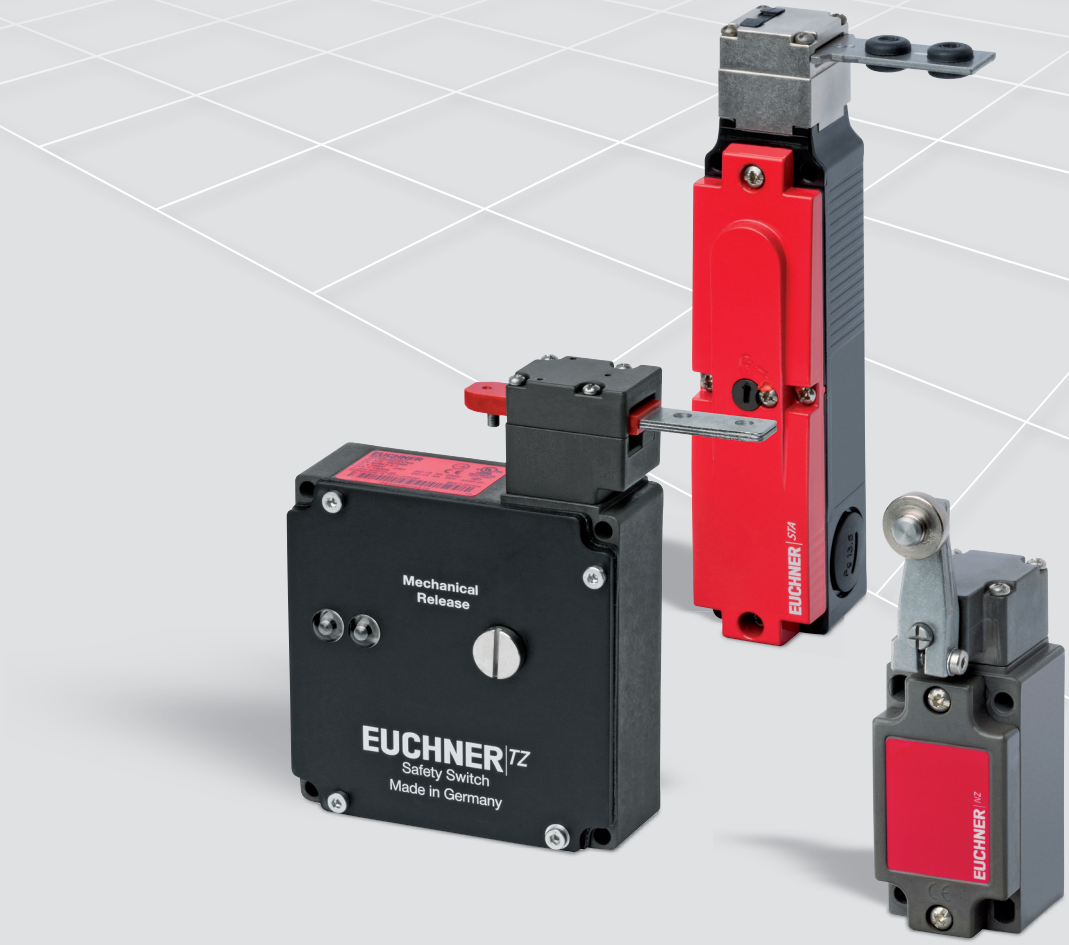
EN

Safety Switches with Metal Housing



EUCHNER
More than safety.

EUCHNER

More than safety.

Headquarters in Leinfelden-Echterdingen

Logistics center in Leinfelden-Echterdingen

Production location in Unterböhringen

Internationally successful – the EUCHNER company

EUCHNER GmbH + Co. KG is a world-leading company in the area of industrial safety technology. EUCHNER has been developing and producing high-quality switching systems for mechanical and systems engineering for more than 60 years.
The medium-sized family-operated company based in Leinfelden, Germany, employs more than 600 people around the world.

In addition to the production locations in Unterböhringen and Shanghai/China, 15 subsidiaries and other sales partners in Germany and abroad work for our international success on the market.

Quality and innovation – the EUCHNER products

A look into the past shows EUCHNER to be a company with a great inventive spirit. We take the technological and ecological challenges of the future as an incentive for extraordinary product developments.

EUCHNER safety switches monitor safety doors on machines and installations, help to minimize dangers and risks and thereby reliably protect people and processes. Today, our products range from electromechanical and electronic components to intelligent integrated safety solutions. Safety for people, machines and products is one of our dominant themes.

We define future safety technology with the highest quality standards and reliable technology. Extraordinary solutions ensure the great satisfaction of our customers. The product ranges are subdivided as follows:

- Transponder-coded Safety Switches (CES)
- Transponder-coded Safety Switches with guard locking (CET)
- Interlocking and guard locking systems (Multifunctional Gate Box MGB)
- Access management systems (Electronic-Key-System EKS)
- Electromechanical Safety Switches
- Magnetically coded Safety Switches (CMS)
- Enabling Switches
- Safety Relays
- Emergency Stop Devices
- Hand-Held Pendant Stations and Handwheels
- Safety Switches with AS-Interface
- Joystick Switches
- Position Switches

made in Germany

Contents

Safety Switches with Metal Housing

About this catalog

The catalog *Safety switches with metal housings* provides an overview of our safety switches with metal housings in the series N1A, NB01, NZ, TZ, NX, TX, STA and the safety hinge ESH. For numerous applications these switches are the right choice due to their robustness and long service life. You will find the technical data after the product overview. There is a reference to the page with the related technical data on the pages listing the products.

At the front of the catalog you will find useful information on the topic of safety switches.
We have prepared an overview of the standards and a glossary on this topic in the appendix.
You will also find important safety instructions in the appendix.

You will find the following series and accessories in this catalog:

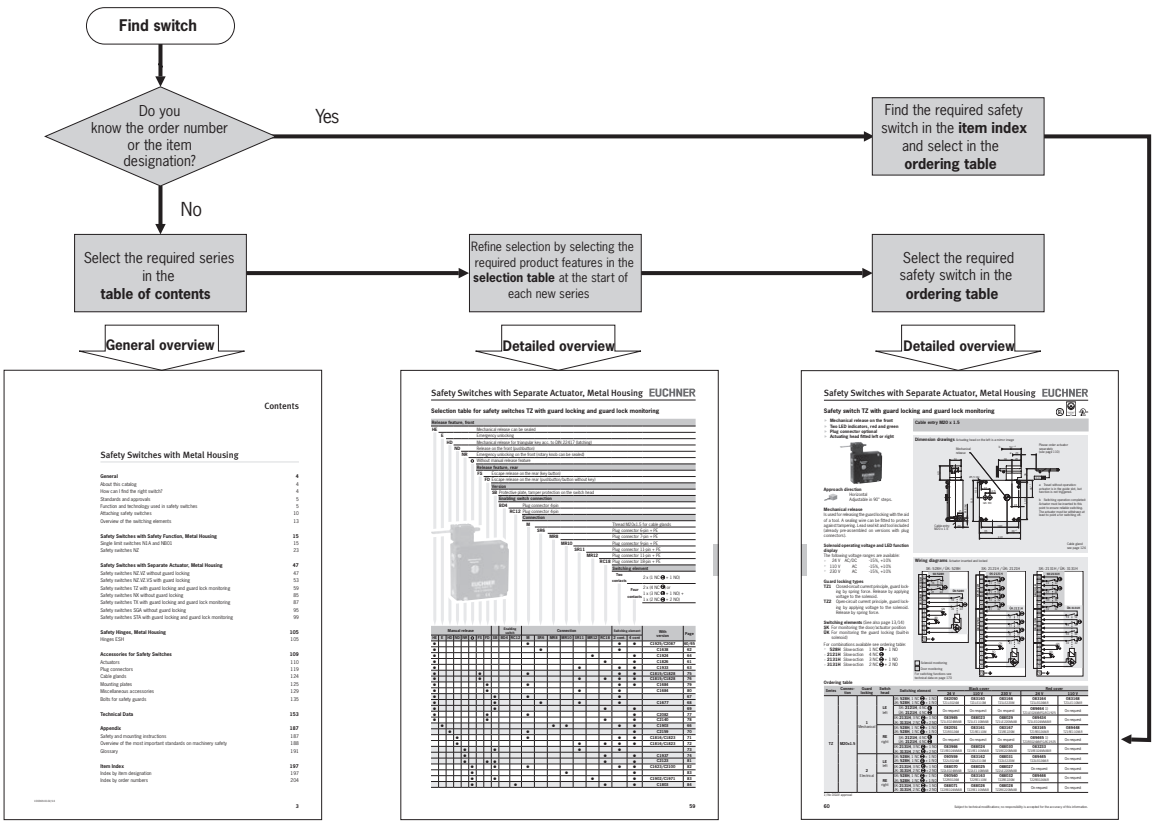
Safety switches in metal housing

With safety function		With separate actuator							Safety hinge ESH	Accessories
Single hole fixing limit switches	Safety switches	Without guard locking			With guard locking	With guard locking and guard lock monitoring				
N1A	NB01	NZ	NZ.VZ	NX	SGA	NZ.VZ.VS	TZ	TX	STA	
										
see page 15	see page 15	see page 23	see page 47	see page 85	see page 95	see page 53	see page 59	see page 87	see page 99	see page 105	see page 109

How can I find the right switch?

There are two ways you can find the right switch:

1. If you know the order number or the product designation, look for the switch directly in the item index (see page 197 or page 204).
2. If you have specific requirements, refine the selection step-by-step with the aid of the table of contents and the selection tables.



Standards and approvals

Standards

Safety switches must meet the requirements for safety components as per the Machinery Directive. The Machinery Directive has been implemented in national law in the EU member states and, as a result, is binding for all manufacturers.
Detailed requirements for the switches are defined in EN 60947 Part 5-1 (Specification for low-voltage switchgear and controlgear. Part 5-1: Control circuit devices and switching elements. Electromechanical control circuit devices).
If the requirements of this standard are met, conformity with the applicable laws and therefore with the Machinery Directive is assumed. EUCHNER safety switches comply with the relevant standards for safety switchgear and therefore help you to comply with safety requirements during the design of your machinery.

Approvals

To demonstrate conformity, the Machinery Directive also includes the possibility of type examination. Although all relevant standards are taken into account during development, we have all our safety switches subjected to additional type examinations by a notified body.
Many of the safety switches listed in this catalog have been tested by the German Social Accident Insurance association (DGUV), formerly the employers' liability insurance association (BG), and are given in the lists from the DGUV.
Furthermore, numerous switches are listed by Underwriters Laboratories (UL). These switches can be used in countries in which this listing is required. The approval symbols on the individual pages of the catalog indicate which body tested the switches.
With the aid of the approval symbols listed below you can quickly see which approvals are available for the related switches:

DGUV Test ET Sicherheit geprüft tested safety	Switches with this symbol have the approval of the German Social Accident Insurance association (DGUV) – formerly the employers' liability insurance association (BG)
c UL us LISTED	Switches with this symbol are approved by Underwriters Laboratories (UL, Canada and USA)

Special approvals:

GL	Switches with this symbol are approved by the Germanischer Lloyd (GL)
	Switches with this symbol are compliant with the official Russian standard ГОСТ (GOST)

Function and technology used in safety switches

The task of safety switches

Safety switches have the task of preventing the operation of a machine in the case of a potential hazard. This task is defined in EN 1088 (Safety of machinery. Interlocking devices associated with guards. Principles for design and selection). For this purpose the safety circuit must be opened by the safety switch. Safety switches are therefore key elements of an interlocking device.
In this context an interlocking device is, for example, the interruption of machine operation if the safety door is open – the stop state of the machine is "interlocked" so to speak and unintentional starting is therefore prevented. In relation to movable safety guards this means that if safety doors or safety flaps are open, the machine or system cannot be operated if the machine or system can produce a hazard. For this reason the safety switch for a safety guard must be attached such that a malfunction is excluded. Safety switches must also not be tampered with or bypassed.
The most important feature of a safety switch is at least one NC contact which is operated positively. The switching contacts are separated by a positively driven mechanism when the safety guard is opened.

Safety switch types

In general, a differentiation is made between safety switches with safety function and safety switches with separate actuator.

With safety function

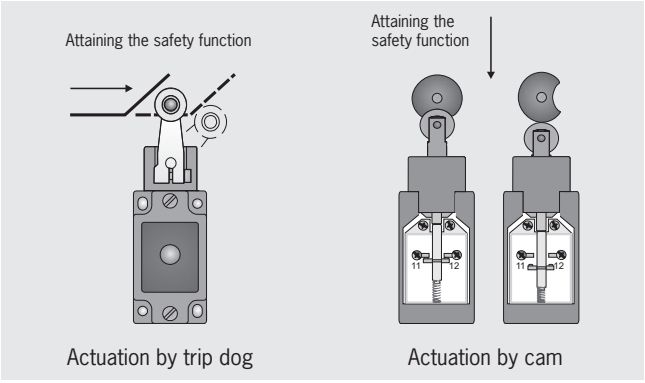
With separate actuator

EUCHNER has safety switches with safety function and safety switches with separate actuator in its range.

Safety switches with safety function

Safety switches with safety function are safety switches in which the actuating element and the switch are fitted in one housing. The actuating elements are available in various versions (e.g. in the form of a plunger or a lever arm). The switches N1A, NB01 and NZ listed in this catalog are safety switches with safety function.
To actuate a switch with safety function, trip dogs or cams are often used (see figure on the next page).
The switch must be attached such that the switch is actuated if the safety guard is opened. The positively driven contact in the switching element is opened and the machine is shut down. A built-in spring returns the switch to the free position when the safety guard is closed and the positively driven contact is closed. In this way the safety circuit is enabled again.
A safety trip dog with a defined slope should be used to approach the switch. Linear trip dogs are generally used for travel limiting or for shutting down in final positions. A cam with cut-out (negative dog) is particularly suitable for protecting safety guards. An alternative is the safety hinge ESH.

On the safety hinge ESH the cam is already integrated into the switch in a very small space envelope. It is therefore possible to protect movable safety guards with very little mounting effort.



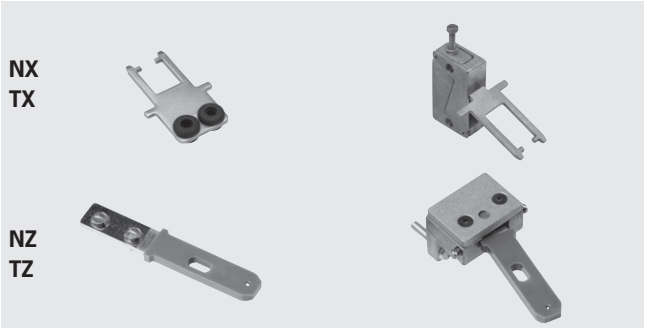
Actuation by trip dog | Actuation by cam

Safety switches with separate actuator

On safety switches with separate actuator, the actuating element is separate to the switch and is attached to the moving part of the safety guard to be monitored. When the safety guard is closed, the actuating element is inserted in the switch. The actuating elements are available in various versions to suit the safety guard that is to be monitored.
This catalog contains series NZ.VZ, NZ.VZ.VS, TZ, NX, TX and STA switches that are used in combination with separate actuating elements.

Actuating elements for switches with separate actuator

The safety switches NZ.VZ, NZ.VZ.VS, TZ, NX and TX can only be actuated using a special actuating element with multiple coding. The coding is a type of lock and key principle. The safety switch can only be actuated using an actuating element of a specific shape. Unlike a conventional key, the actuating elements for a switch series are always the same shape.



Straight actuator | Hinged actuator

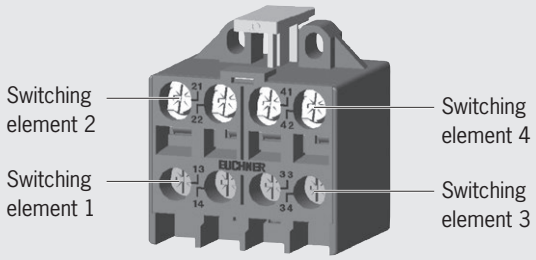
The switching element is closed by inserting the actuating element in the switch head. The positively driven contact is reliably opened by the positive application of force when the actuating element is removed – even if the contacts are welded together. In the open state, the machinery or systems are then safely interlocked against starting.
The actuators for the series NZ.VZ and TZ comprise a laminated spring steel core encapsulated in an abrasion-resistant plastic. As the spring steel core comprises three layers, complete fracture on overloading is unlikely. Straight actuators and hinged actuators are available for a wide range of applications in which, e.g. hinged and sliding doors are used. Hinged actuators are spring-mounted actuators that adjust to the inner contours of the switch on insertion in the actuating head. They are suitable for small hinged doors with a radius from 165 mm. For sliding doors and hinged doors with an adequately large pivoting radius (> 1000 mm) a straight actuator can be used.

If increased play is required when the door is closed, an actuator with overtravel is available. With this actuator the door can move slightly in the actuating direction when closed. This is important, for example, if safety doors have a rubber end stop. Using an actuator with overtravel, the continuous pressure from the compressed rubber can be reduced. In this way the load is reduced on the switch head and the door mechanism.

Switching elements

Different switching elements are available for the switches offered in the catalog:

- 1 contact switching element
- 2 contact switching elements with two independent switching contacts
- 4 contact switching elements with four independent switching contacts



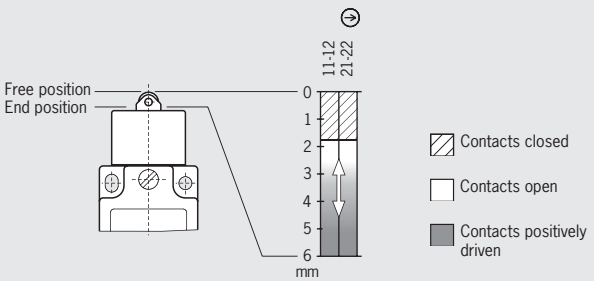
4 contact switching element

Only one switching element is fitted in each case in switches of the series N1A, NB, NZ, NX, TX and STA. Two switching elements are fitted to all series TZ safety switches. In this case one of the switching elements is used to monitor the door position (SK) and the other is used to monitor the position of the guard locking solenoid (ÜK). Switching elements are divided into two types as a function of their switching behavior:

- Slow-action switching elements and
- Snap-action switching elements

Slow-action switching element

Slow-action switching elements are mostly used in safety switches. The opening of the switching element is directly dependent on the position of the actuator. The further the actuator is moved, the further the switching element is opened.

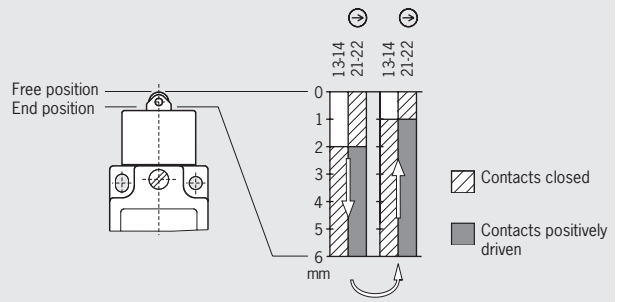


Travel diagram,
Slow-action switching element

The actuator travel is therefore directly proportional to the travel covered by the switching contact in the switching element. From the travel diagrams it can be seen at which point the switching element changes from the closed state to the open state.

Snap-action switching element

On snap-action switching elements, the change from the completely closed state to the completely open state is made at a defined point. As a result the switching point is at a defined position unlike on slow-action contact elements. Snap-action switching elements typically have a switching hysteresis.



Travel diagram,
Snap-action switching element

Positively driven contacts ⊖

Positively driven contacts are used in the switching elements. These are special switching contacts that are designed to ensure the switching contacts are always reliably separated. Even if contacts are welded together, the connection is opened by the actuating force.
It is a common feature of all switching elements that at least one switching contact is designed as a positively driven contact. Often two positively driven contacts are employed to increase safety using the principle of duplicated design (redundancy). This dual-channel design ensures that on the failure of one channel or on a fault in the control circuit (e. g. in the machine wiring), the interlocking can still be provided with the aid of the second channel.

Explanation of symbols and notation

Symbols and specific notation related to the switches or the switching contact are used time and again in the catalog.
The following example is intended to explain these aspects:

Notation
1 NC ⊖ + 1 NO

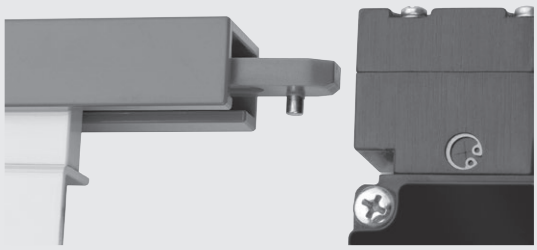
Explanation
Normally closed contacts are represented by NC, normally open contacts by NO. The number defines how many contacts are available. The symbol after the NC defines that the NC contact is a positively driven contact. This switch therefore has one normally closed contact and one normally open contact; the normally closed contact is a positively driven contact.

Auxiliary contacts

Door monitoring contact
In addition to the safety contacts, auxiliary contacts are also required to indicate to the control system that the safety guard is open. As these switching contacts do not have any safety function, either NC or NO contacts can be used.

Protection against tampering

A safety switch can only ensure that operation is free of hazards if it is not bypassed. To prevent tampering on switches with separate actuator, the actuator should be positively mounted on the safety guard. All actuating elements are supplied with safety screws that can be fastened using commonly available tools, but that can only be undone with extreme difficulty. It should be ensured that the screws cannot be undone with simple tools.
Increased protection against bypassing can be achieved by using a covered installation. In this way it can be made more difficult to insert replacement actuators, or this action can be prevented. Suitable for this purpose, for instance, are rear wall mounting or guiding the actuator in a C rail.
Switches with safety function can be installed covered so that the actuating element cannot be reached.



Guiding the actuator in a C rail

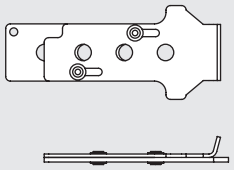
Protective plate

On the switches NZ.VZ, increased protection against bypassing can be achieved by using a protective plate over the switch head. The switch head's rearward opening is then rendered almost inaccessible.

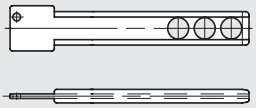
Safety switch with separate actuator with protective plate

Lockout bar

To prevent the unintentional closing of a safety guard, lockout bars are available for switches with separate actuator. The lockout bar is inserted in the safety switch instead of the actuator when the safety guard is open. The lockout bar can then be secured with commercially available padlocks (up to five locks) to protect against removal.



Lockout bar for three padlocks (here for NX/TX)



Lockout bar for three padlocks (here for NZ/TZ)

This feature guarantees protection for anyone (e.g. maintenance or service personnel, or cleaning staff) who needs to enter potentially hazardous areas. The switches cannot signal a safe (closed) state with a lockout bar fitted. As a result unintentional starting of the machine is not possible.

Guard locking

Safety switches with separate actuator are available both with and without guard locking. Guard locking is a feature that prevents the unintentional opening of a door as long as there is a hazard. The door is locked by preventing the removal of the actuator from the safety switch.
The series N1A, NB, NZ, NX, TX and STA listed in this catalog are safety switches with separate actuator with guard locking.

Safety switch NZ.VZ.VS

Safety switch TZ

Safety switch TX

Protection of personnel

Guard locking is required if a hazard cannot be removed immediately by shutting down a machine (e.g. a movement with overtravel). In this case fail-safe control of the locking solenoid for the guard locking is required. This requirement can, for instance, be achieved by a standstill monitor or a safe time-delay. The safety switch must also provide a facility for monitoring the position of the solenoid.
The series TZ, TX and STA feature the guard lock monitoring required for this function and can therefore be used for protection of personnel.

Process protection

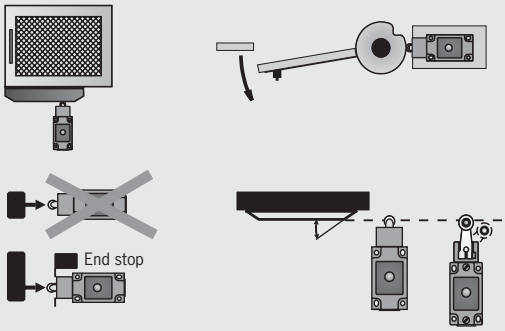
Often a safety guard is only to be locked to prevent interruption to the process due to unintentional opening of the safety guard. In this case the position of the guard locking solenoid does not need to be integrated in the safety circuit. In this situation the series NZ.VZ.VS, TZ, TX and STA safety switches are suitable.

Housing material

The series N1A, NB, NZ and TZ safety switches have a die-cast alloy housing with an anodized surface. Due to the durable housing material and the high degree of protection (up to IP 67), these switches can be used even under the harshest conditions. The degree of protection only applies to the space for the electrical wiring and not to the actuating head.

Attaching safety switches with safety function, with separate actuator and the actuators

Certain requirements must be met with respect to attaching the safety switches (e.g. EN 1088 Safety of machinery. Interlocking devices associated with guards. Principles for design and selection).
Any installation position can be used, however, the switches must be attached such that their position cannot be changed in operation. On the other hand, if necessary it must be possible to replace the switches at any time without renewed adjustment.
These requirements are achieved by using reliable fixings that can only be undone using tools. To prevent a change to the position, there must also be no movement in the joint (e.g. by using dowel pins).

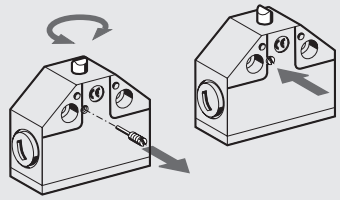


Attaching safety switches and actuators

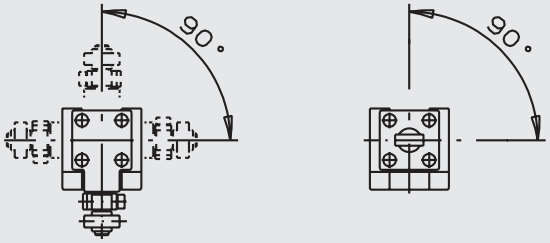
The same applies to the actuators for switches with separate actuator and trip dogs for switches with safety function. A joint without movement is also required here. Above all else, loosening must be prevented. In addition, it must be ensured that cams and trip dogs can only be mounted in the correct position.
To prevent tampering, safety screws can also be used for the attachment of safety switches and trip dogs.
Mounting plates are available to ease the attachment of switches with separate actuator and also actuators. Bolts attached to the safety door are extremely helpful. All requirements, e.g. the mechanical end stop for the door and the exact guidance of the actuator, are optimally met by using bolts.

Changing the approach direction

Often the actuator approach direction does not match the standard alignment of the actuating head as delivered. For this reason, the actuating heads on the safety switches NZ, TZ, NX, TX and STA can be very straightforwardly adjusted to the required direction.

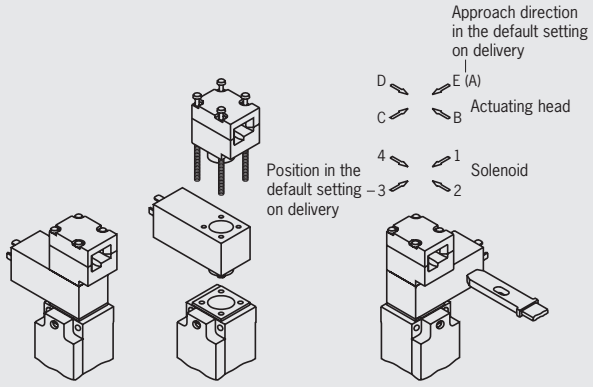


Changing the approach direction
single hole fixing limit switch N1A/NB01

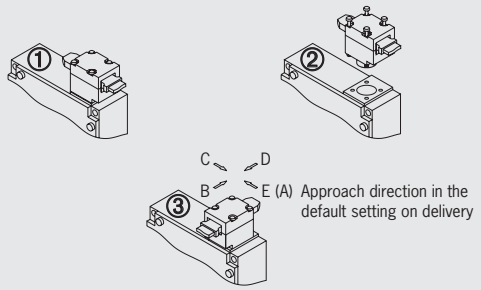


Lever arm Plunger

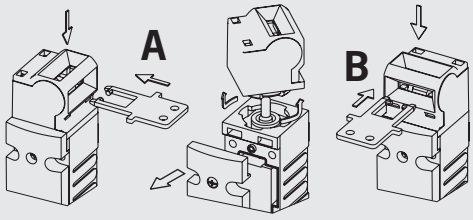
Changing the approach direction safety switch NZ (4 x 90°)



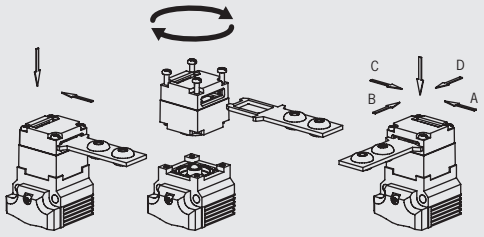
Changing the approach direction safety switch NZ.VZ.VS (4 x 90°)



Changing the approach direction safety switch TZ



Changing the approach direction safety switch NX/TX



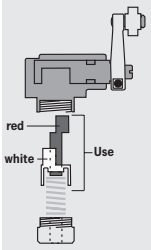
Changing the approach direction safety switch STA

After undoing the four fastening screws, the actuating head can be rotated in 90° steps. If for reasons of protection against tampering, renewed removal of the actuating head is to be prevented, the actuating head can be fastened to the basic housing using safety screws. You will find appropriate fixings in the accessories section of this catalog.

Changing the switching direction

In addition, the actuating direction can be adjusted such that the actuator only switches in one direction.

Position Use	Actuation / Active	Left	Not activated	Right	
white / red	Both sides left + right				
red / white	State				
	Pos.driven contacts	⊖	closed	⊖	
	NO contacts	closed	open	closed	
white / red	One side left				
	State				
	Pos.driven contacts	closed	closed	⊖	
	NO contacts	open	open	closed	
red / white	One side right				
	State				
	Pos.driven contacts	⊖	closed	closed	
	NO contacts	closed	open	open	

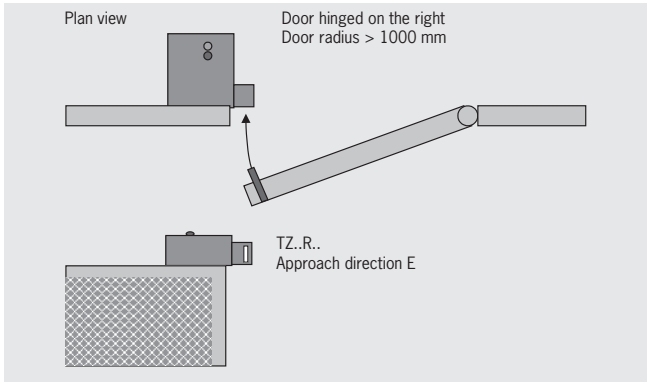


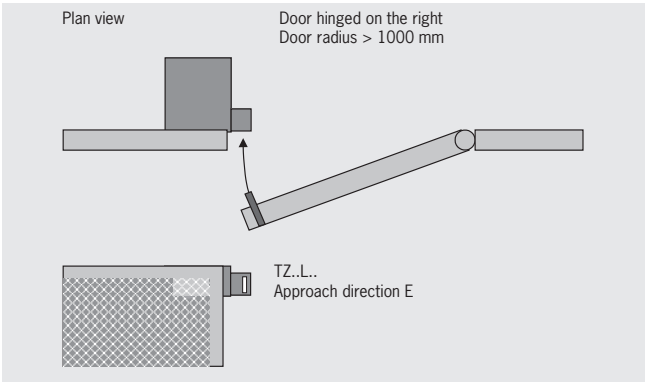
Changing the switching direction position switch NZ.H...

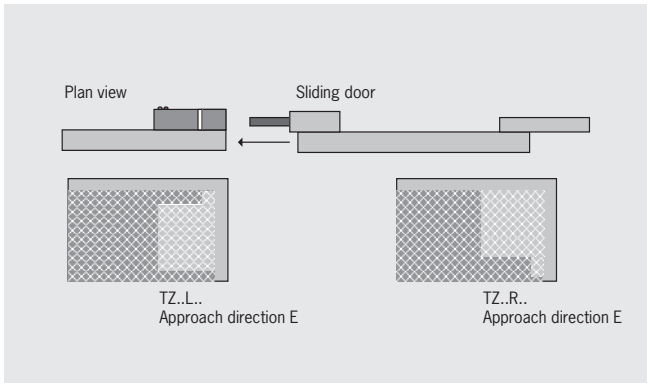
Attaching the safety switch TZ with actuating head fitted on left or right

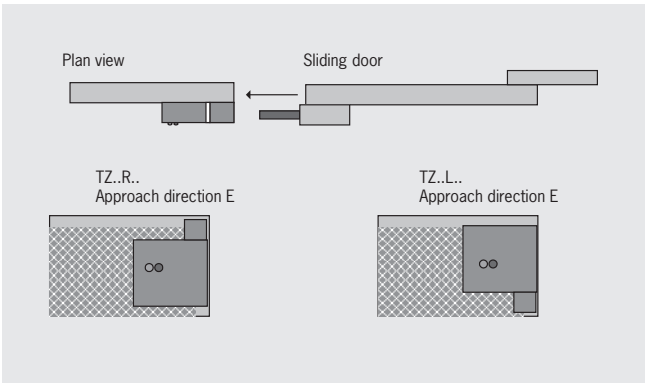
The safety switch TZ can be mounted in a large number of different installation positions. Often the switch is mounted horizontally on the roof of a machine or with a suspended actuating head. The method of attachment depends on whether the switch is to be attached in a protected installation position, for instance to make tampering more difficult, or whether the switch is to be mounted so that it is easily accessible as the escape release must be within reach from inside the system.

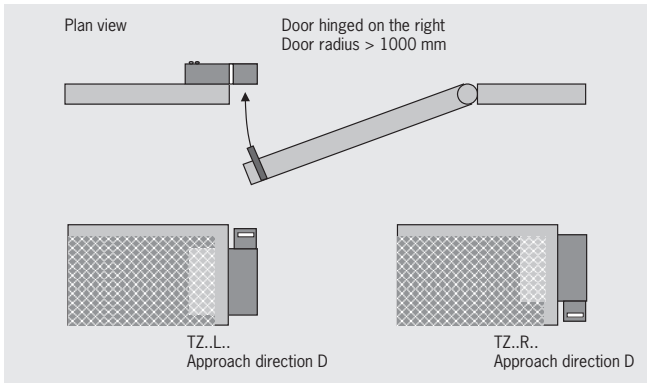
The drawings show that the attachment of the actuating head is very heavily dependent on how the switch is mounted. It is not possible to list all methods of attachment here, as the actuator head can be rotated in 90° steps. As a result there are a very large number of different methods of attachment. There is a suitable way of mounting the switch for every application.

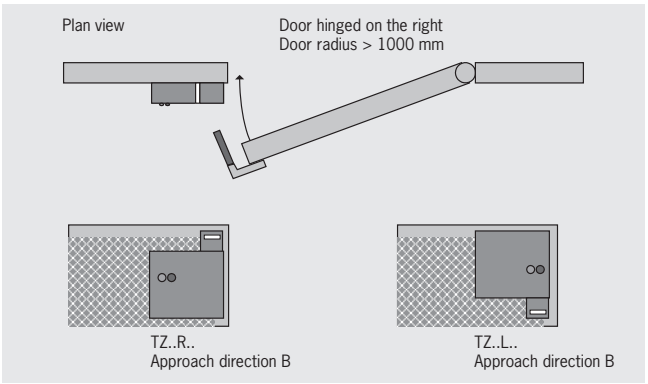


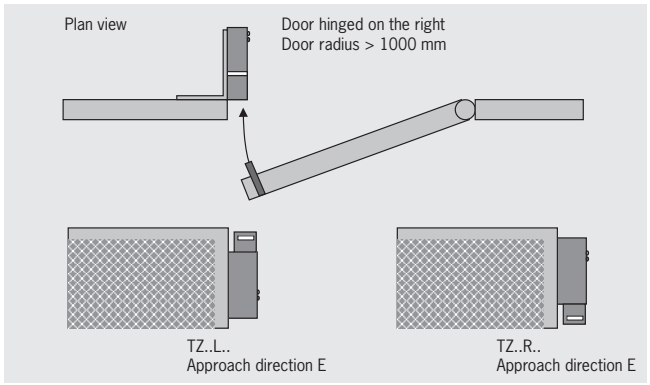


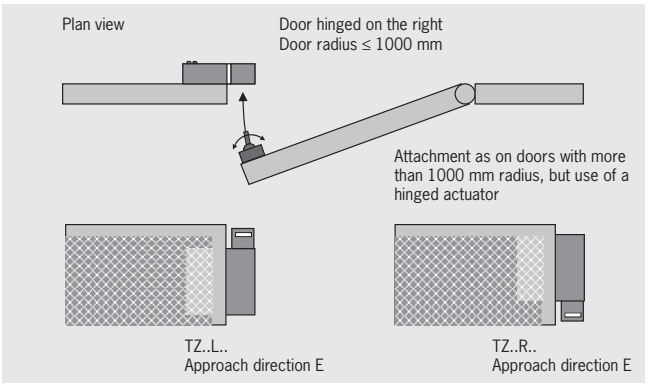












Electrical connection

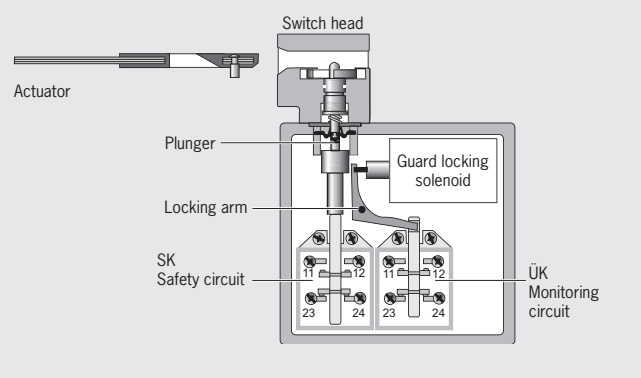
On switches with cable entry there is a large space envelope for making the electrical connection.
Modern wiring concepts increasingly utilize plug-in connections. A switch with plug connectors can be easily replaced during servicing work. This configuration results in short downtimes.
The safety switches NZ and TZ are available with various plug connectors. In addition to the appropriate mating connectors, these connectors are available with pre-assembled cables as accessories.

Switch layout for design TZ

▸ Locking arm
The locking arm ensures that the switch is guard locked by the solenoid. It acts directly on the switching element ÜK; the positively driven contact can only be closed in the locked state (see ▸*Protection against unintentional closing*).

▸ SK
The position of the SK switching element is dependent on the position of the actuator or the safety guard. This situation means that the positively driven contacts on the SK switching element are only closed if the actuator is in the switch head.

▸ ÜK
The position of the ÜK switching element is dependent on the position of the actuator or the safety guard and the position of the solenoid or the guard locking. I.e., both guard locking and positively driven contact on the ÜK switching element can only be closed if the actuator is in the switch head and the guard locking solenoid is controlled correspondingly.



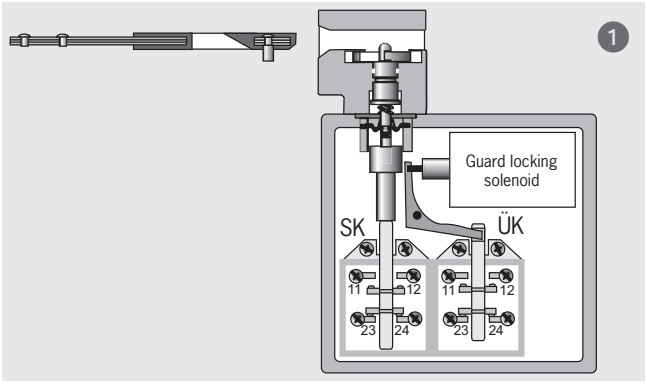
LED indicator TZ

As standard the TZ series is equipped with a red and a green LED. Depending on the switch design, the assignment is pre-wired or can be chosen as required (see also Page 169).

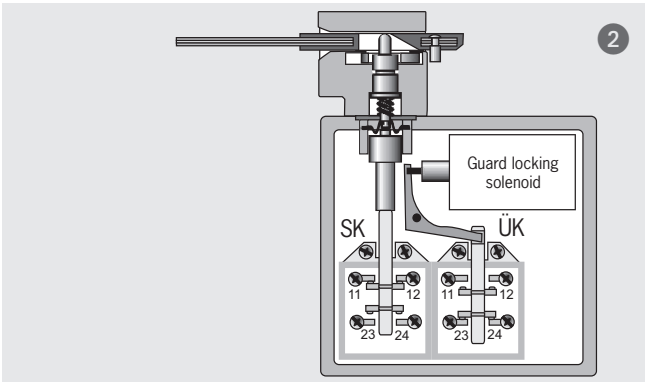
Principle of operation of TZ

The sectional drawings show the safety switch TZ in its three switch states:

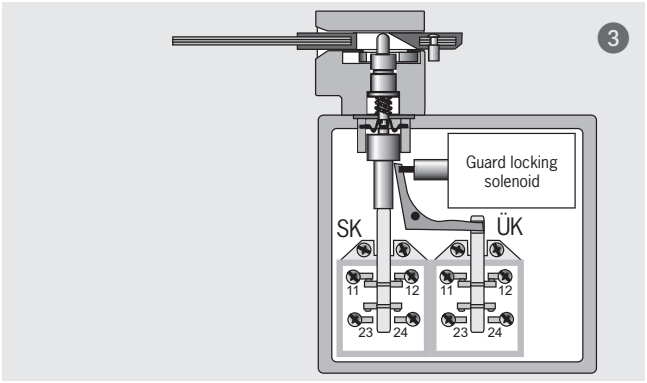
1 Door open and not locked
In the initial state (actuator removed/safety guard open) all positively driven contacts (SK and ÜK) are open. The related NO contacts 23-24 are closed and signal the state *open and unlocked*. Unintentional closing of the contacts on switching element ÜK is impossible due to the switch mechanism (see ▸*Protection against unintentional closing*).



2 Door closed and not locked
The plunger is released by inserting the actuator into the switch head. The contacts 11-12 on switching element SK are closed, the contacts 23-24 are opened. The contacts 11-12 on the switching element ÜK remain open as before, the door auxiliary contacts 23-24 for switching element ÜK remain closed.



3 Door closed and locked
After the actuator has been inserted, it is possible to activate the switch's guard locking. If the guard locking solenoid is activated, the locking arm locks the plunger and actuates the switching element ÜK. The contacts 11-12 are closed on this switching element. The contacts 11-12 on the switching element SK continue to remain closed. In this position the positively driven contacts 11-12 on the two switching elements SK and ÜK are safely locked, both door auxiliary contacts 23-24 are opened. The actuator and the safety guard are locked. This means that the machine connected to the safety circuit can be started.



LED indicator TX

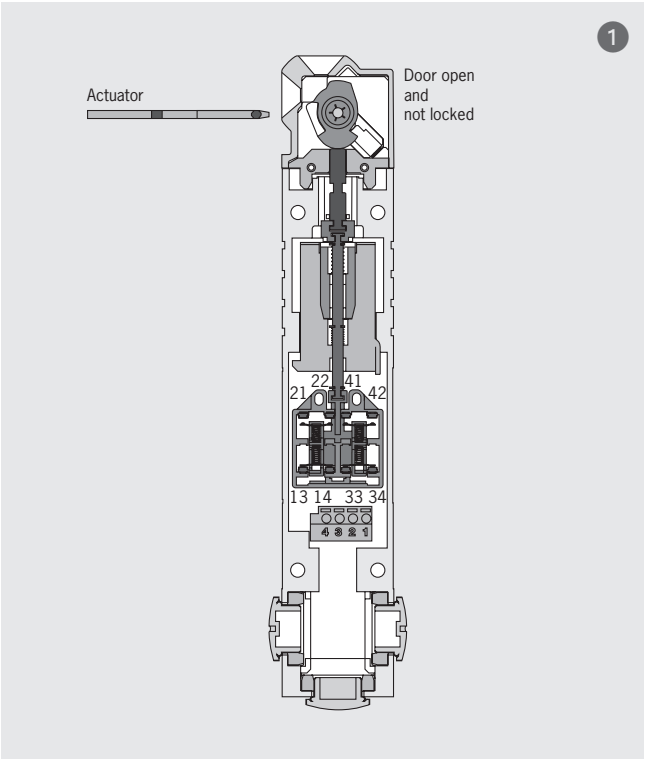
As standard the TX series is equipped with a red and a green LED. Depending on the switch design, the assignment is pre-wired or can be chosen as required.

Principle of operation of TX/STA

The sectional drawings show the safety switch TX in its three switch states. The same principle of operation applies to the STA.

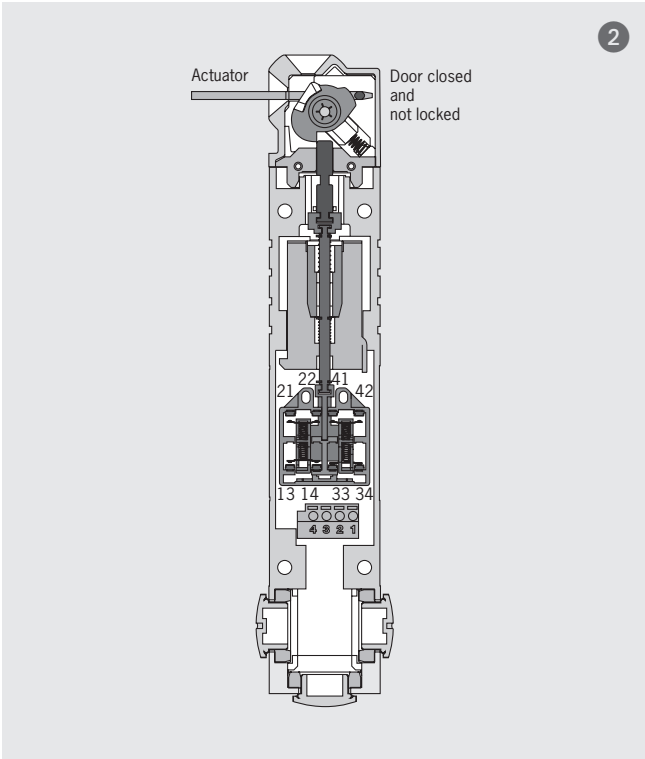
1 Door open and not locked

In the initial state (actuator removed/safety guard open) all positively driven contacts (here: 21-22 and 41-42) are open. The NO contact 13-14 is closed and signals the condition *Door open*. The NO contact 33-34 is also closed and signals the condition *Not locked*. Unintentional closing of the contacts 21-22 and 41-42 is impossible due to the switch mechanism (see ➧*Protection against unintentional closing*).



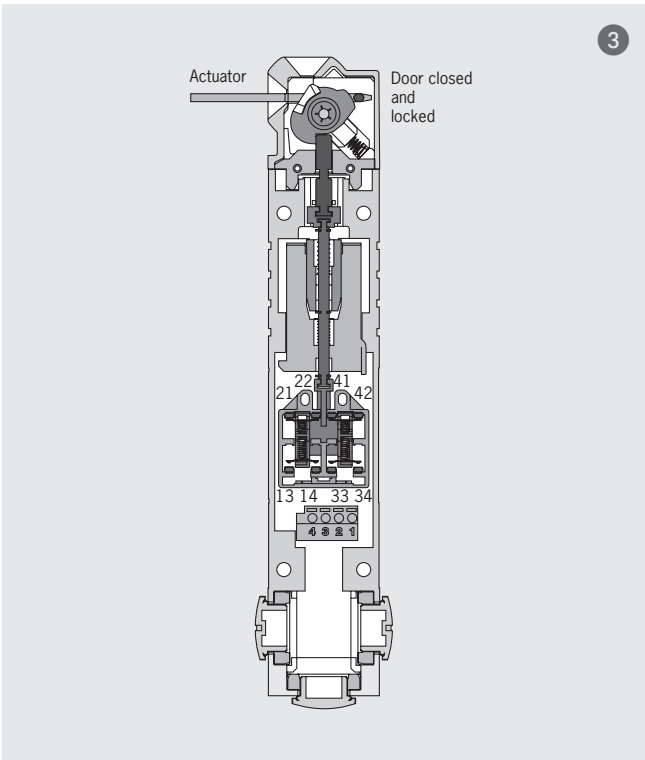
2 Door closed and not locked

The plunger is released by inserting the actuator into the switch head. The NO contact 13-14 is now open and signals the condition *Door closed*. The NO contact 33-34 remains closed and signals the condition *Not locked*. The positively driven contacts 21-22 and 41-42 remain open as before.



3 Door closed and locked

After the actuator has been inserted, it is possible to activate the switch's guard locking. When the guard locking solenoid is activated, NO contact 33-34 is opened and signals the condition *Locked*. The NO contact 13-14 signals as before the condition *Door closed*. The positively driven contacts 21-22 and 41-42 were closed when the guard locking solenoid was activated. The actuator and the safety guard are locked. This means that the machine connected to the safety circuit can be started.



Protection against unintentional closing

The design feature of a guard locking which ensures that the locking mechanism (solenoid plunger) cannot go into the locking position if the safety guard is open is also referred to in BGI 575 as *Protection against unintentional closing*.

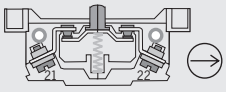
Switching elements

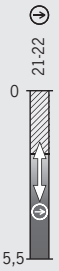
The switching elements used in our safety switches have a dedicated numbering system. A selection of switching elements is available depending on the switch type. In the following overview you can see which switching element is covered by the related number.
Some switching elements are marked with an *H* (e. g. 528H). The switching elements have an H-shaped contact bridge. They have a lower contact resistance and can therefore also safely switch small currents from 1 mA.

Please note: safety switching elements are not available as replacement switching elements.

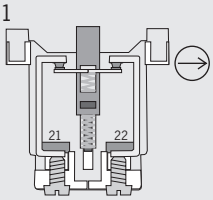
Switching elements with 1 switching contact

Switching element 508
- Slow-action switching contact
- 1 positively driven contact
- for series N1A



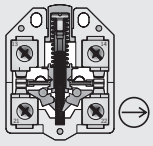


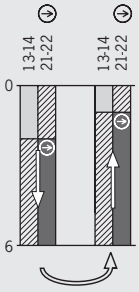
Switching element 588
- Slow-action switching contact
- 1 positively driven contact
- for series NB01



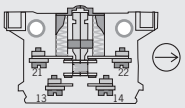
Switching elements with 2 contacts

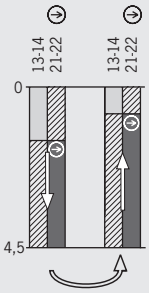
Switching element 511
- Snap-action switching element
- 1 positively driven contact + 1 NO contact
- for series NZ



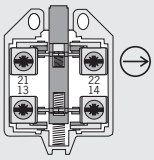


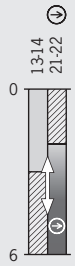
Switching element 514
- Snap-action switching element
- 1 positively driven contact + 1 NO contact
- for series N1A



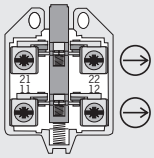


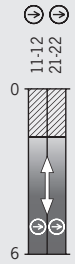
Switching element 528H
- Slow-action switching element
- 1 positively driven contacts + 1 NO cont.
- for series NZ / TZ





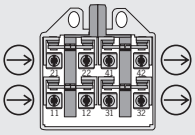
Switching element 538H
- Slow-action switching element
- 2 positively driven contacts
- for series NZ / TZ

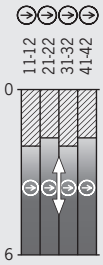




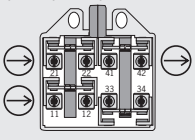
Switching elements with 4 contacts

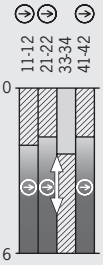
Switching element 2121H
- Slow-action switching element
- 4 positively driven contacts
- for series NZ / TZ / NX





Switching element 2131H
- Slow-action switching element
- 3 positively driven contacts + 1 NO cont. (door monitoring contact on STA)
- for series NZ / TZ / NX / STA

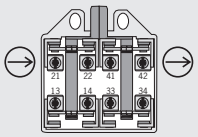


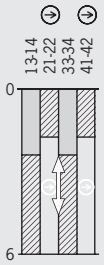


Contact
- closed
- open
- positively opened

Switching element 3131H

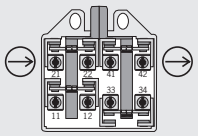
- Slow-action switching element
- 2 positively driven contacts + 2 NO cont.
- for series NZ / TZ / NX

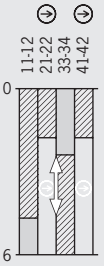




Switching element 4121

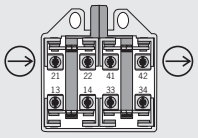
- Slow-action switching element
- 2 positively driven contacts + 1 NO cont. + 1 NC contact (door monitoring cont.)
- for series TX

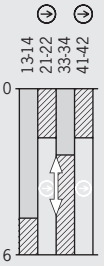




Switching element 4131 (without door monitoring contact)

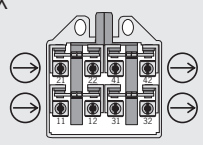
- Slow-action switching element
- 2 positively driven contacts + 1 NO cont. + 1 NO contact
- for series TX

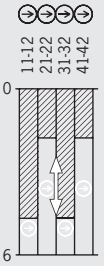




Switching element 4141

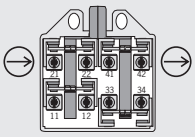
- Slow-action switching element
- 2 positively driven contacts + 2 positively driven contacts (door monitoring contacts)
- for series TX

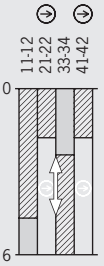




Switching element ETX B

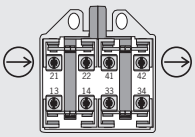
- Slow-action switching element
- 2 positively driven contacts + 1 NO cont. + 1 NC contact (door monitoring cont.
- for series TX

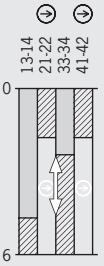




Switching element ETX C

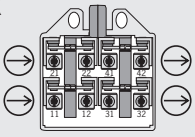
- Slow-action switching element
- 2 positively driven contacts + 1 NO cont. + 1 NO contact (door monitoring cont.)
- for series TX

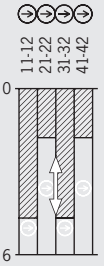




Switching element ETX D

- Slow-action switching element
- 2 positively driven contacts +
- 2 positively driven contacts (door monitoring contacts)
- for series TX





Contact

- closed
- open
- positively opened

Selection table for single hole fixing limit switches N1A and NB01

Actuating element

N1AD	Chisel plunger
N1AR/N1AB	Roller plunger with steel roller ∅ 8 mm
N1ARL	Roller plunger with steel roller ∅ 18 mm
N1AW	Domed plunger
NB01D	Chisel plunger
NB01R	Roller plunger with steel roller ∅ 5 mm

Connection

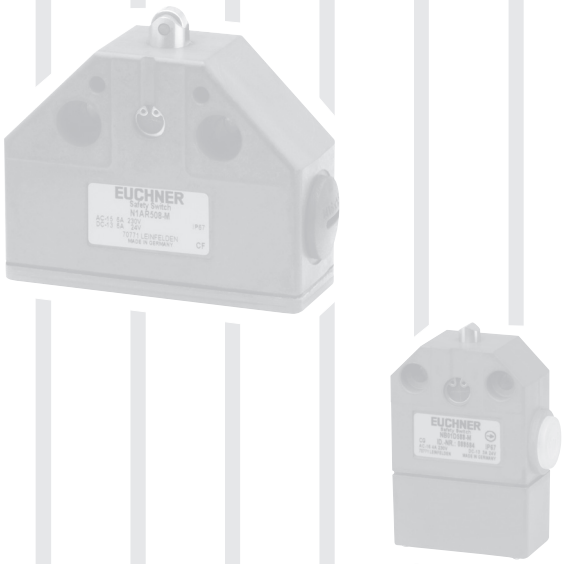
M	Thread M16x1.5 or M12x1.5 for cable glands
SVM5	M12 plug connector 5-pin, male socket adjustable (270°) for elbow connector

Exterior diaphragm

AM	Protection against heavy soiling (dust) and aggressive coolants.

Switching element

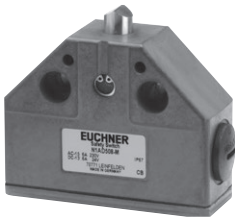
One contact	1 NC ⊖
Two contacts	1 NC ⊖ + 1 NO



Actuating element						Connection		Dia-phragm AM	Switching element		with version	Page
N1AD	N1AR N1AB	N1ARL	N1AW	NB01D	NB01R	M	SVM5		One contact	Two contacts		
●						●			●	●	C2222	16
●						●		●	●	●		17
●							●			●		17
	●					●			●	●	C2222	18
	●					●		●	●	●		19
	●						●			●		19
		●				●			●	●		20
			●			●	●		●	●	C2222	21
				●		●			●			22
					●	●			●			22

Single hole fixing limit switch N1AD with chisel plunger

- **Housing according to DIN 43693**
- **LED optional**
- **Plug connector optional**
- **Exterior diaphragm optional**
- **Low temperature down to -40 °C optional**



Approach direction

Horizontal
Adjustable in 90° steps.

Exterior diaphragm (optional)
Protection against heavy soiling (dust) and aggressive coolants.

Low temperature
Version C2222 with silicone membrane and low temperature grease.

LED function display (optional)
A function display is available for the following voltage ranges:

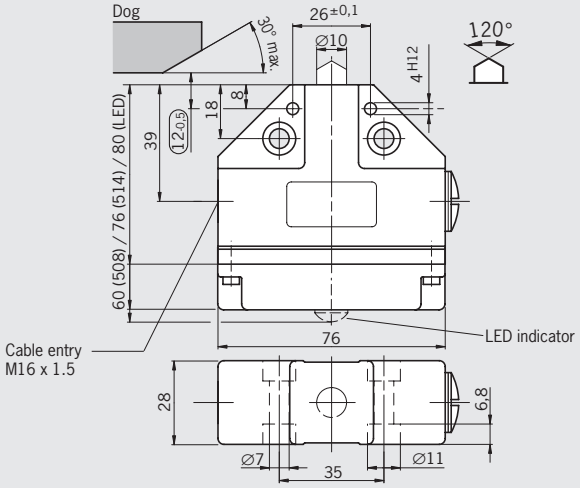
- AC/DC 12-60 V ±15% red
- AC 110 V ±15% red
- AC 230 V ±15% red

Switching elements (See also page 13)

- **514** Snap-action switching contact
  1 NC ⊖ + 1 NO
- **508** Slow-action switching contact
  1 NC ⊖

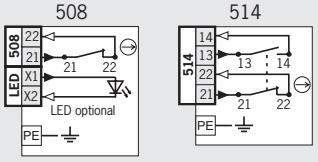
Cable entry M16 x 1.5

Dimension drawings



Cable gland
see page 124

Wiring diagrams



Ordering table

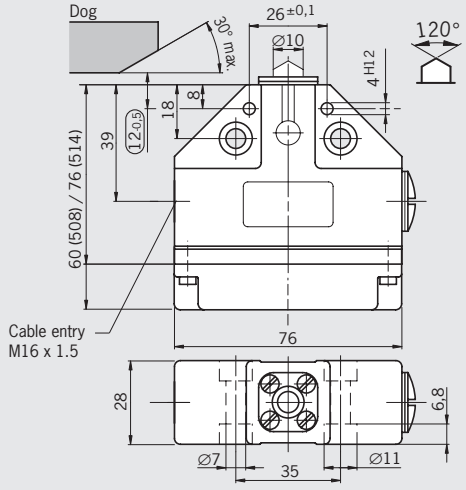
Series	Actuator	Connection	Switching element	Version	Function display			
					Without LED	12-60 V red LED	110 V red LED	230 V red LED
N1A	D Chisel plunger	Cable entry **M16 x 1.5**	**508** 1 NC ⊖		**083886** N1AD508-M	**087218** N1AD508LE060-M	**087221** N1AD508LE110-M	**087224** N1AD508LE220-M
				C2222 Low temperature	**103237** N1AD508-MC2222	-	-	-
			514 1 NC ⊖ + 1 NO		**083849** N1AD514-M	-	-	-

1) Approval pending

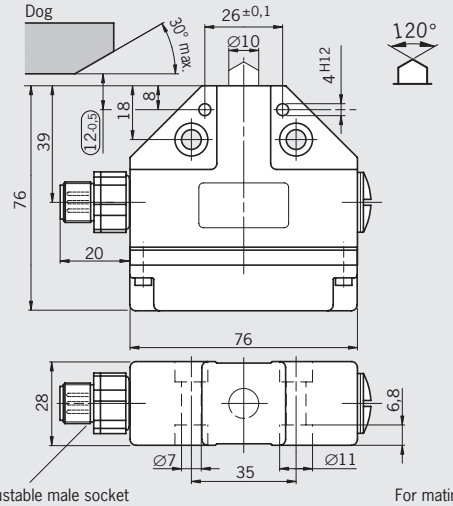
Cable entry M16 x 1.5
Exterior diaphragm

Plug connector SVM5
M12 plug, 5-pin

Dimension drawings



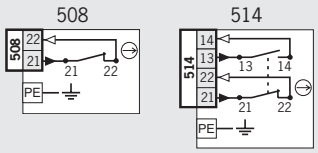
Cable gland
see page 124

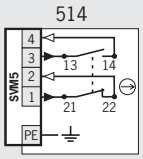


Adjustable male socket
(max. 270°)

For mating connector
see page 124

Wiring diagrams





Ordering table

Series	Actuator	Connection	Switching element	Version	Function display Without LED
N1A	D Chisel plunger	Cable entry **M16 x 1.5**	**508** 1 NC ⊖	Exterior diaphragm	**090546** N1AD508AM-M
			514 1 NC ⊖ + 1 NO	Exterior diaphragm	**091261** N1AD514AM-M
		Plug connector **SVM5** (M12 plug)	**514** 1 NC ⊖ + 1 NO		**087603** N1AD514SVM5-M

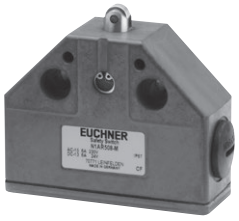
1) Approval pending

For safety precautions see page 187
For technical data see page 153

Single hole fixing limit switch N1AR/N1AB with roller plunger

1)

- **Housing according to DIN 43693**
- **Steel roller ∅ 8 mm**
- **LED optional**
- **Plug connector optional**
- **Exterior diaphragm optional**
- **Bearing optional**
- **Low temperature down to -40 °C optional**



Approach direction

Horizontal
Adjustable in 90° steps.

Exterior diaphragm (optional)
Protection against heavy soiling (dust) and aggressive coolants.

Low temperature
Version C2222 with silicone membrane and low temperature grease.

Ball bearing
For high approach speeds and long travel distances.

LED function display (optional)
A function display is available for the following voltage ranges:

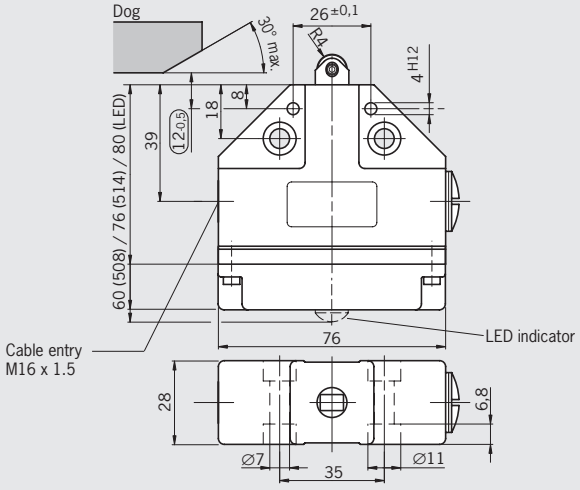
- AC/DC 12-60 V red
- AC 110 V ±15% red
- AC 230 V ±15% red

Switching elements (See also page 13)

- **514** Snap-action switching contact 1 NC ⊖ + 1 NO
- **508** Slow-action switching contact 1 NC ⊖

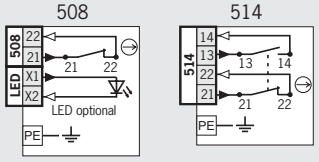
Cable entry M16 x 1.5

Dimension drawings



Cable gland
see page 124

Wiring diagrams



Ordering table

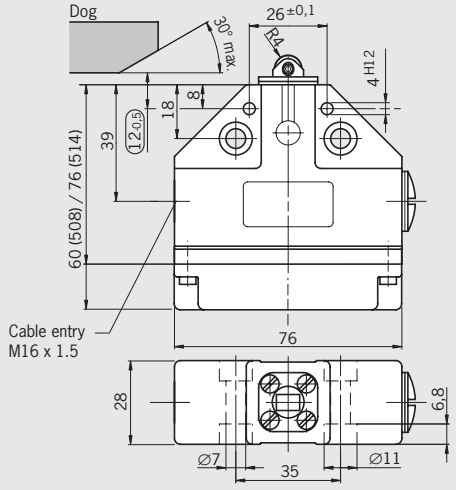
Series	Actuator	Connection	Switching element	Version	Function display			
					Without LED	12-60 V red LED	110 V red LED	230 V red LED
N1A	**R** Roller plunger ∅ 8 mm	Cable entry **M16 x 1.5**	**508** 1 NC ⊖	Slide bearing	**083887** N1AR508-M	**087219** N1AR508LE060-M	**087222** N1AR508LE110-M	**087225** N1AR508LE220-M
				C2222 Low temperature	**103221** N1AR508-MC2222	-	-	-
			514 1 NC ⊖ + 1 NO	Slide bearing	**078487** N1AR514-M	On request	On request	On request
	B Roller plunger ∅ 8 mm	Cable entry **M16 x 1.5**	**508** 1 NC ⊖	Ball bearing	**087245** N1AB508-M	-	-	-
			514 1 NC ⊖ + 1 NO	Ball bearing	**087247** N1AB514-M	-	-	-

1) Approval pending

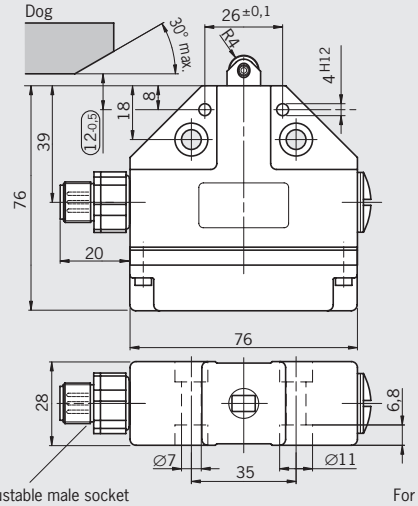
Cable entry M16 x 1.5
Exterior diaphragm

Plug connector SVM5
M12 plug, 5-pin

Dimension drawings



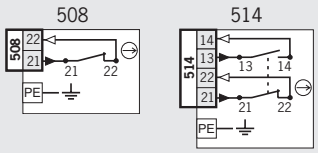
Cable gland
see page 124

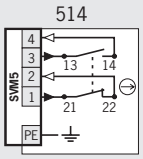


Adjustable male socket
(max. 270°)

For mating connector
see page 124

Wiring diagrams





Ordering table

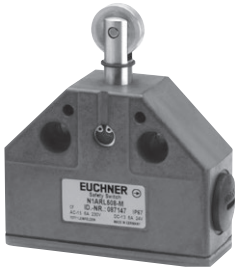
Series	Actuator	Connection	Switching element	Version	Function display Without LED
N1A	R Roller plunger Ø 8 mm	Cable entry **M16 x 1.5**	**508** 1 NC ⊖	Exterior diaphragm	**090547** N1AR508AM-M
			514 1 NC ⊖ + 1 NO	Exterior diaphragm	**087158** N1AR514AM-M
		Plug connector **SVM5** (M12 plug)	**514** 1 NC ⊖ + 1 NO		**087604** N1AR514SVM5-M

1) Approval pending

For safety precautions see page 187
For technical data see page 153

Single hole fixing limit switch N1ARL with extended roller plunger

- **Housing according to DIN 43693**
- **Steel roller ∅ 18 mm**



Approach direction

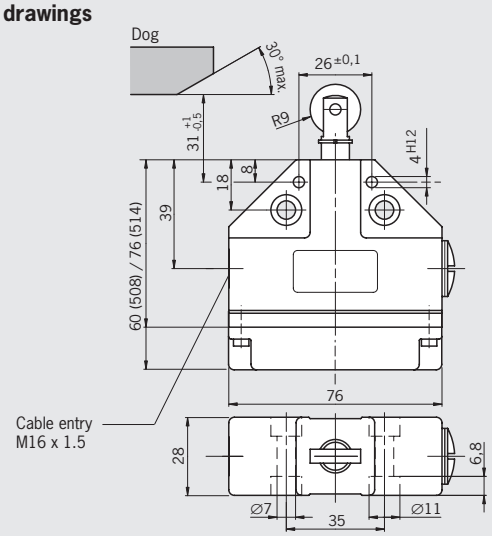
Horizontal
Adjustable in 90° steps.

Switching elements (See also page 13)

- **514** Snap-action switching contact 1 NC ⊖ + 1 NO
- **508** Slow-action switching contact 1 NC ⊖

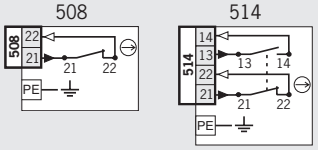
Cable entry M16 x 1.5

Dimension drawings



Cable gland
see page 124

Wiring diagrams



Ordering table

Series	Actuator	Connection	Switching element	Function display
				Without LED
N1A	**RL** Roller plunger ∅ 18 mm	Cable entry **M16 x 1.5**	**508** 1 NC ⊖	**087147** N1ARL508-M
			514 1 NC ⊖ + 1 NO	**087204** N1ARL514-M

1) Approval pending

Single hole fixing limit switch N1AW with domed plunger

- **Housing according to DIN 43693**
- **LED optional**
- **Plug connector optional**
- **Low temperature down to -40 °C optional**

Approach direction

Horizontal and vertical

Low temperature

Version C2222 with silicone membrane and low temperature grease.

LED function display (optional)

A function display is available for the following voltage ranges:

- AC/DC 12-60 V red
- AC 110 V ±15% red
- AC 230 V ±15% red

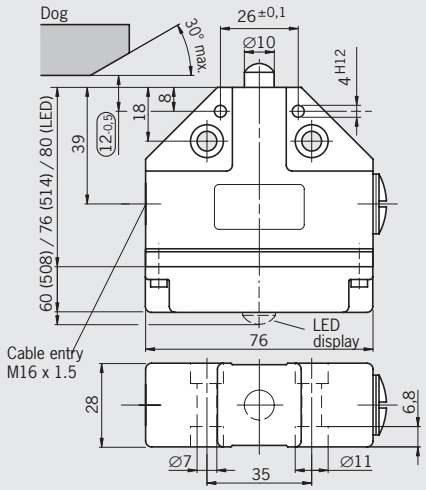
Switching elements (See also page 13)

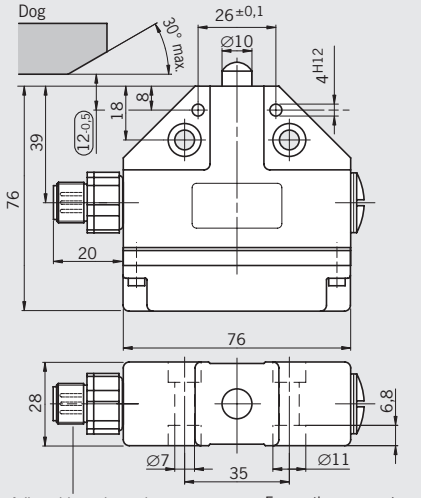
- **514** Snap-action switching contact 1 NC ⊖ + 1 NO
- **508** Slow-action switching contact 1 NC ⊖

Cable entry M16 x 1.5

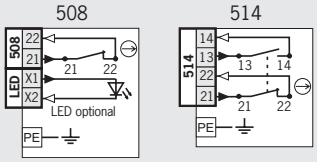
Plug connector SVM5
M12 plug, 5-pin

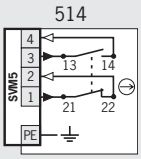
Dimension drawings





Wiring diagrams





Ordering table

Series	Actuator	Connection	Switching element	Version	Function display			
					Without LED	12-60 V red LED	110 V red LED	230 V red LED
N1A	W Domed plunger	Cable entry **M16 x 1.5**	**508** 1 NC ⊖		**087205** N1AW508-M	**087220** N1AW508LE060-M	**087223** N1AW508LE110-M	**087226** N1AW508LE220-M
				C2222 Low temperature	**103222** N1AW508-MC2222	-	-	-
			514 1 NC ⊖ + 1 NO		**083850** N1AW514-M	-	-	-
		Plug connector **SVM5** (M12 plug)	**514** 1 NC ⊖ + 1 NO		**090743** N1AW514SVM5-M	-	-	-

1) Approval pending

For safety precautions see page 187
For technical data see page 153

Single hole fixing limit switch NB01

- **With chisel plunger**
- **With roller plunger, steel roller ∅ 5 mm**

Approach direction

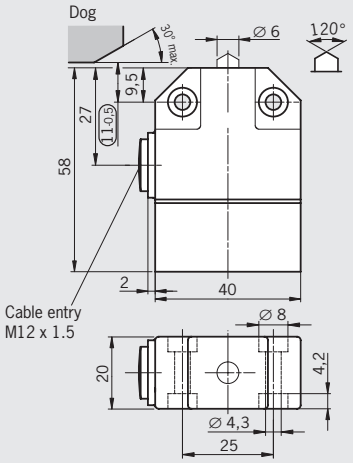
Horizontal
Adjustable in 90° steps.

Switching elements (See also page 13)

- **588** Slow-action switching contact 1 NC ⊖

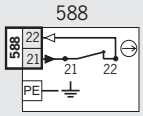
Cable entry M12 x 1.5
Chisel plunger

Dimension drawings

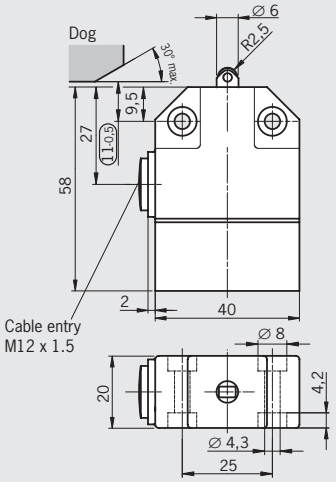


Cable gland
see page 124

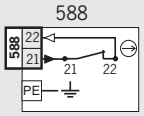
Wiring diagrams



Cable entry M12 x 1.5
Roller plunger



Cable gland
see page 124



Ordering table

Series	Actuator	Connection	Switching element	Function display
				Without LED
NB01	**D** Chisel plunger	Cable entry **M12 x 1.5**	**588** 1 NC ⊖	**088584** NB01D588-M
	R Roller plunger ∅ 5 mm	Cable entry **M12 x 1.5**	**588** 1 NC ⊖	**088583** NB01R588-M

1) Approval pending

Selection table for safety switches NZ

Actuating element

WO	Domed plunger
RK	Roller plunger with steel roller ∅ 8 mm
RS	Roller plunger with steel roller ∅ 12 mm
RG	Roller plunger with plastic roller ∅ 12 mm
RL	Extended roller plunger with steel roller ∅ 18 mm
HS	Lever arm with steel roller ∅ 18 mm; 19 mm for grooved ball bearing (C1833)
HB	Lever arm with plastic roller ∅ 18 mm; 30 mm (version C569); roller on inside of lever (C1779)
PS	Adjustable lever arm with steel roller ∅ 18 mm
PB	Adjustable lever arm with plastic roller ∅ 18 mm

Connection

M	Thread M20x1.5 for cable glands
SVM5	M12 plug connector 5-pin, male socket adjustable (270°) for elbow connector
SR6	Plug connector 6-pin + PE
MR8	Plug connector 7-pin + PE
MR9	Plug connector 8-pin + PE
MR10	Plug connector 9-pin + PE
SR11	Plug connector 11-pin + PE

Switching element

Two contacts	1 NC ⊖ + 1 NO or 2 NC ⊖
Four contacts	2 NC ⊖ + 2 NO, 3 NC ⊖ + 1 NO or 4 NC ⊖

Actuating element									Connection							Switching element		With version	Page
WO	RK	RS	RG	RL	HS	HB	PS	PB	M	SVM5	SR6	MR8	MR9	MR10	SR11	Two contacts	Four contacts		
●									●	●						●	●		24
●											●					●		C1630/C1631	25
●															●		●		25
	●								●	●						●	●	C1912	26
	●										●				●	●	●		27
		●							●							●		C1588	43
		●							●	●						●	●		28
		●									●					●		C1630/C1631	29
		●											●		●		●		29
			●						●	●						●	●		30
			●								●					●		C1631	31
			●												●		●		31
				●					●	●						●	●		32
				●							●					●			33
				●											●		●	C1831	33
					●				●	●						●	●		34
					●						●					●		C1630	35
					●										●		●		35
					●							●	●	●			●		36
					●				●								●	C1779	45
					●				●							●		C1833	46
						●			●							●		C569	44
						●			●	●						●	●		37
						●					●					●		C1630/C1631	38
						●									●		●		38
						●							●	●			●		39
							●		●							●	●		40
							●				●					●			41
							●								●		●		41
								●	●							●	●		42

Safety switch NZ.WO with domed plunger

- **Version B according to EN 50041** (Hardened)
- **LED optional**
- **Plug connector optional**

Approach direction

Horizontal and vertical

LED function display (optional)
A function display is available for the following voltage ranges:

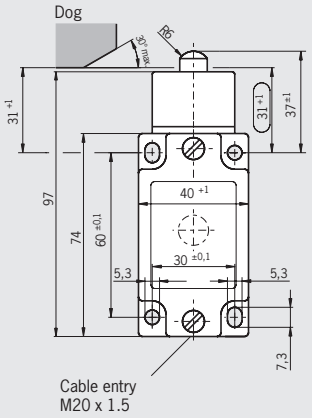
- AC/DC 12-60 V red or yellow
- AC 110 V ±15% red

Switching elements (See also page 13/14)

- **511** Snap-action switching contact 1 NC ⊖ + 1 NO
- **528H** Slow-action switching contact 1 NC ⊖ + 1 NO
- **538H** Slow-action switching contact 2 NC ⊖
- **2121H** Slow-action switching contact 4 NC ⊖
- **2131H** Slow-action switching contact 3 NC ⊖ + 1 NO
- **3131H** Slow-action switching contact 2 NC ⊖ + 2 NO

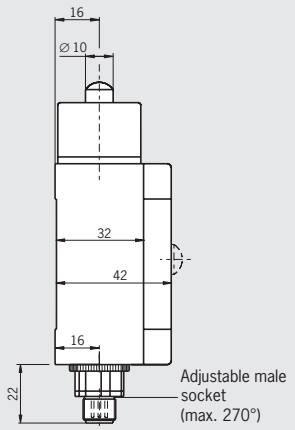
Cable entry M20 x 1.5

Dimension drawings



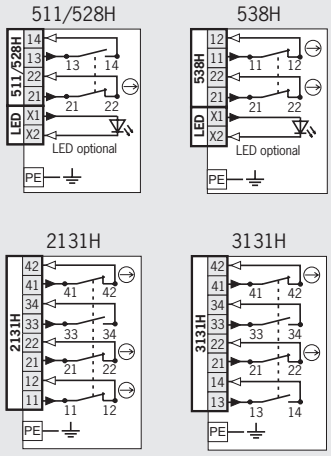
Cable gland see page 124

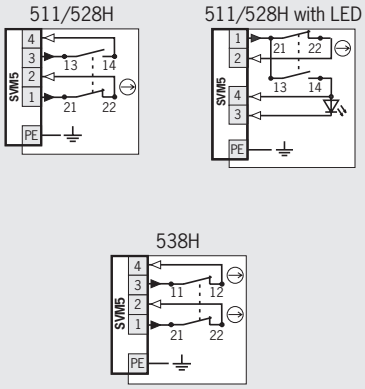
Plug connector SVM5
M12 plug, 5-pin



For mating connector see page 124

Wiring diagrams Switch not activated





Ordering table

Series	Actuator	Connection	Switching element	Function display: Without LED	12-60 V red LED	110 V red LED	12-60 V yellow LED
NZ	WO Domed plunger	1 Cable entry **M20 x 1.5**	**511** [1] 1 NC ⊖ + 1 NO	**088611** [1] NZ1WO-511-M	**089057** [1] NZ1WO-511L060-M	**089059** [1] NZ1WO-511L110-M	**089058** [1] NZ1WO-511L060GE-M
			528H 1 NC ⊖ + 1 NO	**089624** NZ1WO-528-M	**089078** NZ1WO-528L060-M	On request	On request
			538H 2 NC ⊖	**090878** NZ1WO-538-M	**089076** NZ1WO-538L060-M	On request	On request
			2131H 3 NC ⊖ + 1 NO	**089629** NZ1WO-2131-M	-	-	-
			3131H 2 NC ⊖ + 2 NO	**089626** NZ1WO-3131-M	-	-	-
		2 Plug connector **SVM5** (M12 plug)	**511** [1] 1 NC ⊖ + 1 NO	**089014** [1] NZ2WO-511SVM5	On request	-	**098652** [1] NZ2WO-511SVM5L060GE
			528H 1 NC ⊖ + 1 NO	**090923** NZ2WO-528SVM5	On request	-	On request
			538H 2 NC ⊖	**090924** NZ2WO-538SVM5	On request	-	On request

1) No DGUV approval for switching element 511

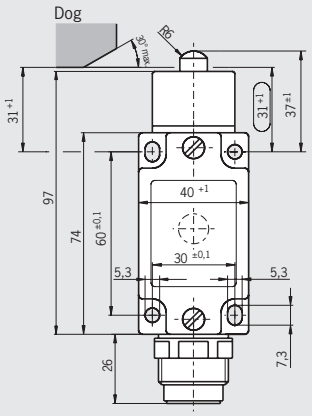
1)

Plug connector SR6
6-pin + PE

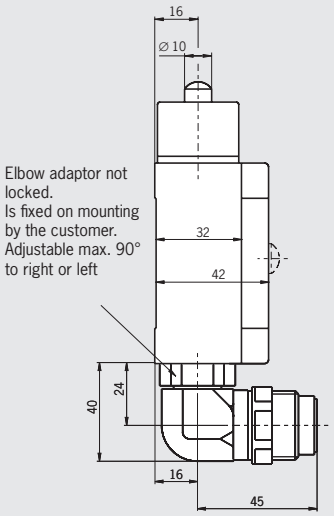
Plug connector SR6 angled
6-pin + PE

Plug connector SR11
11-pin + PE

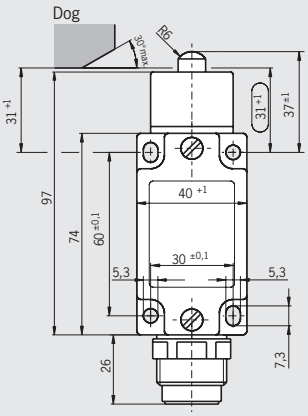
Dimension drawings



For mating connector see page 120



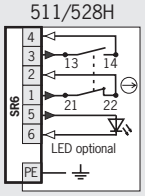
For mating connector see page 120



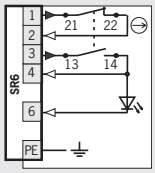
For mating connector see page 120

Wiring diagrams Switch not activated

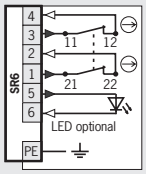
511/528H



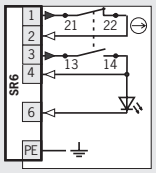
511...C1630



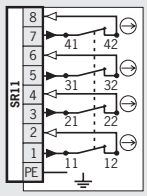
538H



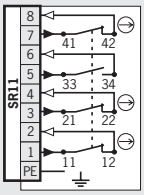
511...C1631



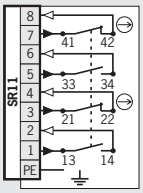
2121H



2131H



3131H



Ordering table

Series	Actuator	Connection	Switching element	Version	Function display: Without LED	Function display: 12-60 V red LED	Function display: 12-60 V yellow LED
NZ	WO Domed plunger	2 Plug connector SR6	511 [1] 1 NC ⊖ + 1 NO		090909 [1] NZ2WO-511	091280 [1] NZ2WO-511L060	On request
			511 [1] 1 NC ⊖ + 1 NO	C1630 Alternative wiring	On request	On request	059481 [1] NZ2WO-511L060C1630
			528H 1 NC ⊖ + 1 NO		090910 NZ2WO-528	091279 NZ2WO-528L060	On request
			538H 2 NC ⊖		090911 NZ2WO-538	087558 NZ2WO-538L060	On request
		2 Plug connector SR6 Angled	511 [1] 1 NC ⊖ + 1 NO	C1631 Alternative wiring	On request	On request	059482 [1] NZ2WO-511L060C1631
		2 Plug connector SR11	2121H 4 NC ⊖		090976 NZ2WO-2121	-	-
			2131H 3 NC ⊖ + 1 NO		090912 NZ2WO-2131	-	-
			3131H 2 NC ⊖ + 2 NO		090913 NZ2WO-3131	-	-

1) No DGUV approval for switching element 511

For safety precautions see page 187
For technical data see page 153

Safety switch NZ.RK with roller plunger

- **Steel roller ∅ 8 mm**
- **LED optional**
- **Plug connector optional**
- **Bearing optional**

Approach direction

Horizontal
Adjustable in 90° steps.

LED function display (optional)
A function display is available for the following voltage ranges:

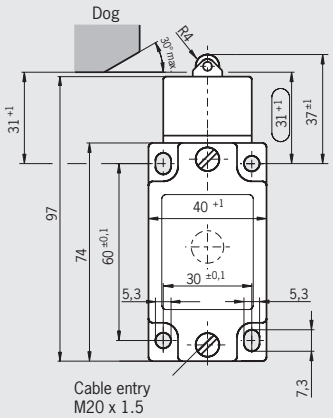
AC/DC	12-60 V		red or yellow
AC	110 V	±15%	red
AC	230 V	±15%	red

Switching elements (See also page 13/14)

- **511** Snap-action switching contact
  1 NC ⊖ + 1 NO
- **528H** Slow-action switching contact
  1 NC ⊖ + 1 NO
- **538H** Slow-action switching contact
  2 NC ⊖
- **2131H** Slow-action switching contact
  3 NC ⊖ + 1 NO
- **3131H** Slow-action switching contact
  2 NC ⊖ + 2 NO

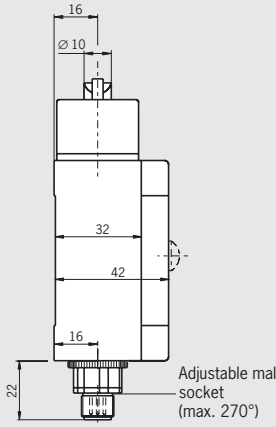
Cable entry M20 x 1.5

Dimension drawings



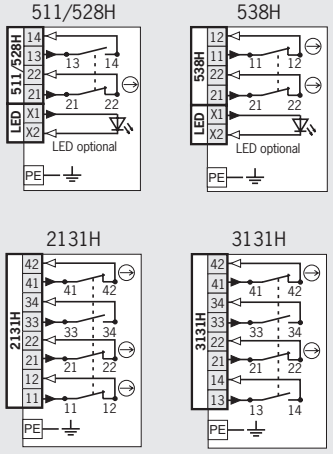
Cable gland
see page 124

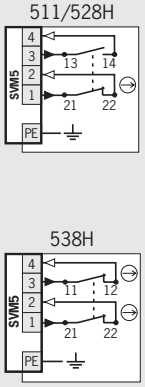
Plug connector SVM5
M12 plug, 5-pin



For mating connector
see page 124

Wiring diagrams Switch not activated





Ordering table

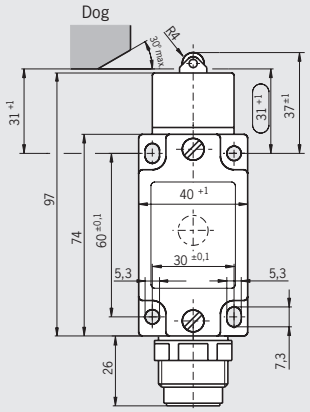
Series	Actuator	Connection	Switching element	Version	Function display: Without LED	12-60 V red LED	110 V red LED	12-60 V yellow LED
NZ	RK Roller plunger	1 Cable entry **M20 x 1.5**	**511** [1] 1 NC ⊖ + 1 NO		**088608** [1] NZ1RK-511-M	**090354** [1] NZ1RK-511L060-M	**090355** [1] NZ1RK-511L220-M	On request
			528H 1 NC ⊖ + 1 NO		**090905** NZ1RK-528-M	**090358** NZ1RK-528L060-M	On request	On request
			528H 1 NC ⊖ + 1 NO	**C1912** With bearing	**090572** NZ1RK-528-MC1912	On request	On request	**086408** NZ1RK-528L060GE-MC1912
			538H 2 NC ⊖		**090906** NZ1RK-538-M	On request	On request	On request
			2131H 3 NC ⊖ + 1 NO		**090907** NZ1RK-2131-M	-	-	-
			3131H 2 NC ⊖ + 2 NO		**090908** NZ1RK-3131-M	-	-	-
		2 Plug connector **SVM5** (M12 plug)	**511** [1] 1 NC ⊖ + 1 NO		**089007** [1] NZ2RK-511SVM5	On request	-	On request
			528H 1 NC ⊖ + 1 NO		**090930** NZ2RK-528SVM5	On request	-	On request
			538H 2 NC ⊖		**089018** NZ2RK-538SVM5	On request	-	On request

1) No DGUV approval for switching element 511

1)

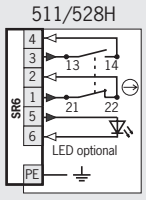
Plug connector SR6
6-pin + PE

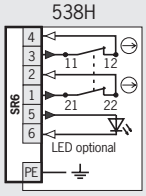
Dimension drawings



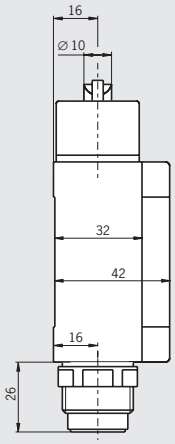
For mating connector see page 120

Wiring diagrams Switch not activated

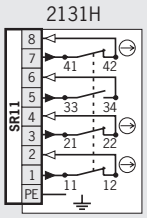


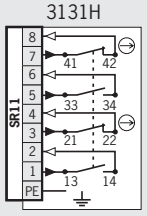


Plug connector SR11
11-pin + PE



For mating connector see page 120





Ordering table

Series	Actuator	Connection	Switching element	Function display: Without LED	Function display: 12-60 V red LED	Function display: 110 V red LED
NZ	RK Roller plunger	2 Plug connector SR6	511 1) 1 NC ⊖ + 1 NO	090016 1) NZ2RK-511	On request	088180 1) NZ2RK-511L110
			528H 1 NC ⊖ + 1 NO	090919 NZ2RK-528	091292 NZ2RK-528L060	On request
			538H 2 NC ⊖	090920 NZ2RK-538	On request	On request
		2 Plug connector SR11	2131H 3 NC ⊖ + 1 NO	090921 NZ2RK-2131	-	-
			3131H 2 NC ⊖ + 2 NO	090922 NZ2RK-3131	-	-

1) No DGUV approval for switching element 511

For safety precautions see page 187
For technical data see page 153

Safety switch NZ.RS with roller plunger

- **Version C according to EN 50041** (steel roller ∅ 12 mm)
- **LED optional**
- **Plug connector optional**

Approach direction

Horizontal
Adjustable in 90° steps.

LED function display (optional)
A function display is available for the following voltage ranges:

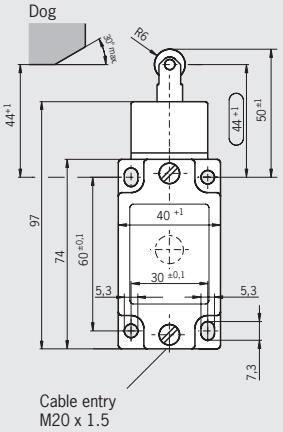
- AC/DC 12-60 V red or yellow
- AC 110 V ±15% red
- AC 230 V ±15% red

Switching elements (See also page 13/14)

- **511** Snap-action switching contact 1 NC ⊖ + 1 NO
- **528H** Slow-action switching contact 1 NC ⊖ + 1 NO
- **538H** Slow-action switching contact 2 NC ⊖
- **2121H** Slow-action switching contact 4 NC ⊖
- **2131H** Slow-action switching contact 3 NC ⊖ + 1 NO
- **3131H** Slow-action switching contact 2 NC ⊖ + 2 NO

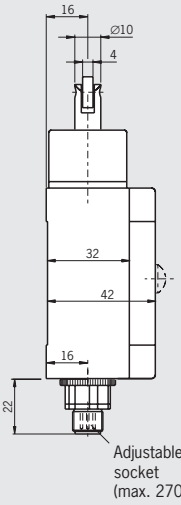
Cable entry M20 x 1.5

Dimension drawings



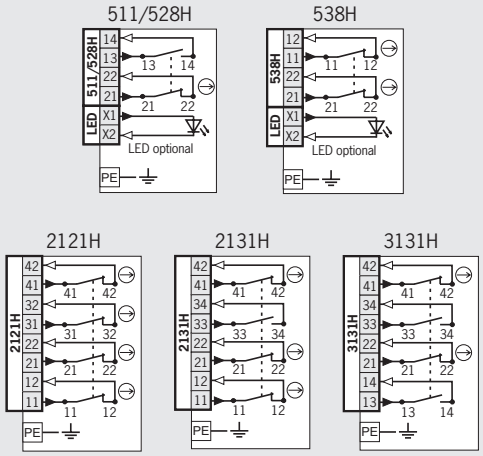
Cable gland see page 124

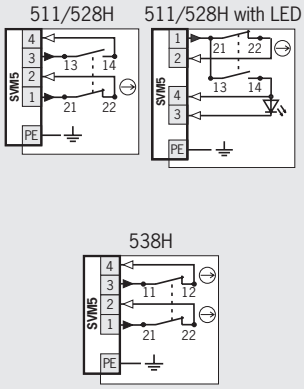
Plug connector SVM5
M12 plug, 5-pin



For mating connector see page 124

Wiring diagrams Switch not activated





Ordering table

Series	Actuator	Connection	Switching element	Version	Function display: Without LED	12-60 V red LED	110 V red LED	12-60 V yellow LED
NZ	RS Roller plunger	1 Cable entry **M20 x 1.5**	**511** [1] 1 NC ⊖ + 1 NO		**079960** [1] NZ1RS-511-M	**089053** [1] NZ1RS-511L060-M	**089055** [1] NZ1RS-511L220-M	**086528** [1] NZ1RS-511L060GE-M
			528H 1 NC ⊖ + 1 NO		**089627** NZ1RS-528-M	**086413** NZ1RS-528L060-M	**091291** NZ1RS-528L220-M	On request
			538H 2 NC ⊖		**090936** NZ1RS-538-M	**090555** NZ1RS-538L060-M	On request	**090424** NZ1RS-538L060GE-M
			2121H 4 NC ⊖		**087595** NZ1RS-2121-M	-	-	-
			2131H 3 NC ⊖ + 1 NO		**089633** NZ1RS-2131-M	-	-	-
			3131H 2 NC ⊖ + 2 NO		**089631** NZ1RS-3131-M	-	-	-
		2 Plug connector **SVM5** (M12 plug)	**511** [1] 1 NC ⊖ + 1 NO		**090027** [1] NZ2RS-511SVM5	On request	-	**098651** [1] NZ2RS-511SVM5L060GE
			528H 1 NC ⊖ + 1 NO		**090963** NZ2RS-528SVM5	On request	-	On request
			538H 2 NC ⊖		**090964** NZ2RS-538SVM5	On request	-	On request

1) No DGUV approval for switching element 511

1)

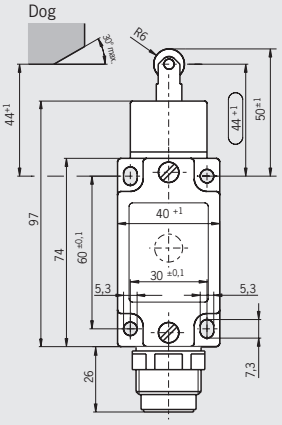
Plug connector SR6
6-pin + PE

Plug connector SR6 Angled 6-pin + PE

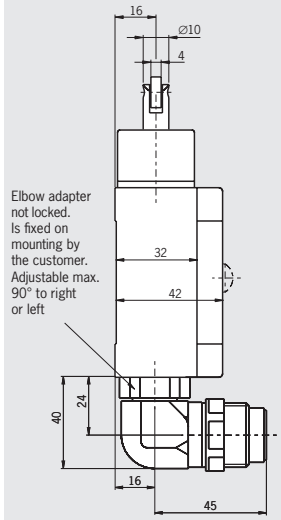
Plug connector MR9
8-pin + PE

Plug connector SR11
11-pin + PE

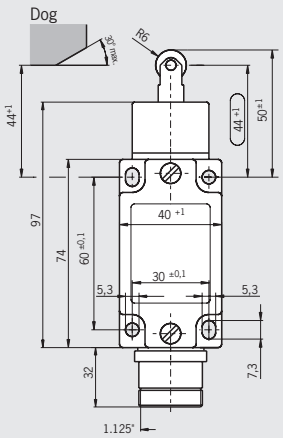
Dimension drawings



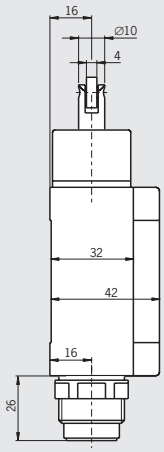
For mating connector see page 120



For mating connector see page 120

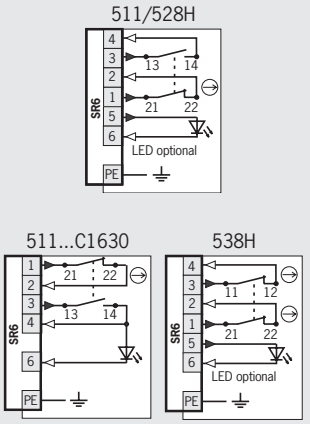


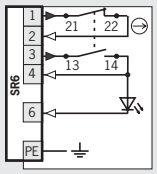
For mating connector see page 123

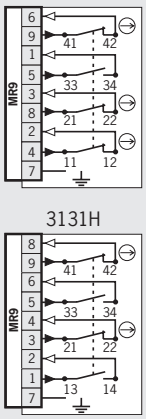


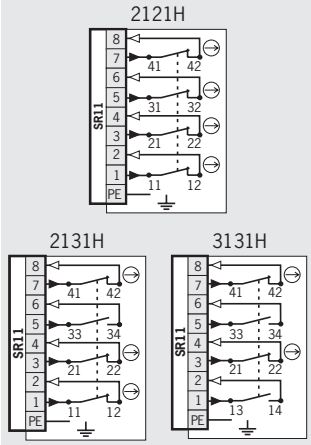
For mating connector see page 120

Wiring diagrams Switch not activated









Ordering table

Series	Actuator	Connection	Switching element	Version	Function display: Without LED	Function display: 12-60 V red LED	Function display: 12-60 V yellow LED
NZ	RS Roller plunger	2 Plug connector **SR6**	**511** [1] 1 NC ⊖ + 1 NO		**090024** [1] NZ2RS-511	**090147** [1] NZ2RS-511L060	**089622** [1] NZ2RS-511L060GE
			511 [1] 1 NC ⊖ + 1 NO	**C1630** Alternative wiring	On request	On request	**082400** [1] NZ2RS-511L060C1630
			528H 1 NC ⊖ + 1 NO		**090950** NZ2RS-528	**088197** NZ2RS-528L060	On request
			538H 2 NC ⊖		**090951** NZ2RS-538	**090952** NZ2RS-538L060	On request
		2 Plug connector **SR6** Angled	**511** [1] 1 NC ⊖ + 1 NO	**C1631** Alternative wiring	On request	On request	**079350** [1] NZ2RS-511L060C1631
		1...9C Plug connector **MR9**	**2131H** 3 NC ⊖ + 1 NO		**077362** [3] NZ1RS-2131-9C-GMMF	-	-
			3131H 2 NC ⊖ + 2 NO		**087074** NZ1RS-3131-9C-GMMF	-	-
		2 Plug connector **SR11**	**2121H** 4 NC ⊖		**090974** NZ2RS-2121	-	-
			2131H 3 NC ⊖ + 1 NO		**090149** NZ2RS-2131	-	-
			3131H 2 NC ⊖ + 2 NO		**090954** NZ2RS-3131	-	-

1) No DGUV approval for switching element 511 3) UL approval only for safety switch 077362

For safety precautions see page 187
For technical data see page 153

Safety switch NZ.RG with roller plunger

- **Version C according to EN 50041** (plastic roller ∅ 12 mm)
- **LED optional**
- **Plug connector optional**

Approach direction

Horizontal
Adjustable in 90° steps.

LED function display (optional)
A function display is available for the following voltage ranges:

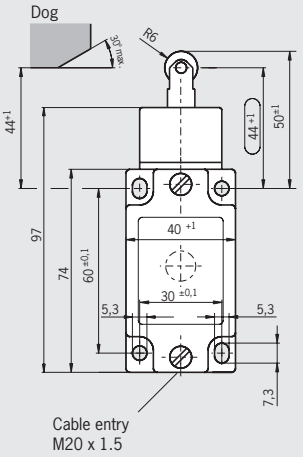
- AC/DC 12-60 V red or yellow
- AC 230 V ±15% red

Switching elements (See also page 13/14)

- **511** Snap-action switching contact 1 NC ⊖ + 1 NO
- **528H** Slow-action switching contact 1 NC ⊖ + 1 NO
- **538H** Slow-action switching contact 2 NC ⊖
- **2131H** Slow-action switching contact 3 NC ⊖ + 1 NO
- **3131H** Slow-action switching contact 2 NC ⊖ + 2 NO

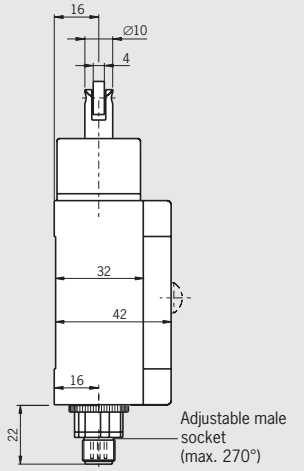
Cable entry M20 x 1.5

Dimension drawings



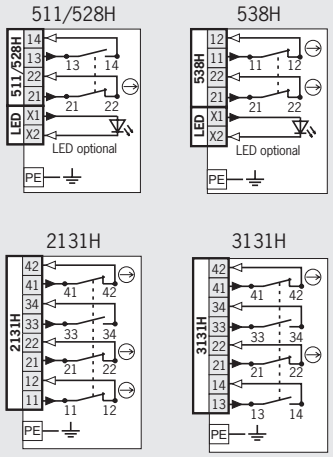
Cable gland see page 124

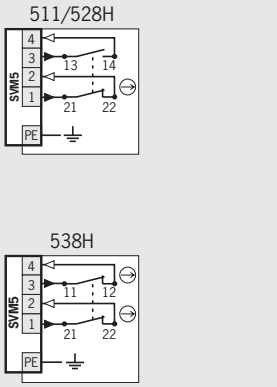
Plug connector SVM5
M12 plug, 5-pin



For mating connector see page 124

Wiring diagrams Switch not activated





Ordering table

Series	Actuator	Connection	Switching element	Function display: Without LED	Function display: 12-60 V red LED	Function display: 230 V red LED
NZ	RG Roller plunger	1 Cable entry **M20 x 1.5**	**511** [1] 1 NC ⊖ + 1 NO	**088605** [1] NZ1RG-511-M	**089052** [1] NZ1RG-511L060-M	**089054** [1] NZ1RG-511L220-M
			528H 1 NC ⊖ + 1 NO	**090932** NZ1RG-528-M	**090008** NZ1RG-528L060-M	On request
			538H 2 NC ⊖	**090933** NZ1RG-538-M	**090009** NZ1RG-538L060-M	On request
			2131H 3 NC ⊖ + 1 NO	**090934** NZ1RG-2131-M	-	-
			3131H 2 NC ⊖ + 2 NO	**090935** NZ1RG-3131-M	-	-
		2 Plug connector **SVM5** (M12 plug)	**511** [1] 1 NC ⊖ + 1 NO	**090026** [1] NZ2RG-511SVM5	On request	-
			528H 1 NC ⊖ + 1 NO	**090961** NZ2RG-528SVM5	On request	-
			538H 2 NC ⊖	**090962** NZ2RG-538SVM5	On request	-

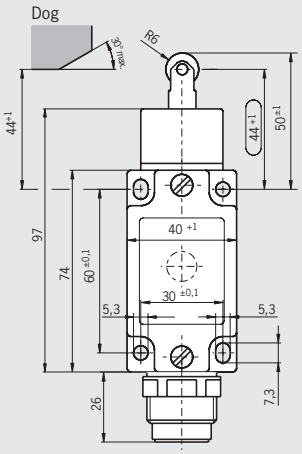
1) No DGUV approval for switching element 511

Plug connector SR6
6-pin + PE

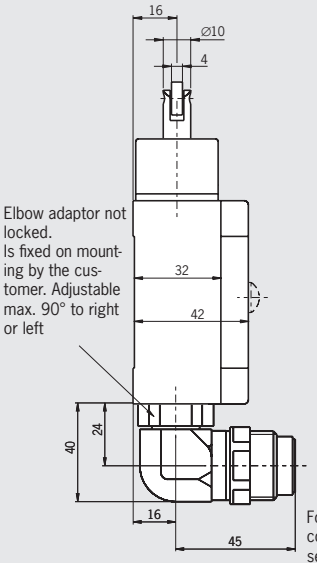
Plug connector SR6 angled
6-pin + PE

Plug connector SR11
11-pin + PE

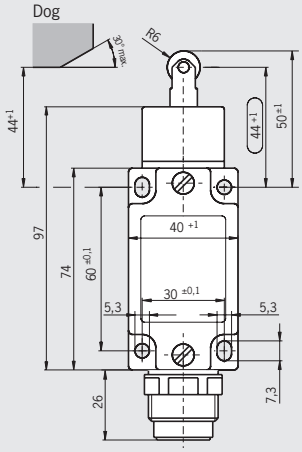
Dimension drawings



For mating connector see page 120



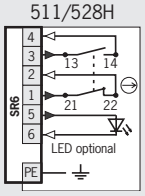
For mating connector see page 120



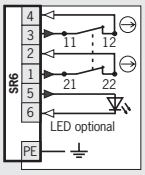
For mating connector see page 120

Wiring diagrams Switch not activated

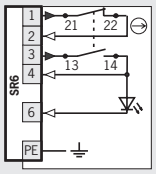
511/528H



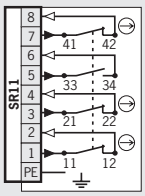
538H



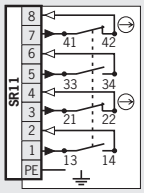
511...1631



2131H



3131H



Ordering table

Series	Actuator	Connection	Switching element	Version	Function display	
					Without LED	12-60 V red LED
NZ	RG Roller plunger	2 Plug connector SR6	511 [1] 1 NC ⊖ + 1 NO		090032 [1] NZ2RG-511	091284 [1] NZ2RG-511L060
			528H 1 NC ⊖ + 1 NO		090943 NZ2RG-528	-
			538H 2 NC ⊖		090945 NZ2RG-538	090946 NZ2RG-538L060
		2 Plug connector SR6 Angled	511 [1] 1 NC ⊖ + 1 NO	C1631 Alternative wiring	On request	On request
		2 Plug connector SR11	2131H 3 NC ⊖ + 1 NO		090947 NZ2RG-2131	-
			3131H 2 NC ⊖ + 2 NO		090948 NZ2RG-3131	-

1) No DGUV approval for switching element 511

For safety precautions see page 187
For technical data see page 153

Safety switch NZ.RL with roller plunger

- **Steel roller ∅ 18 mm**
- **With grooved ball bearing ∅ 16 mm optional**
- **LED optional**
- **Plug connector optional**

Approach direction

Horizontal
Adjustable in 90° steps.

LED function display (optional)
A function display is available for the following voltage ranges:

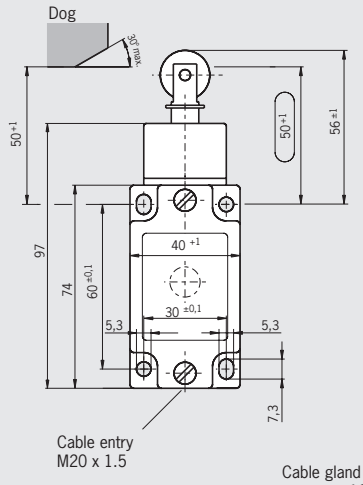
AC/DC	12-60 V		red
AC	110 V	±15%	red
AC	230 V	±15%	red

Switching elements (See also page 13/14)

- **511** Snap-action switching contact 1 NC ⊖ + 1 NO
- **528H** Slow-action switching contact 1 NC ⊖ + 1 NO
- **538H** Slow-action switching contact 2 NC ⊖
- **2121H** Slow-action switching contact 4 NC ⊖
- **2131H** Slow-action switching contact 3 NC ⊖ + 1 NO
- **3131H** Slow-action switching contact 2 NC ⊖ + 2 NO

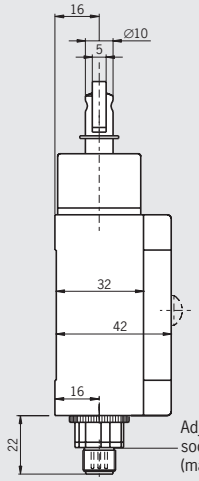
Cable entry M20 x 1.5

Dimension drawings



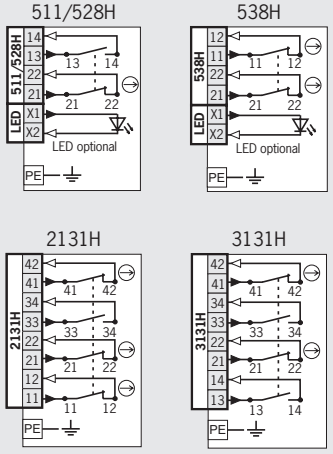
Cable gland see page 124

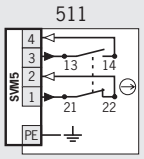
Plug connector SVM5
M12 plug, 5-pin



For mating connector see page 124

Wiring diagrams Switch not activated





Ordering table

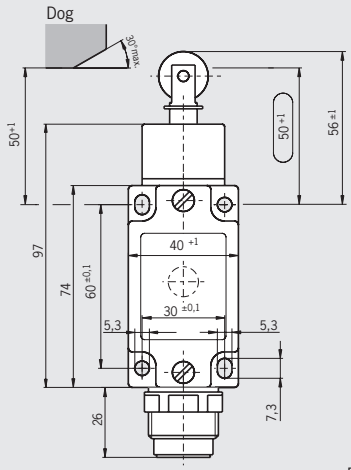
Series	Actuator	Connection	Switching element	Function display: Without LED	12-60 V red LED	110 V red LED	230 V red LED
NZ	RL Roller plunger	1 Cable entry **M20 x 1.5**	**511** [1] 1 NC ⊖ + 1 NO	**088614** [1] NZ1RL-511-M	**088996** [1] NZ1RL-511L060-M	**089080** [1] NZ1RL-511L110-M	**089079** [1] NZ1RL-511L220-M
			528H 1 NC ⊖ + 1 NO	**090937** NZ1RL-528-M	**090938** NZ1RL-528L060-M	On request	-
			538H 2 NC ⊖	**090939** NZ1RL-538-M	**090940** NZ1RL-538L060-M	On request	On request
			2131H 3 NC ⊖ + 1 NO	**090941** NZ1RL-2131-M	-	-	-
			3131H 2 NC ⊖ + 2 NO	**090942** NZ1RL-3131-M	-	-	-
		2 Plug connector **SVM5** (M12 plug)	**511** [1] 1 NC ⊖ + 1 NO	**090028** [1] NZ2RL-511SVM5	On request	-	-

1) No DGUV approval for switching element 511

1)

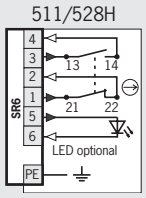
Plug connector SR6
6-pin + PE

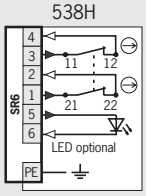
Dimension drawings



For mating connector see page 120

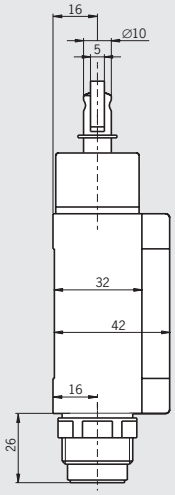
Wiring diagrams Switch not activated



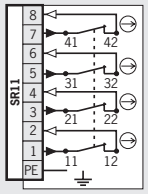


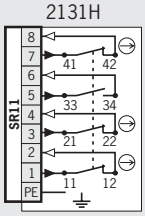
Plug connector SR11
11-pin + PE

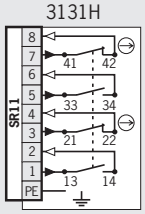
Note:
Roller diameter 16 mm on version with grooved ball bearing (C1831)



For mating connector see page 120







Ordering table

Series	Actuator	Connection	Switching element	Version	Function display	
					Without LED	12-60 V red LED
NZ	RL Roller plunger	2 Plug connector SR6	511 1) 1 NC ⊖ + 1 NO		090025 1) NZ2RL-511	-
			528H 1 NC ⊖ + 1 NO		-	091282 NZ2RL-528L060
			538H 2 NC ⊖		-	091278 NZ2RL-538L060
		2 Plug connector SR11	2121H 4 NC ⊖		090975 NZ2RL-2121	-
			2121H 4 NC ⊖	C1831 Grooved ball bearing	095806 NZ2RL-2121C1831	-
			2131H 3 NC ⊖ + 1 NO		090958 NZ2RL-2131	-
			3131H 2 NC ⊖ + 2 NO		090959 NZ2RL-3131	-

1) No DGUV approval for switching element 511

For safety precautions see page 187
For technical data see page 153

Safety switch NZ.HS with roller lever arm

- **Version A according to EN 50041** (steel roller ∅ 18)
- **LED optional**
- **Plug connector optional**

Approach direction

Horizontal

Switch head and lever arm can be adjusted in 90° steps.

Switching direction

Right, left or both sides (see page 9).

LED function display (optional)

A function display is available for the following voltage ranges:

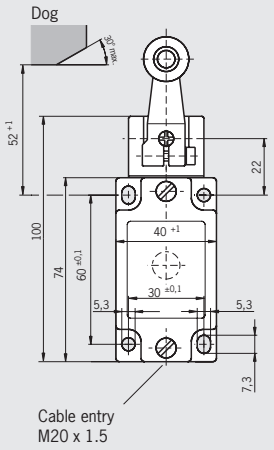
AC/DC	12-60 V		red or yellow
AC	110 V	±15%	red
AC	230 V	±15%	red

Switching elements (See also page 13/14)

- **511** Snap-action switching contact 1 NC ⊖ + 1 NO
- **528H** Slow-action switching contact 1 NC ⊖ + 1 NO
- **538H** Slow-action switching contact 2 NC ⊖
- **2121H** Slow-action switching contact 4 NC ⊖
- **2131H** Slow-action switching contact 3 NC ⊖ + 1 NO
- **3131H** Slow-action switching contact 2 NC ⊖ + 2 NO

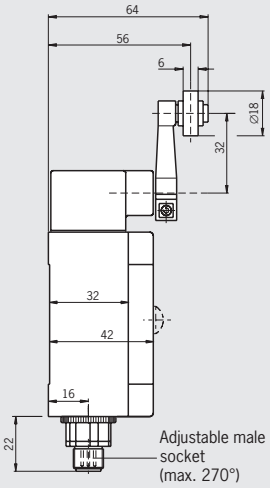
Cable entry M20 x 1.5

Dimension drawings



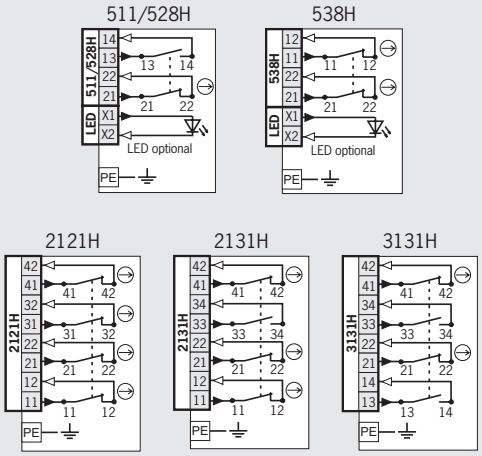
Cable gland see page 124

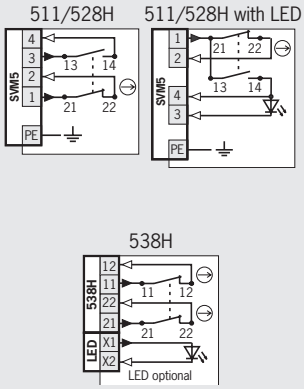
Plug connector SVM5
M12 plug, 5-pin



For mating connector see page 124

Wiring diagrams Switch not activated





Ordering table

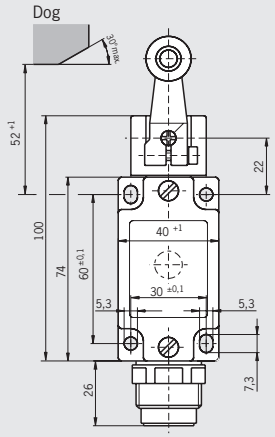
Series	Actuator	Connection	Switching element	Version	Function display: Without LED	12-60 V red LED	110 V red LED	230 V red LED	12-60 V yellow LED
NZ	HS Lever arm	1 Cable entry **M20 x 1.5**	**511** [1] 1 NC ⊖ + 1 NO		**079953** [1] NZ1HS-511-M	**090035** [1] NZ1HS-511L060-M	**090036** [1] NZ1HS-511L110-M	**090037** [1] NZ1HS-511L220-M	**090038** [1] NZ1HS-511L060GE-M
			528H 1 NC ⊖ + 1 NO		**090970** NZ1HS-528-M	**090971** NZ1HS-528L060-M	**090050** NZ1HS-528L110-M	**090052** NZ1HS-528L220-M	**090049** NZ1HS-528L060GE-M
			538H 2 NC ⊖		**090972** NZ1HS-538-M	**090760** NZ1HS-538L060-M	On request	On request	On request
			2121H 4 NC ⊖		**090254** NZ1HS-2121-M	-	-	-	-
			2131H 3 NC ⊖ + 1 NO		**090973** NZ1HS-2131-M	-	-	-	-
			3131H 2 NC ⊖ + 2 NO		**090747** NZ1HS-3131-M	-	-	-	-
		2 Plug connector **SVM5** (M12 plug)	**511** [1] 1 NC ⊖ + 1 NO		**090867** [1] NZ2HS-511SVM5	On request	-	-	**098648** [1] NZ2HS-511SVM5L060GE
			528H 1 NC ⊖ + 1 NO		**090868** NZ2HS-528SVM5	On request	-	-	On request
			538H 2 NC ⊖		**090869** NZ2HS-538SVM5	On request	-	-	On request

1) No DGUV approval for switching element 511

1)

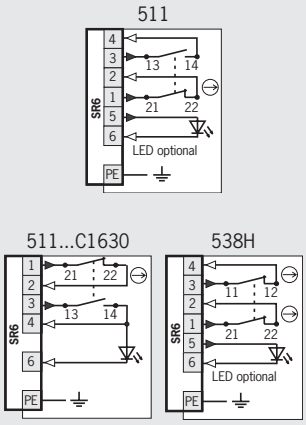
Plug connector SR6
6-pin + PE

Dimension drawings

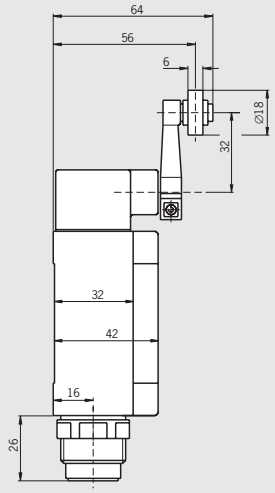


For mating connector see page 120

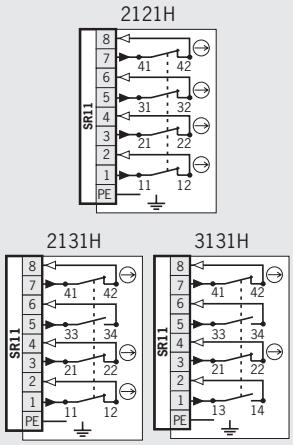
Wiring diagrams Switch not activated



Plug connector SR11
11-pin + PE



For mating connector see page 120



Ordering table

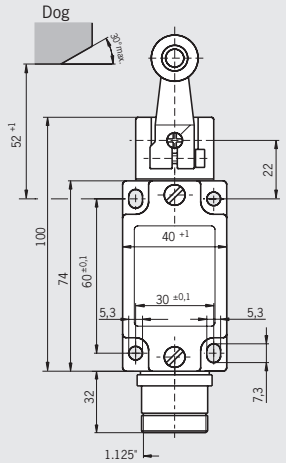
Series	Actuator	Connection	Switching element	Version	Function display: Without LED	Function display: 12-60 V red LED	Function display: 12-60 V yellow LED
NZ	HS Lever arm	2 Plug connector SR6	**511** [1] 1 NC ⊖ + 1 NO		**089093** [1] NZ2HS-511	**089094** [1] NZ2HS-511L060	**090697** [1] NZ2HS-511L060GE
			511 [1] 1 NC ⊖ + 1 NO	**C1631** Alternative wiring	On request	On request	**078473** [1] NZ2HS-511L060C1630
			528H 1 NC ⊖ + 1 NO		**090852** NZ2HS-528	**088196** NZ2HS-528L060	On request
			538H 2 NC ⊖		**090853** NZ2HS-538	**090854** NZ2HS-538L060	On request
		2 Plug connector SR11	**2121H** 4 NC ⊖		**091264** NZ2HS-2121	-	-
			2131H 3 NC ⊖ + 1 NO		**090146** NZ2HS-2131	-	-
			3131H 2 NC ⊖ + 2 NO		**090856** NZ2HS-3131	-	-

1) No DGUV approval for switching element 511

Please turn over

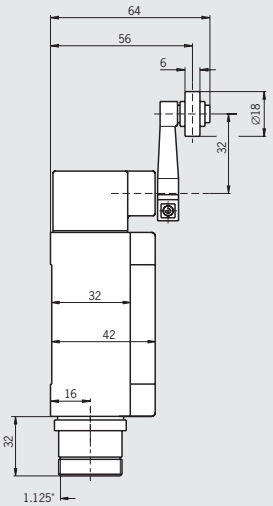
For safety precautions see page 187
For technical data see page 153

Plug connector MR8
7-pin + PE

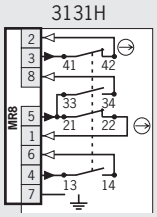


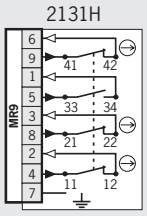
For mating connector see page 123

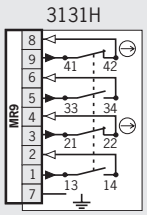
Plug connector MR9
8-pin + PE



For mating connector see page 123







Ordering table

Series	Actuator	Connection	Switching element	Function display		
				Without LED	12-60 V red LED	12-60 V yellow LED
NZ	HS Lever arm	1...8C Plug connector MR8	3131H 2 NC ⊖ + 2 NO	086574 NZ1HS-3131-8C-Ford / PT60577-101K01	-	-
		1...9C Plug connector MR9	2131H 3 NC ⊖ + 1 NO	077391 [3] NZ1HS-2131-9C-GMMF	-	-
			3131H 2 NC ⊖ + 2 NO	073508 NZ1HS-3131-9C-GMMF	-	-

3) UL approval only for safety switch 077391

Safety switch NZ.HB with roller lever arm

- **Version A according to EN 50041** (plastic roller ∅ 18)
- **LED optional**
- **Plug connector optional**

Approach direction

Horizontal

Switch head and lever arm can be adjusted in 90° steps.

Switching direction

Right, left or both sides (see page 9).

LED function display (optional)

A function display is available for the following voltage ranges:

- AC/DC 12-60 V red or yellow
- AC 230 V ±15% red

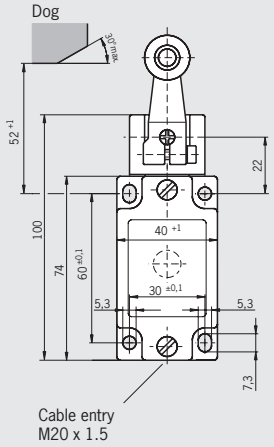
Switching elements (See also page 13/14)

- **511** Snap-action switching contact 1 NC ⊖ + 1 NO
- **528H** Slow-action switching contact 1 NC ⊖ + 1 NO
- **538H** Slow-action switching contact 2 NC ⊖
- **2131H** Slow-action switching contact 3 NC ⊖ + 1 NO
- **3131H** Slow-action switching contact 2 NC ⊖ + 2 NO

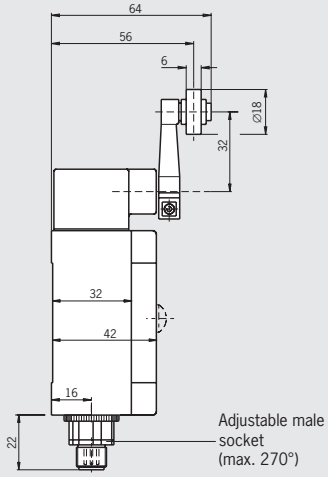
Cable entry M20 x 1.5

Plug connector SVM5
M12 plug, 5-pin

Dimension drawings

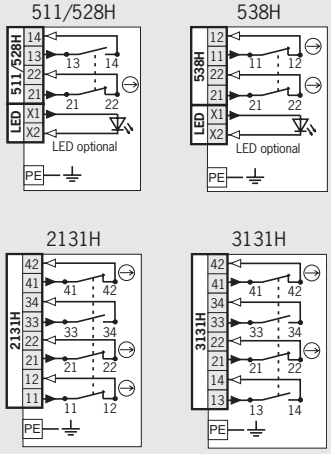


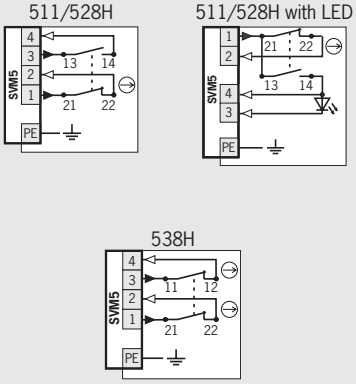
Cable gland see page 124



For mating connector see page 124

Wiring diagrams Switch not activated





Ordering table

Series	Actuator	Connection	Switching element	Function display: Without LED	12-60 V red LED	230 V red LED	12-60 V yellow LED
NZ	HB Lever arm	1 Cable entry **M20 x 1.5**	**511** [1] 1 NC ⊖ + 1 NO	**079952** [1] NZ1HB-511-M	**090039** [1] NZ1HB-511L060-M	**090040** [1] NZ1HB-511L220-M	**086525** [1] NZ1HB-511L060GE-M
			528H 1 NC ⊖ + 1 NO	**088199** NZ1HB-528-M	**090965** NZ1HB-528L060-M	**090051** NZ1HB-528L220-M	**086527** NZ1HB-528L060GE-M
			538H 2 NC ⊖	**090966** NZ1HB-538-M	**090967** NZ1HB-538L060-M	On request	On request
			2131H 3 NC ⊖ + 1 NO	**090968** NZ1HB-2131-M	-	-	-
			3131H 2 NC ⊖ + 2 NO	**090969** NZ1HB-3131-M	-	-	-
		2 Plug connector **SVM5** (M12 plug)	**511** [1] 1 NC ⊖ + 1 NO	**090861** [1] NZ2HB-511SVM5	On request	-	**098649** [1] NZ2HB-511SVM5L060GE
			528H 1 NC ⊖ + 1 NO	**090864** NZ2HB-528SVM5	On request	-	On request
			538H 2 NC ⊖	**090862** NZ2HB-538SVM5	On request	-	On request

1) No DGUV approval for switching element 511

Please turn over

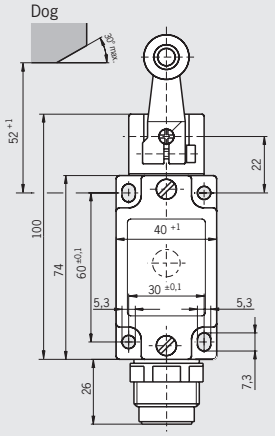
For safety precautions see page 187
For technical data see page 153

Plug connector SR6
6-pin + PE

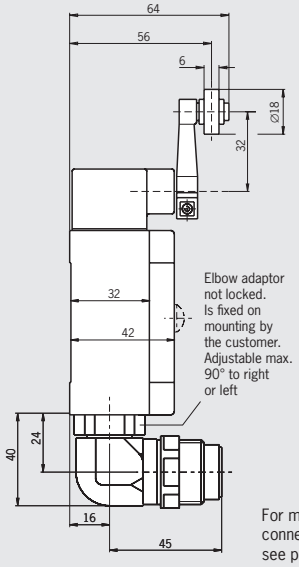
Plug connector SR6 angled
6-pin + PE

Plug connector SR11
11-pin + PE

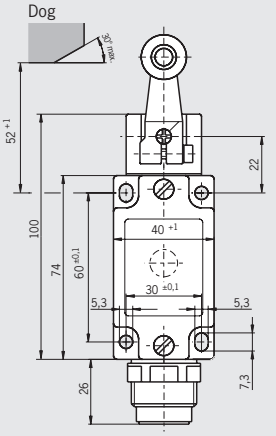
Dimension drawings



For mating connector see page 120

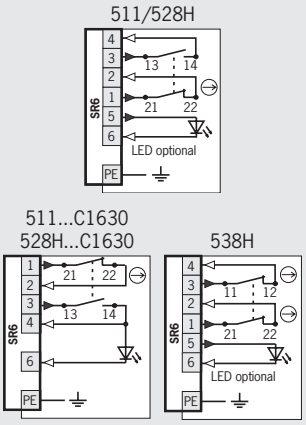


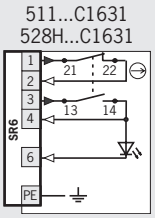
For mating connector see page 120

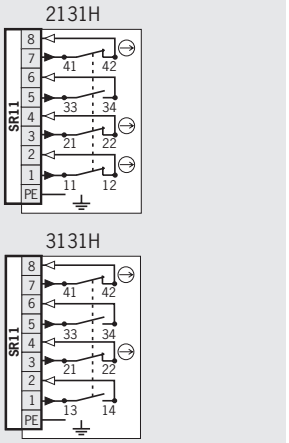


For mating connector see page 120

Wiring diagrams Switch not activated







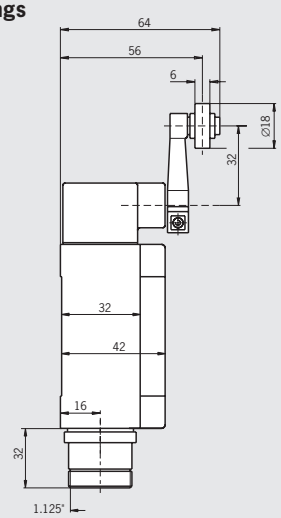
Ordering table

Series	Actuator	Connection	Switching element	Version	Function display: Without LED	12-60 V red LED	230 V red LED	12-60 V yellow LED
NZ	HB Lever arm	2 Plug connector SR6	**511** [1] 1 NC ⊖ + 1 NO		**089091** [1] NZ2HB-511	**089092** [1] NZ2HB-511L060	On request	**090719** [1] NZ2HB-511L060GE
			511 [1] 1 NC ⊖ + 1 NO	**C1630** Alternative wiring	On request	On request	On request	**054121** [1] NZ2HB-511L060C1630
			528H 1 NC ⊖ + 1 NO		**090845** NZ2HB-528	**090846** [1] NZ2HB-528L060	**091281** NZ2HB-528L220	-
			528H 1 NC ⊖ + 1 NO	**C1630** Alternative wiring	On request	On request	On request	**091346** NZ2HB-528L060C1630
			538H 2 NC ⊖		**090847** NZ2HB-538	**090848** NZ2HB-538L060	On request	On request
		2 Plug connector SR6 Angled	**511** [1] 1 NC ⊖ + 1 NO	**C1631** Alternative wiring	On request	On request	On request	**054122** [1] NZ2HB-511L060C1631
			528H 1 NC ⊖ + 1 NO	**C1631** Alternative wiring	On request	On request	On request	**091347** NZ2HB-528L060C1631
		2 Plug connector SR11	**2131H** 3 NC ⊖ + 1 NO		**090136** NZ2HB-2131	-	-	-
			3131H 2 NC ⊖ + 2 NO		**090137** NZ2HB-3131	-	-	-

1) No DGUV approval for switching element 511

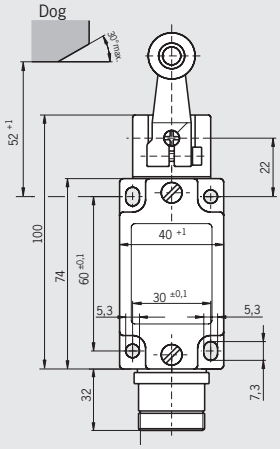
Plug connector MR9
8-pin + PE

Dimension drawings



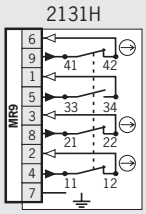
For mating connector see page 123

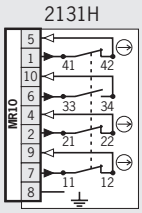
Plug connector MR10
9-pin + PE



For mating connector see page 123

Wiring diagrams Switch not activated





Ordering table

Series	Actuator	Connection	Switching element	Function display			
				Without LED	12-60 V red LED	230 V red LED	12-60 V yellow LED
NZ	HB Lever arm	**1...9C** Plug connector **MR9**	**2131H** 3 NC ⊖ + 1 NO	**077390** NZ1HB-2131-9C-GMMF	-	-	-
		1...10C Plug connector **MR10**	**2131H** 3 NC ⊖ + 1 NO	**095898** NZ1HB-2131-10C-FW	-	-	-

For safety precautions see page 187
For technical data see page 153

Safety switch NZ.PS with adjustable lever arm

- **Steel roller ∅ 18**
- **LED optional**
- **Plug connector optional**

Approach direction


Horizontal

Switch head and lever arm can be adjusted in 90° steps.

Switching direction
Right, left or both sides (see page 9).

Lever arm adjustment
Lever arm length can be adjusted from 28 mm to 78 mm in steps of 12.5 mm.

LED function display (optional)
A function display is available for the following voltage ranges:

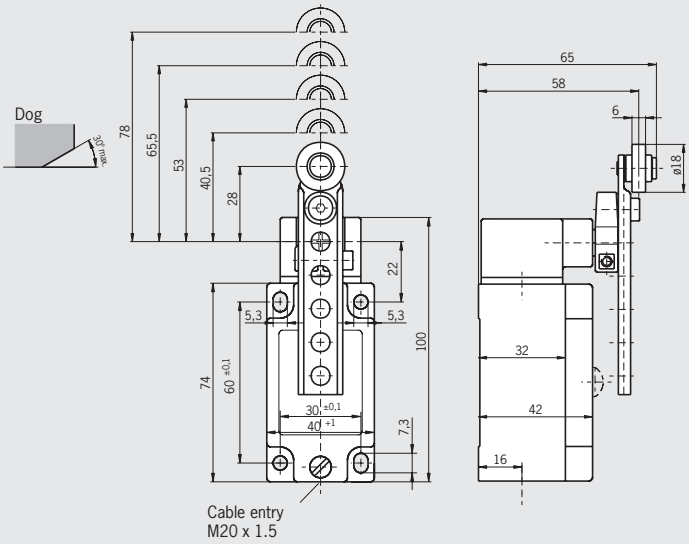
- AC/DC 12-60 V red or yellow
- AC 230 V ±15% red

Switching elements (See also page 13/14)

- **511** Snap-action switching contact 1 NC ⊖ + 1 NO
- **528H** Slow-action switching contact 1 NC ⊖ + 1 NO
- **538H** Slow-action switching contact 2 NC ⊖
- **2121H** Slow-action switching contact 4 NC ⊖
- **2131H** Slow-action switching contact 3 NC ⊖ + 1 NO
- **3131H** Slow-action switching contact 2 NC ⊖ + 2 NO

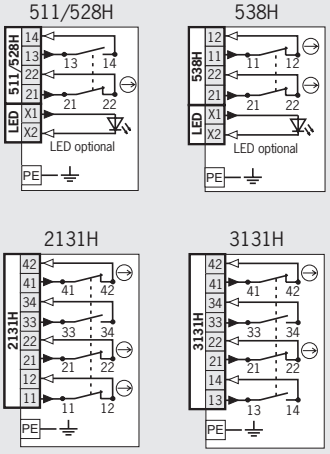
Cable entry M20 x 1.5

Dimension drawings



Cable gland see page 124

Wiring diagrams Switch not activated



Ordering table

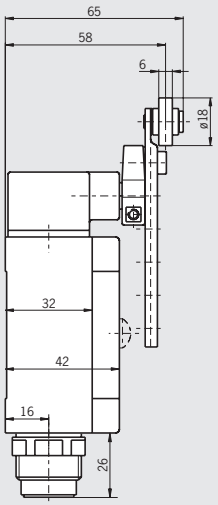
Series	Actuator	Connection	Switching element	Function display			
				Without LED	12-60 V red LED	230 V red LED	12-60 V yellow LED
NZ	PS Adjustable lever arm	1 Cable entry M20 x 1.5	511 [1] 1 NC ⊖ + 1 NO	088613 [1] NZ1PS-511-M	On request	On request	On request
			528H 1 NC ⊖ + 1 NO	090874 NZ1PS-528-M	090430 NZ1PS-528L060-M	093521 NZ1PS-528L220-M	093523 NZ1PS-528L220GE-M
			538H 2 NC ⊖	090875 NZ1PS-538-M	On request	On request	On request
			2131H 3 NC ⊖ + 1 NO	090876 NZ1PS-2131-M	-	-	-
			3131H 2 NC ⊖ + 2 NO	090877 NZ1PS-3131-M	-	-	-

1) No DGUV approval for switching element 511

1)

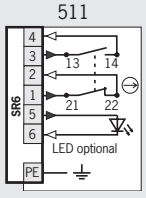
Plug connector SR6
6-pin + PE

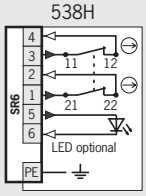
Dimension drawings



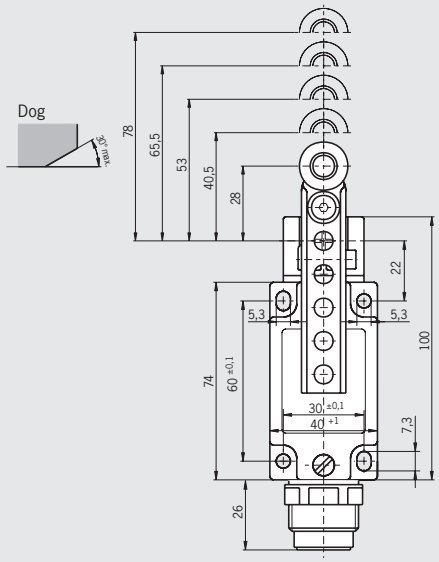
For mating connector see page 120

Wiring diagrams Switch not activated

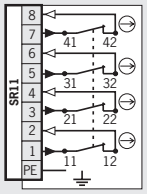


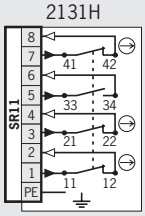


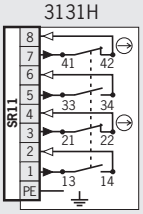
Plug connector SR11
11-pin + PE



For mating connectors see page 120







Ordering table

Series	Actuator	Connection	Switching element	Function display	
				Without LED	12-60 V red LED
NZ	PS Adjustable lever arm	2 Plug connector SR6	511 1) 1 NC ⊖ + 1 NO	093112 1) NZ2PS-511	090152 1) NZ2PS-511L060
			538H 2 NC ⊖	On request	091632 NZ2PS-538L060
		2 Plug connector SR11	2121H 4 NC ⊖	091268 NZ2PS-2121	-
			2131H 3 NC ⊖ + 1 NO	090151 NZ2PS-2131	-
			3131H 2 NC ⊖ + 2 NO	090150 NZ2PS-3131	-

1) No DGUV approval for switching element 511

For safety precautions see page 187
For technical data see page 153

Safety switch NZ.PB with adjustable lever arm

- **Plastic roller ∅ 18**

Approach direction


Horizontal

Switch head and lever arm can be adjusted in 90° steps.

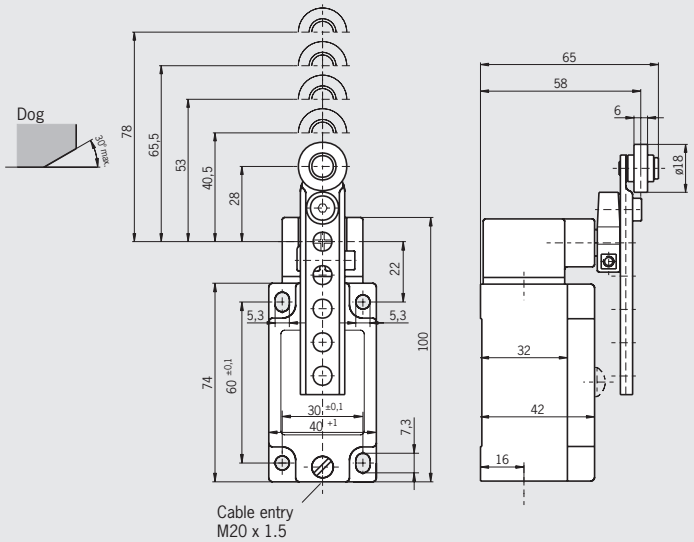
Switching direction
Right, left or both sides (see page 9).

Lever arm adjustment
Lever arm length can be adjusted from 28 mm to 78 mm in steps of 12.5 mm.

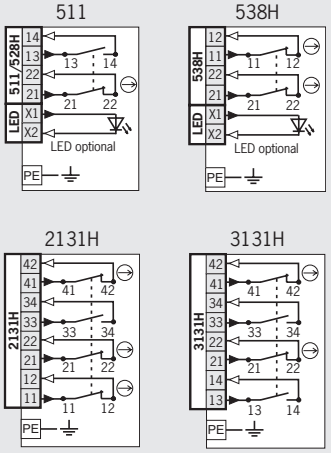
Switching elements (See also page 13/14)
- **511** Snap-action switching contact 1 NC ⊖ + 1 NO
- **538H** Slow-action switching contact 2 NC ⊖
- **2131H** Slow-action switching contact 3 NC ⊖ + 1 NO
- **3131H** Slow-action switching contact 2 NC ⊖ + 2 NO

Cable entry M20 x 1.5

Dimension drawings



Wiring diagrams Switch not activated



Ordering table

Series	Actuator	Connection	Switching element	Function display
				Without LED
NZ	PB Adjustable lever arm	1 Cable entry M20 x 1.5	**511** [1] 1 NC ⊖ + 1 NO	**088618** [1] NZ1PB-511-M
			538H 2 NC ⊖	**090871** NZ1PB-538-M
			2131H 3 NC ⊖ + 1 NO	**090872** NZ1PB-2131-M
			3131H 2 NC ⊖ + 2 NO	**090873** NZ1PB-3131-M

1) No DGUV approval for switching element 511

Safety switch NZ.RS.C1588 with roller plunger

- **Version C according to EN 50041** (steel roller ∅ 12 mm)
- **Exterior bellows** (Material CR rubber)

Approach direction

Horizontal

Switch head and lever arm can be adjusted in 90° steps.

Exterior bellows

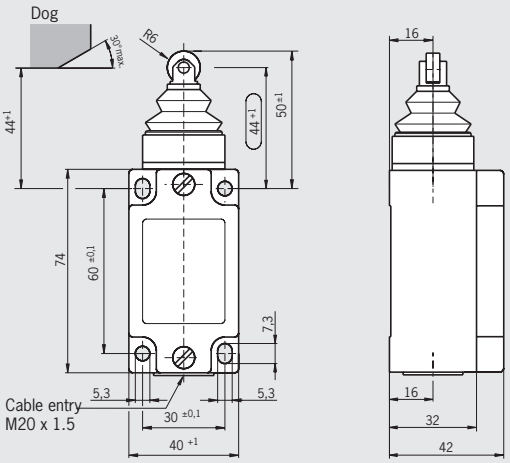
Protection against heavy soiling (dust) and aggressive coolants.

Switching elements (See also page 13)

- **511** Snap-action switching contact 1 NC ⊖ + 1 NO
- **528H** Slow-action switching contact 1 NC ⊖ + 1 NO

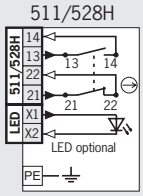
Cable entry M20 x 1.5

Dimension drawings



Cable gland see page 124

Wiring diagrams Switch not activated



Ordering table

Series	Actuator	Connection	Switching element	Version	Function display
					Without LED
NZ	RS Roller plunger	1 Cable entry M20 x 1.5	511 [1] 1 NC ⊖ + 1 NO	C1588 Exterior bellows, red cover	091352 [1] NZ1RS-511-MC1588
			528H 1 NC ⊖ + 1 NO	C1588 Exterior bellows, red cover	091339 NZ1RS-528-MC1588

1) No DGUV approval for switching element 511

For safety precautions see page 187
For technical data see page 153

Safety switch NZ.HB.C569 with roller lever arm

- **Large plastic roller ∅ 30 mm**
- **LED optional**

Cable entry M20 x 1.5

Approach direction

Horizontal

Switch head and lever arm can be adjusted in 90° steps.

Switching direction

Right, left or both sides (see page 9).

LED function display (optional)

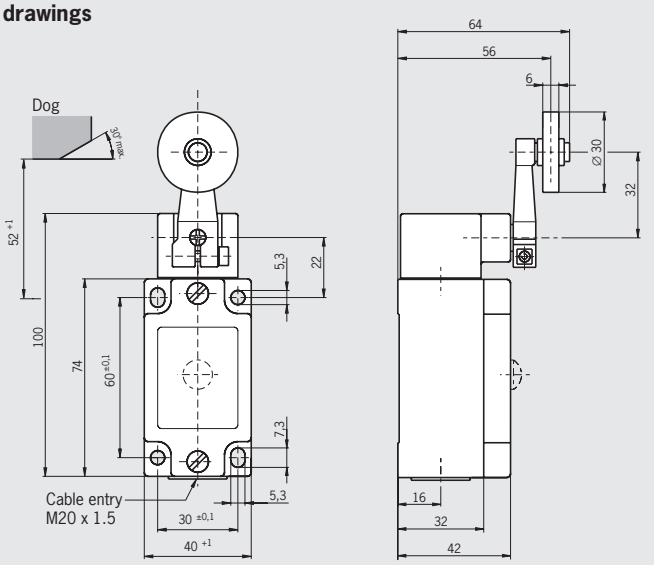
A function display is available for the following voltage ranges:

- AC/DC 12-60 V red

Switching elements (See also page 13)

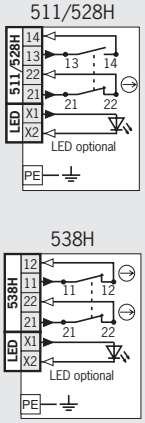
- **511** Snap-action switching contact 1 NC ⊖ + 1 NO
- **528H** Slow-action switching contact 1 NC ⊖ + 1 NO
- **538H** Slow-action switching contact 2 NC ⊖

Dimension drawings



Cable gland see page 124

Wiring diagrams Switch not activated



Ordering table

Series	Actuator	Connection	Switching element	Version	Function display	
					Without LED	12-60 V red LED
NZ	HB Lever arm	1 Cable entry **M20 x 1.5**	**511** [1] 1 NC ⊖ + 1 NO	**C569** Large plastic roller ∅ 30 mm	**079965** [1] NZ1HB-511-MC569	**091091** [1] NZ1HB-511L060-MC569
			528H 1 NC ⊖ + 1 NO	**C569** Large plastic roller ∅ 30 mm	**079946** NZ1HB-528-MC569	**091330** NZ1HB-528L060-MC569
			538H 2 NC ⊖	**C569** Large plastic roller ∅ 30 mm	**079999** NZ1HB-538-MC569	On request

1) No DGUV approval for switching element 511

Safety switch NZ.HS.C1779 with roller lever arm

- **Steel roller ∅ 18 mm**
- **Roller mounted on inside of lever**

Cable entry M20 x 1.5

Approach direction

Horizontal

Switch head and lever arm can be adjusted in 90° steps.

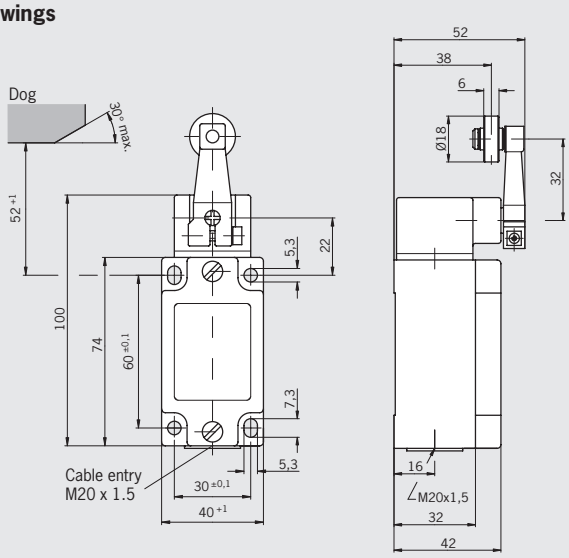
Switching direction

Right, left or both sides (see page 9).

Switching elements (See also page 14)

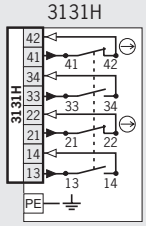
- **3131H** Slow-action switching contact 2 NC ⊖ + 2 NO

Dimension drawings



Cable gland see page 124

Wiring diagrams Switch not activated



Ordering table

Series	Actuator	Connection	Switching element	Version	Function display
					Without LED
NZ	**HS** Lever arm	**1** Cable entry **M20 x 1.5**	**3131H** 2 NC ⊖ + 2 NO	**C1779** Roller mounted on inside of lever	**079996** NZ1HS-3131-MC1779

For safety precautions see page 187
For technical data see page 153

Safety switch NZ.HS.C1833 with roller lever arm

- **Steel roller ∅ 19 mm**
- **With grooved ball bearing**
- **LED on request**

Approach direction


Horizontal

Switch head and lever arm can be adjusted in 90° steps.

Switching direction

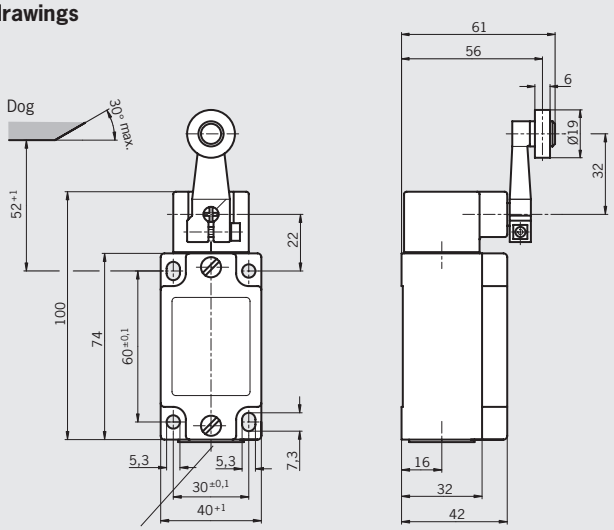
Right, left or both sides (see page 9).

Switching elements (See also page 13)

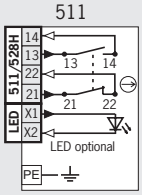
- **511** Snap-action switching contact 1 NC ⊖ + 1 NO

Cable entry M20 x 1.5

Dimension drawings



Wiring diagrams Switch not activated



Ordering table

Series	Actuator	Connection	Switching element	Version	Function display
					Without LED
NZ	**HS** Lever arm	**1** Cable entry **M20 x 1.5**	**511** 1 NC ⊖ + 1 NO	**C1833** With grooved ball bearing	**091312** NZ1HS-511-MC1833

Selection table for safety switches NZ.VZ

Version

SB Protective plate, tamper protection on the switch head

Connection

M Thread M20x1.5 for cable glands

SVM5 M12 plug connector 5-pin

C16-1 Plug connector 6-pin + PE

SR6 Plug connector 6-pin + PE

MR8 Plug connector 7-pin + PE

MR9 Plug connector 8-pin + PE

MR10 Plug connector 9-pin + PE

SR11 Plug connector 11-pin + PE

Switching element

Two contacts 1 NC ⊖ + 1 NO or 2 NC ⊖

Four contacts 2 NC ⊖ + 2 NO, 3 NC ⊖ + 1 NO or 4 NC ⊖

SB	Connection								Switching element		With version	Page
	M	SVM5	C16-1	SR6	MR8	MR9	MR10	SR11	Two contacts	Four contacts		
	●								●	●		48
		●		●					●			49
								●		●		49
					●	●	●			●		50
●	●								●		C1233	51
●			●	●					●		C1420/C1701/C1233	52
●								●		●	C1233	52

Safety switch NZ.VZ

- **Housing according to EN 50041**
- **Various cable entries**
- **Plug connector optional**
- **LED optional**

Approach direction

Horizontal
Adjustable in 90° steps.

LED function display (optional)
A function display is available for the following voltage ranges:

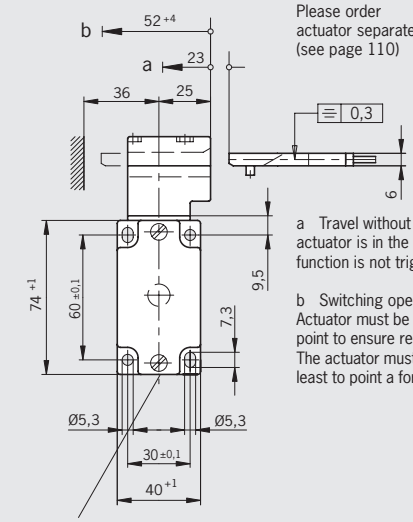
AC/DC	12-60 V		red
AC	110 V	±15%	red
AC	230 V	±15%	red

Switching elements (See also page 13/14)

- **511** Snap-action switching contact 1 NC ⊖ + 1 NO
- **528H** Slow-action switching contact 1 NC ⊖ + 1 NO
- **538H** Slow-action switching contact 2 NC ⊖
- **2121H** Slow-action switching contact 4 NC ⊖
- **2131H** Slow-action switching contact 3 NC ⊖ + 1 NO
- **3131H** Slow-action switching contact 2 NC ⊖ + 2 NO

Cable entry M20 x 1.5

Dimension drawings



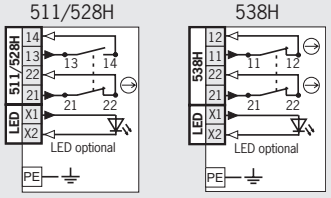
Please order actuator separately (see page 110)

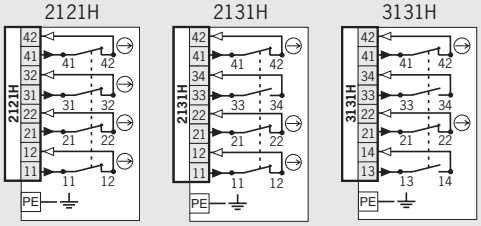
a Travel without operation: actuator is in the guide slot, but function is not triggered.

b Switching operation completed: Actuator must be inserted to this point to ensure reliable switching. The actuator must be withdrawn at least to point a for switching off.

Cable gland see page 124

Wiring diagrams Actuator inserted





Ordering table

Series	Actuator	Connection	Switching element	Version	Function display			
					Without LED	12-60 V red LED	110 V red LED	230 V red LED
NZ	VZ Separate actuator	1 Cable entry M20 x 1.5	511 [1] 1 NC ⊖ + 1 NO		089479 [1] NZ1VZ-511E-M	On request	On request	On request
			528H 1 NC ⊖ + 1 NO		090671 NZ1VZ-528E-M	090566 NZ1VZ-528EL060-M	089480 NZ1VZ-528EL110-M	082121 NZ1VZ-528EL220-M
			538H 2 NC ⊖		085676 NZ1VZ-538E-M	082119 NZ1VZ-538EL060-M	089481 NZ1VZ-538EL110-M	089482 NZ1VZ-538EL220-M
			2121H 4 NC ⊖		089486 NZ1VZ-2121E-M	-	-	-
			2131H 3 NC ⊖ + 1 NO		082123 NZ1VZ-2131E-M	-	-	-
			3131H 2 NC ⊖ + 2 NO		082122 NZ1VZ-3131E-M	-	-	-

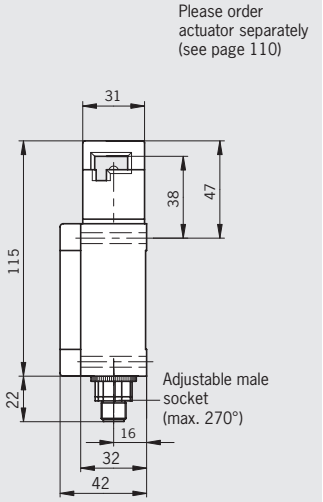
1) No DGUV approval for switching element 511

Plug connector SVM5
M12 plug, 5-pin

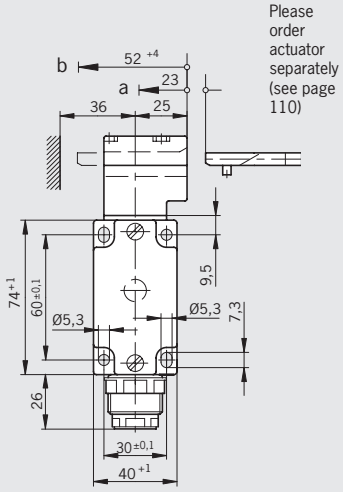
Plug connector SR6
6-pin + PE

Plug connector SR11
11-pin + PE

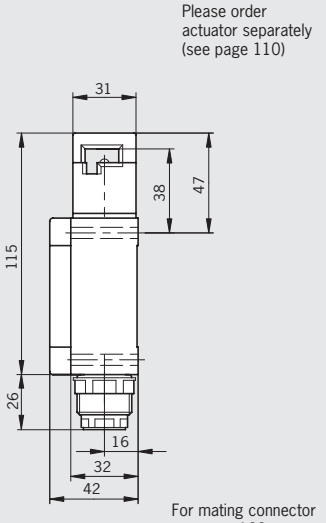
Dimension drawings



For mating connector see page 124

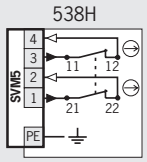


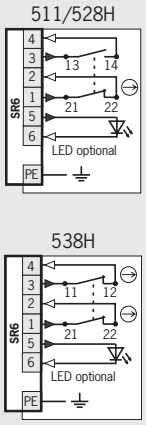
For mating connector see page 120

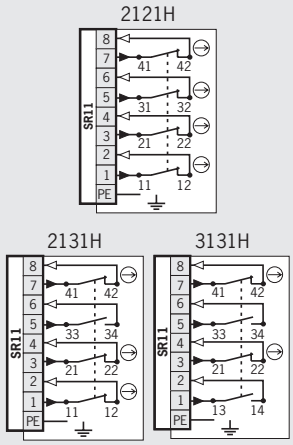


For mating connector see page 120

Wiring diagrams Actuator inserted







Ordering table

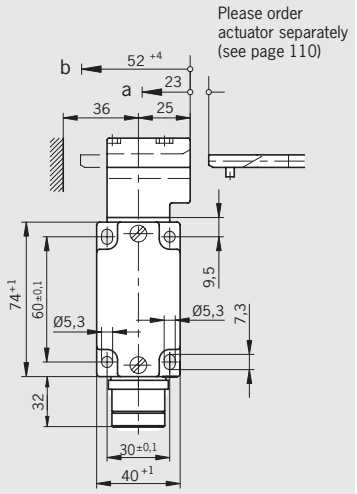
Series	Actuator	Connection	Switching element	Function display: Without LED	12-60 V red LED	110 V red LED	230 V red LED
NZ	VZ Separate actuator	2 Plug connector SVM5	538H 2 NC ⊖	084905 NZ2VZ-538ESVM5	On request	-	-
		2 Plug connector SR6	511 1) 1 NC ⊖ + 1 NO	On request	045551 1) NZ2VZ-511EL060	On request	On request
			528H 1 NC ⊖ + 1 NO	084885 NZ2VZ-528E	045801 NZ2VZ-528EL060	059467 NZ2VZ-528EL110	038129 NZ2VZ-528EL220
			538H 2 NC ⊖	090143 NZ2VZ-538E	052108 NZ2VZ-538EL060	072234 NZ2VZ-538EL110	059004 NZ2VZ-538EL220
		2 Plug connector SR11	2121H 4 NC ⊖	088852 NZ2VZ-2121E	-	-	-
			2131H 3 NC ⊖ + 1 NO	090144 NZ2VZ-2131E	-	-	-
			3131H 2 NC ⊖ + 2 NO	090145 NZ2VZ-3131E	-	-	-

1) No DGUV approval for switching element 511

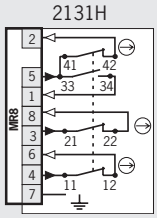
Please turn over

For safety precautions see page 187
For technical data see page 153

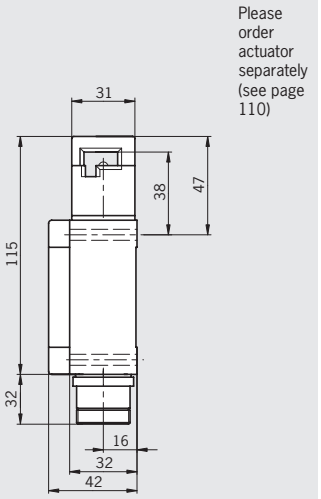
Plug connector MR8
7-pin + PE



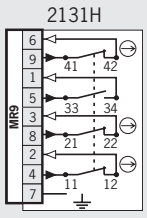
For mating connector see page 123



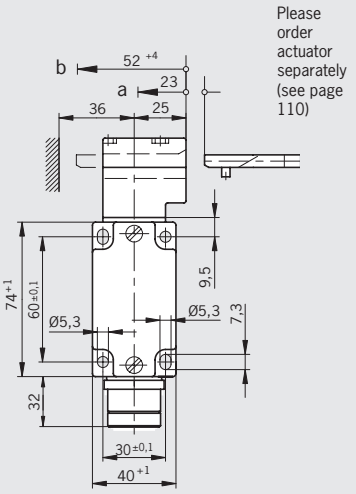
Plug connector MR9
8-pin + PE



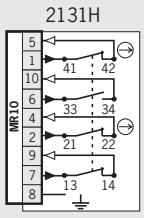
For mating connector see page 123



Plug connector MR10
9-pin + PE



For mating connector see page 123



Ordering table

Series	Actuator	Connection	Switching element	Function display			
				Without LED	12-60 V red LED	110 V red LED	230 V red LED
NZ	VZ Separate actuator	**1** Plug connector **MR8**	**2131H** 3 NC ⊖ + 1 NO	**092355** NZ1VZ-2131E-8C-GMMF	-	-	-
		1 Plug connector **MR9**	**2131H** 3 NC ⊖ + 1 NO	**077363** NZ1VZ-2131E-9C-GMMF	-	-	-
		1 Plug connector **MR10**	**2131H** 3 NC ⊖ + 1 NO	**095896** NZ1VZ-2131E-10C-FW	-	-	-

Safety switch NZ.VZ

- **Housing according to EN 50041**
- **Protective plate for switch head**
- **Plug connector optional**
- **LED optional**

Approach direction

Horizontal
Adjustable in 90° steps.

Protective plate for switch head
Makes it more difficult to tamper with the switch.

LED function display (optional)
A function display is available for the following voltageranges:

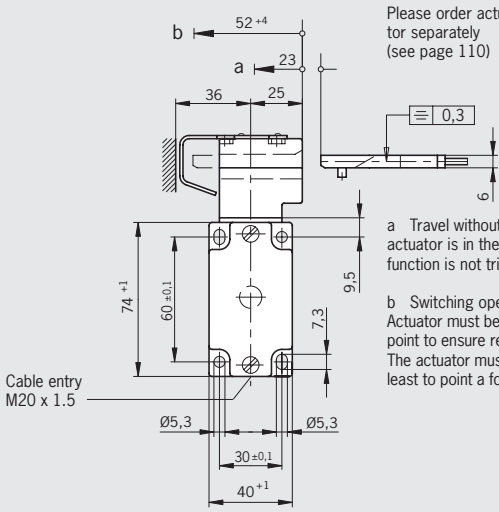
- AC/DC 12-60 V red
- AC 230 V ±15% red

Switching elements (See also page 13/14)

- **528H** Slow-action switching contact 1 NC ⊖ + 1 NO
- **538H** Slow-action switching contact 2 NC ⊖
- **2121H** Slow-action switching contact 4 NC ⊖
- **2131H** Slow-action switching contact 3 NC ⊖ + 1 NO

Cable entry M20 x 1.5

Dimension drawings



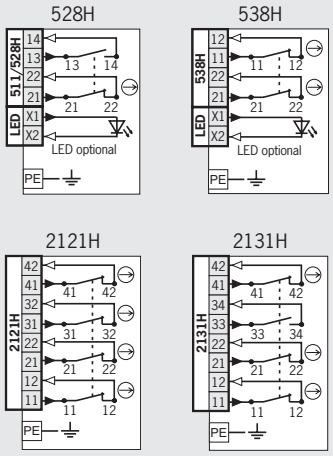
Please order actuator separately (see page 110)

a Travel without operation: actuator is in the guide slot, but function is not triggered.

b Switching operation completed: Actuator must be inserted to this point to ensure reliable switching. The actuator must be withdrawn at least to point a for switching off.

Cable gland see page 124

Wiring diagrams Actuator inserted



Ordering table

Series	Actuator	Connection	Switching element	Version	Function display		
					Without LED	12-60 V red LED	230 V red LED
NZ	VZ Separate actuator	1 Cable entry M20 x 1.5	528H 1 NC ⊖ + 1 NO	With protective plate	082137 NZ1VZ-528E-MC1233	089497 NZ1VZ-528EL060-MC1233	On request
			538H 2 NC ⊖	With protective plate	093858 NZ1VZ-538E-MC1233	On request	089496 NZ1VZ-538EL220-MC1233
			2121H 4 NC ⊖	With protective plate	089914 NZ1VZ-2121E-MC1233	-	-
			2131H 3 NC ⊖ + 1 NO	With protective plate	093859 NZ1VZ-2131E-MC1233	-	-

Please turn over

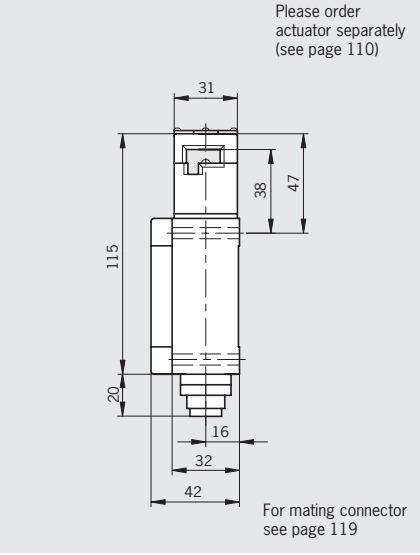
For safety precautions see page 187
For technical data see page 153

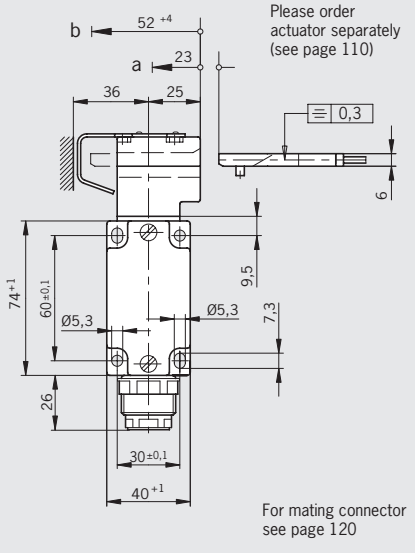
Plug connector C16-1
6-pin + PE

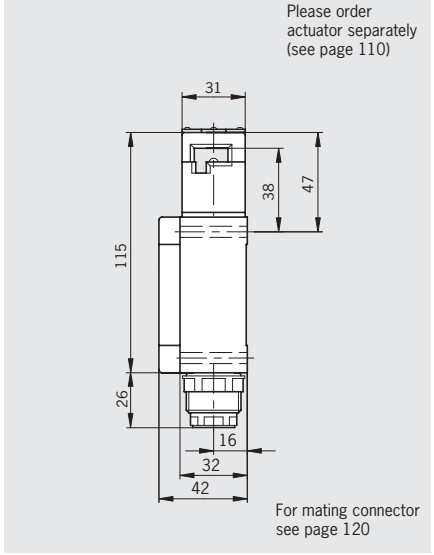
Plug connector SR6
6-pin + PE

Plug connector SR11
11-pin + PE

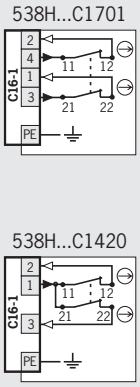
Dimension drawings

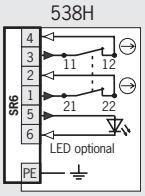


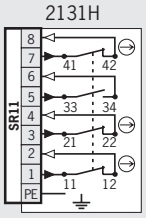




Wiring diagrams Actuator inserted







Ordering table

Series	Actuator	Connection	Switching element	Version	Function display Without LED
NZ	VZ Separate actuator	**2** Plug connector **C16-1**	**538H** 2 NC ⊖	**C1701** With protective plate	**071200** NZ2VZ-538EC1701
				C1420 With protective plate Alternative wiring	**043296** NZ2VZ-538EC1420
		2 Plug connector **SR6**	**538H** 2 NC ⊖	With protective plate	**077229** NZ2VZ-538EC1233
		2 Plug connector **SR11**	**2131H** 3 NC ⊖ + 1 NO	With protective plate	**093857** NZ2VZ-2131EC1233

Selection table for safety switches NZ.VZ.VS with guard locking without guard lock monitoring

Guard locking

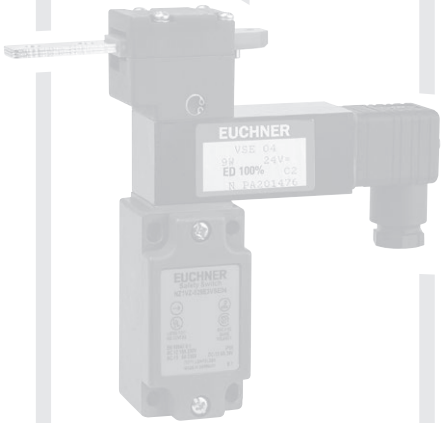
- **VSM** — Mechanical guard locking, closed-circuit current principle
- **VSE** — Electrical guard locking, open-circuit current principle

Connection

- **M** — Thread M20x1.5 for cable glands
- **SR6** — Plug connector 6-pin + PE
- **SR11** — Plug connector 11-pin + PE

Switching element

- **Two contacts** — 2 NC ⊖ or 1 NC ⊖ + 1 NO
- **Four contacts** — 2 NC ⊖ + 2 NO, 3 NC ⊖ + 1 NO



Guard locking		Connection			Switching element		Page
VSM	VSE	M	SR6	SR11	Two contacts	Four contacts	
●		●			●	●	54
●			●		●		55
●				●		●	55
	●	●			●	●	56
	●		●		●		57
	●			●		●	57

Safety switch NZ.VZ.VSM with guard locking without guard lock monitoring

- **Housing according to EN 50041**
- **Plug connector optional**
- **LED optional**

Approach direction

Horizontal
Adjustable in 90° steps.

Solenoid operating voltage and optional LED function display

A function display is available for the following voltage ranges:

Solenoid	LED		
DC 24 V ± 10%	AC/DC	12-60 V	red
AC 110 V ± 15%	AC	110 V ± 15%	red [1]
AC 230 V ± 15%	AC	230 V ± 15%	red [1]

Guard locking type

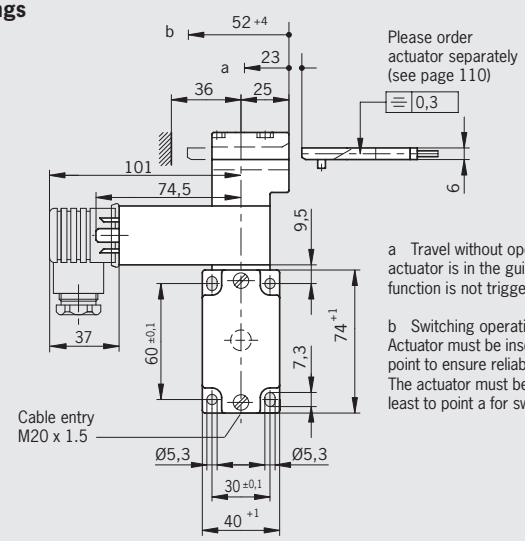
VSM Closed-circuit current principle, guard locking by spring force. Release by applying voltage to the solenoid.

Switching elements (See also page 13/14)

- **511** Snap-action switching contact 1 NC ⊖ + 1 NO
- **528H** Slow-action switching contact 1 NC ⊖ + 1 NO
- **538H** Slow-action switching contact 2 NC ⊖
- **2131H** Slow-action switching contact 3 NC ⊖ + 1 NO
- **3131H** Slow-action switching contact 2 NC ⊖ + 2 NO

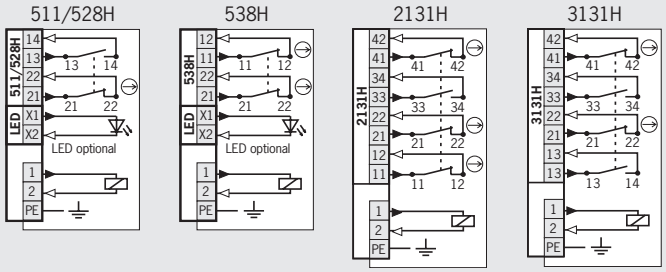
Cable entry M20 x 1.5

Dimension drawings



Solenoid plug see page 119
Cable gland see page 124

Wiring diagrams



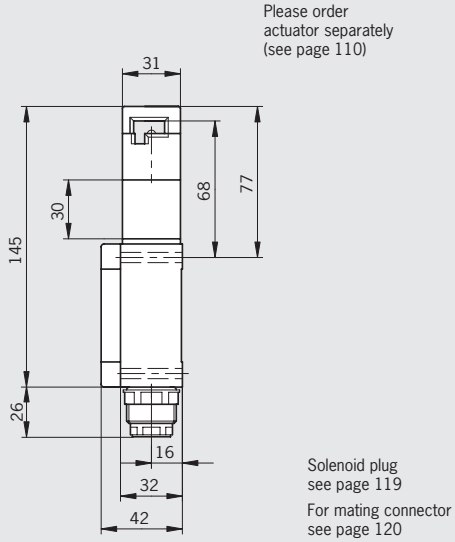
Ordering table

Series	Actuator	Connection	Guard locking	Solenoid voltage	Switching element	Function display: Without LED	12-60 V red LED	110 V red LED	230 V red LED
NZ	VZ Separate actuator	1 Cable entry M20 x 1.5	VSM Mech. guard locking closed-circuit current principle	04 24 V DC	511 1 NC ⊖ + 1 NO	090339 NZ1VZ-511E3VSM04-M	090344 NZ1VZ-511E3VSM04L060-M	On request	On request
					528H 1 NC ⊖ + 1 NO	082125 NZ1VZ-528E3VSM04-M	082126 NZ1VZ-528E3VSM04L060-M	On request	089488 NZ1VZ-528E3VSM04L220-M
					538H 2 NC ⊖	082131 NZ1VZ-538E3VSM04-M	082132 NZ1VZ-538E3VSM04L060-M	On request	090345 NZ1VZ-538E3VSM04L220-M
					2131H 3 NC ⊖ + 1 NO	088049 NZ1VZ-2131E3VSM04-M	-	-	-
					3131H 2 NC ⊖ + 2 NO	088050 NZ1VZ-3131E3VSM04-M	-	-	-
				07 [1] 110 V AC	528H 1 NC ⊖ + 1 NO	082129 NZ1VZ-528E3VSM07-M	On request	089485 NZ1VZ-528E3VSM07L110-M	090341 NZ1VZ-528E3VSM07L220-M
					538H 2 NC ⊖	088046 NZ1VZ-538E3VSM07-M	On request	090340 NZ1VZ-538E3VSM07L110-M	On request
					2131H 3 NC ⊖ + 1 NO	088038 NZ1VZ-3131E3VSM07-M	-	-	-
					3131H 2 NC ⊖ + 2 NO	088040 NZ1VZ-3131E3VSM07-M	-	-	-
				09 [1] 230 V AC	528H 1 NC ⊖ + 1 NO	088045 NZ1VZ-528E3VSM09-M	090349 NZ1VZ-528E3VSM09L060-M	On request	090342 NZ1VZ-528E3VSM09L220-M
					538H 2 NC ⊖	088044 NZ1VZ-538E3VSM09-M	On request	On request	On request
					2131H 3 NC ⊖ + 1 NO	088039 NZ1VZ-2131E3VSM09-M	-	-	-
					3131H 2 NC ⊖ + 2 NO	088041 NZ1VZ-3131E3VSM09-M	-	-	-

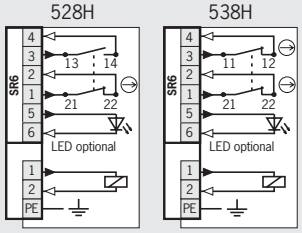
1) Use only solenoid plug with integrated rectifier (see page 119)

Plug connector SR6
6-pin + PE

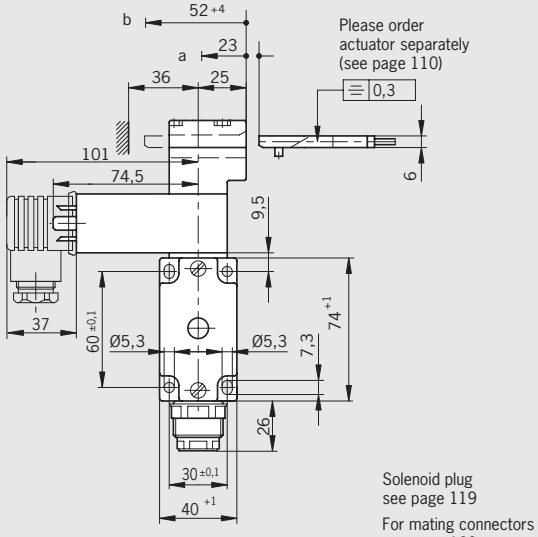
Dimension drawings

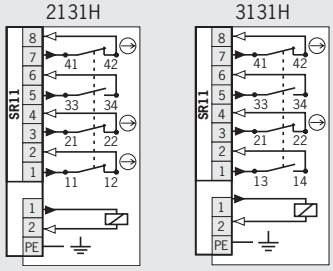


Wiring diagrams



Plug connector SR11
11-pin + PE





Ordering table

Series	Actuator	Connection	Guard locking	Solenoid voltage	Switching element	Function display		
						Without LED	12-60 V red LED	230 V red LED
NZ	VZ Separate actuator	2 Plug connector SR6	VSM Mech. guard locking closed-circuit current principle	04 24 V DC	528H 1 NC ⊖ + 1 NO	037299 NZ2VZ-528E3VSM04	045856 NZ2VZ-528E3VSM04L060	070039 NZ2VZ-528E3VSM04L220
					538H 2 NC ⊖	050428 NZ2VZ-538E3VSM04	059427 NZ2VZ-538E3VSM04L060	On request
				09 [1] 230 V AC	528H 1 NC ⊖ + 1 NO	055718 NZ2VZ-528E3VSM09	On request	On request
					538H 2 NC ⊖	076502 NZ2VZ-538E3VSM09	On request	On request
		2 Plug connector SR11	VSM Mech. guard locking closed-circuit current principle	04 24 V DC	2131H 3 NC ⊖ + 1 NO	074471 NZ2VZ-2131E3VSM04	-	-
					3131H 2 NC ⊖ + 2 NO	074472 NZ2VZ-3131E3VSM04	-	-

1) Use only solenoid plug with integrated rectifier (see page 119)

For safety precautions see page 187
For technical data see page 153

Safety switch NZ.VZ.VSE with guard locking without guard lock monitoring

- **Housing according to EN 50041**
- **Plug connector optional**
- **LED optional**

Approach direction

Horizontal
Adjustable in 90° steps.

Solenoid operating voltage and optional LED function display

A function display is available for the following voltage ranges:

Solenoid	LED		
DC 24 V ± 10%	AC/DC	12-60 V	red
AC 110 V ± 15%	AC	110 V ± 15%	red [1]
AC 230 V ± 15%	AC	230 V ± 15%	red [1]

Guard locking type

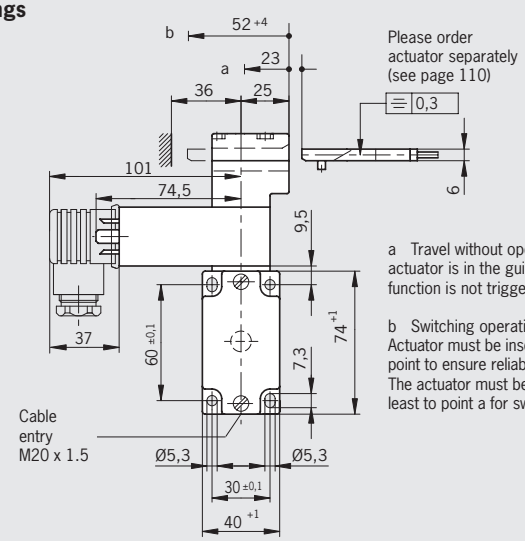
VSE Open-circuit current principle, guard locking by applying voltage to the solenoid. Release by spring force.

Switching elements (See also page 13/14)

- **511** Snap-action switching contact 1 NC ⊖ + 1 NO
- **528H** Slow-action switching contact 1 NC ⊖ + 1 NO
- **538H** Slow-action switching contact 2 NC ⊖
- **2131H** Slow-action switching contact 3 NC ⊖ + 1 NO
- **3131H** Slow-action switching contact 2 NC ⊖ + 2 NO

Cable entry M20 x 1.5

Dimension drawings



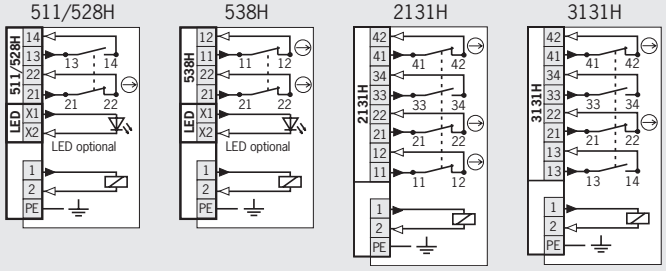
Please order actuator separately (see page 110)

a Travel without operation: actuator is in the guide slot, but function is not triggered.

b Switching operation completed: Actuator must be inserted to this point to ensure reliable switching. The actuator must be withdrawn at least to point a for switching off.

Solenoid plug see page 119
Cable gland see page 124

Wiring diagrams



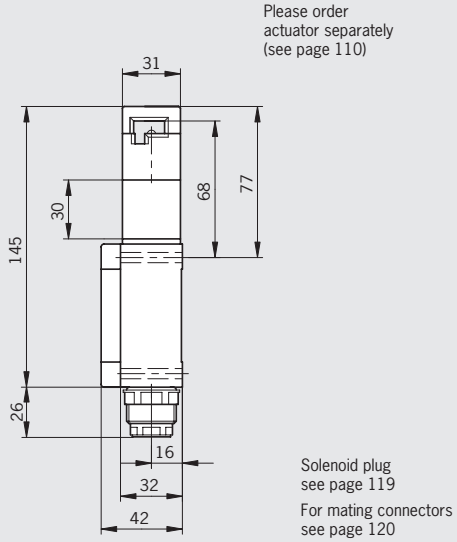
Ordering table

Series	Actuator	Connection	Guard locking	Solenoid voltage	Switching element	Function display: Without LED	12-60 V red LED	110 V red LED	230 V red LED
NZ	VZ Separate actuator	1 Cable entry M20 x 1.5	VSE Elec. guard locking closed-circuit current principle	04 24 V DC	511 1 NC ⊖ + 1 NO	090343 NZ1VZ-511E3VSE04-M	On request	On request	On request
					528H 1 NC ⊖ + 1 NO	079300 NZ1VZ-528E3VSE04-M	082130 NZ1VZ-528E3VSE04I060-M	On request	091738 NZ1VZ-528E3VSE04L220-M
					538H 2 NC ⊖	089905 NZ1VZ-538E3VSE04-M	082128 NZ1VZ-538E3VSE04L060-M	On request	On request
					2131H 3 NC ⊖ + 1 NO	082134 NZ1VZ-2131E3VSE04-M	-	-	-
					3131H 2 NC ⊖ + 2 NO	088051 NZ1VZ-3131E3VSE04-M	-	-	-
				07 [1] 110 V AC	528H 1 NC ⊖ + 1 NO	082133 NZ1VZ-528E3VSE07-M	090337 NZ1VZ-528E3VSE07L060-M	089484 NZ1VZ-528E3VSE07L110-M	090336 NZ1VZ-528E3VSE07L220-M
					538H 2 NC ⊖	088048 NZ1VZ-538E3VSE07-M	On request	090348 NZ1VZ-538E3VSE07L110-M	On request
					2131H 3 NC ⊖ + 1 NO	088036 NZ1VZ-2131E3VSE07-M	-	-	-
					3131H 2 NC ⊖ + 2 NO	088042 NZ1VZ-3131E3VSE07-M	-	-	-
				09 [1] 230 V AC	528H 1 NC ⊖ + 1 NO	088047 NZ1VZ-528E3VSE09-M	090346 NZ1VZ-528E3VSE09L060-M	On request	090335 NZ1VZ-528E3VSE09L220-M
					538H 2 NC ⊖	088035 NZ1VZ-538E3VSE09-M	On request	On request	090334 NZ1VZ-538E3VSE09L220-M
					2131H 3 NC ⊖ + 1 NO	088037 NZ1VZ-2131E3VSE09-M	-	-	-
					3131H 2 NC ⊖ + 2 NO	088043 NZ1VZ-3131E3VSE09-M	-	-	-

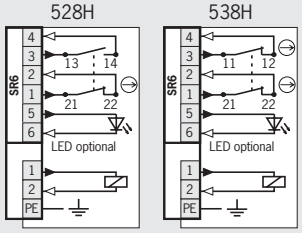
1) Use only solenoid plug with integrated rectifier (see page 119)

Plug connector SR6
6-pin + PE

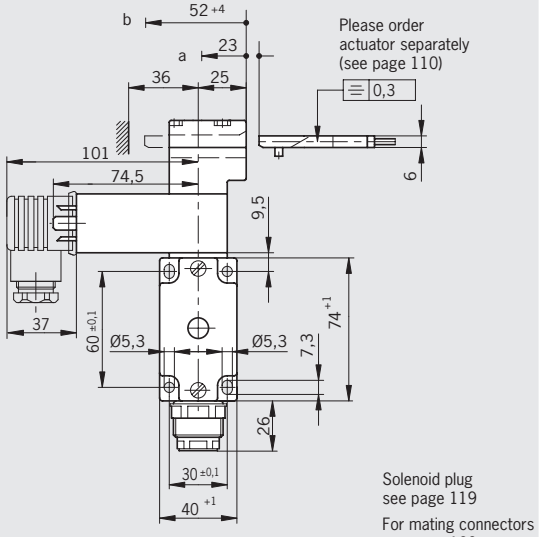
Dimension drawings

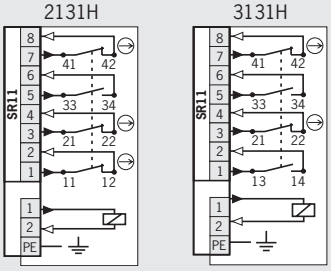


Wiring diagrams



Plug connector SR11
11-pin + PE





Ordering table

Series	Actuator	Connection	Guard locking	Solenoid voltage	Switching element	Function display		
						Without LED	12-60 V red LED	110 V red LED
NZ	VZ Separate actuator	2 Plug connector SR6	VSE Elec. guard locking closed-circuit current principle	04 24 V DC	528H 1 NC ⊖ + 1 NO	044894 NZ2VZ-528E3VSE04	046742 NZ2VZ-528E3VSE04L060	On request
					538H 2 NC ⊖	047837 NZ2VZ-538E3VSE04	057921 NZ2VZ-538E3VSE04L060	On request
				07 [1] 110 V AC	528H 1 NC ⊖ + 1 NO	On request	On request	070290 NZ2VZ-528E3VSE07L110
		2 Plug connector SR11	VSE Elec. guard locking closed-circuit current principle	04 24 V DC	2131H 3 NC ⊖ + 1 NO	074473 NZ2VZ-2131E3VSE04	-	-
					3131H 2 NC ⊖ + 2 NO	074474 NZ2VZ-3131E3VSE04	-	-

1) Use only solenoid plug with integrated rectifier (see page 119)

For safety precautions see page 187
For technical data see page 153

Selection table for safety switches TZ with guard locking and guard lock monitoring

Release feature, front

- **HE** Mechanical release can be sealed
- **E** Emergency unlocking
- **HD** Mechanical release for triangular key acc. to DIN 22417 (latching)
- **ND** Release on the front (pushbutton)
- **NR** Emergency unlocking on the front (rotary knob can be sealed)
- **O** Without manual release feature

Release feature, rear

- **FS** Escape release on the rear (key button)
- **FD** Escape release on the rear (pushbutton/button without key)

Version

- **SB** Protective plate, tamper protection on the switch head

Enabling switch connection

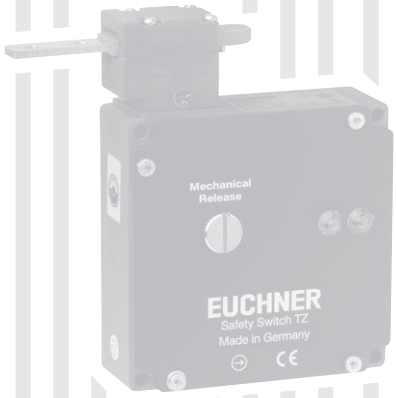
- **BD4** Plug connector 4-pin
- **RC12** Plug connector 4-pin

Connection

- **M** Thread M20x1.5 for cable glands
- **SR6** Plug connector 6-pin + PE
- **MR8** Plug connector 7-pin + PE
- **MR10** Plug connector 9-pin + PE
- **SR11** Plug connector 11-pin + PE
- **MR12** Plug connector 11-pin + PE
- **RC18** Plug connector 18-pin + PE

Switching element

- **Two contacts** 2 x (1 NC ⊖ + 1 NO)
- **Four contacts** 2 x (4 NC ⊖) or 1 x (3 NC ⊖ + 1 NO) + 1 x (2 NC ⊖ + 2 NO)



Manual release									Enabling switch		Connection							Switching element		With version	Page
HE	E	HD	ND	NR	O	FS	FD	SB	BD4	RC12	M	SR6	MR8	MR10	SR11	MR12	RC18	2 cont.	4 cont		
●											●							●	●	C1925/C2087	60/65
●												●						●		C1638	62
●																●			●	C1924	64
●																	●		●	C1826	61
●															●			●	●	C1933	63
●						●					●							●	●	C1815/C1828	75
●						●									●		●	●	●	C1815/C1828	76
●							●				●							●	●	C1684	79
●							●								●			●		C1684	80
●								●			●							●			67
●								●				●			●			●		C1677	68
●								●									●		●		69
●							●				●								●	C2082	77
●							●										●		●	C2140	78
	●												●	●				●	●	C1903	66
		●									●								●	C2159	70
			●								●							●	●	C1816/C1823	71
			●												●		●	●	●	C1816/C1823	72
				●				●							●			●			73
				●													●		●	C1937	74
				●			●	●									●		●	C2123	81
					●			●			●							●	●	C1623/C2100	82
					●									●					●		83
					●			●								●			●	C1902/C1971	83
					●					●							●		●	C1803	84

Safety switch TZ with guard locking and guard lock monitoring

- **Mechanical release on the front**
- **Two LED indicators, red and green**
- **Plug connector optional**
- **Actuating head fitted left or right**

Approach direction

Horizontal
Adjustable in 90° steps.

Mechanical release
Is used for releasing the guard locking with the aid of a tool. A sealing wire can be fitted to protect against tampering. Lead seal kit and tool included (already pre-assembled on versions with plug connectors).

Solenoid operating voltage and LED function display
The following voltage ranges are available:

24 V	AC/DC	-15%, +10%
110 V	AC	-15%, +10%
230 V	AC	-15%, +10%

Guard locking types

TZ1 Closed-circuit current principle, guard locking by spring force. Release by applying voltage to the solenoid.

TZ2 Open-circuit current principle, guard locking by applying voltage to the solenoid. Release by spring force.

Switching elements (See also page 13/14)

SK For monitoring the door/actuator position

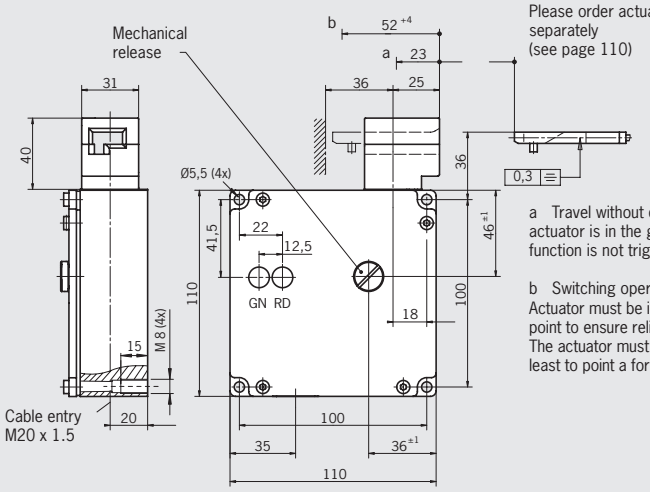
ÜK For monitoring the guard locking (built-in solenoid)

For combinations available see ordering table:

- **528H** Slow-action 1 NC ⊖ + 1 NO
- **2121H** Slow-action 4 NC ⊖
- **2131H** Slow-action 3 NC ⊖ + 1 NO
- **3131H** Slow-action 2 NC ⊖ + 2 NO

Cable entry M20 x 1.5

Dimension drawings Actuating head on the left is a mirror image



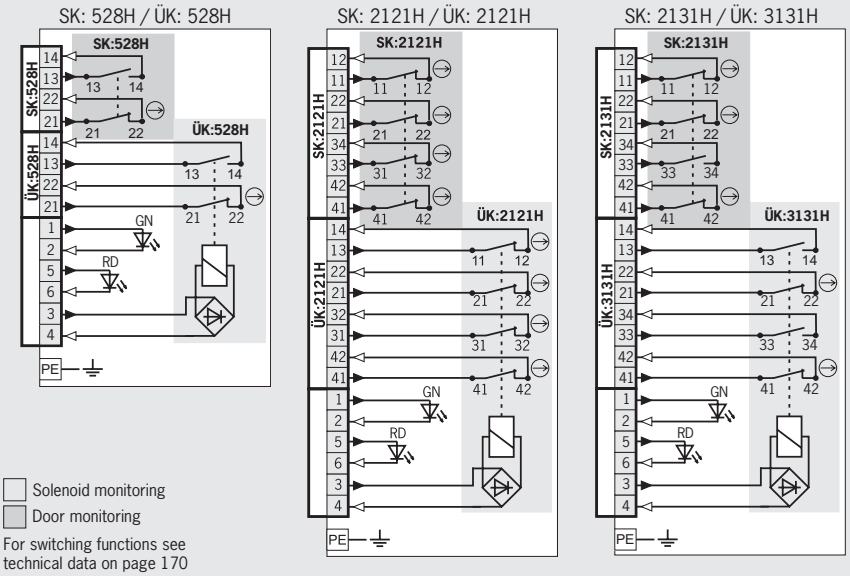
Please order actuator separately (see page 110)

a Travel without operation: actuator is in the guide slot, but function is not triggered.

b Switching operation completed: Actuator must be inserted to this point to ensure reliable switching. The actuator must be withdrawn at least to point a for switching off.

Cable gland see page 124

Wiring diagrams Actuator inserted and locked



Solenoid monitoring
Door monitoring

For switching functions see technical data on page 170

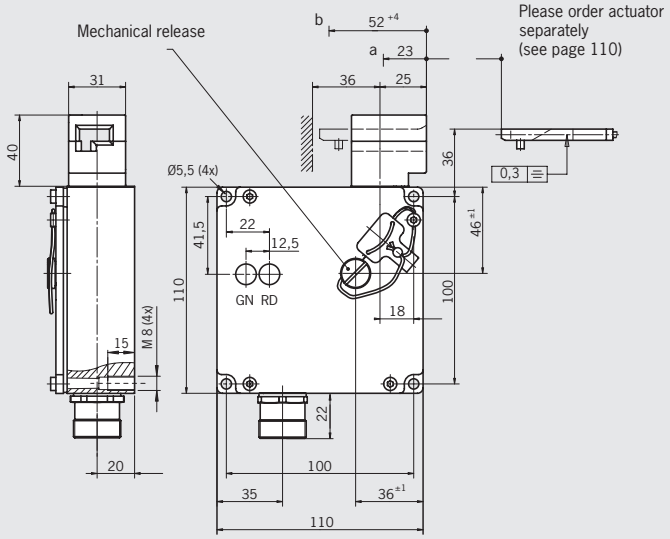
Ordering table

Series	Connection	Guard locking	Switch head	Switching element	Black cover 24 V	Black cover 110 V	Black cover 230 V	Red cover 24 V	Red cover 110 V
TZ	M20x1.5	1 Mechanical	LE left	SK: **528H**, 1 NC ⊖ + 1 NO ÜK: **528H**, 1 NC ⊖ + 1 NO	**082050** TZ1LE024M	**083160** TZ1LE110M	**083166** TZ1LE220M	**083164** TZ1LE024M-R	**083168** TZ1LE110M-R
				SK: **2121H**, 4 NC ⊖ ÜK: **2121H**, 4 NC ⊖	On request	On request	On request	**089464** 1) TZ1LE024MVFG-RC1925	On request
				SK: **2131H**, 3 NC ⊖ + 1 NO ÜK: **3131H**, 2 NC ⊖ + 2 NO	**083965** TZ1LE024MVAB	**088023** TZ1LE110MVAB	**088029** TZ1LE220MVAB	**089434** TZ1LE024MVAB-R	On request
			RE right	SK: **528H**, 1 NC ⊖ + 1 NO ÜK: **528H**, 1 NC ⊖ + 1 NO	**082051** TZ1RE024M	**083161** TZ1RE110M	**083167** TZ1RE220M	**083165** TZ1RE024M-R	**089448** TZ1RE110M-R
				SK: **2121H**, 4 NC ⊖ ÜK: **2121H**, 4 NC ⊖	On request	On request	On request	**089465** 1) TZ1RE024MVFG-RC1925	On request
				SK: **2131H**, 3 NC ⊖ + 1 NO ÜK: **3131H**, 2 NC ⊖ + 2 NO	**083966** TZ1RE024MVAB	**088024** TZ1RE110MVAB	**088030** TZ1RE220MVAB	**083233** TZ1RE024MVAB-R	On request
		2 Electrical	LE left	SK: **528H**, 1 NC ⊖ + 1 NO ÜK: **528H**, 1 NC ⊖ + 1 NO	**090559** TZ2LE024M	**083162** TZ2LE110M	**088031** TZ2LE220M	**089445** TZ2LE024M-R	On request
				SK: **2131H**, 3 NC ⊖ + 1 NO ÜK: **3131H**, 2 NC ⊖ + 2 NO	**088070** TZ2LE024MVAB	**088025** TZ2LE110MVAB	**088027** TZ2LE220MVAB	On request	On request
			RE right	SK: **528H**, 1 NC ⊖ + 1 NO ÜK: **528H**, 1 NC ⊖ + 1 NO	**090560** TZ2RE024M	**083163** TZ2RE110M	**088032** TZ2RE220M	**089446** TZ2RE024M-R	On request
				SK: **2131H**, 3 NC ⊖ + 1 NO ÜK: **3131H**, 2 NC ⊖ + 2 NO	**088071** TZ2RE024MVAB	**088026** TZ2RE110MVAB	**088028** TZ2RE220MVAB	On request	On request

1) No DGUV approval

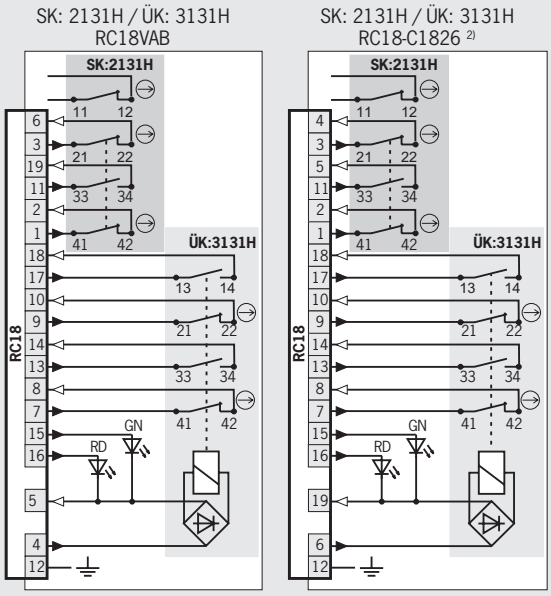
Plug connector RC18
18-pin + PE

Dimension drawings Actuating head on the left is a mirror image



For mating connector see page 121

Wiring diagrams Actuator inserted and locked



For switching functions see technical data on page 170

Solenoid monitoring
Door monitoring

Ordering table

Series	Connection	Guard locking	Switch head	Switching element	Version	Black cover 24 V
TZ	RC18 Plug connector	1 Mechanical	LE left	SK: **2131H**, 3 NC ⊖ + 1 NO ÜK: **3131H**, 2 NC ⊖ + 2 NO		**084242** TZ1LE024RC18VAB
					C1826 Wiring	**084246** 2) TZ1LE024RC18VAB-C1826
			RE right	SK: **2121H**, 4 NC ⊖ ÜK: **2121H**, 4 NC ⊖		**084243** TZ1RE024RC18VAB
					C1826 Wiring	**084247** 2) TZ1RE024RC18VAB-C1826
		2 Electrical	LE left	SK: **2131H**, 3 NC ⊖ + 1 NO ÜK: **3131H**, 2 NC ⊖ + 2 NO	C1826 Wiring	**085180** 2) TZ2LE024RC18VAB-C1826
			RE right	SK: **2131H**, 3 NC ⊖ + 1 NO ÜK: **3131H**, 2 NC ⊖ + 2 NO	C1826 Wiring	**085181** 2) TZ2RE024RC18VAB-C1826

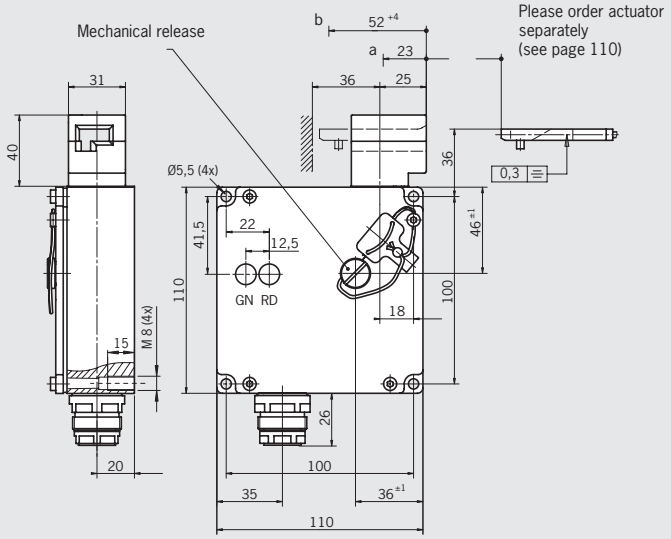
2) **Important**: use suitable mating connector with option C1825!

Please turn over

For safety precautions see page 187
For technical data see page 153

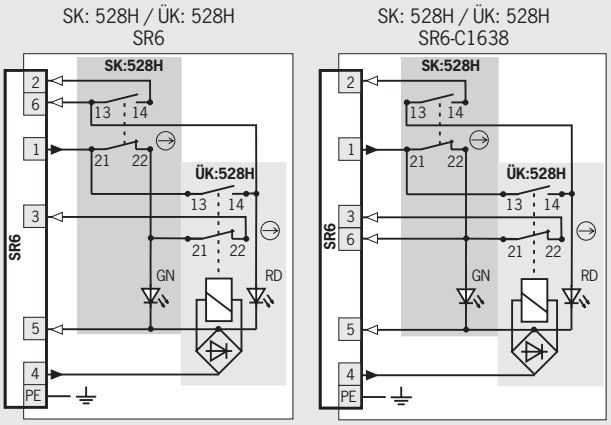
Plug connector SR6
6-pin + PE

Dimension drawings Actuating head on the left is a mirror image



For mating connector see page 120

Wiring diagrams Actuator inserted and locked



For switching functions see technical data on page 170

Solenoid monitoring
Door monitoring

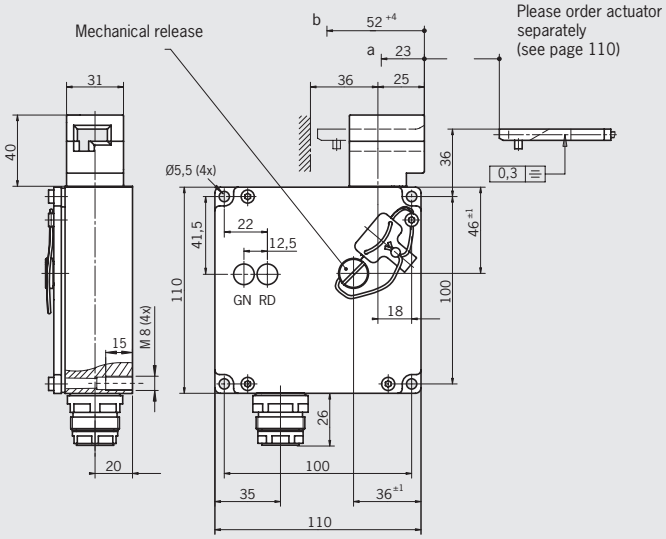
Ordering table

Series	Connection	Guard locking	Switch head	Switching element	Version	Black cover 24 V	Black cover 110 V	Black cover 230 V	Red cover 24 V
TZ	SR6 Plug connector	1 Mechanical	LE left	SK: **528H**, 1 NC ⊖ + 1 NO ÜK: **528H**, 1 NC ⊖ + 1 NO		**046502** TZ1LE024SR6	**046503** TZ1LE110SR6	**046504** TZ1LE220SR6	On request
					C1638 [1] Wiring	**089476** [1] TZ1LE024SR6-C1638	On request	On request	On request
			RE right	SK: **528H**, 1 NC ⊖ + 1 NO ÜK: **528H**, 1 NC ⊖ + 1 NO		**046190** TZ1RE024SR6	**046191** TZ1RE110SR6	**051879** TZ1RE220SR6	On request
					C1638 [1] Wiring	**070529** [1] TZ1RE024SR6-C1638	On request	On request	On request
		2 Electrical	LE left	SK: **528H**, 1 NC ⊖ + 1 NO ÜK: **528H**, 1 NC ⊖ + 1 NO		**049159** TZ2LE024SR6	**052914** TZ2LE110SR6	**045450** TZ2LE220SR6	**046915** TZ2LE024SR6-R
					C1638 [1] Wiring	**076294** [1] TZ2LE024SR6-C1638	On request	On request	On request
			RE right	SK: **528H**, 1 NC ⊖ + 1 NO ÜK: **528H**, 1 NC ⊖ + 1 NO		**049102** TZ2RE024SR6	**049238** TZ2RE110SR6	**047937** TZ2RE220SR6	**059672** TZ2RE024SR6-R
					C1638 [1] Wiring	**055819** [1] TZ2RE024SR6-C1638	On request	On request	On request

1) No DGUV approval

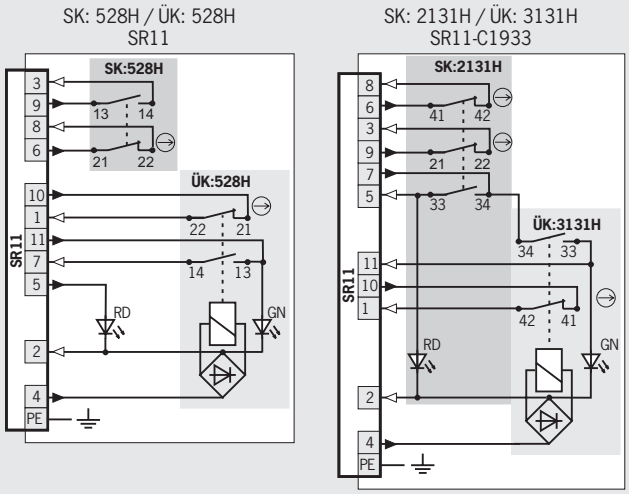
Plug connector SR11
11-pin + PE

Dimension drawings Actuating head on the left is a mirror image



For mating connector see page 120

Wiring diagrams Actuator inserted and locked



For switching functions see technical data on page 170

Solenoid monitoring
Door monitoring

Ordering table

Series	Connection	Guard locking	Switch head	Switching element	Version	Black cover 24 V
TZ	SR11 Plug connector	1 Mechanical	LE left	SK: **528H**, 1 NC ⊖ + 1 NO ÜK: **528H**, 1 NC ⊖ + 1 NO		**070828** TZ1LE024SR11
				SK: **2131H**, 3 NC ⊖ + 1 NO ÜK: **3131H**, 2 NC ⊖ + 2 NO	**C1933** [1] Alternative wiring	**083230** [1] TZ1LE024SR11VAB-C1933
			RE right	SK: **528H**, 1 NC ⊖ + 1 NO ÜK: **528H**, 1 NC ⊖ + 1 NO		**070826** TZ1RE024SR11
				SK: **2131H**, 3 NC ⊖ + 1 NO ÜK: **3131H**, 2 NC ⊖ + 2 NO	**C1933** [1] Alternative wiring	**083231** [S] TZ1RE024SR11VAB-C1933
		2 Electrical	LE left	SK: **528H**, 1 NC ⊖ + 1 NO ÜK: **528H**, 1 NC ⊖ + 1 NO		**070958** TZ2LE024SR11
			RE right	SK: **528H**, 1 NC ⊖ + 1 NO ÜK: **528H**, 1 NC ⊖ + 1 NO		**070957** TZ2RE024SR11

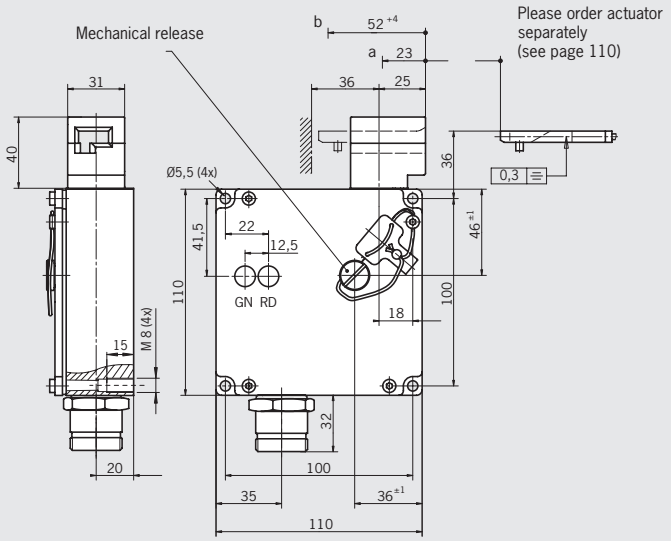
1) No DGUV approval

Please turn over

For safety precautions see page 187
For technical data see page 153

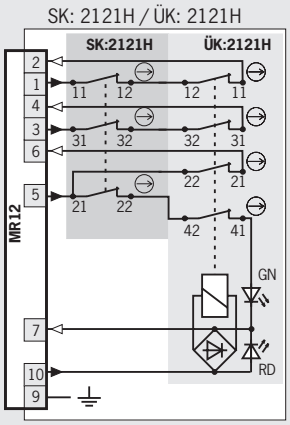
Plug connector MR12
11-pin + PE

Dimension drawings Actuating head on the left is a mirror image



For mating connector see page 123

Wiring diagrams Actuator inserted and locked



For switching functions see technical data on page 170

☐ Solenoid monitoring
☐ Door monitoring

Ordering table

Series	Connection	Guard locking	Switch head	Switching element	Black cover 24 V	Black cover 110 V	Black cover 230 V	Red cover 24 V
TZ	**MR12** Plug connector	**1** Mechanical	**LE** left	SK: **2121H**, 4 NC ⊖ ÜK: **2121H**, 4 NC ⊖	On request	On request	On request	**083190** TZ1LE024BHAVFG-RC1924
			RE right	SK: **2121H**, 4 NC ⊖ ÜK: **2121H**, 4 NC ⊖	On request	On request	On request	**083191** TZ1RE024BHAVFG-RC1924

Safety switch TZ with guard locking and guard lock monitoring

- **Mechanical release on the front**
- **Two cable entries M20x1.5**
- **Two LED indicators, red and green**
- **Plug connector on request**
- **Actuating head fitted left or right**

Approach direction

Horizontal
Adjustable in 90° steps.

Mechanical release
Is used for releasing the guard locking with the aid of a tool. A sealing wire can be fitted to protect against tampering. Lead seal kit and tool included (already pre-assembled on versions with plug connectors).

Solenoid operating voltage and LED function display
The following voltage ranges are available:
- 24 V AC/DC -15%, +10%

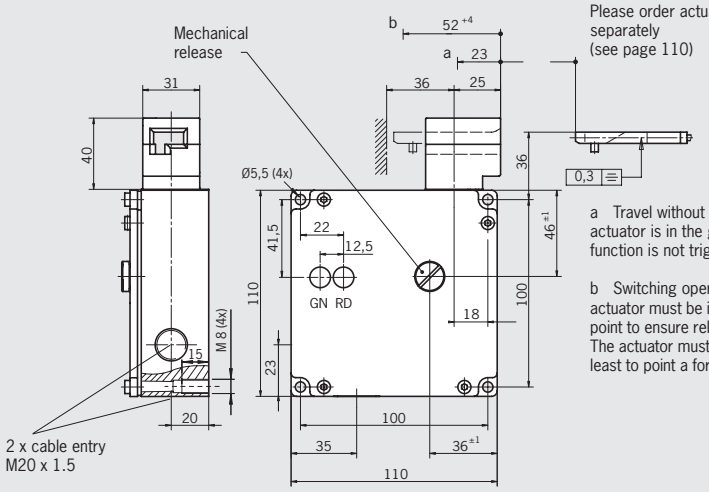
Guard locking types
TZ1 Closed-circuit current principle, guard locking by spring force. Release by applying voltage to the solenoid.

Switching elements (See also page 13/14)
SK For monitoring the door/actuator position
ÜK For monitoring the guard locking (built-in solenoid)

For combinations available see ordering table:
- **528H** Slow-action switching contact 1 NC ⊖ + 1 NO
- **2131H** Slow-action switching contact 3 NC ⊖ + 1 NO
- **3131H** Slow-action switching contact 2 NC ⊖ + 2 NO

Cable entry 2 x M20 x 1.5

Dimension drawings Actuating head on the left is a mirror image

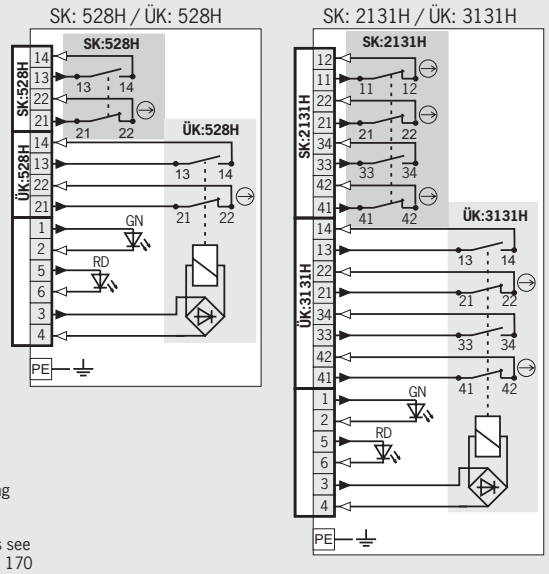


a Travel without operation: actuator is in the guide slot, but function is not triggered.

b Switching operation completed: actuator must be inserted to this point to ensure reliable switching. The actuator must be withdrawn at least to point a for switching off.

Cable gland see page 124

Wiring diagrams Actuator inserted and locked



Solenoid monitoring
Door monitoring

For switching functions see technical data on page 170

Ordering table

Series	Connection	Guard locking	Switch head	Switching element	Version	Black cover 24 V
TZ	2 x M20x1.5	1 Mechanical	LE left	SK: **528H**, 1 NC ⊖ + 1 NO ÜK: **528H**, 1 NC ⊖ + 1 NO	2 cable entries	**095245** TZ1LE024M-C2087
				SK: **2131H**, 3 NC ⊖ + 1 NO ÜK: **3131H**, 2 NC ⊖ + 2 NO	2 cable entries	On request
			RE right	SK: **528H**, 1 NC ⊖ + 1 NO ÜK: **528H**, 1 NC ⊖ + 1 NO	2 cable entries	**095253** TZ1RE024M-C2087
				SK: **2131H**, 3 NC ⊖ + 1 NO ÜK: **3131H**, 2 NC ⊖ + 2 NO	2 cable entries	**098205** TZ1RE024MVAB-C2087

For safety precautions see page 187
For technical data see page 153

Safety switch TZ with guard locking and guard lock monitoring

- **Emergency unlocking on the front**
- **Two LED indicators, red and green**
- **Plug connector**
- **Actuating head fitted left or right**

Approach direction

Horizontal
Adjustable in 90° steps.

Emergency unlocking
Is used for the manual release of the guard locking without tools. The emergency unlocking mechanism must be returned to the locked state manually.

Solenoid operating voltage and LED function display
The following voltage ranges are available:
- 24 V AC/DC -15%, +10%
- 110 V AC -15%, +10%

Guard locking types
TZ1 Closed-circuit current principle, guard locking by spring force. Release by applying voltage to the solenoid.
TZ2 Open-circuit current principle, guard locking by applying voltage to the solenoid. Release by spring force.

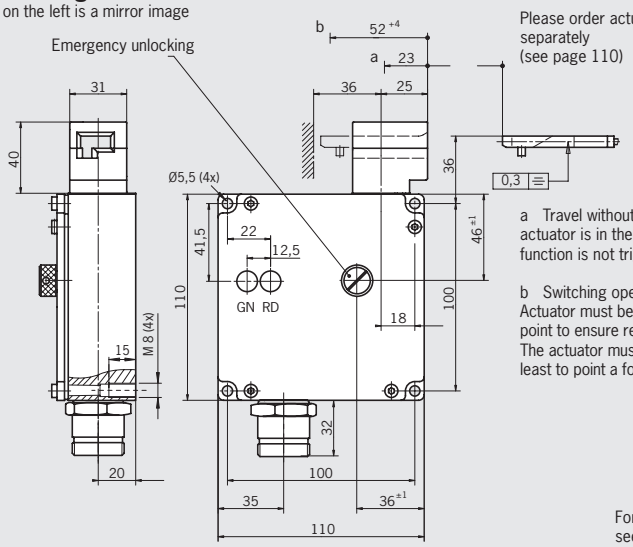
Switching elements (See also page 13/14)
SK For monitoring the door/actuator position
ÜK For monitoring the guard locking (built-in solenoid)

For combinations available see ordering table:
- **528H** Slow-action switching element 1 NC ⊖ + 1 NO
- **2121H** Slow-action switching contact 4 NC ⊖
- **2131H** Slow-action switching contact 3 NC ⊖ + 1 NO
- **3131H** Slow-action switching contact 2 NC ⊖ + 2 NO

Plug connector MR8 (GL)
7-pin + PE

Plug connector MR10
9-pin + PE

Dimension drawings
Actuating head on the left is a mirror image



Please order actuator separately (see page 110)

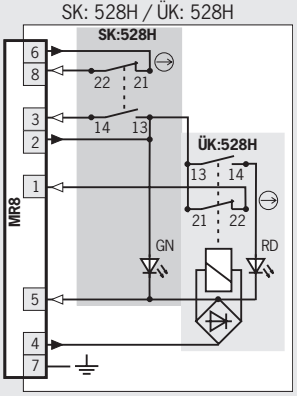
a Travel without operation: actuator is in the guide slot, but function is not triggered.

b Switching operation completed: Actuator must be inserted to this point to ensure reliable switching. The actuator must be withdrawn at least to point a for switching off.

For mating connector see page 123

Wiring diagrams Actuator inserted and locked

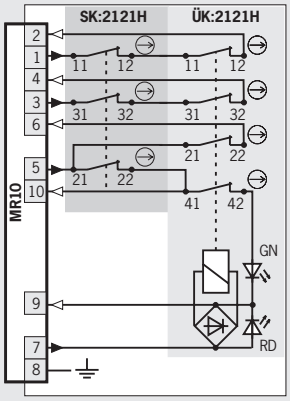
SK: 528H / ÜK: 528H



For switching functions see technical data on page 170

Solenoid monitoring
Door monitoring

SK: 2121H / ÜK: 2121H
-C1903



For switching functions see technical data on page 170

Solenoid monitoring
Door monitoring

Ordering table

Series	Connection	Guard locking	Switch head	Switching element	Version	Black cover 24 V	Black cover 110 V	Red cover 24 V
TZ	MR8 Plug connector	1 Mechanical	LE left	SK: **528H**, 1 NC ⊖ + 1 NO ÜK: **528H**, 1 NC ⊖ + 1 NO	Emergency unlocking cannot be sealed	**054964** TZ1LE024PG0R8C	**074917** TZ1LE110PG0R8C	On request
			RE right	SK: **528H**, 1 NC ⊖ + 1 NO ÜK: **528H**, 1 NC ⊖ + 1 NO	Emergency unlocking cannot be sealed	**059920** TZ1RE024PG0R8C	**074916** TZ1RE110PG0R8C	On request
	MR10 Plug connector	1 Mechanical	LE left	SK: **2121H**, 4 NC ⊖ ÜK: **2121H**, 4 NC ⊖	Emergency unlocking cannot be sealed	On request	On request	**082095** TZ1LE024BHA-C1903
			RE right	SK: **2121H**, 4 NC ⊖ ÜK: **2121H**, 4 NC ⊖	Emergency unlocking cannot be sealed	On request	On request	**082096** TZ1RE024BHA-C1903
		2 Electrical	LE left	SK: **2121H**, 4 NC ⊖ ÜK: **2121H**, 4 NC ⊖	Emergency unlocking cannot be sealed	On request	On request	**082083** TZ2LE024BHA-C1903
			RE right	SK: **2121H**, 4 NC ⊖ ÜK: **2121H**, 4 NC ⊖	Emergency unlocking cannot be sealed	On request	On request	**082084** TZ2RE024BHA-C1903

Safety switch TZ with guard locking and guard lock monitoring

- **Mechanical release on the front**
- **Protective plate for switch head**
- **Two LED indicators, red and green**
- **Plug connector optional**
- **Actuating head fitted left or right**

Approach direction

Horizontal
Adjustable in 90° steps.

Mechanical release
Is used for releasing the guard locking with the aid of a tool. A sealing wire can be fitted to protect against tampering. Lead seal kit and tool included (already pre-assembled on versions with plug connectors).

Protective plate for switch head
Makes it more difficult to tamper with the switch.

Solenoid operating voltage and LED function display
The following voltage range is available:
- 24 V AC/DC -15%, +10%

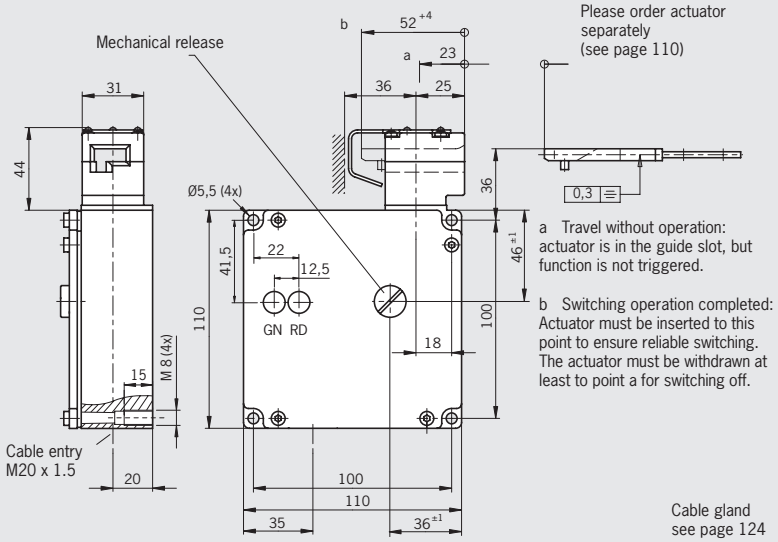
Guard locking types
TZ1 Closed-circuit current principle, guard locking by spring force. Release by applying voltage to the solenoid.
TZ2 Open-circuit current principle, guard locking by applying voltage to the solenoid. Release by spring force.

Switching elements (See also page 13/14)
SK For monitoring the door/actuator position
ÜK For monitoring the guard locking (built-in solenoid)

For combinations available see ordering table:
- **528H** Slow-action switching contact 1 NC ⊖ + 1 NO
- **2131H** Slow-action switching contact 3 NC ⊖ + 1 NO
- **3131H** Slow-action switching contact 2 NC ⊖ + 2 NO

Cable entry M20 x 1.5

Dimension drawings Actuating head on the left is a mirror image



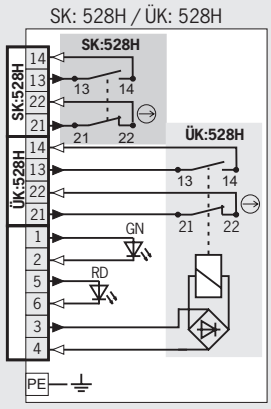
Please order actuator separately (see page 110)

a Travel without operation: actuator is in the guide slot, but function is not triggered.

b Switching operation completed: Actuator must be inserted to this point to ensure reliable switching. The actuator must be withdrawn at least to point a for switching off.

Cable gland see page 124

Wiring diagrams Actuator inserted and locked



For switching functions see technical data on page 170

☐ Solenoid monitoring
☐ Door monitoring

Ordering table

Series	Connection	Guard locking	Switch head	Switching element	Version	Black cover 24 V
TZ	M20x1.5	1 Mechanical	LE left	SK: **528H**, 1 NC ⊖ + 1 NO ÜK: **528H**, 1 NC ⊖ + 1 NO	With protective plate	**089470** TZ1LE024M-089470
			RE right	SK: **528H**, 1 NC ⊖ + 1 NO ÜK: **528H**, 1 NC ⊖ + 1 NO	With protective plate	**089471** TZ1RE024M-089471

Please turn over

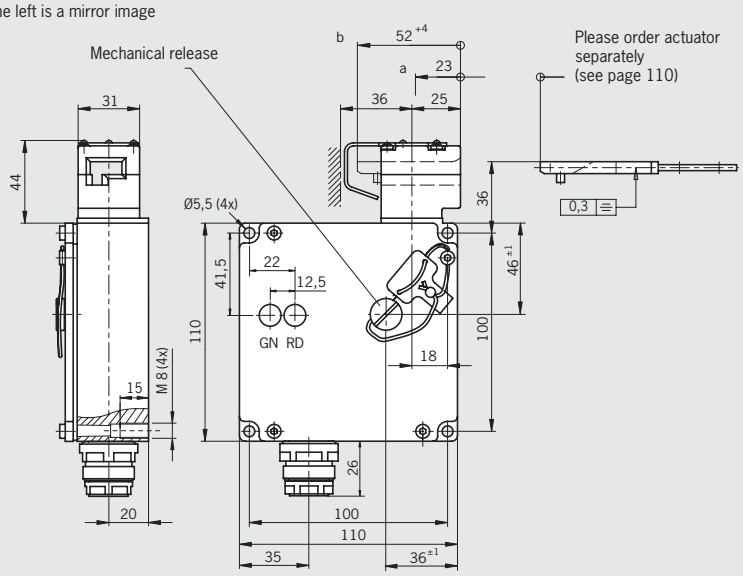
For safety precautions see page 187
For technical data see page 153

GL GL

Plug connector SR6
6-pin + PE

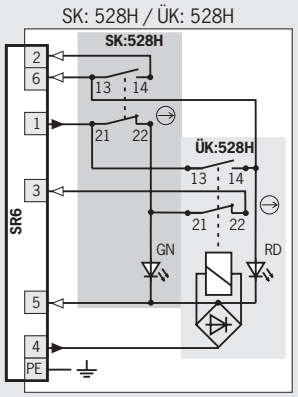
Plug connector SR11
11-pin + PE

Dimension drawings Actuating head on the left is a mirror image



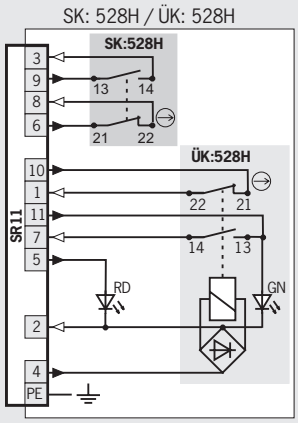
For mating connector see page 120

Wiring diagrams Actuator inserted and locked



For switching functions see technical data on page 170

Solenoid monitoring
Door monitoring



For switching functions see technical data on page 170

Solenoid monitoring
Door monitoring

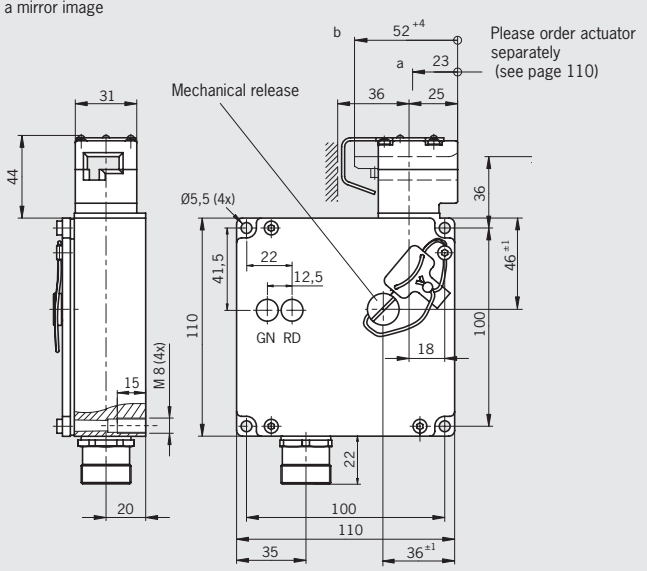
Ordering table

Series	Connection	Guard locking	Switch head	Switching element	Version	Black cover 24 V
TZ	**SR6** Plug connector	**1** Mechanical	**LE** left	SK: **528H**, 1 NC ⊖ + 1 NO ÜK: **528H**, 1 NC ⊖ + 1 NO	With protective plate	**059694** TZ1LE024SR6-C1677
			RE right	SK: **528H**, 1 NC ⊖ + 1 NO ÜK: **528H**, 1 NC ⊖ + 1 NO	With protective plate	**059692** TZ1RE024SR6-C1677
		2 Electrical	**LE** left	SK: **528H**, 1 NC ⊖ + 1 NO ÜK: **528H**, 1 NC ⊖ + 1 NO	With protective plate	**059852** TZ2LE024SR6-C1677
			RE right	SK: **528H**, 1 NC ⊖ + 1 NO ÜK: **528H**, 1 NC ⊖ + 1 NO	With protective plate	**059699** TZ2RE024SR6-C1677
	SR11 Plug connector	**1** Mechanical	**LE** left	SK: **528H**, 1 NC ⊖ + 1 NO ÜK: **528H**, 1 NC ⊖ + 1 NO	With protective plate	**093860** TZ1LE024SR11-093860
			RE right	SK: **528H**, 1 NC ⊖ + 1 NO ÜK: **528H**, 1 NC ⊖ + 1 NO	With protective plate	**093861** TZ1RE024SR11-093861

GL

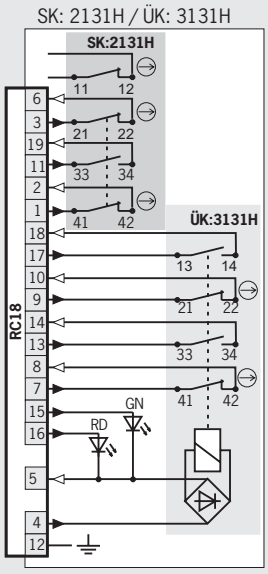
Plug connector RC18
18-pin + PE

Dimension drawings Actuating head on the left is a mirror image



For mating connector see page 121

Wiring diagrams Actuator inserted and locked



For switching functions see technical data on page 170

Solenoid monitoring
Door monitoring

Ordering table

Series	Connection	Guard locking	Switch head	Switching element	Version	Black cover 24 V
TZ	RC18 Plug connector	1 Mechanical	LE left	SK: **2131H**, 3 NC ⊖ + 1 NO ÜK: **3131H**, 2 NC ⊖ + 2 NO	With protective plate	**093862** TZ1LE024RC18VAB-093862
			RE right	SK: **2131H**, 3 NC ⊖ + 1 NO ÜK: **3131H**, 2 NC ⊖ + 2 NO	With protective plate	**093863** TZ1RE024RC18VAB-093863

For safety precautions see page 187
For technical data see page 153

Safety switch TZ with guard locking and guard lock monitoring

GL

- **Mechanical release on the front, release with a triangular key according to DIN 22417**
- **Two LED indicators, red and green**
- **Actuating head fitted left or right**

Approach direction

Horizontal
Adjustable in 90° steps.

Mechanical release
This releases the guard locking after operation with a triangular key acc. to DIN 22417.

Solenoid operating voltage and LED function display
The following voltage range is available:
- 24 V AC/DC -15%, +10%

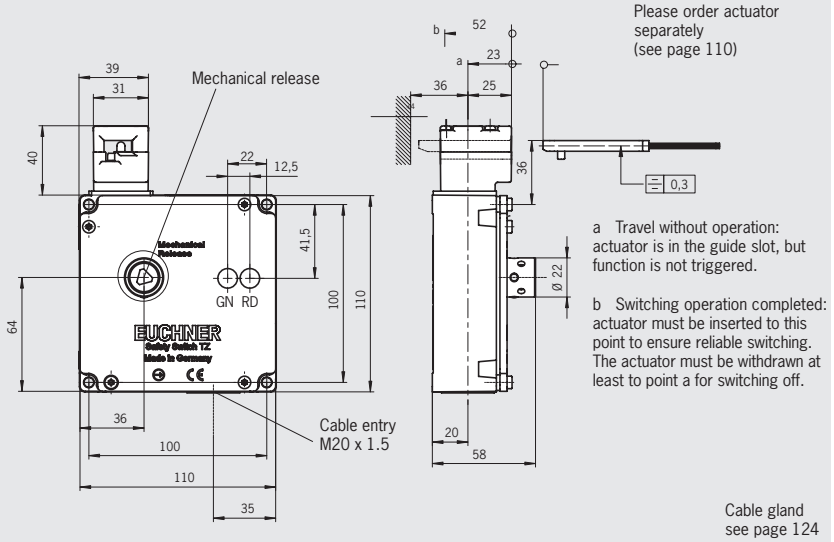
Guard locking types
TZ1 Closed-circuit current principle, guard locking by spring force. Release by applying voltage to the solenoid.

Switching elements (See also page 13/14)
SK For monitoring the door/actuator position
ÜK For monitoring the guard locking (built-in solenoid)

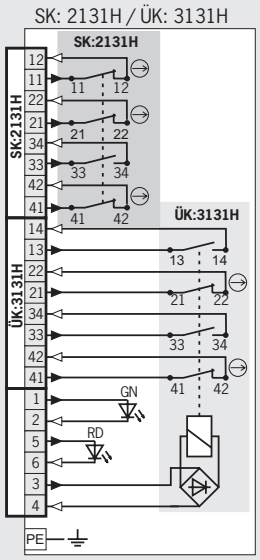
For combinations available see ordering table:
- **2131H** Slow-action switching contact 3 NC ⊖ + 1 NO
- **3131H** Slow-action switching contact 2 NC ⊖ + 2 NO

Cable entry M20 x 1.5

Dimension drawings actuator head on the right is a mirror image



Wiring diagrams Actuator inserted and locked



For switching functions see technical data on page 170

Ordering table

Series	Connection	Guard locking	Switch head	Switching element	Version	Black cover 24 V
TZ	M20x1.5	1 Mechanical	LE left	SK: **2131H**, 3 NC ⊖ + 1 NO ÜK: **3131H**, 2 NC ⊖ + 2 NO	Mechanical release with triangular key	**098718** TZ1LB024MVAB-C2159
			RE right	SK: **2131H**, 3 NC ⊖ + 1 NO ÜK: **3131H**, 2 NC ⊖ + 2 NO	Mechanical release with triangular key	**098717** TZ1RB024MVAB-C2159

Safety switch TZ with guard locking and guard lock monitoring

- **Release on the front with pushbutton**
- **Two LED indicators, red and green**
- **Plug connector optional**
- **Actuating head fitted left or right**

Approach direction

Horizontal
Adjustable in 90° steps.

Release
Is used for the manual release of the guard locking without tools. It is possible to remove the disable and return the switch to its operating state by hand without tools.

Solenoid operating voltage and LED function display
The following voltage range is available:
- 24 V AC/DC -15%, +10%

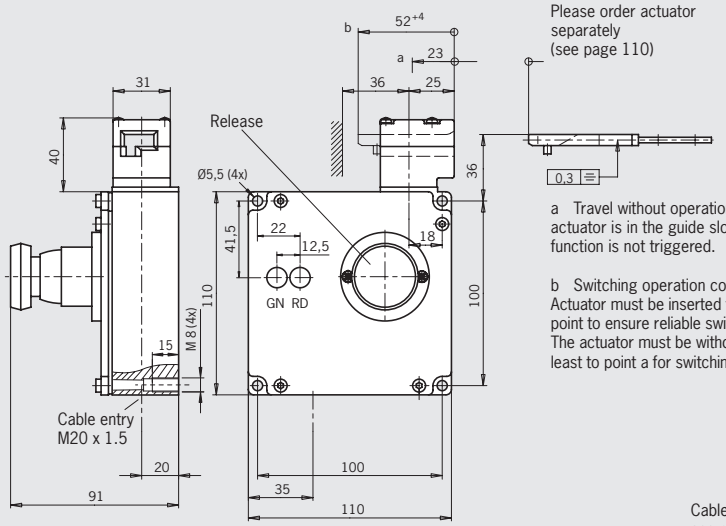
Guard locking types
TZ1 Closed-circuit current principle, guard locking by spring force. Release by applying voltage to the solenoid.
TZ2 Open-circuit current principle, guard locking by applying voltage to the solenoid. Release by spring force.

Switching elements (See also page 13/14)
SK For monitoring the door/actuator position
ÜK For monitoring the guard locking (built-in solenoid)

For combinations available see ordering table:
- **528H** Slow-action switching contact 1 NC ⊖ + 1 NO
- **2131H** Slow-action switching contact 3 NC ⊖ + 1 NO
- **3131H** Slow-action switching contact 2 NC ⊖ + 2 NO

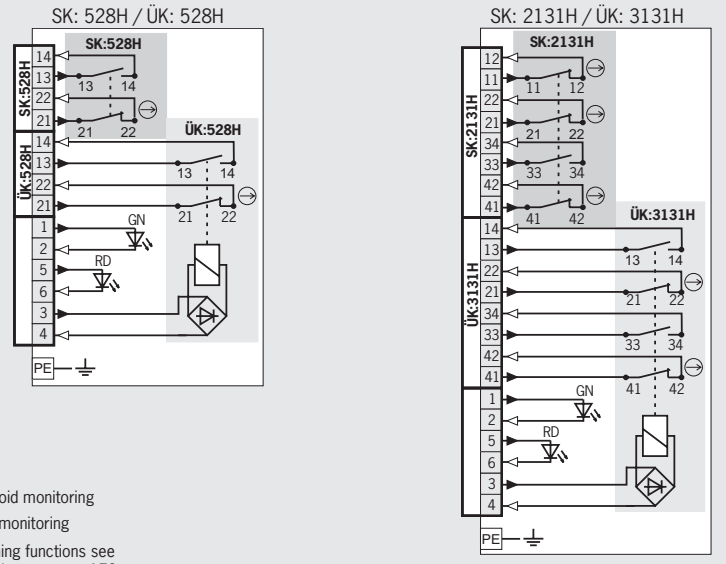
Cable entry M20 x 1.5

Dimension drawings Actuating head on the left is a mirror image



Cable gland see page 124

Wiring diagrams Actuator inserted and locked



Solenoid monitoring
Door monitoring

For switching functions see technical data on page 170

Ordering table

Series	Connection	Guard locking	Switch head	Switching element	Version	Black cover 24 V
TZ	M20x1.5	1 Mechanical	LE left	SK: **528H**, 1 NC ⊖ + 1 NO ÜK: **528H**, 1 NC ⊖ + 1 NO	Release (blue push button)	**089477** TZ1LE024M-C1816
			RE right	SK: **528H**, 1 NC ⊖ + 1 NO ÜK: **528H**, 1 NC ⊖ + 1 NO	Release (blue push button)	**096901** TZ1RE024M-C1816
		2 Electrical	LE left	SK: **528H**, 1 NC ⊖ + 1 NO ÜK: **528H**, 1 NC ⊖ + 1 NO	Release (blue push button)	**087992** TZ2LE024M-C1816
			RE right	SK: **2131H**, 3 NC ⊖ + 1 NO ÜK: **3131H**, 2 NC ⊖ + 2 NO	Release (blue push button)	**089455** TZ2LE024MVAB-C1823
			LE left	SK: **528H**, 1 NC ⊖ + 1 NO ÜK: **528H**, 1 NC ⊖ + 1 NO	Release (blue push button)	**087993** TZ2RE024M-C1816
			RE right	SK: **2131H**, 3 NC ⊖ + 1 NO ÜK: **3131H**, 2 NC ⊖ + 2 NO	Release (blue push button)	**089456** TZ2RE024MVAB-C1823

Please turn over

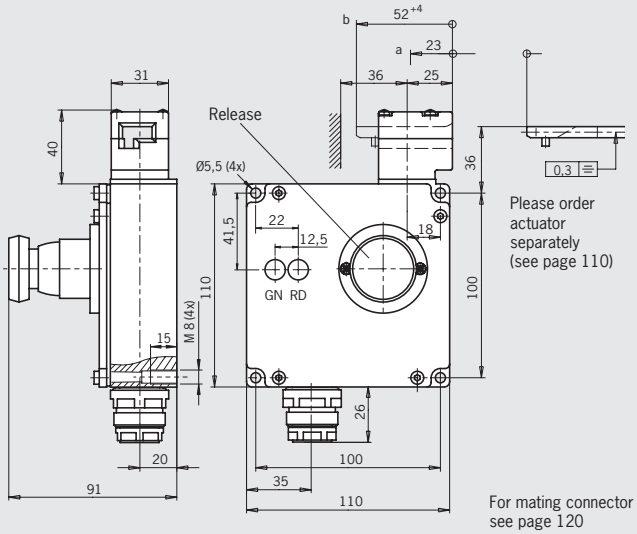
For safety precautions see page 187
For technical data see page 153

GL GL

Plug connector SR11
11-pin + PE

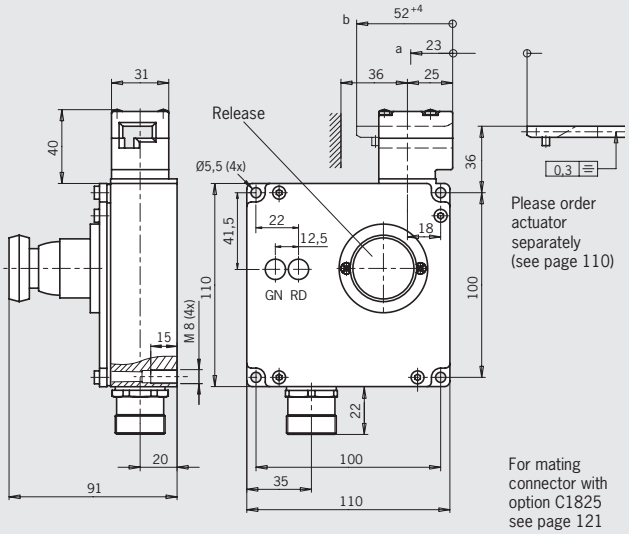
Plug connector RC18
18-pin + PE

Dimension drawings Actuating head on the left is a mirror image



Please order actuator separately (see page 110)

For mating connector see page 120

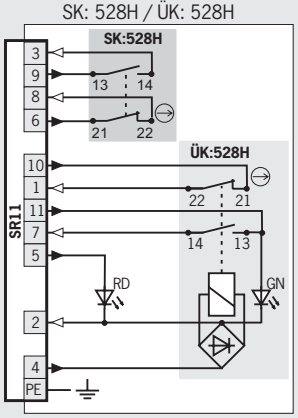


Please order actuator separately (see page 110)

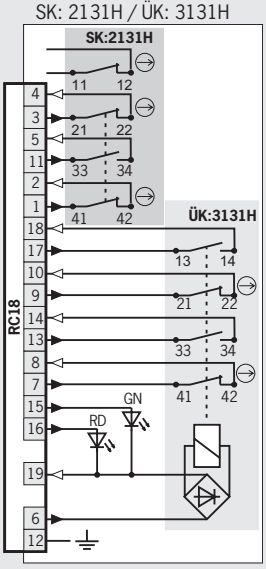
For mating connector with option C1825 see page 121

Wiring diagrams Actuator inserted and locked

SK: 528H / ÜK: 528H



SK: 2131H / ÜK: 3131H



☐ Solenoid monitoring
☐ Door monitoring

For switching functions see technical data on page 170

☐ Solenoid monitoring
☐ Door monitoring

For switching functions see technical data on page 170

Ordering table

Series	Connection	Guard locking	Switch head	Switching element	Version	Black cover 24 V
TZ	**SR11** Plug connector	**1** Mechanical	**LE** left	SK: **528H**, 1 NC ⊖ + 1 NO ÜK: **528H**, 1 NC ⊖ + 1 NO	Release (blue push button)	**077044** TZ1LE024SR11-C1816
			RE right	SK: **528H**, 1 NC ⊖ + 1 NO ÜK: **528H**, 1 NC ⊖ + 1 NO	Release (blue push button)	**077042** TZ1RE024SR11-C1816
	RC18 [1] Plug connector	**1** Mechanical	**LE** left	SK: **2131H**, 3 NC ⊖ + 1 NO ÜK: **3131H**, 2 NC ⊖ + 2 NO	Release (blue push button)	**088090** TZ1LE024RC18VAB-C1823
			RE right	SK: **2131H**, 3 NC ⊖ + 1 NO ÜK: **3131H**, 2 NC ⊖ + 2 NO	Release (blue push button)	**088091** TZ1RE024RC18VAB-C1823

1) **Important**: use suitable mating connector with option C1825!

Safety switch TZ with guard locking and guard lock monitoring

GL

- **Emergency unlocking on the front with rotary knob**
- **Protective plate for switch head optional**
- **Two LED indicators, red and green**
- **Plug connectors**
- **Actuating head fitted left or right**

Approach direction

Horizontal
Adjustable in 90° steps.

Emergency unlocking
Is used for the manual release of the guard locking without tools. The emergency unlocking mechanism must be returned to the locked state manually. A sealing wire can be fitted to protect against tampering. Lead seal kit and tool included (already pre-assembled on versions with plug connectors).

Protective plate for switch head
Makes it more difficult to tamper with the switch.

Solenoid operating voltage and LED function display
The following voltage range is available:
- 24 V AC/DC -15%, +10%

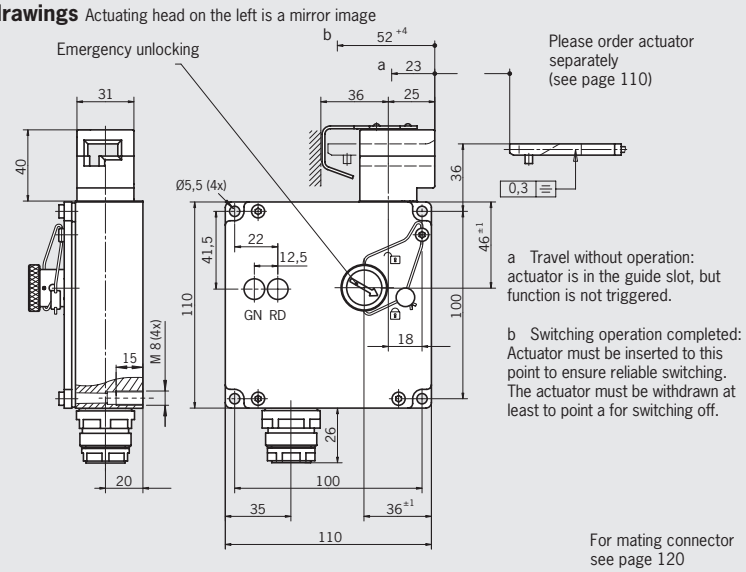
Guard locking types
TZ1 Closed-circuit current principle, guard locking by spring force. Release by applying voltage to the solenoid.

Switching elements (See also page 13/14)
SK For monitoring the door/actuator position
ÜK For monitoring the guard locking (built-in solenoid)

For combinations available see ordering table:
- **528H** Slow-action switching contact 1 NC ⊖ + 1 NO
- **2131H** Slow-action switching contact 3 NC ⊖ + 1 NO
- **3131H** Slow-action switching contact 2 NC ⊖ + 2 NO

Plug connector SR11 with protective plate
11-pin + PE

Dimension drawings Actuating head on the left is a mirror image



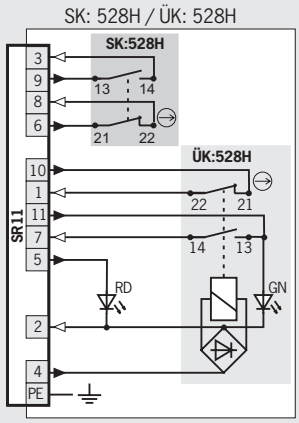
Please order actuator separately (see page 110)

a Travel without operation: actuator is in the guide slot, but function is not triggered.

b Switching operation completed: Actuator must be inserted to this point to ensure reliable switching. The actuator must be withdrawn at least to point a for switching off.

For mating connector see page 120

Wiring diagrams Actuator inserted and locked



For switching functions see technical data on page 170

☐ Solenoid monitoring
☐ Door monitoring

Ordering table

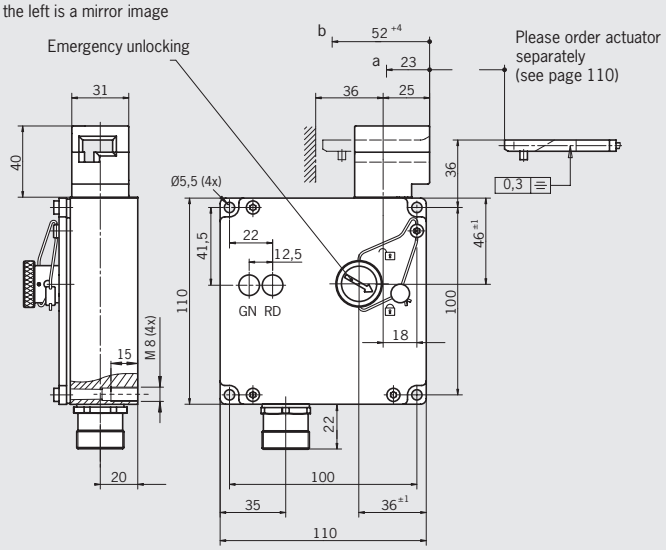
Series	Connection	Guard locking	Switch head	Switching element	Version	Black cover 24 V
TZ	SR11 Plug connector	1 Mechanical	LE left	SK: **528H**, 1 NC ⊖ + 1 NO ÜK: **528H**, 1 NC ⊖ + 1 NO	Emergency unlocking (rotary knob), with protective plate	**094342** TZ1LE024SR11-094342
			RE right	SK: **528H**, 1 NC ⊖ + 1 NO ÜK: **528H**, 1 NC ⊖ + 1 NO	Emergency unlocking (rotary knob), with protective plate	**094343** TZ1RE024SR11-094343

Please turn over

For safety precautions see page 187
For technical data see page 153

Plug connector RC18
18-pin + PE

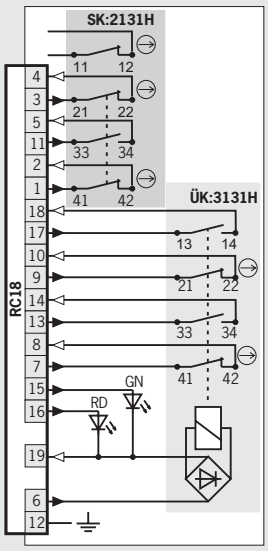
Dimension drawings
Actuating head on the left is a mirror image



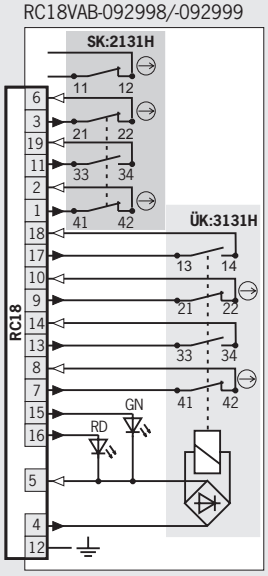
For mating connector with option C1825 see page 121

Wiring diagrams
Actuator inserted and locked

SK: 2131H / ÜK: 3131H
RC18-C1937



SK: 2131H / ÜK: 3131H
RC18VAB-092998/-092999



For switching functions see technical data on page 170

Solenoid monitoring
Door monitoring

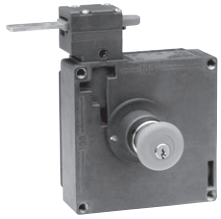
Ordering table

Series	Connection	Guard locking	Switch head	Switching element	Version	Black cover 24 V
TZ	**RC18** 1) Plug connector	**1** Mechanical	**LE** left	SK: **2131H**, 3 NC ⊖ + 1 NO ÜK: **3131H**, 2 NC ⊖ + 2 NO	Emergency unlocking (rotary knob)	**074260** TZ1LE024RC18VAB-C1937
			RE right	SK: **2131H**, 3 NC ⊖ + 1 NO ÜK: **3131H**, 2 NC ⊖ + 2 NO	Emergency unlocking (rotary knob)	**074261** TZ1RE024RC18VAB-C1937
		2 Electrical	**LE** left	SK: **2131H**, 3 NC ⊖ + 1 NO ÜK: **3131H**, 2 NC ⊖ + 2 NO	Emergency unlocking (rotary knob)	**100778** TZ2LE024RC18VAB-C1937
			RE right	SK: **2131H**, 3 NC ⊖ + 1 NO ÜK: **3131H**, 2 NC ⊖ + 2 NO	Emergency unlocking (rotary knob)	**100777** TZ2RE024RC18VAB-C1937
	RC18 Plug connector	**1** Mechanical	**LE** left	SK: **2131H**, 3 NC ⊖ + 1 NO ÜK: **3131H**, 2 NC ⊖ + 2 NO	Emergency unlocking (rotary knob), alternative wiring	**092998** TZ1LE024RC18VAB-092998
			RE right	SK: **2131H**, 3 NC ⊖ + 1 NO ÜK: **3131H**, 2 NC ⊖ + 2 NO	Emergency unlocking (rotary knob), alternative wiring	**092999** TZ1RE024RC18VAB-092999

1) **Important**: use suitable mating connector with option C1825!

Safety switch TZ with guard locking and guard lock monitoring

- **Mechanical release on the front**
- **Escape release on the rear with key button**
- **Two LED indicators, red and green**
- **Plug connector optional**
- **Actuating head fitted left or right**



Approach direction

Horizontal
Adjustable in 90° steps.

Escape release

Is used for the manual release of the guard locking from within the danger area without tools. The disable can only be removed and the switch returned to its operating state using a key included (2 keys included).

Solenoid operating voltage and LED function display

The following voltage range is available:

- 24 V AC/DC -15%, +10%
- 110 V AC -15%, +10%

Guard locking types

TZ1 Closed-circuit current principle, guard locking by spring force. Release by applying voltage to the solenoid.

TZ2 Open-circuit current principle, guard locking by applying voltage to the solenoid. Release by spring force.

Switching elements (See also page 13/14)

SK For monitoring the door/actuator position

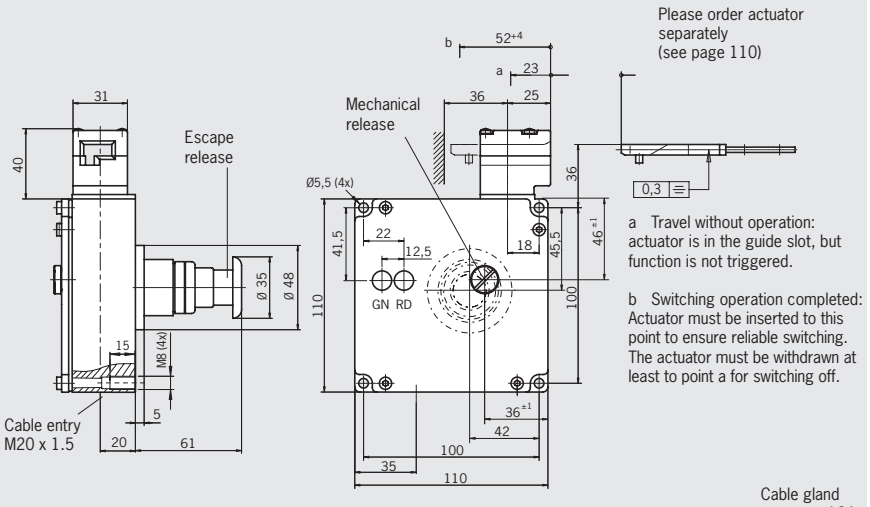
ÜK For monitoring the guard locking (built-in solenoid)

For combinations available see ordering table:

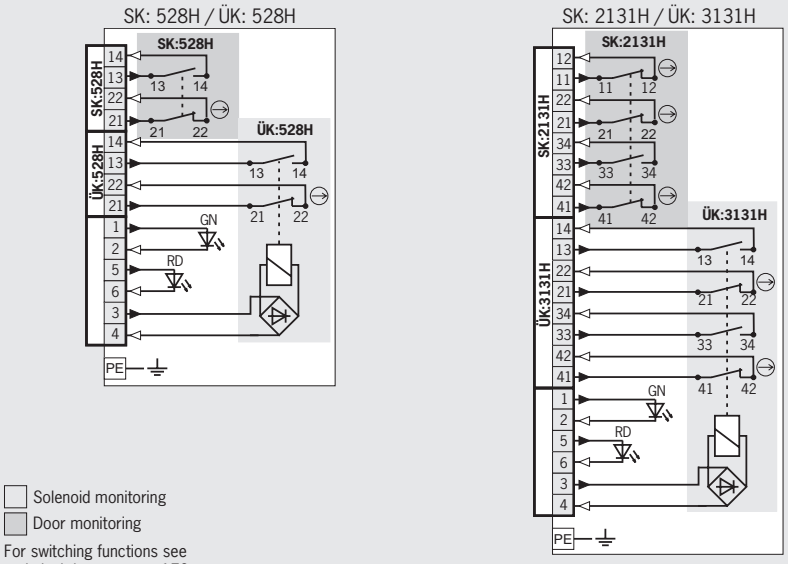
- **528H** Slow-action switching contact 1 NC ⊖ + 1 NO
- **2131H** Slow-action switching contact 3 NC ⊖ + 1 NO
- **3131H** Slow-action switching contact 2 NC ⊖ + 2 NO

Cable entry M20 x 1.5

Dimension drawings Actuating head on the left is a mirror image



Wiring diagrams Actuator inserted and locked



For switching functions see technical data on page 170

Ordering table

Series	Connection	Guard locking	Switch head	Switching element	Version	Black cover 24 V	Black cover 110 V
TZ	M20x1.5	1 Mechanical	LE left	SK: **528H**, 1 NC ⊖ + 1 NO ÜK: **528H**, 1 NC ⊖ + 1 NO	Escape release (red key button)	**087990** TZ1LE024M-C1815	On request
				SK: **2131H**, 3 NC ⊖ + 1 NO ÜK: **3131H**, 2 NC ⊖ + 2 NO	Escape release (red key button)	**089468** TZ1LE024MVAB-C1828	**094311** TZ1LE110MVAB-C1828
			RE right	SK: **528H**, 1 NC ⊖ + 1 NO ÜK: **528H**, 1 NC ⊖ + 1 NO	Escape release (red key button)	**087991** TZ1RE024M-C1815	On request
				SK: **2131H**, 3 NC ⊖ + 1 NO ÜK: **3131H**, 2 NC ⊖ + 2 NO	Escape release (red key button)	**089469** TZ1RE024MVAB-C1828	**094312** TZ1RE110MVAB-C1828
		2 Electrical	LE left	SK: **528H**, 1 NC ⊖ + 1 NO ÜK: **528H**, 1 NC ⊖ + 1 NO	Escape release (red key button)	**089460** TZ2LE024M-C1815	On request
				SK: **2131H**, 3 NC ⊖ + 1 NO ÜK: **3131H**, 2 NC ⊖ + 2 NO	Escape release (red key button)	**087290** TZ2LE024MVAB-C1828	On request
			RE right	SK: **528H**, 1 NC ⊖ + 1 NO ÜK: **528H**, 1 NC ⊖ + 1 NO	Escape release (red key button)	**089461** TZ2RE024M-C1815	On request
				SK: **2131H**, 3 NC ⊖ + 1 NO ÜK: **3131H**, 2 NC ⊖ + 2 NO	Escape release (red key button)	**087291** TZ2RE024MVAB-C1828	On request

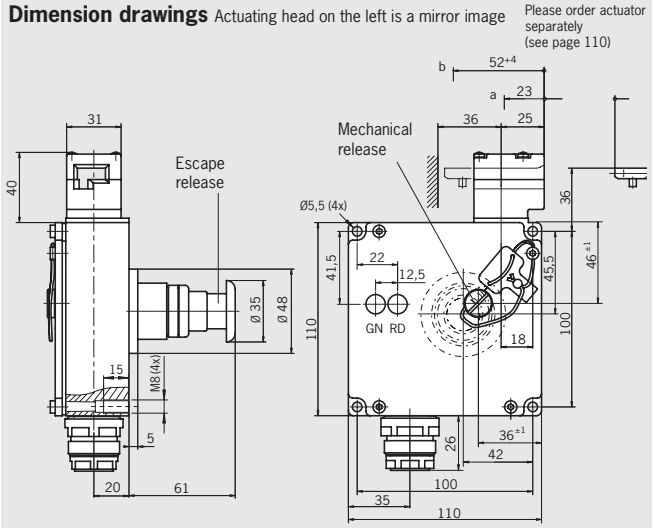
Please turn over

For safety precautions see page 187
For technical data see page 153

GL

Plug connector SR11
11-pin + PE

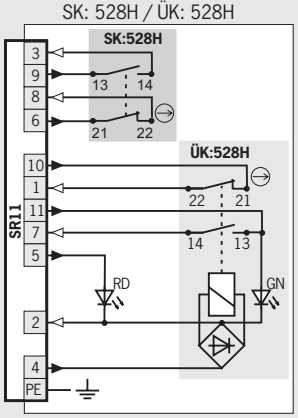
Dimension drawings Actuating head on the left is a mirror image



For mating connector see page 120

Wiring diagrams Actuator inserted and locked

SK: 528H / ÜK: 528H

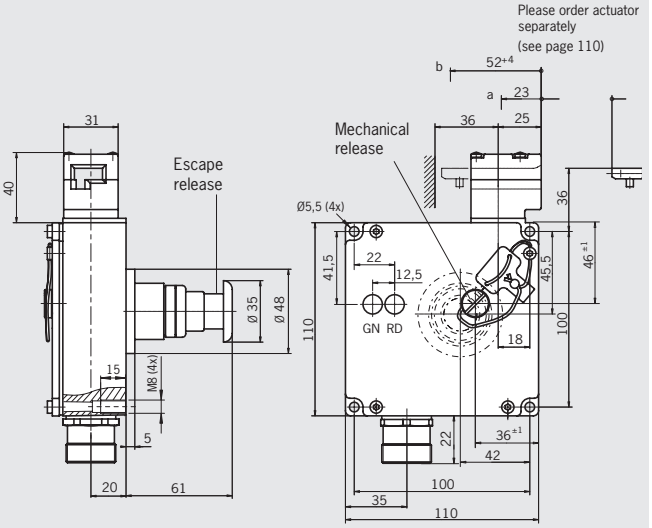


☐ Solenoid monitoring
☐ Door monitoring

For switching functions see technical data on page 170

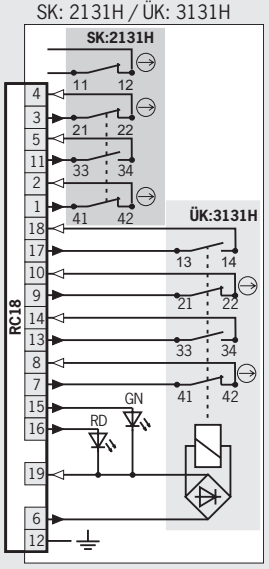
GL

Plug connector RC18
18-pin + PE



For mating connector with option C1825 see page 121

SK: 2131H / ÜK: 3131H



☐ Solenoid monitoring
☐ Door monitoring

For switching functions see technical data on page 170

Ordering table

Series	Connection	Guard locking	Switch head	Switching element	Version	Black cover 24 V
TZ	**SR11** Plug connector	**2** Electrical	**LE** left	SK: **528H**, 1 NC ⊖ + 1 NO ÜK: **528H**, 1 NC ⊖ + 1 NO	Escape release (key button)	**079660** TZ2LE024SR11-C1815
			RE right	SK: **528H**, 1 NC ⊖ + 1 NO ÜK: **528H**, 1 NC ⊖ + 1 NO	Escape release (key button)	**079661** TZ2RE024SR11-C1815
	RC18 1) Plug connector	**1** Mechanical	**LE** left	SK: **2131H**, 3 NC ⊖ + 1 NO ÜK: **3131H**, 2 NC ⊖ + 2 NO	Escape release (key button)	**090352** TZ1LE024RC18VAB-C1828
			RE right	SK: **2131H**, 3 NC ⊖ + 1 NO ÜK: **3131H**, 2 NC ⊖ + 2 NO	Escape release (key button)	**090353** TZ1RE024RC18VAB-C1828
		2 Electrical	**LE** left	SK: **2131H**, 3 NC ⊖ + 1 NO ÜK: **3131H**, 2 NC ⊖ + 2 NO	Escape release (key button)	**093103** TZ2LE024RC18VAB-C1828
			RE right	SK: **2131H**, 3 NC ⊖ + 1 NO ÜK: **3131H**, 2 NC ⊖ + 2 NO	Escape release (key button)	**093104** TZ2RE024RC18VAB-C1828

1) **Important**: use suitable mating connector with option C1825!

Safety switch TZ with guard locking and guard lock monitoring

- **Mechanical release on the front**
- **Escape release on the rear with push-button**
- **Two LED indicators, red and green**
- **Plug connector optional**
- **Actuating head fitted left or right**

Approach direction

Horizontal
Adjustable in 90° steps.

Escape release
Is used for the manual release of the guard locking from within the danger area without tools.

Solenoid operating voltage and LED function display
The following voltage ranges are available:
- 24 V AC/DC -15%, +10%
- 110 V AC -15%, +10%

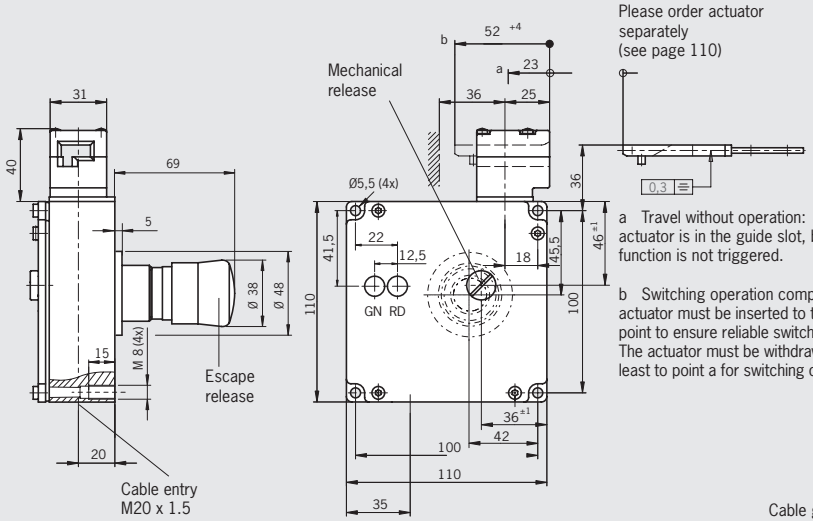
Guard locking types
TZ1 Closed-circuit current principle, guard locking by spring force. Release by applying voltage to the solenoid.

Switching elements (See also page 13/14)
SK For monitoring the door/actuator position
ÜK For monitoring the guard locking (built-in solenoid)

For combinations available see ordering table:
- **2131H** Slow-action switching contact 3 NC ⊖ + 1 NO
- **3131H** Slow-action switching contact 2 NC ⊖ + 2 NO

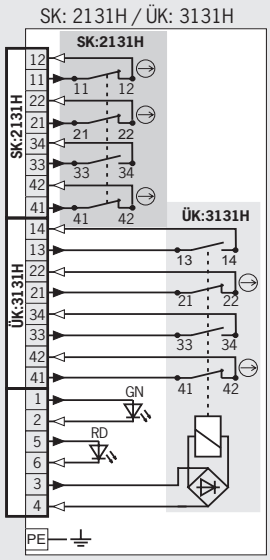
Cable entry M20 x 1.5

Dimension drawings Actuating head on the left is a mirror image



Cable gland see page 124

Wiring diagrams Actuator inserted and locked



For switching functions see technical data on page 170

Solenoid monitoring
Door monitoring

Ordering table

Series	Connection	Guard locking	Switch head	Switching element	Version	Black cover 24 V	Black cover 110 V
TZ	M20x1.5	1 Mechanical	LE left	SK: **2131H**, 3 NC ⊖ + 1 NO ÜK: **3131H**, 2 NC ⊖ + 2 NO	**C2082** Escape release (pushbutton)	**096487** TZ1LE024MVAB-C2082	**095992** TZ1LE110MVAB-C2082
			RE right	SK: **2131H**, 3 NC ⊖ + 1 NO ÜK: **3131H**, 2 NC ⊖ + 2 NO	**C2082** Escape release (pushbutton)	**096488** TZ1RE024MVAB-C2082	**095103** TZ1RE110MVAB-C2082

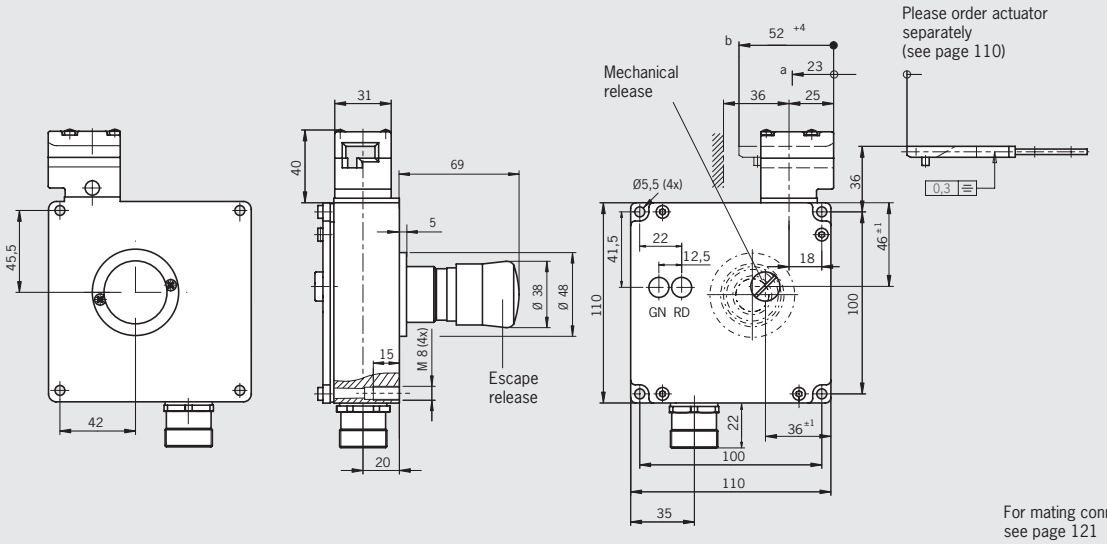
Please turn over

For safety precautions see page 187
For technical data see page 153

GL

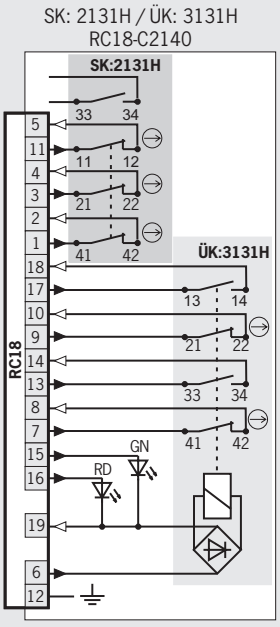
Plug connector RC18
18-pin + PE

Dimension drawings Actuating head on the left is a mirror image



For mating connector see page 121

Wiring diagrams Actuator inserted and locked



Solenoid monitoring
Door monitoring

For switching functions see technical data on page 170

Ordering table

Series	Connection	Guard locking	Switch head	Switching element	Version	Black cover 24 V
TZ	**RC18** Plug connector	**1** Mechanical	**LE** left	SK: **2131H**, 3 NC ⊖ + 1 NO ÜK: **3131H**, 2 NC ⊖ + 2 NO	**C2140** Escape release (key button)	**098297** TZ1LE024RC18VAB-C2140
			RE right	SK: **2131H**, 3 NC ⊖ + 1 NO ÜK: **3131H**, 2 NC ⊖ + 2 NO	**C2140** Escape release (key button)	**098298** TZ1RE024RC18VAB-C2140

Safety switch TZ with guard locking and guard lock monitoring

- **Mechanical release on the front**
- **Escape release on the rear with push-button**
- **Two LED indicators, red and green**
- **Plug connector optional**
- **Actuating head fitted left or right**

Approach direction

Horizontal
Adjustable in 90° steps.

Escape release
Is used for the manual release of the guard locking from within the danger area without tools.

Solenoid operating voltage and LED function display
The following voltage ranges are available:

- 24 V AC/DC -15%, +10%
- 110 V AC -15%, +10%
- 230 V AC -15%, +10%

Guard locking types

TZ1 Closed-circuit current principle, guard locking by spring force. Release by applying voltage to the solenoid.

Switching elements (See also page 13/14)

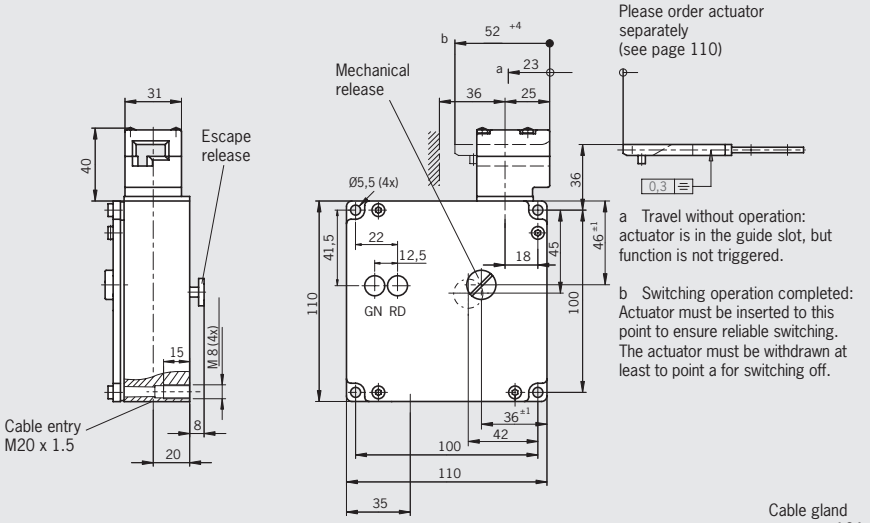
SK For monitoring the door/actuator position
ÜK For monitoring the guard locking (built-in solenoid)

For combinations available see ordering table:

- **528H** Slow-action switching contact 1 NC ⊖ + 1 NO
- **2131H** Slow-action switching contact 3 NC ⊖ + 1 NO
- **3131H** Slow-action switching contact 2 NC ⊖ + 2 NO

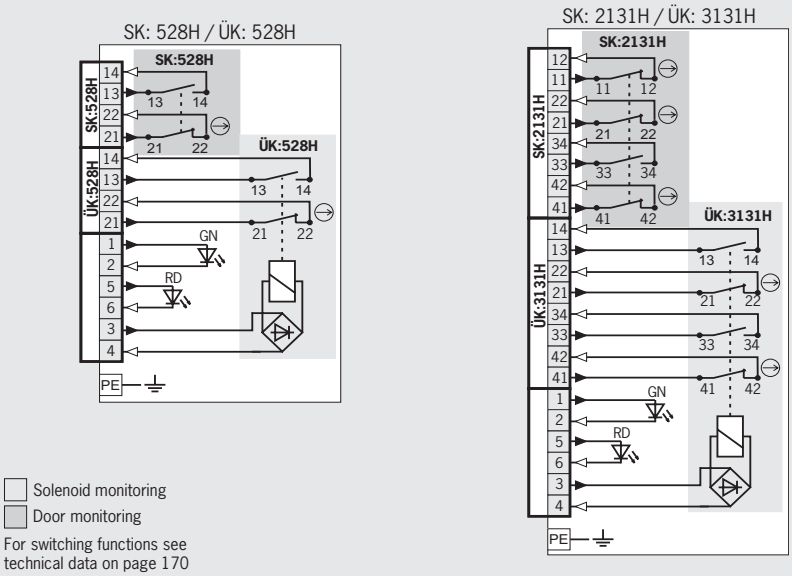
Cable entry M20 x 1.5

Dimension drawings Actuating head on the left is a mirror image



Cable gland see page 124

Wiring diagrams Actuator inserted and locked



Solenoid monitoring
Door monitoring

For switching functions see technical data on page 170

Ordering table

Series	Connection	Guard locking	Switch head	Switching element	Version	Black cover 24 V	Black cover 110 V	Black cover 230 V
TZ	M20x1.5	1 Mechanical	LE left	SK: **528H**, 1 NC ⊖ + 1 NO ÜK: **528H**, 1 NC ⊖ + 1 NO	**C1684** Escape release (pushbutton)	**083170** TZ1LE024M-C1684	**089924** TZ1LE110M-C1684	**093770** TZ1LE220M-C1684
				SK: **2131H**, 3 NC ⊖ + 1 NO ÜK: **3131H**, 2 NC ⊖ + 2 NO	**C1684** Escape release (pushbutton)	**084820** TZ1LE024MVAB-C1684	On request	On request
			RE right	SK: **528H**, 1 NC ⊖ + 1 NO ÜK: **528H**, 1 NC ⊖ + 1 NO	**C1684** Escape release (pushbutton)	**083171** TZ1RE024M-C1684	**089475** TZ1RE110M-C1684	**093771** TZ1RE220M-C1684
				SK: **2131H**, 3 NC ⊖ + 1 NO ÜK: **3131H**, 2 NC ⊖ + 2 NO	**C1684** Escape release (pushbutton)	**088084** TZ1RE024MVAB-C1684	On request	On request

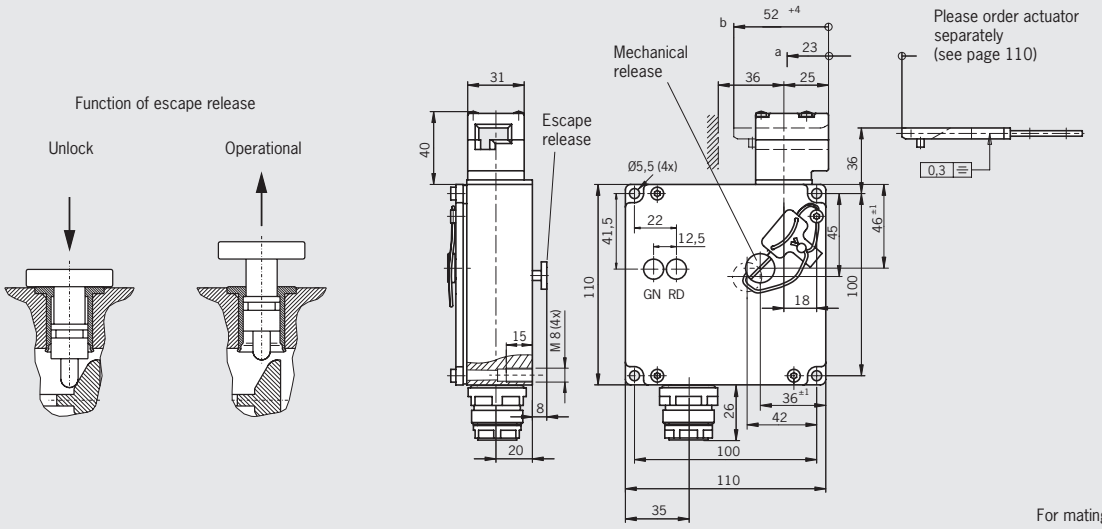
Please turn over

For safety precautions see page 187
For technical data see page 153

GL

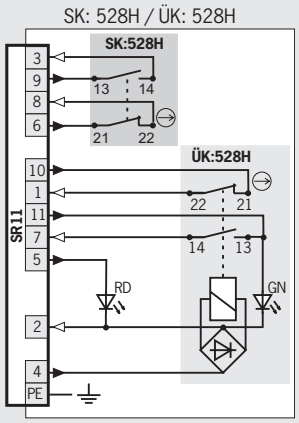
Plug connector SR11
11-pin + PE

Dimension drawings Actuating head on the left is a mirror image



For mating connector see page 120

Wiring diagrams Actuator inserted and locked



For switching functions see technical data on page 170

Solenoid monitoring
Door monitoring

Ordering table

Series	Connection	Guard locking	Switch head	Switching element	Version	Black cover 24 V
TZ	**SR11** Plug connector	**1** Mechanical	**LE** left	SK: **528H**, 1 NC ⊖ + 1 NO ÜK: **528H**, 1 NC ⊖ + 1 NO	**C1684** Escape release (pushbutton)	**070886** TZ1LE024SR11-C1684
			RE right	SK: **528H**, 1 NC ⊖ + 1 NO ÜK: **528H**, 1 NC ⊖ + 1 NO	**C1684** Escape release (pushbutton)	**070884** TZ1RE024SR11-C1684

Safety switch TZ with guard locking and guard lock monitoring

GL

- **Emergency unlocking on the front with rotary knob**
- **Escape release on the rear with push-button**
- **Protective plate for switch head**
- **Two LED indicators, red and green**
- **Actuating head fitted left or right**

Approach direction

Horizontal
Adjustable in 90° steps.

Emergency unlocking
Is used for the manual release of the guard locking without tools. The emergency unlocking mechanism must be returned to the locked state manually. A sealing wire can be fitted to protect against tampering. Lead seal kit and tool included (already pre-assembled on versions with plug connectors).

Escape release
Is used for the manual release of the guard locking from within the danger area without tools.

Protective plate for switch head
Makes it more difficult to tamper with the switch.

Solenoid operating voltage and LED function display
The following voltage range is available:
- 24 V AC/DC -15%, +10%

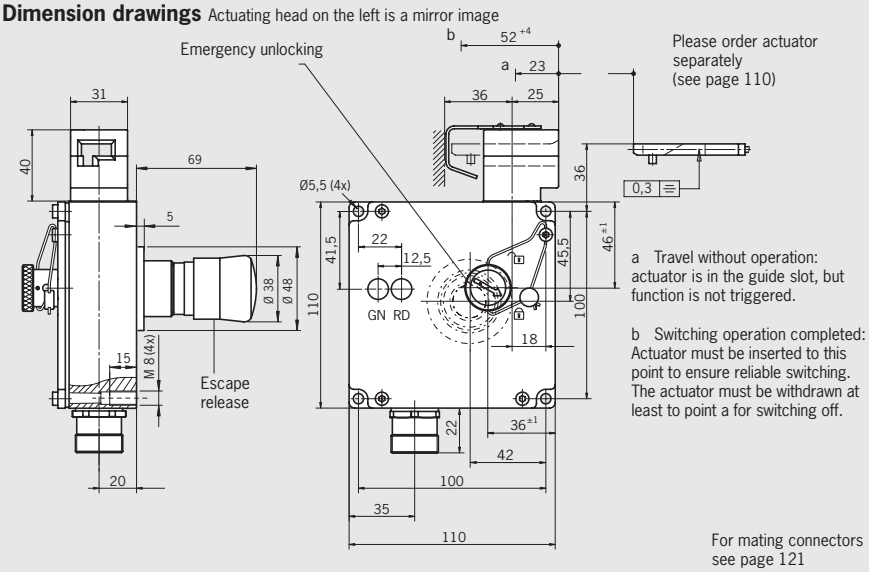
Guard locking types
TZ1 Closed-circuit current principle, guard locking by spring force. Release by applying voltage to the solenoid.

Switching elements (See also page 13/14)
SK For monitoring the door/actuator position
ÜK For monitoring the guard locking (built-in solenoid)

For combinations available see ordering table:
- **2131H** Slow-action switching contact 3 NC ⊖ + 1 NO
- **3131H** Slow-action switching contact 2 NC ⊖ + 2 NO

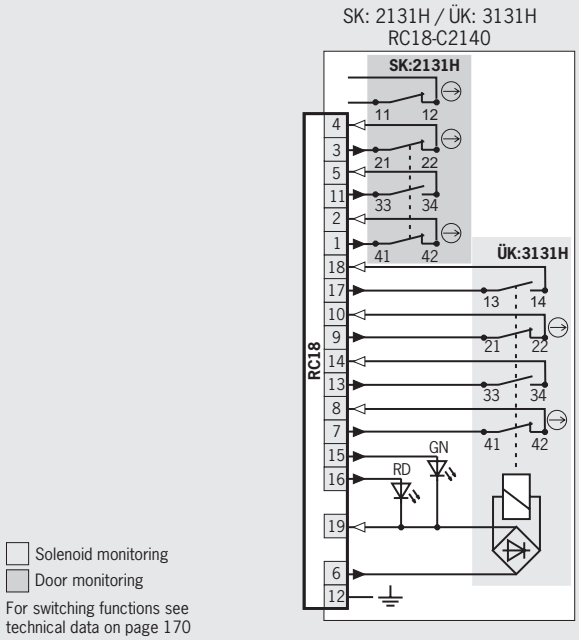
Plug connector RC18
18-pin + PE

Dimension drawings Actuating head on the left is a mirror image



For mating connectors see page 121

Wiring diagrams Actuator inserted and locked



For switching functions see technical data on page 170

Ordering table

Series	Connection	Guard locking	Switch head	Switching element	Version	Black cover 24 V
TZ	**RC18** Plug connector	**1** Mechanical	**LE** left	SK: **2131H**, 3 NC ⊖ + 1 NO ÜK: **3131H**, 2 NC ⊖ + 2 NO	Emergency unlocking (rotary knob), escape release (pushbutton), with protective plate	**097347** TZ1LE024RC18VAB-C2123
			RE right	SK: **2131H**, 3 NC ⊖ + 1 NO ÜK: **3131H**, 2 NC ⊖ + 2 NO	Emergency unlocking (rotary knob), escape release (pushbutton), with protective plate	**097348** TZ1RE024RC18VAB-C2123

For safety precautions see page 187
For technical data see page 153

Safety switch TZ with guard locking and guard lock monitoring

- **Without mechanical release**
- **Protective plate for switch head optional**
- **Two LED indicators, red and green**
- **Plug connector optional**
- **Actuating head fitted left or right**

Approach direction

Horizontal
Adjustable in 90° steps.

Protective plate for switch head
Makes it more difficult to tamper with the switch.

Solenoid operating voltage and LED function display
The following voltage ranges are available:
- 24 V AC/DC -15%, +10%
- 110 V AC -15%, +10%

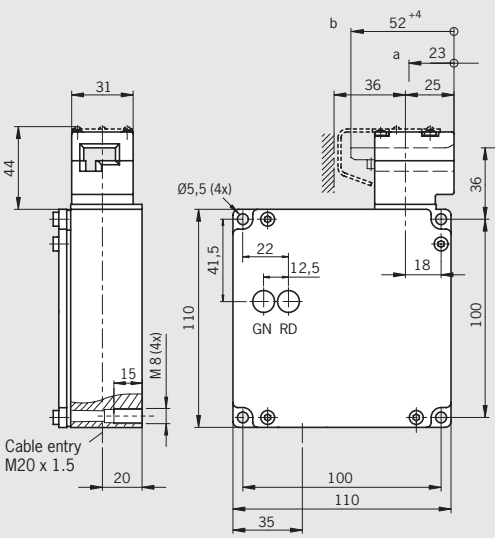
Guard locking types
TZ1 Closed-circuit current principle, guard locking by spring force. Release by applying voltage to the solenoid.

Switching elements (See also page 13/14)
SK For monitoring the door/actuator position
ÜK For monitoring the guard locking (built-in solenoid)

For combinations available see ordering table:
- **528H** Slow-action switching contact 1 NC ⊖ + 1 NO
- **2121H** Slow-action switching contact 4 NC ⊖
- **2131H** Slow-action switching contact 3 NC ⊖ + 1 NO
- **3131H** Slow-action switching contact 2 NC ⊖ + 2 NO

Cable entry M20 x 1.5

Dimension drawings Actuating head on the left is a mirror image



Please order actuator separately (see page 110)

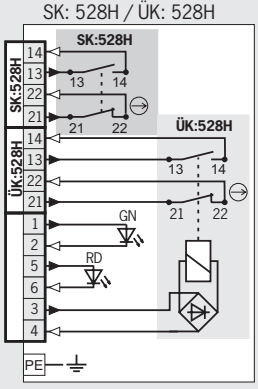
a Travel without operation: actuator is in the guide slot, but function is not triggered.

b Switching operation completed: Actuator must be inserted to this point to ensure reliable switching. The actuator must be withdrawn at least to point a for switching off.

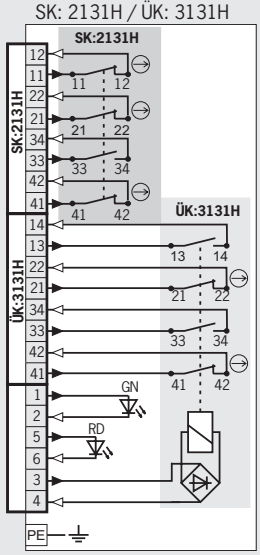
Cable gland see page 124

Wiring diagrams Actuator inserted and locked

SK: 528H / ÜK: 528H



SK: 2131H / ÜK: 3131H



☐ Solenoid monitoring
☐ Door monitoring

For switching functions see technical data on page 170

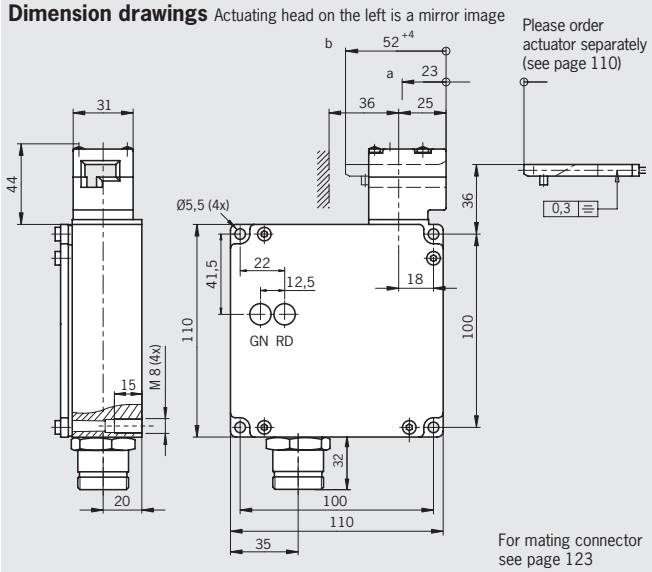
Ordering table

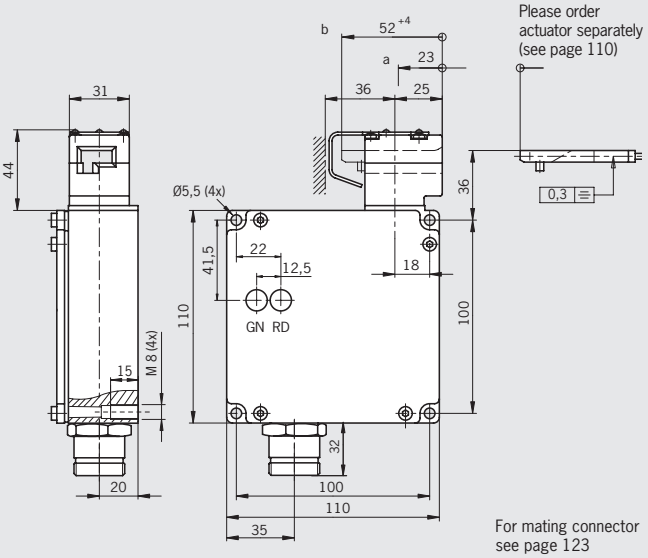
Series	Connection	Guard locking	Switch head	Switching element	Version	Black cover 24 V	Black cover 110 V	Red cover 24 V
TZ	M20x1.5	1 Mechanical	LE left	SK: **528H**, 1 NC ⊖ + 1 NO ÜK: **528H**, 1 NC ⊖ + 1 NO	Without mechanical release, with protective plate	**083246** TZ1LE024M-C1623	-	On request
				SK: **2131H**, 3 NC ⊖ + 1 NO ÜK: **3131H**, 2 NC ⊖ + 2 NO	Without mechanical release, with protective plate	**085170** TZ1LE024MVAB-C1623	-	**089466** TZ1LE110MVAB-C1623
				SK: **2131H**, 3 NC ⊖ + 1 NO ÜK: **3131H**, 2 NC ⊖ + 2 NO	Without mechanical release	**096052** TZ1LE024MVAB-RC2100	-	-
			RE right	SK: **528H**, 1 NC ⊖ + 1 NO ÜK: **528H**, 1 NC ⊖ + 1 NO	Without mechanical release, with protective plate	**083247** TZ1RE024M-C1623	-	On request
				SK: **2131H**, 3 NC ⊖ + 1 NO ÜK: **3131H**, 2 NC ⊖ + 2 NO	Without mechanical release, with protective plate	**085171** TZ1RE024MVAB-C1623	-	**088063** TZ1RE110MVAB-C1623
				SK: **2131H**, 3 NC ⊖ + 1 NO ÜK: **3131H**, 2 NC ⊖ + 2 NO	Without mechanical release	**096051** TZ1RE024MVAB-RC2100	-	-

Plug connector MR10
9-pin + PE

Plug connector MR12
11-pin + PE

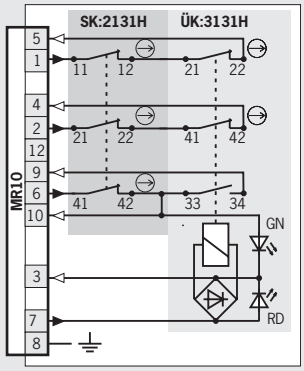
Dimension drawings Actuating head on the left is a mirror image



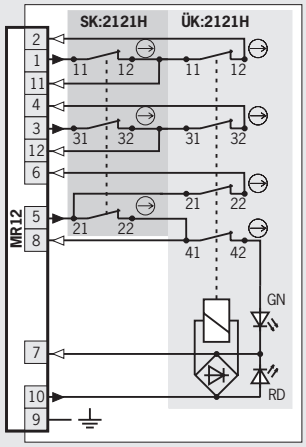


Wiring diagrams Actuator inserted and locked

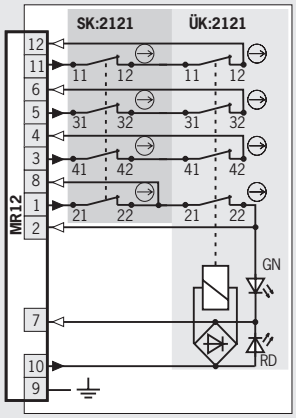
SK: 2131H / ÜK: 3131H
MR10 VAB-F



SK: 2121H / ÜK: 2121H
C1902



SK: 2121H / ÜK: 2121H
RC1971



For switching functions see technical data on page 170

Solenoid monitoring
Door monitoring

For switching functions see technical data on page 170

Solenoid monitoring
Door monitoring

Ordering table

Series	Connection	Guard locking	Switch head	Switching element	Version	Red cover 24 V
TZ	**MR10** Plug connector	**1** Mechanical	**LE** left	SK: **2131H**, 3 NC ⊖ ÜK: **3131H**, 2 NC ⊖ + 1 NO	Without mechanical release	**095902** [1] TZ1LE024MVAB-10C-FW
			RE right	SK: **2131H**, 3 NC ⊖ ÜK: **3131H**, 2 NC ⊖ + 1 NO	Without mechanical release	**095903** [1] TZ1RE024MVAB-10C-FW
	MR12 Plug connector	**1** Mechanical	**LE** left	SK: **2121H**, 4 NC ⊖ ÜK: **2121H**, 4 NC ⊖	Without mechanical release, with protective plate	**079692** TZ1LE024BHA-C1902
					C1971 Alternative wiring, without mechanical release, with protective plate	**085569** TZ1LE024BHAVFG-RC1971
			RE right	SK: **2121H**, 4 NC ⊖ ÜK: **2121H**, 4 NC ⊖	Without mechanical release, with protective plate	**079693** TZ1RE024BHA-C1902
					C1971 Alternative wiring, without mechanical release, with protective plate	**085570** TZ1RE024BHAVFG-RC1971

1) No DGUV approval

For safety precautions see page 187
For technical data see page 153

Safety switch TZ with guard locking and guard lock monitoring

- **Without mechanical release**
- **Two LED indicators, red and green**
- **Plug connector for switch connection**
- **Plug connector for enabling switch**
- **Actuating head fitted left or right**

Approach direction

Horizontal
Adjustable in 90° steps.

Solenoid operating voltage and LED function display

The following voltage range is available:

- 24 V AC/DC -15%, +10%

Guard locking types

TZ1 Closed-circuit current principle, guard locking by spring force. Release by applying voltage to the solenoid.

TZ2 Open-circuit current principle, guard locking by applying voltage to the solenoid. Release by spring force.

Switching elements (See also page 13/14)

SK For monitoring the door/actuator position

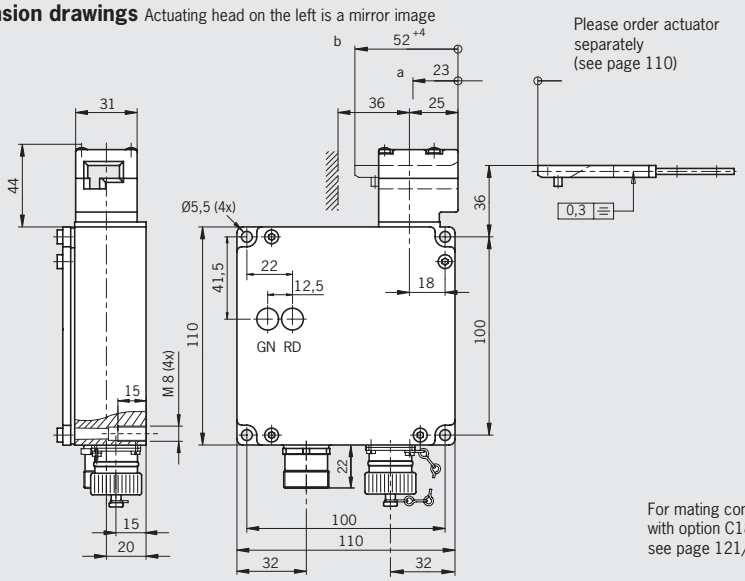
ÜK For monitoring the guard locking (built-in solenoid)

For combinations available see ordering table:

- **528H** Slow-action 1 NC ⊖ + 1 NO
- **2131H** Slow-action 3 NC ⊖ + 1 NO
- **3131H** Slow-action 2 NC ⊖ + 2 NO

Plug connector RC18 and RC12 (Enabling switch)
18-pin + PE / 12-pin

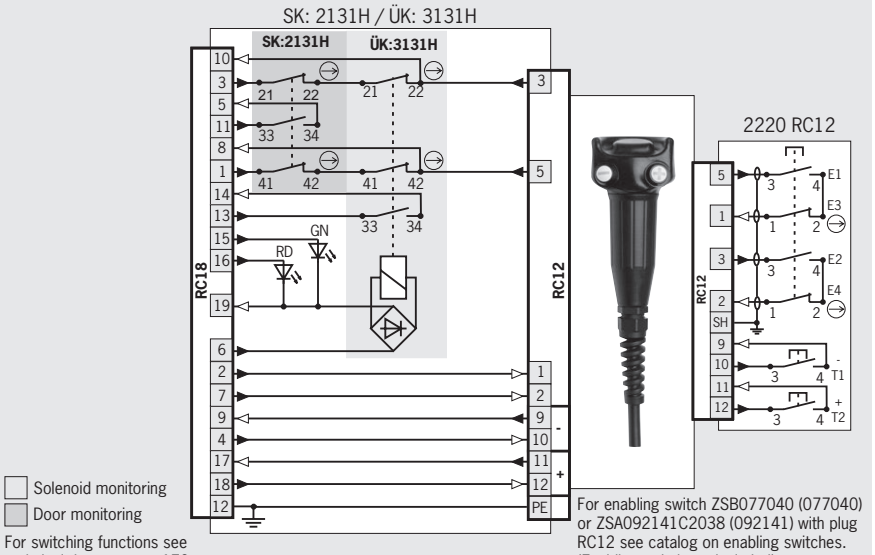
Dimension drawings Actuating head on the left is a mirror image



Please order actuator separately (see page 110)

For mating connector with option C1825 see page 121/122

Wiring diagrams Actuator inserted and locked



For switching functions see technical data on page 170

For enabling switch ZSB077040 (077040) or ZSA092141C2038 (092141) with plug RC12 see catalog on enabling switches. (Enabling switch not included)

Ordering table

Series	Connection	Enabling switch connection	Guard locking	Switch head	Switching element	Version	Black cover 24 V
TZ	**RC18** 1) Plug connector	Enabling switch plug **RC12**	**1** Mechanical	**LE** left	SK: **2131H**, 3 NC ⊖ + 1 NO ÜK: **3131H**, 2 NC ⊖ + 2 NO	Without mechanical release	**091062** TZ1LE024RC18VAB-C1803
				RE right	SK: **2131H**, 3 NC ⊖ + 1 NO ÜK: **3131H**, 2 NC ⊖ + 2 NO	Without mechanical release	**091063** TZ1RE024RC18VAB-C1803
			2 Electrical	**LE** left	SK: **2131H**, 3 NC ⊖ + 1 NO ÜK: **3131H**, 2 NC ⊖ + 2 NO	Without mechanical release	**075955** TZ2LE024RC18VAB-C1803
				RE right	SK: **2131H**, 3 NC ⊖ + 1 NO ÜK: **3131H**, 2 NC ⊖ + 2 NO	Without mechanical release	**077149** TZ2RE024RC18VAB-C1803

1) **Important**: use suitable mating connector with option C1825!

Selection table for safety switches NX

Connection	
M	Thread M20x1.5 for cable glands

Switching element	
Four contacts	4 NC ⊖ or 3 NC ⊖ + 1 NO or 2 NC ⊖ + 2 NO

Connection M	Switching element Four contacts		Page
●	●		86

Safety switch NX

- **Cable entry M20 x 1.5**
- **LED indicator optional**

Approach direction

Horizontal and vertical
Can be adjusted in 90° steps

LED function display (optional)
A function display (2 LEDs, red and green) is available for the following voltage ranges:

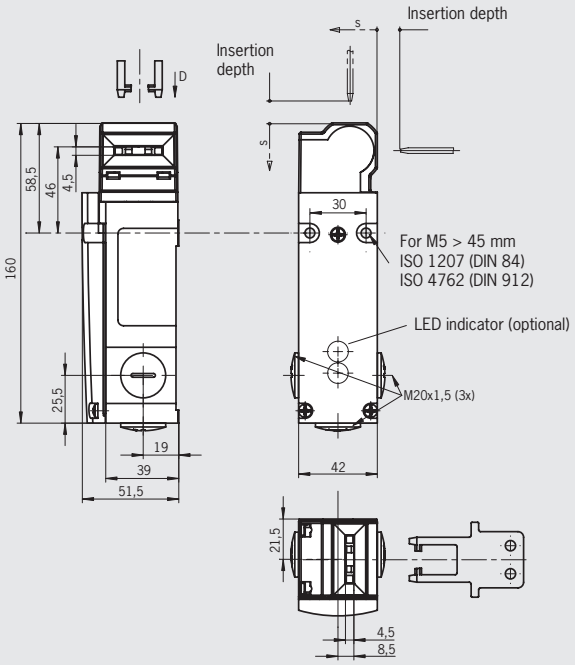
- DC 24 V +10%, -15%

Switching elements (See also page 13/14)

- **2121** Slow-action switching contact 4 NC ⊖
- **2131** Slow-action switching contact 3 NC ⊖ + 1 NO
- **3131** Slow-action switching contact 2 NC ⊖ + 2 NO

Cable entry M20 x 1.5

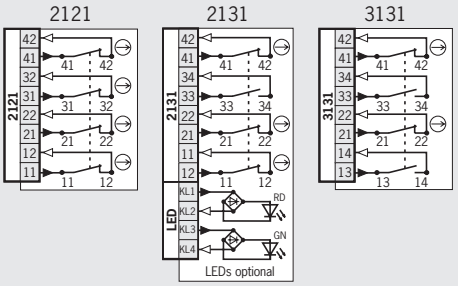
Dimension drawing



Please order actuator separately (see page 114)

For cable glands see page 124

Wiring diagrams Actuator inserted



Ordering table

Series	Connection	Switching element	Version	Order no./item
NX	**1** Cable entry **3 x M20 x 1.5**	**2121** 3 NC ⊖		**092625** NX1-2121A-M
		2131 3 NC ⊖ + 1 NO		**092624** NX1-2131A-M
		2131H 3 NC ⊖ + 1 NO	**L024** LED indicator DC 24 V	**091682** NX1-2131AL024-M
		3131 2 NC ⊖ + 2 NO		**092626** NX1-3131A-M

For safety precautions see page 187
For technical data see page 153

Selection table for safety switch TX with guard locking and guard lock monitoring

Release feature, front

HE Mechanical release on the front

Release feature, rear

FE Escape release on the rear side

Connection

M Thread M20x1.5 for cable glands

NPT½" Thread ½" for cable glands

BH10 Plug connector 9-pin + PE

SR11 Plug connector 11-pin + PE

BH12 Plug connector 11-pin + PE

RC18 Plug connector 18-pin + PE

M12 Plug connector 5-pin

Switching element

Four contacts 2 NC ⊖ / 1 NO + 1 NC or
2 NC ⊖ / 1 NO + 1 NC or
2 NC ⊖ + 2 NC ⊖

Manual release		Connection							Switching element	With version	Page
HE	FE	M	NPT½"	BH10	SR11	BH12	RC18	M12	Four contacts		
●		●	●						●		88
●				●			●		●		89
●		●	●						●		90
●					●	●	●		●		91
●	●	●					●		●	C1991/C2161	92
●	●						●		●	C1991	93
●								●	●	C2129	94

Safety switch TX with guard locking and guard lock monitoring

- **Mechanical release on the front**
- **With door monitoring contact**
- **Plug connector optional**

Approach direction

Horizontal and vertical
Can be adjusted in 90° steps

Mechanical release

Is used for releasing the guard locking with the aid of a tool. The mechanical release must be sealed to prevent tampering (for example with sealing lacquer).

Solenoid operating voltage

- AC/DC 24 V +10%, -15%
- AC 110 V +10%, -15%
- AC 230 V +10%, -15%

LED function display

The switch has a function display (2 LEDs, red and green). The LED voltage is same as the solenoid operating voltage.

Guard locking types

TX1 Closed-circuit current principle, guard locking by spring force. Release by applying voltage to the solenoid.

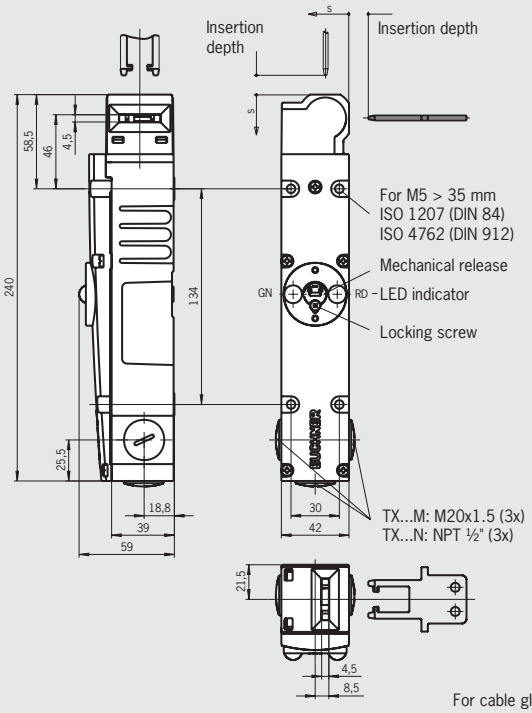
TX2 Open-circuit current principle, guard locking by applying voltage to the solenoid. Release by spring force.

Switching elements (See also page 14)

- **ETX B** Slow-action switching contact 2 NC ⊖ / 1 NO + 1 NC (door monitoring contact)
- **ETX C** Slow-action switching contact 2 NC ⊖ / 1 NO + 1 NO (door monitoring contact)
- **ETX D** Slow-action switching contact 2 NC ⊖ + 2 NC ⊖ (door monitoring contact)

Cable entry M20 x 1.5 / cable entry NPT ½"

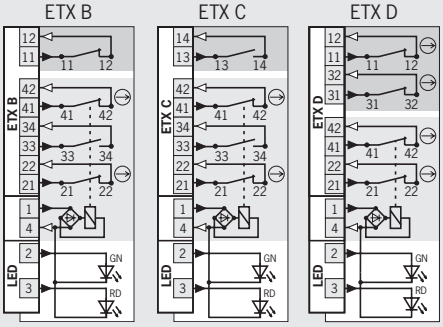
Dimension drawing



Please order actuator separately (see page 114)

For cable glands see page 124

Wiring diagrams Actuator inserted and locked



Solenoid monitoring
Door monitoring

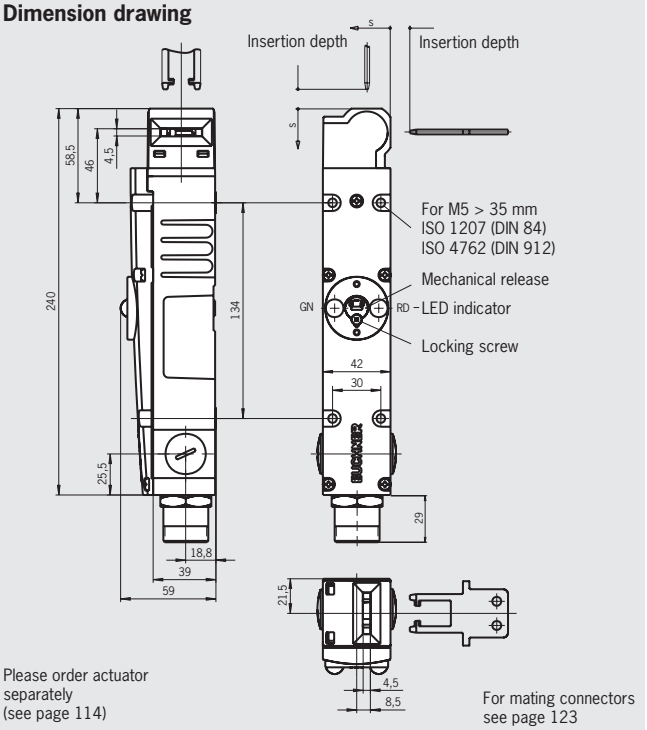
For switching functions see technical data on page 175

Ordering table

Series	Connection	Guard locking	Switching element	Solenoid operating voltage AC/DC 24 V	AC 110 V	AC 230 V
TX	M Cable entry 3 x M20 x 1.5	1 Mechanical	ETX B 2 NC ⊖ / 1 NO + 1 NC	082921 TX1B-A024M	085383 TX1B-A110M	085385 TX1B-A230M
			ETX C 2 NC ⊖ / 1 NO + 1 NO	082922 TX1C-A024M	085384 TX1C-A110M	085386 TX1C-A230M
			ETX D 2 NC ⊖ + 2 NC ⊖	095025 TX1D-A024MC2081	-	-
		2 Electrical	ETX B 2 NC ⊖ / 1 NO + 1 NC	082927 TX2B-A024M	085387 TX2B-A110M	085389 TX2B-A230M
			ETX C 2 NC ⊖ / 1 NO + 1 NO	082928 TX2C-A024M	085388 TX2C-A110M	085390 TX2C-A230M
			ETX D 2 NC ⊖ + 2 NC ⊖	095026 TX2D-A024MC2081	-	-
	N Cable entry 3 x NPT ½"	1 Mechanical	ETX B 2 NC ⊖ / 1 NO + 1 NC	082944 TX1B-A024N	085382 TX1B-A110N	On request
			ETX C 2 NC ⊖ / 1 NO + 1 NO	082945 TX1C-A024N	On request	On request
		2 Electrical	ETX B 2 NC ⊖ / 1 NO + 1 NC	082946 TX2B-A024N	On request	On request
			ETX C 2 NC ⊖ / 1 NO + 1 NO	082947 TX2C-A024N	On request	On request

Plug connector BH10
9-pin + PE

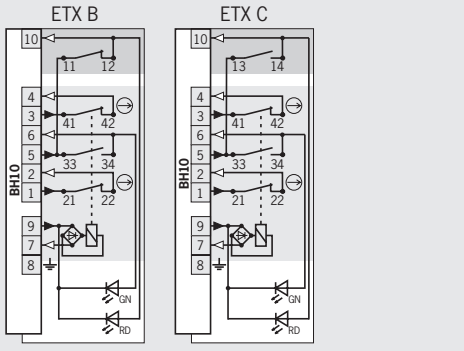
Dimension drawing



Please order actuator separately (see page 114)

For mating connectors see page 123

Wiring diagrams Actuator inserted and locked

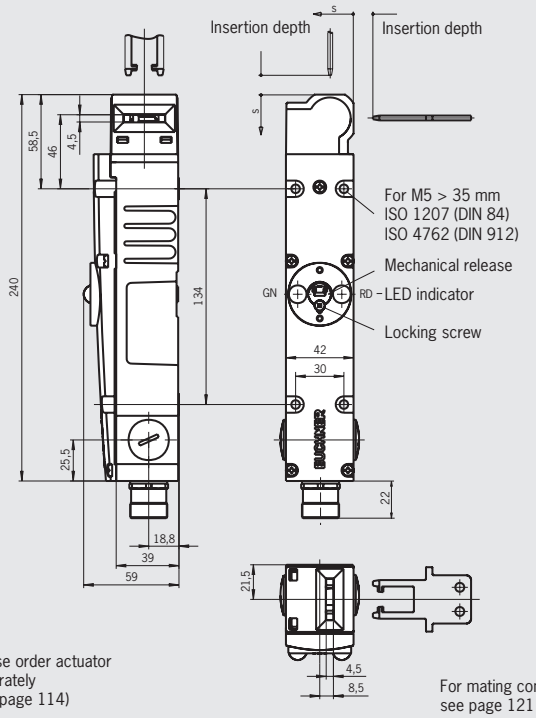


Solenoid monitoring
Door monitoring

For switching functions see technical data on page 175

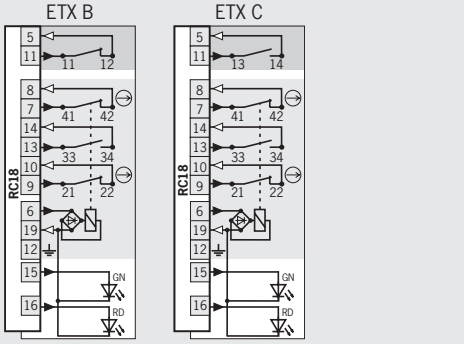
Plug connector RC18
18-pin + PE

Dimension drawing



Please order actuator separately (see page 114)

For mating connectors see page 121



Solenoid monitoring
Door monitoring

For switching functions see technical data on page 175

Ordering table

Series	Connection	Guard locking	Switching element	Solenoid operating voltage		
				AC/DC 24 V	AC 110 V	AC 230 V
TX	Plug connector **BH10**	**1** Mechanical	**ETX B** 2 NC ⊖ / 1 NO + 1 NC	**085380** TX1B-A024BH10	On request	On request
		2 Electrical	**ETX B** 2 NC ⊖ / 1 NO + 1 NC	**085381** TX2B-A024BH10	On request	On request
	Plug connector **RC18**	**1** Mechanical	**ETX B** 2 NC ⊖ / 1 NO + 1 NC	**082933** TX1B-A024RC18	-	-
			ETX C 2 NC ⊖ / 1 NO + 1 NO	**082934** TX1C-A024RC18	-	-
		2 Electrical	**ETX B** 2 NC ⊖ / 1 NO + 1 NC	**082939** TX2B-A024RC18	-	-
			ETX C 2 NC ⊖ / 1 NO + 1 NO	**082940** TX2C-A024RC18	-	-

For safety precautions see page 187
For technical data see page 153

Safety switch TX with guard locking and guard lock monitoring

- **Mechanical release on the front**
- **Release under load possible**
- **With door monitoring contact**
- **Plug connector optional**

Approach direction

Horizontal and vertical
Can be adjusted in 90° steps

Mechanical release
Is used for releasing the guard locking with the aid of a tool. The mechanical release must be sealed to prevent tampering (for example with sealing lacquer).

Solenoid operating voltage
- AC/DC 24 V +10%, -15%
- AC 110 V +10%, -15%

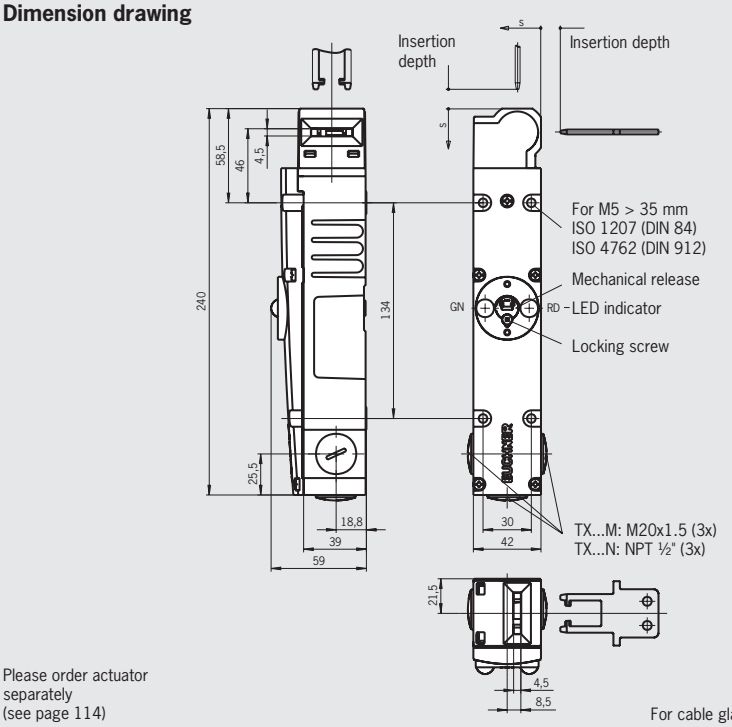
LED function display
The switch has a function display (2 LEDs, red and green). The LED voltage is same as the solenoid operating voltage.

Guard locking types
TX3 Closed-circuit current principle, guard locking by spring force. Release by applying voltage to the solenoid. Release under load possible.

Switching elements (See also page 14)
- **ETX B** Slow-action switching contact 2 NC ⊖ / 1 NO + 1 NC (door monitoring contact)
- **ETX C** Slow-action switching contact 2 NC ⊖ / 1 NO + 1 NO (door monitoring contact)

Cable entry M20 x 1.5 / cable entry NPT ½"

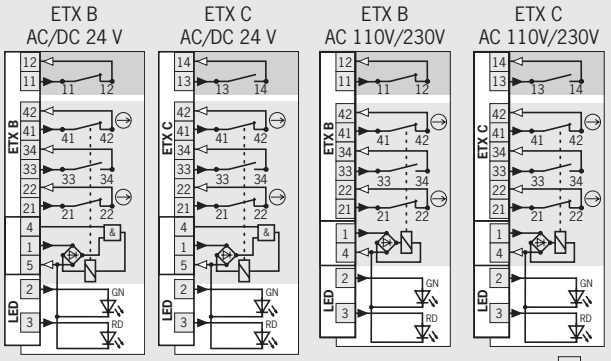
Dimension drawing



Please order actuator separately (see page 114)

For cable glands see page 124

Wiring diagrams Actuator inserted and locked



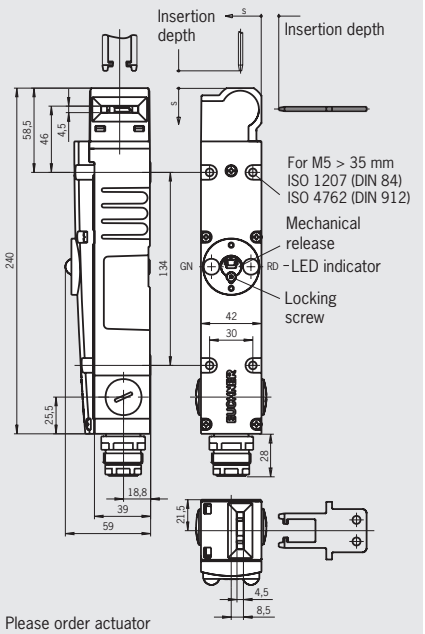
For switching functions see technical data on page 175

Ordering table

Series	Connection	Guard locking	Switching element	Solenoid operating voltage	
				AC/DC 24 V	AC 110 V
TX	**M** Cable entry **3 x M20 x 1.5**	**3** Mechanical	**ETX B** 2 NC ⊖ / 1 NO + 1 NC	**082952** TX3B-A024M	**082988** TX3B-A110M
			ETX C 2 NC ⊖ / 1 NO + 1 NO	**082953** TX3C-A024M	**082989** TX3C-A110M
	N Cable entry **3 x NPT ½"**	**3** Mechanical	**ETX B** 2 NC ⊖ / 1 NO + 1 NC	**082997** TX3B-A024N	On request
			ETX C 2 NC ⊖ / 1 NO + 1 NO	**082998** TX3C-A024N	On request

Plug connector SR11
11-pin + PE

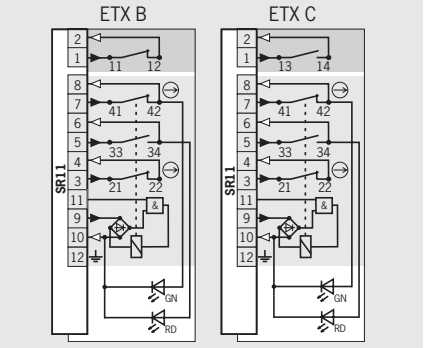
Dimension drawing



Please order actuator separately (see page 114)

For mating connectors see page 120

Wiring diagrams Actuator inserted and locked

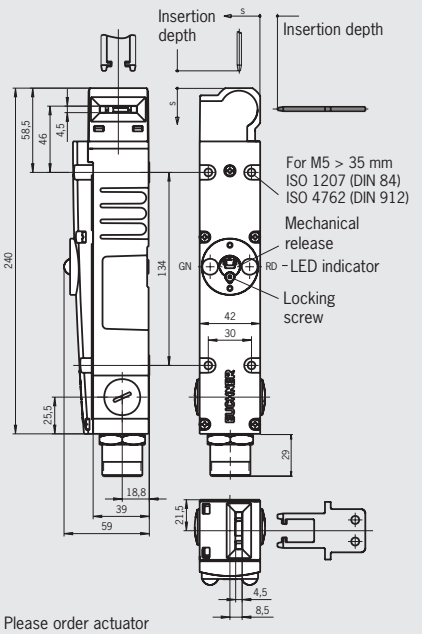


For switching functions see technical data see page 175

Solenoid monitoring
Door monitoring

Plug connector BH12
11-pin + PE

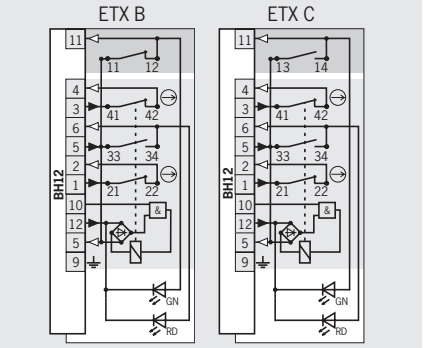
Dimension drawing



Please order actuator separately (see page 114)

For mating connectors see page 123

Wiring diagrams Actuator inserted and locked

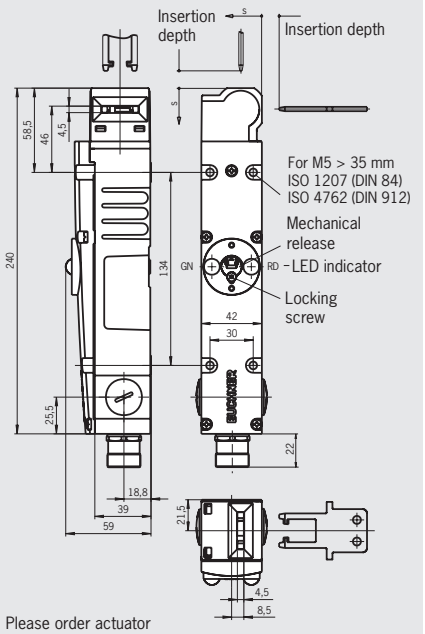


For switching functions see technical data see page 175

Solenoid monitoring
Door monitoring

Plug connector RC18
18-pin + PE

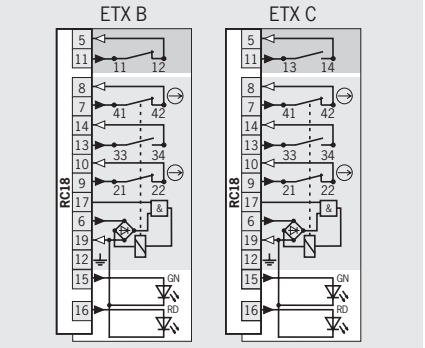
Dimension drawing



Please order actuator separately (see page 114)

For mating connectors see page 121

Wiring diagrams Actuator inserted and locked



For switching functions see technical data see page 175

Solenoid monitoring
Door monitoring

Ordering table

Series	Connection	Guard locking	Switching element	Solenoid operating voltage AC/DC 24 V	Solenoid operating voltage AC 110 V
TX	Plug connector **SR11**	**3** Mechanical	**ETX B** 2 NC ⊖ / 1 NO + 1 NC	On request	-
			ETX C 2 NC ⊖ / 1 NO + 1 NO	**085396** TX3C-A024SR11	-
	Plug connector **BH12**	**3** Mechanical	**ETX B** 2 NC ⊖ / 1 NO + 1 NC	**082999** TX3B-A024BH12	On request
			ETX C 2 NC ⊖ / 1 NO + 1 NO	**083000** TX3C-A024BH12	On request
	Plug connector **RC18**	**3** Mechanical	**ETX B** 2 NC ⊖ / 1 NO + 1 NC	**082964** TX3B-A024RC18	-
			ETX C 2 NC ⊖ / 1 NO + 1 NO	**082965** TX3C-A024RC18	-

For safety precautions see page 187
For technical data see page 153

Safety switch TX with guard locking and guard lock monitoring

- **Escape release on the rear side**
- **Release under load possible (only TX3 version)**
- **With door monitoring contact**
- **Plug connector optional**

Approach direction

Horizontal and vertical
Can be adjusted in 90° steps

Escape release
Is used for the manual release of the guard locking from within the danger area without tools. With identification of On/Off position..

Solenoid operating voltage
- AC/DC 24 V +10%, -15%

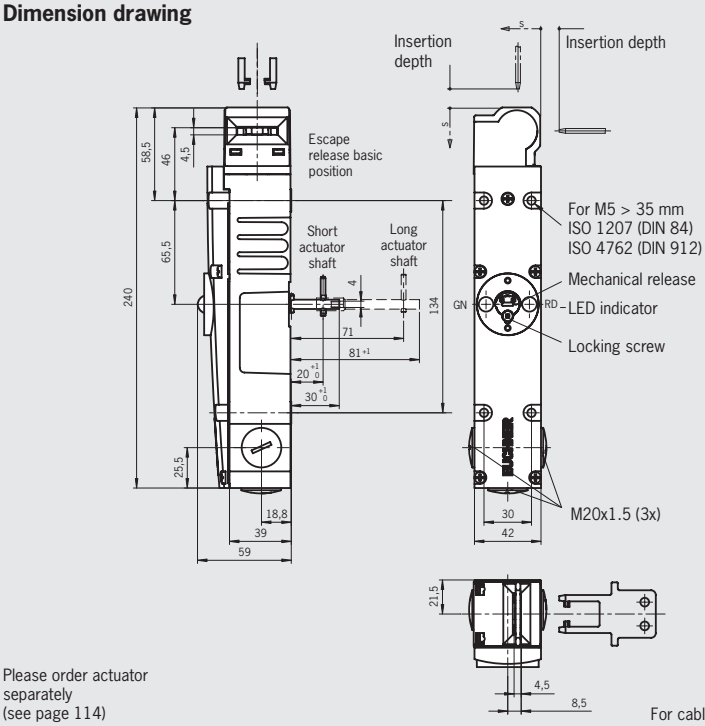
LED function display
The switch has a function display (2 LEDs, red and green). The LED voltage is same as the solenoid operating voltage.

Guard locking types
TX1 Closed-circuit current principle, guard locking by spring force. Release by applying voltage to the solenoid.
TX3 Closed-circuit current principle, guard locking by spring force. Release by applying voltage to the solenoid. Release under load possible.

Switching elements (See also page 14)
- **ETX B** Slow-action switching contact 2 NC ⊖ / 1 NO + 1 NC (door monitoring contact)
- **ETX C** Slow-action switching contact 2 NC ⊖ / 1 NO + 1 NO (door monitoring contact)
- **ETX D** Slow-action switching contact 2 NC ⊖ + 2 NC ⊖ (door monitoring contact)

Cable entry M20 x 1.5

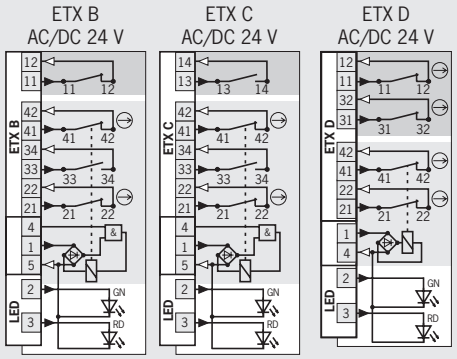
Dimension drawing



Please order actuator separately (see page 114)

For cable glands see page 124

Wiring diagrams Actuator inserted and locked



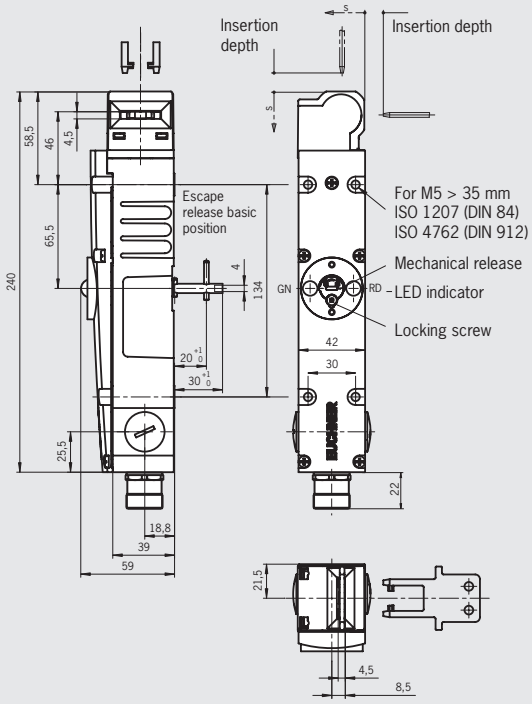
For switching functions see technical data on page 175

Ordering table

Series	Connection	Guard locking	Switching element	Version	Solenoid operating voltage AC/DC 24 V
TX	M Cable entry 3 x M20 x 1.5	1 Mechanical	ETX C 2 NC ⊖ / 1 NO + 1 NO	C2161 Long actuator shaft	099489 TX1C-A024MC2161
			ETX D 2 NC ⊖ + 2 NC ⊖	C1991 Short actuator shaft	096173 TX1D-A024MC1991
		3 Mechanical	ETX B 2 NC ⊖ / 1 NO + 1 NC	C1991 Short actuator shaft	085391 TX3B-A024MC1991
			ETX C 2 NC ⊖ / 1 NO + 1 NO	C1991 Short actuator shaft	093118 TX3C-A024MC1991
				C2161 Long actuator shaft	098946 TX3C-A024MC2161

Plug connector RC18
18-pin + PE

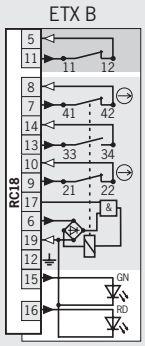
Dimension drawing



Please order actuator separately
(see page 114)

For mating connectors see page 121

Wiring diagrams Actuator inserted and locked



Solenoid monitoring
Door monitoring

For switching functions see technical data on page 175

Ordering table

Series	Connection	Guard locking	Switching element	Version	Solenoid operating voltage AC/DC 24 V
TX	Plug connector **RC18**	**3** Mechanical	**ETX B** 2 NC ⊖ / 1 NO + 1 NC	**C1991** Short actuator shaft	**093559** TX3B-A024RC18C1991

For safety precautions see page 187
For technical data see page 153

Safety switch TX with guard locking and guard lock monitoring

GL

- **Mechanical release on the front**
- **With door monitoring contact**
- **Separate plug connector for solenoid monitoring and door monitoring with solenoid operating voltage**
- **For direct connection to PROFIsafe inputs/outputs**

Approach direction

Horizontal and vertical
Can be adjusted in 90° steps

Mechanical release
Is used for releasing the guard locking with the aid of a tool. The mechanical release must be sealed to prevent tampering (for example with sealing lacquer).

Solenoid operating voltage

AC/DC	24 V	+10%, -15%
AC	110 V	+10%, -15%
AC	230 V	+10%, -15%

LED function display
The switch has a function display (2 LEDs, red and green). The LED voltage is same as the solenoid operating voltage.

Guard locking types

TX1 Closed-circuit current principle, guard locking by spring force. Release by applying voltage to the solenoid.

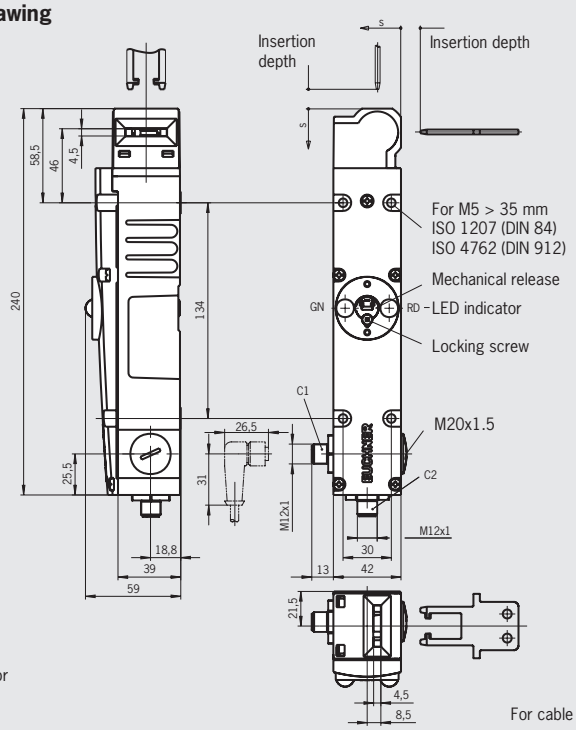
TX2 Open-circuit current principle, guard locking by applying voltage to the solenoid. Release by spring force.

Switching elements (See also page 14)

ETX B Slow-action switching contact
2 NC ⊖ / 1 NO + 1 NC
(door monitoring contact)

Plug connector M12
2 plug connectors, 5-pin

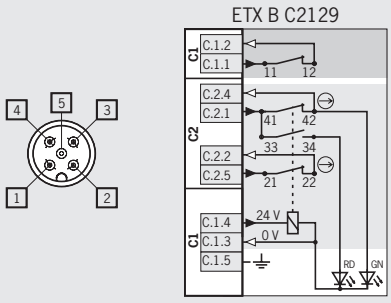
Dimension drawing



Please order actuator separately (see page 114)

For cable glands see page 124

Wiring diagrams Actuator inserted and locked



Solenoid monitoring
Door monitoring

For switching functions see technical data on page 175

Ordering table

Series	Connection	Guard locking	Switching element	Version	Solenoid operating voltage AC/DC 24 V
TX	Plug connectors **2 x M12**	**1** Mechanical	**ETX B** 2 NC ⊖ / 1 NO + 1 NC	**C2129**	**097623** TX1B-A024MC2129

Selection table for safety switches SGA

Version

standard — One metal actuating head

Connection

M — Thread M20x1.5 for cable glands

SR11 — Plug connector 11-pin + PE

RC18 — Plug connector 18-pin + PE

Switching element

Two contacts — 2 NC ⊖

Four contacts — 3 NC ⊖ + 1 NO, 4 NC ⊖

Version standard	Connection M	Connection SR11	Connection RC18	Switching element Two contacts	Switching element Four contacts	Page
●	●				●	96
●		●			●	97
●			●		●	98

Safety switch SGA

- **Cable entry M20 x 1.5**
- **Plug connector optional**

Approach direction

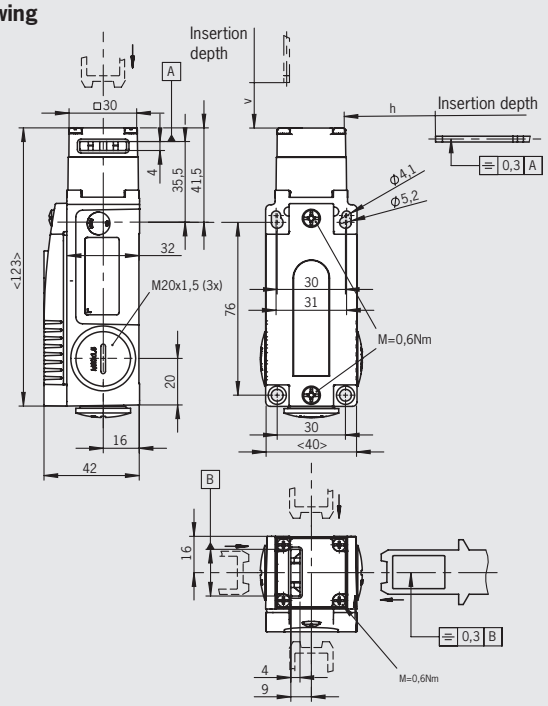
Horizontal and vertical
Can be adjusted in 90° steps

Switching elements

- **2121** Slow-action switching contact
  4 NC ⊖
- **2131** Slow-action switching contact
  3 NC ⊖ + 1 NO

Cable entry M20 x 1.5

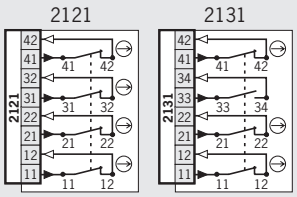
Dimension drawing



Please order actuator separately
(see pages 116-118)

For cable glands see page 124

Wiring diagrams Actuator inserted

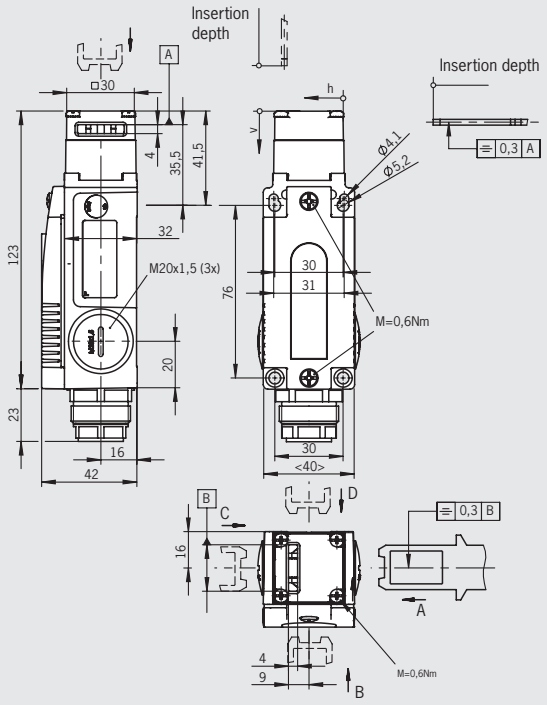


Ordering table

Series	Connection	Switching element	Order no./item
SGA	1 Cable entry 3 x M20 x 1.5	2121 4 NC ⊖	103725 SGA1A-2121A-M
		2131 3 NC ⊖ + 1 NO	106307 SGA1A-2131A-M

Plug connector SR11
11-pin + PE

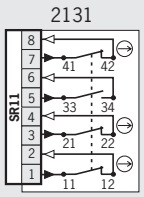
Dimension drawing



Please order actuator separately
(see pages 116-118)

For plug connectors see page 121

Wiring diagrams Actuator inserted



Ordering table

Series	Connection	Switching element	Order no./item
SGA	**2** Plug connectors **SR11**	**2131** 3 NC ⊖ + 1 NO	**106736** SGA2E-2131ASR11

For safety precautions see page 187
For technical data see page 153

Safety switch SGA

- **2 illuminated pushbuttons**
- **Plug connector RC18**

Approach direction

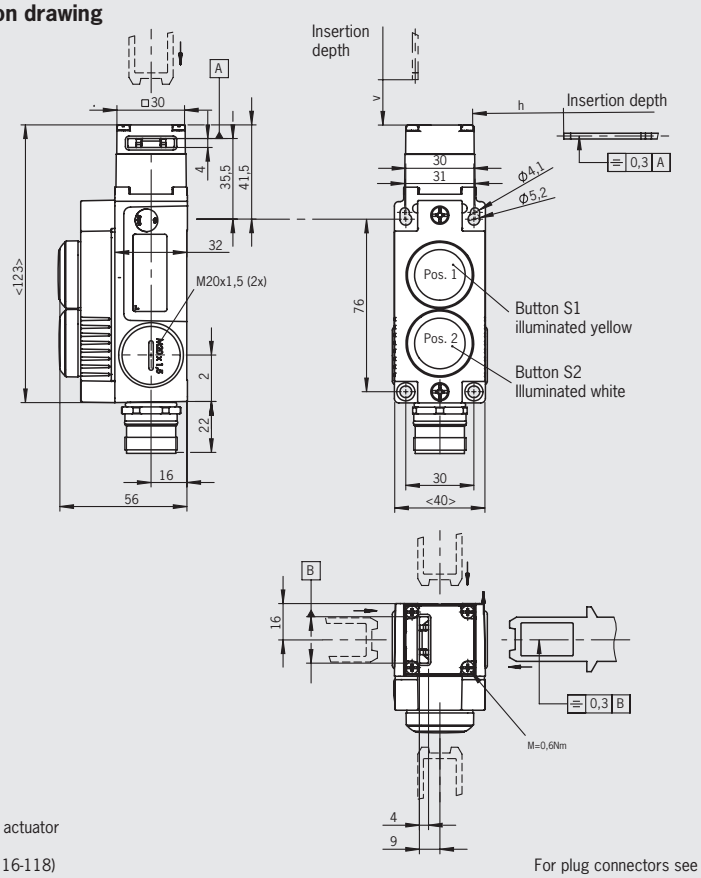
Horizontal and vertical
Can be adjusted in 90° steps

Switching elements

- **2121** Slow-action switching contact
  4 NC ⊖

Plug connector RC18
18-pin + PE

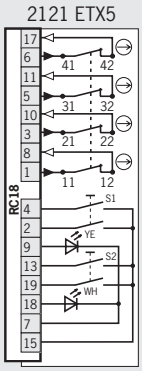
Dimension drawing



Please order actuator separately
(see pages 116-118)

For plug connectors see page 121

Wiring diagrams Actuator inserted



Ordering table

Series	Connection	Switching element	Version	Order no./item
SGA	**2** Plug connectors **RC18**	**2121** 4 NC ⊖	**Pos. 1:** yellow push button **Pos. 2:** white push button	**104012** SGA2A-2121ARC18-ETX5

Selection table for safety switches STA with guard locking and guard lock monitoring

Version

- **Standard** – One actuating head made of metal
- **TW** – *TWIN*, 2 actuating heads made of metal

Release feature

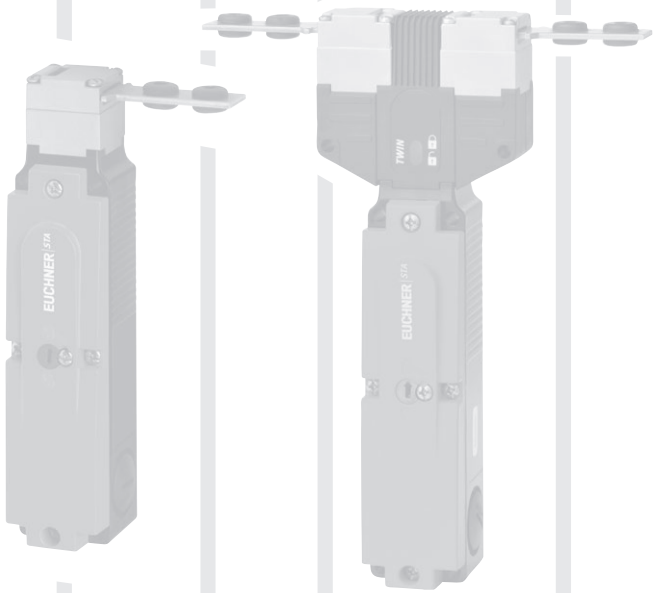
- **HE** – Mechanical release on the front
- **FE** – Escape release on the rear side

Door monitoring

- **STA3/4** – With door monitoring contact
- **STA1/2** – Without door monitoring contact

Connection

- **M** – Thread M20x1.5 for cable gland
- **SR11** – Plug connector 11-pin + PE
- **RC18** – Plug connector 18-pin + PE



Version		Release feature		Door monitoring		Connection			Page
Standard	TW	HE	FE	STA3/4	STA1/2	M	SR11	RC18	
●		●		●		●			100
●		●		●			●	●	101
●		●			●	●			102
●		●	●	●		●			103
	●	●		●		●			104

Safety switch STA with guard locking and guard lock monitoring

- **Mechanical release on the front**
- **With door monitoring contact**
- **Plug connector optional**

Approach direction

Horizontal and vertical
Can be adjusted in 90° steps

Mechanical release
Is used for releasing the guard locking with the aid of a tool. To protect against tampering, the mechanical release is sealed with sealing lacquer.

Solenoid operating voltage
- AC/DC 24 V +10%, -15%

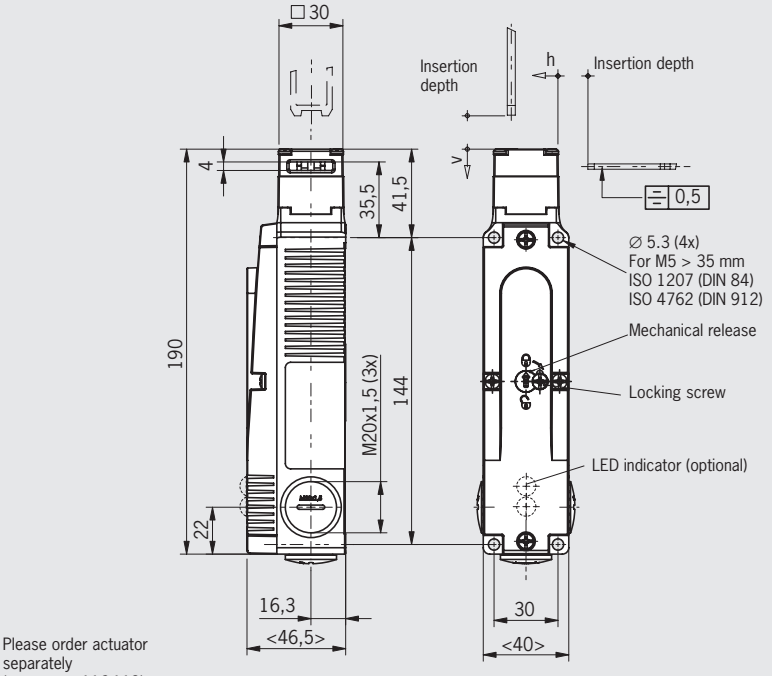
LED function display (optional)
A function display (2 LEDs, red and green) is available for the following voltage ranges:
- AC/DC 24 V +10%, -15%

Guard locking types
STA3 Closed-circuit current principle, guard locking by spring force. Release by applying voltage to the guard locking solenoid.
STA4 Open-circuit current principle, guard locking by applying voltage to the guard locking solenoid. Release by spring force.

Switching elements
- **2131** Slow-action switching contact 2 NC ⊖ + 1 NO + 1 NC (door monitoring contact)
- **4121** Slow-action switching contact 2 NC ⊖ + 1 NC / 1 NO (door monitoring contact)
- **4131** Slow-action switching contact 2 NC ⊖ + 1 NO + 1 NO (door monitoring contact)
- **4141** Slow-action switching contact 2 NC ⊖ + 2 NC ⊖ (door monitoring contact)

Cable entry M20 x 1.5

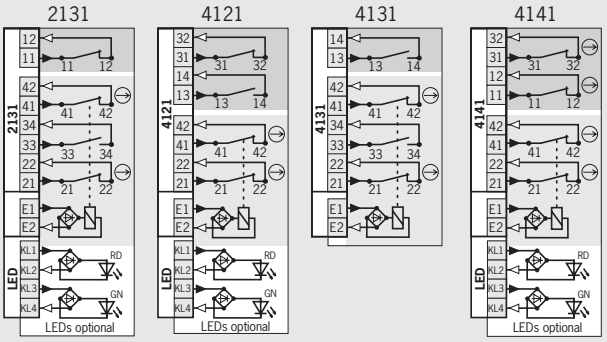
Dimension drawing



Please order actuator separately (see pages 116-118)

For cable glands see page 124

Wiring diagrams Actuator inserted and locked



Solenoid monitoring
Door monitoring

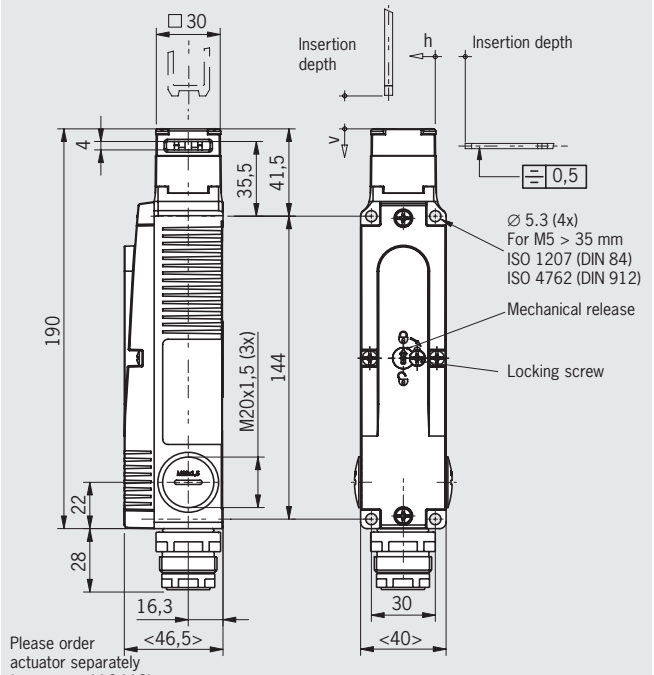
For switching functions see technical data on page 180

Ordering table

Series	Connection	Guard locking	Switching element	Version	Solenoid operating voltage AC/DC 24 V	Solenoid operating voltage AC 230 V
STA	M Cable entry 3 x M20 x 1.5	3 Mechanical	2131 2 NC ⊖ + 1 NC + 1 NO		096938 STA3A-2131A024M	104171 STA3A-2131A230M
			4121 2 NC ⊖ + 1 NC / 1 NO		096936 STA3A-4121A024M	-
				024L LED indicator AC/DC 24 V	106535 STA3A-4121A024L024M	-
			4131 2 NC ⊖ + 1 NO + 1 NO		099480 STA3A-4131A024M	-
			4141 2 NC ⊖ + 2 NC ⊖		099274 STA3A-4141A024M	-
				024L LED indicator AC/DC 24 V	100898 STA3A-4141A024L024M	-
		4 Electrical	2131 2 NC ⊖ + 1 NC + 1 NO		096939 STA4A-2131A024M	-
				024L LED indicator AC/DC 24 V	103926 STA4A-2131A024L024M	-
			4121 2 NC ⊖ + 1 NC / 1 NO		096937 STA4A-4121A024M	-
			4131 2 NC ⊖ + 1 NO + 1 NO		099481 STA4A-4131A024M	-
			4141 2 NC ⊖ + 2 NC ⊖		109172 STA4A-4141A024M	-

Plug connector SR11
11-pin + PE

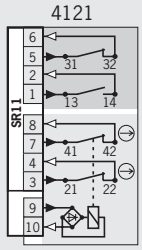
Dimension drawing



Please order actuator separately (see pages 116-118)

For plug connectors see page 120

Wiring diagrams Actuator inserted and locked

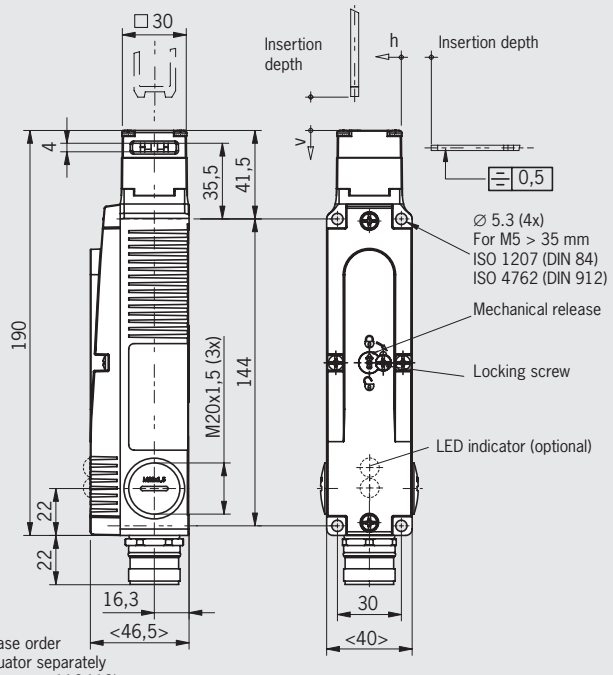


Solenoid monitoring
Door monitoring

For switching functions see technical data on page 180

Plug connector RC18
18-pin + PE

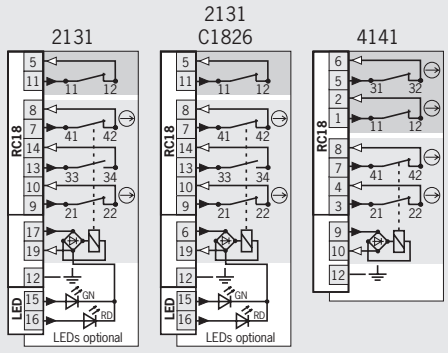
Dimension drawing



Please order actuator separately (see pages 116-118)

For plug connectors see page 121

Wiring diagrams Actuator inserted and locked



Solenoid monitoring
Door monitoring

For switching functions see technical data on page 180

Ordering table

Series	Connection	Guard locking	Switching element	Version	Solenoid operating voltage AC/DC 24 V
STA	**SR11** Plug connector	**3** Mechanical	**4121** 2 NC ⊖ + 1 NC / 1 NO		**105304** STA3A-4121A024SR11
	RC18 Plug connector	**3** Mechanical	**2131** 2 NC ⊖ + 1 NO + 1 NC	**024L** LED indicator AC/DC 24 V	**099658** STA3A-2131A024L024RC18
				024L LED indicator AC/DC 24 V **C1826** Special wiring	**106623** STA3A-2131A024L024RC18C1826
			4141 2 NC ⊖ + 2 NC ⊖		**100029** STA3A-4141A024RC18
		4 Electrical	**2131** 2 NC ⊖ + 1 NC + 1 NO	**024L** LED indicator AC/DC 24 V	**105303** STA4A-2131A024L024RC18
				024L LED indicator AC/DC 24 V **C1826** Special wiring	**106622** STA4A-2131A024L024RC18C1826

For safety precautions see page 187
For technical data see page 153

Safety switch STA with guard locking and guard lock monitoring

- **Mechanical release on the front**
- **Without door monitoring contact**

Approach direction

Horizontal and vertical
Can be adjusted in 90° steps

Mechanical release
Is used for releasing the guard locking with the aid of a tool. To protect against tampering, the mechanical release is sealed with sealing lacquer.

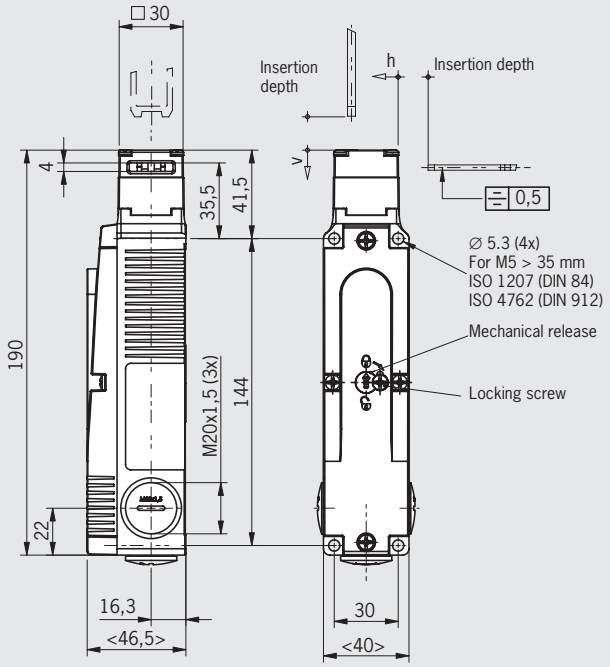
Solenoid operating voltage
- AC/DC 24 V +10%, -15%

Guard locking types
STA1 Closed-circuit current principle, guard locking by spring force. Release by applying voltage to the guard locking solenoid.
STA2 Open-circuit current principle, guard locking by applying voltage to the guard locking solenoid. Release by spring force.

Switching elements
- **4131** Slow-action switching contact 2 NC ⊖ + 2 NO

Cable entry M20 x 1.5

Dimension drawing

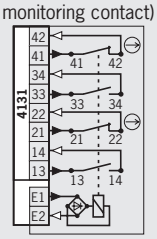


Please order actuator separately (see pages 116-118)

For cable glands see page 124

Wiring diagrams Actuator inserted and locked

4131
(without door monitoring contact)



For switching functions see technical data on page 180

Ordering table

Series	Connection	Guard locking	Switching element	Solenoid operating voltage AC/DC 24 V
STA	M Cable entry 3 x M20 x 1.5	1 Mechanical	4131 2 NC ⊖ + 2 NO	096439 STA1A-4131A024M
		2 Electrical	4131 2 NC ⊖ + 2 NO	096935 STA2A-4131A024M

Safety switch STA with guard locking and guard lock monitoring

- **Escape release from the rear**
- **With door monitoring contact**

Approach direction

Horizontal and vertical
Can be adjusted in 90° steps

Escape release
Is used for the manual release of the guard locking from within the danger area without tools. With identification of On/Off position..

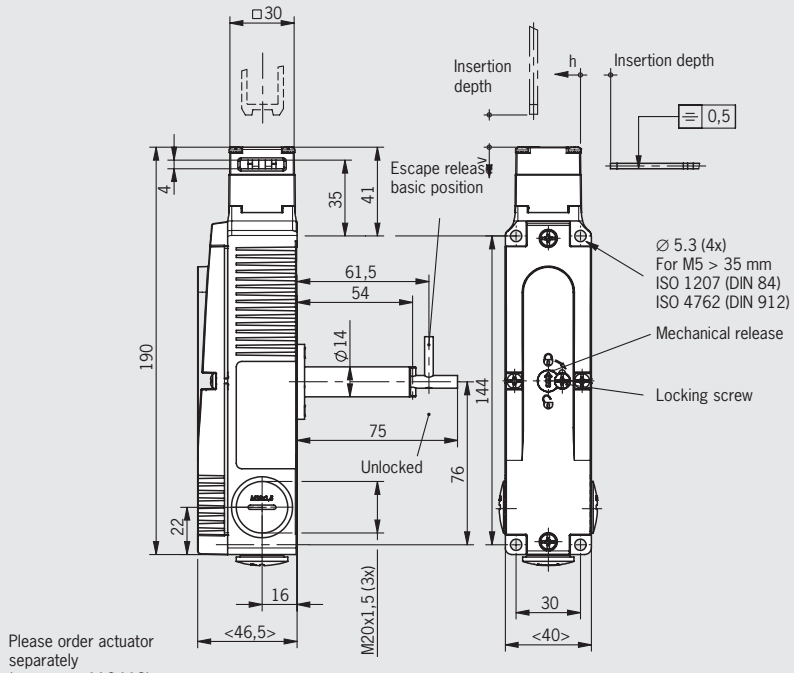
Solenoid operating voltage
- AC/DC 24 V +10%, -15%

Guard locking types
STA3 Closed-circuit current principle, guard locking by spring force. Release by applying voltage to the guard locking solenoid.

Switching elements
- **2131** Slow-action switching contact
  2 NC ⊖ + 1 NO + 1 NC
  (door monitoring contact)

Cable entry M20 x 1.5

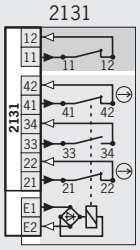
Dimension drawing



Please order actuator separately
(see pages 116-118)

For cable glands see page 124

Wiring diagrams Actuator inserted and locked



Solenoid monitoring
Door monitoring

For switching functions see technical data on page 180

Ordering table

Series	Connection	Guard locking	Switching element	Version	Solenoid operating voltage AC/DC 24 V
STA	**M** Cable entry **3 x M20 x 1.5**	**3** Mechanical	**2131** 2 NC ⊖ + 1 NC + 1 NO	**C1993** Long actuator shaft	**103660** STA3A-2131A024MC1993

For safety precautions see page 187
For technical data see page 153

Safety switch STA-TW with guard locking and guard lock monitoring

- **Actuating heads made of metal**
- **Simultaneous monitoring of two safety doors**
- **Mechanical release on the front**
- **Mechanical key release optional**
- **With door monitoring contact**

Approach direction

Horizontal and vertical
Can be adjusted in 90° steps

Mechanical release
Is used for releasing the guard locking with the aid of a tool. To protect against tampering, the mechanical release is sealed with sealing lacquer.

Mechanical key release
Additional lock on the switch head. Function as for mechanical release. The mechanical key release setting is indicated in the window. Two keys are included.

Solenoid operating voltage
- AC/DC 24 V +10%, -15%

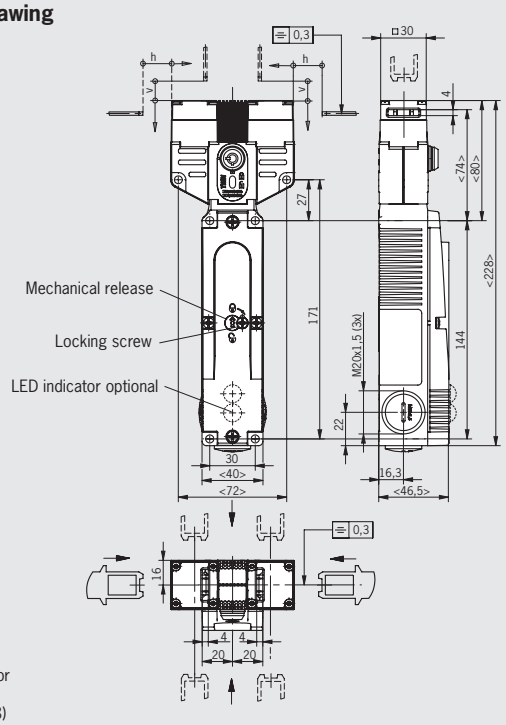
LED function display (optional)
A function display (2 LEDs, red and green) is available for the following voltage ranges:
- AC/DC 24 V +10%, -15%

Guard locking types
STP3 Closed-circuit current principle, guard locking by spring force. Release by applying voltage to the guard locking solenoid.

Switching elements
- **2131** Slow-action switching contact 2 NC ⊖ + 1 NO + 1 NC (door monitoring contact)
- **4121** Slow-action switching contact 2 NC ⊖ + 1 NC / 1 NO (door monitoring contact)

Cable entry M20 x 1.5

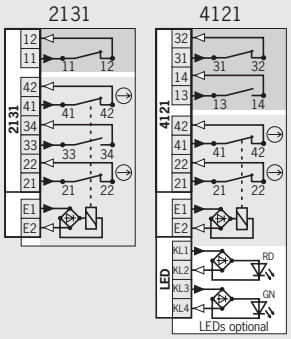
Dimension drawing



Please order actuator separately (see pages 116-118)

For cable glands see page 124

Wiring diagrams Actuator inserted and locked



Solenoid monitoring
Door monitoring

For switching functions see technical data on page 183

Ordering table

Series	Connection	Guard locking	Switching element	Version	Solenoid operating voltage AC/DC 24 V
STA-TW	**M** Cable entry **3 x M20 x 1.5**	**3** Mechanical	**2131** 2 NC ⊖ + 1 NC + 1 NO		**105617** STA-TW-3A-2131AC024M
				With mechanical key release (indentical locking)	**105888** STA-TW-3A-2131AC024M-S1
			4121 2 NC ⊖ + 1 NC / 1 NO		**106545** STA-TW-3A-4121AC024M
				024L LED indicator AC/DC 24 V	**106379** STA-TW-3A-4121AC024L024M

Selection table for safety hinge ESH

Switching element	
Two contacts	1 NC ⊖ + 1 NO or 2 NC ⊖

Switching element Two contacts		Page
●		106

Hinge ESH

- **Hinge with integrated safety function**
- **Suitable for profile assembly**

The safety hinges ESH are safety devices for monitoring movable safety guards, such as doors or covers on machinery or systems.
On the safety hinges ESH-ARO... the operating point can be adjusted as often as necessary.

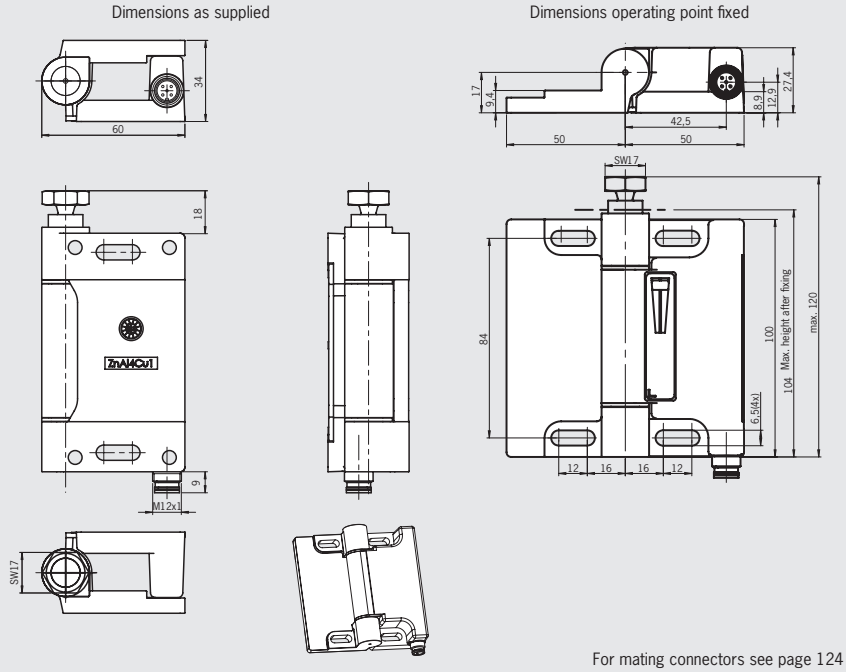
Important: During mounting the axes of the hinges used must be exactly aligned.

Switching elements

- **20** Snap-action switching contact
  2 NC ⊖
- **11** Snap-action switching contact
  1 NC ⊖ + 1 NO

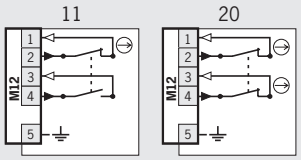
Plug connector M12
4-pin + PE

Dimension drawing



For mating connectors see page 124

Wiring diagrams



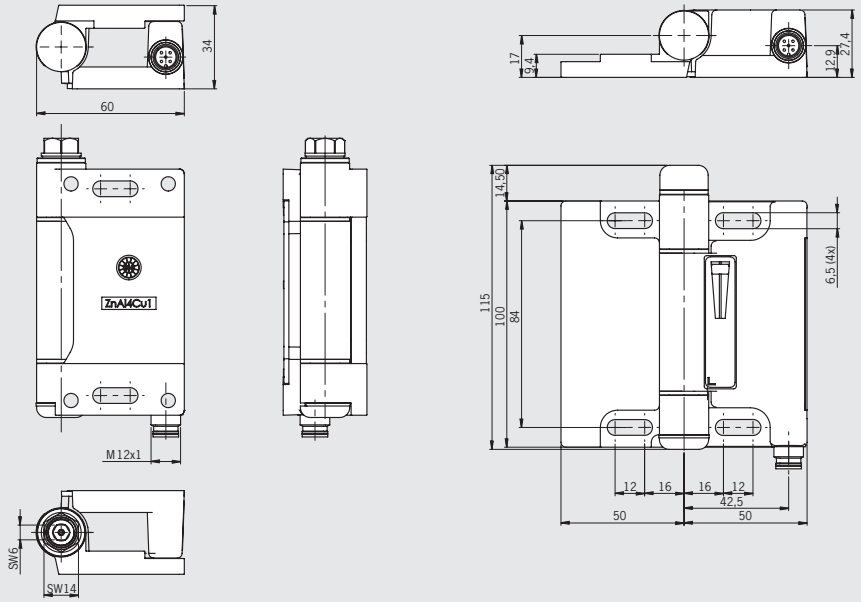
Ordering table

Series	Switching element	Version	Order no./item
Safety hinge **ESH-PRO**	**11** 1 NC ⊖ + 1 NO	Plug connector **M12**	**095895** ESH-PRO-11A-1205
	20 2 NC ⊖	Plug connector **M12**	**095894** ESH-PRO-20A-1205
	-	Matching hinge (without safety function)	**096007** ESH-PRO

▶ **Hinge ESH-ARO re-adjustable**

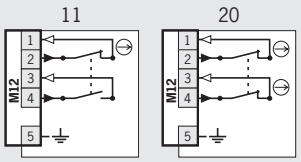
Plug connector M12
4-pin + PE

Dimension drawing



For mating connectors see page 124

Wiring diagrams

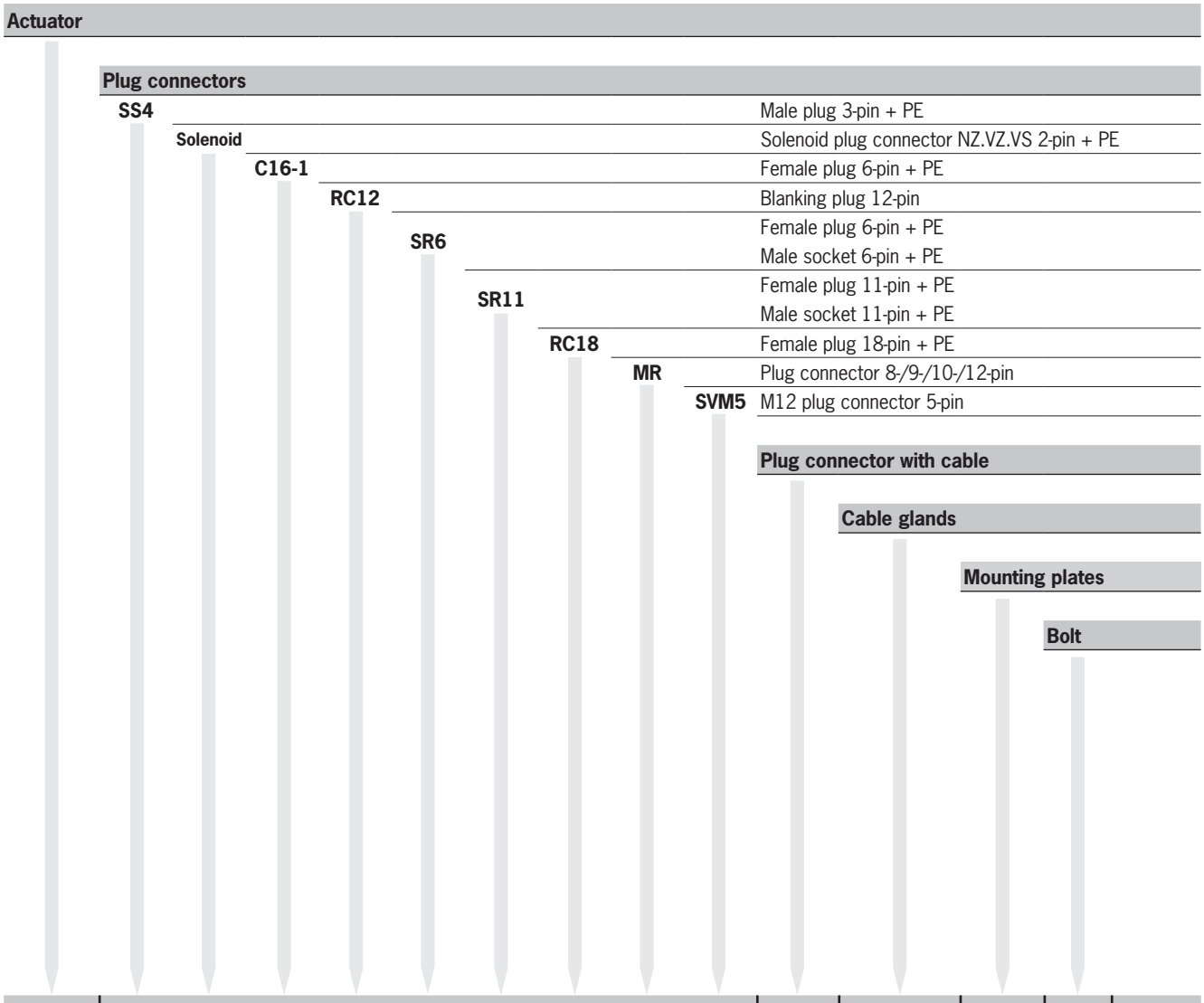


Ordering table

Series	Switching element	Version	Order no./item
Safety hinge **ESH-ARO** re-adjustable	**11** 1 NC ⊖ + 1 NO	Plug connector **M12**	**109409** ESH-ARO-11A-1205
	20 2 NC ⊖	Plug connector **M12**	**106548** ESH-ARO-20A-1205
	-	Matching hinge (without safety function)	**096007** ESH-PRO
	-	Replacement protective cap	**110443** INSTALLATION KIT CAP

For safety precautions see page 187
For technical data see page 153

Selection table for accessories



Actuator	Plug connectors									With cable	Cable gland	Mounting plates	Bolt	Page
	SS4	Solenoid	C16-1	RC12	SR6	SR11	RC18	MR	SVM5					
●														110
	●													119
		●												119
			●											119
				●										119
					●					●				120
						●				●				120
							●							121
							●			●				122
								●		●				123
									●	●				124
											●			124
												●		125
													●	135

Actuators for safety switches NZ.VZ, NZ.VZ.VS and TZ

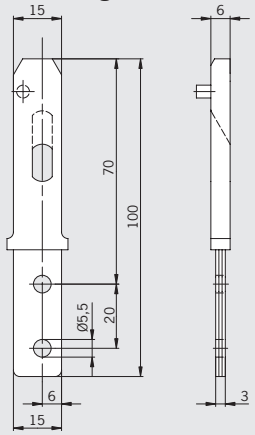
- **Two stainless safety screws per actuator**
- **Increased overtravel optional**
- **Packaging unit 25 pieces optional**

Straight actuator
The straight actuator is used on sliding doors or hinged doors with door radii greater than 1000 mm. Safety screws prevent unscrewing of the actuator. The safety screws included can be inserted with a normal tool, but cannot be removed again.

Actuator with overtravel
- **4 mm** for doors with normal play
- **16 mm** for doors with large play (optional)

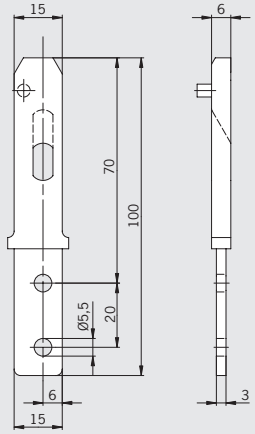
Actuator Z-G straight
Overtravel 4 mm

Dimension drawings

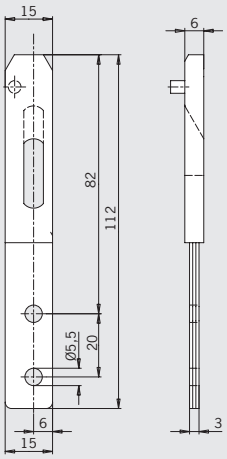


Actuator Z-GME straight
Overtravel 4 mm, solid stainless steel

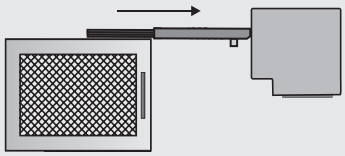
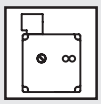
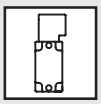
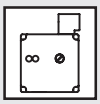
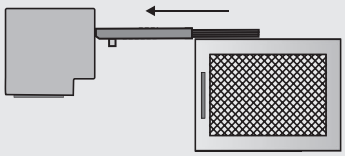
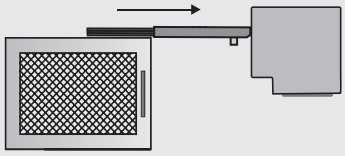
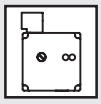
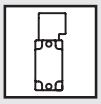
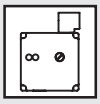
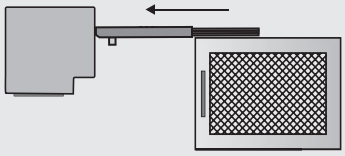
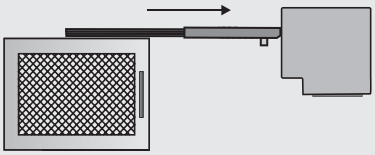
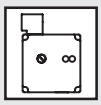
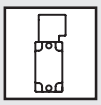
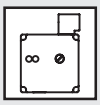
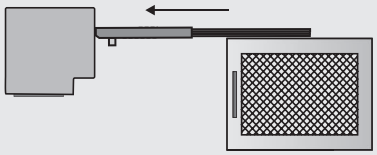
Dimension drawings

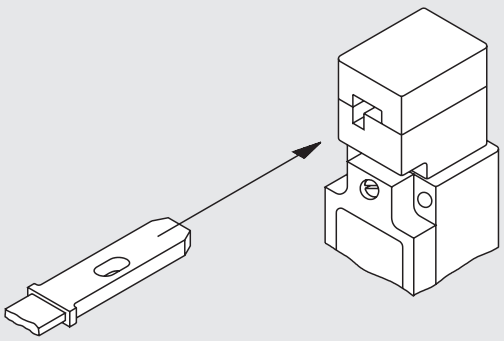


Actuator Z-GN straight
Overtravel 16 mm



Selection table for actuators

Actuator					
Actuator straight Z-G 016849 overtravel 4 mm		 TZ-LE	 NZ	 TZ-RE	
Actuator straight Z-GME 097436 overtravel 4 mm		 TZ-LE	 NZ	 TZ-RE	
Actuator straight Z-GN 072251 overtravel 16 mm		 TZ-LE	 NZ	 TZ-RE	



Straight actuator
Z-G 016849
Z-GME 097436
Z-GN 072251

Ordering table

Designation	Design	Min. door radius r [mm]	Packaging unit	Order no./item
Actuator Straight	**Z-G** 4 mm overtravel incl. 2 safety screws M5 x 10	≥ 1000	1 ea.	**016849** ACTUATOR-Z-G
			25 ea.	**074411** ACTUATOR-Z-G/V25
	Z-GME 4 mm overtravel, made of solid stainless steel incl. 2 safety screws M5x10	≥ 1000	1 ea.	**097436** ACTUATOR-Z-GME
	Z-GN 16 mm overtravel incl. 2 safety screws M5x10	≥ 1000	1 ea.	**072251** ACTUATOR-Z-GN

For safety precautions see page 187
For technical data see page 153

Actuators for safety switches NZ.VZ, NZ.VZ.VS and TZ

- **Two stainless safety screws per actuator**
- **Smaller door radii optional**
- **Packaging unit 25 pieces optional**

Hinged actuator
For door radii less than 1000 mm a hinged actuator should be used. The spring action movement of the actuator prevents damage due to the actuator jamming in the actuating head. Depending on the movement of the safety guard, the actuator must be selected for left/right or top/bottom.

Option C2241
Hinged actuator made of stainless steel.

Hinged actuator Z-R/Z-LL
Radius ≥ 400 mm, safety guard hinged on left/right

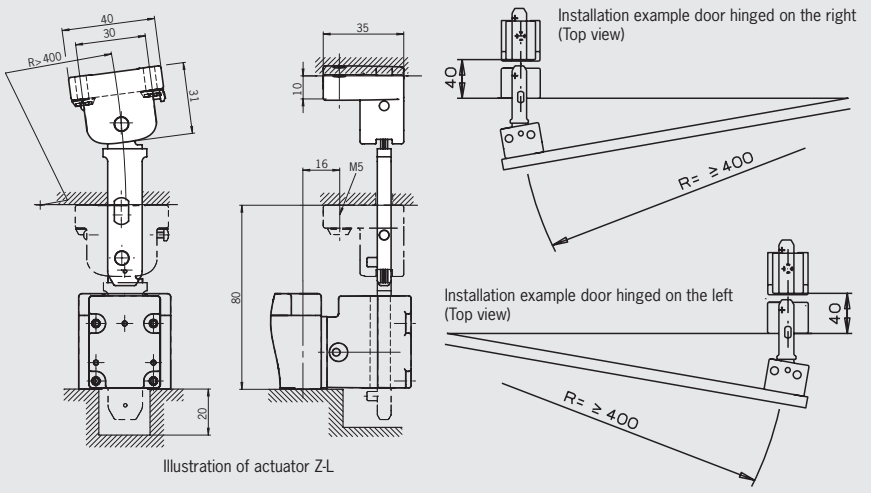
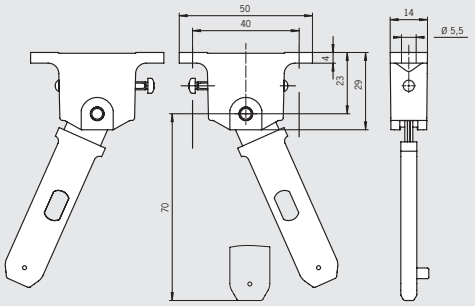
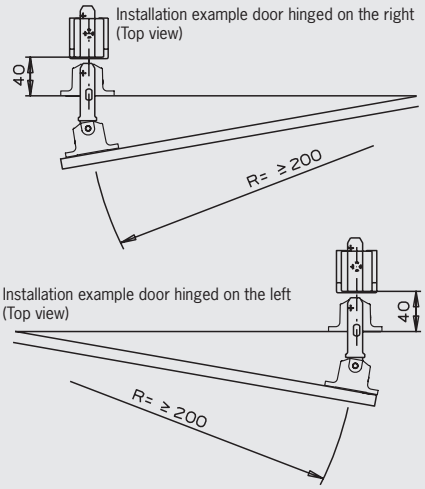


Illustration of actuator Z-L

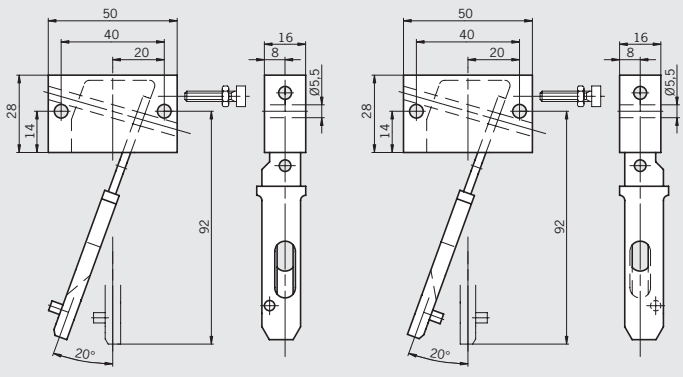
Hinged actuator Z-R-C2194/Z-L-C2194
Radius ≥ 200 mm, safety guard hinged on left/right



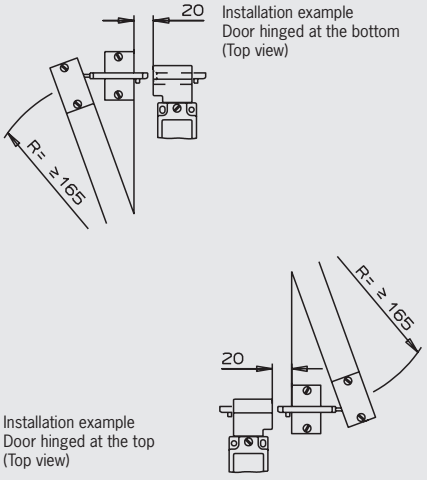
Z-L Z-R



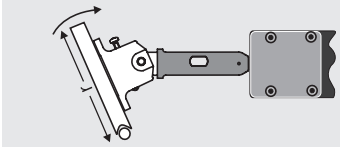
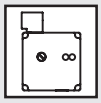
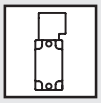
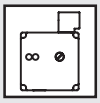
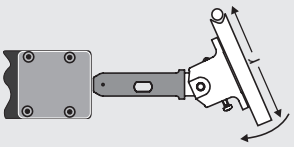
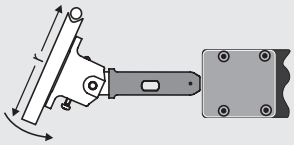
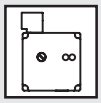
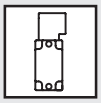
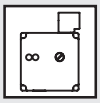
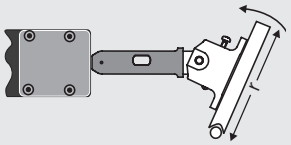
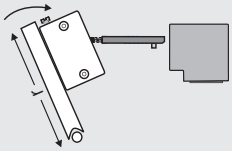
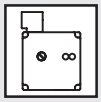
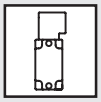
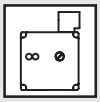
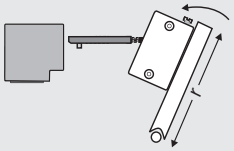
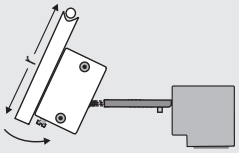
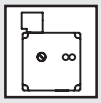
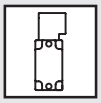
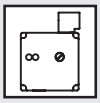
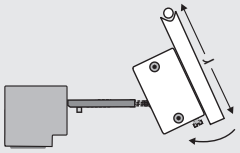
Hinged actuator Z-U/Z-O/Z-U-C2241/Z-O-C2241
Radius ≥ 165 mm, safety guard hinged at bottom/top

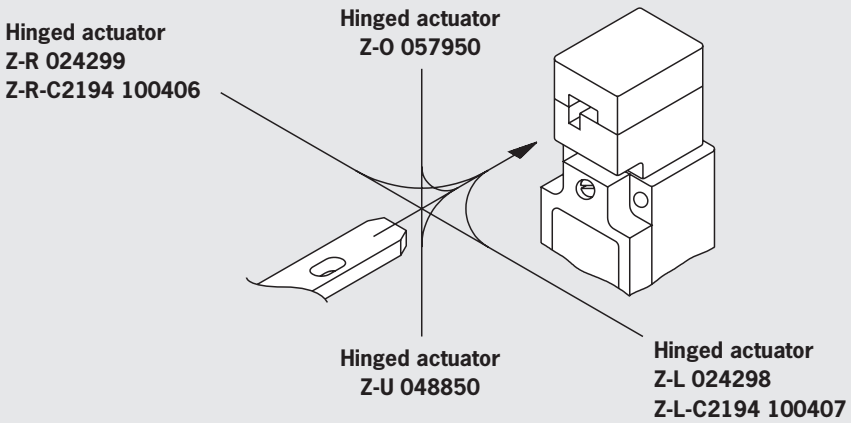


Z-U Z-O



Selection table for actuators

Actuator					
Hinged actuator Z-L 024298 Z-L-C2194 100407		 TZ-LE	 NZ	 TZ-RE	
Hinged actuator Z-R 024299 Z-R-C2194 100406		 TZ-LE	 NZ	 TZ-RE	
Hinged actuator Z-U 048850		 TZ-LE	 NZ	 TZ-RE	
Hinged actuator Z-O 057950		 TZ-LE	 NZ	 TZ-RE	



Ordering table

Designation	Design	Version	Min. door radius r [mm]	Packaging unit	Order no./item
Hinged actuator	**Z-R** Safety guard hinged on the left incl. 2 safety screws M5 x 16		≥ 400	1 ea.	**024299** HINGED ACTUATOR-Z-R
				25 ea.	**074412** HINGED ACTUATOR-Z-R/V25
	Z-L Safety guard hinged on the right incl. 2 safety screws M5 x 16		≥ 400	1 ea.	**024298** HINGED ACTUATOR-Z-L
				25 ea.	**074413** HINGED ACTUATOR-Z-L/V25
	Z-R-C2194 Safety guard hinged on the left incl. 2 safety screws M5x10	**C2194** Smaller door radius	≥ 200	1 ea.	**100406** HINGED ACTUATOR-Z-R-C2194
	Z-L-C2194 Safety guard hinged on the right incl. 2 safety screws M5 x 10	**C2194** Smaller door radius	≥ 200	1 ea.	**100407** HINGED ACTUATOR-Z-L-C2194
	Z-U Safety guard hinged at bottom incl. 2 safety screws M5 x 25		≥ 165	1 ea.	**048850** HINGED ACTUATOR-Z-U
				25 ea.	**074414** HINGED ACTUATOR-Z-U/V25
		C2241 Material: stainless steel	≥ 165	1 ea.	**103845** HINGED ACTUATOR-Z-U-C2241
	Z-O Safety guard hinged at top incl. 2 safety screws M5 x 25		≥ 165	1 ea.	**057950** HINGED ACTUATOR-Z-O
				25 ea.	**074415** HINGED ACTUATOR-Z-O/V25
		C2241 Material: stainless steel	≥ 165	1 ea.	**104068** HINGED ACTUATOR-Z-O-C2241

For safety precautions see page 187
For technical data see page 153

Actuators for safety switches NX/TX

- **Actuators made of stainless steel**
- **Two stainless safety screws per actuator**
- **With rubber bush**

Straight actuator
The straight actuator is used on sliding doors or hinged doors with door radii greater than 300 mm. Safety screws prevent unscrewing of the actuator.

Actuator with overtravel
- **2 mm** for doors with normal play
- **7 mm** for doors with large play (optional)

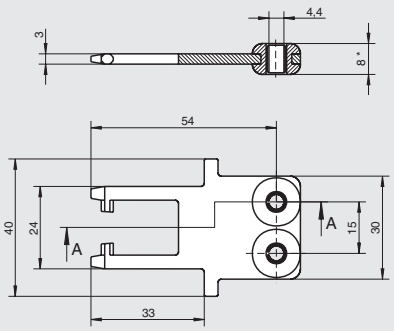
Actuators with rubber bushings
For flexible mounting of the actuator.

Hinged actuator
For door radii less than 300 mm a hinged actuator should be used. The spring action movement of the actuator prevents damage due to the actuator jamming in the actuating head. Depending on the movement of the safety guard, the actuator must be selected for left/right or top/bottom.

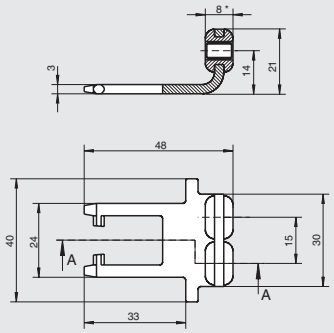
Screws made of stainless steel
The safety screws included can be inserted with a normal tool, but cannot be removed again.

Actuator X-GQ straight
Rubber bush, overtravel 2 mm

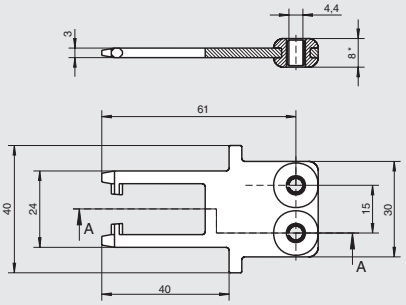
Dimension drawings



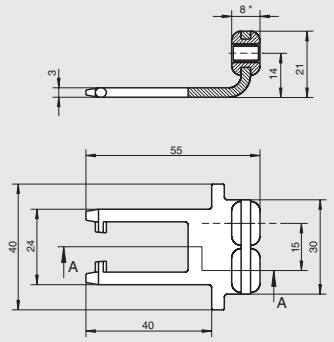
Actuator X-WQ bent
Rubber bush, overtravel 2 mm



Actuator X-GNQ straight
Rubber bush, overtravel 7 mm



Actuator X-WNQ bent
Rubber bush, overtravel 7 mm

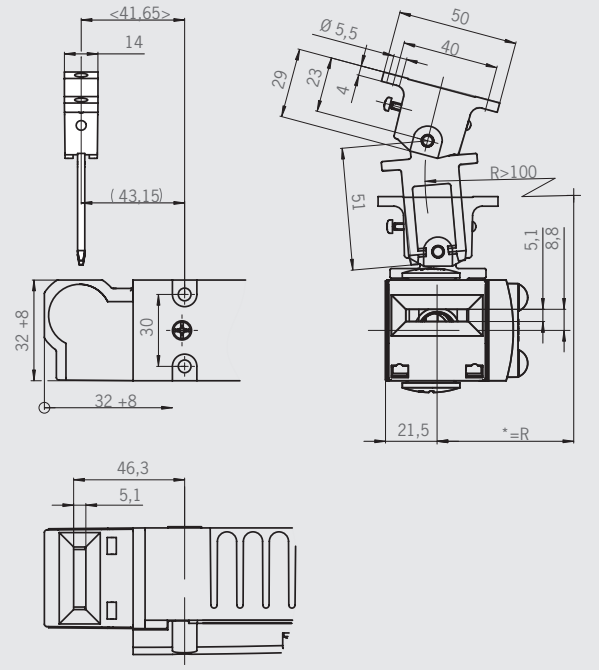


Ordering table

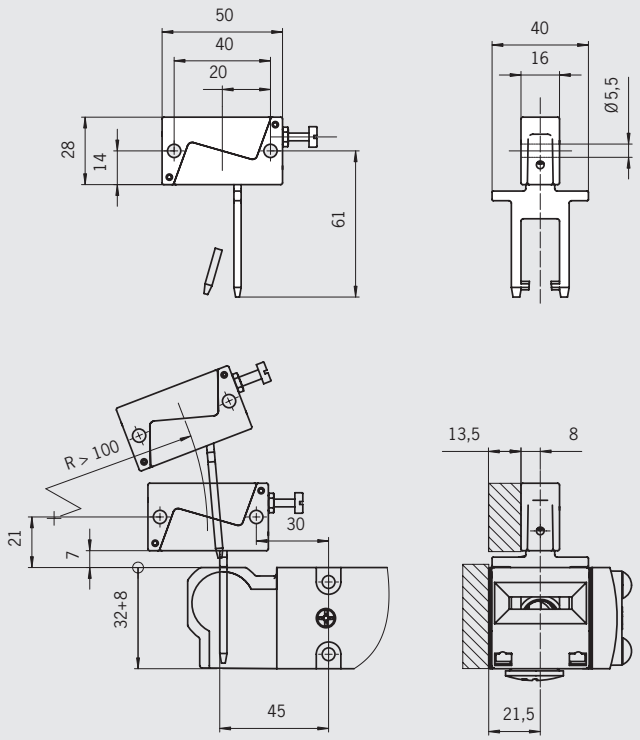
Designation	Design	Min. door radius r [mm]	Packaging unit	Order no./item
Actuator Straight Rubber bush	**X-GQ** 2 mm overtravel incl. 2 safety screws M4 x 14	300	1 ea.	**079739** ACTUATOR-X-GQ
Actuator Angled Rubber bush	**X-WQ** 2 mm overtravel incl. 2 safety screws M4 x 14	300	1 ea.	**079740** ACTUATOR-X-WQ
Actuator Straight Rubber bush, overtravel	**X-GNQ** 7 mm overtravel incl. 2 safety screws M4 x 14	440	1 ea.	**079741** ACTUATOR-X-GNQ
Actuator Angled Rubber bush, overtravel	**X-WNQ** 7 mm overtravel incl. 2 safety screws M4 x 14	440	1 ea.	**079742** ACTUATOR-X-WNQ

* The dimension 8 relates to the fitted state

Hinged actuator X-LR-N
Radius ≥ 100 mm, safety guard hinged on right/left



Hinged actuator X-OU-N
Radius ≥ 100 mm, safety guard hinged at bottom/top



Ordering table

Designation	Design	Min. door radius r [mm]	Packaging unit	Order no./item
Hinged actuator	**X-LR-N** Safety guard hinged on the right or left incl. 2 safety screws M5 x 10	≥ 100	1 ea.	**098082** HINGED ACTUATOR-X-LR-N
	X-OU-N Safety guard hinged at top or bottom incl. 2 safety screws M5 x 10	≥ 100	1 ea.	**097906** HINGED ACTUATOR-X-OU-N

For safety precautions see page 187
For technical data see page 153

Actuators for safety switches SGA/STA

- **Two stainless safety screws per actuator**
- **Actuators with rubber bushings**

Note
Type S actuators must not be used in conjunction with insertion funnels.
L actuators must be used for insertion funnels.

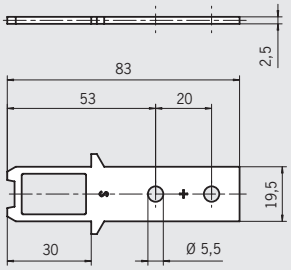
Straight actuator
Suitable for a maximum tensile force of 3000 N
The straight actuator is used on sliding doors or hinged doors with door radii greater than 300 mm. Safety screws prevent unscrewing of the actuator.

Bent actuator
Suitable for a maximum tensile force of 1500 N

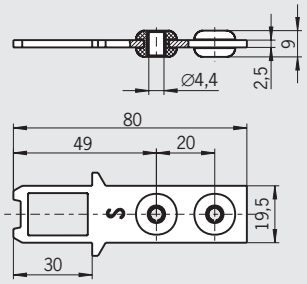
Screws made of stainless steel
The safety screws included can be inserted with a normal tool, but cannot be removed again.

Standard actuator S, straight
Without rubber bush, overtravel 5 mm

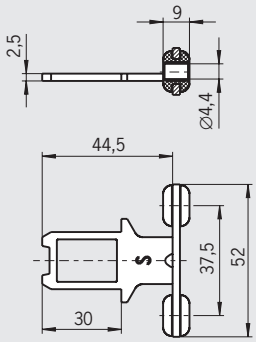
Dimension drawings



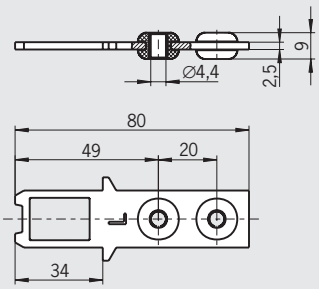
Standard actuator S, straight
With rubber bush, overtravel 5 mm



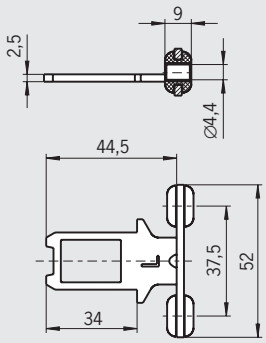
Standard actuator S, bent
With rubber bush, overtravel 5 mm



Actuator L, straight, for insertion funnel
With rubber bush, overtravel 5 mm



Actuator L, bent, for insertion funnel
With rubber bush, overtravel 5 mm



Ordering table

Designation	Design	Min. door radius r [mm]	Packaging unit	Order no./item
Actuator S Straight	**S-G-SN-C2115** Without rubber bush, 5 mm overtravel incl. 2 safety screws M5 x 10	300	1 ea.	**097861** ACTUATOR S-G-SN-C2115
	S-GT-SN With rubber bush, 5 mm overtravel incl. 2 safety screws M4 x 14	300	1 ea.	**095738** ACTUATOR S-GT-SN
Actuator S Angled	**S-WQ-SN** With rubber bush, 5 mm overtravel incl. 2 safety screws M4 x 14	300	1 ea.	**095740** ACTUATOR S-WQ-SN
Actuator L Straight	**S-GT-LN** With rubber bush, 5 mm overtravel incl. 2 safety screws M4 x 14	300	1 ea.	**095739** ACTUATOR S-GT-LN
Actuator L Angled	**S-WQ-LN** With rubber bush, 5 mm overtravel incl. 2 safety screws M4 x 14	300	1 ea.	**095741** ACTUATOR S-WQ-LN

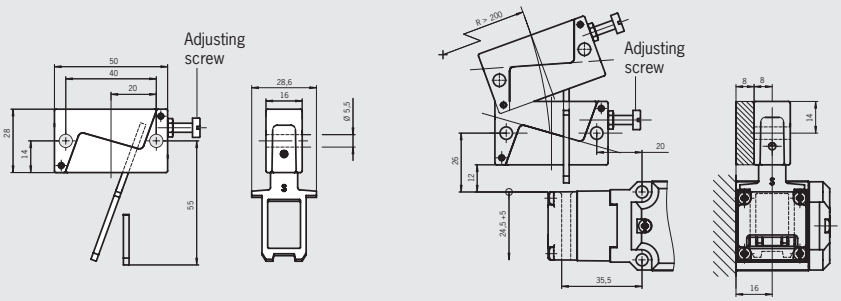
Hinged actuator for safety switches SGA/STA

- **Actuators made of stainless steel**
- **Two stainless safety screws per actuator**
- **For top and bottom hinged doors**
- **For right and left hinged doors**

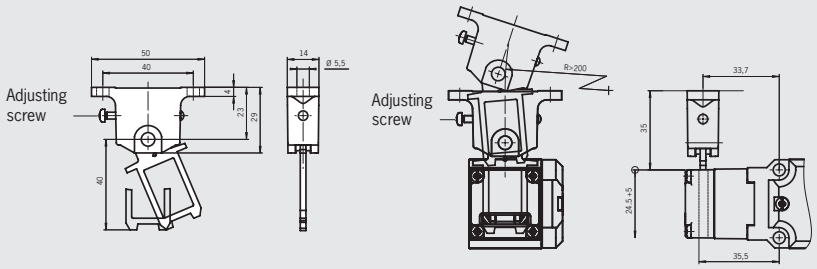
Hinged actuator
For door radii less than 1000 mm a hinged actuator should be used. The spring action movement of the actuator prevents damage due to the actuator jamming in the actuating head. Depending on the movement of the safety guard, the actuator must be selected for left/right or top/bottom.

Hinged actuator S-OU-SN
Radius ≥ 200 mm, safety guard hinged at top/bottom, overtravel 5 mm

Dimension drawings



Hinged actuator S-LR-SN
Radius ≥ 200 mm, safety guard hinged on left/right, overtravel 5 mm



Ordering table

Designation	Design	Min. door radius r [mm]	Packaging unit	Order no./item
Hinged actuator	**S-OU-SN** For top and bottom hinged doors 5 mm overtravel incl. 2 safety screws M5 x 25	200	1 ea.	**095315** HINGED ACTUATOR-S-OU-SN
	S-LR-SN For left and right hinged doors 5 mm overtravel incl. 2 safety screws M5 x 10	200	1 ea.	**096838** HINGED ACTUATOR-S-LR-SN

For safety precautions see page 187
For technical data see page 153

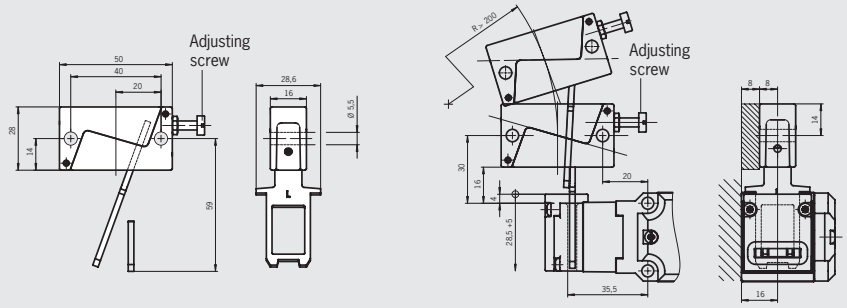
Hinged actuator for safety switches SGA/STA

- **Actuators made of stainless steel**
- **Two stainless safety screws per actuator**
- **For top and bottom hinged doors**
- **For right and left hinged doors**

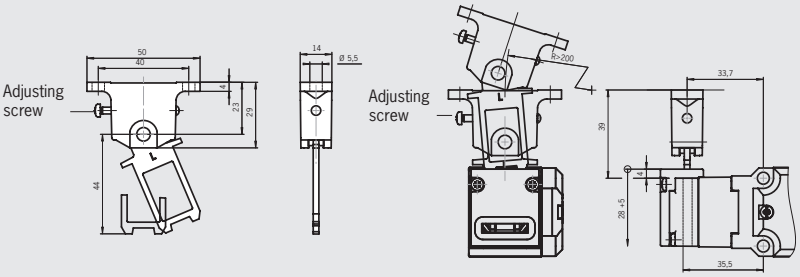
Hinged actuator
For door radii less than 1000 mm a hinged actuator should be used. The spring action movement of the actuator prevents damage due to the actuator jamming in the actuating head. Depending on the movement of the safety guard, the actuator must be selected for left/right or top/bottom.

Hinged actuator S-OU-LN for insertion funnel
Radius ≥ 200 mm, safety guard hinged at top/bottom, overtravel 5 mm

Dimension drawings



Hinged actuator S-LR-LN for insertion funnel
Radius ≥ 200 mm, safety guard hinged on left/right, overtravel 5 mm



Ordering table

Designation	Design	Min. door radius r [mm]	Packaging unit	Order no./item
Hinged actuator	**S-OU-LN** For top and bottom hinged doors 5 mm overtravel incl. 2 safety screws M5 x 25	200	1 ea.	**096697** HINGED ACTUATOR-S-OU-LN
	S-LR-LN For left and right hinged doors 5 mm overtravel incl. 2 safety screws M5 x 10	200	1 ea.	**096844** HINGED ACTUATOR-S-LR-LN

Plug connectors SS4, C16-1, RC12 and solenoid plugs

For safety switches series NZ and TZ

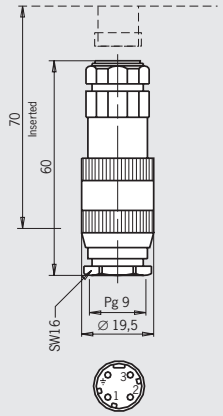
- **Plugs and sockets**
- **Blanking plug**
- **Solenoid plug**

Blanking plug
To cover the socket for the enabling switch on the safety switch TZ with socket RC12.

Plug connector for solenoid locking NZ.VZ.VS
- Without rectifier
  For the connection of DC.
- With rectifier
- For the connection of AC 110 V - AC 230 V.

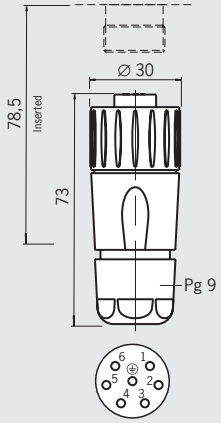
Male plug SS4
3-pin + PE

Dimension drawings



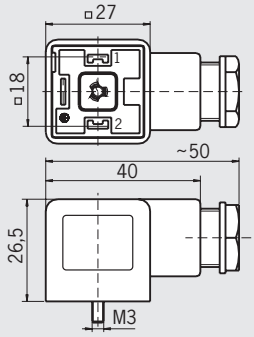
View of connection side, plug

Female connector C16-1
6-pin + PE

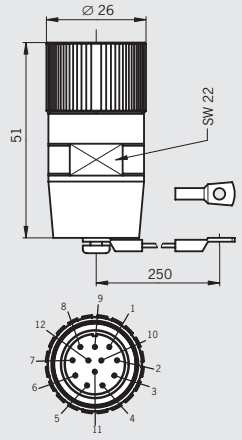


View of connection side, socket

Solenoidconnector NZ.VZ.VS
2-pin + PE

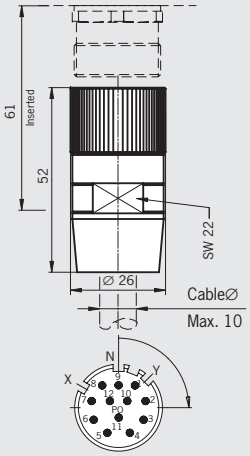


Blanking plug RC12
12-pin



View of connection side, plug

Male plug RC12
12-pin



View of connection side, plug

Ordering table

Designation	Version	Order no./item
SS4 3-pin + PE	Plug for socket BD4	**002787** SS4
C16-1 1) 6-pin + PE	Female plug	**043861** Cable socket 6 + PE
RC12 1) 12-pin	Male plug	**073294** RC-12P1N8A8096
	Blanking plug without bridges	**073293** RC-12P1N8A8300
Solenoid plug NZ.VZ..VS 2-pin + PE	For DC without rectifier	**028345** Plug connector for solenoid locking
	For AC with rectifier max. AC 240 V	**028338** Plug connector with rectifier for solenoid locking

For information on crimp contacts see page 134.
1) Crimp contacts are included.

For safety precautions see page 187
For technical data see page 153

Plug connectors SR6 and SR11

- **Plugs and sockets**
- **Crimp contacts**
- **90° angled optional**
- **Cable optional**
- **Coding shells**

Angled plug connector
On plug connectors without cables the direction of the cable exit can be adjusted.

Male socket
For fitting in safety switches.

Coding shells
Two coding shells and screws. If used only matching connectors can be mated.

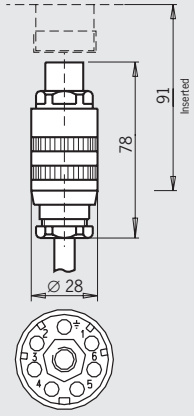
Cable (optional)
Cable sleeve PUR, color gray, conductor cross-section 1.0 mm².

Connector assignment for plug with cable

SR6		SR11	
Pin	**Wire**	**Pin**	**Wire**
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
⏚	7	7	7
		8	8
		9	9
		10	10
		11	11
		⏚	12

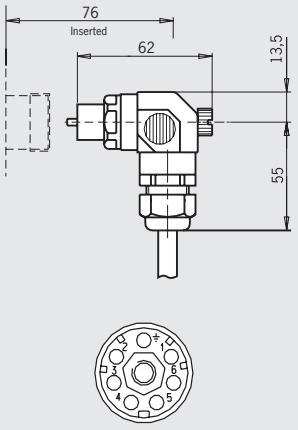
Female plug SR6 EF
6-pin + PE

Dimension drawings



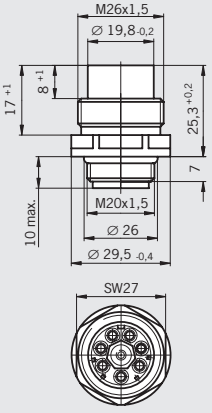
View of connection side, socket
Contact carrier can be adjusted

Female connector SR6 WF angled 6-pin + PE



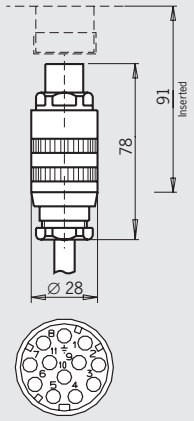
View of connection side, socket
Contact carrier can be adjusted

Male socket SR6 AM
6-pin + PE



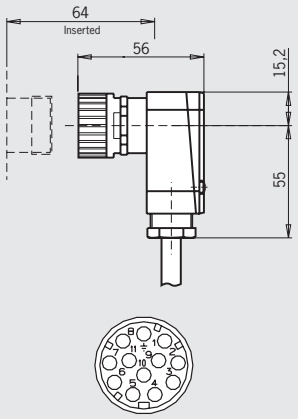
View of connection side, plug

Female plug SR11 EF
11-pin + PE



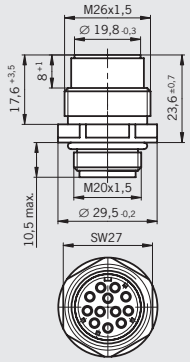
View of connection side, socket
Contact carrier can be adjusted

Female connector SR11 WF angled 11-pin + PE



View of connection side, socket
Contact carrier can be adjusted

Male socket SR11 AM
11-pin + PE



View of connection side, plug

Ordering table

Designation	Version	Cable					
		Without	**5 m**	**10 m**	**15 m**	**20 m**	**25 m**
SR6 [1] 6-pin + PE	**EF** Female plug	**013176** SR6EF	**077632** SR6EF-5000	**077633** SR6EF-10000	**077634** SR6EF-15000	**098128** SR6EF-20000	-
	WF Female plug angled	**024999** SR6WF	**077638** SR6WF-5000	**077639** SR6WF-10000	**077640** SR6WF-15000	-	-
	K Coding shells	**013178** SR6K	-	-	-	-	-
	AM Male socket, connection M20x1.5	**087180** SR6AM2-M20	-	-	-	-	-
SR11 [1] 11-pin + PE	**EF** Female plug	**070859** SR11EF	**077629** SR11EF-5000	**077630** SR11EF-10000	**077631** SR11EF-15000	**096632** SR11EF-20000	**094749** SR11EF-25000
	WF Female plug angled	**054773** SR11WF	**077635** SR11WF-5000	**077636** SR11WF-10000	**077637** SR11WF-15000	-	-
	AM Male socket, connection M20x1.5	**091296** SR11AM2-M20	-	-	-	-	-
SR6 and SR11	**Socket crimp contacts** Conductor cross-section 0.5 - 1.5 mm²	**071260** SRF	-	-	-	-	-
	Pin crimp contacts Conductor cross-section 0.5 - 1.5 mm²	**071261** SRM	-	-	-	-	-

For information on crimp contacts see page 134.
1) Crimp contacts are included.

Plug connectors RC18 and RC18 with option C1825

- **90° angled optional**
- **Cable optional**
- **Halogen-free cable optional**

Crimp contacts
With 19 crimp pins for conductor cross-section 0.75 - 1.00 mm².

Option C1825
With 16 crimp pins for conductor cross-section 0.38 - 0.5 mm² and 3 pins for conductor cross-section 0.75 - 1.0 mm² for control of the guard locking solenoid. This plug is easier to connect.
Important: Only for switch with option C1826.

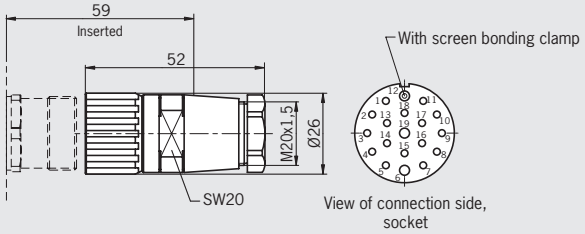
Angled plug connector (optional)
On plug connectors with cables the direction of the cable exit can be chosen on left/right. On plug connectors without cables the direction can be adjusted in 45° steps.

Cable (optional)
Cable sleeve PUR, color black, wire cross-section 0.5 mm² or 1.0 mm².

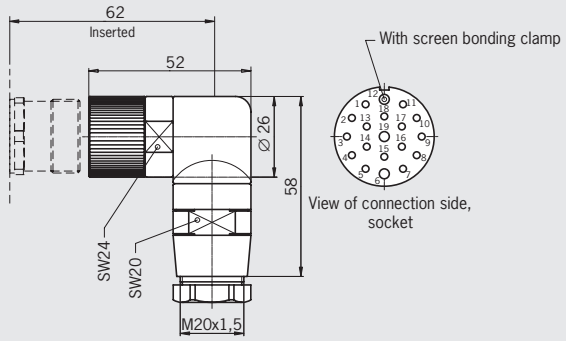
Halogen-free cable (optional)
Cable sleeve PUR, color black, halogen-free, silicone-free. Reduction of toxic gases and smoke in case of fire.
Conductor cross-section 0.5 mm² or 1.0 mm².

Female plug RC18 / RC18..C1825
18-pin + PE (for cable diameter 10 ... 14 mm)

Dimension drawings



Female plug RC18 / RC18..C1825
Angled 18-pin + PE (for cable diameter 10 ... 14 mm)



Ordering table

Designation	Version	Without cable
RC18 [2] 18-pin + PE	**EF** Female plug [1]	**074616** RC18EF
	WF Female plug angled [1]	**074617** RC18WF
	Replacement pin crimp contacts Conductor cross-section 19 x 0.75 - 1 mm²	**094309** Pin crimp contact RCM
	EF-C1825 Female plug [1]	**077025** RC18EF-C1825
	WF-C1825 Female plug angled [1]	**077026** RC18WF-C1825
	Replacement pin crimp contacts Conductor cross-section 16 x 0.38 - 0.5 mm² 3 x 0.75 - 1 mm²	**094310** Pin crimp contact RCM-C1825

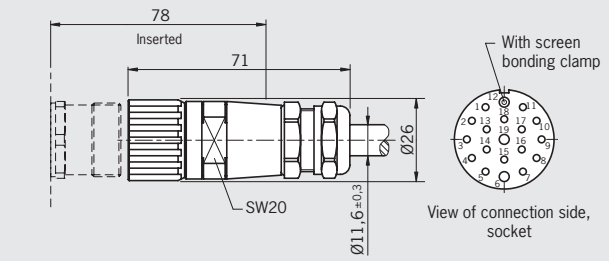
For information on crimp contacts see page 134.
1) Suitable for safety switches TZ without option C1825.
2) Crimp contacts are included.

Please turn over

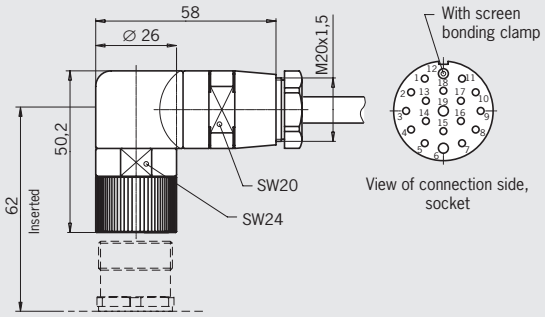
For safety precautions see page 187
For technical data see page 153

Female plug RC18 / RC18..C1825 with cable
18-pin + PE / 19-pin PUR

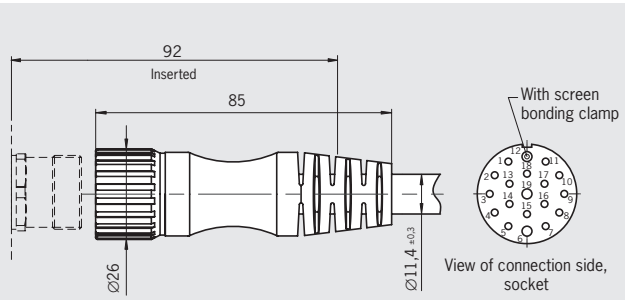
Dimension drawings



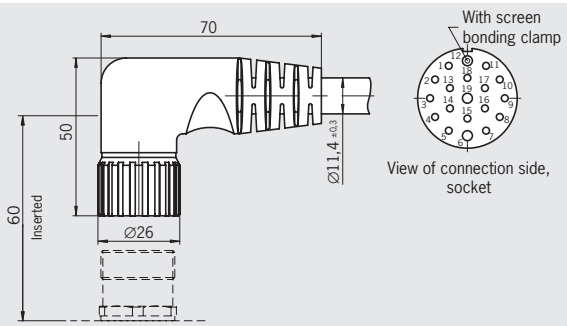
Female plug RC18 / RC18..C1825 angled with cable 18-pin + PE



Female plug RC18 / RC18..C1825 with cable halogen-free
18-pin + PE



Female plug RC18 / RC18..C1825 angled with cable halogen-free 18-pin + PE



Connector assignment plug RC18 with cable and option C1825

Pin	Wire color	Cond. cross-section [mm]
1	VT	0.5
2	RD	0.5
3	GY	0.5
4	RD/BU	0.5
5	GN	0.5
6	BU	1.0
7	GY/PK	0.5
8	GN/WH	0.5
9	YE/WH	0.5
10	GY/WH	0.5
11	BK	0.5
12	GN/YE	1.0
13	PK	0.5
14	BN/GY	0.5
15	BN/YE	0.5
16	BN/GN	0.5
17	WH	0.5
18	YE	0.5
19	BN	1.0

Ordering table

Descrp.	Version	Cable									
		1.5 m	3 m	6 m	8 m	10 m	15 m	20 m	25 m	30 m	40 m
RC18 18-pin + PE with cable	**EF-C1825** Female plug	**092761** RC18EF1,5M-C1825	**092816** RC18EF3M-C1825	**077014** RC18EF6M-C1825	**077015** RC18EF8M-C1825	**092898** RC18EF10M-C1825	**077016** RC18EF15M-C1825	**092726** RC18EF20M-C1825	**092727** RC18EF25M-C1825	**095993** RC18EF30M-C1825	**102490** RC18EF40M-C1825
	WFL-C1825 Female connector cable exit left	**092906** RC18WF1,5ML-C1825	**092908** RC18WF3ML-C1825	**077018** RC18WF6ML-C1825	**077019** RC18WF8ML-C1825	**092901** RC18WF10ML-C1825	**077020** RC18WF15ML-C1825	**092910** RC18WF20ML-C1825	**092912** RC18WF25ML-C1825	-	-
	WFR-C1825 Female connector cable exit right	**092907** RC18WF1,5MR-C1825	**092909** RC18WF3MR-C1825	**085194** RC18WF6MR-C1825	**085195** RC18WF8MR-C1825	**092902** RC18WF10MR-C1825	**085196** RC18WF15MR-C1825	**092911** RC18WF20MR-C1825	**092913** RC18WF25MR-C1825	-	-
RC18 18-pin + PE with cable halogen-free	**EFF-C1825** Female plug	**092883** RC18EF1,5MF-C1825	**092884** RC18EF3MF-C1825	**092885** RC18EF6MF-C1825	**092886** RC18EF8MF-C1825	**092887** RC18EF10MF-C1825	**092888** RC18EF15MF-C1825	**092889** RC18EF20MF-C1825	**092890** RC18EF25MF-C1825	-	-
	WFLF-C1825 Female connector cable exit left	**092891** RC18WF1,5MLF-C1825	**092893** RC18WF3MLF-C1825	**092697** RC18WF2MLF-C1825	**092895** RC18WF8MLF-C1825	**092699** RC18WF10MLF-C1825	**092701** RC18WF15MLF-C1825	**092704** RC18WF20MLF-C1825	**092724** RC18WF25MLF-C1825	-	-
	WFRF-C1825 Female connector cable exit right	**092892** RC18WF1,5MRF-C1825	**092894** RC18WF3MRF-C1825	**092698** RC18WF6MRF-C1825	**092896** RC18WF8MRF-C1825	**092700** RC18WF10MRF-C1825	**092702** RC18WF15MRF-C1825	**092708** RC18WF20MRF-C1825	**092725** RC18WF25MRF-C1825	-	-

Ordering table female connector RC18 with cable PUR, 19-pin, separately numbered cores, black (Numbering as per the pin number)

Descrp.	Cable *						
	1.5 m	3 m	6 m	10 m	15 m	20 m	25 m
RC18 Female plug 19-pin **with cable PUR**	**110301** C-M23F19-PU01,5-MA-110301	**110302** C-M23F19-PU03,0-MA-110302	**110303** C-M23F19-PU06,0-MA-110303	**110304** C-M23F19-PU10,0-MA-11030	**110305** C-M23F19-PU15,0-MA-110305	**110306** C-M23F19-PU20,0-MA-110306	**110307** C-M23F19-PU25,0-MA-110307

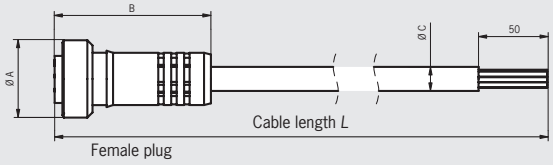
* Conductor cross-section as connection cable on left.

Plug connectors MR8/MR9/MR10/MR12 with cable

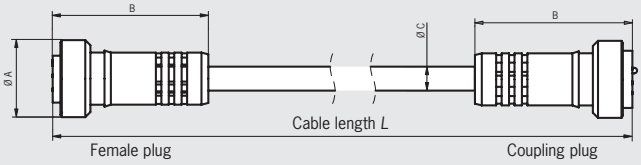
Female connector with cable
8-, 9-, 10-, 12-pin

Extension cable
8-, 9-, 10-, 12-pin

Dimension drawings



Dim.	8-pin	9-pin	10-pin	12-pin
A	∅ 29	∅ 32	∅ 32	∅ 32
B	59	64	64	64
C	∅ 8.9	∅ 9.7	∅ 9.8	∅ 10.4



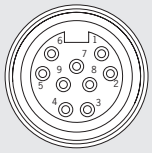
Dim.	8-pin	9-pin	10-pin	12-pin
A	∅ 29	∅ 32	∅ 32	∅ 32
B	59	64	64	64
C	∅ 8.9	∅ 9.7	∅ 9.8	∅ 10.4

Connector assignment (Conductor cross-section 0.82 mm² / 18 AWG)

8-pin

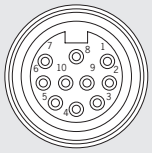
Pin	Wire color
1	OG
2	BU
3	WH/BK
4	BK
5	WH
6	RD
7	GN/YE
8	RD/BK

9-pin



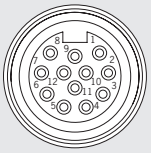
Pin	Wire color
1	OG
2	BU
3	RD/BK
4	GN/BK
5	WH
6	RD
7	GN/YE
8	WH/BK
9	BK

10-pin



Pin	Wire color
1	OG
2	BU
3	WH/BK
4	RD/BK
5	GN/BK
6	OG/BK
7	RD
8	GN/YE
9	BK
10	WH

12-pin



Pin	Wire color
1	OG
2	BU
3	WH/BK
4	RD/BK
5	GN/BK
6	OG/BK
7	BU/BK
8	BK/WH
9	GN/YE
10	RD
11	WH
12	BK

Ordering table

Version	Connection	Material	Cable length *L* [mm]								
			910	1800	3600	6000	9100	12100	15200	18200	24300
Female connector with cable	**MR8**	**PVC**	-	**100938**	**100939**	**100940**	**100941**	**100942**	**103152**	**103153**	-
		PUR	-	**102506**	**100945**	**100946**	**102507**	**102508**	**102509**	**103149**	**103150**
	MR9	**PVC**	**100947**	**102502**	**100948**	**102503**	**102504**	**103154**	-	**103156**	-
		PUR	-	**102510**	**102511**	**102512**	**102513**	**102514**	**102515**	**103151**	-
	MR10	**PVC**	-	**100949**	**100950**	**100951**	**100952**	**102505**	**100953**	**103157**	-
		PUR	-	**102516**	**102517**	**102518**	**100956**	**102519**	**102520**	**102521**	-
	MR12	**PVC**	-	**100959**	**100960**	**100961**	**100962**	**103158**	**103159**	**103160**	-
		PUR	-	**100966**	**100967**	**102522**	**102523**	**102524**	**102525**	**102526**	-
Extension cable	**MR8**	**PVC**	-	-	**100943**	-	**100944**	-	-	-	-
		PUR	-	-	-	-	-	-	-	-	-
	MR10	**PVC**	-	-	**100954**	-	**100955**	-	-	-	-
		PUR	-	-	-	**100957**	-	-	**100958**	-	-
	MR12	**PVC**	-	-	**100963**	**100964**	**100965**	-	-	-	-
		PUR	-	**102527**	**100968**	-	-	-	-	-	-

For safety precautions see page 187
For technical data see page 153

Plug connectors SGLF and SWLF with cable

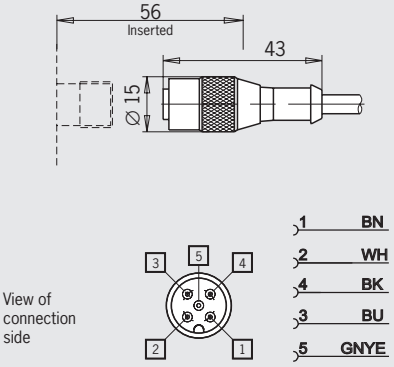
For safety switches series NZ and N1A

- **Plug connector M12 with cable**
- **90° angled optional**

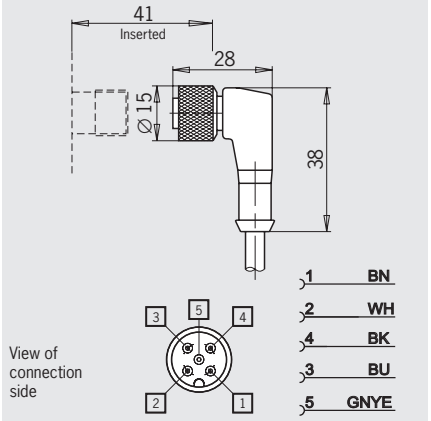
Cable
Cable sleeve PUR, color black, halogen-free, flame retardant. Reduction of toxic gases and smoke in case of fire. Conductor cross-section 0.34 mm².

Plug connector SGLF with cable
M12 plug, 5-pin

Dimension drawings



Plug connector SWLF with cable
Angled, M12 plug, 5-pin



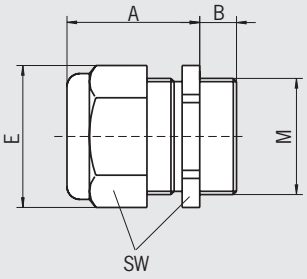
Ordering table

Type	Number of pins	Version	Cable length 5 m
SGLF	**5**	Female connector M12 for male plug SVM5	**073461** SGLF5-5000P
SWLF	**5**	Female connector M12 Angled for male plug SVM5	**073462** SWLF5-5000P

Cable glands

- **M12 x 1.5**
- **M16 x 1.5**
- **M20 x 1.5**

Cable glands
Suitable for various cable diameters. Versions available in plastic and metal.



Article	Thread	Cable∅ [mm]	A [mm]	B [mm]	E [mm]	SW [mm]
EKV.12/04	M12 x 1.5	4 - 6.5	20	5	15.5	14
EKV.16/04	M16 x 1.5	4 - 6.5	20	6	20	18
EKP.16/05	M16 x 1.5	5 - 10	28	8	22	20
EKV.16/06	M16 x 1.5	6.5 - 9.5	20	6	20	18
EKV.20/06	M20 x 1.5	6.5 - 9.5	20	6	24.4	22
EKP.20/06	M20 x 1.5	6 - 12	26	11	27	24
EKV.20/09	M20 x 1.5	9 - 13	20	6	24.4	22
EKV.12/06	NPT ½"	6 - 12	22	13	27	24
EKVPO.12/06	NPT ½"	6 - 12	26	13	27	24

Ordering table

Thread	Version	Material	
		Metal	Plastic
M12 x 1.5	Cable diameter 4 - 6.5 mm	**086327** EKVM12/04	-
M16 x 1.5	Cable diameter 4 - 6.5 mm	**086328** EKVM16/04	-
	Cable diameter 5 - 10 mm	-	**084572** EKPM16/05
	Cable diameter 6.5 - 9.5 mm	**086330** EKVM16/06	-
M20 x 1.5	Cable diameter 6 - 12 mm	-	**077679** EKPM20/06
	Cable diameter 6.5 - 9.5 mm	**077683** EKVM20/06	-
	Cable diameter 9 - 13 mm	**077684** EKVM20/09	-
NPT ½"	Cable diameter 6 - 12 mm	**077691** EKVN12/06	**077692** EKPON12/06

Mounting plates EMP for safety switches NZ.VZ

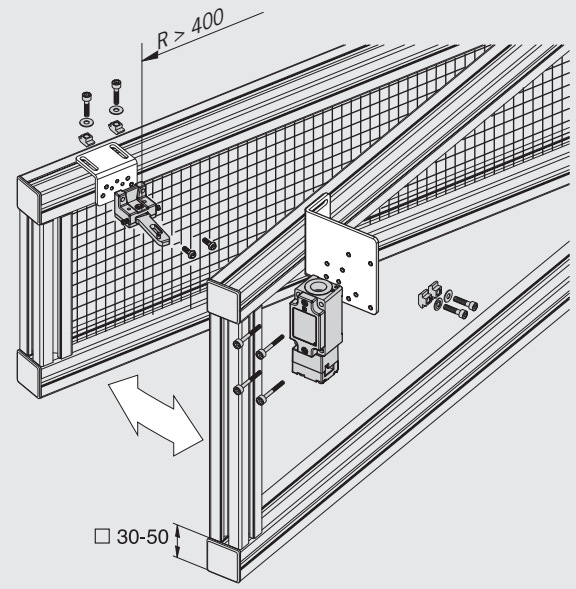
- **For vertical and horizontal mounting of safety switch NZ.VZ**

The mounting plates are used for fastening safety switches NZ and actuators to safety guards. The safety switches can be attached vertically and horizontally.

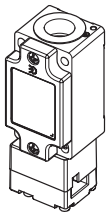
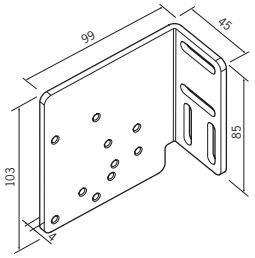
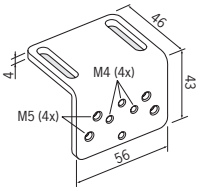
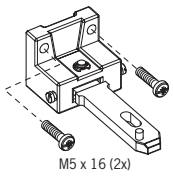
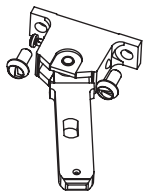
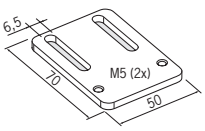
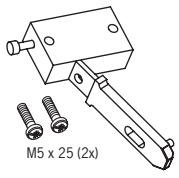
Note

- Mounting plate material: galvanized St37.

Mounting example, safety switch vertical



Ordering table

Switch	Installation method switch	Mounting plate switch	Mounting plate actuator	Actuator	Minimum distance hinged actuator to switch
NZ... 	**A** Vertical	**085753** EMP-SC 	**093457** EMP-B1 	**024298** **024299**  Page 113	> 400 mm
	B Horizontal			**100406** **100407**  Page 113	> 200 mm
			093458 EMP-B2 	**048850** **057950**  Page 113	> 165 mm

For safety precautions see page 187
For technical data see page 153

Mounting plates EMP for safety switches STA

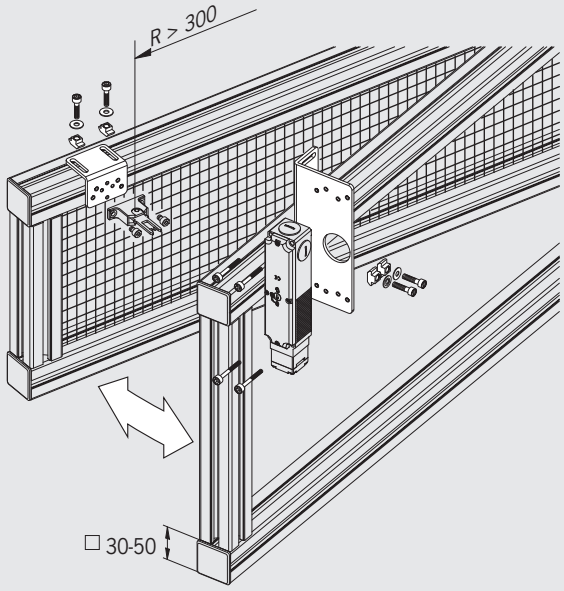
- **For vertical and horizontal mounting of safety switch STA**

The mounting plates are used for fastening safety switches STA and actuators to safety guards. The safety switches can be attached vertically and horizontally.

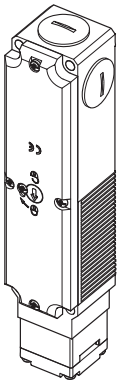
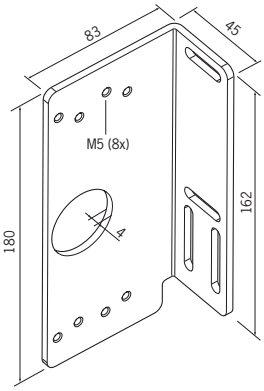
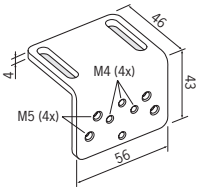
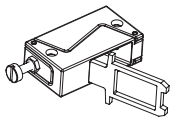
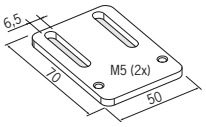
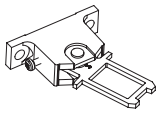
Note

- Mounting plate material: galvanized St37.

Mounting example, safety switch vertical



Ordering table

Switch	Installation method switch	Mounting plate switch	Mounting plate actuator	Actuator	Minimum distance hinged actuator to switch
STA... 	**A** Vertical	**093456** EMP-SB 	**093457** EMP-B1 	**095315** **096697**  Page 117/118	> 200 mm
	B Horizontal		**093458** EMP-B2 	**096838** **096844**  Page 117/118	> 200 mm

Mounting plates EMP for safety switches TX

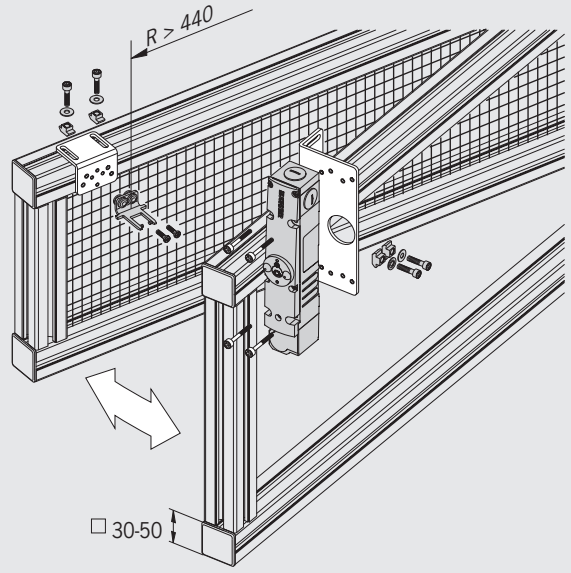
- **For vertical mounting of safety switch TX**

The mounting plates are used for fastening safety switches TX and actuators to safety guards. The safety switches can be attached vertically.

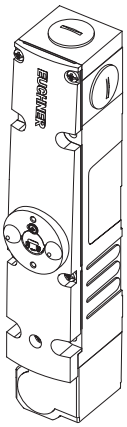
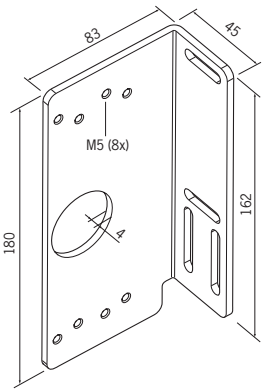
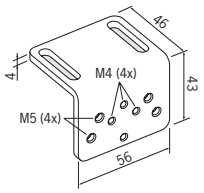
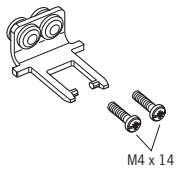
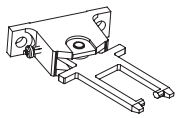
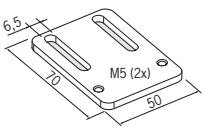
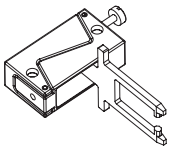
Note

- Mounting plate material: galvanized St37.
- The mounting plate EMP-SB is also suitable for the safety switches TX...C1991 with escape release from the rear.

Mounting example, safety switch vertical



Ordering table

Switch	Installation method switch	Mounting plate switch	Mounting plate actuator	Actuator	Minimum distance hinged actuator to switch
TX... 	**C** Vertical	**093456** EMP-SB 	**093457** EMP-B1 	**079740** **079742**  Page 114	> 400 mm
				098082  Page 115	> 100 mm
			093458 EMP-B2 	**097906**  Page 115	> 100 mm

For safety precautions see page 187
For technical data see page 153

Mounting plates EMP for safety switches TZ

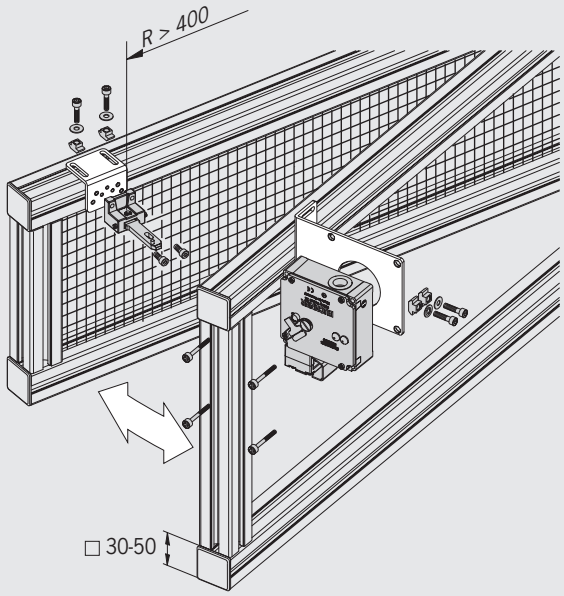
- **For vertical and horizontal mounting of safety switch TZ**

The mounting plates are used for fastening safety switches TZ and actuators to safety guards. The safety switches can be attached horizontally or vertically.
The mounting plate EMP-SA is also suitable for safety switches with escape release from the rear.

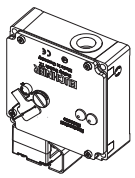
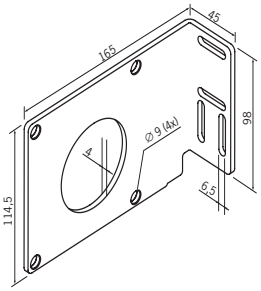
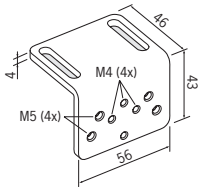
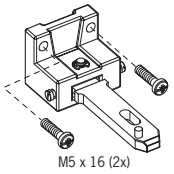
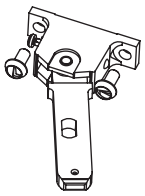
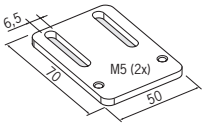
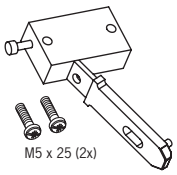
Note

- Mounting plate material: galvanized St37.
- The mounting plate EMP-SA is also suitable for the safety switches TZ...C1684, TZ...C1815 and TZ...C1828 with escape release from the rear.

Mounting example, safety switch vertical



Ordering table

Switch	Installation method switch	Mounting plate switch	Mounting plate actuator	Actuator	Minimum distance hinged actuator to switch
TZ... 	**A** Vertical	**094401** EMP-SA 	**093457** EMP-B1 	**024298** **024299**  Page 113	> 400 mm
	B Horizontal			**100406** **100407**  Page 113	> 200 mm
			093458 EMP-B2 	**048850** **057950**  Page 113	> 165 mm

Miscellaneous accessories

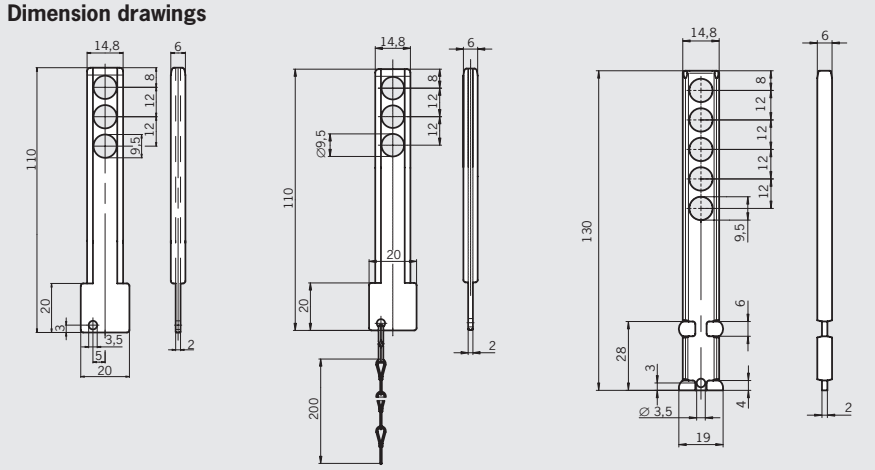
- **Lockout bar**
- **Insertion funnel**

Lockout bar
With the safety door open, can be slid into the actuator head on a switch with separate actuator instead of an actuator. Removal can be prevented using a commercially available padlock. For the protection of people in areas with a possible hazard.
Cannot be used in combination with the protective plate.

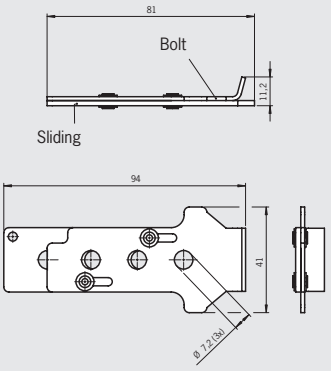
Insertion funnel
If an insertion funnel is used, even inexactly positioned actuators are inserted reliably in the actuating head due to the large opening funnel, thus protecting the safety switch against mechanical influences.

Lockout bars
For safety switches series NZ.VZ and TZ

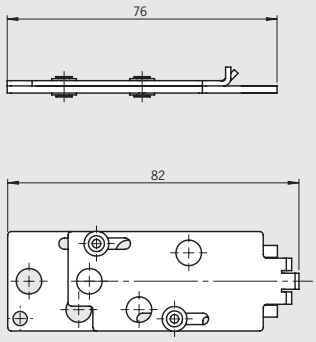
Dimension drawings



Lockout bar
For safety switches NX and TX

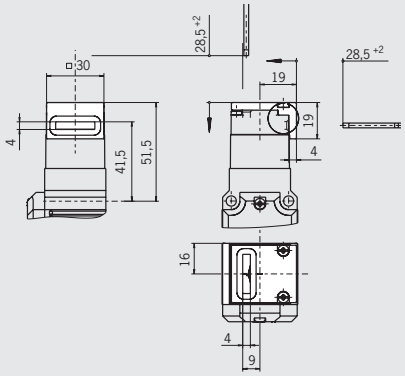


Lockout bar
For safety switch STA



Insertion funnel
For safety switches STA/STP

Dimension drawings



Minimum door radius with insertion funnel
R > 300 mm

Ordering table

Designation	Version	Use	Order no./item
Lockout bar	3 holes	For safety switches series NZ.VZ and TZ without protective plate	**046730** Lockout bar Z
	3 holes with chain	For safety switches series NZ.VZ and TZ without protective plate	**091305** Lockout bar with chain
	3 holes	For safety switch STA	**105701** Lockout bar STP
	5 holes	For safety switches series NZ.VZ and TZ without protective plate	**086538** Lockout bar Z
	3 holes	For safety switches NX and TX	**096098** Lockout bar TX
Insertion funnel	Incl. 2 fastening screws	For safety switches STA/STP	**093157** Insertion funnel STA

For safety precautions see page 187
For technical data see page 153

Miscellaneous accessories

- **Protective plate**
- **Replacement head for NZ.VZ**
- **Lead seal kit**
- **LED function display**
- **Safety screws**

Protective plate
Optimal protection against tampering on safety switches with separate actuator (NZ.VZ and TZ). The protective plate prevents modification of the switch via the actuator outlet opening.

Replacement head for NZ.VZ
Replacement head for a safety switch with separate actuator (NZ.VZ). With 4 safety screws and replacement screws. As the switches are safety components, in case of defects we recommendreplacing the entire safety switch. **Not suitable for the safety switches TZ!**

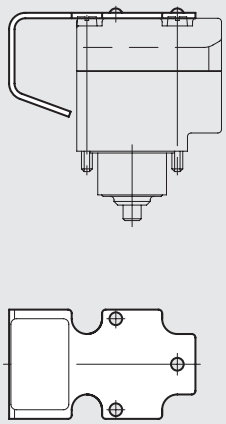
Lead seal kit TZ
For sealing the mechanical release on the safety switch TZ. The locking screw is included.

Lead seal kit TZ-C1937
For sealing the emergency unlocking on the safety switch TZ.

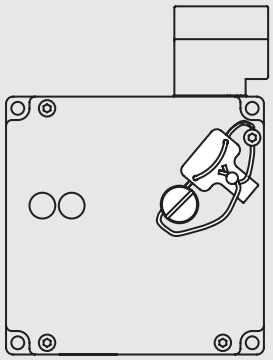
Safety screws
To prevent unscrewing of actuators and actuating heads. The screws can be tightened using a normal tool, but cannot be removed again.

Protective plate

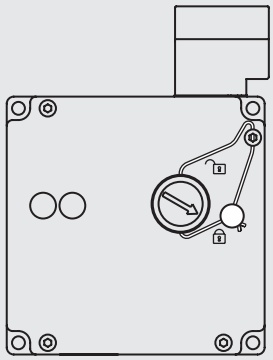
Dimension drawings



Lead seal kit TZ



Lead seal kit TZ-C1937



Ordering table

Designation	Version	Use	Order no./item
Protective plate		For safety switch with separate actuator (NZ.VZ and TZ)	**059136** Protective plate NZ/TZ
Replacement head NZ.VZ		Not suitable for safety switch TZ!	**076250** Actuating head NZVZ
Lead seal kit	Comprising lead seal, wire, locking screw and key	For safety switch TZ	**048257** Lead seal kit TZ
	Comprising lead seal and wire	For safety switch TZ with rotary emergency unlocking	**087256** Lead seal kit TZ-C1937
Safety screws packaging unit: 100 ea.	**M4 x 14**	For actuator 079739, 079740, 079741 and 079742	**074063** M4X14/V100
	M5 x 10	For actuator 016849, 072251, 100406 and 100407	**073455** M5X10/V100
	M5 x 16	For hinged actuator 024299 and 024298	**073456** M5X16/V100
	M5 x 25	For hinged actuator 048850 and 057950	**073457** M5X25/V100
	M3 x 40	For actuator head NZ and TZ	**075530** M3X40/V100
	M3 x 70	For actuator head NZ.VZ..VSE and NZ.VZ..VSM	**075531** M3X70/V100

Miscellaneous accessories

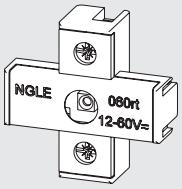
▸ LED function display

LED function display
Upgrade kits with LEDs are available for the safety switches N1A and NZ. The intensity of the light from the indicators is always the same, independent of the voltage applied.

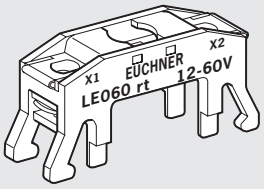
Note: The LED function display can only be used in conjunction with double switching elements.

LED function display

Dimension drawings



NGLE...



LE...

Ordering table

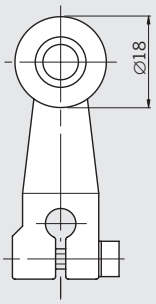
Designation	Version	Voltage					
		12-60 V red LED	12-60 V yellow	12-60 V green	110 V red LED	230 V red LED	230 V yellow LED
LED function display NGLE	For safety switch NZ	**029220** NGLE060RT	**029222** NGLE060GE	**029221** NGLE060GR	**045822** NGLE110RT	**045825** NGLE220RT	**045827** NGLE220GE
LED function display LE	For safety switch N1A	**035495** LE060RT	**035497** LE060GE	**035496** LE060GR	**045579** LE110RT	**045582** LE220RT	**045584** LE220GE

▸ Replacement roller arm

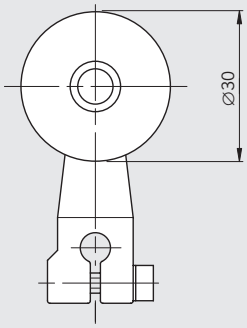
Replacement roller arm
Replacement roller lever for safety switches with safety function with lever arm. As the switches are safety components, in case of defects we recommend replacing the entire switch. Complete switch heads are not available.

Replacement roller arm

Dimension drawings



NHS (steel roller)
NHB (plastic roller)



NHBC569

Ordering table

Designation	Version	Order no./item
Replacement roller arm	**Replacement plunger** For NZ.HS	**012043** Roller arm NHS
	Replacement plunger For NZ.HB	**012042** Roller arm NHB
	Replacement plunger For NZ.HB...C569	**012044** Roller arm NHBC569

For safety precautions see page 187
For technical data see page 153

Miscellaneous accessories

- **Emergency unlocking for safety switches STA and TX**
- **Release for safety switches TX**
- **Lock for emergency unlocking with manual return for safety switches TX**
- **Triangular key for safety switches TZ**

Emergency unlocking
Is used for the manual release of the guard locking without tools. The emergency unlocking mechanism must be returned to the locked state manually. A sealing wire can be fitted to protect against tampering.
Attention: Prior to mounting, the locking screw for the mechanical release must be removed.

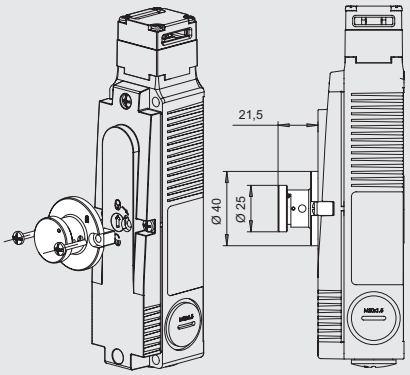
Release
Is used for the manual release of the guard locking. The integrated spring automatically resets the emergency unlocking to the locked state. A sealing wire can be fitted to protect against tampering.
Attention: Prior to mounting, the locking screw for the mechanical release must be removed.

Lock
The lock is used in combination with safety switch TX. The mechanical key release enables authorized personnel to actuate the mechanical release using the related key in certain situations. The unlocking mechanism holds the solenoid in the "unlocked" position.
Two screws are used to fix the lock to the cover of the safety switch TX (above the mechanical release).
Attention: Prior to mounting, the locking screw for the mechanical release must be removed.

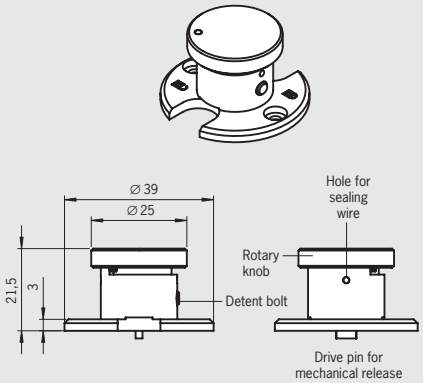
- Please order safety switch TX separately
- 2 keys are supplied
- Every safety switch of series TX can be upgraded to include a lock

Emergency unlocking
For safety switch STA

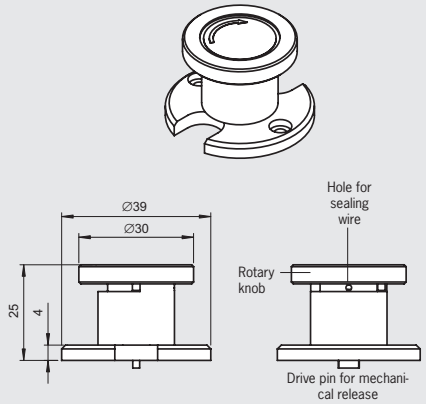
Dimension drawings



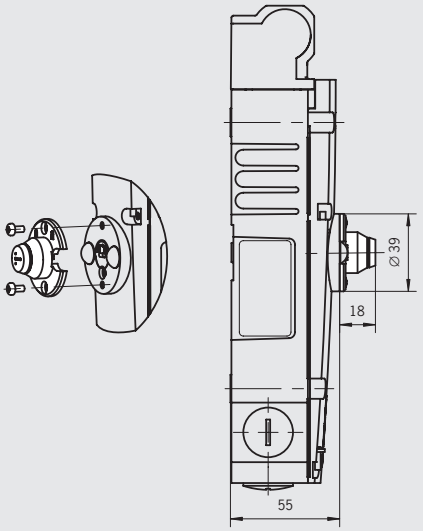
Emergency unlocking
For safety switches TX



Release
For safety switches TX



Lock
For safety switches TX



Ordering table

Designation	Version	Use	Order no./item
Emergency unlocking	Incl. 2 screws 3.5 x 19	For safety switch STA	**099876** Emergency unlocking STA
	Incl. 2 screws M3 x 6	For safety switches TX	**094771** Emergency unlocking TX
Release	Incl. 2 screws M3 x 6	For safety switches TX	**094773** Release with automatic reset TX
Lead seal kit		For emergency unlocking TX and release TX	**087256** Lead seal kit
Lock	Unique (unique key needed to open)	For safety switches TX	**079796** Lock TX
	Identical locking (identical locks)	For safety switches TX	**079795** Lock TX
	Replacement key (2 x) for identical locking	For safety switches TX	**077206** Replacement key TX
Triangular key	DIN 22417 M5 100 mm	For safety switches TZ	**103057** Triangular key

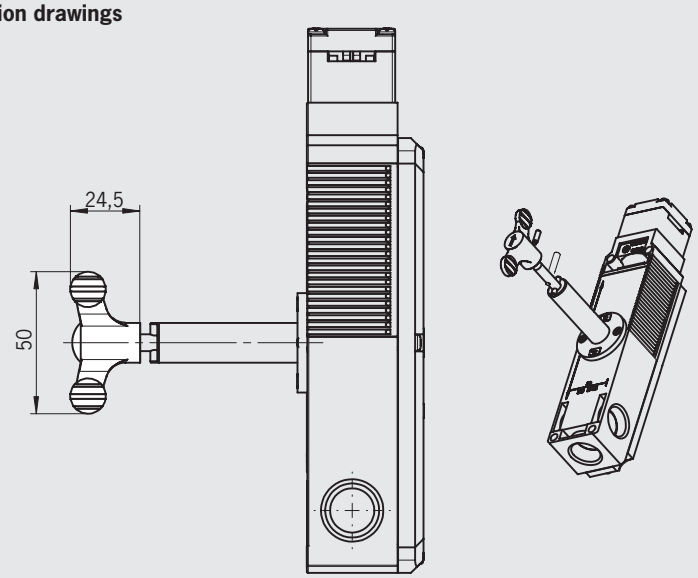
Miscellaneous accessories

- **Handle for escape release**

Handle for escape release
Can be mounted on all escape release actuator shafts C1993 for safety switches STA for easier use.

Handle for escape release
For safety switch STA

Dimension drawings



Ordering table

Designation	Use	Order no./item
Handle for escape release	For safety switch STA	**105329** Escape release handle

For safety precautions see page 187
For technical data see page 153

List of plug connector suppliers

We provide no guarantee for the completeness and correctness of the ordering data given. The data was valid in October 2004. The related manufacturers reserve the right to make changes without notice. The plug connectors and accessories listed are also available from other manufacturers.

▸ Plug connectors and accessories

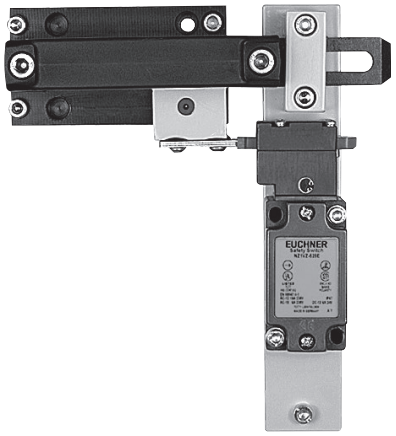
For plug connector	Function	Manufacturer's designation	
SVM5 5 pins	Female connector M12	**99-0436-57-05** Cable socket	**Binder** www.binder-connector.de
	Flange socket M12	**09-3442-700-05** Flange connector with flexible wires	
	Blanking plug M12	**08-2425-000-000** Protective cap for socket with retaining strap	
CE5 3-pin + N + PE	Mating connector (socket)	**CEE plug as per CEE standard**	
C16-1 6 pins + PE	Female flange connector	**T3107 500** Female receptacle	**Amphenol-Tuchel** www.amphenol-tuchel.com
	Socket crimp contacts for C16-1, VPE 100 pcs.	**VN02 016 0002 (1)** Single contact, silver, 0.5-1.5 mm2	
	Blanking plug	**T6483 000** Protective cap for female receptacle	
HAN10 10 pins + PE	Flange socket 1 cable exit	**19 20 010 0251** Socket housing 1 cable exit	**Harting** www.harting.com
	Socket contacts (installation for flange socket)	**09 20 010 3101** Socket contact insert crimp connection	
	Socket contacts for crimping	**09 33 000 6220** Crimp contacts, socket, 0.5 mm2	
	Blanking plug	**09 20 010 5425** Cover	
RC17-Y coded 17 pins	Female flange connector, solder for male plug RC17Y)	**RC-17S1Y122000** Flange plug connector 17-pin	**Coninvers** www.coninvers.com
	Blanking plug	**RC-17P1N8A83NN** Protective cap for socket with retaining strap	

▸ Crimp and extraction tools

For plug connector	Function	Manufacturer's designation	
SR6 and SR11	Crimp tool	**932 507-002** XZC 0701	**Hirschmann** www.hirschmann.com
	Extraction tool	**931 812-001** XWA 164	
C16-1	Crimp tool	**TA0500 + TA0000163 + TA0002016001** Crimp pliers, jaws and contact receptacle	**Amphenol-Tuchel** www.amphenol-tuchel.com
	Extraction tool	**FG 0300 1461** Extraction tool	
RC12	Crimp tool	**RC-Z2378** Crimp pliers for machined contacts	**Coninvers** www.coninvers.com
	Extraction tool	**RC-Z2097** Extraction tool/insertion tool	
RC18	Crimp tool	**RC-Z2504** Crimp pliers for machined contacts	
	Extraction tool	**RC-Z2514** Extraction tool	
VP19	Crimp tool	**T98143 DAK 83S-30 / 11-7576T3** Insertion tool	**Litton/Veam** www.littonveam.com
	Extraction tool	**46592-MT50 / 11-7576T3** Removal tool	
UT23	Crimp tool	**Y16RCM** Crimping tool for machined contacts	**Burndy** www.burndy.com
	Extraction tool	**RX2025GE1** Extraction tool	
TB24	Crimp tool	**WT10-04** Crimp tool	**Thomas & Betts** www.tnb.com
	Extraction tool	**TRT16** Contact removal tool	

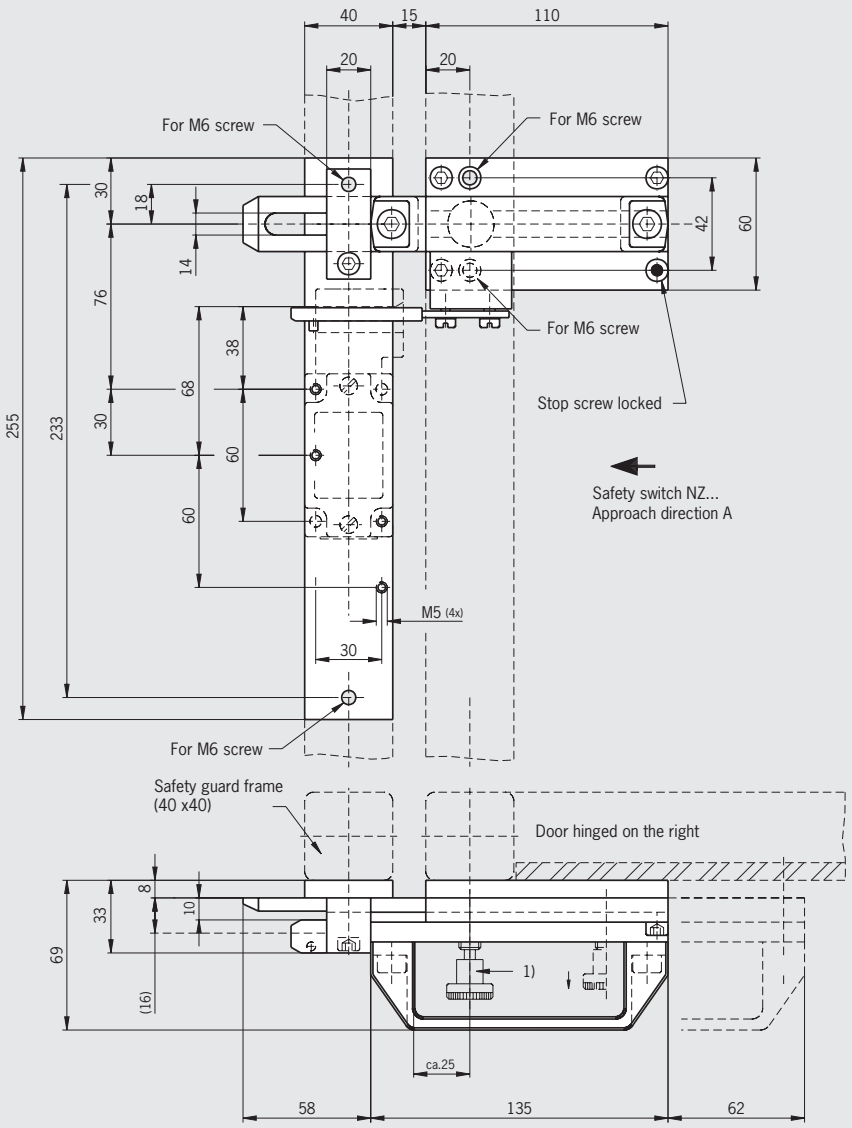
Bolts for safety guards

- **For safety switches NZ.VZ und NZ.VZ.VS**
- **Bolt NZ-.B with ball detent mechanism**
- **Bolt NZ-.R2 with detent knob**
- **For right or left hinged doors**



Bolt for safety switches NZ.VZ and NZ.VZ.VS

Dimension drawings (here: shown with detent knob)



1) Bolt with detent mechanism:
latches in open position and prevents unintentional closing of the bolt.
When the bolt is closed, the knob engages and prevent unintentional opening.
Unlocked by pulling the detent knob upward.

Special features

- Bolt **NZ-.B** engages in open and closed position
  - Prevents accidental opening and closing of the bolt
- Bolt **NZ-.R2** engages in open and closed position. Unlocked by pulling the detent knob upward

Features

- Easily fitted to standard aluminum profiles and machine covers by screw connection
- Easy to use
- Distinctive yellow color for easy recognition
- Robust version for heavy doors
- No additional door handle necessary
- Slot on the bolt permits attachment of padlocks

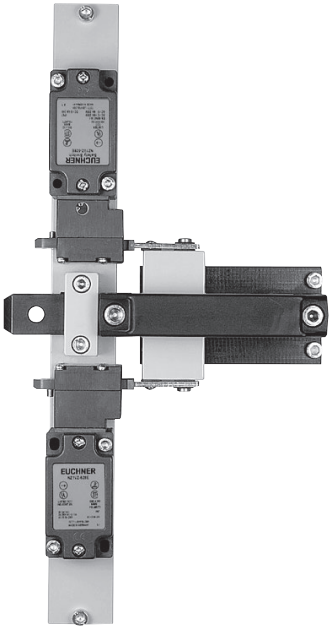
Ordering table

Designation	Detent mechanism	Version	Order no./item
Bolt NZ-A	Without	For right hinged doors, actuator included	**057734** Bolt NZ-A
Bolt NZ-C	Without	For left hinged doors, actuator included	**057735** Bolt NZ-C
Bolt NZ-AB	Ball detent mechanism	For right hinged doors, actuator included	**083890** Bolt NZ-AB
Bolt NZ-CB	Ball detent mechanism	For left hinged doors, actuator included	**083892** Bolt NZ-CB
Bolt NZ-AR2	Detent knob	For right hinged doors, actuator included	**078455** Bolt NZ-AR2
Bolt NZ-CR2	Detent knob	For left hinged doors, actuator included	**078456** Bolt NZ-CR2

For safety precautions see page 187
For technical data see page 153

Bolts for safety guards

▶ **For 2 safety switches NZ.VZ on one bolt**



Special features

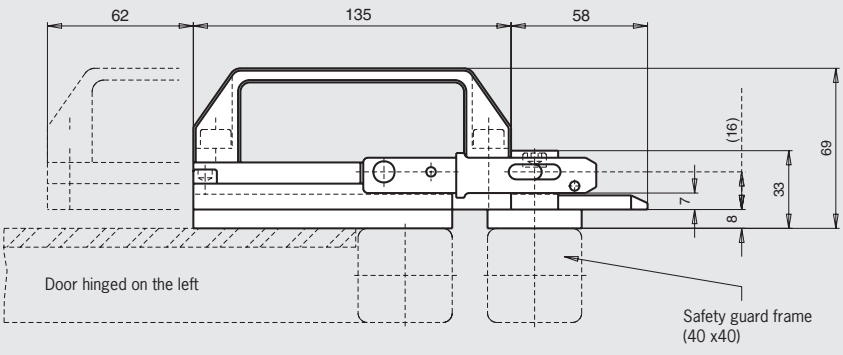
- One bolt for 2 safety switches
  - A higher safety category according to EN ISO 13849-1 (e.g. category 4) is achieved
- Bolt can be used for doors hinged on the right or left

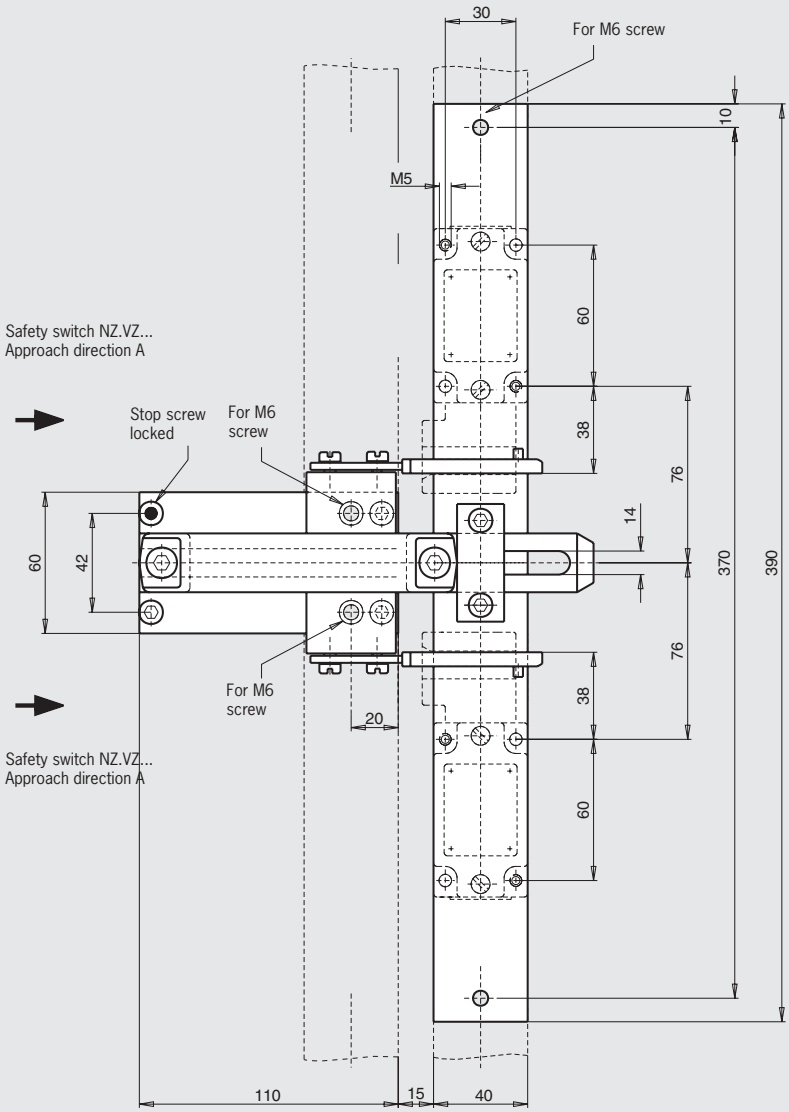
Features

- Easily fitted to standard aluminum profiles and machine covers by screw connection
- Distinctive yellow color for easy recognition
- Robust version for heavy doors
- No additional door handle necessary
- Slot on the bolt permits attachment of padlocks

Bolt for 2 safety switches NZ.VZ on one bolt

Dimension drawings



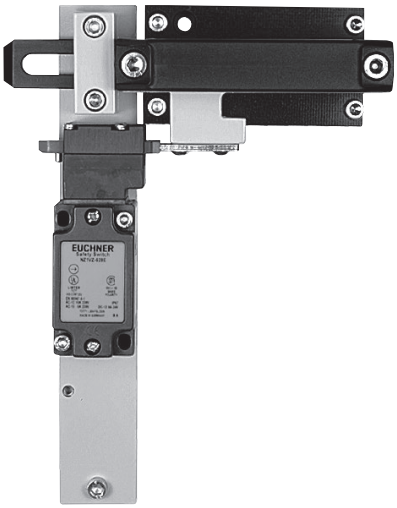


Ordering table

Designation	Detent mechanism	Version	Order no./item
Bolt NZ-AC	Without	For right or left hinged doors, 2 safety switches on one bolt, actuator included	**076188** Bolt NZ-AC

Bolts for safety guards

- **For safety switches NZ.VZ**
- **Lever for escape release from the danger area**
- **Bolt with detent knob**
- **For right or left hinged doors**



Special features

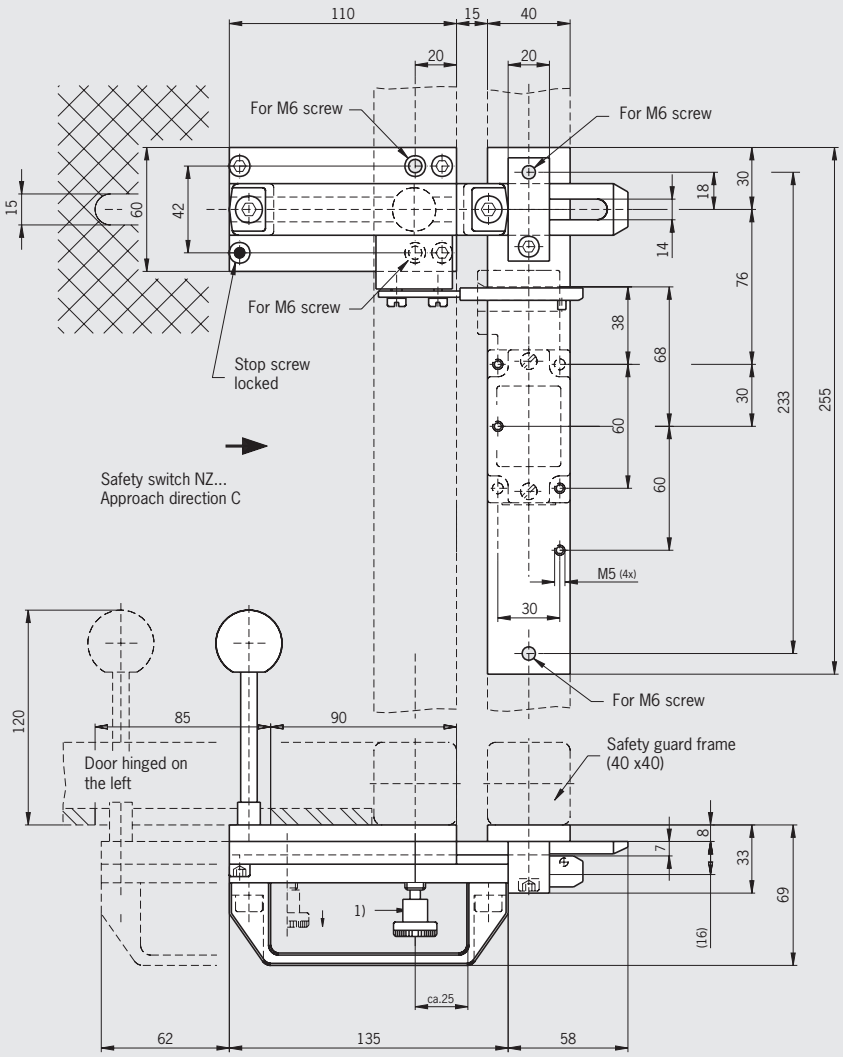
- Bolt with detent mechanism
  Latches in open position and prevents unintentional closing of the bolt

Features

- Easily fitted to standard aluminum profiles and machine covers by screw connection
- Distinctive yellow color for easy recognition
- Robust version for heavy doors
- No additional door handle necessary
- Slot on the bolt permits attachment of padlocks

Bolt for safety switches NZ.VZ

Dimension drawings



1) Bolt with detent mechanism:
latches in open position and prevents unintentional closing of the bolt.
Unlocked by pulling the detent knob upward.

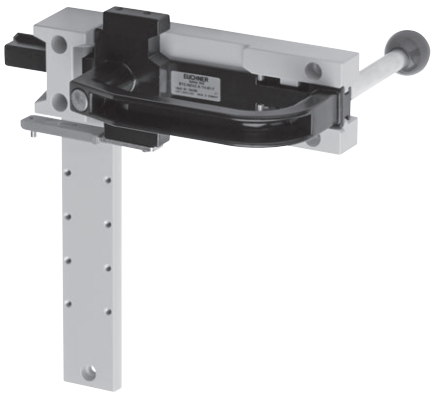
Ordering table

Designation	Detent mechanism	Version	Order no./item
Bolt NZ-AF	Detent knob	For right hinged doors, escape release from the danger area, actuator included	**078451** Bolt NZ-AF
Bolt NZ-CF	Detent knob	For left hinged doors, escape release from the danger area, actuator included	**078452** Bolt NZ-CF

For safety precautions see page 187
For technical data see page 153

Bolts for safety guards

- **For safety switches NZ.VZ und NZ.VZ.VS**
- **Material: Die-cast aluminum**
- **Lever for escape release from the danger area (optional)**
- **For doors hinged on the right or left**



Special features
(only for bolt BTC-NZVZ-S-TH-01-F with escape release)

- Bolt with detent mechanism
  Latches in open position and prevents unintentional closing of the bolt. Unlocked by pressing the knob
- Lever for escape release from the danger area (optional)

Features

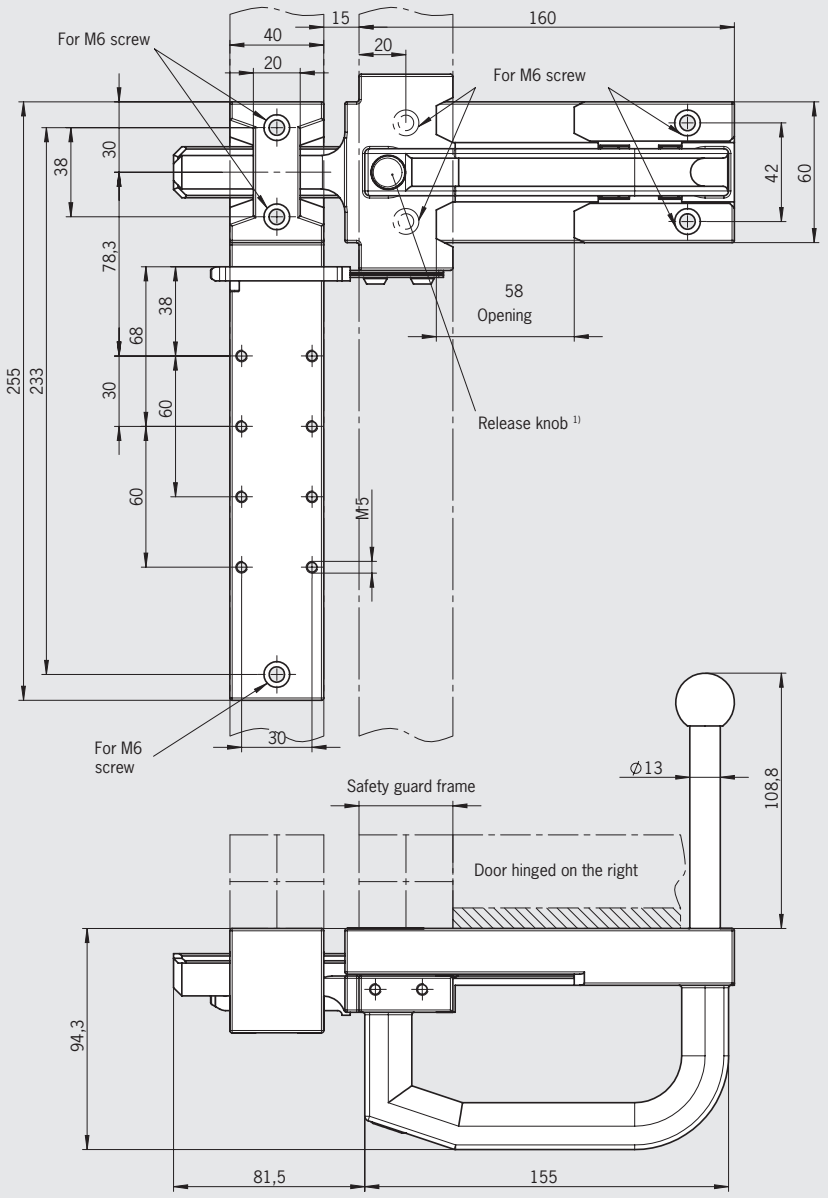
- Easily fitted to standard aluminum profiles and machine covers by screw connection
- Distinctive yellow color for easy recognition
- Robust version for heavy doors
- No additional door handle necessary

Notes

- Actuator included
- Order safety switch separately

Bolt for safety switches NZ.VZ and NZ.VZ.VS

Dimension drawings (here: shown with escape release)



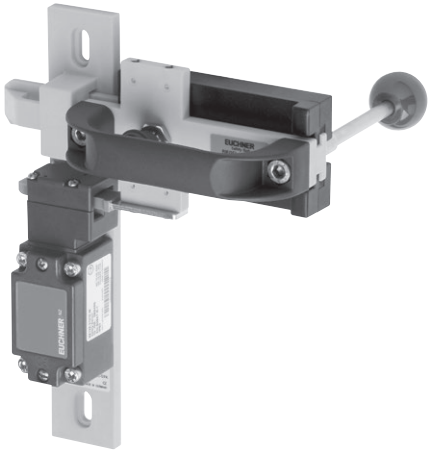
1) Bolt with detent mechanism (only for bolt BTC-NZVZ-S-TH-01-F with escape release):
latches in open position and prevents unintentional closing of the bolt.
Unlocked by pressing the knob

Ordering table

Designation	Detent mechanism	Version	Order no./item
Bolt BTC-NZVZ-S-TH-01-F	1 x detent mechanism open	For right or left hinged doors, with escape release	**104399** Bolt BTC-NZVZ-S-TH-01-F
Bolt BTC-NZVZ-S-TH-00-X	Without	For right or left hinged doors, without escape release	**104398** Bolt BTC-NZVZ-S-TH-00-X

Bolts for safety guards

- **For safety switches NZ.VZ**
- **Material: reinforced plastic**
- **Lever for escape release from the danger area**
- **Bolt with detent knob**
- **For right or left hinged doors**



Special features

- Bolt with detent mechanism (only bolts with escape release) Bolt latches in open position to prevent unintentional closing

Features

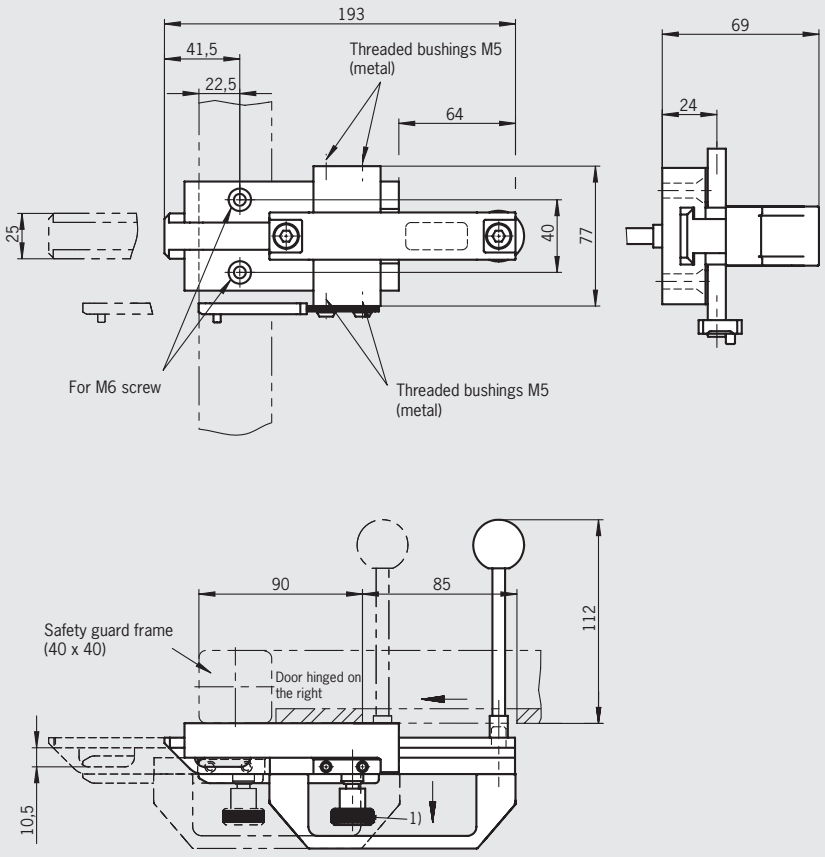
- Easily fitted to standard aluminum profiles and machine covers by screw connection
- Distinctive yellow color for easy recognition
- Robust version for heavy doors
- No additional door handle necessary
- Slot on the bolt permits attachment of padlocks

Notes

- Functions only in conjunction with switch bracket **NZ-GFK**
- Actuator included
- Order safety switch separately
- Order switch bracket separately

Bolt for safety switches NZ.VZ

Dimension drawings



1) Bolt with detent mechanism (only for bolts with escape release): latches in open position and prevents unintentional closing of the bolt. Unlocked by pulling the detent knob upward.

Ordering table

Designation	Detent mechanism	Version	Order no./item
Bolt NZ-GFK	Without	For right hinged doors, without escape release, actuator included	**096617** Bolt NZ-GFK
Bolt NZ-GFK-F	Detent knob	For left hinged doors, escape release from the danger area, actuator included	**097603** Bolt NZ-GFK-F
Switch bracket NZ-GFK		Separate	**096614** Switch bracket NZ-GFK

For safety precautions see page 187
For technical data see page 153

Bolts for safety guards

- **For safety switches NZ.VZ, NZ.VZ.VS and TZ...**
- **Bolt with ball handle**
- **For right or left hinged doors**

Special features

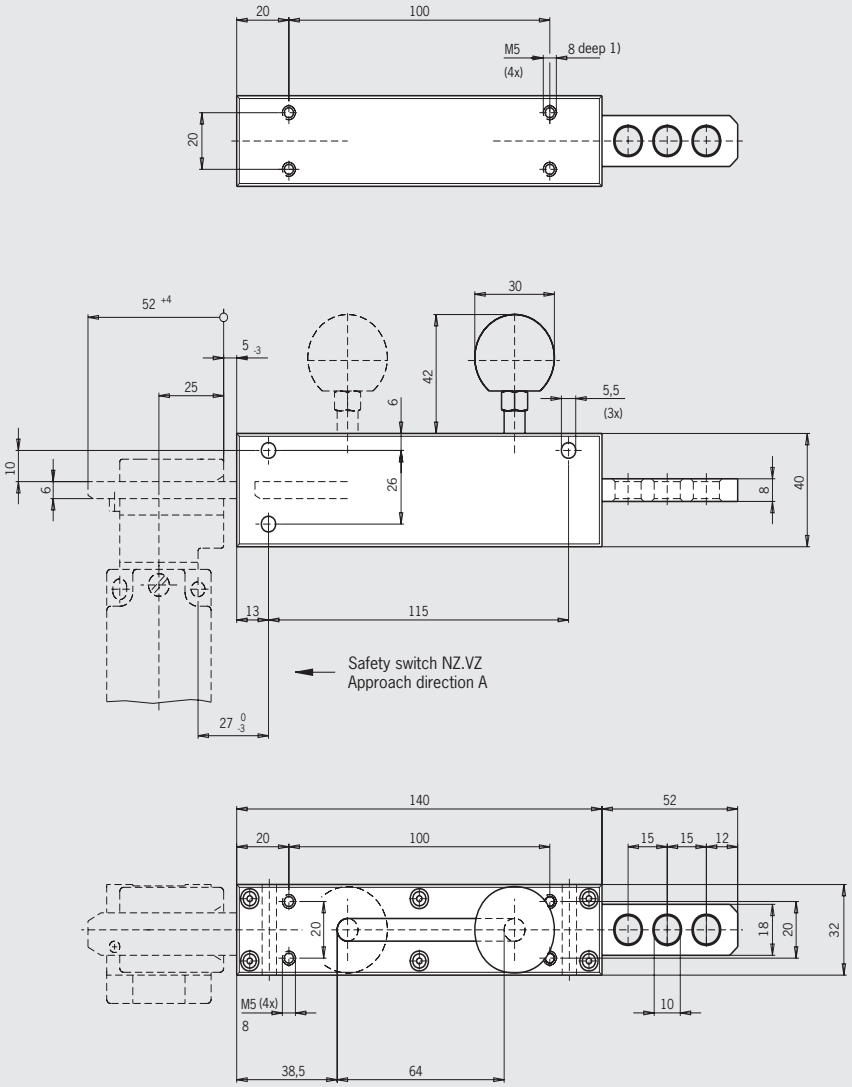
- With bolt **NZ/TZ-S1** actuating pin on bottom
  - Safety switch fastened as shown in illustration
- With bolt **NZ/TZ-S2** actuating pin on top
  - Safety switch fastened rotated by 180°
- After the door is opened, the actuator is automatically withdrawn into the bolt by a built-in return spring
  - Protection of the operator
    When the door is open there is no risk of injury due to a protruding actuator
  - Protection of the actuator
    When hinged doors are closed it is ensured that the actuator is not used as an end stop

Features

- Three holes enable padlocks to be attached

Bolt for safety switches NZ.VZ, NZ.VZ.VS and TZ

Dimension drawings



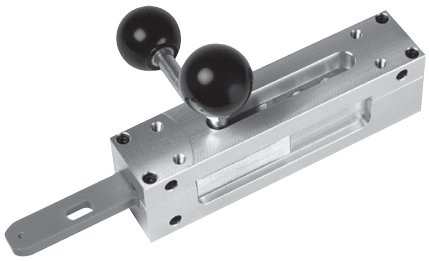
1) Bolt fastening

Ordering table

Designation	Detent mechanism	Version	Order no./item
Bolt NZ/TZ-S1	Without	For right or left hinged doors, actuating pin on bottom, actuator included	**028357** Bolt NZ/TZ-S1
Bolt NZ/TZ-S2	Without	For right or left hinged doors, actuating pin on top, actuator included	**028359** Bolt NZ/TZ-S2

Bolts for safety guards

- **For safety switches NZ.VZ, NZ.VZ.VS and TZ with escape release**
- **Lever for escape release from the danger area**
- **Bolt with ball handle**
- **For right or left hinged doors**



Special features

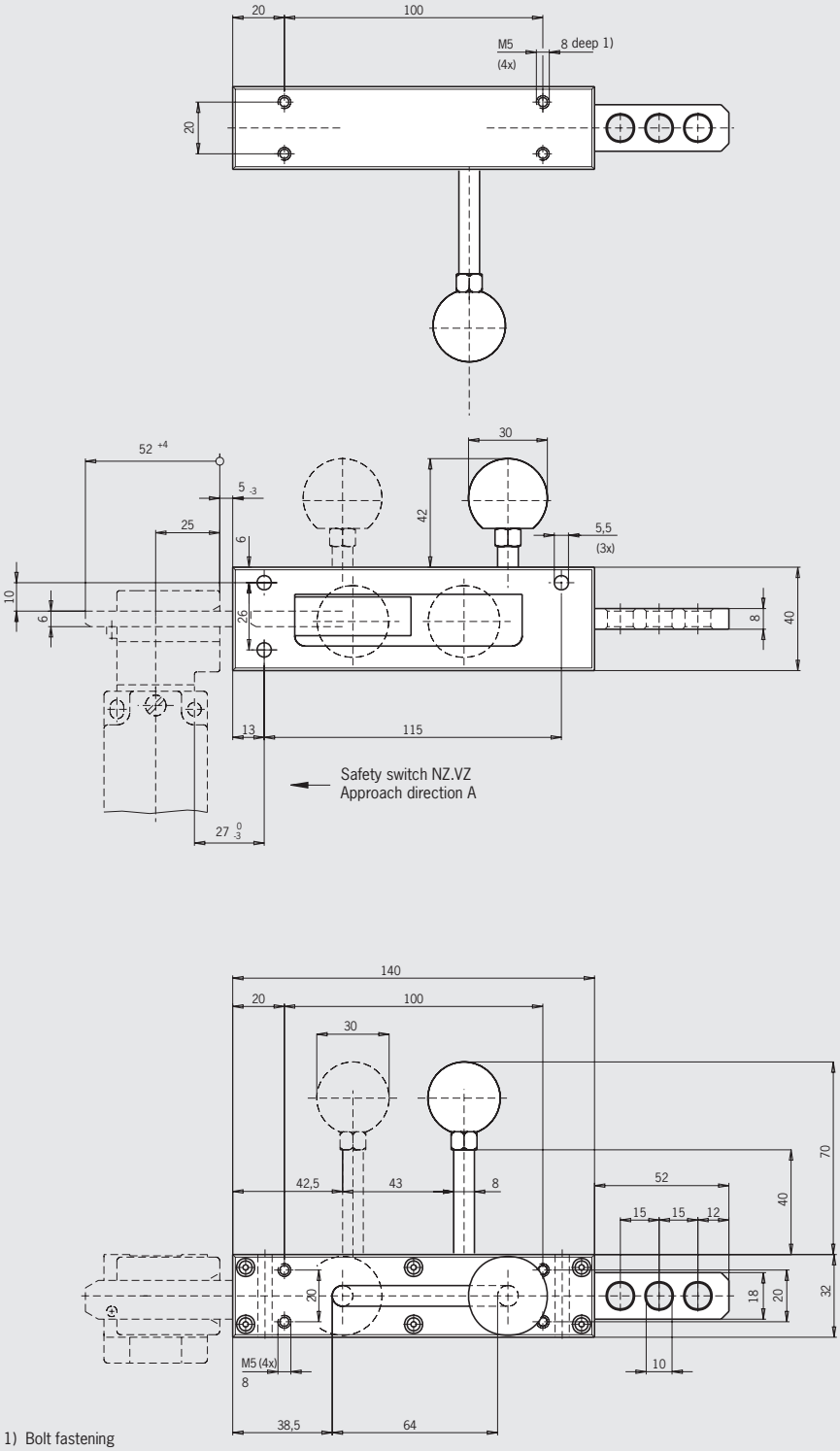
- After the door is opened, the actuator is automatically withdrawn into the bolt by a built-in return spring
  - Protection of the operator
    When the door is open there is no risk of injury due to a protruding actuator
  - Protection of the actuator
    When hinged doors are closed it is ensured that the actuator is not used as an end stop

Features

- The emergency release lever only enables the doors to be **opening** from inside the danger area
- Three holes enable padlocks to be attached

Bolt for safety switches NZ.VZ, NZ.VZ.VS and TZ with escape release

Dimension drawings



1) Bolt fastening

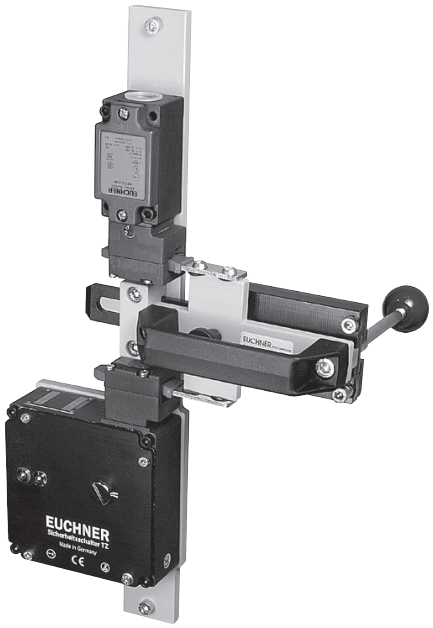
Ordering table

Designation	Detent mechanism	Version	Order no./item
Bolt NZ/TZ-S1/AF	Without	For right hinged doors, escape release from the danger area, actuator included	**079786** Bolt NZ/TZ-S1/AF
Bolt NZ/TZ-S1/CF	Without	For left hinged doors, escape release from the danger area, actuator included	**079785** Bolt NZ/TZ-S1/CF

For safety precautions see page 187
For technical data see page 153

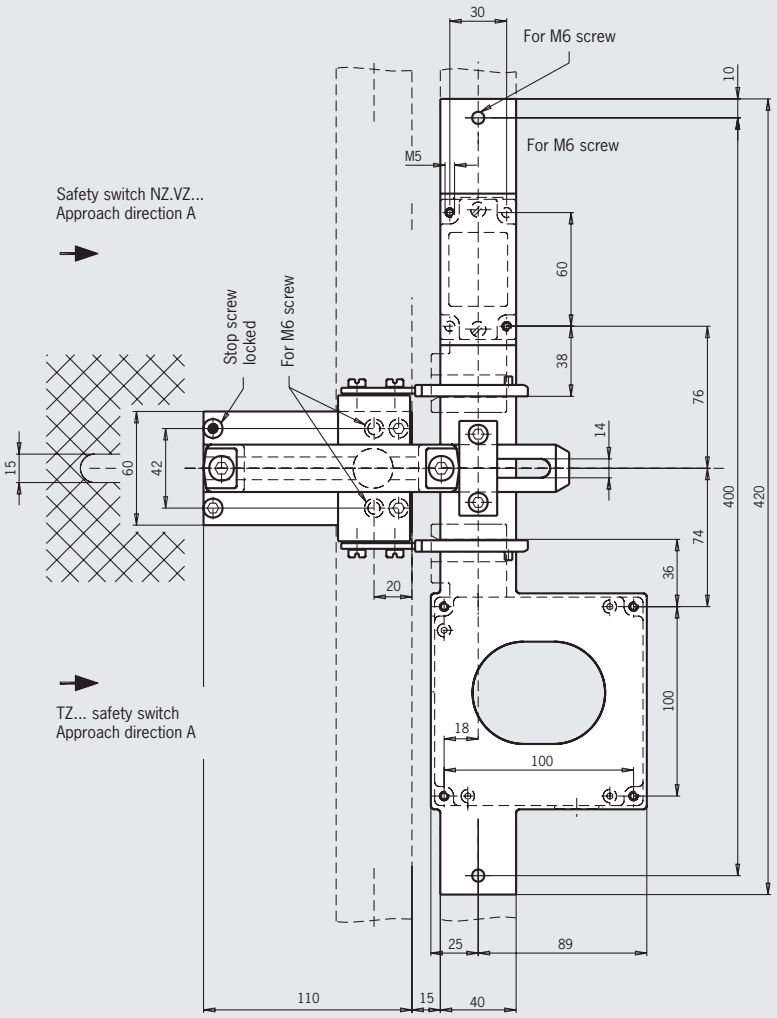
Bolts for safety guards

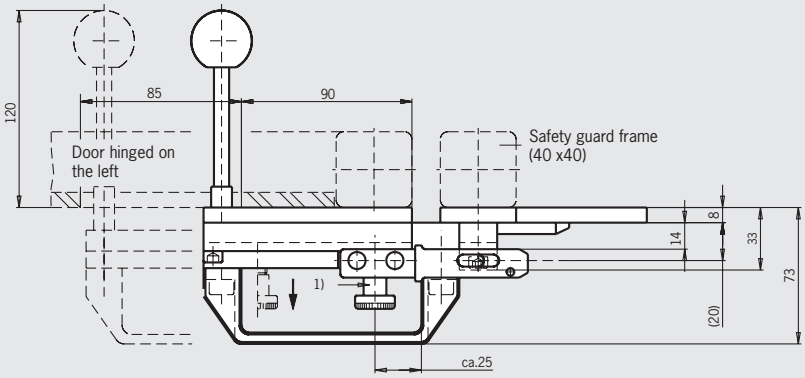
- **For safety switches NZ.VZ and TZ with escape release**
- **Lever for escape release from the danger area**
- **For 2 safety switches on one bolt (NZ and TZ)**
- **For right or left hinged doors**



Bolt for 2 safety switches NZ.VZ and TZ on one bolt

Dimension drawings





1) Bolt with detent mechanism:
latches in open position and prevents unintentional closing of the bolt.
Unlocked by pulling the detent knob upward.

Special features

- One bolt for 2 safety switches (NZ and TZ with guard locking)
  - A higher safety category according to EN ISO 13849-1 (e.g. category 4) is achieved
- Bolt with detent mechanism
  Latches in open position and prevents unintentional closing of the bolt

Features

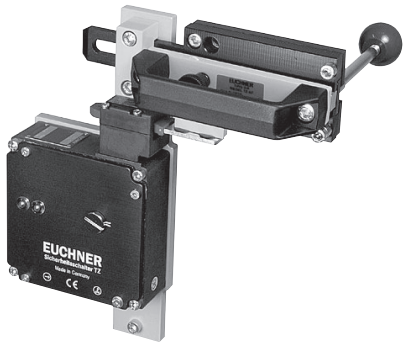
- Easily fitted to standard aluminum profiles and machine covers by screw connection
- Distinctive yellow color for easy recognition
- Robust version for heavy doors
- No additional door handle necessary
- Slot on the bolt permits attachment of padlocks

Ordering table

Designation	Detent mechanism	Version	Order no./item
Bolt NZ/TZ-ACF	Detent knob	For right or left hinged doors, 2 safety switches on one bolt, escape release from the danger area, actuator included	**083900** Bolt NZ/TZ-ACF

Bolts for safety guards

- **For safety switches TZ with escape release**
- **Lever for escape release from the danger area**
- **For right or left hinged doors**



Special features

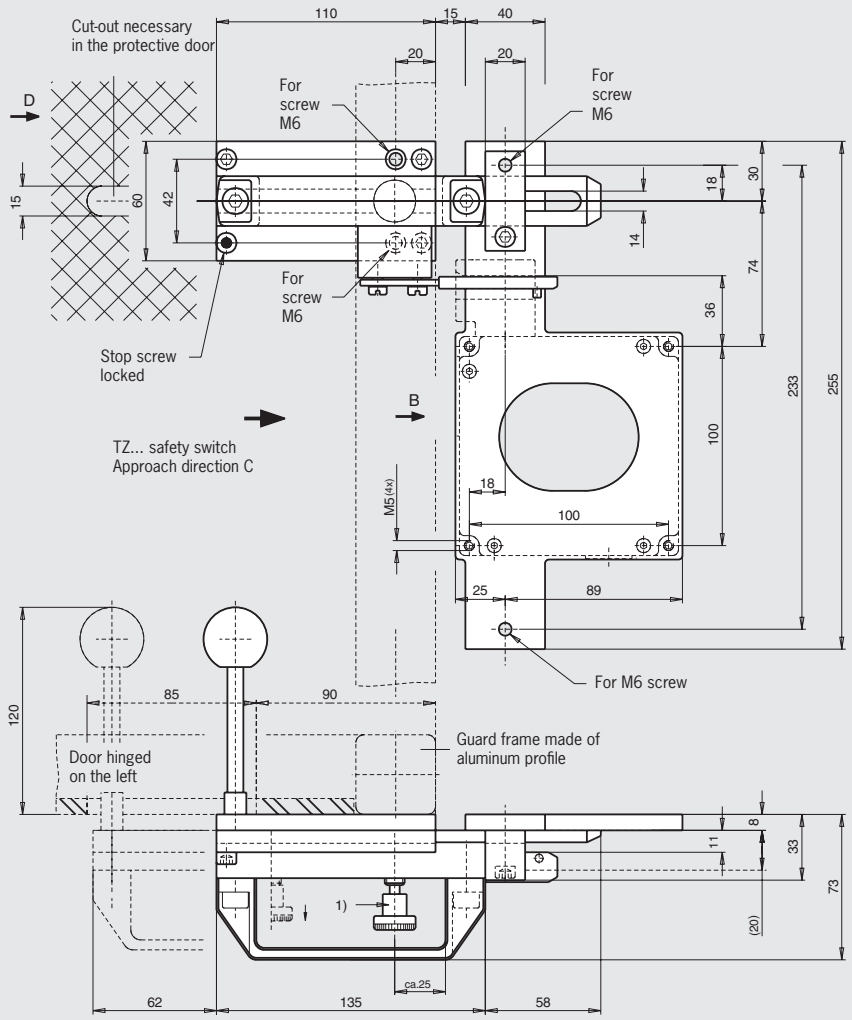
- Bolt with detent mechanism
  Latches in open position and prevents unintentional closing of the bolt

Features

- Easily fitted to standard aluminum profiles and machine covers by screw connection
- Distinctive yellow color for easy recognition
- Robust version for heavy doors
- No additional door handle necessary
- Slot on the bolt permits attachment of padlocks

Bolt for safety switch TZ with escape release

Dimension drawings



1) Bolt with detent mechanism:
latches in open position and prevents unintentional closing of the bolt.
Unlocked by pulling the detent knob upward.

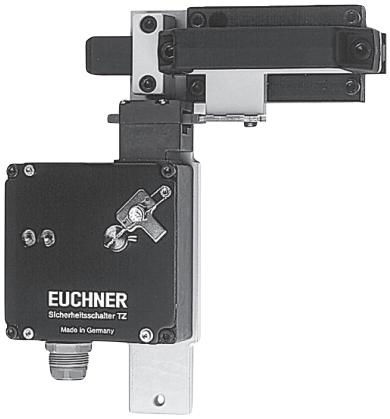
Ordering table

Designation	Detent mechanism	Version	Order no./item
Bolt TZ-AF	Detent knob	For right hinged doors, escape release from the danger area, actuator and switch bracket included	**076200** Bolt TZ-AF
Bolt TZ-CF	Detent knob	For left hinged doors, escape release from the danger area, actuator and switch bracket included	**076199** Bolt TZ-CF

For safety precautions see page 187
For technical data see page 153

Bolts for safety guards

- **For safety switches TZ**
- **Optional stainless steel bolt, 1.4301**
- **For right or left hinged doors**



Features

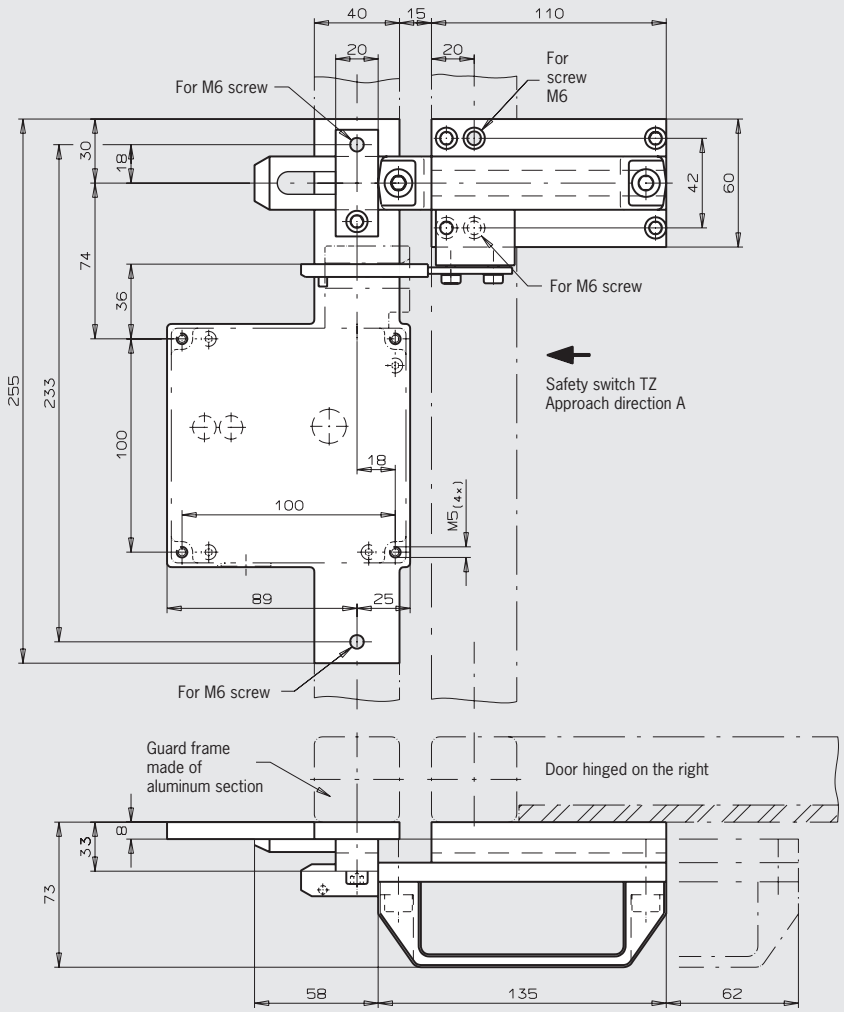
- Easily fitted to standard aluminum profiles and machine covers by screw connection
- Easy to use
- Distinctive yellow color for easy recognition
- Robust version for heavy doors
- No additional door handle necessary
- Slot on the bolt permits attachment of padlocks

Version in stainless steel 1.4301

- Suitable for use in the chemical and foodstuff industries
- Screw material stainless steel V2A
- Handle material polypropylene
- Slide strip material polyethylene

Bolts for safety switches series TZ

Dimension drawings

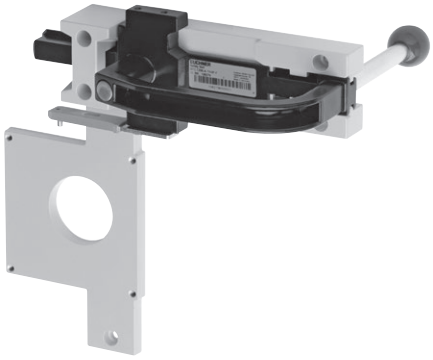


Ordering table

Designation	Detent mechanism	Version	Order no./item
Bolt TZ-A	Without	For doors hinged on the right actuator and switch bracket included	**057736** Bolt TZ-A
Bolt TZ-C	Without	For doors hinged on the left, actuator and switch bracket included	**057737** Bolt TZ-C
Bolt TZ-A-NIRO	Without	For right hinged doors, bolt bade of stainless steel 1.4301, actuator and switch bracket included	**079798** Bolt TZ-A-NIRO
Bolt TZ-C-NIRO	Without	For left hinged doors, bolt bade of stainless steel 1.4301, actuator and switch bracket included	**079799** Bolt TZ-C-NIRO
Bolt TZ-A-NIRO-C2101	Without	For right hinged doors, bolt bade of stainless steel 1.4301, screws made of stainless steel V2A, handle and slide strips made of stainless steel 1.4, actuator and switch bracket included	**096057** Bolt TZ-A-NIRO-C2101
Bolt TZ-C-NIRO-C2101	Without	For left hinged doors, bolt bade of stainless steel 1.4301, screws made of stainless steel V2A, handle and slide strips made of stainless steel 1.4, actuator and switch bracket included	**096058** Bolt TZ-C-NIRO-C2101

Bolts for safety guards

- **For safety switches TZ**
- **Material: Die-cast aluminum**
- **Lever for escape release from the danger area (optional)**
- **For doors hinged on the right or left**



Special features
(only for bolt BTC-TZ00 A/C-TH-01-F with escape release)

- Bolt with detent mechanism
  Latches in open position and prevents unintentional closing of the bolt. Unlocked by pressing the knob
- Lever for escape release from the danger area (optional)

Features

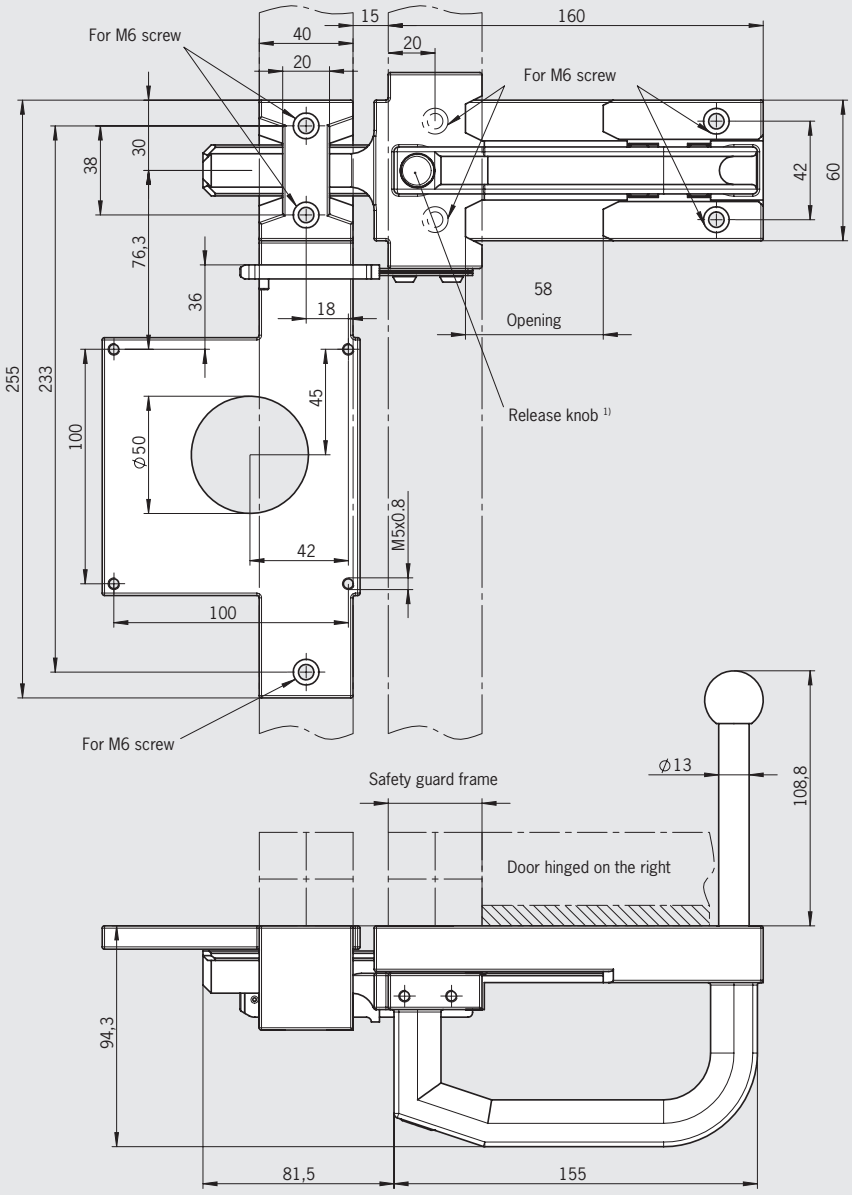
- Easily fitted to standard aluminum profiles and machine covers by screw connection
- Distinctive yellow color for easy recognition
- Robust version for heavy doors
- No additional door handle necessary

Notes

- Actuator included
- Order safety switch separately

Bolts for safety switches series TZ

Dimension drawings (here: bolt for doors hinged on the right with escape release)



1) Bolt with detent mechanism
(only for bolt BTC-TZ00-A/C-TH-01-F with escape release): latches in open position and prevents unintentional closing of the bolt.
Unlocked by pressing the knob

Ordering table

Designation	Detent mechanism	Version	Order no./item
Bolt BTC-TZ00-A-TH-01-F	1 x detent mechanism open	For right hinged doors, with escape release	**106279** Bolt BTC-TZ00-A-TH-01-F
Bolt BTC-TZ00-C-TH-01-F	1 x detent mechanism open	For left hinged doors, with escape release	**106281** Bolt BTC-TZ00-C-TH-01-F
Bolt BTC-TZ00-A-TH-00-X	Without	For right hinged doors, without escape release	**106278** Bolt BTC-TZ00-A-TH-00-X
Bolt BTC-TZ00-C-TH-00-X	Without	For left hinged doors, without escape release	**106280** Bolt BTC-TZ00-C-TH-00-X

For safety precautions see page 187
For technical data see page 153

Bolts for safety guards

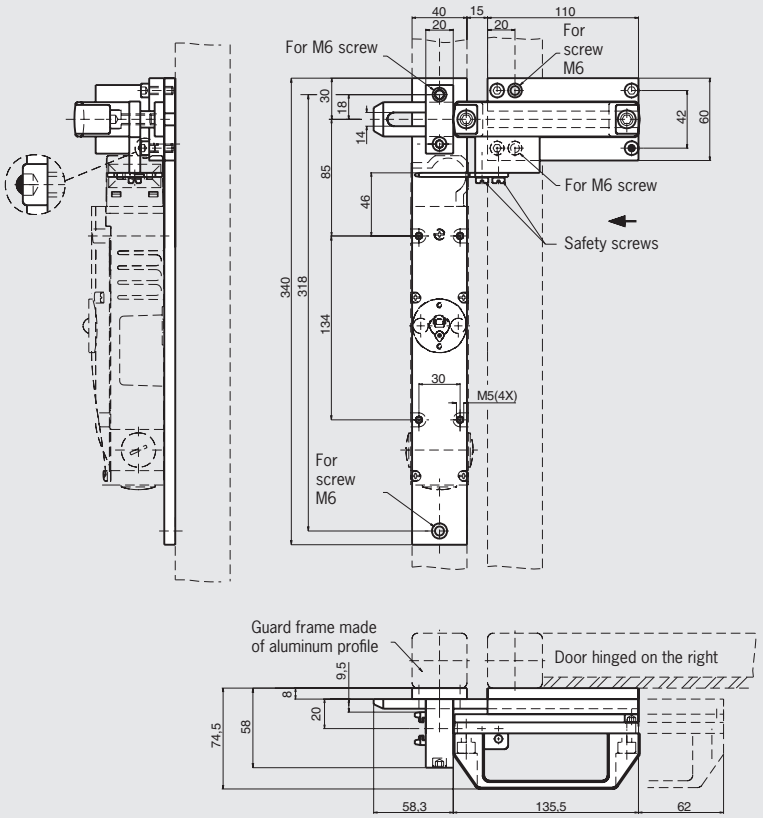
- **For safety switches TX and NX**
- **For right or left hinged doors**

Features

- Easily fitted to standard aluminum profiles and machine covers by screw connection
- Distinctive yellow color for easy recognition
- No additional door handle necessary
- Slot on the bolt tongue permits attachment of padlocks

Bolt for safety switches series TX and NX

Dimension drawings

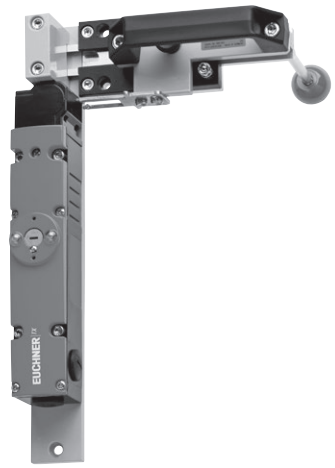


Ordering table

Designation	Detent mechanism	Version	Order no./item
Bolt TX-A	Without	Without escape release, for doors hinged on the right, actuator and switch bracket included	**082990** Bolt TX-A
Bolt TX-C	Without	Without escape release, for doors hinged on the left, actuator and switch bracket included	**082991** Bolt TX-C

Bolts for safety guards

- **For safety switches TX...C1991/C2161 with escape release**
- **For right or left hinged doors**

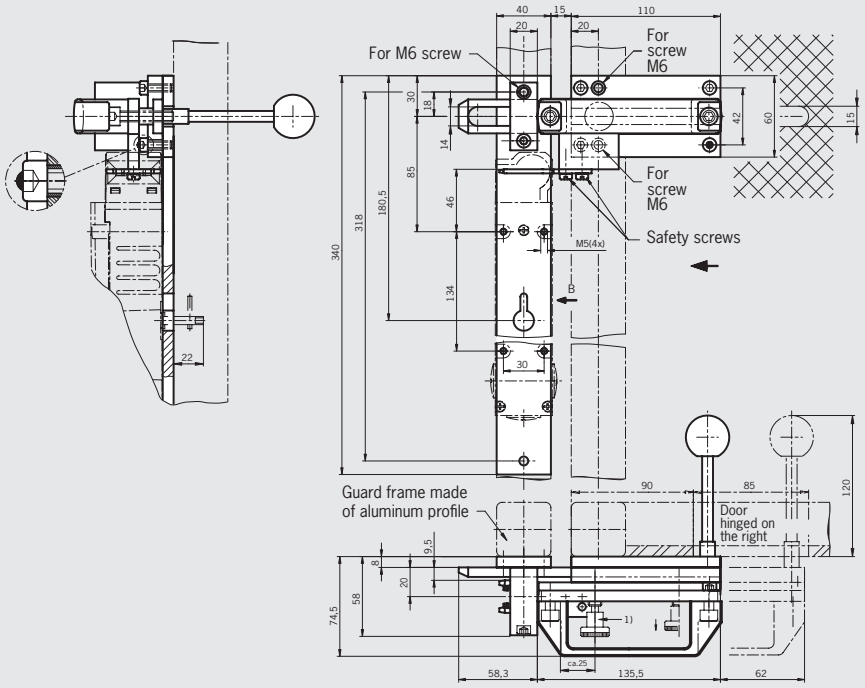


Features

- Easily fitted to standard aluminum profiles and machine covers by screw connection
- Distinctive yellow color for easy recognition
- No additional door handle necessary
- Slot on the bolt tongue permits attachment of padlocks

Bolts for safety switches series TX...C1991/C2161
with escape release

Dimension drawings



Ordering table

Designation	Detent mechanism	Version	Order no./item
Bolt TX-AF	Detent knob	With escape release, for doors hinged on the right, actuator and switch bracket included	**085392** Bolt TX-AF
Bolt TX-CF	Detent knob	With escape release, for doors hinged on the left, actuator and switch bracket included	**085393** Bolt TX-CF

For safety precautions see page 187
For technical data see page 153

Bolt for safety guards for safety switches SGA/STA

- **Lever for escape release from the danger area (optional)**

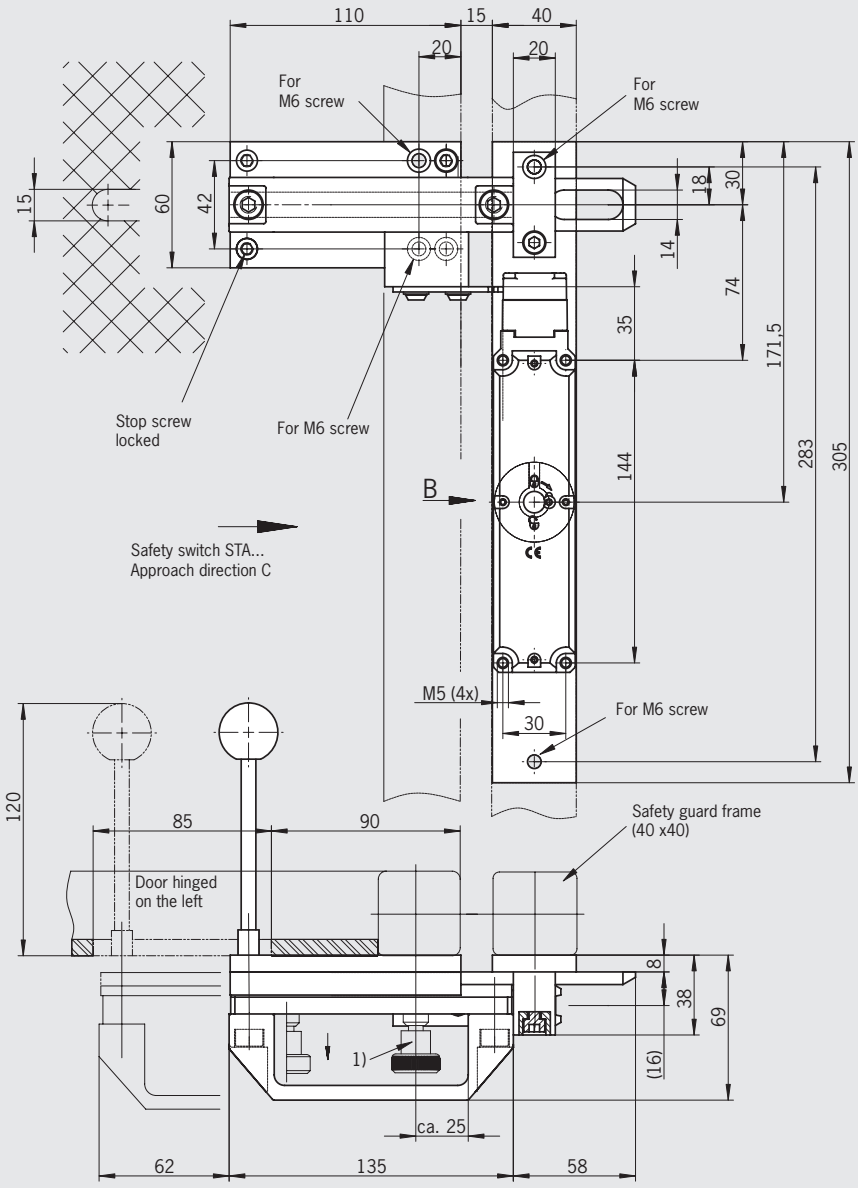
Special features
(only for bolt S-AF and S-CF with escape release)
- Bolt with detent mechanism
  Latches in open position and prevents unintentional closing of the bolt
- Lever for escape release from the danger area (optional)

Features
- Easily fitted to standard aluminum profiles and machine covers by screw connection
- Distinctive yellow color for easy recognition
- Robust version for heavy doors
- No additional door handle necessary
- Slot on the bolt permits attachment of padlocks

Notes
- The bolts are only suitable for series **SGA/STA**
- Actuator included
- Order safety switch separately

Bolt for safety switch SGA/STA

Dimension drawings (here: shown with escape release)



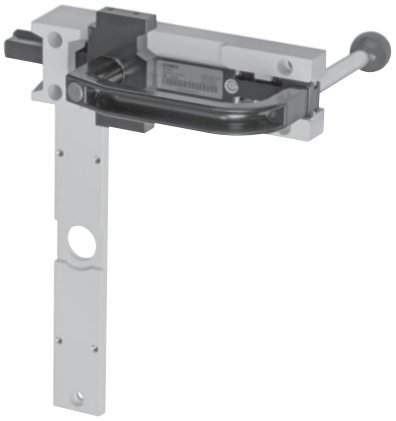
1) Bolt with detent mechanism (only for bolt S-AF and S-CF with escape release):
latches in open position and prevents unintentional closing of the bolt.
Unlocked by pulling the detent knob upward.

Ordering table

Designation	Detent mechanism	Version	Order no./item
Bolt S-AF	Detent knob	For right hinged doors, with escape release	**096390** Bolt S-AF
Bolt S-CF	Detent knob	For left hinged doors, with escape release	**096391** Bolt S-CF
Bolt S-A	Without	For right hinged doors, without escape release	**096384** Bolt S-A
Bolt S-C	Without	For left hinged doors, without escape release	**096385** Bolt S-C

Bolt for safety guards for safety switches STA/SGA

- **Material: Die-cast aluminum**
- **Lever for escape release from the danger area (optional)**
- **For doors hinged on the right or left**



Special features
(only for bolt BTC-ST/G-S-TH-01-F with escape release)

- Bolt with detent mechanism
  Latches in open position and prevents unintentional closing of the bolt. Unlocked by pressing the knob
- Lever for escape release from the danger area (optional)

Features

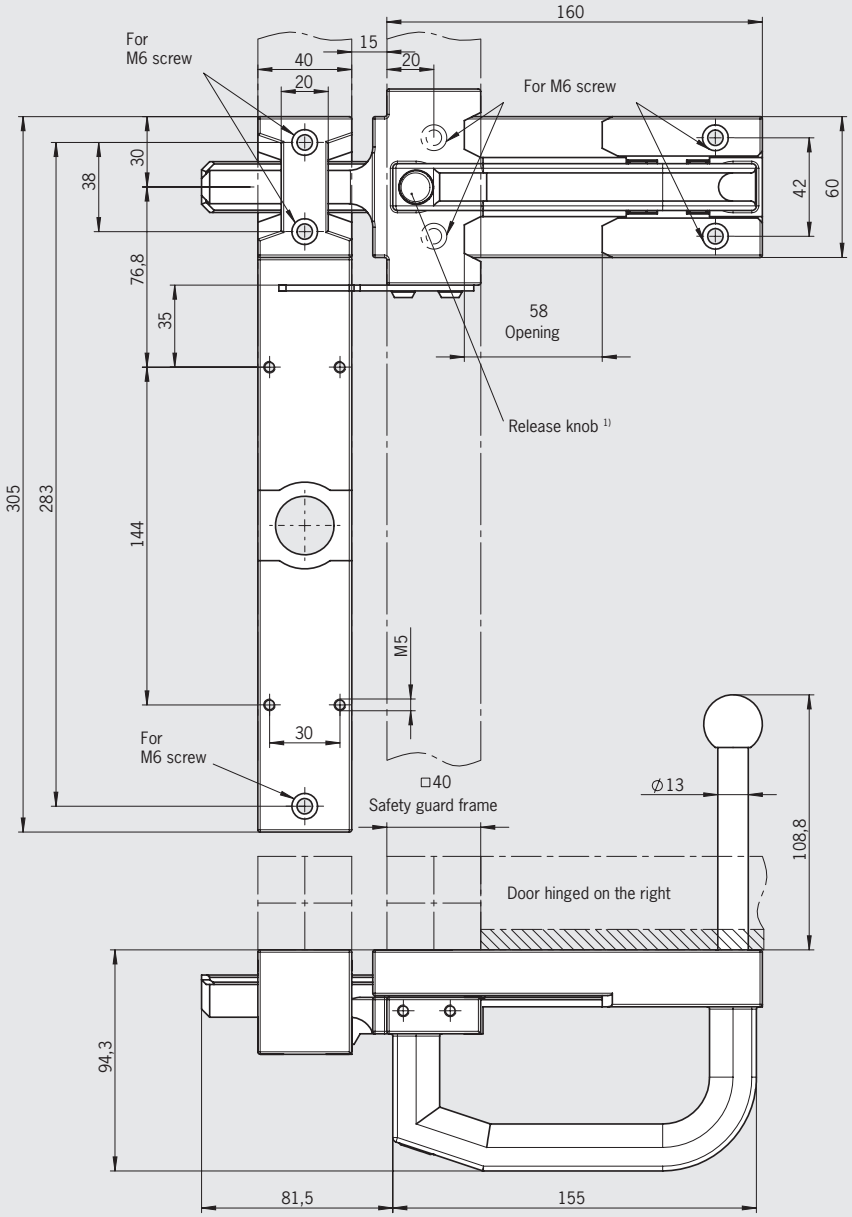
- Easily fitted to standard aluminum profiles and machine covers by screw connection
- Distinctive yellow color for easy recognition
- Robust version for heavy doors
- No additional door handle necessary

Notes

- The bolts are only suitable for series **STA.../SGA...**
- Actuator included
- Order safety switch separately

Bolt for safety switch STA.../SGA...

Dimension drawings (here: shown with escape release)



1) Bolt with detent mechanism (only for bolts BTC-ST/G-S-TH-01-F with escape release): latches in open position and prevents unintentional closing of the bolt. Unlocked by pressing the knob

Ordering table

Designation	Detent mechanism	Version	Order no./item
Bolt BTC-ST/G-S-TH-01-F	1 x detent mechanism open	For right or left hinged doors, with escape release	**106285** Bolt BTC-ST/G-S-TH-01-F
Bolt BTC-ST/G-S-TH-00-X	Without	For right or left hinged doors, without escape release	**106284** Bolt BTC-ST/G-S-TH-00-X

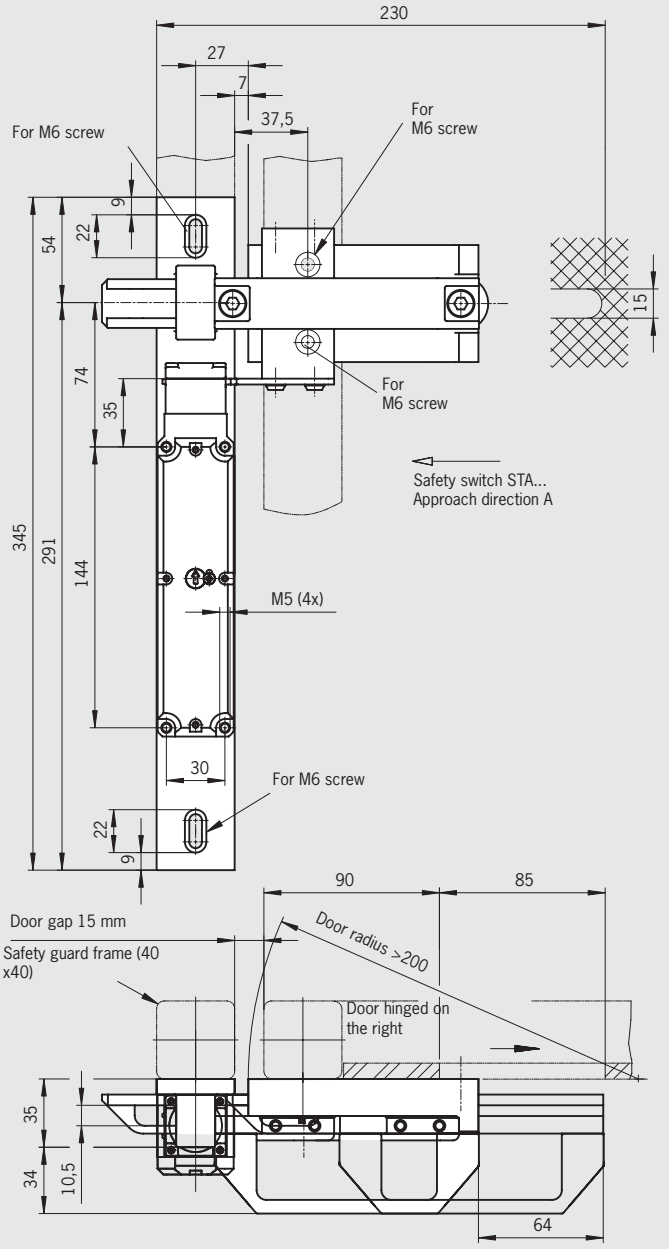
For safety precautions see page 187
For technical data see page 153

Bolt for safety guards for safety switches SGA/STA

- **Material: reinforced plastic**
- **For left or right hinged doors**

Bolt for safety switch SGA/STA

Dimension drawings



Features

- Easily fitted to standard aluminum profiles and machine covers by screw connection
- Distinctive yellow color for easy recognition
- Robust version for heavy doors
- No additional door handle necessary
- Slot on the bolt permits attachment of padlocks

Notes

- Functions only in conjunction with switch bracket **TP-GFK**
- Actuator included
- Order safety switch separately
- Order switch bracket separately

Ordering table

Designation	Detent mechanism	Version	Order no./item
Bolt STP-GFK	Without	For right or left hinged doors, without escape release (also for SGA/STA)	**098121** Bolt STP-GFK
Switch bracket TP-GFK		Separate (also for SGA/STA)	**096613** Switch bracket TP-GFK

Accessories for bolts

- **Adapter NZ/TZ... for safety switches NZ.../TZ... for Bosch EcoSafe 45x45 and 30x30**
- **Replacement handle for EUCHNER bolts**

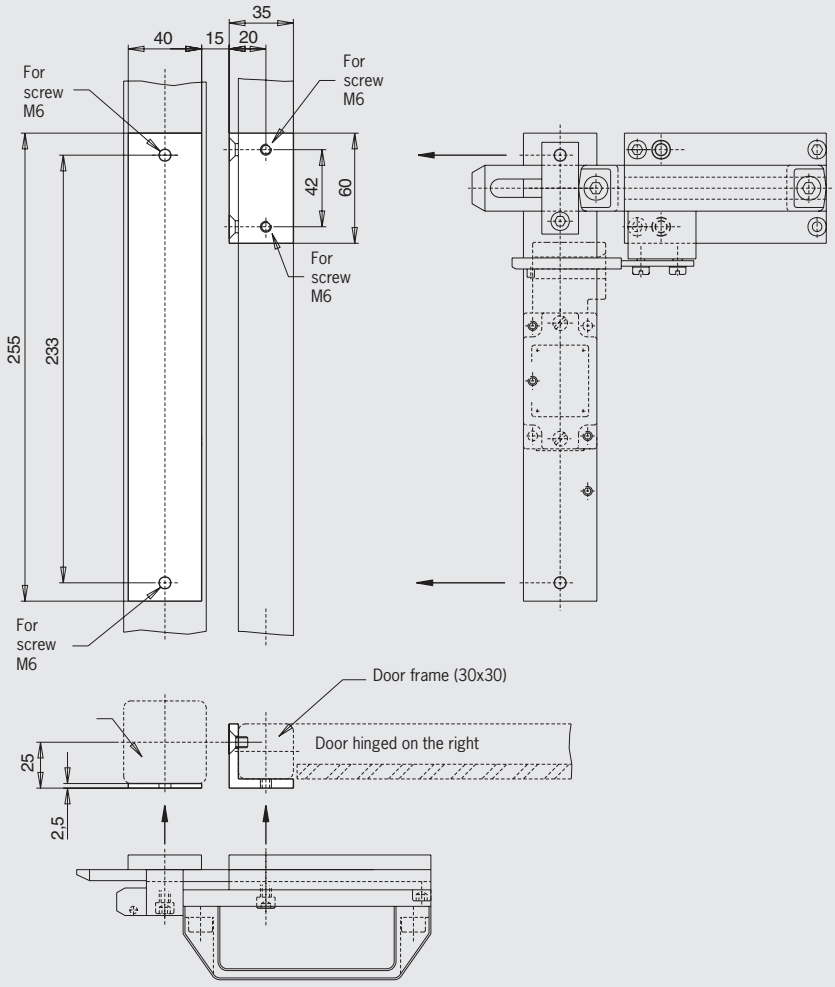
Adapter NZ/TZ

Using the adapter set the **NZ...** and **TZ...** bolts can be fastened to aluminum profiles (Bosch EcoSafe).
The adapter set is only suitable for protection cross-beams 45x45 mm in combination with safety doors 30x30 mm

- Simple screw mounting
- Symmetrical design for doors hinged on the right or left

Adapter NZ/TZ...

Dimension drawings

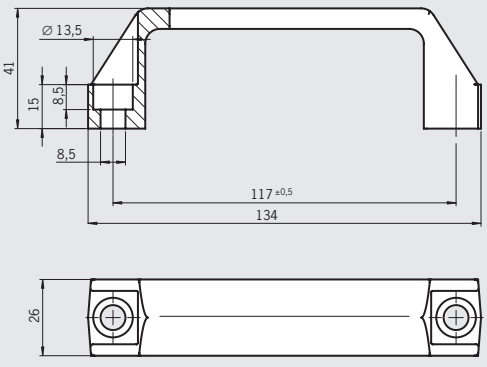


Replacement handle for EUCHNER bolts

- Material: plastic, reinforced polypropylene (PP)
- Color: black, mat
- Temperature resistance up to 100 °C

Replacement handle EUCHNER bolts

Dimension drawings



Ordering table

Designation	Version	Order no./item
Adapter NZ/TZ 45/30	Incl. 4 fastening screws for elbow adapter	**079033** Adapter NZ/TZ 45/30
Bolt handle/V5	Packaging unit 5 pieces, screws not included	**093500** Bolt handle/V5

For safety precautions see page 187
For technical data see page 153

Overview

Safety switch series	
N1A	Single hole fixing limit switches
NB01	Single limit switch, small design
NZ	Position switch NZ
NZ.VZ	Safety switch NZ.VZ
NZ.VZ.VS	Safety switch NZ.VZ.VS
TZ	Safety switch TZ
NX	Safety switch NX
TX	Safety switch TX
SGA	Safety switch SGA
STA	Safety switch STA
STA-TW	Safety switch STA-TW
ESH	Safety hinge ESH
Accessories for safety switches	

Safety switch series												Accesso-ries		Page
N1A	NB01	NZ	NZ.VZ	NZ.VZ.VS	TZ	NX	TX	SGA	STA	STA-TW	ESH			
●														154
	●													156
		●												158
			●											162
				●										165
					●									168
						●								171
							●							173
								●						177
									●					179
										●				182
											●			184
												●		185

Single limit switch N1A...

The technical data on switches and switching elements apply to all connections. Further technical data are given for the connection selected.

Reliability values acc. to EN ISO 13849-1

Parameter	Value	Unit
B_{10d}	2 x 10^7 operating cycles	

Switch

Parameter	Value				Unit
Housing material	Die-cast aluminum, anodized				
Ambient temperature	- 25 ... + 80				°C
Weight	Approx. 0.25				kg
Approach speed, min.	0.1				m/min
Switching element	**N1AD**	**N1AR/N1AB**	**N1ARL**	**N1AW**	
Approach speed, max. [1] Depending on actuator	40	80	20	10	m/min
Operating point accuracy depending on actuator [2]	± 0.002	± 0.01	± 0.1	± 0.002	mm

Switching element

Parameter	Value		Unit
Switching principle	Slow-action switching contact	Snap-action switching contact	
Switching element with 1 switching contact	**508** 1 NC ⊖	-	
Switching element with 2 switching contacts	-	**514** 1 NC ⊖ + 1 NO	
Mechanical life	30 x 10^6 operating cycles	1 x 10^6 operating cycles	
Actuating force, min.	15	30	N
Contact closing time	-	< 5	ms
Contact bounce time	-	< 3	ms
Min. switching current at 24 V DC	10		mA
Switching current max.	6		A
Rated impulse withstand voltage U_{imp}	2.5		kV
Contact material	Silver alloy, gold flashed		

Connection, cable entry M16 x 1.5

Parameter		Value		Unit
Connection		Screw terminal		
Version		M16 x 1.5		
Conductor cross-section, max.		Per flexible wire 1.5 mm²		
Degree of protection according to IEC 60529		IP 67		
Rated insulation voltage U_i		250		V AC/DC
Switching element		**508**	**514**	
Conventional thermal current I_{th}		6	6	A
Short circuit protection acc. to IEC 60269-1 (control circuit fuse)		6	6	A gG
Utilization category according to IEC 60947-5-1	AC-15	I_e 6 A U_e 230 V	I_e 2.5 A U_e 230 V	
	DC-13	I_e 6 A U_e 24 V	I_e 6 A U_e 24 V	

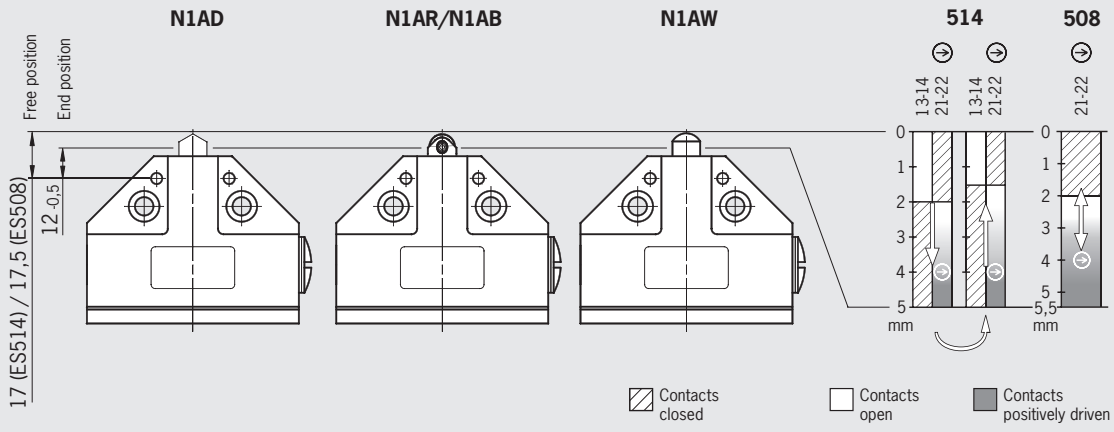
1) The approach speed given applies in conjunction with EUCHNER trip dogs at an approach angle of 30°. At a smaller approach angle this approach speed can be exceeded.
2) The reproducible operating point accuracy relates to axial actuation, after run-in of approx. 2000 operating cycles

Connection, plug connector SVM 5 (M12)

Parameter		Value	Unit
Connection		Plug connector	
Version		M12 (4-pin + PE), male socket adjustable (max. 270o) for elbow connector	
Degree of protection according to IEC 60529		IP 67 3)	
Rated insulation voltage U_i		30	V AC/DC
Switching element		**514**	
Conventional thermal current I_{th}		4	A
Short circuit protection acc. to IEC 60269-1 (control circuit fuse)		4	A gG
Utilization category according to IEC 60947-5-1	AC-15	I_e 4 A U_e 30 V	
	DC-13	I_e 4 A U_e 24 V	

3) Screwed tight with the related plug connector (see page 124)

Travel diagram, N1AD/N1AR/N1AB/N1AW



Travel diagram, N1ARL

Single limit switch NB01...

The technical data on switches and switching elements apply to all connections. Further technical data are given for the connection selected.

Reliability values acc. to EN ISO 13849-1

Parameter	Value	Unit
B_{10d}	2 x 10^7 operating cycles	

Switch

Parameter	Value		Unit
Housing material	Die-cast aluminum, anodized		
Ambient temperature	- 25 ... + 70		°C
Weight	Approx. 0.2		kg
Switching element	**NB01D**	**NB01R**	m/min
Approach speed, max. [1] Depending on actuator	20	50	
Operating point accuracy depending on actuator [2]	± 0.02	± 0.05	mm

Switching element

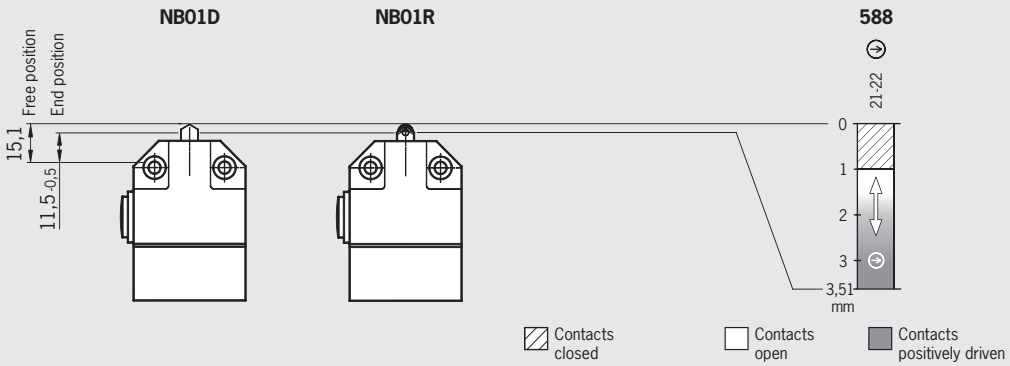
Parameter	Value	Unit
Switching principle	Slow-action switching contact	
Switching element with 1 switching contact	**588** 1 NC ⊖	
Mechanical life	10 x 10^6 operating cycles	
Actuating force, min.	15	N
Min. switching current at 24 V DC	1	mA
Switching current max.	6	A
Rated impulse withstand voltage U_{imp}	4	kV
Contact material	Silver alloy, gold flashed	

Connection, cable entry M12 x 1.5

Parameter		Value	Unit
Connection		Screw terminal	
Version		M12 x 1.5	
Conductor cross-section, max.		Per flexible wire 1.5 mm²	
Degree of protection according to IEC 60529		IP 67	
Rated insulation voltage U_i		250	V AC/DC
Switching element		**588**	
Conventional thermal current I_{th}		6	A
Short circuit protection acc. to IEC 60269-1 (control circuit fuse)		6	A gG
Utilization category according to IEC 60947-5-1	AC-15	I_e 4 A U_e 230 V	
	DC-13	I_e 3 A U_e 24 V	

1) The approach speed given applies in conjunction with EUCHNER trip dogs at an approach angle of 30°. At a smaller approach angle this approach speed can be exceeded.

Travel diagram, NB01D/NB01R



Position switches NZ...

The technical data on switches and switching elements apply to all connections. Further technical data are given for the connection selected.

Reliability values acc. to EN ISO 13849-1

Parameter	Value	Unit
B_{10d}	2 x 10^7 operating cycles	

Switch

Parameter	Value							Unit
Housing material	Anodized die-cast alloy							
Mechanical life	30 x 10^6 operating cycles							
Ambient temperature	- 25 ... + 80							°C
Weight	Approx. 0.3							kg
Approach speed, min.	0.1							m/min
Approach speed, max. [1] Depending on actuator	**HB**	**HS**	**PB**	**PS**	**RG, RL, RS**	**RK**	**WO**	m/min
	300	60	120	30	20	50	10	
Actuating force, min.	15							N

Switching element

Parameter	Value			Unit
Switching principle	Snap-action	Slow-action switching contact		
Switching element with 2 switching contacts	**511** 1 NC ⊖ + 1 NO	**528H** 1 NC ⊖ + 1 NO	**538H** 2 NC ⊖	
Switching element with 4 switching contacts	-	**2121H** 4 NC ⊖	**2131H** 3 NC ⊖ + 1 NO	**3131H** 2 NC ⊖ + 2 NO
Min. switching current at 24 V DC	1	1		mA
Switching current max.	6	4		A
Contact closing time	< 4	-		ms
Contact bounce time	< 3	-		ms
Rated impulse withstand voltage U_{imp}	2.5			kV
Contact material	Silver alloy, gold flashed			

Connection, cable entry M20 x 1.5

Parameter		Value		Unit
Connection		Screw terminal		
Version		M20 x 1.5		
Conductor cross-section, max.		Per flexible wire 1.5 mm²		
Degree of protection according to IEC 60529		IP 67		
Rated insulation voltage U_i		250		V AC/DC
Switching element		Snap-action switching contact **511**	Slow-action switching contact **528H, 538H, 2121H, 2131H, 3131H**	
Conventional thermal current I_{th}		6	4	A
Short circuit protection acc. to IEC 60269-1 (control circuit fuse)		6	4	A gG
Utilization category according to IEC 60947-5-1	AC-12	I_e 10 A U_e 230 V	-	
	AC-15	I_e 6 A U_e 230 V	I_e 4 A U_e 230 V	
	DC-13	I_e 6 A U_e 24 V	I_e 4 A U_e 24 V	

1) The approach speed given applies in conjunction with EUCHNER trip dogs at an approach angle of 30°. At a smaller approach angle this approach speed can be exceeded.

Connection, plug connector SVM 5 (M12) 			
Parameter		**Value**	**Unit**
Connection		Plug connector	
Version		M12 (4-pin + PE), male socket adjustable (max. 270o) for elbow connector	
Degree of protection according to IEC 60529		IP 67 [2]	
Rated insulation voltage U_i		30	V AC/DC
Switching element		Snap-action switching contact **511**, Slow-action switching contact **528H**, **538H**	
Conventional thermal current I_{th}		4	A
Short circuit protection acc. to IEC 60269-1 (control circuit fuse)		4	A gG
Utilization category according to IEC 60947-5-1	AC-15	I_e 4 A U_e 30 V	
	DC-13	I_e 4 A U_e 24 V	

Connection, plug connector SR6 				
Parameter		**Value**		**Unit**
Connection		Plug connector according to DIN 43651		
Version		SR6 (6-pin + PE)		
Degree of protection according to IEC 60529		IP 65 [2]		
Rated insulation voltage U_i		250		V AC/DC
Switching element		Snap-action switching contact **511**	Slow-action switching contact **528H**, **538H**	
Conventional thermal current I_{th}		6	4	A
Short circuit protection acc. to IEC 60269-1 (control circuit fuse)		6	4	A gG
Utilization category according to IEC 60947-5-1	AC-15	I_e 6 A U_e 230 V	I_e 4 A U_e 230 V	
	DC-13	I_e 6 A U_e 24 V	I_e 4 A U_e 24 V	

Connection, plug connector MR8 			
Parameter		**Value**	**Unit**
Connection		Plug connector	
Version		MR8 (7-pin + PE)	
Degree of protection according to IEC 60529		IP 65 [2]	
Rated insulation voltage U_i		250	V AC/DC
Switching element		Slow-action switching contact **3131H**	
Conventional thermal current I_{th}		4	A
Short circuit protection acc. to IEC 60269-1 (control circuit fuse)		4	A gG
Utilization category according to IEC 60947-5-1	AC-15	I_e 4 A U_e 230 V	
	DC-13	I_e 4 A U_e 24 V	

Connection, plug connector MR9 			
Parameter		**Value**	**Unit**
Connection		Plug connector	
Version		MR9 (8-pin + PE)	
Degree of protection according to IEC 60529		IP 65 [2]	
Rated insulation voltage U_i		250	V AC/DC
Switching element		Slow-action switching contact **2131H, 3131H**	
Conventional thermal current I_{th}		4	A
Short circuit protection acc. to IEC 60269-1 (control circuit fuse)		4	A gG
Utilization category according to IEC 60947-5-1	AC-15	I_e 4 A U_e 230 V	
	DC-13	I_e 4 A U_e 24 V	

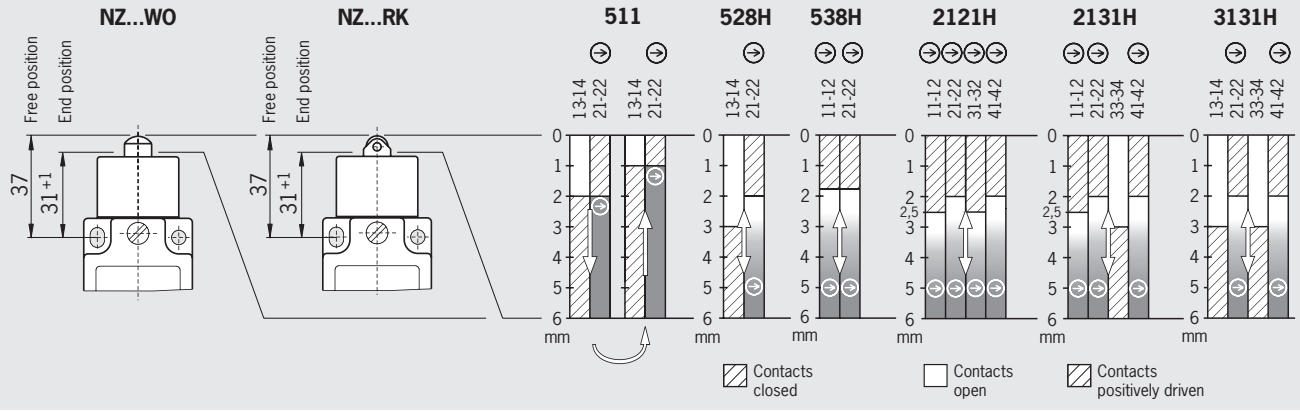
Connection, plug connector MR10 			
Parameter		**Value**	**Unit**
Connection		Plug connector	
Version		MR10 (9-pin + PE)	
Degree of protection according to IEC 60529		IP 65 [2]	
Rated insulation voltage U_i		250	V AC/DC
Conventional thermal current I_{th}		4	A
Short circuit protection acc. to IEC 60269-1 (control circuit fuse)		4	A gG
Utilization category according to IEC 60947-5-1	AC-15	I_e 4 A U_e 230 V	
	DC-13	I_e 4 A U_e 24 V	

2) Screwed tight with the related plug connector (see page 120 and 123)

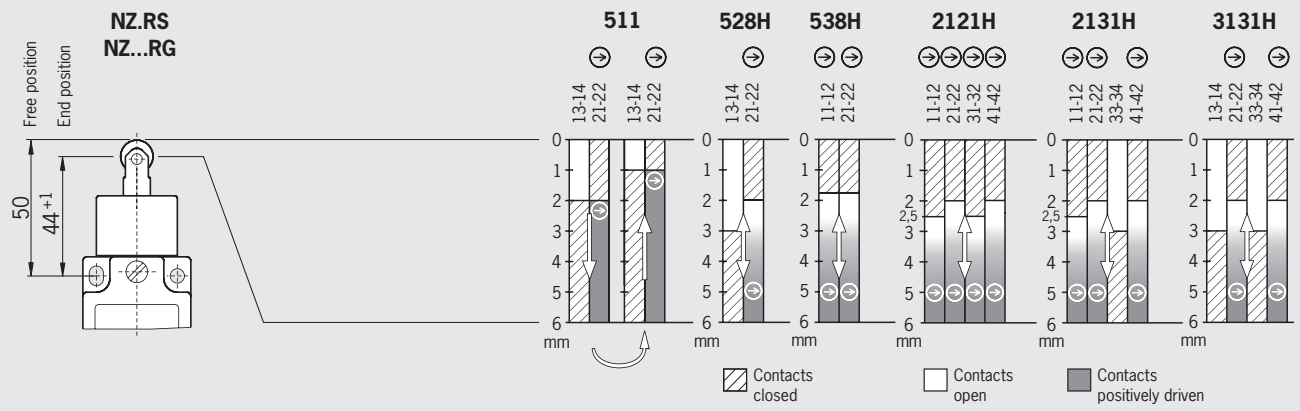
Connection, plug connector SR11		12-pol	
Parameter		**Value**	**Unit**
Connection		Plug connector	
Version		SR11 (11-pin + PE)	
Degree of protection according to IEC 60529		IP 65 [2]	
Rated insulation voltage U_i		50	V AC/DC
Switching element		Slow-action switching contact **2121H, 2131H, 3131H**	
Conventional thermal current I_{th}		4	A
Short circuit protection acc. to IEC 60269-1 (control circuit fuse)		4	A gG
Utilization category according to IEC 60947-5-1	AC-15	I_e 4 A U_e 50 V	
	DC-13	I_e 4 A U_e 24 V	

2) Screwed tight with the related plug connector (see page 120)

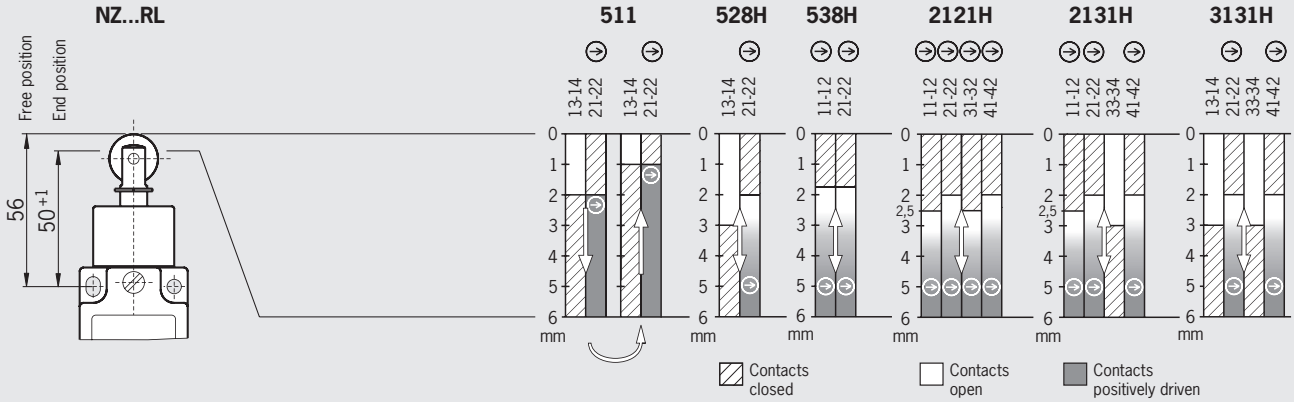
Travel diagram, NZ.WO/NZ.RK



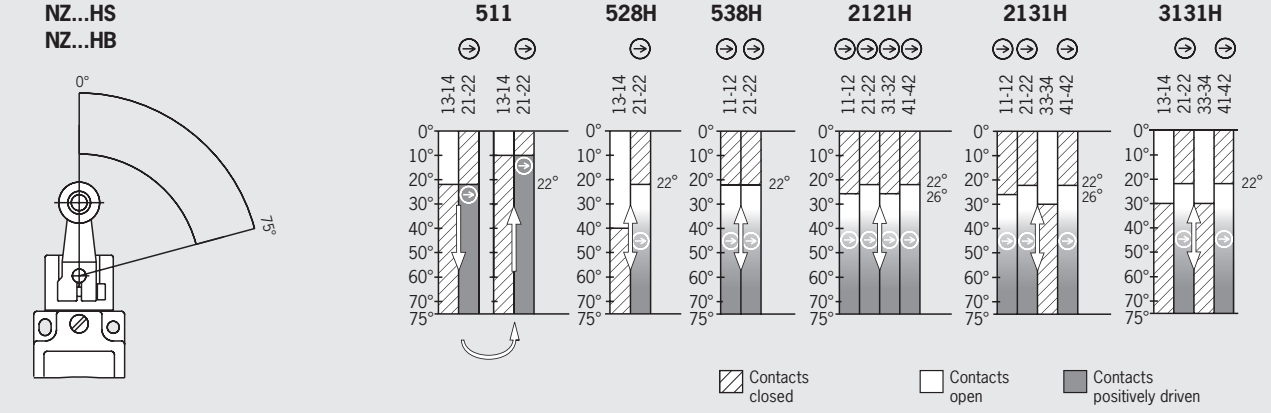
Travel diagram, NZ.RS/NZ.RG



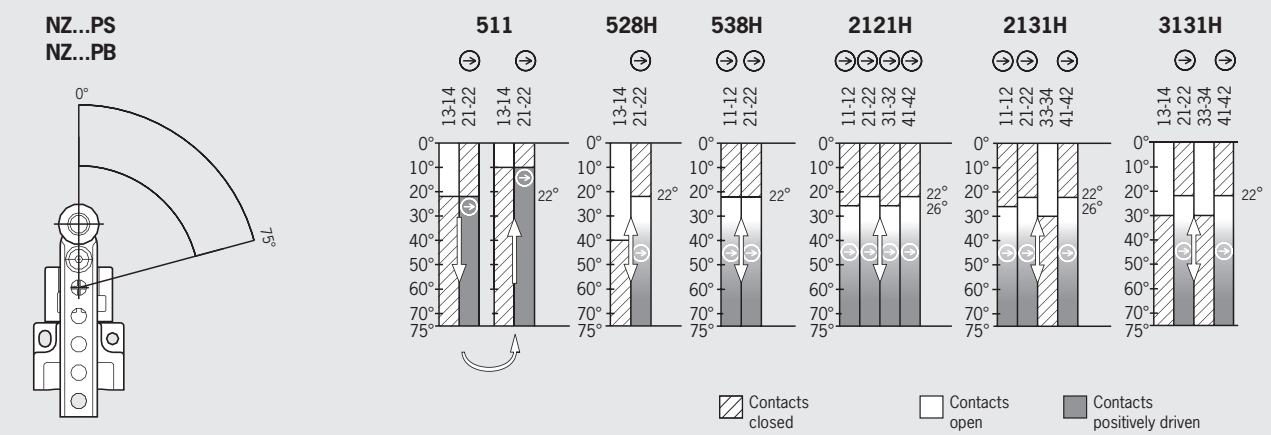
Travel diagram, NZ.RL



Travel diagram, NZ.HS/NZ.HB



Travel diagram, NZ.PS/NZ.PB



Safety switch NZ.VZ

The technical data on switches and switching elements apply to all connections. Further technical data are given for the connection selected.

Reliability values acc. to EN ISO 13849-1

Parameter	Value	Unit
B_{10d}	4.5 x 10^6 operating cycles	

Switch

Parameter	Value	Unit
Housing material	Anodized die-cast alloy	
Mechanical life	2 x 10^6 operating cycles	
Ambient temperature	- 25 ... + 80	°C
Weight	Approx. 0.3	kg
Approach speed, max.	20	m/min
Approach speed, min.	0.02 (for switching element ES511)	m/min
Actuating force	35	N
Extraction force	35	N
Retention force	8	N

Switching element

Parameter	Value			Unit
Switching principle	Snap-action	Slow-action switching contact		
Switching element with 2 switching contacts	**511** 1 NC ⊖ + 1 NO	**528H** 1 NC ⊖ + 1 NO	**538H** 2 NC ⊖	
Switching element with 4 switching contacts	-	**2121H** 4 NC ⊖	**2131H** 3 NC ⊖ + 1 NO	**3131H** 2 NC ⊖ + 2 NO
Min. switching current at 24 V DC	1	1		mA
Switching current max.	6	4		A
Contact closing time	< 4	-		ms
Contact bounce time	< 3	-		ms
Rated impulse withstand voltage U_{imp}	2.5			kV
Contact material	Silver alloy, gold flashed			

Connection, cable entry M20 x 1.5

Parameter		Value		Unit
Connection		Screw terminal		
Version		M20 x 1.5		
Conductor cross-section, max.		Per flexible wire 1.5 mm²		
Degree of protection according to IEC 60529		IP 67		
Rated insulation voltage U_i		250		V AC/DC
Switching element		Snap-action switching contact **511**	Slow-action switching contact **528H, 538H, 2121H, 2131H, 3131H**	
Conventional thermal current I_{th}		6	4	A
Short circuit protection acc. to IEC 60269-1 (control circuit fuse)		6	4	A gG
Utilization category according to IEC 60947-5-1	AC-12	I_e 10 A U_e 230 V	-	
	AC-15	I_e 6 A U_e 230 V	I_e 4 A U_e 230 V	
	DC-13	I_e 6 A U_e 24 V	I_e 4 A U_e 24 V	

Connection, plug connector SVM 5 (M12) 			
Parameter		**Value**	**Unit**
Connection		Plug connector	
Version		M12 (4-pin + PE), male socket adjustable (max. 270o) for elbow connector	
Degree of protection according to IEC 60529		IP 67 [1]	
Rated insulation voltage U_i		30	V AC/DC
Switching element		Slow-action switching contact **538H**	
Conventional thermal current I_{th}		4	A
Short circuit protection acc. to IEC 60269-1 (control circuit fuse)		4	A gG
Utilization category according to IEC 60947-5-1	AC-15	I_e 4 A U_e 30 V	
	DC-13	I_e 4 A U_e 24 V	

Connection, plug connector C16-1 			
Parameter		**Value**	**Unit**
Connection		Plug connector	
Version		C16-1 (6-pin + PE)	
Degree of protection according to IEC 60529		IP 67 [1]	
Rated insulation voltage U_i		250	V AC/DC
Switching element		Slow-action switching contact **538H**	
Conventional thermal current I_{th}		4	A
Short circuit protection acc. to IEC 60269-1 (control circuit fuse)		4	A gG
Utilization category according to IEC 60947-5-1	AC-15	I_e 4 A U_e 30 V	
	DC-13	I_e 4 A U_e 24 V	

Connection, plug connector SR6 				
Parameter		**Value**		**Unit**
Connection		Plug connector according to DIN 43651		
Version		SR6 (6-pin + PE)		
Degree of protection according to IEC 60529		IP 65 [1]		
Rated insulation voltage U_i		250		V AC/DC
Switching element		Snap-action switching contact **511**	Slow-action switching contact **528H**, **538H**	
Conventional thermal current I_{th}		6	4	A
Short circuit protection acc. to IEC 60269-1 (control circuit fuse)		6	4	A gG
Utilization category according to IEC 60947-5-1	AC-15	I_e 6 A U_e 230 V	I_e 4 A U_e 230 V	
	DC-13	I_e 6 A U_e 24 V	I_e 4 A U_e 24 V	

Connection, plug connector MR8 			
Parameter		**Value**	**Unit**
Connection		Plug connector	
Version		MR8 (7-pin + PE)	
Degree of protection according to IEC 60529		IP 65 [1]	
Rated insulation voltage U_i		250	V AC/DC
Switching element		Slow-action switching contact **2131H**	
Conventional thermal current I_{th}		4	A
Short circuit protection acc. to IEC 60269-1 (control circuit fuse)		4	A gG
Utilization category according to IEC 60947-5-1	AC-15	I_e 4 A U_e 230 V	
	DC-13	I_e 4 A U_e 24 V	

Connection, plug connector MR9 			
Parameter		**Value**	**Unit**
Connection		Plug connector	
Version		MR9 (8-pin + PE)	
Degree of protection according to IEC 60529		IP 65 [1]	
Rated insulation voltage U_i		250	V AC/DC
Switching element		Slow-action switching contact **2131H**	
Conventional thermal current I_{th}		4	A
Short circuit protection acc. to IEC 60269-1 (control circuit fuse)		4	A gG
Utilization category according to IEC 60947-5-1	AC-15	I_e 4 A U_e 230 V	
	DC-13	I_e 4 A U_e 24 V	

1) Screwed tight with the related plug connector (see page 119, 120, 123 and 124)

Connection, plug connector MR10		10-pol	
Parameter		**Value**	**Unit**
Connection		Plug connector	
Version		MR10 (9-pin + PE)	
Degree of protection according to IEC 60529		IP 65 [1]	
Rated insulation voltage U_i		250	V AC/DC
Conventional thermal current I_{th}		4	A
Short circuit protection acc. to IEC 60269-1 (control circuit fuse)		4	A gG
Utilization category according to IEC 60947-5-1	AC-15	I_e 4 A U_e 230 V	
	DC-13	I_e 4 A U_e 24 V	

Connection, plug connector SR11		12-pol	
Parameter		**Value**	**Unit**
Connection		Plug connector	
Version		SR11 (11-pin + PE)	
Degree of protection according to IEC 60529		IP 65 [1]	
Rated insulation voltage U_i		50	V AC/DC
Switching element		Slow-action switching contact **2121H, 2131H, 3131H**	
Conventional thermal current I_{th}		4	A
Short circuit protection acc. to IEC 60269-1 (control circuit fuse)		4	A gG
Utilization category according to IEC 60947-5-1	AC-15	I_e 4 A U_e 50 V	
	DC-13	I_e 4 A U_e 24 V	

1) Screwed tight with the related plug connector (see page 120 and 123)

Safety switches NZ.VZ.VS... with guard locking

The technical data on switches, switching elements and guard locking apply to all connections. Further technical data are given for the connection selected.

Reliability values acc. to EN ISO 13849-1

Parameter	Value	Unit
B_{10d}	4.5 x 10^6 operating cycles	

Switch

Parameter	Value	Unit
Housing material	Anodized die-cast alloy	
Mechanical life	2 x 10^6 operating cycles	
Ambient temperature	- 25 ... + 80	°C
Weight	Approx. 0.7	kg
Approach speed, max.	20	m/min
Approach speed, min.	0.02 (for switching element ES511)	m/min
Actuating force	45	N
Extraction force	40	N
Retention force	35	N
Locking force, max.	2000	N
Locking force F_{Zh} in acc. with GS-ET-19	1500	N

Switching element

Parameter	Value			Unit
Switching principle	Snap-action	Slow-action switching contact		
Switching element with 2 switching contacts	**511** 1 NC ⊖ + 1 NO	**528H** 1 NC ⊖ + 1 NO	**538H** 2 NC ⊖	
Switching element with 4 switching contacts	-	**2131H** 3 NC ⊖ + 1 NO	**3131H** 2 NC ⊖ + 2 NO	
Min. switching current at 24 V DC	1	1		mA
Switching current max.	6	4		A
Contact closing time	< 4	-		ms
Contact bounce time	< 3	-		ms
Rated impulse withstand voltage U_{imp}	2.5			kV
Contact material	Silver alloy, gold flashed			

Guard locking

Parameter	Value			Unit
Solenoid operating voltage	DC 24 V +10/-15%	AC 110 V +10/-15% [1]	AC 230 V +10/-15% [1]	
Connection	Switch mounted connector (2-pin + PE) according to 43650			
Conductor cross-section	For technical data on the solenoid plug see page 119			
Duty cycle	100			%
Power consumption	< 10			W

1) Use only solenoid plug with integrated rectifier

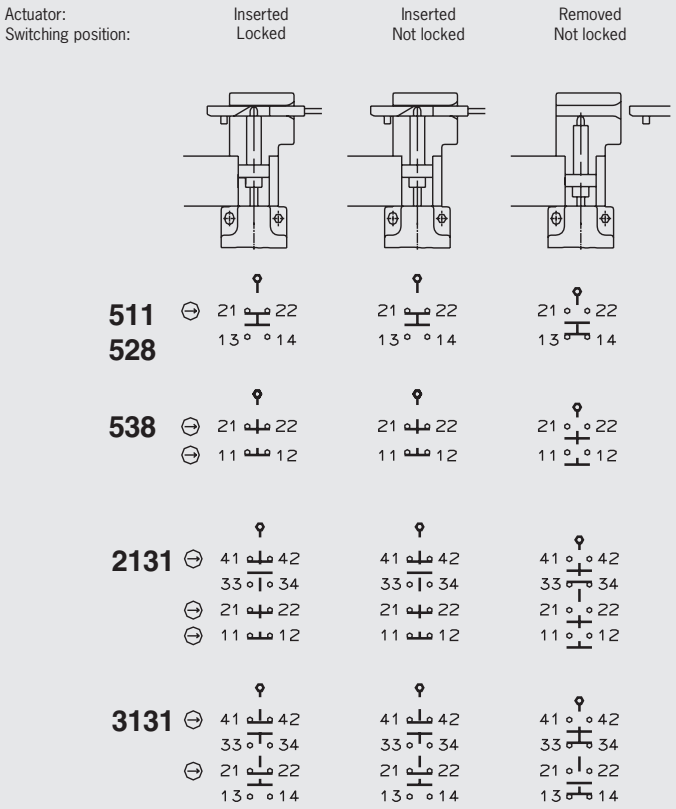
Connection, cable entry M20 x 1.5				
Parameter		**Value**		**Unit**
Connection		Screw terminal		
Version		M20 x 1.5		
Conductor cross-section, max.		Per flexible wire 1.5 mm²		
Degree of protection according to IEC 60529		IP 67		
Rated insulation voltage U_i		250		V AC/DC
Switching element		Snap-action switching contact **511**	Slow-action switching contact **528H, 538H, 2131H, 3131H**	
Conventional thermal current I_{th}		6	4	A
Short circuit protection acc. to IEC 60269-1 (control circuit fuse)		6	4	A gG
Utilization category according to IEC 60947-5-1	AC-12	I_e 10 A U_e 230 V	-	
	AC-15	I_e 6 A U_e 230 V	I_e 4 A U_e 230 V	
	DC-13	I_e 6 A U_e 24 V	I_e 4 A U_e 24 V	

Connection, plug connector SR6			
Parameter		**Value**	**Unit**
Connection		Plug connector according to DIN 43651	
Version		SR6 (6-pin + PE)	
Degree of protection according to IEC 60529		IP 65 [2)]	
Rated insulation voltage U_i		250	V AC/DC
Switching element		Slow-action switching contact **528H**, **538H**	
Conventional thermal current I_{th}		4	A
Short circuit protection acc. to IEC 60269-1 (control circuit fuse)		4	A gG
Utilization category according to IEC 60947-5-1	AC-15	I_e 4 A U_e 230 V	
	DC-13	I_e 4 A U_e 24 V	

Connection, plug connector SR11			
Parameter		**Value**	**Unit**
Connection		Plug connector	
Version		SR11 (11-pin + PE)	
Degree of protection according to IEC 60529		IP 65 [2)]	
Rated insulation voltage U_i		50	V AC/DC
Switching element		Slow-action switching contact **2131H, 3131H**	
Conventional thermal current I_{th}		4	A
Short circuit protection acc. to IEC 60269-1 (control circuit fuse)		4	A gG
Utilization category according to IEC 60947-5-1	AC-15	I_e 4 A U_e 50 V	
	DC-13	I_e 4 A U_e 24 V	

2) Screwed tight with the related plug connector (see page 120)

Switching functions NZ.VZ.VS



Safety switch TZ with guard locking and guard lock monitoring

The technical data on switches, switching elements and guard locking apply to all connections. Further technical data are given for the connection selected.

Reliability values acc. to EN ISO 13849-1

Parameter	Value	Unit
B_{10d}	3 x 10^6 operating cycles	

Switch

Parameter	Value	Unit
Housing material	Anodized die-cast alloy	
Mechanical life	1 x 10^6 operating cycles	
Ambient temperature	- 25 ... + 80	°C
Weight	Approx. 1.2	kg
Approach speed, max.	20	m/min
Actuating force	35	N
Extraction force	30	N
Retention force	10	N
Locking force, max.	2000	N
Locking force F_{Zh} in acc. with GS-ET-19	1500	N

Switching element

Parameter	Value		Unit
Switching principle	Slow-action switching contact		
Switching element with 2 switching contacts	SK: **528H** / ÜK: **528H** 1 NC ⊖ + 1 NO / 1 NC ⊖ + 1 NO		
Switching element with 4 switching contacts	SK: **2131H** / ÜK: **3131H** 3 NC ⊖ + 1 NO / 2 NC ⊖ + 2 NO	SK: **2121H** / ÜK: **2121H** 4 NC ⊖ / 4 NC ⊖	
Min. switching current at 24 V DC	1		mA
Rated impulse withstand voltage U_{imp}	2.5		kV
Contact material	Silver alloy, gold flashed		

Guard locking

Parameter	Value			Unit
Solenoid operating voltage	AC/DC 24 V +10/-15%	AC 110 V +10/-15% [1]	AC 230 V +10/-15% [1]	
Duty cycle	100			%
Power consumption	10			W

Connection, cable entry M20 x 1.5

Parameter		Value			Unit
Connection		Screw terminal			
Version		M20 x 1.5			
Conductor cross-section, max.		Per flexible wire 1.5 mm²			
Degree of protection according to IEC 60529		IP 67	IP 65:	With escape release TZ...C1815, TZ...C1828 With emergency release TZ...C1816, TZ...C1823	
Rated insulation voltage U_i		250			V AC/DC
Conventional thermal current I_{th}		4			A
Short circuit protection acc. to IEC 60269-1 (control circuit fuse)		4			A gG
Utilization category according to IEC 60947-5-1	AC-15	I_e 4 A U_e 230 V			
	DC-13	I_e 4 A U_e 24 V			

Connection, plug connector RC18 			
Parameter		**Value**	**Unit**
Connection		Plug connector	
Version		RC18 (18-pin + PE)	
Degree of protection according to IEC 60529		IP 65 [1]	
Rated insulation voltage U_i		110	V AC/DC
Conventional thermal current I_{th}		4	A
Short circuit protection acc. to IEC 60269-1 (control circuit fuse)		4	A gG
Utilization category according to IEC 60947-5-1	AC-15	I_e 4 A U_e 110 V	
	DC-13	I_e 4 A U_e 24 V	

Connection, plug connector SR6 			
Parameter		**Value**	**Unit**
Connection		Plug connector according to DIN 43651	
Version		SR6 (6-pin + PE)	
Degree of protection according to IEC 60529		IP 65 [1]	
Rated insulation voltage U_i		250	V AC/DC
Conventional thermal current I_{th}		4	A
Short circuit protection acc. to IEC 60269-1 (control circuit fuse)		4	A gG
Utilization category according to IEC 60947-5-1	AC-15	I_e 4 A U_e 230 V	
	DC-13	I_e 4 A U_e 24 V	

Standard wiring TZ...SR6
The green LED indicates the state of the safety circuit and the red LED the state of the monitoring circuit.

Green only: Safety circuit closed
Red only: Actuator unlocked, safety circuit open

The exact states of the safety circuit and the actuator can be seen in the adjacent table for the safety switch TZ...SR6.

LED		Actuator		Safety circuit	
Red	Green	Locked	Unlocked	Closed	Open
ON	ON		X	X	
ON	OFF		X		X
OFF	ON	X		X	
OFF	OFF	Not defined or no power			

Connection, plug connector SR11 			
Parameter		**Value**	**Unit**
Connection		Plug connector	
Version		SR11 (11-pin + PE)	
Degree of protection according to IEC 60529		IP 65 [1]	
Rated insulation voltage U_i		50	V AC/DC
Conventional thermal current I_{th}		4	A
Short circuit protection acc. to IEC 60269-1 (control circuit fuse)		4	A gG
Utilization category according to IEC 60947-5-1	AC-15	I_e 4 A U_e 50 V	
	DC-13	I_e 4 A U_e 24 V	

Connection, plug connector MR8 			
Parameter		**Value**	**Unit**
Connection		Plug connector	
Version		MR8 (7-pin + PE)	
Degree of protection according to IEC 60529		IP 65 [1]	
Rated insulation voltage U_i		250	V AC/DC
Conventional thermal current I_{th}		4	A
Short circuit protection acc. to IEC 60269-1 (control circuit fuse)		4	A gG
Utilization category according to IEC 60947-5-1	AC-15	I_e 4 A U_e 230 V	
	DC-13	I_e 4 A U_e 24 V	

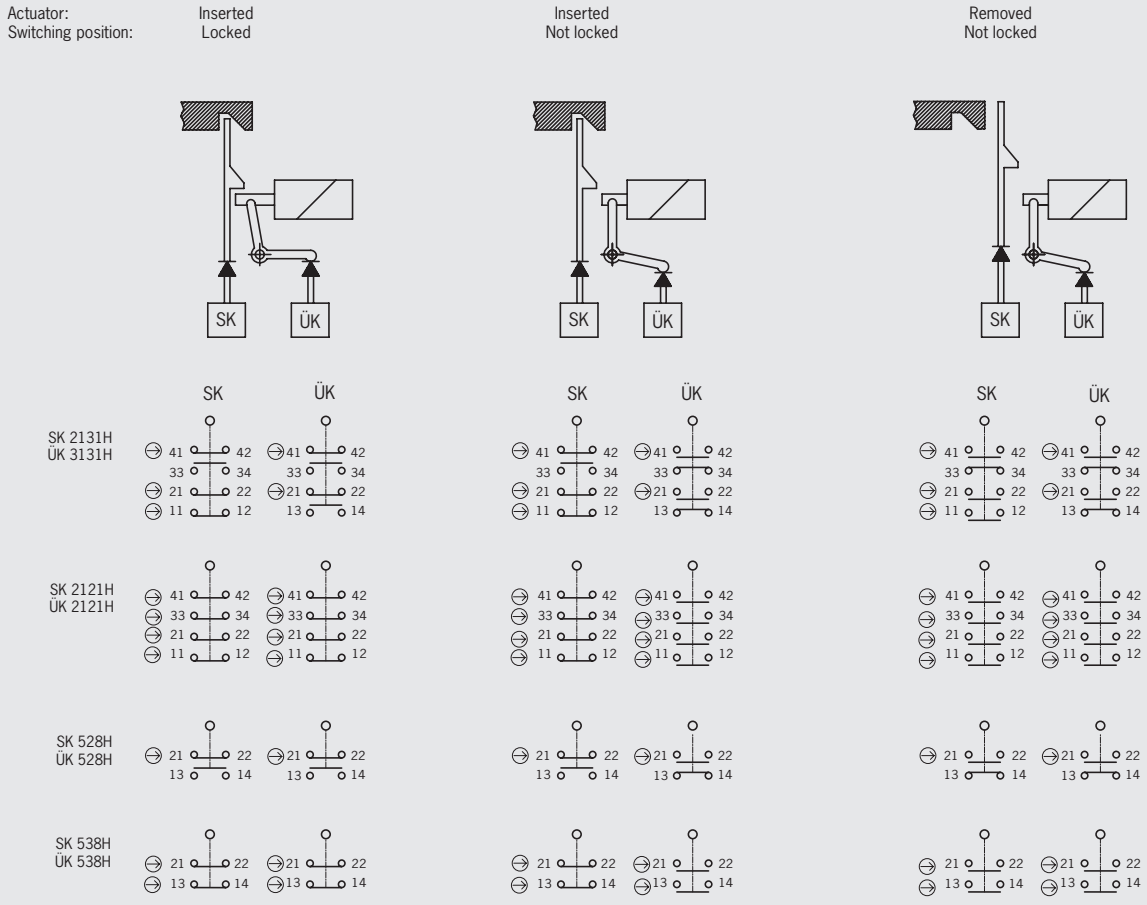
Connection, plug connector MR10 			
Parameter		**Value**	**Unit**
Connection		Plug connector	
Version		MR10 (9-pin + PE)	
Degree of protection according to IEC 60529		IP 65 [1]	
Rated insulation voltage U_i		250	V AC/DC
Conventional thermal current I_{th}		4	A
Short circuit protection acc. to IEC 60269-1 (control circuit fuse)		4	A gG
Utilization category according to IEC 60947-5-1	AC-15	I_e 4 A U_e 230 V	
	DC-13	I_e 4 A U_e 24 V	

1) Screwed tight with the related plug connector (see page 120, 121 and 123)

Connection, plug connector MR12		12-pol	
Parameter		**Value**	**Unit**
Connection		Plug connector	
Version		MR12 (11-pin + PE)	
Degree of protection according to IEC 60529		IP 65 [1]	
Rated insulation voltage U_i		230	V AC/DC
Conventional thermal current I_{th}		4	A
Short circuit protection acc. to IEC 60269-1 (control circuit fuse)		4	A gG
Utilization category according to IEC 60947-5-1	AC-15	I_e 4 A U_e 60 V	
	DC-13	I_e 4 A U_e 24 V	

1) Screwed tight with the related plug connector (see page 123)

Switching functions TZ



Safety switch NX

The technical data on switches and switching elements apply to all connections. Further technical data are given for the connection selected.

Reliability values acc. to EN ISO 13849-1

Parameter	Value	Unit
B_{10d}	4.5 x 10^6 operating cycles	

Switch

Parameter	Value		Unit
Housing material	Die-cast alloy, cathodically dipped		
Mechanical life	2 x 10^6 operating cycles		
Ambient temperature	- 20 ... + 80		°C
Weight	Approx. 0.4		kg
Approach speed, max.	20		m/min
Actuating force	40		N
Extraction force	50		N
Retention force	10		N
Insertion depth	Standard actuator	Overtravel actuator	
Required insertion depth $s_{min.}$	32	32	mm
Maximum insertion depth $s_{max.}$	33	40	mm
Actuator travel (in the locked state)	6	13	mm

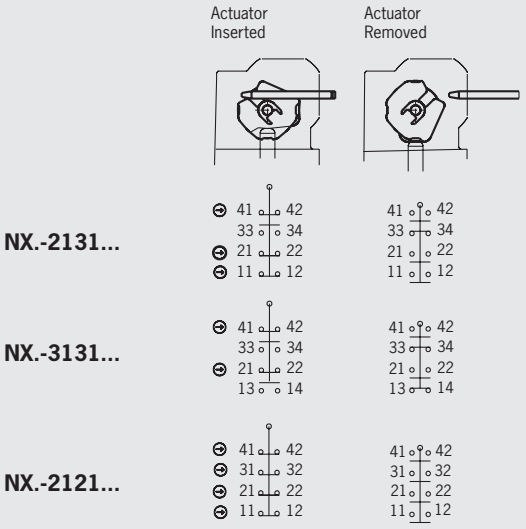
Switching element

Parameter	Value			Unit
Switching principle	Slow-action switching contact			
Switching element with 4 switching contacts	**2121** 4 NC ⊖	**2131** 3 NC ⊖ + 1 NO	**3131** 2 NC ⊖ + 2 NO	
Min. switching current at 24 V DC	1			mA
Switching voltage, min., at 10 mA	12			V
Contact material	Silver alloy, gold flashed			

Connection, cable entry M20 x 1.5

Parameter		Value	Unit
Connection		Screw terminal	
Version		M20 x 1.5	
Conductor cross-section		0.34 ... 1.5	mm^2
Degree of protection according to IEC 60529		IP 67	
Rated insulation voltage U_i		250	V AC/DC
Rated impulse withstand voltage U_{imp}		2.5	kV
Conventional thermal current I_{th}		4	A
Short circuit protection acc. to IEC 60269-1 (control circuit fuse)		4	A gG
Utilization category according to IEC 60947-5-1	AC-15	I_e 4 A U_e 230 V	
	DC-13	I_e 4 A U_e 24 V	

Switching functions NX



Safety switch TX... with guard locking and guard lock monitoring

The technical data on switches, switching elements and guard locking apply to all connections. Further technical data are given for the connection selected.

Reliability values acc. to EN ISO 13849-1

Parameter	Value	Unit
B_{10d}	6 x 10^6 operating cycles	

Switch

Parameter	Value		Unit
Housing material	Die-cast alloy, cathodically dipped		
Mechanical life	> 1 x 10^6 operating cycles		
Ambient temperature	- 20 ... + 80		°C
Weight	Approx. 0.8		kg
Approach speed, max.	20		m/min
Actuating force	35		N
Extraction force	35		N
Retention force	20		N
Locking force, max.	1700		N
Locking force F_{Zh} in acc. with GS-ET-19	1300		N
Insertion depth	Standard actuator	Overtravel actuator	
Required insertion depth $s_{min.}$	32	32	mm
Maximum insertion depth $s_{max.}$	33	40	mm
Actuator travel (in the locked state)	6	13	mm

Switching element

Parameter	Value			Unit
Switching principle	Slow-action switching contact			
Switching element with 4 switching contacts	**ETX B** 2 NC ⊖ + 1 NO + 1 NC	**ETX C** 2 NC ⊖ + 1 NO + 1 NO	**ETX D** 2 NC ⊖ + 2 NC ⊖	
Min. switching current at 24 V DC	1			mA
Switching voltage, min., at 10 mA	12			V
Contact material	Silver alloy, gold flashed			

Guard locking

Parameter	Value			Unit
Solenoid operating voltage	AC/DC 24 V +10/-15%	AC 110 V +10/-15% [1]	AC 230 V +10/-15% [1]	
Connection	Reverse polarity protected, integrated bridge rectifier			
Duty cycle	100			%
Power consumption	10			W

Connection, cable entry M20 x 1.5

Parameter		Value	Unit
Connection		Screw terminal	
Version		M20 x 1.5	
Conductor cross-section		0.34 ... 1.5	mm^2
Degree of protection according to IEC 60529		IP 67	
Rated insulation voltage U_i		250	V AC/DC
Rated impulse withstand voltage U_{imp}		2.5	kV
Conventional thermal current I_{th}		4	A
Short circuit protection acc. to IEC 60269-1 (control circuit fuse)		4	A gG
Utilization category according to IEC 60947-5-1	AC-15	I_e 4 A U_e 230 V	
	DC-13	I_e 4 A U_e 24 V	

Connection, cable entry NPT ½"			
Parameter		**Value**	**Unit**
Connection		Screw terminal	
Version		NPT ½"	
Conductor cross-section, max.		0.34 ... 1.5 mm²	
Degree of protection according to IEC 60529		IP 67	
Rated insulation voltage U_i		250	V AC/DC
Rated impulse withstand voltage U_{imp}		2.5	kV
Conventional thermal current I_{th}		4	A
Short circuit protection acc. to IEC 60269-1 (control circuit fuse)		4	A gG
Utilization category according to IEC 60947-5-1	AC-15	I_e 4 A U_e 230 V	
	DC-13	I_e 4 A U_e 24 V	

Connection, plug connector SVM 5 (M12)			
Parameter		**Value**	**Unit**
Connection		Plug connector	
Version		M12 (4-pin + PE), male socket adjustable (max. 270o) for elbow connector	
Degree of protection according to IEC 60529		IP 67 [1]	
Rated insulation voltage U_i		30	V AC/DC
Conventional thermal current I_{th}		4	A
Short circuit protection acc. to IEC 60269-1 (control circuit fuse)		4	A gG
Utilization category according to IEC 60947-5-1	AC-15	I_e 4 A U_e 30 V	
	DC-13	I_e 4 A U_e 24 V	

1) Screwed tight with the related plug connector

Connection, plug connector BH10			
Parameter		**Value**	**Unit**
Connection		Plug connector	
Version		BH10 (9-pin + PE)	
Degree of protection according to IEC 60529		IP 65 [1]	
Rated insulation voltage U_i		50	V AC/DC
Rated impulse withstand voltage U_{imp}		2.5	kV
Conventional thermal current I_{th}		4	A
Short circuit protection acc. to IEC 60269-1 (control circuit fuse)		4	A gG
Utilization category according to IEC 60947-5-1	AC-15	I_e 4 A U_e 24 V	
	DC-13	I_e 4 A U_e 24 V	

1) Screwed tight with the related plug connector

Connection, plug connector BH12			
Parameter		**Value**	**Unit**
Connection		Plug connector	
Version		BH12 (11-pin + PE)	
Degree of protection according to IEC 60529		IP 65 [1]	
Rated insulation voltage U_i		50	V AC/DC
Rated impulse withstand voltage U_{imp}		2.5	kV
Conventional thermal current I_{th}		4	A
Short circuit protection acc. to IEC 60269-1 (control circuit fuse)		4	A gG
Utilization category according to IEC 60947-5-1	AC-15	I_e 4 A U_e 24 V	
	DC-13	I_e 4 A U_e 24 V	

1) Screwed tight with the related plug connector

Connection, plug connector SR11			
Parameter		**Value**	**Unit**
Connection		Plug connector	
Version		SR11 (11-pin + PE)	
Degree of protection according to IEC 60529		IP 65 [1]	
Rated insulation voltage U_i		50	V AC/DC
Rated impulse withstand voltage U_{imp}		1.5	kV
Conventional thermal current I_{th}		4	A
Short circuit protection acc. to IEC 60269-1 (control circuit fuse)		4	A gG
Utilization category according to IEC 60947-5-1	AC-15	I_e 4 A U_e 50 V	
	DC-13	I_e 4 A U_e 24 V	

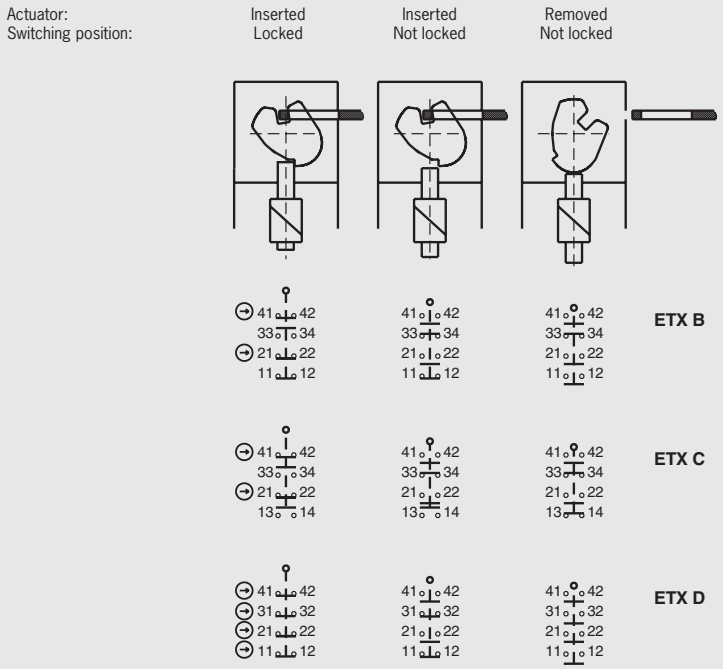
1) Screwed tight with the related plug connector (see page 120 and 123)

Connection, plug connector RC18

Parameter		Value	Unit
Connection		Plug connector	
Version		RC18 (18-pin + PE)	
Degree of protection according to IEC 60529		IP 65 [1]	
Rated insulation voltage U_i		50	V AC/DC
Rated impulse withstand voltage U_{imp}		2.5	kV
Conventional thermal current I_{th}		4	A
Short circuit protection acc. to IEC 60269-1 (control circuit fuse)		4	A gG
Utilization category according to IEC 60947-5-1	AC-15	I_e 4 A U_e 24 V	
	DC-13	I_e 4 A U_e 24 V	

1) Screwed tight with the related plug connector (see page 121)

Switching functions TX



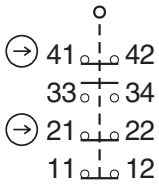
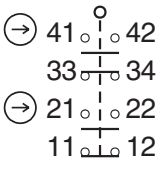
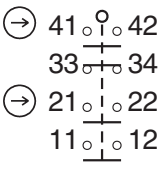
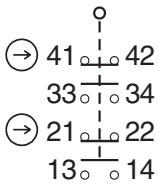
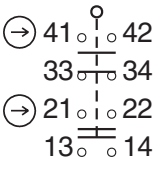
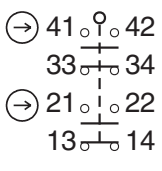
Switching characteristics safety switch TX3... (mechanical guard locking)

The application of a voltage U_B/ U_S when the actuator is not inserted does not produce **any** change in the state of the switching element.

Solenoid operating voltage U_B
On versions TX...110 and TX...230 release is performed using the voltage U_B.
A control voltage U_S is not necessary.

Control voltage U_S
On the version TX...24 an additional control voltage U_S is only required if U_B cannot supply the required current of 2 A for T_{IMP} = 250 ms when the solenoid is switched on.
Otherwise, the connection terminals U_S and U_B must be bridged on the version TX...24.

Safety switch TX3... with door monitoring contact (mechanical guard locking)

			Actuator inserted		Actuator removed
			Locked	Not locked	
Switching element	ETX B				
	ETX C				
Switch design	TX3...24	Control voltage U_S	0 V	24 V	24 V or 0 V
		Operating voltage U_B	0 V	24 V	24 V or 0 V
	TX3...110 / TX3...230	Control voltage U_S	Not connected		
		Operating voltage U_B	0 V	110 V or 230 V	110 V, 230 V or 0 V

Safety switch SGA

The technical data on switches and switching elements apply to all connections. Further technical data are given for the connection selected.

Reliability values acc. to EN ISO 13849-1

Parameter	Value	Unit
B_{10d}	3 x 10^6 operating cycles	

Switch

Parameter	Value	Unit
Housing material	Anodized die-cast	
Mechanical life	2 x 10^6 operating cycles	
Ambient temperature	- 20 ... + 80	°C
Weight	Approx. 0.275	kg
Approach speed, max.	20	m/min
Actuating force	25	N
Extraction force	25	N
Retention force	10	N
Insertion depth (minimum required travel + permissible overtravel)	Actuator *S* standard	
Approach direction side (h)	24.5 + 5	mm
Approach direction from top (v)	24.5 + 5	mm

Switching element

Parameter	Value		Unit
Switching principle	Slow-action switching contact		
Switching element with 4 switching contacts	**2121** 4 NC ⊖	**2131** 3 NC ⊖ + 1 NO	
Min. switching current at 24 V DC	1		mA
Switching voltage, min., at 10 mA	12		V
Contact material	Silver alloy, gold flashed		

Connection, cable entry M20 x 1.5

Parameter		Value	Unit
Connection		Screw terminal	
Version		M20 x 1.5	
Conductor cross-section		0.34 ... 1.5	mm^2
Degree of protection according to IEC 60529		IP 67	
Rated insulation voltage U_i		250	V AC/DC
Rated impulse withstand voltage U_{imp}		2.5	kV
Conventional thermal current I_{th}		4	A
Short circuit protection acc. to IEC 60269-1 (control circuit fuse)		4	A gG
Utilization category according to IEC 60947-5-1	AC-15	I_e 4 A U_e 230 V	
	DC-13	I_e 4 A U_e 24 V	

Connection, plug connector SR11		12-pol	
Parameter		**Value**	**Unit**
Connection		Plug connector	
Version		SR11 (11-pin + PE)	
Degree of protection according to IEC 60529		IP 65 [1)]	
Rated insulation voltage U_i		50	V AC/DC
Rated impulse withstand voltage U_{imp}		1.5	kV
Conventional thermal current I_{th}		4	A
Short circuit protection acc. to IEC 60269-1 (control circuit fuse)		4	A gG
Utilization category according to IEC 60947-5-1	AC-15	I_e 4 A U_e 50 V	
	DC-13	I_e 4 A U_e 24 V	

1) Screwed tight with the related plug connector (see page 120)

Connection, plug connector RC18		18-pol	
Parameter		**Value**	**Unit**
Connection		Plug connector	
Version		RC18 (18-pin + PE)	
Degree of protection according to IEC 60529		IP 65 [1)]	
Rated insulation voltage U_i		50	V AC/DC
Rated impulse withstand voltage U_{imp}		2.5	kV
Conventional thermal current I_{th}		4	A
Short circuit protection acc. to IEC 60269-1 (control circuit fuse)		4	A gG
Utilization category according to IEC 60947-5-1	AC-15	I_e 4 A U_e 24 V	
	DC-13	I_e 4 A U_e 24 V	

1) Screwed tight with the related plug connector (see page 121)

Safety switch STA... with guard locking and guard lock monitoring

The technical data on switches, switching elements and guard locking apply to all connections. Further technical data are given for the connection selected.

Reliability values acc. to EN ISO 13849-1

Parameter	Value	Unit
B_{10d}	1.2×10^7 operating cycles	

Switch

Parameter	Value		Unit
Housing material	Anodized die-cast		
Mechanical life	1×10^6 operating cycles		
Ambient temperature	- 20 ... + 80		°C
Weight	Approx. 0.6		kg
Approach speed, max.	20		m/min
Actuating force	35		N
Extraction force (no locked)	30		N
Retention force	20		N
Locking force, max.	Approach direction		N
	From top (v)	Side (h)	
	3000	3000	
Locking force F_{Zh} in acc. with GS-ET-19	Approach direction		N
	From top (v)	Side (h)	
	2300	2300	
Insertion depth (minimum required travel + permissible overtravel)	Actuator *S* standard	Actuator L for insertion funnel	
Approach direction side (h)	24.5 + 5	28.5 + 5	mm
Approach direction from top (v)	24.5 + 5	28.5 + 5	mm

Switching element

Parameter	Value				Unit
Switching principle	Slow-action switching contact				
Switching element with 4 switching contacts	**2131** 2 NC ⊖ + 1 NO + 1 NC	**4121** 2 NC ⊖ + 1 NC + 1 NO	**4131** 2 NC ⊖ + 2 NO	**4141** 2 NC ⊖ + 2 NC ⊖	
Min. switching current at 24 V DC	1				mA
Switching voltage, min., at 10 mA	12				V
Contact material	Silver alloy, gold flashed				

Guard locking

Parameter	Value	Unit
Solenoid operating voltage	AC/DC 24 V +10/-15%	
Connection	Reverse polarity protected, integrated bridge rectifier	
Duty cycle	100	%
Power consumption	8	W

Connection, cable entry M20 x 1.5

Parameter		Value	Unit
Connection		Screw terminal	
Version		M20 x 1.5	
Conductor cross-section		0.34 ... 1.5	mm^2
Degree of protection according to IEC 60529		IP 67	
Rated insulation voltage U_i		250	V AC/DC
Rated impulse withstand voltage U_{imp}		2.5	kV
Conventional thermal current I_{th}		4	A
Short circuit protection acc. to IEC 60269-1 (control circuit fuse)		4	A gG
Utilization category according to IEC 60947-5-1	AC-15	I_e 4 A U_e 230 V	
	DC-13	I_e 4 A U_e 24 V	

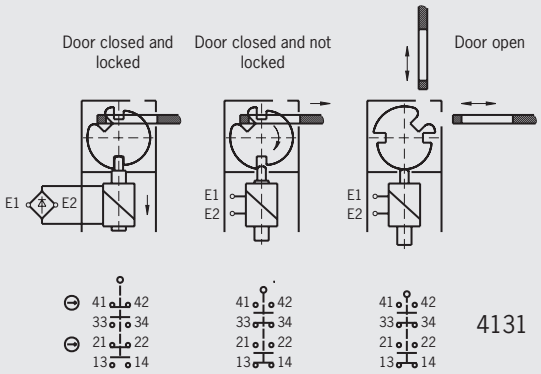
Connection, plug connector SR11		12-pol	
Parameter		**Value**	**Unit**
Connection		Plug connector	
Version		SR11 (11-pin + PE)	
Degree of protection according to IEC 60529		IP 65 [1]	
Rated insulation voltage U_i		50	V AC/DC
Rated impulse withstand voltage U_{imp}		1.5	kV
Conventional thermal current I_{th}		4	A
Short circuit protection acc. to IEC 60269-1 (control circuit fuse)		4	A gG
Utilization category according to IEC 60947-5-1	AC-15	I_e 4 A U_e 50 V	
	DC-13	I_e 4 A U_e 24 V	

1) Screwed tight with the related plug connector (see page 120)

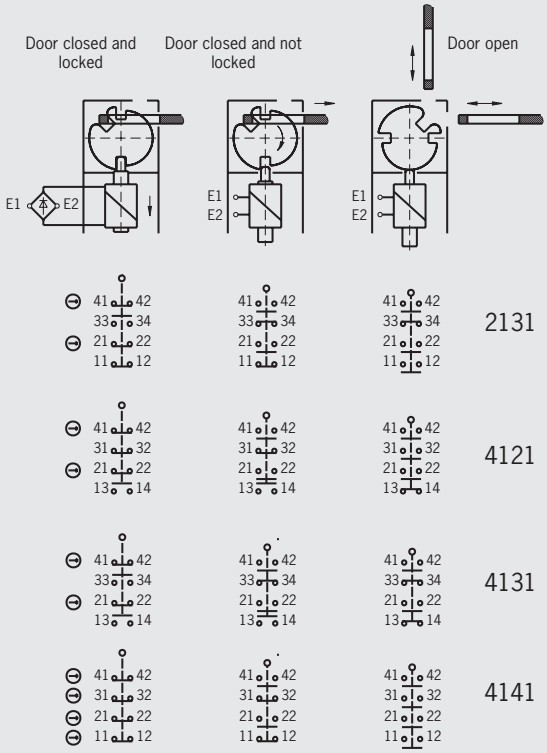
Connection, plug connector RC18		18-pol	
Parameter		**Value**	**Unit**
Connection		Plug connector	
Version		RC18 (18-pin + PE)	
Degree of protection according to IEC 60529		IP 65 [1]	
Rated insulation voltage U_i		110	V AC/DC
Rated impulse withstand voltage U_{imp}		2.5	kV
Conventional thermal current I_{th}		4	A
Short circuit protection acc. to IEC 60269-1 (control circuit fuse)		4	A gG
Utilization category according to IEC 60947-5-1	AC-15	I_e 4 A U_e 110 V	
	DC-13	I_e 4 A U_e 24 V	

1) Screwed tight with the related plug connector (see page 121)

Switching functions STA1/STA2 without door monitoring contact



Switching functions STA3/STA4 with door monitoring contact



Safety switch STA-TW with guard locking and guard lock monitoring

The technical data on switches, switching elements and guard locking apply to all connections. Further technical data are given for the connection selected.

Reliability values acc. to EN ISO 13849-1

Parameter	Value	Unit
B_{10d}	4.5 x 10^6 operating cycles	

Switch

Parameter		Value	Unit
Housing material	Housing	Anodized die-cast	
	Actuating heads	Die-cast aluminum	
	Cam in actuating head	Stainless steel	
Mechanical life		1 x 10^6 operating cycles	
Ambient temperature		- 20 ... + 55	°C
Weight		Approx. 0.62	kg
Approach speed, max.		20	m/min
Actuating force		35	N
Extraction force (no locked)		30	N
Retention force		20	N
Locking force, max.		Approach direction	N
		From top (v): 2500 / Side (h): 2500	
Locking force F_{Zh} in acc. with GS-ET-19		Approach direction	N
		From top (v): 2000 / Side (h): 2000	
Insertion depth (minimum required travel + permissible overtravel)		Actuator *S* standard	
Approach direction side (h)		24.5 + 5	mm
Approach direction from top (v)		24.5 + 5	mm

Switching element

Parameter	Value	Unit
Switching principle	Slow-action switching contact	
Switching element with 4 switching contacts	**2131**: 2 NC ⊖ + 1 NO + 1 NC / **4121**: 2 NC ⊖ + 1 NC + 1 NO	
Min. switching current at 24 V DC	1	mA
Switching voltage, min., at 10 mA	12	V
Contact material	Silver alloy, gold flashed	

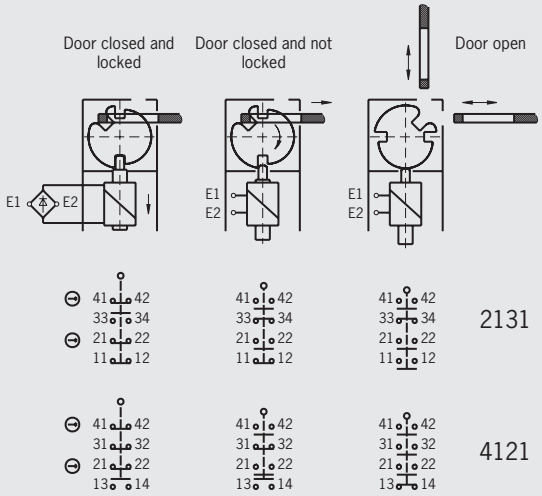
Guard locking

Parameter	Value	Unit
Solenoid operating voltage	AC/DC 24 V +10/-15%	
Connection	Reverse polarity protected, integrated bridge rectifier	
Duty cycle	100	%
Power consumption	8	W

Connection, cable entry M20 x 1.5

Parameter		Value	Unit
Connection		Screw terminal	
Version		M20 x 1.5	
Conductor cross-section		0.34 ... 1.5	mm^2
Degree of protection according to IEC 60529		IP 67	
Rated insulation voltage U_i		250	V AC/DC
Rated impulse withstand voltage U_{imp}		2.5	kV
Conventional thermal current I_{th}		4	A
Short circuit protection acc. to IEC 60269-1 (control circuit fuse)		4	A gG
Utilization category according to IEC 60947-5-1	AC-15	I_e 4 A U_e 230 V	
	DC-13	I_e 4 A U_e 24 V	

Switching functions STA-TW



Safety hinge ESH

The technical data on switches and switching elements apply to all connections. Further technical data are given for the connection selected.

Reliability values acc. to EN ISO 13849-1

Parameter	Value	Unit
B_{10d}	2 x 10^6 operating cycles	

Switch

Parameter	Value	Unit
Housing material	Die-cast zinc	
Ambient temperature	- 25 ... + 70	°C
Weight	Approx. 0.77	kg
Pivoting angle	- 10 ... 180	°
Max. load as per mechanical life test acc. to EN 1935	Grade 12 (100 kg door weight)	m/min

Switching element

Parameter	Value		Unit
Switching principle	Slow-action switching contact		
Switching element with 2 switching contacts	**20** 2 NC ⊖	**11** 1 NC ⊖ + 1 NO	
Mechanical life	1 x 10^6 operating cycles		
Operating point	4° from fixing point		
Positively driven	Approx. 10° from fixing point		
Actuation frequency	max. 1200/h		
Degree of contamination (external, according to EN 60947)	3 (industrial)		
Min. switching current at 24 V DC	1		mA
Rated impulse withstand voltage U_{imp}	2.5		kV
Contact material	Silver alloy		

Connection, plug connector SVM 5 (M12)

Parameter		Value	Unit
Connection		Plug connector	
Version		M12 (4-pin + PE)	
Degree of protection according to IEC 60529		IP 67 [1)]	
Rated insulation voltage U_i		60	V AC/DC
Conventional thermal current I_{th}		3	A
Short circuit protection acc. to IEC 60269-1 (control circuit fuse)		2	A gG
Utilization category according to IEC 60947-5-1	AC-15	I_e 1.5 A U_e 30 V	
	DC-13	I_e 2 A U_e 24 V	

1) Screwed tight with the related plug connector

Accessories for safety switches

Solenoid plug

Parameter	Value	Unit
Housing material	Plastic	
Number of pins	3 (2 + PE)	
Nominal voltage max.	240	V AC/DC
Degree of protection according to IEC 60529 (inserted)	IP 65	
Connection	Pillar terminals and tab terminals	

SS4

Parameter	Value	Unit
Housing material	Brass matt chromium plated	
Number of pins	4 (3 + PE)	
Cable diameter	6 - 8	mm
Nominal voltage max.	250	V AC/DC
Degree of protection according to IEC 60529 (inserted)	IP 67	
Connection	Soldered connections	

SR6

Parameter	Value	Unit
Housing material	Plastic	
Number of pins	7 (6 + PE)	
Cable diameter	7 - 9	mm
Nominal voltage max.	250	V AC/DC
Degree of protection according to IEC 60529 (inserted)	IP 65	
Connection	Crimp contacts 0.5 to 1.5 mm^2	

SR11

Parameter	Value	Unit
Housing material	Plastic	
Number of pins	12 (11 + PE)	
Cable diameter	8 - 10	mm
Nominal voltage max.	50	V AC/DC
Degree of protection according to IEC 60529 (inserted)	IP 65	
Connection	Crimp contacts 0.5 to 1.5 mm^2	

RC12

Parameter	Value	Unit
Housing material	Metal	
Number of pins	12	
Cable diameter	10.5	mm
Nominal voltage max.	150	V AC/DC
Degree of protection according to IEC 60529 (inserted)	IP 67	
Connection	12 crimp contacts 0.75 to 1.0 mm^2	

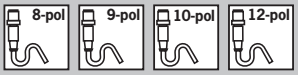
RC18

Parameter	Value	Unit
Housing material	Metal	
Number of pins	19 (18 + PE)	
Cable diameter	10 - 14	mm
Nominal voltage max.	32	V AC/DC
Degree of protection according to IEC 60529 (inserted)	IP 65	
Connection	19 crimp contacts 0.75 to 1.0 mm^2	

RC18..C1825

Parameter	Value	Unit
Housing material	Metal	
Number of pins	19 (18 + PE)	
Cable diameter	10 - 14	mm
Nominal voltage max.	32	V AC/DC
Degree of protection according to IEC 60529 (inserted)	IP 65	
Connection	16 crimp contacts 0.38 to 0.5 mm^2 3 crimp contacts 0.75 to 1.0 mm^2	

M12 with cable (SGLF, SWLF)		
Parameter	**Value**	**Unit**
Housing material	Metal / plastic	
Number of pins	5	
Nominal voltage max.	30	V AC/DC
Degree of protection according to IEC 60529 (inserted)	IP 68	
Connection	5 open cable ends	

M8/MR9/MR10/MR12 with cable		
Parameter	**Value**	**Unit**
Housing material	PVC/PUR	
Number of pins	8 / 9 / 10 / 12	
Nominal voltage max.	300	V AC/DC
Degree of protection according to IEC 60529 (inserted)	IP 67	
Connection	Plug connector / flying leads	

Safety precautions

Safety switches perform a personal protection function. Incorrect installation or tampering can lead to severe injuries to personnel.
Prior to installation, use and maintenance, it is imperative that you read the operating instructions. Also take into account the following points:

- Safety switches must **not** be bypassed (bridging of contacts), turned away, removed or otherwise rendered ineffective.
- The switching operation on safety switches with separate actuator must only be triggered by actuators specifically provided for this purpose which are permanently connected to the safety guard.
- Mounting and electrical connection must be performed only by authorized personnel.
- Safety switches and actuators must not be used as an end stop.
- Switching elements are not allowed to be replaced on safety switches.
- Series NZ.VZ.VS and TZ safety switches with locking solenoids are not allowed to be used in potentially explosive atmospheres.
- If damaged or worn, safety switches must be replaced as a unit.

Notes on installation

Safety switches with safety function

- To obtain the direct opening travel, the trip dog setting distance shown in the dimension drawing must be observed (see technical data, travel diagrams). Actuating elements, e. g. cam approach guides, must be positively mounted according to EN 1088, i.e. riveted, welded or secured in some other way against becoming loose.
- Safety switches must not be used as an end stop. It must be ensured that the safety switch does not move after adjustment.
- It must be possible to replace safety switches without the need for re-adjustment.

Safety switches with separate actuator

- The safety switch and actuator must be installed properly. The actuator must be positively mounted, e. g. by using safety screws (are included with the actuator) or by welding, riveting, or pinning.
- Safety switches must not be used as an end stop. Safety switches must be mounted such that they can be replaced.
- A hazard analysis must be prepared as per the Machinery Directive. The hazardous point must be classified with the aid of type C standards or EN 954-1 or its successor. Safety switches must be chosen to match this classification and the information given in DIN EN 1088.

Overview of the most important standards on machinery safety

Type A standards		
(EN 292-1) withdrawn	ISO 12100-1	Safety of machinery. Basic concepts, general principles for design. Part 1: Basic terminology, methodology
(EN 292-2) withdrawn	ISO 12100-2	Safety of machinery - Basic concepts, general principles for design - Part 2: Technical principles
EN 1050	ISO/DIS 14121	Safety of machinery. Principles for risk assessment

Type B standards		
EN 294		Safety of machinery. Safety distances to prevent danger zones being reached by the upper limbs
EN 418		Safety of machinery. Emergency stop equipment, functional aspects. Principles for design
EN 547-1		Safety of machinery. Human body measurements. Part 1: Principles for determining the dimensions required for openings for whole body access into machinery
EN 574		Safety of machinery. Two-hand control circuits. Functional aspects. Principles for design
EN 811		Safety of machinery. Safety distances to prevent danger zones being reached by the lower limbs
EN 953		Safety of machinery. Guards. General requirements for the design and construction of fixed and movable guards
EN 954-1	ISO 13849-1	Safety of machinery. Safety related parts of control systems. Part 1: General principles for design
EN 954-2	ISO 13849-2	Safety of machinery. Safety related parts of control systems. Part 2: Validation
EN 954-100		Sicherheit von Maschinen – Sicherheitsbezogene Teile von Steuerungen – Leitfaden für Benutzung und Anwendung der EN 954-1 (Safety of machinery. Safety related parts of control systems. Guidelines on the use and application of EN 954-1)
EN 999		Safety of machinery. The positioning of protective equipment in respect of approach speeds of parts of the human body
EN 1037		Safety of machinery. Prevention of unexpected start-up
EN 1088		Safety of machinery. Interlocking devices associated with guards. Principles for design and selection.
EN 60204-1	IEC 60204-1	Safety of machinery. Electrical equipment of machines. Part 1: General requirements
EN 60204-11	IEC 60204-11	Safety of machinery. Electrical equipment of machines. Part 11: Requirements for HV equipment for voltages above 1000 V a.c. or 1500 V d.c. and not exceeding 36 kV
EN 60204-31	IEC 60204-31	Safety of machinery. Electrical equipment of machines. Part 31: Particular safety and EMC requirements for sewing machines, units and systems
EN 60204-32	IEC 60204-32	Safety of machinery. Electrical equipment of machines. Part 32: Requirements for hoisting machines
EN 62061	IEC 62061	Safety of machinery. Functional safety of safety-related electrical, electronic and programmable electronic control systems
EN 61496-1	IEC 61496-1	Safety of machinery. Electro-sensitive protective equipment. Part 1: General requirements and tests
EN 61496-3	IEC 61496-3	Safety of machinery. Electro-sensitive protective equipment. Part 3: Particular requirements for active opto-electronic protective devices responsive to diffuse reflection (AOPDDR)
EN 61508	IEC 61508	Functional safety of electrical/electronic/programmable electronic safety-related systems.

Type C standards		
EN 201		Rubber and plastics machines. Injection moulding machines. Safety requirements
EN 415-1		Safety of packaging machines. Part 1: Terminology and classification of packaging machines and associated equipment
EN 415-2		Safety of packaging machines. Part 2: Pre-formed rigid container packaging machines
EN 415-3		Safety of packaging machines. Part 3: Form, fill and seal machines
EN 415-4		Safety of packaging machines. Part 4: Palletizers and depalletizers
EN 422		Rubber and plastics. Machines. Safety. Blow moulding machines intended for the production of hollow articles. Requirements for the design and construction
EN 692		Mechanical presses. Safety
EN 693		Machine tools. Safety. Hydraulic presses
EN 775	ISO 10218	Industrial robots. Recommendations for safety
EN 931		Footwear manufacturing machines. Lasting machines. Safety requirements

EN 848-1		Safety of woodworking machines. One side moulding machines with rotating tool. Part 1: Single spindle vertical moulding machines
EN 848-2		Safety of woodworking machines. One side moulding machines with rotating tool. Part 2: Single spindle handfed/integrated fed routing machines
EN 848-3		Safety of woodworking machines. One side moulding machines with rotating tool. Part 3: Numerical control (NC) boring machines and routing machines
EN 972		Tannery machines. Reciprocating roller machines. Safety requirements
EN 1010		Safety of machinery. Safety requirements for the design and construction of printing and paper converting machines.
EN 1114-1		Rubber and plastics machines. Extruders and extrusion lines. Part 1: Safety requirements for extruders
EN 1114-2		Rubber and plastics machines. Extruders and extrusion lines. Part 2: Safety requirements for die face pelletizers
EN 1114-3		Rubber and plastics machines. Extruders and extrusion lines. Part 3: Safety requirements for haul-offs
EN 1218-1		Safety of woodworking machines. Tenoning machines. Part 1: Single end tenoning machines with sliding table
EN 1870-1		Safety of woodworking machines. Circular sawing machines. Part 1: Circular saw benches (with and without sliding table) and dimension saws
EN 1870-9		Safety of woodworking machines. Circular sawing machines. Part 9: Double blade circular sawing machines for cross-cutting with integrated feed and with manual loading and/or unloading
EN ISO 11111	ISO 11111	Textile machinery. Safety requirements
EN 12415		Safety of machine tools. Small numerically controlled turning machines and turning centres
EN 12417		Machine tools. Safety. Machining centres
EN 12478		Safety of machine tools. Large numerically controlled turning machines and turning centres
EN 12622		Safety of machine tools. Hydraulic press brakes

OSHA standards		
29 CFR 1910.147		The Control of Hazardous Energy
29 CFR 1910.211		Definitions
29 CFR 1910	Subpart O	Machinery and Machine Guarding
29 CFR 1910.212		General Requirements for all machines
29 CFR 1910.213		Woodworking machinery requirements
29 CFR 1910.215		Abrasive wheel machinery
29 CFR 1910.217		Mechanical power presses
29 CFR 1910.217	App A	Mandatory requirements for certification / validation of safety systems for presence sensing device initiation of mechanical power presses
29 CFR 1910.217	App B	Nonmandatory guidelines for certification / validation of safety systems for presence sensing device initiation of mechanical power presses
29 CFR 1910.217	App C	Mandatory requirements for OSHA recognition of thirdparty validation organizations for the PDSI standard
29 CFR 1910.219		Mechanical Power-transmission Apparatus
29 CFR 1910	Subpart P	Hand and Portable Power Tools and Other Hand-Held Equipment
29 CFR 1910.242		Hand and portable powered tools and equipment, general
29 CFR 1910.243		Guarding of portable powered tools
29 CFR 1910	Subpart S	Electrical
29 CFR 1910.303		General requirements
29 CFR 1910.304		Wiring design and protection
29 CFR 1910.305		Wiring methods, components, and equipment for general use
29 CFR 1926.300		General Requirements
29 CFR 1926.301		Hand Tools
29 CFR 1926.302		Power-operated Hand Tools
29 CFR 1926.303		Abrasive Wheels and Tools

29 CFR 1926.304	Woodworking Tools
29 CFR 1926.307	Mechanical Power –Transmission Apparatus
29 CFR 1926.555	Conveyors

ANSI Standards	
ANSI B5.37-1970	External Cylindrical Grinding Machines - Centerless
ANSI B5.42-198	External Cylindrical Grinding Machines – Universal
ANSI B5.52M-1980	Presses, General Purpose, Single Point Gap Type, Mechanical Power (Metric)
ANSI B7.1-2000	Safety Code for the Use, Care and Protection of Abrasive Wheels
ANSI B11.1-1988	Machine Tools – Mechanical Power Presses, Safety Requirement for Construction, Care, and Use
ANSI B11.3-1982	Power Press Brakes, Safety Requirements for the Construction, Care, and Use of
ANSI B11.4-1993	Shears - Safety Requirement for Construction, Care, and Use
ANSI B11.9-1975	Grinding Machines, Safety Requirements for the Construction, Care, and Use of
ANSI B11.12-1975	Roll-Forming and Roll-Bending Machines - Safety Requirement for Construction, Care, and Use
ANSI B11.19-1999	Performance Criteria for the Design, Construction, Care and Operation of Safeguarding when Referenced by the Other Machine Tool Safety Standards
ANSI B11.20	Manufacturing Systems/Cells
ANSI B11-TR3-2000	Risk Assessment and Risk Reduction - A Guide to Estimate, Evaluate and Reduce Risks Associated with Machine Tools
ANSI B15.1-53	Code for Mechanical Power Transmission Apparatus
ANSI B20.1-57	Safety Code for Conveyors, Cableways, and Related Equipment
ANSI B65.1-1995	Safety Standard – Printing Press Systems
ANSI O1.1-54	Safety Code for Woodworking Machinery

RIA, NFPA Standards	
NFPA 79 (2002)	Electrical Standard for Industrial Machinery
RIA 15.06-1999	Industrial Robots and Robot Systems - Safety Requirements

JIS standards in English	
JIS B 6014:1980	General code of safety for machine tools
JIS B 6507:1981	General code of safety for wood working machinery
JIS B 6607:1983	Safety standards for construction of band saw machines with feed carriages
JIS B 9650:1988	General design rules for safety and sanitation of food processing machinery
JIS B 9651:1988	Design rules for safety and sanitation of baking machinery
JIS B 9652:1988	Design rules for safety and sanitation of cake making machinery
JIS B 9653:1988	Design rules for safety and sanitation of meat processing machinery
JIS B 9654:1988	Design rules for safety and sanitation of marine product machinery

Glossary

Actuating force
Switches with safety function:
The actuating force is the minimum force required to perform a switching operation.
Switches with separate actuator:
The actuating force is the force required to insert the actuator in order to thus perform a switching operation.

Actuation (electrical / mechanical)
Transition of a moving contact from one switch position to another. This will result in a change to the switch state of an item of switchgear. A differentiation is made between electrical actuation (e.g. switching on – switching off) and mechanical actuation (e. g. closing – opening).

Actuator/actuating element
Switches with safety function:
Mechanical element on a safety position switch that triggers the switching operation. Actuators are available in different forms, for example as roller plungers, chisel plunger or roller arms.

Roller plunger Chisel plunger Roller arm

Switches with separate actuator:
On switches ▸*with separate actuator* the actuating element is separate from the ▸*safety switch*. The design of the actuators is matched (coded) to the safety switch so that ▸*tampering* using simple means (screwdriver, pieces of wire) is not possible.

Straight actuator Hinged actuator

Approach speed
Speed at which a position switch can be mechanically actuated. The permitted approach speed is dependent on the shape and material of the ▸*actuating element* and the approach angle. The higher the approach speed, the lower the approach angle that should be chosen.

Bolt
Bolts function as follows: the bolt tongue mechanically guides the ▸*actuator* when it is inserted in the actuating head of the ▸*safety switch*. The bolt mounted on the door frame comprises a protruding bolt tongue, the handle and the actuator, mounted offset somewhat to the rear. The switch holder with the safety switch is fitted to the frame. The bolt absorbs forces that act on the switch and the actuator and that could damage the switch and actuator.

Bolt for safety switch with guard locking

Category
The ▸*categories* according to EN ISO 13849-1 (B, 1, 2, 3 and 4) provide an assessment of the performance of safety-related parts of a control system on the occurrence of failures.

Closed-circuit current principle
On a ▸*safety guard* with ▸*guard locking* based on the closed-circuit current principle, the safety guard is locked by spring force until the guard locking solenoid is supplied with power. Unlocking is by solenoid force. The term ▸*mechanical guard locking* is also used.

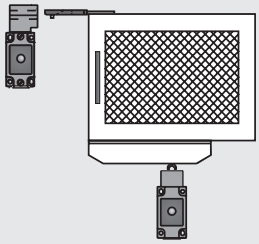
Cyclic mode
An ▸*operating mode* in which the working space on the machine is opened during every operating cycle and the operator therefore frequently needs to work in the ▸*danger area*.

Danger area
Any area in or around a machine in which a person is subject to a risk of injury or a health hazard.
The hazard can

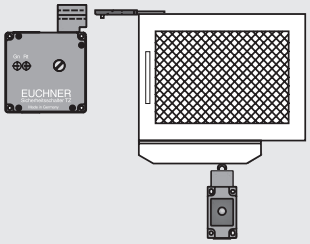
- Either be present continuously on the correct use of the machine (movement of hazardous moving parts, arcs during welding, etc.)
- Or can occur unexpectedly (unintentional, unexpected starting, etc.).

Degree of protection
The degree of protection is defined according to EN 60529-1 and is given as an IP. After the IP there are two digits; the first digit gives the degree of protection against the penetration of solid foreign bodies and the second digit gives the degree of protection against the penetration of liquids. For ▸*safety switches* the degree of protection IP 55 is to be provided as a matter of preference (BGI 575).

Diversity
Diversity is the use of two different concepts to provide a function. For instance, the use of a switch ▸*with safety function* and a switch ▸*with separate actuator* on a ▸*safety guard*. Here it is assumed that a single failure cannot affect two different concepts in the same way. Diversity also makes ▸*tampering* more difficult and the safety of ▸*redundant* systems is increased.



Movable safety guard without guard locking, diverse layout.



Movable safety guard with guard locking, diverse layout.

Electrical guard locking
Guard locking based ‣*open-circuit current principle*.

Emergency release
The emergency release is used to unlock ‣*guard locking* in an emergency. The guard locking can be unlocked without tools.

Safety switch with guard locking and emergency release

Emergency unlocking
The emergency unlocking is used to unlock ‣*guard locking* in an emergency. The guard locking can be unlocked without tools and from the access side. With the emergency unlocking, the switch engages in the unlocked position and can only be reset to its original position after an action similar to a repair.

Safety switch with guard locking and emergency unlocking

Automatic mode
The automatic mode is an ‣*operating mode* in which, unlike the ‣*manual mode* only system starting is triggered by human intervention. All other actions are performed automatically.

Enable path
An enable path is used to generate a safety-related output signal. Enable paths act to the exterior like NO contacts.

Enabling switch
If a ‣*safety guard* is open, movements are only to be possible if the controls are operated continuously. These are controls with automatic return to their original position. In general the term enabling switches is used here.

Enabling switch with +/– buttons

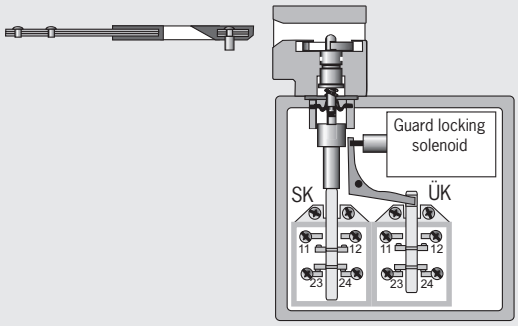
Escape release
The escape release must make it possible to unlock the safety guard from within the ‣*danger area* without the use of tools. The device must be manually operated and must positively act on the ‣*locking mechanism*. Actuation must result in permanent disabling of the ‣*guard locking*.

Extraction force
The extraction force is the required minimum force to achieve positively driven opening of all NC contacts.

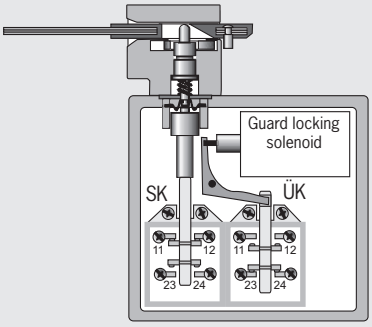
Guard locking
The guard locking retains a movable safety guard in the closed position until the machine can no longer pose any risk of injury. With the guard locking open, unintentional starting of the machine is prevented.

Guard lock monitoring
The guard lock monitoring monitors the position of the guard locking solenoids. This device is positively linked to the switching element ÜK via a locking arm. On intentional or unintentional unlocking of the guard locking solenoid, the positively driven contact in this switching element is actuated and therefore signals the position of the guard locking solenoid. The sectional drawings show the safety switch TZ in its three switch states:

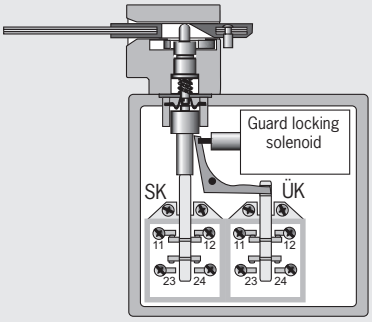
❶ Door open and not locked



❷ Door closed and not locked

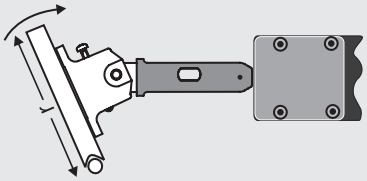


❸ Door closed and locked



Hazardous states
Potentially hazardous conditions are states that could result in injury. ▸*Safety switches* prevent, on the correct use of the ▸*safety guard* this hazard (cf. ▸*safe state*).

Hinged actuator
The hinged actuator is, unlike the straight actuator, spring mounted and as a result the actuator can be inserted in the actuator head without problems even with small door radii. With larger radii, a straight actuator can be used.



Hinged actuator

Interlocking, interlocking device
According to EN 1088 an interlock device is a mechanical, electrical or other device with the purpose of preventing operation of the machine under certain conditions (usually as long as a ▸*movable safety guard* is not closed).

Locking force
The locking force is the force that ▸*guard locking* can withstand on switches ▸*with separate actuator*.
The locking force in accordance with GS-ET 19 includes an additional safety coefficient (S = 1.3) which is prescribed by the employers' liability insurance association in its test principles.
The locking force F_{Zh} in accordance with GS-ET 19 is calculated as follows:

$$F_{Zh} = \frac{\text{Locking force max.}}{\text{Safety coefficient}}$$

Manual mode
Manual mode is an ▸*operating mode* in which the machine movements are not performed automatically, but using individual commands from the user.

Mechanical guard locking
Guard locking based ▸*closed-circuit current principle*.

Mechanical release
On the failure of ▸*guard locking* the locking can be released from the access side using a mechanical release. Unlocking is performed using a tool or a key. The mechanical release should be protected against misuse (seal, lacquer).

Safety switch with mechanical release

Mounting safety switches and actuators
Safety switches must be mounted such that they are adequately secured against changes to their position. Easy bypassing of the safety switch must be prevented.

Movable safety guard
A movable *safety guard* is the part of the machine that is used as a barrier to protect against hazards. Movable safety guards form a physical barrier to the *danger area*. They can be, e. g. safety doors, covers, fences, housings, etc.

Open-circuit current principle
On a *safety guard* with *guard locking* based on the open-circuit current principle, the safety guard is locked until the power supply to the guard locking solenoid is interrupted. Unlocking is by spring force. The term *electrical guard locking* is also used.

Operating modes
Every machine can have one or more operating modes that are defined by the type of machine and their application. If the selection of an operating mode can cause a hazardous situation, the selection of this operating mode must beprevented by suitable means (e.g. key-operated switch, access code). The selection of an operating mode on its own is not allowed to trigger machine operation. A separate action on the part of the operator must be required to start the operation of the machine. A means of indication of the selected operating mode is to be provided (e.g. the position of an operating mode selector switch, an indicator, a screen indication, etc.). Technical protective measures must remain effective for all operating modes. If it is necessary to disable technical protective measures (e. g. for setting up or maintenance work), a device for operating mode selection is to be provided that can be secured in the required operating mode (e.g. locked with a key) so that automatic operation can be prevented. In addition, one or more of the following devices should be provided:

- Movement enable using an enabling switch. The machine only runs as long as the enabling switch is operated.
- A portable control unit with a device for shutting down in an emergency or an enabling device. If a portable control unit is used, it must only be possible to trigger a movement from this point
- Movement speed or movement energy restriction
- Movement area restriction

PDF
The abbreviation PDF can have several meanings in safety engineering:
1 **P**robability of **D**angerous **F**ailure
According to EN 61508, PDF is the probability of failure of a component and is used to determine the Safety Integrity Level (*SIL*) for the overall machine.
2 **P**roximity **D**evices with defined behaviour under **F**ault conditions
Proximity switches with defined behavior under fault conditions (see EN 60947-5-3).

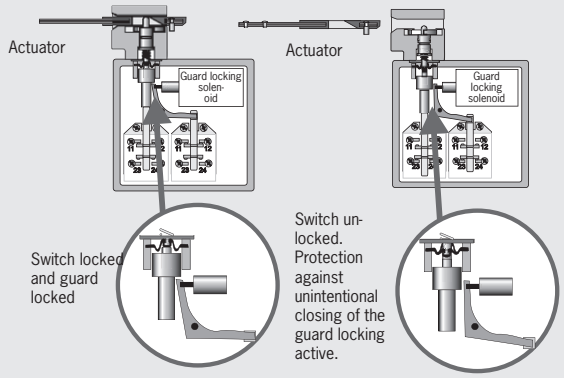
Position switches
Position switches are used to acquire the position of axes or moving *safety guards*. As soon as a position switch is used as a safety-relevant component, the term position switch with safety function or safety-related position switch is used. In this case the switching element must contain at least one *positively driven contact*.

Positive actuation
Positive actuation is the positive movement of a moving mechanical component together with another component – either by direct contact or via rigid parts. The second component is, as a result, moved positively by the first.

Positively driven, positively driven contact
The achievement of contact separation by a positive movement of the *actuating element* is termed positively driven. *Switching contacts* with this switching characteristic are termed positively driven contacts. These NC contacts are drawn with the symbol shown below. Also switches must meet the requirements of EN 60947-5-1 annex K.

Symbol for a positively driven contact

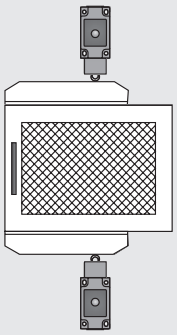
Protection against unintentional closing
Protection against unintentional closing of an interlock device with *guard locking* mechanically prevents the *safety switch* changing to the locked position with the *safety guard* open and therefore signaling a safe state.



Protective plate
For switches with separate actuator, a protective plate is available as an option; this plate makes it more difficult to tamper with the actuating head.

Protective plate on safety switch without guard locking

Redundancy
Redundancy is the use of more than one system to always maintain the same safety function even on the failure of individual components.
Even for the use of a position switch with two positively driven NC contacts, the term redundant (dual-channel) system is often used. However, here it is to be noted that only duplication of the safety contacts is achieved, the mechanical drive (trip dog and plunger) remains single-channel as before. To setup a redundant system (from safety category 3 according to EN ISO 13849-1), both the mechanism (two position switches) and the electronics should be of dual-channel layout.
By means of ▸*diversity* the safety of a redundant system is further increased.



Movable safety guard with redundant safety switches

Retention force
The retention force is the maximum force, with the ▸*safety switch* in the locked state, that is may be applied to the ▸*actuator* so that the guard locking can still be unlocked.
In the case of switches without guard locking, the retention force is the maximum force that may be applied to the actuator in the withdrawal direction while still guaranteeing reliable contact.

Risk
The combination of the probability and the severity of injury in a hazardous situation.

Risk assessment
The ▸*standard* EN 1050 contains procedures necessary to perform a risk assessment. The risk assessment initially involves a risk analysis and a subsequent risk evaluation. In EN 954-1 there is a simple procedure for determining the required ▸*category* to match the ▸*risk*.

Safe state
A safe state is provided if no hazard can be produced by a system or machine on correct use (cf. ▸*hazardous states*).

Safety guard
A safety guard is intended to protect people, products and the environment from hazards. A differentiation is made between ▸*movable safety guards* and fixed safety guards.

Safety relays
Safety relays are used to evaluate switchgear connected (safety switches, emergency stop switchgear, etc.). They ensure that the OSSD (Output Signal Switching Device) is opened.

Safety relay ESM

Safety switch
A safety switch is part of a safety chain. It provides a safe signal in the input circuit. On opening the ▸*safety guard* a stop signal is generated. In this way unintentional machine starting is prevented when the safety guard is open, that is ▸*interlocking* is achieved.

SIL (Safety Integrity Level)
According to EN 61508 the objective for the probability of failure on the execution of risk-reducing functions. The standard defines the requirements that are necessary to achieve a specific safety level (SIL).

Single-fault tolerance
Single-fault tolerance means that even after the occurrence of a single failure, the agreed safe function continues to be provided.

Slow-action contact element
A slow-action contact element is characterized by the opening of the switching contact as a function of the speed at which the ▸*actuator* is moved.

Snap-action contact element
On snap-action contact *elements* the ▸*switching element* jumps to the other switch state from a defined position of the ▸*actuator*. The movement of the switching contact is independent of the speed at which the actuator is moved. Snap-action contact elements typically have hysteresis.

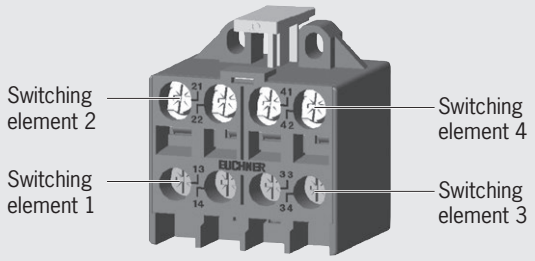
Standards
The European Machinery Directive states that if harmonized standards are observed, it is allowed to assume that the directive is met. Standards specify the requirements of the directive in more detail and as a rule represent the *general state-of-the-art*. Manufacturers of ▸*safety switches* must comply with EN 60947-5. All EUCHNER safety switches comply with this standard.

Start (automatic or manual)
An item of safety switchgear (e.g. ▸*safety relay*) can be started manually or automatically. On a manual start, an enable signal is generated after the Start button is pressed and a ▸*safe state* has been detected. This function is also termed static operation and is stipulated for emergency stop devices (EN 60204-1).
On an automatic start, an enable signal is generated after a safe state has been detected without any manual enable. This function is also termed dynamic operation and is not allowed for emergency stop devices (EN 60204-1).

Stop category
EN 60204-1 defines various stop categories; here stopping refers to the shutdown of the machine.
Stop category 0 means that the machine is shutdown by the immediate shutdown of the power.

Stop category 1 means that the machine is shutdown in a controlled manner while the supply of power is maintained to bring the machine to a standstill. Once standstill has been reached, the power is interrupted.
Stop category 2 means that the machine is shutdown in a controlled manner while the supply of power is maintained to bring the machine to a standstill. The power is not interrupted at standstill. This stop category is not allowed to be used for shutdown in an emergency according to EN 60204-1.

Switching elements
Switching elements are fitted in position switches. Switching elements are available with a normally closed function, with a normally open function and as ‣*positively driven contacts*. EUCHNER supplies switching elements with one, two, three or four switching elements for the various switch types. Switching elements can be designed as a ‣*slow-action contact element* and as a ‣*snap-action contact element*.



Quadruple switching element

Tampering
Tampering is the conscious disabling or bypassing of ‣*safety guards* and their components. ‣*Safety switches* and other safety devices must be designed such that the protective function cannot be changed or bypassed by hand or using *one* simple action. Simple actions include using:

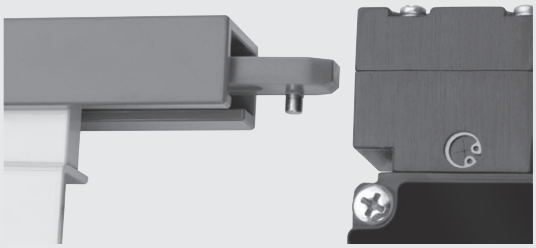
- Screwdriver
- Ball-point pens
- Nails
- Pieces of wire
- Adhesive tape
- etc..

Actions that are not regarded as simple are actions that require more than one work step with tools.

The *inability to bypass by simple means* (BGI 575) is:

- The dismantling of parts
- The turning of the safety switch away from its protective position
- The usage of a second ‣*actuator*
- The bridging of the contacts

It should be taken into account in the design that, despite safety guards, straightforward and correct operation of machines and systems must be possible. If this aspect is not taken into account, the probability of bypassing safety measures will increase.


Guiding the actuator in a C rail

Testing
Testing is intended to ensure that a safety system functions correctly. Testing can be performed automatically, by the control system, in the form of monitoring or testing during the process. Depending on the requirements, a combination of automatic and manual testing is also possible. The testing must be repeated at defined intervals as a function of the risk analysis. Testing is required for ‣*category 2* and 4 according to EN 954-1 and should also be performed for category 3.

With safety function and with separate actuator (switches)
‣*Safety switches* are divided into two different functional types. On switches with safety function the ‣*actuator* is permanently connected to the switch, on switches with separate actuator, the actuator is separate and is mounted on the ‣*safety guard*.

With safety function

With separate actuator

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Index by order number

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