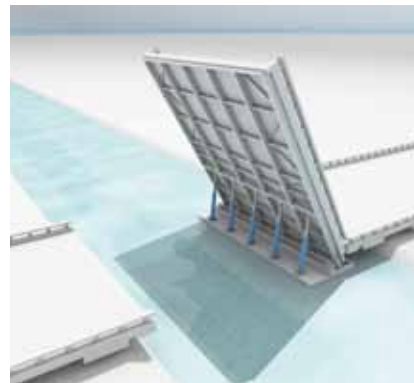
Positioning heavy bridges



When building bridges, special heavy-duty cylinders carry out horizontal feed and vertical lifting motions to move the bridge elements, which weigh multiple tons. The Micropulse transducer rod CD is installed in the pressure area of heavy-duty cylinders and high pressure cylinders to position these extreme loads synchronously and with millimeter precision.

- For pressures up to 1000 bar
- Resolution down to 1µm for synchronous positioning with millimeter precision
- Ex area zone 2; non-incendive "nA"

Lifting and lowering bridges



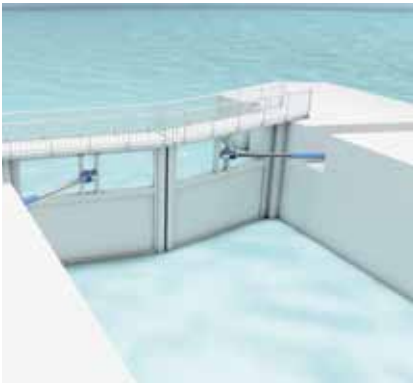
Every second counts when raising and lowering movable bridges, as impact on traffic must be kept to a minimum. High-precision position measurement systems integrated into the hydraulic cylinders ensure that the bridge raises and lowers quickly and efficiently. High-pressure resistant inductive sensors reliably identify the end position of the cylinder.

- Position and speed detection
- High-pressure resistant rated to 500 bar
- Cost-effective solution for monitoring end positions



©RWS

Opening and closing locks



Hydraulic cylinders move the powerful gates of the large locks, which can take on enormous dimensions in seaports. BTL ProCompact HB transducers are used in hydraulic cylinders to exchange the water efficiently and monitor the position of the gates.

- Stainless steel for use in coastal areas
- with a cable guard system, can also be temporarily used under water
- nearly limitless service life through an effective contact-free principle

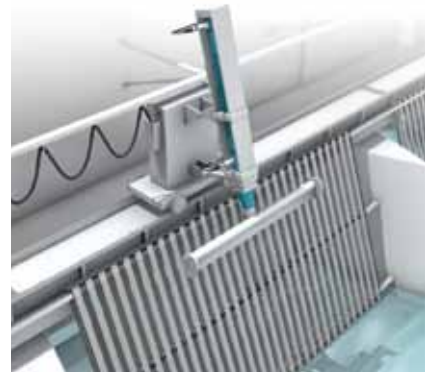
Controlling the gates



The requirements for a weir go much further than just opening and closing the gate. Fish ladders must be taken into account and the fully automatic control of the water level must be ensured. BSI inclination sensors reliably and precisely measure the intermediate position of the gate.

- Absolute angle tracing for exact positioning
- Wide temperature range for outdoor use
- Metal housing and high degree of protection – ideal for harsh environments

Detecting rake cleaner end positions



Floating debris at the infeed end of hydroelectric power plants causes efficiency loss and thus diminishes cost-effectiveness. The worst-case scenario could result in plant downtimes with high costs. With the high-pressure resistant inductive sensors BHS, the end positions on the rake cleaner can be easily and reliably detected.

- High pressure rating
- Easy to install
- From M5 to M18 – for all cylinder types

Mining and Open-pit Mining/ Raw Material Extraction

Durability is a must.

Whether under or above ground, sensor requirements are extensive. Temperatures are high deep underground. There are also extreme vibrations and shock loads. Under these conditions, durable and resistant technology is a must.

Balluff offers the best security for position measurement in mining; through robust, wear-free and high-precision position measurement systems and over 25 years of experience in this field.



Tunnel construction – Controlling pushing cylinders



Tunnel boring machines remove rock centimeter by centimeter. Pushing cylinders, which continuously force the drill head into the rock, provide the strength needed for this. Micropulse transducers BTL correctly report the piston position and allow for a smooth drilling process.

- Reliable
- Wear-free: long life for the highest system availability
- Vibration-resistant: for use under extreme conditions



©Herrenknecht

Positioning drills



Always know where the driller is:
When searching for new raw material supplies, soil samples are taken with mobile drillers to confirm potential deposits. Micropulse transducers BTL PF ensure reliability for the correct drilling depth.

- Flat design, space-saving for mobile machines
- Robust profile housing
- Wear-free, since it is contact-free with up to 15 mm distance from the position encoder to the transducer

Monitoring drill depth



In raw material extraction, Micropulse BTL profile position measurement systems installed outside the cylinders monitor the drilling of the blast holes below ground. This is the only way that safe and reliable tunnel mining and efficient raw material excavation can be ensured.

- Easy installation and fast exchange, since they are externally attached
- Extremely robust against shock and vibration
- Reliable, even at high ambient temperatures

Supporting longwall mining



In mining, shields prevent rocks from falling in the working area and injuring miners. To support longwall mining, hydraulic cylinders are used. Micropulse BTL position measurement systems of the K series integrated in the hydraulic cylinders provide exact positioning and secure monitoring of the shields.

- Compact design
- Explosion-protected versions
- made from stainless steel

Steel and Metallurgical Industry – Continuous Processes Around the Clock

Reliably manage high temperatures, shocks and vibrations.

The production of steel is highly complex and is carried out using high temperatures, shock and vibration under the most difficult conditions. This places high demands on producers and mechanical engineers. Ensuring a safe and reliable process with optimal quality management is critical. A fundamental prerequisite for this is the highest quality of systems and machines. Balluff offers optimal, internationally approved sensors, as well as corresponding network and connection technology.

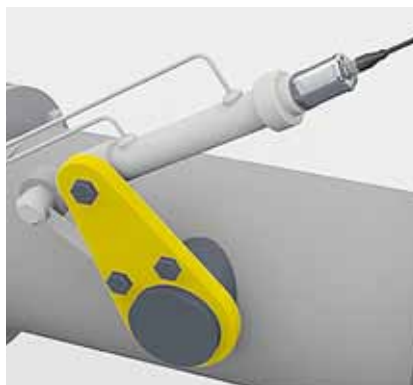
Coke oven – Controlling movements



The Micropulse transducer BTL in the hydraulic cylinder controls all movements at the coke oven battery up to 100°C. Its robust metal housing with IP 67 and PTFE cable for up to 200°C makes it ideal for particularly hot environments.

- High-temperature resistant for use on the coke oven battery
- Metal housing in IP 67
- Different interfaces

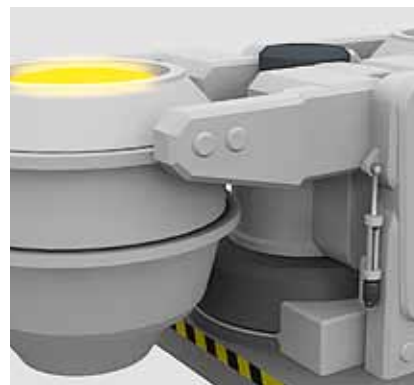
Blast furnace – Controlling air and gas supply



Micropulse transducers BTL are used for controlling flaps and valves on the blast furnace in order to regulate the supply and exhaust air during production of pig iron. Alternatively, standard inductive sensors BES deliver convincing performance. Additional security: A temperature sensor is integrated in the electronics head for all micropulse transducers BTL with a bus interface. This guarantees the correct temperature measurement.

- Temperature measurement integrated in the transducer
- Explosion protection versions
- Non-contact operating principle

Monitoring ladle movements

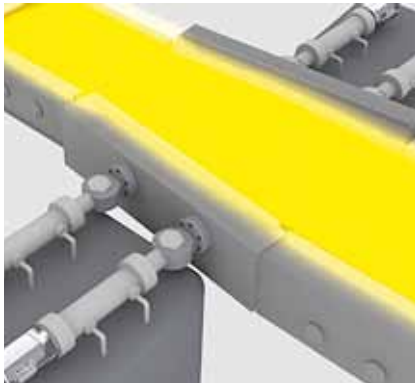


Ladles ensure replenishment of steel in production. Optimal control over the process and ensuring the addition of the correct quantity of steel in the continuous casting line is only possible through precise ladle movements. Micropulse transducers BTL7 (double and triple-redundant) provide absolute security and the best reliability for the continuous casting process.

- Redundancy for absolute security
- The highest availability through completely independent systems in one head
- Easy to retrofit, since it is compatible with the standard BTL



Controlling the slab guidance



Micropulse transducers BTL in the hydraulic cylinder are ideal for positioning and guiding the slabs. They check for the correct configuration of the lateral guides and accompany the slabs on their path through the rolling stand. The large forces in the reshaping are reliably compensated for in this process.

- Rapid Replacement Module (RRM) for fast changes without interrupting the hydraulic circuit
- Vibration and shock resistant

Setting the roll gap



The roll gap can be set with high accuracy using the Micropulse transducer BTL in IP 69K during hot or cold rolling. The vacuum-sealed BTL does not require any additional protection for continuous water cooling of the rolling stand.

- Outstanding accuracy for precise work
- Stainless steel housing for tough applications
- Vacuum sealed, even during constant water cooling

Positioning the rollers



Micropulse transducers BTL guarantee high accuracy when winding the coils. The pressure roller is guided, for example, depending on the roll diameter.

- Absolute output signal
- Extremely exact for precisely guiding pressure rollers
- Also with IO-Link for easy wiring

Pressing – Always in High Quality

**Ensuring consistent product quality
means constantly monitoring every movement.
Balluff stands for both.**

Whether in the automotive industry, the rubber industry or when processing wood and composite materials, such as carbon fibers: presses are indispensable in today's industry. They are used to manufacture metal parts of all kinds. Particle boards for house construction and carbon fiber body parts for the cars of tomorrow. In individual parts production or on long press lines that ideally work continuously 365 days a year. While doing so, great repeat accuracy and continuously high precision is required. The extensive Balluff portfolio fulfills all requirements.



Pressing metals



Productivity and flexibility are important goals of the automotive supply industry. Micropulse transducers measure the movements of the press with absolute precision. For a wide variety of moldings. For every part produced. This supports the production of a wide variety of lot sizes and optimal processes.

- Different designs for external or internal installation
- Multifaceted mechanical accessories
- Various interfaces for easy connection to the controller



©Schuler AG

Forming composite materials



When producing components from carbon-fiber-reinforced plastic (CFRP), the carbon fibers that are woven to mats are pressed into shape under heat and pressure. In this process, they must be monitored and harden uniformly. Micropulse transducers ensure uniform pressure with every press-fitting process without being impeded by heat.

- High temperature range
- High repeat accuracy
- Also has multiple position encoders to monitor both sides of the press

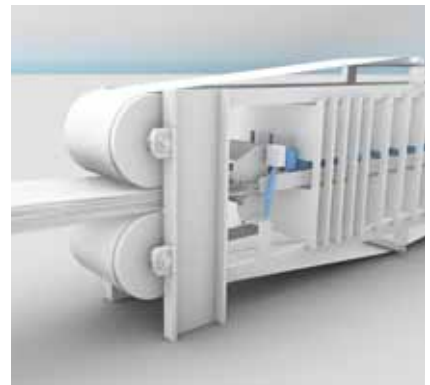
Vulcanizing tires



In hydraulic heat presses, green tires receive their correct shape. It is important to achieve consistent quality. Micropulse transducers BTL ensure high repeat accuracy and the exactly identical result at all times. They satisfy the highest requirements of the manufacturing process.

- Contact-free measuring principle for maximum service life, even with short cycle times
- Extremely precise for consistent quality
- Profile housing for easy installation

Monitoring parallelism of the presses



Up to 60 cylinders ensure an optimal result in fiberboard systems. The Micropulse transducers integrated in the hydraulic cylinders monitor closing height and parallelism of the press with outstanding reliability. Therefore, the dimensions of the particle boards can be successfully maintained. The high ambient temperature does not affect the transducers.

- Explosion protected
- Extended temperature range
- Can be installed in the cylinders

Sensors for All Areas of Power Generation

The extensive performance spectrum appeals with advantages for renewable energy and conventional solutions.

Climate change, demographic trends and the limited availability of fossil fuels have led to new solutions in the energy industry: to offshore wind farms or solar power plants in the desert. The distribution of power generation leads to a large number of individual systems and the immediate influence of extreme environmental factors place stringent requirements on the quality of the components used.

Whether renewable energy or the conventional power generation, Balluff products are used in all areas. Balluff sensors and systems feature excellent quality. Their security, durability and reliability are true hallmarks.

Adapting pitch to the wind speed



Balluff position measuring systems BTL were developed specifically for use in the hydraulic cylinders of wind power plants. Using the systems' pitch adjustment, the rotor blade angles can be adapted accurately to the wind speed to maximize power generation and ensure plant reliability.

- Contactless = low-maintenance
- Pressure rated to 600 bar
- Vibration and shock-resistant for stable use in adverse conditions

Adjusting guide and rotor blades



The guide and rotor blades on Kaplan turbines can be adjusted with help from BTL micropulse transducers. For example, a BTL profile controls the position of the guide vanes as needed. Another BTL integrated in the shaft ensures optimal adaptation of the impeller to the water volume.

- No reference run required after voltage interruption
- Rugged, non-contacting
- High protection class
- Pressure-rated for installation inside hydraulic cylinders

Tracking the sun with parabolic troughs



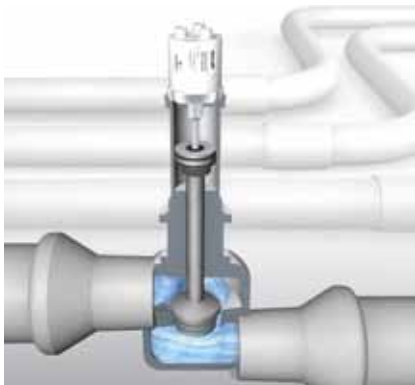
With the parabolic trough power plant, collectors concentrate solar energy onto a receiver tube positioned in the focal line and heat up the oil flowing in it. For high efficiency, all troughs have to be continuously adjusted to follow the sun's path and be focused exactly on the receiver tubes. This is achieved by magnetically coded position and angle measurement systems BML that are positioned directly on the rotating shaft.

- Direct measurement
- Precise position detection
- Determining reference points



©Sener/Torresol Energy

Monitoring valves



The highest safety requirements for emergency shutoff control valves require redundant systems. In compact redundant Micropulse transducer BTL 7, up to three independent measurement sections and three independent electronics systems are integrated in a rod. The robust, absolute position measurement system is freely configurable and easy to operate.

- 2 or 3 completely separate systems in one housing for maximum safety
- Compact and space-saving
- Non-contact and wear-free
- Monitoring of all channels via LEDs

Controlling flaps



Flaps are used in all areas of power plants to control gases and fumes. Robust hydraulic cylinders with the position measurement system BTL reliably open and close the flaps and support safe operation of the power plant.

- Additional temperature range for outdoor use
- Can be installed in the cylinders
- Reliable

Controlling diverter positions



Diverter guide gas turbine fumes. Either to the bypass chimney or to the steam generator. With help from hydraulics and micro-pulse displacement sensors integrated in them, the diverter can be opened or closed in increments.

- Ex-variants for use in the potentially explosive area
- Compact design
- suitable for dynamic applications

Wood and Pulp Industry – with Large Bandwidth

Raw boards to fine paper: innovative sensor technology masters different requirements.

Wood is a multi-use material. Processing ranges from raw boards to fine paper. The wood and paper industry has a wide array of requirements for this reason. In forestry and in the sawmill industry, sensors are subjected to the harshest ambient conditions and must work with the highest reliability. Precise, smart sensors and position measurement systems are used in wood processing and paper machines for an efficient machining process.

Balluff fulfills the entire range of requirements of the wood and pulp industry. Innovative sensor technology is robust, precise, reliable and enables fast, automated processes.

Monitoring hydraulic cylinders



Sensors for debarkers are exposed to strong vibrations. Transducers in hydraulic cylinders monitor the piston position of the infeed unit. This enables logs of different thicknesses to be optimally fed.

- Reliable, with high protection class
- Rugged housing
- Direct signal evaluation or in conjunction with processor units for all control and closed-loop systems

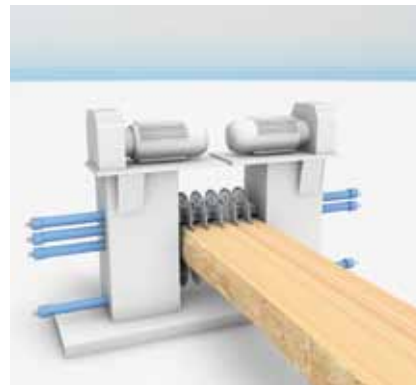
Positioning logs



Vertical band saws adjust to maintain the desired board thickness after each cut. Micropulse transducers are excellently suited to configuring these settings quickly and with great versatility.

- Pressure-resistant for integration in hydraulic cylinders
- High repeat accuracy
- Electronic head can be replaced in the event of service

Adjusting the saw blade

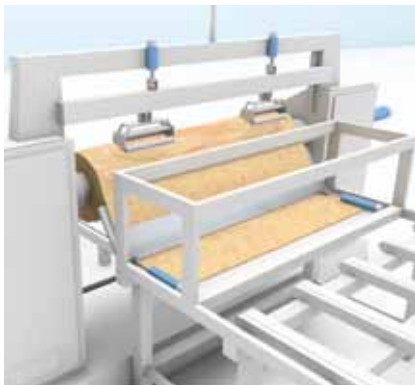


Saw units with single-blade adjustment make it possible to change the cross-section extremely fast. Hydraulic cylinders control the saw blades and Micropulse transducers reliably and accurately return the position. As a result, using them supports optimum exploitation of the wood.

- Multiple position encoders are possible
- Vibration-resistant



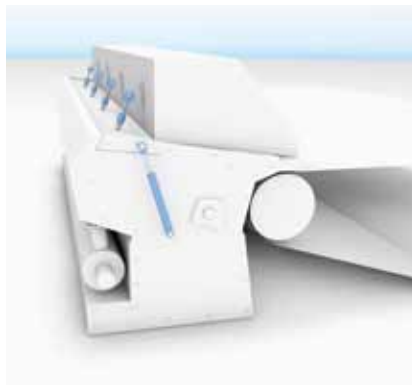
Tracking the peeling knife



In veneer production, logs are peeled layer by layer. For an optimal result, contact pressure and the position of the peeling knife must be precisely controlled. This can only be successful through smart cylinders with a built-in position measurement system BTL.

- Rule-compatible
- Tolerant of shocks
- IP 67 metal housing – protection against swarf, sawdust

Hydraulically controlling the head box



For paper production, hydraulic components must often work reliably under aggressive ambient conditions. For example, the headbox evenly applies the stock suspension on the wire mesh and thus influences the paper quality. Deckle plates and headbox bottom lip are hydraulically controlled. Precise position measurement systems in hydraulic cylinders ensure an optimal result.

- For use in aggressive environments: sensor head made from stainless steel
- Tolerant of vibration
- IP 69K

Controlling the winding process



Produced paper is wound up around large rolls. At high production speeds, these rolls grow very fast and become extremely heavy. The most up-to-date hydraulic and position measurement technology ensures the best possible winding process. Micro-pulse transducers BTL that are securely packed in the hydraulic cylinder report the position.

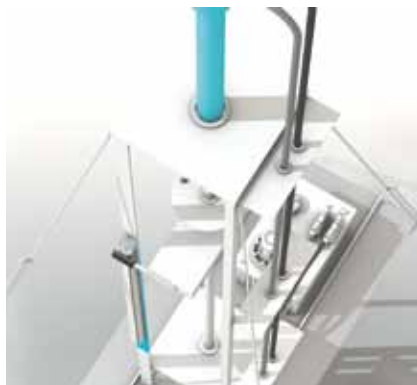
- Different interfaces
- High sampling rates are possible

Oil and Gas Extraction – Under High Pressure

Safety is not disputable.

Oil and gas still make a critical contribution to generation of energy. But the growing scarcity of resources demands even greater effort for extracting fossil fuels and the use of new, more efficient methods. Raw ambient conditions and hard mechanical strains are a tough endurance test for people and material. This requires safe, durable technology. Robust, precise and low-maintenance Balluff sensors support efficient oil and gas extraction. These offer explosion protection and are internationally approved.

Monitoring artificial lifts



After tapping an oil field, crude oil pumps do their work entirely autonomously for the most part. Pump parameters are continuously monitored via sensors and, usually, via automated remote systems. Balluff Micropulse transducer profiles prove themselves in the difficult application directly on the pump and guarantee reliable monitoring of position and path.

- Robust design
- Exact measurement of path and position
- Up to 7.6 m in length

Positioning artificial lifts



To minimize load and wear, crude oil pumps have to be aligned exactly over the drill hole. Balluff inclination sensors BSI are ideal for use in harsh outdoor environments. Thanks to their analog angle values, the pumps can be positioned with extreme precision.

- High protection class IP 67 – suitable for use under rough conditions
- Precise, absolute angle measurement
- Compact housing

Controlling valves



Control and shutoff valves are used in many areas of oil and gas extraction, in refineries, as well as in petrochemical plants. They must reliably work in very harsh environments. In corresponding vulnerable environments, explosion protection is a top priority. The certified Micropulse position measurement systems BTL ensure reliable and secure use.

- High reliability
- with ATEX, IECEx and many additional international approvals



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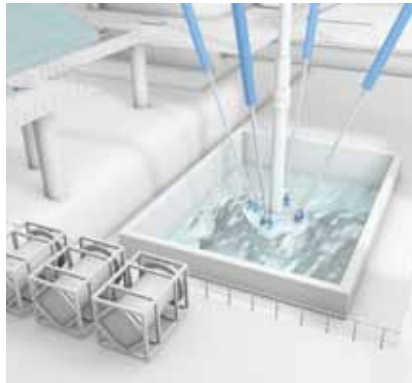
Positioning drill pipes



Pipehandlers take drill pipes out of the magazine and position them directly over the borehole. Quick and efficient drilling is thus ensured. Powerful hydraulics move the heavy rods with ease and bring them directly into place and position. Balluff position measurement systems are critical for prompt, correct positioning.

- High temperature range
- Long-lasting
- Robust

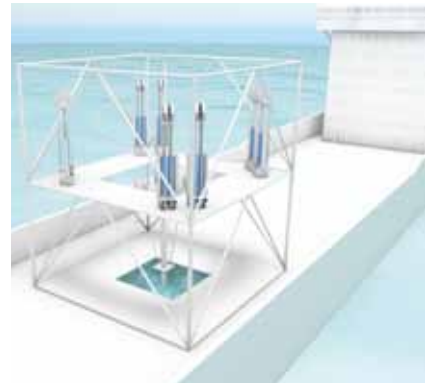
Drilling riser – Monitoring tension



Compensation cylinders must maintain a specified tension of the marine riser and balance all fluctuations. To do so, the hydraulic cylinders are attached between tensioner ring and rig and equipped with position measurement. These smart hydraulics level the sea movement and ensure continuous tension of the production riser, independent from the upward and downward heave of the floating drilling rig.

- Length of up to 7.6 m
- Explosion protected in the stainless steel housing

Holding wire-line tension



Wire-lines connect floating drilling rigs to the seabed. These are held under tension at all times to prevent damage. During swelling, tension is hydraulically adjusted to the clamping device. When this occurs, the piston position of the cylinder must be reliably reported back. Micropulse transducers BTL execute this perfectly.

- Many interfaces
- Space-saving with installation in the cylinder
- Non-contact and wear-free

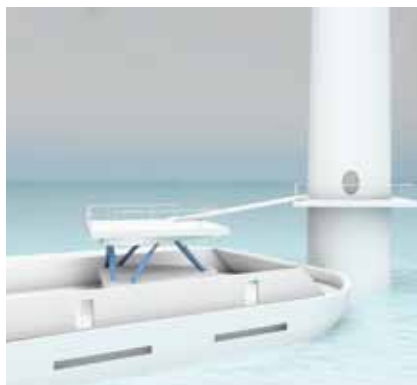
Offshore and Ship Technology – Failsafe with Winds and Waves

High swelling, strong breezes and aggressive salt water are always factors to control.

When building a ship, heavy-duty is the order of the day. To easily move the enormous loads, hydraulics are superior to other solutions. Hydraulic systems are also required to make ships jut out into the sea and stay on target. Balluff offers suitable sensors for the rough sea climate. With maximum reliability and durability. From propeller adjustment via stabilizers to various superstructures.



Compensating motion

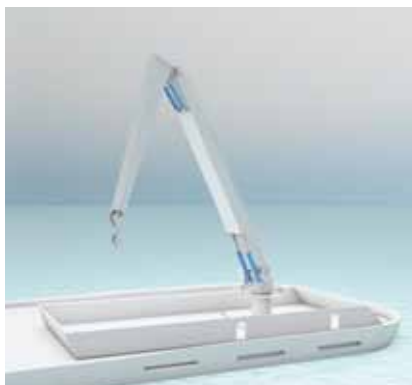


Security on the sea: Even with swelling, people from the supply vessel can safely reach the platform or the offshore wind power plant.

Smart hydraulics with a triple-redundant position measurement system compensate for all boat movements and allow for safe access.

- Redundant for maximum security
- Rule-compatible – perfectly suitable for complex control

Lifting loads



Cranes are used not only in the harbor, but also on the sea. So that safe work is possible, hydraulics and sensors attuned to the harsh sea are needed. Thus, explosion-protected high-pressure resistant inductive sensors reliably measure the end position of the offshore crane, even with high swelling.

- Flameproof up to 500 bar
- Wide portfolio for installation in every cylinder type
- High-temperature versions

Controlling variable pitch propellers



Variable pitch propellers bring critical advantages to the ship propulsion system. This is particularly worthwhile when there are frequently changing speeds, such as on ferries or cruise ships. Angle adjustment is hydraulic and is controlled by triple-redundant Balluff position measurement systems.

- Compatible with retrofit of safety
- status LED, 3x
- GL approval (Germanischer Lloyd)



© balluff.com

Ensuring maneuverability



Jet engines are always used if high speeds on the heavy seas or maneuverability in slow travel are required. Hydraulic cylinders move the infeed flap and nozzle to adjust to direction and speed. Micropulse transducers integrated in the cylinders reliably measure movement.

- Can be completely integrated into the cylinder
- Stainless steel
- Accessories for the pass-thru of the cable through the cylinder (stainless steel, IP 67)

Adjusting ship rudders



To keep a ship on target, the ship rudder must be continuously adjusted. This is successful with reliable and high-precision Balluff position measurement technology. Position measurement systems BTL rod (integrated in the hydraulic cylinder) and BTL profile check the rudder position from start to finish and allow for exact readjustment.

- Non-contact
- Protected, because it is integrated in the cylinder
- Rod or profile housing

Controlling ship stabilizers



Particularly cruise ship passengers suffer from rough seas. Stabilizers are used so that the ship fluctuates less, which decreases ship movements. Depending on the position, the optimal fin angle is changed to keep the ship as vertical as possible in the water. The Micropulse transducer HB guarantees the correct adjustment.

- Reliable
- Watertight, IP 69K
- Connector with protective sleeve device

Purposeful Movement on all Levels – Dynamically Controlled

Premium class position measurement guarantees safe operation.

Whether for development of new vehicles or training for pilots, motion platforms simulate later use and add to safety. Thus, vehicles are already strained to their limits during development to reduce costly, time-intensive tests. Pilots are very well prepared for all flight situations. Additionally, motion platforms in amusement parks allow for the greatest possible driving pleasure.

These also compensate for all wave movements on ships and ensure safe access. State-of-the-art medical technology uses them for optimal tumor handling. They position the telescopes with precision for viewing the universe.

The core of the motion platforms are smart hydraulic cylinders with integrated position measurement systems to guarantee dynamic control and safe operation. Premium position measurement from Balluff is excellently suited to this.



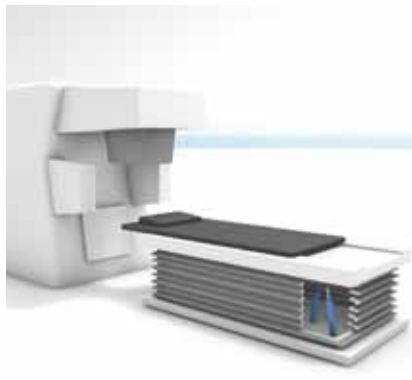
Controlling flight simulators



Highly dynamic hydraulic systems move flight simulators. These simulate real movements to intensively prepare pilots for all possible situations without endangering people and machines. The Micropulse transducer rod supports the extensive training.

- Complete sets to retrofit existing systems
- Many interfaces
- Extremely fast (high sampling rate)

Positioning patients



Prerequisite for an efficient and gentle radiation treatment is, for example, the exact positioning of the patients. Position measurement systems BTL are integrated in the hydraulic cylinders of the hexapods. These systems control movement and enable positioning with millimeter precision.

- High repeat accuracy
- Absolute measuring
- Status LED for operation status display

Controlling train tilt

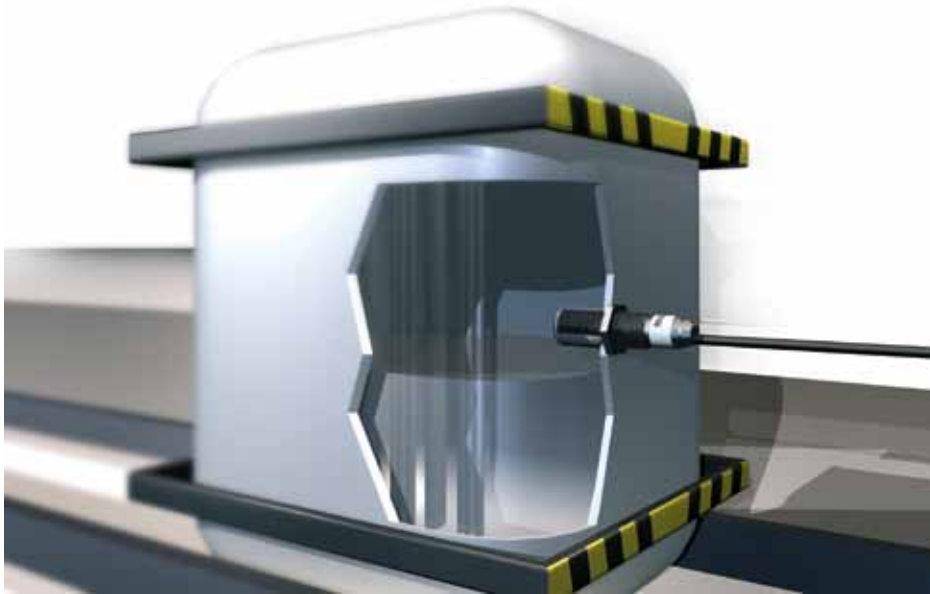


For shortened travel time and high cornering speeds, express trains are actively tilted up to 8°. Hydraulic cylinders with redundant Micropulse position measurement systems are used in inclination technology. For maximum passenger safety and optimal angles in every curve.

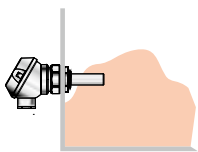
- Also suitable during shocks and vibrations
- Redundant versions for more safety
- Large temperature range

Capacitive Sensors for Level Detection

**Cylinder design, DC 3-wire,
M12x1, G1/4", NPT1/4" MicroLevel,
M18x1, R3/8", NPT3/8"**



Size	
Order code	
Part number	
Rated switching distance	
Pressure range	
Selectable PNP/NPN normally open/normally closed	
PNP NO	
PNP NC	
NPN NO	
NPN NC	
Temperature range	
Switching frequency	
Connection	



Adjustment: The adjustment is carried out with a potentiometer. The objective is to set a middle value between the turn-on and turn-off point when the sensor is damped. In individual cases when temperature swings are great and very sticky media are used, a slight readjustment may be necessary. Otherwise, our adjustment instructions for non-flush mount sensor versions apply.



Information about object detection can be found in our catalog or online at www.balluff.com

Size	
Order code	
Part number	
Rated switching distance	
Pressure range	
Selectable PNP/NPN normally open/normally closed	
PNP NO	
PNP NC	
NPN NO	
NPN NC	
Temperature range	
Switching frequency	
Connection	



	M12x1 MicroLevel				G1/4" MicroLevel				NPT1/4" MicroLevel			M12x1	G1/4"	NPT1/4"	
	BCS00ZL BCS S44KK01-PSCFNG-EP00,3-GS49	BCS00ZM BCS S44KK01-POCFNG-EP00,3-GS49	BCS00ZN BCS S44KK01-NSCFNG-EP00,3-GS49	BCS00ZP BCS S44KK01-NOCFNG-EP00,3-GS49	BCS00ZR BCS S44KK02-PSCFNG-EP00,3-GS49	BCS00ZT BCS S44KK02-POCFNG-EP00,3-GS49	BCS00ZU BCS S44KK02-NSCFNG-EP00,3-GS49	BCS00ZW BCS S44KK02-NOCFNG-EP00,3-GS49	BCS00ZY BCS S44KK03-PSCFNG-EP00,3-GS49	BCS00ZZ BCS S44KK03-POCFNG-EP00,3-GS49	BCS0100 BCS S44KK03-NSCFNG-EP00,3-GS49	BCS0101 BCS S44KK03-NOCFNG-EP00,3-GS49	BCS0102 BCS S44KK01-GPCFNG-EP02	BCS0103 BCS S44KK02-GPCFNG-EP02	BCS0104 BCS S44KK03-GPCFNG-EP02
	Level adjustable 10 bar				Level adjustable 10 bar				Level adjustable 10 bar			Level adjustable 10 bar			
	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	-5...+105 °C (sensing surface) 10 Hz 0.3 m PUR cable with M8 connector, 3-pin				-5...+105 °C (sensing surface) 10 Hz 0.3 m PUR cable with M8 connector, 3-pin				-5...+105 °C (sensing surface) 10 Hz 0.3 m PUR cable with M8 connector, 3-pin			-5...+105 °C (sensing surface) 10 Hz 2 m PUR cable, 3x0.34 mm ²			



	M18x1				R3/8"				NPTF3/8"						
	BCS006H BCS S01T401-PSCFNG-KM16-T02	BCS006J BCS S01T401-POCFNG-KM16-T02	BCS006K BCS S01T401-NSCFNG-KM16-T02	BCS006L BCS S01T401-NOCFNG-KM16-T02	BCS006M S02T401-PSCFNG-KM16-T02	BCS006N S02T401-POCFNG-KM16-T02	BCS006P S02T401-NSCFNG-KM16-T02	BCS006R S02T401-NOCFNG-KM16-T02	BCS00A6 S03T401-PSCFNH-KM16-T02	BCS00A7 S03T401-POCFNH-KM16-T02	BCS00A8 S03T401-NSCFNH-KM16-T02	BCS00A9 S03T401-NOCFNH-KM16-T02			
	Level adjustable up to 10 bar				Level adjustable up to 10 bar				Level adjustable up to 10 bar						
	■	■	■	■	■	■	■	■	■	■	■	■			
	-30...+125 °C 5 Hz Screw terminals, 3x0.34 mm ²				-30...+125 °C 5 Hz Screw terminals, 3x0.34 mm ²				-30...+125 °C 5 Hz Screw terminals, 3x0.34 mm ²						

High-pressure Rated Inductive Sensors

M5x0.5, M8x1, M12x1 M18x1



Size	M5x0.5									
Order code										
Part number	BHS006U BHS G409N-PSD10-EP02	BHS006W BHS G409N-POD10-EP02	BHS006Y BHS G409N-NSD10-EP02	BHS006N BHS G403N-PSD10-S26	BHS006P BHS G403N-POD10-S26	BHS006R BHS G403N-NSD10-S26	BHS005H BHS G408N-PSC10-S49	BHS005F BHS G408N-POC10-S49	BHS005E BHS G408N-NSC10-S49	
Length	32 mm			40.6 mm			47 mm			
Installation dimensions	Ø 4.2g6			Ø 4.2g6			Ø 4.2g6			
Pressure range	up to 500 bar			up to 500 bar			up to 500 bar			
Supply voltage	10...30 V			10...30 V			10...30 V			
Rated switching distance	1 mm			1 mm			1 mm			
PNP NO	■			■			■			
PNP NC		■			■			■		
NPN NO			■			■			■	
NPN NC										
Temperature range	-25...+80 °C			-25...+80 °C			-25...+80 °C			
Switching frequency	3 KHz			3 KHz			3 KHz			
Connection	2 m PUR cable, 3x0.1 mm ²			M5 connector, 3-pin			M8 connector, 3-pin			



Size	M12x1										
Order code											
Part number	BHS0023 BES 516-300-S164-S4-D	BHS0032 BES 516-300-S262-S4-D	BHS0033 BES 516-300-S265-S4-D	BHS002Y BES 516-300-S249-S4-D	BHS005Y BHS B249V-PSD15-S04	BHS0063 BHS B400V-PSD15-S04	BHS0061 BHS B265V-PSD15-S04	BHS0021 BES 516-300-S162-S4-D	BHS001L BES 516-300-S135-S4-D	BHS005R BHS B135V-PSD15-S04	
Length	138 mm	50 mm	56 mm					69 mm	78 mm		
Installation dimensions	Ø 10e7	Ø 10e7	Ø 10e7					Ø 10e7	Ø 10e7		
Pressure range	500 bar	500 bar	500 bar					500 bar	500 bar		
Supply voltage	10...30 V	10...30 V	10...30 V					10...30 V	10...30 V		
Rated switching distance	1.5 mm	1.5 mm	1.5 mm					1.5 mm	1.5 mm		
PNP NO	■	■	■	■	■	■	■	■	■	■	
PNP complementary											
Temperature range	-25 ... +80 °C	-25 ... +90 °C	-25 ... +80 °C	-25 ... +80 °C	-25... +120 °C	-25... +120 °C	-25... +120 °C	-25 ... +80 °C	-25 ... +80 °C	-25... +120 °C	
Switching frequency	1 kHz	2 kHz	2 kHz	2 kHz	400 Hz	400 Hz	400 Hz	2 kHz	1 kHz	400 Hz	
Connection	M12 connector, 4-pin										



M8 x 1

BHS0054 BHS A404N-PSC15-S49	BHS0053 BHS A404N-POC15-S49	BHS0052 BHS A404N-NSC15-S49	BHS0051 BHS A404N-NOC15-S49	BHS0050 BHS A402N-PSC15-S49	BHS004Y BHS A402N-NSC15-S49	BHS004Z BHS A402N-POC15-S49	BHS004W BHS A402N-NOC15-S49	BHS0058 BHS A407N-PSD15-BP02	BHS0057 BHS A407N-POD15-BP02	BHS0056 BHS A407N-NSD15-BP02	BHS0055 BHS A407N-NOD15-BP02
45 mm				55 mm				31.3 mm			
Ø 6.5g6				Ø 6.5g6				Ø 6.5g6			
up to 500 bar				up to 500 bar				up to 500 bar			
10...30 V				10...30 V				10...30 V			
1.5 mm				1.5 mm				1.5 mm			
■	■	■	■	■	■	■	■	■	■	■	■
0...+80 °C				-25...+80 °C				-25...+80 °C			
4 kHz				4 kHz				4 kHz			
M8 connector, 3-pin				M8 connector, 3-pin				2 m PUR cable, 3x0.1 mm ²			

Temperature output



M18x1

BHS005T BHS B135V-PSD15-S04-T01	BHS0001 BES 516-100-S45-S4-D	BHS0049 BES 516-300-S298-S4-D	BHS0076 BHS B135V-PAD15-S04-007	BHS0022 BES 516-300-S163-S4-D	BHS004C BES 516-300-S300-S4-D	BHS0060 BHS B249V-PSD25-S04-003	BHS0065 BHS B400V-PSD25-S04-003	BHS0062 BHS B265V-PSD25-S04-003	BHS005U BHS B135V-PSD25-S04-003	BHS004A BES 516-300-S299-S4-D	BHS004J BES 516-300-S308-S4-D	BHS0026 BES 516-300-S190-S4	BHS0027 BES 516-300-S203
				93 mm		56 mm				55 mm		58 mm	61 mm
				Ø 10e7		Ø 10e7				Ø 15f6		Ø 16f7	Ø 16f7
				500 bar		500 bar							
				10...30 V		10...30 V							
				1.5 mm		2.5 mm	1.5 mm	2.5 mm	2.5 mm	1.5 mm		3 mm	3 mm
■	■	■	■	■	■	■	■	■	■	■	■	■	■
-25...+120 °C	-25...+80 °C		-25 ...+85 °C	-25...+80 °C		-25...+90 °C				-25 ...+80 °C		-25 ...+80 °C	-25 ...+80 °C
400 Hz	1 kHz	1 kHz	1.5 kHz	1 kHz		400 Hz				2 kHz		400 Hz	1 kHz
										M12 connector, 4-pin			

High-pressure Rated and Explosion Protected Inductive Sensors

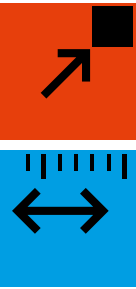
**M12x1, M18x1,
NAMUR isolating amplifier**



Size	M12x1					M18x1
Order code						
Part number	BHS004M BES 516-300-S321-NEX-S4-D	BHS0031 BES 516-300-S262-NEX-S4-D	BHS002W BES 516-300-S249-NEX-S4-D	BHS001K BES 516-300-S135-NEX-S4-D	BHS005P BHS B135V-PSD15-NEX-S04	BHS004H BES 516-300-S308-NEX-S4-D
Length	78 mm	78 mm	56 mm	78 mm		55 mm
Installation dimensions	Ø 10e7	Ø 10e7	Ø 10e7	Ø 10e7		Ø 15f6
Designation	Zone 2	Zone 2	Zone 2	Zone 2		Zone 2
Pressure range	350 bar	500 bar	500 bar	500 bar		500 bar
Supply voltage	10...30 V	10...30 V	10...30 V	10...30 V		10...30 V
Rated switching distance	1.5 mm	1.5 mm	1.5 mm	1.5 mm		1.5 mm
PNP NO	■	■	■	■	■	■
Temperature range	-25...+80 °C	-25...+90 °C	-25...+80 °C	-25...+80 °C	-25...+120 °C	-25...+80 °C
Switching frequency	1 kHz	2 kHz	2 kHz	1 kHz	400 Hz	2 kHz
Connection	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin		M12 connector, 4-pin



Size	99x17.6x114.5 mm	
Order code		
Part number	FHW004P STAHL 9170/20-12-11S	FHW004R STAHL 9170/20-12-21S
Input	NAMUR-specification	
Output relay	2-channel, 1 converter Switching voltage 250 V AC Switching current 4 A AC Switching capacity 50 W/1000 VA	
Function change	via switch	
Supply voltage U _s	24 V DC	120...230 V AC
Ambient temperature T _a	-20...+60 °C	
Marking for Ex area	EX II (1) GD [Ex ia] IIC/IIB and EX II 3 G EEx nAC II T4	



M12x1 NAMUR	
BHS004L BES 516-300-S318-S4-N	BHS004K BES 516-300-S315-S4-N
Ø 10e7	
EX II 2 G EX ia IIC T6	
500 bar	
10...30 V	
1.5 mm	
-25...+70 °C	
1 kHz	
M12 connector, 4-pin	

Size	M12x1
Order code	BAW0040 BAW Z08EO-UAD20B-S04G-H11
Part number	
Length	78.1 mm
Installation dimensions	Ø 10e7
Designation	
Pressure range	500 bar
Supply voltage	15...30 V
Output signal	0...10 V
Repeat accuracy R _{BWN}	±8.0 µm
Limit frequency	1 kHz
Measuring range	0.5... 2 mm
Temperature range	-25...+80 °C
Connection	M12 connector, 3-pin



Size	23.165...115.8 mm		
Part number	BES 516-300-S 295/0.912" ...4.560" -S4	BES 516-200-S 2/0.912" ...4.560" -S 21	BES 516-200-S 2/0.912" ...4.560" S5
Pressure range	207 bar/3000psi	207 bar/3000psi	207 bar/3000psi
Supply voltage	10...30 V DC	20...250 V AC/DC	20...250 V AC/DC
Rated switching distance	2 mm	2 mm	2 mm
PNP NO			
Temperature range	-25...+70 °C	-25...+70 °C	-25...+70 °C
Switching frequency	10 Hz	50 Hz	50 Hz
Connection	M12 connector, 4-pin BCC M415-0000-IA-003-EX44T2-020	1/2"-20UNF-2A plug connector, 3-pin C21-AE3-00-TY-060F	7/8"-16UN plug connector, 5-pin, BCC A314-0000-IO-003-EX44W6-020

Fieldbus Modules P111

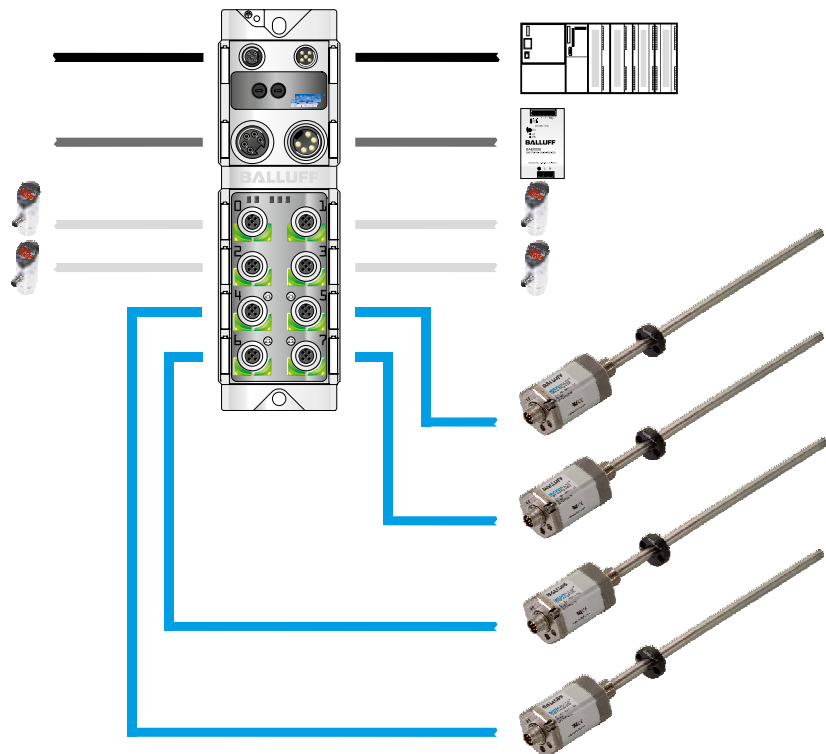
For easy connection of Micropulse transducers



Fieldbus/version	Profibus/4x P111, 8x DI	Profibus/4x P111, 4x AI (0...10 V/4...20 mA)
Order code Part number	BN10064 BN1-PBS-551-001-Z001	BN10065 BN1-PBS-552-001-Z001
Inputs	digital	Analog
No. of I/O ports	8	8
No. of digital inputs	8 PNP	
No. of analog inputs		4 (0...10 V/4...20 mA)
No. of P111 inputs	4	4

Profibus modules P111 are designed for connecting Micropulse transducers. Profibus modules P111 fulfill the highest mechanical standards through their resistant metal housing.

The modules are fitted with four independent ports to separately connect four Micropulse transducers BTL. A maximum of 16 position encoders can be used per BTL port. The maximum rated length measures 7500 mm. Depending on design, four additional ports can be assigned digital or analog sensors.



For information on our micropulse transducers BTL and BIW, refer to our catalog or visit our website at www.balluff.com

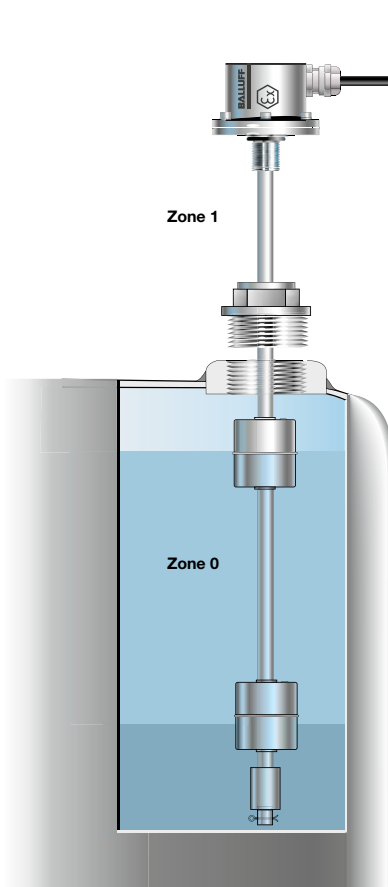
Filling Level Sensor in Zone 0/1

Reliably measure oil level



Float Zone 0

Description for Series	Parabolic float Rod BTL	Ball float Rod BTL	Cylindrical float Rod BTL	Cylindrical float Rod BTL
Order code Part number	BAM014E BTL2-S-6216-8P-EX	BAM014A BTL2-S-5113-4K-EX	BAM0147 BTL2-S-4414-4Z-EX	BAM0148 BTL2-S-4414-4Z01-EX
Immersion depths given $\rho = 1 \text{ g/cm}^3(\text{H}_2\text{O})$	$s_s \sim 41 \text{ mm}$	$s_s \sim 26 \text{ mm}$	$s_s \sim 30 \text{ mm}$	$s_s \sim 45 \text{ mm}$
Immersion depths given $\rho = 0.7 \text{ g/cm}^3$	$s_s \sim 57 \text{ mm}$	$s_s \sim 40 \text{ mm}$	$s_s \sim 39 \text{ mm}$	submerges
Operating temperature	-20...+130 °C	-20...+120 °C	-20...+120 °C	-20...+120 °C



Series	Rod DEX BTL5
Part number	BTL5-1M-...-DEX-...
Shock load	100 g/6 ms in accordance with EN 60068-2-27 and 100 g/2 ms in accordance with EN 60068-2-29
Vibration	12 g, 10...2000 Hz in accordance with EN 60068-2-6
Operating temperature	-40 to +60 °C
Polarity reversal protected	Yes
Overvoltage protection	TransZorb protection diodes
Dielectric strength	500 V DC (GND to housing)
Degree of protection as per IEC 60529	IP 67
Housing material	Stainless steel 1.4305
Flange and tube material	Tube stainless steel 1.4571, flange 1.4571 or 1.4429 or 1.4404
Housing attachment	Model B thread M18x1.5, model Z 3/4" 16 UNF, model K fit 18h6 with 6 cheese-head screws
Connection	Cable connection
EMC testing	
Radio interference emission	EN 55016-2-3 (industrial and residential area)
Static electricity (ESD)	EN 61000-4-2 Severity level 3
Electromagnetic fields (RFI)	EN 61000-4-3 Severity level 3
Electrical fast transient bursts (BURST)	IEC 61000-4-4 Severity level 4
Conducted interference induced by high-frequency fields	EN 61000-4-6 Severity level 3

Inclination Sensors

Standard and high-end designs



Size		Micro-Electro-Mechanical Systems (MEMS)										
Order code												
Part number		BSI000J	BSI000K	BSI000P	BSI000R	BSI000H	BSI000M	BSI000N	BSI000T	BSI000U	BSI000L	
		BSI Q41K0-XB-MXS015-S92	BSI Q41K0-XB-MXS030-S92	BSI Q41K0-XB-MXS045-S92	BSI Q41K0-XB-MXS090-S92	BSI Q41K0-XB-MXP360-S92	BSI Q41K0-XA-MXS015-S92	BSI Q41K0-XA-MXS030-S92	BSI Q41K0-XA-MXS045-S92	BSI Q41K0-XA-MXS090-S92	BSI Q41K0-XA-MXP360-S92	
Supply voltage		10...30 V DC					10...30 V DC					
Number of axis		1	1	1	1	1	1	1	1	1	1	
Measuring range	15°	■					■					
	30°		■					■				
	45°			■					■			
	90°				■					■		
	360°					■					■	
Accuracy		0.6°	0.6°	0.8°	0.8°	1.0°	0.6°	0.6°	0.8°	0.8°	1.0°	
Resolution		0.09°					0.09°					
Output signal		4...20 mA					0...10 V					
Housing		PBTP					PBTP					
Dimensions		40x40x25 mm					40x40x25 mm					
Temperature range		-25...+85 °C					-25...+85 °C					
Connection		M12 connector, 5-pin					M12 connector, 5-pin					



Size		Micro-Electro-Mechanical Systems (MEMS)										
Order code												
Part number		BSI001E	BSI0018	BSI0019	BSI001A	BSI0015	BSI001C	BSI0017	BSI001F	BSI0005	BSI0016	
		BSI R65K0-XB-MXS015-S115	BSI R65K0-XB-MXS030-S115	BSI R65K0-XB-MXS045-S115	BSI R65K0-XB-MXS090-S115	BSI R65K0-XB-MXP360-S115	BSI R65K0-XA-MXS015-S115	BSI R65K0-XA-MXS030-S115	BSI R65K0-XA-MXS045-S115	BSI R65K0-XA-MXS090-S115	BSI R65K0-XA-MXP360-S115	
Supply voltage		10...30 V DC					10...30 V DC					
Number of axes		1	1	1	1	1	1	1	1	1	1	
Measuring range	15°	■					■					
	30°		■					■				
	45°			■					■			
	90°				■					■		
	360°					■					■	
Accuracy		0.2°	0.2°	0.2°	0.2°	0.25°	0.2°	0.2°	0.2°	0.2°	0.25°	
Resolution		0.01°					0.01°					
Output signal		4...20 mA					0...10 V					
Housing		PBTP					PBTP					
Dimensions		60x50x27 mm					60x50x27 mm					
Temperature range		-40...+85 °C					-25...+85 °C					
Connection		M12 connector, 8-pin					M12 connector, 8-pin					



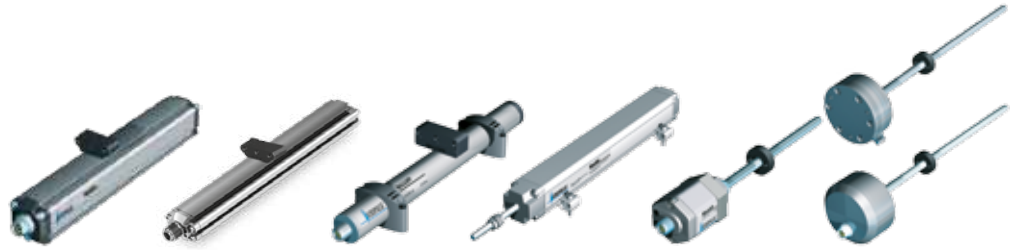
	BSI000W BSI Q41K0-XB-MYS015-S92	BSI000Y BSI Q41K0-XB-MYS030-S92	BSI0011 BSI Q41K0-XB-MYS045-S92	BSI0012 BSI Q41K0-XB-MYS090-S92	BSI000Z BSI Q41K0-XA-MYS015-S92	BSI0010 BSI Q41K0-XA-MYS030-S92	BSI0013 BSI Q41K0-XA-MYS045-S92	BSI0014 BSI Q41K0-XA-MYS090-S92				
	10...30 V DC				10...30 V DC							
	2	2	2	2	2	2	2	2				
	■	■	■	■	■	■	■	■				
	0.6°	0.6°	0.8°	0.8°	0.6°	0.6°	0.8°	0.8°				
	0.09°				0.09°							
	4...20 mA				0...10 V							
	PBTP				PBTP							
	40x40x25 mm				40x40x25 mm							
	-25...+85 °C				-25...+85 °C							
	M12 connector, 5-pin				M12 connector, 5-pin							



	BSI0006 BSI R65K0-XB-MYS015-S115	BSI0007 BSI R65K0-XB-MYS030-S115	BSI0008 BSI R65K0-XB-MYS045-S115	BSI0009 BSI R65K0-XB-MYS090-S115	BSI000A BSI R65K0-XA-MYS015-S115	BSI000C BSI R65K0-XA-MYS030-S115	BSI000E BSI R65K0-XA-MYS045-S115	BSI000F BSI R65K0-XA-MYS090-S115	Capacitive			
	10...30 V DC				10...30 V DC				0...30 V DC			
	2	2	2	2	2	2	2	2	1	1	1	
	■	■	■	■	■	■	■	■	■	■	■	
	0.12°	0.12°	0.2°	0.2°	0.12°	0.12°	0.2°	0.2°	0.1°	0.1°	0.1°	
	0.01°				0.01°				0.01°			
	4...20 mA				0...10 V				4...20 mA	4...20 mA	Modbus	
	PBTP				PBTP				Aluminum			
	60x50x27 mm				60x50x27 mm				79x21x28 mm			
	-25...+85 °C				-25...+85 °C				-40...+85 °C			
	M12 connector, 8-pin				M12 connector, 8-pin				M8 connector, 4-pin			

Micropulse Transducers

Product overview

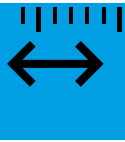
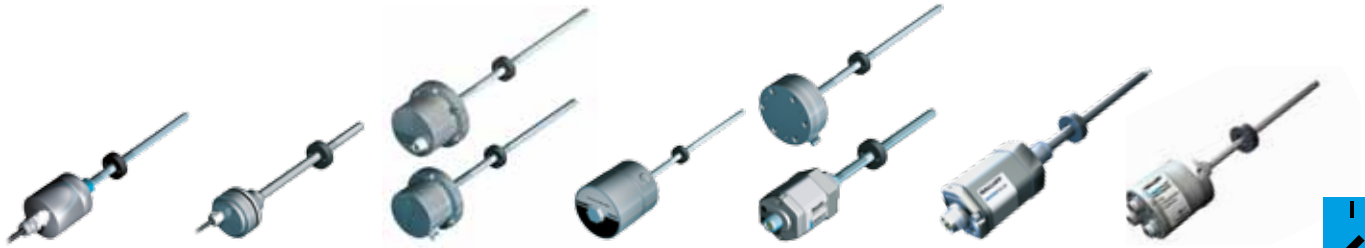


Series	Profile style	Profile style	Profile AT	Profile BIW	Rod	Rod Compact	
Design	P	PF	A1	P1	B, A, Z, Y	H, K, W	
Installation version e.g. in hydraulic cylinders					■	■	
External fitting version e.g. on machine frames	■	■	■	■			
Application area	Pressing					Power plants, sawmills, tunnel drilling machines	
Special Properties	Standard	Flat Design		Extremely fast	Standard	Flat design	
Special approvals							
Position Encoders	Floating/cap- tive	Floating/cap- tive	Floating	Captive push rod	Free or floating	Free or floating	
Multi-position encoder	■		■		■		
Interfaces							
Analog voltage	0...10 V, 10...0 V	■	■	■	■	■	■
	-10 V...+10 V	■	■	■	■	■	■
Analog current	4...20 mA	■	■	■	■	■	■
	0...20 mA	■	■	■	■	■	■
SSI	■				■	■	
SSI-SYNC	■				■	■	
CANopen	■				■	■	
DeviceNet	■						
Profibus DP	■				■		
Start/stop pulse interface	■		■		■		
VARAN			■				
EtherCAT	■		■		■		
IO-Link		■					



For information on our micropulse transducers BTL and BIW, refer to our new catalog or visit our website at www.balluff.com

MICROPULSE®



	Rod Pro Compact HB/WB	Rod AR E2/E28	Rod DEX B/J	Rod J-DEXC TA12 C	Rod NEX K, B, Z	Rod high-pressure resistant NEX CD	Rod Redundant T
	■	■	■	■	■		
Offshore, steel hydraulics engineering, steel mills		Mobile working machines	Oil, gas, steel mills	Offshore, oil and gas	Power plants	Heavy-duty cylinders	Ship technology, power plants
Outdoor system		Vehicle approval	Potentially explosive Operation	Potentially explosive Operation	Potentially explosive Operation	High-pressure resistant rated to 1000 bar	Increased safety
IP 69K Stainless steel 1.4404 Seawater-resistant		KBA, e1	Flameproof "d," Zone 0/1, Zone 22, ATEX, IECex, KC, EAC	Flameproof "d," Zone 0/1, Zone 20, ATEX, IECex, CSA	Ignition protection type "n" Zone 2, Zone 21, ATEX, IECex, CSA	Ignition protection type "n" Zone 2, Zone 21, ATEX	2 or 3 times redundant
Free or floating		Free or floating	Free or floating	Free or floating	Free or floating		Free or floating
	■	■	■	■	■	■	■
	■	■	■	■	■	■	■
	■	■	■	■	■	■	■
	■	■	■	■	■	■	■
	■	■	■	■	■	■	■
	■	■	■	■	■	■	■
	■	■	■	■	■	■	■
	■	■	■	■	■	■	■
	■	■	■	■	■	■	■
	■	■	■	■	■	■	■

Pressure Sensors

Pressure transmitters

Current variants 4...20 mA

Voltage variants 0...10 V DC



Current variants 4...20 mA



Order code Part number	BSP00FW BSP V002-DV004-A06A1A-S4	BSP00H1 BSP B010-DV004-A06A1A-S4	BSP00H5 BSP B250-DV004-A06A1A-S4	BSP00F3 BSP B400-DV004-A06A1A-S4	BSP00H6 BSP B600-DV004-A06A1A-S4	BSP00H7 BSP V002-FV004-A06A1A-S4	BSP00HC BSP B010-FV004-A06A1A-S4	BSP00HJ BSP B250-FV004-A06A1A-S4	BSP00HK BSP B400-FV004-A06A1A-S4	BSP00HL BSP B600-FV004-A06A1A-S4
Supply voltage U_s	8...32 V DC					8...32 V DC				
Length	76 mm					76 mm				
-1...2 bar (-14.5...29 psi)	■					■				
0...10 bar (0...145 psi)		■					■			
0...250 bar (0...3626 psi)			■					■		
0...400 bar (0...5802 psi)				■					■	
0...600 bar (0...8702 psi)					■					■
Ambient/media temperature	-40...+85 °C/-40...+125 °C					-40...+85 °C/-40...+125 °C				
Connection	M12 connector, 4-pin					M12 connector, 4-pin				
Process connection	G1/4"					NPT1/4"				

Voltage variants 0...10 V DC



Order code Part number	BSP00JE BSP V002-DV004-A04A1A-S4	BSP00JK BSP B010-DV004-A04A1A-S4	BSP00JP BSP B250-DV004-A04A1A-S4	BSP00JR BSP B400-DV004-A04A1A-S4	BSP00JT BSP B600-DV004-A04A1A-S4	BSP00JU BSP V002-FV004-A04A1A-S4	BSP00KO BSP B010-FV004-A04A1A-S4	BSP00K4 BSP B250-FV004-A04A1A-S4	BSP00K5 BSP B400-FV004-A04A1A-S4	BSP00K6 BSP B600-FV004-A04A1A-S4
Supply voltage U_s	10...30 V DC					10...30 V DC				
Length	76 mm					76 mm				
-1...2 bar (-14.5...29 psi)	■					■				
0...10 bar (0...145 psi)		■					■			
0...250 bar (0...3626 psi)			■					■		
0...400 bar (0...5802 psi)				■					■	
0...600 bar (0...8702 psi)					■					■
Ambient/media temperature	-40...+85 °C/-40...+125 °C					-40...+85 °C/-40...+125 °C				
Connection	M12 connector, 4-pin					M12 connector, 4-pin				
Process connection	G1/4"					NPT1/4"				



BSP00HM BSP V002-KV004-A06A1A-S4	BSP00HT BSP B010-KV004-A06A1A-S4	BSP00HZ BSP B250-KV004-A06A1A-S4	BSP00JO BSP B400-KV004-A06A1A-S4	BSP00J1 BSP B600-KV004-A06A1A-S4	BSP00J2 BSP V002-HV004-A06A1A-S4	BSP00J6 BSP B010-HV004-A06A1A-S4	BSP00J9 BSP B250-HV004-A06A1A-S4	BSP00JA BSP B400-HV004-A06A1A-S4	BSP00JC BSP B600-HV004-A06A1A-S4		
8...32 V DC 76 mm					8...32 V DC 74.5 mm						
■	■	■	■	■	■	■	■	■	■	■	
-40...+85 °C/-40...+125 °C M12 connector, 4-pin R1/4"					-40...+85 °C/-40...+125 °C M12 connector, 4-pin G1/2"						



BSP00K7 BSP V002-KV004-A04A1A-S4	BSP00KC BSP B010-KV004-A04A1A-S4	BSP00KJ BSP B250-KV004-A04A1A-S4	BSP00KK BSP B400-KV004-A04A1A-S4	BSP00KL BSP B600-KV004-A04A1A-S4	BSP00KM BSP V002-HV004-A04A1A-S4	BSP00KT BSP B010-HV004-A04A1A-S4	BSP00KZ BSP B250-HV004-A04A1A-S4	BSP00LO BSP B400-HV004-A04A1A-S4	BSP00L1 BSP B600-HV004-A04A1A-S4		
10...30 V DC 76 mm					10...30 V DC 76 mm						
■	■	■	■	■	■	■	■	■	■	■	
-40...+85 °C/-40...+125 °C M12 connector, 4-pin R1/4"					-40...+85 °C/-40...+125 °C M12 connector, 4-pin G1/2"						



PNP pressure sensors

Order code Part number	BSP00CF BSP V002-EV003-D00S1B-S4	BSP00CL BSP B010-EV003-D00S1B-S4	BSP00CR BSP B250-EV003-D00S1B-S4	BSP00CT BSP B400-EV003-D00S1B-S4	BSP00CU BSP B600-EV003-D00S1B-S4	BSP00AM BSP V002-EV003-A00S1B-S4	BSP00AT BSP B010-EV003-A00S1B-S4	BSP00AZ BSP B250-EV003-A00S1B-S4	BSP00C0 BSP B400-EV003-A00S1B-S4	BSP00C1 BSP B600-EV003-A00S1B-S4
Supply voltage U_b	18...36 V DC					18...36 V DC				
Length	94 mm					94 mm				
-1...2 bar (-14.5...29 psi)	■					■				
0...10 bar (0...145 psi)		■					■			
0...250 bar (0...3626 psi)			■					■		
0...400 bar (0...5802 psi)				■					■	
0...600 bar (0...8702 psi)					■					■
Ambient/media temperature	-40...+85 °C/-40...+125 °C					-40...+85 °C/-40...+125 °C				
Connection	M12 connector, 4-pin					M12 connector, 4-pin				
Connectors	Internal thread G1/4" in accordance with DIN EN 3852					Internal thread G1/4" in accordance with DIN EN 3852				
Process connection	Internal thread G1/4" in accordance with DIN EN 3852					Internal thread G1/4" in accordance with DIN EN 3852				

Adapters for different process connections



Description	Adapter G1/4"	Adapter G1/4"	Adapter G1/2"
Order code Part number	BAM01KP BAM AD-SP-008-1G4/1G4-4	BAM01KR BAM AD-SP-008-1G4/1G4-4-EN837	BAM01UJ BAM AD-SP-008-1G4/1G2-4
Housing material	Stainless steel	Stainless steel	Stainless steel
Connection	Sensor-side Process-side	G1/4" in accordance with DIN EN 3852 G1/4" in accordance with DIN EN 3852	G1/4" in accordance with DIN EN 3852 G1/2" in accordance with DIN EN 3852



IO-Link

One programmable switching point and analog output 4...20 mA

	BSP00A7 BSP V002-EV003-A02S1B-S4	BSP00AC BSP B010-EV003-A02S1B-S4	BSP00AJ BSP B250-EV003-A02S1B-S4	BSP00AK BSP B400-EV003-A02S1B-S4	BSP00AL BSP B600-EV003-A02S1B-S4
18...36 V DC	■				
94 mm	■	■			
			■		
				■	
					■
-40...+85 °C / -40...+125 °C					
M12 connector, 4-pin					
Internal thread G1/4" in accordance with DIN EN 3852					



For information about our pressure sensors BSP, refer to our catalog or look online at www.balluff.com



Internal thread

	Adapter M20x1.5	Adapter R1/4"	Adapter NPT1/4"	Adapter NPT1/4"
BAM0209 BAM AD-SP-008-1G4/M20X1,5-4		BAM01RP BAM AD-SP-008-1G4/1R4-4	BAM01KT BAM AD-SP-008-1G4/1N4-4	BAM01TR BAM AD-SP-011-1G4/1N4-4
Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel
G1/4" in accordance with DIN EN 3852	G1/4" in accordance with DIN EN 3852	G1/4" in accordance with DIN EN 3852	G1/4" in accordance with DIN EN 3852	G1/4" in accordance with DIN EN 3852
M20x1.5	R1/4"	NPT1/4"	Internal thread NPT1/4"	

BALLUFF

sensors worldwide



Systems and Service



Industrial Networking and Connectivity



Industrial Identification



Object Detection



Linear Position Sensing and Measurement



Condition Monitoring and Fluid Sensors



Accessories

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