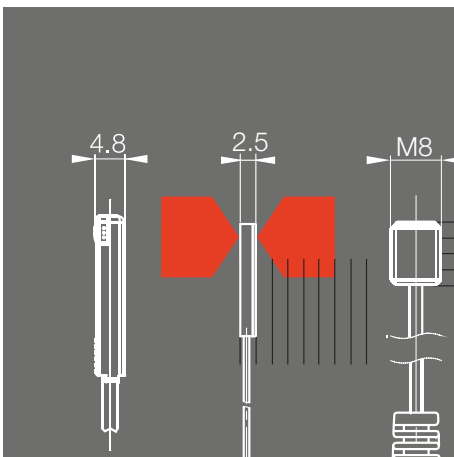


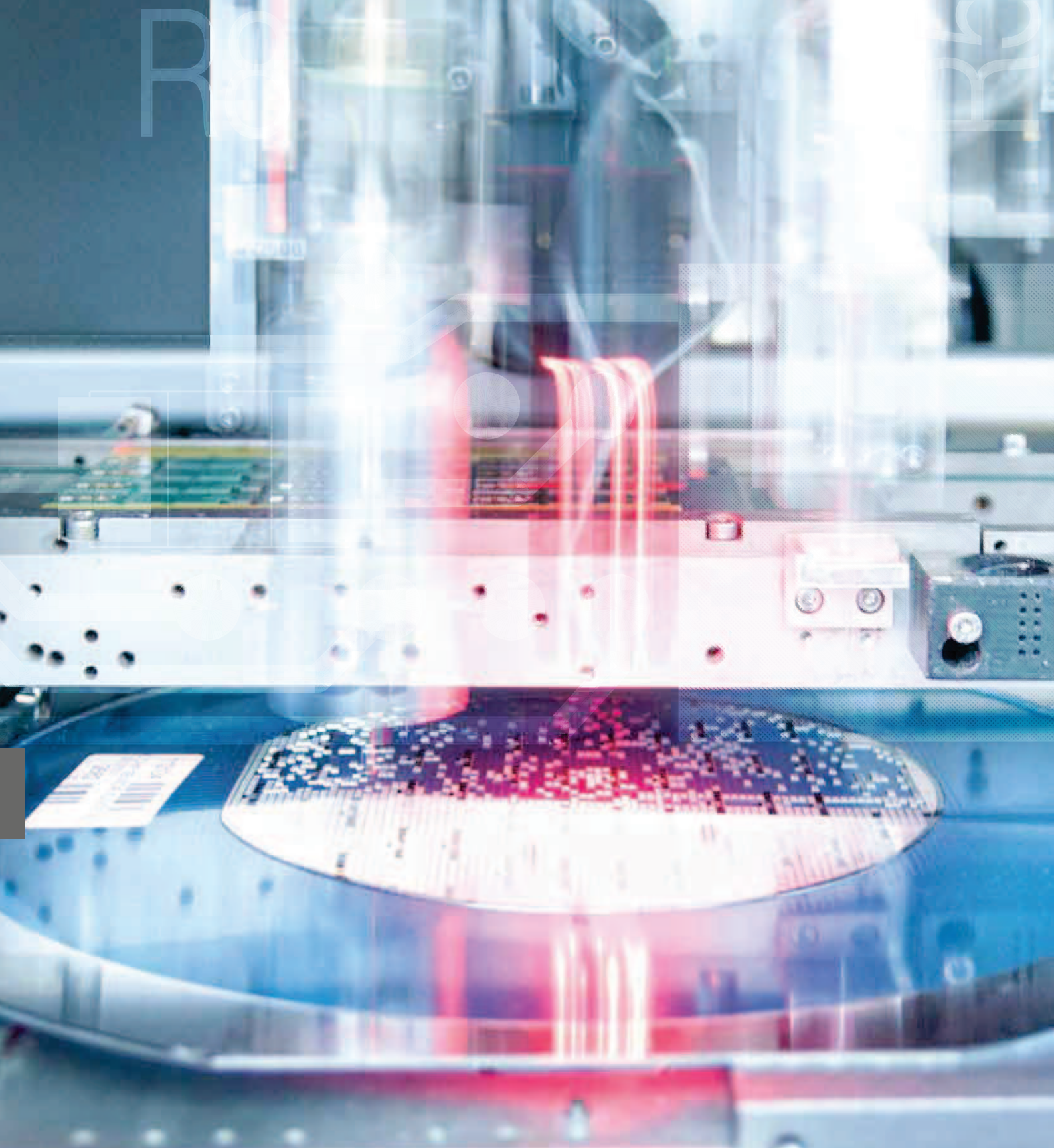
BALLUFF

sensors worldwide

Balluff mini.s

Compact sensors for factory automation





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Compact Sensors for Factory Automation



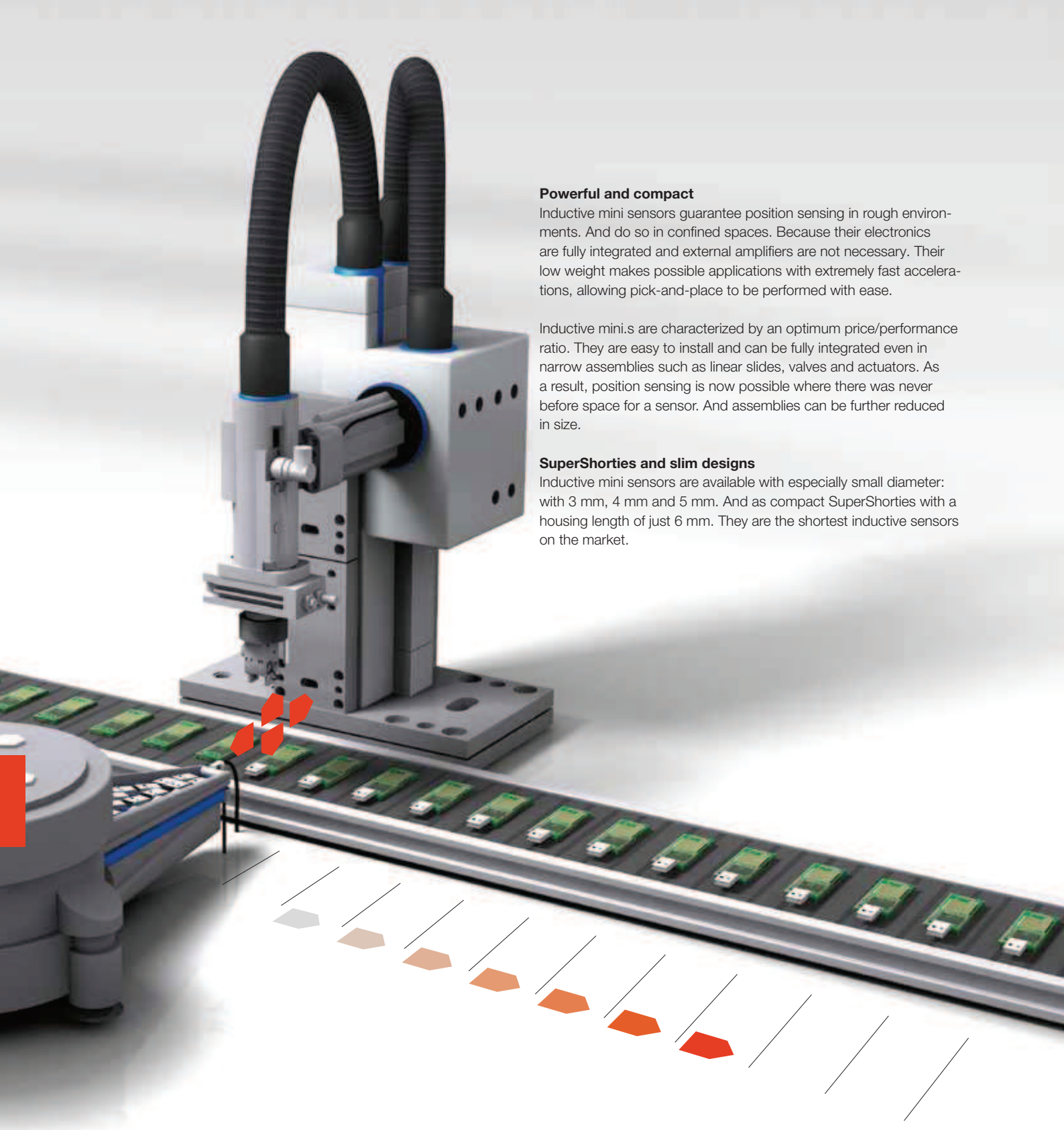
Mini design. Maxi performance!

The increasing miniaturization of assemblies demands the smallest and lightest possible yet still high-performance components. Balluff mini sensors meet these requirements. With small dimensions and top performance, they offer a great degree of freedom in design and make possible considerably more applications. With mini sensors, users have greater flexibility.

Miniature sensors are available from Balluff in all operating principles: as inductive, photoelectric, magnetic, capacitive and as ultrasonic sensors. Available for each sensor technology are compact inductive couplers, space-saving fieldbus modules and RFID in mini versions.

The extensive Balluff product line includes mini sensors and compact connection technology which are ideally suited for factory automation – especially for robotics, handling and production lines.

Because particularly in robotics, on production lines or in handling applications, low weight is a key requirement for being able to achieve fast cycle times. Another advantage is the reduced space requirement, which increases flexibility in a tightly packed machine compartment. The fact that Balluff mini.s guarantee high precision ensures the reliability required here.



Powerful and compact

Inductive mini sensors guarantee position sensing in rough environments. And do so in confined spaces. Because their electronics are fully integrated and external amplifiers are not necessary. Their low weight makes possible applications with extremely fast accelerations, allowing pick-and-place to be performed with ease.

Inductive mini.s are characterized by an optimum price/performance ratio. They are easy to install and can be fully integrated even in narrow assemblies such as linear slides, valves and actuators. As a result, position sensing is now possible where there was never before space for a sensor. And assemblies can be further reduced in size.

SuperShorties and slim designs

Inductive mini sensors are available with especially small diameter: with 3 mm, 4 mm and 5 mm. And as compact SuperShorties with a housing length of just 6 mm. They are the shortest inductive sensors on the market.

Inductive Mini Sensors

- The most compact on the market: can be fully integrated
- Unmatched in thinness and, as SuperShorty, unrivaled in shortness
- Low weight (0.7 g) for extreme accelerations

Inductive Mini Sensors

For position sensing in rough environments



SuperShorties



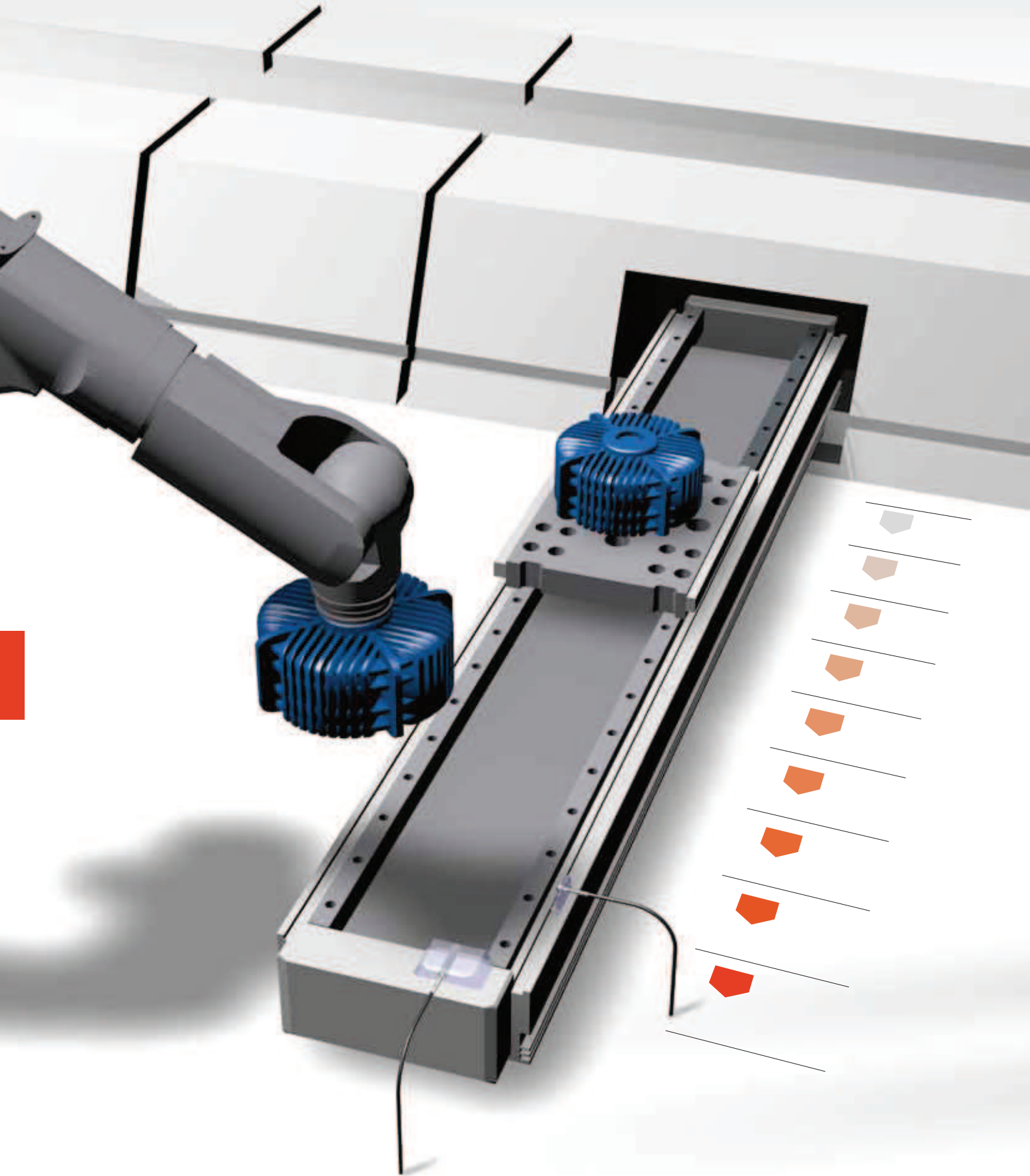
Dimensions	Ø 6.5x6 mm	M8x10 mm	M12x12 mm	8x20x8 mm
Mounting	flush	flush	flush	flush
Rated switching distance s_n	1.5 mm	1.5 mm	4 mm	2 mm
PNP, NO	Ordering code	BES0254	BES0273	BES0464
	Part number	BES G06E00-PSC15B-EP00,3-GS49	BES M08EA-PSC15B-EP00,3-GS49	BES M12EA-PSC40B-EP00,3-GS04
Supply voltage U_B	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
Switching frequency f	3 kHz	3 kHz	1 kHz	3 kHz
Housing/sensing surface material	Stainless steel/PBT	Stainless steel/PBT	Stainless steel/LCP	Stainless steel/PBT
Enclosure rating per IEC 60529	IP 67	IP 67	IP 67	IP 67
Connection	0.3 m PUR cable with M8 connector, 3-pin	0.3 m PUR cable with M8 connector, 3-pin	0.3 m PUR cable with M12 connector, 3-pin	0.3 m PUR cable with M8 connector, 3-pin

Small designs



Dimensions	Ø 3x27 mm	Ø 4x27 mm	M5x27 mm	5x25x5 mm
Mounting	flush	flush	flush	flush
Rated switching distance s_n	1 mm	1.5 mm	1.5 mm	1.5 mm
PNP, NO	Ordering code	BES00M5	BES00JJ	BES00HC
	Part number	BES 516-3044-G-E4-C-S49-00,3	BES 516-3007-G-E4-C-S49-00,3	BES 516-3006-G-E4-C-S49-00,3
Supply voltage U_B	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
Switching frequency f	2 kHz	3 kHz	3 kHz	2 kHz
Housing/sensing surface material	Stainless steel/POM	Stainless steel/PBT	Stainless steel/PBT	Stainless steel/PBT
Enclosure rating per IEC 60529	IP 67	IP 67	IP 67	IP 67
Connection	0.3 m PUR cable with M8 connector, 3-pin	0.3 m PUR cable with M8 connector, 3-pin	0.3 m PUR cable with M8 connector, 3-pin	0.3 m PUR cable with M8 connector, 3-pin

Accessories for Inductive mini.s
For mechanical protection and simple mounting




Accessories for Inductive mini.s

Mini-sensors require accessories that not only exactly match their compact design, but which are also precisely tailored to their usage conditions.

Fixing nuts

Inductive mini-sensors can be simply positioned everywhere with fixing nuts in an extremely small space. In just a few work steps, the mini.s can be securely mounted to housings and base plates. Fixing nuts ensure easy and cost-effective mounting.



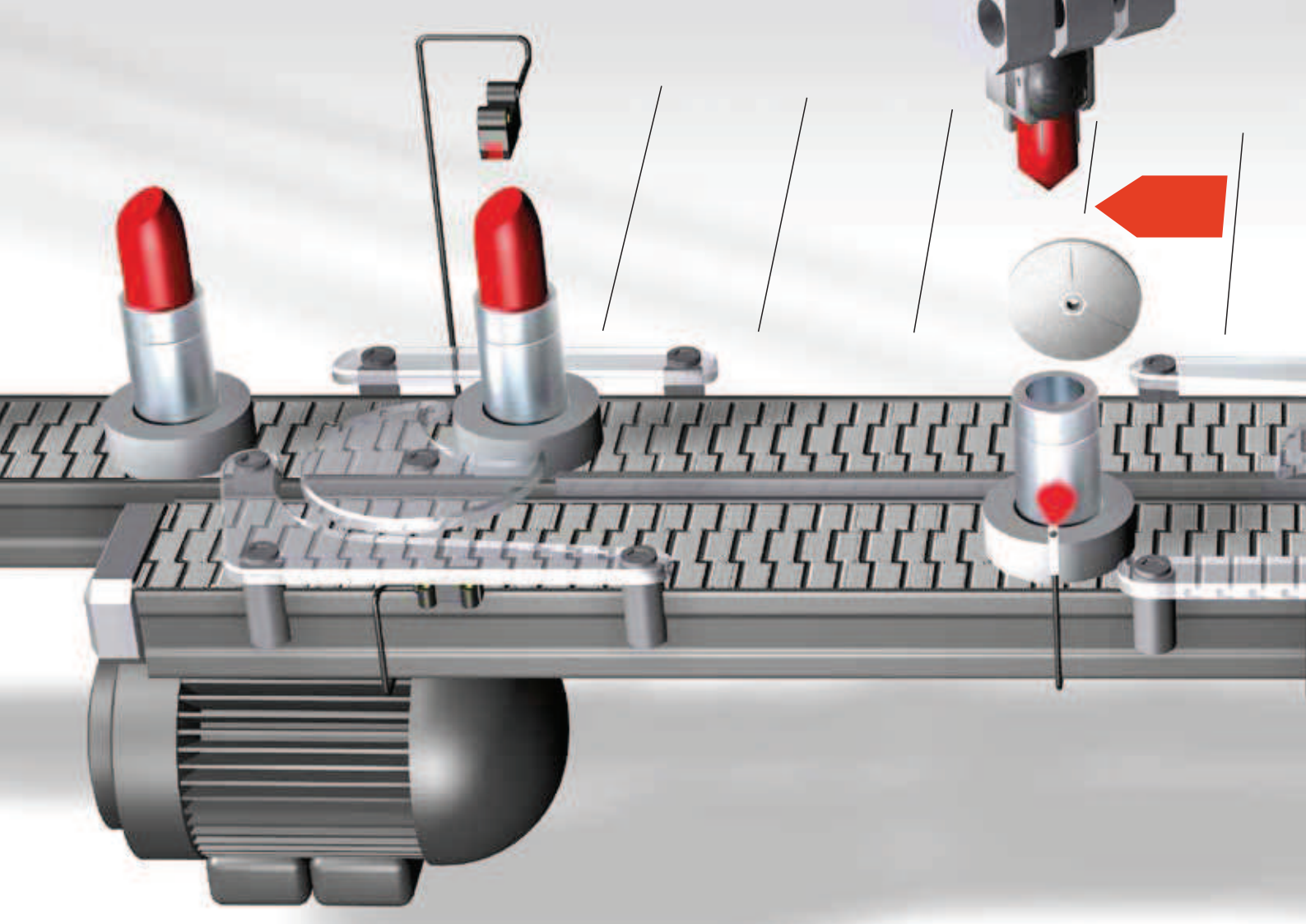
Use	For Ø 3 mm sensors and fiber optics with M5×0.8 fastening thread	For Ø 4 mm sensors and fiber optics with M6×1 fastening thread	For Ø 6.5 mm sensors with M8×1 fastening thread
Ordering code	BAM000T	BAM000U	BAM000W
Part number	BAM MC-XA-002-D03,0-2	BAM MC-XA-002-D04,0-2	BAM MC-XA-002-D06,5-2
WAF	5	6	8
Material	Nickel-plated brass	Nickel-plated brass	Nickel-plated brass

Tube switch

The tube switch, together with the inductive mini sensors, forms the smallest positive stop for factory automation. Even under rough conditions, it ensures high reproducibility and a particularly high stopping resistance.



Use	For Ø 4 mm sensors for mechanical protection	For M5 sensors for mechanical protection
Ordering code	BAM01C0	BAM01AZ
Part number	BAM FS-XE-002-D4-4	BAM FS-XE-001-M5-4
Spring force F (N)	3	3
Impact force F_{max} (N)	400	400
Min. switching operations (with F_{max})	500000	500000
Housing material	Stainless steel	Stainless steel



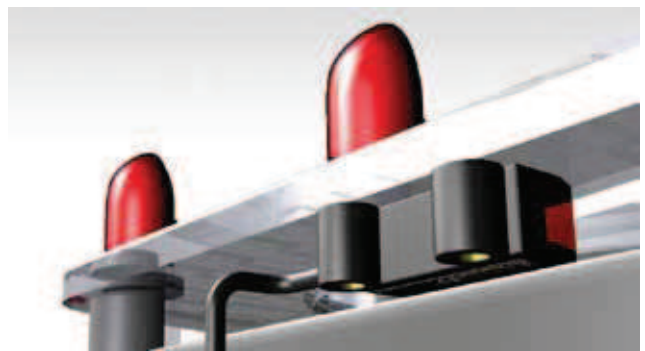
Photoelectric Mini Sensors

You can count on the photoelectric mini.s: if small parts need to be precisely detected in applications with limited space and if long ranges are important. They work absolutely reliably from less than one millimeter to distances of up to three meters.

- Long ranges of up to 3 m
- Large range of product variants
- Easy to operate, precise function

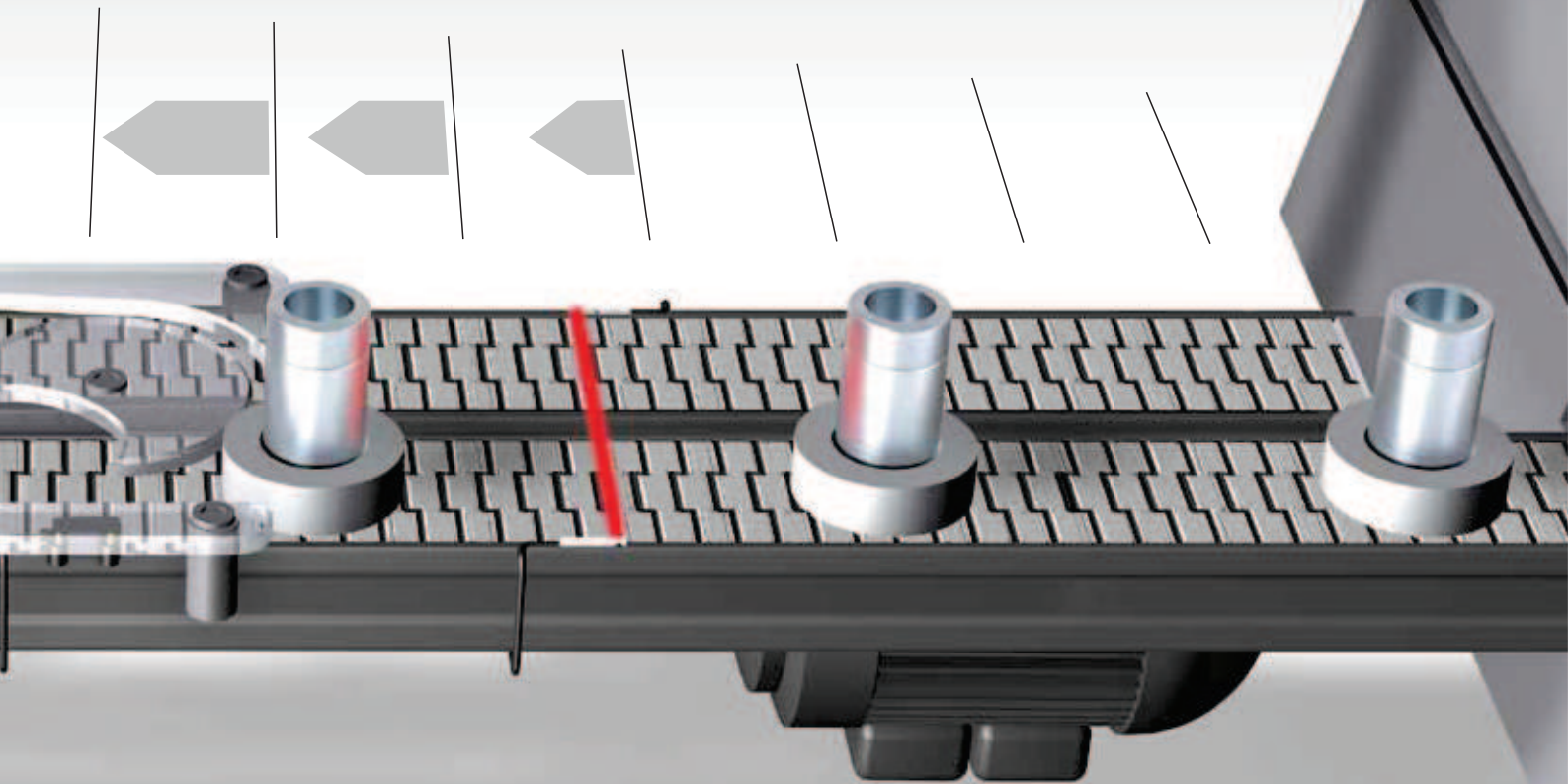
With their range of product variants, they are a reliable solution to all applications and offer a great degree of freedom in design.






Advanced laser technology, homogeneous red light or innovative pinpoint technology stand for high process accuracy. Diffuse sensors with background suppression reliably eliminate interfering influences. And the photoelectric mini.s are simple to operate.



Photoelectric Mini Sensors

Precisely detect small parts from a distance



Model	BOS 08M	BOS Q08M	BOS Q08M	BOS 2K
Dimensions	M8x57.5 mm	8x8x59 mm	8x8x59 mm	7.6x12.5x25.1 mm
Range		5...60 mm		1...30 mm
 Diffuse sensor with background suppression	Ordering code	BOS0160		BOS0106
	Part number	BOS Q08M-PS-KF20-S49		BOS 2K-PS-RH11-00,2-S49
Range	1...55 mm	1...55 mm		1...55 mm
 Energetic diffuse sensor	Ordering code	BOS0006	BOS0041	BOS00ZW
	Part number	BOS 08M-PS-RD11-S49	BOS Q08M-PS-RD11-S49	BOS 2K-PS-RD10-00,2-S49
Range	25...550 mm	25...550 mm		45...800 mm
 Retroreflective sensor	Ordering code	BOS00RC	BOS00U6	BOS00ZR
	Part number	BOS 08M-PS-PR11-S49	BOS Q08M-PS-PR11-S49	BOS 2K-PS-PR10-00,2-S49
Range	0...1100 mm	0...2200 mm	0...3000 mm	0...1200 mm
 Through-beam receiver	Ordering code	BOS00W9	BOS00YF	BOS0199
	Part number	BOS 08M-PS-RE11-S49	BOS Q08M-PS-KE20-S49	BOS Q08M-PS-LE20-S49
 Through-beam emitter	Ordering code	BOS0151	BOS00YK	BOS018K
	Part number	BOS 08M-X-RS11-S49	BOS Q08M-X-KS20-S49	BOS Q08M-X-LS20-S49
Supply voltage U_B	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
Emitter, light type	LED, red light (640 nm)	LED, red light (640 nm)	Laser, red light (650 nm)	LED, red light (640 nm)
Switching frequency f	400 Hz	400 Hz	400 Hz	800 Hz
Enclosure rating per IEC 60529	IP 67	IP 67	IP 67	IP 67
Housing/optical surface material	Nickel-plated brass/PMMA	Nickel-plated brass/PMMA	Nickel-plated brass/PMMA	ABS/PMMA
Connection	M8 connector, 3-pin	M8 connector, 3-pin	M8 connector, 3-pin	0.2 m PUR cable with M8 connector, 3-pin

Fiber Optics

- The tightest installation conditions
- Variety of end pieces
- Maximum flexibility



If very small parts need to be reliably detected and if tight installation conditions leave no space for even a mini sensor, fiber optics are the choice.

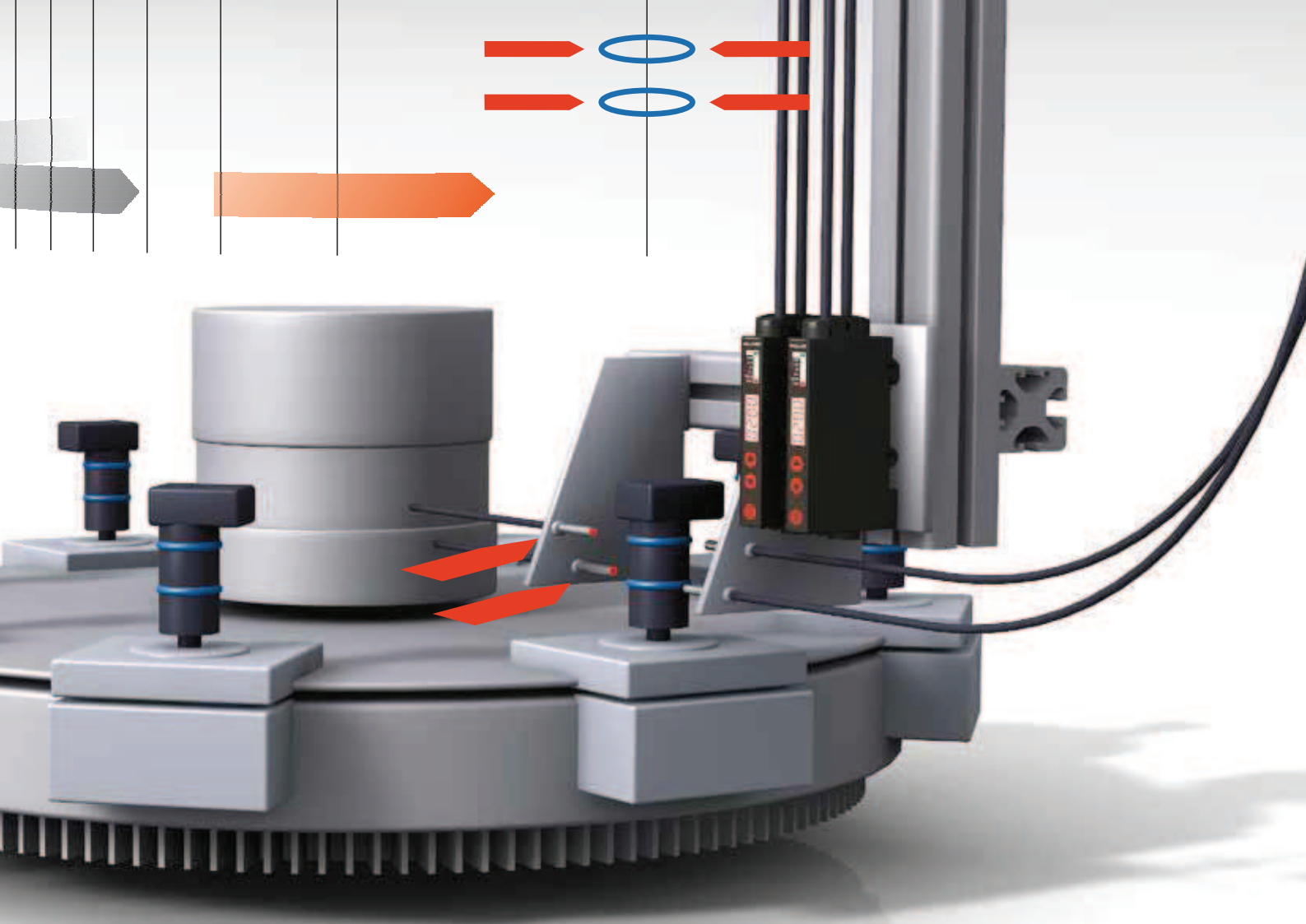
They bring high light intensity and create space, since they are to be very precisely positioned. Optical head and sensor electronics are connected to one another via elastic fibers. As a result, sensor information is transmitted in the highest quality and the smallest parts are reliably detected.

By means of a variety of end pieces – with straight or angled light exit, flexible optical head or coaxial fiber arrangement – and various fiber diameters, plastic fiber optics offer users maximum flexibility. Particularly as plastic fiber optics can also be tailored to the desired length.

Optical head	
Version	
Light exit	
Ordering code	
Part number	
Features	
Sheathing Ø	
Core Ø	
Fiber length	
Temperature range	
Max. range with BFB 75K	

Please order BFB 75K fiber optic base unit separately (Ordering code: **BFB0004**).



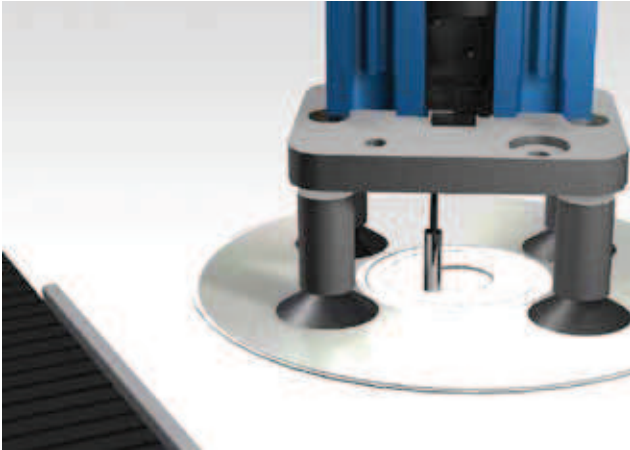


Ø 2.5 mm	M4x25 mm	M4x14.4 mm	13x20 mm	19x38 mm
Diffuse sensor, coaxial	Diffuse sensor, coaxial	Diffuse sensor	Diffuse sensor	Through-beam sensor
straight	straight	90°	90°	90°
BFO00AT	BFO0006	BFO00AW	BFO00AR	BFO0068
BFO D13-XB-AB-EAK-10-01	BFO D22-XB-UB-EAK-15-02	BFO D22-LAH-BK-EAK-10-02	BFO D13-XV-AK-EAK-50-02	BFO D25-LA-ED-EAK-250-02
Very compact	Detect extremely small objects	Highly flexible and robust	Compact with FixFocus	Light grid
2.5 mm	2x2.2 mm	2.2 mm	2.2 mm	2.8 mm
1x0.5 mm/9x0.25 mm	1x1 mm/16x0.25 mm	1 mm	1 mm	32x0.25 mm
1 m	2 mm	2 m	2 m	2 m
-55...+70 °C	-40...+60 °C	-40...+70 °C	-40...+70 °C	-55...+70 °C
60 mm	130 mm*	250 mm	6 mm	550 mm

* To detect the smallest objects, focusing sleeves must be used. Ranges with BFO 04-FL-1: **19 mm**, with BFO 04-FL-2: **7 mm**

Capacitive Sensors

Detect all materials – independent of dust, reflections, color and properties of an object



In difficult environments, if dust, reflections or object properties and color could influence a measurement, capacitive sensors are the right choice. Precisely monitor stack heights, detect solids and liquids. Through glass or plastic container walls up to 4 mm thick or in direct contact. Because their Teflon® sensing surface makes them particularly resistant. Robust stainless steel housings are designed for use under even demanding conditions.

The flat disc design offers a large switching distance and, at the same time, requires particularly little space.

In addition, fine adjustment of the capacitive mini sensors is easily performed by means of a separate sensor amplifier.

Capacitive Sensors

- Large switching distance
- Difficult conditions
- Suitable for all materials

Mini sensors with integrated electronics

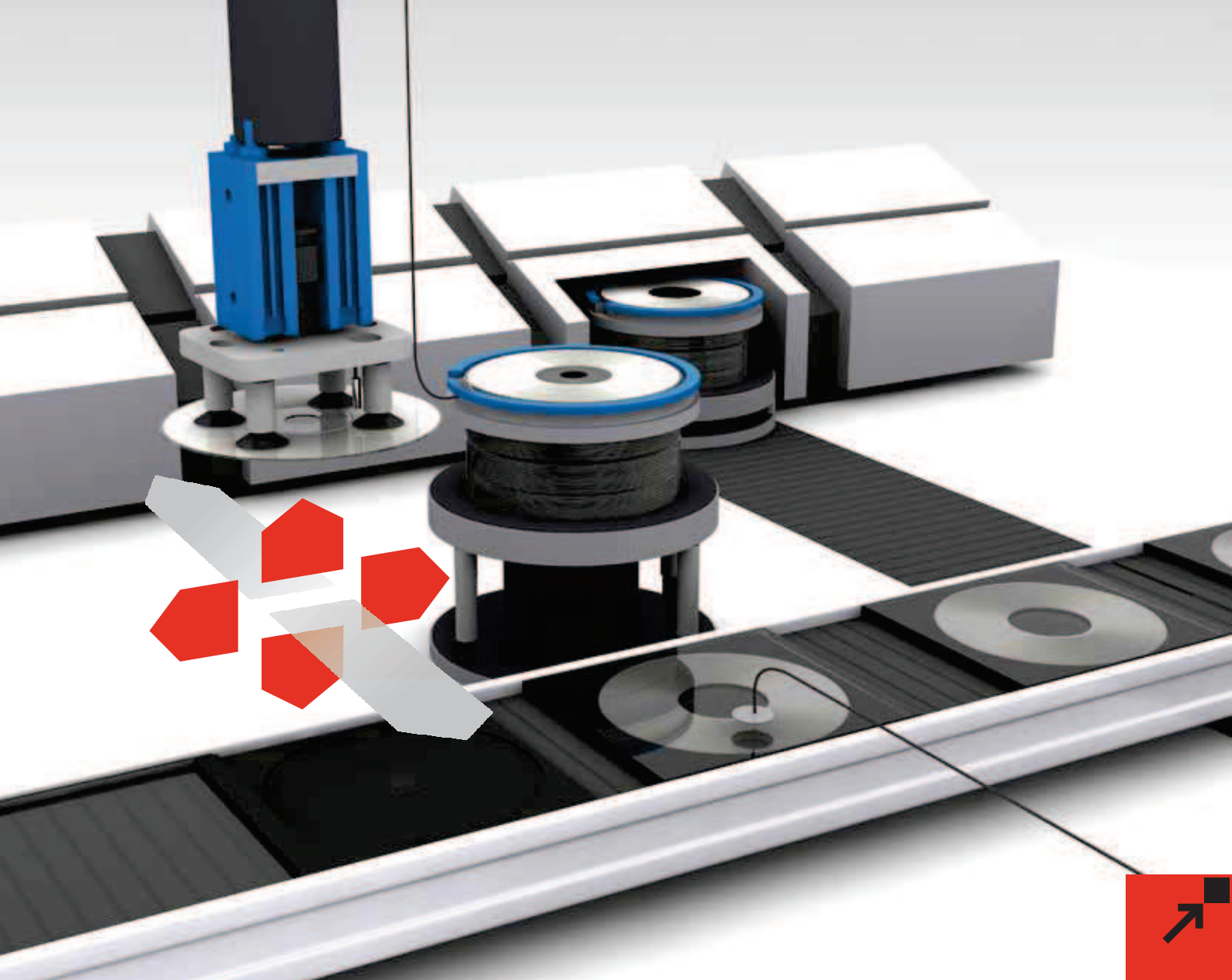


Size	M8×1	Ø 30×4 mm
Mounting	flush	flush
Rated switching distance s_n	0.1...1.5 mm	2...15 mm
PNP, NO	Ordering code	Ordering code
	Part number	Part number
Supply voltage U_B	11...30 V DC	10...35 V DC
Switching frequency f	100 Hz	100 Hz
Enclosure rating per IEC 60529	IP 65	IP 67
Housing/sensing surface material	Stainless steel/PTFE	Stainless steel/PTFE
Connection	M8 connector, 3-pin	2 m cable PUR, 3×0.14 mm ²

Mini sensors with separate sensor amplifier



Dimensions	Ø 30×4 mm
Mounting	flush
Rated switching distance s_n	2...15 mm
PNP, NO	Ordering code
	Part number
Supply voltage U_B	10...35 V DC
Switching frequency f	100 Hz
Enclosure rating per IEC 60529	IP 67
Housing/sensing surface material	Stainless steel/PTFE
Connection	2 m cable PUR, 3×0.14 mm ²



Ø 4×29 mm	M5×29 mm	Ø 6.5×18 mm	Ø 18×2.5 mm	45×30×15 mm
flush	flush	flush	flush	
0.1...1 mm	0.1...1 mm	0.1...1.5 mm	0.1...3 mm	
BCS0010	BCS0011	BCS0012	BCS001A	BAE009E
BCS G04T4D-XXS10C-EP02-GZ01-002	BCS M05T4C-XXS10C-EP02-GZ01-002	BCS G06T4B-XXS15C-EP02-GZ01-002	BCS D18T403-XXS30C-EP02-GZ01-002	BAE SA-CS-001-PS
Operation with switching amplifier	Operation with switching amplifier	Operation with switching amplifier	Operation with switching amplifier	12...35 V DC
100 Hz	100 Hz	100 Hz	100 Hz	100 Hz
IP 67	IP 67	IP 67	IP 66	IP 67
Stainless steel/PTFE	Stainless steel/PTFE	Stainless steel/PTFE	Stainless steel/PTFE	PC
2 m cable PUR, 3×0.14 mm ²	2 m cable PUR, 3×0.14 mm ²	2 m cable PUR, 3×0.14 mm ²	2 m cable PVC, 3×0.09 mm ²	2 m PUR cable, 3×0.14 mm ²

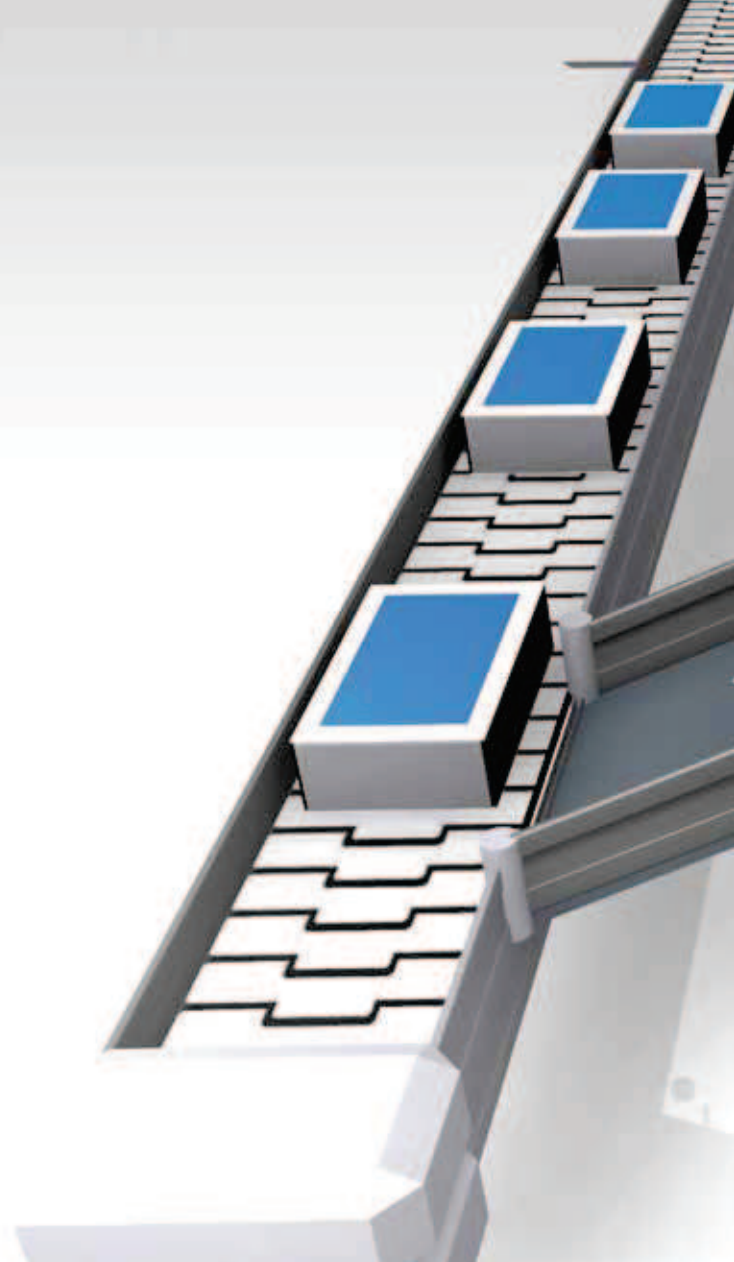
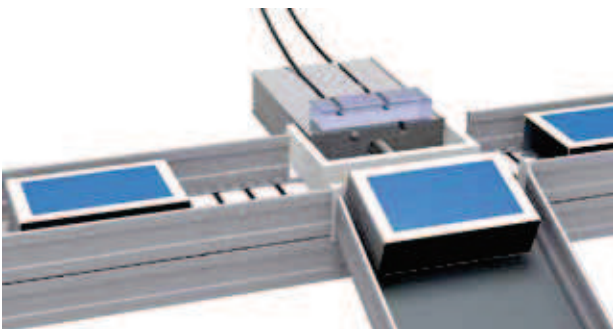
Magnetic Cylinder Sensors
**For reliable, wear-free position detection
 on all pneumatic cylinders**

Magnetic Cylinder Sensors

- For reliable, wear-free position detection on all pneumatic cylinders
- Universal use guaranteed with only a few different types
- Increase functional reliability and improve machine availability

Balluff offers ideal solutions for reliable and wear-free position detection for short-stroke cylinders and mini-grippers. Balluff mini cylinder switches are especially short and are among the shortest on the market. The sensors have a highly accurate switch point for maximum precision, even over short switching distances.

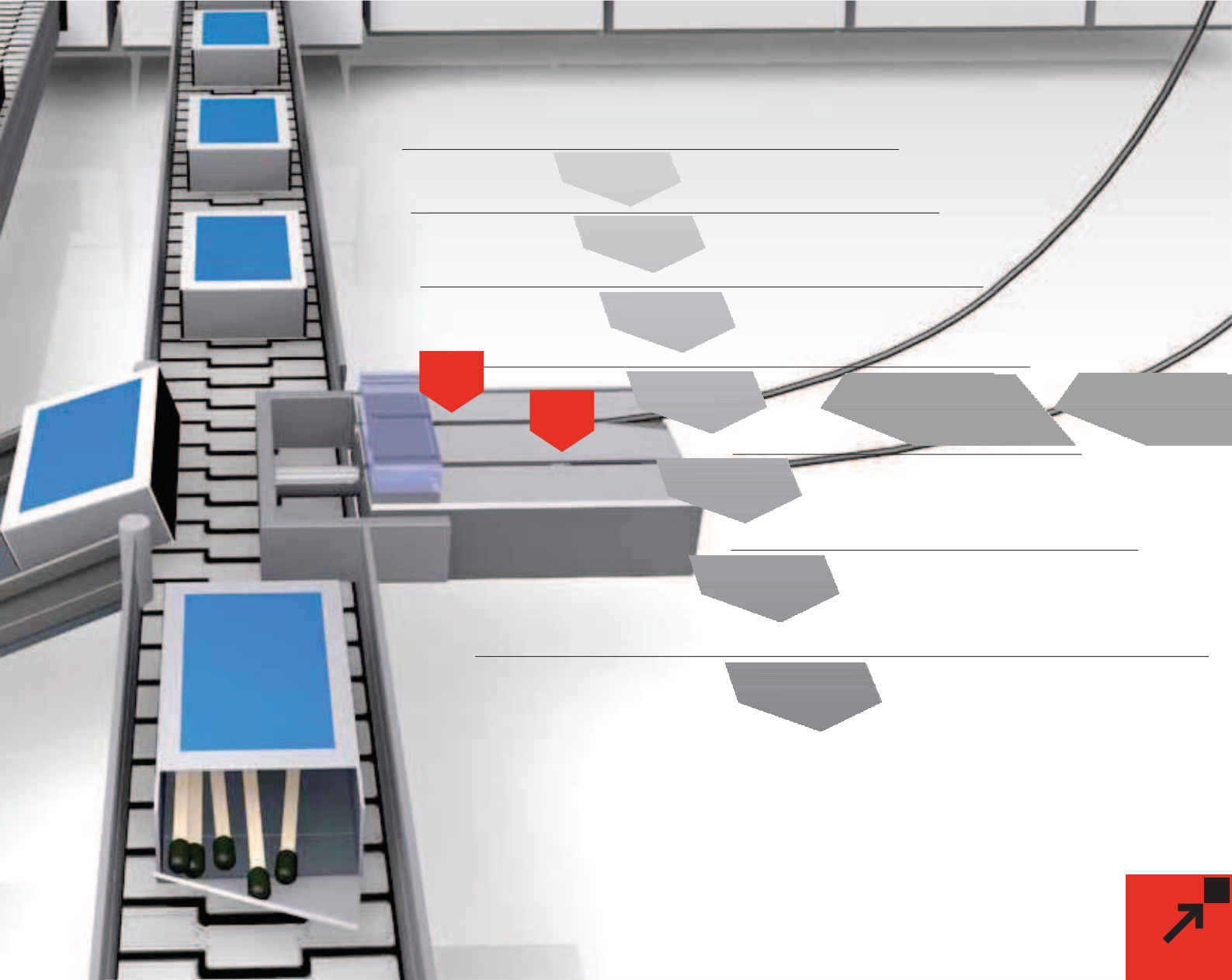
Magnetic cylinder sensors increase the functional reliability and improve the availability of the machines. And universal use is guaranteed with only a few different types. Special designs for C- and T-slots – can also be installed from above – are available.



Model	
Dimensions	
Properties	
PNP, NO	Ordering code
	Part number
Supply voltage U_B	
Switching frequency f	
Enclosure rating per IEC 60529	
Housing material	
Connection	

Mounting brackets

-  C-slot (Size 10 slot)
-  C-slot (Round slot)
-  T-slot



BMF 103 16×2.8×4.9 mm Unrivaled in shortness	BMF 303 4.5×2.9×21.6 mm For all common cylinders	BMF 204 4.5×3.7×16.8 mm For the Festo C-slot	BMF 214 4.5×3.9×16.8 mm For the SMC C-slot	BMF 235 5.5×5×23.5 mm For the T-slot	BMF243 3×3.75×24 mm For all C-slots
BMF001L	BMF0043	BMF0002	BMF00A2	BMF00C4	BMF00EL
BMF 103K-PS-C-2A-SA2-S49-00,3	BMF 303K-PS-C-2A-SA2-S49-00,3	BMF 204K-PS-C-2A-SA2-S49-00,3	BMF 214K-PS-C-2A-SA2-S49-00,3	BMF 235K-PS-C-2A-SA2-S49-00,3	BMF 243K-PS-C-2A-SA2-S49-00,3
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
7 kHz	7 kHz	7 kHz	7 kHz	3 kHz	7 kHz
IP 67	IP 67	IP 67	IP 67	IP 67	IP 67
LCP	LCP	PA 12	PA 12	PA 12	PA 12
0.3 m PUR cable with M8 connector, 3-pin	0.3 m PUR cable with M8 connector, 3-pin	0.3 m PUR cable with M8 connector, 3-pin	0.3 m PUR cable with M8 connector, 3-pin	0.3 m PUR cable with M8 connector, 3-pin	0.3 m PUR cable with M8 connector, 3-pin

BAM01K7 BMF 103-HW-102 	BAM00L1 BMF 303-HW-31 	Slide-in			Can be installed from above
BAM01K6 BMF 103-HW-100 	BAM01F0 BMF 303-HW-97 		Slide-in		Can be installed from above
BAM00KA BMF 103-HW-43 	BAM00L2 BMF 303-HW-33 			Can be installed from above	

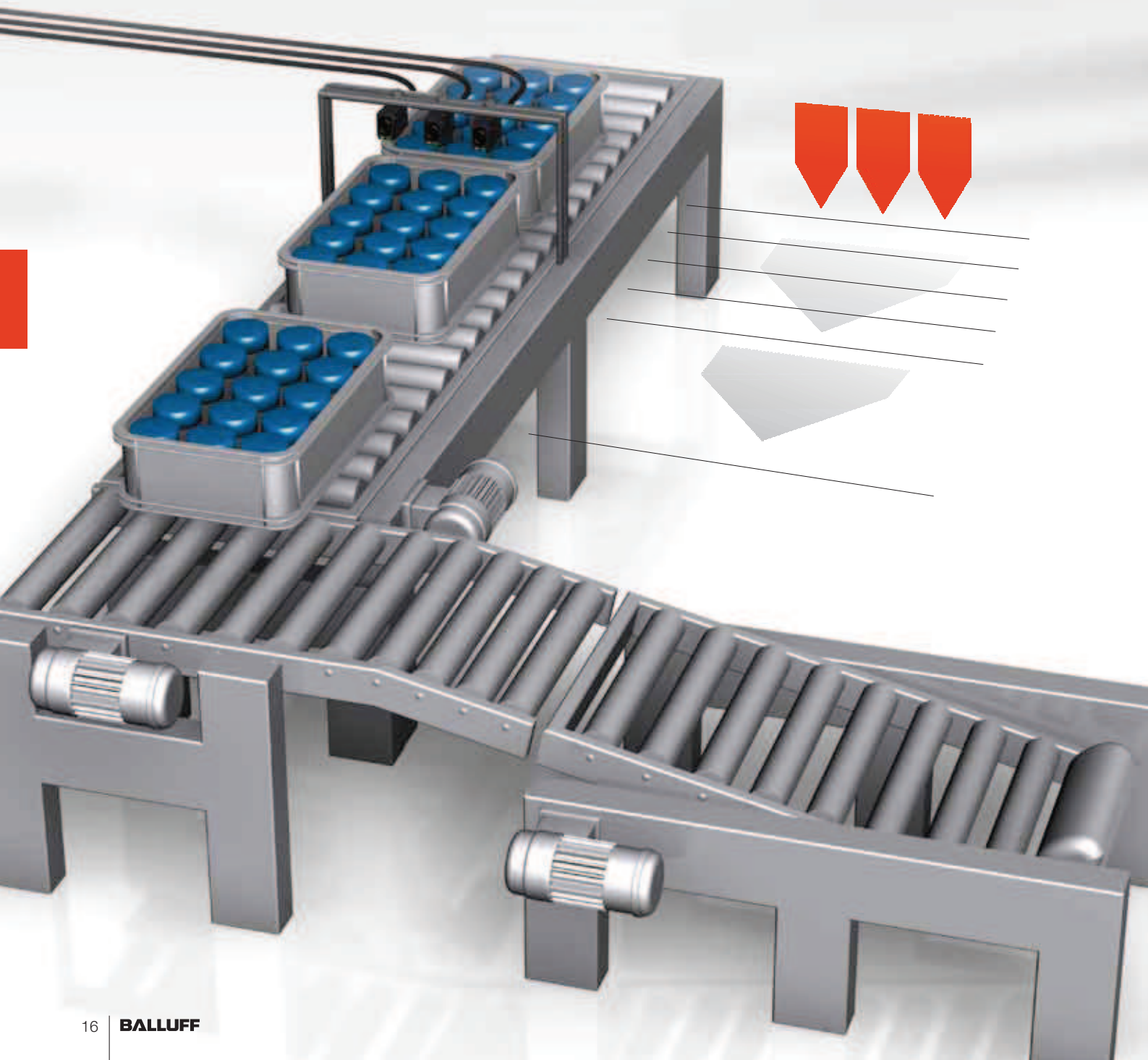
Ultrasonic Sensors

Universal use for distance measurement and position detection

The small ultrasonic sensors in rectangular housing operate with high resolution, leaving nothing to be desired in terms of accuracy.

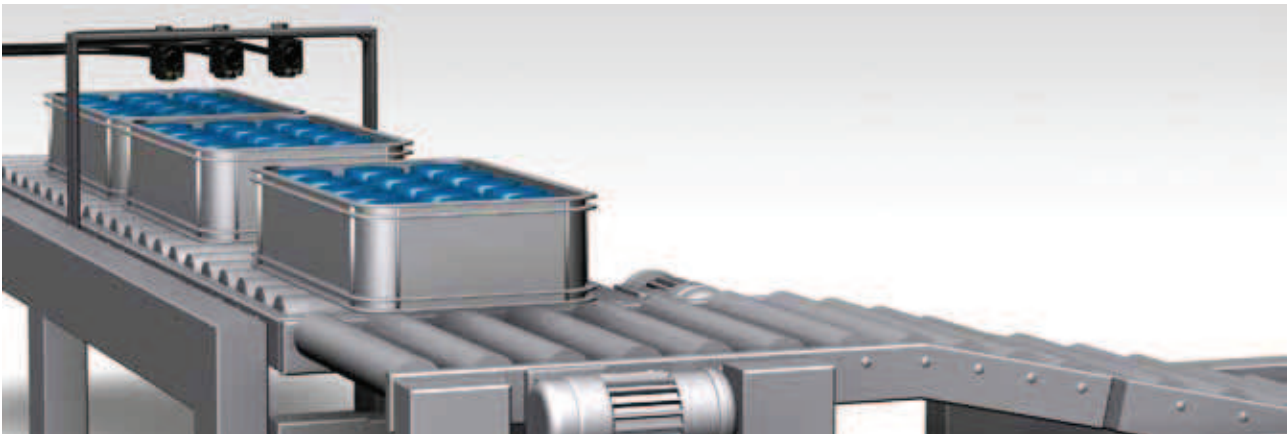
For challenging measurement tasks, BUS R06K1..02/007 and BUS R06K1..02/015 can be upgraded with an attachment waveguide. This allows measurements to be performed in bore holes and openings with diameters > 5 mm. The BUS R06K1..02/015, with its very short response delay and high switching frequency of 125 Hz, is particularly well suited for reliably detecting fast procedures.

For the simultaneous operation of up to ten sensors in a constricted space, the series is equipped with a synchronization input. The wide range of variants with switching output or with current or voltage analog output in five operating scanning ranges make the sensor family suitable for nearly limitless applications.



Ultrasonic Sensors

- High resolution
- Measuring range from 20 mm to 1 m
- Five operating scanning ranges



Operating scanning range	20...150 mm	55...240 mm	120...700 mm
Size	21.6×32×12 mm	23×32×12 mm	20×32×18 mm

BUS R06K switching output

Resolution	0.056 mm	0.037 mm	0.037 mm
PNP, NO/NC	Ordering code	BUS004C	BUS004L
	Part number	BUS R06K1-PPX-02/015-S75G	BUS R06K1-PPX-05/024-S75G
		BUS R06K1-PPX-12/070-S75G	

BUS R06K analog output

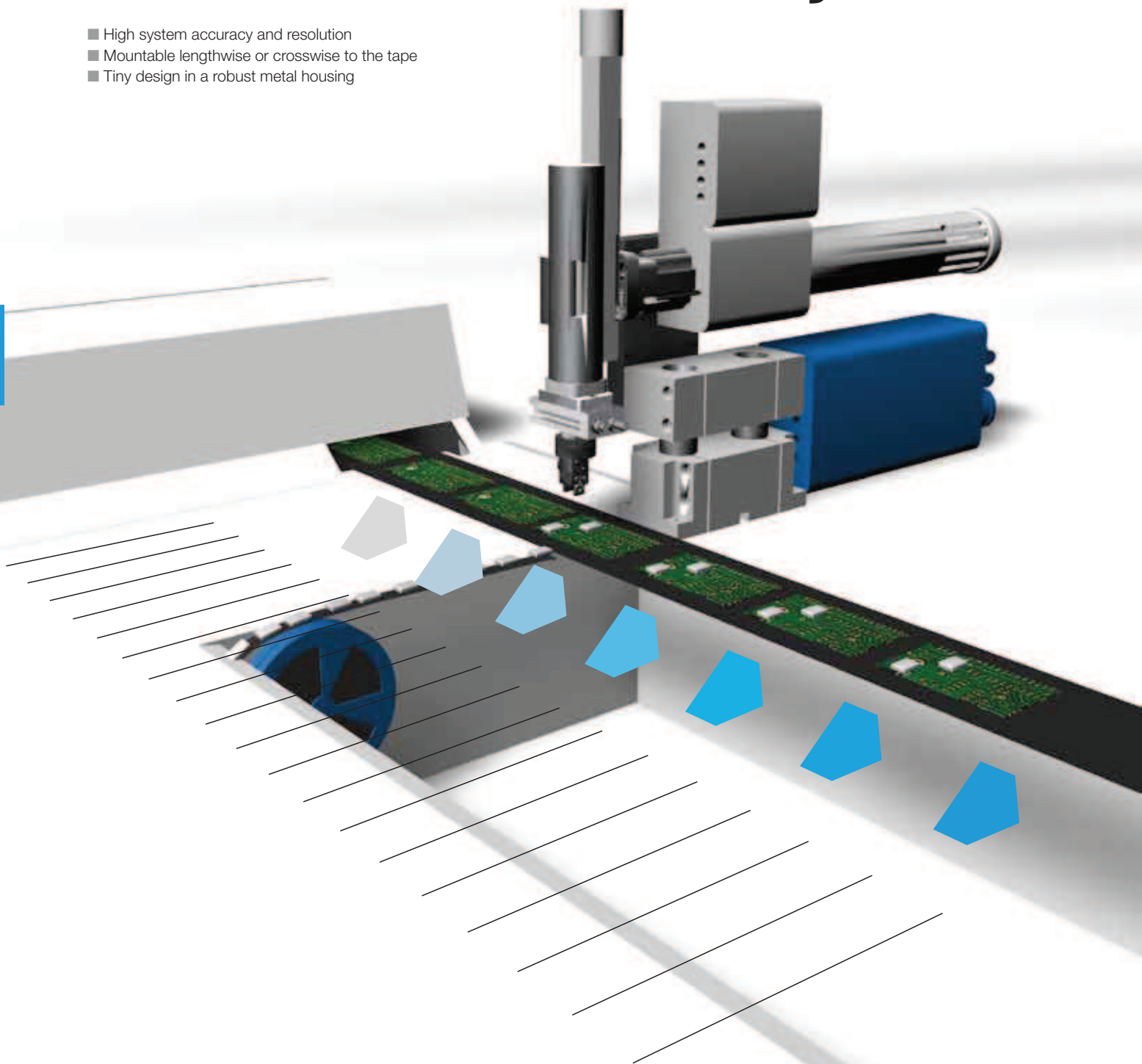
Resolution (dependent on set window)	0.056 mm	0.037...0.072 mm	0.037...0.215 mm
4...20 mA	Ordering code	BUS004J	BUS004F
	Part number	BUS R06K1-XB-02/015-S75G	BUS R06K1-XB-05/024-S75G
		BUS R06K1-XB-12/070-S75G	

Supply voltage U_B	20...30 V DC	20...30 V DC	20...30 V DC
Output current max.	200 mA	200 mA	200 mA
Enclosure rating per IEC 60529	IP 67	IP 67	IP 67
Housing/sensing surface material	ABS/polyurethane foam	ABS/polyurethane foam	ABS/polyurethane foam
Connection	M8 connector, 4-pin	M8 connector, 4-pin	M8 connector, 4-pin

NPN variants can be found in the ultrasonic sensor catalog

Magnetically Coded Position Measurement System

- High system accuracy and resolution
- Mountable lengthwise or crosswise to the tape
- Tiny design in a robust metal housing



Magnetically Coded Position and Angle Measurement System

Absolute measuring system for short strokes

Inaccuracy and tolerance shifts have a negative effect on production quality. Directly measuring systems provide assistance here. They detect the current position directly on the carriage or the load support. The new BML-S1H magnetically encoded position and angle measurement system measures highly dynamic applications exactly

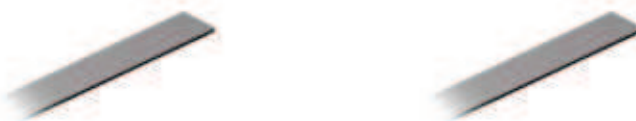
and absolutely. It operates contact- and wear-free. Even external factors such as dirt and temperature do not affect it. With the unbeatably small sensor head, it is ideal for linear guides, pick-and-place applications, drive feedback or vibration welding.



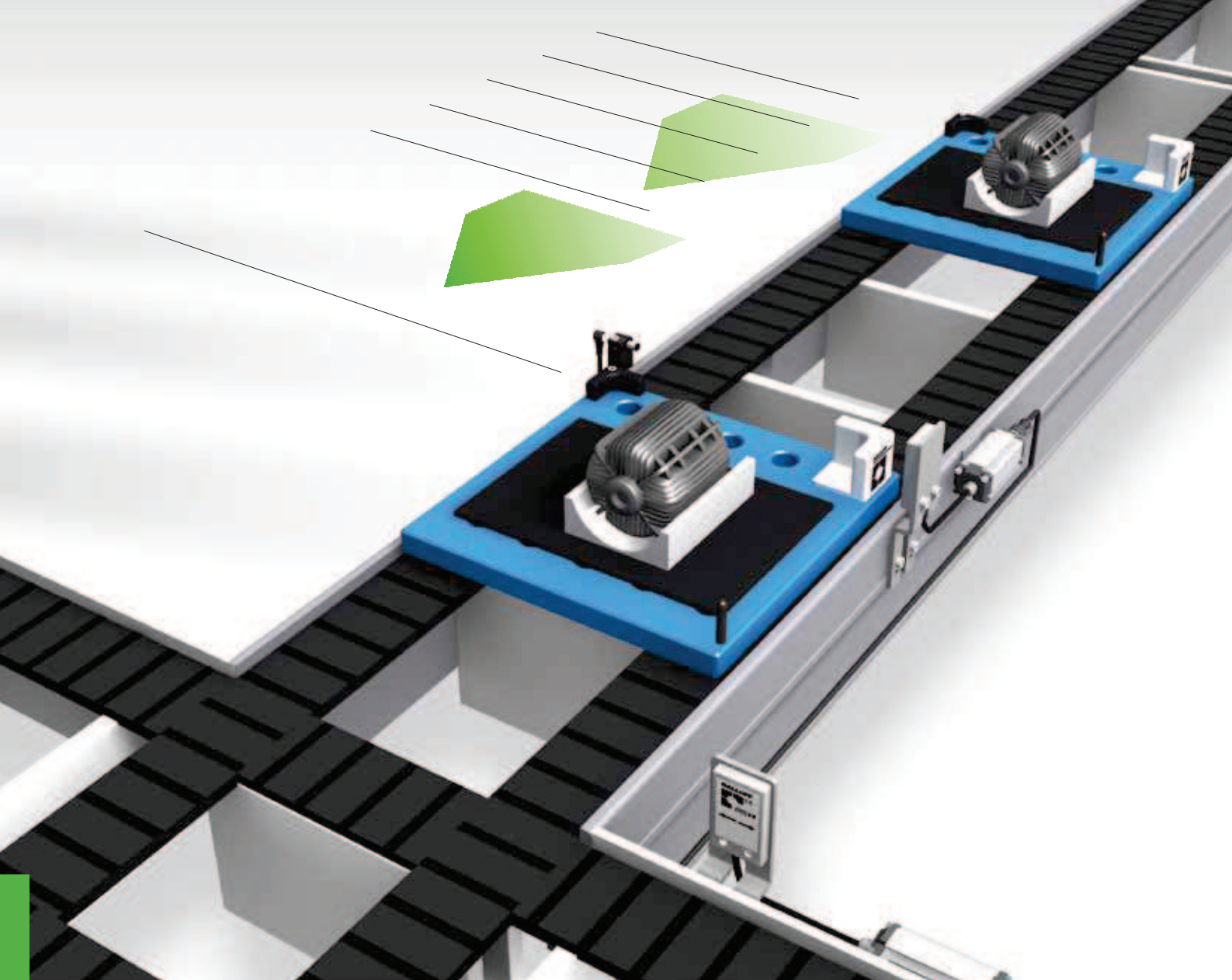
Sensor head 

Model	BML-S1H...		BML-S1H...	
Dimensions	40×14×13 mm		40×14×13 mm	
Output signal	Absolute SSI		Absolute SSI	
Max. measuring length	64 mm		256 mm	
Lengthwise	Ordering code	BML0391	Ordering code	BML0393
approach direction	Part number	BML-S1H1-S6QC-M3AA-D0-KA00,3-S284	Part number	BML-S1H1-S6QC-M3CA-D0-KA00,3-S284
Crosswise	Ordering code	BML0392	Ordering code	BML0394
approach direction	Part number	BML-S1H2-S6QC-M3AA-D0-KA00,3-S284	Part number	BML-S1H2-S6QC-M3CA-D0-KA00,3-S284
Resolution	1/1.024 µm per LSB		1/1.024 µm per LSB	
Repeat accuracy	≤ 1 µm		≤ 1 µm	
System accuracy	±7 µm		±7 µm	
Supply voltage	5 V ±5 %		5 V ±5 %	
Tape pole pitch	1 mm		1 mm	
Max. read distance, sensor head/tape	0.35 mm (without cover strip)		0.35 mm (without cover strip)	
Max. travel speed	5 m/s		5 m/s	

Magnetic tape



Model	Magnetic tape		Magnetic tape	
Ordering code	BML039J		BML039K	
Part number	BML-M02-A33-A3-M0009-A		BML-M02-A33-A3-M0028-C	
Length (measurement length)	90 mm (64 mm)		280 mm (256 mm)	
Tape/cover strip material	Rubber ferrite / stainless steel		Rubber ferrite / stainless steel	



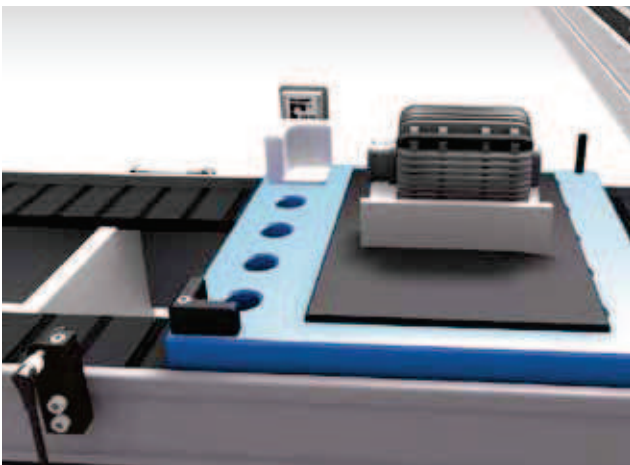
Data carriers



Dimensions	Ø 10×4.5 mm		24×24×21 mm	Ø 8×35 mm
Antenna type	round		rod	rod
Ordering code	BIS004A		BIS00NZ	BIS00P1
Part number	BIS M-122-02/A		BIS M-191-02/A	BIS M-154-03/A
Capacity	2000 bytes		2000 bytes	112 bytes
Working/storage temperature	0...+70 °C/-25...+85 °C		-30...+70 °C/-30...+85 °C	-25...+50 °C/-30...+60 °C
Enclosure rating	IP 67		IP 67	IP 67
Read/write distance	non-metal	in metal	non-metal	non-metal
BIS VM-305	0...7 mm	0...5 mm		
BIS VM-306	0...2 mm	0...2 mm		
BIS VM-352			0...14 mm	0...10 mm

Industrial RFID for Transfer Systems

- Compact data carrier
- Unbeatably small antenna designs
- Fast data communication



Industrial RFID BIS M, whose compact components guarantee high data security, is available for transfer systems. They are easy to mount. And their steel data carriers can even be mounted flush.

Compact corner data carriers, thin pill-shape data carriers and slim rod data carriers offer users great flexibility. Antennae with detached electronics enable use even in constricted conditions.

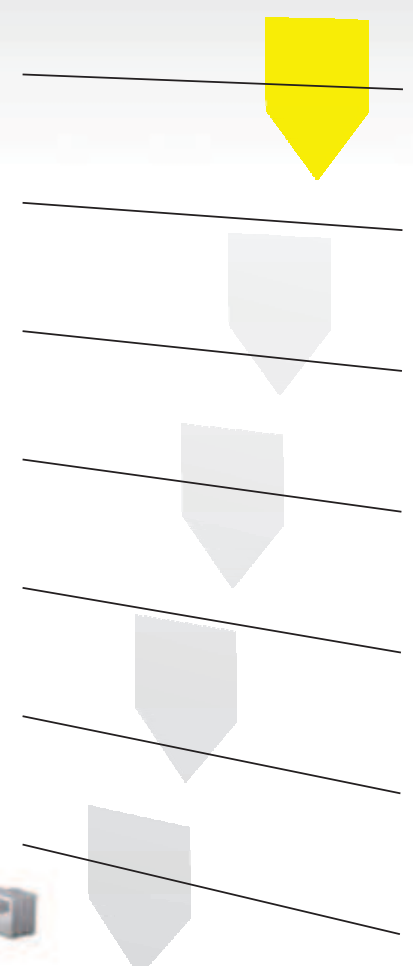
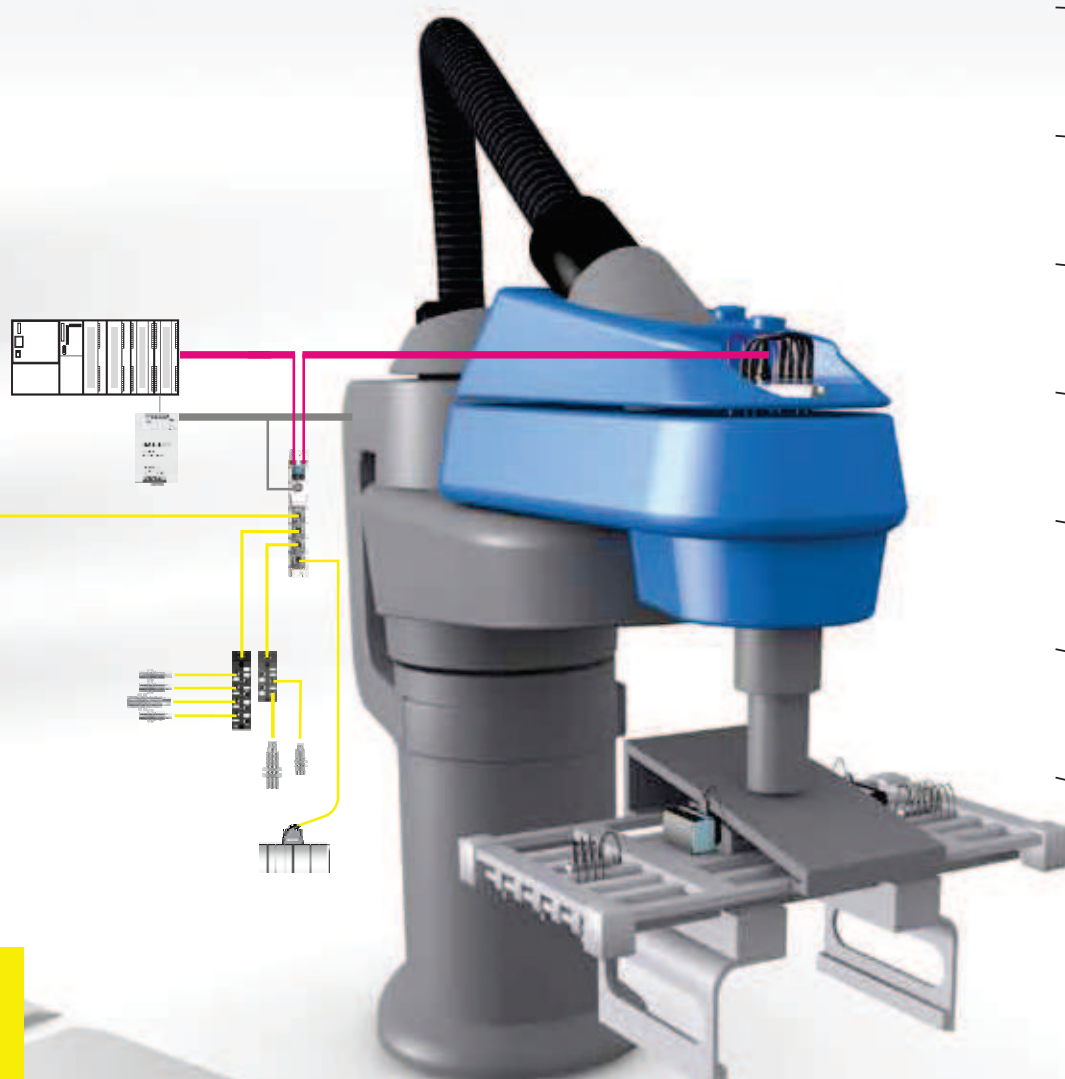


RF read/write heads



Dimensions	25x50x10 mm	M12x37.25 mm	25x50x10 mm
Mounting in steel	non-flush	non-flush	non-flush
Antenna type	round	round	rod
Ordering code	BIS00T9	BIS00T7	BIS00T6
Part number	BIS VM-305-001-S4	BIS VM-306-001-S4	BIS VM-352-001-S4
Enclosure rating per IEC 60529	IP 67 (with connector)	IP 67 (with connector)	IP 67 (with connector)
Housing material	AlMgSi 0.5/ABS-GF16	AlMgSi 0.5/nickel-plated brass	AlMgSi 0.5/ABS-GF16
Connection	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin

Space-saving Fieldbus Splitters and Sensor Hubs With IO-Link for fast, simple connection



Mini master

IO-Link

IO-Link/fieldbus	Master/Profibus-DP
Version	4x IO-Link ports, max. 8 DI/DO
Dimensions	224x37x32 mm
Ordering code	BNI003P
Part number	BNI-PBS-507-001-Z011
Supply voltage U_B	18...30 V DC
Load current _{max.} channel/output	200 mA/≤ 1.6 A
Total current $U_{Actuator}/U_{Sensor}$	≤ 9 A/≤ 9 A
Connection: fieldbus	M12, B-coded (male/female)
Connection: operating voltage	7/8" male, 5-pole
Connection: I/O ports	M12, A-coded (female)
Number of I/O-ports/IO-Link ports	4/4
Number of inputs/outputs	max. 8 PNP/max. 8 PNP
Configurable	yes
Enclosure rating per IEC 60529	IP 67 when screwed into place
Housing material	Nickel-plated GdZn

IO-Link	
No. of IO-Link ports	4x master
Operating modes (3-wire)	SIO, COM 1, COM 2, COM 3
Max. load current IO-Link device	≤ 1.6 A

Not only do slim assemblies need mini-sensors, they also require connection technology in compact and high-performance designs. Because only so can the design freedom and flexibility of the mini sensors be truly exhausted.

With mini masters, space-saving passive splitters and small, valve terminal connectors in IO-Link designs, Balluff offers efficient, cost-effective solutions. IO-Link thereby reduces the work and expense associated with wiring, testing and hardware. With simple, unshielded, economical standard cables, mini sensors are installed quickly and cost-effectively. And mini sensors are quickly and reliably configured through IO-Link connection technology via the controller. Moreover, continuous diagnostics ensure reliable system operation, as they facilitate timely maintenance.

Fieldbus Splitters and Sensor Hubs

- Time-saving and cost-effective installation
- Easy adjustment during running operation
- Continuous monitoring



Passive splitters



IO-Link



IO-Link		Device
Dimensions	4x DI	85x30x23.7 mm
	8x DI	129.5x30x23.7 mm
4x DI	Ordering code	BNI001Y
	Part number	BNI IOL-102-S01-K019
8x DI	Ordering code	BNI001W
	Part number	BNI IOL-101-S01-K018
Supply voltage U_B		18...30 V DC
Total current U_S		max. 800 mA
Connection: I/O ports		M8, 3-pin (female)
Connection: IO-Link port		M12, A-coded (male)
No. of I/O ports		4 or 8
Number of inputs		4 or 8 PNP
Configurable		NC/NO
Enclosure rating per IEC 60529		IP 67 when screwed into place
Housing material		Plastic

IO-Link

No. of IO-Link ports	1x device
Operating mode	COM 2
Parameter	NC/NO per input

Valve terminal connectors



IO-Link

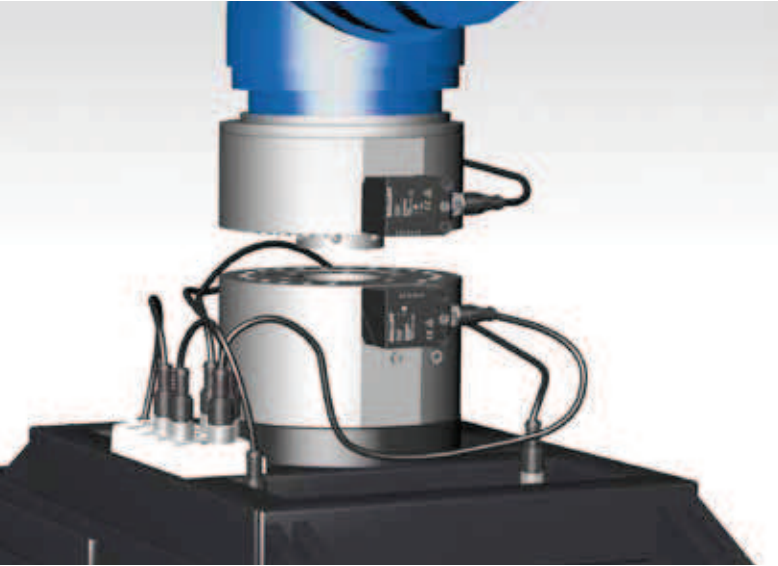


Model		Valve terminal connectors
Can be used with		Festo CPV and Bosch Rexroth LS04, HF04
Output signal		IO-Link
Dimensions		53x60.8x12.5 mm
	Ordering code	BNI001E
	Part number	BNI IOL-750-V02-K007
Supply voltage U_B		18...30.2 V DC
Total current U_S		1.6 A
Number of outputs		16
IO-Link		2 byte
Cycle time _{min.}		2.5 ms
Interface		SUB-D 25-pin
Cable lengths with M12-plugs		60 cm
Enclosure rating per IEC 60529		IP 40
Housing material		Plastic

IO-Link

Mode	COM 2
Baud rate	38.4 kBaud
IO-Link process data length	3 byte

Compact Inductive Couplers
For fast, contact-free connection

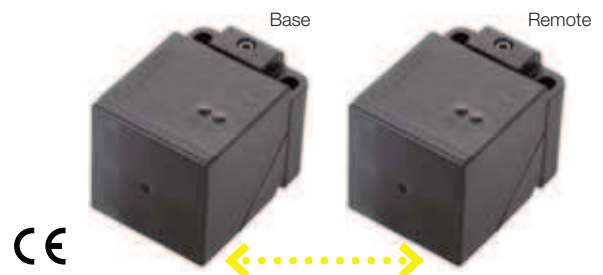


For robotics, the inductive IO-Link coupler in the compact 40×40 housing is ideal. It combines rapid format changes, freedom of wear and great flexibility. Inductive couplers eliminate the need for mechanical plug contacts, since they contactlessly transmit signals – absolutely reliably.

The IO-Link interface of the compact inductive coupler ensures the simplest installation. Because IO-Link is quickly wired.

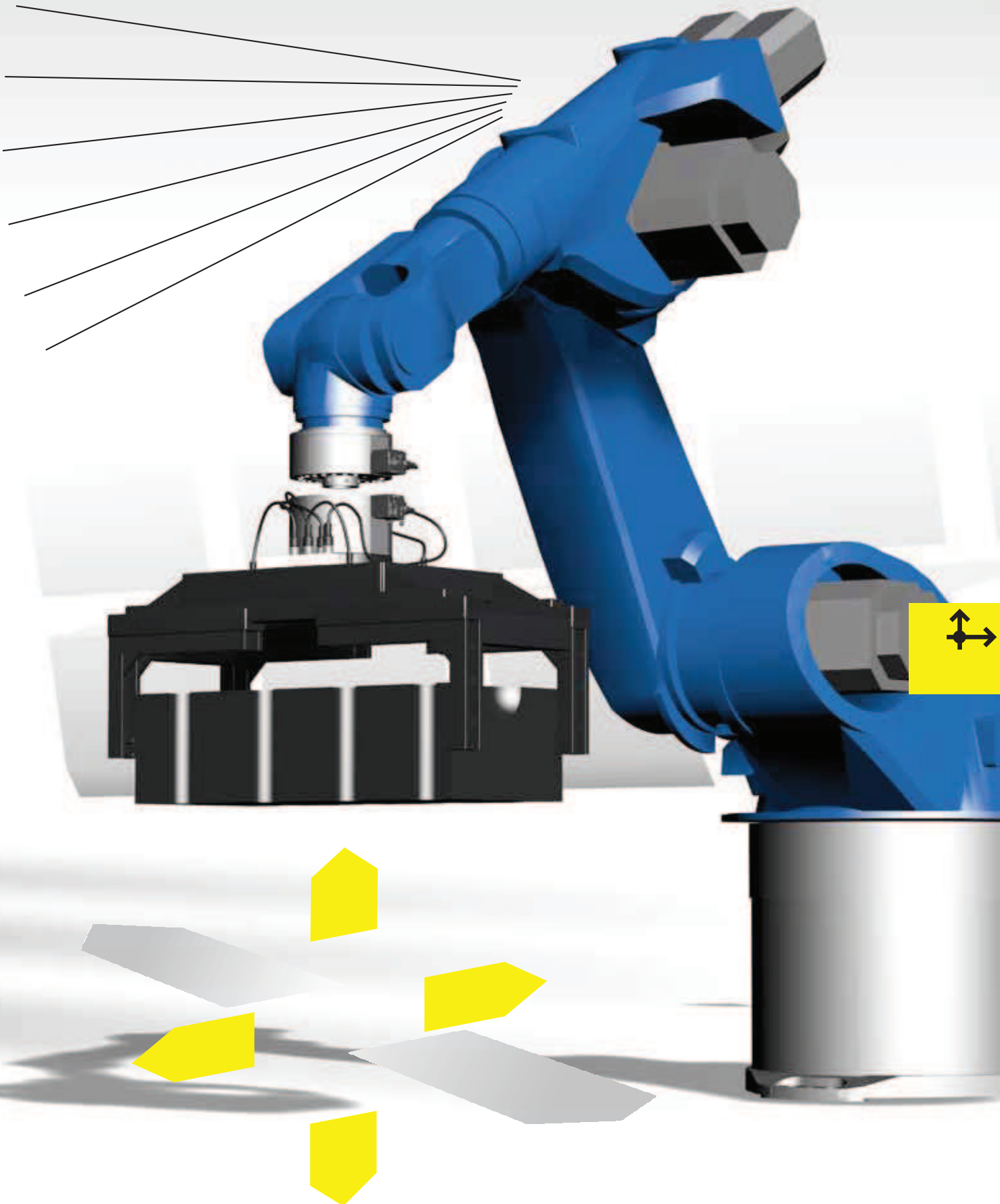
Compact Inductive Couplers

- No mechanical wear, thus maintenance free
- Best signal quality
- Rapid format changes



Size	40×40×63 mm	40×40×63 mm
Working range	1...5 mm	1...5 mm
Ordering code	BIC005A	BIC005C
Part number	BIC 110-I2A50-Q40KFU-SM4A4A	BIC 210-I2A50-Q40KFU-SM4A5A
Supply voltage U_B incl. residual ripple	24 V DC ±10 %	
Power supply, continuous output current		500 mA
Enclosure rating per IEC 60529	IP 67	IP 67
Housing/sensing surface material	PBTP	PBTP
Connection	M12 connector, 4-pin, A-coded (male)	M12-connector, 5-pin, A-coded (female)

IO-Link		
Baud rate	38.4 kBaud	38.4 kBaud
Process data cycle	12 ms at minimum cycle time	
IO-Link process data length	3 input bytes	3 input bytes





Services

- From the design and planning of your projects
- To testing and setup on-site
- To training and support

Services

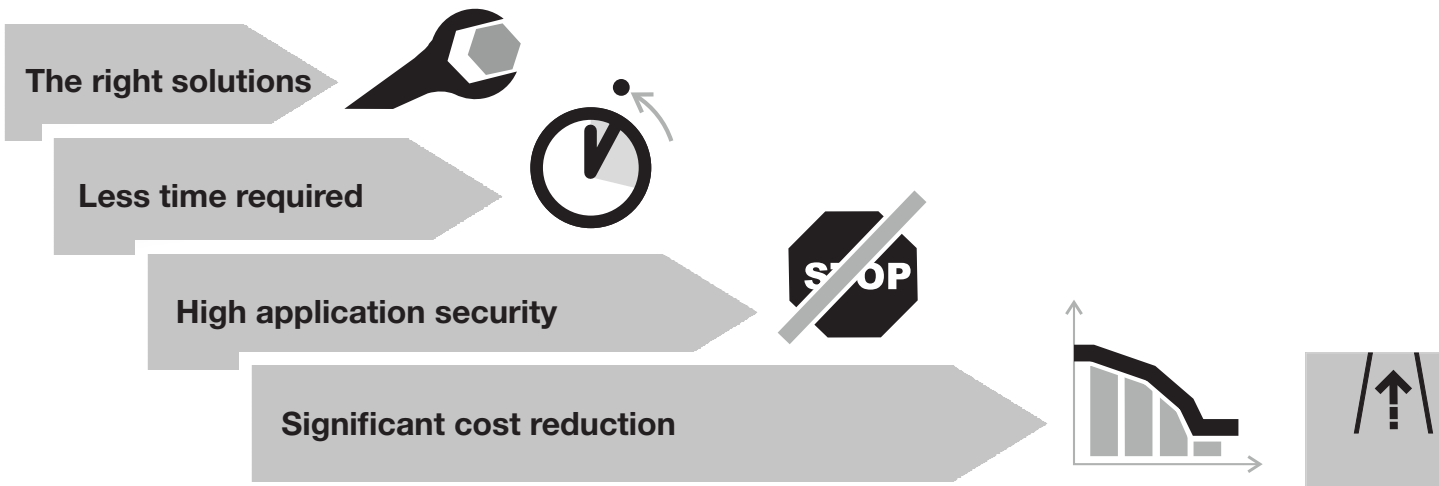
**Customized. According to your specifications.
With maximum quality.**

Balluff offers highly efficient sensor technology with high-performance mini sensors and compact connection technology. And more. Because with our extensive services, you can obtain support direct from the manufacturer: from the design and planning of your projects, to testing and setup on-site, to training and support. Over the entire life cycle of our products.

This creates greater planning security and provides faster commissioning and an earlier start of production. This leads to higher productivity and more cost-effectiveness. And this relieves you of additional stress in your everyday work, giving you more time to focus on your core business.



More information can be found in our services brochure.



<p>Application advice through our TecSupport: Discuss your technical requirements. And take advantage of our expertise.</p>	<p>Real-world examples:</p> <ul style="list-style-type: none"> ■ Selection of the correct identification procedure for an assembly line ■ IO-Link concept as a cost-effective alternative to conventional wiring ■ System consulting for radio frequency identification (RFID): identification of large steel pipes in adverse environments ■ Recognizing multiple containers on a pallet in goods receiving
<p>Commissioning: Order expert knowledge. And benefit from a quick start of production.</p>	<p>Real-world examples:</p> <ul style="list-style-type: none"> ■ Setting up an optical checkpoint with the BVS vision sensor ■ Consulting and support during the programming of BIS RFID systems ■ Installation and commissioning of a color detection application with the BFS color sensor
<p>Fully customized products: Order individual versions according to your requirements: from preassembly to engineering services. And take advantage of the optimum.</p>	<p>Real-world examples:</p> <ul style="list-style-type: none"> ■ Extending the housing of a BHS high-pressure resistant inductive sensor ■ Extra threads for the housing cover of a BTL micropulse travel sensor ■ Customer-specific holder for an RFID data carrier ■ Adaptation of the characteristics for BAW analog sensors
<p>Workshops: Make use of well-founded manufacturer knowledge. And benefit from application security.</p>	<ul style="list-style-type: none"> ■ Professional sensor use: Select operating principles, install sensors professionally and ensure the reliable operation of your application. ■ Linear position sensing: This is how you measure precisely and wear-free. ■ RFID: The right data at the right time at the right place. ■ Vision sensor: Using an image processing sensor, ensure manufacturing quality in three steps. ■ Vision sensor idet: Reliably identify data matrix codes with an image-processing sensor. ■ Industrial networking with IO-Link: Manage signals intelligently and cost-effectively.



Object Detection



Linear Position Sensing



Fluid Sensors



Industrial Identification



Industrial Networking and Connectivity



Accessories



Service

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