AUTONOMOUS Safety Sensor

P3S/P4S

Standard	EN 13849-1	EN 954-1	EN 61508
P3S	PL:d	Category 3	SIL2
P4S	PL:e	Category 4	SIL3

❑ **Autonomous safety sensor which can be directly integrated in a security chain by ensuring the monitoring of mobile guards parts (sliding, swivelling or removable). The control housing or external surveillance module is removed.**

❑ Entirely electronic with high coding level (inviolability).
Self-protected static outputs (short-circuit of the load and temperature).
Virtually unlimited life time (very high MTTFd).

❑ Dynamic self-control system by 2 internal microprocessors with permanent scan of each status, including any opening devices that may stay closed for a long time. 1oo2D structure.

❑ **P3S version** with redundancy and internal monitoring for using in category 3 according EN 13849-1. It is possible to connect up to 32 sensors in series.

❑ **P4S version** with redundancy and internal and external surveillance of external contactors with EDM (External Devices Monitoring) feedback loop for using in category 4 according EN 13849-1. Status output warning any system defection.

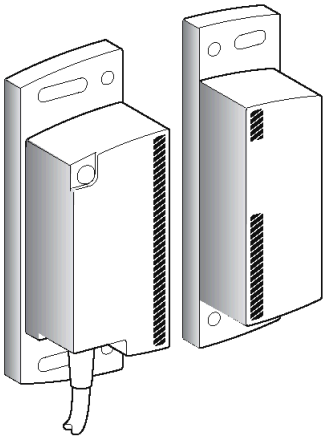
❑ 9 different direction of approaching between the sensor and the coded magnet. Important lateral movement tolerated. Important detection distances and configurable on request.

❑ Very solid IP67 plastic housing and high-pressure washing resistance (IP69K). Cable outputs (standard 2, 5 or 10 meters) or M12 connectors with high resistance to external attacks (cutting oils, ...).

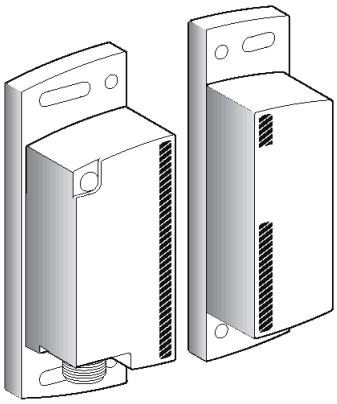
❑ Visualization by multicolor LED indicating the product status and the possible defects.

❑ Compliance with standars IEC 61508, EN 62061(SIL3), EN13849-1 (category 3 and 4), EN1088/ISO14119, EN/IEC60947-5-1, EN/IEC60947-5-2, EN/IEC60947-5-3.

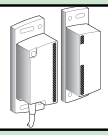
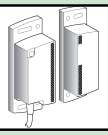
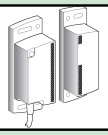
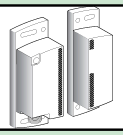
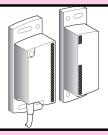
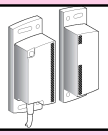
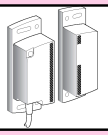
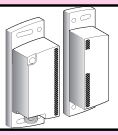
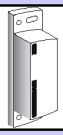
❑ Product certifications : CE, UL/Canada (UL508, CSA 22), TUV for security.



Cable version with
2, 5 or 10 meters of cable



M12 connector version

REFERENCE	P3S79129	P3S79159	P3S79119	P3S791M9	P4S80129	P4S80159	P4S80119	P4S801M9	P5000309
Housing									
Type	Category 3 according EN13849-1.				Category 4 according EN13849-1.				Actuator
Output type	cable 2 meters	cable 5 meters	cable 10 meters	M12	cable 2 meters	cable 5 meters	cable 10 meters	M12	Actuator
Security output	2 static outputs 24VDC 1,5A				2 static outputs 24VDC 1,5A				Actuator
Alarm output	no output				static output PNP 24VDC 0,5A				Actuator

The reference includes the magnet

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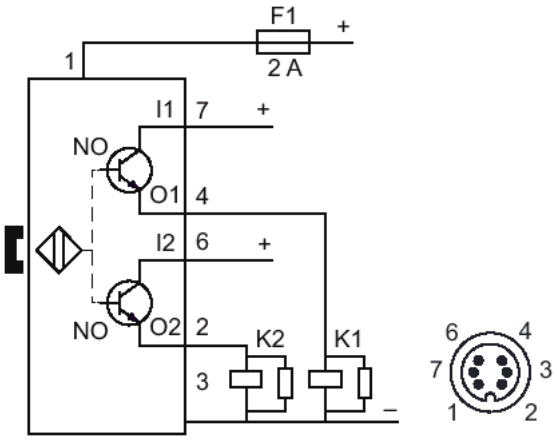
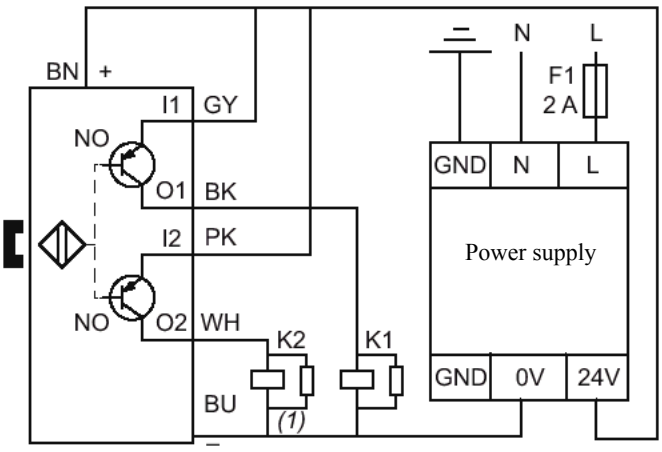
Application category 3 according EN 13849-1

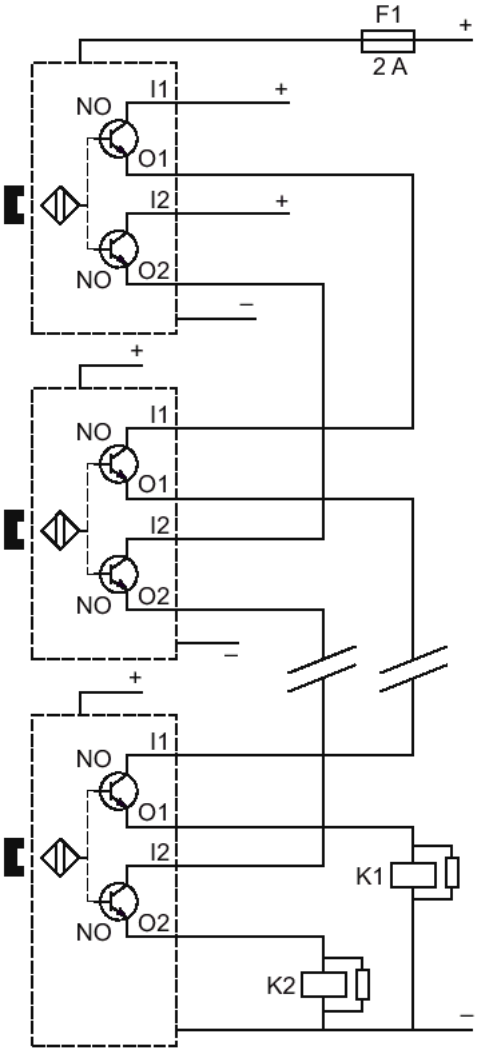
Block diagram P3S version



Block diagram P3S version SIL2



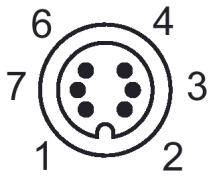
P3S sensors chaining



Use moreover a safety adapted power supply.

Connection cable and connector version outputs (P3S only):

Connection	Cable version	Connector version
+24VDC	Brown : BN	Pin N°1
0VDC	Blue : BU	Pin N°3
I1 (+ output 1)	Grey : GY	Pin N°7
O1 (- output 1)	Black : BK	Pin N°4
I2 (+ output 2)	Pink : PK	Pin N° 6
O2 (- output 2)	White : WH	Pin N°2



- In case of chaining several sensors, consider the products on-state resistance and the cable resistance. The direct drop by sensor will depend on this resistance and the load current. Typically we can connect in series 32 products with 2-meters length cables.

- In case of using standard M12 extension, check carefully the wire colors concordance.

- These sensors can also be associated to safety modules. Check the compatibility.

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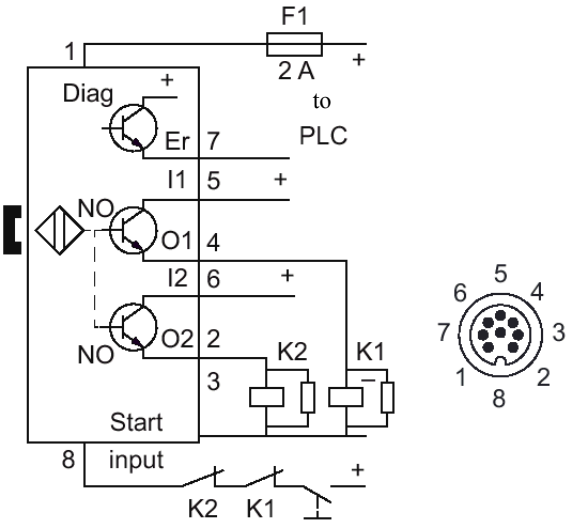
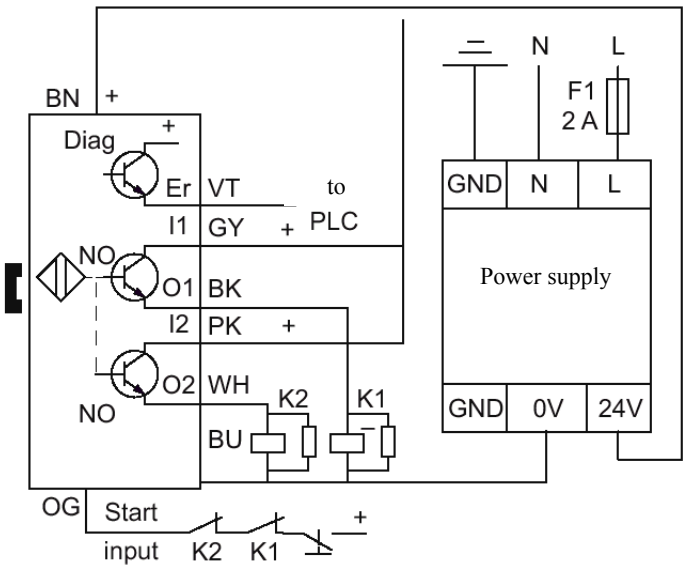
Application category 4 according EN 13849-1

Block diagram P4S version



Block diagram P4S version SIL3



Use moreover a safety adapted power supply.
External contactors K1 and K2 must be mechanically linked.

The dynamic starting loop (EDM : START INPUT) must imperatively be linked.

STATUS Output : Er : Closed = ON when all is OK
Opened = OFF when defect

Connection cable outputs and connector version (P4S only):

Connection	Cable version	Connector version
+24VDC	Brown : BN	Pin N°1
0VDC	Blue : BU	Pin N°3
I1 (+ output 1)	Grey : GY	Pin N°5
O1 (- output 1)	Black : BK	Pin N°4
I2 (+ output 2)	Pink : PK	Pin N° 6
O2 (- output 2)	White : WH	Pin N°2
Er (Status output)	Violet : VT	Pin N°7
EDM (Start input)	Orange : OG	Pin N°8

- In case of using standard M12 extension, check carefully the wire colors concordance.

Specifications			
Parameter	**Symbol**	**Typ**	**Unit**
Rated operating characteristics	Ub	DC 24V +10% -20%	V
Consumption current	Ie	40	mA
Rated voltage isulation	Ui	36	V
Rated voltage withstand shocks according EN60947-5-1	Uimp	2,5	KV
Integrated outputs protection		protection against overload and short-circuit	
Security outputs (2 outputs)		2 static selfprotected outputs type PNP normally opened if no actuator 24VDC 1,5A (2A up to 60°C)	
Security ouputs on-state resistance		ON = 340mOhms + 90mOhms / meter of cable Connector version : add 5 mOhms per pin	
Outputs voltage drop (with 2 meters of cable)		I= 0,1A ==> 0,08V I=0,5A ==>0,4V I= 0,1A ==> 0,08V I=0,5A ==>0,4V	
Alarm output only on P4S version		1 static selfprotected output type PNP normally closed if no defect 24VDC 0,5A	
Signalling		LED green/red/orange fixed or flashing	
Wiring P3S cable output (IEC60947-5-2-A3 and IEC61076)		6x 0,25mm^2 , length 2, 5 or 10 meters depending on version. Cable dimension 6,1+/-0,3mm	
Wiring P3S connector (IEC60947-5-2-A3 and IEC61076)		connector M12 6 points	
Wiring P4S cable output (IEC60947-5-2-A3 and IEC61076)		8x 0,25mm^2 , length 2, 5 or 10 meters depending on version. Cable dimension 6,1+/-0,3mm	
Wiring P3S connector (IEC60947-5-2-A3 and IEC61076)		connector M12 8 points	
Cable resistance		90mohms per meter for one wire	
Max using frequency		3 Hz	Hz
Delay actuation		100	ms
Discordance time (simultaneous closing of the 2 redundant channels and contactors feedback loop for P4S version)		2	s
Operating temperature		-25....+70°C	°C
Storage temperature		-40....+85°C	°C
Resistance vibration according IEC60068-2-6		10gn (10.....150hz)	
Schocks according IEC60068-2-7		30gn,11ms	
Pollution degree according IEC/EN60947-5-1		3	
Reproducibility		<10%	
Hysteresis		<20%	
Protection againts electric shock		class III according IEC60536	
Isulation resistance		>10^{E9}	
Material		Housing : thermoplastic (PBT) Cables : reinforced PVC	
Reliability features		MTTFd = 2182 years DC = High CCF >80 PFH = 3,94^{E-09} / PFD = 1,15^{E-05} / SFF=92,5% / HFT=1	
Weight (sensor + actuator)		Connector version : 215g With 2 cable meters : 320g / With 5 cable meters : 480g / With 10 cable meters : 745g	

LED Operation

LED status		Meaning	Maintenance
LED switched off	○	no supply (or LED out of order)	check power supply
LED fixed orange	●	Unsufficient supply voltage	check power supply
LED green flasing	✳	Stand-off state - no presence of transmitter	normal = OK
LED fixed green	●	On state	normal = OK
Fixed red / orange flashing	✳	Alignment defect with problem discrepancy. Rearm by taking away the actuator.	Sensor alignment
Fixed red	●	Major defect. Rearm by switching the supply off.	Check the installation

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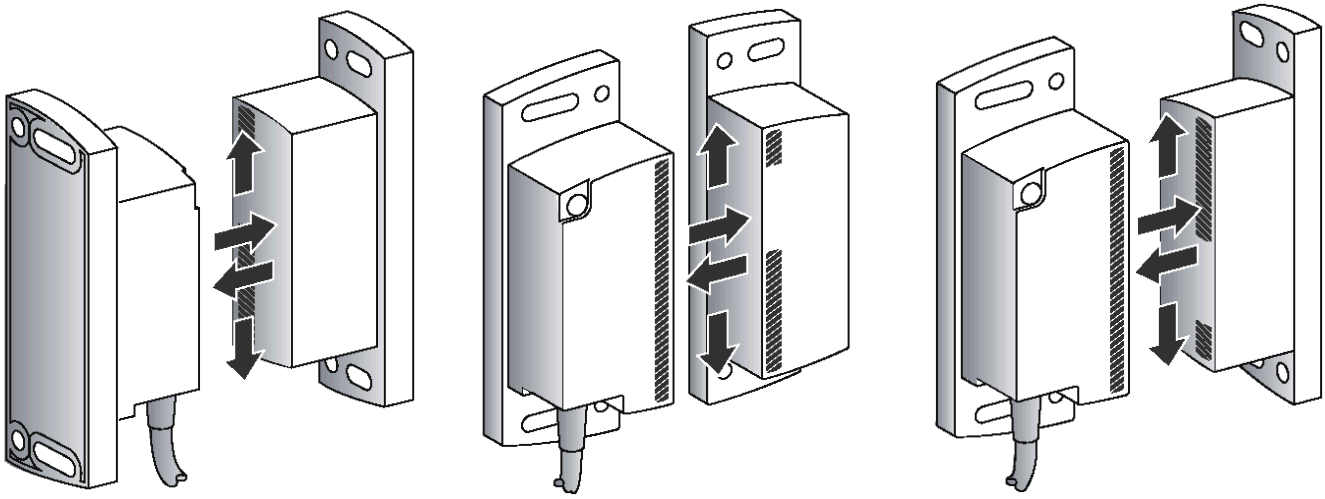
Directions of approach (sensor /actuator): 9 directions



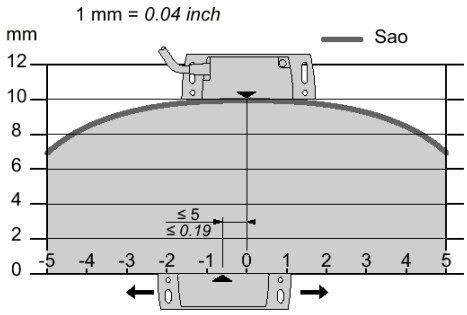
Face to face | Side by side | 90°

Distance of approach and output status :

Operating distance : Sao = 10mm (*)
Release distance : Sar = 20mm (*)
Approach speed : 0,01m/s mini

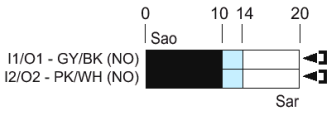
(*) Other distances configurable on request

Lareral movement

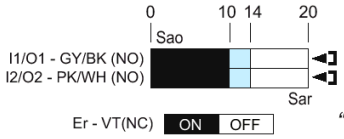


Outputs status

P3S Version



P4S Version



"OFF" = Error

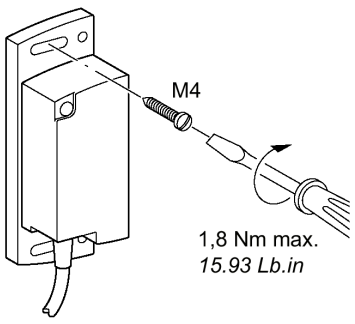
Closed output
Opened ouput
Transient

Sao: Working scope provided
Sar : Triggering scope provided
Selon EN/IEC 60947-5-3

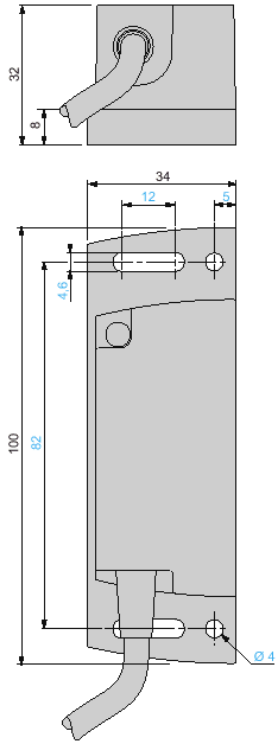
Assembly:

Rivet mounting or one-way M4 screw
(tightening torque 1,8Nm max).

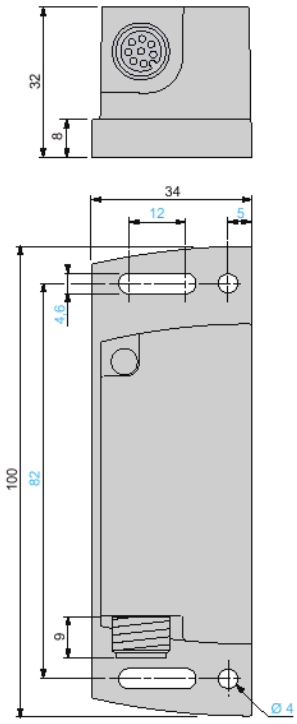
Make sure the disassembly cannot be done easily.



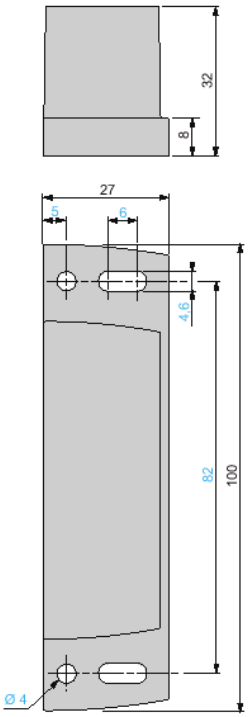
Dimensions (mm):



Sensor cable output



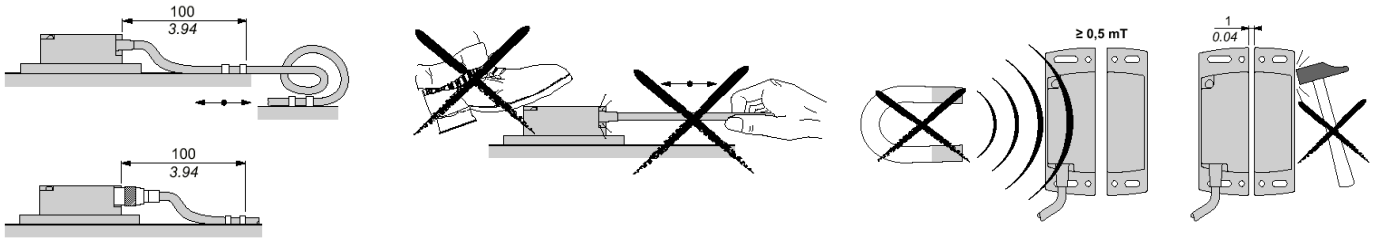
Sensor connector output



Actuator

PRECAUTIONS:

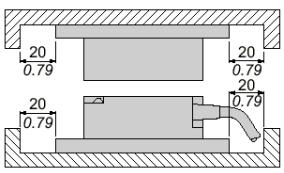
Cable protection:

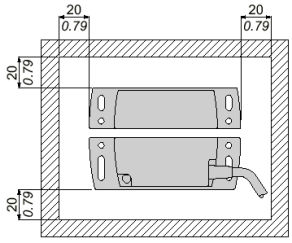


Avoid the too much external magnetic fields.

Mounting upon ferromagnetic support:

With these sensors a magnetic hold is not necessary, but putting them in a ferromagnetic environment may decrease the detection distances. We advise minimum distances.





Maintenance :

The reliability of these entirely electronic sensors is important. The selfcontrol is automatically secured by the product.
Check periodically the good working of the LED (green when all is OK).
Check the fasteners and remove the metal shavings.
Watch its all-round good working and replace it in case of degradation.
Switch off the power supply before working on the sensor.
Only qualified people must perform the installation, and the maintenance.

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