



## 1 Company Profile



▶ 5

## 1 New products



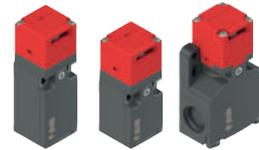
▶ 13

## 2 Safety switches with separate actuator



For heavy duty applications

▶ 17



For standard applications

▶ 23

## 3 Magnetic safety sensors



SR B series

▶ 29



SR A series

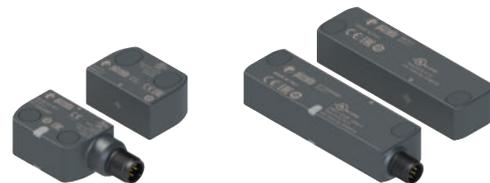
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ST D series

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Switches for hinges  
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▶ 85

Switches for hinges  
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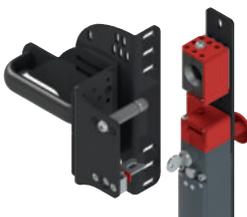


NS series  
▶ 185



Remote escape release  
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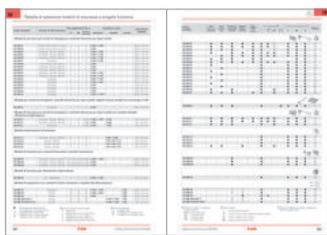
BN series control device units  
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P-Connect connection gateway  
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**10A** For emergency stops and movable guard monitoring  
CS AR series  
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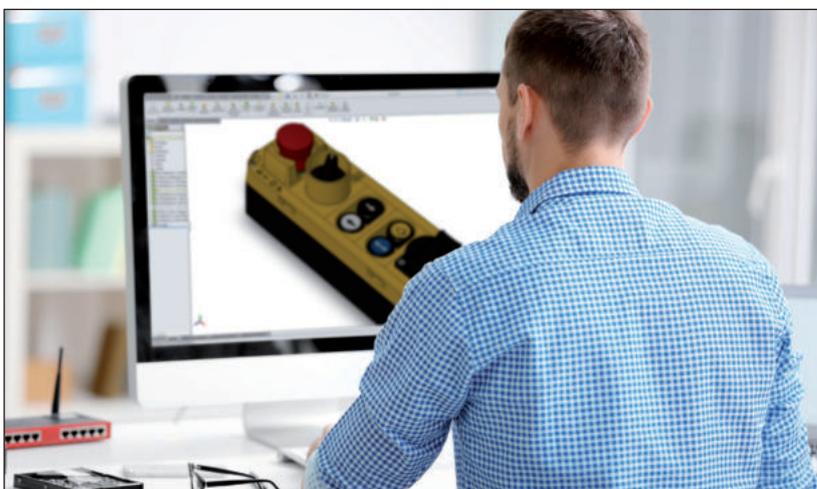


## MORE THAN 300 PROFESSIONALS WITH PASSION

It is people, with their professionalism and dedication that make a great company. This profound conviction has always guided Pizzato Elettrica in their choice of employees and partners.

Today, Giuseppe and Marco Pizzato lead a tireless team providing the fastest and most efficient response to the demands of the market. This team has grown over the last 10 years and has achieved a considerable increase in sales in all the countries where Pizzato Elettrica is present.

The various strategic sectors of the business are headed by professionals with significant experience and expertise. Many of these people have developed over years with the company.



Others are experts in their specific field and have integrated personal experience with the Pizzato Elettrica ethos to extend the company's capability and knowledge.

From the design office to the technical assistance department, from managers to workers, every employee believes in the company and its future. Pizzato Elettrica employees all give the best of themselves secure in the knowledge they are the fundamental elements of a highly valuable enterprise.



## 100% MADE IN ITALY

Pizzato Elettrica is one of the leading European manufacturers of position switches, microswitches, safety devices, safety modules, foot switches, control and signalling devices, and devices for lifts. An entrepreneurial company such as Pizzato Elettrica bases its foundations on a solid and widely shared value system. The pillars that form the basis of the company's work have remained constant, and constitute the fundamental guiding principles for all company activities.

### PASSION FOR QUALITY

Passion for product quality, orientation towards excellence, innovation, and continuous development, represent the key principles of Pizzato Elettrica's everyday work.

Anyone using Pizzato Elettrica's products does so in the certainty that these devices are of certified quality, since they are the result of a process that is scrupulously controlled at every stage of the production.

The company's goal is to offer the market safe, reliable, and innovative solutions.

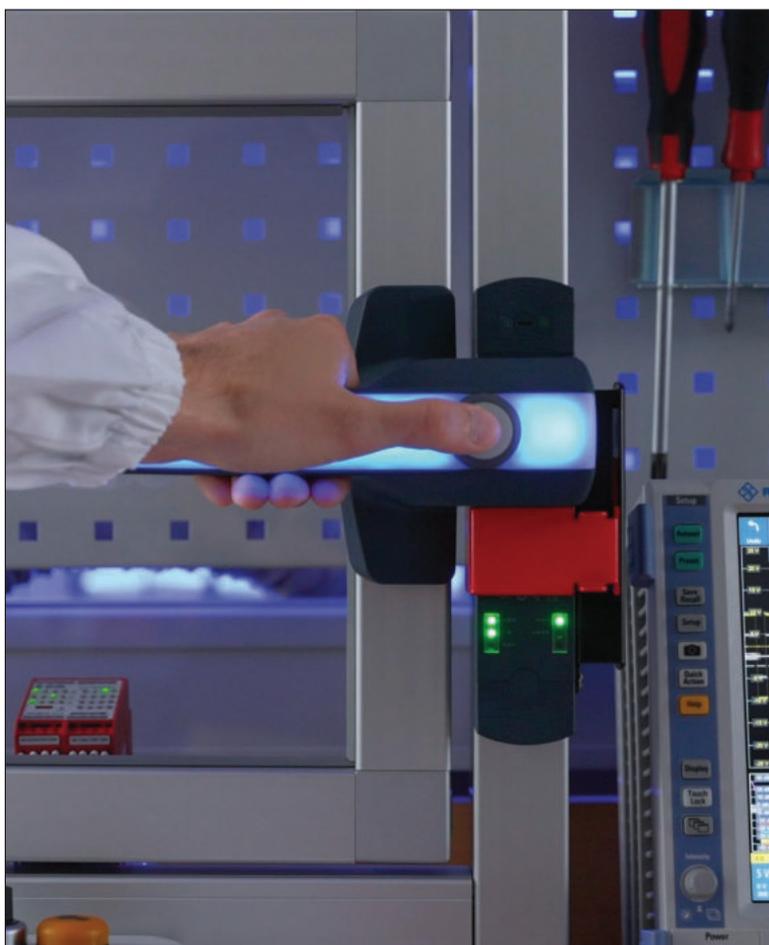
### CARE FOR THE CUSTOMER

In order to be successful, a product must respond to the specific needs of those who will use it. Market developments must be carefully monitored in order to understand, in advance, which new applications will prove themselves truly useful. This is why Pizzato Elettrica has always cultivated close synergies with the companies that have chosen it

as a supplier, using this continuous dialogue to identify the potential developments of the own product range in order to make it highly flexible, complete and capable to respond to the most diverse needs.

### 100% MADE IN ITALY

All Pizzato Elettrica products are designed, developed, and tested entirely at the company plants in Marostica, in the province of Vicenza in Italy. The company is thus able to meet specific customer requirements at all times, by offering a comprehensive range of products and technologically advanced solutions.





## 1984: AN ENTREPRENEURIAL STORY BEGINS

- 1984** The company Pizzato di Pizzato B. & C. snc. manufacturer of position switches is founded.
- 1988** The company becomes a limited liability partnership, and is renamed Pizzato Elettrica, a brand shortly destined to become renowned and valued nationwide. The first company-owned plant (P1) geared towards mechanical processing was built.
- 1990** By the end of the decade, thanks to the development of quality products and the experience built on the Italian market, Pizzato Elettrica turns to the international market.
- 1995** Building of the second plant (P3) geared towards the moulding of plastic materials. Development of the position switch range continues in parallel. Start of significant years in terms of safety devices planning. The safety sector becomes a key sector to the company.
- 1998** Construction of the third plant (P4), housing the assembly department.
- 2002** Achievement of the ISO 9001:2000 certification. Launching of the first safety modules. The new factory headquarters and logistics centre (P5) is built and will remain the company's headquarters for many years. Continued expansion of the industrial safety and automation product range.
- 2007** Pizzato Elettrica faces its first generational change: Giuseppe and Marco Pizzato take over the company directorship.
- 2010** Extension of Pizzato Elettrica product portfolio, with the launch of the innovative EROUND line consisting of control and signalling devices. This product range accompanies position switches and safety devices, thus offering complete solutions to customers.
- 2012** Introduction of Gemnis Studio, the first software produced by Pizzato Elettrica. A graphic development environment for the creation, simulation, and debugging of programs that can be integrated in the Gemnis line modules.
- 2013** Foundation of first subsidiary of Pizzato Elettrica, Pizzato Deutschland GmbH, in Germany.
- 2014** A new production facility (P8) dedicated to switches and automatic machines is opened, spanning a surface area of 6000 m<sup>2</sup>.
- 2016** The new NS series of safety switches with electromagnets and RFID technology is introduced, fruit of the company's experience, spanning more than thirty years in the field of industrial safety. To date it is the state of the art in its industry. Foundation of second subsidiary of Pizzato Elettrica, Pizzato France SARL, in France.
- 2017** The company continues to expand and achieves the quality certification based on the more recent version of standard ISO 9001 of 2015. In Spain, the third Pizzato Elettrica subsidiary is founded: Pizzato Iberica SL. The foundation stone is laid for the new factory (P6), which is to become the company's headquarters.
- 2018** The safety handle P-KUBE Krome is launched, a brand new product in the market, confirming that Pizzato Elettrica thrives on innovation in the sectors of automation and industrial safety. Foundation of fourth subsidiary of Pizzato Elettrica, Pizzato USA Inc, in the United States.
- 2019** The new factory (P6) is opened, a modern building of 28,000 m<sup>2</sup> realized with the most advanced Industry 4.0 technologies, where all offices and production divisions are transferred, allowing to further improve the flow of material and information. The logistics and shipment department is optimised with the introduction of a new completely automated warehouse.
- 2021** Pizzato Elettrica India Ltd. and Pizzato Korea Ltd., commercial branches of Pizzato Elettrica, are established in India and South Korea, respectively.
- 2022** Foundation of Pizzato Academy, Pizzato Elettrica's new training site for getting better acquainted with our products and following the constant regulatory developments in the sector.
- Today**, Giuseppe and Marco Pizzato lead a company in constant growth in terms of new product launches, number of employees, turnover, and new markets. Pizzato Elettrica is continuing its new product internationalisation and development process.



## 100 MILLION PARTS SOLD WORLDWIDE

Pizzato Elettrica's product catalogue contains more than 10,000 articles, with more than 1,500 special codes developed for devices personalised according to clients' specific needs. Pizzato Elettrica devices can be grouped, according to typology, into three main macro-categories.

### POSITION SWITCHES

Pizzato Elettrica position switches are daily installed in every type of industrial machinery all over the world for applications in the sector of wood, metal, plastic, automotive, packaging, lifting, medicinal, naval, etc.

In order to be used in a such wide variety of sectors and countries, Pizzato Elettrica position switches are made to be assembled in a lot of configurations thanks to the various body shapes, dozens of contact blocks, hundreds of actuators and materials, forces, assembling versions.

Pizzato Elettrica can offer one of the widest product range of position switches in the world. Moreover, the use of high quality materials, high reliability technologies (e.g. twin bridge contact blocks) as well as the IP67 protection degree make this range of position switches one of the most technologically evolved.

### SAFETY DEVICES

The company Pizzato Elettrica has been one of the first Italian companies developing dedicated items for this sector, creating and patenting dozens of innovative products, thus becoming one of the main European manufacturers of safety devices.

The vast range of products aimed specifically at the safety of machinery, fully designed and assembled at the Marostica (VI) company premises, includes not only more traditional safety switches with separate actuator (with or without locking mechanism) and hinge switches but also state-of-the-art anti-tampering devices with RFID technology, such as the ST series sensors, and NG and NS series locking devices.

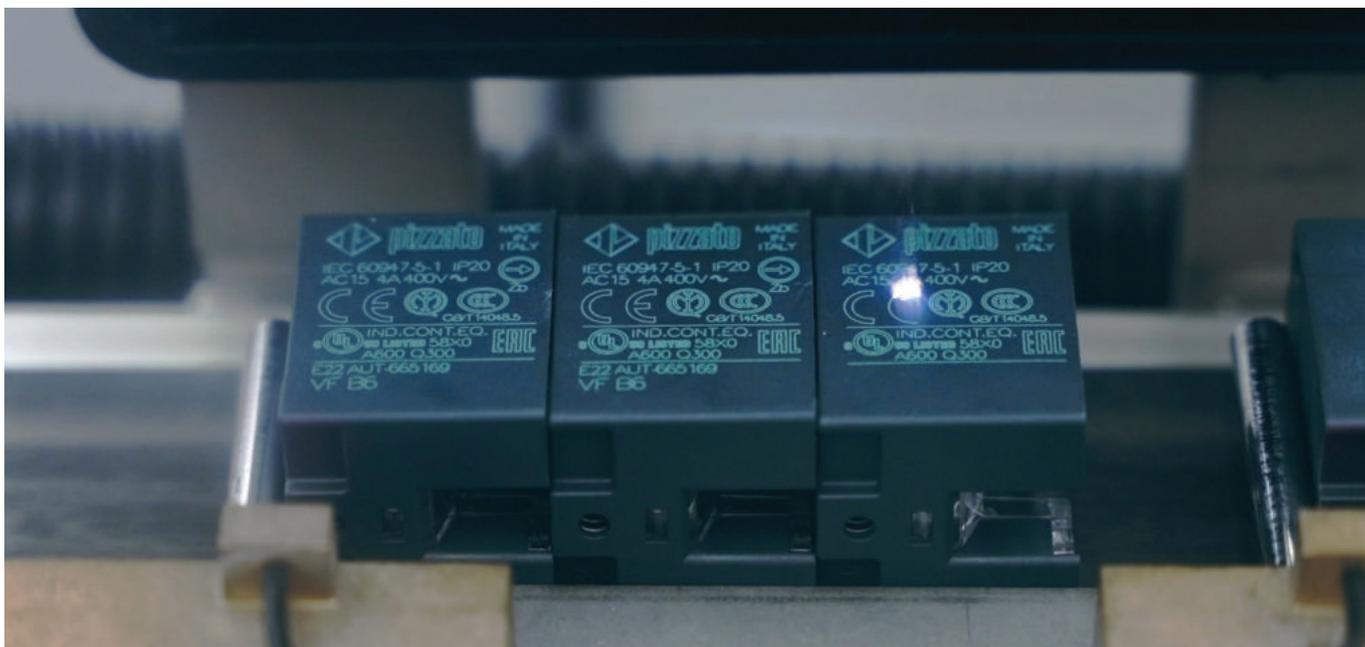
The product range is complemented by safety handles for guards, with the innovative P-KUBE Krome model whose grip can be illuminated with multicolour signalling LEDs, as well as by the CS series safety modules, available in single function versions, or user-programmable with the use of the Gemnis Studio software; fully implemented by Pizzato Elettrica and distributed with a free licence.

### MAN-MACHINE INTERFACE

Pizzato Elettrica's control and signalling devices of the EROUND line are designed for the use in the human-machine interface sector. Thanks to the elegant design, the care for details and the elegance of the product combined with its maximum safety and reliability, this series is one of the most complete and cutting-edge on the market.

In order to satisfy its customers' needs and requests, Pizzato Elettrica offers a lot of accessories purposely designed not only to complete its wide range of products, but also to help device installation on machineries.





## MILLIONS OF CERTIFIED PRODUCT CODES

A simple brand isn't enough: the company is aiming for the Pizzato Elettrica brand to be widely recognised as a synonym for absolute quality and certainty.

A result that has been reached and consolidated over the years, updating and expanding the series of certifications obtained from the most important Italian and international control organisations. Product quality is assessed by seven accredited external bodies: IMQ, UL, CCC, TÜV SÜD, EAC, BSI, BV. These bodies lay out high technical and qualitative standards for the company to achieve and maintain, verified yearly with several inspections: these are performed, without prior notice, by qualified inspectors, who extract samples of products and materials destined for sale from plants, or from the market directly, to subject them to apposite tests.

- **CE MARK.** All Pizzato Elettrica products bear the CE marking in conformity with the European Directives in force.
- **UKCA MARK.** All Pizzato Elettrica products bear the UKCA marking in conformity with the United Kingdom directives in force.
- **ISO 9001 CERTIFICATION.** The company's production system is compliant with the international ISO 9001 standard, in its most recent 2015 revision. The certification covers all of the company's plants and their production and managerial activities: entry checks,

technical, purchasing and commercial department activities, manufacturing operations assessments, final pre-shipping product tests and checks, equipment reviews and the management of the metrological lab.

The Pizzato Elettrica quality management system ensures that all sensitive company processes – from component design to implementation, from materials provisioning to verification of non-compliant products – are carried out according to the procedures laid down, with the aim of providing our customers with continuously improved and reliable products.

- **CERTIFICATION OF COMPANY QUALITY SYSTEMS.** Pizzato Elettrica has obtained the certificate of compliance with the UNI EN ISO 9000 regulations in force in Italy and abroad. It is issued by a recognised independent body that guarantees the quality and reliability of the service offered to clients worldwide.
- **CSQ, CISQ AND IQNET.** The CSQ system is part of the CISQ (Italian Certification of Quality Systems) federation, which consists of the primary certification bodies operating in Italy in the various product sectors. CISQ is the Italian representative body within IQNet, the biggest international Quality Systems and Company Management certification network, which is adhered to by 25 certification organs in as many countries.





## GLOBAL SUBSIDIARIES

**Pizzato Deutschland GmbH**  
Munich  
Founding year: 2013  
info@pizzato.com

**Pizzato France Sarl**  
Villeurbanne - Lyon  
Founding year: 2016  
info@pizzato.com

**Pizzato Iberica SL**  
Barcelona  
Founding year: 2017  
info@pizzato.com

**Pizzato USA**  
East Syracuse, NY  
Founding year: 2018  
info@pizzatousa.com

**Pizzato Elettrica India Ltd.**  
Pune  
Founding year: 2021  
info@pizzato.com

**Pizzato Korea Ltd.**  
Seoul  
Founding year: 2021  
info@pizzato.com

The purpose of these subsidiaries is to coordinate and support the activities of representative agencies, or distributors, present in the various countries, managing marketing and sales activities, with further objectives of increasing brand visibility and penetration capacity of Pizzato Elettrica products in markets considered strategic.

Products from Pizzato Elettrica are currently used in over 80 countries: The commercial support network, which is made up of local professional and experienced representatives, combined with the productive capacity of the headquarters in Italy, are the basis for the formation of a group that, together with its partners, has all the necessary requirements to become one of the most important companies in the field of automation and industrial safety.

## TECHNICAL AND SALES ASSISTANCE



### TECHNICAL DEPARTMENT

The Pizzato Elettrica technical department provides direct technical and qualified assistance in Italian and English, helping in this way the customers to choose the suitable product for their own application explaining the characteristics and the correct installation.

Office hours: Monday to Friday  
08:00 am - 12:30 pm / 02:00 pm - 05:30 pm CET

Telephone: +39.0424.470.930

E-mail: tech@pizzato.com

Spoken languages:  

### SALES DEPARTMENT

Among the strengths in the company relationship with the commercial network, the direct assistance guaranteed in five languages: Italian, English, French, German and Spanish. A service that confirms Pizzato Elettrica quality and attention to the needs of customers from around the world.

Office hours: Monday to Friday  
08:00 am - 12:30 pm / 02:00 pm - 05:30 pm CET

Telephone: +39.0424.470.930

E-mail: info@pizzato.com

Spoken languages:     





## TRADE FAIRS AND EVENTS

### TRADE FAIRS

Pizzato Elettrica regularly participate to many trade fairs in Italy and abroad, presenting in this way to the market the products, the latest news, etc.

### EVENTS

Besides offering qualified technical assistance, Pizzato Elettrica presents itself as a dynamic partner who is attentive to the needs of its customers. For this reason, the company organises several meetings and training courses with particular attention to the regulatory aspect of machinery safety.



## WEBSITE WWW.PIZZATO.IT

### PRODUCT NEWS

Visit the website at [www.pizzato.com](http://www.pizzato.com) to stay updated on all the news regarding product launches, to view the entire range of products created by Pizzato Elettrica, and to consult all the documentation provided.

### SEARCH USING FILTERS

You can find the product you want by entering the relative item code, or use the filters provided to create the item most adapted to your particular requirements, by choosing the features it needs to offer.

### BROWSABLE, DOWNLOADABLE CATALOGUE

Users can download the complete catalogue or alternatively browse it directly online, an extremely handy solution for those wishing to consult the range of products simply and rapidly.

### HIGH RESOLUTION IMAGES

The information provided for each product is complete with high resolution images to offer visitors to the website a clear, accurate view of the items in close detail, also offering them the possibility to zoom in and out on the image.

### USAGE INSTRUCTIONS

You can download product usage or installation instructions, in PDF format, to your computer.

### 2D AND 3D FILES

2D and 3D drawings are available for every item; in formats that are compatible with the widest variety of drawing programs.

### CERTIFICATES AND EC DECLARATIONS OF CONFORMITY

The latest product type approval certificates, and EC declarations of conformity in accordance with applicable European product directives, are published on the website.

### LARGE VIDEO SECTION

The large video section of the website is capable of showcasing the main characteristics, functions and use of the various products.

### MULTILINGUAL TRANSLATIONS

The website's multilingual versions allow the clients of the global market to find all the information they need in one place.

### WEBINARS

The webinars from Pizzato Elettrica go into detail in the area of machine safety with focus on the further development of standards. The speakers are experts with targeted specialisation and detailed knowledge of standards and directives in the industry.

### CROSS-REFERENCE

It is possible to find a Pizzato Elettrica product as an alternative to others on the market in terms of functionality.

## P-KUBE Smart safety handles for ST series RFID sensors



- Modern and ergonomic design that allows implementation of machines and guards with particularly pleasing aesthetics.
- Can be combined with ST series RFID safety sensors.
- Versions with illuminated door handle using RGB LEDs that allow the state of the guard to be signalled on-site, whereby various colours and sequences can be fully customised.
- Versions available with illuminated button that is integrated in the door handle.
- Possibility to install the door handle with horizontal or vertical grip.
- For light guards, fastening occurs directly on the grip; in the case of heavier guards, a robust mounting plate located on the interior is used.

► 241

## P-Connect connection gateway for safety devices



- The system allows up to 6 devices to be connected to a data network, whereby safety information is exchanged via PROFIsafe extensions.
- Depending on the configuration, possibility to connect various devices from Pizzato Elettrica such as safety switches of the NG and NS series.
- Multiple P-Connect gateways can be connected in series.
- Plug and Play device that reduces wiring time.
- Quick access to diagnostic data.
- Aluminium housing, baked powder coating.
- Protection degree IP65.
- The 3 integrated signal LEDs provide better diagnostic visualisation in the field.

► 289

## FY series safety switches with separate actuator with lock



- Housing made of glass fibre reinforced technopolymer, shock-proof and self-extinguishing.
- Strong interlocking system that guarantees a maximum actuator holding force of 2800 N.
- Select between 30 configurations of the 4-pin contact blocks.
- Protection degree up to IP67 and IP69K.
- Versions with key release and escape release button.
- Versions with the possibility to integrate up to 2 control devices in the cover.
- 4 types of actuators made of stainless steel available for different types of applications.
- Head and release devices can be individually aligned on the switch in 4 directions and are non-detachable.
- 2 signalling LEDs that can be used to display the various operating states of the switch from the outside.

► 139



## Remote escape release for NG and NS series safety switches

- Auxiliary release device for unlocking the safety switch with lock of the guard through remote actuation.
- Can be combined with a dedicated emergency stop button that enables a fast, safe and immediately visible actuation.
- Suitable for all applications in which access to the safety switch is not easily achieved.
- Available for NG and NS series RFID safety switches with guard locking.
- Self-monitoring of cable tension that can be used for the safe stopping of the machine should the cable be cut or loosened.
- The remote escape release can be rotated about the switch axis, with 4 different cable output directions.

► 203



## NS series safety switches with modular housing for 1 to 4 devices

- The NS series safety switches are available with an optional additional module that integrates control devices depending on user needs.
- The versions with 3 or 4 control devices are supplemented by shorter variants that can accept 1 or 2 control devices.
- Technopolymer housing.
- Rotatable modules for the greatest installation flexibility.
- New laser-markable lenses are available: the desired markings are permanently applied directly to the lenses by means of lasers.
- Wide range of available control devices.

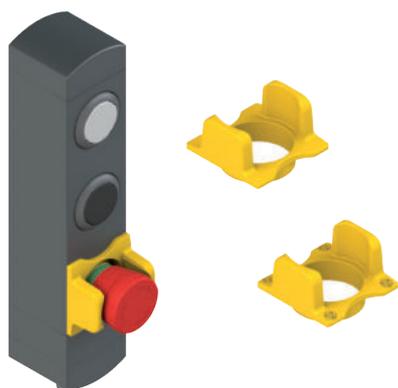
► 185



## BN series control device units

- The BN series of control device units has been further expanded with the new versions with 1 and 2 devices: 1 to 8 devices now fit into the modular technopolymer housings.
- New laser-markable lenses are available: the desired markings are permanently applied directly to the lenses by means of lasers.
- Wide range of available control devices.
- Rotatable modules for the greatest installation flexibility.
- Configurable with various types of connection output.
- Min. dimensions 40x40 mm.

► 275



### Protective guard for emergency stop buttons for the BN and NS series

- Protective cover that absorbs undesired shocks on the emergency stop button.
- Suitable for all BN and NS versions with integrated control devices and emergency stop buttons.
- Laser-markable in compliance with EN ISO 13850.

► 278



### New tamper-proof protections for M12 connectors, VF PC series

- New version ensuring additional protection against tampering with the electrical connections.
- Quick assembly with two interlocking shells.
- Removal possible only by breaking the shells.
- Different versions available for connector - device and male connector - female connector connections.
- Versions available in detectable blue plastic, suitable for the food industry.

► 435



### Gemis Studio 12

- Completely updated graphics.
- New remote support management.
- New function blocks.
- Option of disabling the test pulses of the PNP safety outputs.

► 369



## ST H series safety sensors 10-30 Vdc

- New version with hardware capable of operating with supply voltage and I/O voltage of between 10 and 30 Vdc.
- New auto-reset circuit designed for application on lifting platforms installed on vehicles.

► 51



## Connectors M8, M12 with new fixing ring, M23

- Large selection of connectors for cables and switch panels: optimal solution for use in combination with Pizzato switches.
- M12 connectors with new fixing ring with grooved circular and hexagonal attachment for tightening with torque-controlled tools. Available in male and female versions.
- Gold-plated contacts for increased reliability.
- Anti-vibration self-locking ring nuts.
- Highly flexible cables, suitable for use in drag chains, with oil-resistant PVC or PUR sheath acc. to IEC 60332-1-2.

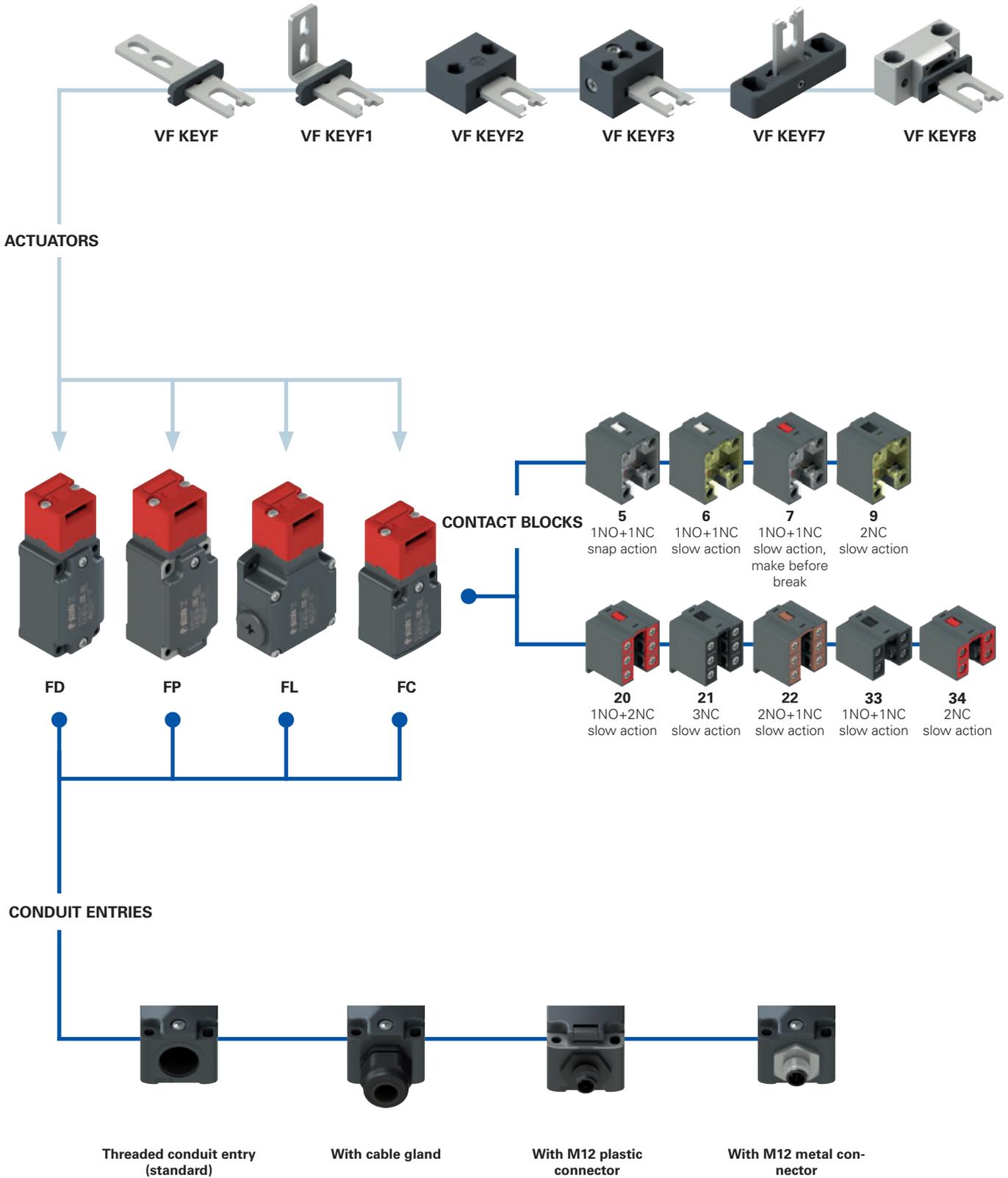
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## UKCA declaration of conformity

- Following the withdrawal of the United Kingdom from the European Union, the UKCA mark (UK Conformity Assessment) for products that are placed on the market in Great Britain must be used instead of the European CE marking. For products that previously required a CE marking, the new UKCA mark for Great Britain (England, Scotland and Wales), in effect since 1 January 2021, is required.
- At the time of printing this catalogue, the British government specified 1 January 2025 as the date from which the UKCA mark will be mandatory for products that are placed on the market in Great Britain; the UKCA mark can also be used prior to this date.
- Pizzato Elettrica has already started to update the mark and will mark its own products with the newly required mark within the time frame specified in the last legislative changes.

Selection diagram



—●— product option  
 —→— Sold separately as accessory



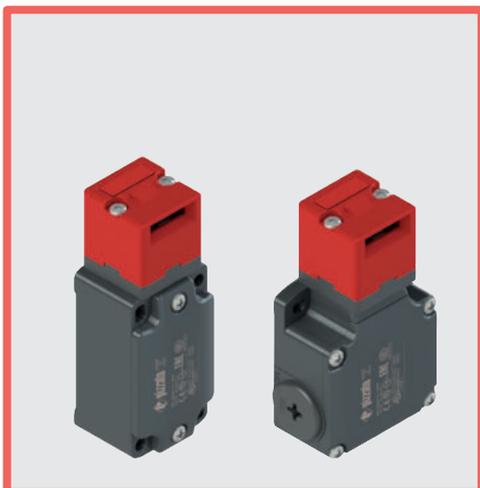
## Code structure

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

article		options		options	
<b>FD 693-</b>		<b>F1GM2</b>		<b>K50T6</b>	
<b>Housing</b>		<b>Ambient temperature</b>			
<b>FD</b>	metal, one conduit entry				-25°C ... +80°C (standard)
<b>FL</b>	metal, three conduit entries			<b>T6</b>	-40°C ... +80°C
<b>FP</b>	technopolymer, one conduit entry				
<b>Contact blocks</b>		<b>Pre-installed cable glands or connectors</b>			
<b>5</b>	1NO+1NC, snap action		no cable gland or connector (standard)		
<b>6</b>	1NO+1NC, slow action	<b>K23</b>	cable gland for cables Ø 6 ... 12 mm		
<b>7</b>	1NO+1NC, slow action, make before break	...	...		
<b>9</b>	2NC, slow action	<b>K50</b>	M12 metal connector, 5-pole		
<b>20</b>	1NO+2NC, slow action	...	...		
<b>21</b>	3NC, slow action				
<b>22</b>	2NO+1NC, slow action				
<b>33</b>	1NO+1NC, slow action				
<b>34</b>	2NC, slow action				
<b>Actuators</b>		<b>Threaded conduit entry</b>			
	without actuator (standard)	<b>M2</b>	M20x1.5 (standard)		
<b>F</b>	straight actuator VF KEYF		PG13.5		
<b>F1</b>	angled actuator VF KEYF1				
<b>F2</b>	jointed actuator VF KEYF2				
<b>F3</b>	jointed actuator adjustable in two directions VF KEYF3				
<b>F7</b>	jointed actuator adjustable in one direction VF KEYF7				
<b>F8</b>	universal actuator VF KEYF8				
		<b>Contact type</b>			
			silver contacts (standard)		
		<b>G</b>	silver contacts with 1 µm gold coating		
		<b>G1</b>	silver contacts, 2.5 µm gold coating (not for contact blocks 20, 21, 22, 33, 34)		

For the complete list of possible combinations please contact our technical department.

article		options		options	
<b>FC 3393-</b>		<b>F1GM2</b>		<b>K50T6</b>	
<b>Housing</b>		<b>Ambient temperature</b>			
<b>FC</b>	metal, one conduit entry				-25°C ... +80°C (standard)
		<b>T6</b>			-40°C ... +80°C
<b>Contact blocks</b>		<b>Pre-installed cable glands or connectors</b>			
<b>33</b>	1NO+1NC, slow action		no cable gland (standard)		
<b>34</b>	2NC, slow action	<b>K23</b>	cable gland for cables Ø 6 ... 12 mm		
		<b>K50</b>	M12 metal connector, 5-pole		
<b>Actuators</b>		<b>Threaded conduit entry</b>			
	without actuator (standard)	<b>M2</b>	M20x1.5 (standard)		
<b>F</b>	straight actuator VF KEYF		PG11		
<b>F1</b>	angled actuator VF KEYF1				
<b>F2</b>	jointed actuator VF KEYF2				
<b>F3</b>	jointed actuator adjustable in two directions VF KEYF3				
<b>F7</b>	jointed actuator adjustable in one direction VF KEYF7				
<b>F8</b>	universal actuator VF KEYF8				
		<b>Contact type</b>			
			silver contacts (standard)		
		<b>G</b>	silver contacts with 1 µm gold coating		



### Main features

- Metal housing or technopolymer housing, from one to three conduit entries
- Protection degree IP67
- 9 contact blocks available
- 6 stainless steel actuators available
- Versions with M12 connector
- Versions with gold-plated silver contacts

### Quality marks:



IMQ approval:	EG605
UL approval:	E131787
CCC approval:	2021000305000099
EAC approval:	RU C-IT.YT03.B.00035/19

### Technical data

#### Housing

FP series housing made of glass fibre reinforced technopolymer, self-extinguishing, shock-proof and with double insulation:

FD, FL and FC series: metal housing, baked powder coating.

Metal head, baked powder coating.

FD, FP, FC series: one threaded conduit entry: M20x1.5 (standard)

FL series: three threaded conduit entries: M20x1.5 (standard)

Protection degree: IP67 acc. to EN 60529 with cable gland of equal or higher protection degree

#### General data

SIL (SIL CL) up to:	SIL 3 acc. to EN 62061
Performance Level (PL) up to:	PL e acc. to EN ISO 13849-1
Mechanical interlock, coded:	type 2 acc. to EN ISO 14119
Coding level:	low acc. to EN ISO 14119
Safety parameter $B_{10D}$ :	2,000,000 for NC contacts
Mission time:	20 years
Ambient temperature:	-25°C ... +80°C (standard) -40°C ... +80°C (T6 option)
Max. actuation frequency:	3600 operating cycles/hour
Mechanical endurance:	1 million operating cycles
Max. actuation speed:	0.5 m/s
Min. actuation speed:	1 mm/s
Actuator extraction force:	10 N~
Tightening torques for installation:	see page 441
Wire cross-sections and wire stripping lengths:	see page 461

#### In compliance with standards:

IEC 60947-5-1, IEC 60947-1, IEC 60204-1, EN ISO 14119, EN ISO 12100, IEC 60529, EN IEC 63000, BG-GS-ET-15, UL 508, CSA C22.2 No. 14.

#### Approvals:

EN 60947-5-1, UL 508, CSA C22.2 No. 14, GB/T14048.5.

#### Compliance with the requirements of:

Machinery Directive 2006/42/EC, EMC Directive 2014/30/EU, RoHS Directive 2011/65/EU.

#### Positive contact opening in conformity with standards:

IEC 60947-5-1, EN 60947-5-1.

**⚠ If not expressly indicated in this chapter, for correct installation and utilization of all articles see the instructions given on pages 439 to 454.**

	Electrical data	Utilization category
without connector	Thermal current ( $I_{th}$ ): 10 A Rated insulation voltage (U): 500 Vac 600 Vdc 400 Vac 500 Vdc (contact blocks 20, 21, 22, 33, 34) Rated impulse withstand voltage ( $U_{imp}$ ): 6 kV 4 kV (contact blocks 20, 21, 22, 33, 34) Conditional short circuit current: 1000 A acc. to EN 60947-5-1 Protection against short circuits: type aM fuse 10 A 500 V Pollution degree: 3	Alternating current: AC15 (50÷60 Hz) $U_e$ (V) 250 400 500 $I_e$ (A) 6 4 1 Direct current: DC13 $U_e$ (V) 24 125 250 $I_e$ (A) 3 0.55 0.3
with M12 connector, 4 or 5-pole	Thermal current ( $I_{th}$ ): 4 A Rated insulation voltage (U): 250 Vac 300 Vdc Protection against short circuits: type gG fuse 4 A 500 V Pollution degree: 3	Alternating current: AC15 (50÷60 Hz) $U_e$ (V) 24 120 250 $I_e$ (A) 4 4 4 Direct current: DC13 $U_e$ (V) 24 125 250 $I_e$ (A) 3 0.55 0.3
with M12 connector, 8-pole	Thermal current ( $I_{th}$ ): 2 A Rated insulation voltage (U): 30 Vac 36 Vdc Protection against short circuits: type gG fuse 2 A 500 V Pollution degree: 3	Alternating current: AC15 (50÷60 Hz) $U_e$ (V) 24 $I_e$ (A) 2 Direct current: DC13 $U_e$ (V) 24 $I_e$ (A) 2



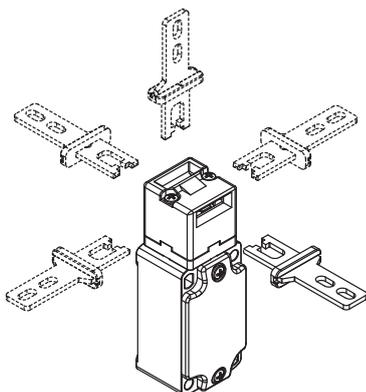
## Description



These safety switches are ideal for controlling gates, sliding doors and other guards which protect dangerous parts of machines without inertia.

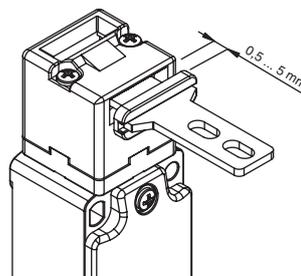
The stainless steel actuator is fastened to the moving part of the guard in such a way that it is separated from the switch each time the guard is opened. A special mechanism ensures that removing the actuator forces the positive opening of the electrical contacts. Easy to install, these switches can be used with all types of guards (with hinge as well as sliding and removable types). The possibility to actuate the switch only with a specific actuator guarantees that the machine can be restarted only after the guard has been closed. These switches are made of robust materials with larger dimensions and are designed especially for heavy gates and harsh environments.

## Head with variable orientation



For all switches, the head can be adjusted in 90° steps after removing the two fastening screws. In this way it is possible to actuate the switch from 5 different directions.

## Wide-ranging actuator travel



The actuation head of this switch features a wide range of travel. In this way the guard can oscillate along the direction of insertion (4.5 mm) without causing unwanted machine shutdowns. This wide range of travel is available in all actuators in order to ensure maximum device reliability.

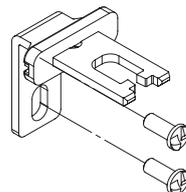
## Protection degree IP67

# IP67

These devices are designed to be used under the toughest environmental conditions, and they pass the IP67 immersion test acc. to EN 60529.

They can therefore be used in all environments where the maximum degree of protection is required for the housing.

## Safety screws for actuators



As required by EN ISO 14119, the actuator must be fixed immovably to the guard 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 419.

## Extended temperature range

# -40°C

These devices are also available in a special version suitable for an ambient operating temperature range from -40°C up to +80°C.

They can therefore be used for applications in cold stores, sterilisers and other equipment with low temperature environments. The special materials used to produce these versions retain their characteristics even under these conditions, thereby expanding the installation possibilities.

## 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.

## Features approved by IMQ

Rated insulation voltage (Ui):	500 Vac 400 Vac (for contact blocks 2, 11, 12, 20, 21, 22, 28, 29, 30, 33, 34, 37)
Conventional free air thermal current (Ith):	10 A
Protection against short circuits:	type aM fuse 10 A 500 V
Rated impulse withstand voltage (U <sub>imp</sub> ):	6 kV 4 kV (for contact blocks 20, 21, 22, 28, 29, 30, 33, 34) IP67
Protection degree of the housing:	IP67
MV terminals (screw terminals)	
Pollution degree:	3
Utilization category:	AC15
Operating voltage (U <sub>e</sub> ):	400 Vac (50 Hz)
Operating current (I <sub>e</sub> ):	3 A
Forms of the contact element:	Za, Za+Za, X+X, Zb, Y+Y, Y+Y+X, Y+Y+Y, Y+X+X, Y, X.
Positive opening of contacts on contact blocks	5, 6, 7, 8, 9, 11, 13, 14, 16, 17, 18, 19, 20, 21, 22, 28, 29, 30, 33, 34, 37, 38, 39, 66.
In compliance with standards:	EN 60947-1, EN 60947-5-1, fundamental requirements of the Low Voltage Directive 2014/35/EU.

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

## Features approved by UL

Electrical Ratings:	Q300 pilot duty (69 VA, 125-250 V dc) A600 pilot duty (720 VA, 120-600 V ac)
Environmental Ratings:	Types 1, 4X, 12, 13
	Use 60 or 75 °C copper (Cu) conductor and wire size range 12, 14 AWG, stranded or solid. The terminal tightening torque of 7.1 lb in (0.8 Nm).
	For FP series: the hub is to be connected to the conduit before the hub is connected to the enclosure.

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





### Stainless steel actuators

**IMPORTANT:** These actuators can be used only with items of the FD, FP, FL, FC and FS series (e.g. FD 693-M2).  
Low level of coding acc. to EN ISO 14119.

Article	Description
VF KEYF	Straight actuator

Article	Description
VF KEYF1	Angled actuator

Article	Description
VF KEYF2	Jointed actuator

Article	Description
VF KEYF3	Actuator adjustable in two directions

The actuator can flex in four directions for applications where the guard alignment is not precise.

Actuator adjustable in two directions for guards with reduced dimensions.

Article	Description
VF KEYF7	Actuator adjustable in one direction

Actuator adjustable in one direction for guards with reduced dimensions.

Article	Description
VF KEYF8	Universal actuator

Jointed actuator for guards with poor alignment, adjustable in two dimensions for small doors; can be mounted in various positions. The metal fixing body has two pairs of bore holes; it is provided for rotating the working plane of the actuator by 90°.

### Accessories

Article	Description
VF KB1	Lock out device

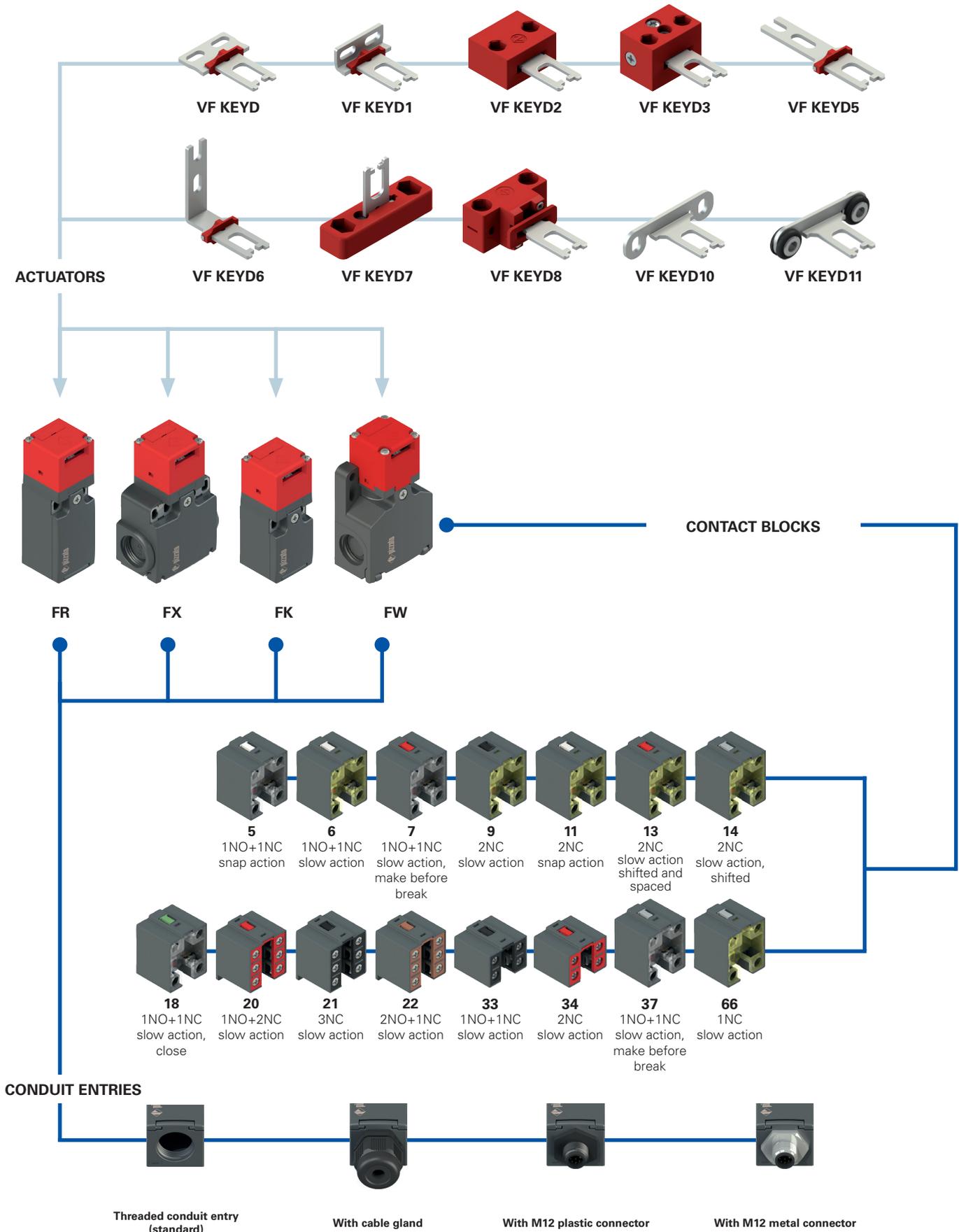
Padlockable lock out device to prevent the actuator entry and the accidental closing of the door behind operators while they are in the danger area.

All values in the drawings are in mm

Accessories See page 419

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

Selection diagram



● product option  
 → Sold separately as accessory



## Code structure

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

article options options  
**FR 693-E3D1XGM2K70T6**

Housing	
<b>FR</b>	technopolymer, one conduit entry
<b>FX</b>	technopolymer, two conduit entries
<b>FW</b>	technopolymer, three conduit entries

Contact blocks	
<b>5</b>	1NO+1NC, snap action
<b>6</b>	1NO+1NC, slow action
<b>7</b>	1NO+1NC, slow action, make before break
<b>9</b>	2NC, slow action
<b>11</b>	2NC, snap action
<b>13</b>	2NC, slow action, shifted and spaced
<b>14</b>	2NC, slow action, shifted
<b>18</b>	1NO+1NC, slow action, close
<b>20</b>	1NO+2NC, slow action
<b>21</b>	3NC, slow action
<b>22</b>	2NO+1NC, slow action
<b>33</b>	1NO+1NC, slow action
<b>34</b>	2NC, slow action
<b>37</b>	1NO+1NC, slow action, make before break
<b>66</b>	1NC, slow action

Head type	
<b>92</b>	detachable head (FW housing only)
<b>93</b>	non-detachable head (FR, FX and FK housing only)

Actuator extraction force	
	10 N (standard)
<b>E3</b>	30 N

Actuators	
	without actuator (standard)
<b>D</b>	straight actuator VF KEYD
<b>D1</b>	angled actuator VF KEYD1
<b>D2</b>	jointed actuator VF KEYD2
...	...

Ambient temperature	
	-25°C ... +80°C (standard)
<b>T6</b>	-40°C ... +80°C

Pre-installed cable glands or connectors	
	no cable gland or connector (standard)
<b>K23</b>	cable gland for cables Ø 6 ... 12 mm
...	...
<b>K70</b>	M12 plastic connector, 4-pole
...	...

For the complete list of possible combinations please contact our technical department.

Threaded conduit entry	
<b>M2</b>	M20x1.5 (standard)
<b>M1</b>	M16x1.5
	PG 13.5 (FR-FX housing only)
<b>A</b>	PG 11 (FR-FX housing only)

Contact type	
	silver contacts (standard)
<b>G</b>	silver contacts with 1 µm gold coating
<b>G1</b>	silver contacts, 2.5 µm gold coating (not for contact blocks 20, 21, 22, 33, 34)

External metallic parts	
	zinc-plated steel (standard)
<b>X</b>	stainless steel

article options options  
**FK 3393-E3D1XGM2K24T6**

Housing	
<b>FK</b>	technopolymer, one conduit entry

Contact blocks	
<b>33</b>	1NO+1NC, slow action
<b>34</b>	2NC, slow action

Actuator extraction force	
	10 N (standard)
<b>E3</b>	30 N

Actuators	
	without actuator (standard)
<b>D</b>	straight actuator VF KEYD
<b>D1</b>	angled actuator VF KEYD1
<b>D2</b>	jointed actuator VF KEYD2
...	...

Ambient temperature	
	-25°C ... +80°C (standard)
<b>T6</b>	-40°C ... +80°C

Pre-installed cable glands or connectors	
	no cable gland or connector (standard)
<b>K24</b>	cable gland for cables Ø 5 ... 10 mm
<b>K70</b>	M12 plastic connector, 4-pole

For the complete list of possible combinations please contact our technical department.

Threaded conduit entry	
<b>M2</b>	M20x1.5 (standard)
	PG 11

External metallic parts	
	zinc-plated steel (standard)
<b>X</b>	stainless steel

Contact type	
	silver contacts (standard)
<b>G</b>	silver contacts with 1 µm gold coating



### Main features

- Technopolymer housing, from one to three conduit entries
- Hinged cover, fixed with single captive screw
- Metal plates on mounting holes of the housing (FR, FX, FK)
- Protection degree IP 67 and IP69K
- 15 contact blocks available
- 10 stainless steel actuators available
- Versions with M12 connector
- Versions with gold-plated silver contacts

### Quality marks:



IMQ approval:	EG610
UL approval:	E131787
CCC approval:	2021000305000101
EAC approval:	RU C-IT.YT03.B.00035/19

### Technical data

#### Housing

Housing made of glass fibre reinforced technopolymer, self-extinguishing, shock-proof and with double insulation:	□
FR series, one conduit entry:	M20x1.5 (standard)
FK series: one threaded conduit entry:	M16x1.5 (standard)
FX series: two knock-out threaded conduit entries:	M20x1.5 (standard)
FW series - three knock-out threaded conduit entries:	M20x1.5 (standard)
Protection degree FR, FK, FX:	IP67 acc. to EN 60529 (with cable gland of equal or higher protection degree)
	IP69K acc. to ISO 20653 (with cable gland of equal or higher protection degree)
Protection degree FW:	IP67 acc. to EN 60529 (with cable gland of equal or higher protection degree)

#### General data

SIL (SIL CL) up to:	SIL 3 acc. to EN 62061
Performance Level (PL) up to:	PL e acc. to EN ISO 13849-1
Mechanical interlock, coded:	type 2 acc. to EN ISO 14119
Coding level:	low acc. to EN ISO 14119
Safety parameter $B_{10D}$ :	2,000,000 for NC contacts
Mission time:	20 years
Ambient temperature:	-25°C ... +80°C (standard)
	-40°C ... +80°C (T6 option)
Max. actuation frequency:	3600 operating cycles/hour
Mechanical endurance:	1 million operating cycles
Max. actuation speed:	0.5 m/s
Min. actuation speed:	1 mm/s
Actuator extraction force:	10 N~ (30 N~ -E3 versions)
Tightening torques for installation:	see page 439
Wire cross-sections and wire stripping lengths:	see page 461

#### In compliance with standards:

IEC 60947-5-1, IEC 60947-1, IEC 60204-1, EN ISO 14119, EN ISO 12100, IEC 60529, EN IEC 63000, BG-GS-ET-15, UL 508, CSA C22.2 No. 14.

#### Approvals:

EN 60947-5-1, UL 508, CSA C22.2 No. 14, GB/T14048.5.

#### Compliance with the requirements of:

Machinery Directive 2006/42/EC, EMC Directive 2014/30/EU, RoHS Directive 2011/65/EU.

#### Positive contact opening in conformity with standards:

IEC 60947-5-1, EN 60947-5-1.

**⚠ If not expressly indicated in this chapter, for correct installation and utilization of all articles see the instructions given on pages 439 to 454.**

### Electrical data

### Utilization category

without connector	Thermal current ( $I_{th}$ ):	10 A	Alternating current: AC15 (50÷60 Hz)			
	Rated insulation voltage (U):	500 Vac 600 Vdc 400 Vac 500 Vdc (contact blocks 20, 21, 22, 33, 34)	$U_e$ (V)	250	400	500
	Rated impulse withstand voltage ( $U_{imp}$ ):	6 kV 4 kV (contact blocks 20, 21, 22, 33, 34)	$I_e$ (A)	6	4	1
	Conditional short circuit current: Protection against short circuits: Pollution degree:	1000 A acc. to EN 60947-5-1 type aM fuse 10 A 500 V 3	Direct current: DC13 $U_e$ (V)	24	125	250

$I_e$ (A)	3	0.55	0.3
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with M12 connector, 4-pole	Thermal current ( $I_{th}$ ):	4 A	Alternating current: AC15 (50÷60 Hz)			
	Rated insulation voltage (U):	250 Vac 300 Vdc	$U_e$ (V)	24	120	250
	Protection against short circuits: Pollution degree:	type gG fuse 4 A 500 V 3	$I_e$ (A)	4	4	4
			Direct current: DC13 $U_e$ (V)	24	125	250

$I_e$ (A)	3	0.55	0.3
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with M12 connector, 8-pole	Thermal current ( $I_{th}$ ):	2 A	Alternating current: AC15 (50÷60 Hz)		
	Rated insulation voltage (U):	30 Vac 36 Vdc	$U_e$ (V)	24	
	Protection against short circuits: Pollution degree:	type gG fuse 2 A 500 V 3	$I_e$ (A)	2	
			Direct current: DC13 $U_e$ (V)	24	

$I_e$ (A)	2
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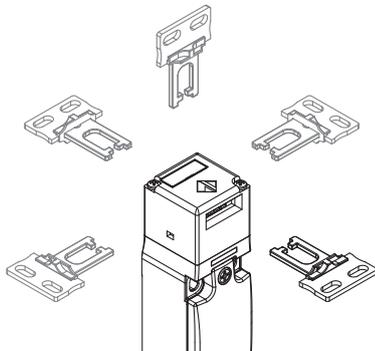


## Description



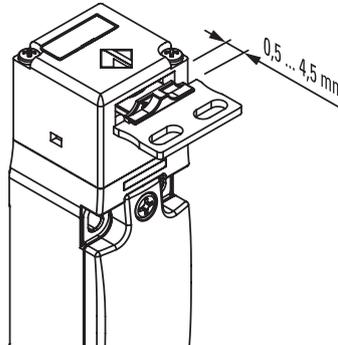
These safety switches are ideal for controlling gates, sliding doors and other guards which protect dangerous parts of machines without inertia. The stainless steel actuator is fastened to the moving part of the guard in such a way that it is separated from the switch each time the guard is opened. A special mechanism ensures that removing the actuator forces the positive opening of the electrical contacts. Easy to install, these switches can be used with all types of guards (with hinge as well as sliding and removable types). The possibility to actuate the switch only with a specific actuator guarantees that the machine can be restarted only after the guard has been closed.

## Head with variable orientation



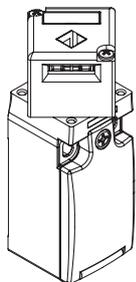
For all switches, the head can be adjusted in 90° steps after removing the two fastening screws. In this way it is possible to actuate the switch from 5 different directions.

## Wide-ranging actuator travel



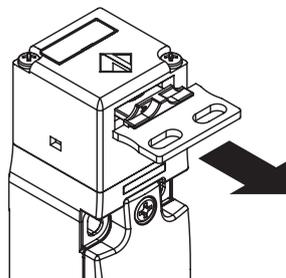
The actuation head of this switch features a wide range of travel. In this way the guard can oscillate along the direction of insertion (4 mm) without causing unwanted machine shutdowns. This wide range of travel is available in all actuators in order to ensure maximum device reliability.

## Not detachable head



To make head adjustment safer and smoother, these switches are equipped with a special head to body coupling system. This system makes it impossible to remove the head from the device even during adjustment, thus rendering the use of one-way screws unnecessary for locking the head in position once adjustment is complete. This solution is available for the FR, FX and FK series.

## Versions with 30 N actuator extraction force



Versions with 30 N actuator holding force instead of the standard 10 N are available.

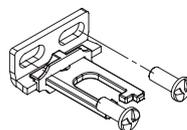
## Protection degrees IP67 and IP69K

**IP69K**  
**IP67**

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

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).

## Safety screws for actuators



As required by EN ISO 14119, the actuator must be fixed immovably to the guard 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 419.

## Extended temperature range

**-40°C**

These devices are also available in a special version suitable for an ambient operating temperature range from -40°C up to +80°C.

They can therefore be used for applications in cold stores, sterilisers and other equipment with low temperature environments. The special materials used to produce these versions retain their characteristics even under these conditions, thereby expanding the installation possibilities.

## Features approved by IMQ

Rated insulation voltage (Ui):	500 Vac 400 Vac (for contact blocks 2, 11, 12, 20, 21, 22, 28, 29, 30, 37, 33, 34)
Conventional free air thermal current (Ith):	10 A
Protection against short circuits:	type aM fuse 10 A 500 V
Rated impulse withstand voltage (U <sub>imp</sub> ):	6 kV 4 kV (for contact blocks 20, 21, 22, 28, 29, 30, 33, 34)
Protection degree of the housing:	IP67
MV terminals (screw terminals)	
Pollution degree:	3
Utilization category:	AC15
Operating voltage (U <sub>e</sub> ):	400 Vac (50 Hz)
Operating current (I <sub>e</sub> ):	3 A

Forms of the contact element: Za, Za+Za, X+X, Zb, Y+Y, Y+Y+X, Y+Y+Y, Y+X+X, Y, X.  
Positive opening of contacts on contact blocks 5, 6, 7, 8, 9, 11, 13, 14, 16, 17, 18, 19, 20, 21, 22, 28, 29, 30, 33, 34, 37, 38, 39, 66.

In compliance with standards: EN 60947-1, EN 60947-5-1, fundamental requirements of the Low Voltage Directive 2014/35/EU.

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

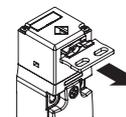
## Features approved by UL

Electrical Ratings:	Q300 pilot duty (69 VA, 125-250 V dc) A600 pilot duty (720 VA, 120-600 V ac)
Environmental Ratings:	FR: Types 1, 4X FX, FK, FW: Types 1, 4X, 12, 13
Use 60 or 75 °C copper (Cu) conductor and wire size range 12, 14 AWG, stranded or solid. The terminal tightening torque of 7.1 lb in (0.8 Nm).	
The hub is to be connected to the conduit before the hub is connected to the enclosure.	

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

		Technopolymer housing Without actuator							
Contact type: <b>R</b> = snap action <b>L</b> = slow action <b>LO</b> = slow action make before break <b>LS</b> = slow action shifted <b>LV</b> = slow action shifted and spaced <b>LA</b> = slow action close									
Contact block									
5	<b>R</b>	FR 593-M2	⊕ 1NO+1NC	FX 593-M2	⊕ 1NO+1NC	FW 592-M2	⊕ 1NO+1NC	/	
6	<b>L</b>	FR 693-M2	⊕ 1NO+1NC	FX 693-M2	⊕ 1NO+1NC	FW 692-M2	⊕ 1NO+1NC	/	
7	<b>LO</b>	FR 793-M2	⊕ 1NO+1NC	FX 793-M2	⊕ 1NO+1NC	FW 792-M2	⊕ 1NO+1NC	/	
9	<b>L</b>	FR 993-M2	⊕ 2NC	FX 993-M2	⊕ 2NC	FW 992-M2	⊕ 2NC	/	
11	<b>R</b>	FR 1193-M2	⊕ 2NC	FX 1193-M2	⊕ 2NC	FW 1192-M2	⊕ 2NC	/	
13	<b>LV</b>	FR 1393-M2	⊕ 2NC	FX 1393-M2	⊕ 2NC	FW 1392-M2	⊕ 2NC	/	
14	<b>LS</b>	FR 1493-M2	⊕ 2NC	FX 1493-M2	⊕ 2NC	FW 1492-M2	⊕ 2NC	/	
18	<b>LA</b>	FR 1893-M2	⊕ 1NO+1NC	FX 1893-M2	⊕ 1NO+1NC	FW 1892-M2	⊕ 1NO+1NC	/	
20	<b>L</b>	FR 2093-M2	⊕ 1NO+2NC	FX 2093-M2	⊕ 1NO+2NC	FW 2092-M2	⊕ 1NO+2NC	/	
21	<b>L</b>	FR 2193-M2	⊕ 3NC	FX 2193-M2	⊕ 3NC	FW 2192-M2	⊕ 3NC	/	
22	<b>L</b>	FR 2293-M2	⊕ 2NO+1NC	FX 2293-M2	⊕ 2NO+1NC	FW 2292-M2	⊕ 2NO+1NC	/	
33	<b>L</b>	FR 3393-M2	⊕ 1NO+1NC	FX 3393-M2	⊕ 1NO+1NC	FW 3392-M2	⊕ 1NO+1NC	FK 3393-M2	⊕ 1NO+1NC
34	<b>L</b>	FR 3493-M2	⊕ 2NC	FX 3493-M2	⊕ 2NC	FW 3492-M2	⊕ 2NC	FK 3493-M2	⊕ 2NC
37	<b>LO</b>	FR 3793-M2	⊕ 1NO+1NC	FX 3793-M2	⊕ 1NO+1NC	FW 3792-M2	⊕ 1NO+1NC	/	
66	<b>L</b>	FR 6693-M2	⊕ 1NC	FX 6693-M2	⊕ 1NC	FW 6692-M2	⊕ 1NC	/	
Actuating force		10 N (18 N ⊕)							
Travel diagrams		page 446 - group 8							

All switches listed above are available in a version with 30 N actuator extraction force. To obtain these products, the order code must be changed by adding the extension "E3", for example FR 693-M2E3.



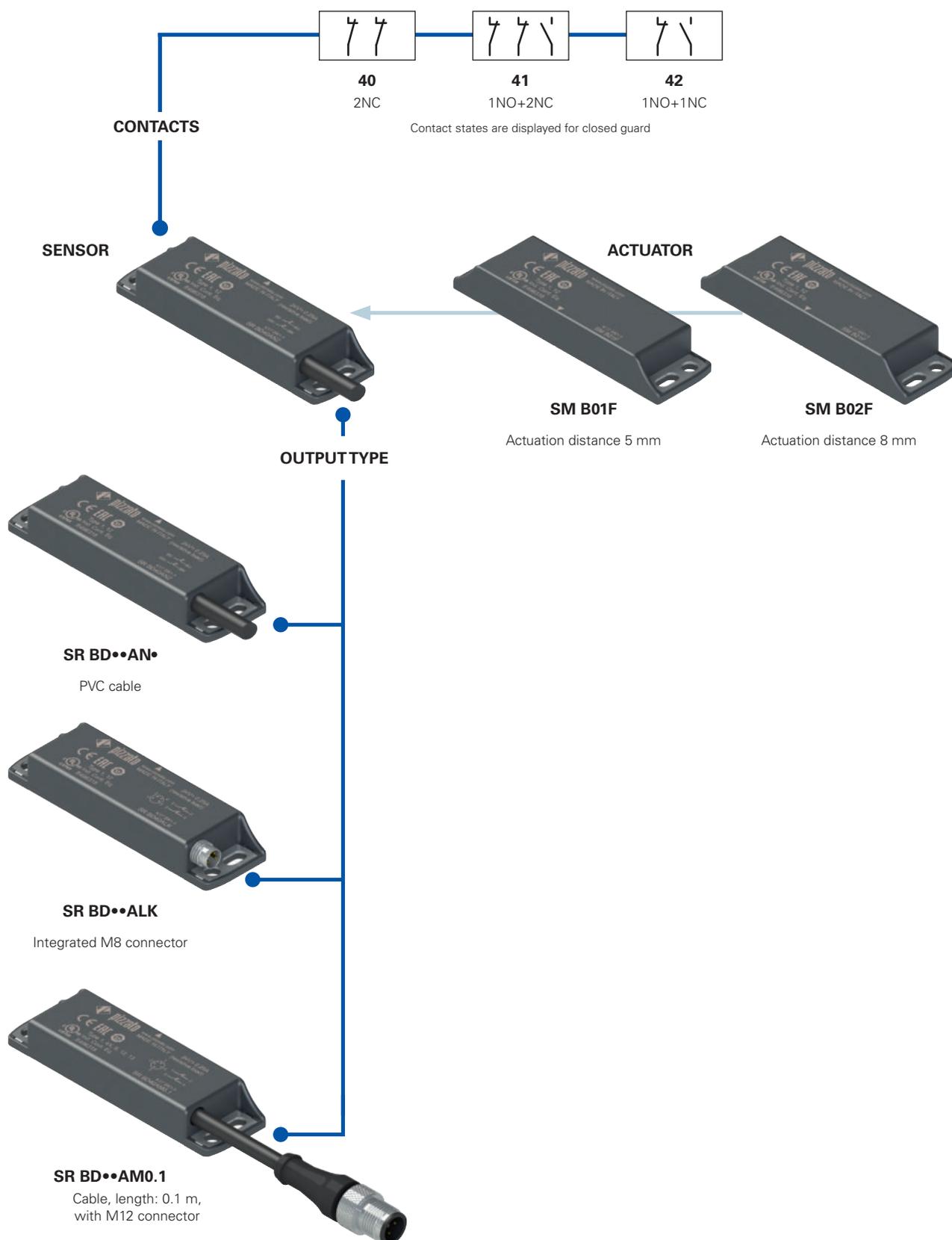
Extraction force for 30 N versions	30 N~ (38 N ⊕)			

### Limits of use

- Do not use where dust and dirt may penetrate in any way into the head and deposit there. In particular where metal dust, concrete or chemicals are spread.
- Adhere to the EN ISO 14119 requirements regarding low level of coding for interlocks.
- Do not use in environments with presence of explosive or flammable gases or dusts. In these cases use ATEX products (see dedicated Pizzato catalogue).



## Selection diagram

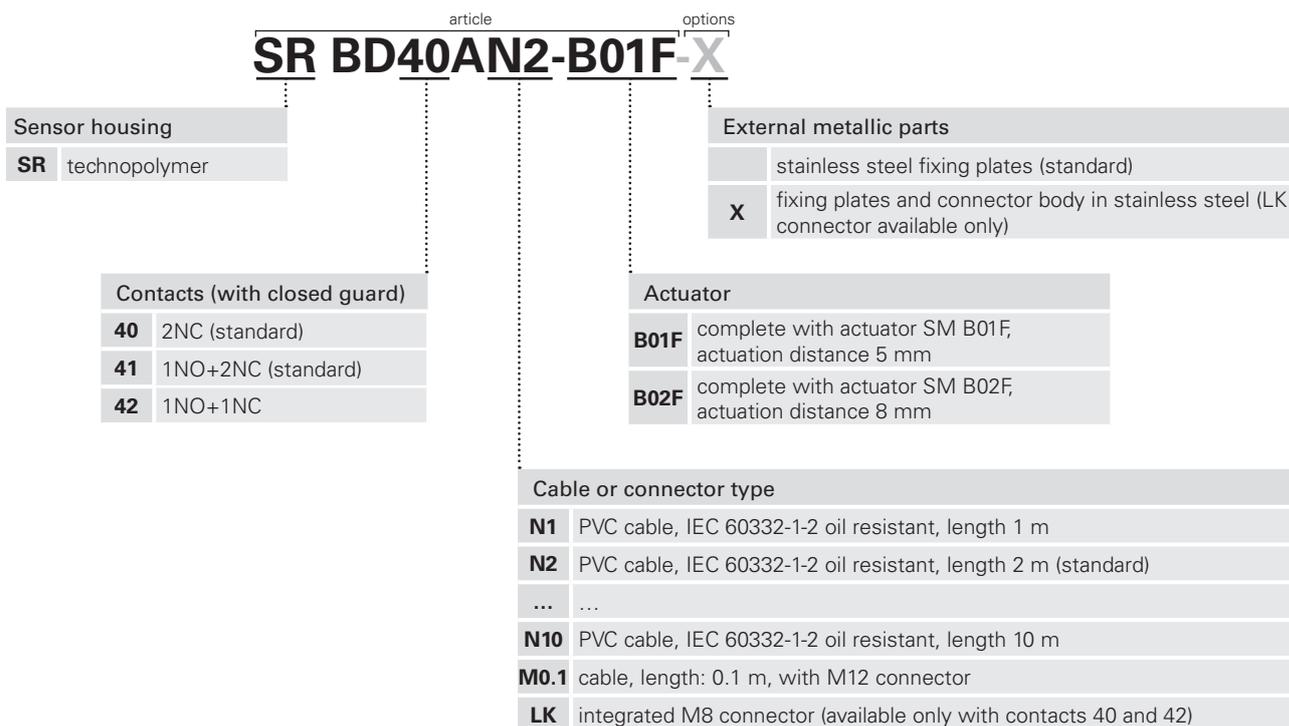


- product option
- Sold separately as accessory



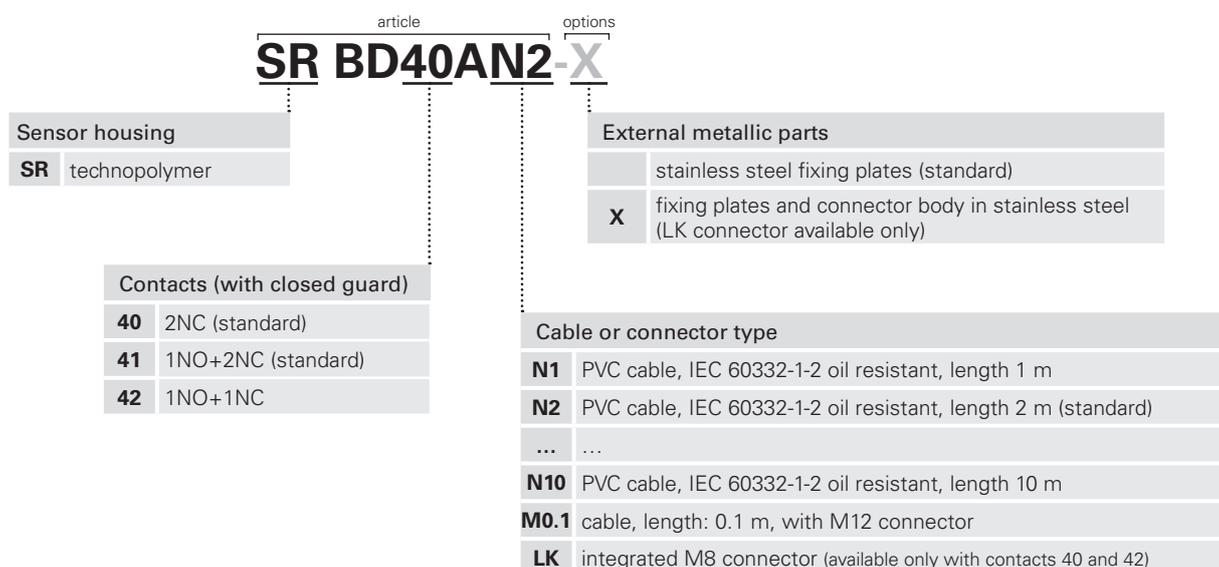
## Code structure for sensor with actuator

**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 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

<b>Actuator</b>	
<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 18 05 75157 024  
 EAC approval: RU C-IT.YT03.B.00035/19

### Compliance with the requirements of:

Machinery Directive 2006/42/EC,  
 EMC Directive 2014/30/EU,  
 RoHS Directive 2011/65/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

SIL (SIL CL) up to: SIL 3 acc. to EN 62061  
 Performance Level (PL) up to: PL e acc. to EN ISO 13849-1  
 Safety category up to: cat. 4 acc. to EN ISO 13849-1  
 Interlock, no contact, coded: type 4 acc. to EN ISO 14119  
 Coding level: low acc. to EN ISO 14119  
 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)  
 Mission time: 20 years  
 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, IEC 60947-5-1, IEC 60947-5-2, IEC 60947-5-3 (in abbinamento con un modulo di sicurezza), EN ISO 14119, EN ISO 12100, EN ISO 13849-1, EN ISO 13849-2, IEC 62061, IEC 60204-1, IEC 60529, IEC 61508-1, IEC 61508-2, IEC 61508-4, EN IEC 63000, ISO 20653, UL 508, CSA C22.2 No. 14.

#### Approvals:

UL 508, CSA C22.2 No. 14, EN ISO 13849-1, EN 60947-5-3, EN 61508-1, EN 61508-2, EN 61508-4, EN 62061, EN 60947-1.

#### Actuation data

Assured operating distance S<sub>ao</sub>: 5 mm with actuator SM B01F  
 8 mm with actuator SM B02F  
 Assured release distance S<sub>ar</sub>: 15 mm with actuator SM B01F  
 20 mm with actuator SM B02F  
 Repeat accuracy: ≤ 10%  
 Switching frequency: up to 1 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 Ü<sub>i</sub>: 120 Vac (with cable)  
 50 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  
 Rated conditional short-circuit current: 100 A

**⚠ If not expressly indicated in this chapter, for correct installation and utilization of all articles see the instructions given on pages 439 to 454.**

### 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

Electrical Ratings: 24 Vdc, 0,25 A (resistive load)  
 Environmental Ratings: Types 1, 4X, 6, 12, 13  
 Accessory for series SR for actuator switch series SM B.

### 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, cat. 4. with CS AR-08

In compliance with standards: 2006/42/EC Machinery Directive, EN ISO 13849-1:2015 (Cat. 4, PL e), EN 60947-5-3:2013, EN ISO 14119:2013, EN 61508-1:2010 (SIL 3), EN 61508-2:2010 (SIL 3), EN 61508-4:2010 (SIL 3), EN 62061:2005/A2:2015 (SIL CL 3)

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

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



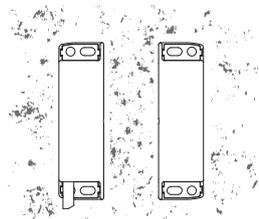
### Description



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.

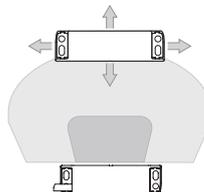
These products consist of a sensor that detects the magnetic field and which is connected to the machine structure and of a coded magnetic actuator, which is connected to the movable guard. When the sensor and actuator are approached (closed guard), the sensor detects the actuator and actuates the electrical 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 food industry.

### Wide actuation range

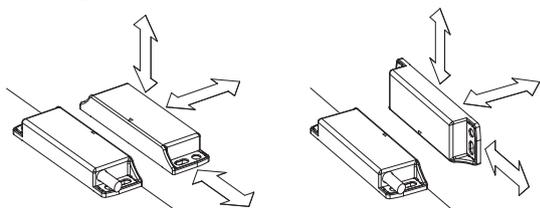


With their built-in features, magnetic sensors have a wide actuation range, making them very well suited for applications with large tolerances or where mechanical properties change over time.

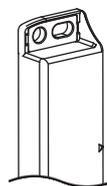
In this type of sensor, the actuation distances may vary depending on the shift direction of the actuator in relation to the sensor.

### 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.

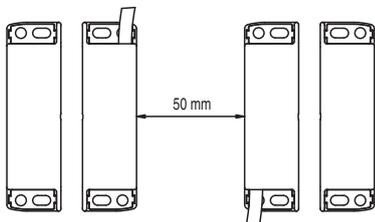


### Stainless steel fixing plates



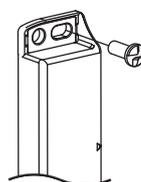
To prevent damage to the fixing slots when fastening on non-perfectly flat surfaces, coded magnetic sensors are equipped with stainless steel fixing plates. Even in the presence of suitable fixing surfaces, this solution makes the sensor more robust against mechanical stresses.

### Assembly of multiple sensor-actuator systems



It is possible to install more than one device on the same machine. The minimum mounting distance between sensor-actuator systems is only 50 mm.

### 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 419.

### 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.

### 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.

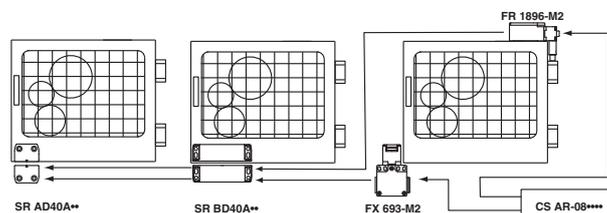
It should be noted that the series connection of two or more coded sensors reduces the self-monitoring capacity of the system, see ISO/TR 24119.

The use of Pizzato Elettrica safety modules is recommended.

### Protection degrees IP67 and IP69K

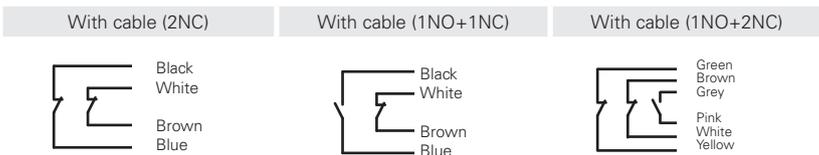
# IP69K IP67

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



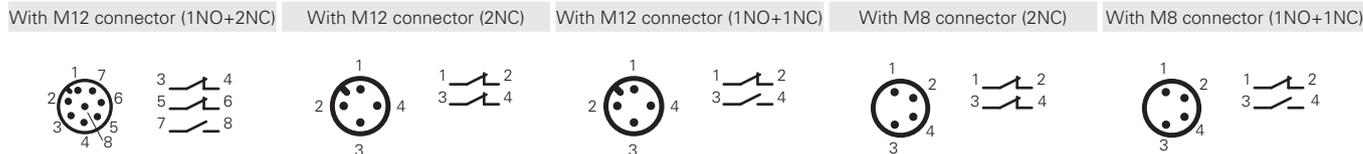
## Internal connections with cable

Contact states are displayed for closed guard



## Internal connections with connector

Contact states are displayed for closed guard



For female connectors, see page 419.

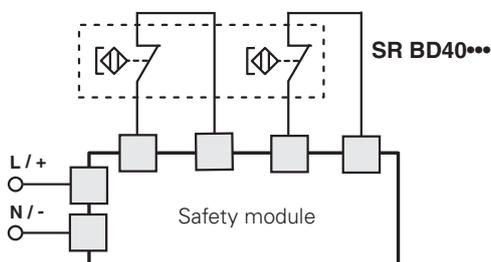
## Connection with safety modules

A coded magnetic sensor alone cannot be used for safety functions because its operating principles are not considered safe by the standards (e.g. 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.

## Compatible safety modules

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.

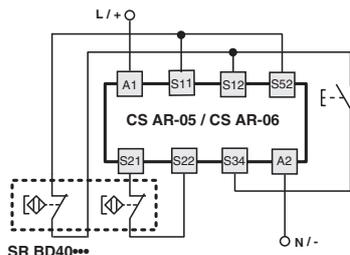


Sensors	Compatible safety modules	Safety module output contacts	
		Instantaneous contacts	Delayed contacts
SR BD40A... SR BD41A... SR BD42A... <sup>a</sup>	CS AR-01•••• <sup>b</sup>	2NO+1NC	/
	CS AR-02•••• <sup>b</sup>	3NO	/
	CS AR-04•••• <sup>b</sup>	3NO+1NC	/
	CS AR-05••••	3NO+1NC	/
	CS AR-06••••	3NO+1NC	/
	CS AR-08••••	2NO	/
	CS AR-46•024	1NO	/
	CS AR-91••••	2NO+1PNP	/
	CS AR-94••••	2NO	/
	CS AR-95••••	2NO	/
	CS AT-0•••••	2NO+1NC	2NO
	CS AT-1•••••	3NO	2NO
	CS AT-3•••••	2NO	1NO
	CS FS-5•••••	1NO+1NC+1CO	/
	CS MP••••••••	see page 369	see page 369
	CS MF••••••••	see page 401	see page 401

<sup>a</sup> Compatible with CS MF202••-P4 and CS MP•••••••• only.  
<sup>b</sup> Compatible with modules with production batch later than 06/2014 only.  
 For features of the safety modules see page 305.

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

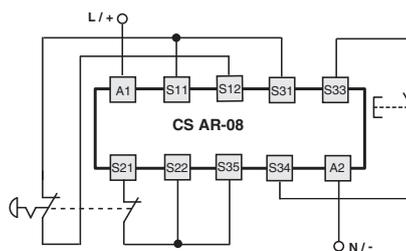
Input configuration with manual start (CS AR-05) and monitored start (CS AR-06)  
 2 channels



For features of the safety modules see page 305.

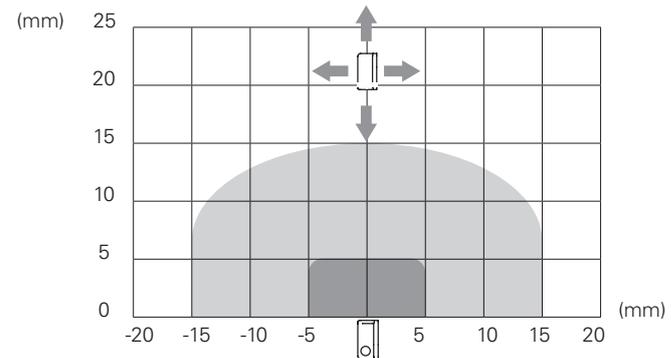
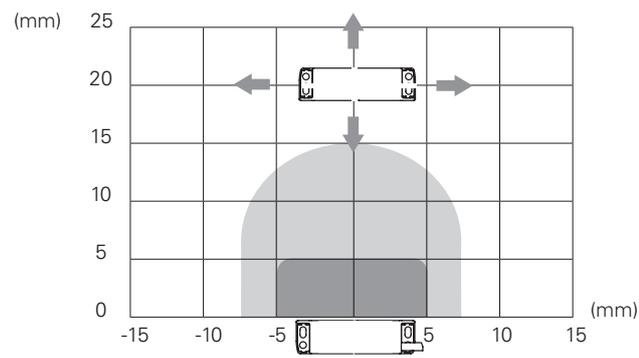
### Connection with safety modules CS AR-08 or CS AT

Input configuration with manual start  
 2 channels

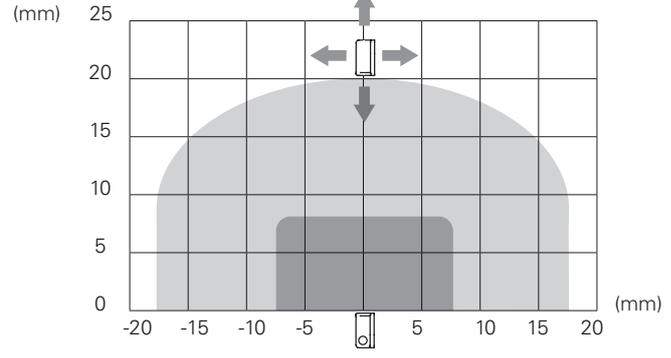
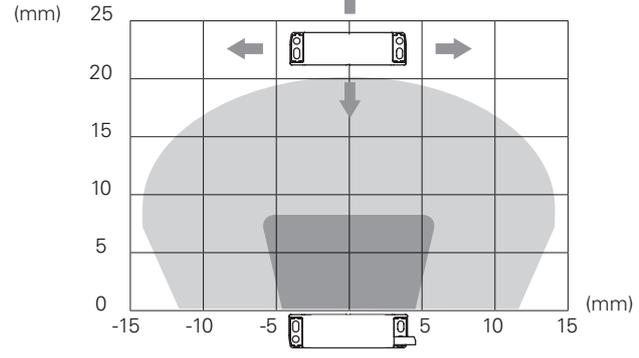




**Operating distances SR BD.....-B01F**



**Operating distances SR BD.....-B02F**



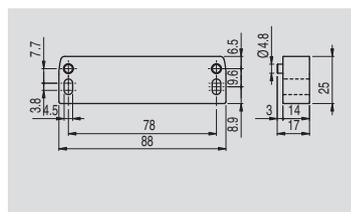
Legend:  
 ■ Assured operating distance  $S_{ao}$     ■ Assured release distance  $S_{ar}$   
**Note:** The progress of the activation areas is for reference only

**Dimensional drawings**

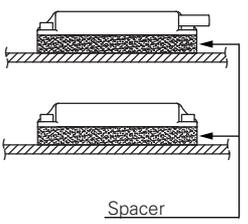
Integrated cable, length: 2 m		M8 connector		Cable, length: 0.1 m, with M12 connector		coded actuator Low level of coding acc. to EN ISO 14119	
SR BD40AN2	2NC	SR BD40ALK	2NC	SR BD40AM0.1	2NC	SM B01F	Actuation distance 5 mm
SR BD41AN2	1NO+2NC	/		SR BD41AM0.1	1NO+2NC	SM B02F	Actuation distance 8 mm
SR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

**Accessories**

**Spacer**

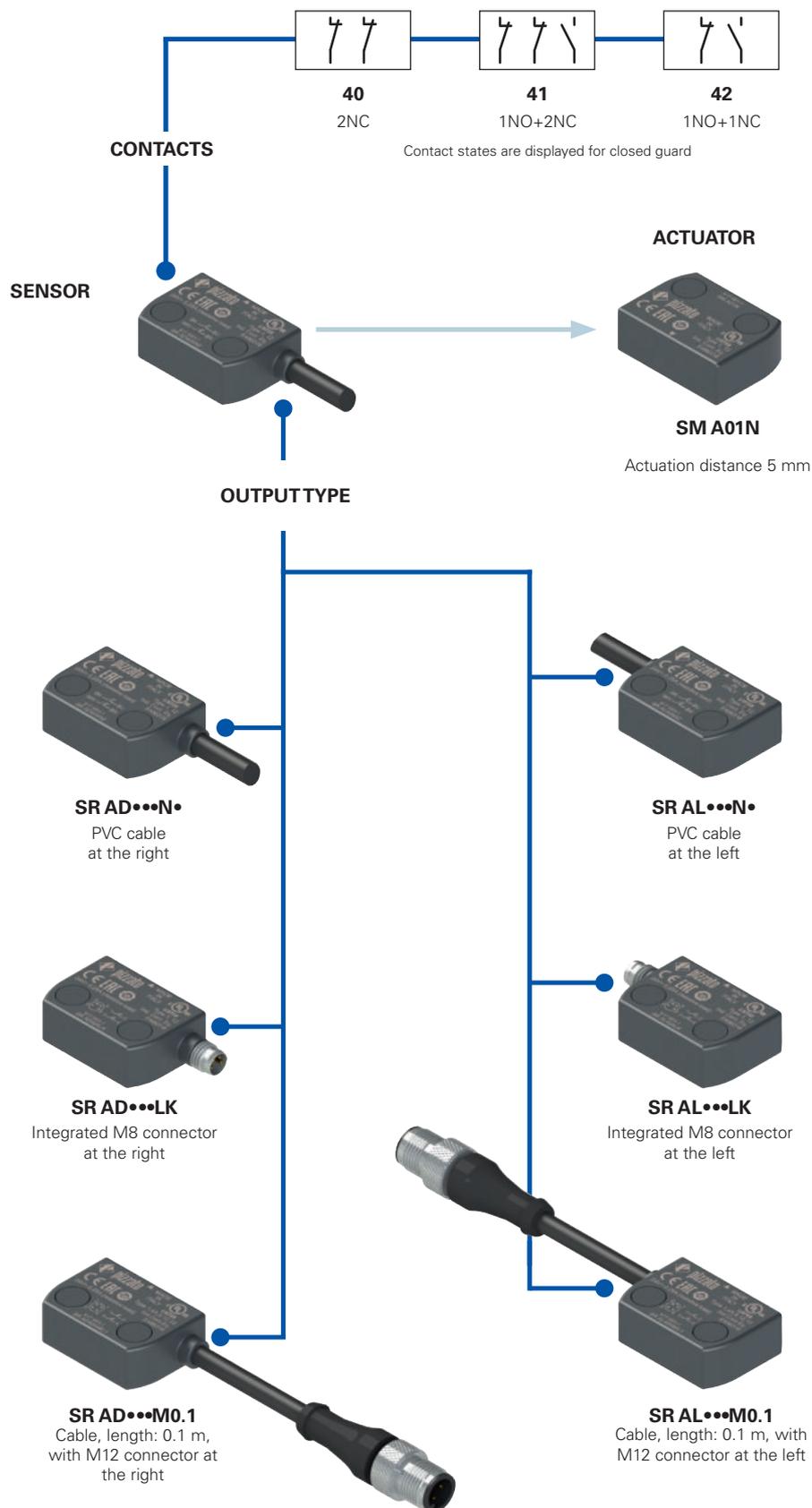


If possible do not mount the sensor and the actuator on ferromagnetic materials.  
 This spacer is placed between the magnetic safety sensors and metal surfaces that can deflect the magnetic field: as a result, the activation and deactivation distances of the sensor remain the same.  
 Because it is made out of a single block of material, it is especially well suited for applications where a high level of cleanness is required, as any material present in the installation area cannot penetrate and accumulate.



Article	Description
VS SP1BA1	Technopolymer spacer for SR B series sensors

## Selection diagram

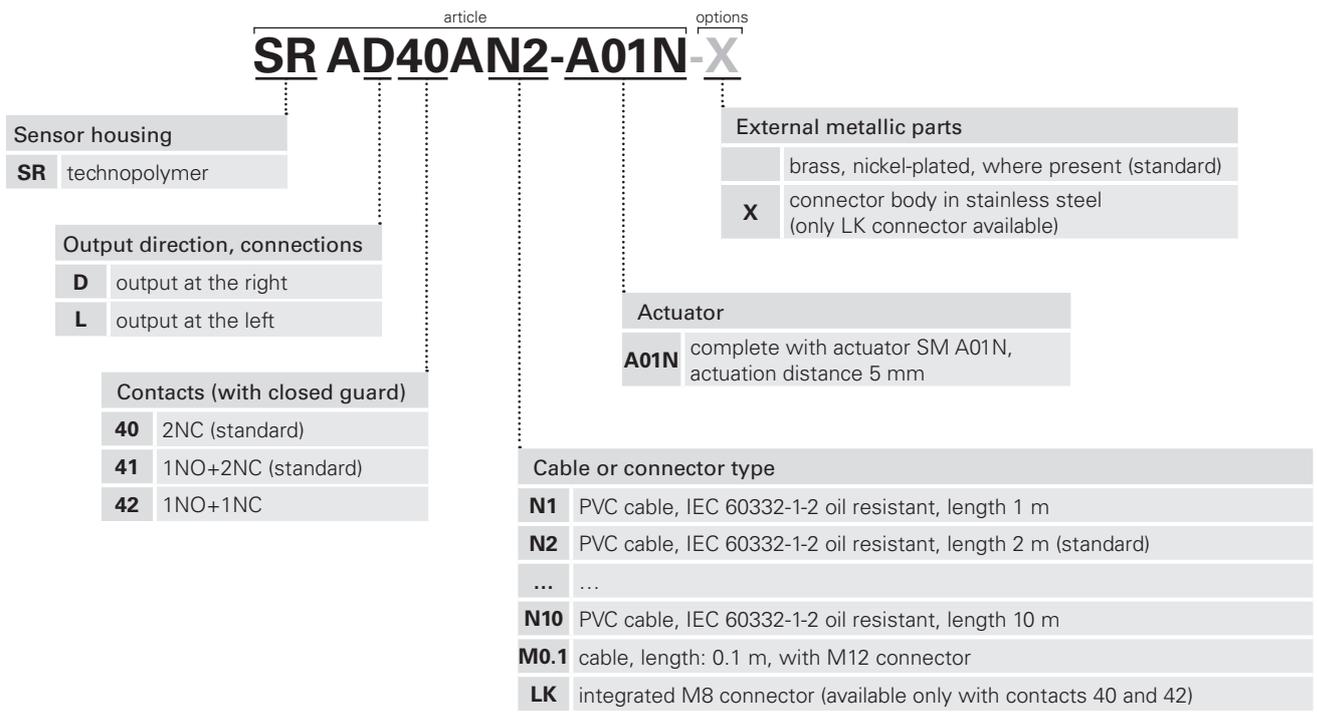


- product option
- Sold separately as accessory



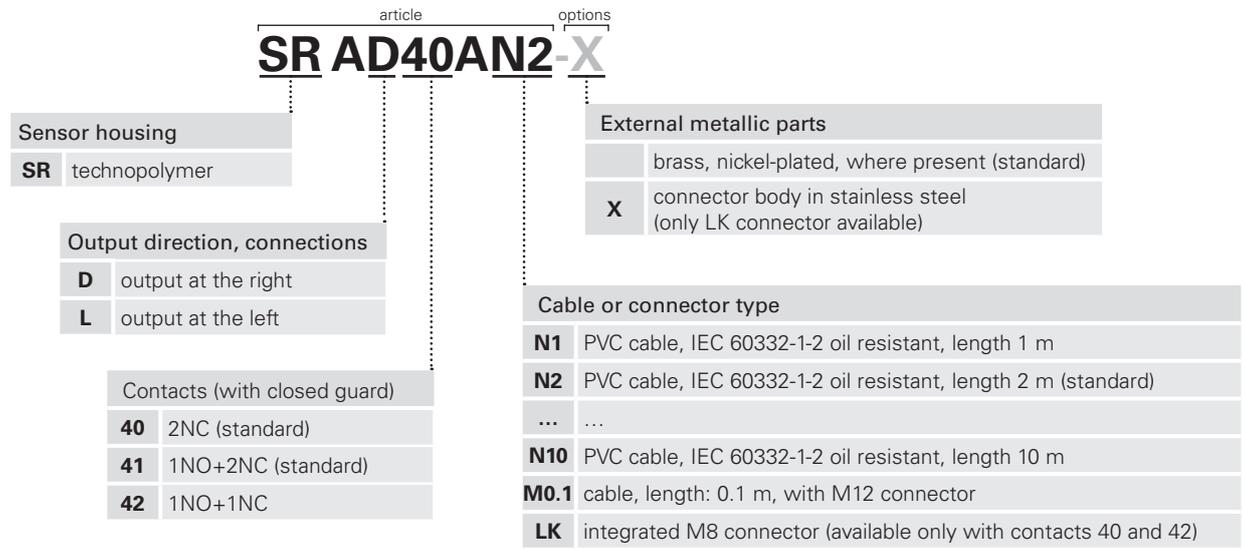
### Code structure for sensor with actuator

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



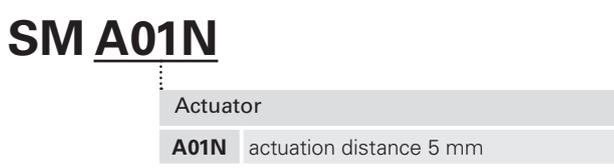
### Code structure for single sensor

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



**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





### Main features

- Actuation without mechanical contact
- 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 18 05 75157 024  
 EAC approval: RU C-IT.VT03.B.00035/19

### Compliance with the requirements of:

Machinery Directive 2006/42/EC,  
 EMC Directive 2014/30/EU,  
 RoHS Directive 2011/65/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

SIL (SIL CL) up to: SIL 3 acc. to EN 62061  
 Performance Level (PL) up to: PL e acc. to EN ISO 13849-1  
 Safety category up to: cat. 4 acc. to EN ISO 13849-1  
 Interlock, no contact, coded: type 4 acc. to EN ISO 14119  
 Coding level: low acc. to EN ISO 14119  
 Safety parameter B<sub>10D</sub>: 20,000,000 (used with Pizzato safety modules)  
 400,000  
 (used with max load: DC12 24 V 0.25 A)  
 20 years  
 Ambient temperature: -25°C ... +80°C  
 Ambient temperature 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 60947-1:2007, IEC 60947-5-1, IEC 60947-5-2, IEC 60947-5-3 (in abbinamento con un modulo di sicurezza), EN ISO 14119, EN ISO 12100, EN ISO 13849-1, EN ISO 13849-2, IEC 62061, IEC 60204-1, IEC 60529, IEC 61508-1, EN 61508-2, IEC 61508-4, EN IEC 63000, ISO 20653, UL 508, CSA C22.2 No. 14.

#### Approvals:

UL 508, CSA C22.2 No. 14, EN ISO 13849-1, EN 60947-5-3, EN 61508-1, EN 61508-2, EN 61508-4, EN 62061, EN 60947-1.

#### Actuation data

Assured operating distance S<sub>ao</sub>: 5 mm with actuator SM A01N  
 Assured release distance S<sub>ar</sub>: 15 mm with actuator SM A01N  
 Repeat accuracy: ≤ 10%  
 Switching frequency: up to 1 Hz  
 Distance between two sensors: minimum 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)  
 50 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  
 Rated conditional short-circuit current: 100 A

**⚠ If not expressly indicated in this chapter, for correct installation and utilization of all articles see the instructions given on pages 439 to 454.**

### 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

Electrical Ratings: 24 Vdc, 0,25 A (resistive load)  
 Environmental Ratings: Types 1, 4X, 6, 12, 13  
 Accessory for series SR for actuator switch series SM A.

### 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, cat. 4. with CS AR-08

In compliance with standards: 2006/42/EC Machinery Directive, EN ISO 13849-1:2015 (Cat. 4, PL e), EN 60947-5-3:2013, EN ISO 14119:2013, EN 61508-1:2010 (SIL 3), EN 61508-2:2010 (SIL 3), EN 61508-4:2010 (SIL 3), EN 62061:2005/A2:2015 (SIL CL 3)

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

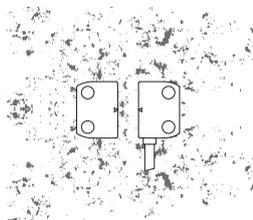
Please contact our technical department for the list of approved products.

## 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.

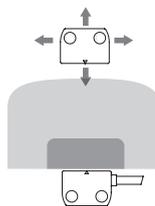
## Insensitivity to dirt



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 food industry.

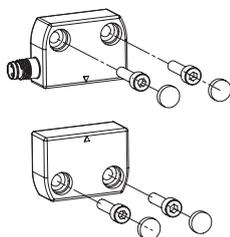
## Wide actuation range



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.

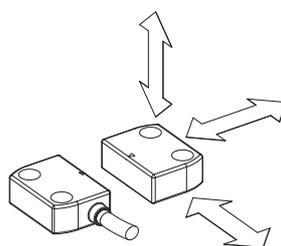
In this type of sensor, the actuation distances may vary depending on the shift direction of the actuator in relation to the sensor.

## Protection against tampering



Each sensor and actuator of the SR A series is supplied complete with snap-on protection caps to be applied on the holes of the fixing screws. Not only do the caps prevent dirt from accumulating and simplify cleaning, they also block access to the fastening screws of the actuator. As a result, standard screws can be used instead of tamper-proof screws.

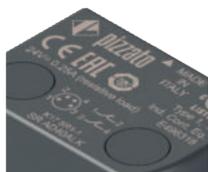
## Actuation from many directions



The coded magnetic sensors were designed to be activated by the respective actuator from various directions.

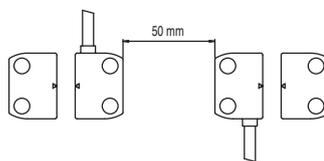
The customer therefore enjoys maximum flexibility when positioning devices along the perimeter of the guards.

## 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.

## Assembly of multiple sensor-actuator systems



It is possible to install more than one device on the same machine. The minimum mounting distance between sensor-actuator systems is only 50 mm.

## Protection degrees IP67 and IP69K



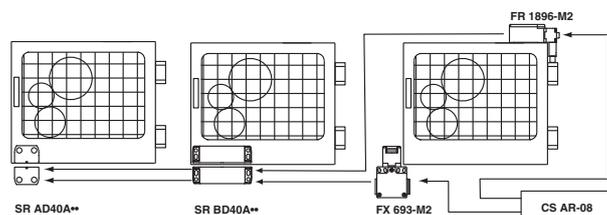
These devices are designed to be used under the toughest environmental conditions, and they pass the IP67 immersion test acc. to EN 60529. They can therefore be used in all environments where the maximum degree of protection is required for the housing. Due to

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

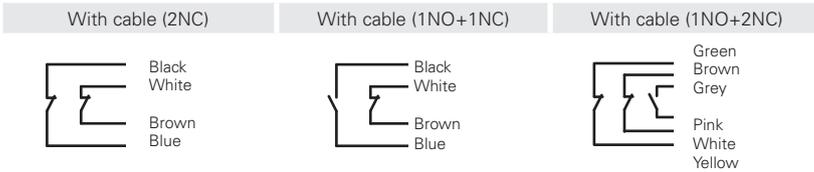
The coded magnetic sensors can be connected in series with the only limitation that the overall resistance, of sensors and the related wiring, has to be not higher than the admitted max. value of the module, which typically is equal to 50 Ω (see module features). This is a very high value that, with 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.



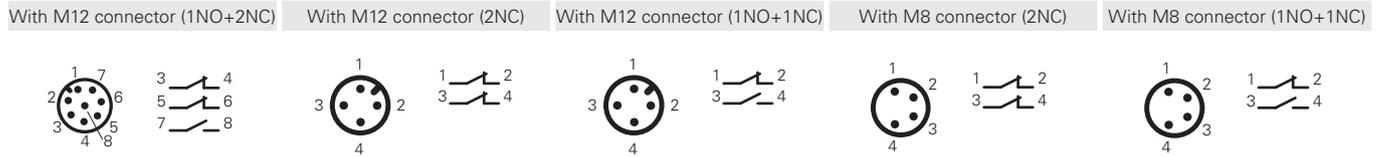
## Internal connections with cable

Contact states are displayed for closed guard



## Internal connections with connector

Contact states are displayed for closed guard



For female connectors, see page 419

## Connection with safety modules

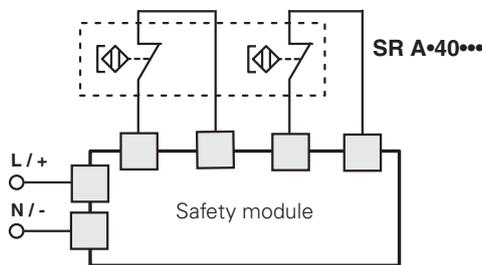
A coded magnetic sensor alone cannot be used for safety functions because its operating principles are not considered safe by the standards (e.g. the positive opening on mechanical switches).

For this reason, a magnetic sensor coded for use in safety applications must always be connected to a safety module with at least two channels that monitors the proper function.

## Compatible safety modules

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 AD40A●● SR AD41A●● SR AD42A●● <sup>a</sup>	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 AR-94●●●●	2NO	/
	CS AR-95●●●●	2NO	/
	CS AT-0●●●●●	2NO+1NC	2NO
	CS AT-1●●●●●	3NO	2NO
	CS AT-3●●●●●	2NO	1NO
	CS FS-5●●●●●	1NO+1NC+1CO	/
	CS MP●●●●●●●●	see page 369	see page 369
	CS MF●●●●●●●●	see page 401	see page 401

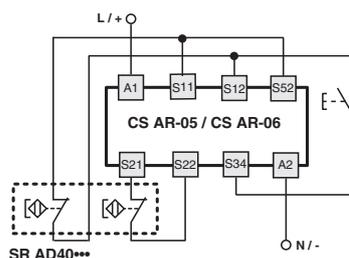
<sup>a</sup> Compatible with CS MF202●●-P4 and CS MP●●●●●●●● only.

<sup>b</sup> Compatible with modules with production batch later than 06/2014 only. For features of the safety modules see page 305.

### 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)

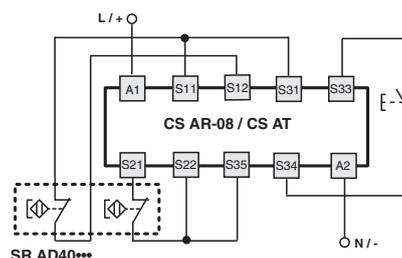
2 channels



### Connection with safety modules CS AR-08 or CS AT

Input configuration with manual start

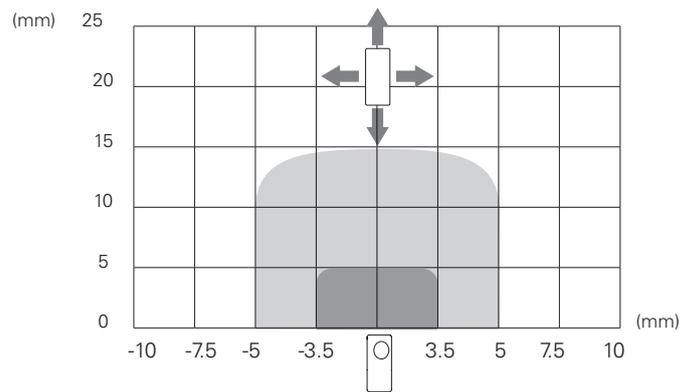
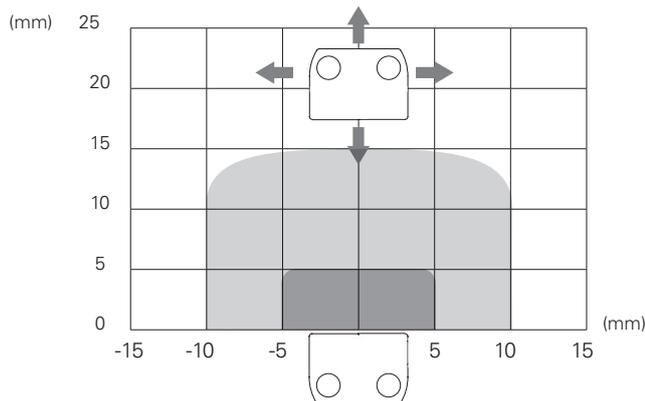
2 channels



For features of the safety modules see page 305.



# Operating distances SR AD.....A01N



Legend:

Assured operating distance  $S_{ao}$

Assured release distance  $S_{ar}$

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

## Dimensional drawings

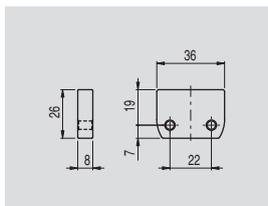
Integrated cable, length: 2 m, at the right		Integrated cable, length: 2 m, at the left	
SR AD40AN2	2NC	SR AL40AN2	2NC
SR AD41AN2	1NO+2NC	SR AL41AN2	1NO+2NC
SR AD42AN2	1NO+1NC	SR AL42AN2	1NO+1NC

coded actuator Low level of coding acc. to EN ISO 14119	
SM A01N	Actuation distance 5 mm

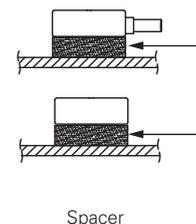
M8 connector, at the right	M8 connector, at the left	Cable, length: 0.1 m, with M12 connector at the right	Cable, length: 0.1 m, with M12 connector at the left
SR AD40ALK	2NC	SR AD40AM0.1	2NC
/	/	SR AD41AM0.1	1NO+2NC
SR AD42ALK	1NO+1NC	SR AD42AM0.1	1NO+1NC
		SR AL40AM0.1	2NC
		SR AL41AM0.1	1NO+2NC
		SR AL42AM0.1	1NO+1NC

## Accessories

### Spacer



If possible do not mount the sensor and the actuator on ferromagnetic materials. 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. Because it is made out of a single block of material, it is especially well suited for applications where a high level of cleanliness is required, as any material present in the installation area cannot penetrate and accumulate.



Article	Description
VS SP1AA1	Technopolymer spacer for SR A series sensors

## Introduction



In combination with the corresponding safety modules, the sensors of the ST D series are suitable for the monitoring of protective devices on machines without inertia and allow the system in which they are used to reach a safety category up to SIL 3 acc. to EN 62061 as well as up to PL e and Category 4 acc. to EN ISO 13849-1. These sensors use RFID (Radio Frequency IDentification) technology and provide high protection against possible manipulation thanks to the uniqueness of the codes transmitted by the actuator. Because they have no mechanical elements, they guarantee a long service life even in applications with frequent operating cycles and under harsh environmental conditions.

## Maximum safety with a single device

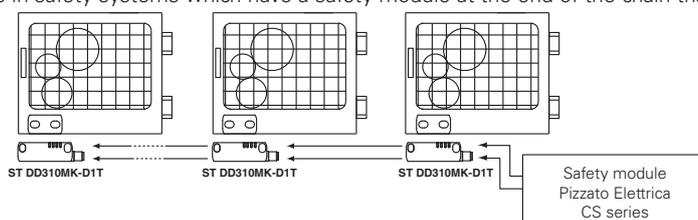
**PL e + SIL 3** The sensors of the ST D series are constructed with redundant electronics. As a result, the maximum PL e and SIL 3 safety levels can still be achieved through the use of a single device on a guard. This avoids expensive wiring in the field and allows faster installation. Inside the control cabinet, the two electronic safety outputs must be connected to a module suitable for managing devices with solid state outputs, or to a safety PLC.

## Series connection of multiple sensors

**PL e + SIL 3** One of the most important features of the ST D series from Pizzato Elettrica is the possibility of connecting up to 32 sensors in series, while still maintaining the maximum safety level (PL e) laid down in EN 13849-1.

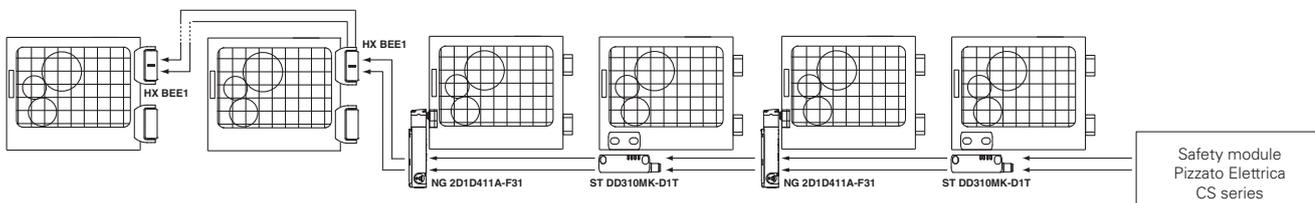
This connection type is permissible in safety systems which have a safety module at the end of the chain that monitors the outputs of the last ST sensor.

The fact that the PL e safety level can be maintained even with 32 sensors connected in series demonstrates the extremely secure structure of each sensor of the ST series.



## Series connection with other devices

**PL e + SIL 3** The ST D series features two safety inputs and two safety outputs, which can be connected in series with other Pizzato Elettrica safety devices. This option allows the creation of safety chains containing various devices. For example, stainless steel safety hinges (HX BEE1 series), transponder sensors (ST series) and door lock sensors (NG or NS series) can be connected in series while still maintaining the maximum PL e and SIL 3 safety levels.



## High level coded actuators



The ST D series is provided with an electronic system based on RFID technology to detect the actuator. This allows to provide each actuator with different coding and makes it impossible to tamper with a device by using another actuator of the same series. Millions of different coding combinations are possible for the actuators. They are therefore classified as high level coded actuators, according to EN ISO 14119.

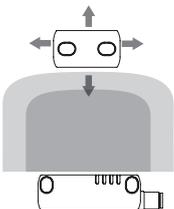
## Protection degrees IP67 and IP69K

**IP69K**  
**IP67**

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

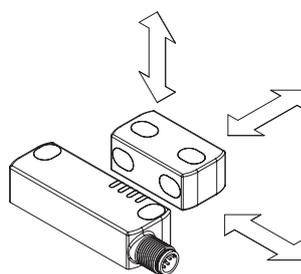
their special design, these devices are suitable for use in equipment subjected to cleaning with high pressure hot water jets. These devices meet the IP69K test requirements according to ISO 20653 (water jets with 100 bar and 80°C).

## Wide actuation range



By utilising the properties of RFID technology, the sensors of the ST D series have a wide actuation range, making them very well suited for applications with large tolerances or where mechanical properties change over time.

## Actuation from many directions



The sensors of the ST D series from Pizzato Elettrica were designed to be activated from various directions, thereby providing the customer with maximum flexibility when positioning the sensors on the guards. Furthermore, the SM D•T actuator can be secured in two mutually orthogonal directions.



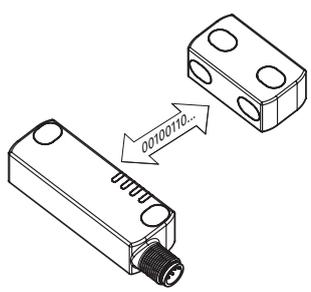
### Programmability

Pizzato Elettrica supplies a programmable version of the ST D series sensors. With a simple and brief operation, the sensor can be programmed to recognise the code of a new actuator.

By activating a special input, the sensor is switched to a safe state, during which it waits for a new code to be accepted. As the actuator approaches, the ST D sensor performs a number of checks on the code being received, whereby the code must adhere to certain parameters of RFID technology.

If the checks are successful, the sensor uses LEDs to signal the successful completion of the procedure.

After programming has been completed, the sensor only recognises the code of the last programmed actuator, thereby preserving the safety level and the reliability of the system in which it is installed.



### Laser engraving

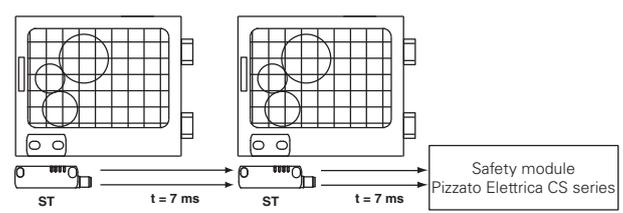
All devices are marked using a dedicated indelible laser system. These engravings are therefore suitable for extreme environments too. Thanks to this system that does not use labels, the loss of plate data is prevented and a greater resistance of the marking is achieved over time.



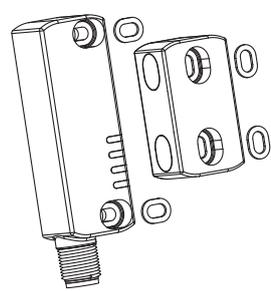
### Short signal propagation delay

One of the main features of the ST D sensors is the short signal propagation time of approx. 7 ms after deactivation of the inputs.

This short signal propagation time is particularly advantageous for sensors connected in series.

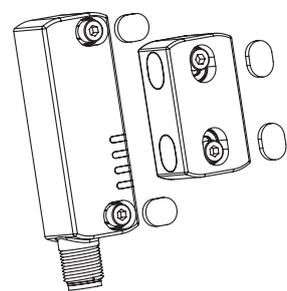


### Stainless steel fixing plates



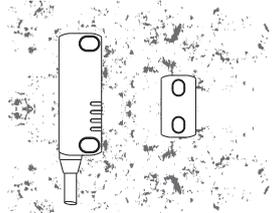
The stainless-steel fixing plates for the ST D sensors not only protect the mounting eyes during installation on surfaces that are not perfectly flat, they also help the sensor better withstand mechanical loads. As a result, the system is safer and more reliable.

### Protection against tampering



Each sensor and actuator of the ST D series is supplied complete with snap-on protection caps to be applied on the holes of the fixing screws. Not only do the caps prevent dirt from accumulating and simplify cleaning, they also block access to the fastening screws of the actuator. As a result, standard screws can be used instead of tamper-proof screws.

### Insensitivity to dirt



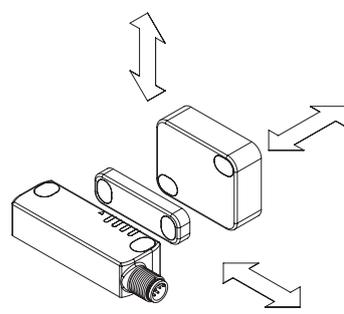
The sensors are completely sealed and retain their safety characteristics even in the presence of dirt or deposits (not ferromagnetic material). This characteristic, combined with the design without recesses, makes them particularly suitable for use in the food industry.

### Four LEDs for immediate diagnosis

As the LEDs have been designed for quick immediate diagnosis, the status of each input and output is highlighted by one specific LED. By knowing which device is active and which door is open, it is possible to quickly identify an interruption in the safety chain as well as any internal device errors. All of this at a glance, without needing to decode complex flashing sequences.



### Versions with increased actuation distance



In addition to the standard actuation distance of 12 mm, sensors with an actuation distance of 20 mm are also available. The increased actuation distance of the sensors is ideal for installation situations in which it is not possible to ensure that the actuator approaches the sensor in a precise and stable manner.

### New compact actuators

In addition to the standard actuators, the new compact actuators SM L•T are now available to order; these actuators have a single mounting direction (frontal) and maintain the same actuation distance of 12 mm as the actuator SM D•T.

Due to the reduced thickness (just 7 mm), they can be installed in all applications with restricted space conditions and thereby enable use of RFID technology, even with guards of small dimensions.



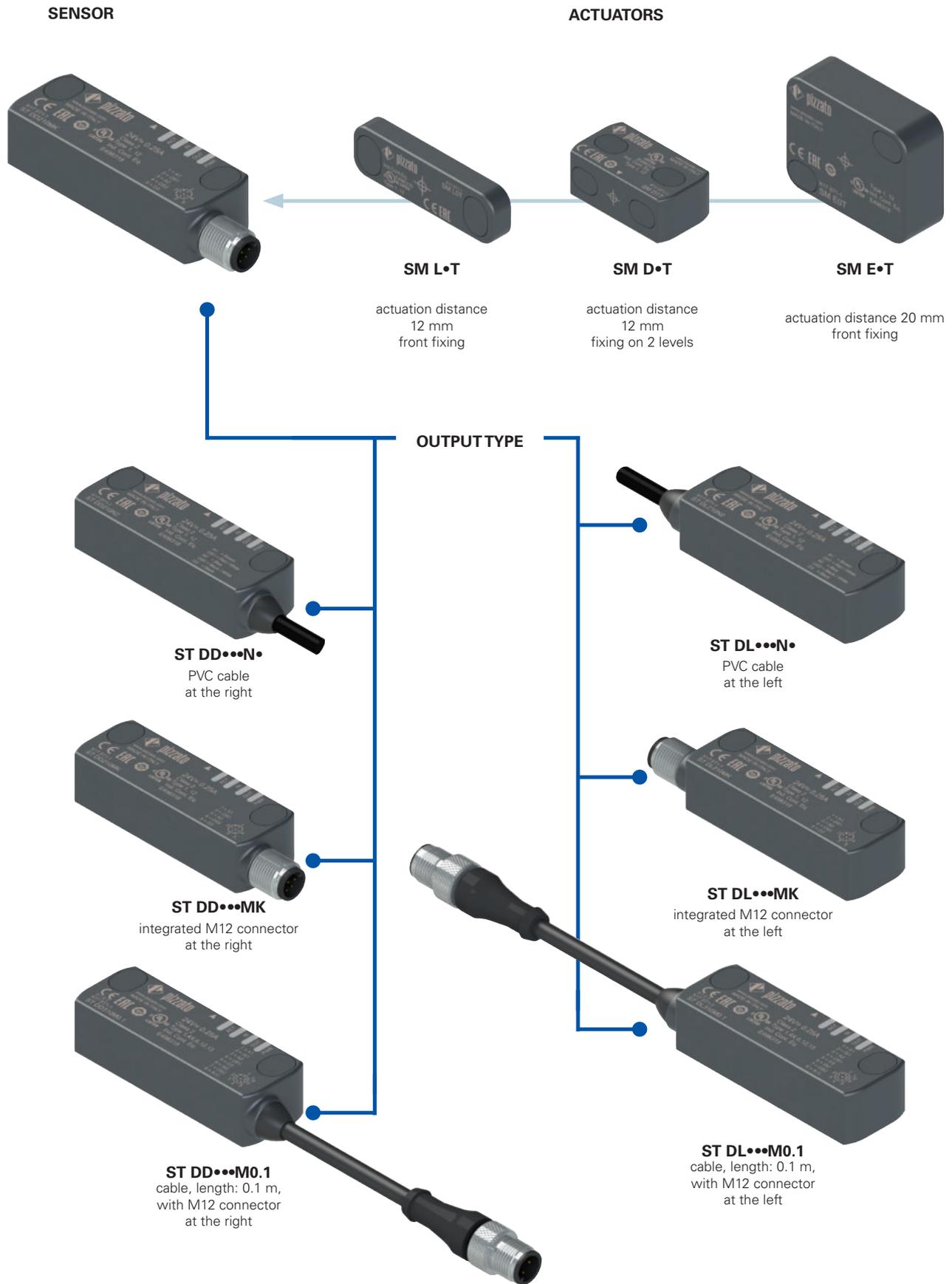
### External device monitoring

**EDM** On request, the switch can be supplied with EDM function (External Device Monitoring). In this case, the switch itself checks the proper function of the devices connected to the safety outputs. These devices (usually relays or safety contactors) must send a feedback signal to the EDM input, which checks that the received signal is consistent with the state of the safety outputs.

### Extended supply voltage range

In addition to the standard 24 Vdc supply voltage, the ST D series sensors are available with an extended supply voltage of 12 ... 24 Vdc (articles ST D•••1••). This characteristic makes them particularly suitable for use in the automotive sector, in machines powered by common battery systems, and both in light and heavy vehicles.

## Selection diagram



- product option
- Sold separately as accessory



**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

# ST DD420N2-D1T

### Output direction, connections

<b>D</b>	output at the right
<b>L</b>	output at the left

### Inputs and outputs

	OS safety outputs	O3 signalling outputs	IS safety inputs	I3 programming inputs	EDM inputs
<b>21</b>	2	1	-	-	-
<b>31</b>	2	1	2	-	-
<b>42</b>	2	1	2	1	-
<b>51</b>	2	1	2	-	1
<b>61</b>	2	1 (inverted)	-	-	-
<b>71</b>	2	1 (inverted)	2	-	-
<b>82</b>	2	1 (inverted)	2	1	-

**Note:** versions 21, 31, 51, 61, 71 are only supplied together with an actuator.

### Supply voltage

<b>0</b>	24 Vdc
<b>1</b>	12 ... 24 Vdc

### Cable or connector type

<b>N</b>	PVC cable, IEC 60332-1-2 oil resistant (standard)
<b>H</b>	PUR cable, halogen free (not available with versions ST D•2••••• and ST D•6•••••)
<b>M</b>	M12 connector

### Actuator

<b>D0T</b>	standard actuator low level of coding the sensor recognises any type D0T actuator
<b>D1T</b>	standard actuator high level of coding the sensor recognises one single type D1T actuator
<b>E0T</b>	Large actuator low level of coding the sensor recognises any type E0T actuator
<b>E1T</b>	Large actuator high level of coding the sensor recognises one single type E1T actuator
<b>L0T</b>	miniaturized actuator low level of coding the sensor recognises any type L0T actuator
<b>L1T</b>	miniaturized actuator high level of coding the sensor recognises one single type L1T actuator

### Connection type

<b>0.1</b>	cable, length: 0.1 m, with M12 connector
<b>0.5</b>	cable, length: 0.5 m
...	...
<b>2</b>	cable, length: 2 m (standard)
...	...
<b>10</b>	cable, length: 10 m
<b>K</b>	integrated M12 connector

**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 sensor

# ST DD420N2

### Output direction, connections

<b>D</b>	output at the right
<b>L</b>	output at the left

### Inputs and outputs

	OS safety outputs	O3 signalling outputs	IS safety inputs	I3 programming inputs
<b>42</b>	2	1	2	1
<b>82</b>	2	1 (inverted)	2	1

### Supply voltage

<b>0</b>	24 Vdc
<b>1</b>	12 ... 24 Vdc

### Connection type

<b>0.1</b>	cable, length: 0.1 m, with M12 connector
<b>0.5</b>	cable, length: 0.5 m
...	...
<b>2</b>	cable, length: 2 m (standard)
...	...
<b>10</b>	cable, length: 10 m
<b>K</b>	integrated M12 connector

### Cable or connector type

<b>N</b>	PVC cable, IEC 60332-1-2 oil resistant (standard)
<b>H</b>	PUR cable, halogen free (not available with versions ST D•2••••• and ST D•6•••••)
<b>M</b>	M12 connector

**Attention!** Individual sensors are initially programmed with the code of the actuators with low coding level •0T.  
**Attention!** The feasibility of a code number does not mean the effective availability of a product. Please contact our sales office.

## Code structure for actuator

# SM D1T

### Design and actuation distance

<b>D</b>	standard actuator actuation distance 12 mm
<b>E</b>	large actuator actuation distance 20 mm
<b>L</b>	miniaturized actuator actuation distance 12 mm

### Actuator

<b>0T</b>	low level coded actuator the sensor recognises any type •0T actuator
<b>1T</b>	high level coded actuator the sensor recognises one single type •1T actuator



### Main features

- Actuation without contact, using RFID technology
- Digitally coded actuator
- Protection degrees IP67 and IP69K
- 4 LEDs for status display of the sensor
- Actuators with various actuation distances

### Quality marks:



UL approval: E496318  
 EC type examination certificate: M6A 075157 0027  
 TÜV SÜD approval: Z10 075157 0026  
 EAC approval: RU C-IT.YT03.B.00035/19

### In compliance with standards:

IEC 61508-1, IEC 61508-2, IEC 61508-3,  
 IEC 61508-4, EN ISO 13849-1, EN ISO 13849-2,  
 EN ISO 14119, EN 62061, EN 60947-5-3,  
 EN 60947-5-2, EN 60947-1, EN 61326-1,  
 EN 61326-3-1, EN 61326-3-2, EN IEC 63000,  
 ETSI 301 489-1, ETSI 301 489-3, ETSI 300 330,  
 UL 508, CSA C22.2 No. 14.

### Compliance with the requirements of:

Machinery Directive 2006/42/EC,  
 EMC Directive 2014/30/EC,  
 Directive 2014/53/EU - RED,  
 RoHS Directive 2011/65/EU,  
 FCC Part 15.

### Connection with safety modules for safety applications:

Connection with safety modules  
 CS AR-01●●●●; CS AR-02●●●●; CS AR-05●●●●;  
 CS AR-06●●●●; CS AR-08●●●●; CS AT-0●●●●●;  
 CS AT-1●●●●●; CS MP●●●●●.

When connected to the safety module, the sensor can be classified as a control circuit device up to PDDb (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.

## Technical data

### Housing

Housing made of glass fibre reinforced technopolymer, self-extinguishing.  
 Versions with integrated cable 6 x 0.5 mm<sup>2</sup> or 8 x 0.34 mm<sup>2</sup>, length 2 m, other lengths 0.5 m ... 10 m on request

Versions with M12 stainless steel connector

Versions with 0.1 m cable length and integrated M12 connector, other lengths 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

SIL (SIL CL) up to: SIL 3 acc. to EN 62061  
 Performance Level (PL) up to: PL e acc. to EN ISO 13849-1  
 Safety category up to: cat. 4 acc. to EN ISO 13849-1  
 Interlock, no contact, coded: type 4 acc. to EN ISO 14119  
 Level of coding acc. to EN ISO 14119: high with SM ●1T actuators  
 low with SM ●0T actuators

Safety parameters:

MTTF<sub>D</sub>: 4077 years  
 PFH<sub>D</sub>: 1.20E-11  
 DC: High  
 Mission time: 20 years  
 Ambient temperature for sensors without cable: -25°C ... +70°C  
 Ambient temperature for sensors with cable: see table on page 46  
 Storage and transport temperature: -25°C ... +85°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

### Electrical data of IS1/IS2/I3/EDM inputs

Rated operating voltage U<sub>e1</sub>: 24 Vdc or 12 ... 24 Vdc  
 Rated current consumption I<sub>e1</sub>: 5 mA

### Electrical data of OS1/OS2 safety outputs

Rated operating voltage U<sub>e2</sub>: 24 Vdc or 12 ... 24 Vdc  
 Output type: PNP type OSSD  
 Maximum current per output I<sub>e2</sub>: 0.25 A  
 Minimum current per output I<sub>m2</sub>: 0.5 mA  
 Thermal current I<sub>th2</sub>: 0.25 A  
 Utilization category: DC13; U<sub>e2</sub>=24 Vdc, I<sub>e2</sub>=0.25 A  
 Short circuit detection: Yes  
 Overcurrent protection: Yes  
 Internal self-resettable protection fuse: 0.75 A  
 Duration of the deactivation impulses at the safety outputs: < 300 μs  
 Permissible maximum capacitance between outputs: < 200 nF  
 Permissible maximum capacitance between output and ground: < 200 nF

### Electrical data of O3 signalling output

Rated operating voltage U<sub>e3</sub>: 24 Vdc or 12 ... 24 Vdc  
 Output type: PNP  
 Maximum current per output I<sub>e3</sub>: 0.1 A  
 Utilization category: DC12; U<sub>e3</sub>=24 Vdc; I<sub>e3</sub>=0.1 A  
 Short circuit detection: No  
 Overcurrent protection: Yes  
 Internal self-resettable protection fuse: 0.75 A

### Actuation data

	SMD●T	SM E●T	SM L●T
Assured operating distance S <sub>ao</sub> :	10 mm	16 mm	10 mm
Assured release distance S <sub>ar</sub> :	16 mm	27 mm	16 mm
Rated operating distance S <sub>an</sub> :	12 mm	20 mm	12 mm
Rated release distance S <sub>nr</sub> :	14 mm	23 mm	14 mm
Repeat accuracy:	≤ 10 % s <sub>n</sub>		
Differential travel:	≤ 20 % s <sub>n</sub>		
RFID transponder frequency:	125 kHz		
Max. switching frequency:	1 Hz		
Distance between two sensors:	min. 50 mm		
Response time upon deactivation of input IS1 or IS2:	typically 7 ms, max. 12 ms		
Response time upon actuator removal:	typically 80 ms, max. 150 ms		

### Power supply electrical data

Rated operating voltage U<sub>e</sub>:  
 - 24 Vdc versions: 24 Vdc -15% ... +10% SELV/PELV  
 - 12 ... 24 Vdc versions: 12 ... 24 Vdc -30% ... +25% SELV/PELV  
 Operating current at U<sub>e</sub> voltage:  
 - minimum: 40 mA  
 - with all outputs at maximum power: 700 mA  
 Rated insulation voltage U<sub>i</sub>: 32 Vdc  
 Rated impulse withstand voltage U<sub>imp</sub>: 1.5 kV  
 External protection fuse: 1 A type Gg or equivalent device  
 Overvoltage category: III



### Features approved by UL

Electrical Ratings: 24 Vdc Class 2, 0,25 A (resistive load)  
 Environmental Ratings: Types 1, 4X, 6, 12, 13  
 Accessory for series ST for actuator switch series SM D, SM E, SM G, SM L.

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

### Features approved by TÜV SÜD

Supply voltage: 24 Vdc, -15% ... +10%  
 12 ... 24 Vdc -30% ... +25%  
 Protection degree: IP67 and IP69K  
 Ambient temperature: -25°C ... + 70°C  
 Storage and transport temperature: -25°C ... +85°C  
 PL, category: PL e, category 4

In compliance with standards: Machinery Directive 2006/42/EC, EN ISO 13849-1:2015, EN 60947-5-3:2013, EN 61508-1:2010 (SIL 3), EN 61508-2:2010 (SIL 3), EN 61508-3:2010 (SIL 3), EN 61508-4:2010 (SIL 3), IEC 62061:2005 (SIL CL3), IEC 62061:2005/AMD1:2012, IEC 62061:2005/AMD2:2015 (SIL CL3).

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

### Selection table for sensors with high level coded actuators

OS safety outputs	O signalling outputs	IS safety inputs	I programming inputs	EDM inputs	Programmable	cable, length: 0.1 m, with M12 connector at the right		cable, length: 0.1 m, with M12 connector at the left		integrated cable, at the right	integrated cable, at the left	M12 connector, at the right	M12 connector, at the left
						ST DD210M0.1-D1T	ST DL210M0.1-D1T	ST DD210N•-D1T	ST DL210N•-D1T	ST DD210MK-D1T	ST DL210MK-D1T		
2	1	-	-	-	-	ST DD310M0.1-D1T	ST DL310M0.1-D1T	ST DD310N•-D1T	ST DL310N•-D1T	ST DD310MK-D1T	ST DL310MK-D1T		
2	1	2	1	-	•	ST DD420M0.1-D1T	ST DL420M0.1-D1T	ST DD420N•-D1T	ST DL420N•-D1T	ST DD420MK-D1T	ST DL420MK-D1T		
2	1	2	-	1	-	ST DD510M0.1-D1T	ST DL510M0.1-D1T	ST DD510N•-D1T	ST DL510N•-D1T	ST DD510MK-D1T	ST DL510MK-D1T		

To order a product with E•T or L•T actuator replace D with E or L in the codes shown above.  
 For example: ST DD310M0.1-D•T → ST DD310M0.1-E•T or ST DD310M0.1-L•T

### Selection table for sensors

OS safety outputs	O signalling outputs	IS safety inputs	I programming inputs	EDM inputs	Programmable	cable, length: 0.1 m, with M12 connector at the right		cable, length: 0.1 m, with M12 connector at the left		integrated cable, at the right	integrated cable, at the left	M12 connector, at the right	M12 connector, at the left
						ST DD420M0.1	ST DL420M0.1	ST DD420N•	ST DL420N•	ST DD420MK	ST DL420MK		
2	1	2	1	-	•								

### Selection table for actuators

Level of coding acc. to ISO 14119	actuation distance 12 mm	actuation distance 12 mm	actuation distance 20 mm
low	SM L1T	SM D1T	SM E1T

The use of RFID technology in ST series sensors makes them suitable for several applications. Pizzato Elettrica offers two different versions of actuators, in order to best suit customers' specific needs.

Type •0T actuators are all encoded with the same code. This implies that a sensor associated with an actuator type •0T can be activated by other actuators type •0T.

Type •1T actuators are always encoded with different codes. This implies that a sensor associated with an actuator type •1T can be activated only by a specific actuator. Another •1T type actuator will not be recognised by the sensor until a new association procedure is carried out (reprogramming). After reprogramming, the old actuator type •1T will no longer be recognized.

Reprogramming of the actuator can be performed repeatedly.

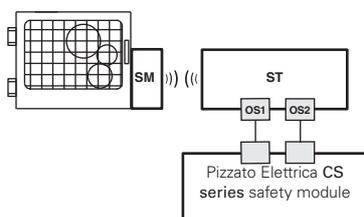
### Ambient temperature for sensors with cable

Cable features	Connection type	Output with cable		
		N	N	H
Cable type		N	N	H
Conductors		6x0.5 mm <sup>2</sup>	8x0.34 mm <sup>2</sup>	8x0.34 mm <sup>2</sup>
Application field		General	General	General, mobile installation
In compliance with standards		03VV-F	03VV-F	03E7Q-H
Sheath		PVC OIL RESISTANT	PVC OIL RESISTANT	PUR Halogen Free
Self-extinguishing		IEC 60332-1-2 UL 758:FT1 CEI 20-22 II	IEC 60332-1-2 UL 758:FT1 CEI 20-22 II	IEC 60332-1-2 UL 758:FT1 CEI 20-22 II
Oil resistant		UL 758 CSA 22.2 N°210	UL 758 CSA 22.2 N°210	UL 758 CSA 22.2 N°210
Max. speed		/	/	300 m/min.
Max. acceleration		/	/	5 m/s <sup>2</sup>
Minimum bending radius		108 mm	108 mm	70 mm
Outer diameter		7 mm	7 mm	7 mm
End stripped		80 mm	80 mm	80 mm
Copper conductors		Class 6 IEC 60228	Class 5 IEC 60228	Class 6 IEC 60228
Engraving		6272	6276	6283
Ambient temperature	Cable, fixed installation	-25°C +70°C	-25°C +70°C	-25°C +70°C
	Cable, flexible installation	-5°C +70°C	-5°C +70°C	-25°C +70°C
	Cable, mobile installation	/	/	-25°C +70°C
Approvals		CE cULus TÜV EAC	CE cULus TÜV EAC	CE cULus TÜV EAC

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

### Complete safety system

The use of complete and tested solutions guarantees the electrical compatibility between the sensors of the ST series and the safety modules from Pizzato Elettrica, as well as high reliability. The sensors have been tested with the modules listed in the adjacent table.

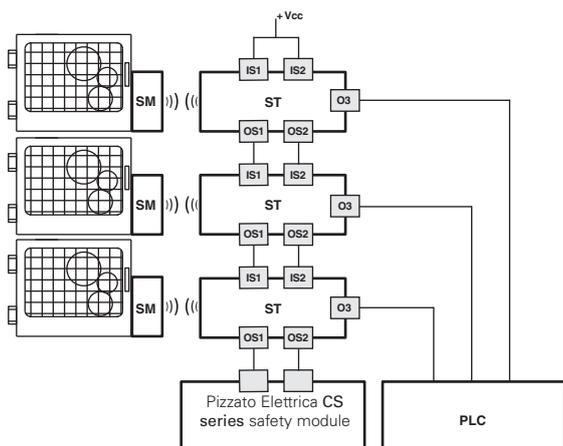


ST sensors can be used as individual devices provided that the outputs be evaluated by a Pizzato Elettrica safety module (see table for combinable safety modules).

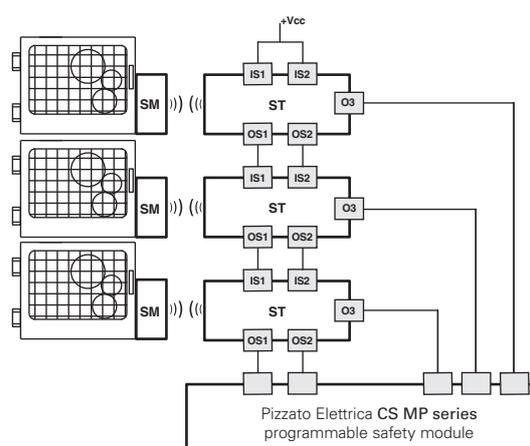
### Compatible safety modules

Sensors	Safety modules	Safety module output contacts		
		Instantaneous safety contacts	Delayed safety contacts	Signalling contacts
ST D.....	CS AR-01.....	2NO	/	1NC
	CS AR-02.....	3NO	/	/
	CS AR-05.....	3NO	/	1NC
	CS AR-06.....	3NO	/	1NC
	CS AR-08.....	2NO	/	/
	CS AT-0.....	2NO	2NO	1NC
	CS AT-1.....	3NO	2NO	/
	CS MP.....	see page 369		
	CS MF.....	see page 401		

All ST series sensors can be connected, provided that compatibility is checked, to safety modules or safety PLCs with OSSD inputs.

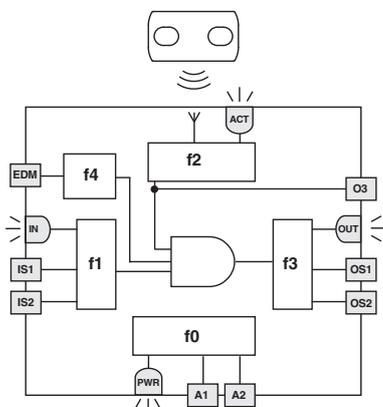


Possibility of series connection of multiple sensors for simplifying the wiring of the safety system, whereby only the outputs of the last sensor are evaluated by a Pizzato Elettrica safety module (see table with compatible safety modules). Each ST sensor is equipped with a signalling output, which – depending on the version – is activated or deactivated when the respective guard is closed. Depending on the specific requirements of the application, this information can be evaluated by a PLC.



Possibility of series connection of multiple sensors for simplifying the wiring of the safety system, whereby only the outputs of the last sensor are evaluated by a Pizzato Elettrica safety module of the CS MP series. Both the safety-relevant evaluation and the evaluation of the signalling outputs are performed by the CS MP series.

### Internal wiring diagram (ST D•5••••)



The adjacent diagram illustrates five logical, linked sub-functions of the sensor.

Function f0 is a basic function and includes the monitoring of the power supply as well as internal, cyclical tests.

Function f1 monitors the status of the inputs, whereas function f2 monitors the position of the actuator in the detection area.

Function f3 is intended to activate or deactivate the safety outputs and check for any faults or short circuits in the outputs.

In the EDM versions, function f4 checks the EDM signal on state changes of the safety outputs.

The safety-related function, which combines the sub-functions mentioned above, only activates the safety outputs if the input signals are correctly applied and the actuator is located within the safe zone.

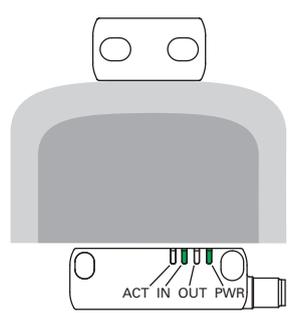
The status of each sub-function is displayed by corresponding LEDs (PWR, IN, ACT, OUT), thereby providing a quick overview of the operating status of the sensor.

LED	Function
ACT	state of actuator / O3 output
IN	status of safety inputs
OUT	status of safety outputs
PWR	Power supply / self-diagnosis

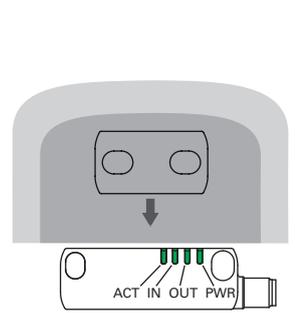


### Limit activation zone and safe activation zone (ST D•4••••)

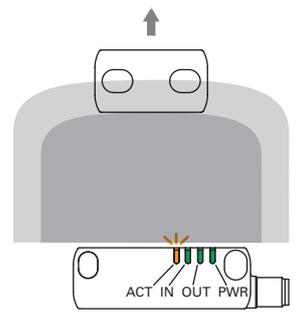
When aligning the sensor with the actuator, the status LEDs use various colours to indicate whether the actuator is in the limit activation zone or in the safe activation zone. The following figures use the ST DD420MK-D1T sensor as an example.



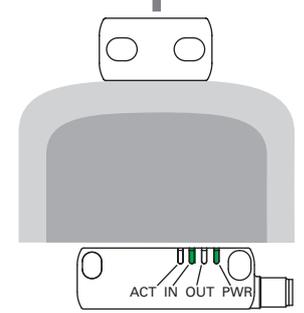
Operating voltage is applied to the sensor, (LED PWR on, green), the inputs are enabled (LED IN on, green), the outputs are deactivated (LED OUT off). The actuator is outside of the actuation zone (LED ACT off).



If the actuator is moved inside the safe activation zone (dark grey area), the ACT LED on the sensor illuminates (green) and it activates the outputs (LED OUT on, green).



When the actuator leaves the safe zone, the sensor keeps the safety outputs enabled. Entry into the limit activation zone (light grey area) is, however, indicated by the ACT LED (orange/green, flashing).



As soon as the actuator exits the limit activation zone, the sensor deactivates the outputs and switches off the OUT and ACT LEDs.

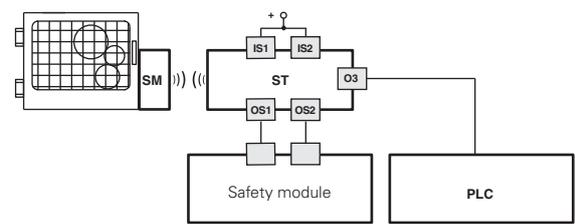
### Operating states (ST D•4••••)

PWR LED	OUT LED	IN LED	ACT LED	Sensor state	Description
○	○	○	○	OFF	Sensor off.
●	○	○	○	POWER ON	Internal tests upon activation.
●	*	○	*	RUN	Sensor with inactive inputs.
●	*	●	*	RUN	Activation of the inputs.
●	*	◌	*	RUN	Input incoherence. Recommended action: check for presence and/or wiring of inputs.
●	*	*	●	RUN	Actuator in safe area. O3 signalling output active.
●	*	*	◌	RUN	Actuator in limit activation zone, O3 active. Recommended action: bring the sensor back to the safe area.
●	●	●	●	RUN	Activation of the inputs. Actuator in safe area and safety outputs active.
●	◌	*	*	ERROR	Error on outputs. Recommended action: check for any short circuits between the outputs, outputs and ground or outputs and power supply, then restart the sensor.
●	*	*	*	ERROR	Internal error. Recommended action: restart the sensor. If the failure persists, replace the sensor.

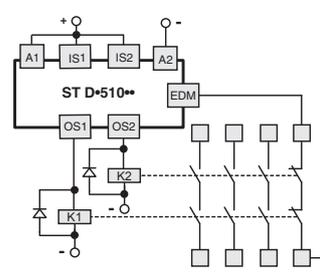
Legend: ○ = off ● = on ◌ = flashing ◐ = alternating colours \* = indifferent

### O3 output inverted (ST D•6••••, ST D•7••••, ST D•8••••)

The version with inverted O3 signalling output allows checking of the actual electrical connection of the sensor by an external PLC. The O3 output will be activated when the actuator is removed and the OS safety outputs are switched off.



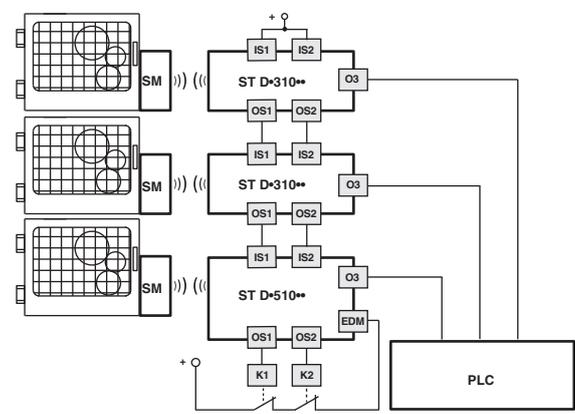
### External device monitoring (EDM)



The ST D•51••• version, in addition to maintaining the operating and safety characteristics of the ST series, allows control of **forcibly guided NC contacts of contactors or relays** controlled by the safety outputs of the sensor itself. As an alternative to the relays or contactors you can use Pizzato Elettrica expansion modules CS ME-03. See page

359.

This check is carried out by monitoring the EDM input (External Device Monitoring as defined in EN 61496-1) of the sensor.



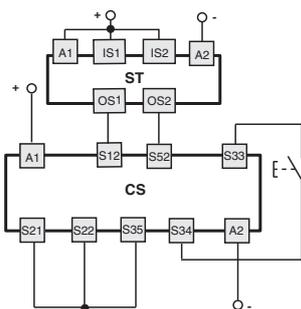
This version, with the IS safety inputs, **can be used at the end of a series of ST sensors, up to a maximum number of 32 devices**, while maintaining the maximum PL e safety level according to EN ISO 13849-1.

For specific applications, this solution allows you to dispense with the safety module connected to the last device in the chain.

## Connection with safety modules

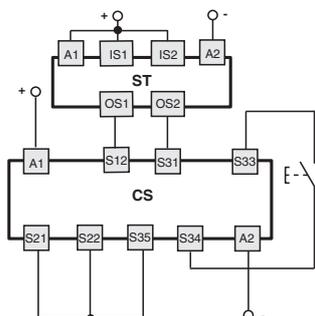
Connections with CS AR-08•••• safety modules

Input configuration with monitored start  
2 channels / Category 4 / up to SIL 3 / PL e



Connections with CS AT0••••• / CS AT1••••• safety modules

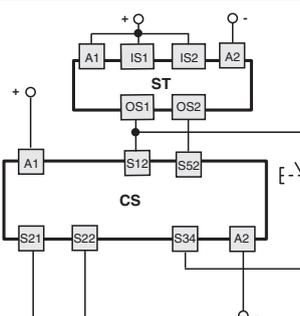
Input configuration with monitored start  
2 channels / Category 4 / up to SIL 3 / PL e



For features of the safety modules see page 305.

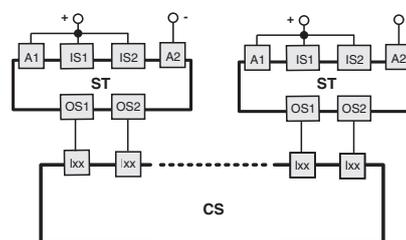
Connections with CS AR-05•••• / CS AR-06•••• safety modules

Input configuration with manual start (CS AR-05••••)  
or monitored start (CS AR-06••••)  
2 channels / Category 4 / up to SIL 3 / PL e



Connection with safety module CS MP•••••0

The connections vary according to the program of the module  
Category 4 / up to SIL 3 / PL e

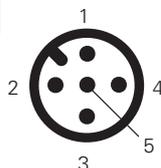


For application examples, see page 368.

## Internal device connections

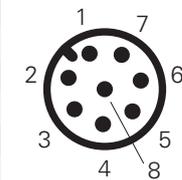
### 5-pole versions ST D•2••••, ST D•6••••

M12 connector	Cable	Connection
1	brown	A1 (+)
2	red/white	OS1
3	blue	A2 (-)
4	black/white	OS2
5	black	O3
/	red	not connected



### 8-pole versions ST D•3••••, ST D•4••••, ST D•5••••, ST D•7••••, ST D•8••••

M12 connector	Cable	Connection
1	brown	A1 (+)
2	red	IS1
3	blue	A2 (-)
4	red/white	OS1
5	black	O3
6	purple	IS2
7	black/white	OS2
8	purple/white	not connected <sup>(a)</sup> I3 <sup>(b)</sup> EDM <sup>(c)</sup>



<sup>(a)</sup> for articles ST D•3••••, ST D•7••••.  
<sup>(b)</sup> for articles ST D•4••••, ST D•8••••.  
<sup>(c)</sup> for articles ST D•5••••.

### Legend:

- A1-A2: supply
- IS1-IS2 Safety inputs
- OS1-OS2: safety outputs
- O3: signalling output
- I3: programming input
- EDM: input for monitoring of NC contacts of the contactors

**Note:** Versions with customised pin assignments are available on request.

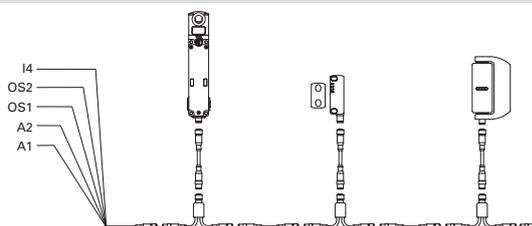
For female connectors, see page 419.

## Series connection

To simplify series connections of the devices, various M12 connectors are available that allow complete wiring.

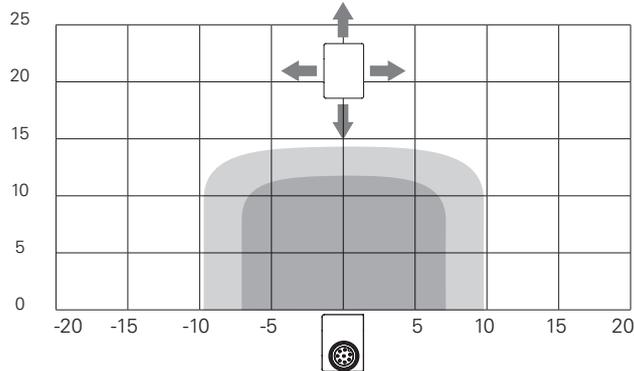
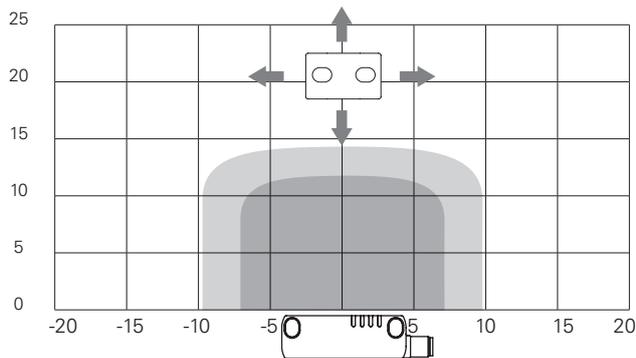
This solution significantly reduces installation times while at the same time maintaining the maximum safety levels PL e and SIL 3.

For further information see page 426.

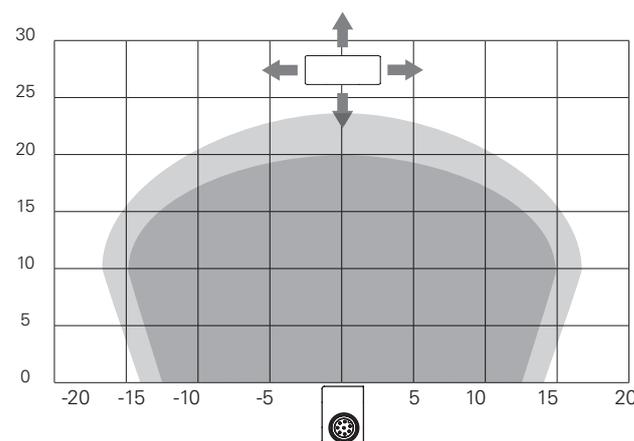
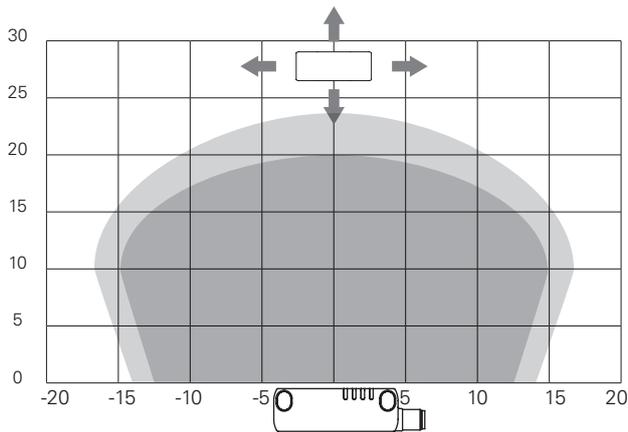




### Operating distances SM D•T/SM L•T actuators



### Operating distances SM E•T actuator



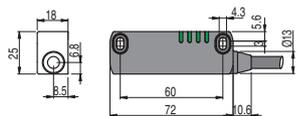
Legend:

- Rated operating distance  $s_n$  (mm)
- Rated release distance  $s_{nr}$  (mm)

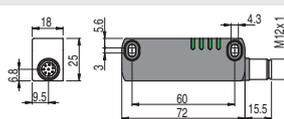
Note: The progress of the activation areas is for reference only; the possible application on ferromagnetic surfaces can reduce the operating distances.

### Dimensional drawings

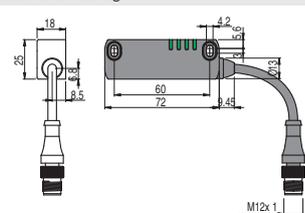
ST DD•••N• sensor with cable at the right



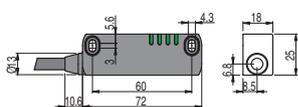
ST DD•••MK sensor with M12 connector at the right



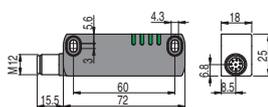
ST DD•••M0.1 sensor with cable and M12 connector at the right



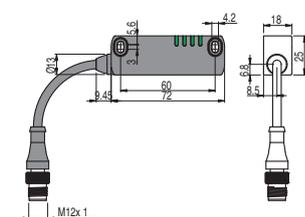
ST DL•••N• sensor with cable at the left



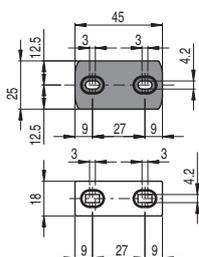
ST DL•••MK sensor with M12 connector at the left



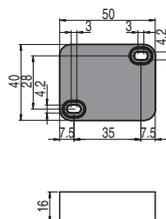
ST DL•••M0.1 sensor with cable and M12 connector at the left



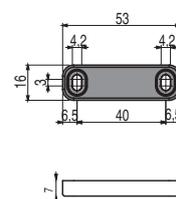
SM D•T actuator



SM E•T actuator



SM L•T actuator



All values in the drawings are in mm

Accessories See page 419

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

## Introduction



The RFID safety sensors of the ST G - ST H series represent the evolution of the ST D series already known and appreciated by machine builders and users.

The symmetry of the housing allows the same sensor to be used on both left and right doors; by simply rotating the sensor onto itself. The mounting hole spacing (22 mm for the ST G series, 78 mm for the ST H series) was especially realised to perform a technological upgrade of the traditional magnetic sensors of the SR A and SR B series, replacing these with an evolved RFID safety sensor, without changing the machine's mounting hole spacing.

The monolithic housing – free of resins for encapsulation – can be used in even the most aggressive of environments; such as, for example, in the food and pharmaceuticals sector.

## Maximum safety with a single device

# PL e + SIL 3

The sensors of the ST G - ST H series are constructed with redundant electronics. As a result, the maximum PL e and SIL 3 safety levels can still be achieved through the use of a single device on a guard. This avoids expensive wiring in the field and allows faster installation. Inside the control cabinet, the two electronic safety outputs must be connected to a safety module with OSSD inputs or to a safety PLC.

## High level coded actuators



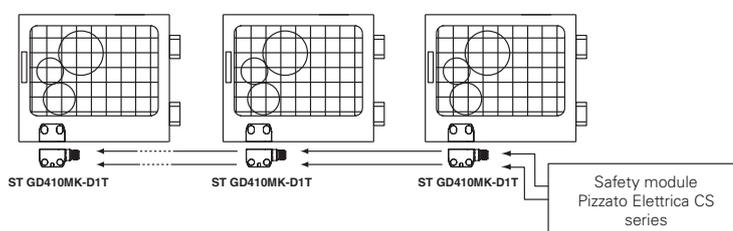
The sensors are provided with an electronic system based on RFID technology to detect the actuator. This allows to provide each actuator with different coding and makes it impossible to tamper with a device by using another actuator of the same series. Millions of different coding combinations are possible for the actuators. They are therefore classified as high level coded actuators, according to EN ISO 14119.

## Series connection of multiple sensors

One of the most important features of the ST G - ST H series from Pizzato Elettrica is the possibility of connecting up to 32 sensors in series, while still maintaining the maximum safety level (PL e) laid down in EN 13849-1.

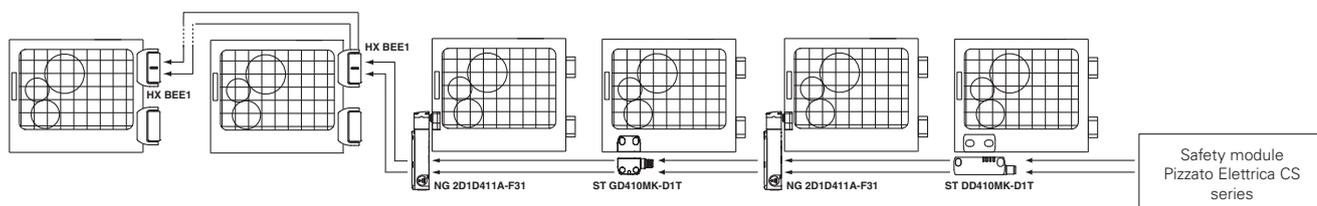
This connection type is permissible in safety systems which have a safety module at the end of the chain that monitors the outputs of the last sensor.

The fact that the PL e safety level can be maintained even with 32 sensors connected in series demonstrates the extremely secure structure of each sensor of this series.

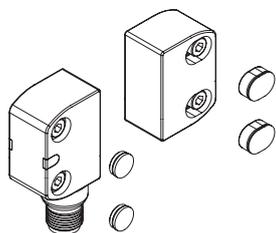


## Series connection with other devices

The ST G - ST H series features two safety inputs and two safety outputs, which can be connected in series with other Pizzato Elettrica safety devices. This option allows the creation of safety chains containing various devices. For example, stainless steel hinge switches (HX BEE1 series), RFID sensors (ST series) and guard-locking switches (NG or NS series) can be connected in series while still maintaining the maximum PL e and SIL 3 safety levels.



## Protection against tampering



Each sensor and actuator is supplied complete with snap-on protection caps to be applied on the holes of the fixing screws. Not only do the caps prevent dirt from accumulating and simplify cleaning, they also block access to the fastening screws of the actuator. As a result, standard screws can be used instead of tamper-proof screws.

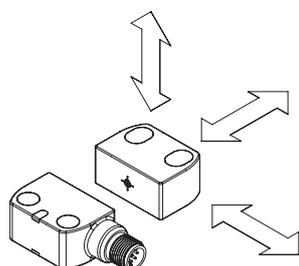
## Protection degrees IP67 and IP69K

# IP69K IP67

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

## Actuation from many directions



The sensors were designed to be activated from various directions, thereby providing the customer with maximum flexibility when positioning the sensors on the guards.

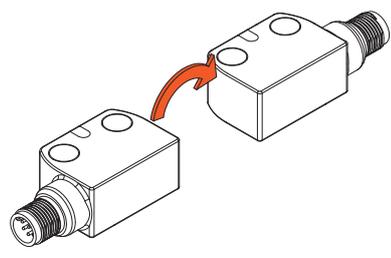
## Laser engraving

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.





### Symmetrical housing



Both sensor and actuator are perfectly symmetrical, and can therefore be attached to the machine frame in any orientation.

This feature allows the user to decide the side on which the cable or connector should exit, according to the sensor mounting position, by simply rotating it into the desired direction; thus eliminating the need to order differently coded products.

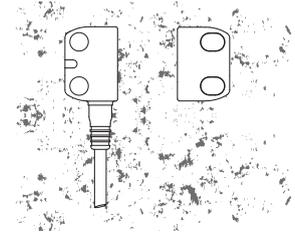
### Multicolour signalling LED



The ST G - ST H series sensors have a multicolour RGB signalling LED, which, using suitable transparent lenses, can be seen from both sides of the device. This allows fast, immediate diagnostics of the input and output operating states.

This makes it possible to quickly identify the interruption points in the safety chain, active devices, open guards, and any internal device errors – all of which can be identified simply and intuitively.

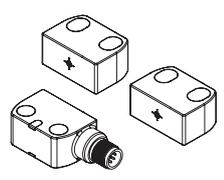
### Insensitivity to dirt and protection of the cable



The sensors are completely sealed and retain their safety characteristics even in the presence of dirt or deposits (not ferromagnetic material). This characteristic, combined with the design without recesses, makes them particularly suitable for use in the food industry. In the versions with cable, this is protected with a gasket located near the output of the switch.

This gasket is also provided with knurling by means of which a corrugated tube can be fastened as cable protection.

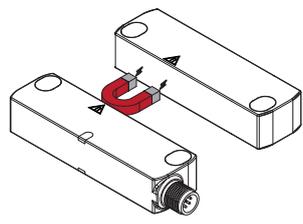
### Special multitag versions



Special versions of the device are available that have two or more actuators with a high level of coding, all of which can be recognised by the same sensor. The internal firmware of the sensor can be factory programmed, memorising a different device behaviour for each actuator when the actuator is in front of the sensor.

The multitag function is particularly useful in machines with several work stations, that require various operating modes on the basis of the actuator recognised by the sensor (e.g.: interchangeable machine parts, position of robot, rotary tables, etc.)

### Magnetic holding of the actuator



Devices of the ST H series can be ordered with a permanent magnet installed inside the housing, able to generate a holding force between sensor and actuator.

This way, the guard can be kept closed even when there are vibrations or when there is a recoil during the closing stage.

The magnetic holding force can be selected in three different magnitudes to best adapt to any usage situation.

### External device monitoring

**EDM** On request, the switch can be supplied with EDM function (External Device Monitoring). In this case, the switch itself checks the proper function of the devices connected to the safety outputs. These devices (usually relays or safety contactors) must send a feedback signal to the EDM input, which checks that the received signal is consistent with the state of the safety outputs.

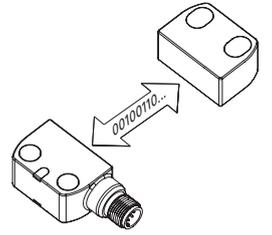
### Programmability

Programmable sensor versions are available. Here, with a simple and brief operation, the sensor can be programmed to recognise the code of a new actuator.

By activating a special input, the sensor is switched to a safe state, during which it waits for a new code to be accepted. As the actuator approaches, the sensor performs a number of checks on the code being received, whereby the code must adhere to certain parameters of RFID technology.

If the checks are successful, the sensor uses LEDs to signal the successful completion of the procedure.

After programming has been completed, the sensor only recognises the code of the last programmed actuator, thereby preserving the safety level and the reliability of the system in which it is installed.

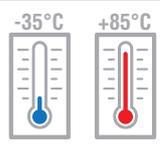


### Versions for mobile applications

# 10-30V

The RFID safety sensors of the ST H series are now also available in the version with 10-30 V supply voltage, designed for mobile applications where a supply voltage of 12 V is usually available, but also for situations in which the supply voltage is far from the 24 V commonly available in industrial environments.

### Extended temperature



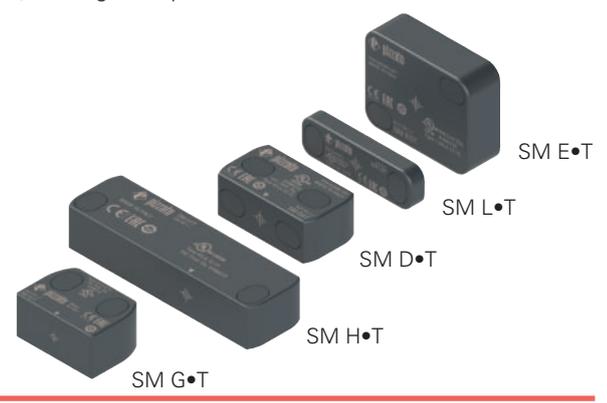
Devices with a T8 code extension can be installed in environments with temperatures from -35°C to +85°C and are especially indicated for machines in the food and pharmaceutical sector, allowing to use ST sensors in a broad field of application.

The extended temperature versions are available for both articles with a cable, and those with a stainless steel connector.

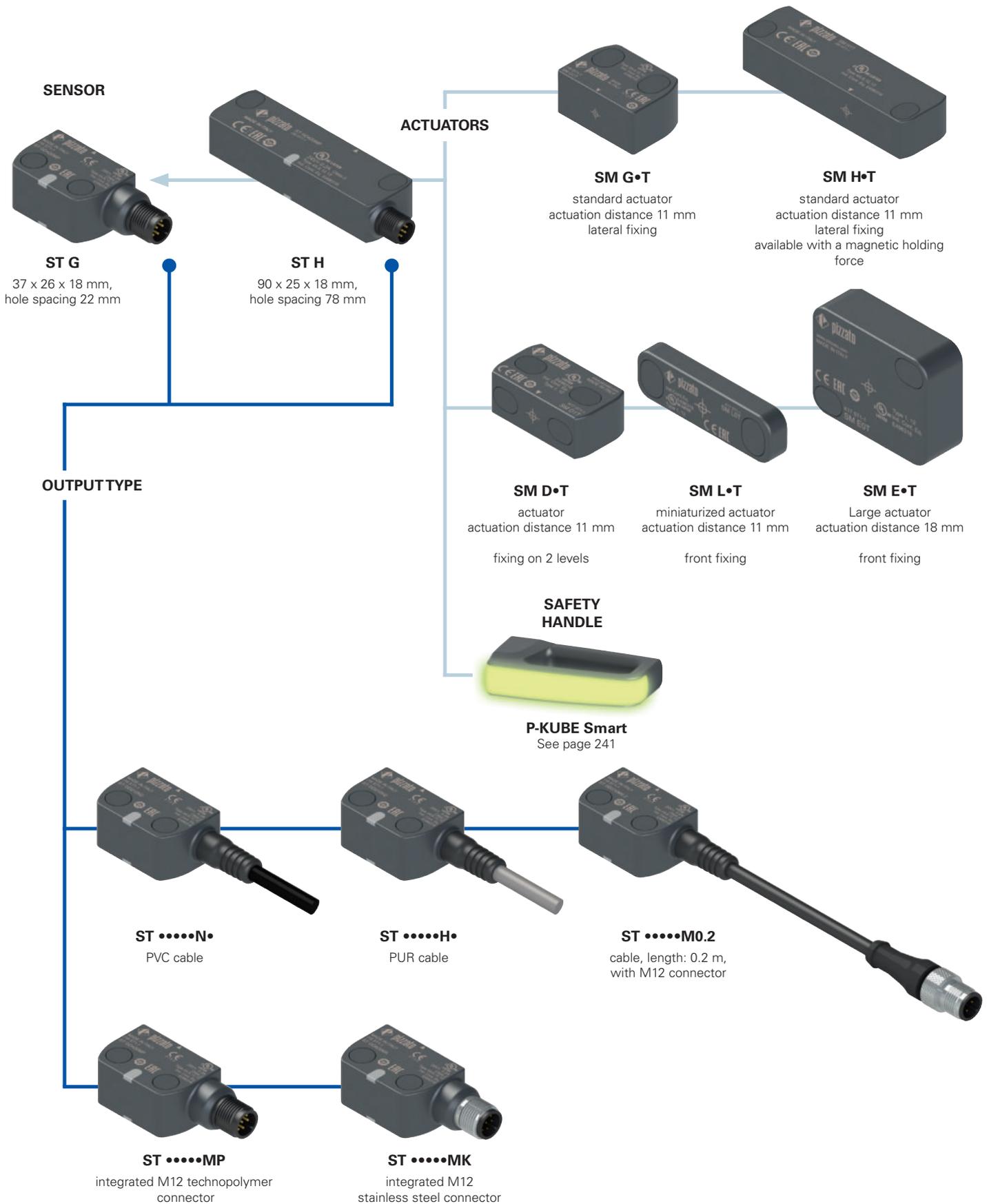
### Compatible with all SM ••T actuators

Designed for use in conjunction with the SM G•T and SM H•T series actuators, together they form a complete assembly, even from an aesthetic point of view; the ST G and ST H sensors are also compatible with all actuators available for the ST series, with either high or low level of coding.

This is particularly useful in applications where the actuator must have specific characteristics; such as, for example, increased activation distance (SM E•T actuators), compact installation dimensions (SM L•T actuators), or fixing holes positioned on two different sides (SM D•T).



Selection diagram



- product option
- Sold separately as accessory





### Main features

- Actuation without contact, using RFID technology
- Digitally coded actuator
- Protection degrees IP67 and IP69K
- Symmetrical housing with universal fixing orientation
- Multicolour signalling LED
- Versions with extended temperature range from -35 °C to +85 °C
- Multitag versions with two or more actuators
- ST H versions available with a magnetic holding force of the actuator
- ST H versions with extended supply voltage range 10 ... 30 Vdc

### Quality marks:



UL approval: E496318  
 EC type examination certificate: M6A 075157 0027  
 TÜV SÜD approval: Z10 075157 0026  
 EAC approval: RU C-IT.YT03.B.00035/19  
 COLAB approval: 0111/19 + 0096/20

### In compliance with standards:

IEC 61508-1, IEC 61508-2, IEC 61508-3, IEC 61508-4, EN ISO 13849-1, EN ISO 13849-2, EN ISO 14119, EN 62061, EN 60947-5-3, EN 60947-5-2, EN 60947-1, EN 61326-1, EN 61326-3-1, EN 61326-3-2, EN IEC 63000, ETSI 301 489-1, ETSI 301 489-3, ETSI 300 330, UL 508, CSA C22.2 No. 14.

### Compliance with the requirements of:

Machinery Directive 2006/42/EC,  
 EMC Directive 2014/30/EC,  
 Directive 2014/53/EU - RED,  
 RoHS Directive 2011/65/EU,  
 FCC Part 15.

### Connection with safety modules for safety applications:

Connection with safety modules  
 CS AR-01•••••; CS AR-02•••••; CS AR-05•••••;  
 CS AR-06•••••; CS AR-08•••••; CS AT-0•••••;  
 CS AT-1•••••; CS MP•••••.

When connected to the safety module, the sensor can be classified as a control circuit device up to PDDb (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.

## Technical data

### Housing

Housing made of glass fibre reinforced technopolymer, self-extinguishing.  
 Versions with integrated cable 5 x 0.25 mm<sup>2</sup> or 8 x 0.25 mm<sup>2</sup>, length 2 m, other lengths on request.

Versions with integrated M12 connector, plastic or stainless steel, AISI 304.

Versions with 0.2 m cable length and M12 connector, other lengths 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

SIL (SIL CL) up to:

SIL 3 acc. to EN 62061

Performance Level (PL) up to:

PL e acc. to EN ISO 13849-1

Safety category up to:

cat. 4 acc. to EN ISO 13849-1

Interlock, no contact, coded:

type 4 acc. to EN ISO 14119

Level of coding acc. to EN ISO 14119:

high with SM•IT actuators

low with SM•OT actuators

Safety parameters:

MTTF<sub>D</sub>:

1551 years

PFH<sub>D</sub>:

1.19E-09

DC:

High

Mission time:

20 years

Ambient temperature for sensors without cable:

-25°C ... +70°C (standard)

-35°C ... +85°C (T8 option)

Ambient temperature for sensors with cable:

see table on page 63

Storage and transport temperature:

-35°C ... +85°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 ... 1 Nm

### Power supply electrical data

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

24 Vdc (-15% ... +10%) SELV/PELV

10 ... 30 Vdc (version ST H•••1••)

Operating current at U<sub>e</sub> voltage:

- minimum:

20 mA

- with all outputs at maximum power:

550 mA

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

32 Vdc

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

1.5 kV

External protection fuse:

1 A type Gg or equivalent device

Overvoltage category:

III

### Electrical data of IS1/IS2/I3/EDM inputs

Rated operating voltage U<sub>e1</sub>:

24 Vdc

Rated current consumption I<sub>e1</sub>:

2.5 mA

Switching time EDM state (t<sub>EDM</sub>):

500 ms

### Electrical data of OS1/OS2 safety outputs

Rated operating voltage U<sub>e2</sub>:

24 Vdc

Output type:

PNP type OSSD

Maximum current per output I<sub>e2</sub>:

0.2 A

Minimum current per output I<sub>m2</sub>:

0.5 mA

Thermal current I<sub>t2</sub>:

0.2 A

Utilization category:

DC13; U<sub>e2</sub>=24 Vdc, I<sub>e2</sub>=0.2 A

Short circuit detection:

Yes

Overcurrent protection:

Yes

Internal self-resettable protection fuse:

0.3 A

Duration of the deactivation impulses at the safety

outputs:

< 300 µs

Permissible maximum capacitance between outputs:

< 200 nF

Permissible maximum capacitance between output and ground:

< 200 nF

Response time upon deactivation of input IS1 or IS2:

< 15 ms

Response time upon actuator removal:

< 50 ms

Availability time:

2 s

### Electrical data of O3 signalling output

Rated operating voltage U<sub>e3</sub>:

24 Vdc

Output type:

PNP

Maximum current per output I<sub>e3</sub>:

0.1 A

Utilization category:

DC13; U<sub>e3</sub>=24 Vdc, I<sub>e3</sub>=0.1 A

Short circuit detection:

No

Overcurrent protection:

Yes

Internal self-resettable protection fuse:

120 mA

### Actuation data

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

8 mm

SM•GT,  
SM•HT,SM•DT,SM•LT actuators

SM E•T actuators

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

20 mm

14 mm

Rated operating distance S<sub>n</sub>:

11 mm

18 mm

Rated release distance S<sub>nr</sub>:

13 mm

20.5 mm

Repeat accuracy:

≤ 10 % s<sub>n</sub>

Differential travel:

≤ 20 % s<sub>n</sub>

RFID transponder frequency:

125 kHz

Max. switching frequency:

1 Hz

Distance between two sensors:

min. 50 mm



### Features approved by UL

Electrical Ratings: 24 Vdc Class 2, 0,20 A  
 Environmental Ratings: Types 1, 4X, 6, 12, 13  
 Accessory for series ST for actuator switch series SM D, SM E, SM G, SM H, SM L.  
 The models provided with M12 Connector may be provided with the mating-Connectors-part (with Cord attached).

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

### Features approved by TÜV SÜD

Supply voltage: 24 Vdc -15%...+10%  
 10 - 30 Vdc (ST H•••1•• only)  
 Protection degree: IP67 and IP69K  
 Ambient temperature: -25°C ... + 70°C  
 -35°C ... + 85°C (T8 option)  
 Storage and transport temperature: -25°C ... +85°C  
 PL, category: PL e, category 4

In compliance with standards: Machinery Directive 2006/42/EC, EN ISO 13849-1:2015, EN 60947-5-3:2013, EN 61508-1:2010 (SIL 3), EN 61508-2:2010 (SIL 3), EN 61508-3:2010 (SIL 3), EN 61508-4:2010 (SIL 3), IEC 62061:2005 (SIL CL3), IEC 62061:2005/AMD1:2012, IEC 62061:2005/AMD2:2015 (SIL CL3).

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

### Selection table for ST G sensors with high level coded actuators

OS safety outputs	O signalling outputs	IS safety inputs	I programming inputs	EDM inputs	Programmable	with 0.2 m cable length and M12 connector		
						with cable	with M12 connector	
2	1	-	-	-	-	ST GD210M0.2-G1T	ST GD210N•-G1T	ST GD210MP-G1T
2	1	2	-	-	-	ST GD310M0.2-G1T	ST GD310N•-G1T	ST GD310MP-G1T
2	1	2	1	-	•	ST GD420M0.2-G1T	ST GD420N•-G1T	ST GD420MP-G1T
2	1	2	-	1	-	ST GD510M0.2-G1T	ST GD510N•-G1T	ST GD510MP-G1T

### Selection table for ST H sensor with high level coded actuator

Magnetic holding force	OS safety outputs	O signalling outputs	IS safety inputs	I programming inputs	EDM inputs	Programmable	with 0.2 m cable length and M12 connector		
							with cable	with M12 connector	
-	2	1	-	-	-	-	ST HD210M0.2-H1T	ST HD210N•-H1T	ST HD210MP-H1T
	2	1	2	-	-	-	ST HD310M0.2-H1T	ST HD310N•-H1T	ST HD310MP-H1T
	2	1	2	1	-	•	ST HD420M0.2-H1T	ST HD420N•-H1T	ST HD420MP-H1T
	2	1	2	-	1	-	ST HD510M0.2-H1T	ST HD510N•-H1T	ST HD510MP-H1T
25 N	2	1	-	-	-	-	ST HE210M0.2-H1TE	ST HE210N•-H1TE	ST HE210MP-H1TE
	2	1	2	-	-	-	ST HE310M0.2-H1TE	ST HE310N•-H1TE	ST HE310MP-H1TE
	2	1	2	1	-	•	ST HE420M0.2-H1TE	ST HE420N•-H1TE	ST HE420MP-H1TE
	2	1	2	-	1	-	ST HE510M0.2-H1TE	ST HE510N•-H1TE	ST HE510MP-H1TE
40 N	2	1	-	-	-	-	ST HE210M0.2-H1TF	ST HE210N•-H1TF	ST HE210MP-H1TF
	2	1	2	-	-	-	ST HE310M0.2-H1TF	ST HE310N•-H1TF	ST HE310MP-H1TF
	2	1	2	1	-	•	ST HE420M0.2-H1TF	ST HE420N•-H1TF	ST HE420MP-H1TF
	2	1	2	-	1	-	ST HE510M0.2-H1TF	ST HE510N•-H1TF	ST HE510MP-H1TF
50 N	2	1	-	-	-	-	ST HE210M0.2-H1TG	ST HE210N•-H1TG	ST HE210MP-H1TG
	2	1	2	-	-	-	ST HE310M0.2-H1TG	ST HE310N•-H1TG	ST HE310MP-H1TG
	2	1	2	1	-	•	ST HE420M0.2-H1TG	ST HE420N•-H1TG	ST HE420MP-H1TG
	2	1	2	-	1	-	ST HE510M0.2-H1TG	ST HE510N•-H1TG	ST HE510MP-H1TG

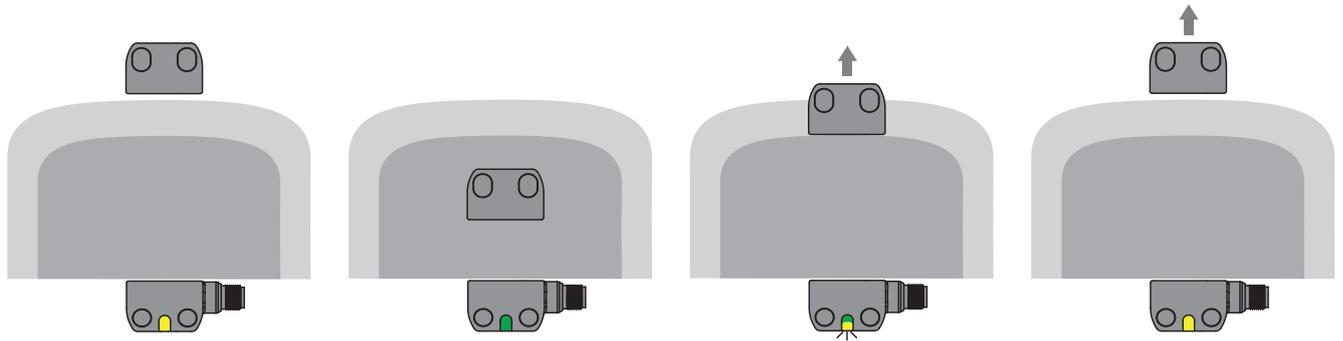
→ The 2D and 3D files are available at [www.pizzato.com](http://www.pizzato.com)





### Limit activation zone and safe activation zone

When aligning the sensor with the actuator, the multicolour signalling LED changes colour to indicate to the operator whether the actuator is in the limit activation zone or in the safe activation zone.



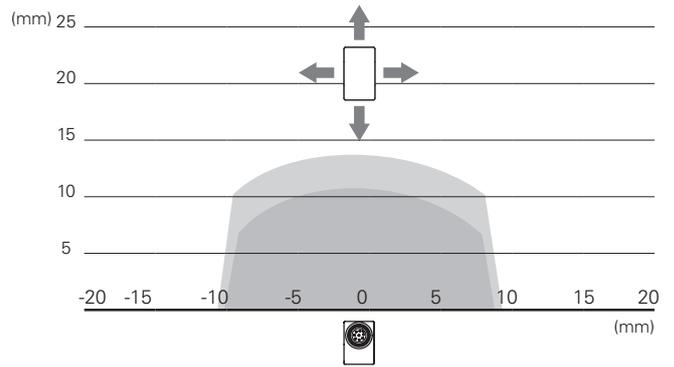
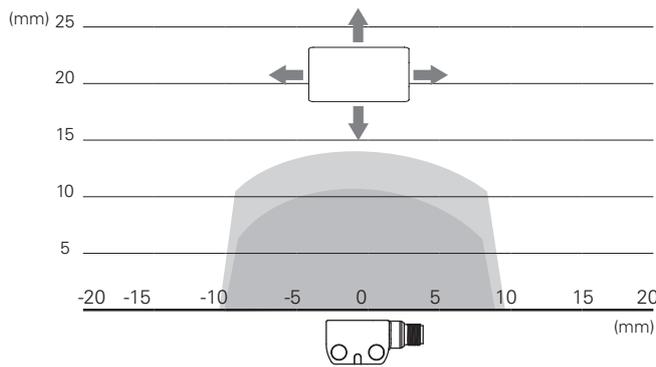
The sensor has power, the inputs are enabled, the outputs are disabled. The actuator is outside of the actuation zone. The LED is illuminated constant yellow.

If the actuator is moved inside the safe activation zone (dark grey area), the sensor activates the outputs. The LED is illuminated constant green.

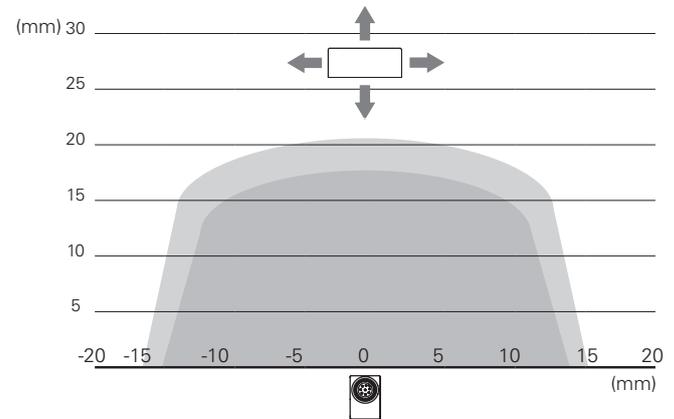
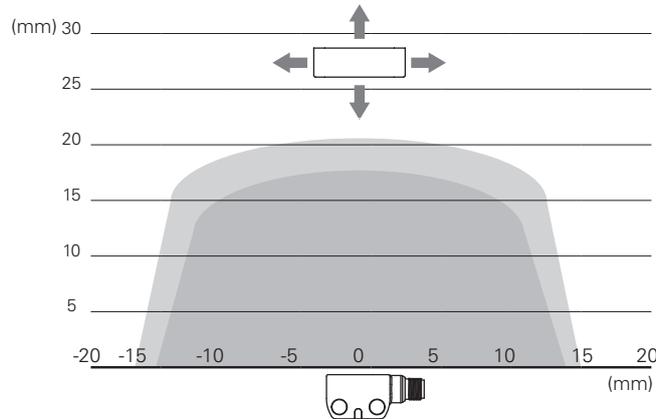
When the actuator leaves the safe zone, the sensor keeps the safety outputs enabled. Entry into the limit activation zone (light grey area) is, however, indicated by the yellow LED flashing intermittently.

When the actuator leaves the limit activation zone, the sensor disables the outputs. The signalling LED illuminates again constant yellow.

### Operating distances for SM G•T, SM H•T, SM D•T, SM L•T actuators



### Operating distances for SM E•T actuators



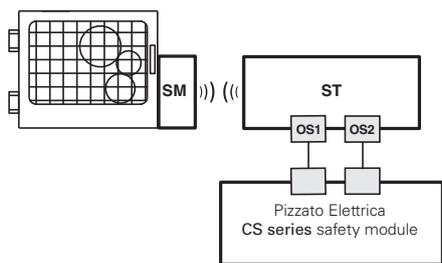
Legend:

- Rated operating distance  $s_n$  (mm)
- Rated release distance  $s_{nr}$  (mm)

**Note:** The progress of the activation areas is for reference only; the possible application on ferromagnetic surfaces can reduce the operating distances.

## Complete safety system

The use of complete and tested solutions guarantees the electrical compatibility between the sensors of the ST series and the safety modules from Pizzato Elettrica, as well as high reliability. The sensors have been tested with the modules listed in the adjacent table.



ST sensors can be used as individual devices provided that the outputs be evaluated by a Pizzato Elettrica safety module (see table for combinable safety modules).

## Compatible safety modules

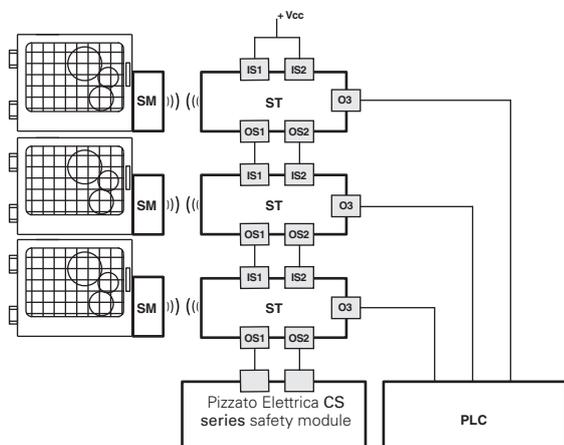
Sensors	Safety modules	Safety module output contacts		
		Instantaneous safety contacts	Delayed safety contacts	Signalling contacts
ST G..... ST H.....	CS AR-01.....	2NO	/	1NC
	CS AR-02.....	3NO	/	/
	CS AR-05.....	3NO	/	1NC
	CS AR-06.....	3NO	/	1NC
	CS AR-08.....	2NO	/	/
	CS AT-0.....	2NO	2NO	1NC
	CS AT-1.....	3NO	2NO	/
	CS MP.....	see page 369		
	CS MF.....	see page 401		

All ST series sensors can be connected, provided that compatibility is checked, to safety modules or safety PLCs with OSSD inputs.

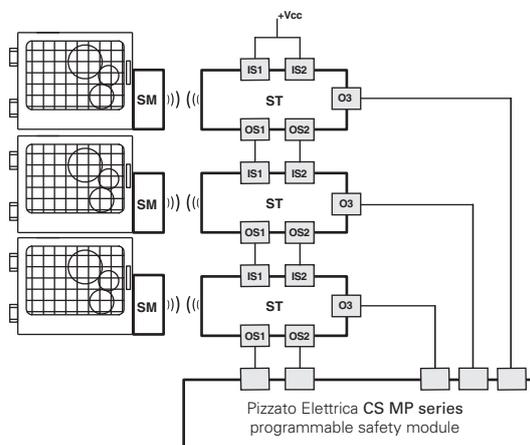
## Series connection with safety modules

Multiple ST series sensors can be **connected in series**, so as to simplify the safety system wiring. In this configuration, the safety outputs of the last sensor in the chain must be evaluated by a Pizzato Elettrica CS series safety module (see table for compatible safety modules).

Each ST sensor is additionally equipped with a **signalling output**, which – depending on the version – is activated or deactivated when the respective guard is closed. This information can be managed – according to the specific requirements of the implemented system – by a PLC or by a Pizzato Elettrica CS MP series safety module, which allows control of both safety and signalling outputs.



Connection with safety module and PLC

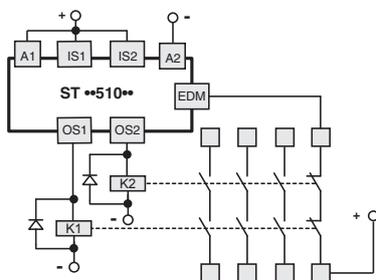


Connection with programmable safety module

## External device monitoring (EDM)

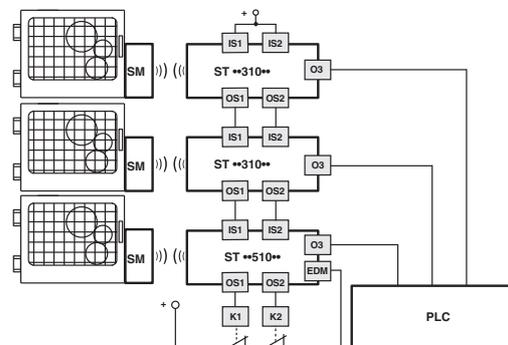
The ST ..5..... and ST ..9..... versions, in addition to maintaining the operating and safety characteristics of the ST series, allow control of **forcibly guided NC contacts of contactors or relays** controlled by the safety outputs of the sensor itself. This check is carried out by monitoring the EDM input (External Device Monitoring as defined in EN 61496-1) of the sensor.

As an alternative to the relays or contactors you can use Pizzato Elettrica expansion modules CS ME-03. See page 359.



The EDM version, which is equipped with the IS safety inputs, **can be used at the end of a series** of ST sensors, **up to a maximum number of 32 devices**, while maintaining the maximum PL e safety level according to EN 13849-1.

For specific applications, this solution allows you to dispense with the safety module connected to the last device in the chain.



## O3 output inverted

Using versions with inverted O3 signalling output (articles ST ..6....., ST ..7....., ST ..8....., ST ..9.....) allows checking of the actual electrical connection of the sensor by an external PLC. The O3 output will be activated when the actuator is removed and the OS safety outputs are switched off.

