BALLUFF

SIESENSORIK

# BCS Capacitive Sensors

New approaches to object and level detection

more added value

# Capacitive Sensors
## New approaches to object and level detection

With over 50 years of sensors experience, Balluff is a worldwide leading sensor specialist with our own line of connectivity products for every area of factory automation. With headquarters in Germany and 54 representatives and subsidiaries, Balluff is expertly represented on every continent in the world.

Balluff stands for comprehensive systems from a single source, continuous innovation, the most modern technology, highest quality and greatest reliability. And even more: for distinctive customer orientation, custom tailored solutions, fast worldwide service and outstanding applications assistance. In short: for reliable, expert partnership.

Whether electronic and mechanical sensors, rotary and linear transducers, identification systems or optimized connectivity solutions for high-performance automation, Balluff masters not only the entire technological variety with all the operating principles, but also offers innovative technology and the most modern electronics – tested down to the last detail in the company's own testing laboratory – furthermore a quality management system certified in accordance with DIN EN ISO 9001 : 2008. Balluff technology can be used anywhere in the world, since it meets even regional quality standards. And Balluff technology is available internationally. So there is always a Balluff expert near you.

Balluff products increase throughput, quality and productivity day in and day out. They create the prerequisites for meeting the demands of the global market when it comes to greater performance and cost reduction. Including in the most demanding areas. No matter how stringent your requirements may be, Balluff provides solutions at the latest state of the art.

**Fully exploit the potential of high quality. And profit from reliable object and level detection. With Balluff series BCS capacitive sensors. They ensure high efficiency, even when others fall short.**


CERTIFICATE

BALLUFF
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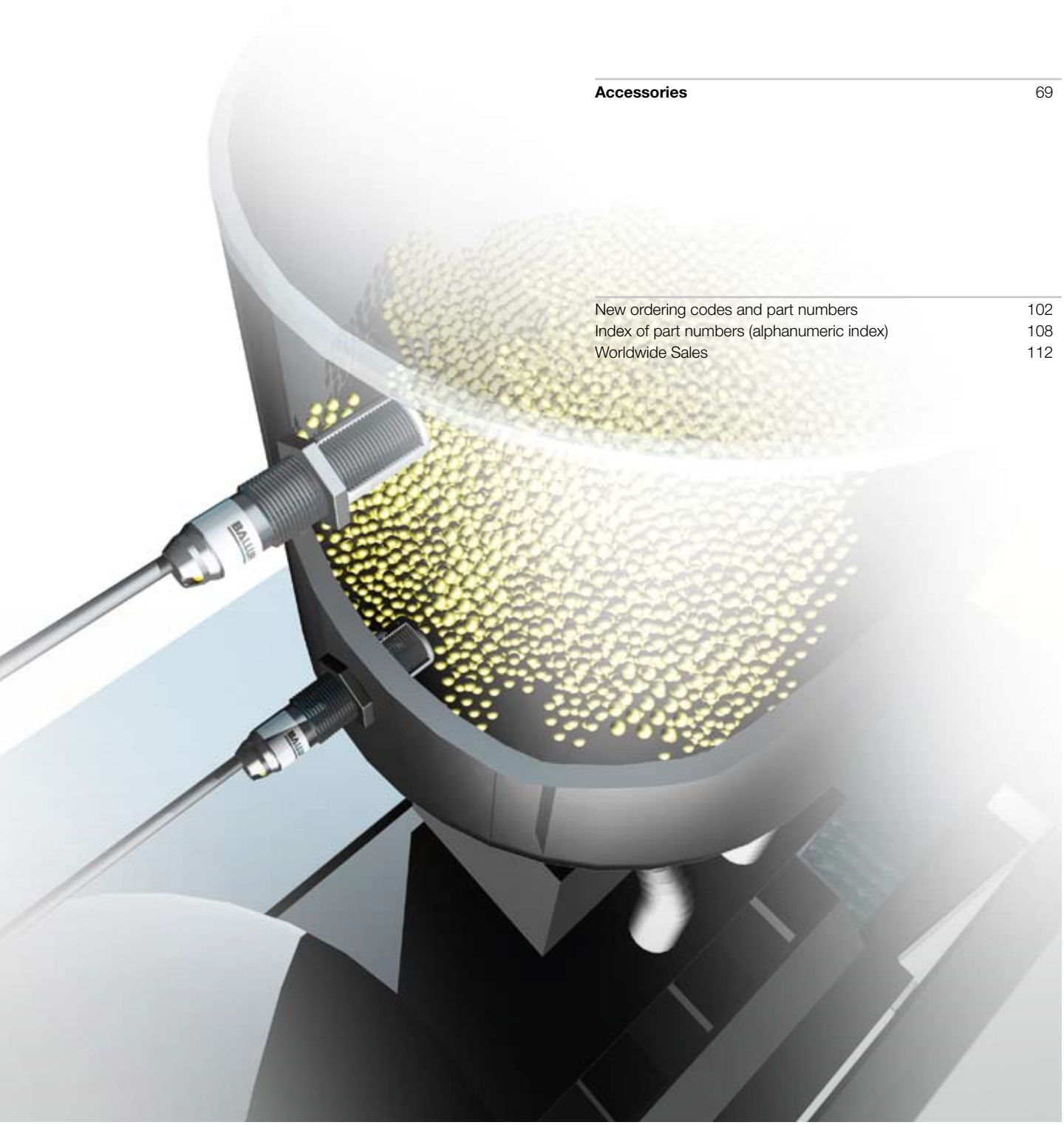
**The full capacitive product line**
Technologically advanced know-how – now from a single source

## more added value

– Broad range of applications with a variety of form factors – including mini
– Increased reliability in high temperatures and high pressures
– Greater design freedom even when space is at a premium

# Capacitive Sensors





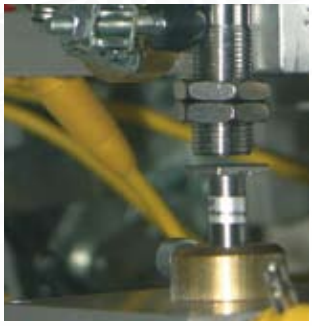
# Capacitive Sensors
## Performance spectrum

Capacitive sensors have become an indispensable part of industrial automation. They bring reliability to object and level detection.

Balluff series BCS capacitive sensors are especially capable and powerful. They get the job done when others fall short.

BCS sensors monitor stack heights and levels, presence and contents with extreme precision. They are unaffected by dust and reflections or object composition or color. And they detect contents with absolute reliability even through glass and plastic walls, without regard to external conditions. So that Balluff capacitive sensors ensure reliability.

Use Balluff series BCS capacitive sensors to go where others fear to tread.



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

Solve tough applications that used to seem impossible.


**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.

This extraordinarily reliable switching precision is made possible by a new, patented oscillator technology that automatically compensates for any possible interference factors.

# Capacitive Sensors
## For high technical demands

Balluff series BCS capacitive sensors are not only masters of object and level detection. They show the competition to its seat when high technical requirements are involved.

High temperature and pressure ratings, stainless steel and Teflon housings for harsh environments, a wide supply voltage range and especially compact form factors are all available in the BCS family. And capacitive stick-on sensors adapt to the shape of the housing.

**SMART***LEVEL* sensors go the extra mile. These ideal level sensors see conductive media through thicker glass and plastic walls while compensating for moisture, foam and build-up. And guarantee application security in a wider range of production processes.

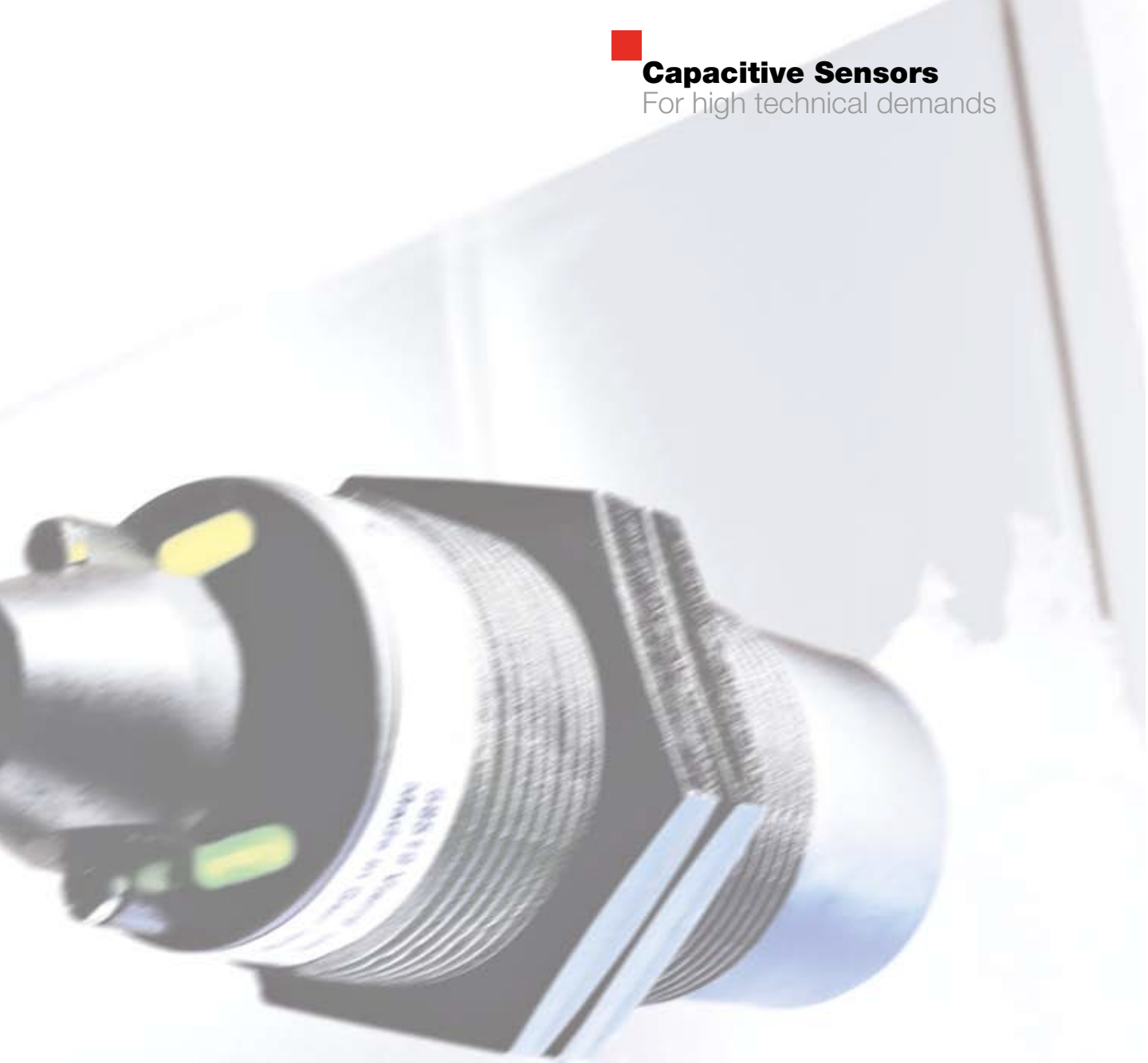

**Stainless steel sensors**
- For high tightening torques
- Proven in harsh environments, with foods, plastics, specialty machines as well as the lumber and furniture industry

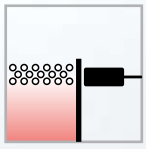

**Teflon sensors**
- With chemically resistant housing
- For detecting aggressive media such as acids and bases
- Outstanding in the semiconductor and foods industry as well as medical and industrial manufacturing technology

**Stick-on sensors**
- Quick, cost-effective to install, e.g. on container walls or pipes
- The flexible sensor adapts to the container shape or pipe.


**High temperature rated sensors**
- For ambient temperatures up to 250 °C
- Suitable for level sensing e.g. of granulates in dryers (plastics industry) and for object detection of hot materials in clamping jaws

# Capacitive Sensors
## For high technical demands







**SMART*LEVEL* sensors**
- With chemically resistant PTFE housing
- Compensate for moisture, foam and build-up
- Penetrate glass and plastic walls even over 10mm thick
- Detect aqueous to highly conductive media
- Reduce costs through adjustment-free installation and cleaning-free operation in most applications
- Reduced use of materials and less construction outlay (e.g. no bypass tubes)

**AC/DC sensors**
- Wide operating voltage range of 20…250 V AC/DC

For the international market!

**Mini sensors**
- For more design freedom
- For small parts detection
- For installation in tight mounting spaces
- Tubular and disc form factors
- Shielded and unshielded versions

**Application-specific form factors**
- For leak monitoring
- ESD resistant
- Pressure rated
- Reliable function diagnostics
- High enclosure rating

# Capacitive Sensors
## Produce 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** | | | | | | | |
| 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. 28 | p. 28 | p. 28...29 | p. 29 | p. 30...31 | p. 30...31 | |
| Direct sensing of bulk product and powdery media | | | | | | | |
| Sensing bulk product and powdery media through a container wall up to approx. 4mm | | | | | | | |
| Direct sensing of non-conductive liquid and paste-like media | | | | | | | |
| Sensing non-conductive liquids and paste-like media through a container wall up to approx. 4 mm | | | | | | | |
| Direct sensing of conductive liquids (**SMART***LEVEL* technology) | | | | | | | |

| | Ø 10 mm flush | Ø 10 mm non-flush | M12×1 flush | M12×1 flush | M18×1 flush | M18×1 non-flush | Ø 20 mm flush | Ø 22 mm flush |
|---|---|---|---|---|---|---|---|---|
| | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| | | | | | | ■ | | |
| | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| | | | ■ | ■ | ■ | ■ | | |
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| | ■ | ■ | ■ | ■ | | | | |
| | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| | | | | | | p. 65 | | |
| | | | | | | | p.43 | |
| | | | | | | p. 57 | | |
| | | | | | | p. 57 (up to 8 mm) | | |
| | | | | | | p. 57 | | |
| | | | | | | p. 57 | | |
| | p. 31...32 | p.31 p.31 | p. 32...33 | p. 46...47 | p. 33...34 | p. 48...49 | p. 43 | p.35 |
| | | | | | p. 33...34 | | | p.35 |
| | | | | p. 46...47 | | p. 48...49 | | |
| | | | | | p. 33...34 | | | p.35 |
| | | | | | | p. 57 (up to 8 mm) | | |

# Capacitive Sensors
## Produce 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** | | | | | | | |
| V2A | ■ | ■ | ■ | | | ■ | |
| Plastic | | ■ | ■ | ■ | ■ | | |
| PTFE (Teflon) | | | ■ | | | | |
| **Wiring** | | | | | | | |
| Connector | | ■ | ■ | ■ | | | |
| Cable with connector | | | | | | ■ | |
| Cable | ■ | ■ | ■ | ■ | ■ | ■ | |
| Terminal housing | | | | | | | |
| **Special features** | | | | | | | |
| High temperature rated | | | p. 65 | | | | |
| Pressure rated | | | | | | | |
| Stick-on, flexible | | | | | | | |
| Degree of protection IP 68 | | | | | | | |
| Function diagnostics | | | | | | | |
| **SMART***LEVEL* | | | | | | | |
| Compensate for moisture, foam and build-up | | | p. 58 | | | | |
| Penetrate glass or plastic walls over 10 mm thick | | | p. 58 | | | | |
| Detection of aqueous to highly conductive media | | | p. 58 | | | | |
| Virtually no adjustment or cleaning required | | | p. 58 | | | | |
| **Main areas of application** | | | | | | | |
| Object detection | p. 35 | p. 35...36 | | p. 36 | | p. 37...39 | |
| Direct sensing of bulk product and powdery media | | p. 35...36 (lower $\varepsilon_r$) | p. 50...51 | p. 36 (lower $\varepsilon_r$) | p. 51 | | |
| Sensing bulk product and powdery media through a container wall up to approx. 4mm | p. 35 | p. 35...36 | | p. 36 | | p. 37...39 (Ø 22...30 mm) | |
| Direct sensing of non-conductive liquid and paste-like media | | | p. 50...51 | | p. 51 | | |
| Sensing non-conductive liquids and paste-like media through a container wall up to approx. 4 mm | p. 35 | p. 35...36 | | p. 36 | | p. 37...39 (Ø 22...30 mm) | |
| Direct sensing of conductive liquids (**SMART***LEVEL* technology) | | | p. 58 | | | | |
| Detecting conductive liquids through a container wall even over 10 mm thick (**SMART***LEVEL* technology) | | | p. 58 | | | | |
| Leak monitoring | | | | | | | |








| 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“ |
|---|---|---|---|---|---|---|---|
| ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| | | | | | | | |
| | | | | | | | |
| ■ | ■ | ■ | ■ | | ■ | | |
| ■ | | | | ■ | | ■ | ■ |
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| ■ | | | | | ■ | | ■ |
| | ■ | | ■ | | | | |
| ■ | ■ | ■ | | ■ | ■ | | |
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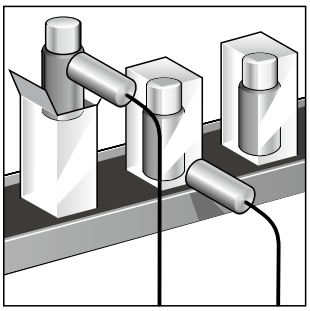
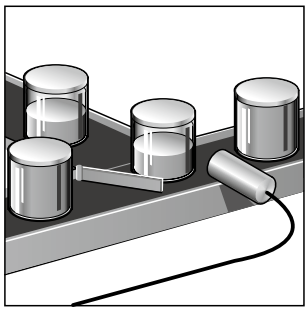
| | | | | | | | |
| | | | | p. 59 | p. 59...61 | p. 54...55 | p. 65 |
| | | | | | p. 52...54, 59...61 | p. 54...55 | p. 65 (6 bar) |
| | | | p. 41 | | | | |
| | | | | | p. 52...53, 59...61 (10 bar) | p. 54...55 (10 bar) | p. 65 (6 bar) |
| | | | | | p. 60...61 | | |
| p. 62 | p. 63 | | | p. 59 | p. 59...61 | | |
| p. 62 | p. 63 (up to 8 mm) | | | | | | |
| p. 62 | p. 63 | p. 66 | | p. 59 | p. 59...61 | | |
| p. 62 | p. 63 | p. 66 | | p. 59 | p. 59...61 | | |
| | | | | | | | |
| p. 39 | p. 40 | | p. 41 | | | | |
| | | | | | p. 52...54 | p. 54...55 | p. 65 |
| p. 39 | p. 40 | | p. 41 | | | | |
| | | | | | p. 52...54 | p. 54...55 | p. 65 |
| p. 39 | p. 40 | | p. 41 | | | | |
| | | | | p. 59 | p. 59...61 | | |
| p. 62 | p. 63 (up to 8 mm) | | | | | | |
| | p. 40 | p. 66 | | | | | |

# Capacitive Sensors
## Applications

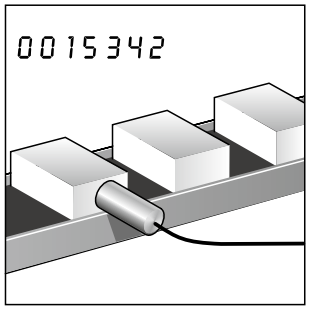
Balluff capacitive sensors are ideal for detecting objects and levels: whether granulates, powders, viscous or watery media. No matter what the industry or application, at Balluff you get the right sensor for your special application.



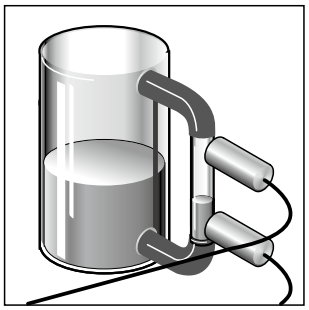
*Final checking on packaging lines. Packaging, contents*



*Level control in filling applications, controlling the reject station*



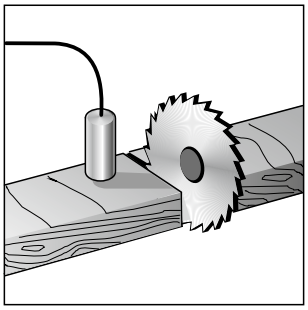

*Detecting, counting objects*



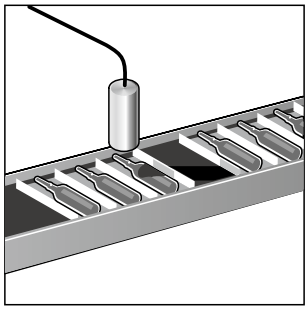
*Flow or pumping control in reservoirs*

**Sectors**

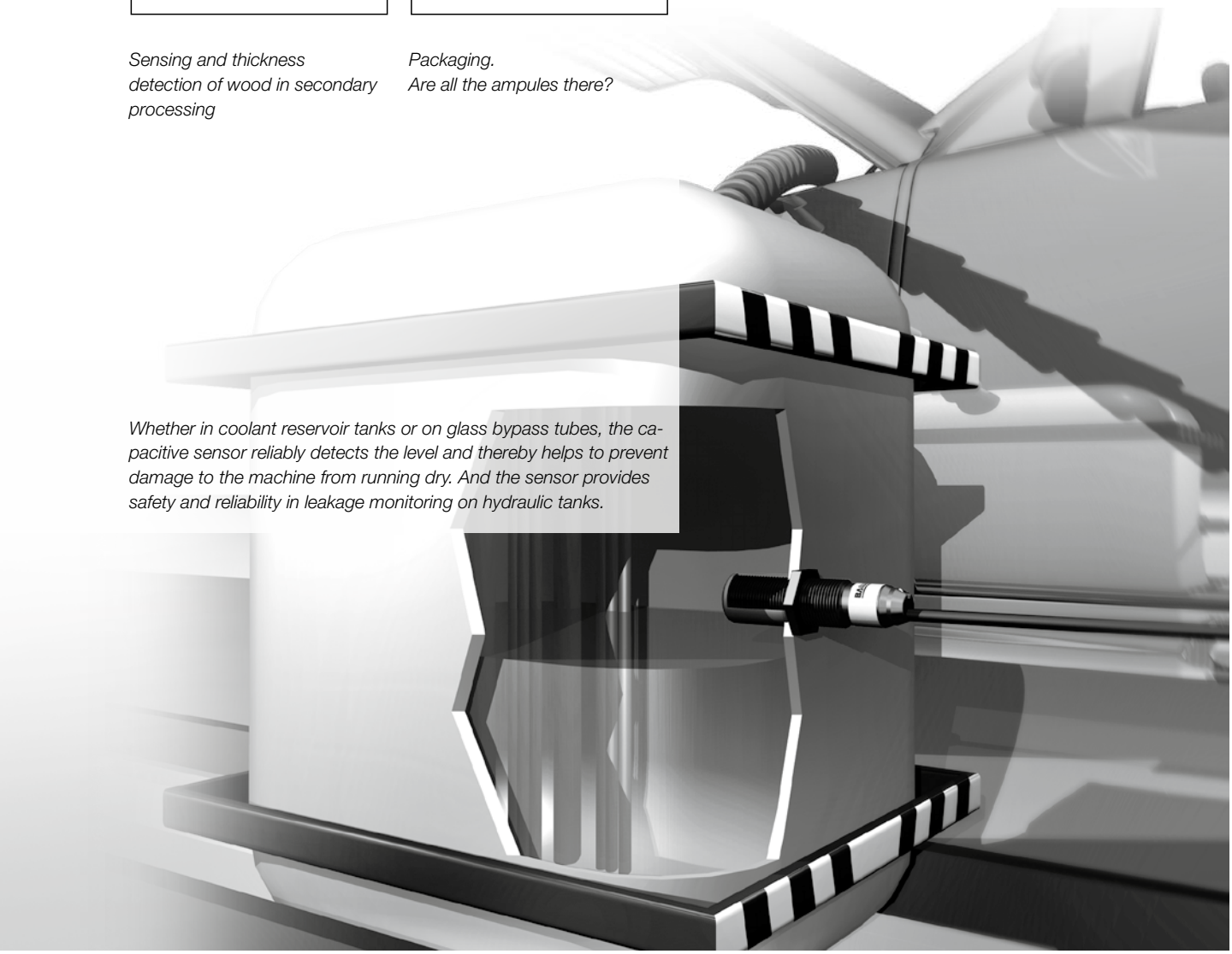
- Handling and automation
- Specialty machinery building
- Automobile industry
- Semiconductor industry
- Electronics industry (circuit boards, CD and DVD manufacturing, ...)
- Foods industry
- Bottling and packaging
- Chemical industry
- Industrial cleaning technology
- Pharmaceuticals and medical technology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



*Sensing and thickness detection of wood in secondary processing*



*Packaging. Are all the ampules there?*



*Whether in coolant reservoir tanks or on glass bypass tubes, the capacitive sensor reliably detects the level and thereby helps to prevent damage to the machine from running dry. And the sensor provides safety and reliability in leakage monitoring on hydraulic tanks.*

# Fundamentals and Definitions
## Contents

Balluff series BCS capacitive sensors are classic object and level detectors that can reliably detect levels of liquids, bulk material and granulates through 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. And replacing a sensor is simple, and does not require sealing or resealing the container.

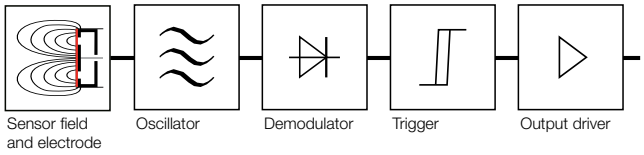


**Functional principle**

The non-contacting capacitive sensor converts a variable of interest in technical production terms (e.g. object or level) into a signal which can be processed further. The function is based on the alteration in the electrical 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. This is part of an RC oscillator.

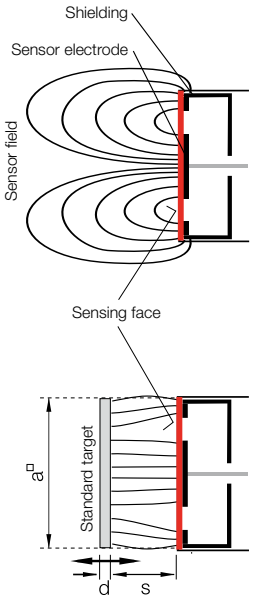



When metallic or non-metallic objects approach the sensing surface of the capacitive sensor, the capacitance changes and the oscillator begins to oscillate. This causes the trigger stage downstream of the oscillator to trip, and the switching amplifier to change its output status. The switching function at the output is either an N.O., N.C. or changeover contact, depending on the type of unit involved. The function of the capacitive sensor can be explained using the equation for capacitance:

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

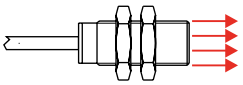
$\varepsilon_r$: Relative dielectric constant (property of the target medium)
$\varepsilon_0$: Absolute dielectric constant, unchanging
F: Area
S: Distance

From the formula above it follows that objects which have a sufficiently large relative dielectric coefficient ($\varepsilon_r$) and area will be detected by the capacitive sensor. Besides the **standard (multi-purpose) sensor technology,** in which the pickup is a constituent part of the oscillator circuit, there are also more modern processes designed to meet special application requirements.



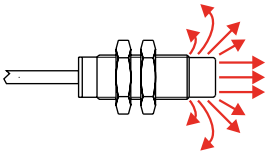

**Sensors for object detection (shielded)**

Sensors with a rectilinear electrical field. These devices scan solids (e.g. wafers, components, PCBs, hybrids, cartons, stacks of paper, bottles, plastic blocks and sheets) from a distance or liquids through a partition wall (glass or plastic, thickness max. 4 mm), and should in each individual case be tested beforehand with samples. See Adjustment section.



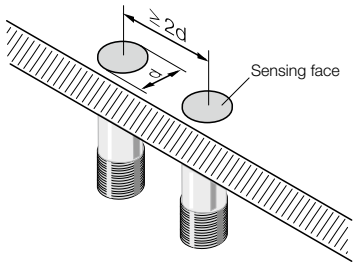
**Sensors for level detection (non-flush/unshielded sensor version)**

Sensors with a spherical electrical field. These units are designed to detect the product, bulk goods or liquids (e.g. granulate, sugar, flour, corn, sand, or oil and water) with their active surface, by touching the medium or through tank wall. The choice of the appropriate sensor depends on the operating conditions and the kind of medium and should in each case be tested beforehand with samples. See Adjustment section.



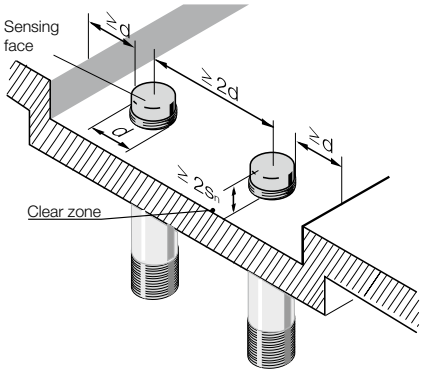
**Flush-mount (shielded) proximity switches**

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



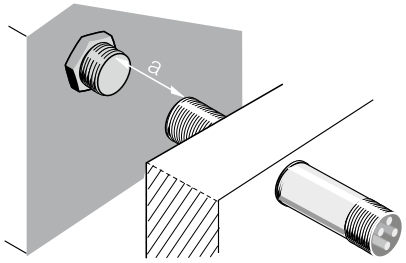

**Unshielded proximity switches**

The sensing face must extend ≥ $2s_n$ from the metallic installation medium. The distance between two proximity switches must be ≥ 2d.




**Opposing installation of 2 sensors**

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



**Sensing face**

... is the area through which the high-frequency sensor 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 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
– the diameter of the circle of the sensing face or
– 3 $s_r$, if the value is greater than the given diameter.

**Rated switching distance $s_n$**

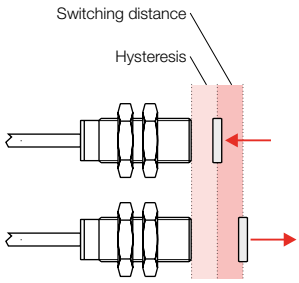
... is a theoretical value, which does not take into account manufacturing tolerances, sample differences, operating temperatures, supply voltages, etc.

**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 capacitive sensors, the effective operating distance $s_r$ can be set using a potentiometer.

**Hysteresis**

... is the distance differential between the switch-on point (as the object approaches) and the switch-off point (as the object recedes again).




**Repeat accuracy**

... is the maximum sensing distance differential between any two measurements, measured within 8 hours with multiple "approaches" to the object being scanned. 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 de-activation of the sensors during a specified interval (one second). Measuring method in conformity with IEC 60947-5-2.

**Ambient temperature range $T_a$**

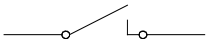
... specifies the temperature range at which the sensor may be operated. Balluff manufactures both sensors for the standard temperature range –30...+70° C and sensors for more stringent temperature requirements up to max. +250°C.

**Temperature drift**

... states the amount by which the sensing distance may change in dependence on temperature. This lies between 15 and 20% of the effective operating distance $s_r$ (–5...+55 °C).

**Switching function**

N.O. contact: the switching output of the sensor is not switched through in its de-activated state.



N.C. contact: the switching output of the sensor is switched through in its de-activated state.

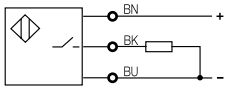
**DC 3-/4-wire**

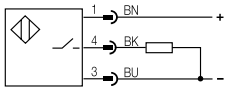
**PNP (+) sourcing**

Cable/terminals

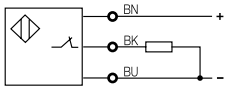
Connector

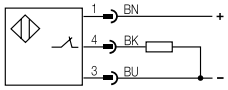
Normally open




Normally closed



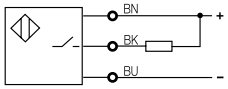



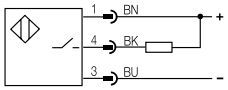

**NPN (–) sinking**

Cable/terminals

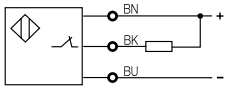
Connector

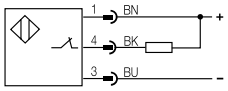
Normally open



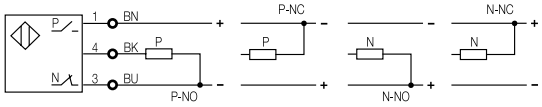

Normally closed




**PNP/NPN selectable**

NO/NC user selectable

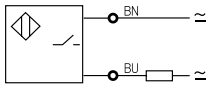



**AC/DC 2-wire**

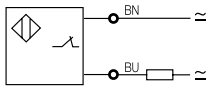
**Protection isolated (Protection Class II ⧈)**

Cable/terminals

Normally open




Normally closed




**Wire colors, marking per DIN IEC 60757**

| | |
|---|---|
| **BN** | brown |
| **BK** | black |
| **BU** | blue |
| **WH** | white |

**Supply voltage $U_s$**

... is the voltage range in which flawless functioning of the sensor is assured. It includes all voltage tolerances and residual ripples.

**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 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 intrinsic current consumption of the sensor at maximum supply voltage $U_S$ with no switched load.

**Short-circuit protection and overload protection**

All DC sensors feature this protection device. 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 functioning.

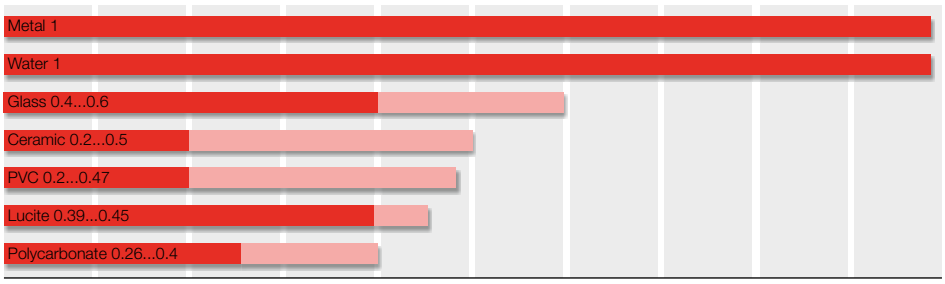
**Polarity reversal protection**

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 actuation element (target) enters the sensor field, the capacitance changes proportionally to $\varepsilon_r$ and to the immersion depth or to the distance to the sensing face.
Since the rated switching distance $s_n$ is based on a grounded standard target made of Fe 360, the switching distances must be corrected when using other materials.

### Correction factors for typical materials




Correction factors should be determined using the target material directly.

## Application range of SMARTLEVEL sensors with conductivity values

The media and conductivity values given here are only guide values and are for general orientation only. When in doubt, testing should be carried out, since factors such as temperature and media concentration can affect the conductivity values. Please contact us.
Conductivity values for other media on request.

| BCS Standard<br>up to approx. 0.7 mS | SMARTLEVEL 15<br>approx. 0.7...15 mS | SMARTLEVEL 50<br>approx. 15...50 mS | SMARTLEVEL 500+<br>approx. 50...500 mS<br>and greater<br>Available starting 2010 |
|---|---|---|---|
| Industrial waste water (select the sensor according to conductivity of the medium | | | |
| | Disinfectants (media containing chlorine) | | |
| | Table salt solution | | |
| Alcohol | Rinsing agents | | |
| Marmalade | Milk/buttermilk/yoghurt | | |
| Deionized water | Fruit juice | | |
| Mineral oils | Coolant/lubricants | | Ketchup/mayonnaise/mustard |
| Plant oils | Formic acid (30 %) | | Phosphoric acid (10 %) |
| Ammonia (30 %) | Vinegar | | Sulfuric acid (10 %) |
| Drinking water | Cola | | Calcium chloride (30 %) |
| Sugar solution, diluted | Honey/glue | Blood | Hydrochloric acid (40 %) |
| Toothpaste | Beer | Saltwater | Nitric acid (12 %) |

## 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

By choosing and combining the appropriate housing materials, sensors can be supplied for almost all environmental conditions. PTFE has special significance here.
Balluff offers a large selection of sensors with full PTFE construction.

| 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 |

**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 |

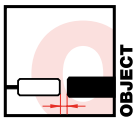
**Approvals**

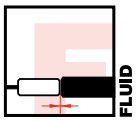
... are granted by national and international institutions.
Their symbols affirm that our products meet the specifications of these institutions.
"US Safety System" and "Canadian Standards Association" under the auspices of Underwriters Laboratories Inc. (cUL).

**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.

**Shielded sensors**
Normally, the rectilinear field of flush-mounted sensors scans objects from a distance. To ensure flawless switching of the sensor, the maximum switching distance must be checked before using the device. The following example applications show how you can do this.

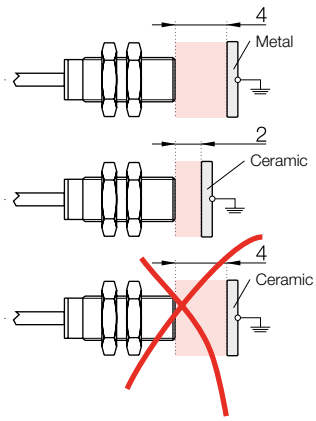



**Detecting solid bodies made of different materials**
A shielded capacitive sensor will be used to detect a ceramic plate. The sensor is set to the maximum rated switching distance $s_n$ of for example 4 mm from metal or by approximation from your hand. With this preset distance of 4 mm, move the sensor towards the ceramic plate. The rated switching distance $s_n$ to the ceramic plate has been reduced to approx. 2mm.

The distance of 2 mm is now the maximum permissible switching distance for the ceramic plate. You can also adjust for smaller sensing distances than 2 mm.

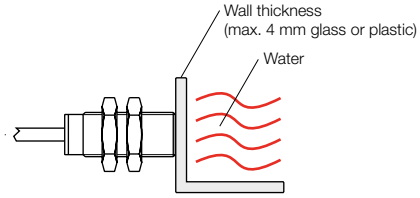
**Attention!**
To ensure that our sensors work reliably within their technical specifications, they have a greater sensing distance than the indicated maximum rated switching distance $s_n$. If the user now adjusts the switching distance for the above described ceramic plate to 4 mm, the sensor will operate in an unreliable range. This entails a risk that temperature and other environmental factors, plus electrical interference in the mains, may lead to faulty switching by the sensor.



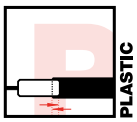

**Sensing levels through container walls**
A shielded capacitive sensor will be used to detect a liquid, e.g. water, through the container wall. This partition wall may only be made of glass or plastic. The basic calculation for the thickness of the wall thickness yields a value in millimeters of approx. 10 to 20% of the switching distance, but max. 4 mm (for standard sensors).

The sensor's face (active surface) is now glued to the glass or plastic wall or mounted on it in a maximally form-fitting configuration. The tank is then filled with water until approx. 30 to 50% of the sensor's active surface is covered.

When small and ultra-small quantities of liquid are being scanned, particularly, and if the sensor has not been mounted in a form-fitting configuration (flat sensor surface on a tank wall with a small radius), 30% should be selected as the coverage area. Now turn the sensor's potentiometer counter-clockwise (lower sensitivity) until the sensor switches off (for NO contact versions "LED OFF"). Now turn the potentiometer clockwise again (higher sensitivity) until the LED, and thus the output signal, just about switch on again. Using the calibration process described here ensures that the sensor does not detect the wall or the media residues on the wall, but only switches when the liquid has again reached the above-described level of 30 to 50%.

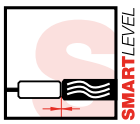


**Unshielded sensors**
These capacitive sensors with their circular electrical field are especially suited as level detectors for liquids, granulates or powders.




**Sensing levels directly in the container**
An unshielded capacitive sensor will be used to detect a granulate in a tank. The sensor is now installed in the tank with its active surface (clear zone at the head as described in the catalog), in a configuration ensuring that the head is completely covered by the product.

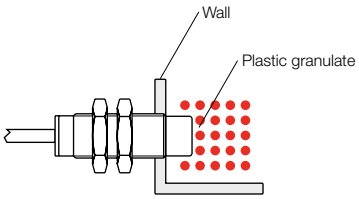
Now turn the sensor's potentiometer counter-clockwise (lower sensitivity) until the LED, and thus the output signal, switch off. Then turn the potentiometer clockwise (higher sensitivity) until the LED, and thus the output signal, just switches on again. Then turn the potentiometer another ¼-turn(90°-rotation) clockwise. This is to compensate for possible temperature fluctuations or changes in the moisture level of the product being scanned. If a medium has a high $\varepsilon_r$, especially water, the sensor will react much more sensitively. Therefore the adjustment should be made for around 50 to 80% coverage, or a sensor in the **SMART***LEVEL* series should be used.

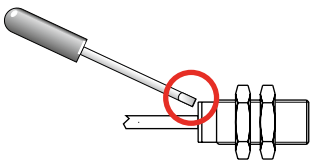



**Detecting levels of conductive liquids directly in the container or through a container wall**
The ideal level sensors **SMART***LEVEL* detect liquid media directly and all conductive or adhesive liquids through thicker container walls. And they do it without adjustment as long as the wall thickness does not exceed 6mm. For thicker walls the **SMART***LEVEL* will need to be adjusted. Adjustment is possible with the container empty or full.

**Adjusting with a full container**
First fill the container and install the sensor on the container wall. Now the **SMART***LEVEL* has contact and turns itself on.
Now turn the potentiometer slowly counter-clockwise until the sensor turns off. Now slowly turn the potentiometer (with the sensor switched off) clockwise until the sensor turns on again. At the turn-on point then turn the potentiometer another half-turn (approx. 180°) clockwise and the **SMART***LEVEL* sensor is adjusted.

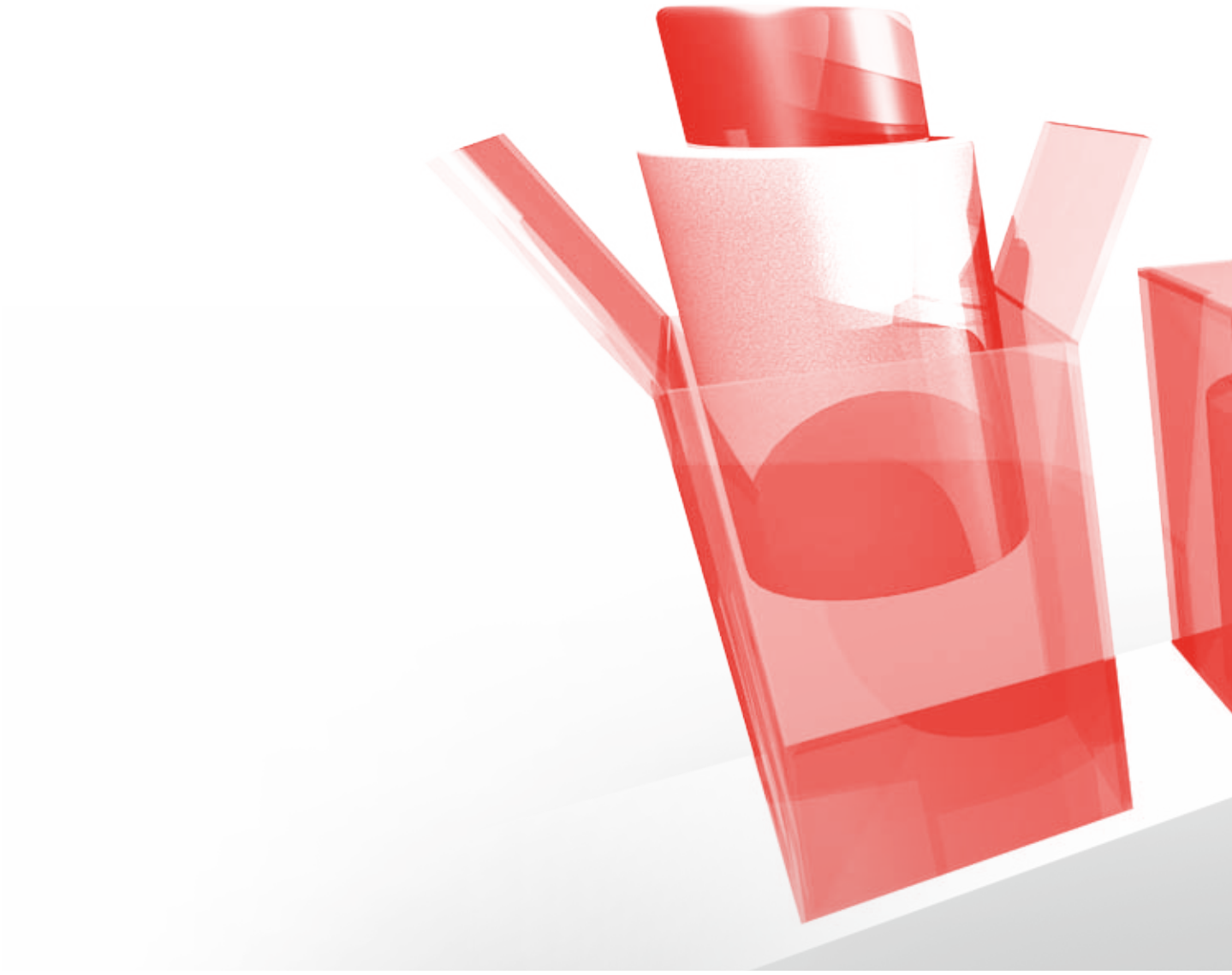
**Adjusting with an empty container**
Install the **SMART***LEVEL* sensor on the container wall. Now the **SMART***LEVEL* has contact and turns itself on. Now turn the potentiometer slowly counter-clockwise until the sensor turns off. Now slowly turn the potentiometer (with the sensor switched off) clockwise until the sensor turns on again. At the turn-on point the potentiometer only needs to be turned 3 times by approx. 360° counter-clockwise and the **SMART***LEVEL* sensor is adjusted.



**Important:** when calibrating capacitive sensors, the different material properties of the product being scanned must always be taken into consideration.

Capacitive sensors are accordingly fitted with a trimming potentiometer, which can be used to adjust the device's sensitivity. Turning the potentiometer clockwise increases the sensitivity. Turning the potentiometer counter-clockwise decreases the sensitivity.



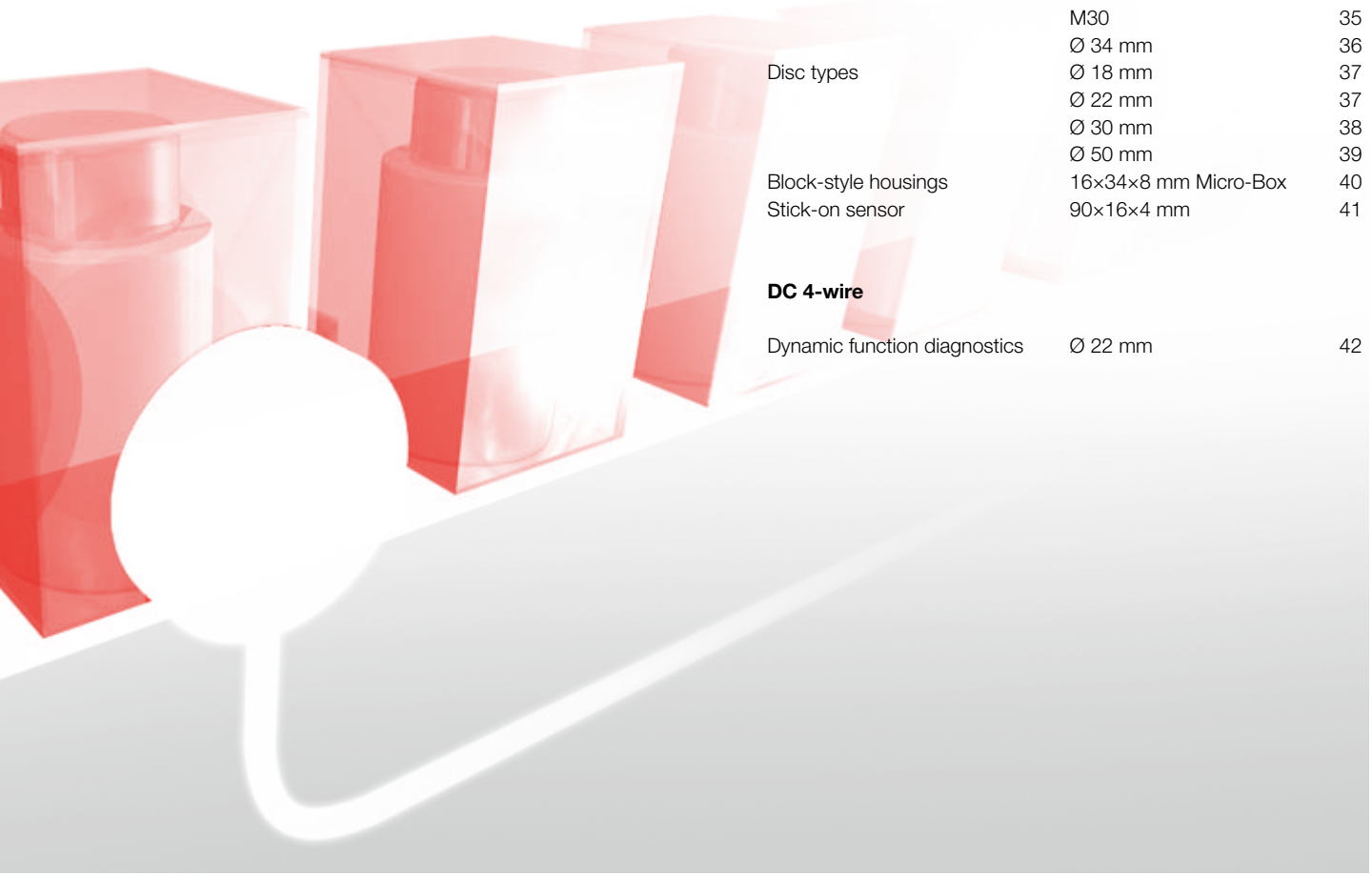
# Object Detection
## Contents

Industry standard capacitive sensors are M12 to M30 tubular housings. For small parts detection or installation in tight mounting spaces, however, smaller form factors are needed. The Balluff product line therefore offers a large selection of sizes and form factors. The small capacitive sensors can be calibrated simply using a separate sensor amplifier. And their rugged stainless steel housing ensures reliability even under challenging conditions.

Capacitive sensors from Balluff employ a straight-line electrical field. These sensors detect solid bodies (e.g. wafers, PCBs, cartons, paper stacks, bottles, plastic blocks and plates) and sense liquids through walls made of glass and plastic (thickness max. 4 mm).

Advantage: The straight-line electrical field also enables media having a low dielectric constant to be detected.



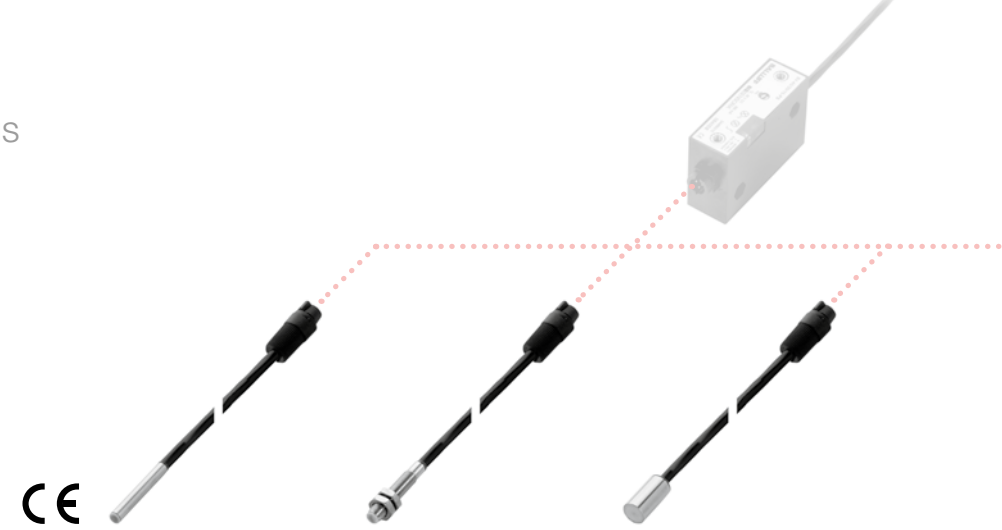





Electrical devices, connectors and holders see Accessories section starting **page 69**

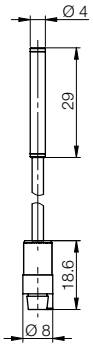
# Object Detection

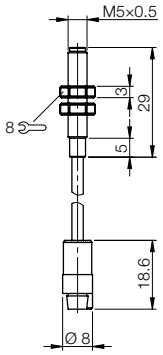
## DC 3-wire ·Tubular housings
## Ø 4 mm, M5, Ø 6.5 mm

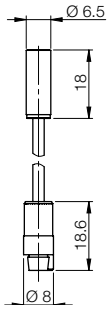


| | | | | | |
|---|---|---|---|---|---|
| Housing size | | | **Ø 4 mm** | **M5×0.5** | **Ø 6.5 mm** |
| Mounting | | | flush | flush | flush |
| Rated switching distance $s_n$ | | | **0.1…1 mm** | **0.1…1 mm** | **0.1…1.5 mm** |
| With sensor amplifier | | **Ordering code** | **BCS0010** | **BCS0011** | **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 71



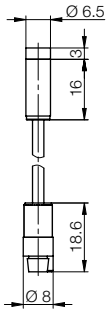



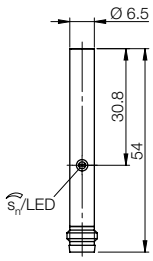



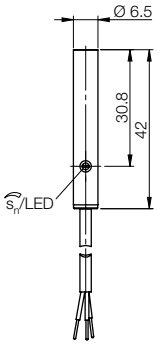


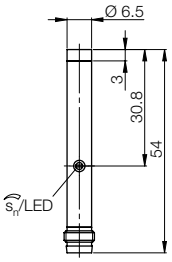


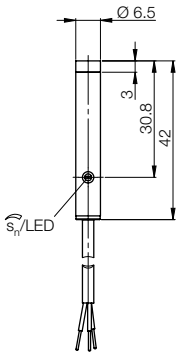
| | | | | | |
|---|---|---|---|---|---|
| | **Ø 6.5 mm** | **Ø 6.5 mm** | **Ø 6.5 mm** | **Ø 6.5 mm** | **Ø 6.5 mm** |
| | non-flush | flush | flush | non-flush | non-flush |
| | **0.1…3 mm** | **0.1…1.5 mm** | **0.1…1.5 mm** | **0.1…3 mm** | **0.1…3 mm** |
| | **BCS0013** | | | | |
| | BCS G06T4B-XXS30G-EP02-GZ01-002 | | | | |
| | | **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 types
Block-style
Stick-on sensor

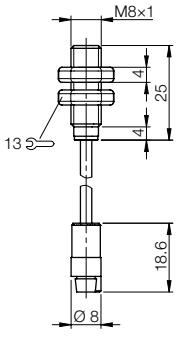
DC 4-wire
Dynamic function diagnostics

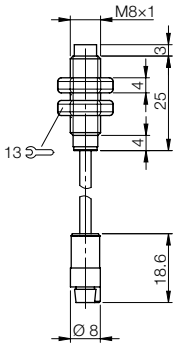


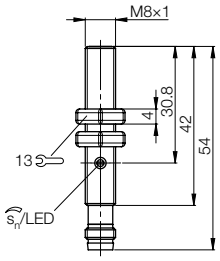
Electrical devices, connectors and holders see Accessories section starting **page 69**

| | | | | | |
|---|---|---|---|---|---|
| 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 |

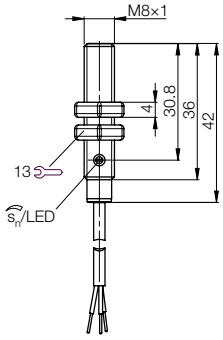
For sensor amplifiers see Accessories section Page 71

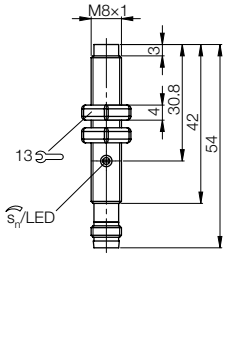


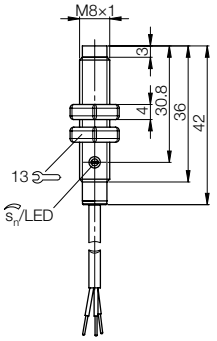



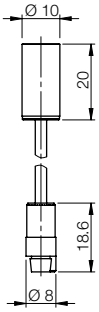



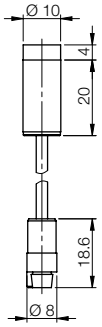
| | | | | | |
|---|---|---|---|---|---|
| | **M8 × 1** | **M8 × 1** | **M8 × 1** | **Ø 10 mm** | **Ø 10 mm** |
| | flush | non-flush | non-flush | flush | non-flush |
| | **0.1…1.5 mm** | **0.1…3 mm** | **0.1…3 mm** | **0.1…4 mm** | **1…8 mm** |
| | | | | **BCS0016** | **BCS0017** |
| | | | | BCS G10T4B-XXS40C-EP02-GZ01-002 | 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 |



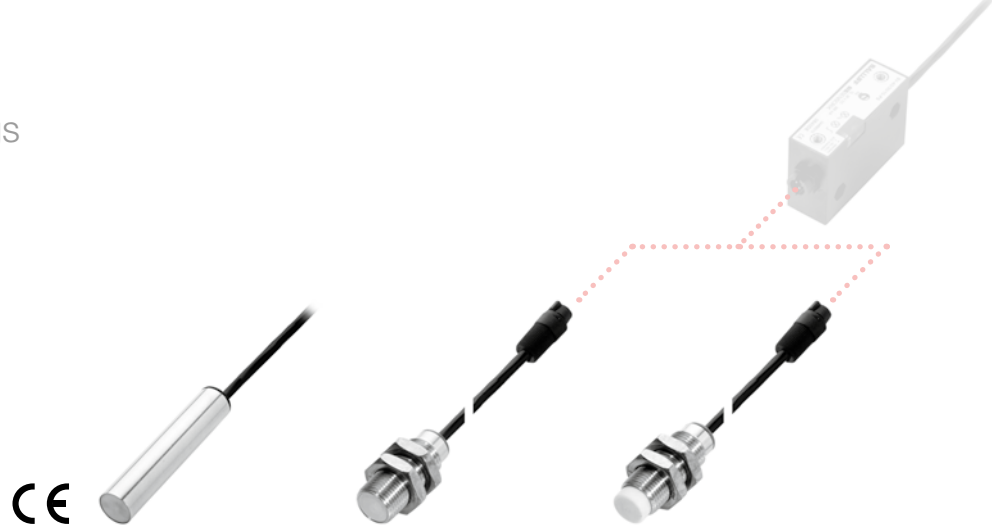




Electrical devices, connectors and holders see Accessories section starting **page 69**

# Object Detection

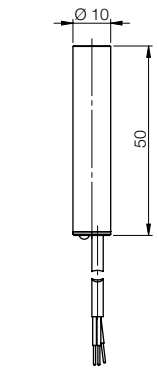
## DC 3-wire · Tubular housings
## Ø 10 mm, M12

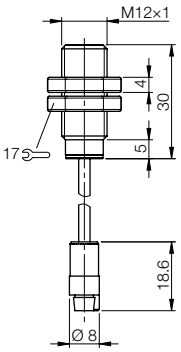


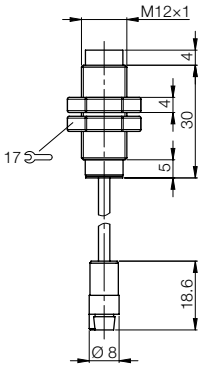
| | | | | | |
|---|---|---|---|---|---|
| Housing size | | | **Ø 10 mm** | **M12×1** | **M12×1** |
| Mounting | | | flush | flush | non-flush |
| Rated switching distance $s_n$ | | | **1…4 mm** | **0.1…4 mm** | **1…8 mm** |
| With sensor amplifier | | **Ordering code** | | **BCS0018** | **BCS0019** |
| | | 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 |

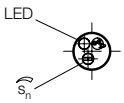
For sensor amplifiers see Accessories section Page 71

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.



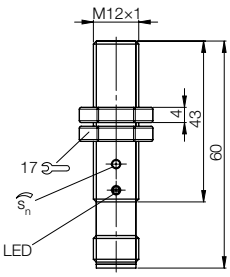



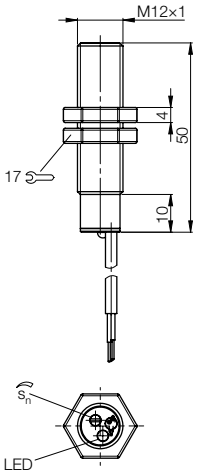



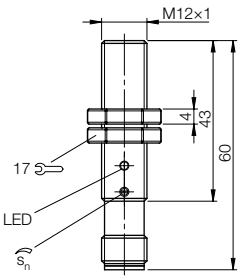


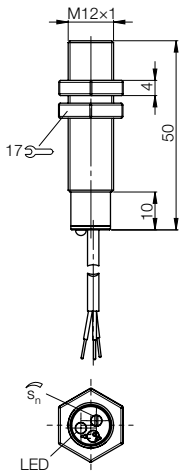


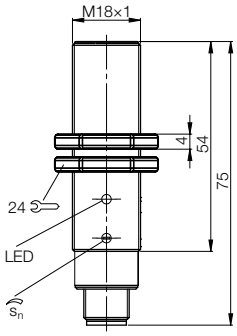
| | | | | | |
|---|---|---|---|---|---|
| | **M12×1** | **M12×1** | **M12×1** | **M12×1** | **M18×1** |
| | flush | flush | flush | flush | flush |
| | **1…4 mm** | **1…4 mm** | **1…4 mm** | **1…4 mm** | **2…8 mm** |
| | | | | | |
| | | | | | |
| | **BCS0037** | **BCS002Z** | **BCS003T** | **BCS003M** | **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 |
| Operating voltage | 12…35 V DC | 12…35 V DC | 12…35 V DC | 12…35 V DC | 10…35 V DC |
| Voltage drop | ≤ 0.8 V | ≤ 0.8 V | ≤ 0.8 V | ≤ 0.8 V | ≤ 1.5 V |
| Switching voltage | 75 V DC | 75 V DC | 75 V DC | 75 V DC | 75 V DC |
| Switching current | 200 mA | 200 mA | 200 mA | 200 mA | 300 mA |
| Current consumption | ≤ 10 mA | ≤ 10 mA | ≤ 10 mA | ≤ 10 mA | ≤ 10 mA |
| Short-circuit protection | yes/yes | yes/yes | yes/yes | yes/yes | yes/yes |
| Ambient temperature | –30…+70 °C | –30…+70 °C | –30…+60 °C | –30…+70 °C | –30…+70 °C |
| Switching frequency | 100 Hz | 100 Hz | 100 Hz | 100 Hz | 100 Hz |
| Function display | LED yellow | LED yellow | LED yellow | LED yellow | LED yellow |
| Protection rating | IP 65 | IP 65 | IP 65 | IP 65 | IP 67 |
| Housing material | V2A | V2A | PVC | PVC | V2A |
| Sensing face | PTFE | PTFE | PVC | PVC | PBT |
| Housing material | PA | POM | PA | PVC | PA |
| Connection | 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 |



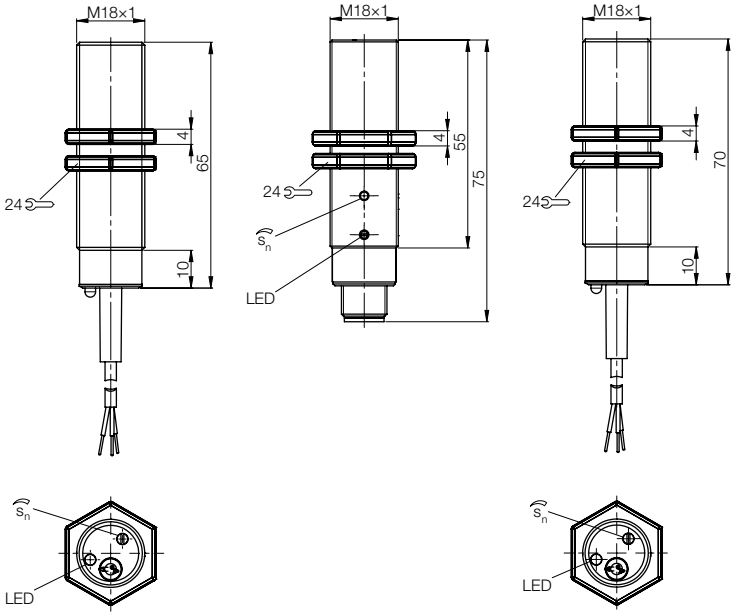




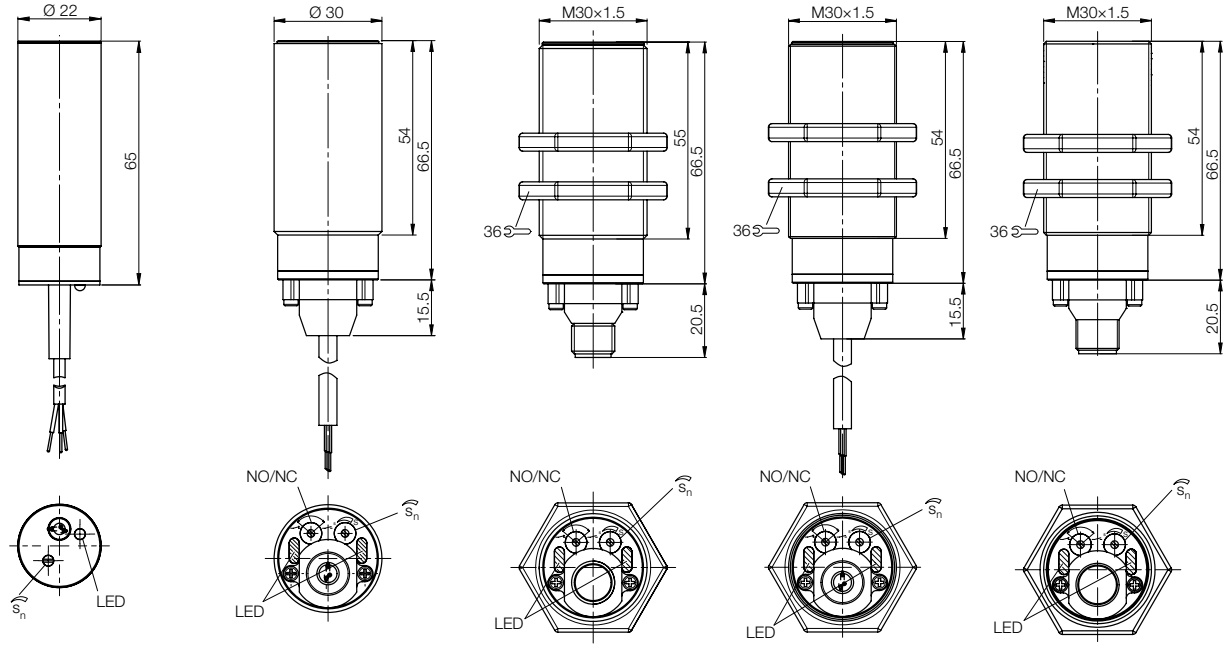
Electrical devices, connectors and holders see Accessories section starting **page 69**

| | | | | | |
|---|---|---|---|---|---|
| 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 |







Electrical devices, connectors and holders see Accessories section starting **page 69**

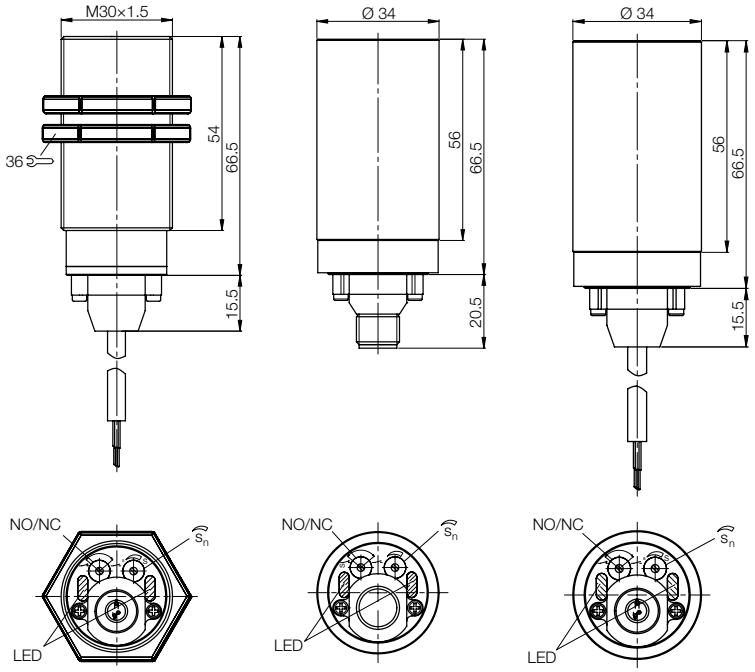
# Object Detection

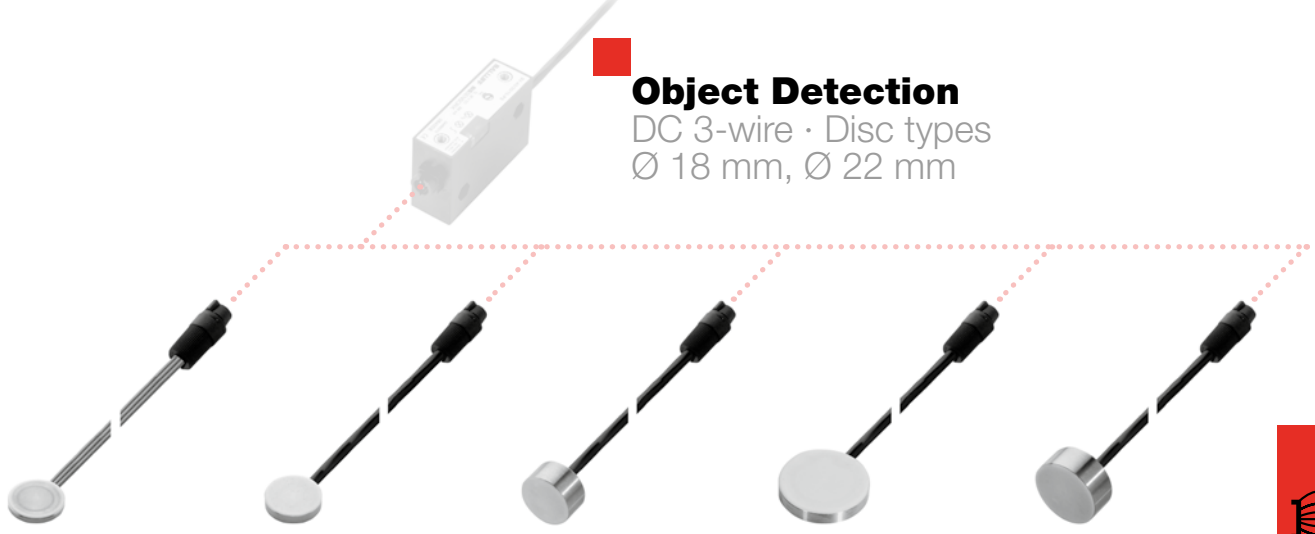
## DC 3-wire · Tubular housings
## M30, Ø 34 mm

| | | | | | |
|---|---|---|---|---|---|
| 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 |

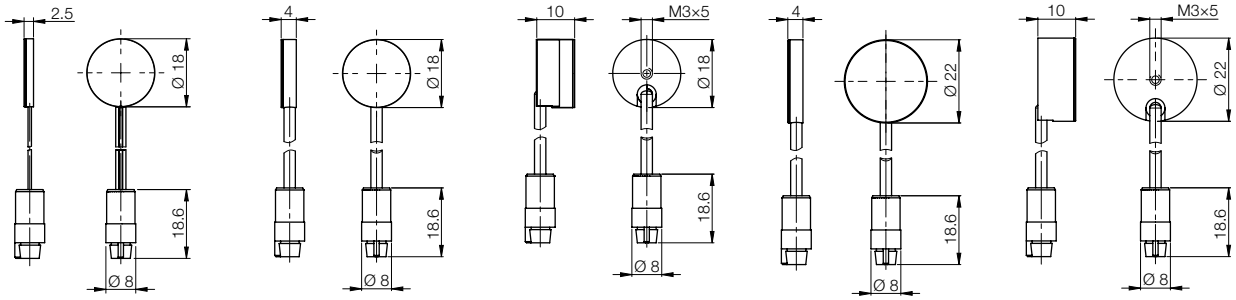
For sensor amplifiers see Accessories section Page 71

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.





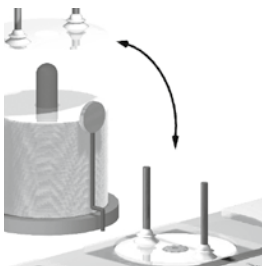
| | Ø 18×2.5 mm | Ø 18×4 mm | Ø 18×10 mm | Ø 22×4 mm | Ø 22×10 mm |
|---|---|---|---|---|---|
| | flush | flush | flush | flush | flush |
| | **0.1…3 mm** | **1…5 mm** | **1…5 mm** | **1…10 mm** | **1…10 mm** |
| | **BCS001A** | **BCS001C** | **BCS001E** | **BCS001F** | **BCS001H** |
| | BCS D18T403-XXS30C-EP02-GZ01-002 | 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 |

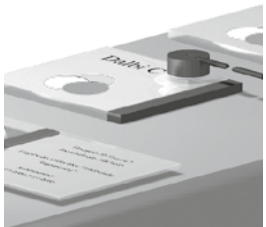


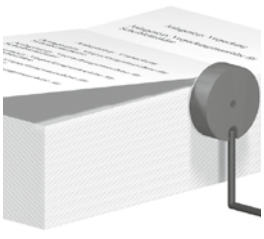




Electrical devices, connectors and holders see Accessories section starting **page 69**

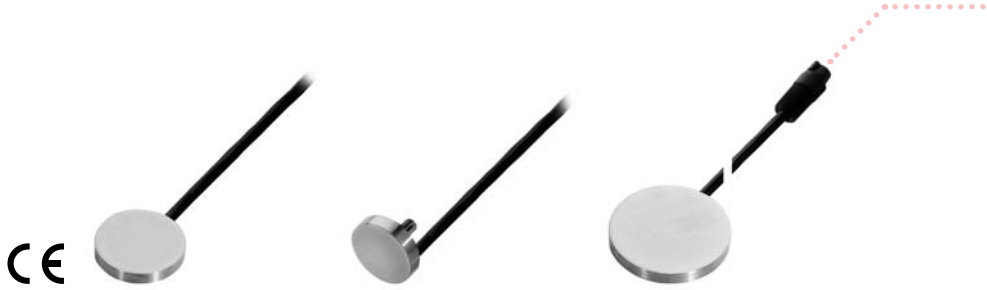







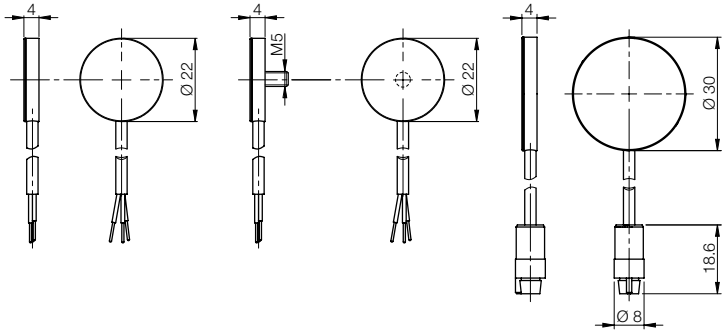
# Object Detection

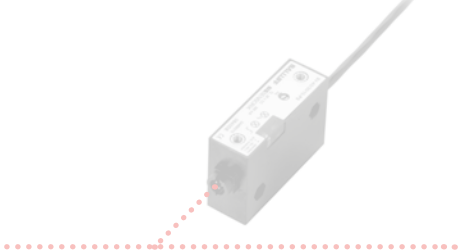
## DC 3-wire · Disc types
## Ø 22 mm, Ø 30 mm



| | | | | | |
|---|---|---|---|---|---|
| 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 NO/NC selectable | | **Ordering code** | | | |
| | | 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 71

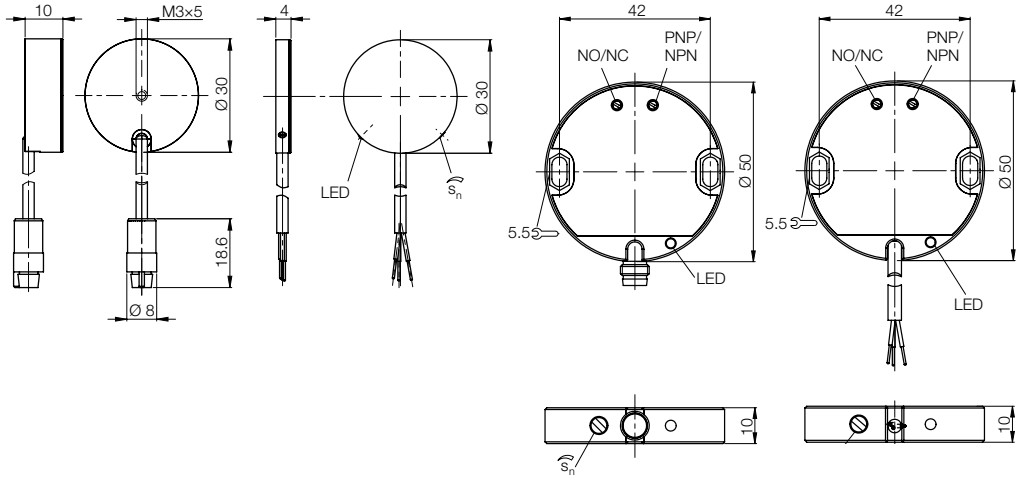




# Object Detection

## DC 3-wire · Disc types
## Ø 30 mm, Ø 50 mm


| | 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 | |

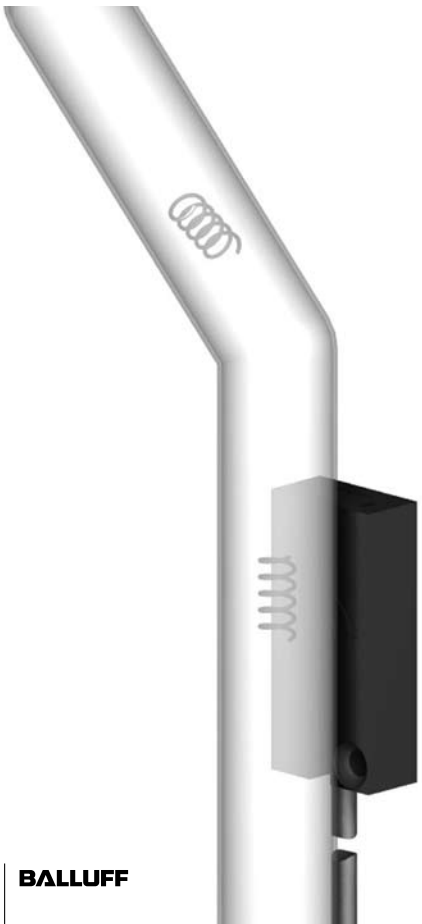


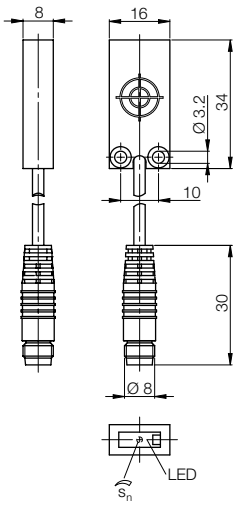




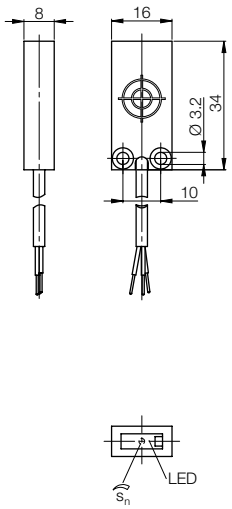
Electrical devices, connectors and holders see Accessories section starting **page 69**

| | | | | |
|---|---|---|---|---|
| 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 |

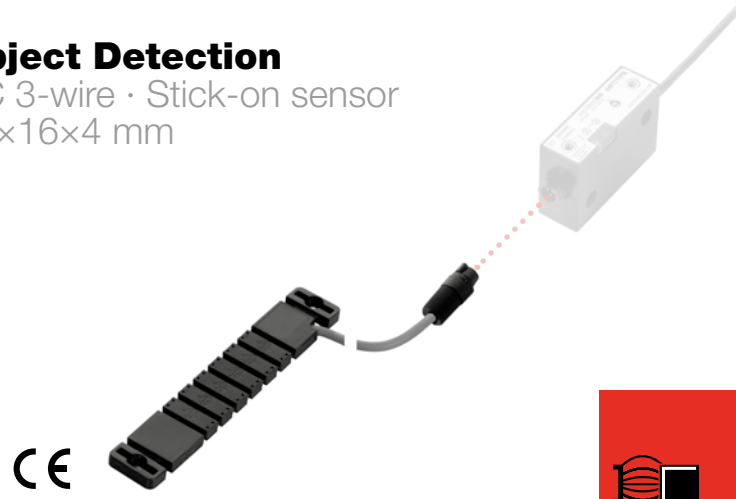





Mounting frame included in scope of delivery

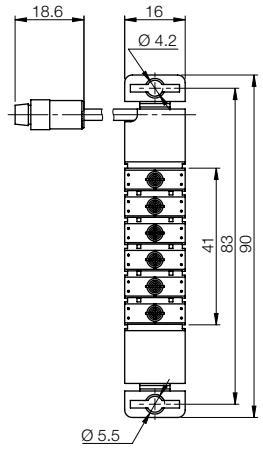



Mounting frame included in scope of delivery



| | | |
|---|---|---|
| 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 |

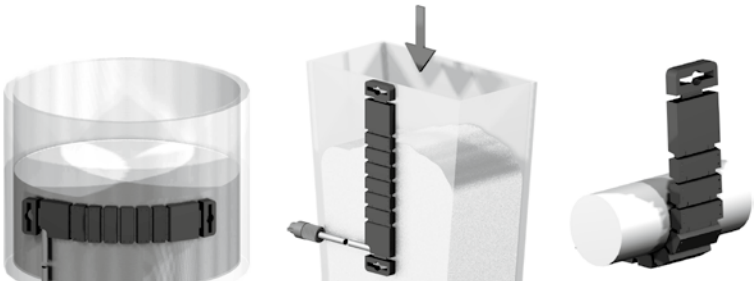

For sensor amplifiers see Accessories section Page 71





Electrical devices, connectors and holders see Accessories section starting **page 69**

**Function**
Proximity switches with dynamic diagnostics allow monitoring of the sensor functions including the cable.

The oscillator state is changed by means of a pulse generator while the switch is operating. As soon as there is any damage to the sensor head or the oscillator fails electrically, the pulse generator can no longer change the oscillator state and there are no longer pulses on the output.

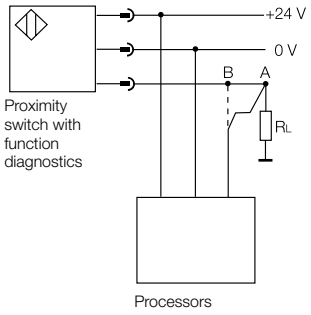
The pulse frequency is f ~ 160 Hz and the pulse duration t ~ 300 µs. The pulse-pause ratio of t ~ 5 % is selected small enough that the test pulses can be filtered out by the input filter of a controller, or, for example, a relay can be directly driven. The information "proximity switch damped or undamped"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

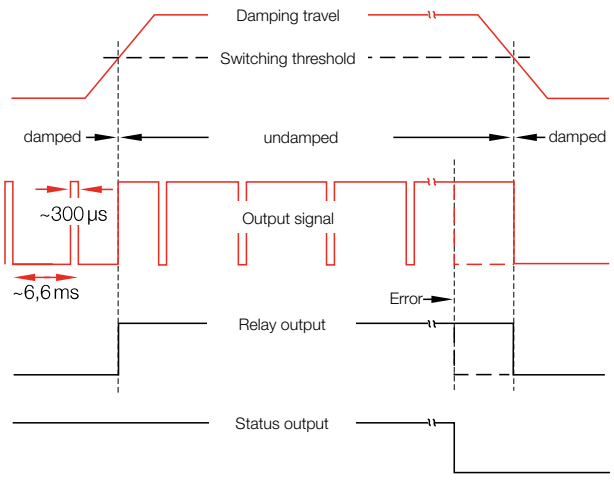
**Function monitoring**
The test pulses and thereby the function of the proximity switch are monitored by additional electronics which signal error-free function by means of a high level on the "Status/Output" message output.

For this, Balluff offers a function diagnostics unit which can be easily installed in a controller:

**Note!**
**The system described here is not suitable for systems with personal protection. For additional information please request a device 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.



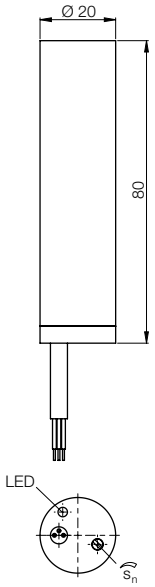




*Pulse diagram of a proximity switch with function diagnostics (normally closed)*

# Object Detection

## DC 4-wire · dynamic function diagnostics
## Ø 20 mm

| | | |
|---|---|---|
| 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 77

DC 3-wire
Tubular housings
Disc types
Block-style
Stick-on sensor

DC 4-wire
**Dynamic function diagnostics**

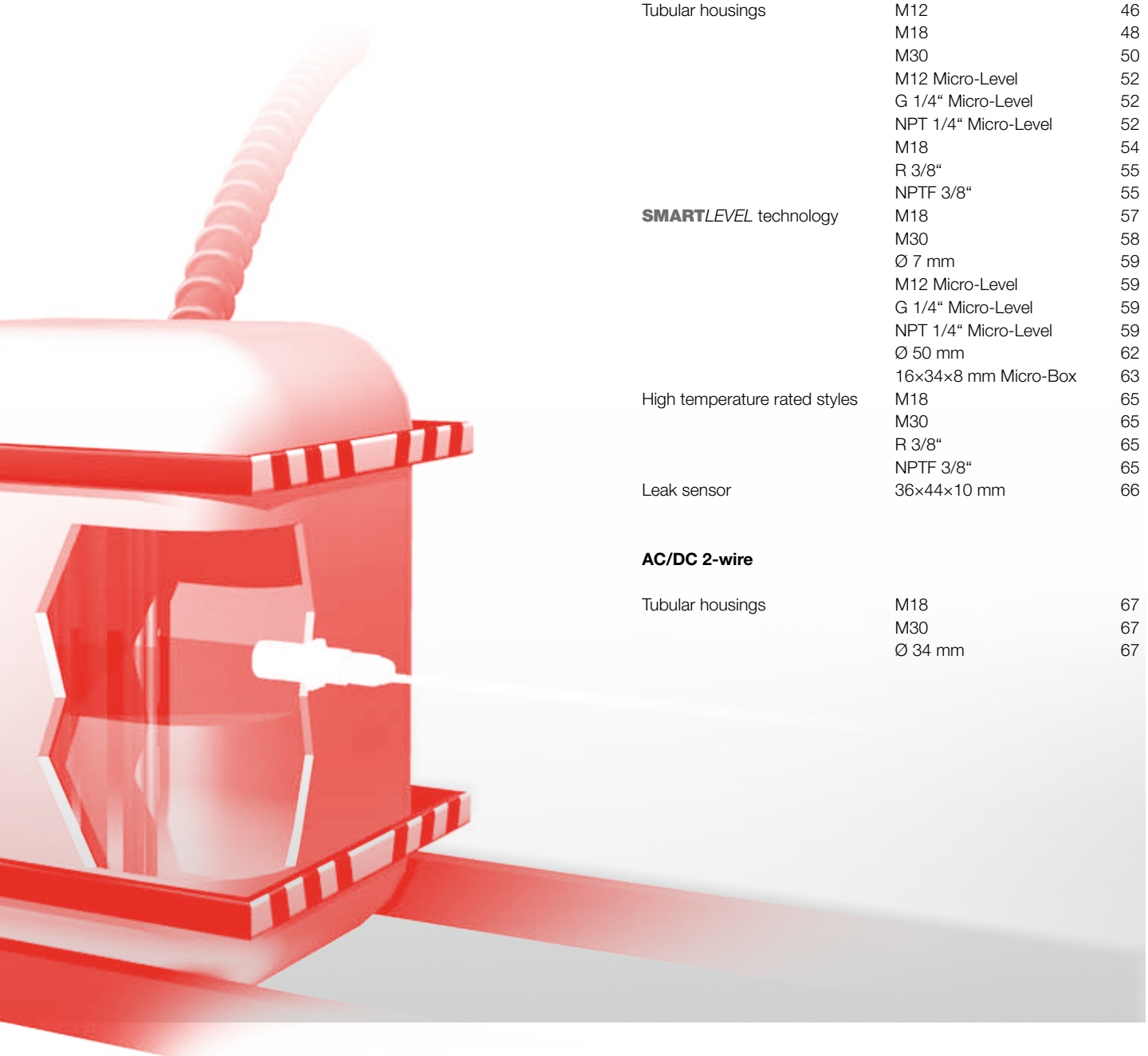
Electrical devices, connectors and holders see Accessories section starting **page 69**

# 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.





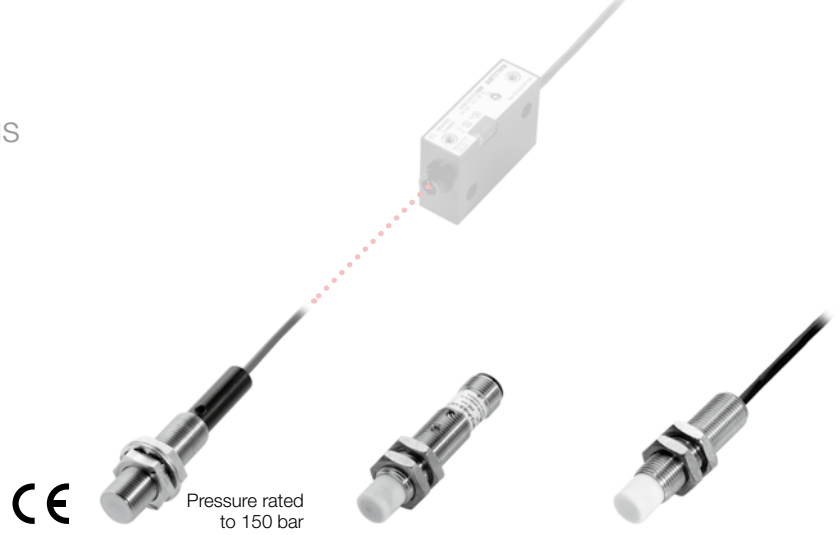

**DC 3-wire**
Tubular housings
**SMART***LEVEL* technology
High temperature rated styles
Leak sensor

**AC/DC 2-wire**
Tubular housings

Electrical devices, connectors and holders see Accessories section starting **page 69**

# Level Detection

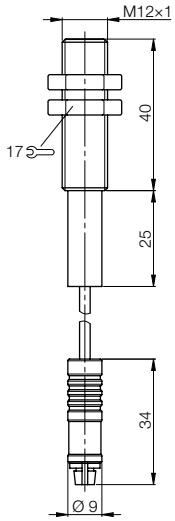
## DC 3-wire · Tubular housings
## M12

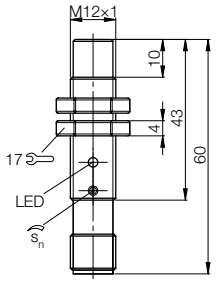


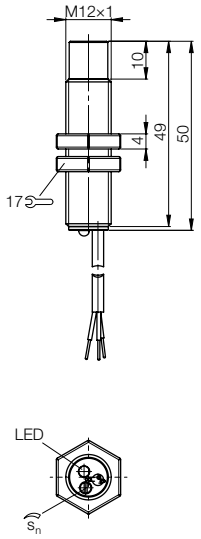
Pressure rated to 150 bar

| | | | | | |
|---|---|---|---|---|---|
| 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 | | | no/yes | 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 71



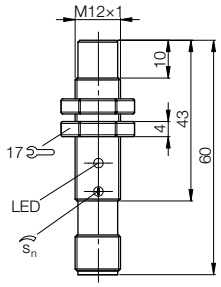

**For direct installation in containers**

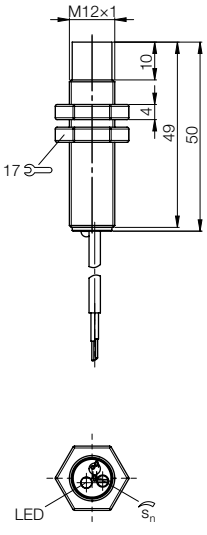
The non-flush mount sensors for level detection M12...M30 in plastic or PTFE housing provide IP 68 protection (at approx. 5 bar) at the sensing face. Sensors in stainless steel housing meet IP 67 at the sensing face.

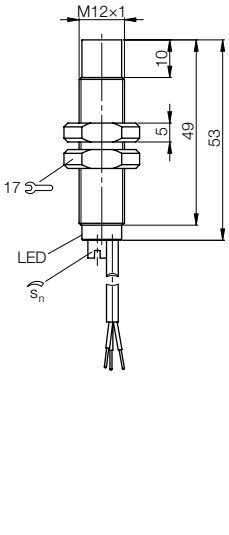
Especially EMC resistant, above standard

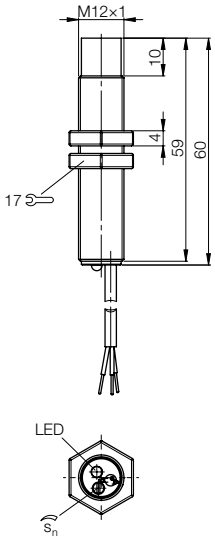
Especially EMC resistant, above standard

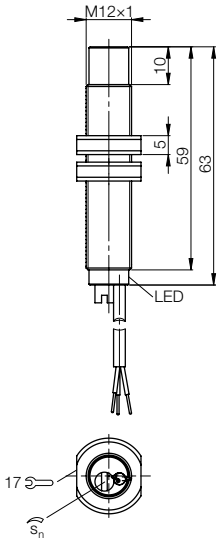
| | | | | |
|---|---|---|---|---|
| **M12×1** | **M12×1** | **M12×1** | **M12×1** | **M12×1** |
| non-flush | non-flush | non-flush | non-flush | non-flush |
| **1…8 mm** | **1…8 mm** | **1…8 mm** | **1…6 mm** | **1…6 mm** |
| | | | | |
| | | | | |
| **BCS005Y** | **BCS0059** | **BCS006Z** | **BCS006T** | **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**
**SMART***LEVEL* technology
High temperature rated styles
Leak sensor

**AC/DC 2-wire**
Tubular housings

Electrical devices, connectors and holders see Accessories section starting **page 69**

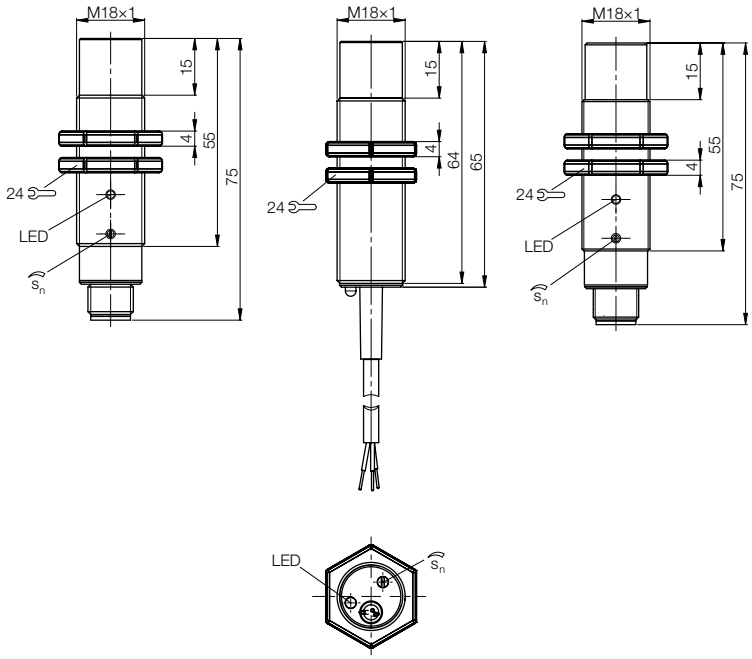
# Level Detection

## DC 3-wire · Tubular housings
## M18

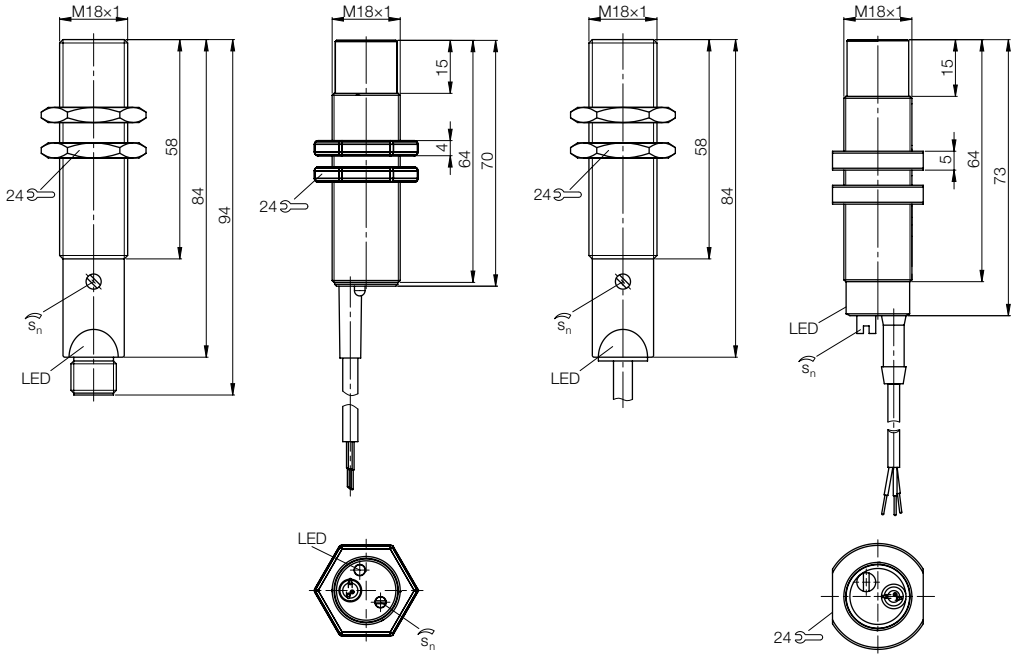
| | | | | | |
|---|---|---|---|---|---|
| Housing size | | | **M18×1** | **M18×1** | **M18×1** |
| Mounting | | | non-flush | non-flush | non-flush |
| Rated switching distance $s_n$ | | | **2…15 mm** | **2…15 mm** | **2…15 mm** |
| PNP | Normally open | **Ordering code** | **BCS006A** | **BCS005R** | **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 |

**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.



| | | | | |
|---|---|---|---|---|
| | **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 |
| | 250 V AC (⧈) | 75 V DC | 250 V AC (⧈) | 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 |





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

AC/DC 2-wire
Tubular housings

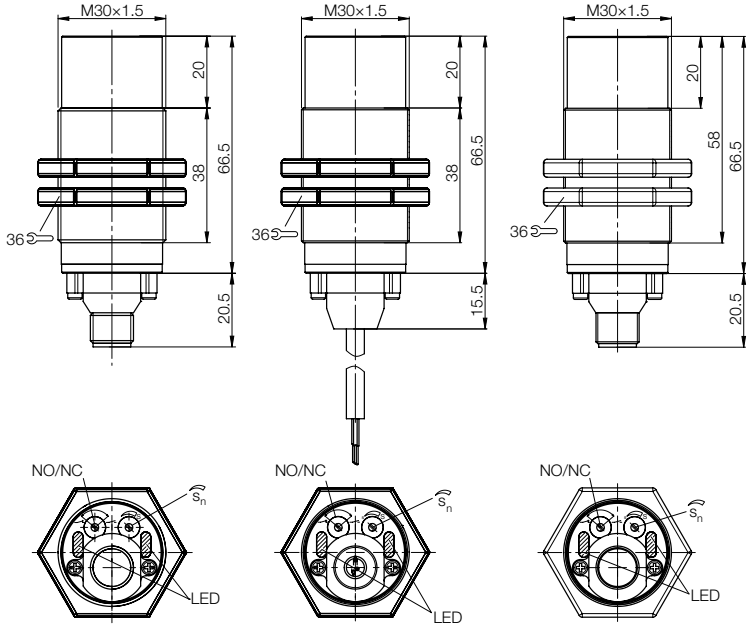
Electrical devices, connectors and holders see Accessories section starting **page 69**

# Level Detection
## DC 3-wire · Tubular housings
## M30

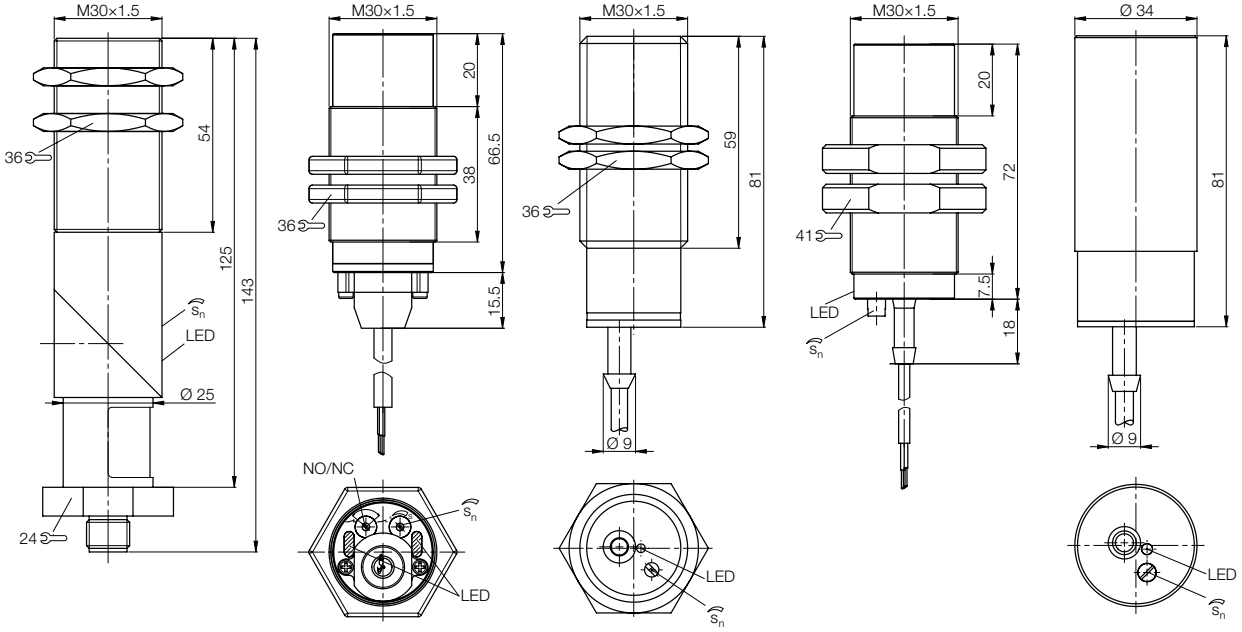
| | | | | | |
|---|---|---|---|---|---|
| Housing size | | | **M30×1.5** | **M30×1.5** | **M30×1.5** |
| Mounting | | | non-flush | non-flush | non-flush |
| Rated switching distance $s_n$ | | | **1…30 mm** | **2…30 mm** | **1…30 mm** |
| PNP | Normally open | **Ordering code** | | | |
| | | Part number | | | |
| 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.



| | | | | | |
|---|---|---|---|---|---|
| | **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 |




Mounting cuff included in scope of delivery


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

AC/DC 2-wire
Tubular housings

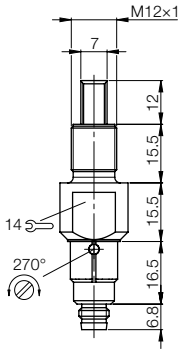
Electrical devices, connectors and holders see Accessories section starting **page 69**

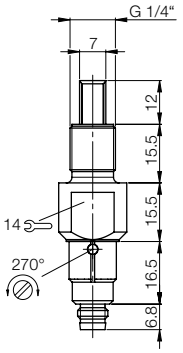
# Level Detection

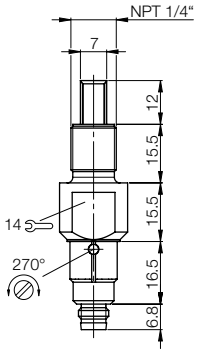
## DC 3-wire · Tubular housings
## Micro-Level M12, G 1/4“, NPT 1/4“

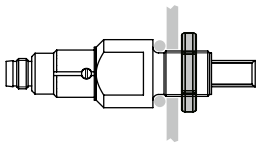
| | | | | |
|---|---|---|---|---|
| Housing size | | **M12×1** Micro-Level | **G 1/4“** Micro-Level | **NPT 1/4“** Micro-Level |
| Mounting | | non-flush | non-flush | non-flush |
| Rated switching distance $s_n$ | | **Level adjustable** | **Level adjustable** | **Level adjustable** |
| PNP/NPN and | **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 67 (Sensing face: IP 68 at max. 10 bar) | IP 67 (Sensing face: IP 68 at max. 10 bar) | IP 67 (Sensing face: IP 68 at max. 10 bar) |
| 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 100

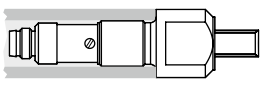


**Standard mounting** uses through-holes with included nut. This can be ignored when threaded holes are used or serve as additional security. Sealing is accomplished using an O-ring or gasket.

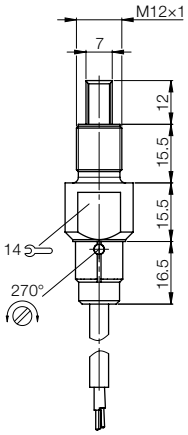


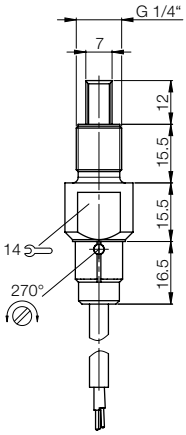
**Reverse mounting** in a tube of any desired length for fashioning "point-switching" rod sensors. Here also sealing can be accomplished using an O-ring or a gasket.

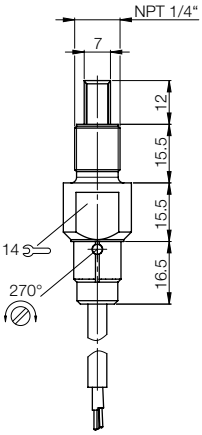


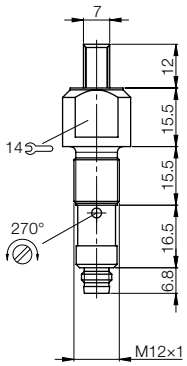


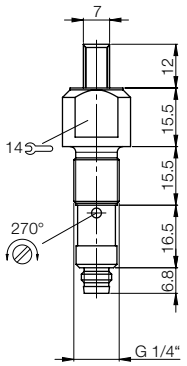
| | | | | | |
|---|---|---|---|---|---|
| | **M12×1** Micro-Level | **G 1/4“** Micro-Level | **NPT 1/4“** Micro-Level | **M12×1** Micro-Level | **G 1/4“** Micro-Level |
| | non-flush | non-flush | non-flush | non-flush | non-flush |
| | **Level adjustable** | **Level adjustable** | **Level adjustable** | **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 67 | IP 67 | IP 67 | IP 64 | IP 64 |
| | (Sensing face: | (Sensing face: | (Sensing face: | (Sensing face: | (Sensing face: |
| | IP 68 at max. 10 bar) | IP 68 at max. 10 bar) | IP 68 at max. 10 bar) | IP 68 at max. 10 bar) | IP 68 at max. 10 bar) |
| | PSU | PSU | PSU | PSU | PSU |
| | PSU | PSU | PSU | PSU | PSU |
| | PSU | PSU | PSU | PSU | PSU |
| | 2 m cable PUR, | 2 m cable PUR, | 2 m cable PUR, | M8 connector, | M8 connector, |
| | 3×0.34 mm² | 3×0.34 mm² | 3×0.34 mm² | 3-pin | 3-pin |




**DC 3-wire**

**Tubular housings**

**SMART***LEVEL* technology

High temperature rated styles

Leak sensor

**AC/DC 2-wire**

Tubular housings

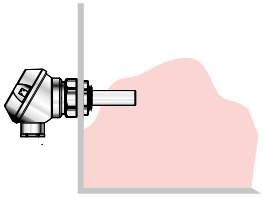

Electrical devices, connectors and holders see Accessories section starting **page 69**

# Level Detection

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

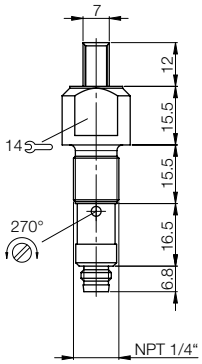
Pressure rated to 10 bar

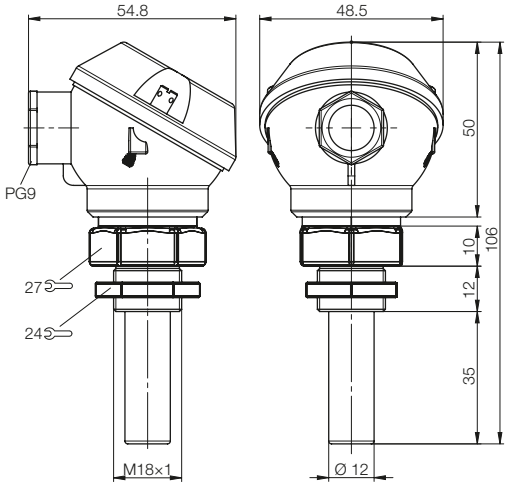
| | | | | |
|---|---|---|---|---|
| Housing size | | | **NPT 1/4“** Micro-Level | **M18×1** |
| Mounting | | | non-flush | non-flush |
| Rated switching distance $s_n$ | | | **Level adjustable** | **Level adjustable** |
| PNP | Normally open | **Ordering code** | | **BCS006H** |
| | | Part number | | 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 64<br>(Sensing face:<br>IP 68 at max. 10 bar) | IP 67<br>(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,<br>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.



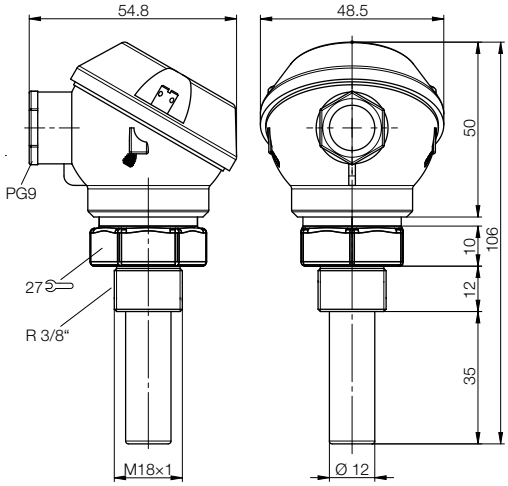




Gasket not included in the scope of delivery

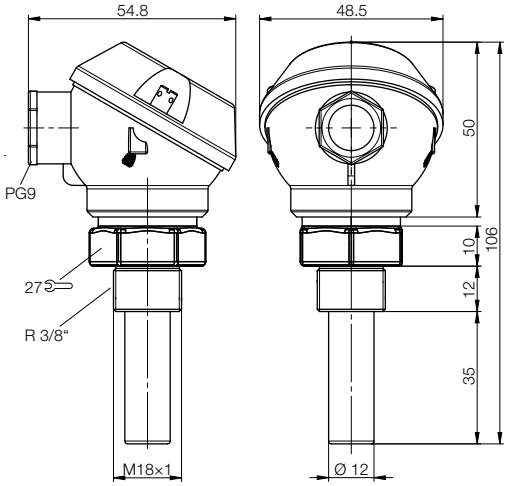
Pressure rated to 10 bar

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<br>(Sensing face: IP 68 at max. 10 bar) | IP 67<br>(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 | |




Gasket not included in the scope of delivery




Gasket not included in the scope of delivery


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

AC/DC 2-wire
Tubular housings



Electrical devices, connectors and holders see Accessories section starting **page 69**

**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. Because **SMART***LEVEL* sensors can do far more - precisely when all other types have long since taken in their sails: in applications that were previously either tricky or simply impossible to solve. **SMART***LEVEL* sensors go the extra mile.

**SMART***LEVEL*
- Compensate for moisture, foam and build-up
- Penetrate glass or plastic walls even over 10 mm thick
- Detect aqueous to highly conductive media
- Feature chemically resistant housings made of PTFE

**SMART***LEVEL* sensors reduce cost
- Adjustment-free installation and
- Freedom from cleaning in most applications
- Reduced use of materials and
- 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. If needed, the calibration can be changed at the factory.

**Note on cable routing**
The connection cable should not be coiled behind the sensor. Instead, shorten the cable if needed or route it loosely.

**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

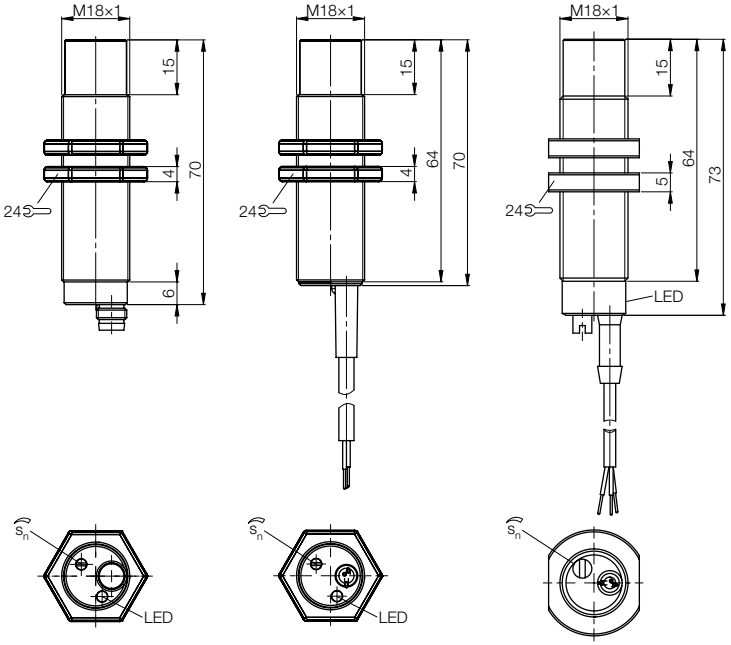
| | | | | | |
|---|---|---|---|---|---|
| Housing size | | | **M18×1** | **M18×1** | **M18×1** |
| Mounting | | | non-flush | non-flush | non-flush |
| Rated switching distance $s_n$ | | | **Self-adjusting** | **Self-adjusting** | **Self-adjusting** |
| PNP | Normally open | **Ordering code** | **BCS008T** | **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 |


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

**AC/DC 2-wire**
Tubular housings


**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.





Electrical devices, connectors and holders see Accessories section starting **page 69**

**SMART***LEVEL* 15

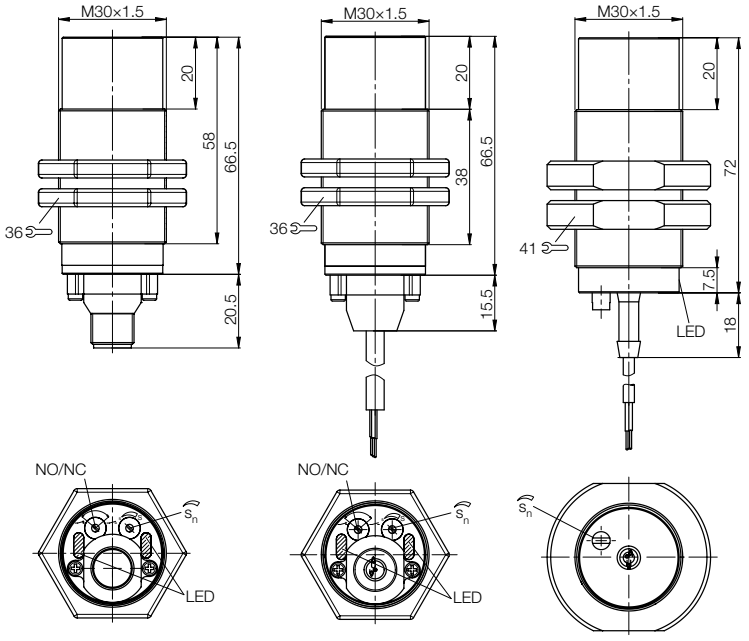
**SMART***LEVEL* 15

**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.



**SMART***LEVEL* 15

| **Ø 7×52 mm** |
|---|
| non-flush |
| **Self-adjusting** |
| **BCS009C** |
| BCS S20TT01-PSLFAG-ET02 |
| **BCS009E** |
| BCS S20TT01-POLFAG-ET02 |
| |
| **BCS009F** |
| BCS S20TT01-NSLFAG-ET02 |
| **BCS009H** |
| BCS S20TT01-NOLFAG-ET02 |
| |
| |
| |
| 10…30 V DC |
| ≤ 1.5 V |
| 75 V DC |
| 50 mA |
| ≤ 20 mA |
| no/no |
| +5…+100 °C |
| 10 Hz |
| |
| |
| IP 66 |
| PTFE |
| PTFE |
| PTFE |
| 2 m cable PTFE, 3×0.2 mm² |

**SMART***LEVEL* 15

| **M12×1** Micro-Level |
|---|
| non-flush |
| **Self-adjusting** |
| |
| |
| |
| |
| |
| |
| |
| **BCS0095** |
| BCS S41SS01-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 67 (Sensing face: IP 68 at max. 10 bar) |
| PSU |
| PSU |
| PSU |
| M8 connector, 3-pin |

**SMART***LEVEL* 15

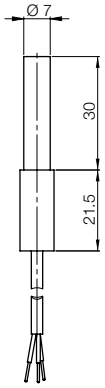
| **G 1/4“** Micro-Level |
|---|
| non-flush |
| **Self-adjusting** |
| |
| |
| |
| |
| |
| |
| |
| **BCS0096** |
| BCS S41SS02-GPCFAG-S49G |
| 10…35 V DC |
| ≤ 3 V |
| 75 V DC |
| 50 mA |
| ≤ 20 mA |
| no/yes |
| –10…+105 °C |
| 5 Hz |
| LED green |
| LED yellow |
| IP 67 (Sensing face: IP 68 at max. 10 bar) |
| PSU |
| PSU |
| PSU |
| M8 connector, 3-pin |

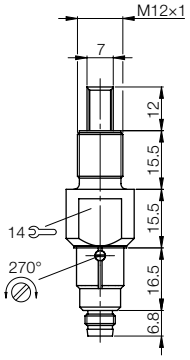
**SMART***LEVEL* 15

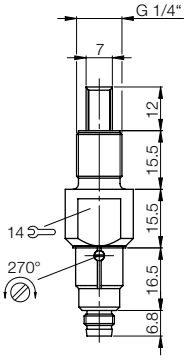
| **NPT 1/4“** Micro-Level |
|---|
| non-flush |
| **Self-adjusting** |
| |
| |
| |
| |
| |
| |
| |
| **BCS0097** |
| BCS S41SS03-GPCFAG-S49G |
| 10…35 V DC |
| ≤ 3 V |
| 75 V DC |
| 50 mA |
| ≤ 20 mA |
| no/yes |
| –10…+105 °C |
| 5 Hz |
| LED green |
| LED yellow |
| IP 67 (Sensing face: IP 68 at max. 10 bar) |
| PSU |
| PSU |
| PSU |
| M8 connector, 3-pin |

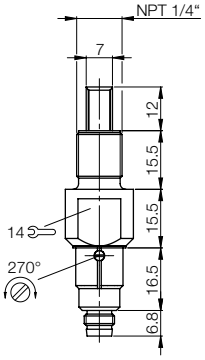
**SMART***LEVEL* 15

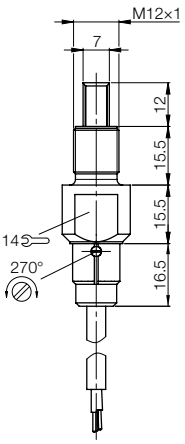
| **M12×1** Micro-Level |
|---|
| non-flush |
| **Self-adjusting** |
| |
| |
| |
| |
| |
| |
| |
| **BCS008Z** |
| BCS S40SS01-GPCFAG-EP02 |
| 10…35 V DC |
| ≤ 3 V |
| 75 V DC |
| 50 mA |
| ≤ 20 mA |
| no/yes |
| –10…+105 °C |
| 5 Hz |
| LED green |
| LED yellow |
| IP 67 (Sensing face: IP 68 at max. 10 bar) |
| PSU |
| PSU |
| PSU |
| 2 m cable PUR, 3×0.34 mm² |




Shield (M18 or 1/2“) for Micro-Level sensors
see Accessories section Page 100


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

**AC/DC 2-wire**
Tubular housings

Electrical devices, connectors and holders see Accessories section starting **page 69**

# Level Detection

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

## Micro-Level G 1/4“, NPT 1/4“, M12

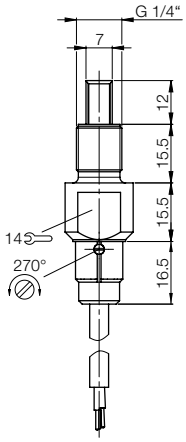
**SMART***LEVEL* 15

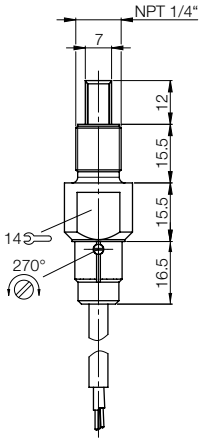
**SMART***LEVEL* 15

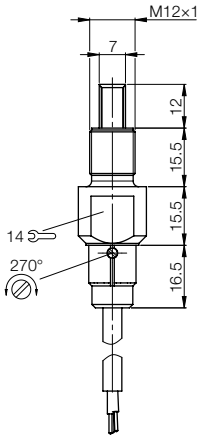
**SMART***LEVEL* 15

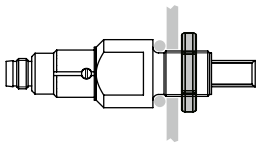
| | | | | |
|---|---|---|---|---|
| Housing size | | **G 1/4“** Micro-Level | **NPT 1/4“** Micro-Level | **M12×1** Micro-Level |
| Mounting | | non-flush | non-flush | non-flush |
| Rated switching distance $s_n$ | | **Self-adjusting** | **Self-adjusting** | **Self-adjusting** |
| PNP/NPN and | **Ordering 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 | 50/50 mA push-pull |
| 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 67 (Sensing face: IP 68 at max. 10 bar) | IP 67 (Sensing face: IP 68 at max. 10 bar) | IP 67 (Sensing face: IP 68 at max. 10 bar) |
| 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 100

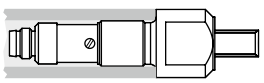


**Standard mounting** uses through-holes with included nut. This can be ignored when threaded holes are used or serve as additional security. Sealing is accomplished using an O-ring or gasket.



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

**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 67 (Sensing face: IP 68 at max. 10 bar) |
| 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 67 (Sensing face: IP 68 at max. 10 bar) |
| 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 64 (Sensing face: IP 68 at max. 10 bar) |
| PSU |
| PSU |
| PSU |
| M8 connector, 3-pin |

**SMART***LEVEL* 15

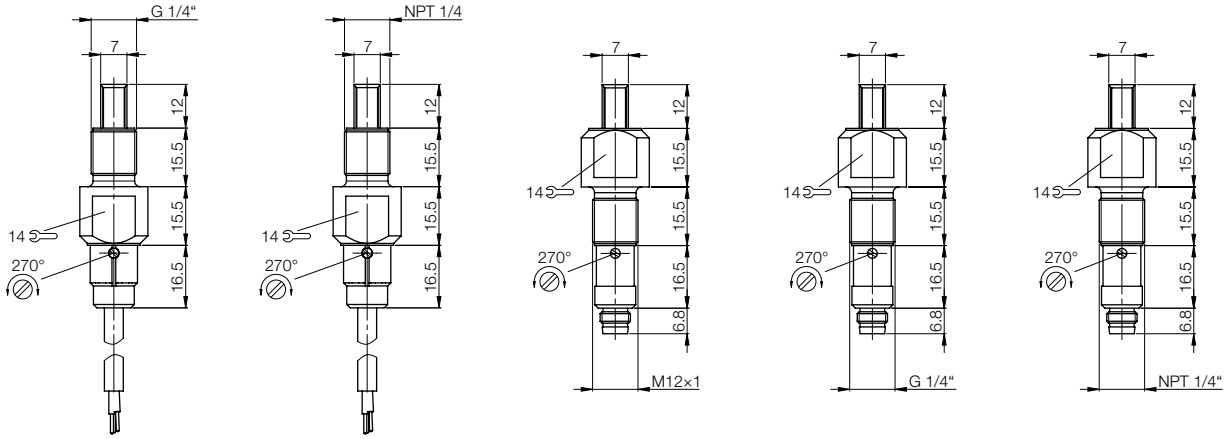
| **G 1/4“** Micro-Level |
|---|
| non-flush |
| **Self-adjusting** |
| **BCS0099** |
| BCS S42SS02-GPCFAG-S49G |
| 10…35 V DC |
| ≤ 3 V |
| 75 V DC |
| 50 mA |
| ≤ 20 mA |
| no/yes |
| –10…+105 °C |
| 5 Hz |
| LED green |
| LED yellow |
| IP 64 (Sensing face: IP 68 at max. 10 bar) |
| PSU |
| PSU |
| PSU |
| M8 connector, 3-pin |

**SMART***LEVEL* 15

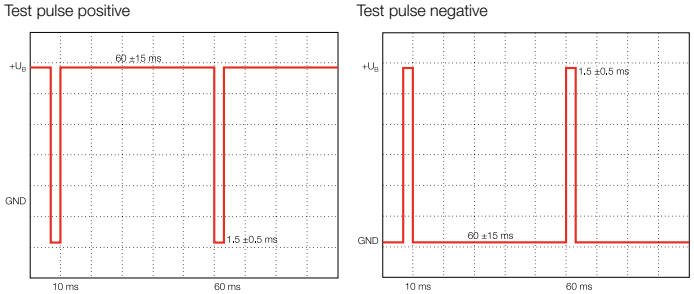
| **NPT 1/4“** Micro-Level |
|---|
| non-flush |
| **Self-adjusting** |
| **BCS009A** |
| BCS S42SS03-GPCFAG-S49G |
| 10…35 V DC |
| ≤ 3 V |
| 75 V DC |
| 50 mA |
| ≤ 20 mA |
| no/yes |
| –10…+105 °C |
| 5 Hz |
| LED green |
| LED yellow |
| IP 64 (Sensing face: IP 68 at max. 10 bar) |
| PSU |
| PSU |
| PSU |
| M8 connector, 3-pin |


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

**AC/DC 2-wire**
Tubular housings


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





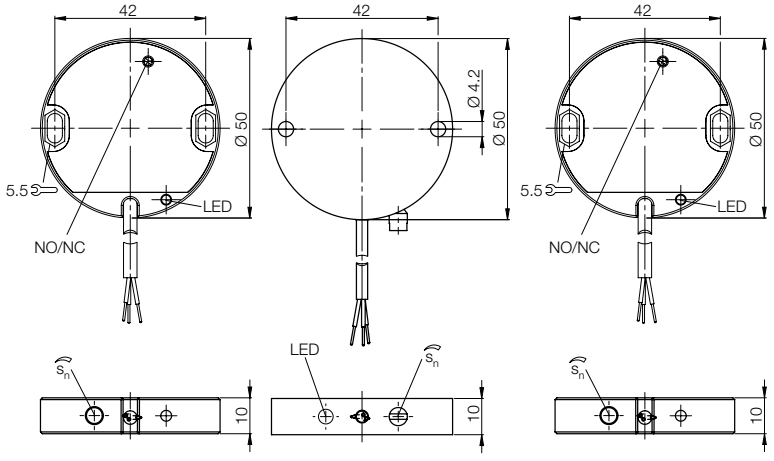
Electrical devices, connectors and holders see Accessories section starting **page 69**

**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 |



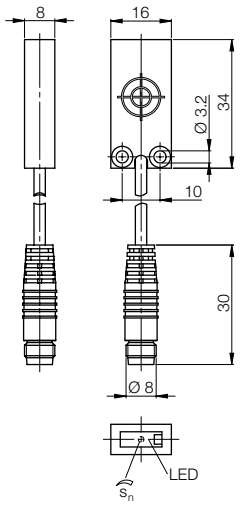
**SMART***LEVEL* 15

**SMART***LEVEL* 15

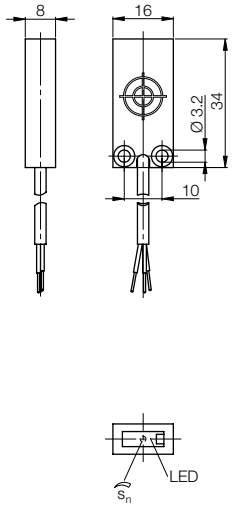
Available starting 2010

**SMART***LEVEL* 500+

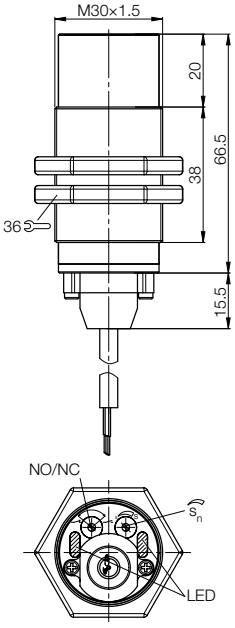
| | | | | |
|---|---|---|---|---|
| **16×34×8 mm** Micro-Box | **16×34×8 mm** Micro-Box | **M30×1.5** | | |
| flush | flush | non-flush | | |
| **Self-adjusting** | **Self-adjusting** | **Self-adjusting** | | |
| **BCS008M** | **BCS008H** | | | |
| BCS R08RR01-PSMFAC-EP00,2-GS49 | BCS R08RR01-PSMFAC-EP02 | | | |
| **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 | 100/100 mA push-pull | | |
| ≤ 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 in scope of delivery




Mounting frame included in scope of delivery





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

**AC/DC 2-wire**
Tubular housings

Electrical devices, connectors and holders see Accessories section starting **page 69**

# Level Detection
## DC 3-wire · High-temperature rated versions

+250 °C
+482 °F

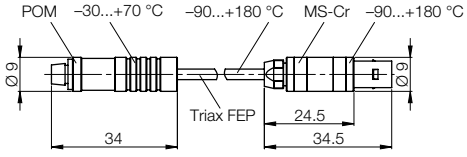
Balluff high-temperature sensors can be used for level detection of liquid, paste-like or powdery media at high temperatures up to 250 °C.
To withstand such extreme conditions, the housing of the high-temperature rated sensors is made of stainless steel and the sensor heads of PTFE. The sensors are also used with a special Triax 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 | | |

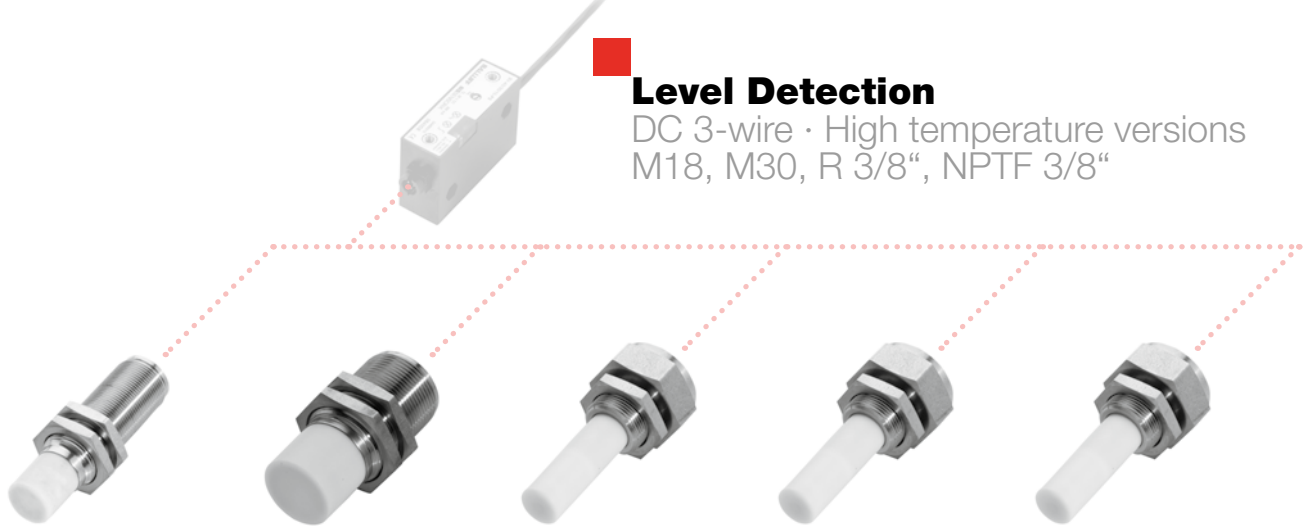
For sensor amplifiers
see Accessories section
Page 71

| | |
|---|---|
| Description | **Connectors for high-temperature sensors** |
| **Ordering code** | **BCC04JW** |
| Part number | BCC Z003-020 |
| Ambient temperature range $T_a$ | See drawing |
| Degree of protection per IEC 60529 | IP 54 |
| Wiring | 2 m Triax FEP |

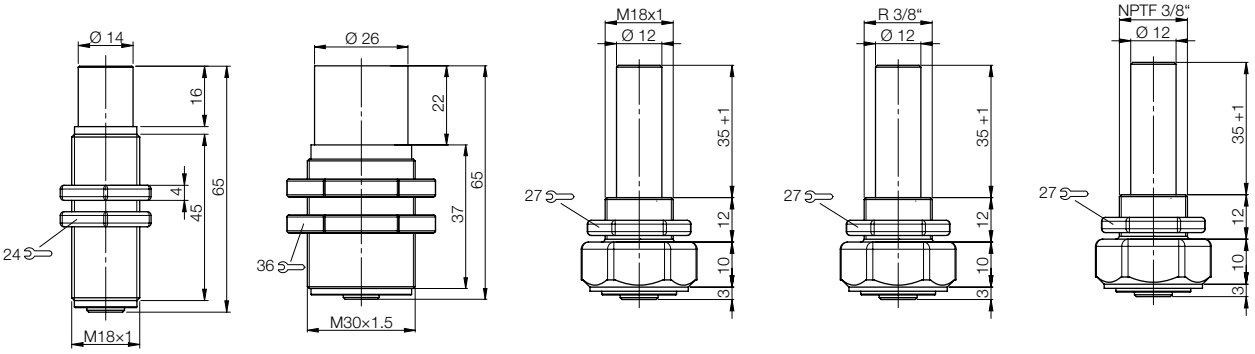


# Level Detection

## 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<br>(Sensing face: IP 68 at max. 6 bar) | IP 54<br>(Sensing face: IP 68 at max. 6 bar) | IP 54<br>(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 |







Electrical devices, connectors and holders see Accessories section starting **page 69**

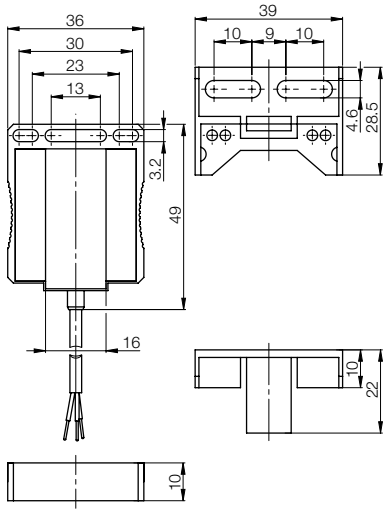
# Level Detection

## DC 3-wire · Leak sensor
## 36×44×10 mm

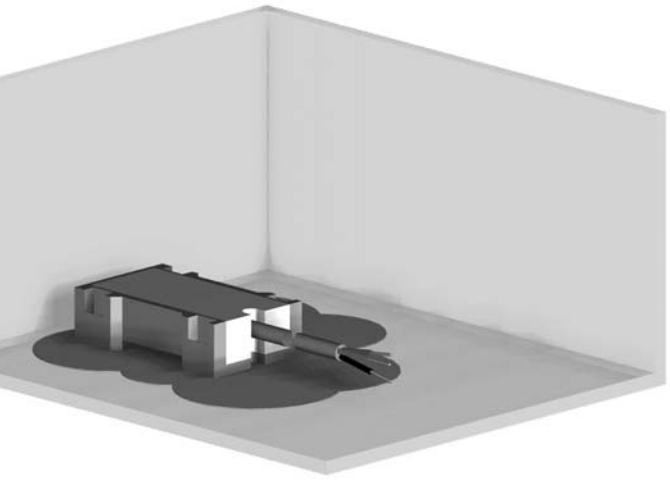
The new Balluff leak sensor detects even the slightest amounts of liquid quickly and reliably. It thereby prevents costly damage in and around the equipment. The sensor features a chemically resistant housing and a PTFE jacketed cable, so that it can be used even in aggressive surroundings such as in 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

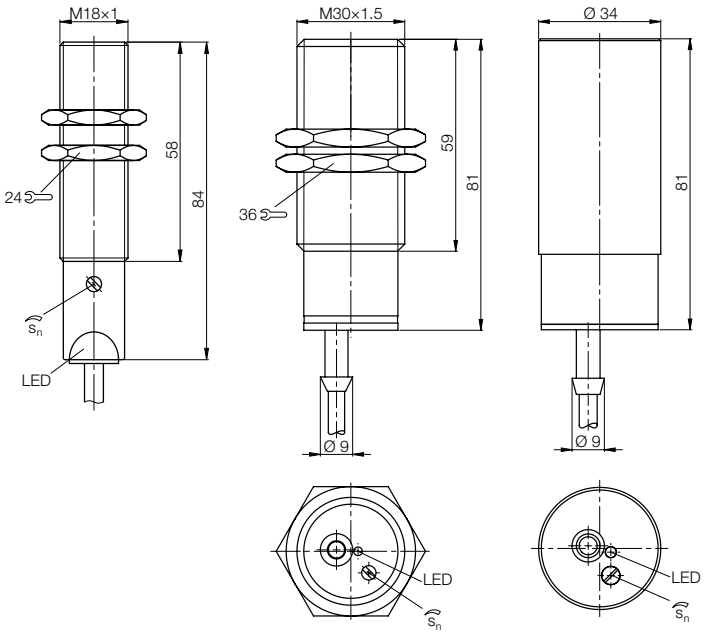
| | | | |
|---|---|---|---|
| Housing size | | | **36×44×10 mm** |
| Mounting | | | flush |
| Rated switching distance $s_n$ | | | **1.3 mm** |
| Normally open | PNP/NPN selectable | **Ordering code** | **BCS00H7** |
| | | Part number | BCS Z05AA02-GSCFNZ01-DT02 |
| Normally closed | PNP/NPN selectable | **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 |




Mounting cuff included in scope of delivery


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

AC/DC 2-wire
**Tubular housings**

Electrical devices, connectors and holders see Accessories section starting **page 69**

# Accessories
## Contents

The numerous varieties of capacitive sensors for individual solutions are enhanced by custom matched accessories. This means that power supplies are assured of providing continuity under different voltages, even at high loads. With sensor amplifiers, minis show what they can do. And precisely matched mounting elements ensure exact positioning.

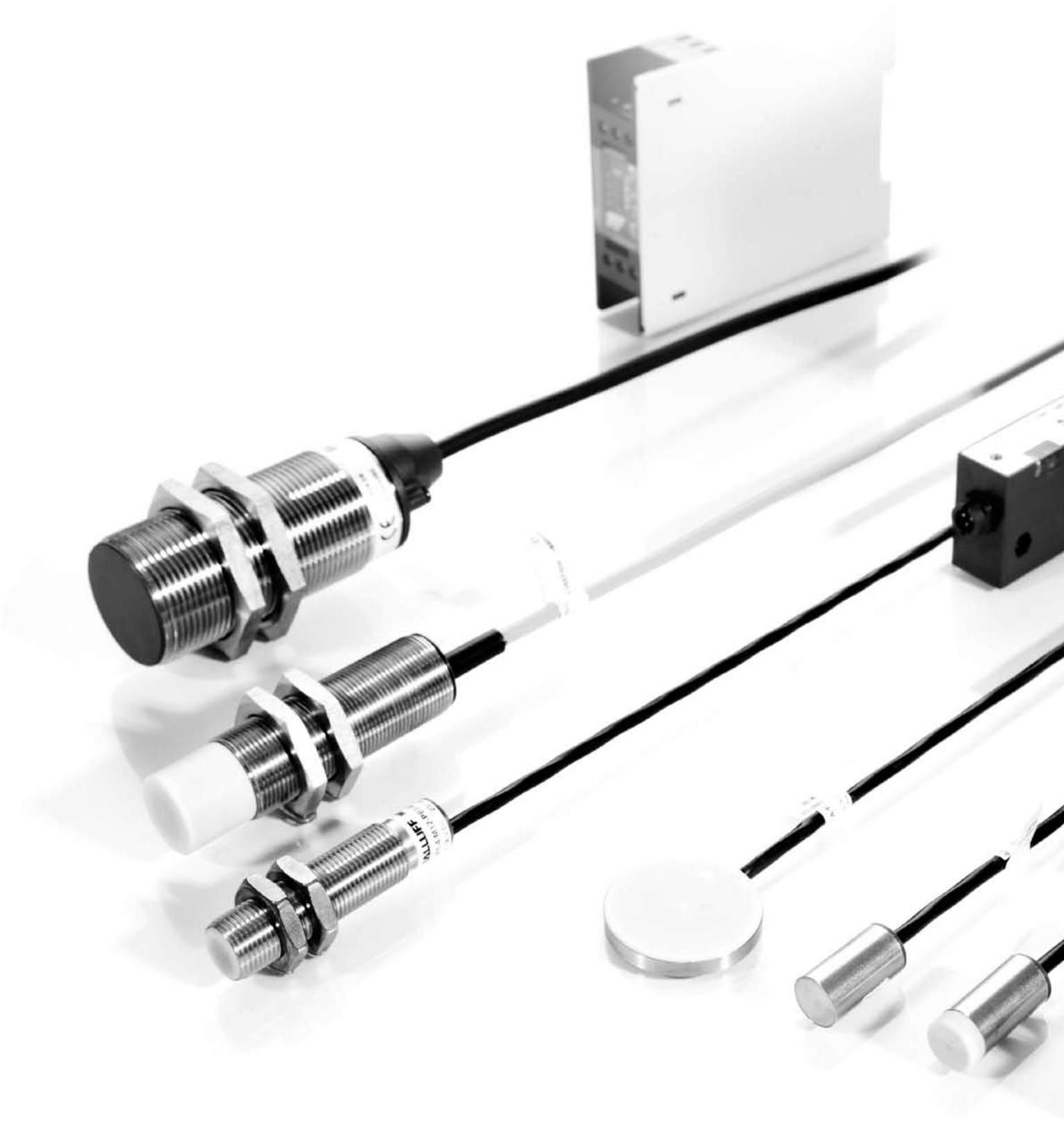
The comprehensive line of connectors provides the best possible connection and ensure that Balluff capacitive sensors can be used anywhere in the automation field.





# Accessories

Sensor amplifiers and
sensor power supplies
for capacitive sensors

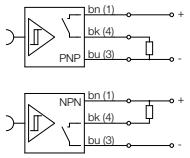


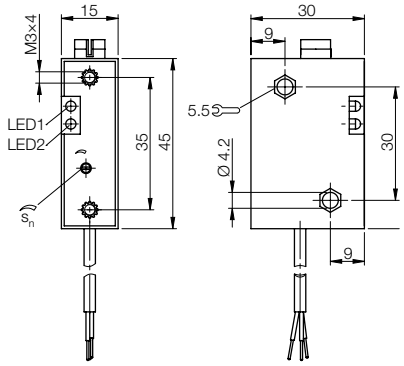
# Accessories

## Sensor amplifier
## for one capacitive sensor
## without internal amplifier

| | | | |
|---|---|---|---|
| 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.

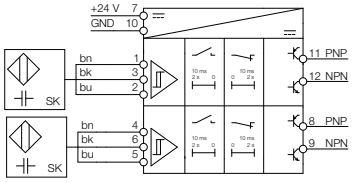
# Accessories

## Sensor amplifier for two capacitive sensors without internal amplifier

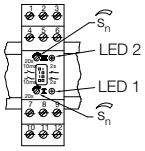
- Two discrete sensor amplifiers in one housing
- Connection for two capacitive sensors without internal amplifier
- PNP and NPN transistor output
- Selectable N.O./N.C.
- Actuation delay (normally open) selectable 10 ms/2 s
- Turn-off delay (normally closed_ selectable 10 ms/2s
- Clamping terminal
- Switching distance for sensors separately adjustable
- Switching state indicated by two separate LEDs

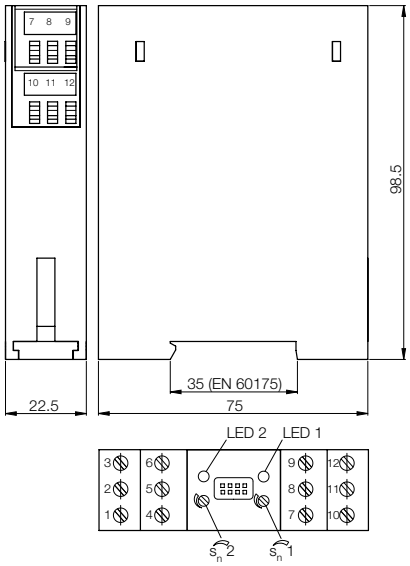
| | | |
|---|---|---|
| Housing size | | **98.5×75×22.5 mm** |
| Mounting | | DIN rail (EN 60751) |
| PNP/NPN and NO/NC selectable | **Ordering code** | **BAE009P** |
| | Part number | BAE SA-CS-002-YP |
| Supply voltage $U_S$ | | 10…35 V DC |
| Voltage drop $U_d$ at $I_e$ | | 0.8 V |
| Rated insulation 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



# Accessories

## Sensor amplifier with logic for two capacitive sensors without internal amplifier

**Sensor amplifier with logic**
- Connection for two capacitive sensors without internal amplifier
- Two outputs each PNP/NPN for Q and Q
- Turn-on delay selectable 10 ms/2s
- Function OR, AND, RS-FF, min/max selectable
- Clamping terminal
- Switching distance for sensors separately adjustable
- Switching state indicated by two separate LEDs

**OR function**
Output Q active when one or both sensors are damped.

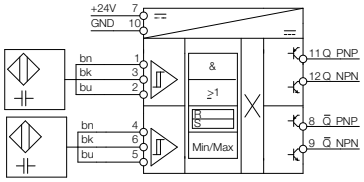
**AND function**
Output Q active only when both sensors are damped.

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

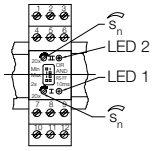
**Function min/max**
Output Q active when both sensors are damped. The output is only reset when both sensors are undamped.

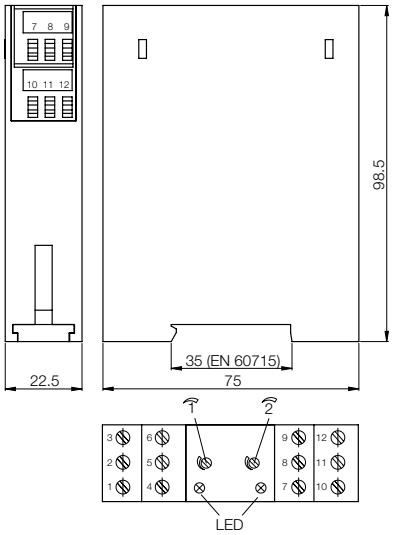
| | | |
|---|---|---|
| Housing size | | **98.5×75×22.5 mm** |
| Mounting | | DIN rail (EN 60751) |
| PNP/NPN and NO/NC selectable | **Ordering code** | **BAE009R** |
| | Part number | BAE SA-CS-003-YP |
| Supply voltage $U_S$ | | 10…35 V DC |
| Voltage drop $U_d$ at $I_e$ | | 0.8 V |
| Rated insulation 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




### Display



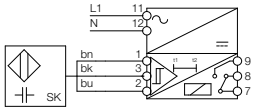



# Accessories

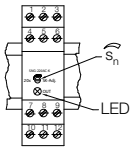
## Sensor amplifier for a capacitive sensor without internal amplifier

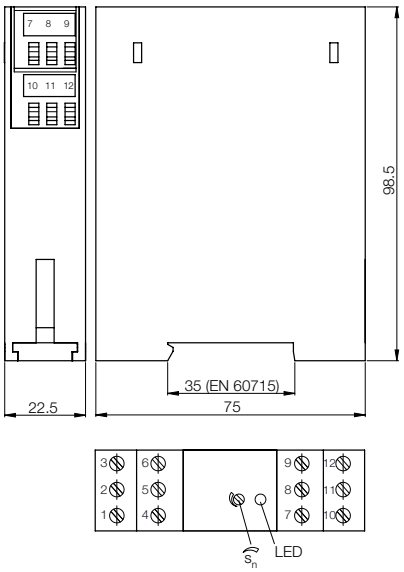
| | | | |
|---|---|---|---|
| Housing size | | **98.5×75×22.5 mm** | **98.5×75×22.5 mm** |
| Mounting | | DIN rail (EN 60751) | DIN rail (EN 60751) |
| PNP/NPN and NO/NC selectable | **Ordering code** | **BAE009K** | **BAE009L** |
| | Part number | BAE SA-CS-006-XR | BAE SA-CS-007-XR |
| Supply voltage $U_S$ | | 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 |

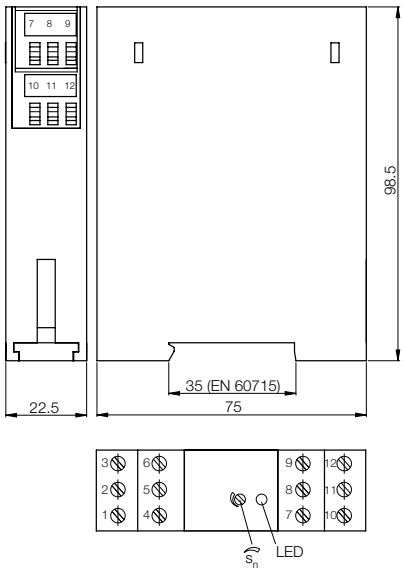
### Wiring configuration




### Display



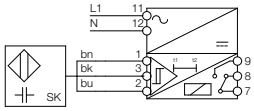



# Accessories

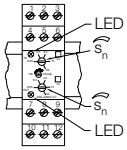
## Sensor amplifier with timer function for a capacitive sensor without internal amplifier

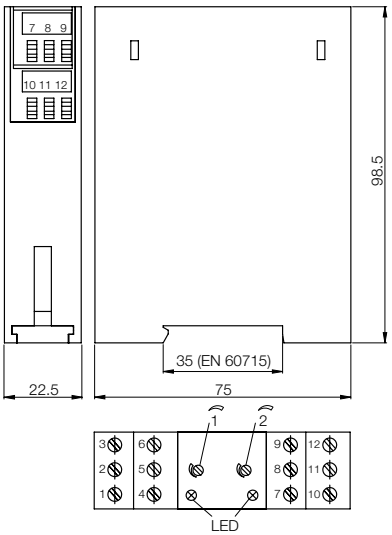
| | | | |
|---|---|---|---|
| Housing size | | **98.5×75×22.5 mm** | **98.5×75×22.5 mm** |
| Mounting | | DIN rail (EN 60751) | DIN rail (EN 60751) |
| PNP/NPN and NO/NC selectable | **Ordering code** | **BAE009M** | **BAE009N** |
| | Part number | BAE SA-CS-008-XR | BAE SA-CS-009-XR |
| Supply voltage $U_S$ | | 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 |

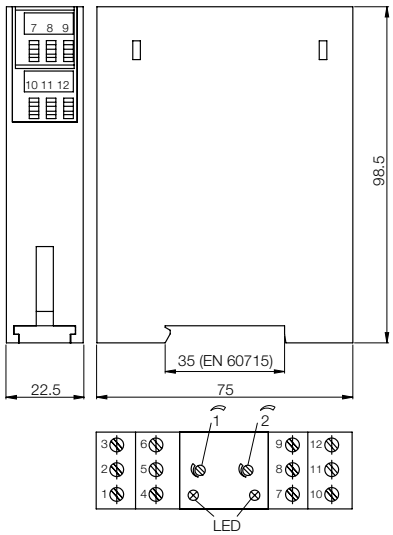
### Wiring configuration




### Display



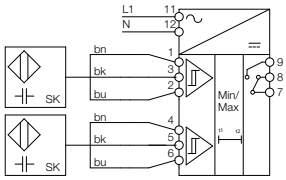



# Accessories

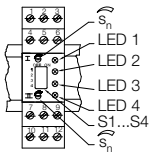
## Sensor amplifier with Min/Max level control for two capacitive sensors without internal amplifier

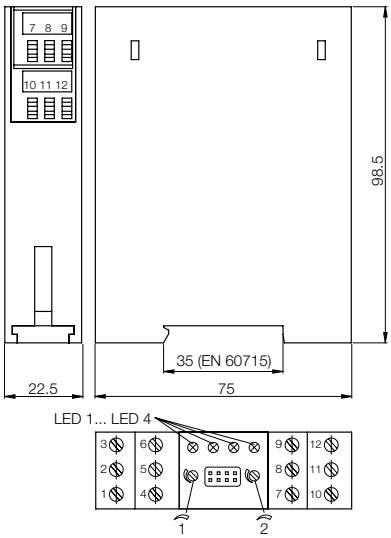
| | | | |
|---|---|---|---|
| Housing size | | **98.5×75×22.5 mm** | **98.5×75×22.5 mm** |
| Mounting | | DIN rail (EN 60751) | DIN rail (EN 60751) |
| PNP/NPN and NO/NC selectable | **Ordering code** | **BAE009T** | **BAE009U** |
| | Part number | BAE SA-CS-004-XR | BAE SA-CS-005-XR |
| Supply voltage $U_S$ | | 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 |

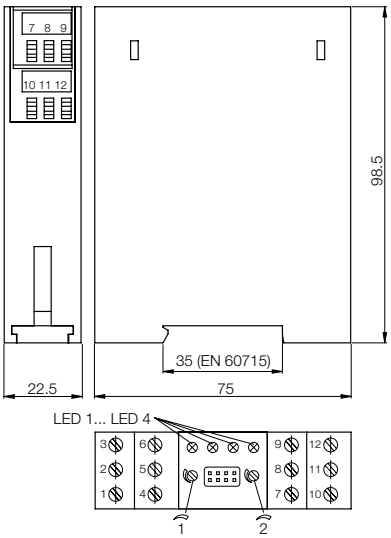
### Wiring configuration




### Display




### Function

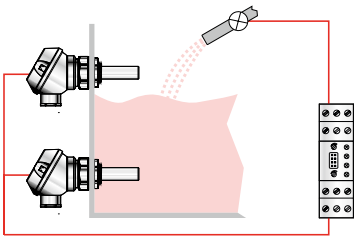
When both sensors are undamped, the relay turns on – "LED" empty" lights up (contact 7/9 closed). If the Min sensor is damped, the "LED fill" lights up. When both sensors are damped, the relay turns off – "LED" full" lights up (contact 7/9 open). If the Max sensor is damped, the "LED empty" lights up. The relay does not turn on until both sensors are again undamped.
Other functions are selectable using the mini DIL switches.

### DIL 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

### Applications

– Min- and Max fill level control
– Input for connecting two 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
## Function diagnostics unit

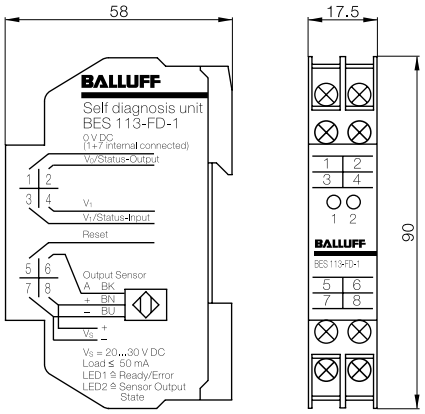
The BES 113-FD-1 function diagnostics unit monitors a proximity switch with dynamic function diagnostics including its cable. A logic circuit polls the sensor signals for the presence of test pulses and also monitors for proper function of the processor. For the machine controller it emits a High level 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.

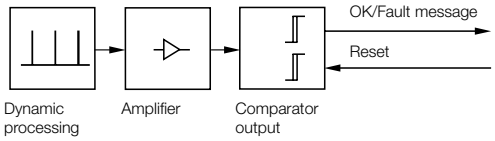
Recurring faults are stored by the device. They must be reset using a reset function (Low signal on 5).

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 |





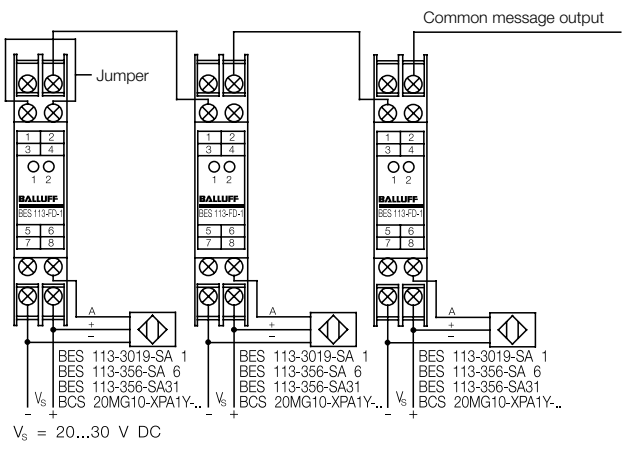




**Cascading**

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.



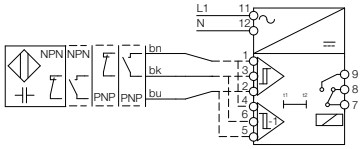
# Accessories

## Sensor amplifiers with potential-free changeover contact for one capacitive sensor

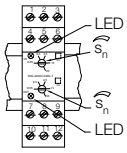
| | | | |
|---|---|---|---|
| Housing size | | **98.5×75×22.5 mm** | **98.5×75×22.5 mm** |
| Mounting | | DIN rail (EN 60751) | DIN rail (EN 60751) |
| Potential-free changeover contact | **Ordering code** | **BAE009W** | **BAE009Y** |
| | Part number | BAE SA-XE-010-XR | BAE SA-XE-011-XR |
| Supply 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 |

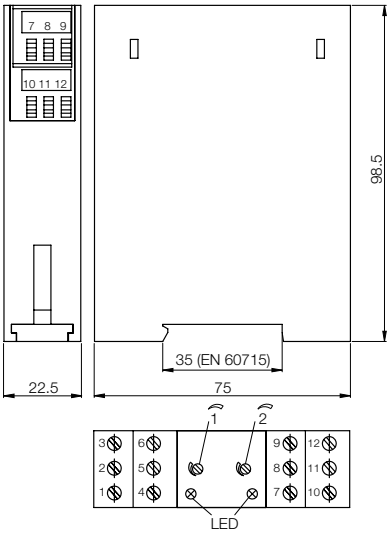
**Not suitable for devices with XDC final stage (e.g. BCS S4...)**

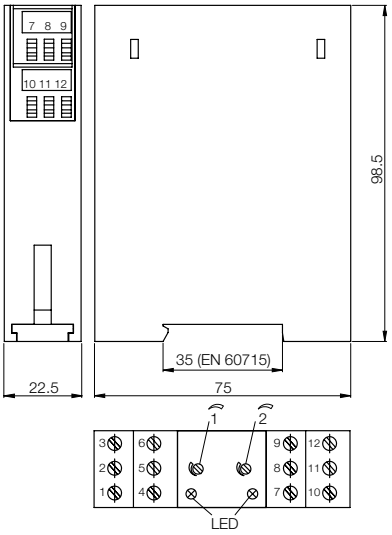
### Wiring configuration




### Display



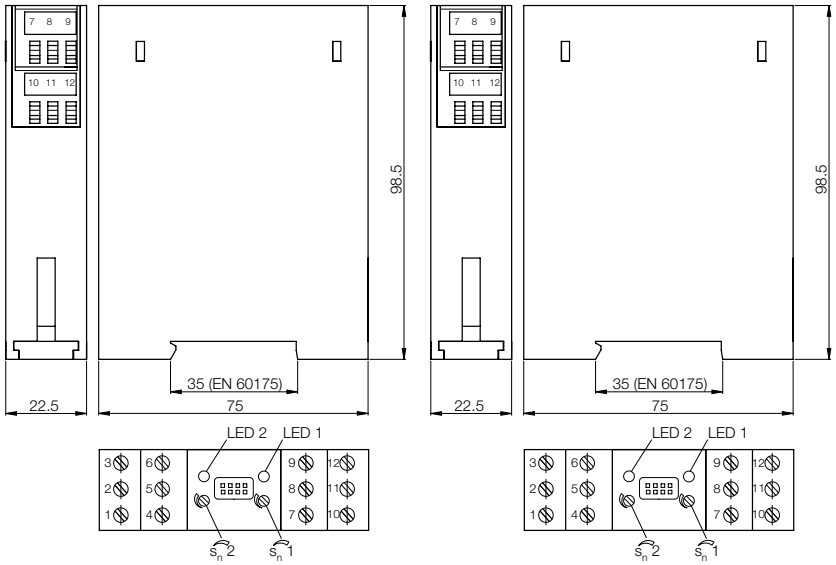
# Accessories

## Sensor amplifiers with Min/Max level control and potential-free changeover contact for two capacitive sensors

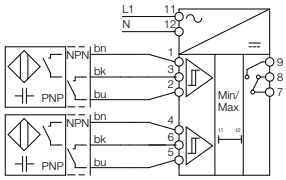
| | | | |
|---|---|---|---|
| Housing size | | **98.5×75×22.5 mm** | **98.5×75×22.5 mm** |
| Mounting | | DIN rail (EN 60751) | DIN rail (EN 60751) |
| Potential-free changeover contact | **Ordering code** | **BAE009Z** | **BAE00A0** |
| | Part number | BAE SA-XE-012-XR | BAE SA-XE-013-XR |
| Supply 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 |



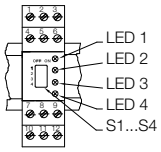
**Not suitable for devices with XDC final stage (e.g. BCS S4...)**




### Wiring configuration




### Display




### Function

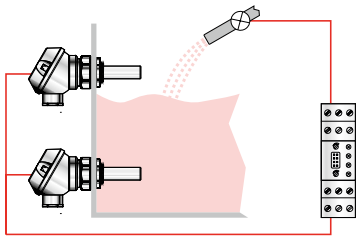
When both sensors are undamped, the relay turns on – "LED" empty" lights up (contact 7/9 closed). If the Min sensor is damped, the "LED fill" lights up. When both sensors are damped, the relay turns off – "LED" full" lights up (contact 7/9 open). If the Max sensor is damped, the "LED empty" lights up. The relay does not turn on until both sensors are again undamped.
Other functions are selectable using the mini DIL switches.

### DIL 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

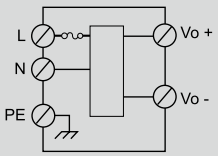


### Applications

– Min- and Max fill level control
– Automatic PNP and NPN input voltage for connecting two normally open sensors
– DC short circuit protected
– Turn-on delay for Min- and Max sensor selectable independently

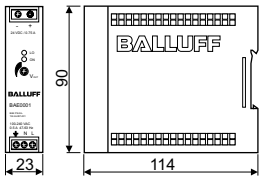
# Accessories

## Power supplies · Single-phase input voltage
## 0.75 A

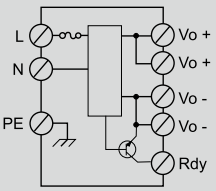
| | |
|---|---|
| Output current | 0.75 A |
| Output power | 18 W |
| Output voltage | 24 V DC |
| Input voltage | 100...240 V AC |
| **Ordering code** | **BAE0001** |
| Part number | BAE PS-XA-1W-24-007-001 |
| Input voltage range | 90...265 V AC/120...370 V DC |
| Inrush current | 115 V AC < 10 A/230 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 |  |



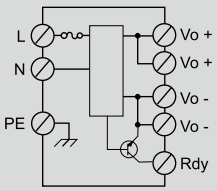
| | |
|---|---|
| L, N | Input terminals |
| PE | PE connection |
| Vo – | Output terminal – |
| Vo + | Output terminal + |



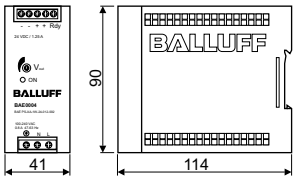
| | |
|---|---|
| 1.25 A | 2.5 A |
| 30 W | 60 W |
| 24 V DC | 24 V DC |
| 100...240 V AC | 100...240 V AC |
| **BAE0004** | **BAE0005** |
| BAE PS-XA-1W-24-012-002 | BAE PS-XA-1W-24-025-002 |
| 85...264 V AC/90...375 V DC | 85...264 V AC/90...375 V DC |
| 115 V AC < 20 A/230 V AC < 40 A | 115 V AC < 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 |

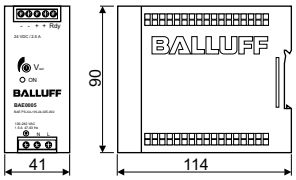



| | |
|---|---|
| L, N | Input terminals |
| PE | PE connection |
| Vo – | Output terminal – |
| Vo + | Output terminal + |
| Rdy | Ready output |



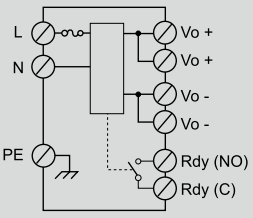

| | |
|---|---|
| L, N | Input terminals |
| PE | PE connection |
| Vo – | Output terminal – |
| Vo + | Output terminal + |
| Rdy | Ready output |



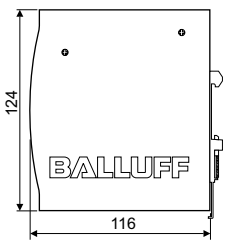
# Accessories

## 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 |  |

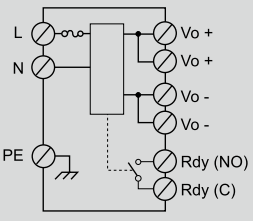


| | |
|---|---|
| L, N | Input terminals |
| PE | PE connection |
| Vo – | Output terminal – |
| Vo + | Output terminal + |
| Rdy | Ready output |

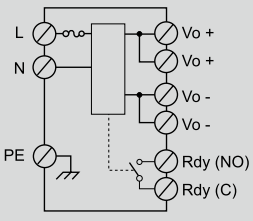





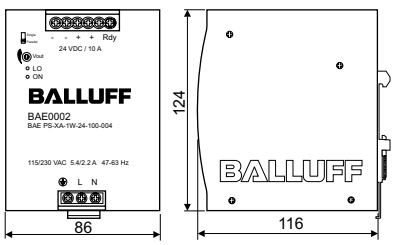
| | |
|---|---|
| 10 A | 20 A |
| 240 W | 480 W |
| 24 V DC | 24 V DC |
| 115/230 V AC (Auto-Select) | 115/230 V AC (Auto-Select) |
| **BAE0002** | **BAE0003** |
| BAE PS-XA-1W-24-100-004 | BAE PS-XA-1W-24-200-005 |
| 93...132 V AC; 186...264 V AC/210...370 V DC | 90...264 V AC/120...370 V DC |
| 115 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 |

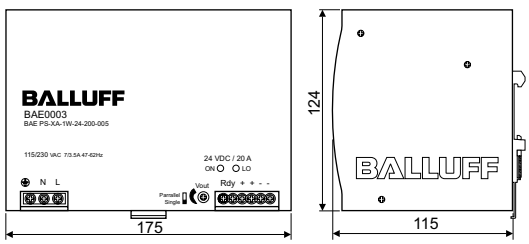



| | |
|---|---|
| L, N | Input terminals |
| PE | PE connection |
| Vo – | Output terminal – |
| Vo + | Output terminal + |
| Rdy | Ready output |



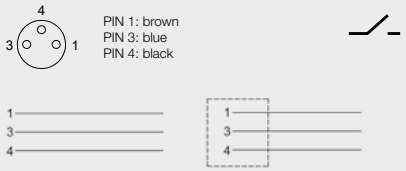
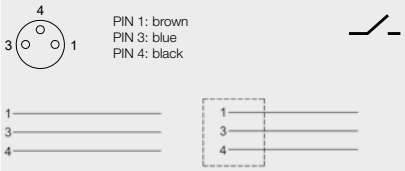

| | |
|---|---|
| L, N | Input terminals |
| PE | PE connection |
| Vo – | Output terminal – |
| Vo + | Output terminal + |
| Rdy | Ready output |



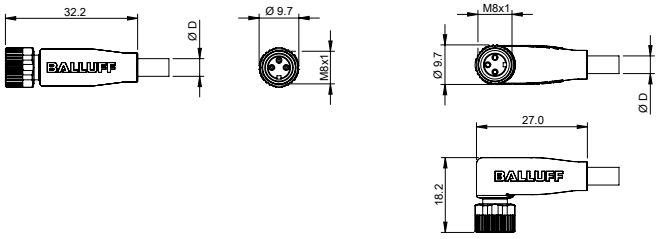
# Accessories

## M8-female straight and right-angle, 3-pin, no LED

| | | | |
|---|---|---|---|
| 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 | |
| Ambient temperature $T_a$ PUR shielded | –25 °C...+80 °C | –25 °C...+80 °C | |
| Ambient temperature $T_a$ PVC | –5 °C...+80 °C | –5 °C...+80 °C | |
| Ambient temperature $T_a$ PVC shielded | –5 °C...+80 °C | –5 °C...+80 °C | |
| Use | Normally open ⎍ | Normally open ⎍ | |

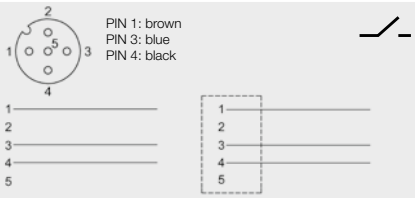
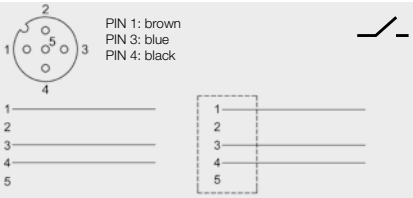
| Cable material | Color | Length | Ordering code | | |
|---|---|---|---|---|---|
| | | | Part number | | |
| PUR | black | 2 m | **BCC02M8** | **BCC02ML** | |
| | | | BCC M313-0000-10-001-PX0334-020 | BCC M323-0000-10-001-PX0334-020 | |
| PUR | black | 5 m | **BCC02M9** | **BCC02MM** | |
| | | | BCC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

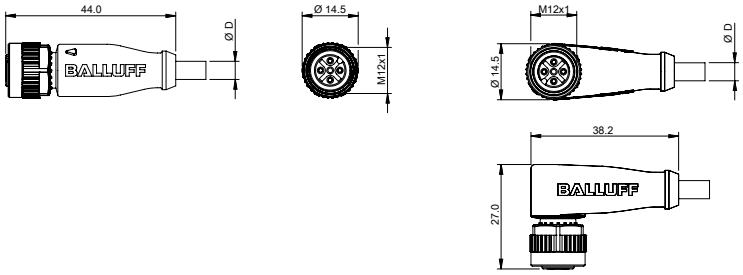


# Accessories

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

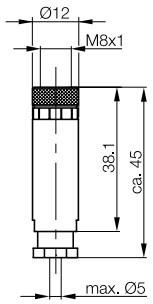
| | | | |
|---|---|---|---|
| |  |  | |
| | 250 V AC | 250 V AC | |
| | 250 V DC | 250 V DC | |
| | Molded-on | Molded-on | |
| | 3×0.34mm² | 3×0.34mm² | |
| | IP 68 | IP 68 | |
| | –25 °C...+80 °C | –25 °C...+80 °C | |
| | –25 °C...+80 °C | –25 °C...+80 °C | |
| | –5 °C...+80 °C | –5 °C...+80 °C | |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

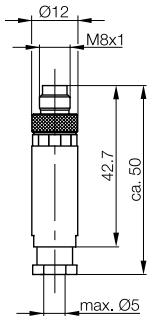
| | Ordering code | | |
|---|---|---|---|
| | Part number | | |
| | **BCC030K** | **BCC0317** | |
| | BCC M415-0000-1A-001-PX0334-020 | BCC M425-0000-1A-001-PX0334-020 | |
| | **BCC030L** | **BCC0318** | |
| | BCC M415-0000-1A-001-PX0334-050 | BCC M425-0000-1A-001-PX0334-050 | |
| | **BCC030M** | **BCC0319**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



| | | | |
|---|---|---|---|
| Connector diagram |  |  | |
| System | | | |
| Style | Straight female | Straight male | |
| 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 | 3×0.14...0.5 mm² | 3×0.14...0.5 mm² | |
| Cable diameter min. | max. Ø 5 mm | max. Ø 5 mm | |
| Wiring | Screw terminal | Screw terminal | |
| Enclosure rating per IEC 60529 | IP 67 | IP 67 | |
| Ambient temperature range $T_a$ | –40...+85 °C | –40...+85 °C | |
| Use | NO ⎍- or<br>NC ⎍ | NO ⎍- or<br>NC ⎍ | |

| | **Ordering code** | | |
|---|---|---|---|
| | Part number | | |
| | **BCC0157** | **BCC156** | |
| | BKS-S142-00 | BKS-141-00 | |

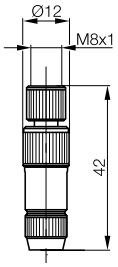


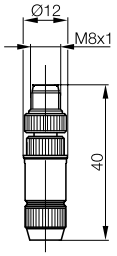



Quick-connect system

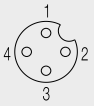
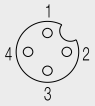
Quick-connect system

| | | | | |
|---|---|---|---|---|
| |  |  | | |
| | Harax | Harax | | |
| | Straight female | Straight female | | |
| | 10...30 V DC | 10...30 V DC | | |
| | For user assembly | For user assembly | | |
| | 3×0.14...0.34 mm² | 3×0.14...0.34 mm² | | |
| | max. 3.2...5.4 mm | max. 3.2...5.4 mm | | |
| | Insulation displacement IDC | Insulation displacement IDC | | |
| | IP 68 | IP 68 | | |
| | –5...50 °C | –5...50 °C | | |
| | NO ⌐- or | NO ⌐- or | | |
| | NC ⌐ | NC ⌐ | | |
| | **Ordering code** | | | |
| | Part number | | | |
| | **BCC02HC** | **BCC02HE** | | |
| | BKS-S111-RT13 | BKS-S113-RT13 | | |

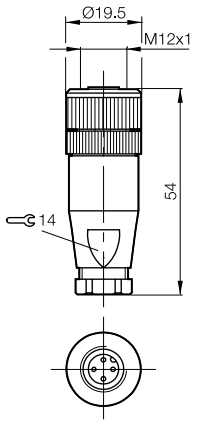


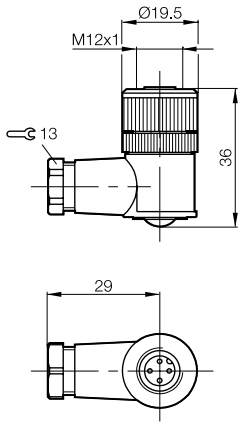



# Accessories
## Connectors for User Assembly
## M12

| | | | |
|---|---|---|---|
| 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 | |

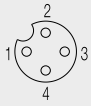
| | **Ordering code** | | |
|---|---|---|---|
| | Part number | | |
| | **BCC0149** | **BCC0144** | |
| | BKS-S 10-3 | BKS-S 8-3 | |

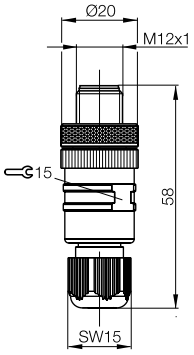


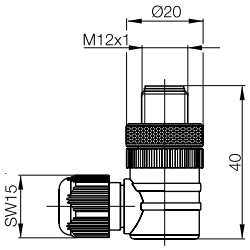



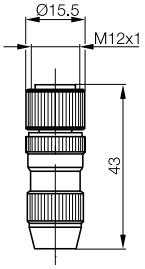
Quick-connect system

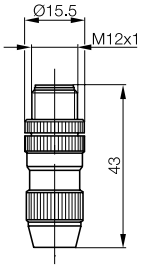
Quick-connect system

| | | | | |
|---|---|---|---|---|
| |  |  |  |  |
| | | | 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 |



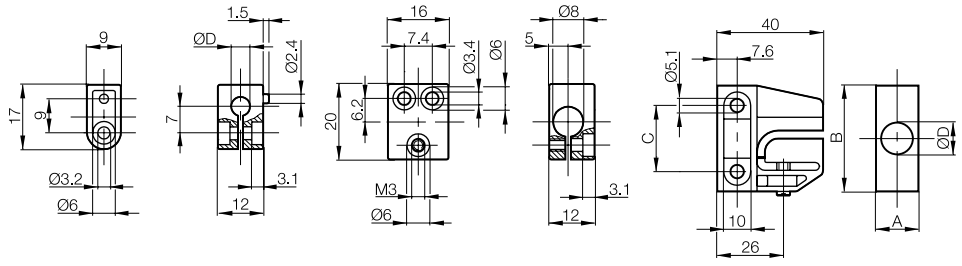



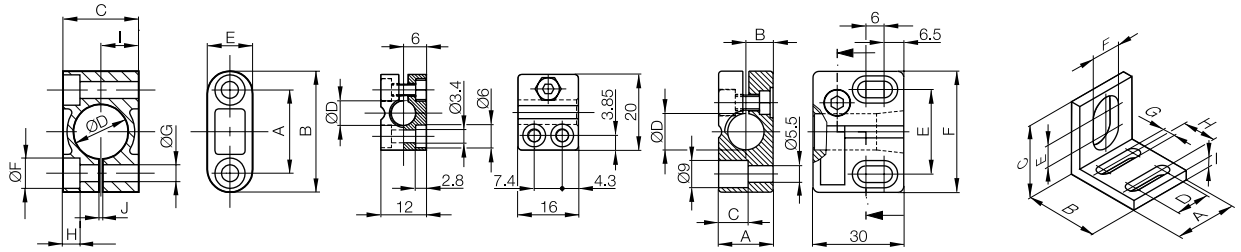
Stackable
Row mounting

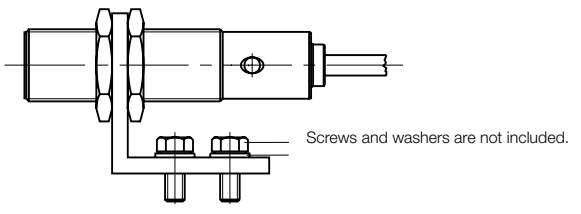
| Description | | Mounting clamp | Mounting clamp | Mounting clamp w/out positive stop | |
|---|---|---|---|---|---|
| Ø 4 mm | **Ordering code** | **BAM0094** | | | |
| | Part number | BES 04,0-KB-1 | | | |
| Ø 6.5 mm | **Ordering code** | **BAM009C** | **BAM009F** | | |
| | Part number | BES 06,5-KB-1 | 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 | |

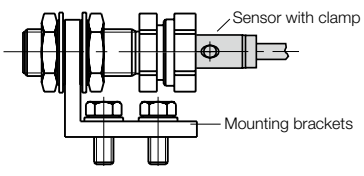





| | Mounting cuff | | | | | Mounting clamp w/out positive stop | | | | | Mounting clamp w/out positive stop | | | | | Mounting bracket | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | **BAM009A** | | | | | **BAM009E** | | | | | | | | | | | | | | |
| | BES 06,5-BS-1 | | | | | BES 06,5-KB-3 | | | | | | | | | | | | | | |
| | **BAM00A2** | | | | | **BAM00A5** | | | | | | | | | | **BAM009U** | | | | |
| | BES 08,0-BS-1 | | | | | BES 08,0-KB-3 | | | | | | | | | | BES 08,0-HW-1 | | | | |
| | **BAM00C4** | | | | | | | | | | **BAM00C9** | | | | | **BAM00C0** | | | | |
| | BES 12,0-BS-1 | | | | | | | | | | BES 12,0-KB-3 | | | | | BES 12,0-HW-1 | | | | |
| | **BAM00F2** | | | | | | | | | | **BAM00F7** | | | | | **BAM00EY** | | | | |
| | BES 18,0-BS-1 | | | | | | | | | | BES 18,0-KB-3 | | | | | BES 18,0-HW-1 | | | | |
| | **BAM00HN** | | | | | | | | | | | | | | | **BAM00HH** | | | | |
| | BES 30,0-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 | | | | |



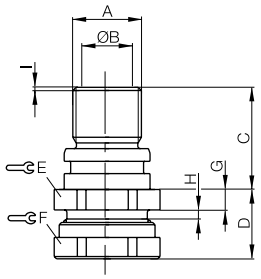



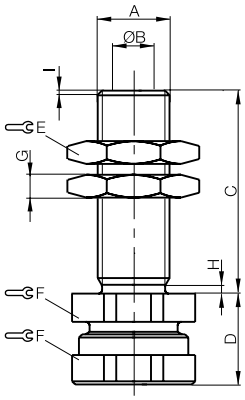

These aluminum mounting brackets provide a way of easily and quickly attaching sensors to the machine. For tubular sensors, we recommend the additional use of clamps (see page 92).

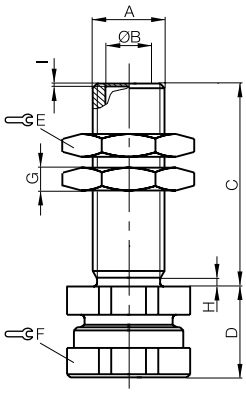
**Use**
For all sensors with corresponding diameter.



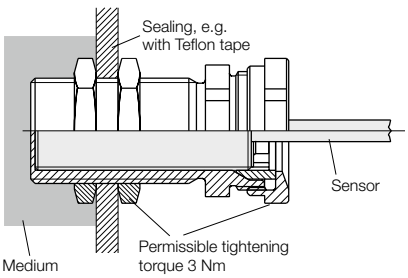
| Description | | Clamp with positive stop | Clamp with positive stop | Clamp with positive stop | | |
|---|---|---|---|---|---|---|
| Ø 8 mm | **Ordering code** | | | **BAM00AL** | | |
| | Part number | | | BES 08,0-KH-3L | | |
| Ø 12 mm | **Ordering code** | **BAM008E** | **BAM00E3** | **BAM00E2** | | |
| | 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 | | |



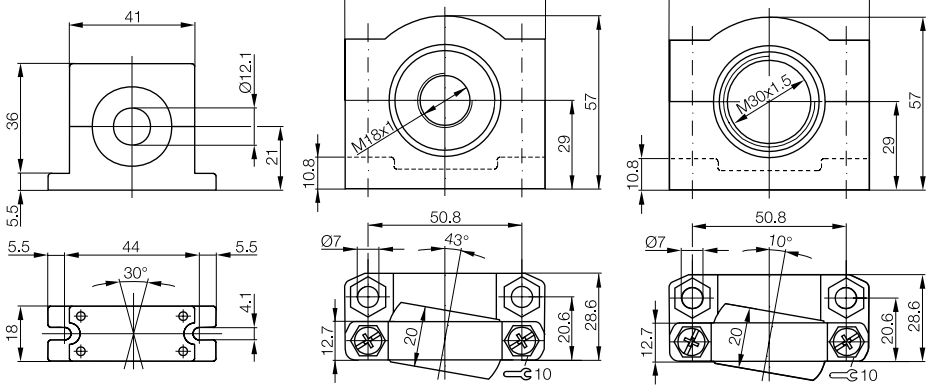





**Installation example using BES ...-KH-3L**
Particularly suitable for sensing in liquid media



| 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 |




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.

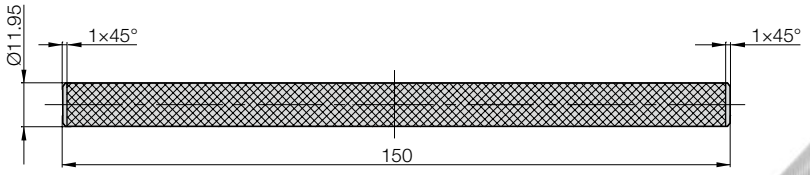
Balluff offers you not only the highest quality sensors, but also matched mounting accessories. For optimum positioning of the sensors in equipment and machines.

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.

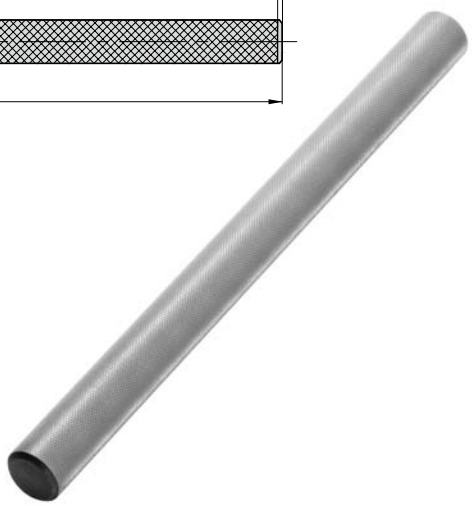
| | |
|---|---|
| Description | |
| Style | |
| Use | |
| **Ordering code** | |
| Part number | |
| **Ordering code** | |
| Part number | |
| **Ordering code** | |
| Part number | |
| Material | |

**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) |



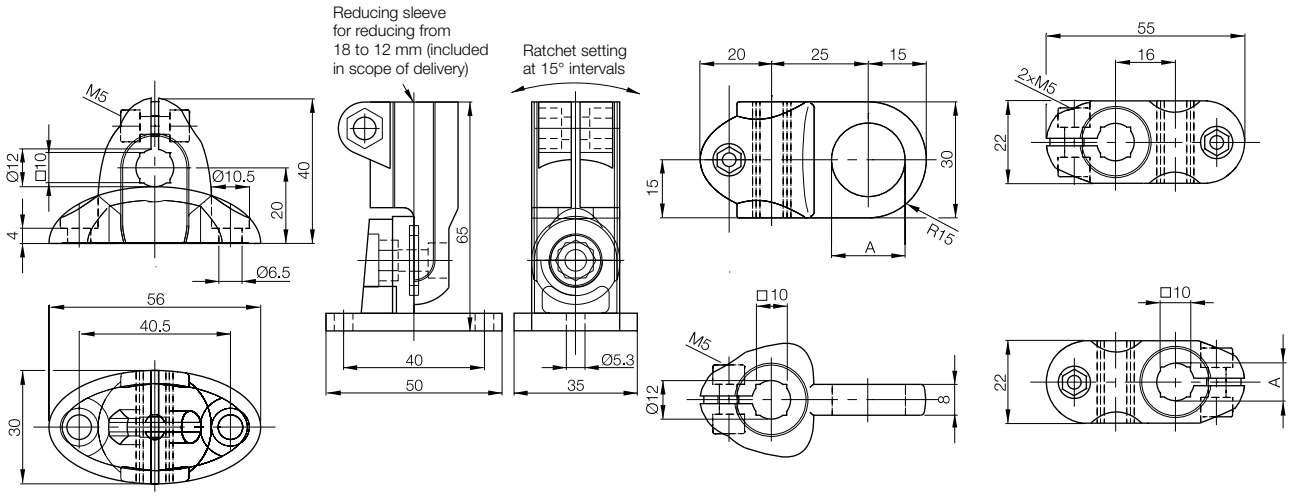

The mounting rods are knurled full-length.
This prevents any position change.






| | 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 |

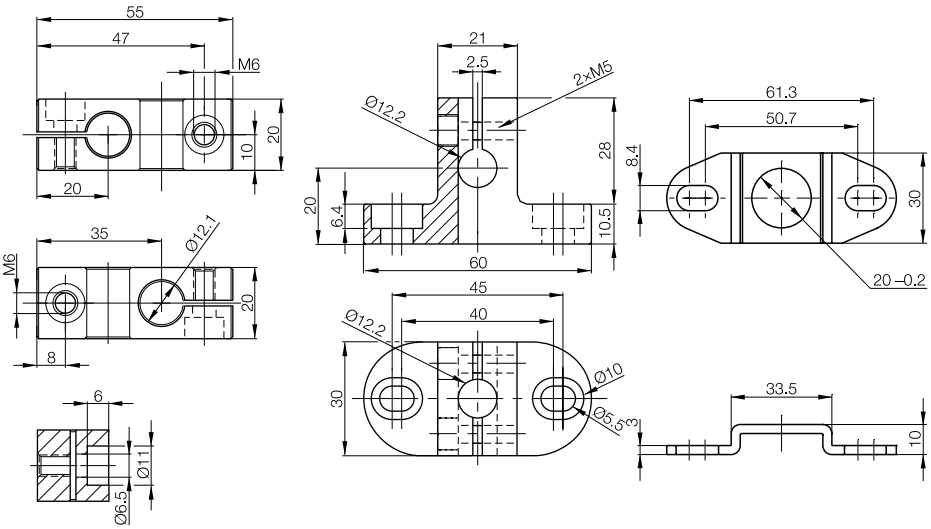

Electrical Devices
Connectors
**Mounting Components**
Cover Nuts
Adapters


| | 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 CU-M-D12-IO60-01 | |
| **Ordering code** | | | | |
| Part number | | | | |
| **Ordering code** | | | | |
| Part number | | | | |
| Material | Anodized Al | Anodized Al | Stainless steel | |

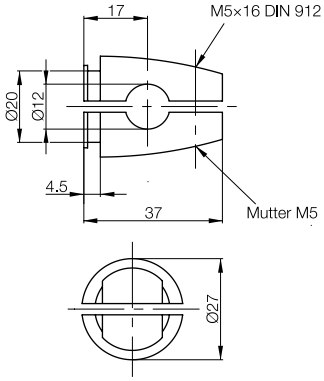


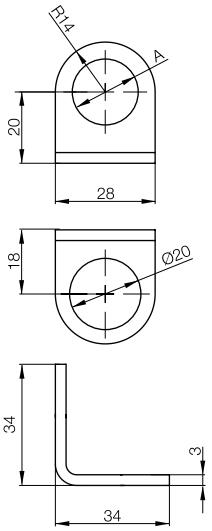


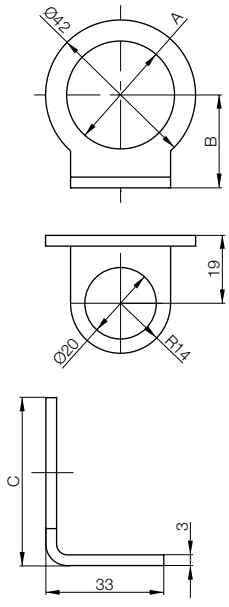


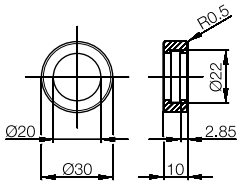
| | **Clamping cylinder** | **Sensor Holder** | **Sensor Holder** | **Adapter ring** |
|---|---|---|---|---|
| | | for clamping cylinder | for clamping cylinder | for 2× BMS CS-M-D12-IZ |
| | Accommodates all holders, sensors and reflectors | for tubular sensors M8, M12, M18 and all clamps M8...M18 | 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 |





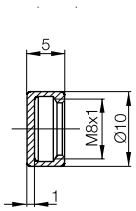

| | A |
|---|---|
| BMS CS-...08 | Ø 8 |
| BMS CS-...12 | Ø 12 |
| BMS CS-...18 | Ø 18 |

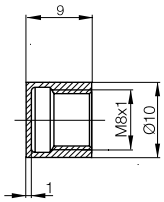
| | A | B | C |
|---|---|---|---|
| BMS CS-...30 | Ø 30.2 | 26 | 47 |
| BMS CS-...36 | Ø 36.5 | 30 | 54 |

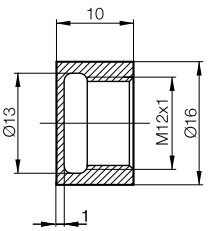


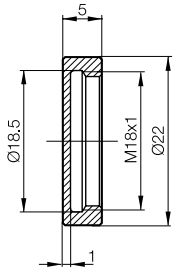



| Description | Cover nut | Cover nut | Cover nut | Cover nut | |
|---|---|---|---|---|---|
| **Ordering code** | **BAM009Z** | **BAM00A0** | **BAM00C2** | **BAM00EZ** | |
| Part number | BES 08-SM-1 | BES 08-SM-1F | BES 12-SM-2 | BES 18-SM-1 | |
| Material | This cover nut is threaded on to a M8×1 housing. 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. | |



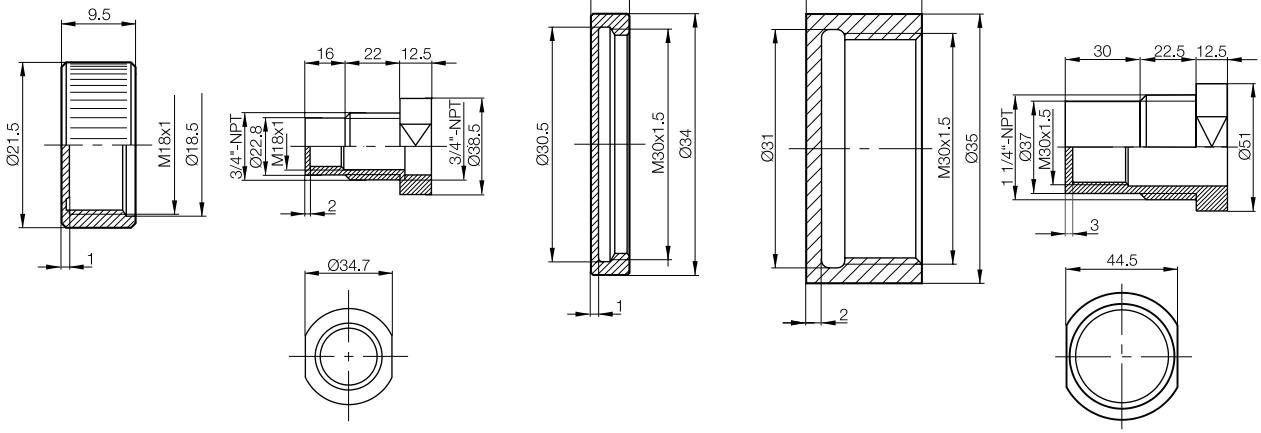



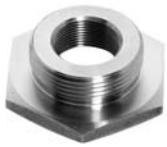
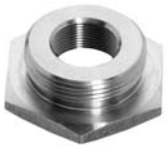




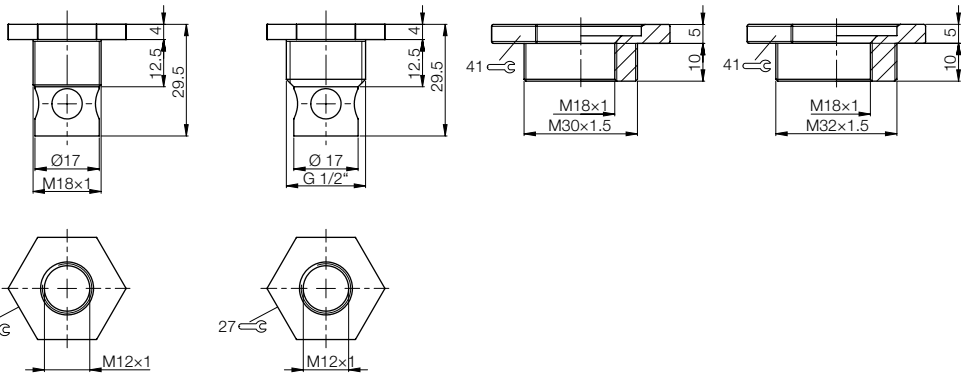
| | Cover nut | Cover nut | Cover nut | Cover nut | Cover nut |
|---|---|---|---|---|---|
| | **BAM00F0** | **BAM00F1** | **BAM00HJ** | **BAM00HK** | **BAM00H2** |
| | BES 18-SM-2 | BES 18-SM-3 | BES 30-SM-1 | BES 30-SM-2 | BES 30-SM-3 |
| | This cover nut is threaded on to a M18×1 housing. It is made 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!<br>The nominal switching distance of proximity switches is reduced by 1 mm when the cover nut is installed. | Please note!<br>The nominal switching distance of proximity switches is reduced by 2 mm when the cover nut is installed. | Please note!<br>The nominal switching distance of proximity switches is reduced by 1 mm when the cover nut is installed. | Please note!<br>The nominal switching distance of proximity switches is reduced by 2 mm when the cover nut is installed. | Please note!<br>The nominal switching distance of proximity switches is reduced by 2 mm when the cover nut is installed. |



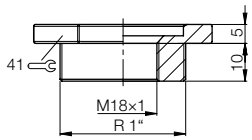


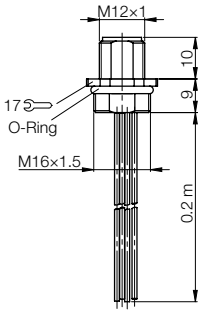



| Description | **Adapter for Micro-Level M12 to M18** | **Adapter for Micro-Level M12 to G 1/2“** | **Adapter for BCS S01/2/3 M18 to M30** | **Adapter for BCS S01/2/3 M18 to M32** |
|---|---|---|---|---|
| **Ordering code** | **BAM018J** | **BAM018K** | **BAM018E** | **BAM018F** |
| Part number | BAM 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<br>for BCS S01/2/3<br>M18 to R 1“ | Adapter<br>for BCS S01/2/3<br>M16 to M12 | | | |
|---|---|---|---|---|---|
| | **BAM018H** | **BCC04JT** | | | |
| | BAM AD-XA-001-M18/R1“-4 | BCC M454-0000-2A-RM004-020 | | | |
| | V2A | MS-Ni/PA<br>–30...+70 °C<br>0.2 cable PVC,<br>3×0.25 mm² | | | |



# Capacitive Sensors

## New ordering codes and part numbers

To make ordering simple we have introduced a new ordering code and changed the part number. If you are already a customer, please use the table. To ensure you can still find your sensor easily, it contains information and cross-references to old SK-, SK1- and SV-designations for the new BCS-, BAE- and BAM-designations and ordering codes. The changeover affects only ordering codes and part numbers, the sensors themselves remain unchanged.

| Old part number | Old material number | New | New part number | New | New ordering code | Page |
|---|---|---|---|---|---|---|
| BCS 010-POB-1-L-PU-02 | 155034 | | BCS G10T4H-POM40C-EP02 | | BCS002U | 32 |
| BCS 010-PSB-1-L-PU-02 | 554550 | | BCS G10T4H-PSM40C-EP02 | | BCS002T | 32 |
| BCS 012-PS-1-L-S4 | 149696 | | BCS M12T4D2-PSM80G-S04G | | BCS0062 | 46 |
| BCS 012-PSB-1-L-S4 | 149695 | | BCS M12T4D2-PSM40C-S04G | | BCS0037 | 33 |
| BCS 20MG10-XPA1Y-8B-03 | 523190 | | unchanged | | BCS0001 | 43 |
| BCS G34KN2-NOC20G-AV02 | 153036 | | unchanged | | BCS0002 | 51 |
| BCS G34KN2-NSC24G-AV02 | 125722 | | unchanged | | BCS0003 | 51 |
| BCS G34KN2-POC20G-AV02 | 153035 | | unchanged | | BCS0004 | 51 |
| BCS G34KN2-PSC24G-AV02 | 125723 | | unchanged | | BCS0005 | 51 |
| BCS G34KN2-UOT20G-AV02 | 153140 | | unchanged | | BCS0006 | 67 |
| BCS G34KN2-UST20G-AV02 | 153141 | | unchanged | | BCS0007 | 67 |
| BCS M08EG1-PSC15C-S49G | 155032 | | BCS M08T4E2-PSM15C-S49G | | BCS002A | 30 |
| BCS M08EG-PSC30G-S49G | 155033 | | BCS M08T4E2-PSM30G-S49G | | BCS002M | 31 |
| BCS M12ED-XXS40B-BP02-GZ01 | 124538 | | BCS M12T4D-XXS40C-EP02-GZ01-002 | | BCS0018 | 32 |
| BCS M12EG2-XXS10B-BT01-GZ01-501 | 125801 | | unchanged | | BCS00CR | 46 |
| BCS M18EM-POC15G-S04G | 155037 | | BCS M18T4G2-POC15G-S04G | | BCS006C | 48 |
| BCS M18EM1-POC80C-S04G | 155035 | | BCS M18B4G2-POC80C-S04G | | BCS0049 | 33 |
| BCS M18EM1-PSC80C-S04G | 149694 | | BCS M18B4G2-PSC80C-S04G | | BCS0047 | 33 |
| BCS M18EM-PSC15G-S04G | 155036 | | BCS M18T4G2-PSC15G-S04G | | BCS006A | 48 |
| BCS M18KM3-NOC80G-BV02 | 153031 | | unchanged | | BCS0008 | 49 |
| BCS M18KM3-NSC80G-BV02 | 145178 | | unchanged | | BCS0009 | 49 |
| BCS M18KM3-POC80G-BV02 | 153032 | | unchanged | | BCS000A | 49 |
| BCS M18KM3-POC80G-S04G-001 | 145184 | | unchanged | | BCS000C | 49 |
| BCS M18KM3-PSC80G-BV02 | 145175 | | unchanged | | BCS000E | 49 |
| BCS M18KM3-PSC80G-S04G | 145181 | | unchanged | | BCS000H | 49 |
| BCS M18KM3-UOT80G-BV02 | 153134 | | unchanged | | BCS000J | 67 |
| BCS M18KM3-UST80G-BV02 | 153148 | | unchanged | | BCS000K | 67 |
| BCS M30EG2-PSC30G-S04K | 152269 | | unchanged | | BCS00HF | * |
| BCS M30EM2-PSC20C-S04K | 152270 | | unchanged | | BCS00HH | * |
| BCS M30KM7-PPH15G-S04U | 139472 | | unchanged | | BCS000L | 51 |
| BCS M30KN2-NOC15G-AV02 | 153034 | | unchanged | | BCS000M | 51 |
| BCS M30KN2-NSC18G-AV02 | 125724 | | unchanged | | BCS000N | 51 |
| BCS M30KN2-POC15G-AV02 | 153033 | | unchanged | | BCS000P | 51 |
| BCS M30KN2-PSC18G-AV02 | 125728 | | unchanged | | BCS000R | 51 |
| BCS M30KN2-UOT15G-AV02 | 153143 | | unchanged | | BCS000U | 67 |
| BCS M30KN2-UST15G-AV02 | 153147 | | unchanged | | BCS000W | 67 |
| BCS R08KE-POC80C-EP00,2-GS49 | 155621 | | BCS R08RR01-POM80C-EP00,2-GS49 | | BCS0056 | 40 |
| BCS R08KE-POCFAC-EP00,2-GS49 | 155619 | | BCS R08RR01-POMFAC-EP00,2-GS49 | | BCS008N | 63 |
| BCS R08KE-PSC80C-EP00,2-GS49 | 155620 | | BCS R08RR01-PSM80C-EP00,2-GS49 | | BCS0055 | 40 |
| BCS R08KE-PSCFAC-EP00,2-GS49 | 155618 | | BCS R08RR01-PSMFAC-EP00,2-GS49 | | BCS008M | 63 |
| BES 516-620-PS-02 | 124539 | | BAE SA-CS-001-PS | | BAE009E | 71 |
| MA-M18/M30/10-VA | 90092 | | BAM AD-XA-001-M18/M30-4 | | BAM018E | 100 |
| MA-M18/M32/10-VA | 90093 | | BAM AD-XA-001-M18/M32x1,5-4 | | BAM018F | 100 |
| MA-M18/R1/10-VA | 90109 | | BAM AD-XA-001-M18/R1"-4 | | BAM018H | 101 |
| MSA-MLM12/G1/2-VA | 13016 | | BAM AD-XA-002-M12/G1/2"-4 | | BAM018K | 100 |
| MSA-MLM12/M18X1-VA | 13014 | | BAM AD-XA-002-M12/M18-4 | | BAM018J | 100 |
| SK-1-M5-B-VA/PTFE | 03002 | | BCS M05T4C-XXS10C-EP02-GZ01-002 | | BCS0011 | 28 |
| SK-1-4-B-VA/PTFE | 03001 | | BCS G04T4D-XXS10C-EP02-GZ01-002 | | BCS0010 | 28 |

# Capacitive Sensors
## New ordering codes and part numbers

| Old part number | Old material number | New part number | New ordering code | Page |
|---|---|---|---|---|
| SK-1.5-6.5-B-VA/PTFE | 03003 | BCS G06T4B-XXS15C-EP02-GZ01-002 | BCS0012 | 28 |
| SK-1.5-M8-B-VA/PTFE | 03005 | BCS M08T4C-XXS15C-EP02-GZ01-002 | BCS0014 | 30 |
| SK-3-18/2.5-B-VA/PTFE | 03011 | BCS D18T403-XXS30C-EP02-GZ01-002 | BCS001A | 37 |
| SK-3-6.5-NB-VA/PTFE | 03004 | BCS G06T4B-XXS30G-EP02-GZ01-002 | BCS0013 | 29 |
| SK-3-M8-NB-VA/PTFE | 03006 | BCS M08T4C1-XXS30G-EP02-GZ01-002 | BCS0015 | 30 |
| SK-4-10-B-VA/PTFE | 03007 | BCS G10T4B-XXS40C-EP02-GZ01-002 | BCS0016 | 31 |
| SK-4-M12-B-VA/PTFE | 03009 | BCS M12T4D-XXS40C-EP02-GZ01-002 | BCS0018 | 32 |
| SK-5-18/10-B-VA/PTFE | 03013 | BCS D18T407-XXS50C-EP02-GZ01-002 | BCS001E | 37 |
| SK-5-18/4-B-VA/PTFE | 03012 | BCS D18T404-XXS50C-EP02-GZ01-002 | BCS001C | 37 |
| SK-8-10-NB-VA/PTFE | 03008 | BCS G10T4C-XXS80G-EP02-GZ01-002 | BCS0017 | 31 |
| SK-8-M12-NB-VA/PTFE | 03010 | BCS M12T4D1-XXS80G-EP02-GZ01-002 | BCS0019 | 32 |
| SK-10-22/10-B-VA/PTFE | 03015 | BCS D22T408-XXS10C-EP02-GZ01-002 | BCS001H | 37 |
| SK-10-22/4-B-VA/PTFE | 03014 | BCS D22T405-XXS10C-EP02-GZ01-002 | BCS001F | 37 |
| SK-15-30/10-B-VA/PTFE | 03017 | BCS D30T409-XXS15C-EP02-GZ01-002 | BCS001K | 39 |
| SK-15-30/4-B-VA/PTFE | 03016 | BCS D30T406-XXS15C-EP02-GZ01-002 | BCS001J | 38 |
| SK-HT180-FS-J3/8NPTF-VA/PTFE | 09010 | BCS S10T403-XXSFNC-SZ02-T07 | BCS00A5 | 65 |
| SK-HT180-FS-M18-VA/PTFE | 09008 | BCS S10T401-XXSFNC-SZ02-T07 | BCS00A3 | 65 |
| SK-HT180-FS-R3/8-VA/PTFE | 09009 | BCS S10T402-XXSFNC-SZ02-T07 | BCS00A4 | 65 |
| SK-HT250-10-M18-NB-VA/PTFE | 09001 | BCS M18T4H1-XXS10H-SZ02-T08 | BCS00A1 | 65 |
| SK-HT250-20-M30-NB-VA/PTFE | 09002 | BCS M30T4G1-XXS20H-SZ02-T08 | BCS00A2 | 65 |
| SK1-1.5-6.5-NBO-VA/PTFE | 06004 | BCS G06T4E1-NOM15C-EP02 | BCS001P | 29 |
| SK1-1.5-6.5-NBO-VA/PTFE-Y1 | 06008 | BCS G06T4D2-NOM15C-S49G | BCS001W | 29 |
| SK1-1.5-6.5-NBS-VA/PTFE | 06003 | BCS G06T4E1-NSM15C-EP02 | BCS001N | 29 |
| SK1-1.5-6.5-NBS-VA/PTFE-Y1 | 06007 | BCS G06T4D2-NSM15C-S49G | BCS001U | 29 |
| SK1-1.5-6.5-PBO-VA/PTFE | 06002 | BCS G06T4E1-POM15C-EP02 | BCS001M | 29 |
| SK1-1.5-6.5-PBO-VA/PTFE-Y1 | 06006 | BCS G06T4D2-POM15C-S49G | BCS001T | 29 |
| SK1-1.5-6.5-PBS-VA/PTFE | 06001 | BCS G06T4E1-PSM15C-EP02 | BCS001L | 29 |
| SK1-1.5-6.5-PBS-VA/PTFE-Y1 | 06005 | BCS G06T4D2-PSM15C-S49G | BCS001R | 29 |
| SK1-1.5-M8-NBO-VA/PTFE | 06020 | BCS M08T4E1-NOM15C-EP02 | BCS0029 | 31 |
| SK1-1.5-M8-NBO-VA/PTFE-Y1 | 06024 | BCS M08T4E2-NOM15C-S49G | BCS002F | 30 |
| SK1-1.5-M8-NBS-VA/PTFE | 06019 | BCS M08T4E1-NSM15C-EP02 | BCS0028 | 31 |
| SK1-1.5-M8-NBS-VA/PTFE-Y1 | 06023 | BCS M08T4E2-NSM15C-S49G | BCS002E | 30 |
| SK1-1.5-M8-PBO-VA/PTFE | 06018 | BCS M08T4E1-POM15C-EP02 | BCS0027 | 31 |
| SK1-1.5-M8-PBO-VA/PTFE-Y1 | 06022 | BCS M08T4E2-POM15C-S49G | BCS002C | 30 |
| SK1-1.5-M8-PBS-VA/PTFE | 06017 | BCS M08T4E1-PSM15C-EP02 | BCS0026 | 31 |
| SK1-1.5-M8-PBS-VA/PTFE-Y1 | 06021 | BCS M08T4E2-PSM15C-S49G | BCS002A | 30 |
| SK1-3-6.5-NNBO-VA/PTFE | 06012 | BCS G06T4E1-NOM30G-EP02 | BCS0021 | 29 |
| SK1-3-6.5-NNBO-VA/PTFE-Y1 | 06016 | BCS G06T4D2-NOM30G-S49G | BCS0025 | 29 |
| SK1-3-6.5-NNBS-VA/PTFE | 06011 | BCS G06T4E1-NSM30G-EP02 | BCS0020 | 29 |
| SK1-3-6.5-NNBS-VA/PTFE-Y1 | 06015 | BCS G06T4D2-NSM30G-S49G | BCS0024 | 29 |
| SK1-3-6.5-PNBO-VA/PTFE | 06010 | BCS G06T4E1-POM30G-EP02 | BCS001Z | 29 |
| SK1-3-6.5-PNBO-VA/PTFE-Y1 | 06014 | BCS G06T4D2-POM30G-S49G | BCS0023 | 29 |
| SK1-3-6.5-PNBS-VA/PTFE | 06009 | BCS G06T4E1-PSM30G-EP02 | BCS001Y | 29 |
| SK1-3-6.5-PNBS-VA/PTFE-Y1 | 06013 | BCS G06T4D2-PSM30G-S49G | BCS0022 | 29 |
| SK1-3-M8-NNBO-VA/PTFE | 06028 | BCS M08T4E1-NOM30G-EP02 | BCS002L | 31 |
| SK1-3-M8-NNBO-VA/PTFE-Y1 | 06032 | BCS M08T4E2-NOM30G-S49G | BCS002R | 31 |
| SK1-3-M8-NNBS-VA/PTFE | 06027 | BCS M08T4E1-NSM30G-EP02 | BCS002K | 31 |
| SK1-3-M8-NNBS-VA/PTFE-Y1 | 06031 | BCS M08T4E2-NSM30G-S49G | BCS002P | 31 |
| SK1-3-M8-PNBO-VA/PTFE | 06026 | BCS M08T4E1-POM30G-EP02 | BCS002J | 31 |
| SK1-3-M8-PNBO-VA/PTFE-Y1 | 06030 | BCS M08T4E2-POM30G-S49G | BCS002N | 31 |
| SK1-3-M8-PNBS-VA/PTFE | 06025 | BCS M08T4E1-PSM30G-EP02 | BCS002H | 31 |
| SK1-3-M8-PNBS-VA/PTFE-Y1 | 06029 | BCS M08T4E2-PSM30G-S49G | BCS002M | 31 |
| SK1-4-10-NBO-VA/PTFE | 06036 | BCS G10T4H-NOM40C-EP02 | BCS002Y | 32 |
| SK1-4-10-NBS-VA/PTFE | 06035 | BCS G10T4H-NSM40C-EP02 | BCS002W | 32 |
| SK1-4-10-PBO-VA/PTFE | 06034 | BCS G10T4H-POM40C-EP02 | BCS002U | 32 |
| SK1-4-10-PBS-VA/PTFE | 06033 | BCS G10T4H-PSM40C-EP02 | BCS002T | 32 |
| SK1-4-M12-NBO-PVC | 06094 | BCS M12VVG1-NOM40C-EP02 | BCS003R | 33 |
| SK1-4-M12-NBO-PVC-Y2 | 06098 | BCS M12VVD2-NOM40C-S04G | BCS003Y | 33 |
| SK1-4-M12-NBO-VA/PTFE | 06040 | BCS M12T4G1-NOM40C-EP02 | BCS0032 | 33 |
| SK1-4-M12-NBO-VA/PTFE-Y2 | 06068 | BCS M12T4D2-NOM40C-S04G | BCS00AC | 33 |
| SK1-4-M12-NBS-PVC | 06093 | BCS M12VVG1-NSM40C-EP02 | BCS003P | 33 |
| SK1-4-M12-NBS-PVC-Y2 | 06097 | BCS M12VVD2-NSM40C-S04G | BCS003W | 33 |

# Capacitive Sensors

## New ordering codes and part numbers

| Old part number | Old material number | New part number | New ordering code | Page |
|---|---|---|---|---|
| SK1-4-M12-NBS-VA/PTFE | 06039 | BCS M12T4G1-NSM40C-EP02 | BCS0031 | 33 |
| SK1-4-M12-NBS-VA/PTFE-Y2 | 06067 | BCS M12T4D2-NSM40C-S04G | BCS0039 | 33 |
| SK1-4-M12-PBO-PVC | 06092 | BCS M12VVG1-POM40C-EP02 | BCS003N | 33 |
| SK1-4-M12-PBO-PVC-Y2 | 06096 | BCS M12VVD2-POM40C-S04G | BCS003U | 33 |
| SK1-4-M12-PBO-VA/PTFE | 06038 | BCS M12T4G1-POM40C-EP02 | BCS0030 | 33 |
| SK1-4-M12-PBO-VA/PTFE-Y2 | 06066 | BCS M12T4D2-POM40C-S04G | BCS0038 | 33 |
| SK1-4-M12-PBS-PVC | 06091 | BCS M12VVG1-PSM40C-EP02 | BCS003M | 33 |
| SK1-4-M12-PBS-PVC-Y2 | 06095 | BCS M12VVD2-PSM40C-S04G | BCS003T | 33 |
| SK1-4-M12-PBS-VA/PTFE | 06037 | BCS M12T4G1-PSM40C-EP02 | BCS002Z | 33 |
| SK1-4-M12-PBS-VA/PTFE-Y2 | 06065 | BCS M12T4D2-PSM40C-S04G | BCS0037 | 33 |
| SK1-6F-22/4-NBS-VA/PTFE | 06087 | BCS D22T403-NSM60C-EP02 | BCS003J | 38 |
| SK1-6F-22/4-PBS-VA/PTFE | 06085 | BCS D22T403-PSM60C-EP02 | BCS003H | 38 |
| SK1-8-34/16/8-NBO-PP | 06136 | BCS R08RR01-NOM80C-EP02 | BCS0054 | 40 |
| SK1-8-34/16/8-NBO-PP-M2/Y1 | 06140 | BCS R08RR01-NOM80C-EP00,2-GS49 | BCS0058 | 40 |
| SK1-8-34/16/8-NBS-PP | 06135 | BCS R08RR01-NSM80C-EP02 | BCS0053 | 40 |
| SK1-8-34/16/8-NBS-PP-M2/Y1 | 06139 | BCS R08RR01-NSM80C-EP00,2-GS49 | BCS0057 | 40 |
| SK1-8-34/16/8-PBO-PP | 06134 | BCS R08RR01-POM80C-EP02 | BCS0052 | 40 |
| SK1-8-34/16/8-PBO-PP-M2/Y1 | 06138 | BCS R08RR01-POM80C-EP00,2-GS49 | BCS0056 | 40 |
| SK1-8-34/16/8-PBS-PP | 06133 | BCS R08RR01-PSM80C-EP02 | BCS0051 | 40 |
| SK1-8-34/16/8-PBS-PP-M2/Y1 | 06137 | BCS R08RR01-PSM80C-EP00,2-GS49 | BCS0055 | 40 |
| SK1-8-M12-NNBO-CPTFE | 07080 | BCS M12TTG1-NOM80G-ET02 | BCS0072 | 47 |
| SK1-8-M12-NNBO-PVC | 07004 | BCS M12VVG1-NOM80G-EP02 | BCS005E | 47 |
| SK1-8-M12-NNBO-PVC-Y2 | 07040 | BCS M12VVD2-NOM80G-S04G | BCS0061 | 47 |
| SK1-8-M12-NNBO-VA/PTFE | 07008 | BCS M12T4G1-NOM80G-EP02 | BCS005K | 46 |
| SK1-8-M12-NNBO-VA/PTFE-Y2 | 07044 | BCS M12T4D2-NOM80G-S04G | BCS0065 | 46 |
| SK1-8-M12-NNBS-CPTFE | 07079 | BCS M12TTG1-NSM80G-ET02 | BCS0071 | 47 |
| SK1-8-M12-NNBS-PVC | 07003 | BCS M12VVG1-NSM80G-EP02 | BCS005C | 47 |
| SK1-8-M12-NNBS-PVC-Y2 | 07039 | BCS M12VVD2-NSM80G-S04G | BCS0060 | 47 |
| SK1-8-M12-NNBS-VA/PTFE | 07007 | BCS M12T4G1-NSM80G-EP02 | BCS005J | 46 |
| SK1-8-M12-NNBS-VA/PTFE-Y2 | 07043 | BCS M12T4D2-NSM80G-S04G | BCS0064 | 46 |
| SK1-8-M12-PNBO-CPTFE | 07078 | BCS M12TTG1-POM80G-ET02 | BCS0070 | 47 |
| SK1-8-M12-PNBO-PVC | 07002 | BCS M12VVG1-POM80G-EP02 | BCS005A | 47 |
| SK1-8-M12-PNBO-PVC-Y2 | 07038 | BCS M12VVD2-POM80G-S04G | BCS005Z | 47 |
| SK1-8-M12-PNBO-VA/PTFE | 07006 | BCS M12T4G1-POM80G-EP02 | BCS005H | 46 |
| SK1-8-M12-PNBO-VA/PTFE-Y2 | 07042 | BCS M12T4D2-POM80G-S04G | BCS0063 | 46 |
| SK1-8-M12-PNBS-CPTFE | 07077 | BCS M12TTG1-PSM80G-ET02 | BCS006Z | 47 |
| SK1-8-M12-PNBS-PVC | 07001 | BCS M12VVG1-PSM80G-EP02 | BCS0059 | 47 |
| SK1-8-M12-PNBS-PVC-Y2 | 07037 | BCS M12VVD2-PSM80G-S04G | BCS005Y | 47 |
| SK1-8-M12-PNBS-VA/PTFE | 07005 | BCS M12T4G1-PSM80G-EP02 | BCS005F | 46 |
| SK1-8-M12-PNBS-VA/PTFE-Y2 | 07041 | BCS M12T4D2-PSM80G-S04G | BCS0062 | 46 |
| SK1-8-M18-NBO-PVC | 06102 | BCS M18VVM1-NOM80C-EV02 | BCS0045 | 34 |
| SK1-8-M18-NBO-PVC-Y2 | 06106 | BCS M18VVG2-NOC80C-S04G | BCS004E | 34 |
| SK1-8-M18-NBO-VA/PBT | 06048 | BCS M18B4M-NOC80C-EV02 | BCS00AE | 34 |
| SK1-8-M18-NBO-VA/PBT-Y2 | 06072 | BCS M18B4G2-NOC80C-S04G | BCS004F | 33 |
| SK1-8-M18-NBS-PVC | 06101 | BCS M18VVM1-NSM80C-EV02 | BCS0043 | 34 |
| SK1-8-M18-NBS-PVC-Y2 | 06105 | BCS M18VVG2-NSC80C-S04G | BCS004A | 34 |
| SK1-8-M18-NBS-VA/PBT | 06047 | BCS M18B4M-NSC80C-EV02 | BCS0044 | 34 |
| SK1-8-M18-NBS-VA/PBT-Y2 | 06071 | BCS M18B4G2-NSC80C-S04G | BCS004C | 33 |
| SK1-8-M18-PBO-PVC | 06100 | BCS M18VVM1-POM80C-EV02 | BCS0041 | 34 |
| SK1-8-M18-PBO-PVC-Y2 | 06104 | BCS M18VVG2-POC80C-S04G | BCS0048 | 34 |
| SK1-8-M18-PBO-VA/PBT | 06046 | BCS M18B4M-POC80C-EV02 | BCS0042 | 34 |
| SK1-8-M18-PBO-VA/PBT-Y2 | 06070 | BCS M18B4G2-POC80C-S04G | BCS0049 | 33 |
| SK1-8-M18-PBS-PVC | 06099 | BCS M18VVM1-PSM80C-EV02 | BCS003Z | 34 |
| SK1-8-M18-PBS-PVC-Y2 | 06103 | BCS M18VVG2-PSC80C-S04G | BCS0046 | 34 |
| SK1-8-M18-PBS-VA/PBT | 06045 | BCS M18B4M-PSC80C-EV02 | BCS0040 | 34 |
| SK1-8-M18-PBS-VA/PBT-Y2 | 06069 | BCS M18B4G2-PSC80C-S04G | BCS0047 | 33 |
| SK1-10-22-NBO-VA/PVC | 06052 | BCS D22V4M1-NOC10C-EV02 | BCS0036 | 35 |
| SK1-10-22-NBS-VA/PVC | 06051 | BCS D22V4M1-NSC10C-EV02 | BCS0035 | 35 |
| SK1-10-22-PBO-VA/PVC | 06050 | BCS D22V4M1-POC10C-EV02 | BCS0034 | 35 |
| SK1-10-22-PBS-VA/PVC | 06049 | BCS D22V4M1-PSC10C-EV02 | BCS0033 | 35 |
| SK1-15-30/4-NBO-VA/PTFE | 06084 | BCS D30T401-NOC15C-EP02 | BCS003F | 39 |
| SK1-15-30/4-NBS-VA/PTFE | 06083 | BCS D30T401-NSC15C-EP02 | BCS003E | 39 |

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|---|---|---|---|---|
| SK1-15-30/4-PBO-VA/PTFE | 06082 | BCS D30T401-POC15C-EP02 | BCS003C | 39 |
| SK1-15-30/4-PBS-VA/PTFE | 06081 | BCS D30T401-PSC15C-EP02 | BCS003A | 39 |
| SK1-15-M18-NNBO-CPTFE | 07084 | BCS M18TTI2-NOC15G-AT02 | BCS0076 | 49 |
| SK1-15-M18-NNBO-PVC | 07016 | BCS M18VVI1-NOC15G-DV02 | BCS005P | 49 |
| SK1-15-M18-NNBO-PVC-Y2 | 07048 | BCS M18VVG2-NOC15G-S04G | BCS0069 | 48 |
| SK1-15-M18-NNBO-VA/PTFE | 07020 | BCS M18T4I1-NOC15G-DV02 | BCS005W | 48 |
| SK1-15-M18-NNBO-VA/PTFE-Y2 | 07052 | BCS M18T4G2-NOC15G-S04G | BCS006F | 48 |
| SK1-15-M18-NNBS-CPTFE | 07083 | BCS M18TTI2-NSC15G-AT02 | BCS0075 | 49 |
| SK1-15-M18-NNBS-PVC | 07015 | BCS M18VVI1-NSC15G-DV02 | BCS005N | 49 |
| SK1-15-M18-NNBS-PVC-Y2 | 07047 | BCS M18VVG2-NSC15G-S04G | BCS0068 | 48 |
| SK1-15-M18-NNBS-VA/PTFE | 07019 | BCS M18T4I1-NSC15G-DV02 | BCS005U | 48 |
| SK1-15-M18-NNBS-VA/PTFE-Y2 | 07051 | BCS M18T4G2-NSC15G-S04G | BCS006E | 48 |
| SK1-15-M18-PNBO-CPTFE | 07082 | BCS M18TTI2-POC15G-AT02 | BCS0074 | 49 |
| SK1-15-M18-PNBO-PVC | 07014 | BCS M18VVI1-POC15G-DV02 | BCS005M | 49 |
| SK1-15-M18-PNBO-PVC-Y2 | 07046 | BCS M18VVG2-POC15G-S04G | BCS0067 | 48 |
| SK1-15-M18-PNBO-VA/PTFE | 07018 | BCS M18T4I1-POC15G-DV02 | BCS005T | 48 |
| SK1-15-M18-PNBO-VA/PTFE-Y2 | 07050 | BCS M18T4G2-POC15G-S04G | BCS006C | 48 |
| SK1-15-M18-PNBS-CPTFE | 07081 | BCS M18TTI2-PSC15G-AT02 | BCS0073 | 49 |
| SK1-15-M18-PNBS-PVC | 07013 | BCS M18VVI1-PSC15G-DV02 | BCS005L | 49 |
| SK1-15-M18-PNBS-PVC-Y2 | 07045 | BCS M18VVG2-PSC15G-S04G | BCS0066 | 48 |
| SK1-15-M18-PNBS-VA/PTFE | 07017 | BCS M18T4I1-PSC15G-DV02 | BCS005R | 48 |
| SK1-15-M18-PNBS-VA/PTFE-Y2 | 07049 | BCS M18T4G2-PSC15G-S04G | BCS006A | 48 |
| SK1-20-30-NBX-VA/PBT | 06116 | BCS D30B4M3-NPC20C-EP02 | BCS004J | 35 |
| SK1-20-30-PBX-VA/PBT | 06115 | BCS D30B4M3-PPC20C-EP02 | BCS004H | 35 |
| SK1-20-M30-NBX-PBT | 06118 | BCS M30BBM3-NPC20C-EP02 | BCS004L | 36 |
| SK1-20-M30-NBX-PBT-Y2 | 06120 | BCS M30BBM2-NPM20C-S04G | BCS004N | 35 |
| SK1-20-M30-NBX-VA/PBT | 06122 | BCS M30B4M3-NPM20C-EP02 | BCS004R | 35 |
| SK1-20-M30-NBX-VA/PBT-Y2 | 06124 | BCS M30B4M2-NPM20C-S04G | BCS004U | 35 |
| SK1-20-M30-PBX-PBT | 06117 | BCS M30BBM3-PPC20C-EP02 | BCS004K | 36 |
| SK1-20-M30-PBX-PBT-Y2 | 06119 | BCS M30BBM2-PPM20C-S04G | BCS004M | 35 |
| SK1-20-M30-PBX-VA/PBT | 06121 | BCS M30B4M3-PPM20C-EP02 | BCS004P | 35 |
| SK1-20-M30-PBX-VA/PBT-Y2 | 06123 | BCS M30B4M2-PPM20C-S04G | BCS004T | 35 |
| SK1-25-34-NBX-PVC | 06126 | BCS G34VVM3-NPM20C-EP02 | BCS004Y | 36 |
| SK1-25-34-NBX-PVC-Y2 | 06128 | BCS G34VVM2-NPM20C-S04G | BCS0050 | 36 |
| SK1-25-34-PBX-PVC | 06125 | BCS G34VVM3-PPM20C-EP02 | BCS004W | 36 |
| SK1-25-34-PBX-PVC-Y2 | 06127 | BCS G34VVM2-PPM20C-S04G | BCS004Z | 36 |
| SK1-25-50/10-XBX-POM | 06089 | BCS D50OO02-YPC25C-EV02 | BCS003K | 39 |
| SK1-25-50/10-XBX-POM-Y1 | 06090 | BCS D50OO03-YPC25C-S49G | BCS003L | 39 |
| SK1-30-M30-NNBO-CPTFE | 07088 | BCS M30TTH2-NOC30G-AT02 | BCS007A | 51 |
| SK1-30-M30-NNBS-CPTFE | 07087 | BCS M30TTH2-NSC30G-AT02 | BCS0079 | 51 |
| SK1-30-M30-NNBX-PBT | 07090 | BCS M30BBM3-NPC30G-EP02 | BCS007E | 51 |
| SK1-30-M30-NNBX-PBT-Y2 | 07092 | BCS M30BBM2-NPC30G-S04G | BCS007H | 50 |
| SK1-30-M30-NNBX-VA/PTFE | 07094 | BCS M30T4M3-NPC30G-EP02 | BCS007K | 50 |
| SK1-30-M30-NNBX-VA/PTFE-Y2 | 07096 | BCS M30T4M2-NPC30G-S04G | BCS007M | 50 |
| SK1-30-M30-PNBO-CPTFE | 07086 | BCS M30TTH2-POC30G-AT02 | BCS0078 | 51 |
| SK1-30-M30-PNBS-CPTFE | 07085 | BCS M30TTH2-PSC30G-AT02 | BCS0077 | 51 |
| SK1-30-M30-PNBX-PBT | 07089 | BCS M30BBM3-PPC30G-EP02 | BCS007C | 51 |
| SK1-30-M30-PNBX-PBT-Y2 | 07091 | BCS M30BBM2-PPC30G-S04G | BCS007F | 50 |
| SK1-30-M30-PNBX-VA/PTFE | 07093 | BCS M30T4M3-PPC30G-EP02 | BCS007J | 50 |
| SK1-30-M30-PNBX-VA/PTFE-Y2 | 07095 | BCS M30T4M2-PPC30G-S04G | BCS007L | 50 |
| SK1-A-8-M18-4I20B-VA/PBT | 08002 | BCW M18B4M1-ICM80C-DV02 | BCW0001 | * |
| SK1-FS-MLG1/4-XDC-PSU | 07306 | BCS S40SS02-GPCFNG-EP02 | BCS009P | 53 |
| SK1-FS-MLG1/4-XDC-PSU-Y1 | 07309 | BCS S41SS02-GPCFNG-S49G | BCS009U | 52 |
| SK1-FS-MLM12-XDC-PSU | 07305 | BCS S40SS01-GPCFNG-EP02 | BCS009N | 53 |
| SK1-FS-MLM12-XDC-PSU-Y1 | 07308 | BCS S41SS01-GPCFNG-S49G | BCS009T | 52 |
| SK1-FS-MLNPT1/4-XDC-PSU | 07307 | BCS S40SS03-GPCFNG-EP02 | BCS009R | 53 |
| SK1-FS-MLNPT1/4-XDC-PSU-Y1 | 07310 | BCS S41SS03-GPCFNG-S49G | BCS009W | 52 |
| SK1-FS-MLRG1/4-XDC-PSU-Y1 | 07312 | BCS S42SS02-GPCFNG-S49G | BCS009Z | 53 |
| SK1-FS-MLRM12-XDC-PSU-Y1 | 07311 | BCS S42SS01-GPCFNG-S49G | BCS009Y | 53 |
| SK1-FS-MLRNPT1/4-XDC-PSU-Y1 | 07313 | BCS S42SS03-GPCFNG-S49G | BCS00A0 | 54 |
| SK1-FSA-34/16/8-NBO-PP | 07136 | BCS R08RR01-NOMFAC-EP02 | BCS008L | 63 |
| SK1-FSA-34/16/8-NBO-PP-M2/Y1 | 07140 | BCS R08RR01-NOMFAC-EP00,2-GS49 | BCS008R | 63 |

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| SK1-FSA-34/16/8-NBS-PP | 07135 | BCS R08RR01-NSMFAC-EP02 | BCS008K | 63 |
| SK1-FSA-34/16/8-NBS-PP-M2/Y1 | 07139 | BCS R08RR01-NSMFAC-EP00,2-GS49 | BCS008P | 63 |
| SK1-FSA-34/16/8-PBO-PP | 07134 | BCS R08RR01-POMFAC-EP02 | BCS008J | 63 |
| SK1-FSA-34/16/8-PBO-PP-M2/Y1 | 07138 | BCS R08RR01-POMFAC-EP00,2-GS49 | BCS008N | 63 |
| SK1-FSA-34/16/8-PBS-PP | 07133 | BCS R08RR01-PSMFAC-EP02 | BCS008H | 63 |
| SK1-FSA-34/16/8-PBS-PP-M2/Y1 | 07137 | BCS R08RR01-PSMFAC-EP00,2-GS49 | BCS008M | 63 |
| SK1-FSA-50/10-NBO-CPTFE | 07122 | BCS D50TT05-NOCFAC-ET02 | BCS0083 | 62 |
| SK1-FSA-50/10-NBS-CPTFE | 07121 | BCS D50TT05-NSCFAC-ET02 | BCS0082 | 62 |
| SK1-FSA-50/10-NBX-POM | 07124 | BCS D50OO04-NPCFAC-EV02 | BCS0085 | 62 |
| SK1-FSA-50/10-PBO-CPTFE | 07120 | BCS D50TT05-POCFAC-ET02 | BCS0081 | 62 |
| SK1-FSA-50/10-PBS-CPTFE | 07119 | BCS D50TT05-PSCFAC-ET02 | BCS0080 | 62 |
| SK1-FSA-50/10-PBX-POM | 07123 | BCS D50OO04-PPCFAC-EV02 | BCS0084 | 62 |
| SK1-FSA-D7B9/52-NNBO-CPTFE | 07160 | BCS S20TT01-NOLFAG-ET02 | BCS009H | 59 |
| SK1-FSA-D7B9/52-NNBS-CPTFE | 07159 | BCS S20TT01-NSLFAG-ET02 | BCS009F | 59 |
| SK1-FSA-D7B9/52-PNBO-CPTFE | 07158 | BCS S20TT01-POLFAG-ET02 | BCS009E | 59 |
| SK1-FSA-D7B9/52-PNBS-CPTFE | 07157 | BCS S20TT01-PSLFAG-ET02 | BCS009C | 59 |
| SK1-FSA-M18-NNBO-CPTFE | 07132 | BCS M18TTI2-NOCFAG-AT02 | BCS008F | 57 |
| SK1-FSA-M18-NNBO-PVC | 07104 | BCS M18VVI1-NOCFAG-DV02 | BCS007T | 57 |
| SK1-FSA-M18-NNBO-PVC-Y1 | 07144 | BCS M18VVN-NOCFAG-S49G | BCS008Y | 57 |
| SK1-FSA-M18-NNBS-CPTFE | 07131 | BCS M18TTI2-NSCFAG-AT02 | BCS008E | 57 |
| SK1-FSA-M18-NNBS-PVC | 07103 | BCS M18VVI1-NSCFAG-DV02 | BCS007R | 57 |
| SK1-FSA-M18-NNBS-PVC-Y1 | 07143 | BCS M18VVN-NSCFAG-S49G | BCS008W | 57 |
| SK1-FSA-M18-PNBO-CPTFE | 07130 | BCS M18TTI2-POCFAG-AT02 | BCS008C | 57 |
| SK1-FSA-M18-PNBO-PVC | 07102 | BCS M18VVI1-POCFAG-DV02 | BCS007P | 57 |
| SK1-FSA-M18-PNBO-PVC-Y1 | 07142 | BCS M18VVN-POCFAG-S49G | BCS008U | 57 |
| SK1-FSA-M18-PNBS-CPTFE | 07129 | BCS M18TTI2-PSCFAG-AT02 | BCS008A | 57 |
| SK1-FSA-M18-PNBS-PVC | 07101 | BCS M18VVI1-PSCFAG-DV02 | BCS007N | 57 |
| SK1-FSA-M18-PNBS-PVC-Y1 | 07141 | BCS M18VVN-PSCFAG-S49G | BCS008T | 57 |
| SK1-FSA-M30-NNBO-CPTFE | 07128 | BCS M30TTH2-NOCFAG-AT02 | BCS0089 | 58 |
| SK1-FSA-M30-NNBS-CPTFE | 07127 | BCS M30TTH2-NSCFAG-AT02 | BCS0088 | 58 |
| SK1-FSA-M30-NNBX-PBT | 07116 | BCS M30BBM3-NPCFAG-EP02 | BCS007W | 58 |
| SK1-FSA-M30-NNBX-PBT-Y2 | 07118 | BCS M30BBM2-NPCFAG-S04G | BCS007Z | 58 |
| SK1-FSA-M30-PNBO-CPTFE | 07126 | BCS M30TTH2-POCFAG-AT02 | BCS0087 | 58 |
| SK1-FSA-M30-PNBS-CPTFE | 07125 | BCS M30TTH2-PSCFAG-AT02 | BCS0086 | 58 |
| SK1-FSA-M30-PNBX-PBT | 07115 | BCS M30BBM3-PPCFAG-EP02 | BCS007U | 58 |
| SK1-FSA-M30-PNBX-PBT-Y2 | 07117 | BCS M30BBM2-PPCFAG-S04G | BCS007Y | 58 |
| SK1-FSA-MLG1/4-XDC-PSU | 07146 | BCS S40SS02-GPCFAG-EP02 | BCS0090 | 60 |
| SK1-FSA-MLG1/4-XDC-PSU-Y1 | 07152 | BCS S41SS02-GPCFAG-S49G | BCS0096 | 59 |
| SK1-FSA-MLG1/4-XDCS-PSU | 07149 | BCS S40SS02-GPCFAG-EP02-D01 | BCS0093 | 61 |
| SK1-FSA-MLM12-XDC-PSU | 07145 | BCS S40SS01-GPCFAG-EP02 | BCS008Z | 59 |
| SK1-FSA-MLM12-XDC-PSU-Y1 | 07151 | BCS S41SS01-GPCFAG-S49G | BCS0095 | 59 |
| SK1-FSA-MLM12-XDCS-PSU | 07148 | BCS S40SS01-GPCFAG-EP02-D01 | BCS0092 | 60 |
| SK1-FSA-MLNPT1/4-XDC-PSU | 07147 | BCS S40SS03-GPCFAG-EP02 | BCS0091 | 60 |
| SK1-FSA-MLNPT1/4-XDC-PSU-Y1 | 07153 | BCS S41SS03-GPCFAG-S49G | BCS0097 | 59 |
| SK1-FSA-MLNPT1/4-XDCS-PSU | 07150 | BCS S40SS03-GPCFAG-EP02-D01 | BCS0094 | 61 |
| SK1-FSA-MLRG1/4-XDC-PSU-Y1 | 07155 | BCS S42SS02-GPCFAG-S49G | BCS0099 | 61 |
| SK1-FSA-MLRM12-XDC-PSU-Y1 | 07154 | BCS S42SS01-GPCFAG-S49G | BCS0098 | 61 |
| SK1-FSA-MLRNPT1/4-XDC-PSU-Y1 | 07156 | BCS S42SS03-GPCFAG-S49G | BCS009A | 61 |
| SK1-HT125-FS-J3/8NPTF-NO-VA/PTFE | 90141 | BCS S03T401-NOCFNH-KM16-T02 | BCS00A9 | 55 |
| SK1-HT125-FS-J3/8NPTF-NS-VA/PTFE | 90140 | BCS S03T401-NSCFNH-KM16-T02 | BCS00A8 | 55 |
| SK1-HT125-FS-J3/8NPTF-PO-VA/PTFE | 90126 | BCS S03T401-POCFNH-KM16-T02 | BCS00A7 | 55 |
| SK1-HT125-FS-J3/8NPTF-PS-VA/PTFE | 90144 | BCS S03T401-PSCFNH-KM16-T02 | BCS00A6 | 55 |
| SK1-HT125-FS-JM18-NO-VA/PTFE | 07064 | BCS S01T401-NOCFNG-KM16-T02 | BCS006L | 54 |
| SK1-HT125-FS-JM18-NS-VA/PTFE | 07063 | BCS S01T401-NSCFNG-KM16-T02 | BCS006K | 54 |
| SK1-HT125-FS-JM18-PO-VA/PTFE | 07062 | BCS S01T401-POCFNG-KM16-T02 | BCS006J | 54 |
| SK1-HT125-FS-JM18-PS-VA/PTFE | 07061 | BCS S01T401-PSCFNG-KM16-T02 | BCS006H | 54 |
| SK1-HT125-FS-JR3/8-NO-VA/PTFE | 07068 | BCS S02T401-NOCFNG-KM16-T02 | BCS006R | 55 |
| SK1-HT125-FS-JR3/8-NS-VA/PTFE | 07067 | BCS S02T401-NSCFNG-KM16-T02 | BCS006P | 55 |
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| SK1-HT125-FS-JR3/8-PS-VA/PTFE | 07065 | BCS S02T401-PSCFNG-KM16-T02 | BCS006M | 55 |
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| SK1-TM-6-M12/60-PNBS-PVC | 07069 | BCS M12VVI1-PSM60G-EP02-E | BCS006T | 47 |
| SK1-TM-6-M12/63-NNBO-CPTFE | 07304 | BCS M12TTI1-NOM60G-ET02-E | BCS009M | 47 |
| SK1-TM-6-M12/63-NNBS-CPTFE | 07303 | BCS M12TTI1-NSM60G-ET02-E | BCS009L | 47 |
| SK1-TM-6-M12/63-PNBO-CPTFE | 07302 | BCS M12TTI1-POM60G-ET02-E | BCS009K | 47 |
| SK1-TM-6-M12/63-PNBS-CPTFE | 07301 | BCS M12TTI1-PSM60G-ET02-E | BCS009J | 47 |
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| SL-YAZA-3m | 90069 | BCC Z002-030 | BCC04JY | * |
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| SNG-115AC-K-T | 04008 | BAE SA-CS-009-XR | BAE009N | 75 |
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# Object Detection

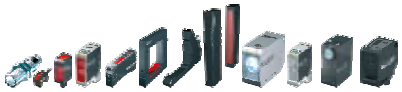
- Inductive sensors: DC 3-/4-wire
- Inductive sensors: DC 2-wire
- Inductive sensors: AC/DC
- Inductive sensors: Special features
  - Factor 1
  - Steelface
  - Weld field immune
  - Magnetic field immune
  - Desina-Diagnostic
  - Pressure rated
  - Temperature Rated
  - PROXINOX
  - Ring sensors
  - Extended switching distances
- Sensors for pneumatic cylinders
- Magnetic field sensors
- Capacitive sensors
- Pressure sensors
- Diffuse Energetic with Fore- and Background Suppression
- Retro-reflective sensors
- Through-beam sensors: Emitter/Receiver
- Fiber optic systems
- Fork sensors
- Dynamic optical windows
- Light grids
- Contrast sensors
- Luminescence sensors
- Color sensors
- Laser fork sensors
- Mechanical single and multiple position switches
- Mechanical single and multiple position switches with safety switch positions
- 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 4 mm
- Wireless System
- Special form factors for mechanical and inductive multiple position switches


Find out more about our product range in our brochures or online!

- www.balluff.com

**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 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**
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BMS mounting system

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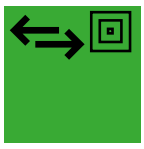
**Object Detection**

**Linear Position Sensing**



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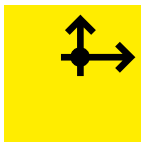

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