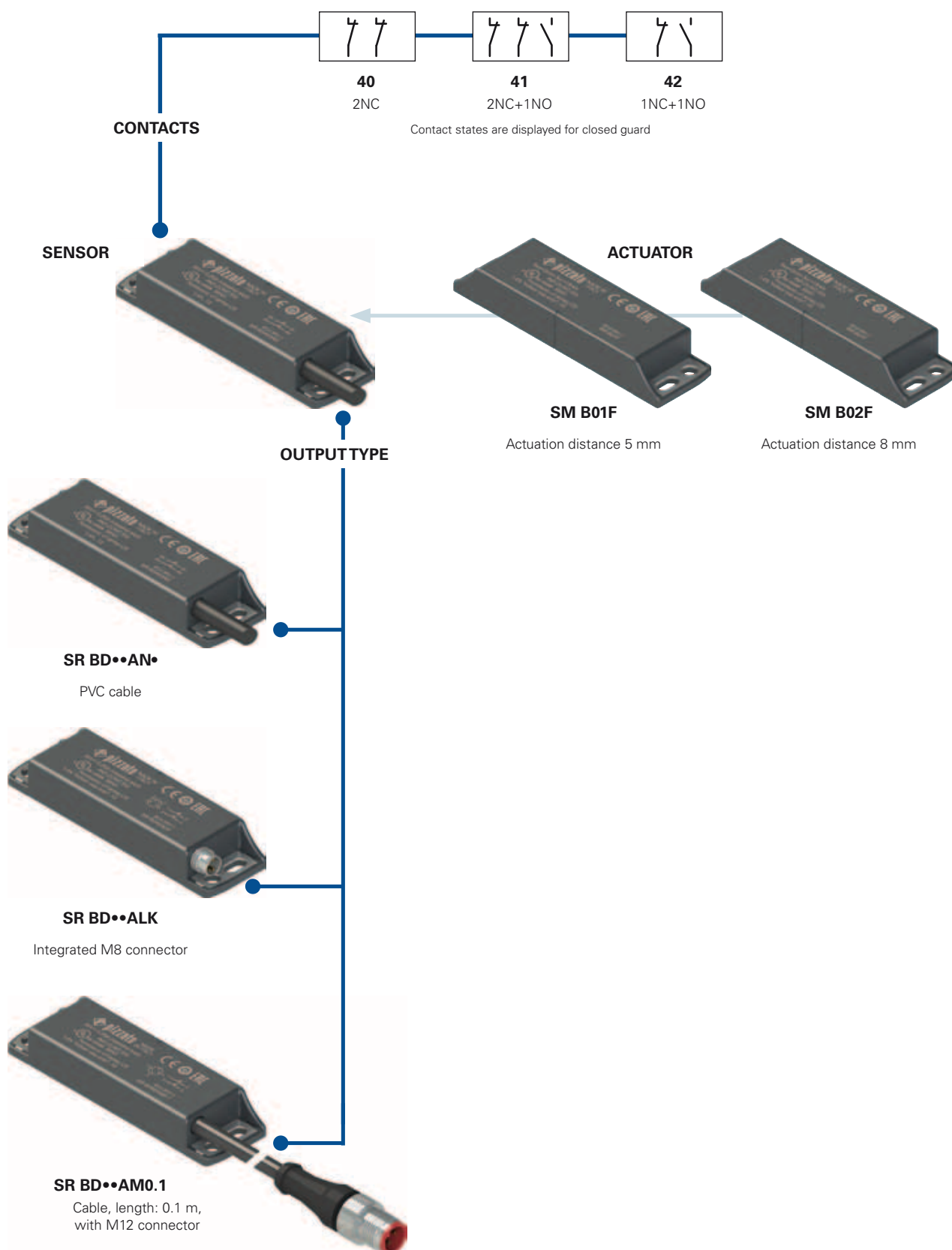


## Selection diagram

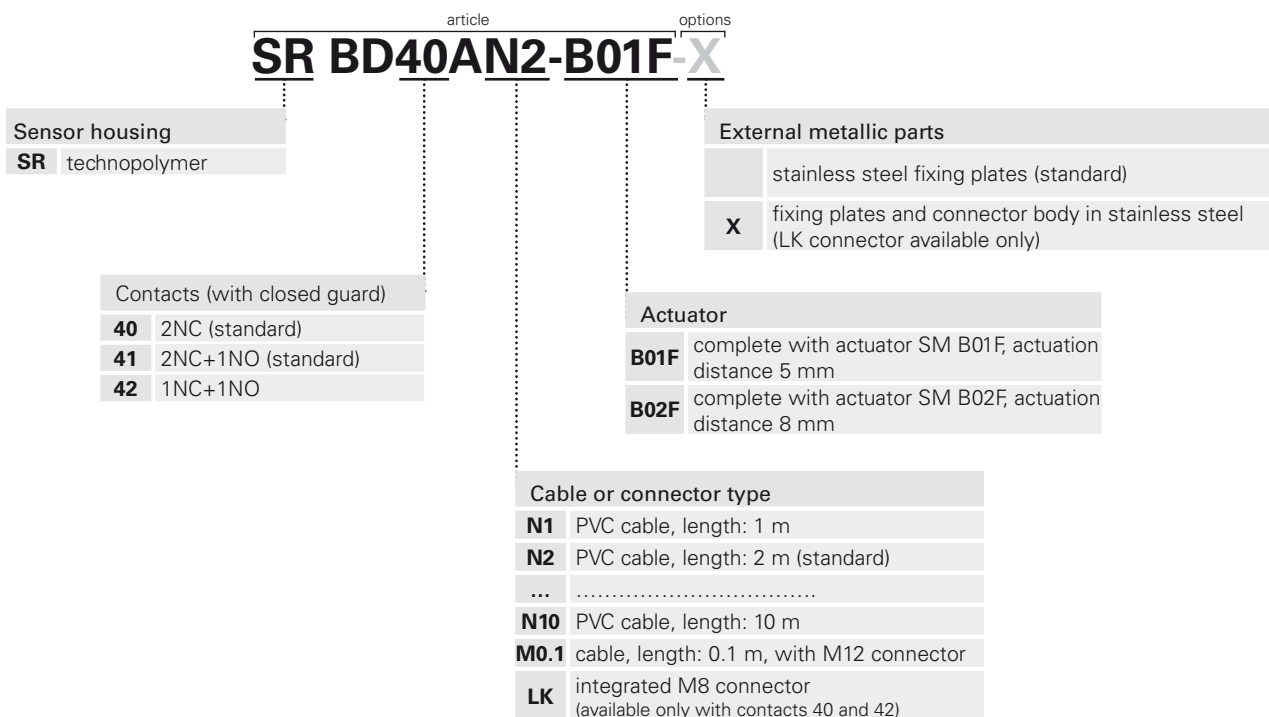


—●— product option  
 —→ accessory sold separately



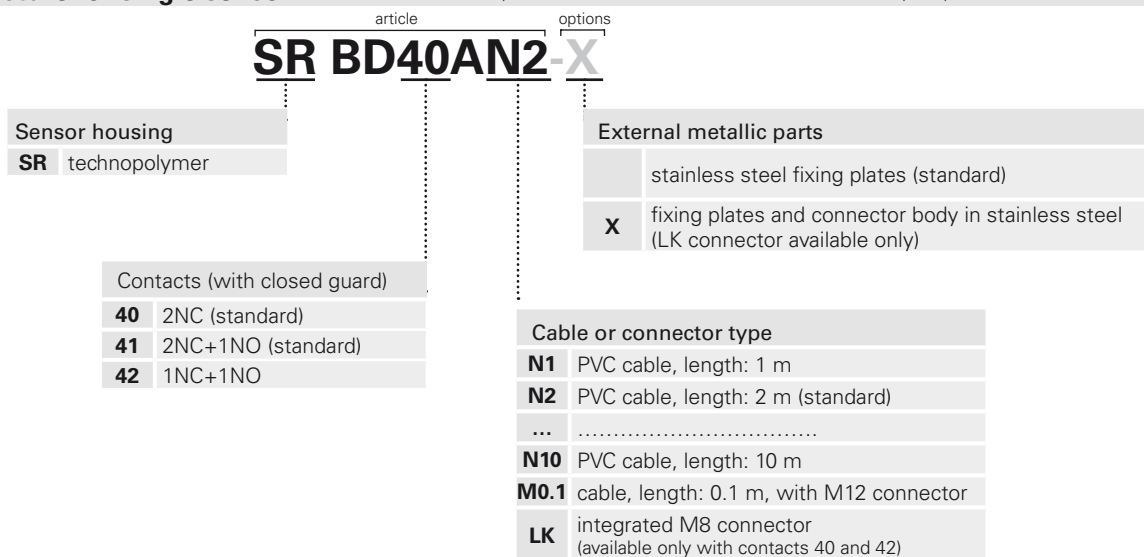
**Attention!** The feasibility of a code number does not mean the effective availability of a product. Please contact our sales office.

### Code structure for sensor with actuator



### Code structure for single sensor

**Attention!** The feasibility of a code number does not mean the effective availability of a product. Please contact our sales office.



### Code structure for single actuator

**Attention!** The feasibility of a code number does not mean the effective availability of a product. Please contact our sales office.

**SM B01F**

Actuator	
<b>B01F</b>	actuation distance 5 mm
<b>B02F</b>	actuation distance 8 mm



### Main features

- Actuation without mechanical contact
- Stainless steel fixing plates
- Output contacts: 2NC, 1NO+2NC or 1NO+1NC
- Insensitive to dirt
- Protection degrees IP67 and IP69K
- Coded actuator
- Technopolymer housing
- Versions with M8 or M12 connector

### Quality marks:



UL approval: E496318  
TÜV SÜD approval: Z10 15 08 75157 008  
EAC approval: RU C-IT.AD35.B.00454

### Compliance with the requirements of:

Low Voltage Directive 2014/35/EU  
Machinery Directive 2006/42/EC  
EMC Directive 2014/30/EU.

## Technical data

### Housing

Housing made of glass fibre reinforced technopolymer, self-extinguishing.  
Versions with integrated cable 4 x 0.34 mm<sup>2</sup> or 6 x 0.25 mm<sup>2</sup>, length 2 m, other lengths from 0.5 m ... 10 m on request.  
Versions with integrated M8 connector  
Versions with 0.1 m cable length and M12 connector, other lengths from 0.1 ... 3 m on request

Protection degree:

IP67 acc. to EN 60529

IP69K acc. to ISO 20653

(Protect the cables from direct high-pressure and high-temperature jets)

### General data

For safety applications up to:

SIL 3 acc. to EN 62061

PL e acc. to EN ISO 13849-1

type 4 acc. to EN ISO 14119

low acc. to EN ISO 14119

Interlock, no contact, coded:

Coding level:

Safety parameter B<sub>10D</sub>:

20,000,000 (with compatible Pizzato Elettrica safety modules)

400,000 (at max. load: DC12 24 V 250 mA)

20 years

Service life:

Ambient temperature:

-25°C ... +80°C

Ambient temp. with flexible installation cable:

-5°C ... +80°C

Vibration resistance:

10 gn (10 ... 150 Hz) acc. to IEC 60068-2-6

Shock resistance:

30 gn; 11 ms acc. to EN 60068-2-27

Pollution degree

3

Screw tightening torque:

0.8 ... 2 Nm

### In compliance with standards:

IEC 60947-1, EN 60947-1, IEC 60947-5-1, EN 60947-5-1, EN 60947-5-2, EN 60947-5-3 (in connection with safety module), EN ISO 14119, EN ISO 12100, EN ISO 13849-1, EN ISO 13849-2, IEC 60204-1, EN 60204-1, IEC 60529, EN 60529, ISO 20653, UL 508, CSA 22.2 No.14 .

### Approvals:

UL 508, CSA 22.2 No.14 , EN ISO 13849-1, EN 60947-5-3, EN 50178, EN 61508-1, EN 61508-2, EN 61508-4, IEC 62061, EN 60947-1.

### Actuation data

Assured operating distance S<sub>ao</sub>

5 mm with actuator SM B01F

Assured release distance S<sub>ar</sub>

15 mm with actuator SM B01F

Assured operating distance S<sub>ao</sub>

8 mm with actuator SM B02F

Assured release distance S<sub>ar</sub>

20 mm with actuator SM B02F

Repeat accuracy

≤ 10%

Switching frequency

up to 150 Hz

Distance between two sensors

min. 50 mm

### Electrical data

Rated operating voltage U<sub>e</sub>:

24 Vac/dc

Rated operating current I<sub>e</sub>:

0.25 A (resistive load)

Rated insulation voltage U<sub>i</sub>:

120 Vac (with cable)

60 Vac / 75 Vdc (with M8 connector)

120 Vac (with M12 connector, 4-pole)

30 Vac / 36 Vdc (with M12 connector, 8-pole)

Rated impulse withstand voltage (U<sub>imp</sub>):

6 kV

1.5 kV (with connector)

Thermal current I<sub>th</sub>:

0.25 A

Maximum switching load:

6 W (resistive load)

Protection fuse:

0.25 A type F

Electrical endurance:

1 million operating cycles

**⚠ If not expressly indicated in this chapter, for correct installation and utilization of all articles see chapter utilization requirements from page 313 to page 324.**

### Connection with safety modules for safety applications:

Connection with safety modules CS AR-01••••; CS AR-02••••; CS AR-04••••; CS AR-05••••; CS AR-06••••; CS AR-08••••; CS AR-46•024; CS AR-91••••; CS AT-0•••••; CS AT-1•••••; CS AT-3•••••; CS FS-5•••••; CS MF••••••••; CS MP••••••••. When connected to the safety module, the sensor can be classified as a control circuit device up to PDF-M (EN 60947-5-3). The system can be used in safety circuits up to PL e/SIL 3/category 4 in accordance with EN ISO 13849-1.

### Features approved by UL

Utilization categories: 24 Vdc, 0.25 A (resistive load).

Housing features type 1, 4X "indoor use only," 12.

Accessory for CS series.

In compliance with standard: UL 508, CSA 22.2 No.14

### Features approved by TÜV SÜD

Supply voltage: 24 Vac/dc

Rated operating current (max.): 0.25 A

Ambient temperature: -25 °C ... + 80 °C

Protection degree: IP67

PL, category: PL e, category 4 with CS AR-08

In compliance with standards: 2006/42/EEC Machine Directive, EN ISO 13849-1:2008, EN 60947-5-3/A1:2005, EN 50178:1997, EN 61508-1:1998 (SIL 1-3), EN 61508-2:2000 (SIL 1-3), EN 61508-4:1998 (SIL 1-3), IEC 62061:2005 (SIL CL 3), EN 60947-1

Please contact our technical department for the list of approved products.

Please contact our technical department for the list of approved products.

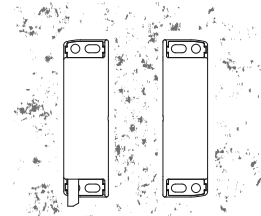


## Description



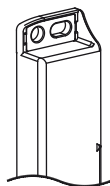
Coded magnetic sensors are devices suitable for monitoring protections and guards of machines without inertia which, when linked to a safety module, can create a system with safety category up to SIL 3 according to EN 62061, up to PL e according to EN ISO 13849-1 and up to category 4 according to EN ISO 13849-1. These products consist of a sensor that detects the magnetic field and which is connected to the machine structure and of a coded magnetic actuator, which is connected to the movable guard. When the sensor and actuator are approached (closed guard), the sensor detects the actuator and actuates the electrical contacts. The sensor is designed to be activated only by the correct coded actuator and not through a common magnet.

## Insensitivity to dirt



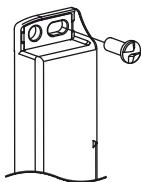
Magnetic sensors are totally sealed and retain their safety characteristics also where dirt and dust are present (not ferromagnetic material). This characteristic, combined with the design without recesses, makes them particularly suitable for use in the agricultural and food industries.

## Stainless steel fixing plates



To prevent damage to the fixing slots when fastening on non-perfectly flat surfaces, coded magnetic sensors are equipped with stainless steel fixing plates. Even in the presence of suitable fixing surfaces, this solution makes the sensor more robust against mechanical stresses.

## Safety screws for actuators



As required by EN ISO 14119, the actuator must be fixed immovably to the door frame. Pan head safety screws with one-way fitting are available for this purpose. With this screw type, the actuators cannot be removed or tampered by using common tools.

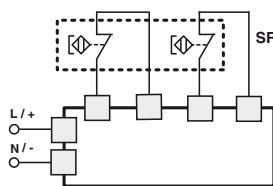
See accessories on page 310.

## Laser engraving



All devices are marked using a dedicated indelible laser system. These engravings are therefore suitable for extreme environments too. Thanks to this system that does not use labels, the loss of plate data is prevented and a greater resistance of the marking is achieved over time.

## Compatible safety modules



SR BD40\*\*\*

The magnetic sensors have been tested and approved for operation with suitable safety modules (see list). The use of complete and tested solutions guarantees the electrical compatibility between the sensor and safety module, as well as high reliability.

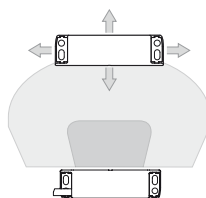
Sensors	Compatible safety modules	Safety module output contacts	
		Instantaneous contacts	Delayed contacts
SR BD40A** SR BD41A** SR BD42A**	CS AR-01●●●● <sup>b</sup>	2NO+1NC	/
	CS AR-02●●●● <sup>b</sup>	3NO	/
	CS AR-04●●●● <sup>b</sup>	3NO+1NC	/
	CS AR-05●●●●	3NO+1NC	/
	CS AR-06●●●●	3NO+1NC	/
	CS AR-08●●●●	2NO	/
	CS AR-46●024	1NO	/
	CS AR-91●●●●	2NO+1PNP	/
	CS AT-0●●●●	2NO+1NO	2NO
	CS AT-1●●●●	3NO	2NO
	CS AT-3●●●●	2NO	1NO
	CS FS-5●●●●	1NO+1NC+1CO	/
	CS MP●●●●●●	see page 253	see page 255
	CS MF●●●●●●	see page 281	see page 283

<sup>a</sup> Compatible with CS MF202●●-P4 and CS MP●●●●●● only.

<sup>b</sup> Compatible with modules with production batch later than 04/2014 only.

For features of the safety modules see page 191.

## Wide actuation range

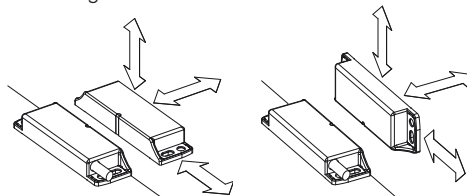


With their built-in features, magnetic sensors have a wide actuation range, making them very well suited for applications with large tolerances or where mechanical properties change over time.

In this type of sensor, the actuation distances may vary depending on the shift direction of the actuator in relation to the sensor.

## Actuation from many directions

The coded magnetic sensors were designed to be activated by the respective actuator from various directions. The customer therefore enjoys maximum flexibility when positioning devices along the perimeter of the guards.



## Protection degrees IP67 and IP69K

**IP69K**  
**IP67**

These devices are designed to be used in the toughest environmental conditions and they pass the IP67 immersion test acc. to EN 60529. They can therefore be used in all environments where maximum protection degree of the housing is required. Due

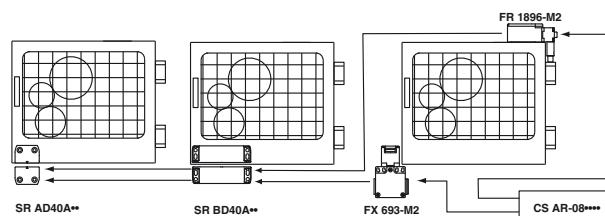
to their special design, these devices are suitable for use in equipment subjected to cleaning with high pressure hot water jets. These devices meet the IP69K test requirements according to ISO 20653 (water jets with 100 bar and 80°C).

## Series connection of multiple sensors

The coded magnetic sensors can be connected in series with the only limitation that the overall resistance, of sensors and the related wiring, has to be not higher than the admitted max. value of the module, which typically is equal to 50 ohm (see module features). This is a very high value that, with normal wiring, allows the use of dozens of sensors without problems. It is also possible to realise mixed circuit solutions by connecting coded magnetic sensors in series to safety switches, with the only limitation being the above-mentioned maximum electrical resistance.

It should be noted that the series connection of two or more coded sensors reduces the self-monitoring capacity of the system, see ISO/TR 24119.

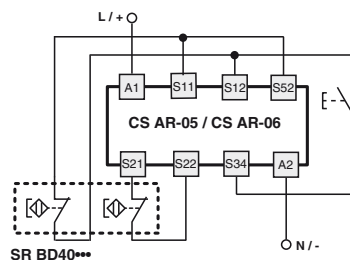
The use of Pizzato Elettrica safety modules is recommended.



### Connection with safety modules

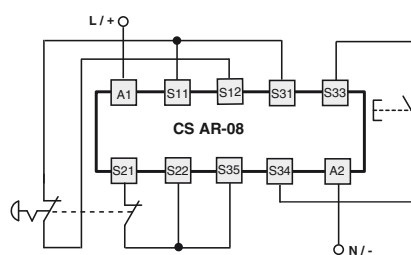
Connection with safety modules CS AR-05 or CS AR-06

Input configuration with manual start (CS AR-05) and monitored start (CS AR-06)  
2 channels



Connection with safety module CS AR-08 or CS AT

Input configuration with manual start  
2 channels

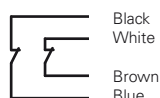


For features of the safety modules see page 191.

### Internal connections with cable

Contact states are displayed for closed guard

With cable (2NC)



With cable (1NC+1NO)



With cable (2NC+1NO)



### Internal connections with connector

Contact states are displayed for closed guard

With M12 connector (2NC+1NO)



With M12 connector (2NC)



With M12 connector (1NC+1NO)



With M8 connector (2NC)

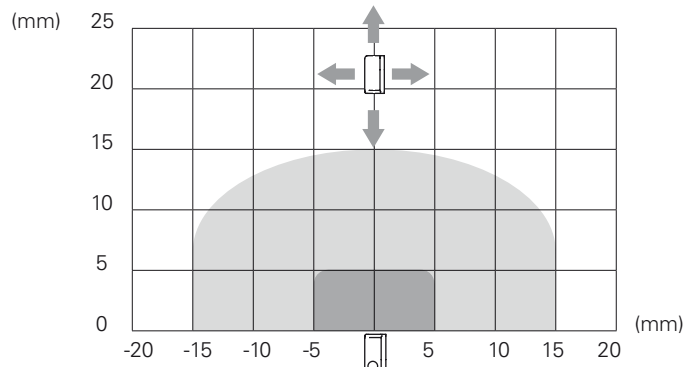
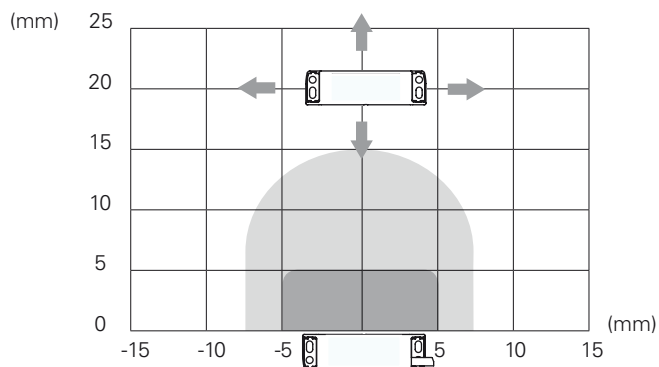


With M8 connector (1NC+1NO)

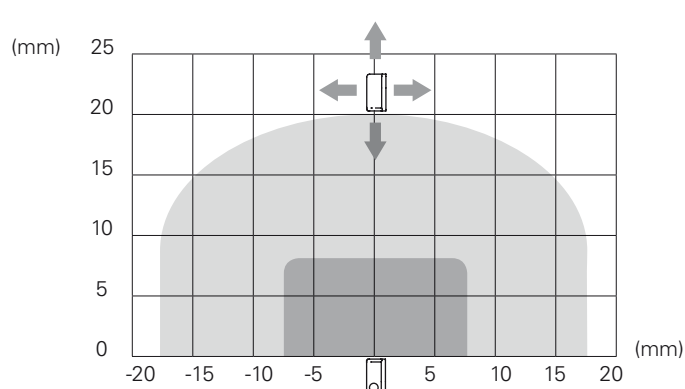
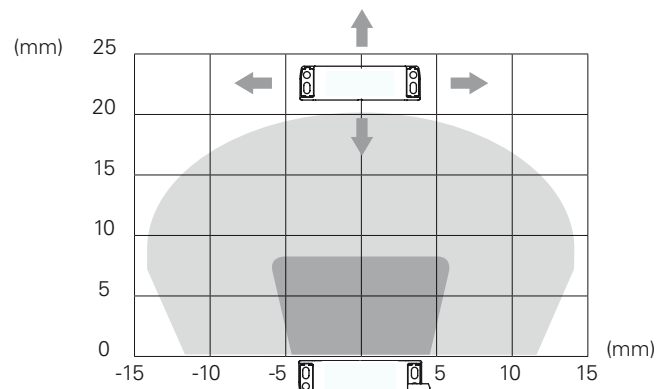


Female connectors see page 299

### Operating distances SR BD.....-B01F



### Operating distances SR BD.....-B02F



Legend:

Assured operating distance  $S_{ao}$   
Assured release distance  $S_{ar}$

Note: The progress of the activation areas is for reference only



## Dimensional drawings

All values in the drawings are in mm

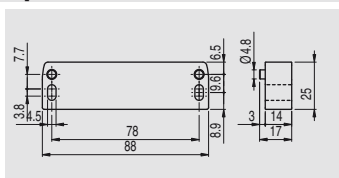
integrated cable, length: 2 m	M8 connector	cable, length: 0.1 m, with M12 connector	coded actuator Low level of coding acc. to EN ISO 14119
SR BD40AN2 2NC	SR BD40ALK 2NC	SR BD40AM0.1 2NC	SM B01F Actuation distance 5 mm
SR BD41AN2 1NO+2NC		SR BD41AM0.1 1NO+2NC	SM B02F Actuation distance 8 mm
SR BD42AN2 1NO+1NC	SR BD42ALK 1NO+1NC	SR BD42AM0.1 1NO+1NC	

Items with code on **green** background are stock items

Accessories See page 299

→ The 2D and 3D files are available at [www.pizzato.com](http://www.pizzato.com)

## Spacer



This spacer is placed between the magnetic safety sensors and metal surfaces that can deflect the magnetic field: as a result, the activation and deactivation distances of the sensor remain the same.

Article	Description
VS SP1BA1	Spacer for SR B series sensors

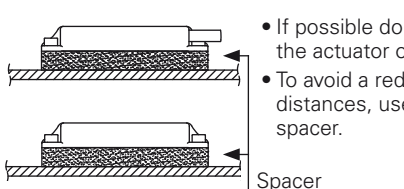
## Use of coded magnetic sensors for safety applications

A coded magnetic sensor alone cannot be used for safety functions because its operating principles are not considered safe by the standards (such as the positive opening on mechanical switches). For this reason, a magnetic sensor coded for use in safety applications must always be connected to a safety module that monitors its proper operation through a circuit with at least two channels.

## Limits of use

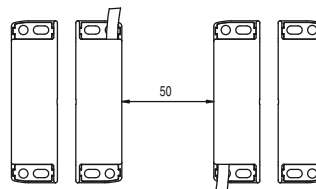
- Installation must be carried out by qualified staff only.
- Before commissioning and at regular intervals, the correct switching of the contacts and proper operation of the system, consisting of the sensor and the safety module, must be checked.
- Do not use a hammer for adjustment.
- Do not use the sensor as a mechanical stop.
- Observe the assured operating and release distances.
- Adhere to the EN ISO 14119 requirements regarding low level of coding for interlocks.
- Do not mount the sensor and actuator in strong magnetic fields.
- Keep away from iron filings.
- Avoid any impact with the sensor. Excessive shock and vibrations may affect the correct operation of the sensor.
- The actuator must not strike the sensor.
- In case of damages or wear, the entire device – including the actuator – must be replaced.
- Keep load under the value indicated in the electrical data.
- If the sensors are used without corresponding safety module, the protective fuse recommended in the electrical data must be connected in series to each sensor contact.
- Turn off the power supply before accessing the switch contacts, also during wiring.

## Installation on ferromagnetic material



- If possible do not mount the sensor and the actuator on ferromagnetic materials.
- To avoid a reduction in the switching distances, use the special VS SP1BA1 spacer.

## Assembly of multiple sensor-actuator systems



The minimum spacing between adjacent sensor-actuator systems must be at least 50 mm.