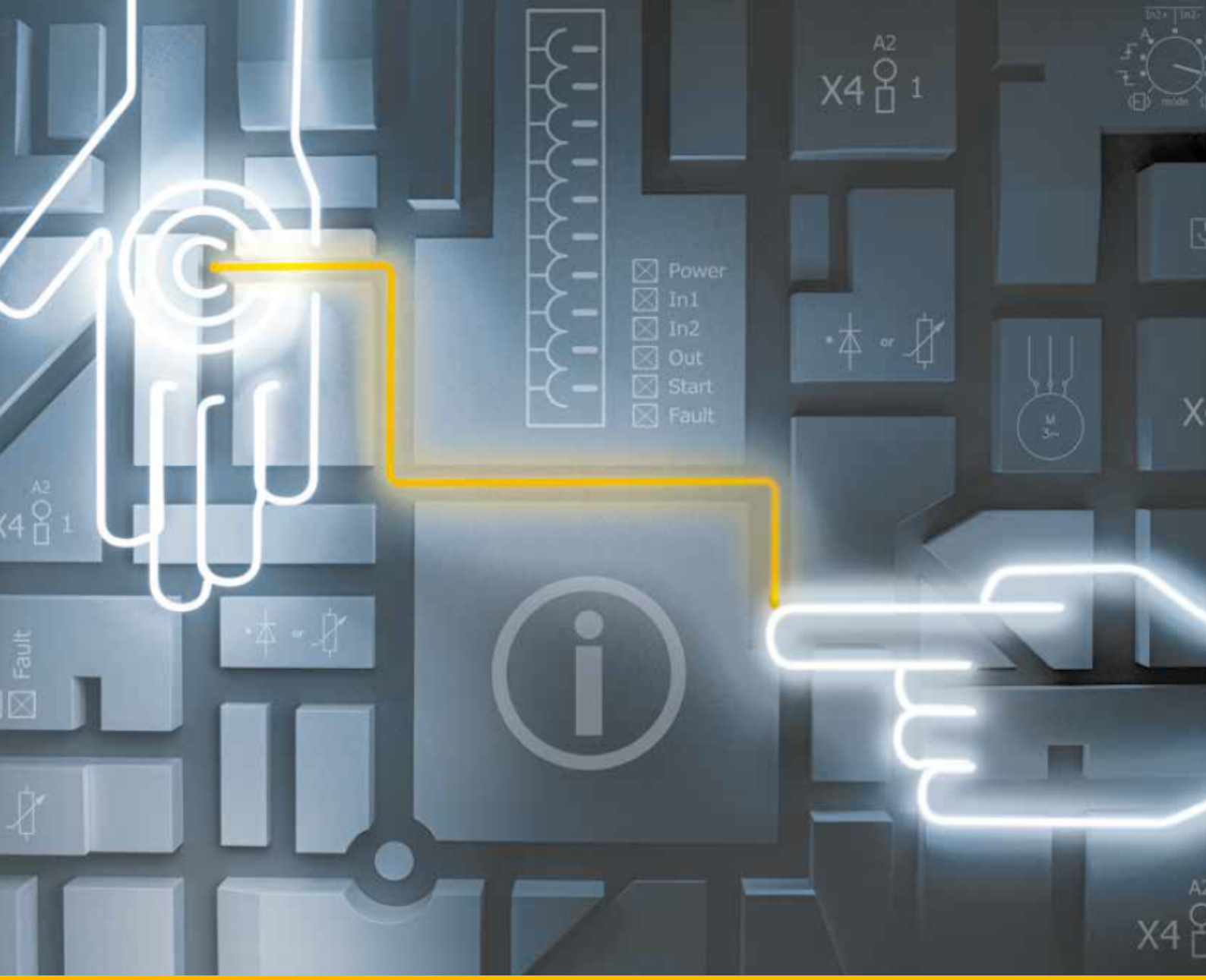


PSEN mg1-A-LDFXX

PILZ
THE SPIRIT OF SAFETY

Operating Manual-1006674-EN-01

This document is the original document.

Where unavoidable, for reasons of readability, the masculine form has been selected when formulating this document. We do assure you that all persons are regarded without discrimination and on an equal basis.

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 series connection with E-STOP, from Version . 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 gate system and control elements that have a fixed connection to the safety gate system.

- 1 E-STOP
- 1 pushbutton, illuminated
- 1 pushbutton, unilluminated

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

The safety guard locking device can be operated in two ways:

- Conditional unlocking

  The safety guard locking device prevents the safety gate from being unlocked while there is any hazard within the danger zone.

- Unconditional unlocking

  The operator can unlock the safety guard locking device at any time. After unlocking starts, the guard locking device generates a stop command. The time required to unlock the guard must be longer than the time required to stop the hazardous machine function.

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 under the following condition:

- Plant is in a safe condition

  Make sure that this is the case with an AND operation in the safety system immediately before the output is operated.

The safety switch meets the requirements in accordance with:

- EN 60947-5-3: PDDB
- EN IEC 61508
- EN ISO 13849-1: PL d (Cat. 2)
- EN ISO 14119
  - – Coding level [📖 11] 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 achieved only when

- for the interlock, the safety outputs have 2-channel processing
- for guard locking, the solenoid has 2-channel operation via safe, tested outputs, suitable for PL e (Cat. 4 applications.

With 1-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 guard 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

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.

2.2.2 Use of qualified personnel

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

A competent person is a qualified and knowledgeable person who, because of their training, experience and current professional activity, has the specialist knowledge required. 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.

2.2.3 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.).

2.2.4 Disposal

- In safety-related applications, please comply with the mission time T_M in the safety-related characteristic data.
- When decommissioning, please comply with local regulations regarding the disposal of electronic devices (e.g. Electrical and Electronic Equipment Act).

2.3 For your safety

- Do not remove the connector's protective cap until you are just about to connect the unit. 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-LDFXX-LTA1-U2 PSEN mg1-A-LDFXX-RTA1-U2 PSEN mg1-A-LDFXX-FTA1-U2 Mechanical safety switch with guard locking, coded	PSEN ml 1.1 actuator PSEN ml 1.1 round actuator
PSEN mg1-A-LDFXX-LTA2-U2 PSEN mg1-A-LDFXX-RTA2-U2 PSEN mg1-A-LDFXX-FTA2-U2 Mechanical safety switch with guard locking, fully coded	PSEN ml 2.1 actuator PSEN ml 2.1 round actuator
PSEN mg1-A-LDFXX-LTA1-U2 Mechanical safety switch with guard locking, coded	PSEN ml DHM up l 1.1 actuator
PSEN mg1-A-LDFXX-RTA1-U2 Mechanical safety switch with guard locking, coded	PSEN ml DHM down r 1.1 actuator
PSEN mg1-A-LDFXX-LTA2-U2 Mechanical safety switch with guard locking, fully coded	PSEN ml DHM up l 2.1 actuator
PSEN mg1-A-LDFXX-RTA2-U2 Mechanical safety switch with guard locking, fully coded	PSEN ml DHM down r 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 PSEN ml actuator. A maximum of 8 learning procedures are possible for that one actuator.	High

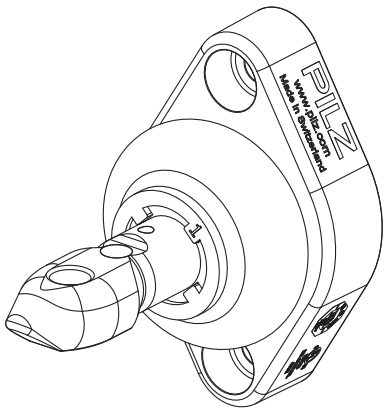
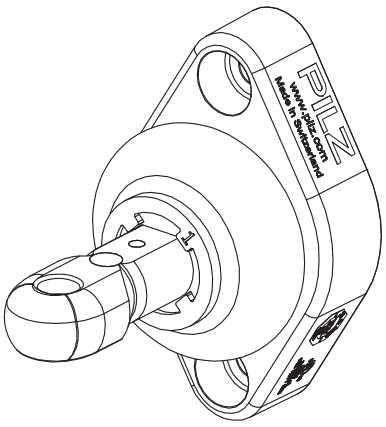
3.2 Device features

- On small door radiuses, (see Install the safety switch horizontally at a swing gate [30]) the PSEN ml actuator center ring can be inserted (see Order reference: Accessories [90]).
- Signal output Y32
- The safety switch can be expanded with up to three stationary and/or external escape releases (see Order reference: Accessories [90]).

  The escape release enables the manual release of the guard locking without aids from **inside** the danger zone and it 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).

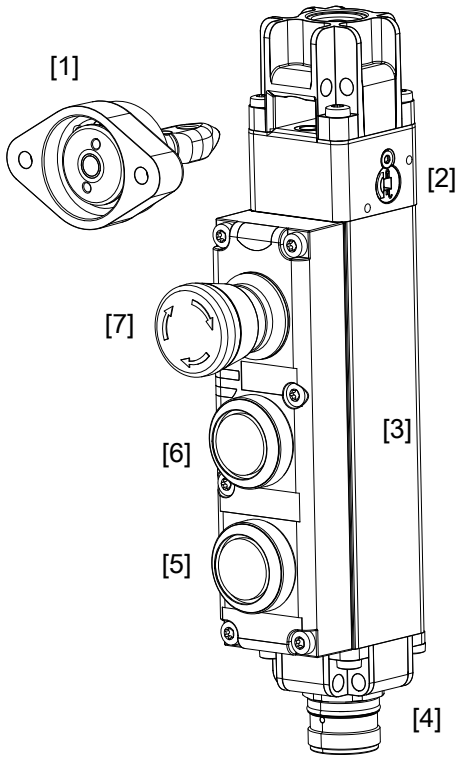
  The external escape releases are available with push/pull cables between 0.5 and 4 m in length (grading 50 cm).
- The E-STOP pushbutton can be positioned above or below. To do this, the half shell must be dismantled and rotated.
- The bolt in the actuator can be rotated 90° in the actuator housing before the actuator is installed [40]. As a result, the actuator can be installed vertically or horizontally.
- The actuator is available in two types (see Order reference: Accessories [90]).
  - Standard actuator
  - Actuator with rounded tip

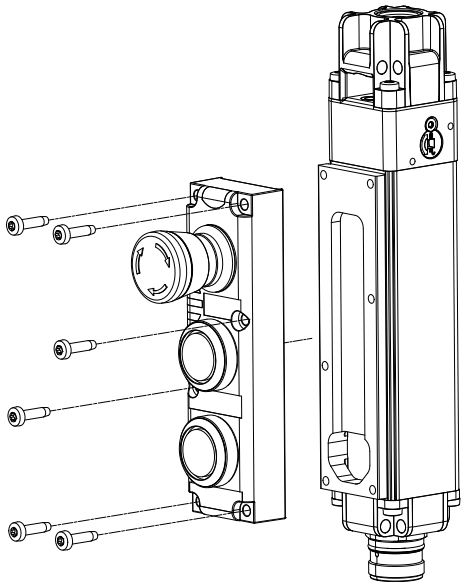
	
Standard actuator	Actuator with rounded tip

- 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
- 1 signal output
- M23, 19-pin male connector

- LEDs:
  - Supply voltage/fault
  - Status of actuator
  - Status of guard locking
  - Status of safety inputs S11 and S21

4 Function description



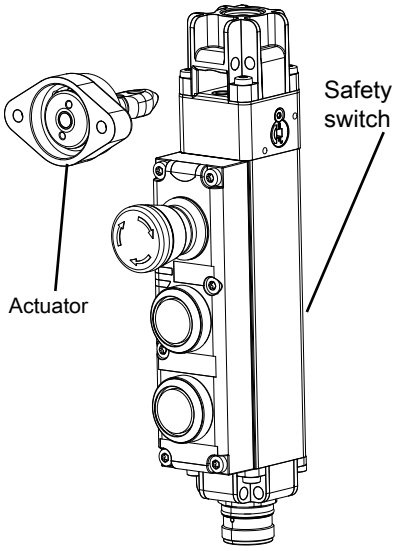


[1]	Actuator	After undoing 6 fixing screws, the pushbutton half shell can be dismantled: ▸ to swap control elements ▸ to rotate the half shell 180°
[2]	Auxiliary release	
[3]	Safety switch	
[4]	Connector	
[5]	BE1: Pushbutton, illuminated	
[6]	BE2: Pushbutton, unilluminated	
[7]	ES: E-STOP pushbutton	

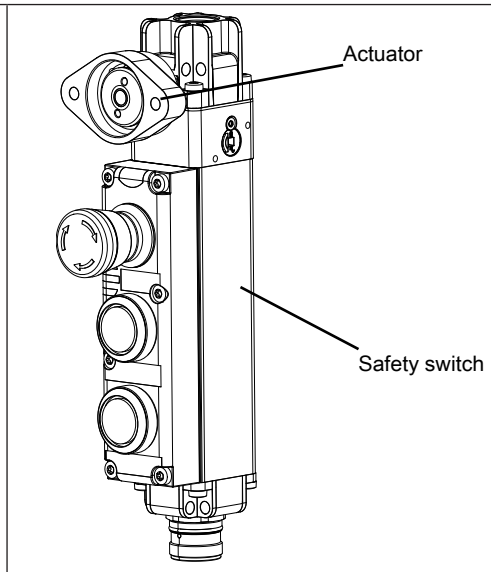
4.1 Structure

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).



Gate open



Gate closed

Safety outputs 12 and 22

Under these conditions there is a high signal at safety outputs 12 and 22:

- Actuator is detected **and**
- 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.

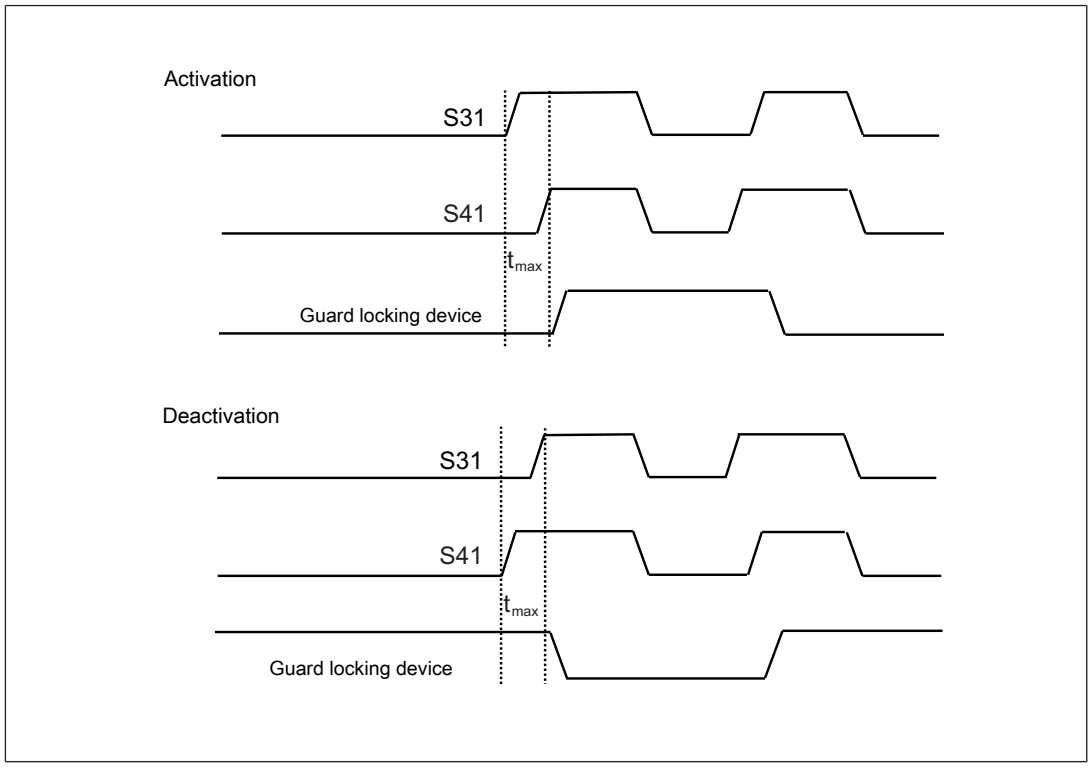
4.2 Activation of safety inputs S31 and S41 (solenoid operation)

- 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.

Guard locking is activated through a high signal (duration 350 - 400 ms) at inputs S31 and S41 (solenoid operation). After activation, the inputs must be low. Another pulse (duratiion 350 - 400 ms) at these inputs deactivates guard locking.

4.2.1 Activation with specification of direction

- The guard locking is activated when the time between the rising edges from S31 to S41 is between 40 ms and 500 ms (S31 before S41).
- The guard locking is deactivated when the time between the rising edges from S31 to S41 is between 40 ms and 500 ms (S41 before S31).



Legend

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

4.2.2 Activation without specification of direction

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

4.3 Operating mode

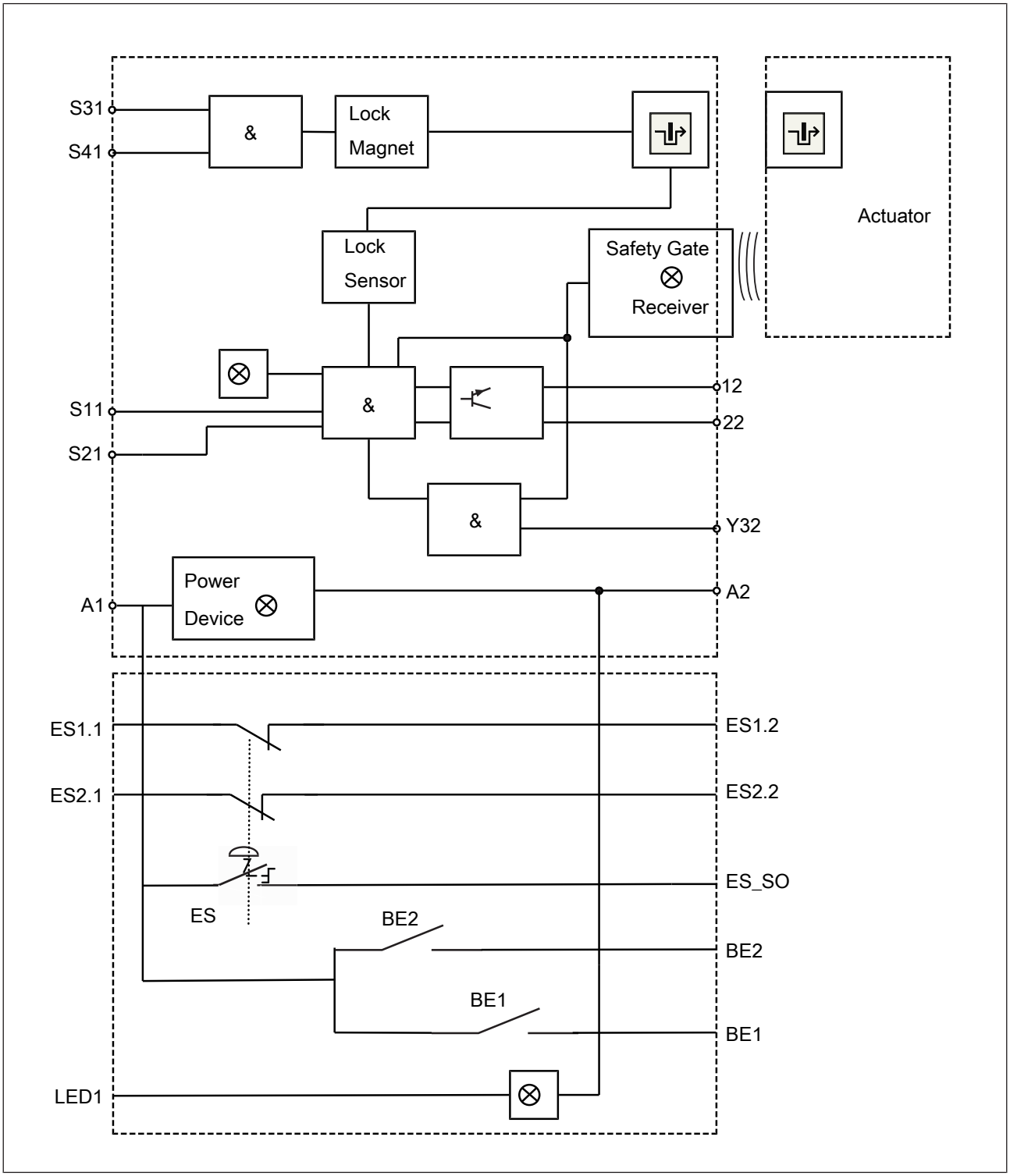
- Operation with specified direction when activating/deactivating guard locking

  A specified direction can be used to control switching of the guard locking status.

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

  – Force direction: The safety switch is selectively activated or deactivated by offset activation of the rising edges at S31 and S41.

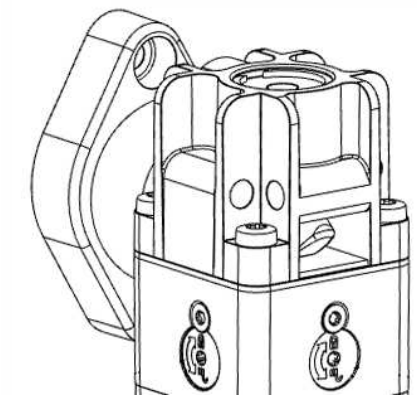
4.4 Block diagram



4.5 Auxiliary release

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

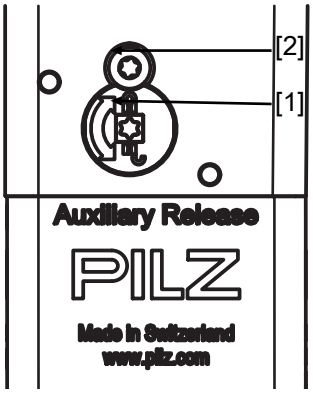
The safety switch has auxiliary releases on three sides.



INFORMATION

If guard locking is deactivated using the auxiliary release, there is a low signal at safety outputs 12 and 22. A warning will be output (see chapter Operation [📖 53]). The safety switch does **not** switch to the fault condition.

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



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.

4.5.1 Recommissioning

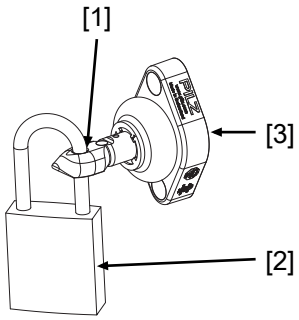
1. Using an Allen key (SW4), rotate the auxiliary release screw [1] (see diagram) as far as it will go in the opposite direction to the arrow (max. 230°).
2. Use varnish to seal the marked area/indent [2] (see diagram).
3. Carry out a function test on the safety switch and actuator. The safety function may only be checked by qualified personnel.

INFORMATION

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

4.6 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] Padlock

[3] Actuator

- If the actuator is to 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

- Plug in the connector. 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
≥ 20.4 V	50 m
≥ 24 V	120 m
≥ 28.8 V	180 m

5.2 Pin assignment

NOTICE

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

	19-pin M23 male connector

PIN	Function	Terminal designation	Cable colour (Pilz cable)
1	Safety input channel 2	S21	Red
2	Signal output	Y32	Grey
3	Signal output, E-STOP	ES_SO	Purple
4	Safety output channel 2	22	Yellow
5	Safety output channel 1	12	Green
6	0 V UB	A2	Blue
7	Operation of solenoid to open and close guard locking (channel 2)	S41	White
8	Operation of solenoid of the next safety switch in the series connection (channel 2)	42	Red-blue
9	E-STOP channel 1	ES1.1	Grey-brown
10	Pushbutton 2	B2	Brown-green
11	E-STOP channel 1	ES1.2	Yellow-brown
12	Pushbutton 1	B1	Green-yellow

PIN	Function	Terminal designation	Cable colour (Pilz cable)
13	Safety input channel 1	S11	Black
14	E-STOP channel 2	ES2.1	White-yellow
15	LED pushbutton 1	LED1	White-green
16	E-STOP channel 2	ES2.2	White-grey
17	Operation of solenoid of the next safety switch in the series connection (channel 1)	32	Grey-pink
18	Operation of solenoid to open and close guard locking (channel 1)	S31	Pink
19	+24 V UB	A1	Brown

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

- The E-STOP must be evaluated by a safety-related evaluation device with test pulses in accordance with EN 60204-1.

The selected evaluation device must have the following properties:

- 2-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 are evaluated through 2 channels.
- The state of the OSSDs must be tested before and after safety inputs S31 and S41 are activated (solenoid operation) (see Timing diagram).

WARNING!

Hazard due to loss of the safety function

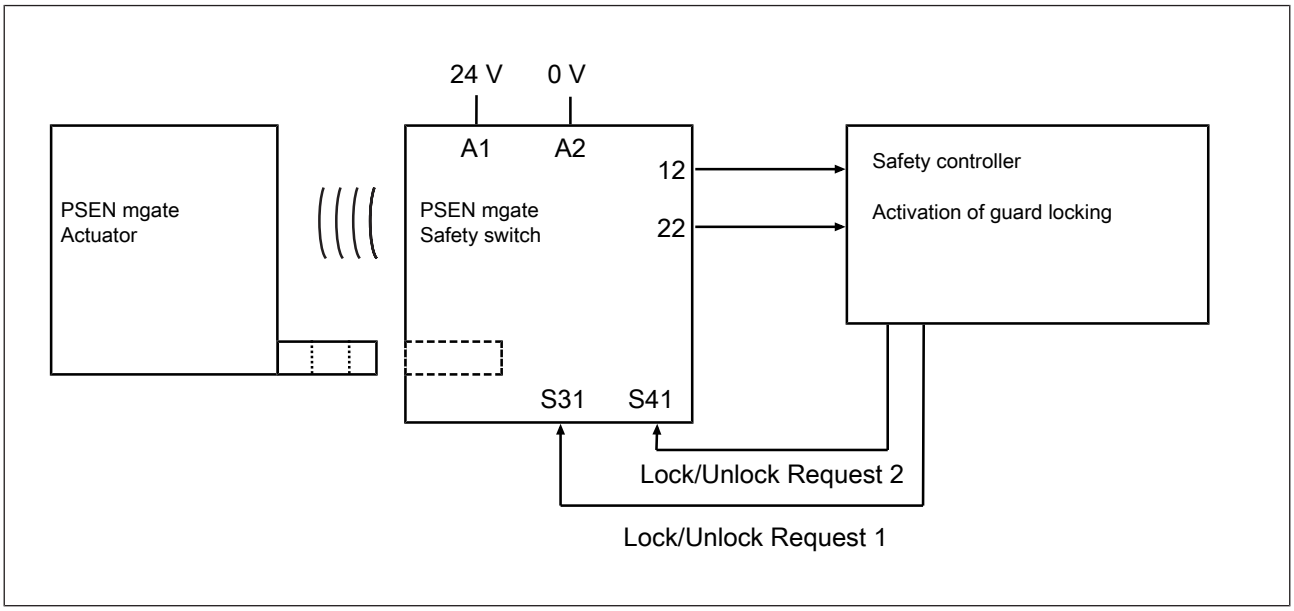
Depending on the application, serious injury or death may result. The safety function can be lost when the safe state is not checked regularly.

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

6.2 Minimum requirements for activation of guard locking

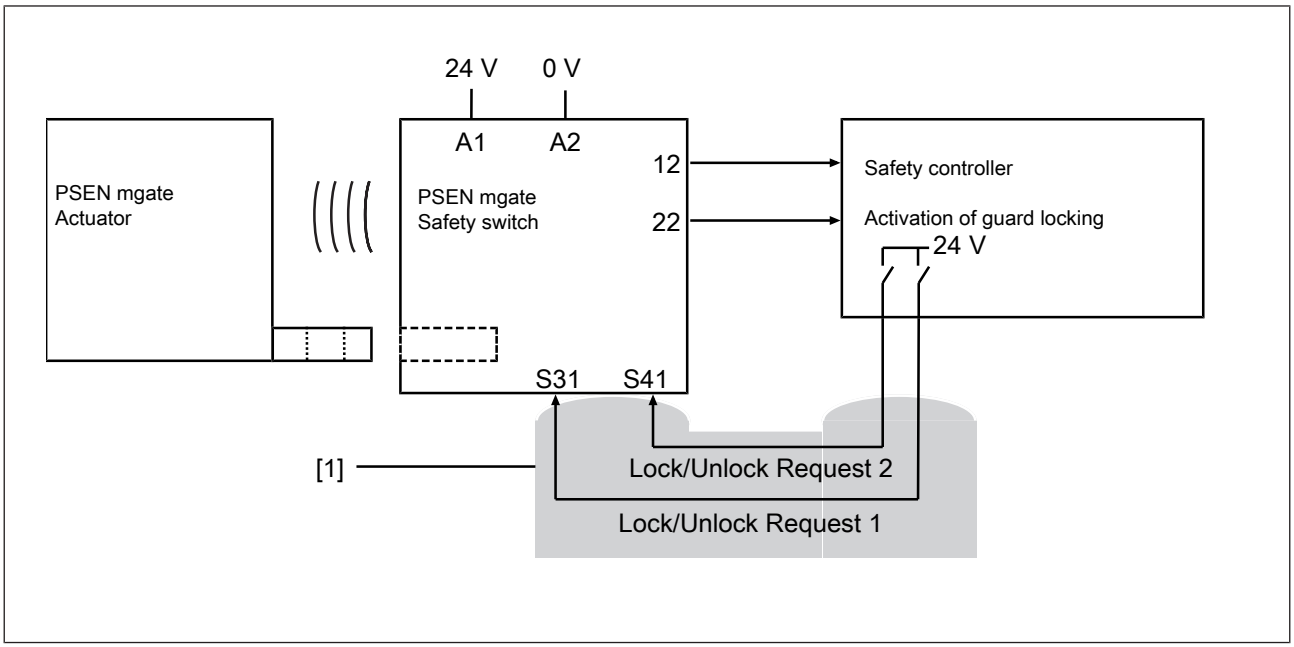
Use in PL e (Cat. 4) applications

- Safety inputs S31 and S41 (solenoid operation) have 2-channel operation via safe outputs, which are suitable for PL e (Cat. 4) applications
- 2-channel operation for safety inputs S31 and S41 (solenoid operation), each with 0.5 A
- 2-channel processing of safety outputs
- Monitoring of shorts across signal cables through activation of guard locking



Use in PL d (Cat. 3) applications

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



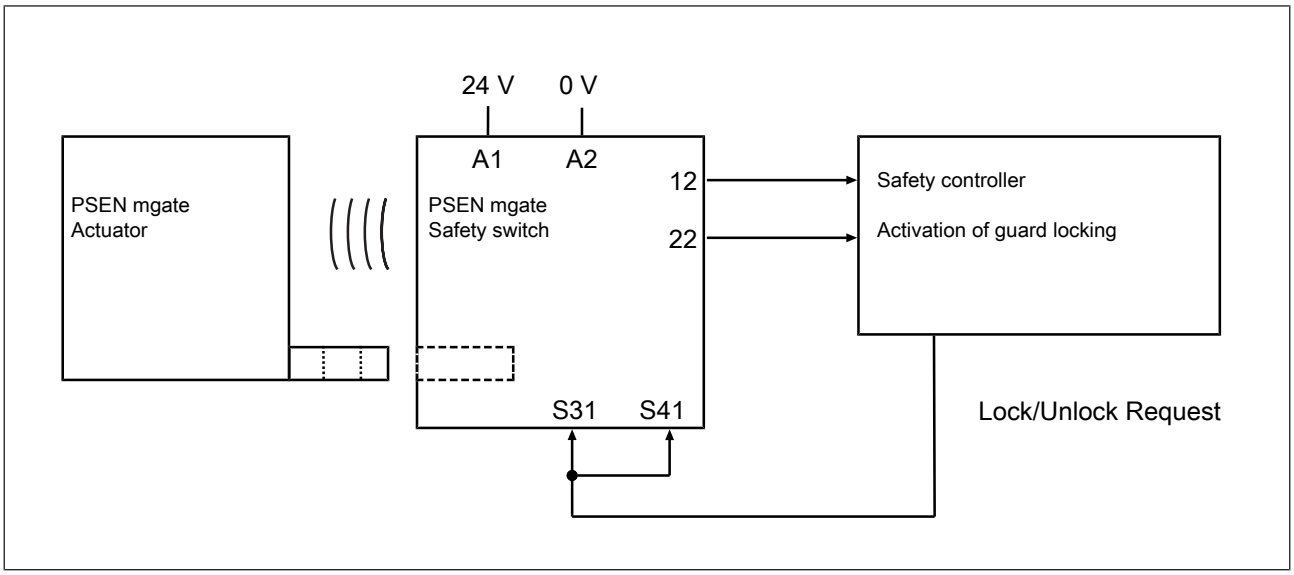
Legend

[1] Protected cable layout

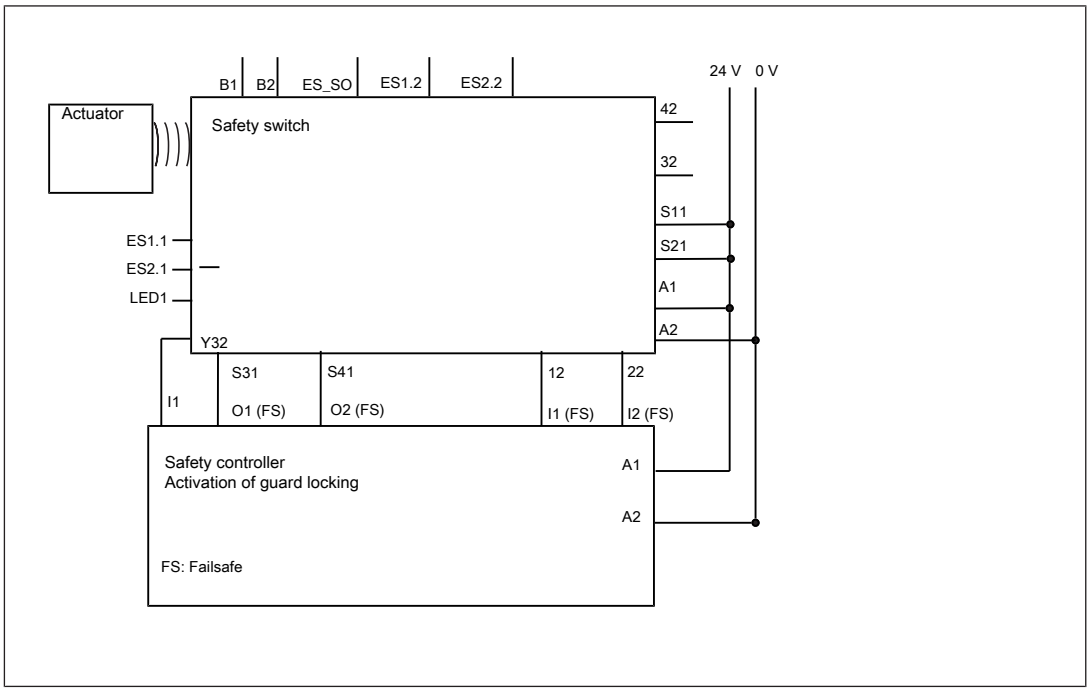
Use in PL d (Cat. 2) applications

- 1-channel operation for safety inputs S31 and S41 (solenoid operation) via safe outputs

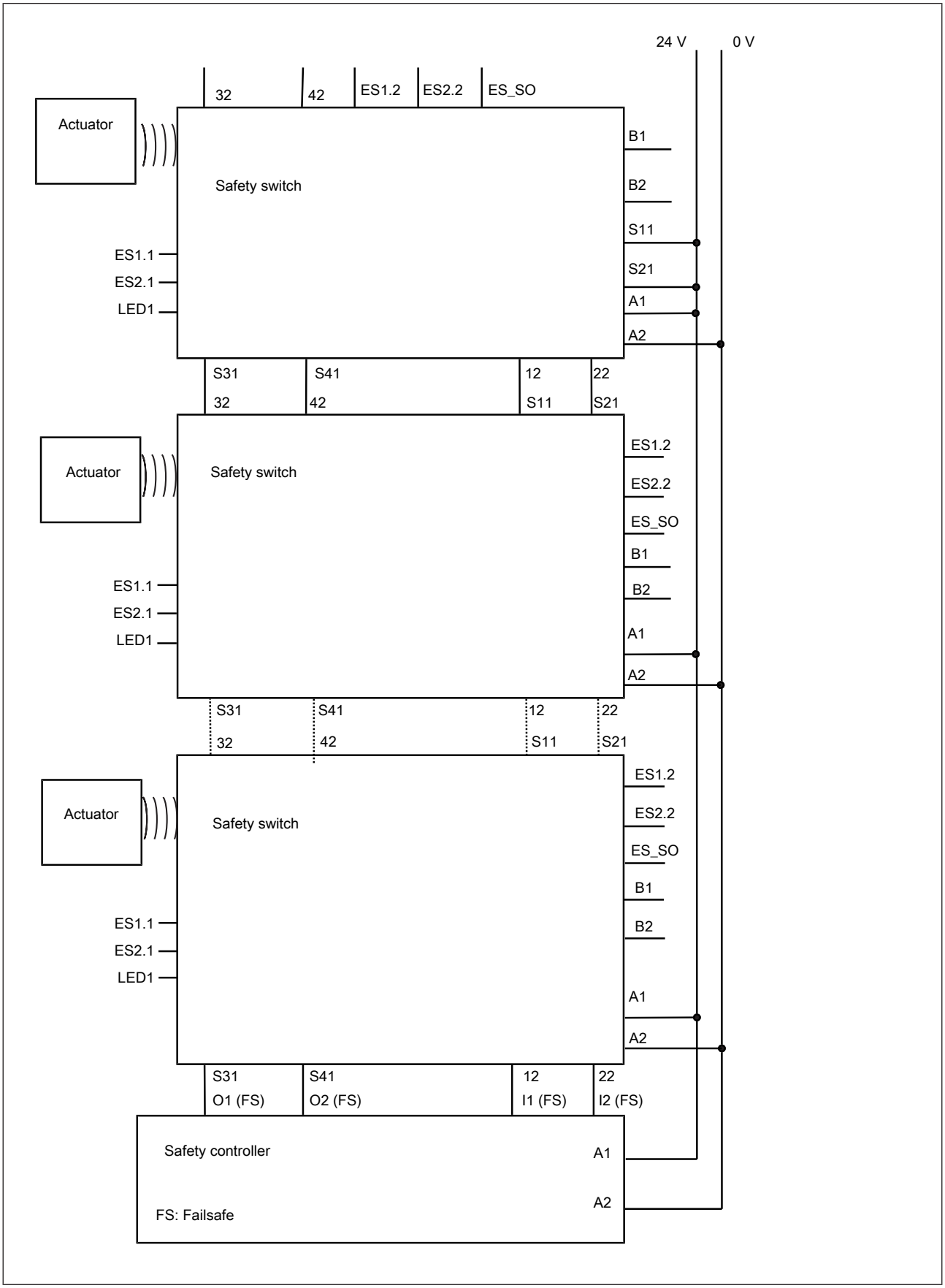
- 2-channel processing of safety outputs
- 1-channel operation for interconnected safety inputs S31 and S41 (solenoid operation), with 1 A



6.3 Single connection



6.4 Series 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 8 learning procedures are possible.

1. The actuator that is to be taught in must be brought into the safety switch's response range as the only transponder. As soon as the actuator is detected, the "Safety Gate" LED will flash yellow.
2. After 20 s has elapsed, the "Safety Gate" LED turns to quick yellow flashes. Trigger a system reset in the next 120 s by interrupting the power supply.
3. When the supply voltage is switched back on, the learning procedure is complete and the number of permitted additional learning procedures is reduced by 1.

NOTICE

– The actuator must not be removed during the learning procedure.
– This actuator cannot be retaught 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

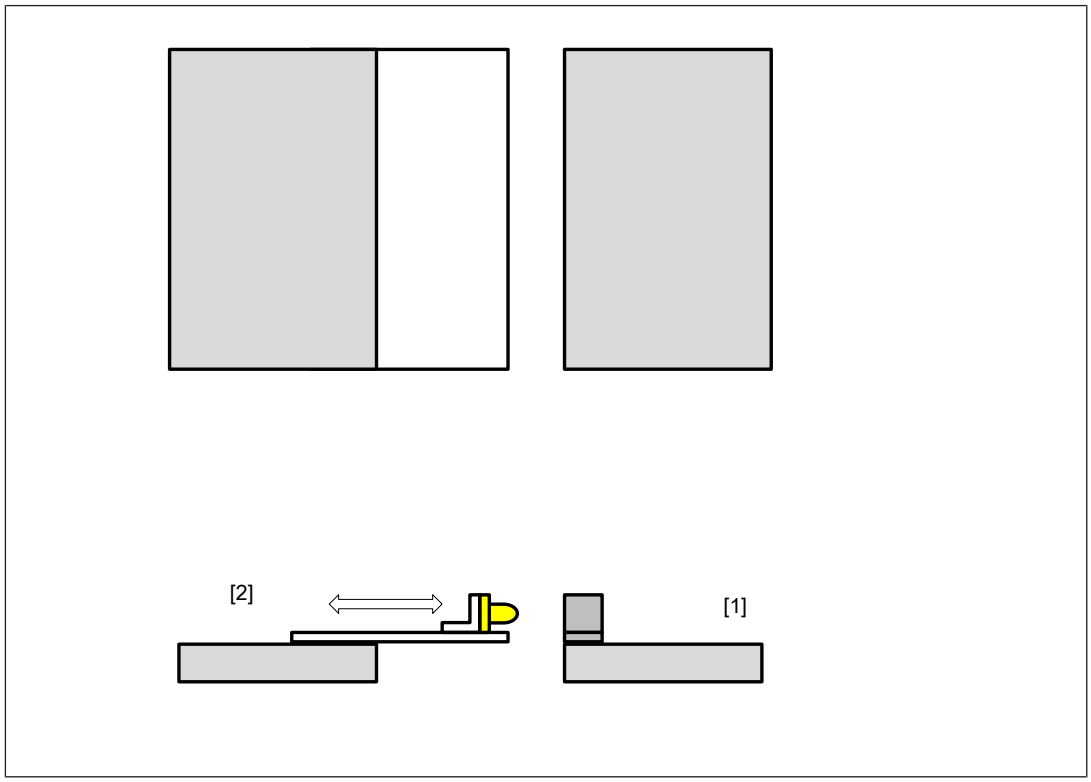
Install safety switch and actuator so that it is not possible to reach through with hand or finger.

- 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 [📖 90]) only with small door radiuses (see Install the safety switch horizontally at a swing gate [📖 30]).
- 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 [📖 51]).
- 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

8.2 Installation types

8.2.1 Installation on sliding gate



Legend

[1] Safety switch, installed on gate frame

[2] Actuator with mounting bracket (available as Accessory [90]), installed on sliding gate

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 [38] on the gate frame.
2. Use two M5 screws to fix the actuator to the gate.

8.2.2 Installation on swing gate

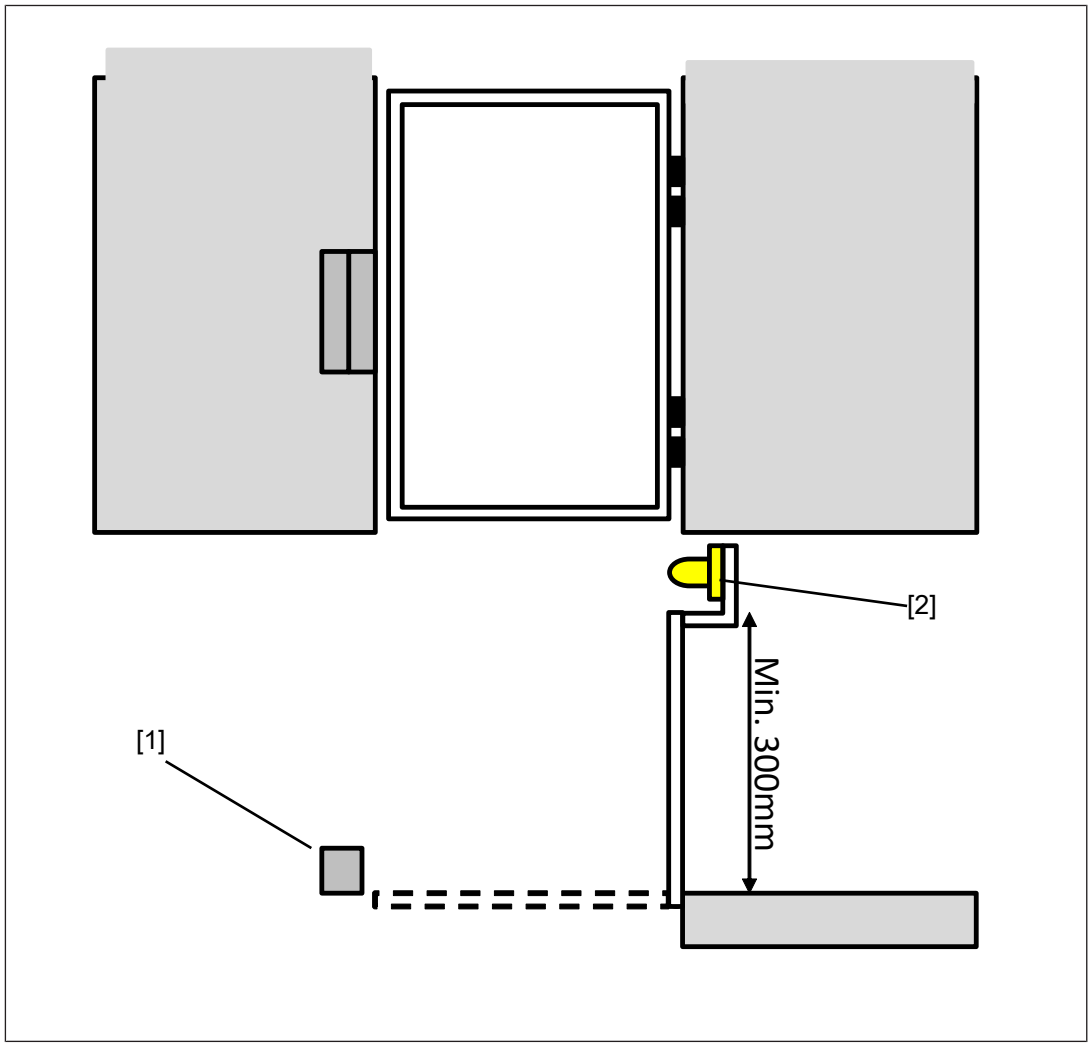


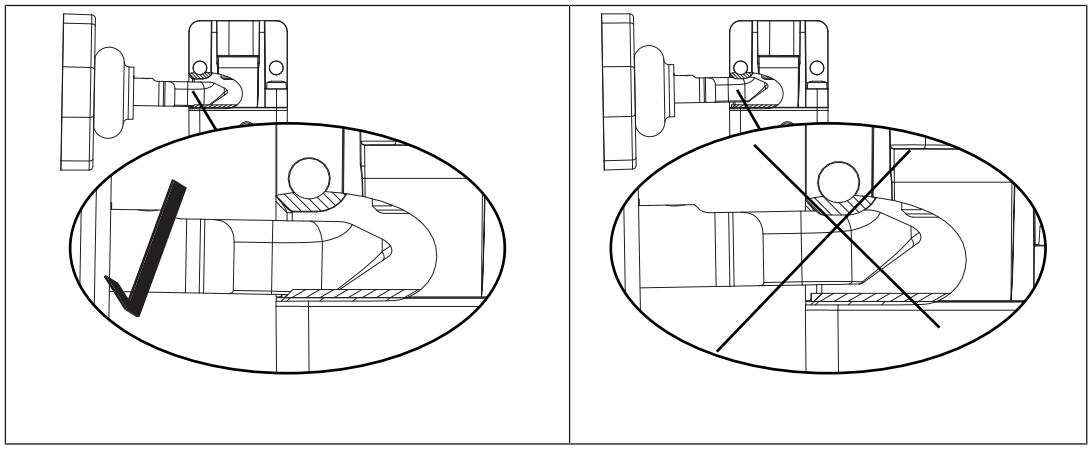
Fig.: Swing gate with internal and external hinge

Legend

[1]	Safety switch on gate frame
[2]	Actuator, installed on swing gate

1. Install a safety switch for front entry of the actuator with the fixing screws of the safety switch crosswise to the actuator [📖 38] on the gate frame.
2. Rotate the bolt in the actuator housing 90° [📖 40].
3. Use two M5 screws to fix the actuator to the gate.

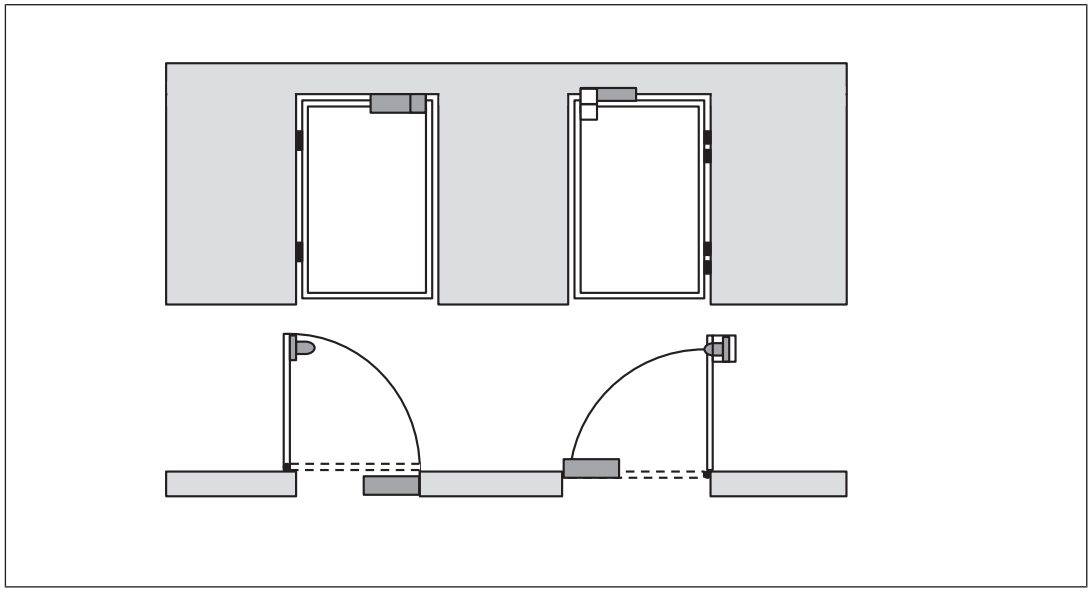
The actuator should engage smoothly into the safety switch.



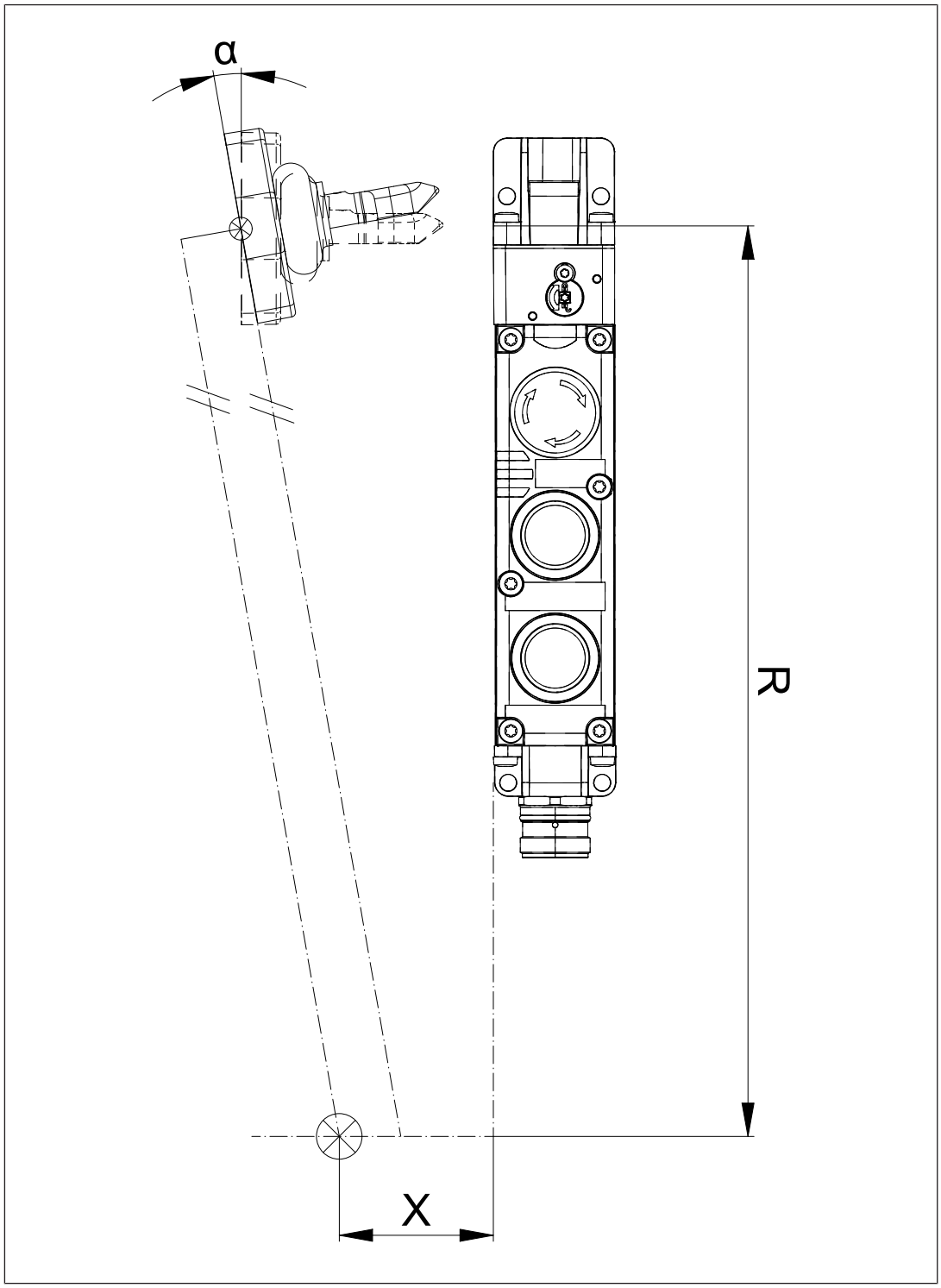
Install the safety switch horizontally at a swing gate

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.



Legend

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 installed on the frames of left and right hinged sliding gates and swing gates. If necessary use a Mounting plate [📖 34] or Mounting bracket [📖 37] (see Order reference: Accessories [📖 90]).

  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 = 15.000 N

  – Fixing screws side-on to actuator:

    Holding force F_{Zh} = 5.000 N,

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

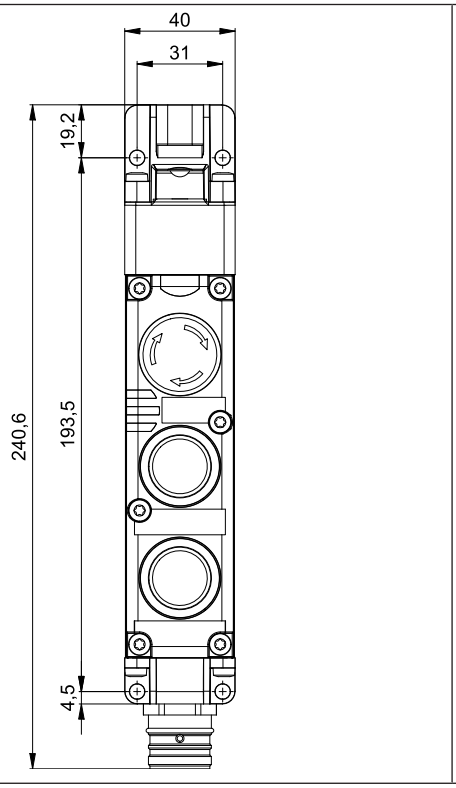
INFORMATION

The specified holding forces only apply to installation without mounting bracket. The holding forces when installed with a mounting bracket can be found in the table "Technical details for mounting bracket [📖 87]".

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

Installation of safety switch	Tapped hole
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 mounting surface

8.3.1 Installation without mounting plate

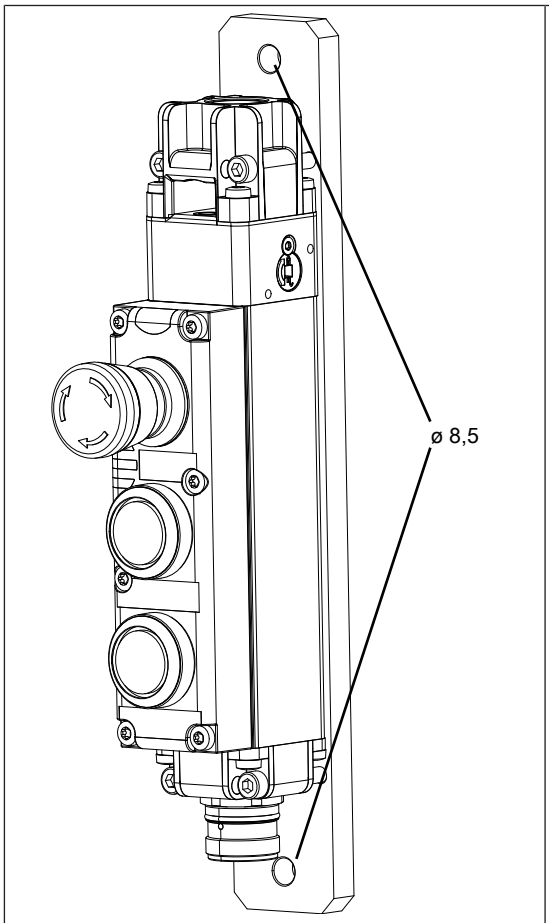


Fixing screws parallel/crosswise to the actuator, no mounting plate

Provide the mounting surface with tapped holes as indicated.

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



Fixing screws parallel/crosswise to the actuator, with mounting plate

Provide the mounting surface with tapped holes as indicated.

1. Attach the mounting plate to the swing gate/sliding gate.

   Ensure that a flat-head screw is used on the connector side.

2. Use four M5 screws to fix the safety switch to the mounting plate.

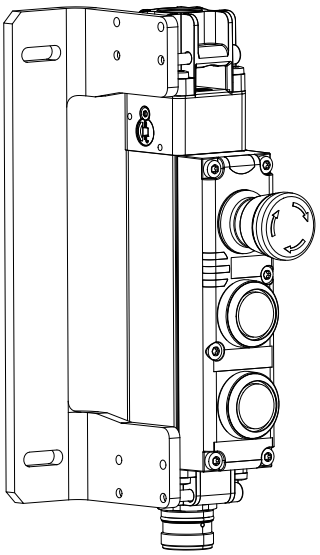
NOTICE

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



Safety switch with mounting bracket

Provide the mounting surface with tapped holes for two M6 screws (see Dimensions).

(Figure: Order no. 570476)

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.

8.3.4 Installation with rotated half shell

- The E-STOP pushbutton can be positioned above or below. To do this, the half shell must be dismantled and rotated.

Prerequisites

- The plant that is controlled by the PSEN mgate is not in operation and cannot be restarted without an equivalent safety device.

Required tool

- Screwdriver for Torx Tx 20

Procedure:

WARNING!

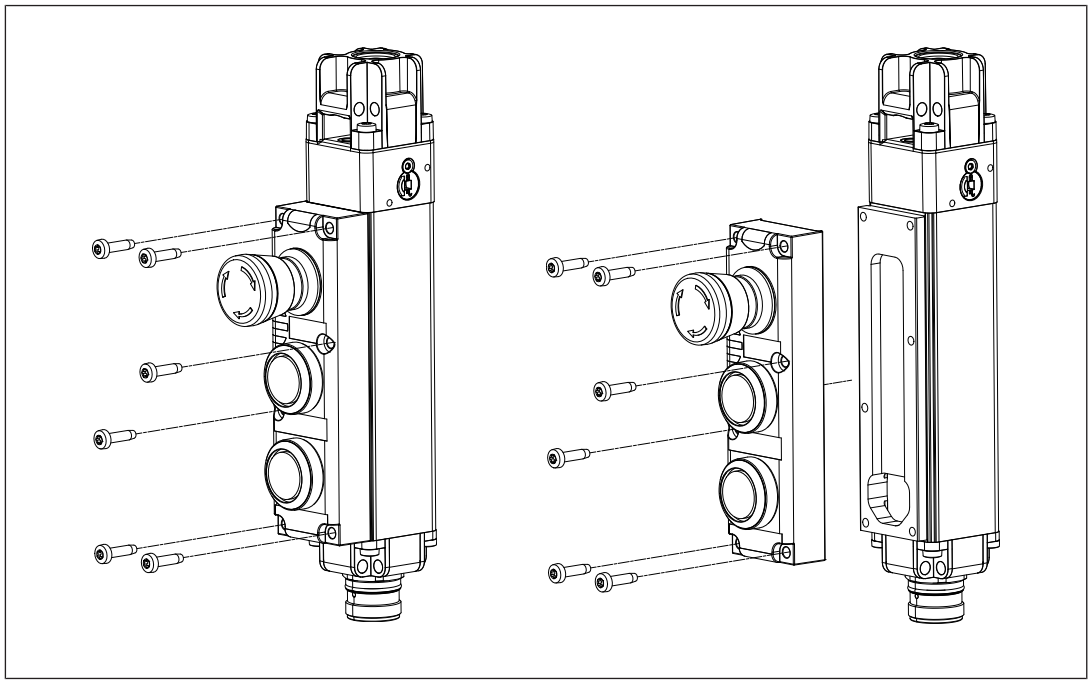
Hazard due to loss of the safety function

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

The protection type (see Technical details [📖 69]) is only achieved when using Pilz connection cables that are available as accessories, and when all torques on the connector and the attachments for the components of the PSEN mgate 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 and the evaluation device.
2. Loosen the fixing screws of the PSEN mgate on the mounting surface.

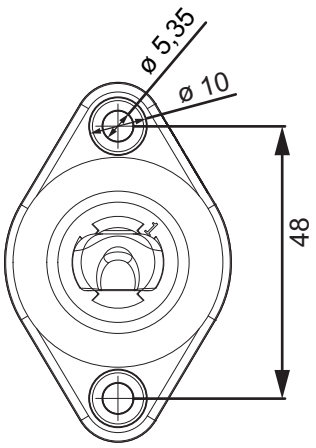


3. Loosen the 6 fixing screws for the half shell with the control elements and remove the half shell.
4. Rotate the half shell 180° so that the E-STOP pushbutton is on the lower side of the half shell.
5. Fasten the half shell back on to the safety switch housing and tighten the screws with .
6. Fasten the PSEN mgate to the mounting surface using the fixing screws with 6 - 6,5 Nm.
7. Connect PSEN mgate to the evaluation device.
8. Perform a manual function test on the unit.

   Only commission the plant that is controlled by the unit if the function test was successful.
9. Put the plant that is controlled with PSEN mgate back into service.

8.4 Actuator installation

8.4.1 Installation without mounting bracket

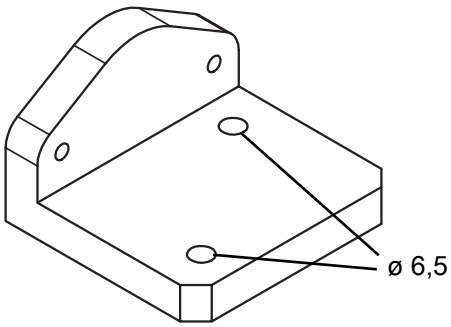


Actuator, no mounting bracket

Provide the mounting surface with tapped holes for two M5 screws (see diagram).

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

8.4.2 Installation with mounting bracket



Actuator, with mounting bracket

Provide the mounting surface with tapped holes for two M6 screws (see Dimensions).

(Diagram: order no. 570492 as example)

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.

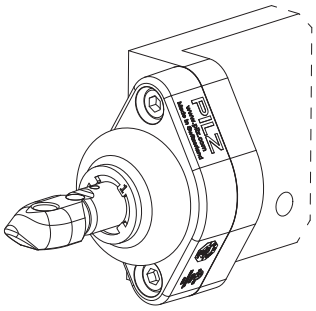


Fig.: Actuator, installed on mounting bracket

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].

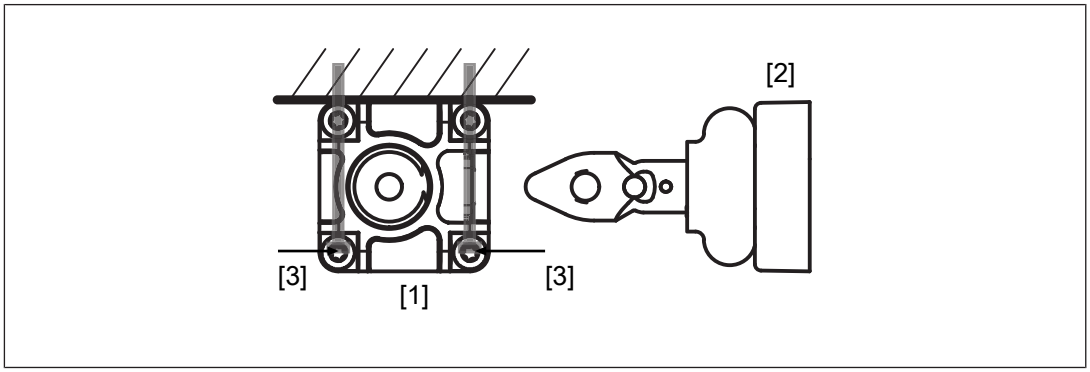


Fig.: Fixing screws of the safety switch crosswise to actuator

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].

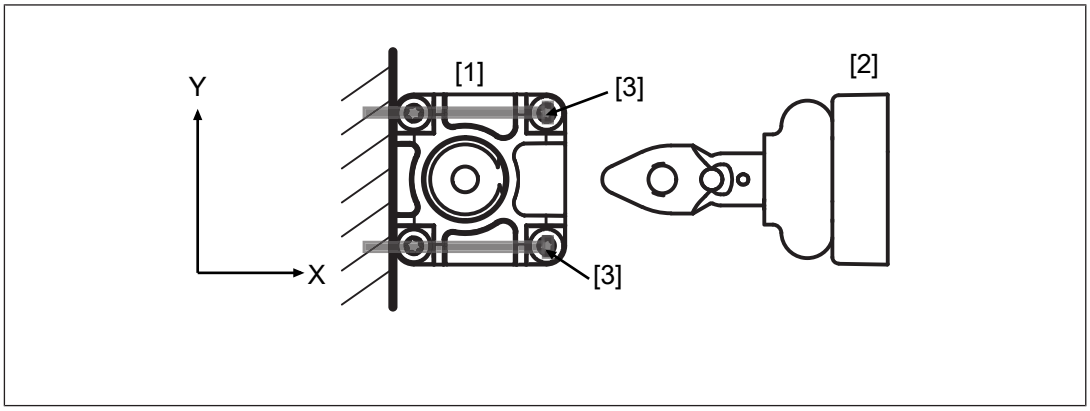


Fig.: Fixing screws of the safety switch in parallel to actuator

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 settling gates.

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

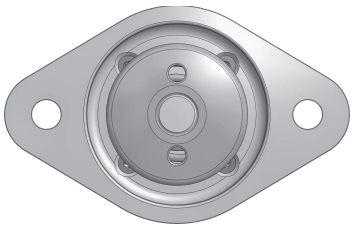
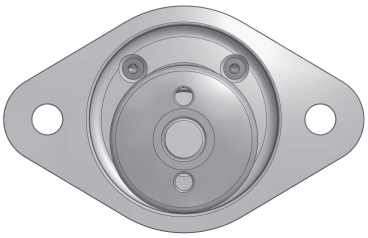
Centre the bolt in the actuator housing (see diagram). Use the PSEN ml actuator center ring only with small door radiuses (see Install the safety switch horizontally at a swing gate [📖 30]).

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°

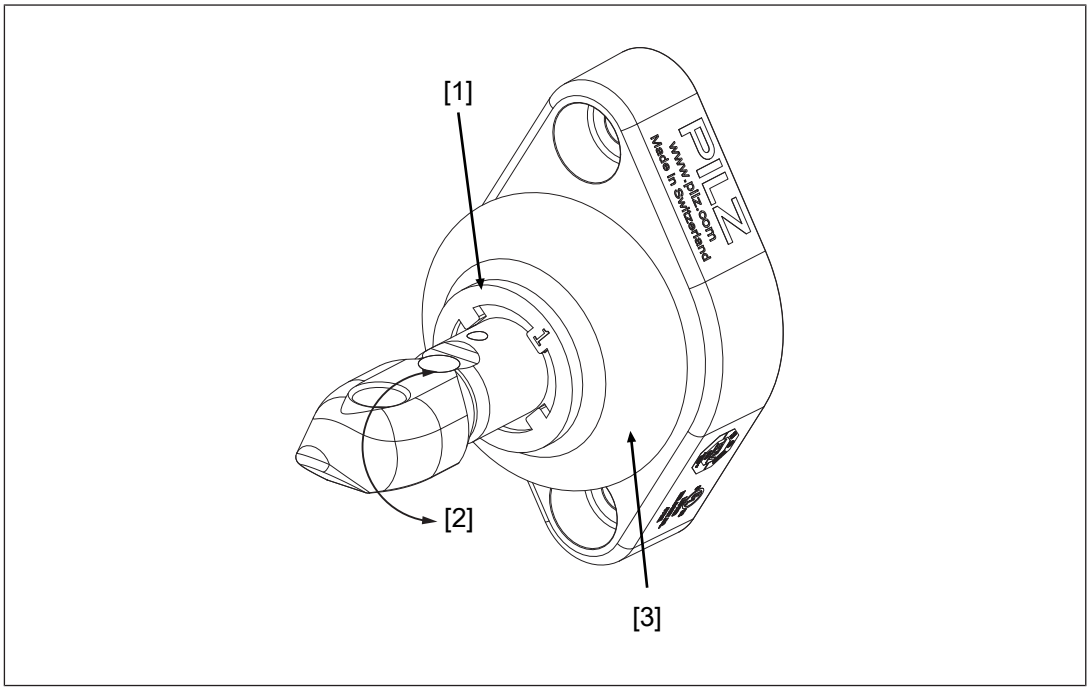
The actuator can be installed vertically on a gate (see Figure [14]). To install the actuator horizontally, the bolt can be rotated 90° in the actuator housing prior to installation.

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 [3] 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 ([2]).



Legend

[1] Spring plate in the housing skin

[2] Bolt, can be rotated 90°

[3] Housing skin

3. Centre the bolt in the actuator housing [39].

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

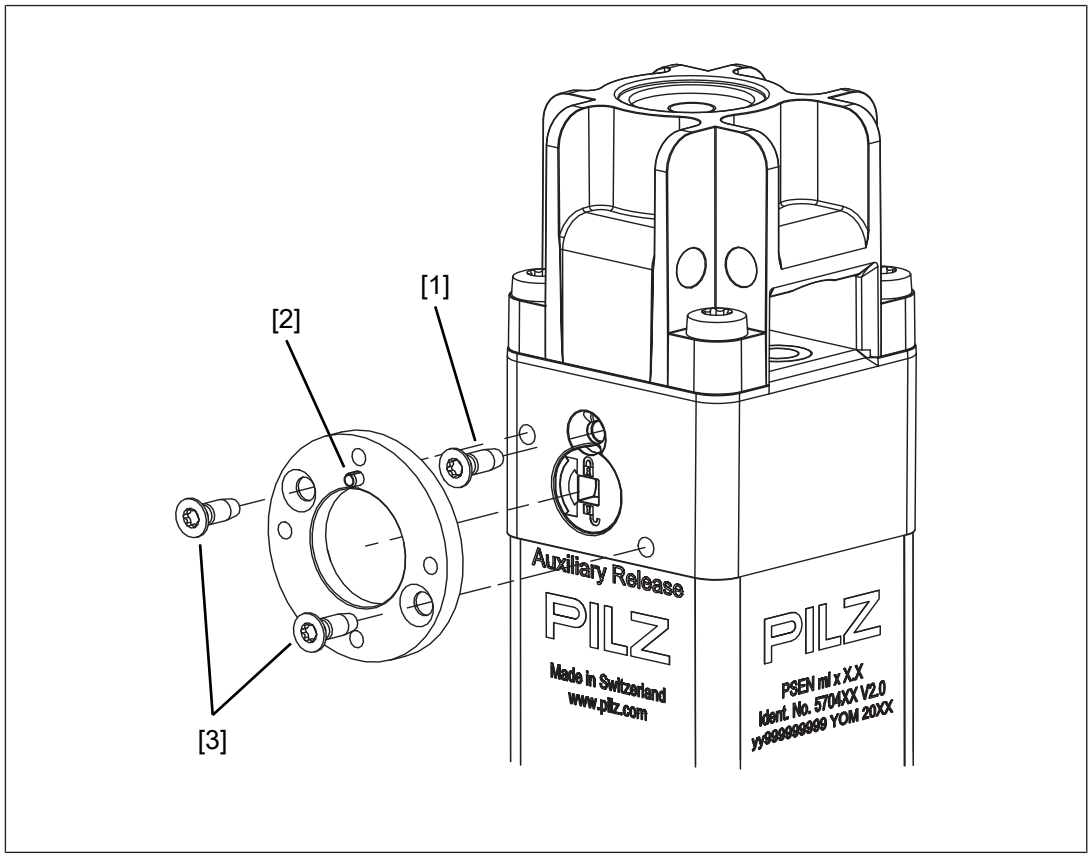
On escape releases with push/pull cables 0.5 m (order no. 570466) and 0.75 m (order no. 570467), bending the push/pull cable may reduce its functionality and lifetime.

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 stationary escape release

1. Remove the security screw [1] using a Torx T10 screwdriver T10.
2. Screw the adapter disk of the escape release with the two hexagon sockets M3x8 [3] on the safety switch with 1,2 - 1,5 Nm (see diagram). The pin of the adapter disk [2] must be at the place where the security screw of the auxiliary release [1] used to be.



Legend

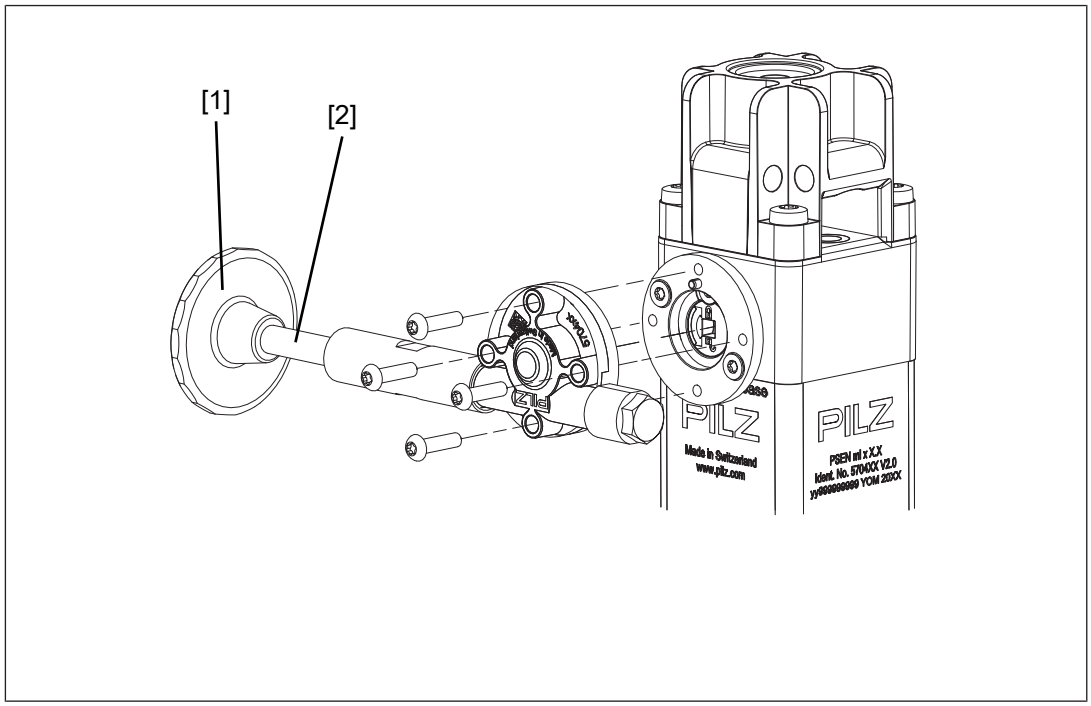
[1] Security screw of the auxiliary release

[2] Pin in the adapter disk

[3] Hexagon sockets 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 [📖 90]).



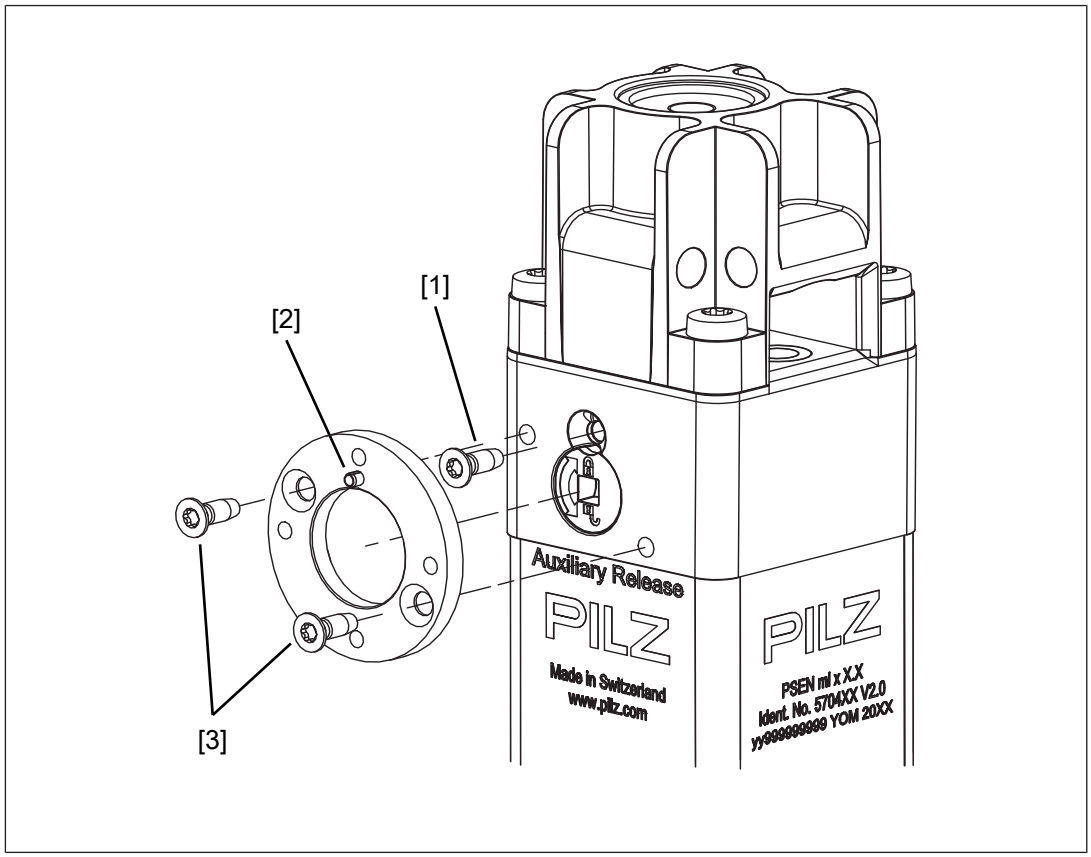
Legend

[1] Button of the escape release pin

[2] Escape release pin

8.5.3 Installation external escape release

1. Remove the security screw [1] using a Torx T10 screwdriver T10.
2. Screw the adapter disk of the escape release with the two hexagon sockets M3x8 [3] on the safety switch with 1,2 - 1,5 Nm (see diagram). The pin of the adapter disk [2] must be at the place where the security screw of the auxiliary release [1] used to be.



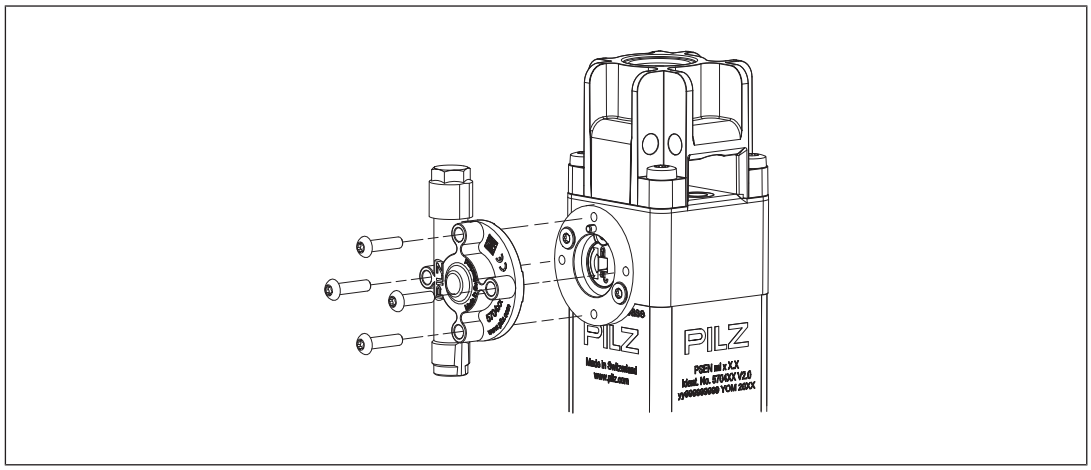
Legend

[1] Security screw of the auxiliary release

[2] Pin in the adapter disk

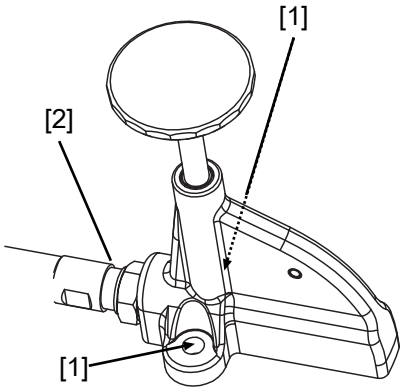
[3] Hexagon sockets M3x8

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)

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



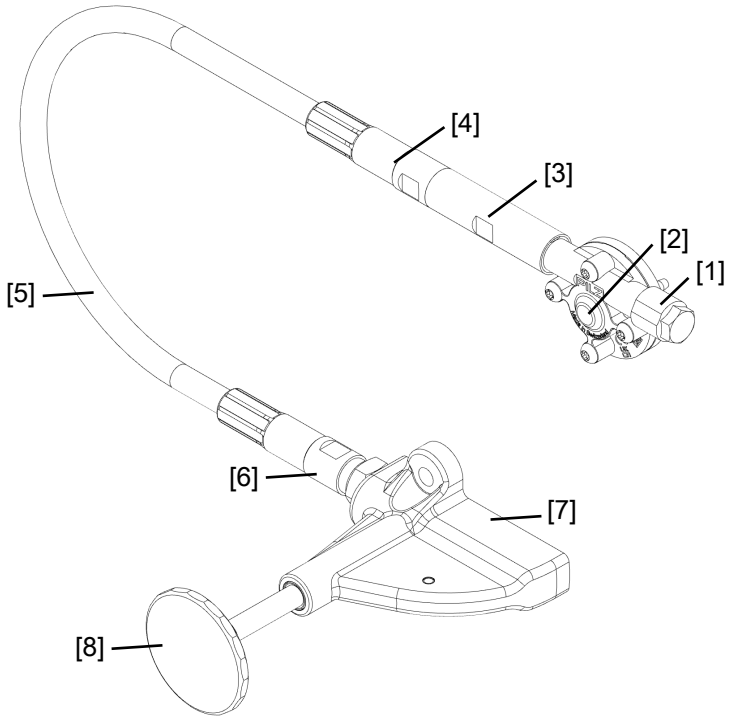
Legend

[1] Screwing the escape release to the mounting area

[2] Screwing the cable

Material of the escape release

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



Number	Material
1	Zinc, coated
2	Zinc, coated
3	Free-cutting steel coated
4	Stainless steel
5	Push-pull cable: steel Insulation: plastic: PE-HD
6	Stainless steel
7	Zinc, coated
8	Zinc, coated

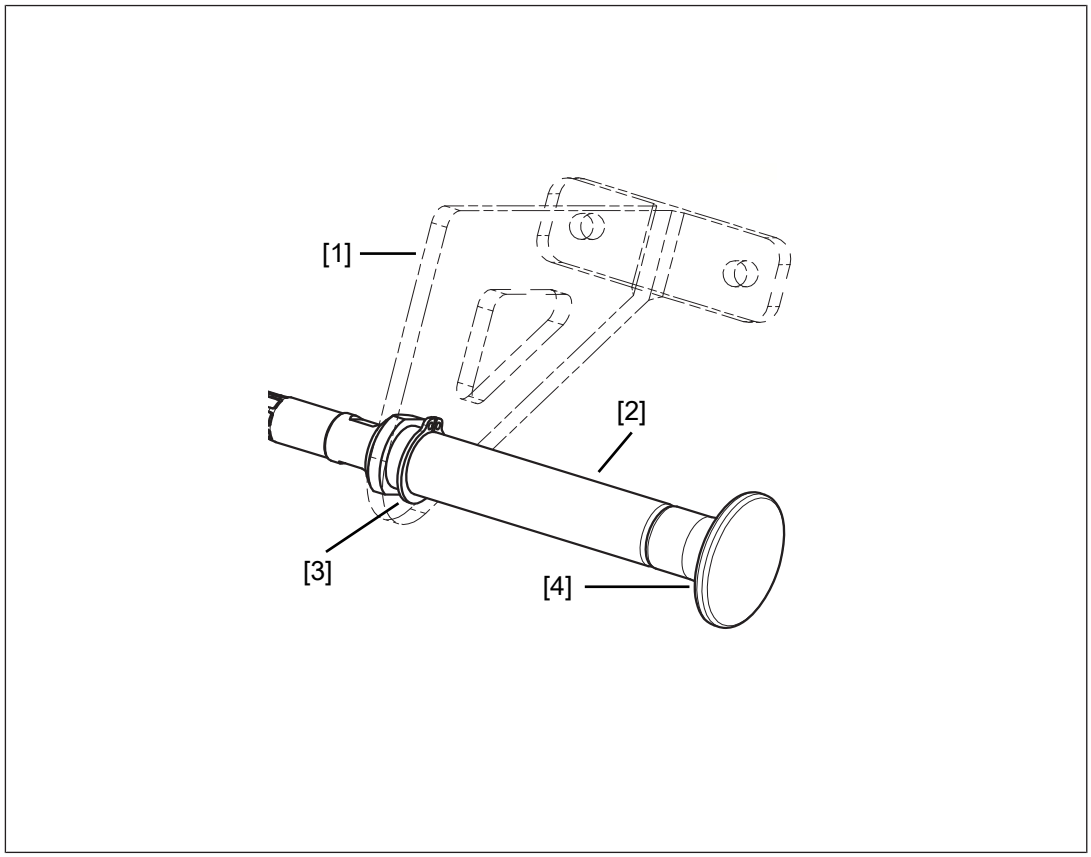
Fastening for the escape release (order no. 570463)

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

- Corrosion-resistant material
- Material thickness: 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 cylinder through the hole in the bracket [1].
- Install the retaining ring [3] 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 [4] as far as it will go.
- Leave the adhesive to set for min. 24 hours.



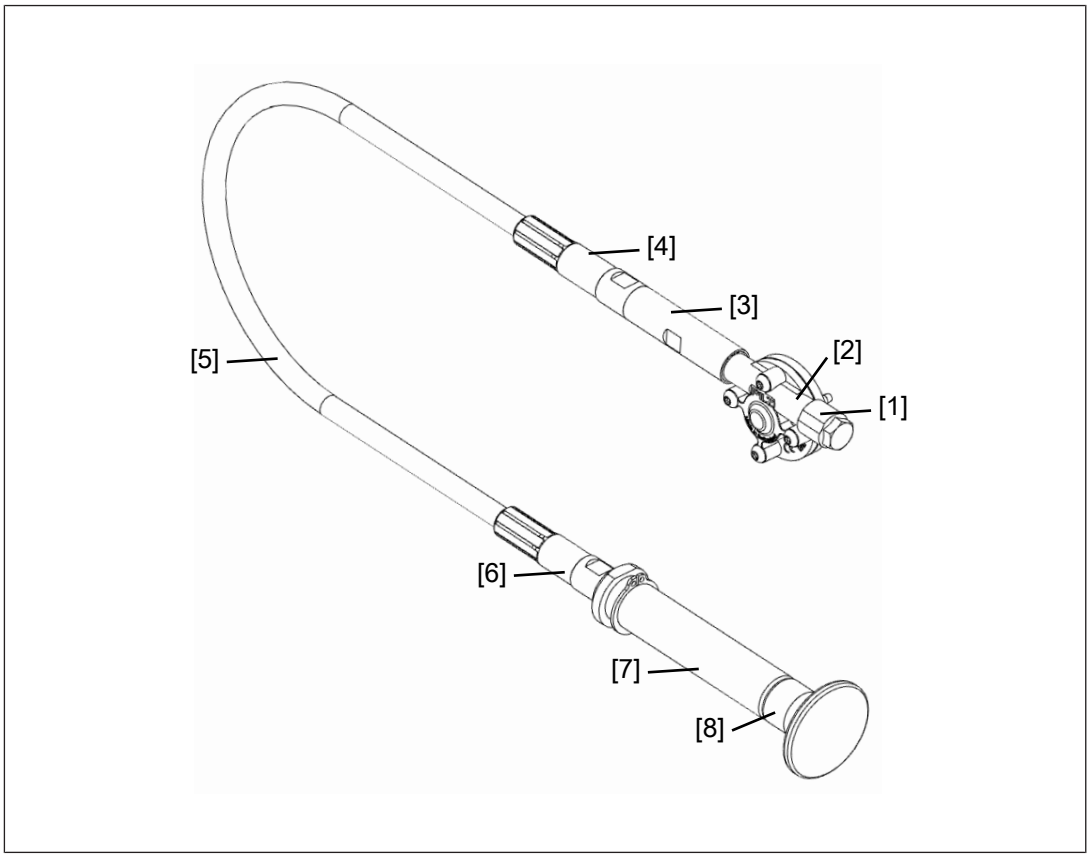
Legend

[1] Bracket (not in the Pilz portfolio)
[2] Cylinder
[3] Retaining ring
[4] Button handle

- 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.

Material of the escape release

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



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

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

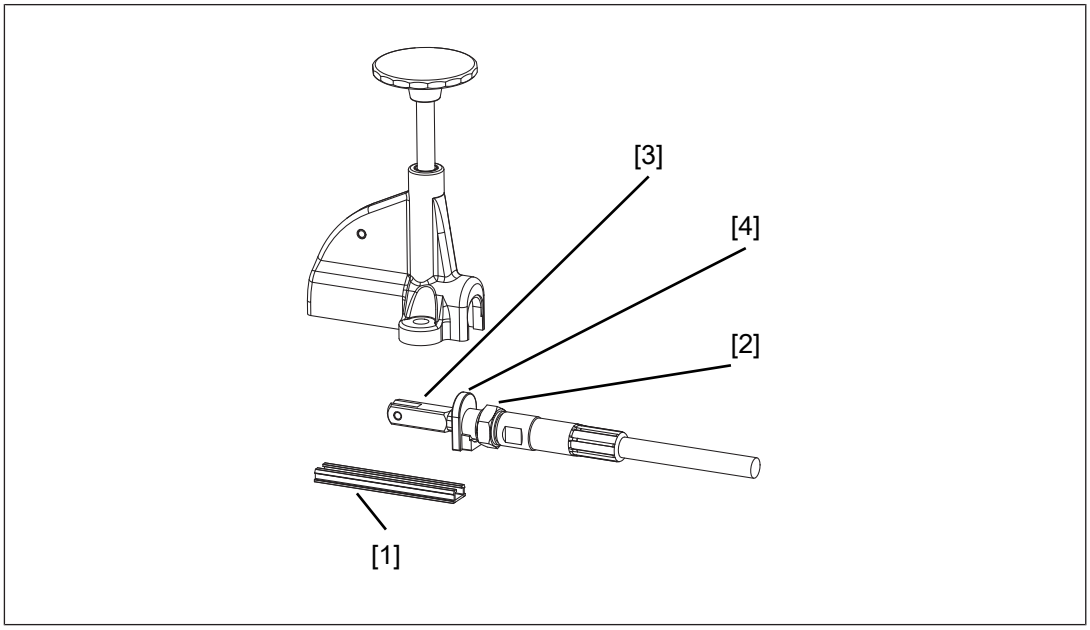
If the push/pull cable is to be run through a conduit pipe, the cable has to be uninstalled at the escape release first.

Prerequisites

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

Procedure

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



Legend

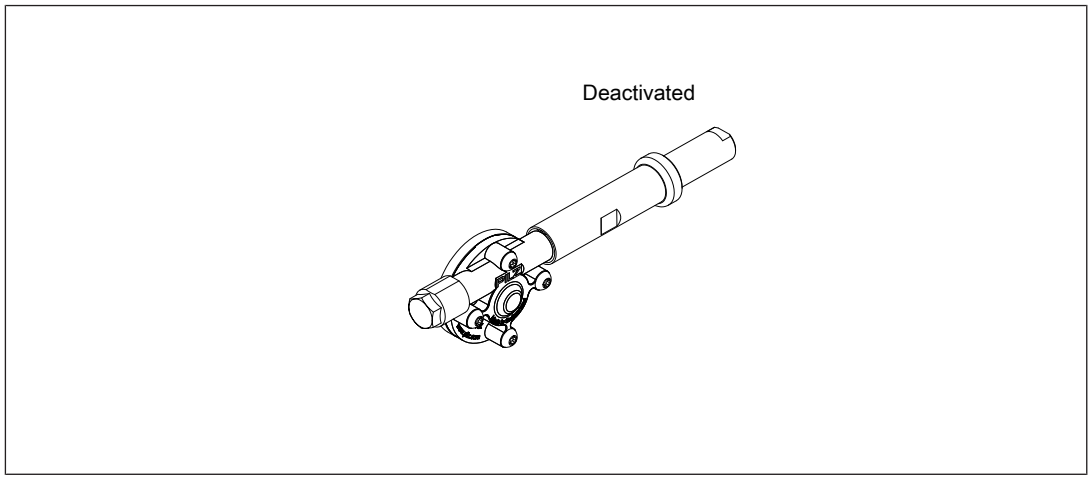
[1] Cover
[2] Nut M10 x 0,75
[3] Fork head
[4] Slot nut

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

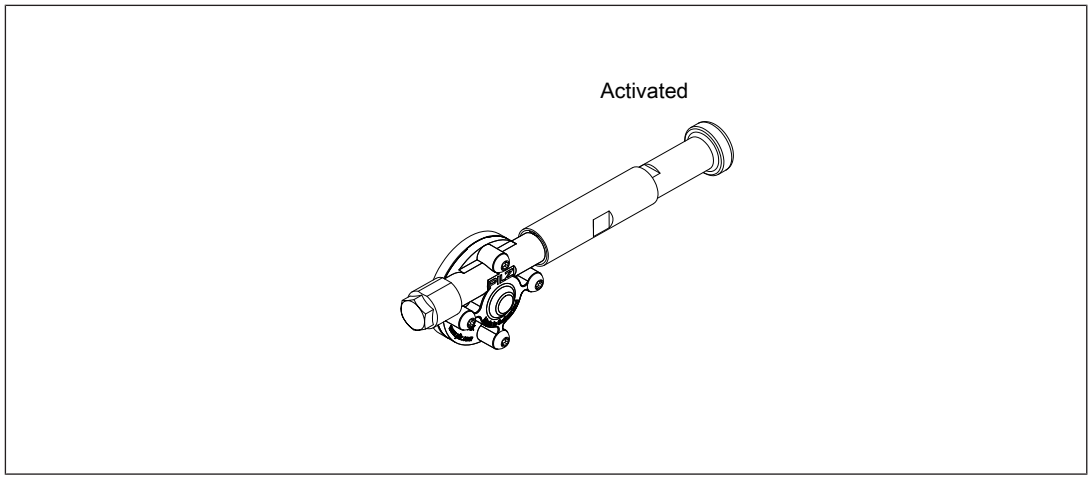
8.6 Auxiliary release

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



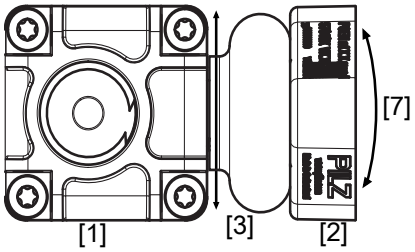
To activate the auxiliary release the button handle must be unscrewed and then screwed back on to the piston rod rotated 180°.



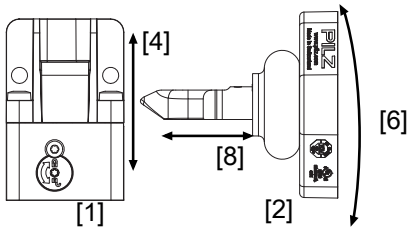
9 Adjustment

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.

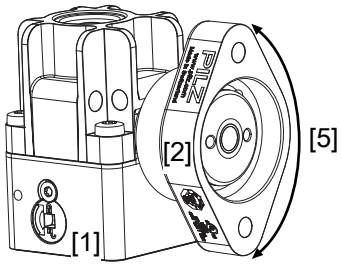
- Always test the function with a connected evaluation device.
- Use a connected evaluation device to check the function of the escape release.
- Safety switch and actuator must be aligned correctly



View from above



View from the side



Perspective view

[1]	Safety switch	
[2]	Actuator	
[3]	Max. lateral offset	+/-3,0 mm
[4]	Max. vertical offset	+/-3,0 mm
[5]	Max. angular offset around the X axis	+/-2,0 deg
[6]	Max. angular offset around the Y axis	+/-2,5 deg
[7]	Max. angular offset around the Z axis	+/-7,5 deg
[8]	Max. offset in closing direction	+/-2 mm

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 CL 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 illuminates green: The unit is ready for operation
- "Safety Gate" LED lights up yellow: Actuator is within the response range
- "Lock" LED lights up green: Guard locking active
- "Input" LED lights up yellow: The unit is ready for operation

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

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

Warnings

LED status				Switch status	Remedy / measure
Device	Safety gate	Input	Lock		
 Green	 Yellow	 Yellow	 Green	Safety gate closed, actuator detected, guard locking cannot be activated / deactivated	Check the alignment [📖 51] 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	

LED status				Switch status	Remedy / measure
Device	Safety gate	Input	Lock		
 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	Safety Gate	Input	Lock		
 Red	 Yellow	 Yellow	Display not definitive	Safety switch deactivated due to under or overvoltage	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	Dis-play not defin-itive	Display not definitive	Wrong actuator	Use only approved combinations (see 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 products 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 device should be checked at regular intervals and after each error.

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 is inserted 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 after the actuator is detected, there is a high signal at signal output Y32.
- 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
  - 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 controlled by the PSEN mgate is not in operation and cannot be restarted 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 [📖 90]) for threaded ring of the control element
- Screwdriver for Torx Tx 8
- Screwdriver for Torx Tx 20

Procedure:

WARNING!

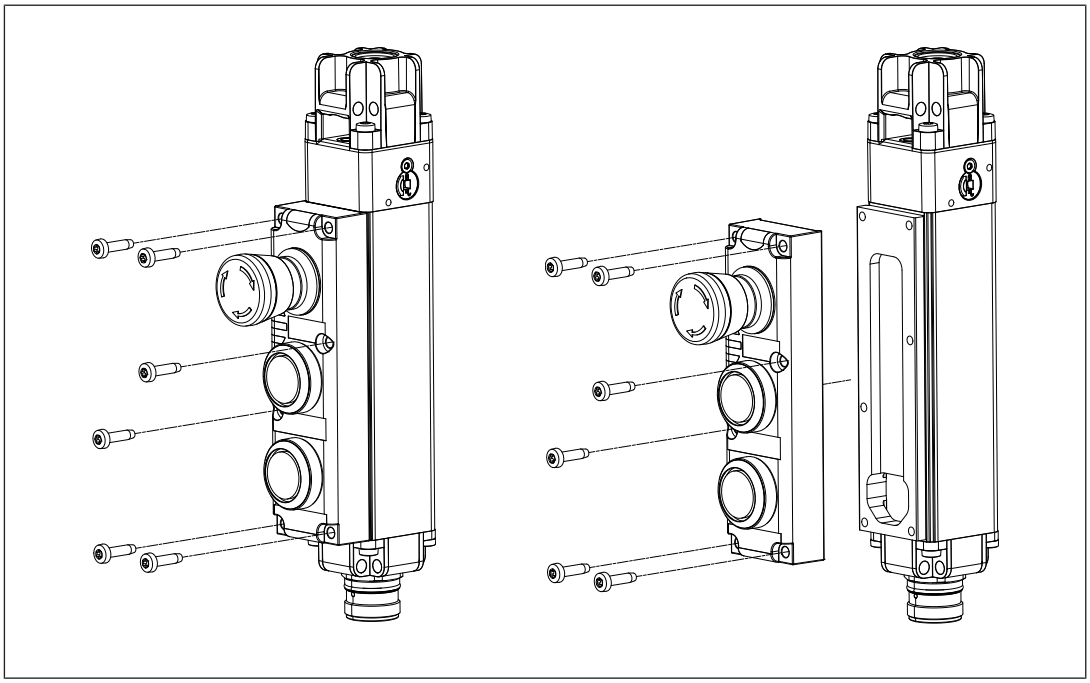
Hazard due to loss of the safety function

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

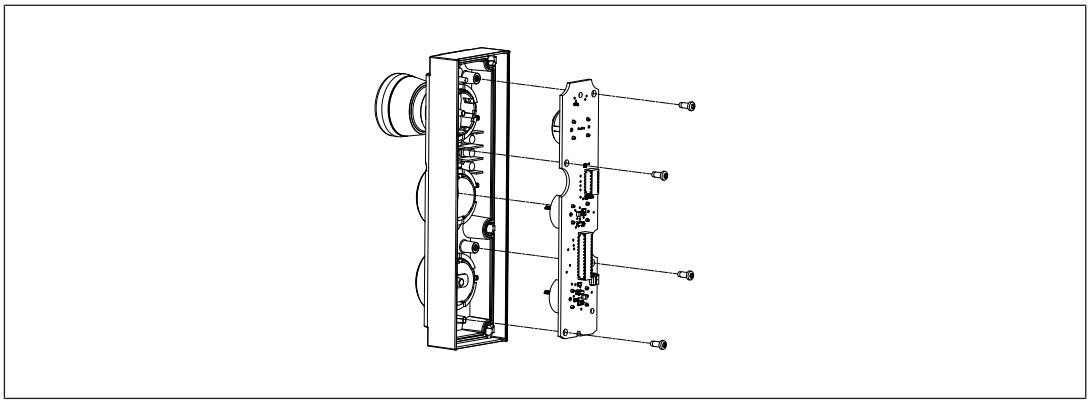
The protection type (see Technical details [📖 69]) is only achieved when using Pilz connection cables that are available as accessories, and when all torques on the connector and the attachments for the components of the PSEN mgate are complied with (see Technical details). If not tightened sufficiently,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

– Ensure that all torques are complied with.

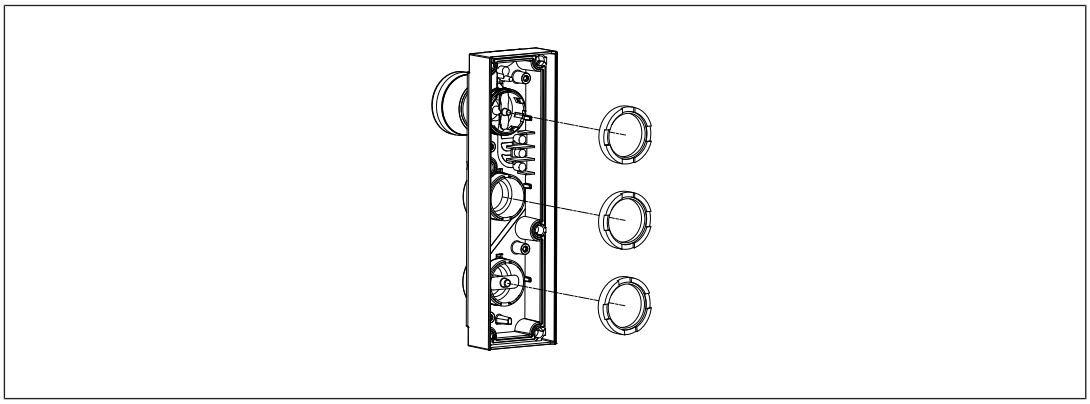
1. Remove the connection between the PSEN mgate and the evaluation device.
2. Loosen the fixing screws of the PSEN mgate on the mounting surface.
3. Loosen the 6 fixing screws for the half shell with the control elements and remove the half shell.



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

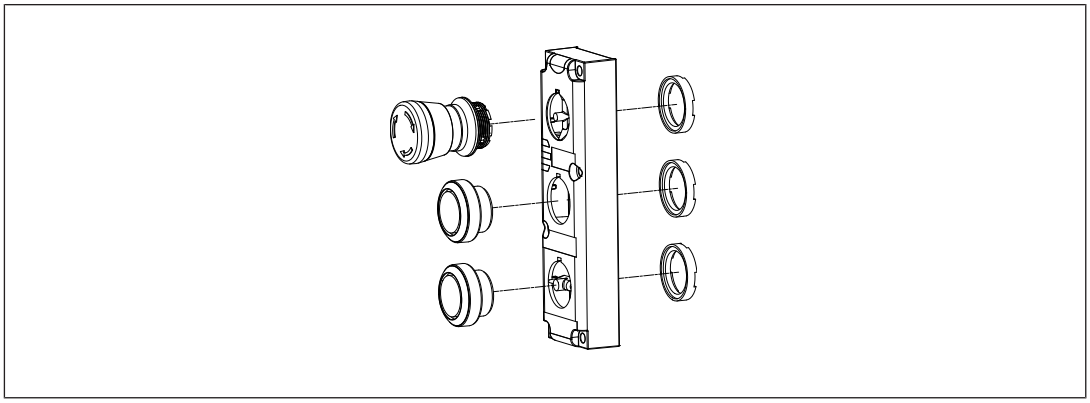


5. Loosen the threaded ring of the control element that is to be exchanged and remove the threaded ring (see figure).



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

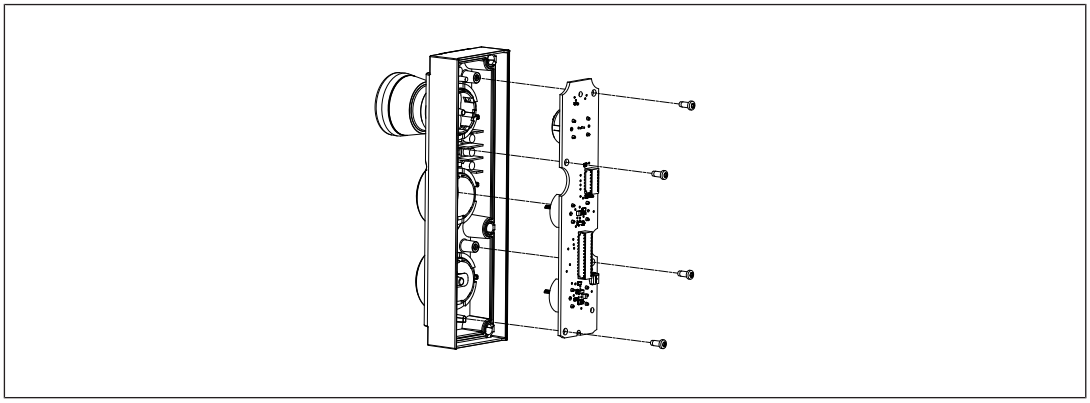
   The control element has a stud on its side to secure it against twisting. The stud must be positioned correctly when inserting the control element.



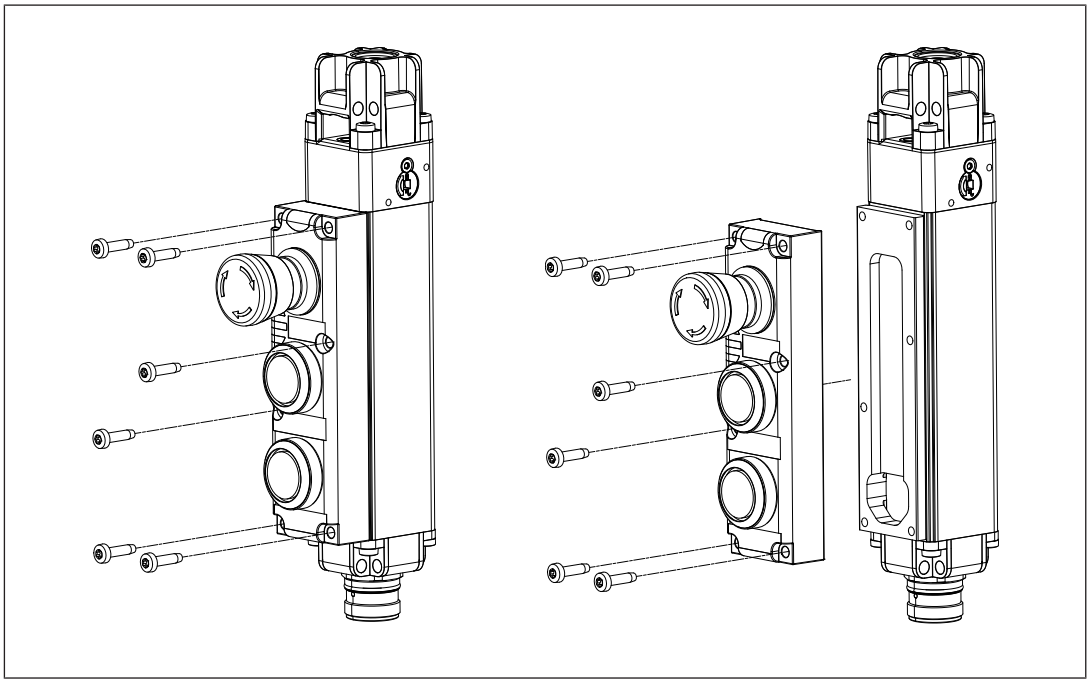
7. Screw the control element back on to the threaded ring (see diagram) with 1,1 - 1,3 Nm and place the printed circuit board in position.

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

8. Screw the printed circuit board to the fixing screws with (see figure).



9. Fasten the half shell back on to the safety switch housing and tighten the screws with .
   ⇨ Make sure that the strands are not damaged, crushed or twisted here.



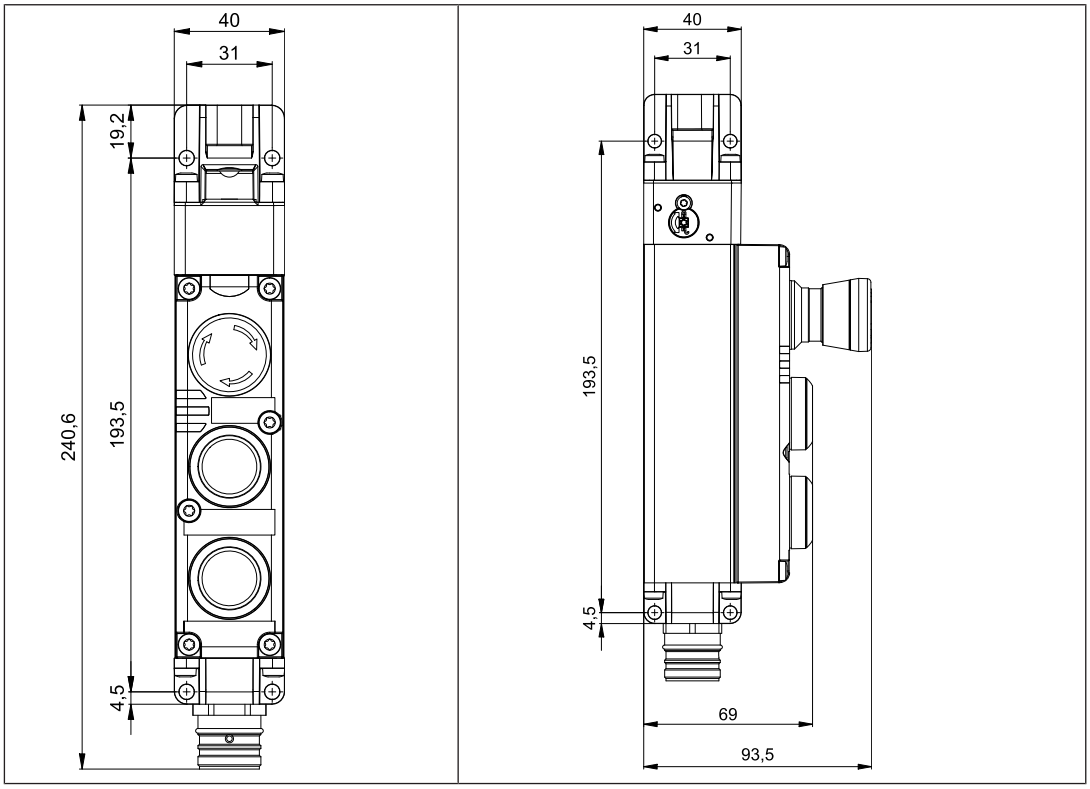
10. Fasten the PSEN mgate to the mounting surface using the fixing screws with 6 - 6,5 Nm.
11. Connect PSEN mgate to the evaluation device.
12. Perform a manual function test on the unit.

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

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

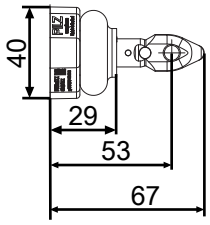
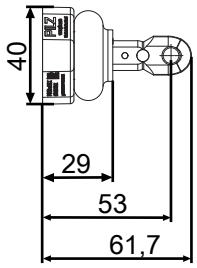
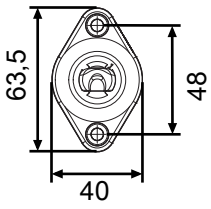
- Place one of the coloured caps provided (see Order reference, accessories) on to the relevant pushbutton.
- Ensure that the alignment marking [1] on the coloured cap matches up with one of the positions illustrated.
- Press on the coloured cap until you feel it click into position.

12 Dimensions



Safety switch - front view, side view

Actuator

		
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

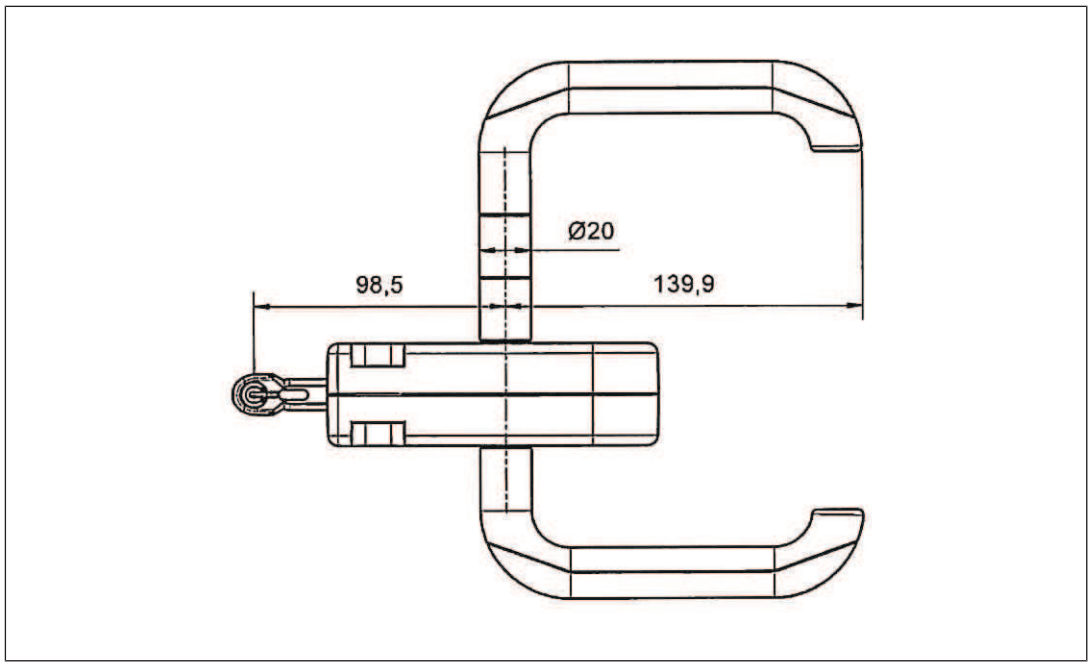


Fig.: Plan view with 2 extensions (order no. 6O000009)

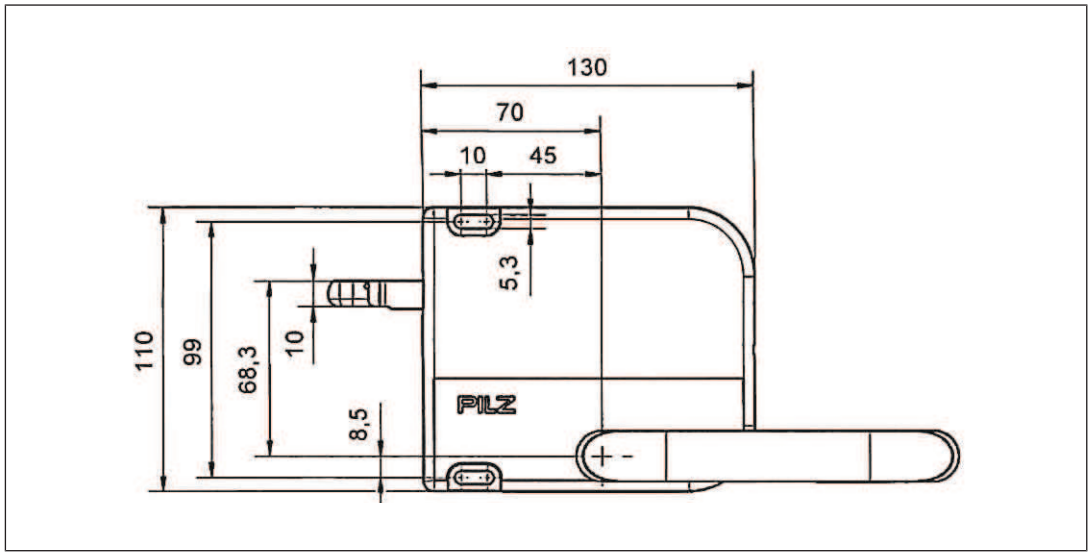


Fig.: Front view

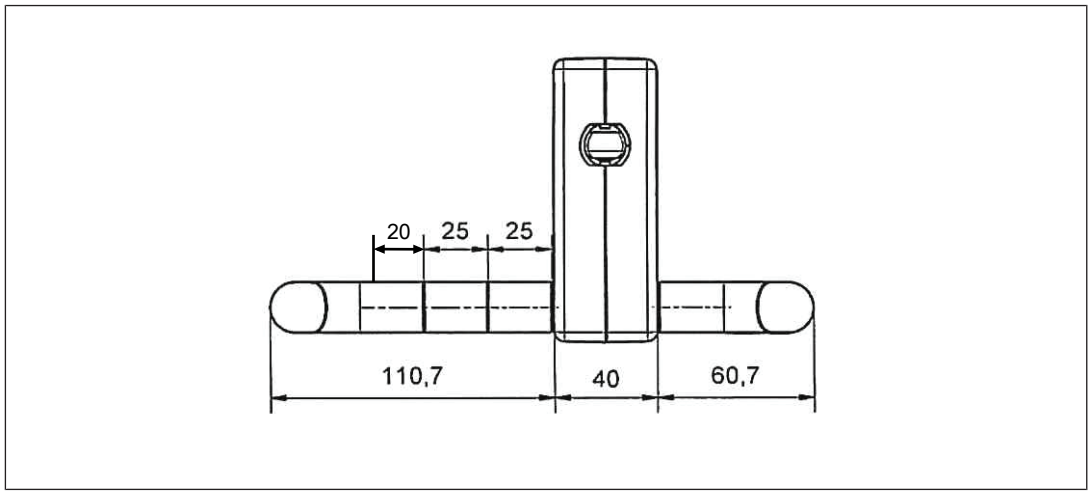


Fig.: Side view of actuator with two extensions (order no. 6O000009)

Mounting plate (see Accessories [📖 90])

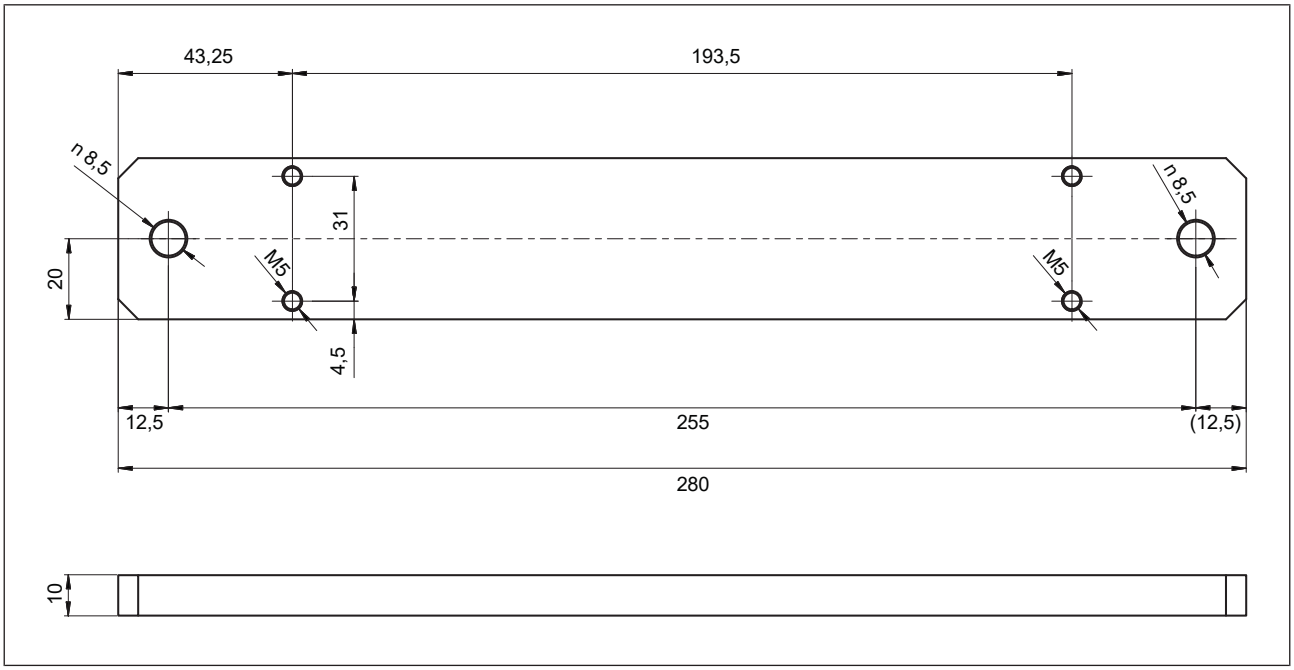


Fig.: Order no.: 570490

Mounting bracket for sliding gate (see Accessories [📖 90])

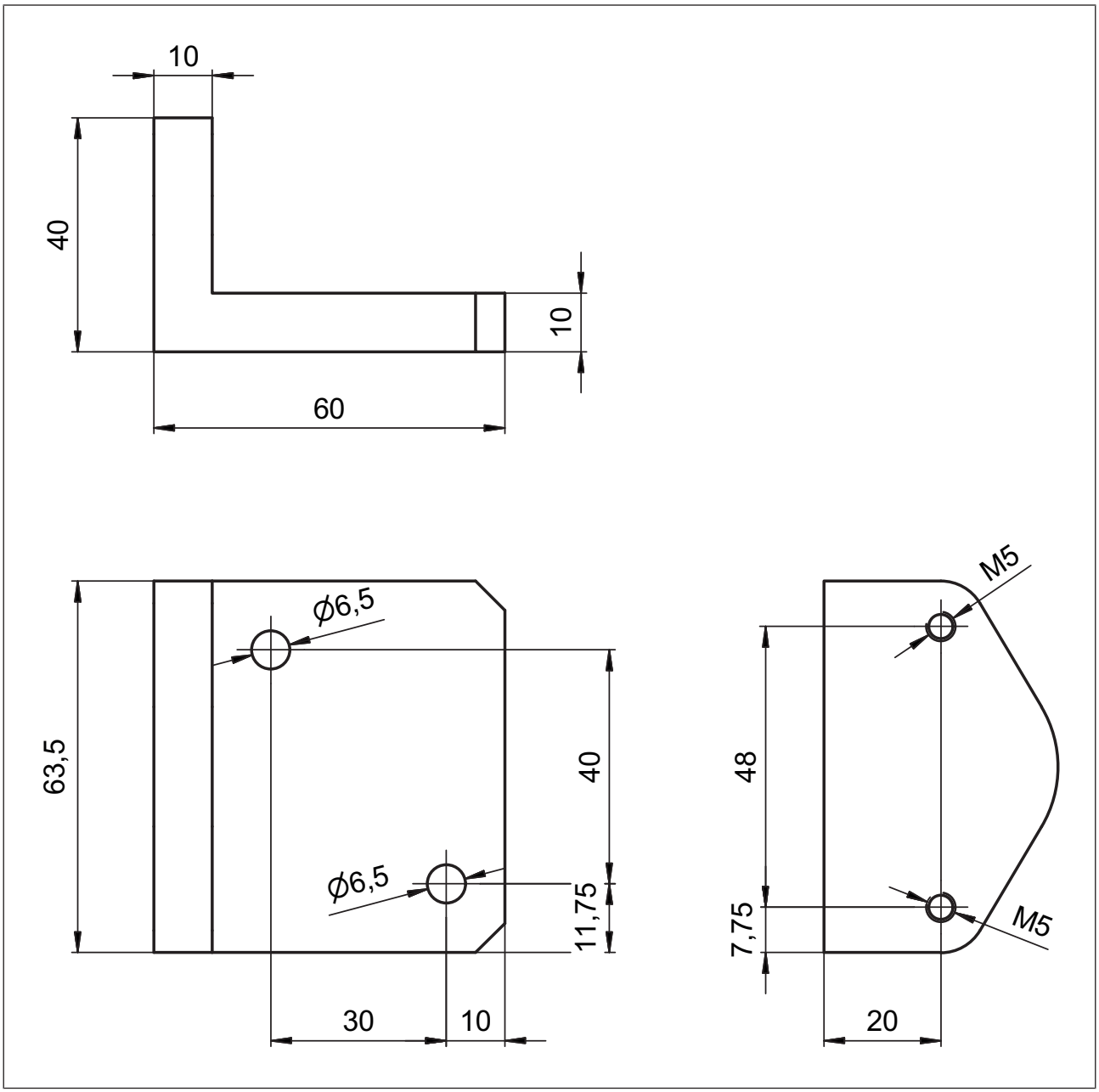


Fig.: Order no.: 570492

Mounting bracket for swing gate (see Accessories [📖 90])

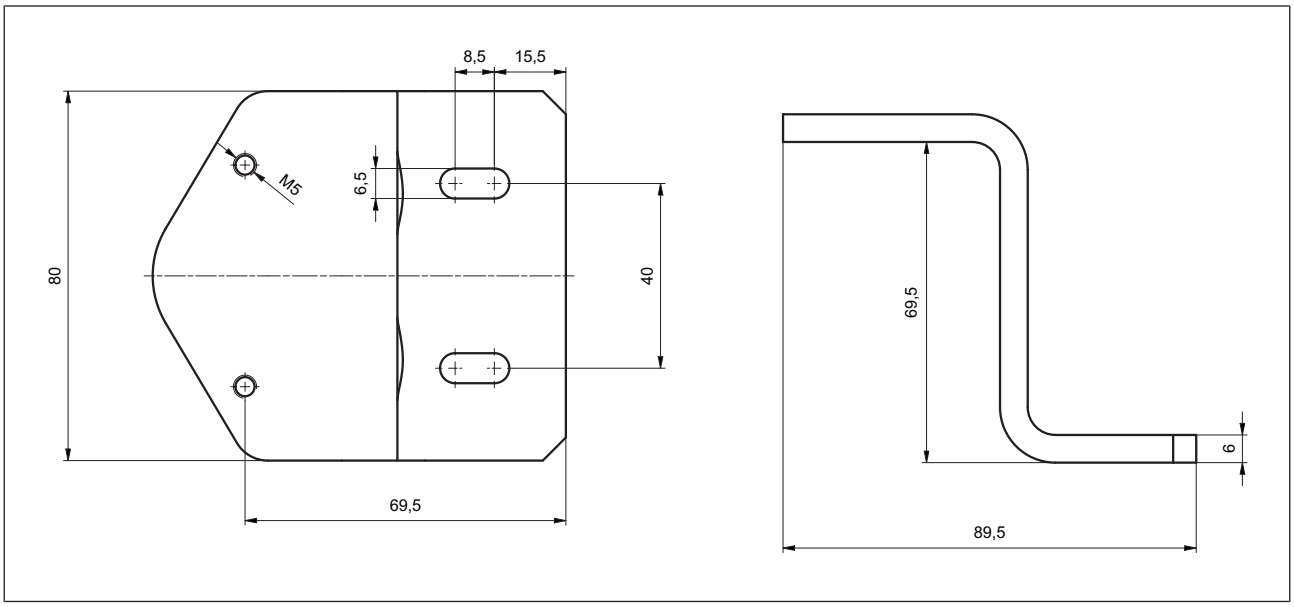


Fig.: Order no.: 570493

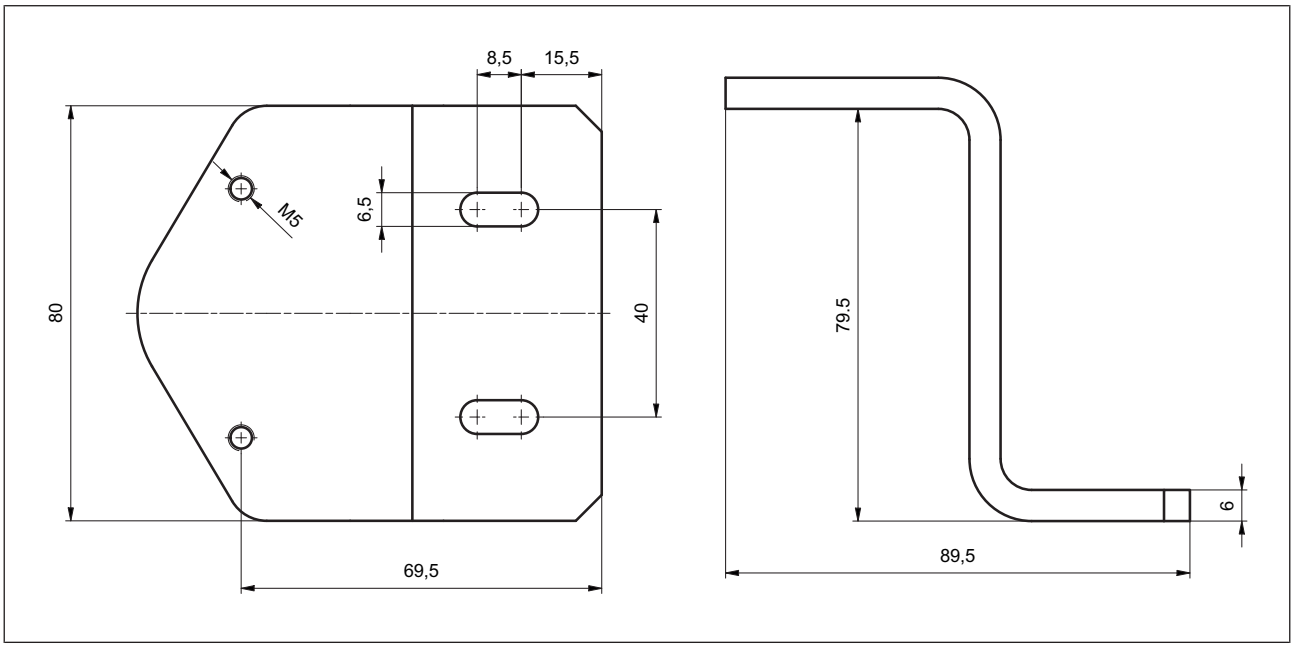


Fig.: Order no.: 570494

Mounting bracket with handle unit for sliding gate (see Accessories [📖 90])

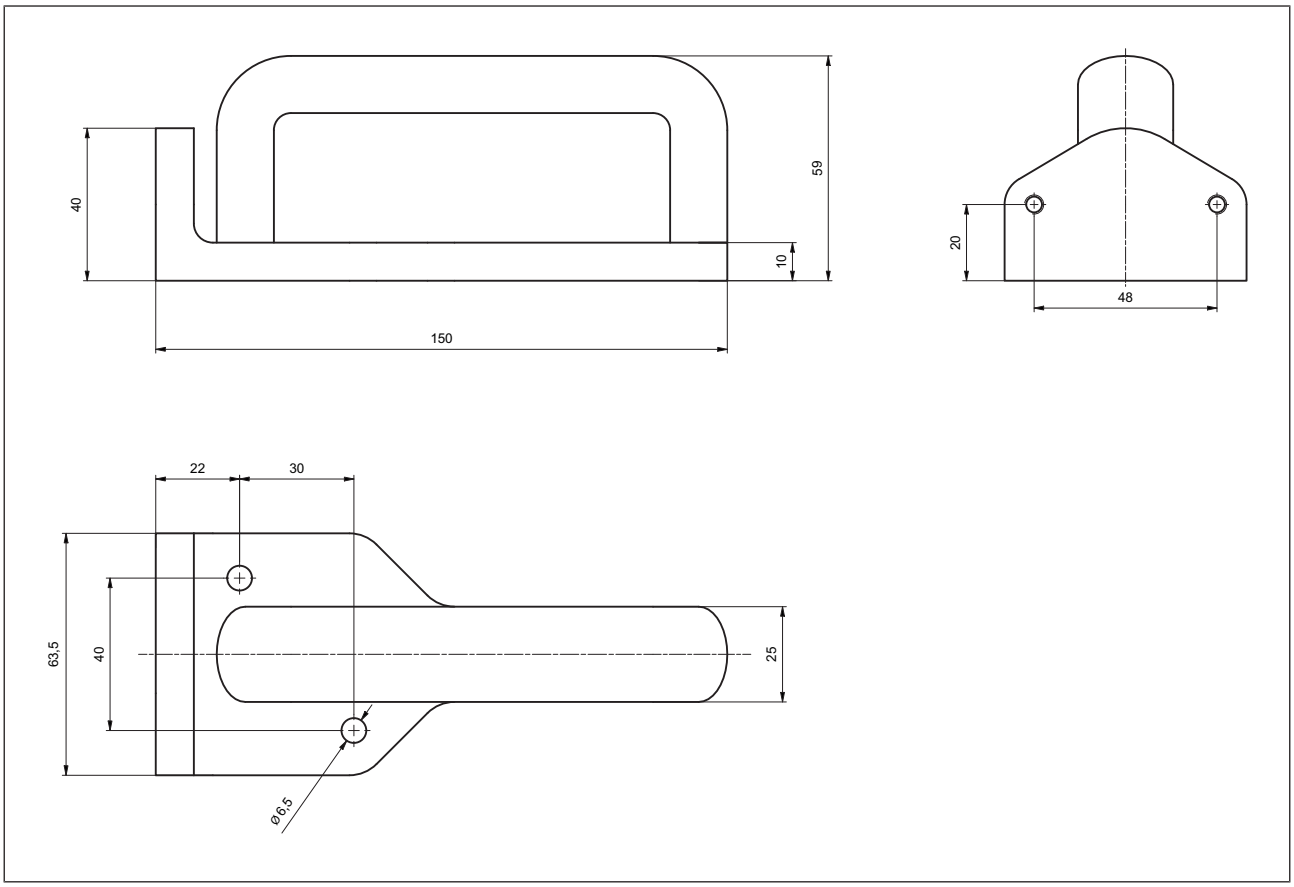


Fig.: Order no.: 570495

Mounting bracket with handle unit for swing gate (see Accessories [📖 90])

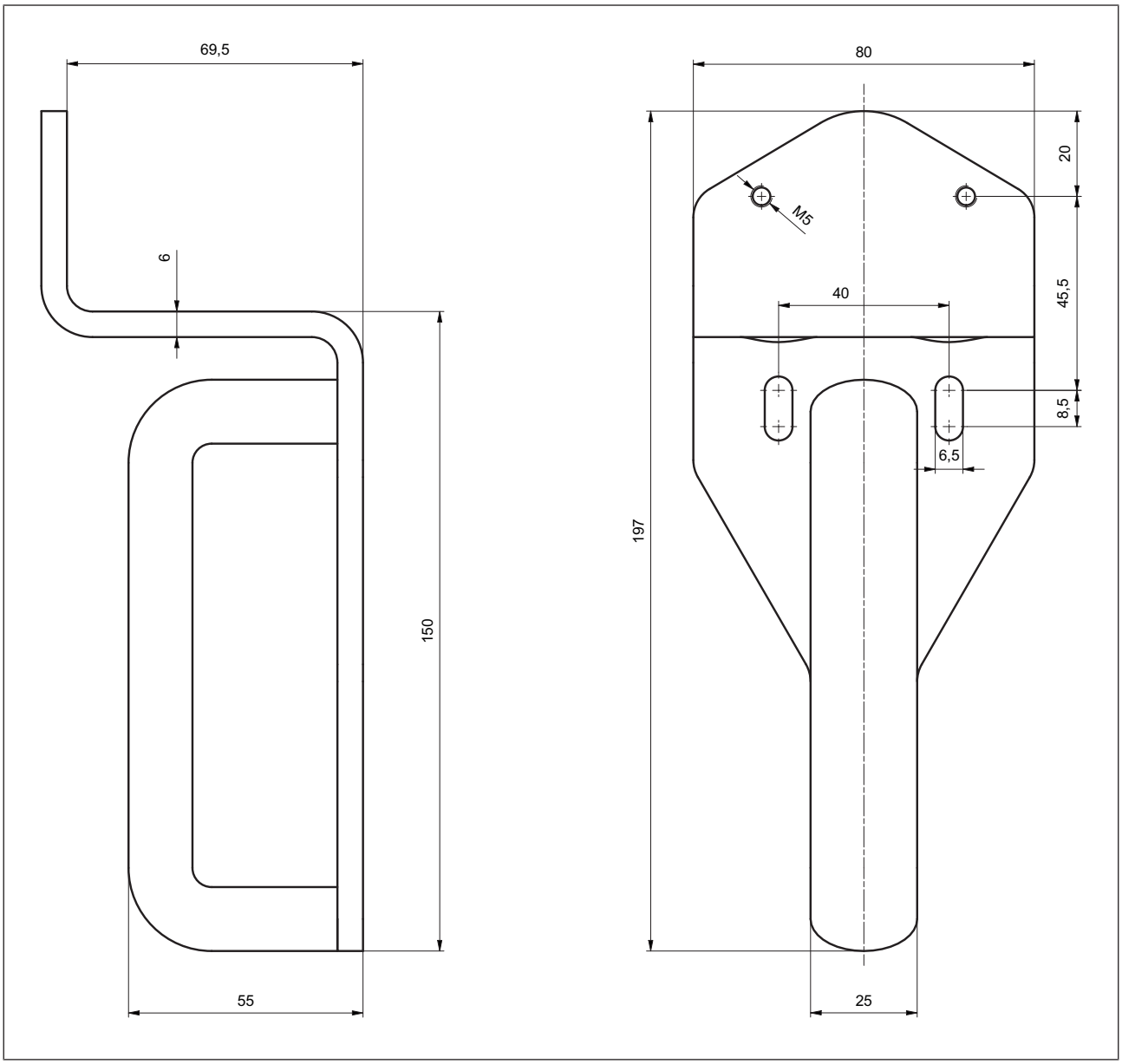


Fig.: Order no.: 570496

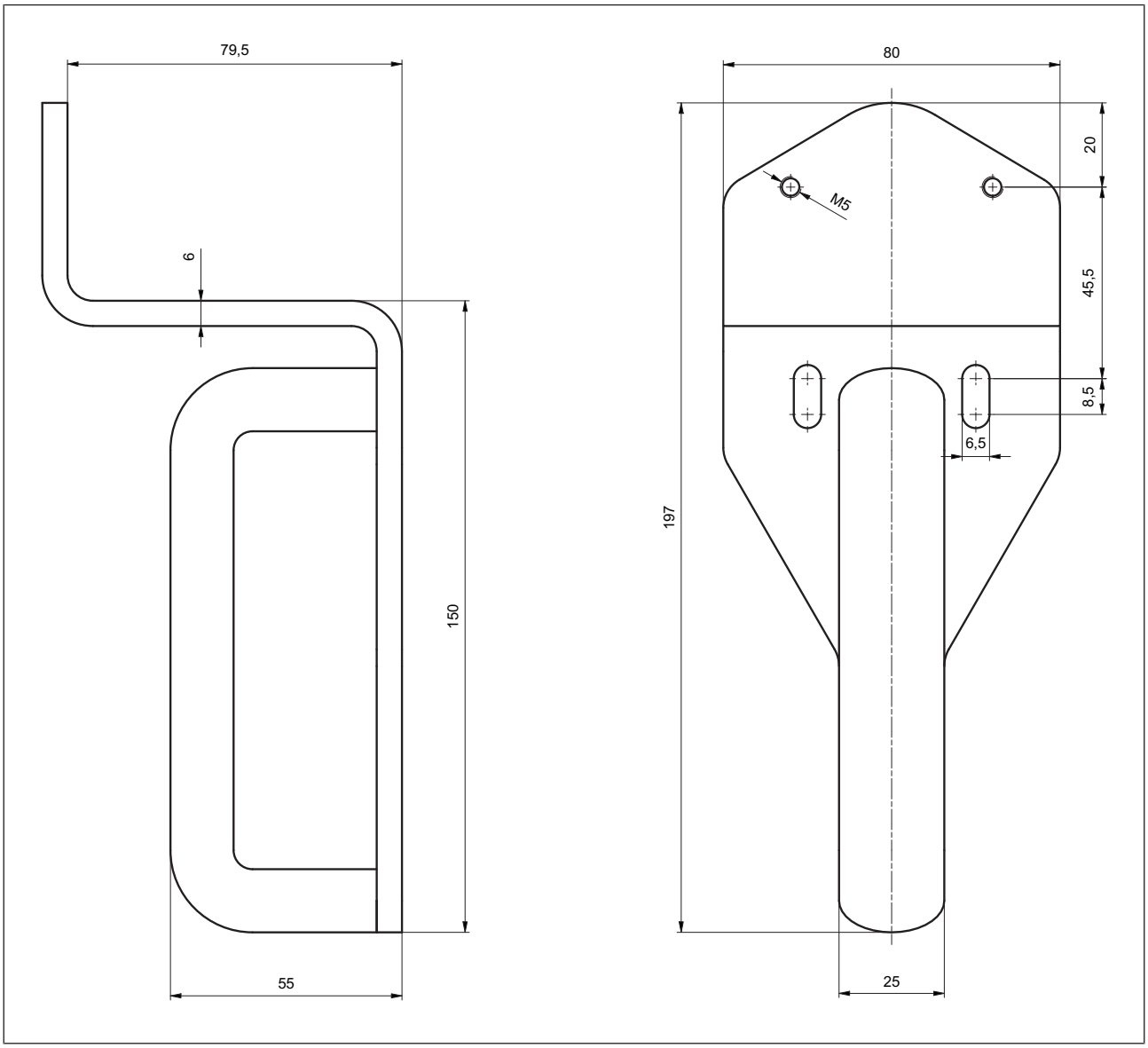
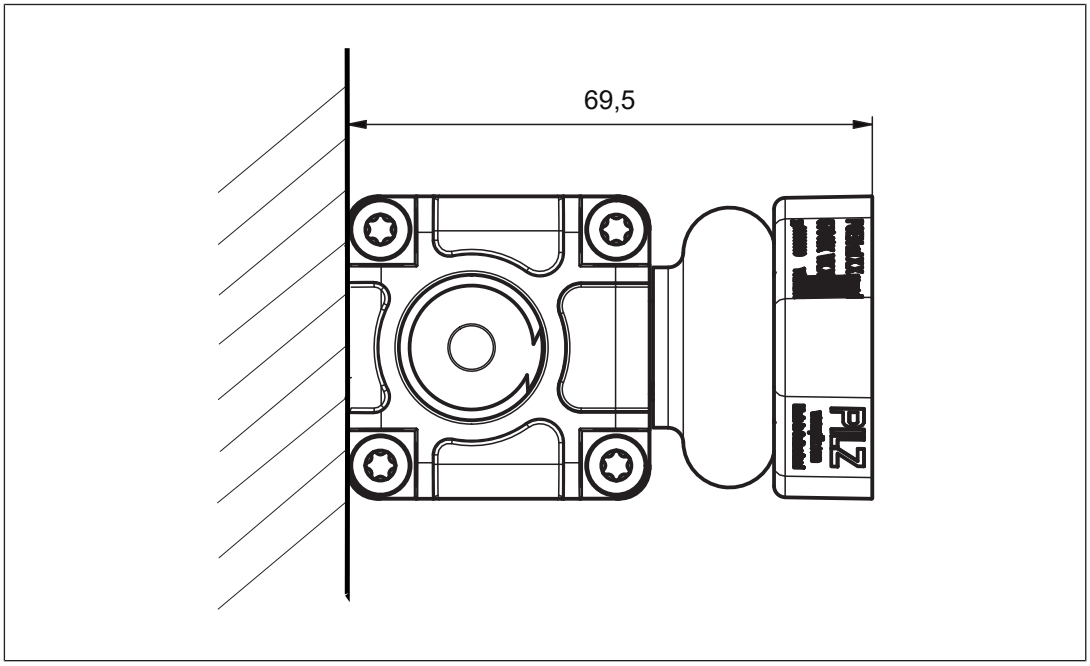


Fig.: Order no.: 570497

Distance between safety switch mounting surface and actuator mounting surface



13 Technical details for safety switch

General	6M000019	6M000020	6M000021
Certifications	CE, EAC, FCC, IC, TÜV, UKCA, cULus Listed	CE, EAC, FCC, IC, TÜV, UKCA, cULus Listed	CE, EAC, FCC, IC, TÜV, UKCA, cULus Listed
Sensor's mode of operation	Transponders	Transponders	Transponders
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	**6M000019**	**6M000020**	**6M000021**
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	**6M000019**	**6M000020**	**6M000021**
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	**6M000019**	**6M000020**	**6M000021**
Quantity	7	7	7
Voltage at inputs	24 V DC	24 V DC	24 V DC
Current at solenoid input	500 mA	500 mA	500 mA
Emergency stop	**6M000019**	**6M000020**	**6M000021**
Quantity	1	1	1

Emergency stop	6M000019	6M000020	6M000021
Number of N/C contacts	2	2	2
Number of signal contacts	1	1	1
E-STOP release type	Turn release	Turn release	Turn release
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
Current	0,1 A	0,1 A	0,1 A
Contact material	Au	Au	Au
Contact material signal contact	Au	Au	Au
Mechanical life	6050 cycles	6050 cycles	6050 cycles
Signal outputs			
Output voltage	24 V	24 V	24 V
Max. current	100 mA	100 mA	100 mA
Pushbutton	**6M000019**	**6M000020**	**6M000021**
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	**6M000019**	**6M000020**	**6M000021**
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	6M000019	6M000020	6M000021
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	**6M000019**	**6M000020**	**6M000021**
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
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	**6M000019**	**6M000020**	**6M000021**
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
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

Environmental data	6M000019	6M000020	6M000021
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	**35 V**	**35 V**	**35 V**
Rated impulse withstand voltage	**0,8 kV**	**0,8 kV**	**0,8 kV**
Protection type			
Housing	**IP65**	**IP65**	**IP65**
in accordance with UL	**Type 1**	**Type 1**	**Type 1**
Mechanical data	**6M000019**	**6M000020**	**6M000021**
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 direction of entry	**left**	**right**	**Frontal**
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	**M23, 19-pin male connector**	**M23, 19-pin male connector**	**M23, 19-pin male connector**
Connector contact assignment	**U2**	**U2**	**U2**
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**

Mechanical data	6M000019	6M000020	6M000021
Max. torque setting			
Connectors	2,5 Nm	2,5 Nm	2,5 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 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
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
General	**6M000022**	**6M000023**	**6M000024**
Certifications	CE, EAC, FCC, IC, TÜV, UKCA, cULus Listed	CE, EAC, FCC, IC, TÜV, UKCA, cULus Listed	CE, EAC, FCC, IC, TÜV, UKCA, cULus Listed
Sensor's mode of operation	Transponders	Transponders	Transponders
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	coded	coded	coded
Transponders	**6M000022**	**6M000023**	**6M000024**
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	**6M000022**	**6M000023**	**6M000024**
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

Electrical data	6M000022	6M000023	6M000024
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	**6M000022**	**6M000023**	**6M000024**
Quantity	7	7	7
Voltage at inputs	24 V DC	24 V DC	24 V DC
Current at solenoid input	500 mA	500 mA	500 mA
Emergency stop	**6M000022**	**6M000023**	**6M000024**
Quantity	1	1	1
Number of N/C contacts	2	2	2
Number of signal contacts	1	1	1
E-STOP release type	Turn release	Turn release	Turn release
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
Current	0,1 A	0,1 A	0,1 A
Contact material	Au	Au	Au
Contact material signal contact	Au	Au	Au
Mechanical life	6050 cycles	6050 cycles	6050 cycles
Signal outputs			
Output voltage	24 V	24 V	24 V
Max. current	100 mA	100 mA	100 mA
Pushbutton	**6M000022**	**6M000023**	**6M000024**
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	**6M000022**	**6M000023**	**6M000024**
OSSD safety outputs	2	2	2

Semiconductor outputs	6M000022	6M000023	6M000024
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	**6M000022**	**6M000023**	**6M000024**
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	**6M000022**	**6M000023**	**6M000024**
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
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	**6M000022**	**6M000023**	**6M000024**
Temperature of metal surface at ambient temperature: 25 °C	40 °C	40 °C	40 °C

Environmental data	6M000022	6M000023	6M000024
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
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	35 V	35 V	35 V
Rated impulse withstand voltage	0,8 kV	0,8 kV	0,8 kV
Protection type			
Housing	IP65	IP65	IP65
in accordance with UL	Type 1	Type 1	Type 1
Mechanical data	**6M000022**	**6M000023**	**6M000024**
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 direction of entry	left	right	Frontal
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

Mechanical data	6M000022	6M000023	6M000024
Sensor flush installation in accordance with EN 60947-5-2	**No**	**No**	**No**
Connection type	**M23, 19-pin male connector**	**M23, 19-pin male connector**	**M23, 19-pin male connector**
Connector contact assignment	**U2**	**U2**	**U2**
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	**2,5 Nm**	**2,5 Nm**	**2,5 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 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**
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**

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

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

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
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
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 data	570480	570481	570482	570483
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 of actuator	**145 g**	**145 g**	**145 g**	**145 g**
Weight	**145 g**	**145 g**	**145 g**	**145 g**

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

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

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
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

Environmental data	6O000001	6O000002	6O000003	6O000004
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
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 of actuator	2.050 g	2.050 g	2.050 g	2.050 g

Mechanical data	6O000001	6O000002	6O000003	6O000004
Weight	**2.050 g**	**2.050 g**	**2.050 g**	**2.050 g**

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

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

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
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

Environmental data	6O000005	6O000006	6O000007	6O000008
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
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 of actuator	2.050 g	2.050 g	2.050 g	2.050 g

Mechanical data	6O000005	6O000006	6O000007	6O000008
Weight	**2.050 g**	**2.050 g**	**2.050 g**	**2.050 g**

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

17 Safety characteristic data

NOTICE

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

Operating mode	EN ISO 13849-1: 2015 PL	EN ISO 13849-1: 2015 Category	EN IEC 62061 SIL CL/max. SIL	EN IEC 62061 61508 PFH_D [1/h]	EN/IEC 61511 61508 SIL	EN/IEC 61511 61508 PFD	EN ISO 13849-1: 2015 T_M [year]
1-ch. guard locking	**PL d**	**Cat. 2**	**SIL CL 2**	**2,45E-08**	–	**5,90E-05**	**20**
2-ch. guard locking	**PL e**	**Cat. 4**	**SIL CL 3**	**2,45E-08**	–	**5,90E-05**	**20**
2-ch. OSSD	**PL e**	**Cat. 4**	**SIL CL 3**	**1,78E-08**	–	**3,88E-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 units that are 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.

18 Supplementary data

18.1 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.

18.2 Technical details for mounting bracket without handle unit

General	570492	570493	570494
Certifications	CE	CE	CE
Mechanical data	**570492**	**570493**	**570494**
Holding force FZh in accordance with EN ISO 14119	–	3000 N	3000 N
Holding force F1max in accordance with EN ISO 14119	–	6000 N	6000 N
Weight	420 g	420 g	445 g

18.3 Technical details for mounting bracket with handle unit

General	570495	570496	570497
Certifications	CE	CE	CE
Mechanical data	**570495**	**570496**	**570497**
Holding force FZh in accordance with EN ISO 14119	3000 N	3000 N	3000 N
Holding force F1max in accordance with EN ISO 14119	6000 N	6000 N	6000 N
Weight	260 g	600 g	630 g

18.4 Technical details escape release 570460, 570462, 570470

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

18.5 Technical details escape release 570471-570473

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

18.6 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

18.7 Technical details escape release 570466-570469

General	570466	570467	570468	570469
Certifications	CE	CE	CE	CE
Mechanical data	**570466**	**570467**	**570468**	**570469**
Release force escape 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

19 Order reference

19.1 Safety switch

Product type	Features	Order no.
PSEN mg1-A-LD-FXX-LTA1-U2 switch	Safety gate system PSENmgate, with control elements, 1 illuminated pushbutton, 1 unilluminated pushbutton (1 NO each) and 1 E-STOP pushbutton (2 NC + 1 NO), coded, with automatic reset, safety switch for entry from left, 19-pin M23 male connector, series connection	6M000019
PSEN mg1-A-LD-FXX-RTA1-U2 switch	Safety gate system PSENmgate, with control elements, 1 illuminated pushbutton, 1 unilluminated pushbutton (1 NO each) and 1 E-STOP pushbutton (2 NC + 1 NO), coded, with automatic reset, safety switch for entry from right, 19-pin M23 male connector, series connection	6M000020
PSEN mg1-A-LD-FXX-FTA1-U2 switch	Safety gate system PSENmgate, with control elements, 1 illuminated pushbutton, 1 unilluminated pushbutton (1 NO each) and 1 E-STOP pushbutton (2 NC + 1 NO), coded, with automatic reset, safety switch for front entry, 19-pin M23 male connector, series connection	6M000021
PSEN mg1-A-LD-FXX-LTA2-U2 switch	Safety gate system PSENmgate, with control elements, 1 illuminated pushbutton, 1 unilluminated pushbutton (1 NO each) and 1 E-STOP pushbutton (2 NC + 1 NO), fully coded, with automatic reset, safety switch for entry from left, 19-pin M23 male connector, series connection	6M000022
PSEN mg1-A-LD-FXX-RTA2-U2 switch	Safety gate system PSENmgate, with control elements, 1 illuminated pushbutton, 1 unilluminated pushbutton (1 NO each) and 1 E-STOP pushbutton (2 NC + 1 NO), fully coded, with automatic reset, safety switch for entry from right, 19-pin M23 male connector, series connection	6M000023
PSEN mg1-A-LD-FXX-FTA2-U2 switch	Safety gate system PSENmgate, with control elements, 1 illuminated pushbutton, 1 unilluminated pushbutton (1 NO each) and 1 E-STOP pushbutton (2 NC + 1 NO), fully coded, with automatic reset, safety switch for front entry, 19-pin M23 male connector, series connection	6M000024

19.2 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

Product type	Features	Order no.
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

19.3 Accessories

Product type	Features	Order no.
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

Product type	Features	Order no.
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 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 bracket swinging door 70	Mounting bracket for installing the actuator on a swing gate, with 2 hexagonal socket head screws and 1 tamper-proof pan head locking screw, M5x12. Height: 70 mm.	570493
PSEN ml bracket swinging door 80	Mounting bracket for installing the actuator on a swing gate, with 2 hexagonal socket head screws and 1 tamper-proof pan head locking screw, M5x12. Height: 80 mm.	570494
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
PSEN ml door handle swinging door 70	Mounting bracket with handle unit for installing the actuator on a swing gate, with 2 hexagonal socket head screws and 1 tamper-proof pan head locking screw, M5x12. Height: 70 mm.	570496
PSEN ml door handle swinging door 80	Mounting bracket with handle unit for installing the actuator on a swing gate, with 2 hexagonal socket head screws and 1 tamper-proof pan head locking screw, M5x12. Height: 80 mm.	570497
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

Product type	Features	Connector X1	Connector X2	Connector X3	Order no.

PSEN ml auxiliary release hd1	Auxiliary release, hygienic design 1	570461