PSEN cs6.11 M12/8

▶ PSEN sensor technology

PILZ

THE SPIRIT OF SAFETY

Contents

Introduction

Validity of documentation

This documentation is valid for the product PSEN cs6.11 M12/8 from Version 2.0.

This operating manual explains the function and operation, describes the installation and provides guidelines on how to connect the product.

Using the documentation

This document is intended for instruction. Only install and commission the product if you have read and understood this document. The document should be retained for future reference.

Definition of symbols

Information that is particularly important is identified as follows:

DANGER!

This warning must be heeded! It warns of a hazardous situation that poses an immediate threat of serious injury and death and indicates preventive measures that can be taken.

WARNING!

This warning must be heeded! It warns of a hazardous situation that could lead to serious injury and death and indicates preventive measures that can be taken.

CAUTION!

This refers to a hazard that can lead to a less serious or minor injury plus material damage, and also provides information on preventive measures that can be taken.

NOTICE

This describes a situation in which the product or devices could be damaged and also provides information on preventive measures that can be taken. It also highlights areas within the text that are of particular importance.

> **INFORMATION**
>
> This gives advice on applications and provides information on special features.

Safety

Intended use

The safety functions of the safety switch are:

▸ Safe shutdown of safety outputs when the actuator is removed beyond the assured release distance s_{ar} or when the actuator is not detected

▸ Remain shut down safely after the actuator has been removed

The safety switch meets the requirements in accordance with:

▸ EN 60947-5-3: PDDB with the actuator PSEN cs6.11 M12

▸ EN 62061: SIL CL 3

▸ EN ISO 13849-1: PL e (Cat. 4)

▸ EN ISO 14119: Coding level High, type 4

The safety switch may only be used with the corresponding actuator PSEN cs6.11 M12.

The safety level PL e (Cat. 4)/SIL CL 3 is only achieved if

▸ the safety outputs use 2-channel processing.

Improper use

The following is deemed improper use in particular

▸ Any component, technical or electrical modification to the product,

▸ Use of the product outside the areas described in this operating manual,

▸ Use of the product outside the technical details (see Technical details [📖 33]).

> **NOTICE**
>
> **EMC-compliant electrical installation**
>
> The product is designed for use in an industrial environment. The product may cause interference if installed in other environments. If installed in other environments, measures should be taken to comply with the applicable standards and directives for the respective installation site with regard to interference.

Safety regulations

Safety assessment

Before using a device, a safety assessment in accordance with the Machinery Directive is required.

The product as an individual component fulfils the functional safety requirements in accordance with EN ISO 13849 and EN 62061. However, this does not guarantee the functional safety of the overall plant/machine. To achieve the relevant safety level of the overall plant/machine's required safety functions, each safety function needs to be considered separately.

Additional documents that apply

Please read and take note of the following documents.

Only for use of the Safety Device Diagnostics (SDD):

▶ Fieldbus module operating manual, for example SDD ES PROFINET

▶ System description "Safety Device Diagnostics"

For the use of passive junctions:

▶ Operating manual of a passive junction, for example:

    – PSEN ix2 F4 code

    – PSEN ix2 F8 code

    – PDP67 F 4 code

    – PSEN Y junction M12 sensor

    – PSEN Y junction M12 cable

You will need to be conversant with the information in these documents in order to fully understand this operating manual.

Use of qualified personnel

The products may only be assembled, installed, programmed, commissioned, operated, maintained and decommissioned by persons who are competent to do so.

A competent person is a qualified and knowledgeable person who, because of their training, experience and current professional activity, has the specialist knowledge required. To be able to inspect, assess and operate devices, systems and machines, the person has to be informed of the state of the art and the applicable national, European and international laws, directives and standards.

It is the company's responsibility only to employ personnel who

▶ Are familiar with the basic regulations concerning health and safety / accident prevention,

▶ Have read and understood the information provided in the section entitled Safety

▶ Have a good knowledge of the generic and specialist standards applicable to the specific application.

Warranty and liability

All claims to warranty and liability will be rendered invalid if

▸ The product was used contrary to the purpose for which it is intended,

▸ Damage can be attributed to not having followed the guidelines in the manual,

▸ Operating personnel are not suitably qualified,

▸ Any type of modification has been made (e.g. exchanging components on the PCB boards, soldering work etc.).

Disposal

▸ In safety-related applications, please comply with the mission time T_M in the safety-related characteristic data.

▸ When decommissioning, please comply with local regulations regarding the disposal of electronic devices (e.g. Electrical and Electronic Equipment Act).

For your safety

> **DANGER!**
>
> **Risk of malfunction of pacemakers or implanted defibrillators**
>
> The magnetic field of the safety switch may cause malfunctions of pacemakers or implanted defibrillators.
>
> People with a pacemaker or implanted defibrillators must maintain a distance of at least 100 mm to the safety switch and actuator.

> **WARNING!**
>
> **Loss of safety function due to manipulation of the interlocking device**
>
> Manipulation of the interlocking device may lead to serious injury and death.
>
> – You should prevent any possibility of the interlocking device being manipulated through the use of a spare actuator.
>
> – Keep the substitute actuator in a safe place and protect it from unauthorised access.
>
> – If substitute actuators are used, these must be installed as described under Installation [📖 26].
>
> – If the original actuators are replaced with substitute actuators, the original actuators must be destroyed before disposal.

▸ Do not remove the connector's protective cap until you are just about to connect the unit. This will prevent potential contamination.

Unit features

▸ Transponder technology for presence detection

▸ Pilz coding type: fully coded

▸ Dual-channel operation

▸ 2 safety inputs for series connection of multiple safety switches

▸ 2 safety outputs

▸ Safety Device Diagnostics (SDD)

Safety Device Diagnostics can be used to poll sensor information, to perform actions and to read configuration parameters

▸ Diagnostic input for Y1 for Safety Device Diagnostics (SDD)

▸ Signal output/diagnostic output Y32 for Safety Device Diagnostics

▸ Magnetic latching with permanent magnet, (holding force 30 N)

▸ LED display for:

   – State of actuator detection

   – State of the inputs

   – Supply voltage/fault

▸ 1 actuation direction with 3 approach directions (see Explanation of markings [📖 12])

   – Square marking

The guaranteed safe operating distances for the specified selections only apply when the actuator approaches the switch vertically. With other approach directions, the operating distances may partly be considerably larger.

Function description

The safety outputs may have a high or low signal, depending on the position of the actuator and the signal status of the safety inputs.

Electrical states of the safety inputs and outputs (when switch is ready for operation: DEVICE LED is green):

Actuator in the response range	Safety input S11	Safety input S21	Safety output 12	Safety output 22	Signal output Y32 (without use of the SDD)
Yes	High	High	High	High	High
Yes	Low	Low	Low	Low	High
No	x	x	Low	Low	Low
Yes	High	Low	High	Low	High
Yes	Low	High	Low	High	High

x: High or low signal

Feasibility monitoring for safety inputs S11 and S21

▸ If one safety input switches from high to low, while the other safety input remains high, an unequal status is displayed: **Input LED has quick yellow flashes and Device LED flashes red**

▸ If this safety input switches back from low to high, while the other safety input remains high, a feasibility error is displayed and a partial operation lock is triggered: **Input LED flashes yellow and Device LED flashes red**

A switch to a high signal will only lead to normal switch operation if both inputs had a low signal. From this moment on, the switch to high may occur (partial operation lock see Error display [📖 30]).
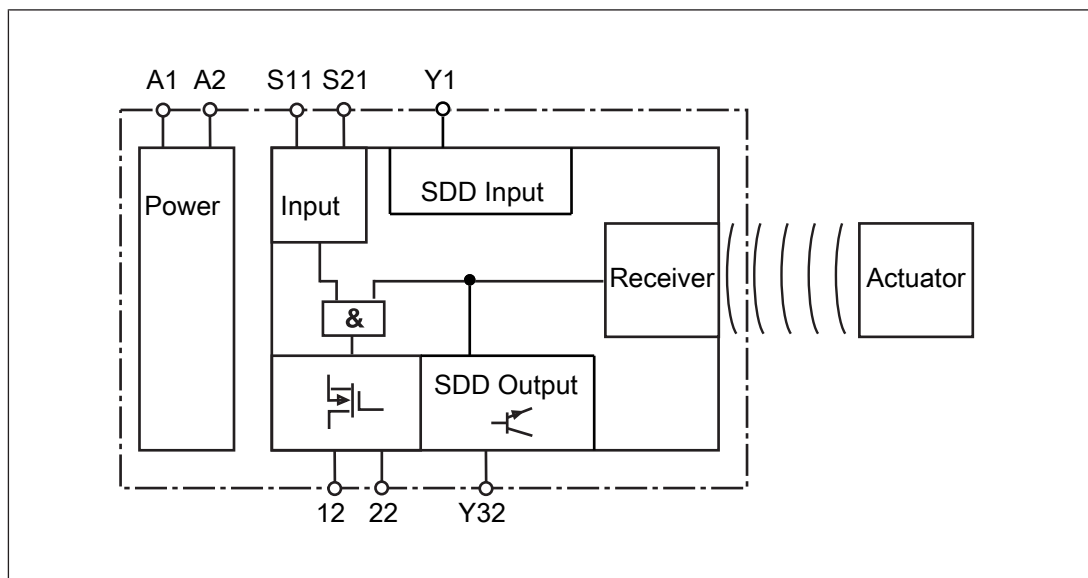
▸ Diagnostic input Y1

If a fieldbus module of the SDD is used, the diagnostic input Y1 is automatically activated and data is read.

If no fieldbus module of the SDD is used, the diagnostic input Y1 is not used.

▸ Signal output/diagnostic output Y32 in SDD mode

If a fieldbus module of the SDD is used, the signal output/diagnostic output Y32 is activated for writing data.

Safety Device Diagnostics

Safety Device Diagnostics is an option that can be selected independently of the safety-related wiring.

When using the Safety Device Diagnostics, up to 16 sensors connected in series can be connected as a subscriber to a fieldbus module.

The communication of the sensors with the fieldbus module is automatically built up again with each new supply of the supply voltage. As a result, a sensor can be exchanged, e.g. when servicing, without the need for special measures.

An exchange can be detected via the fieldbus module e.g. through the serial number.

▶ With Safety Device Diagnostics there are the following diagnostic options for the fieldbus module:

– Poll information of the sensors (examples: what sensor in the series has switched, at what point could there be an open circuit in the series connection)

– Read configuration parameters of the sensor (examples: Number of teach-in processes remaining, serial number of the sensor)

– Perform actions (example: poll updated actuator name)

The results of the sensor diagnostics can be checked already during the installation phase via the display in the fieldbus module, without the need to connect the fieldbus module to the network.

▶ With Safety Device Diagnostics there are the following diagnostic options for the fieldbus module for simple wiring:
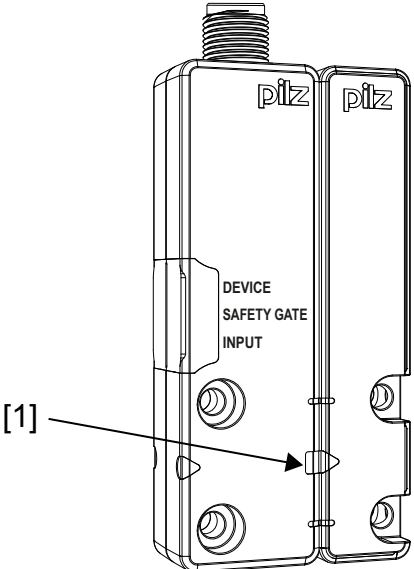
– Information is passed on via the fieldbus module directly to the network

– Mappings of the signal outputs to the sensor are automated by the SDD.

This prevents wiring errors and an expansion or reduction of the sensors is possible without the need to change existing wiring.

– Wiring in accordance with IP20: Rapid installation in the control cabined is enabled.

– Wiring in accordance with IP67: Various passive junctions can be used (see Order references for accessories [📖 38]) to connect several sensors with only one cable from the field in the control cabinet.

Further information on Safety Device Diagnostics can be found in Additional documents that apply [📖 7].

Operating distances

Alignment of the actuator	Operating distances
	[1] Actuator aligned to the square marking on the switch S_{ao} Assured operating distance: 8 mm S_{ar} Assured release distance: 20 mm S_o Typical operating distance: 11 mm S_r Typical release distance: 14 mm
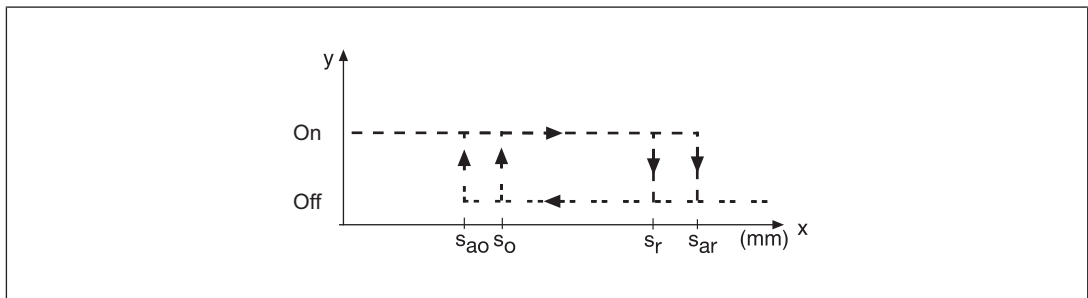
Typical course of change in the holding force as the distance from the switch to the actuator increases with frontal approach

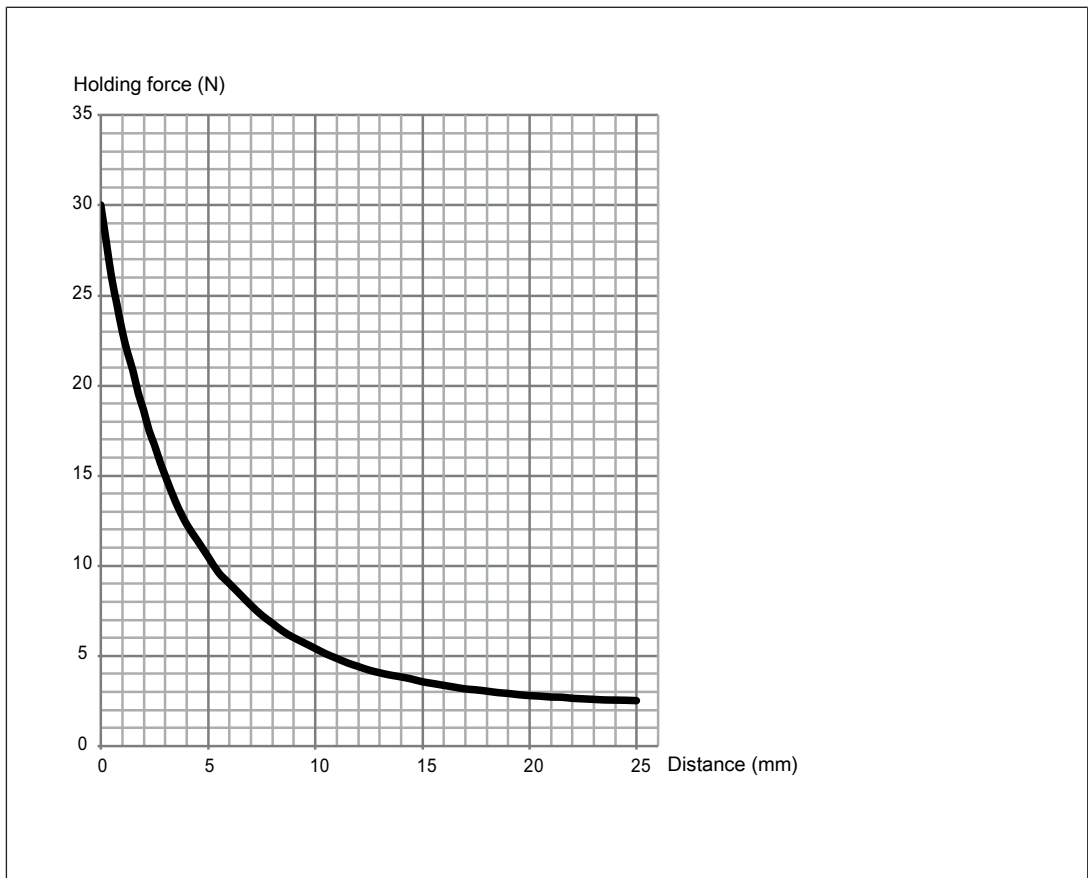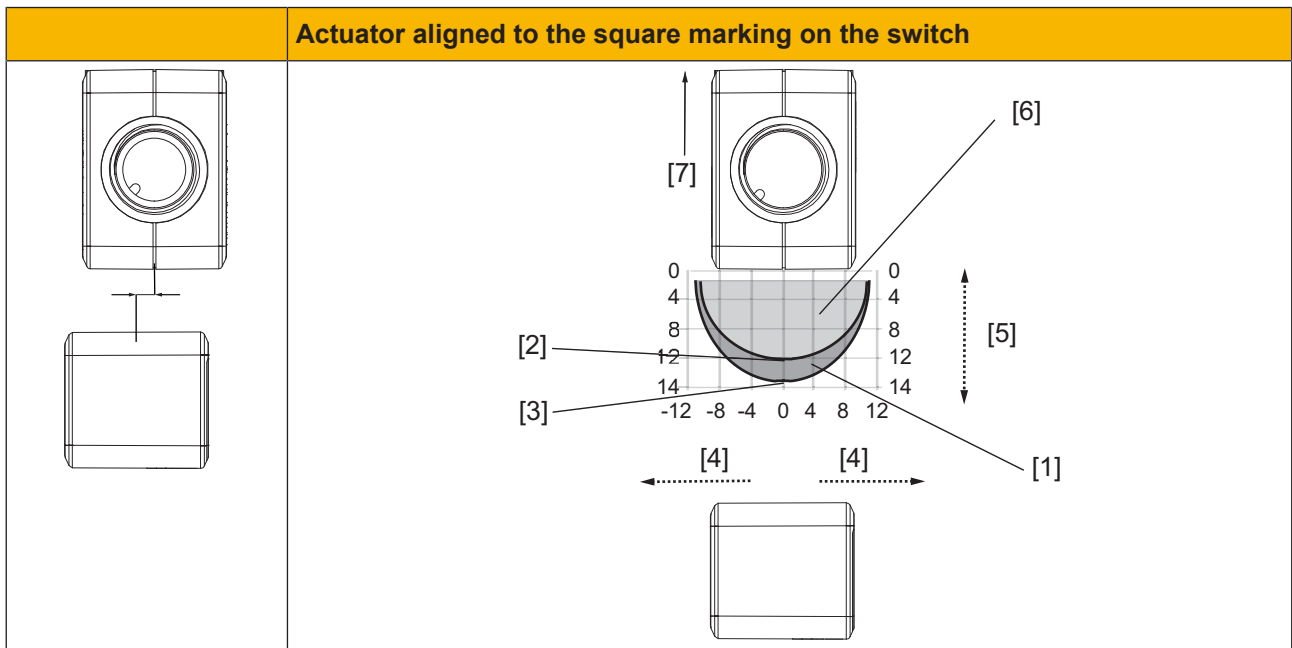Fig.: Change in the holding force for distances from 0-25 mm

Lateral and vertical offset

Lateral offset when aligning to the triangle marking

Actuator aligned to the square marking on the switch

Legend

[1] Hysteresis

[2] Typical operating distance S_O

[3] Typical release distance S_r

[4] Offset in mm

[5] Operating distance in mm

[6] Response range

[7] Status of LED

Lateral offset when aligning to the triangle marking
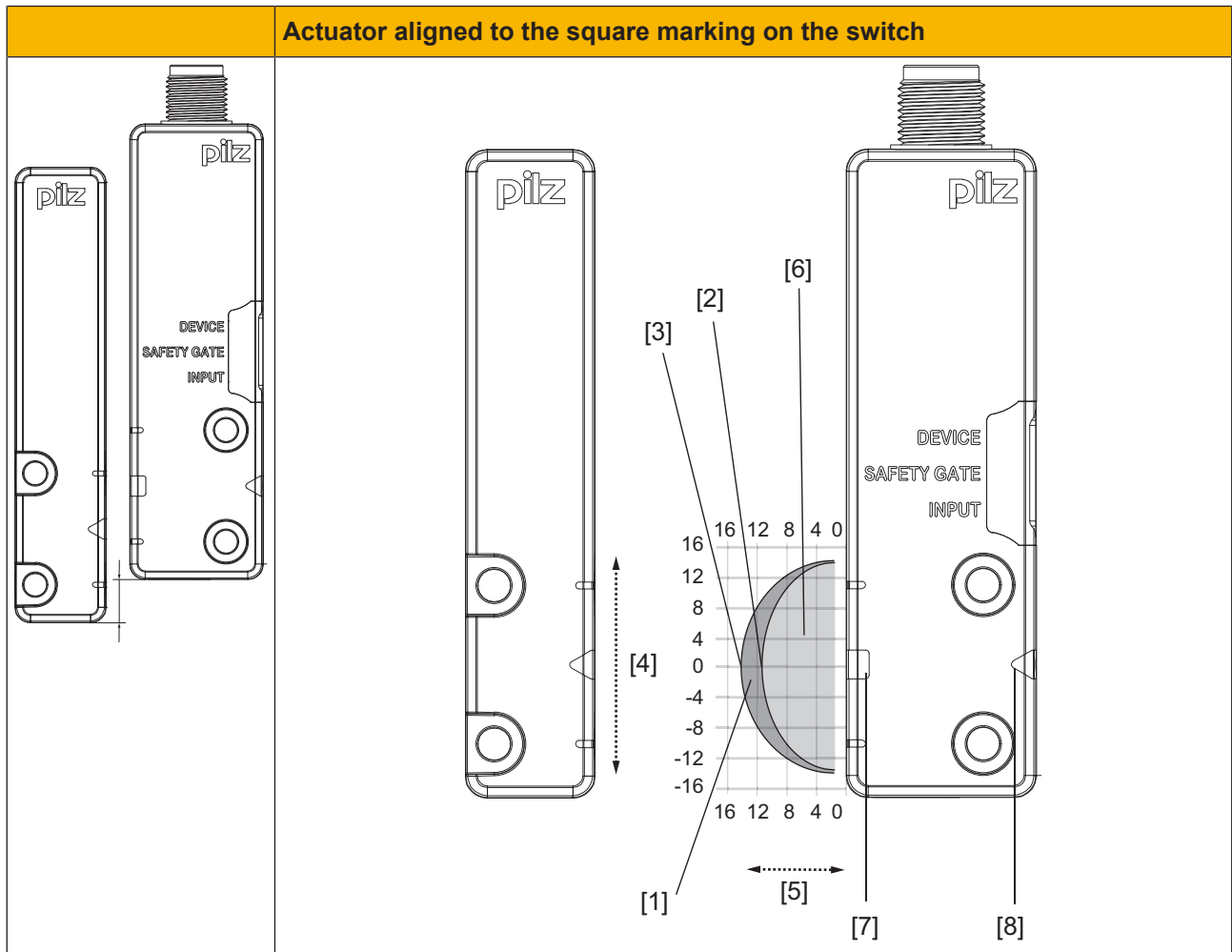
Actuator aligned to the square marking on the switch

16 12 8 4 0

16
12
8
4
0
-4
-8
-12
-16

16 12 8 4 0

[6]
[2]
[3]
[4]
[1]
[5]
[7]
[8]

Legend

[1] Hysteresis

[2] Typical operating distance S_O

[3] Typical release distance S_r

[4] Offset in mm

[5] Operating distance in mm

[6] Response range

[7] Status of LED

[8] Square marking

Wiring

Important information

▸ Information given in the Technical details [📖 33] must be followed.

▸ Switch off the supply voltage before disconnecting the plug-in connection.

▸ Make sure that when connecting or separating the connector the pollution degree 1 or 2 is maintained.

▸ The max. cable length l_{max} in the input circuit is calculated from

  – the max. cable capacitance at the safety outputs (see Technical data [📖 33]).

  – the minimum permitted supply voltage at the safety switch (19.2 V).

▸ The power supply must meet the regulations for extra low voltages with protective electrical separation (SELV, PELV).

▸ The inputs and outputs of the safety switch must have a protective separation to voltages over 60 VDC.

> **INFORMATION**
>
> Only use safety relays with a 24 VDC supply voltage. Safety relays with a wide-range power supply or in AC device versions have internal potential isolation and are not suitable as evaluation devices.

▸ The supply voltage to the safety switch must be protected with a 2 A to 4 A quick-acting fuse.

▸ Ensure the wiring and EMC requirements of EN 60204-1 are met.

▸ When connecting in series, consider the requirements of manipulation protection and the protection against bypassing or from overriding the safety switch (EN ISO 14119).

▸ When the safety inputs of the safety switch are controlled by an upstream device, and they are not wired with 24 V,

  – They must be monitored for shorts across contacts (e.g. by PSEN cs, PSEN ml, PSEN sg or PSEN sl) **or**

  – The faults at the safety inputs that can occur by shorts across contact will have to be excluded by suitable measures (e.g. wiring in accordance with EN 602041).

Pin assignment, connector and cable

5 6　　4 7　8 　3 1　2	8-pin M12 connector
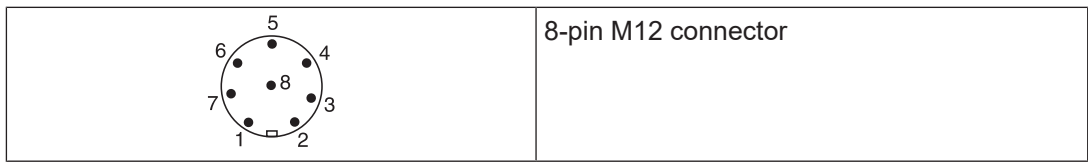
PIN	Connection designation	Function	Wire colour
1	S21	Input, channel 2	white
2	A1	+24 VUB	brown
3	12	Output, channel1	green
4	22	Output, channel2	yellow
5	Y32	Signal output/diagnostic output	grey
6	S11	Input, channel 1	pink
7	A2	0 V UB	blue
8	Y1	Diagnostics input	red

The wire colour also applies for the cable available from Pilz as an accessory.

NOTICE

The inputs S11 and S21 may only be used for the series connection with Pilz sensors.

Connection to evaluation devices

Make sure that the selected evaluation device has the following property:

▶ OSSD signals are evaluated through 2 channels with plausibility monitoring

Note:

▶ Information given in the Technical details [🔖 33] must be followed.

▶ The use of Safety Device Diagnostics is described in the System Description "Safety Device Diagnostics".

CAUTION!

**Do not connect the signal output to 0 V!**

If the signal output Y32 is connected to 0 V, the safety switch may be damaged as a result. Connect the signal output Y32 to a consumer, e.g. to the input on a control system, or leave the signal output unconnected. Also note the max. current (see Technical details [🔖 33]).

Single connection

Connection diagram, single connection without SDD
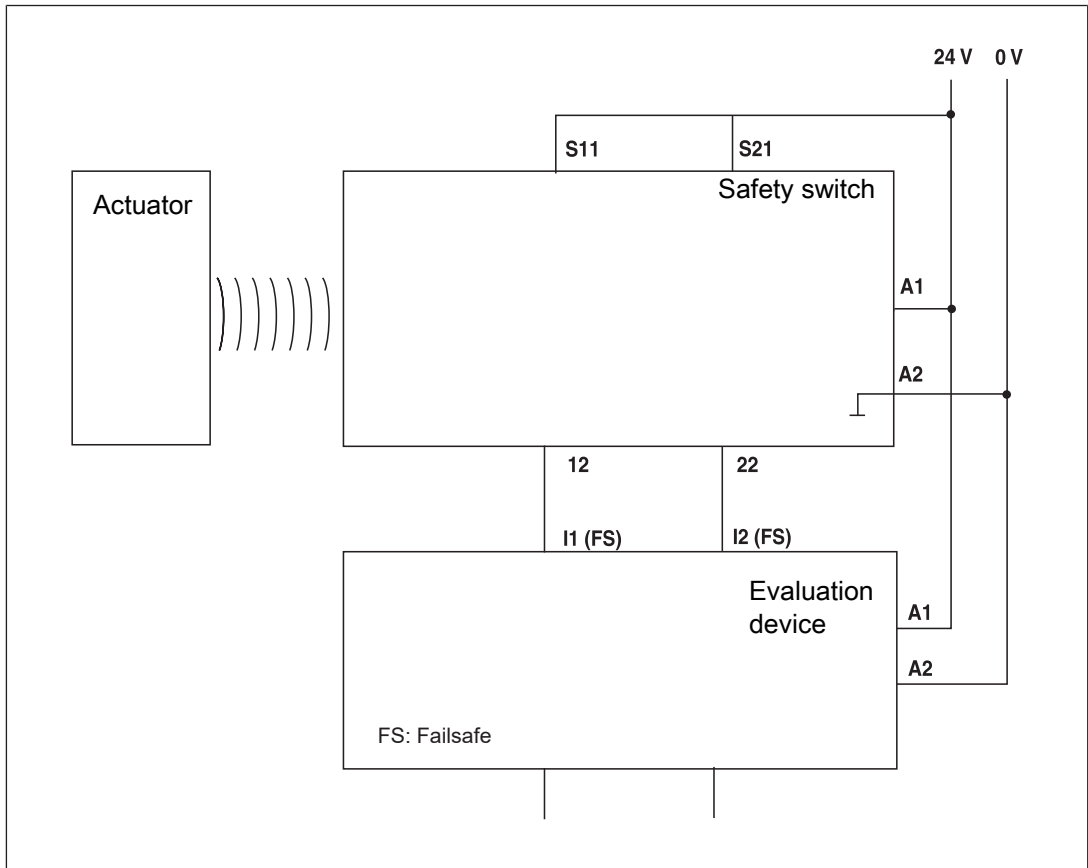
Connection diagram, single connection with SDD
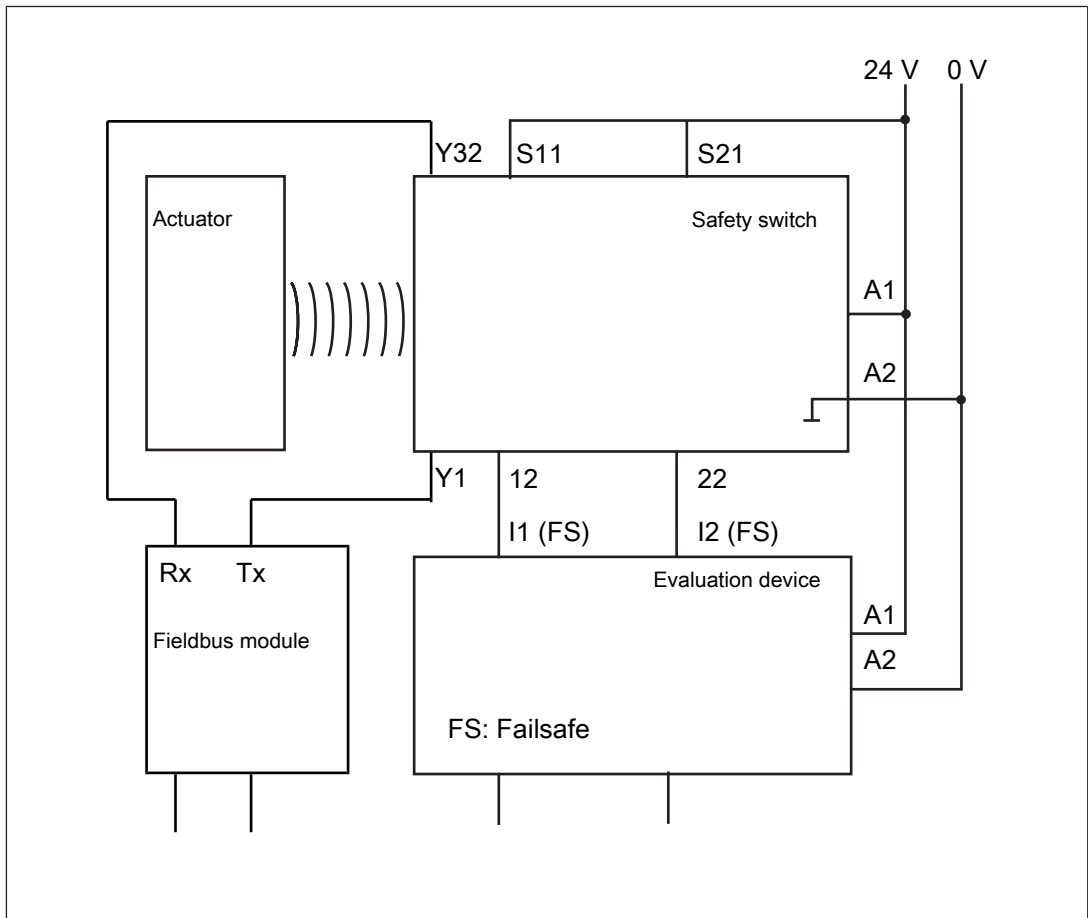
Series connection

The safety sensors PSENcode are also suitable for series connection with other sensors.

The series connection of maximum 32 sensors PSENcs 5.x and PSENcs 6.x is approved for SIL CL 3 without using the SDD.

When using the SDD, the series connection of maximum 16 sensors PSENcs 5.x and PSENcs 6.x is approved

In series connections with use of the SDD, use only use sensors that are suitable for SDD.

In practice, the maximum possible number will be limited by the following parameters, among others:

▸ The required SIL level (e.g. SIL CL 3),

▸ the required performance level (e.g. PL e (Cat. 4)),

▸ the maximum delay or risk time permitted by the application.

Ensure there is sufficient supply voltage, taking inrush currents and fusing into consideration.

⚠	**CAUTION!** **Extension of delay-on de-energisation** When several (n) devices are connected in series, the delay-on de-energisation time adds with the number of interconnected safety switches. The max. delay-on de-energisation is made up of the risk time (see Technical details [📖 33]) + (n-1) x max. delay-on de-energisation of the inputs + max. delay-on de-energisation of the evaluation device

▸ When making series connections using SDD, only use the following passive junctions.

– PSEN ix2 F4 code

– PSEN ix2 F8 code

– PSEN Y junction M8-M12/M12 PIGTAIL

– PSEN Y junction M12-M12/M12 PIGTAIL

– PSEN Y junction M12 SENSOR

– PSEN Y junction M12 cable channel

Function test when safety channels are connected in series

Before commissioning and after each change, check that the safety function is guaranteed when the gates are opened. To do this, open each gate individually and check the status at the inputs on the evaluation device:

▸ Close all the gates.

  There must be high signals at the inputs on the evaluation device (e.g. S11, S21 or I1, I2).

▸ Open one gate; the other gates remain closed.

 There must be low signals at the inputs on the evaluation device (e.g. S11, S21 or I1, I2).

▸ Close the gate again.

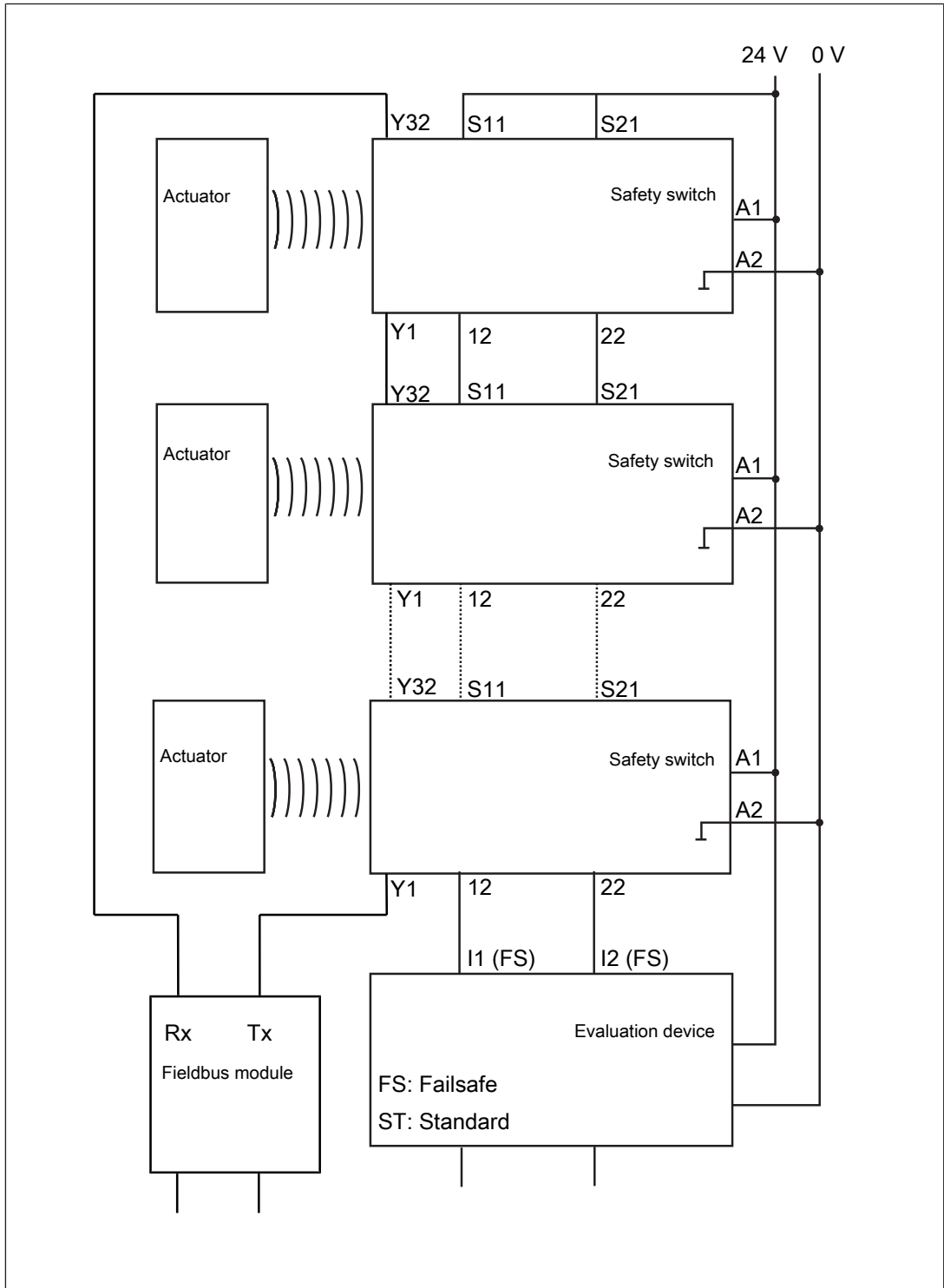 High signals must return at the inputs on the evaluation device (e.g. S11, S21 or I1, I2).

▸ Repeat the test for each gate.

▸ If the input signals do not react as described above, check and rectify the wiring and carry out the test again.

Connection diagram, series connection without SDD
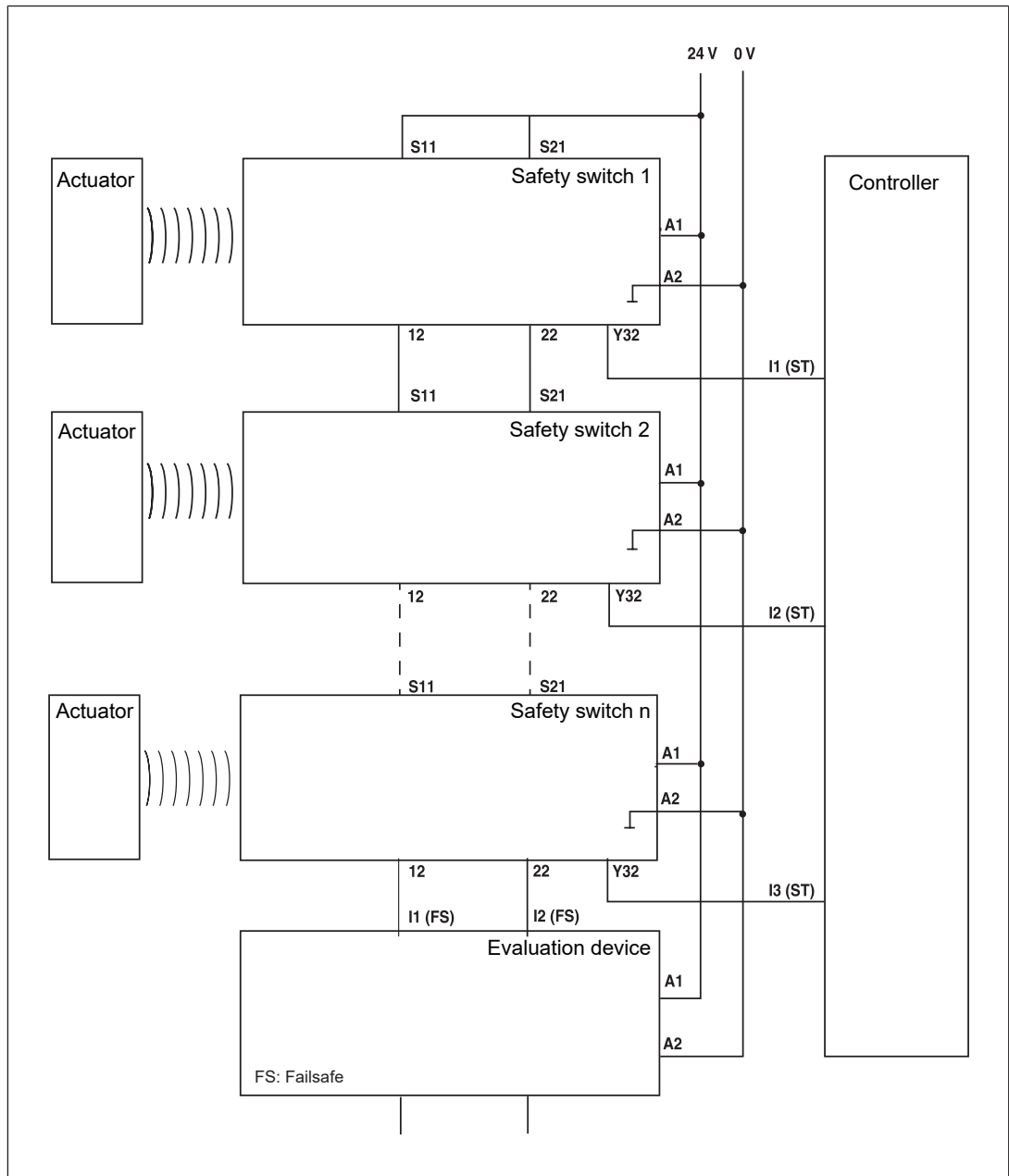
Connection diagram, series connection with SDD

Connection to Pilz evaluation devices

The safety switch PSEN cs6.11 M12/8 can be connected to Pilz evaluation devices, for example.

Suitable Pilz evaluation devices are, for example:

▸ PNOZelog for safety gate monitoring

▸ PNOZpower for safety gate monitoring

▸ PNOZsigma for safety gate monitoring

▸ PNOZ X for safety gate monitoring

▸ PNOZmulti for safety gate monitoring
  Configure the safety switch in the PNOZmulti Configurator with switch type 3.

▸ PSS for safety gate monitoring with standard function block SB064, SB066 or
 FS_Safety Gate

The correct connection to the respective evaluation device is described in the operating manual for the evaluation device. Make sure that the connection is made in accordance with the specifications in the operating manual for the selected evaluation device.

The connections to two evaluation devices are shown on the following pages, by way of example:

▸ PNOZ s3 and

▸ PNOZmulti

| Without SDD | With SDD |

Without SDD	With SDD
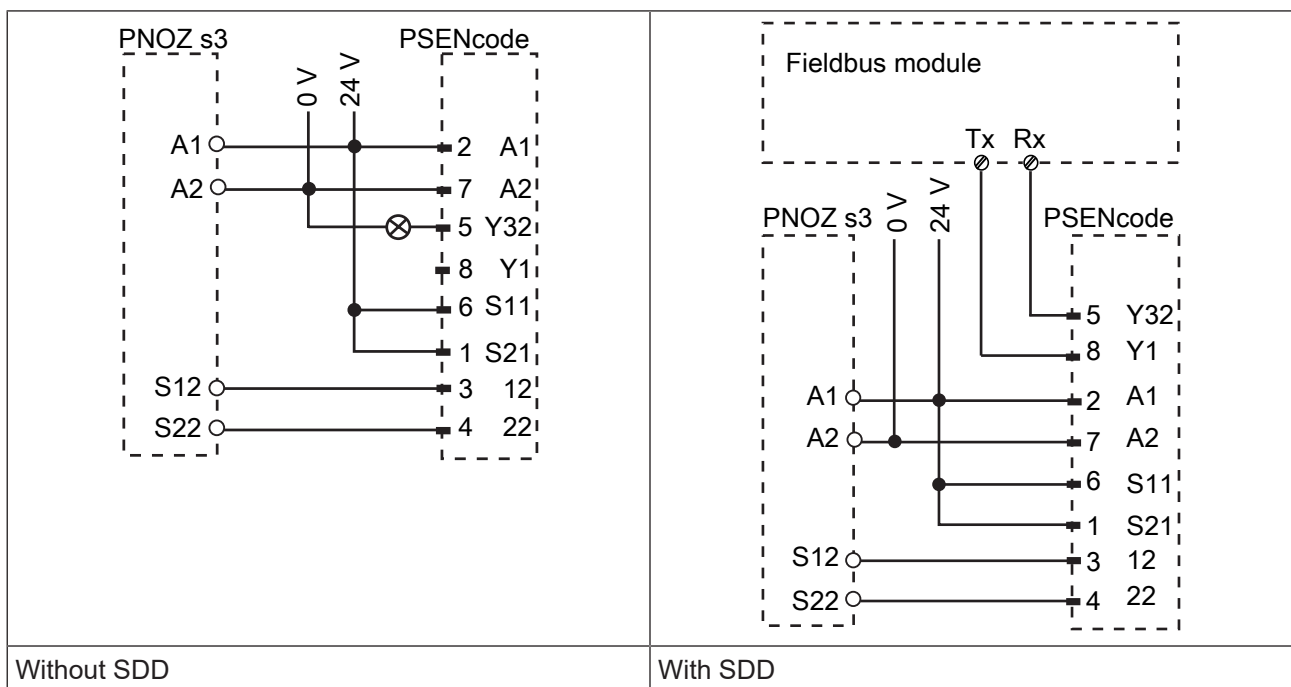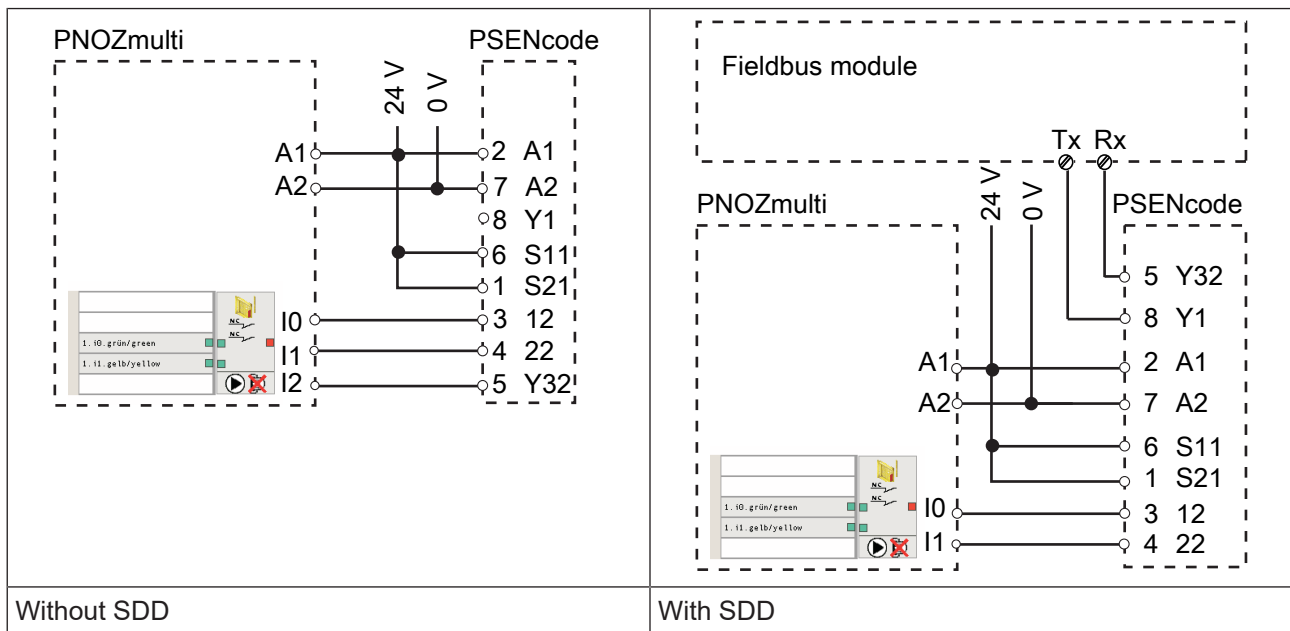
Teaching in the actuator

Teaching in the actuator for the first time:

The first actuator to be detected by the safety switch (see Intended use [📖 6]) is taught in automatically as soon as it is brought into the response range.

To teach in a new actuator:

A maximum of 8 learning procedures are possible.

1. The actuator that is to be taught in must be brought into the safety switch's response range as the only transponder. As soon as the actuator is detected, the "Safety Gate" LED will flash yellow.

2. After 20 s has elapsed, the "Safety Gate" LED turns to quick yellow flashes. Trigger a system reset in the next 120 s by interrupting the power supply.

3. When the supply voltage is switched back on, the learning procedure is complete and the number of permitted additional learning procedures is reduced by 1.

> **NOTICE**
> – The actuator must not be removed during the learning procedure.
> – It is no loner possible to reteach his actuator on the same safety switch.

Installation

> ⚠️ **CAUTION!**
>
> **Potential loss of safety function due to changed device properties**
>
> The unit's properties may be affected if installed in an environment containing electrically or magnetically conductive material.
>
> – Please check the operating distances and the assured release distance.

▸ The safety switch and actuator should be installed opposite each other in parallel.

Make sure that the actuator is aligned to the square marking on the sensor (see Operating distances [📖 12]).

▸ Safety switches and actuators should only be secured using M4 screws with a flat head (e.g. M4 cheese-head or pan head screws).

▸ Torque setting: Please note the information provided under Technical details [📖 33].

▸ The distance between two safety switches must be maintained (see Technical details [📖 33]).

The distance can be undershot in certain application cases (see diagrams).
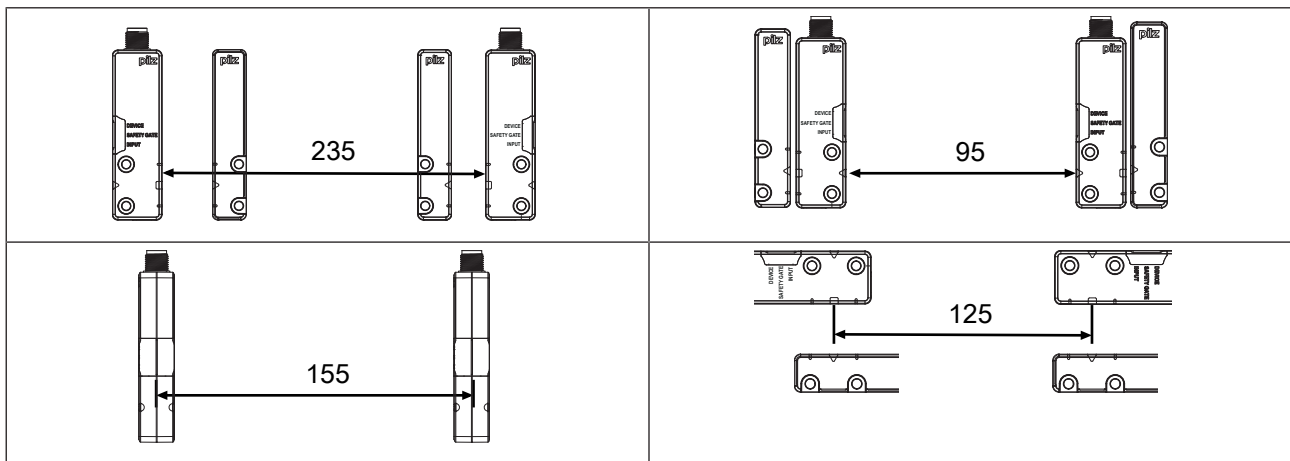
▸ If using angled connector plugs, note the defined angle of the cable routing.

▸ When installing make sure you comply with the requirements of EN ISO 14119.

▸ Make sure that the safety switch and actuator cannot be used as an end stop.

▸ For simpler installation, the mounting brackets (see Order reference for Accessories [📖 38]) can be used.

▸ The actuator should be protected from unauthorised removal and from contamination. Close the mounting holes using the seals provided (see diagrams). The use of seals should be regarded as equivalent to using permanent fastenings in accordance with EN ISO 14119.
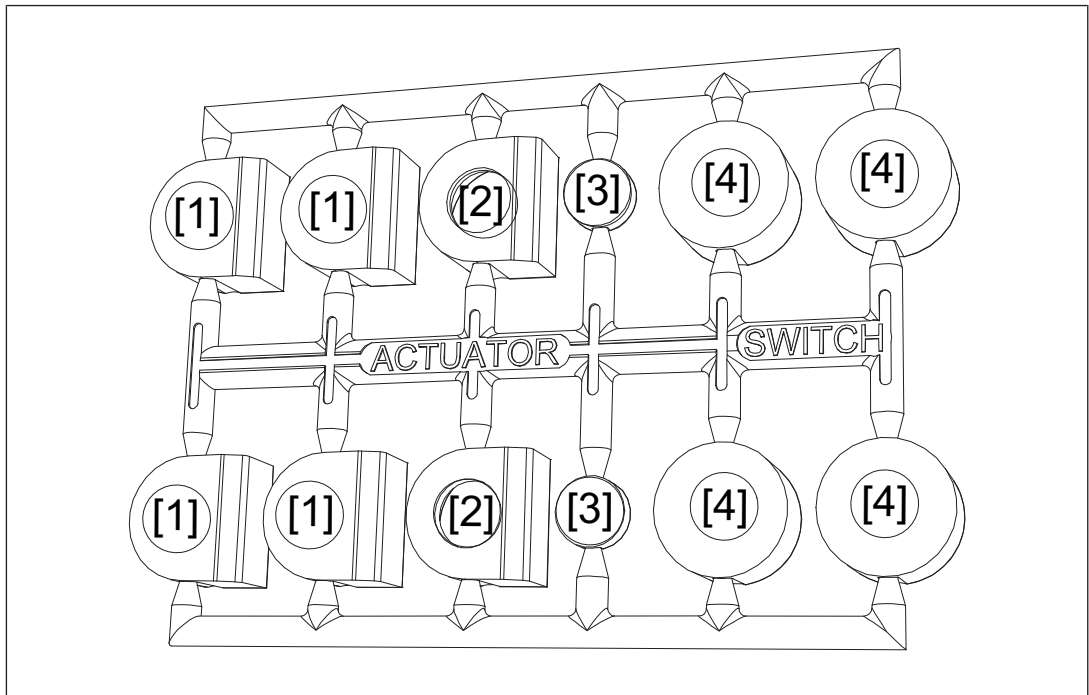
Fig.: Seals

[1]: 4 seals for actuators

[2]: 2 seals for actuators

[3]: 2 seals for actuators

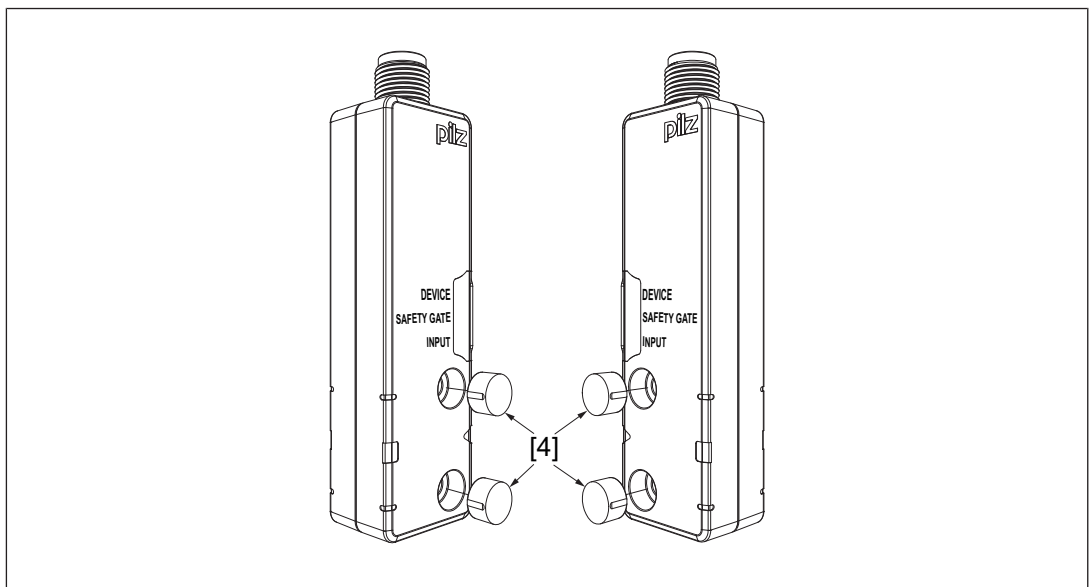[4]: 2 seals for switches and 2 seals for actuators
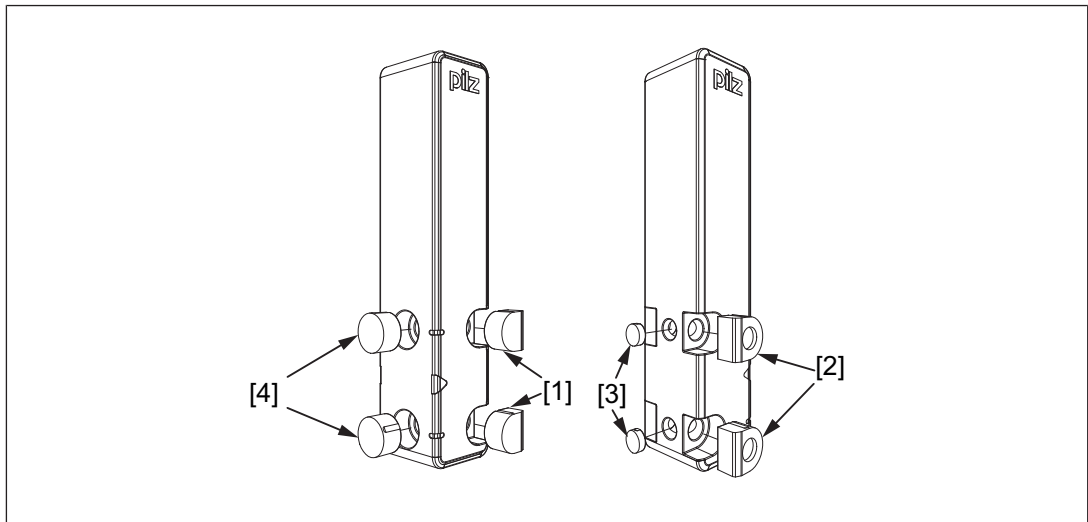

Fig.: Applying the screw cover [4] on the switch

Fig.: Applying the screw covers [1] and [3] on the actuator

Procedure:

1. Drill holes (for M4 screws) in the mounting surface to secure the actuator and sensor (see Dimensions in mm [📖 31]).

2. Use a screw to fix the sensor to the mounting surface.

   Make sure that the square marking on the sensor can be operated using the actuator from the right side.

3. Do not fully tighten the second screw on the safety switch.

4. Use a screw to fix the actuator to the mounting surface.

   Make sure that the actuator with the triangle marking points towards the triangle marking on the sensor.

5. Do not fully tighten the second screw on the actuator.

6. Align the safety switch and tighten the screws.

7. Align the actuator and tighten the screws.

Use in operating heights higher than 2000 m above sea level

When using the PSEN cs6.11 M12/8 note the reduced max. ambient temperature of +60 °C at a height of 2000 m to 4000 m.

Adjustment

▸ The stated operating distances (see Technical details [📖 33]) only apply when the safety switch and actuator are installed facing each other in parallel. Operating distances may deviate if other arrangements are used.

▸ Note the maximum permitted lateral and vertical offset (see Operating distances [📖 12] and Lateral and vertical offset [📖 14]).

Operation

> **NOTICE**
>
> The safety function should be checked after initial commissioning and each time the plant/machine is changed. The safety functions may only be checked by qualified personnel.

Status indicators:

Legend:

●	LED off
☼	LED on
◐	LED flashes (500 ms on, 500 ms off)
◐⚡	LED flashes quickly (50 ms on, 950 ms off)
◐⚡⚡	LED flashes very quickly (30 ms on, 470 ms off)

Normal mode

LED status		Switch status
Device	☼ Green	Ready for operation
Safety Gate	☼ yellow	Actuator is within the response range
	● Off	Actuator is outside the response range
Input	☼ yellow	Both safety inputs are high
	● Off	Both safety inputs are low

LED status, teach-in actuator

LED status			Switch status	Remedy / measure
Device	**Safety Gate**	**Input**		
☼ Green	◐ yellow	Display not definitive	Teaching actuator. Duration approx. 20 seconds	-
☼ Green	◐⚡⚡ yellow	Display not definitive	Actuator teach-in complete.	Switch voltage off and then on again.

Error display

LED status			Switch status	Remedy / measure
Device	**Safety Gate**	**Input**		
Red	● off	● off	Internal error on switch	Change the switch.
Red	Yellow	Yellow	Supply voltage is outside the tolerance range	Ensure the voltage supply corresponds to the Technical details [33].
Yellow	Display not definitive	Display not definitive	Supply voltage is at the limit of the tolerance range	Ensure the voltage supply corresponds to the Technical details [33].
Red	Display of last status	Display of last status	Outputs in fault condition	Check the outputs and switch the voltage off and then on again.
Green	Yellow	Display not definitive	Wrong actuator	Use the actuator that has been taught-in or teach in a new actuator (see Teaching in the actuator [25]).
● off	Yellow	Yellow	Switch doesn't start	Change the switch.

Dimensions in mm

Safety switch

Actuator
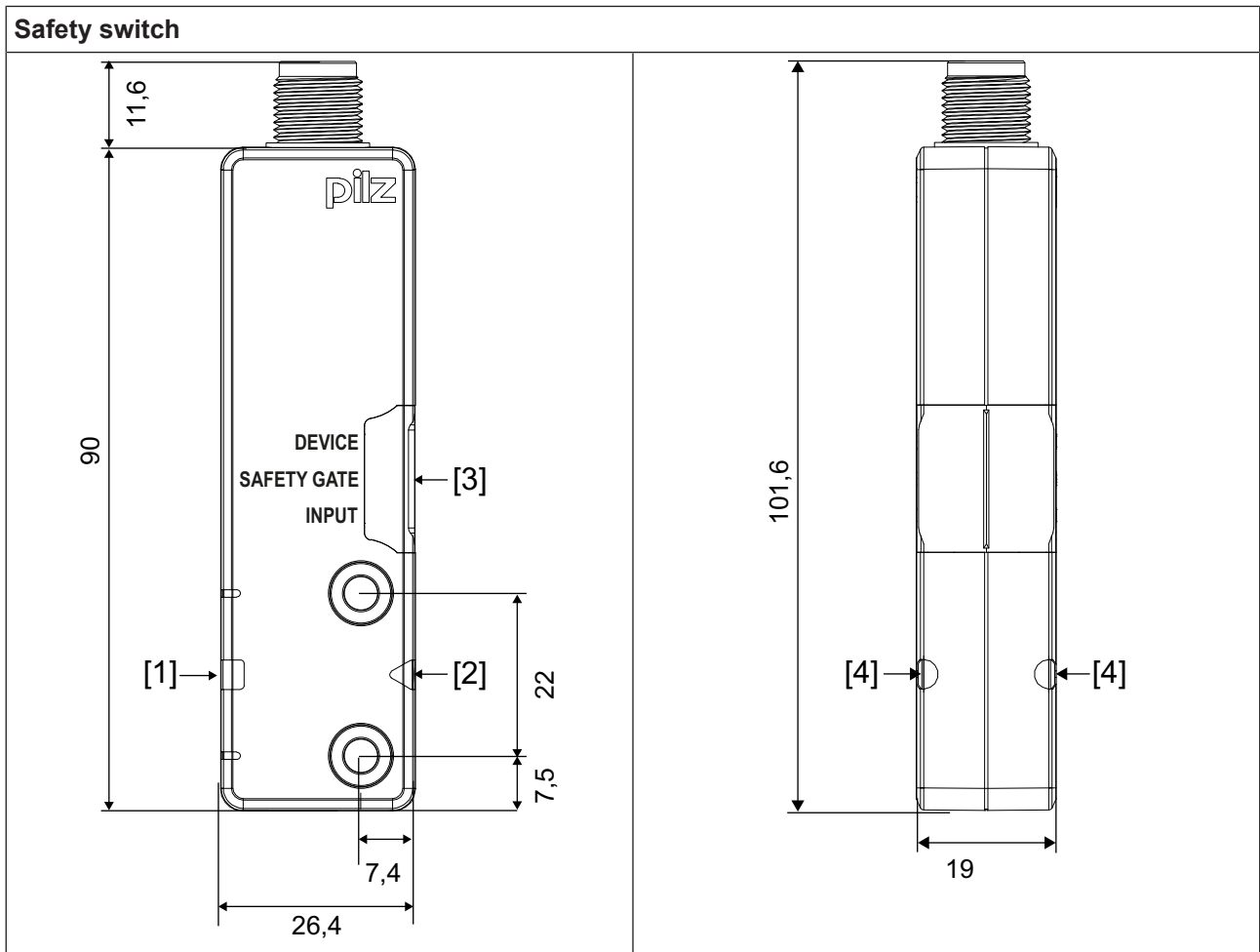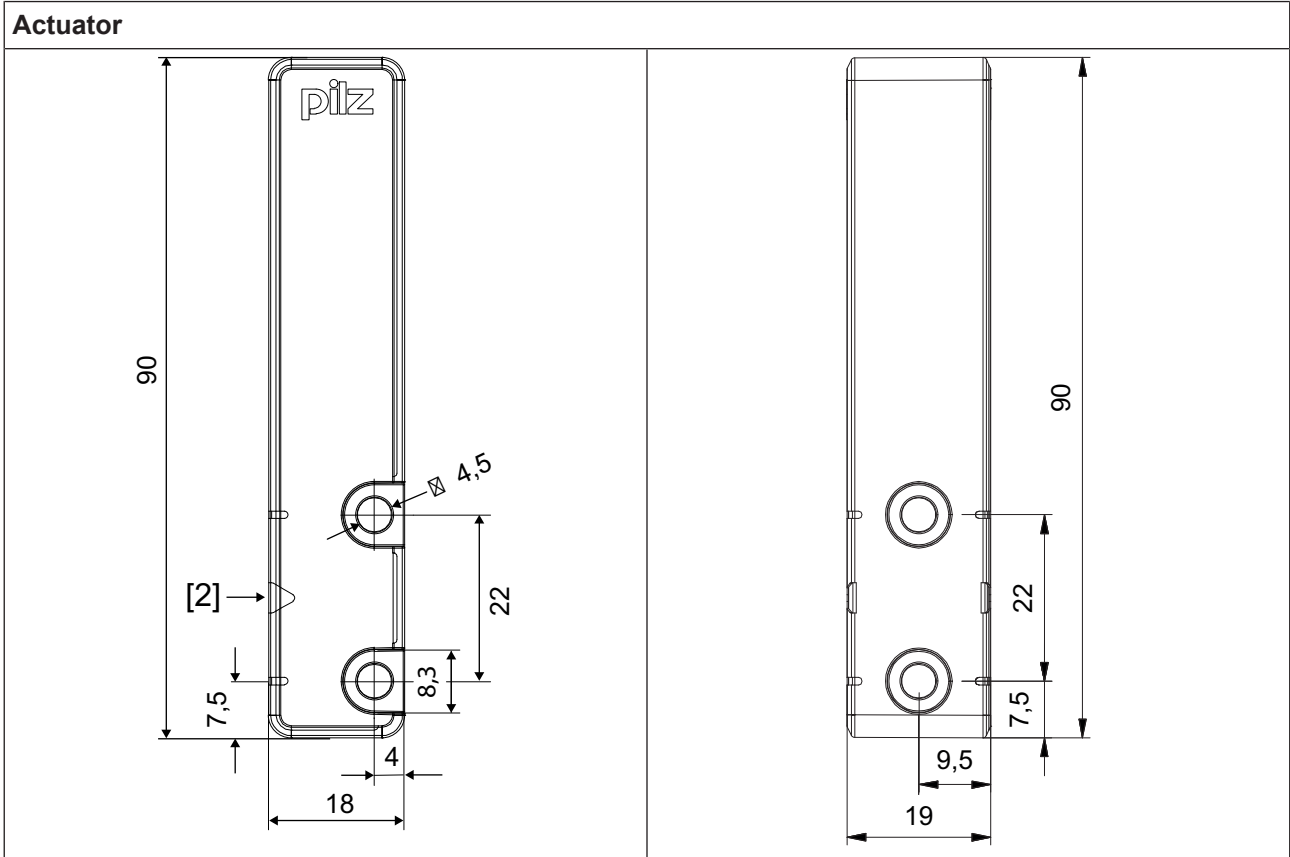
Legend:

[1] Square marking

[2] Triangle marking

[3] LEDs

[4] Semicircle marking

Technical details

General	
Certifications	**CE, EAC, ECOLAB, FCC, IC, TÜV, UKCA, cULus Listed**
Sensor's mode of operation	**Transponder**
Coding level in accordance with EN ISO 14119	**High**
Design in accordance with EN ISO 14119	**4**
Classification in accordance with EN 60947-5-3	**PDDB**
Pilz coding type	**fully coded**
Transponder	
Frequency band	**122 kHz - 128 kHz**
Max. transmitter output	**15 mW**
Electrical data	
Supply voltage	
Voltage	**24 V**
Kind	**DC**
Voltage tolerance	**-20 %/+20 %**
Output of external power supply (DC)	**1 W**
Max. switching frequency	**3 Hz**
Max. cable capacitance at the safety outputs	
No-load, PNOZ with relay contacts	**40 nF**
PNOZmulti, PNOZelog, PSS	**40 nF**
Max. inrush current impulse	
Current pulse, A1	**0,5 A**
No-load current	**25 mA**
Inputs	
Number	**2**
Voltage at inputs	**24 V DC**
Input current range	**1,6 - 3 mA**
Semiconductor outputs	
Number of OSSD safety outputs	**2**
Signal outputs	**1**
Switching current per output	**100 mA**
Breaking capacity per output	**2,4 W**
Potential isolation from system voltage	**No**
Short circuit-proof	**yes**
Residual current at outputs	**400 µA**
Voltage drop at OSSDs	**1 V**
Conditional rated short circuit current	**100 A**
Lowest operating current	**2 mA**
Utilisation category in accordance with EN 60947-1	**DC-12**
Times	
Test pulse duration, safety outputs	**150 µs**

Times	
Switch-on delay	
after UB is applied	**1 s**
Inputs typ.	**1 ms**
Inputs max.	**3 ms**
Actuator typ.	**30 ms**
Actuator max.	**50 ms**
Delay-on de-energisation	
Inputs typ.	**2 ms**
Inputs max.	**4 ms**
Actuator typ.	**30 ms**
Actuator max.	**40 ms**
Risk time in accordance with EN 60947-5-3	**150 ms**
Supply interruption before de-energisation	**20 ms**
Simultaneity, channel 1 and 2 max.	∞
Environmental data	
Ambient temperature	
In accordance with the standard	**EN 60068-2-14**
Temperature range	**-25 - 70 °C**
Max. at max. operating height	**+60 °C**
Max. at max. operating height <2000 m	**+70 °C**
Storage temperature	
In accordance with the standard	**EN 60068-2-1/-2**
Temperature range	**-40 - 85 °C**
Climatic suitability	
In accordance with the standard	**EN 60068-2-30**
Humidity	**93 % r. h. at 40 °C**
Max. operating height above sea level	**4000 m**
EMC	**EN 60947-5-3**
Vibration	
In accordance with the standard	**EN 60947-5-2**
Frequency	**10 - 55 Hz**
Amplitude	**1 mm**
Shock stress	
In accordance with the standard	**EN 60947-5-2**
Acceleration	**30g**
Duration	**11 ms**
Airgap creepage	
Overvoltage category	**III**
Pollution degree	**3**
Rated insulation voltage	**75 V**
Rated impulse withstand voltage	**1 kV**
Protection type	
Housing	**IP66, IP67**

Operating distances	
Repetition accuracy switching distances	**3 %**
Change of operating distance with temperature changes	**+-0,02mm/°C**
Operating distances when the actuator approaches square marking	
Assured operating distance Sao	**8 mm**
Assured release distance Sar	**20 mm**
Typical operating distance So	**11 mm**
Typical release distance Sr	**14 mm**
Typical hysteresis	**2 mm**
Mechanical data	
Magnetic holding force between actuator and sensor	**30 N**
Actuator 1	**PSEN cs6.11 M12**
Min. distance between safety switches	**250 mm**
Sensor flush installation in accordance with EN 60947-5-2	**yes, follow installation guidelines**
Connection type	**M12, 8-pin male connector**
Material	**PA+GF, PBT, polycarbonate**
Max. torque setting for fixing screws	**1 Nm**
Dimensions	
Height	**26,4 mm**
Width	**101,6 mm**
Depth	**19 mm**
Actuator dimensions	
Height	**18 mm**
Width	**90 mm**
Depth	**19 mm**
Weight of safety switch	**75 g**
Weight of actuator	**60 g**
Weight	**135 g**

Where standards are undated, the 2015-11 latest editions shall apply.

Safety characteristic data

> **NOTICE**
>
> You must comply with the safety characteristic data in order to achieve the required safety level for your plant/machine.

Operating mode	EN ISO 13849-1: 2015 PL	EN ISO 13849-1: 2015 Category	EN 62061 SIL CL	EN 62061 PFH$_D$ [1/h]	IEC 61511 SIL	IEC 61511 PFD	EN ISO 13849-1: 2015 T$_M$ [year]
2-ch. OSSD	PL e	Cat. 4	SIL CL 3	9,56E-10	–	8,51E-06	20

Explanatory notes for the safety-related characteristic data:

▸ The SIL CL value in accordance with EN 62061 corresponds to the SIL value in accordance with EN 61508.

▸ T$_M$ is the maximum mission time in accordance with EN ISO 13849-1. The value also applies as the retest interval in accordance with EN 61508-6 and IEC 61511 and as the proof test interval and mission time in accordance with EN 62061.

All the units used within a safety function must be considered when calculating the safety characteristic data.

> **INFORMATION**
>
> A safety function's SIL/PL values are **not** identical to the SIL/PL values of the units that are used and may be different. We recommend that you use the PAScal software tool to calculate the safety function's SIL/PL values.

Supplementary data

Radio approval

<table>
<tr><td colspan="2">USA/Canada</td></tr>
<tr><td>FCC</td><td>FCC ID: VT8-PSENCS5
IC: 7482A-PSENCS5</td></tr>
<tr><td colspan="2">
FCC/IC-Requirements:
This product complies with Part 15 of the FCC Rules and with Industry Canada licence-exempt RSS standards.
Operation is subject to the following two conditions:
1) this product may not cause harmful interference, and
2) this product must accept any interference received, including interference that may cause undesired operation.

Changes or modifications made to this product not expressly approved by Pilz may void the FCC authorization to operate this equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Le présent produit est conforme aux CNR d'Industrie Canada applicables aux appareils radio
exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:
(1) le produit ne doit pas produire de brouillage, et
(2) l'utilisateur de le produit doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.
</td></tr>
</table>

Order reference

Safety switch

Product type	Features		Order no.
PSEN cs6.11 M12/8 1switch	Safety switch, fully coded	8-pin M12 connector	542151

Actuator

Product type	Features		Order no.
PSEN cs6.11 M12 1actuator	Actuator, fully coded		542181

Complete systems

Product type	Features		Order no.
PSEN cs6.11 M12/8/ PSEN cs6.11 M12 1unit	Safety gate system, fully coded	8-pin M12 connector	542111

Accessories

Installation material

Product type	Features	Order no.
PSEN bracket	Mounting bracket	532110
PSEN mag/cs bracket straight	Mounting aid	532111
PSEN screw M4x20 10pcs	Safety screws made from stainless steel with one-way slot	540313
PSEN screw M4x26 10pcs	Safety screws made from stainless steel with one-way slot	540314
PSEN cs1/2 bracket cable fix	Mechanical protection against defeat, protecting against unauthorised cable disconnection or damage for safety switches PSENcode cs1/2, PSENcode cs5/6 M12, PSENslock	532112

Cable

Product type	Connection 1	Connection 2	Length	Order no.
PSEN cable M12-8sf	straight, M12, 8-pin, socket	Open cable	3 m	540319
			5 m	540320
			10 m	540321
			20 m	540333
			30 m	540326
PSEN cable M12-8af	Angled, M12, 8-pin, socket	Open cable	3 m	540322
			5 m	540323
			10 m	540324
			30 m	540325
PSEN cable M12-8sf M12-8sm	straight, M12, 8-pin, socket	straight, M12, 8-pin, pin	2 m	540340
			5 m	540341
			10 m	540342
			20 m	540343
			30 m	540344

Series connection

Product type	Connection X1	Connection X2	Connection X3	Order no.
PSEN Y junction M12 SENSOR	M12, 8-pin, pin	M12, 8-pin, socket	M12, 8-pin, socket	540315
PSEN Y junction M12 cable channel	M12, 8-pin, pin	M12, 8-pin, socket	M12, 8-pin, socket	540316
PSEN T junction M12	M12, 8-pin, socket	M12, 8-pin, pin	M8, 4-pin, pin	540331
PSEN Y junction M8-M12/ M12 PIGTAIL	M12, 8-pin, socket	M12, 8-pin, pin	M8, 8-pin, socket	540337
PSEN Y junction M12-M12/ M12 PIGTAIL	M12, 8-pin, socket	M12, 8-pin, pin	M12, 8-pin, socket	540338

Product type				Order no.
PDP67 F 4 code	Decentralised passive junction			773603
PDP67 F 4 code VA	Decentralised passive junction, V2A ring nut			773613

Safety Device Diagnostics

Product type	Features	Connection type	Order no.
PSEN ix2 F4 code	Interface for connecting max. 4 PSEN safety sensors	Spring-loaded terminal	535111
PSEN ix2 F8 code	Interface for connecting max. 8 PSEN safety sensors	Spring-loaded terminal	535112

Product type	Features	Connection type	Order no.
SDD ES ETH	Modbus/TCP fieldbus module for Safety Device Diagnostics	Spring-loaded terminal	540130
SDD ES Profibus	Profibus fieldbus module for Safety Device Diagnostics	Spring-loaded terminal	540132
SDD ES Profinet	Profinet fieldbus module for Safety Device Diagnostics	Spring-loaded terminal	540138

EC declaration of conformity

This product/these products meet the requirements of the following directives of the European Parliament and of the Council.

▸ 2006/42/EC on machines

▸ 2014/53/EC on radio equipment

The complete EC Declaration of Conformity is available on the Internet at www.pilz.com/downloads.
Representative: Norbert Fröhlich, Pilz GmbH & Co. KG, Felix-Wankel-Str. 2, 73760 Ostfildern, Germany

UKCA-Declaration of Conformity

UKCA-Declaration of Conformity

This product(s) complies with following UK legislation:

▸ Supply of Machinery (Safety) Regulations 2008

▸ Radio Equipment Regulations 2017

The complete UKCA Declaration of Conformity is available on the Internet at www.pilz.com/support/downloads.

Representative: Pilz Automation Technology, Pilz House, Little Colliers Field, Corby, Northamptonshire, NN18 8TJ United Kingdom, eMail: mail@pilz.co.uk

▶ Support

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Pilz develops environmentally-friendly products using ecological materials and energy-saving technologies. Offices and production facilities are ecologically designed, environmentally-aware and energy-saving. So Pilz offers sustainability, plus the security of using energy-efficient products and environmentally-friendly solutions.

We are represented internationally. Please refer to our homepage www.pilz.com for further details or contact our headquarters.

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PILZ
THE SPIRIT OF SAFETY