ST series safety sensors with RFID technology

Introduction

The ST series sensors, combined with appropriate safety modules, are suitable for controlling protections and guards on machines without inertia, allowing the system within which they are integrated to attain a safety category up to SIL 3 acc. to EN 62061, and 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 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.

Maximum safety with a single device

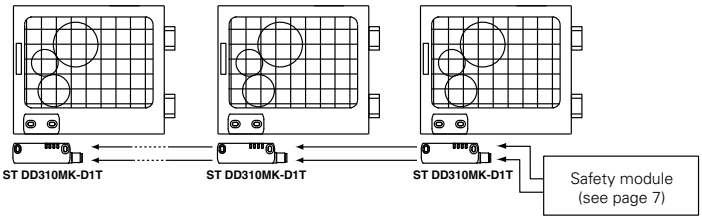
PL e + SIL 3

Constructed with redundant electronic technology, the ST series sensors make it possible to create circuits having maximum PL e and SIL 3 safety levels by installing just one device on the protection. This avoids expensive wiring on the field and allows quicker installation. Inside the panel, the two electronic safety outputs must be connected to a safety module with OSSD inputs or to a safety PLC.

Connection of several sensors in series

PL e + SIL 3

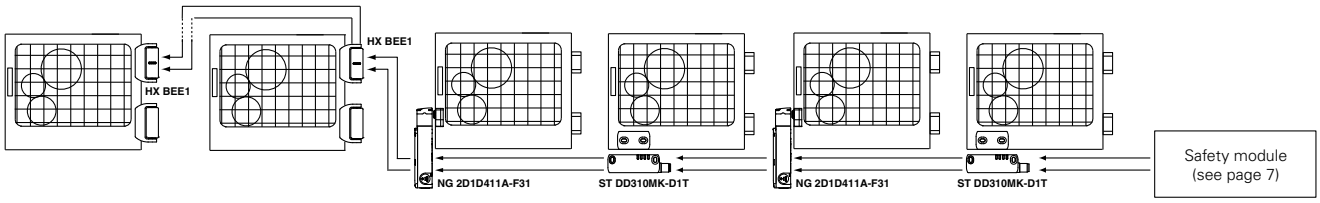
One of the major characteristics of Pizzato Elettrica ST products is that several sensors can be connected in series, up to a maximum number of 32 devices, while maintaining the maximum safety level (PLe) prescribed by the EN ISO 13849-1 standard.
This connection method is permitted in safety systems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



Series connection with other devices

PL e + SIL 3

The ST series features two safe inputs and two safe 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 the creation of circuits with connections in series, including stainless steel safety hinges (HX BEE1 series), transponder sensors (ST series) and door lock sensors (NG series), while maintaining maximum PL e and SIL 3 safety levels.



High level coded actuators

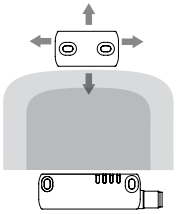
The ST series features an electronic system based on RFID technology to detect the actuator. This system gives a different coding to each actuator and makes it impossible to tamper with a device by using another actuator belonging to the same series. The actuators may have millions of different coding combinations, and are therefore classified as actuators with a high coding level, according to EN ISO 14119 .

Protection degrees IP67 and IP69K

IP69K
IP67

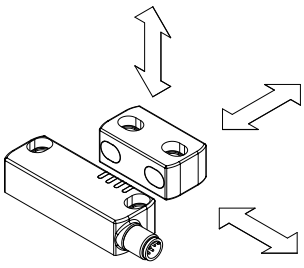
These devices are designed to be used in the toughest environmental conditions and they pass the IP67 immersion test acc. to IEC 60529. They can therefore be used in all environments where the maximum protection of the housing is required. Special measures also allow devices to be used even in machines which are subjected to washing with high pressure warm water jets. In fact these devices pass the IP69K test according to ISO 20653, using jets of water to 100 atmospheres at a temperature of 80°C.

Wide actuation zone



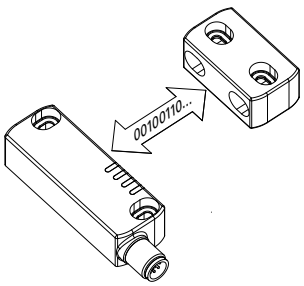
Since they exploit the intrinsic characteristics of RFID technology, the ST series sensors cover a wide activation zone, which makes them particularly suitable in conditions of poorly defined protections or with mechanical characteristics changing over time.

Actuation from many directions



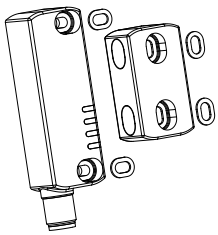
Pizzato Elettrica ST series sensors have been designed to be activated from various directions, thus providing the customer with the greatest versatility in positioning the devices along the protection perimeters. Moreover, the actuator SM D•T can be fixed on 2 perpendicular planes.

Programmability



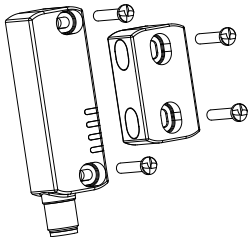
Pizzato Elettrica supplies a programmable version of the ST series sensors. A simple brief operation makes it possible to program the sensor in order for it to recognise the code of a new actuator. The procedure involves the activation of a dedicated input which brings the sensor to a safe state, while 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.

Stainless steel fixing plates



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.

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 with using common tools. See accessories on page 295 - General Catalogue Safety 2015/16.

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. This makes it possible to quickly identify the interruption points in the safe chain, which device is active, which door is opened and any errors inside the device. All that in a straightforward way without needing to decode complex blinking sequences.

External device monitoring

EDM

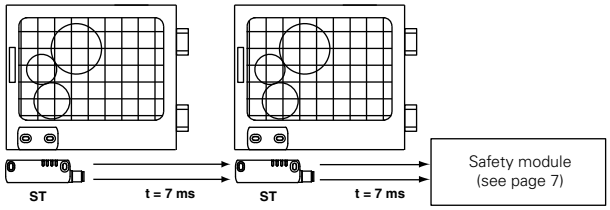
On request we can supply the device with EDM (External Device Monitoring) function, so that the device itself can check the integrity of the relays connected to the safety outputs. These safety relays or safety contactors send a feedback signal to the EDM input, which verifies the consistency of the received signal with the safety outputs state.

Laser engraving

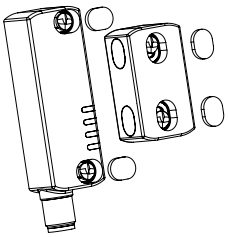
All devices are indelibly marked with a dedicated laser system that allows the marking to be also suitable for extreme environments. This system that does not use labels, prevents the loss of plate data and the marking is more resistant over time.

Quick propagation time

One of the main features of the ST sensors is the quick signal propagation time, usually of 7 ms, for deactivating inputs.
This fast signal response is particularly useful for sensors connected in series.

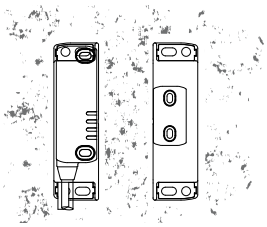


Double anti-tampering safety



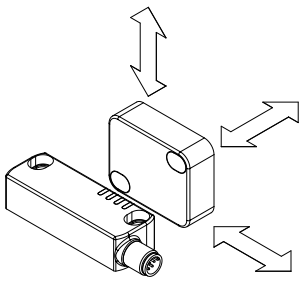
The ST series sensors and respective actuators are supplied with appropriate caps for covering the slots housing the fixing screws. These caps prevent dirt from accumulating, therefore making it easier to clean the system where the sensor is installed and keeping its operational capacity unaltered.
A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

Insensitivity to dirt



The sensors are totally sealed and retain their safety characteristics also where dirt and dust are present (not ferromagnetic material). This characteristic, joined with the shape without recesses, make them especially proper to the use in the agro-industrial sector.

Versions with extended activation distance

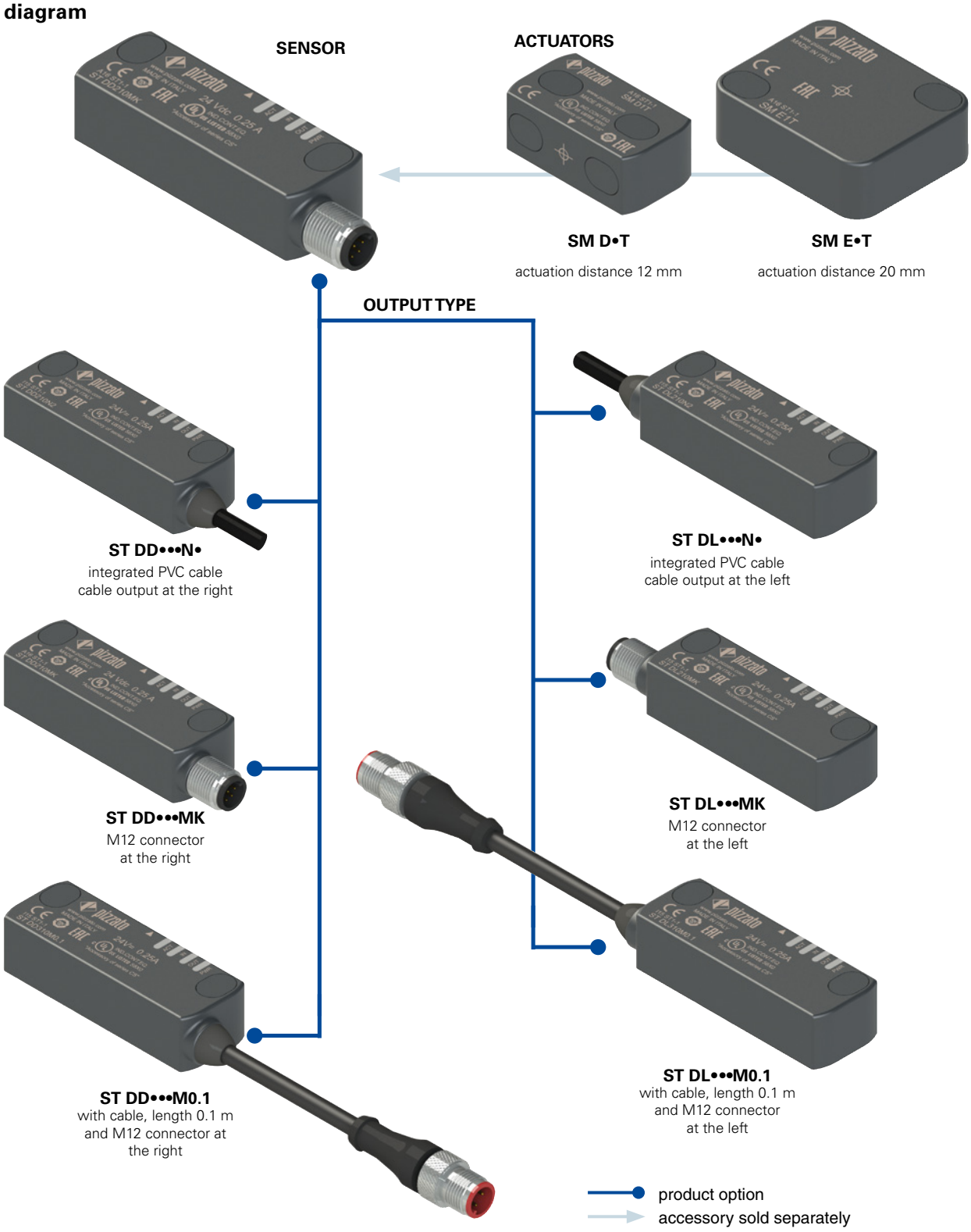


New versions of safety sensors are now available. Their actuation distance is 20 mm, in addition to the standard version with a 12 mm distance. This increase is ideal when a precise and stable distance between the sensor and the actuator cannot be guaranteed.

Inverted signalling output

To adapt to specific customer needs, in addition to the standard versions, you can request monitoring output O3 with inverted operation.

Selection diagram



Code structure for sensor with actuator

ST DD420N2-D1T

Output direction, connections

D	output at the right
L	output at the left

Actuator

D0T	low level coded actuator the switch recognises any type D0T actuator
D1T	high level coded actuator the switch recognises one single D1T actuator
E0T	low level coded actuator the switch recognises any type E0T actuator
E1T	high level coded actuator the switch recognises one single E1T actuator

Inputs and outputs

	OS safety outputs	NC signalling outputs	IS safety inputs	programming inputs I	EDM inputs
21	2	1	-	-	-
31	2	1	2	-	-
42	2	1	2	1	-
51	2	1	2	-	1
61	2	1 (inverted)	-	-	-
71	2	1 (inverted)	2	-	-
82	2	1 (inverted)	2	1	-

Note: versions 21, 31, 51, 61, 71 are only sold with the actuator

Type of integrated cable or connector

N2	integrated PVC cable, length 2 m (standard)
...	.....
N10	integrated PVC cable, length 10 m
MK	with 5 or 8 pole stainless steel M12 connector
M0.1	cable, length 0.1 m, with M12 connector not available for ST D•2•••• versions

Supply voltage

0	24 Vdc
1	12 … 24 Vdc

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

D	output at the right
L	output at the left

Type of integrated cable or connector

N2	integrated PVC cable, length 2 m (standard)
...	.....
N10	integrated PVC cable, length 10 m
MK	with 5 or 8 pole stainless steel M12 connector
M0.1	cable, length 0.1 m, with M12 connector

Inputs and outputs

	OS safety outputs	NC signalling outputs	IS safety inputs	programming inputs I
42	2	1	2	1
82	2	1 (inverted)	2	1

Supply voltage

0	24 Vdc
1	12 ... 24 Vdc

Attention! Each sensor is initially programmed for recognising actuators with a low encoding level, code •0T.
Attention! The feasibility of a code number does not mean the effective availability of a product. Please contact our sales office.

Actuator code structure

SM D1T

Actuation distance

D	Actuation distance 12 mm
E	Actuation distance 20 mm

Actuator

0T	low level coded actuator the switch recognises any type •0T actuator
1T	high level coded actuator the switch recognises one single •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
- Versions with M12 connector
- Actuators with different activation distance

Markings and quality marks:

UL approval: E131787
TÜV SÜD approval: Z10 12 11 75157 004
EAC approval: RU C-IT ДМ94.B.01024

In conformity with standards:

IEC 61508-1, IEC 61508-2, IEC 61508-3, IEC 61508-4, EN ISO 13849-1, EN ISO 13849-2, EN 62061, EN 60947-5-3 / A1, EN 60947-5-2, EN 60947-1, EN 61326-1, EN 61326-3-1, EN 61326-3-2, ETSI 301 489-1, ETSI 301 489-3, ETSI 300 330-2, UL 508, CSA 22.2 No.14

In conformity with the requirements of:

Machinery Directive 2006/42/EC
EMC Directive 2014/30/EC
Directive 2014/53/UE - RED
FCC Part 15

Connection with safety modules for safety applications:

Connection with safety modules 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 to PDF-M (EN 60947-5-3).
The system can be used in safety circuits to PL e/SIL 3/category 4 in accordance with EN ISO 13849-1.

Technical data

Housing

Housing made of glass fiber reinforced technopolymer, self-extinguishing.
Versions with integrated cable 6 x 0.5 mm² or 8 x 0.34 mm², length 2 m, other lengths on request.
Versions with M12 connector
Versions with cable, length 0.1 m, M12 connector

Protection degree:	IP67 acc. to EN 60529 IP69K acc. to ISO 20653

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

General data

For safety applications up to:	SIL 3 acc. to EN 62061 PL e acc. to EN ISO 13849-1
Interlock without contact, coded:	type 4 acc. to EN ISO 14119
Level of coding acc. to EN ISO 14119	High with D1T or E1T actuator Low with D0T or E0T actuator
Safety parameters:	
$MTTF_d$:	4077 years
PFH_d:	1.46E-09
DC:	High
Service life:	20 years
Operating temperature:	-25 … +70°C
Storage and transport temperature:	-25 … +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 inputs IS1/IS2/I3/EDM

Rated operating voltage U_{e1}:	24 Vdc or 12 ... 24 Vdc
Rated current consumption I_{e1}:	5 mA

Electrical data of safety outputs OS1/OS2

Rated operating voltage U_{e2}:	24 Vdc or 12 ... 24 Vdc
Output type:	OSSD, PNP type
Maximum current per output I_{e2}:	0.25 A
Minimum current per output I_{m2}:	0.5 mA
Thermal current I_{th2}:	0.25 A
Utilization category:	DC13; U_{e2}=24 Vdc, I_{e2}=0.25 A
Short circuit detection:	Yes
Protection against overcurrent:	Yes
Auto-resettable internal protection fuse:	0.75 A
Duration of the deactivation impulses at the safety outputs:	< 300 us
Permissible capacitance between outputs:	< 200 nF
Permissible cap. between output and ground:	< 200 nF

Electrical data of signalling output O3

Rated operating voltage U_{e3}:	24 Vdc or 12 ... 24 Vdc
Output type:	PNP
Maximum current per output I_{e3}:	0.1 A
Utilization category:	DC12; U_{e3}=24 Vdc; I_{e3}=0.1A
Short circuit detection:	No
Protection against overcurrent:	Yes
Auto-resettable internal protection fuse:	0.75 A

Actuation data	Actuator SM D•T	Actuator SM E•T
Assured operating distance s_{ao}:	10 mm	16 mm
Assured release distance s_{ar}:	16 mm	27 mm
Rated operating distance s_n:	12 mm	20 mm
Rated release distance s_{nr}:	14 mm	23 mm
Repeat accuracy:	≤ 10 % s_n	
Differential travel:	≤ 20 % s_n	
Max. switching frequency:	1 Hz	
Distance between two sensors:	min. 50 mm	

Electrical data

Rated operating voltage U_e SELV:	24 Vdc -15%...+10% (versioni 24 Vdc) 12 ... 24 Vdc -30%...+25% (versioni 12 ... 24 Vdc)
Rating operating voltage U_e:	
- minimum:	40 mA
- with all outputs at full power:	0.7 A
Rated insulation voltage U_i:	32 Vdc
Rated impulse withstand voltage U_{imp}:	1.5 kV
External protection fuse:	1 A F type or equivalent device
Overvoltage category:	III

Characteristics approved by UL

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

Inputs supplied by remote class 2 source or limited voltage and limited energy.

Data of housing type 1, 4X "indoor use only", 12.

Accessory for CS series.

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

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

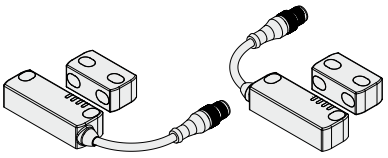
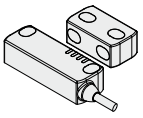
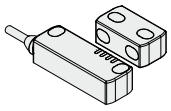
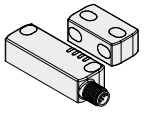
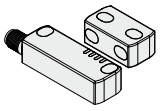
Characteristics approved by TÜV SÜD

Supply voltage: 24 Vdc
Rated operating current (max.): 0.25 A
Ambient temperature: -25°C … +70°C
Protection degree: IP67
PL, category: PL e, category 4

In conformity with standards: 2006/42/EEC Machinery Directive, EN ISO 13849-1:2008, EN 60947-5-3/A1:2005, EN 50178:1997, 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 CL 3)

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

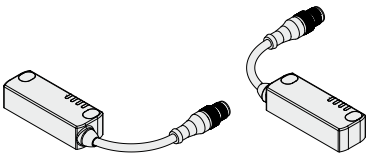
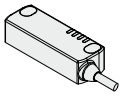
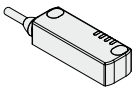
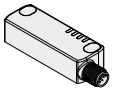
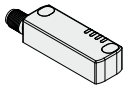
Selection table for sensors with high level coded actuator

OS safety outputs	NC signalling outputs	IS safety inputs	programming inputs I	EDM inputs	Programmable	with cable, length 0.1 m, M12 connector at the right	with cable, length 0.1 m, 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
2	1	-	-	-	-			ST DD210N•-D1T	ST DL210N•-D1T	ST DD210MK-D1T	ST DL210MK-D1T
2	1	2	-	-	-	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

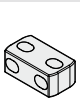
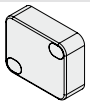
In order to purchase an item with an E•T actuator, please replace letter D with letter E in the above-mentioned codes. Example: ST DD310M0.1-D•T → ST DD310M0.1-E•T

Sensor selection table

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

Actuator selection table

Level of coding acc. to ISO 14119	Actuation distance 12 mm	Actuation distance 20 mm
low	SM D0T	SM E0T
high	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.

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

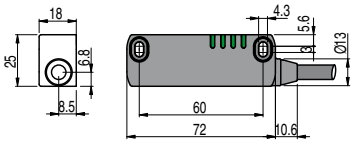
•1T actuators type are always encoded with different codes. This implies that a sensor associated with an actuator type •1T can be activated only by a specific actuator. Another •1T actuator type will not be recognised by the sensor until a new association procedure is carried out (reprogramming). After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

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

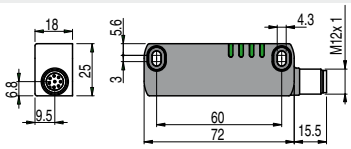
Dimensional drawings

All measures in the drawings are in mm

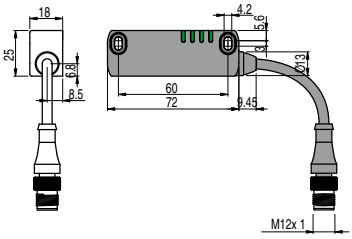
Sensor ST DD•••N• with cable at the right



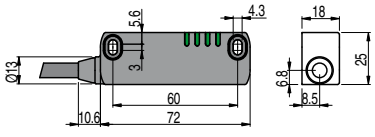
Sensor ST DD•••MK with M12 connector at the right



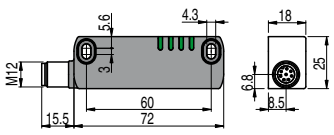
Sensor ST DD•••M0.1 with cable and M12 connector at the right



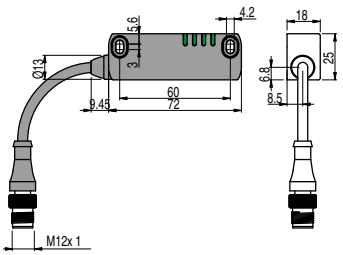
Sensor ST DL•••N• with cable at the left



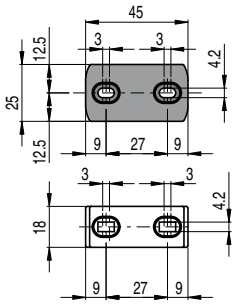
Sensor ST DL•••MK with M12 connector at the left



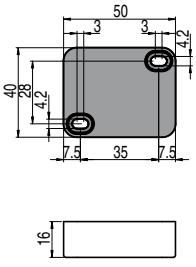
Sensor ST DL•••M0.1 with cable and M12 connector at the left



Actuator SM D•T



Actuator SM E•T

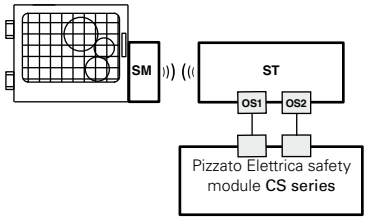


Accessories See page 287 - General Catalogue Safety 2015/16.

➔ The 2D and 3D files are available at **www.pizzato.com**

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.

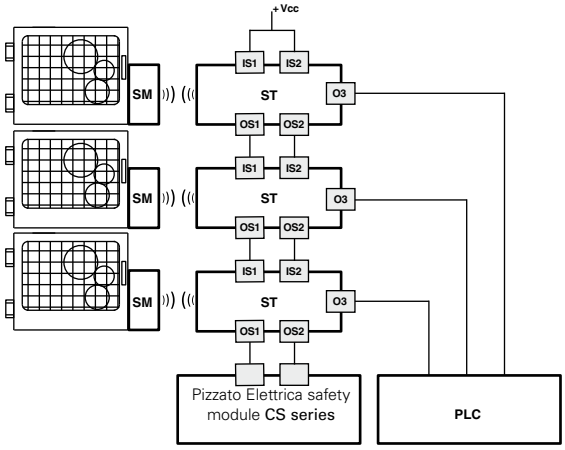


The ST sensor can be used individually after evaluating the outputs by means of a Pizzato Elettrica safety module (table for safety modules to be combined).

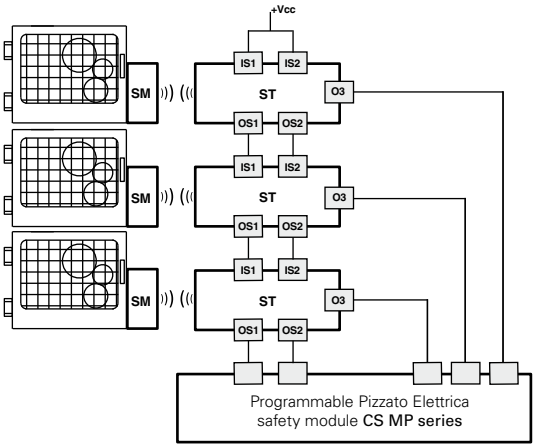
Compatible safety modules

Sensors	Safety modules	Safety module output contacts		
		Instantaneous safety contacts	Delayed safety contacts	Signalling contacts
ST D••••••	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 243 - General Catalogue Safety 2015/16		

Once their compatibility has been verified, all ST sensors can generally be connected to safety modules or safety PLCs recognising OSSD input signals.

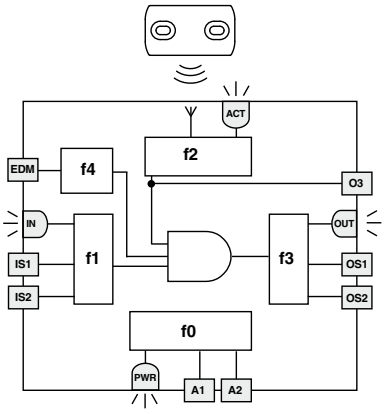


Possible connection in series of several sensors in order to simplify the safety system wiring, after evaluating the outputs from the last sensor in the chain by means of a Pizzato Elettrica safety module (table for safety modules to be combined). Each ST sensor is equipped with a signalling output, which is activated or deactivated depending on the version selected, 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 wiring diagram (ST D•5••••)

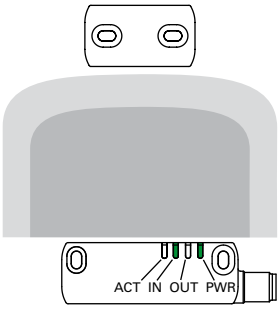


The diagram on the side represents the 5 logic functions which interact inside the sensor.
Function f0 is a global function which deals with the sensor power supply and the internal tests which it cyclically undergoes.
The task of function f1 is to evaluate the status of the sensor inputs, whereas function f2 checks the presence of the actuator inside the sensor operating areas.
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, the f4 function verifies the consistency of the EDM signal during safety output state changes.
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.
The status of each function is displayed by the corresponding LED (PWR, IN, ACT, OUT), in such a way that the general sensor status becomes immediately obvious to the operator.

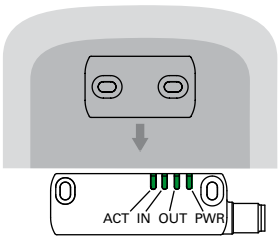
LED	Function
ACT	state of actuator / output O3
IN	status of safety inputs
OUT	status of safety outputs
PWR	power supply/self-diagnosis

Limited and safe activation zones (ST D•4•••)

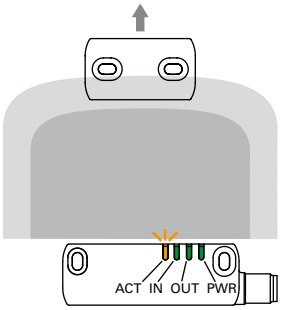
During alignment of the sensor with the actuator, the status LEDs indicate, by means of different colours, the presence of the actuator within the limit activation zone or the safe activation zone. In the figure below an example with sensor ST DD420MK-D1T.



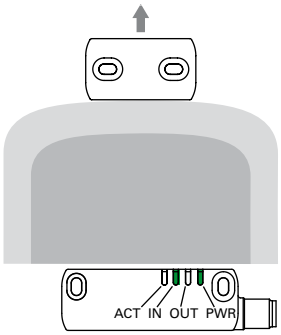
The sensor is supplied with power (LED PWR on, green), the inputs are enabled (LED IN on, green), the outputs are disabled (LED OUT off). The actuator is on the outside of the activation zone (LED ACT off).



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.

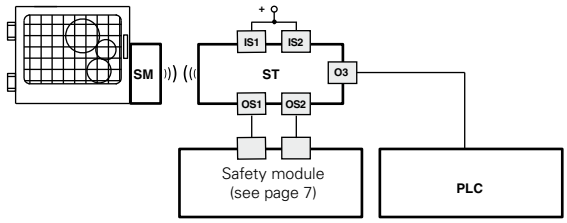
Operating states (ST D•4••••)

PWR LED	OUT LED	IN LED	ACT LED	Status. sensor	Description
○	○	○	○	OFF	Sensor off.
●	○	○	○	POWER ON	Internal tests upon activation.
●	✳	○	✳	RUN	Sensor with inactive inputs.
●	✳	●	✳	RUN	Activation of inputs.
●	✳	◔	✳	RUN	Inputs not coherent. Recommended action: check for presence and/or wiring of inputs.
●	✳	✳	●	RUN	Actuator in safe area. O3 signalling output active.
●	✳	✳	◔	RUN	Actuator in limit zone, O3 active. Recommended action: bring the sensor within the safe activation zone.
●	●	●	●	RUN	Activation of 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, and restart the sensor.
●	✳	✳	✳	ERROR	Internal error. Recommended action: restart the sensor. If the fault persists, replace the sensor.

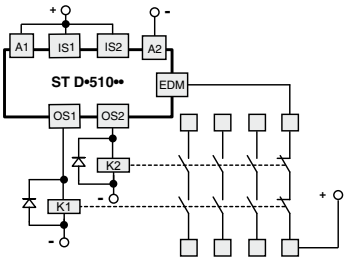
Legend: ○ = off ● = on ◔ = blinking ◐ = alternating colours ✳ = indifferent

Output O3 inverted (ST D•6•••, ST D•7•••, ST D•8•••)

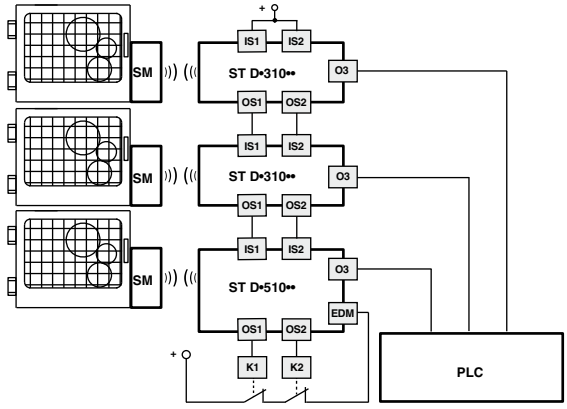
The version with signalling output O3 inverted allows checking of the actual electrical connection of the sensor by an external PLC. In the event of removal of the actuator and switching off of the OS safe outputs, output O3 will become active.



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 235 - General Catalogue Safety 2015/16.
This check is carried out by monitoring of the EDM input (External Device Monitoring as defined in EN 61496-1) of the sensor.



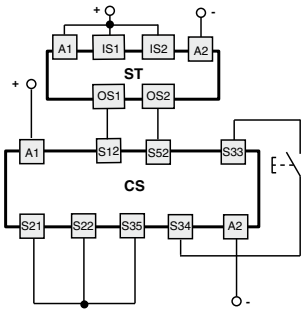
This version, with the IS safety inputs, **can be used at the end of a series** of ST sensors, **up to a maximum number of 32 devices**, while maintaining the maximum PL e safety level according to EN ISO 13849-1.
For certain applications, there is no need to connect a safety module to the chain's last device.

Connection with safety modules

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

Input configuration with monitored start

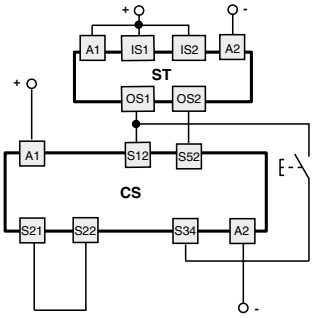
2 channels / Category 4 / up to SIL 3 / PL e



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

Input configuration with manual start (CS AR-05••••)
or monitored start (CS AR-06••••)

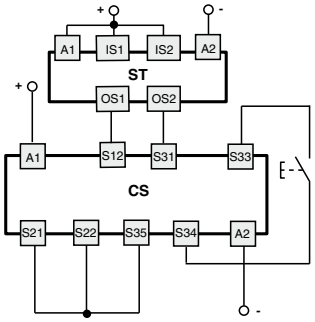
2 channels / Category 4 / up to SIL 3 / PL e



Connection with safety modules CS AT-0••••• / CS AT-1•••••

Input configuration with monitored start

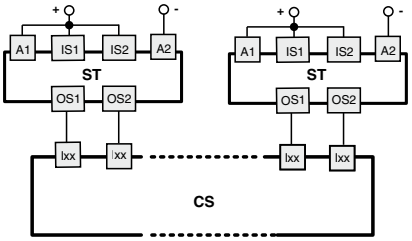
2 channels / Category 4 / up to SIL 3 / PL e



Connection with safety modules CS MP••••0

The connections vary according to the program of the module

Category 4/ up to SIL 3 / PL e



For features of the safety modules see page 181 - General Catalogue Safety 2015/16.

Internal connections with cable

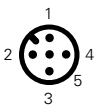
	ST D•2••N• ST D•6••N•
cable colour	connection
brown	A1
red/white	OS1
blue	A2
black/white	OS2
black	O3

	ST D•3••N• ST D•7••N•
cable colour	connection
brown	A1
red	IS1
blue	A2
red/white	OS1
black	O3
purple	IS2
black/white	OS2
purple/white	not connected

	ST D•4••N• ST D•8••N•
cable colour	connection
brown	A1
red	IS1
blue	A2
red/white	OS1
black	O3
purple	IS2
black/white	OS2
purple/white	I3

	ST D•5••N•
cable colour	connection
brown	A1
red	IS1
blue	A2
red/white	OS1
black	O3
purple	IS2
black/white	OS2
purple/white	EDM

Internal connections with connector



	ST D•2••M• ST D•6••M•
pin	connection
1	A1
2	OS1
3	A2
4	OS2
5	O3

	ST D•3••M• ST D•7••M•
pin	connection
1	A1
2	IS1
3	A2
4	OS1
5	O3
6	IS2
7	OS2
8	not connected

	ST D•4••M• ST D•8••M•
pin	connection
1	A1
2	IS1
3	A2
4	OS1
5	O3
6	IS2
7	OS2
8	I3

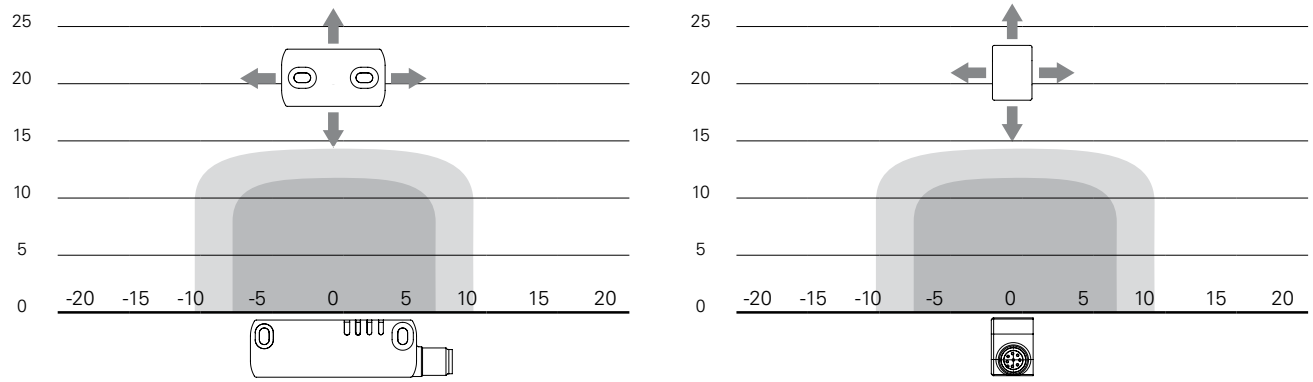
	ST D•5••M•
pin	connection
1	A1
2	IS1
3	A2
4	OS1
5	O3
6	IS2
7	OS2
8	EDM

Legend

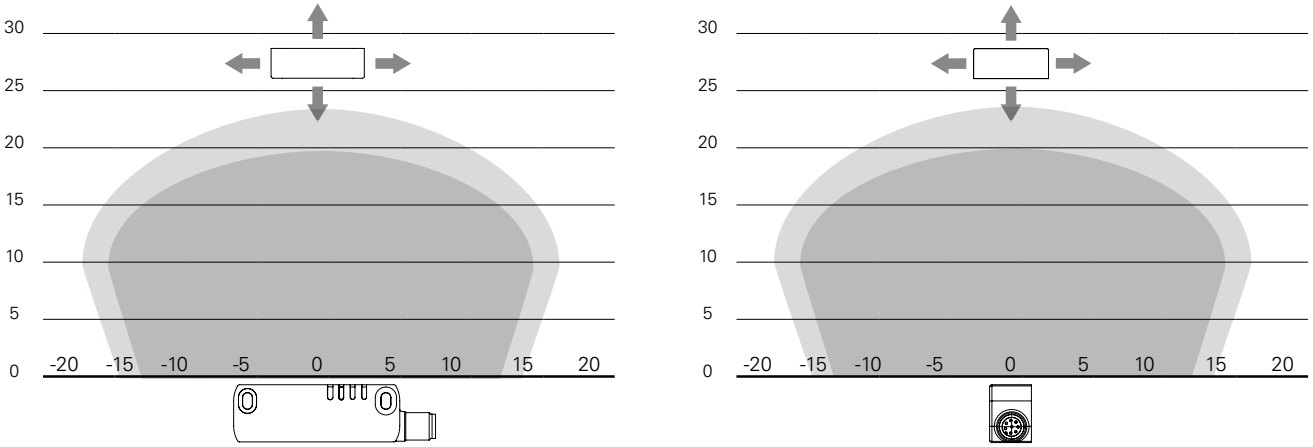
A1-A2	supply	OS1-OS2	safety outputs	I3	programming input
IS1-IS2	safety inputs	O3	signalling output	EDM	input for monitoring of NC contacts of the contactors

Sockets See page 287 - General Catalogue Safety 2015/16

Operating distances actuator SM D•T



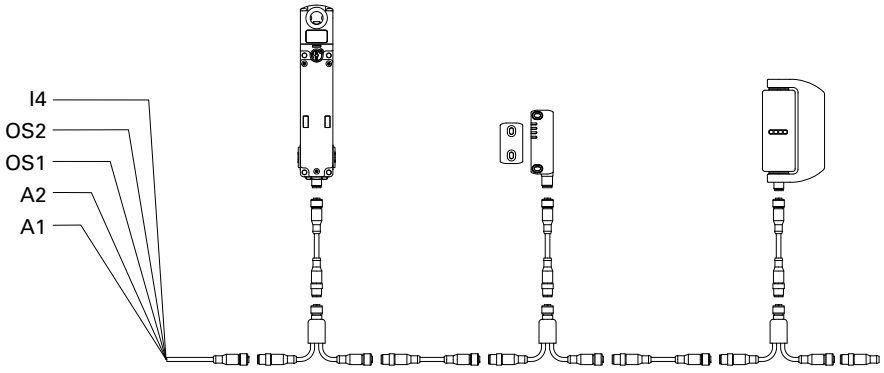
Operating distances actuator SM E•T



Legend:
Rated operating distance s_n (mm)
Rated release distance s_{or} (mm)
Note: The drawing of the activation areas is indicative.

Series connection

To simplify serial connections, a series of M12 connectors are available that allow complete wiring.
This solution significantly reduces installation times, whilst maintaining the maximum PL e and SIL 3 safety levels.
For further information see page 290 - General Catalogue Safety 2015/16.



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HMI

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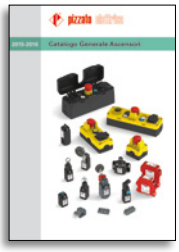
Safety



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