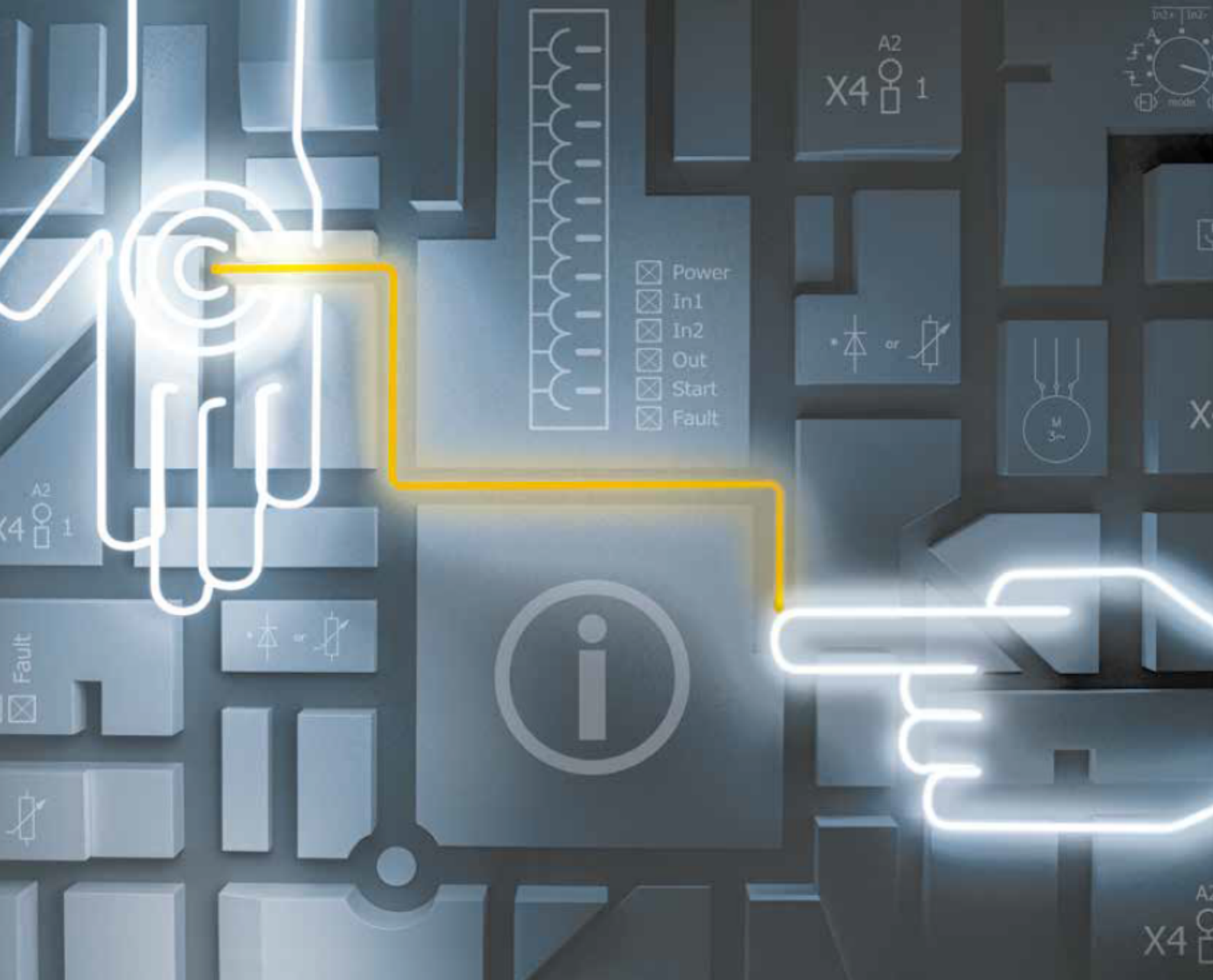




► PSEN mg1-A-LLXXX

PILZ
THE SPIRIT OF SAFETY

Operating Manual-1006671-EN-07



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SD means Secure Digital

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1 Introduction

1.1 Validity of documentation

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

This documentation is valid for products in the series PSEN mg1-A-LLXXX from Version 1.0. It is valid until new documentation is published.

1.2 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.

1.3 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.

2 Safety

2.1 Intended use

The product is a combination of a safety locking device and control elements that have a fixed connection to the safety locking device.

- ▶ 2 pushbuttons, illuminated

The safety guard locking device is used for interlocking and guard locking of swing gates and sliding gates.

The hazardous machine function may only be executed under the following conditions:

- ▶ There is a high signal at safety outputs 12 and 22 and
- ▶ There is a low signal at safety inputs S31 (Lock/Unlock Request 1) and S41 (Lock/Unlock Request 2).

Safety inputs S31 and S41 (solenoid operation) may only be operated when the plant is in a safe state.

- ▶ Ensure that this is the case in the safety controller, for example with an AND operation immediately before the output on the safety controller is activated.

The safety switch meets the requirements in accordance with:

- ▶ EN 60947-5-3: Pddb
- ▶ EN IEC 61508
- ▶ EN IEC 62061
- ▶ EN ISO 13849-1: PL d (Cat. 2)
- ▶ EN ISO 14119
 - Coding level  12] with actuator PSEN ml 1.1: low, type 4
 - Coding level with actuator PSEN ml 2.1: high, type 4

The safety switch may only be used with one of the approved actuators (see [Approved combinations](#)  11]).

The safety level PL e (Cat. 4) is only achieved when

- ▶ for the interlock, the safety outputs have dual-channel processing
- ▶ for the guard locking device, the solenoid has dual-channel-channel operation via safe, tested outputs, suitable for PL e (Cat. 4) applications.

With single-channel operation of the safety inputs S31 (Lock/Unlock Request 1) and S41 (Lock/Unlock Request 2), it is only possible to achieve safety level PL d (Cat. 2).



NOTICE

Shock stress exceeded: if the safety switch is used together with one of the actuators PSEN ml DHM (as described in this document), the max. acceleration is reduced to 10g.

Foreseeable misuse

- ▶ Use of the product as an emergency release.
- ▶ Safety switches and actuators for the safety locking device must not be used as mechanical limit stops.
- ▶ Use under corrosive environmental conditions (e.g. cooling emulsions, surface treatment, gases).
- ▶ Use in environments with high dust pollution.
- ▶ PSEN mgate LLXXX may only be installed in an industrial environment A.
PSEN mgate LLXXX may cause interference if installed in other environments.

2.2 Safety regulations

2.2.1 Safety assessment

Before using a product, a risk assessment in accordance with the Machinery Directive is required.

The product as an individual component fulfils the functional safety requirements in accordance with EN/IEC 61508, EN ISO 13849-1/2 and EN IEC 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.

It is the responsibility of the user/operator to carry out a risk assessment for their application, in which they consider the impact of assumed errors in the wiring and take appropriate measures to control or avoid these errors.

2.2.2 Additional documents that apply

Please read and take note of the following documents.

Only when using Safety Device Diagnostics (SDD)

- ▶ Fieldbus module operating manual, SDD ES PROFINET (1003826) for example
- ▶ System description Safety Device Diagnostics (1003827)

When using passive junctions

- ▶ Operating manual for a passive junction

When using a handle module

- ▶ Operating manual PSEN ml DHM

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

2.2.3 Use of qualified personnel

The products may only be assembled, installed, programmed, commissioned, operated, de-commissioned and maintained 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. In order to inspect, assess and handle products, devices, systems, plant and machinery, this person must be familiar with 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.

2.2.4 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.).

2.2.5 Disposal

- ▶ In safety-related applications, please comply with the mission time T_M stated 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).

2.3 For your safety

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



WARNING!

Risk of injury due to loss of the safety function

Replacing an actuator (e.g. defective actuator) with an inappropriate actuator from the interlock and guard locking system may lead to serious injury and death.

- You should prevent the interlocking and guard locking system from being manipulated with an inappropriate actuator.
- Keep the substitute actuator (optional) in a safe place and protect it from unauthorised access.
- Destroy any replaced actuators before disposal.

3 Overview

3.1 Approved combinations

A safety gate system consists of a safety switch and an actuator.

Various actuators are approved, each of which offer a range of additional options.

If the operating manual mentions an actuator, it means any approved actuator.

Safety switch	Actuator
PSEN mg1-A-LLXXX-LBA1-S1-D	PSEN ml 1.1 actuator
PSEN mg1-A-LLXXX-LBA1-S1-U	PSEN ml 1.1 round actuator
PSEN mg1-A-LLXXX-RBA1-S1-D	
PSEN mg1-A-LLXXX-RBA1-S1-U	
PSEN mg1-A-LLXXX-FBA1-S1-D	
PSEN mg1-A-LLXXX-FBA1-S1-U	
Mechanical safety switch with guard locking, coded.	
PSEN mg1-A-LLXXX-LBA1-S1-D	PSEN ml DHM down l 1.1 actuator
Mechanical safety switch with guard locking, coded.	
PSEN mg1-A-LLXXX-LBA1-S1-U	PSEN ml DHM up r 1.1 actuator
Mechanical safety switch with guard locking, coded.	
PSEN mg1-A-LLXXX-RBA1-S1-D	PSEN ml DHM down r 1.1 actuator
Mechanical safety switch with guard locking, coded.	
PSEN mg1-A-LLXXX-RBA1-S1-U	PSEN ml DHM up l 1.1 actuator
Mechanical safety switch with guard locking, coded.	
PSEN mg1-A-LLXXX-LBA2-S1-D	PSEN ml 2.1 actuator
PSEN mg1-A-LLXXX-LBA2-S1-U	PSEN ml 2.1 round actuator
PSEN mg1-A-LLXXX-RBA2-S1-D	
PSEN mg1-A-LLXXX-RBA2-S1-U	
PSEN mg1-A-LLXXX-FBA2-S1-D	
PSEN mg1-A-LLXXX-FBA2-S1-U	
Mechanical safety switch with guard locking, fully coded.	
PSEN mg1-A-LLXXX-LBA2-S1-D	PSEN ml DHM down l 2.1 actuator
Mechanical safety switch with guard locking, fully coded.	

Safety switch	Actuator
PSEN mg1-A-LLXXX-LBA2-S1-U Mechanical safety switch with guard locking, fully coded.	PSEN ml DHM up r 2.1 actuator
PSEN mg1-A-LLXXX-RBA2-S1-D Mechanical safety switch with guard locking, fully coded.	PSEN ml DHM down r 2.1 actuator
PSEN mg1-A-LLXXX-RBA2-S1-U Mechanical safety switch with guard locking, fully coded.	PSEN ml DHM up l 2.1 actuator

A distinction is made between the following Pilz coding types:

Pilz coding types	Description	Coding level in accordance with EN ISO 14119
Coded	The safety switch PSEN mg switch accepts any PSEN ml actuator.	Low
Fully coded	The safety switch PSEN mg switch only accepts a taught-in PSEN ml actuator. A maximum of 8 learning procedures are possible for that one actuator.	High

3.2 Product features

- ▶ Upward or downward cable outlet
The safety switches are available with cable outlet upwards or downwards, as an option (see [order references](#)  102]).
- ▶ On small door radiuses, (see [Install the safety switch horizontally at a swing gate](#)  34]) the PSEN ml actuator center ring can be inserted (see [Order reference: Accessories](#)  104]).
- ▶ Diagnostic input for Y1 for Safety Device Diagnostics (SDD)
- ▶ Signal output/diagnostic output Y32 for Safety Device Diagnostics
- ▶ An escape release (stationary or external) can be added to the safety switch (see [Order reference: Accessories](#)  104]).

The options for positioning the escape release vary between the individual types.

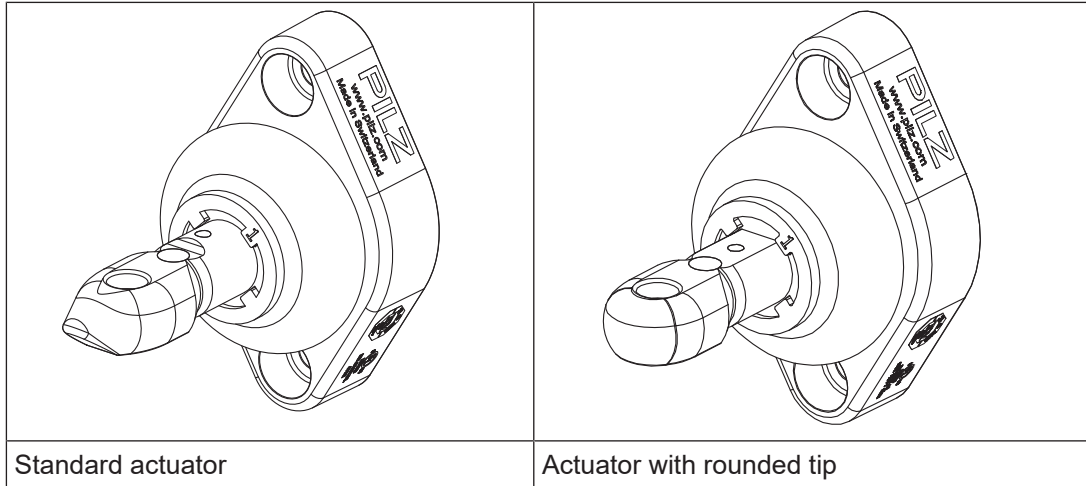
The escape release enables the manual release of the guard locking device without aids from **inside** the danger zone and corresponds to an escape release in accordance with EN ISO 14119.

The stationary escape release can be extended by a maximum of 50 mm (twice by 25 mm).

The external escape releases are available with push/pull cables between 0.5 and 4 m in length (50 cm increments).

- ▶ The bolt in the actuator can be [rotated 90° in the actuator housing before the actuator is installed](#)  42]. As a result, the actuator can be installed vertically or horizontally.

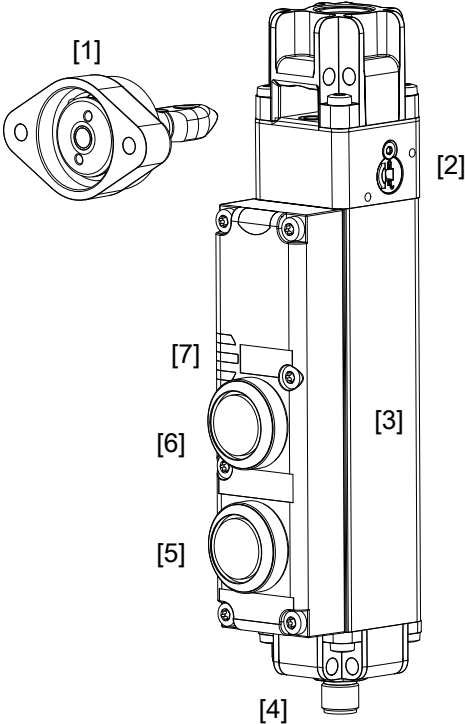
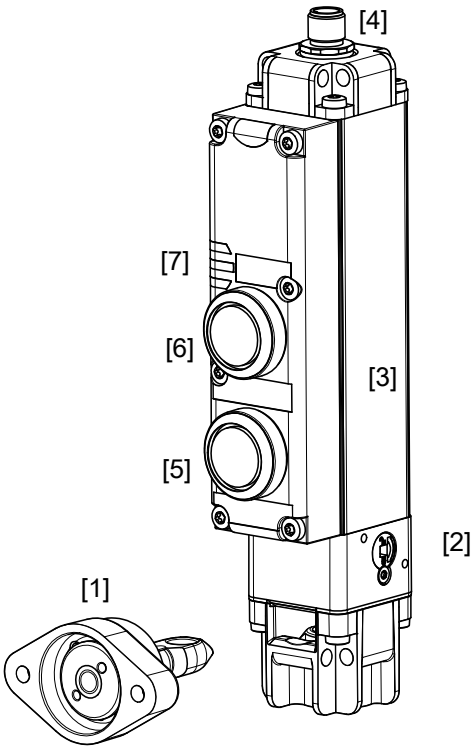
- ▶ The actuator is available in two types (see [Order reference: Accessories](#)  104]).
 - Standard actuator
 - Actuator with rounded tip



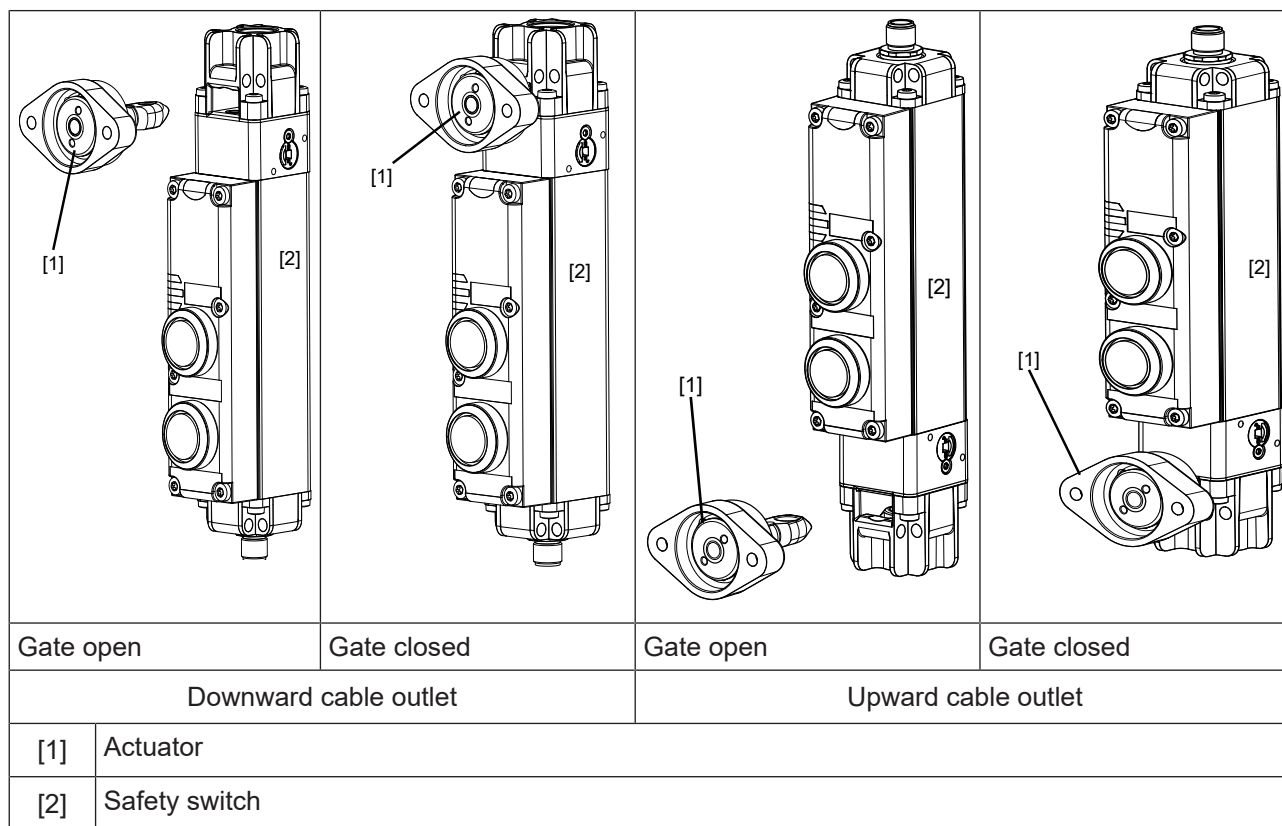
- ▶ Suitable for left and right hinged safety gates
- ▶ Safe interlocking (position monitoring)
- ▶ Safe guard locking for swing gates and sliding gates
- ▶ Guard locking element keeps the safety gate from being opened unintentionally
- ▶ 2 safety outputs
- ▶ Transponder technology

- ▶ Safety Device Diagnostics (SDD)
 - Safety Device Diagnostics can be used to retrieve sensor information, to perform actions and to read and write configuration parameters.
 - Manipulation protection in accordance with ISO 14119 is possible by verifying the short name of the actuator through the controller via SDD communication.
- ▶ 12-pin M12 male connector
- ▶ LEDs:
 - Supply voltage/fault
 - Status of actuator
 - Status of guard locking

4 Function description

 Downward cable outlet	
 Upward cable outlet	
[1]	Actuator
[2]	Auxiliary release
[3]	Safety switch
[4]	Connector
[5]	BE1: Pushbutton, illuminated
[6]	BE2: Pushbutton, illuminated
[7]	LEDs for status display

4.1 Structure



The interlocking and guard locking system prevents the safety gates to the danger zone from being opened while there is any hazard within the danger zone (machine movement, voltage, ...).

The safety outputs may have a high or low signal, depending on the position of the actuator and the signal path of safety inputs S31 and S41 (solenoid operation).

Safety outputs 12 and 22

A high signal is present at safety outputs 12 and 22 under the following conditions:

- ▶ Actuator is detected **and**
- ▶ The guard locking pin has successfully been activated (guard locking pin is in the locked position)

If one of these conditions is not met, the signal at the safety outputs will be low.

4.2 Activation of safety inputs S31 and S41 (solenoid operation)

- ▶ If there is a low signal at safety inputs S31 and S41, the guard locking pin does not change its position.
- ▶ Guard locking may only be deactivated once the hazardous movement has been completed.

Active use of Safety Device Diagnostics

► Operation with active use of the Safety Device Diagnostics

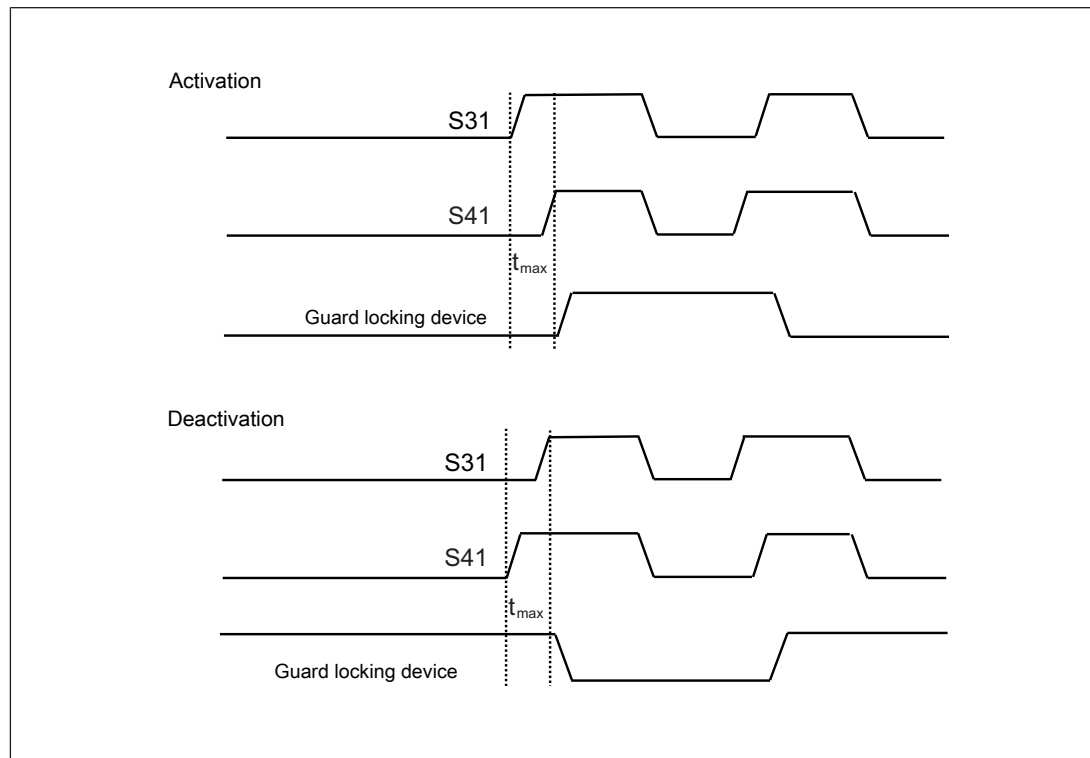
- Activate/deactivate the guard locking by a combination of a Safety Device Diagnostics command and the status of the safety inputs S31 and S41 (S31 and S41 must have a high signal).

The safety requirements are guaranteed by the signals S31 and S41 (the fieldbus for Safety Device Diagnostics communication is not safe).

4.2.1

Activation with specification of direction

- Guard locking is activated when the time between the rising edges from S31 to S41 is between 40 ms and 500 ms ($t_{\max}$) (S31 before S41).
- Guard locking is deactivated when the time between the rising edges from S41 to S31 is between 40 ms and 500 ms ($t_{\max}$) (S41 before S31).
- Force direction: The safety switch is selectively activated or deactivated by offset activation of the rising edges at S31 and S41.



Legend

$t_{\max}$ Maximum time between the rising edges from S31 and S42

4.2.2

Activation without specification of direction

Guard locking is activated through a simultaneous high signal at inputs S31 and S41 (solenoid operation). After activation, the inputs must be low. Another pulse at these inputs deactivates guard locking.

- The guard locking changes its state when the time between the rising edges from S31 and S41 < 20 ms.

- ▶ Toggle: The safety switch changes the guard locking status (activated <-> deactivated) each time S31 and S41 are activated simultaneously.

4.3 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 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.

Any exchange can be detected via the fieldbus module, through the serial number for example.

- ▶ 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 switch).
 - Perform actions (example: poll updated actuator name).
 - Selectively activate or deactivate guard locking of individual PSEN mg within a series connection.

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.

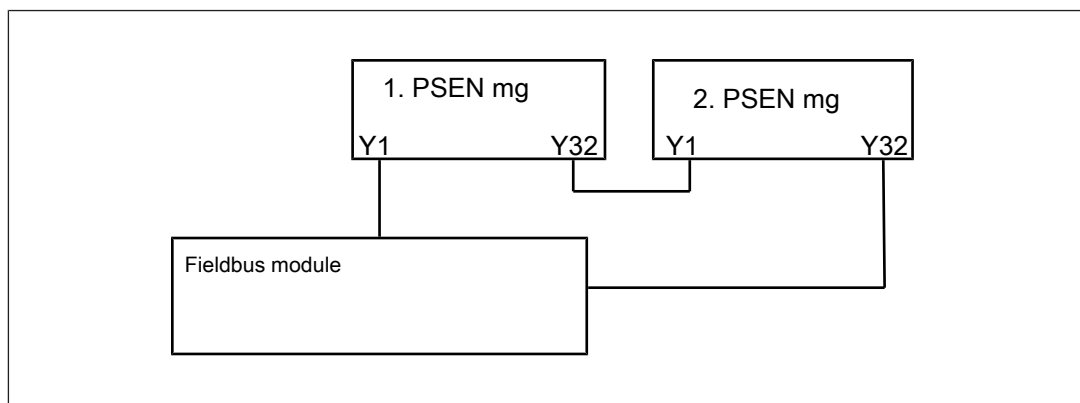
- ▶ With Safety Device Diagnostics there are the following diagnostic options for the fieldbus module for simple wiring:
 - Information is passed on via the fieldbus module directly to the network
 - Mappings of the signal outputs to the sensor are automated by the SDD.

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.

Further information on Safety Device Diagnostics can be found in [Additional documents that apply \[9\]](#).

- ▶ Series connection for diagnostics with Safety Device Diagnostics



4.4 Operating modes

The safety switch can be used in various operating modes.

- ▶ Operation without Safety Device Diagnostics
 - Standard operating mode
 - After every restart the safety switch is in operation without Safety Device Diagnostics.
 - No communication with Safety Device Diagnostics
 - Guard locking is activated/deactivated exclusively via signals S31 and S41.
- ▶ Operation with passive use of the Safety Device Diagnostics
 - Safety switch supplies diagnostic data to Safety Device Diagnostics.
 - Guard locking is activated/deactivated exclusively via signals S31 and S41.
- ▶ Operation with active use of the Safety Device Diagnostics
 - Activate/deactivate the guard locking by a combination of a Safety Device Diagnostics command and the status of the safety inputs S31 and S41 (S31 and S41 must have a high signal).

The safety requirements are guaranteed by the signals S31 and S41 (the fieldbus for Safety Device Diagnostics communication is not safe).

Timing diagrams

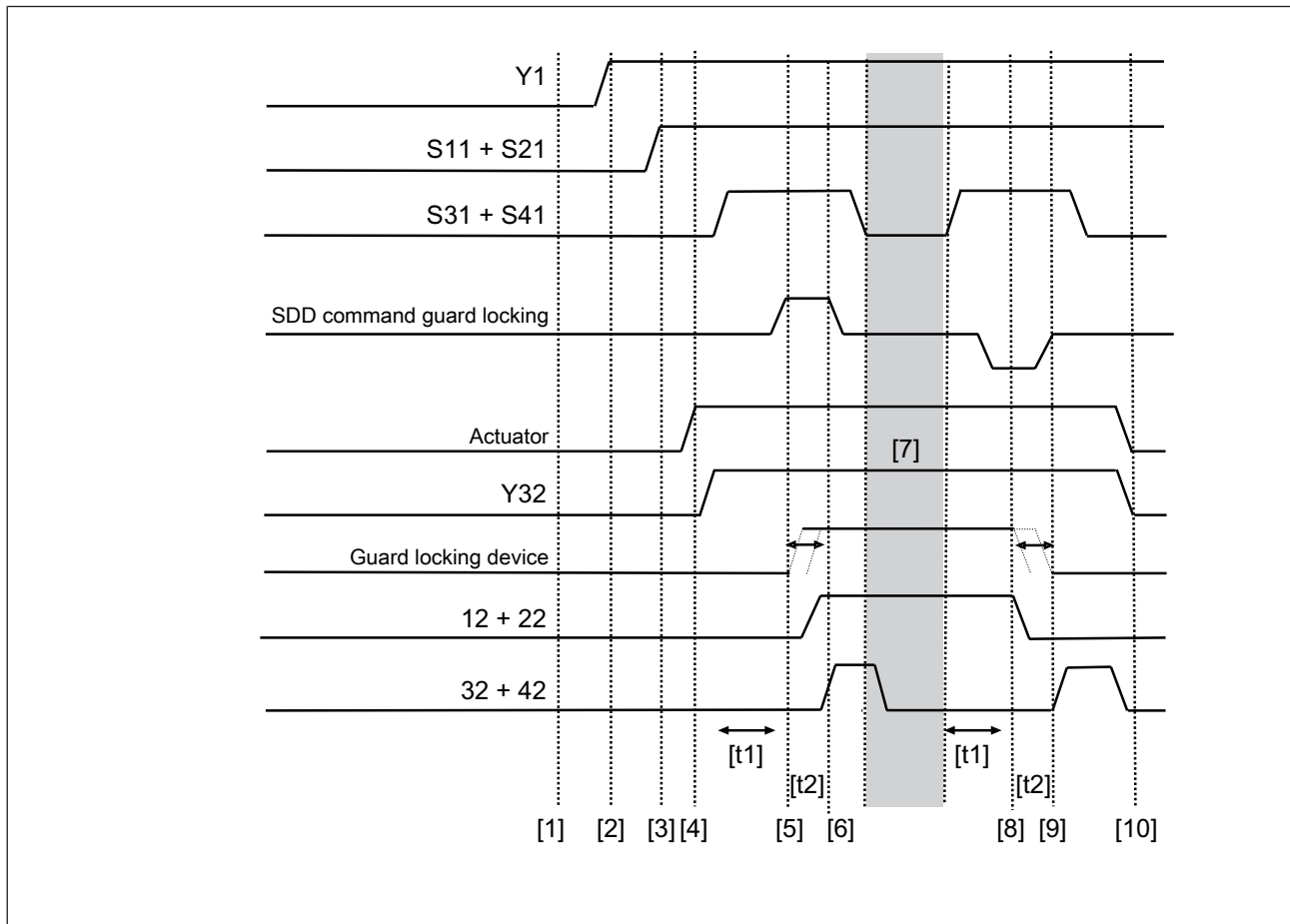


Fig.: Active use of Safety Device Diagnostics

Legend

- [1] Gate is open
- [2] The door connected upstream in the series connection is closed
- [3] The door connected upstream in the series connection is locked
- [4] Gate is closed
- [5] Guard locking is activated by the safety control system
- [6] Guard locking is activated
- [7] Execution of the hazardous machine function is permitted
- [8] Outputs will be deactivated
- [9] Guard locking will be deactivated
- [10] Gate is open
- [t1] Processing time of guard locking signal = 100 ms
- [t2] Time window for changing guard locking status

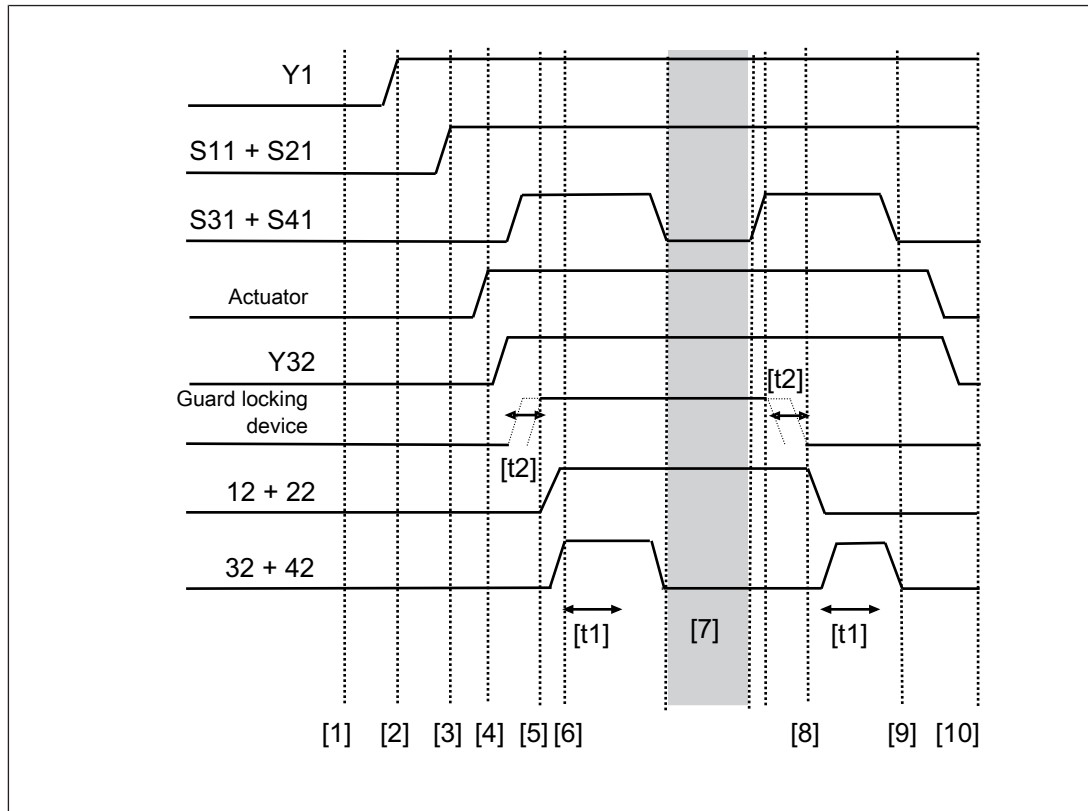
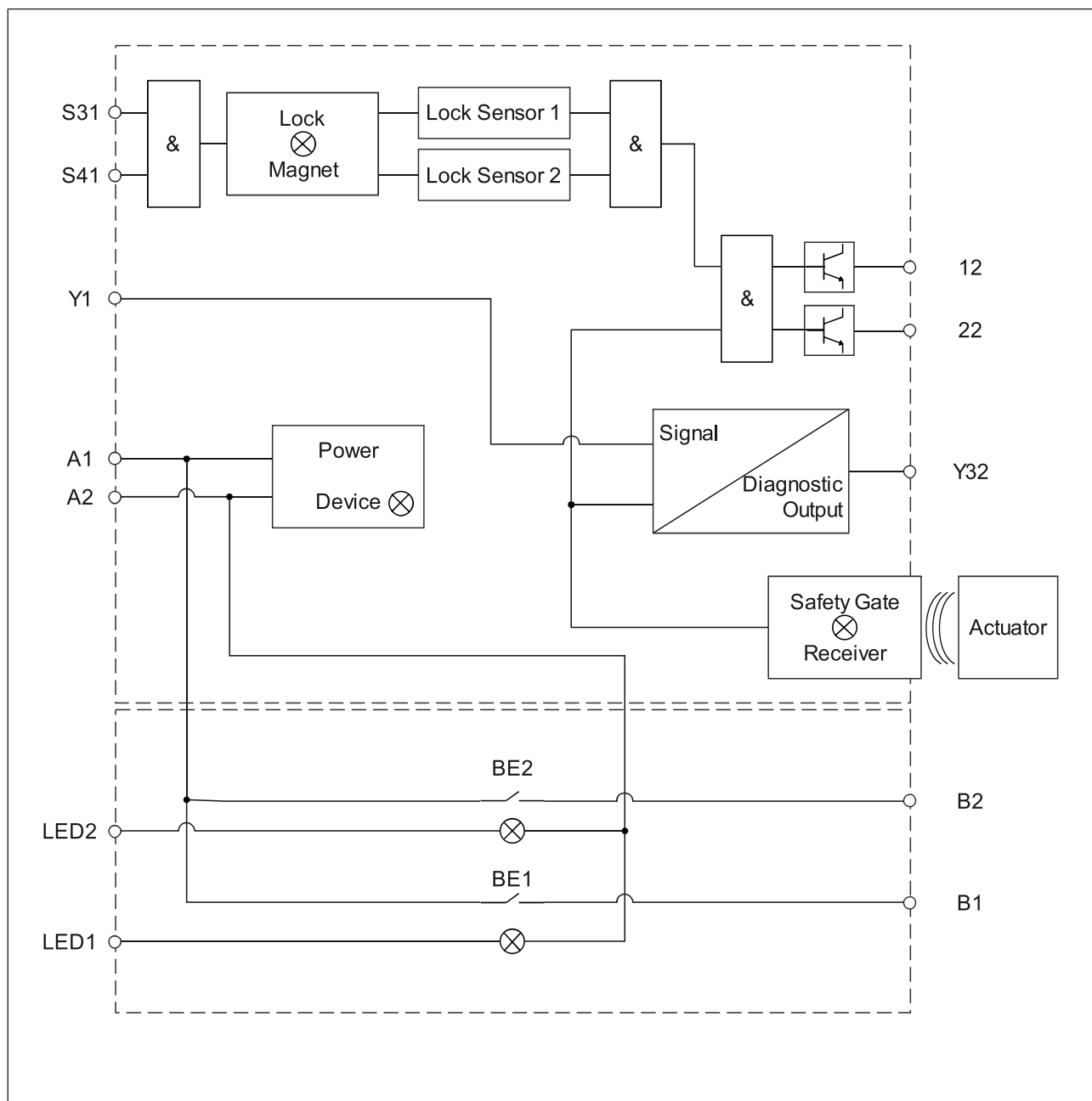


Fig.: Passive use of the Safety Device Diagnostics

Legend

- [1] Gate is open
- [2] The door connected upstream in the series connection is closed
- [3] The door connected upstream in the series connection is locked
- [4] Gate is closed
- [5] Guard locking is activated by the programmable safety system
- [6] Guard locking is activated
- [7] Execution of the hazardous machine function is permitted
- [8] Outputs will be deactivated
- [9] Guard locking will be deactivated
- [10] Gate is open
- [t1] Processing time of guard locking signal = 100 ms
- [t2] Time window for changing guard locking status

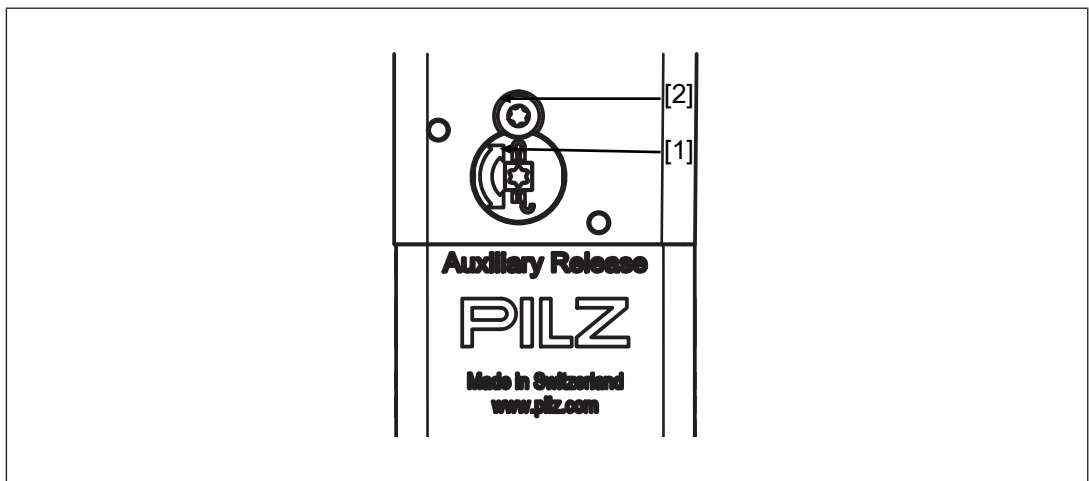
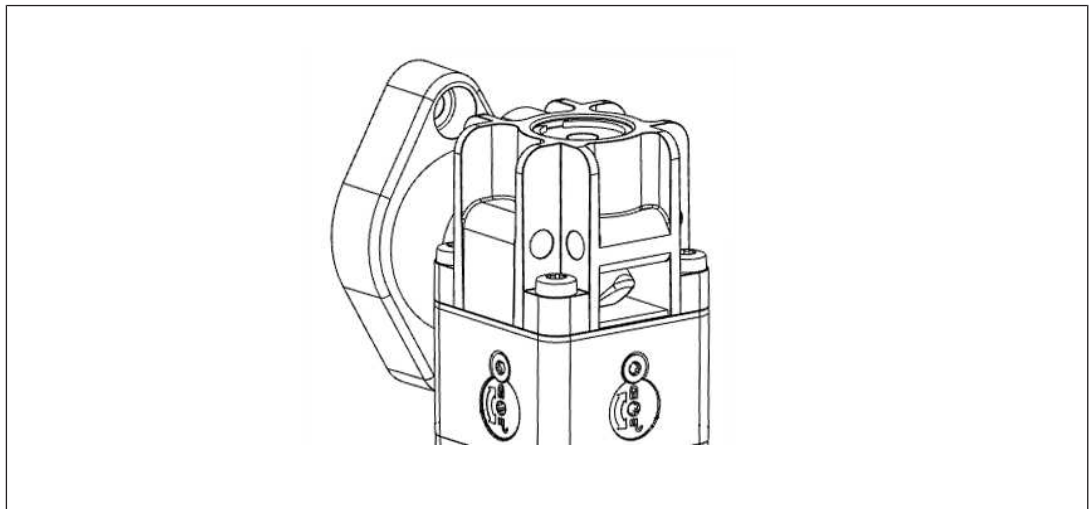
4.5 Block diagram



4.6 Auxiliary release

The auxiliary release enables guard locking to be opened from the access side to the danger zone.

The safety switch has auxiliary releases on three sides.



Legend

- [1] Auxiliary release screw Torx T10
- [2] Security screw Torx T10, sealed with varnish when delivered

Procedure:

1. Remove the security screw [2] using a Torx T10 screwdriver.
2. Rotate the auxiliary release screw [1] half a turn anti-clockwise using a Torx T10 screwdriver. The guard locking pin is displaced and the bolt is released.

The safety gate to the danger zone can be opened.



INFORMATION

If guard locking is deactivated using the auxiliary release, there is a low signal at safety outputs 12 and 22. A warning is issued (see [Operation \[55\]](#)). The safety switch does **not** switch to a fault state.

It is possible to open guard locking using the control system.

4.6.1 Recommissioning

1. Turn the auxiliary release screw [1] (see Figure) half a turn clockwise using a Torx T10 screwdriver.
2. Re-insert the security screw [2] (see Figure) using a Torx T10 screwdriver.
3. Seal the security screw with thread-locking fluid (e.g. Loctite 7400).
4. Carry out a function test on the safety switch and actuator. The safety function may only be checked by qualified personnel.

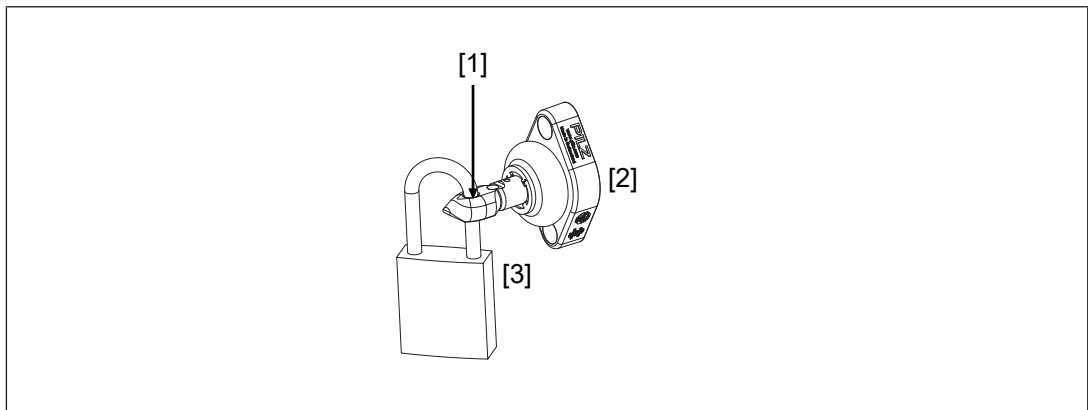


INFORMATION

If the auxiliary release screw is not returned back into position correctly after use, guard locking cannot be activated/deactivated.

4.7 Prevent restart

To prevent the machine restarting (unintentionally) while there is someone inside the danger zone, a padlock can be attached via the through hole on the actuator (see diagram). As a result the actuator cannot engage with the safety switch, guard locking is not activated and the machine is prevented from starting.



Legend

- [1] Through hole on the actuator for attaching a padlock
- [2] Actuator
- [3] Padlock

- If the actuator is to be blocked using several locks in parallel, a multiple lock can be used (e.g. Brady lockout device, article no. 852439).

5 Wiring

5.1 Important information

- ▶ Screw the connector in place. Please note the max. torque setting in the [Technical details](#) [69].
- ▶ Information given in the [Technical details](#) [69] must be followed.
- ▶ Comply with the max. cable length.

Supply voltage on the safety controller	Max. cable length
$\geq 20.4 \text{ V}$	50 m
$\geq 24 \text{ V}$	120 m
$\geq 28.8 \text{ V}$	180 m

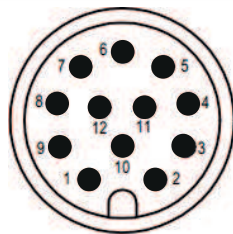
- ▶ The power supply must meet the regulations for extra low voltages with protective electrical separation (SELV, PELV).
- ▶ The power supply must have an overvoltage protection of $\leq 35 \text{ V DC}$.

5.2 Pin assignment



NOTICE

The colour marking for the connection lead only applies for the cable that Pilz supplies as an accessory.



12-pin M12 male connector

PIN	Function	Terminal designation	Cable colour (Pilz cable)
1	+24 V UB	A1	Brown
2	0 V UB	A2	Blue
3	Operation of solenoid to open and close guard locking (channel 2)	S41	White
4	Safety output channel 1	12	Green
5	Operation of solenoid to open and close guard locking (channel 1)	S31	Pink
6	Safety output channel 2	22	Yellow
7	LED pushbutton 1	LED1	Black
8	Signal output/diagnostic output	Y32	Grey

PIN	Function	Terminal designation	Cable colour (Pilz cable)
9	Diagnostic input	Y1	Red
10	LED pushbutton 2	LED2	Purple
11	Pushbutton 1	B1	Grey-pink
12	Pushbutton 2	B2	Red-blue

5.3

EMC requirements

- ▶ Ensure the wiring and EMC requirements of EN 60204-1 are met.
- ▶ UL requirement: The supply voltage to the safety switch must be protected with a quick-acting fuse (see [Technical details \[69\]](#)).
- ▶ The power supply must meet the regulations for extra low voltages with protective electrical separation (SELV, PELV).



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 inputs and outputs of the safety switch must have protective separation from voltages over 35 VDC.

6 Connection to controllers and evaluation devices

6.1 Important information

Ensure that the selected evaluation device has the following properties:

- ▶ Dual-channel with plausibility monitoring
Both OSSDs must change the switch state synchronously. In particular, the evaluation device must monitor that the state of **both** OSSDs was "Gate unlocked" before **both** return to the "Gate locked" state and vice-versa.
- ▶ OSSD signals have dual-channel evaluation.
- ▶ The state of the OSSDs must be tested before and after safety inputs S31 and S41 are activated (solenoid operation) (see [Timing diagram \[📖 20\]](#)).



WARNING!

Potential loss of safety function due to failure to test for a safe condition

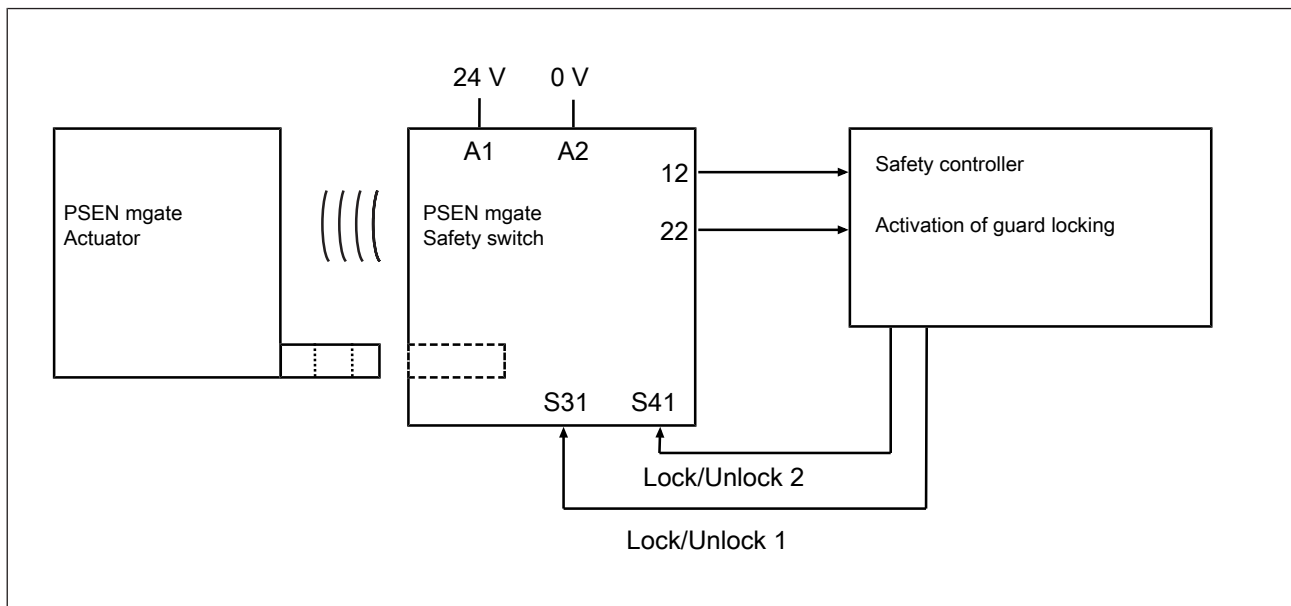
Depending on the application, serious injury or death may result.

- Use an evaluation device/safety system to test whether the plant is in a safe condition.
- Do not operate the solenoid of the PSEN mgate LLXXX via S31/S41 unless the plant is in a safe condition.

6.2 Minimum requirements for activation of guard locking

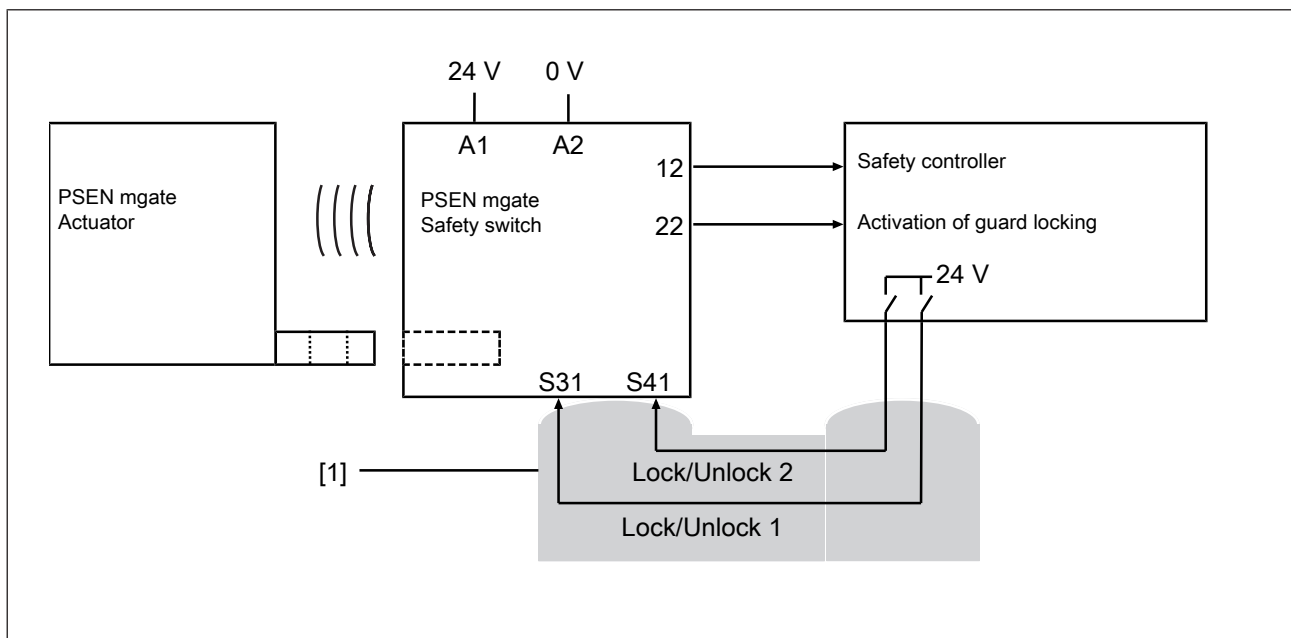
Use in PL e (Cat. 4) applications

- ▶ The safety inputs S31 and S41 (solenoid operation) have dual-channel-channel operation via safe outputs, which are suitable for PL e (Cat. 4) applications.
- ▶ Dual-channel operation of safety inputs S31 and S41 (solenoid operation), each with 0.5 A.
- ▶ Dual-channel processing of safety outputs.
- ▶ Monitoring of shorts across signal cables through activation of guard locking.



Use in PL d (Cat. 3) applications

- ▶ The safety inputs S31 and S41 (solenoid operation) have dual-channel operation via safe relay outputs.
- ▶ Dual-channel operation of safety inputs S31 and S41 (solenoid operation), each with 0.5 A.
- ▶ Dual-channel processing of safety outputs.
- ▶ Exclusion of shorts across signal cables through appropriate measures (e.g. protected cable layout, see EN ISO 13849-2).

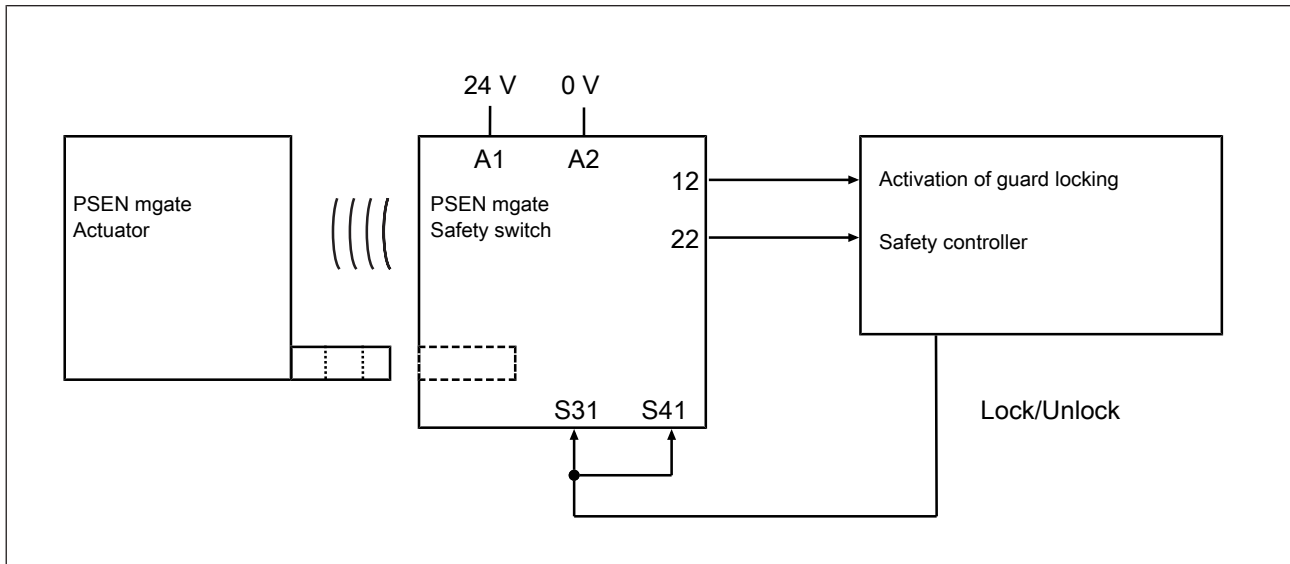


Legend

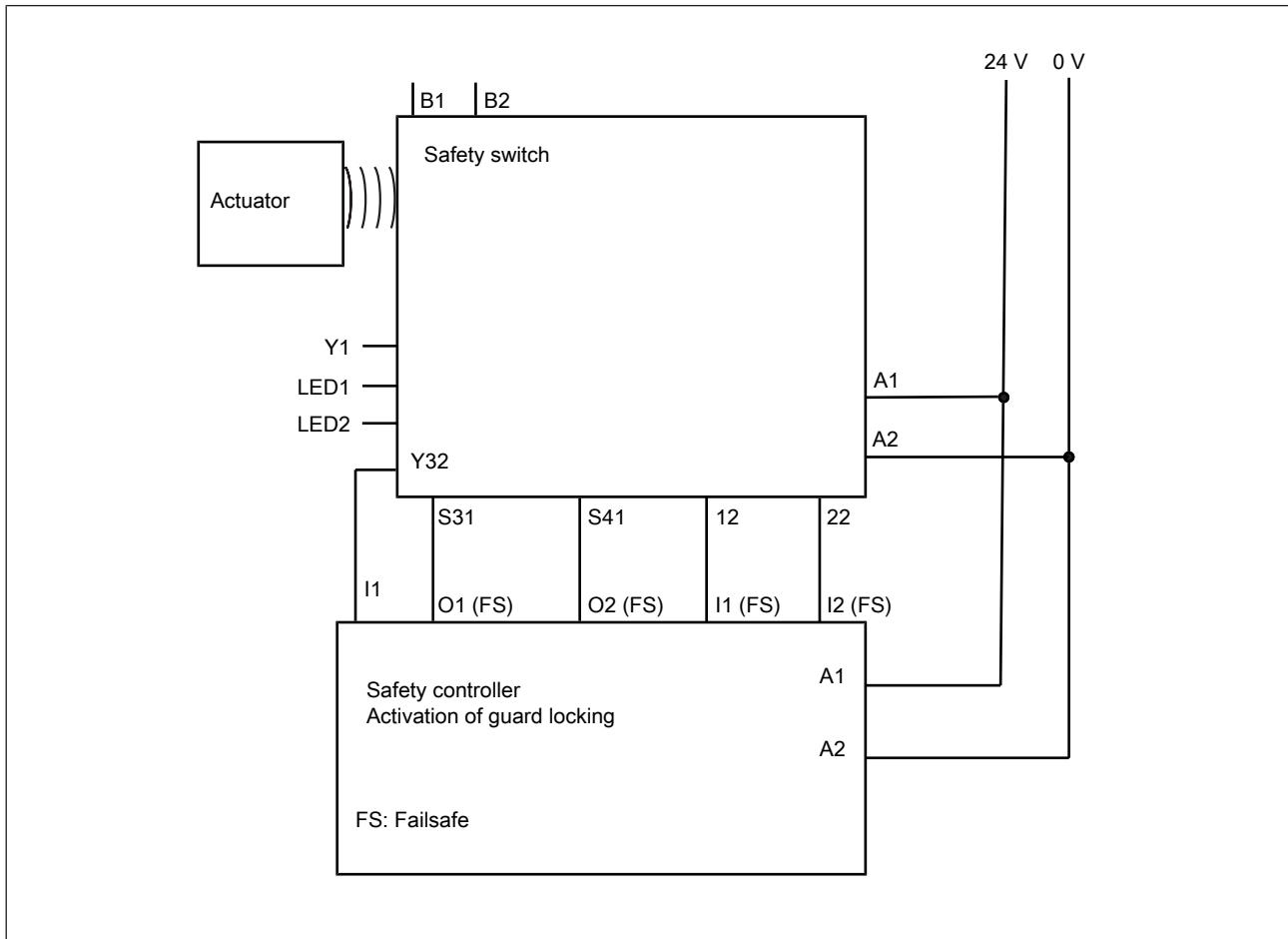
[1] Protected cable layout

Use in PL d (Cat. 2) applications

- ▶ 1-channel operation for safety inputs S31 and S41 (solenoid operation) via safe outputs
- ▶ Dual-channel processing of safety outputs.
- ▶ Single-channel operation of interconnected safety inputs S31 and S41 (solenoid operation), with 1 A.



6.3 Single connection



7 Teaching in the actuator

Coded safety switch

Any corresponding Pilz actuator (see [Technical Details \[69\]](#)) is detected as soon as it is brought into the response range.

Fully-coded safety switch

Teaching in the actuator for the first time:

The first actuator to be detected by the safety switch (see [Technical details \[69\]](#)) is taught in automatically as soon as it is brought into the response range.

To teach in a new actuator:

- ▶ A maximum of eight 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 "Gate" LED will flash yellow.
- 2. After a waiting period of 20 s, the "Gate" LED has quick yellow flashes. Trigger a system reset in the next 120 s by interrupting the supply voltage.
- 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 one.



NOTICE

- The actuator must not be removed during the learning procedure.
- It is no longer possible to retrain this actuator on the same safety switch.

8 Installation

8.1 Important information



NOTICE

Install the safety switch and actuator so that the possibilities of defeat are reduced to a minimum (see guidelines for reducing the possibilities for defeating interlocking devices in EN ISO 14119).



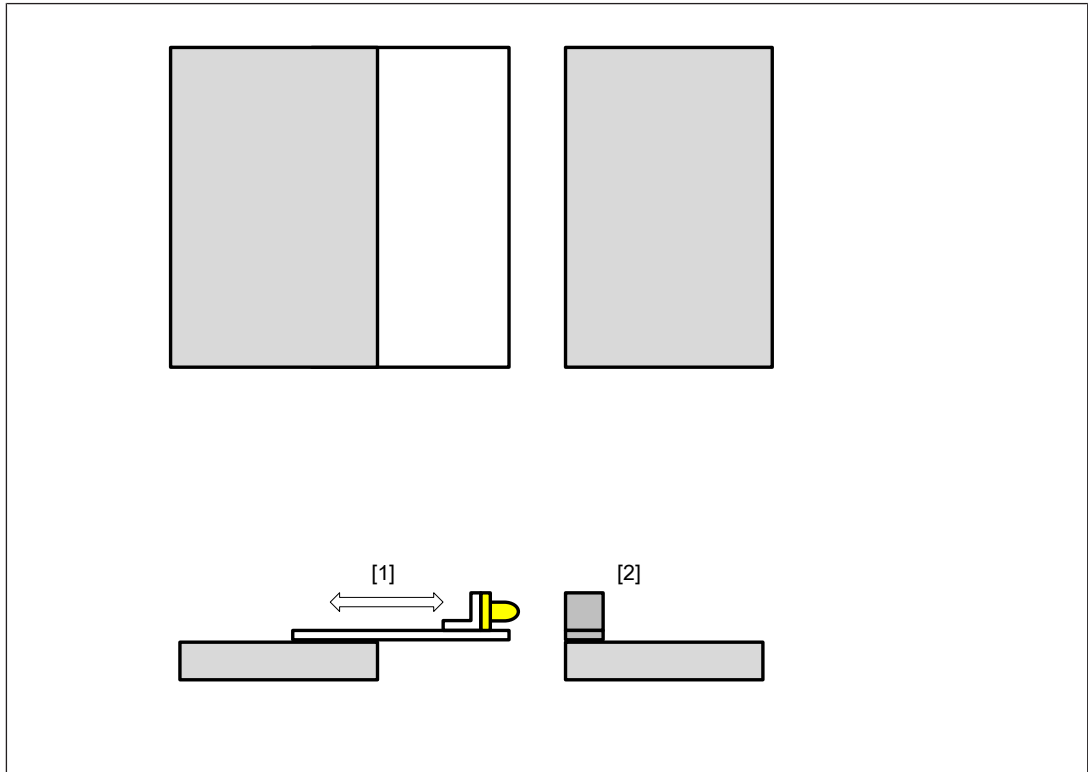
NOTICE

Install safety switch and actuator so that it is not possible to reach through with hand or finger.

- ▶ The mounting surfaces for safety switches and actuators can have a max. unevenness of 0.5 mm.
- ▶ The safety switch and actuator should be installed opposite each other in parallel.
- ▶ For a minimum screw depth of 6 mm, M5 screws with resistance class 8.8 should be used to attach the safety switch and actuator.
- ▶ Pilz recommends that you use the PSEN ml actuator center ring (see [Order reference \[104\]](#)) only with small door radiuses (see [Install the safety switch horizontally at a swing gate \[34\]](#)).
- ▶ After installation, at least one of the auxiliary releases/escape releases must be operated.
- ▶ Torque setting: Please note the information provided under [Technical details \[69\]](#). Don't fully tighten the safety screws until the safety switches and actuators are correctly aligned and the function has been tested (see [Adjustment \[54\]](#)).
- ▶ For a minimum screw depth of 7.2 mm, M6 screws with resistance class 8.8 should be used to attach the L-bracket.
- ▶ Prevent the safety switch and actuator being exposed to heavy shock or vibration.
- ▶ 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 self-loosening of the fastening elements,
 - On the safety switch: By complying with the max. torque setting (see [Technical details \[69\]](#)).
 - On the actuator: By complying with the max. torque setting (see [Technical details \[69\]](#)) and medium-strength threadlockers.
- ▶ The actuator must rest flush on the mounting surface.
- ▶ Installation of the safety switch and actuator must be concealed.
- ▶ Safety switches and actuators of the safety gate system must not be used as mechanical limit stops.
- ▶ PSEN mgate LLXXX must be situated so that it can easily be reached above the access level (e.g. base level, platform level).

8.2 Installation types

8.2.1 Installation on sliding gate



Legend

[1] Actuator with mounting bracket (available as [Accessory](#)  104]), installed on sliding gate

[2] Safety switch, installed on gate frame

1. Install a safety switch for left or right entry of the actuator with the [fixing screws of the safety switch parallel to the actuator](#)  40] on the gate frame.
2. Use two M5 screws to fix the actuator to the gate.

8.2.2 Installation on swing gate



WARNING!

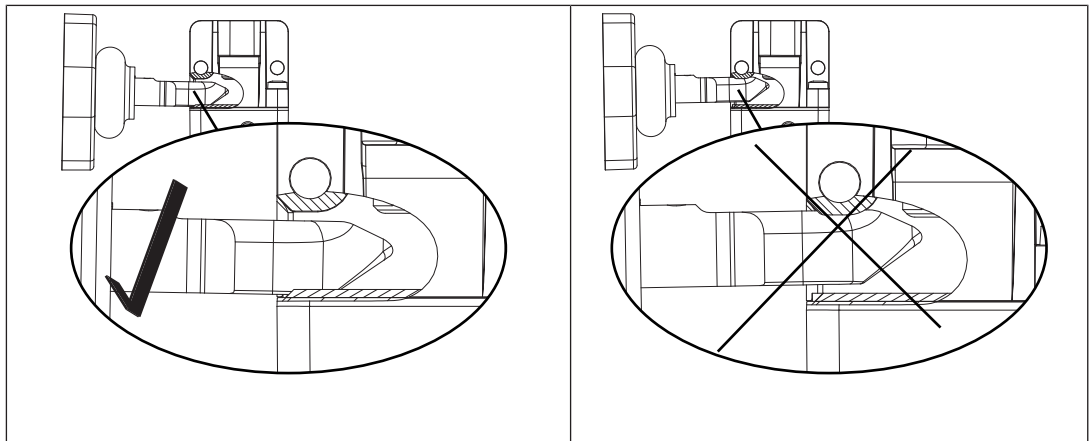
Risk of injury when using PSEN mgate LLXXX-FXXX with a mounting bracket on a swing gate

The use of PSEN mgate LLXXX-FXXX with one of the stated mounting brackets (item numbers 570493, 570494, 570496, 570497) on a swing gate can lead to injuries.

- Ensure that none of the stated mounting brackets 570493, 570494, 570496, 570497 are used with PSEN mgate LLXXX-FXXX on a swing gate.
- When using PSEN mgate LLXXX-FXXX with a mounting bracket on a swing gate, only use one of the following mounting brackets or handle units: 6M000049, 6M000050, 6M000051 or 6M000052 (see [Order reference accessories](#) [104]).

1. Install a safety switch for front entry of the actuator with the [fixing screws of the safety switch crosswise to the actuator](#) [40] on the gate frame.
2. [Rotate the bolt in the actuator housing 90°](#) [42].
3. Use two M5 screws to fix the actuator to the gate.

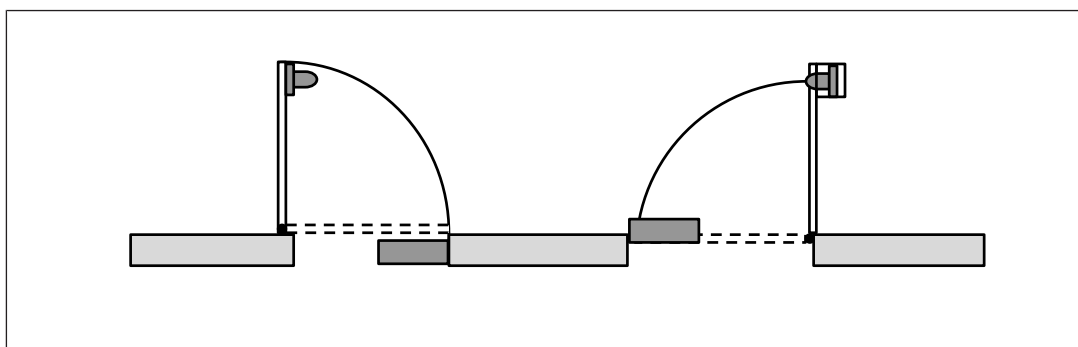
The actuator should engage smoothly into the safety switch.



Install the safety switch horizontally at a swing gate

Depending on the installation boundary conditions, a larger gate radius may be required (see diagram).

Please contact Pilz when smaller gate radiuses are required.



Maintain a slight parallel offset from the gate's rotation point when installing the actuator.

Downward cable outlet	Upward cable outlet
R	The distance of the upper part of the safety switch from the rotation point of the door
X	Parallel shift of the actuator
α	Tilt angle when installing the actuator

- Tilt the actuator by 10° when installing, when the door radius is $R < 600$ mm.

Pilz recommends that you use the PSEN ml actuator 10° adapter for correctly installing the actuator.

8.3 Safety switch installation

- To fix the safety switch at the three possible mounting positions, there are three drill holes on three sides.

As a result, the safety switch can be mounted on the frames of left and right-hinged sliding gates and swing gates. If necessary use a [mounting plate](#) [37] or [mounting bracket](#) [38] (see [Order reference: Accessories](#) [104]).

Different holding forces arise, based on the installation.

- Fixing screws in parallel to actuator:

Holding force $F_{Zh} = 7.500$ N

Holding force F_{1max} in accordance with EN ISO 14119 = 5.000 N

- Fixing screws side-on to actuator:

Holding force $F_{Zh} = 15.000 \text{ N}$

Holding force F_{1max} in accordance with EN ISO 14119 = 10.000 N



INFORMATION

The specified holding forces only apply to installation without mounting bracket. The holding forces when installed with mounting bracket can be found in the table "[Technical details for mounting bracket \[99\]](#)".

The tapped holes must have a depth of at least 6 mm.

Installation of safety switch	Tapped holes
Fixing screws in parallel/side-on to actuator, no mounting plate	Tapped holes for four M5 screws on the mounting surface.
Fixing screws in parallel/side-on to actuator, with mounting plate	Tapped holes for two M8 screws on the mounting surface, for attaching the mounting plate.
Fixing screws crosswise to actuator with L-bracket	Tapped holes for two M6 screws on the mounting surface, for attaching the L-bracket.

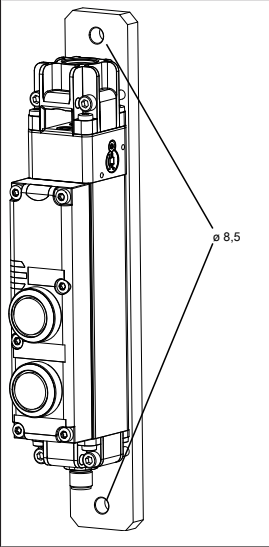
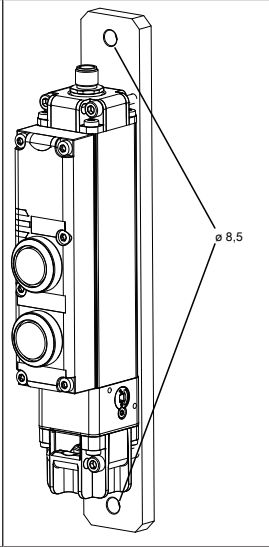
8.3.1

Installation without mounting plate

		Fixing screws parallel/crosswise to the actuator, no mounting plate Provide the mounting surface with tapped holes as indicated.
Downward cable outlet	Upward cable outlet	

1. Attach the safety switch to the swing gate/sliding gate.
2. Use four M5 screws to fix the safety switch to the mounting surface.

8.3.2 Installation with mounting plate

 Diagram showing the actuator with a downward cable outlet. A dimension line indicates a distance of 8.5 from the top of the actuator to the mounting plate.	 Diagram showing the actuator with an upward cable outlet. A dimension line indicates a distance of 8.5 from the top of the actuator to the mounting plate.	Fixing screws parallel/crosswise to the actuator, with mounting plate Provide the mounting surface with tapped holes as indicated.
Downward cable outlet	Upward cable outlet	

1. Attach the mounting plate to the swing gate/sliding gate.
2. Use four M5 screws to fix the safety switch to the mounting plate.



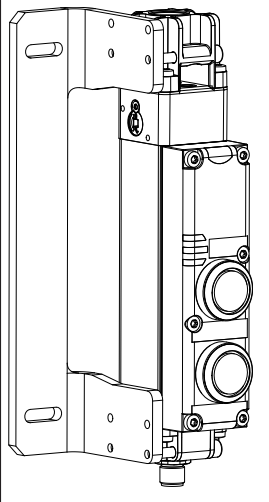
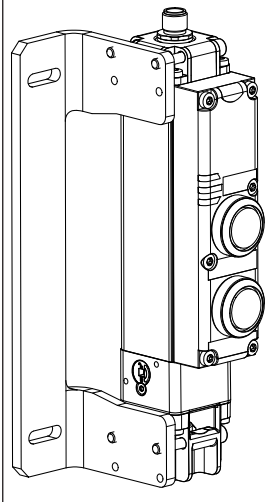
NOTICE

Correct distances when installing the actuator

The actuator must be attached at the same distance to the mounting surface as the safety switch.

If the safety switch is installed using a mounting plate, then the actuator **must** also be installed using a mounting plate (see Install actuator on mounting plate).

8.3.3 Installation using L-brackets

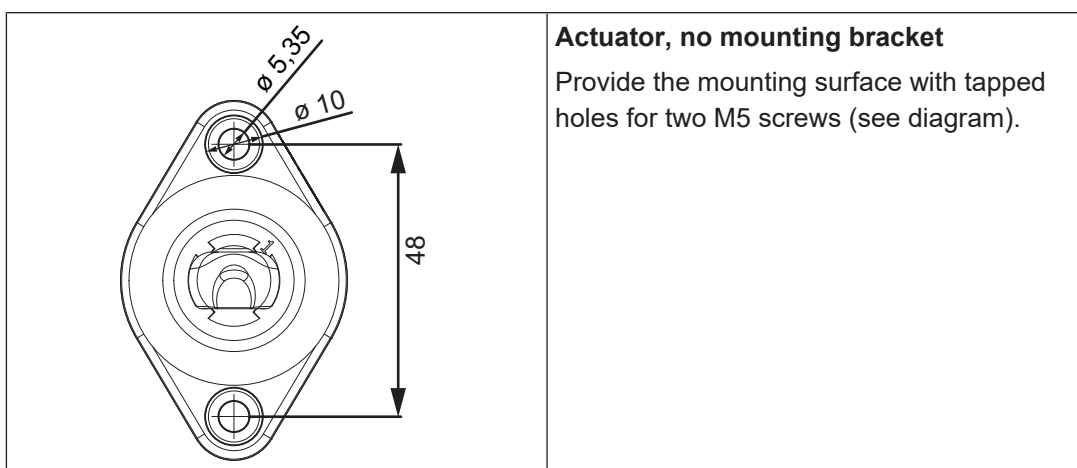
 Diagram showing the actuator with an L-bracket. The bracket is attached to the side of the actuator.	 Diagram showing the actuator with an L-bracket. The bracket is attached to the side of the actuator.	Safety switch with mounting bracket Provide the mounting surface with tapped holes for two M6 screws (see Dimensions). (Diagram: Order no. 570476)
---	---	---

Downward cable outlet	Upward cable outlet	
-----------------------	---------------------	--

1. Use two M6 screws to fix the mounting bracket to the gate. The position of the drill holes can be taken from the section entitled Dimensions.
2. Use four M5 screws to fix the safety switch to the mounting bracket.

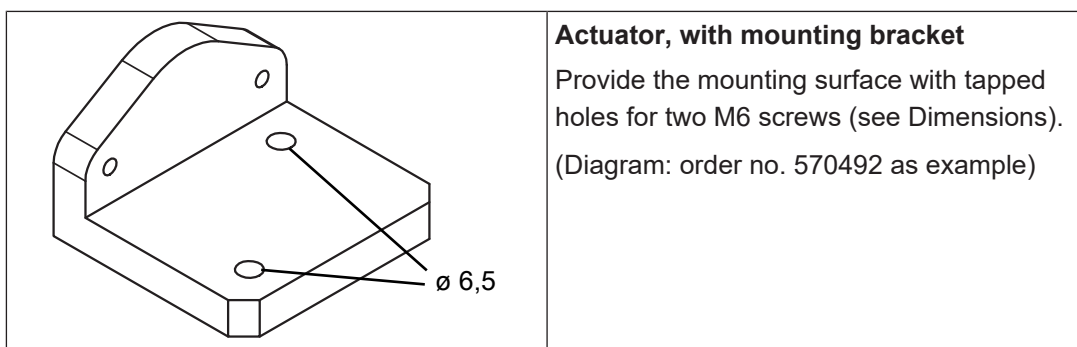
8.4 Actuator installation

8.4.1 Installation without mounting bracket



1. Attach the actuator to the gate.
2. Use two M5 screws to fix the actuator to the mounting plate.

8.4.2 Installation with mounting bracket



1. Use two M6 screws to fix the mounting bracket to the gate (for torque setting see [Technical details](#) [69]). The position of the drill holes can be taken from the section entitled Dimensions.
2. Use two M5 screws to fix the actuator to the mounting bracket.

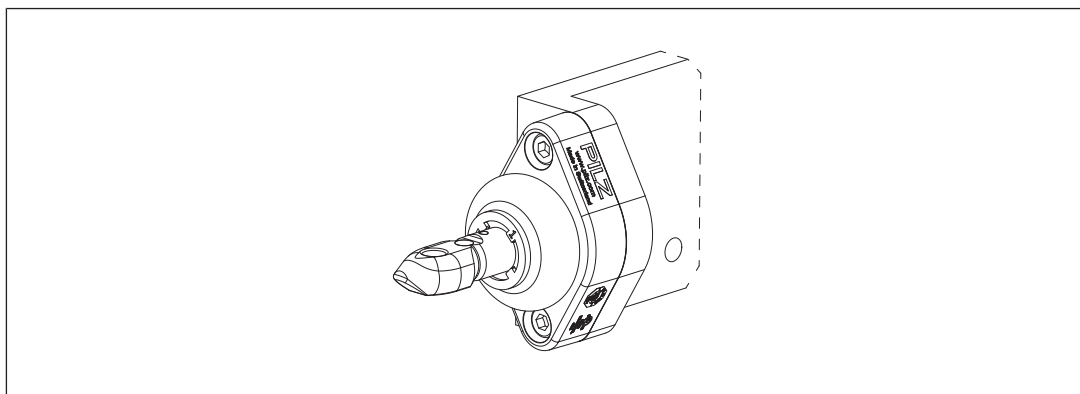


Fig.: Actuator, installed on mounting bracket

8.4.3 Install fixing screws side-on to actuator

Use four M5 screws to fix the safety switch to the mounting surface.

► Torque setting: Please note the information provided under [Technical details](#) [69].

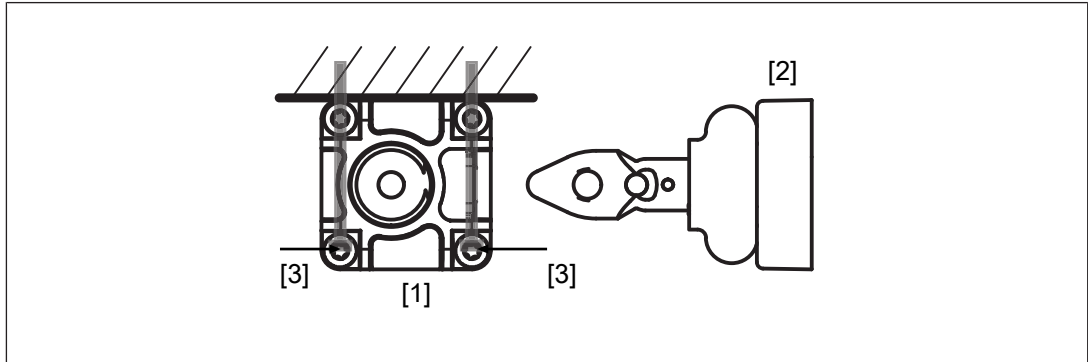


Fig.: Fixing screws of the safety switch crosswise to actuator

Legend

- [1] Front of safety switch
- [2] Actuator
- [3] Fixing screws of the safety switch crosswise to actuator

8.4.4 Install fixing screws in parallel to actuator

Use four M5 screws to fix the safety switch to the mounting surface.

► Torque setting: Please note the information provided under [Technical details](#) [69].

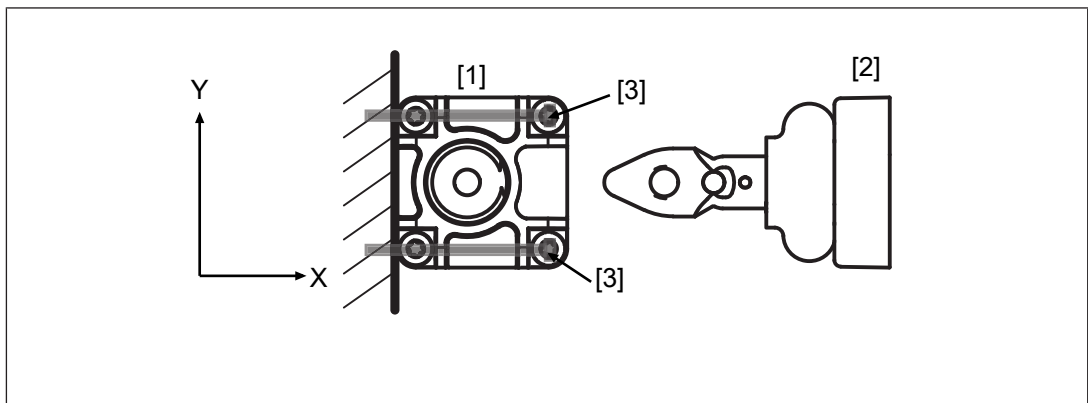


Fig.: Fixing screws of the safety switch in parallel to actuator

Legend

- [1] Safety switch
- [2] Actuator
- [3] Fixing screws of the safety switch in parallel to actuator

8.4.5 Centre the bolt in the actuator housing

The bolt must be centred in the actuator housing in order to maintain the distances on setting gates.

With small door radiuses, the bolt should be centred in the actuator housing.

Centre the bolt in the actuator housing (see diagram). Use the PSEN ml actuator center ring only with small door radiuses (see [Install the safety switch horizontally at a swing gate](#) [📖 34]).

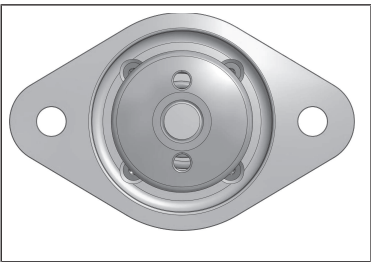
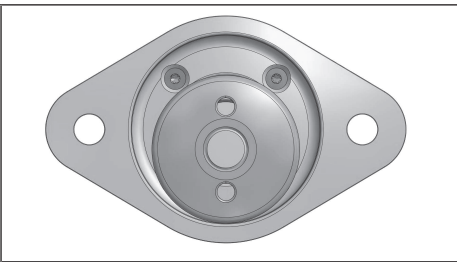
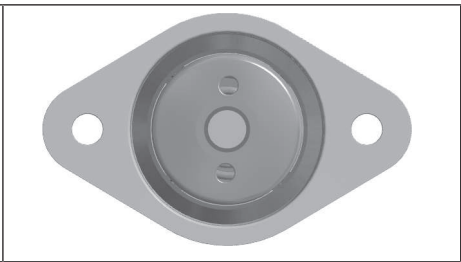


NOTICE

Reduction of the actuator's service life

When using the accessory PSEN ml actuator center ring the actuator's service life can be substantially reduced.

After 50.000 cycles it may happen that the actuator misaligns, and that it has to be realigned regularly.

		
Bolt centred within the actuator housing	Bolt not centred within the actuator housing	Bolt with PSEN ml actuator center ring in the actuator housing

8.4.6 Rotate the bolt in the actuator housing 90°

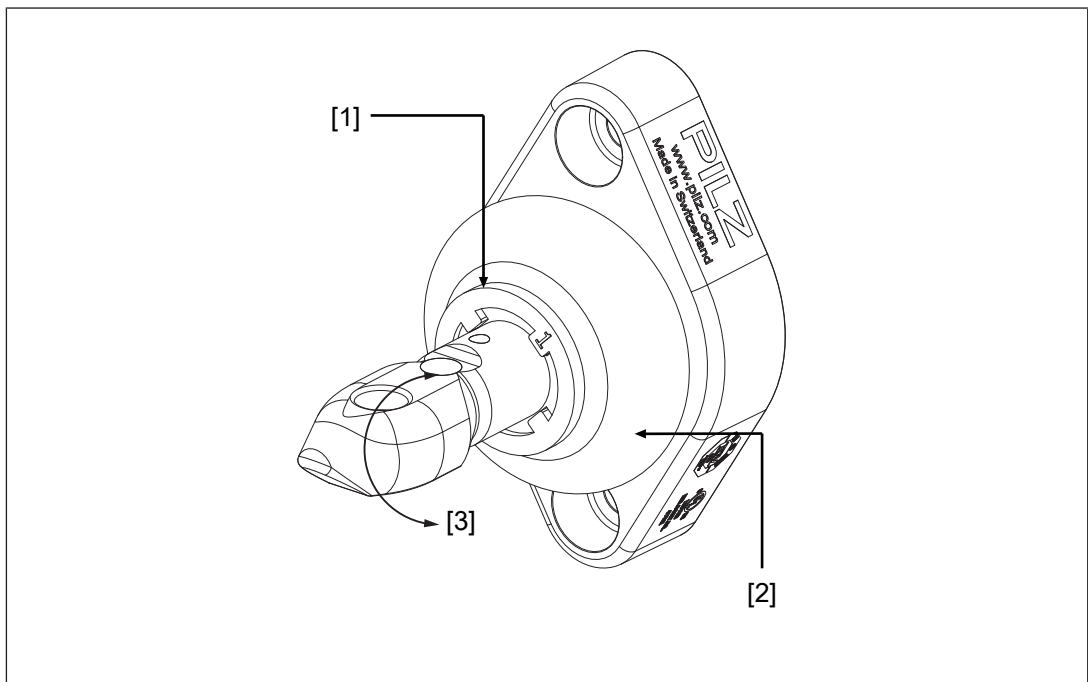
The actuator can be installed vertically on a gate (see [Figure 15](#)). To install the actuator horizontally, the bolt can be rotated 90° in the actuator housing prior to installation.

**NOTICE**

PSEN ml 1.1/2.1 round actuator has no anti-rotation device

Turn the bolt in the actuator housing to the correct position before installing.

1. On the housing skin [2] in the actuator housing, press down the spring plate [1] on both sides of the bolt and keep the plate held down.
2. Rotate the bolt in the housing skin by 90° in the required direction ([3]).

**Legend**

- [1] Spring plate in the housing skin
 - [2] Housing skin
 - [3] Bolt, can be rotated 90°
3. Centre the [bolt in the actuator housing](#) [Figure 41](#).

8.5 Escape release

8.5.1 Important information

**WARNING!****Risk of injury due to loss of the safety function.**

Incorrect installation of the escape release means that the button of the escape release pin can be accessed from the outside. This may mean that the guard locking is unlocked from the outside and the safety gate is opened, although the hazardous machine is switched on.

- The escape release should be installed so that it is only accessible from inside the danger zone.

- ▶ The button of the escape release pin must be impossible to reach from a position outside the protected area.
- ▶ Prevent any unintended operation of the escape release.
- ▶ Prevent the effect of transverse forces on the escape release.
- ▶ Secure the screw connections with a medium-strength threadlocker.
- ▶ The button of the escape release pin must be clearly visible and it must not be concealed.
- ▶ Maintain the min. bending radius of the push/pull cable of 60 mm when using the external escape release.

**NOTICE****Functional restrictions of the external escape release imposed by incorrect installation**

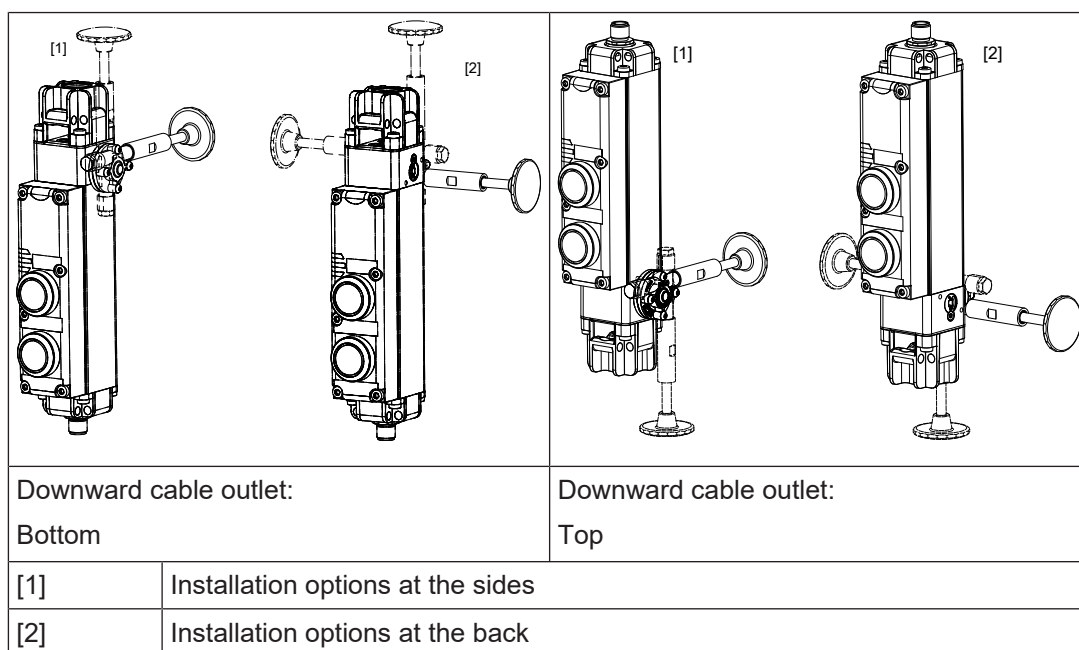
On escape releases with push/pull cable 0.5 m (order no. 570466) and 0.75 m (order no. 570467), bending the push/pull cable may reduce its functionality and lifetime.

Ensure that these versions are installed as straight as possible.

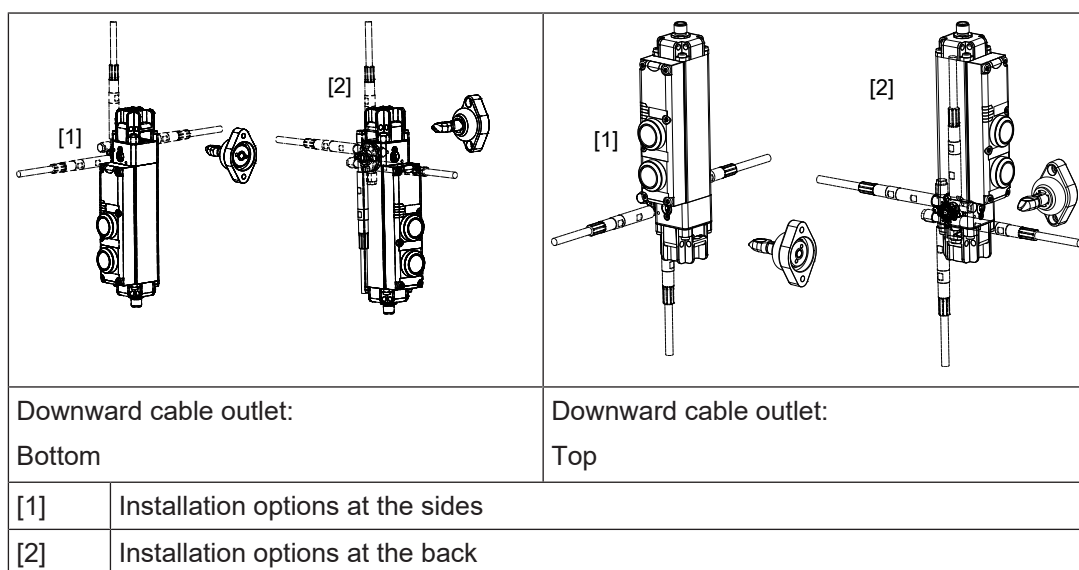
- ▶ The mounting surface has to completely cover the bottom of the escape release housing. The bottom of the escape release housing must not be accessible after installation.

8.5.2 Installation positions for escape release

The stationary escape release can be installed on the auxiliary releases in three different directions each.



The external escape release can be installed on the auxiliary releases in four different directions each. The push/pull cable can be led out on different sides.

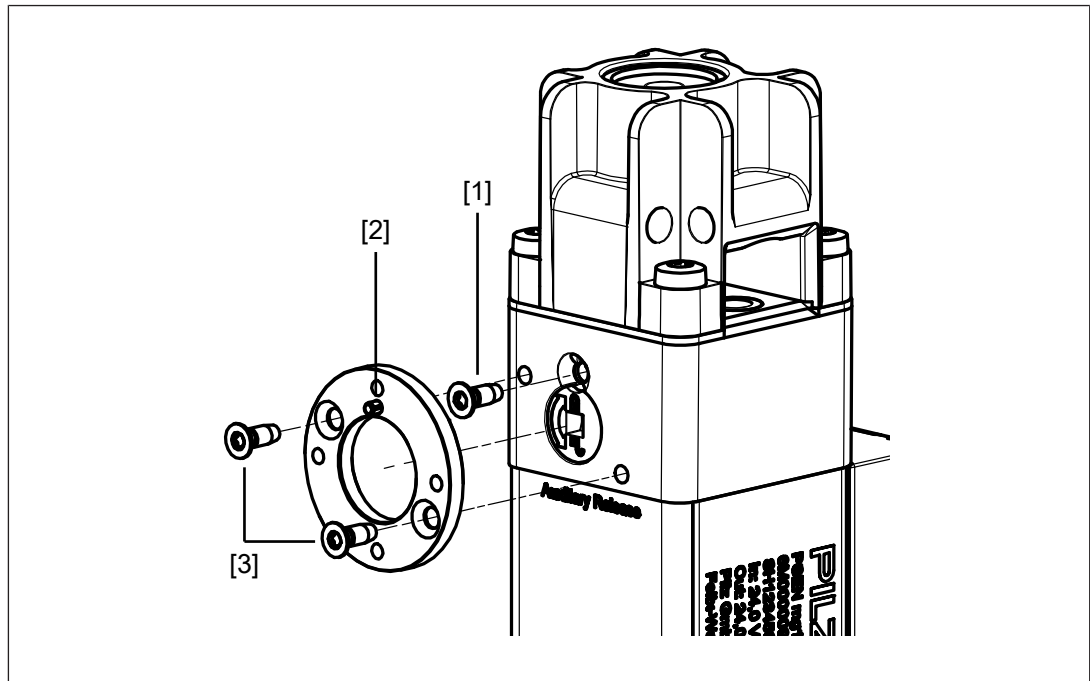


8.5.3

Installation stationary escape release

1. Remove the security screw [1] using a Torx T10 screwdriver T10.
2. Use the two countersunk screws M3x8 [3] to attach the escape release adapter disk to the safety switch with 1,2 - 1,5 Nm (see diagram). The pin in the adapter disk [2] must be located at the place where the auxiliary release security screw [1] used to be.

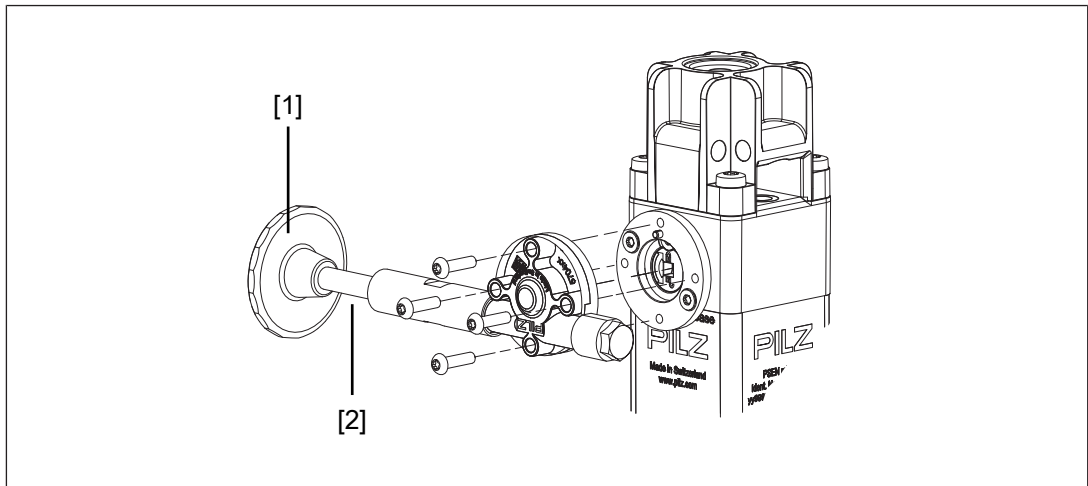
The two countersunk screws are self-tapping.



Legend

- [1] Auxiliary release security screw
- [2] Pin in the adapter disk
- [3] Countersunk screws M3x8

3. Screw the escape release with the four raised head screws M3x12 to the adapter disk with 1,2 - 1,5 Nm (see diagram).
 - The button of the escape release pin can be removed for the installation (e.g. when the escape release pin is to be run through a wall). Once the installation of the escape release is complete, the button of the escape release pin must be secured again with a medium-strength threadlocker and hand-tightened
 - To bridge larger distances the escape release pin can be extended by a max. of 25 mm two times (see [Order reference: Accessories](#) [104]).



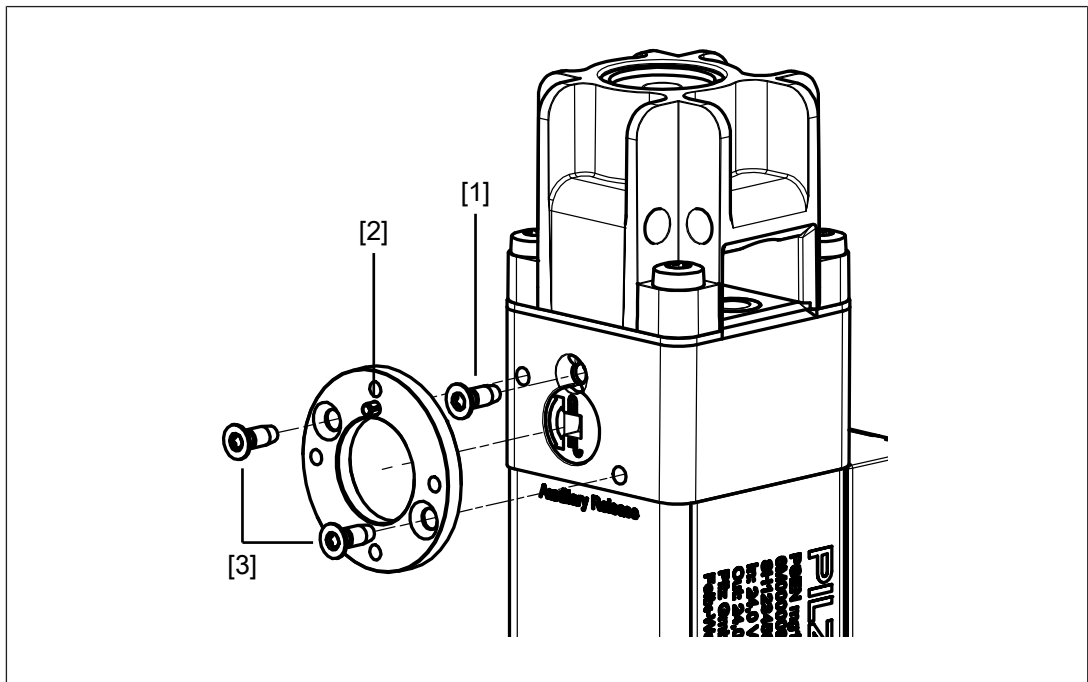
Legend

- [1] Button of the escape release pin
- [2] Escape release pin

8.5.4 Installation external escape release

1. Remove the security screw [1] using a Torx T10 screwdriver T10.
2. Use the two countersunk screws M3x8 [3] to attach the escape release adapter disk to the safety switch with 1,2 - 1,5 Nm (see diagram). The pin in the adapter disk [2] must be located at the place where the auxiliary release security screw [1] used to be.

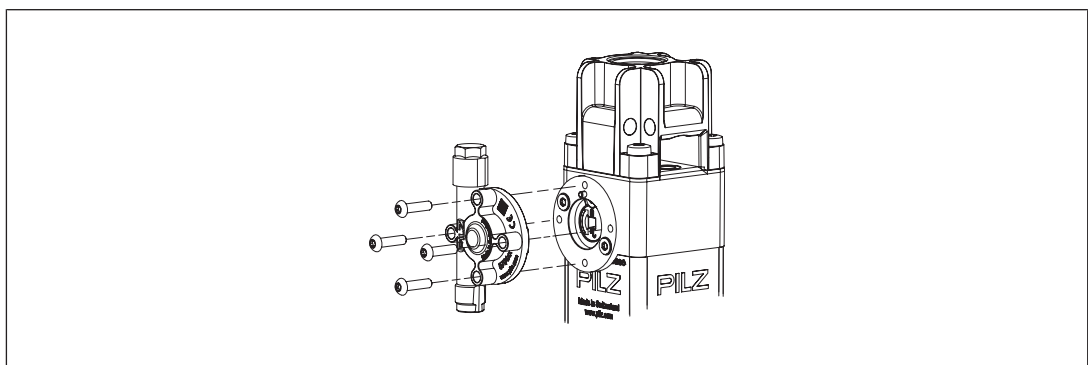
The two countersunk screws are self-tapping.



Legend

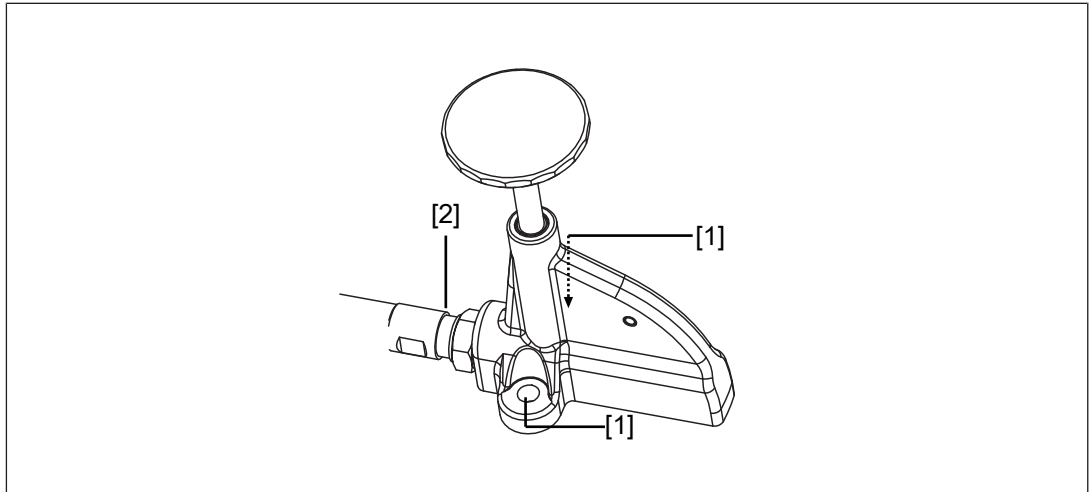
- [1] Auxiliary release security screw
- [2] Pin in the adapter disk
- [3] Countersunk screws M3x8

3. Screw the escape release with the four raised head screws M3x12 to the adapter disk with 1,2 - 1,5 Nm (see diagram).



Fastening for the housing of the escape release (order no. 570466 - 570475)

Use the screws [1] to fasten the housing of the escape release to a mounting surface with 6 - 6,5 Nm (see diagram).

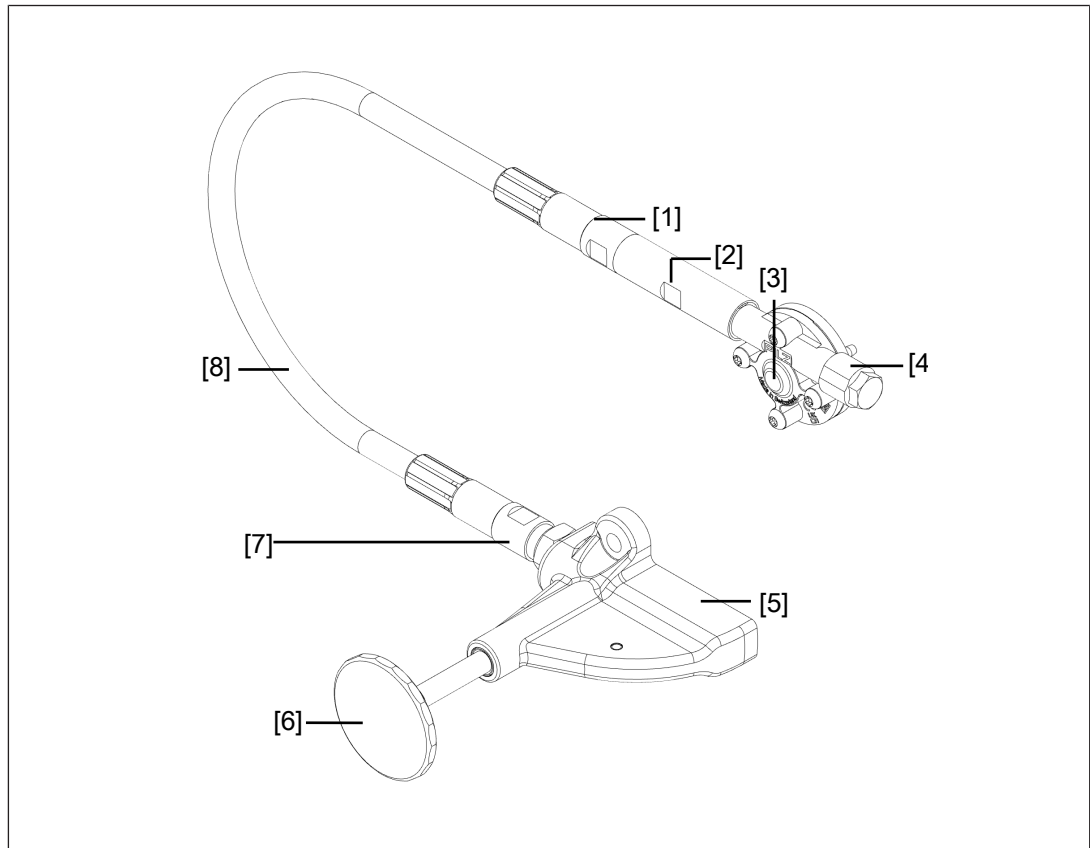


Legend

- [1] Screwing the escape release to the mounting surface
- [2] Screwing the cable

Material of the escape release 570466, 570475

When selecting the cleaning agent, consider the material of the escape release.



Legend

[1]	Stainless steel
[2]	Stainless steel
[3]	Zinc, coated
[4]	Zinc, coated
[5]	Zinc, coated
[6]	Zinc, coated
[7]	Stainless steel
[8]	Push/pull cable: steel Insulation: plastic: PE-HD

- The screws of the push/pull cable [2] can be loosened to make installation easier (e.g. when the push/pull cable is to be run through a wall). The screws must be fixed with 6 - 6,5 Nm after the escape release is installed.

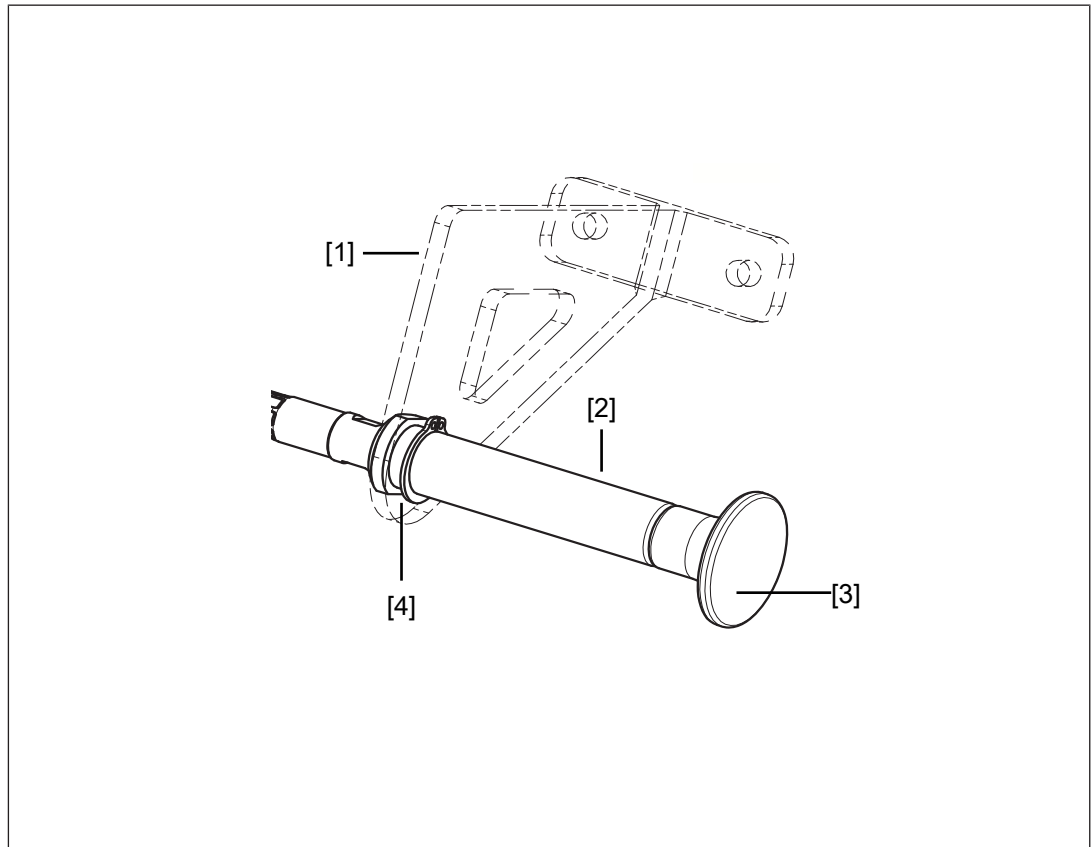
Fastening for the escape release (order no. 570463)

The escape release is fastened using a bracket (not in the Pilz portfolio). The bracket must have the following properties:

- ▶ Corrosion-resistant material
- ▶ Material strength: 4 +/- 0.5 mm
- ▶ Only low elastic deformation may occur at a force of 150 N. The cable must be able to move with it.

Fasten escape release:

- ▶ Insert the piston rod through the hole in the bracket [1].
- ▶ Install the retaining ring [4] using circlip pliers for outer rings.
- ▶ Pull the piston rod [2] out completely.
- ▶ Apply a threadlocking adhesive evenly on the thread of the piston rod and then turn the red button handle [3] as far as it will go.
- ▶ Leave the adhesive to set for min. 24 hours.

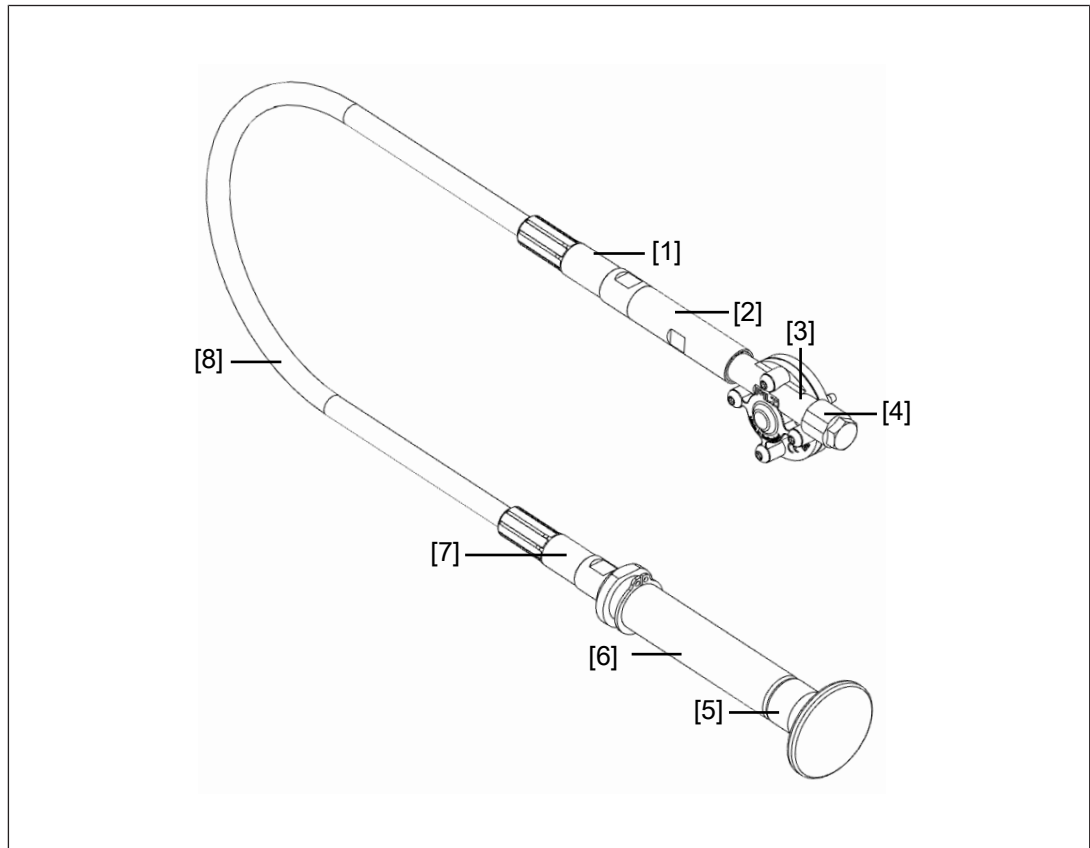


Legend

- [1] Bracket (not in the Pilz portfolio)
- [2] Piston rod
- [3] Button handle (red)
- [4] Retaining ring

Material of the escape release 570463

When selecting the cleaning agent, consider the material of the escape release.



Legend

[1]	Stainless steel
[2]	Stainless steel
[3]	Zinc, coated
[4]	Zinc, coated
[5]	Reinforced plastic: PA6 GF
[6]	Stainless steel
[7]	Stainless steel
[8]	Push/pull cable: steel Insulation: plastic: PE-HD

8.5.5 Dismantling of escape release (order no. 570466 - 570475)

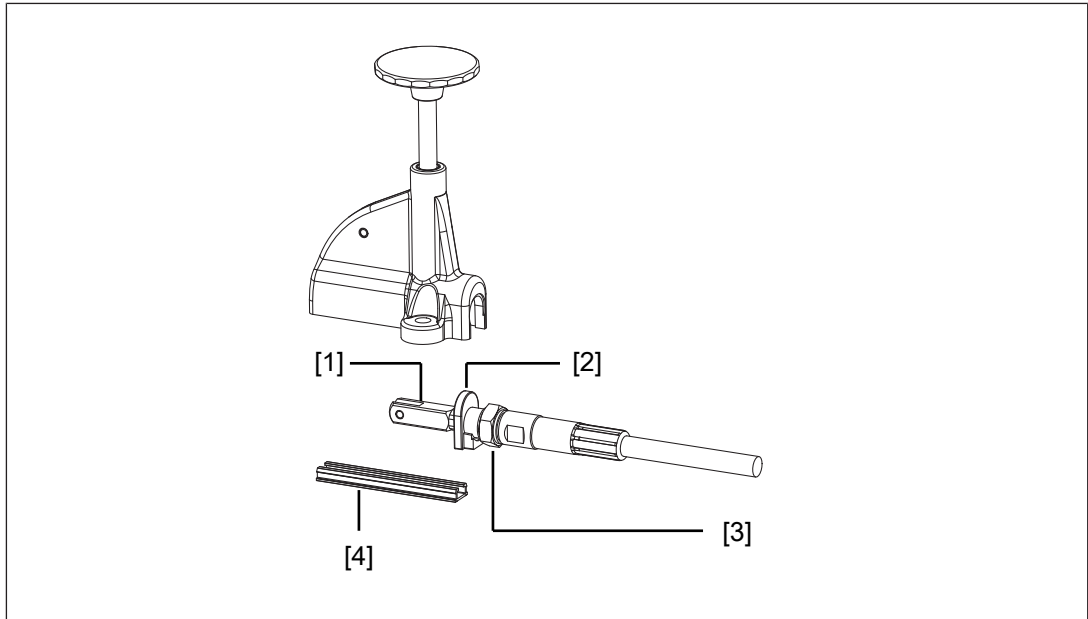
If the push/pull cable is to be run through a conduit pipe, the cable has to be uninstalled at the escape release first.

Prerequisites

- The conduit pipe must have a diameter of at least 12 mm.

Procedure

1. Lift off the cover [4] (e.g. with a screwdriver with a flat blade).



Legend

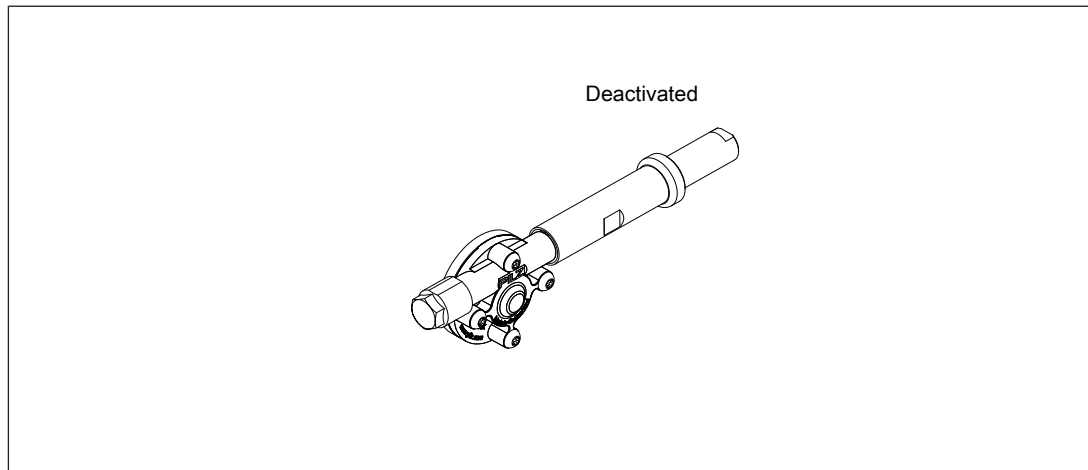
- [1] Fork head
- [2] Slot nut
- [3] Nut M10x0.75
- [4] Cover

2. Loosen the nut [3].
3. Pull out the push/pull cable with the slot nut [2] and remove the slot nut and the nut [3] from the cable.
4. Run the cable through the conduit pipe.
5. Push the nut [3] and the slot nut [2] over the fork head [1] back on to the cable.
6. Push the cable with the fork head [1] on to the fork in the escape release. The slot nut [2] must be fitted back into the groove.
7. Tighten the nut [3] with 6 - 6,5 Nm.
8. Put the cover [4] back on.

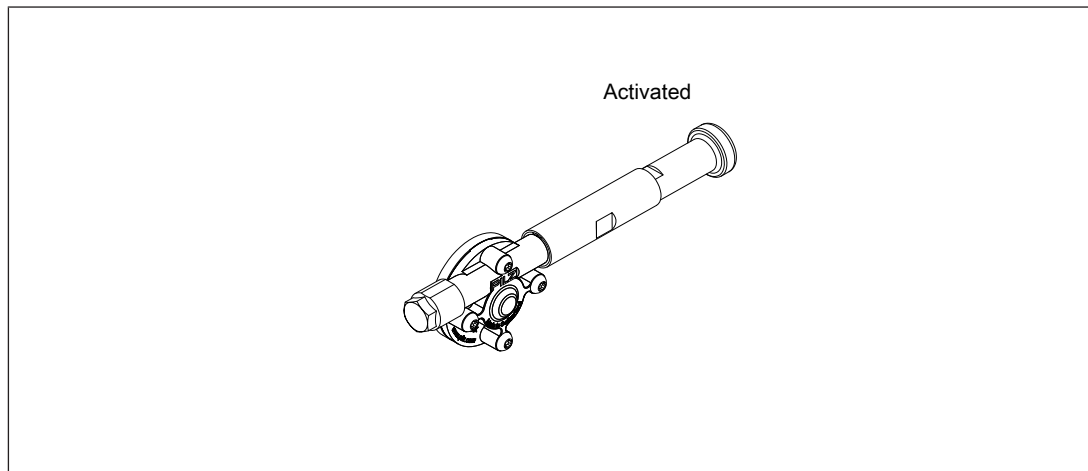
8.6 Auxiliary release

Install the auxiliary release on the safety switch as described in Installation external escape release.

- ▶ Use an 8 mm spanner to release the button handle.
- ▶ Apply a low-strength threadlocker (e.g. a threadlocking adhesive) evenly on the thread of the piston rod and then turn the red button handle as far as it will go. Max. torque setting: 1 Nm



To activate the auxiliary release the button handle must be unscrewed and then screwed back on to the piston rod rotated 180°.



9 Adjustment

After installation, check whether adjustment is necessary. To check this refer to the diagrams with the stated values for max. offset and correct if necessary.

- ▶ Always test the function with a connected evaluation device.
- ▶ Use a connected evaluation device to check the function of the escape release.
- ▶ Safety switch and actuator must be aligned correctly

View from above		View from the side	Perspective view
P	Safety switch		
A	Actuator		
[1]	Max. lateral offset	+/-3,0 mm	
[2]	Max. angular offset around the Z axis	+/-7,5 deg	
[3]	Max. vertical offset	+/-3,0 mm	
[4]	Max. offset in closing direction	+/-2 mm	
[5]	Max. angular offset around the Y axis	+/-2,5 deg	
[6]	Max. angular offset around the X axis	+/-2,0 deg	

9.1 Attach safety switch and actuator

Once the safety switch and actuator are correctly aligned, the actuator's screw connection must be tightened.

Procedure:

1. Tighten up one M5 screw.
2. For applications with increased safety requirements (e.g. SIL 2 PL d), swap the second M5 screw for an M5 locking screw.
3. Tighten up the M5 screw or M5 locking screw.

Please note the max. torque setting stated in the [Technical details](#) 69].

10 Operation

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 (25 ms on, 475 ms off)

Status indicators

- ▶ "Device" LED lights up green: Device is ready for operation
- ▶ "Gate" LED lights up yellow: Actuator is within the response range
- ▶ "Lock" LED lights up green: Guard locking active
- ▶ "Input" LED lights up yellow: Device is ready for operation, a high signal is present at both safety inputs



NOTICE

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

10.1 Normal operation

LED status				Switch status
Device	Gate	Input	Lock	
 Green	 Yellow	 Yellow	 Green	The safety switch is started.
 Green	 Yellow	 Yellow	 Green	Safety gate open, actuator not detected, guard locking deactivated.
 Green	 Yellow	 Yellow	 Green	Safety gate closed, actuator detected, guard locking deactivated.

LED status				Switch status
Device	Gate	Input	Lock	
 Green	 Yellow	 Yellow	 Green	Safety gate closed, actuator detected, guard locking activated.

Warnings

LED status				Switch status	Remedy / measure
Device	Gate	Input	Lock		
 Green	 Yellow	 Yellow	 Green	Safety gate closed, actuator detected, guard locking cannot be activated / deactivated	Check the alignment [54] of the actuator to the safety switch.
				Safety gate stuck or blocked, actuator detected, guard locking cannot be activated / deactivated	Make sure that the gate is not stuck or blocked.
				The supply voltage to safety inputs S31 and S41 was switched back on before the auxiliary release screw was turned back.	Turn back the auxiliary release screw and then switch the supply voltage on (see Recommissioning).
 Green	Display not definitive	 Yellow	 Yellow	Guard locking pin is in an intermediate position	
 Yellow	Display not definitive	 Yellow	Display not definitive	Safety switch active despite over or undervoltage	Check the supply voltage. If safety inputs S31 and S41 are activated or deactivated while an undervoltage warning is present, the safety switch switches to a fault state.

10.2 Error display

LED status				Switch status	Remedy / measure
Device	Gate	Input	Lock		
 Red	 Yellow	 Yellow	Display not definitive	Safety switch deactivated due to under or over-voltage	Check the supply voltage and switch the supply voltage off and then on again.
 Red	Previous LED display is retained		Display not definitive	Safety outputs in fault condition	Check the wiring and switch the supply voltage off and then on again.
 Red			 Red	Auxiliary release/escape release activated	▶ Auxiliary release: Turn back the auxiliary release screw and then switch the supply voltage on (see Recommissioning). ▶ Escape release: Pull the button of the escape release pin back again and then switch on the supply voltage again (see Recommissioning under escape release).
 Red	Display not definitive			Safety switch does not start	Change the safety switch.
 Green	 Yellow	Display not definitive		Wrong actuator	Only used approved combinations  11].

11 Checks and maintenance

It is not necessary to perform maintenance work on the product in normal operation.

- ▶ Please return any faulty product to Pilz.

Regular inspection of the switch function is required to guarantee the trouble-free, long-term function.

If the interlock and guard locking system is only used rarely (opening and closing the safety gate and activating/deactivating the guard locking device), a manual function test is required.

The correct function of the product should be checked at regular intervals and after any fault.

Test intervals in accordance with EN ISO 14119:

- ▶ For PL e, at least once a month
- ▶ For PL d, at least once a year

Visual inspection

- ▶ Check that the seal on the security screw on the auxiliary release is intact. If the seal is not intact, insert the security screw and use varnish to seal the security screw.
- ▶ Check the safety switch and actuator for damage.
Replace the damaged safety switch and actuator.
- ▶ Check that the safety switch and actuator are firmly secured.
Tighten the fixing screws using the appropriate torque.
- ▶ Check the offset of the safety switch and actuator.
 - Max. lateral offset
 - Max. angular offset
 - Max. vertical offset
- ▶ Check that the wiring is correct.
- ▶ Remove any dirt from the safety switch and actuator.

Function test:

- ▶ The actuator is detected and at the signal output/ diagnostic output Y32 there is a high signal after detection of the actuator.
- ▶ The guard locking device can be activated/deactivated when the safety inputs S31 and S41 are activated.
- ▶ Under these conditions there is a high signal at safety outputs 12 and 22:
 - The actuator is detected
 - The guard locking pin has successfully been activated (guard locking pin is in the locked position)

If one of these conditions is not met, the signal at the safety outputs will be low.

Escape release

- ▶ Test whether the button of the escape release pin can be detected and reached.
- ▶ Check the function of the escape release.

11.1 Exchange of control elements

Prerequisites

- ▶ The plant that is operated by the PSEN mgate LLXXX is out of service and cannot be re-started without an equivalent safety device.
- ▶ The new control element has the same design as the defective control element.

Required tool

- ▶ PIT gb fixing spanner (see [Accessories](#) [ 104]) for threaded ring of the control element
- ▶ Screwdriver for Torx T8
- ▶ Screwdriver for Torx T20

Procedure:



WARNING!

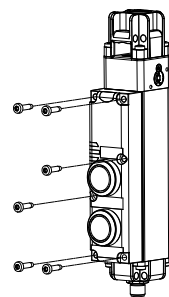
Hazard due to loss of the safety function

Serious or fatal injury could result, depending on the application.

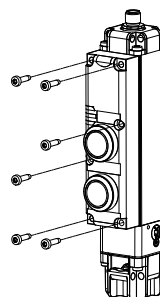
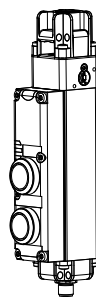
The protection type (see [Technical details](#) [ 69]) is only achieved using Pilz connection cables, which are available as accessories, and when all torques on the connector and the attachments for the components of the PSEN mgate LLXXX are complied with (see Technical details). If not tightened sufficiently, the protective function may be lost.

- Ensure that all torques are complied with.

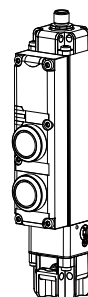
1. Remove the connection between the PSEN mgate LLXXX and the evaluation device.
2. Loosen the fixing screws of the PSEN mgate LLXXX on the mounting surface.
3. Loosen the 6 fixing screws for the half shell with the control elements and remove the half shell.



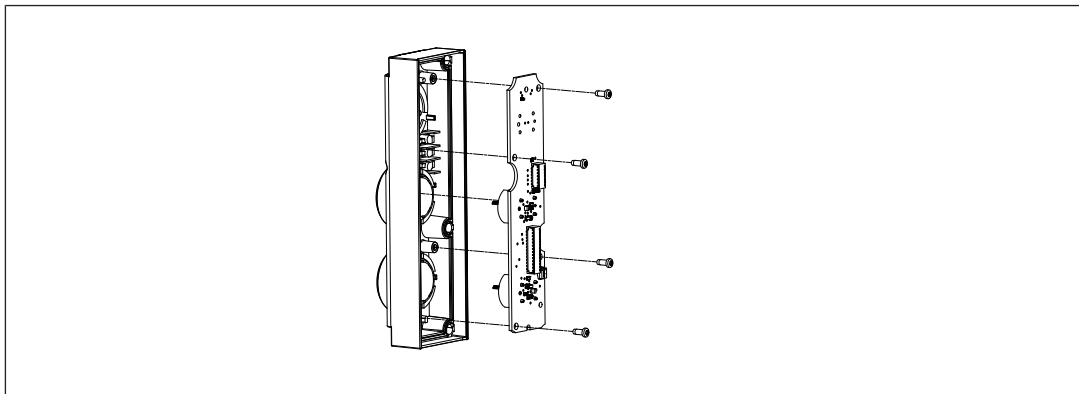
Downward cable outlet



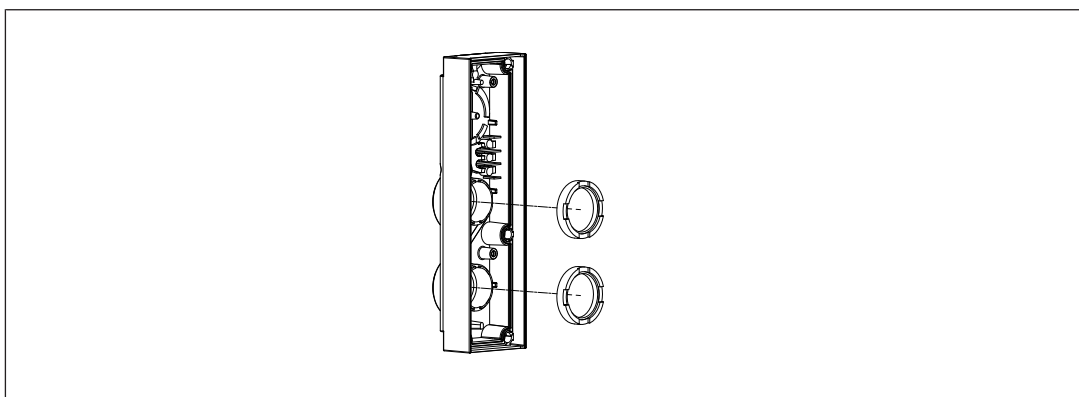
Upward cable outlet



4. Loosen the fixing screws of the printed circuit board and carefully lift off the printed circuit board (see figures).

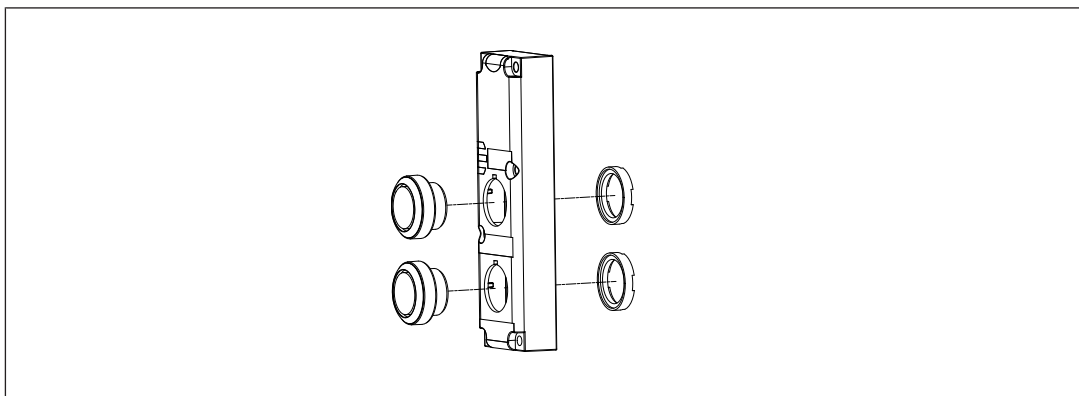


5. Loosen the threaded ring of the control element that is to be exchanged and remove the threaded ring (see figure).

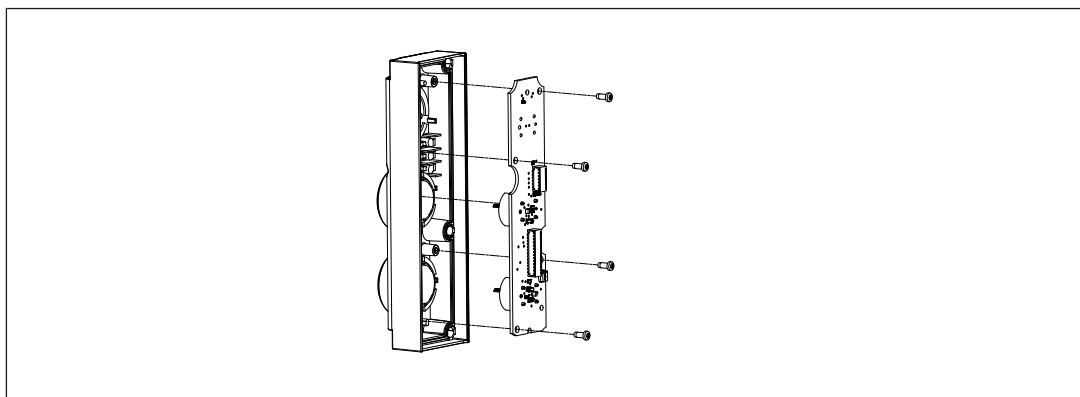


6. Remove the control element on the front of the PSEN mgate LLXXX and insert the part of the new control element.

The control element has a stud on its side to secure it against twisting. The stud must be positioned correctly when inserting the control element.

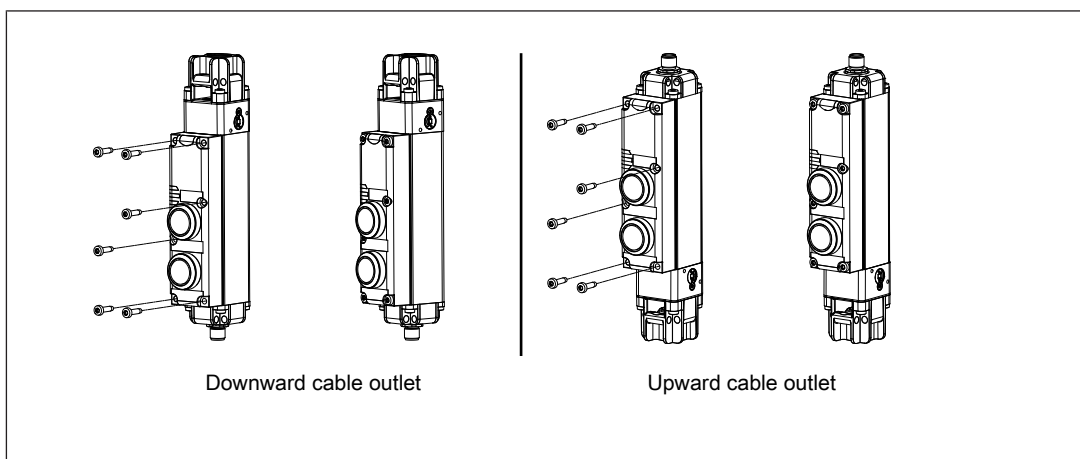


7. Screw the control element back on to the threaded ring (see diagram) with 1,1 - 1,3 Nm and place the printed circuit board in position.
⇒ Make sure that the strands are not damaged, crushed or twisted here.
8. Screw the printed circuit board to the fixing screws with 0,4 - 0,6 Nm (see figure).



9. Fasten the half shell back on to the safety switch housing and tighten the screws with 2,4 - 2,6 Nm.

⇒ Make sure that the strands are not damaged, crushed or twisted here.



10. Fasten the PSEN mgate LLXXX back on to the mounting surface using the fixing screws with 6 - 6,5 Nm.

11. Connect PSEN mgate LLXXX to the evaluation device.

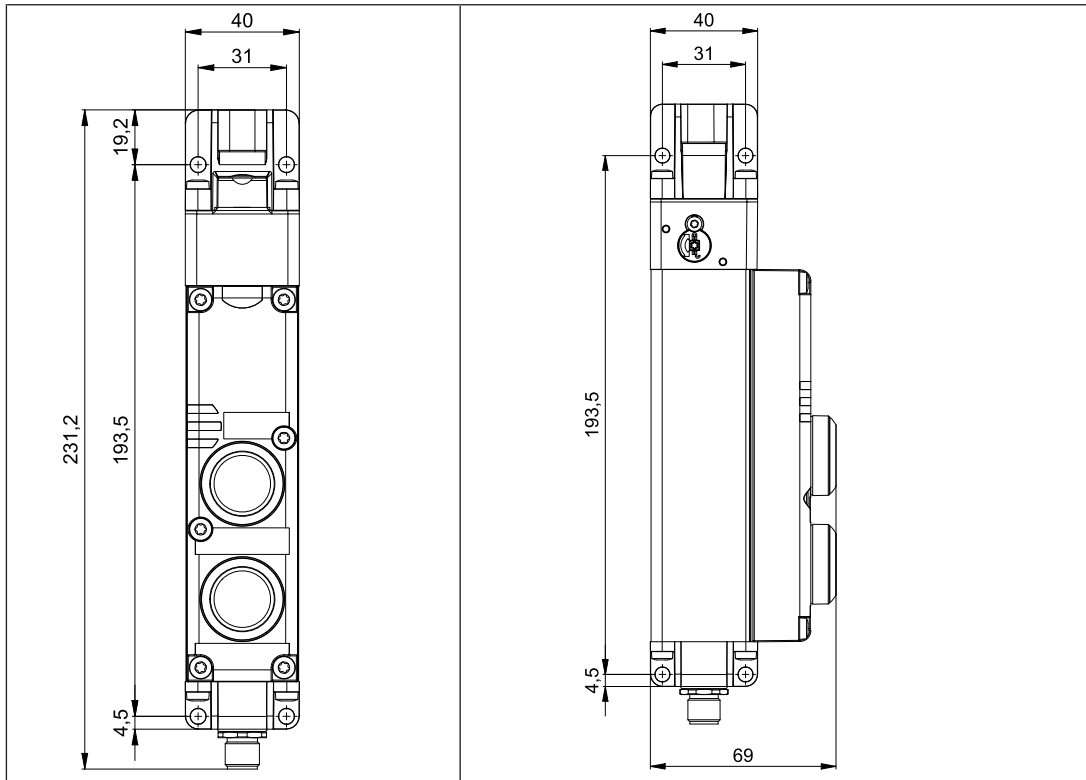
12. Carry out a manual function test of the product.

Only commission the plant that is controlled by the product if the function test was successful.

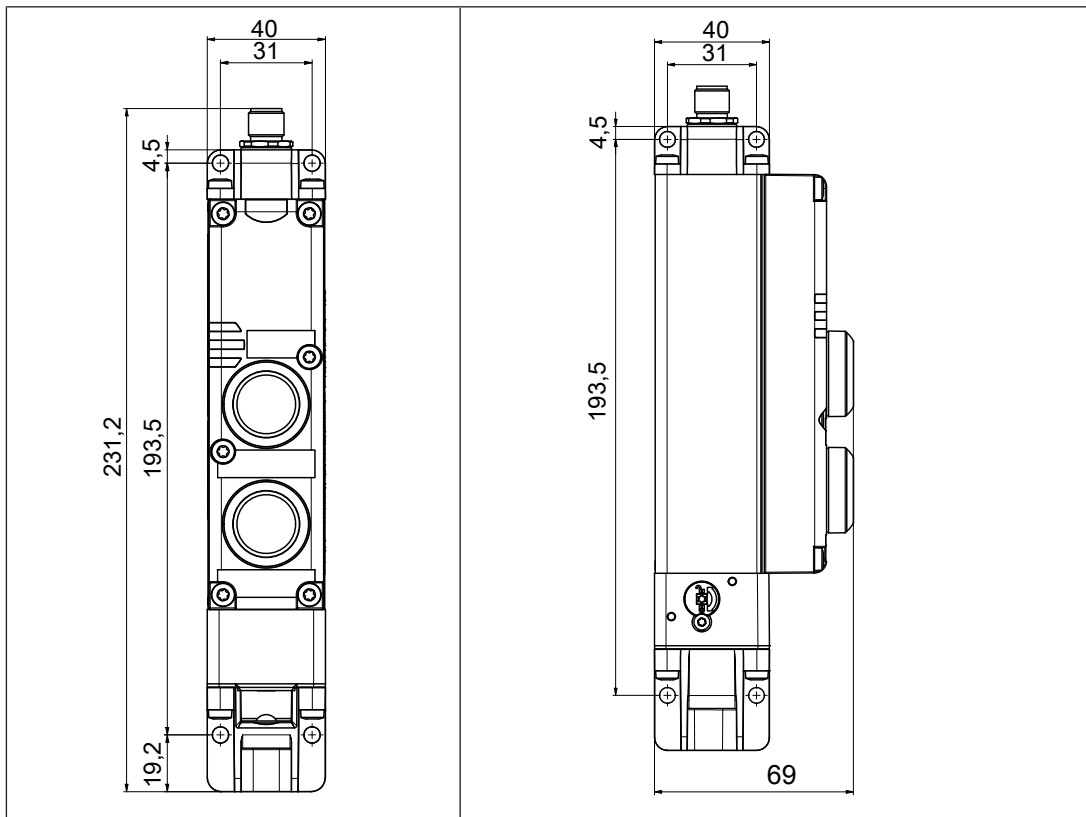
13. Put the plant that is controlled with PSEN mgate LLXXX back into service.

- ▶ Place one of the coloured caps provided (see Order reference, accessories) on to the relevant pushbutton.
- ▶ Ensure that the alignment marking on the coloured cap matches up with one of the positions illustrated.
- ▶ Press on the coloured cap until you feel it click into position.

12 Dimensions

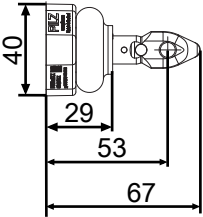
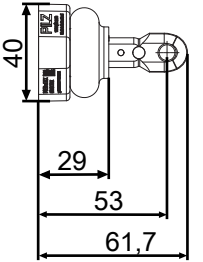
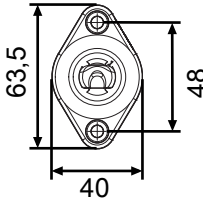


Safety switch - front view, side view



Safety switch with cable outlet upwards - front view, side view

Actuator

 Technical drawing showing the side view of the actuator. Dimensions: 40 (height), 29 (width), 53 (width), 67 (width).	 Technical drawing showing the side view of the round actuator. Dimensions: 40 (height), 29 (width), 53 (width), 61,7 (width).	 Technical drawing showing the rear view of the actuator without the centering ring. Dimensions: 63,5 (height), 48 (height), 40 (width).
PSEN ml 1.1/PSEN ml 2.1 actuator	PSEN ml 1.1/PSEN ml 2.1 round actuator	Actuator without centering ring, rear view

Handle module as actuator

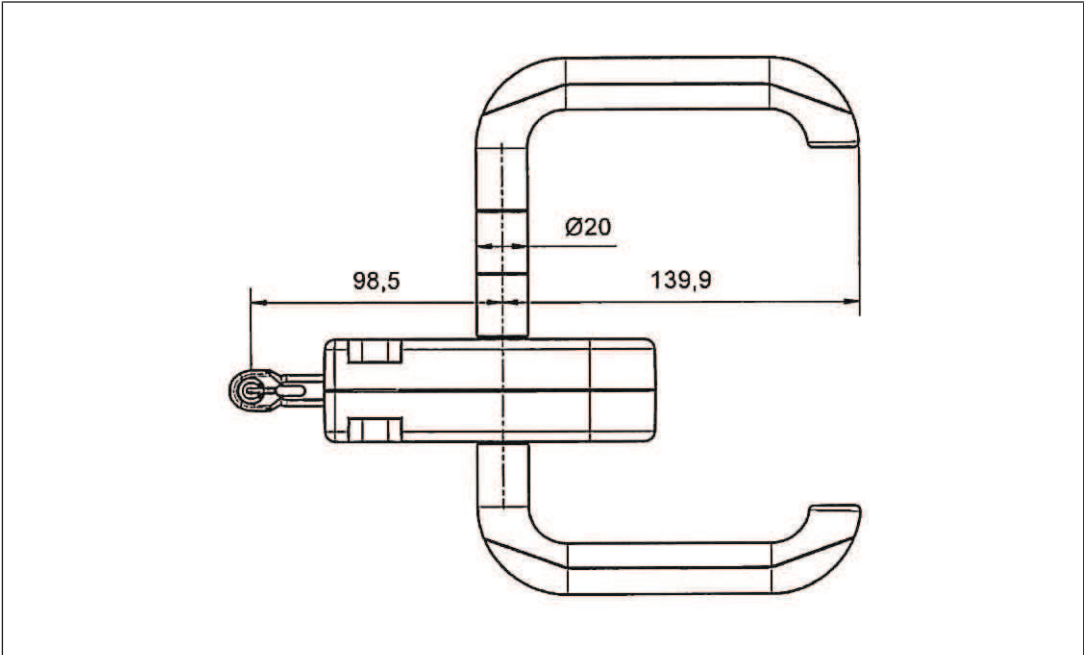


Fig.: Plan view with 2 extensions (order no. 60000009)

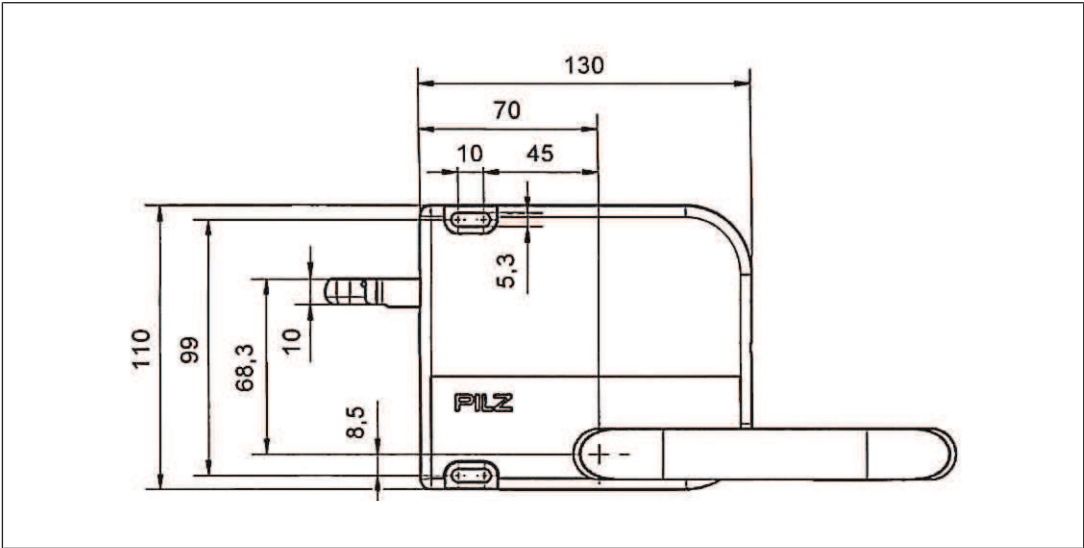


Fig.: Front view

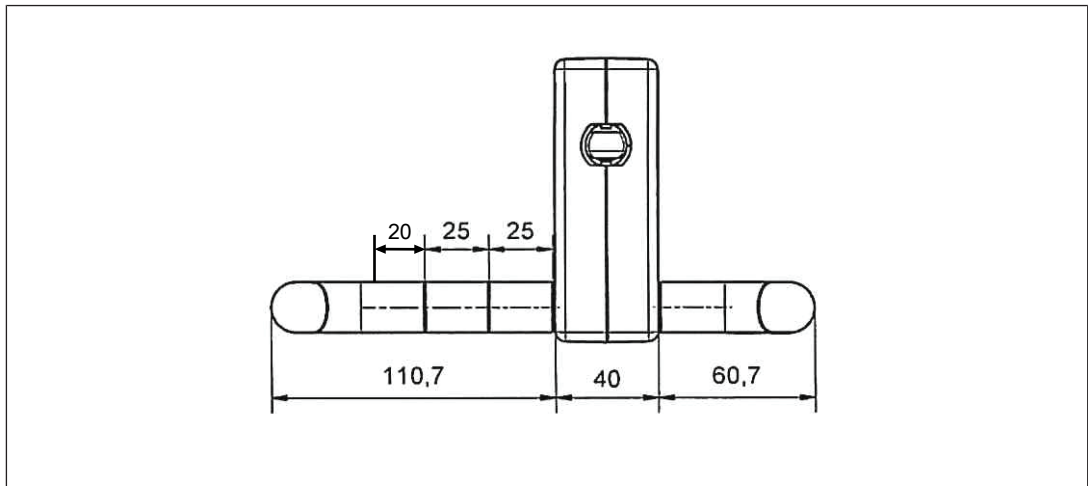


Fig.: Side view of actuator with two extensions (order no. 6O000009)

Mounting plate (see [Accessories](#) [104])

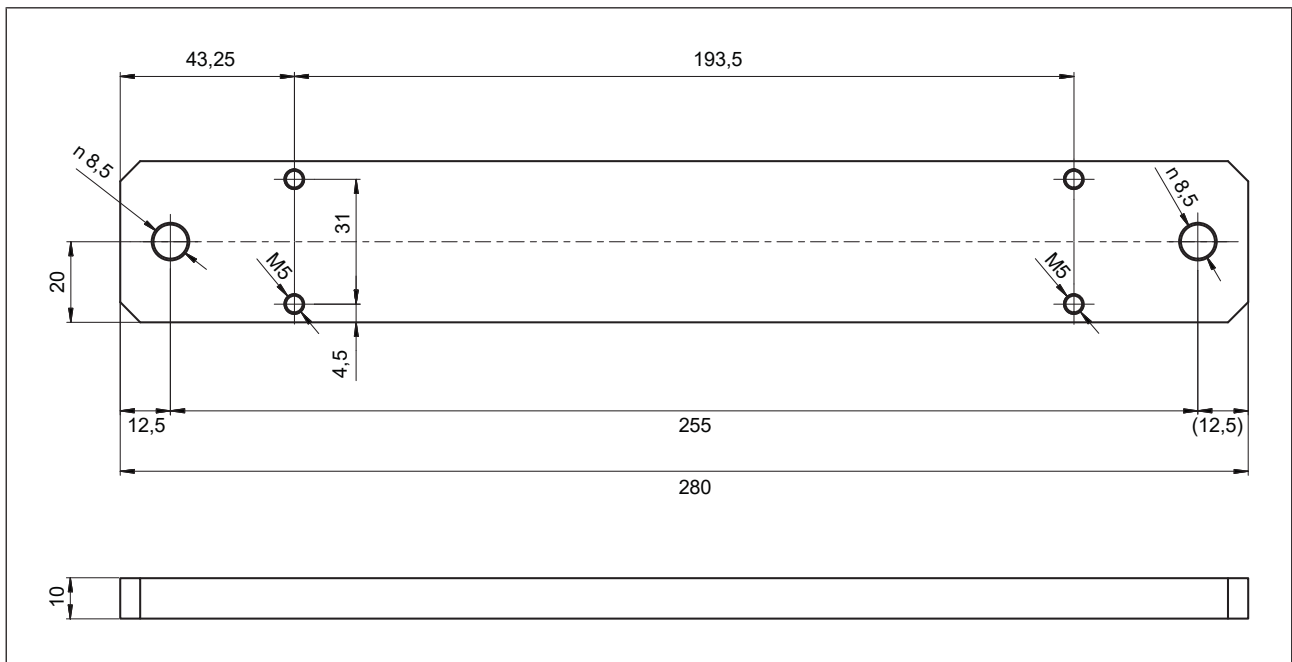


Fig.: Order no.: 570490

Mounting bracket for sliding gate (see [Accessories \[104\]](#))

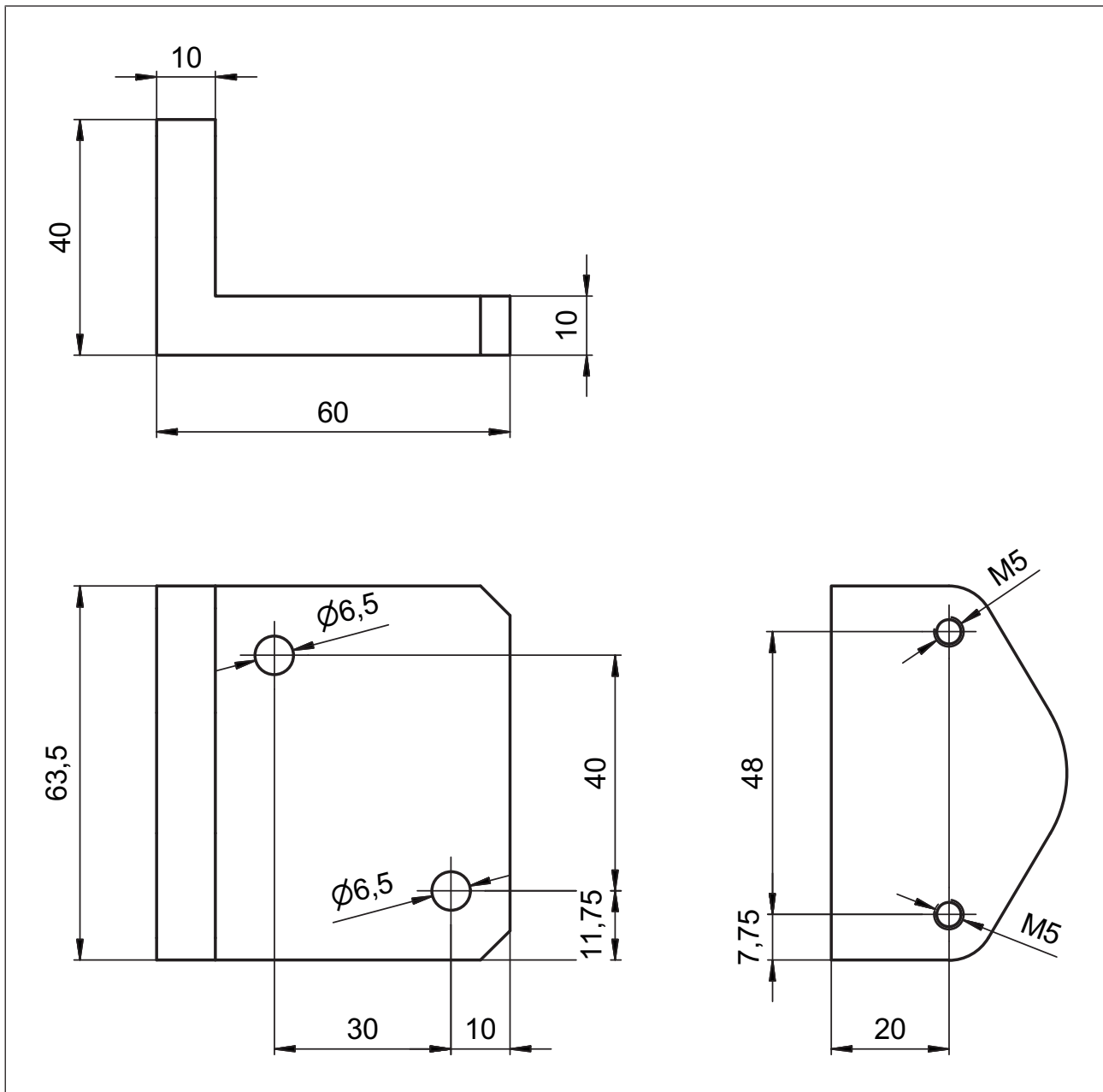


Fig.: Order no.: 570492

**PSENmgate mounting bracket for swing gate, height 70 mm (see
Accessories [📖 104])**

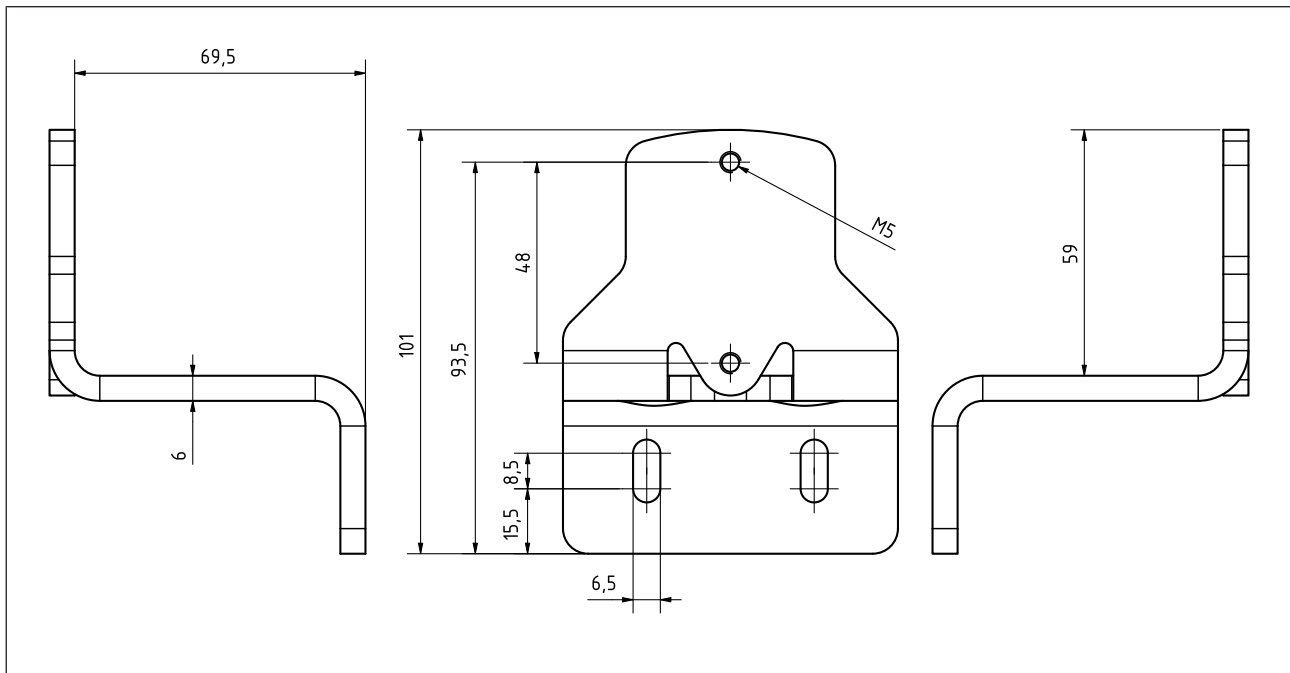


Fig.: Order no.: 6M000049

**PSENmgate mounting bracket for swing gate, height 80 mm (see
Accessories [📖 104])**

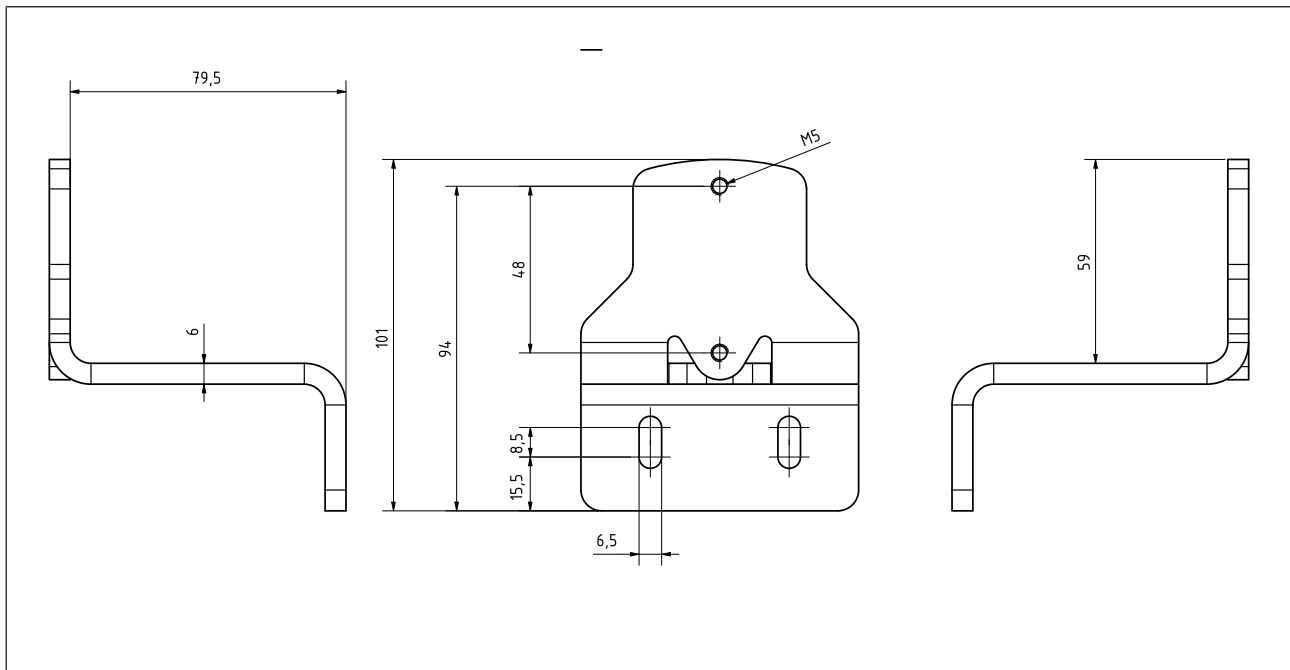


Fig.: Order no.: 6M000050

Mounting bracket with handle unit for sliding gate (see [Accessories \[104\]](#))

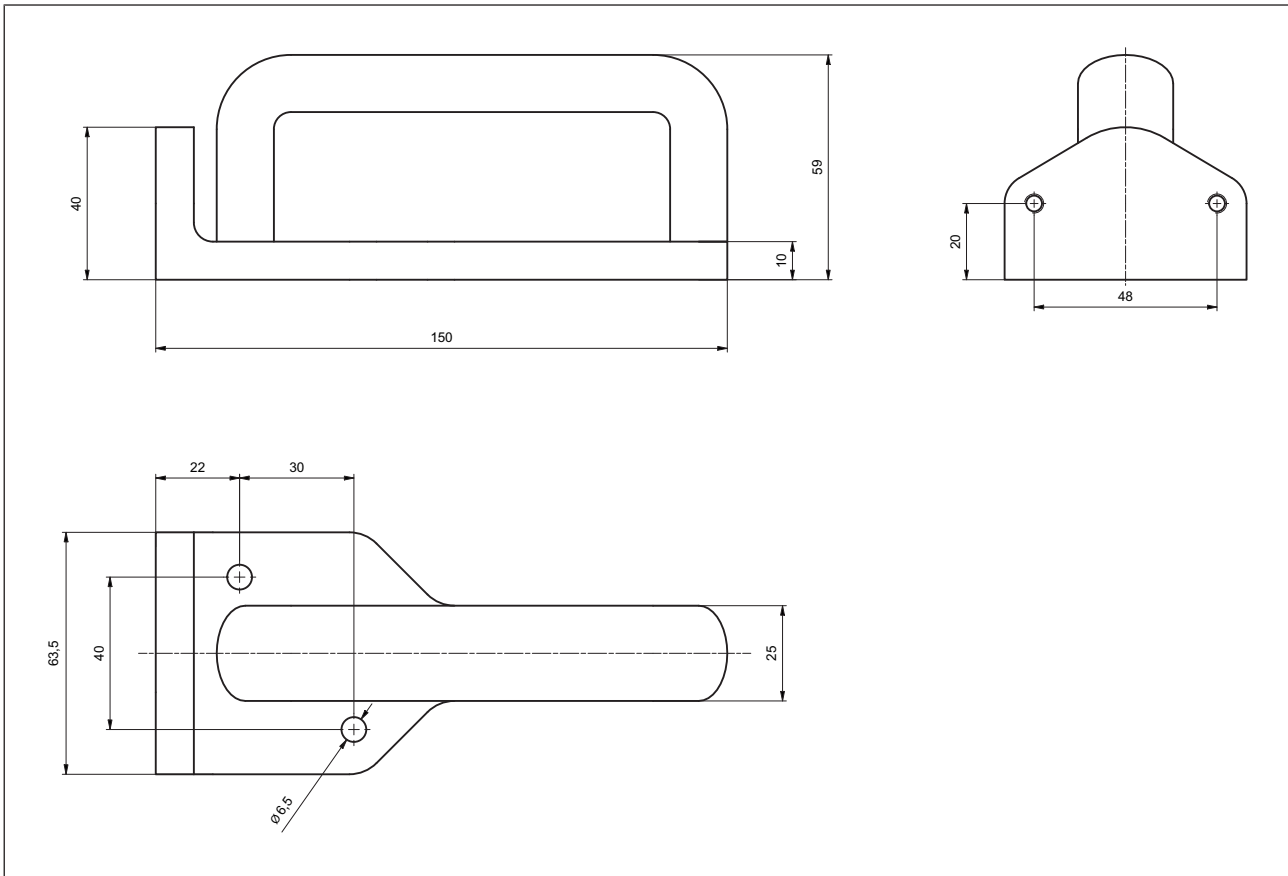


Fig.: Order no.: 570495

PSENmgate handle unit for swing gate, height 70 mm (see [Accessories \[104\]](#))

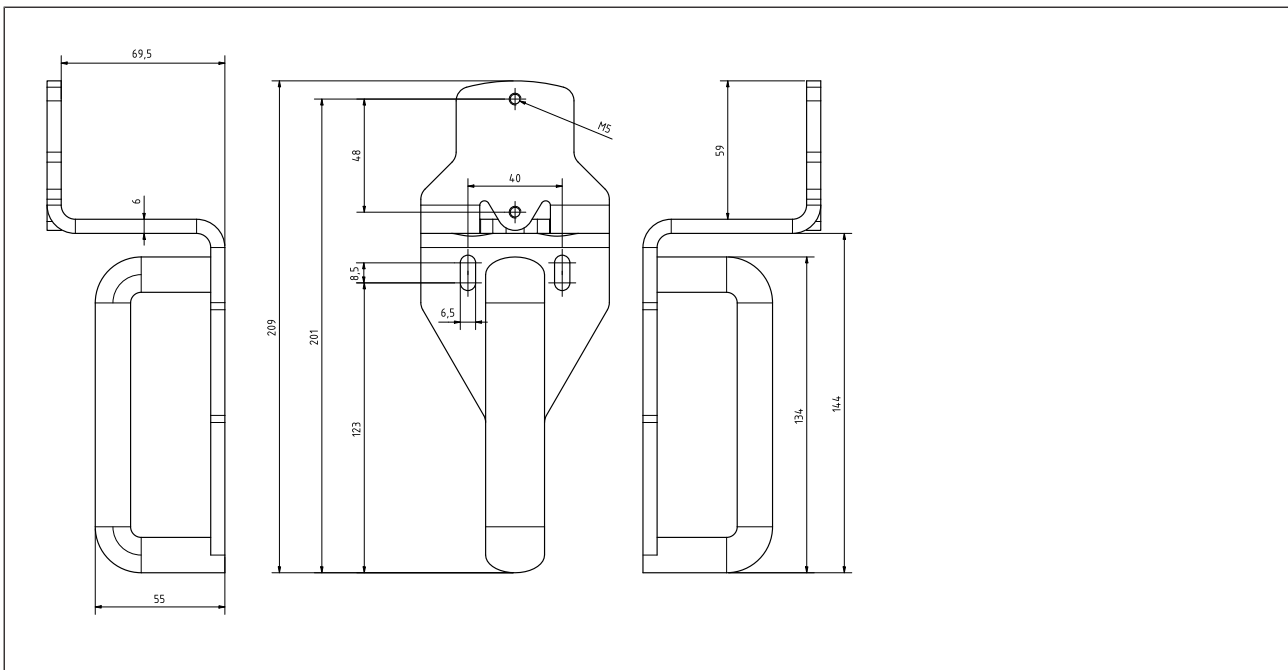


Fig.: Order no.: 6M000051

PSENmgate handle unit for swing gate, height 80 mm (see [Accessories](#) 104])

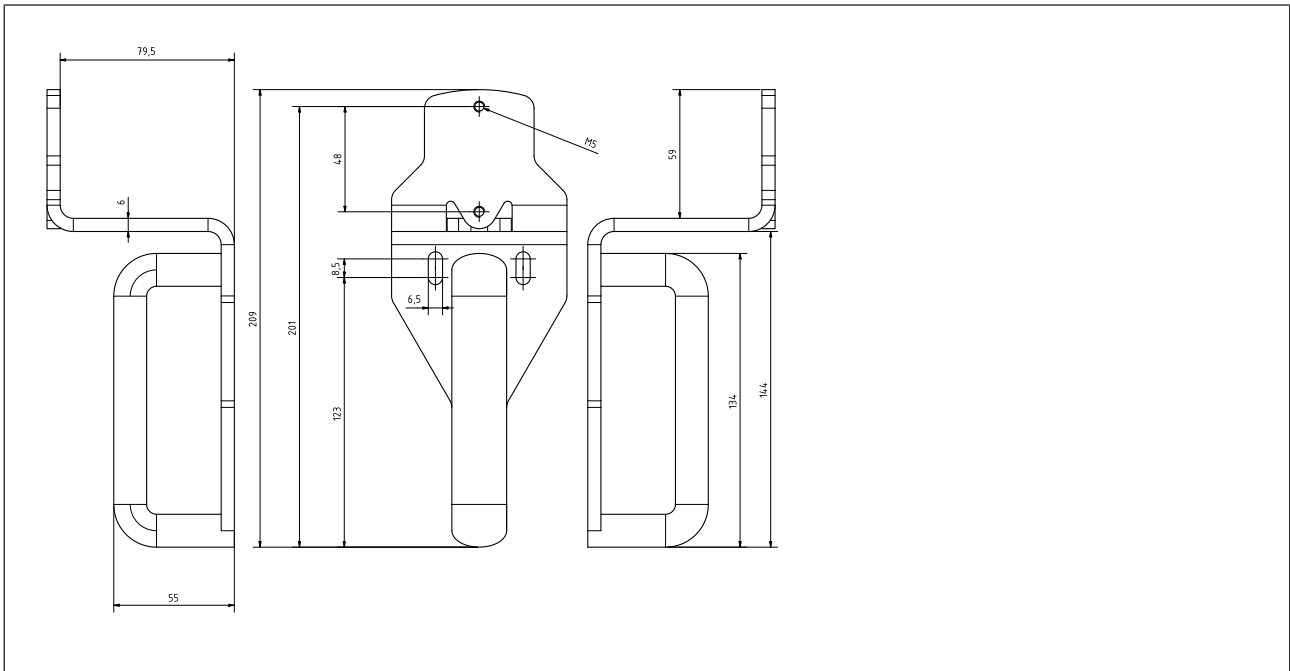
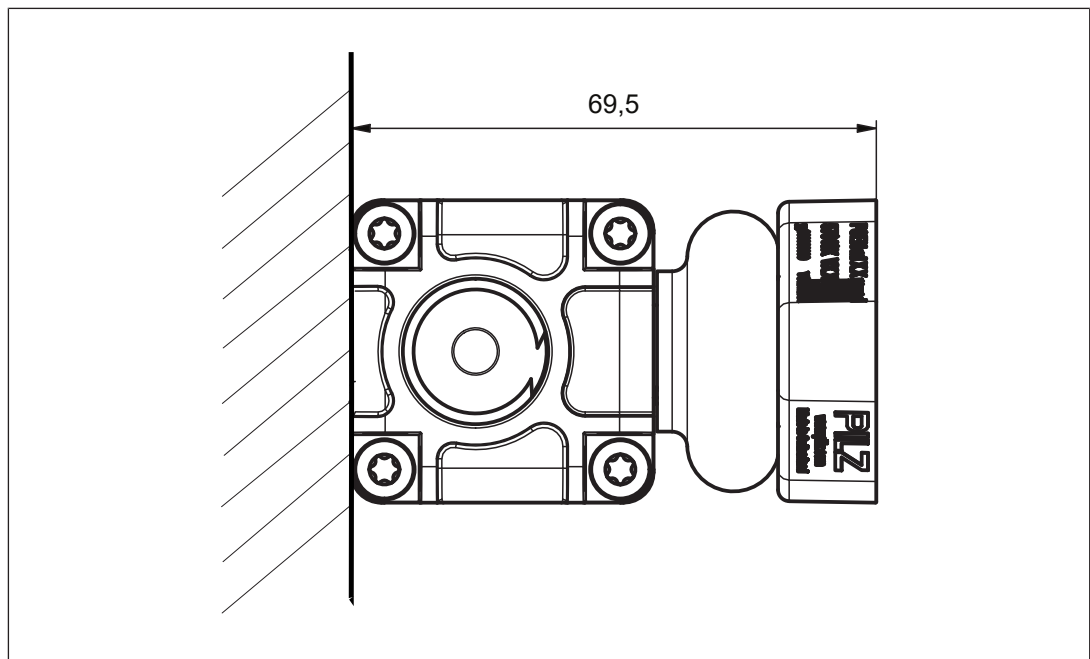


Fig.: Order no.: 6M000052

Distance between safety switch mounting surface and actuator mounting surface



13 Technical details for safety switch order no. 6M000001-6M000003

Where standards are undated, the 2022-11 valid editions apply.

General	6M000001	6M000002	6M000003
Certifications	CE, EAC, FCC, IC, cULus Listed	CE, EAC, FCC, IC, cULus Listed	CE, EAC, FCC, IC, cULus Listed
Sensor's mode of operation	Transponders	Transponders	Transponders
Actuator direction of entry	left	right	Frontal
Coding level in accordance with EN ISO 14119	Low	Low	Low
Design in accordance with EN ISO 14119	4	4	4
Classification in accordance with EN 60947-5-3	PDDb	PDDb	PDDb
Pilz coding type	coded	coded	coded
Transponders	6M000001	6M000002	6M000003
Frequency band	122 kHz - 128 kHz	122 kHz - 128 kHz	122 kHz - 128 kHz
Max. transmitter output	15 mW	15 mW	15 mW
Electrical data	6M000001	6M000002	6M000003
Supply voltage			
Voltage	24 V	24 V	24 V
Kind	DC	DC	DC
Voltage tolerance	-20 %/+20 %	-20 %/+20 %	-20 %/+20 %
Output of external power supply (DC)	1 W	1 W	1 W
Max. switching frequency	1 Hz	1 Hz	1 Hz
Magnet. supply voltage	24 V	24 V	24 V
Max. solenoid current for t < 150 ms	1 A	1 A	1 A
Max. cable capacitance at the safety outputs			
No-load, PNOZ with relay contacts	40 nF	40 nF	40 nF
PNOZmulti, PNOZelog, PSS	70 nF	70 nF	70 nF
Max. inrush current impulse			
Current pulse, A1	5 A	5 A	5 A
Pulse duration, A1	0,0002 ms	0,0002 ms	0,0002 ms
Max. unit fuse protection in accordance with UL	3 A	3 A	3 A
No-load current	40 mA	40 mA	40 mA
Inputs	6M000001	6M000002	6M000003
Quantity	4	4	4

Inputs	6M000001	6M000002	6M000003
Voltage at inputs	24 V DC	24 V DC	24 V DC
Current at solenoid input	500 mA	500 mA	500 mA
Pushbutton	6M000001	6M000002	6M000003
Quantity	2	2	2
Utilisation category			
in accordance with the standard	EN 60947-5-1	EN 60947-5-1	EN 60947-5-1
DC13 at	24 V	24 V	24 V
Max. current	0,1 A	0,1 A	0,1 A
Mechanical life	1,000,000 cycles	1,000,000 cycles	1,000,000 cycles
B10	1,300,000 cycles	1,300,000 cycles	1,300,000 cycles
Contact material	Ag	Ag	Ag
Semiconductor outputs	6M000001	6M000002	6M000003
OSSD safety outputs	2	2	2
Signal outputs	1	1	1
Switching current per output	100 mA	100 mA	100 mA
Breaking capacity per output	2,4 W	2,4 W	2,4 W
Potential isolation from system voltage	No	No	No
Short circuit-proof	Yes	Yes	Yes
Residual current at outputs	100 µA	100 µA	100 µA
Voltage drop at OSSDs	1 V	1 V	1 V
Conditional rated short circuit current	100 A	100 A	100 A
Lowest operating current	1 mA	1 mA	1 mA
Utilisation category in accordance with EN 60947-1	DC-13	DC-13	DC-13
Pushbutton	6M000001	6M000002	6M000003
Utilisation category			
in accordance with the standard	EN 60947-5-1	EN 60947-5-1	EN 60947-5-1
Mechanical life	1,000,000 cycles	1,000,000 cycles	1,000,000 cycles
Contact material	AgNi	AgNi	AgNi
Times	6M000001	6M000002	6M000003
Max. test pulse duration, safety outputs	450 µs	450 µs	450 µs
Switch-on delay			
after UB is applied	1,1 s	1,1 s	1,1 s
Actuator typ.	30 ms	30 ms	30 ms
Actuator max.	50 ms	50 ms	50 ms

Times	6M000001	6M000002	6M000003
Delay-on de-energisation			
Actuator typ.	30 ms	30 ms	30 ms
Actuator max.	40 ms	40 ms	40 ms
Risk time in accordance with EN 60947-5-3	260 ms	260 ms	260 ms
Supply interruption before de-energisation	10 ms	10 ms	10 ms
Simultaneity, channel 1 and 2 max.	20 ms	20 ms	20 ms
Min. pulse duration Lock/Unlock Request	350 - 400 ms	350 - 400 ms	350 - 400 ms
Processing time activate/deactivate guard locking	100 ms	100 ms	100 ms
Environmental data	6M000001	6M000002	6M000003
Temperature of metal surface at ambient temperature: 25 °C	40 °C	40 °C	40 °C
Ambient temperature			
in accordance with the standard	EN 60068-2-14	EN 60068-2-14	EN 60068-2-14
Temperature range	0 - 55 °C	0 - 55 °C	0 - 55 °C
Storage temperature			
in accordance with the standard	EN 60068-2-1/-2	EN 60068-2-1/-2	EN 60068-2-1/-2
Temperature range	-25 - 75 °C	-25 - 75 °C	-25 - 75 °C
Climatic suitability			
in accordance with the standard	EN 60068-2-78	EN 60068-2-78	EN 60068-2-78
Humidity	93 % r. h. at 40 °C	93 % r. h. at 40 °C	93 % r. h. at 40 °C
Max. operating height above SL	2000 m	2000 m	2000 m
EMC	EN 55011: class A, EN 60947-5-3, EN 61326-3-1	EN 55011: class A, EN 60947-5-3, EN 61326-3-1	EN 55011: class A, EN 60947-5-3, EN 61326-3-1
Vibration			
in accordance with the standard	EN 60068-2-6	EN 60068-2-6	EN 60068-2-6
Frequency	10 - 55 Hz	10 - 55 Hz	10 - 55 Hz
Amplitude	1 mm	1 mm	1 mm
Shock stress			
in accordance with the standard	EN 60068-2-27	EN 60068-2-27	EN 60068-2-27
Number of shocks	3	3	3
Acceleration	30g	30g	30g
Duration	11 ms	11 ms	11 ms
Airgap creepage			
Overvoltage category	III	III	III
Pollution degree	3	3	3
Rated insulation voltage	32 V	32 V	32 V

Environmental data	6M000001	6M000002	6M000003
Rated impulse withstand voltage	0,8 kV	0,8 kV	0,8 kV
Protection type			
Housing in accordance with UL	IP65 Type 1	IP65 Type 1	IP65 Type 1
Mechanical data	6M000001	6M000002	6M000003
Escape release available	No	No	No
Mechanical life	1,000,000 cycles	1,000,000 cycles	1,000,000 cycles
Mechanical life with centering ring	50,000 cycles	50,000 cycles	50,000 cycles
Latching force	30 N	30 N	30 N
Retention force	20 - 40 N	20 - 40 N	20 - 40 N
Max. retract speed of actuator	0,3 m/s	0,3 m/s	0,3 m/s
Actuator 1	PSEN ml 1.1	PSEN ml 1.1	PSEN ml 1.1
Min. distance between safety switches	0 mm	0 mm	0 mm
Sensor flush installation in accordance with EN 60947-5-2	No	No	No
Connection type	M12, 12-pin male connector	M12, 12-pin male connector	M12, 12-pin male connector
Connector contact assignment	S1	S1	S1
Cable	LiYY 12 x 0.25 mm2	LiYY 12 x 0.25 mm2	LiYY 12 x 0.25 mm2
Material	Aluminium, stainless steel, plastic, galvanised steel, Zn	Aluminium, stainless steel, plastic, galvanised steel, Zn	Aluminium, stainless steel, plastic, galvanised steel, Zn
Material Top	Plastic	Plastic	Plastic
Max. torque setting Connectors	0,6 Nm	0,6 Nm	0,6 Nm
Max. fixing screws torque settings	6 - 6,5 Nm	6 - 6,5 Nm	6 - 6,5 Nm
Max. torque setting escape release	1,2 - 1,5 Nm	1,2 - 1,5 Nm	1,2 - 1,5 Nm
Max. torque setting for mounting plate	22 - 24 Nm	22 - 24 Nm	22 - 24 Nm
Max. torque setting for mounting bracket	14 - 16 Nm	14 - 16 Nm	14 - 16 Nm
Torque setting circuit board	0,4 - 0,6 Nm	0,4 - 0,6 Nm	0,4 - 0,6 Nm
Torque setting control element	1,1 - 1,3 Nm	1,1 - 1,3 Nm	1,1 - 1,3 Nm
Torque setting, half shell	2,4 - 2,6 Nm	2,4 - 2,6 Nm	2,4 - 2,6 Nm
Min. gate radius	300 mm	300 mm	300 mm

Mechanical data	6M000001	6M000002	6M000003
Dimensions			
Height	237,5 mm	237,5 mm	237,5 mm
Width	40 mm	40 mm	40 mm
Depth	65 mm	65 mm	65 mm
Weight	1.019 g	1.019 g	1.020 g

14 Technical details for safety switch order no. 6M000004-6M000006

Where standards are undated, the 2022-11 valid editions apply.

General	6M000004	6M000005	6M000006
Certifications	CE, EAC, FCC, IC, cU-Lus Listed	CE, EAC, FCC, IC, cU-Lus Listed	CE, EAC, FCC, IC, cU-Lus Listed
Sensor's mode of operation	Transponders	Transponders	Transponders
Actuator direction of entry	left	right	Frontal
Coding level in accordance with EN ISO 14119	High	High	High
Design in accordance with EN ISO 14119	4	4	4
Classification in accordance with EN 60947-5-3	PDDb	PDDb	PDDb
Pilz coding type	fully coded	fully coded	fully coded
Transponders	6M000004	6M000005	6M000006
Frequency band	122 kHz - 128 kHz	122 kHz - 128 kHz	122 kHz - 128 kHz
Max. transmitter output	15 mW	15 mW	15 mW
Electrical data	6M000004	6M000005	6M000006
Supply voltage			
Voltage	24 V	24 V	24 V
Kind	DC	DC	DC
Voltage tolerance	-20 %/+20 %	-20 %/+20 %	-20 %/+20 %
Output of external power supply (DC)	1 W	1 W	1 W
Max. switching frequency	1 Hz	1 Hz	1 Hz
Magnet. supply voltage	24 V	24 V	24 V
Max. solenoid current for t < 150 ms	1 A	1 A	1 A
Max. cable capacitance at the safety outputs			
No-load, PNOZ with relay contacts	40 nF	40 nF	40 nF
PNOZmulti, PNOZelog, PSS	70 nF	70 nF	70 nF
Max. inrush current impulse			
Current pulse, A1	5 A	5 A	5 A
Pulse duration, A1	0,0002 ms	0,0002 ms	0,0002 ms
Max. unit fuse protection in accordance with UL	3 A	3 A	3 A
No-load current	40 mA	40 mA	40 mA
Inputs	6M000004	6M000005	6M000006
Quantity	4	4	4

Inputs	6M000004	6M000005	6M000006
Voltage at inputs	24 V DC	24 V DC	24 V DC
Current at solenoid input	500 mA	500 mA	500 mA
Pushbutton	6M000004	6M000005	6M000006
Quantity	2	2	2
Utilisation category			
in accordance with the standard	EN 60947-5-1	EN 60947-5-1	EN 60947-5-1
DC13 at	24 V	24 V	24 V
Max. current	0,1 A	0,1 A	0,1 A
Mechanical life	1,000,000 cycles	1,000,000 cycles	1,000,000 cycles
B10	1,300,000 cycles	1,300,000 cycles	1,300,000 cycles
Contact material	Ag	Ag	Ag
Semiconductor outputs	6M000004	6M000005	6M000006
OSSD safety outputs	2	2	2
Signal outputs	1	1	1
Switching current per output	100 mA	100 mA	100 mA
Breaking capacity per output	2,4 W	2,4 W	2,4 W
Potential isolation from system voltage	No	No	No
Short circuit-proof	Yes	Yes	Yes
Residual current at outputs	100 µA	100 µA	100 µA
Voltage drop at OSSDs	1 V	1 V	1 V
Conditional rated short circuit current	100 A	100 A	100 A
Lowest operating current	1 mA	1 mA	1 mA
Utilisation category in accordance with EN 60947-1	DC-13	DC-13	DC-13
Pushbutton	6M000004	6M000005	6M000006
Utilisation category			
in accordance with the standard	EN 60947-5-1	EN 60947-5-1	EN 60947-5-1
Mechanical life	1,000,000 cycles	1,000,000 cycles	1,000,000 cycles
Contact material	AgNi	AgNi	AgNi
Times	6M000004	6M000005	6M000006
Max. test pulse duration, safety outputs	450 µs	450 µs	450 µs
Switch-on delay			
after UB is applied	1,1 s	1,1 s	1,1 s
Actuator typ.	30 ms	30 ms	30 ms
Actuator max.	50 ms	50 ms	50 ms

Times	6M000004	6M000005	6M000006
Delay-on de-energisation			
Actuator typ.	30 ms	30 ms	30 ms
Actuator max.	40 ms	40 ms	40 ms
Risk time in accordance with EN 60947-5-3	260 ms	260 ms	260 ms
Supply interruption before de-energisation	10 ms	10 ms	10 ms
Simultaneity, channel 1 and 2 max.	20 ms	20 ms	20 ms
Min. pulse duration Lock/Unlock Request	350 - 400 ms	350 - 400 ms	350 - 400 ms
Processing time activate/deactivate guard locking	100 ms	100 ms	100 ms
Environmental data	6M000004	6M000005	6M000006
Temperature of metal surface at ambient temperature: 25 °C	40 °C	40 °C	40 °C
Ambient temperature			
in accordance with the standard	EN 60068-2-14	EN 60068-2-14	EN 60068-2-14
Temperature range	0 - 55 °C	0 - 55 °C	0 - 55 °C
Storage temperature			
in accordance with the standard	EN 60068-2-1/-2	EN 60068-2-1/-2	EN 60068-2-1/-2
Temperature range	-25 - 75 °C	-25 - 75 °C	-25 - 75 °C
Climatic suitability			
in accordance with the standard	EN 60068-2-78	EN 60068-2-78	EN 60068-2-78
Humidity	93 % r. h. at 40 °C	93 % r. h. at 40 °C	93 % r. h. at 40 °C
Max. operating height above SL	2000 m	2000 m	2000 m
EMC	EN 55011: class A, EN 60947-5-3, EN 61326-3-1	EN 55011: class A, EN 60947-5-3, EN 61326-3-1	EN 55011: class A, EN 60947-5-3, EN 61326-3-1
Vibration			
in accordance with the standard	EN 60068-2-6	EN 60068-2-6	EN 60068-2-6
Frequency	10 - 55 Hz	10 - 55 Hz	10 - 55 Hz
Amplitude	1 mm	1 mm	1 mm
Shock stress			
in accordance with the standard	EN 60068-2-27	EN 60068-2-27	EN 60068-2-27
Number of shocks	3	3	3
Acceleration	30g	30g	30g
Duration	11 ms	11 ms	11 ms
Airgap creepage			
Overvoltage category	III	III	III
Pollution degree	3	3	3
Rated insulation voltage	32 V	32 V	32 V

Environmental data	6M000004	6M000005	6M000006
Rated impulse withstand voltage	0,8 kV	0,8 kV	0,8 kV
Protection type			
Housing in accordance with UL	IP65 Type 1	IP65 Type 1	IP65 Type 1
Mechanical data	6M000004	6M000005	6M000006
Escape release available	No	No	No
Mechanical life	1,000,000 cycles	1,000,000 cycles	1,000,000 cycles
Mechanical life with centering ring	50,000 cycles	50,000 cycles	50,000 cycles
Latching force	30 N	30 N	30 N
Retention force	20 - 40 N	20 - 40 N	20 - 40 N
Max. retract speed of actuator	0,3 m/s	0,3 m/s	0,3 m/s
Actuator 1	PSEN ml 2.1	PSEN ml 2.1	PSEN ml 2.1
Min. distance between safety switches	0 mm	0 mm	0 mm
Sensor flush installation in accordance with EN 60947-5-2	No	No	No
Connection type	M12, 12-pin male connector	M12, 12-pin male connector	M12, 12-pin male connector
Connector contact assignment	S1	S1	S1
Cable	LiYY 12 x 0.25 mm²	LiYY 12 x 0.25 mm²	LiYY 12 x 0.25 mm²
Material	Aluminium, stainless steel, plastic, galvanised steel, Zn	Aluminium, stainless steel, plastic, galvanised steel, Zn	Aluminium, stainless steel, plastic, galvanised steel, Zn
Material Top	Plastic	Plastic	Plastic
Max. torque setting Connectors	0,6 Nm	0,6 Nm	0,6 Nm
Max. fixing screws torque settings	6 - 6,5 Nm	6 - 6,5 Nm	6 - 6,5 Nm
Max. torque setting escape release	1,2 - 1,5 Nm	1,2 - 1,5 Nm	1,2 - 1,5 Nm
Max. torque setting for mounting plate	22 - 24 Nm	22 - 24 Nm	22 - 24 Nm
Max. torque setting for mounting bracket	14 - 16 Nm	14 - 16 Nm	14 - 16 Nm
Torque setting circuit board	0,4 - 0,6 Nm	0,4 - 0,6 Nm	0,4 - 0,6 Nm
Torque setting control element	1,1 - 1,3 Nm	1,1 - 1,3 Nm	1,1 - 1,3 Nm
Torque setting, half shell	2,4 - 2,6 Nm	2,4 - 2,6 Nm	2,4 - 2,6 Nm
Min. gate radius	300 mm	300 mm	300 mm

Mechanical data	6M000004	6M000005	6M000006
Dimensions			
Height	237,5 mm	237,5 mm	237,5 mm
Width	40 mm	40 mm	40 mm
Depth	65 mm	65 mm	65 mm
Weight	1.019 g	1.019 g	1.020 g

15 Technical details for safety switch order no. 6M000025-6M000027

Where standards are undated, the 2022-11 valid editions apply.

General	6M000025	6M000026	6M000027
Certifications	CE, EAC, FCC, IC, TÜV, cULus Listed	CE, EAC, FCC, IC, TÜV, cULus Listed	CE, EAC, FCC, IC, TÜV, cULus Listed
Sensor's mode of operation	Transponders	Transponders	Transponders
Actuator direction of entry	left	right	Frontal
Coding level in accordance with EN ISO 14119	Low	Low	Low
Design in accordance with EN ISO 14119	4	4	4
Classification in accordance with EN 60947-5-3	PDDb	PDDb	PDDb
Pilz coding type	coded	coded	coded
Transponders	6M000025	6M000026	6M000027
Frequency band	122 kHz - 128 kHz	122 kHz - 128 kHz	122 kHz - 128 kHz
Max. transmitter output	15 mW	15 mW	15 mW
Electrical data	6M000025	6M000026	6M000027
Supply voltage			
Voltage	24 V	24 V	24 V
Kind	DC	DC	DC
Voltage tolerance	-20 %/+20 %	-20 %/+20 %	-20 %/+20 %
Output of external power supply (DC)	1 W	1 W	1 W
Max. switching frequency	1 Hz	1 Hz	1 Hz
Magnet. supply voltage	24 V	24 V	24 V
Max. solenoid current for t < 150 ms	1 A	1 A	1 A
Max. cable capacitance at the safety outputs			
No-load, PNOZ with relay contacts	40 nF	40 nF	40 nF
PNOZmulti, PNOZelog, PSS	70 nF	70 nF	70 nF
Max. inrush current impulse			
Current pulse, A1	5 A	5 A	5 A
Pulse duration, A1	0,0002 ms	0,0002 ms	0,0002 ms
Max. unit fuse protection in accordance with UL	3 A	3 A	3 A
No-load current	40 mA	40 mA	40 mA
Inputs	6M000025	6M000026	6M000027
Quantity	5	5	5

Inputs	6M000025	6M000026	6M000027
Voltage at inputs	24 V DC	24 V DC	24 V DC
Current at solenoid input	500 mA	500 mA	500 mA
Pushbutton	6M000025	6M000026	6M000027
Quantity	2	2	2
Utilisation category			
in accordance with the standard	EN 60947-5-1	EN 60947-5-1	EN 60947-5-1
DC13 at	24 V	24 V	24 V
Max. current	0,1 A	0,1 A	0,1 A
Mechanical life	1,000,000 cycles	1,000,000 cycles	1,000,000 cycles
B10	1,300,000 cycles	1,300,000 cycles	1,300,000 cycles
Contact material	Ag	Ag	Ag
Semiconductor outputs	6M000025	6M000026	6M000027
OSSD safety outputs	2	2	2
Signal outputs	1	1	1
Switching current per output	100 mA	100 mA	100 mA
Breaking capacity per output	2,4 W	2,4 W	2,4 W
Potential isolation from system voltage	No	No	No
Short circuit-proof	Yes	Yes	Yes
Residual current at outputs	100 µA	100 µA	100 µA
Voltage drop at OSSDs	1 V	1 V	1 V
Conditional rated short circuit current	100 A	100 A	100 A
Lowest operating current	1 mA	1 mA	1 mA
Utilisation category in accordance with EN 60947-1	DC-13	DC-13	DC-13
Pushbutton	6M000025	6M000026	6M000027
Utilisation category			
in accordance with the standard	EN 60947-5-1	EN 60947-5-1	EN 60947-5-1
Mechanical life	1,000,000 cycles	1,000,000 cycles	1,000,000 cycles
Contact material	AgNi	AgNi	AgNi
Times	6M000025	6M000026	6M000027
Max. test pulse duration, safety outputs	450 µs	450 µs	450 µs
Switch-on delay			
after UB is applied	1,1 s	1,1 s	1,1 s
Actuator typ.	30 ms	30 ms	30 ms
Actuator max.	50 ms	50 ms	50 ms

Times	6M000025	6M000026	6M000027
Delay-on de-energisation			
Actuator typ.	30 ms	30 ms	30 ms
Actuator max.	40 ms	40 ms	40 ms
Risk time in accordance with EN 60947-5-3	260 ms	260 ms	260 ms
Supply interruption before de-energisation	10 ms	10 ms	10 ms
Simultaneity, channel 1 and 2 max.	20 ms	20 ms	20 ms
Min. pulse duration Lock/Unlock Request	350 - 400 ms	350 - 400 ms	350 - 400 ms
Processing time activate/deactivate guard locking	100 ms	100 ms	100 ms
Environmental data	6M000025	6M000026	6M000027
Temperature of metal surface at ambient temperature: 25 °C	40 °C	40 °C	40 °C
Ambient temperature			
in accordance with the standard	EN 60068-2-14	EN 60068-2-14	EN 60068-2-14
Temperature range	0 - 55 °C	0 - 55 °C	0 - 55 °C
Storage temperature			
in accordance with the standard	EN 60068-2-1/-2	EN 60068-2-1/-2	EN 60068-2-1/-2
Temperature range	-25 - 75 °C	-25 - 75 °C	-25 - 75 °C
Climatic suitability			
in accordance with the standard	EN 60068-2-78	EN 60068-2-78	EN 60068-2-78
Humidity	93 % r. h. at 40 °C	93 % r. h. at 40 °C	93 % r. h. at 40 °C
Max. operating height above SL	2000 m	2000 m	2000 m
EMC	EN 55011: class A, EN 60947-5-3, EN 61326-3-1	EN 55011: class A, EN 60947-5-3, EN 61326-3-1	EN 55011: class A, EN 60947-5-3, EN 61326-3-1
Vibration			
in accordance with the standard	EN 60068-2-6	EN 60068-2-6	EN 60068-2-6
Frequency	10 - 55 Hz	10 - 55 Hz	10 - 55 Hz
Amplitude	1 mm	1 mm	1 mm
Shock stress			
in accordance with the standard	EN 60068-2-27	EN 60068-2-27	EN 60068-2-27
Number of shocks	3	3	3
Acceleration	30g	30g	30g
Duration	11 ms	11 ms	11 ms
Airgap creepage			
Overvoltage category	III	III	III
Pollution degree	3	3	3
Rated insulation voltage	32 V	32 V	32 V

Environmental data	6M000025	6M000026	6M000027
Rated impulse withstand voltage	0,8 kV	0,8 kV	0,8 kV
Protection type			
Housing in accordance with UL	IP65 Type 1	IP65 Type 1	IP65 Type 1
Mechanical data	6M000025	6M000026	6M000027
Escape release available	No	No	No
Mechanical life	1,000,000 cycles	1,000,000 cycles	1,000,000 cycles
Mechanical life with centering ring	50,000 cycles	50,000 cycles	50,000 cycles
Latching force	30 N	30 N	30 N
Retention force	20 - 40 N	20 - 40 N	20 - 40 N
Max. retract speed of actuator	0,3 m/s	0,3 m/s	0,3 m/s
Actuator 1	PSEN ml 1.1	PSEN ml 1.1	PSEN ml 1.1
Min. distance between safety switches	0 mm	0 mm	0 mm
Sensor flush installation in accordance with EN 60947-5-2	No	No	No
Connection type	M12, 12-pin male connector	M12, 12-pin male connector	M12, 12-pin male connector
Connector contact assignment	S1	S1	S1
Cable	LiYY 12 x 0.25 mm²	LiYY 12 x 0.25 mm²	LiYY 12 x 0.25 mm²
Material	Aluminium, stainless steel, plastic, galvanised steel, Zn	Aluminium, stainless steel, plastic, galvanised steel, Zn	Aluminium, stainless steel, plastic, galvanised steel, Zn
Material Top	Plastic	Plastic	Plastic
Max. torque setting Connectors	0,6 Nm	0,6 Nm	0,6 Nm
Max. fixing screws torque settings	6 - 6,5 Nm	6 - 6,5 Nm	6 - 6,5 Nm
Max. torque setting escape release	1,2 - 1,5 Nm	1,2 - 1,5 Nm	1,2 - 1,5 Nm
Max. torque setting for mounting plate	22 - 24 Nm	22 - 24 Nm	22 - 24 Nm
Max. torque setting for mounting bracket	14 - 16 Nm	14 - 16 Nm	14 - 16 Nm
Torque setting circuit board	0,4 - 0,6 Nm	0,4 - 0,6 Nm	0,4 - 0,6 Nm
Torque setting control element	1,1 - 1,3 Nm	1,1 - 1,3 Nm	1,1 - 1,3 Nm
Torque setting, half shell	2,4 - 2,6 Nm	2,4 - 2,6 Nm	2,4 - 2,6 Nm
Min. gate radius	300 mm	300 mm	300 mm

Mechanical data	6M000025	6M000026	6M000027
Dimensions			
Height	237,5 mm	237,5 mm	237,5 mm
Width	40 mm	40 mm	40 mm
Depth	65 mm	65 mm	65 mm
Weight	1.019 g	1.019 g	1.020 g

16 Technical details for safety switch order no. 6M000028-6M000030

Where standards are undated, the 2022-11 valid editions apply.

General	6M000028	6M000029	6M000030
Certifications	CE, EAC, FCC, IC, TÜV, cULus Listed	CE, EAC, FCC, IC, TÜV, cULus Listed	CE, EAC, FCC, IC, TÜV, cULus Listed
Sensor's mode of operation	Transponders	Transponders	Transponders
Actuator direction of entry	left	right	Frontal
Coding level in accordance with EN ISO 14119	High	High	High
Design in accordance with EN ISO 14119	4	4	4
Classification in accordance with EN 60947-5-3	PDDb	PDDb	PDDb
Pilz coding type	fully coded	fully coded	fully coded
Transponders	6M000028	6M000029	6M000030
Frequency band	122 kHz - 128 kHz	122 kHz - 128 kHz	122 kHz - 128 kHz
Max. transmitter output	15 mW	15 mW	15 mW
Electrical data	6M000028	6M000029	6M000030
Supply voltage			
Voltage	24 V	24 V	24 V
Kind	DC	DC	DC
Voltage tolerance	-20 %/+20 %	-20 %/+20 %	-20 %/+20 %
Output of external power supply (DC)	1 W	1 W	1 W
Max. switching frequency	1 Hz	1 Hz	1 Hz
Magnet. supply voltage	24 V	24 V	24 V
Max. solenoid current for t < 150 ms	1 A	1 A	1 A
Max. cable capacitance at the safety outputs			
No-load, PNOZ with relay contacts	40 nF	40 nF	40 nF
PNOZmulti, PNOZelog, PSS	70 nF	70 nF	70 nF
Max. inrush current impulse			
Current pulse, A1	5 A	5 A	5 A
Pulse duration, A1	0,0002 ms	0,0002 ms	0,0002 ms
Max. unit fuse protection in accordance with UL	3 A	3 A	3 A
No-load current	40 mA	40 mA	40 mA
Inputs	6M000028	6M000029	6M000030
Quantity	5	5	5

Inputs	6M000028	6M000029	6M000030
Voltage at inputs	24 V DC	24 V DC	24 V DC
Current at solenoid input	500 mA	500 mA	500 mA
Pushbutton	6M000028	6M000029	6M000030
Quantity	2	2	2
Utilisation category			
in accordance with the standard	EN 60947-5-1	EN 60947-5-1	EN 60947-5-1
DC13 at	24 V	24 V	24 V
Max. current	0,1 A	0,1 A	0,1 A
Mechanical life	1,000,000 cycles	1,000,000 cycles	1,000,000 cycles
B10	1,300,000 cycles	1,300,000 cycles	1,300,000 cycles
Contact material	Ag	Ag	Ag
Semiconductor outputs	6M000028	6M000029	6M000030
OSSD safety outputs	2	2	2
Signal outputs	1	1	1
Switching current per output	100 mA	100 mA	100 mA
Breaking capacity per output	2,4 W	2,4 W	2,4 W
Potential isolation from system voltage	No	No	No
Short circuit-proof	Yes	Yes	Yes
Residual current at outputs	100 µA	100 µA	100 µA
Voltage drop at OSSDs	1 V	1 V	1 V
Conditional rated short circuit current	100 A	100 A	100 A
Lowest operating current	1 mA	1 mA	1 mA
Utilisation category in accordance with EN 60947-1	DC-13	DC-13	DC-13
Pushbutton	6M000028	6M000029	6M000030
Utilisation category			
in accordance with the standard	EN 60947-5-1	EN 60947-5-1	EN 60947-5-1
Mechanical life	1,000,000 cycles	1,000,000 cycles	1,000,000 cycles
Contact material	AgNi	AgNi	AgNi
Times	6M000028	6M000029	6M000030
Max. test pulse duration, safety outputs	450 µs	450 µs	450 µs
Switch-on delay			
after UB is applied	1,1 s	1,1 s	1,1 s
Actuator typ.	30 ms	30 ms	30 ms
Actuator max.	50 ms	50 ms	50 ms

Times	6M000028	6M000029	6M000030
Delay-on de-energisation			
Actuator typ.	30 ms	30 ms	30 ms
Actuator max.	40 ms	40 ms	40 ms
Risk time in accordance with EN 60947-5-3	260 ms	260 ms	260 ms
Supply interruption before de-energisation	10 ms	10 ms	10 ms
Simultaneity, channel 1 and 2 max.	20 ms	20 ms	20 ms
Min. pulse duration Lock/Unlock Request	350 - 400 ms	350 - 400 ms	350 - 400 ms
Processing time activate/deactivate guard locking	100 ms	100 ms	100 ms
Environmental data	6M000028	6M000029	6M000030
Temperature of metal surface at ambient temperature: 25 °C	40 °C	40 °C	40 °C
Ambient temperature			
in accordance with the standard	EN 60068-2-14	EN 60068-2-14	EN 60068-2-14
Temperature range	0 - 55 °C	0 - 55 °C	0 - 55 °C
Storage temperature			
in accordance with the standard	EN 60068-2-1/-2	EN 60068-2-1/-2	EN 60068-2-1/-2
Temperature range	-25 - 75 °C	-25 - 75 °C	-25 - 75 °C
Climatic suitability			
in accordance with the standard	EN 60068-2-78	EN 60068-2-78	EN 60068-2-78
Humidity	93 % r. h. at 40 °C	93 % r. h. at 40 °C	93 % r. h. at 40 °C
Max. operating height above SL	2000 m	2000 m	2000 m
EMC	EN 55011: class A, EN 60947-5-3, EN 61326-3-1	EN 55011: class A, EN 60947-5-3, EN 61326-3-1	EN 55011: class A, EN 60947-5-3, EN 61326-3-1
Vibration			
in accordance with the standard	EN 60068-2-6	EN 60068-2-6	EN 60068-2-6
Frequency	10 - 55 Hz	10 - 55 Hz	10 - 55 Hz
Amplitude	1 mm	1 mm	1 mm
Shock stress			
in accordance with the standard	EN 60068-2-27	EN 60068-2-27	EN 60068-2-27
Number of shocks	3	3	3
Acceleration	30g	30g	30g
Duration	11 ms	11 ms	11 ms
Airgap creepage			
Overvoltage category	III	III	III
Pollution degree	3	3	3
Rated insulation voltage	32 V	32 V	32 V

Environmental data	6M000028	6M000029	6M000030
Rated impulse withstand voltage	0,8 kV	0,8 kV	0,8 kV
Protection type			
Housing in accordance with UL	IP65 Type 1	IP65 Type 1	IP65 Type 1
Mechanical data	6M000028	6M000029	6M000030
Escape release available	No	No	No
Mechanical life	1,000,000 cycles	1,000,000 cycles	1,000,000 cycles
Mechanical life with centering ring	50,000 cycles	50,000 cycles	50,000 cycles
Latching force	30 N	30 N	30 N
Retention force	20 - 40 N	20 - 40 N	20 - 40 N
Max. retract speed of actuator	0,3 m/s	0,3 m/s	0,3 m/s
Actuator 1	PSEN ml 2.1	PSEN ml 2.1	PSEN ml 2.1
Min. distance between safety switches	0 mm	0 mm	0 mm
Sensor flush installation in accordance with EN 60947-5-2	No	No	No
Connection type	M12, 12-pin male connector	M12, 12-pin male connector	M12, 12-pin male connector
Connector contact assignment	S1	S1	S1
Cable	LiYY 12 x 0.25 mm²	LiYY 12 x 0.25 mm²	LiYY 12 x 0.25 mm²
Material	Aluminium, stainless steel, plastic, galvanised steel, Zn	Aluminium, stainless steel, plastic, galvanised steel, Zn	Aluminium, stainless steel, plastic, galvanised steel, Zn
Material Top	Plastic	Plastic	Plastic
Max. torque setting Connectors	0,6 Nm	0,6 Nm	0,6 Nm
Max. fixing screws torque settings	6 - 6,5 Nm	6 - 6,5 Nm	6 - 6,5 Nm
Max. torque setting escape release	1,2 - 1,5 Nm	1,2 - 1,5 Nm	1,2 - 1,5 Nm
Max. torque setting for mounting plate	22 - 24 Nm	22 - 24 Nm	22 - 24 Nm
Max. torque setting for mounting bracket	14 - 16 Nm	14 - 16 Nm	14 - 16 Nm
Torque setting circuit board	0,4 - 0,6 Nm	0,4 - 0,6 Nm	0,4 - 0,6 Nm
Torque setting control element	1,1 - 1,3 Nm	1,1 - 1,3 Nm	1,1 - 1,3 Nm
Torque setting, half shell	2,4 - 2,6 Nm	2,4 - 2,6 Nm	2,4 - 2,6 Nm
Min. gate radius	300 mm	300 mm	300 mm

Mechanical data	6M000028	6M000029	6M000030
Dimensions			
Height	237,5 mm	237,5 mm	237,5 mm
Width	40 mm	40 mm	40 mm
Depth	65 mm	65 mm	65 mm
Weight	1.019 g	1.019 g	1.020 g

17 Technical details, actuator, order no. 570480-570483

Where standards are undated, the 2022-11 valid editions apply.

General	570480	570481	570482	570483
Certifications	CE, FCC, IC, TÜV, UKCA, cULus Listed	CE, FCC, IC, TÜV, UKCA, cULus Listed	CE, TÜV, UKCA, cULus Listed	CE, TÜV, UKCA, cULus Listed
Sensor's mode of operation	Transponders	Transponders	Transponders	Transponders
Actuator design	Pointed	Pointed	Rounded	Rounded
Coding level in accordance with EN ISO 14119	Low	High	Low	High
Pilz coding type	coded	fully coded	coded	fully coded
Environmental data	570480	570481	570482	570483
Ambient temperature				
in accordance with the standard	EN 60068-2-14	EN 60068-2-14	EN 60068-2-14	EN 60068-2-14
Temperature range	0 - 60 °C	0 - 60 °C	0 - 60 °C	0 - 60 °C
Storage temperature				
in accordance with the standard	EN 60068-2-1/-2	EN 60068-2-1/-2	EN 60068-2-1/-2	EN 60068-2-1/-2
Temperature range	-25 - 70 °C	-25 - 70 °C	-25 - 70 °C	-25 - 70 °C
Climatic suitability				
in accordance with the standard	EN 60068-2-78	EN 60068-2-78	EN 60068-2-78	EN 60068-2-78
Humidity	93 % r. h. at 40 °C	93 % r. h. at 40 °C	93 % r. h. at 40 °C	93 % r. h. at 40 °C
EMC	EN 55011: class A, EN 60947-5-3, EN 61326-3-1	EN 55011: class A, EN 60947-5-3, EN 61326-3-1	EN 55011: class A, EN 60947-5-3, EN 61326-3-1	EN 55011: class A, EN 60947-5-3, EN 61326-3-1
Vibration				
in accordance with the standard	EN 60068-2-6	EN 60068-2-6	EN 60947-5-2	EN 60947-5-2
Frequency	10 - 55 Hz	10 - 55 Hz	10 - 55 Hz	10 - 55 Hz
Amplitude	1 mm	1 mm	1 mm	1 mm
Shock stress				
in accordance with the standard	EN 60068-2-27	EN 60068-2-27	EN 60947-5-2	EN 60947-5-2
Number of shocks	3	3	3	3
Acceleration	30g	30g	50g	50g
Duration	11 ms	11 ms	11 ms	11 ms

Environmental data 570480		570481	570482	570483
Protection type				
Housing	IP67	IP67	IP67	IP67
in accordance with UL	Type 1	Type 1	Type 1	Type 1
Mechanical data 570480		570481	570482	570483
Mechanical life	1,000,000 cycles	1,000,000 cycles	1,000,000 cycles	1,000,000 cycles
Mechanical life with centering ring	50,000 cycles	50,000 cycles	50,000 cycles	50,000 cycles
Holding force FZh				
Fixing screws in parallel to actuator	7.500 N	7.500 N	7.500 N	7.500 N
Fixing screws side-on to actuator	5.000 N	5.000 N	5.000 N	5.000 N
Holding force F1Max in accordance with ISO 14119				
Fixing screws in parallel to actuator	15.000 N	15.000 N	15.000 N	15.000 N
Fixing screws side-on to actuator	10.000 N	10.000 N	10.000 N	10.000 N
Max. vertical offset	+/-3,0 mm	+/-3,0 mm	+/-3,0 mm	+/-3,0 mm
Max. lateral offset	+/-3,0 mm	+/-3,0 mm	+/-3,0 mm	+/-3,0 mm
Max. angular offset around the X axis	+/-2,0 deg	+/-2,0 deg	+/-2,0 deg	+/-2,0 deg
Max. angular offset around the Y axis	+/-2,5 deg	+/-2,5 deg	+/-2,5 deg	+/-2,5 deg
Max. angular offset around the Z axis	+/-7,5 deg	+/-7,5 deg	+/-7,5 deg	+/-7,5 deg
Max. offset in closing direction	+/-2 mm	+/-2 mm	+/-2 mm	+/-2 mm
Max. retract speed of actuator	0,3 m/s	0,3 m/s	0,3 m/s	0,3 m/s
Material	Stainless steel, plastic, polycarbonate, galvanised steel, Zn	Stainless steel, plastic, polycarbonate, galvanised steel, Zn	Stainless steel, plastic, polycarbonate, galvanised steel, Zn	Stainless steel, plastic, polycarbonate, galvanised steel, Zn
Max. fixing screws torque settings	6 Nm	6 Nm	6 Nm	6 Nm
Actuator dimensions				
Height	63,5 mm	63,5 mm	63,5 mm	63,5 mm
Width	40 mm	40 mm	40 mm	40 mm
Depth	67,2 mm	67,2 mm	61,4 mm	61,4 mm
Weight	145 g	145 g	145 g	145 g

18 Technical details for actuator, order no. 6O000001-6O000004

Where standards are undated, the 2022-11 valid editions apply.

General	6O000001	6O000002	6O000003	6O000004
Certifications	CE, TÜV, UKCA, cULus Listed	CE, TÜV, UKCA, cULus Listed	CE, TÜV, UKCA, cULus Listed	CE, TÜV, UKCA, cULus Listed
Sensor's mode of operation	Transponders	Transponders	Transponders	Transponders
Coding level in accordance with EN ISO 14119	Low	High	Low	High
Design in accordance with EN ISO 14119	4	4	4	4
Pilz coding type	coded	fully coded	coded	fully coded
Environmental data	6O000001	6O000002	6O000003	6O000004
Temperature of metal surface at ambient temperature: 25 °C	40 °C	40 °C	40 °C	40 °C
Ambient temperature				
in accordance with the standard	EN 60068-2-14	EN 60068-2-14	EN 60068-2-14	EN 60068-2-14
Temperature range	0 - 60 °C	0 - 60 °C	0 - 60 °C	0 - 60 °C
Storage temperature				
in accordance with the standard	EN 60068-2-1/-2	EN 60068-2-1/-2	EN 60068-2-1/-2	EN 60068-2-1/-2
Temperature range	-25 - 70 °C	-25 - 70 °C	-25 - 70 °C	-25 - 70 °C
Climatic suitability				
in accordance with the standard	EN 60068-2-78	EN 60068-2-78	EN 60068-2-78	EN 60068-2-78
Humidity	93 % r. h. at 40 °C	93 % r. h. at 40 °C	93 % r. h. at 40 °C	93 % r. h. at 40 °C
EMC	EN 55011: class A, EN 60947-5-3, EN 61326-3-1	EN 55011: class A, EN 60947-5-3, EN 61326-3-1	EN 55011: class A, EN 60947-5-3, EN 61326-3-1	EN 55011: class A, EN 60947-5-3, EN 61326-3-1
Vibration				
in accordance with the standard	EN 60068-2-6	EN 60068-2-6	EN 60068-2-6	EN 60068-2-6
Frequency	10 - 55 Hz	10 - 55 Hz	10 - 55 Hz	10 - 55 Hz
Amplitude	1 mm	1 mm	1 mm	1 mm

Environmental data	6O000001	6O000002	6O000003	6O000004
Shock stress				
in accordance with the standard	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2
Number of shocks	6	6	6	6
Acceleration	10g	10g	10g	10g
Duration	11 ms	11 ms	11 ms	11 ms
Protection type				
Housing	IP20	IP20	IP20	IP20
in accordance with UL	Type 1	Type 1	Type 1	Type 1
Mechanical data	6O000001	6O000002	6O000003	6O000004
Cable outlet	up	up	up	up
Service life escape release	6050 cycles	6050 cycles	6050 cycles	6050 cycles
Mechanical life	250,000 cycles	250,000 cycles	250,000 cycles	250,000 cycles
Holding force FZh				
on sliding gates (installed with mounting lug)	2000 N	2000 N	2000 N	2000 N
on swing gates:	3000 N	3000 N	3000 N	3000 N
Holding force F1Max				
in accordance with ISO 14119				
on sliding gates (installed with mounting lug)	4000 N	4000 N	4000 N	4000 N
on swing gates:	6000 N	6000 N	6000 N	6000 N
Max. vertical offset	+/-2,0 mm	+/-2,0 mm	+/-2,0 mm	+/-2,0 mm
Max. lateral offset	+/-2,0 mm	+/-2,0 mm	+/-2,0 mm	+/-2,0 mm
Max. angular offset around the X axis	+/-2,0 deg	+/-2,0 deg	+/-2,0 deg	+/-2,0 deg
Max. angular offset around the Y axis	+/-2,5 deg	+/-2,5 deg	+/-2,5 deg	+/-2,5 deg
Max. angular offset around the Z axis	+/-5,0 deg	+/-5,0 deg	+/-5,0 deg	+/-5,0 deg
Max. offset in closing direction	+/-5,0 mm	+/-5,0 mm	+/-5,0 mm	+/-5,0 mm
Max. retract speed of actuator	0,3 m/s	0,3 m/s	0,3 m/s	0,3 m/s
Material	Stainless steel, plastic, Zn	Stainless steel, plastic, Zn	Stainless steel, plastic, Zn	Stainless steel, plastic, Zn
Max. fixing screws torque settings	6 Nm	6 Nm	6 Nm	6 Nm
Max. torque setting for mounting plate	22 - 24 Nm	22 - 24 Nm	22 - 24 Nm	22 - 24 Nm
Max. torque setting for rotary handle	6 - 6,5 Nm	6 - 6,5 Nm	6 - 6,5 Nm	6 - 6,5 Nm
Gate hinge	left	left	right	right

Mechanical data	6O000001	6O000002	6O000003	6O000004
Min. gate radius	800 mm	800 mm	800 mm	800 mm
Actuator dimensions				
Height	130 mm	130 mm	130 mm	130 mm
Width	110 mm	110 mm	110 mm	110 mm
Depth	40 mm	40 mm	40 mm	40 mm
Weight	2.050 g	2.050 g	2.050 g	2.050 g

19 Technical details for actuator, order no. 6O000005-6O000008

Where standards are undated, the 2022-11 valid editions apply.

General	6O000005	6O000006	6O000007	6O000008
Certifications	CE, TÜV, UKCA, cULus Listed	CE, TÜV, UKCA, cULus Listed	CE, TÜV, UKCA, cULus Listed	CE, TÜV, UKCA, cULus Listed
Sensor's mode of operation	Transponders	Transponders	Transponders	Transponders
Coding level in accordance with EN ISO 14119	Low	High	Low	High
Design in accordance with EN ISO 14119	4	4	4	4
Pilz coding type	coded	fully coded	coded	fully coded
Environmental data	6O000005	6O000006	6O000007	6O000008
Temperature of metal surface at ambient temperature: 25 °C	40 °C	40 °C	40 °C	40 °C
Ambient temperature				
in accordance with the standard	EN 60068-2-14	EN 60068-2-14	EN 60068-2-14	EN 60068-2-14
Temperature range	0 - 60 °C	0 - 60 °C	0 - 60 °C	0 - 60 °C
Storage temperature				
in accordance with the standard	EN 60068-2-1/-2	EN 60068-2-1/-2	EN 60068-2-1/-2	EN 60068-2-1/-2
Temperature range	-25 - 70 °C	-25 - 70 °C	-25 - 70 °C	-25 - 70 °C
Climatic suitability				
in accordance with the standard	EN 60068-2-78	EN 60068-2-78	EN 60068-2-78	EN 60068-2-78
Humidity	93 % r. h. at 40 °C	93 % r. h. at 40 °C	93 % r. h. at 40 °C	93 % r. h. at 40 °C
EMC	EN 55011: class A, EN 60947-5-3, EN 61326-3-1	EN 55011: class A, EN 60947-5-3, EN 61326-3-1	EN 55011: class A, EN 60947-5-3, EN 61326-3-1	EN 55011: class A, EN 60947-5-3, EN 61326-3-1
Vibration				
in accordance with the standard	EN 60068-2-6	EN 60068-2-6	EN 60068-2-6	EN 60068-2-6
Frequency	10 - 55 Hz	10 - 55 Hz	10 - 55 Hz	10 - 55 Hz
Amplitude	1 mm	1 mm	1 mm	1 mm

Environmental data	6O000005	6O000006	6O000007	6O000008
Shock stress				
in accordance with the standard	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2
Number of shocks	6	6	6	6
Acceleration	10g	10g	10g	10g
Duration	11 ms	11 ms	11 ms	11 ms
Protection type				
Housing	IP20	IP20	IP20	IP20
in accordance with UL	Type 1	Type 1	Type 1	Type 1
Mechanical data	6O000005	6O000006	6O000007	6O000008
Cable outlet	down	down	down	down
Service life escape release	6050 cycles	6050 cycles	6050 cycles	6050 cycles
Mechanical life	250,000 cycles	250,000 cycles	250,000 cycles	250,000 cycles
Holding force FZh				
on sliding gates (installed with mounting lug)	2000 N	2000 N	2000 N	2000 N
on swing gates:	3000 N	3000 N	3000 N	3000 N
Holding force F1Max				
in accordance with ISO 14119				
on sliding gates (installed with mounting lug)	4000 N	4000 N	4000 N	4000 N
on swing gates:	6000 N	6000 N	6000 N	6000 N
Max. vertical offset	+/-2,0 mm	+/-2,0 mm	+/-2,0 mm	+/-2,0 mm
Max. lateral offset	+/-2,0 mm	+/-2,0 mm	+/-2,0 mm	+/-2,0 mm
Max. angular offset around the X axis	+/-2,0 deg	+/-2,0 deg	+/-2,0 deg	+/-2,0 deg
Max. angular offset around the Y axis	+/-2,5 deg	+/-2,5 deg	+/-2,5 deg	+/-2,5 deg
Max. angular offset around the Z axis	+/-5,0 deg	+/-5,0 deg	+/-5,0 deg	+/-5,0 deg
Max. offset in closing direction	+/-5,0 mm	+/-5,0 mm	+/-5,0 mm	+/-5,0 mm
Max. retract speed of actuator	0,3 m/s	0,3 m/s	0,3 m/s	0,3 m/s
Material	Stainless steel, plastic, Zn	Stainless steel, plastic, Zn	Stainless steel, plastic, Zn	Stainless steel, plastic, Zn
Max. fixing screws torque settings	6 Nm	6 Nm	6 Nm	6 Nm
Max. torque setting for mounting plate	22 - 24 Nm	22 - 24 Nm	22 - 24 Nm	22 - 24 Nm
Max. torque setting for rotary handle	6 - 6,5 Nm	6 - 6,5 Nm	6 - 6,5 Nm	6 - 6,5 Nm
Gate hinge	left	left	right	right

Mechanical data	6O000005	6O000006	6O000007	6O000008
Min. gate radius	800 mm	800 mm	800 mm	800 mm
Actuator dimensions				
Height	130 mm	130 mm	130 mm	130 mm
Width	110 mm	110 mm	110 mm	110 mm
Depth	40 mm	40 mm	40 mm	40 mm
Weight	2.050 g	2.050 g	2.050 g	2.050 g

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Classification according to ZVEI, CB24I

The following tables describe the classes and specific values of the product interface and the classes of interfaces compatible with it. The classification is described in the ZVEI position paper "Classification of Binary 24 V Interfaces - Functional Safety aspects covered by dynamic testing".

Solenoid inputs

Drain		Source	
Safety switch	C2	Safety control system	C2, C3

Drain parameters	Min.	Typ.	Max.
Test impulse duration	-	-	500 µs
Input resistance	16 Ohm	-	
Capacitive load	-	-	1,5 nF

Safe 1-pole HL outputs

Source			Drain	
Safety switch	C2		Evaluation device	C1, C2

Source parameters	Min.	Typ.	Max.
Test impulse duration	-	-	450 µs
Rated current	-	-	0,1 A
Capacitive load	-	-	70 nF

21 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: 2023	EN ISO 13849-1: 2023	EN IEC 62061: 2021	EN IEC 62061 61508	EN/IEC 61511 61508	EN/IEC 61511 61508	EN ISO 13849-1: 2023
	PL	Category	Max. SIL	PFH [1/h]	SIL	PFD	T _M [year]
1-ch. guard locking	PL d	Cat. 2	SIL 2	4,09E-09	SIL 2	2,35E-05	20
2-ch. guard locking	PL e	Cat. 4	SIL 3	4,09E-09	SIL 3	2,35E-05	20
2-ch. OSSD	PL e	Cat. 4	SIL 3	2,34E-09	SIL 3	1,18E-05	20

Explanatory notes for the safety-related characteristic data:

- 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 IEC 61508-6 and EN IEC 61511 and as the proof test interval and mission time in accordance with EN IEC 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 products used and may differ from these.



NOTICE

Be sure that you observe the mechanical life. The safety characteristic data are only valid as long as the values of mechanical life are met.

22 Supplementary data

22.1 Radio approval

USA/Canada



FCC ID: VT8-PSENMG1
IC: 7482A-PSENMG1

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.

22.2 Technical details for mounting bracket without handle unit 570492

General

Certifications **CE**

Mechanical data

Weight **420 g**

22.3 Technical details for mounting bracket with handle unit 570495

General

Certifications **CE**

Mechanical data

Holding force FZh in accordance with EN ISO 14119 **3000 N**

Holding force F1max in accordance with EN ISO 14119 **6000 N**

Weight **260 g**

22.4 Technical details PSEN mgate mounting bracket 6M000049, 6M000050, 6M000051, 6M000052

Environmental data		6M000049	6M000050	6M000051	6M000052
Ambient temperature					
Temperature range		0 - 55 °C	0 - 55 °C	0 - 55 °C	0 - 55 °C
Mechanical data		6M000049	6M000050	6M000051	6M000052
Holding force FZ _h in accordance with EN ISO 14119		3000 N	3000 N	3000 N	3000 N
Holding force F1 _{max} in accordance with EN ISO 14119		6000 N	6000 N	6000 N	6000 N
Material		Steel-coated	Steel-coated	Steel-coated	Steel-coated
Weight		470 g	510 g	715 g	745 g

22.5 Technical details escape release 570460, 570462, 570470

General	570460	570462	570470
Certifications	CE	CE	CE
Mechanical data	570460	570462	570470
Release force escape re- lease	80 N	80 N	80 N
Service life escape re- lease	6050 cycles	6050 cycles	6050 cycles
Weight	115 g	15 g	420 g

22.6 Technical details escape release 570466-570469

General	570466	570467	570468	570469
Certifications	CE	CE	CE	CE
Mechanical data	570466	570467	570468	570469
Release force es- cape release	80 N	80 N	80 N	80 N
Service life escape release	6050 cycles	6050 cycles	6050 cycles	6050 cycles
Weight	320 g	345 g	370 g	395 g

22.7 Technical details escape release 570471-570473

General	570471	570472	570473
Certifications	CE	CE	CE
Mechanical data	570471	570472	570473
Release force escape re- lease	80 N	80 N	80 N
Service life escape re- lease	6050 cycles	6050 cycles	6050 cycles
Weight	470 g	520 g	570 g

22.8 Technical details escape release 570474-570475

General	570474	570475
Certifications	CE	CE
Mechanical data	570474	570475
Release force escape release	80 N	80 N
Service life escape release	6050 cycles	6050 cycles
Weight	620 g	670 g

23 Order reference

23.1 Safety switch

Product type	Features	Product ID
PSEN mg1-A-LLXXX-LBA1-S1-D switch	Safety gate system PSENmgate, with operation elements, 2 illuminated pushbuttons (1 NO each), coded, with automatic reset, safety switch for entry from left, 12-pin M12 male connector, cable outlet downwards, single connection	6M000001
PSEN mg1-A-LLXXX-RBA1-S1-D switch	Safety gate system PSENmgate, with operation elements, 2 illuminated pushbuttons (1 NO each), coded, with automatic reset, safety switch for entry from right, 12-pin M12 male connector, cable outlet downwards, single connection	6M000002
PSEN mg1-A-LLXXX-FBA1-S1-D switch	Safety gate system PSENmgate, with operation elements, 2 illuminated pushbuttons (1 NO each), coded, with automatic reset, safety switch for front entry, 12-pin M12 male connector, cable outlet downwards, single connection	6M000003
PSEN mg1-A-LLXXX-LBA2-S1-D switch	Safety gate system PSENmgate, with operation elements, 2 illuminated pushbuttons (1 NO each), fully coded, with automatic reset, safety switch for entry from left, 12-pin M12 male connector, cable outlet downwards, single connection	6M000004
PSEN mg1-A-LLXXX-RBA2-S1-D switch	Safety gate system PSENmgate, with operation elements, 2 illuminated pushbuttons (1 NO each), fully coded, with automatic reset, safety switch for entry from right, 12-pin M12 male connector, cable outlet downwards, single connection	6M000005
PSEN mg1-A-LLXXX-FBA2-S1-D switch	Safety gate system PSENmgate, with operation elements, 2 illuminated pushbuttons (1 NO each), fully coded, with automatic reset, safety switch for front entry, 12-pin M12 male connector, cable outlet downwards, single connection	6M000006
PSEN mg1-A-LLXXX-LBA1-S1-U switch	Safety gate system PSENmgate, with operation elements, 2 illuminated pushbuttons (1 NO each), coded, with automatic reset, safety switch for entry from left, 12-pin M12 male connector, cable outlet upwards, single connection	6M000025
PSEN mg1-A-LLXXX-RBA1-S1-U switch	Safety gate system PSENmgate, with operation elements, 2 illuminated pushbuttons (1 NO each), coded, with automatic reset, safety switch for entry from right, 12-pin M12 male connector, cable outlet upwards, single connection	6M000026
PSEN mg1-A-LLXXX-FBA1-S1-U switch	Safety gate system PSENmgate, with operation elements, 2 illuminated pushbuttons (1 NO each), coded, with automatic reset, safety switch for front entry, 12-pin M12 male connector, cable outlet upwards, single connection	6M000027
PSEN mg1-A-LLXXX-LBA2-S1-U switch	Safety gate system PSENmgate, with operation elements, 2 illuminated pushbuttons (1 NO each), fully coded, with automatic reset, safety switch for entry from left, 12-pin M12 male connector, cable outlet upwards, single connection	6M000028
PSEN mg1-A-LLXXX-RBA2-S1-U switch	Safety gate system PSENmgate, with operation elements, 2 illuminated pushbuttons (1 NO each), fully coded, with automatic reset, safety switch for entry from right, 12-pin M12 male connector, cable outlet upwards, single connection	6M000029

Product type	Features	Product ID
PSEN mg1-A-LLXXX-FBA2-S1-U switch	Safety gate system PSENmgate, with operation elements, 2 illuminated pushbuttons (1 NO each), fully coded, with automatic reset, safety switch for front entry, 12-pin M12 male connector, cable outlet upwards, single connection	6M000030

23.2 Actuator

Product type	Features	Order no.
PSEN ml 1.1 actuator	Actuator, coded, for safety guard locking device PSENmlock	570480
PSEN ml 2.1 actuator	Actuator, fully coded, for safety guard locking device PSENmlock	570481
PSEN ml 1.1 round actuator	Actuator with rounded head, coded, for safety locking device PSENmlock	570482
PSEN ml 2.1 round actuator	Actuator with rounded head, fully coded, for safety locking device PSENmlock	570483
PSEN ml DHM up l 1.1	Door handle module as actuator, coded, for safety guard locking device PSENmlock, for safety switch with upward cable outlet, left-hinged door	6O000001
PSEN ml DHM up l 2.1	Door handle module as actuator, fully coded, for safety guard locking device PSENmlock, for safety switch with upward cable outlet, left-hinged door	6O000002
PSEN ml DHM up r 1.1	Door handle module as actuator, coded, for safety guard locking device PSENmlock, for safety switch with upward cable outlet, right-hinged door	6O000003
PSEN ml DHM up r 2.1	Door handle module as actuator, fully coded, for safety guard locking device PSENmlock, for safety switch with upward cable outlet, right-hinged door	6O000004
PSEN ml DHM down l 1.1	Door handle module as actuator, coded, for safety guard locking device PSENmlock, for safety switch with downward cable outlet, left-hinged door	6O000005
PSEN ml DHM down l 2.1	Door handle module as actuator, fully coded, for safety guard locking device PSENmlock, for safety switch with downward cable outlet, left-hinged door	6O000006
PSEN ml DHM down r 1.1	Door handle module as actuator, coded, for safety guard locking device PSENmlock, for safety switch with downward cable outlet, right-hinged door	6O000007
PSEN ml DHM down r 2.1	Door handle module as actuator, fully coded, for safety guard locking device PSENmlock, for safety switch with downward cable outlet, right-hinged door	6O000008

23.3 Accessories

Product type	Features	Order no.
PIT gb color covers	Colour covers for the illuminated pushbuttons (set)	G1000009
PSEN ml escape release	Escape release stationary	570460
PSEN ml escape release extension	Extension escape release stationary 25 mm	570462
PSEN ml escape release cordset 1.0m	Escape release external with push/pull cable 1.0 m	570468
PSEN ml escape release cordset 1.25m	Escape release external with push/pull cable 1.25 m	570469
PSEN ml escape release cordset 1.5m	Escape release external with push/pull cable 1.5 m	570470
PSEN ml escape release cordset 2.0m	Escape release external with push/pull cable 2 m	570471
PSEN ml escape release cordset 2.5m	Escape release external with push/pull cable 2.5 m	570472
PSEN ml escape release cordset 3.0m	Escape release with push/pull cable 3.0 m	570473
PSEN ml escape release cordset 3.5m	Escape release external with push/pull cable 3.5 m	570474
PSEN ml escape release cordset 4.0m	Escape release external with push/pull cable 4 m	570475
PSEN ml actuator 10° adapter	Mounting bracket for installing the actuator (10° angle) at small swing gates with a radius of 300 - 500 mm	570484
PSEN ml actuator center ring	1 center rings for PSENmlock actuator	570485
PSEN ml DHM mounting plate	Mounting plate for actuator PSEN ml DHM down/up l/r x.x	6O000013
PSEN ml mounting plate	Mounting plate for installing the safety switch, with 4 hexagonal socket head screws and 1 tamper-proof pan head locking screw, M5x40	570490
PSEN ml DHM extension	2 x 25 mm extensions for installing the door handle on gates with a cross section > 20 mm	6O000009
PSEN ml DHM extension cover	Cover sleeves to conceal the extension sleeves	6O000012
PSEN ml DHM mounting flap	Mounting flaps for sliding gates	6O000014
PSEN ml bracket sliding door	Mounting bracket for installing the actuator on a sliding gate, with 2 hexagonal socket head screws and 1 tamper-proof pan head locking screw, M5x16	570492
PSEN ml door handle sliding door	Mounting bracket with handle unit for installing the actuator on a sliding gate, with 2 hexagonal socket head screws and 1 tamper-proof pan head locking screw, M5x16.	570495

Product type	Features	Order no.
PSEN mg bracket swinging door 70	PSENmgate mounting bracket for swing gates, height 70 mm, with 2 hexagonal socket head screws and 1 tamper-proof pan head locking screw, M5x12	6M000049
PSEN mg bracket swinging door 80	PSENmgate mounting bracket for swing gates, height 80 mm, with 2 hexagonal socket head screws and 1 tamper-proof pan head locking screw, M5x12	6M000050
PSEN mg door handle swinging door 70	PSENmgate handle unit for swing gates, height 70 mm, with 2 hexagonal socket head screws and 1 tamper-proof pan head locking screw, M5x12	6M000051
PSEN mg door handle swinging door 80	PSENmgate handle unit for swing gates, height 80 mm, with 2 hexagonal socket head screws and 1 tamper-proof pan head locking screw, M5x12	6M000052
PSEN screw set bracket swinging door	Screw set for installing the actuator on a mounting bracket for swing gates, with 2 hexagonal socket head screws and 1 tamper-proof pan head locking screw, M5x12	570498
PSEN screw set bracket sliding door	Screw set for installing the actuator on amounting bracket for sliding gates, with 2 hexagonal socket head screws and 1 tamper-proof pan head locking screw, M5x16	570499
PSEN ml auxiliary release hd1	Auxiliary release, hygienic design 1	570461
PSEN cable M12-12sf 2m	Connection cable, PUR, yellow RAL1003, 12-pin, straight M12 socket, on open cable end, A-coded, cable length: 2 m	570350
PSEN cable M12-12sf 3m	Connection cable, PUR, yellow RAL1003, 12-pin, straight M12 socket, on open cable end, A-coded, cable length: 3 m	570351
PSEN cable M12-12sf 5m	Connection cable, PUR, yellow RAL1003, 12-pin, straight M12 socket, on open cable end, A-coded, cable length: 5 m	570352
PSEN cable M12-12sf 10m	Connection cable, PUR, yellow RAL1003, 12-pin, straight M12 socket, on open cable end, A-coded, cable length: 10 m	570353
PSEN cable M12-12sf 20m	Connection cable, PUR, yellow RAL1003, 12-pin, straight M12 socket, on open cable end, A-coded, cable length: 20 m	570354
PSEN cable M12-12sf 30m	Connection cable, PUR, yellow RAL1003, 12-pin, straight M12 socket, on open cable end, A-coded, cable length: 30 m	570355
PSEN cable M12-12sf 50m	Connection cable, PUR, yellow RAL1003, 12-pin, straight M12 socket, on open cable end, A-coded, cable length: 50 m	570356

24 **EC declaration of conformity**

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

- ▶ 2006/42/EC on machines
- ▶ 2014/53/EU on radio equipment

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

Representative: Pilz GmbH & Co. KG, Felix-Wankel-Str. 2, 73760 Ostfildern, Germany

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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/downloads.

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► 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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