Visualisation; Diagnostics

Easy to Configure

Programming IEC 61131-3

Rapid Installation

PSEN sl-1.0p 6.1

PILZ
THE SPIRIT OF SAFETY

▸ PSEN sensor technology

Introduction

Validity of documentation

This documentation is valid for the product PSEN sl-1.0p 6.1. It is valid until new documentation is published.

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

Safety function of safety switch:

▶ 2 safety outputs supply a high signal each when the corresponding input is high and the actuator is in the switch's response range.

The safety gate system meets the requirements in accordance with

▶ EN 60947-5-3: PDDB with the corresponding actuator PSEN sl0.5 or PSEN sl0.5fm (see Technical details: System with normal actuator [27], System with free-moving actuator [30])

▶ EN 62061: SIL CL 3

▶ EN ISO 13849-1: PL e and Cat. 4

▶ EN ISO 14119: Coding level High, Type 4

▶ The safety switch may only be used with the corresponding actuator (see Technical Details: System with normal actuator [27], System with free-moving actuator [30]).

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

▶ the safety outputs use 2-channel processing.

> **NOTICE**
>
> **Positioning of the safety switch**
>
> As the safety switch is not intended for a guard locking device for personal protection, the safeguard monitored by the safety switch must be positioned in a way that the access time corresponds at least to the machine's stopping time.

Because of the low operating distance (see Technical details [27]) the repetition accuracy of 40 % deviates from the requirement in accordance with EN 60947-5-2 (max. 10%).

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 manual

▶ Use of the product outside the technical details (see Technical details [27]).

> **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.

> **INFORMATION**
>
> The magnet surface and counterplate may heat up. When installing, make sure that heat dissipation is guaranteed.

Safety regulations

Safety assessment

Before using a unit it is necessary to perform a safety assessment in accordance with the Machinery Directive.

Functional safety is guaranteed for the product as a single component. However, this does not guarantee the functional safety of the overall plant/machine. In order to achieve the required safety level for the overall plant/machine, define the safety requirements for the plant/machine and then define how these must be implemented from a technical and organisational standpoint.

Use of qualified personnel

The products may only be assembled, installed, programmed, commissioned, operated, maintained and decommissioned by competent persons.

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 this description under "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 to life due to manipulation/defeat of the safeguard
>
> If replacement actuators are obtained, these must be installed as described in the chapter entitled Installation.
> If replacement actuators are used manipulatively or the function of the safeguard is defeated, there is a risk to life when operating the plant or machine! This must be considered in the operator's hazard assessment and the operator must define appropriate measures to exclude manipulation.

▸ 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 type of coding: coded

▸ different actuators available (see Order reference [📖 34])

  – Standard actuator PSEN sl-1.0

  – free-moving actuator PSEN sl-1.0fm for special applications with higher tolerance compensation

▸ Dual-channel operation

▸ 2 safety outputs

▸ 2 safety inputs for series connection of multiple safety switches

▸ 1 signal output

▸ Magnetic guard locking for process protection

▸ 1 input to switch the locking magnet on/off

- ▸ LEDs for
  - – Supply voltage/fault
  - – Gate closed
  - – State of the inputs
  - – State of the magnetic guard locking device
- ▸ M12, 8-pin male connector

Function description
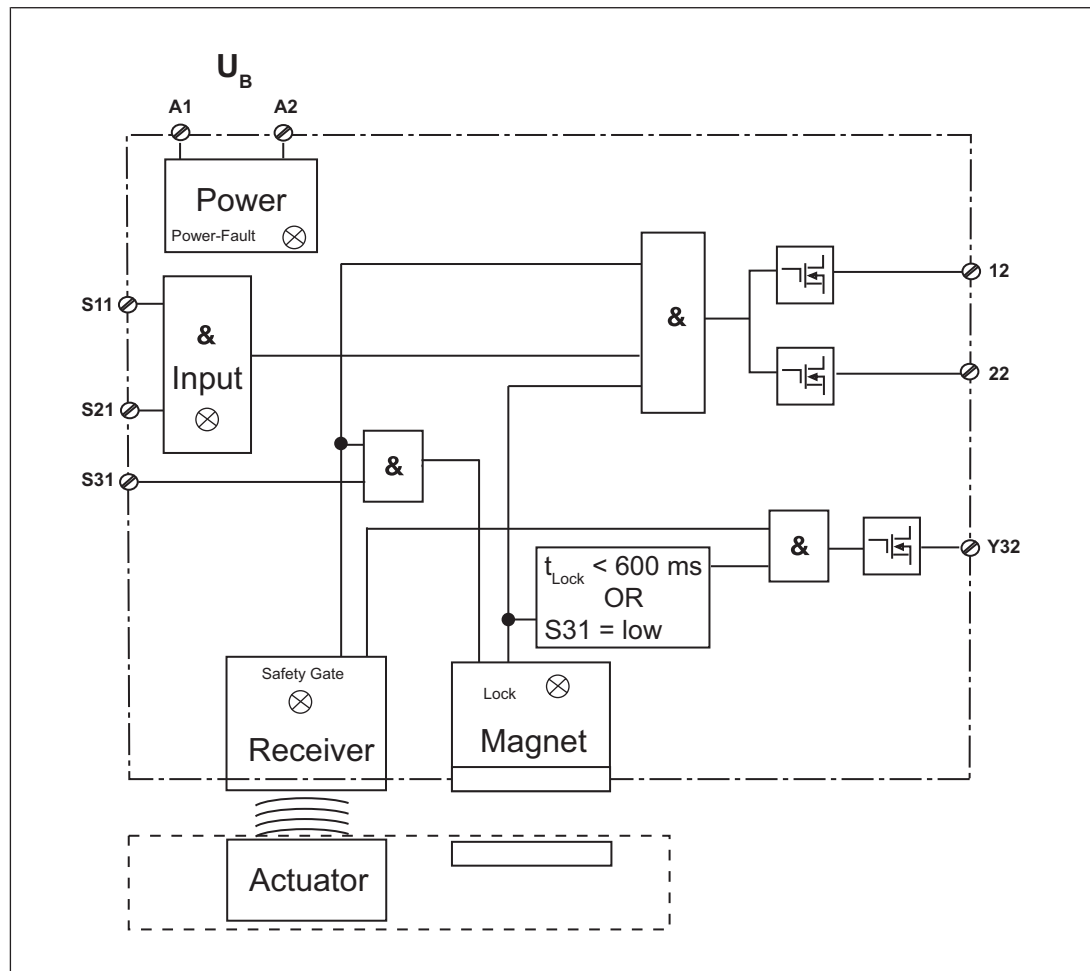
There is a high signal at safety outputs 12 and 22 if the following occur **simultaneously**:

- ▸ The actuator is within the response range (safety gate closed) and
- ▸ Inputs S11 and S21 are high and
- ▸ Input S31 is high (control command for magnetic guard locking) and
- ▸ The locking magnet is switched on.

Safety outputs 12 and 22 are low if **at least one** of the following conditions are met:

- ▸ The actuator is outside the response range or
- ▸ Inputs S11 or S21 are low or
- ▸ Input S31 is low (control command for magnetic guard locking) and the locking magnet is switched off.

Signal output Y32

There is a high signal at the signal output Y32 if the actuator is within the response range (safety gate closed).

The high signal is maintained if the following conditions are met simultaneously

▶ [1] in the timing diagram

– Actuator is within the response range **and**

– There is a high signal at S31 **and**

– The holding force of the locking magnets was achieved within t_{Lock} = 600 ms

or

▶ [4] in the timing diagram

– Actuator is within the response range **and**

– There is a low signal at S31.

At the signal output Y32 the signal switches to low if

▶ The actuator leaves the response range (safety gate open) (see [3] in the timing diagram) **or**

▶ The holding force could not be achieved after t_{Lock} = 600 ms (see [2] in the timing diagram). In this case, the signal at the signal output can only switch back to high if

– There is a low signal at input S31 for at least 500 ms **and**

– a high signal is transmitted afterwards.
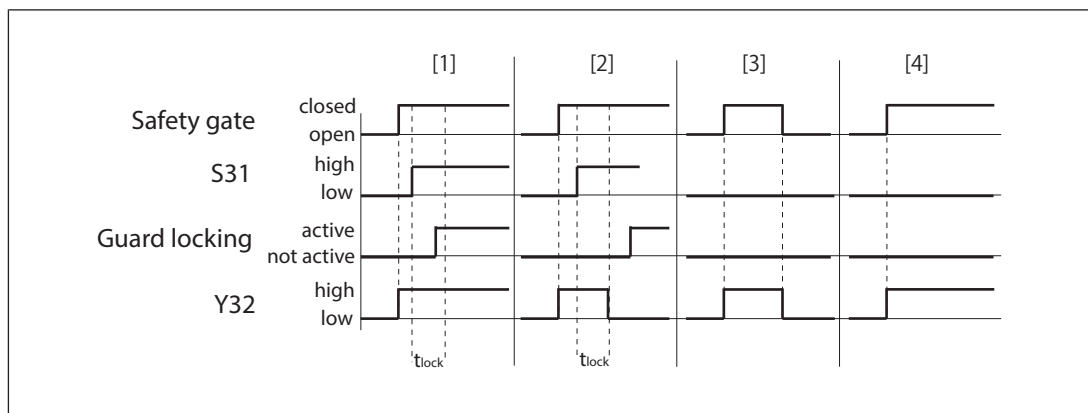
Feasibility monitoring for safety inputs S11 and S21

▶ If the signal at a safety input switches from high to low, while the other safety input remains high, an unequal status is displayed:

▶ If the signal at this input switches back from low to high, while a high signal remains at the other input, a feasibility error is displayed and a partial operation lock is triggered: The OSSDs are switched off during the partial operation lock.

A switch to a high signal will only lead to normal safety switch operation if both inputs had a low signal simultaneously. From this moment on, the switch to high signal may occur (partial operation lock see Error display [📖 24]).

Magnetic guard locking device and magnet monitoring

▶ The locking magnet is switched on if S31 (control command for magnetic guard locking) is high and the actuator is detected (safety gate closed).

▸ The holding force of the locking magnet is tested on power-up. If the magnet's holding force is not achieved after max. 600 ms, there will be no switch from low to high. The holding force will be tested a further 7 times.

These tests have no influence on the signal output. If the test is successful during any of these attempts, the gate is locked.

▸ After S31 switches to low, wait at least 500 ms until S31 is switched back to high. Also note the max. switching frequency (see Technical details: System with normal actuator [📖 27], System with free-moving actuator [📖 30], under electrical data).

▸ For physical reasons, a remanence (residual magnetism) remains after the locking magnet is switched off; this is dissipated the first time the sensor and actuator are separated. Therefore a higher effort is required when opening for the first time.

▸ If the safety gate is in a locked condition and is opened by force, the safety outputs will shut down.

Lateral and vertical offset

▸ Max. vertical offset 5 mm
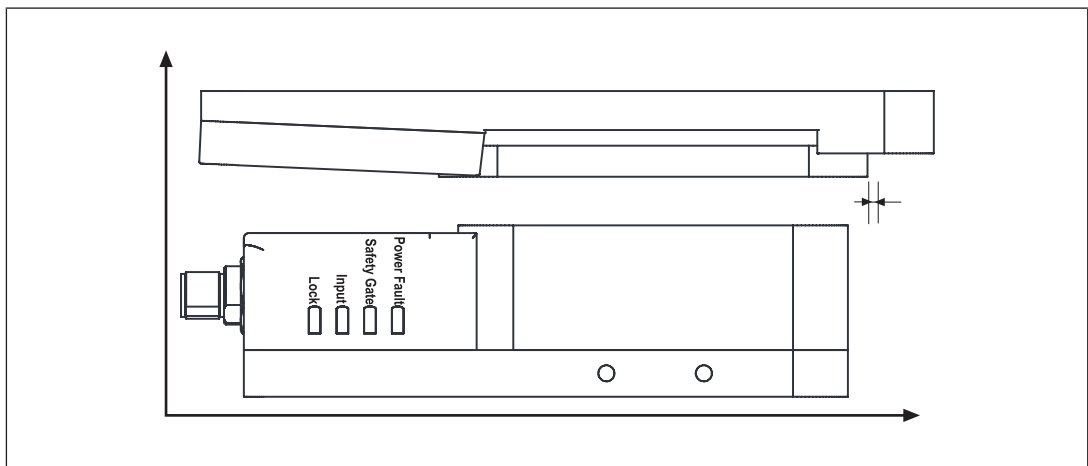
▸ Max. lateral offset: 3 mm
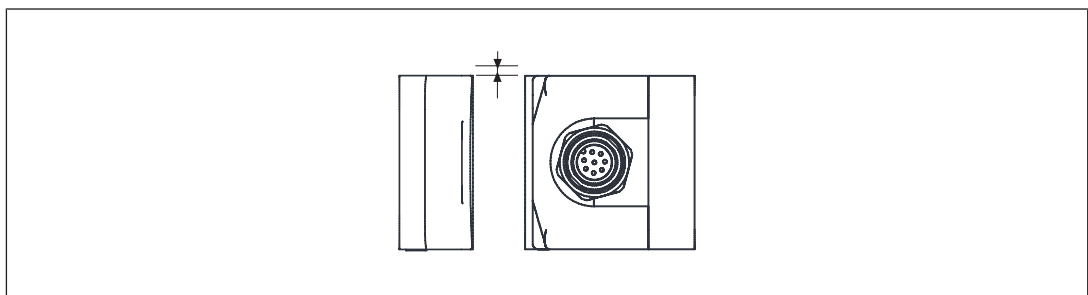
Wiring

Please note:

▸ You must comply with the specifications stated in the technical details (see Technical details: System with normal actuator [27], System with free-moving actuator [30]).

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

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

> **i** **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.

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

▸ When connecting in series, make sure you comply with the wiring technology requirements (DIN EN 60204-1) and manipulation protection requirements (EN ISO 14119).

Guidelines for cable length

The max. cable length depends on the voltage drop at the safety switches. The level of voltage drop is determined by the:

▸ Cable resistance

▸ Current of the device and the current load of the outputs

If the level of the supply voltage at the device connector falls below the minimum permitted value (see Technical details: System with normal actuator [27], System with free-moving actuator [30]), the locking magnet is no longer activated reliably. The "Lock" LED registers an error when guard locking.

Possible remedies:

▸ Set the supply voltage constantly to the upper tolerance range (see Technical details: System with normal actuator [27], System with free-moving actuator [30]).

▸ Select a higher conductor cross section

▸ Reduce load at the outputs, e.g. with evaluation device PNOZ e1.1p

Recommended cable cross sections

Prerequisite:

▸ Supply voltage: 24 V

▸ Cable type: LiYY 8x0.25 mm² (79 Ohm/km) from Pilz

Max. load per safety output	100 mA	500 mA
Cable length	45 m	24 m

If cable lengths greater than those stated in the table are required, please contact Pilz.

Pin assignment

	8-pin M12 connector
(diagram of 8-pin M12 connector with pins numbered 1-8)	
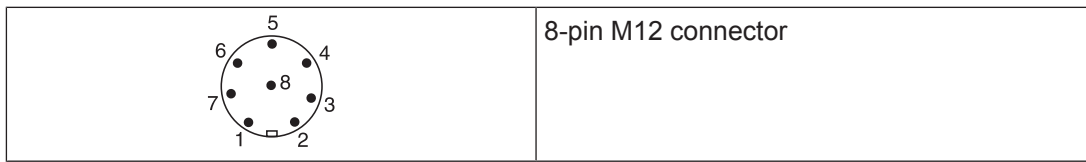
PIN	Function	Terminal designation	Cable colour (Pilz cable)
1	Input, channel 2	S21	White
2	+24 V UB	A1	Brown
3	Safety output channel 1	12	Green
4	Safety output channel 2	22	Yellow
5	Signal output "Lock"	Y32	Grey
6	Input, channel 1	S11	Pink
7	0 V UB	A2	Blue
8	"Lock_Unlock"	S31	Red

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

Connection to evaluation devices

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

▸ 2-channel with feasibility monitoring

▸ OSSD signals are evaluated

Connection diagram, single connection

Connection diagram, series connection
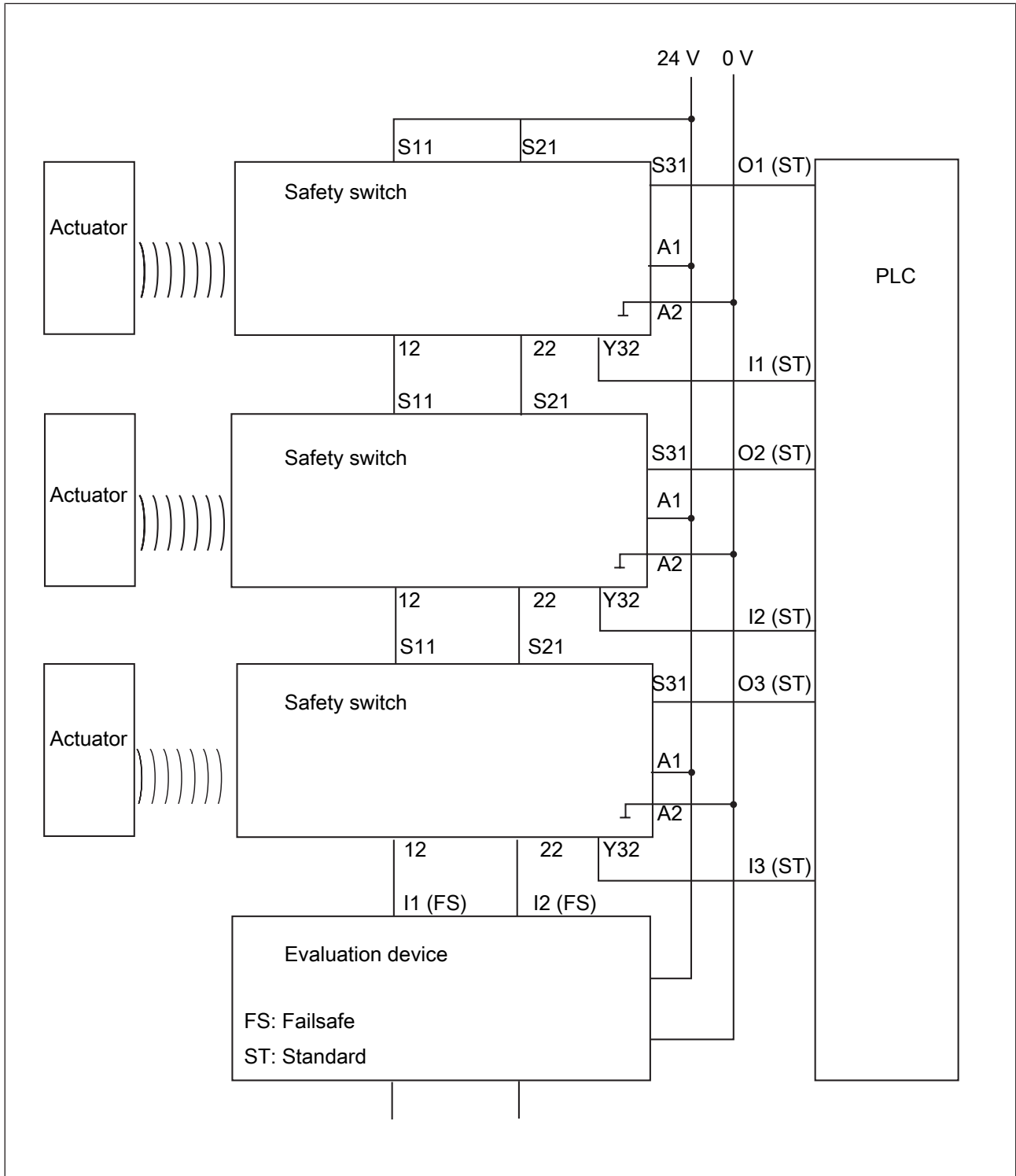
> **CAUTION!**
>
> Extension of delay-on de-energisation
>
> When several (n) devices are connected in series, the delay-on de-energisation time adds with the number of interconnected safety switches.
> The may. delay-on de-energisation is composed of
> max. delay-on de-energisation actuator
> + (n-1) x max. delay-on de-energisation of the inputs
> + delay-on de-energisation of the evaluation device

> **CAUTION!**
>
> When several units are connected in series, the required current adds with the number of interconnected safety switches.

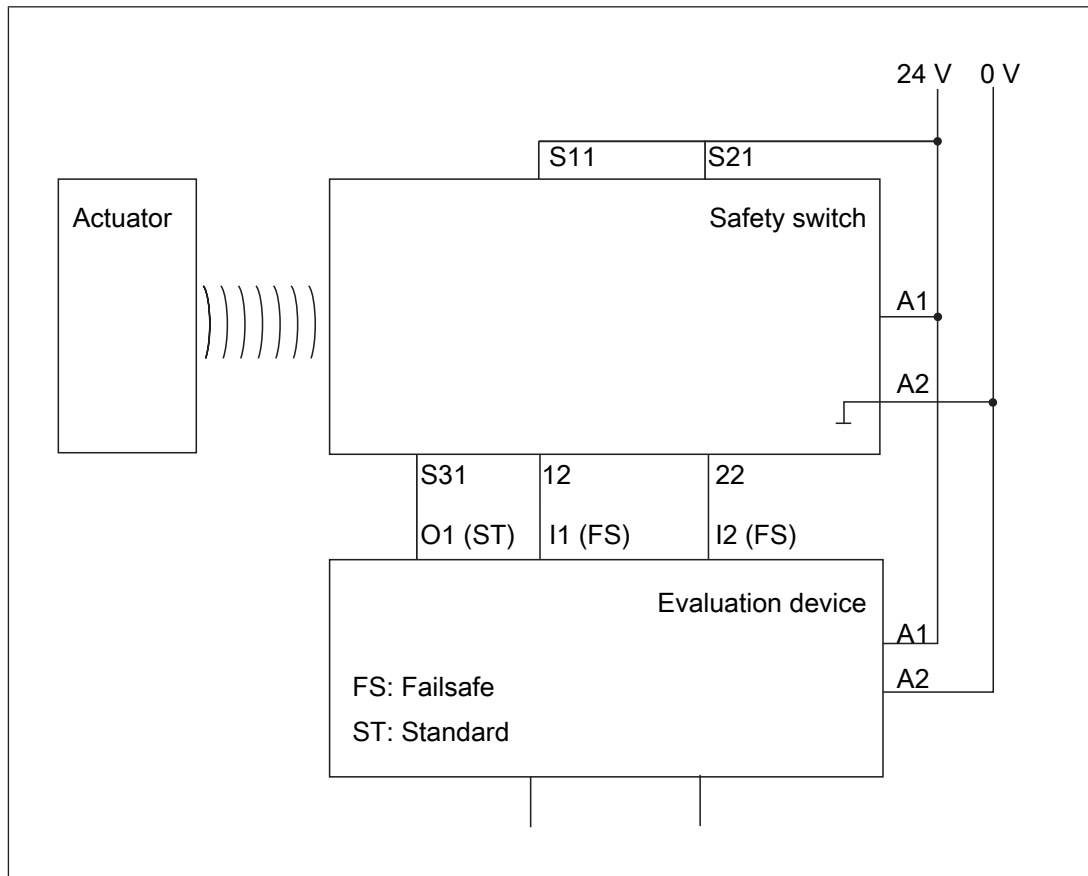The safety switch PSEN sl-1.0p 6.1 can be connected to Pilz evaluation devices, for example.

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 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

Connection example PNOZ s3
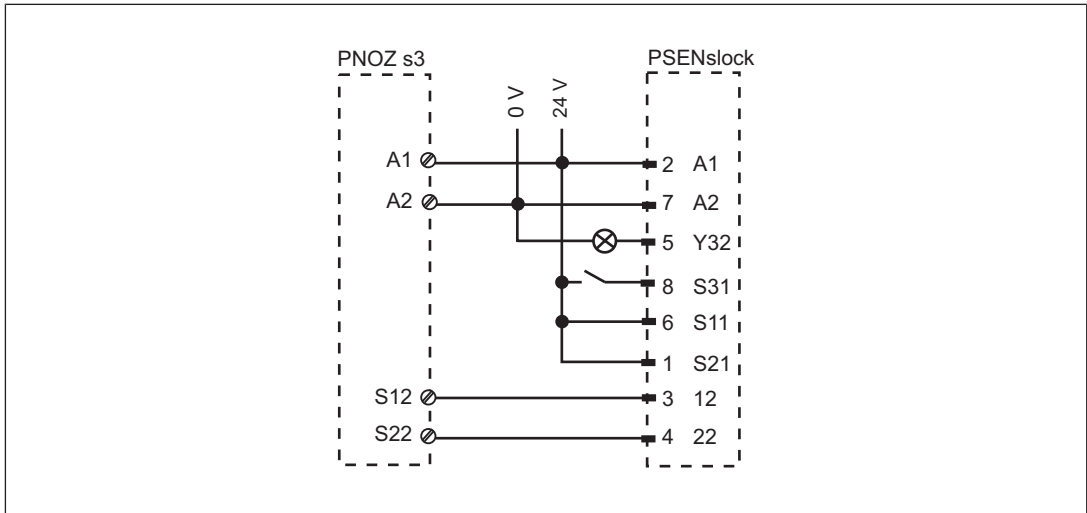
Connection example PNOZmulti
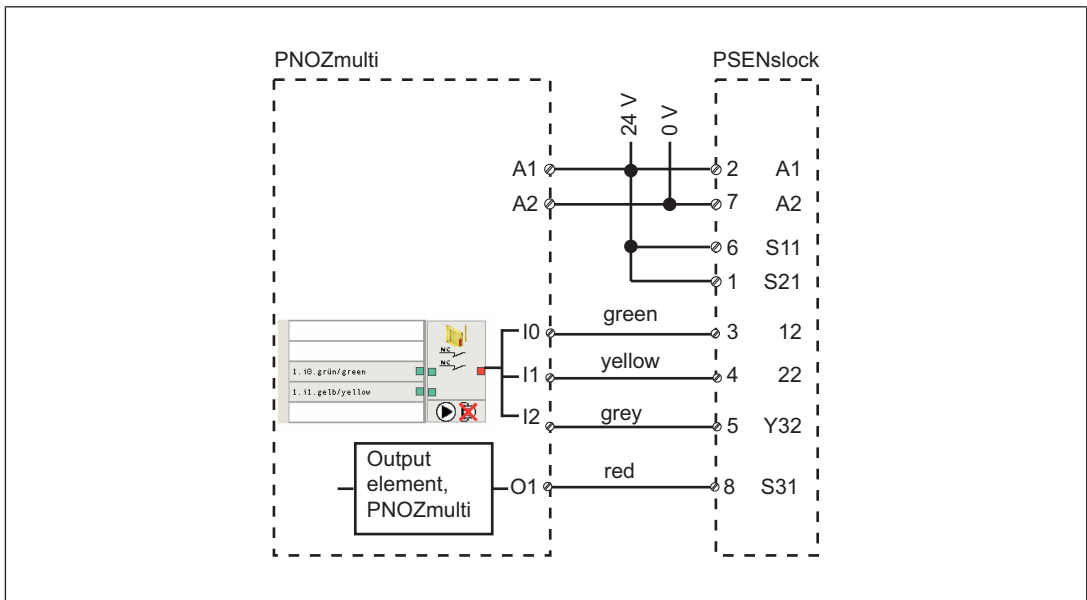
Legend:

I0	Input OSSD
I1	Input OSSD
I2	Signal input
O1	Lock/Unlock

Teaching in the actuator

PSEN sl-1.0p 6.1

Teaching in the actuator for the first time:

The first corresponding actuator to be detected by the safety switch (see Technical details: System with normal actuator [📖 27], System with free-moving actuator [📖 30]) is automatically taught in as soon as it is brought into the response range.

To teach in a new actuator:

▸ 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 switches to a yellow flashing light.

▸ After a waiting period of 20 s has elapsed, the "Safety Gate" LED switches to quick yellow flashes. Trigger a system reset in the next 120 s by interrupting the power supply.

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

▸ A maximum of 8 learning procedures are possible.

> **NOTICE**
>
> The actuator must not be removed during the learning procedure.

> **INFORMATION**
>
> This actuator cannot be retaught on the same safety switch.

Installation

▸ The safety gate system can be installed on left or right-hinged swing gates or on sliding gates.

> **WARNING!**
>
> Potential loss of safety function due to gross manipulation
>
> Depending on the application, serious injury or death may result.
>
> Use appropriate installation measures to prevent
>
> – The wiring being modified.
>
> – A short circuit being generated on the connector.
>
> – The possibility of using a second actuator to open the safety gate.

> ⚠️ **CAUTION!**
>
> 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.

▸ Safety switches and actuators must be positioned so that they are secured against a change of position.

▸ Also note the max. angular offset (see Technical details: System with normal actuator [📖 27], System with free-moving actuator [📖 30]).

▸ The access to the safety switch and actuator has to be possible for maintenance and checking the correct operation.

▸ Use reliable fastening elements. A tool is to be required to loosen the fastening elements.

▸ Prevent self-loosening of the fastening elements of safety switch and actuator.

▸ The fastening of safety switch and actuator has to be sufficiently stable to ensure the proper operation of the safety switch and the actuator.

▸ Prevent the safety switch and actuator being exposed to heavy shock or vibration

▸ Circumvention of the safety switch in a reasonably foreseeable manner must be prevented.

▸ Installation measures in accordance with EN ISO 14119

 – Use permanently secured safety screws with a flat head to attach the safety switch and the actuator (e.g. cheese-head or pan head screws) or rivets.

▸ Alignment errors of the guard must not adversely affect the safety function of the guard.

> ℹ️ **INFORMATION**
>
> Mounting brackets are available as accessories [📖 34].

Note regarding the free-moving actuator PSEN sl-1.0fm

The actuators PSEN sl-1.0fm are fitted with a movable metal plate. For this reason, a recess must be provided in the mounting surface for the screw connection.
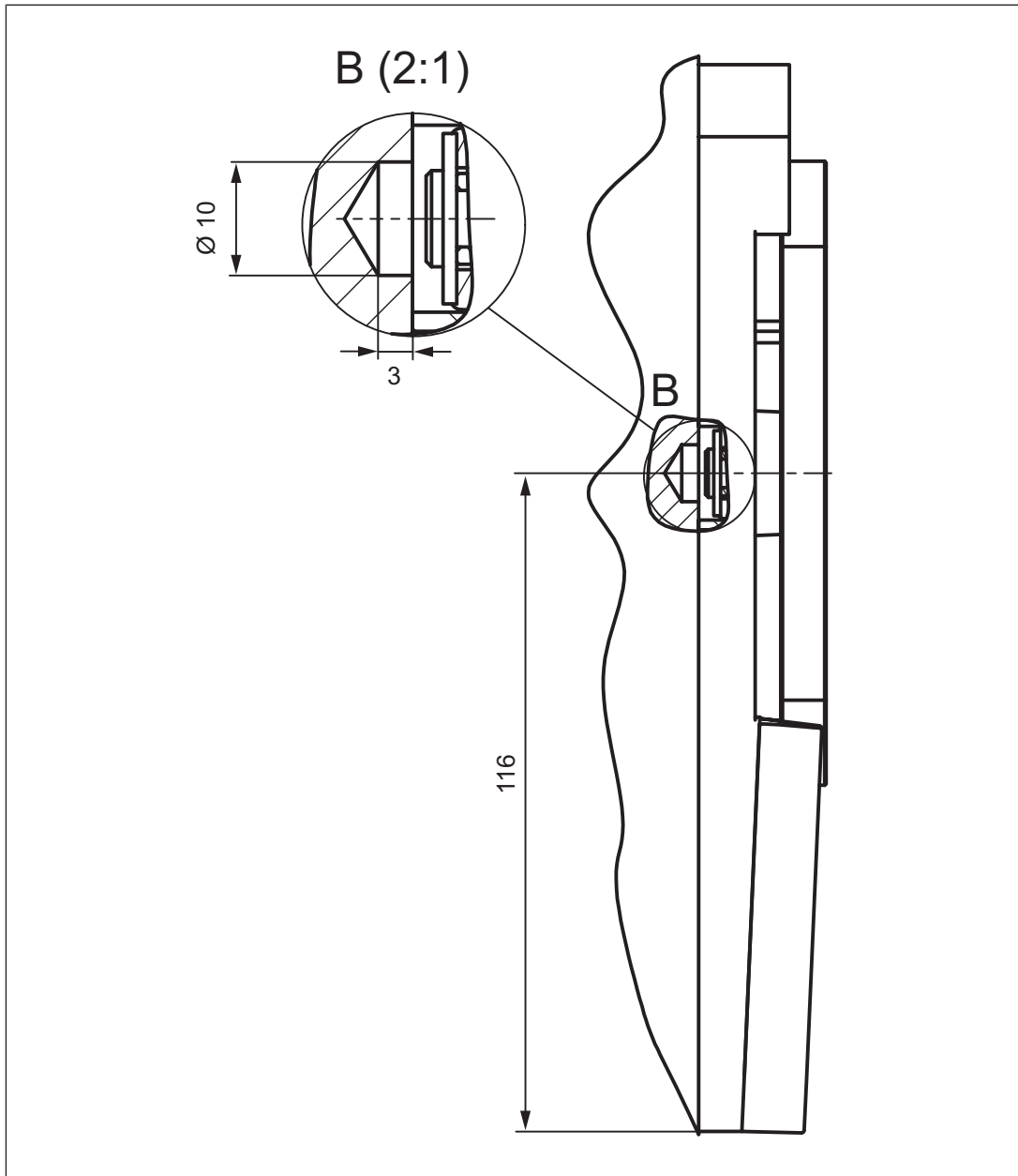
WARNING!

Risk of death and serious injury by reaching into the danger zone!

The actuators enable a warped gate to be closed. A gap may occur on the gate as a result. Make sure that the gap remains small enough to exclude the possibility of reaching into the danger zone.

Installing on a swing gate

Align the actuator flush with the edge of the gate at the height required and tighten the screws	
Close gate.	
Align the mounting bracket flush with the safety switch and tighten the screws.	
Align the safety switch and mounting bracket with the actuator and tighten the screws.	
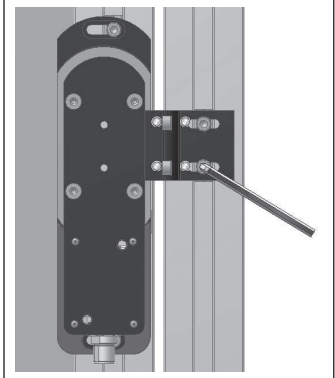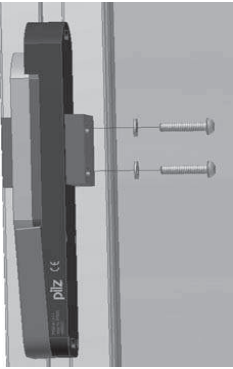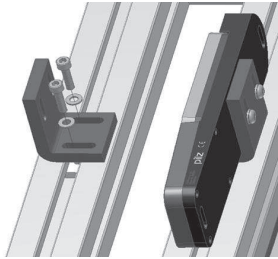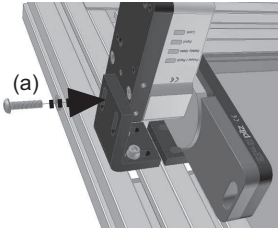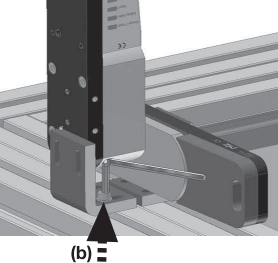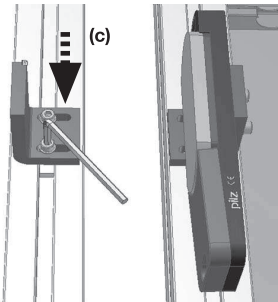
Installing on a sliding gate

Align the actuator mounting bracket flush with the sliding gate and tighten the screws.	
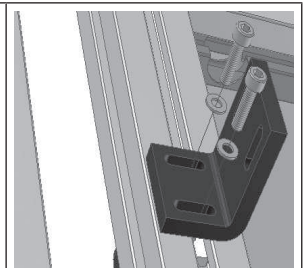
Install the actuator at the height required.	
Align the safety switch mounting bracket flush with the frame and fasten with screws. (Important: do not tighten the screws)	
Fix safety switch upright with a **screw** (a), close gate.	
Align mounting brackets, press firmly together and tighten screw (b).	
Remove the safety switch and tighten screw (c).	

| Align the safety switch to the actuator and tighten the screws. | |
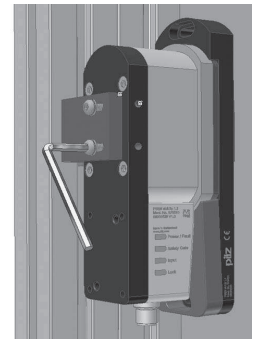
Adjustment

▸ The stated operating distances (see Technical details: System with normal actuator [📖 27], System with free-moving actuator [📖 30]) 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 Lateral and vertical offset [📖 11]).

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.

> **CAUTION!**
>
> Contaminated surfaces can reduce the holding force of the electromagnet.
>
> Make sure that the contact surfaces are clean.

Status indicators:

▸ "Power / Fault" LED illuminates green: The unit is ready for operation

▸ "Safety Gate" LED lights up yellow: Actuator is within the response range

▸ "Lock" LED lights up green: Magnetic guard locking device active and signal output Y32 is high

▸ "Input" LED lights up yellow: There is a high signal at the inputs.

Error display through periodic flashing:

▸ "Input" LED lights up yellow: the signal switches from high to low at one input, while a high signal remains on the other input (**partial operation**).
Remedy: Open both channels of the input circuit.

▸ "Power/Fault" LED lights up red: Error message
Flashing codes for fault diagnostics are output to the "Safety Gate" or "Input" LED (see Error display through flashing codes).
Remedy: Rectify fault and interrupt power supply.

▸ "Lock" LED lights up red: Guard locking request is present, but guard locking has not taken place within 600 ms or the safety gate was opened by force.
This behaviour occurs, for example, when the safety gate is open or the actuator is not within the response range (even temporarily) or the holding force is too low.
Remedy: Rectify the cause (e.g. close safety gate), switch off S31 and then switch it back on again after at least 500 ms.

Please note the different times for

▸ The switch-on delay after UB is applied.

Error display through flashing codes

The "Safety Gate" and "Input" LEDs send flash signals; an error code can be established from the number and sequence. The "Power/Fault" LED illuminates red.

Each error code is indicated by three short flashes of the "Input" or "Safety Gate" LED. After a longer pause, the LED will then flash at one second intervals. The number of LED flashes corresponds to a digit in the error code. The error code can consist of up to 3 digits. The digits are separated by a longer period without flashing. The entire sequence is constantly repeated.

Number of flashes	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Decimal error code	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 0

Example:

Error code 1,4,1:

Flash frequency of the "Safety Gate" or "Input" LED
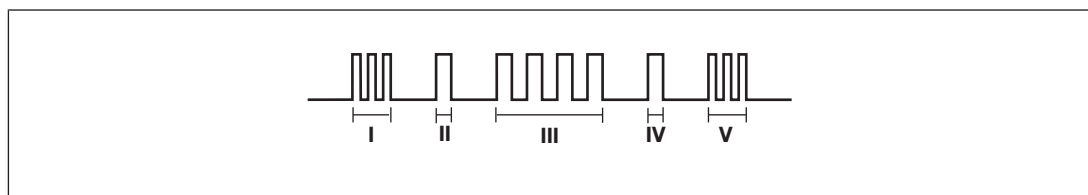
Meaning of flash frequency:

	Flash frequency	Meaning
I	3 times, short	Code for error message
II	Once, for one second each	Code for 1st digit
III	4 times, for one second each	Code for 2nd digit
IV	Once, for one second each	Code for 3rd digit
V	3 times, short	Code for error message repeated

Table of error codes

Error code Decimal	Number of flashes	Description	Remedy
1,4,1	3x short – 1x long – 4x long – 1x long – 3x short	Wiring errors at the inputs or outputs	Check the wiring of the inputs and outputs and rectify wiring errors
1,12	3x short – 1x long – 12x long – 3x short	Wiring error output 12	Check wiring output 12 and rectify wiring error
1,6,3	3x short – 1x long – 6x long – 3x long – 3x short	Wiring error output 12	Check wiring output 12 and rectify wiring error
1,13	3x short – 1x long – 12x long – 3x short	Wiring error output 22	Check wiring output 22 and rectify wiring error
1,6,4	3x short – 1x long – 6x long – 4x long – 3x short	Wiring error output 22	Check wiring output 22 and rectify wiring error
14	3x short – 14x long – 3x short	Wiring error output terminal 12 or capacitive load is too high (cable is too long)	Check wiring output 12 and rectify wiring error Check cable length and shorten it, if necessary (see max. cable length)
15	3x short – 15x long – 3x short	Wiring error output terminal 22 or capacitive load is too high (cable is too long)	Check wiring output 22 and rectify wiring error Check cable length and shorten it, if necessary (see max. cable length)

Other flashing codes signal an internal error. Remedy: Change device.

Dimensions in mm
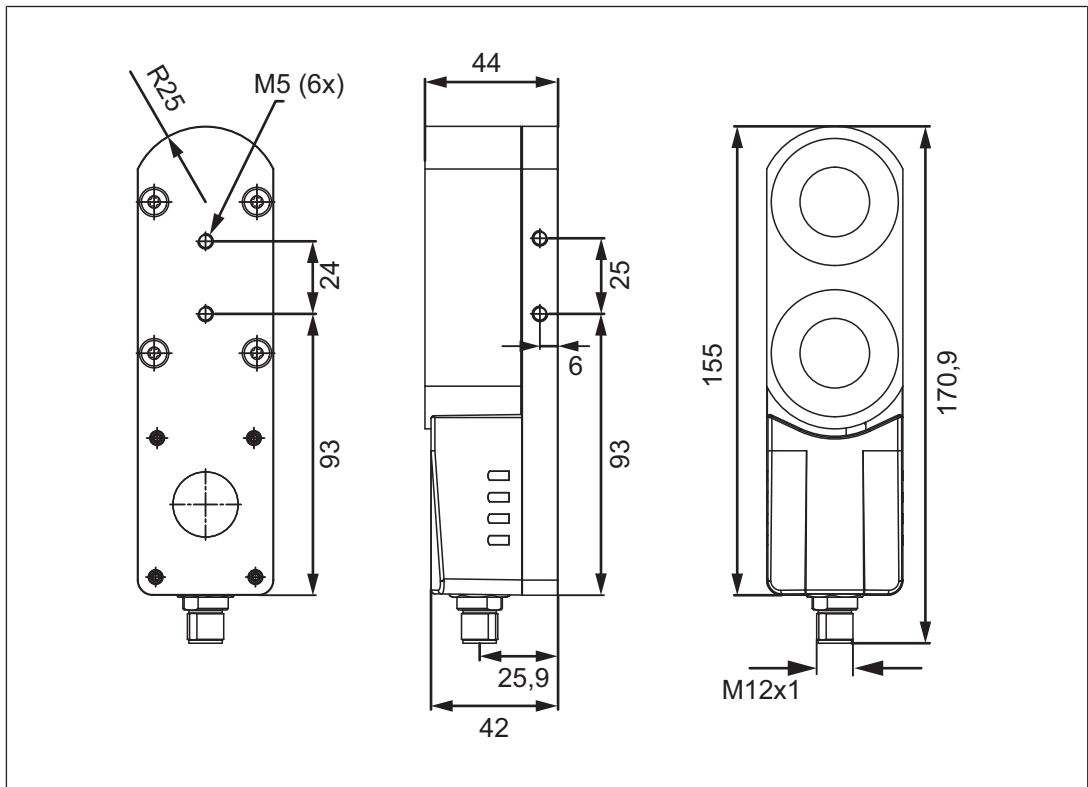
Fig.: Safety switch and locking magnet
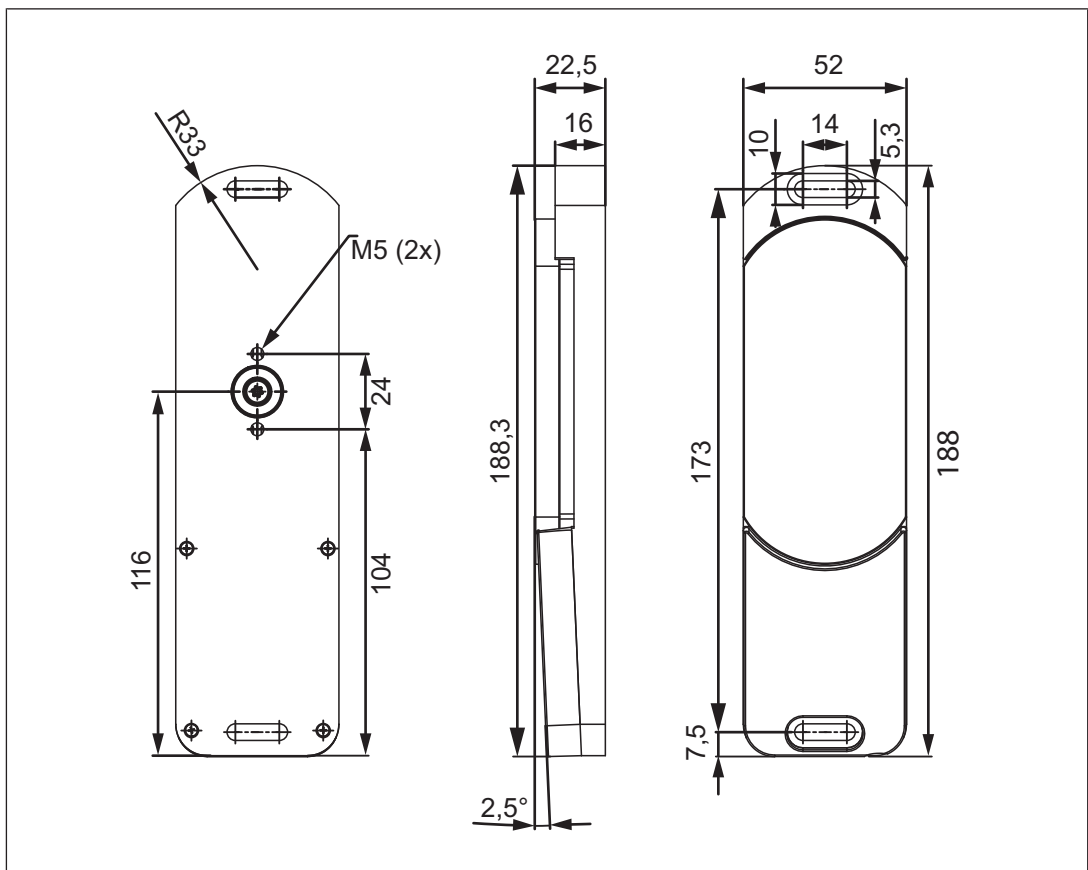
Fig.: Actuator
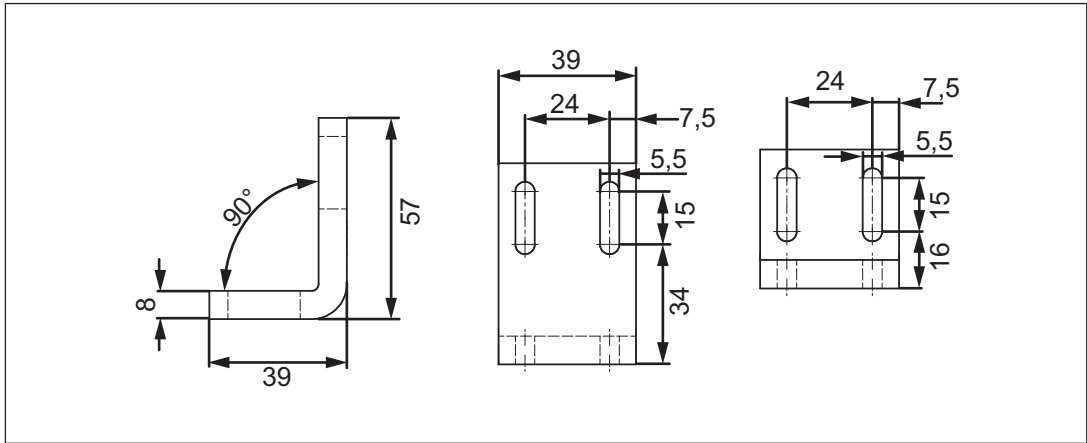
Fig.: Mounting bracket for sliding gate (see Accessories [📖 34])
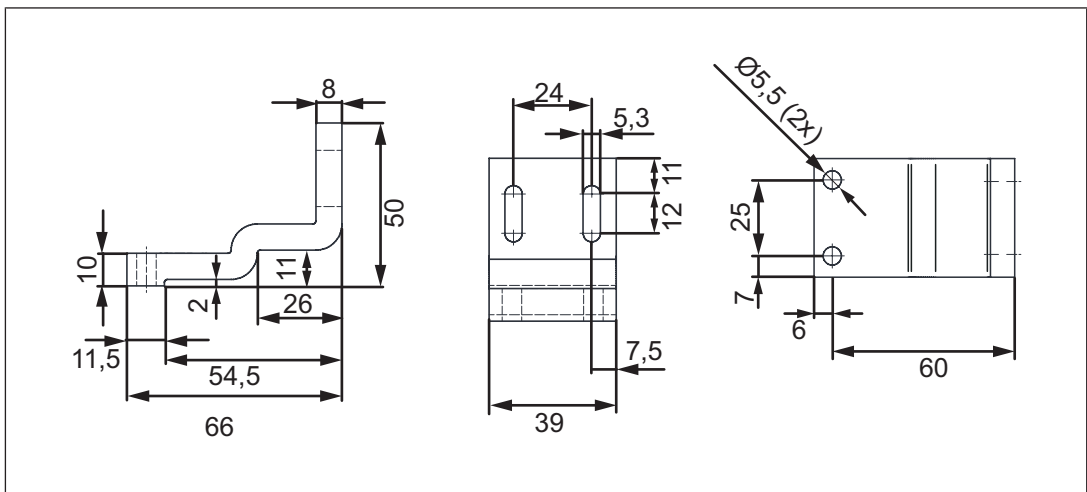
Fig.: Mounting bracket for swing gate (see Accessories [📖 34])

Technical Details Order No. 570681

General	
Approvals	**CE, EAC (Eurasian), FCC, IC, TÜV, 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	**-15 %/+10 %**
Output of external power supply (DC)	**7,2 W**
Max. inrush current at UB	**0,6 A**
Max. switching frequency	**1 Hz**
Max. cable capacitance at the safety outputs	
No-load, PNOZ with relay contacts	**40 nF**
PNOZmulti, PNOZelog, PSS	**70 nF**
No-load current	**40 mA**
Inputs	
Number	**2**
Voltage at inputs	**24 V DC**
Input current range	**5 mA**
Semiconductor outputs	
OSSD safety outputs	**2**
Signal outputs	**1**
Switching current per output	**500 mA**
Breaking capacity per output	**12 W**
Short circuit-proof	**yes**
Residual current at outputs	**250 µA**
Voltage drop at OSSDs	**1,5 V**
Conditional rated short circuit current	**100 A**
Lowest operating current	**0 mA**
Utilisation category in accordance with EN 60947-1	**DC-12**
Times	
Test pulse duration, safety outputs	**450 µs**
Switch-on delay	
after UB is applied	**1,6 s**
Inputs typ.	**20 ms**
Inputs max.	**35 ms**
Actuator typ.	**500 ms**
Delay-on de-energisation	
Inputs typ.	**20 ms**
Inputs max.	**35 ms**
Actuator typ.	**25 ms**
Actuator max.	**260 ms**
Risk time in accordance with EN 60947-5-3	**260 ms**
Supply interruption before de-energisation	**15 ms**
Simultaneity, channel 1 and 2 max.	**∞**
Environmental data	
Temperature of metal surface at ambient temperature: 25 °C	**65 °C**

Environmental data	
Ambient temperature	
In accordance with the standard	**EN 60068-2-14**
Temperature range	**-25 - 55 °C**
Storage temperature	
In accordance with the standard	**EN 60068-2-1/-2**
Temperature range	**-25 - 70 °C**
Climatic suitability	
In accordance with the standard	**EN 60068-2-78**
Humidity	**93 % r. h. at 40 °C**
EMC	**EN 55011: class A, EN 60947-5-3, EN 62061**
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 60068-2-27**
Number of shocks	**3**
Acceleration	**30g**
Duration	**11 ms**
In accordance with the standard	**EN 60068-2-29**
Number of shocks	**500**
Acceleration	**10g**
Duration	**16 ms**
Airgap creepage	
Overvoltage category	**III**
Pollution degree	**3**
Rated insulation voltage	**75 V**
Rated impulse withstand voltage	**1 kV**
Protection type	
Housing	**IP67**
Mechanical data	
Holding force FZh in accordance with ISO 14119	**1000 N**
Magnetic holding force on	**1.000 N**
Magnetic holding force off	**30 N**
Max. vertical offset	**5 mm**
Max. lateral offset	**3 mm**
Max. angular offset	**2,5 deg**
Actuator 1	**PSEN sl-1.0 2.1**
Operating distances	
Assured operating distance Sao	**1 mm**
Typical operating distance So	**2 mm**
Assured release distance Sar	**15 mm**
Repetition accuracy switching distances	**40 %**
Typ. Hysteresis	**0,7 mm**
Min. distance between safety switches	**30 mm**

Mechanical data

Sensor flush installation in accordance with EN 60947-5-2	**Yes, follow installation guidelines**
Connection type	**M12, 8-pin male connector**
Cable	**LiYY 8 x 0.25 mm2**
Material	
Top	**PBT**
Anchor plate	**Nickel-plated steel**
Base plate	**Anticorodal, hard anodised**
Actuator	**Anticorodal, hard anodised**
Max. torque setting for fixing screws	**3 Nm**
Dimensions	
Height	**172 mm**
Width	**45 mm**
Depth	**44 mm**
Actuator dimensions	
Height	**188 mm**
Width	**52 mm**
Depth	**22 mm**
Weight of safety switch	**1.120 g**
Weight of actuator	**600 g**
Weight	**1.720 g**

Where standards are undated, the 2015-04 latest editions shall apply.

Technical Details Order No. 570684

General	
Approvals	**CE, EAC (Eurasian), FCC, IC, TÜV, 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	**-15 %/+10 %**
Output of external power supply (DC)	**7,2 W**
Max. inrush current at UB	**0,6 A**
Max. switching frequency	**1 Hz**

Electrical data	
Max. cable capacitance at the safety outputs	
No-load, PNOZ with relay contacts	**40 nF**
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No-load current	**40 mA**
Inputs	
Number	**2**
Voltage at inputs	**24 V DC**
Input current range	**5 mA**
Semiconductor outputs	
OSSD safety outputs	**2**
Signal outputs	**1**
Switching current per output	**500 mA**
Breaking capacity per output	**12 W**
Short circuit-proof	**yes**
Residual current at outputs	**250 µA**
Voltage drop at OSSDs	**1,5 V**
Conditional rated short circuit current	**100 A**
Lowest operating current	**0 mA**
Utilisation category in accordance with EN 60947-1	**DC-12**
Times	
Test pulse duration, safety outputs	**450 µs**
Switch-on delay	
after UB is applied	**1,6 s**
Inputs typ.	**20 ms**
Inputs max.	**35 ms**
Actuator typ.	**500 ms**
Delay-on de-energisation	
Inputs typ.	**20 ms**
Inputs max.	**35 ms**
Actuator typ.	**25 ms**
Actuator max.	**260 ms**
Risk time in accordance with EN 60947-5-3	**260 ms**
Supply interruption before de-energisation	**15 ms**
Simultaneity, channel 1 and 2 max.	**∞**
Environmental data	
Temperature of metal surface at ambient temperature: 25 °C	**65 °C**
Ambient temperature	
In accordance with the standard	**EN 60068-2-14**
Temperature range	**-25 - 55 °C**
Storage temperature	
In accordance with the standard	**EN 60068-2-1/-2**
Temperature range	**-25 - 70 °C**

Environmental data	
Climatic suitability	
In accordance with the standard	**EN 60068-2-78**
Humidity	**93 % r. h. at 40 °C**
EMC	**EN 55011: class A, EN 60947-5-3, EN 62061**
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In accordance with the standard	**EN 60947-5-2**
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Amplitude	**1 mm**
Shock stress	
In accordance with the standard	**EN 60068-2-27**
Number of shocks	**3**
Acceleration	**30g**
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Number of shocks	**500**
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Airgap creepage	
Overvoltage category	**III**
Pollution degree	**3**
Rated insulation voltage	**75 V**
Rated impulse withstand voltage	**1 kV**
Protection type	
Housing	**IP67**
Mechanical data	
Holding force FZh in accordance with ISO 14119	**1000 N**
Magnetic holding force on	**1.000 N**
Magnetic holding force off	**30 N**
Max. vertical offset	**5 mm**
Max. lateral offset	**3 mm**
Max. angular offset	**2,5 deg**
Actuator 1	**PSEN sl-1.0fm 2.1**
Operating distances	
Assured operating distance Sao	**1 mm**
Typical operating distance So	**2 mm**
Assured release distance Sar	**15 mm**
Repetition accuracy switching distances	**40 %**
Typ. Hysteresis	**0,7 mm**
Min. distance between safety switches	**30 mm**
Sensor flush installation in accordance with EN 60947-5-2	**Yes, follow installation guidelines**
Connection type	**M12, 8-pin male connector**
Cable	**LiYY 8 x 0.25 mm2**

Mechanical data	
Material	
Top	**PBT**
Anchor plate	**Nickel-plated steel**
Base plate	**Anticorodal, hard anodised**
Actuator	**Anticorodal, hard anodised**
Max. torque setting for fixing screws	**3 Nm**
Dimensions	
Height	**172 mm**
Width	**45 mm**
Depth	**44 mm**
Actuator dimensions	
Height	**188 mm**
Width	**52 mm**
Depth	**22 mm**
Weight of safety switch	**1.120 g**
Weight of actuator	**590 g**
Weight	**1.710 g**

Where standards are undated, the 2015-04 latest editions shall apply.

Supplementary data

Radio approval

USA/Canada

FC **FCC ID: VT8-PSENSLP**
FC **IC: 7482A-PSENSLP**

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.

Safety characteristic data

> **!** **NOTICE**
>
> You must comply with the safety-related 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	3,29E-09	SIL 3	1,72E-04	20

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

> **i** **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.

Order reference

Safety gate system

Product type	Features	Connection type	Order no.
PSEN sl-1.0p 6.1 / PSEN sl-1.0 1 unit	Safety gate system, fully coded	M12, 8-pin connector	570 681
PSEN sl-1.0p 6.1 / PSEN sl-1.0fm 1 unit	Safety gate system, fully coded, with free-moving actuator	M12, 8-pin connector	570 684

Accessories

Product type	Features	Order no.
PSEN sl bracket swing door	Mounting bracket for swing gates and folding gates	570 550
PSEN sl bracket sliding door	Mounting bracket for sliding gates	570 551

EC declaration of conformity

This product/these products meet the requirements of the directive 2006/42/EC for machinery of the European Parliament and of the Council. 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

▶ Support

Technical support is available from Pilz round the clock.

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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.

PILZ
THE SPIRIT OF SAFETY