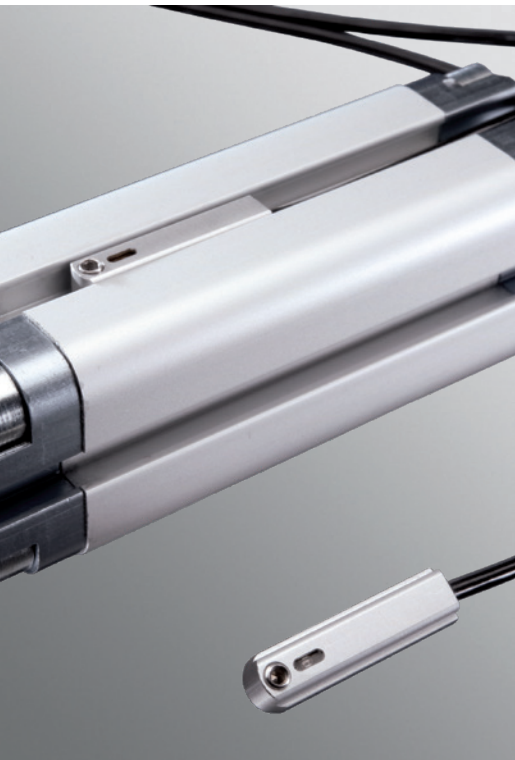




**Complete Range  
Sensor Systems**





# BERNSTEIN AG

## A Success Story



### Safety for man and machine

BERNSTEIN AG ranks among the world's leading providers of industrial safety technology. With our comprehensive range of switches, sensors, enclosures, suspension systems and other components for industrial applications, we offer our customers effective and versatile solutions.

In-depth market knowledge, the close proximity to end users as well as years of experience in mechanical engineering and electronics are reflected down to the last detail in our products.

By conforming to international safety guidelines, our products perfectly integrate in individual system solutions. Our focus is complete commitment to safety for man, machine and industrial processes.

### Our expertise for your safety

With sound application expertise we support our customers from all branches of industry in the planning and implementation of systems designed to meet stringent safety requirements. In addition to classic plant and machine construction, we look after customers in the lift construction, automotive, agriculture, conveyor construction, automation engineering, wood-working, renewable energy, AS-Interface and EX.

# Our knowledge is your success



**GERMANY**  
Porta Westfalica  
BERNSTEIN  
BUSINESS CENTER



**GERMANY**  
Hille-Hartum



**EUROPE**  
Budapest (Hungary)  
BERNSTEIN Kft.



**ASIA**  
Taicang (China)  
BERNSTEIN Safe Solutions

## Our philosophy

Customer Satisfaction is our number one priority. For us, Quality is more than making a good product, it's about designing them to perfectly match ALL of your needs.

Customized Solutions are fully integrated into our business and form part of our everyday working life. Employees are treated as our greatest asset as they are responsible for the quality and success of our products. All BERNSTEIN TEAM members are trained and educated to the highest possible standard so they can deliver "Best in Class" Service and Support. The BERNSTEIN TEAM will support you both personally and professionally, working together we will provide you with the best Safe Solution – for any size of project.

## Future-proof solutions

Our objective is to actively influence technical innovation and modern application solutions. BERNSTEIN has therefore always been at the centre of defining trends in technology. With an unwavering commitment to the future we will continue providing the best possible answers in terms of technology, ecology and economic efficiency.

That is our definition of progress!

# BERNSTEIN AG

## The Product Lines

### Switch Systems



#### Switch systems – Economy meets safety

BERNSTEIN electromechanical switches offer a convincing price/performance ratio and impress with their extreme reliability for many different operating voltages. The range extends from limit switches, encapsulated in insulating material or metal, through foot switches to safety switching devices. The AS-i compatible products save time and material in installation and provide cost advantages in operation. The comprehensive range of designs and sizes, the possible switching functions and the choice of actuators make virtually any application reality.

### Sensor Systems



#### Sensor systems – Compact intelligence

The extremely fast and exceptionally precise BERNSTEIN sensors operate without interference and wear in all applications. The tried-and-tested reliability and the compact dimensions are greatly appreciated in all branches of industry. Matching the specific application, in addition to ultrasonic sensors and level switches, customers can choose from a wide range of inductive, capacitive, magnetic or optical sensors. Alongside the comprehensive standard range of sensors, we also offer comprehensive development and design for individual solutions.

## Enclosure Systems



### **Enclosure systems – Function and design**

With its long tradition in manufacturing enclosures, BERNSTEIN combines superior enclosure technology, designed for encapsulating a diverse range of applications, with ultramodern and variable suspension systems. An extensive range of aluminium and plastic terminal boxes as well as the wiring and circuitry in standard and control enclosures conforming to specific customer requirements round off the product portfolio. Our enclosures conform to standards used in medical technology, industry as well as food and EX applications.

# Product Line Sensor Systems





### **Sensor systems – Compact intelligence**

BERNSTEIN is an established manufacturer of high quality electromechanical and electronic low voltage switching devices and sensors. Our products are used in the most diverse range of applications, ranging from lift construction through wood-working and packaging machines through to machine tools.

Contactless sensors are characterised by absolute reliability, suitability for a wide range of applications and optimum cost-benefit ratio. Their main purpose is to convert mechanical movement into electrical signals that are processed in control systems.

In modern day applications, however, sensors directly connected to bus systems are being used to an ever greater extent to monitor mechanical movement and convert it into digital information.

Selecting the right sensor for the job depends on the prevailing ambient and operating conditions as well as corresponding technical requirements. In addition to the detection method (inductive, capacitive, optical, ultrasonic or magnetic) it is also necessary to select the corresponding output function (PNP, NPN, AC, normally-closed or normally-open contact). Sensing distances as well as the direction and type of approach are also important selection criteria. In view of the large number of possible combinations, the scope of application is virtually unlimited.

### **Maximum functions – minimum space**

The range of applications in which limit switches are used has changed in line with increasing automation. Sensors are no longer used purely for the purpose of detecting position but rather they must be able to output analogue values for the purpose of calculating the distance with the necessary signal processing already taking place in the sensor itself. A sensor can also be used to sample two switching points in order to reduce the number of components in machines and systems.

This functionality is achieved by the use of state-of-the-art microcontrollers and advanced sensor technologies. Modern sensors from BERNSTEIN therefore open up new applications, extend the range of functions and as a result significantly increase efficiency.

### **Complementing our product range we offer attractive customer services:**

- Assistance in assessing risk and configuring safety functions
- Preassembly of products with standard power supply lines or customised cables
- Supply of M8 or M12 connection technology
- Development of sensors to customer specifications
- Development and manufacture of customer-specific system solutions

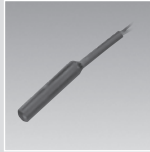

## Inductive Sensors

| Type   | Page |
|--|------|
| <b>General</b>   | 12   |
|  <ul style="list-style-type: none"> <li>• ø 3 mm</li> <li>• ø 4 mm</li> <li>• ø 6,5 mm</li> <li>• M4</li> <li>• M5</li> </ul>   | 14   |
|  <ul style="list-style-type: none"> <li>• M8</li> </ul>   | 16   |
|  <ul style="list-style-type: none"> <li>• M12</li> </ul>  | 18   |
|  <ul style="list-style-type: none"> <li>• M18</li> </ul>   | 22   |
|  <ul style="list-style-type: none"> <li>• M30</li> </ul>  | 28   |
|  <ul style="list-style-type: none"> <li>• ø 34 mm</li> </ul>  | 32   |
|  <ul style="list-style-type: none"> <li>• 5 x 5 x 25 mm</li> <li>• 8 x 8 x 40 mm</li> <li>• 8 x 8 x 56 mm</li> <li>• 12 x 12 x 55 mm</li> </ul>                                 | 32   |
|  <ul style="list-style-type: none"> <li>• 27 x 10 x 5 mm</li> <li>• 28 x 16 x 11 mm</li> <li>• 40 x 26 x 12 mm</li> <li>• 50 x 25 x 10 mm</li> <li>• 60 x 36 x 10 mm</li> </ul> | 33   |
|  <ul style="list-style-type: none"> <li>• 68 x 30 x 15 mm</li> <li>• 40 x 40 mm</li> </ul>  | 36   |

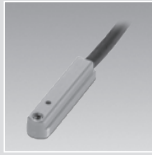
## Capacitive Sensors

| Type  | Page |
|---|------|
| <b>General</b>  | 38   |
|  <ul style="list-style-type: none"> <li>• M12</li> <li>• M18</li> </ul>                          | 42   |
|  <ul style="list-style-type: none"> <li>• M30</li> <li>• M32</li> </ul>                          | 44   |
|  <ul style="list-style-type: none"> <li>• ø 20 mm</li> <li>• ø 34 mm</li> </ul>                  | 46   |
|  <ul style="list-style-type: none"> <li>• 50 x 25 x 10 mm</li> <li>• 68 x 30 x 15 mm</li> </ul> | 47   |



## Magnetic Switches

| Type  | Page |
|---|------|
| <b>General</b>  | 48   |
|  <ul style="list-style-type: none"> <li>• Electromechanical magnetic switches</li> <li>• Plastic</li> <li>• Metal</li> </ul> | 52   |
| <b>General</b>  | 60   |
|  <ul style="list-style-type: none"> <li>• Electronic magnetic sensors</li> <li>• Plastic</li> <li>• Metal</li> </ul>         | 62   |

## Slot Sensors

| Type   | Page |
|--|------|
| <b>General</b>   | 71   |
|  <ul style="list-style-type: none"> <li>• E22</li> <li>• E30</li> <li>• Analogue</li> <li>• Teachable</li> <li>• Electronic</li> <li>• Reed contact</li> </ul> | 72   |

## Contactless safety technology

| Type  | Page |
|---|------|
|  <ul style="list-style-type: none"> <li>• Non-contact Safety Sensor SRF</li> </ul> | 75   |
|  <ul style="list-style-type: none"> <li>• Magnetic Monitoring Systems</li> </ul>   | 84   |

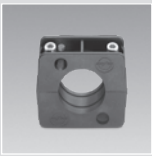
## Accessories



**Magnets** 88



**Cable couplers** 94



**• Mounting brackets** 96



**Sensor tester** 98

## Annex

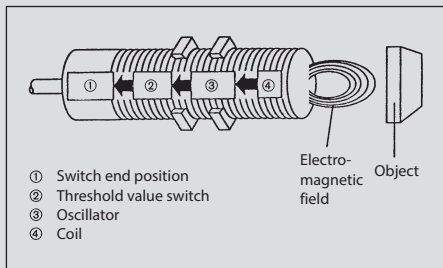
**Type code** 100

**Wiring diagrams** 109

# Inductive Sensors

## Functional principle

In general, inductive proximity switches consist of four basic elements: a coil, an oscillator, a threshold switch and an output stage with short-circuit protection. The oscillator generates a high frequency, electromagnetic alternating field which is emitted from the active face of the coil. Eddy currents are induced in a metal object that enters this field. These eddy currents draw energy from both the electromagnetic field and from the oscillator which is consequently attenuated. The more energy taken the closer the metal object moves towards the active face. The threshold switch switches on the output stage at a defined attenuation value. In proximity switches with a DC voltage supply, this switch is designed as an NPN transistor which switches the connected load to the negative pole or as a PNP transistor which switches the load to the positive pole. The output stage is a thyristor or a triac in AC voltage switches.

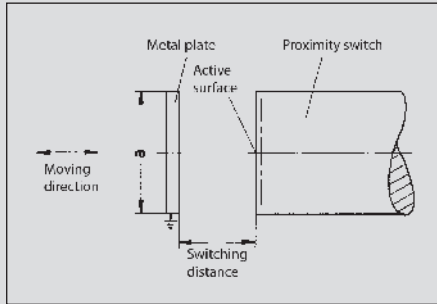


## Sensing distance

The sensing distance (gap) is determined by the coil diameter, i.e. larger sensors are required for larger sensing distances. The sensing distance is also dependent on the size of the metal object to be detected as well as the material it is made from.

## Target

The sensing distance is measured with a 1 mm thick square measuring plate made of steel (ST 37) referred to as a target. The edge length is equal to the diameter of the active face or equal to three times the sensing distance depending on which value is greater.



## Nominal sensing distance: (Sn)

The nominal sensing distance is a device-specific characteristic value that is dependent on the coil diameter.

## Real sensing distance: (Sr)

The real sensing distance is measured at nominal voltage and nominal temperature. It must be between 90 % – 110 % of the nominal sensing distance.

## Useable sensing distance: (Su)

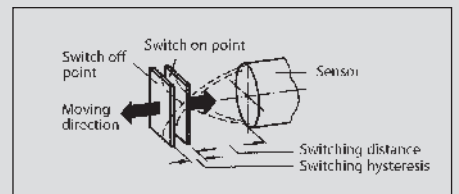
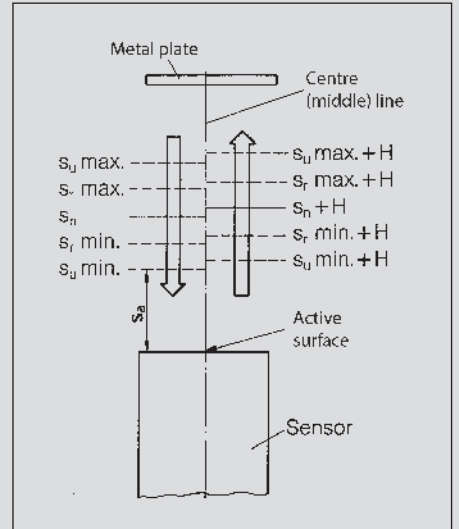
The useable sensing distance is measured within the permissible temperature and voltage ranges and is 90 % – 110 % of the real sensing distance.

## Operational sensing distance: (Sa) (Assured operation distance)

The operational sensing distance takes into account the influence of the supply voltage, temperature and control systems. Reliable switching under all permissible operating conditions is assured within 0 % – 81 % of the nominal sensing distance.  $S_a \sim 0.81 S_n$ .

## Hysteresis: (H)

Hysteresis refers to the difference between the switch-on point as an object approaches and the switch-off point as the object moves away. This hysteresis is specified as a percentage of the nominal sensing distance and is typically 10 %. It is required to prevent the output chattering in response to slowly approaching objects, temperature drift, electrical interference or vibration.

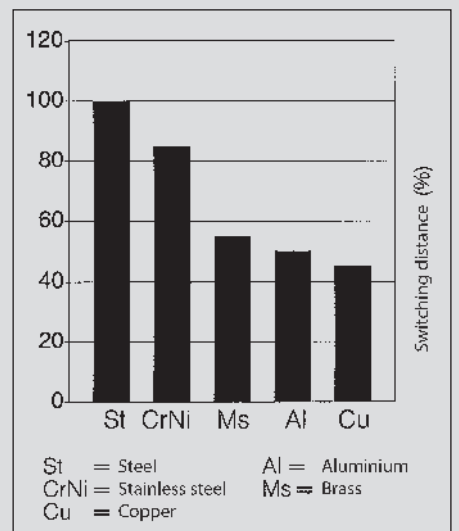


## Repeatability

Repeatability is the ability of a sensor to repeatedly detect an object at the same distance away from the sensing surface. The typical deviation is < 5 %.

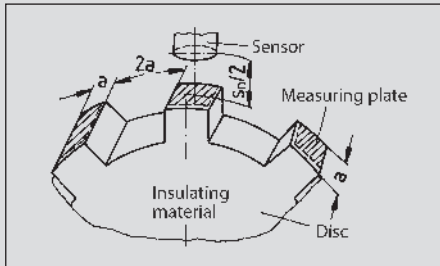
## Reduction factors

The definition of the sensing distance is based on the measurement performed with a standardised square target made of steel. If other materials with the same dimensions are used, the sensing distance will be reduced as shown in the following graphic.



### Switching frequency

The switching frequency is measured with a redating, non-conductive plate, on which the standard targets are mounted as illustrated (size of targets as previously defined).



The distance between the targets and sensor is equal to half the nominal sensing distance. The maximum switching frequency is reached when the switch-on or switch-off signal time drops below 50 µs.

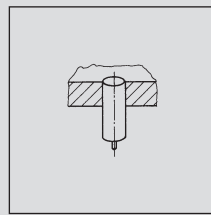
### Temperature range

For most sensors, the permissible ambient temperature range is between -25 °C and +70 °C (-13 °F to +158 °F). Sensors with an extended temperature range of -40 °C to +100 °C are also available.

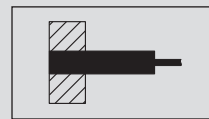
### Assembly

Inductive sensors contain a coil on a ferromagnetic core that bundles the electromagnetic alternating field. The core is installed into the enclosure in such a way that the field emerges from the switch at the active face. A part of the magnetic field, however, also emerges from the side of the core. The sensor in a flush mount arrangement would already be influenced by the metal on the sides. For this reason, a metal band is fitted about the core in plastic enclosures, thus restricting the lateral magnetic field in a flush mount configuration. Due to the pre-attenuation attributed to the metal ring or a metal enclosure, flush mount versions have a shorter sensing distance than non-flush mount sensors and can be mounted closer to each other.

### Flush mount

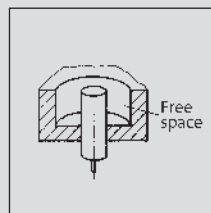


The active face can be flush with a metal surface.

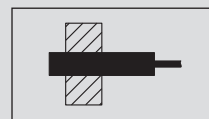


Catalogue symbol for flush mount

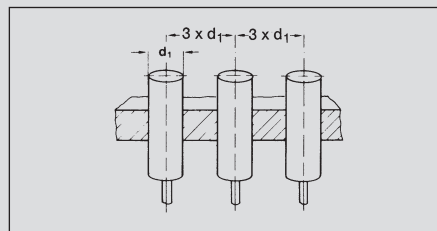
### Non-flush mount



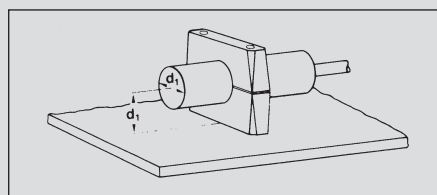
Sensors for non-flush mount require a clearance equal to three times the sensor enclosure diameter and a min. depth of 2x Sn.



Catalogue symbol for non-flush mount



Minimum spacing between non-flush mount sensors



Installation with a mounting bracket parallel to a steel wall

### NAMUR sensors

(Standardization association for measurement and control in chemical industries)

### Protection class

Corresponding to their ID code, the enclosures are dustproof and waterproof in accordance with IP65 or IP67 (EN 60529).

### Short-circuit protection

Standard sensors are protected against short-circuit (cyclic) and polarity reversal.

### Tightening torque requirements

BERNSTEIN supplies corresponding mounting nuts with its sensors. Refer to the respective datasheets for the required tightening torque.

#### Tightening torque examples for sensors in brass enclosure:

|     |        |
|-----|--------|
| M4  | 0.8 Nm |
| M5  | 1.5 Nm |
| M8  | 8 Nm   |
| M12 | 10 Nm  |
| M18 | 25 Nm  |
| M30 | 70 Nm  |

### Materials

The sensors are protected by a glass fibre reinforced thermoplastic, brass or stainless steel enclosure. The connection cable has a PVC or PU sheathing.

### Connection systems

The following connection systems are available for standard sensors:

- Cable variants (2 m) with PVC or PUR sheathing
- Connector variants with M8, M12 connector or connector conforming to DIN 43650
- Quick-connect system with Ultralock connectors

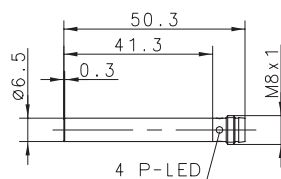
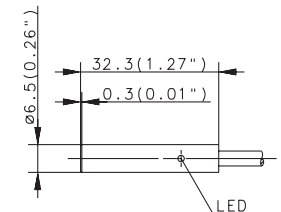
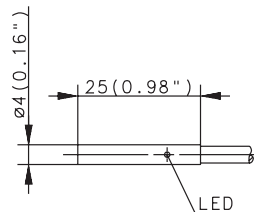
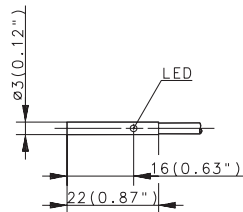
### Standards and approvals

All sensors are CE-certified. The following European standards apply in accordance with CENELEC:

- EN 60947-5-2 Proximity switches
- EN 60947-5-6 NAMUR sensors

# Inductive Sensors (Type Ø 3 mm, Ø 4 mm, Ø 6.5 mm, M4, M5)

| Type                     | Ø 3 mm    | Ø 4 mm    | Ø 6.5 mm  |              |
|--------------------------|-----------|-----------|-----------|--------------|
| Type of installation     | Flush     | Flush     | Flush     | Flush        |
| Nominal sensing distance | 0.6 mm    | 0.8 mm    | 1.5 mm    | 1.5 mm       |
| Type of connection       | Cable 2 m | Cable 2 m | Cable 2 m | Connector M8 |
| Special feature          |           |           |           |              |



|                 |    |                                    |  |  |  |  |
|-----------------|----|------------------------------------|--|--|--|--|
| <b>PNP</b>      | DC | NO contact                         | <b>6502999019</b><br>KIB-D03PS/0,6-KL2PU | <b>6502999004</b><br>KIB-D04PS/0,8-KL2PU | <b>6502999010</b><br>KIB-D06PS/1,5-KL2 | <b>6502999012</b><br>KIB-D06PS/1,5-KLSM8 |
|                 |    | NC contact                         |  |  |  |  |
| <b>NPN</b>      | DC | NO contact                         | <b>6502799007</b><br>KIB-D03PÖ/0,6-KL2PU | <b>6502799002</b><br>KIB-D04PÖ/0,8-KL2PU | <b>6502799011</b><br>KIB-D06PÖ/1,5-KL2 |  |
|                 |    | NC contact                         |  |  |  |  |
| <b>PNP/NPN</b>  | DC | NO/NC prog.<br>push-pull operation |  |  |  |  |
| <b>NAMUR</b>    | DC | Type                               |  |  |  |  |
| <b>Analogue</b> | DC |                                    |  |  |  |  |
| <b>2-wire</b>   | DC | NO contact                         |  |  |  |  |
|                 |    | NC contact                         |  |  |  |  |
|                 | AC | NO contact                         |  |  |  |  |
|                 |    | NC contact                         |  |  |  |  |
|                 |    | Changeover contact                 |  |  |  |  |

## Technical data

|                                      |       |           |           |           |           |
|--------------------------------------|-------|-----------|-----------|-----------|-----------|
| Rated operating voltage              | $U_B$ | 10–30 VDC | 10–30 VDC | 10–36 VDC | 10–36 VDC |
| Rated operating current              | $I_B$ | ≤ 100 mA  | ≤ 200 mA  | ≤ 200 mA  | ≤ 200 mA  |
| Switching frequency (max)            | F     | 3000 Hz   | 3000 Hz   | 1000 Hz   | 1000 Hz   |
| Short circuit-protection             |       | Cyclic    | Cyclic    | Cyclic    | Cyclic    |
| Function/operating voltage indicator |       | LED/-     | LED/-     | LED/-     | LED/-     |
| Sensing distance, adjustable         |       |           |           |           |           |

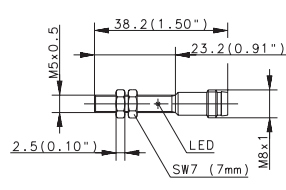
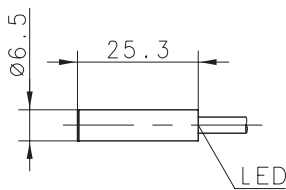
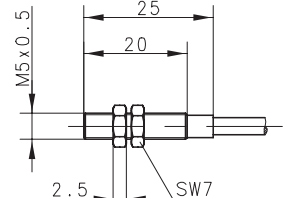
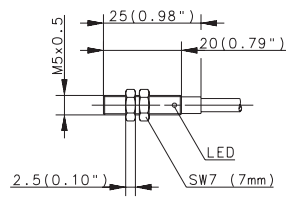
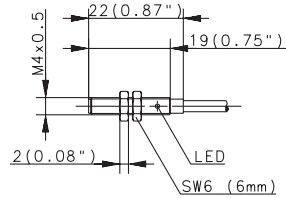
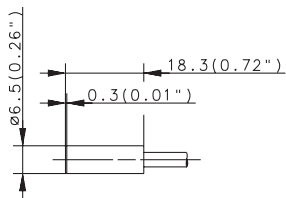
## Mechanical data

|   |  |                           |                          |                          |                        |
|---|--|---------------------------|--------------------------|--------------------------|------------------------|
| Ambient temperature (min/max)                         |  | -25°C/+70°C               | -25°C/+70°C              | -25°C/+70°C              | -25°C/+70°C            |
| Protection class in accordance with IEC 529, EN 60529 |  | IP67                      | IP67                     | IP67                     | IP67                   |
| Enclosure material                                    |  | Stainless steel 1.4305    | Stainless steel 1.4401   | Stainless steel 1.4401   | Stainless steel 1.4401 |
| Connection  |  | 3 x 0.055 mm <sup>2</sup> | 3 x 0.14 mm <sup>2</sup> | 3 x 0.14 mm <sup>2</sup> | M8 x 1                 |

Please refer to Accessories for cable couplers, mounting brackets and sensor tester.



| Ø 6.5 mm  |           | M4        | M5        | M5           |           |
|-----------|-----------|-----------|-----------|--------------|-----------|
| Flush     | Flush     | Flush     | Flush     | Flush        | Flush     |
| 1.5 mm    | 1.5 mm    | 0.6 mm    | 1 mm      | 1 mm         | 1 mm      |
| Cable 2 m | Cable 5 m | Cable 2 m | Cable 2 m | Connector M8 | Cable 2 m |
|           |           |           |           |              | NAMUR     |



|  |   |  |  |  |  |  |                                      |
|--|---|--|--|--|--|--|--------------------------------------|
| <b>6502999034</b><br>KIB-D06PS/1,5-K2VPU | <b>6602999460</b><br>KIB-D06PS/1,5-KL5V | <b>6502999020</b><br>KIB-M04PS/0,6-KL2PU |  | <b>6502999003</b><br>KIB-M05PS/001-KL2PU<br><b>6502799001</b><br>KIB-M05PÖ/001-KL2PU | <b>6502999018</b><br>KIB-M05PS/001-KLSM8<br><b>6502799019</b><br>KIB-M05PÖ/001-KLSM8 |  |                                      |
|  |   |  |  | <b>6502399003</b><br>KIB-M05NS/001-KL2PU   |  |  |                                      |
|  |   |  |  |  |  |  |                                      |
|  |   |  |  |  |  |  | <b>6501699008</b><br>KIB-M05EA/001-2 |
|  |   |  |  |  |  |  |                                      |

|           |           |           |           |           |          |
|-----------|-----------|-----------|-----------|-----------|----------|
| 10–36 VDC | 10–36 VDC | 10–30 VDC | 10–30 VDC | 10–30 VDC | 5–25 VDC |
| ≤ 200 mA  | ≤ 200 mA  | ≤ 100 mA  | ≤ 200 mA  | ≤ 200 mA  | –        |
| 1000 Hz   | 1000 Hz   | 3000 Hz   | 3000 Hz   | 3000 Hz   | ≈ 3 kHz  |
| Cyclic    | Cyclic    | Cyclic    | Cyclic    | Cyclic    | –        |
| –/–       | LED/–     | LED/–     | LED/–     | LED/–     | –/–      |

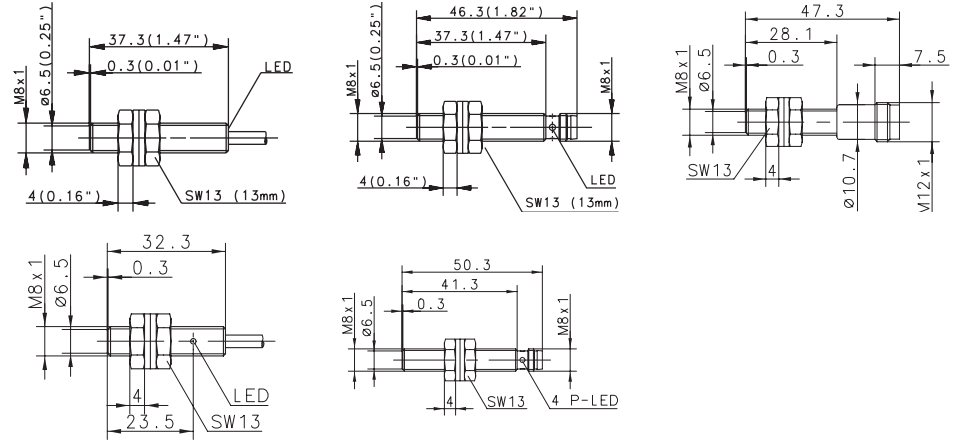
|                          |                          |                           |                          |             |                          |
|--------------------------|--------------------------|---------------------------|--------------------------|-------------|--------------------------|
| –25°C/+70°C              | –25°C/+70°C              | –25°C/+70°C               | –25°C/+70°C              | –25°C/+70°C | –25°C/+70°C              |
| IP67                     | IP67                     | IP67                      | IP67                     | IP67        | IP67                     |
| Stainless steel 1.4401   | Stainless steel 1.4401   | Stainless steel 1.4305    | CuZn39Pb3                | CuZn39Pb3   | CuZn39Pb3                |
| 3 x 0.14 mm <sup>2</sup> | 3 x 0.14 mm <sup>2</sup> | 3 x 0.055 mm <sup>2</sup> | 3 x 0.14 mm <sup>2</sup> | M8 x 1      | 2 x 0.14 mm <sup>2</sup> |

You will find detailed data sheets to the products under [www.bernstein.eu](http://www.bernstein.eu)



# Inductive Sensors (Type M8)

| Type                     | M8        |           | M8           |              | M8            |
|--------------------------|-----------|-----------|--------------|--------------|---------------|
| Type of installation     | Flush     | Flush     | Flush        | Flush        | Flush         |
| Nominal sensing distance | 1.5 mm    | 1.5 mm    | 1.5 mm       | 1.5 mm       | 1.5 mm        |
| Type of connection       | Cable 2 m | Cable 6 m | Connector M8 | Connector M8 | Connector M12 |
| Special feature          |           |           |              |              |               |



|                 |    |  |  |  |  |  |   |
|-----------------|----|--|--|--|--|--|---|
| <b>PNP</b>      | DC | NO contact<br>Type<br>NC contact<br>Type<br>Antivalent NO/NC | <b>6932901001</b><br>KIB-M08PS/1,5-KL2 | <b>6502901004</b><br>KIB-M08PS/1,5-KL6<br><b>6502701001</b><br>KIB-M08PÖ/1,5-KL2 | <b>6932942001</b><br>KIB-M08PS/1,5-KLSM8 | <b>6502742001</b><br>KIB-M08PÖ/1,5-KLSM8 | <b>6502942007</b><br>KIB-M08PS/0,1-KS12 |
| <b>NPN</b>      | DC | NO contact<br>Type<br>NC contact<br>Antivalent NO/NC         | <b>6932301001</b><br>KIB-M08NS/1,5-KL2 |  | <b>6932342001</b><br>KIB-M08NS/1,5-KLSM8 |  |   |
| <b>PNP/NPN</b>  | DC | NO/NC prog.<br>push-pull operation                           |  |  |  |  |   |
| <b>NAMUR</b>    | DC | Type   |  |  |  |  |   |
| <b>Analogue</b> | DC |  |  |  |  |  |   |
| <b>2-wire</b>   | DC | NO contact<br>NC contact                                     |  |  |  |  |   |
|                 | AC | NO contact<br>NC contact<br>Changeover contact               |  |  |  |  |   |

### Technical data

|                                      |       |           |           |           |           |           |
|--------------------------------------|-------|-----------|-----------|-----------|-----------|-----------|
| Rated operating voltage              | $U_B$ | 10–36 VDC | 10–36 VDC | 10–36 VDC | 10–36 VDC | 10–36 VDC |
| Rated operating current              | $I_B$ | ≤ 200 mA  | ≤ 200 mA  | ≤ 200 mA  | ≤ 200 mA  | ≤ 200 mA  |
| Switching frequency (max)            | F     | 1000 Hz   | 1000 Hz   | 1000 Hz   | 1000 Hz   | 1000 Hz   |
| Short circuit-protection             |       | Cyclic    | Cyclic    | Cyclic    | Cyclic    | Cyclic    |
| Function/operating voltage indicator |       | LED/-     | LED/-     | LED/-     | LED/-     | -/-       |
| Sensing distance, adjustable         |       |           |           |           |           |           |

### Mechanical data

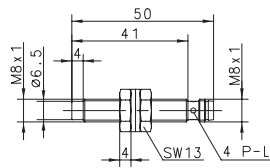
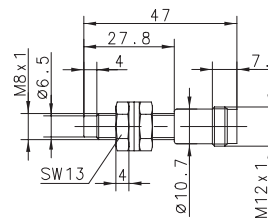
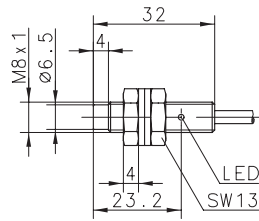
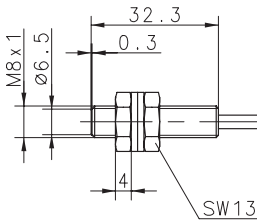
|   |  |                          |                          |                        |                        |                        |
|---|--|--------------------------|--------------------------|------------------------|------------------------|------------------------|
| Ambient temperature (min/max)                         |  | -25°C/+70°C              | -25°C/+70°C              | -25°C/+70°C            | -25°C/+70°C            | -25°C/+70°C            |
| Protection class in accordance with IEC 529, EN 60529 |  | IP67                     | IP67                     | IP67                   | IP67                   | IP67                   |
| Enclosure material                                    |  | Stainless steel 1.4305   | Stainless steel 1.4305   | Stainless steel 1.4305 | Stainless steel 1.4305 | Stainless steel 1.4305 |
| Connection  |  | 3 x 0.14 mm <sup>2</sup> | 3 x 0.14 mm <sup>2</sup> | M8 x 1                 | M8 x 1                 | M12 x 1                |

Please refer to Accessories for cable couplers, mounting brackets and sensor tester.





|           |           |              |               |
|-----------|-----------|--------------|---------------|
| <b>M8</b> | <b>M8</b> |              | <b>M8</b>     |
| Flush     | Non-flush | Non-flush    | Non-flush     |
| 1.5 mm    | 2 mm      | 2 mm         | 2 mm          |
| Cable 2 m | Cable 2 m | Connector M8 | Connector M12 |
| NAMUR     |           |              |               |



|                                      |  |  |  |   |  |  |
|--------------------------------------|--|--|--|---|--|--|
|                                      |  | <b>6502916003</b><br>KIN-M08PS/002-KL2 | <b>6502942006</b><br>KIN-M08PS/002-KLSM8 | <b>6502942008</b><br>KIN-M08PS/002-KS12 |  |  |
|                                      |  |  |  |   |  |  |
|                                      |  |  |  |   |  |  |
| <b>6501601003</b><br>KIB-M08EA/1,5-2 |  |  |  |   |  |  |
|                                      |  |  |  |   |  |  |

|          |           |           |           |
|----------|-----------|-----------|-----------|
| 5-25 VDC | 10-36 VDC | 10-36 VDC | 10-36 VDC |
| -        | ≤ 200 mA  | ≤ 200 mA  | ≤ 200 mA  |
| ≈ 1 kHz  | 750 Hz    | 750 Hz    | 750 Hz    |
| -        | Cyclic    | Cyclic    | Cyclic    |
| -/-      | LED/-     | LED/-     | -/-       |

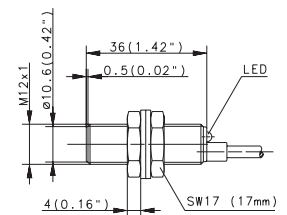
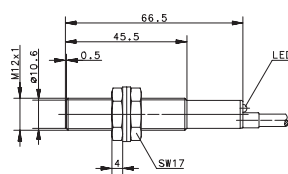
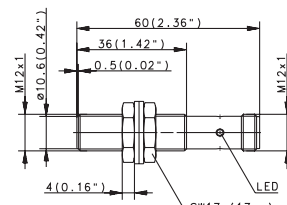
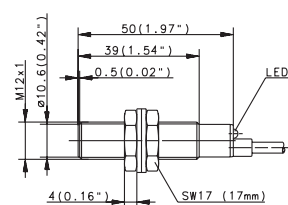
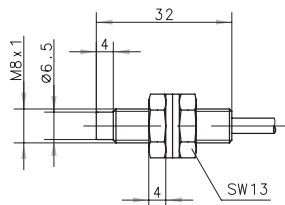
|                          |                          |                        |                        |
|--------------------------|--------------------------|------------------------|------------------------|
| -25°C/+70°C              | -25°C/+70°C              | -25°C/+70°C            | -25°C/+70°C            |
| IP67                     | IP67                     | IP67                   | IP67                   |
| Stainless steel 1.4305   | Stainless steel 1.4305   | Stainless steel 1.4305 | Stainless steel 1.4305 |
| 2 x 0.25 mm <sup>2</sup> | 3 x 0.14 mm <sup>2</sup> | M8 x 1                 | M12 x 1                |

You will find detailed data sheets to the products under [www.bernstein.eu](http://www.bernstein.eu)



# Inductive Sensors (Type M8, M12)

| Type                     | M8        | M12       | M12       | M12           |
|--------------------------|-----------|-----------|-----------|---------------|
| Type of installation     | Non-flush | Flush     | Flush     | Flush         |
| Nominal sensing distance | 2 mm      | 2 mm      | 2 mm      | 2 mm          |
| Type of connection       | Cable 2 m | Cable 2 m | Cable 2 m | Connector M12 |
| Special feature          | NAMUR     |           |           |               |



|                 |    |  |  |  |  |  |
|-----------------|----|--|--|--|--|--|
| <b>PNP</b>      | DC | NO contact<br>Type<br>NC contact<br>Type<br>Antivalent NO/NC |  | <b>6932903001</b><br>KIB-M12PS/002-KL2 | <b>6932943001</b><br>KIB-M12PS/002-KLS12<br><b>6602743112</b><br>KIB-M12PÖ/002-KLS12 | <b>6502903016</b><br>KIB-M12PS/002-KL2V<br><b>6502703005</b><br>KIB-M12PÖ/002-KL2V |
| <b>NPN</b>      | DC | NO contact<br>Type<br>NC contact<br>Type<br>Antivalent NO/NC |  | <b>6932303001</b><br>KIB-M12NS/002-KL2 | <b>6932343001</b><br>KIB-M12NS/002-KLS12   | <b>6502103003</b><br>KIB-M12NÖ/002-KL2V  |
| <b>PNP/NPN</b>  | DC | NO/NC prog.<br>push-pull operation                           |  |  |  |  |
| <b>NAMUR</b>    | DC | Type   |  | <b>6501601005</b><br>KIN-M08EA/002-2   |  |  |
| <b>Analogue</b> | DC |  |  |  |  |  |
| <b>2-wire</b>   | DC | NO contact<br>NC contact                                     |  |  |  |  |
|                 | AC | NO contact<br>Type<br>NC contact<br>Changeover contact       |  | <b>6503503001</b><br>KIB-M12AS/002-L2  |  |  |

## Technical data

|                                      |       |          |           |             |           |           |
|--------------------------------------|-------|----------|-----------|-------------|-----------|-----------|
| Rated operating voltage              | $U_B$ | 5–25 VDC | 10–36 VDC | 76–250 V AC | 10–36 VDC | 10–36 VDC |
| Rated operating current              | $I_B$ | –        | ≤ 200 mA  | ≤ 200 mA    | ≤ 200 mA  | ≤ 200 mA  |
| Switching frequency (max)            | F     | ≈ 1 kHz  | 800 Hz    | ≈ 10 Hz     | 800 Hz    | 800 Hz    |
| Short circuit-protection             |       | –        | Cyclic    | –           | Cyclic    | Cyclic    |
| Function/operating voltage indicator |       | –/–      | LED/–     | LED/–       | LED/–     | LED/–     |
| Sensing distance, adjustable         |       |          |           |             |           |           |

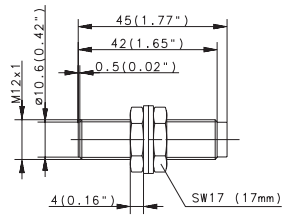
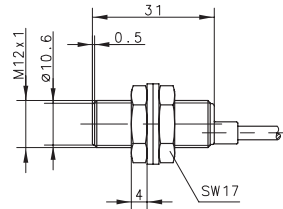
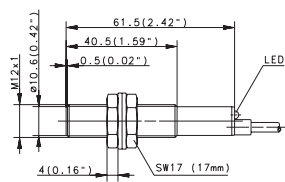
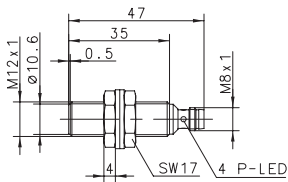
## Mechanical data

|   |  |                          |                          |                          |             |                          |
|---|--|--------------------------|--------------------------|--------------------------|-------------|--------------------------|
| Ambient temperature (min/max)                         |  | –25°C/+70°C              | –25°C/+70°C              | –25°C/+70°C              | –25°C/+70°C | –25°C/+70°C              |
| Protection class in accordance with IEC 529, EN 60529 |  | IP67                     | IP67                     | IP67                     | IP67        | IP67                     |
| Enclosure material                                    |  | Stainless steel 1.4305   | CuZn39Pb3                | CuZn39Pb3                | CuZn39Pb3   | CuZn39Pb3                |
| Connection  |  | 2 x 0.25 mm <sup>2</sup> | 3 x 0.14 mm <sup>2</sup> | 2 x 0.14 mm <sup>2</sup> | M12 x 1     | 3 x 0.14 mm <sup>2</sup> |

Please refer to Accessories for cable couplers, mounting brackets and sensor tester.



|              |               |            |           |
|--------------|---------------|------------|-----------|
| <b>M12</b>   | <b>M12</b>    | <b>M12</b> |           |
| Flush        | Flush         | Flush      | Flush     |
| 2 mm         | 2 mm          | 2 mm       | 2 mm      |
| Connector M8 | Connector M12 | Cable 2 m  | Cable 2 m |
|              |               | 4000 Hz    | NAMUR     |



|   |  |   |  |                                      |  |  |
|---|--|---|--|--------------------------------------|--|--|
| <b>6502943008</b><br>KIB-M12PS/002-KLSM8V | <b>6502943006</b><br>KIB-M12PS/002-KS12V<br><b>6502743005</b><br>KIB-M12PÖ/002-KS12V | <b>6502903012</b><br>KIB-M12PS/002-KL2F |  |                                      |  |  |
|   |  |   |  |                                      |  |  |
|   |  |   |  |                                      |  |  |
|   |  |   |  | <b>6501624760</b><br>KIB-M12EA/002-2 |  |  |
|   |  |   |  |                                      |  |  |

|           |           |           |          |
|-----------|-----------|-----------|----------|
| 10–30 VDC | 10–36 VDC | 10–60 VDC | 5–25 VDC |
| ≤ 200 mA  | ≤ 200 mA  | ≤ 200 mA  | –        |
| 800 Hz    | 800 Hz    | 4000 Hz   | ≤ 800 Hz |
| Cyclic    | Cyclic    | Cyclic    | –        |
| LED/–     | –/–       | LED/–     | –/–      |

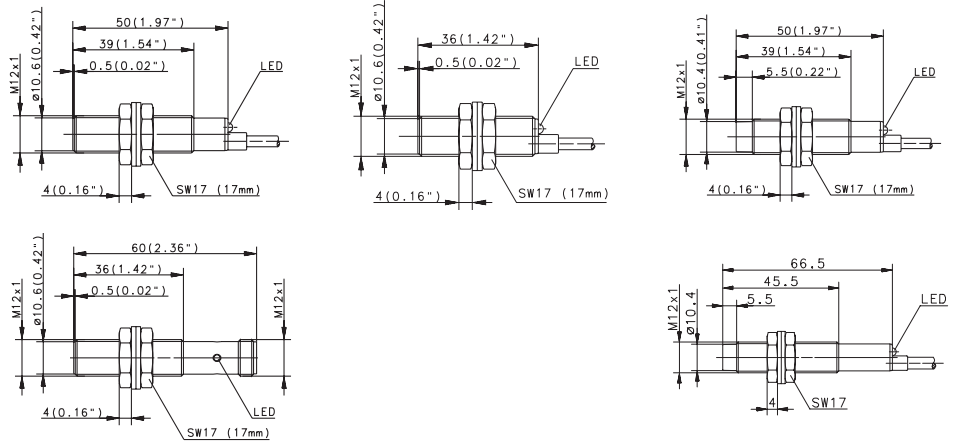
|             |             |                          |                          |
|-------------|-------------|--------------------------|--------------------------|
| –25°C/+70°C | –25°C/+70°C | –25°C/+70°C              | –25°C/+70°C              |
| IP67        | IP67        | IP67                     | IP67                     |
| CuZn39Pb3   | CuZn39Pb3   | CuZn39Pb3                | CuZn39Pb3                |
| M8 x 1      | M12 x 1     | 3 x 0.14 mm <sup>2</sup> | 2 x 0.25 mm <sup>2</sup> |

You will find detailed data sheets to the products under [www.bernstein.eu](http://www.bernstein.eu)



# Inductive Sensors (Type M12)

| Type                     | M12           |               | M12           |           | M12       |  |
|--------------------------|---------------|---------------|---------------|-----------|-----------|--|
| Type of installation     | Flush         | Flush         | Flush         | Non-flush | Non-flush |  |
| Nominal sensing distance | 4 mm          | 4 mm          | 4 mm          | 4 mm      | 4 mm      |  |
| Type of connection       | Cable 2 m     | Connector M12 | Cable 2 m     | Cable 2 m | Cable 2 m |  |
| Special feature          | Sensing dist. | Sensing dist. | Sensing dist. |           |           |  |



|                 |    |  |   |   |  |  |  |
|-----------------|----|--|---|---|--|--|--|
| <b>PNP</b>      | DC | NO contact                                       | <b>6502903025</b><br>KIB-M12PS/004-KL2E | <b>6502943015</b><br>KIB-M12PS/004-KLS12E | <b>6502903023</b><br>KIB-M12PS/004-KL2VE | <b>6932904001</b><br>KIN-M12PS/004-KL2 | <b>6932704001</b><br>KIN-M12PÖ/004-KL2 |
|                 |    | Type<br>NC contact<br>Type<br>Antivalent NO/NC   |   |   |  |  |  |
| <b>NPN</b>      | DC | NO contact                                       |   |   |  | <b>6932304001</b><br>KIN-M12NS/004-KL2 | <b>6932104001</b><br>KIN-M12NÖ/004-KL2 |
|                 |    | Type<br>NC contact<br>Type<br>Antivalent NO/NC   |   |   |  |  |  |
| <b>PNP/NPN</b>  | DC | NO/NC prog.<br>push-pull operation               |   |   |  |  |  |
| <b>NAMUR</b>    | DC |  |   |   |  |  |  |
| <b>Analogue</b> | DC |  |   |   |  |  |  |
| <b>2-wire</b>   | DC | NO contact                                       |   |   |  |  | <b>6503504001</b><br>KIN-M12AS/004-L2  |
|                 |    | NC contact                                       |   |   |  |  |  |
|                 | AC | NO contact                                       |   |   |  |  | <b>6503404001</b><br>KIN-M12ÄÖ/004-L2  |
|                 |    | Type<br>NC contact<br>Type<br>Changeover contact |   |   |  |  |  |

### Technical data

|                                      |       |           |           |           |           |             |
|--------------------------------------|-------|-----------|-----------|-----------|-----------|-------------|
| Rated operating voltage              | $U_B$ | 10–30 VDC | 10–36 VDC | 10–36 VDC | 10–36 VDC | 76–250 V AC |
| Rated operating current              | $I_B$ | ≤ 200 mA  | ≤ 200 mA  | ≤ 200 mA  | ≤ 200 mA  | ≤ 200 mA    |
| Switching frequency (max)            | F     | 800 Hz    | 800 Hz    | 800 Hz    | 400 Hz    | ≈ 10 Hz     |
| Short circuit-protection             |       | Cyclic    | Cyclic    | Cyclic    | Cyclic    | –           |
| Function/operating voltage indicator |       | LED/–     | LED/–     | LED/–     | LED/–     | LED/–       |
| Sensing distance, adjustable         |       |           |           |           |           |             |

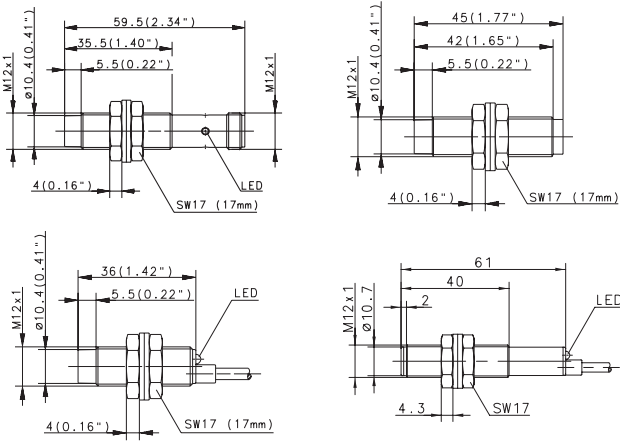
### Mechanical data

|   |                          |             |                          |                          |                          |
|---|--------------------------|-------------|--------------------------|--------------------------|--------------------------|
| Ambient temperature (min/max)                         | –25°C/+70°C              | –25°C/+70°C | –25°C/+70°C              | –25°C/+70°C              | –25°C/+70°C              |
| Protection class in accordance with IEC 529, EN 60529 | IP67                     | IP67        | IP67                     | IP67                     | IP67                     |
| Enclosure material                                    | CuZn39Pb3                | CuZn39Pb3   | CuZn39Pb3                | CuZn39Pb3                | CuZn39Pb3                |
| Connection  | 3 x 0.14 mm <sup>2</sup> | M12 x 1     | 3 x 0.14 mm <sup>2</sup> | 3 x 0.14 mm <sup>2</sup> | 2 x 0.14 mm <sup>2</sup> |

Please refer to Accessories for cable couplers, mounting brackets and sensor tester.



| M12                                |                                | M12                                |   |  |  |
|------------------------------------|--------------------------------|------------------------------------|---|--|--|
| Non-flush<br>4 mm<br>Connector M12 | Non-flush<br>4 mm<br>Cable 2 m | Non-flush<br>4 mm<br>Connector M12 | Non-flush<br>4 mm<br>Cable 2 m<br>Plastic |  |  |



|  |   |  |  |  |  |  |  |
|--|---|--|--|--|--|--|--|
| <b>6932944001</b><br>KIN-M12PS/004-KLS12 | <b>6502904014</b><br>KIN-M12PS/004-KL2V | <b>6502944006</b><br>KIN-M12PS/004-KS12V | <b>6502919001</b><br>KIN-T12PS/004-KL2 |  |  |  |  |
| <b>6502744003</b><br>KIN-M12PÖ/004-KLS12 |   |  |  |  |  |  |  |
| <b>6932344001</b><br>KIN-M12NS/004-KLS12 |   |  |  |  |  |  |  |
|  |   |  |  |  |  |  |  |
|  |   |  |  |  |  |  |  |
|  |   |  |  |  |  |  |  |

|           |           |           |           |  |  |
|-----------|-----------|-----------|-----------|--|--|
| 10–36 VDC | 10–36 VDC | 10–36 VDC | 10–30 VDC |  |  |
| ≤ 200 mA  | ≤ 200 mA  | ≤ 200 mA  | ≤ 200 mA  |  |  |
| 400 Hz    | 400 Hz    | 400 Hz    | 400 Hz    |  |  |
| Cyclic    | Cyclic    | Cyclic    | Cyclic    |  |  |
| LED/–     | LED/–     | –/–       | LED/–     |  |  |

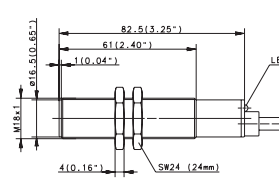
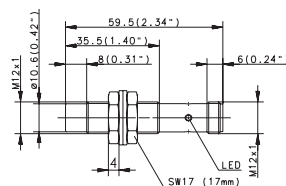
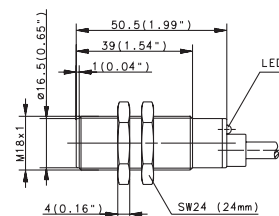
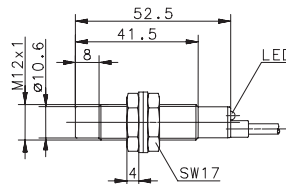
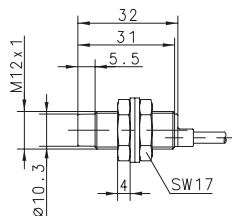
|             |                          |             |                          |  |  |
|-------------|--------------------------|-------------|--------------------------|--|--|
| –25°C/+70°C | –25°C/+70°C              | –25°C/+70°C | –25°C/+70°C              |  |  |
| IP67        | IP67                     | IP67        | IP67                     |  |  |
| CuZn39Pb3   | CuZn39Pb3                | CuZn39Pb3   | PA, red                  |  |  |
| M12 x 1     | 3 x 0.14 mm <sup>2</sup> | M12 x 1     | 3 x 0.14 mm <sup>2</sup> |  |  |

You will find detailed data sheets to the products under [www.bernstein.eu](http://www.bernstein.eu)



# Inductive Sensors (Type M12, M18)

| Type                     | M12       | M12           | M12           | M18       | M18       |
|--------------------------|-----------|---------------|---------------|-----------|-----------|
| Type of installation     | Non-flush | Non-flush     | Non-flush     | Flush     | Flush     |
| Nominal sensing distance | 4 mm      | 8 mm          | 8 mm          | 5 mm      | 5 mm      |
| Type of connection       | Cable 2 m | Cable 2 m     | Connector M12 | Cable 2 m | Cable 2 m |
| Special feature          | NAMUR     | Sensing dist. | Sensing dist. |           |           |



|                 |    |  |                                      |   |   |  |
|-----------------|----|--|--------------------------------------|---|---|--|
| <b>PNP</b>      | DC | NO contact<br>Type<br>NC contact<br>Type<br>Antivalent NO/NC<br>Type |                                      | <b>6502904021</b><br>KIN-M12PS/008-KL2E | <b>6502944013</b><br>KIN-M12PS/008-KLS12E | <b>6932905001</b><br>KIB-M18PS/005-KL2<br><b>6932705001</b><br>KIB-M18PÖ/005-KL2 |
| <b>NPN</b>      | DC | NO contact<br>Type<br>NC contact<br>Type<br>Antivalent NO/NC<br>Type |                                      |   | <b>6602344458</b><br>KIN-M12NS/008-KLS12E | <b>6932105001</b><br>KIB-M18NÖ/005-KL2   |
| <b>PNP/NPN</b>  | DC | NO/NC prog.<br>push-pull operation                                   |                                      |   |   |  |
| <b>NAMUR</b>    | DC | Type   | <b>6501625761</b><br>KIN-M12EA/004-2 |   |   |  |
| <b>Analogue</b> | DC |  |                                      |   |   |  |
| <b>2-wire</b>   | DC | NO contact<br>NC contact   |                                      |   |   |  |
|                 | AC | NO contact<br>Type<br>NC contact<br>Type<br>Changeover contact       |                                      |   |   | <b>6503505004</b><br>KIB-M18AS/005-L2<br><b>6503405001</b><br>KIB-M18AÖ/005-L2   |

## Technical data

|                                      |       |          |           |           |           |             |
|--------------------------------------|-------|----------|-----------|-----------|-----------|-------------|
| Rated operating voltage              | $U_B$ | 5–25 VDC | 10–36 VDC | 10–36 VDC | 10–36 VDC | 20–250 V AC |
| Rated operating current              | $I_B$ | –        | ≤ 200 mA  | ≤ 200 mA  | ≤ 200 mA  | ≤ 400 mA    |
| Switching frequency (max)            | F     | ≤ 400 Hz | 400 Hz    | 400 Hz    | 500 Hz    | ≈ 10 Hz     |
| Short circuit-protection             |       | –        | Cyclic    | Cyclic    | Cyclic    | –           |
| Function/operating voltage indicator |       | –/–      | LED/–     | LED/–     | LED/–     | LED/–       |
| Sensing distance, adjustable         |       |          |           |           |           |             |

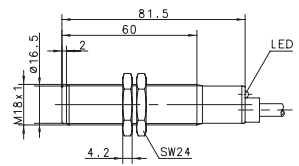
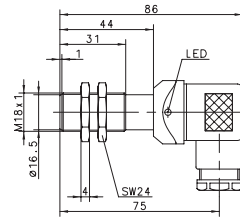
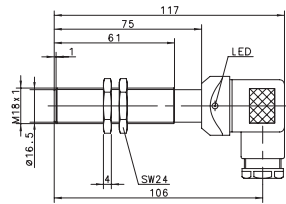
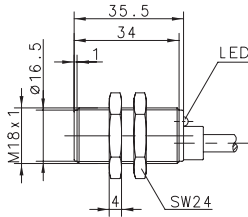
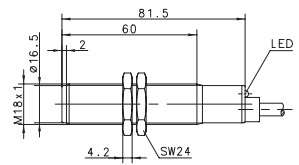
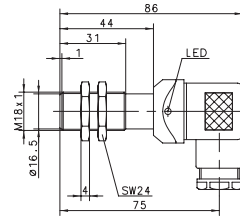
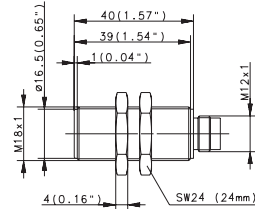
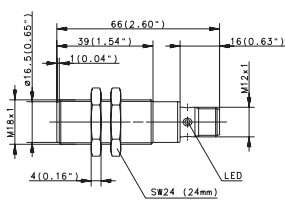
## Mechanical data

|   |  |                          |                          |             |                         |                         |
|---|--|--------------------------|--------------------------|-------------|-------------------------|-------------------------|
| Ambient temperature (min/max)                         |  | –25°C/+70°C              | –25°C/+70°C              | –25°C/+70°C | –25°C/+70°C             | –25°C/+70°C             |
| Protection class in accordance with IEC 529, EN 60529 |  | IP67                     | IP67                     | IP67        | IP67                    | IP67                    |
| Enclosure material                                    |  | CuZn39Pb3                | CuZn39Pb3                | CuZn39Pb3   | CuZn39Pb3               | CuZn39Pb3               |
| Connection  |  | 2 x 0.25 mm <sup>2</sup> | 3 x 0.14 mm <sup>2</sup> | M12 x 1     | 3 x 0.5 mm <sup>2</sup> | 2 x 0.5 mm <sup>2</sup> |

Please refer to Accessories for cable couplers, mounting brackets and sensor tester.



| M18                            |                            | M18                            |                                | M18                            |                                | M18                                   |                                       |
|--------------------------------|----------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|---------------------------------------|---------------------------------------|
| Flush<br>5 mm<br>Connector M12 | Flush<br>5 mm<br>Cable 6 m | Flush<br>5 mm<br>Connector M12 | Flush<br>5 mm<br>DIN Connector | Flush<br>5 mm<br>DIN Connector | Flush<br>5 mm<br>DIN Connector | Flush<br>5 mm<br>Cable 2 m<br>Plastic | Flush<br>5 mm<br>Cable 2 m<br>Plastic |



|  |   |  |  |   |  |  |                                       |
|--|---|--|--|---|--|--|---------------------------------------|
| <b>6932905004</b><br>KIB-M18PS/005-KLS12 | <b>6502905013</b><br>KIB-M18PS/005-KL6V | <b>6502905012</b><br>KIB-M18PS/005-KS12V<br><b>6502705007</b><br>KIB-M18PÖ/005-KS12V | <b>6602905662</b><br>KIB-M18PS/005-KLSD<br><b>6502705001</b><br>KIB-M18PÖ/005-KLSD | <b>6502940001</b><br>KIB-M18PS/005-KLSDV<br><br><b>6502840002</b><br>KIB-M18PU/005-KSDV | <b>6502920990</b><br>KIB-T18PS/005-KL2 |  |                                       |
| <b>6932305004</b><br>KIB-M18NS/005-KLS12 |   |  |  |   |  |  | <b>6503520697</b><br>KIB-T18AS/005-L2 |

|           |           |           |           |           |           |           |             |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-------------|
| 10–36 VDC | 10–60 VDC | 10–60 VDC | 10–60 VDC | 10–60 VDC | 10–60 VDC | 10–60 VDC | 24–250 V AC |
| ≤ 200 mA  | ≤ 200 mA  | ≤ 200 mA  | ≤ 200 mA  | ≤ 200 mA  | ≤ 200 mA  | ≤ 200 mA  | ≤ 200 mA    |
| 500 Hz    | 500 Hz    | 500 Hz    | 500 Hz    | 500 Hz    | 500 Hz    | 500 Hz    | ≈ 10 Hz     |
| Cyclic    | Cyclic    | Cyclic    | –         | Cyclic    | Cyclic    | Cyclic    | –           |
| LED/–     | LED/–     | –/–       | LED/–     | LED/–     | –/–       | LED/–     | LED/–       |

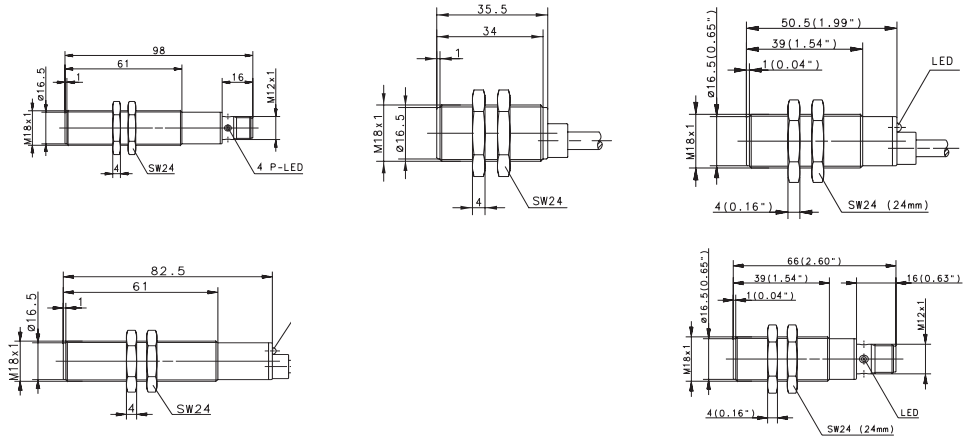
|             |                         |             |             |             |             |                         |                         |
|-------------|-------------------------|-------------|-------------|-------------|-------------|-------------------------|-------------------------|
| –25°C/+70°C | –25°C/+70°C             | –25°C/+70°C | –25°C/+70°C | –25°C/+70°C | –25°C/+70°C | –25°C/+70°C             | –25°C/+70°C             |
| IP67        | IP67                    | IP67        | IP65        | IP65        | IP65        | IP67                    | IP67                    |
| CuZn39Pb3   | CuZn39Pb3               | CuZn39Pb3   | CuZn39Pb3   | CuZn39Pb3   | CuZn39Pb3   | PA, red                 | PA, red                 |
| M12 x 1     | 3 x 0.5 mm <sup>2</sup> | M12 x 1     | DIN 43650   | DIN 43650   | DIN 43650   | 3 x 0.5 mm <sup>2</sup> | 2 x 0.5 mm <sup>2</sup> |

You will find detailed data sheets to the products under [www.bernstein.eu](http://www.bernstein.eu)



# Inductive Sensors (Type M18)

| Type                     | M18           |             | M18       |               | M18           |               |
|--------------------------|---------------|-------------|-----------|---------------|---------------|---------------|
| Type of installation     | Flush         | Flush       | Flush     | Flush         | Flush         | Flush         |
| Nominal sensing distance | 5 mm          | 5 mm        | 5 mm      | 8 mm          | 8 mm          | 8 mm          |
| Type of connection       | Connector M12 | Cable 2 m   | Cable 2 m | Cable 2 m     | Connector M12 | Connector M12 |
| Special feature          | Temperature   | Temperature | NAMUR     | Sensing dist. | Sensing dist. | Sensing dist. |



|                 |    |  |   |   |                                      |   |   |
|-----------------|----|--|---|---|--------------------------------------|---|---|
| <b>PNP</b>      | DC | NO contact<br>Type<br>NC contact<br>Type<br>Antivalent NO/NC<br>Type | <b>6502940006</b><br>KIB-M18PS/005-KLS12T | <b>6502905023</b><br>KIB-M18PS/005-KL2PUT |                                      | <b>6502905022</b><br>KIB-M18PS/008-KL2E | <b>6502940005</b><br>KIB-M18PS/008-KLS12E |
| <b>NPN</b>      | DC | NO contact<br>Type<br>NC contact<br>Antivalent NO/NC<br>Type         |   |   |                                      |   |   |
| <b>PNP/NPN</b>  | DC | NO/NC prog.<br>push-pull operation                                   |   |   |                                      |   |   |
| <b>NAMUR</b>    | DC | Type   |   |   | <b>6501626762</b><br>KIB-M18EA/005-2 |   |   |
| <b>Analogue</b> | DC |  |   |   |                                      |   |   |
| <b>2-wire</b>   | DC | NO contact<br>NC contact   |   |   |                                      |   |   |
|                 | AC | NO contact<br>Type<br>NC contact<br>Type<br>Changeover contact       |   |   |                                      |   |   |

### Technical data

|                                      |       |               |               |               |               |               |
|--------------------------------------|-------|---------------|---------------|---------------|---------------|---------------|
| Rated operating voltage              | $U_B$ | 10–30 VDC     | 10–30 VDC     | 5–25 VDC      | 10–36 VDC     | 10–36 VDC     |
| Rated operating current              | $I_B$ | $\leq 200$ mA | $\leq 200$ mA | –             | $\leq 200$ mA | $\leq 200$ mA |
| Switching frequency (max)            | F     | 500 Hz        | 500 Hz        | $\leq 400$ Hz | 500 Hz        | 500 Hz        |
| Short circuit-protection             |       | Cyclic        | Cyclic        | –             | Cyclic        | Cyclic        |
| Function/operating voltage indicator |       | LED/–         | LED/–         | –/–           | LED/–         | LED/–         |
| Sensing distance, adjustable         |       |               |               |               |               |               |

### Mechanical data

|   |             |                         |                         |                         |             |
|---|-------------|-------------------------|-------------------------|-------------------------|-------------|
| Ambient temperature (min/max)                         | –40°C/+100° | –40°C/+100°             | –25°C/+70°C             | –25°C/+70°C             | –25°C/+70°C |
| Protection class in accordance with IEC 529, EN 60529 | IP67        | IP67                    | IP67                    | IP67                    | IP67        |
| Enclosure material                                    | CuZn39Pb3   | CuZn39Pb3               | CuZn39Pb3               | CuZn39Pb3               | CuZn39Pb3   |
| Connection  | M12 x 1     | 3 x 0.5 mm <sup>2</sup> | 2 x 0.5 mm <sup>2</sup> | 3 x 0.5 mm <sup>2</sup> | M12 x 1     |

Please refer to Accessories for cable couplers, mounting brackets and sensor tester.

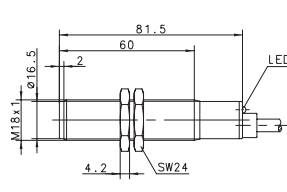
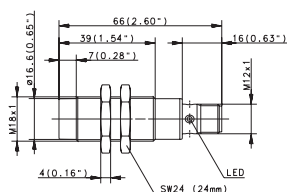
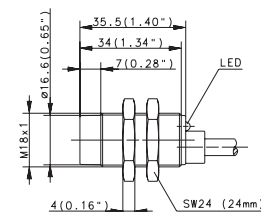
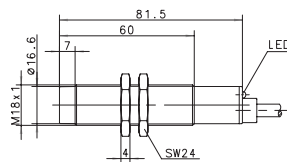
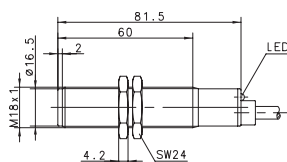






# Inductive Sensors (Type M18)

| Type                     | M18       |               | M18       |           | M18       |
|--------------------------|-----------|---------------|-----------|-----------|-----------|
| Type of installation     | Non-flush | Non-flush     | Non-flush | Non-flush | Non-flush |
| Nominal sensing distance | 8 mm      | 8 mm          | 8 mm      | 8 mm      | 8 mm      |
| Type of connection       | Cable 2 m | Connector M12 | Cable 2 m | Cable 2 m | Cable 2 m |
| Special feature          | Plastic   |               |           | Plastic   |           |



|                 |    |  |  |  |  |
|-----------------|----|--|--|--|--|
| <b>PNP</b>      | DC | NO contact<br>Type<br>NC contact<br>Type<br>Antivalent NO/NC<br>Type | <b>6932906004</b><br>KIN-M18PS/008-KLS12<br><b>6932706002</b><br>KIN-M18PÖ/008-KLS12 | <b>6502921975</b><br>KIN-T18PS/008-KL2 | <b>6502906006</b><br>KIN-M18PS/008-KL2V<br><b>6502706002</b><br>KIN-M18PÖ/008-KL2V |
| <b>NPN</b>      | DC | NO contact<br>Type<br>NC contact<br>Antivalent NO/NC                 | <b>6932306004</b><br>KIN-M18NS/008-KLS12   |  | <b>6502306004</b><br>KIN-M18NS/008-KL2V  |
| <b>PNP/NPN</b>  | DC | NO/NC prog.<br>push-pull operation                                   |  |  |  |
| <b>NAMUR</b>    | DC |  |  |  |  |
| <b>Analogue</b> | DC | Type   |  |  |  |
| <b>2-wire</b>   | DC | NO contact<br>NC contact<br>Type                                     | <b>6503521705</b><br>KIN-T18AS/008-L2<br><b>6503421704</b><br>KIN-T18AÖ/008-L2       | <b>6501306001</b><br>KIN-M18ZS/008-L2  |  |
|                 | AC | NO contact<br>Type<br>NC contact<br>Type<br>Changeover contact       |  |  |  |

## Technical data

|                                      |       |             |           |           |           |           |
|--------------------------------------|-------|-------------|-----------|-----------|-----------|-----------|
| Rated operating voltage              | $U_B$ | 24–250 V AC | 10–36 VDC | 10–60 VDC | 10–60 VDC | 10–60 VDC |
| Rated operating current              | $I_B$ | ≤ 200 mA    | ≤ 200 mA  | ≤ 200 mA  | ≤ 200 mA  | ≤ 200 mA  |
| Switching frequency (max)            | F     | ≈ 10 Hz     | 200 Hz    | 200 Hz    | 200 Hz    | 200 Hz    |
| Short circuit-protection             |       | –           | Cyclic    | –         | Cyclic    | Cyclic    |
| Function/operating voltage indicator |       | LED/–       | LED/–     | LED/–     | LED/–     | LED/–     |
| Sensing distance, adjustable         |       |             |           |           |           |           |

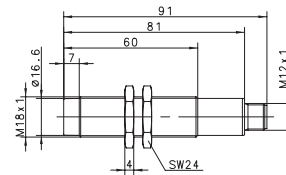
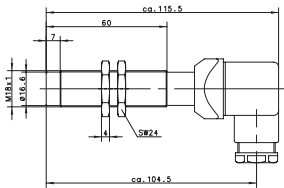
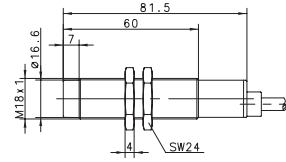
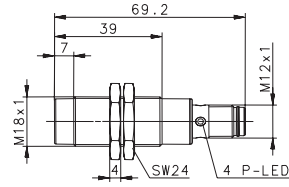
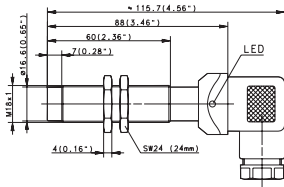
## Mechanical data

|   |  |                         |             |                         |                         |                         |
|---|--|-------------------------|-------------|-------------------------|-------------------------|-------------------------|
| Ambient temperature (min/max)                         |  | –25°C/+70°C             | –25°C/+70°C | –25°C/+70°C             | –25°C/+70°C             | –25°C/+70°C             |
| Protection class in accordance with IEC 529, EN 60529 |  | IP67                    | IP67        | IP67                    | IP67                    | IP67                    |
| Enclosure material                                    |  | PA, red                 | CuZn39Pb3   | CuZn39Pb3               | PA, red                 | CuZn39Pb3               |
| Connection  |  | 2 x 0.5 mm <sup>2</sup> | M12 x 1     | 2 x 0.5 mm <sup>2</sup> | 3 x 0.5 mm <sup>2</sup> | 3 x 0.5 mm <sup>2</sup> |

Please refer to Accessories for cable couplers, mounting brackets and sensor tester.



|                                    |                                    |   |                                |                                    |  |
|------------------------------------|------------------------------------|---|--------------------------------|------------------------------------|--|
| <b>M18</b>                         |                                    | <b>M18</b>                                      |                                | <b>M18</b>                         |  |
| Non-flush<br>8 mm<br>DIN Connector | Non-flush<br>8 mm<br>DIN Connector | Non-flush<br>8 mm<br>Connector M12<br>Ultralock | Non-flush<br>8 mm<br>Cable 2 m | Non-flush<br>8 mm<br>Connector M12 |  |



|   |  |   |                                      |  |  |
|---|--|---|--------------------------------------|--|--|
| <b>6502941001</b><br>KIN-M18PS/008-KLSD |  |   |                                      |  |  |
| <b>6502741001</b><br>KIN-M18PÖ/008-KLSD | <b>6602841421</b><br>KIN-M18PU/008-KSD |   |                                      |  |  |
|   |  | <b>6502306011</b><br>KIN-M18NS/008-KLS12U |                                      |  |  |
|   |  |   |                                      |  |  |
|   |  |   | <b>6502006001</b><br>KIN-M18PA/008-2 | <b>6602006111</b><br>KIN-M18PA/008-S12 |  |
|   |  |   |                                      |  |  |

|           |           |           |           |           |
|-----------|-----------|-----------|-----------|-----------|
| 10–60 VDC | 10–60 VDC | 10–36 VDC | 10–36 VDC | 10–36 VDC |
| ≤ 200 mA  | ≤ 200 mA  | ≤ 200 mA  | –         | –         |
| 200 Hz    | 200 Hz    | 200 Hz    | –         | –         |
| Cyclic    | –         | Cyclic    | Cyclic    | –         |
| LED/–     | –/–       | LED/–     | –/–       | –/–       |

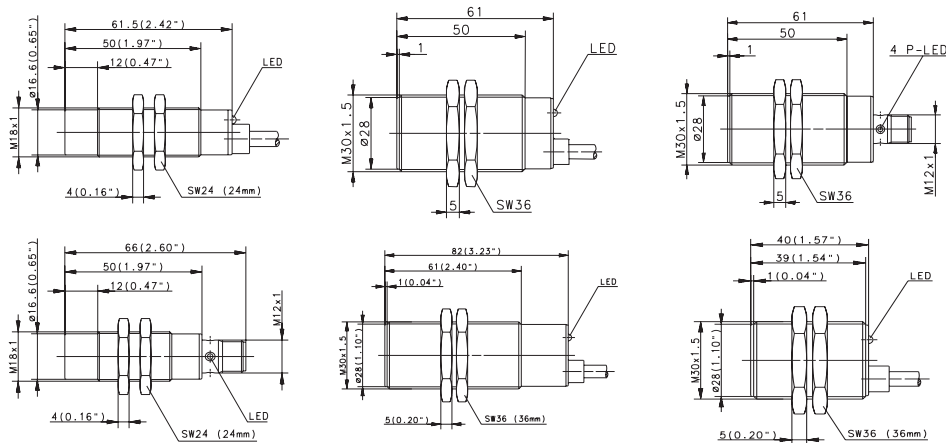
|             |             |             |                         |             |
|-------------|-------------|-------------|-------------------------|-------------|
| –25°C/+70°C | –40°C/+80°C | –25°C/+70°C | –25°C/+70°C             | –25°C/+70°C |
| IP65        | IP65        | IP67        | IP67                    | IP67        |
| CuZn39Pb3   | CuZn39Pb3   | CuZn39Pb3   | CuZn39Pb3               | CuZn39Pb3   |
| DIN 43650   | DIN 43650   | M12 x 1     | 3 x 0.5 mm <sup>2</sup> | M12 x 1     |

You will find detailed data sheets to the products under [www.bernstein.eu](http://www.bernstein.eu)



# Inductive Sensors (Type M18, M30)

| Type                     | M18           |               | M30       |           | M30           |           |
|--------------------------|---------------|---------------|-----------|-----------|---------------|-----------|
| Type of installation     | Non-flush     | Non-flush     | Flush     | Flush     | Flush         | Flush     |
| Nominal sensing distance | 16 mm         | 16 mm         | 10 mm     | 10 mm     | 10 mm         | 10 mm     |
| Type of connection       | Cable 2 m     | Connector M12 | Cable 2 m | Cable 2 m | Connector M12 | Cable 2 m |
| Special feature          | Sensing dist. | Sensing dist. |           |           |               |           |



|                 |    |  |   |   |   |  |  |
|-----------------|----|--|---|---|---|--|--|
| <b>PNP</b>      | DC | NO contact<br>Type<br>NC contact<br>Type<br>Antivalent NO/NC   | <b>6502906018</b><br>KIN-M18PS/016-KL2E | <b>6502941004</b><br>KIN-M18PS/016-KLS12E | <b>6932907001</b><br>KIN-M18PS/016-KLS12E | <b>6932907002</b><br>KIB-M30PS/010-KLS12                                       | <b>6502907003</b><br>KIB-M30PS/010-KL2V<br><b>6502707001</b><br>KIB-M30PÖ/010-KL2V |
| <b>NPN</b>      | DC | NO contact<br>Type<br>NC contact<br>Antivalent NO/NC           |   |   |   |  |  |
| <b>PNP/NPN</b>  | DC | NO/NC prog.<br>Type<br>push-pull operation                     |   |   |   |  |  |
| <b>NAMUR</b>    | DC |  |   |   |   |  |  |
| <b>Analogue</b> | DC | Type   |   |   |   |  |  |
| <b>2-wire</b>   | DC | NO contact<br>NC contact<br>Type                               |   |   |   |  |  |
|                 | AC | NO contact<br>Type<br>NC contact<br>Type<br>Changeover contact |   |   |   | <b>6503507378</b><br>KIB-M30AS/010-L2<br><b>6503407240</b><br>KIB-M30AÖ/010-L2 |  |

## Technical data

|                                      |       |           |           |           |             |           |           |
|--------------------------------------|-------|-----------|-----------|-----------|-------------|-----------|-----------|
| Rated operating voltage              | $U_B$ | 10–36 VDC | 10–36 VDC | 10–36 VDC | 20–250 V AC | 10–36 VDC | 10–60 VDC |
| Rated operating current              | $I_B$ | ≤ 200 mA  | ≤ 200 mA  | ≤ 200 mA  | ≤ 400 mA    | ≤ 200 mA  | ≤ 200 mA  |
| Switching frequency (max)            | F     | 200 Hz    | 200 Hz    | 300 Hz    | ≈ 10 Hz     | 300 Hz    | 300 Hz    |
| Short circuit-protection             |       | Cyclic    | Cyclic    | Cyclic    | –           | Cyclic    | Cyclic    |
| Function/operating voltage indicator |       | LED/–     | LED/–     | LED/–     | LED/–       | LED/–     | LED/–     |
| Sensing distance, adjustable         |       |           |           |           |             |           |           |

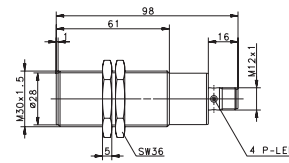
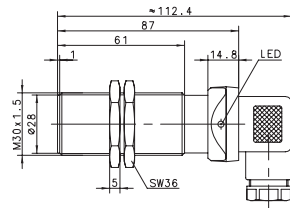
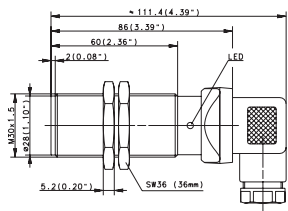
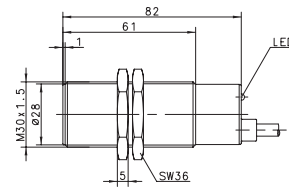
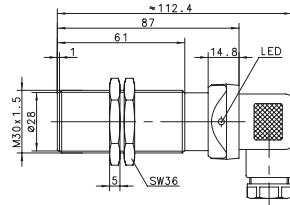
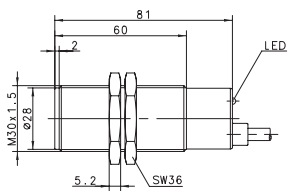
## Mechanical data

|   |  |                         |             |                         |                         |             |                         |
|---|--|-------------------------|-------------|-------------------------|-------------------------|-------------|-------------------------|
| Ambient temperature (min/max)                         |  | –25°C/+70°C             | –25°C/+70°C | –25°C/+70°C             | –25°C/+70°C             | –25°C/+70°C | –25°C/+70°C             |
| Protection class in accordance with IEC 529, EN 60529 |  | IP67                    | IP67        | IP67                    | IP67                    | IP67        | IP67                    |
| Enclosure material                                    |  | CuZn39Pb3               | CuZn39Pb3   | CuZn39Pb3               | CuZn39Pb3               | CuZn39Pb3   | CuZn39Pb3               |
| Connection  |  | 3 x 0.5 mm <sup>2</sup> | M12 x 1     | 3 x 0.5 mm <sup>2</sup> | 2 x 0.5 mm <sup>2</sup> | M12 x 1     | 3 x 0.5 mm <sup>2</sup> |

Please refer to Accessories for cable couplers, mounting brackets and sensor tester.



| M30       |               | M30           |               | M30         |               |
|-----------|---------------|---------------|---------------|-------------|---------------|
| Flush     | Flush         | Flush         | Flush         | Flush       | Flush         |
| 10 mm     | 10 mm         | 10 mm         | 10 mm         | 10 mm       | 10 mm         |
| Cable 2 m | DIN Connector | DIN Connector | DIN Connector | Cable 2 m   | Connector M12 |
| Plastic   | Plastic       |               |               | Temperature | Temperature   |



|   |   |   |   |  |  |
|---|---|---|---|--|--|
| <b>6502722708</b><br>KIB-T30PÖ/010-KL2  | <b>6502939001</b><br>KIB-M30PS/010-KLSD | <b>6502907013</b><br>KIB-M30PS/010-KL2PUT | <b>6502939006</b><br>KIB-M30PS/010-KLS12T |  |  |
|   |   |   |   |  |  |
| <b>6502822862</b><br>KIB-T30PP/010-KLSD |   |   |   |  |  |
|   |   |   |   |  |  |
|   |   | <b>6503535960</b><br>KIB-M30AS/010-LSD    |   |  |  |
|   |   | <b>6503435959</b><br>KIB-M30AÖ/010-LSD    |   |  |  |

|           |           |           |             |           |           |
|-----------|-----------|-----------|-------------|-----------|-----------|
| 10–60 VDC | 10–60 VDC | 10–60 VDC | 20–265 V AC | 10–30 VDC | 10–30 VDC |
| ≤ 200 mA  | ≤ 200 mA  | ≤ 200 mA  | ≤ 500 mA    | ≤ 200 mA  | ≤ 200 mA  |
| 300 Hz    | 300 Hz    | 300 Hz    | 20 Hz       | 300 Hz    | 300 Hz    |
| Cyclic    | Cyclic    | Cyclic    | –           | Cyclic    | Cyclic    |
| LED/–     | LED/–     | LED/–     | LED/–       | LED/–     | LED/–     |

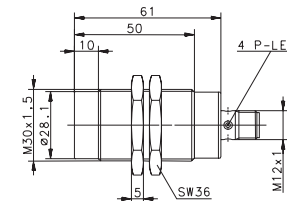
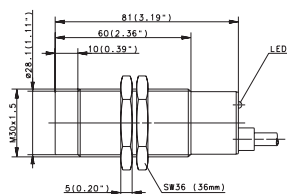
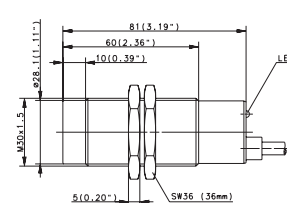
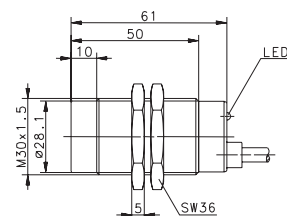
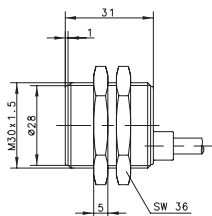
|                         |             |             |             |                         |             |
|-------------------------|-------------|-------------|-------------|-------------------------|-------------|
| –25°C/+70°C             | –25°C/+70°C | –25°C/+70°C | –25°C/+70°C | –40°C/+100°             | –40°C/+100° |
| IP67                    | IP65        | IP65        | IP65        | IP67                    | IP67        |
| PA, red                 | PA, red     | CuZn39Pb3   | CuZn39Pb3   | CuZn39Pb3               | CuZn39Pb3   |
| 3 x 0.5 mm <sup>2</sup> | DIN 43650   | DIN 43650   | DIN 43650   | 3 x 0.5 mm <sup>2</sup> | M12 x 1     |

You will find detailed data sheets to the products under [www.bernstein.eu](http://www.bernstein.eu)



# Inductive Sensors (Type M30)

| Type                     | M30       | M30       | M30       | M30         |               |
|--------------------------|-----------|-----------|-----------|-------------|---------------|
| Type of installation     | Flush     | Non-flush | Non-flush | Non-flush   | Non-flush     |
| Nominal sensing distance | 10 mm     | 15 mm     | 15 mm     | 15 mm       | 15 mm         |
| Type of connection       | Cable 2 m | Cable 2 m | Cable 2 m | Cable 2.5 m | Connector M12 |
| Special feature          | NAMUR     |           |           |             |               |



|                 |    |  |                                      |  |  |   |  |
|-----------------|----|--|--------------------------------------|--|--|---|--|
| <b>PNP</b>      | DC | NO contact<br>Type<br>NC contact<br>Type<br>Antivalent NO/NC<br>Type |                                      | <b>6932908001</b><br>KIN-M30PS/015-KL2 | <b>6502908002</b><br>KIN-M30PS/015-KL2 |   | <b>6932908002</b><br>KIN-M30PS/015-KLS12<br><b>6602308459</b><br>KIN-M30NS/015-KLS12 |
| <b>NPN</b>      | DC | NO contact<br>Type<br>NC contact<br>Type<br>Antivalent NO/NC         |                                      |  | <b>6502808001</b><br>KIN-M30PU/015-KL2 |   |  |
| <b>PNP/NPN</b>  | DC | NO/NC prog.<br>Type<br>push-pull operation                           |                                      |  | <b>6502308001</b><br>KIN-M30NS/015-KL2 |   |  |
| <b>NAMUR</b>    | DC | Type   | <b>6501699012</b><br>KIB-M30EA/010-2 |  |  |   |  |
| <b>Analogue</b> | DC | Type   |                                      |  |  |   |  |
| <b>2-wire</b>   | DC | NO contact<br>NC contact   |                                      |  |  |   |  |
|                 | AC | NO contact<br>Type<br>NC contact<br>Changeover contact               |                                      |  |  | <b>6503508246</b><br>KIN-M30AS/015-L2,5 |  |

## Technical data

|                                      |       |          |           |           |             |           |
|--------------------------------------|-------|----------|-----------|-----------|-------------|-----------|
| Rated operating voltage              | $U_B$ | 5–25 VDC | 10–36 VDC | 10–60 VDC | 20–250 V AC | 10–36 VDC |
| Rated operating current              | $I_B$ | –        | ≤ 200 mA  | ≤ 200 mA  | ≤ 400 mA    | ≤ 200 mA  |
| Switching frequency (max)            | F     | ≤ 300 Hz | 100 Hz    | 100 Hz    | ≈ 10 Hz     | 100 Hz    |
| Short circuit-protection             |       | –        | Cyclic    | Cyclic    | –           | Cyclic    |
| Function/operating voltage indicator |       | –/–      | LED/–     | LED/–     | LED/–       | LED/–     |
| Sensing distance, adjustable         |       |          |           |           |             |           |

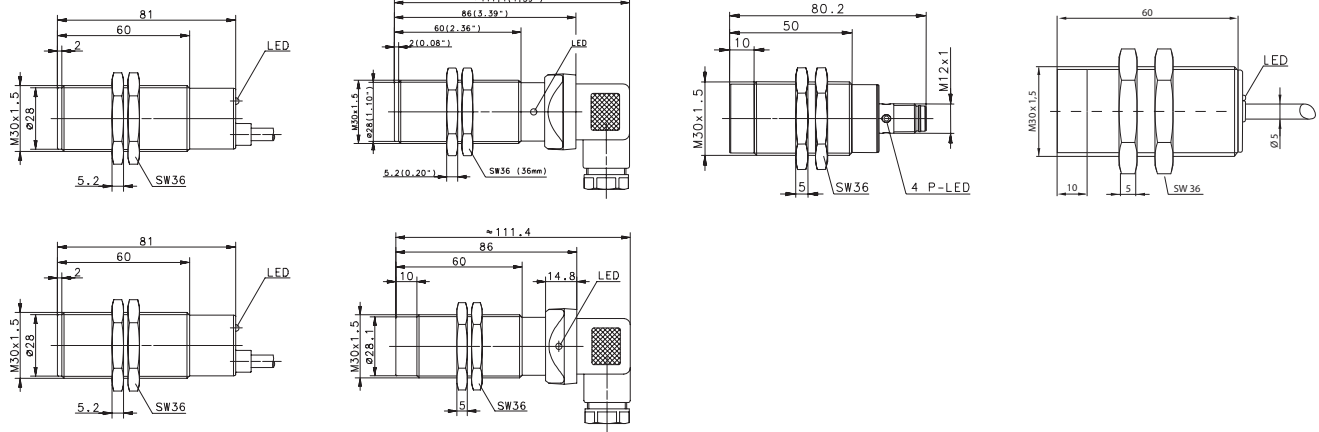
## Mechanical data

|   |  |                         |                         |                         |                         |             |
|---|--|-------------------------|-------------------------|-------------------------|-------------------------|-------------|
| Ambient temperature (min/max)                         |  | –25°C/+70°C             | –25°C/+70°C             | –25°C/+70°C             | –25°C/+70°C             | –25°C/+70°C |
| Protection class in accordance with IEC 529, EN 60529 |  | IP67                    | IP67                    | IP67                    | IP67                    | IP67        |
| Enclosure material                                    |  | CuZn39Pb3               | CuZn39Pb3               | CuZn39Pb3               | CuZn39Pb3               | CuZn39Pb3   |
| Connection  |  | 2 x 0.5 mm <sup>2</sup> | 3 x 0.5 mm <sup>2</sup> | 3 x 0.5 mm <sup>2</sup> | 2 x 0.5 mm <sup>2</sup> | M12 x 1     |

Please refer to Accessories for cable couplers, mounting brackets and sensor tester.



| M30                |                    | M30                |                    | M30                |                    | M30       |               |
|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|-----------|---------------|
| Non-flush<br>15 mm | Non-flush<br>15 mm | Non-flush<br>15 mm | Non-flush<br>15 mm | Non-flush<br>15 mm | Non-flush<br>40 mm | Cable 2 m | Sensing dist. |
| Cable 2 m          | Cable 2.5 m        | DIN Connector      | DIN Connector      | Connector M12      | Cable 2 m          |           |               |
| Plastic            | Plastic            | Plastic            |                    | Analogue           |                    |           |               |



|   |   |   |                                      |   |  |
|---|---|---|--------------------------------------|---|--|
| <b>6502923981</b><br>KIN-T30PS/015-KL2  |   | <b>6502935001</b><br>KIN-M30PS/015-KLSD |                                      | <b>6502908009</b><br>KIN-M30PS/040-KL2E |  |
|   |   |   |                                      |   |  |
|   | <b>6502836860</b><br>KIN-T30PP/015-KLSD |   |                                      |   |  |
|   |   |   | <b>6502008001</b><br>KIN-M30PA/015-2 |   |  |
| <b>6503523956</b><br>KIN-T30AS/015-L2,5 |   |   |                                      |   |  |

|           |             |           |           |           |           |
|-----------|-------------|-----------|-----------|-----------|-----------|
| 10–60 VDC | 20–250 V AC | 10–60 VDC | 10–60 VDC | 10–36 VDC | 10–30 VDC |
| ≤ 200 mA  | ≤ 400 mA    | ≤ 200 mA  | ≤ 200 mA  | ≤ 200 mA  | ≤ 200 mA  |
| 100 Hz    | ≈ 10 Hz     | 100 Hz    | 100 Hz    | 100 Hz    | ≤ 100 Hz  |
| Cyclic    | –           | Cyclic    | Cyclic    | Cyclic    | Cyclic    |
| LED/–     | LED/–       | LED/–     | LED/–     | LED/–     | LED/–     |

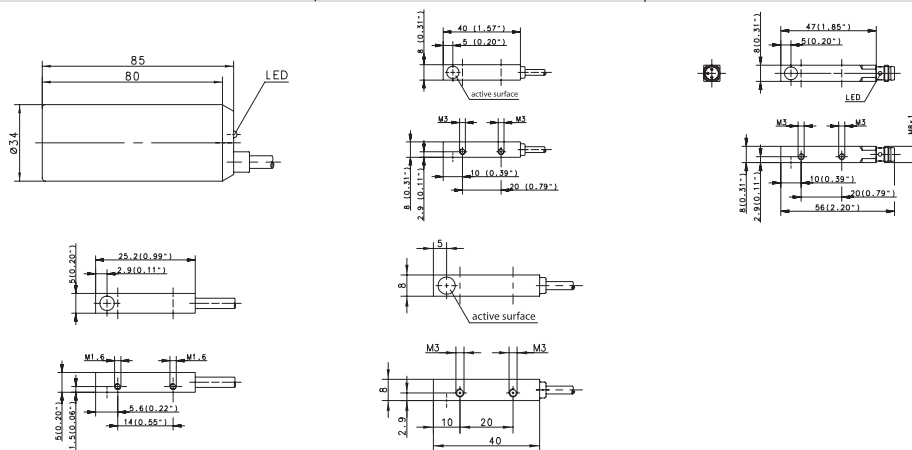
|                         |                         |             |             |             |                          |
|-------------------------|-------------------------|-------------|-------------|-------------|--------------------------|
| –25°C/+70°C             | –25°C/+70°C             | –25°C/+70°C | –25°C/+70°C | –25°C/+70°C | –25°C/+70°C              |
| IP67                    | IP67                    | IP65        | IP65        | IP67        | IP67                     |
| PA, red                 | PA, red                 | PA, red     | CuZn39Pb3   | CuZn39Pb3   | CuZn39Pb3                |
| 3 x 0.5 mm <sup>2</sup> | 2 x 0.5 mm <sup>2</sup> | DIN 43650   | DIN 43650   | M12 x 1     | 3 x 0.34 mm <sup>2</sup> |

You will find detailed data sheets to the products under [www.bernstein.eu](http://www.bernstein.eu)



# Inductive Sensors (Type Ø 34 mm, 5 x 5, 8 x 8, 12 x 12, 27 x 10, 28 x 16)

| Type                     | Ø 34 mm   | 5 x 5 x 25 mm | 8 x 8 x 40 mm |           | 8 x 8 x 56 mm |
|--------------------------|-----------|---------------|---------------|-----------|---------------|
| Type of installation     | Non-flush | Flush         | Flush         | Flush     | Flush         |
| Nominal sensing distance | 20.0 mm   | 1.5 mm        | 1.5 mm        | 1.5 mm    | 1.5 mm        |
| Type of connection       | Cable 2 m | Cable         | Cable 2 m     | Cable 2 m | Connector M8  |
| Special feature          |           |               |               |           |               |



|                 |    |  |   |  |  |  |  |
|-----------------|----|--|---|--|--|--|--|
| <b>PNP</b>      | DC | NO contact<br>Type<br>NC contact<br>Type<br>Antivalent NO/NC | <b>6502915002</b><br>KIN-R34PS/020-KL2  | <b>6502999026</b><br>KIB-Q05PS/001-K2PU<br><b>6502799010</b><br>KIB-Q05PÖ/001-K2PU | <b>6502980004</b><br>KIB-Q08PS/1,5-K2<br><b>6502780001</b><br>KIB-Q08PÖ/1,5-K2 | <b>6602980087</b><br>KIB-Q08PS/1,5-K2T | <b>6502980002</b><br>KIB-Q08PS/1,5-KLSM8<br><b>6502780002</b><br>KIB-Q08PÖ/1,5-KLSM8 |
| <b>NPN</b>      | DC | NO contact<br>Type<br>NC contact<br>Type<br>Antivalent NO/NC |   |  |  |  |  |
| <b>PNP/NPN</b>  | DC | NO/NC prog.<br>Type<br>push-pull operation                   | <b>6502915001</b><br>KIN-R34PP/020-KLSD |  |  |  |  |
| <b>NAMUR</b>    | DC |  |   |  |  |  |  |
| <b>Analogue</b> | DC |  |   |  |  |  |  |
| <b>2-wire</b>   | DC | NO contact<br>NC contact                                     |   |  |  |  |  |
|                 | AC | NO contact<br>NC contact<br>Changeover contact               |   |  |  |  |  |

## Technical data

|                                      |       |           |           |           |           |           |
|--------------------------------------|-------|-----------|-----------|-----------|-----------|-----------|
| Rated operating voltage              | $U_B$ | 10–60 VDC | 10–30 VDC | 10–36 VDC | 10–36 VDC | 10–36 VDC |
| Rated operating current              | $I_B$ | ≤ 200 mA  | 200 mA    | ≤ 200 mA  | ≤ 200 mA  | ≤ 200 mA  |
| Switching frequency (max)            | F     | 100 Hz    | 1000 Hz   | 1000 Hz   | 1000 Hz   | 1000 Hz   |
| Short circuit-protection             |       | Cyclic    | Cyclic    | Cyclic    | Cyclic    | Cyclic    |
| Function/operating voltage indicator |       | LED/-     | -/-       | -/-       | -/-       | LED/-     |
| Sensing distance, adjustable         |       |           |           |           |           |           |

## Mechanical data

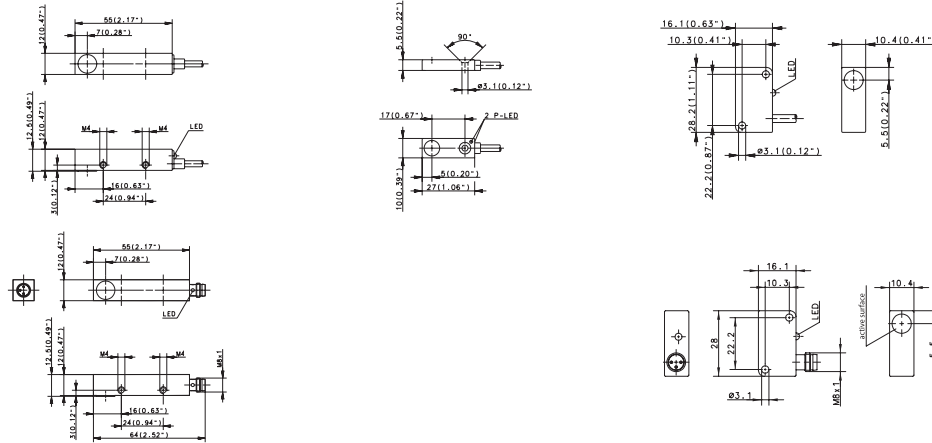
|   |  |                         |                          |                          |                          |             |
|---|--|-------------------------|--------------------------|--------------------------|--------------------------|-------------|
| Ambient temperature (min/max)                         |  | -25°C/+70°C             | -25°C/+70°C              | -25°C/+70°C              | 0°C/+100°C               | -25°C/+70°C |
| Protection class in accordance with IEC 529, EN 60529 |  | IP67                    | IP67                     | IP67                     | IP67                     | IP67        |
| Enclosure material                                    |  | PBT, red                | CuZn39PB3                | CuZn39PB3                | CuZn39PB3                | CuZn39PB3   |
| Connection  |  | 3 x 0.5 mm <sup>2</sup> | 3 x 0.05 mm <sup>2</sup> | 3 x 0.14 mm <sup>2</sup> | 3 x 0.14 mm <sup>2</sup> | M8 x 1      |

Please refer to Accessories for cable couplers, mounting brackets and sensor tester.





| 12 x 12 x 55 mm |              | 27 x 10 x 5 mm | 28 x 16 x 11 mm |              |
|-----------------|--------------|----------------|-----------------|--------------|
| Flush           | Flush        | Flush          | Flush           | Flush        |
| 4 mm            | 4 mm         | 1.5 mm         | 2 mm            | 2 mm         |
| Cable 2 m       | Connector M8 | Cable 2 m      | Cable 2 m       | Connector M8 |



|   |   |  |  |  |  |  |
|---|---|--|--|--|--|--|
| <b>6502999028</b><br>KIB-Q12PS/004-KL2E | <b>6502999030</b><br>KIB-Q12PS/004-KLSM8E | <b>6502993001</b><br>KIB-E27PS/1,5-KL2PU | <b>6502973001</b><br>KIB-E28PS/002-KL2 | <b>6502973002</b><br>KIB-E28PS/002-KLSM8<br><b>6502773001</b><br>KIB-E28PÖ/002-KLSM8 |  |  |
|   | <b>6502399021</b><br>KIB-Q12NS/004-KLSM8E |  |  |  |  |  |
|   |   |  |  |  |  |  |
|   |   |  |  |  |  |  |
|   |   |  |  |  |  |  |

|           |           |           |           |           |
|-----------|-----------|-----------|-----------|-----------|
| 10–60 VDC | 10–60 VDC | 10–30 VDC | 10–30 VDC | 10–30 VDC |
| ≤ 200 mA  | ≤ 200 mA  | ≤ 200 mA  | ≤ 200 mA  | ≤ 200 mA  |
| 800 Hz    | 800 Hz    | 1000 Hz   | 800 Hz    | 800 Hz    |
| Cyclic    | Cyclic    | Cyclic    | Cyclic    | Cyclic    |
| LED/–     | LED/–     | LED/–     | LED/–     | LED/–     |

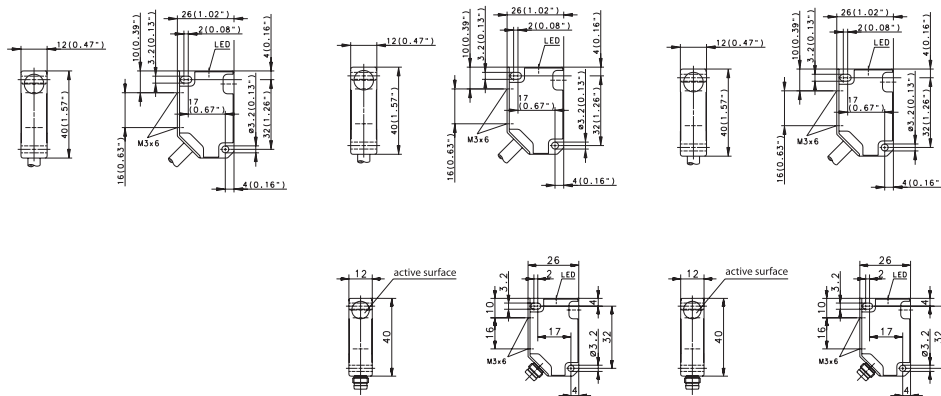
|                          |             |                          |                          |             |
|--------------------------|-------------|--------------------------|--------------------------|-------------|
| –25°C/+70°C              | –25°C/+70°C | –25°C/+70°C              | –25°C/+70°C              | –25°C/+70°C |
| IP67                     | IP67        | IP67                     | IP67                     | IP67        |
| CuZn39Pb3                | CuZn39Pb3   | PA, black                | PA, black                | PA, black   |
| 3 x 0.14 mm <sup>2</sup> | M8 x 1      | 3 x 0.14 mm <sup>2</sup> | 3 x 0.14 mm <sup>2</sup> | M8 x 1      |

You will find detailed data sheets to the products under [www.bernstein.eu](http://www.bernstein.eu)



# Inductive Sensors (Type 28 x 16 mm, 40 x 26 mm, 50 x 25 mm, 60 x 36 mm)

| Type                     | 40 x 26 x 12 mm | 40 x 26 x 12 mm | 40 x 26 x 12 mm | 40 x 26 x 12 mm | 40 x 26 x 12 mm |
|--------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Type of installation     | Flush           | Flush           | Non-flush       | Non-flush       | Non-flush       |
| Nominal sensing distance | 2 mm            | 2 mm            | 4 mm            | 4 mm            | 4 mm            |
| Type of connection       | Cable 2 m       | Connector M8    | Cable 2 m       | Cable 2 m       | Connector M8    |
| Special feature          |                 |                 |                 |                 |                 |



|                 |    |  |  |  |  |  |
|-----------------|----|--|--|--|--|--|
| <b>PNP</b>      | DC | NO contact<br>Type<br>NC contact<br>Type<br>Antivalent NO/NC<br>Type | <b>6502984023</b><br>KIB-E40PS/002-KL2<br><b>6502784006</b><br>KIB-E40PÖ/002-KL2 | <b>6502984025</b><br>KIB-E40PS/002-KLSM8 | <b>6502984024</b><br>KIN-E40PS/004-KL2<br><b>6502784007</b><br>KIN-E40PÖ/004-KL2 | <b>6502984026</b><br>KIN-E40PS/004-KLSM8<br><b>6502784008</b><br>KIN-E40PÖ/004-KLSM8 |
| <b>NPN</b>      | DC | NO contact<br>Type<br>NC contact<br>Type<br>Antivalent NO/NC         |  |  |  |  |
| <b>PNP/NPN</b>  | DC | NO/NC prog.<br>Type<br>push-pull operation                           |  |  |  |  |
| <b>NAMUR</b>    | DC | Type   |  |  |  |  |
| <b>Analogue</b> | DC | Type   |  |  |  |  |
| <b>2-wire</b>   | DC | NO contact<br>NC contact   |  |  |  |  |
|                 | AC | NO contact<br>Type<br>NC contact<br>Changeover contact               |  |  |  | <b>6503584005</b><br>KIN-E40AS/004-L2  |

## Technical data

|                                      |       |           |           |           |             |           |
|--------------------------------------|-------|-----------|-----------|-----------|-------------|-----------|
| Rated operating voltage              | $U_B$ | 10–36 VDC | 10–36 VDC | 10–36 VDC | 20–250 V AC | 10–36 VDC |
| Rated operating current              | $I_B$ | ≤ 200 mA  | ≤ 200 mA  | ≤ 200 mA  | ≤ 300 mA    | ≤ 200 mA  |
| Switching frequency (max)            | F     | 800 Hz    | 800 Hz    | 400 Hz    | 10 Hz       | 400 Hz    |
| Short circuit-protection             |       | Cyclic    | Cyclic    | Cyclic    | –           | Cyclic    |
| Function/operating voltage indicator |       | LED/–     | LED/–     | LED/–     | LED/–       | LED/–     |
| Sensing distance, adjustable         |       |           |           |           |             |           |

## Mechanical data

|   |  |                         |             |                         |                         |             |
|---|--|-------------------------|-------------|-------------------------|-------------------------|-------------|
| Ambient temperature (min/max)                         |  | –25°C/+70°C             | –25°C/+70°C | –25°C/+70°C             | –25°C/+70°C             | –25°C/+70°C |
| Protection class in accordance with IEC 529, EN 60529 |  | IP67                    | IP67        | IP67                    | IP67                    | IP67        |
| Enclosure material                                    |  | PBT, black              | PBT, black  | PBT, black              | PBT, black              | PBT, black  |
| Connection  |  | 3 x 0.5 mm <sup>2</sup> | M8 x 1      | 3 x 0.5 mm <sup>2</sup> | 2 x 0.5 mm <sup>2</sup> | M8 x 1      |

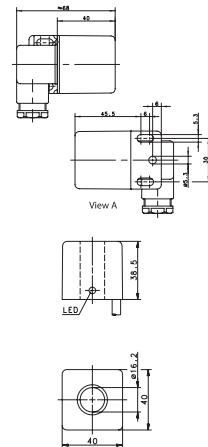
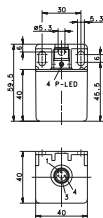
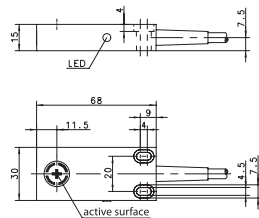
Please refer to Accessories for cable couplers, mounting brackets and sensor tester.





## Inductive Sensors (Type 68 x 30 mm, 40 x 40 mm)

| Type                     | 68 x 30 x 15 mm | 40 x 40 mm    | 40 x 40 mm    |             |
|--------------------------|-----------------|---------------|---------------|-------------|
| Type of installation     | Non-flush       | Non-flush     | Non-flush     | Non-flush   |
| Nominal sensing distance | 7 mm            | 20 mm         | 15 mm         | 0 mm        |
| Type of connection       | Cable 2 m       | Connector M12 | DIN Connector | Cable 6 m   |
| Special feature          |                 |               |               | Ring sensor |



|                 |    |  |  |  |   |
|-----------------|----|--|--|--|---|
| <b>PNP</b>      | DC | NO contact<br>Type<br>NC contact<br>Type<br>Antivalent NO/NC | <b>6502956076</b><br>KIN-E68PS/007-KL2 | <b>6502982003</b><br>KIN-N40PS/020-KLS12 | <b>6502999036</b><br>KIR-N40PS/000-KL6  |
| <b>NPN</b>      | DC | NO contact<br>Type<br>NC contact<br>Type<br>Antivalent NO/NC | <b>6502156058</b><br>KIN-E68NÖ/007-KL6 |  |   |
| <b>PNP/NPN</b>  | DC | NO/NC prog.<br>Type<br>push-pull operation                   |  |  | <b>6502982001</b><br>KIN-N40PP/015-KLSD |
| <b>NAMUR</b>    | DC |  |  |  |   |
| <b>Analogue</b> | DC |  |  |  |   |
| <b>2-wire</b>   | DC | NO contact<br>NC contact                                     |  |  |   |
|                 | AC | NO contact<br>NC contact<br>Changeover contact               |  |  |   |

### Technical data

|                                      |       |           |           |           |           |
|--------------------------------------|-------|-----------|-----------|-----------|-----------|
| Rated operating voltage              | $U_B$ | 10–60 VDC | 10–36 VDC | 10–60 VDC | 10–30 VDC |
| Rated operating current              | $I_B$ | ≤ 200 mA  | ≤ 200 mA  | ≤ 400 mA  | ≤ 200 mA  |
| Switching frequency (max)            | F     | 200 Hz    | 50 Hz     | 100 Hz    | –         |
| Short circuit-protection             |       | Cyclic    | Cyclic    | Cyclic    | Cyclic    |
| Function/operating voltage indicator |       | LED/–     | LED/–     | LED/–     | LED/–     |
| Sensing distance, adjustable         |       |           |           |           |           |

### Mechanical data

|   |  |                         |               |             |                         |
|---|--|-------------------------|---------------|-------------|-------------------------|
| Ambient temperature (min/max)                         |  | –25°C/+70°C             | –25°C/+70°C   | –25°C/+70°C | –25°C/+70°C             |
| Protection class in accordance with IEC 529, EN 60529 |  | IP67                    | IP67          | IP65        | IP67                    |
| Enclosure material                                    |  | PBT, black              | PA, red/black | PA, red     | PA, black               |
| Connection  |  | 3 x 0.5 mm <sup>2</sup> | M12 x 1       | DIN 43650   | 3 x 0.5 mm <sup>2</sup> |

Please refer to Accessories for cable couplers, mounting brackets and sensor tester.





# Capacitive Sensors

## Functional principle

Capacitive proximity switches detect conductive and non-conductive materials that can be in a solid or liquid state. They serve the purpose of monitoring product levels in containers, checking contents in filling and packaging systems as well as detecting, positioning, monitoring and counting objects, e.g. in sequence control systems, conveyor belts.

Used for detecting media such as:

- **solid:**  
wood, ceramic, glass, paper stacks, plastic, stone, rubber, ice, nonferrous metals, potatoes
- **liquid:**  
water, oil, beverages, adhesives, paints
- **granular:**  
plastic pellets, granulated products, grain, fodder, wood chip
- **powder:**  
dyes, detergents, sand, cement, fertilizer, salt, sugar, flour, coffee

## Technical description

The function of the capacitive proximity switch is based on evaluating the influence exerted by an actuator on the electrical field at the active face of the switch. The approach of an influencing object increases the capacitance of the capacitor, which consists of a sensor electrode located behind the active face and the actuator connected to earth / mass. This increase in capacitance is dependent on the conductance and the dielectric constant of the actuator as well as its mass, surface area and its distance from the sensor electrode. The capacitive limit switch is equipped with an RC oscillator with a gain factor that increases as a result of the rise in capacitance of the previously described capacitor to such an extent that oscillation is induced. In limit switches, the capacitance required to induce oscillation can be determined by the built-in potentiometer intervening in the feedback of the oscillator.

The response sensitivity, i.e. the sensing distance with a given actuator can be adjusted in this way. The oscillator output signal is fed to an evaluation circuit that actuates the switching amplifier.

In response to the approach of **conductive** material the actuating object and the active face of the sensor form the plates of a capacitor. The change in capacitance and the consequently achievable sensing distance are large.

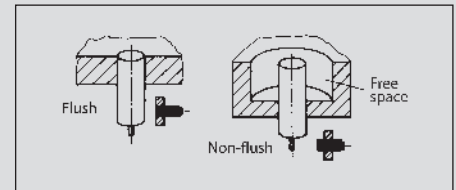
In response to the approach of **non-conductive** material  $\epsilon > 1$  only the change in the dielectric constant is effective. The increase in capacitance is less than is the case for conductive materials. The resulting sensing distance is small.

| Sensitivity table  |      |
|--|------|
| St37 or other metals, earthed                            | 1.00 |
| Surface of water   | 1.00 |
| St37 150 x 150 x 1 mm, not earthed                       | 0.85 |
| Marble 150 x 150 x 12.5 mm                               | 0.65 |
| Glass 150 x 150 x 7.5 mm                                 | 0.55 |
| Stack of paper DIN A 4, 80 g/m <sup>2</sup> , 500 sheets | 0.55 |
| Fibre board 150 x 150 x 16 mm                            | 0.45 |
| Ceramic tile 150 x 150 x 6 mm                            | 0.25 |
| PVC 150 x 150 x 4 mm                                     | 0.15 |

These values only indicate the expected magnitude of the response sensitivity as the specific properties of the actuating object and of the surroundings in actual applications have a considerable influence on the response distance. It is important to take into account the influence of moisture in order to ensure trouble-free operation. A high water content in the material to be detected, e.g. wood or paper, increases the sensing distance considerably.

In terms of capacitive proximity switches a distinction is made between

- flush mount and
  - non-flush mount
- limit switches.



In the case of non-flush mount limit switches a clearance that must contain no influencing material must be created about the switch. Due to the adjustment facility available in capacitive proximity switches, the installation of non-flush mount devices is not problematic in connection with reduced clearance. Non-flush mount capacitive proximity switches are characterised by low sensitivity to soiling or condensation.

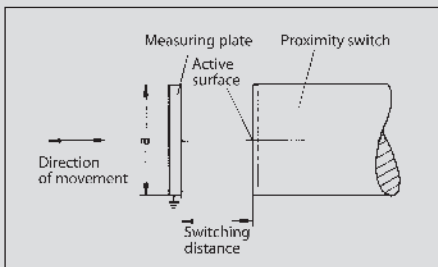
A screening electrode built into flush mount limit switches is connected to circuit ground. As both electrodes of the capacitor are now close together, flush mount capacitive proximity switches are particularly suitable for sensing dielectrics. The disadvantage is that this configuration has an increased sensitivity to condensation or soiling.

Capacitive proximity switches can mutually influence each other if they are mounted next to or opposite each other. In such configurations, the response of flush mount switches is considerably less sensitive than non-flush mount switches. Trials under actual application conditions should be carried out at distances from  $> 2x$  to  $< 8x$  enclosure diameter. Arrangements with distances  $> 8x$  enclosure diameter are not problematic.

**Active face:** The active face of a capacitive proximity switch is the point at which the electrical field emerges. This point is located at the end face on types designed as threaded sleeves or smooth cylinders. Non-cylindrical limit switches are identified by a symbol on the corresponding face.

**Influencing:** In relation to a capacitive proximity switch the term influencing refers to the change in the switching status in response to the medium to be detected entering the electrical field.

**Standard target:** The standard target is defined as a square plate, 1 mm thick and made from FE 360.



The side length "a" of the square target corresponds to the diameter of the circle described by the active face. The length of its side is defined as the larger of either the active face diameter or three times the nominal sensing distance. The target must be earthed in order to ensure comparable sensing distances. The sensing distance of rectangular, capacitive proximity switches is determined by means of an earthed target with a size equal to the surface of the active side of the limit switch.

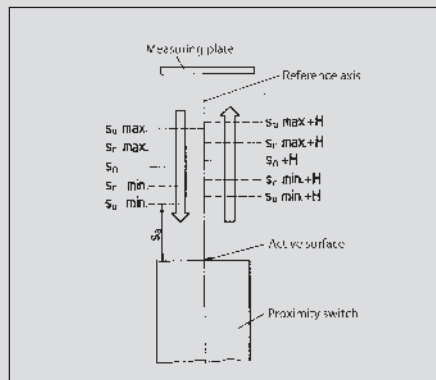
**Sensing distance:** The sensing distance, that changes the status of the output stage, is the distance of the influencing object in relation to the active face.

**Nominal sensing distance ( $s_n$ ):** This is a device-specific characteristic value that does not take into account influences such as tolerance, temperature and changes in voltage.

**Real sensing distance ( $s_r$ ):** The real sensing distance is measured at a rated voltage and an ambient temperature of 23 °C +/- 5 °C. It must be between 90 % and 110 % of the nominal sensing distance.

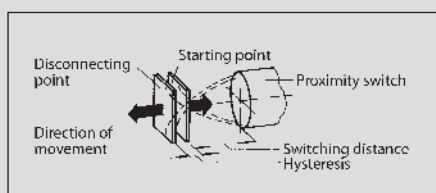
**Useable sensing distance ( $s_u$ ):** The useable sensing distance is measured within the permissible temperature and voltage ranges and is 80 % – 120 % of the real sensing distance.

**Assured sensing distance ( $s_a$ ) (operational sensing distance):** This is the distance that can be used effectively under the influence of temperature, voltage as well as tolerance variables. It is between 0 % and 72 % of the nominal sensing distance.

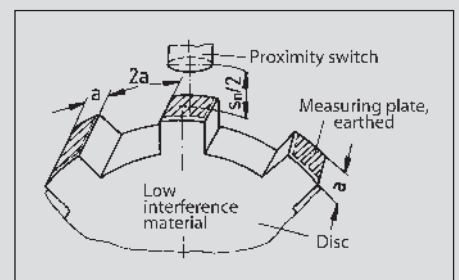


**Reproducibility:** The reproducibility of the switching distance is the repeat accuracy of the real sensing distance of two successive switching operations within a period of 8 hours at an ambient temperature between 18 °C and 28 °C and a supply voltage that may not deviate by more than 5 % from the rated voltage. The difference between any two measurements must not be more than 10 % of the real sensing distance.

**Switching hysteresis:** The switching hysteresis refers to the difference between the switch-on point as an object approaches the target and the switch-off point as the object moves away from the proximity switch. The value is specified as a percentage of the real sensing distance.



**Switching frequency:** The switching frequency is measured in accordance with EN 60947-5-2. The standard targets with the side length "a" are mounted on a plate that exerts minimum influence at "2a" intervals and are moved passed the proximity switch to be tested at half the nominal sensing distance. The maximum switching frequency is reached when the switch-on or switch-off time of the proximity switch is 50 μs. In the case of AC proximity switches, the maximum switching frequency is reached when the switch-on and switch-off time is equal to the half wave period of the supply frequency.



**Temperature range:** In accordance with DIN, the temperature range is from -25 °C to +70 °C. Reliable operation is ensured within this range.

#### Protection class

Corresponding to their ID code, the enclosures are dustproof and waterproof in accordance with IP65 or IP67 (DIN 40050).

#### Connection cable

A PVC-insulated connection cable is supplied as standard. Special versions with silicone sheathing, polyurethane sheathing, irradiation cross-linked PVC or Teflon insulation are also available.

#### Plug connection

Nowadays the plug connection is just as significant as the fixed cable on electronic proximity switches. The capacitive proximity switches in the BERNSTEIN range can be equipped with a wide variety of plug connections. As standard, this catalogue contains connector versions of virtually all types of limit switch.

#### Standards

All sensors conform to EN 60947-5-2



# Capacitive Sensors

## Important information

Capacitive sensors are able to detect conductive and non-conductive materials in solid, liquid, granular or powder form. However, certain criteria must be taken into account in practical applications.

## Sensing distance

The nominal sensing distances are specified and set at the factory in accordance with DIN EN 60947-5-2/98. The maximum sensing distance is achieved on approach of **conductive** materials of corresponding size.

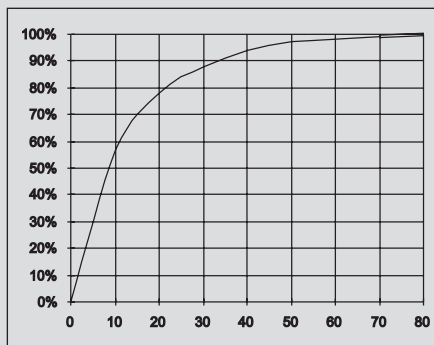
On approach of **non-conductive** materials, the dielectric constant  $\epsilon$  of the material to be detected is of decisive significance. Depending on the application, the specified sensing distances vary by a certain factor in relation to the dielectric constant. The values determined according to the table only indicate the expected magnitude of the response sensitivity as the specific properties of the actuating object (diameter, thickness, moisture content etc.) and of the surroundings (earthing) in actual applications have a considerable influence on the response distance. In most cases adaptation to the specific application can be achieved by adjustment with the built-in potentiometer.

## Clearance

In the case of non-flush mount capacitive sensors a clearance that must contain no influencing material must be created about the sensor. Non-flush mount capacitive sensors are characterised by low sensitivity to soiling or condensation. On account of their design, flush mount capacitive sensors are particularly suitable for sensing dielectrics. The increased sensitivity, however, may be detrimental in terms of the above mentioned parasitic effects.

If capacitive proximity switches are to be mounted opposite or next to each other, trials under actual application conditions should be carried out at distances between 2x and 8x enclosure diameter. Thanks to the adjustment facility, however, adaptation to specific applications is almost always possible.

| Examples of dielectric constants |             |
|----------------------------------|-------------|
| Glass                            | 3 ... 14    |
| Rubber                           | 2.5 ... 3   |
| Laminated paper                  | 3.5 ... 6   |
| Wood                             | 2.5 ... 6.8 |
| Marble                           | 8.4 ... 14  |
| Mineral oil                      | 2.15        |
| Epoxy resin                      | 3.3 ... 3.6 |
| Petroleum                        | 2.2         |
| Plexiglas                        | 3.6         |
| Polyamide                        | 3 ... 8     |
| PVC                              | 3.3 ... 4.1 |
| Porcelain                        | 4.2 ... 6.5 |
| Teflon PTFE                      | 2           |
| Air                              | 1           |
| Water                            | 80.8        |
| Paper (dry)                      | 2           |



Variance of sensing distance as a function of  $\epsilon$

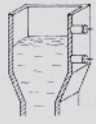
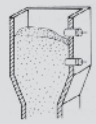
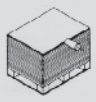



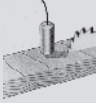


## Application descriptions

A particular application of capacitive proximity switches is to detect levels in non-metallic containers from the outside. Advantage: There is no need to make a hole in the container wall for the purpose of detecting product level. The medium to be detected does not come in contact with the limit switch. The prerequisite is that the dielectric constant and the mass of the material to be detected are greater than that of the container. The response sensitivity of the proximity switch must be reduced with the built-in potentiometer to such an extent that the limit switch does not respond to the container wall but rather to the medium to be detected.



Above: Insulation glass production lines equipped with BERNSTEIN capacitive sensors

Further fields of application are illustrated below.

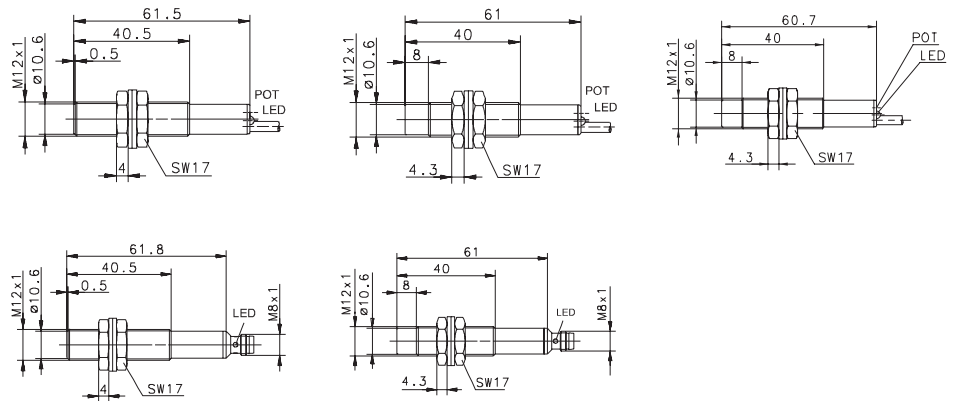
- 
Level monitoring in non-metallic containers
- 
Level monitoring of bulk material, e.g. granulated material, fodder
- 
Stack height scanning, e.g. paper, chip board
- 
Fill level monitoring in paint and adhesive containers
- 
Registering, counting, sorting or monitoring in conveyor belt systems
- 
Detecting, positioning in sequence control systems
- 
Detection in woodworking applications
- 
Belt breakage signalling
- 
Level monitoring in packing systems





# Capacitive Sensors (Type M12, M18)

| Type                     | M12       |              | M12       |              | M12           |
|--------------------------|-----------|--------------|-----------|--------------|---------------|
| Type of installation     | Flush     | Flush        | Non-flush | Non-flush    | Non-flush     |
| Nominal sensing distance | 2 mm      | 2 mm         | 4 mm      | 4 mm         | 6 mm          |
| Type of connection       | Cable 2 m | Connector M8 | Cable 2 m | Connector M8 | Cable 2 m     |
| Special feature          |           |              |           |              | Sensing dist. |



|                 |    |  |  |  |   |  |  |
|-----------------|----|--|--|--|---|--|--|
| <b>PNP</b>      | DC | NO contact<br>Type<br>NC contact<br>Type<br>Antivalent NO/NC<br>Type | <b>6507903001</b><br>KCB-M12PS/002-KLP2<br><b>6507703001</b><br>KCB-M12PÖ/002-KLP2 | <b>6507903004</b><br>KCB-M12PS/002-KLSM8 | <b>6507919001</b><br>KCN-T12PS/004-KLP2 | <b>6507919004</b><br>KCN-T12PS/004-KLSM8 | <b>6607919110</b><br>KCN-T12PS/006-KLP2E |
| <b>NPN</b>      | DC | NO contact<br>Type<br>NC contact<br>Type<br>Antivalent NO/NC         | <b>6507303001</b><br>KCB-M12NS/002-KLP2  |  | <b>6507319001</b><br>KCN-T12NS/004-KLP2 |  |  |
| <b>PNP/NPN</b>  | DC | NO/NC prog.<br>push-pull operation                                   |  |  |   |  |  |
| <b>NAMUR</b>    | DC |  |  |  |   |  |  |
| <b>Analogue</b> | DC |  |  |  |   |  |  |
| <b>2-wire</b>   | DC | NO contact<br>NC contact   |  |  |   |  |  |
|                 | AC | NO contact<br>Type<br>NC contact<br>Type<br>Changeover contact       |  |  |   |  |  |

### Technical data

|                                      |       |           |           |           |           |           |
|--------------------------------------|-------|-----------|-----------|-----------|-----------|-----------|
| Rated operating voltage              | $U_B$ | 10–36 VDC | 10–36 VDC | 10–36 VDC | 10–36 VDC | 10–36 VDC |
| Rated operating current              | $I_e$ | ≤ 200 mA  | ≤ 200 mA  | ≤ 200 mA  | ≤ 200 mA  | ≤ 200 mA  |
| Switching frequency (max)            | F     | 25 Hz     | 25 Hz     | 25 Hz     | 25 Hz     | 25 Hz     |
| Short circuit-protection             |       | Cyclic    | Cyclic    | Cyclic    | Cyclic    | Cyclic    |
| Function/operating voltage indicator |       | LED/–     | LED/–     | LED/–     | LED/–     | LED/–     |
| Sensing distance, adjustable         |       | Poti      | –         | Poti      | –         | Poti      |

### Mechanical data

|   |  |                          |             |                          |             |                          |
|---|--|--------------------------|-------------|--------------------------|-------------|--------------------------|
| Ambient temperature (min/max)                         |  | –25°C/+70°C              | –25°C/+70°C | –25°C/+70°C              | –25°C/+70°C | –25°C/+70°C              |
| Protection class in accordance with IEC 529, EN 60529 |  | IP65                     | IP65        | IP65                     | IP65        | IP65                     |
| Enclosure material                                    |  | CuZn39Pb3                | CuZn39Pb3   | PBT, black               | PBT, black  | PBT, black               |
| Connection  |  | 3 x 0.14 mm <sup>2</sup> | M8 x 1      | 3 x 0.14 mm <sup>2</sup> | M8 x 1      | 3 x 0.14 mm <sup>2</sup> |

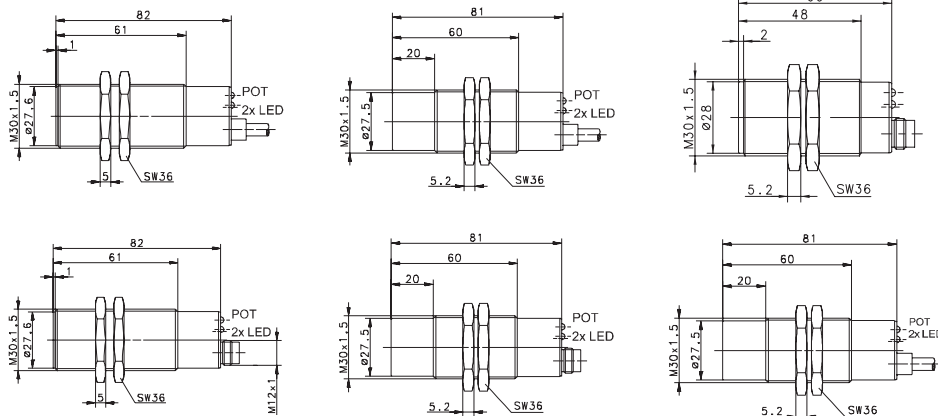
Please refer to Accessories for cable couplers, mounting brackets and sensor tester.





# Capacitive Sensors (Type M30, M32)

| Type                     | M30       |               | M30       |               | M30           |           |
|--------------------------|-----------|---------------|-----------|---------------|---------------|-----------|
| Type of installation     | Flush     | Flush         | Non-flush | Non-flush     | Non-flush     | Non-flush |
| Nominal sensing distance | 10 mm     | 10 mm         | 20 mm     | 20 mm         | 20 mm         | 20 mm     |
| Type of connection       | Cable 2 m | Connector M12 | Cable 2 m | Connector M12 | Connector M12 | Cable 2 m |
| Special feature          |           |               |           |               | Short form    |           |



|                 |    |  |   |   |   |   |  |
|-----------------|----|--|---|---|---|---|--|
| <b>PNP</b>      | DC | NO contact<br>Type<br>NC contact<br>Antivalent NO/NC<br>Type           | <b>6507907001</b><br>KCB-M30PS/010-KLP2 | <b>6507907004</b><br>KCB-M30PS/010-KLPS12 | <b>6507923727</b><br>KCN-T30PS/020-KLP2 | <b>6507923004</b><br>KCN-T30PS/020-KLPS12 | <b>6507923006</b><br>KCN-T30PS/020-KLPS12V                                       |
| <b>NPN</b>      | DC | NO contact<br>Type<br>NC contact<br>Antivalent NO/NC<br>Type           | <b>6507707001</b><br>KCB-M30PÖ/010-KLP2 |   | <b>6507323001</b><br>KCN-T30NS/020-KLP2 |   |  |
| <b>PNP/NPN</b>  | DC | NO/NC prog.<br>Type<br>push-pull operation<br>Type                     |   |   |   |   |  |
| <b>NAMUR</b>    | DC |  |   |   |   |   |  |
| <b>Analogue</b> | DC |  |   |   |   |   |  |
| <b>2-wire</b>   | DC | NO contact<br>NC contact   |   |   |   |   |  |
|                 | AC | NO contact<br>Type<br>NC contact<br>Type<br>Changeover contact<br>Type |   |   |   |   | <b>6508523001</b><br>KCN-T30AS/020-LP2<br><b>6508423001</b><br>KCN-T30AÖ/020-LP2 |

### Technical data

|                                      |       |           |           |           |           |           |             |
|--------------------------------------|-------|-----------|-----------|-----------|-----------|-----------|-------------|
| Rated operating voltage              | $U_B$ | 10–60 VDC | 10–60 VDC | 10–60 VDC | 10–60 VDC | 10–60 VDC | 20–250 V AC |
| Rated operating current              | $I_o$ | ≤ 400 mA  | ≤ 400 mA  | ≤ 400 mA  | ≤ 400 mA  | ≤ 400 mA  | ≤ 300 mA    |
| Switching frequency (max)            | F     | 25 Hz     | 25 Hz     | 25 Hz     | 25 Hz     | 25 Hz     | 15 Hz       |
| Short circuit-protection             |       | Cyclic    | Cyclic    | Cyclic    | Cyclic    | Cyclic    | –           |
| Function/operating voltage indicator |       | LED/LED   | LED/LED   | LED/LED   | LED/LED   | LED/LED   | LED/LED     |
| Sensing distance, adjustable         |       | Poti      | Poti      | Poti      | Poti      | Poti      | Poti        |

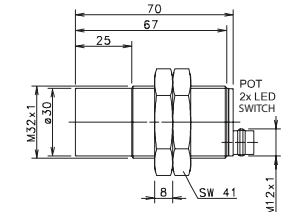
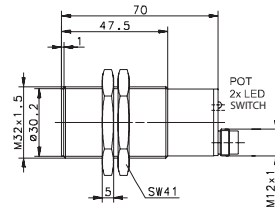
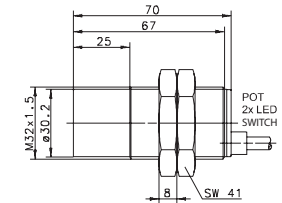
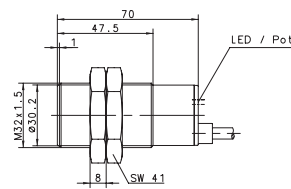
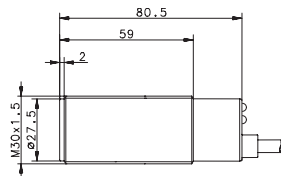
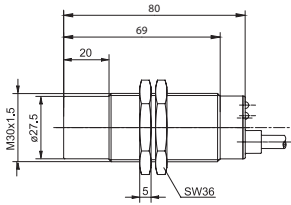
### Mechanical data

|   |  |                         |             |                         |             |             |                         |
|---|--|-------------------------|-------------|-------------------------|-------------|-------------|-------------------------|
| Ambient temperature (min/max)                         |  | –25°C/+70°C             | –25°C/+70°C | –25°C/+70°C             | –25°C/+70°C | –25°C/+70°C | –25°C/+70°C             |
| Protection class in accordance with IEC 529, EN 60529 |  | IP65                    | IP65        | IP65                    | IP65        | IP65        | IP65                    |
| Enclosure material                                    |  | CuZn39Pb3               | CuZn39Pb3   | PBT, black              | PBT, black  | PBT, black  | PBT, black              |
| Connection  |  | 3 x 0.5 mm <sup>2</sup> | M12 x 1     | 3 x 0.5 mm <sup>2</sup> | M12 x 1     | M12 x 1     | 2 x 0.5 mm <sup>2</sup> |

Please refer to Accessories for cable couplers, mounting brackets and sensor tester.



| M30   | M30  | M32                         |                                 | M32                             |                                     |
|---|--|-----------------------------|---------------------------------|---------------------------------|-------------------------------------|
| Non-flush<br>20 mm<br>Cable 2 m<br>PTFE front cap | Non-flush<br>20 mm<br>Cable 2 m<br>Timer/Relay | Flush<br>15 mm<br>Cable 6 m | Flush<br>15 mm<br>Connector M12 | Non-flush<br>30 mm<br>Cable 2 m | Non-flush<br>30 mm<br>Connector M12 |



|   |  |  |  |   |  |
|---|--|--|--|---|--|
| <b>6507908001</b><br>KCN-M30PS/020-KLP2 |  |  |  |   |  |
| <b>6507308001</b><br>KCN-M30NS/020-KLP2 |  |  |  |   |  |
|   |  |  | <b>6507013013</b><br>KCB-M32DP/015-KLP6<br><b>6507013012</b><br>KCB-M32GP/015-KLP2 | <b>6507013015</b><br>KCB-M32DP/015-KLPS12 | <b>6507013001</b><br>KCN-T32DP/030-KLP2<br><b>6507013004</b><br>KCN-T32DP/030-KLPS12 |
|   |  |  |  |   |  |
|   |  |  |  |   |  |
|   |  | <b>6509023001</b><br>KCN-T30RU/020-LP2 |  |   |  |

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| 10–60 VDC<br>≤ 400 mA<br>25 Hz<br>Cyclic<br>LED/LED<br>Poti | 20–250 V AC<br>≤ 1 A<br>–<br>–<br>LED/LED<br>Poti | 10–60 VDC<br>≤ 400 mA<br>25 Hz<br>Cyclic<br>LED/LED<br>Poti | 10–60 VDC<br>≤ 400 mA<br>25 Hz<br>Cyclic<br>LED/–<br>Poti | 10–60 VDC<br>≤ 400 mA<br>25 Hz<br>Cyclic<br>LED/–<br>Poti | 10–60 VDC<br>≤ 400 mA<br>25 Hz<br>Cyclic<br>LED/–<br>Poti |
|---|---|---|---|---|---|

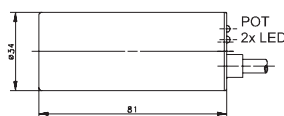
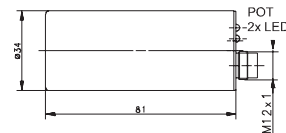
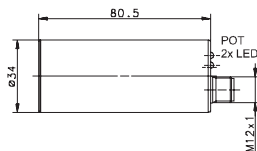
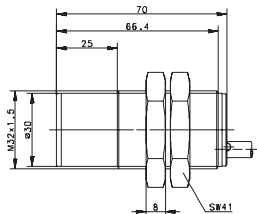
|  |  |   |   |  |  |
|--|--|---|---|--|--|
| –25°C/+70°C<br>IP67<br>Stainless steel 1.4305<br>3 x 0,5 mm <sup>2</sup> | –25°C/+70°C<br>IP67<br>PBT, black<br>5 x 0,5 mm <sup>2</sup> | –25°C/+70°C<br>IP65<br>CuZn39Pb3<br>3 x 0.5 mm <sup>2</sup> | –25°C/+70°C<br>IP65<br>CuZn39Pb3<br>M12 x 1 | –25°C/+70°C<br>IP65<br>PBT, black<br>3 x 0.5 mm <sup>2</sup> | –25°C/+70°C<br>IP65<br>PBT, black<br>M12 x 1 |
|--|--|---|---|--|--|

You will find detailed data sheets to the products under [www.bernstein.eu](http://www.bernstein.eu)



# Capacitive Sensors (Type M32, Ø 34 mm, E50, E68)

| Type                     | M32         | Ø 34 mm       |           | Ø 34 mm       |           |
|--------------------------|-------------|---------------|-----------|---------------|-----------|
| Type of installation     | Non-flush   | Flush         | Non-flush | Non-flush     | Non-flush |
| Nominal sensing distance | 30 mm       | 20 mm         | 30 mm     | 30 mm         | 30 mm     |
| Type of connection       | Cable 2 m   | Connector M12 | Cable 2 m | Connector M12 | Cable 2 m |
| Special feature          | Timer/Relay |               |           |               |           |



|                 |    |  |  |   |   |   |  |
|-----------------|----|--|--|---|---|---|--|
| <b>PNP</b>      | DC | NO contact<br>Type<br>NC contact<br>Antivalent NO/NC                   |  | <b>6507915006</b><br>KCB-D34PS/020-KLPS12 | <b>6507915001</b><br>KCN-R34PS/030-KLP2 | <b>6507915004</b><br>KCN-R34PS/030-KLPS12 |  |
| <b>NPN</b>      | DC | NO contact<br>Type<br>NC contact<br>Antivalent NO/NC                   |  |   | <b>6507315001</b><br>KCN-R34NS/030-KLP2 |   |  |
| <b>PNP/NPN</b>  | DC | NO/NC prog.<br>push-pull operation                                     |  |   |   |   |  |
| <b>NAMUR</b>    | DC |  |  |   |   |   |  |
| <b>Analogue</b> | DC |  |  |   |   |   |  |
| <b>2-wire</b>   | DC | NO contact<br>NC contact   |  |   |   |   |  |
|                 | AC | NO contact<br>Type<br>NC contact<br>Type<br>Changeover contact<br>Type | <b>6508613001</b><br>KCN-T32RU/030-LP2 |   |   |   | <b>6508515001</b><br>KCN-R34AS/030-LP2<br><b>6508415001</b><br>KCN-R34AÖ/030-LP2 |

### Technical data

|                                      |       |              |           |           |           |             |
|--------------------------------------|-------|--------------|-----------|-----------|-----------|-------------|
| Rated operating voltage              | $U_B$ | 180–250 V AC | 10–60 VDC | 10–60 VDC | 10–60 VDC | 20–250 V AC |
| Rated operating current              | $I_e$ | ≤ 8 A        | ≤ 200 mA  | ≤ 400 mA  | ≤ 400 mA  | ≤ 300 mA    |
| Switching frequency (max)            | F     | –            | 25 Hz     | 25 Hz     | 25 Hz     | 15 Hz       |
| Short circuit-protection             |       | –            | Cyclic    | Cyclic    | Cyclic    | –           |
| Function/operating voltage indicator |       | LED/LED      | LED/LED   | LED/LED   | LED/LED   | LED/LED     |
| Sensing distance, adjustable         |       | Poti         | Poti      | Poti      | Poti      | Poti        |

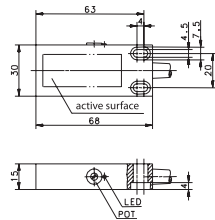
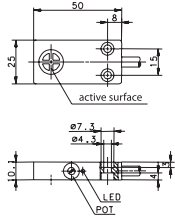
### Mechanical data

|   |  |                         |             |                         |             |                         |
|---|--|-------------------------|-------------|-------------------------|-------------|-------------------------|
| Ambient temperature (min/max)                         |  | –25°C/+70°C             | –25°C/+70°C | –25°C/+70°C             | –25°C/+70°C | –25°C/+70°C             |
| Protection class in accordance with IEC 529, EN 60529 |  | IP65                    | IP65        | IP65                    | IP65        | IP65                    |
| Enclosure material                                    |  | PBT, black              | CuZn39Pb3   | PBT, red                | PBT, red    | PBT, red                |
| Connection  |  | 5 x 0.5 mm <sup>2</sup> | M12 x 1     | 3 x 0.5 mm <sup>2</sup> | M12 x 1     | 2 x 0.5 mm <sup>2</sup> |

Please refer to Accessories for cable couplers, mounting brackets and sensor tester.



|                            |                             |  |  |
|----------------------------|-----------------------------|--|--|
| <b>E50</b>                 | <b>E68</b>                  |  |  |
| Flush<br>8 mm<br>Cable 2 m | Flush<br>10 mm<br>Cable 2 m |  |  |



|   |   |  |  |  |  |
|---|---|--|--|--|--|
| <b>6507990001</b><br>KCB-E50PS/008-KLP2 | <b>6507956001</b><br>KCB-E68PS/010-KLP2 |  |  |  |  |
| <b>6507390001</b><br>KCB-E50NS/008-KLP2 |   |  |  |  |  |
|   |   |  |  |  |  |
|   |   |  |  |  |  |
|   |   |  |  |  |  |

|           |           |  |  |
|-----------|-----------|--|--|
| 10–36 VDC | 10–36 VDC |  |  |
| ≤ 200 mA  | ≤ 200 mA  |  |  |
| 25 Hz     | 25 Hz     |  |  |
| Cyclic    | Cyclic    |  |  |
| LED/-     | LED/-     |  |  |
| Poti      | Poti      |  |  |

|                          |                         |  |  |
|--------------------------|-------------------------|--|--|
| -25°C/+70°C              | -25°C/+70°C             |  |  |
| IP65                     | IP65                    |  |  |
| PBT, black               | PBT, black              |  |  |
| 3 x 0.34 mm <sup>2</sup> | 3 x 0.5 mm <sup>2</sup> |  |  |

You will find detailed data sheets to the products under [www.bernstein.eu](http://www.bernstein.eu)



# Magnetic Switches

## General Information on BERNSTEIN Magnetic Switches

### Electromechanical and electronic variants

BERNSTEIN has extended its range of electromechanical magnetic switches with electronic versions which operate according to the Hall and magnetoresistive principle.

Electromechanical and electronic magnetic switches have special properties which ensure optimum use in their respective environments.

The electronic versions are characterised by their enhanced mechanical properties (extremely high resistance to vibration, shock or impact) and are not prone to wear in operation.

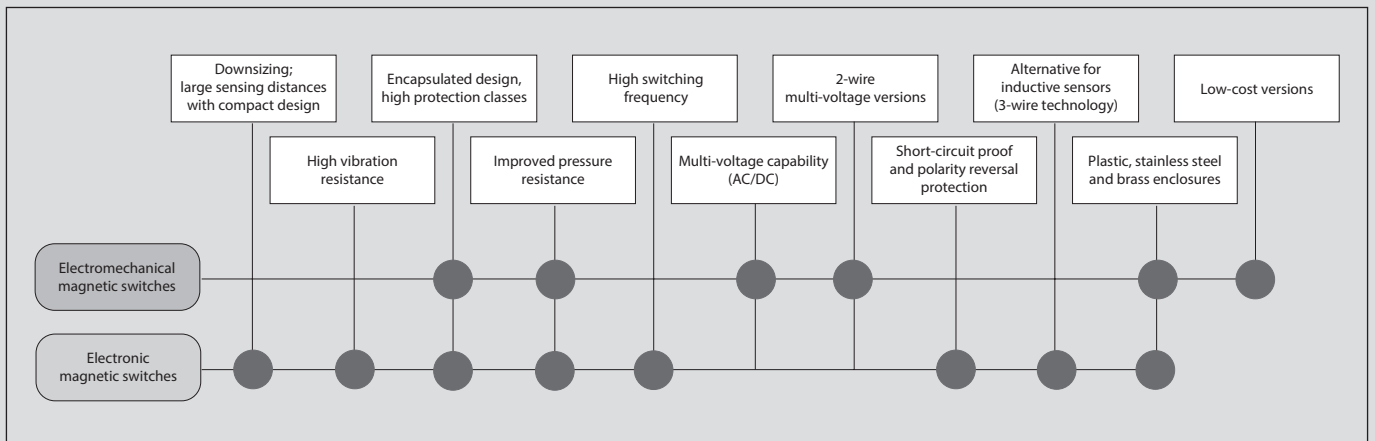
Thanks to the use of only one single “active” component (reed contact), “traditional” electromechanical magnetic switches are extremely reliable in operation. The universal current capability and low procurement costs allow these switches to be used in a wide range of applications.

The matrix below highlights the main features of each functional principle and helps you to decide on which magnetic switch to use for your application.



### Technical features and applications

More detailed information on the technical features and applications relating to the different functional principles are provided in the following sections.





# Electromechanical Magnetic Switches

## Special features of electromechanical magnetic switches

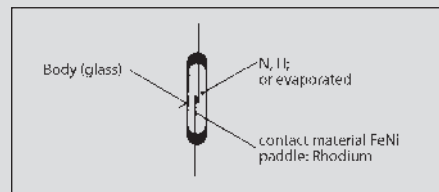
- Reliable under extreme ambient conditions such as dirt, humidity, gas, dust, etc.
- Protection class up to IP67
- Stable switching point, reproducible switching point accuracy of approx. 0.1 mm
- Can be operated from several directions
- Can be mounted in any position
- High operational reliability ensured by the use of only one single component
- Easy to install
- Long electrical service life (depending on the load to be switched) more than 10<sup>8</sup> switching cycles if contacts are suitably protected
- Special versions available for extreme temperatures from -40 °C to +150 °C
- Can be connected to direct and alternating voltage sources

## Design, function and operating principle of an electromechanical magnetic switch

The basic elements of this type of switch are the components which change their electrical characteristics in response to the approach of an actuating magnet. The contact paddles assume opposing polarity (north and south pole) under the influence of a magnetic field.

The approach can be made by either permanent magnets or electromagnets; the sensitivity of the switch and the field strength of the magnet determine the distance between the switch and magnet. Opening and closing of the contact studs is determined by the magnet correspondingly approaching or moving away from the switch. Normally-closed, normally-open and changeover contacts as well as bistable versions are included in our range of products.

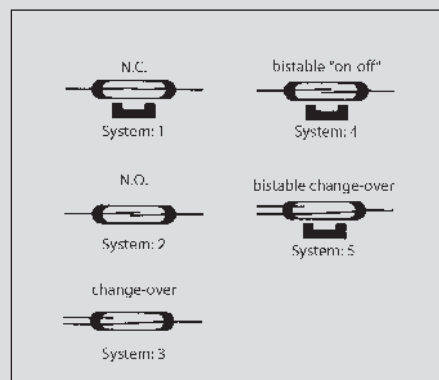
The magnetically influenced parts and their auxiliary components (resistor, diode, triac, output stage, etc.) are cast in high quality insulating material or casting compound to increase the vibration / impact strength and guarantee a protection class up to IP67. Metal versions (stainless steel, aluminium and brass) as well as standard plastic versions are available for use under extreme ambient conditions such as wider temperature ranges.



Design of a reed contact

## Biasing (bistable)

Bias magnets energise or hold the contact closed. The contact of the bistable normally-open or normally-closed contact is held closed until a stronger magnet with opposite polarity neutralises the biasing.



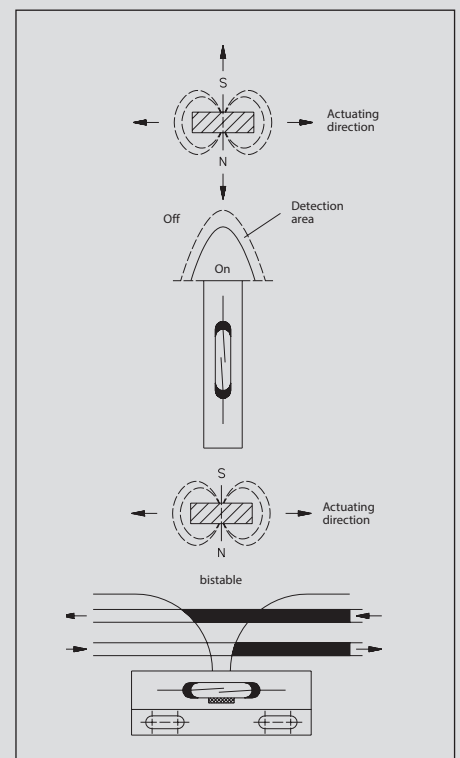
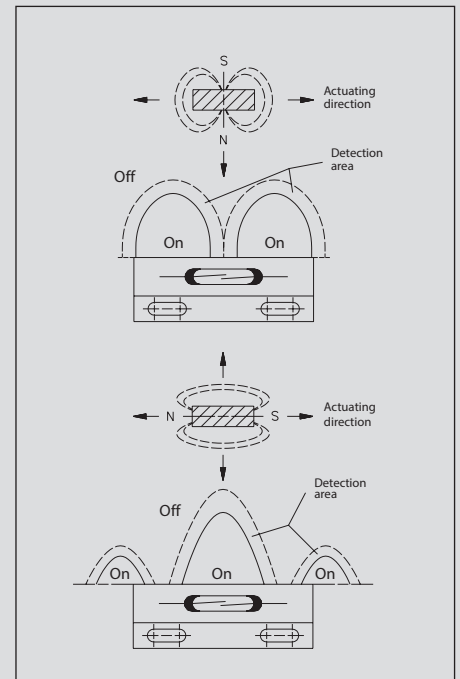
Types of reed contact switches

## Actuation and switching characteristics

The switching characteristics are principally determined by the approach and polarity of the magnet. The following drawings show typical characteristics. Materials and external dimensions are specified in the product overview. Magnetic switches with reed contact output are identified by an "A" in the second position of the type code (MA...).

## Switching frequency

Up to 200 Hz, depending on the size of load to be switched (considerably faster than relays, contactors etc.).



# Magnetic Switches

## Switching distances

Refer to the tables in this catalogue to identify which switching magnets may be used as well as the minimum achievable switching distance.

## Temperature ranges

The standard version may be used in a temperature range from  $-5\text{ }^{\circ}\text{C}$  to  $+70\text{ }^{\circ}\text{C}$ . Special types are also available offering an extended operating temperature range from  $-40\text{ }^{\circ}\text{C}$  to  $+150\text{ }^{\circ}\text{C}$ .

## Electrical service life

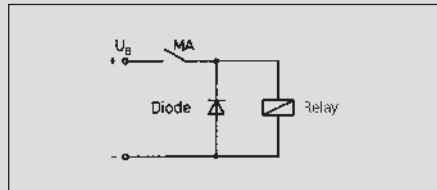
To maintain a long service life of the electrical contacts, it is important to ensure the maximum supply voltage and maximum switching current are not exceeded. Refer to the diagrams on Page 67 for the load values.

## Guidelines for reed contact protection

The values for current, voltage and power specified in the catalogue apply only to purely resistive loads. Very often, however, these loads are exposed to inductive or capacitive components. In these cases it is advisable to protect the reed contacts against voltage and current peaks. Whilst it is not possible to recommend a safe contact protection concept that applies to all load ranges (each individual case will require its own evaluation), we would like to present general guidelines on how reed contacts may be connected to different loads in order to avoid premature failure.

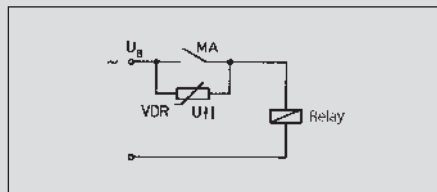
## 1. Inductive loads

In DC applications, contact protection is relatively easy to realise with the aid of a free-wheeling diode connected in parallel to the load. The diode polarity must be selected so that it blocks when normal operating voltage is applied but will short-circuit the voltage induced after the switch is opened (voltage peaks can significantly exceed the operating voltage).



Suppression of voltage peaks with a free-wheeling diode

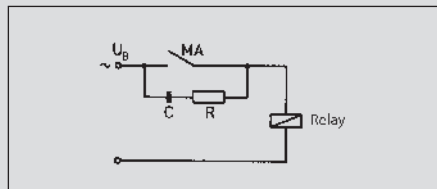
1) Voltage peaks induced by switching off inductive loads are suppressed by connecting a voltage-dependent resistor (VDR) in parallel to the reed contact.



Suppression of voltage peaks with a VDR

2) In AC voltage applications effective protection is achieved with a combination of a resistor and a capacitor (RC element).

Generally, the RC element is connected parallel to the contact and therefore in series to the load (vice versa is also possible).



Suppression of voltage peaks with RC element

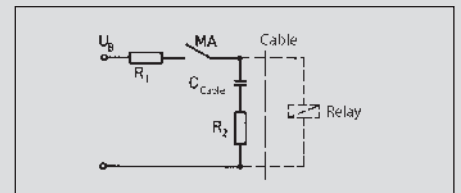
## 2. Capacitive loads

In contrast to inductive loads, an increase of making currents can occur in connection with capacitive loads and lamp loads that could damage and even weld contacts closed. When capacitors are switched (e.g. cable capacitance) a very high peak current occurs with its intensity depending on the capacitance and length of the cable leading to the switch.

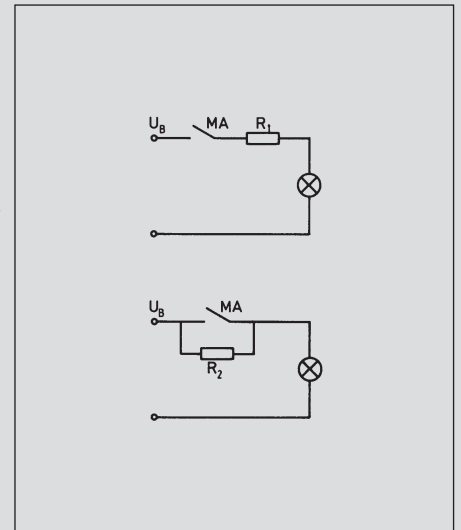
A resistor connected in series to the contact will reduce this current. The size of the resistor is determined by the characteristics of the corresponding electric circuit.

It should, however, be as large as possible to reduce the current to a permissible value, thus ensuring reliable contact protection.

## Contact protection with resistors for limiting current:

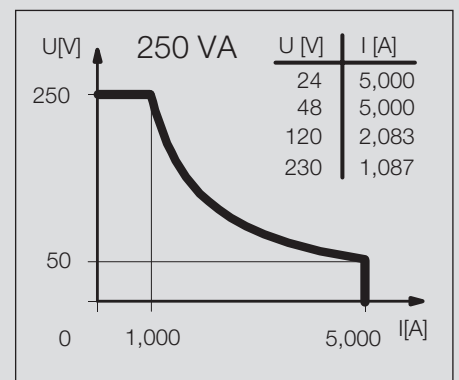
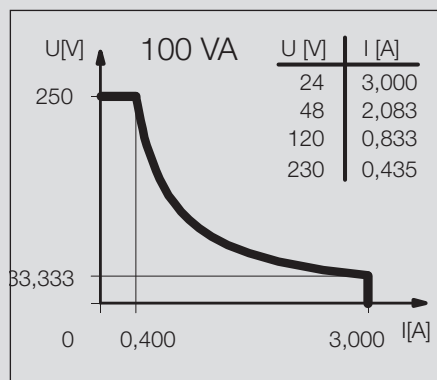
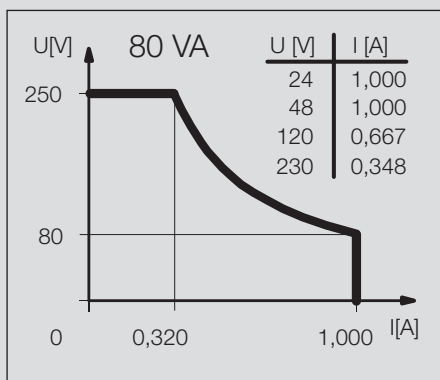
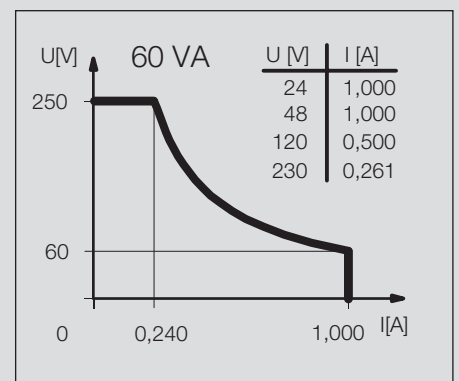
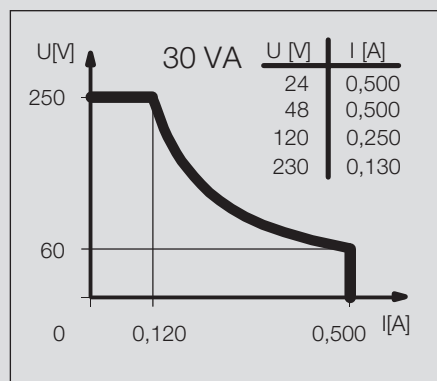
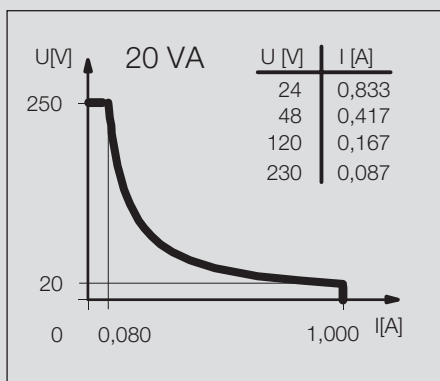
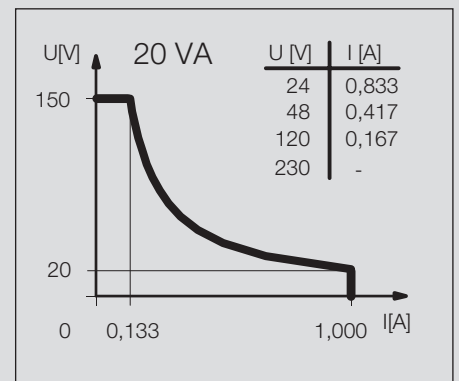
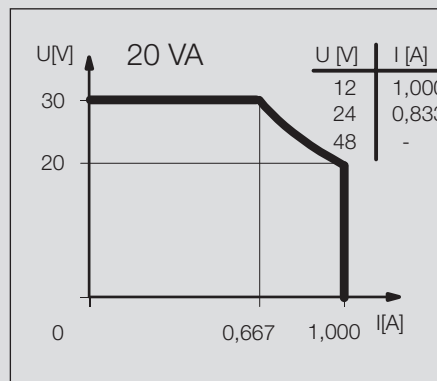
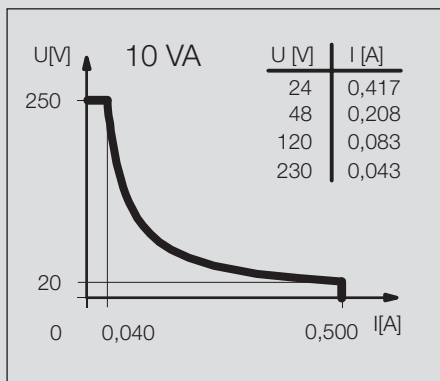
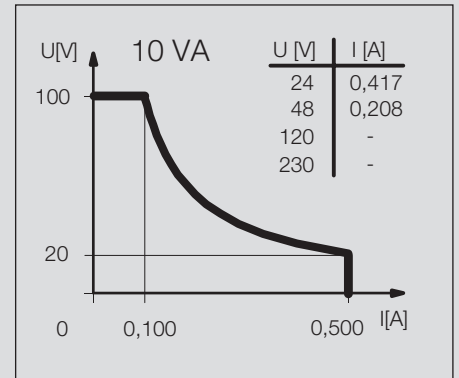
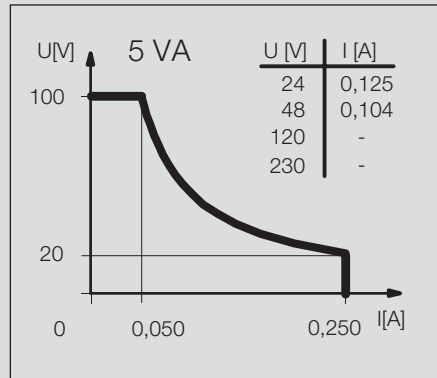
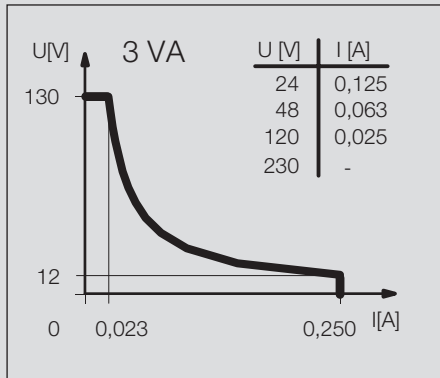


Capacitive load



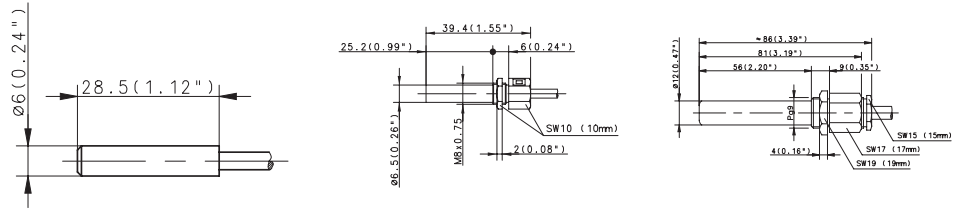
Lamp load

Performance diagrams for electromechanical magnetic switches



# Magnetic Switches (Type Ø 6 mm, Ø 6.5 mm, Ø 12 mm, Ø 13 mm)

| Type                             | Ø 6 mm    |           | Ø 6.5 mm  |  | Ø 12 mm   |           |
|----------------------------------|-----------|-----------|-----------|--|-----------|-----------|
| Nominal switching distance (San) | 19 mm     | 19 mm     | 18 mm     |  | 6 mm      | 7 mm      |
| Type of connection               | Cable 1 m | Cable 1 m | Cable 2 m |  | Cable 1 m | Cable 1 m |
| Reference magnet (Page)          | T-62 N/S  | T-62 N/S  | T-62 N/S  |  | T-62 N/S  | T-62 N/S  |
| Special feature                  |           |           |           |  |           |           |



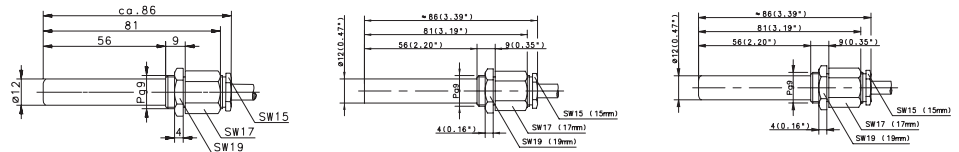
|                    |                    |                   |                   |                   |                   |
|--------------------|--------------------|-------------------|-------------------|-------------------|-------------------|
| Switching function | NO contact         | <b>6311230571</b> | <b>6310246500</b> |                   | <b>6314206246</b> |
|                    | Type               | MAK-3012-B-1      | MAK-4612-A-2      |                   | MAA-0612-F-1      |
| NC contact         | Type               |                   |                   |                   |                   |
|                    | Changeover contact | <b>6310330572</b> |                   | <b>6317306315</b> |                   |
| Type               | MAK-3013-X-1       |                   |                   | MAA-0613-M-1      |                   |
|                    | Bistable           |                   |                   |                   |                   |
| Type               |                    |                   |                   |                   |                   |

| Technical data                  | Ø 6 mm |              | Ø 6.5 mm |  | Ø 12 mm |        |
|---------------------------------|--------|--------------|----------|--|---------|--------|
| Max. switching voltage          | 100 V  | 250 V        | 250 V    |  | 250 V   | 250 V  |
| Switching current (max)         | 0.25 A | 0.5 A        | 0.5 A    |  | 1 A     | 3 A    |
| Performance class (diagram No.) | 5 VA   | 10 VA        | 20 VA    |  | 80 VA   | 100 VA |
| Shock resistance                |        | 50 g (11 ms) |          |  |         |        |

| Mechanical data                                       | Ø 6 mm                   |             | Ø 6.5 mm                 |  | Ø 12 mm                  |                          |
|---|--------------------------|-------------|--------------------------|--|--------------------------|--------------------------|
| Ambient temperature (min/max)                         | -5°C/+70°C               | -5°C/+70°C  | -5°C/+70°C               |  | -5°C/+70°C               | -5°C/+70°C               |
| Protection class in accordance with IEC 529, EN 60529 | IP67                     | IP67        | IP67                     |  | IP67                     | IP67                     |
| Enclosure material                                    | PA                       | PA          | PA                       |  | Aluminium                | Al/CuZn39Pb3             |
| Connection  | 3 x 0.14 mm <sup>2</sup> | 2 x 0.14 mm | 2 x 0.14 mm <sup>2</sup> |  | 4 x 0.75 mm <sup>2</sup> | 3 x 0.75 mm <sup>2</sup> |

Please refer to Accessories for magnets, mounting brackets, cable couplers and sensor tester.

| Type                             | Ø 12 mm   |           | Ø 12 mm     |           | Ø 12 mm   |           |
|----------------------------------|-----------|-----------|-------------|-----------|-----------|-----------|
| Nominal switching distance (San) | 7 mm      | 7 mm      | 7 mm        | 7 mm      | 8 mm      | 12 mm     |
| Type of connection               | Cable 1 m | Cable 3 m | Cable 8 m   | Cable 2 m | Cable 1 m | Cable 1 m |
| Reference magnet (Page)          | T-62 N/S  | T-62 N/S  | T-62 N/S    | T-62 N/S  | T-62 N/S  | T-62 N/S  |
| Special feature                  |           |           | Temperature |           |           |           |



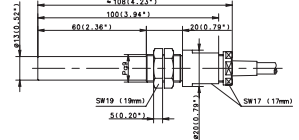
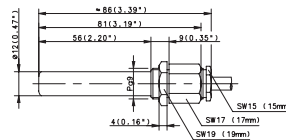
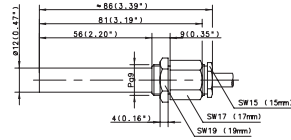
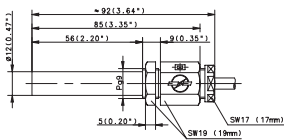
|                    |                    |                   |                   |                   |                   |                   |
|--------------------|--------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| Switching function | NO contact         | <b>6312206321</b> | <b>6314216476</b> | <b>6314216585</b> | <b>6314226423</b> |                   |
|                    | Type               | MAA-0612-D-1      | MAN-1612-F-3      | MAN-1612-FT-8     | MAK-2612-F-1      |                   |
| NC contact         | Type               |                   |                   |                   |                   |                   |
|                    | Changeover contact |                   |                   |                   |                   | <b>6315306314</b> |
| Type               | MAA-0613-K-1       |                   |                   |                   |                   | <b>6316316259</b> |
|                    | Bistable           |                   |                   |                   |                   | MAN-1613-L-1      |

| Technical data                  | Ø 12 mm |              | Ø 12 mm |        | Ø 12 mm |       |
|---------------------------------|---------|--------------|---------|--------|---------|-------|
| Max. switching voltage          | 250 V   | 250 V        | 250 V   | 250 V  | 250 V   | 250 V |
| Switching current (max)         | 0.5 A   | 3 A          | 3 A     | 3 A    | 0.5 A   | 1 A   |
| Performance class (diagram No.) | 30 VA   | 100 VA       | 100 VA  | 100 VA | 30 VA   | 60 VA |
| Shock resistance                |         | 50 g (11 ms) |         |        |         |       |

| Mechanical data                                       | Ø 12 mm                  |                          | Ø 12 mm                  |                         | Ø 12 mm                  |                          |
|---|--------------------------|--------------------------|--------------------------|-------------------------|--------------------------|--------------------------|
| Ambient temperature (min/max)                         | -5°C/+70°C               | -5°C/+70°C               | -40°C/+150°C             | -5°C/+70°C              | -5°C/+70°C               | -5°C/+70°C               |
| Protection class in accordance with IEC 529, EN 60529 | IP67                     | IP67                     | IP67                     | IP67                    | IP67                     | IP67                     |
| Enclosure material                                    | Aluminium                | Stainless steel 1.4305   | Stainless steel 1.4305   | PA, red                 | Al/CuZn39Pb3             | Stainless steel 1.4305   |
| Connection  | 3 x 0.75 mm <sup>2</sup> | 3 x 0.75 mm <sup>2</sup> | 3 x 0.75 mm <sup>2</sup> | 2 x 0.5 mm <sup>2</sup> | 4 x 0.75 mm <sup>2</sup> | 4 x 0.75 mm <sup>2</sup> |

Please refer to Accessories for magnets, mounting brackets, cable couplers and sensor tester.

| Ø 12 mm   |           | Ø 12 mm     |          | Ø 12 mm   |             | Ø 13 mm   |           |
|-----------|-----------|-------------|----------|-----------|-------------|-----------|-----------|
| 12 mm     | 12 mm     | 16 mm       | 18 mm    | 19 mm     | 19 mm       | 9 mm      | 20 mm     |
| Cable 1 m | Cable 1 m | Cable 4 m   | Cable 1m | Cable 1 m | Cable 1 m   | Cable 1 m | Cable 1 m |
| T-62 N/S  | T-62 N/S  | T-62 N/S    | T-62 N/S | T-69 N/S  | T-69 N/S    | T-62 N/S  | T-62 N/S  |
|           |           | Temperature |          |           | Temperature |           |           |



|                                   |                                   |                                    |                                   |                                   |                                    |                                   |                                   |
|-----------------------------------|-----------------------------------|------------------------------------|-----------------------------------|-----------------------------------|------------------------------------|-----------------------------------|-----------------------------------|
| <b>6316326426</b><br>MAK-2613-L-1 | <b>6315326425</b><br>MAK-2613-K-1 | <b>6410206399</b><br>MAA-0612-NT-4 | <b>6310406554</b><br>MAA-0614-P-1 | <b>6316306248</b><br>MAA-0613-L-1 | <b>6316306004</b><br>MAA-0613-LT-1 | <b>6310136616</b><br>MAK-3611-P-1 | <b>6310536617</b><br>MAK-3615-L-1 |
|-----------------------------------|-----------------------------------|------------------------------------|-----------------------------------|-----------------------------------|------------------------------------|-----------------------------------|-----------------------------------|

|       |       |       |        |       |       |        |       |
|-------|-------|-------|--------|-------|-------|--------|-------|
| 250 V | 250 V | 250 V | 250 V  | 250 V | 250 V | 250 V  | 250 V |
| 1 A   | 0.5 A | 1.5 A | 5 A    | 1 A   | 1 A   | 5 A    | 1 A   |
| 60 VA | 30 VA | 50 VA | 250 VA | 60 VA | 60 VA | 250 VA | 60 VA |

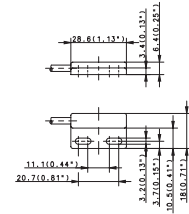
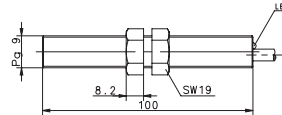
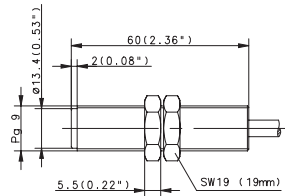
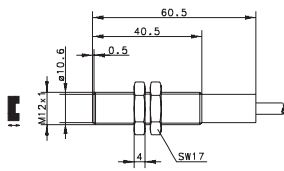
|                         |                         |                          |                         |                          |                          |                          |                          |
|-------------------------|-------------------------|--------------------------|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| -5°C/+70°C              | -5°C/+70°C              | -40°C/+150°C             | -5°C/+70°C              | -5°C/+70°C               | -40°C/+150°C             | -5°C/+70°C               | -5°C/+70°C               |
| IP67                    | IP67                    | IP67                     | IP67                    | IP67                     | IP67                     | IP67                     | IP67                     |
| PA, red                 | PA, red                 | Al/CuZn39Pb3             | Al/CuZn39Pb3            | Al/CuZn39Pb3             | Al/CuZn39Pb3             | PA, black                | PA, black                |
| 3 x 0.5 mm <sup>2</sup> | 3 x 0.5 mm <sup>2</sup> | 3 x 0.75 mm <sup>2</sup> | 3 x 0.5 mm <sup>2</sup> | 4 x 0.75 mm <sup>2</sup> | 4 x 0.75 mm <sup>2</sup> | 2 x 0.75 mm <sup>2</sup> | 3 x 0.75 mm <sup>2</sup> |

You will find detailed data sheets to the products under [www.bernstein.eu](http://www.bernstein.eu)





| M12       |           | PG9       |           | PG9       |           | 28.6x18x6.4mm |  |
|-----------|-----------|-----------|-----------|-----------|-----------|---------------|--|
| 18 mm     | 22 mm     | 17 mm     | 20 mm     | 20 mm     | 8 mm      | 8 mm          |  |
| Cable 2 m | Cable 2 m | Cable 2 m | Cable 2 m | Cable 2 m | Cable 1 m | Cable 1.5 m   |  |
| T-62 N/S  | T-62 N/S  | T-62 N/S  | T-62 N/S  | D         | TK-11-11  | TK-11-11      |  |



|                                 |                                   |                                   |                                     |                                 |                                   |
|---------------------------------|-----------------------------------|-----------------------------------|-------------------------------------|---------------------------------|-----------------------------------|
| <b>6310118626</b><br>MAM-1811-2 | <b>6410433350</b><br>MAK-3314-P-2 | <b>6316343544</b><br>MAM-4313-L-2 | <b>6310431569</b><br>MAM-3114-2-LED | <b>6310311615</b><br>MAK-1113-1 | <b>6410311368</b><br>MAK-1113-1,5 |
|---------------------------------|-----------------------------------|-----------------------------------|-------------------------------------|---------------------------------|-----------------------------------|

|              |        |       |        |        |        |
|--------------|--------|-------|--------|--------|--------|
| 175 V        | 250 V  | 250 V | 250 V  | 130 V  | 130 V  |
| 0.25 A       | 1.5 A  | 1 A   | 1 A    | 0.25 A | 0.25 A |
| 5 VA         | 250 VA | 60 VA | 120 VA | 3 VA   | 3 VA   |
| 50 g (11 ms) |        |       |        |        |        |

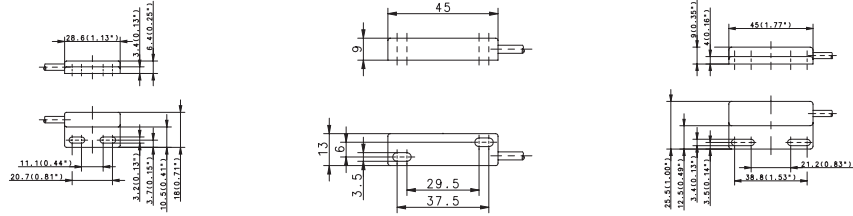
|                          |                         |                         |                         |                          |                          |
|--------------------------|-------------------------|-------------------------|-------------------------|--------------------------|--------------------------|
| -5°C/+70°C               | -25°C/+70°C             | -5°C/+80°C              | -5°C/+80°C              | -5°C/+70°C               | -20°C/+70°C              |
| IP67                     | IP67                    | IP65                    | IP65                    | IP67                     | IP67                     |
| CuZn39Pb3                | PA, red                 | CuZn39Pb3               | CuZn39Pb3               | PA, black                | PA                       |
| 2 x 0.34 mm <sup>2</sup> | 2 x 0.5 mm <sup>2</sup> | 3 x 0.5 mm <sup>2</sup> | 2 x 0.5 mm <sup>2</sup> | 3 x 0.14 mm <sup>2</sup> | 3 x 0.14 mm <sup>2</sup> |

You will find detailed data sheets to the products under [www.bernstein.eu](http://www.bernstein.eu)



# Magnetic Switches (Type 28.6 x 18, 45 x 13, 45 x 25.5, 68 x 30, 80 x 20)

| Type                             | 28.6x18x6.4mm |           | 45x13x9mm |  | 45x25.5x9mm |           |
|----------------------------------|---------------|-----------|-----------|--|-------------|-----------|
| Nominal switching distance (San) | 10 mm         | 25 mm     | 10 mm     |  | 5 mm        | 10 mm     |
| Type of connection               | Cable 1 m     | Cable 5 m | Cable 2 m |  | Cable 1 m   | Cable 1 m |
| Reference magnet (Page)          | TK-11-11      | T-67 N/S  | TK-11-01  |  | TK-45       | TK-45     |
| Special feature                  |               |           |           |  |             |           |



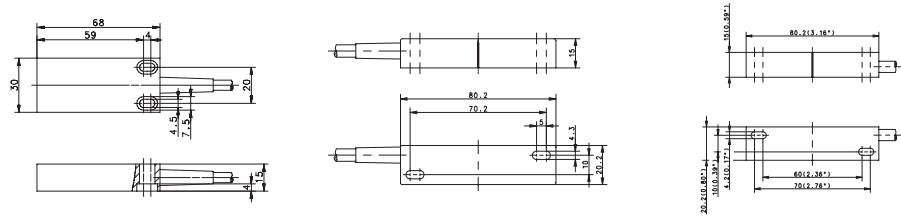
|                    |                    |                   |                   |                   |
|--------------------|--------------------|-------------------|-------------------|-------------------|
| Switching function | NO contact         | <b>6311211541</b> | <b>6311201095</b> | <b>6311245539</b> |
|                    | Type               | MAK-1112-B-1      | MAK-0112-B-2      | MAK-4512-B-1      |
| NC contact         | Type               |                   |                   |                   |
|                    | Changeover contact |                   |                   |                   |
| Type               |                    | <b>6311411603</b> |                   |                   |
|                    | Bistable           | MAK-1114-B-5      |                   |                   |
| Type               |                    |                   |                   | <b>6316345540</b> |
|                    |                    |                   |                   | MAK-4513-L-1      |

| Technical data                  | 28.6x18x6.4mm |       | 45x13x9mm |  | 45x25.5x9mm |              |
|---------------------------------|---------------|-------|-----------|--|-------------|--------------|
| Max. switching voltage          | 250 V         | 250 V | 250 V     |  | 250 V       | 250 V        |
| Switching current (max)         | 0.5 A         | 0.5 A | 0.5 A     |  | 1 A         | 0.5 A        |
| Performance class (diagram No.) | 10 VA         | 10 VA | 10 VA     |  | 60 VA       | 10 VA        |
| Shock resistance                |               |       |           |  |             | 50 g (11 ms) |

| Mechanical data                                       | 28.6x18x6.4mm |  | 45x13x9mm   |  | 45x25.5x9mm              |  |
|---|---------------|--|-------------|--|--------------------------|--|
| Ambient temperature (min/max)                         | -5°C/+70°C    |  | -5°C/+70°C  |  | -5°C/+70°C               |  |
| Protection class in accordance with IEC 529, EN 60529 | IP67          |  | IP67        |  | IP67                     |  |
| Enclosure material                                    | PA, black     |  | PA, black   |  | PA                       |  |
| Connection  | 2 x 0.14 mm   |  | 2 x 0.14 mm |  | 2 x 0.34 mm <sup>2</sup> |  |

Please refer to Accessories for magnets, mounting brackets, cable couplers and sensor tester.

| Type                             | 68x30x15mm |  | 80x20x15mm |           | 80x20x15mm  |           |
|----------------------------------|------------|--|------------|-----------|-------------|-----------|
| Nominal switching distance (San) | 8 mm       |  | 18 mm      | 18 mm     | 20 mm       | 10 mm     |
| Type of connection               | Cable 1 m  |  | Cable 1 m  | Cable 1 m | Cable 3 m   | Cable 3 m |
| Reference magnet (Page)          | T-62 N/S   |  | TK-21-02   | TK-21-02  | T-62 N/S    | T-67      |
| Special feature                  |            |  |            |           | Temperature |           |



|                    |                    |                   |                   |                   |                   |                   |
|--------------------|--------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| Switching function | NO contact         | <b>6316313004</b> | <b>6315302309</b> | <b>6315312196</b> | <b>6314402566</b> | <b>6419402397</b> |
|                    | Type               | MAK-1313-L-1      | MAK-0213-K-1      | MAK-1213-K-1      | MAA-0214-FT-3     | MAK-0214-P-3      |
| NC contact         | Type               |                   |                   |                   |                   |                   |
|                    | Changeover contact |                   |                   |                   |                   |                   |
| Type               |                    |                   |                   |                   |                   |                   |
|                    | Bistable           |                   |                   |                   |                   |                   |

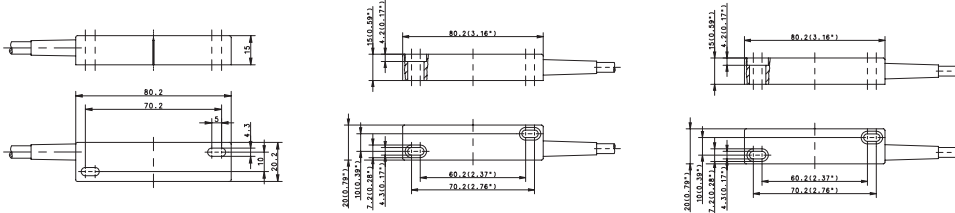
| Technical data                  | 68x30x15mm |  | 80x20x15mm |       | 80x20x15mm |              |
|---------------------------------|------------|--|------------|-------|------------|--------------|
| Max. switching voltage          | 250 V      |  | 250 V      | 250 V | 250 V      | 250 V        |
| Switching current (max)         | 1 A        |  | 0.5 A      | 0.5 A | 3 A        | 5 A          |
| Performance class (diagram No.) | 60 VA      |  | 30 VA      | 30 VA | 100 VA     | 250 VA       |
| Shock resistance                |            |  |            |       |            | 10 g (11 ms) |

| Mechanical data                                       | 68x30x15mm              |  | 80x20x15mm               |                          | 80x20x15mm               |                         |
|---|-------------------------|--|--------------------------|--------------------------|--------------------------|-------------------------|
| Ambient temperature (min/max)                         | -5°C/+70°C              |  | -5°C/+70°C               | -5°C/+70°C               | -40°C/+150°C             | -25°C/+70°C             |
| Protection class in accordance with IEC 529, EN 60529 | IP67                    |  | IP67                     | IP67                     | IP67                     | IP67                    |
| Enclosure material                                    | PC, red                 |  | PA, black                | PA, red                  | GDAISI12, red            | PA, black               |
| Connection  | 3 x 0.5 mm <sup>2</sup> |  | 3 x 0.75 mm <sup>2</sup> | 3 x 0.75 mm <sup>2</sup> | 3 x 0.75 mm <sup>2</sup> | 2 x 0.5 mm <sup>2</sup> |

Please refer to Accessories for magnets, mounting brackets, cable couplers and sensor tester.



| 80x20x15 mm |           | 80x20x15 mm |           | 80x20x15 mm |           |
|-------------|-----------|-------------|-----------|-------------|-----------|
| 21 mm       | 21 mm     | 21 mm       | 24 mm     | 24 mm       | 25 mm     |
| Cable 1 m   | Cable 1 m | Cable 1 m   | Cable 1 m | Cable 1 m   | Cable 1 m |
| TK-21-02    | TK-21-02  | TK-21-12    | TA-21-02  | TK-21-12    | T-62 N/S  |



|                                   |                                   |                                   |                                   |                                   |                                   |
|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|
| <b>6312202316</b><br>MAK-0212-L-1 | <b>6314202204</b><br>MAK-0212-F-1 | <b>6314212217</b><br>MAK-1212-F-1 | <b>6316302206</b><br>MAK-0213-L-1 | <b>6316312220</b><br>MAK-1213-L-1 | <b>6410412143</b><br>MAK-1214-L-2 |
|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|

|       |        |        |       |       |       |
|-------|--------|--------|-------|-------|-------|
| 250 V | 250 V  | 250 V  | 250 V | 250 V | 250 V |
| 0.5 A | 3 A    | 3 A    | 1 A   | 1 A   | 1 A   |
| 30 VA | 100 VA | 100 VA | 60 VA | 60 VA | 60 VA |

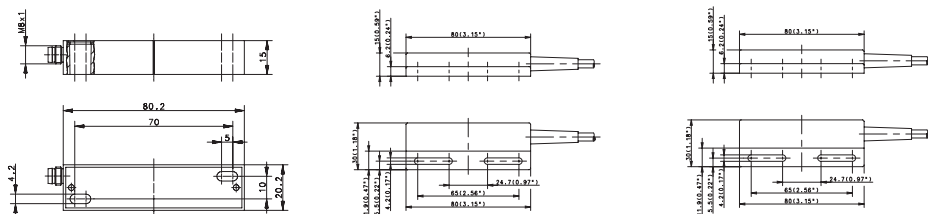
|                          |                          |                         |                         |                         |                         |
|--------------------------|--------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| -5°C/+70°C               | -5°C/+70°C               | -5°C/+70°C              | -5°C/+70°C              | -5°C/+70°C              | -5°C/+70°C              |
| IP67                     | IP67                     | IP67                    | IP67                    | IP67                    | IP67                    |
| PA, black                | PA, black                | PA, red                 | PA, black               | PA, red                 | PA, red                 |
| 2 x 0.75 mm <sup>2</sup> | 2 x 0.75 mm <sup>2</sup> | 2 x 0.5 mm <sup>2</sup> | 3 x 0.5 mm <sup>2</sup> | 3 x 0.5 mm <sup>2</sup> | 2 x 0.5 mm <sup>2</sup> |

You will find detailed data sheets to the products under [www.bernstein.eu](http://www.bernstein.eu)



# Magnetic Switches (Type 80 x 20 mm, 80 x 30 mm, 85 x 24 mm, 88 x 25 mm, 100 x 58 mm)

| Type                             | 80x20x15 mm    |             | 80x30x15 mm |           | 80x30x15 mm |           |
|----------------------------------|----------------|-------------|-------------|-----------|-------------|-----------|
| Nominal switching distance (San) | 25 mm          | 30 mm       | 8 mm        | 19 mm     | 20 mm       | 22 mm     |
| Type of connection               | Connector M8   | Cable 1 m   | Cable 1 m   | Cable 1 m | Cable 1 m   | Cable 1 m |
| Reference magnet (Page)          | Ø 10 x 50 Neod | TA-21-02    | TK-44       | TK-44     | T-62 N/S    | TK-44     |
| Special feature                  |                | Temperature |             |           |             |           |



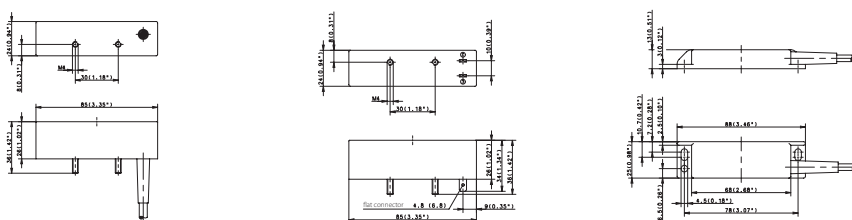
| Switching function      | 80x20x15 mm                |                             | 80x30x15 mm                |  | 80x30x15 mm                |  |
|-------------------------|----------------------------|-----------------------------|----------------------------|--|----------------------------|--|
|                         | NO contact Type            |                             |                            |  | 6314244536<br>MAK-4412-F-1 |  |
| NC contact Type         |                            |                             | 6314144542<br>MAK-4411-F-1 |  |                            |  |
| Changeover contact Type | 6310302636<br>MAA-0213-STK | 6316302389<br>MAA-0213-LT-1 |                            |  | 6317344538<br>MAK-4413-M-1 |  |
| Bistable Type           |                            |                             |                            |  | 6310444537<br>MAK-4414-P-1 |  |

| Technical data                  | 80x20x15 mm |              | 80x30x15 mm |        | 80x30x15 mm |       |
|---------------------------------|-------------|--------------|-------------|--------|-------------|-------|
| Max. switching voltage          | 60 V        | 250 V        | 250 V       | 250 V  | 250 V       | 250 V |
| Switching current (max)         | 1 A         | 1 A          | 3 A         | 3 A    | 5 A         | 1 A   |
| Performance class (diagram No.) | 3 VA        | 60 VA        | 100 VA      | 100 VA | 250 VA      | 80 VA |
| Shock resistance                |             | 10 g (11 ms) |             |        |             |       |

| Mechanical data                                       | 80x20x15 mm    |                          | 80x30x15 mm             |                         | 80x30x15 mm             |                         |
|---|----------------|--------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| Ambient temperature (min/max)                         | -30°C/+80°C    | -40°C/+150°C             | -5°C/+70°C              | -5°C/+70°C              | -5°C/+70°C              | -5°C/+70°C              |
| Protection class in accordance with IEC 529, EN 60529 | IP65           | IP67                     | IP67                    | IP67                    | IP67                    | IP67                    |
| Enclosure material                                    | GDAISi 12, red | GDAISi12, red            | PA, black               | PA, black               | PA, black               | PA                      |
| Connection  | M8 x 1         | 4 x 0.75 mm <sup>2</sup> | 2 x 0.5 mm <sup>2</sup> | 2 x 0.5 mm <sup>2</sup> | 2 x 0.5 mm <sup>2</sup> | 3 x 0.5 mm <sup>2</sup> |

Please refer to Accessories for magnets, mounting brackets, cable couplers and sensor tester.

| Type                             | 85x24x26 mm |           | 85x24x26 mm |  | 88x25x13 mm |           |
|----------------------------------|-------------|-----------|-------------|--|-------------|-----------|
| Nominal switching distance (San) | 15 mm       | 24 mm     | 24 mm       |  | 22 mm       | 25 mm     |
| Type of connection               | Cable 3 m   | Cable 1 m | Flat plug   |  | Cable 1 m   | Cable 1 m |
| Reference magnet (Page)          | T-67 N/S    | T-69 N/S  | T-69 N/S    |  | TK-42       | TK-42     |
| Special feature                  |             |           | K4.8        |  |             |           |



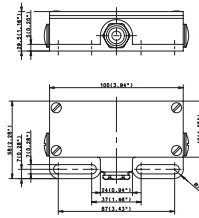
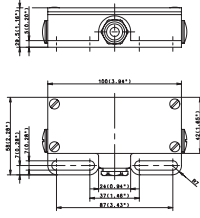
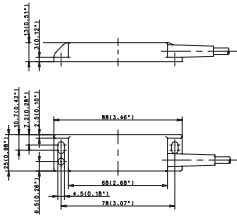
| Switching function      | 85x24x26 mm                |                            | 85x24x26 mm                     |  | 88x25x13 mm                |                            |
|-------------------------|----------------------------|----------------------------|---------------------------------|--|----------------------------|----------------------------|
|                         | NO contact Type            |                            |                                 |  |                            | 6314242533<br>MAK-4212-F-1 |
| NC contact Type         |                            |                            |                                 |  |                            |                            |
| Changeover contact Type |                            |                            |                                 |  | 6317342535<br>MAK-4213-M-1 |                            |
| Bistable Type           | 6314432609<br>MAK-3214-F-3 | 6310432598<br>MAK-3214-P-1 | 6310432590<br>MAK-3214-P-STK4.8 |  |                            |                            |

| Technical data                  | 85x24x26 mm |        | 85x24x26 mm |  | 88x25x13 mm |        |
|---------------------------------|-------------|--------|-------------|--|-------------|--------|
| Max. switching voltage          | 250 V       | 250 V  | 250 V       |  | 250 V       | 250 V  |
| Switching current (max)         | 3 A         | 5 A    | 5 A         |  | 1 A         | 3 A    |
| Performance class (diagram No.) | 100 VA      | 250 VA | 250 VA      |  | 80 VA       | 100 VA |
| Shock resistance                |             |        |             |  |             |        |

| Mechanical data                                       | 85x24x26 mm             |                          | 85x24x26 mm |  | 88x25x13 mm             |                         |
|---|-------------------------|--------------------------|-------------|--|-------------------------|-------------------------|
| Ambient temperature (min/max)                         | -25°C/+70°C             | -5°C/+70°C               | -20°C/+70°C |  | -5°C/+70°C              | -5°C/+70°C              |
| Protection class in accordance with IEC 529, EN 60529 | IP67                    | IP67                     | IP67        |  | IP67                    | IP67                    |
| Enclosure material                                    | PBT                     | PA, black                | PBT, black  |  | PA, black               | PA, black               |
| Connection  | 2 x 0.5 mm <sup>2</sup> | 2 x 0.75 mm <sup>2</sup> | 4.8 mm      |  | 3 x 0.5 mm <sup>2</sup> | 2 x 0.5 mm <sup>2</sup> |

Please refer to Accessories for magnets, mounting brackets, cable couplers and sensor tester.

| 88x25x13 mm |           | 100x58x29.5    |                | 100x58x29.5    |  |
|-------------|-----------|----------------|----------------|----------------|--|
| 25 mm       | 25 mm     | 10 mm          | 10 mm          | 15 mm          |  |
| Cable 1 m   | Cable 3 m | Screw terminal | Screw terminal | Screw terminal |  |
| T-69 N/S    | T-69 N/S  | TA-31          | TA-31          | T-62 N/S       |  |



|                                   |                                   |                                 |                                 |                                 |  |
|-----------------------------------|-----------------------------------|---------------------------------|---------------------------------|---------------------------------|--|
|                                   |                                   |                                 | <b>6314203232</b><br>MAA-0312-F |                                 |  |
| <b>6310442534</b><br>MAK-4214-P-1 | <b>6310442622</b><br>MAK-4214-P-3 | <b>6317303312</b><br>MAA-0313-M |                                 | <b>6319403532</b><br>MAA-0314-P |  |

|        |        |       |        |        |
|--------|--------|-------|--------|--------|
| 250 V  | 250 V  | 250 V | 250 V  | 250 V  |
| 5 A    | 5 A    | 1 A   | 3 A    | 5 A    |
| 250 VA | 250 VA | 80 VA | 100 VA | 250 VA |

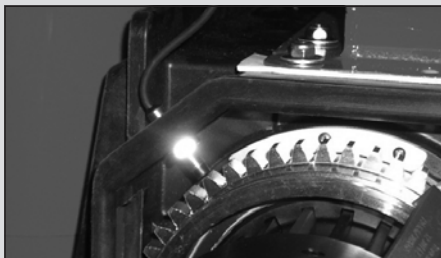
|                         |                         |                          |                          |                          |
|-------------------------|-------------------------|--------------------------|--------------------------|--------------------------|
| -5°C/+70°C              | -5°C/+70°C              | -5°C/+70°C               | -25°C/+70°C              | -25°C/+70°C              |
| IP67                    | IP67                    | IP67                     | IP65                     | IP65                     |
| PA, black               | PA, black               | Aluminium                | Aluminium                | Aluminium                |
| 2 x 0.5 mm <sup>2</sup> | 2 x 0.5 mm <sup>2</sup> | max. 1.5 mm <sup>2</sup> | max. 1.5 mm <sup>2</sup> | max. 1.5 mm <sup>2</sup> |

You will find detailed data sheets to the products under [www.bernstein.eu](http://www.bernstein.eu)



# Electronic Magnetic Sensors

Thanks to their special properties, electronic magnetic switches with magnetoresistive or Hall elements are ideal for use in many different applications. They are used to detect position, angle and / or speed and are immune to shock, impact, vibration and wear. High switching frequencies, long switching distances, a broad temperature range and excellent reproducibility are other advantageous features of this technology which in many cases make them the technically superior alternative to electromechanical reed contacts.



The fact that many non-magnetic metals allow magnetic fields to pass unhindered also extends the fields of application for magnetic sensors. This makes it possible to encapsulate sensors in a sturdy pressure-proof metal enclosure. Sensors can, however, also be mounted in tubing or concealed behind non-magnetic metal surfaces.

### Advantages of electronic magnetic sensors over electromechanical reed contacts

- Reliable and immune to vibration
- Bounce-free switching
- Unlimited service life
- High repeat accuracy
- Short response times
- High sensitivity
- Thermal stability

Select the sensor and the technical principle that best meet your requirements from the comprehensive BERNSTEIN range of magnetic sensors: Hall sensors with minimum circuitry, standard Hall sensors with integrated sensor electronics or magnetoresistive sensors. Round, square or metric bodies in plastic, brass, brass / plastic or stainless enclosures.

### Fundamentals of Hall sensor technology

The BERNSTEIN range of magnetic sensors is based on a modular system comprising an encapsulated Hall element with the EMC protective circuitry. These sensors therefore conform to the requirements of EN-60947-5-2 for non-mechanical magnetic proximity switches. Sensors of various designs are available for a wide variety of applications.



- Output circuitry NPN, NO contact or bistable
- Voltage range 4.5 – 24 V DC
- Polarity reversal protected
- Switching frequencies up to 20 kHz
- Size ranging from 6 mm diameter to 50 x 25 x 10 mm
- Unipolar version

### Standard range of Hall sensors

In contrast to the more basic BERNSTEIN Hall sensors, the functionality and modularity have been enhanced in these Hall sensors by integrating comprehensive sensor electronics. In this segment BERNSTEIN also offers a complete modular system that can be adapted to suit your specific needs.

- Output circuitry PNP, NC or NO contact or bistable
- Voltage range 10 – 39 V DC
- Output current 400 mA, short-circuit proof
- Polarity reversal protected
- Switching frequencies up to 10 kHz
- Size ranging from M10 diameter to 50 x 25 x 10 mm
- Unipolar version

### Single-channel speed sensors with high frequency range

BERNSTEIN offers a high performance series of gearwheel sensors designed as electronic magnetic sensors with Hall elements that detect the rotation of near-engine ferromagnetic gearwheels with sensing distances of up to 2 mm. A specific feature of these single-channel speed sensors is their high switching frequency. Based on the BERNSTEIN modular range of magnetic sensors, switching frequencies of up to 20 kHz can be realised. Switching frequencies up to 10 kHz can be achieved in the standard range. The sensors are available in M12 and M18 versions. The characteristic versatility of Hall sensors is fully utilised in these applications:

Outstanding immunity to shock, impact, vibration, non-wearing and silent, high switching frequencies, broad temperature range, exceptional repeat accuracy.

### Technical data

- Output circuitry PNP or NPN
- Voltage range 10 – 36 V DC
- Switching frequencies up to 20 kHz
- Sensing distance 0 – 2 mm on ferromagnetic material

### Standard range of magnetoresistive sensors

Magnetoresistive sensors are more sensitive than Hall-effect sensors by a factor of 10. Not only can they be very small but they can also detect especially low field strengths.

In addition to their high measuring accuracy even at high ambient temperatures, these sensors are also characterised by a high degree of reliability and by the fact that they occupy little space. Since they are designed to be independent of polarity, the countermagnet does not need to be mounted with pole orientation. With corresponding encapsulation, BERNSTEIN magnetoresistive sensors have proven effective even in demanding environments such as lift construction or agricultural technology.

- Output circuitry PNP, NC or NO contact
- High sensitivity (up to sensing distance of 60 mm)
- Voltage range 10 – 39 V DC/10 – 30 V DC
- Output current 400 mA/200 mA, short-circuit proof
- Polarity reversal protected
- Polarity independent
- Size 6 mm diameter to M18

### Microsensors

Ever more complex and above all more compact measuring and control configurations require components that occupy even less space. In line with this trend, BERNSTEIN has expanded its comprehensive range of sensors for determining position, angle and / or speed in industrial applications in two branches of development: Compared to the previous smallest model (RD = 6 mm), the diameter in this series of magnetoresistive sensors has been further reduced by 30 % yet the smallest model RD = 4 mm or 5 x 5 mm still achieves the parameters of the larger sensors. As part of the second development stage, the basic and standard range of electronic magnetic sensors has been expanded to include the latch functionality (bistable switching characteristic) which utilises the magnetic field only for the corresponding switching operation. As a result, this functionality has been added to a wide range of enclosure variants in the current modular range.

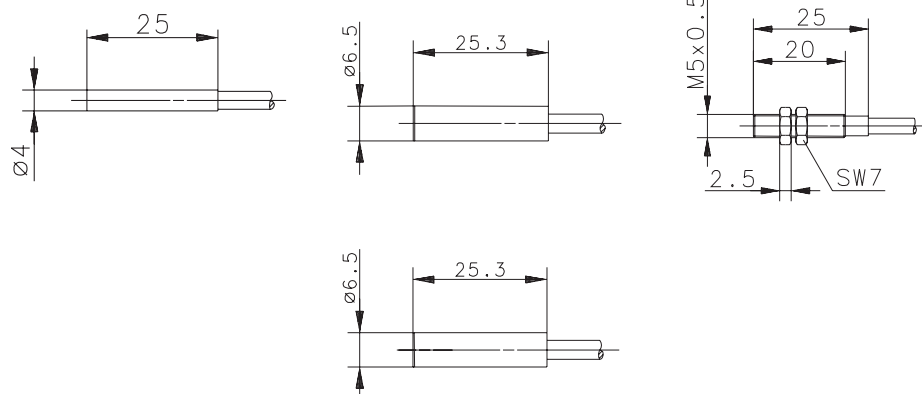
### Sensing distances of electronic magnetic sensors

Since the sensing distances of magnetic sensors are influenced by the combination of sensor and magnet, it is appropriate to consider them as a complete system. The overview below shows the expected sensing distances (Sn) when using different magnets from the BERNSTEIN range.

| Magnet | Size    | Article number    | Sn of Hall sensors | Sn of magneto-resistive sensors |
|--------|---------|-------------------|--------------------|---------------------------------|
| T 75   | Ø 5 mm  | <b>6301175057</b> | 5 mm               | 10 mm                           |
| T 06   | Ø 6 mm  | <b>6301106065</b> | 5 mm               | 15 mm                           |
| T 61   | Ø 20 mm | <b>6301261035</b> | 10 mm              | 35 mm                           |
| T 62   | Ø 23 mm | <b>6301262039</b> | 17 mm              | 45 mm                           |
| T 67   | Ø 20 mm | <b>6301167054</b> | 15 mm              | 40 mm                           |
| T 69   | Ø 31 mm | <b>6301269031</b> | 20 mm              | 60 mm                           |

## Electronic Magnetic Sensors (Type D04, D06, M05, M08, M10, M12)

| Type                               | D04       | D06       |           | M05       |
|------------------------------------|-----------|-----------|-----------|-----------|
| Operating mode                     | MR        | Hall      | MR        | MR        |
| Magnetic sensitivity (mT)          | 3 mT      | 10 mT     | 2 mT      | 3 mT      |
| Sensing distance (S <sub>n</sub> ) | 30 mm     | 17 mm     | 45 mm     | 30 mm     |
| Reference magnet (Page)            | T-62 N/S  | T-62 N/S  | T-62 N/S  | T-62 N/S  |
| Type of connection                 | Cable 2 m | Cable 2 m | Cable 2 m | Cable 2 m |
| Special feature                    |           |           |           |           |



| PNP      | NO contact<br>Type<br>NC contact<br>Type<br>Bistable<br>Type | 6373299132 | MEN-D04PS/M03-K2 | 6373270105   | MEN-D06PS/M02-K2 | 6373299133 | MEM-M05PS/M03-K2 |
|----------|--|------------|------------------|--|------------------|------------|------------------|
| NPN      | NO contact<br>Type<br>NC contact<br>Bistable<br>Type         |            |                  | 6362670001<br>MEN-D06NS/H10-K2<br><br>6363870032<br>MEN-D06NB/H11-K2 |                  |            |                  |
| Analogue | Current output<br>Voltage output                             |            |                  |  |                  |            |                  |

### Technical data

|                                      |                |                 |                 |           |                 |
|--------------------------------------|----------------|-----------------|-----------------|-----------|-----------------|
| Rated operating voltage              | U <sub>B</sub> | 4.5–30 VDC      | 4.5–24 VDC      | 10–30 VDC | 4.5–30 VDC      |
| Rated operating current              | I <sub>e</sub> | 200 mA          | 25 mA           | 200 mA    | 200 mA          |
| Max. switching voltage               | F              | 10 kHz          | 20 kHz          | 1500 Hz   | 10 kHz          |
| Function/operating voltage indicator |                | –/–             | –/–             | –/–       | –/–             |
| Sensitivity adjustable               |                |                 |                 |           |                 |
| Short circuit-protection             |                | Current limiter | Current limiter | Cyclic    | Current limiter |
| Teachable                            |                |                 |                 |           |                 |

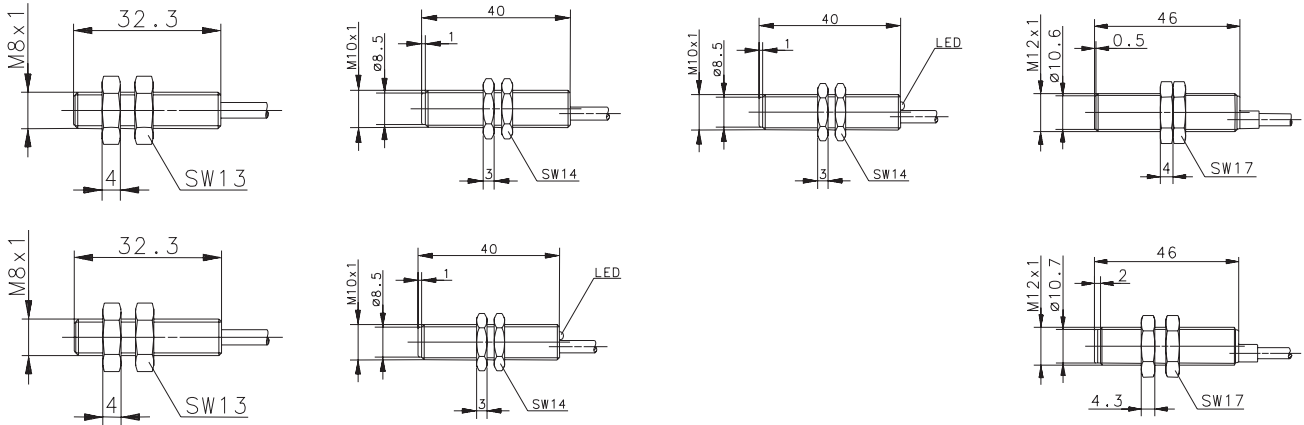
### Mechanical data

|   |  |                          |                          |                          |                          |
|---|--|--------------------------|--------------------------|--------------------------|--------------------------|
| Ambient temperature (min/max)                         |  | –20°C/+70°C              | –25°C/+70°C              | –25°C/+70°C              | –20°C/+70°C              |
| Protection class in accordance with IEC 529, EN 60529 |  | IP67                     | IP67                     | IP67                     | IP67                     |
| Enclosure material                                    |  | Stainless steel 1.4401   | Stainless steel 1.4401   | Stainless steel 1.4401   | CuZn39Pb3                |
| Connection  |  | 3 x 0.14 mm <sup>2</sup> | 3 x 0.14 mm <sup>2</sup> | 3 x 0.14 mm <sup>2</sup> | 3 x 0.14 mm <sup>2</sup> |

Please refer to Accessories for magnets, mounting brackets, cable couplers and sensor tester.



| M08       |           | M10       |           | M10       |  | M12       |           |
|-----------|-----------|-----------|-----------|-----------|--|-----------|-----------|
| Hall      | MR        | Hall      | Hall      | MR        |  | Hall      | Hall      |
| 10 mT     | 2 mT      | 10 mT     | 10 mT     | 1 mT      |  | 10 mT     | 10 mT     |
| 17 mm     | 45 mm     | 17 mm     | 17 mm     | 45 mm     |  | 17 mm     | 17 mm     |
| T-62 N/S  | T-62 N/S  | T-62 N/S  | T-62 N/S  | T-62 N/S  |  | T-62 N/S  | T-62 N/S  |
| Cable 2 m | Cable 2 m | Cable 2 m | Cable 2 m | Cable 2 m |  | Cable 2 m | Cable 2 m |
|           |           |           | All-metal | All-metal |  |           |           |

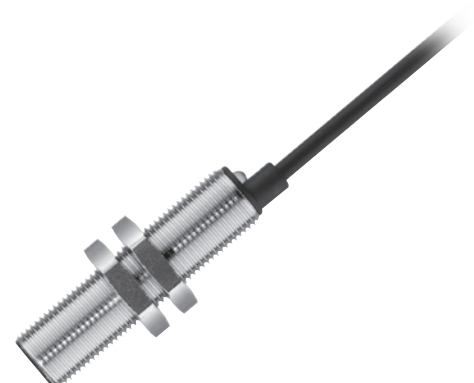


|                                       |                                       |                                       |  |  |  |                                       |                                       |
|---------------------------------------|---------------------------------------|---------------------------------------|--|--|--|---------------------------------------|---------------------------------------|
|                                       | <b>6373260107</b><br>MEM-M08PS/M02-K2 |                                       | <b>6372261085</b><br>MEM-M10PS/H10-KL2<br><b>6372161086</b><br>MEM-M10PÖ/H10-KL2<br><b>6373461124</b><br>MEM-M10PB/H11-KL2 | <b>6373261087</b><br>MEM-M10PS/M01-KL2<br><b>6373161088</b><br>MEM-M10PÖ/M01-KL2 |  |                                       |                                       |
| <b>6362660002</b><br>MEM-M08NS/H10-K2 |                                       | <b>6362661003</b><br>MEM-M10NS/H10-K2 |  |  |  | <b>6362662004</b><br>MEM-M12NS/H10-K2 | <b>6362662005</b><br>MEK-M12NS/H10-K2 |
| <b>6363860033</b><br>MEM-M08NB/H11-K2 |                                       | <b>6363861034</b><br>MEM-M10NB/H11-K2 |  |  |  | <b>6363862035</b><br>MEM-M12NB/H11-K2 | <b>6363862036</b><br>MEK-M12NB/H11-K2 |

|                 |         |                 |         |         |                 |                 |
|-----------------|---------|-----------------|---------|---------|-----------------|-----------------|
| 4.5–24 V        | 10–30 V | 4.5–24 V        | 10–39 V | 10–39 V | 4.5–24 V        | 4.5–24 V        |
| 25 mA           | 200 mA  | 25 mA           | 400 mA  | 400 mA  | 25 mA           | 25 mA           |
| 20 kHz          | 1500 Hz | 20 kHz          | 10 kHz  | 10 kHz  | 20 kHz          | 20 kHz          |
| -/-             | -/-     | -/-             | LED/-   | LED/-   | -/-             | -/-             |
| Current limiter | Cyclic  | Current limiter | Cyclic  | Cyclic  | Current limiter | Current limiter |

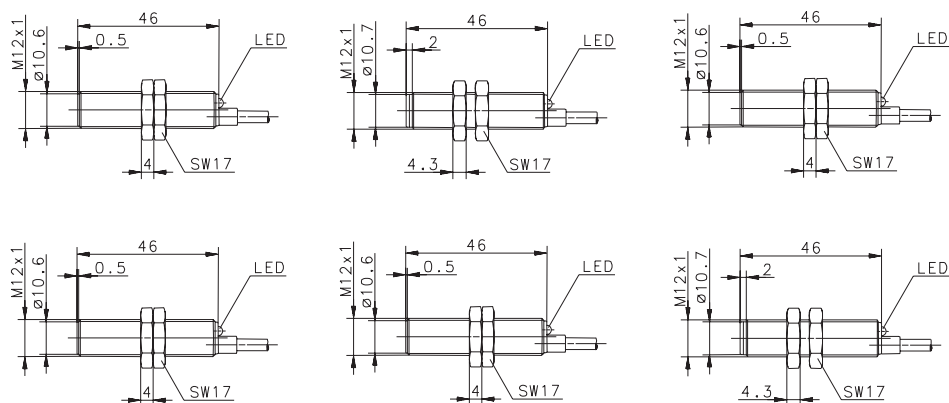
|                          |                          |                          |                          |                          |                          |                          |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| -25°C/+70°C              | -25°C/+70°C              | -25°C/+70°C              | -25°C/+70°C              | -25°C/+70°C              | -25°C/+70°C              | -25°C/+70°C              |
| IP67                     | IP67                     | IP67                     | IP67                     | IP67                     | IP67                     | IP67                     |
| CuZn39Pb3                | CuZn39Pb3                | CuZn39Pb3                | CuZn39Pb3                | CuZn39Pb3                | CuZn39Pb3                | PA                       |
| 3 x 0.14 mm <sup>2</sup> | 3 x 0.14 mm <sup>2</sup> | 3 x 0.14 mm <sup>2</sup> | 3 x 0.14 mm <sup>2</sup> | 3 x 0.14 mm <sup>2</sup> | 3 x 0.14 mm <sup>2</sup> | 3 x 0.14 mm <sup>2</sup> |

You will find detailed data sheets to the products under [www.bernstein.eu](http://www.bernstein.eu)



# Electronic Magnetic Sensors (Type M12, M18)

| Type                               | M12       |            | M12       |           | M12       |           |
|------------------------------------|-----------|------------|-----------|-----------|-----------|-----------|
| Operating mode                     | Hall      | Hall       | Hall      | MR        | MR        | MR        |
| Magnetic sensitivity (mT)          | 10 mT     | 10 mT      | 10 mT     | 1 mT      | 1 mT      | 1 mT      |
| Sensing distance (S <sub>n</sub> ) | 17 mm     | 17 mm      | 17 mm     | 45 mm     | 45 mm     | 45 mm     |
| Reference magnet (Page)            | T-62 N/S  | T-62 N/S   | T-62 N/S  | T-62 N/S  | T-62 N/S  | T-62 N/S  |
| Type of connection                 | Cable 2 m | Cable 10 m | Cable 2 m | Cable 2 m | Cable 5 m | Cable 2 m |
| Special feature                    |           |            |           |           |           |           |

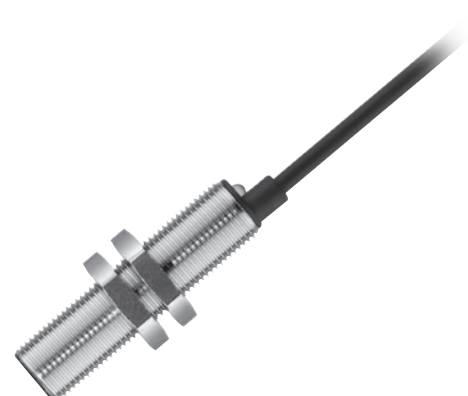


| PNP      | NO contact Type<br>NC contact Type<br>Bistable Type | 6372262090<br>MEM-M12PS/H10-KL2<br>6372162092<br>MEM-M12PÖ/H10-KL2<br>6373462126<br>MEM-M12PB/H11-KL2 | 6472262077<br>MEM-M12PS/H10-KL10 | 6372262089<br>MEK-M12PS/H10-KL2<br>6372162091<br>MEK-M12PÖ/H10-KL2<br>6373462125<br>MEK-M12PB/H11-KL2 | 6373262094<br>MEM-M12PS/M01-KL2<br>6373162096<br>MEM-M12PÖ/M01-KL2 | 6373262123<br>MEM-M12PS/M01-KL5 | 6373262093<br>MEK-M12PS/M01-KL2<br>6373162095<br>MEK-M12PÖ/M01-KL2 |
|----------|---|---|----------------------------------|---|--|---------------------------------|--|
| NPN      | NO contact Type<br>NC contact Type<br>Bistable Type |   |                                  |   |  |                                 |  |
| Analogue | Current output<br>Voltage output                    |   |                                  |   |  |                                 |  |

| Technical data                       |                |           |           |           |           |           |
|--------------------------------------|----------------|-----------|-----------|-----------|-----------|-----------|
| Rated operating voltage              | U <sub>B</sub> | 10–39 VDC | 10–39 VDC | 10–39 VDC | 10–39 VDC | 10–39 VDC |
| Rated operating current              | I <sub>e</sub> | 400 mA    | 400 mA    | 400 mA    | 400 mA    | 400 mA    |
| Max. switching voltage               | F              | 10 kHz    | 10 kHz    | 10 kHz    | 10 kHz    | 1500 Hz   |
| Function/operating voltage indicator |                | LED/-     | LED/-     | LED/-     | LED/-     | LED/-     |
| Sensitivity adjustable               |                |           |           |           |           |           |
| Short circuit-protection             |                | Cyclic    | Cyclic    | Cyclic    | Cyclic    | Cyclic    |
| Teachable                            |                |           |           |           |           |           |

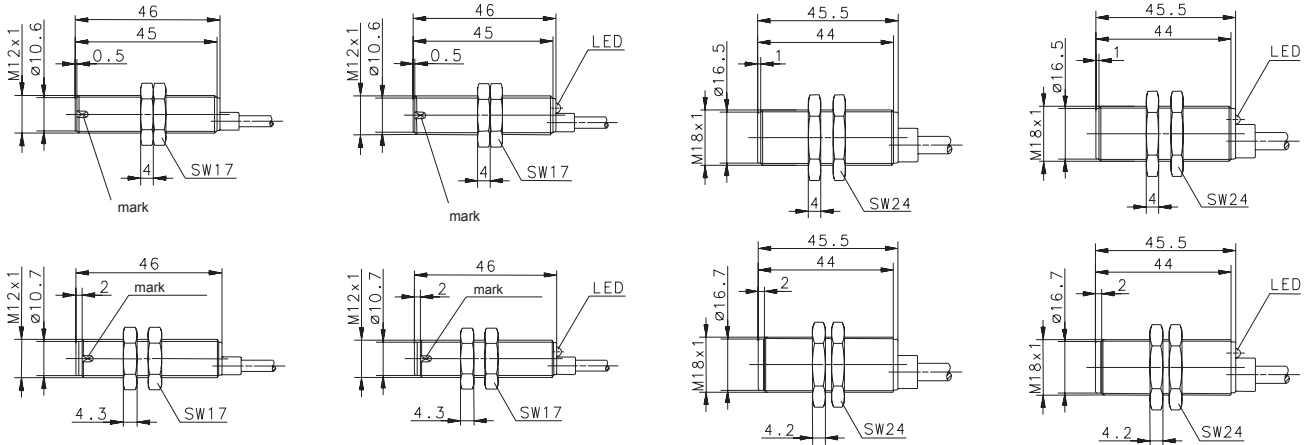
| Mechanical data                                       |  |                          |                          |                          |                          |                          |
|---|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Ambient temperature (min/max)                         |  | -25°C/+70°C              | -25°C/+70°C              | -25°C/+70°C              | -25°C/+70°C              | -25°C/+70°C              |
| Protection class in accordance with IEC 529, EN 60529 |  | IP67                     | IP67                     | IP67                     | IP67                     | IP67                     |
| Enclosure material                                    |  | CuZn39Pb3                | CuZn39Pb3                | PA                       | CuZn39Pb3                | PA                       |
| Connection  |  | 3 x 0.14 mm <sup>2</sup> | 3 x 0.14 mm <sup>2</sup> | 3 x 0.14 mm <sup>2</sup> | 3 x 0.14 mm <sup>2</sup> | 3 x 0.14 mm <sup>2</sup> |

Please refer to Accessories for magnets, mounting brackets, cable couplers and sensor tester.





| M12       |           | M12       |           | M18       |           | M18       |           |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Hall      | Hall      | Hall      | Hall      | Hall      | Hall      | Hall      | Hall      |
| -         | -         | -         | -         | 10 mT     | 10 mT     | 10 mT     | 10 mT     |
| 0-2 mm    | 0-2 mm    | 0-2 mm    | 0-2 mm    | 17 mm     | 17 mm     | 17 mm     | 17 mm     |
| -         | -         | -         | -         | T-62 N/S  | T-62 N/S  | T-62 N/S  | T-62 N/S  |
| Cable 2 m | Cable 2 m | Cable 2 m | Cable 2 m | Cable 2 m | Cable 2 m | Cable 2 m | Cable 2 m |
| Speed     | Speed     | Speed     | Speed     |           |           |           |           |

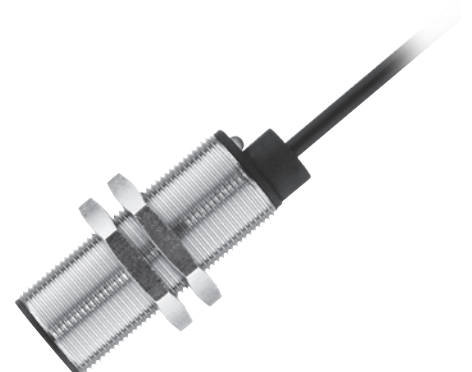


|                                     |                                     |                                      |                                      |                                       |                                       |  |  |
|-------------------------------------|-------------------------------------|--------------------------------------|--------------------------------------|---------------------------------------|---------------------------------------|--|--|
|                                     |                                     | <b>6379262120</b><br>MEM-M12PD/H-KL2 | <b>6379262119</b><br>MEK-M12PD/H-KL2 |                                       |                                       | <b>6372263098</b><br>MEM-M18PS/H10-KL2 | <b>6372263097</b><br>MEK-M18PS/H10-KL2 |
|                                     |                                     |                                      |                                      |                                       |                                       | <b>6372163100</b><br>MEM-M18PÖ/H10-KL2 | <b>6372163099</b><br>MEK-M18PÖ/H10-KL2 |
|                                     |                                     |                                      |                                      |                                       |                                       | <b>6373463128</b><br>MEM-M18PB/H11-KL2 | <b>6373463127</b><br>MEK-M18PB/H11-KL2 |
| <b>6369662028</b><br>MEM-M12ND/H-K2 | <b>6369662027</b><br>MEK-M12ND/H-K2 |                                      |                                      | <b>6362663006</b><br>MEM-M18NS/H10-K2 | <b>6362663007</b><br>MEK-M18NS/H10-K2 |  |  |
|                                     |                                     |                                      |                                      | <b>6363863037</b><br>MEM-M18NB/H11-K2 | <b>6363863038</b><br>MEK-M18NB/H11-K2 |  |  |

|         |         |         |         |                 |                 |         |         |
|---------|---------|---------|---------|-----------------|-----------------|---------|---------|
| 10-36 V | 10-36 V | 10-39 V | 10-39 V | 4.5-24 V        | 4.5-24 V        | 10-39 V | 10-39 V |
| < 20 mA | < 20 mA | 400 mA  | 400 mA  | 25 mA           | 25 mA           | 400 mA  | 400 mA  |
| 20 kHz  | 20 kHz  | 10 kHz  | 10 kHz  | 20 kHz          | 20 kHz          | 10 kHz  | 10 kHz  |
| -/-     | -/-     | LED/-   | LED/-   | -/-             | -/-             | LED/-   | LED/-   |
| Cyclic  | Cyclic  | Cyclic  | Cyclic  | Current limiter | Current limiter | Cyclic  | Cyclic  |

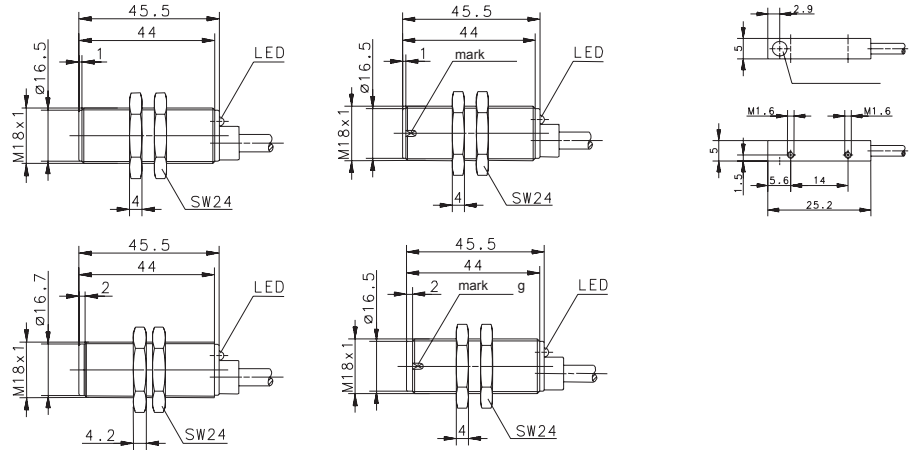
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|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| -25°C/+70°C              | -25°C/+70°C              | -25°C/+70°C              | -25°C/+70°C              | -25°C/+70°C              | -25°C/+70°C              | -25°C/+70°C              | -25°C/+70°C              |
| IP67                     | IP67                     | IP67                     | IP67                     | IP67                     | IP67                     | IP67                     | IP67                     |
| CuZn39Pb3                | PA, red                  | CuZn39Pb3                | PA, red                  | CuZn39Pb3                | PBT                      | CuZn39Pb3                | PBT                      |
| 3 x 0.14 mm <sup>2</sup> | 3 x 0.14 mm <sup>2</sup> | 3 x 0.14 mm <sup>2</sup> | 3 x 0.14 mm <sup>2</sup> | 3 x 0.14 mm <sup>2</sup> | 3 x 0.14 mm <sup>2</sup> | 3 x 0.14 mm <sup>2</sup> | 3 x 0.14 mm <sup>2</sup> |

You will find detailed data sheets to the products under [www.bernstein.eu](http://www.bernstein.eu)



# Electronic Magnetic Sensors (Type M18, Q05, Q08, Q12, E27, E29)

| Type                               | M18       |           | M18       |           | Q05       |
|------------------------------------|-----------|-----------|-----------|-----------|-----------|
| Operating mode                     | MR        | MR        | Hall      | Hall      | MR        |
| Magnetic sensitivity (mT)          | 1 mT      | 1 mT      | -         | -         | 3 mT      |
| Sensing distance (S <sub>n</sub> ) | 45 mm     | 45 mm     | 0 – 2 mm  | 0 – 2 mm  | 10 mm     |
| Reference magnet (Page)            | T-62 N/S  | T-62 N/S  | -         | -         | T-62 N/S  |
| Type of connection                 | Cable 2 m | Cable 2 m | Cable 2 m | Cable 2 m | Cable 2 m |
| Special feature                    |           |           | Speed     | Speed     |           |



| PNP        | NPN        | Analogue       | 6373263102        | 6373263101        | 6379263122      | 6379263121      | 6373299134       |
|------------|------------|----------------|-------------------|-------------------|-----------------|-----------------|------------------|
| NO contact | NO contact | Current output | MEM-M18PS/M01-KL2 | MEK-M18PS/M01-KL2 | MEM-M18PD/H-KL2 | MEK-M18PD/H-KL2 | MEM-Q05PS/M03-K2 |
| Type       | Type       | Voltage output |                   |                   |                 |                 |                  |
| NC contact | NC contact |                | 6373163104        | 6373163103        |                 |                 |                  |
| Type       | Type       |                | MEM-M18PÖ/M01-KL2 | MEK-M18PÖ/M01-KL2 |                 |                 |                  |
| Bistable   | Bistable   |                |                   |                   |                 |                 |                  |
| Type       | Type       |                |                   |                   |                 |                 |                  |

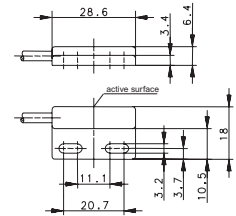
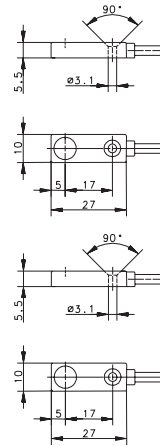
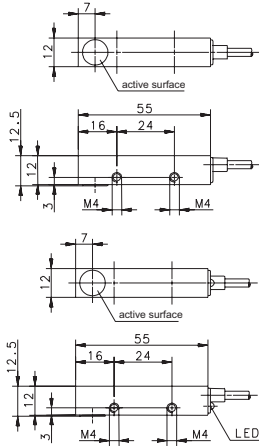
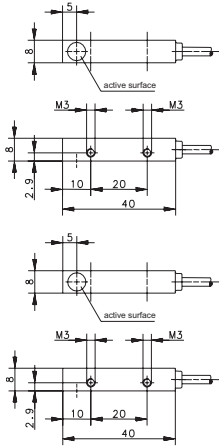
| Technical data                         | 6373263102 | 6373263101 | 6379263122 | 6379263121 | 6373299134      |
|--|------------|------------|------------|------------|-----------------|
| Rated operating voltage U <sub>B</sub> | 10–39 VDC  | 10–39 VDC  | 10–39 VDC  | 10–39 VDC  | 4.5–30 VDC      |
| Rated operating current I <sub>e</sub> | 400 mA     | 400 mA     | 400 mA     | 400 mA     | 200 mA          |
| Max. switching voltage F               | 10 kHz     | 10 kHz     | 10 kHz     | 10 kHz     | 10 kHz          |
| Function/operating voltage indicator   | LED/-      | LED/-      | LED/-      | LED/-      | -/-             |
| Sensitivity adjustable                 |            |            |            |            |                 |
| Short circuit-protection               | Cyclic     | Cyclic     | Cyclic     | Cyclic     | Current limiter |
| Teachable                              |            |            |            |            |                 |

| Mechanical data                                       | 6373263102               | 6373263101               | 6379263122               | 6379263121               | 6373299134               |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Ambient temperature (min/max)                         | -25°C/+70°C              | -25°C/+70°C              | -25°C/+70°C              | -25°C/+70°C              | -20°C/+70°C              |
| Protection class in accordance with IEC 529, EN 60529 | IP67                     | IP67                     | IP67                     | IP67                     | IP67                     |
| Enclosure material                                    | CuZn39Pb3                | PBT                      | CuZn39Pb3                | PBT, black               | CuZn39Pb3                |
| Connection  | 3 x 0.14 mm <sup>2</sup> | 3 x 0.14 mm <sup>2</sup> | 3 x 0.14 mm <sup>2</sup> | 3 x 0.14 mm <sup>2</sup> | 3 x 0.05 mm <sup>2</sup> |

Please refer to Accessories for magnets, mounting brackets, cable couplers and sensor tester.



| Q08       |           | Q12       |           | E27       |           | E29       |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Hall      | MR        | Hall      | Hall      | Hall      | Hall      | Hall      |
| 10 mT     | 2 mT      | 10 mT     | 10 mT     | 10 mT     | 2 mT      | 10 mT     |
| 17 mm     | 45 mm     | 17 mm     | 17 mm     | 17 mm     | 30 mm     | 17 mm     |
| T-62 N/S  | T-62 N/S  | T-62 N/S  | T-62 N/S  | T-62 N/S  | T-62 N/S  | T-62 N/S  |
| Cable 2 m | Cable 2 m | Cable 2 m | Cable 2 m | Cable 2 m | Cable 2 m | Cable 2 m |



|                                       |                                       |                                       |  |                                       |                                       |                                       |
|---------------------------------------|---------------------------------------|---------------------------------------|--|---------------------------------------|---------------------------------------|---------------------------------------|
|                                       | <b>6373280106</b><br>MEM-Q08PS/M02-K2 |                                       | <b>6372255083</b><br>MEM-Q12PS/H10-KL2<br><b>6372155084</b><br>MEM-Q12P0/H10-KL2<br><b>6373455131</b><br>MEM-Q12PB/H11-KL2 |                                       |                                       |                                       |
| <b>6362680012</b><br>MEM-Q08NS/H10-K2 |                                       | <b>6362655013</b><br>MEM-Q12NS/H10-K2 |  | <b>6362693010</b><br>MEK-E27NS/H10-K2 |                                       | <b>6362611008</b><br>MEK-E29NS/H10-K2 |
| <b>6363880043</b><br>MEM-Q08NB/H11-K2 |                                       | <b>6363855044</b><br>MEM-Q12NB/H11-K2 |  | <b>6363893041</b><br>MEK-E27NB/H11-K2 | <b>6363893031</b><br>MEK-E27NB/H02-K2 | <b>6363811039</b><br>MEK-E29NB/H11-K2 |

|                 |           |                 |           |                 |                 |                 |
|-----------------|-----------|-----------------|-----------|-----------------|-----------------|-----------------|
| 4.5–24 VDC      | 10–30 VDC | 4.5–24 VDC      | 10–39 VDC | 4.5–24 VDC      | 4.5–24 VDC      | 4.5–24 VDC      |
| 25 mA           | 200 mA    | 25 mA           | 400 mA    | 25 mA           | 25 mA           | 25 mA           |
| 20 kHz          | 1500 Hz   | 20 kHz          | 10 kHz    | 20 kHz          | 20 kHz          | 20 kHz          |
| -/-             | -/-       | -/-             | LED/-     | -/-             | -/-             | -/-             |
| Current limiter | Cyclic    | Current limiter | Cyclic    | Current limiter | Current limiter | Current limiter |

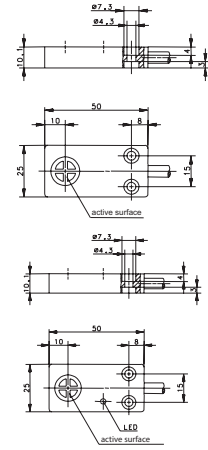
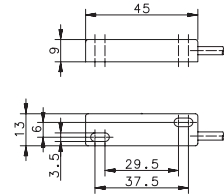
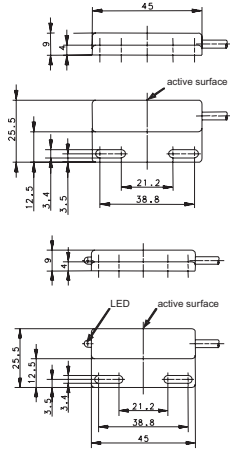
|                          |                          |                          |                          |                          |                          |                          |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| -25°C/+70°C              | -25°C/+70°C              | -25°C/+70°C              | -25°C/+70°C              | -25°C/+70°C              | -25°C/+70°C              | -25°C/+70°C              |
| IP67                     | IP67                     | IP67                     | IP67                     | IP67                     | IP67                     | IP67                     |
| CuZn39Pb3                | CuZn39Pb3                | CuZn39Pb3                | CuZn39Pb3                | PA                       | PA                       | PA                       |
| 3 x 0.14 mm <sup>2</sup> | 3 x 0.14 mm <sup>2</sup> | 3 x 0.14 mm <sup>2</sup> | 3 x 0.14 mm <sup>2</sup> | 3 x 0.14 mm <sup>2</sup> | 3 x 0.14 mm <sup>2</sup> | 3 x 0.14 mm <sup>2</sup> |

You will find detailed data sheets to the products under [www.bernstein.eu](http://www.bernstein.eu)



# Electronic Magnetic Sensors (Type E45, E50, E90)

| Type                               | E45       |           | E45       | E50       |           |
|------------------------------------|-----------|-----------|-----------|-----------|-----------|
| Operating mode                     | Hall      | Hall      | MR        | Hall      | Hall      |
| Magnetic sensitivity (mT)          | 10 mT     | 10 mT     | 3 mT      | 10 mT     | 10 mT     |
| Sensing distance (S <sub>n</sub> ) | 17 mm     | 17 mm     | 20 mm     | 17 mm     | 17 mm     |
| Reference magnet (Page)            | T-62 N/S  | T-62 N/S  | T-62 N/S  | T-62 N/S  | T-62 N/S  |
| Type of connection                 | Cable 2 m | Cable 2 m | Cable 1 m | Cable 2 m | Cable 2 m |
| Special feature                    |           |           |           |           |           |



|          |                    |  |                                      |  |  |
|----------|--------------------|--|--------------------------------------|--|--|
| PNP      | NO contact Type    | <b>6372245079</b><br>MEK-E45PS/H10-KL2 |                                      |  | <b>6372290081</b><br>MEK-E50PS/H10-KL2 |
|          | NC contact Type    | <b>6372145080</b><br>MEK-E45PÖ/H10-KL2 |                                      |  | <b>6372190082</b><br>MEK-E50PÖ/H10-KL2 |
| NPN      | Bistable Type      | <b>6373445129</b><br>MEK-E45PB/H11-KL2 | <b>6370401203</b><br>MEK-E45PB/M03-1 |  | <b>6373490130</b><br>MEK-E50PB/H11-KL2 |
|          | LED active surface |  |                                      |  |  |
| Analogue | Current output     | <b>6362645009</b><br>MEK-E45NS/H10-K2  |                                      |  | <b>6362690011</b><br>MEK-E50NS/H10-K2  |
|          | Voltage output     | <b>6363845040</b><br>MEK-E45NB/H11-K2  |                                      |  | <b>6363890042</b><br>MEK-E50NB/H11-K2  |

### Technical data

|                                      |                |                 |           |           |                 |           |
|--------------------------------------|----------------|-----------------|-----------|-----------|-----------------|-----------|
| Rated operating voltage              | U <sub>B</sub> | 4.5–24 VDC      | 10–39 VDC | 10–60 VDC | 4.5–24 VDC      | 10–39 VDC |
| Rated operating current              | I <sub>e</sub> | 25 mA           | 400 mA    | 200 mA    | 25 mA           | 400 mA    |
| Max. switching voltage               | F              | 20 kHz          | 10 kHz    | 20 Hz     | 20 kHz          | 10 kHz    |
| Function/operating voltage indicator |                | –/–             | LED/–     | –/–       | –/–             | LED/–     |
| Sensitivity adjustable               |                |                 |           |           |                 |           |
| Short circuit-protection             |                | Current limiter | Cyclic    | –         | Current limiter | Cyclic    |
| Teachable                            |                |                 |           |           |                 |           |

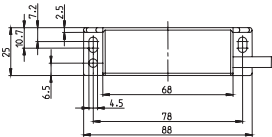
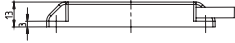
### Mechanical data

|   |  |                          |                          |                          |                          |                          |
|---|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Ambient temperature (min/max)                         |  | –25°C/+70°C              | –25°C/+70°C              | –5°C/+70°C               | –25°C/+70°C              | –25°C/+70°C              |
| Protection class in accordance with IEC 529, EN 60529 |  | IP67                     | IP67                     | IP67                     | IP67                     | IP67                     |
| Enclosure material                                    |  | PA                       | PA                       | PA                       | PBT                      | PBT                      |
| Connection  |  | 3 x 0.14 mm <sup>2</sup> | 3 x 0.14 mm <sup>2</sup> | 2 x 0,14 mm <sup>2</sup> | 3 x 0.50 mm <sup>2</sup> | 3 x 0.50 mm <sup>2</sup> |

Please refer to Accessories for magnets, mounting brackets, cable couplers and sensor tester.



|            |  |  |  |
|------------|--|--|--|
| <b>E90</b> |  |  |  |
| MR         |  |  |  |
| 3 mT       |  |  |  |
| 20 mm      |  |  |  |
| T-62 N/S   |  |  |  |
| Cable 1 m  |  |  |  |



|                   |  |  |  |  |  |  |  |
|-------------------|--|--|--|--|--|--|--|
| <b>6370442204</b> |  |  |  |  |  |  |  |
| MEK-E90PB/M03-1   |  |  |  |  |  |  |  |
|                   |  |  |  |  |  |  |  |
|                   |  |  |  |  |  |  |  |

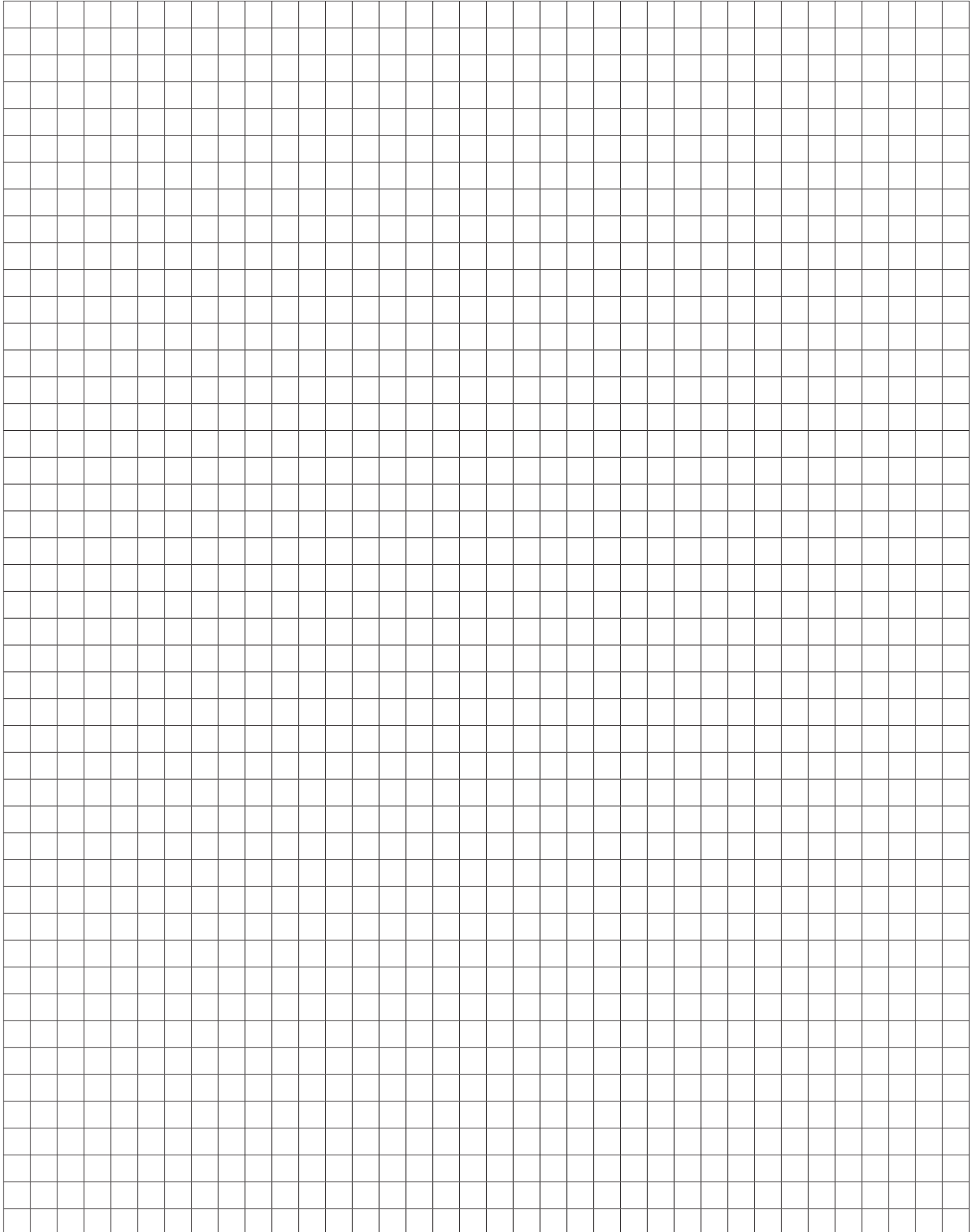
|           |  |  |  |
|-----------|--|--|--|
| 10-60 VDC |  |  |  |
| 200 mA    |  |  |  |
| 20 Hz     |  |  |  |
| -/-       |  |  |  |
| -         |  |  |  |

|                          |  |  |  |
|--------------------------|--|--|--|
| -5°C/+70°C               |  |  |  |
| IP67                     |  |  |  |
| PA                       |  |  |  |
| 2 x 0,50 mm <sup>2</sup> |  |  |  |

You will find detailed data sheets to the products under [www.bernstein.eu](http://www.bernstein.eu)



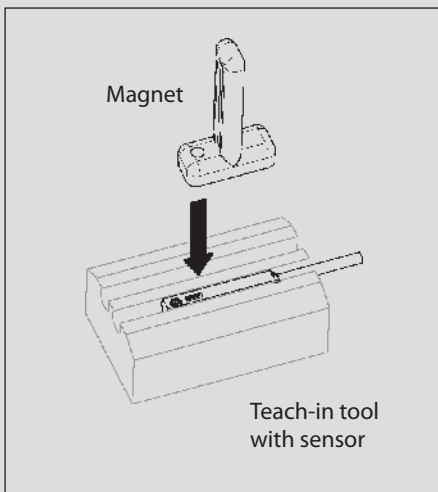
## Notes



## Programmable Miniature Position Sensors with Fully Integrated Electronics

The teachable magnetic sensors are characterised by one or two freely programmable, independent switching points. Despite this high degree of functionality, BERNSTEIN has succeeded in integrating the entire electronics into a compact sensor enclosure with the smallest possible dimensions. This design feature renders additional protection (e.g. for the cable electronics or high-cost safeguards) unnecessary.

The compact design is suitable for installation in all standard T- and C-slots (e.g. FESTO or SMC). In an installed position, the freely programmable switching points can be quickly and easily set with the aid of the easy-to-use teach-in tool.



This configuration largely avoids unintentional changes to the settings and substantially increases the resistance to environmental influences while retaining the protection class rating.

Manually searching for the switching points has been replaced by rapid electronic balancing with the sensor installed in position. LEDs at the top of the sensor serve as the function indicator, provide information on the programming status and also signal faults. In addition to featuring effective polarity reversal protection as standard, the sensors also have an internal EEPROM that stores the switching points in the event of power failure.

### Advantages

- Completely integrated electronic solution
- Permanent protection rating
- No need for additional electronics
- Fully immersed and therefore protected installation in the slot
- Suitable for standard C- and T-slots
- Available as cable or plug version
- Occupies only one slot
- Freely programmable switching points
- Straightforward teach-in procedure
- Reduced installation and wiring requirements
- Can be fitted from above
- High switching accuracy

- The installed sensor assumes programming mode when the teach-in tool is placed over it
- The positions of the magnet are assigned to the respective outputs by correspondingly aligning the tool
- The programmable switching points are stored in the sensor
- The switching points can be changed by repeating the teach-in procedure

### Technical data

- PNP/NO contact
- Magnetic sensitivity  $\pm 1.5 \text{ mT}$  to  $\pm 13.5 \text{ mT}$
- Sensing distance up to 50 mm (depending on magnet/air gap)
- Repeat accuracy  $\leq 0.1 \text{ mT}$
- Hysteresis  $1 \text{ mT} \leq H \leq 1.35 \text{ mT}$
- Operating voltage range 10 – 30 V DC
- Output current  $I_e \leq 50 \text{ mA}$  (one output switched)  $\leq 25 \text{ mA}$  per output (both outputs switched)
- Ambient temperature  $-20 \text{ }^\circ\text{C}$  to  $+80 \text{ }^\circ\text{C}$
- Protection class IP67

### Other slot sensors

Sensors with only one output can also be used for applications that require only one switching point. For this purpose BERNSTEIN offers a range of Hall sensors with set sensitivity or reed contact versions that do not require auxiliary energy.

### All sensors come with the following accessories:

- 1x setscrew M2 x 3 (E22), M3 x 6 (E30), DIN 913
- 1x Offset screwdriver (E22)
- 1x Teach-in tool
- 1x Operating and installation instructions

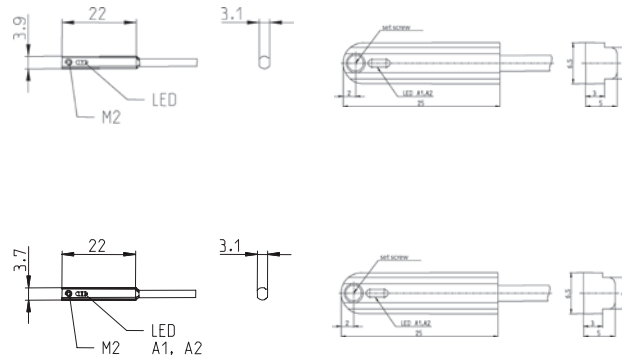
### Standards and approvals

MEK E-22/MEA E30  
EN 60947-5-2



# Teachable Electronic Slot Sensors

| Type                             | E22               |                   | E30               |                   |
|----------------------------------|-------------------|-------------------|-------------------|-------------------|
| <b>Operating mode</b>            | Hall              | Hall              | Hall              | Hall              |
| <b>Magnetic sensitivity (mT)</b> | 1.5 – 13.5 mT     | 1.5 – 13.5 mT     | 1.5 – 13.5 mT     | 1.5 – 13.5 mT     |
| <b>Switching function</b>        | PNP NO / 0 – 10 V | PNP NO / 0 – 10 V | PNP NO / 0 – 10 V | PNP NO / 0 – 10 V |
| <b>Reference magnet (Page)</b>   |                   |                   |                   |                   |
| <b>Type of connection</b>        | Cable 2 m         | Connector M8      | Cable 2 m         | Connector M8      |



|                          |  |  |  |  |   |  |  |
|--------------------------|--|--|--|--|---|--|--|
| <b>Type</b>              | C-slot SMC<br>Double-channel<br>Type<br>C-slot Festo<br>Type<br>T-slot<br>Type | <b>6370281183</b><br>MEK-E22PS/HP2-KL2<br><b>6370281185</b><br>MEK-E22PS/HP2-KL2 | <b>6370281184</b><br>MEK-E22PS/HP2-KL0,3S8<br><b>6370281186</b><br>MEK-E22PS/HP2-KL0,3S8 | <b>6370299187</b><br>MEA-E30PS/HP2-KL2 | <b>6370299188</b><br>MEA-E30PS/HP2-KL0,3S8  |  |  |
| <b>Type</b>              | C-slot SMC<br>Single-channel<br>Type<br>C-slot Festo<br>Type<br>T-slot<br>Type | <b>6372281177</b><br>MEK-E22PS/HP1-KL2<br><b>6372281179</b><br>MEK-E22PS/HP1-KL2 | <b>6372281178</b><br>MEK-E22PS/HP1-KL0,3S8<br><b>6372281180</b><br>MEK-E22PS/HP1-KL0,3S8 | <b>6372299181</b><br>MEA-E30PS/HP1-KL2 | <b>6372299182</b><br>MEA-E30PS/HP1-KL0,3S8  |  |  |
| <b>Analogue 0 – 10 V</b> | T-slot<br>Type   |  |  |  | <b>6370099169</b><br>MEA-E30A10/H50-KL0,3S8 |  |  |

## Technical data

|                                      |       |           |           |           |           |
|--------------------------------------|-------|-----------|-----------|-----------|-----------|
| Rated operating voltage              | $U_b$ | 10–30 VDC | 10–30 VDC | 10–30 VDC | 10–30 VDC |
| Rated operating current              | $I_e$ | ≤ 50 mA   | ≤ 50 mA   | ≤ 50 mA   | ≤ 50 mA   |
| Max. switching voltage               | F     |           |           |           |           |
| Function/operating voltage indicator |       | LED/–     | LED/–     | LED/–     | LED/–     |
| Sensitivity adjustable               |       | Yes       | Yes       | Yes       | Yes       |
| Short circuit-protection             |       | Cyclic    | Cyclic    | Cyclic    | Cyclic    |
| Teachable                            |       | Yes       | Yes       | Yes       | Yes       |

## Mechanical data

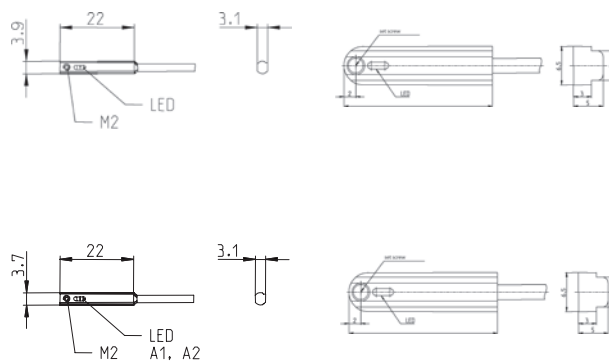
|   |  |                          |             |                          |             |
|---|--|--------------------------|-------------|--------------------------|-------------|
| Ambient temperature (min/max)                         |  |                          |             |                          |             |
| <b>Single-channel / Double-channel</b>                |  | –20°C/+80°C              | –20°C/+80°C | –20°C/+80°C              | –20°C/+80°C |
| <b>Analogue 1 – 10 V</b>                              |  |                          |             | +5°C/+55°C               |             |
| Protection class in accordance with IEC 529, EN 60529 |  | IP67                     | IP67        | IP67                     | IP67        |
| Enclosure material                                    |  | PA                       | PA          | Aluminium                | Aluminium   |
| Connection  |  | 4 x 0.05 mm <sup>2</sup> | M8 x 1      | 4 x 0.05 mm <sup>2</sup> | M8 x 1      |

Please refer to Accessories for magnets, mounting brackets, cable couplers and sensor tester.





| Type                      | E22       |              | E30       |              |
|---------------------------|-----------|--------------|-----------|--------------|
| Operating mode            | Hall      | Hall         | Hall      | Hall         |
| Magnetic sensitivity (mT) | 3 mT      | 3 mT         | 3 mT      | 3 mT         |
| Switching function        | PNP NO    | PNP NO       | PNP NO    | PNP NO       |
| Reference magnet (Page)   |           |              |           |              |
| Type of connection        | Cable 2 m | Connector M8 | Cable 2 m | Connector M8 |



| Type | C-slot SMC<br>Type<br>C-slot Festo<br>Type<br>T-slot<br>Type | 6372281171<br>MEK-E22PS/H03-KL2 | 6372281172<br>MEK-E22PS/H03-KL0,3S8 | 6372281173<br>MEK-E22PS/H03-KL2 | 6372281174<br>MEK-E22PS/H03-KL0,3S8 | 6372299175<br>MEA-E30PS/H03-KL2 | 6372299176<br>MEA-E30PS/H03-KL0,3S8 |
|------|--|---------------------------------|-------------------------------------|---------------------------------|-------------------------------------|---------------------------------|-------------------------------------|
|------|--|---------------------------------|-------------------------------------|---------------------------------|-------------------------------------|---------------------------------|-------------------------------------|

### Technical data

|                                      |       |           |           |           |           |
|--------------------------------------|-------|-----------|-----------|-----------|-----------|
| Rated operating voltage              | $U_B$ | 10–30 VDC | 10–30 VDC | 10–30 VDC | 10–30 VDC |
| Rated operating current              | $I_e$ | ≤ 50 mA   | ≤ 50 mA   | ≤ 50 mA   | ≤ 50 mA   |
| Max. switching voltage               | F     |           |           |           |           |
| Function/operating voltage indicator |       | LED/–     | LED/–     | LED/–     | LED/–     |
| Sensitivity adjustable               |       | Yes       | Yes       | Yes       | Yes       |
| Short circuit-protection             |       | Cyclic    | Cyclic    | Cyclic    | Cyclic    |
| Teachable                            |       | –         | –         | –         | –         |

### Mechanical data

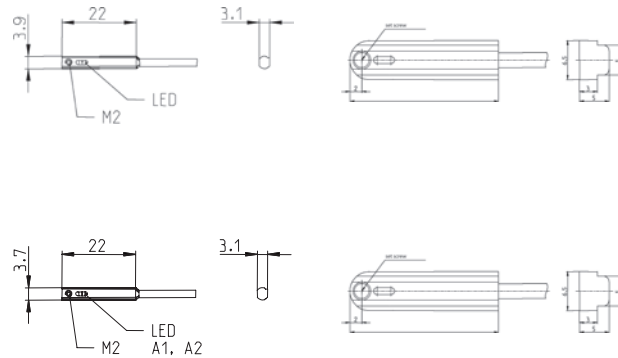
|   |                          |             |                          |             |
|---|--------------------------|-------------|--------------------------|-------------|
| Ambient temperature (min/max)                         | –20°C/+80°C              | –20°C/+80°C | –20°C/+80°C              | –20°C/+80°C |
| Protection class in accordance with IEC 529, EN 60529 | IP67                     | IP67        | IP67                     | IP67        |
| Enclosure material                                    | PA                       | PA          | Aluminium                | Aluminium   |
| Connection  | 3 x 0.05 mm <sup>2</sup> | M8 x 1      | 3 x 0.05 mm <sup>2</sup> | M8 x 1      |

Please refer to Accessories for magnets, mounting brackets, cable couplers and sensor tester.



# Slot Sensors with Reed Contact

| Type                      | E22       |              | E30       |              |
|---------------------------|-----------|--------------|-----------|--------------|
| Operating mode            | Reed      | Reed         | Reed      | Reed         |
| Magnetic sensitivity (mT) | 3 mT      | 3 mT         | 3 mT      | 3 mT         |
| Switching function        | NO        | NO           | NO        | NO           |
| Switching power           | 10 VA     | 10 VA        | 10 VA     | 10 VA        |
| Type of connection        | Cable 2 m | Connector M8 | Cable 2 m | Connector M8 |



| Type | C-slot SMC<br>Type<br>C-slot Festo<br>Type<br>T-slot<br>Type | <b>6310281741</b><br>MAK-E22S/R20-2 | <b>6310281742</b><br>MAK-E22S/R20-0,3S8 | <b>6310281743</b><br>MAK-E22S/R20-2 | <b>6310281744</b><br>MAK-E22S/R20-0,3S8 | <b>6310299745</b><br>MAA-E30S/R20-2 | <b>6310299746</b><br>MAA-E30S/R20-0,3S8 |
|------|--|-------------------------------------|---|-------------------------------------|---|-------------------------------------|---|
|      |  |                                     |   |                                     |   |                                     |   |

## Technical data

|  |                 |                 |                 |                 |
|--|-----------------|-----------------|-----------------|-----------------|
| Rated operating voltage $U_b$                  | 120 V           | 120 V           | 120 V           | 120 V           |
| Performance class (diagram No.)                | 10 VA           | 10 VA           | 10 VA           | 10 VA           |
| Shock resistance                               | 30 g (11 ms)    | 30 g (11 ms)    | 30 g (11 ms)    | 30 g (11 ms)    |
| Reproducibility                                | +/- 1 mm        | +/- 1 mm        | +/- 1 mm        | +/- 1 mm        |
| Mechanical service life (switching operations) | $3 \times 10^8$ | $3 \times 10^8$ | $3 \times 10^8$ | $3 \times 10^8$ |

## Mechanical data

|   |                              |             |                              |             |
|---|------------------------------|-------------|------------------------------|-------------|
| Ambient temperature (min/max)                         | -25°C/+80°C                  | -25°C/+80°C | -25°C/+80°C                  | -25°C/+80°C |
| Protection class in accordance with IEC 529, EN 60529 | IP67                         | IP67        | IP67                         | IP67        |
| Enclosure material                                    | PA                           | PA          | Aluminium                    | Aluminium   |
| Connection  | $3 \times 0.05 \text{ mm}^2$ | M8 x 1      | $3 \times 0.05 \text{ mm}^2$ | M8 x 1      |

You will find detailed data sheets to the products under [www.bernstein.eu](http://www.bernstein.eu)



## Non-contact Safety Sensor SRF



The SRF (Safety RFID) is a non-contact safety sensor, that monitors moveable safety guards, such as doors, flaps and hoods. This particularly compact sensor protects employees from injuries by shutting down or not starting up machines when the safety guard is not properly closed.

**With its innovative diagnostic system, the SRF makes safety circuits suitable for Industry 4.0.**

The system provides a multitude of diagnostic data of each sensor, even in a series connection, to support smart production.

Diagnostic data is fed into the machine control system via I/O Link or alternatively displayed on a smartphone by way of NFC technology. In this way, 20 different diagnostic information of each sensor can be retrieved and made available.

This diagnostic data delivers cost-effective predictive maintenance in a simple way. Through its advanced fault recognition capability, costly machine shutdowns can be prevented.

**This way, your machinery and plant will work even more efficiently!**



### Innovative

- New innovative Daisychain Diagnostics (DCD)
- Reading diagnostics information through Android smartphone via NFC interface
- Transmission of data via I/O Link interface
- Simple and specific maintenance thanks to pre-failure monitoring
- Cost reduction by eliminating machine downtimes
- Connecting the sensor information of six different diagnostic circuits
- Support of an energy-optimised application: Voltage levels known at any time

### Safe

- Safe sensors in Cat. 4, PL e or SIL CL 3
- Safe serial connection of SRF up to PL e, Cat. 4 / SIL CL 3
- Coded and unique actuator

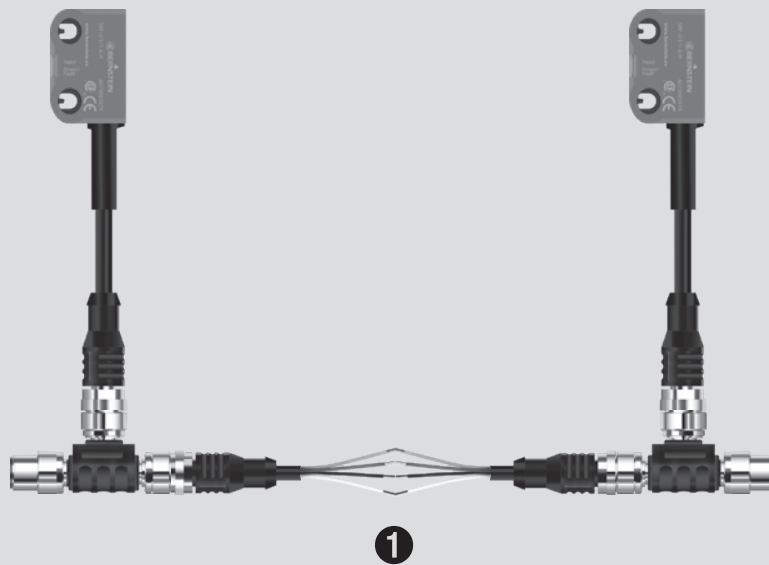
### Versatile

- Protection class of IP69
- Local reset button
- Compact design
- Diagnostics system DCD
- PNP diagnostics
- Fault tolerant output
- Single and series connection possible
- Connection via M12 plug

## Non-contact Safety Sensor SRF

### Benefits and advantages SRF

- **Cost-saving:** thanks to a four-wire unshielded standard connection cable from sensor to sensor ❶
- **Compact:** small in size, flexible in use
- **Safe:** up to PL e – even in series connection, with high defeat protection (according to ISO 14119)
- Series connection of the sensors through internal safety electronics without compromising the safety level



### Coding types

- Low coding level:  
Coded sensor with only one possible code
- High coding level:  
Coded sensor with more than 1000 different codes
- Unique coding: High coding level – but no spare actuator accepted

### Diagnostics (not safety related)

- PNP diagnostics:  
Signalling contact as PNP NO output that indicates whether the safety guard is closed
- DCD System:  
Detailed diagnostic system DCD that submits a complete status image of a sensor, even in series connection

### Reset function

Local reset of the sensor to enable restart of the machine.

### Fault tolerant outputs

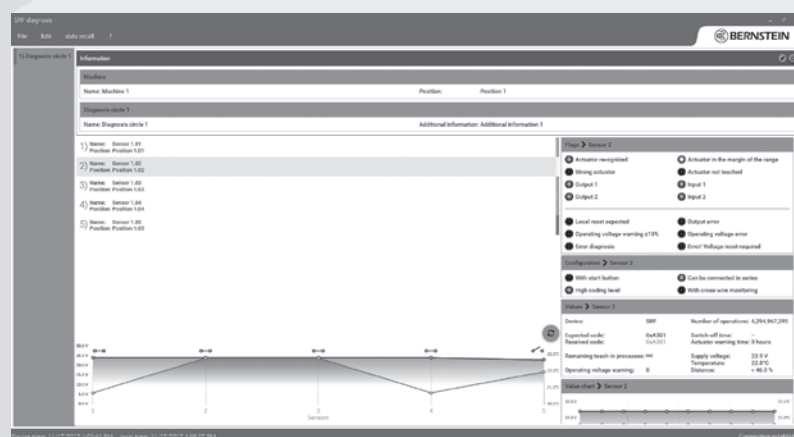
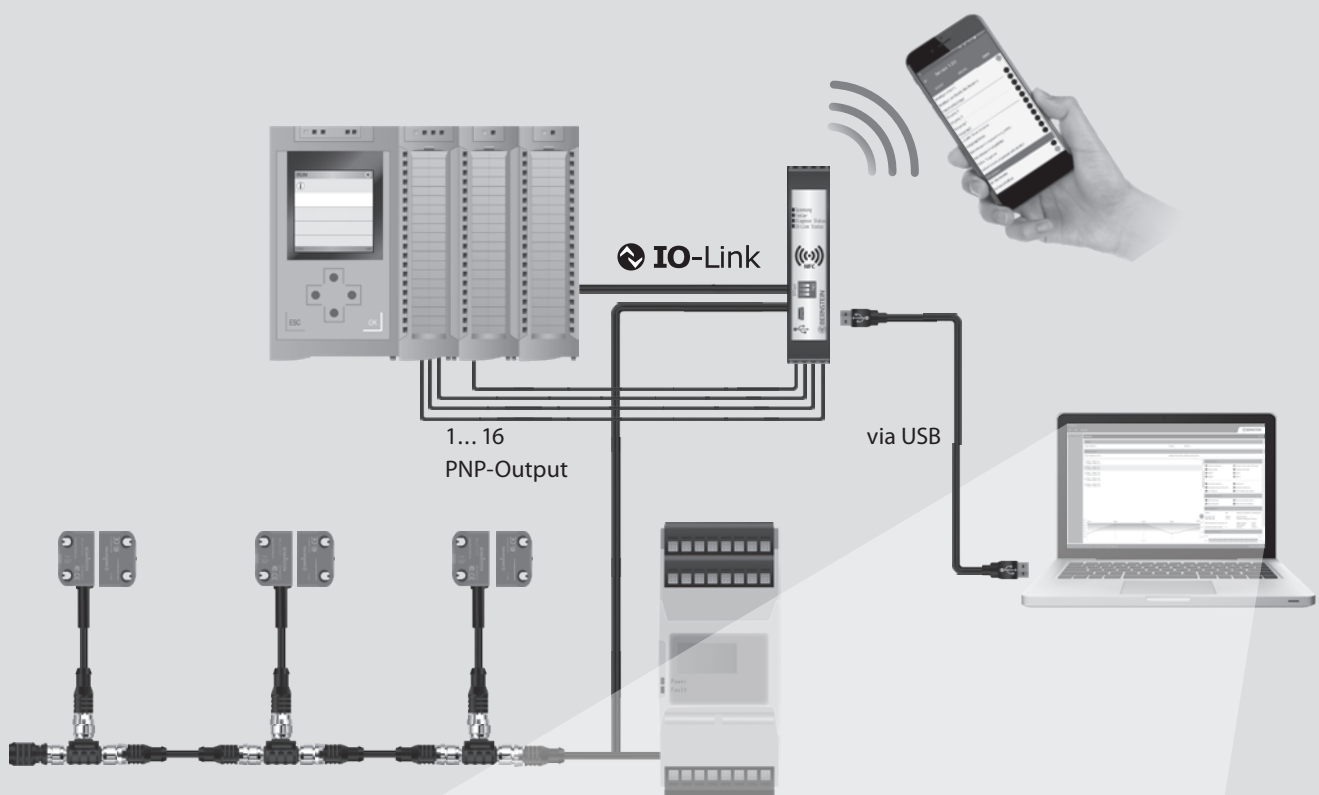
The fault tolerant outputs prevent an unexpected machine stop and allow to run down the machine in a controlled manner.

This is how it works:

If an error is detected at one output, the sensor indicates this with a flash code –whilst simultaneously transmitting the information via the DCD system. After 20 minutes, the second still intact output, will switch off.

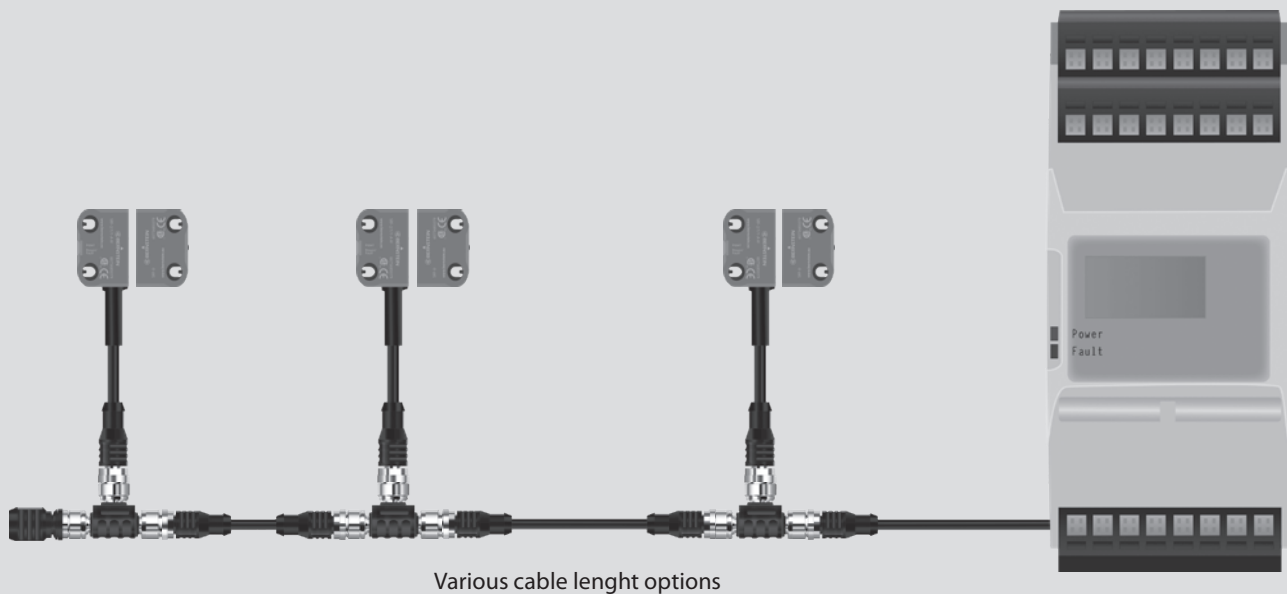
## Benefits and advantages diagnostics

- Comprehensive diagnostics information for each sensor and for the entire system
- Diagnostic data simply retrievable
- Time and cost savings during commissioning, maintenance and fault investigation
- Protection against unexpected machine stops through pre-fault detection
- Display of diagnostic data on smartphones via NFC
- Simple troubleshooting through reading out the fault memory via NFC also in case of missing power supply



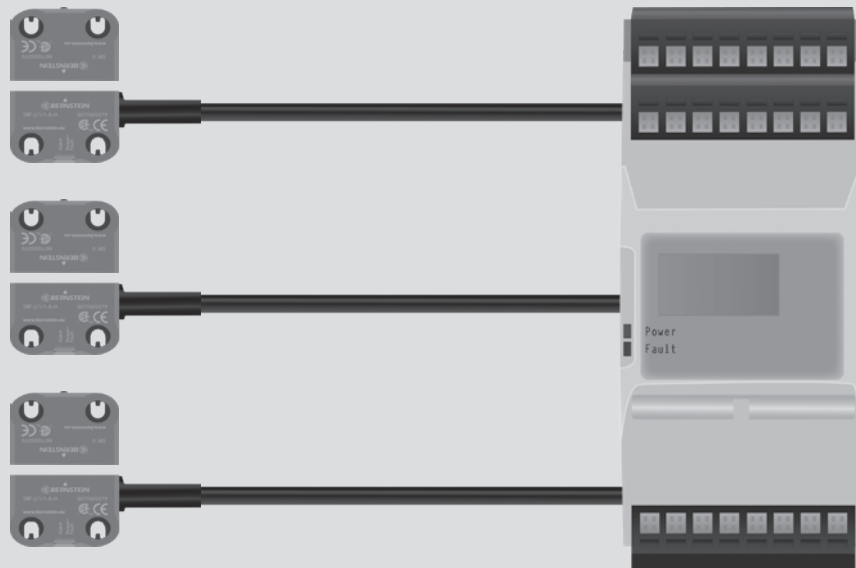
# Non-contact Safety Sensor SRF

## SRF for series connection



| Article number | Designation       | Unique   | High coding level | Low coding level | PNP diagnostics | Daisychain diagnostics (DCD) | Reset input | M12 8-pin connection with 25 cm cable |
|----------------|-------------------|--|-------------------|------------------|-----------------|------------------------------|-------------|---------------------------------------|
| 6075685094     | SRF-4/1/1-E0.25-U | x  |                   |                  | x               |                              |             | x                                     |
| 6075685095     | SRF-4/1/1-E0.25-H |  | x                 |                  | x               |                              |             | x                                     |
| 6075685096     | SRF-4/1/1-E0.25-L |  |                   | x                | x               |                              |             | x                                     |
| 6075685097     | SRF-4/2/1-E0.25-U | x  |                   |                  | x               |                              | x           | x                                     |
| 6075685098     | SRF-4/2/1-E0.25-H |  | x                 |                  | x               |                              | x           | x                                     |
| 6075685099     | SRF-4/2/1-E0.25-L |  |                   | x                | x               |                              | x           | x                                     |
| 6075685100     | SRF-5/1/1-E0.25-U | x  |                   |                  |                 | x                            |             | x                                     |
| 6075685101     | SRF-5/1/1-E0.25-H |  | x                 |                  |                 | x                            |             | x                                     |
| 6075685102     | SRF-5/1/1-E0.25-L |  |                   | x                |                 | x                            |             | x                                     |
| 6075685080     | SRF-5/2/1-E0.25-U | x  |                   |                  |                 | x                            | x           | x                                     |
| 6075685103     | SRF-5/2/1-E0.25-H |  | x                 |                  |                 | x                            | x           | x                                     |
| 6075685104     | SRF-5/2/1-E0.25-L |  |                   | x                |                 | x                            | x           | x                                     |
| 6075687078     | SRF-0             | Actuator SRF, suitable for all coding levels (not included, please order separately) |                   |                  |                 |                              |             |                                       |

## SRF for single connection



| Article number | Designation       | Unique   | High coding level | Low coding level | PNP diagnostics | M12 5-pin connection with 25 cm cable | 2 m cable with open cable end |  |
|----------------|-------------------|--|-------------------|------------------|-----------------|---------------------------------------|-------------------------------|--|
| 6075685117     | SRF-2/1/1-A2-U    | x  |                   |                  | x               |                                       | x                             |  |
| 6075685079     | SRF-2/1/1-A2-H    |  | x                 |                  | x               |                                       | x                             |  |
| 6075685118     | SRF-2/1/1-A2-L    |  |                   | x                | x               |                                       | x                             |  |
| 6075685119     | SRF-2/1/1-E0.25-U | x  |                   |                  | x               | x                                     |                               |  |
| 6075685120     | SRF-2/1/1-E0.25-H |  | x                 |                  | x               | x                                     |                               |  |
| 6075685121     | SRF-2/1/1-E0.25-L |  |                   | x                | x               | x                                     |                               |  |
| 6075687078     | SRF-0             | Actuator SRF, suitable for all coding levels (not included, please order separately) |                   |                  |                 |                                       |                               |  |

# Non-contact Safety Sensor SRF

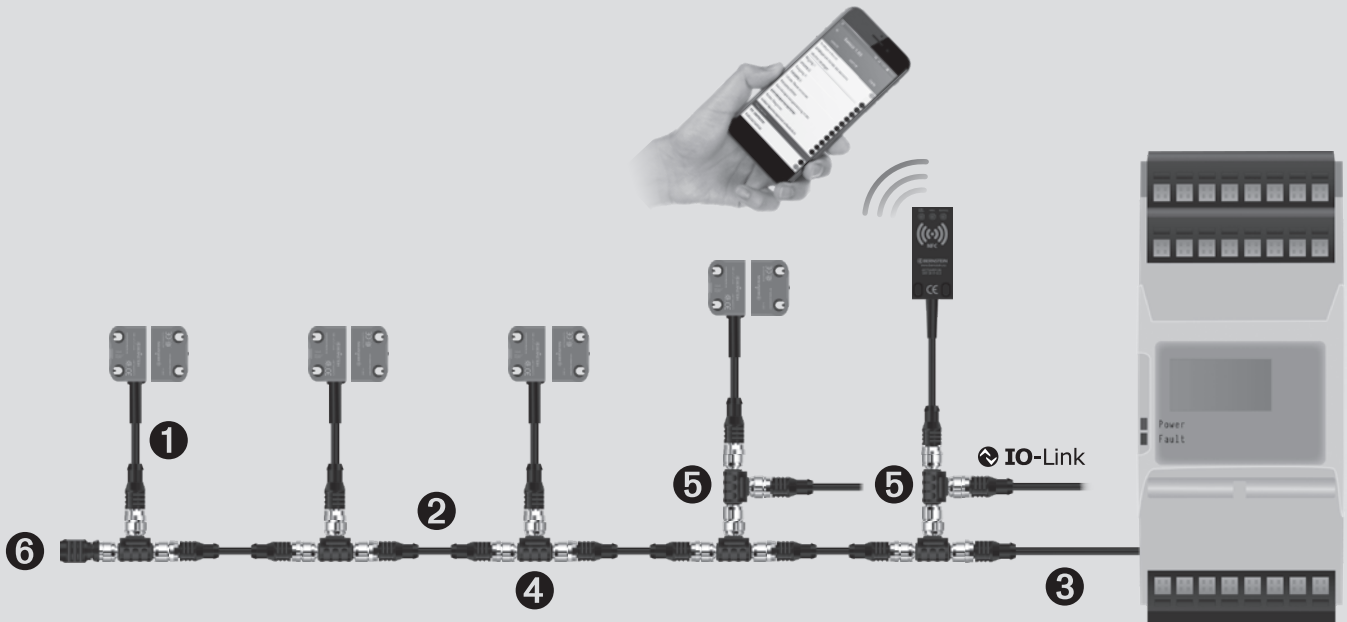
## Diagnostic module



| Article number | Designation        | Enclosure  | Number of diagnostic circuits | Digital output | Interfaces |     |         |
|----------------|--------------------|--|-------------------------------|----------------|------------|-----|---------|
|                |                    |  |                               |                | I/O Link   | NFC | USB 2.0 |
| 6075619122     | SRF DI-C-0/1-T     | DIN rail housing 22.5 mm                                   | 1                             | -              | X          | X   | X       |
| 6075619123     | SRF DI-C-8/1-T     | DIN rail housing 22.5 mm                                   | 1                             | 8              | X          | X   | X       |
| 6075619124     | SRF DI-C-16/1-T    | DIN rail housing 22.5 mm                                   | 1                             | 16             | X          | X   | X       |
| 6075619125     | SRF DI6-C-0/1-T    | DIN rail housing 22.5 mm                                   | 6                             | -              | X          | X   | X       |
| 6075689126     | SRF DI-F-0/2-E0.25 | Rectangular sensor enclosure (use directly at the machine) | 1                             | -              | X          | X   |         |



## Accessories



## Connection cable and connecting cable

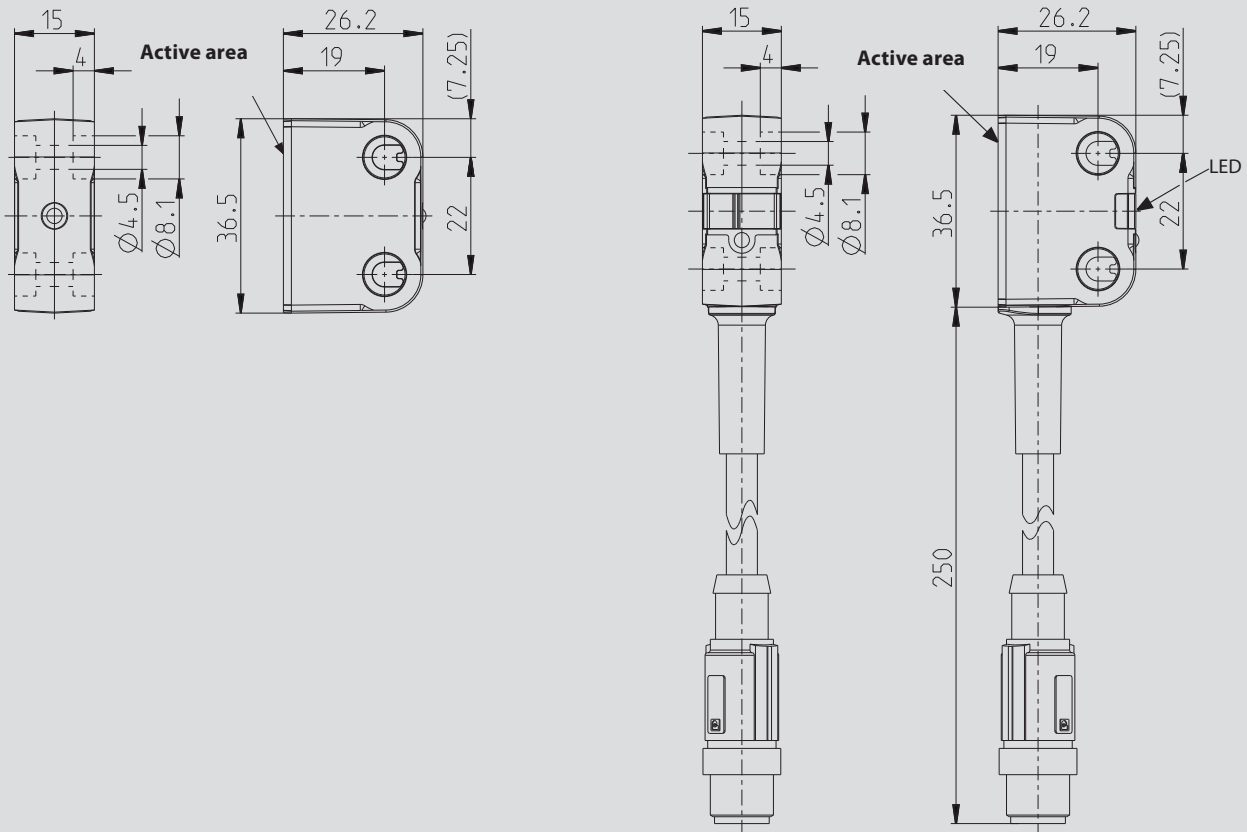
| Pos.-Nr. | Article number | Designation        | Description      | Plug alignment | Plug 1 | Plug 2 | Number of plugs | Cable length in meter |
|----------|----------------|--------------------|------------------|----------------|--------|--------|-----------------|-----------------------|
| 1        | 6075689085     | S1W-M12A8/BW-1PU   | Connecting cable | straight       | M      | F      | 8               | 1                     |
| 1        | 6075689086     | S1W-M12A8/BW-2PU   | Connecting cable | straight       | M      | F      | 8               | 2                     |
| 2        | 6075689087     | S1W-M12C4/AW-2PU   | Connecting cable | straight       | M      | F      | 4               | 2                     |
| 2        | 6075689088     | S1W-M12C4/AW-5PU   | Connecting cable | straight       | M      | F      | 4               | 5                     |
| 2        | 6075689089     | S1W-M12C4/AW-10PU  | Connecting cable | straight       | M      | F      | 4               | 10                    |
| 3        | 6075689092     | SFW-M12B5/AW-2PU   | Connecting cable | straight       | F      |        | 5               | 2                     |
| 3        | 6075689093     | SFW-M12B5/AW-5PU   | Connecting cable | straight       | F      |        | 5               | 2                     |
| 3        | 6075689090     | SFW-M12C4/AW-0.5PU | Connecting cable | straight       | F      |        | 4               | 0.5                   |
| 3        | 6075689091     | SFW-M12C4/AW-2PU   | Connecting cable | straight       | F      |        | 4               | 2                     |

## T adapter, termination plug and fixing screws

| Pos.-Nr. | Article number | Designation           | Description   |
|----------|----------------|-----------------------|---|
| 4        | 6075989082     | ATS-M12/4-M12/8       | T adapter for series connection                       |
| 5        | 6075989083     | ATD-M12/8-M12/4       | T adapter for connection of I/O link and reset button |
| 6        | 6075689084     | AEP-M12/4             | Termination plug M12                                  |
|          | 6075689127     | AT-CLIP-M12           | Fixing clip for T adapter                             |
|          | 6075689128     | One-way screw M4 x 16 | 10 x Fixing screws M4 x 16 One-way screw              |

# Non-contact Safety Sensor SRF

## Technical data SRF



### Electrical data

- Rated operational voltage  $U_e$ : 24 V
- Output current of the safety outputs  $I_e$ : 100 mA
- Output current of the message output  $I_e$ : 10 mA

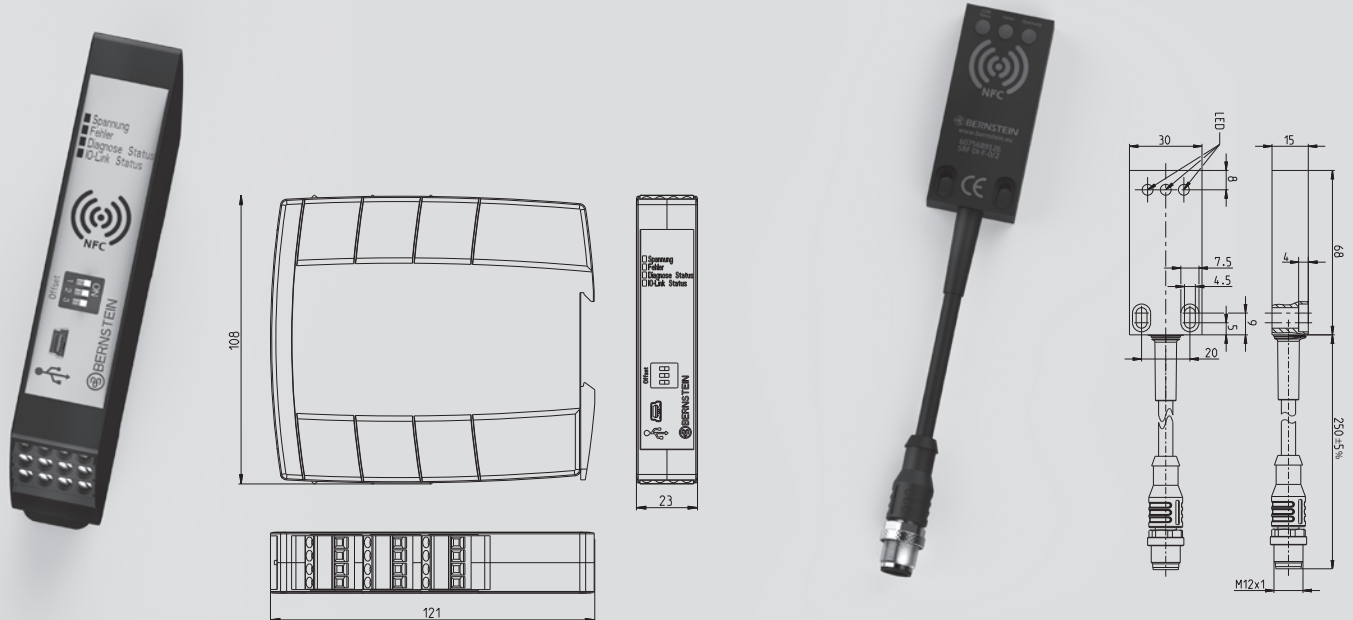
### Mechanical data

- Housing: PA66 + PA6, red, self-extinguishing
- Connection cable: PUR
- Mounting holes:  $\varnothing$  4,5 (for M4 screws)
- Displays: 1  $\times$  LED red/green operating status  
1  $\times$  LED yellow actuation status
- Ambient temperature: -25 °C to +70 °C
- Protection class: IP69

### Safety data sheet

- PL e / Kat. 4 (according to EN ISO 13849-1)
- SIL CL 3 (according to DIN EN 62061)
- $PFH_D = 6 \times 10^{-9}$  1/h
- Mission time  $T_M$ : 20 years
  
- Switching distance:
  - Rated operating distance  $S_n$ : 13 mm
  - Assured switching distance – On  $S_{ao}$ : 10 mm
  - Assured switching distance – Off  $S_{ar}$ : 25 mm
  - Hysteresis: 2 mm
- Switch-off delay  $t_a$ : max. 100 ms
- Ready delay  $t_v$ : max. 2 s

## Technical data diagnostic module



## Cabinet module

- Rated operational voltage  $U_e$ : 24 V DC
- I/O Link protocol: V1.1
- Output current per signal output  $I_e$ : 50 mA
- Ambient temperature: 0 °C to +60 °C
- Protection class: IP20

## Field module

- Rated operational voltage  $U_e$ : 24 V DC
- I/O Link protocol: V1.1
- Output current per signal output  $I_e$ : –
- Ambient temperature: -25 °C to +70 °C
- Protection class: IP69

## Safety relay SCR ON

The SCR ON safety relay monitors the SRF's safety outputs.

### Features

- PL e to ISO 13849
- 3 enabling paths
- Feedback loop with monitored / automatic reset

| Article number | Designation       |
|----------------|-------------------|
| 6075111020     | SCR ON4-W22-3.6-S |



## Safety sensors MAK

To achieve a PL or SIL value with the MAK safety sensors, it is necessary to connect them to a safety evaluation unit. The magnetic safety sensors are dual channel versions. The evaluation unit (BERNSTEIN designation: MÜZ) monitors the correct switching of the two MAK channels and a defined time window in which the two channels must switch.

With the combination of MAK and MÜZ, a PL D and a SIL 3 can be reached. Besides the 3 different types of magnetic safety switches, BERNSTEIN also offers two different evaluation units.

### Product features

- Performance Level d
- Redundancy with NO and NC contacts
- Switching distance: 6 mm
- IP67

### Magnetic controllers for safety functions

BERNSTEIN offers magnetic controllers for safety functions that fulfill performance level d according to EN 13849-1 and SIL 3 according to EN 61508 or rather EN 62061.

A safety system consists of the safety magnetic controllers and a coded transducer unit.

The anti-tamper security of the transducer unit is achieved by variable coding of the actuator magnets and magnetic switches.

Depending on the type of device, one or two coded transducer units (magnetic switch with corresponding magnet) of type:

- MAK-4236
- MAK-5236
- MAK-5336

can be connected to and monitored by the safety magnetic controllers.



MAK-4236-x with magnet TK-42-CD



MAK-5236-x with magnet TK-52-CD / 2



MAK-5336-x with magnet TK-43-CD

The safety magnetic controller processes the NC or NO contact signals coming from the coded magnetic switches. Thereby, it is possible to detect the opening of the safety guard (door, hatch, protective hood etc.) and to turn off the safety output. Thanks to the redundant evaluation, the magnetic controller is switched to the "safe state" should a fault or manipulation occur, or if the time difference is exceeded between the NC contact signal and the NO contact signal. An LED indicates that the safety magnetic controller is in the "safe state".

To ensure fault detection of the switch-off device, the MÜZ-102 offers the possibility to connect a return circuit. The system additionally features a NC contact for signalling purposes.

- Redundancy by NO and NC contacts
- Manipulation safety by coding
- Monitoring of the return circuit (depending on device type)

## Magnetic controllers for safety functions

TÜV certified

- EN ISO 13849-1 Performance Level d
- EN 61508 and EN 62061 SIL 3
- EN 60947-5-3 Single fault security S



## Coded transducer units

Magnetic switches

|   |                   |                   |
|---|-------------------|-------------------|
| Type designation                            | MÜZ-102/D24-FL-DA | MÜZ-202/D24-FL    |
| <b>Article number</b>                       | <b>6392701306</b> | <b>6392702307</b> |
| Max. number of connectable transducer units | 1                 | 2                 |
| Safety output, NO contact                   | ●                 | ●                 |
| Feedback circuit                            | ●                 | -                 |
| Data output (NC contact)                    | ●                 | -                 |
| <b>Technical data</b>                       |                   |                   |
| Operating voltage                           | 24 V DC           | 24 V DC           |
| Operating current                           | 60 mA             | 60 mA             |

|                       |  |
|-----------------------|--|
| Type designation      |  |
| <b>Article number</b> |  |
| Cable length          |  |
| Type designation      |  |
| <b>Article number</b> |  |
| Cable length          |  |

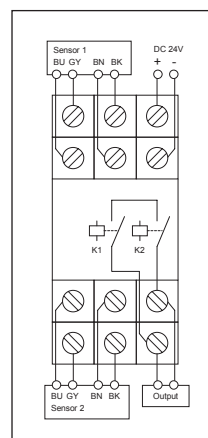
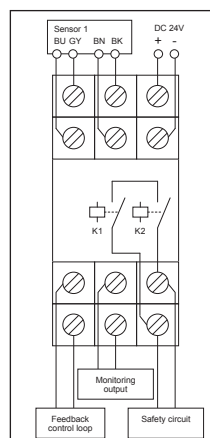
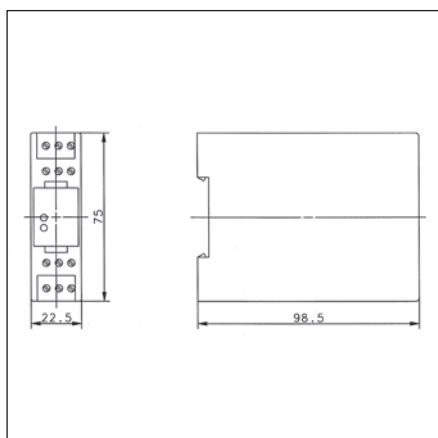
|                       |  |
|-----------------------|--|
| Type designation      |  |
| <b>Article number</b> |  |
| Cable length          |  |

|                       |  |
|-----------------------|--|
| Type designation      |  |
| <b>Article number</b> |  |
| Cable length          |  |

|                       |  |
|-----------------------|--|
| Type designation      |  |
| <b>Article number</b> |  |
| Cable length          |  |

|   |         |                          |
|---|---------|--------------------------|
| <b>Ambient conditions</b>               |         |                          |
| Temperature range                       | min/max | 0 °C/+55 °C              |
|   |         | 32 °F/+131 °F            |
| Protection class (to IEC 529, EN 60529) |         | IP20                     |
| Enclosure material                      |         | PC                       |
| Mounting system (DIN 50022)             |         | TS 35                    |
| Type of connection: Terminal block      |         | max. 2.5 mm <sup>2</sup> |

|   |         |     |
|---|---------|-----|
| <b>Ambient conditions</b>               |         |     |
| Temperature range                       | min/max |     |
| Protection class (to IEC 529, EN 60529) |         |     |
| Enclosure material                      |         |     |
| Sensing distance                        | S on    | min |
|   | S on    | max |
| <b>Actuating magnet</b>                 |         |     |
| Type designation                        |         |     |
| <b>Article number</b>                   |         |     |
| Use: safety magnetic controller         |         |     |
| <b>Article number</b>                   |         |     |



All dimensions in mm

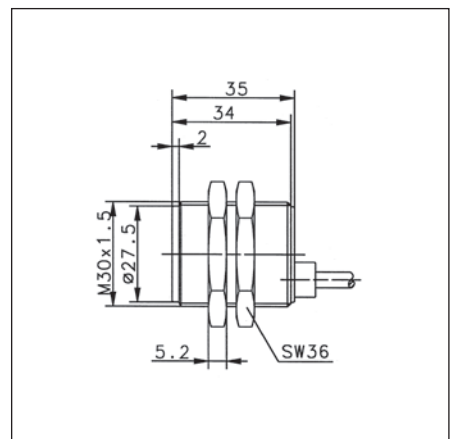
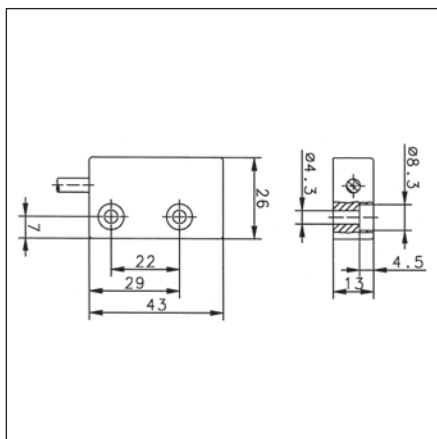
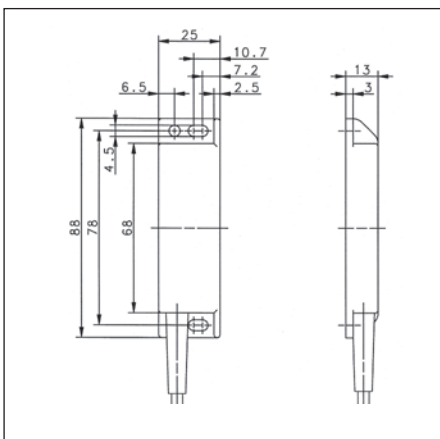
Other types available on request.



|  |  |  |
|--|--|--|
| MAK-4236-3<br><b>6490642315</b><br>3 m PVC cable     | MAK-5236-3<br><b>6490652316</b><br>3 m PVC cable     | MAK-5336-3<br><b>6490653317</b><br>3 m PVC cable     |
| MAK-4236-6<br><b>6490642302</b><br>6 m PVC cable     | MAK-5236-6<br><b>6490652307</b><br>6 m PVC cable     | MAK-5336-6<br><b>6490653311</b><br>6 m PVC cable     |
| MAK-4236-9<br><b>6490642303</b><br>9 m PVC cable     | MAK-5236-9<br><b>6490652308</b><br>9 m PVC cable     | MAK-5336-9<br><b>6490653312</b><br>9 m PVC cable     |
| MAK-4236-STK<br><b>6490642305</b><br>4-pin connector | MAK-5236-STK<br><b>6490652309</b><br>4-pin connector | MAK-5336-STK<br><b>6490653313</b><br>4-pin connector |

|                                |                                |                                |
|--------------------------------|--------------------------------|--------------------------------|
| -5 °C/+70 °C<br>+23 °F/+158 °F | -5 °C/+70 °C<br>+23 °F/+158 °F | -5 °C/+70 °C<br>+23 °F/+158 °F |
| IP67                           | IP67                           | IP67                           |
| PA 6.6                         | PBT                            | PA 6.6                         |
| 4 mm                           | 3 mm                           | 3 mm                           |
| 14 mm                          | 14 mm                          | 14 mm                          |

|                               |                                 |                               |
|-------------------------------|---------------------------------|-------------------------------|
| TK-42-CD<br><b>6402042310</b> | TK-52-CD/2<br><b>6402052311</b> | TK-43-CD<br><b>6402043312</b> |
| <b>6392701306</b>             | <b>6392701306</b>               | <b>6392701306</b>             |
| <b>6392702307</b>             | <b>6392702307</b>               | <b>6392702307</b>             |





# Accessories

## Magnets

### 1. Hard ferrite magnets

Barium and strontium hard ferrites are economically priced, reliable components that are also widely used in automation, control and measurement applications. When operated in high temperature ranges, the specified switching distance will decrease by a factor of 0.2 % per 1 °C.

Chemical properties:

Ferrite magnets are oxide ceramics. They are made of approx. 80 % iron oxide and 20 % barium oxide or strontium oxide. The magnets are resistant to a large number of chemicals, including solvents, caustic solutions and weak acids. If strong organic and inorganic acids, e.g. hydrochloric, sulphuric and hydrofluoric acid, are used, their resistance will basically be determined by the temperature, concentration and reaction time of the medium. In general, the resistance should first be determined by means of longterm tests.

Mechanical properties:

Due to their ceramic characteristic, ferrites are brittle and sensitive to shock and bending loads.

### 2. Rare-earth magnets

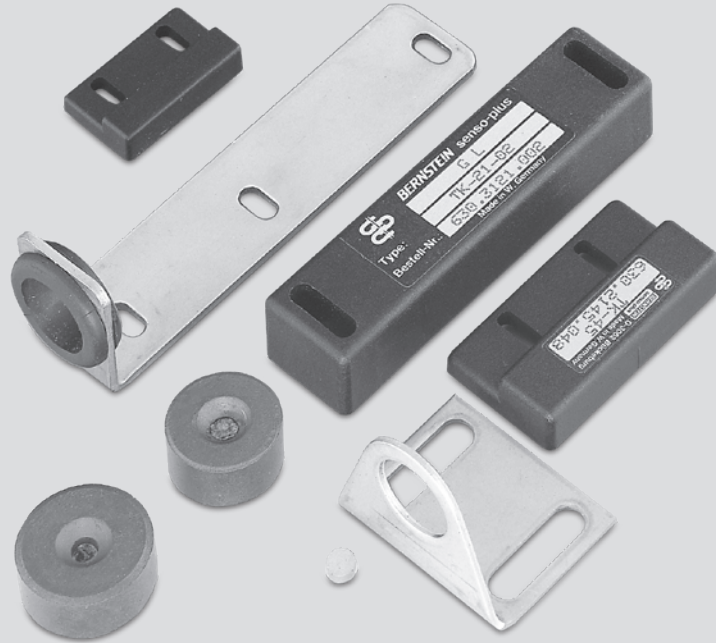
Permanent magnets made from samarium cobalt and neodymium iron boron are high performance and high quality components that are widely used in drive and control engineering. When operated in high temperature ranges, the specified switching distance will decrease by a factor of 0.02 % per 1 °C.

Chemical properties:

All rare-earth magnets are metallic materials and show the corresponding characteristics associated with these materials, e.g. the polished shine immediately after being machined. The magnets are surface-treated (e.g. nickel coating) to protect them from environmental influences.

Mechanical properties:

Minor chips may occur if rare-earth magnets are subjected to impact stress. They respond very sensitively to vibrations and may become demagnetised.



### 3. Plastic-bound magnets

Plastic-bound permanent magnets have an attractive price-performance ratio and thanks to the way they are formed they can be produced with complex geometries.

Injection-moulded magnets are typical composite materials. The magnetic powder is embedded in thermoplastic materials (polyamides). One of the main advantages of plastic-bound magnets is that they can be formed into a diverse range of shapes.

Chemical properties:

Surface corrosion can rarely be found on plastic bound magnets. For this reason, they can be used in most fields of application without additional coating.

Mechanical properties:

Plastic-bound magnets can be subjected to buckling and bending without breaking or chipping.

### Use in potentially explosive atmospheres

Magnets must not be used in potentially explosive atmospheres as they can cause sparks. Grinding dust and chips from rare-earth magnets are self-igniting and burn off at high temperatures. They should therefore only be machined using ample water and never in dry conditions since even dried grinding dust can ignite.

### Strong magnetic fields

Strong magnetic fields can interfere with or even damage electronic or mechanical equipment. This includes cardiac pacemakers. Appropriate safety distances are specified in the corresponding manuals or may be requested from the manufacturers.

### Radioactive radiation

Permanent magnets must not be exposed to longterm radioactive radiation otherwise they may lose their magnetism.



### Effects on persons

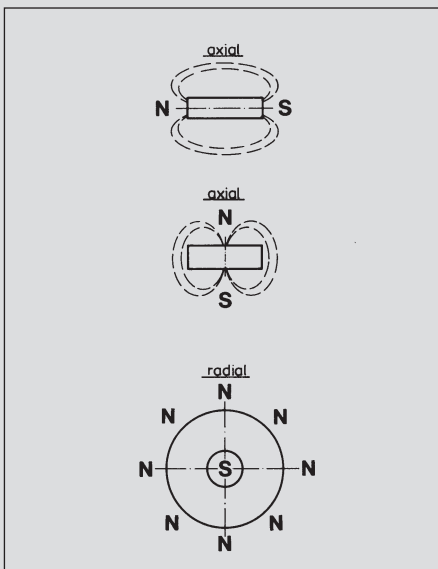
There are no known side-effects caused by touching magnet materials.

### Magnet shapes

Rectangular, circular and cylindrical magnets are the most common shapes of permanent magnets manufactured in a press-shaping process. In addition to these standard geometries, permanent magnets may be manufactured in many other shapes. The shape should preferably be defined during the pressing process since subsequent shaping can only be performed using complex diamond tools. Holes and openings can only be made in the pressing direction.

### Directions of magnetisation

The term preferred direction refers to the alignment of the magnetic crystals in a certain direction. The magnet achieves its highest magnetic values in this preferred direction and must therefore be magnetised in this direction.



The preferred direction is achieved by subjecting the magnetic powder to a strong external magnetic field (coil) during the pressing process. As magnets have no preferred direction, the magnetisation direction and type can be freely selected.

### Mounting a magnetic switch system on ferromagnetic materials

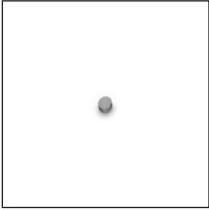
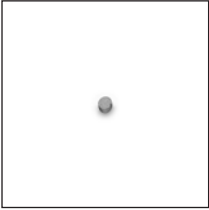
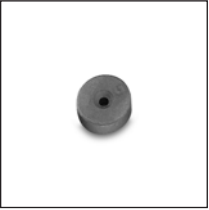

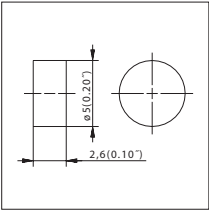
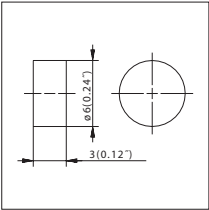
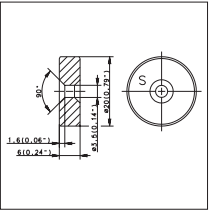
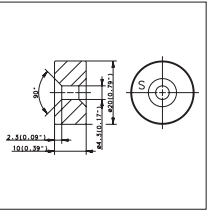


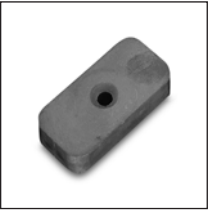
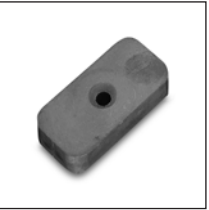
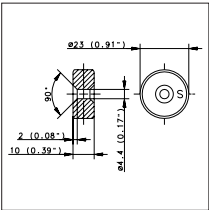
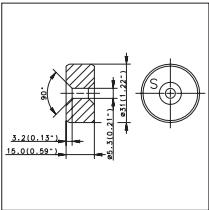
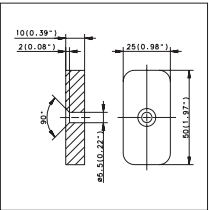
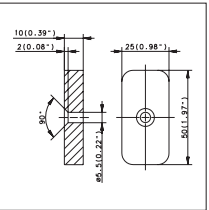
The nominal distance may be reduced when magnetic limit switches and their actuating magnets are mounted on magnetisable material (Fe, etc.). To ensure trouble-free operation, a minimum gap of 15 mm between the magnetic switch and any material that can be magnetised should be maintained as a reference value. The same applies to the actuating magnets.

### Applications

- Counting
- Position indication in lifts
- End position switches in pneumatic and hydraulic installations
- Position indication on butterfly valves, slide valves and valves in general
- Conveyors in high-bay shelving
- Position detection in textile, packaging and meat cutting machines
- Machine runtime and downtime monitoring
- Control of machine tools
- Level monitoring of liquids (see Float Switches)

# Accessories

## Actuating Magnets without Encapsulation


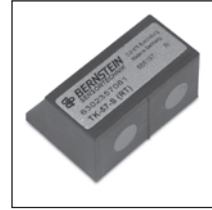

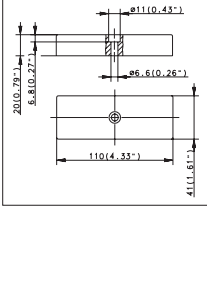
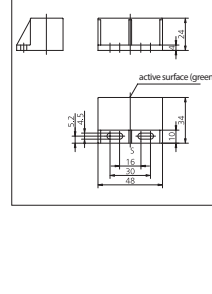
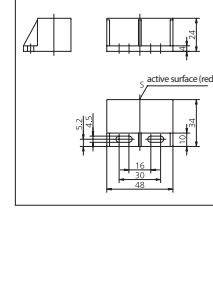



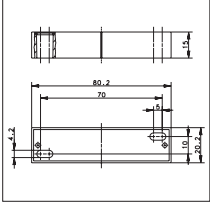
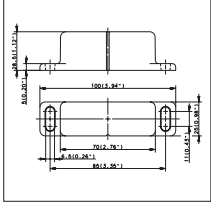
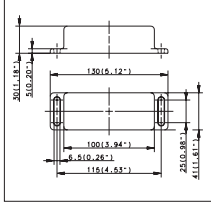
| Actuating magnets without encapsulation       | T-75  | T-06N/S  | T-61N/S   | T-67N/S   |
|---|---|--|---|---|
|   |    |    |    |    |
| Magnet material                               | Rare-earth  | Neodymium iron boron (NdFeB)   | Barium ferrite  | Barium ferrite  |
| Temperature range (magnetic switch operation) | -40 °C ... +150 °C<br>-40 °F ... +302 °F  | -40 °C ... +150 °C<br>-40 °F ... +302 °F   | -40 °C ... +150 °C<br>-40 °F ... +302 °F  | -40 °C ... +150 °C<br>-40 °F ... +302 °F  |
| Temperature coefficient                       | 0.2 %/K   | 0.2 %/K  | 0.2 %/K   | 0.2 %/K   |
| Enclosure material                            | -   | -  | -   | -   |
| Article number                                | <b>6301175057</b>   | <b>6301106065</b>  | <b>6301261035</b>   | <b>6301167054</b>   |
| Dimensioned drawing                           |  |  |  |  |
|   |   | Marking slots on north pole side   |   |   |
| Actuating magnets without encapsulation       | T-62N/S   | T-69N/S  | T-68N   | T-68S   |
|   |  |  |  |  |
| Magnet material                               | Barium ferrite  | Barium ferrite   | Barium ferrite  | Barium ferrite  |
| Temperature range (magnetic switch operation) | -40 °C ... +150 °C<br>-40 °F ... +302 °F  | -40 °C ... +150 °C<br>-40 °F ... +302 °F   | -40 °C ... +150 °C<br>-40 °F ... +302 °F  | -40 °C ... +150 °C<br>-40 °F ... +302 °F  |
| Temperature coefficient                       | 0.2 %/K   | 0.2 %/K  | 0.2 %/K   | 0.2 %/K   |
| Enclosure material                            | -   | -  | -   | -   |
| Article number                                | <b>6301262039</b>   | <b>6301269031</b>  | <b>6301268028</b>   | <b>6301368033</b>   |
| Dimensioned drawing                           |  |  |  |  |
|   |   |  | 90° countersink on north pole side  | 90° countersink on south pole side  |

## Actuating Magnets in Plastic Enclosure




| Actuating magnets in plastic enclosure        | TK-11-11                               | TK-11-01                               | TK-21-02                               | TK-21-12                               |
|---|--|--|--|--|
|   |  |  |  |  |
| Magnet material                               | AlNiCo-500                             | AlNiCo-500                             | AlNiCo-500                             | AlNiCo-500                             |
| Temperature range (magnetic switch operation) | -20 °C ... +80 °C<br>-4 °F ... +176 °F | -20 °C ... +80 °C<br>-4 °F ... +176 °F | -20 °C ... +80 °C<br>-4 °F ... +176 °F | -20 °C ... +80 °C<br>-4 °F ... +176 °F |
| Temperature coefficient                       | 0.2 %/K                                | 0.2 %/K                                | 0.2 %/K                                | 0.2 %/K                                |
| Enclosure material                            | PA 6.6                                 | PA 6.6                                 | PA 6.6                                 | PA 6.6                                 |
| Article number                                | <b>6302111047</b>                      | <b>6303111001</b>                      | <b>6303121002</b>                      | <b>6302121030</b>                      |
| Dimensioned drawing                           |  |  |  |  |
| Actuating magnets in plastic enclosure        | TK-45                                  | TK-42                                  | TK-44                                  |  |
|   |  |  |  |  |
| Magnet material                               | AlNiCo-500                             | AlNiCo-500                             | AlNiCo-500                             |  |
| Temperature range (magnetic switch operation) | -20 °C ... +80 °C<br>-4 °F ... +176 °F | -20 °C ... +80 °C<br>-4 °F ... +176 °F | -20 °C ... +80 °C<br>-4 °F ... +176 °F |  |
| Temperature coefficient                       | 0.2 %/K                                | 0.2 %/K                                | 0.2 %/K                                |  |
| Enclosure material                            | PA 6.6                                 | PA 6.6                                 | PA 6.6                                 |  |
| Article number                                | <b>6302145048</b>                      | <b>6302142049</b>                      | <b>6302144050</b>                      |  |
| Dimensioned drawing                           |  |  |  |  |

# Accessories

## Actuating Magnets




| Actuating magnets in plastic enclosure  | TK-50  | TK-57N  | TK-57S  |
|---|--|---|---|
|    |    |    |   |
| Magnet material   | Barium ferrite   | Barium ferrite  | Barium ferrite  |
| Temperature range (magnetic switch operation)                                       | -20 °C ... +80 °C<br>-4 °F ... +176 °F   | -20 °C ... +80 °C<br>-4 °F ... +176 °F  | -20 °C ... +80 °C<br>-4 °F ... +176 °F  |
| Temperature coefficient   | 0.2 %/K  | 0.2 %/K   | 0.2 %/K   |
| Enclosure material  | PA 6.6   | PBT   | PBT   |
| Article number  | 6302100053   | 6302257060  | 6302357061  |
| Dimensioned drawing   |   |   |  |
| Actuating magnets in metal enclosure  | TA-21-02   | TA-31   | TA-33   |
|  |  |  |   |
| Magnet material   | AlNiCo-500   | AlNiCo-500  | Barium ferrite  |
| Temperature range (magnetic switch operation)                                       | -40 °C ... +150 °C<br>-40 °F ... +302 °F   | -20 °C ... +80 °C<br>-4 °F ... +176 °F  | -20 °C ... +80 °C<br>-4 °F ... +176 °F  |
| Temperature coefficient   | 0.2 %/K  | 0.2 %/K   | 0.2 %/K   |
| Enclosure material  | Al   | Al  | Al  |
| Article number  | 6305121064   | 6303131005  | 6303133034  |
| Dimensioned drawing   |   |   |  |

## Mounting Brackets




| Mounting brackets     | BWN-M06NI/40 x 47   | BWN-M06NI/27 x 38  | BWN-M36NI   |
|-----------------------|---|--|---|
|                       |  |  |  |
| Material              | Niro 1.4301   | Niro 1.4301  | Niro 1.4301   |
| For series            | MA-06, MA-16,<br>MA-26, MA-15   | MA-06, MA-16,<br>MA-26, MA-15  | MA-06, MA-16,<br>MA-26, MA-15   |
| <b>Article number</b> | <b>4102802001</b>   | <b>4102802002</b>  | <b>4904700035</b>   |
| Dimensioned drawing   |   |  |   |





## Accessories


### Miniature Snap-In Connectors

| Miniature snap-in connectors                                     | Ø 6.5 mm  | Ø 6.5 mm   |
|--|---|--|
| <b>Contact assignments</b><br>1 = Brown<br>2 = Black<br>3 = Blue |  |  |
|  |  |  |
| Cable material   | PUR   | PUR  |
| Coupler material   | PA 12   | PA 12  |
| Coupling ring material   | POM   | POM  |
| Temperature range  | -25 °C ... +90 °C<br>-13 °F ... +194 °F   | -25 °C ... +90 °C<br>-13 °F ... +194 °F  |
| Switching function   | Universal   | Universal  |
| Cable structure  | 3 x 0.25 mm <sup>2</sup>  | 3 x 0.25 mm <sup>2</sup>   |
| Protection class   | IP67/NEMA 4   | IP67/NEMA 4  |
| <b>Article number</b>  | <b>4139100219</b>   | <b>4139100221</b>  |
| Type   | GDK-R06US/SO0-2,5PU   | WDK-R06US/SO0-2,5PU  |
|  | <b>4139100220</b>   | <b>4139100222</b>  |
| Type   | GDK-R06US/SO0-5PU   | WDK-R06US/SO0-5PU  |
|  | <b>4139100267</b>   | <b>4139100267</b>  |
| Type   |   | WDK-R06US/SO0-10PU   |

### Connectors

| Cable connector M8 x 1   | M8  | M8   | M8  |
|--|---|--|---|
| <b>Contact assignments</b><br>1 = Brown<br>2 = Black<br>3 = Blue |  |  |  |
| Cable material   | PVC   | PVC  | PVC   |
| Coupler material   | TPU   | PUR  | PUR   |
| Coupling ring material   | CuZn39Pb3   | CuZn39Pb3  | CuZn39Pb3   |
| Temperature range  | -25/+90 °C  | -25/+90 °C   | -25/+90 °C  |
| Switching function   | PNP/LED   | Universal  | Universal   |
| Cable structure  | 3 x 0.25 mm <sup>2</sup>  | 3 x 0.25 mm <sup>2</sup>   | 3 x 0.25 mm <sup>2</sup>  |
| Protection class   | IP67  | IP67   | IP67  |
| <b>Article number</b>  | <b>4139100213</b>   | <b>4139100795</b>  | <b>4139100798</b>   |
| Type   | WDK-M08PS/LL2-2   | GDK-M08US/WO0-2  | WDK-M08US/WO0-2   |
|  | <b>4139100216</b>   | <b>4139100796</b>  | <b>4139100799</b>   |
| Type   | WDK-M08PS/LL2-5   | GDK-M08US/WO0-5  | WDK-M08US/WO0-5   |
|  |   | <b>4139100797</b>  | <b>4139100800</b>   |
| Type   |   | GDK-M08US/WO0-10   | WDK-M08US/WO0-10  |

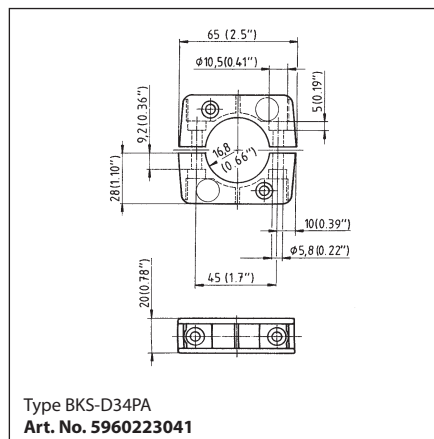
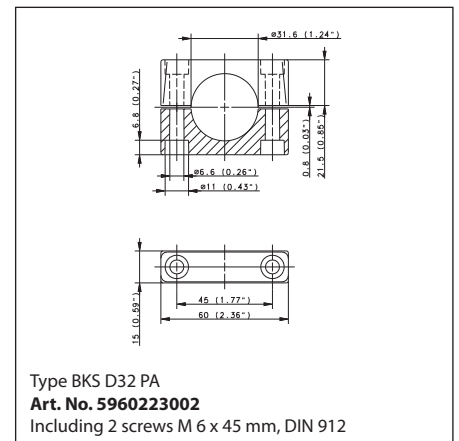
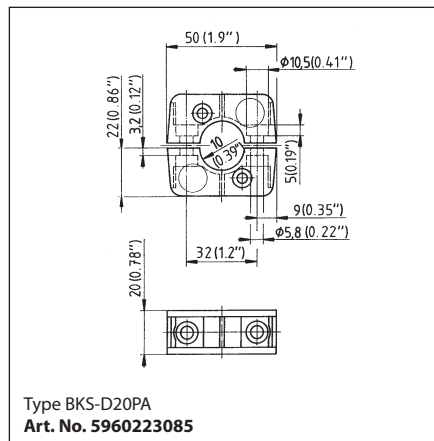
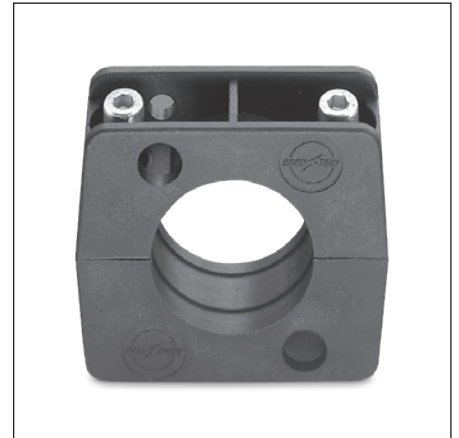
| Cable connector M12 x 1   | M12 3-wire  | M12 3-wire   | M12 4-wire  | M12 4-wire  |
|---|---|--|---|---|
| <b>Contact assignments</b><br>1 = Brown<br>2 = White<br>3 = Blue<br>4 = Black |  |  |  |  |
| Cable material  | PVC   | PVC  | PVC   | PUR   |
| Coupler material  | PUR   | PUR  | PA  | PUR   |
| Coupling ring material  | CuZn39Pb3   | CuZn39Pb3  | CuZn39Pb3   | CuZn39Pb3   |
| Temperature range   | -25/+90 °C  | -25/+90 °C   | -25/+90 °C  | -25/+90 °C  |
| Switching function  | Universal   | Universal  | Universal   | PNP/LED   |
| Cable structure   | 3 x 0.34 mm <sup>2</sup>  | 3 x 0.34 mm <sup>2</sup>   | 4 x 0.25 mm <sup>2</sup>  | 4 x 0.25 mm <sup>2</sup>  |
| Protection class  | IP67  | IP67   | IP67  | IP67  |
| <b>Article number</b>   | <b>4139100801</b>   | <b>4139100804</b>  |   | <b>4139100244</b>   |
| Type  | GDK-M12US/WO0-2   | WDK-M12US/WO0-2  |   | WDK-M12PA/SL2-2PU   |
| <b>5 m</b>  | <b>4139100802</b>   | <b>4139100468</b>  | <b>4139100903</b>   | <b>4139100245</b>   |
| Type  | GDK-M12US/WO0-5   | WDK-M12US/WO0-5  | WDK-M12UA/WO0-5   | WDK-M12PA/SL2-5PU   |
| <b>10 m</b>   | <b>4139100803</b>   | <b>4139100805</b>  | <b>4139100467</b>   | <b>4139100254</b>   |
| Type  | GDK-M12US/WO0-10  | WDK-M12US/WO0-10   | WDK-M12UA/WO0-10  | WDK-M12PA/SL2-10PU  |

| Cable connector M12 x 1   | M12   | M12  | M12 3-wire  | M12 5-wire  |
|---|---|--|---|---|
| <b>Contact assignments</b><br>1 = Brown<br>2 = White<br>3 = Blue<br>4 = Black |  |  |  |  |
| Cable material  | -   | -  | PVC   | PUR   |
| Coupler material  | PA  | PA   | TPU   | PUR   |
| Coupling ring material  | CuZn39Pb3   | CuZn39Pb3  | CuZn39Pb3   | CuZn39Pb3   |
| Temperature range   | -25/+90 °C  | -25/+90 °C   | -25/+90 °C  | -25/+90 °C  |
| Switching function  | Universal   | Universal  | PNP/LED   | Universal   |
| Cable structure   | -   | -  | 3 x 0.4 mm <sup>2</sup>   | 5 x 0.34 mm <sup>2</sup>  |
| Protection class  | IP67  | IP67   | IP67  | IP67  |
| <b>Article number</b>   | <b>4139100102</b>   | <b>4139100101</b>  | <b>4139100553</b>   | <b>4139100956</b>   |
| Type  | GDA-M12UA/LO  | WDA-M12UA/LO   | WDK-M12PS/LL2-2   | GDK-M12UU/HO-2PU  |
| <b>5 m</b>  |   |  | <b>4139100554</b>   |   |
| Type  |   |  | WDK-M12PS/LL2-6   |   |
| <b>10 m</b>   |   |  |   |   |
| Type  |   |  |   |   |





## Mounting Brackets



# Accessories

## Sensor Tester



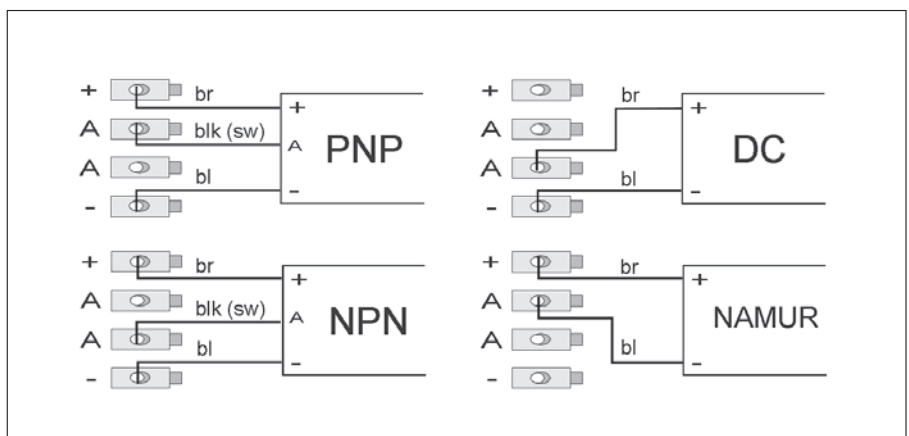
| Technical data    |  |
|-------------------|--|
| Type designation  | Sensor Tester  |
| Article number    | <b>651000048</b>   |
| Function          | Sensor tester for DC 2-wire and 3-wire proximity switches<br>Test function: Checking and indicating the switching status of a sensor with visual and acoustic signal |
| Power supply      | 9 V block battery (6LR61)  |
| Output voltage    | 15 VDC, 20 mA stabilised   |
| Enclosure         | Modified enclosure of Series OR20  |
| Temperature range | min/max<br>-25 °C/+70 °C   |
| Input signals     | NPN/PNP 3-wire, DC 2-wire, NAMUR   |

The sensor tester is used for checking 2-wire and 3-wire DC proximity switches. Coloured LEDs and an acoustic signal are used to indicate the switching statuses.

- Green LED: Operating voltage
- Red LED: Low battery
- Yellow LED: Sensor switching status

When not in use, the sensor tester switches off automatically after approx. 30 s.

### Connection assignments





# Type Code

## Inductive Sensors

|               |          |          |                   |          |          |          |          |          |                  |          |          |          |          |          |          |          |    |    |   |
|---------------|----------|----------|-------------------|----------|----------|----------|----------|----------|------------------|----------|----------|----------|----------|----------|----------|----------|----|----|---|
| 1             | 2        | 3        | 4                 | 5        | 6        | 7        | 8        | 9        | 10               | 11       | 12       | 13       | 14       | 15       | 16       | 17       | 18 | 19 | + |
| <b>K</b>      | <b>I</b> | <b>N</b> | <b>-</b>          | <b>T</b> | <b>1</b> | <b>2</b> | <b>N</b> | <b>S</b> | <b>/</b>         | <b>0</b> | <b>0</b> | <b>4</b> | <b>-</b> | <b>K</b> | <b>L</b> | <b>2</b> |    |    |   |
| Product group |          |          | Type of enclosure |          |          |          | Output   |          | Sensing distance |          |          |          | Options  |          |          |          |    |    |   |

| Product group     |   |  |
|-------------------|---|--|
| 1                 | K | Non-contact proximity switch                 |
| 2                 | I | Inductive                                    |
| 3                 | B | Flush mount                                  |
|                   | N | Non-flush mount                              |
|                   | R | Ring sensor                                  |
| 4                 | - | Dash (fixed)                                 |
| Type of enclosure |   |  |
| 5                 | M | Metric thread (metal enclosure)              |
|                   | T | Metric thread (plastic enclosure)            |
|                   | D | Round enclosure (metal)                      |
|                   | R | Round enclosure (plastic)                    |
|                   | Q | Cuboid enclosure (metal)                     |
|                   | P | PG thread (metal)                            |
|                   | E | Rectangular enclosure (plastic)              |
|                   | S | Slot proximity switch (plastic)              |
|                   | N | Standard mounting (to DIN 50025/50037)       |
|                   | C | Compact enclosure                            |
| 6 – 7             |   | Two-digit number for:                        |
|                   |   | Round types = Ø as specified                 |
|                   |   | Threaded types = standard designation        |
|                   |   | Rectangular types = consecutive type numbers |

| Design examples             |     |                            |
|-----------------------------|-----|----------------------------|
|                             | D08 | Ø 8 mm (metal)             |
|                             | R22 | Ø 22 mm (plastic)          |
|                             | M12 | Threaded barrel M12 x 1    |
| Rectangular and other types |     |                            |
|                             | E16 | 16 x 5 x 5 mm              |
|                             | E27 | 27 x 10 x 5.5 mm           |
|                             | E28 | 28 x 16 x 11 mm            |
|                             | E40 | 40 x 26 x 12 mm            |
|                             | E50 | 50 x 25 x 10 mm            |
|                             | E68 | 68 x 30 x 15 mm            |
|                             | G00 | Tube thread, general       |
|                             | N44 | 41.5 x 41.5 x 120 mm       |
|                             | Q05 | 5 x 5 x 25 mm              |
|                             | Q08 | 8 x 8 x 40 mm, Side active |
|                             | Q12 | 12 x 12 x 55 mm            |

| Output           |            |  |
|------------------|------------|--|
| 8                | P          | PNP                                    |
|                  | N          | NPN                                    |
|                  | A          | AC 2-wire                              |
|                  | E          | NAMUR                                  |
|                  | Z          | DC 2-wire                              |
|                  | R          | Relay                                  |
|                  | G          | Push-pull                              |
|                  | D          | Dual output stage (NPN/PNP selectable) |
| 9                | S          | NO contact                             |
|                  | Ö          | NC contact                             |
|                  | P          | Programmable                           |
|                  | A          | Analogue                               |
|                  | U          | Antivalent (selectable)                |
| 10               | /          | Slash (fixed)                          |
| Sensing distance |            |  |
| 11 – 13          | f. ex. 1.5 | 1.5 mm                                 |
|                  | f. ex. 002 | 2.0 mm                                 |
|                  | f. ex. 040 | 40 mm                                  |
| 14               | -          | Dash (fixed)                           |
| Options          |            |  |
| 15 – 17          |            | See type code "OPTIONS", p. 106        |

## Capacitive Sensors

|               |          |          |                   |          |          |          |          |          |                  |          |          |          |          |          |          |          |          |    |   |
|---------------|----------|----------|-------------------|----------|----------|----------|----------|----------|------------------|----------|----------|----------|----------|----------|----------|----------|----------|----|---|
| 1             | 2        | 3        | 4                 | 5        | 6        | 7        | 8        | 9        | 10               | 11       | 12       | 13       | 14       | 15       | 16       | 17       | 18       | 19 | + |
| <b>K</b>      | <b>C</b> | <b>N</b> | <b>-</b>          | <b>T</b> | <b>1</b> | <b>2</b> | <b>N</b> | <b>S</b> | <b>/</b>         | <b>0</b> | <b>0</b> | <b>4</b> | <b>-</b> | <b>K</b> | <b>L</b> | <b>P</b> | <b>2</b> |    |   |
| Product group |          |          | Type of enclosure |          |          |          | Output   |          | Sensing distance |          |          |          | Options  |          |          |          |          |    |   |

| Product group     |   |  |
|-------------------|---|--|
| 1                 | K | Non-contact proximity switch                 |
| 2                 | C | Capacitive                                   |
| 3                 | B | Flush mount                                  |
|                   | N | Non-flush mount                              |
| 4                 | - | Dash (fixed)                                 |
| Type of enclosure |   |  |
| 5                 | M | Metric thread (metal enclosure)              |
|                   | T | Metric thread (plastic enclosure)            |
|                   | D | Round enclosure (metal)                      |
|                   | R | Round enclosure (plastic)                    |
|                   | Q | Cuboid enclosure (metal)                     |
|                   | P | PG thread (metal)                            |
|                   | E | Rectangular enclosure (plastic)              |
|                   | N | Standard mounting (to DIN 50025/50037)       |
| 6-7               |   | Two-digit number for:                        |
|                   |   | Round types = Ø as specified                 |
|                   |   | Threaded types = standard designation        |
|                   |   | Rectangular types = consecutive type numbers |

| Design examples |    |  |
|-----------------|----|--|
|                 | 12 | Thread M12 x 1                                 |
|                 | 18 | Thread M18 x 1                                 |
|                 | 30 | Thread M30 x 1,5                               |
|                 | 32 | Thread M32 x 1,5                               |
|                 | 34 | Ø 34 mm (metal/plastic)                        |
|                 | 20 | Ø 20 mm (plastic)                              |
|                 | 22 | Ø 22 mm (plastic)                              |
|                 | 50 | 50 x 25 x 10 mm                                |
|                 | 68 | 68 x 30 x 15 mm                                |
|                 | 44 | 41.5 x 41.5 x 120 mm (Euro standard enclosure) |
| Output          |    |  |
| 8               | p  | PNP  |
|                 | N  | NPN  |
|                 | A  | AC 2-wire                                      |
|                 | E  | NAMUR  |
|                 | Z  | DC 2-wire                                      |
|                 | R  | Relay  |
|                 | G  | Push-pull                                      |
|                 | D  | Dual output stage (NPN/PNP selectable)         |

| Output           |          |                                 |
|------------------|----------|---------------------------------|
| 9                | S        | NO contact                      |
|                  | Ö        | NC contact                      |
|                  | P        | Programmable                    |
|                  | A        | Analogue                        |
|                  | U        | Antivalent (selectable)         |
| 10               | /        | Slash (fixed)                   |
| Sensing distance |          |                                 |
| 11-13            | e.g. 1.5 | 1.5 mm                          |
|                  | e.g. 002 | 2.0 mm                          |
|                  | e.g. 040 | 40 mm                           |
| 14               | -        | Dash (fixed)                    |
| Options          |          |                                 |
| 15-19            |          | See type code "OPTIONS", p. 106 |

# Magnetic Switches

|               |          |          |          |          |          |                        |          |          |          |              |          |          |                  |          |          |    |  |  |
|---------------|----------|----------|----------|----------|----------|------------------------|----------|----------|----------|--------------|----------|----------|------------------|----------|----------|----|--|--|
| 1             | 2        | 3        | 4        | 5        | 6        | 7                      | 8        | 9        | 10       | 11           | 12       | 13       | 14               | 15       | 16       | 17 |  |  |
| <b>M</b>      | <b>A</b> | <b>K</b> | <b>-</b> | <b>0</b> | <b>1</b> | <b>1</b>               | <b>2</b> | <b>-</b> | <b>D</b> | <b>-</b>     | <b>1</b> | <b>-</b> | <b>S</b>         | <b>O</b> | <b>K</b> |    |  |  |
| Product group |          |          | Type     |          |          | Contact specifications |          |          |          | Cable length |          |          | Special features |          |          |    |  |  |

| Product group          |                    |   |
|------------------------|--------------------|---|
| 1                      | M                  | Magnetic switch   |
| 2                      | Type of output     |   |
|                        | A                  | Reed contact  |
|                        | R                  | Relay   |
| 3                      | Enclosure material |   |
|                        | A                  | Aluminium   |
|                        | N                  | Stainless steel   |
|                        | M                  | Brass, nickel-plated  |
|                        | K                  | Plastic, general  |
|                        | O                  | Other materials   |
| 4                      | -                  | Dash (fixed)  |
| Type                   |                    |   |
| 5 – 6                  | 01 – 99            | Cylindrical and rectangular types (see next page for details) |
| Contact specifications |                    |   |
| 7                      | Number of contacts |   |
|                        | e.g. 1             | 1 Reed contact  |
|                        | e.g. 2             | 2 Reed contacts   |
|                        | ...                | etc.  |

| 8  | Contact function                    |                                   |
|----|-------------------------------------|-----------------------------------|
|    | 1                                   | NC contact                        |
|    | 2                                   | NO contact                        |
|    | 3                                   | Changeover contact                |
|    | 4                                   | Bistable (ON/OFF)                 |
|    | 5                                   | Bistable (changeover contact)     |
|    | 6                                   | NC, NO contact; separate contacts |
|    | 7                                   | Coded, BG                         |
|    | 8                                   | Currently not used                |
|    | 9                                   | Currently not used                |
|    | 0                                   | Other outputs                     |
| 9  | -                                   | Dash (fixed)                      |
| 10 | Contact type/power of reed contacts |                                   |
|    | A                                   | 250 VDC ; 0.5 A; 20 VA            |
|    | B                                   | 250 VDC ; 0.5 A; 10 VA            |
|    | C                                   | 250 VDC ; 0.5 A; 30 VA            |
|    | D                                   | 250 VDC ; 0.5 A; 30 VA            |
|    | E                                   | 250 VDC ; 1.5 A; 30 VA            |
|    | F                                   | 250 VDC ; 3.0 A; 100 VA           |
|    | G                                   | 250 VDC ; 5.0 A; 250 VA           |
|    | H                                   | 250 VDC ; 1.0 A; 60 VA            |
|    | K                                   | 250 VDC ; 0.5 A; 30 VA            |
|    | L                                   | 250 VDC ; 1.0 A; 60 VA            |
|    | M                                   | 250 VDC ; 1.0 A; 80 VA            |
|    | N                                   | 250 VDC ; 1.0 A; 60 VA            |
|    | O                                   | 120 VDC ; 0.5 A; 10 VA            |
|    | P                                   | 250 VDC ; 5.0 A; 250 VA           |
|    | R                                   | 28 VDC ; 0.25 A; 3 VA             |
|    | W                                   | 250 VDC ; 1.0 A; 60 VA            |
|    | X                                   | 100 VDC ; 0.25 A; 5 VA            |
|    | Y                                   | 100 VDC ; 0.5 A; 10 VA            |

| TRIAC                  |        |   |
|------------------------|--------|---|
|                        | K      | 24 – 250 VDC ; 1.5 A<br>a. 300 VA<br>b. 330 VA      |
|                        | Hall   |   |
| 11                     | -      | Dash (fixed)  |
| Cable length in metres |        |   |
| 12                     | e.g. 1 | 1 m cable   |
|                        | e.g. 2 | 2 m cable   |
|                        | ...    | etc.  |
| 13                     | -      | Dash (fixed)  |
| Special features       |        |   |
| 14 – 17                | T      | Temperature resistant from -40 °C to +150 °C        |
|                        | SI     | With miniature fuse                                 |
|                        | VDR    | With VDR  |
|                        | WID    | With resistor                                       |
|                        | LED    | With LED  |
|                        | SPK    | Spiral cable  |
|                        | SK     | Special cable                                       |
|                        | SOK    | Connector type without head (without device socket) |
|                        | SMK    | Connector type with head (with device socket)       |
|                        | PG11   | Type of thread                                      |
|                        | RZ     | Time delay with relay                               |
|                        | 220 V  | 220 Volt version                                    |
|                        | 24 V   | 24 Volt version                                     |
|                        | STK    | Connector   |

## Magnetic Switches

|               |          |          |          |          |          |                        |          |          |          |              |          |          |                  |          |          |    |  |  |
|---------------|----------|----------|----------|----------|----------|------------------------|----------|----------|----------|--------------|----------|----------|------------------|----------|----------|----|--|--|
| 1             | 2        | 3        | 4        | 5        | 6        | 7                      | 8        | 9        | 10       | 11           | 12       | 13       | 14               | 15       | 16       | 17 |  |  |
| <b>M</b>      | <b>A</b> | <b>K</b> | <b>-</b> | <b>0</b> | <b>1</b> | <b>1</b>               | <b>2</b> | <b>-</b> | <b>D</b> | <b>-</b>     | <b>1</b> | <b>-</b> | <b>S</b>         | <b>O</b> | <b>K</b> |    |  |  |
| Product group |          |          | Type     |          |          | Contact specifications |          |          |          | Cable length |          |          | Special features |          |          |    |  |  |

| Type  |         |                                   |
|-------|---------|-----------------------------------|
| 5 – 6 | 01 – 99 | Cylindrical and rectangular types |
|       | 01      | 45 x 13 x 9 mm [MA-01] PA         |
|       | 02      | 80 x 20 x 15 mm [MA-02] PA/AL     |
|       | 03      | 110 x 58 x 29 mm [MA-03] AL       |
|       | 04      | ∅ 15.5 x 87 mm [MA-04] PC         |
|       | 05      | Currently not used                |
|       | 06      | ∅ 12 x 81 mm [MA-06] AL           |
|       | 07 – 10 | Currently not used                |
|       | 11      | 28.6 x 18 x 6.4 mm [MA-11] PA     |
|       | 12      | 80 x 20 x 15 mm [MA-12] PA        |
|       | 13      | 68 x 30 x 15 mm [MA-13] PC        |
|       | 14      | Currently not used                |
|       | 15      | ∅ 12 x 81 mm [MA-15] PA           |
|       | 16      | ∅ 12 x 81 mm [MA-13] VA           |
|       | 17      | PG9 x 60 mm [MA-17] PA            |
|       | 18      | M12 x 1 x 60 mm [MA-18] Ms        |
|       | 19      | M18 x 1 x 80 mm [MA-19] Ms        |
|       | 20      | Currently not used                |
|       | 21      | PG9 x 80 mm [MA-21] PA            |
|       | 22      | Currently not used                |
|       | 23      | M12 x 1 x 80 mm [MA-23] Ms        |
|       | 24/25   | Currently not used                |
|       | 26      | ∅ 12 x 81 mm [MA-26] PA           |
|       | 27      | Currently not used                |
|       | 28      | M12 x 1 x 60 mm [MA-28] PA        |
|       | 29      | M18 x 1 x 80 mm [MA-29] PA        |
|       | 30      | ∅ 6 x 30 mm [MA-30] PA            |
|       | 31      | Currently not used                |
|       | 32      | 85 x 26 x 26 mm [MA-32] PBT       |
|       | 33      | M12 x 1 x 80 mm [MA-33] PA        |
|       | 34/35   | Currently not used                |

|  |       |                             |
|--|-------|-----------------------------|
|  | 36    | ∅ 13 x 96 mm [MA-36] PA     |
|  | 37–39 | Currently not used          |
|  | 40    | M10 x 1 x 40 mm [MA-40] PPE |
|  | 41    | 50 x 31 x 11 mm [MA-41] PA  |
|  | 42    | 88 x 25 x 13 mm [MA-42] PA  |
|  | 43    | PG9 x 80 mm [MA-43] Ms      |
|  | 44    | 80 x 30 x 15 mm [MA-44] PA  |
|  | 45    | 45 x 25.5 x 9 mm [MA-45] PA |
|  | 46    | ∅ 6.5 x 39.34 mm [MA-46] PA |
|  | 47    | Currently not used          |
|  | 48    | 80 x 30 x 15 mm [MA-48] PA  |
|  | 49–51 | Currently not used          |
|  | 52    | 43 x 26 x 13 mm [MA-52] PBT |
|  | 53    | M30 x 1.5 mm [MA-53] PA     |
|  | 54    | Currently not used          |
|  | 55    | 12 x 12 x 55 mm [MA-55] S   |
|  | 56–59 | Currently not used          |
|  | 60    | M8 x 1 mm [MA-60] S         |
|  | 61    | M10 x 1 mm [MA-61] S        |
|  | 62    | M12 x 1 mm [MA-62] S        |
|  | 63    | M18 x 1 mm [MA-63] S        |
|  | 64    | M30 x 1.5 mm [MA-64] S      |
|  | 65–69 | Currently not used          |
|  | 70    | ∅ 6.5 mm [MA-70] S          |
|  | 71/72 | Currently not used          |
|  | 73    | 68 x 30 x 15 mm [MA-73] S   |
|  | 74–79 | Currently not used          |
|  | 80    | 8 x 8 x 40 mm [MA-80] S     |
|  | 81–98 | Currently not used          |
|  | 99    | other [MA-99] S             |

## Magnetic Switch Monitoring Devices

|               |   |   |   |                            |                  |   |   |   |         |    |    |    |                  |    |    |    |    |    |    |    |    |    |    |
|---------------|---|---|---|----------------------------|------------------|---|---|---|---------|----|----|----|------------------|----|----|----|----|----|----|----|----|----|----|
| 1             | 2 | 3 | 4 | 5                          | 6                | 7 | 8 | 9 | 10      | 11 | 12 | 13 | 14               | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| M             | Ü | Z | - | 1                          | 0                | 2 | / | U | 2       | 4  | -  | F  | L                | -  | 2  | S  | -  | E  | 2  | 0  | -  | H  | G  |
| Product group |   |   |   | Numb. of magnetic switches | Number of relays |   |   |   | Voltage |    |    |    | Special features |    |    |    |    |    |    |    |    |    |    |

| Product group                           |     |                                |
|---|-----|--------------------------------|
| 1                                       | M   | Magnetic limit switch, general |
| 2                                       | Ü   | Monitoring                     |
|   | C   | Controller                     |
| 3                                       | Z   | Control station                |
|   | S   | Interface                      |
|   | N   | Power supply unit              |
| 4                                       | -   | Dash (fixed)                   |
| Number of connectable magnetic switches |     |                                |
| 5                                       | 1   | 1 unit                         |
|   | 2   | 2 units                        |
|   | ... | etc.                           |
| Number of relays                        |     |                                |
| 6 – 7                                   | 01  | 1 unit                         |
|   | 02  | 2 units                        |
|   | 03  | Constant current source        |
|   | 04  | 4 units                        |
|   | ... | etc.                           |
| 8                                       | /   | Slash (fixed)                  |

| Voltage |  |               |
|---------|--|---------------|
| 9       | A  | AC            |
|         | D  | DC            |
|         | U  | UC            |
|         | 1  | Mains voltage |
|         | 2  | Mains voltage |
| 10 – 11 | 24   | 24 Volt       |
|         | The following applies when there is a "1" in the 9 <sup>th</sup> position: |               |
|         | 10   | 110 Volt      |
|         | 20   | 120 Volt      |
|         | 30   | 130 Volt      |
|         | The following applies when there is a "2" in the 9 <sup>th</sup> position: |               |
|         | 10   | 210 Volt      |
|         | 20   | 220 Volt      |
|         | 30   | 230 Volt      |

| Special features |  |                                 |
|------------------|--|---------------------------------|
| 13 – 24          | FL   | Flat design                     |
|                  | 2S   | NO contact signal (to outside)  |
|                  | E20  | 20 transducer units, externally |
|                  | HG   | Hall sensor                     |
|                  | VC   | Voltage control                 |
|                  | PRT  | Print version                   |
|                  | DA   | Data output                     |
|                  | Special features are separated by a dash with no specific position assignment. |                                 |



## Magnetic Sensors / Teachable Slot Sensors / Electronic

|               |          |          |                   |          |          |          |          |          |             |          |          |          |          |          |          |          |  |  |  |
|---------------|----------|----------|-------------------|----------|----------|----------|----------|----------|-------------|----------|----------|----------|----------|----------|----------|----------|--|--|--|
| 1             | 2        | 3        | 4                 | 5        | 6        | 7        | 8        | 9        | 10          | 11       | 12       | 13       | 14       | 15       |          |          |  |  |  |
| <b>M</b>      | <b>E</b> | <b>K</b> | <b>-</b>          | <b>M</b> | <b>1</b> | <b>2</b> | <b>P</b> | <b>S</b> | <b>/</b>    | <b>H</b> | <b>1</b> | <b>0</b> | <b>-</b> | <b>K</b> | <b>L</b> | <b>2</b> |  |  |  |
| Product group |          |          | Type of enclosure |          |          |          | Output   |          | Sensitivity |          |          |          | Options  |          |          |          |  |  |  |

| Product group     |   |  |
|-------------------|---|--|
| 1                 | M | Magnetic sensor                            |
| 2                 | E | Electronic                                 |
| 3                 | K | Plastic                                    |
|                   | M | Brass                                      |
|                   | N | Stainless steel                            |
| 4                 | - | Dash (fixed)                               |
| Type of enclosure |   |  |
| 5                 | M | Metric thread                              |
|                   | D | Round enclosure                            |
|                   | E | Rectangular enclosure                      |
|                   | Q | Cuboid enclosure                           |
| 6 – 7             |   | Two-digit number for:                      |
|                   |   | Metric enclosure<br>= standard designation |
|                   |   | Round enclosure<br>= Ø as specified        |
|                   |   | Rectangular enclosure<br>= enclosure width |
|                   |   | Cuboid enclosure<br>= edge length          |

| Output      |          |  |
|-------------|----------|--|
| 8           | P        | PNP                                      |
|             | N        | NPN                                      |
| 9           | S        | NO contact                               |
|             | Ö        | NC contact                               |
|             | B        | Bistable                                 |
|             | A        | Analogue                                 |
|             | D        | Speed                                    |
| 10          | /        | Slash (fixed)                            |
| Sensitivity |          |  |
| 11          | H        | Hall                                     |
|             | M        | Magneto-resistive                        |
| 12 – 13     |          | Sensitivity in mT                        |
|             | z. B. 10 | 10 mT                                    |
|             | z. B. 01 | 1 mT                                     |
| 14          | -        | Dash (fixed)                             |
| Options     |          |  |
| 15          |          | See type code "OPTIONS",<br>see page 106 |

## Type Code

### Options

|          |          |          |          |          |          |          |          |          |          |          |          |          |          |  |  |  |  |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|--|--|--|--|
| 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        | 10       | 11       | 12       | 13       | 14       |  |  |  |  |
| <b>K</b> | <b>L</b> | <b>2</b> | <b>E</b> | <b>V</b> | <b>P</b> | <b>S</b> | <b>N</b> | <b>T</b> | <b>F</b> | <b>Z</b> | <b>I</b> | <b>D</b> | <b>G</b> |  |  |  |  |
|          |          |          |          |          |          |          |          |          |          |          |          |          |          |  |  |  |  |

|   |      |  |
|---|------|--|
| 1 | K    | Short circuit-proof                                      |
| 2 | L    | LED  |
| 3 | 2    | Cable length in m  |
| 4 | E    | Extended sensing distance (sn large)                     |
| 5 | V    | Shortened type   |
| 6 | P    | Potentiometer  |
| 7 | S    | Device connector (terminals)                             |
|   | PU   | PUR cable  |
|   | SD   | Connector to DIN 43650 (including socket)                |
|   | SM   | Mini snap-in device connector                            |
|   | S8   | M8 device connector with union nut                       |
|   | S12  | M12 device connector with union nut                      |
|   | SM8  | Mini snap-in / M8 screw-on device connector              |
|   | S12A | M12 device connector with union nut, AC version          |
|   | S16S | M16 device connector with union nut and dust cap         |
|   | S12U | M12 Ultra-Lock device connector                          |
|   | S5   | M5 x 0,5 device connector<br>Screw-connection with cable |

|    |   |                              |
|----|---|------------------------------|
| 8  | N | Stainless steel enclosure    |
| 9  | T | Extended temperature range   |
| 10 | F | Extended switching frequency |
| 11 | Z | Time-delayed                 |
| 12 | I | Programmable (intelligent)   |
| 13 | D | ATEX products, dust Ex       |
| 14 | G | ATEX products, gas Ex        |

## Cable Connectors

|                       |          |          |                    |          |          |          |                |          |          |          |          |          |              |          |          |          |  |  |  |
|-----------------------|----------|----------|--------------------|----------|----------|----------|----------------|----------|----------|----------|----------|----------|--------------|----------|----------|----------|--|--|--|
| 1                     | 2        | 3        | 4                  | 5        | 6        | 7        | 8              | 9        | 10       | 11       | 12       | 13       | 14           | 15       | 16       | 17       |  |  |  |
| <b>W</b>              | <b>D</b> | <b>K</b> | <b>-</b>           | <b>M</b> | <b>1</b> | <b>2</b> | <b>P</b>       | <b>S</b> | <b>/</b> | <b>L</b> | <b>L</b> | <b>2</b> | <b>-</b>     | <b>2</b> | <b>P</b> | <b>U</b> |  |  |  |
| Device specifications |          |          | Type of connection |          |          |          | Classification |          |          | LEDs     |          |          | Cable length | Options  |          |          |  |  |  |

| Device specifications |     |   |
|-----------------------|-----|---|
| 1                     |     | Cable output  |
|                       | W   | Elbow   |
|                       | G   | Straight  |
| 2                     |     | Product group   |
|                       | D   | Socket  |
|                       | S   | Connector (the sensor connections should always be used as the basis for connecting lines with different outputs) |
|                       | A   | Adapter (socket and connector)  |
| 3                     |     | Preassembly   |
|                       | K   | Fixed cable   |
|                       | A   | Connection space, self-configurable   |
|                       | V   | Connecting line (extension)   |
| 4                     | -   | Dash (fixed)  |
| Type of connection    |     |   |
| 5 - 7                 |     | Always related to the socket / connector  |
|                       | M12 | Union nut M12 x 1   |
|                       | M08 | Union nut M8 x 1  |
|                       | R06 | Round snap-in connection Ø 6.5 mm   |
|                       | R12 | Round snap-in connection, Ultra-Lock M12  |
|                       | M05 | M5 x 0.5 screw-on connection  |

| Classification |   |   |
|----------------|---|---|
| 8              |   | Configuration for switch output   |
|                | P | PNP (LED to negative)   |
|                | N | N = NPN (LED to positive)   |
|                | U | Universal (no LED)  |
|                | A | AC (M12 special coding Pin 1 + 2)   |
| 9              |   | Pin assignments of cable sockets for switch output                        |
|                | S | NO contact<br>1 - 3 - 4 for M12<br>1 - 3 - 2 for Mini<br>1 - 2 for M12 AC |
|                | Ö | NC contact<br>1 - 3 - 2 for M12   |
|                | A | Antivalent<br>1 - 3 - 4 - 2 for M12                                       |
|                | N | NAMUR<br>1 - 3 for M12  |
|                | U | More than 4 connections   |
|                | T | Teach-in function   |
| 10             | / | Slash (fixed)   |
| Manufacturer   |   |   |
| 11             |   | Internal information  |

| LEDs         |         |                       |
|--------------|---------|-----------------------|
| 12           | L       | Integrated LED        |
|              | O       | Without LED           |
| 13           |         | Number of LEDs        |
|              | 0       | No LED                |
|              | 1       | 1 LED                 |
|              | 2       | 2 LEDs etc.           |
| 14           | -       | Dash (fixed)          |
| Cable length |         |                       |
| 15           |         | In m (moulded cable)  |
| Options      |         |                       |
| 16 - 17      | PU      | Polyurethane cable    |
|              | HF      | Highly flexible cable |
|              | SD      | Connector/socket      |
|              | BD      | Socket both ends      |
|              | R       | Vibration safeguard   |
|              | Without | PVC cable             |

# Type Code

## Mounting Material

|               |          |          |          |            |          |          |          |          |  |  |  |  |  |  |  |  |  |  |  |  |
|---------------|----------|----------|----------|------------|----------|----------|----------|----------|--|--|--|--|--|--|--|--|--|--|--|--|
| 1             | 2        | 3        | 4        | 5          | 6        | 7        | 8        | 9        |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>B</b>      | <b>K</b> | <b>S</b> | <b>-</b> | <b>D</b>   | <b>2</b> | <b>0</b> | <b>P</b> | <b>A</b> |  |  |  |  |  |  |  |  |  |  |  |  |
| Product group |          |          |          | Type group |          |          | Material |          |  |  |  |  |  |  |  |  |  |  |  |  |

| Product group |   |                   |
|---------------|---|-------------------|
| 1             | B | Mounting material |
| 2             |   | Type of product   |
|               | K | Retaining bracket |
|               | W | Mounting bracket  |
|               | H | Retaining plate   |
| 3             |   | Specification     |
|               | S | Bracket, 2-piece  |
|               | B | Block, 1-piece    |
|               | R | Reducer           |
|               | N | 90° elbow         |
| 4             | - | Dash (fixed)      |

| Type group |          |   |
|------------|----------|---|
| 5-7        |          | <b>For clips:</b>                               |
|            |          | Diameter in mm corresponding to matching sensor |
|            |          | <b>For elbows:</b><br>Type group                |
|            | e.g. L05 | Light barrier OR05                              |
|            | e.g. M06 | Magnetic switch M06                             |
| Material   |          |   |
| 8-9        |          | Material  |
|            | ST       | Steel   |
|            | NI       | Stainless steel                                 |
|            | AL       | Aluminium                                       |
|            | PA       | Polyamide                                       |
|            | PP       | Polypropylene                                   |

## Types of Output DC 1

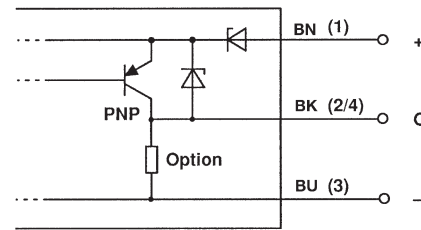
Cable colour abbreviations

BN = Brown

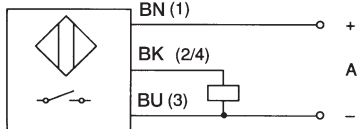
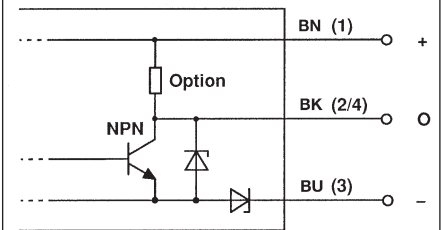
BU = Blue

BK = Black (switch output)

**PNP output**  
(circuit schematic)

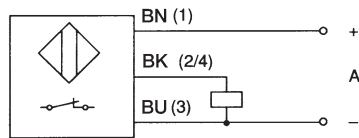


**NPN output**  
(circuit schematic)



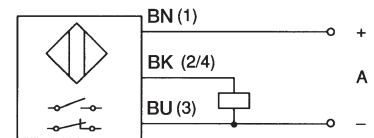
**1) PNP normally-open contact**

When actuated, a PNP transistor applies the output to positive.



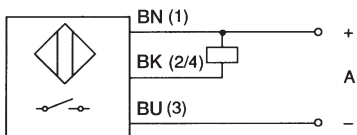
**2) PNP normally-closed contact**

When actuated, a PNP transistor disconnects the output from positive.



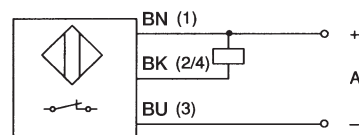
**3) PNP programmable**

The PNP NO contact 1) or PNP NC contact 2) function can be selected by means of a built-in changeover switch.



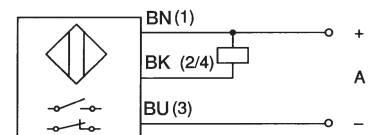
**4) NPN normally-open contact**

When actuated, a NPN transistor applies the output to negative.



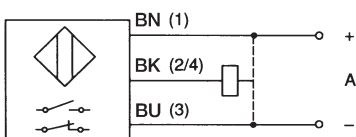
**5) NPN normally-closed contact**

When actuated, an NPN transistor disconnects the output from negative.



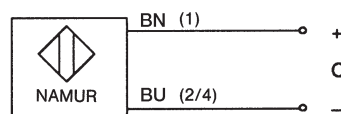
**6) NPN programmable**

The NPN NO contact 4) or NPN NC contact 5) function can be selected by means of a built-in changeover switch.



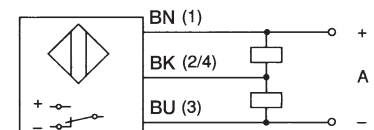
**7) PNP/NPN programmable**

Two built-in changeover switches are used to select between PNP or NPN switching and between NC or NO function.



**8) NAMUR**

Current change to DIN EN 60947-5-6



**9) Push-pull programmable**

When actuated, the output changes from negative to positive or, selectable with a built-in changeover switch, from positive to negative.

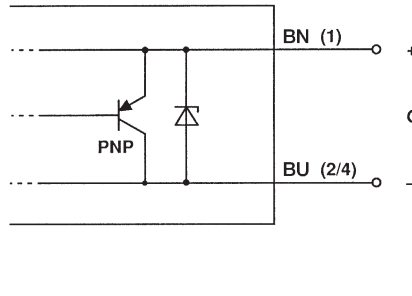
# Wiring Diagrams

## Types of Output DC 2

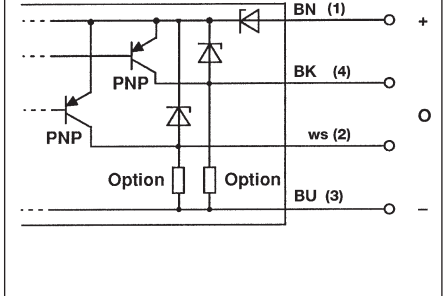
Cable colour abbreviations

- BN = Brown
- BU = Blue
- BK = Black (switch output)
- WH = White (switch output)

**DC 2-wire**  
(circuit schematic)



**DC 4-wire**  
(circuit schematic)



**1) NO contact DC 2-wire**  
When actuated, the contacts are bridged.

**2) NC contact DC 2-wire**  
When actuated, the contacts are disconnected.

**3) NC/NO contact programmable DC 2-wire**  
The NO contact 1) or NC contact 2) function can be selected by means of a built-in changeover switch.

**4) Changeover output DC (antivalent) PNP 4-wire**  
When actuated, the positive operating voltage is alternatively applied to one of the two outputs.

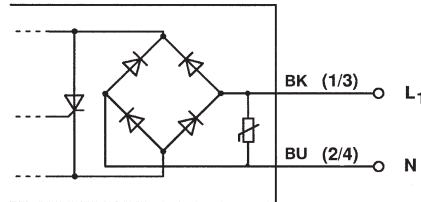
**5) Changeover output DC (antivalent) NPN 4-wire**  
When actuated, the negative operating voltage is alternatively applied to one of the two outputs.

## Types of Output AC 1

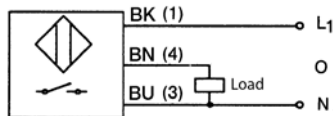
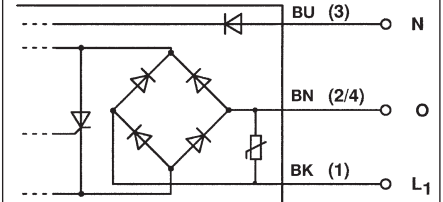
Cable colour abbreviations

BN = Brown  
 BU = Blue  
 BK = Black

**AC 2-wire**  
 (circuit schematic)

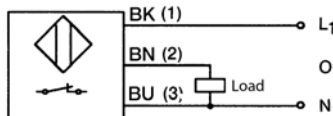


**AC 3-wire**  
 (circuit schematic)



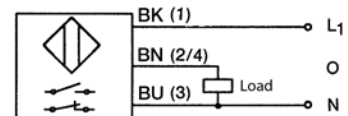
**1) NO contact AC 3-wire**

When actuated, a thyristor connected across a rectifier bridge applies the operating voltage to the output.



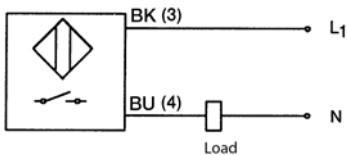
**2) NC contact AC 3-wire**

When actuated, a thyristor connected across a rectifier bridge disconnects the operating voltage from the output.



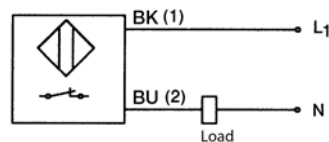
**3) NC/NO contact programmable AC 3-wire**

The AC NO contact 1) or AC NC contact 2) function can be selected by means of a built-in changeover switch.



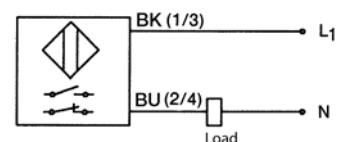
**4) NO contact AC 2-wire**

When actuated, a thyristor connected across a rectifier bridge applies the load to the operating voltage.



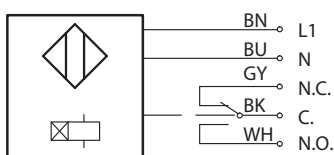
**5) NC contact AC 2-wire**

When actuated, a thyristor connected across a rectifier bridge disconnects the load from the operating voltage.



**6) NC/NO contact programmable AC 2-wire**

The AC NO contact 4) or AC NC contact 5) function can be selected by means of a built-in changeover switch.



**7) AC relay output**

With adjustable pickup delay

# Wiring Diagrams


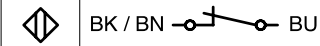

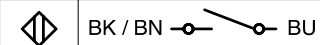

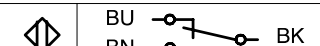

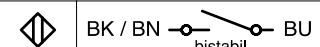

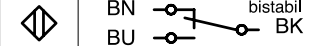
## Type of Contact

### Electric Loading Capacity of Reed Contacts AC/DC

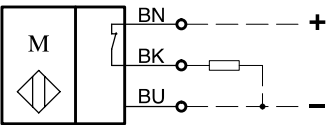
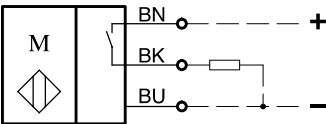
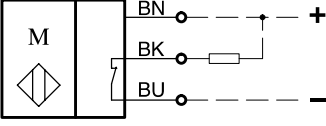
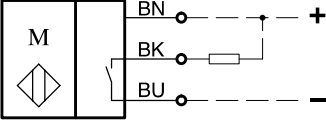
| Contact type ID | Power   | Voltage | Current |
|-----------------|---------|---------|---------|
| R               | 3 VA    | 28 V    | 0.25 A  |
| X               | 5 VA    | 100 V   | 0.25 A  |
| B               | 10 VA   | 250 V   | 0.5 A   |
| Y               | 10 VA   | 100 V   | 0.5 A   |
| A               | 20 VA   | 250 V   | 0.5 A   |
| K               | 30 VA   | 250 V   | 0.5 A   |
| H               | 60 VA   | 250 V   | 1.0 A   |
| L               | 60 VA   | 250 V   | 1.0 A   |
| M               | 80 VA   | 250 V   | 1.0 A   |
| F               | 100 VA  | 250 V   | 3.0 A   |
| G               | 250 VA* | 250 V   | 5.0 A*  |
| P               | 250 VA* | 250 V   | 5.0 A*  |

\* Maximum make current for the duration of 2 ms  
2.5 A; 100 W/VA in continuous operation

## Wiring Diagrams Electromechanical Magnetic Switches

|                             |   |   |
|-----------------------------|---|---|
| contact                     |  |  |
| NO contact                  |  |  |
| Changeover contact          |  |  |
| Bistable ON-OFF             |  |  |
| Bistable Changeover contact |  |  |

## Wiring Diagrams Electronic Magnetic Switches

|                               |   |
|-------------------------------|---|
| NC contact, PNP               |  |
| NO contact, PNP/PNP, bistable |  |
| NC contact, NPN               |  |
| NO contact, NPN               |  |





