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BCS Capacitive Sensors

New approaches to object and level detection

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Capacitive Sensors

Capacitive Sensors

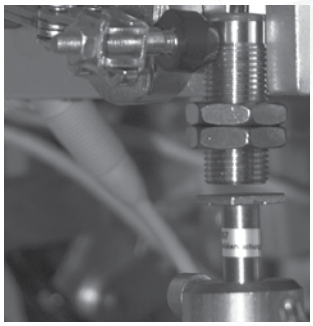
New approaches to object and level detection

Capacitive sensors have become an important part of industrial automation.

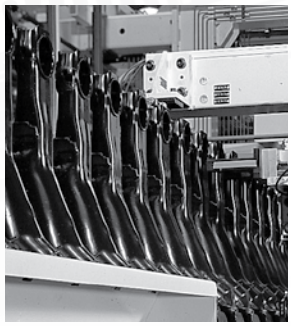
Balluff BCS capacitive sensors monitor and detect stack heights and levels, as well as presence of objects and content in glass, plastic or paper packages with extreme precision. They are unaffected by dust, surface reflections or object composition such as color or texture. Capacitive sensors also detect levels of solids or liquids with absolute reliability through glass and plastic walls, with less regard to external conditions.

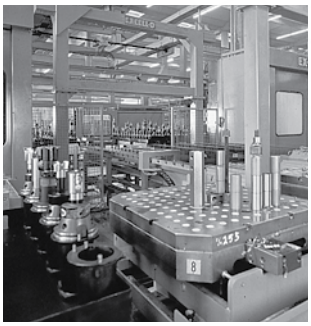
Balluff BCS capacitive sensors get the job done when others fall short.

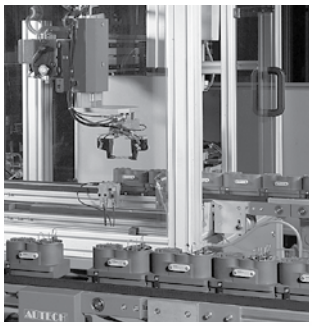
BCS capacitive sensors open up new ways to solve challenging applications.



The ideal level sensor, **SMART***LEVEL* sees through not only thick glass and plastic walls, it also compensates automatically for moisture, foam and extensive material build-up.







SMART*LEVEL* **takes off – in the Airbus A380**

Airbus is equipping the lavatories in their 4-engine large-body A380 with a mixer tap. At the heart of this exclusive system in the elegant Airbus design is the compact **SMART***LEVEL* capacitive sensor from Balluff. These SMARTLevel sensors enable passengers to conveniently select the desired water temperature with the assistance of an LED indicator.

SMART*LEVEL* technology avoids false triggering caused by clinging dirt, soap foam or liquid film on the sensing surface. Only hand-touching the faucet results in a switching operating, even if a soaked paper towel covers it entirely. This extraordinarily reliable switching precision is made possible by the new, patented oscillator SMARTLevel technology which automatically compensates for any possible interference factors.

Capacitive Sensors

New approaches to object and level detection

Balluff BCS capacitive sensors are not only superior in object and level detection applications, but they are also highly specialized for a wide range of challenging applications.

The BCS family of capacitive sensors consists of high temperature and pressure ratings, stainless steel and PTFE housings for harsh environments, a wide supply voltage range and especially compact form factors. The BCS adhesive sensor adapts to curved housing and surface shapes due to its unique flexible design.

SMART*LEVEL* sensors go the extra mile for liquid level applications. This sensor series detects conductive or water-based media through thick glass and plastic walls while compensating for moisture, foam and material build-up. SmartLevel sensors do not require any initial setup procedure while guaranteeing application security in a wide range of production processes. Read more about SmartLevel on page 42.

Stainless steel sensors
- Offers high tightening torques
- Higher sensing ranges on non-conductive materials
- Proven in demanding environments such as foods, plastics, specialty machines as well as the lumber and furniture industry

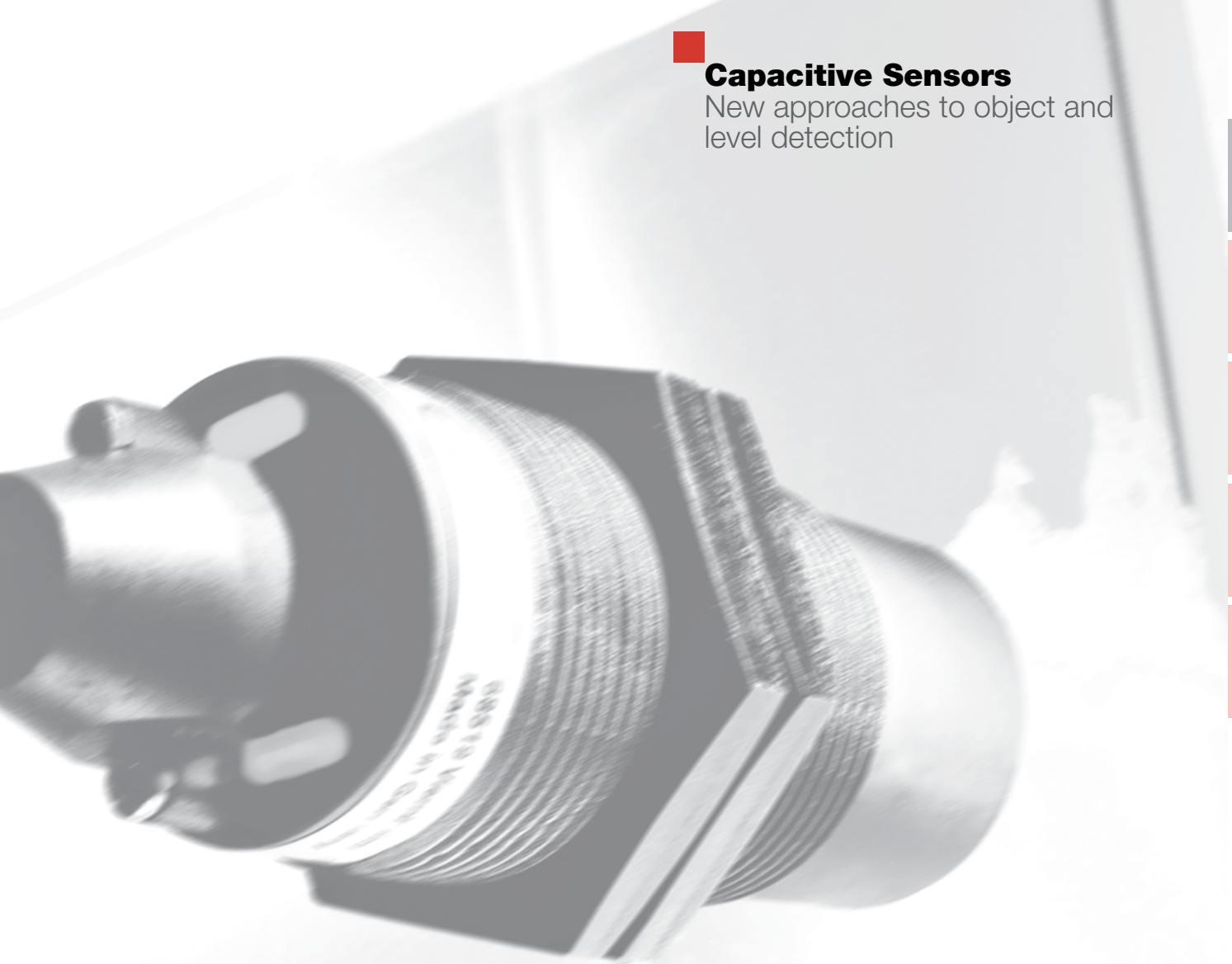
Complete PTFE sensors
- Outstanding chemical resistance
- For level detection of aggressive and caustic media such as acids, bases, and solvents
- Proven in the semiconductor and food industries, as well as the medical and industrial manufacturing industries

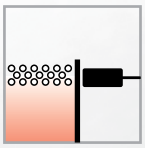
Adhesive sensors
- Quick, cost-effective mounting, (e.g. on container walls or pipes)
- Flexible housing adapts to almost any curved and uneven surface

High temperature rated sensors
- For ambient temperatures up to 480 °F (250 °C)
- Suitable for level sensing (e.g. granulates, epoxy resins, and for object detection of materials in elevated temperature environments such as glass tempering)

Capacitive Sensors

New approaches to object and level detection





SMART*LEVEL* sensors
- Compensate automatically for moisture, foam and material build-up
- Penetrate glass and plastic walls up to 12mm thick
- Detect water-based and highly conductive media
- Reduce costs through adjustment-free installation in most applications
- Eliminate maintenance cleaning procedures
- Available with chemically resistant complete PTFE housing

AC/DC sensors
- Wide operating voltage range of 20…250 V AC or DC
- For robust relay controls

Mini sensors
- Remote amplifier for easy adjustment in confined spaces
- Small housing dimensions offer a higher design freedom
- Ideal for small parts detection
- Tubular and disc form factors with equal performance to self contained version
- Shielded and unshielded form factors all in a robust stainless steel housing
- IP 67 rated

Application-specific form factors
- For leakage detection
- Immunity to ESD
- Pressure rated up to 150 bars
- External function diagnostics
- IP68/ 69K rating

Capacitive Sensors
Product overview






	Ø 4 mm flush	M5×0.5 flush	Ø 6.5 mm flush	Ø 6.5 mm non-flush	M8×1 flush	M8×1 non-flush	
Supply voltage							
DC	■	■	■	■	■	■	
AC/DC							
Housing materials							
Stainless Steel 304 (V2A)	■	■	■	■	■	■	
Plastic							
PTFE (Teflon)							
Wiring							
Connector			■	■	■	■	
Cable with connector	■	■	■	■	■	■	
Cable			■	■	■	■	
Special features							
High temperature rated							
Function diagnostics							
SMART*LEVEL*							
Compensate for moisture, foam and build-up							
Penetrate glass or plastic walls over 10 mm thick							
Detection of aqueous to highly conductive media							
Virtually no adjustment or cleaning required							
Main areas of application							
Object detection	p. 14	p. 14	p. 14...15	p. 15	p. 16...17	p. 16...17	
Direct sensing of **bulk** product and powdery media							
Indirect sensing of **bulk** product and powdery media through a container wall up to approx. 4mm							
Direct sensing of non-conductive **liquid** and paste-like media							
Indirect sensing of non-conductive **liquids** and paste-like media through a container wall up to approx. 4 mm							
Direct sensing of conductive **liquids** (**SMART***LEVEL* technology)							

Capacitive Sensors
Product overview








Ø 10 mm flush	Ø 10 mm non-flush	M12×1 flush	M12×1 non-flush	M18×1 flush	M18×1 non-flush	Ø 20 mm flush	Ø 22 mm flush
■	■	■	■	■	■	■	■
					■		
■	■	■	■	■	■	■	■
		■	■	■	■		
			■		■		
		■	■	■	■		
■	■	■	■				
■	■	■	■	■	■	■	■
					p. 51		
						p. 29	
					p. 43		
					p. 43 (up to 8 mm)		
					p. 43		
					p. 43		
p. 17...18	p.17 p.17	p. 18...19	p. 32...33	p. 19...20	p. 34...35	p. 29	p. 21
				p. 19...20			p. 21
			p. 32...33		p. 34...35		
				p. 19...20			p. 21
					p. 43 (up to 8 mm)		

Capacitive Sensors
Product overview

	Ø 30 mm flush	M30×1.5 flush	M30×1.5 non-flush	Ø 34 mm flush	Ø 34 mm non-flush	Disc shapes Ø 18...30 mm	
Supply voltage							
DC	■	■	■	■		■	
AC/DC			■		■		
Housing materials							
Stainless Steel 304 (V2A)	■	■	■			■	
Plastic		■	■	■	■		
PTFE (Teflon)			■				
Wiring							
Connector		■	■	■			
Cable with connector						■	
Cable	■	■	■	■	■	■	
Terminal housing							
Special features							
High temperature rated			p. 51				
Pressure rated							
Stick-on, flexible							
Degree of protection IP 68							
Function diagnostics							
SMART*LEVEL*							
Compensate for moisture, foam and build-up			p. 44				
Penetrate glass or plastic walls over 10 mm thick			p. 44				
Detection of aqueous to highly conductive media			p. 44				
Virtually no adjustment or cleaning required			p. 44				
Main areas of application							
Object detection	p. 21	p. 21...22		p. 22		p. 23...25	
Direct sensing of **bulk** product and powdery media		p. 21...22 (lower ε_r)	p. 36...37	p. 22 (lower ε_r)	p. 37		
Indirect sensing of **bulk** product and powdery media through a container wall up to approx. 4mm	p. 21	p. 21...22		p. 22		p. 23...25 (Ø 22...30 mm)	
Direct sensing of **non-conductive** liquid and paste-like media			p. 36...37		p. 37		
Indirect sensing of **non-conductive** liquids and paste-like media through a container wall up to approx. 4 mm	p. 21	p. 21...22		p. 22		p. 23...25 (Ø 22...30 mm)	
Direct sensing of **conductive** liquids (**SMART***LEVEL* technology)			p. 44				
Indirect sensing of **conductive** liquids through a container wall even over 10 mm thick (**SMART***LEVEL* technology)			p. 44				
Leak monitoring							

Capacitive Sensors
Product overview



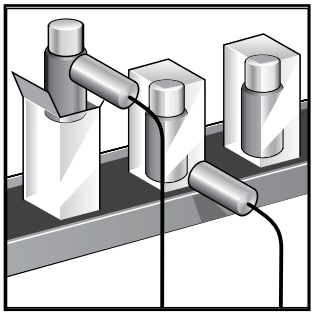




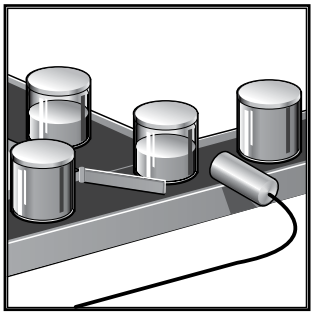

Disc shapes Ø 50 mm	Micro-Box 16×34×8 mm	36×44×10 mm	90×16×4 mm	Ø 7×52 mm	Micro-Level M12×1, G 1/4“, NPT 1/4“	M18×1, R 3/8“, NPTF 3/8“	M18×1, R 3/8“, NPTF 3/8“
■	■	■	■	■	■	■	■
■	■	■	■		■		
■				■		■	■
■					■		■
	■		■				
■	■	■		■	■		
						■	
				p. 45	p. 45...47	p. 40...41	p. 51
					p. 38...40, 45...47	p. 40...41	p. 51 (6 bar)
			p. 27				
					p. 38...39, 45...47 (10 bar)	p. 40...41 (10 bar)	p. 51 (6 bar)
					p. 46...47		
p. 48	p. 49			p. 45	p. 45...47		
p. 48	p. 49 (up to 8 mm)						
p. 48	p. 49	p. 52		p. 45	p. 45...47		
p. 48	p. 49	p. 52		p. 45	p. 45...47		
p. 25	p. 26		p. 27				
					p. 38...40	p. 40...41	p. 51
p. 25	p. 26		p. 27				
					p. 38...40	p. 40...41	p. 51
p. 25	p. 26		p. 27				
				p. 45	p. 45...47		
p. 48	p. 49 (up to 8 mm)						
	p. 26	p. 52					

Capacitive Sensors
Applications

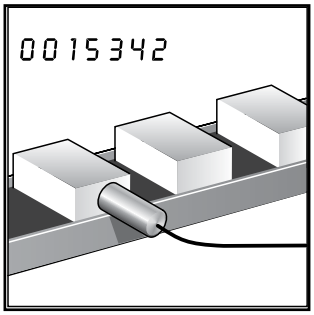
Balluff capacitive sensors are ideal for presence detection of non-metallic objects and levels of granulates, powders, viscous media or liquids, whether conductive water-based or non-conductive fluids such as oil. No matter what industry you are in or what application you are trying to solve, Balluff will find the capacitive sensor to fit your need.



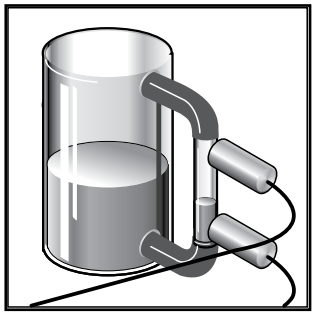
Quality content control inspection in the packaging industry



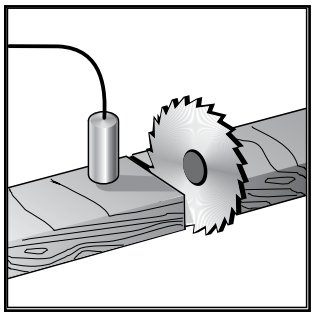
Level control in filling station



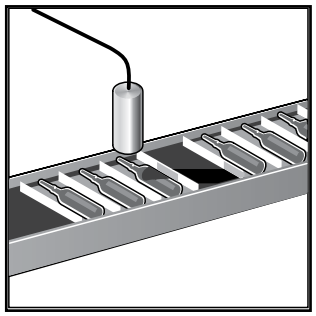
Presence detection



Flow or level control for reservoirs or tanks



Presence detection and analog thickness measurement of wood boards

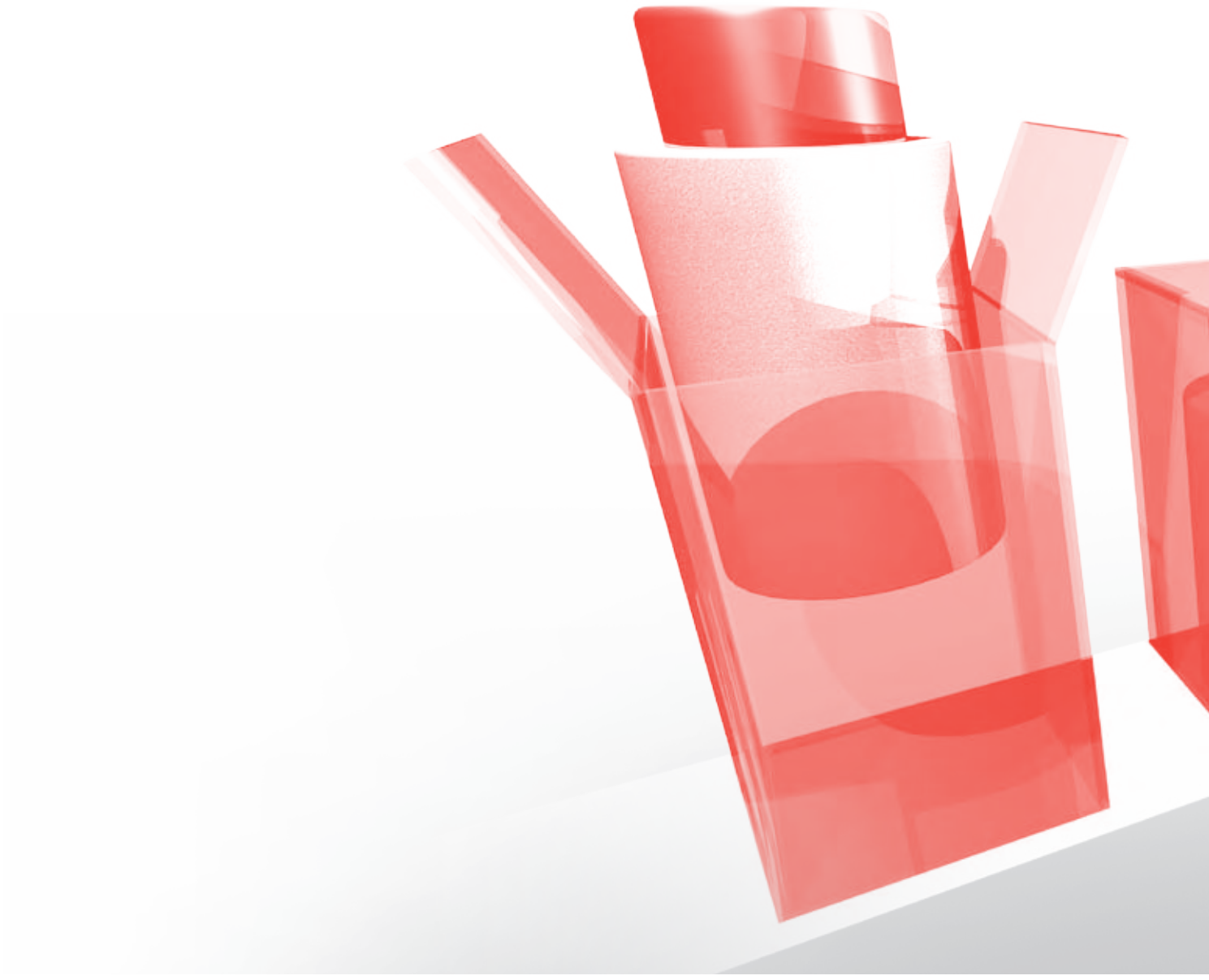


Presence or absence detection of ampoules in pharmaceutical packaging industry

Balluff capacitive sensors are used in the following market segments:

- Handling and automation
- Specialty machinery building
- Automotive industry
- Semiconductor industry
- Electronics manufacturing industry (circuit boards, CD and DVD manufacturing, etc.)
- Food processing industry
- Bottling and packaging
- Chemical industry
- Industrial cleaning technology
- Pharmaceuticals and medical technology
- Plastics and rubber industry
- Timber and furniture industries
- Paper and printing industries
- Energy production

Whether in coolant reservoir tanks or on glass bypass tubes, the capacitive sensor reliably detects levels of coolants, oils and other fluids to prevent damage to the machinery from running dry. Capacitive sensors are also suitable for leakage detection of hydraulic fluids to indicate early malfunction.

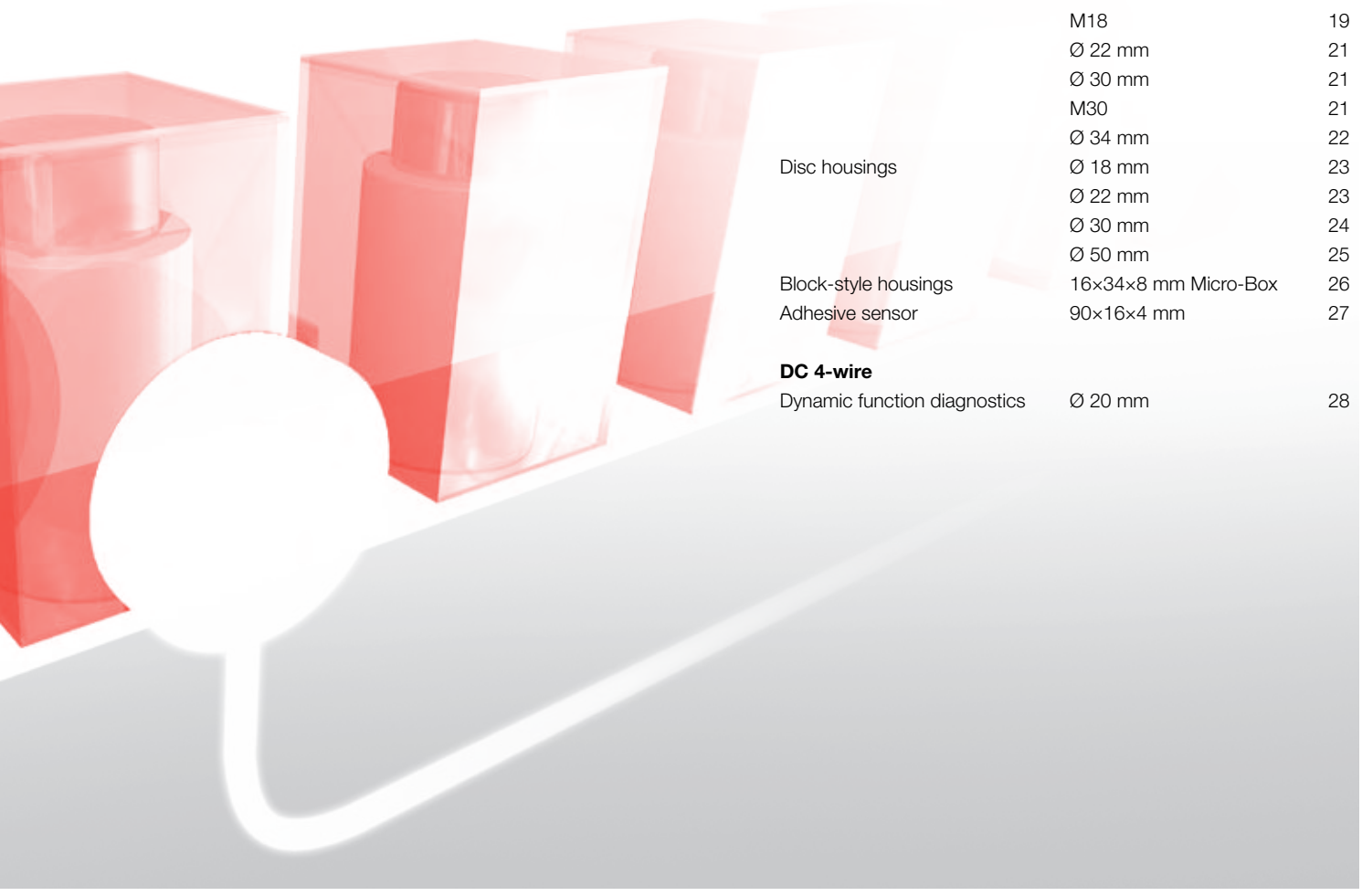


Object Detection
Contents

The industry standard capacitive sensors are M12 to M30 tubular housings. However, small parts detection or installations in tight mounting spaces require smaller form factors, therefore Balluff developed a capacitive product line that offers a large selection of sizes and form factors including miniature remote amplified versions. The product line also shows variety for different housing materials ranging from industrial rugged stainless steel to economical plastic grade versions.

Capacitive object detection sensors from Balluff employ a straight-line electrical field which is optimized for detection of solid bodies (e.g. wafers, PCBs, cartons, paper stacks, bottles, plastic blocks and plates) and liquid level detection through non-metallic container walls made of glass and plastic (thickness max. 4 mm).

Advantage: The straight-line electrical field in combination with the stainless steel housing allows Balluff BCS sensors to detect very low dielectric materials.

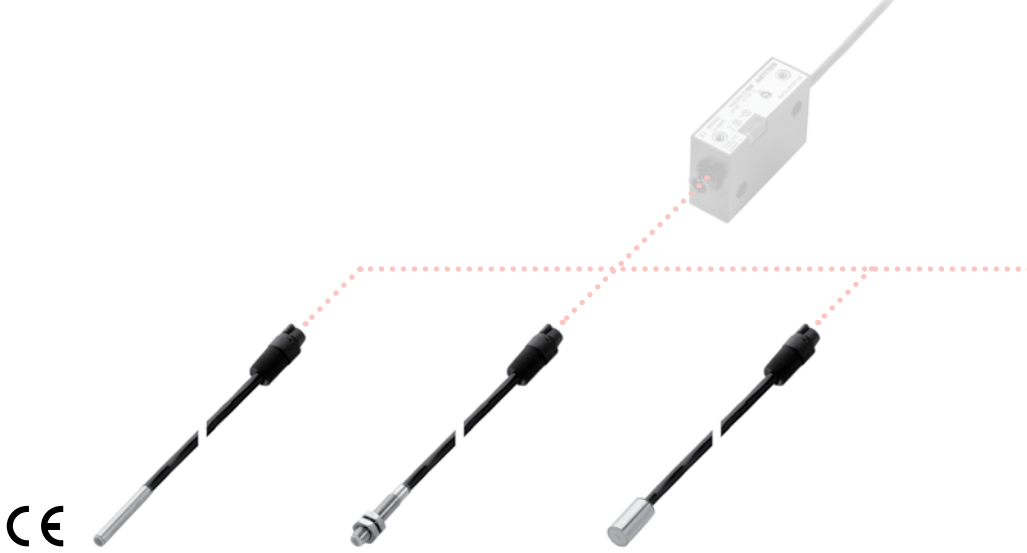


DC 3–wire
Tubular housings
Disc housings
Block-style
Adhesive sensor

DC 4–wire
Dynamic function diagnostics

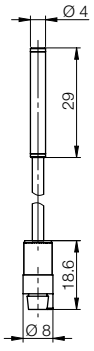
For power supplies, amplifiers, connectors and mounting brackets see accessories section starting **page 55**

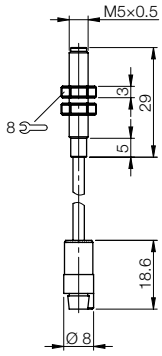
Object Detection
DC 3-wire Tubular housings

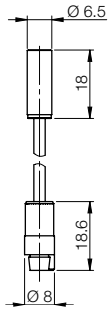


Housing size			**Ø 4 mm**	**M5×0.5**	**Ø 6.5 mm**	
Mounting			flush	flush	flush	
Rated switching distance s_n			**0.1…1 mm**	**0.1…1 mm**	**0.1…1.5 mm**	
With sensor amplifier		**Ordering code**	**BCS0010**	**BCS0011**	**BCS0012**	
		Part number	BCS G04T4D-XXS10C-EP02-GZ01-002	BCS M05T4C-XXS10C-EP02-GZ01-002	BCS G06T4B-XXS15C-EP02-GZ01-002	
PNP	Normally open	**Ordering code**				
		Part number				
PNP	Normally closed	**Ordering code**				
		Part number				
NPN	Normally open	**Ordering code**				
		Part number				
NPN	Normally closed	**Ordering code**				
		Part number				
Supply voltage U_S			4…8 V DC	4…8 V DC	4…8 V DC	
Voltage drop U_d at I_e						
Rated insulation voltage U_i			75 V DC	75 V DC	75 V DC	
Output current max.						
No-load supply current I_0 max.						
Reverse polarity/short circuit protected						
Ambient temperature range T_a			–30…+80 °C	–30…+80 °C	–30…+80 °C	
Switching frequency f			100 Hz	100 Hz	100 Hz	
Output function indicator						
Degree of protection per IEC 60529			IP 67	IP 67	IP 67	
Material		Housing	V2A	V2A	V2A	
		Sensing face	PTFE	PTFE	PTFE	
		Cover	POM	POM	POM	
Wiring			2 m cable PUR, 3×0.14 mm²	2 m cable PUR, 3×0.14 mm²	2 m cable PUR, 3×0.14 mm²	

For sensor amplifiers see Accessories section Page 57



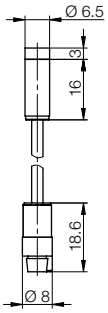


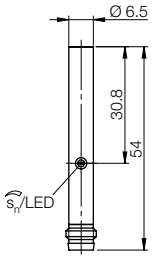


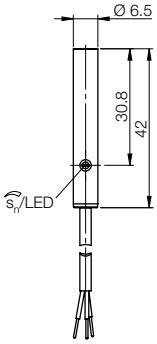


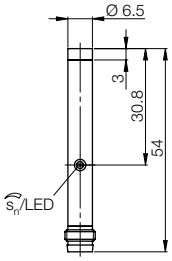


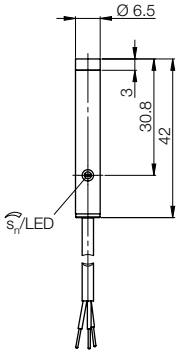
	Ø 6.5 mm	**Ø 6.5 mm**	**Ø 6.5 mm**	**Ø 6.5 mm**	**Ø 6.5 mm**
	non-flush	flush	flush	non-flush	non-flush
	0.1…3 mm	**0.1…1.5 mm**	**0.1…1.5 mm**	**0.1…3 mm**	**0.1…3 mm**
	BCS0013				
	BCS G06T4B-XXS30G-EP02-GZ01-002				
		BCS001R	**BCS001L**	**BCS0022**	**BCS001Y**
		BCS G06T4D2-PSM15C-S49G	BCS G06T4E1-PSM15C-EP02	BCS G06T4D2-PSM30G-S49G	BCS G06T4E1-PSM30G-EP02
		BCS001T	**BCS001M**	**BCS0023**	**BCS001Z**
		BCS G06T4D2-POM15C-S49G	BCS G06T4E1-POM15C-EP02	BCS G06T4D2-POM30G-S49G	BCS G06T4E1-POM30G-EP02
		BCS001U	**BCS001N**	**BCS0024**	**BCS0020**
		BCS G06T4D2-NSM15C-S49G	BCS G06T4E1-NSM15C-EP02	BCS G06T4D2-NSM30G-S49G	BCS G06T4E1-NSM30G-EP02
		BCS001W	**BCS001P**	**BCS0025**	**BCS0021**
		BCS G06T4D2-NOM15C-S49G	BCS G06T4E1-NOM15C-EP02	BCS G06T4D2-NOM30G-S49G	BCS G06T4E1-NOM30G-EP02
	4…8 V DC	11…30 V DC	11…30 V DC	11…30 V DC	11…30 V DC
		≤ 2 V	≤ 2 V	≤ 2 V	≤ 2 V
	75 V DC	75 V DC	75 V DC	75 V DC	75 V DC
		50 mA	50 mA	50 mA	50 mA
		≤ 10 mA	≤ 10 mA	≤ 10 mA	≤ 10 mA
		yes/yes	yes/yes	yes/yes	yes/yes
	–30…+80 °C	–10…+70 °C	–10…+70 °C	–10…+70 °C	–10…+70 °C
	100 Hz	100 Hz	100 Hz	100 Hz	100 Hz
		LED yellow	LED yellow	LED yellow	LED yellow
	IP 67	IP 65	IP 65	IP 65	IP 65
	V2A	V2A	V2A	V2A	V2A
	PTFE	PTFE	PTFE	PTFE	PTFE
	POM	PA	POM	PA	POM
	2 m cable PUR, 3×0.14 mm²	M8 connector, 3-pin	2 m cable PUR, 3×0.14 mm²	M8 connector, 3-pin	2 m cable PUR, 3×0.14 mm²











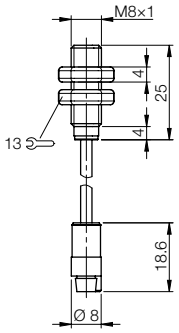
DC 3–wire
Tubular housings
Disc housings
Block-style
Adhesive sensor

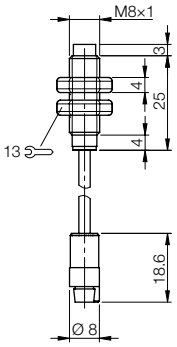
DC 4–wire
Dynamic function diagnostics

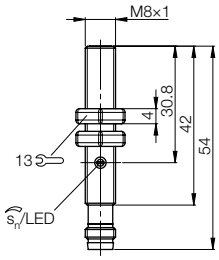
For power supplies, amplifiers, connectors and mounting brackets see accessories section starting **page 55**

Housing size		**M8 × 1**	**M8 × 1**	**M8 × 1**	
Mounting		flush	non-flush	flush	
Rated switching distance s_n		**0.1…1.5 mm**	**0.1…3 mm**	**0.1…1.5 mm**	
With sensor amplifier	**Ordering code**	**BCS0014**	**BCS0015**		
	Part number	BCS M08T4C-XXS15C-EP02-GZ01-002	BCS M08T4C1-XXS30G-EP02-GZ01-002		
PNP Normally open	**Ordering code**			**BCS002A**	
	Part number			BCS M08T4E2-PSM15C-S49G	
PNP Normally closed	**Ordering code**			**BCS002C**	
	Part number			BCS M08T4E2-POM15C-S49G	
NPN Normally open	**Ordering code**			**BCS002E**	
	Part number			BCS M08T4E2-NSM15C-S49G	
NPN Normally closed	**Ordering code**			**BCS002F**	
	Part number			BCS M08T4E2-NOM15C-S49G	
Supply voltage U_S		4…8 V DC	4…8 V DC	11…30 V DC	
Voltage drop U_d at I_e				≤ 2 V	
Rated insulation voltage U_i		75 V DC	75 V DC	75 V DC	
Output current max.				50 mA	
No-load supply current I_0 max.				≤ 10 mA	
Reverse polarity/short circuit protected				yes/yes	
Ambient temperature range T_a		–30…+80 °C	–30…+80 °C	–10…+70 °C	
Switching frequency f		100 Hz	100 Hz	100 Hz	
Output function indicator				LED yellow	
Degree of protection per IEC 60529		IP 67	IP 67	IP 65	
Material	Housing	V2A	V2A	V2A	
	Sensing face	PTFE	PTFE	PTFE	
	Cover	POM	POM	V2A	
Wiring		2 m cable PUR, 3×0.14 mm²	2 m cable PUR, 3×0.14 mm²	M8 connector, 3-pin	

For sensor amplifiers see Accessories section Page 57



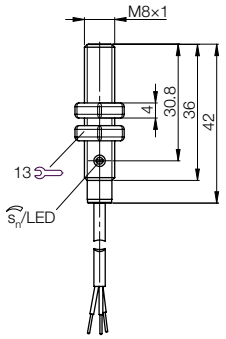


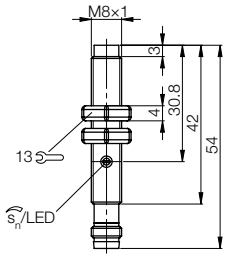


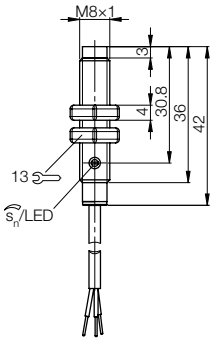


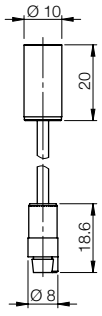


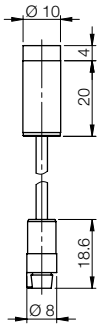
	M8 × 1	**M8 × 1**	**M8 × 1**	**Ø 10 mm**	**Ø 10 mm**
	flush	non-flush	non-flush	flush	non-flush
	0.1…1.5 mm	**0.1…3 mm**	**0.1…3 mm**	**0.1…4 mm**	**1…8 mm**
				BCS0016	**BCS0017**
				BCS G10T4B-XXS40C-EP02-GZ01-002	BCS G10T4C-XXS80G-EP02-GZ01-002
	BCS0026	**BCS002M**	**BCS002H**		
	BCS M08T4E1-PSM15C-EP02	BCS M08T4E2-PSM30G-S49G	BCS M08T4E1-PSM30G-EP02		
	BCS0027	**BCS002N**	**BCS002J**		
	BCS M08T4E1-POM15C-EP02	BCS M08T4E2-POM30G-S49G	BCS M08T4E1-POM30G-EP02		
	BCS0028	**BCS002P**	**BCS002K**		
	BCS M08T4E1-NSM15C-EP02	BCS M08T4E2-NSM30G-S49G	BCS M08T4E1-NSM30G-EP02		
	BCS0029	**BCS002R**	**BCS002L**		
	BCS M08T4E1-NOM15C-EP02	BCS M08T4E2-NOM30G-S49G	BCS M08T4E1-NOM30G-EP02		
	11…30 V DC	11…30 V DC	11…30 V DC	4…8 V DC	4…8 V DC
	≤ 2 V	≤ 2 V	≤ 2 V		
	75 V DC	75 V DC	75 V DC	75 V DC	75 V DC
	50 mA	50 mA	50 mA		
	≤ 10 mA	≤ 10 mA	≤ 10 mA		
	yes/yes	yes/yes	yes/yes		
	–10…+70 °C	–10…+70 °C	–10…+70 °C	–30…+80 °C	–30…+80 °C
	100 Hz	100 Hz	100 Hz	100 Hz	100 Hz
	LED yellow	LED yellow	LED yellow		
	IP 65	IP 65	IP 65	IP 67	IP 67
	V2A	V2A	V2A	V2A	V2A
	PTFE	PTFE	PTFE	PTFE	PTFE
	POM	V2A	POM	POM	POM
	2 m cable PUR, 3×0.14 mm²	M8 connector, 3-pin	2 m cable PUR, 3×0.14 mm²	2 m cable PUR, 3×0.14 mm²	2 m cable PUR, 3×0.14 mm²









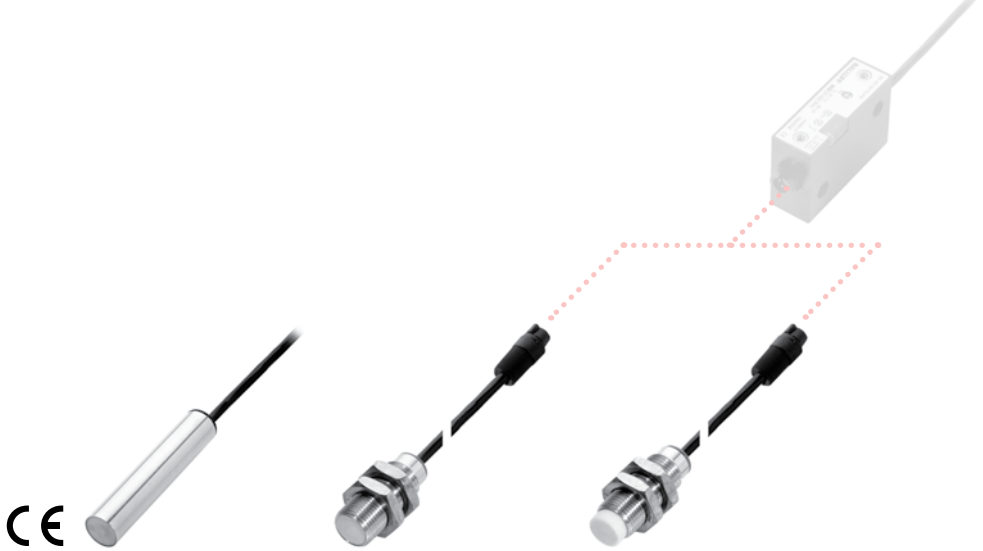


DC 3–wire
Tubular housings
Disc housings
Block-style
Adhesive sensor

DC 4–wire
Dynamic function diagnostics

For power supplies, amplifiers, connectors and mounting brackets see accessories section starting **page 55**

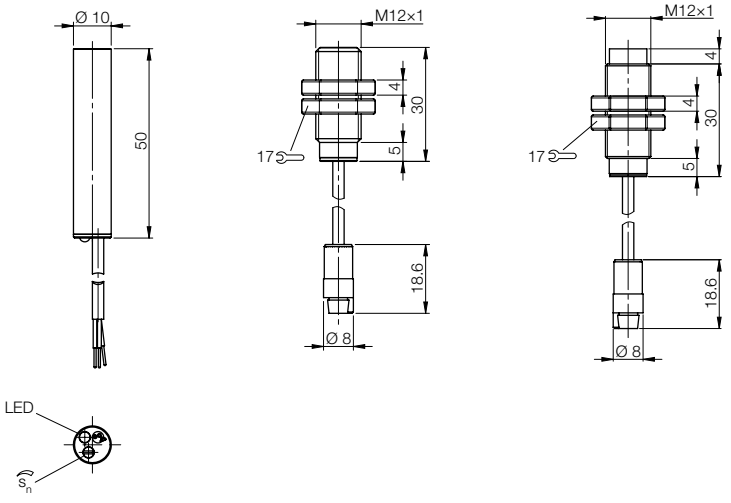
Object Detection
DC 3-wire Tubular housings



Housing size			**Ø 10 mm**	**M12×1**	**M12×1**	
Mounting			flush	flush	non-flush	
Rated switching distance s_n			**1…4 mm**	**0.1…4 mm**	**1…8 mm**	
With sensor amplifier		**Ordering code**		**BCS0018**	**BCS0019**	
		Part number		BCS M12T4D-XXS40C-EP02-GZ01-002	BCS M12T4D1-XXS80G-EP02-GZ01-002	
PNP	Normally open	**Ordering code**	**BCS002T**			
		Part number	BCS G10T4H-PSM40C-EP02			
PNP	Normally closed	**Ordering code**	**BCS002U**			
		Part number	BCS G10T4H-POM40C-EP02			
NPN	Normally open	**Ordering code**	**BCS002W**			
		Part number	BCS G10T4H-NSM40C-EP02			
NPN	Normally closed	**Ordering code**	**BCS002Y**			
		Part number	BCS G10T4H-NOM40C-EP02			
Supply voltage U_S			12…35 V DC	4…8 V DC	4…8 V DC	
Voltage drop U_d at I_e			≤ 0.8 V			
Rated insulation voltage U_i			75 V DC	75 V DC	75 V DC	
Output current max.			200 mA			
No-load supply current I_0 max.			≤ 10 mA			
Reverse polarity/short circuit protected			yes/yes			
Ambient temperature range T_a			–30…+70 °C	–30…+80 °C	-30…+80 °C	
Switching frequency f			100 Hz	100 Hz	100 Hz	
Output function indicator			LED yellow			
Degree of protection per IEC 60529			IP 65	IP 67	IP 67	
Material		Housing	V2A	V2A	V2A	
		Sensing face	PTFE	PTFE	PTFE	
		Cover	POM	POM	POM	
Wiring			2 m cable PUR, 3×0.14 mm²	2 m cable PUR, 3×0.14 mm²	2 m cable PUR, 3×0.14 mm²	

For sensor amplifiers see Accessories section Page 57

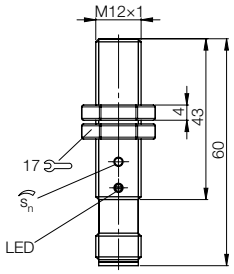
The flush mount sensors for object detection M12...M30 in plastic or PTFE housing provide IP 68 protection (at approx. 5 bar) at the sensing face.

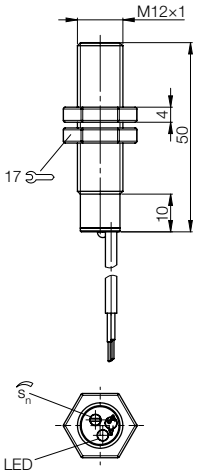


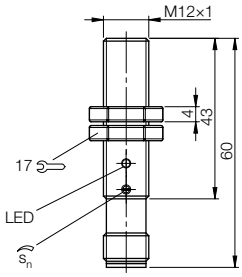


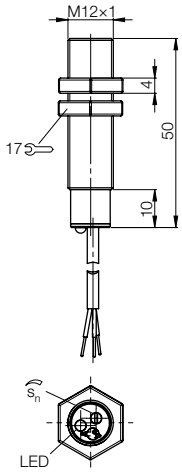


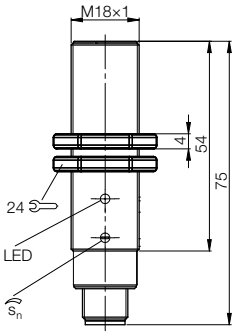
	M12×1	**M12×1**	**M12×1**	**M12×1**	**M18×1**
	flush	flush	flush	flush	flush
	1…4 mm	**1…4 mm**	**1…4 mm**	**1…4 mm**	**2…8 mm**
	BCS0037	**BCS002Z**	**BCS003T**	**BCS003M**	**BCS0047**
	BCS M12T4D2-PSM40C-S04G	BCS M12T4G1-PSM40C-EP02	BCS M12VVD2-PSM40C-S04G	BCS M12VVG1-PSM40C-EP02	BCS M18B4G2-PSC80C-S04G
	BCS0038	**BCS0030**	**BCS003U**	**BCS003N**	**BCS0049**
	BCS M12T4D2-POM40C-S04G	BCS M12T4G1-POM40C-EP02	BCS M12VVD2-POM40C-S04G	BCS M12VVG1-POM40C-EP02	BCS M18B4G2-POC80C-S04G
	BCS0039	**BCS0031**	**BCS003W**	**BCS003P**	**BCS004C**
	BCS M12T4D2-NSM40C-S04G	BCS M12T4G1-NSM40C-EP02	BCS M12VVD2-NSM40C-S04G	BCS M12VVG1-NSM40C-EP02	BCS M18B4G2-NSC80C-S04G
	BCS00AC	**BCS0032**	**BCS003Y**	**BCS003R**	**BCS004F**
	BCS M12T4D2-NOM40C-S04G	BCS M12T4G1-NOM40C-EP02	BCS M12VVD2-NOM40C-S04G	BCS M12VVG1-NOM40C-EP02	BCS M18B4G2-NOC80C-S04G
	12…35 V DC	12…35 V DC	12…35 V DC	12…35 V DC	10…35 V DC
	≤ 0.8 V	≤ 0.8 V	≤ 0.8 V	≤ 0.8 V	≤ 1.5 V
	75 V DC	75 V DC	75 V DC	75 V DC	75 V DC
	200 mA	200 mA	200 mA	200 mA	300 mA
	≤ 10 mA	≤ 10 mA	≤ 10 mA	≤ 10 mA	≤ 10 mA
	yes/yes	yes/yes	yes/yes	yes/yes	yes/yes
	–30…+70 °C	–30…+70 °C	–30…+60 °C	–30…+70 °C	–30…+70 °C
	100 Hz	100 Hz	100 Hz	100 Hz	100 Hz
	LED yellow	LED yellow	LED yellow	LED yellow	LED yellow
	IP 65	IP 65	IP 65	IP 65	IP 67
	V2A	V2A	PVC	PVC	V2A
	PTFE	PTFE	PVC	PVC	PBT
	PA	POM	PA	PVC	PA
	M12 connector, 4-pin, A-coded	2 m cable PUR 3×0.14 mm²	M12 connector, 4-pin, A-coded	2 m cable PUR 3×0.14 mm²	M12 connector, 4-pin, A-coded











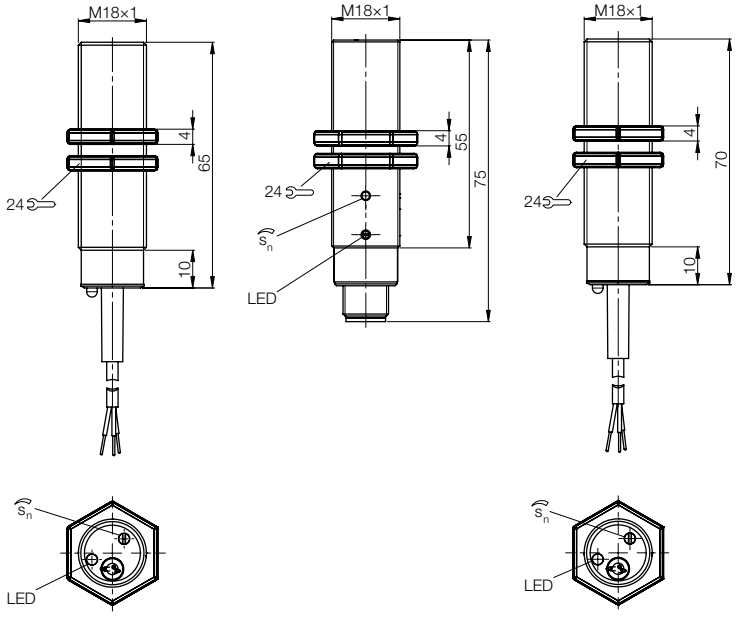
DC 3–wire
Tubular housings
Disc housings
Block-style
Adhesive sensor

DC 4–wire
Dynamic function diagnostics

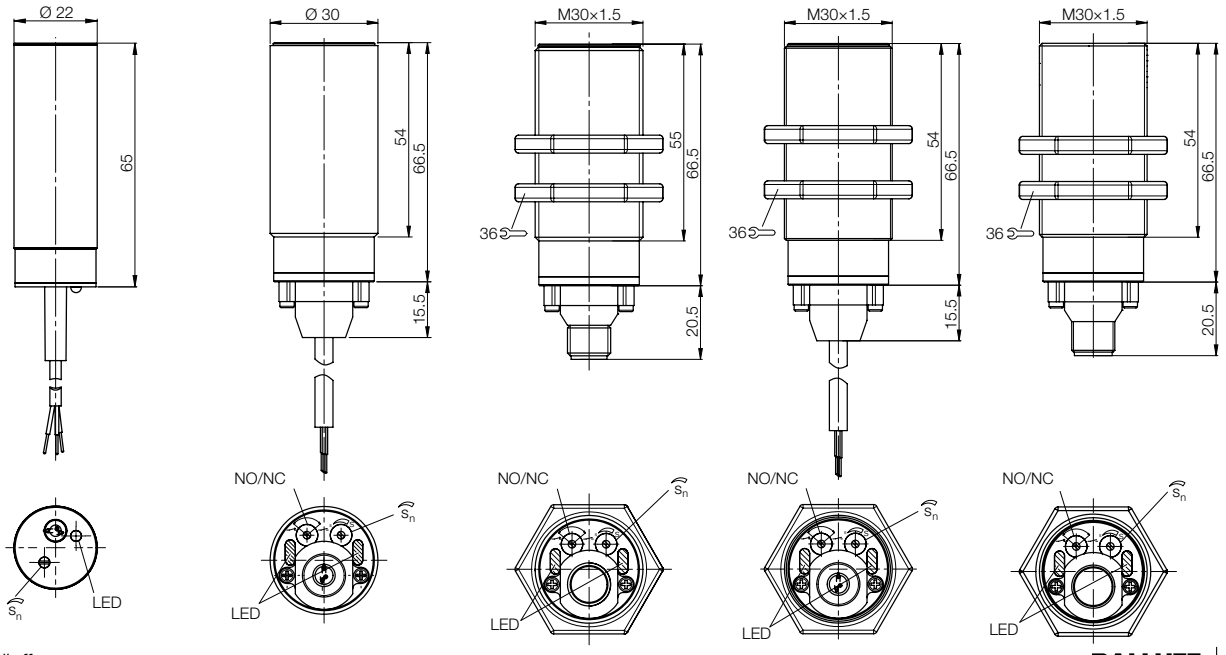
For power supplies, amplifiers, connectors and mounting brackets see accessories section starting **page 55**

Housing size			**M18×1**	**M18×1**	**M18×1**
Mounting			flush	flush	flush
Rated switching distance s_n			**2…8 mm**	**2…8 mm**	**2…8 mm**
PNP	Normally open	**Ordering code**	**BCS0040**	**BCS0046**	**BCS003Z**
		Part number	BCS M18B4M-PSC80C-EV02	BCS M18VVG2-PSC80C-S04G	BCS M18VVM1-PSM80C-EV02
PNP	Normally closed	**Ordering code**	**BCS0042**	**BCS0048**	**BCS0041**
		Part number	BCS M18B4M-POC80C-EV02	BCS M18VVG2-POC80C-S04G	BCS M18VVM1-POM80C-EV02
PNP	NO/NC selectable	**Ordering code**			
		Part number			
NPN	Normally open	**Ordering code**	**BCS0044**	**BCS004A**	**BCS0043**
		Part number	BCS M18B4M-NSC80C-EV02	BCS M18VVG2-NSC80C-S04G	BCS M18VVM1-NSM80C-EV02
NPN	Normally closed	**Ordering code**	**BCS00AE**	**BCS004E**	**BCS0045**
		Part number	BCS M18B4M-NOC80C-EV02	BCS M18VVG2-NOC80C-S04G	BCS M18VVM1-NOM80C-EV02
NPN	NO/NC selectable	**Ordering code**			
		Part number			
Supply voltage U_S			10…35 V DC	10…35 V DC	10…35 V DC
Voltage drop U_d at I_e			≤ 1.5 V	≤ 1.5 V	≤ 1.5 V
Rated insulation voltage U_i			75 V DC	75 V DC	75 V DC
Output current max.			300 mA	300 mA	300 mA
No-load supply current I_0 max.			≤ 10 mA	≤ 10 mA	≤ 10 mA
Reverse polarity/short circuit protected			yes/yes	yes/yes	yes/yes
Ambient temperature range T_a			–30…+70 °C	–30…+60 °C	–30…+60 °C
Switching frequency f			100 Hz	100 Hz	100 Hz
Power indicator					
Output function indicator			LED yellow	LED yellow	LED yellow
Degree of protection per IEC 60529			IP 67	IP 67	IP 67
Material		Housing	V2A	PVC	PVC
		Sensing face	PBT	PVC	PVC
		Cover	PBT	PA	PBT
Wiring			2 m cable PVC, 3×0.25 mm²	M12 connector, 4-pin, A-coded	2 m cable PVC, 3×0.25 mm²

The flush mount sensors for object detection M12...M30 in plastic or PTFE housing provide IP 68 protection (at approx. 5 bar) at the sensing face.



	Ø 22 mm	**Ø 30 mm**	**M30×1.5**	**M30×1.5**	**M30×1.5**
	flush	flush	flush	flush	flush
	2…10 mm	**2…20 mm**	**1…20 mm**	**1…20 mm**	**1…20 mm**
	BCS0033				
	BCS D22V4M1-PSC10C-EV02				
	BCS0034				
	BCS D22V4M1-POC10C-EV02				
		BCS004H	**BCS004T**	**BCS004P**	**BCS004M**
		BCS D30B4M3-PPC20C-EP02	BCS M30B4M2-PPM20C-S04G	BCS M30B4M3-PPM20C-EP02	BCS M30BBM2-PPM20C-S04G
	BCS0035				
	BCS D22V4M1-NSC10C-EV02				
	BCS0036				
	BCS D22V4M1-NOC10C-EV02				
		BCS004J	**BCS004U**	**BCS004R**	**BCS004N**
		BCS D30B4M3-NPC20C-EP02	BCS M30B4M2-NPM20C-S04G	BCS M30B4M3-NPM20C-EP02	BCS M30BBM2-NPM20C-S04G
	10…35 V DC	10…35 V DC	10…35 V DC	10…35 V DC	10…35 V DC
	≤ 1.5 V	≤ 1.8 V	≤ 1.8 V	≤ 1.8 V	≤ 1.8 V
	75 V DC	75 V DC	75 V DC	75 V DC	75 V DC
	300 mA	300 mA	300 mA	300 mA	300 mA
	≤ 10 mA	≤ 15 mA	≤ 15 mA	≤ 15 mA	≤ 15 mA
	yes/yes	yes/yes	yes/yes	yes/yes	yes/yes
	–30…+60 °C	–30…+70 °C	–30…+70 °C	–30…+70 °C	–30…+70 °C
	100 Hz	100 Hz	100 Hz	100 Hz	100 Hz
		LED green	LED green	LED green	LED green
	LED yellow	LED yellow	LED yellow	LED yellow	LED yellow
	IP 67	IP 64	IP 64	IP 64	IP 64
	V2A	V2A	V2A	V2A	PBT
	PVC	PBT	PBT	PBT	PBT
	PVC	PBT/PE	PBT/PE	PBT/PE	PBT/PE
	2 m cable PVC, 3×0.25 mm²	2 m cable PUR, 3×0.34 mm²	M12 connector, 4-pin, A-coded	2 m cable PUR, 3×0.34 mm²	M12 connector, 4-pin, A-coded

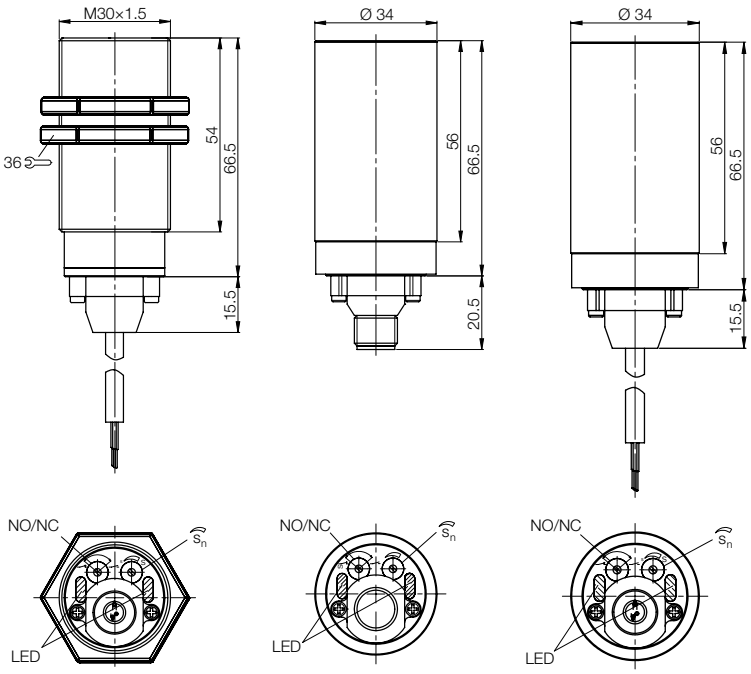


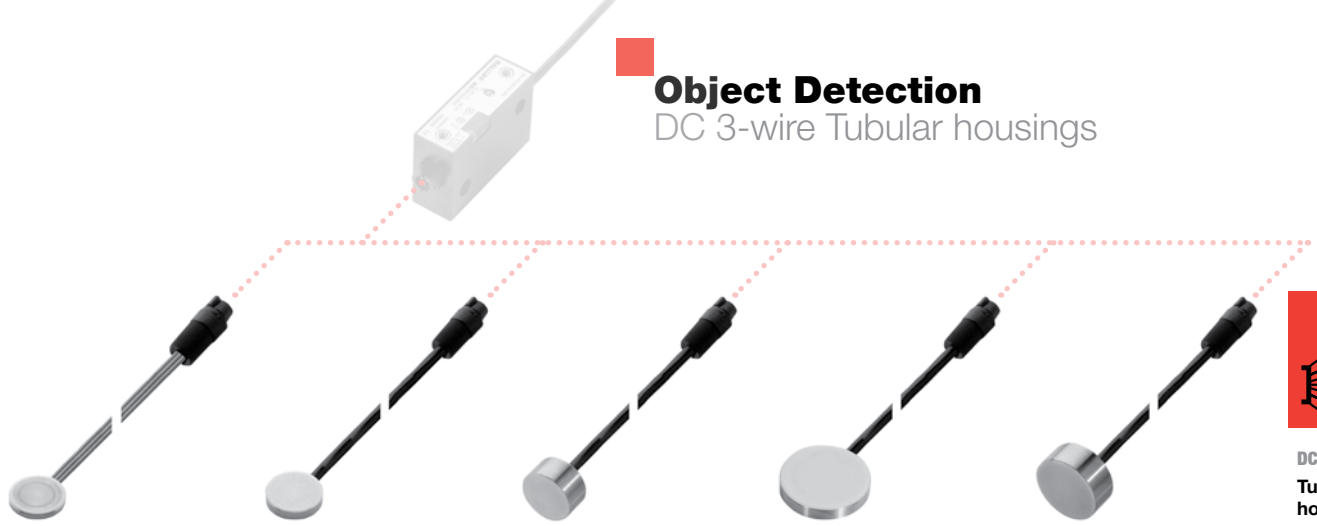
For power supplies, amplifiers, connectors and mounting brackets see accessories section starting **page 55**

Housing size			**M30×1.5**	**Ø 34 mm**	**Ø 34 mm**
Mounting			flush	flush	flush
Rated switching distance s_n			**1…20 mm**	**1…25 mm**	**1…25 mm**
With sensor amplifier		**Ordering code**			
		Part number			
PNP	NO/NC	**Ordering code**	**BCS004K**	**BCS004Z**	**BCS004W**
	selectable	Part number	BCS M30BBM3-PPC20C-EP02	BCS G34VVM2-PPM20C-S04G	BCS G34VVM3-PPM20C-EP02
NPN	NO/NC	**Ordering code**	**BCS004L**	**BCS0050**	**BCS004Y**
	selectable	Part number	BCS M30BBM3-NPC20C-EP02	BCS G34VVM2-NPM20C-S04G	BCS G34VVM3-NPM20C-EP02
Supply voltage U_S			10…35 V DC	10…35 V DC	10…35 V DC
Voltage drop U_d at I_e			≤ 1.8 V	≤ 1.8 V	≤ 1.8 V
Rated insulation voltage U_i			75 V DC	75 V DC	75 V DC
Output current max.			300 mA	300 mA	300 mA
No-load supply current I_0 max.			≤ 15 mA	≤ 15 mA	≤ 15 mA
Reverse polarity/short circuit protected			yes/yes	yes/yes	yes/yes
Ambient temperature range T_a			–30…+70 °C	–30…+70 °C	–30…+70 °C
Switching frequency f			100 Hz	100 Hz	100 Hz
Power indicator			LED green	LED green	LED green
Output function indicator			LED yellow	LED yellow	LED yellow
Degree of protection per IEC 60529			IP 64	IP 64	IP 64
Material		Housing	PBT	PVC	PVC
		Sensing face	PBT	PVC	PVC
		Cover	PBT/PE	PBT/PE	PBT/PE
Wiring			2 m cable PUR, 3×0.34 mm²	M12 connector, 4-pin, A-coded	2 m cable PUR, 3×0.34 mm²

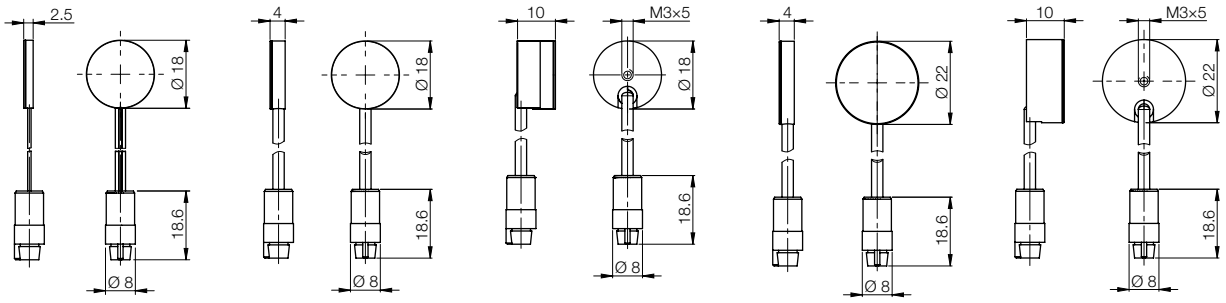
For sensor amplifiers see Accessories section Page 57

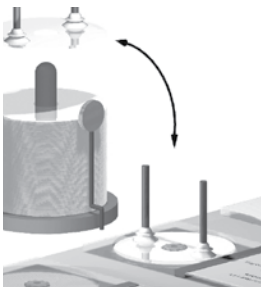
The flush mount sensors for object detection M12...M30 in plastic or PTFE housing provide IP 68 protection (at approx. 5 bar) at the sensing face.

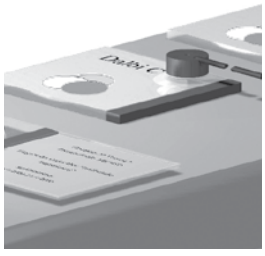


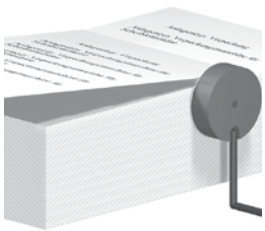


	Ø 18×2.5 mm	**Ø 18×4 mm**	**Ø 18×10 mm**	**Ø 22×4 mm**	**Ø 22×10 mm**
	flush	flush	flush	flush	flush
	0.1…3 mm	**1…5 mm**	**1…5 mm**	**1…10 mm**	**1…10 mm**
	BCS001A	**BCS001C**	**BCS001E**	**BCS001F**	**BCS001H**
	BCS D18T403-XXS30C-EP02-GZ01-002	BCS D18T404-XXS50C-EP02-GZ01-002	BCS D18T407-XXS50C-EP02-GZ01-002	BCS D22T405-XXS10C-EP02-GZ01-002	BCS D22T408-XXS10C-EP02-GZ01-002
	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
	–30…+70 °C	–30…+80 °C	–30…+80 °C	–30…+80 °C	–30…+80 °C
	100 Hz	100 Hz	100 Hz	100 Hz	100 Hz
	IP 66	IP 66	IP 66	IP 66	IP 66
	V2A	V2A	V2A	V2A	V2A
	PTFE	PTFE	PTFE	PTFE	PTFE
	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	2 m cable PUR, 3×0.14 mm²







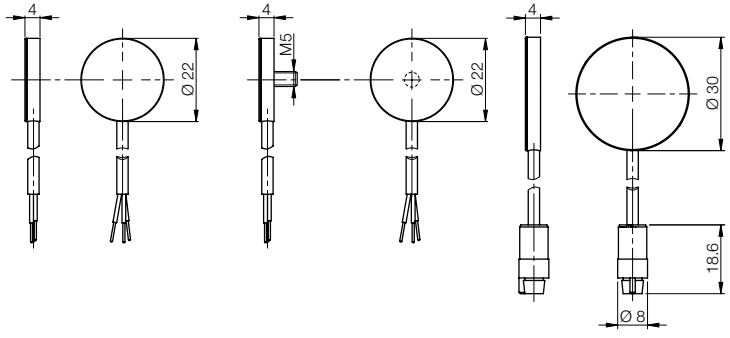


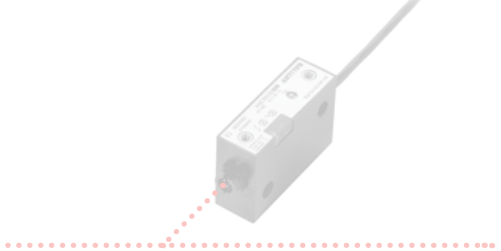
For power supplies, amplifiers, connectors and mounting brackets see accessories section starting **page 55**

Object Detection
DC 3-wire Disc housings

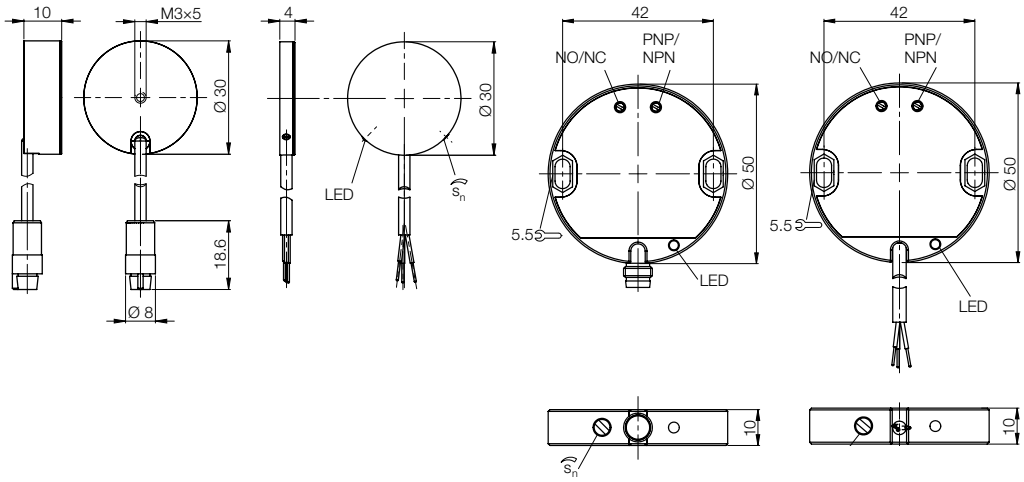
Housing size			**Ø 22×4 mm**	**Ø 22×4 mm**	**Ø 30×4 mm**	
Mounting			flush	flush	flush	
Rated switching distance s_n			**6 mm ±10 %**	**6 mm ±10 %**	**1…15 mm**	
With sensor amplifier		**Ordering code**			**BCS001J**	
		Part number			BCS D30T406-XXS15C-EP02-GZ01-002	
PNP	Normally open	**Ordering code**	**BCS003H**	**BCS00HK**		
		Part number	BCS D22T403-PSM60C-EP02	BCS D22T402-PSM60C-EP02		
PNP	Normally closed	**Ordering code**				
		Part number				
NPN	Normally open	**Ordering code**	**BCS003J**			
		Part number	BCS D22T403-NSM60C-EP02			
NPN	Normally closed	**Ordering code**				
		Part number				
PNP/NPN and		**Ordering code**				
NO/NC selectable		Part number				
Supply voltage U_S			12…30 V DC	12…30 V DC	4…8 V DC	
Voltage drop U_d at I_e			≤ 0.8 V	≤ 0.8 V		
Rated insulation voltage U_i			75 V DC	75 V DC	75 V DC	
Output current max.			300 mA	300 mA		
No-load supply current I_0 max.			≤ 10 mA	≤ 10 mA		
Reverse polarity/short circuit protected			yes/yes	yes/yes		
Ambient temperature range T_a			–30…+70 °C	–30…+70 °C	–30…+80 °C	
Switching frequency f			100 Hz	100 Hz	100 Hz	
Output function indicator						
Degree of protection per IEC 60529			IP 64	IP 64	IP 66	
Material		Housing	V2A	V2A	V2A	
		Sensing face	PTFE	PTFE	PTFE	
		Cover				
Wiring			2 m cable PUR, 3×0.14 mm²	2 m cable PUR, 3×0.14 mm²	2 m cable PUR, 3×0.14 mm²	

For sensor amplifiers see Accessories section Page 57





	Ø 30×10 mm	**Ø 30×4 mm**	**Ø 50×10 mm**	**Ø 50×10 mm**	
	flush	flush	flush	flush	
	1...15 mm	**2...15 mm**	**2...25 mm**	**2...25 mm**	
	BCS001K				
	BCS D30T409-XXS15C-EP02-GZ01-002				
		BCS003A			
		BCS D30T401-PSC15C-EP02			
		BCS003C			
		BCS D30T401-POC15C-EP02			
		BCS003E			
		BCS D30T401-NSC15C-EP02			
		BCS003F			
		BCS D30T401-NOC15C-EP02			
			BCS003L	**BCS003K**	
			BCS D50OO03-YPC25C-S49G	BCS D50OO02-YPC25C-EV02	
	4…8 V DC	10…35 V DC	10…30 V DC	10…30 V DC	
		≤ 0.8 V	≤ 1.5 V	≤ 2 V	
	75 V DC	75 V DC	75 V DC	75 V DC	
		300 mA	150 mA	150 mA	
		≤ 10 mA	≤ 15 mA	≤ 15 mA	
		yes/yes	yes/yes	yes/yes	
	–30…+80 °C	–30…+70 °C	–30…+60 °C	–30…+60 °C	
	100 Hz	100 Hz	50 Hz	50 Hz	
		LED yellow	LED yellow	LED yellow	
	IP 66	IP 67	IP 65	IP 67	
	V2A	V2A	POM	POM	
	PTFE	PTFE	POM	POM	
			POM	POM	
	2 m cable PUR, 3×0.14 mm²	2 m cable PUR, 3×0.14 mm²	M8 connector, 3-pin	2 m cable PVC, 3×0.25 mm²	



DC 3–wire
Tubular housings
Disc housings
Block-style
Adhesive sensor

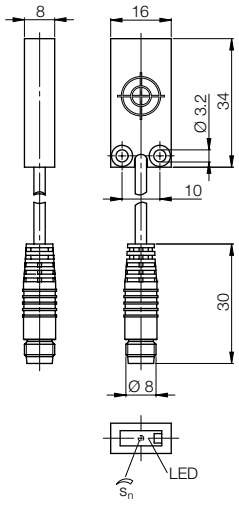
DC 4–wire
Dynamic function diagnostics

For power supplies, amplifiers, connectors and mounting brackets see accessories section starting **page 55**

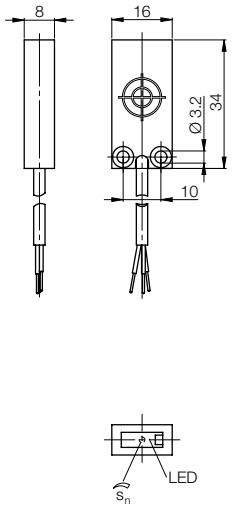
Object Detection

DC 3-wire Block-style housings

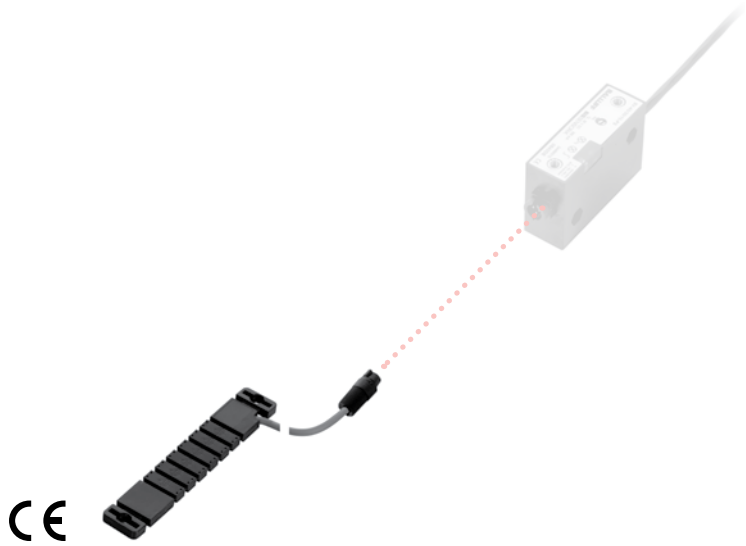
Housing size			**16×34×8 mm** Micro-Box	**16×34×8 mm** Micro-Box
Mounting			flush	flush
Rated switching distance s_n			**1…8 mm**	**1…8 mm**
PNP	Normally open	**Ordering code**	**BCS0055**	**BCS0051**
		Part number	BCS R08RR01-PSM80C-EP00,2-GS49	BCS R08RR01-PSM80C-EP02
PNP	Normally closed	**Ordering code**	**BCS0056**	**BCS0052**
		Part number	BCS R08RR01-POM80C-EP00,2-GS49	BCS R08RR01-POM80C-EP02
NPN	Normally open	**Ordering code**	**BCS0057**	**BCS0053**
		Part number	BCS R08RR01-NSM80C-EP00,2-GS49	BCS R08RR01-NSM80C-EP02
NPN	Normally closed	**Ordering code**	**BCS0058**	**BCS0054**
		Part number	BCS R08RR01-NOM80C-EP00,2-GS49	BCS R08RR01-NOM80C-EP02
Supply voltage U_S			12…30 V DC	12…30 V DC
Voltage drop U_d at I_e			≤ 1.5 V	≤ 1.5 V
Rated insulation voltage U_i			75 V DC	75 V DC
Output current max.			50 mA	50 mA
No-load supply current I_0 max.			≤ 10 mA	≤ 10 mA
Reverse polarity/short circuit protected			yes/yes	yes/yes
Ambient temperature range T_a			–30…+70 °C	–30…+70 °C
Switching frequency f			100 Hz	100 Hz
Output function indicator			LED yellow	LED yellow
Degree of protection per IEC 60529			IP 67	IP 67
Material		Housing	PP	PP
		Sensing face	PP	PP
		Cover	PP	PP
Wiring			0.2 m cable PUR, 3×0.14 mm² with M8 connector, 3-pin	2 m cable PUR, 3×0.14 mm²



Mounting frame included in scope of delivery

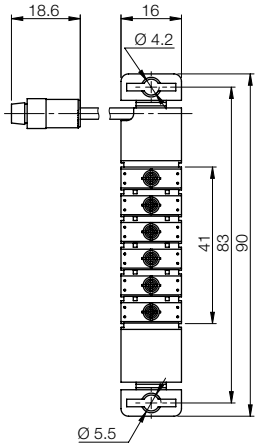


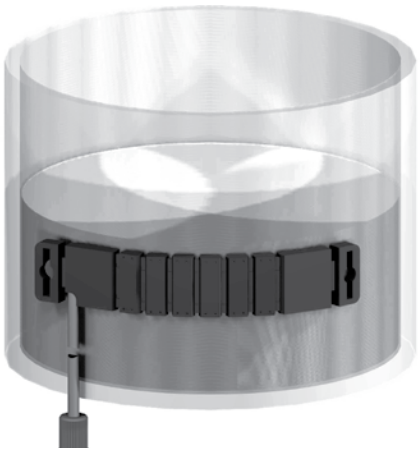
Mounting frame included in scope of delivery

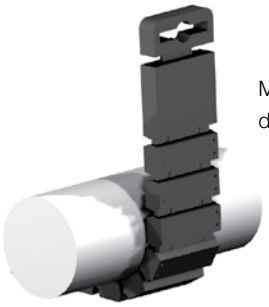


Housing size		**90×16×4 mm**
Mounting		flush
Rated switching distance s_n		**0…10 mm**
With sensor amplifier	**Ordering code**	**BCS000Y**
	Part number	BCS F01CP01-XXS10C-EP02-GZ01-002
Supply voltage U_S		4…8 V DC
Rated insulation voltage U_i (protection class)		75 V DC
Ambient temperature range T_a		0…+60 °C
Switching frequency f		100 Hz
Degree of protection per IEC 60529		IP 60
Material	Housing	PC/PUR
	Sensing face	PUR
Wiring		2 m cable PUR, 3×0.14 mm²

For sensor amplifiers see Accessories section Page 57







Minimum bending diameter 20 mm

DC 3–wire
Tubular housings
Disc housings
Block-style
Adhesive sensor

DC 4–wire
Dynamic function diagnostics

For power supplies, amplifiers, connectors and mounting brackets see accessories section starting **page 55**

Object Detection
DC 4-wire Dynamic function diagnostics

Function

Balluff BCS capacitive sensors with internal dynamic self-diagnostics allow monitoring of the sensor functions including the cable connection.

The internal oscillator circuit uses a modulated pulse generator forcing the oscillator to change state for specific frequency and pulse duration. In the event of a damaged sensing head or oscillator circuit or consecutive electronics, the pulse generator can no longer change state resulting a loss of pulses on the output.

The pulse frequency is f ~ 160 Hz with a pulse duration of t ~ 300 µs. The pulse-pause ratio of t~5% is selected small enough so that the test pulses can be easily filtered out by the input filter of a controller, to allow, for example, a directly driven relay. The switching condition information “proximity switch damped or undamped” can therefore be processed in the usual fashion.

Function monitoring

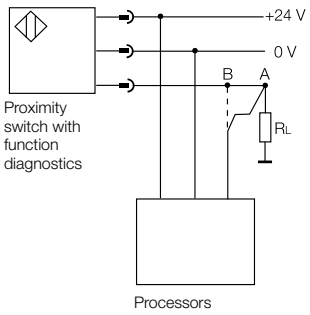
In order to evaluate the test pulses, additional electronics or sufficient I/O logic on the input controller is required. Balluff offers a function diagnostics unit which can be easily integrated into existing control logic.

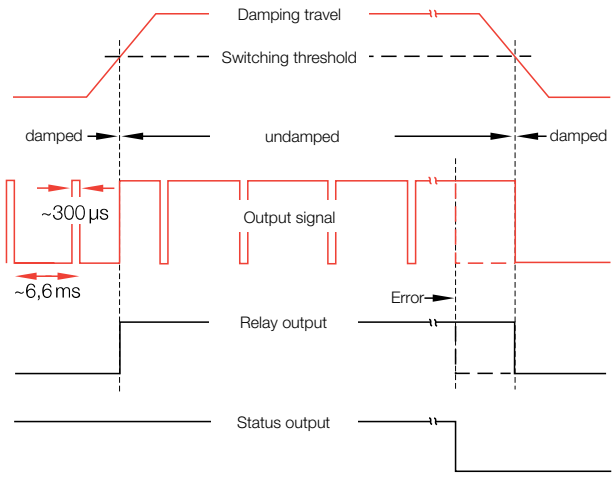
Note!

This self-monitoring system is not suitable or certified for personal safety applications. For additional information please request a detailed description.

Installation notes

The signal line for the function diagnostics unit should be connected as close to the load R_L as possible (Point A).
When Point B is connected the cable segment between B and load R_L is not monitored.

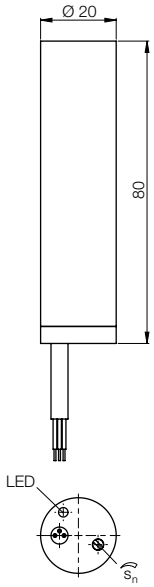




Pulse diagram of a proximity switch with function diagnostics (normally closed)

Housing size			**Ø 20 mm**
Mounting			flush
Rated switching distance s_n			**10 mm**
PNP	Complementary	**Ordering code**	**BCS0001**
		Part number	BCS 20MG10-XPA1Y-8B-03
Supply voltage U_S			10...30 V DC
Voltage drop U_d at I_e			≤ 3.5 V
Rated insulation voltage U_i			75 V DC
Output current max.			130 mA
No-load supply current I_0 max.			≤ 10 mA
Reverse polarity/short circuit protected			yes/yes
Ambient temperature range T_a			+10...+50 °C
Switching frequency f			100 Hz
Power indicator			LED green
Output function indicator			LED yellow
Degree of protection per IEC 60529			IP 63
Material		Housing	V2A
		Sensing face	EP
Wiring			3 m cable PUR, 4×0.25 mm²

Function diagnostics unit
with electronic output,
see Accessories section, page 63

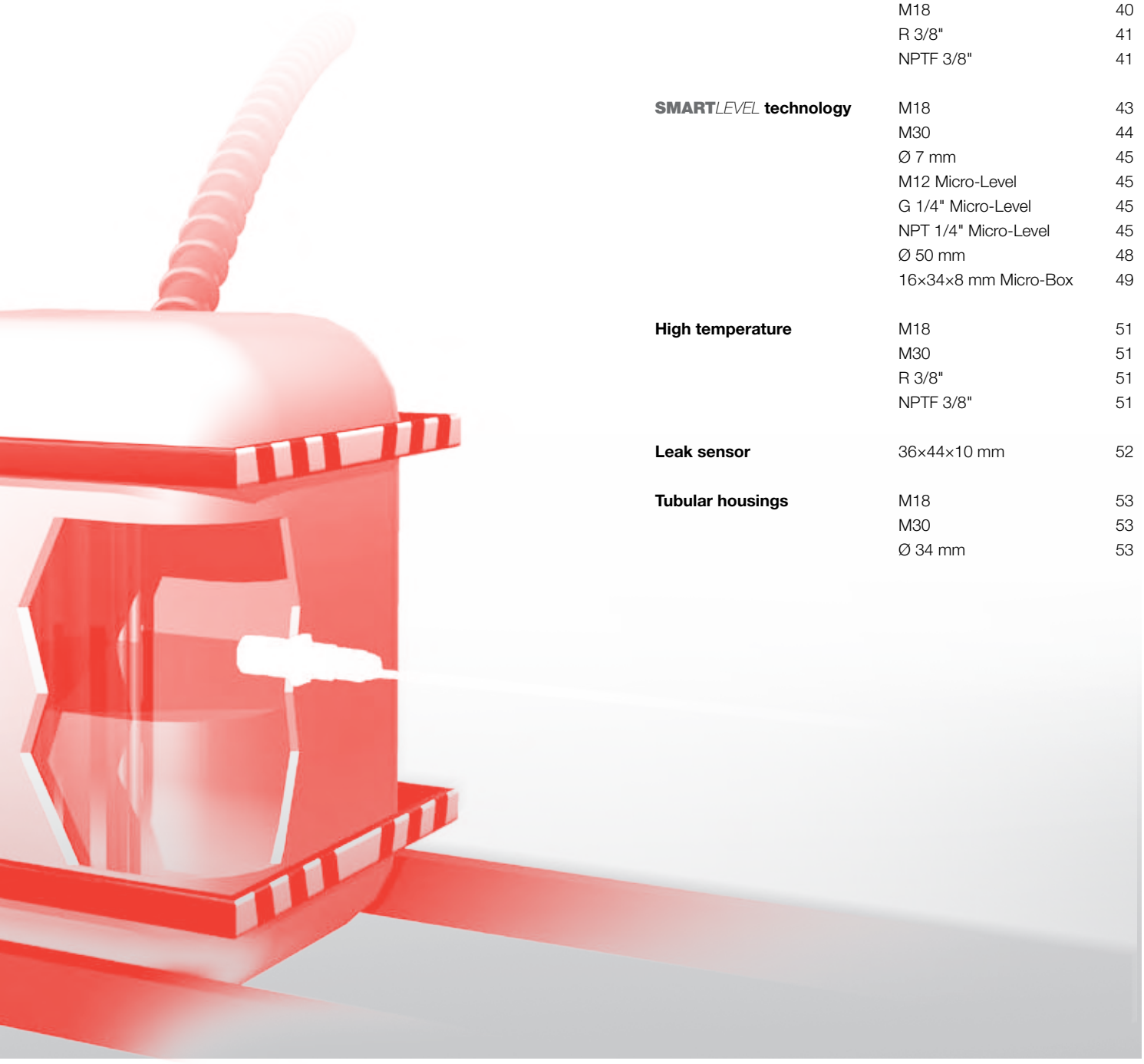


For power supplies, amplifiers, connectors and mounting brackets see accessories section starting **page 55**

Level Detection
Contents

Capacitive sensors for level detection use their sensing face to detect the product, bulk material or liquid (e.g. plastic granulate, sugar, oil, aqueous media) directly or through a container wall.

Advantage: Their spherical electrical field effectively compensates for build-up on the sensing face of the sensor.



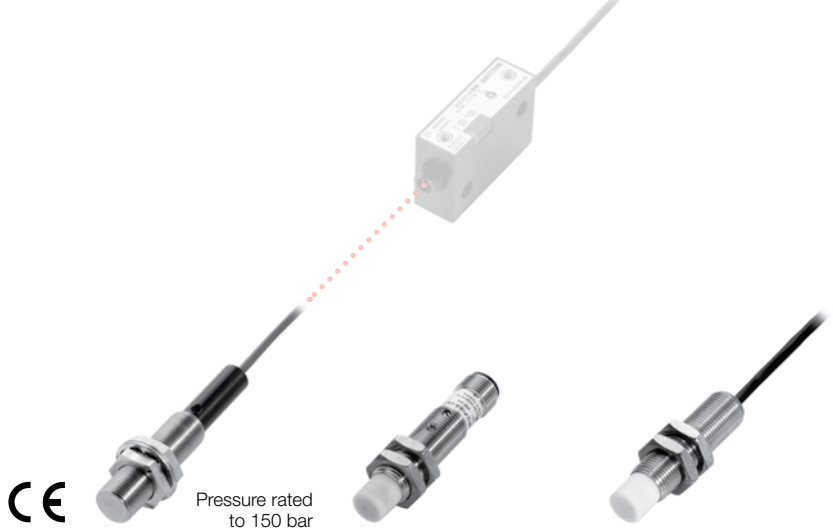
DC 3-wire
Tubular housings
SMART technology
High temperature rated styles
Leak sensor

AC/DC 2-wire
Tubular housings

For power supplies, amplifiers, connectors and mounting brackets see accessories section starting **page 55**

Level Detection

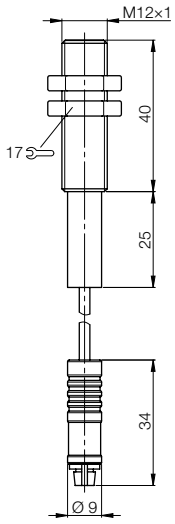
DC 3-wire Tubular housings
M12

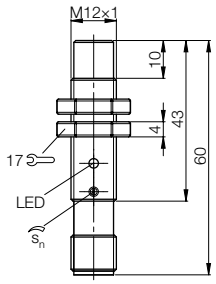


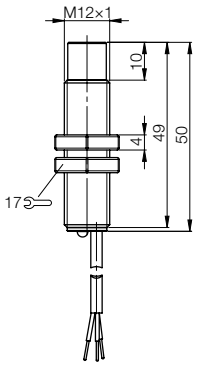
Pressure rated to 150 bar

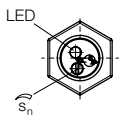
Housing size			**M12×1**	**M12×1**	**M12×1**
Mounting			flush	non-flush	non-flush
Rated switching distance s_n			**1 mm**	**1…8 mm**	**1…8 mm**
With sensor amplifier		**Ordering code**	**BCS00CR**		
		Part number	BCS M12EG2-XXS10B-BT01-GZ01-501		
PNP	Normally open	**Ordering code**		**BCS0062**	**BCS005F**
		Part number		BCS M12T4D2-PSM80G-S04G	BCS M12T4G1-PSM80G-EP02
PNP	Normally closed	**Ordering code**		**BCS0063**	**BCS005H**
		Part number		BCS M12T4D2-POM80G-S04G	BCS M12T4G1-POM80G-EP02
NPN	Normally open	**Ordering code**		**BCS0064**	**BCS005J**
		Part number		BCS M12T4D2-NSM80G-S04G	BCS M12T4G1-NSM80G-EP02
NPN	Normally closed	**Ordering code**		**BCS0065**	**BCS005K**
		Part number		BCS M12T4D2-NOM80G-S04G	BCS M12T4G1-NOM80G-EP02
Supply voltage U_S			4...8 V DC	12…35 V DC	12…35 V DC
Voltage drop U_d at I_e				≤ 0.8 V	≤ 0.8 V
Rated insulation voltage U_i			75 V DC	75 V DC	75 V DC
Output current max.				200 mA	200 mA
No-load supply current I_0 max.				≤ 10 mA	≤ 10 mA
Reverse polarity/short circuit protected				yes/yes	yes/yes
Ambient temperature range T_a			0...+70 °C	–30…+70 °C	–30…+70 °C
Switching frequency f				100 Hz	100 Hz
Output function indicator				LED yellow	LED yellow
Degree of protection per IEC 60529			IP 67	IP 65	IP 65
Material		Housing	V2A	V2A	V2A
		Sensing face	PTFE	PTFE	PTFE
		Cover	POM	PA	POM
Wiring			Triax sensor cable, see page 64	M12 connector, 4-pin, A-coded	2 m cable PUR, 3×0.14 mm²

For sensor amplifiers see Accessories section Page 57









The non-flush mount sensors for level detection M12...M30 in plastic or PTFE housing provide IP 68 protection (at approx. 5 bar) at the sensing face. Sensors in stainless steel housing meet IP 67 at the sensing face.

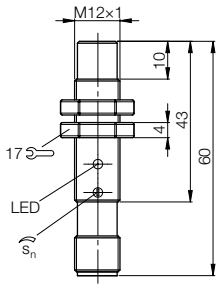


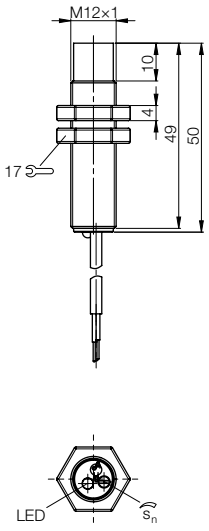


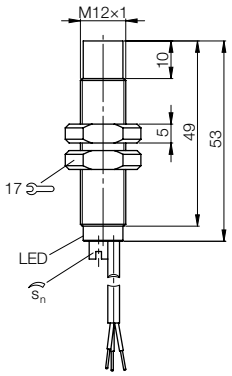
Especially EMC resistant, above standard

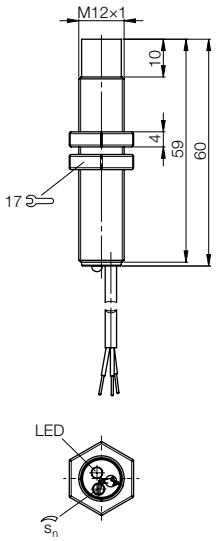
Especially EMC resistant, above standard

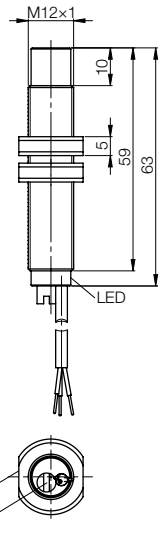
	M12×1	**M12×1**	**M12×1**	**M12×1**	**M12×1**
	non-flush	non-flush	non-flush	non-flush	non-flush
	1…8 mm	**1…8 mm**	**1…8 mm**	**1…6 mm**	**1…6 mm**
	BCS005Y	**BCS0059**	**BCS006Z**	**BCS006T**	**BCS009J**
	BCS M12VVD2-PSM80G-S04G	BCS M12VVG1-PSM80G-EP02	BCS M12TTG1-PSM80G-ET02	BCS M12VVI1-PSM60G-EP02-E	BCS M12TTI1-PSM60G-ET02-E
	BCS005Z	**BCS005A**	**BCS0070**	**BCS006U**	**BCS009K**
	BCS M12VVD2-POM80G-S04G	BCS M12VVG1-POM80G-EP02	BCS M12TTG1-POM80G-ET02	BCS M12VVI1-POM60G-EP02-E	BCS M12TTI1-POM60G-ET02-E
	BCS0060	**BCS005C**	**BCS0071**	**BCS006W**	**BCS009L**
	BCS M12VVD2-NSM80G-S04G	BCS M12VVG1-NSM80G-EP02	BCS M12TTG1-NSM80G-ET02	BCS M12VVI1-NSM60G-EP02-E	BCS M12TTI1-NSM60G-ET02-E
	BCS0061	**BCS005E**	**BCS0072**	**BCS006Y**	**BCS009M**
	BCS M12VVD2-NOM80G-S04G	BCS M12VVG1-NOM80G-EP02	BCS M12TTG1-NOM80G-ET02	BCS M12VVI1-NOM60G-EP02-E	BCS M12TTI1-NOM60G-ET02-E
	12…35 V DC	12…35 V DC	12…35 V DC	13…35 V DC	12…35 V DC
	≤ 0.8 V	≤ 0.8 V	≤ 0.8 V	≤ 0.8 V	≤ 0.8 V
	75 V DC	75 V DC	75 V DC	75 V DC	75 V DC
	200 mA	200 mA	200 mA	200 mA	200 mA
	≤ 10 mA	≤ 10 mA	≤ 10 mA	≤ 15 mA	≤ 10 mA
	yes/yes	yes/yes	yes/yes	yes/yes	yes/yes
	–30…+60 °C	–30…+60 °C	–30…+70 °C	–30…+60 °C	–30…+60 °C
	100 Hz	100 Hz	100 Hz	25 Hz	25 Hz
	LED yellow	LED yellow	LED red	LED yellow	LED red
	IP 65	IP 65	IP 65	IP 65	IP 65
	PVC	PVC	PTFE	PVC	PTFE
	PVC	PVC	PTFE	PVC	PTFE
	PA	PVC	PTFE	PVC	PTFE
	M12 connector, 4-pin, A-coded	2 m cable PUR, 3×0.14 mm²	2 m cable PTFE, 3×0.2 mm²	2 m cable PUR, 3×0.14 mm²	2 m cable PTFE, 3×0.2 mm²











DC 3-wire
Tubular housings
SMARTLEVEL technology
High temperature rated styles
Leak sensor

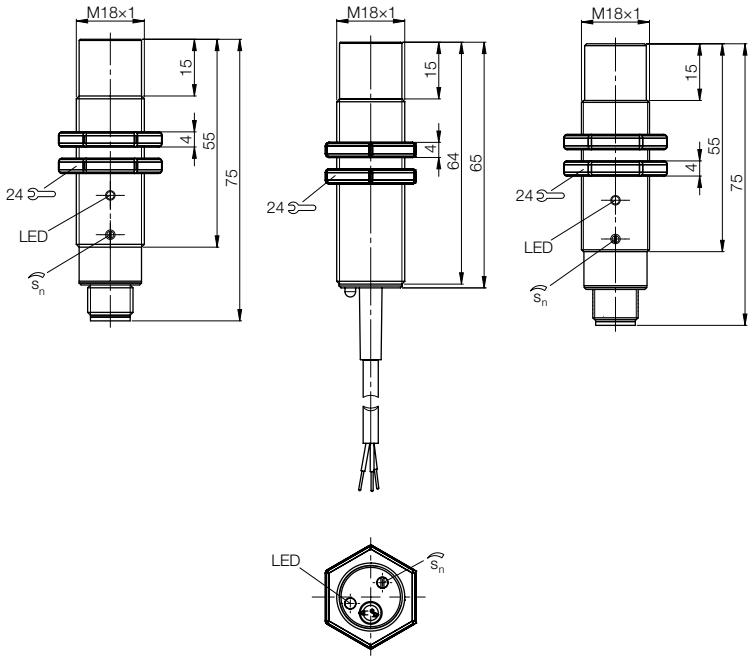
AC/DC 2-wire
Tubular housings

For power supplies, amplifiers, connectors and mounting brackets see accessories section starting **page 55**

Level Detection
DC 3-wire Tubular housings
M18

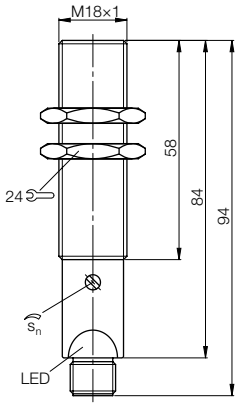
Housing size			**M18×1**	**M18×1**	**M18×1**
Mounting			non-flush	non-flush	non-flush
Rated switching distance s_n			**2…15 mm**	**2…15 mm**	**2…15 mm**
PNP	Normally open	**Ordering code**	**BCS006A**	**BCS005R**	**BCS0066**
		Part number	BCS M18T4G2-PSC15G-S04G	BCS M18T4I1-PSC15G-DV02	BCS M18VVG2-PSC15G-S04G
PNP	Normally closed	**Ordering code**	**BCS006C**	**BCS005T**	**BCS0067**
		Part number	BCS M18T4G2-POC15G-S04G	BCS M18T4I1-POC15G-DV02	BCS M18VVG2-POC15G-S04G
NPN	Normally open	**Ordering code**	**BCS006E**	**BCS005U**	**BCS0068**
		Part number	BCS M18T4G2-NSC15G-S04G	BCS M18T4I1-NSC15G-DV02	BCS M18VVG2-NSC15G-S04G
NPN	Normally closed	**Ordering code**	**BCS006F**	**BCS005W**	**BCS0069**
		Part number	BCS M18T4G2-NOC15G-S04G	BCS M18T4I1-NOC15G-DV02	BCS M18VVG2-NOC15G-S04G
Supply voltage U_S			10…35 V DC	10…35 V DC	10…35 V DC
Voltage drop U_d at I_e			≤ 1.5 V	≤ 1.5 V	≤ 1.5 V
Rated insulation voltage U_i (protection class)			75 V DC	75 V DC	75 V DC
Output current max.			300 mA	300 mA	300 mA
No-load supply current I_0 max.			≤ 10 mA	≤ 10 mA	≤ 10 mA
Reverse polarity/short circuit protected			yes/yes	yes/yes	yes/yes
Ambient temperature range T_a			–30…+70 °C	–30…+70 °C	–30…+60 °C
Switching frequency f			100 Hz	100 Hz	100 Hz
Output function indicator			LED yellow	LED yellow	LED yellow
Degree of protection per IEC 60529			IP 67	IP 67	IP 67
Material		Housing	V2A	V2A	PVC
		Sensing face	PTFE	PTFE	PVC
		Cover	PA	POM	PA
Wiring			M12 connector, 4-pin, A-coded	2 m cable PVC, 3×0.25 mm²	M12 connector, 4-pin, A-coded

The non-flush mount sensors for level detection M12...M30 in plastic or PTFE housing provide IP 68 protection (at approx. 5 bar) at the sensing face. Sensors in stainless steel housing meet IP 67 at the sensing face.

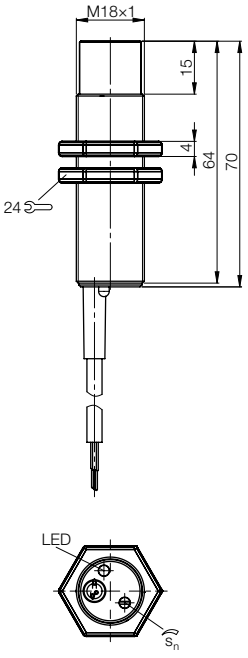


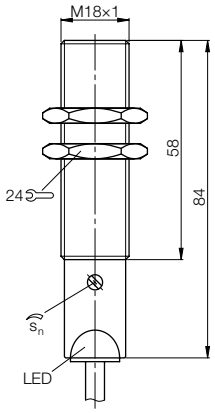



	M18×1	**M18×1**	**M18×1**	**M18×1**
	non-flush	non-flush	non-flush	non-flush
	8 mm*	**2…15 mm**	**8 mm***	**2…15 mm**
	BCS000H	**BCS005L**	**BCS000E**	**BCS0073**
	BCS M18KM3-PSC80G-S04G	BCS M18VVI1-PSC15G-DV02	BCS M18KM3-PSC80G-BV02	BCS M18TTI2-PSC15G-AT02
	BCS000C	**BCS005M**	**BCS000A**	**BCS0074**
	BCS M18KM3-POC80G-S04G-001	BCS M18VVI1-POC15G-DV02	BCS M18KM3-POC80G-BV02	BCS M18TTI2-POC15G-AT02
		BCS005N	**BCS0009**	**BCS0075**
		BCS M18VVI1-NSC15G-DV02	BCS M18KM3-NSC80G-BV02	BCS M18TTI2-NSC15G-AT02
		BCS005P	**BCS0008**	**BCS0076**
		BCS M18VVI1-NOC15G-DV02	BCS M18KM3-NOC80G-BV02	BCS M18TTI2-NOC15G-AT02
	10...36 V DC	10…35 V DC	10...36 V DC	10…35 V DC
	≤ 2.5 V	≤ 1.5 V	≤ 2.5 V	≤ 1.5 V
	75 V DC	75 V DC	75 V DC	75 V DC
	250 mA	300 mA	250 mA	300 mA
	≤ 15 mA	≤ 10 mA	≤ 15 mA	≤ 10 mA
	yes/yes	yes/yes	yes/yes	yes/yes
	–25...+80 °C	–30…+60 °C	–25...+80 °C	–30…+70 °C
	50 Hz	100 Hz	50 Hz	100 Hz
	LED yellow	LED yellow	LED yellow	LED red
	IP 67	IP 67	IP 67	IP 67
	PBT	PVC	PBT	PTFE
	PBT	PVC	PBT	PTFE
	PBT	PBT	PBT	PTFE
	M12 connector, 4-pin, A-coded	2 m cable PVC, 3×0.25 mm²	2 m cable PVC, 3×0.34 mm	2 m cable PTFE, 3×0.2 mm²

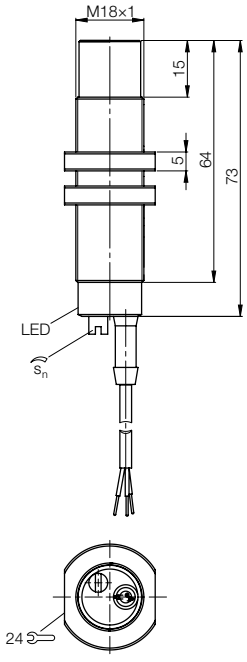


*** Flush mounting reduces the effective switching distance by 50%.**





*** Flush mounting reduces the effective switching distance by 50%.**



DC 3-wire
Tubular housings
SMARTLEVEL technology
High temperature rated styles
Leak sensor

AC/DC 2-wire
Tubular housings

For power supplies, amplifiers, connectors and mounting brackets see accessories section starting **page 55**

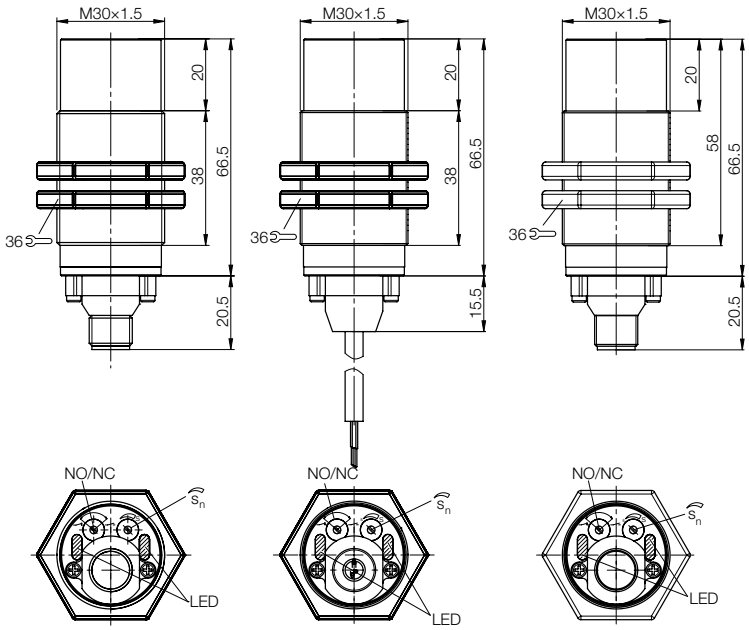
Level Detection

DC 3-wire Tubular housings
M30

Housing size			**M30×1.5**	**M30×1.5**	**M30×1.5**	
Mounting			non-flush	non-flush	non-flush	
Rated switching distance s_n			**1…30 mm**	**2…30 mm**	**1…30 mm**	
PNP	Normally open	**Ordering code**				
		Part number				
PNP	Normally closed	**Ordering code**				
		Part number				
PNP	NO/NC selectable	**Ordering code**	**BCS007L**	**BCS007J**	**BCS007F**	
		Part number	BCS M30T4M2-PPC30G-S04G	BCS M30T4M3-PPC30G-EP02	BCS M30BBM2-PPC30G-S04G	
NPN	Normally open	**Ordering code**				
		Part number				
NPN	Normally closed	**Ordering code**				
		Part number				
NPN	NO/NC selectable	**Ordering code**	**BCS007M**	**BCS007K**	**BCS007H**	
		Part number	BCS M30T4M2-NPC30G-S04G	BCS M30T4M3-NPC30G-EP02	BCS M30BBM2-NPC30G-S04G	
Supply voltage U_S			10…35 V DC	10…35 V DC	10…35 V DC	
Voltage drop U_d at I_e			≤ 1.8 V	≤ 1.8 V	≤ 1.8 V	
Rated insulation voltage U_i (protection class)			75 V DC	75 V DC	75 V DC	
Output current max.			300 mA	300 mA	300 mA	
No-load supply current I_0 max.			≤ 15 mA	≤ 15 mA	≤ 15 mA	
Reverse polarity/short circuit protected			yes/yes	yes/yes	yes/yes	
Ambient temperature range T_a			–30…+70 °C	–30…+70 °C	–30…+70 °C	
Switching frequency f			100 Hz	100 Hz	100 Hz	
Power indicator			LED green	LED green	LED green	
Output function indicator			LED yellow	LED yellow	LED yellow	
Degree of protection per IEC 60529			IP 64	IP 64	IP 64	
Material		Housing	V2A	V2A	PBT	
		Sensing face	PTFE	PTFE	PBT	
		Cover	PBT/PE	PBT/PE	PBT/PE	
Wiring			M12 connector, 4-pin, A-coded	2 m cable PUR 3×0.34 mm²	M12 connector, 4-pin, A-coded	

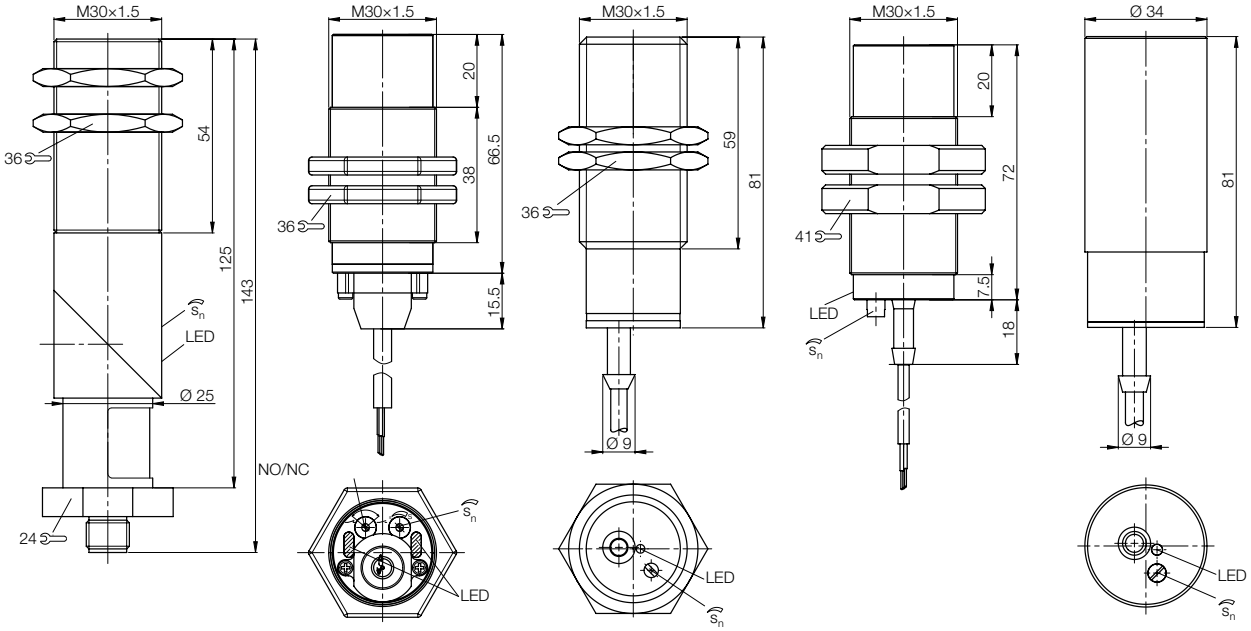
For direct installation in containers

The non-flush mount sensors for level detection M12...M30 in plastic or PTFE housing provide IP 68 protection (at approx. 5 bar) at the sensing face. Sensors in stainless steel housing meet IP 67 at the sensing face.



Level Detection
DC 3-wire Tubular housings
M30, Ø 34 mm

	M30×1.5	**M30×1.5**	**M30×1.5**	**M30×1.5**	**Ø 34 mm**
	non-flush	non-flush	non-flush	non-flush	non-flush
	15 mm*	**1…30 mm**	**15 mm***	**2…30 mm**	**20 mm**
			BCS000R	**BCS0077**	**BCS0005**
			BCS M30KN2-PSC18G-AV02	BCS M30TTH2-PSC30G-AT02	BCS G34KN2-PSC24G-AV02
			BCS000P	**BCS0078**	**BCS0004**
			BCS M30KN2-POC15G-AV02	BCS M30TTH2-POC30G-AT02	BCS G34KN2-POC20G-AV02
	BCS000L	**BCS007C**			
	BCS M30KM7-PPH15G-S04U	BCS M30BBM3-PPC30G-EP02			
			BCS000N	**BCS0079**	**BCS0003**
			BCS M30KN2-NSC18G-AV02	BCS M30TTH2-NSC30G-AT02	BCS G34KN2-NSC24G-AV02
			BCS000M	**BCS007A**	**BCS0002**
			BCS M30KN2-NOC15G-AV02	BCS M30TTH2-NOC30G-AT02	BCS G34KN2-NOC20G-AV02
		BCS007E			
		BCS M30BBM3-NPC30G-EP02			
	10...36 V DC	10…35 V DC	10...36 V DC	10…35 V DC	10...36 V DC
	≤ 2.5 V	≤ 1.8 V	≤ 2.5 V	≤ 1.8 V	≤ 2.5 V
	250 V AC (∏)	75 V DC	250 V AC (∏)	75 V DC	250 V AC (∏)
	250 mA	300 mA	250 mA	300 mA	250 mA
	≤ 16 mA	≤ 15 mA	≤ 15 mA	≤ 10 mA	≤ 13 mA
	yes/yes	yes/yes	yes/yes	yes/yes	yes/yes
	–25...+70 °C	–30…+70 °C	–25...+70 °C	–30…+70 °C	–25...+70 °C
	40 Hz	100 Hz	40 Hz	100 Hz	40 Hz
		LED green			
	LED yellow	LED yellow	LED yellow	LED red	LED yellow
	IP 65	IP 64	IP 65	IP 67	IP 65
	PBT	PBT	PBT	PTFE	PBT
	PBT	PBT	PBT	PTFE	PBT
	PC	PBT/PE	PBT	PTFE	PBT
	M12 connector, 4-pin, A-coded	2 m cable PUR 3×0.34 mm²	2 m cable PVC, 3×0.5 mm	2 m cable PTFE, 3×0.2 mm²	2 m cable PVC, 3×0.5 mm



DC 3-wire
Tubular housings
SMARTLEVEL technology
High temperature rated styles
Leak sensor

AC/DC 2-wire
Tubular housings

For power supplies, amplifiers, connectors and mounting brackets see accessories section starting **page 55**

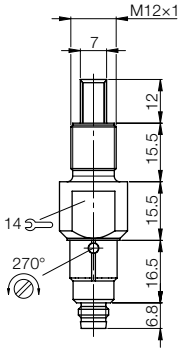
*** Flush mounting reduces the effective switching distance by 50%.**

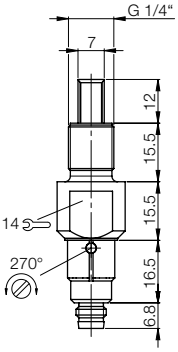
Level Detection

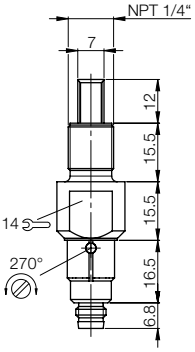
DC 3-wire Tubular housings
Micro-Level M12, G 1/4“, NPT 1/4“

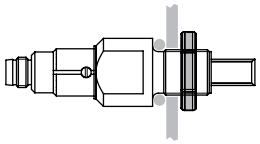
Housing size		**M12×1** Micro-Level	**G 1/4“** Micro-Level	**NPT 1/4“** Micro-Level	
Mounting		non-flush	non-flush	non-flush	
Rated switching distance s_n		**Level adjustable**	**Level adjustable**	**Level adjustable**	
PNP/NPN and	**Ordering code**	**BCS009T**	**BCS009U**	**BCS009W**	
NO/NC selectable	Part number	BCS S41SS01-GPCFNG-S49G	BCS S41SS02-GPCFNG-S49G	BCS S41SS03-GPCFNG-S49G	
Supply voltage U_S		10…35 V DC	10…35 V DC	10…35 V DC	
Voltage drop U_d at I_e		≤ 3 V	≤ 3 V	≤ 3 V	
Rated insulation voltage U_i		75 V DC	75 V DC	75 V DC	
Output current max.		50 mA	50 mA	50 mA	
No-load supply current I_0 max.		≤ 20 mA	≤ 20 mA	≤ 20 mA	
Reverse polarity/short circuit protected		no/yes	no/yes	no/yes	
Ambient temperature range T_a		–10…+70 °C	–10…+70 °C	–10…+70 °C	
Switching frequency f		5 Hz	5 Hz	5 Hz	
Power indicator		LED green	LED green	LED green	
Output function indicator		LED yellow	LED yellow	LED yellow	
Degree of protection per IEC 60529		IP 68 at max. 10 bar/ IP 69K	IP 68 at max. 10 bar/ IP 69K	IP 68 at max. 10 bar/ IP 69K	
Material	Housing	PSU	PSU	PSU	
	Sensing face	PSU	PSU	PSU	
	Cover	PSU	PSU	PSU	
Wiring		M8 connector, 3-pin	M8 connector, 3-pin	M8 connector, 3-pin	

Shield (M18 or 1/2“) for Micro-Level sensors
see Accessories section Page 87

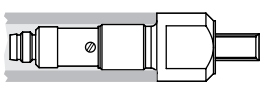








Standard mounting uses through-holes with included nut. This can be ignored when threaded holes are used or serve as additional security. Sealing is accomplished using an O-ring or gasket.



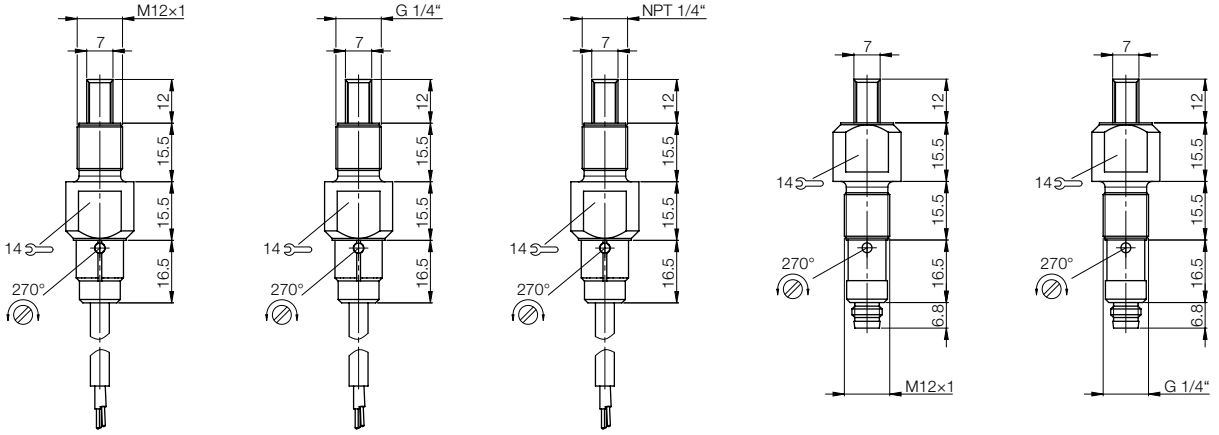
Reverse mounting in a tube of any desired length for fashioning "point-switching" rod sensors. Here, sealing can also be accomplished using an O-ring or a gasket.

Level Detection
DC 3-wire Tubular housings
Micro-Level M12, G 1/4“, NPT 1/4“





	M12×1 Micro-Level	**G 1/4“** Micro-Level	**NPT 1/4“** Micro-Level	**M12×1** Micro-Level	**G 1/4“** Micro-Level
	non-flush	non-flush	non-flush	non-flush	non-flush
	Level adjustable	**Level adjustable**	**Level adjustable**	**Level adjustable**	**Level adjustable**
	BCS009N	**BCS009P**	**BCS009R**	**BCS009Y**	**BCS009Z**
	BCS S40SS01-GPCFNG-EP02	BCS S40SS02-GPCFNG-EP02	BCS S40SS03-GPCFNG-EP02	BCS S42SS01-GPCFNG-S49G	BCS S42SS02-GPCFNG-S49G
	10…35 V DC	10…35 V DC	10…35 V DC	10…35 V DC	10…35 V DC
	≤ 3 V	≤ 3 V	≤ 3 V	≤ 3 V	≤ 3 V
	75 V DC	75 V DC	75 V DC	75 V DC	75 V DC
	50 mA	50 mA	50 mA	50 mA	50 mA
	≤ 20 mA	≤ 20 mA	≤ 20 mA	≤ 20 mA	≤ 20 mA
	no/yes	no/yes	no/yes	no/yes	no/yes
	–10…+70 °C	–10…+70 °C	–10…+70 °C	–10…+70 °C	–10…+70 °C
	5 Hz	5 Hz	5 Hz	5 Hz	5 Hz
	LED green	LED green	LED green	LED green	LED green
	LED yellow	LED yellow	LED yellow	LED yellow	LED yellow
	IP 68 at max. 10 bar/ IP 69K	IP 68 at max. 10 bar/ IP 69K	IP 68 at max. 10 bar/ IP 69K	IP 68 at max. 10 bar/ IP 69K	IP 68 at max. 10 bar/ IP 69K
	PSU	PSU	PSU	PSU	PSU
	PSU	PSU	PSU	PSU	PSU
	PSU	PSU	PSU	PSU	PSU
	2 m cable PUR, 3×0.34 mm²	2 m cable PUR, 3×0.34 mm²	2 m cable PUR, 3×0.34 mm²	M8 connector, 3-pin	M8 connector, 3-pin



DC 3-wire
Tubular housings
SMARTLEVEL technology
High temperature rated styles
Leak sensor

AC/DC 2-wire
Tubular housings

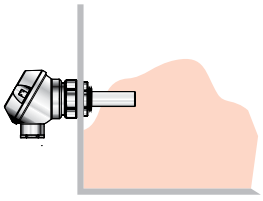
For power supplies, amplifiers, connectors and mounting brackets see accessories section starting **page 55**

Level Detection

DC 3-wire Tubular housings
Micro-Level NPT 1/4“
M18

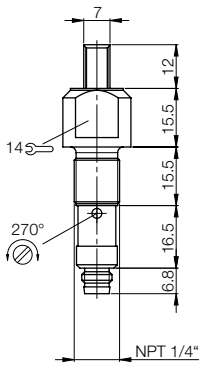
Pressure rated to 10 bar

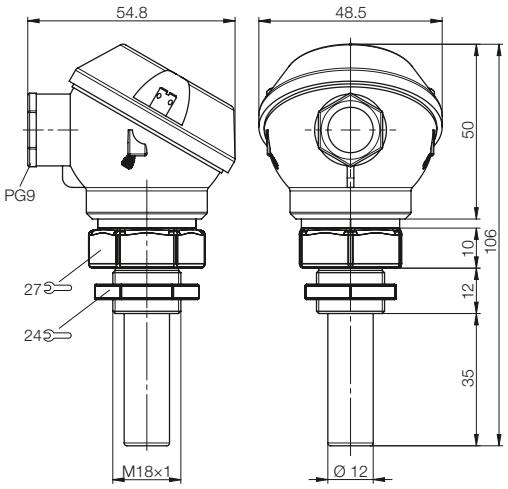
Housing size			**NPT 1/4“** Micro-Level	**M18×1**	
Mounting			non-flush	non-flush	
Rated switching distance s_n			**Level adjustable**	**Level adjustable**	
PNP	Normally open	**Ordering code**		**BCS006H**	
		Part number		BCS S01T401-PSCFNG-KM16-T02	
PNP	Normally closed	**Ordering code**		**BCS006J**	
		Part number		BCS S01T401-POCFNG-KM16-T02	
NPN	Normally open	**Ordering code**		**BCS006K**	
		Part number		BCS S01T401-NSCFNG-KM16-T02	
NPN	Normally closed	**Ordering code**		**BCS006L**	
		Part number		BCS S01T401-NOCFNG-KM16-T02	
PNP/NPN and NO/NC selectable		**Ordering code**	**BCS00A0**		
		Part number	BCS S42SS03-GPCFNG-S49G		
Supply voltage U_S			10…35 V DC	10…35 V DC	
Voltage drop U_d at I_e			≤ 3 V	≤ 2.7 V	
Rated insulation voltage U_i			75 V DC	75 V DC	
Output current max.			50 mA	100 mA	
No-load supply current I_0 max.			≤ 20 mA	≤ 10 mA	
Reverse polarity/short circuit protected			no/yes	yes/yes	
Ambient temperature range T_a			–10…+70 °C	–30…+125 °C	
Switching frequency f			5 Hz	5 Hz	
Power indicator			LED green		
Output function indicator			LED yellow	LED yellow	
Degree of protection per IEC 60529			IP 68 at max. 10 bar/ IP 69K	IP 67 (Sensing face: IP 68 at max. 10 bar)	
Material		Housing	PSU	Die-case aluminum (GD-Al)	
		Sensing face	PSU	PTFE	
		Cover	PSU	Die-case aluminum (GD-Al)	
Wiring			M8 connector, 3-pin	Screw terminals	



Adjustment

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



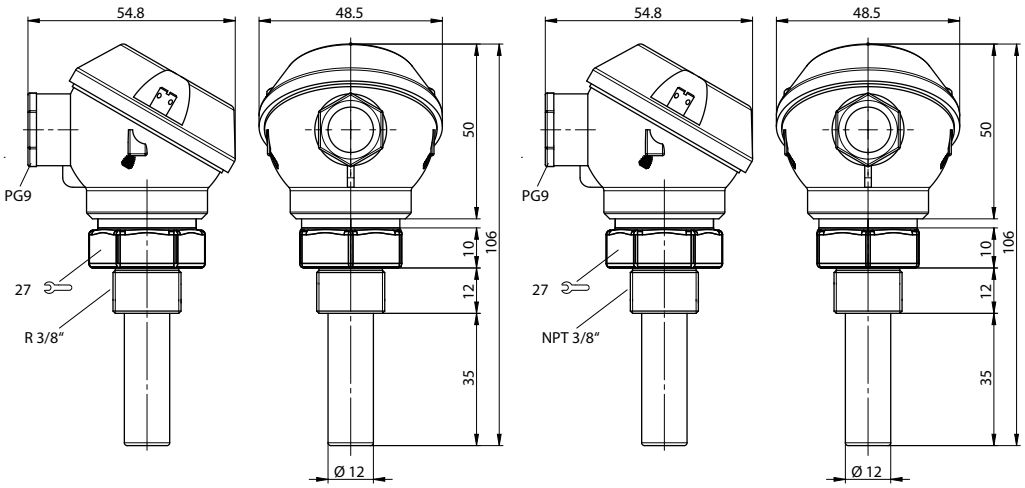


O-ring not included

Pressure rated to 10 bar

Pressure rated to 10 bar

	R 3/8“	NPTF 3/8“	
	non-flush	non-flush	
	Level adjustable	**Level adjustable**	
	BCS006M	**BCS00A6**	
	BCS S02T401-PSCFNG-KM16-T02	BCS S03T401-PSCFNH-KM16-T02	
	BCS006N	**BCS00A7**	
	BCS S02T401-POCFNG-KM16-T02	BCS S03T401-POCFNH-KM16-T02	
	BCS006P	**BCS00A8**	
	BCS S02T401-NSCFNG-KM16-T02	BCS S03T401-NSCFNH-KM16-T02	
	BCS006R	**BCS00A9**	
	BCS S02T401-NOCFNG-KM16-T02	BCS S03T401-NOCFNH-KM16-T02	
	10…35 V DC	10…35 V DC	
	≤ 2.7 V	≤ 2.7 V	
	75 V DC	75 V DC	
	100 mA	100 mA	
	≤ 10 mA	≤ 10 mA	
	yes/yes	yes/yes	
	–30…+125 °C	–30…+125 °C	
	5 Hz	5 Hz	
	LED yellow	LED yellow	
	IP 67	IP 67	
	(Sensing face: IP 68 at max. 10 bar)	(Sensing face: IP 68 at max. 10 bar)	
	Die-case aluminum (GD-Al)	Die-case aluminum (GD-Al)	
	PTFE	PTFE	
	Die-case aluminum (GD-Al)	Die-case aluminum (GD-Al)	
	Screw terminals	Screw terminals	



DC 3-wire
Tubular housings
SMARTLEVEL technology
High temperature rated styles
Leak sensor

AC/DC 2-wire
Tubular housings

For power supplies, amplifiers, connectors and mounting brackets see accessories section starting **page 55**

SMART*LEVEL* **sensors set new standards**
Simply describing **SMART***LEVEL* as a level sensor for reliable sensing of liquid, conductive media does not do it justice. **SMART***LEVEL* sensors can solve applications that were previously tricky or even impossible.

SMART*LEVEL*
- Compensate for moisture, foam and build-up
- Penetrate glass or plastic walls up to 12 mm thick
- Detect aqueous to highly conductive media
- Feature chemically resistant housings made of PTFE

SMART*LEVEL* sensors reduce cost
- Adjustment-free installation
- Freedom from cleaning in most applications
- Reduced use of materials
- Less construction outlay (e.g. no bypass tubes)

SMART*LEVEL* sensors optimize production processes and increase application reliability.

Standard applications with liquid, conductive media
SMART*LEVEL* sensors are factory adjusted for standard applications and can reliably detect liquid, conductive media through glass or plastic walls. The factory setting automatically hides glass and plastic walls (approx. 0.5...6 mm) and compensates for internal or external foam, moisture, and contamination.

Special applications
SMART*LEVEL* sensors can also be used with liquid, conductive media in otherwise tricky or even impossible applications such as seeing through glass and plastic walls even greater than 6 mm thick.

Note on cable routing
The connection cable should not be coiled behind the sensor. Instead, shorten the cable if needed or route it loosely. (see diagrams above)

SMART*LEVEL* **takes off – in the Airbus A380**
Airbus is equipping the rest rooms in their 4-engine large-body A380 with a mixer tap. The heart of this exclusive system in the elegant Airbus design are compact **SMART***LEVEL* capacitive sensors from Balluff. These enable passengers to conveniently select the desired water temperature with the assistance of an LED indicator. The show-stopper: sensing errors are impossible, since **SMART***LEVEL* sensors ignore clinging dirt, liquid films and soap foam. Only hand-touching the faucet results in a switching operating, even if a wet paper towel covers it.

SMART*LEVEL* 15

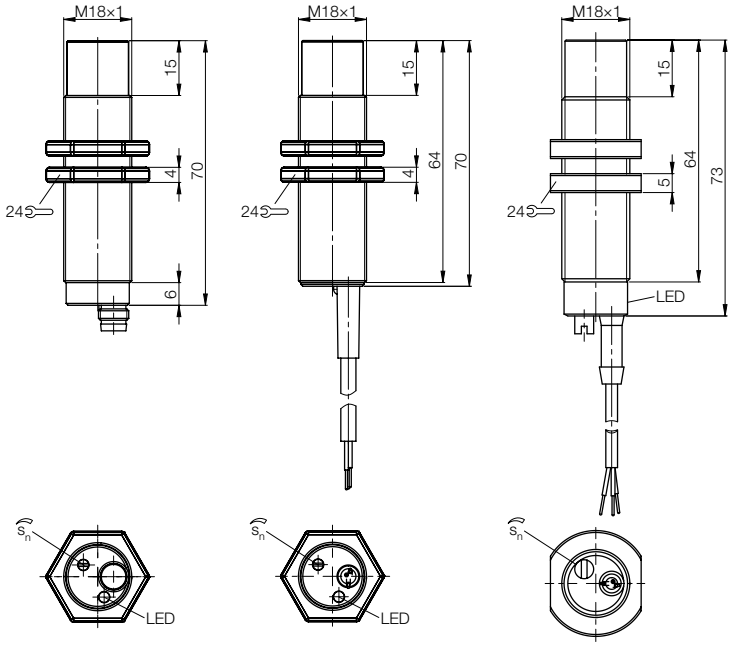
SMART*LEVEL* 15

SMART*LEVEL* 15

Housing size			**M18×1**	**M18×1**	**M18×1**
Mounting			non-flush	non-flush	non-flush
Rated switching distance s_n			**Self-adjusting**	**Self-adjusting**	**Self-adjusting**
PNP	Normally open	**Ordering code**	**BCS008T**	**BCS007N**	**BCS008A**
		Part number	BCS M18VVN-PSCFAG-S49G	BCS M18VVI1-PSCFAG-DV02	BCS M18TTI2-PSCFAG-AT02
PNP	Normally closed	**Ordering code**	**BCS008U**	**BCS007P**	**BCS008C**
		Part number	BCS M18VVN-POCFAG-S49G	BCS M18VVI1-POCFAG-DV02	BCS M18TTI2-POCFAG-AT02
NPN	Normally open	**Ordering code**	**BCS008W**	**BCS007R**	**BCS008E**
		Part number	BCS M18VVN-NSCFAG-S49G	BCS M18VVI1-NSCFAG-DV02	BCS M18TTI2-NSCFAG-AT02
NPN	Normally closed	**Ordering code**	**BCS008Y**	**BCS007T**	**BCS008F**
		Part number	BCS M18VVN-NOCFAG-S49G	BCS M18VVI1-NOCFAG-DV02	BCS M18TTI2-NOCFAG-AT02
Supply voltage U_S			10…35 V DC	10…35 V DC	10…35 V DC
Voltage drop U_d at I_e			≤ 1.8 V	≤ 1.8 V	≤ 1.8 V
Rated insulation voltage U_i			75 V DC	75 V DC	75 V DC
Output current max.			300 mA	300 mA	300 mA
No-load supply current I_0 max.			≤ 20 mA	≤ 20 mA	≤ 20 mA
Reverse polarity/short circuit protected			yes/yes	yes/yes	yes/yes
Ambient temperature range T_a			–10…+60 °C	–10…+60 °C	–10…+60 °C
Switching frequency f			2 Hz	2 Hz	2 Hz
Output function indicator			LED yellow	LED yellow	LED red
Degree of protection per IEC 60529			IP 64	IP 64	IP 64
Material		Housing	PVC	PVC	PTFE
		Sensing face	PVC	PVC	PTFE
		Cover	PVC	PBT	PTFE
Wiring			M8 connector, 3-pin	2 m cable PVC, 3×0.25 mm²	2 m cable PTFE, 3×0.2 mm²

For direct installation in containers

The non-flush mount sensors for level detection M12...M30 in plastic or PTFE housing provide IP 68 protection (at approx. 5 bar) at the sensing face. Sensors in stainless steel housing meet IP 67 at the sensing face.



DC 3-wire
Tubular housings
SMARTLEVEL-**technology**
High temperature rated styles
Leak sensor

AC/DC 2-wire
Tubular housings

For power supplies, amplifiers, connectors and mounting brackets see accessories section starting **page 55**

Level Detection

DC 3-wire **SMART***LEVEL* technology

M30

SMART*LEVEL*

SMART*LEVEL* 15

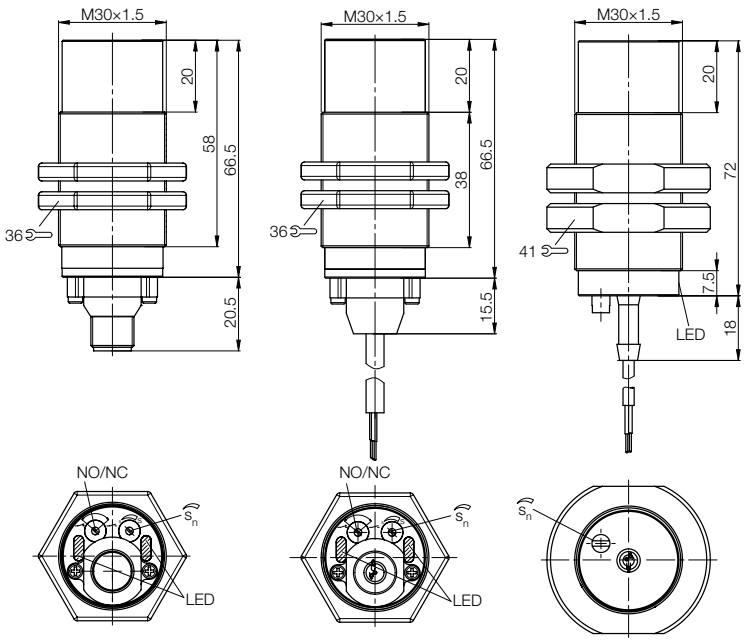
SMART*LEVEL* 15

SMART*LEVEL* 15

Housing size			**M30×1.5**	**M30×1.5**	**M30×1.5**	
Mounting			non-flush	non-flush	non-flush	
Rated switching distance s_n			**Self-adjusting**	**Self-adjusting**	**Self-adjusting**	
PNP	Normally open	**Ordering code**			**BCS0086**	
		Part number			BCS M30TTH2-PSCFAG-AT02	
PNP	Normally closed	**Ordering code**			**BCS0087**	
		Part number			BCS M30TTH2-POCFAG-AT02	
PNP	NO/NC selectable	**Ordering code**	**BCS007Y**	**BCS007U**		
		Part number	BCS M30BBM2-PPCFAG-S04G	BCS M30BBM3-PPCFAG-EP02		
NPN	Normally open	**Ordering code**			**BCS0088**	
		Part number			BCS M30TTH2-NSCFAG-AT02	
NPN	Normally closed	**Ordering code**			**BCS0089**	
		Part number			BCS M30TTH2-NOCFAG-AT02	
NPN	NO/NC selectable	**Ordering code**	**BCS007Z**	**BCS007W**		
		Part number	BCS M30BBM2-NPCFAG-S04G	BCS M30BBM3-NPCFAG-EP02		
PNP/NPN and NO/NC selectable		**Ordering code**				
		Part number				
Supply voltage U_S			10…35 V DC	10…35 V DC	10…35 V DC	
Voltage drop U_d at I_e			≤ 1.8 V	≤ 1.8 V	≤ 1.8 V	
Rated insulation voltage U_i			75 V DC	75 V DC	75 V DC	
Output current max.			300 mA	300 mA	300 mA	
No-load supply current I_0 max.			≤ 20 mA	≤ 20 mA	≤ 20 mA	
Reverse polarity/short circuit protected			yes/yes	yes/yes	yes/yes	
Ambient temperature range T_a			–10…+60 °C	–10…+60 °C	–10…+60 °C	
Switching frequency f			2 Hz	2 Hz	2 Hz	
Power indicator			LED green	LED green		
Output function indicator			LED yellow	LED yellow	LED red	
Degree of protection per IEC 60529			IP 64	IP 64	IP 64	
Material		Housing	PBT	PBT	PTFE	
		Sensing face	PBT	PBT	PTFE	
		Cover	PBT/PE	PBT/PE	PTFE	
Wiring			M12 connector, 4-pin, A-coded	2 m cable PUR, 3×0.34 mm²	2 m cable PTFE, 3×0.2 mm²	

For direct installation in containers

The non-flush mount sensors for level detection M12...M30 and Ø 7×52 mm in plastic or PTFE housing provide IP 68 protection (at approx. 5 bar) at the sensing face. Sensors in stainless steel housing meet IP 67 at the sensing face.



Level Detection

DC 3-wire **SMART***LEVEL* technology
Ø 7 mm, Micro-Level M12, G 1/4”, NPT 1/4”

SMART*LEVEL* 15

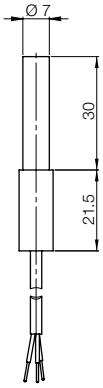
SMART*LEVEL* 15

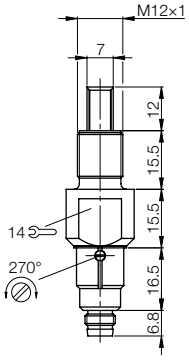
SMART*LEVEL* 15

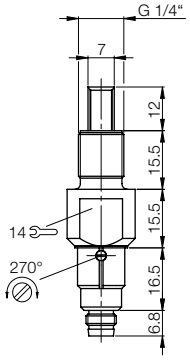
SMART*LEVEL* 15

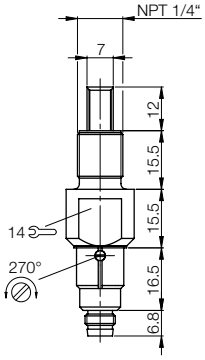
SMART*LEVEL* 15

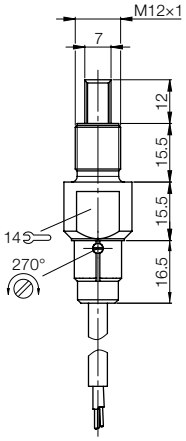
	Ø 7×52 mm	**M12×1** Micro-Level	**G 1/4”** Micro-Level	**NPT 1/4”** Micro-Level	**M12×1** Micro-Level
	non-flush	non-flush	non-flush	non-flush	non-flush
	Self-adjusting	**Self-adjusting**	**Self-adjusting**	**Self-adjusting**	**Self-adjusting**
	BCS009C				
	BCS S20TT01-PSLFAG-ET02				
	BCS009E				
	BCS S20TT01-POLFAG-ET02				
	BCS009F				
	BCS S20TT01-NSLFAG-ET02				
	BCS009H				
	BCS S20TT01-NOLFAG-ET02				
		BCS0095	**BCS0096**	**BCS0097**	**BCS008Z**
		BCS S41SS01-GPCFAG-S49G	BCS S41SS02-GPCFAG-S49G	BCS S41SS03-GPCFAG-S49G	BCS S40SS01-GPCFAG-EP02
	10…30 V DC	10…35 V DC	10…35 V DC	10…35 V DC	10…35 V DC
	≤ 1.5 V	≤ 3 V	≤ 3 V	≤ 3 V	≤ 3 V
	75 V DC	75 V DC	75 V DC	75 V DC	75 V DC
	50 mA	50 mA	50 mA	50 mA	50 mA
	≤ 20 mA	≤ 20 mA	≤ 20 mA	≤ 20 mA	≤ 20 mA
	no/no	no/yes	no/yes	no/yes	no/yes
	+5…+100 °C	–10…+105 °C	–10…+105 °C	–10…+105 °C	–10…+105 °C
	10 Hz	5 Hz	5 Hz	5 Hz	5 Hz
		LED green	LED green	LED green	LED green
		LED yellow	LED yellow	LED yellow	LED yellow
	IP 66	IP 68 at max. 10 bar/ IP 69K	IP 68 at max. 10 bar/ IP 69K	IP 68 at max. 10 bar/ IP 69K	IP 68 at max. 10 bar/ IP 69K
	PTFE	PSU	PSU	PSU	PSU
	PTFE	PSU	PSU	PSU	PSU
	PTFE	PSU	PSU	PSU	PSU
	2 m cable PTFE, 3×0.2 mm²	M8 connector, 3-pin	M8 connector, 3-pin	M8 connector, 3-pin	2 m cable PUR, 3×0.34 mm²











Shield (M18 or 1/2“) for Micro-Level sensors
see Accessories section Page 86

DC 3-wire
Tubular housings
SMARTLEVEL-**technology**
High temperature rated styles
Leak sensor

AC/DC 2-wire
Tubular housings

For power supplies, amplifiers, connectors and mounting brackets see accessories section starting **page 55**

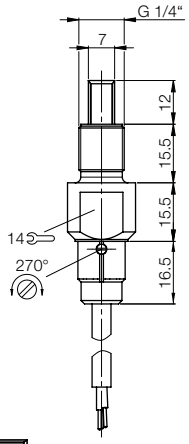
SMART*LEVEL* 15

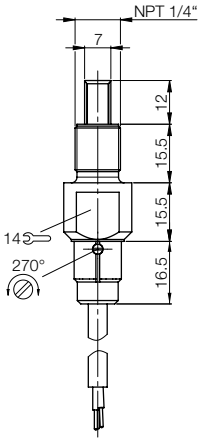
SMART*LEVEL* 15

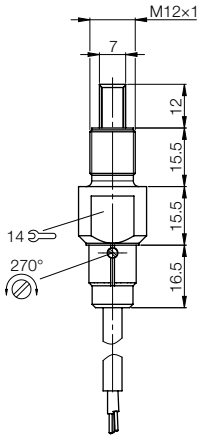
SMART*LEVEL* 15

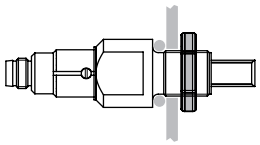
Housing size		**G 1/4”** Micro-Level	**NPT 1/4”** Micro-Level	**M12×1** Micro-Level	
Mounting		non-flush	non-flush	non-flush	
Rated switching distance s_n		**Self-adjusting**	**Self-adjusting**	**Self-adjusting**	
PNP/NPN and	**Ordering code**	**BCS0090**	**BCS0091**	**BCS0092***	
NO/NC selectable	Part number	BCS S40SS02-GPCFAG-EP02	BCS S40SS03-GPCFAG-EP02	BCS S40SS01-GPCFAG-EP02-D01	
Supply voltage U_S		10…35 V DC	10…35 V DC	10…35 V DC	
Voltage drop U_d at I_e		≤ 3 V	≤ 3 V	≤ 3 V	
Rated insulation voltage U_i		75 V DC	75 V DC	75 V DC	
Output current max.		50 mA	50 mA	50 mA	
No-load supply current I_0 max.		≤ 20 mA	≤ 20 mA	≤ 20 mA	
Reverse polarity/short circuit protected		no/yes	no/yes	no/yes	
Ambient temperature range T_a		–10…+105 °C	–10…+105 °C	–10…+105 °C	
Switching frequency f		5 Hz	5 Hz	100 Hz	
Power indicator		LED green	LED green	LED green	
Output function indicator		LED yellow	LED yellow	LED yellow	
Degree of protection per IEC 60529		IP 68 at max. 10 bar/ IP 69K	IP 68 at max. 10 bar/ IP 69K	IP 68 at max. 10 bar/ IP 69K	
Material	Housing	PSU	PSU	PSU	
	Sensing face	PSU	PSU	PSU	
	Cover	PSU	PSU	PSU	
Wiring		2 m cable PUR, 3×0.34 mm²	2 m cable PUR, 3×0.34 mm²	2 m cable PUR, 3×0.34 mm²	

Shield (M18 or 1/2“) for Micro-Level sensors
see Accessories section Page 86

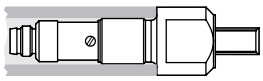








Standard mounting uses through-holes with included nut. This can be ignored when threaded holes are used or serve as additional security. Sealing is accomplished using an O-ring or gasket.



Reverse mounting in a tube of any desired length for fashioning "point-switching" rod sensors. Here, sealing can also be accomplished using an O-ring or a gasket.

Level Detection
DC 3-wire **SMART***LEVEL* technology
Micro-Level, NPT 1/4”, M12

SMART*LEVEL* 15

G 1/4” Micro-Level
non-flush
Self-adjusting
BCS0093*
BCS S40SS02-GPCFAG-EP02-D01
10…35 V DC
≤ 3 V
75 V DC
50/50 mA push-pull
≤ 20 mA
no/yes
–10…+105 °C
100 Hz
LED green
LED yellow
IP 68 at max. 10 bar/ IP 69K
PSU
PSU
PSU
2 m cable PUR, 3×0.34 mm²

SMART*LEVEL* 15

NPT 1/4” Micro-Level
non-flush
Self-adjusting
BCS0094*
BCS S40SS03-GPCFAG-EP02-D01
10…35 V DC
≤ 3 V
75 V DC
50/50 mA push-pull
≤ 20 mA
no/yes
–10…+105 °C
100 Hz
LED green
LED yellow
IP 68 at max. 10 bar/ IP 69K
PSU
PSU
PSU
2 m cable PUR, 3×0.34 mm²

SMART*LEVEL* 15

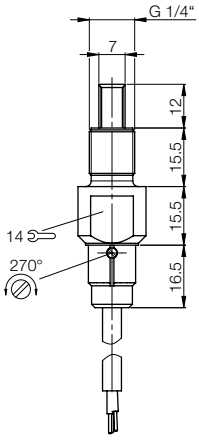
M12×1 Micro-Level
non-flush
Self-adjusting
BCS0098
BCS S42SS01-GPCFAG-S49G
10…35 V DC
≤ 3 V
75 V DC
50 mA
≤ 20 mA
no/yes
–10…+105 °C
5 Hz
LED green
LED yellow
IP 68 at max. 10 bar/ IP 69K
PSU
PSU
PSU
M8 connector, 3-pin

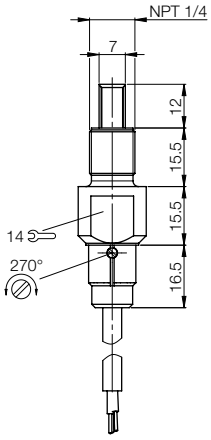
SMART*LEVEL* 15

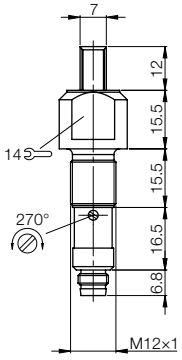
G 1/4” Micro-Level
non-flush
Self-adjusting
BCS0099
BCS S42SS02-GPCFAG-S49G
10…35 V DC
≤ 3 V
75 V DC
50 mA
≤ 20 mA
no/yes
–10…+105 °C
5 Hz
LED green
LED yellow
IP 68 at max. 10 bar/ IP 69K
PSU
PSU
PSU
M8 connector, 3-pin

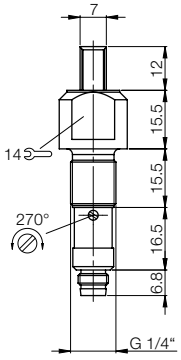
SMART*LEVEL* 15

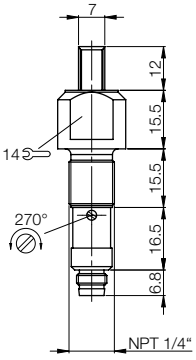
NPT 1/4” Micro-Level
non-flush
Self-adjusting
BCS009A
BCS S42SS03-GPCFAG-S49G
10…35 V DC
≤ 3 V
75 V DC
50 mA
≤ 20 mA
no/yes
–10…+105 °C
5 Hz
LED green
LED yellow
IP 68 at max. 10 bar/ IP 69K
PSU
PSU
PSU
M8 connector, 3-pin





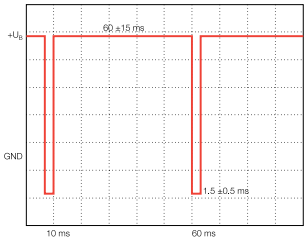




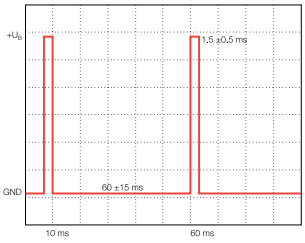


* **The continuous self-test signal (CST) is superimposed on the output signal.**

Test pulse positive



Test pulse negative



DC 3-wire
Tubular housings
SMART-technology
High temperature rated styles
Leak sensor

AC/DC 2-wire
Tubular housings

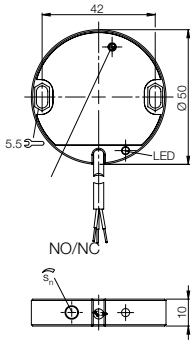
For power supplies, amplifiers, connectors and mounting brackets see accessories section starting **page 55**

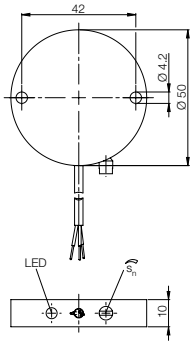
SMART*LEVEL* 15

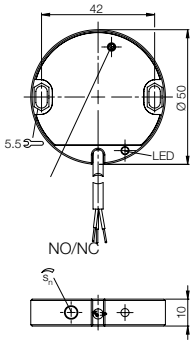
SMART*LEVEL* 15

SMART*LEVEL* 50

Housing size			**Ø 50×10 mm**	**Ø 50×10 mm**	**Ø 50×10 mm**	
Mounting			flush	flush	flush	
Rated switching distance s_n			**Self-adjusting**	**Self-adjusting**	**Self-adjusting**	
PNP	Normally open	**Ordering code**		**BCS0080**	**BCS00CK**	
		Part number		BCS D50TT05-PSCFAC-ET02	BCS D50OO06-PSFSC-EV02	
PNP	Normally closed	**Ordering code**		**BCS0081**	**BCS00CM**	
		Part number		BCS D50TT05-POCFAC-ET02	BCS D50OO06-POFSC-EV02	
PNP	NO/NC selectable	**Ordering code**	**BCS0084**			
		Part number	BCS D50OO04-PPCFAC-EV02			
NPN	Normally open	**Ordering code**		**BCS0082**	**BCS00HE**	
		Part number		BCS D50TT05-NSCFAC-ET02	BCS D50OO06-NSFSC-EV02	
NPN	Normally closed	**Ordering code**		**BCS0083**	**BCS00C1**	
		Part number		BCS D50TT05-NOCFAC-ET02	BCS D50OO06-NOFSC-EV02	
NPN	NO/NC selectable	**Ordering code**	**BCS0085**			
		Part number	BCS D50OO04-NPCFAC-EV02			
PNP/NPN and NO/NC selectable		**Ordering code**				
		Part number				
Supply voltage U_S			10…35 V DC	10…35 V DC	10…35 V DC	
Voltage drop U_d at I_e			≤ 1.8 V	≤ 1.8 V	≤ 1.8 V	
Rated insulation voltage U_i			75 V DC	75 V DC	75 V DC	
Output current max.			300 mA	300 mA	300 mA	
No-load supply current I_0 max.			≤ 20 mA	≤ 20 mA	≤ 10 mA	
Reverse polarity/short circuit protected			yes/yes	yes/yes	yes/yes	
Ambient temperature range T_a			–10…+60 °C	–10…+60 °C	–10…+60 °C	
Switching frequency f			2 Hz	2 Hz	2 Hz	
Power indicator						
Output function indicator			LED yellow	LED red	LED yellow	
Degree of protection per IEC 60529			IP 67	IP 67	IP 67	
Material		Housing	POM	PTFE	POM	
		Sensing face	POM	PTFE	POM	
		Cover	POM	PTFE	POM	
Wiring			2 m cable PVC, 3×0.25 mm²	2 m cable PTFE, 3×0.2 mm²	2 m cable PVC, 3×0.25 mm²	







Level Detection

DC 3-wire **SMART***LEVEL* technology
Micro-Box 16×34×8 mm
M30

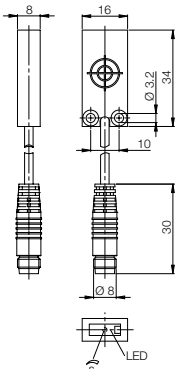
SMART*LEVEL* 15

SMART*LEVEL* 15

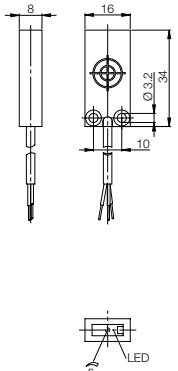
Consult factory for availability

SMART*LEVEL* 500+

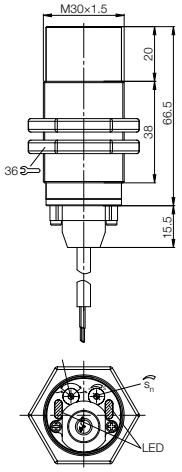
16×34×8 mm Micro-Box	**16×34×8 mm** Micro-Box	**M30×1.5**		
flush	flush	non-flush		
Self-adjusting	**Self-adjusting**	**Self-adjusting**		
BCS008M	**BCS008H**			
BCS R08RR01-PSMFAC-EP00,2-GS49	BCS R08RR01-PSMFAC-EP02			
BCS008N	**BCS008J**			
BCS R08RR01-POMFAC-EP00,2-GS49	BCS R08RR01-POMFAC-EP02			
BCS008P	**BCS008K**			
BCS R08RR01-NSMFAC-EP00,2-GS49	BCS R08RR01-NSMFAC-EP02			
BCS008R	**BCS008L**			
BCS R08RR01-NOMFAC-EP00,2-GS49	BCS R08RR01-NOMFAC-EP02			
		BCS00HJ		
		BCS M30T4M3-GPCFVG-EP02		
12…30 V DC	12…30 V DC	10…30 V DC		
≤ 1.5 V	≤ 1.5 V	≤ 3 V		
75 V DC	75 V DC	75 V DC		
50 mA	50 mA	100 mA		
≤ 10 mA	≤ 10 mA	≤ 15 mA		
yes/yes	yes/yes	no/yes		
–30…+70 °C	–30…+70 °C	–10…+60 °C		
2 Hz	2 Hz	2 Hz		
		LED green		
LED yellow	LED yellow	LED yellow		
IP 67	IP 67	IP 67		
PP	PP	V2A		
PP	PP	PTFE		
PP	PP	PBT/PE		
0.2 m cable PUR, 3×0.14 mm² with M8 connector, 3-pin	2 m cable PUR, 3×0.14 mm²	2 m cable PUR, 3×0.34 mm²		



Mounting frame included



Mounting frame included



NO/NC

DC 3-wire
Tubular housings
SMARTLEVEL-**technology**
High temperature rated styles
Leak sensor

AC/DC 2-wire
Tubular housings

For power supplies, amplifiers, connectors and mounting brackets see accessories section starting **page 55**

Level Detection
DC 3-wire High-temperature rated

+250 °C
+482 °F

Balluff high-temperature sensors can be used for level detection of liquid, paste-like or powdery media at high temperatures up to 250 °C.

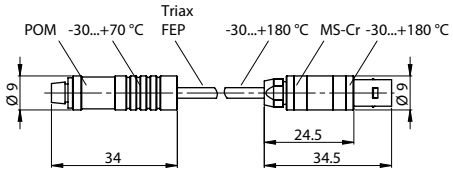
To withstand such extreme conditions, the housing of the high-temperature rated sensors is made of stainless steel and the sensor heads of PTFE. The sensors are also used with a special triax shielded sensor cable and a separate amplifier.

CE

Housing size		
Mounting		
Rated switching distance s_n		
With sensor amplifier	**Ordering code**	
	Part number	
Supply voltage U_S		
Ambient temperature range T_a		
Degree of protection per IEC 60529		
Material	Housing	
	Sensing face	
	Cover	
Wiring		

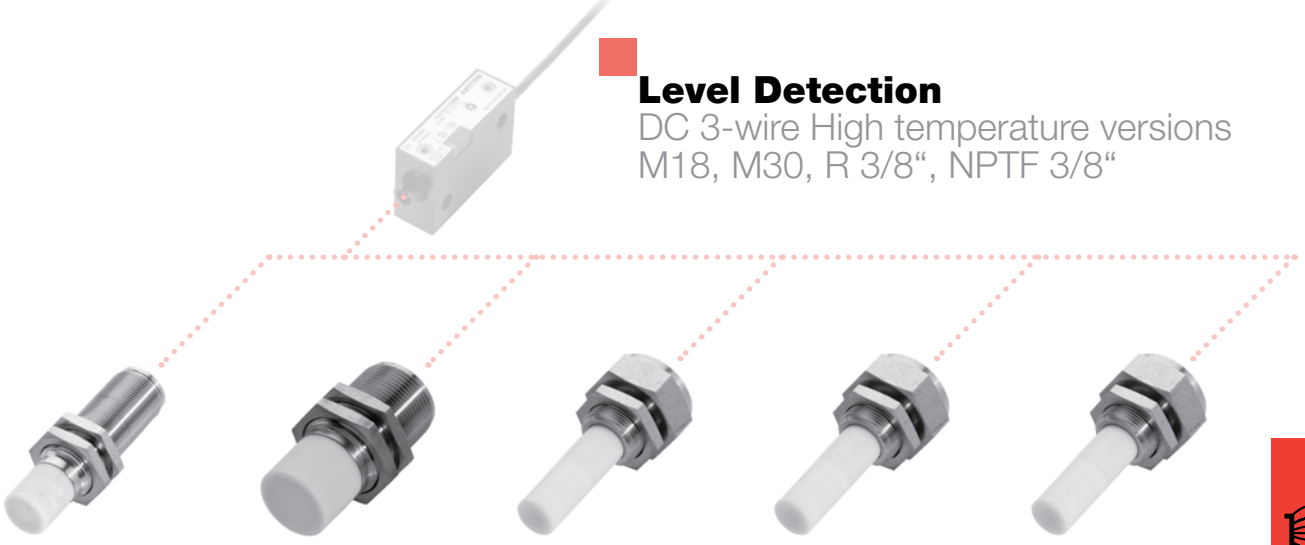
For sensor amplifiers
see Accessories section
Page 57

Description	**Connectors for high-temperature sensors**
Ordering code	**BCC04JW**
Part number	BCC Z003-020
Ambient temperature range T_a	-10...+70° C
Degree of protection per IEC 60529	IP 54
Wiring	2 m Triax FEP

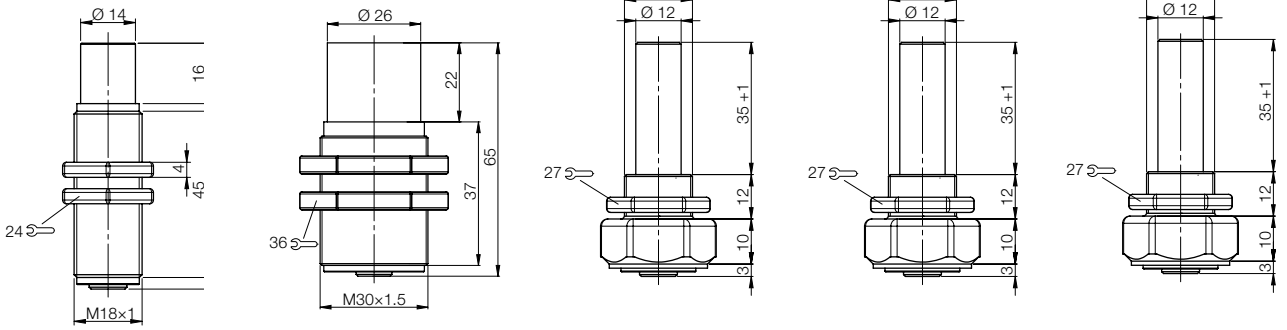


Level Detection

DC 3-wire High temperature versions
M18, M30, R 3/8“, NPTF 3/8“



	M18×1	**M30×1.5**	**M18×1**	**R 3/8“**	**NPTF 3/8“**
	non-flush	non-flush	non-flush	non-flush	non-flush
	1…10 mm	**1…20 mm**	**Level adjustable**	**Level adjustable**	**Level adjustable**
	BCS00A1	**BCS00A2**	**BCS00A3**	**BCS00A4**	**BCS00A5**
	BCS M18T4H1-XXS10H-SZ02-T08	BCS M30T4G1-XXS20H-SZ02-T08	BCS S10T401-XXSFNC-SZ02-T07	BCS S10T402-XXSFNC-SZ02-T07	BCS S10T403-XXSFNC-SZ02-T07
	4…8 V DC	4…8 V DC	4…8 V DC	4…8 V DC	4…8 V DC
	–180…+250 °C	**–180…+250 °C**	**–10…+180 °C**	**–10…+180 °C**	**–10…+180 °C**
	IP 54	IP 54	IP 54 (Sensing face: IP 68 at max. 6 bar)	IP 54 (Sensing face: IP 68 at max. 6 bar)	IP 54 (Sensing face: IP 68 at max. 6 bar)
	V2A	V2A	V2A	V2A	V2A
	PTFE	PTFE	PTFE	PTFE	PTFE
	PTFE/MS-Cr	PTFE/MS-Cr	PTFE/MS-Cr	PTFE/MS-Cr	PTFE/MS-Cr
	Triax sensor cable	Triax sensor cable	Triax sensor cable	Triax sensor cable	Triax sensor cable

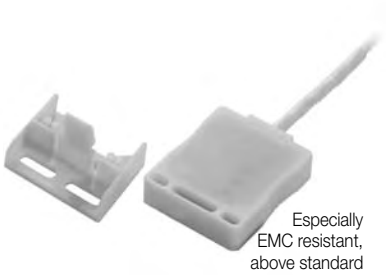


For power supplies, amplifiers, connectors and mounting brackets see accessories section starting **page 55**

Level Detection

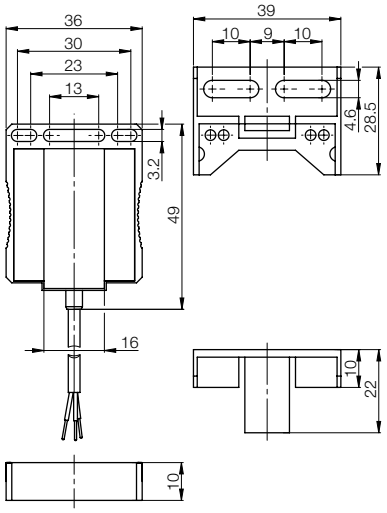
DC 3-wire Leak sensor
36×44×10 mm

The new Balluff leak sensor detects even the slightest amounts of liquid quickly and reliably. It thereby prevents costly damage in and around the equipment. The sensor features a chemically resistant housing and a PTFE jacketed cable, so that it can be used even in aggressive surroundings, such as in the semiconductor industry, without being damaged. The included mounting frame allows the sensor to be screwed directly to the floor. Sensor removal from the frame is also quick and easy. High EMC resistance increases operating reliability even further.



Especially EMC resistant, above standard

Housing size			**36×44×10 mm**
Mounting			flush
Rated switching distance s_n			**1.3 mm**
Normally open	PNP/NPN selectable	**Ordering code**	**BCS00H7**
		Part number	BCS Z05AA02-GSCFNZ01-DT02
Normally closed	PNP/NPN selectable	**Ordering code**	**BCS00H6**
		Part number	BCS Z05AA02-GOCFNZ01-DT02
Supply voltage U_S			18...30 V DC
Voltage drop U_d at I_e			≤ 2 V
Rated insulation voltage U_i (protection class)			75 V DC
Output current max.			50 mA
No-load supply current I_0 max.			≤ 20 mA
Reverse polarity/short circuit protected			yes/yes
Ambient temperature range T_a			–10...+70 °C
Switching frequency f			10 Hz
Output function indicator			LED red
Degree of protection per IEC 60529			IP 67
Material		Housing	PP
		Sensing face	PP
		Cover	PP
Wiring			2 m cable PTFE, 3×0.2 mm²

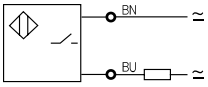


Mounting frame included in scope of delivery

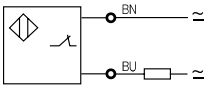
Housing size		**M18×1**	**M30×1.5**	**Ø 34 mm**
Mounting		non-flush	non-flush	non-flush
Rated switching distance s_n		**8 mm**	**15 mm**	**20 mm**
Normally open	**Ordering code**	**BCS000K**	**BCS000W**	**BCS0007**
	Part number	BCS M18KM3-UST80G-BV02	BCS M30KN2-UST15G-AV02	BCS G34KN2-UST20G-AV02
Normally closed	**Ordering code**	**BCS000J**	**BCS000U**	**BCS0006**
	Part number	BCS M18KM3-UOT80G-BV02	BCS M30KN2-UOT15G-AV02	BCS G34KN2-UOT20G-AV02
Supply voltage U_S		20...250 V AC/DC	20...250 V AC/DC	20...250 V AC/DC
Voltage drop U_d at I_e		≤ 6 V	≤ 6 V	≤ 6 V
Rated insulation voltage U_i (protection class)		250 V AC ([)	250 V AC ([)	250 V AC ([)
Output current max.		350 mA (AC)/100 mA (DC)	250 mA (AC)	250 mA (AC)
Reverse polarity/short circuit protected		no/no	no/no	no/no
Ambient temperature range T_a		–25...+80 °C	–25...+70 °C	–25...+70 °C
Switching frequency f		25 Hz (AC)/50 Hz (DC)	25 Hz (AC)/50 Hz (DC)	25 Hz (AC)/50 Hz (DC)
Output function indicator		LED yellow	LED yellow	LED yellow
Degree of protection per IEC 60529		IP 67	IP 65	IP 65
Material	Housing	PBT	PBT	PBT
	Sensing face	PBT	PBT	PBT
	Cover	PBT	PBT	PBT
Wiring		2 m cable PVC, 2×0.34 mm²	2 m cable PVC, 2×0.34 mm²	2 m cable PVC, 2×0.5 mm²

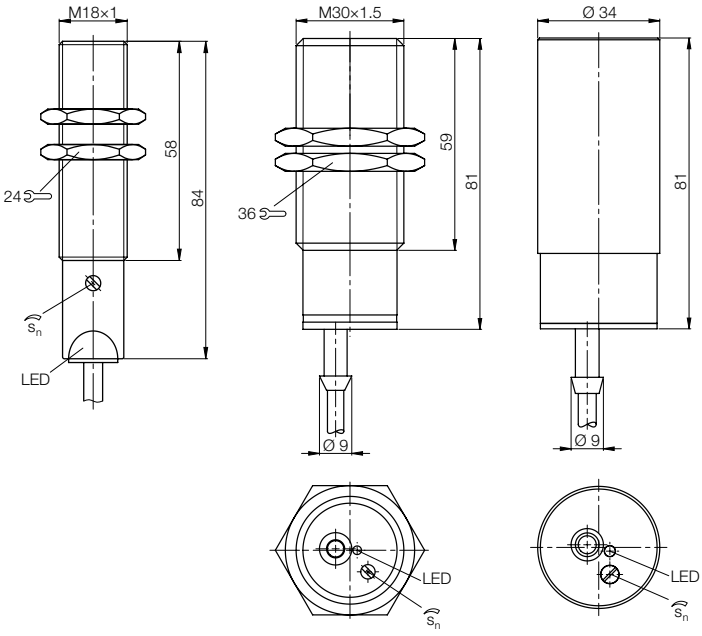
Wiring Diagrams

AC/DC N/O 2-wire (Cable)



AC/DC N/C 2-wire (Cable)





Mounting cuff included

DC 3-wire
Tubular housings
SMARTLEVEL technology
High temperature rated styles
Leak sensor

AC/DC 2-wire
Tubular housings

For power supplies, amplifiers, connectors and mounting brackets see accessories section starting **page 55**

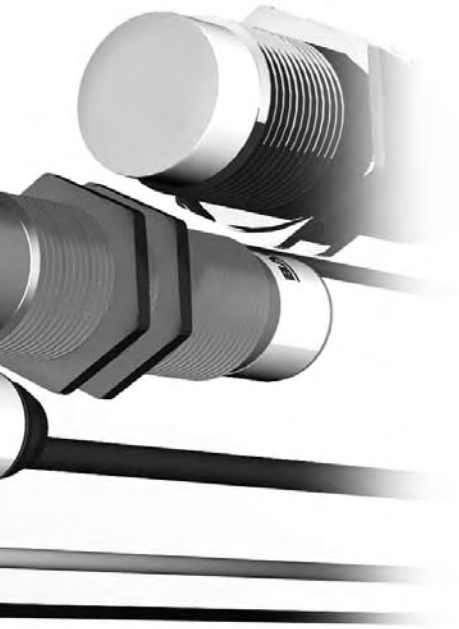
Accessories
Contents

The numerous varieties of capacitive sensors for individual solutions are enhanced by custom matched accessories. This means that power supplies assure continuity under different voltages, even at high loads. With standalone sensor amplifiers or combined amplifier power supplies, miniature sensors fit in almost any automation environment. Precisely matched mounting brackets ensure exact positioning in all situations.

A comprehensive line of connectors provides the best possible connectivity and ensures that Balluff capacitive sensors can be used anywhere in automation equipment.

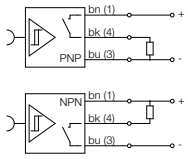
Accessories

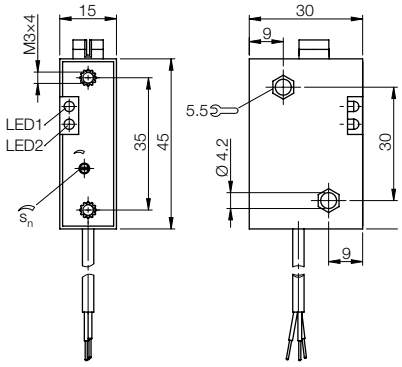
Sensor amplifiers and sensor power supplies for capacitive sensors



Housing size			**45×30×15 mm**
PNP	Normally open	**Ordering code**	**BAE009E**
		Part number	BAE SA-CS-001-PS
PNP	Normally closed	**Ordering code**	**BAE009F**
		Part number	BAE SA-CS-001-PO
NPN	Normally open	**Ordering code**	**BAE009H**
		Part number	BAE SA-CS-001-NS
NPN	Normally closed	**Ordering code**	**BAE009J**
		Part number	BAE SA-CS-001-NO
Supply voltage U_S			12…35 V DC
Voltage drop U_d at I_e			0.8 V
Rated insulation voltage U_i (protection class)			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 range T_a			–30…+70 °C
Switching frequency f			100 Hz
Function indicator			yes/yes
Degree of protection per IEC 60529			IP 67
Material		Housing	PC
Wiring			2 m cable PUR 3x0.14 mm²

Wiring configuration





Function overview

LED 1: Switching status indicator
LED 2: Power indicator
Pos. 1: Through-hole Ø 4.2 mm,
hex well both sides
for inserting an M3 nut.

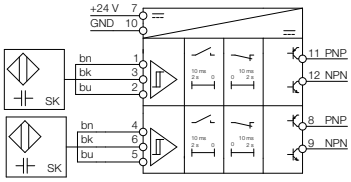
Accessories

Sensor amplifier for two miniature sensors

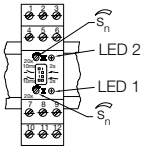
– Two discrete sensor amplifiers in one housing
– Two PNP and NPN transistor outputs
– Selectable N.O./N.C.
– Actuation delay (normally open) selectable 10 ms/2 s
– Turn-off delay (normally closed) selectable 10 ms/2s
– Screw terminal connections
– Switching distance for sensors separately adjustable
– Switching state indicated by two separate LEDs

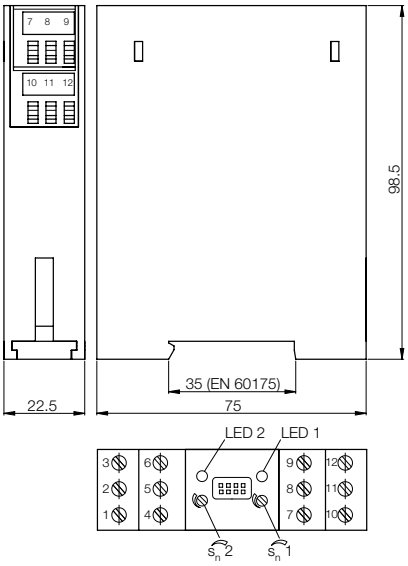
Housing size		**98.5×75×22.5 mm**
Mounting		DIN rail (EN 60751)
PNP/NPN and	**Ordering code**	**BAE009P**
NO/NC selectable	Part number	BAE SA-CS-002-YP
Supply voltage U_S		10…35 V DC
Voltage drop U_d at I_e		0.8 V
Rated insulation voltage U_i (protection class)		75 V DC
Output current max.		300 mA
No-load supply current I_0 max.		15 mA
Reverse polarity/short circuit protected		yes/yes
Ambient temperature range T_a		–30…+70 °C
Switching frequency f		100 Hz
Function indicator		yes/yes
Degree of protection per IEC 60529		IP40 (IP 20 terminal enclosure)
Material	Housing	PC
Wiring		max. 2.5 mm² AWG 14

Wiring configuration



Display





Sensor amplifier with logic
- Connection for two capacitive sensors without internal amplifier
- Two PNP and NPN transistor outputs
- Turn-on delay selectable 10 ms/2s
- Function OR, AND, RS-FF, Min/Max selectable
- Screw terminal connections
- Switching distance for sensors separately adjustable
- Switching state indicated by two separate LEDs

OR function
Output Q active when either one or both sensors are activated.

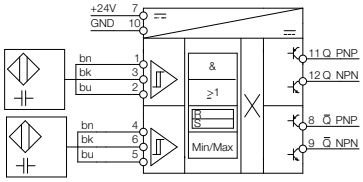
AND function
Output Q active only when both sensors are activated.

RS-FF function
Output Q active when the sensor is first activated on the Set input. This status is retained until the sensor is activated again on the Reset input.

Function min/max
Output Q active when both sensors are activated. The output is only reset when both sensors are deactivated.

Housing size		**98.5×75×22.5 mm**
Mounting		DIN rail (EN 60751)
PNP/NPN and NO/NC selectable	**Ordering code**	**BAE009R**
	Part number	BAE SA-CS-003-YP
Supply voltage U_S		10…35 V DC
Voltage drop U_d at I_e		0.8 V
Rated insulation voltage U_i (protection class)		75 V DC
Output current max.		300 mA
No-load supply current I_0 max.		25 mA
Reverse polarity/short circuit protected		yes/yes
Ambient temperature range T_a		–30…+70 °C
Switching frequency f		100 Hz
Function indicator		no/yes
Degree of protection per IEC 60529		IP40 (IP 20 terminal enclosure)
Material	Housing	PC
Wiring		max. 2.5 mm² AWG 14

Wiring configuration



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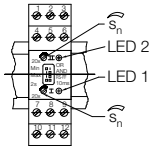
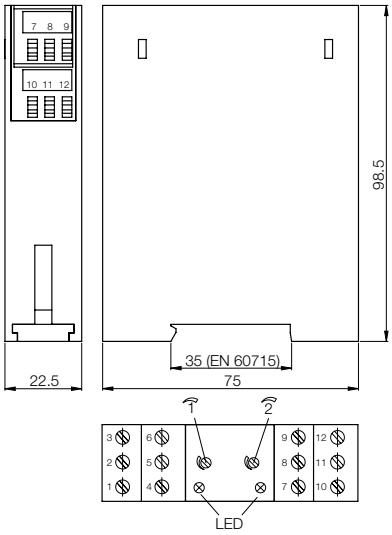


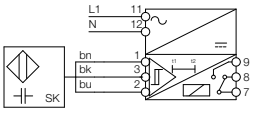


Accessories

AC powered sensor amplifier for miniature sensors with relay output

Housing size		**98.5×75×22.5 mm**	**98.5×75×22.5 mm**
Mounting		DIN rail (EN 60751)	DIN rail (EN 60751)
PNP/NPN and	**Ordering code**	**BAE009K**	**BAE009L**
NO/NC selectable	Part number	BAE SA-CS-006-XR	BAE SA-CS-007-XR
Supply voltage U_S		230 V AC	115 V AC
Rated insulation voltage U_i (protection class)		250 V AC	250 V AC
Output current max.		8 A	8 A
No-load supply current I_0 max.		20 mA	20 mA
Reverse polarity/short circuit protected		no/no	no/no
Ambient temperature range T_a		–30…+70 °C	–30…+70 °C
Switching frequency f		10 Hz	10 Hz
Function indicator		no/yes	no/yes
Degree of protection per IEC 60529		IP 20	IP 20
Material	Housing	PC	PC
Wiring		max. 2.5 mm² AWG 14	max. 2.5 mm² AWG 14

Wiring configuration



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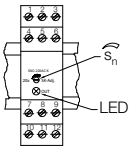
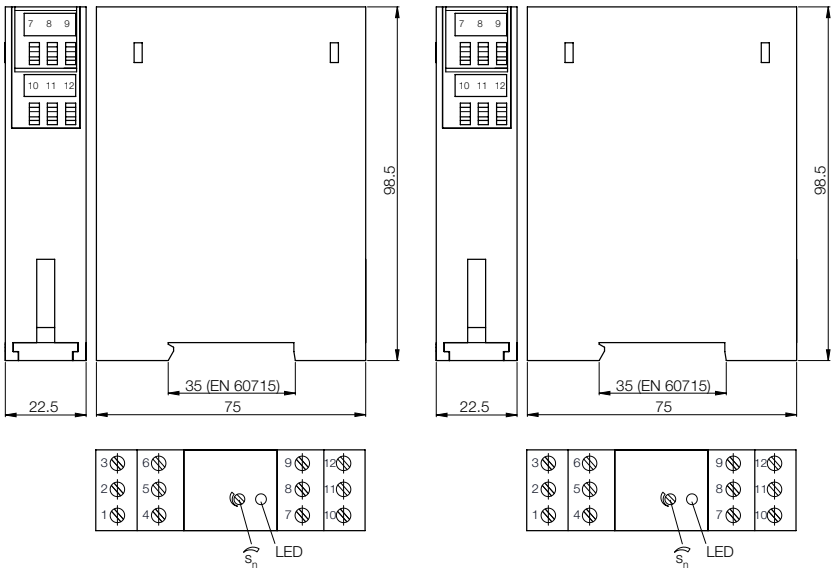




- Potential free relay output
- Screw terminal connections
- Adjustable switching distance
- Switching state indicated by two separate LEDs

Accessories

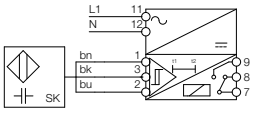
AC powered sensor amplifier for miniature sensor with relay output and delay timer

230 VAC

115 VAC

Housing size		**98.5×75×22.5 mm**	**98.5×75×22.5 mm**
Mounting		DIN rail (EN 60751)	DIN rail (EN 60751)
PNP/NPN and NO/NC selectable	**Ordering code**	**BAE009M**	**BAE009N**
	Part number	BAE SA-CS-008-XR	BAE SA-CS-009-XR
Supply voltage U_S		230 V AC	115 V AC
Rated insulation voltage U_i (protection class)		250 V AC	250 V AC
Output current max.		8 A	8 A
No-load supply current I_0 max.		20 mA	20 mA
Reverse polarity/short circuit protected		no/no	no/no
Ambient temperature range T_a		–30…+70 °C	–30…+70 °C
Switching frequency f		10 Hz	10 Hz
Function indicator		no/yes	no/yes
Degree of protection per IEC 60529		IP 20	IP 20
Material	Housing	PC	PC
Wiring		max. 2.5 mm² AWG 14	max. 2.5 mm² AWG 14

Wiring configuration



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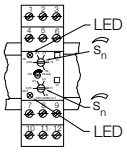
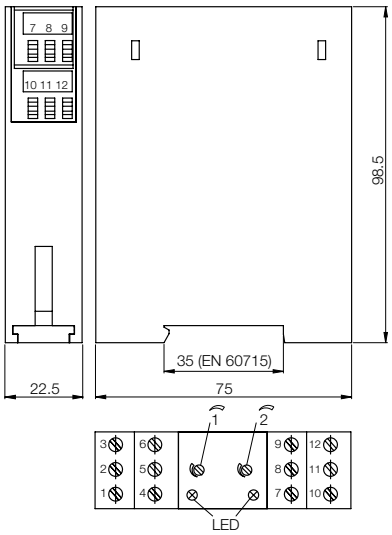
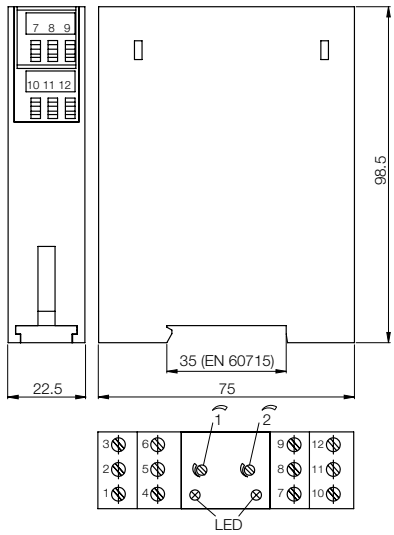






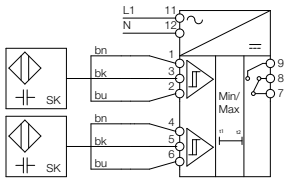
- Potential free relay output
- Adjustable delay timer 50ms...30s
- Screw terminal connections
- Adjustable switching distance
- Switching state indicated by two separate LEDs

Accessories

AC powered sensor amplifier for two miniature sensors with relay output and min/max logic controller

Housing size		**98.5×75×22.5 mm**	**98.5×75×22.5 mm**
Mounting		DIN rail (EN 60751)	DIN rail (EN 60751)
PNP/NPN and	**Ordering code**	**BAE009T**	**BAE009U**
NO/NC selectable	Part number	BAE SA-CS-004-XR	BAE SA-CS-005-XR
Supply voltage U_S		230 V AC	115 V AC
Rated insulation voltage U_i (protection class)		250 V AC	250 V AC
Output current max.		8 A	8 A
No-load supply current I_0 max.		20 mA	40 mA
Reverse polarity/short circuit protected		no/no	no/no
Ambient temperature range T_a		–30…+70 °C	–30…+70 °C
Switching frequency f		5 Hz	5 Hz
Function indicator		no/yes	no/yes
Degree of protection per IEC 60529		IP40 (IP 20 terminal enclosure)	IP40 (IP 20 terminal enclosure)
Material	Housing	PC	PC
Wiring		max. 2.5 mm² AWG 14	max. 2.5 mm² AWG 14

Wiring configuration



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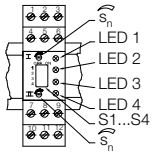
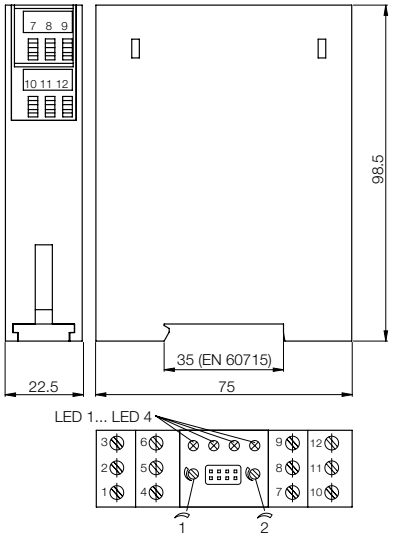
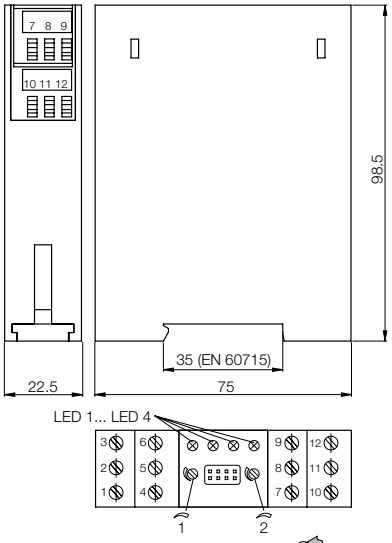






Function

When both sensors are deactivated, the relay turns on – “LED” empty“ lights up (contact 7/9 closed).
If the Min sensor activates, the “LED fill” lights up. When both sensors are activated, the relay turnsoff – “LED full” lights up (contact 7/9 open).

Note:

If the Max sensor is activated, the “LED empty” lights up. The relay does not switch on until both sensors are deactivating again.

DIP switch functions

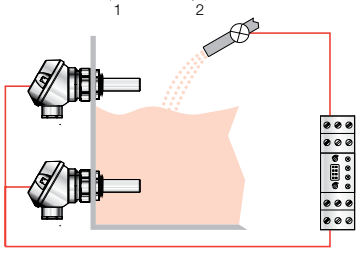
S1 – Time delay Max-Sensor (off: approx. 0.2 s; on: approx. 5 s)
S2 – Time delay Min-Sensor (off: approx. 0.2 s; on: approx. 5 s)
S3 – Power-on-Setup (off: fill; on: empty)
S4 – Output (relay inverse)

Function indicators

A – Full
B – Fill
C – Empty
D – Empty

Sensor adjustment

Max-Sensor: Pot I
Min-Sensor: Pot II



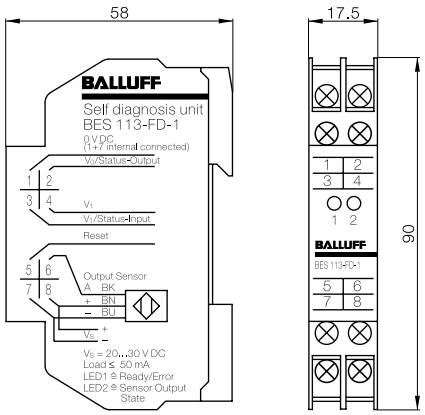
Diagnostics

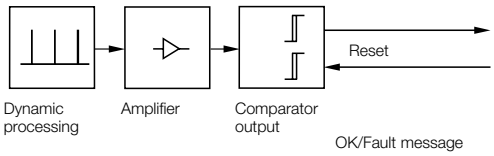
The BES 113-FD-1 function diagnostics unit monitors a proximity switch with dynamic function diagnostics including its cable. A logic circuit polls the sensor signals for the presence of test pulses and also monitors for proper function of the processor. For the machine controller it emits a High level signal on the "Status/Output" line when there is no fault and a Low signal when a fault is present. LEDs indicate the switching state of the sensor.

Recurring faults are stored by the device. They must be reset using a reset function (Low signal on 5).

If the BES 113-FD-1 is used as a single unit, terminals VI (3 and 4) must be jumpered together.

Description		**Function diagnostics unit** with electronic output
Use		for function diagnostic sensors
Ordering code		**BAE006W**
Part number		BES 113-FD-1
Supply voltage U_S		20...30 V DC
No-load current		approx. 20 mA
Output voltage U_0	low	0...(0.1×U_S) when the sensor or diagnostics unit has a fault)
(referenced to 0 V)	high	(0.5×U_S)...U_S when malfunctioning
Output current max.		50 mA
Ambient temperature range T_a		0...+60 °C
LED 1 green		„Ready/Error“ – in a faultless state the LED is on bright. When there is a fault the LED illuminates dimly).
LED 2 yellow		„Sensor Output State“ indicates the switching state of the sensor.
Degree of protection per IEC 60529		Housing IP 40, terminals IP 20
Housing attachment		Rail mount per DIN EN 50022-35
max. conductor cross-section		2×2.5 mm²



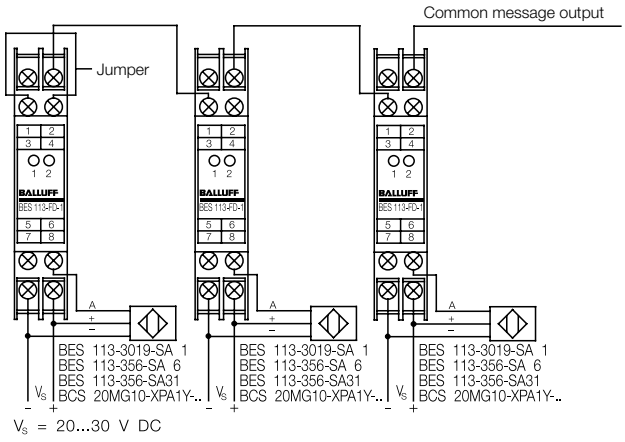


Cascading

When cascading several BES 113-FD-1 the output (2) must be connected to the input (3) of the amplifier. The jumper between VI is not needed except for the first device.

When there is a malfunction, the message appears on the last device. The defective sensor is indicated by the first weakly illuminated LED in the cascade.

Small and space-saving, the BES 113-FD-1 can be mounted in a DIN rail per DIN EN 50022-35.



Accessories

AC powered sensor controller with relay output and timer delay

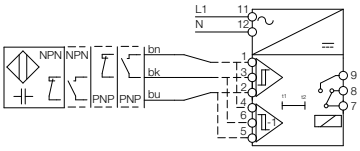
230 VAC

115 VAC

Housing size		**98.5×75×22.5 mm**	**98.5×75×22.5 mm**
Mounting		DIN rail (EN 60751)	DIN rail (EN 60751)
Potential-free changeover contact	**Ordering code**	**BAE009W**	**BAE009Y**
	Part number	BAE SA-XE-010-XR	BAE SA-XE-011-XR
Supply voltage U_S		230 V AC	115 V AC
Output current max.		8 A	8 A
No-load supply current I_0 max.		20 mA	40 mA
Ambient temperature range T_a		–30…+70 °C	–30…+70 °C
Switching frequency f		10 Hz	10 Hz
Function indicator		no/yes	no/yes
Degree of protection per IEC 60529		IP 20	IP 20
Material	Housing	PC	PC
Wiring		Screw terminals	Screw terminals

Not suitable for devices with push-pull output (e.g. BCS S4...)

Wiring configuration



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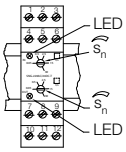
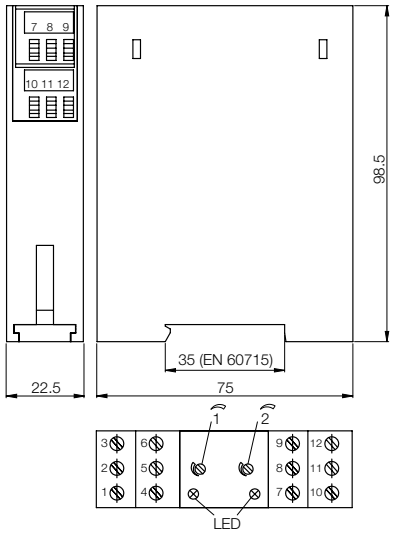
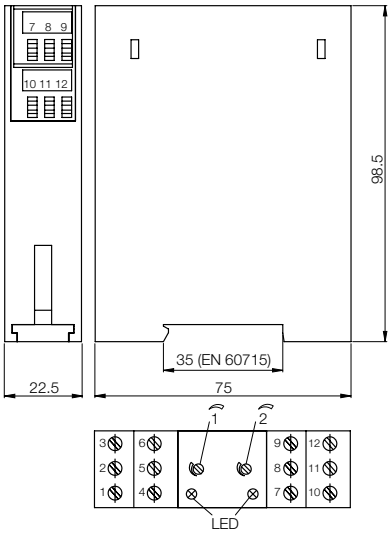


– Actuation delay selectable 50ms..30s S1
– Turn-off delay selectable 50ms..30s S2





Accessories

AC powered sensor controller with relay output and min/max logic

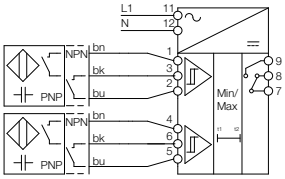
230 VAC

115 VAC

Housing size		**98.5×75×22.5 mm**	**98.5×75×22.5 mm**
Mounting		DIN rail (EN 60751)	DIN rail (EN 60751)
Potential-free changeover contact	**Ordering code**	**BAE009Z**	**BAE00A0**
	Part number	BAE SA-XE-012-XR	BAE SA-XE-013-XR
Supply voltage U_S		230 V AC	115 V AC
Output current max.		8 A	8 A
No-load supply current I_0 max.		20 mA	40 mA
Ambient temperature range T_a		–30…+70 °C	–30…+70 °C
Switching frequency f		5 Hz	5 Hz
Function indicator		no/yes	no/yes
Degree of protection per IEC 60529		IP 20	IP 20
Material	Housing	PC	PC
Wiring		Screw terminals	Screw terminals

Not suitable for devices with XDC output (e.g. BCS S4...)

Wiring configuration



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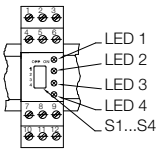
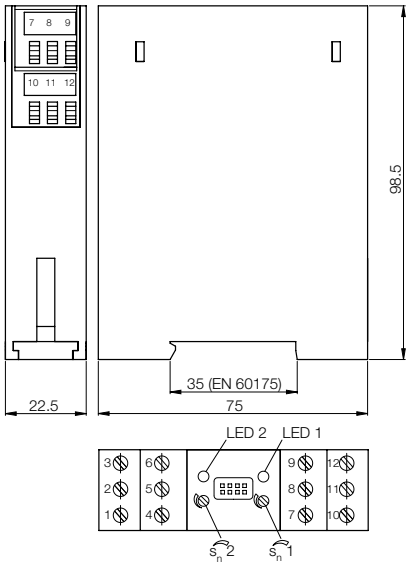
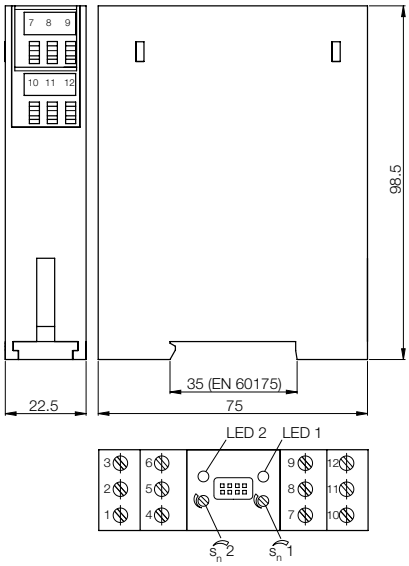






Function

When both sensors are deactivated, the relay turns on – “LED” empty lights up (contact 7/9 closed).
If the Min sensor activates, the “LED fill” lights up. When both sensors are activated, the relay turnsoff – “LED full” lights up (contact 7/9 open).

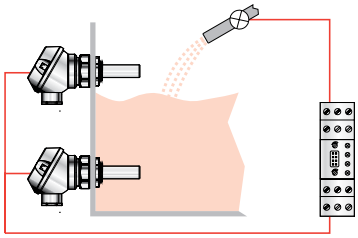
Note: If the Max sensor is activated, the “LED empty” lights up. The relay does not switch on until both sensors are deactivating again.

DIP switch functions

S1 – Time delay Max-Sensor (off: approx. 0.2 s; on: approx. 5 s)
S2 – Time delay Min-Sensor (off: approx. 0.2 s; on: approx. 5 s)
S3 – Power-on-Setup (off: fill; on: empty)
S4 – Output (relay inverse)

Function indicators

A – Full
B – Fill
C – Empty
D – Empty

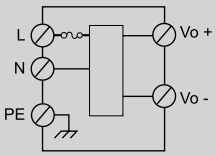


Applications

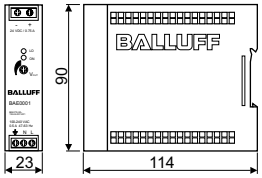
– Min- and Max level control
– Input for connecting two miniature capacitive sensors for level sensing, adjustable separately using two potentiometers
– DC short circuit protected
– Turn-on delay for Min- and Max sensor selectable independently

Accessories

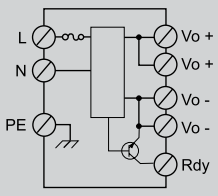
Power supplies single-phase input voltage 0.75 A

Output current	0.75 A
Output power	18 W
Output voltage	24 V DC
Input voltage	100...240 V AC
Ordering code	**BAE0001**
Part number	BAE PS-XA-1W-24-007-001
Input voltage range	90...265 V AC/120...370 V DC
Inrush current	115 V AC < 10 A/230 V AC < 18 A
Frequency range	47...63 Hz
Input fuse	T2 A/250 V AC internal
Voltage adjustment range	21.6...28.8 V DC
Temperature coefficient	±0.02 %/°C
Ripple & Noise	50 mV
Holdup time	115 V AC > 20 ms/230 V AC > 75 ms
Status indicator DC ON	Green LED
Status indicator DC LOW	Red LED
Efficiency	77 %
Response	Hiccup mode
Switching frequency	> 100 kHz
Isolation voltage	3000 V AC
Isolation resistance	100 MΩ
Turn-on delay	< 1 s
Ambient temperature range	–25 °C...+71 °C
Derating	–3 %/°C above +61 °C
Parallel mode	Yes (with external diodes)
Degree of protection per IEC 60529	IP 20
Ready output	no
Cooling	Air convection
Housing material	Plastic
Weight	0.15 kg
approvals	CE, UL/cUL, TÜV
Wiring Diagram	

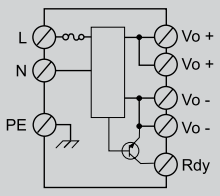
L, N	Input terminals
PE	PE connection
Vo –	Output terminal –
Vo +	Output terminal +



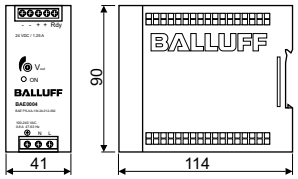
1.25 A	2.5 A
30 W	60 W
24 V DC	24 V DC
100...240 V AC	100...240 V AC
BAE0004	**BAE0005**
BAE PS-XA-1W-24-012-002	BAE PS-XA-1W-24-025-002
85...264 V AC/90...375 V DC	85...264 V AC/90...375 V DC
115 V AC < 20 A/230 V AC < 40 A	115 V AC < 30 A/230 V AC < 60 A
47...63 Hz	47...63 Hz
T2 A/250 V AC internal	T2 A/250 V AC internal
24.0...28.0 V DC	24.0...28.0 V DC
±0.02 %/°C	±0.02 %/°C
50 mV	50 mV
115 V AC > 20 ms/230 V AC > 30 ms	115 V AC > 20 ms/230 V AC > 30 ms
Green LED	Green LED
86 %	89 %
Forward characteristic	Hiccup mode
> 100 kHz	> 100 kHz
3000 V AC	3000 V AC
100 MΩ	100 MΩ
< 1 s	< 1 s
–25 °C...+71 °C	–25 °C...+71 °C
–2.5 %/°C above +61 °C	–2.5 %/°C above +61 °C
Yes (with external diodes)	Yes (with external diodes)
IP 20	IP 20
DC OK output	DC OK output
Air convection	Air convection
Plastic	Plastic
0.29 kg	0.36 kg
CE, UL/cUL, TÜV	CE, UL/cUL, TÜV

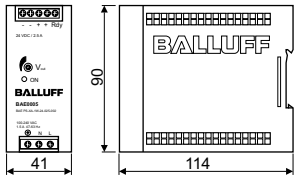


L, N	Input terminals
PE	PE connection
Vo –	Output terminal –
Vo +	Output terminal +
Rdy	Ready output



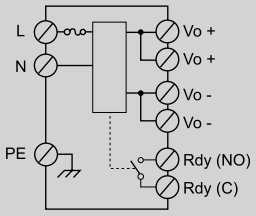
L, N	Input terminals
PE	PE connection
Vo –	Output terminal –
Vo +	Output terminal +
Rdy	Ready output



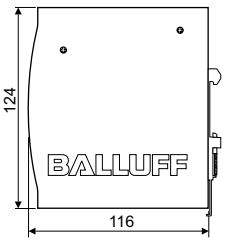


Accessories

Power supplies Single-phase input voltage 5 A

Output current	5 A
Output power	120 W
Output voltage	24 V DC
Input voltage	115/230 V AC (Auto-Select)
Ordering code	**BAE0006**
Part number	BAE PS-XA-1W-24-050-003
Input voltage range	90...132 V AC; 186...264 V AC/210...370 V DC
Inrush current	115 V AC < 24 A/230 V AC < 48 A
Frequency range	47...63 Hz
Input fuse	T3.15 A/250 V AC internal
Voltage adjustment range	22.5...28.5 V DC
Temperature coefficient	±0.03 %/°C
Ripple & Noise	50 mV
Holdup time	115 V AC > 25 ms/230 V AC > 30 ms
Status indicator DC ON	Green LED
Status indicator DC LOW	Red LED
Efficiency	86 %
Response	Current limiter
Switching frequency	> 80 kHz
Isolation voltage	3000 V AC
Isolation resistance	100 MΩ
Turn-on delay	< 1 s
Ambient temperature range	–25 °C...+71 °C
Derating	–2.5 %/°C above +61 °C
Parallel mode	yes
Degree of protection per IEC 60529	IP 20
Ready output	DC OK output relay
Cooling	Air convection
Housing material	Metal
Weight	0.92 kg
Approvals	CE, UL/cUL, TÜV
Wiring Diagram	

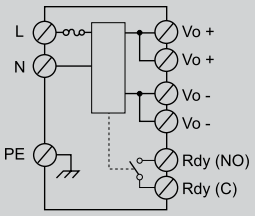
L, N	Input terminals
PE	PE connection
Vo –	Output terminal –
Vo +	Output terminal +
Rdy	Ready output



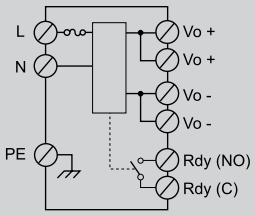
Accessories

Power supplies single-phase input voltage 10 A, 20 A

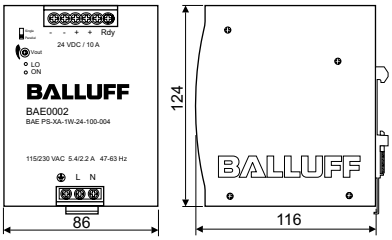
	10 A	20 A
	240 W	480 W
	24 V DC	24 V DC
	115/230 V AC (Auto-Select)	115/230 V AC (Auto-Select)
	BAE0002	**BAE0003**
	BAE PS-XA-1W-24-100-004	BAE PS-XA-1W-24-200-005
	93...132 V AC; 186...264 V AC/210...370 V DC	90...264 V AC/120...370 V DC
	115 V AC < 30 A/230 V AC < 60 A	115 V AC < 25 A/230 V AC < 50 A
	47...63 Hz	47...63 Hz
	T6.3 A/250 V AC internal	T10 A/250 V AC internal
	22.5...28.5 V DC	22.5...28.5 V DC
	±0.02 %/°C	±0.02 %/°C
	100 mV	100 mV
	115 V AC > 25 ms/230 V AC > 30 ms	115 V AC > 25 ms/230 V AC > 30 ms
	Green LED	Green LED
	Red LED	Red LED
	89 %	89 %
	Current limiter	Current limiter
	> 80 kHz	> 100 kHz
	3000 V AC	3000 V AC
	100 MΩ	100 MΩ
	< 1 s	< 1 s
	–25 °C...+71 °C	–25 °C...+71 °C
	–2.5 %/°C above +61 °C	–2.5 %/°C above +61 °C
	yes	yes
	IP 20	IP 20
	DC OK output relay	DC OK output relay
	Air convection	Air convection
	Metal	Metal
	1.0 kg	1.92 kg
	CE, UL/cUL, TÜV	CE, UL/cUL, TÜV

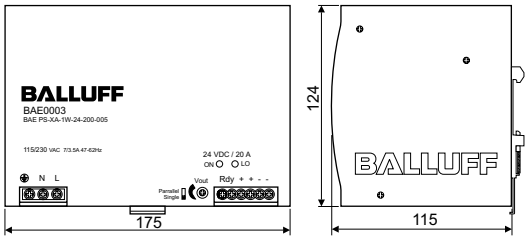


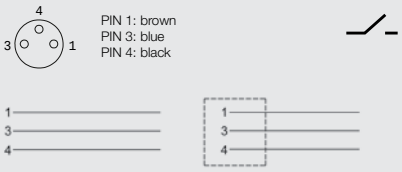
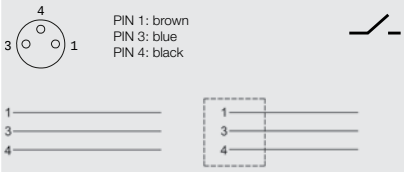
L, N	Input terminals
PE	PE connection
Vo –	Output terminal –
Vo +	Output terminal +
Rdy	Ready output



L, N	Input terminals
PE	PE connection
Vo –	Output terminal –
Vo +	Output terminal +
Rdy	Ready output

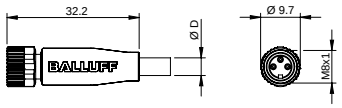


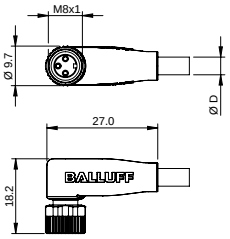


Connector diagram and wiring			
Operating voltage max. AC U_B		60 V AC	60 V AC
Operating voltage max. DC U_B		60 V DC	60 V DC
Cable		Molded-on	Molded-on
No. of wires × cross-section		3×0.34mm²	3×0.34mm²
Enclosure rating per IEC 60529		IP 67	IP 67
Ambient temperature T_a	PUR	–25 °C...+80 °C	–25 °C...+80 °C
	PUR shielded	–25 °C...+80 °C	–25 °C...+80 °C
	PVC	–5 °C...+80 °C	–5 °C...+80 °C
	PVC shielded	–5 °C...+80 °C	–5 °C...+80 °C
Use		Normally open	Normally open

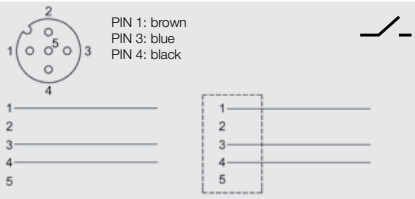
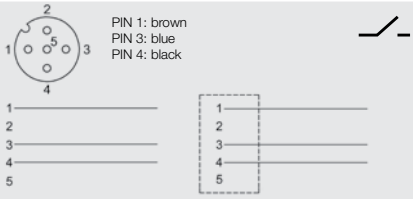
Cable material	Color	Length	Ordering code	
			Part number	
PUR	black	2 m	**BCC02M8**	**BCC02ML**
			BCC M313-0000-10-001-PX0334-020	BCC M323-0000-10-001-PX0334-020
PUR	black	5 m	**BCC02M9**	**BCC02MM**
			BCC M313-0000-10-001-PX0334-050	BCC M323-0000-10-001-PX0334-050
PUR	black	10 m	**BCC02MA**	**BCC02MN**
			BCC M313-0000-10-001-PX0334-100	BCC M323-0000-10-001-PX0334-100

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

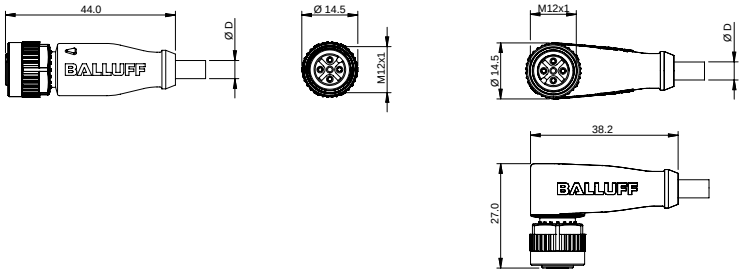




Accessories
M12-female right-angle, 3-pin, no LED

			
	250 V AC	250 V AC	
	250 V DC	250 V DC	
	Molded-on	Molded-on	
	3×0.34mm²	3×0.34mm²	
	IP 68	IP 68	
	–25 °C...+80 °C	–25 °C...+80 °C	
	–25 °C...+80 °C	–25 °C...+80 °C	
	–5 °C...+80 °C	–5 °C...+80 °C	
	–5 °C...+80 °C	–5 °C...+80 °C	
	Normally open	Normally open	

	Ordering code		
	Part number		
	BCC030K	**BCC0317**	
	BCC M415-0000-1A-001-PX0334-020	BCC M425-0000-1A-001-PX0334-020	
	BCC030L	**BCC0318**	
	BCC M415-0000-1A-001-PX0334-050	BCC M425-0000-1A-001-PX0334-050	
	BCC030M	**BCC0319**	
	BCC M415-0000-1A-001-PX0334-100	BCC M425-0000-1A-001-PX0334-100	



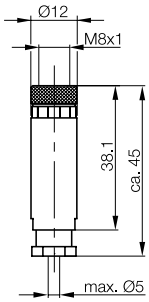
Accessories
Field attachables
M8

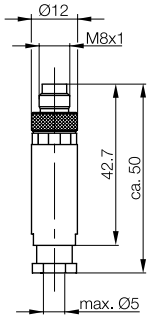
Quick-connect system

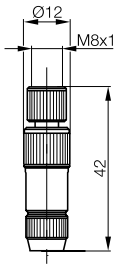
Quick-connect system

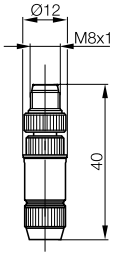
Connector diagram					
System			Harax	Harax	
Style	Straight female	Straight male	Straight female	Straight female	
Operating voltage max. U_S	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC	
Cable	For user assembly	For user assembly	For user assembly	For user assembly	
No. of wires × cross-section	3×0.14...0.5 mm²	3×0.14...0.5 mm²	3×0.14...0.34 mm²	3×0.14...0.34 mm²	
Cable diameter min.	max. Ø 5 mm	max. Ø 5 mm	max. 3.2...5.4 mm	max. 3.2...5.4 mm	
Wiring	Screw terminal	Screw terminal	Insulation displacement IDC	Insulation displacement IDC	
Enclosure rating per IEC 60529	IP 67	IP 67	IP 68	IP 68	
Ambient temperature range T_a	–40...+85 °C	–40...+85 °C	–5...50 °C	–5...50 °C	
Use	NO ⌐- or NC ⌐	NO ⌐- or NC ⌐	NO ⌐- or NC ⌐	NO ⌐- or NC ⌐	

	Ordering code		**Ordering code**		
	Part number		Part number		
	BCC0157	**BCC156**	**BCC02HC**	**BCC02HE**	
	BKS-S142-00	BKS-141-00	BKS-S111-RT13	BKS-S113-RT13	



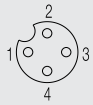




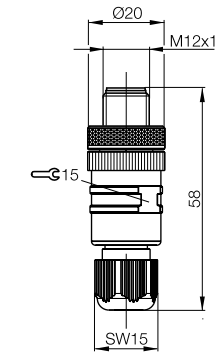


Quick-connect system

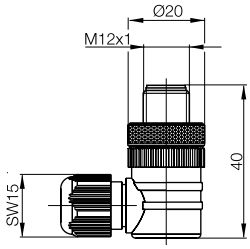
Quick-connect system

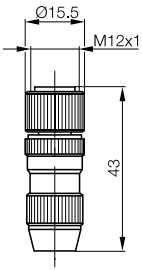


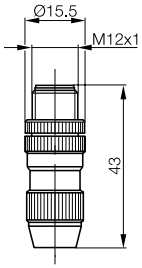
			Harax	Harax
	Straight male	Straight male	Straight female	Straight female
	10...30 V DC	10...30 V DC	10...30 V DC	10...30 V DC
	For user assembly	For user assembly	For user assembly	For user assembly
	3/4×max. 0.75 mm²	3/4×max. 0.75 mm²	3/4×0.14...0.34 mm²	3/4×0.14...0.34 mm²
	max. Ø 4...6 mm	max. Ø 4...6 mm	max. Ø 4...5.1 mm	max. Ø 4...5.1 mm
	Screw terminals	Screw terminals	Insulation displacement IDC	Insulation displacement IDC
	IP 67	IP 67	IP 67	IP 67
	–25...+90 °C	–25...+90 °C	–5...+50 °C	–5...+50 °C
	Complementary	Complementary	Complementary	Complementary
Ordering code				
Part number				
			BCC02H8	**BCC02H9**
	RSC 4/7	RSCW 4/7	BKS-S107-RT14	BKS-S109-RT14

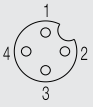
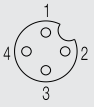


PXD902b

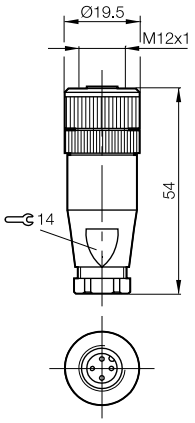


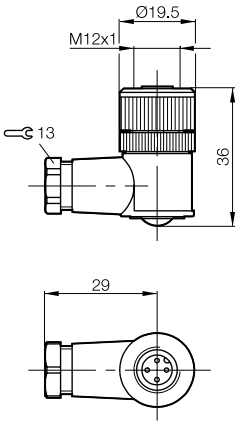




Connector diagram		
System		
Style	Straight female	Right angle female
Operating voltage max. U_S	10...30 V DC	10...30 V DC
Cable	For user assembly	For user assembly
No. of wires × cross-section	3/4×max. 0.75 mm²	3/4×max. 0.75 mm²
Cable diameter min.	max. Ø 4...6 mm	max. Ø 4...6 mm
Wiring	Screw terminals	Screw terminals
Enclosure rating per IEC 60529	IP 67	IP 67
Ambient temperature range T_a	–40...+85 °C	–40...+85 °C
Use	Complementary	Complementary

	Ordering code	
	Part number	
	BCC0149	**BCC0144**
	BKS-S 10-3	BKS-S 8-3



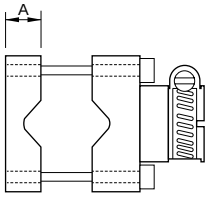


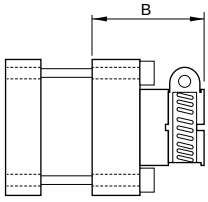
Fits	M12	M18	M30	ø 34 mm
Mounting - bracket	Split halves clamped with screws			
Mounting - sensor	Hose clamp			
Material	Plastic and stainless steel			
Dimensions (mm)				
A	10.5	11.7	19.1	19.1
B	29.5	38.1	67.8	67.8
C	38.1	45.0	69.9	69.9
D	12.1	18.1	30.1	34.1
Tube diameter (mm)	9.4-20.6	9.4-20.6	25.4-44.5	25.4-44.5
Tube diameter (inches)	0.37-0.81	0.37-0.81	1.0-1.75	1.0-1.75

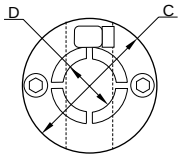
	Ordering code			
	Part number			
	BAM015E	**BAM015F**	**BAM015H**	**BAM015J**
	BCSA-SG-12-D	BCSA-SG-18-D	BCSA-SG-30-D	BCSA-SG-34-D

Accessories Deliver Faster Changeover Time

A common application, tank level control, is now simple with Balluff BCSA sight glass mounts. On and off levels can be easily adjusted on the external tube by moving the sensors up or down as desired. The ability to make these process changes quickly saves you money and satisfies the need for high-accuracy feedback.



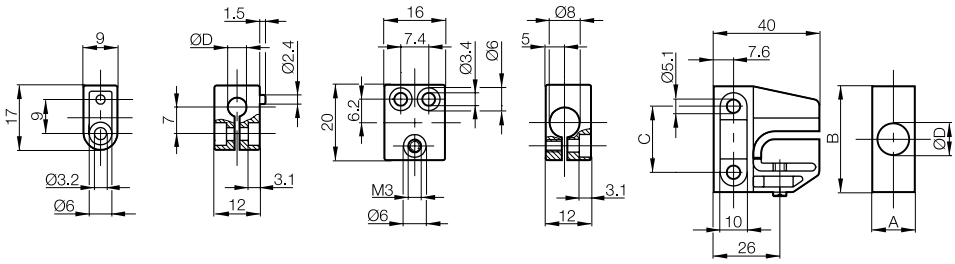




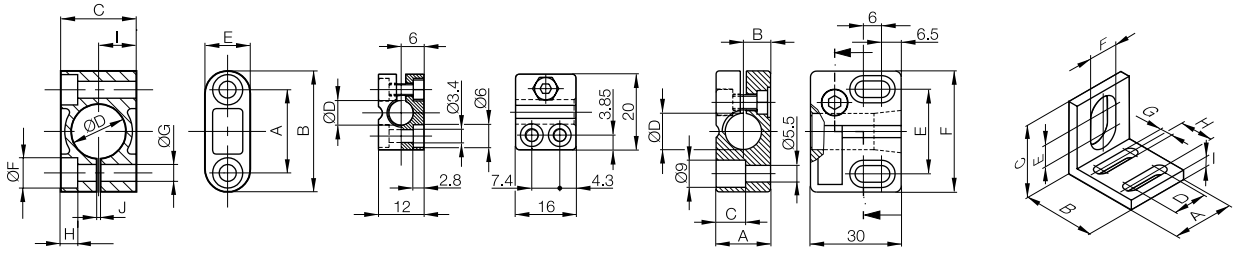
Accessories
Mounting brackets

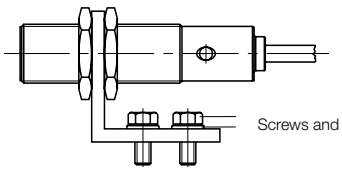
Stackable
Row mounting

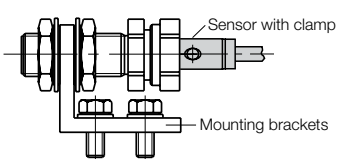
Description		Mounting clamp	Mounting clamp	Mounting clamp w/out positive stop
Ø 4 mm	**Ordering code**	**BAM0094**		
	Part number	BES 04,0-KB-1		
Ø 6.5 mm	**Ordering code**	**BAM009C**	**BAM009F**	
	Part number	BES 06,5-KB-1	BES 06,5-KB-7	
Ø 8 mm	**Ordering code**		**BAM00AA**	
	Part number		BES 08,0-KB-7	
Ø 12 mm	**Ordering code**			**BAM00C7**
	Part number			BES 12,0-KB-2
Ø 18 mm	**Ordering code**			**BAM00F6**
	Part number			BES 18,0-KB-2
Ø 30 mm	**Ordering code**			
	Part number			
Form factor		for Ø 4 mm / for Ø 6.5 mm		for Ø 12 mm / for Ø 18 mm
Dimension A				16 / 22
Dimension B				40 / 45
Dimension C				25 / 30
Dimension D		Ø 4 / Ø 6.5		Ø 12 / Ø 18
Dimension E				
Dimension F				
Dimension G				
Dimension H				
Dimension I				
Dimension J				
Material		PA 6	Al	PA 6



	Mounting cuff					Mounting clamp w/out positive stop					Mounting clamp w/out positive stop					Mounting bracket				
	BAM009A					**BAM009E**										**BAM009U**				
	BES 06,5-BS-1					BES 06,5-KB-3										BES 08,0-HW-1				
	BAM00A2					**BAM00A5**										**BAM00C0**				
	BES 08,0-BS-1					BES 08,0-KB-3					**BAM00C9**					BES 12,0-HW-1				
	BAM00C4										BES 12,0-KB-3					**BAM00EY**				
	BES 12,0-BS-1										**BAM00F7**					BES 18,0-HW-1				
	BAM00F2										BES 18,0-KB-3					**BAM00HH**				
	BES 18,0-BS-1															BES 30,0-HW-1				
	for Ø 6.5 mm	for Ø 8 mm	for Ø 12 mm	for Ø 18 mm	for Ø 30 mm	for Ø 6.5 mm	for Ø 8 mm				for Ø 12 mm	for Ø 18 mm				for Ø 8 mm	for Ø 12 mm	for Ø 18 mm	for Ø 30 mm	
	17	17	22	26	42						18	24				25	25	30	40	
	27	27	32	36	55						9	12				30	30	40	40	
	16	16	20	26	38						9.7	13.5				30	30	40	60	
	Ø 6.4	Ø 7.9	Ø 11.9	Ø 17.9	Ø 30	Ø 6.5	Ø 8				Ø 12	Ø 18				14	14	18	30	
	12	12	12	12	18						28	28				12	9	11	19	
	Ø 8	Ø 8	Ø 8	Ø 8	Ø 10						40	40				8.1	12.1	18.1	30.1	
	Ø 4.5	Ø 4.5	Ø 4.5	Ø 4.5	Ø 5.5											5.2	5.2	5.2	5.2	
	4.5	4.5	4.5	4.5	5.5											14	14	14	14	
	8	8	10	13	19											4	4	5	5	
	1	1	1	1	1.5															
	PA 6					PA 6					PA 6					Al				







These aluminum mounting brackets provide a way of easily and quickly attaching sensors to the machine. For tubular sensors, we recommend the additional use of clamps (see page 78).

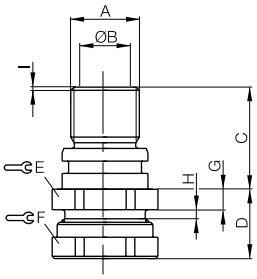
Use

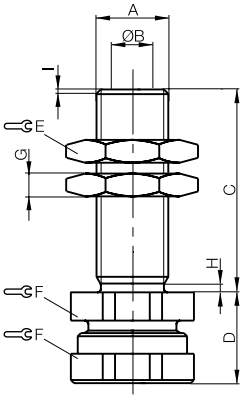
For all sensors with corresponding diameter.

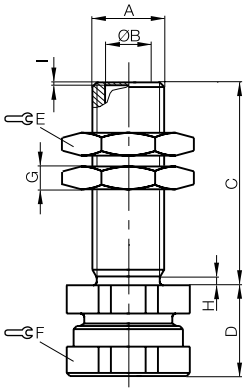
Accessories
Capacitive prox mounts



Description		Clamp with positive stop	Clamp with positive stop	Clamp with positive stop		
Ø 8 mm	**Ordering code**			**BAM00AL**		
	Part number			BES 08,0-KH-3L		
Ø 12 mm	**Ordering code**	**BAM008E**	**BAM00E3**	**BAM00E2**		
	Part number	BES 12,0-KH-5F	BES 12,0-KH-3X	BES 12,0-KH-3L		
Ø 18 mm	**Ordering code**			**BAM00FY**		
	Part number			BES 18,0-KH-3L		
Form factor		for Ø 12 mm	for Ø 12 mm	for Ø 8 mm	for Ø 12 mm	for Ø 18 mm
Dimension A		M16×1	M16×1	M12×1	M16×1	M24×1
Dimension B		Ø 12	Ø 12	Ø 8	Ø 12	Ø 18
Dimension C		22.5	15.4	34	30	40
Dimension D		15.5	30	max. 14.5	max. 14.5	max. 19.5
Dimension E		flat-to-flat 22	flat-to-flat 22	flat-to-flat 17	flat-to-flat 22	flat-to-flat 30
Dimension F		flat-to-flat 22	flat-to-flat 22	flat-to-flat 17	flat-to-flat 22	flat-to-flat 30
Dimension G		4	3.8	4	4	5
Dimension H		2.1	2.1	2.1	2.1	3.2
Dimension I		0.8	1	0.5	1	1
Material		PBT fiberglass reinforced	PBT fiberglass reinforced	PBT fiberglass reinforced		

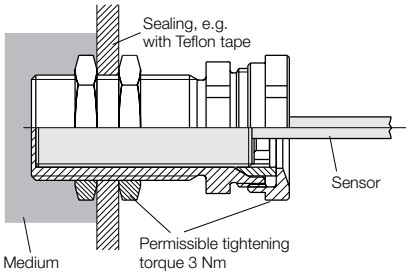




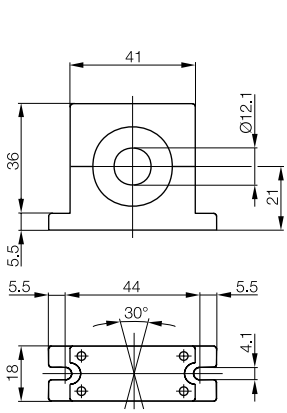


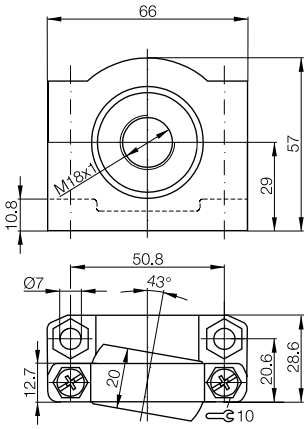
Installation example using BES ...-KH-3L

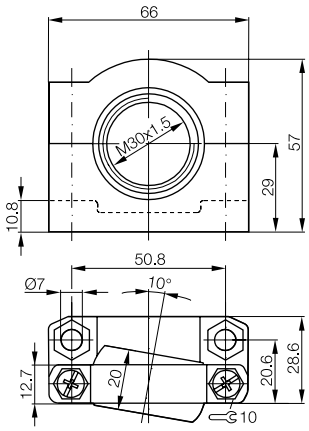
Particularly suitable for sensing in liquid media



Description		Mounting cuff	Mounting clamp with ball joint	Mounting clamp with ball joint
Ø 12 mm	**Ordering code**	**BAM00R2**		
	Part number	BOS 12,0-BS-1		
Ø 18 mm	**Ordering code**		**BAM00T3**	
	Part number		BOS 18,0-KB-1	
Ø 30 mm	**Ordering code**			**BAM00TN**
	Part number			BOS 30,0-KB-1
Material		Plastic	PA 6	PA 6







Accessories
Mounting system

Whether sensors are used in machine tools, assembly and handling, in packaging or specialty machines - one thing is certain: to work properly they must be precisely positioned. The Balluff Mounting System makes this simple.

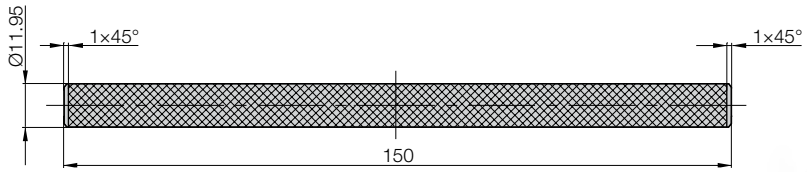
Balluff offers you not only the highest quality sensors, but also a full line of mounting accessories that provide optimum positioning of the sensors in equipment and on machines.

The Balluff mounting system can be used on base plates or on all commonly available extruded profiles and for tubular or block-style sensors. The flexible accessories kit allows you to cover virtually any required spatial angle, and even offers supplementary accessories such as reflector holders and adapter plates.

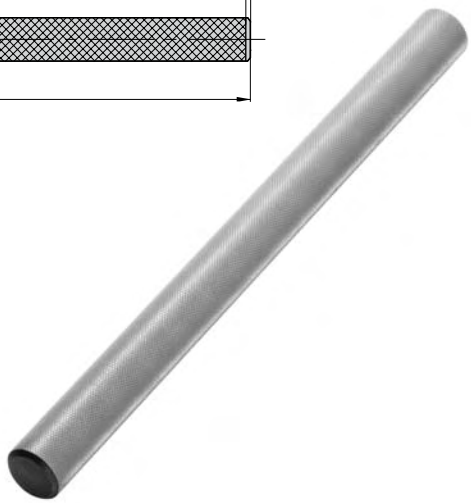
Description	
Style	
Use	
Ordering code	
Part number	
Ordering code	
Part number	
Ordering code	
Part number	
Material	

Mounting rods Ø 12 mm, anodized Al

Ordering code	Part number	Length
BAM002R	BMS RS-M-D12-0150-00	150 mm
BAM002T	BMS RS-M-D12-0250-00	250 mm
BAM002U	BMS RS-M-D12-1000-00	1000 mm (for user assembly)

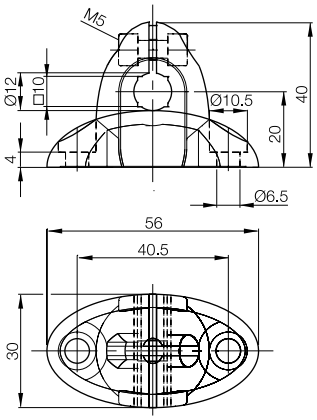


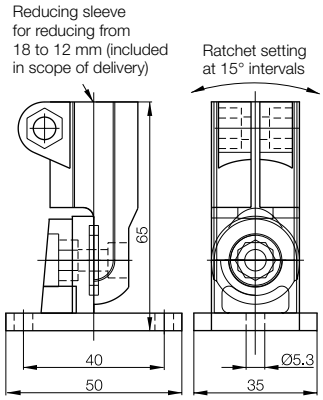
The mounting rods are knurled full-length.
This prevents any position change.

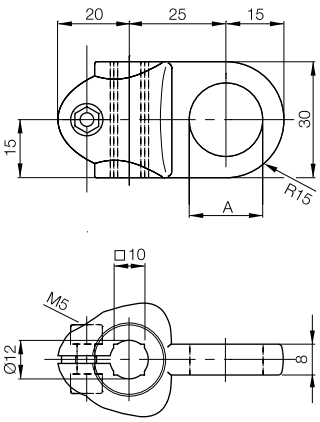


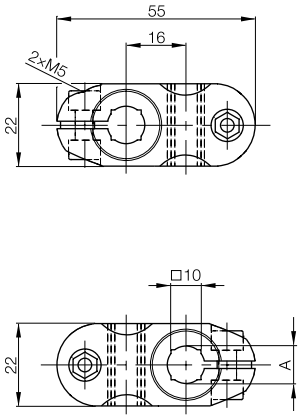



	Base holder	Articulated base holder	Sensor Holder	Cross-connector
	for 1 rod Ø 12 mm or 10×10 mm	for 1 rod Ø 12 mm	for 1 rod Ø 12 mm or 10×10 mm	for 2 rods Ø 10/12 mm or 10×10 mm
	for mounting on base plates or extrusions	for mounting on base plates or extrusions	for tubular sensors M8, M12, M18	Connecting element for 2 rods Ø 10/12 mm or 10×10 mm
	BAM002J	**BAM002Y**	**BAM002K**	**BAM003U**
	BMS CU-P-D12-A040-00	BMS CUJ-P-D12-R040-00	BMS CS-P-D12-AD08-00	BMS CC-P-D10-A-00
			BAM002N	**BAM002M**
			BMS CS-P-D12-AD12-00	BMS CC-P-D12-A-00
			BAM002P	
			BMS CS-P-D12-AD18-00	
	POM	POM	POM	POM





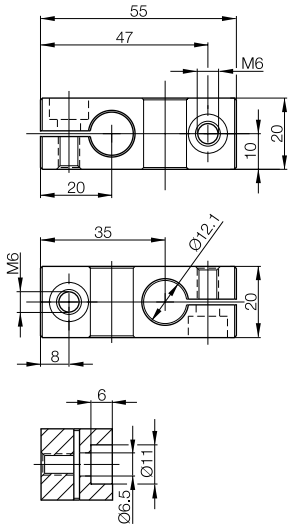


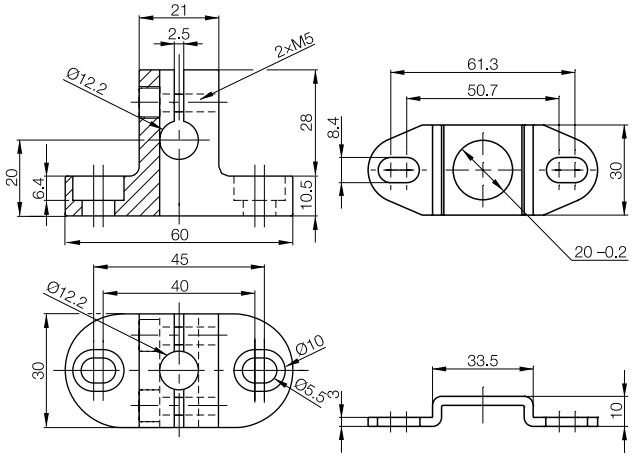


	A
BMS CS-...08	Ø 8
BMS CS-...12	Ø 12
BMS CS-...18	Ø 18

	A
BMS CC-P-D10...	Ø 10
BMS CC-P-D12...	Ø 12

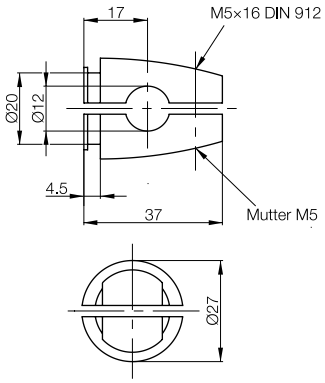
Description	**Cross-connector**	**Base holder**	**Base holder**	
Style	for 2 rods Ø 12 mm	for 1 rod Ø 12 mm (vertical or horizontal)	for clamping cylinder	
Use	Connecting element for 2 rods Ø 12 mm	for mounting on base plates or extrusions	for mounting on base plates or extrusions	
Ordering code	**BAM002Z**	**BAM002W**	**BAM0044**	
Part number	BMS CC-M-D12-B-00	BMS CU-M-D12-A040-00	BMS CS-M-D12-IO60-01	
Ordering code				
Part number				
Ordering code				
Part number				
Material	Anodized Al	Anodized Al	Stainless steel	

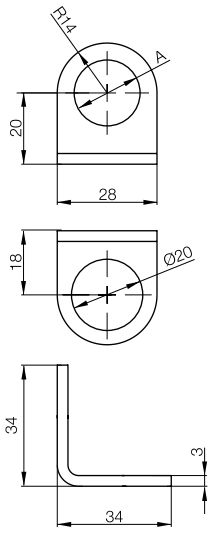




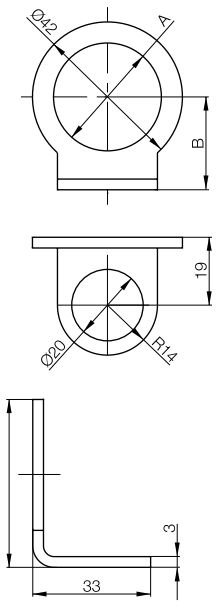



	Clamping cylinder	Sensor Holder	Sensor Holder	Adapter ring
		for clamping cylinder	for clamping cylinder	for 2× BMS CS-M-D12-IZ
	Accommodates all holders, sensors and reflectors	for tubular sensors M8, M12, M18 and all clamps M8...M18	for tubular sensors M30	for clamping cylinder
	BAM0031	**BAM0036**	**BAM0033**	**BAM003J**
	BMS CS-M-D12-IZ	BMS CS-M-D12-ID08-01	BMS CS-M-D12-ID30-01	BMS AD-M-003-D12/IZ
		BAM0037	**BAM003M**	
		BMS CS-M-D12-ID12-01	BMS CS-M-D12-ID36-01	
		BAM0032		
		BMS CS-M-D12-ID18-01		
	GD-Zn	Stainless steel	Stainless steel	Anodized Al

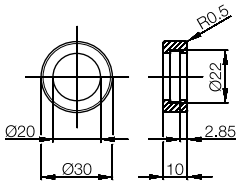




A	
BMS CS-...08	Ø 8
BMS CS-...12	Ø 12
BMS CS-...18	Ø 18



	A	B	C
BMS CS-...30	Ø 30.2	26	47
BMS CS-...36	Ø 36.5	30	54

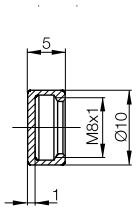


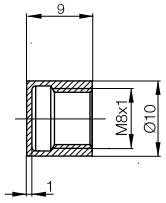
BALLUFF 83

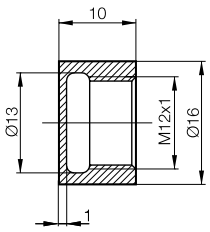
Accessories
PTFE covers

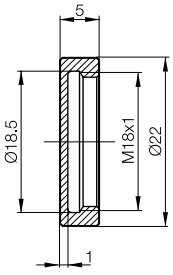



Description	Cover nut	Cover nut	Cover nut	Cover nut	
Ordering code	**BAM009Z**	**BAM00A0**	**BAM00C2**	**BAM00EZ**	
Part number	BES 08-SM-1	BES 08-SM-1F	BES 12-SM-2	BES 18-SM-1	
Material	This cover nut is threaded on to a M8×1 housing. It is made of PTFE and protects the active surface from weld splatter.	This cover nut is threaded on to a M8×1 housing. It is made of PTFE and protects the active surface from weld splatter.	This cover nut is threaded on to a M12×1 housing. It is made of POM and is used when mechanical stress is greater.	This cover nut is threaded on to a M18×1 housing. It is made of PTFE and can be used on welding equipment to protect the sensing face. It is also applicable in high temperatures and especially resistant to chemical influences.	
	Please note! The nominal switching distance of proximity switches is reduced by 1 mm when the cover nut is installed.	Please note! The nominal switching distance of proximity switches is reduced by 1 mm when the cover nut is installed.	Please note! The nominal switching distance of proximity switches is reduced by 1 mm when the cover nut is installed.	Please note! The nominal switching distance of proximity switches is reduced by 1 mm when the cover nut is installed.	

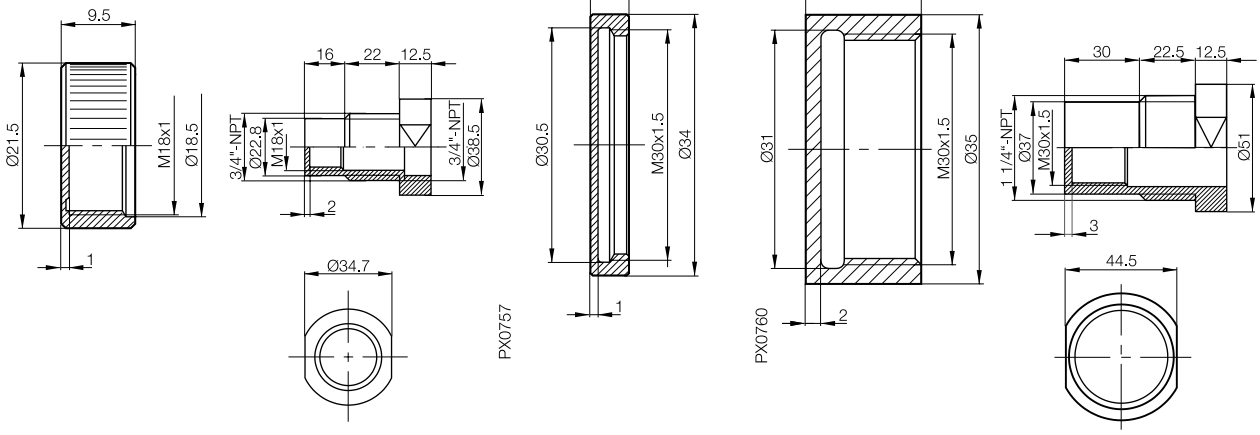






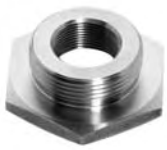
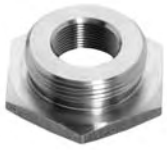


	Cover nut	Cover nut	Cover nut	Cover nut	Cover nut
	BAM00F0	**BAM00F1**	**BAM00HJ**	**BAM00HK**	**BAM00H2**
	BES 18-SM-2	BES 18-SM-3	BES 30-SM-1	BES 30-SM-2	BES 30-SM-3
	This cover nut is threaded on to a M18×1 housing. It is made of POM and is used when mechanical stress is greater.	This cover nut is threaded on to a M18×1 housing. It is made of PTFE and when properly installed can withstand up to 14 bar.	This cover nut is threaded on to a M30×1.5 housing. It is made of PTFE and can be used on welding equipment to protect the sensing face. It is also applicable in high temperatures and especially resistant to chemical influences.	This cover nut is threaded on to a M30×1.5 housing. It is made of POM and is used when mechanical stress is greater.	This cover nut is threaded on to a M30×1.5 housing. It is made of PTFE and when properly installed can withstand up to 14 bar.
	Please note! The nominal switching distance of proximity switches is reduced by 1 mm when the cover nut is installed.	Please note! The nominal switching distance of proximity switches is reduced by 2 mm when the cover nut is installed.	Please note! The nominal switching distance of proximity switches is reduced by 1 mm when the cover nut is installed.	Please note! The nominal switching distance of proximity switches is reduced by 2 mm when the cover nut is installed.	Please note! The nominal switching distance of proximity switches is reduced by 2 mm when the cover nut is installed.

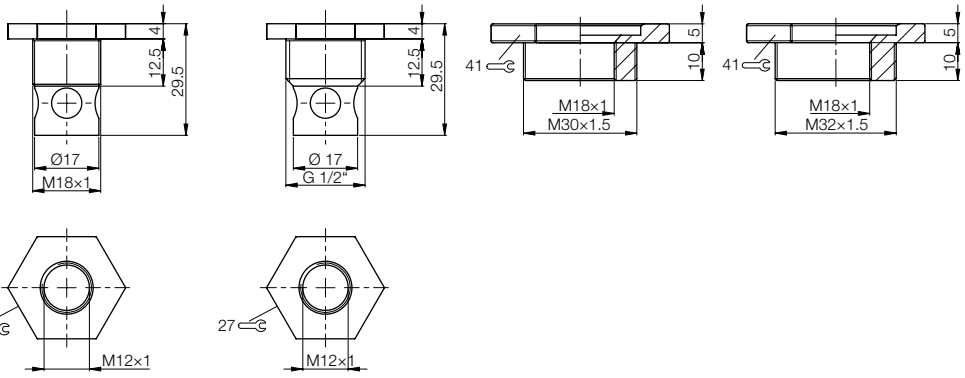


Protective Teflon™ switchwells are perfect for attaching capacitive sensors to containers for level detection.

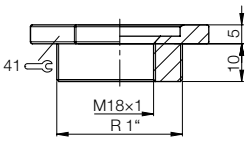


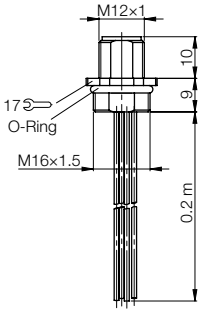



Description	**Adapter for Micro-Level M12 to M18**	**Adapter for Micro-Level M12 to G 1/2“**	**Adapter for BCS S01/2/3 M18 to M30**	**Adapter for BCS S01/2/3 M18 to M32**	
Ordering code	**BAM018J**	**BAM018K**	**BAM018E**	**BAM018F**	
Part number	BAM AD-XA-002-M12/M18-4	BAM AD-XA-002-M12/G1/2“-4	BAM AD-XA-001-M18/M30-4	BAM AD-XA-001-M18/M32x1,5-4	
Material	V2A	V2A	V2A	V2A	
Ambient temperature range T_a					
Wiring					



	Adapter for BCS S01/2/3 M18 to R 1“	Adapter for BCS S01/2/3 M16 to M12			
	BAM018H	**BCC04JT**			
	BAM AD-XA-001-M18/R1“-4	BCC M454-0000-2A-RM004-020			
	V2A	MS-Ni/PA –30...+70 °C 0.2 cable PVC, 3×0.25 mm²			





Fundamentals and Definitions
Contents

Balluff BCS capacitive sensors are classic object and level detectors that can reliably detect levels of liquids, bulk material, and granulates directly or indirectly through non-metallic container walls. They evaluate the change in capacitance which an object creates when it enters the electrical field of a capacitor. Thus capacitive sensors can detect not only metals, but also non-conductors and simply “see” through non-metallic materials.

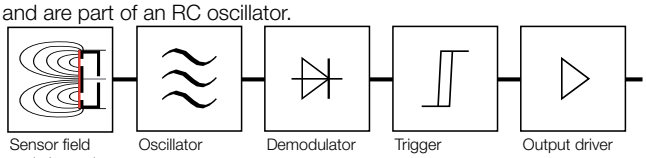
Fundamentals and Definitions
Functional principle

Functional principle

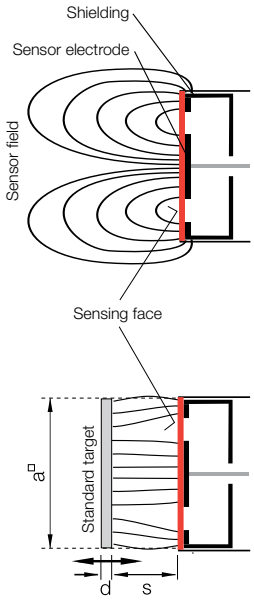
The non-contact capacitive sensor converts a variable of interest in technical production terms (e.g. object or level) into a signal which can be further processed. The function is based on an alternating electro-static field around its active zone.

The sensor is comprised essentially of:
- Sensor electrode and shielding
- Oscillator
- Demodulator
- Trigger
- Output driver

These two electrodes form the open capacitor of the sensing surface and are part of an RC oscillator.



When metallic or non-metallic objects approach the sensing area of the capacitive sensor, the capacitance changes and the oscillator begins to oscillate. This causes the trigger stage downstream of the oscillator to trip depending on the user adjusted threshold level, and the switching amplifier to change its output status.
The behavior and function of a capacitive sensor can be best explained using the equation for capacitance below:



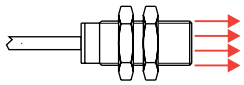
$C = \varepsilon_0 \times \varepsilon_r \times F \times (1/S)$

ε_r: Relative dielectric constant (property of the target medium)
ε_0: Absolute dielectric constant, unchanging
F: Area
S: Distance

From the formula above it follows that objects will be detected depending on the material specific dielectric constant, its relative size compared to the sensing field and the distance in between.
For example a presence detection application has a constant relative dielectric and area if the target object remains the same, but differs in the distance. Indirect level detection applications usually keep the distance and area to the target constant but vary the relative dielectric constant - the non-metallic tank wall in conjunction with the changing target level inside.

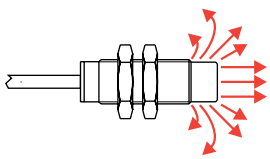
Sensors for object detection (flush/shielded)

Sensors with a rectilinear electrical field. These devices detect solids (e.g. wafers, components, PCBs, hybrids, cartons, stacks of paper, glass or plastic bottles, plastic blockes and sheets) from a distance, or liquids indirectly through a partition wall made of glass or plastic (thickness max. 4 mm), and should in individual cases be tested beforehand with samples.



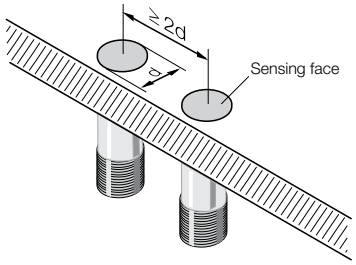
Sensors for level detection (non-flush/unshielded)

Sensors with a spherical electrical field. These devices are designed to detect product, bulk goods or liquids (e.g. granulate, sugar, flour, corn, sand, or oil and water) immersed in the medium or through a non-metallic tank wall. The choice of the appropriate sensor depends on the operating conditions and the type of medium and should in each case be tested beforehand with samples.



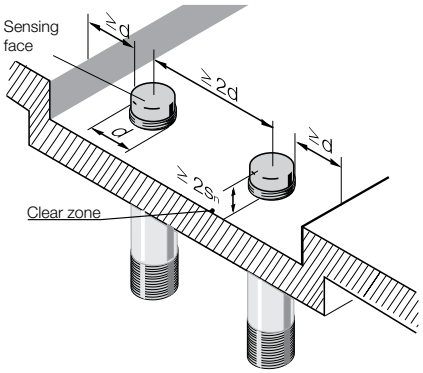
Flush-mount (shielded) proximity switches

... can be installed with their sensing faces flush to the surrounding material.
The distance between two proximity switches (in row mounting) must be ≥ 2d.



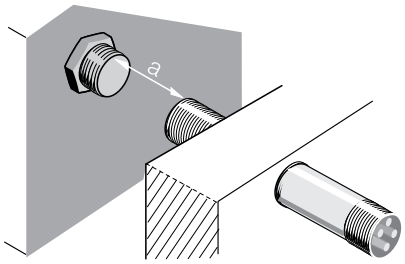
Non-flush (unshielded) proximity switches

The sensing face must extend ≥ $2s_n$ from the surrounding material.
The distance between two proximity switches must be ≥ 2d.



Opposing installation

... requires a minimum distance of a ≥ 4d between the sensing faces.



NOTE: Non compliance with above guidelines will result in unreliable operation and cross talk between sensors.

Fundamentals and Definitions
Electrical definitions

Sensing face

... is the area through which the high-frequency electro-static field enters the air space. It is determined mainly by the surface area of the cover cap and corresponds approximately to the area of the outer sensor electrode.

Standard target

... is a grounded, square metal plate made of Fe 360 (ISO 630), with the switching distance determined per EN 60947-5-2. The thickness is d = 1 mm; and the side length a corresponds to either the diameter of the circle of the sensing face or $3xs_r$, if the value is greater than the given diameter.

Rated switching distance s_n

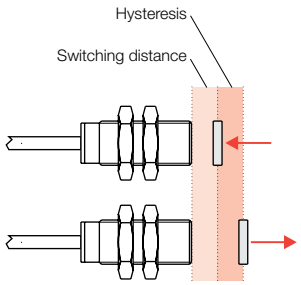
... is a theoretical value, which does not take into account manufacturing tolerances, sample differences, operating temperatures, supply voltages, etc.

Effective operating distance s_r

... is the switching distance of a single proximity switch measured under specified conditions such as flush mounting, rated operating voltage U_e, temperature T_a = +23 °C ±5 °C . For out capacitive sensors, the effective operating distance s_r can be adjusted by the potentiometer.

Hysteresis

... is the distance difference between the switch-on point when approaching, and the switch-off point when the target is receding from the active surface.



Repeat accuracy

... is the maximum sensing distance differential between any two measurements, measured within 8 hours with multiple "approaches“ to the target object. The repeat accuracy generally lies between 2 and 5% of the effective operating distance s_r.

Switching frequency

... is a succession of periodically repeated activation and deactivation of the sensors during a specified interval (one second). Measuring method in conformity with IEC 60947-5-2.

Ambient temperature range T_a

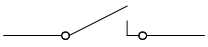
... specifies the temperature range at which the sensor may be operated. Balluff manufactures both sensors for the standard temperature range –30...+70° C and sensors for more elevated temperature requirements up to +250°C.

Temperature drift

... states the amount by which the sensing distance may change in dependence on the ambient temperature. This lies between 15 and 20% of the effective operating distance s_r within the stated operating temperature range.

Switching function

N.O. (normally open): the sensor closes a circuit to the load when a target is detected or the sensor is operated. Contacts are open when the sensor is not operated and when there is no external force on the actuator.



N.C. (normally closed): The sensor opens a circuit to the load when a target is detected or the sensor is operated. Contacts are closed when the sensor is not operated and when there is no external force on the actuator.

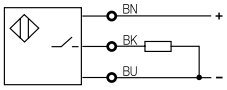
DC 3-/4-wire

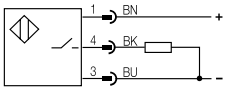
PNP (+) sourcing

Cable/terminals

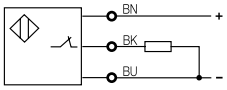
Connector

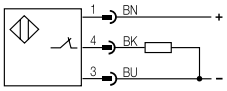
Normally open





Normally closed



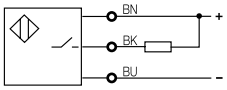


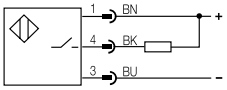
NPN (–) sinking

Cable/terminals

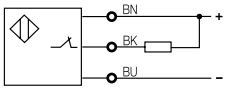
Connector

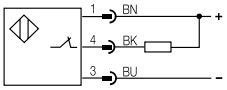
Normally open





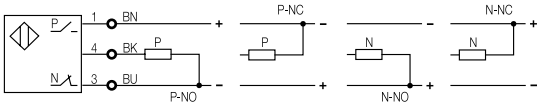
Normally closed





PNP/NPN selectable

NO/NC user selectable (XDC - output)

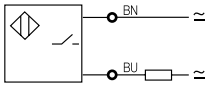


AC/DC 2-wire

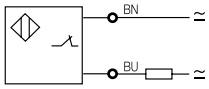
Protection isolated (Protection Class II)

Cable/terminals

Normally open



Normally closed



Wire colors, marking per DIN IEC 60757

BN	brown
BK	black
BU	blue
WH	white

Fundamentals and Definitions

Electrical definitions

Supply voltage U_S

... is the nominal voltage, or voltage range at which the device is designed to be operated continuously.

Voltage drop U_d

... is the voltage measured across the active output of the proximity switch when carrying the operational current flows under specified conditions.

Ripple

... is the maximum permissible AC voltage which may be superimposed on the DC supply voltage U_S without affecting the function of the sensor.

Output current or operating current I_e

... is the maximum current with which the sensor may be loaded at its output in continuous operation.

Standby current

... is the maximum current consumption of the sensor at maximum supply voltage U_S with no switched load.

Short-circuit protection and overload protection

In the event of overload or short-circuit at the output, the output transistor is automatically switched off. as soon as the malfunction has been corrected, the output stage is reset to normal function.

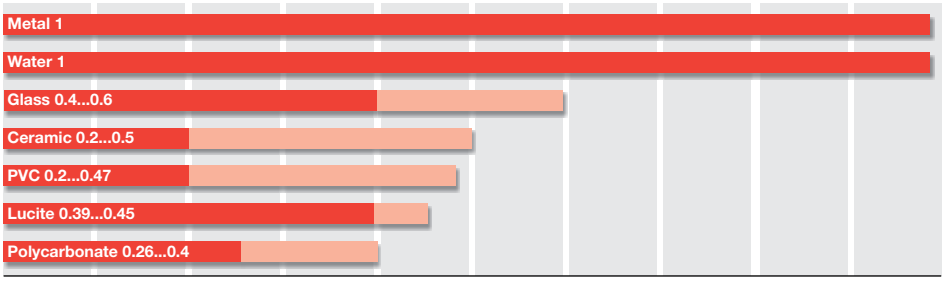
Reverse polarity protection

The sensor electronics are protected against possible polarity reversal or interchanging of the connection wires.

Operating conditions and correction factors

If an electrically non-conducting target enters the active sensor field, the capacitance changes proportionally to ε_r and to the immersion depth or to the distance to the sensing face.
The rated maximum switching distance s_n is measured with a grounded metal target made of Fe 360. All materials other than this grounded metal plate will result in a reduced maximum sensing range by the stated approximated reduction factors below.

Correction factors for typical materials

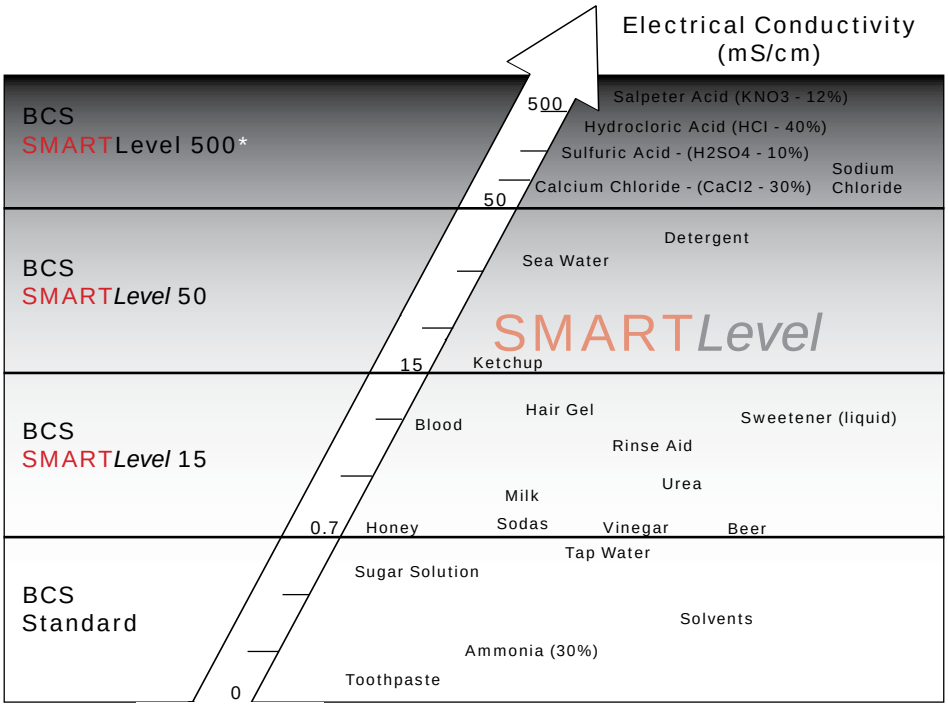


Correction factors for typical materials

NOTE: Reduction factor values are just approximations and should be specifically determined for each application.

Applications for SMART*LEVEL* sensors with conductivity values

The following chart gives an approximated overview of electrical conductivity values for specific liquids. SMARTLEVEL Sensors rely on the conductivity for detection and compensation. Matching the right SMARTLEVEL sensor becomes especially crucial for challenging applications. The media and conductivity values given here are only guide values and are for general orientation only. Changing material composition and concentrations can affect the conductivity values substantially.



*Contact factory for availability

Fundamentals and Definitions
Mechanical definitions

Mounting torques

To ensure that the sensors are not mechanically destroyed during installation, make sure that you comply with the following torque figures.

Housing size	Material	Tightening torque
M5×0.5	V2A	3 Nm
M8 × 1	V2A	15 Nm
M12×1	V2A	40 Nm
M18×1	V2A	60 Nm
M30×1.5	V2A	90 Nm

Housing materials

Sensors can be supplied for almost all environmental conditions by choosing and combining the appropriate housing material.

Material	Use and characteristics
Plastics	
FEP Tetrafluorethylene-Perfluorpropylene	High temperature resistance up to 180 °C, insulation material for cable
PA Polyamide	High impact resistance, good chemical resistance
PBT/PET Polybutylenterephtalate/ Polyethylenterephtalate	High mechanical strength and temperature resistance. Some types flame-retardant. Good chemical resistance. Good oil resistance.
PC Polycarbonate	Clear, hard, elastic and impact resistant. Good temperature resistance. Limited chemical resistance
POM Polyoxymethylene	High impact resistance, good mechanical strength. Good chemical resistance
PP Polypropylene	Very good electrical properties. Impact resistant, tough, mechanically resilient. Very low water uptake. Good to very good chemical resistance
PSU Polysulfone	High temperature resistance, high impact resistance, good chemical resistance, FDA approved (food grade)
PTFE Polytetraflourethylene	Best temperature and chemical resistance, FDA approved (food grade)
PUR Polyurethane	Elastic, abrasion-resistant, impact-resistant. Good resistance to oils, greases, solvents (used for gaskets and cable jackets)
PVC Polyvinylchloride	Good mechanical strength and chemical resistance (cable)
Metal	
V2A Stainless steel	Excellent corrosion resistance and strength. Quality , 1.4301: Standard material for foods industry.

Insulation class

II [EN 60947-5-2/IEC 60947-5-2

Protection

The degrees of protection IP 20, IP 40, IP 54, IP 64 up to IP 68 are in accordance with IEC 60529.
Code letters IP (International Protection) designate protection against shock hazard, ingress of solid foreign bodies, and water, for electrical equipment.

IP 69K
Protection against ingress of water at high pressure and steam cleaning per DIN 40050 Part 9.

First digit:
2 Protection against penetration of solid bodies larger than 12 mm, shielding from fingers and objects
4 Protection against penetration of solid bodies larger than 1 mm, shielding from tools and wires
5 Protection against harmful dust deposits, complete shock-hazard protection
6 Protection against penetration of dust, complete shock-hazard protection

Second digit:
0 No special protection
4 Protection against water spraying from all directions against the piece of equipment concerned
5 Protection against a water jet from a nozzle, directed from all directions against the piece of equipment concerned
7 Protection against water, when the piece of equipment concerned (housing) is immersed in water under specified pressure and time conditions
8 Protection against water during continuous submersion

Quality Management System in accordance with DIN EN ISO 9001:2008

Balluff Companies	
Balluff GmbH	Germany
Balluff SIE Sensorik GmbH	Germany
Balluff Elektronika Kft	Hungary
Balluff Ltd.	Great Britain
Balluff Automation s.r.l.	Italy
Balluff Inc.	USA
Balluff GmbH	Austria
Balluff CZ, s.r.o	Czech Republic
Balluff Hy-Tech AG	Switzerland
Balluff Sensortechnik AG	Switzerland
Balluff Controles Elétricos Ltda.	Brazil
Balluff de México S.A. de C.V.	Mexico

Environmental Management System per DIN EN ISO 14001:2005

Balluff Companies	
Balluff GmbH	Germany
Balluff Elektronika Kft	Hungary

Testing Laboratory

The Balluff testing laboratory works in accordance with ISO/IEC 17025 and is accredited by the DATech for Testing of Electromagnetic Compatibility (EMC).

Balluff products meet the EU Directives

Products requiring marking are subjected to a conformity evaluation process according to the EU Directive and the product is marked with the CE Marking. Balluff products fall under the following EU Directives:

2004/108/EC	EMC Directive
2006/95/EC	Low-Voltage Directive applies to AC and AC/DC sensors

Approvals

... are granted by national and international institutions.
Their symbols affirm that our products meet the specifications of these institutions.
"US Safety System" and "Canadian Standards Association" under the auspices of Underwriters Laboratories Inc. (cUL).

Balluff is a member of ALPHA

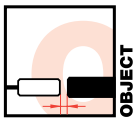
ALPHA, an association for testing and certification of low-voltage devices, promotes the individual responsibility of the manufacturer of such devices by means of uniform test procedures according to current standards and thereby supports the attainment of such high product quality. ALPHA also grants nationally recognized product certificates when certain conditions are met. Through ALPHA's membership in LOVAG (Low Voltage Agreement Group), its certificates are also recognized in other European countries.

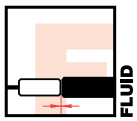
Fundamentals and Definitions
Setup guidelines

Flush (shielded) sensors

Flush mountable sensors are normally being used for presence detection of objects or for indirect point level detection of solids, powders or liquids. The following two setup routines help to assure proper setup and operations.

All BCS sensors allow sensitivity adjustment potentiometer.





Presence Detection of Solid Objects

The following procedures are outlined for setting a normally open capacitive sensor for ideal sensing conditions:

1. Mount the sensor in the actual sensing position
2. Set up the target for the worst case condition. This means for a presence detection application to move the object to the farthest occurring position from the sensor.
3. All BCS capacitive sensors are already factory preset to their maximum operational sensing range. The sensor has to move closer to the target object, if the farthest object position does not assure a reliable switching. Alternatively, a larger sensor with a larger sensing range can to be chosen.
4. The sensitivity can now be reduced by turning the potentiometer CCW until the sensor switches off. Increase now the sensitivity CW by 1/2 turn to set the sensor to its optimal sensitivity setting.

Example:

In the following example, a shielded capacitive sensor in a M12 tubular housing will be used to detect a ceramic plate.

The sensor is factory preset to a maximum rated switching distance sn of 4 mm to metal or by approximation to your hand. When moving the sensor towards the target object, the rated switching distance sn to the ceramic plate has been reduced to approx. 2mm. This distance is now the maximum permissible switching distance for the ceramic plate.

Note:

To ensure that Balluff's BCS capacitive sensors work reliably within their technical specifications, they have a greater sensing distance than the indicated maximum rated switching distance sn in the datasheet. If the user decides to adjusts the sensor to a switching distance greater than 2mm for the above described ceramic plate, the sensor will operate in an unreliable mode. This entails a risk that temperature and other environmental factors or electrical interferences may lead to unreliable switching conditions.

Point-Level Detection through Container Walls

Empty Setup (normally open)

1. Mount the sensor in the actual level sensing position flush to the non-metallic container wall.
2. All BCS capacitive sensors are already factory preset to their maximum operational sensing range. The sensor will initially trigger on the container wall material.
3. The sensitivity has to be reduced to by turning the potentiometer CCW until the sensor switches off. Increase now the sensitivity CW by 1/2 turn to set the sensor to its optimal sensitivity setting.
4. The sensor should switch on at 40% to 50% sensing area coverage - readjust the sensitivity CCW if the coverage is above 50% and CW if it is below 40%.

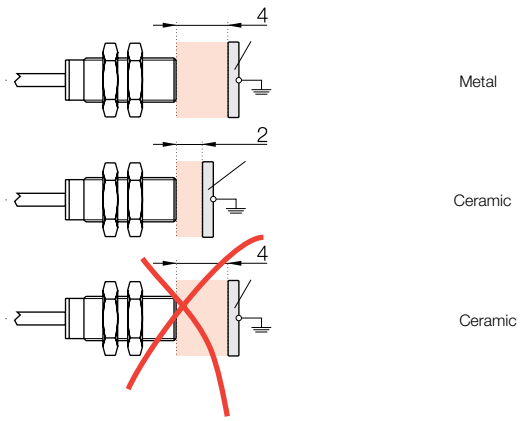
Full Setup (normally open)

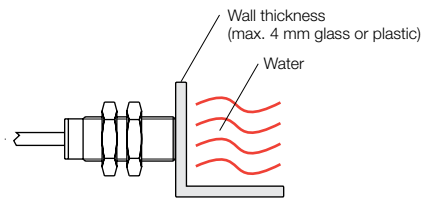
1. Mount th sensor in the actual level sensing position flush to the non-metallic container wall.
2. All BCS capacitive sensors are already factory preset to their maximum operational sensing range. The sensor will initially switch on to the container wall.
3. The sensitivity has to be reduced by turning the potentiometer CCW until the sensor switches off. Increase now the sensitivity CW by 1/2 turn to set the sensor to its optimal sensitivity setting.
4. The sensor should switch on at 40% - 50% sensing area coverage - readjust the sensitivity CCW if the coverage is above 50% and CW if it is below 40%.

Note:

The partition wall may only be made of glass or plastic. A rule of thumb for the maximum thickness of the wall yields a value of approx. 10 to 20% of the sensor's rated switching distance, but max. 4 mm. SMARTLevel sensors can sense through up to 12mm of wall, but are limited to water-based or conductive liquids.

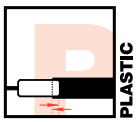
For very small amounts of liquids and small tank radiuses which do not allow a tight form-fitting mounting, the sensors should be adjusted for approx. 30% sensing area.





Non-Flush (unshielded) sensors

These capacitive sensor use a larger spherical electrical field which is especially suited for level detection of liquids, granulates or powders.

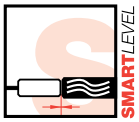


Direct Point-Level detection

Full Setup (normally open)

1. Mount the sensor in the actual level sensing position with regards to the minimum clearance guide line in our mounting reference.
2. All BCS capacitive sensors are already factory preset to their maximum operational sensing range. The sensor will initially switch on contact with the target material.
3. The sensitivity has to be reduced by turning the potentiometer CCW until the sensor switches off. Now increase the sensitivity CW by 1/2 turn to set the sensor to its optimal sensitivity setting.

This setup procedure assures that the influence of temperature and material build-up has been reduced to a minimum. In some instances, the target material creates extensive material build-up or has a very high relative dielectric constant (conductivity) leading to uncontrollable repetitive false triggering. SMARTLevel sensors will assure in these applications reliable operations and automatic compensation for such kind of disturbance factors.



Direct or Indirect Level Detection of Water-based or Conductive Liquids

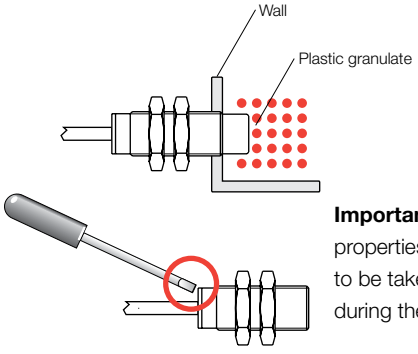
SmartLevel sensors use a new patented capacitive sensing technology to detect water-based or other conductive liquids direct or indirect through non-metallic container walls. SMARTLevel sensors do not require any preliminary sensitivity adjustment for container walls up to 6mm but are able to penetrate up to 12mm with additional adjustment described in the following for empty and full containers.

Empty setup (normally open)

1. Mount the sensor in the actual level sensing position flush to the non-metallic container wall.
2. The sensor will stay off independent of the container wall. Turn the sensitivity adjustment slowly CW until the sensor turns on.
3. The sensitivity now has to be reduced by slowly turning the potentiometer 3-turns CCW.
4. The sensor should switch on at 40% to 50% sensing area coverage - readjust the sensitivity CCW if the coverage is above 50% and CW if it is below 40%.

Full Setup (normally open)

1. Mount the sensor in the actual level sensing position flush to the non-metallic container wall.
2. The sensor switches on if the thickness of the container wall is below 6mm, and stay off if it is thicker.
3. Adjust the sensor now CCW until it barely switches off or CW until it barely switches on.
4. Increase the sensitivity CW by another 1/2 turn to set the sensor to its optimal sensitivity setting.
5. The sensor should switch on at 40% to 50% sensing area coverage - readjust the sensitivity CCW if the coverage is above 50% and CW if it is below 40%.



Important: Different material properties and conditions have to be taken into consideration during the calibration process.

All Balluff BCS capacitive sensors are therefore equipped with highly accurate trim potentiometers to adjust the device's sensitivity. Turning the potentiometer clockwise (CW) increases the sensitivity, whereas counter-clockwise (CCW) turning reduces it.

Balluff North America

Florence, Kentucky USA
Enjoying one of the highest growth rates in the automation industry, Balluff's Florence, Kentucky United States headquarters is located just south of Cincinnati, Ohio. Our customers are in industries such as automotive, machine tool, robotics, injection molding, packaging, material handling, and more.

In addition to sales, marketing, and logistic functions, this facility manufactures regionally focused inductive proximity sensors and Micropulse® magnetostrictive linear position sensors.

The Balluff Global Network

Balluff spans the globe with representation in 49 countries.

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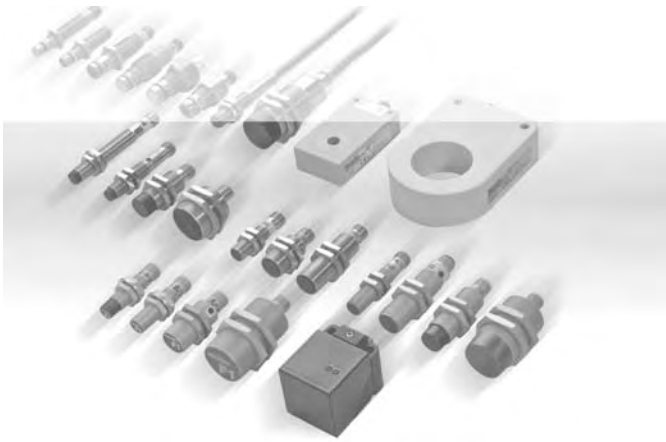
Croatia
Czech Republic



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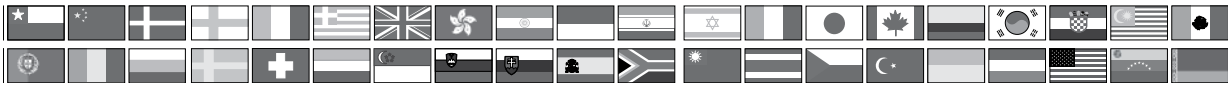
For a complete global listing visit www.balluff.com/global



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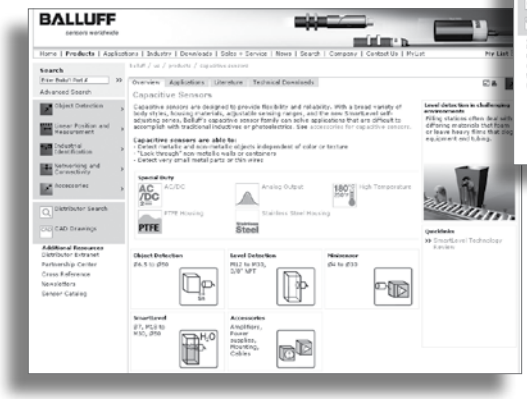
E-Mail: balluff.mexico@balluff.com

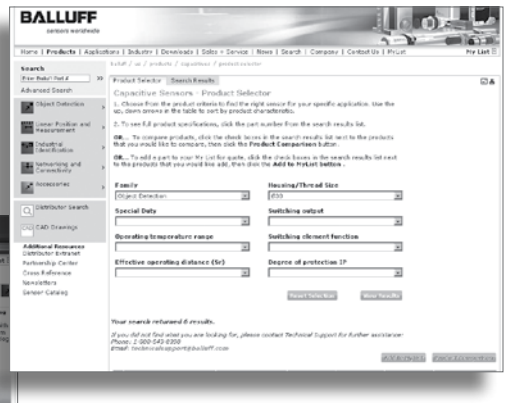
For more information on Capacitive sensors, visit www.balluff.com/capacitive

Resources available:

- Datasheets
- Drawings
- Literature
- Applications
- Videos



Visit the capacitive overview page to learn more about Balluff's general and special duty capacitive sensors. You can also access other resources such as applications, literature, technical downloads, and more.



The capacitive product selector helps to narrow your search by choosing housing size, operating distance, and even the operating temperature range.

Visit the SMARTLevel page to watch a demonstration video and download articles, press releases and more about the SMART-Level line at **www.balluff.com/smartlevel**.

Visit the Capacitive Applications area to find various object detection and level sensing applications.

Capacitive Sensors
New ordering codes and part numbers

The following pages give a cross reference to old SK-, SK1-, SV- and SVG- part number to our new short order and part description. The part number changeover affects only the short order codes and part numbers, all sensor specification remain unchanged.

Old part number	Old article number	New part number	New ordering code	Page number
BCS 010-POB-1-L-PU-02	155034	BCS G10T4H-POM40C-EP02	BCS002U	18
BCS 010-PSB-1-L-PU-02	554550	BCS G10T4H-PSM40C-EP02	BCS002T	18
BCS 012-PS-1-L-S4	149696	BCS M12T4D2-PSM80G-S04G	BCS0062	32
BCS 012-PSB-1-L-S4	149695	BCS M12T4D2-PSM40C-S04G	BCS0037	18
BCS 20MG10-XPA1Y-8B-03	523190	unchanged	BCS0001	29
BCS G34KN2-NOC20G-AV02	153036	unchanged	BCS0002	36
BCS G34KN2-NSC24G-AV02	125722	unchanged	BCS0003	36
BCS G34KN2-POC20G-AV02	153035	unchanged	BCS0004	36
BCS G34KN2-PSC24G-AV02	125723	unchanged	BCS0005	36
BCS G34KN2-UOT20G-AV02	153140	unchanged	BCS0006	53
BCS G34KN2-UST20G-AV02	153141	unchanged	BCS0007	53
BCS M08EG1-PSC15C-S49G	155032	BCS M08T4E2-PSM15C-S49G	BCS002A	16
BCS M08EG-PSC30G-S49G	155033	BCS M08T4E2-PSM30G-S49G	BCS002M	16
BCS M12ED-XXS40B-BP02-GZ01	124538	BCS M12T4D-XXS40C-EP02-GZ01-002	BCS0018	18
BCS M12EG2-XXS10B-BT01-GZ01-501	125801	unchanged	BCS00CR	32
BCS M18EM-POC15G-S04G	155037	BCS M18T4G2-POC15G-S04G	BCS006C	34
BCS M18EM1-POC80C-S04G	155035	BCS M18B4G2-POC80C-S04G	BCS0049	18
BCS M18EM1-PSC80C-S04G	149694	BCS M18B4G2-PSC80C-S04G	BCS0047	18
BCS M18EM-PSC15G-S04G	155036	BCS M18T4G2-PSC15G-S04G	BCS006A	34
BCS M18KM3-NOC80G-BV02	153031	unchanged	BCS0008	34
BCS M18KM3-NSC80G-BV02	145178	unchanged	BCS0009	34
BCS M18KM3-POC80G-BV02	153032	unchanged	BCS000A	34
BCS M18KM3-POC80G-S04G-001	145184	unchanged	BCS000C	34
BCS M18KM3-PSC80G-BV02	145175	unchanged	BCS000E	34
BCS M18KM3-PSC80G-S04G	145181	unchanged	BCS000H	34
BCS M18KM3-UOT80G-BV02	153134	unchanged	BCS000J	53
BCS M18KM3-UST80G-BV02	153148	unchanged	BCS000K	53
BCS M30EG2-PSC30G-S04K	152269	unchanged	BCS00HF	N/A
BCS M30EM2-PSC20C-S04K	152270	unchanged	BCS00HH	N/A
BCS M30KM7-PPH15G-S04U	139472	unchanged	BCS000L	36
BCS M30KN2-NOC15G-AV02	153034	unchanged	BCS000M	36
BCS M30KN2-NSC18G-AV02	125724	unchanged	BCS000N	36
BCS M30KN2-POC15G-AV02	153033	unchanged	BCS000P	36
BCS M30KN2-PSC18G-AV02	125728	unchanged	BCS000R	36
BCS M30KN2-UOT15G-AV02	153143	unchanged	BCS000U	53
BCS M30KN2-UST15G-AV02	153147	unchanged	BCS000W	53
BCS R08KE-POC80C-EP00,2-GS49	155621	BCS R08RR01-POM80C-EP00,2-GS49	BCS0056	26
BCS R08KE-POCFAC-EP00,2-GS49	155619	BCS R08RR01-POMFAC-EP00,2-GS49	BCS008N	48
BCS R08KE-PSC80C-EP00,2-GS49	155620	BCS R08RR01-PSM80C-EP00,2-GS49	BCS0055	26
BCS R08KE-PSCFAC-EP00,2-GS49	155618	BCS R08RR01-PSMFAC-EP00,2-GS49	BCS008M	48

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Old part number	Old article number	New part number	New ordering code	Page number
BES 516-620-PS-02	124539	BAE SA-CS-001-PS	BAE009E	57
MA-M18/M30/10-VA	90092	BAM AD-XA-001-M18/M30-4	BAM018E	86
MA-M18/M32/10-VA	90093	BAM AD-XA-001-M18/M32x1,5-4	BAM018F	86
MA-M18/R1/10-VA	90109	BAM AD-XA-001-M18/R1”-4	BAM018H	86
MSA-MLM12/G1/2-VA	13016	BAM AD-XA-002-M12/G1/2”-4	BAM018K	86
MSA-MLM12/M18X1-VA	13014	BAM AD-XA-002-M12/M18-4	BAM018J	86
SK-1-M5-B-VA/PTFE	3002	BCS M05T4C-XXS10C-EP02-GZ01-002	BCS0011	14
SK-1-4-B-VA/PTFE	3001	BCS G04T4D-XXS10C-EP02-GZ01-002	BCS0010	14
SK-1.5-6.5-B-VA/PTFE	3003	BCS G06T4B-XXS15C-EP02-GZ01-002	BCS0012	14
SK-1.5-M8-B-VA/PTFE	3005	BCS M08T4C-XXS15C-EP02-GZ01-002	BCS0014	16
SK-3-18/2.5-B-VA/PTFE	3011	BCS D18T403-XXS30C-EP02-GZ01-002	BCS001A	22
SK-3-6.5-NB-VA/PTFE	3004	BCS G06T4B-XXS30G-EP02-GZ01-002	BCS0013	14
BCS 010-POB-1-L-PU-02	155034	BCS G10T4H-POM40C-EP02	BCS002U	18
BCS 010-PSB-1-L-PU-02	554550	BCS G10T4H-PSM40C-EP02	BCS002T	18
BCS 012-PS-1-L-S4	149696	BCS M12T4D2-PSM80G-S04G	BCS0062	32
BCS 012-PSB-1-L-S4	149695	BCS M12T4D2-PSM40C-S04G	BCS0037	18
BCS 20MG10-XPA1Y-8B-03	523190	unchanged	BCS0001	29
BCS G34KN2-NOC20G-AV02	153036	unchanged	BCS0002	36
BCS G34KN2-NSC24G-AV02	125722	unchanged	BCS0003	36
BCS G34KN2-POC20G-AV02	153035	unchanged	BCS0004	36
BCS G34KN2-PSC24G-AV02	125723	unchanged	BCS0005	36
BCS G34KN2-UOT20G-AV02	153140	unchanged	BCS0006	53
BCS G34KN2-UST20G-AV02	153141	unchanged	BCS0007	53
BCS M08EG1-PSC15C-S49G	155032	BCS M08T4E2-PSM15C-S49G	BCS002A	16
BCS M08EG-PSC30G-S49G	155033	BCS M08T4E2-PSM30G-S49G	BCS002M	16
BCS M12ED-XXS40B-BP02-GZ01	124538	BCS M12T4D-XXS40C-EP02-GZ01-002	BCS0018	18
BCS M12EG2-XXS10B-BT01-GZ01-501	125801	unchanged	BCS00CR	32
BCS M18EM-POC15G-S04G	155037	BCS M18T4G2-POC15G-S04G	BCS006C	34
BCS M18EM1-POC80C-S04G	155035	BCS M18B4G2-POC80C-S04G	BCS0049	18
BCS M18EM1-PSC80C-S04G	149694	BCS M18B4G2-PSC80C-S04G	BCS0047	18
BCS M18EM-PSC15G-S04G	155036	BCS M18T4G2-PSC15G-S04G	BCS006A	34
BCS M18KM3-NOC80G-BV02	153031	unchanged	BCS0008	34
BCS M18KM3-NSC80G-BV02	145178	unchanged	BCS0009	34
BCS M18KM3-POC80G-BV02	153032	unchanged	BCS000A	34
BCS M18KM3-POC80G-S04G-001	145184	unchanged	BCS000C	34
BCS M18KM3-PSC80G-BV02	145175	unchanged	BCS000E	34
BCS M18KM3-PSC80G-S04G	145181	unchanged	BCS000H	34
BCS M18KM3-UOT80G-BV02	153134	unchanged	BCS000J	53
BCS M18KM3-UST80G-BV02	153148	unchanged	BCS000K	53
BCS M30EG2-PSC30G-S04K	152269	unchanged	BCS00HF	N/A
BCS M30EM2-PSC20C-S04K	152270	unchanged	BCS00HH	N/A
BCS M30KM7-PPH15G-S04U	139472	unchanged	BCS000L	36
BCS M30KN2-NOC15G-AV02	153034	unchanged	BCS000M	36
BCS M30KN2-NSC18G-AV02	125724	unchanged	BCS000N	36

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Old part number	Old article number	New part number	New ordering code	Page number
BCS M30KN2-POC15G-AV02	153033	unchanged	BCS000P	36
BCS M30KN2-PSC18G-AV02	125728	unchanged	BCS000R	36
BCS M30KN2-UOT15G-AV02	153143	unchanged	BCS000U	53
BCS M30KN2-UST15G-AV02	153147	unchanged	BCS000W	53
BCS R08KE-POC80C-EP00,2-GS49	155621	BCS R08RR01-POM80C-EP00,2-GS49	BCS0056	26
BCS R08KE-POCFAC-EP00,2-GS49	155619	BCS R08RR01-POMFAC-EP00,2-GS49	BCS008N	48
BCS R08KE-PSC80C-EP00,2-GS49	155620	BCS R08RR01-PSM80C-EP00,2-GS49	BCS0055	26
BCS R08KE-PSCFAC-EP00,2-GS49	155618	BCS R08RR01-PSMFAC-EP00,2-GS49	BCS008M	48
BES 516-620-PS-02	124539	BAE SA-CS-001-PS	BAE009E	57
MA-M18/M30/10-VA	90092	BAM AD-XA-001-M18/M30-4	BAM018E	86
MA-M18/M32/10-VA	90093	BAM AD-XA-001-M18/M32x1,5-4	BAM018F	86
MA-M18/R1/10-VA	90109	BAM AD-XA-001-M18/R1”-4	BAM018H	86
MSA-MLM12/G1/2-VA	13016	BAM AD-XA-002-M12/G1/2”-4	BAM018K	86
MSA-MLM12/M18X1-VA	13014	BAM AD-XA-002-M12/M18-4	BAM018J	86
SK-1-M5-B-VA/PTFE	3002	BCS M05T4C-XXS10C-EP02-GZ01-002	BCS0011	14
SK-1-4-B-VA/PTFE	3001	BCS G04T4D-XXS10C-EP02-GZ01-002	BCS0010	14
SK-1.5-6.5-B-VA/PTFE	3003	BCS G06T4B-XXS15C-EP02-GZ01-002	BCS0012	14
SK-1.5-M8-B-VA/PTFE	3005	BCS M08T4C-XXS15C-EP02-GZ01-002	BCS0014	16
SK-3-18/2.5-B-VA/PTFE	3011	BCS D18T403-XXS30C-EP02-GZ01-002	BCS001A	22
SK-3-6.5-NB-VA/PTFE	3004	BCS G06T4B-XXS30G-EP02-GZ01-002	BCS0013	14
SK-3-M8-NB-VA/PTFE	3006	BCS M08T4C1-XXS30G-EP02-GZ01-002	BCS0015	16
SK-4-10-B-VA/PTFE	3007	BCS G10T4B-XXS40C-EP02-GZ01-002	BCS0016	16
SK-4-M12-B-VA/PTFE	3009	BCS M12T4D-XXS40C-EP02-GZ01-002	BCS0018	18
SK-5-18/10-B-VA/PTFE	3013	BCS D18T407-XXS50C-EP02-GZ01-002	BCS001E	22
SK-5-18/4-B-VA/PTFE	3012	BCS D18T404-XXS50C-EP02-GZ01-002	BCS001C	22
SK-8-10-NB-VA/PTFE	3008	BCS G10T4C-XXS80G-EP02-GZ01-002	BCS0017	16
SK-8-M12-NB-VA/PTFE	3010	BCS M12T4D1-XXS80G-EP02-GZ01-002	BCS0019	18
SK-10-22/10-B-VA/PTFE	3015	BCS D22T408-XXS10C-EP02-GZ01-002	BCS001H	22
SK-10-22/4-B-VA/PTFE	3014	BCS D22T405-XXS10C-EP02-GZ01-002	BCS001F	22
SK-15-30/10-B-VA/PTFE	3017	BCS D30T409-XXS15C-EP02-GZ01-002	BCS001K	24
SK-15-30/4-B-VA/PTFE	3016	BCS D30T406-XXS15C-EP02-GZ01-002	BCS001J	24
SK-HT180-FS-J3/8NPTF-VA/PTFE	9010	BCS S10T403-XXSFNC-SZ02-T07	BCS00A5	51
SK-HT180-FS-M18-VA/PTFE	9008	BCS S10T401-XXSFNC-SZ02-T07	BCS00A3	51
SK-HT180-FS-R3/8-VA/PTFE	9009	BCS S10T402-XXSFNC-SZ02-T07	BCS00A4	51
SK-HT250-10-M18-NB-VA/PTFE	9001	BCS M18T4H1-XXS10H-SZ02-T08	BCS00A1	51
SK-HT250-20-M30-NB-VA/PTFE	9002	BCS M30T4G1-XXS20H-SZ02-T08	BCS00A2	51
SK1-1.5-6.5-NBO-VA/PTFE	6004	BCS G06T4E1-NOM15C-EP02	BCS001P	14
SK1-1.5-6.5-NBO-VA/PTFE-Y1	6008	BCS G06T4D2-NOM15C-S49G	BCS001W	14
SK1-1.5-6.5-NBS-VA/PTFE	6003	BCS G06T4E1-NSM15C-EP02	BCS001N	14
SK1-1.5-6.5-NBS-VA/PTFE-Y1	6007	BCS G06T4D2-NSM15C-S49G	BCS001U	14
SK1-1.5-6.5-PBO-VA/PTFE	6002	BCS G06T4E1-POM15C-EP02	BCS001M	14
SK1-1.5-6.5-PBO-VA/PTFE-Y1	6006	BCS G06T4D2-POM15C-S49G	BCS001T	14
SK1-1.5-6.5-PBS-VA/PTFE	6001	BCS G06T4E1-PSM15C-EP02	BCS001L	14
SK1-1.5-6.5-PBS-VA/PTFE-Y1	6005	BCS G06T4D2-PSM15C-S49G	BCS001R	14

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Old part number	Old article number	New part number	New ordering code	Page number
SK1-1.5-M8-NBO-VA/PTFE	6020	BCS M08T4E1-NOM15C-EP02	BCS0029	16
SK1-1.5-M8-NBO-VA/PTFE-Y1	6024	BCS M08T4E2-NOM15C-S49G	BCS002F	16
SK1-1.5-M8-NBS-VA/PTFE	6019	BCS M08T4E1-NSM15C-EP02	BCS0028	16
SK1-1.5-M8-NBS-VA/PTFE-Y1	6023	BCS M08T4E2-NSM15C-S49G	BCS002E	16
SK1-1.5-M8-PBO-VA/PTFE	6018	BCS M08T4E1-POM15C-EP02	BCS0027	16
SK1-1.5-M8-PBO-VA/PTFE-Y1	6022	BCS M08T4E2-POM15C-S49G	BCS002C	16
SK1-1.5-M8-PBS-VA/PTFE	6017	BCS M08T4E1-PSM15C-EP02	BCS0026	16
SK1-1.5-M8-PBS-VA/PTFE-Y1	6021	BCS M08T4E2-PSM15C-S49G	BCS002A	16
SK1-3-6.5-NNBO-VA/PTFE	6012	BCS G06T4E1-NOM30G-EP02	BCS0021	14
SK1-3-6.5-NNBO-VA/PTFE-Y1	6016	BCS G06T4D2-NOM30G-S49G	BCS0025	14
SK1-3-6.5-NNBS-VA/PTFE	6011	BCS G06T4E1-NSM30G-EP02	BCS0020	14
SK1-3-6.5-NNBS-VA/PTFE-Y1	6015	BCS G06T4D2-NSM30G-S49G	BCS0024	14
SK1-3-6.5-PNBO-VA/PTFE	6010	BCS G06T4E1-POM30G-EP02	BCS001Z	14
SK1-3-6.5-PNBO-VA/PTFE-Y1	6014	BCS G06T4D2-POM30G-S49G	BCS0023	14
SK1-3-6.5-PNBS-VA/PTFE	6009	BCS G06T4E1-PSM30G-EP02	BCS001Y	14
SK1-3-6.5-PNBS-VA/PTFE-Y1	6013	BCS G06T4D2-PSM30G-S49G	BCS0022	14
SK1-3-M8-NNBO-VA/PTFE	6028	BCS M08T4E1-NOM30G-EP02	BCS002L	16
SK1-3-M8-NNBO-VA/PTFE-Y1	6032	BCS M08T4E2-NOM30G-S49G	BCS002R	16
SK1-3-M8-NNBS-VA/PTFE	6027	BCS M08T4E1-NSM30G-EP02	BCS002K	16
SK1-3-M8-NNBS-VA/PTFE-Y1	6031	BCS M08T4E2-NSM30G-S49G	BCS002P	16
SK1-3-M8-PNBO-VA/PTFE	6026	BCS M08T4E1-POM30G-EP02	BCS002J	16
SK1-3-M8-PNBO-VA/PTFE-Y1	6030	BCS M08T4E2-POM30G-S49G	BCS002N	16
SK1-3-M8-PNBS-VA/PTFE	6025	BCS M08T4E1-PSM30G-EP02	BCS002H	16
SK1-3-M8-PNBS-VA/PTFE-Y1	6029	BCS M08T4E2-PSM30G-S49G	BCS002M	16
SK1-4-10-NBO-VA/PTFE	6036	BCS G10T4H-NOM40C-EP02	BCS002Y	18
SK1-4-10-NBS-VA/PTFE	6035	BCS G10T4H-NSM40C-EP02	BCS002W	18
SK1-4-10-PBO-VA/PTFE	6034	BCS G10T4H-POM40C-EP02	BCS002U	18
SK1-4-10-PBS-VA/PTFE	6033	BCS G10T4H-PSM40C-EP02	BCS002T	18
SK1-4-M12-NBO-PVC	6094	BCS M12VVG1-NOM40C-EP02	BCS003R	18
SK1-4-M12-NBO-PVC-Y2	6098	BCS M12VVD2-NOM40C-S04G	BCS003Y	18
SK1-4-M12-NBO-VA/PTFE	6040	BCS M12T4G1-NOM40C-EP02	BCS0032	18
SK1-4-M12-NBO-VA/PTFE-Y2	6068	BCS M12T4D2-NOM40C-S04G	BCS00AC	18
SK1-4-M12-NBS-PVC	6093	BCS M12VVG1-NSM40C-EP02	BCS003P	18
SK1-4-M12-NBS-PVC-Y2	6097	BCS M12VVD2-NSM40C-S04G	BCS003W	18
SK1-4-M12-NBS-VA/PTFE	6039	BCS M12T4G1-NSM40C-EP02	BCS0031	18
SK1-4-M12-NBS-VA/PTFE-Y2	6067	BCS M12T4D2-NSM40C-S04G	BCS0039	18
SK1-4-M12-PBO-PVC	6092	BCS M12VVG1-POM40C-EP02	BCS003N	18
SK1-4-M12-PBO-PVC-Y2	6096	BCS M12VVD2-POM40C-S04G	BCS003U	18
SK1-4-M12-PBO-VA/PTFE	6038	BCS M12T4G1-POM40C-EP02	BCS0030	18
SK1-4-M12-PBO-VA/PTFE-Y2	6066	BCS M12T4D2-POM40C-S04G	BCS0038	18
SK1-4-M12-PBS-PVC	6091	BCS M12VVG1-PSM40C-EP02	BCS003M	18
SK1-4-M12-PBS-PVC-Y2	6095	BCS M12VVD2-PSM40C-S04G	BCS003T	18
SK1-4-M12-PBS-VA/PTFE	6037	BCS M12T4G1-PSM40C-EP02	BCS002Z	18
SK1-4-M12-PBS-VA/PTFE-Y2	6065	BCS M12T4D2-PSM40C-S04G	BCS0037	18

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Old part number	Old article number	New part number	New ordering code	Page number
SK1-6F-22/4-NBS-VA/PTFE	6087	BCS D22T403-NSM60C-EP02	BCS003J	24
SK1-6F-22/4-PBS-VA/PTFE	6085	BCS D22T403-PSM60C-EP02	BCS003H	24
SK1-8-34/16/8-NBO-PP	6136	BCS R08RR01-NOM80C-EP02	BCS0054	26
SK1-8-34/16/8-NBO-PP-M2/Y1	6140	BCS R08RR01-NOM80C-EP00,2-GS49	BCS0058	26
SK1-8-34/16/8-NBS-PP	6135	BCS R08RR01-NSM80C-EP02	BCS0053	26
SK1-8-34/16/8-NBS-PP-M2/Y1	6139	BCS R08RR01-NSM80C-EP00,2-GS49	BCS0057	26
SK1-8-34/16/8-PBO-PP	6134	BCS R08RR01-POM80C-EP02	BCS0052	26
SK1-8-34/16/8-PBO-PP-M2/Y1	6138	BCS R08RR01-POM80C-EP00,2-GS49	BCS0056	26
SK1-8-34/16/8-PBS-PP	6133	BCS R08RR01-PSM80C-EP02	BCS0051	26
SK1-8-34/16/8-PBS-PP-M2/Y1	6137	BCS R08RR01-PSM80C-EP00,2-GS49	BCS0055	26
SK1-8-M12-NNBO-CPTFE	7080	BCS M12TTG1-NOM80G-ET02	BCS0072	32
SK1-8-M12-NNBO-PVC	7004	BCS M12VVG1-NOM80G-EP02	BCS005E	32
SK1-8-M12-NNBO-PVC-Y2	7040	BCS M12VVD2-NOM80G-S04G	BCS0061	32
SK1-8-M12-NNBO-VA/PTFE	7008	BCS M12T4G1-NOM80G-EP02	BCS005K	32
SK1-8-M12-NNBO-VA/PTFE-Y2	7044	BCS M12T4D2-NOM80G-S04G	BCS0065	32
SK1-8-M12-NNBS-CPTFE	7079	BCS M12TTG1-NSM80G-ET02	BCS0071	32
SK1-8-M12-NNBS-PVC	7003	BCS M12VVG1-NSM80G-EP02	BCS005C	32
SK1-8-M12-NNBS-PVC-Y2	7039	BCS M12VVD2-NSM80G-S04G	BCS0060	32
SK1-8-M12-NNBS-VA/PTFE	7007	BCS M12T4G1-NSM80G-EP02	BCS005J	32
SK1-8-M12-NNBS-VA/PTFE-Y2	7043	BCS M12T4D2-NSM80G-S04G	BCS0064	32
SK1-8-M12-PNBO-CPTFE	7078	BCS M12TTG1-POM80G-ET02	BCS0070	32
SK1-8-M12-PNBO-PVC	7002	BCS M12VVG1-POM80G-EP02	BCS005A	32
SK1-8-M12-PNBO-PVC-Y2	7038	BCS M12VVD2-POM80G-S04G	BCS005Z	32
SK1-8-M12-PNBO-VA/PTFE	7006	BCS M12T4G1-POM80G-EP02	BCS005H	32
SK1-8-M12-PNBO-VA/PTFE-Y2	7042	BCS M12T4D2-POM80G-S04G	BCS0063	32
SK1-8-M12-PNBS-CPTFE	7077	BCS M12TTG1-PSM80G-ET02	BCS006Z	32
SK1-8-M12-PNBS-PVC	7001	BCS M12VVG1-PSM80G-EP02	BCS0059	32
SK1-8-M12-PNBS-PVC-Y2	7037	BCS M12VVD2-PSM80G-S04G	BCS005Y	32
SK1-8-M12-PNBS-VA/PTFE	7005	BCS M12T4G1-PSM80G-EP02	BCS005F	32
SK1-8-M12-PNBS-VA/PTFE-Y2	7041	BCS M12T4D2-PSM80G-S04G	BCS0062	32
SK1-8-M18-NBO-PVC	6102	BCS M18VVM1-NOM80C-EV02	BCS0045	20
SK1-8-M18-NBO-PVC-Y2	6106	BCS M18VVG2-NOC80C-S04G	BCS004E	20
SK1-8-M18-NBO-VA/PBT	6048	BCS M18B4M-NOC80C-EV02	BCS00AE	20
SK1-8-M18-NBO-VA/PBT-Y2	6072	BCS M18B4G2-NOC80C-S04G	BCS004F	18
SK1-8-M18-NBS-PVC	6101	BCS M18VVM1-NSM80C-EV02	BCS0043	20
SK1-8-M18-NBS-PVC-Y2	6105	BCS M18VVG2-NSC80C-S04G	BCS004A	20
SK1-8-M18-NBS-VA/PBT	6047	BCS M18B4M-NSC80C-EV02	BCS0044	20
SK1-8-M18-NBS-VA/PBT-Y2	6071	BCS M18B4G2-NSC80C-S04G	BCS004C	18
SK1-8-M18-PBO-PVC	6100	BCS M18VVM1-POM80C-EV02	BCS0041	20
SK1-8-M18-PBO-PVC-Y2	6104	BCS M18VVG2-POC80C-S04G	BCS0048	20
SK1-8-M18-PBO-VA/PBT	6046	BCS M18B4M-POC80C-EV02	BCS0042	20
SK1-8-M18-PBO-VA/PBT-Y2	6070	BCS M18B4G2-POC80C-S04G	BCS0049	18
SK1-8-M18-PBS-PVC	6099	BCS M18VVM1-PSM80C-EV02	BCS003Z	20
SK1-8-M18-PBS-PVC-Y2	6103	BCS M18VVG2-PSC80C-S04G	BCS0046	20

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SK1-8-M18-PBS-VA/PBT	6045	BCS M18B4M-PSC80C-EV02	BCS0040	20
SK1-8-M18-PBS-VA/PBT-Y2	6069	BCS M18B4G2-PSC80C-S04G	BCS0047	18
SK1-10-22-NBO-VA/PVC	6052	BCS D22V4M1-NOC10C-EV02	BCS0036	20
SK1-10-22-NBS-VA/PVC	6051	BCS D22V4M1-NSC10C-EV02	BCS0035	20
SK1-10-22-PBO-VA/PVC	6050	BCS D22V4M1-POC10C-EV02	BCS0034	20
SK1-4-M12-NBS-VA/PTFE	6039	BCS M12T4G1-NSM40C-EP02	BCS0031	18
SK1-4-M12-NBS-VA/PTFE-Y2	6067	BCS M12T4D2-NSM40C-S04G	BCS0039	18
SK1-4-M12-PBO-PVC	6092	BCS M12VVG1-POM40C-EP02	BCS003N	18
SK1-4-M12-PBO-PVC-Y2	6096	BCS M12VVD2-POM40C-S04G	BCS003U	18
SK1-4-M12-PBO-VA/PTFE	6038	BCS M12T4G1-POM40C-EP02	BCS0030	18
SK1-4-M12-PBO-VA/PTFE-Y2	6066	BCS M12T4D2-POM40C-S04G	BCS0038	18
SK1-4-M12-PBS-PVC	6091	BCS M12VVG1-PSM40C-EP02	BCS003M	18
SK1-4-M12-PBS-PVC-Y2	6095	BCS M12VVD2-PSM40C-S04G	BCS003T	18
SK1-4-M12-PBS-VA/PTFE	6037	BCS M12T4G1-PSM40C-EP02	BCS002Z	18
SK1-4-M12-PBS-VA/PTFE-Y2	6065	BCS M12T4D2-PSM40C-S04G	BCS0037	18
SK1-6F-22/4-NBS-VA/PTFE	6087	BCS D22T403-NSM60C-EP02	BCS003J	24
SK1-6F-22/4-PBS-VA/PTFE	6085	BCS D22T403-PSM60C-EP02	BCS003H	24
SK1-8-34/16/8-NBO-PP	6136	BCS R08RR01-NOM80C-EP02	BCS0054	26
SK1-8-34/16/8-NBO-PP-M2/Y1	6140	BCS R08RR01-NOM80C-EP00,2-GS49	BCS0058	26
SK1-8-34/16/8-NBS-PP	6135	BCS R08RR01-NSM80C-EP02	BCS0053	26
SK1-8-34/16/8-NBS-PP-M2/Y1	6139	BCS R08RR01-NSM80C-EP00,2-GS49	BCS0057	26
SK1-8-34/16/8-PBO-PP	6134	BCS R08RR01-POM80C-EP02	BCS0052	26
SK1-8-34/16/8-PBO-PP-M2/Y1	6138	BCS R08RR01-POM80C-EP00,2-GS49	BCS0056	26
SK1-8-34/16/8-PBS-PP	6133	BCS R08RR01-PSM80C-EP02	BCS0051	26
SK1-8-34/16/8-PBS-PP-M2/Y1	6137	BCS R08RR01-PSM80C-EP00,2-GS49	BCS0055	26
SK1-8-M12-NNBO-CPTFE	7080	BCS M12TTG1-NOM80G-ET02	BCS0072	32
SK1-8-M12-NNBO-PVC	7004	BCS M12VVG1-NOM80G-EP02	BCS005E	32
SK1-8-M12-NNBO-PVC-Y2	7040	BCS M12VVD2-NOM80G-S04G	BCS0061	32
SK1-8-M12-NNBO-VA/PTFE	7008	BCS M12T4G1-NOM80G-EP02	BCS005K	32
SK1-8-M12-NNBO-VA/PTFE-Y2	7044	BCS M12T4D2-NOM80G-S04G	BCS0065	32
SK1-8-M12-NNBS-CPTFE	7079	BCS M12TTG1-NSM80G-ET02	BCS0071	32
SK1-8-M12-NNBS-PVC	7003	BCS M12VVG1-NSM80G-EP02	BCS005C	32
SK1-8-M12-NNBS-PVC-Y2	7039	BCS M12VVD2-NSM80G-S04G	BCS0060	32
SK1-8-M12-NNBS-VA/PTFE	7007	BCS M12T4G1-NSM80G-EP02	BCS005J	32
SK1-8-M12-NNBS-VA/PTFE-Y2	7043	BCS M12T4D2-NSM80G-S04G	BCS0064	32
SK1-8-M12-PNBO-CPTFE	7078	BCS M12TTG1-POM80G-ET02	BCS0070	32
SK1-8-M12-PNBO-PVC	7002	BCS M12VVG1-POM80G-EP02	BCS005A	32
SK1-8-M12-PNBO-PVC-Y2	7038	BCS M12VVD2-POM80G-S04G	BCS005Z	32
SK1-8-M12-PNBO-VA/PTFE	7006	BCS M12T4G1-POM80G-EP02	BCS005H	32
SK1-8-M12-PNBO-VA/PTFE-Y2	7042	BCS M12T4D2-POM80G-S04G	BCS0063	32
SK1-8-M12-PNBS-CPTFE	7077	BCS M12TTG1-PSM80G-ET02	BCS006Z	32
SK1-8-M12-PNBS-PVC	7001	BCS M12VVG1-PSM80G-EP02	BCS0059	32
SK1-8-M12-PNBS-PVC-Y2	7037	BCS M12VVD2-PSM80G-S04G	BCS005Y	32
SK1-8-M12-PNBS-VA/PTFE	7005	BCS M12T4G1-PSM80G-EP02	BCS005F	32

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SK1-8-M12-PNBS-VA/PTFE-Y2	7041	BCS M12T4D2-PSM80G-S04G	BCS0062	32
SK1-8-M18-NBO-PVC	6102	BCS M18VVM1-NOM80C-EV02	BCS0045	20
SK1-8-M18-NBO-PVC-Y2	6106	BCS M18VVG2-NOC80C-S04G	BCS004E	20
SK1-8-M18-NBO-VA/PBT	6048	BCS M18B4M-NOC80C-EV02	BCS00AE	20
SK1-8-M18-NBO-VA/PBT-Y2	6072	BCS M18B4G2-NOC80C-S04G	BCS004F	18
SK1-8-M18-NBS-PVC	6101	BCS M18VVM1-NSM80C-EV02	BCS0043	20
SK1-8-M18-NBS-PVC-Y2	6105	BCS M18VVG2-NSC80C-S04G	BCS004A	20
SK1-8-M18-NBS-VA/PBT	6047	BCS M18B4M-NSC80C-EV02	BCS0044	20
SK1-8-M18-NBS-VA/PBT-Y2	6071	BCS M18B4G2-NSC80C-S04G	BCS004C	18
SK1-8-M18-PBO-PVC	6100	BCS M18VVM1-POM80C-EV02	BCS0041	20
SK1-8-M18-PBO-PVC-Y2	6104	BCS M18VVG2-POC80C-S04G	BCS0048	20
SK1-8-M18-PBO-VA/PBT	6046	BCS M18B4M-POC80C-EV02	BCS0042	20
SK1-8-M18-PBO-VA/PBT-Y2	6070	BCS M18B4G2-POC80C-S04G	BCS0049	18
SK1-8-M18-PBS-PVC	6099	BCS M18VVM1-PSM80C-EV02	BCS003Z	20
SK1-8-M18-PBS-PVC-Y2	6103	BCS M18VVG2-PSC80C-S04G	BCS0046	20
SK1-8-M18-PBS-VA/PBT	6045	BCS M18B4M-PSC80C-EV02	BCS0040	20
SK1-8-M18-PBS-VA/PBT-Y2	6069	BCS M18B4G2-PSC80C-S04G	BCS0047	18
SK1-10-22-NBO-VA/PVC	6052	BCS D22V4M1-NOC10C-EV02	BCS0036	20
SK1-10-22-NBS-VA/PVC	6051	BCS D22V4M1-NSC10C-EV02	BCS0035	20
SK1-10-22-PBO-VA/PVC	6050	BCS D22V4M1-POC10C-EV02	BCS0034	20
SK1-10-22-PBS-VA/PVC	6049	BCS D22V4M1-PSC10C-EV02	BCS0033	20
SK1-15-30/4-NBO-VA/PTFE	6084	BCS D30T401-NOC15C-EP02	BCS003F	24
SK1-15-30/4-NBS-VA/PTFE	6083	BCS D30T401-NSC15C-EP02	BCS003E	24
SK1-15-30/4-PBO-VA/PTFE	6082	BCS D30T401-POC15C-EP02	BCS003C	24
SK1-15-30/4-PBS-VA/PTFE	6081	BCS D30T401-PSC15C-EP02	BCS003A	24
SK1-15-M18-NNBO-CPTFE	7084	BCS M18TTI2-NOC15G-AT02	BCS0076	34
SK1-15-M18-NNBO-PVC	7016	BCS M18VVI1-NOC15G-DV02	BCS005P	34
SK1-15-M18-NNBO-PVC-Y2	7048	BCS M18VVG2-NOC15G-S04G	BCS0069	34
SK1-15-M18-NNBO-VA/PTFE	7020	BCS M18T4I1-NOC15G-DV02	BCS005W	34
SK1-15-M18-NNBO-VA/PTFE-Y2	7052	BCS M18T4G2-NOC15G-S04G	BCS006F	34
SK1-15-M18-NNBS-CPTFE	7083	BCS M18TTI2-NSC15G-AT02	BCS0075	34
SK1-15-M18-NNBS-PVC	7015	BCS M18VVI1-NSC15G-DV02	BCS005N	34
SK1-15-M18-NNBS-PVC-Y2	7047	BCS M18VVG2-NSC15G-S04G	BCS0068	34
SK1-15-M18-NNBS-VA/PTFE	7019	BCS M18T4I1-NSC15G-DV02	BCS005U	34
SK1-15-M18-NNBS-VA/PTFE-Y2	7051	BCS M18T4G2-NSC15G-S04G	BCS006E	34
SK1-15-M18-PNBO-CPTFE	7082	BCS M18TTI2-POC15G-AT02	BCS0074	34
SK1-15-M18-PNBO-PVC	7014	BCS M18VVI1-POC15G-DV02	BCS005M	34
SK1-15-M18-PNBO-PVC-Y2	7046	BCS M18VVG2-POC15G-S04G	BCS0067	34
SK1-15-M18-PNBO-VA/PTFE	7018	BCS M18T4I1-POC15G-DV02	BCS005T	34
SK1-15-M18-PNBO-VA/PTFE-Y2	7050	BCS M18T4G2-POC15G-S04G	BCS006C	34
SK1-15-M18-PNBS-CPTFE	7081	BCS M18TTI2-PSC15G-AT02	BCS0073	34
SK1-15-M18-PNBS-PVC	7013	BCS M18VVI1-PSC15G-DV02	BCS005L	34
SK1-15-M18-PNBS-PVC-Y2	7045	BCS M18VVG2-PSC15G-S04G	BCS0066	34
SK1-15-M18-PNBS-VA/PTFE	7017	BCS M18T4I1-PSC15G-DV02	BCS005R	34

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SK1-15-M18-PNBS-VA/PTFE-Y2	7049	BCS M18T4G2-PSC15G-S04G	BCS006A	34
SK1-20-30-NBX-VA/PBT	6116	BCS D30B4M3-NPC20C-EP02	BCS004J	20
SK1-20-30-PBX-VA/PBT	6115	BCS D30B4M3-PPC20C-EP02	BCS004H	20
SK1-20-M30-NBX-PBT	6118	BCS M30BBM3-NPC20C-EP02	BCS004L	22
SK1-20-M30-NBX-PBT-Y2	6120	BCS M30BBM2-NPM20C-S04G	BCS004N	20
SK1-20-M30-NBX-VA/PBT	6122	BCS M30B4M3-NPM20C-EP02	BCS004R	20
SK1-20-M30-NBX-VA/PBT-Y2	6124	BCS M30B4M2-NPM20C-S04G	BCS004U	20
SK1-20-M30-PBX-PBT	6117	BCS M30BBM3-PPC20C-EP02	BCS004K	22
SK1-20-M30-PBX-PBT-Y2	6119	BCS M30BBM2-PPM20C-S04G	BCS004M	20
SK1-20-M30-PBX-VA/PBT	6121	BCS M30B4M3-PPM20C-EP02	BCS004P	20
SK1-20-M30-PBX-VA/PBT-Y2	6123	BCS M30B4M2-PPM20C-S04G	BCS004T	20
SK1-25-34-NBX-PVC	6126	BCS G34VVM3-NPM20C-EP02	BCS004Y	22
SK1-25-34-NBX-PVC-Y2	6128	BCS G34VVM2-NPM20C-S04G	BCS0050	22
SK1-25-34-PBX-PVC	6125	BCS G34VVM3-PPM20C-EP02	BCS004W	22
SK1-25-34-PBX-PVC-Y2	6127	BCS G34VVM2-PPM20C-S04G	BCS004Z	22
SK1-25-50/10-XBX-POM	6089	BCS D50OO02-YPC25C-EV02	BCS003K	24
SK1-25-50/10-XBX-POM-Y1	6090	BCS D50OO03-YPC25C-S49G	BCS003L	24
SK1-30-M30-NNBO-CPTFE	7088	BCS M30TTH2-NOC30G-AT02	BCS007A	36
SK1-30-M30-NNBS-CPTFE	7087	BCS M30TTH2-NSC30G-AT02	BCS0079	36
SK1-30-M30-NNBX-PBT	7090	BCS M30BBM3-NPC30G-EP02	BCS007E	36
SK1-30-M30-NNBX-PBT-Y2	7092	BCS M30BBM2-NPC30G-S04G	BCS007H	36
SK1-30-M30-NNBX-VA/PTFE	7094	BCS M30T4M3-NPC30G-EP02	BCS007K	36
SK1-30-M30-NNBX-VA/PTFE-Y2	7096	BCS M30T4M2-NPC30G-S04G	BCS007M	36
SK1-30-M30-PNBO-CPTFE	7086	BCS M30TTH2-POC30G-AT02	BCS0078	36
SK1-30-M30-PNBS-CPTFE	7085	BCS M30TTH2-PSC30G-AT02	BCS0077	36
SK1-30-M30-PNBX-PBT	7089	BCS M30BBM3-PPC30G-EP02	BCS007C	36
SK1-30-M30-PNBX-PBT-Y2	7091	BCS M30BBM2-PPC30G-S04G	BCS007F	36
SK1-30-M30-PNBX-VA/PTFE	7093	BCS M30T4M3-PPC30G-EP02	BCS007J	36
SK1-30-M30-PNBX-VA/PTFE-Y2	7095	BCS M30T4M2-PPC30G-S04G	BCS007L	36
SK1-A-8-M18-4I20B-VA/PBT	8002	BCW M18B4M1-ICM80C-DV02	BCW0001	N/A
SK1-FS-MLG1/4-XDC-PSU	7306	BCS S40SS02-GPCFNG-EP02	BCS009P	38
SK1-FS-MLG1/4-XDC-PSU-Y1	7309	BCS S41SS02-GPCFNG-S49G	BCS009U	38
SK1-FS-MLM12-XDC-PSU	7305	BCS S40SS01-GPCFNG-EP02	BCS009N	38
SK1-FS-MLM12-XDC-PSU-Y1	7308	BCS S41SS01-GPCFNG-S49G	BCS009T	38
SK1-FS-MLNPT1/4-XDC-PSU	7307	BCS S40SS03-GPCFNG-EP02	BCS009R	38
SK1-FS-MLNPT1/4-XDC-PSU-Y1	7310	BCS S41SS03-GPCFNG-S49G	BCS009W	38
SK1-FS-MLRG1/4-XDC-PSU-Y1	7312	BCS S42SS02-GPCFNG-S49G	BCS009Z	38
SK1-FS-MLRM12-XDC-PSU-Y1	7311	BCS S42SS01-GPCFNG-S49G	BCS009Y	38
SK1-FS-MLRNPT1/4-XDC-PSU-Y1	7313	BCS S42SS03-GPCFNG-S49G	BCS00A0	40
SK1-FSA-34/16/8-NBO-PP	7136	BCS R08RR01-NOMFAC-EP02	BCS008L	48
SK1-FSA-34/16/8-NBO-PP-M2/Y1	7140	BCS R08RR01-NOMFAC-EP00,2-GS49	BCS008R	48
SK1-FSA-34/16/8-NBS-PP	7135	BCS R08RR01-NSMFAC-EP02	BCS008K	48
SK1-FSA-34/16/8-NBS-PP-M2/Y1	7139	BCS R08RR01-NSMFAC-EP00,2-GS49	BCS008P	48
SK1-FSA-34/16/8-PBO-PP	7134	BCS R08RR01-POMFAC-EP02	BCS008J	48

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SK1-FSA-34/16/8-PBO-PP-M2/Y1	7138	BCS R08RR01-POMFAC-EP00,2-GS49	BCS008N	48
SK1-FSA-34/16/8-PBS-PP	7133	BCS R08RR01-PSMFAC-EP02	BCS008H	48
SK1-FSA-34/16/8-PBS-PP-M2/Y1	7137	BCS R08RR01-PSMFAC-EP00,2-GS49	BCS008M	48
SK1-FSA-50/10-NBO-CPTFE	7122	BCS D50TT05-NOCFAC-ET02	BCS0083	48
SK1-FSA-50/10-NBS-CPTFE	7121	BCS D50TT05-NSCFAC-ET02	BCS0082	48
SK1-FSA-50/10-NBX-POM	7124	BCS D50OO04-NPCFAC-EV02	BCS0085	48
SK1-FSA-50/10-PBO-CPTFE	7120	BCS D50TT05-POCFAC-ET02	BCS0081	48
SK1-FSA-50/10-PBS-CPTFE	7119	BCS D50TT05-PSCFAC-ET02	BCS0080	48
SK1-FSA-50/10-PBX-POM	7123	BCS D50OO04-PPCFAC-EV02	BCS0084	48
SK1-FSA-D7B9/52-NNBO-CPTFE	7160	BCS S20TT01-NOLFAG-ET02	BCS009H	44
SK1-FSA-D7B9/52-NNBS-CPTFE	7159	BCS S20TT01-NSLFAG-ET02	BCS009F	44
SK1-FSA-D7B9/52-PNBO-CPTFE	7158	BCS S20TT01-POLFAG-ET02	BCS009E	44
SK1-FSA-D7B9/52-PNBS-CPTFE	7157	BCS S20TT01-PSLFAG-ET02	BCS009C	44
SK1-FSA-M18-NNBO-CPTFE	7132	BCS M18TTI2-NOCFAG-AT02	BCS008F	43
SK1-FSA-M18-NNBO-PVC	7104	BCS M18VVI1-NOCFAG-DV02	BCS007T	43
SK1-FSA-M18-NNBO-PVC-Y1	7144	BCS M18VVN-NOCFAG-S49G	BCS008Y	43
SK1-FSA-M18-NNBS-CPTFE	7131	BCS M18TTI2-NSCFAG-AT02	BCS008E	43
SK1-FSA-M18-NNBS-PVC	7103	BCS M18VVI1-NSCFAG-DV02	BCS007R	43
SK1-FSA-M18-NNBS-PVC-Y1	7143	BCS M18VVN-NSCFAG-S49G	BCS008W	43
SK1-FSA-M18-PNBO-CPTFE	7130	BCS M18TTI2-POCFAG-AT02	BCS008C	43
SK1-FSA-M18-PNBO-PVC	7102	BCS M18VVI1-POCFAG-DV02	BCS007P	43
SK1-FSA-M18-PNBO-PVC-Y1	7142	BCS M18VVN-POCFAG-S49G	BCS008U	43
SK1-FSA-M18-PNBS-CPTFE	7129	BCS M18TTI2-PSCFAG-AT02	BCS008A	43
SK1-FSA-M18-PNBS-PVC	7101	BCS M18VVI1-PSCFAG-DV02	BCS007N	43
SK1-FSA-M18-PNBS-PVC-Y1	7141	BCS M18VVN-PSCFAG-S49G	BCS008T	43
SK1-FSA-M30-NNBO-CPTFE	7128	BCS M30TTH2-NOCFAG-AT02	BCS0089	44
SK1-FSA-M30-NNBS-CPTFE	7127	BCS M30TTH2-NSCFAG-AT02	BCS0088	44
SK1-FSA-M30-NNBX-PBT	7116	BCS M30BBM3-NPCFAG-EP02	BCS007W	44
SK1-FSA-M30-NNBX-PBT-Y2	7118	BCS M30BBM2-NPCFAG-S04G	BCS007Z	44
SK1-FSA-M30-PNBO-CPTFE	7126	BCS M30TTH2-POCFAG-AT02	BCS0087	44
SK1-FSA-M30-PNBS-CPTFE	7125	BCS M30TTH2-PSCFAG-AT02	BCS0086	44
SK1-FSA-M30-PNBX-PBT	7115	BCS M30BBM3-PPCFAG-EP02	BCS007U	44
SK1-FSA-M30-PNBX-PBT-Y2	7117	BCS M30BBM2-PPCFAG-S04G	BCS007Y	44
SK1-FSA-MLG1/4-XDC-PSU	7146	BCS S40SS02-GPCFAG-EP02	BCS0090	46
SK1-FSA-MLG1/4-XDC-PSU-Y1	7152	BCS S41SS02-GPCFAG-S49G	BCS0096	44
SK1-FSA-MLG1/4-XDCS-PSU	7149	BCS S40SS02-GPCFAG-EP02-D01	BCS0093	46
SK1-FSA-MLM12-XDC-PSU	7145	BCS S40SS01-GPCFAG-EP02	BCS008Z	44
SK1-FSA-MLM12-XDC-PSU-Y1	7151	BCS S41SS01-GPCFAG-S49G	BCS0095	44
SK1-FSA-MLM12-XDCS-PSU	7148	BCS S40SS01-GPCFAG-EP02-D01	BCS0092	46
SK1-FSA-MLNPT1/4-XDC-PSU	7147	BCS S40SS03-GPCFAG-EP02	BCS0091	46
SK1-FSA-MLNPT1/4-XDC-PSU-Y1	7153	BCS S41SS03-GPCFAG-S49G	BCS0097	44
SK1-FSA-MLNPT1/4-XDCS-PSU	7150	BCS S40SS03-GPCFAG-EP02-D01	BCS0094	46
SK1-FSA-MLRG1/4-XDC-PSU-Y1	7155	BCS S42SS02-GPCFAG-S49G	BCS0099	46
SK1-FSA-MLRM12-XDC-PSU-Y1	7154	BCS S42SS01-GPCFAG-S49G	BCS0098	46

Capacitive Sensors

New ordering codes and part numbers

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SK1-FSA-MLRNPT1/4-XDC-PSU-Y1	7156	BCS S42SS03-GPCFAG-S49G	BCS009A	46
SK1-HT125-FS-J3/8NPTF-NO-VA/PTFE	90141	BCS S03T401-NOCFNH-KM16-T02	BCS00A9	40
SK1-HT125-FS-J3/8NPTF-NS-VA/PTFE	90140	BCS S03T401-NSCFNH-KM16-T02	BCS00A8	40
SK1-HT125-FS-J3/8NPTF-PO-VA/PTFE	90126	BCS S03T401-POCFNH-KM16-T02	BCS00A7	40
SK1-HT125-FS-J3/8NPTF-PS-VA/PTFE	90144	BCS S03T401-PSCFNH-KM16-T02	BCS00A6	40
SK1-HT125-FS-JM18-NO-VA/PTFE	7064	BCS S01T401-NOCFNG-KM16-T02	BCS006L	40
SK1-HT125-FS-JM18-NS-VA/PTFE	7063	BCS S01T401-NSCFNG-KM16-T02	BCS006K	40
SK1-HT125-FS-JM18-PO-VA/PTFE	7062	BCS S01T401-POCFNG-KM16-T02	BCS006J	40
SK1-HT125-FS-JM18-PS-VA/PTFE	7061	BCS S01T401-PSCFNG-KM16-T02	BCS006H	40
SK1-HT125-FS-JR3/8-NO-VA/PTFE	7068	BCS S02T401-NOCFNG-KM16-T02	BCS006R	40
SK1-HT125-FS-JR3/8-NS-VA/PTFE	7067	BCS S02T401-NSCFNG-KM16-T02	BCS006P	40
SK1-HT125-FS-JR3/8-PO-VA/PTFE	7066	BCS S02T401-POCFNG-KM16-T02	BCS006N	40
SK1-HT125-FS-JR3/8-PS-VA/PTFE	7065	BCS S02T401-PSCFNG-KM16-T02	BCS006M	40
SK1-TM-6-M12/60-NNBO-PVC	7072	BCS M12VVI1-NOM60G-EP02-E	BCS006Y	32
SK1-TM-6-M12/60-NNBS-PVC	7071	BCS M12VVI1-NSM60G-EP02-E	BCS006W	32
SK1-TM-6-M12/60-PNBO-PVC	7070	BCS M12VVI1-POM60G-EP02-E	BCS006U	32
SK1-TM-6-M12/60-PNBS-PVC	7069	BCS M12VVI1-PSM60G-EP02-E	BCS006T	32
SK1-TM-6-M12/63-NNBO-CPTFE	7304	BCS M12TTI1-NOM60G-ET02-E	BCS009M	32
SK1-TM-6-M12/63-NNBS-CPTFE	7303	BCS M12TTI1-NSM60G-ET02-E	BCS009L	32
SK1-TM-6-M12/63-PNBO-CPTFE	7302	BCS M12TTI1-POM60G-ET02-E	BCS009K	32
SK1-TM-6-M12/63-PNBS-CPTFE	7301	BCS M12TTI1-PSM60G-ET02-E	BCS009J	32
SKF-10-90/16/4-B-PC/PU	2003	BCS F01CP01-XXS10C-EP02-GZ01-002	BCS000Y	27
SL-YA-M20	13012	BCC Z001-002	BCC04JU	N/A
SL-YAZA-3m	90069	BCC Z002-030	BCC04JY	N/A
SL-YAZA-8m	90070	BCC Z002-080	BCC04JZ	N/A
SLK-HT	9007	BCC Z003-020	BCC04JW	50
SNG-115AC/24DC-T	12004	BAE SA-XE-011-XR	BAE009Y	64
SNG-115AC-K	4006	BAE SA-CS-007-XR	BAE009L	60
SNG-115AC-K-MinMax	4012	BAE SA-CS-005-XR	BAE009U	62
SNG-115AC-K-T	4008	BAE SA-CS-009-XR	BAE009N	61
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SNG-230AC-K	4005	BAE SA-CS-006-XR	BAE009K	60
SNG-230AC-K-MinMax	4011	BAE SA-CS-004-XR	BAE009T	62
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Object Detection

Sensor Product Line
Inductive sensors BES DC 3-/4-wire
Inductive sensors BES DC 2-wire
Inductive sensors BES AC/DC
Inductive sensors BES with special properties
Sensors for pneumatic cylinders BMF
Magnetic field sensors BMF
Capacitive sensors BCS
Pressure sensors BSP

Photoelectric Product Line
Diffuse energetic BOS with fore- and background suppression
Retro-reflective sensors BOS
Through-beam sensors BOS (emitter/receiver)
Fiber optic systems BFB
Through-beam fork sensors BGL
Dynamic optical windows BOWA
Light grids BLG
Contrast sensors BKT
Luminescence sensors BLT
Color sensors BFS
Photoelectric distance sensors BOD

Mechanical Product Line
Mechanical Single and Multiple Position Switches
Mechanical single and multiple position switches to DIN EN 60204-1/VDE 0113
Mechanical single and multiple position switches with positive opening
Mechanical multiple position switches with quick plunger change-out
Inductive single and multiple position switches
Inductive single and multiple position switches with extended switching distance
Mechanical wireless position switches
Mixed assembly multiple position switches

Linear Position and Sensing

Linear Displacement Product Line
Micropulse® transducer BTL Profile Series
Micropulse® transducer BTL AT Series
Micropulse® transducer BTL Rod-Style Series
Micropulse® transducer BTL Compact Rod Series
Micropulse® processors, BUS interfaces
BML magnetic linear encoder system
BDG/BRG incremental and absolute encoders
BIW pulse-Inductive linear displacement sensor
BAW inductive distance sensors
BIL magnetoinductive position sensors
BOD photoelectric distance sensors

Industrial Identification

Industrial Identification
BIS C Industrial RFID systems
BIS L Industrial RFID systems
BIS M Industrial RFID systems
BIS S Industrial RFID systems
BVS Vision Sensor

Industrial Networking and Connectivity

Industrial Networking and Connectivity
BCC connectors and cables
BPI passive splitter boxes
BNI active splitter boxes
IO-Link
Inductive transmission systems - Remote
BIC inductive couplers
BUS systems
Wireless
Electrical Devices

Mechanical Accessories

Mechanical Accessories
Holders and Fastening Systems
BMS mounting system

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