

ST series safety sensors with RFID technology



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Introduction

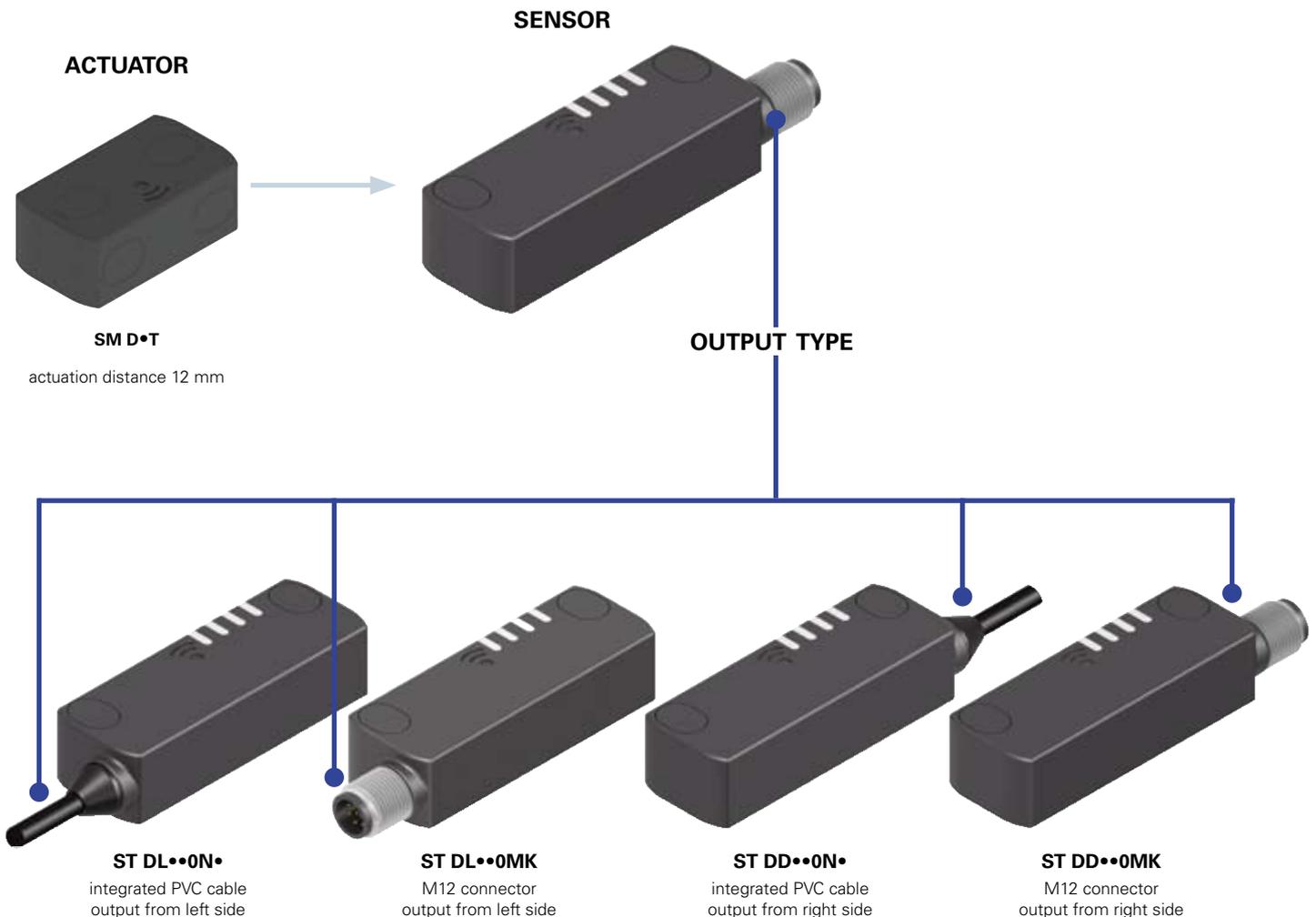
Pizzato Elettrica ST series sensors, combined with appropriate safety modules, are suitable for controlling protections and guards, allowing the system where they are incorporated to attain a safety category up to SIL 3 according to EN 62061 standard, up to PLe and category 4 according to EN ISO 13849-1 standard.

These sensors use RFID (Radio Frequency Identification) technology and provide high protection against possible mishandling thanks to the uniqueness of the code transmitted by the actuator. Having no mechanical contacts, they guarantee long working life even in systems subject to frequent opening/closing and operating in hostile environmental conditions.

Main data

- Non-contact operation using RFID technology
- Digitally coded actuator
- Use in safety applications up to SIL3/PLe
- Protection degree IP67 and IP69K
- Extended working life
- 4 LEDs for status display of the sensor
- Technopolymer housing with laser-engraved markings
- Versions with M12 connector

Selection diagram



- product option
- ▶— accessory sold separately

Sensor with actuator code structure

ST DD210N2-D1T

Connection output direction

D	output from right
L	output from left

Inputs and outputs

	safety outputs OS	auxiliary outputs O	safety inputs IS	programming inputs I
2	2	1	-	-
3	2	1	2	-
4	2	1	2	1

Programming

1	pre-programmed
2	reprogrammable (article ST D•420•• only)

Actuator

D0T	complete with SM D0T coded actuator, actuation distance 12 mm (Sn)
D1T	complete with SM D1T uniquely coded actuator, actuation distance 12 mm (Sn)

Type of cable or connector

N2	integrated PVC cable, length 2 m (standard)
...
N10	integrated PVC cable, length 10 m
MK	5 or 8 poles M12 connector

Sensors with integrated PVC cable output will be available in the first quarter of 2013.

Single sensor code structure

ST DD420N2

Connection output direction

D	output from right
L	output from left

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	safety outputs OS	auxiliary outputs O	safety inputs IS	programming inputs I
4	2	1	2	1

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Actuator code structure

SM D1T

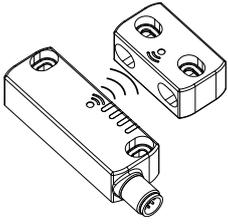
Actuator

D0T	coded actuator, actuation distance 12 mm (Sn)
D1T	uniquely coded actuator, actuation distance 12 mm (Sn)

Coded = Switch accepts any actuator type D0T.
Uniquely coded = Switch accepts only one actuator, no teach-in facility.

ST series safety sensors with RFID technology

Use of RFID technology



The ST series sensors exploit the advantages deriving from using RFID (Radio Frequency Identification) technology. The unique digital code contained in the actuator can guarantee the system where they are installed a high level of safety and reliability, preventing any possible mishandling. Their specific resistance to dynamic stress, absence of moving mechanical parts and shape without recesses allow these sensors to be used even in particularly hostile thermal conditions or in the presence of dirt and dust.

Protection degree IP67 and IP69K

The ST series sensor by Pizzato Elettrica, besides having an IP67 protection degree, have passed the test proving their IP69K protection degree according to the prescriptions established by the DIN 40050 standard. Therefore they are suitable for use in machineries subjected to intense washing with high pressure and high temperature water jets and for any condition or environment where a particular attention for cleanness and hygiene is required, such as in food or pharmaceutical industry.

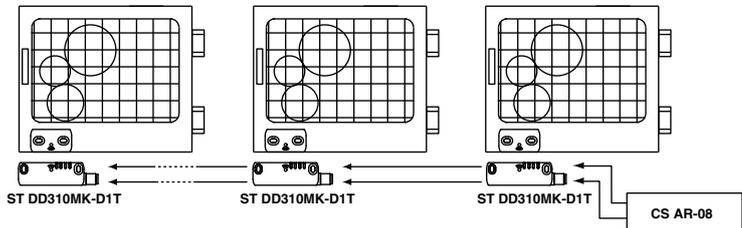
IP69K
IP67

Connection in series of several sensors

One of the major characteristics of Pizzato Elettrica ST products is that several sensors can be connected in series, up to a maximum number of 32 devices, **while maintaining the maximum safety level (PLe) prescribed by the EN 13849-1 standard.**

This connection method is permitted in safety systems which, at the end of the chain, feature a safety module evaluating the outputs of last ST sensor.

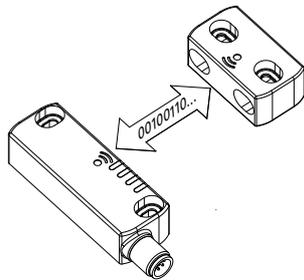
The fact that the PLe safety level can be maintained even with 32 sensors connected in series indicates the presence of an extremely safe structure inside each individual ST sensor.



SIL 3 / PLe

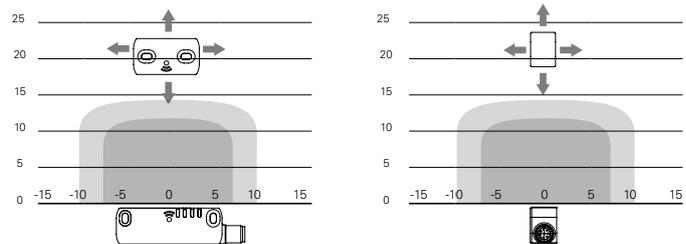
Programmability

Pizzato Elettrica supplies a programmable version of the ST series sensors. A simple brief operation makes it possible to program the sensor in order for it to recognise the code of a new actuator. The procedure involves the activation of a dedicated input which brings the sensor to a safe state, while waiting for a new code to be memorised. When the actuator is brought closer, the ST sensor carries out a number of checks on the code being received, which must respect certain parameters peculiar to RFID technology. On completion of these checks, the sensor will indicate, by means of LED signals, that the procedure has been successful. After programming has been completed, the sensor will only recognise the actuator code corresponding to the last programming operation, thereby preserving the level of safety and reliability in the system where it is installed.



Wide actuation zone

Since they exploit the intrinsic characteristics of RFID technology, the ST series sensors cover a wide activation zone, which makes them particularly suitable in conditions of poorly defined protections or with mechanical characteristics changing over time.

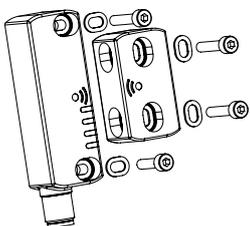


Legend:

- Activation distance S_n (mm)
- Deactivation distance S_{nr} (mm)

Note: The drawing of the activation areas is indicative.

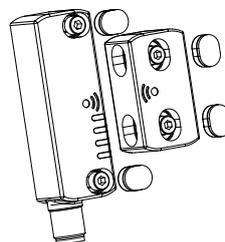
Fixing plates in stainless steel



The presence of stainless-steel fixing plates in ST sensors, besides ensuring that fitting on surfaces not perfectly level does not damage the slots, makes the sensor sturdier against mechanical stress. The system therefore becomes safer and more reliable.

It is advisable to block the sensor and the actuator with safety screws in stainless steel.

Protection caps



The ST series sensors and respective actuators are supplied with appropriate caps for covering the slots housing the fixing screws. These caps prevent dirt from accumulating, therefore making it easier to clean the system where the sensor is installed and keeping its operational capacity unaltered. A further mechanical tampering protection is provided by means of fixing screw covers.

Laser marking

Pizzato Elettrica has introduced a new laser marking for sensors ST series. Thanks to this new system which excludes the use of labels, markings on the products are indelible.

Furthermore, in case of machineries subjected to intense high pressure water jets, there is no risk of labels detaching from the product.



Signalling LEDs

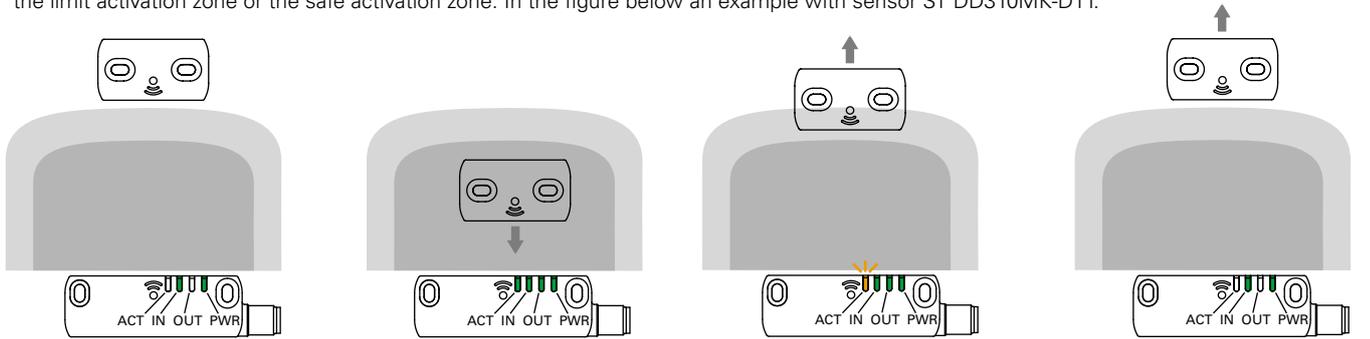
The Pizzato Elettrica ST series sensors feature 4 status signalling LEDs. The purpose of these LEDs is to make it easier to understand the actual sensor operation.



LED	Function
ACT	Actuator status
IN	Safe input status
OUT	Safe output status
PWR	Power supply/self-diagnosis

Limit and safe activation zones

During alignment of the sensor with the actuator, the status LEDs indicate, by means of different colours, the presence of the actuator within the limit activation zone or the safe activation zone. In the figure below an example with sensor ST DD310MK-D1T.



The sensor is supplied with power (LED PWR on, green), the inputs are enabled (LED IN on, green), the outputs are disabled (LED OUT off). The actuator is on the outside of the activation zone (LED ACT off).

When the actuator is brought inside the safe activation zone (dark grey area), the sensor switches on LED ACT to green and enables the outputs (LED OUT on, green).

When the actuator leaves the safe zone, the sensor keeps the outputs enabled; however, by means of the LED ACT (blinking, orange/green), it indicates that the actuator is entering the limit activation zone (light grey area).

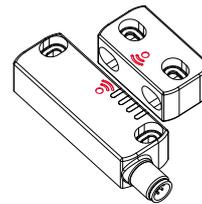
When the actuator leaves the limit activation zone, the sensor disables the outputs and switches off the LED OUT and LED ACT.

Operational states

PWR LED	OUT LED	IN LED	ACT LED	Sensor state	Description
○	○	○	○	OFF	Sensor off.
●	○	○	○	POWER ON	Internal tests on activation.
●	*	○	*	RUN	Sensor inputs not active.
●	*	●	*	RUN	Inputs activation.
●	*	◌	*	RUN	Inputs inconsistency. Recommended action: check the inputs and / or their wiring.
●	*	*	●	RUN	Actuator in the safe activation zone Auxiliary output O3 active.
●	*	*	◌	RUN	Actuator in the limit activation zone, O3 active. Recommended action: bring the sensor within the safe activation zone.
●	●	●	●	RUN	Inputs activation. Actuator in the safe activation zone and safety outputs active.
●	◌	*	*	ERROR	Outputs error. Recommended action: check for short circuits between outputs, outputs and ground, or outputs and power supply; restart the sensor.
●	*	*	*	ERROR	Internal error. Recommended action: restart the sensor. If the fault persists, replace the sensor.

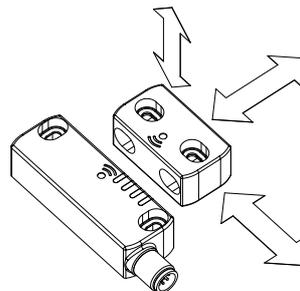
Legend: ○ = off ● = on ◌ = blinking ◐ = alternate colours * = indifferent

Easy sensor/actuator alignment



The sensors and the actuators are provided with engraved markings on the housing in order to make alignment easier during the fitting stage. For correct operation, install the sensors and the actuators so that their markings correspond.

Activation from various directions



Pizzato Elettrica ST series sensors have been designed to be activated from various directions, thus providing the customer with the greatest versatility in positioning the devices along the protection perimeters. Moreover, the actuator can be fixed on 2 perpendicular planes.

ST series safety sensors with RFID technology

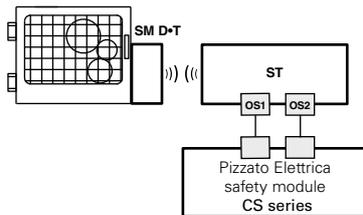
Sensors used for safety applications

The redundant internal structure of the ST sensor meets the characteristics required by the EN ISO 13489-1 and IEC 62061 standards, therefore the actual sensor can be classified as a device of category 4, PLe and SIL 3. Its high diagnostic cover and high MTTF for each single channel make it possible for the ST sensor not to lose its safety function even in the case of one single anomaly. These are the reason why the sensor can be used in series, while maintaining the PLe safety level, as long as it is connected to an appropriate module which controls its correct operation.

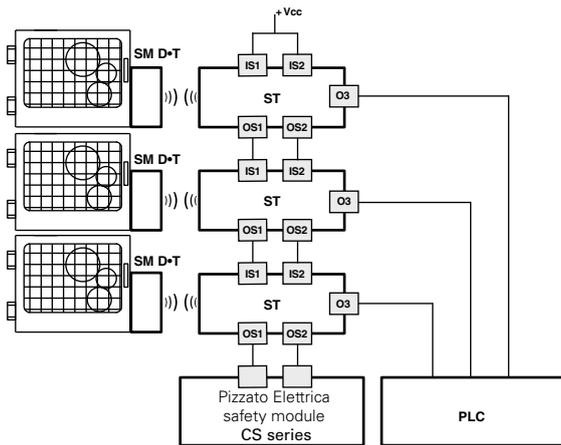
Complete safety system

The use of complete tested solutions means that the customer can be certain of the electrical compatibility between the ST series sensor and Pizzato Elettrica safety modules, thus ensuring greater reliability. In fact, these sensors have been tested for operation with the modules specified in the table shown on the side.

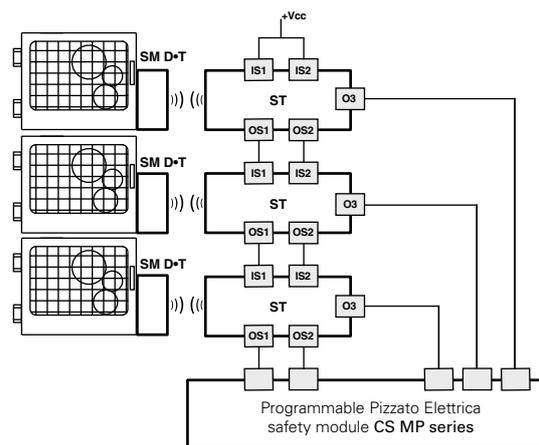
Sensors	Compatible safety modules	Safety module output contacts		
		Safety instantaneous contacts	Safety delayed contacts	Signaling contacts
ST D••••0••	CS AR-05•••••	3NO	/	1NC
	CS AR-06•••••	3NO	/	1NC
	CS AR-08•••••	2NO	/	/
	CS AT-0••••••	2NO	2NO	1NO
	CS AT-1••••••	3NO	2NO	/
	CS MP•••••••	see article features		



The ST sensor can be used individually after evaluating the outputs by means of a Pizzato Elettrica safety module (table for safety modules to be combined).

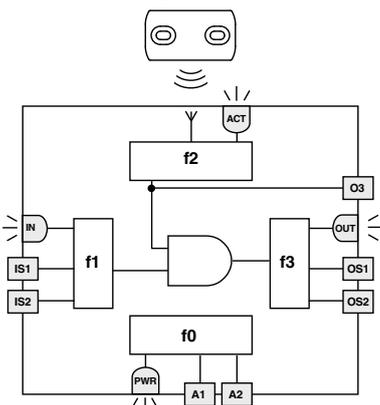


Possible connection in series of several sensors in order to simplify the safety system wiring, after evaluating the outputs from the last sensor in the chain by means of a Pizzato Elettrica safety module (table for safety modules to be combined). Each ST sensor is provided with a signalling output, which is activated when the respective guard is closed. This piece of information can be managed by a PLC, depending on the specific requirements of the system installed.



Possible connection in series of several sensors in order to simplify the safety system wiring, after evaluating the outputs from the last sensor in the chain by means of a safety module from Pizzato Elettrica CS MP series, which allows management of both safety and signalling functions.

Internal diagram



The side scheme shows the 4 logical functions interacting inside the sensor.

F0 function has the fundamental task to control the sensor's power supply and the internal tests which the sensor cyclically undergoes.

F1 function has the task to control the status of the sensor's inputs, while F2 checks the actuator's presence within the activation zone limits.

F3 function has the task to enable the safety outputs and check their possible failure or short circuit.

The macro-function, which controls the above mentioned functions, enables the safety outputs only in presence of active inputs with actuator within the safe zone limits.

Each function's status is displayed by means of an individual LED (PWR, IN, ACT, OUT), to allow the operator to have an immediate evaluation of the global sensor's status.

Safety screws

10 pcs packs

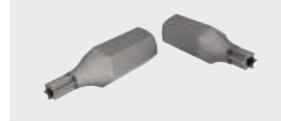


These new screws have tamper-resistant Torx buttonheads. Devices fixed with this kind of screws cannot be removed or tampered by common tools. The safety screws are in stainless steel with different threaded body lengths available: they suit any application where devices are subjected to frequent washing or cor-

roding substances are present.

Article	Description
VF VAM4X20BX-X	M4X20 screw, tamper-resistant Torx T20, AISI 304 for ST series
VF VAM4X25BX-X	M4X25 screw, tamper-resistant Torx T25, AISI 304 for ST series

Safety screws bits

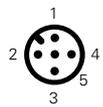


Safety screws bits, 1/4" drive.

Article	Description
VF VAIT1T20	Bits for tamper-resistant Torx T20, M4 screw

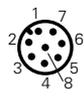
Internal connections with cable or connector

Sensor ST D•2•••••



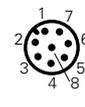
cable color	pin	connections
brown	1	A1
red/white	2	OS1
blue	3	A2
black/white	4	OS2
black	5	O3

Sensor ST D•3•••••



cable color	pin	connections
brown	1	A1
red	2	IS1
blue	3	A2
red/white	4	OS1
black	5	O3
purple	6	IS2
black/white	7	OS2
purple/white	8	not connected

Sensor ST D•4•••••



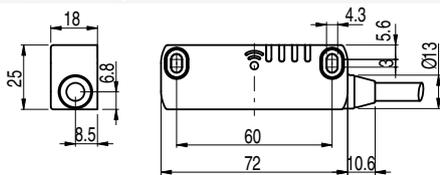
cable color	pin	connections
brown	1	A1
red	2	IS1
blue	3	A2
red/white	4	OS1
black	5	O3
purple	6	IS2
black/white	7	OS2
purple/white	8	I3

Legend

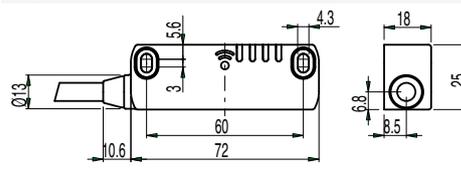
A1-A2	power supply
IS1-IS2	safety inputs
OS1-OS2	safety outputs
O3	auxiliary output
I3	programming input

Dimensional drawings

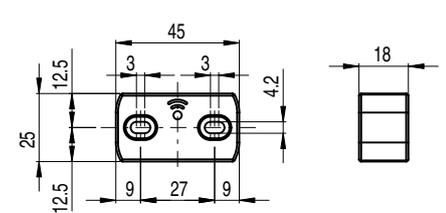
Sensor ST DD••••N• with cable output from right side



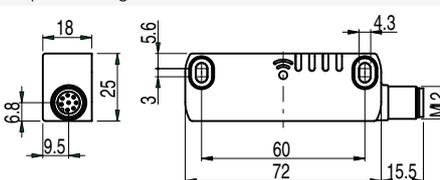
Sensor ST DL••••N• with cable output from left side



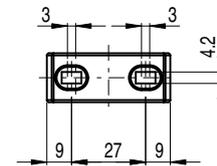
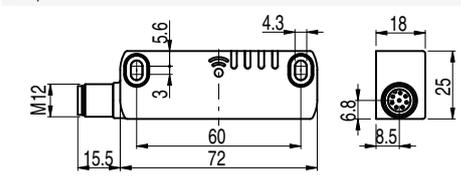
Actuator SM D1T

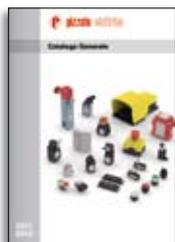


Sensor ST DD••••MK with M12 connector output from right side



Sensor ST DL••••MK with M12 connector output from left side

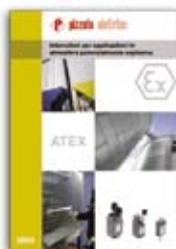




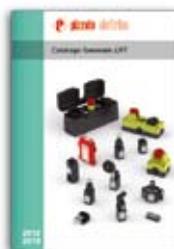
General catalog



Production program



ATEX brochure



LIFT
General Catalog



Dvd



Web site
www.pizzato.com



pizzato elettrica

Passion for Quality

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