BALLUFF

sensors worldwide

Products + News

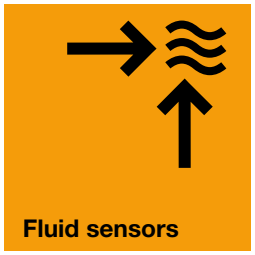
Products + News | Superior quality for efficient automation +++ Services | Customized. According to your specifications. In the best quality. +++ Profinet | Now with eight IO-Link master ports +++ Ultrasonic sensors | The accurate all-rounder +++ Inductive mini-sensors | For position sensing in a harsh environment +++ and much more ...

With over 50 years of sensor experience, Balluff is a leading global sensor specialist with its own line of connectivity products for every area of factory automation. Balluff is based in Germany and has a tight international network of 54 representatives and subsidiaries.

Balluff stands for comprehensive systems from a single source, continuous innovation, state-of-the-art technology, highest quality, and greatest reliability. That's not all: Balluff also stands for exceptional customer orientation, customized solutions, fast worldwide service, and outstanding quality of consultation services.

Object Detection

Linear Position Sensing

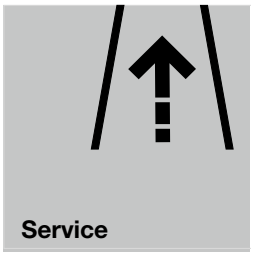


Fluid sensors

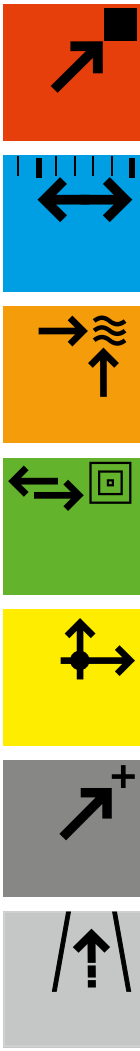
Industrial Identification

Industrial Networking and Connectivity

Accessories



Service



New

Inductive mini-sensors

For position sensing in a harsh environment

Small housing, low weight, and yet the highest switching precision? Balluff mini-sensors fulfill these industrial automation requirements. By means of small designs and peak performance, they offer great freedom of design and enable substantially more applications ...

cont. on page 14

BOS 50K photoelectric sensors

Diffuse sensor with enormous range

Conventional diffuse sensors are frequently used in industrial automation. However, these often reach their limits if larger switching distances are involved. Not the case for the new Balluff photoelectric sensors with Super Long Range Technology. They solve complex ...

cont. on page 52

BMF 243 cylinder sensors

The new benchmark for every C-slot/ rounded groove

- Solid hold in the slot, sensor cannot be wrenched from the slot
- Can be installed even on cylinders with a dirty slot
- Can also be used in space-critical applications
- ...

cont. on page 62

BUS ultrasonic sensors

The accurate all-rounder from Balluff

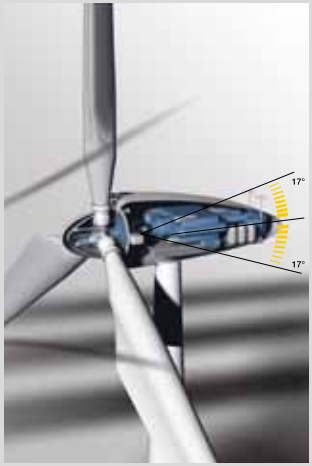
Ultrasonic sensors are accurate all-rounders. They measure fill levels, heights and sag without making contact as well as count and monitor the presence of objects. And particularly suited for critical situations. Dust, dirt, and steam do not pose a problem ...

cont. on page 74

Product Highlights
An overview

BSI
inclination sensors

360° – so that nothing gets out of place



The precise position control and continuous positioning of rotational movements are of great importance in many applications. Balluff BSI inclination sensors measure the deviation from the horizontal on an axis of up to 360°. They can be used down to –40°F, ...

cont. on page 82

MICROPULSE
BTL6 Profile PF IO-Link

Fast installation and commissioning

The Micropulse PF IO-Link is an absolute and non-contact position measuring system that continuously provides measurements in µm in the 1-ms cycle. These measurements are directly and digitally transmitted via IO-Link. IO-Link is a point-to-point connection below ...

cont. on page 92

MICROPULSE
BTL6-V11V Rod BZ

With VARAN real-time industrial Ethernet

With the Micropulse BTL6-V11V Rod, Balluff is putting the first integrable position measuring system with VARAN real-time industrial Ethernet on the market. Micropulse rod-position measuring systems integrated in the pressure section of the hydraulic cylinder measure the current piston position directly. ...

cont. on page 94

MICROPULSE⁺
BTL7 Profile P

Position measurement in a demanding environment

Micropulse⁺ position measuring systems in a profile housing are non-contact, absolute measuring systems for accurately measuring one or more distances. They impress with their robust design including IP 67 high degree of protection, ease of installation, and wear-free ...

cont. on page 96

New

Flush-mounted BSP pressure sensors

Where standard sensors reach their limit

Balluff pressure sensors with a flush-mounted membrane are designed for media in which standard pressure sensors reach their limit. With their flush-mounted, welded stainless steel membrane, the sensors have no dead spaces and are particularly easy to clean ...

cont. on page 106

BVS-E infrared vision sensors

Invisible means greater process reliability

Inspection and read processes for vision sensors can be impaired by changing ambient light. Simultaneously, employees and technicians are often bothered by the pulsing light of normal vision sensors. But you do not have to have such problems. ...

cont. on page 118

Coaxial lighting

For highly reflective surfaces

Coaxial lighting is the optimal solution for lighting highly reflective surfaces. Therefore, coaxial lighting is well suited for transmitted light inspections of colored materials and for inspections of printed or dirty surfaces. ...

cont. on page 128

3D holder system for vision sensors

With unique quick-change plate

The 3D sensor holder with quick-change plate for industrial image processing from Balluff is a novelty on the market. Originally conceived for vision sensors, this multitalent can also hold other sensors of similar size. To do so, you only have to exchange ...

cont. on page 130

Product Highlights
An overview

Flat backlighting with IP 69K

The correct light even in harsh environments

The new surface illuminator with the IP 69K high degree of protection is designed for difficult environments. Absolute water and dust density withstands even the highest loads of rough day-to-day work. This way the backlighting is not only particularly ...

cont. on page 134

Universal IO-Link switch

Unlimited possibilities

In a process-related manner, pumps, signal lights, control panels, valve clusters, switch units, transfer units, and much more are connected with the control level in the simplest way. On the one hand, the module offers the familiar IO-Link connection via the standard ...

cont. on page 176

Profinet modules – second generation

With display, integrated switch, and Web server

Profinet is increasingly becoming the communications medium of the future for mechanical and plant engineering. In some areas, it has already incrementally replaced the Profibus. Profinet has for a long time been a globally recognized standard for network ...

cont. on page 184

Industrial networking and connectivity

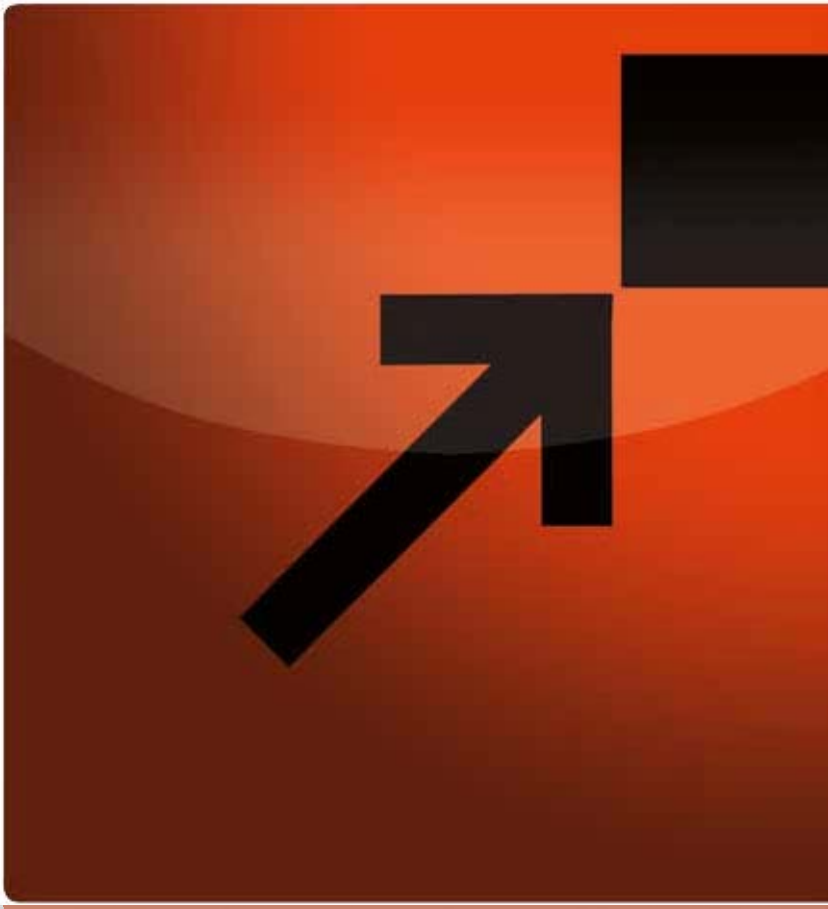
Hook up, seal, forget

Until now, you had a difficult choice when installing plug connectors. Either you could use a plug with a molded cable and in this manner achieve higher leakproofness, or you could decide in favor of an adjustable plug, if you needed flexible cable length ...

cont. on page 198

Object Detection

Mechanical Multiple Position Switches
Inductive Sensors
Photoelectric Sensors
Sensors for Pneumatic Cylinders
Capacitive Sensors
Ultrasonic Sensors



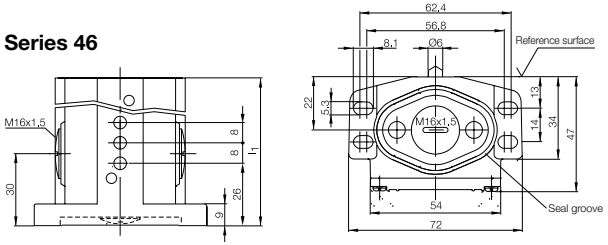
more added value

Stays cool, even when things get hot

The ultra-high temperature-proof multiple and single position switches can be used for temperatures up to 180 °C, require little space and feature a robust die casting housing. They are the perfect solution for harsh environments in die construction, plastic and steel industry.

Switch element BSE 79

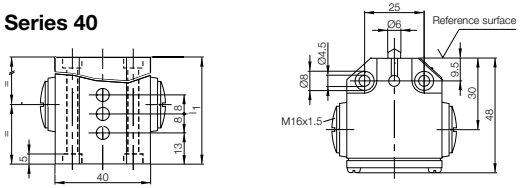
Series 46



Available sizes

Number of plungers	2	3
Dimension l_1	49 mm	59 mm

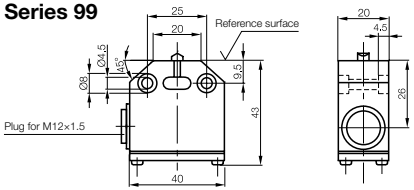
Series 40



Available sizes

Number of plungers	2	3
Dimension l_1	49 mm	59 mm

Series 99



For Extreme Applications up to +180 °C

Ultra-high temperature-resistant multiple and single position switches BNS

Ordering example:
BNS 819-B03-D08-46-15

BNS 819-B_ _-_ 08-_ _-15

No. of plungers	Plunger style	Model
02 2×	**D** Chisel	**40**
03 3×	**K** Ball	**46**
	R Roller	

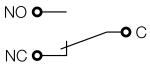
Ordering example:
BNS 819-99-D-15

BNS 819-99-_ 15

Plunger style
D Chisel
K Ball
R Roller

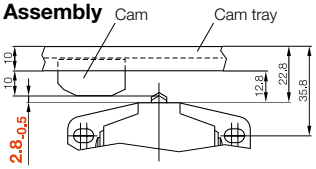
Additional types on request
Ultra-BNS@balluff.de or from your Balluff Field Service Specialist.

Type	Multiple and single position switches, 40, 46 and 99 series
Plunger spacing	8/10 mm
Plunger style	Chisel (**D**), Ball (**K**), Roller (**R**)
Plunger material	Stainless steel, contact surfaces induction-hardened
Housing material	Cast aluminum, corrosion-resistant, anodized finish
Connection type	M12×1.5 or M16×1.5 for bulkhead
Ambient temperature range	–5...150 °C (–5...180 °C 10 h/day) +23...302 °F (+23...356 °F 10 h/day)
Degree of protection per IEC 60529	IP 67



Switching element	**BSE 79**
Part number	BNS 819-...-46-15
Contact material	Gold
Switching principle	Snap switch
Contact system	Single-pin changeover
Connection type	Solder connection
Approval	UL, CE, CSA, CCC, ENEC
Plunger point to reference surface	4 mm
Switching point to reference surface	3.5 mm
Maximum plunger travel	3.5 mm
Switching actuating force on plunger	Min. 8 N

Assembly



Important!
To ensure switching function, the dimension $2.8_{-0.5}$ is especially critical.

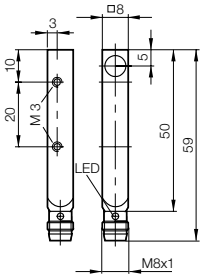
- Due to the miniature design, position sensing is now possible even where there used to be no space for a sensor.
- Assemblies can be shrunk even further, since the sensors require less space.
- Ideal price/performance ratio
- Robust through high-quality metal enclosure
- High functional reserve through increased switching distance
- TripleProx: triple switching distance, flush-mountable

Size		**8×50×8 mm**
Type of mounting		Flush
Rated switching distance s_n		**3 mm**
Switching distance identification		■■■
PNP	**Ordering code**	**BES01U4**
NO	Part number	BES Q08ZC-PSC30B-S49G
Supply voltage U_B		10...30 V DC
Rated operating current I_e		200 mA
Polarity reversal/short-circuit protected		yes/yes
Function indicator		yes
Ambient temperature		–25...+70 °C
Switching frequency f		1000 Hz
Degree of protection as per IEC 60529		IP 67
Approvals		CE, cULus
Housing material		Brass-coated
Material of sensing surface		PBT
Connection		M8 connector, 3-pin

Common application examples

- Linear units
- Robotics and automation
- Vibrating conveyor

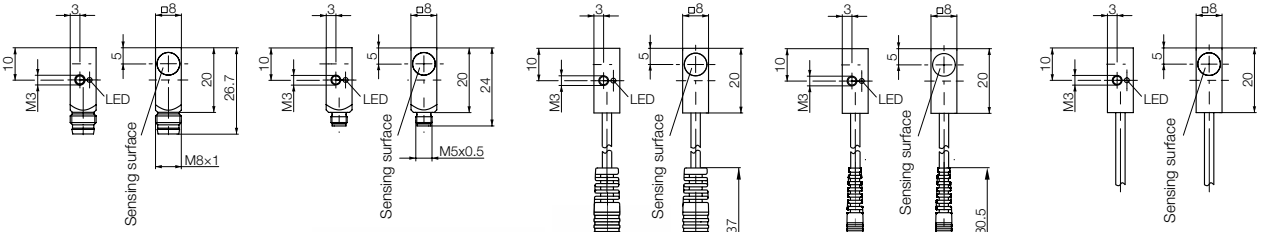
For installation instructions and connection circuit diagrams, see the catalog "Object detection – Inductive sensors".



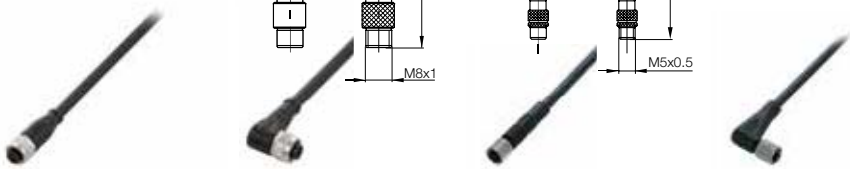
BES Inductive Sensors, 8×8 mm TripleProx and Shorties

The sensors with the dream dimensions

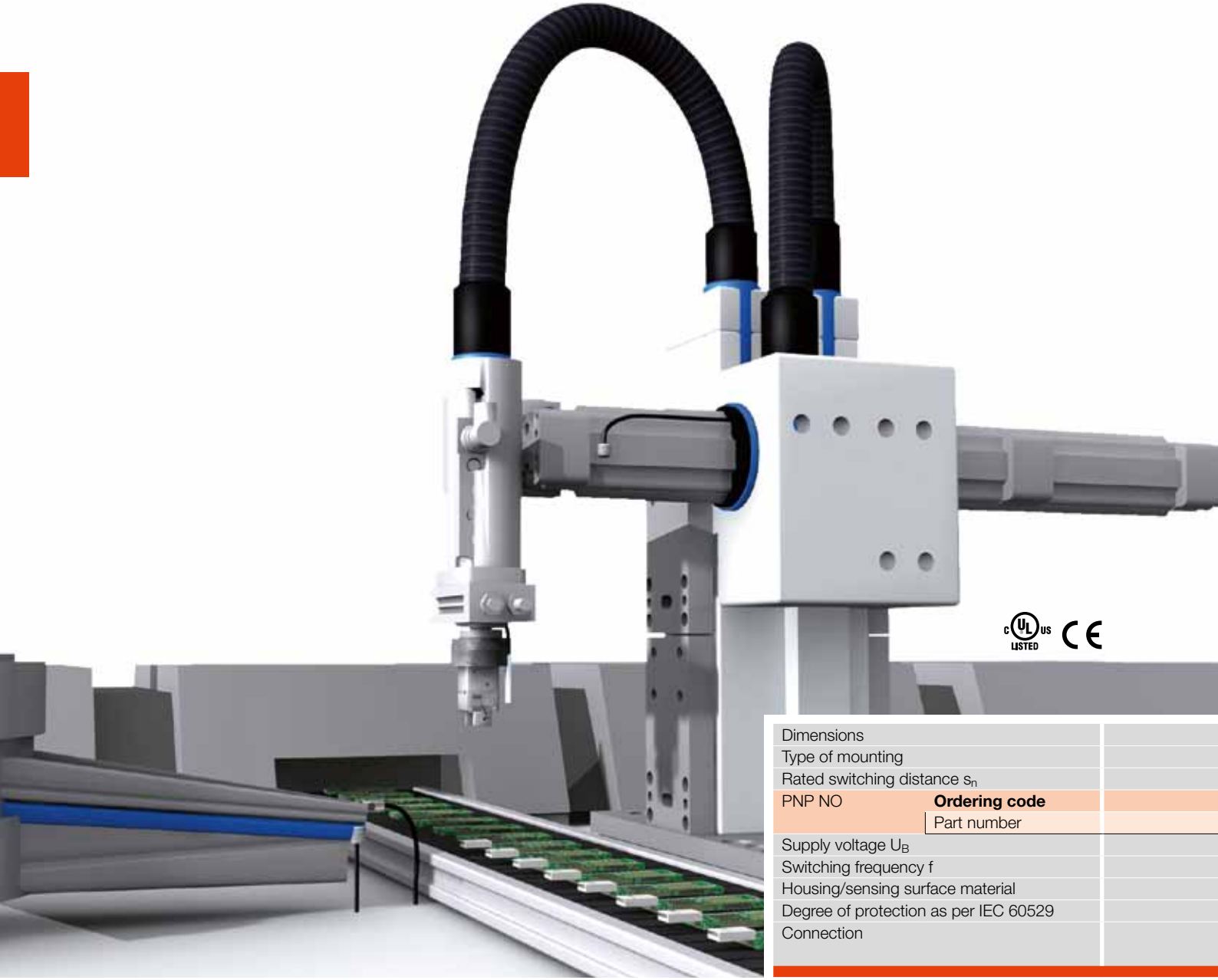
8×27×8 mm	**8×24×8 mm**	**8×20×8 mm**	**8×20×8 mm**	**8×20×8 mm**
Flush	Flush	Flush	Flush	Flush
2 mm	**2 mm**	**2 mm**	**2 mm**	**2 mm**
■■	■■	■■	■■	■■
BES03Y8	**BES03U4**	**BES041N**	**BES041U**	**BES03U2**
BES Q08MEC-PSC20B-S49G	BES Q08MEC-PSC20B-S26G	BES Q08MEC-PSC20B-EP00,3-GS49	BES Q08MEC-PSC20B-EP00,3-GS26	BES Q08MEC-PSC20B-EP02
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
200 mA	200 mA	200 mA	200 mA	200 mA
yes/yes	yes/yes	yes/yes	yes/yes	yes/yes
yes	yes	yes	yes	yes
–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C
3000 Hz	3000 Hz	3000 Hz	3000 Hz	3000 Hz
IP 67	IP 67	IP 67	IP 67	IP 67
CE, cULus	CE, cULus	CE, cULus	CE, cULus	CE, cULus
Brass-coated	Brass-coated	Brass-coated	Brass-coated	Brass-coated
PBT	PBT	PBT	PBT	PBT
M8 connector, 3-pin	M5 connector, 3-pin	0.3 m cable PUR with M8 connector, 3-pin	0.3 m cable PUR with M5 connector, 3-pin	2 m PUR cable, 3×0.14 mm²



A large selection of plug connectors and connecting cables in different cable materials and lengths can be found in our catalog Industrial Networking and Connectivity.



Connector		**M8 × 1**	**M8 × 1**	**M5×0.5**	**M5×0.5**
Type		Straight female	Right angle female	Straight female	Right angle female
Cable length/material		2 m PUR	2 m PUR	3 m PUR	3 m PUR
No LED	**Ordering code**	**BCC02NU**	**BCC02P5**	**BCC00HE**	**BCC00HM**
	Part number	BCC M313-0000-10-001-VX8334-020	BCC M323-0000-10-001-VX8334-020	BKS-B 25-1-PU-03	BKS-B 25-1-PU-03



Dimensions		
Type of mounting		
Rated switching distance s_n		
PNP NO	**Ordering code**	
	Part number	
Supply voltage U_B		
Switching frequency f		
Housing/sensing surface material		
Degree of protection as per IEC 60529		
Connection		

Inductive Mini-sensors
For position sensing in a harsh environment

Small housing, low weight, and yet the highest switching precision? Balluff mini-sensors fulfill these industrial automation requirements. By means of small designs and peak performance, they offer great freedom of design and enable substantially more applications. Thus users have high flexibility.

High-performance and compact

Inductive mini-sensors guarantee position sensing in a harsh environment. Their electronics is completely integrated, therefore they can be completely integrated in narrow modules, such as linear units, valves, and actuators. And modules can be made even smaller.

Their low weight enables applications with extremely fast accelerations, which means that pick-and-place is easy to manage.

Inductive SuperShorty M12

The shortest inductive M12 on the market enables position sensing in applications where there never used to be space for a sensor. The SuperShorty with ultimate power density is available in two versions:

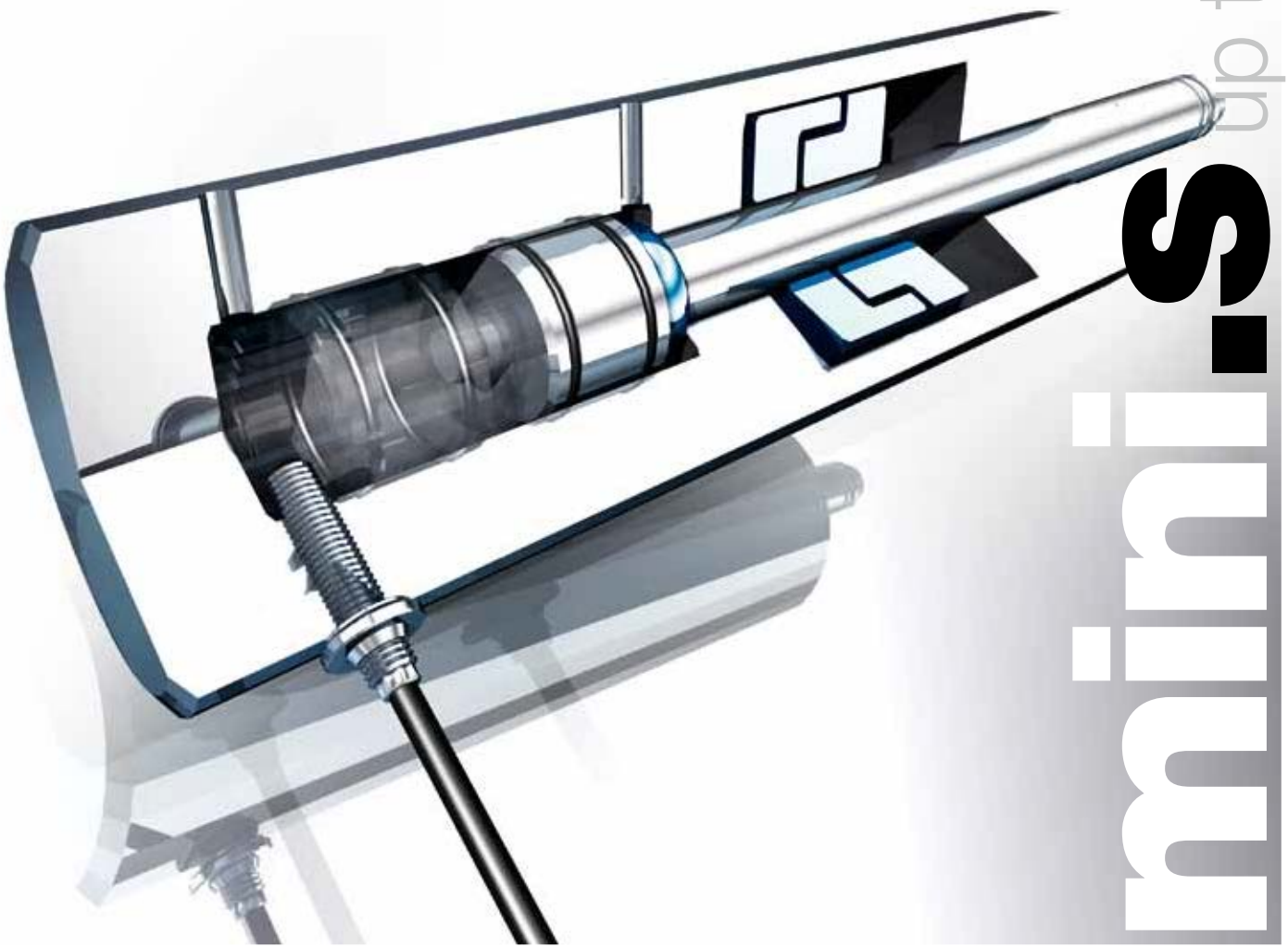
- With a length of 12 mm it can be mounted flush and offers a switching distance of 4 mm.
- With a length of 17 mm it is not mounted flush and has a switching distance of 6 mm.

Cable variants with M12 plugs are available.

				
	Ø 6.5×6 mm	M8×10 mm	M12×12 mm	M12×17 mm
	Flush	Flush	Flush	Non-flush
	1.5 mm	1.5 mm	4 mm	6 mm
	BES0254	**BES0273**	**BES0464**	**BES047L**
	BES G06E60-PSC15B-EP00.3-GS49	BES M08EA-PSC15B-EP00.3-GS49	BES M12EA-PSC40B-EP00.3-GS04	BES M12EA-PSC60F-EP00.3-GS04
	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
	3 kHz	3 kHz	1 kHz	1 kHz
	Stainless steel/PBT	Stainless steel/PBT	Stainless steel/LCP	Stainless steel/LCP
	IP 67	IP 67	IP 67	IP 67
	0.3 m PUR cable with M8 plug, 3-pin	0.3 m PUR cable with M8 plug, 3-pin	0.3 m PUR cable with M12 plug, 3-pin	0.3 m PUR cable with M12 plug, 3-pin

more added value

- Mini design M5
- For pressure-resistant applications up to 100 bar
- Ideal price/performance ratio



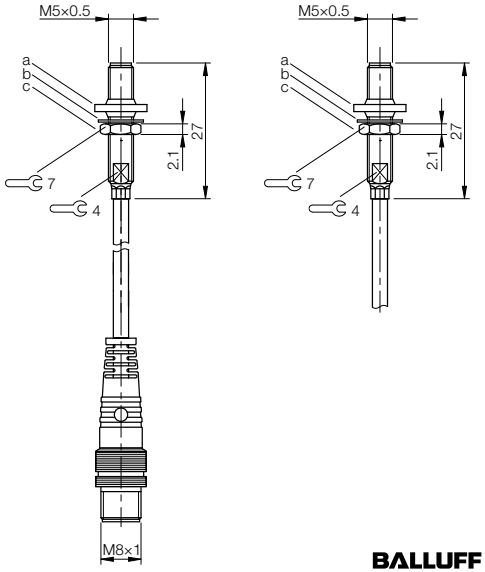
mini.S up to 100 bar

Pressure-resistant Inductive Mini Sensors

Powerful M5 sensors up to 100 bar

Size			**M5×0.5**	**M5×0.5**
Mounting type			Flush	Flush
Rated switching distance s_n			**0.8 mm**	**0.8 mm**
PNP	NO	**Ordering code**	**BES03LC**	**BES03L7**
		Part number	BES M05ED-PSD08B-BP00,3-GS49-R03	BES M05ED-PSD08B-BP02-R03
	NC	**Ordering code**	**BES03LE**	**BES03L8**
		Part number	BES M05ED-POD08B-BP00,3-GS49-R03	BES M05ED-POD08B-BP02-R03
NPN	NO	**Ordering code**	**BES03LF**	**BES03L9**
		Part number	BES M05ED-NSD08B-BP00,3-GS49-R03	BES M05ED-NSD08B-BP02-R03
	NC	**Ordering code**	**BES03LH**	**BES03LA**
		Part number	BES M05ED-NOD08B-BP00,3-GS49-R03	BES M05ED-NOD08B-BP02-R03
Supply voltage U_B			10...30 V DC	10...30 V DC
Rated operating current I_e			100 mA	100 mA
Reverse polarity protected			Yes	Yes
Short-circuit protected			Yes	Yes
Ambient temperature range			–25...+70 °C	–25...+70 °C
Sensor degree of protection per IEC 60529			IP 67	IP 67
Approvals			CE, cULus	CE, cULus
Housing material			Stainless steel	Stainless steel
Material of sensing face			Ceramic	Ceramic
Connection			0.3 m cable PUR with M8 connector, 3-pin	2 m cable PUR, 3×0.14 mm²
Pressure rated to			**100 bar**	**100 bar**

a) Sealing washer
b) Plain washer
c) Mounting nut
Included in the scope of delivery!



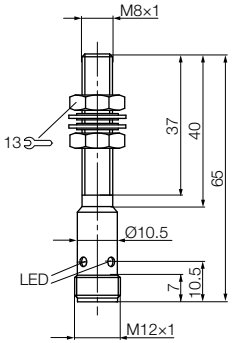
Application areas

- Coolant/lubricant sector
- Laboratories
- Low-pressure hydraulic systems
- Valves
- Pneumatic systems
- Industrial cleaning
- Special machine construction

more added value

- Greater switching distances for increased performance reserves
- Saves time during installation because adjustments are minimized
- Greater reliability in practice, even if the detected objects vibrate
- Housing and sensor identification optimized for the requirements in the automobile industry
- Perfectly suited for applications with variable detection objects (steel, AL, CuZn and Cu)

Size		**M8×1**
Mounting type		Flush
Rated switching distance s_n		**2 mm**
PNP NO	**Ordering code**	**BES03YP**
	Part number	BES M08MG1-PSC20A-S04G-W
Supply voltage U_B		10...30 V DC
Rated operating current I_e		100 mA
Reverse polarity/short-circuit protected		Yes/yes
Ambient temperature range		–25...+70 °C
Switching frequency f		1000 Hz
Degree of protection per IEC 60529		IP 67
Approvals		CE, cULus
Housing material		Brass, PTFE coated
Material of sensing face		LCP
Connection		M12 connector, 3-pin, A-coded



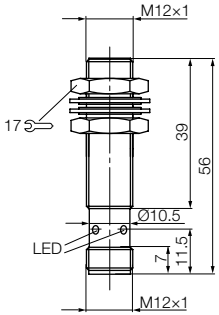
Application areas

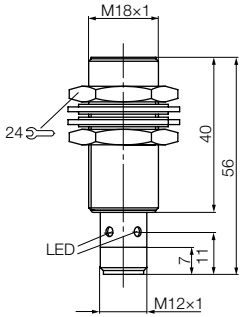
- Welding lines
- Lightweight construction
- Automobile suppliers
- Material handling technology
- Electric motors and electrical brakes
- Special machine construction

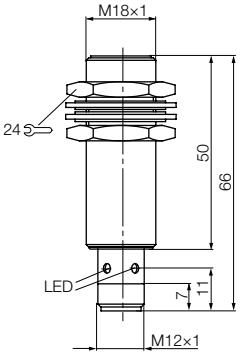
Weld Immune Factor 1+ Sensors

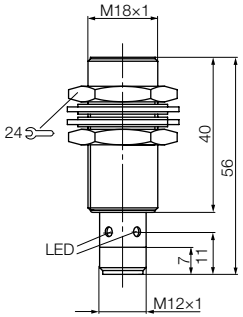
A plus for your application

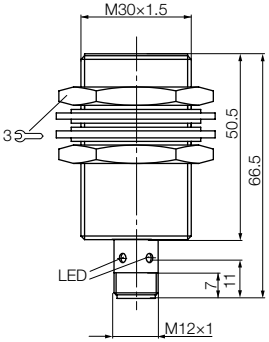
M12×1	**M18×1**	**M18×1**	**M18×1**	**M30×1.5**
Flush	Flush	Flush	Quasi-flush	Flush
4 mm	**8 mm**	**8 mm**	**12 mm**	**15 mm**
BES03YR	**BES03YT**	**BES03YU**	**BES03YW**	**BES03YY**
BES M12MG-PSC40A-S04G-W	BES M18MG-PSC80A-S04G-W	BES M18MI-PSC80A-S04G-W	BES M18MG-PSC12A-S04G-W	BES M30MI-PSC15A-S04G-W
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
200 mA	200 mA	200 mA	200 mA	200 mA
Yes/yes	Yes/yes	Yes/yes	Yes/yes	Yes/yes
–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C
2000 Hz	350 Hz	600 Hz	600 Hz	250 Hz
IP 67	IP 67	IP 67	IP 67	IP 67
CE, cULus	CE, cULus	CE, cULus	CE, cULus	CE, cULus
Brass, PTFE coated	Brass, PTFE coated	Brass, PTFE coated	Brass, PTFE coated	Brass, PTFE coated
PPS GF40	PPS GF40	PPS GF40	PPS GF40	PPS GF40
M12 connector, 3-pin, A-coded	M12 connector, 3-pin, A-coded	M12 connector, 3-pin, A-coded	M12 connector, 3-pin, A-coded	M12 connector, 3-pin, A-coded



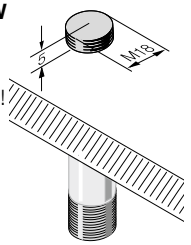








Installation in metal for **BES03YW** requires: Observe clear zone!



more added value

- Optimization of system availability
- Reduction in maintenance costs
- Increase in process quality

The ultra-high temperature-resistant inductive sensors can be used in temperature ranges up to +160 °C. These sensors are ideally suited to harsh environments in the steel industry, in plastic injection molding machines and in forging and foundry processes.

CE

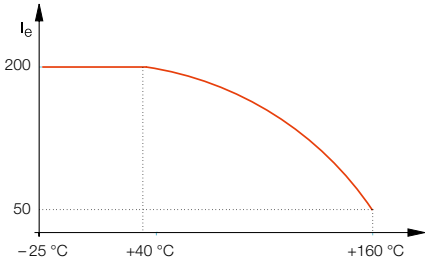
Size		
Mounting type		
Rated switching distance s_n		
PNP, NO	**Ordering code**	
	Part number	
Supply voltage U_B		
Voltage drop U_d at I_e		
Rated operating current I_e		
Ambient temperature range		
Switching frequency f		
Degree of protection per IEC 60529		
Housing material		
Sensing surface material		
Connection		

For Extreme Applications up to +160 °C

Ultra-high temperature-resistant inductive sensors

M18×1	**M18×1**	**M30×1.5**	**M30×1.5**
Flush	Non-flush	Flush	Non-flush
5 mm	**8 mm**	**10 mm**	**15 mm**
BES043T	**BES043U**	**BES043W**	**BES043Y**
BES 515-326-SA49-D-TF-02	BES 515-360-SA13-D-TF-02	BES 515-327-SA22-D-TF-02	BES 515-362-SA4-D-TF-02
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
2.5 V	2.5 V	2.5 V	2.5 V
200 mA	200 mA	200 mA	200 mA
–25...+160 °C	**–25...+160 °C**	**–25...+160 °C**	**–25...+160 °C**
200 Hz	200 Hz	200 Hz	200 Hz
IP 69K	IP 69K	IP 69K	IP 69K
Stainless steel 1.4571	Stainless steel 1.4571	Stainless steel 1.4571	Stainless steel 1.4571
PEEK	PEEK	PEEK	PEEK
2 m cable FEP, 3×0.34 mm²	2 m cable FEP, 3×0.34 mm²	2 m cable FEP, 3×0.34 mm²	2 m cable FEP, 3×0.34 mm²

Rated operating current



more added value

Size		**Ø 12×50 mm**	**M12×50 mm**	**M12×45 mm**	**M12×65 mm**	**Ø 12×54.5 mm**
Mounting type		Flush	Flush	Flush	Flush	Non-flush
Rated switching distance s_n		**2 mm**	**2 mm**	**4 mm**	**4 mm**	**4 mm**
PNP, NO	**Ordering code**	**BES0430**	**BES0444**	**BES0433**	**BES0435**	**BES0431**
	Part number	BES G12EE1-PSY20B-S04G-L02	BES M12EE1-PSY20B-S04G-L01	BES M12EE-PSC40B-S04G-L01	BES M12EI-PSC40B-S04G-L01	BES G12EE1-PSY40F-S04G-L02
PNP, NC	**Ordering code**			**BES0432**	**BES0434**	
	Part number			BES M12EE-POC40B-S04G-L01	BES M12EI-POC40B-S04G-L01	
NPN, NO	**Ordering code**				**BES0436**	
	Part number				BES M12EI-NSC40B-S04G-L01	
Supply voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
Voltage drop U_d at I_e		3.5 V	3.5 V	2 V	2.5 V	3.5 V
Rated operating current I_e		130 mA*	130 mA*	200 mA	200 mA	130 mA*
Reverse polarity/short-circuit protected		Yes/yes	Yes/yes	Yes/yes	Yes/yes	Yes/yes
Ambient temperature range		–40...+105 °C	–40...+105 °C	–25...+85 °C	–25...+85 °C	–40...+105 °C
Switching frequency f		800 Hz	800 Hz	2000 Hz	1000 Hz	400 Hz
Approvals/conformity		CE, cULus, Ecolab, FDA compliant	CE, cULus, Ecolab, FDA compliant	CE, cULus, Ecolab, FDA compliant	CE, cULus, Ecolab, FDA compliant	CE, cULus, Ecolab, FDA compliant
Degree of protection		IP 69K and IP 68 per BWN Pr. 27	IP 69K and IP 68 per BWN Pr. 27	IP 69K and IP 68 per BWN Pr. 27	IP 69K and IP 68 per BWN Pr. 27	IP 69K and IP 68 per BWN Pr. 27
Housing material		Stainless steel 1.4571	Stainless steel 1.4571	Stainless steel 1.4404	Stainless steel 1.4404	Stainless steel 1.4571
Sensing surface material		PEEK	PEEK	LCP	LCP	PEEK
Connection		M12 connector	M12 connector	M12 connector	M12 connector	M12 connector

Stainless Steel

IP 68 as per BWN

IP 69K

FDA

ECOLAB

H_2O_2 resistant

Balluff offers a large selection of sensors for the food industry

PROXI*NOX*

Sensors for the Food Industry

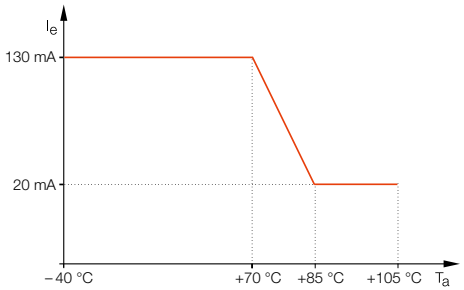
New inductive Proxinox sensors



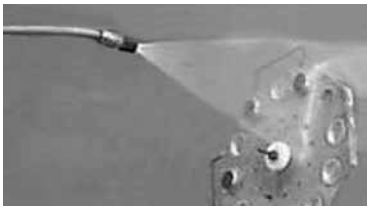



	M12×54.5 mm	**Ø 18×45 mm**	**M18×45 mm**	**M18×65 mm**	**Ø 18×54.5 mm**	**M18×54.5 mm**
	Non-flush	Flush	Flush	Flush	Non-flush	Non-flush
	4 mm	**5 mm**	**5 mm**	**8 mm**	**8 mm**	**8 mm**
	BES0443	**BES0439**	**BES0441**	**BES0437**	**BES043A**	**BES0442**
	BES M12EE1-PSY40F-S04G-L01	BES G18EE1-PSY50B-S04G-L02	BES M18EE1-PSY50B-S04G-L01	BES M18EI-PSC80B-S04G-L01	BES G18EE1-PSY80F-S04G-L02	BES M18EE1-PSY80F-S04G-L01
				BES0438		
				BES M18EI-POC80B-S04G-L01		
	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
	3.5 V	3.5 V	3.5 V	2.5 V	3.5 V	3.5 V
	130 mA*	130 mA*	130 mA*	200 mA	130 mA*	130 mA*
	Yes/yes	Yes/yes	Yes/yes	Yes/yes	Yes/yes	Yes/yes
	–40...+105 °C	–40...+105 °C	–40...+105 °C	–40...+85 °C	–40...+105 °C	–40...+105 °C
	400 Hz	500 Hz	500 Hz	700 Hz	200 Hz	200 Hz
	CE, cULus, Ecolab, FDA compliant	CE, cULus, Ecolab, FDA compliant	CE, cULus, Ecolab, FDA compliant	CE, cULus, Ecolab, FDA compliant	CE, cULus, Ecolab, FDA compliant	CE, cULus, Ecolab, FDA compliant
	IP 69K and IP 68 per BWN Pr. 27	IP 69K and IP 68 per BWN Pr. 27	IP 69K and IP 68 per BWN Pr. 27	IP 69K and IP 68 per BWN Pr. 27	IP 69K and IP 68 per BWN Pr. 27	IP 69K and IP 68 per BWN Pr. 27
	Stainless steel 1.4571	Stainless steel 1.4571	Stainless steel 1.4571	Stainless steel 1.4404	Stainless steel 1.4571	Stainless steel 1.4571
	PEEK	PEEK	PEEK	PEEK	PEEK	PEEK
	M12 connector	M12 connector	M12 connector	M12 connector	M12 connector	M12 connector

***Current decrease curve**



Steam jet tested!

more added value

Compact sensor designs with large switching distances are required in material handling technology. In addition, the switching and operating state of the sensor can be identified from far away.

Housing optimized for material handling technology

- Highly visible corner LEDs
- Sensor head can be mounted in five positions
- Connector outlet set to position within a 270° range

Factor 1 sensors are the first choice for welding applications because they have a Teflon-coated sensing face and are immune to magnetic fields.

CE

Size		
Mounting type		
Rated switching distance s_n		
PNP NO	**Ordering code**	
	Part number	
Supply voltage U_B		
Rated operating current I_e		
Reverse polarity/short-circuit protected		
Ambient temperature range		
Switching frequency f		
Sensor degree of protection per IEC 60529		
Approvals		
Housing material		
Material of sensing face		
Connection		

Inductive Q40 Block Sensors with Corner LEDs

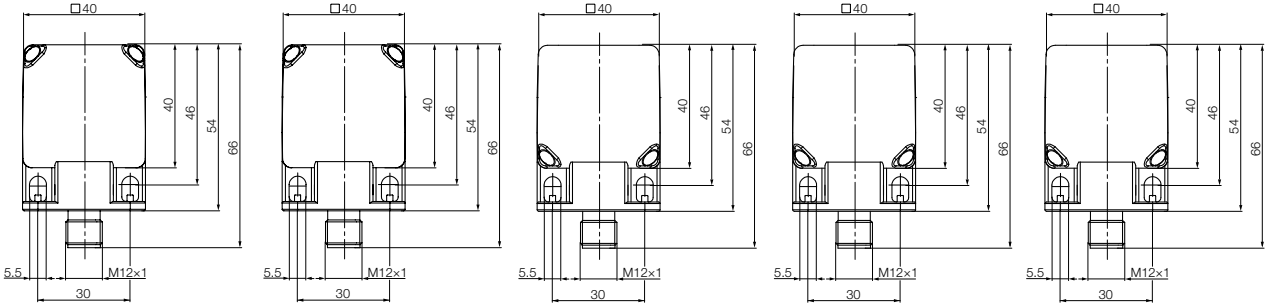
Optimized for material handling technology applications

Factor 1
Magnetic field immune

Factor 1
Magnetic field immune

Factor 1
Magnetic field immune

40×40×66 mm	**40×40×66 mm**	**40×40×66 mm**	**40×40×66 mm**	**40×40×66 mm**
Flush	Non-flush	Flush	Non-flush	Non-flush
20 mm	**40 mm**	**20 mm**	**35 mm**	**40 mm**
BES0306	**BES0308**	**BES0305**	**BES0307**	**BES0304**
BES Q40KFU-PSC20B-S04G-012	BES Q40KFU-PSC40F-S04G-012	BES Q40KFU-PSC20A-S04G-012	BES Q40KFU-PSC35E-S04G-012	BES Q40KFU-PAC40E-S04G-012
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
200 mA	200 mA	200 mA	200 mA	200 mA
Yes/yes	Yes/yes	Yes/yes	Yes/yes	Yes/yes
–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C
100 Hz	60 Hz	200 Hz	200 Hz	200 Hz
IP 67	IP 67	IP 67	IP 67	IP 67
CE, cULus	CE, cULus	CE, cULus	CE, cULus	CE, cULus
PA	PA	PA	PA	PA
PA	PA	PA Teflon coated	PA Teflon coated	PA Teflon coated
M12 connector, 3-pin, A-coded	M12 connector, 3-pin, A-coded	M12 connector, 3-pin, A-coded	M12 connector, 3-pin, A-coded	M12 connector, 3-pin, A-coded



more added value

Inductive tube sensors BES complement the line of ring sensors. Optimized for tube infeeds in automated assembly, they detect small parts easily and reliably.

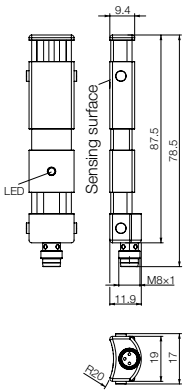
- Simple attachment to infeed tube
- Pulse extension of 150 ms results in a reliable detection of fast-moving parts
- Object speed max. 20 m/s

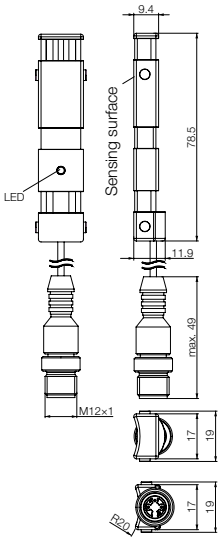
Inductive Tube Sensors BES Z06K

Fast and easy to install

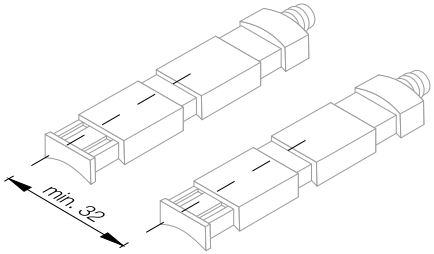
Size		17×78.5×11.9 mm	17×78.5×11.9 mm
Minimum object size		Screw M3×5	Screw M3×5
Rated switching distance s_n		16 mm	16 mm
PNP, NO	**Ordering code**	**BES0428**	**BES0429**
	Part number	BES Z06K-PSC16F-S49G	BES Z06K-PSC16F-BP00,1-GS04
Supply voltage U_B		10...30 V DC	10...30 V DC
Rated operating current I_e		200 mA	200 mA
Reverse polarity/short-circuit protected		Yes/yes	Yes/yes
Ambient temperature T_a		–25...+70 °C	–25...+70 °C
Function indicator		Yes	Yes
Degree of protection per IEC 60529		IP 67	IP 67
Housing material		PA 6.6	PA 6.6
Connection		M8 connector, 3-pin	M12 connector, 3-pin, A-coded with 0.1 m cable PUR
Pulse prolongation		150 ms	150 ms

Rated switching distance s_n based on FE360 steel plate (18×18×1 mm).





Centerline spacing for side-by-side mounting



more added value

- No misalignment between emitter and receiver
- Easy, fast commissioning
- Reliable detection of transparent objects

Reliable Transparency Detection

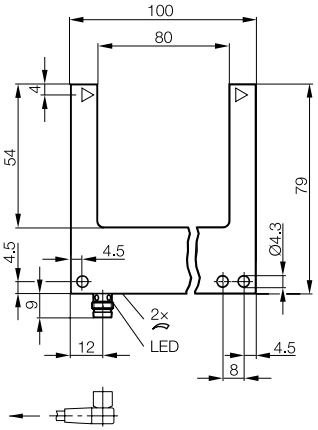
Now also available with BGL laser fork sensors

Maximum reliability – simple handling

Balluff BGL laser fork sensors ensure completely reliable detection of transparent objects. These also provide the unsurpassed advantages offered by fork sensors: the transmitter and receiver do not need to be aligned. And there is no longer any misalignment. BGL laser fork sensors are therefore characterized by simple and fast commissioning as well as maximum reliability.

Ordering code / Part number		BGL002T BGL 80A-009-S49	BGL002U BGL 80A-010-S49
Switching output	PNP	■	
	NPN		■
Switching type	NC/NO selectable	■	■
Connection	M8 connector, 3-pin	■	■
Fork opening	80 mm	■	■
Light type		Laser	
Switching frequency		5000 Hz	
Degree of protection		IP 67	
Housing material		Gd-Zn	
Optical surface		Glass	

For additional information visit our website at **www.balluff.com**



more added value

- High degree of process reliability
- Better quality
- Improved efficiency

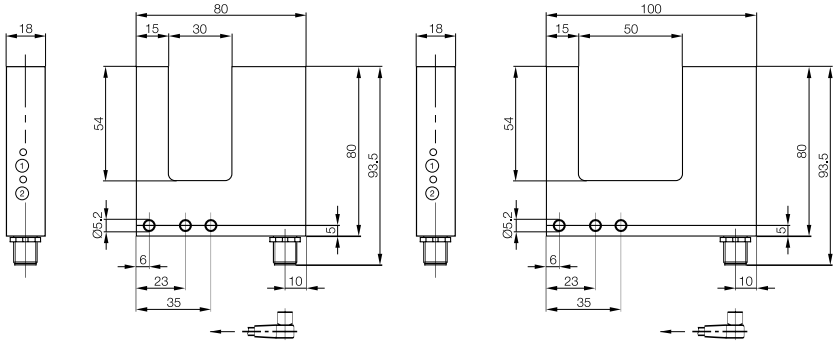
Reliable Web Edge Control

Analog BGL fork sensors: a light band accomplishes more

In-process correction
The light band on analog fork sensors not only ensures completely reliable detection, but also determines the position of objects with extreme accuracy: In-process correction could not be easier.
Process reliability and product quality are significantly improved. Use the BGL light band fork sensor – with enhanced efficiency as a welcome extra.

Technical highlights
- Analog signal proportional to the skin depth of the object
- Stable value, even in the event of height variations
- High degree of soiling resistance and compensation
- Fieldbus connection with IO-Link

■ **Ordering code** □ Part number		**BGL002Z**	BGL 30C-001-S4	**BGL0037**	BGL 50C-001-S4	**BGL0033**	BGL 30C-005-S4	**BGL0031**	BGL 30C-003-S4	**BGL003C**	BGL 50C-005-S4	**BGL0039**	BGL 50C-003-S4	**BGL0035**	BGL 30C-007-S4	**BGL003F**	BGL 50C-007-S4
Basic: 2 switching outputs		■		■													
Advanced: 1 analog output with 1 switching/error output						■		■		■		■					
Premium: IO-Link														on request			
Fork opening	30 mm	■				■		■						■			
	50 mm			■						■		■				■	
Switching output	PNP	■		■		■		■		■		■		■		■	
	NPN	on request															
Analog output	0...10 V DC					■				■							
	4...20 mA							■				■					
Light type		Red light															
Measurement field length		25 mm															
Resolution		≤ 0.1 mm															
Housing material		Al anodized															
Connection		M12 connector, 4-pin															

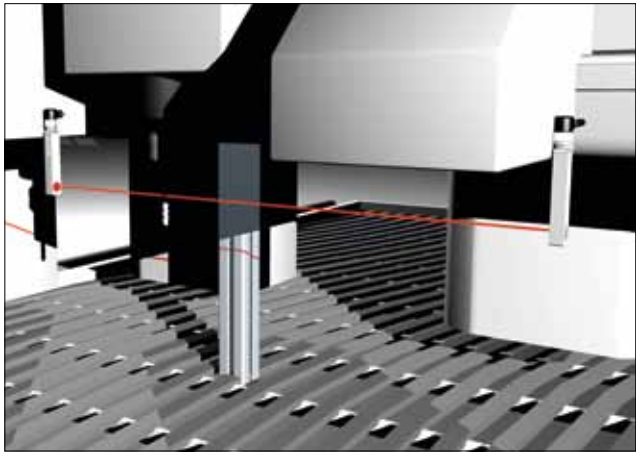


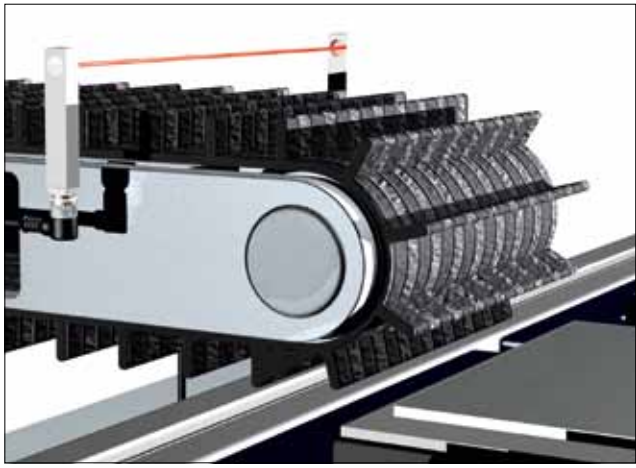
Integral air rinsing nozzle to prevent dust from accumulating on the optical transmitter and receiver. Simple connection via standard pneumatic system.

Reliably detect the smallest parts
Balluff through-beam sensors BOS Q08M are innovative, compact products that reach a high performance level. Nothing else produces comparable results under similar conditions. These sensors are therefore particularly recommended if there is little space available. A focused light beam is able to detect even the smallest of parts, grooves or holes in a completely reliable manner, allowing you to control e.g. heights very accurately. And in cramped systems, the high-performance, compact units are also characterized by the fact that their fine laser beam (PinPoint laser/red light) can be aligned very precisely in the middle of closely set parts to ensure reliable detection.

- Compact design for limited space
- Rugged metal housing
- Reliable detection of small parts up to 0.4 mm (PinPoint red light) or 0.28 mm (laser)
- Uses a patented mounting concept for Bosch profiles that allows quick, precise positioning

more added value





Red Light and Laser Through-beam Sensors BOS Q08M

Extreme accuracy in a compact, high-performance design

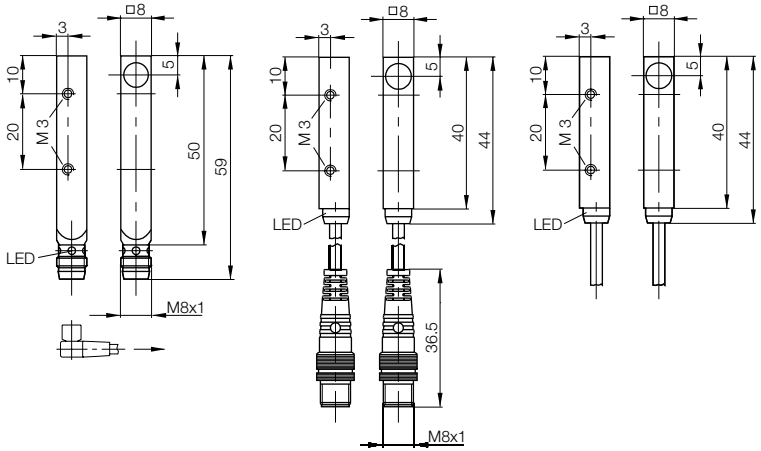
PinPoint

Laser

		Emitter				Receiver							Emitter				Receiver						
Ordering code		**BOS00YK**	**BOS00YH**	**BOS00YJ**		**BOS00YF**	**BOS00YC**	**BOS00YE**	**BOS00YA**	**BOS00Y8**	**BOS00Y9**		**BOS018K**	**BOS019M**	**BOS018M**		**BOS0199**	**BOS0197**	**BOS0198**	**BOS0196**	**BOS0194**	**BOS0195**	
Part number		BOS Q08M-X-KS20-S49	BOS Q08M-X-KS20-00,2-S49	BOS Q08M-X-KS20-02		BOS Q08M-PS-KE20-S49	BOS Q08M-PS-KE20-00,2-S49	BOS Q08M-PS-KE20-02	BOS Q08M-PO-KE20-S49	BOS Q08M-PO-KE20-00,2-S49	BOS Q08M-PO-KE20-02		BOS Q08M-X-LS20-S49	BOS Q08M-X-LS20-00,2-S49	BOS Q08M-X-LS20-02		BOS Q08M-PS-LE20-S49	BOS Q08M-PS-LE20-00,2-S49	BOS Q08M-PS-LE20-02	BOS Q08M-PO-LE20-S49	BOS Q08M-PO-LE20-00,2-S49	BOS Q08M-PO-LE20-02	
PNP						■	■	■	■	■	■						■	■	■	■	■	■	
NPN						on request											on request						
NO						■	■	■									■	■	■				
NC									■	■	■									■	■	■	
Connection	M8 connector, 3-pin	■				■			■				■				■			■			
	Cable with M8 connector, 3-pin		■				■			■				■				■			■		
	Cable			■				■			■				■				■				■
Range		0...2.2 m											0...3 m										
Light type		Red light (PinPoint LED)											Laser (laser class 1)										
Switching frequency		400 Hz											400 Hz										
Smallest detectable part		0.4 mm											0.28 mm										
Degree of protection		IP 67											IP 67										
Housing material		Nickel-plated Gd-Zn											Nickel-plated Gd-Zn										
Optical surface		PMMA											PMMA										

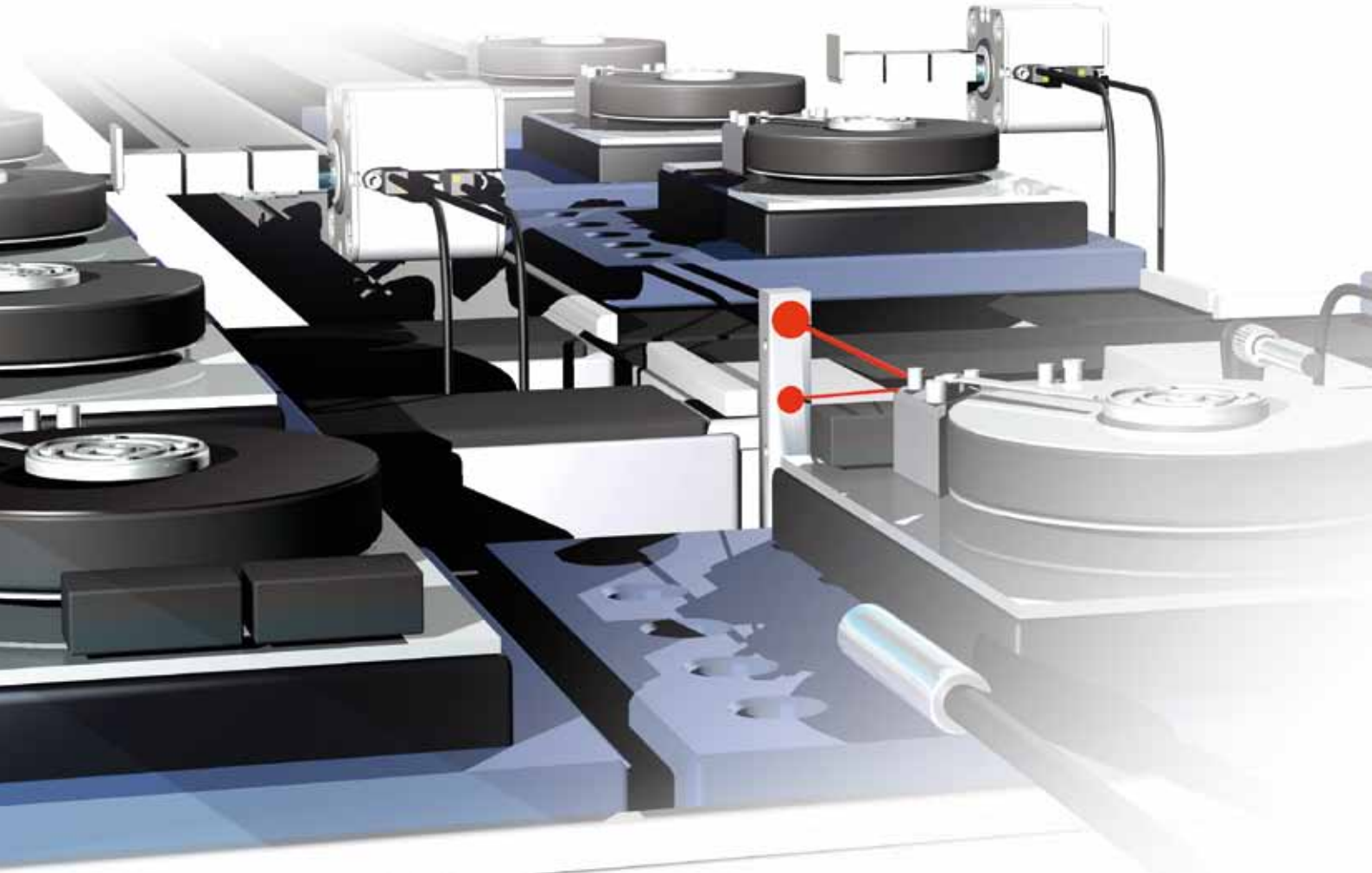
For additional information visit our website at **www.balluff.com**

Clamp holder
For Bosch profile: **BES Q08-KH-3**



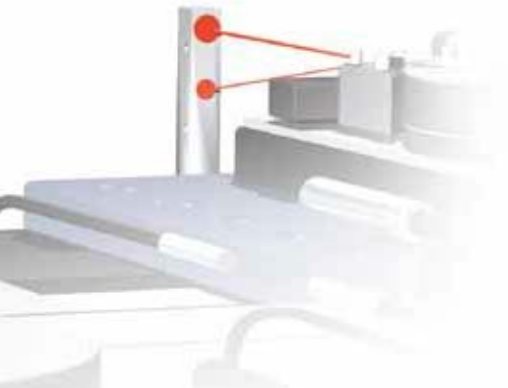
more added value

- Rapid commissioning as no adjustments are required
- The compact design also enables use in the smallest of spaces
- Innovative PinPoint technology: reliable suppression of objects outside the detection field



BOS Q08M Diffuse Sensor with Fixed Background Suppression

Quick installation



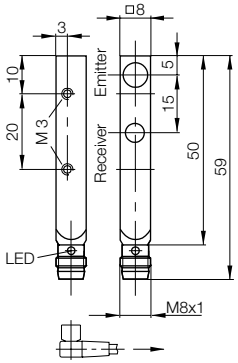
Ordering code
Part number

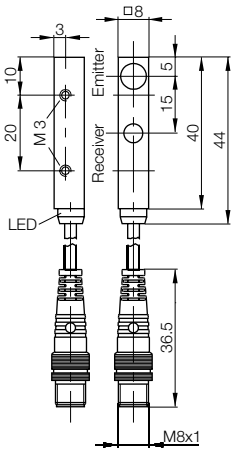
		Diffuse sensor					
		BOS0160 BOS Q08M-PS-KF20-S49	**BOS0163** BOS Q08M-PS-KF20-00,2-S49	**BOS0161** BOS Q08M-PS-KF20-02	**BOS0164** BOS Q08M-PO-KF20-S49	**BOS0168** BOS Q08M-PO-KF20-00,2-S49	**BOS0165** BOS Q08M-PO-KF20-02
Switching output	PNP	■	■	■	■	■	■
	NPN	on request					
Switching type	NO	■	■	■			
	NC				■	■	■
Connection	M8 connector, 3-pin	■			■		
	Cable with M8 connector, 3-pin		■			■	
	Cable			■			■
Sensing distance		5...50 mm					
Light type		Red light PinPoint LED					
Switching frequency		400 Hz					
Degree of protection		IP 67					
Housing material		Nickel-plated Gd-Zn					
Optical surface		PMMA					

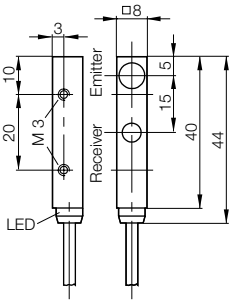
For additional information visit our website at **www.balluff.com**

Rapid application – high reliability
Only Balluff offers the powerful combination of fixed background suppression and homogeneous red light through innovative PinPoint technology. And all of this is contained in a compact design, thereby enabling simple installation in even the most confined spaces.

In addition, the sensors are ready for immediate use without any adjustment. A new, patented mounting concept also ensures flush installation in aluminum profiles. For Bosch profile: **BES Q08-KH-3**



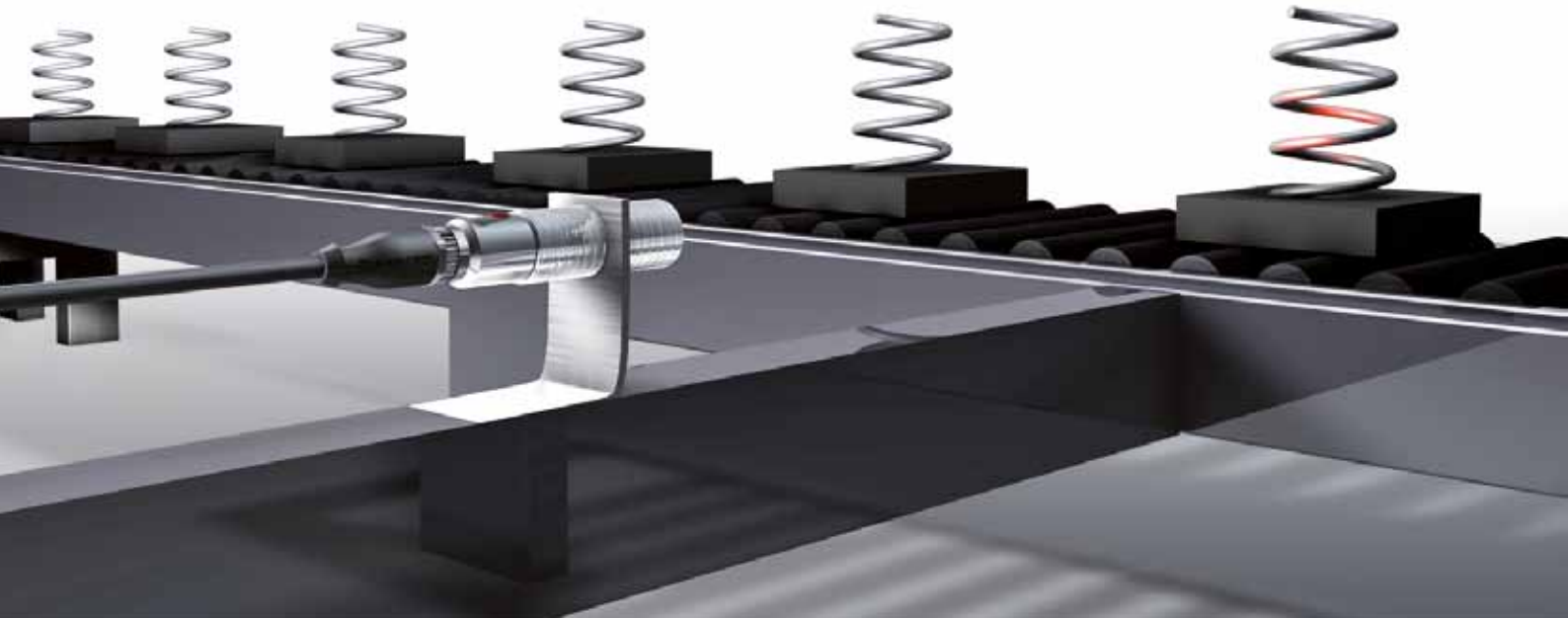




Balluff M18 laser diffuse sensors with background suppression are a genuine highlight. They are available with different light types, allowing you to simply select according to your requirements. The perfectly focused light beam is able to detect the smallest of parts, grooves or holes with maximum precision and reliability. The large light spot of the red light variant with 300 mm is ideal for detecting objects with notches, holes or openings, because breakthroughs and free areas are simply bridged.
High-precision distinction between foreground and background at extremely short distances – the 150 mm red light version is ideal in this case.

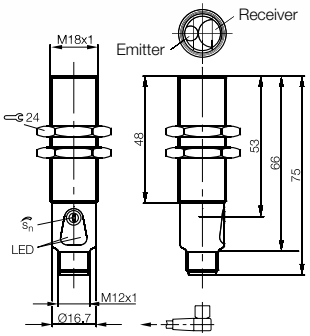
- Exact, almost color-independent object detection
- For every application the correct light type – laser or red light
- Precise setting with 10-turn potentiometer
- Robust M18 metal housing with same design for all types
- Universal fastening and alignment thanks to wide range of assembly accessories

more added value



Photoelectric Sensors M18

BOS 18M background suppression – expertise with all kinds of light



RedLight Laser

CE cULus LISTED

Ordering code
Part number

		Red light						Laser				
		BOS019N BOS 18M-PSV-RH22-S4	**BOS014W** BOS 18M-PA-RH22-S4	**BOS019T** BOS 18M-NA-RH22-S4	**BOS01J3** BOS 18M-NA-RH23-S4	**BOS01J2** BOS 18M-PSV-RH23-S4	**BOS01J4** BOS 18M-PA-RH23-S4	**BOS002K** BOS 18M-PSV-LH22-S4	**BOS002H** BOS 18M-PS-LH22-S4	**BOS001L** BOS 18M-NSV-RH22-S4	**BOS01C4** BOS 18M-PSV-LH23-S4	**BOS01C5** BOS 18M-PA-LH23-S4
Sensing distance		30...300 mm			30...150 mm			30...150 mm				
Gray value shift		low			very low			very low				
Light type	Red light	■	■	■	■	■	■					
	Laser							■	■	■	■	■
	Laser class							2	2	2	1	1
Switching output	PNP, antivalent		■				■					■
	PNP, NO	■				■		■	■		■	
	NPN, antivalent			■	■							
	NPN, NO									■		
Error output		■				■		■		■	■	
Optical surface		Glass						PMMA				
Housing material		Nickel-plated brass										
Supply voltage U_B		10...30 V DC										
Switching frequency		500 Hz										
Degree of protection (IEC 60529)		IP 67										
Ambient temperature T_a		–5...+55 °C										

Versions with NC contact upon request.

Accessories

- Clamping block BOS 18,0-KB-1 with ball joint, plastic (ordering code: **BAM00T3**)
- Sensor holder BMS CS-P-D12-AD18-00 for Balluff mounting system, 90° angle, plastic (ordering code: **BAM002P**)
- Sensor holder BMS CS-M-D12-ID18-01, for Balluff mounting system, 90° angle, stainless steel (ordering code: **BAM0032**)
- Adjusting unit BMS AD-M-002-D12/D18 for Balluff mounting system, for fine adjustment (ordering code: **BAM0038**)
- Connector BCC M415-0000-1A-003-PX0434-020, M12 straight, 2 m PUR cable (ordering code: **BCC032F**)

Further accessories upon request.

more added value

- Sound performance and reliable object detection
- Ideal for standard applications, e.g. in automation
- Cost-effective alternative for all types of light
- Plug and play: All sensors with fixed setting
- Universal fastening thanks to wide range of assembly accessories

We often come across systems in which a sensor adjustment is not required, not possible or is undesirable. Our BOS-18M diffuse sensors and light barriers from the GlobalProx family are the correct choice for these applications. All of these sensors have a fixed setting. This shortens the time required for system commissioning and protects against manipulation. Equipped with a sound basic range of functions, these sensors also have the best possible price/performance ratio.

Global

Photoelectric Sensors M18

BOS 18M GlobalProx – sound and cost-effective

Ordering code
Part number

		Diffuse sensor			Retroreflective sensor			Through-beam sensor				
		BOS01FA BOS 18M-PS-RD23-S4	**BOS01FC** BOS 18M-PO-RD23-S4	**BOS01HL** BOS 18M-PS-ID23-S4	**BOS01F8** BOS 18M-PS-PR23-S4	**BOS01F9** BOS 18M-PO-PR23-S4	**BOS01HK** BOS 18M-PS-IR23-S4	**BOS01FE** BOS 18M-PS-RE23-S4	**BOS01FF** BOS 18M-PO-RE23-S4	**BOS01FH** BOS 18M-X-RS23-S4	**BOS01HP** BOS 18M-PS-IE23-S4	**BOS01HM** BOS 18M-X-IS23-S4
Detection range		400 mm	400 mm	600 mm	4 m*	4 m*	6 m*	20 m	20 m	20 m	50 m	50 m
Light type	Red light	■	■		■	■		■	■	■		
	Infrared			■			■				■	■
Switching output	PNP, NO	■		■	■		■	■			■	
	PNP, NC		■			■			■			
	Emitter									■		■
Polarizing filter					■	■						
Supply voltage U_B		10...30 V DC										
Switching frequency		400 Hz										
Housing material		Nickel-plated brass										
Optical surface		Glass										
Type of protection (IEC 60529)		IP 67										
Ambient temperature T_a		–5...+55°C										

* based on reflector BOS R-1

Accessories
- BOS R-1 reflector, circular, Ø 84 mm (Ordering code: **BAM00UK**)
- Reflector BOS R-9, 50x50 mm (ordering code: **BAM00WL**)
- BOS 18.0-KB-1 clamping block, with ball joint, plastic (Ordering code: **BAM00T3**)
- Fastening nuts (2 required) 6KTMU M18X1-MS (Ordering code: **500152**)
- BES 18.0-BS-1 mounting clamp, plastic (Ordering code: **BAM00F2**)
- BES 18-HW-1 retaining bracket, angle for surface mounting 90°, aluminum (Ordering code: **BAM00EY**)
- Sensor holder BMS CS-P-D12-AD18-00, for Balluff assembly system, 90° angle, plastic (ordering code: **BAM002P**)
- Sensor holder BMS CS-M-D12-ID18-01, for Balluff assembly system, 90° angle, stainless steel (ordering code: **BAM0032**)
- Connector BCC M415-0000-1A-003-PX0434-020, M12 straight, 2 m PUR cable (ordering code: **BCC032F**)

Further accessories upon request.
Please order mounting accessories separately.

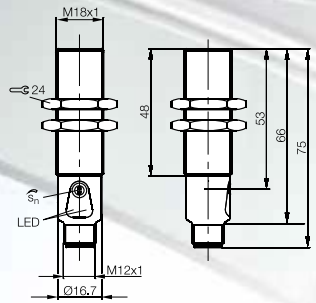
Prox

more added value

- Simple, fast mounting
- Large ranges
- Highly visible red light
- Precise switching response

Precise switching response – excellent repeat accuracy
Cutting-edge LED technology and the latest Fresnel lenses are combined in this unit to form an innovative and powerful photo-electric sensor. What this means in practice: Improved repeat accuracy and precise switching behavior even at large distances.

Technical highlights
- Large operating range
- Rugged M18 metal housing
- State-of-the-art LED technology with sharply contoured light spot



Photoelectric Red Light Sensors M18

For maximum precision

Ordering code
Part number

Ordering code	BOS 18M-PA-RD21-S4	BOS 18M-PS-RD21-S4	BOS 18M-PO-RD21-S4	BOS 18M-PA-RD20-S4	BOS 18M-PS-RD20-S4	BOS 18M-PO-RD20-S4	BOS 18M-PA-PR20-S4	BOS 18M-PS-PR20-S4	BOS 18M-PO-PR20-S4	BOS 18M-X-RS20-S4	BOS 18M-XT-RS20-S4	BOS 18M-PA-RE20-S4	BOS 18M-PS-RE20-S4	BOS 18M-PO-RE20-S4
BOS01CA	**BOS01E7**	**BOS01E8**	**BOS01CF**	**BOS01C1**	**BOS01E3**	**BOS01CE**	**BOS01C3**	**BOS01CZ**	**BOS01C0**	**BOS01EP**	**BOS01CC**	**BOS01C2**	**BOS01EE**	
Type	Diffuse sensor energetic	■	■	■	■	■	■								
	Retroreflective sensor							■	■	■					
	Through-beam emitter										■				
	Through-beam emitter with test input											■			
	Through-beam receiver												■	■	■
Switching output	PNP, antivalent	■			■			■							
	PNP, NO		■			■			■					■	
	PNP, NC			■			■			■					■
Sensing range	30…300 mm														
	1...300 mm	■	■	■											
	1...600 mm				■	■	■								
	0.1...7 m							■	■	■					
	0...20 m										■	■	■	■	■
Switching frequency	400 Hz	■	■	■	■	■	■	■	■	■			■	■	■
Setting		270° potentiometer													
Light type		Red light													
Housing material		Nickel-plated brass													
Connection		M12 connector, 4-pin													

NPN versions on request.

Accessories

– Reflector BOS R-1 (ordering code: **BAM00UK**)
– Straight connector, 2 m PUR, other lengths on request
BCC M415-0000-1A-003-PX0434-020 (ordering code: **BCC032F**)
– Right-angle connector, 2 m PUR, other lengths on request
BCC M425-0000-1A-003-PX0434-020 (ordering code: **BCC032Y**)
Further accessories upon request.

more added value

- Reliable object detection even in a contaminated environment
- Invisible light – does not irritate personnel
- Simple and fast setting with potentiometer
- Through-beam sensor with test input for function control
- Wide range of assembly accessories

The successful BOS 18M series now also includes invisible infrared light. This type of light demonstrates its advantages particularly in heavily contaminated production environments: Objects are reliably detected unimpeded by dust or dirt. With its range of more than 100 meters, the high-power version of the through-beam sensor impresses particularly in this area. The standardized design of all BOS 18Ms permits a simple change between the different types of light – without assembly change.

Photoelectric Infrared Sensors M18

BOS 18M infrared – invisible power

Ordering code
Part number

		Diffuse sensor				Retroreflective sensor							Through-beam sensor							
		BOS01EY	BOS 18M-PA-ID20-S4	**BOS01EZ**	BOS 18M-NA-ID20-S4	**BOS01F0**	BOS 18M-PA-IR20-S4	**BOS01F1**	BOS 18M-PS-IR20-S4	**BOS01F2**	BOS 18M-NA-IR20-S4	**BOS01HR**	BOS 18M-PA-IR21-S4	BOS 18M-NA-IR21-S4	**BOS01F3**	BOS 18M-PA-IE20-S4	**BOS01F4**	BOS 18M-NA-IE20-S4	**BOS01F5**	BOS 18M-X-IS20-S4	**BOS01HN**	BOS 18M-XT-IS20-S4	**BOS01HT**	BOS 18M-X-IS24-S4	**BOS01HU**	BOS 18M-XT-IS24-S4
Detection range		800 mm				10 m*							7 m*		depending on emitter				50 m				100 m			
Light type	PNP	■				■		■				■			■											
	NPN			■						■				■			■									
Switching output	antivalent	■		■		■				■		■		■	■		■									
	NO							■																		
	Emitter																		■		■		■		■	
	Test input																				■				■	
Polarizing filter												■		■												
Supply voltage U_B		10...30 V DC																								
Switching frequency		400 Hz																								
Housing material		Nickel-plated brass																								
Optical surface		Glass																								
Degree of protection (IEC 60529)		IP 67																								
Ambient temperature T_a		–5...+55 °C																								

* based on reflector BOS R-1

Accessories

- Reflector BOS R-1, circular, dia. 84 mm (ordering code: **BAM00UK**)
- Reflector BOS R-9, 50x50 mm (ordering code: **BAM00WL**)
- Clamping block BOS 18,0-KB-1, with ball joint, plastic (ordering code: **BAM00T3**)
- Mounting clamp BES 18,0-BS-1, plastic (ordering code: **BAM00F2**)
- Retaining bracket BES 18-HW-1, angle for surface assembly 90°, aluminum (ordering code: **BAM00EY**)
- Sensor holder BMS CS-P-D12-AD18-00, for Balluff mounting system, 90° angle, plastic (ordering code: **BAM002P**)
- Sensor holder BMS CS-M-D12-ID18-01, for Balluff mounting system, 90° angle, stainless steel (ordering code: **BAM0032**)
- Connector BCC M415-0000-1A-003-PX0434-020, M12 straight, 2 m PUR cable (ordering code: **BCC032F**)

Further accessories upon request.

more added value

- Continuous sensor monitoring of contamination and malfunctions
- Switchable output
- Simple teach-in procedure
- Standardized BOS-18M design for fast sensor change

For users who prefer the teach-in procedure for sensor setting, Balluff now offers its successful red light series BOS 18M, with long ranges, precise switching behavior and very high levels of repeat accuracy. The top sensor in its class is quickly set at the push of a button.

Further advantage: The BOS 18M Teach-in reports "difficulties" immediately by means of our patented diagnostic system "Dynamic Sensor Control", which is available as an option. The DSC allows you to react immediately to contamination or malfunctions. Even users without DSC can make use of the contamination detection as the sensors are also optionally available with a separate alarm output.

Further information on "Dynamic Sensor Control" is available from page 210.

Photoelectric Sensor with Additional Diagnostics

BOS 18M Teach-in

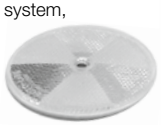
		Diffuse sensor (energetic)		Retro-reflective sensor		Through-beam sensor		
Ordering code		**BOS01CU**	**BOS01J8**	**BOS01CT**	**BOS01J9**	**BOS01CW**	**BOS01J7**	**BOS01CY**
Part number		BOS 18M-PUD-RD30-S4	BOS 18M-PUV-RD30-S4	BOS 18M-PUD-PR30-S4	BOS 18M-PUV-PR30-S4	BOS 18M-PUD-RE30-S4	BOS 18M-PUV-RE30-S4	BOS 18M-X-RS30-S4
Detection range		500 mm		5 m*		20 m		
Switching type	NC/NO selectable	■	■	■	■	■	■	
	Emitter							■
Dynamic Sensor Control		■		■		■		
Separate contamination output			■		■		■	
Polarizing filter				■	■			
Switching frequency		200 Hz	1 kHz	200 Hz	1 kHz	200 Hz	1 kHz	
Supply voltage U_B		10...30 V DC						
Housing material		Nickel-plated brass						
Optical surface		Glass						
Degree of protection (IEC 60529)		IP 67						
Ambient temperature T_a		–5...+55 °C						

* based on reflector BOS R-1

Accessories

- Reflector BOS R-1, circular, dia. 84 mm (ordering code: **BAM00UK**)
- Reflector BOS R-9, 50x50 mm (ordering code: **BAM00WL**)
- Clamping block BOS 18,0-KB-1, with ball joint, plastic (ordering code: **BAM00T3**)
- Mounting clamp BES 18,0-BS-1, plastic (ordering code: **BAM00F2**)
- Retaining bracket BES 18-HW-1, angle for surface assembly 90°, aluminum (ordering code: **BAM00EY**)
- Sensor holder BMS CS-P-D12-AD18-00, for Balluff mounting system, 90° angle, plastic (ordering code: **BAM002P**)
- Sensor holder BMS CS-M-D12-ID18-01, for Balluff mounting system, 90° angle, stainless steel (ordering code: **BAM0032**)
- Connector BCC M415-0000-1A-003-PX0434-020, M12 straight, 2 m PUR cable (ordering code: **BCC032F**)

Further accessories upon request.



Photoelectric Sensors M18

BOS 18M infrared diffuse sensor – especially for glass detection

- Special optics enable glass detection, low blind zones, and high ambient light security.
- Secure detection of solar modules in production (typical distance 2...25 mm).
- Scanning glass detection (typical distance 2...40 mm).
- Secure detection of high-gloss surfaces over a wide angular range.
- Suppression of objects in the background starting at 250 mm

The detection of glass always poses a special challenge for photoelectric sensors. Often, a retroreflective sensor cannot be installed, so detection by means of a diffuse sensor is the only option. For this, Balluff now also provides a solution within the successful BOS 18M model line. The special optics of the sensor ensure that glass surfaces, for example in solar modules, can be detected with certainty.
But the sensor's strengths also come into play in a totally different area: with high-gloss objects. These are reliably detected from all directions over a large angular range.

Additionally, the sensor is extremely insensitive to ambient light and can even suppress objects in the background.

Diffuse sensor energetic

Ordering code		BOS01J1
Part number		BOS 18M-PS-ID24-S4
Switching output	PNP normally open	■
Sensing range	Glass	2...40 mm
	Solar module	2...25 mm
	Gray chart 90%	2...80 mm
Switching frequency		200 Hz
Setting		none
Light type		Infrared
Housing material		Nickel-plated CuZn
Optical surface		PMMA
Connection		M12 connector, 4-pin
Ambient temperature T_a		–5...+55 °C

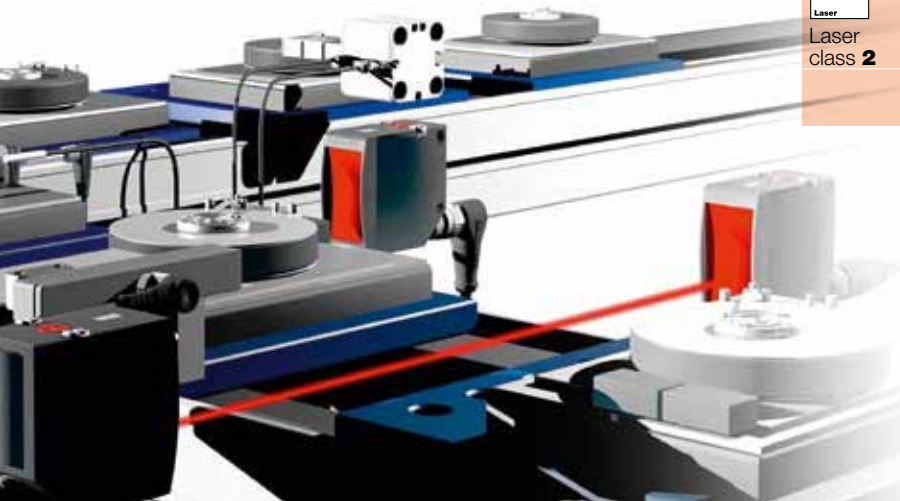
Accessories
- BOS 18.0-KB-1 clamping block, with ball joint, plastic (ordering code: **BAM00T3**)
- BES 18.0-BS-1 mounting clamp, plastic (ordering code: **BAM00F2**)
- BES 18-HW-1 retaining bracket, angle for surface assembly 90°, aluminum (ordering code: **BAM00EY**)
- Sensor holder BMS CS-P-D12-AD18-00, for Balluff assembly system, 90° angle, plastic (ordering code: **BAM002P**)
- Sensor holder BMS CS-M-D12-ID18-01, for Balluff assembly system, 90° angle, stainless steel (ordering code: **BAM0032**)
- Connector BCC M415-0000-1A-003-PX0434-020, M12 straight, 2 m PUR cable (ordering code: **BCC032F**)

Further accessories upon request.

- Accurate switching characteristics for precision positioning tasks
- High ranges and compact design for greater freedom of system design
- Highly visible red light/laser light for precision alignment
- LEDs visible from all sides
- Varied mounting options
- Laser variants ideal for small part detection
- Outstanding price/performance ratio

more added value

Accessories
- Reflector for red light variants BOS R-1 (ordering code: **BAM00UK**)
- Reflector for laser variants BOS R-22 (ordering code: **BAM00UY**)
- Lens protector BAM PC-XO-006-23K-1 (ordering code: **BAM01L8**)
- Mounting bracket BMS CS-M-D12-B23K-05 (ordering code: **BAM01AW**)
- Straight connector, 2 m PUR, other lengths on request BCC M415-0000-1A-003-PX0434-020 (ordering code: **BCC032F**)



Type			
LED red light	Detection range		
	PNP	Antivalent	**Ordering code**
			Part number
	PNP	NC/NO selection	**Ordering code**
			Part number
	Emitter		**Ordering code**
			Part number
	Supply voltage U_B		
	Setting		
	Switching frequency		
	Housing material		
	Optical surface		
	Degree of protection per IEC 60529		
	Ambient temperature T_a		
	Connection		
Laser class **1**	Detection range		
	PNP	Antivalent	**Ordering code**
			Part number
	PNP	NC/NO selection	**Ordering code**
			Part number
Laser class **2**	PNP	Antivalent	**Ordering code**
			Part number
	PNP	NC/NO selection	**Ordering code**
			Part number
	Emitter		**Ordering code**
			Part number
	Supply voltage U_B		
	Setting		
	Switching frequency		
	Housing material		
	Optical surface		
	Degree of protection per IEC 60529		
	Ambient temperature T_a		
	Connection		

Types with NPN upon request.

New Photoelectric Sensors BOS 23K

Red light and laser provide a competitive edge





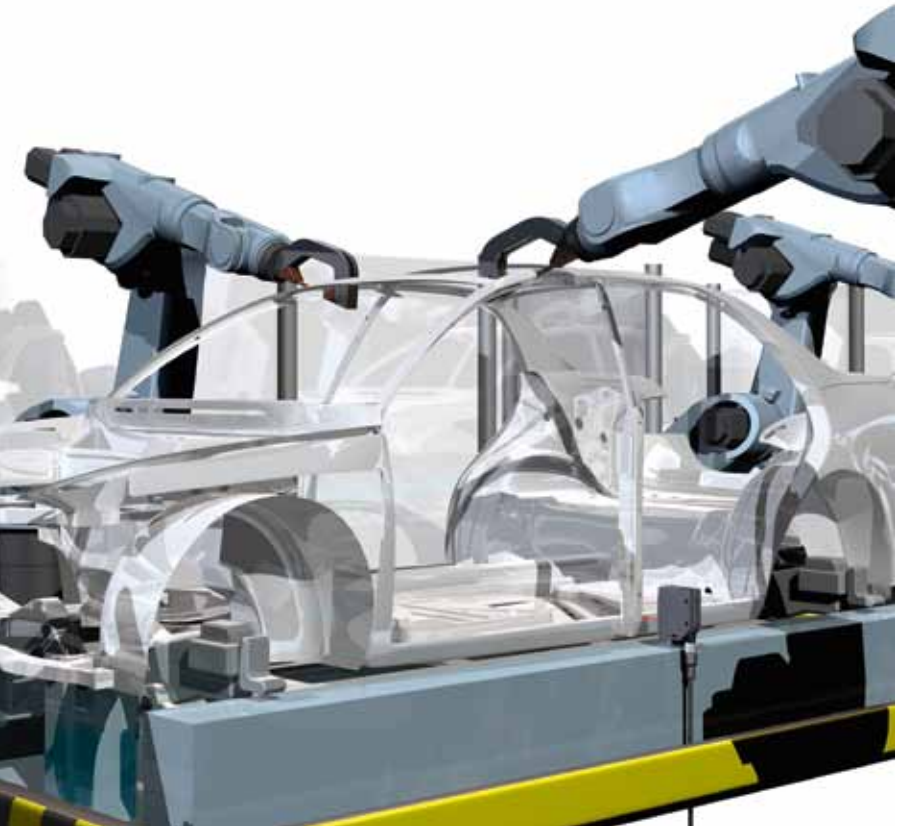
	Diffuse sensor	Diffuse sensor with background suppression	Retroreflective sensor	Through-beam sensor Receiver	Through-beam sensor Emitter
	0...2 m	**0...1.2 m**	**0...14 m**	**0...25 m**	**0...25 m**
	BOS01FM	**BOS01FL**	**BOS01FN**	**BOS01FP**	
	BOS 23K-PA-RD10-S4	BOS 23K-PA-RH10-S4	BOS 23K-PA-RR10-S4	BOS 23K-PA-RE10-S4	
	BOS016Z	**BOS0178**	**BOS016P**	**BOS016F**	
	BOS 23K-PU-RD10-S4	BOS 23K-PU-RH10-S4	BOS 23K-PU-RR10-S4	BOS 23K-PU-RE10-S4	
					BOS016E
					BOS 23K-XT-RS11-S4
	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
	Teach-in	18-turn potentiometer	Teach-in	Teach-in	Teach-in
	600 Hz	600 Hz	600 Hz	500 Hz	
	ABS	ABS	ABS	ABS	ABS
	PMMA	PMMA	PMMA	PMMA	PMMA
	IP 69K	IP 69K	IP 69K	IP 69K	IP 69K
	–20...+60 °C	–20...+60 °C	–20...+60 °C	–20...+60 °C	–20...+60 °C
	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin

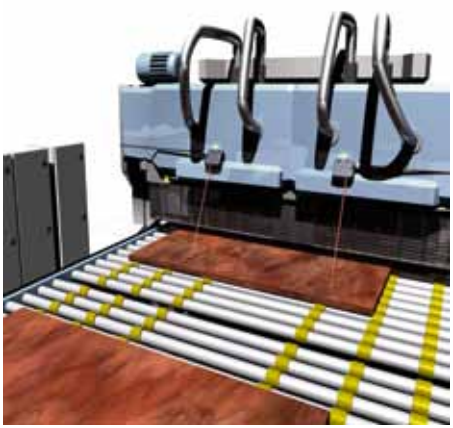
	0...1.2 m	0...1.2 m	0...14 m	0...30 m	0...30 m
		BOS01FR	**BOS01HJ**	**BOS01FU**	
		BOS 23K-PA-LH10-S4	BOS 23K-PA-LR10-S4	BOS 23K-PA-LE10-S4	
		BOS017C	**BOS016U**	**BOS016L**	
		BOS 23K-PU-LH10-S4	BOS 23K-PU-LR10-S4	BOS 23K-PU-LE10-S4	
		BOS01FT			
		BOS 23K-PA-LH20-S4			
	BOS0175	**BOS017H**			
	BOS 23K-PU-LD20-S4	BOS 23K-PU-LH20-S4			
					BOS 016K
					BOS 23K-XT-LS11-S4
	10…30 V DC	12…30 V DC	10…30 V DC	10…30 V DC	10…30 V DC
	Teach-in	18-turn potentiometer	Teach-in	Teach-in	Teach-in
	600 Hz	1 kHz	2 kHz	3.5 kHz	
	ABS	ABS	ABS	ABS	ABS
	PMMA	PMMA	PMMA	PMMA	PMMA
	IP 69K	IP 69K	IP 69K	IP 69K	IP 69K
	–20…+60°C	–20…+60°C	–20…+60°C	–20…+60°C	–20…+60°C
	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin

more added value

- Reliable object detection even at large distances
- Real background suppression up to 2 m sensing range even on dark objects
- Simple alignment due to bright, clearly visible beam spot
- Simple and fast setting with potentiometer
- Through-beam sensor with test input for function control
- Varied and timesaving assembly options

The new light barriers and diffuse sensors in the BOS 50K series combine top performance and compact dimensions. Thanks to their long range, these all-rounders are suitable for use in numerous sectors: From the automobile industry to the woodworking industry. The background suppression, in particular, impresses with an almost color-independent detection of objects – and at maximum sensing range.





CE

Type			

Detection range			
PNP	Antivalent	**Ordering code**	
		Part number	
PNP	NO	**Ordering code**	
		Part number	
PNP	NO with	**Ordering code**	
	fault output	Part number	
	Emitter with	**Ordering code**	
	test input	Part number	
	Emitter without	**Ordering code**	
	test input	Part number	
Gray value shift			
Supply voltage U_B			
Setting			
Switching frequency			
Housing material			
Optical surface			
Degree of protection per IEC 60529			
Ambient temperature T_a			
Connection			

Types with PNP NC contact and NPN upon request

Photoelectric Sensors BOS 50K

Even longer ranges with red light

Diffuse sensor with background suppression	Diffuse sensor	Retroreflective sensor with polarized light	Through-beam sensor Receiver	Through-beam sensor Emitter
200...2000 mm	**1...2000 mm**	**0.1...18 m***	**0...60 m**	
BOS018P	**BOS01CJ**	**BOS01CR**	**BOS01CK**	
BOS 50K-PA-RH12-S4	BOS 50K-PA-RD10-S4	BOS 50K-PA-PR10-S4	BOS 50K-PA-RE10-S4	
BOS018N	**BOS01CP**	**BOS01CL**	**BOS01CM**	
BOS 50K-PS-RH12-S4	BOS 50K-PS-RD10-S4	BOS 50K-PS-PR10-S4	BOS 50K-PS-RE10-S4	
BOS0156				
BOS 50K-PSV-RH12-S4				
				BOS01CN
				BOS 50K-XT-RS10-S4
				BOS01EU
				BOS 50K-X-RS10-S4
< 10 %				
10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
10-turn potentiometer	Potentiometer 270°	Potentiometer 270°		Potentiometer 270°
500 Hz	400 Hz	400 Hz	400 Hz	400 Hz
PC/ABS	PC/ABS	PC/ABS	PC/ABS	PC/ABS
Glass	Glass	Glass	Glass	Glass
IP 67	IP 67	IP 67	IP 67	IP 67
–5...+55 °C	–5...+55 °C	–5...+55 °C	–5...+55 °C	–5...+55 °C
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin

* based on reflector R-1

Accessories

- Reflector BOS R-1, circular, dia. 84 mm (ordering code: **BAM00UK**)
- Mounting bracket BMS CS-M-D12-BX07-06, for Balluff mounting system, 90° angle (ordering code: **BAM01AY**)
- Assembly plate BMS CS-M-D12-BX05-02, for Balluff mounting system, straight (ordering code: **BAM003C**)
- Mounting bracket BAM MB-XO-005-B04-4, angle for surface assembly 90°, adjustable sensor inclination (ordering code: **BAM01E8**)
- Clamp holder BOS 21-KH-2, for fastening to dovetail (ordering code: **BAM00TH**)
- Connector BCC M415-0000-1A-003-PX0434-020 M12 straight, 2 m PUR cable (ordering code: **BCC032F**)

Further accessories upon request.

more added value

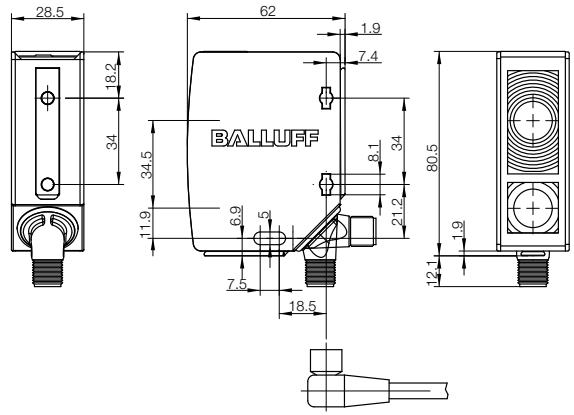
- Innovative technology enables previously unattained switching distances.
- Intelligent sensor technology enables detection of low-reflective objects.
- Easy to align due to a precise, clearly visible red light spotlight.
- Setting is convenient with Teach-in or IO-Link.
- With IO-Link you can configure up to 4 switching points individually.

Conventional diffuse sensors are frequently used in industrial automation. However, these often reach their limits if larger switching distances are involved. Not the case for the new Balluff diffuse sensors with Super Long Range Technology. You solve complex jobs right where, in the past, energetic sensors failed due to their range.
The high-performance diffuse sensors of the BOS 50K product family feature a maximum scanning range of up to 3.5 m. They are easy to operate. And the red light spot, which has extremely good visibility, supports fast and accurate adjustments. In the version with IO-Link, it is even possible to have four individually configurable switching points. Additional IO-Link features, such as being able to specify a switch range, provide for even more versatile options for using the new BOS 50K Super Long Range diffuse sensors.

Photoelectric Sensors BOS 50K

Diffuse sensor with enormous range – Super Long Range Technology

New



Diffuse sensor

Ordering code		BOS01JA	BOS01JH	BOS01JJ
Part number		BOS 50K-PU-RD11-S4	BOS 50K-NU-RD11-S4	BOS 50K-PI-RD11-S4
Scanning range		1...3500 mm		
Light type		Red light		
Supply voltage U_B		10...30 VDC		
Interface	Digital output	■	■	
	IO-Link			■
Setting/configuration	Teach-in	■	■	
	Teach-in or IO-Link			■
Switching frequency		200 Hz		
Housing material		PC/ABS		
Optical surface		Glass		
Degree of protection		IP 67		
Ambient temperature T_a		–5 to +55°C		
Connection		M12 connector, 4-pin		

Accessories

- Mounting bracket BMS CS-M-D12-BX07-06, for Balluff assembly system, 90° angle (ordering code: **BAM01AY**)
- Assembly plate BMS CS-M-D12-BX05-02, for Balluff assembly system, straight (ordering code: **BAM003C**)
- Mounting bracket BAM MB-XO-005-B04-4, angle for surface assembly 90°, adjustable sensor inclination (ordering code: **BAM01E8**)
- Clamp holder BOS 21-KH-2, for fastening to dovetail (ordering code: **BAM00TH**)
- Connector BCC M415-0000-1A-003-PX0434-020 M12 straight, 2 m PUR cable (ordering code: **BCC032F**)

Further accessories upon request.

more added value

- Detection of and distinguishing between a random number of colors
- Reliably distinguishes between the smallest of color nuances
- Large sensing range of 400 mm
- Simple configuration and visualization using software
- Robust metal housing

The True Color Sensor BFS 33M is in a completely different league to conventional RGB sensors. Thanks to its high resolution, it not only detects colors but can also reliably distinguish between nuances. The True Color Sensor thus detects, e.g. minimal color deviations in injection molded parts. And it can also tell if a metal enters production polished or unpolished. Faded colors or poor print quality are detected in an instant and separated. It thus opens up completely new dimensions in quality control. The sensor uses three digital outputs and a serial interface to perform evaluations. The lab color space values are transmitted directly via this interface.

True Color Sensor BFS 33M

For distinguishing between the smallest of color nuances at the highest level

400 mm sensing range
possible with additional lens!

Type	True Color Sensor BFS
Ordering code	**BFS000L**
Part number	BFS 33M-GSS-F01-PU-02
Channels (outputs)	3 (7 colors + background)
Color space	CIELab
Switching frequency	1.5 kHz (on 3 products)
Resolution	8 enhancement settings, 12 bit
Color resolution	< 0.5 dE
Repeat accuracy	< 1 dE
Protection class	IP 54
Ambient temperature T_a	–10...+55 °C
Housing material	Al coated

Type	Plastic fiber optic BFO
Ordering code	**BFO00C4**
Part number	BFO D22-XB-LB-EAK-15-SA1-02
Operating principle	Buttons
Sensing distance	5...80 mm, up to 400 mm with additional lens
Dispersion angle	60°
Connection	SMA connector
Length	2000 mm
Ambient temperature T_a	–55...+70 °C
Fiber optic material	Plastic POF
Sleeve material	Plastic

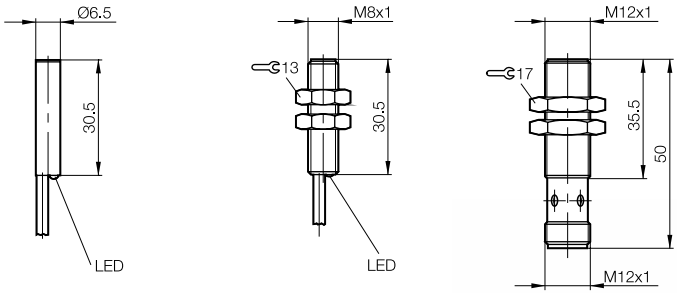
Type	Lens (Long Range)
Ordering code	**BAM01PA**
Part number	BAM LS-FO-001-M6-L
Sensing distance	400 mm
Light spot diameter	23 mm at a distance of 400 mm
Ambient temperature T_a	–10...+140 °C
Lens material	Glass
Housing material	Aluminum-coated

Note: This lens is screwed onto the fiber optic BFO00C4

Industries

- Automobile industry
- Plastics processing
- Packaging industry
- Handling and assembly
- Printing industry
- Timber processing

Model		BMF 07M	BMF 08M	BMF 12M
Maximum switching distance (with BAM01EL)		90 mm	90 mm	90 mm
PNP NO	**Ordering code**	**BMF000E**	**BMF000P**	**BMF00C7**
	Part number	BMF 07M-PS-C-2-KPU -02	BMF 08M-PS-C-2-KPU -02	BMF 12M-PS-C-2-S4
Supply voltage U_B		10...30 V DC	10...30 V DC	10...30 V DC
Reverse polarity/short-circuit protected		Yes/yes	Yes/yes	Yes/yes
Function indicator		Yellow LED	Yellow LED	Yellow LED
Ambient temperature T_a		–25...+85 °C	–25...+85 °C	–25...+70 °C
Degree of protection per IEC 60529		IP 67	IP 67	IP 67
Connection		2 m cable PUR, 3×0.14 mm²	2 m cable PUR, 3×0.14 mm²	M12 connector, 3-pin



Size	Ø 15 mm	Ø 15 mm	Ø 25 mm with hole for M5 screw	Ø 22.1 mm with M5 screw hole
Ordering code	**BAM01EJ**	**BAM01EK**	**BAM01EL**	**BAM01EM**
Part number	BAM TG-MF-006	BAM TG-MF-007	BAM TG-MF-008	BAM TG-MF-009
Height	10 mm	15 mm	15 mm	10.5 mm
Max. switching distance	40 mm	65 mm	90 mm	40 mm

Reliable switching is guaranteed from 0 mm to the switching distance indicated in the table.
The specified switching distances are determined from series measurements and should be considered a starting point for selecting a suitable magnet.

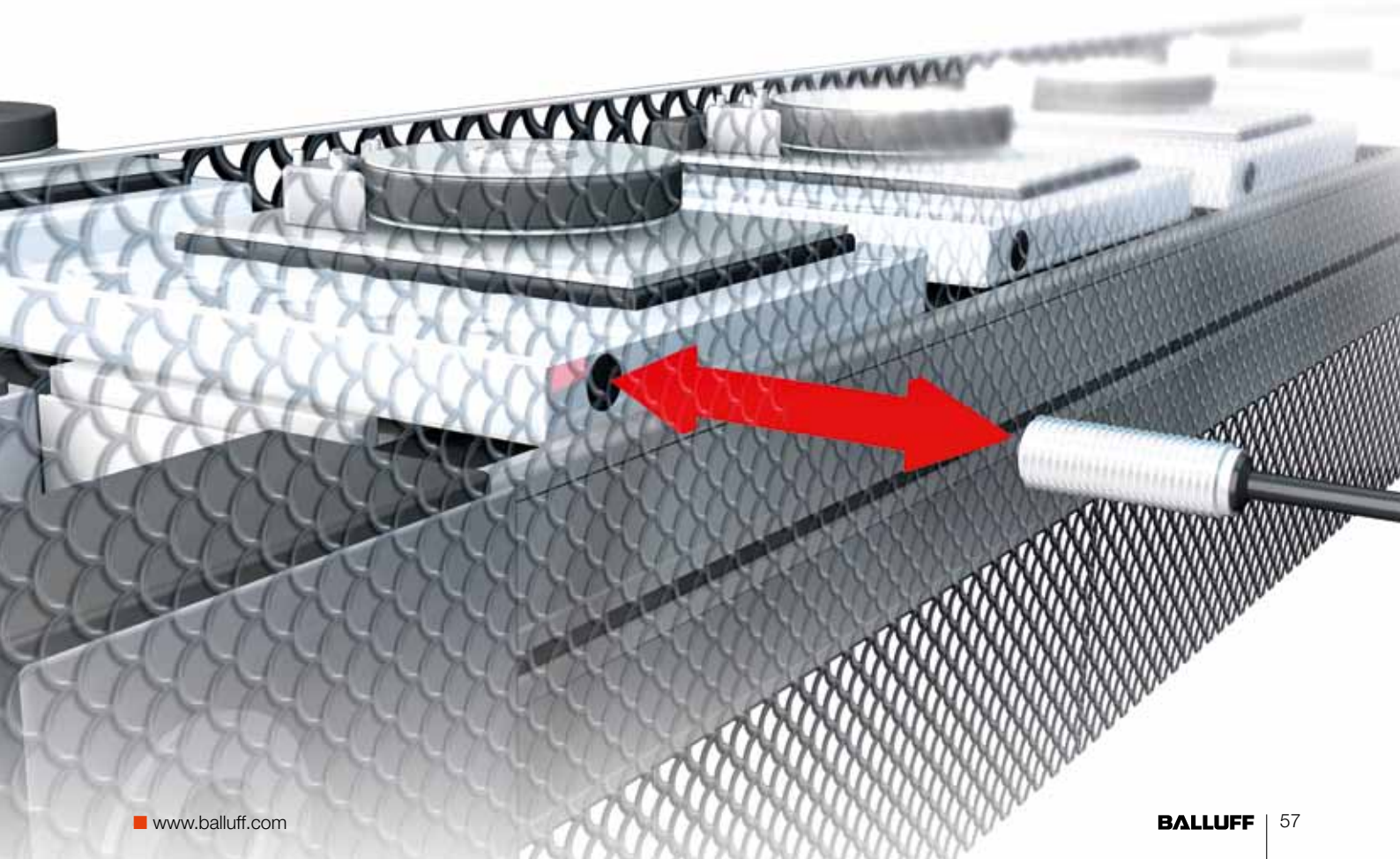
Magnetic Cylinder Sensors for Large Ranges

Miniature design, long switching distances

Magnetic cylinder sensors are feature small, extremely compact designs. Their magnets enable very great switching distances for position sensing. which means that you can query positions up to 90 mm away using a single sensor with a diameter of 6.5 mm. These sensors are industrial grade and resistant to soiling. Positions can also be scanned through containers or pipes because magnetic fields can penetrate many non-magnetizable materials. The detection of codes using magnets is also possible.

- Non-contact position requests up to a distance of 90 mm
- Object detection through non-magnetizable materials
- Compact sensors and small magnets provide the perfect basis for installation
- Outstanding price/performance ratio

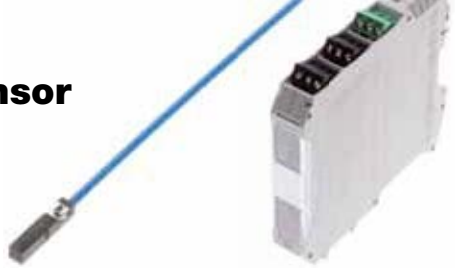
more added value






BMF 255 Magnetic ATEX Cylindrical Sensor

Flexible, simple, secure

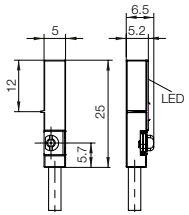


Balluff expands their portfolio of magnetic cylindrical sensors by adding the ATEX area. In particular, areas with continuous, long-term and frequent occurrences of dust, gases and vapors (Zone 0/20, category 1G/1D) are covered.
The sensor can simply be mounted in the T-slots, as usual. With corresponding angle brackets, round and tie bar cylinders can also be equipped without any problems.
With a 6-meter long self-configurable cable, you can quickly and easily connect the sensor to the correct isolating amplifier outside of the ATEX zone. We of course provide the isolating amplifier too.

- Highest Ex protection with the category 1G/1D (Zone 0/20)
- Can be inserted from above in the T-slot quickly and easily, with clamping fixture
- Sensors, isolating amplifiers and angle brackets, all from a single source
- 6 meter long, user-fabricated cable

more added value

Description		**BMF 255**	**Isolating amplifier**
Dimensions (H×W×L)		5.2×5×25 mm	99×17.6×114.5 mm
Namur, normally open	**Ordering code**	**BMF00E4**	
	Part number	BMF 255K-N-06-EEX	
24 V DC	**Ordering code**		**FHW004P**
	Part number		STAHL 9170/20-12-11S
120...230 V AC	**Ordering code**		**FHW004R**
	Part number		STAHL 9170/20-12-21S
Operational voltage measurement U_B		8.2 V DC	The isolating amplifier with relay output serves as the interface between electrical signals from the hazardous area (Ex zone) and the non-hazardous area (safe zone). The input signals from ATEX sensors areconverted using relay switching contacts at the outputs. Input, output and auxiliary power circuits are securely galvanically isolated. **For further information, refer to the Object Detection catalog.**
Ambient temperature T_a		–25...+70 °C	
Responsiveness		2 mT	
Switching frequency f		2 kHz	
Function indicator		yes	
Degree of protection as per IEC 60529		IP 67	
Material	Housing	PA	
	Sensing surface	PA	
	Clamping screw	Stainless steel	
Connection		6 m PVC cable, 2×0.14 mm²	
Approval		**CE, BVS 11 ATEX E071, IECEx BVS 11.0043, Ex II 1G Ex ia IIC T4 Ga, Ex II 1D Ex ia IIIC T 135 °C Da**	
Installation		Can be installed from above	
Cylinder profile		T-slot	



Angle bracket for round and tie bar cylinders

Part number
For round cylinders: BMF 307-HW-96 (BAM01J5) with hose clamp BMF size 2 (BAM00N4)

Cylinder profile	Part number
Profile cylinder and tie bar up to 5...11 mm	BMF 235-HW-109 (BAM01M9)
Profile cylinder and tie bar up to 9...15 mm	BMF 235-HW-110 (BAM01MA)
Profile cylinder and tie bar 14...20 mm	BMF 235-HW-111 (BAM01MC)

more added value

Ultrabright LED

Reliable detection of switching function from far away (25 m in bright factory building)

New mounting concept

Solid hold in the slot, sensor cannot be wrenched from the slot

Knurled screw

Sensor screws in firmly, extremely secure hold in any slot (e.g. Parker, Festo, SMC, Bosch)

Minimum length: 23 mm!
8 mm shorter than previous model

Can also be used in space-critical applications

Can be installed from above: easy to install with hexagon socket or slot screwdriver.

For other pneumatic cylinder sensors, please request a copy of our brochure "BMF magnetic field sensor product overview".

Sensors for Pneumatic Cylinders

BMF 235 – The new benchmark for every T-slot

With our special retaining elements, the BMF 235 can also be quickly and easily assembled on round, tie bar and profile cylinders.

Size			**BMF 235**	**BMF 235**
Dimensions (H×W×L)			5.5×5×23.5 mm	5.5×5×23.5 mm
PNP	NO	**Ordering code**	**BMF00C4**	**BMF00AR**
		Part number	BMF 235K-PS-C-2A-SA2-S49-00,3	BMF 235K-PS-C-2A-PU-02
	NC	**Ordering code**	**BMF00C6**	**BMF00AT**
		Part number	BMF 235K-PO-C-2A-SA2-S49-00,3	BMF 235K-PO-C-2A-PU-02
NPN	NO	**Ordering code**	**BMF00C2**	**BMF00AU**
		Part number	BMF 235K-NS-C-2A-SA2-S49-00,3	BMF 235K-NS-C-2A-PU-02
	NC	**Ordering code**	**BMF00C3**	**BMF00AW**
		Part number	BMF 235K-NO-C-2A-SA2-S49-00,3	BMF 235K-NO-C-2A-PU-02
Supply voltage U_B			10...30 V DC	10...30 V DC
Ambient temperature T_a			–25...+85 °C	–25...+85 °C
Degree of protection as per IEC 60529			IP 67	IP 67
Housing material			Plastic	Plastic
Connection			0.3 m cable PUR with M8 connector, 3-pin	2 m PUR cable, 3×0.14 mm²
Approval			CE, cULus	CE, cULus
Installation			Can be installed from above	Can be installed from above
Cylinder profile			T-slot	T-slot

Other plug and cable variants are available in addition to V-Twin models.
For information, visit our website at **www.balluff.com/bmf235**

Part number
For round cylinders: BMF 307-HW-96 (ordering code: **BAM01J5**) with hose clamp BMF size 2 (ordering code: **BAM00N4**)

Cylinder profile	**Part number**
Profile cylinder and tie bar up to 5...11 mm	BMF 235-HW-109 (ordering code: **BAM01M9**)
Profile cylinder and tie bar up to 9...15 mm	BMF 235-HW-110 (ordering code: **BAM01MA**)
Profile cylinder and tie bar 14...20 mm	BMF 235-HW-111 (ordering code: **BAM01MC**)

more added value

New

New mounting concept

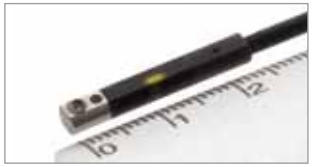
Solid hold in the slot, sensor cannot be wrenched from the slot

Can be installed in the slot from above

Can be installed even on cylinders with a dirty slot

Compact design, i.e. can be mounted flush

Can also be used in space-critical applications



Minimum length: 24 mm!

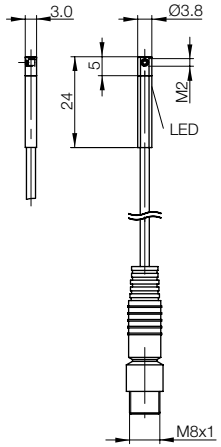
Can also be used in space-critical applications

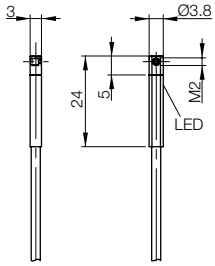
For other pneumatic cylinder sensors, please request a copy of our brochure "BMF magnetic field sensor product overview".

Sensors for Pneumatic Cylinders

BMF 243 – The new benchmark for every C-slot/rounded groove

Size			BMF 243	BMF 243
Dimensions (H×W×L)			3.8×24×3 mm	3.8×24×3 mm
PNP	NO	**Ordering code**	**BMF00EL**	**BMF00EF**
		Part number	BMF 243K-PS-C-2A-SA2-S49-00.3	BMF 243K-PS-C-2A-PU-02
	NC	**Ordering code**	**BMF00EM**	**BMF00EH**
		Part number	BMF 243K-PO-C-2A-SA2-S49-00.3	BMF 243K-PO-C-2A-PU-02
NPN	NO	**Ordering code**	**BMF00EN**	**BMF00EJ**
		Part number	BMF 243K-NS-C-2A-SA2-S49-00.3	BMF 243K-NS-C-2A-PU-02
	NC	**Ordering code**	**BMF00EP**	**BMF00EK**
		Part number	BMF 243K-NO-C-2A-SA2-S49-00.3	BMF 243K-NO-C-2A-PU-02
Supply voltage U_B			10...30 V DC	10...30 V DC
Ambient temperature T_a			–25...+85 °C	–25...+85 °C
Degree of protection as per IEC 60529			IP 67	IP 67
Housing material			Plastic	Plastic
Connection			0.3 m cable PUR with M8 connector, 3-pin	2 m PUR cable, 3×0.10 mm²
Approval			CE, cULus	CE, cULus
Installation			Can be installed from above	Can be installed from above
Cylinder profile			C-slot/rounded groove	C-slot/rounded groove



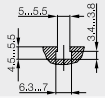
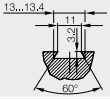
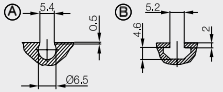
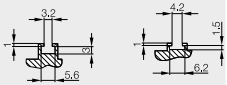




System	**BMF 303**	**BMF 305**	**BMF 103 system**
Dimensions (H×W×L)	4.5×2.9×21.6 mm	10.5×6.5×33.5 mm	16×2.8×4.9 mm
Unique features	**For miniaturized actuators**	**For larger actuators**	**Optimized for short-stroke cylinders and mini-grippers**

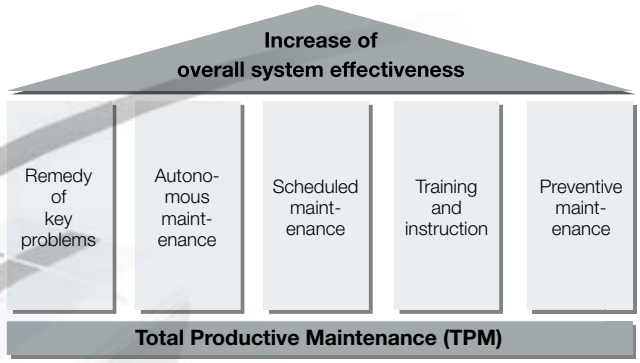
Part number of the most-used types: M8×1 male versions with turnable connection nut and 30 cm cable length

PNP	NO	BMF 303K-PS-C-2A-SA2-S49-00,3	BMF 305K-PS-C-2-SA2-S49-00,3	BMF 103K-PS-C-2A-SA2-S49-00,3

Cylinder profile	Example	Part number		
C-slot (Size 10 slot)	Festo, Sommer, Bosch 	BMF 303-HW-31 Tough  BMF 303-HW-30 Compact 		BMF 103-HW-102 New Hollow screw  BMF 103-HW-42 
C-slot (Round slot)	SMC, Bimba, Schunk 	BMF 303-HW-97 New Tough  BMF 303-HW-28 Compact 		BMF 103-HW-100 New Hollow screw  BMF 103-HW-41 
T-slot	General 	BMF 303-HW-33 Tough  BMF 303-HW-40 Compact 	BMF 305-HW-98 New Hollow screw  BMF 305-HW-20 	BMF 103-HW-43 
Round cylinder	General	BMF 303-HW-59 and Hose clamp[1] 	BMF 305-HW-24 undo Hose clamp[1] 	
Trapezoidal slot	Bosch, Parker, Norgren 	BMF 303-HW-101 New 	BMF 305-HW-106 New 	
Trapezoidal guide	Bosch	BMF 303-HW-80 	BMF 305-HW-27 	
C-slot Large	Numatics, Norgren 	BMF 303-HW-62 	BMF 305-HW-32 Ⓐ  BMF 305-HW-92 Ⓑ 	
with rail/ SMC slot-A and slot-B	SMC 	BMF 303-HW-51 (BMF 303-HW-60[2]) 	BMF 305-HW-26 Slot version  BMF 305-HW-99 New Hexagon socket 	
Profile cylinder and tie bar 5...11 mm	General	BMF 235-HW-109 and BMF 303-HW-33 New 	BMF 235-HW-109 and BMF 305-HW-20 New 	BMF 235-HW-109 and BMF 103-HW-43 New 
Profile cylinder and tie bar 9...15 mm	General	BMF 235-HW-110 and BMF 303-HW-33 New 	BMF 235-HW-110 and BMF 305-HW-20 New 	BMF 235-HW-110 and BMF 103-HW-43 New 
Profile cylinder and tie bar 14...20 mm	General	BMF 235-HW-111 and BMF 303-HW-33 New 	BMF 235-HW-111 and BMF 305-HW-20 New 	BMF 235-HW-111 and BMF 103-HW-43 New 
U slot	SMC CP95	BMF 303-HW-103 New 		

Magnetic Cylinder Sensors with Mounting System

Now even more flexible due to new mounting elements



Removal of key problems
No unreliable switching, even under highest stress, due to highly precise GMR sensor elements and robust metal clamps.

Autonomous maintenance
Faster and safer sensor replacement using one sensor type for all slots with a permanent switching point.

Scheduled maintenance program
The wear-free, fully electronic sensors protect against creeping failure, even after several million switching cycles, thereby increasing your process reliability.

Training and instruction
Easy handling and reduced training effort due to one sensor type for all slots with a uniform operating principle for all mounting brackets.

Maintenance prevention
The costs for maintenance are already reduced to a minimum with the design by means of the consistent use of magnetic sensors with the mounting bracket concept.

One for all

- By selecting the right mounting bracket you can adapt these sensors to virtually every pneumatic cylinder.
- All-purpose types reduce costs and save storage space.
- BMF 303 system for miniaturized actuators
  BMF 305 system for larger actuators
  BMF 103 system for use on mini-grippers and in short-stroke cylinders.
- SA7 variants for Schunk grippers

more added value

Service Case for Position Detection at Pneumatic Cylinder

Ready for Total Productive Maintenance (TPM)

The advantages of the magnetic sensors with a unique mounting system – all in a single case. The position of all standard pneumatic cylinders can be detected using a single product.

- Time and cost savings very time the sensor is changed
- Covers all standard pneumatic cylinders
- Clearly laid out for easy handling

	Conventional sensors	BMF service case with sensors BMF 103, 303, 305 and mounting system	
Sensor replacement			– Case has space to store all the necessary materials – Mounting system retains the switching point when device is replaced
Complexity			– Standard operating principle for all cylinders – Elementary assembly
Variety of models			– One sensor for all cylinders – Reduced storage costs
Service life			– Robust metal clamp – Fully electronic, wear-free electronics
€			**Sensors with mounting system by Balluff can reduce your costs significantly.**

- Contains detailed literature
- Particularly user-friendly due to logical table of contents
- Lid sealed tight when closed
- Contains two BMF 103, 303 and 305 sensors
- Contains two fastening elements for all common types of slot
- Robust, industrial aluminum case
- Contains an extensive range of accessories

Description	**BMF service case**
Ordering code	**BAV0005**
Part number	BAV AS-OD-00002-01

more added value

- No adjustment with standard applications
- Simple cable tie assembly on pipes
- Sensitive adjustment of the responsiveness using a potentiometer

The new BCS Uniflat capacitive sensors of the GlobalProx series provide very good performance with a switching distance of up to 20 mm. With a well-conceived fastening design, their compact plastic housing can be screwed on or secured with cable ties to bypass pipes.

The connection is made using a 2 m connection line or a short pigtail line and an M8 plug. The codable output function provides PNP or NPN and normally open or normally closed functionality.

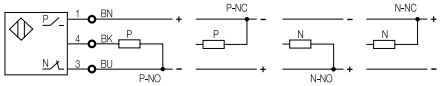
GlobalProx

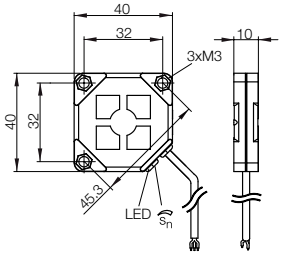
Capacitive Sensors BCS

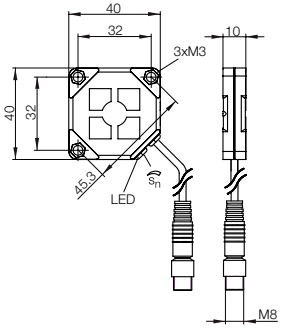
GlobalProx sensors in 40×40 mm size

Size		**40×40×10 mm** Uniflat	**40×40×10 mm** Uniflat
Installation type		flush	flush
Rated switching distance s_n		**20 mm**	**20 mm**
PNP/NPN and normally open/ normally closed selectable	**Ordering code**	**BCS00TR**	
	Part number	BCS Q40BBAA-GPC20C-EP02	
PNP normally open	**Ordering code**		**BCS00U6**
	Part number		BCS Q40BBAA-PSC20C-EP00,3-GS49
PNP normally closed	**Ordering code**		**BCS00U5**
	Part number		BCS Q40BBAA-POC20C-EP00,3-GS49
Supply voltage U_B		10...30 V DC	10...30 V DC
Voltage drop U_d at I_e		2.5 V	2.5 V
Rated insulation voltage U_i		75 V DC	75 V DC
Output current max.		100 mA	100 mA
No-load supply current I_0 max.		15 mA	15 mA
Polarity reversal/short-circuit protected		yes/yes	yes/yes
Ambient temperature T_a		–5...+85 °C	–5...+85 °C
Switching frequency f		100 Hz	100 Hz
Output function/power-on indicator		yes/yes	yes/yes
Degree of protection as per IEC 60529		IP 67	IP 67
Material	Housing	PBT	PBT
	Sensing surface	PBT	PBT
	Cover	PBT	PBT
Connection		2 m PUR cable, 3×0.14 mm²	0.3 m PUR cable with M8 plug, 3-pin

Wiring diagram

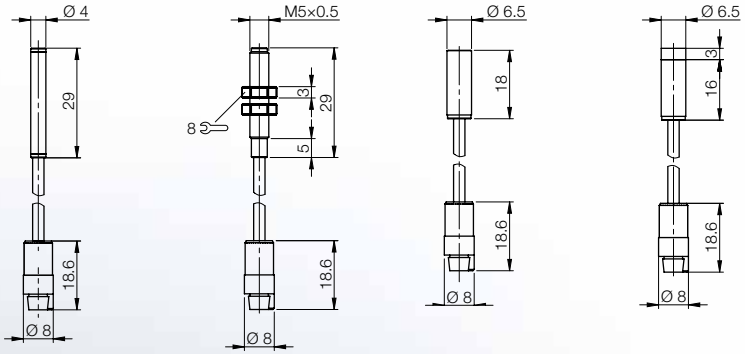






Size	Ø 4 mm	M5×0.5	Ø 6.5 mm	Ø 6.5 mm	
Mounting type	Flush	Flush	Flush	Non-flush	
Rated switching distance s_n	**0.1…1 mm**	**0.1…1 mm**	**0.1…1.5 mm**	**0.1…3 mm**	
Ordering code	**BCS0010**	**BCS0011**	**BCS0012**	**BCS0013**	
Part number	BCS G04T4D-XXS10C-EP02-GZ01-002	BCS M05T4C-XXS10C-EP02-GZ01-002	BCS G06T4B-XXS15C-EP02-GZ01-002	BCS G06T4B-XXS30G-EP02-GZ01-002	
Supply voltage U_B	4…8 V DC	4…8 V DC	4…8 V DC	4…8 V DC	
Rated insulation voltage U_i	75 V DC	75 V DC	75 V DC	75 V DC	
Ambient temperature T_a	–30…+80 °C	–30…+80 °C	–30…+80 °C	–30…+80 °C	
Switching frequency f	100 Hz	100 Hz	100 Hz	100 Hz	
Degree of protection per IEC 60529	IP 67	IP 67	IP 67	IP 67	
Housing material	V2A	V2A	V2A	V2A	
Sensing surface material	PTFE	PTFE	PTFE	PTFE	
Cover material	POM	POM	POM	POM	
Connection	2 m cable PUR, 3×0.14 mm²	2 m cable PUR, 3×0.14 mm²	2 m cable PUR, 3×0.14 mm²	2 m cable PUR, 3×0.14 mm²	

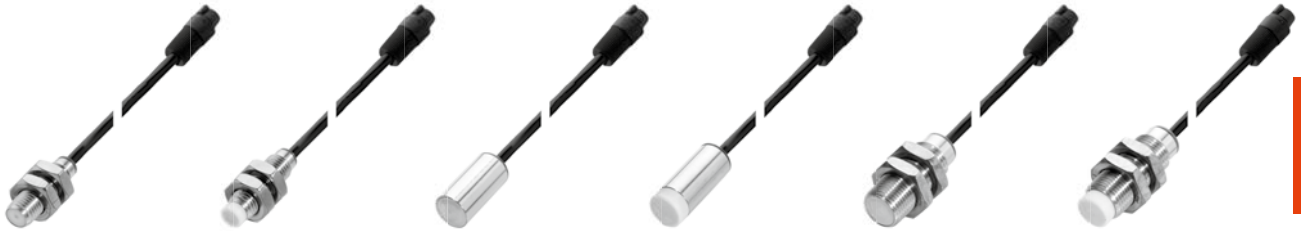
Refer to our catalog or visit **www.balluff.com** for a large selection of capacitive sensors



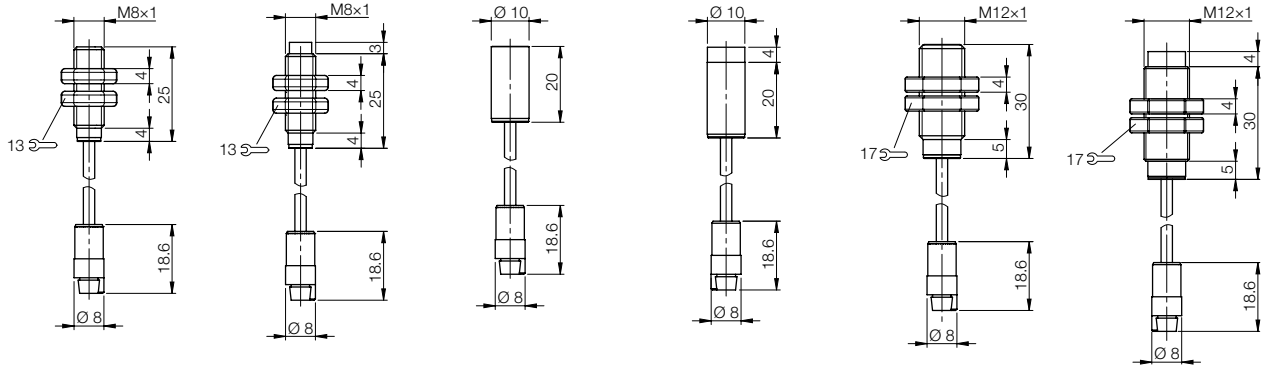
mini.S

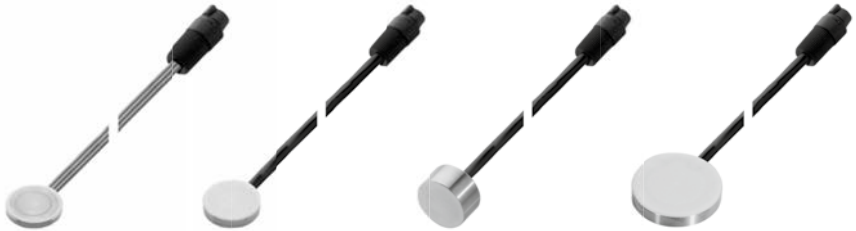
Capacitive Mini Sensors BCS

Object detection in the smallest of spaces



	M8×1	**M8×1**	**Ø 10 mm**	**Ø 10 mm**	**M12×1**	**M12×1**
	Flush	Non-flush	Flush	Non-flush	Flush	Non-flush
	0.1…1.5 mm	**0.1…3 mm**	**0.1…4 mm**	**1…8 mm**	**0.1…4 mm**	**1…8 mm**
	BCS0014	**BCS0015**	**BCS0016**	**BCS0017**	**BCS0018**	**BCS0019**
	BCS M08T4C-XXS15C-EP02-GZ01-002	BCS M08T4C1-XXS30G-EP02-GZ01-002	BCS G10T4B-XXS40C-EP02-GZ01-002	BCS G10T4C-XXS80G-EP02-GZ01-002	BCS M12T4D-XXS40C-EP02-GZ01-002	BCS M12T4D1-XXS80G-EP02-GZ01-002
	4…8 V DC	4…8 V DC	4…8 V DC	4…8 V DC	4…8 V DC	4…8 V DC
	75 V DC	75 V DC	75 V DC	75 V DC	75 V DC	75 V DC
	–30…+80 °C	–30…+80 °C	–30…+80 °C	–30…+80 °C	–30…+80 °C	–30…+80 °C
	100 Hz	100 Hz	100 Hz	100 Hz	100 Hz	100 Hz
	IP 67	IP 67	IP 67	IP 67	IP 67	IP 67
	V2A	V2A	V2A	V2A	V2A	V2A
	PTFE	PTFE	PTFE	PTFE	PTFE	PTFE
	POM	POM	POM	POM	POM	POM
	2 m cable PUR, 3×0.14 mm²	2 m cable PUR, 3×0.14 mm²	2 m cable PUR, 3×0.14 mm²	2 m cable PUR, 3×0.14 mm²	2 m cable PUR, 3×0.14 mm²	2 m cable PUR, 3×0.14 mm²





Size	**Ø 18×2.5 mm**	**Ø 18×4 mm**	**Ø 18×10 mm**	**Ø 22×4 mm**
Mounting type	Flush	Flush	Flush	Flush
Rated switching distance s_n	**0.1…3 mm**	**1…5 mm**	**1…5 mm**	**1…10 mm**
Ordering code	**BCS001A**	**BCS001C**	**BCS001E**	**BCS001F**
Part number	BCS D18T403-XXS30C-EP02-GZ01-002	BCS D18T404-XXS50C-EP02-GZ01-002	BCS D18T407-XXS50C-EP02-GZ01-002	BCS D22T405-XXS10C-EP02-GZ01-002
Supply voltage U_B	4…8 V DC	4…8 V DC	4…8 V DC	4…8 V DC
Rated insulation voltage U_i	75 V DC	75 V DC	75 V DC	75 V DC
Ambient temperature T_a	–30…+70 °C	–30…+80 °C	–30…+80 °C	–30…+80 °C
Switching frequency f	100 Hz	100 Hz	100 Hz	100 Hz
Degree of protection per IEC 60529	IP 66	IP 66	IP 66	IP 66
Housing material	V2A	V2A	V2A	V2A
Sensing surface material	PTFE	PTFE	PTFE	PTFE
Connection	2 m cable PVC, 3×0.09 mm²	2 m cable PUR, 3×0.14 mm²	2 m cable PUR, 3×0.14 mm²	2 m cable PUR, 3×0.14 mm²

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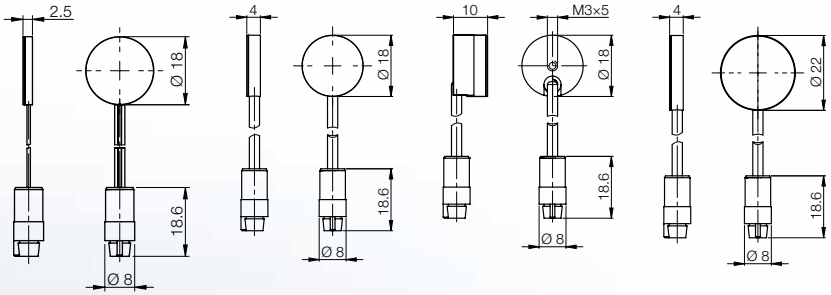
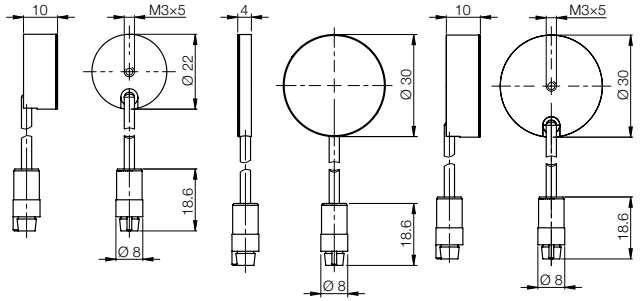


mini-S

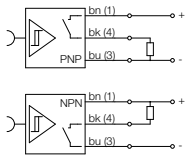
Capacitive Mini Sensors BCS

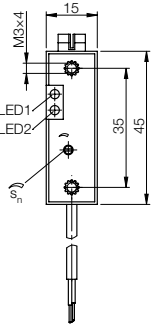
Object detection in the smallest of spaces

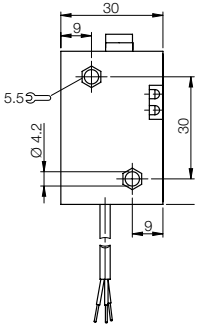
	Ø 22×10 mm	Ø 30×4 mm	Ø 30×10 mm
	Flush	Flush	Flush
	1…10 mm	**1…15 mm**	**1…15 mm**
	BCS001H	**BCS001J**	**BCS001K**
	BCS D22T408-XXS10C-EP02-GZ01-002	BCS D30T406-XXS15C-EP02-GZ01-002	BCS D30T409-XXS15C-EP02-GZ01-002
	4…8 V DC	4…8 V DC	4…8 V DC
	75 V DC	75 V DC	75 V DC
	–30…+80 °C	–30…+80 °C	–30…+80 °C
	100 Hz	100 Hz	100 Hz
	IP 66	IP 66	IP 66
	V2A	V2A	V2A
	PTFE	PTFE	PTFE
	2 m cable PUR, 3×0.14 mm²	2 m cable PUR, 3×0.14 mm²	2 m cable PUR, 3×0.14 mm²



Size			45×30×15 mm
PNP	NO	**Ordering code**	**BAE009E**
		Part number	BAE SA-CS-001-PS
PNP	NC	**Ordering code**	**BAE009F**
		Part number	BAE SA-CS-001-PO
NPN	NO	**Ordering code**	**BAE009H**
		Part number	BAE SA-CS-001-NS
NPN	NC	**Ordering code**	**BAE009J**
		Part number	BAE SA-CS-001-NO
Supply voltage U_B			12…35 V DC
Voltage drop U_d at I_e			0.8 V
Rated insulation voltage U_i			75 V DC
Output current max.			300 mA
No-load supply current I_0 max.			20 mA
Reverse polarity/short-circuit protected			Yes/yes
Ambient temperature T_a			–30…+70 °C
Switching frequency f			100 Hz
Function indicator			Yes/yes
Degree of protection per IEC 60529			IP 67
Housing material			PC
Connection			2 m cable PUR, 3x0.14 mm²







Function overview
LED 1: Switching status indicator
LED 2: Power indicator
Pos. 1: Through-hole dia. 4.2 mm, hexagon on both sides for inserting an M3 nut.

Ultrasonic sensors are accurate all-rounders. They measure fill levels, heights and sag without making contact as well as count and monitor the presence of objects. And particularly suited for critical situations. Dust, dirt and steam do not pose a problem.

Thanks to their display, the ultrasonic sensors of the BUS M30M series with a metal housing are particularly easy to operate. A complete numeric presetting of the sensor is possible. You can choose to have all measured values displayed in mm/cm or % during operation.
The sensor family includes five versions and, with a measuring range from 30 cm to 8 m, covers a wide range of applications.
All versions are available with the option of one or two switching outputs, a current and voltage analog output, or as a combination with switching output and analog output, so that nearly every application can be solved.
The sensors can be used in Multiplex operation and be automatically synchronized, so that they do not influence each other.

Features

- Display of direct measured values
- Measuring range from 30 mm to 8 m
- 1 or 2 switching outputs
- Analog output 4...20 mA and 0...10 V
- Teach-in via 2 buttons
- Temperature compensation

Scanning range			
BUS M30M switching output			
Resolution			
PNP	NO/NC	**Ordering code**	
		Part number	
2x PNP	NO/NC	**Ordering code**	
		Part number	
BUS M30M analog output			
Resolution (depends on window used)			
0...10 V/4...20 mA		**Ordering code**	
		Part number	
BUS M30M switching and analog output			
Resolution (depends on window used)			
0...10 V/4...20 mA		**Ordering code**	
PNP NO/NC		Part number	

Size		
Supply voltage		
Output current		
Degree of protection as per EN 60529		
Operating temperature		
Material	Housing	
	Plastic parts	
	Sensing surface	
Connection		

NPN versions can be found in the Ultrasonic catalog

Ultrasonic Sensors
BUS M30M with display





	30...250 mm	65...350 mm	200...1300 mm	350...3400 mm	600...6000 mm
	0.025 mm	0.025 mm	0.18 mm	0.18 mm	0.18 mm
	BUS0022	**BUS005F**	**BUS0039**	**BUS003P**	**BUS0045**
	BUS M30M1-PPX-03/025-S92K	BUS M30M1-PPX-07/035-S92K	BUS M30M1-PPX-20/130-S92K	BUS M30M1-PPX-35/340-S92K	BUS M30M1-PPX-60/600-S92K
	BUS002R	**BUS005H**	**BUS003C**	**BUS003W**	**BUS003Z**
	BUS M30M1-PWX-03/025-S92K	BUS M30M1-PWX-07/035-S92K	BUS M30M1-PWX-20/130-S92K	BUS M30M1-PWX-35/340-S92K	BUS M30M1-PWX-60/600-S92K
	0.025...0.10 mm	0.025...0.17 mm	0.18...0.57 mm	0.18...1.5 mm	0.18...2.4 mm
	BUS002N	**BUS005K**	**BUS003F**	**BUS003T**	**BUS0041**
	BUS M30M1-XC-03/025-S92K	BUS M30M1-XC-07/035-S92K	BUS M30M1-XC-20/130-S92K	BUS M30M1-XC-35/340-S92K	BUS M30M1-XC-60/600-S92K
	0.025...0.10 mm	0.025...0.17 mm	0.18...0.57 mm	0.18...1.5 mm	0.18...2.4 mm
	BUS002L	**BUS005M**	**BUS0038**	**BUS003L**	**BUS0043**
	BUS M30M1-PPC-03/025-S92K	BUS M30M1-PPC-07/035-S92K	BUS M30M1-PPC-20/130-S92K	BUS M30M1-PPC-35/340-S92K	BUS M30M1-PPC-60/600-S92K
	M30×1	M30×1	M30×1	M30×1	M30×1
	9...30 V DC	9...30 V DC	9...30 V DC	9...30 V DC	9...30 V DC
	200 mA	200 mA	200 mA	200 mA	200 mA
	IP 67	IP 67	IP 67	IP 67	IP 67
	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C
	Nickel-plated CuZn	Nickel-plated CuZn	Nickel-plated CuZn	Nickel-plated CuZn	Nickel-plated CuZn
	PBT, TPU	PBT, TPU	PBT, TPU	PBT, TPU	PBT, TPU
	Polyurethane foam, epoxy resin containing glass	Polyurethane foam, epoxy resin containing glass	Polyurethane foam, epoxy resin containing glass	Polyurethane foam, epoxy resin containing glass	Polyurethane foam, epoxy resin containing glass
	M12 connector, 5-pin	M12 connector, 5-pin	M12 connector, 5-pin	M12 connector, 5-pin	M12 connector, 5-pin

With a housing length of only 41 mm, the new BUS 18M ultrasonic sensors are extremely compact. With their narrow sound cone and a blind zone of only 20 mm, they provide flexible application options. Two housing variants – straight and with a 90° angle head – are available, each with four scanning ranges up to 1.3 m.
The sensor family covers a broad range of applications – through three different output stages: a push-pull switching output or an analog output, available with 4...20 mA or 0...10 V.
The highlight is the complete support of the IO-Link interface. Via the switching output, the sensors can communicate with an IO-Link-capable controller or an IO-Link master.

The sensors can be synchronized with one another, so that they do not influence one another.

Features

- 2 Housing variants
- Measuring range from 20 mm to 1.3 m
- Push-pull switching output
- Analog output 4...20 mA or 0...10 V
- Teach-in via control line
- Temperature compensation

Scanning range			
BUS M18M switching output, straight			
Resolution			
push/pull	NO/NC	**Ordering code**	
	IO-Link	Part number	
BUS W18M switching output, angled			
Resolution			
push/pull	NO/NC	**Ordering code**	
	IO-Link	Part number	
BUS M18M analog output, straight			
Resolution (depends on window used)			
0...10 V	rising/	**Ordering code**	
	falling	Part number	
4...20 mA	rising/	**Ordering code**	
	falling	Part number	
BUS W18M analog output, angled			
Resolution (depends on window used)			
0 to 10 V	rising/	**Ordering code**	
	falling	Part number	
4 to 20	rising/	**Ordering code**	
mA	falling	Part number	

Size		
Supply voltage		
Output current		
Degree of protection as per EN 60529		
Operating temperature		
Material	Housing	
	Plastic parts	
	Sensing surface	
Connection		

Ultrasonic Sensors

BUS 18M with IO-Link – also available in version with 90° angle head

				
	20…150 mm	**30…250 mm**	**65…350 mm**	**120…1000 mm**
	0.069 mm	0.069 mm	0.069 mm	0.069 mm
	BUS0020	**BUS0029**	**BUS004Z**	**BUS004P**
	BUS M18M1-GPXI-02/015-S92G	BUS M18M1-GPXI-03/025-S92G	BUS M18M1-GPXI-07/035-S92G	BUS M18M1-GPXI-12/100-S92G
	0.069 mm	0.069 mm	0.069 mm	0.069 mm
	BUS0023	**BUS002A**	**BUS004Y**	**BUS004N**
	BUS W18M1-GPXI-02/015-S92G	BUS W18M1-GPXI-03/025-S92G	BUS W18M1-GPXI-07/035-S92G	BUS W18M1-GPXI-12/100-S92G
	0.069...0.10 mm	0.069...0.10 mm	0.069...0.17 mm	0.069...0.38 mm
	BUS0026	**BUS0024**	**BUS004T**	**BUS0052**
	BUS M18M1-XA-02/015-S92G	BUS M18M1-XA-03/025-S92G	BUS M18M1-XA-07/035-S92G	BUS M18M1-XA-12/100-S92G
	BUS0025	**BUS002C**	**BUS004W**	**BUS004M**
	BUS M18M1-XB-02/015-S92G	BUS M18M1-XB-03/025-S92G	BUS M18M1-XB-07/035-S92G	BUS M18M1-XB-12/100-S92G
	0.069...0.10 mm	0.069...0.10 mm	0.069...0.17 mm	0.069...0.38 mm
	BUS0028	**BUS0050**	**BUS004R**	**BUS0051**
	BUS W18M1-XA-02/015-S92G	BUS W18M1-XA-03/025-S92G	BUS W18M1-XA-07/035-S92G	BUS W18M1-XA-12/100-S92G
	BUS0027	**BUS002E**	**BUS004U**	**BUS0053**
	BUS W18M1-XB-02/015-S92G	BUS W18M1-XB-03/025-S92G	BUS W18M1-XB-07/035-S92G	BUS W18M1-XB-12/100-S92G
	M18×1	M18×1	M18×1	M18×1
	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
	200 mA	200 mA	200 mA	200 mA
	IP 67	IP 67	IP 67	IP 67
	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C
	Nickel-plated brass tube	Nickel-plated brass tube	Nickel-plated brass tube	Nickel-plated brass tube
	PBT	PBT	PBT	PBT
	Polyurethane foam, epoxy resin containing glass	Polyurethane foam, epoxy resin containing glass	Polyurethane foam, epoxy resin containing glass	Polyurethane foam, epoxy resin containing glass
	M12 connector, 5-pin	M12 connector, 5-pin	M12 connector, 5-pin	M12 connector, 5-pin

The small ultrasonic sensors in a block-shaped housing operate with high resolution, so that they leave nothing wanting in terms of accuracy.

For tough measuring tasks, the BUS R06K1..02/007 and BUS R06K1..02/015 can be equipped with a sound transmission attachment. This makes it possible to carry out measurements in bore holes and openings with diameters > 5 mm.
Due to its short response delay and the high switching frequency of 125 Hz, the BUS R06K1..02/015 is particularly suitable for detecting fast processes.

The series has a synchronization input for simultaneous operation of up to ten sensors where space is at a minimum. The diversity of their versions with switching output or current or voltage analog output with five scanning ranges offer nearly endless fields of application.

Features

- Measuring range from 20 mm to 1 m
- 1 switching output
- Analog output 4...20 mA or 0...10 V
- Teach-in via button
- Synchronization input
- Version with high switching frequency
- Sound transmission attachment optional

Scanning range			
BUS R06K switching output			
Resolution			
PNP	NO/NC	**Ordering code**	
		Part number	
PNP	NO/NC	**Ordering code**	
125 Hz		Part number	
BUS R06K analog output			
Resolution (depends on window used)			
0...10 V		**Ordering code**	
		Part number	
4...20 mA		**Ordering code**	
		Part number	

Size		
Supply voltage		
Output current		
Degree of protection as per EN 60529		
Operating temperature		
Material	Housing	
	Sensing surface	
Connection		

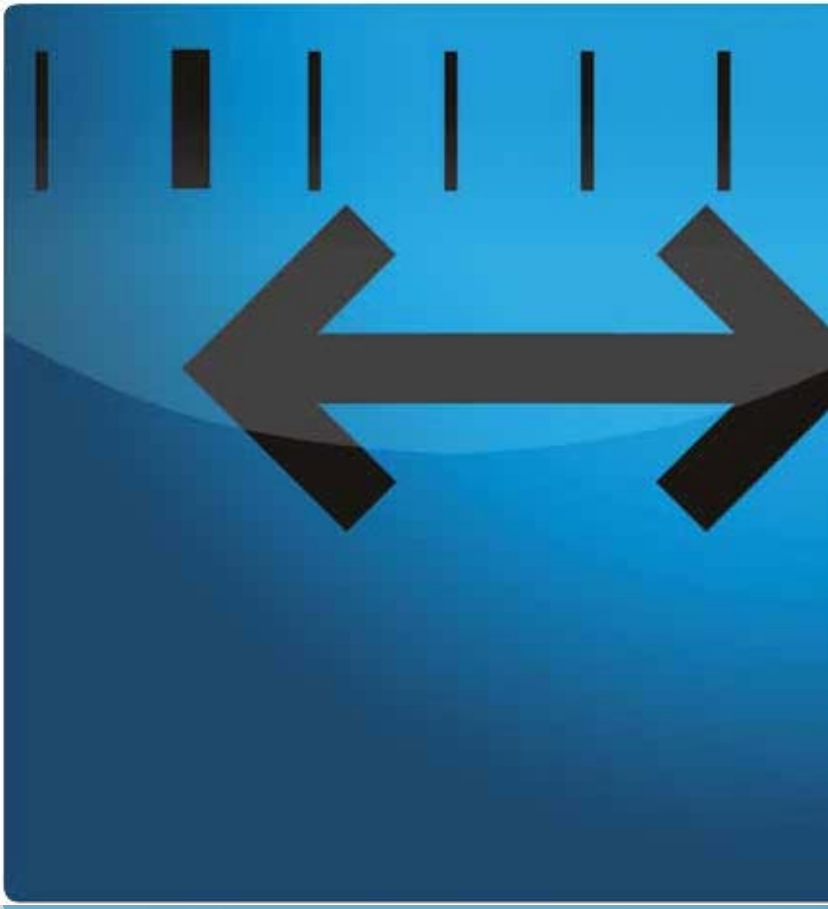
NPN versions can be found in the Ultrasonic catalog

Ultrasonic Sensors
BUS R06K mini-sensor

					
	20…70 mm	**20…150 mm**	**55…240 mm**	**30…250 mm**	**120…700 mm**
	0.056 mm	0.056 mm	0.037 mm	0.069 mm	0.037 mm
	BUS0021	**BUS004C**	**BUS004L**	**BUS0057**	**BUS0059**
	BUS R06K1-PPX-02/007-S75G	BUS R06K1-PPX-02/015-S75G	BUS R06K1-PPX-05/024-S75G	BUS R06K1-PPX-03/025-S75G	BUS R06K1-PPX-12/070-S75G
		BUS0049			
		BUS R06K1-PPX-02/015-S75G-F01			
		0.056 mm	0.037...0.072 mm		0.037...0.215 mm
		BUS004K	**BUS0056**		**BUS005E**
		BUS R06K1-XA-02/015-S75G	BUS R06K1-XA-05/024-S75G		BUS R06K1-XA-12/070-S75G
		BUS004J	**BUS004F**		**BUS005C**
		BUS R06K1-XB-02/015-S75G	BUS R06K1-XB-05/024-S75G		BUS R06K1-XB-12/070-S75G
	21.6×32×12 mm	21.6×32×12 mm	23×32×12 mm	20×32×23 mm	20×32×18 mm
	20...30 V DC	20...30 V DC	20...30 V DC	20...30 V DC	20...30 V DC
	200 mA	200 mA	200 mA	200 mA	200 mA
	IP 67	IP 67	IP 67	IP 67	IP 67
	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C
	ABS	ABS	ABS	ABS	ABS
	Polyurethane foam	Polyurethane foam	Polyurethane foam	Polyurethane foam	Polyurethane foam
	M8 connector, 4-pin	M8 connector, 4-pin	M8 connector, 4-pin	M8 connector, 4-pin	M8 connector, 4-pin

Linear
Position Sensing

Inclination Sensors
High-pressure Inductive Sensors
Inductive Positioning System
Magnetically Coded
Position and Angle Measurement System
Micropulse Transducers



New

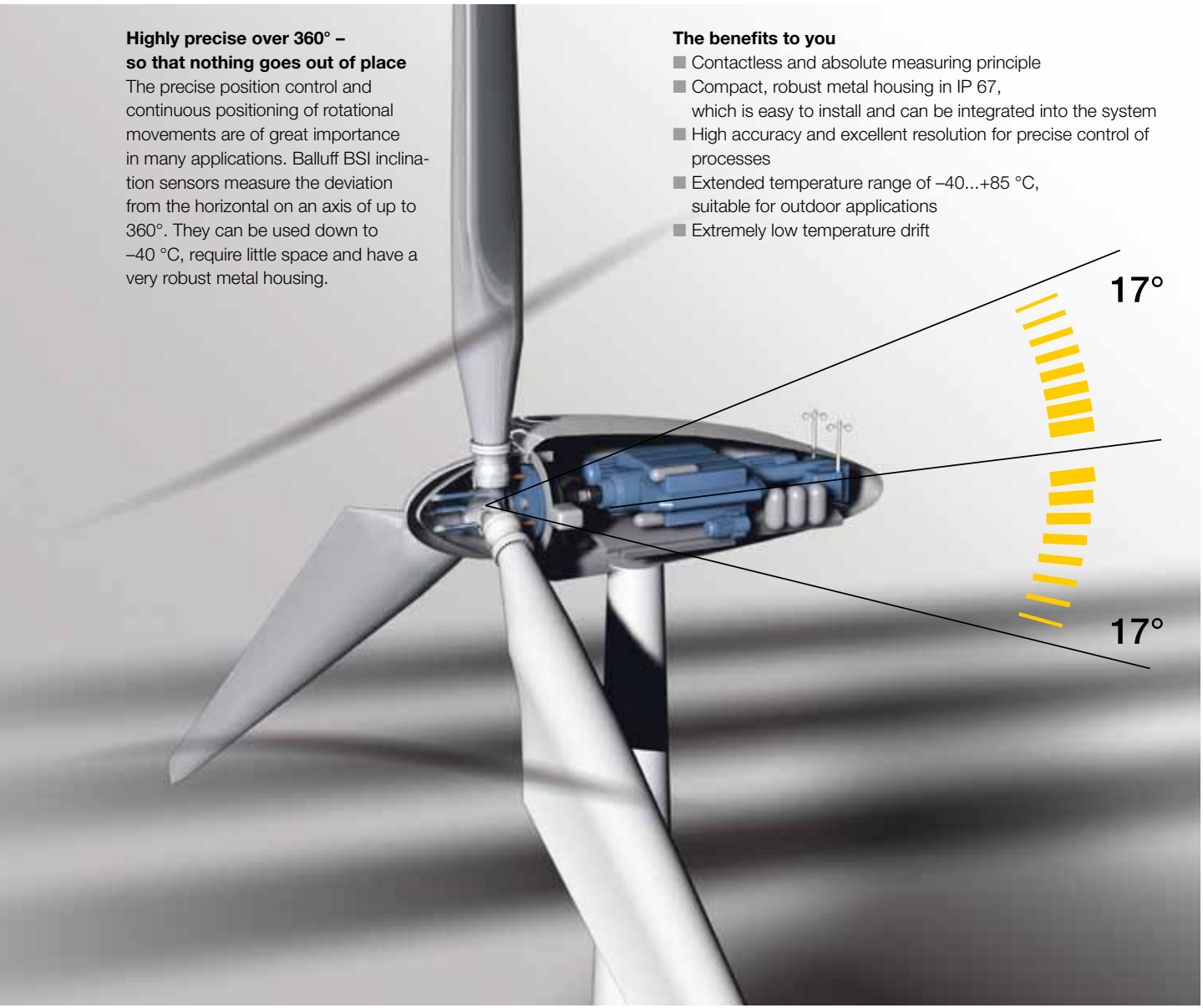
more added value

Highly precise over 360° – so that nothing goes out of place

The precise position control and continuous positioning of rotational movements are of great importance in many applications. Balluff BSI inclination sensors measure the deviation from the horizontal on an axis of up to 360°. They can be used down to –40 °C, require little space and have a very robust metal housing.

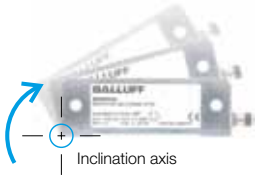
The benefits to you

- Contactless and absolute measuring principle
- Compact, robust metal housing in IP 67, which is easy to install and can be integrated into the system
- High accuracy and excellent resolution for precise control of processes
- Extended temperature range of –40...+85 °C, suitable for outdoor applications
- Extremely low temperature drift



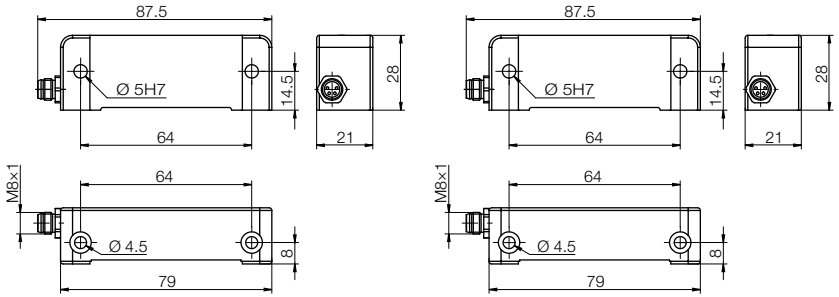
BSI Inclination Sensors

The position securely in your grasp



Size		**79×28×20 mm**	**79×28×20 mm**
Interface		**4...20 mA**	**Modbus RTU RS-485**
Measuring range	**Ordering code**	**BSI0004**	**BSI0003**
0...360°	Part number	BSI R11A0-XB-CXP360-S75G	BSI R11A0-XXR-CXP360-S75G
Measuring range	**Ordering code**	**BSI0002**	
±45°	Part number	BSI R11A0-XB-CXS045-S75G	
Supply voltage U_B		10...30 V DC	10...30 V DC
Current consumption		< 31 mA	< 20 mA
Resolution max.		±0.01°	±0.01°
Max. characteristic deviation		±0.1% (min. 0.1°)	±0.1° at 10 to 40 °C, ±0.15° in any other temperature range
Temperature drift		±0.01%/10 K	
Sampling rate		< 150 ms	< 150 ms
Settling time		< 1 s	< 1 s
Polarity reversal protected/short-circuit protected		yes/yes	yes/yes
Degree of protection as per IEC 60529		IP 67	IP 67
Ambient temperature range T_a		–40...+85 °C	–40...+85 °C
Weight		Approx. 80 g	Approx. 80 g
Housing material		Aluminum	Aluminum
Calibration, measurement protocol		Optional	Optional
Connection		M8 connector, 4-pin	M8 connector, 4-pin

Refer to our BSI inclination sensor catalog or visit **www.balluff.com** for further information

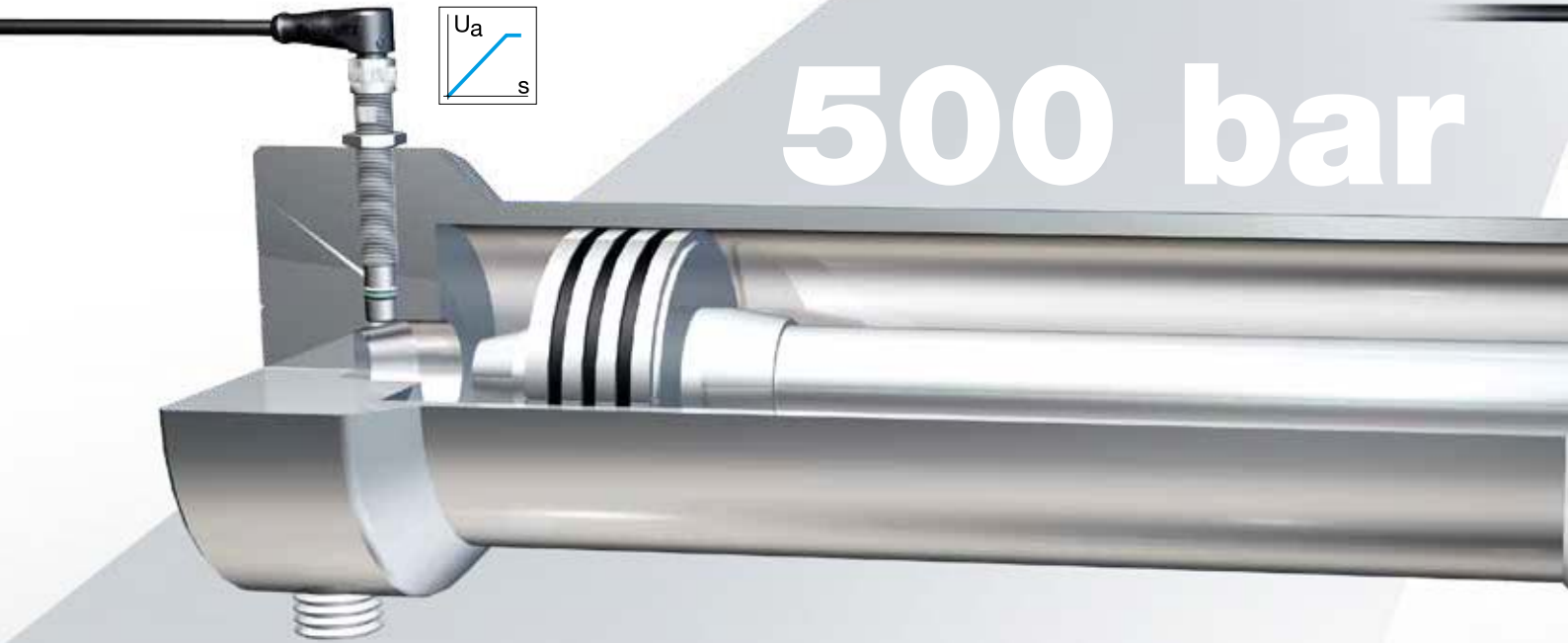


more added value

- One design – two output models
- Switching for final position detection
- Analog for control of valves or immediate stop
- Measurements of valves and cylinders possible
- Ceramic on medium side – robust
- Oil pressure up to 500 bar

Application areas

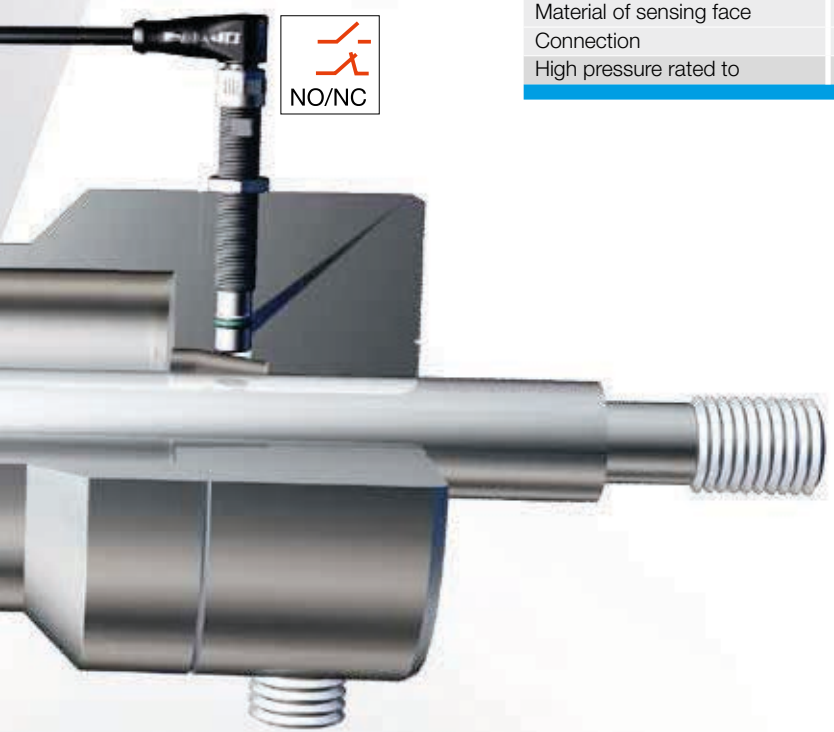
- Control of valves
- Parked position of cranes
- Final position of installation supports
- Service measurements of valves
- Position monitoring in mobile hydraulic systems
- Control of agricultural technology

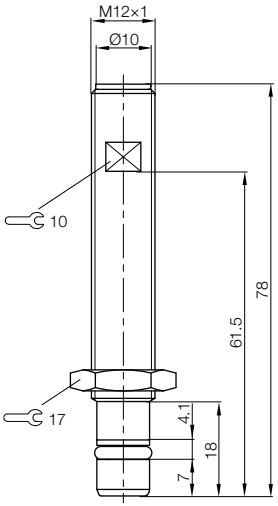


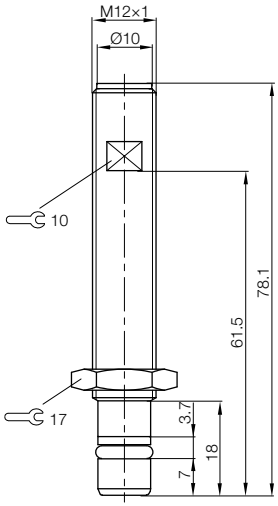
High-pressure Inductive Sensors

Switching or analog up to 500 bar

Size	**M12×1**	**M12×1**
Mounting type	Flush	Flush
Rated switching distance s_n	**1.5 mm**	
Ordering code	**BHS0076**	**BAW0040**
Part number	BHS B135V-PAD15-S04-007	BAW Z08EO-UAD20B-S04G-H11
Output signal	PNP complementary	0...10 V
Detection range		0.5...2 mm
Supply voltage U_B	12...36 V DC	10...30 V DC
Ambient temperature range	–25...+85 °C	–25...+85 °C
Sensor degree of protection per IEC 60529	IP 68	IP 68
Housing material	Stainless steel	Stainless steel
Material of sensing face	Ceramic	Ceramic
Connection	M12 connector	M12 connector
High pressure rated to	**500 bar**	**500 bar**





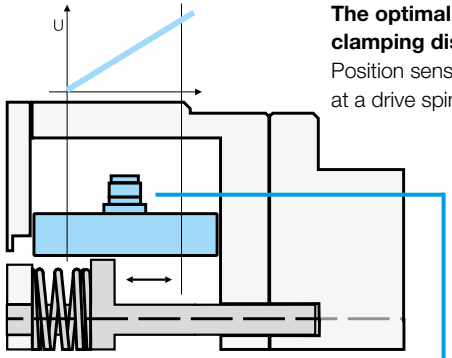


more added value

- Absolute measuring principle, several measuring ranges, teachable
- High level of repeat accuracy and precision
- Optimal linearity and low temperature drift
- Optimized housing design for clamping distance monitoring
- Distance-proportional IO-Link output signal
- Standard output 0...10 V, 4...20 mA

The inductive positioning system BIP is the accurate measuring system for the position detection of metallic objects.

Applications
The main application area of the BIP is the linear position monitoring of drive spindles and clamping devices for tools and workpieces.



The optimal sensor for clamping distance monitoring
Position sensor BIP in use at a drive spindle for tools.

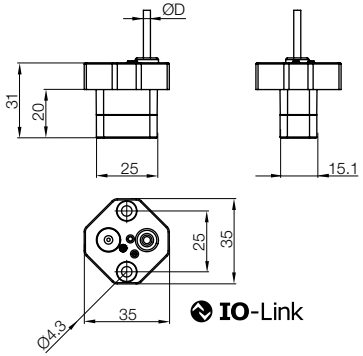
IO-Link

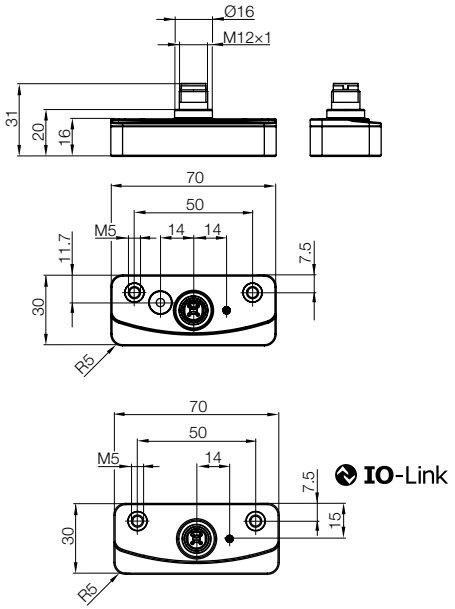
Ordering code	
Part number	
Output signal	
Length of measuring range is teachable	
Detection range	
Target width (EC80)	
Target distance	
Resolution	
Repeat accuracy	
Non-linearity	
Ambient temperature range	
Connection	
Supply voltage	
Housing material	
Function indicator LED	

Inductive Positioning System BIP

Perfectly integratable

	BIP0001	BIP0007	BIP0008	BIP0002	BIP0004	BIP0005
	BIP AD0-B014-01-EP02	BIP LD2-T014-01-EP02	BIP CD2-B014-01-EP02	BIP AD2-B040-02-S4	BIP LD2-T040-02-S4	BIP CD2-B040-02-S4
	0...10 V	IO-Link	4...20 mA	0...10 V	IO-Link	4...20 mA
	7...14 mm			20...40 mm		
	0...14 mm			0...40 mm		
	8 mm			14 mm		
	0,5...2 mm			1...3 mm		
	14 µm			40 µm		
	±80 µm			±80 µm		
	±250 µm			±400 µm		
	–25...+70°C			–25...+85°C		
	2 m cable			M12 connector		
	15...30 V (IO-Link 18...30 V)			15...30 V (IO-Link 18...30 V)		
	PA			PA		
	Yes			Yes		





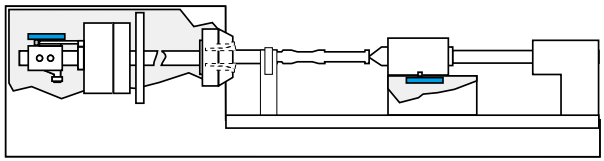
more added value

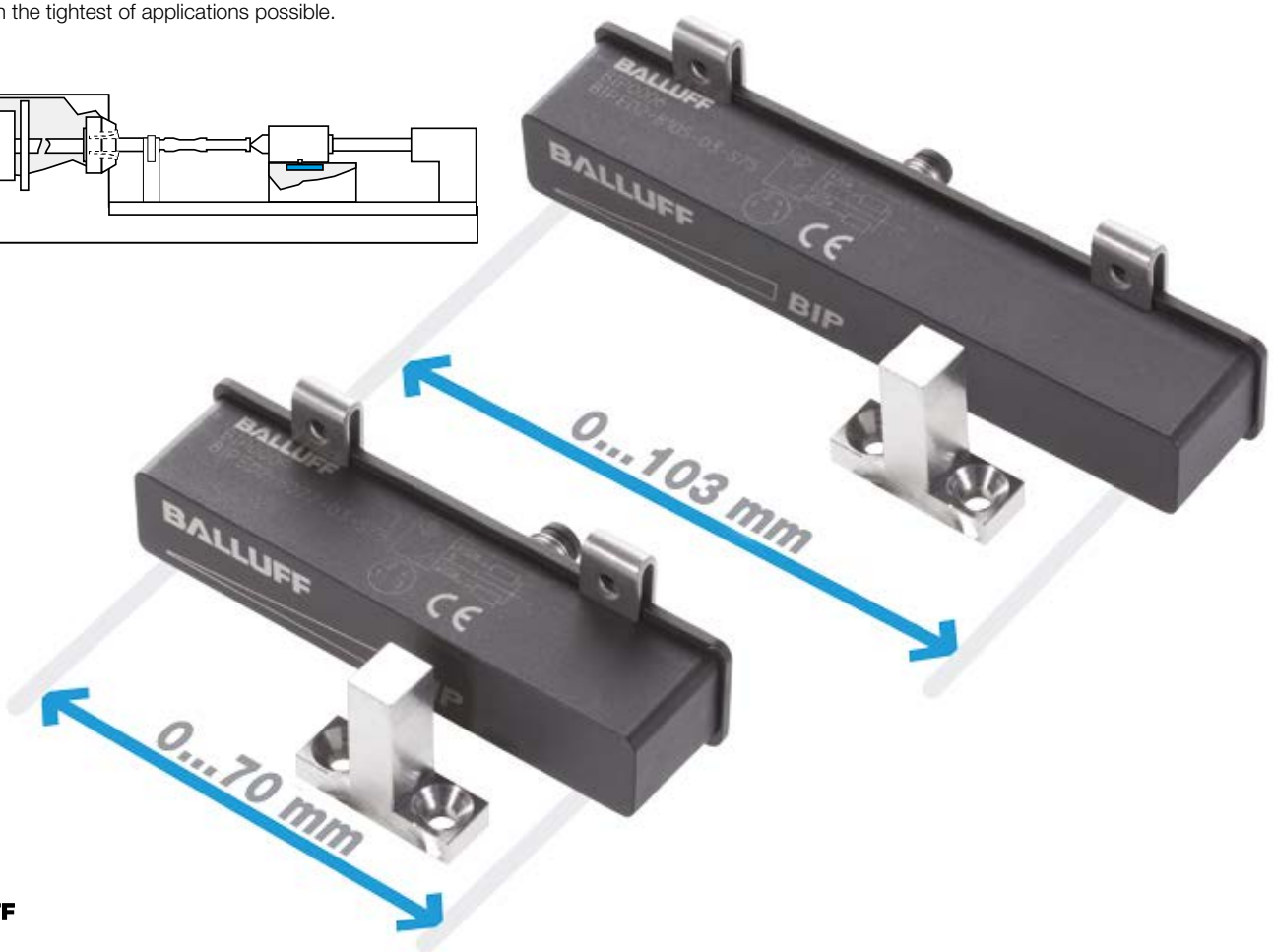
- Absolute measuring principle, several measuring ranges, teachable
- High level of repeat accuracy and precision
- Wide working temperature range and low temperature drift
- Optimized housing design, degree of protection IP 67
- Standard output 0...10 V, 4...20 mA

The inductive positioning system BIP is the accurate measuring system for the position detection of metallic objects.

Applications

These BIP positioning systems are ideal for integrated production monitoring because their unmatched effective length ratio makes installation in the tightest of applications possible.





Inductive Positioning System BIP

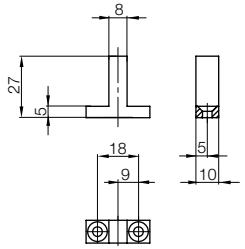
Optimized effective length

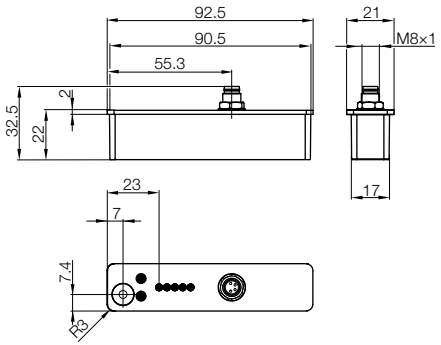
teachable

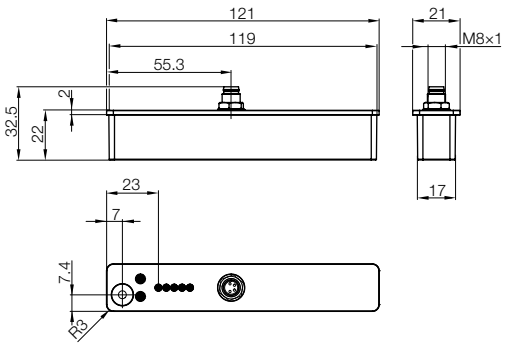
teachable

Ordering code	BIP000C	BIP000E
Part number	BIP ED2-B070-03-S75	BIP ED2-B103-03-S75
Output signal	0...10 V and 4...20 mA	0...10 V and 4...20 mA
Length of measuring range is teachable	35...70 mm	51.5...103 mm
Detection range	0...76.5 mm	0...105 mm
Target width (EC80)	8 mm	8 mm
Target distance	1...3 mm	1...3 mm
Resolution	80 µm	80 µm
Repeat accuracy	±80 µm	±80 µm
Non-linearity	±300 µm	±400 µm
Ambient temperature range	–25...+85 °C	–25...+85 °C
Connection	M8 connector	M8 connector
Supply voltage	16...30 V	16...30 V
Housing material	PBT	PBT
Function indicator LED	Yes	Yes

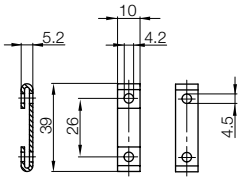
Please order **Metal Target** separately.
Type designation: BAM TG-XE-001
Ordering code: BAM01CP







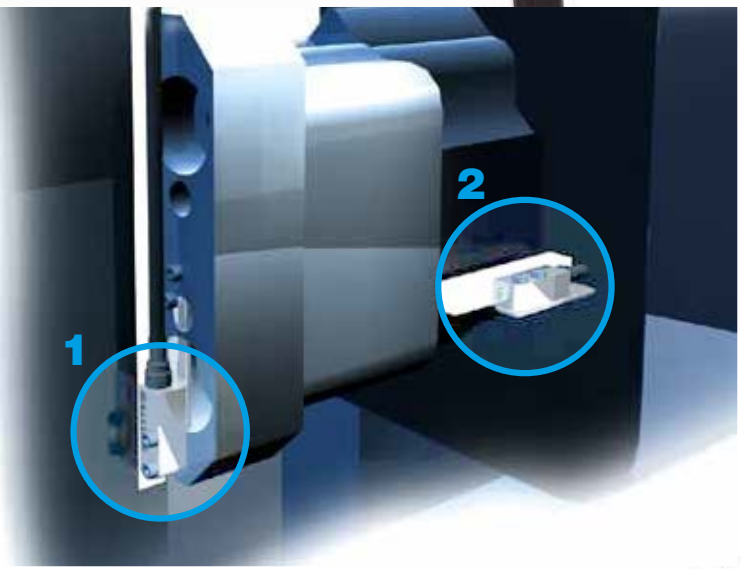
Two fastening clips incl. screws
are included in the delivery.

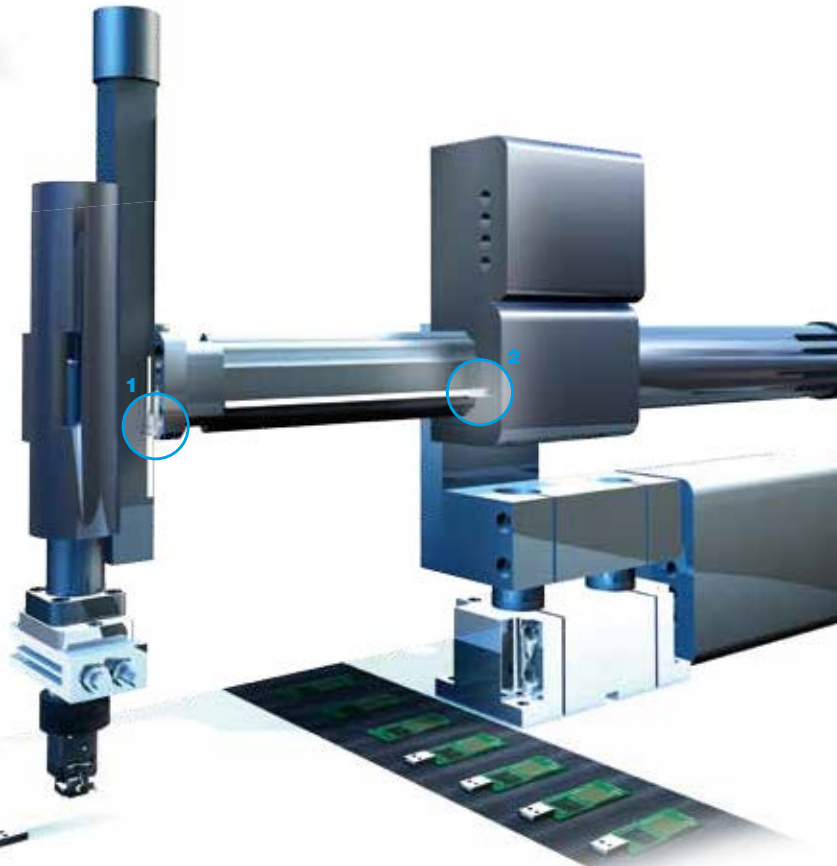


more added value

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

Inaccuracy and tolerance shifts have a negative effect on production quality. Direct measuring systems remedy this. They determine the current position directly on the slide or the load support.
The new BML-S1H magnetically encoded position and angle measurement system measures highly dynamic applications exactly and absolutely. It works contactlessly and wear-free. Even external factors such as dirt and temperature do not impede it.
Frequent applications are linear guidance systems, pick-and-place, drive feedback and vibration wear.





BML-S1H Magnetically Coded Position and Angle Measurement System

Absolute precision

Series		**BML-S1H...**	**BML-S1H...**
Output signal		Absolute: SSI interface, Analog signal: sin/cos, 1 V_{ss}	Absolute: SSI interface, Analog signal: sin/cos, 1 V_{ss}
Data format		16 bit	18 bit
Max. measuring length		64 mm	256 mm
Lengthwise approach direction	**Ordering code**	**BML0391**	**BML0393**
	Part number	BML-S1H1-S6QC-M3AA-D0-KA00,3-S284	BML-S1H1-S6QC-M3CA-D0-KA00,3-S284
Crosswise approach direction	**Ordering code**	**BML0392**	**BML0394**
	Part number	BML-S1H2-S6QC-M3AA-D0-KA00,3-S284	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 %
Current consumption		< 90 mA + Controller current consumption, at 120 Ω load resistance	< 90 mA + Controller current consumption, at 120 Ω load resistance
Tape pole pitch		1 mm	1 mm
Max. read distance, sensor head/measuring body		0.35 mm (without cover strip)	0.35 mm (without cover strip)
Max. travel speed		5 m/s	5 m/s
Sampling rate		$f_{Standard}$ = up to 50 kHz	$f_{Standard}$ = up to 50 kHz
SSi clock frequency		f_{Clk} = 10 kHz to 4 MHz	f_{Clk} = 10 kHz to 4 MHz
Operating temperature		–20...+80 °C	–20...+80 °C
Housing material		Al	Al
Degree of protection as per IEC 60529		IP 67	IP 67

Devices are also available with the BiSS-C interface.

Accessories: M12 connection cable with cable length of 5 m (Ordering code: **BCC09MY**)

Series	**Magnetic Tape**	**Magnetic Tape**
Output signal	for BML-S1H with 64 mm measuring length	for BML-S1H with 256 mm measuring length
Ordering code	**BML039J**	**BML039K**
Part number	BML-M02-A33-A3-M0009-A	BML-M02-A33-A3-M0028-C
Length	90 mm	280 mm
Measuring length	64 mm	256 mm
Magnetic tape material	Rubber - ferrite	Rubber - ferrite
Cover strip material	Stainless steel	Stainless steel

IO-Link

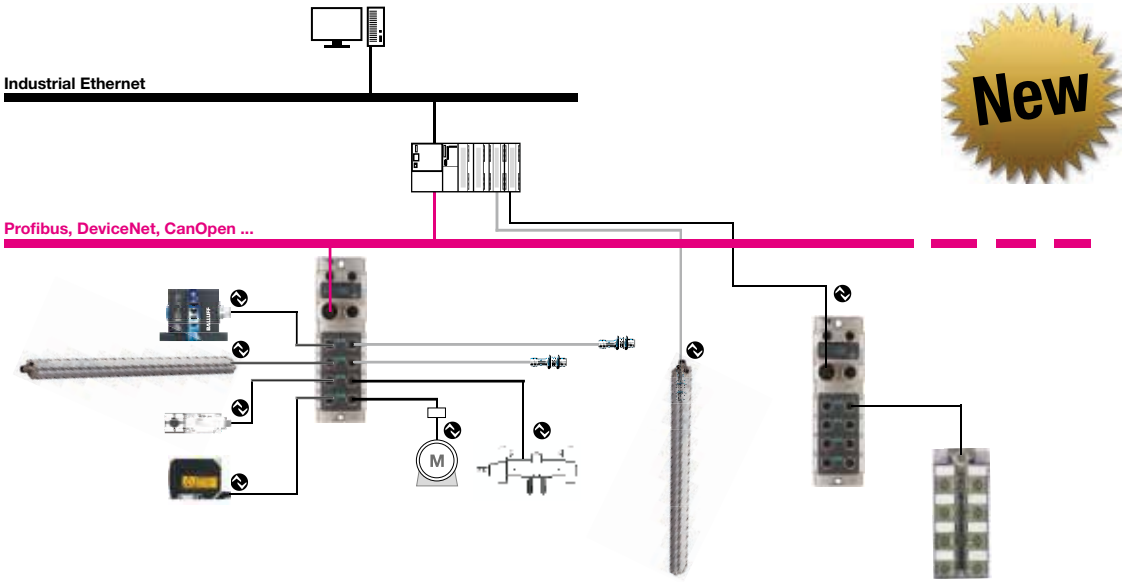
Contactless distance measurement technology with IO-Link

The Micropulse PF IO-Link is an absolute and contactless position measuring system that continuously provides measurements in µm in the 1-ms cycle. These measured values are directly transferred digitally via IO-Link.

IO-Link is a point-to-point connection within any network. An IO-Link system consists of an IO-Link device such as a sensor or actuator, an IO-Link master and the wiring. Master modules are available with all current field bus protocols. The Micropulse PF IO-Link device is coupled to the master via a maximum 20 m long standard sensor/actuator line. The micropulse PF IO-Link works with the communication speed COM3 (230kB), which achieves a process data cycle of 1 ms with a 1.1 master. Via IO-Link, the user interface can be mapped based on an IODD (IO Device Description) in the engineering system. Due to the continuous flow of information, all data are centrally and consistently saved, so that a configuration is possible and reproducible at any time.

Your added value with the PF IO-Link profile

- Simple to configure, quick to install and bring into operation
- COM3, 1 ms process data cycle possible, securely measure quick movements
- OTF, automatic configuration in running operation (on the fly)
- Continuous monitoring and diagnostics
- High transfer rate, quick process data cycle
- Cost-effective to wire with standard M12 cable plug connector
- Easy to integrate in the controller via standard IO-Link modules or sensor hubs
- For the hard, industrial environment, use with IO-Link master component groups in IP 67 from Balluff



Micropulse Transducer BTL6 Profile PF IO-Link

Simple to configure, time-saving to install and bring into operation

Micropulse displacement systems enclosed in a profiled housing are non-contact, absolute measuring systems used for the precision measurement of distances. They are characterized by their very flat design and the robust structure with high IP 67 degree of protection. The current axis positions are "marked" by the position encoder magnets through the wall of the aluminum profile.
These position measuring systems tolerate a lateral offset and a vertical offset of up to 15 mm.

Advantages and characteristics of the PF profile

- Very flat design for simple running over
- Non-contact detection of the actual position
- IP 67, insensitive to contamination
- Insensitive to shock and vibration
- Absolute output signal
- Measurement length up to 4570 mm
- 1 µm resolution
- Linearity deviation ± 200 µm
- Error and status LED

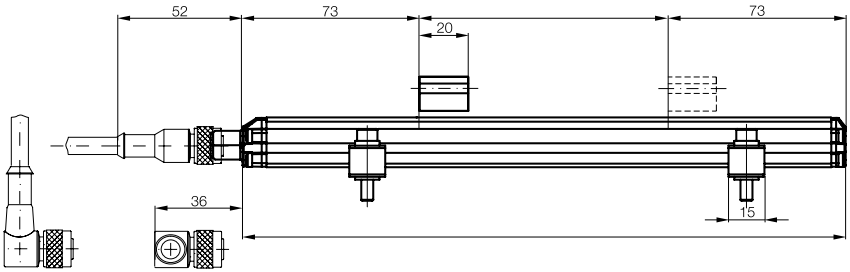
Ordering example:

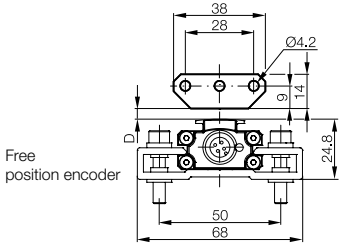
BTL6-U110-M_ _ _ _-PF-S4

IO-Link V1.1

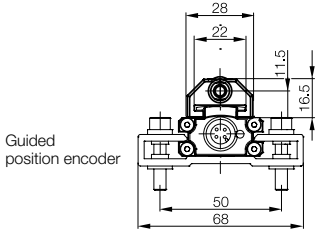
Nominal stroke [mm]
50-4570 mm in 5 mm steps

BLT6 profile PF transducer with free and guided position encoder and plug connection S4





Free
position encoder



Guided
position encoder

VARAN

more added value

Micropulse position measuring systems BTL6-V11V- with VARAN real-time industrial Ethernet

VARAN real-time, hot plug, open, secure, cost-oriented!
Typical features of the open VARAN interface include rapid data transfer in real time with cycle times < 100 µs, automatic addressing, hot plug-ins, a high degree of reliability, low implementation costs as well as simple maintenance and faster service using appropriate service and diagnostic tools.

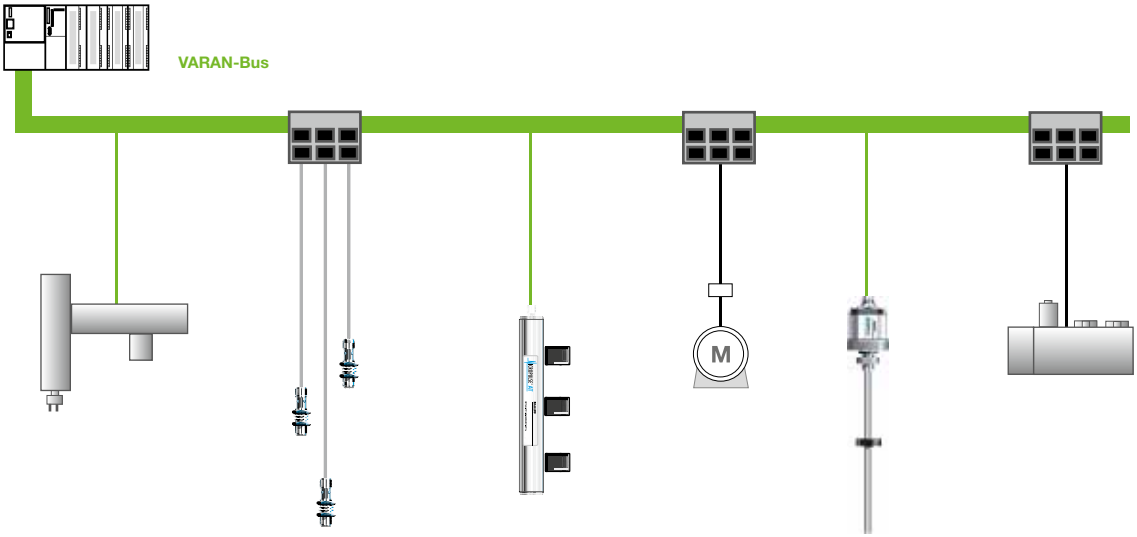
Ideal for drive technology
The hard and secure real-time data transmission makes VARAN increasingly into a standard in drive technology.

Reduction in material and installation costs
Particularly during installation, enormous costs can be saved in material and working times with the plug-in solution. And every plug connection saved means a significant source of errors is eliminated.

Additional information on VARAN real-time industrial Ethernet can be found at www.varan-bus.net

VARAN advantages

- **Hard real-time**
  Cycle times < 100 µs, jitter < 100 ns
  Each command is immediately confirmed by the receiver.
- **High data integrity and error tolerance**
  Unacknowledged messages are repeated in the same bus cycle.
- **Flexible network topology**
  Modular machine structures: star, line and tree topologies can be combined any way you like.
- **Cost-effective**
  At the price level of a fieldbus connection, for which standard components are used for manager and client at a lower price.
- **Open standard**
  VARAN bus is an open standard and is manufacturer-independent.
- **Bus and power supply in one cable**
  Signal and power conduction with plug connector and hybrid cable
- **Hot plug capability**
  In running operation



Micropulse Position Measuring System BTL6-V11V Rod BZ

with VARAN real-time industrial Ethernet

New

VARAN feedback system for hydraulically controlled axes

With the Micropulse BTL6-V11V Rod, Balluff is putting the first integratable position measuring system with VARAN real-time industrial Ethernet on the market. Micropulse rod position measuring systems measure the actual piston position directly, integrated in the pressure area of the hydraulic cylinder. Optimal control quality of the hydraulic axis is achieved through dynamic, reproducible high-precision measurements. The extremely quick and secure real-time data transmission of the VARAN industrial Ethernets and the precise dynamic measurement of the piston positions of the micropulse BTLs makes the system ideal for the use in advanced applications with regulated axes.

Features

- Non-contact detection of the actual position
- Pressure-resistant up to 600 bar (1000 bar) for direct integration in the pressure area
- IP 67, insensitive to contamination
- Insensitive to shock and vibration
- Absolute output signal
- Measurement length up to 4000 mm
- Fast, simple mounting
- Single-plug solution saves system costs
- 15 µm resolution
- Linearity deviation ± 200 µm

Ordering example:

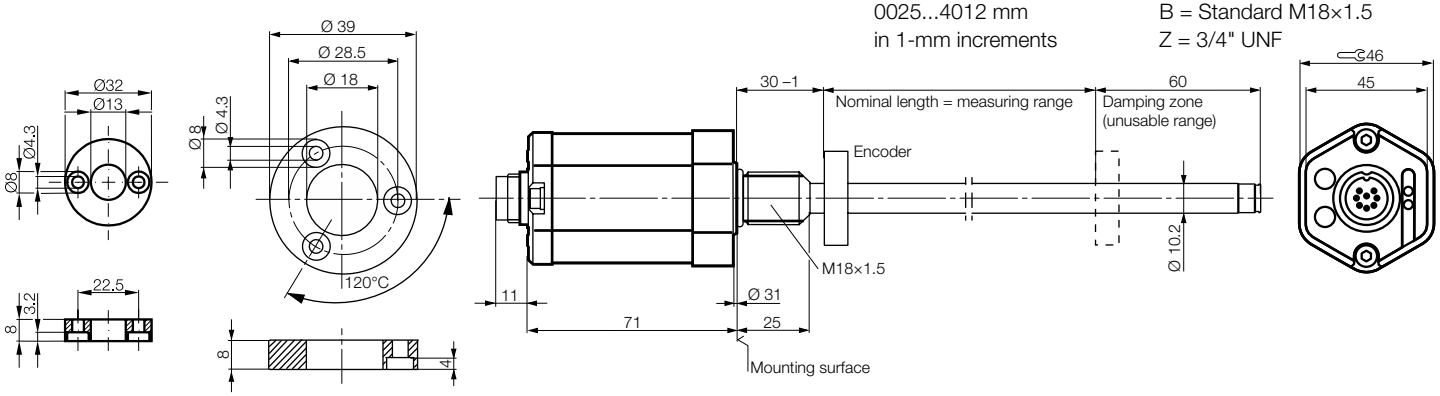
BTL6-V11V-M____-B-S115

Standard Nominal stroke [mm]

0025...4012 mm
in 1-mm increments

Design

B = Standard M18×1.5
Z = 3/4" UNF



BTL-P-1013-4R **BTL-P-1013-3R**

MICROPULSE®

more added value

Micropulse+ position measuring systems in a profile housing are non-contact, absolute measuring systems for accurately measuring one or more distances. They impress with their robust design including IP 67 high degree of protection, ease of installation, and wear-free measurement principle with high accuracy. The current axis positions are marked by the position encoder magnets through the wall of the aluminum profile. The position measuring systems tolerate a lateral offset as well as a height offset of up to 15 mm.

Features

- Non-contact detection of the measured position
- IP 67, insensitive to contamination
- Insensitive to shock and vibration
- Absolute output signal
- Measurement length up to 7620 mm
- Two measurement paths per system
- Error and status LED
- Quick commissioning through USB configuration

Micropulse+ position measuring systems guarantee high cost-effectiveness and quality in the manufacture of concrete blocks. In a concrete block machine, the micropulse+ position measuring system simultaneously and reliably measures the axis position of load and molding stroke movement.

Micropulse⁺ Transducer BTL7 profile P

For precise position measurement in stringent environments

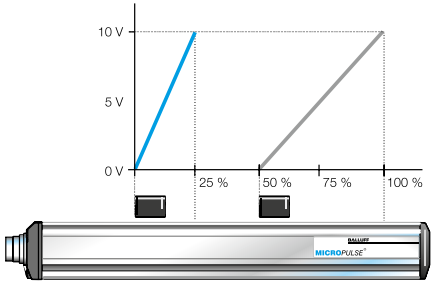
New

Added value with Micropulse⁺ additional functions

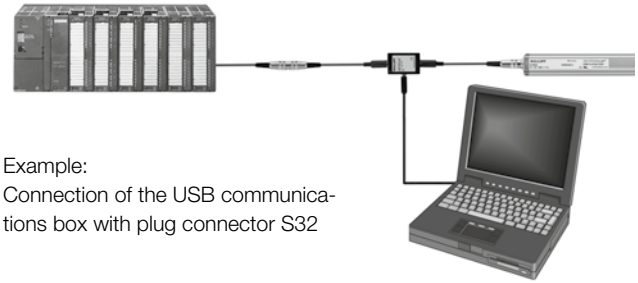
Great value is added for the user through a wide variety of additional functions of Micropulse⁺ profile P.

- Time savings through simple configuration and setting of the beginning and end points via USB interface and free "BTLConfigTool" software
- Universally configurable dual output functions, position and velocity
- Increased operating reliability with status LEDs for indicating the operating status and diagnostic information

Operating mode: Double position indicator



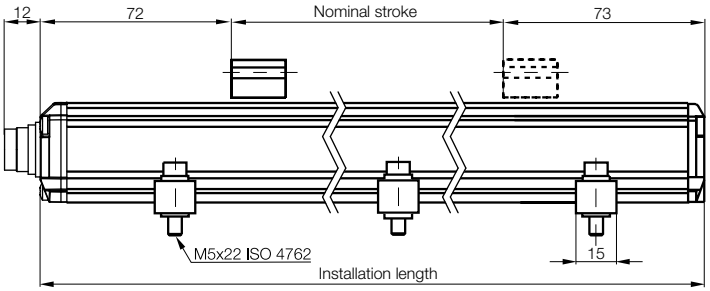
1 position measuring system, 2 movements, 2 output signals



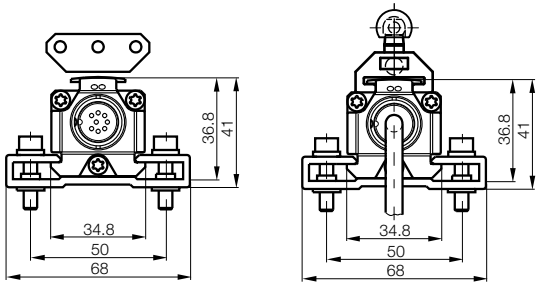
Example:
Connection of the USB communications box with plug connector S32

BTL7-P variants	
Part number	**Analog output signal**
BTL7-A501-M...-P-...	0...10 V and 10...0 V, –10...+10 V can be set via USB
BTL7-E501-M...-P-...	4...20 mA and 20...4 mA, 0...20 mA can be set via USB

BTL7 profile P transducer with free position encoder and plug connection S32



BTL7 profile P transducer with guided position encoder and cable output KA



more added value

BTL7 redundant micropulse transducers

BTL7 redundant micropulse transducers: the robust position measuring system for use in safety-related valves and hydraulic cylinders for measuring ranges between 25 and 7620 mm.
Up to 3 independent position measuring systems in the same housing enable fail-safe linear measurement of, for example, safety valves or the combined monitoring of position and adjustment speed.

- Safety function easily retrofitted
- Flexibility in the safety concept; selectable redundancy: 2 or 3 times redundant
- Machine design can be maintained
- Quick commissioning, characteristics configurable over the entire measuring range
- Diagnostics LEDs enable optimal overview of every active channel
- Non-contact and wear-free

Model	BTL7 rod
Shock rating	100 g/6 ms as per IEC 60068-2-27
Vibration	12 g, 10 to 2000 Hz as per IEC 60068-2-6
Polarity reversal protected	to 36 V
Surge protected	to 36 V
Dielectric strength	500 V AC (GND to housing)
Degree of protection as per IEC 60529	IP 67
Housing material	Aluminum anodized/protective tube stainless 1.4571, flange stainless 1.4571
Fasteners	Model: TB thread M18×1.5 Model: TZ thread 3/4"-16UNF Model: TT thread M30×1.5 Model: TK connecting flange 18h6 with 6 cheese head screws
Pressure rating with 10.2 mm protective tube	600 bars if installed in a hydraulic cylinder up to 2000 mm in rated length 300 bars if installed in hydraulic cylinder >2000 mm rated length
Pressure rating with 21 mm protective tube	250 bars if installed in hydraulic cylinder up to 2000 mm rated length
Connection type	Connector or cable connection
EMC testing:	
Radio interference emission	EN 55016-2-3 Group 1, Class A and B
Static electricity (ESD)	EN 61000-4-2 Severity level 3
Electromagnetic fields (RFI)	EN 61000-4-3 Severity level 3
Rapid, transient electrical pulses (burst)	IEC 61000-4-4 Severity Level 3
Surge voltage	EN 61000-4-5 Severity level 2
Conducted interference, induced by high-frequency fields	EN 61000-4-6 Severity level 3
Magnetic fields	EN 61000-4-8 Severity level 4
Standard rated lengths [mm]	in 5 mm increments up to 7620 mm or in 1 mm increments on request

Redundant Rod Series
Secure and compact

Properties of Micropulse BTL7-A/C/E/G...TB/TZ/TT/TK

- Non-contact detection of piston position
- Resistant to dirt, IP 67
- Shock and vibration resistant 100 g/12 g
- Absolute output signal
- Measurement lengths 25 to 7620 mm in mm increments
- Flexibly configurable measuring range through PC programming
- Status LED to indicate the operating status
- Temperature range –40 to +85 °C
- 2 or 3 times redundant

Flexible measuring range

The start and end point of the measuring range can be adapted flexibly to the application. The configuration is done by remote function.
The output signal for the position indicator or the movement speed can be set just as conveniently. Existing configured settings can easily be copied redundantly to the remaining measuring channels of the BTL7, if desired.

BTL7-_5_ _-M_ _ _ _-_ _-_ _ _ _

Micropulse transducers

Analog interface
A = Voltage output 0 to 10 V or 10 to 0 V (factory settings)
C = Current output 0 to 20 mA or 20 to 0 mA (factory settings)
E = Current output 4 to 20 mA or 20 to 4 mA (factory settings)
G = Voltage output –10 to 10 V or 10 to –10 V (factory settings)

Output gradient
04 = 1 rising output, configurable
05 = 1 falling output, configurable

Rated length (4-digit)
M = metric values in mm

Rod version, fastener
TB2 = metric mounting thread M18×1.5, O-ring, rod diameter 10.2 mm, 2 times redundant
TZ2 = inch thread 3/4"-16UNF, O-ring, rod diameter 10.2 mm, 2 times redundant
TT2 = metric mounting thread M30×1.5, O-ring, rod diameter 21 mm, 2 times redundant (successor to BTL5-...-T-2)
TK2 = connecting flange 18h6, with 6 cheese head screws, O-ring, rod diameter 10.2 mm, 2 times redundant

TB3 = metric mounting thread M18×1.5, O-ring, rod diameter 10.2 mm, 3 times redundant
TZ3 = inch thread 3/4"-16UNF, O-ring, rod diameter 10.2 mm, 3 times redundant
TT3 = metric mounting thread M30×1.5, O-ring, rod diameter 21 mm, 3 times redundant (successor to BTL5-...-T-3)
TK3 = connecting flange 18h6, with 6 cheese head screws, O-ring, rod diameter 10.2 mm, 3 times redundant

Electrical connection
S32 = 8-pin, M16 plug according to IEC 130-9
S135 = 6-pin, M16 plug according to IEC 130-9
KA05 = 5 m cable, PUR

Please order position encoder/ float separately!

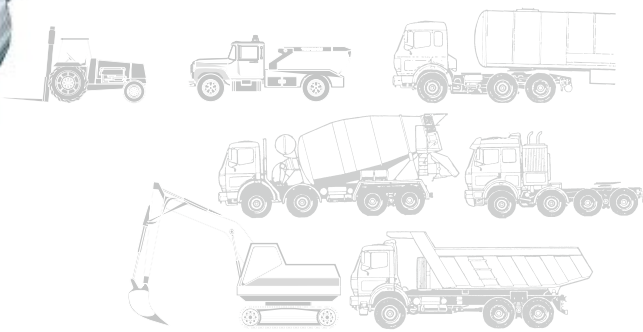
Position encoder
BTL rod

Ordering code	BAM013L	BAM013Y	BAM013J	BAM013R
Part number	BTL-P-1013-4R	BTL-P-1028-15R	BTL-P-1012-4R	BTL-P-1014-2R
Size	Ø32	Ø65	Ø25	Ø21.9

more added value

Clever – the new integrated connector system ZA0 from Balluff
Ideal for hydraulic cylinders with rod eyes, where the Micropulse BTL AR is totally integrated in the cylinder and the hollow-bored piston rod. With the Standard 4-pin M12 connector, the screen connection is via a flange and union nut. An 8-pin M12 version will be available shortly.

Features
- Simple and fast installation that reduces costs
- Small design and integrative to save installation space
- Standard solution for Standard M12 connector
- Degree of protection IP 67
- Prefabricated complete solutions available



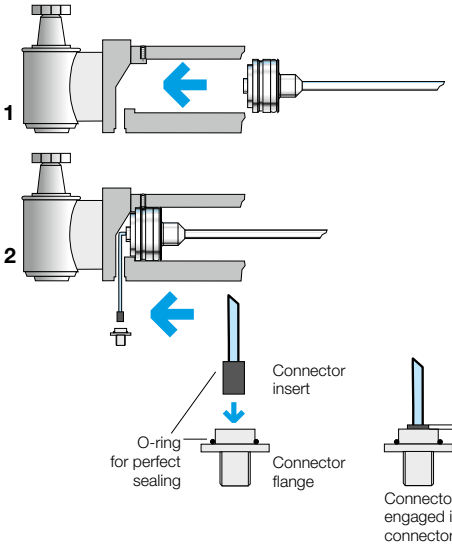
Thermosolar power stations

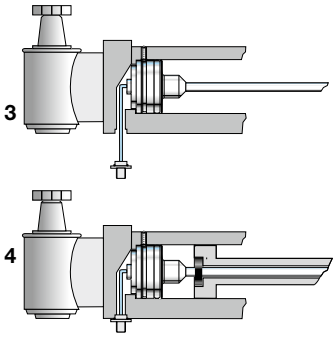
Micropulse Transducers BTL AR ZA0

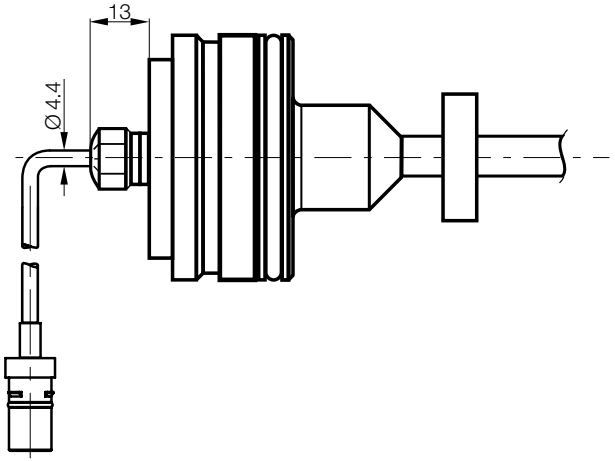
ZA0-M12 integrated connector system, fast and simple installation

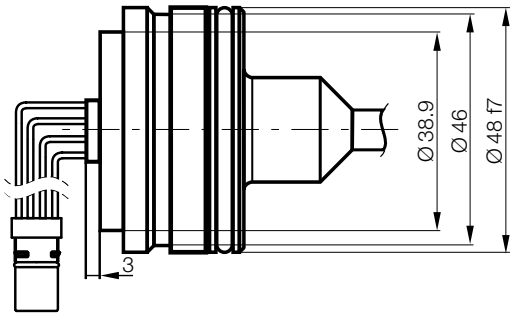
A simple "click" and the IP 67 plug-in connector is ready
Push the distance measurement system Micropulse AR into the hydraulic cylinder. Insert the connector insert into the connector flange (1), let it click (2), secure the connector flange (3) and the IP 67 connector (4) is ready.

Model	
BTL6-A/B/E-...-M...-E-**KA-ZA0**	Connector system for transducers with cable outlet
BTL6-A/B/E-...-M...-E-**LA-ZA0**	Connector system for transducers with strand outlet









Fluid Sensors

Pressure Sensors
Capacitive Sensors for Level Detection
Fork Sensors for Fluid Detection
Micropulse Filling Level Sensor

Pressure Sensors BSP

For a wide variety of applications in factory automation

New

Balluff pressure sensors offer an impressive price/performance ratio and are suitable for a wide variety of applications in factory automation. With their large display and a simple operating concept in accordance with VDMA, they are simple and quick to configure. Additionally, Balluff pressure sensors can be installed flexibly and in a space-saving manner. The display and electrical output can be turned independent of the flange. Other features of these versatile sensors include:

- A compact housing design
- IO-Link
- Local pressure display
- Digital switching outputs
- Analog output signals
- optional –40 °C

11 Pressure variants
33 PNP variants
33 NPN variants
22 Output variants
2 programmable switching points
22 Output variants
1 programmable switching point and analog output 0...10 V DC
22 Output variants
1 programmable switching point and analog output 4...20 mA

+ 66 high-end variants with extended temperature range
= 132 variants of pressure sensors

Refer to our BSP pressure sensor catalog or visit **www.balluff.com** for further information

Pressure ranges		**–1...2 bar, –1...10 bar, 0...2 bar, 0...5 bar, 0...10 bar, 0...20 bar, 0...50 bar, 0...100 bar, 0...250 bar, 0...400 bar, 0...600 bar**
Supply voltage U_B		18...36 V DC
Switching frequency f max.		200 Hz
Accuracy		≤ ±0.5 % FSO BFSL
Temperature error		≤ ±0.3 % FSO/10 K
Ambient/material temperature		**–25…+85 °C/–25...+125 °C optional –40 °C** (in addition to the standard temperature range)
Degree of protection as per IEC 60529		IP 67 (when connected)
Material	Housing	PA 6.6, stainless steel
	Measuring cell	Ceramic
	Seal	Fluoroelastomer
Connection	Connectors	M12 connector, 4-pin
	Process connection	G 1/4"

more added value

11 Pressure variants
33 PNP variants
33 NPN variants
22 Output variants
2 programmable switching points
22 Output variants
1 programmable switching point
and analog output 0...10 V DC
22 Output variants
1 programmable switching point
and analog output 4...20 mA

= 66 variants of flush-mounted pressure sensors

Balluff pressure sensors with a flush-mounted membrane are designed for media in which standard pressure sensors are at their limits. With their flush-mounted, welded stainless steel membrane, the sensors have no dead spaces and can be cleaned particularly well. Due to this, they are excellently suited to pressure measurement in viscous, crystallized or media-containing solids – for example, for:

- Adhesives
- Oils
- Sealant
- Changing media

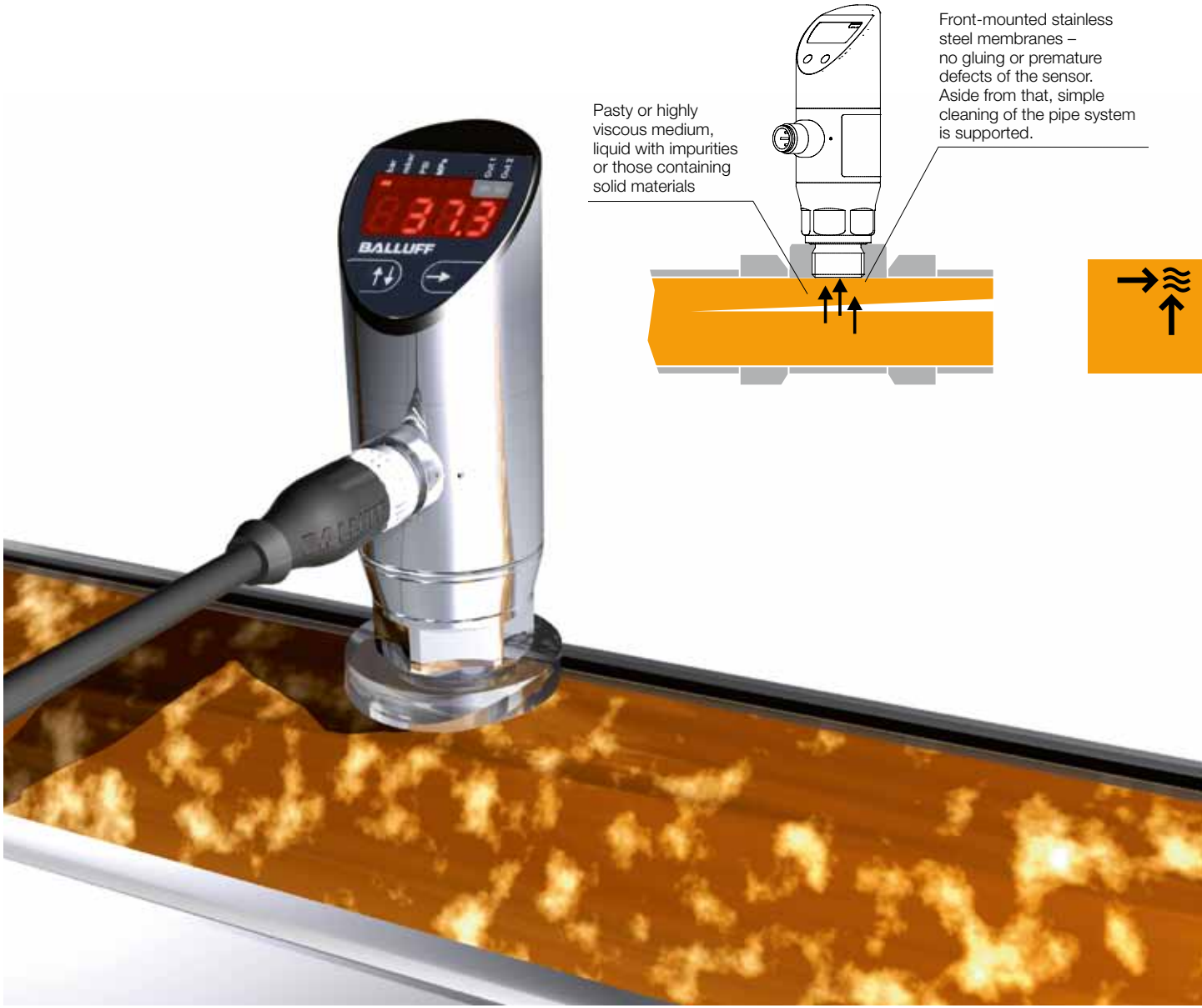
Pressure ranges		**–1...2 bar, –1...10 bar, 0...2 bar, 0...5 bar, 0...10 bar, 0...20 bar, 0...50 bar, 0...100 bar, 0...250 bar, 0...400 bar, 0...600 bar**
Supply voltage U_B		18...36 V DC
Switching frequency f max.		200 Hz
Accuracy		≤ ±0.5 % FSO
Temperature error		≤ ±0,2 % FSO/10 K
Ambient/media temperature		**–40…+85 °C/–40...+125 °C**
Degree of protection as per IEC 60529		IP 67 (when connected)
Material	Housing	PA 6.6, stainless steel
	Membranes	Stainless steel 1.4435
	Seal	Fluoroelastomer
Connection	Connector	M12 connector, 4-pin
	Process connection	G 1/2", flush-mounted

New

Refer to our BSP pressure sensor catalog or visit **www.balluff.com** for further information

Flush-mounted Pressure Sensors BSP

For media at which standard pressure sensors reach their limit



The new capacitive SmartLevel sensors in the Uniflat design detect conductive media through non-metallic container walls with a thickness up to 10 mm extremely reliably. With a well-conceived fastening design, they can be screwed on or secured with cable ties to bypass pipes.

The connection is made using a 2 m connection line or a short pigtail line and an M8 plug. The codable output function provides PNP or NPN and normally open or normally closed functionality.

- No adjustment with standard applications
- Simple cable tie assembly on pipes
- Hides foam and residual material
- Regular cleaning can be omitted

more added value

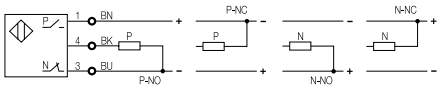
SMARTLEVEL

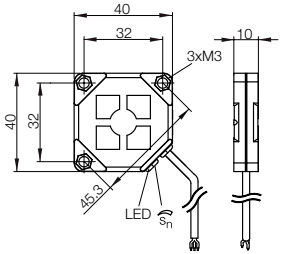
Capacitive Sensors BCS

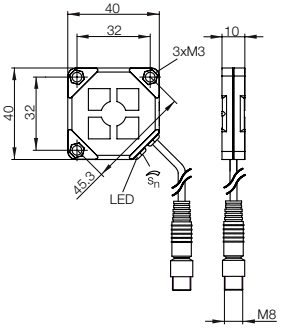
The new 40×40 mm sensor – also available as SmartLevel

Size		**40×40×10 mm** Uniflat	**40×40×10 mm** Uniflat
Installation type		flush	flush
Rated switching distance s_n		**media-dependent**	**media-dependent**
PNP/NPN and normally open/ normally closed cod able	**Ordering code**	**BCS00TP**	
	Part number	BCS Q40BBAA-GPCFAC-EP02	
PNP normally open	**Ordering code**		**BCS00U8**
	Part number		BCS Q40BBAA-PSCFAC-EP00,3-GS49
PNP normally closed	**Ordering code**		**BCS00U7**
	Part number		BCS Q40BBAA-POCFAC-EP00,3-GS49
Supply voltage U_B		10...30 V DC	10...30 V DC
Voltage drop U_d at I_e		2.5 V	2.5 V
Rated insulation voltage U_i		75 V DC	75 V DC
Output current max.		100 mA	100 mA
No-load supply current I_0 max.		11 mA	11 mA
Polarity reversal/short-circuit protected		yes/yes	yes/yes
Ambient temperature T_a		–5...+85 °C	–5...+85 °C
Switching frequency f		10 Hz	10 Hz
Output function/power-on indicator		yes/yes	yes/yes
Degree of protection as per IEC 60529		IP 67	IP 67
Material	Housing	PBT	PBT
	Sensing surface	PBT	PBT
	Cover	PBT	PBT
Connection		2 m PUR cable, 3×0.14 mm²	0.3 m PUR cable with M8 plug, 3-pin

Wiring diagram

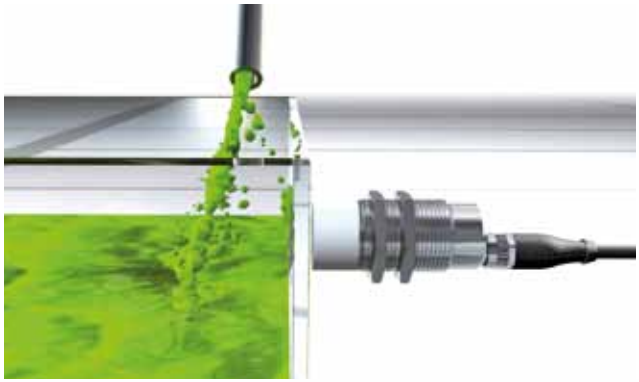




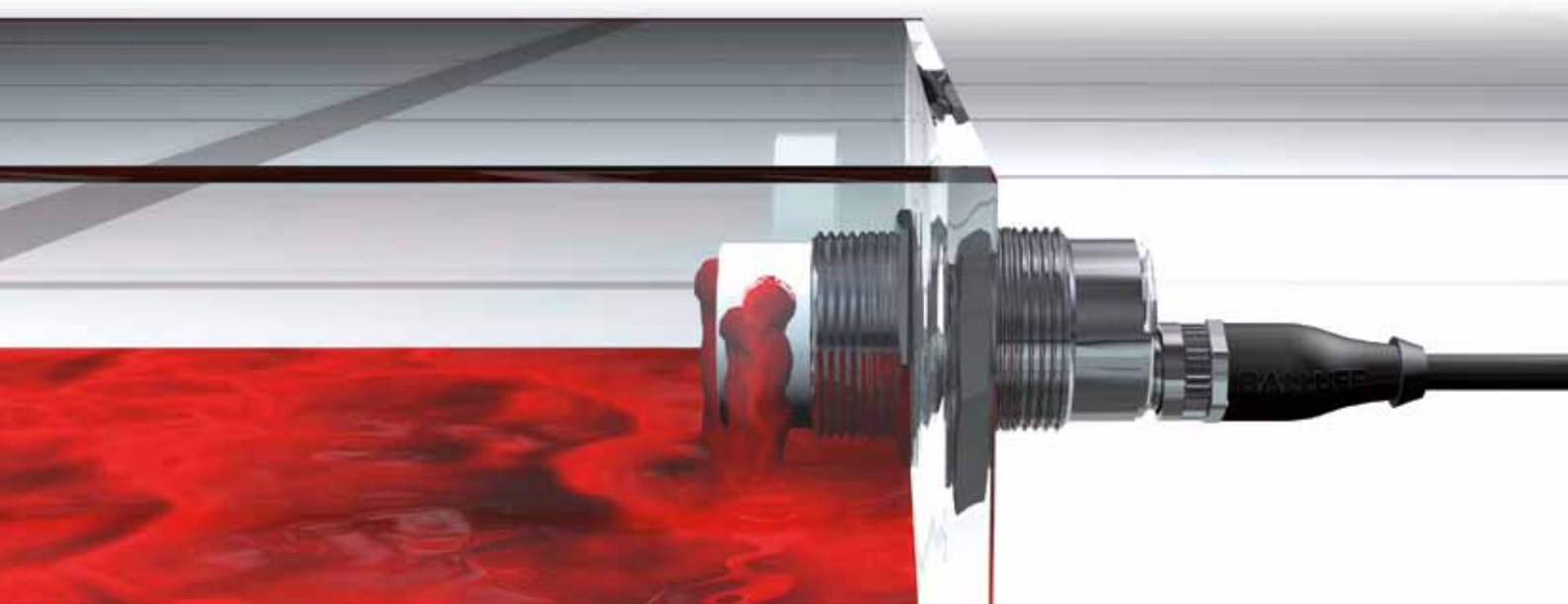


more added value

- Detecting high-conductive acids, such as sulfuric or hydrochloric acid, through plastic or glass containers that are up to 20 mm thick
- Reliable detection of fill levels in food items, such as ketchup or mustard, despite heavy buildup
- Detecting concentrated cleaning agents in plastic containers



Industrial wastewater (depending on conductivity of the medium)		
Disinfectants (media containing chlorine)		
Table salt solution		
Rinsing agents		
Milk/buttermilk/yogurt		
Fruit juice		
Coolant/lubricants		Ketchup/mustard
Formic acid (30 %)		Phosphoric acid (10 %)
Vinegar		Sulfuric acid (10 %)
Cola		Calcium chloride (30 %)
Honey/glue	Blood	Hydrochloric acid (40 %)
Beer	Seawater	Nitric acid (12 %)
SMART*LEVEL* 15 approx. 0.7...15 mS	**SMART***LEVEL* 50 approx. 15...50 mS	**SMART***LEVEL* 500+ approx. 50...500 mS and greater



Capacitive Sensors SMART*LEVEL* 500+

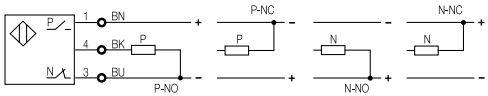
Progress in smart level technology

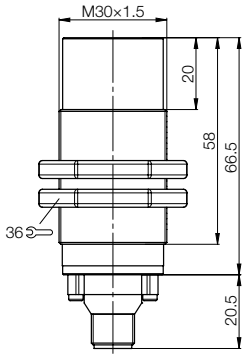
SMART*LEVEL* 500+

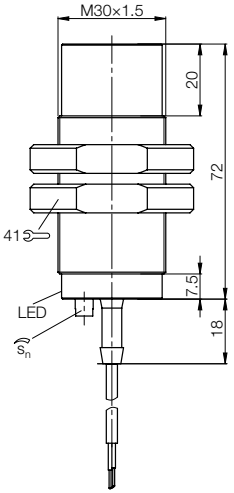
SMART*LEVEL* 500+

Size		**M30×1.5**	**M30×1.5**
Installation type		Non-flush	Non-flush
Rated switching distance s_n		**media-dependent**	**media-dependent**
PNP/NPN and normally open/	**Ordering code**	**BCS00HJ**	**BCS00TZ**
normally closed user codable	Part number	BXS M30T4M3-GPCFVG-S04G	BCS M30TTH2-GPCFVG-AT02
Supply voltage U_B		10...30 V DC	10...30 V DC
Voltage drop U_d at I_e		≤ 2 V	≤ 2 V
Rated insulation voltage U_i		75 V DC	75 V DC
Output current max.		100 mA	100 mA
No-load supply current I_0 max.		< 15 mA	< 15 mA
Polarity reversal/short-circuit protected		yes/yes	yes/yes
Ambient temperature T_a		–10...+60 °C	–10...+60 °C
Switching frequency f		5 Hz	5 Hz
Supply voltage/output function indicator		Green LED/yellow LED	no/red LED
Degree of protection as per IEC 60529		IP 64, connection side IP 67	IP 67
Material	Housing	V2A	PTFE (Teflon)
	Sensing surface	PTFE (Teflon)	PTFE (Teflon)
	Cover	PBT/PE	PTFE (Teflon)
Connection		M12 connector, 4-pin, A-coded	2 m PTFE cable, 3×0.2 mm²

Wiring diagram







more added value

- Detect fluids with a water content > 15 %
- Detection independent of color
- Thin deposits can be masked

Balluff has widened its scope of expertise in through-beam fork sensors by offering sensors for fluid detection. The through-beams with fork openings of 30 mm and 80 mm are suitable for detecting the level of clear, colored or turbid fluids with a water content > 15 % through transparent container walls. Balluff offers a solution for applications where other sensors reach their limits. For example, with this through-beam fork sensor, you can identify hydrous liquids even in small, transparent hoses.

Fork Sensors for Fluid Detection

Reliable level detection through transparent container walls

Ordering code / Part number		BGL003J BGL 30A-011-S49	BGL003K BGL 30A-012-S49	BGL003L BGL 80A-011-S49	BGL003M BGL 80A-012-S49
Switching output	PNP	■		■	
	NPN		■		■
Switching type	NC/NO selectable	■	■	■	■
Connection	M8 connector, 3-pin	■	■	■	■
Fork opening	30 mm	■	■		
	80 mm			■	■
Light type		Infrared			
Switching frequency		2 kHz			
Degree of protection		IP 67			
Housing material		Gd-Zn			
Optical surface		Glass			

For additional information visit our website at **www.balluff.com**

more added value

- Continuously precise measurement in µ range delivers excellent filling results.
- 100 % stainless steel ensures top hygiene standards and long service life.
- International certificate guarantees maximum quality.

Maximum precision for food hygiene – internationally certified

The BTL-SF filling level sensor ensures continuously precise measurement in applications that demand extreme hygiene. Made from corrosion-free stainless steel with excellent surface quality and rounded edges, the sensor meets the highest international hygiene standards and fulfills all strict requirements of the food industry. Take advantage of the best quality directly from the manufacturer.

Other benefits

- Neutral for all liquids
- Compensates for foam to deliver reliable filling level values
- Adjustment-free installation
- Easy to clean in installed state (CIP – Clean in Place)
- For process temperatures up to 130 °C (SIP – Sterilization in Place)
- Standardized interfaces ensure flexible installation
- Internationally certified quality guarantees global marketing and sales of your system
- Rising and falling signal available

ECOLAB

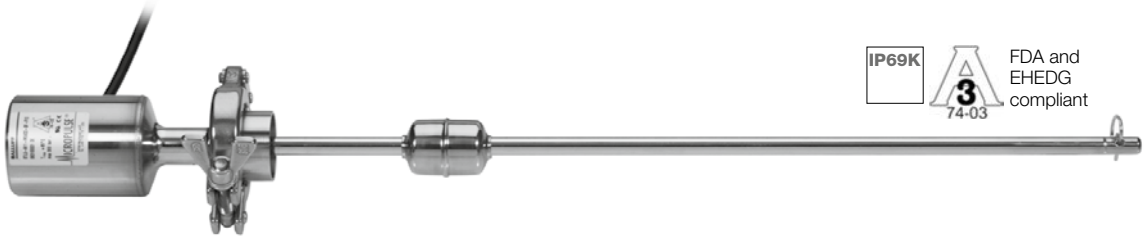
EHEDG

FDA

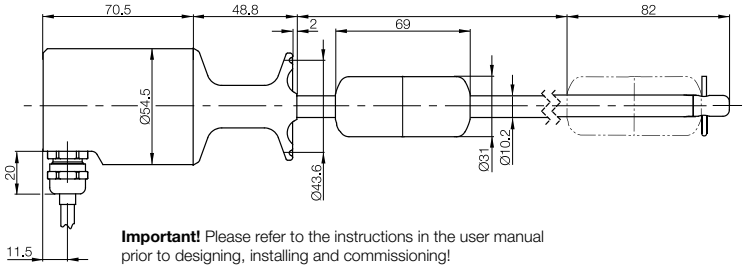
3A 74-03

Micropulse BTL-SF Filling Level Sensor

Maximum precision for foodstuffs and hygiene



Model	BTL5 rod SF
Interface transducer	analog
Interface - customer device	analog
Ordering code	**BTL5-...-M_ _ _ _-SF-F_ _**
Reverse polarity protected	Yes
Overvoltage protected	36 V
Dielectric constant	500 V (GND to housing)
Degree of protection per IEC 60529	IP 67/IP 69K (flange and tube)
Housing material	Stainless steel 1.4404
Flange and tube material	1.4404
Connection	Cable connection
Mounting	1.5" Tri Clamp as per SSI 3A standard 74-03
Pressure rating	300 bar (depending on float)
Standard nominal length (mm)	0025, 0050, 0075, 0100, 0125, 0150, 0175, 0200, 0225, 0250, 0275, 0300, 0325, 0350, 0375, 0400, 0425, 0450, 0475, 0500, 0550, 0600, 0650, 0700, 0750, 0800, 0850, 0900, 0950, 1000, 1100, 1200, 1300, 1400, 1500, 1600, 1700, 1800, 1900, 2000, 2250, 2500 or in 5 mm increments on request

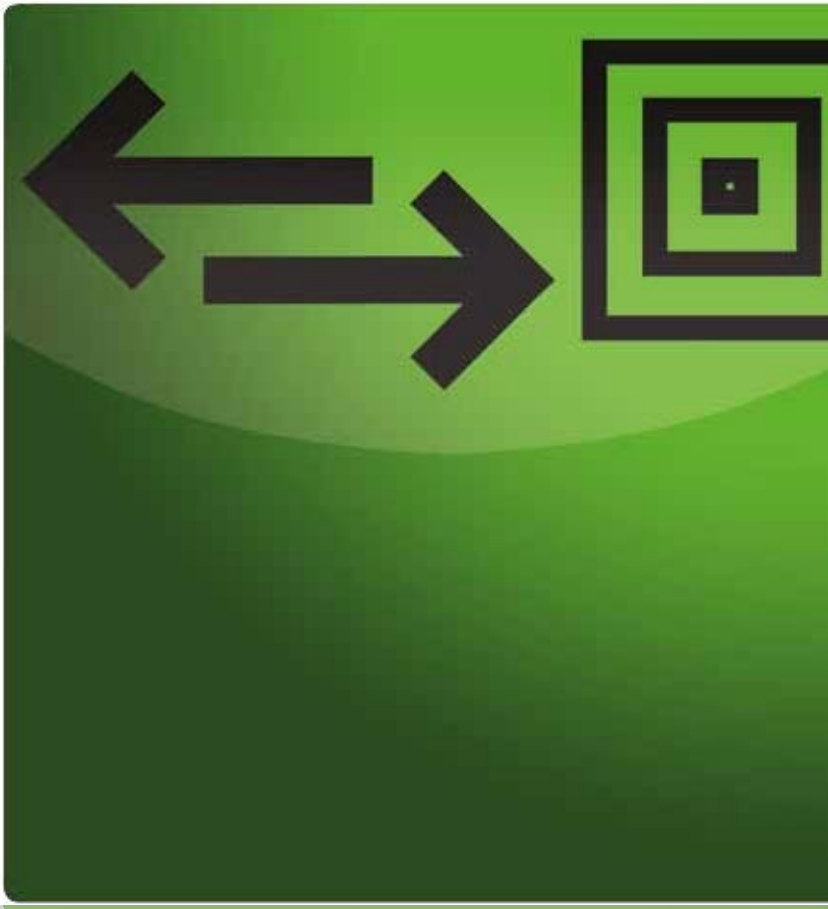


Important! Please refer to the instructions in the user manual prior to designing, installing and commissioning!

Refer to our Micropulse transducer brochures and catalogs or visit **www.balluff.com** for more detailed information

Industrial Identification

Vision Sensors
Industrial RFID Systems



more added value

Inspection and read processes for vision sensors can be impaired by changing ambient light. Simultaneously, employees and technicians are often bothered by the pulsing light of normal vision sensors. But you do not have to have such problems.
Because the BVS-E vision sensor with infrared lighting and integrated light filter prevents this in advance.
Its light is invisible to the human eye, so that it can't bother the operator. And its integrated light filter ensures that most ambient light cannot get in. This increases the read quality and the reliability of the inspection, so that process reliability also increases.

- Invisible light, which does not bother your employees
- Integrated light filter for increased process reliability
- Simple to replace due to fixed integrated lighting, optics and filters
- 10% higher light intensity than comparable red light sensors
- Safe for the eyes, certified for CE (EN 62471:2008)

Series		
Lens, focal length		
PNP, **standard**	**Ordering code**	
	Part number	
PNP, **advanced**	**Ordering code**	
	Part number	
PNP, **identification**	**Ordering code**	
	Part number	
Supply voltage U_B		
Interface		
Configuration interface		
Type detection rate		
Working range		
Working distance, Field of view (horizontal × vertical)		
Lighting		
Eye safety acc. to IEC 62471		
Degree of protection as per IEC 60529		
Connection		

The integrated light filter provides secure code reading: in normal light conditions, …

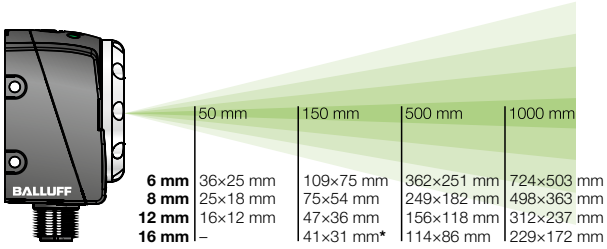
… but also with interference from ambient light. The sensor works reliably, the process reliability is increased.

Vision Sensors BVS-E, Infrared

Invisible – with safety

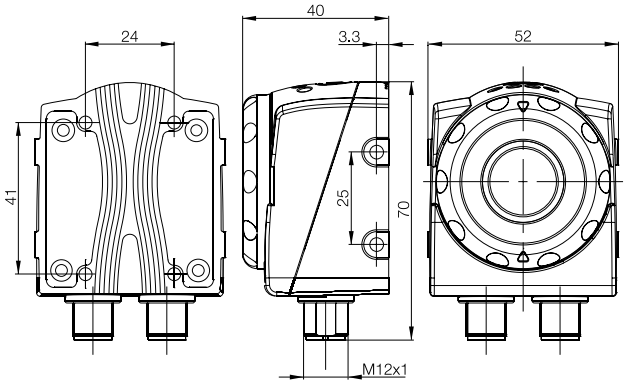
	BVS-E	**BVS-E**	**BVS-E**	**BVS-E**
	Standard lens, **6 mm**	Standard lens, **8 mm**	Telephoto lens, **12 mm**	Telephoto lens, **16 mm**
	BVS0013	**BVS0014**	**BVS0012**	
	BVS OI-3-105-E	BVS OI-3-101-E	BVS OI-3-103-E	
	BVS0016	**BVS0015**	**BVS0017**	**BVS0018**
	BVS OI-3-155-E	BVS OI-3-151-E	BVS OI-3-153-E	BVS OI-3-157-E
	BVS001C	**BVS0019**	**BVS001A**	**BVS001E**
	BVS ID-3-105-E	BVS ID-3-101-E	BVS ID-3-103-E	BVS ID-3-107-E
	24 V DC ±10 %	24 V DC ±10 %	24 V DC ±10 %	24 V DC ±10 %
	RS232 (only identification)	RS232 (only identification)	RS232 (only identification)	RS232 (only identification)
	Ethernet 10/100 Base T	Ethernet 10/100 Base T	Ethernet 10/100 Base T	Ethernet 10/100 Base T
	3...15 Hz (depending on evaluation function)	3...15 Hz (depending on evaluation function)	3...15 Hz (depending on evaluation function)	3...15 Hz (depending on evaluation function)
	50...1000 mm	50...1000 mm	50...1000 mm	180...1000 mm
	50 mm, 36×25 mm / 1000 mm, 724×503 mm	50 mm, 25×18 mm / 1000 mm, 498×363 mm	50 mm, 16×12 mm / 1000 mm, 312×237 mm	180 mm, 41×31 mm / 1000 mm, 229×172 mm
	LED (Infrared), can be disengaged	LED (Infrared), can be disengaged	LED (Infrared), can be disengaged	LED (Infrared), can be disengaged
	Free group	Free group	Free group	Free group
	IP 54	IP 54	IP 54	IP 54
	2× M12 connectors (8 and 4 pin)	2× M12 connectors (8 and 4 pin)	2× M12 connectors (8 and 4 pin)	2× M12 connectors (8 and 4 pin)

To define the field of view and working distance, use the distance calculator at:
www.balluff.com/vision



	50 mm	150 mm	500 mm	1000 mm
6 mm	36×25 mm	109×75 mm	362×251 mm	724×503 mm
8 mm	25×18 mm	75×54 mm	249×182 mm	498×363 mm
12 mm	16×12 mm	47×36 mm	156×118 mm	312×237 mm
16 mm	–	41×31 mm*	114×86 mm	229×172 mm

***** Working range 180 to 1000 mm



more added value

Check the marking on your products. Regardless of whether you label them with 1D codes (bar codes) or 2D codes (data Matrix codes), the BVS reads all common codes on the market. Text and sequences of numbers such as code plain text can be verified using OCV. The result: "*Inspection OK*" or "*Inspection not OK*".
If you need to view the read code data to find out which parts are being processed, you can output it via the RS232 or Ethernet interface.

- Simple operation
- Read several codes in an inspection simultaneously
- Output code data via RS232 or Ethernet interface
- Verify character strings
- Codes readable in any position
- Extensive range of accessories
- Function module for PLC available as of November

Readable bar codes
– Interleaved 2-of-5
– Code 39
– Code 128
– Pharmacode
– Codabar
– EAN 8
– EAN 13
– UPC-E
– PDF 417

Readable Data Matrix codes
– ECC 200

ePLAN

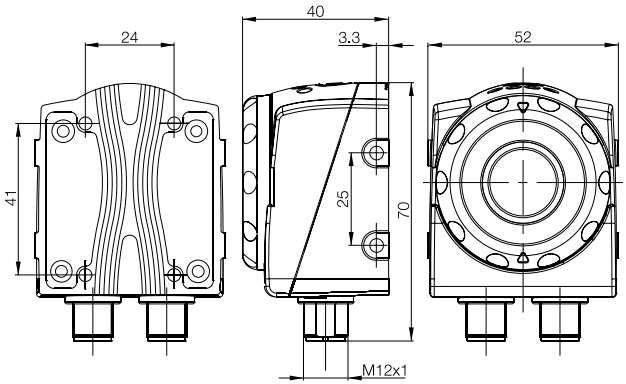
EPLAN macros – Electrical project planning made easy. Also for the BVS!

Vision Sensors BVS-E Identification

Detecting and identifying varied codes

Series		BVS-E Identification	BVS-E Identification	BVS-E Identification
Lens, focal length		Standard lens, **8 mm**	Telephoto lens, **12 mm**	Telephoto lens, **16 mm**
PNP	**Ordering code**	**BVS0001**	**BVS000T**	**BVS000Y**
	Part number	BVS ID-3-001-E	BVS ID-3-003-E	BVS ID-3-007-E
Supply voltage U_B		24 V DC ±10 %	24 V DC ±10 %	24 V DC ±10 %
Switching inputs		1× Trigger, 1× Select	1× Trigger, 1× Select	1× Trigger, 1× Select
Switching outputs		1× lighting synchron., 1× PNP	1× lighting synchron., 1× PNP	1× lighting synchron., 1× PNP
Interface		RS232	RS232	RS232
Configuration interface		Ethernet 10/100 Base T	Ethernet 10/100 Base T	Ethernet 10/100 Base T
Typ. detection rate		3...15 Hz (depending on evaluation function)	3...15 Hz (depending on evaluation function)	3...15 Hz (depending on evaluation function)
Working range		50...1000 mm	50...1000 mm	150...1000 mm
Working distance, Field of view (horizontal×vertical)		50 mm, 25×18 mm / 1000 mm, 500×360 mm	50 mm, 16×12 mm / 1000 mm, 312×237 mm	150 mm, 34×26 mm / 1000 mm, 229×172 mm
Illumination		LED, incident light (red), deselectable	LED, incident light (red), deselectable	LED, incident light (red), deselectable
Eye safety per IEC 62471		Free group	Free group	Free group
Connection		2 connectors M12 (8- and 4-pin)	2 connectors M12 (8- and 4-pin)	2 connectors M12 (8- and 4-pin)
Degree of protection per IEC 60529		IP 54	IP 54	IP 54

To define the field of view and working distance, use the distance calculator at: **www.balluff.com/vision**



Balluff Added-Value Kits (BAV) contain a Vision Sensor, mounting bracket, installation accessories, connector, software CD and operating instructions. **For more information, see page 126.**

more added value

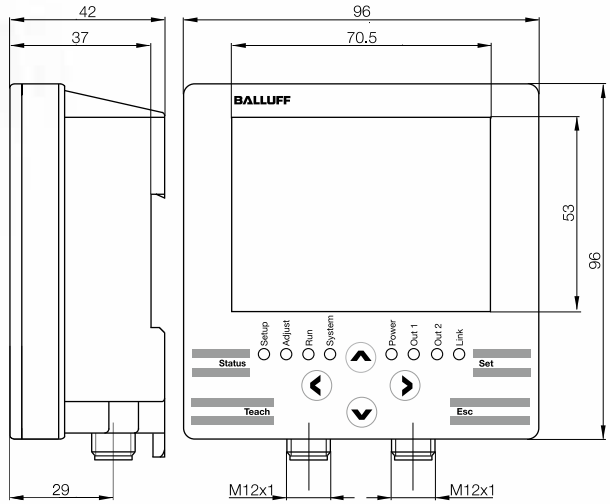
- Simple, self-explanatory operation
- Can be retrofitted on all existing sensors
- Clearly arranged presentation of process statistics and sensor results
- Access for operators, setters and administrators can be controlled by passwords
- Memory for 20 inspections
- Connection to sensor via direct link or network (TCP/IP)

Do you want to see what the sensor sees? You wish to increase your inspection quality with the use of statistical values? And to simply adapt your inspection to changes in components? We have a simple solution: the Vision Sensor Monitor.
It visualizes the sensor images and inspection results and displays the process statistics in a simple overview graphic. The detection of unwanted deviations thus becomes really simple. If an inspection feature changes, such as a sell-by date, authorized users can then adapt the inspection criteria even without a PC. Lengthy setting work is therefore no longer necessary. The monitor allows simple switching between two inspections. The easy-to-use, intuitive user interface of the monitor can be controlled by operating buttons and is available in multiple languages.

Vision Sensor Monitor BVS-E

See what the sensor sees

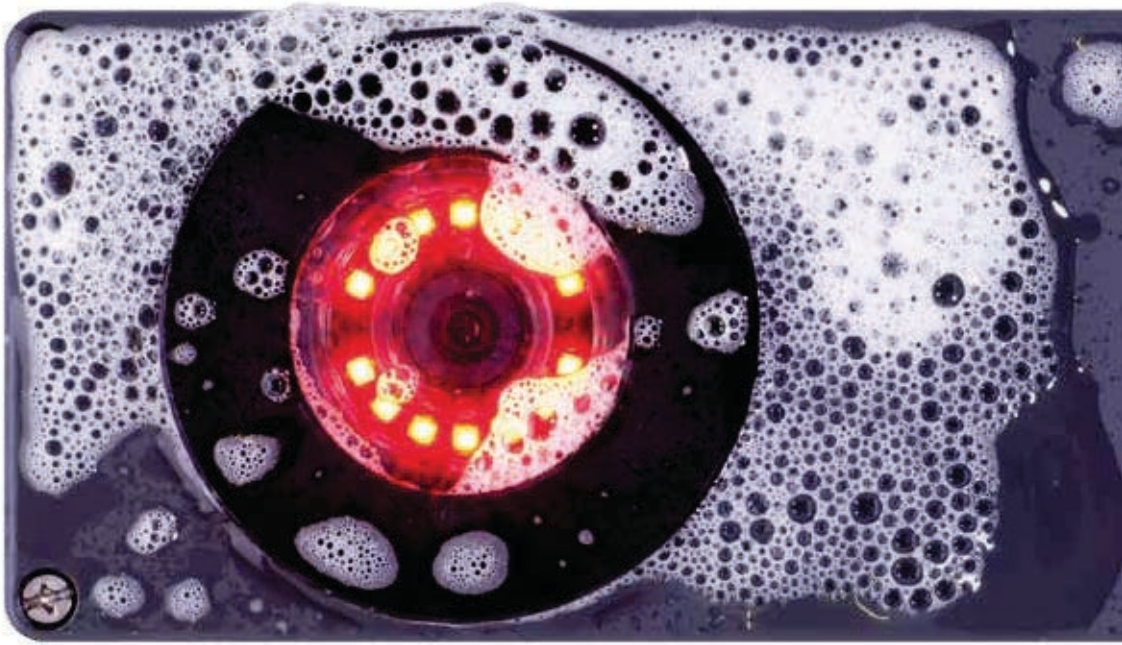
Model		Vision Sensor Monitor
Type		BVS-E
PNP	**Ordering code**	**BAE00EH**
	Part number	BAE PD-VS-002-E
Supply voltage U_B		24 V DC ±10 %
Dimensions		96×96×42.4 mm
Connection		2× M12 connector, 4-pin
Degree of protection per IEC 60529		IP 40
Ambient temperature T_a		–10...+55 mm
Display		3.5“ color LCD



Available accessories:

- 2 m connecting cable
  BCC M415-0000-1A-004-PX0334-020 **Ordering code: BCC030A**
- 5 m connecting cable
  BCC M415-0000-1A-004-PX0334-050 **Ordering code: BCC030C**
- 2 m connecting cable, monitor/sensor
  BCC M415-M415-5D-687-ES64N8-020 **Ordering code: BCC0ANA**
- 5 m connecting cable, monitor/sensor
  BCC M415-M415-5D-687-ES64N8-050 **Ordering code: BCC0ANC**
- 5 m Ethernet cable, monitor/RJ45
  BKS-AD-05-RJ45/GS180-05 **Ordering code: BCC02H1**
- 10 m Ethernet cable, monitor/RJ45
  BKS-AD-05-RJ45/GS180-10 **Ordering code: BCC02H2**
- Monitor protective housing
  BAM PC-AE-002-1 **Ordering code: BAM01A8**


BALLUFF
VISION SENSOR IP67+
BALLUFF
VISION SENSOR IP67+



Degree of Protection IP 67+, Inexpensive Retrofit

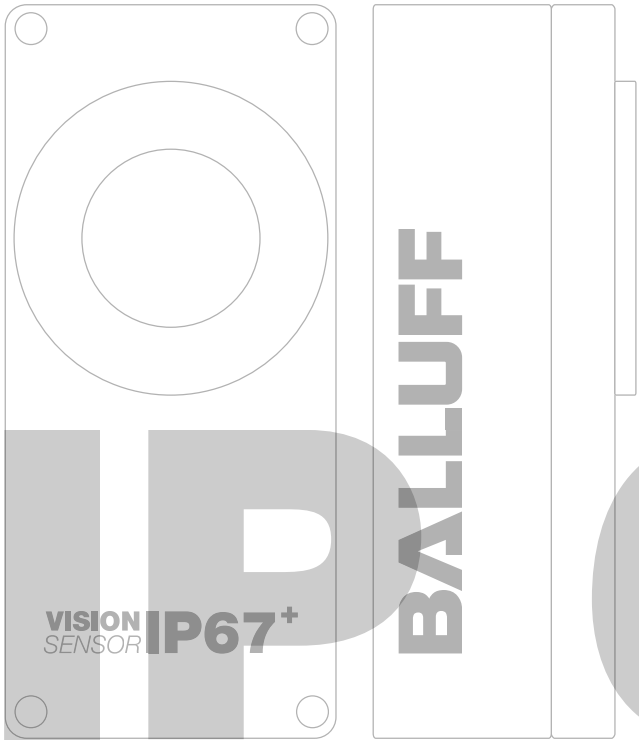
Optional housing for Vision Sensors BVS

- Rugged housing
- Degree of protection IP 67+
- Flexible handling
- Simply assembly and mounting
- Full range of sensor functions
- Inexpensive acquisition

more added value

Balluff now provides an optional housing for splash water areas and other problematic environments for all sensors in the Vision Sensor family. With its IP 67+ protection, it also provides safe protection during long-term use in harsh environments. With a few simple hand movements, the sensor is easily integrated in the robust housing and then mounted on a machine or system. All functions are then available as usual without any loss.

Description	Protective housing BAM for Vision Sensors BVS
Ordering code	**BAM01RR**
Part number	BAM PC-VS-008-1
Dimensions	175×80×62 mm
Mounting	M4 screws (163×52 mm)
Connection	Screwed cable gland M25×1.5 (1× Ø 5 mm, 1× Ø 6 mm)
Degree of protection per IEC 60529	IP 67
Housing material	Cast aluminum, lacquered
Optical surface	Anti-reflective glass



IP67+

more added value

Ever experienced this? You ordered the Vision Sensor BVS with connecting cable. During initial operation, however, you determine that the parameterization cables and mounting brackets are still missing.
This is why we have integrated the Vision Sensor BVS with accessories for you in a package. You only have to order one item and you have everything you need to operate the sensor.
An Added-Value Kit contains a Vision Sensor in a design of your choice, including software CD and operating instructions, mounting bracket and installation accessories, supply and parameterization cables, which means you only have to connect a 24-V power supply unit. If you do not happen to have a power supply unit, needless to say we can also supply you with one.

Balluff Added-Value Kits for Vision Sensors BVS

Sensors and accessories – neatly packed

BAVKIT

	Description		Added-Value Kit with Vision Sensor BVS
STD	**Standard** series with **6-mm** lens	**Ordering code**	**SET00WC**
	(contains the sensor BVS OI-3-005-E)	Part number	BAV BP-PP-00022-01
	Standard series with **8-mm** lens	**Ordering code**	**SET00W9**
	(contains the sensor BVS OI-3-001-E)	Part number	BAV BP-PP-00020-01
	Standard series with **12-mm** lens	**Ordering code**	**SET00WA**
	(contains the sensor BVS OI-3-003-E)	Part number	BAV BP-PP-00021-01
ADV	**Advanced** series with **6-mm** lens	**Ordering code**	**SET00WH**
	(contains the sensor BVS OI-3-055-E)	Part number	BAV BP-PP-00025-01
	Advanced series with **8-mm** lens	**Ordering code**	**SET00WE**
	(contains the sensor BVS OI-3-051-E)	Part number	BAV BP-PP-00023-01
	Advanced series with **12-mm** lens	**Ordering code**	**SET00WF**
	(contains the sensor BVS OI-3-053-E)	Part number	BAV BP-PP-00024-01
	Advanced series with **16-mm** lens	**Ordering code**	**SET00WJ**
	(contains the sensor BVS OI-3-057-E)	Part number	BAV BP-PP-00026-01
ID	**Identification** series with **8-mm** lens	**Ordering code**	**SET00W6**
	(contains the sensor BVS ID-3-001-E)	Part number	BAV BP-PP-00017-01
	Identification series with **12-mm** lens	**Ordering code**	**SET00W7**
	(contains the sensor BVS ID-3-003-E)	Part number	BAV BP-PP-00018-01
	Identification series with **16-mm** lens	**Ordering code**	**SET00W8**
	(contains the sensor BVS ID-3-007-E)	Part number	BAV BP-PP-00019-01
	Contents		Vision sensor, mounting bracket, installation accessories, connector, software CD and operating instructions

Coaxial Lighting

For highly reflective surfaces

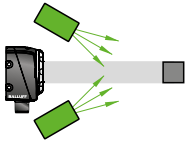
New

more added value

- Long service life
- Homogeneous lighting
- Higher standard of quality
- Energy-saving LED technology

Coaxial lighting is the optimal solution for lighting strongly reflective surfaces. Therefore, coaxial lighting is well suited for transmitted light inspections of colored materials and for inspections of printed or dirty surfaces. They are low maintenance, industrially sound and thus can be integrated with low effort.

Series	Coaxial lighting, red light	Coaxial lighting, red light
Ordering code	**BAE00J9**	**BAE00JA**
Part number	BAE LX-VS-OR50	BAE LX-VS-OR100
Supply voltage U_B	24 V DC	24 V DC
Operating current	218 mA	600 mA
Light field size	50×50 mm	100×100 mm
Emitter, light type	LED, red light	LED, red light
Wavelength	630 nm	630 nm
Dimensions	106×67×57 mm	150×108×110 mm
Connection	M8, 2-pin	M8, 2-pin
Housing material	Anodized aluminum	Anodized aluminum
Weight	450 g	1500 g
Degree of protection as per IEC 60529	IP 54	IP 54
Polarity reversal protected	yes	yes
Short-circuit protected	yes	yes
Ambient temperature range T_a	–10…+55 °C	–10…+55 °C
Storage temperature range	–25…+75 °C	–25…+75 °C



Coaxial lighting is used if the industrial image processing requires diffused light to, for example, homogeneously illuminate highly reflective surfaces and prevent reflection.

New

more added value

3D sensor holder with quick-change plate
The 3D sensor holder with quick-change plate for industrial image processing from Balluff is a novelty on the market. Originally conceived for vision sensors, the multi-talent can also hold other sensors of similar size. To do so, you only have to exchange the sensor-specific change plate. The first holders are already successfully in use in the automotive industry.

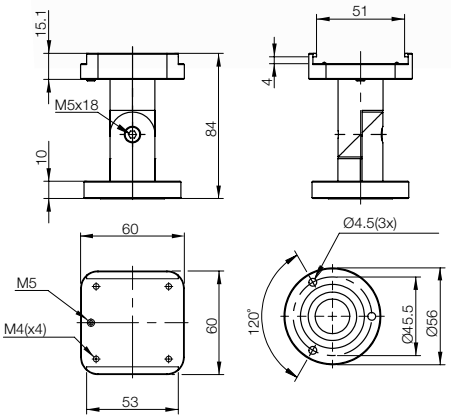
The robust holder made of anodized aluminum has three independent axes of rotation, which can be used to set any desired solid angle and thereby precisely align the sensor. The special attraction is that the position is maintained even if the sensor is exchanged or temporarily removed from the system for a cleaning procedure. That helps minimize downtimes. It is enough to remove the sensor with the quick-change plate from the holder. An optionally used safety screw provides protection from tampering as needed. Without the correct tool, the sensor cannot be removed.

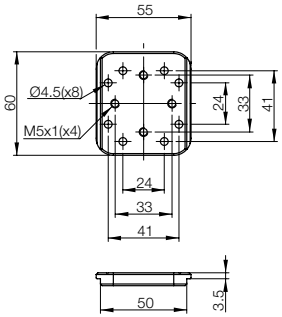
The industry-sound holder made of anodized aluminum draws attention with its particularly simple and practical handling. Thus the holder fits not only on nearly all common installation profiles, such as from item and Bosch, etc., but it can also be fastened directly to machine frames, to a worktop, or, even to a pallet with three holes. Because the user can install foot, plate and holders separately, they have a lot of freedom for design. Particularly enjoyable: This holder is also still fully compatible with universal Balluff BMS Installation System, with which nearly every mounting task can be handled with a few standard elements to be solved flexibly. The holder and change plate can be purchased separately from the manufacturer.

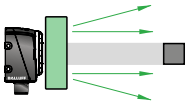
Special properties:
- Quick selection
- Exact alignment
- Stable, robust holder systems
- Simple handling

3D Holder System

With unique quick-change plate







Description	3D holder system
Use	Holder for quick-change plate
Ordering code	**BAM01YT**
Part number	BMS CUJ-M-S25-D045-00
Material	Anodized aluminum

Description	Quick-change plate
Use	3D holder system for BUS
Ordering code	**BAM01YP**
Part number	BMS CS-M-S25-DX15-00
Material	Anodized aluminum

Background lighting: With the through beam method, the background lighting is positioned behind the object you wish to detect. The Vision Sensor only detects the outline of the object based on this position. Partial measurements or sizes can be well checked in this manner. Ambient light also presents no problems. Changes to the surface (markings, color, etc.) can be suppressed almost completely and have no influence on the test result.
Our background lights are particularly bright and versatile. They are also very suitable as diffuse incident lights to illuminate highly reflective components. Due to the extremely flat design, they are ideal for use in applications with limited space.

Spotlights with IP 67 Protection

Can be used universally – red light and infrared

more added value

Special properties:

- IP 67 degree of protection
- Versatile in application and can be used universally
- Energy-saving LED technology
- Red light and infrared variants available
- Space-saving M18 and M30 designs
- Precision illumination, even from a great distance

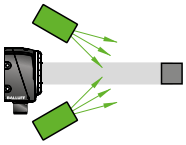
The requirements are particularly demanding if the operational environment is particularly harsh. Spotlights in the housing with the IP 67 form of protection, which Balluff is the first to offer, are the right lights for the job. The extremely robust versions in the space-saving sizes M18 and M30 are also characterized not only by their low power consumption but also by their powerful and evenly distributed light spot in red light and infrared variants.

CE

Series	M18 spotlight, Infrared	M30 spotlight, Infrared
Ordering code	**BAE00H1**	**BAE00H2**
Part number	BAE LX-VS-SI018	BAE LX-VS-SI030
Supply voltage U_B	24 V DC	24 V DC
Operating current	85 mA	115 mA
Light field size	Ø 18 mm	Ø 30 mm
Emitter, light type	LED, infrared	LED, infrared
Wavelength	850 nm	850 nm
Dimension	M18×75 mm	M30×64 mm
Connection	M12 connector, 4-pin	M12 connector, 4-pin
Housing material	V2A	V2A
Weight	65 g	90 g
Degree of protection as per IEC 60529	IP 67	IP 67
Polarity reversal protected	yes	yes
Short-circuit protected	yes	yes
Ambient temperature range T_a	–10…+55 °C	–10…+55 °C
Storage temperature range	–25…+75 °C	–25…+75 °C

New

Spotlight: A spotlight is perfect for the precision illumination of specific areas. Greater inspection distances can be implemented if a spotlight is used. Unlike ring lights, spotlights can be attached in any position. You can swivel the light towards the area that you wish to illuminate.

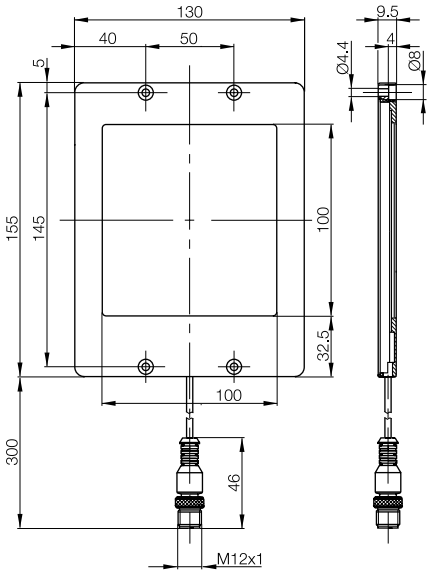


more added value

Special properties:

- Powerful LEDs
- IP 69K
- 24 V DC supply voltage, trigger
- Extremely flat design, low space requirements
- Easy assembly

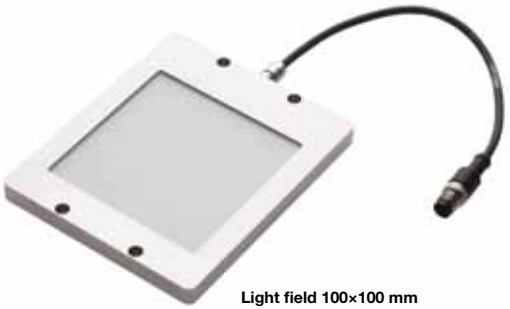
The new surface illuminator in the high form of protection IP 69K is designed for difficult environments. Absolute water and dust density withstands even the highest loads of rough day-to-day work. In this way, the background lighting not only is particularly corrosion-resistant and has a long lifetime, it can also be used in hygienic areas with their special requirements, because it is suited for high pressure cleaners.
Its powerful LEDs are of high quality and provide for an intense and uniform field of illumination. The new lights also extend the already available vision sensor accessories for difficult environments perfectly. These are, for example, a sensor housing in IP 67+ degree of protection and a 24 V DC power pack in IP 67.
Background lighting is suited for transmitted light methods or a diffuse lighting of objects. If you position them behind the object to be detected, the contours of the object are displayed in sharp focus. Partial measurements or sizes can be well checked in this manner.



Extremely Flat Background Lighting in IP 69K

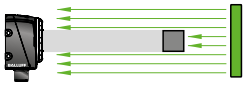
The correct light even in harsh environments

New



Light field 100×100 mm

Series	BAE LX-VS
Style	Background lighting, red light
Ordering code	**BAE00JF**
Part number	BAE LX-VS-HR100-E
Supply voltage U_B	18 to 30 V DC
Operating current	400 mA
Light field size	100×100 mm
Emitter, light type	LED, red light
Wavelength	617 nm
Dimension	155×130×9.5 mm
Fasteners	M4 screws
Connection	M12 connector, 4-pin
Housing material	V2A
Optical surface	Glass
Degree of protection as per IEC 60529	IP 69K
Polarity reversal protected	yes
Short-circuit protected	yes
Ambient temperature range T_a	–10...+55°C
Storage temperature range	–25...+75 °C



Background lighting: With the through beam method, the background lighting is positioned behind the object you wish to detect. The Vision Sensor only detects the outline of the object based on this position. Part dimensions or shapes can in this manner be checked very well. Extraneous light also poses no problems. Changes in the surface (markings, color, etc.) can be suppressed almost completely and have no influence on the test result.
Our background lights are particularly bright and versatile. They are also very suitable as diffuse incident lights to illuminate highly reflective components, for example. Due to the extremely flat design, they are ideal for use in applications with limited space.

more added value

Modern production technologies with smaller batch sizes and ever shorter production cycle times require unambiguous recognition and matching of the produced parts. In response, various systems for industrial identification such as bar codes have been developed. These are inexpensive, but wear quickly. In addition, they are inherently read-only and hold a limited amount of data.

Far greater flexibility is provided by industrial RFID, inductive identification systems with read and write capability for ensuring the most current data in every single process segment. Balluff Industrial RFID BIS reliably process large quantities of data without making visual contact.

Unlimited read/write cycles ensure flexible, rapid, contact-free communication even for the transfer of large data quantities in highly dynamic applications. Our wear-free BIS are easy to integrate in all types of controllers.

Economical Balluff identification systems are able to manage the large volumes of information required in modern-day production plants and make sure your data is transferred to the right place at the right time. All the relevant production and quality data can be acquired and recalled at any time: for optimized production processes and maximum production reliability. Profit from the advantages of Balluff Industrial RFID and benefit from more than 25 years of Balluff RFID expertise. Simply select from the product range according to your application requirements.

Benefits

- **Quick, flexible non-contact data communication without visual contact**
- **Industrial strength in any environment**
- **High-performance, cost-effective**

Why RFID from Balluff?

Comprehensive system expertise – many years of experience

More than 25 years of experience with Industrial RFID –
make use of our knowledge and expertise.

Extensive product portfolio: LF-HF-UHF
the right solution for every application.

No experiments –
benefit from our application experience.

Project support from A...Z –
your solution from a single source.

Service whenever you need it –
you can rely on us.

Global presence – short channels –
ensure rapid availability on a global scale.

Functional and operational reliability –
certified products safeguard your investment.

High degree of acceptance on the market –
trust the market leader in tool identification.

Flexible: solution competence –
your ideas are our motivation.

We are complete providers –
Industrial RFID is just one of our many product ranges.

More than just components –
trained integrators create solutions for you.

See the Industrial Identification brochure for a large selection of products.
For additional information, visit **www.balluff.com/industrial-rfid**

BALLUFF
SYSTEM INTEGRATION PARTNER

more added value

- Everything from a single source
- Certified partners – assured quality
- Benefit from our experience

Analysis
Integration
Planning
Documentation
Design/Development
Service

Optimal Integration of Industrial RFID Systems

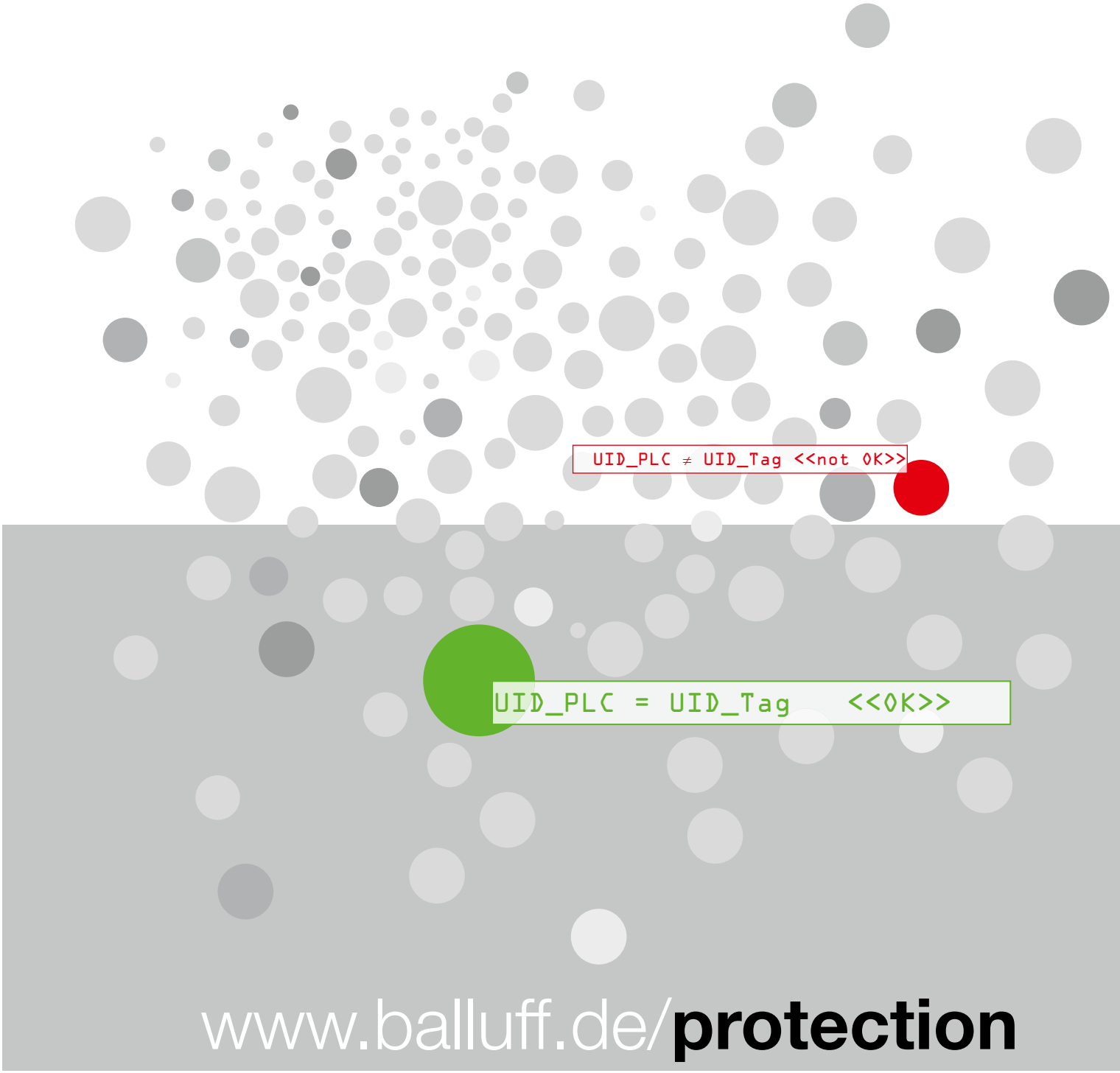
Take advantage of our competent system integration partners

You would like to optimize your system and manufacturing processes with Balluff industrial RFID systems? Just take advantage of the knowledge of our qualified, specially trained integration partners.

Our partners will gladly provide support for:
– Integrating software in PLC or CNC systems
– Integrating hardware in systems and machines
– Retrofitting and modernizing existing systems
– Connecting with higher-level systems and networks
– Creating customer-specific user interfaces

More detailed information is available directly via the websites of our integration partners or simply contact us under the following address: **tecsupport@balluff.de**

BALLUFF
sensors worldwide
RFID SYSTEM INTEGRATION PARTNER


UID_PLC ≠ UID_Tag <<not OK>>
UID_PLC = UID_Tag <<OK>>
www.balluff.de/protection

Protecting Products and Know-how

Balluff is there

more added value

Product piracy is a significant threat to the innovation force and competitiveness of the capital goods industry. According to a VDMA survey from 2008, product piracy already affects two-thirds of the more than 3000 member companies. Today, aggregates, modules and even complete machines are being copied. This is reason enough for Balluff to actively participate in the "Product and know-how protection" working group of the VDMA.

For companies, the product piracy leads to a violation of patent and brand rights and to the loss of their good image. This is frequently accompanied by an enormous price pressure on the original. At the end of the day, it not only costs companies a lot of money, but it also threatens jobs.

Only a holistic approach that includes the areas technology, product, information, process and rights, can lead to a solution. Especially with respect to technologies and products, industrial RFID components from Balluff can be an important tool in identifying the original and tracking its further path.

- Recognizing piracy
- Securing quality
- Protecting your know-how

Applications

The use of RFID allows storing data directly at the object. This allows not only the identification of pirated copies, but also automating setup routines and increasing machine availability. By identifying security and quality-relevant parts, RFID supports you in securing your quality and ensuring security within the process. We will gladly show you the options that are relevant to you – contact us!

■ www.balluff.de/**protection**
We will gladly demonstrate how you can protect your products and your know-how using RFID – just send us an e-mail: **protection@balluff.de**

reddot design award
winner 2012

BIS V Industrial RFID System

The new generation for more efficiency

The variable system for intelligence in a small space: connect up to four read/write heads to one evaluation unit
Make quick, contactless data communication noticeably more efficient with Industrial RFID BIS V from Balluff. Only BIS V from Balluff combines RFID and sensors. BIS V, along with the four antenna channels, has an integrated IO-Link master with the latest version, 1.1. The four antenna channels work completely independently of each other. This saves costs, as fewer evaluation units are needed. Through the IO-Link master you have a node for additional information available, so that you can connect further sensors and/or actuators directly and can create a simple network structure.

The high performance BIS V offers maximum convenience. Display and status LEDs support ease of use. And through its USB service interface, standard hardware, like a PC, is easy to connect.
All connections are easily accessible and completely pluggable.

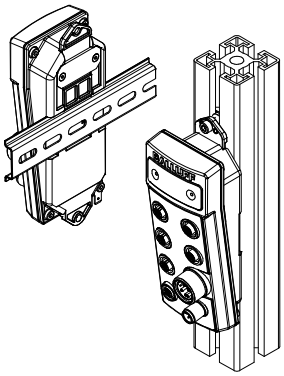
- Function indicator: each read/write head connection has two LEDs for the status and operating state
- Eight monochrome LEDs show the bus status
- LCD indicators with control buttons: setting and displaying the Profibus address and displaying read data carrier UIDs
- USB connection: for fast commissioning without bus connection (reading and writing data carriers), update/upgrade of the evaluation unit or the read/write heads and calling up the operating menu as a PDF file
- Intelligent power plug for saving parameters on site
- Simple mounting on top-hat rails or extruded profiles

Typical applications for the combination of RFID evaluation units and sensors include identification tasks for material flow control in production systems, for conveyor systems in mechanical engineering, in assembly lines and electric suspension systems or in the entire field of intralogistics.

BIS V Industrial RFID System

The new generation for more efficiency

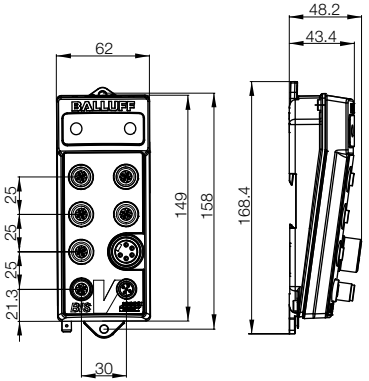
Description		BIS V RFID evaluation unit
Profibus	**Ordering code**	**BIS00T3**
	Part number	BIS V-6102-019-C001
EtherCAT	**Ordering code**	**in preparation**
	Part number	BIS V-6110-063-C002
Power supply		24 V DC ±10 % LPS Class 2
Residual ripple		≤ 10 %
Power supply		≤ 2 A
Ambient temperature T_a		0...+60 °C
Degree of protection as per IEC 60529		IP 65
Housing material		Cast zinc
Weight		800 g
Connection H1 - H4		M12 socket, 5-pin, A-coded
Power connection		7/8" plug, 5-pin
Application interface		IO-Link 1.1, USB 2.0
Application with read/write heads		BIS VM-3… and BIS VL-3…



CC link and **EtherNet/IP** will be available as additional interfaces in the second half of 2012.

The compact EMC-protected metal housing with small dimensions (170×60×40 mm) is perfectly integrated and simple to mount. In control cabinets or in the field up to IP 65, on a top-hat rail, or on a profile.

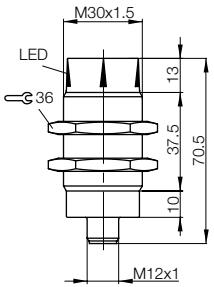
The BIS V industrial RFID system was developed and qualified according to the principles of GAMP® 5.
You can obtain more detailed information upon request at **rfidpharma@balluff.com**

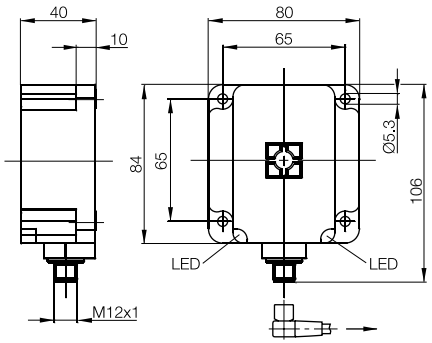


Description	HF read/write head BIS VM	HF read/write head BIS VM	HF read/write head BIS VM
Dimensions	**M30×1.5**	**80×80×40 mm**	**80×80×40 mm**
Mounting in steel	non-flush	non-flush	non-flush
Antenna type	round	round	Rod
Ordering code	**BIS00RF**	**BIS00T0**	**BIS00T2**
Part number	BIS VM-300-001-S4	BIS VM-301-001-S4	BIS VM-351-001-S4
Power supply	≤ 150 mA	≤ 150 mA	≤ 150 mA
Power supply	18…30 V DC	18…30 V DC	18…30 V DC
Residual ripple	≤ 1,3 V_{ss}	≤ 1,3 V_{ss}	≤ 1,3 V_{ss}
Ambient temperature range T_a	–25...+55 °C	–25...+55 °C	–25...+55 °C
Degree of protection as per IEC 60529	IP 67 (with connector)	IP 67 (with connector)	IP 67 (with connector)
Function indicator	yes	yes	yes
Housing material	Nickel-plated CuZn	PBT	PBT
Weight	100 g	190 g	360 g
Connection	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin

Please take the corresponding write/read distance from the Industrial Identification catalog, Chapter BIS M (BIS VM-300... corresponds to BIS M-300...).

Securing clamp included in the scope of delivery.





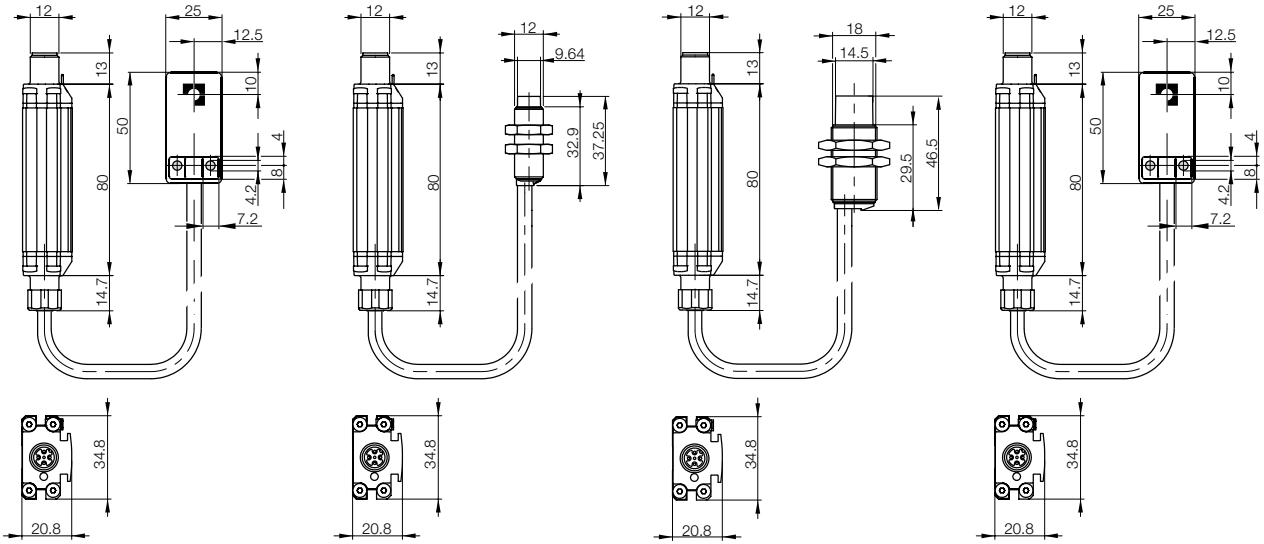
Please order matching plug connectors separately.
(Unshielded cable can be used only for lengths up to 3 m. Cable lengths over 3 m have to be shielded.)

Plug side	Socket side	Cable material	Color	BCC039H	BCC039R	BCC03A8	BCC03AJ	BCC039J	BCC039T	BCC03A9	BCC03AK	BCC039K	BCC039U	BCC03AA	BCC03AL	BCC039L	BCC039W	BCC03AC	BCC03AM	BCC039M	BCC039Y	BCC03AE	BCC03AN
				0.3 m				0.6 m				1 m				1.5 m				2 m			
straight	straight	PUR	black	■				■				■				■				■			
straight	angled	PUR	black		■				■				■				■				■		
angled	straight	PUR	black			■				■				■				■				■	
angled	angled	PUR	black				■				■				■				■				■

Industrial RFID System BIS V

The new generation for more efficiency

HF read/write head BIS VM	HF read/write head BIS VM	HF read/write head BIS VM	HF read/write head BIS VM
25x50x10 mm	**M12×1**	**M18×1**	**25×50×10 mm**
non-flush	non-flush	non-flush	non-flush
round	round	round	Rod
BIS00T9	**BIS00T7**	**BIS00T8**	**BIS00T6**
BIS VM-305-001-S4	BIS VM-306-001-S4	BIS VM-307-001-S4	BIS VM-352-001-S4
≤ 150 mA	≤ 150 mA	≤ 150 mA	≤ 150 mA
18…30 V DC	18…30 V DC	18…30 V DC	18…30 V DC
≤ 1,3 V_{ss}	≤ 1,3 V_{ss}	≤ 1,3 V_{ss}	≤ 1,3 V_{ss}
–25...+55 °C	–25...+55 °C	–25...+55 °C	–25...+55 °C
IP 67 (with connector)	IP 67 (with connector)	IP 67 (with connector)	IP 67 (with connector)
yes	yes	yes	yes
AlMgSi 0.5/ABS-GF16	AlMgSi 0.5/nickel-plated CuZn	AlMgSi 0.5/nickel-plated CuZn	AlMgSi 0.5/ABS-GF16
200 g	190 g	220 g	370 g
M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin	M12 connector, 4-pin



more added value

- Distances up to 275 mm offer greater flexibility, regardless of the background surface.
- FRAM data carriers ensure virtually unlimited read/write cycles.
- Can be used all over the world thanks to ISO-15693-conformity.
- Status indicators mounted directly on the antenna housing are a valuable feature.
- The robust housing guarantees reliable operation in harsh environments.
- 100 % RFID quality means greater reliability.

Application areas
The advantages of the HF antenna BIS M-350 become immediately obvious in all applications where the data carrier is mounted directly on metal or the material in the immediate vicinity cannot be predetermined accurately, for example when products are transported in a crate. BIS M sensors simply ignore the different materials, which means that water, oil, dust and metal have absolutely no effect on the high-performance data carriers.

A Powerful High-frequency Package Ensures Maximum Transparency

HF antenna BIS M-340 and BIS M-350

One of the challenges of intralogistics is the transportation of constantly changing materials. However, smooth operation and transparent processes are still required in spite of the wide variety of different products. A requirement that is not always easy for RFID systems because metallic surfaces, fluids and dirt really put these systems to the test. Not the HF antenna BIS M-350, however. The antenna is fitted with optimized data carriers that help overcome difficulties of this kind with ease while reliably ensuring maximum transparency. All data can be traced at any time.

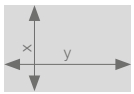
The following system versions are available:

– BIS M 350 and 450 (rod antenna)
– BIS M 340 and 440 (circular antenna)

CE

Connection to processor	**Ordering code**	**BIS00LZ**		**BIS00N6**	
	Part number	BIS M-350-001-S115		BIS M-340-001-S115	
Connection to controller (TCP/IP)	**Ordering code**	**BIS00R0**		**BIS00PZ**	
	Part number	BIS M-450-039-001-06-ST2		BIS M-440-039-001-06-ST2	
Dimensions		240×120×60 mm		240×120×60 mm	
Installation type (steel)		with clear zone		with clear zone	
Antenna type		**Rod**		**Circular**	
Degree of protection per IEC 60529		IP 65		IP 65	
Ambient temperature T_a		0...+55 °C		0...+55 °C	
Housing material		PC		PC	
Appropriate data carrier		**BIS M-153-02/A**		**BIS M-107-03/L-H200**	
Clear zone for data carrier		> 240×480 mm		> 240×480×120 mm	
Read/write distance		0...275 mm		0...100 mm	
Offset at distance	Dimensions	x	y	x	y
	0 mm	±200 mm	±100 mm	±50 mm	±100 mm
	25 mm	±200 mm	±100 mm	±50 mm	±100 mm
	50 mm	±200 mm	±100 mm	±50 mm	±95 mm
	75 mm	±200 mm	±100 mm	±45 mm	±85 mm
	100 mm	±200 mm	±100 mm	±40 mm	±75 mm
	150 mm	±200 mm	±100 mm		
	200 mm	±175 mm	±100 mm		
	250 mm	±100 mm	±100 mm		

Appropriate data carrier
BIS M-153 and BIS M-107



more added value

The Balluff BIS-M System combines advantages such as the fully flush installation of data carriers in steel and absolute data reliability with important properties such as:

- Large reading/writing distances of up to 130 mm
- Fast data communication from data carrier via processor to controller
- Seamless integration in intralogistics applications through global standard ISO 15693/14443
- Smallest possible antenna design sizes

The components are specially designed and manufactured for use with transfer systems from Bosch-Rexroth (TS1 and TS2). The design not only takes RFID communication into consideration but also simple assembly.
Can be installed from the kit, depending on the application.
Thanks to the robust systems and 20 years of experience with RFID, the described solution is a must for every automation task.

Industrial RFID in Transfer Systems

High data reliability and extremely simple assembly




Ordering code	BIS00NZ	BIS00P1	BIS00M2	BIS004A	
Part number	BIS M-191-02/A	BIS M-154-03/A	BIS M-152-03/A	BIS M-122-02/A	
Dimensions	24×24×21 mm	Ø 8×35 mm	Ø 4×22 mm	Ø 10×4.5 mm	
Antenna type	Rod	Rod	Rod	Circular	
Capacity	2000 bytes	112 bytes	112 bytes	2000 bytes	
Working/storage temperature	–30...+70 °C/–30...+85 °C	–25...+50 °C/–30...+60 °C	–25...+50 °C/–30...+60 °C	0...+70 °C/–25...+85 °C	
Degree of protection	IP 67	IP 67	IP 67	IP 67	
Installation	non-metal	non-metal	non-metal	non-metal	in metal
Read/write distance					
BIS M-305				0...7 mm	0...5 mm
BIS M-307				0...7 mm	0...5 mm
BIS M-352	0...14 mm	0...10 mm	0...10 mm		



Ordering code	BIS00NY	BIS00NK	BIS00P2
Part number	BIS M-352-001-S115	BIS M-305-001-S115	BIS M-307-001-S115
Read/write head			
Dimensions	25×50×10 mm	25×50×10 mm	M18×1
Antenna type	Rod	Circular	Circular
Working/storage temperature	0...+70 °C/–20...+85 °C	0...+70 °C/–20...+85 °C	0...+70 °C/–20...+85 °C
Degree of protection	IP 67	IP 67	IP 67
Cable	0.5 m PUR	0.5 m PUR	0.5 m PUR
Connection to	Remote electronics	Remote electronics	Remote electronics
Remote electronics			
Voltage	24 V DC +10 %/–20 % including ripple		
Current	< 50 mA no load		
Working/storage temperature	0...+70 °C/–20...+85 °C		
Degree of protection	IP 67		
Connection to/interface	Processor/M12 connector, 8-pin		

more added value

- Flexible use due to a wide range of different combinations of data carriers and antennas
- Up to two antennas per processor
- Tested quality with CC-Link certificate
- Make use of timesaving features: Connector-based cabling, robust housing that is easy to install, preassembled function modules and diagnostics function that enable easy commissioning

The CC Link field bus protocol ensures quick, robust communication between different stations. The new BIS M-699 processor can now be used directly in the field. Conformity with standards ISO 15693 and 14443 as well as globally approved frequency of 13.56 MHz allow worldwide use of this CC-Link processor.

Processor with CC-Link for 13.56 MHz

Suitable for every environment

Model	BIS M-699
Description	Processor
Ordering code	**BIS00LY**
Part number	BIS M-699-052-050-03-ST11
Dimensions	200×100×60 mm
Antenna ports	2
Standards	ISO 15693/14443
Interface	CC-Link
Degree of protection per IEC 60529	IP 65
Housing material	Metal

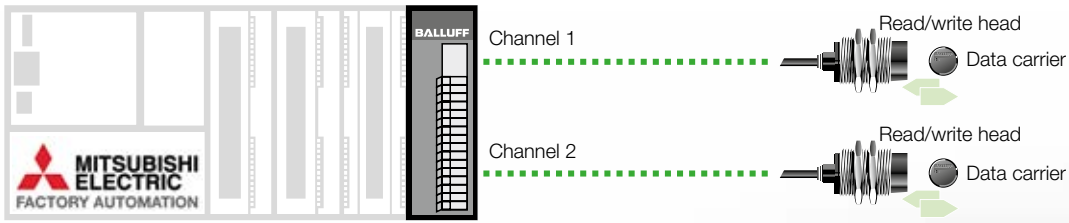
The HF processor BIS M-699 with 13.56 MHz is used directly in the field in all applications where robust controllers are connected directly to CC-Link. Thanks to the wide variety of special data carriers, for example, optimized for flush installation in metal, for temperatures up to 200 °C or for the maximum distance, this HF processor can be used in almost all industrial sectors.

more added value

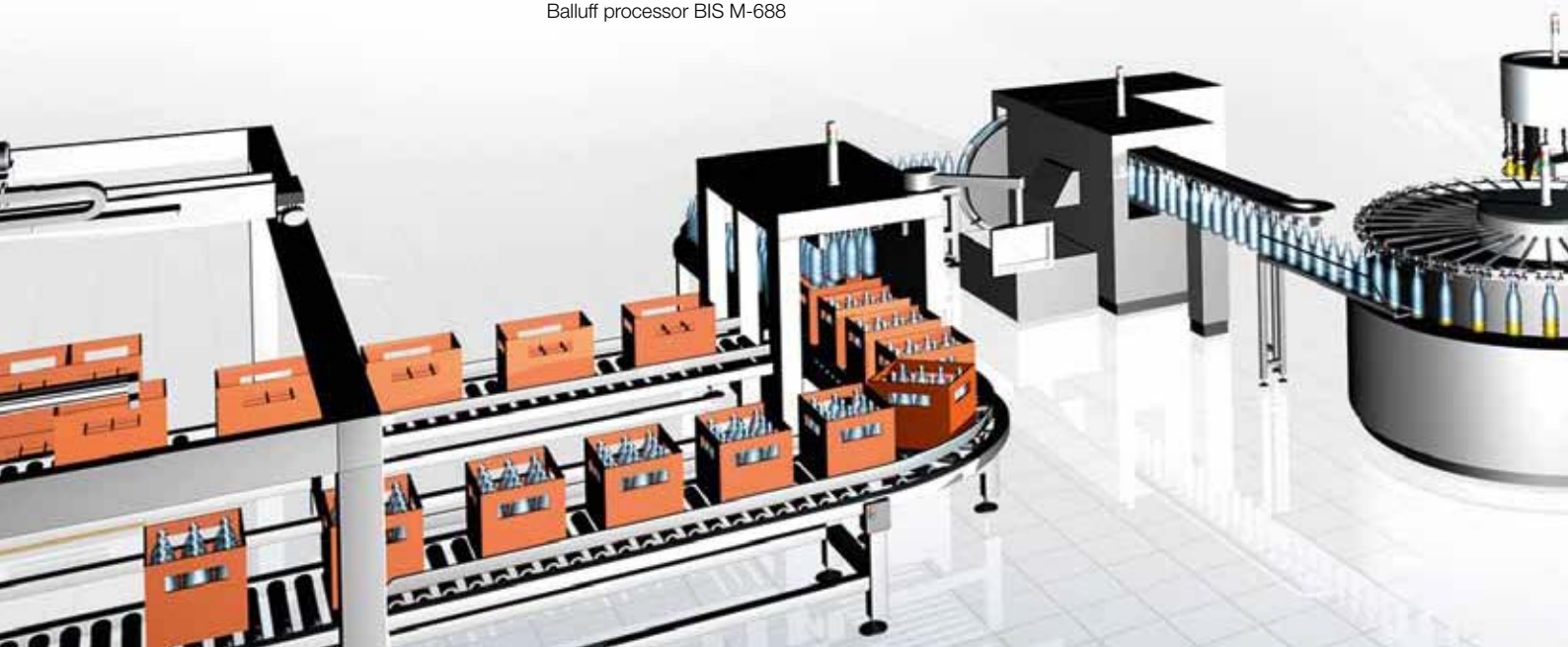
- Easy startup with function modules at no extra cost
- Direct integration into the controller eliminates the need for decentralized wiring
- Function indicator directly on the terminals
- Degree of protection IP 40

The HF processor BIS M-688-001 with 13.56 MHz was developed specially for integration in the MELSEC-Q series from Mitsubishi. All read/write heads from the BIS M series can be connected to the 2-channel card. A wide range of variations provides the right configuration for every application.

Mitsubishi MELSEC-Q series



Balluff processor BIS M-688



Processor for Mitsubishi Controller

Identification without diversions

The MELSEC-Q series enables the user to select the best combination of CPU modules as well as communication, special or I/O modules for configuration of tailored systems. The use of RFID ensures the best possible individual solutions. And in all areas where the highest possible level of flexibility is required. RFID makes processes even more transparent and effective.

Model	BIS M-688
Description	Processor
Ordering code	**BIS00HM**
Part number	BIS M-688-001
Dimensions	98×90.5×27 mm
Frequency	13.56 MHz
Antenna ports	2
Standards	ISO 15693/14443
Interface	Integrated directly in Mitsubishi system Q
Degree of protection per IEC 60529	IP 40

more added value

- High degree of protection – where it is needed
- Data carrier in screw form – simplest form of installation
- Large distances – for more flexibility in your application
- ISO 15693 – applicable worldwide

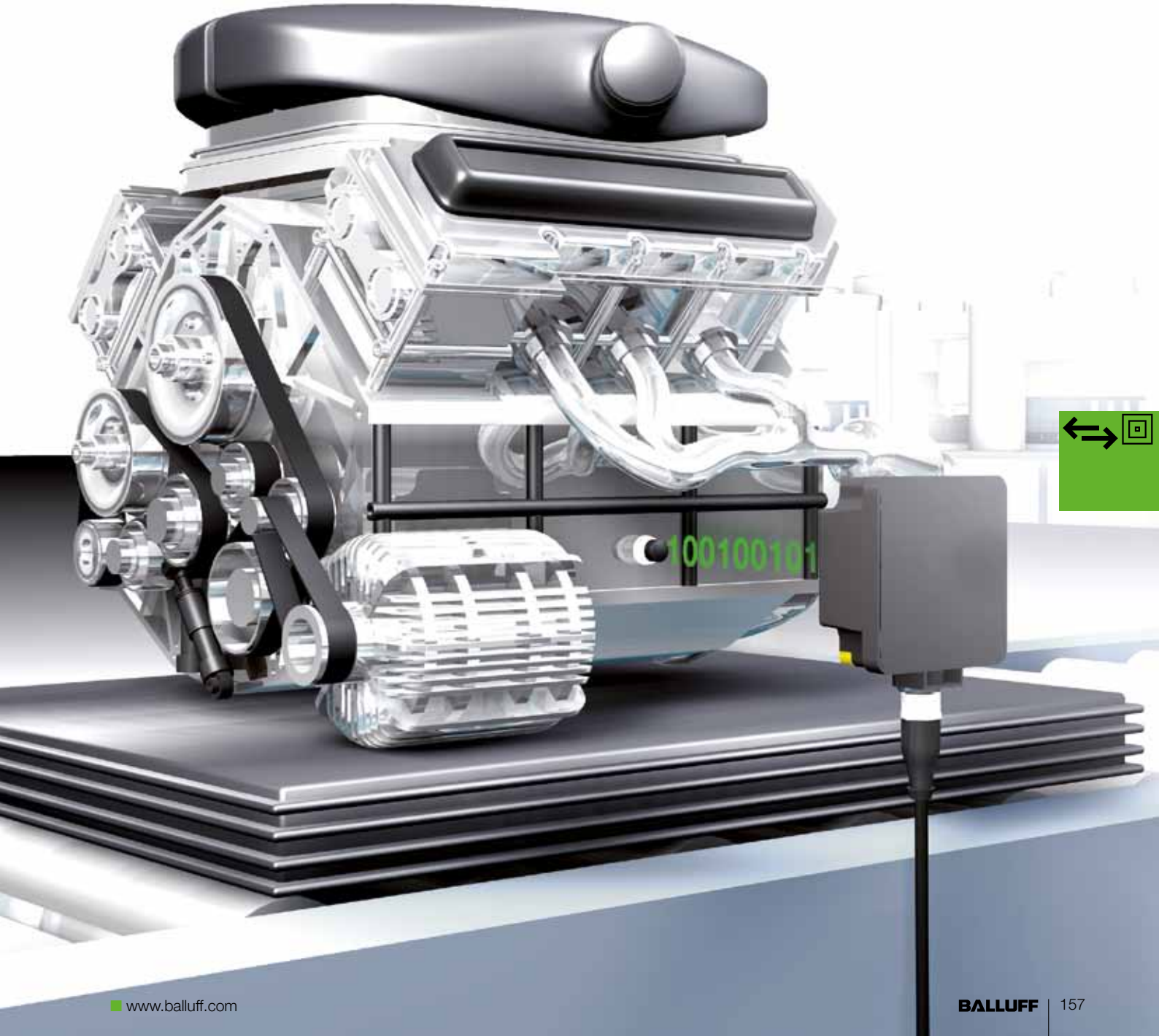
It is not always possible to use a workpiece carrier in the production process. If the information still has to be coupled directly to the object, it is essential to install the data carrier at the object without any difficulties and to quickly remove it again after it has fulfilled its task. A screw is ideally suited for this purpose.
The new data carrier in accordance with ISO 15693 with a storage capacity of 2000 bytes is perfectly suited, for example, for parts tracking in manufacturing processes and for closed-loop applications in which it is always being used recurrently. Varied application options also open up for the identification of manufacturing equipment, such as pressing tools. Thanks to the large reading distances, the data screw in IP 68/x9K provides high installation flexibility.

CE

Ordering code	**BIS00M8**	**BIS00M9**	**BIS00MA**
Part number	BIS M-140-02/A-M8	BIS M-140-02/A-M6	BIS M-140-02/A
Mounting	M8 thread	M6 thread	Clip variant without screw
Memory capacity read/write	2000 bytes	2000 bytes	2000 bytes
Degree of protection per DIN EN 40050	IP 68/x9K	IP 68/x9K	IP 68/x9K
Storage temperature range	–25...+95 °C	–25...+95 °C	–25...+95 °C

HF Data Screw BIS M

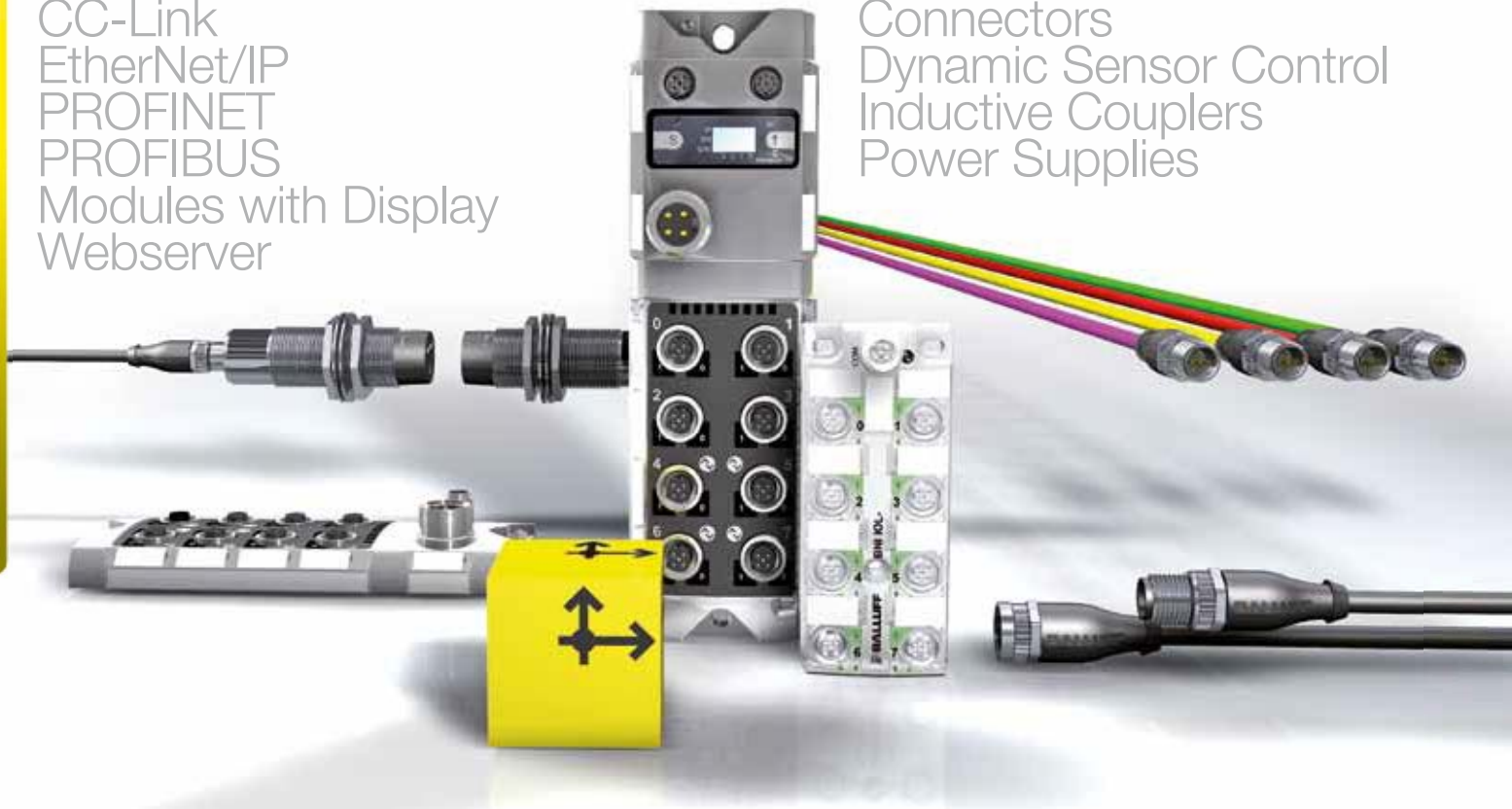
Better safe than sorry – "screwed connection" data

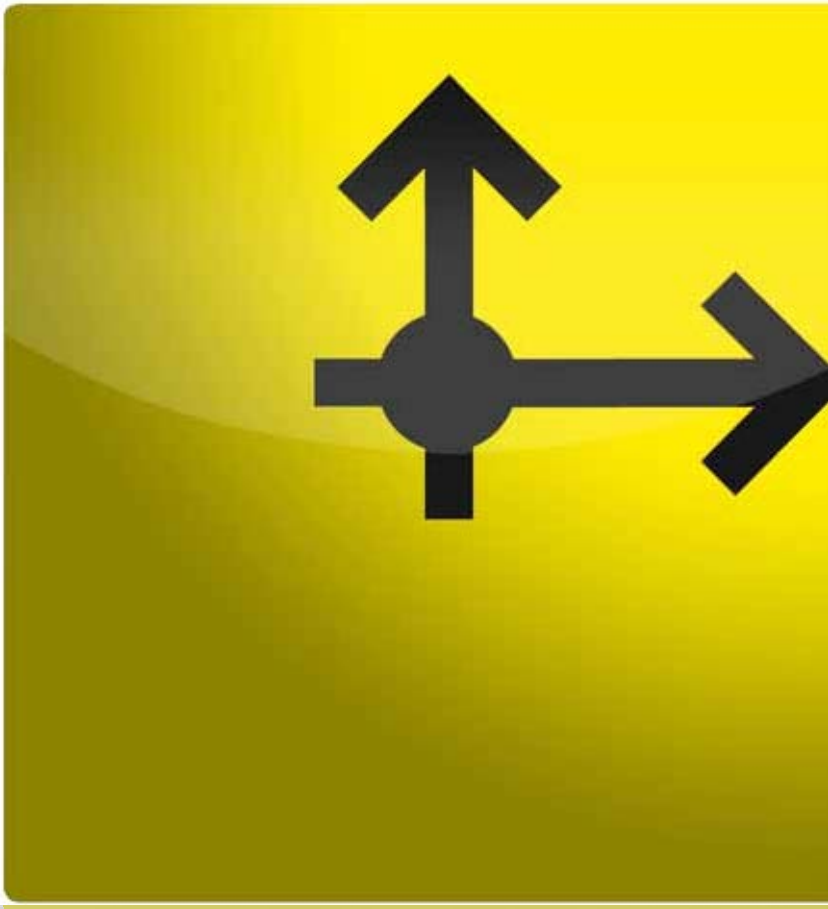


Industrial Networking and Connectivity

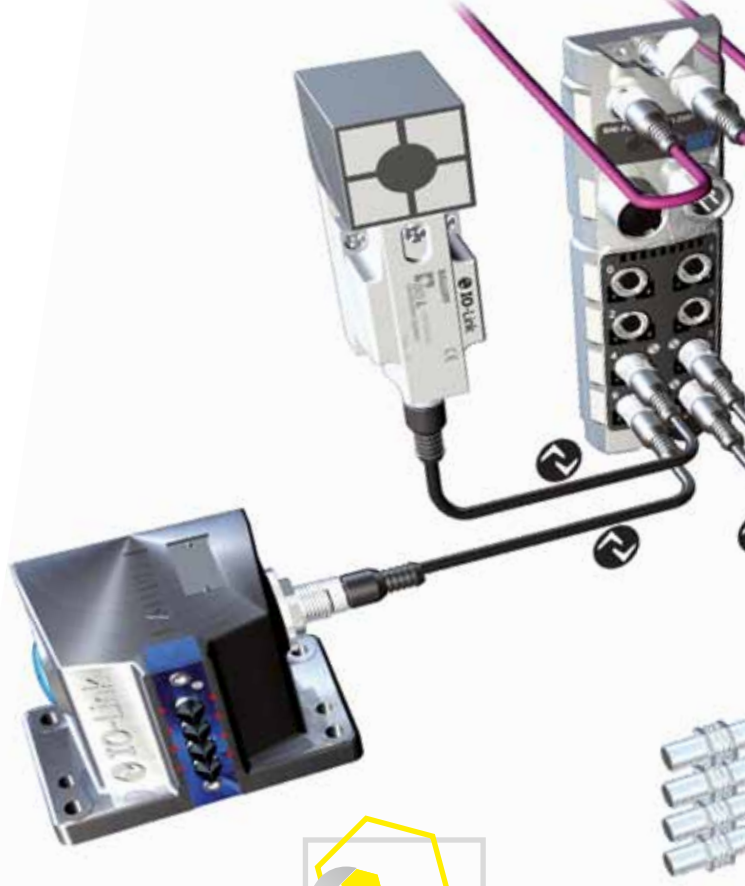
IO-Link
CC-Link
EtherNet/IP
PROFINET
PROFIBUS
Modules with Display
Webserver

Passive Splitters
Connectors
Dynamic Sensor Control
Inductive Couplers
Power Supplies





IO-Link offers potential for optimization- and cost savings for the following areas:



Lower costs

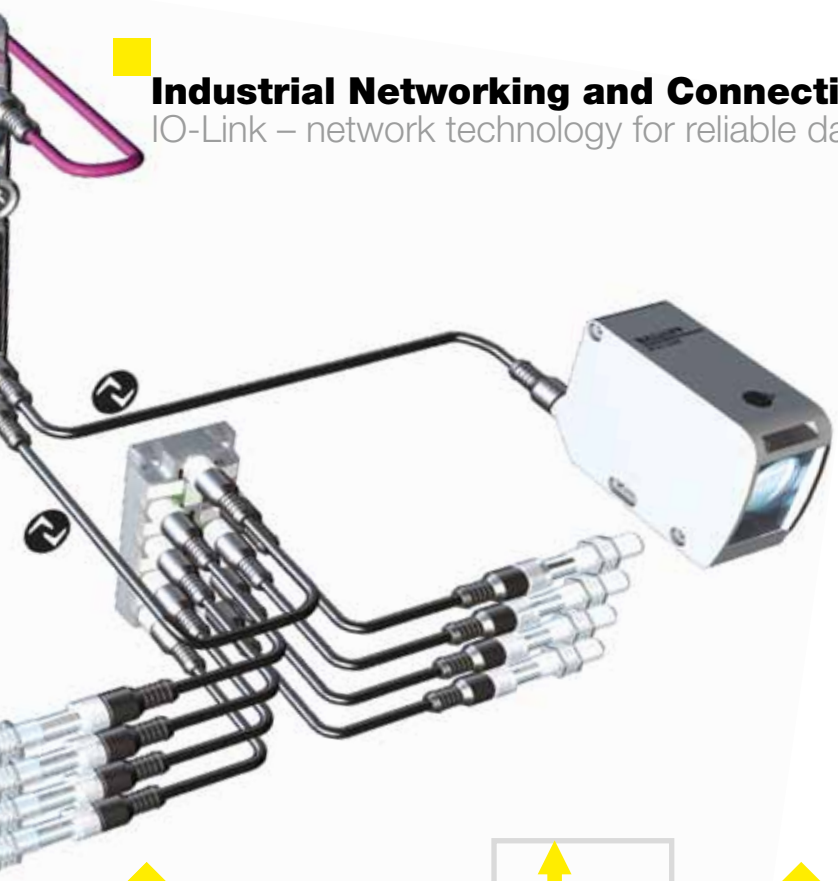
Logistics and planning
- Simplified stocking thanks to uniform, universal interface for all variants
- Reduced planning and administration costs through reduced variety of versions and interfaces
- Lower costs, as simple, unshielded industrial cables can be used
- Increased investment security due to an open standard valid for all manufacturers
- Well equipped for future requirements due to the greatest possible flexibility in project planning

Less maintenance

Service and maintenance
- Automatic readjustment requires less supervision
- Reduced machine downtimes through reliable error detection and localization, fast sensor replacement and centralized data configuration
- Anticipatory error detection reduces maintenance

Industrial Networking and Connectivity

IO-Link – network technology for reliable data transfer and greater efficiency



Reduced time outlay

Installation and commissioning

- Uniform interface and the use of traditional, unshielded industrial cables for simple integration into the fieldbus environment
- Reduced commissioning times, since configuration is performed by the controller
- Incremental expansion through simultaneous use of digital and analog sensors/actuators

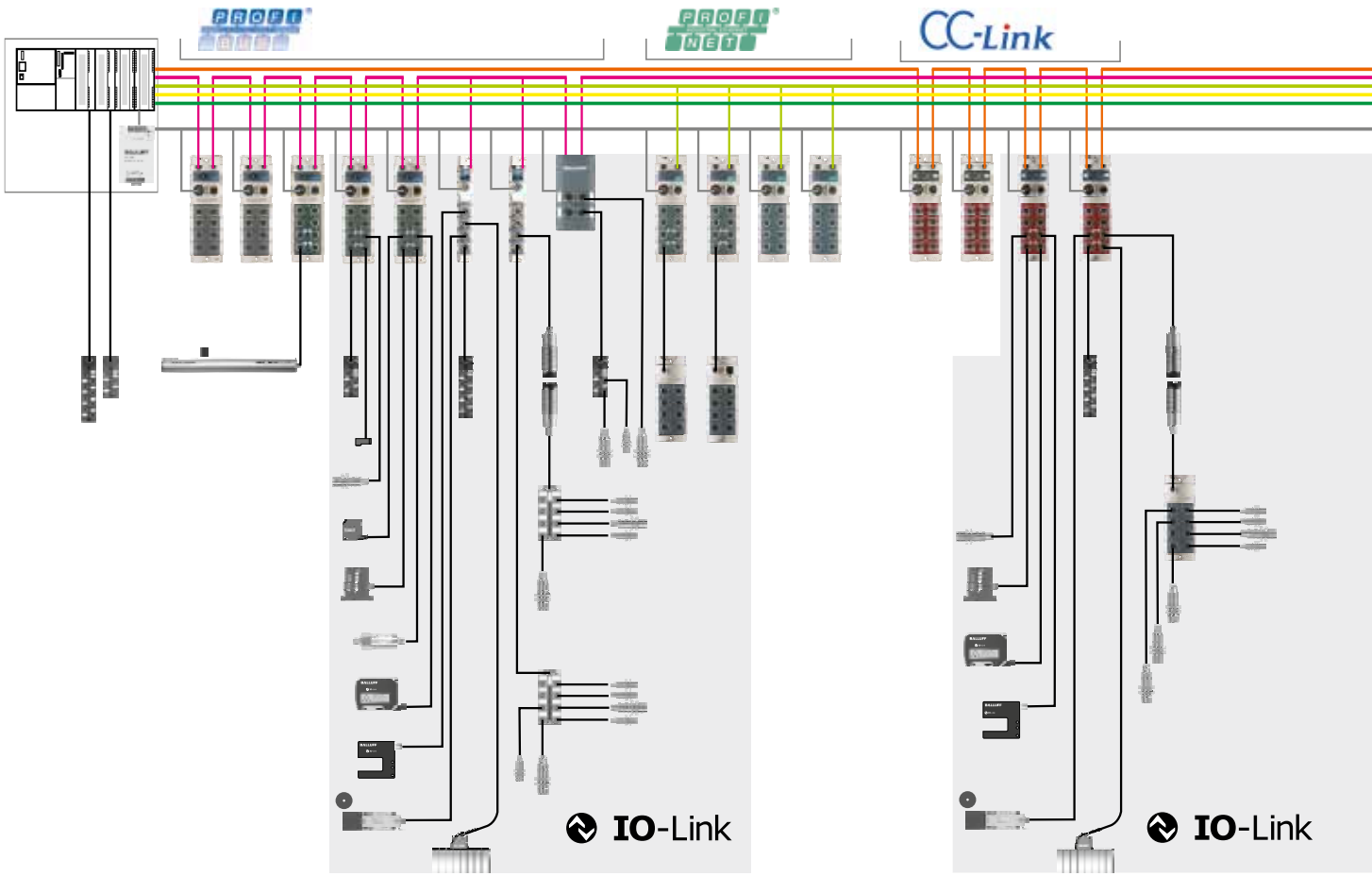
Shorter downtime

Runtime

- Direct data transmission for a high degree of automation precision
- Configuration is performed centrally by the controller – even over long distances
- Reliable readjustment, since data monitoring runs continuously (e.g. maintaining a specified level or a switching hysteresis)
- Fast sensor replacement, quick format changes thanks to centralized setting of parameters
- Standard and IO-Link sensors/actuators can be used simultaneously

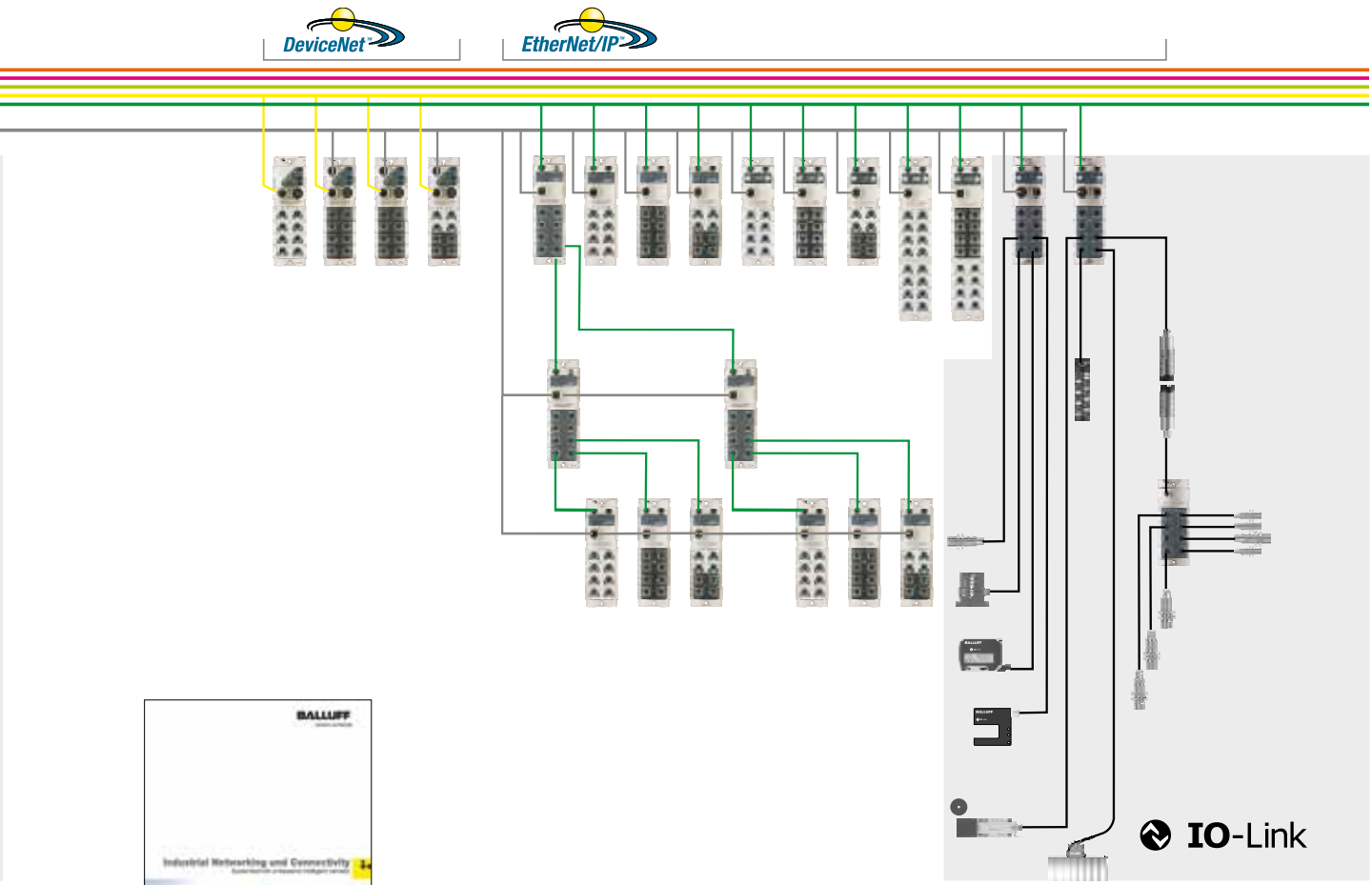
more added value

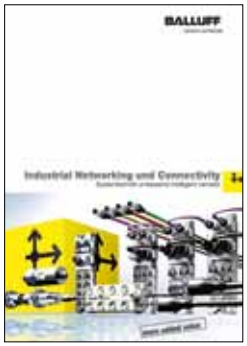
- High degree of protection: IP 67 guaranteed
- High shock and vibration ratings
- Faster and simpler connection



Industrial Networking and Connectivity

System technology networked comprehensively with intelligence





For more information on industrial networking and connectivity, refer to our catalog or visit us online at **www.balluff.de**

more added value

- Robust housing
- Powerful inputs
- Powerful outputs
- Extended temperature range

The metal sensor hubs in a robust housing are suitable for installation in extremely harsh industrial environments such as machine tool plants, steel works and so on.
Based on M12 connectors, metal sensor hubs are simple to install and fulfill demanding requirements for cost-effective installation and maintenance.

Port-specific single-channel monitoring detects short circuits, overloading at the port and offers a completely unique degree of selective diagnostics for devices with this functionality.

Each input can be parameterized as normally closed or normally open using a parameter set, increasing the flexibility of your installation. Antivalent DESINA sensors can also be connected to the DI16 sensor hub with ease.

The BNI IOL-302-000/S01-Z013 version combines two modules in one while achieving maximum functionality and flexibility.
The maximum sensor load current is 500 mA, which is suitable for operating sensors with a high degree of consumption. If configured as an output, up to 2 A is available at the port. This is ideal for the use of hydraulic valves with a high consumption level.

Clearly visible status LEDs
Low-quality LEDs that are often difficult to identify under demanding production conditions perform poorly when used in high-speed applications. Unlike Balluff status LEDs, which are large, bright, highly visible and provide maximum assistance. Balluff modules help you complete setup and maintenance tasks and reduce machine downtimes with ease.

Powerful and safe outputs
With an output current of up to **2 amps**, Balluff output modules are capable of driving almost any load. Each output also offers an overload protection with LED indicator and a memory feature for easy troubleshooting.

Robust, solid metal housing
The fully encapsulated housing can withstand impacts, debris, corrosive fluids, incorrect assembly as well as people treading on it.

Inputs with high density
All Balluff input blocks offer two input points for each connector, accessed via a V splitter. A Desina output is also optionally available via pin 2.

Innovative housing design
The extra-flat profile reduces potential dangers posed by cables. Rounded corners offer highly visible locations for channel markers and two mounting points are sufficient to secure the robust metal housing.

IO-Link

Metal M12 sensor hubs, 16 digital inputs/outputs

IO-Link	Device	Device	Device
Type	16× DI	16× DI/DO	16× DI/DO
Ordering code	**BNI0032**	**BNI003U**	**BNI0035**
Part number	BNI IOL-104-000-Z012	BNI IOL-302-000-Z012	BNI IOL-302-000-Z013
Supply voltage U_B	18...30 V DC	18...30 V DC	18...30 V DC
Function indicator IO-Link RUN	Green LED	Green LED	Green LED
Power indicator	Green LED	Green LED	Green LED
Connection: IO-Link	M12, A-coded, male	M12, A-coded, male	M12, A-coded, male
Connection: I/O ports	M12, A-coded, female	M12, A-coded, female	M12, A-coded, female
Connection U_O	via IO-Link interface	via IO-Link interface	via 7/8" connector
Connection U_A		via IO-Link interface	via 7/8" connector
No. of I/O ports	8	8	8
Number of inputs	16	Max. 16	Max. 16
Number of outputs	0	Max. 16	Max. 16
Configurable	No	Yes	Yes
Single-channel monitoring	No	No	No
Max. load current sensors/channel	100 mA	100 mA	500 mA
Max. load current actuators/channel		0.5 A	2 A
Port status indicator	Yellow/red LED	Yellow/red LED	Yellow/red LED
Total current U_B	< 1.4 A	< 1.4 A	9 A
Total current U_A		< 1.4 A	9 A
Degree of protection per IEC 60529	IP 67 (when connected)	IP 67 (when connected)	IP 67 (when connected)
Operating temperature T_a	–5...+70 °C	–5...+70 °C	–5...+70 °C
Storage temperature range	–25...+70 °C	–25...+70 °C	–25...+70 °C
Mounting	2 mounting holes	2 mounting holes	2 mounting holes
Dimensions (L×W×H)	181×68×36.9 mm	181×68×36.9 mm	181×68×36.9 mm
Housing material	Nickel-plated Gd-Zn	Nickel-plated Gd-Zn	Nickel-plated Gd-Zn

IO-Link

Max. cycle time		2.5 ms	10 ms	10 ms
IO-Link process data length		2 input bytes	2 input bytes/2 output bytes	2 input bytes/2 output bytes
Indicators	Communication	Green LED, pulsing	Green LED, pulsing	Green LED, pulsing
	Error	Red LED	Red LED	Red LED

All hubs include four screw plugs and label set.

more added value

Selectable IO-Link sensor hubs

Simple handling – lower costs – universal use
Selectable IO-Link sensor hubs from Balluff are a market innovation. The user can write and read his own, user-defined identification data. They are, therefore, particularly economical when it is necessary to encode tools. In addition, they are easy to use.

As an interface for interchangeable tools, they offer clearly calculable benefits:
- Quick, reliable format changes
  The hub and data are simply replaced together with the tool and the information is directly passed on to the controller via IO-Link, ensuring continuous process control.
- Quick, economical installation
  Complex multipole cables are no longer required because simple, unshielded, three-core cables are sufficient. Installation is not only fast, but also very economical.
- Speedy setup
  With simple coding via the controller, new tools are made available on an ad hoc basis.

Additional advantages
- IP 67 sensor hubs are extremely versatile.
- The hubs have 16 inputs with single-channel monitoring that provide detailed diagnostic data relating to overloads, short circuits and cable breaks in an instant. In a worst case scenario, the user can intervene immediately and benefit from reduced downtimes.
- You can easily monitor the power supply and function with the convenient LED indicator. Setup, maintenance and downtimes are addressed more quickly.

Selectable sensor hubs from Balluff represent more than just lower costs, less work and reduced downtimes. Selectable sensor hubs from Balluff also stand for greater efficiency.

CE
IO-Link

IO-Link	Device	
Type	16× DI	
Ordering code	**BNI0039**	
Part number	BNI IOL-104-S01-Z012	
Supply voltage U_B	18...30 V DC	
Function indicator IO-Link RUN	Green LED	
Power indicator	Green LED	
Connection: IO-Link	M12, A-coded, male	
Connection: I/O ports	M12, A-coded, female	
Connection U_O	via IO-Link interface	
Connection U_A		
No. of I/O ports	8	
Number of inputs	16	
Number of outputs	0	
Configurable		
Single-channel monitoring	Yes	
Max. load current sensors/channel	100 mA	
Max. load current actuators/channel		
Port status indicator	Yellow/red LED	
Total current U_B	< 1.4 A	
Total current U_A		
Degree of protection per IEC 60529	IP 67 (when connected)	
Operating temperature T_a	–5...+70 °C	
Storage temperature range	–25...+70 °C	
Mounting	2 mounting holes	
Dimensions (L×W×H)	181×68×36.9 mm	
Housing material	Nickel-plated Gd-Zn	

IO-Link

Max. cycle time		10 ms
IO-Link process data length		4 input bytes
Indicators	Communication	Green LED, pulsing
	Error	Red LED

All hubs include four screw plugs and label set.

IO-Link

Metal M12 sensor/actuator hubs, single-channel monitoring

selectable

selectable

	Device	Device	Device	Device
	16× DI	16× DI/DO	16× DI/DO	16× DI/DO
	BNI003T	**BNI003C**	**BNI003A**	**BNI0048**
	BNI IOL-104-S01-Z012-C01	BNI IOL-302-S01-Z012	BNI IOL-302-S01-Z013	BNI IOL-302-S01-Z013-C01
	18...30 V DC	18...30 V DC	18...30 V DC	18...30 V DC
	Green LED	Green LED	Green LED	Green LED
	Green LED	Green LED	Green LED	Green LED
	M12, A-coded, male	M12, A-coded, male	M12, A-coded, male	M12, A-coded, male
	M12, A-coded, female	M12, A-coded, female	M12, A-coded, female	M12, A-coded, female
	via IO-Link interface	via IO-Link interface	via 7/8" connector	via 7/8" connector
		via IO-Link interface	via 7/8" connector	via 7/8" connector
	8	8	8	8
	16	Max. 16	Max. 16	Max. 16
	0	Max. 16	Max. 16	Max. 16
		Yes	Yes	Yes
	Yes	Yes	Yes	Yes
	100 mA	100 mA	500 mA	500 mA
		0.5 A	2 A	2 A
	Yellow/red LED	Yellow/red LED	Yellow/red LED	Yellow/red LED
	< 1.4 A	< 1.4 A	9 A	9 A
		< 1.4 A	9 A	9 A
	IP 67 (when connected)	IP 67 (when connected)	IP 67 (when connected)	IP 67 (when connected)
	–5...+70 °C	–5...+70 °C	–5...+70 °C	–5...+70 °C
	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C
	2 mounting holes	2 mounting holes	2 mounting holes	2 mounting holes
	181×68×36.9 mm	181×68×36.9 mm	181×68×36.9 mm	181×68×36.9 mm
	Nickel-plated Gd-Zn	Nickel-plated Gd-Zn	Nickel-plated Gd-Zn	Nickel-plated Gd-Zn
	15 ms	25 ms	25 ms	30 ms
	6 input bytes	8 input bytes/2 output bytes	8 input bytes/2 output bytes	10 byte input/2 byte output
	Green LED, pulsing	Green LED, pulsing	Green LED, pulsing	Green LED, pulsing
	Red LED	Red LED	Red LED	Red LED

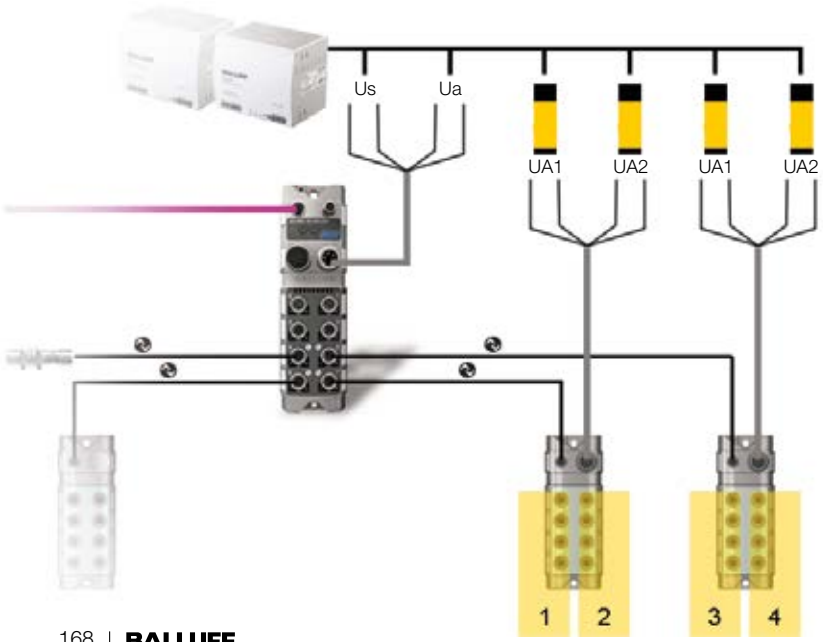
more added value

- Robust housing
- Powerful inputs
- Powerful outputs
- Extended temperature range
- Modules with reliable deactivation mechanism

If you wish to depict standard I/Os or safety I/Os in a fieldbus topology, the issue of safety becomes increasingly important for network/system integration.

Type BNI IOL-252/256 IO-Link actuator hubs fulfill requirements relating to the "passive safety" of outputs following safe deactivation in accordance with Machinery Directive 2006/42/EC, EN 954-1 category 3, EN 13849-1, EN 62061 SIL2.

The I/O block is divided into two galvanically isolated segments in order that two separately switching safety circuits can be implemented using one module.
The functions of the IO-Link system concept are extended considerably as a result. The IO-Link fulfills the requirements for a holistic approach and simultaneously reduces the number of components and guarantees simpler installation.



CE

IO-Link

IO-Link	
Type	
Ordering code	
Part number	
Supply voltage U_B	
Function indicator IO-Link RUN	
Power indicator	
Connection: IO-Link	
Connection: I/O ports	
Connection U_O	
Connection U_A	
No. of I/O ports	
Number of outputs	
Configurable	
Single-channel monitoring	
Number of output circuits	
Outputs per output circuit	
Single-channel monitoring	
Max. load current actuators/channel	
Port status indicator	
Total current U_B	
Total current U_A	
Degree of protection per IEC 60529	
Operating temperature T_a	
Storage temperature range	
Mounting	
Dimensions (L×W×H)	
Housing material	

IO-Link

Max. cycle time		
IO-Link process data length		
Indicators	Communication	
	Error	

IO-Link

Metal M12 actuator hubs, single-channel monitoring




	Device	Device	Device	Device
	2× 4×DO	2× 4×DO	2× 8×DO	2× 8×DO
	BNI0033	**BNI0034**	**BNI003W**	**BNI003Y**
	BNI IOL-252-000-Z013	BNI IOL-256-000-Z013	BNI IOL-252-S01-Z013	BNI IOL-256-S01-Z013
	18...30 V DC	18...30 V DC	18...30 V DC	18...30 V DC
	Green LED	Green LED	Green LED	Green LED
	Green LED	Green LED	Green LED	Green LED
	M12, A-coded, male	M12, A-coded, male	M12, A-coded, male	M12, A-coded, male
	M12, A-coded, female	M12, A-coded, female	M12, A-coded, female	M12, A-coded, female
	via 7/8" connector	via 7/8" connector	via 7/8" connector	via 7/8" connector
	via 7/8" connector	via 7/8" connector	via 7/8" connector	via 7/8" connector
	8	8	8	8
	8	16	8	16
	No	No	No	No
	No	No	Yes	Yes
	2	2	2	2
	4	8	4	8
	No	No	Yes	Yes
	2 A	2 A	2 A	2 A
	Yellow/red LED	Yellow/red LED	Yellow/red LED	Yellow/red LED
	9 A	9 A	9 A	9 A
	9 A	9 A	9 A	9 A
	IP 67 (when connected)	IP 67 (when connected)	IP 67 (when connected)	IP 67 (when connected)
	–5...+70 °C	–5...+70 °C	–5...+70 °C	–5...+70 °C
	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C
	2 mounting holes	2 mounting holes	2 mounting holes	2 mounting holes
	181×68×36.9 mm	181×68×36.9 mm	181×68×36.9 mm	181×68×36.9 mm
	Nickel-plated Gd-Zn	Nickel-plated Gd-Zn	Nickel-plated Gd-Zn	Nickel-plated Gd-Zn
	2.5 ms	5 ms	15 ms	20 ms
	1 output byte	2 output byte	3 input bytes/1 output byte	5 input bytes/2 output bytes
	Green LED, pulsing	Green LED, pulsing	Green LED, pulsing	Green LED, pulsing
	Red LED	Red LED	Red LED	Red LED

All hubs include four screw plugs and label set.

New

more added value

- Every port can be freely configured and can be used as an output or input.
- Inputs can be programmed as normally open or normally closed, depending on requirements, via the configuration.
- Max. load current 350 mA per port
- Max. load current 1.2 A altogether
- When connecting a 1.1 IO-Link master, full 1.1 functionality such as data storage system and extended data frame

Simple handling, fast data, four variants

The space-saving M12 sensor hubs with IO-Link interface are the first choice wherever space is limited, because they offer up to 16 inputs in the tightest of spaces. And their low weight makes them recommended for weight-critical applications.

M12 sensor hubs are easy to install and save time, because a simple 3-pin standard cable is sufficient for the connection. M12 sensor hubs are time and cost saving, even during maintenance and in system operation.

This is because, like all IO-Link products, they ensure consistent diagnostics and can be configured centrally. M12 sensor hubs are also particularly fast. Transmission of 16 sensor signals, for example, takes just 2.5 ms. This ensures that the controller always receives current information. Each individual channel can be programmed to function as normally closed (NC) or normally open (NO), which allows the connection of antivalent sensors (DESINA).

M12 sensor hubs with IO-Link port are available in four variants.

M12 plastic sensor hubs now also have output functionality

The maximum 16 channels of the M12 plastic sensors are freely configurable (input/output) and fulfill the requirements according to cost-effective, flexible wiring.

IO-Link is connected using a 4-pin standard sensor cable.

IO-Link Version 1.1

CE

IO-Link

IO-Link	
Description	
Version	
Ordering code	
Part number	
Supply voltage U_B	
Function indicator IO-Link RUN	
Power indicator	
Connection: IO-Link	
Connection: I/O ports	
Connection U_O	
Connection U_A	
No. of I/O ports	
Number of inputs	
Number of outputs	
Configurable	
Single-channel monitoring	
Codeable via IO-Link	
Max. load current sensors/channel	
Max. load current actuators/channel	
Port status indicator	
Total current U_B	
Total current U_O	
Degree of protection as per IEC 60529	
Operating temperature T_a	
Storage temperature	
Mounting	
Dimensions (L×W×H)	
Housing material	

IO-Link Version 1.1

Max. cycle time		
IO-Link process data length		
Display	Communication	
	Error	

IO-Link
M12 plastic sensor hub, configurable



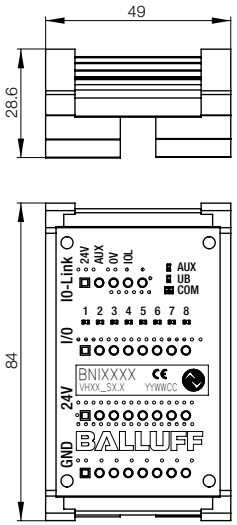

	Device	Device	Device	Device
	Standard module	Single-channel diagnostics	Codeable	Single-channel diagnostics and codeable
	16× DI/DO	16× DI/DO	16× DI/DO	16× DI/DO
	BNI005L	**BNI005T**	**BNI005U**	**BNI005W**
	BNI IOL-302-000-K006	BNI IOL-302-S01-K006	BNI IOL-302-000-K006-C01	BNI IOL-302-S01-K006-C01
	18...30 V	18...30 V	18...30 V	18...30 V
	LED green	LED green	LED green	LED green
	LED green	LED green	LED green	LED green
	M12, A-coded, male	M12, A-coded, male	M12, A-coded, male	M12, A-coded, male
	M12, A-coded, female	M12, A-coded, female	M12, A-coded, female	M12, A-coded, female
	via IO-Link interface	via IO-Link interface	via IO-Link interface	via IO-Link interface
	via IO-Link interface	via IO-Link interface	via IO-Link interface	via IO-Link interface
	8	8	8	8
	16 max.	16 max.	16 max.	16 max.
	16 max.	16 max.	16 max.	16 max.
	yes	yes	yes	yes
	no	yes	no	yes
	no	no	yes	yes
	100 mA	100 mA	100 mA	100 mA
	0.35 A	0.35 A	0.35 A	0.35 A
	Yellow/red LED	Yellow/red LED	Yellow/red LED	Yellow/red LED
	< 1.3 A	< 1.3 A	< 1.3 A	< 1.3 A
	< 1.6 A	< 1.6 A	< 1.6 A	< 1.6 A
	IP 67	IP 67	IP 67	IP 67
	–5...+55 °C	–5...+55 °C	–5...+55 °C	–5...+55 °C
	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C
	2 mounting holes	2 mounting holes	2 mounting holes	2 mounting holes
	115×50×31	115×50×31	115×50×31	115×50×31
	PC	PC	PC	PC
	3.5 ms	5 ms	4 ms	5.5 ms
	2 byte input/2 byte output	8 byte input/2 byte output	4 byte input/2 byte output	10 byte input/2 byte output
	LED green	LED green	LED green	LED green
	Red	Red	Red	Red

All hubs include four screw plugs and a label set.

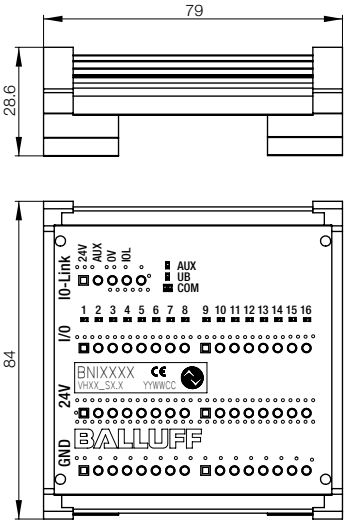
Easy installation with IO-Link under IP-20 conditions
The maximum number of 16 channels of the IP -20 IO-Link sensor/ actuator hub are user configurable (input/output) and meet the requirements for inexpensive flexible wiring.
The IO-Link is connected with a 4-pin standard sensor cable. The connection from/to the peripherals is by means of removable screw terminal blocks.

IO-Link up to the control panel!
The compact size enables the simple and straightforward installation in control cabinets, control boxes and control panel housings.
Simply snap the plastic housing onto a mounting rail according to EN 60175 – done.

IO-Link for integration in devices and device modules.
Circuit board variants are available for the integration in spatially limited and complex functional units which can be integrated via spacing bolts.



BNI IOL-309-000-K024



BNI IOL-310-000-K025

IO-Link
Sensor/actuator hubs, IP 20

IO-Link	Device	Device
Type	8× DI/DO	16× DI/DO
Ordering code	**BNI004K**	**BNI004L**
Part number	BNI IOL-309-000-K024	BNI IOL-310-000-K025
Supply voltage U_B	18…30 V DC	18…30 V DC
Function indicator IO-Link RUN	Green LED	Green LED
Power indicator	Green LED	Green LED
Connection: IO-Link	Spring-loaded terminal, pluggable	Spring-loaded terminal, pluggable
Connection U_O	Spring-loaded terminal, pluggable	Spring-loaded terminal, pluggable
Connection U_A	Spring-loaded terminal, pluggable	Spring-loaded terminal, pluggable
Connection: I/O ports	Spring-loaded terminal, pluggable	Spring-loaded terminal, pluggable
No. of I/O ports	8	16
Number of inputs	Max. 8	Max. 16
Number of outputs	Max. 8	Max. 16
configurable/parameterizable	Yes	Yes
Single-channel monitoring	No	No
Max. load current sensors/channel	100 mA	100 mA
Max. load current actuators/channel	400 mA	400 mA
Port status indicator	Yellow LED	Yellow LED
Total current U_B	< 1.4 A	< 1.4 A
Total current U_A	< 1.4 A	< 1.4 A
Degree of protection per IEC 60529	IP 20	IP 20
Operating temperature T_a	–5…+50 °C	–5…+50 °C
Storage temperature range	–25…+75 °C	–25…+75 °C
Mounting	Top-hat rail fitting over plastic shell	Top-hat rail fitting over plastic shell
Dimensions (L×W×H)	49×84×43 mm (L×W×H)	79×84×43 mm (L×W×H)

IO-Link

No. of IO-Link ports		1× device	1× device
Max. cycle time			12 ms
IO-Link process data length		1 Byte Input/1 Byte Output	2 Bytes Input/2 Bytes Output
Indicators	Communication	Green LED, pulsing	Green LED, pulsing
	Error	Red LED	Red LED

more added value

New options in installation, diagnostics and activation
The BNI IOL-770-V06-A027 module connects process-related, installed valve clusters in the simplest way with the control level. As common with IO-Link, it is ready to connect and has a simple, 3-wire standard cable. Complicated parallel wiring and risk of confusing cables are omitted. Because the "intelligence" is in the activation, nothing changes in the valve cluster or its individual valves.

The valve cluster activation combines 24 double valves with the control level. The module is connected to the VQC valve cluster types from the SMC company via the preinstalled, 26-pin round plug. This saves enormous wiring effort and reduces sources of error very substantially. A common 3-wire standard cable is docked on the other end of the screw-in M12 plug and assumes the complete electric control and the transport of all process and service data from and to the valve cluster.

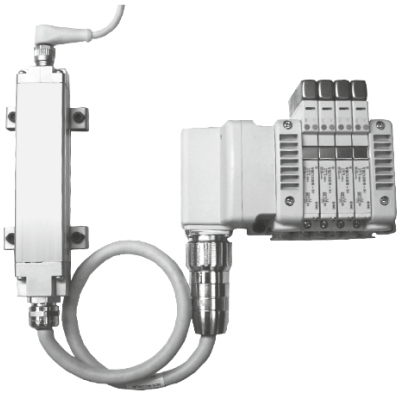
The omission of complicated, multi-stage wiring makes lean wiring concepts possible and saves space, time and money. The pronounced diagnostics functions such as short-circuit monitoring and coil break monitoring provide for increased security in system operation.

- Compact adapter housing for docking directly on the valve cluster
- Switchable via IO-Link to different fieldbuses, cross-manufacturer openness
- Connection to control level is made with common 3-wired sensor cables, saving wiring effort
- Excellent diagnostics functions such as Short-circuit, coil break, power supply

IO-Link
Version 1.1

IO-Link

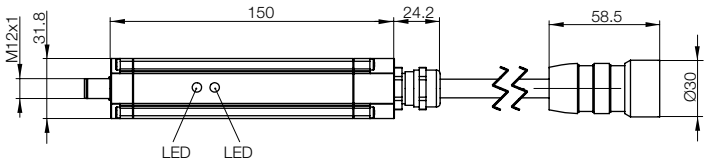
Valve cluster switch for SMC VQC



Signal assignment M27 socket round plug in accordance with SMC VQC valve clusters

Connector diagram and wiring IO-Link interface, M12, A-coded, pin	 PIN 1: +24 V, supply voltage PIN 2: +24 V, supply voltage Power Aux Pin 3: GND, reference potential PIN 4: Q/C, IO-Link data transmission channel PIN 5: -
Version	Power Aux valve terminal connector
Supply voltage U_B	18...30.2 V DC
Outputs	24
Error indicator	LED red
Communication indicator	LED green
Transmission protocol	IO-Link Version 1.1
Transfer rate	COM 2/38.4 kBaud
Interface	M27 socket, 26 pin
IO-Link process data length	9 byte input/4 byte output
Cycle time min.	5.5 ms IO-Link version 1.1
Operating temperature T_a	–5...+70 °C
Storage temperature	–25...+70 °C
Dimensions	187×32×32 mm without cable
Housing material	Aluminum
Total current U_S	1.2 A
Degree of protection	IP 65
Cable length with M27	50 cm

Cable material	Color	Length	Ordering code
			Part number
PVC	Gray	0.4 m	**BNI004W**
			BNI IOL-770-V06-A027



more added value

Universal IO-Link switch – unlimited options
Via the BNI IOL-771-000-K027 module, all devices are open for IO-Link with up to 16 inputs/outputs.

In a process-related manner, pumps, signal lights, control panels, valve clusters, switch units, transfer units and many more are connected with the control level in the simplest way. The module provides both the fast IO-Link connection via the standard sensor line and an open cable with 10 or 18 wires, depending on the exact version.
With it, now any electric unit with up to 16 inputs/outputs can be connected to the control system via a standard sensor cable.

The omission of high-effort, multiple wiring enables lean wiring concepts and saves space, time and money.

The benefits to you
- Compact adapter housing for direct connection to different devices
- Via IO-Link, universal and fieldbus-independent
- Connection to control level with common sensor cable, reduces the wiring effort
- Variant available with 8 or 16 input/output signals

IO-Link
Version 1.1

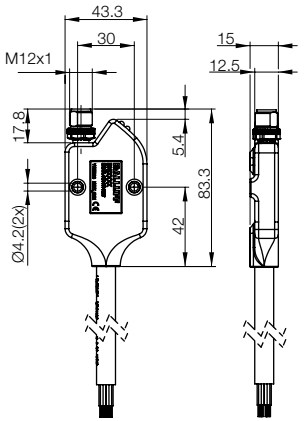
IO-Link
Universal IO-Link switch

New

Connector diagram and wiring IO-Link interface, M12, A-coded, pin	 PIN 1: +24 V, supply voltage PIN 2: Not connected PIN 3: GND, reference potential PIN 4: Q/C, IO-Link data transmission channel Pin 5: Function ground
Version	IO-Link on switch
Supply voltage U_B	18...30.2 V DC
Indicators and monitoring	Power supply, communication, diagnostics
Transmission protocol	IO-Link Version 1.1
Transfer rate	COM2 (38.4 Kbaud)
Cycle time min.	4 ms
Operating temperature T_a	–5 to +75 °C
Storage temperature	–25 to +85 °C
Dimensions	83.3×43.3×15 mm without cable
Housing material	Plastic
Total current U_O	1.2 A
Degree of protection	IP 54

Cable material	Color	Length	Ordering code
			Part number
PVC	Gray	0.4 m	**BNI005M**
			BNI IOL-771-000-K027

Signal assignment M27 socket round plug
in accordance with SMC-VQC valve clusters



more added value

- Compact housing
- High Resolution, 14 bit
- Extended temperature range
- Inputs and outputs

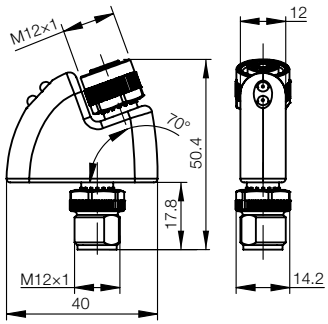
Converting analog signals into IO-Link signals and saving costs in the process

The number of analog data/information/signals generally do not represent 10% of the existing signal formation in most systems and machines.

The connection and integration of analog input/output signals is associated with high costs due to the use of shielded cables on the installation side and expensive multi-channel input modules on the control side.

The solution

The IO-Link analog plugs from Balluff open up a considerable cost reduction potential for systems with limited analog value formation. Expensive shielded cables are replaced with simple unshielded three-core cables. The signal neutrality of the IO-Link ports on the IO-Link master modules, together with the IO-Link analog plugs, ensure maximum signal variance. "Mixing" different input/output/ current and voltage signals in one module is therefore possible.



IO-Link	Device	
Version	1 AI, 0...10 V DC	
Ordering code	**BNI0042**	
Part number	BNI IOL-714-000-K023	
Supply voltage U_B	18…30 V DC	
Connection: IO-Link	M12, A-coded, male	
Analog interface connection	M12, A-coded, female	
Analog ports		
Number of analog ports	1	
Interface	0...10 V DC Input	
Resolution	14 Bit	
Max. load current sensors/channel	1 A	
Max. load current actuators/channel	1.4 A	
Degree of protection as per IEC 60529	IP 67 (when screwed into place)	
Operating temperature T_a	–5…+70 °C	
Storage temperature	–25…+70 °C	
Weight	21 g	
Dimensions (L×W×H)	40×12×50 mm	
Housing material	Plastic	

IO-Link

Max. cycle time	3 ms	
IO-Link process data length	2 bytes input	
Display Communication	Green LED, pulsing	
Module OK	LED green	

IO-Link
Analog adapter




	Device	Device	Device	Device
	1 AI, 4...20 mA	1 AI, PT100	1 AO, 0...10 V DC	1 AO, 4...20 mA
	BNI0041	**BNI004T**	**BNI004C**	**BNI004E**
	BNI IOL-712-000-K023	BNI IOL-716-000-K023	BNI IOL-722-000-K023	BNI IOL-724-000-K023
	18…30 V DC	18…30 V DC	18…30 V DC	18…30 V DC
	M12, A-coded, male	M12, A-coded, male	M12, A-coded, male	M12, A-coded, male
	M12, A-coded, female	M12, A-coded, female	M12, A-coded, female	M12, A-coded, female
	1	1	1	1
	4...20 mA Input	PT 100 Input	0...10 V DC Output	4...20 mA Output
	14 Bit	14 Bit	14 Bit	14 Bit
	1 A	1 A	1 A	1 A
	1.4 A	1.4 A	1.4 A	1.4 A
	IP 67 (when screwed into place)	IP 67 (when screwed into place)	IP 67 (when screwed into place)	IP 67 (when screwed into place)
	–5…+70 °C	–5…+70 °C	–5…+70 °C	–5…+70 °C
	–25…+70 °C	–25…+70 °C	–25…+70 °C	–25…+70 °C
	21 g	21 g	21 g	21 g
	40×12×50 mm	40×12×50 mm	40×12×50 mm	40×12×50 mm
	Plastic	Plastic	Plastic	Plastic
	3 ms	3 ms	3 ms	3 ms
	2 bytes input	2 bytes input	2 bytes output	2 bytes output
	Green LED, pulsing	Green LED, pulsing	Green LED, pulsing	Green LED, pulsing
	LED green	LED green	LED green	LED green

more added value

- Clearly visible status LEDs
- Addressable display
- Powerful and safe outputs
- Innovative housing design

CC-Link

CC-Link is the principle fieldbus technology used in Asia. The open network is supported by the global CC-Link partner association CLPA, which comprises more than 1,000 companies. CC-Link is a standardized fieldbus designed to integrate different automation components from a wide range of providers. CC-Link is an effective integral system that will fulfill 100 % of your application requirements. Utilize the extensive, high-quality CC-Link portfolio from Balluff to implement your own powerful control topologies using products from a single source.

CC-Link with IO-Link functionality

A module with four IO-Link ports is now available to supplement the CC-Link fieldbus module product series.

The CC-Link module with IO-Link includes four IO-Link master ports that can be configured and used fully independently of one another. You get four additional, freely configurable standard I/O ports that provide a further eight inputs/outputs for standard sensors and actuators.

IO-Link

NPN

Fieldbus	CC-Link	CC-Link
Version	4× IO-Link, 12 DI/DO PNP	16 DI NPN
Ordering code	**BNI0040**	**BNI0049**
Part number	BNI CCL-502-100-Z001	BNI CCL-106-100-Z001
Supply voltage U_B	18...30 V DC	18...30 V DC
Function indicator	LED green	LED green
Fault function indicator	LED red	LED red
Power-on indicator	LED green	Module/actuator/sensor supply
Connection: Fieldbus	M12, 5-pin, female and male	M12, 5-pin, female and male
Connection: Operating voltage	7/8", 5-pin, female and male	7/8", 5-pin, female and male
Connection: I/O ports	M12, A-coded, female	M12, A-coded, female
No. of I/O ports	8	8
Number of inputs	max. 12 PNP	16 NPN
Number of outputs	max. 12 PNP	
Configurable inputs/outputs	yes	no
Max. load current sensors/channel	200 mA	200 mA
Max. load current, output	1.6 A/2 A	
Port status indicator (signal status)	LED yellow	LED yellow
Port diagnostic indicator (overload)	LED red	LED red
Total current $U_{Actuator}$	≤ 9 A	≤ 9 A
Total current U_{Sensor}	≤ 9 A	≤ 9 A
Degree of protection as per IEC 60529	IP 67 (when screwed into place)	IP 67 (when screwed into place)
Operating temperature T_a	–5...+70 °C	–5...+55 °C
Storage temperature	–25...+70 °C	–25...+75 °C
Weight	Approx. 577 g	Approx. 577 g
Mounting	2 mounting holes	2 mounting holes
Dimensions (L×W×H)	224×68×36.9 mm	224×68×36.9 mm
Housing material	Nickel-plated GD-Zn	Nickel-plated GD-Zn

IO-Link Version 1.1

No. of IO-Link master ports		4× master
Operating modes (3-wire)		SIO, COM 1, COM 2, COM 3
Display	Communication	LED green
	Error	LED red
Max. load current for IO-Link device		1.6 A

IO-Link Version 1.1

CC-Link

Powerful products from a single source

PNP				
				
	CC-Link	CC-Link	CC-Link	CC-Link
	16 DI PNP	16 DI/DO PNP	8 DI + 8 DO PNP	8 DO
	BNI002F	**BNI002A**	**BNI002C**	**BNI002E**
	BNI CCL-104-100-Z001	BNI CCL-302-100-Z001	BNI CCL-305-100-Z001	BNI CCL-202-100-Z001
	18...30 V DC	18...30 V DC	18...30 V DC	18...30 V DC
	LED green	LED green	LED green	LED green
	LED red	LED red	LED red	LED red
	Module/actuator/sensor supply	Module/actuator/sensor supply	Module/actuator/sensor supply	Module/actuator/sensor supply
	M12, 5-pin, female and male	M12, 5-pin, female and male	M12, 5-pin, female and male	M12, 5-pin, female and male
	7/8", 5-pin, female and male	7/8", 5-pin, female and male	7/8", 5-pin, female and male	7/8", 5-pin, female and male
	M12, A-coded, female	M12, A-coded, female	M12, A-coded, female	M12, A-coded, female
	8	8	8	8
	16 PNP	max. 16 PNP	8 PNP	
		max. 16 PNP	8 PNP	8 PNP
	no	yes	no	no
	200 mA	200 mA	200 mA	200 mA
		2 A	2 A	2 A
	LED yellow	LED yellow	LED yellow	LED yellow
	LED red	LED red	LED red	LED red
	≤ 9 A	≤ 9 A	≤ 9 A	≤ 9 A
	≤ 9 A	≤ 9 A	≤ 9 A	≤ 9 A
	IP 67 (when screwed into place)	IP 67 (when screwed into place)	IP 67 (when screwed into place)	IP 67 (when screwed into place)
	–5...+55 °C	–5...+55 °C	–5...+55 °C	–5...+55 °C
	–25...+75 °C	–25...+75 °C	–25...+75 °C	–25...+75 °C
	Approx. 577 g	Approx. 577 g	Approx. 577 g	Approx. 577 g
	2 mounting holes	2 mounting holes	2 mounting holes	2 mounting holes
	224×68×36.9 mm	224×68×36.9 mm	224×68×36.9 mm	224×68×36.9 mm
	Nickel-plated GD-Zn	Nickel-plated GD-Zn	Nickel-plated GD-Zn	Nickel-plated GD-Zn

more added value

Ethernet/IP with IO-Link functionality
IO-Link now not only communicates with Profibus, Profinet and CC-Link. At Balluff, IO-Link now communicates with Ethernet/IP so that all the benefits of IO-Link are available right down to the second lowest level.

IO-Link not only ensures freedom of installation, but also guarantees simplified wiring, integrated diagnostics and central configuration. System failures can be prevented more reliably and systems restarted more quickly if a failure occurs.

Ethernet/IP with IO-Link guarantees efficient operation. Users gain time, save costs and incorporate intelligent connection technology to improve process quality.

The Ethernet/IP module with IO-Link includes four IO-Link master ports that can be configured and used fully independently of one another. Through this, four additional, freely configurable standard I/O ports are available that provide a further eight inputs/outputs for standard sensors and actuators.

IO-Link
Version 1.1

Fieldbus	Ethernet/IP
Version	4× IO-Link, 16 DI/DO PNP
Ordering code	**BNI004A**
Part number	BNI EIP-502-105-Z015
Supply voltage U_B	18...30 V DC
Module current consumption	120...130 mA
AUX input/output power status UA LED	US /no
Module status indicator: Mod LED	yes
Network status indicator: Net LED	yes
Port status indicator	Black, red, yellow
Connection: Fieldbus	M12, D-coded, female
Connection: AUX power	7/8", plug, 4-pin
Connection: I/O ports	M12, A-coded, female
No. of I/O ports	8
Number of inputs	max. 16 PNP
Number of outputs	max. 16 PNP
Configurable inputs/outputs	yes
Max. load current sensors/channel	200 mA
Max. load current, output	1.6 A/2 A
Port status indicator (signal status)	LED yellow
Port diagnostic indicator (overload)	LED red
Total current $U_{Actuator}$	≤ 9 A
Total current U_{Sensor}	≤ 9 A
Degree of protection as per IEC 60529	IP 67 (when screwed into place)
Operating temperature T_a	–5...+70 °C
Storage temperature	–25...+70 °C
Mounting	2 mounting holes
Dimensions (L×W×H)	225×68×36.9 mm
Housing material	Nickel-plated GD-Zn

IO-Link Version 1.1

No. of IO-Link master ports		4× master
Operating modes (3-wire)		SIO, COM 1, COM 2, COM 3
Display	Communication	LED green
	Error	LED red
Max. load current for IO-Link device		1.6 A

Ethernet
Innovations from Balluff

	Ethernet/IP	Ethernet/IP	Ethernet/IP	Ethernet/IP
	16 DI/DO PNP configurable	16 DI PNP	8 DO PNP	8 DI/DO PNP configurable
	BNI004F	**BNI004M**	**BNI005J**	**BNI0044**
	BNI EIP-302-105-Z015	BNI EIP-104-105-Z015	BNI EIP-202-105-Z015	BNI EIP-307-100-Z014
	18...30 V DC	18...30 V DC	18...30 V DC	18...30 V DC
	120...130 mA	120...130 mA	BUS/RUN	120...130 mA
	US /no	US /no	Display/pushbutton	US /no
	yes	yes	yes	yes
	yes	yes	yes	yes
	Black, red, yellow	Black, red, yellow	Black, red, yellow	Black, red, yellow
	M12, D-coded, female	M12, D-coded, female	M12, D-coded, female	M12, D-coded, female
	7/8", plug, 4-pin	7/8", plug, 4-pin	7/8", plug, 4-pin	7/8", plug, 4-pin
	M12, A-coded, female	M12, A-coded, female	M12, A-coded, female	M12, A-coded, female
	8	8	8	4
	max. 16 PNP	max. 16 PNP		max. 8 PNP
	max. 16 PNP		8	max. 8 PNP
	yes	no	no	yes
	200 mA	200 mA		200 mA
	1.6 A/2 A		2 A	1.6 A/2 A
	LED yellow	LED yellow	LED yellow	LED yellow
	LED red	LED red	LED red	LED red
	≤ 9 A	≤ 9 A	≤ 9 A	≤ 9 A
	≤ 9 A	≤ 9 A		≤ 9 A
	IP 67 (when screwed into place)	IP 67 (when screwed into place)	IP 67 (when screwed into place)	IP 67 (when screwed into place)
	–5...+70 °C	–5...+70 °C	–5...+70 °C	–5...+70 °C
	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C
	2 mounting holes	2 mounting holes	2 mounting holes	2 mounting holes
	225×68×36.9 mm	225×68×36.9 mm	175×68×36.9 mm	175×68×36.9 mm
	Nickel-plated GD-Zn	Nickel-plated GD-Zn	Nickel-plated GD-Zn	Nickel-plated GD-Zn

more added value

Second generation with display, integrated switch and web server

Profinet is increasingly becoming the communications medium of the future for mechanical and plant engineering. In some areas, it has already incrementally replaced the Profibus. Profinet has for a long time been a globally recognized standard for network technology. Based on Ethernet, communication over Profinet is significantly faster, and the volume of data is significantly higher than with classic fieldbus systems and allows the connection of time-critical drive technology. Furthermore, Profinet is quick to install and integrates easily into existing networks. In addition to time savings and considerable cost savings comes the added benefit of ease of operation. This is because only Balluff provides Profinet modules with a display that allows IP addresses to be blocked, protecting the modules from accidental changes. This increases security and simplifies maintenance.

Naturally, even in the second generation of Profinet modules, IO-Link is a firmly entrenched part. The Profinet module with IO-Link functionality has four or eight IO-Link master ports, which the user can configure and use completely independently of one another. You get four additional, freely configurable standard-I/O ports, which make an additional eight inputs/outputs available for standard sensors and actuators.

As a new feature, the second generation of Profinet provides an integrated 2-port Ethernet switch that makes it possible to install a linear topology in the system without an additional external switch.

The integrated web server is likewise new in this generation.

IO-Link
Version 1.1

Fieldbus	Profinet	
Version	8× IO-Link, 16× DI/DO	
Ordering code	**BNI005H**	
Part number	BNI PNT-508-105-Z015	
Supply voltage U_B	18...30 V DC	
Function indicator	BUS/RUN	
Indicators/input	Display/pushbutton	
Module status indicator: Mod LED	yes	
Network status indicator: Net LED	yes	
Port status indicator	Black, red, yellow	
Connection: Fieldbus	M12, D-coded, female	
Connection: AUX power	7/8", plug, 5-pin	
Connection: I/O ports	M12, A-coded, female	
No. of I/O ports	8	
Number of inputs	max. 16 PNP	
Number of outputs	max. 16 PNP	
Configurable inputs/outputs	yes	
Max. load current sensors/channel	200 mA	
Max. load current, output	1.2 A/2 A	
Port status indicator (signal status)	LED yellow	
Port diagnostic indicator (overload)	LED red	
Total current $U_{Actuator}$	≤ 9 A	
Total current U_{Sensor}	≤ 9 A	
Degree of protection as per IEC 60529	IP 67 (when screwed into place)	
Operating temperature T_a	–5...+70 °C	
Storage temperature	–25...+70 °C	
Mounting	2 mounting holes	
Dimensions (L×W×H)	225×68×36.9 mm	
Housing material	Nickel-plated GD-Zn	

IO-Link Version 1.1

No. of IO-Link master ports		8× master
Operating modes (3-wire)		SIO, COM 1, COM 2, COM 3
Display	Communication	LED green
	Error	LED red
Max. load current for IO-Link device		1.2 A

Profinet

Profinet Gen II

IO-Link

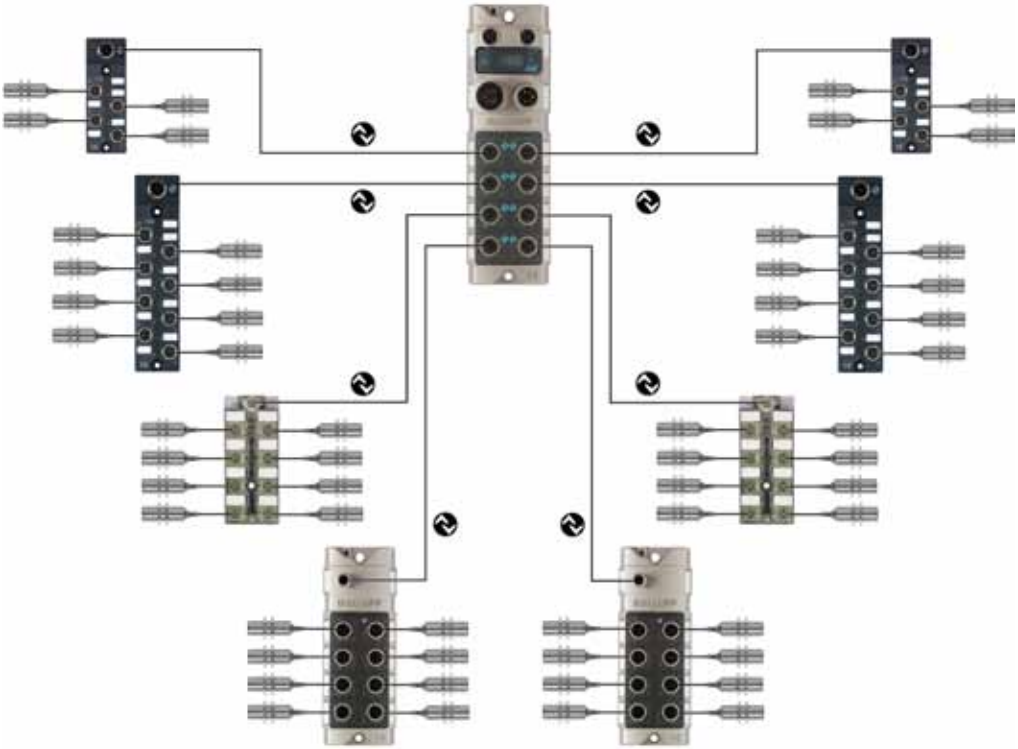
	Profinet	Profinet	Profinet	Profinet	Profinet
	4× IO-Link, 16× DI/DO	16× DI/DO, configurable	16 DI	8 DO	8 DI/8 DO
	BNI004U	**BNI0052**	**BNI0053**	**BNI005F**	**BNI005K**
	BNI PNT-502-105-Z015	BNI PNT-302-105-Z015	BNI PNT-104-105-Z015	BNI PNT-202-105-Z015	BNI PNT-305-105-Z015
	18...30 V DC	18...30 V DC	18...30 V DC	18...30 V DC	18...30 V DC
	BUS/RUN	BUS/RUN	BUS/RUN	BUS/RUN	BUS/RUN
	Display/pushbutton	Display/pushbutton	Display/pushbutton	Display/pushbutton	Display/pushbutton
	yes	yes	yes	yes	yes
	yes	yes	yes	yes	yes
	Black, red, yellow	Black, red, yellow	Black, red, yellow	Black, red, yellow	Black, red, yellow
	M12, D-coded, female	M12, D-coded, female	M12, D-coded, female	M12, D-coded, socket	M12, D-coded, female
	7/8", plug, 5-pin	7/8", plug, 5-pin	7/8", plug, 5-pin	7/8", plug, 5-pin	7/8", plug, 5-pin
	M12, A-coded, female	M12, A-coded, female	M12, A-coded, female	M12, A-coded, socket	M12, A-coded, female
	8	8	8	8	8
	max. 16 PNP	max. 16 PNP	16 PNP		8 PNP
	max. 16 PNP	max. 16 PNP		8 PNP	8 PNP
	yes	yes	no	no	no
	200 mA	200 mA	200 mA		200 mA
	1.6 A/2 A	2 A		2 A	2 A
	LED yellow	LED yellow	LED yellow	LED yellow	LED yellow
	LED red	LED red	LED red	LED red	LED red
	≤ 9 A	≤ 9 A		≤ 9 A	≤ 9 A
	≤ 9 A	≤ 9 A	≤ 9 A		≤ 9 A
	IP 67 (when screwed into place)	IP 67 (when screwed into place)	IP 67 (when screwed into place)	IP 67 (when screwed into place)	IP 67 (when screwed into place)
	–5...+70 °C	–5...+70 °C	–5...+70 °C	–5...+70 °C	–5...+70 °C
	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C	–25...+70 °C
	2 mounting holes	2 mounting holes	2 mounting holes	2 mounting holes	2 mounting holes
	225×68×36.9 mm	225×68×36.9 mm	225×68×36.9 mm	175×68×36.9 mm	300×68×36.9 mm
	Nickel-plated GD-Zn	Nickel-plated GD-Zn	Nickel-plated GD-Zn	Nickel-plated GD-Zn	Nickel-plated GD-Zn

4× master
SIO, COM 1, COM 2, COM 3
LED green
LED red
1.6 A

more added value

136 IOs on a module
Balluff IO-Link solutions save cash money
Until now, at least 9 fieldbus modules had to be used in order to be able to activate 136 IOs. Today, a single Profinet module is sufficient. In connection with the extremely cost-effective sensor/actuator hubs from Balluff, now up to 136 IO signals are offered which can be processed in a most efficient manner. In this way, compared to the standard fieldbus modules, there is a high cost savings of 15 to 20 % per input. If you add the savings from the fieldbus and power cables to that, you get 30 to 40 %. A cost-effective M12 BCC standard cable is sufficient to switch on a sensor/actuator hub. Furthermore, sensor hubs need just one bus address, can variably group sensor signals together within an area of 20 m and ensure exceptional efficiency.

New



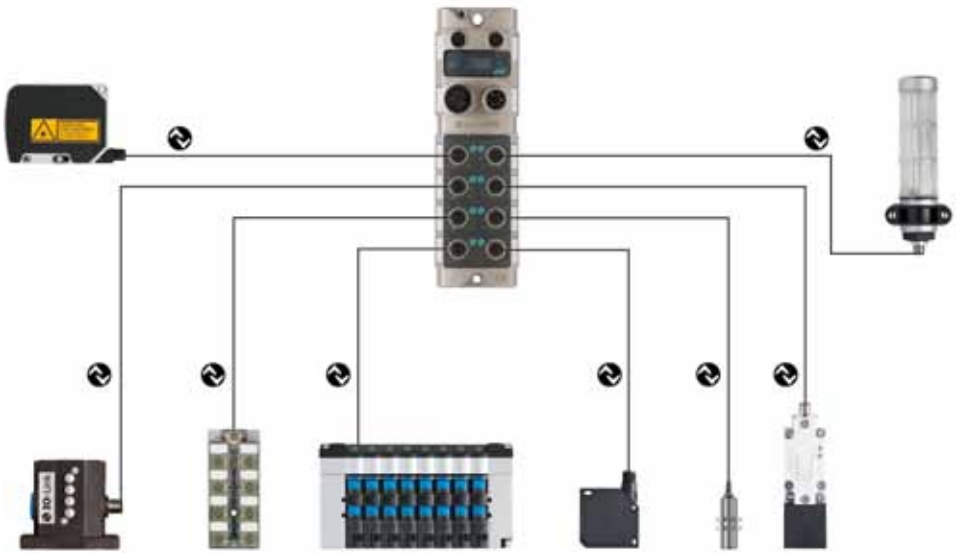
Profinet

Profinet fieldbus module with eight IO-Link ports

1000 tasks, one module:
The Profinet module with eight IO-Link ports

Whether position measurement, object detection, identification, fluid sensor applications, temperature or pressure measurement, through IO-Link, the Profinet module is suitable for every job.
IO-Link provides advantages not only in installing standard sensors, but also can integrate intelligent devices via the same interface. With that, the module provides a uniform interface from the signal to the control level.

During field installation of intelligent devices, there are frequently high costs, as shielded cable and intelligent interface cards such as analog input cards are used in the controller. IO-Link not only makes error-prone analog inputs superfluous, it also reduces the wiring, inspection and hardware effort. Because with simple plug-and-play of unshielded, cost-effective M12 lines, the system is quickly and securely brought into operation.



more added value

Second generation with display
In use for years, Profibus stands for well-engineered fieldbus technology and reliably supports modern manufacturing.

As a full-service provider, Balluff offers a wide range of components for optimum Profibus use. Regardless of controller manufacturer, Balluff has the perfect solution in store for users for efficient field and process communication with simple wiring and fast integration through direct installation in your system and the possibility of fast modifications. Even in harsh environments.

Balluff Profibus solutions are IO-Link capable, allowing solid IO-Link benefits to apply here. Wiring is made even simpler. From start to finish, diagnostics prevent system shutoff, and through central configuration, systems are returned to operation as quickly as possible. Users save time and benefit from real cost advantages.

Now, Balluff is sending the second generation of the Profibus module into operation, and it provides even more advantages.

In addition to time savings and considerable cost savings, it provides even greater ease of operation. Because only Balluff now also provides the Profibus module with displays with which you can set station numbers or call up module information like the hardware and software status. This increases security and simplifies maintenance.

Of course, IO-Link is also a firmly entrenched component in the second generation of Profibus modules. The Profibus – module with IO-Link functionality has four IO-Link master ports, which can be configured and implemented completely independently of each other. You get four additional, freely configurable standard I/O ports that provide an additional eight inputs/outputs for standard sensors and actuators.

IO-Link
Version 1.1

Fieldbus	Profibus
Version	4× IO-Link, 16× DI/DO
Ordering code	**BNI005R**
Part number	BNI PBS-502-101-Z001
Supply voltage U_B	18...30 V DC
Indicators/input	BUS/RUN
Function indicator	Display/pushbutton
Module status indicator: Mod LED	yes
Network status indicator: Net LED	yes
Port status indicator	Black, red, yellow
Connection: Fieldbus	M12, B coded, female/male
Connection: AUX power	7/8", plug, 5-pin
Connection: I/O ports	M12, A-coded, female
No. of I/O ports	8
Number of inputs	max. 16 PNP
Number of outputs	max. 16 PNP
Configurable inputs/outputs	yes
Max. load current sensors/channel	200 mA
Max. load current, output	1.6 A/2 A
Port status indicator (signal status)	LED yellow
Port diagnostic indicator (overload)	LED red
Total current $U_{Actuator}$	≤ 9 A
Total current U_{Sensor}	≤ 9 A
Degree of protection as per IEC 60529	IP 67 (when screwed into place)
Operating temperature T_a	–5...+70 °C
Storage temperature	–25...+70 °C
Mounting	2 mounting holes
Dimensions (L×W×H)	225×68×36.9 mm
Housing material	Nickel-plated GD-Zn

IO-Link Version 1.1

No. of IO-Link master ports		4× master
Operating modes (3-wire)		SIO, COM 1, COM 2, COM 3
Display	Communication	LED green
	Error	LED red
Max. load current for IO-Link device		1.6 A

Profibus

Profibus Gen II

	Profibus	Profibus	Profibus
	16× DI/DO, configurable	16 DI	8 DO
	BNI0047	**BNI005C**	**BNI0057**
	BNI PBS-302-101-Z001	BNI PBS-104-101-Z001	BNI PBS-202-101-Z001
	18...30 V DC	18...30 V DC	18...30 V DC
	BUS/RUN	BUS/RUN	BUS/RUN
	Display/pushbutton	Display/pushbutton	Display/pushbutton
	yes	yes	yes
	yes	yes	yes
	Black, red, yellow	Black, red, yellow	Black, red, yellow
	M12, B coded, female/male	M12, B coded, female/male	M12, B coded, female/male
	7/8", plug, 5-pin	7/8", plug, 5-pin	7/8", plug, 5-pin
	M12, A-coded, female	M12, A-coded, female	M12, A-coded, female
	8	8	8
	max. 16 PNP	16 PNP	8 PNP
	max. 16 PNP		
	yes	no	no
	200 mA	200 mA	
	2 A		2 A
	LED yellow	LED yellow	LED yellow
	LED red	LED red	LED red
	≤ 9 A		≤ 9 A
	≤ 9 A	≤ 9 A	
	IP 67 (when screwed into place)	IP 67 (when screwed into place)	IP 67 (when screwed into place)
	–5...+70 °C	–5...+70 °C	–5...+70 °C
	–25...+70 °C	–25...+70 °C	–25...+70 °C
	2 mounting holes	2 mounting holes	2 mounting holes
	225×68×36.9 mm	225×68×36.9 mm	175×68×36.9 mm
	Nickel-plated GD-Zn	Nickel-plated GD-Zn	Nickel-plated GD-Zn

Modules with Display
Innovations from Balluff

The active distributors for the CC-Link and Ethernet/IP fieldbus systems are the first modules on the market with a display for indicating and entering:

– Node addresses
– Data transmission rates
– Module information (software, firmware, etc.)

The high-resolution, luminous display provides a simple, self-explanatory menu navigation. In this way, two buttons are sufficient to enter and select the individual menu items.

EtherNet/IP™ CC-Link PROFINET PROFIBUS

The display can be locked by the PLC. This is an integral part of the module. With it, unauthorized access is automatically prevented. Two freely controlled LEDS (via the PLC) can also be used for display and diagnostics.

A further benefit:
Relevant information appears on the display, which facilitates diagnostics and thus increases system availability.

more added value

Web Server

Ethernet/IP Gen IV and Profinet Gen II

- A simple browser provides access to the integrated webserver, which has been implemented in all Ethernet/IP modules of Gen IV.

- Comprehensive diagnostic functions are available here, such as the presentation of all LED displays on the module including plain text presentations of the current displays.

- The "Device Properties" area allows you e.g. to parameterize connected devices at the IO-Link port.

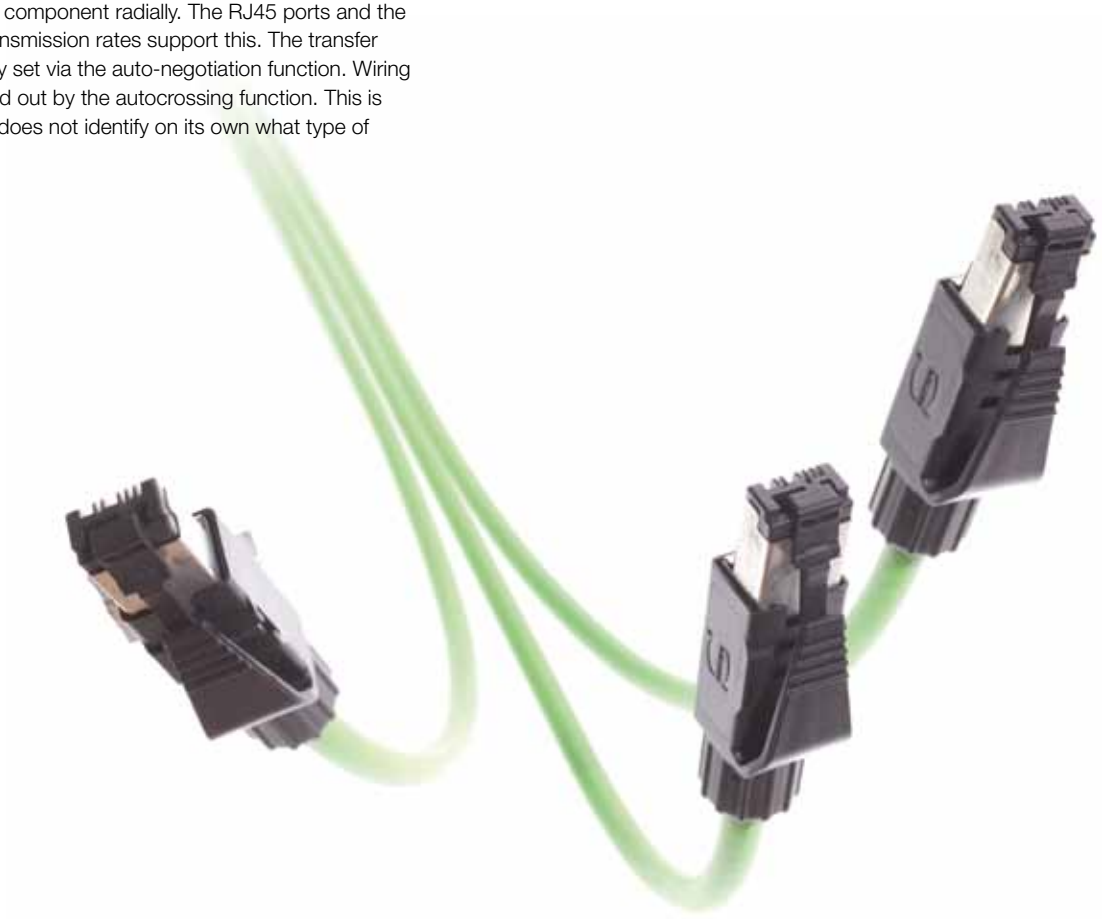
- The "Configurations" function contains the module setting, such as the assignment of the IP address.

more added value

Ethernet 5 port switch
Ethernet 8 port switch
Ethernet-based network systems are gaining more and more importance in industrial automation. Balluff provides a wide variety of Ethernet-based systems and network components such as Profinet or Ethernet/IP for machine and plant equipment.

Balluff now offers a complete system so that you can easily link Ethernet system components with the Ethernet. This is due to the Ethernet product line being expanded by adding the 5- and 8-port Ethernet switch.

With the switch, it is now possible to connect 5-port and 8-port Ethernet devices to a component radially. The RJ45 ports and the 10 and 100 Mbps transmission rates support this. The transfer speed is automatically set via the auto-negotiation function. Wiring errors are reliably ruled out by the autocrossing function. This is because the module does not identify on its own what type of cable is being used.



Ethernet Unmanaged Switch

New

Communication	Ethernet	Ethernet
Version	Ethernet switch	Ethernet switch
Ordering code	**BNI005E**	**BNI0067**
Part number	BNI TCP-951-000-E028	BNI TCP-952-000-E029
Ports	5×RJ45 Spring force clamp	8×RJ45 Spring force clamp
System power supply	0,2...2,5 mm²	0,2...2,5 mm²
Supply voltage U_B	12...48 V DC	2×12…30 V DC redundant
Transfer rate	10/100 Mbps full duplex Auto crossing	10/100 Mbps full duplex Auto crossing
Operating modes	Auto negotiation	Auto negotiation
Communication status	Link/run LED, (yellow/green)	Link/run LED, (yellow/green)
Supply voltage	LED (green), power	LED (green), power
Degree of protection	IP 20	IP 20
Housing	Black plastic	Black plastic
Temperature range	–10...+60 °C (storage temperature –25...+70 °C)	–10...+60 °C (storage temperature –25...+70 °C)
Mounting type	Snaps onto support rail TH35 (EN60715)	Snaps onto support rail TH35 (EN60715)
Weight	152 g	363 g

more added value

- High visibility of LEDs
- Flexible mounting options
- High shock and vibration ratings

Passive splitter boxes by Balluff

Balluff BPI Passive Interfaces for connecting sensors and actuators with the controller are particularly well suited to adverse conditions and recommended where coolants and lubricants are used. A fully enclosed housing provides a higher enclosure rating as well as better shock and vibration resistance characteristics. Due to an outstanding design, Balluff BPI Passive Interfaces can be integrated in all systems and machines. The BPI can be flexibly mounted on all standard profiles and base plates and the mounting bore holes are centrally positioned.
Flexible mounting is supported by highly visible LEDs.
Setting up and adjusting your machines and systems is much easier as a result.

Type	4-way, cap with cable	8-way, cap with cable
Rated power supply U_e	24 V DC	24 V DC
Supply voltage U_B	10...30 V DC	10...30 V DC
Function indicator		
Power indicator		
Sensor connection		
Controller connection	Cap connection with cable	Cap connection with cable
Number of connections		
Current load capacity	2 A	2 A
Total current	6 A	6 A
Housing material	PBT, GF	PBT, GF
Degree of protection per IEC 60529		
Ambient temperature T_a	–25...+80 °C	–25...+80 °C
Version	for base	for base
Recommended connector-port		

Cable material	Color	Length	Ordering code Part number	
PUR	Black	3 m	BPI T009-K-00-KPX70-030	BPI T00E-K-00-KPXB0-030
PUR	Black	5 m	BPI T009-K-00-KPX70-050	BPI T00E-K-00-KPXB0-050
PUR	Black	10 m	BPI T009-K-00-KPX70-100	BPI T00E-K-00-KPXB0-100
PUR	Black	15 m	BPI T009-K-00-KPX70-150	BPI T00E-K-00-KPXB0-150

Passive splitter box BPI, 4-pin

	4-way, base with LEDs	8-way, base with LEDs	4-way, M12 with LEDs	8-way, M12 with LEDs
	24 V DC	24 V DC	24 V DC	24 V DC
	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
	Yes	Yes	Yes	Yes
	Green LED	Green LED	Green LED	Green LED
	4-pin female, M12×1	4-pin female, M12×1	4-pin female, M12×1	4-pin female, M12×1
	Cap connection with/without cable	Cap connection with/without cable	Cap connection without cable	Cap connection without cable
	4	4	4	4
	2 A	2 A	2 A	2 A
	6 A	6 A	6 A	6 A
	PBT, GF, fully enclosed	PBT, GF, fully enclosed	PBT, GF, fully enclosed	PBT, GF, fully enclosed
	IP 67 (when connected)	IP 67 (when connected)	IP 67 (when connected)	IP 67 (when connected)
	–25...+80 °C	–25...+80 °C	–25...+80 °C	–25...+80 °C
	PNP normally open (NO)⎍	PNP normally open (NO)⎍	PNP normally open (NO)⎍	PNP normally open (NO)⎍
	BCC M414...	BCC M414...	BCC M414...	BCC M414...
	BPI007A	**BPI007E**	**BPI007L**	**BPI007J**
	BPI 4M4A4P-2K-00-TP09	BPI 8M4A4P-2K-00-TP0E	BPI 4M4A4P-2K-00-TPS9	BPI 8M4A4P-2K-00-TPSE

Ideal areas of application for passive splitter boxes by Balluff include local installations in assembly and handling machines, packaging technology, special machine construction, etc.

Balluff Passive Interface BPI – A multi-talent, even under demanding conditions

- Outstanding design
- Fully enclosed housing
- High shock and vibration ratings
- Flexible mounting options
- High visibility of LEDs
- Large terminal compartment
- Modular design
- Quick to mount/detach for transportation

Type	4-way, cap with cable	8-way, cap with cable
Rated power supply U_e	24 V DC	24 V DC
Supply voltage U_B	10...30 V DC	10...30 V DC
Function indicator		
Power indicator		
Sensor connection		
Controller connection	Cap connection with cable	Cap connection with cable
Number of connections		
Current load capacity	2 A	2 A
Total current	6 A	6 A
Housing material	PBT, GF	PBT, GF
Degree of protection per IEC 60529		
Ambient temperature T_a	–25...+80 °C	–25...+80 °C
Version	for base	for base
Recommended connector-port		

Cable material	Color	Length	Ordering code Part number	
PUR	Black	3 m	BPI T00G-K-00-KPXB0-030	BPI T00N-K-00-KPXL0-030
PUR	Black	5 m	BPI T00G-K-00-KPXB0-050	BPI T00N-K-00-KPXL0-050
PUR	Black	10 m	BPI T00G-K-00-KPXB0-100	BPI T00N-K-00-KPXL0-100
PUR	Black	15 m	BPI T00G-K-00-KPXB0-150	BPI T00N-K-00-KPXL0-150

Passive splitter box BPI, 5-pin




	4-way, base with LEDs	8-way, base with LEDs	4-way, M12 with LEDs	8-way, M12 with LEDs
	24 V DC	24 V DC	24 V DC	24 V DC
	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
	Yes	Yes	Yes	Yes
	Green LED	Green LED	Green LED	Green LED
	5-pin female, M12×1	5-pin female, M12×1	5-pin female, M12×1	5-pin female, M12×1
	Cap connection with/without cable	Cap connection with/without cable	Cap connection without cable	Cap connection without cable
	4	4	4	4
	2 A	2 A	2 A	2 A
	6 A	6 A	6 A	6 A
	PBT, GF, fully enclosed	PBT, GF, fully enclosed	PBT, GF, fully enclosed	PBT, GF, fully enclosed
	IP 67 (when connected)	IP 67 (when connected)	IP 67 (when connected)	IP 67 (when connected)
	–25...+80 °C	–25...+80 °C	–25...+80 °C	–25...+80 °C
	PNP normally open/ normally closed (NO/NC) ⎍ / ⎍	PNP normally open/ ormally closed (NO/NC) ⎍ / ⎍	PNP normally open/ normally closed (NO/NC) ⎍ / ⎍	PNP normally open/ normally closed (NO/NC) ⎍ / ⎍
	BCC M415...	BCC M415...	BCC M415...	BCC M415...
	BPI007C	**BPI007F**	**BPI007K**	**BPI007H**
	BPI 4M4A5P-2K-00-TP09	BPI 8M4A5P-2K-00-TP0N	BPI 4M4A5P-2K-00-TPSG	BPI 8M4A5P-2K-00-TPSN

more added value

Until now, you had a difficult choice when installing plug connectors. Either you could use a plug with a molded cable and in this manner achieve higher leakproofness, or you could decide in favor of an adjustable plug, if you need flexible cable length.

This either/or is now over. Because the adjustable and castable BCC0CAA plug provides both: higher leakproofness and flexible cable length. The cable is shortened, connected and the plug is easily molded (see drawing). With the BCC0CAA, you increase the reliability of your installation and simultaneously decide the cable length yourself.

In rough environments and extensive systems, the plug is therefore outstandingly well suited.

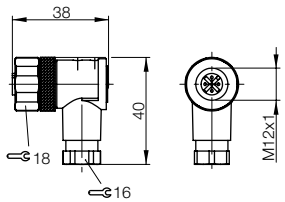
- Higher leakproofness
- Flexible cable length
- Reliable
- For rough environments
- For extensive systems

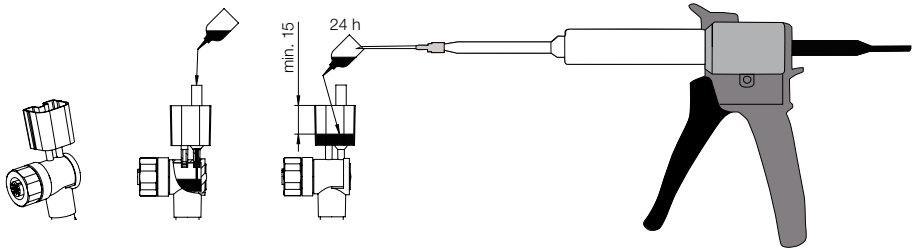
Hook up, seal, forget

New

Connector diagram and wiring		
Connector		M12
Version		Can be fabricated
Use		Socket
Ordering code		**BCC0CAA**
Part number		BCC S445-0000-1A-000-51X475-000-C024
Supply voltage max. AC U_B		125 V AC
Supply voltage max. DC U_B		125 V DC
Wire cross-section		0.14...0.75 mm²
Cable diameter		6...8 mm
Degree of protection as per IEC 60529		IP 67
Ambient temperature T_a		–25...+85 °C
Material	Grip body	PBT, transparent
	Contact	CuZn
	Contact holder	PA

IP 67+



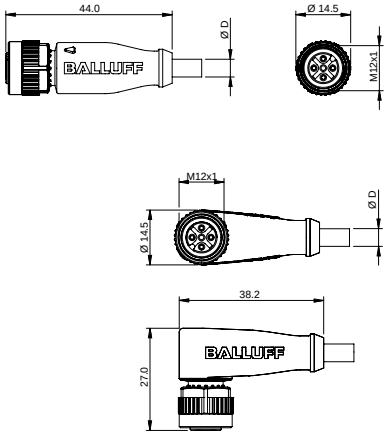


more added value

New BCC connectors up to 120 °C
The durable BCC connectors with IP 68 protection are ideally matched to the wiring and suitable for rapid connection of sensors/ actuators in the industrial automation sector. New products include versions for high-temperature applications up to 120 °C, for example, for the connection of high pressure-resistant sensors in hydraulic applications.

- Temperature range –25…+120 °C
- Degree of protection IP 68
- Flame-resistant
- Straight and angular
- 3-pin, 4-pin
- Easy to find notches on the handle body

120 °C
High Temperature

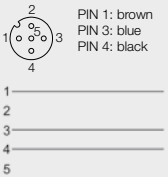
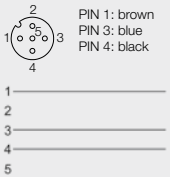
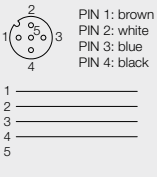
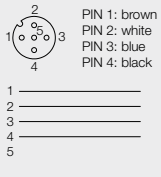


Connector diagram and wiring	
Max. supply voltage AC U_B	
Max. supply voltage DC U_B	
Cable	
No. of wires × conductor cross-section	
Degree of protection as per IEC 60529	
Ambient temperature T_a	
Version	

Cable material	Color	Length	
PUR	Black	2 m	
PUR	Black	3 m	
PUR	Black	5 m	
PUR	Black	10 m	

Other cable materials, colors and lengths on request. Connectors without LED are suitable for PNP and NPN switching functions. NPN versions with LED on request.




				
	250 V AC 250 V DC	250 V AC 250 V DC	250 V AC 250 V DC	250 V AC 250 V DC
	Molded	Molded	Molded	Molded
	3×0.34 mm²	3×0.34 mm²	4×0.34 mm²	4×0.34 mm²
	IP 68	IP 68	IP 68	IP 68
	–25...+120 °C	**–25...+120 °C**	**–25...+120 °C**	**–25...+120 °C**
	Normally open (NO)	Normally open (NO)	Antivalent (NO/NC)	Antivalent (NO/NC)

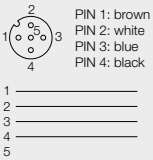
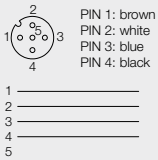
Ordering code			
Part number			
BCC082W	**BCC0832**	**BCC0AA9**	**BCC0AAE**
BCC M415-0000-1A-001-PH0334-020	BCC M425-0000-1A-001-PH0334-020	BCC M415-0000-1A-003-PH0434-020	BCC M425-0000-1A-003-PH0434-020
BCC084N	**BCC0852**		
BCC M415-0000-1A-001-PH0334-030	BCC M425-0000-1A-001-PH0334-030		
BCC082Y	**BCC0833**	**BCC0AAA**	**BCC0AAF**
BCC M415-0000-1A-001-PH0334-050	BCC M425-0000-1A-001-PH0334-050	BCC M415-0000-1A-003-PH0434-050	BCC M425-0000-1A-003-PH0434-050
BCC082Z	**BCC0AA8**	**BCC0AAC**	**BCC0AAH**
BCC M415-0000-1A-001-PH0334-100	BCC M425-0000-1A-001-PH0334-100	BCC M415-0000-1A-003-PH0434-100	BCC M425-0000-1A-003-PH0434-100

more added value

New PUR lines
Standard PUR lines have numerous advantages. They are resilient, wear-resistant, impact-resistant and resistant against solvents. Balluff now also has weld spatter-resistant versions according to ISO 14001 in its product range. This permits the replacement of irradiation-crosslinked lines, which require costly disposal as hazardous waste at the end of their service life. Possible field of applications include automobile manufacturing, in particular, bodyshell work.

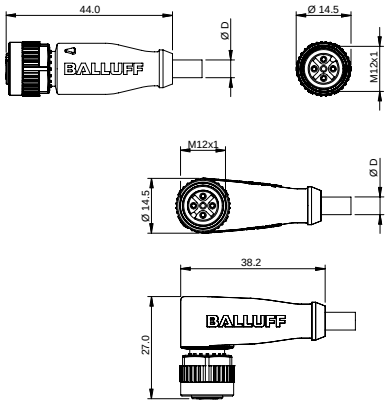
- Resistant to sparks and weld spatter
- Degree of protection IP 68
- Conforms with ISO 14001 – not hazardous waste
- Replacement for irradiation-crosslinked lines
- Jacket color: Black
- Torsional stress 180 °C
- Meets all requirements in the automobile industry

Weld spatter-resistant PUR lines

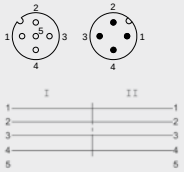
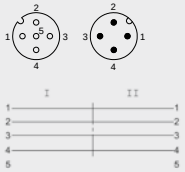
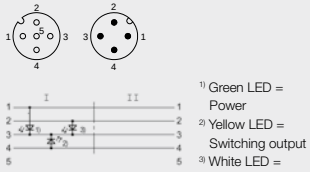
Connector diagram and wiring		
Max. supply voltage AC U_B	250 V AC	250 V AC
Max. supply voltage DC U_B	250 V DC	250 V DC
Cable	Molded	Molded
No. of wires × conductor cross-section	4×0.34 mm²	4×0.34 mm²
Degree of protection as per IEC 60529	IP 68	IP 68
Ambient temperature T_a	–25...+80 °C	–25...+80 °C
Version	Antivalent (NO/NC)	Antivalent (NO/NC)

Cable material	Color	Length	Ordering code	
			Part number	
PUR	Black	2 m	**BCC0AK4**	
			BCC M415-0000-1A-003-PW0434-020	
PUR	Black	5 m	**BCC0AK5**	**BCC0AKE**
			BCC M415-0000-1A-003-PW0434-050	BCC M425-0000-1A-003-PW0434-050
PUR	Black	10 m	**BCC0AK6**	**BCC0AKF**
			BCC M415-0000-1A-003-PW0434-100	BCC M425-0000-1A-003-PW0434-100

Other cable lengths on request.
Connectors without LED are suitable for PNP and NPN switching functions. NPN versions with LED on request.

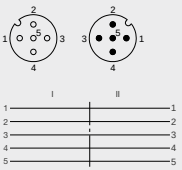


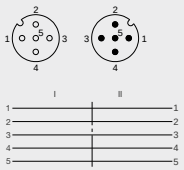
more added value

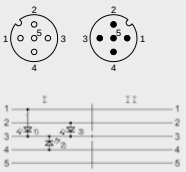
Connector diagram and wiring			
Max. supply voltage AC U_B	250 V AC	250 V AC	
Max. supply voltage DC U_B	250 V DC	250 V DC	30 V DC
Cable	Molded	Molded	Molded
No. of wires × conductor cross-section	4×0.34 mm²	4×0.34 mm²	4×0.34 mm²
Degree of protection per IEC 60529	IP 68	IP 68	IP 68
Ambient temperature T_a	–25...+80 °C	–25...+80 °C	–25...+80 °C
Version	Antivalent (NO/NC) ⎍ / ⎍	Antivalent (NO/NC) ⎍ / ⎍	Antivalent (NO/NC) ⎍ / ⎍
LED, head translucent			green/yellow/white

Cable material	Color	Length	Ordering code Part number		
PUR	Black	0.3 m	**BCC0AP1** BCC M415-M414-3A-304-PW0434-003	**BCC0ANP** BCC M425-M414-3A-304-PW0434-003	**BCC0ANE** BCC M425-M414-3A-650-PW0434-003
PUR	Black	0.6 m	**BCC0AP2** BCC M415-M414-3A-304-PW0434-006	**BCC0ANR** BCC M425-M414-3A-304-PW0434-006	**BCC0ANF** BCC M425-M414-3A-650-PW0434-006
PUR	Black	1 m	**BCC0AP3** BCC M415-M414-3A-304-PW0434-010	**BCC0ANT** BCC M425-M414-3A-304-PW0434-010	**BCC0ANH** BCC M425-M414-3A-650-PW0434-010
PUR	Black	1.5 m	**BCC0AP4** BCC M415-M414-3A-304-PW0434-015	**BCC0ANU** BCC M425-M414-3A-304-PW0434-015	**BCC0ANJ** BCC M425-M414-3A-650-PW0434-015
PUR	Black	2 m	**BCC0AP5** BCC M415-M414-3A-304-PW0434-020	**BCC0ANW** BCC M425-M414-3A-304-PW0434-020	**BCC0ANK** BCC M425-M414-3A-650-PW0434-020
PUR	Black	3 m			
PUR	Black	5 m	**BCC0AP7** BCC M415-M414-3A-304-PW0434-050	**BCC0ANZ** BCC M425-M414-3A-304-PW0434-050	**BCC0ANM** BCC M425-M414-3A-650-PW0434-050

Other cable lengths on request.
Connectors without LED are suitable for PNP and NPN switching functions.
NPN versions with LED available upon request.







[1] Green LED = Power
[2] Yellow LED = Switching output
[3] White LED = Switching output

125 V AC	125 V AC	
125 V DC	125 V DC	30 V DC
Molded	Molded	Molded
5×0.34 mm²	5×0.25 mm²	5×0.34 mm²
IP 68	IP 68	IP 68
–25...+80 °C	–25...+80 °C	–25...+80 °C
Antivalent	Antivalent	Antivalent
(NO/NC) ⎍ / ⎍	(NO/NC) ⎍ / ⎍	(NO/NC) ⎍ / ⎍
		green/yellow/white

Ordering code Part number		
BCC0AJJ BCC M415-M415-3A-313-PW0534-006	**BCC0AKH** BCC M425-M415-3A-313-PW0534-006	**BCC0C0N** BCC M425-M415-3A-661-PW0534-006
BCC0AK7 BCC M415-M415-3A-313-PW0534-010	**BCC0AKJ** BCC M425-M415-3A-313-PW0534-010	**BCC0C0P** BCC M425-M415-3A-661-PW0534-010
BCC0C0M BCC M415-M415-3A-313-PW0534-015		**BCC0C0R** BCC M425-M415-3A-661-PW0534-015
BCC0AK8 BCC M415-M415-3A-313-PW0534-020	**BCC0AKK** BCC M425-M415-3A-313-PW0534-020	**BCC0C0T** BCC M425-M415-3A-661-PW0534-020
BCC0AK9 BCC M415-M415-3A-313-PW0534-030	**BCC0AKL** BCC M425-M415-3A-313-PW0534-030	**BCC0C0U** BCC M425-M415-3A-661-PW0534-030
BCC0AKA BCC M415-M415-3A-313-PW0534-050	**BCC0AKM** BCC M425-M415-3A-313-PW0534-050	**BCC0C0W** BCC M425-M415-3A-661-PW0534-050

more added value

New PUR lines
Standard PUR lines have numerous advantages. They are resilient, wear-resistant, impact-resistant and resistant against solvents. Balluff now also has weld spatter-resistant versions according to ISO 14001 in its product range. This permits the replacement of irradiation-crosslinked lines, which require costly disposal as hazardous waste at the end of their service life. Possible field of applications include automobile manufacturing, in particular, bodyshell work.

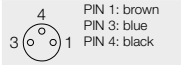
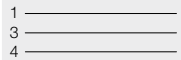
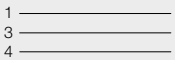
- Resistant to sparks and weld spatter
- Degree of protection IP 67 and IP 68
- Conforms with ISO 14001 – not hazardous waste
- Replacement for irradiation-crosslinked lines
- Jacket color: Orange
- Torsional stress 180 °C
- Meets all requirements in the automobile industry

Connector diagram and wiring	
Max. supply voltage AC U_B	
Max. supply voltage DC U_B	
Cable	
No. of wires × conductor cross-section	
Degree of protection per IEC 60529	
Ambient temperature T_a	
Version	

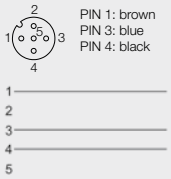
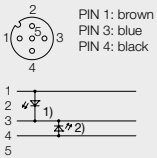
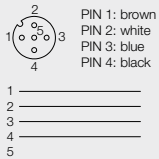
Cable material	Color	Length	
PUR	orange	5 m	

Other cable lengths on request.
Connectors without LED are suitable for PNP and NPN switching functions. NPN versions with LED available upon request.



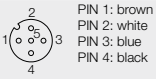

	 PIN 1: brown PIN 3: blue PIN 4: black 	 PIN 1: brown PIN 3: blue PIN 4: black 	 PIN 1: brown PIN 2: white PIN 3: blue PIN 4: black 	 PIN 1: brown PIN 2: white PIN 3: blue PIN 4: black 
	60 V AC	60 V AC	30 V AC	30 V AC
	60 V DC	60 V DC	30 V DC	30 V DC
	Molded	Molded	Molded	
	3×0.34 mm²	3×0.34 mm²	4×0.34 mm²	4×0.34 mm²
	IP 67	IP 67	IP 67	IP 67
	–25...+80 °C	–25...+80 °C	–25...+80 °C	–25...+80 °C
	Normally open	Normally open	Antivalent	Antivalent
	(NO)	(NO)	(NO/NC)	(NO/NC)
Ordering code				
Part number				
	BCC0C3A	**BCC0C24**	**BCC0C21**	**BCC0C20**
	BCC M313-0000-10-001-PW3334-050	BCC M323-0000-10-001-PW3334-050	BCC M314-0000-10-003-PW3434-050	BCC M324-0000-10-003-PW3434-050

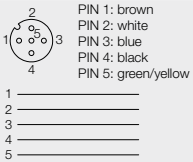


Connector diagram and wiring			
Max. supply voltage AC U_B	250 V AC		250 V AC
Max. supply voltage DC U_B	250 V DC	30 V DC	250 V DC
Cable	Molded	Molded	Molded
No. of wires × conductor cross-section	3×0.34 mm²	3×0.34 mm²	4×0.34 mm²
Degree of protection per IEC 60529	IP 68	IP 68	IP 68
Ambient temperature T_a	–25...+80 °C	–25...+80 °C	–25...+80 °C
Version	Normally open (NO)	Normally open (NO)	Antivalent (NO/NC)
LED, head translucent		green/yellow	

Cable material	Color	Length	Ordering code Part number		
PUR	orange	1.5 m			
PUR	orange	2 m	**BCC086T** BCC M425-0000-1A-001-PW3334-020	**BCC09J8** BCC M425-0000-1A-004-PW3334-020	**BCC09J6** BCC M415-0000-1A-003-PW3434-020
PUR	orange	3 m			
PUR	orange	5 m	**BCC086U** BCC M425-0000-1A-001-PW3334-050	**BCC08MZ** BCC M425-0000-1A-004-PW3334-030	**BCC0C23** BCC M415-0000-1A-003-PW3434-050
PUR	orange	7.5 m			
PUR	orange	10 m	**BCC086W** BCC M425-0000-1A-001-PW3334-100	**BCC08LE** BCC M425-0000-1A-004-PW3334-100	

Other cable lengths on request.
Connectors without LED are suitable for PNP and NPN switching functions.
NPN versions with LED available upon request.





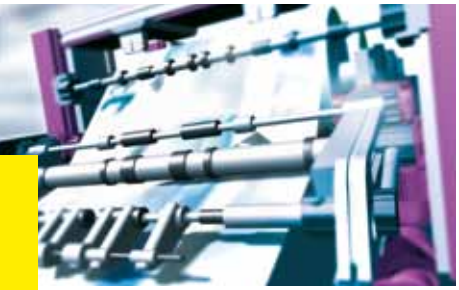
250 V AC	125 V AC	
250 V DC	125 V DC	30 V DC
Molded	Molded	Molded
4×0.34 mm²	5×0.25 mm²	5×0.34 mm²
IP 68	IP 68	IP 68
–25...+80 °C	–25...+80 °C	–25...+80 °C
Antivalent	Antivalent	Antivalent
(NO/NC) ⎍ / ⎍	(NO/NC) ⎍ / ⎍	(NO/NC) ⎍ / ⎍
		green/yellow/white

Ordering code		
Part number		
	BCC087F	**BCC087L**
	BCC M415-0000-1A-034-PW3534-015	BCC M425-0000-1A-040-PW3534-015
BCC0C22	**BCC087H**	**BCC087M**
BCC M425-0000-1A-003-PW3434-050	BCC M415-0000-1A-034-PW3534-050	BCC M425-0000-1A-040-PW3534-050
	BCC087J	**BCC087N**
	BCC M415-0000-1A-034-PW3534-075	BCC M425-0000-1A-040-PW3534-075
	BCC087K	**BCC087P**
	BCC M415-0000-1A-034-PW3534-100	BCC M425-0000-1A-040-PW3534-100

more added value

- Lower total cost of ownership
- Full line from a single source
- Increases functional reliability

Innovation with Balluff sensor systems and connectivity



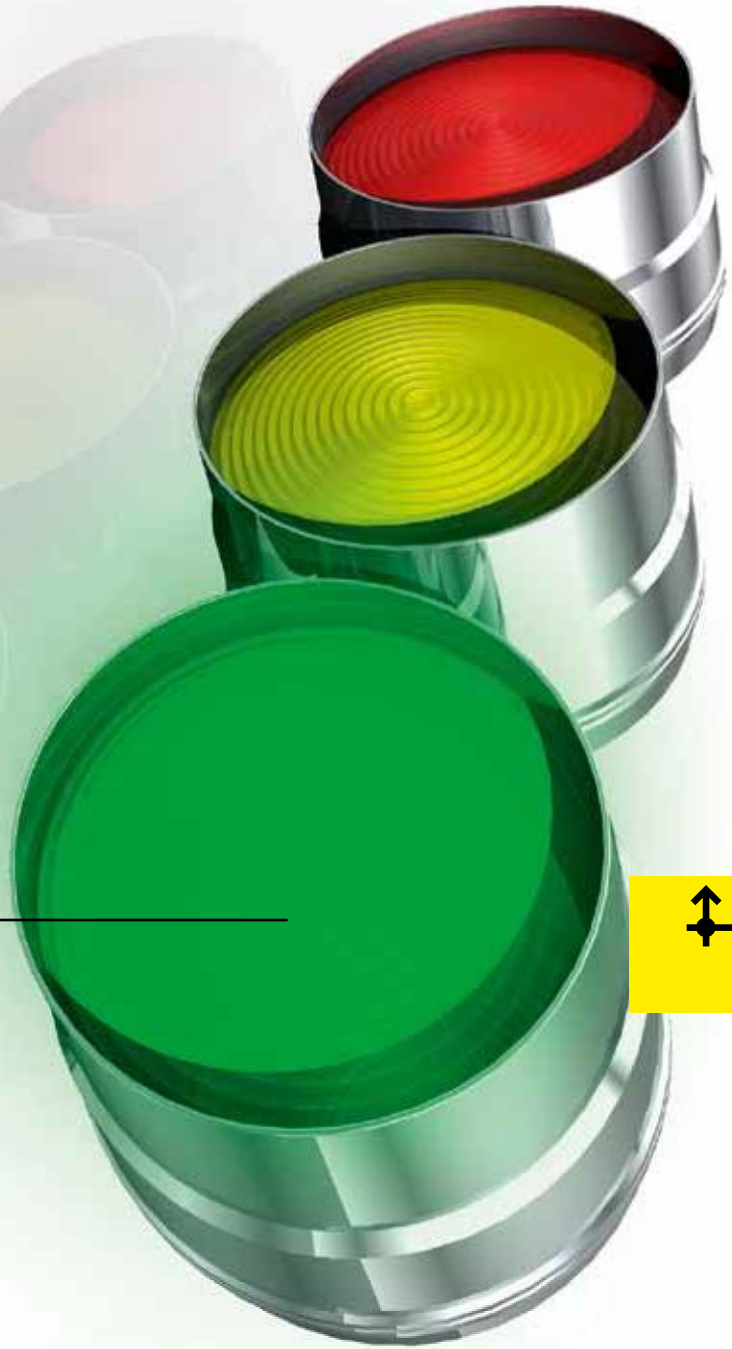
Reliable diagnostics are extremely important for highly dynamic machines. You can identify quality issues linked to the manufacturing process in real-time and take appropriate measures immediately. In the printing and paper machine industry, for example, the machine must react to faults within milliseconds.

Dynamic Sensor Control

Dynamic Sensor Control

Condition monitoring by Balluff

- Accurate planning
- Lower production costs
- Lower maintenance costs
- Faster access to information
- High degree of process reliability
- Optimized production
- Reliable quality



∑ Reduce your
total cost of ownership

Knowledge

Information

Data

Increase in diagnostic accuracy and functionality

IO-Link

- Continuous signal
- Diagnostics
- Parameter configuration

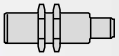
Switching state | Warning message | Error message | Parameter configuration

Dynamic Sensor Control

- Switching signal
- Diagnostics
- Warning messages

DESINA

- Switching signal
- Diagnostics

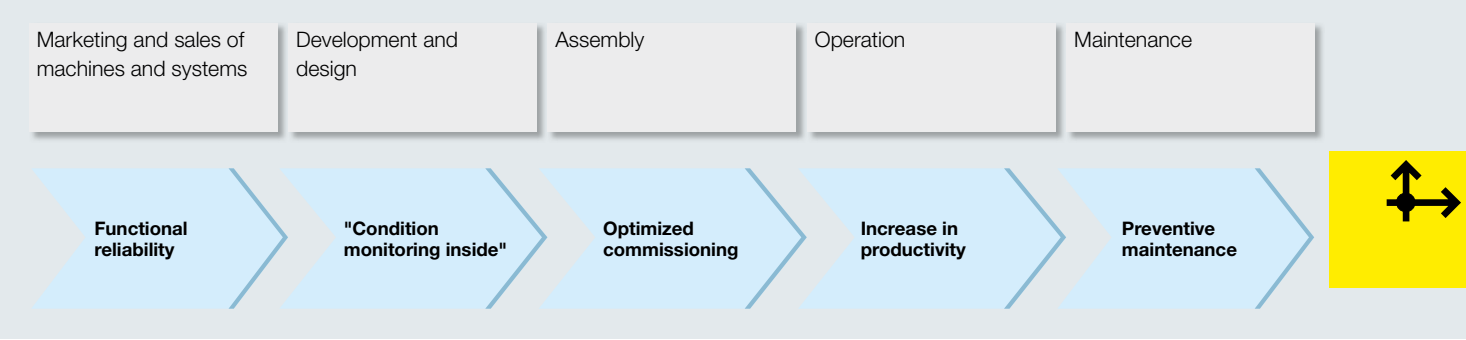


1/0

- Switching signal

Dynamic Sensor Control

Dynamic Sensor Control guarantees faster access to information and ensures simpler, more efficient commissioning and maintenance to increase the value of your machine concept.



All benefit from Dynamic Sensor Control

more added value

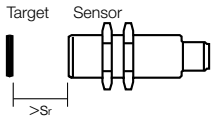
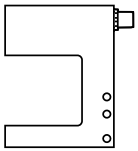
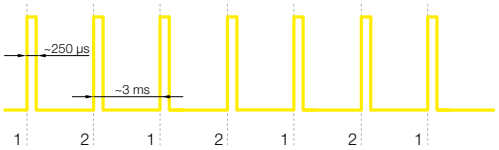
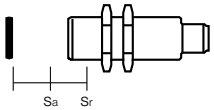
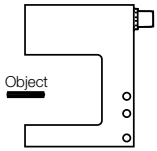
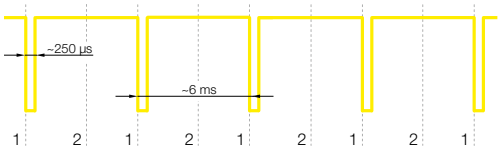
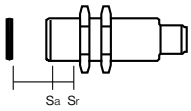
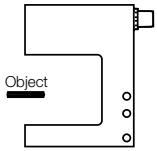
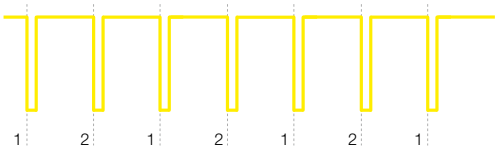
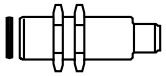
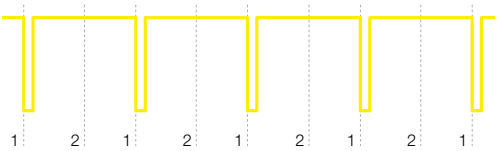
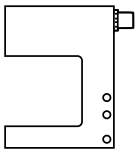
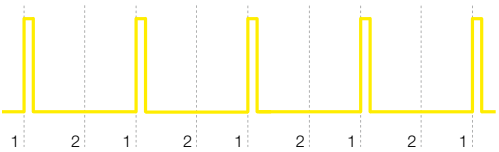
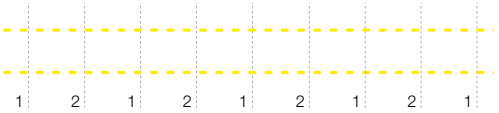
This compact IO-Link master module is equipped with four IO-Link ports that allow the connection of up to 32 DSC-compatible sensors in combination with DSC sensor hubs.

The DSC sensor hub acts as a data compressor that transfers the information from up to eight DSC ports to the IO-Link master module via IO-Link.

Refer to the "Industrial Networking and Connectivity" catalog to see other IO-Link master modules with additional IO ports or for information on installation in the control cabinet wall.

Dynamic Sensor Control

Condition monitoring by Balluff

Inductive high-end sensors	Photoelectric high-end sensors		
Target proximity >s_r 			**Switching state OK** Output Low
Target between s_a and s_r (typical)  LED flashing frequency low	Lens dirty 		**Warning message** Output High
Target in the safe area  LED stable on			**Switching state OK** Output High
Target too close  LED flashing frequency high			**Warning message** Output High
	Lens dirty 		**Warning message** Output Low
Sensor defective **A**ctive sensor element — Processing electronics — **Output** stage **Dynamic Sensor Control** Diagnostics from **A** to **O**	Sensor defective	 Coil break, fault in the processing electronics, output stage defective.	**Error** No pulses Output high or low

Capacitive Ø 20 mm sensor with Dynamic Sensor Control

Ordering code	BCS0001
Part number	BCS 20MG10-XPA1Y-8B-03
Switching type PNP complementary	■
Rated switching distance s_n	10 mm
Size, mounting	Ø 20 mm, flush
Supply voltage U_B	10...30 V DC
Function indicator	Yes
Degree of protection per IEC 60529	IP 63
Approvals	CE
Housing material	V2A, EP
Connection	3 m cable PUR, 3×0.25 mm²

Classic capacitive sensors

- Switching state: Target yes/no
- Warning message: –
- Error message: Sensor OK? yes/no

Inductive M12 sensors with Dynamic Sensor Control

Ordering code	BES02MC	BES02M5	BES02M8
Part number	BES 113-356-SA6-S4	BES 113-3019-SA1-S4	BES 113-356-SA31-S4
Switching type PNP normally open		■	
PNP normally closed	■		■
Rated switching distance s_n	3.7 mm		4 mm
Size, mounting	M12×1, non-flush		
Supply voltage U_B	20...30 V DC		
Function indicator	No		
Degree of protection per IEC 60529	IP 67		
Approvals	CE		
Housing material	CuZn coated		
Connection	M12 connector		

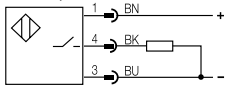
Classic inductive sensors

- Switching state: Target yes/no
- Warning message: –
- Error message: Sensor OK? yes/no

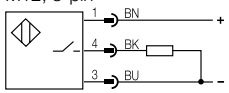
Inductive M08, M12, M18 and M30 sensors with Dynamic Sensor Control

Ordering code / Part number		**BES03EN** BES M08EI-PSY15B-S49G-D01	**BES03EP** BES M08EH-PSY25F-S49G-D01	**BES03EL** BES M08EI-PSY15B-S04G-D01	**BES03EM** BES M08EH1-PSY25F-S04G-D01	**BES03ER** BES M12MI-PSY20B-S04G-D01	**BES03ET** BES M12MH-PSY40F-S04G-D01	**BES03EU** BES M18MI-PSY50B-S04G-D01	**BES03EW** BES M18MG-PSY80F-S04G-D01	**BES03EY** BES M30MI-PSY10B-S04G-D01	**BES03EZ** BES M30MF1-PSY15F-S04G-D01
Size		M8	M8	M8	M8	M12	M12	M18	M18	M30	M30
Switching type	PNP normally open	■	■	■	■	■	■	■	■	■	■
Rated switching distance s_n		1.5 mm	2.5 mm	1.5 mm	2.5 mm	2 mm	4 mm	5 mm	8 mm	10 mm	15 mm
Mounting type	Flush	■		■		■		■		■	
	Non-flush		■		■		■		■		■
Supply voltage U_B		18...30 V DC									
Function indicator		Yes									
Degree of protection per IEC 60529		IP 67									
Approvals		CE, cULus									
Housing material		Stainless steel				CuZn coated					
Connection		M8, 3-pin		M12, 3-pin							

M8, 3-pin



M12, 3-pin



High-end inductive sensors

- Switching state: Target yes/no
- Warning message: Target in critical area
  Function indicator flashes
- Error message: Sensor OK? yes/no

more added value

BGL fork sensors with Dynamic Sensor Control

Ordering code / Part number		BGL0036 BGL 30C-009-S4	BGL003H BGL 50C-009-S4	BGL003N BGL 30A-013-S49	BGL003P BGL 50A-013-S49	BGL003R BGL 80A-013-S49
Fork sensor	1× PNP			■	■	■
	2× PNP	■	■			
Fork opening	30 mm	■		■		
	50 mm		■		■	
	80 mm					■
Light type	Red light	■	■			
	Infrared			■	■	■
Function indicator		Yes				
Repeat accuracy		≤ 0.25 mm		≤ 0.15 mm		
Connection	Connectors	M12, 4-pin		M8, 3-pin		

Photoelectric sensor BOS 18M Teach-In with Dynamic Sensor Control

Ordering code / Part number		BOS01CU BOS 18M-PUD-RD30-S4	BOS01CT BOS 18M-PUD-PR30-S4	BOS01CW BOS 18M-PUD-RE30-S4
Switching type	PNP NC/NO selectable	■	■	■
Rated switching distance s_n		500 mm	5 m*	20 m
Size, mounting		M18		
Supply voltage U_B		10...30 V DC		
Function indicator		Yes		
Degree of protection per IEC 60529		IP 67		
Housing material		Nickel-plated brass		
Connection		M12 connector		

* based on reflector BOS R-1

High-end photoelectric sensors

- Switching state: Target yes/no
- Warning message: Optical system dirty, Function indicator flashes
- Error message: Sensor OK? yes/no

High-end photoelectric sensors

- Switching state: Target yes/no
- Warning message: Optical system dirty, Function indicator flashes
- Error message: Sensor OK? yes/no

CE
IO-Link

Fieldbus	PROFIBUS-DP
Type	4× IO-Link ports or 4 standard I/O ports
Ordering code	**BNI000Z**
Part number	BNI-PBS-507-000-Z011
Supply voltage U_B	18...30 V DC
Connection: Fieldbus	M12, B-coded
Connection: Operating voltage	7/8"
Connection: I/O ports	M12, A-coded, female
No. of I/O ports	4
Number of inputs	Max. 8
Number of outputs	Max. 8
Configurable	Yes
Max. load current sensors/channel	200 mA
Max. output load current	≤ 1.6 A
Total current $U_{Actuator}$	≤ 9 A
Total current U_{Sensor}	≤ 9 A
Degree of protection per IEC 60529	IP 67 (when connected)
Operating temperature T_a	–5...+55 °C
Storage temperature range	–25...+70 °C
Dimensions (L×W×H)	224×37×32 mm
Housing material	Nickel-plated Gd-Zn

IO-Link

No. of IO-Link ports	4× master
Operating modes (3-wire)	SIO, COM 1, COM 2, COM 3
Communication indicator	Green LED
Error indicator	Red LED
Max. load current for IO-Link device	≤ 1.6 A

CE
IO-Link

IO-Link	Device
Type	8× DSC or 8× I
Ordering code	**BNI002Z**
Part number	BNI IOL-530-000-K006
Supply voltage U_B	18...30 V DC
Connection: IO-Link	M12, A-coded, male
Connection: I/O ports	M12, A-coded, female
No. of I/O ports	8
No. of DSC ports	8
No. of digital inputs	8
Max. load current sensors/channel	200 mA
Total current U_B	< 1.2 A
Degree of protection per IEC 60529	IP 67 (when connected)
Operating temperature T_a	–5...+55 °C
Storage temperature range	–25...+85 °C
Dimensions (L×W×H)	115×50×31 mm
Housing material	PC

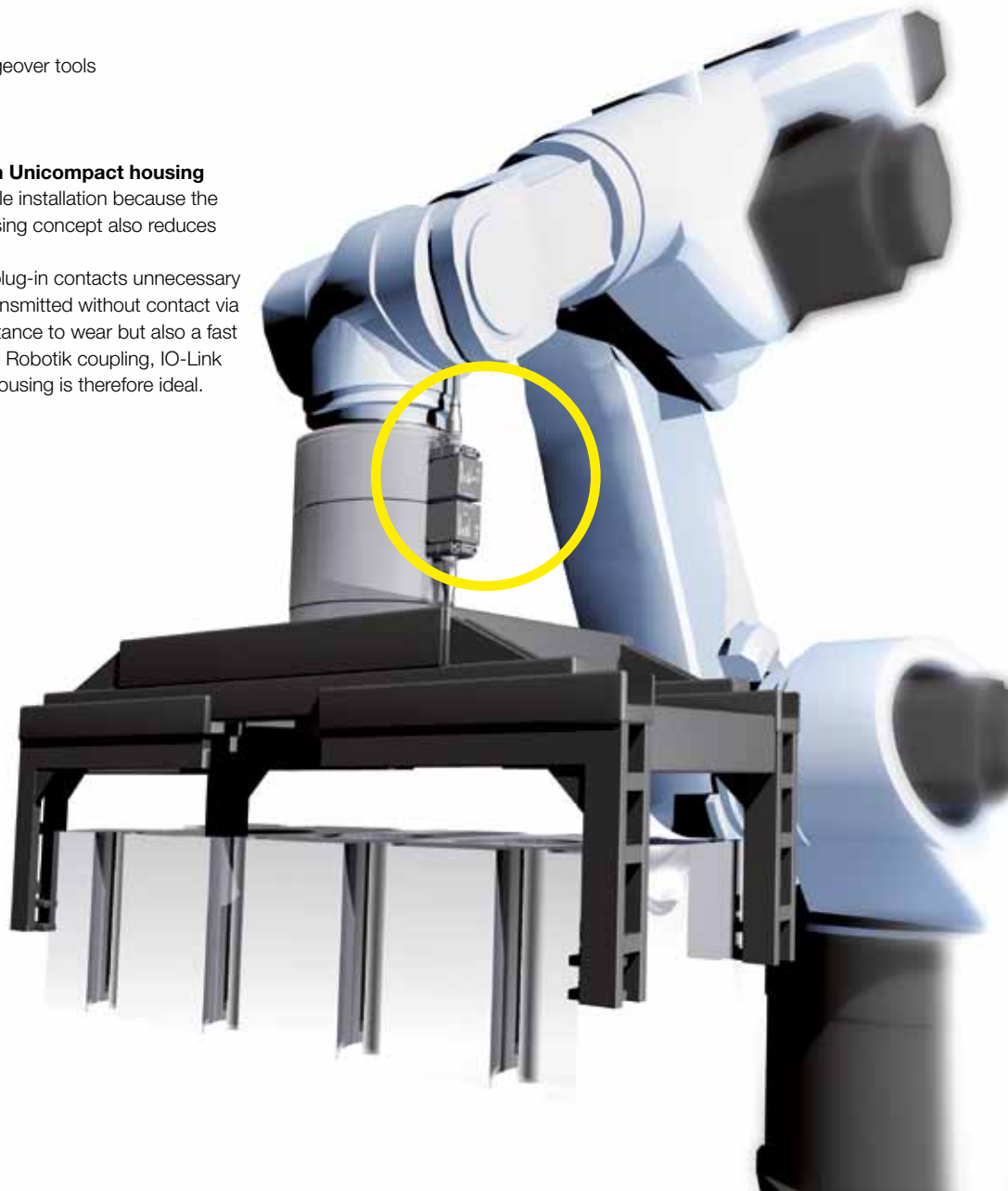
IO-Link

Operating mode	COM 2
Parameters	– Enable/disable DSC – DSC sensitivity – Diagnostics reset – NC/NO

more added value

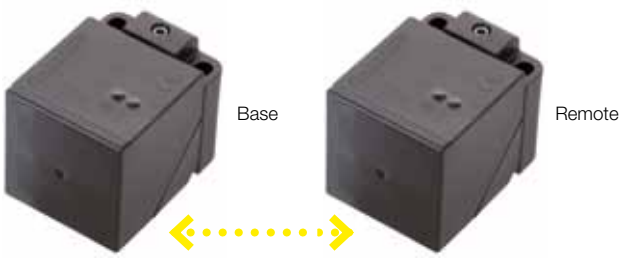
- No mechanical wear
- Maintenance-free
- Increased system availability
- Shorter times when replacing changeover tools
- Simplification of system design
- Simple wiring of replaceable tools

IO-Link unidirectional in 40×40 mm Unicompact housing
The IO-Link interface guarantees simple installation because the IO-Link is quickly wired. The new housing concept also reduces interfering variables.
Inductive couplers make mechanical plug-in contacts unnecessary because the signals can be reliably transmitted without contact via an air gap. This ensures not only resistance to wear but also a fast size change and high flexibility. For the Robotik coupling, IO-Link unidirectional in the compact 40×40 housing is therefore ideal.



Inductive Couplers

IO-Link unidirectional in 40×40 mm Unicompact housing



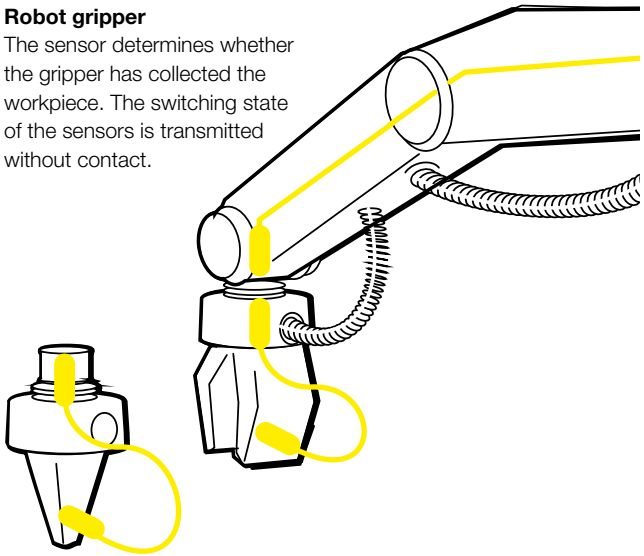
Size	**40×40×63 mm**	**40×40×63 mm**
Working range	1 mm...5 mm	1 mm...5 mm
Ordering code	**BIC005A**	**BIC005C**
Part number	BIC 1I0-I2A50-Q40KFU-SM4A4A	BIC 2I0-I2A50-Q40KFU-SM4A5A
Supply voltage U_B, including residual rippling	24 V DC ±10 %	
Rated operational current I_e	1000 mA	
No-load supply current I_0 max.	100 mA	
Max. current load per output		800 mA
Short-circuit protected	yes	yes
Remote output voltage		24 V DC ±5 %
Power supply, continuous output current		500 mA
Operational readiness		< 100 ms
Ambient temperature T_a	–5...+55 °C	–5...+55 °C
Storage temperature	–25...+70 °C	–25...+70 °C
Transmission distance	0...5 mm	0...5 mm
Function/operational voltage indicator	yes/yes	yes/yes
Weight	Approx. 160 g	Approx. 160 g
Degree of protection as per IEC 60529	IP 67	IP 67
Housing material	PBTP	PBTP
Material of sensing surface	PBTP	PBTP
Connection	M12 connector, plug 4-pin, A-coded 	M12 connector, socket 5-pin, A-coded 

IO-Link		
Transmission rate	38.4 kbaud	38.4 kbaud
Cycle time min.	3 ms	3 ms
Process data cycle	12 ms at minimum cycle time	
IO-Link process data length	3 input bytes	3 input bytes
Frame type	1	1

more added value

- Simple connection, rapid commissioning
- Wear-free
- Robust, even in harsh environments

Robot gripper
The sensor determines whether the gripper has collected the workpiece. The switching state of the sensors is transmitted without contact.



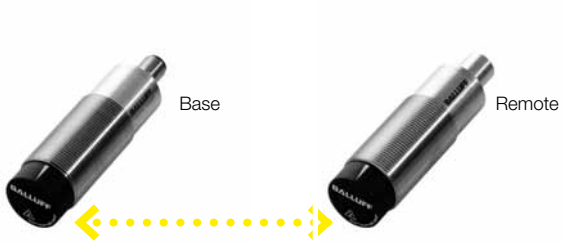
Size	
Working range	
Mounting type	
Ordering code	
Part number	
Supply voltage U_B incl. residual ripple	
Rated operating current I_e	
No-load supply current I_0 max.	
Max. current load per output	
Short-circuit protected	
Remote output voltage	
Power supply, continuous output current	
Rated insulation voltage U_i	
Operational readiness	
Ambient temperature T_a	
Storage temperature range	
Displacement	
Switching frequency f	
Function/Power indicator	
Tightening torque	
Degree of protection per IEC 60529	
Housing material	
Material of sensing face	
Connection	

Retrofitting is simple: BIC is plug-and-play. Your maintenance costs are reduced to a minimum because cable breaks and mechanical wear are a thing of the past.

Inductive Couplers
Power-only

Power-only with 0.2 A power		Power-only with 0.5 A power	
M30×1.5	**M30×1.5**	**M30×1.5**	**M30×1.5**
0...5 mm	**0...5 mm**	**0...5 mm**	**0...5 mm**
Non-flush	Non-flush	Non-flush	Non-flush
BIC0051	**BIC0052**	**BIC0007**	**BIC0008**
BIC 1P0-P2A20-M30ME-SM4A4A	BIC 2P0-P2A20-M30ME1-SM4A5A	BIC 1P0-P2A50-M30MI3-SM4A4A	BIC 2P0-P2A50-M30MI3-SM4A5A
24 V DC ±10 %		24 V DC ±10 %	
max. 500 mA		max. 1 A	
100 mA		100 mA	
Yes	Yes	Yes	Yes
	24 V DC ±5 %		24 V DC ±5 %
	200 mA		500 mA
150 V DC/125 V AC	150 V DC/125 V AC	150 V DC/125 V AC	150 V DC/125 V AC
	< 1 ms		< 100 ms
–5...+55 °C	–5...+55 °C	0...+55 °C	0...+55 °C
–25...+75 °C	–25...+75 °C	–25...+75 °C	–25...+75 °C
	±4 mm		±4 mm
10 Hz	10 Hz	10 Hz	10 Hz
Yes/yes	Yes/yes	Yes/yes	Yes/yes
70 Nm	70 Nm	70 Nm	70 Nm
IP 67	IP 67	IP 67	IP 67
CuZn coated	CuZn coated	CuZn coated	CuZn coated
PC	PC	PC	PC
M12 connector, male 4-pin	M12 connector, female 5-pin	M12 connector, male 4-pin	M12 connector, female 5-pin
			

For more information on BIC inductive couplers, refer to our "Industrial Networking and Connectivity" catalog or visit us online at **www.balluff.com**



	Uni-standard with 0.5 A power and 8 signals		
Size	**M30×1.5**	**M30×1.5**	
Working range	**0...5 mm**	**0...5 mm**	
Mounting type	Non-flush	Non-flush	
Ordering code	**BIC0009**	**BIC000A**	
Part number	BIC 1I3-P2A50-M30MI3-SM4ACA	BIC 2I3-P2A50-M30MI3-SM4ACA	
Supply voltage U_B incl. residual ripple	24 V DC ±10 %		
Rated operating current I_e	max. 1 A		
No-load supply current I_0 max.	100 mA		
Max. current load per output	50 mA		
Short-circuit protected	Yes	Yes	
Remote output voltage		24 V DC ±5 %	
Power supply, continuous output current		500 mA	
Rated insulation voltage U_i	150 V DC/125 V AC	150 V DC/125 V AC	
Operational readiness		< 100 ms	
Ambient temperature T_a	0...+55 °C	0...+55 °C	
Storage temperature range	–25...+75 °C	–25...+75 °C	
Displacement		±4 mm	
Switching frequency f	40 Hz	40 Hz	
Function/Power indicator	Yes/yes	Yes/yes	
Tightening torque	70 Nm	70 Nm	
Degree of protection per IEC 60529	IP 67	IP 67	
Housing material	CuZn coated	CuZn coated	
Material of sensing face	PC	PC	
Connection	M12 connector, male 12-pin 	M12 connector, female 12-pin 	

Benefit from the IO-Link interface, which allows up to 16 sensors per system and lets you connect to the bus environment

***IO-Link**	
Transmission rate	
Cycle time min.	
Process data cycle	
IO-Link process data length	
Frame type	

Inductive Couplers
Uni-Standard and IO-Link

	IO-Link **interface 16 IN**		IO-Link **interface 4× analog**	
	M30×1.5	**M30×1.5**	**M30×1.5**	**M30×1.5**
	0...5 mm	**0...5 mm**	**0...5 mm**	**0...5 mm**
	Non-flush	Non-flush	Non-flush	Non-flush
	BIC000C	**BIC000E**	**BIC0053**	**BIC0054**
	BIC 1I0-I2A50-M30MI3-SM4A4A	BIC 2I0-I2A50-M30MI3-SM4A5A	BIC 1I0-IAA50-M30MI3-SM4A4A	BIC 2I0-IAA50-M30MI3-SM4A5A
	24 V DC ±10 %		24 V DC ±10 %	
	max. 1 A		max. 1 A	
	Yes	Yes	Yes	Yes
		24 V DC ±5 %		24 V DC ±5 %
		500 mA		500 mA
	150 V DC/125 V AC	150 V DC/125 V AC	150 V DC/125 V AC	150 V DC/125 V AC
		< 100 ms		< 100 ms
	0...+55 °C	0...+55 °C	0...+55 °C	0...+55 °C
	–25...+75 °C	–25...+75 °C	–25...+75 °C	–25...+75 °C
		±4 mm		±4 mm
	IO-Link*	IO-Link*	IO-Link*	IO-Link*
	Yes/yes	Yes/yes	Yes/yes	Yes/yes
	70 Nm	70 Nm	70 Nm	70 Nm
	IP 67	IP 67	IP 67	IP 67
	CuZn coated	CuZn coated	CuZn coated	CuZn coated
	PC	PC	PC	PC
	M12 connector, male 4-pin	M12 connector, female 5-pin	M12 connector, male 4-pin	M12 connector, female 5-pin
				
	Together with sensor hub		**Together with analog hub**	
	38,4 kbaud		38,4 kbaud	
	3 ms		3 ms	
	12 ms		33 ms	
	3 input bytes		11 input bytes	
	1		1	

more added value

Intelligent power supplies
For outstanding system availability
If you want to operate your systems and machines with maximum efficiency, the power supply you use must be reliable. Intelligent power supplies from Balluff guarantee a high degree of reliability. Wherever you install the power supply unit, you will obtain a complete picture of your environment which you can then monitor continually.

LEDs for easy monitoring
- Load level
- Stress level
- Lifetime

LEDs indicate the load level and stress level so the operator knows immediately when the unit is operating at maximum performance. The service life of the devices is also displayed, making maintenance and operation extremely easy. The operator can also see exactly when a device need replacing, which increases the overall availability of systems.

The benefits to you
- Continuous monitoring of machines and systems
- Reliable power supplies guarantee efficient operation
- Optimized use of devices and a longer service life
- Assists with maintenance planning
- Devices only replaced when necessary

Versions
Intelligent power supplies from Balluff are available in two versions

IP 20 (with screw terminal)
- With wide input voltage range from 380 to 690 V AC
- Designed for versatile use in industrial automation
- Also satisfies all wind turbine requirements

IP 67 (with connector)
- Suitable for direct use in harsh environments
- Fully enclosed housing
- High shock and vibration ratings

Power Supplies

Reliable power for demanding industrial automation

Load level:

Load level
Reversible in short term

Load level indicates the current load on the device. The display indicates the load without delay.

Heartbeat:

Stress level
Reversible in medium term

Stress level indicates the physical and thermal loads. A change in the load status delays the "pulse" of the device slightly.

Wear indicator:

Lifetime
Irreversible in long term

Lifetime indicates the remaining useful life of the device and is based on the combination of all loads.

All indicators multi-colored – in green, yellow or red – and show the status of the device.

more added value

Intelligent power supply units from Balluff
The autonomous installation of power supply units without switch cabinets with IP 67 protection is becoming more and more popular in industrial automation. Autonomous power supply units are already widely available but are generally difficult to access once they are installed. And to further complicate matters, monitoring the operating status is practically impossible. As a result, operators rely on preventive maintenance concepts to guarantee maximum possible availability. These concepts are reliable but also expensive because devices are frequently replaced during the maintenance cycle well before the end of their service life as there is no alternative system available.

For the first time, intelligent, energy-saving power supply units from Balluff promise to remedy this situation. Their condition is visualized by means of optical indicators.

This novel concept allows detection of the condition of the device at a glance. The device follows dynamic loads and can therefore be operated at a high level of capacity utilization. Usual reserves of 30 to 50 % are therefore superfluous.

This intelligence forms the basis of a new intelligent generation of power supply units that can be continuously utilized at full capacity and provides visual information about the internal status via the:
- Load level
- Stress level
- Lifetime

Visualization should allow the operator to view the status in the simplest way possible.

IP 67

One special feature is that the three-phase intermediate transformer that is usually installed in wind turbines can be omitted. That saves money. A large input voltage range of 380 to 690 V allows the primary switching power supply to be connected directly to the generator voltage on the wind turbine and then operated normally.

IP 20

General key information about the IP 20 and IP 67 power supply units
- High efficiency of 92 %
- Minimal heat loss and generation
- Increased system efficiency
- 3-stage status indication
- Power boost (150 % for 4 sec.)
- Extremely compact
- More efficient utilization of the power supply units
- Planned reserves are not wasted
- Prevention of failures caused by continuous overload
- Scheduled maintenance and repairs no longer necessary
- Higher productivity
- PSU only replaced at the end of its service life
- Lifetime of 15 years (at 80% load and 40 °C), MTBF > 800,000 h
- Enclosed housing guarantees high degree of resistance to vibration and shock loads
- With IP 20, also with floating alarm contacts

Ideal areas of application for these intelligent power supply units include local installations in the automobile industry, machine construction, wind turbines, etc.

Power Supplies

Reliable power for demanding industrial automation

Degree of protection as per IEC 60529			**IP 20**	**IP 67**
Output current			5 A and 10 A	3.8 A and 8 A
Output power			120 W and 240 W	91.2 W and 192 W
Output voltage			24 V DC (SELV)	24 V DC (SELV/PELV)
Input voltage			100...240 V AC Single phase	100...240 V AC Single phase
5 A/120 W	Isolated output	**Ordering code**	**BAE00EK**	
Single phase	(4-pin), SELV	Part number	BAE PS-XA-1W-24-050-013	
10 A/240 W	Isolated output	**Ordering code**	**BAE00EU**	
Single phase	(4-pin), SELV	Part number	BAE PS-XA-1W-24-100-014	
3.8 A/91.2 W	Isolated output	**Ordering code**		**BAE00EN**
Single phase	(4-pin), SELV	Part number		BAE PS-XA-1W-24-038-601
3.8 A/91.2 W	Grounded output	**Ordering code**		**BAE00EP**
Single phase	(4-pin), PELV	Part number		BAE PS-XA-1W-24-038-602
3.8 A/91.2 W	Isolated output	**Ordering code**		**BAE00ER**
Single phase	(5-pin), SELV	Part number		BAE PS-XA-1W-24-038-603
3.8 A/91.2 W	Isolated output	**Ordering code**		**BAE00FW**
Single phase	(4-pin), SELV	Part number		BAE PS-XA-1W-24-038-607
8A /192 W	Isolated output	**Ordering code**		**BAE00ET**
Single phase	(4-pin), SELV	Part number		BAE PS-XA-1W-24-080-604
8A /192 W	Isolated output	**Ordering code**		**BAE00FL**
Single phase	(5-pin), SELV	Part number		BAE PS-XA-1W-24-080-605
8A /192 W	Grounded output	**Ordering code**		**BAE00FY**
Single phase	(4-pin), PELV	Part number		BAE PS-XA-1W-24-080-606
Efficiency			High efficiency > typically 92 %	High efficiency > typically 91 %
MTBF			> 800,000 h	> 800,000 h
Input			Screwed contact	7/8", 3-pin (male)
Output			Screwed contact Floating alarm contacts for DC Alarm and lifetime	7/8", 4-pin (female) fitting for Ethernet/IP, DeviceNet 7/8", 5-pin (female) fitting for CC-Link, Profinet, Profibus
Operating temperature			–25...+70 °C	–25...+70 °C
Storage temperature			–40...+80 °C	–40...+80 °C
Mounting			DIN rail mounting	Panel, wall and field mounting
Housing material			Metal, partly enclosed	Metal, fully enclosed
Service life (at 80 % load and 40°C)			15 years	15 years
Warranty			2 years	2 years

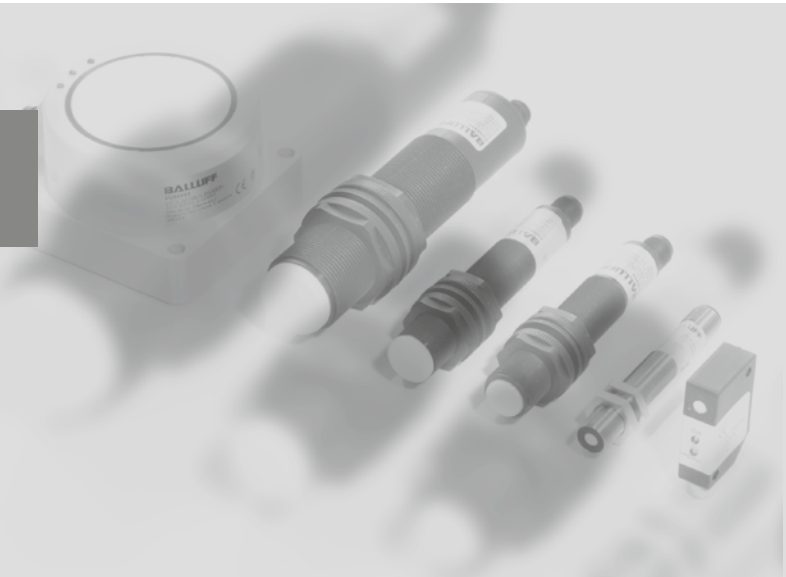
Accessories

Protection Cap
Mounting System
Clamp Holder
Contact Protector
Tube Switch

more added value

- Can be used for ultrasonic sensors in the M18 series
- Protects the sensing surface from mechanical load and hot weld spatter
- With a special coating and grid technology, the cooled spatter does not reach the sensing surface and drops out through an outlet

Ultrasonic sensors in welding lines
In a welding line, BUS ultrasonic sensors detect workpieces in the various steps and positions. With the use of a protection cap, the ultrasonic converter is protected from hot weld spatter.



Whether position detection, distance measurement or the detection of solid, powder or liquid media independent of color, transparency and surface finish: ultrasonic sensors are precision all-rounders. Particularly when large operating ranges and high accuracies are called for, the BUS ultrasonic sensors show what they are capable of. In dusty, humid and misty working conditions, they are often the only alternative.

- Very large operating range
- For difficult environmental conditions
- Insensitive to dirt
- Object-independent distance measurement
- High resolution
- Small blind spots
- Reliable detection of the smallest of objects
- Detection of sound-absorbing materials

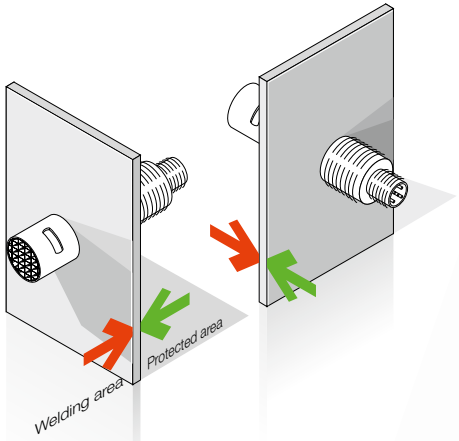
For additional information, see our catalog or visit our website at **www.balluff.com**

Balluff Protection Cap

For ultrasonic sensors in harsh ambient conditions

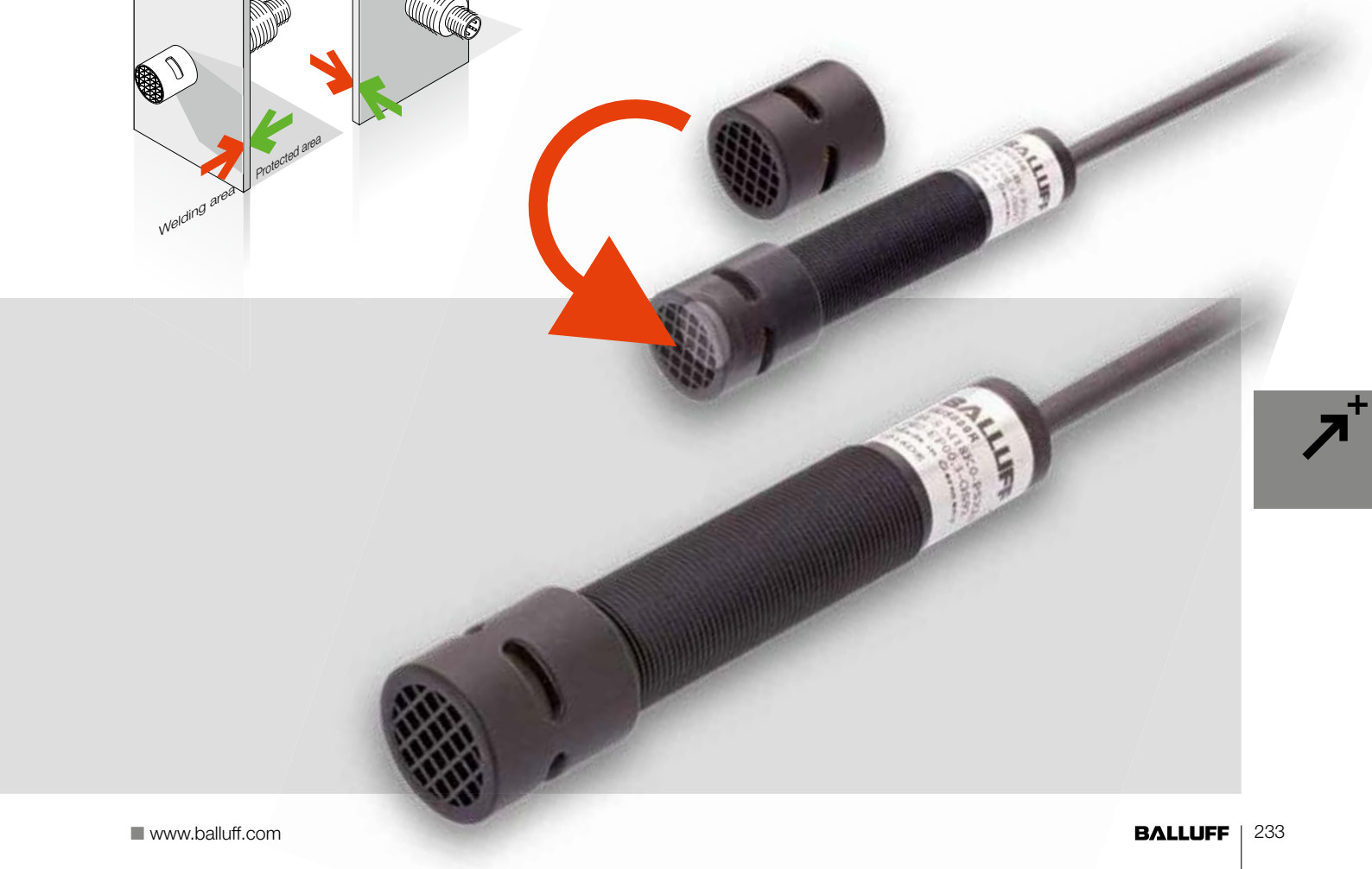
Installation note

The sensor is pushed through a bore hole and secured in the protected area using a locknut. With this type of installation, only the protection cap is exposed to the harsh ambient conditions.



Size	**M18×1**
Version	Welding protection for M18 ultrasonic sensors BUS
Ordering code	**BAM01LJ**
Part number	BAM PC-US-007-M18-2/W
Housing material	CuBe 2-coated

Usable for ultrasonic sensors BUS M18 with a range of up to 600 mm.



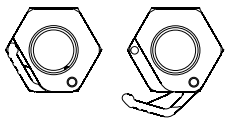
17× Standard
3× Stainless steel
10× PTFE-coated, weld-immune

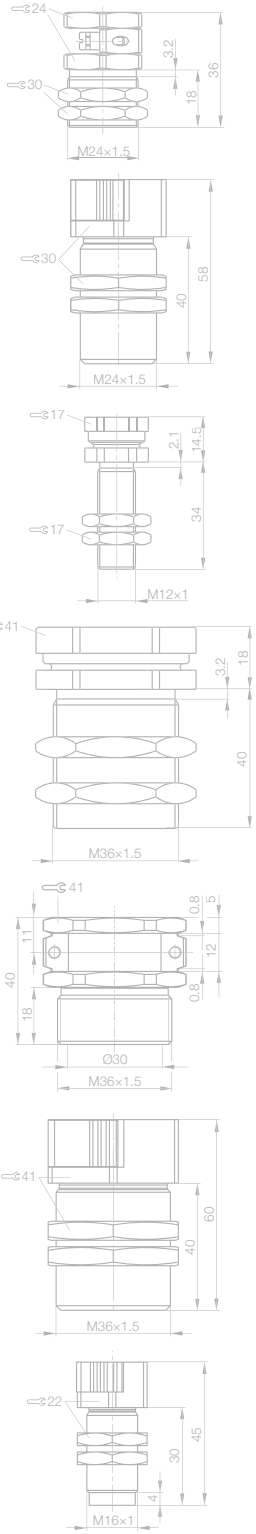
12× Standard with latch
6× Standard with latch
PTFE-coated, weld-immune
6× Stainless steel with latch
6× Stainless steel with latch
PTFE-coated, weld-immune

5× for installation in containers

65 clamp variants!

Balluff has revolutionized methods for attaching sensors with the new latch clamping principle. The sensor is inserted into the clamps and secured in position by folding over the latch. The latch can secure any sensor in all areas of the automation sector without the use of tools.



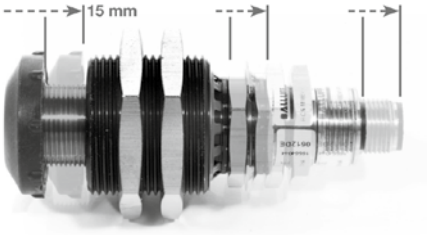


Clamp Overview

65 clamp variants

Stainless Steel

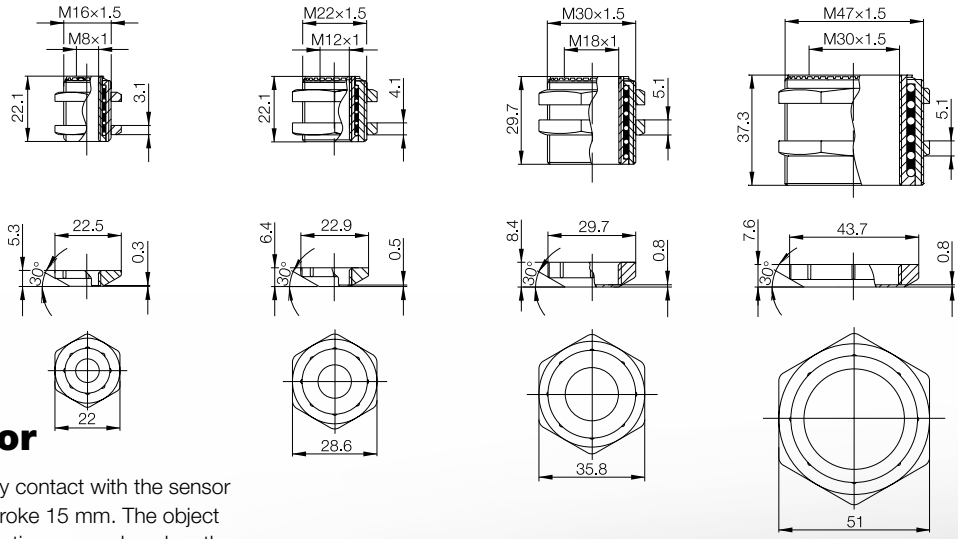
more added value



- For all areas in the automation and material handling industry
- Protects your sensors
- Increases system reliability




Description	**Contact protector**	**Contact protector**	**Contact protector**	**Contact protector**
Version	For **M8** sensors for mechanical protection	For **M12** sensors for mechanical protection	For **M18** sensors for mechanical protection	For **M30** sensors for mechanical protection
Ordering code	**BAM015U**	**BAM015W**	**BAM015Y**	**BAM015Z**
Part number	BESA 08-CM	BESA 12-CM	BESA 18-CM	BESA 30-CM
WAF	22	29	35	51
Ambient temperature range	–45...+85 °C	–45...+85 °C	–45...+85 °C	–45...+85 °C
Material	Anodized Al, POM	Anodized Al, POM	Anodized Al, POM	Anodized Al, POM

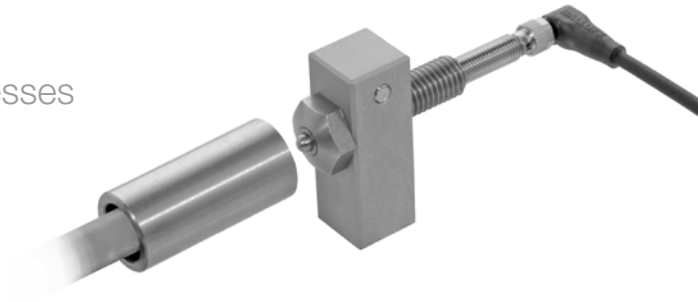


Contact protector

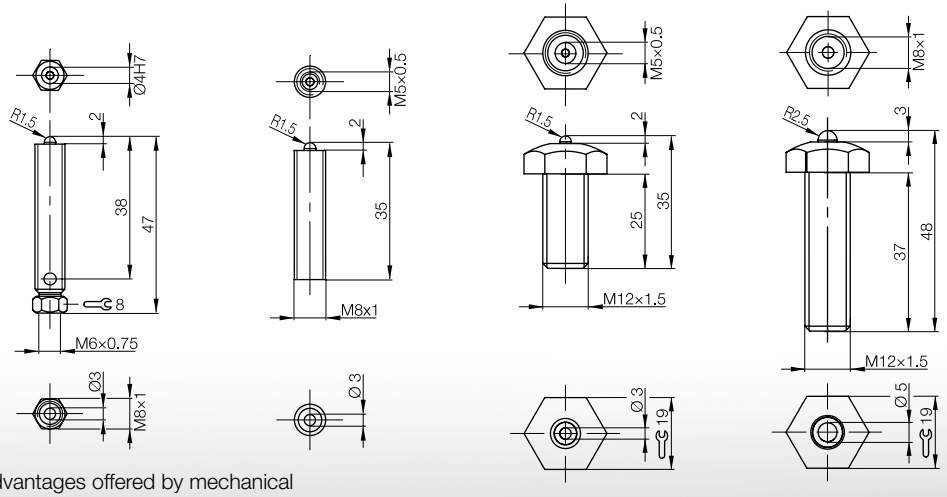
The contact protector absorbs any contact with the sensor while preventing damage, max. stroke 15 mm. The object runs up against an attached protective cap and pushes the sensor back, preventing damage to the sensor or the coil as a result. The contact protector ensures 100 % reliability and the previously stored sensor position is retained.

Contact Protector and Tube Switch

Reliable protection for your sensors and processes



Description	**Tube switch**	**Tube switch**	**Tube switch**	**Tube switch**
Version	For sensors **dia. 4 mm** for mechanical protection	For **M5** sensors for mechanical protection	For **M5** sensors for mechanical protection	For **M8** sensors for mechanical protection
Ordering code	**BAM01C0**	**BAM01AZ**	**BAM019Y**	**BAM019W**
Part number	BAM FS-XE-002-D4-4	BAM FS-XE-001-M5-4	BAM FS-XE-003-M5-4	BAM FS-XE-004-M8-4
Spring force F (N)	3	3	3	4
Impact force $F_{max.}$ (N)	400	400	400	400
Switching operations min. (with $F_{max.}$)	500000	500000	500000	500000
Housing material	Stainless steel	Stainless steel	Stainless steel	Stainless steel



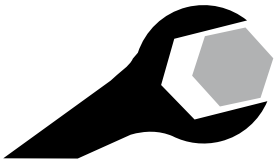
Tube switch

The tube switch combines the advantages offered by mechanical position switches and inductive sensors. Manufactured from stainless steel, it is extremely robust, very reliable even under difficult conditions and can be used immediately in any application in combination with the relevant inductive sensor.

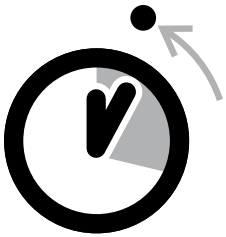
Conception and Planning
Product and Application Advice
Customized Solutions
Targeted Training

Service

The right solutions

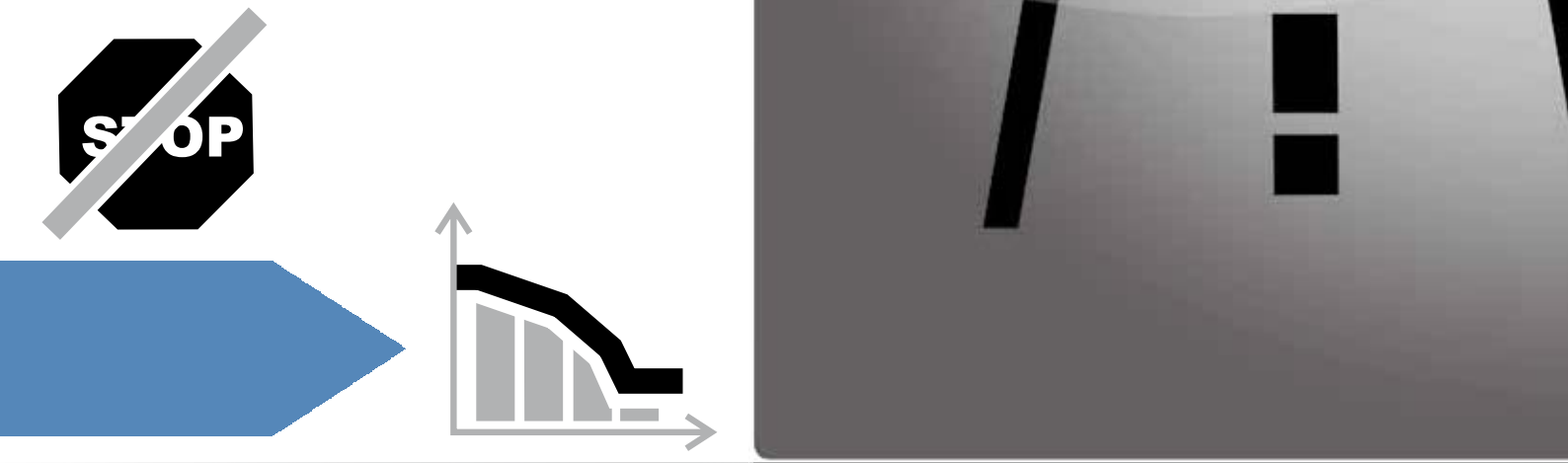


Less time required



High application security

Significant cost reduction


OP

Service

Customized. According to your specifications. In the best quality.

We give you comprehensive service over the entire life cycle of our products: including the conception and planning of your projects, testing and setup on site, and training and support. For an optimal implementation. Completely according to your wishes.

This creates the greatest possible planning security and provides faster commissioning and an earlier start of production. This leads to maximum productivity and more cost-effectiveness. And you are relieved of day-to-day tasks, so that more time remains for your really important jobs. Inform yourself in detail about our service spectrum. And benefit from a reliable partnership.

More information can be found in our service brochure.

Application advice through our TecSupport:
Discuss your technical requirements. And take advantage of our expertise.

Real-world examples:
- 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

Commissioning:
Order expert knowledge. And benefit from a quick start of production.

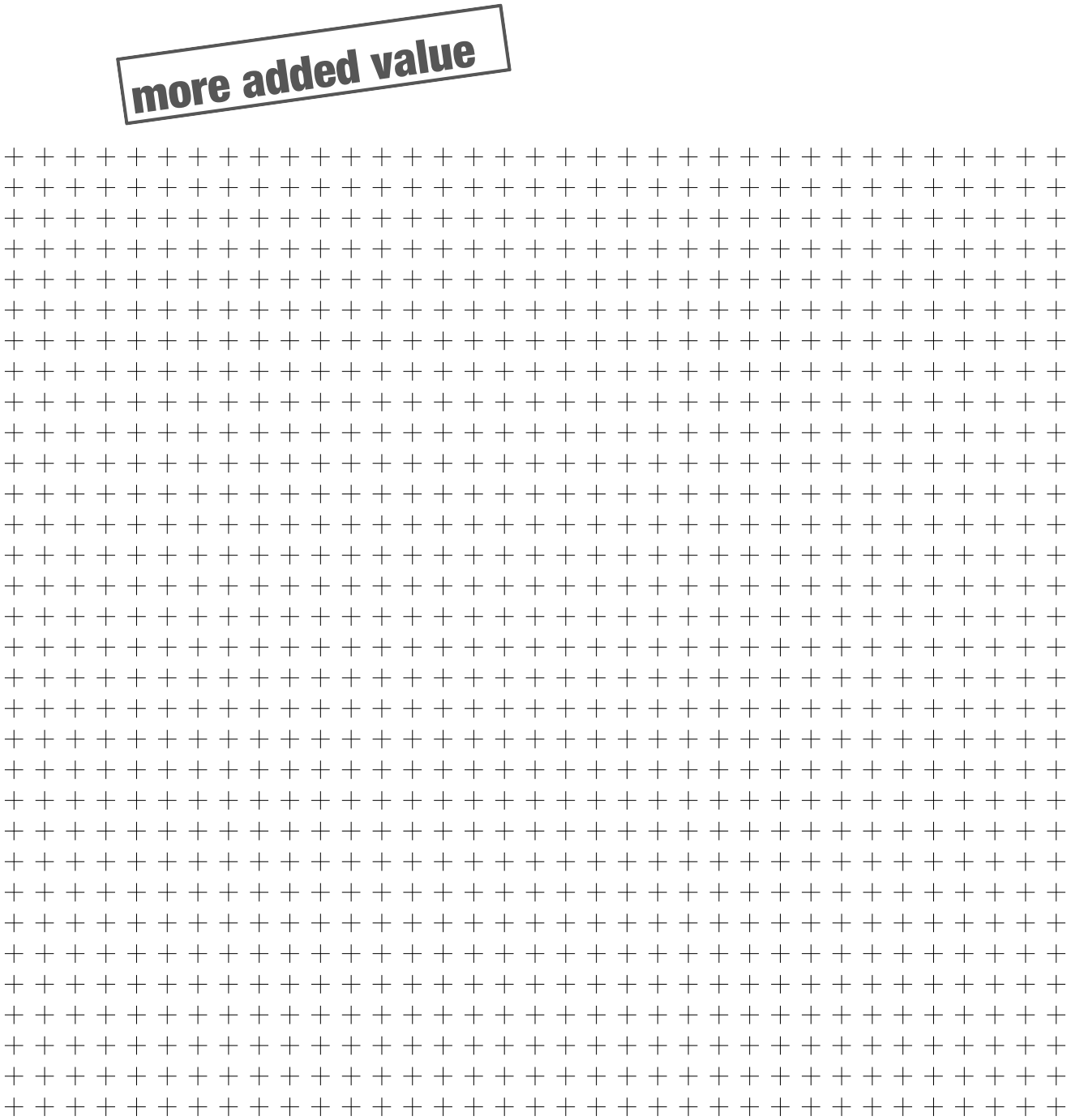
Real-world examples:
- Setting up an optical checkpoint with the BVS vision sensor
- Consulting and support during the programming of BIS RFID systems
- Installation and commissioning of a color detection application with the BFS color sensor

Fully customized products:
Order individual versions according to your requirements: from preassembly to engineering services. And take advantage of the optimum.

Real-world examples:
- 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 a RFID data carrier
- Adaptation of the characteristics for BAW analog sensors

Workshops:
Make use of well-founded manufacturer knowledge. And benefit from application security.

- **Professional sensor use:** Select effective principles, install sensors professionally and secure the reliable operation of your application.
- **Route and distance measurement:** 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 ident:** Reliably identify data matrix codes with an image processing sensor.
- **Industrial networking with IO-Link:** Manage signals intelligently and cost-effectively.

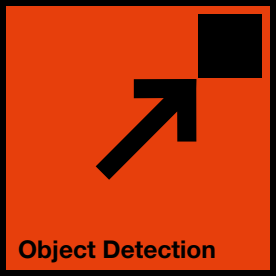

more added value

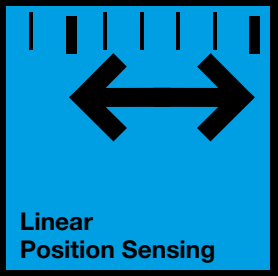
BALLUFF

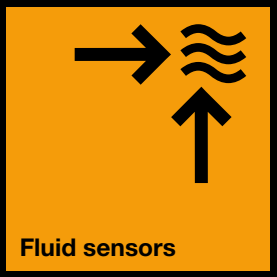
sensors worldwide

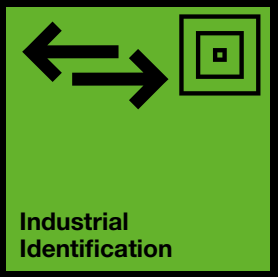
SENSOR SOLUTIONS AND SYSTEMS

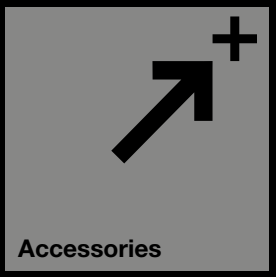
As a recognized partner in all sectors of the automation industry, Balluff offers comprehensive expertise in sensor technology and networking. We supply advanced technology and state-of-the-art electronics to our customers, who benefit from excellent service, application-specific solutions and individual consultation. You too can benefit from the excellent quality of our products and services.

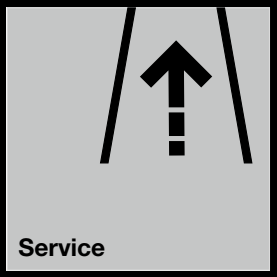












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BALLUFF

sensors worldwide

- Object Detection
- Linear Position Sensing
- Fluid Sensors
- Industrial Identification
- Industrial Networking and Connectivity
- Accessories
- Service

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