

Safety Switches with Metal Housing



More than safety.



EUCHNER

More than safety.



Emil Euchner, the company's founder and inventor of the multiple limit switch, circa 1928.



Around the world – the Swabian specialists in motion sequence control for mechanical and systems engineering.

EUCHNER's history began in 1940 with the establishment of an engineering office by Emil Euchner. Since that time, EUCHNER has been involved in the design and development of switch-gear for controlling a wide variety of motion sequences in mechanical and systems engineering. In 1953, Emil Euchner founded EUCHNER + Co., a milestone in the company's history. In 1952, he developed the first multiple limit switch – to this day a symbol of the enterprising spirit of this family-owned company.

Automation – Safety – ManMachine

Today, our products range from electromechanical and electronic components to complex system solutions. With this wide range of products we can provide the necessary technologies to offer the right solution for special requirements – regardless of whether these relate to reliable and precise positioning or to components and systems for safety engineering in the automation sector.

EUCHNER products are sold through a world-wide sales network of competent partners. With our closeness to the customer and the guarantee of reliable solutions throughout the globe, we enjoy the confidence of customers all over the world.



Quality, reliability, precision

Quality, reliability and precision are the hallmarks of our corporate philosophy. They represent concepts and values to which we feel totally committed. At EUCHNER, quality means that all our employees take personal responsibility for the company as a whole and, in particular, for their own field of work. This individual commitment to perfection results in products which are ideally tailored to the customers' needs and the requirements of the market. After all: our customers and their needs are the focus of all our efforts. Through efficient and effective use of resources, the promotion of personal initiative and courage in finding unusual solutions to the benefit of our customers, we ensure a high level of customer satisfaction. We familiarize ourselves with their needs, requirements and products and we learn from the experiences of our customers' own customers.

EUCHNER – More than safety.



Quality – made by EUCHNER

Safety Switches with Metal Housing

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About this catalog

The catalog Safety switches with Metal housing 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.

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 switch	Position switch	Without guard locking	With guard locking	With guard locking and guard locking monitoring						
N1A	NB01	NZ	NZ.VZ	NX	NZ.VZ.VS	TZ	TX	STA		
										
see page 15	see page 15	see page 23	see page 47	see page 87	see page 53	see page 61	see page 89	see page 97	see page 101	see page 103

How can I find the right switch?

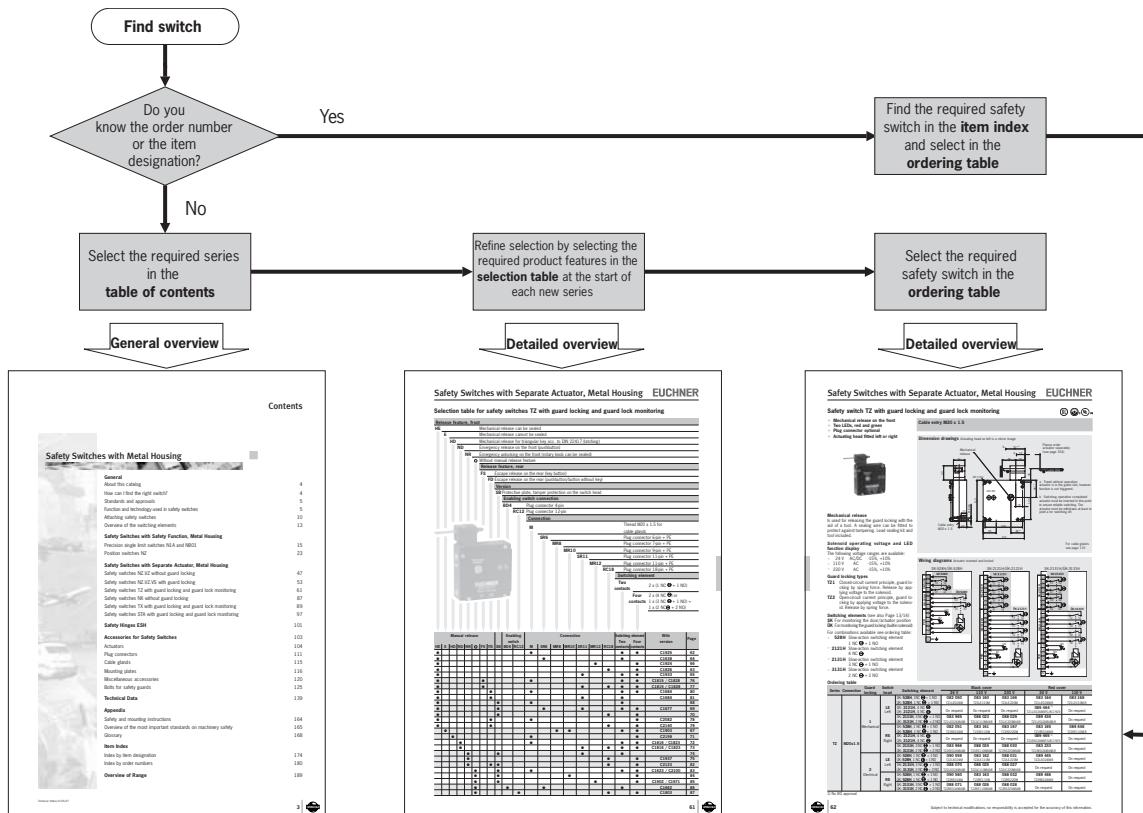
There are two ways you can find the right switch:

- If you know the order number or the product designation, look for the switch directly in the item index (see page 174 or page 180).

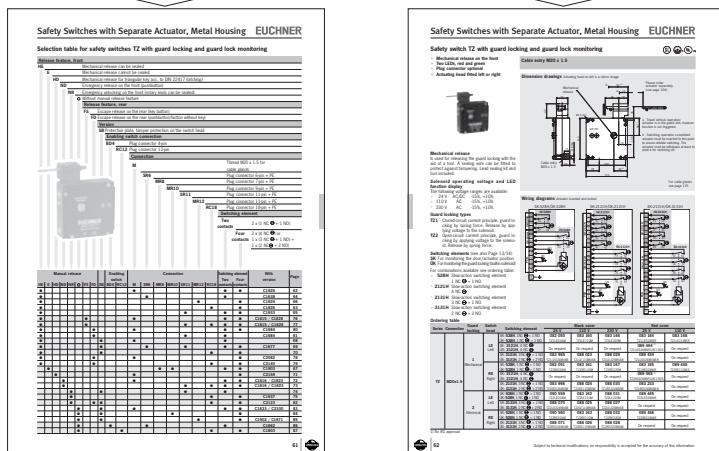
At the front of the catalog you will find useful information on the topic of safety switches.

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.



- 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 employers' liability insurance association (BG) and are given in the lists from the BG.

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:



Switches with this symbol are approved by the German employers' liability insurance association (BG)



Switches with this symbol are approved by Underwriters Laboratories (UL, Canada and USA)

Special approvals:



Switches with this symbol are approved by the Germanischer Lloyd (GL)

Function and technology used in safety switches

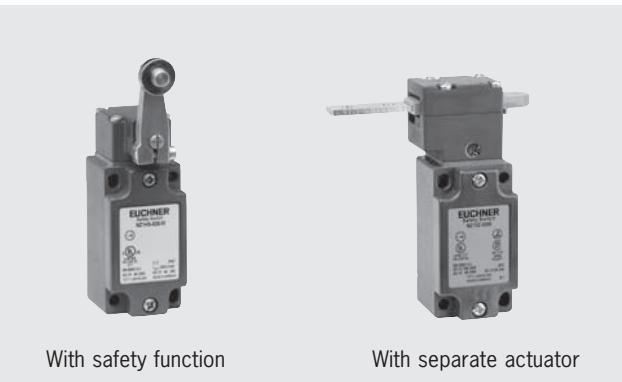
The task of safety switches

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.



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

Safety switches with safety function

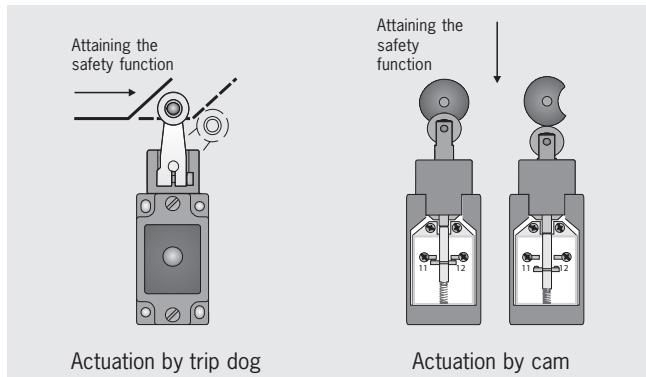
Safety switches with safety function are safety switches in which the actuating element and the switch are fitted in one housing. The actuating elements are available in various versions (e.g. in the form of a plunger or a lever arm). The switches N1A, NB01 and NZ listed in this catalog are safety switches 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.

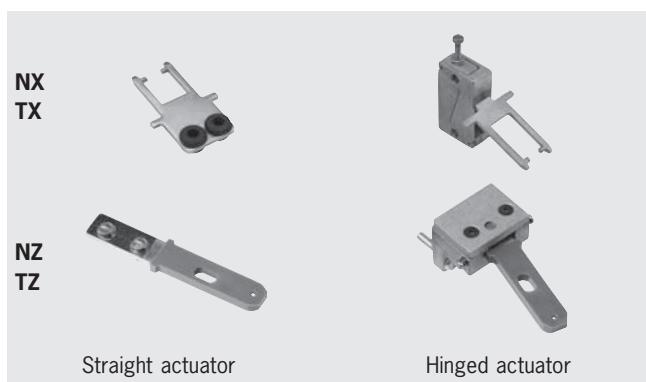


Safety switches with separate actuator

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.



The positively driven contact in 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

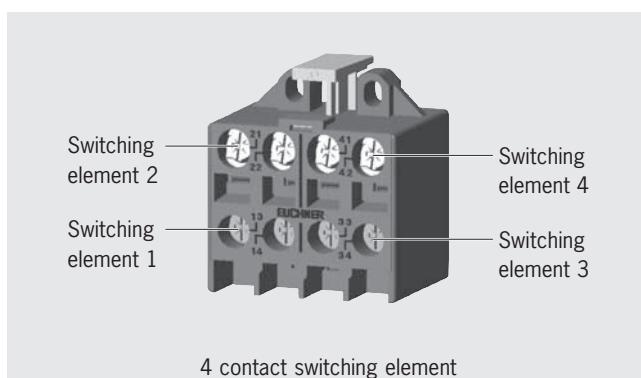
contours of the switch on insertion in the actuating head. They are suitable for small hinged doors with a radius from 165 mm. For sliding doors and hinged doors with an adequately large pivoting radius (> 1000 mm) a straight actuator can be used.

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 elements
- ▶ 2 contact switching elements with two independent switching elements
- ▶ 4 contact switching elements with four independent switching elements

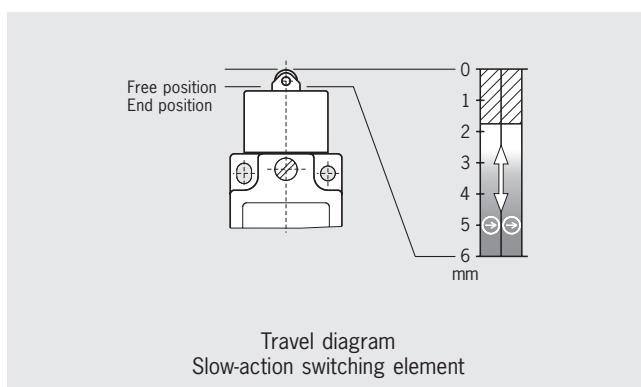


Only one switching element is fitted in each case in switches of the series N1A, NB, NZ, NX, TX and STA. Two switching elements are fitted to all series TZ safety switches. In this case one of the switching elements is used to monitor the door position (SK) and the other is used to monitor the position of the interlocking 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.

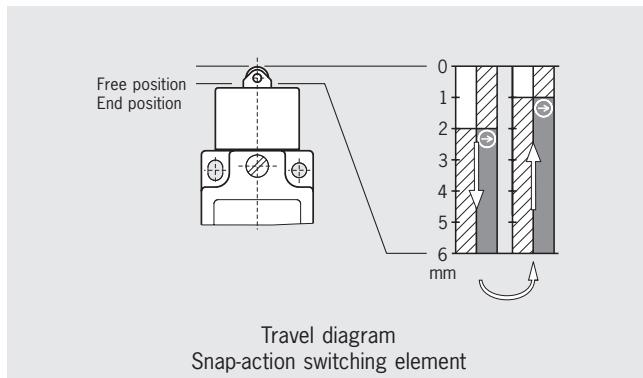


Travel diagram
Slow-action switching element

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.



Positively driven contacts

Positively driven contacts are used in the switching elements. These are special switching elements 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 element 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 element 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 with 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

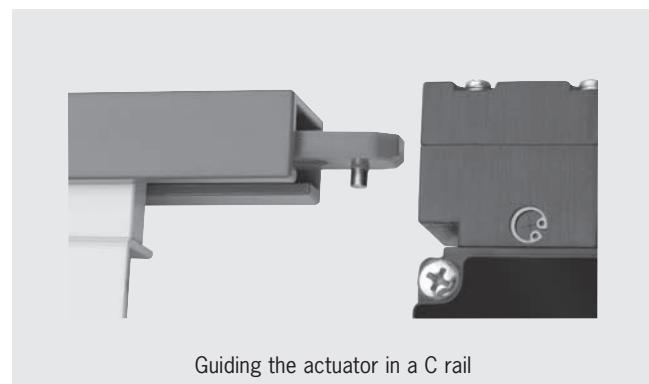
In addition to the safety contacts, auxiliary contacts are also required to indicate to the control system that the safety guard is open. As these switching elements do not have any safety function, either NC or NO contacts can be used.

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

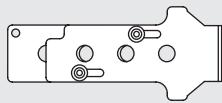
On the switches NZ.VZ, increased protection against bypassing can be achieved by using a protective plate over the switch head. The switch head's rearward opening is then rendered almost inaccessible.



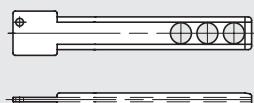
Safety switch with separate actuator with protective plate

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 interlocking 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

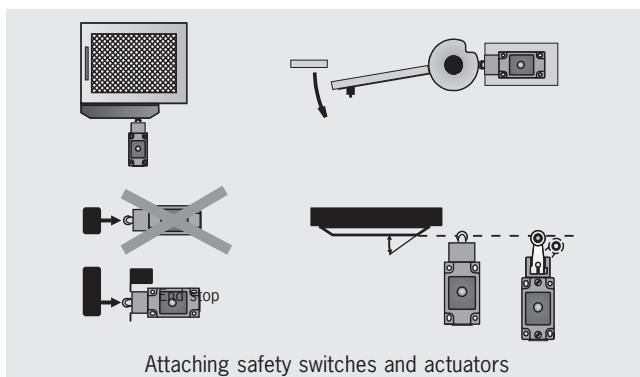
The series N1A, NB, NZ and TZ safety switches have a die-cast alloy housing with an anodized surface. Due to the durable housing material and the high degree of protection (up to IP 67), these switches can be used even under the harshest conditions. The degree of protection only applies to the space 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

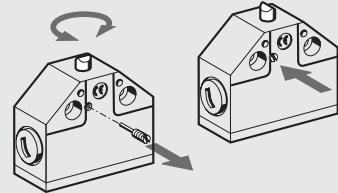
The same applies to the actuators for switches with separate actuator and trip dogs for switches with safety function. A joint without movement is also required here. Above all else, loosening must be prevented. In addition, it must be ensured that cams and trip dogs can only be mounted in the correct position.

To prevent tampering, safety screws can also be used for the attachment of safety switches and trip dogs.

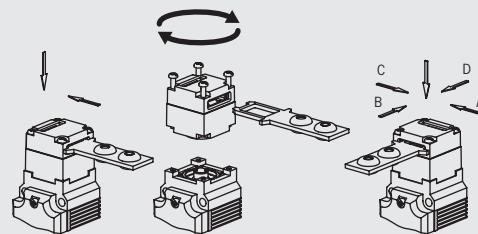
Mounting plates are available to ease the attachment of switches with separate actuator and also actuators. Bolts attached to the safety door are extremely helpful. All requirements, e.g. the mechanical end stop for the door and the exact guidance of the actuator, are optimally met by using bolts.

Changing the approach direction

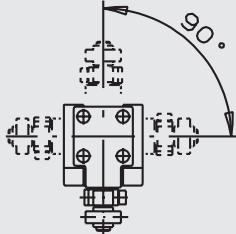
Often the actuator approach direction does not match the standard alignment of the actuating head as delivered. For this reason, the actuating heads on the safety switches NZ, TZ, NX, TX and STA can be very straightforwardly adjusted to the required direction.



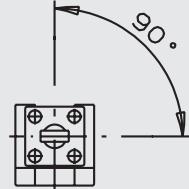
Changing the approach direction
single hole fixing limit switch N1A/NB01



Changing the approach direction safety switch STA

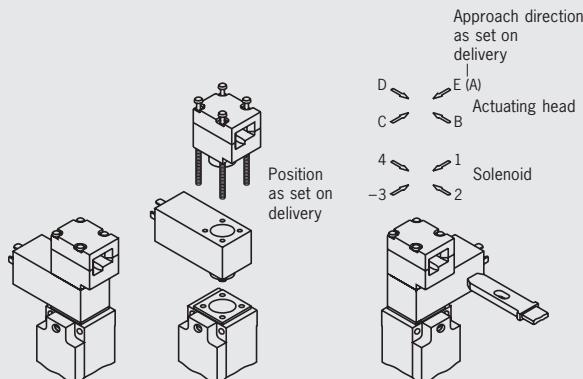


Lever arm

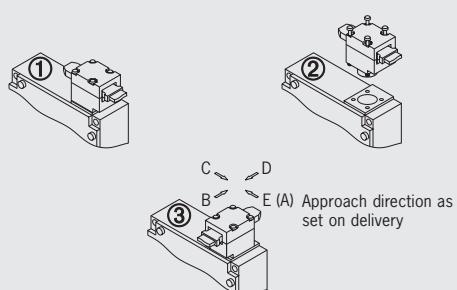


Plunger

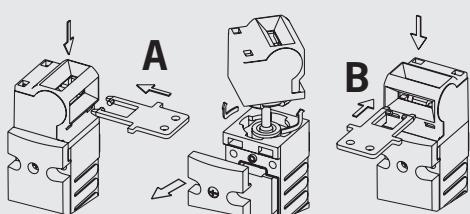
Changing the approach direction safety switch NZ (4 x 90°)



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

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

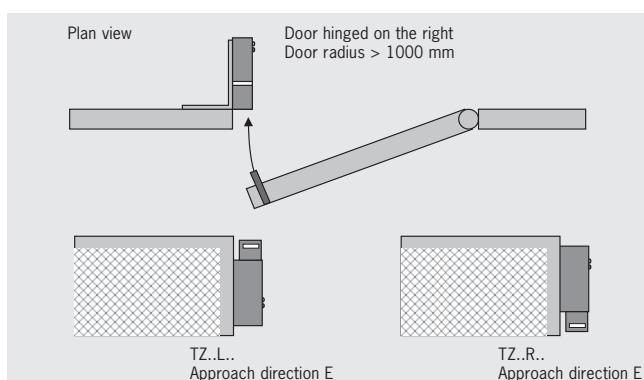
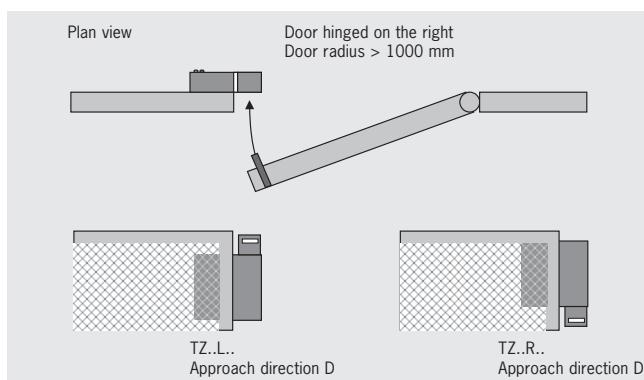
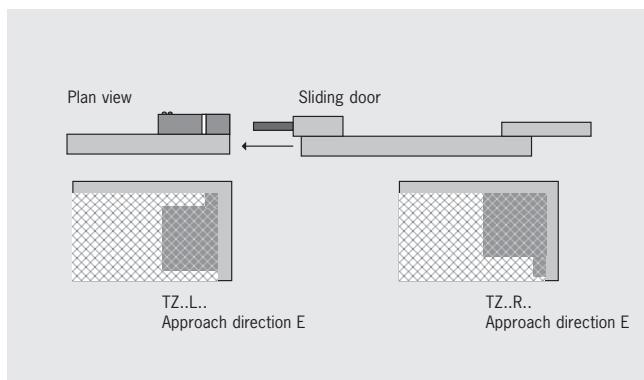
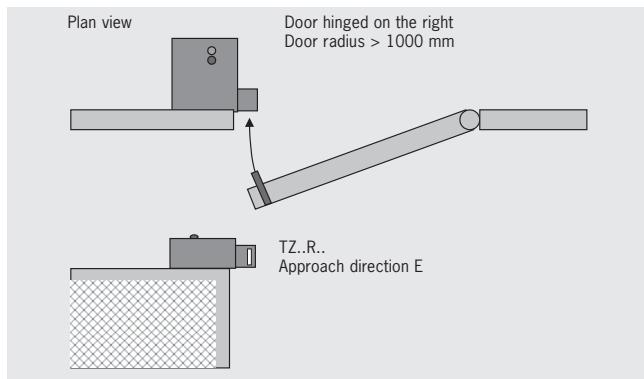
In addition, the actuating direction can be adjusted such that the actuator only switches in one direction.

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

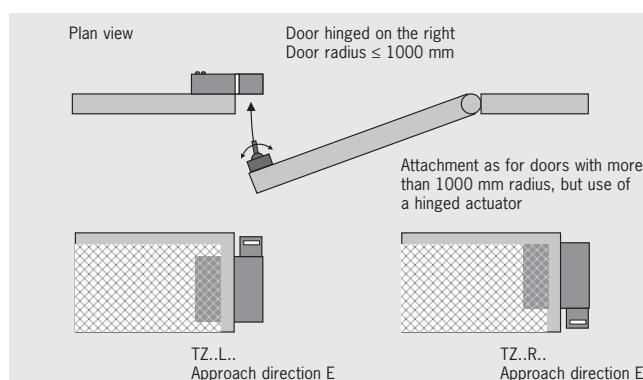
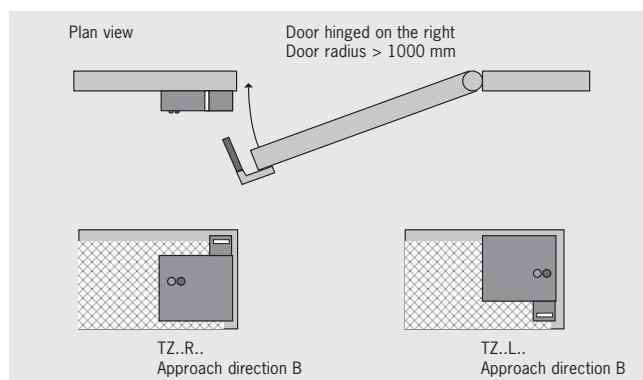
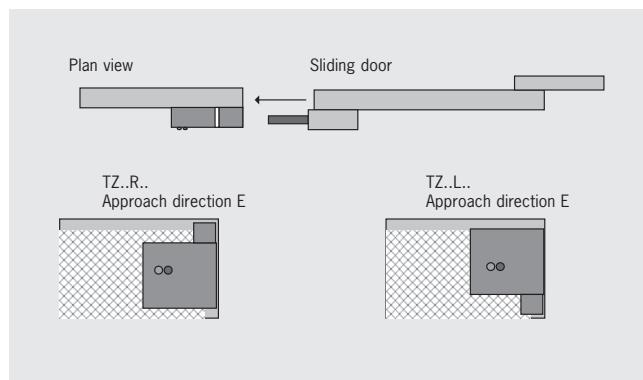
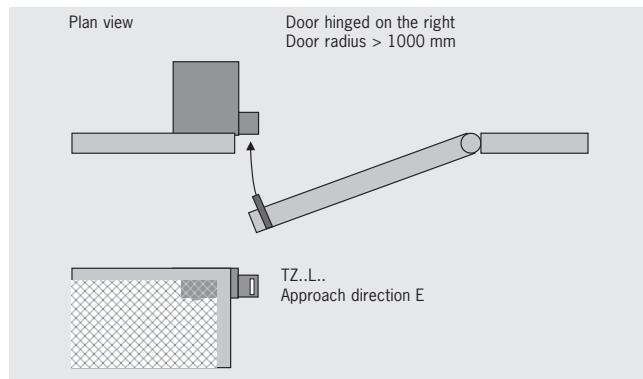
Changing the switching direction position switch NZ.H...

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

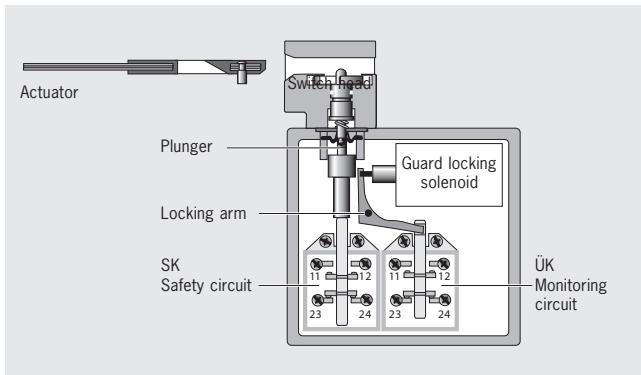
The locking arm ensures that the switch is guard locked by the solenoid. It acts directly on the switching element ÜK; the positively driven contact can only be closed in the locked state (see **protection against unintentional closing*).

▶ 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 interlocking solenoid is controlled correspondingly.



LED indicator TZ

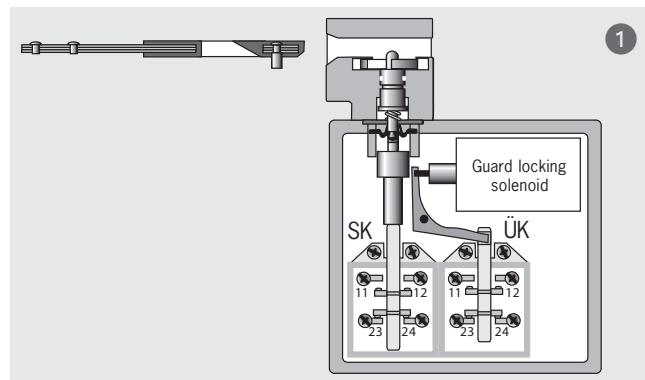
As standard the TZ series is equipped with a red and a green LED. Depending on the switch design, the assignment is pre-wired or can be chosen as required (see also page 153).

Principle of operation of TZ

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

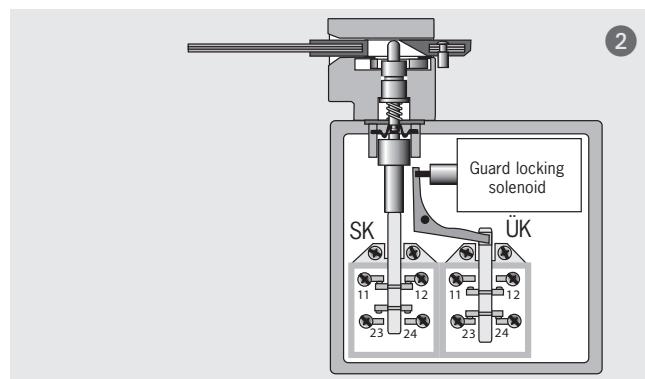
① Door open and not locked

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*).



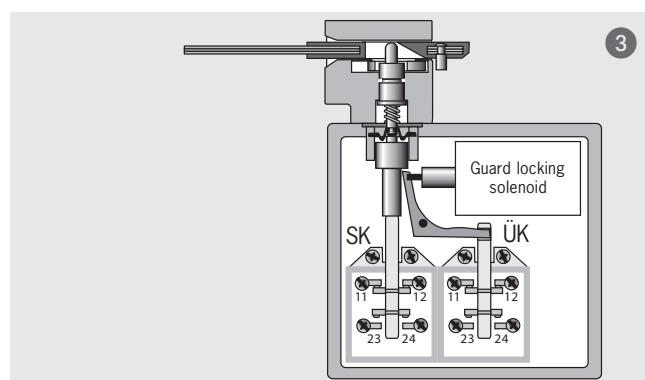
② Door closed and not locked

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 interlocking 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

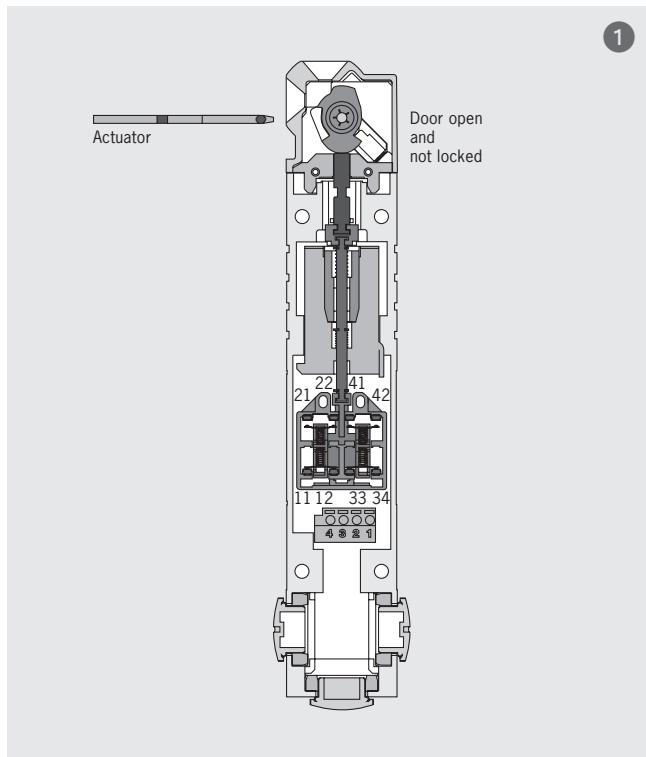
As standard the TX series is equipped with a red and a green LED. Depending on the switch design, the assignment is pre-wired or can be chosen as required.

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.

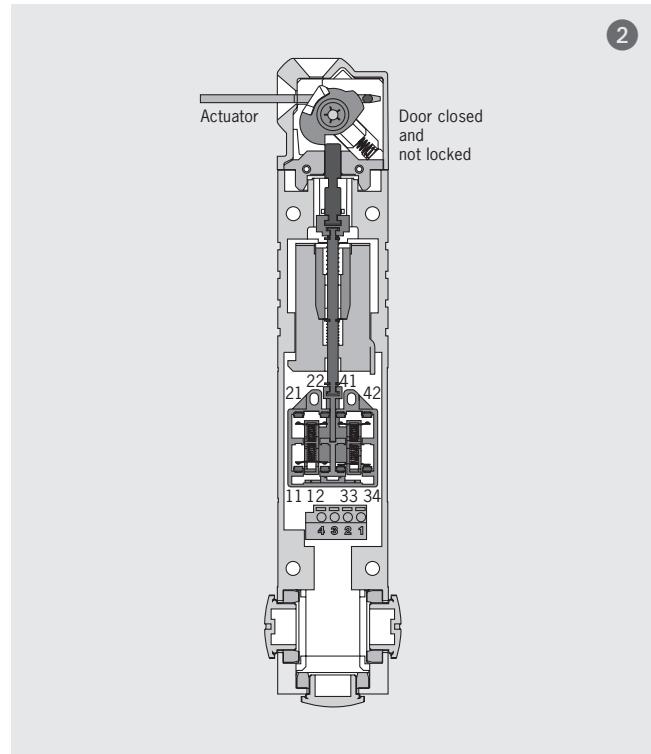
① Door open and not locked

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*).



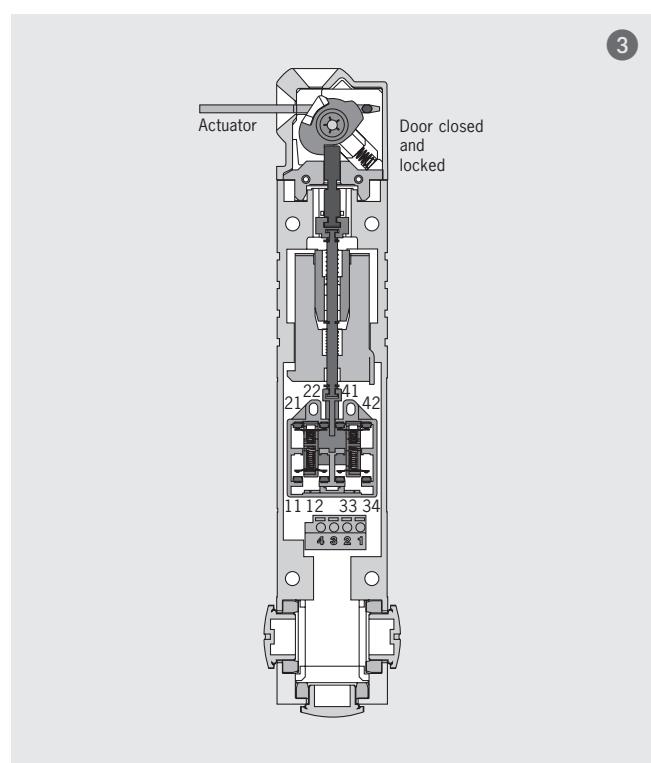
② Door closed and not locked

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* as before. 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 interlocking solenoid is activated, NO contact 33-34 is opened and signals the condition *Locked*. The NO contact 13-14 signals the condition *Door closed* as before. The positively driven contacts 21-22 and 41-42 were closed when the interlocking 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 interlock 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.

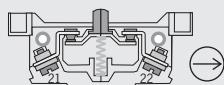
Please note: safety switching elements are not available as replacement switching elements.

Switching elements with 1 contact element



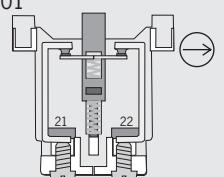
Switching element 508

- ▶ Snap-action switching element
- ▶ 1 positively driven contact
- ▶ For series N1A



Switching element 588

- ▶ Slow-action switching element
- ▶ 1 positively driven contact
- ▶ For series NB01

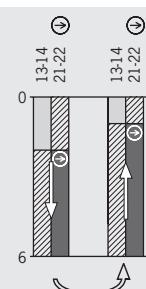
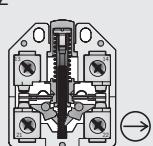


Switching elements with 2 contacts



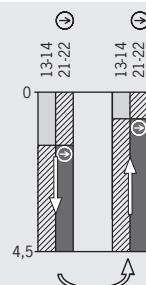
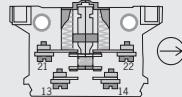
Switching element 511

- ▶ Snap-action switching element
- ▶ 1 positively driven NC contact + 1 NO contact
- ▶ For series NZ



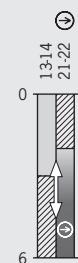
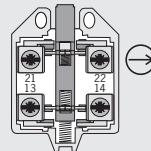
Switching element 514

- ▶ Snap-action switching element
- ▶ 1 positively driven NC contact + 1 NO contact
- ▶ For series N1A



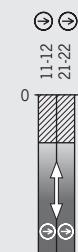
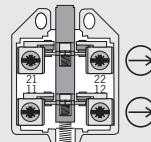
Switching element 528H

- ▶ Slow-action switching element
- ▶ 1 positively driven contact + 1 NO contact
- ▶ For series NZ / TZ



Switching element 538H

- ▶ Slow-action switching element
- ▶ 2 positively driven contacts
- ▶ For series NZ / TZ

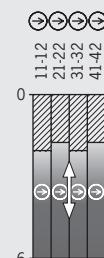
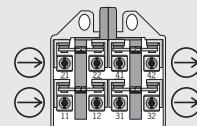


Switching elements with 4 contacts



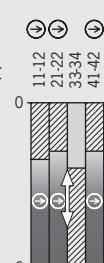
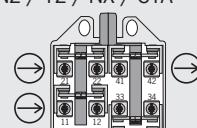
Switching element 2121H

- ▶ Slow-action switching element
- ▶ 4 positively driven contacts
- ▶ For series NZ / TZ / NX



Switching element 2131H

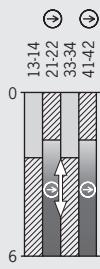
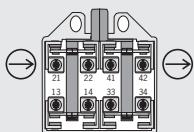
- ▶ Slow-action switching element
- ▶ 3 positively driven contacts + 1 NO contact (door monitoring contact for STA)
- ▶ For series NZ / TZ / NX / STA



Contact
■ closed
□ open
■ positively opened

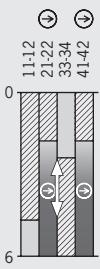
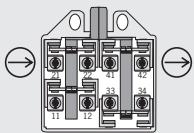
Switching element 3131H

- ▶ Slow-action switching element
- ▶ 2 positively driven contacts + 2 NO contacts
- ▶ For series NZ / TZ / NX



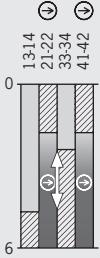
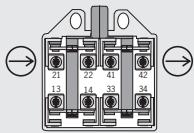
Switching element 4121

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



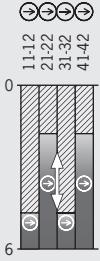
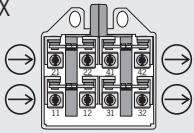
Switching element 4131 (without door monitoring contact)

- ▶ Slow-action switching element
- ▶ 2 positively driven contacts + 1 NO contact
+ 1 NC contact
- ▶ For series TX



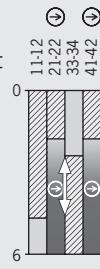
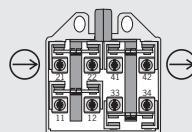
Switching element 4141

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



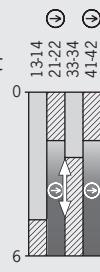
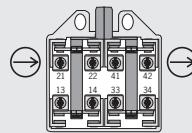
Switching element ETX B

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



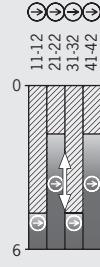
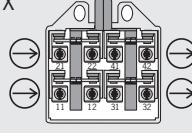
Switching element ETX C

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



Switching element ETX D

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



Contact

- closed
- open
- positively opened

Selection table for precision single limit switches N1A and NB01

The diagram illustrates two safety switch models. On the left, the N1AD model features a large metal housing with a top cap containing two mounting holes and a central actuating element. A long, thin chisel plunger extends downwards from the housing. On the right, the NB01D model shows a smaller, more compact metal housing with a similar top cap and a shorter, thicker chisel plunger extending downwards.

Actuating element						Connection			Exterior diaphragm		Switching element		With version	Page
N1AD	N1AR	N1ARL	N1AW	NB01D	NB01R	M	SVM5	AM	One contact	Two contacts				
●						●			●	●	C1292 / C1293	16		
●						●		●	●	●		17		
●							●		●	●		17		
	●					●			●	●	C1293	18		
	●					●		●	●	●		19		
	●						●		●	●		19		
		●				●			●	●		20		
		●				●		●	●	●		21		
			●			●		●	●	●		22		
				●	●				●			22		

Precision single limit switch N1AD with chisel plunger



- Housing according to DIN 43693
- LED optional
- Plug connector optional
- Exterior diaphragm optional



Approach direction

Horizontal
Can be adjusted in 90° steps.

Exterior diaphragm (optional)

Protection against heavy soiling (dust) and aggressive coolants.

LED function display (optional)

A function display is available for the following voltage ranges:

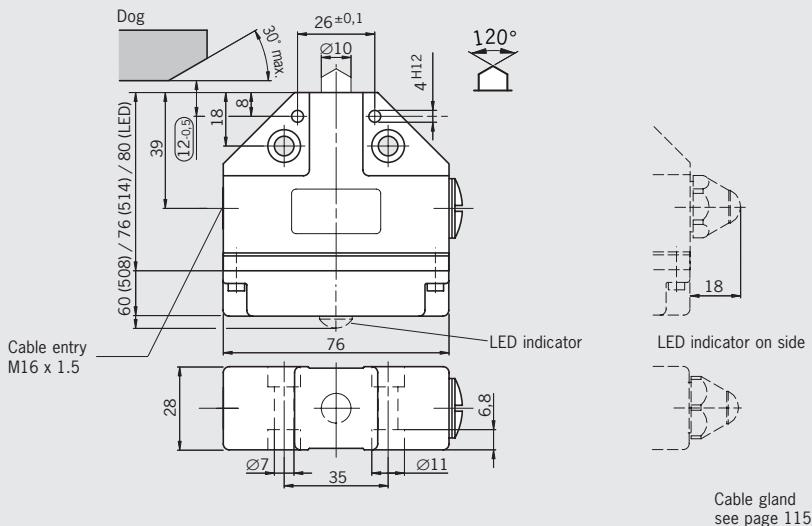
- AC/DC 12-60 V red
- DC 24 V on side red or yellow
- AC 110 V ±15% red
- AC 230 V ±15% red

Switching elements (see also page 13)

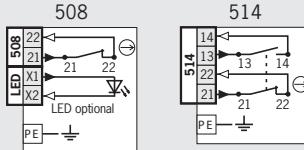
- **514** Snap-action switching element
1 NC \ominus + 1 NO
- **508** Slow-action switching element
1 NC \ominus

Cable entry M16 x 1.5

Dimension drawings



Wiring diagrams



Ordering table

Series	Actuator	Connection	Switching element	Function display					
				Without LED	12-60 V red LED	110 V red LED	230 V red LED	24 V side red	24 V side yellow
N1A	D Chisel plunger	Cable entry M16 x 1.5	508 1 NC \ominus	083 886 N1AD508-M	087 218 N1AD508LE060-M	087 221 N1AD508LE110-M	087 224 N1AD508LE220-M	087 197 N1AD508-MC1293	087 193 N1AD508-MC1292
		Cable entry M16 x 1.5	514 1 NC \ominus + 1 NO	083 849 N1AD514-M	-	-	-	On request	On request

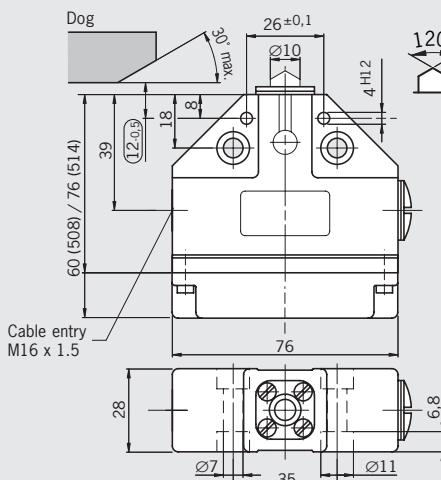
1) Approval pending



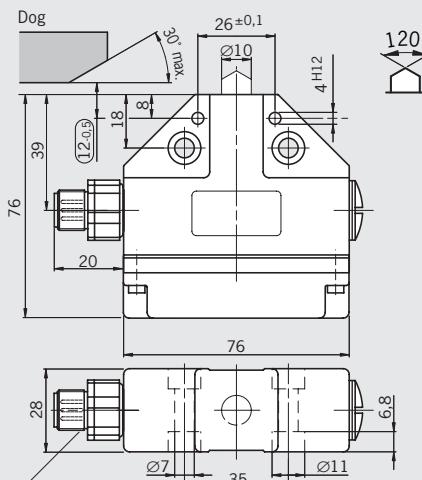
Cable entry M16 x 1.5
Exterior diaphragm

Plug connector SVM5
M12 plug, 5-pin

Dimension drawings

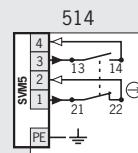
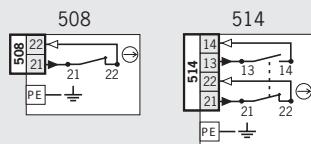


For cable glands
see page 115



For mating connectors
see page 115

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 \ominus	Exterior diaphragm	090 546 N1AD508AM-M	
			514 1 NC \ominus + 1 NO	Exterior diaphragm	091 261 N1AD514AM-M	
	Plug connector SVM5 (M12 plug)		514 1 NC \ominus + 1 NO		087 603 N1AD514SVM5-M	

1) Approval pending

Precision single limit switch N1AR with roller plunger



- Housing according to DIN 43693
- Steel roller Ø 8 mm
- LED optional
- Plug connector optional
- Exterior diaphragm optional
- Bearing optional



Approach direction

Horizontal
Can be adjusted in 90° steps.

Exterior diaphragm (optional)

Protection against heavy soiling (dust) and aggressive coolants.

LED function display (optional)

A function display is available for the following voltage ranges:

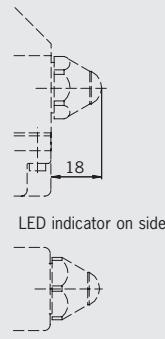
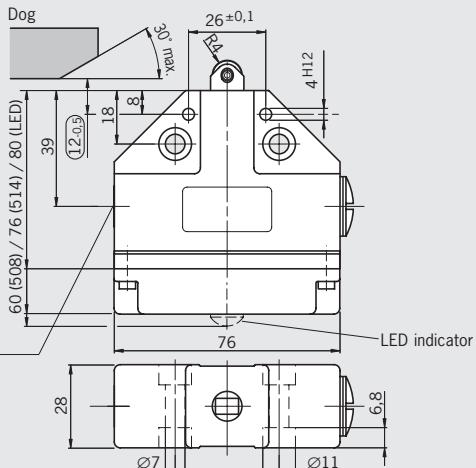
- AC/DC 12-60 V red
- DC 24 V on side red
- AC 110 V ±15% red
- AC 230 V ±15% red

Switching elements (see also page 13)

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

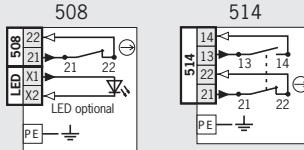
Cable entry M16 x 1.5

Dimension drawings



For cable glands
see page 115

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	24 V side red
N1A	R Roller plunger Ø 8 mm	Cable entry M16 x 1.5	508 1 NC ⊖	Slide bearing	083 887 N1AR508-M	087 219 N1AR508LE060-M	087 222 N1AR508LE110-M	087 225 N1AR508LE220-M	087 198 N1AR508-MC1293
				Ball bearing	087 245 N1AB508-M	-	-	-	On request
			514 1 NC ⊖ + 1 NO	Slide bearing	078 487 N1AR514-M	On request	On request	On request	On request
				Ball bearing	087 247 N1AB514-M	-	-	-	On request

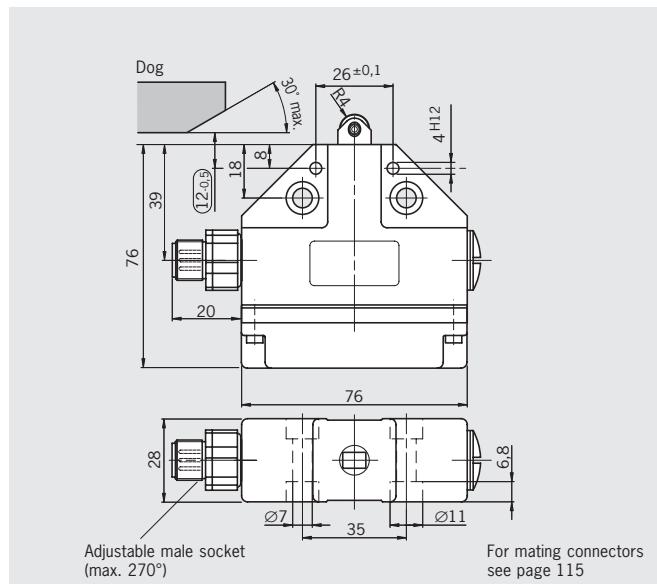
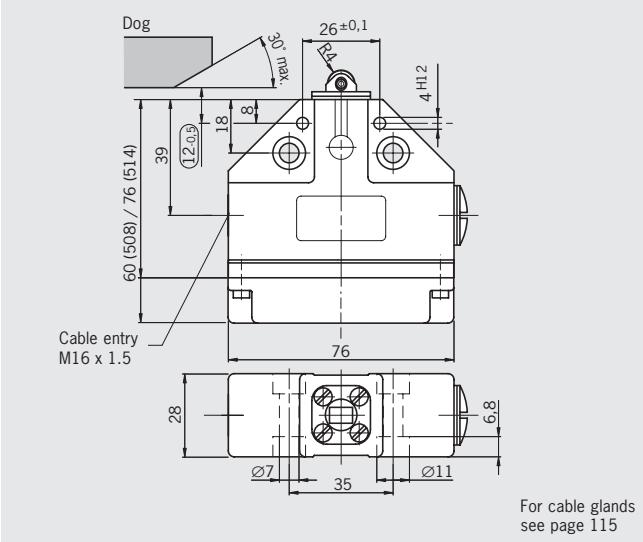
1) Approval pending



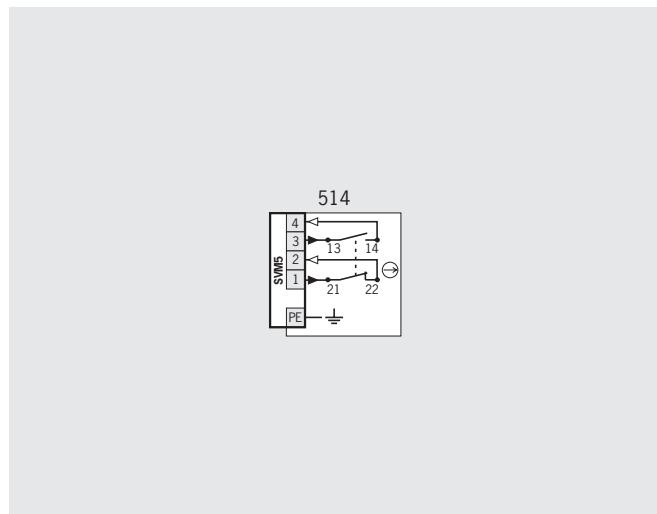
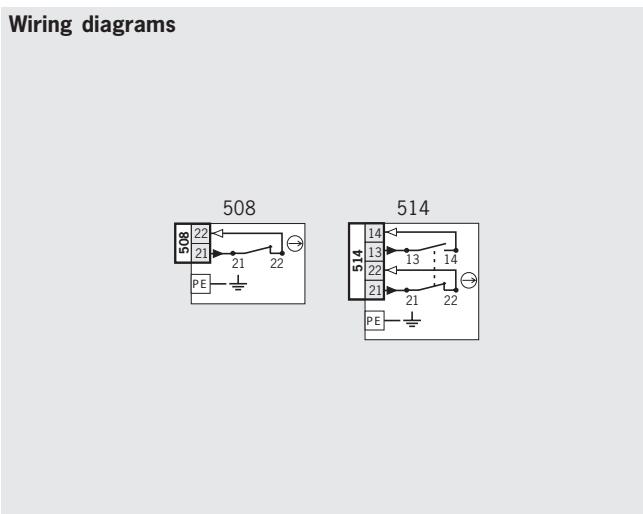
Cable entry M16 x 1.5
Exterior diaphragm

Plug connector SVM5
M12 plug, 5-pin

Dimension drawings



Wiring diagrams



Ordering table

Series	Actuator	Connection	Switching element	Version	Function display	
					Without LED	
N1A	R Roller plunger \varnothing 8 mm	Cable entry M16 x 1.5	508 1 NC \ominus	Exterior diaphragm	090 547 N1AR508AM-M	
			514 1 NC \ominus + 1 NO	Exterior diaphragm	087 158 N1AR514AM-M	
	Plug connector SVM5 (M12 plug)		514 1 NC \ominus + 1 NO		087 604 N1AR514SVM5-M	

1) Approval pending

Precision single limit switch N1ARL with extended roller plunger



- Housing according to DIN 43693
- Steel roller Ø 18 mm

Cable entry M16 x 1.5



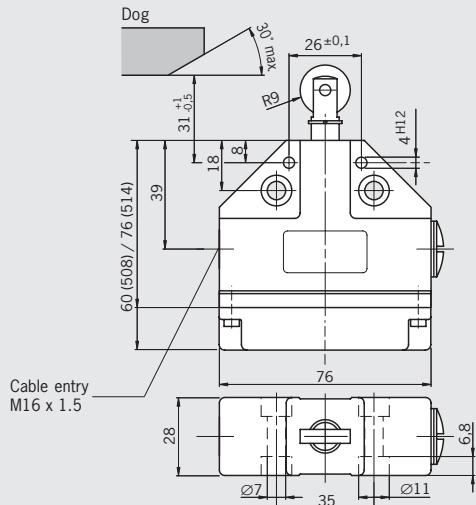
Approach direction

Horizontal
Can be adjusted in 90° steps.

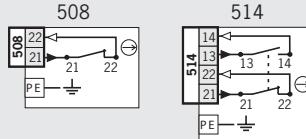
Switching elements (see also page 13)

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

Dimension drawings



Wiring diagrams



Ordering table

Series	Actuator	Connection	Switching element	Function display	
				Without LED	
N1A	RL Roller plunger Ø 18 mm	Cable entry M16 x 1.5	508 1 NC ⊖	087 147 N1ARL508-M	
			514 1 NC ⊖ + 1 NO	087 204 N1ARL514-M	

1) Approval pending

Precision single limit switch N1AW with domed plunger



c_{UL}¹⁾ us

- Housing according to DIN 43693
- 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
- AC 110 V ±15% red
- AC 230 V ±15% red

Switching elements (see also page 13)

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

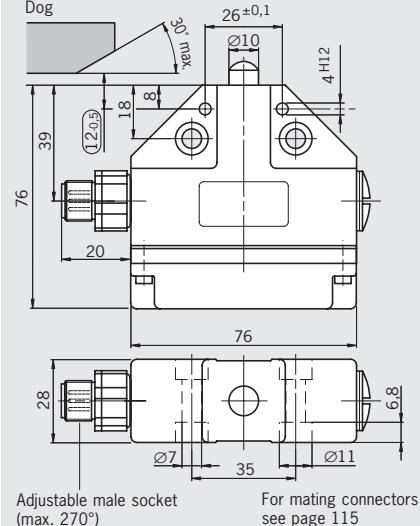
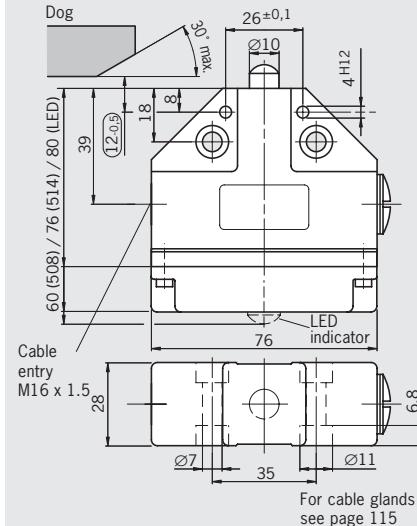
Cable entry M16 x 1.5

Plug connector SVM5

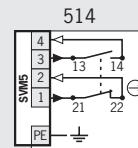
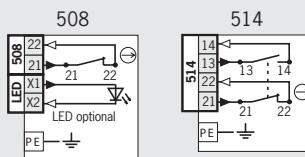


c_{UL}¹⁾ us

Dimension drawings



Wiring diagrams



Ordering table

Series	Actuator	Connection	Switching element	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 ⊖	087 205 N1AW508-M	087 220 N1AW508LE060-M	087 223 N1AW508LE110-M	087 226 N1AW508LE220-M
			514 1 NC ⊖ + 1 NO	083 850 N1AW514-M	-	-	-
	Plug connector SVM5 (M12 plug)		514 1 NC ⊖ + 1 NO	090 743 N1AW514SVM5-M	-	-	-

1) Approval pending

Precision single limit switch NB01



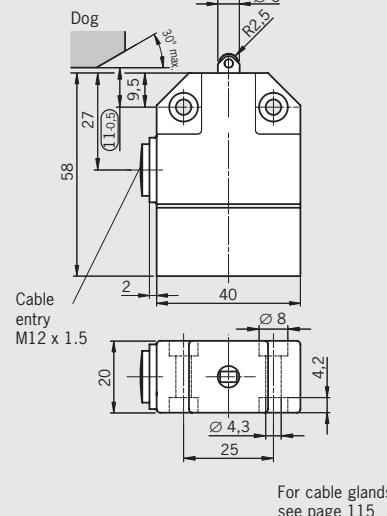
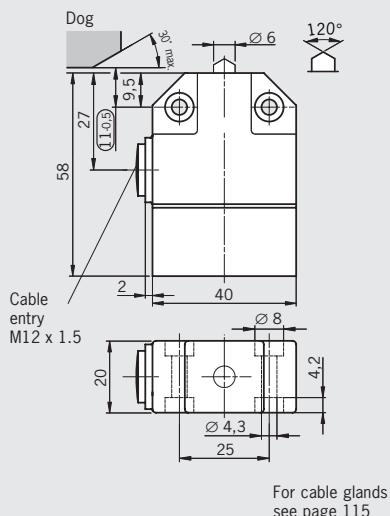
- With chisel plunger
- With roller plunger, steel roller Ø 5 mm



Cable entry M12 x 1.5
Chisel plunger

Cable entry M12 x 1.5
Roller plunger

Dimension drawings



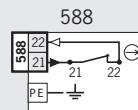
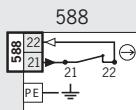
Approach direction

Horizontal
Can be adjusted in 90° steps.

Switching elements (see also page 13)

- 588 Slow-action switching element
1 NC ⊖

Wiring diagrams



Ordering table

Series	Actuator	Connection	Switching element	Function display	
				Without LED	
NB01	D Chisel plunger	Cable entry M12 x 1.5	588 1 NC ⊖	088 584 NB01D588-M	
	R Roller plunger Ø 5 mm	Cable entry M12 x 1.5	588 1 NC ⊖	088 583 NB01R588-M	

1) Approval pending

Selection table for position switches NZ

Actuating element									
WO	Domed plunger								
RK	Roller plunger with steel roller Ø 8 mm								
RS	Roller plunger with steel roller Ø 12 mm								
RG	Roller plunger with plastic roller Ø 12 mm								
RL	Extended roller plunger with steel roller Ø 18 mm								
HS	Lever arm with steel roller Ø 18 mm; 19 mm for ball bearing (C1833)								
HB	Lever arm with plastic roller Ø 18 mm; 30 mm (version C569); Roller on inside of lever (C1779)								
PS	Adjustable lever arm with steel roller Ø 18 mm								
PB	Adjustable lever arm with plastic roller Ø 18 mm								
Connection									
M	Thread M20x1.5 for cable glands								
SVM5	M12 plug connector 5-pin, male socket adjustable (max. 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 ⊖								

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

Safety Switches with Safety Function, Metal Housing

EUCHNER

Position 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 $\pm 15\%$ red
- ▶ AC 230 V $\pm 15\%$ red

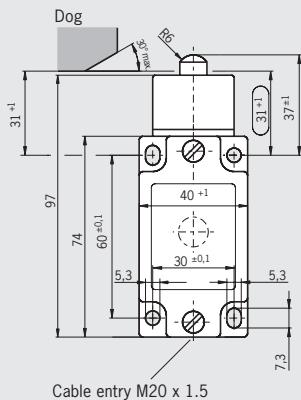
Switching elements (see also page 13/14)

- ▶ **511** Snap-action switching element
1 NC \ominus + 1 NO
- ▶ **528H** Slow-action switching element
1 NC \ominus + 1 NO
- ▶ **538H** Slow-action switching element
2 NC \ominus
- ▶ **2121H** Slow-action switching element
4 NC \ominus
- ▶ **2131H** Slow-action switching element
3 NC \ominus + 1 NO
- ▶ **3131H** Slow-action switching element
2 NC \ominus + 2 NO

Cable entry M20 x 1.5

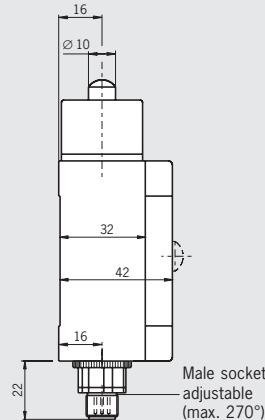


Dimension drawings



For cable glands
see page 115

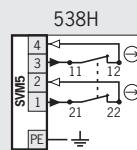
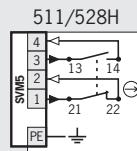
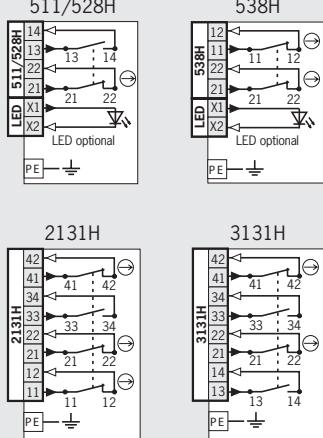
Plug connector SVM5 M12 plug, 5-pin



For mating connectors
see page 115

Wiring diagrams

Switch not actuated



Ordering table

Series	Connection	Actuator	Switching element	Function display				
				Without LED	12-60 V red LED	110 V red LED	230 V red LED	12-60 V yellow LED
NZ	1 Cable entry M20 x 1.5	WO Domed plunger	511 ¹⁾ 1 NC \ominus + 1 NO	088 611 ¹⁾ NZ1WO-511-M	089 057 ¹⁾ NZ1WO-511L060-M	089 059 ¹⁾ NZ1WO-511L110-M	089 060 ¹⁾ NZ1WO-511L220-M	089 058 ¹⁾ NZ1WO-511L060GE-M
			528H 1 NC \ominus + 1 NO	089 624 NZ1WO-528-M	089 078 NZ1WO-528L060-M	On request	On request	On request
			538H 2 NC \ominus	090 878 NZ1WO-538-M	089 076 NZ1WO-538L060-M	On request	On request	On request
			2131H 3 NC \ominus + 1 NO	089 629 NZ1WO-2131-M	-	-	-	-
			3131H 2 NC \ominus + 2 NO	089 626 NZ1WO-3131-M	-	-	-	-
	2 Plug connector SVM5 (M12 plug)	WO Domed plunger	511 1 NC \ominus + 1 NO	089 014 NZ2WO-511SVM5	On request	-	-	On request
			528H 1 NC \ominus + 1 NO	090 923 NZ2WO-528SVM5	On request	-	-	On request
			538H 2 NC \ominus	090 924 NZ2WO-538SVM5	On request	-	-	On request

1) No BG approval for switching element 511

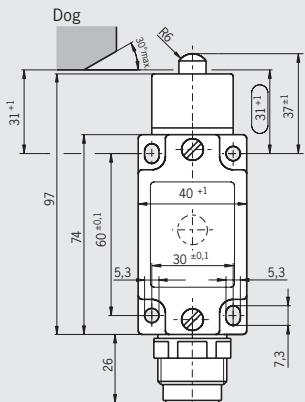


Plug connector SR6
6-pin + PE

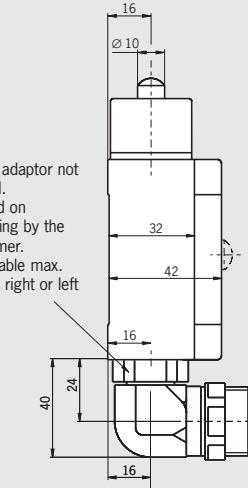
Plug connector SR6 angled
6-pin + PE

Plug connector SR11
11-pin + PE

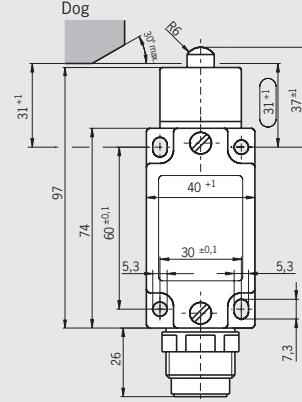
Dimension drawings



For mating connectors
see page 112



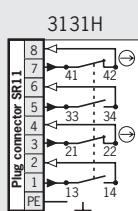
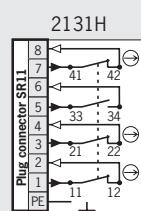
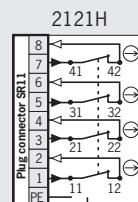
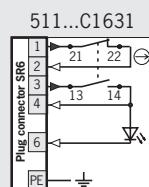
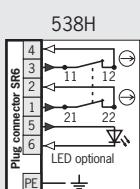
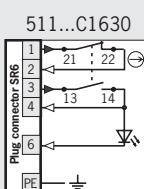
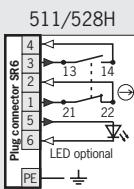
For mating connectors
see page 112



For mating connectors
see page 112

Wiring diagrams

Switch not actuated



Ordering table

Series	Actuator	Connection	Switching element	Version	Function display		
					Without LED	12-60 V red LED	12-60 V yellow LED
NZ	WO Domed plunger	2 Plug connector SR6	511 ¹⁾ 1 NC ⊖ + 1 NO		090 909 ¹⁾ NZ2WO-511	091 280 ¹⁾ NZ2WO-511L060	On request
			511 ¹⁾ 1 NC ⊖ + 1 NO	C1630 Alternative wiring	On request	On request	059 481 ¹⁾ NZ2WO-511L060C1630
			528H 1 NC ⊖ + 1 NO		090 910 NZ2WO-528	091 279 NZ2WO-528L060	On request
			538H 2 NC ⊖		090 911 NZ2WO-538	087 558 NZ2WO-538L060	On request
		511 ¹⁾ 1 NC ⊖ + 1 NO	C1631 Alternative wiring		On request	On request	059 482 ¹⁾ NZ2WO-511L060C1631
	2 Plug connector SR11	2121H 4 NC ⊖			090 976 NZ2WO-2121	-	-
		2131H 3 NC ⊖ + 1 NO			090 912 NZ2WO-2131	-	-
		3131H 2 NC ⊖ + 2 NO			090 913 NZ2WO-3131	-	-

1) No BG approval for switching element 511

Safety Switches with Safety Function, Metal Housing

EUCHNER

Position switch NZ.RK with roller plunger

- Steel roller Ø 8 mm
- LED optional
- Plug connector optional
- Bearing optional



Approach direction



Horizontal

Can be adjusted 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

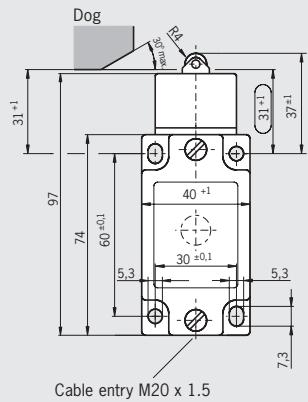
Switching elements (see also page 13/14)

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



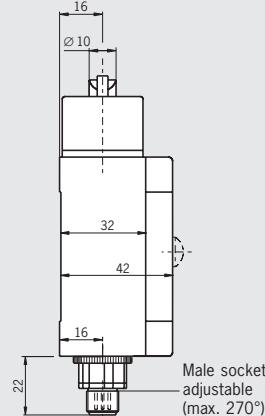
Cable entry M20 x 1.5

Dimension drawings

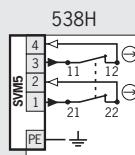
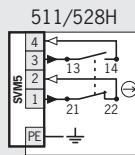
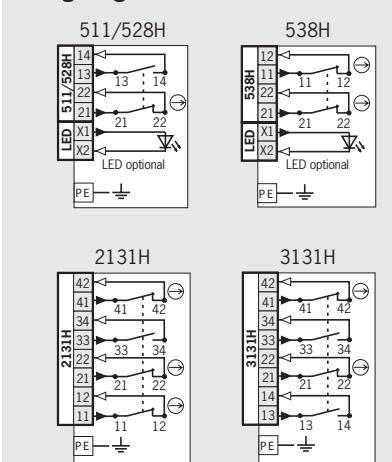


Plug connector SVM5

M12 plug, 5-pin



Wiring diagrams



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	Cable entry M20 x 1.5	511 1 NC ⊖ + 1 NO		088 608 ¹⁾ NZ1RK-511-M	090 354 ¹⁾ NZ1RK-511L060-M	090 355 ¹⁾ NZ1RK-511L220-M	On request
			528H 1 NC ⊖ + 1 NO		090 905 NZ1RK-528-M	090 358 NZ1RK-528L060-M	On request	On request
			528H 1 NC ⊖ + 1 NO With bearing	C1912	090 572 NZ1RK-528-MC1912	On request	On request	086 408 NZ1RK-528L060GE-MC1912
			538H 2 NC ⊖		090 906 NZ1RK-538-M	On request	On request	On request
			2131H 3 NC ⊖ + 1 NO		090 907 NZ1RK-2131-M	-	-	-
		Plug connector SVM5 (M12 plug)	3131H 2 NC ⊖ + 2 NO		090 908 NZ1RK-3131-M	-	-	-
			511 1 NC ⊖ + 1 NO		089 007 NZ2RK-511SVM5	On request	-	On request
			528H 1 NC ⊖ + 1 NO		090 930 NZ2RK-528SVM5	On request	-	On request
			538H 2 NC ⊖		089 018 NZ2RK-538SVM5	On request	-	On request

1) No BG approval for switching element 511

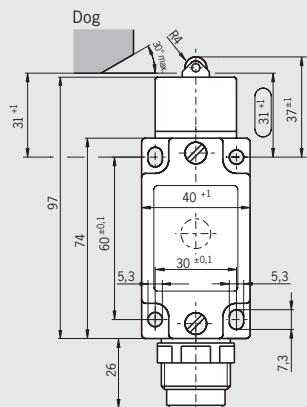




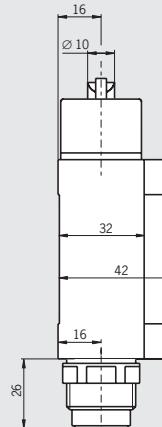
Plug connector SR6
6-pin + PE

Plug connector SR11
11-pin + PE

Dimension drawings



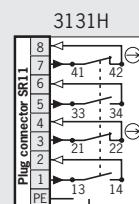
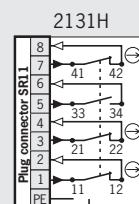
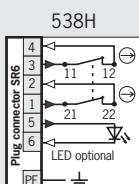
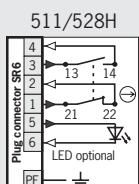
For mating connectors
see page 112



For mating connectors
see page 112

Wiring diagrams

Switch not actuated



Ordering table

Series	Actuator	Connection	Switching element	Function display		
				Without LED	12-60 V red LED	110 V red LED
NZ	RK	2 Plug connector SR6	511 ¹⁾ 1 NC ⊖ + 1 NO	090 016 ¹⁾ NZ2RK-511	On request	088 180 ¹⁾ NZ2RK-511L110
			528H 1 NC ⊖ + 1 NO	090 919 NZ2RK-528	091 292 NZ2RK-528L060	On request
		538H 2 NC ⊖	090 920 NZ2RK-538		On request	On request
	Roller plunger	2 Plug connector SR11	2131H 3 NC ⊖ + 1 NO	090 921 NZ2RK-2131		
			3131H 2 NC ⊖ + 2 NO	090 922 NZ2RK-3131		

1) No BG approval for switching element 511

Safety Switches with Safety Function, Metal Housing

EUCHNER

Position switch NZ.RS with roller plunger



- Version C according to EN 50041
(steel roller Ø 12 mm)
- LED optional
- Plug connector optional
- ATEX approval optional



Approach direction

Horizontal
Can be adjusted in 90° steps.

LED function display (optional)

A function display is available for the following voltage ranges:

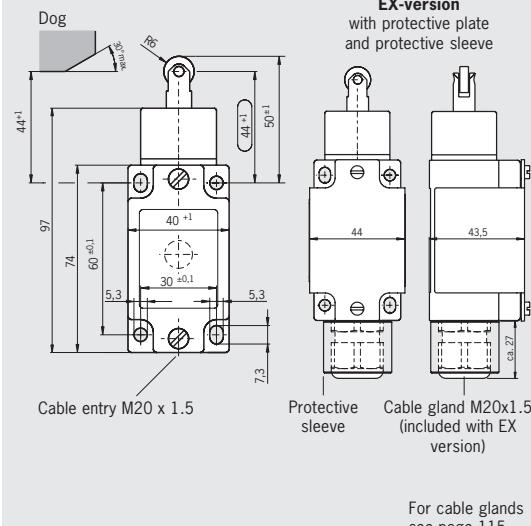
- AC/DC 12-60 V red or yellow
- AC 110 V ±15% red
- AC 230 V ±15% red

Switching elements (see also page 13/14)

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

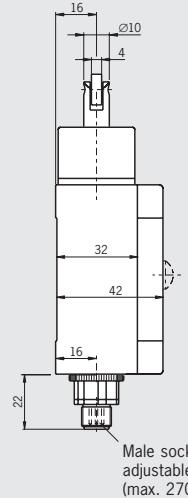
Cable entry M20 x 1.5

Dimension drawings



Plug connector SVM5

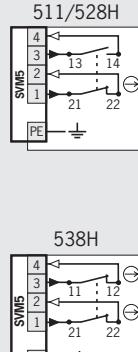
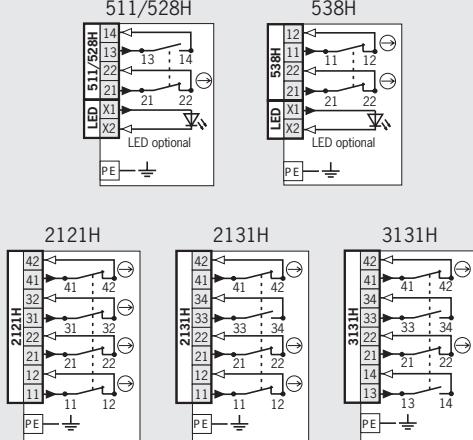
M12 plug, 5-pin



For mating connectors
see page 115

Wiring diagrams

Switch not actuated



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	M20 x 1.5	511 ¹⁾ 1 NC ⊕ + 1 NO		079 960 ¹⁾ NZ1RS-511-M	089 053 ¹⁾ NZ1RS-511L060-M	089 055 ¹⁾ NZ1RS-511L220-M	086 528 ¹⁾ NZ1RS-511L060GE-M
			528H 1 NC ⊕ + 1 NO		089 627 NZ1RS-528-M	086 413 NZ1RS-528L060-M	091 291 NZ1RS-528L220-M	On request
			538H 2 NC ⊕		090 936 NZ1RS-538-M	090 555 NZ1RS-538L060-M	On request	090 424 NZ1RS-538L060GE-M
			2121H 4 NC ⊕		087 595 NZ1RS-2121-M	-	-	-
			2131H 3 NC ⊕ + 1 NO		089 633 NZ1RS-2131-M	-	-	-
			3131H 2 NC ⊕ + 2 NO		089 631 NZ1RS-3131-M	-	-	-
			3131H 2 NC ⊕ + 2 NO	ATEX incl. cable gland	094 169 ²⁾ NZ1RS-3131-M-EX	-	-	-
	2	Plug connector SVM5 (M12 plug)	511 1 NC ⊕ + 1 NO		090 027 NZ2RS-511SVM5	On request	-	On request
			528H 1 NC ⊕ + 1 NO		090 963 NZ2RS-528SVM5	On request	-	On request
			538H 2 NC ⊕		090 964 NZ2RS-538SVM5	On request	-	On request

1) No BG approval for switching element 511

2) Ex II 3 G EEx nC IIC T5 (reduced resistance to impact acc. to EN 61241-1; max. 4 J) / Ex II 3 D Ex tD A22 T90°C (reduced resistance to impact acc. to EN 61241-1; max. 4 J)



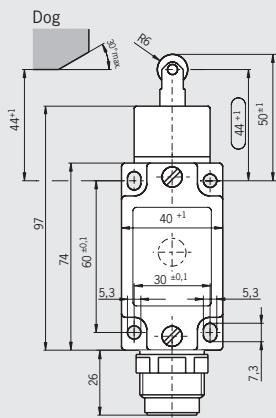
Plug connector SR6
6-pin + PE

Plug connector SR6 angled
6-pin + PE

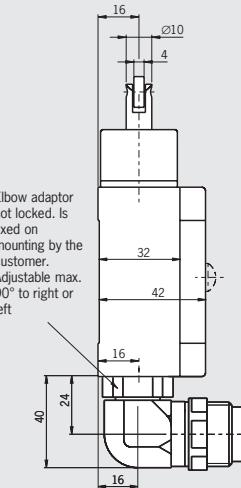
Plug connector MR9
8-pin + PE

Plug connector SR11
11-pin + PE

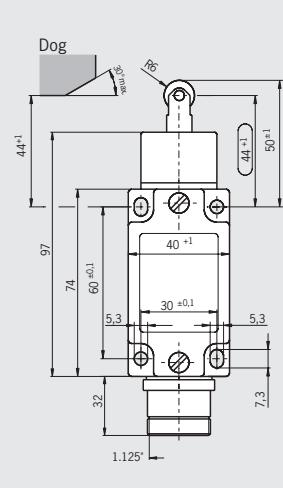
Dimension drawings



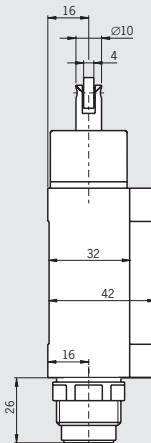
For mating connectors
see page 112



For mating connectors
see page 112



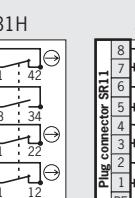
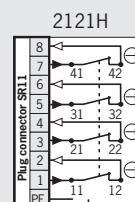
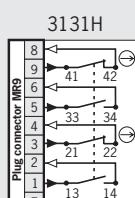
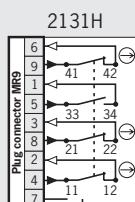
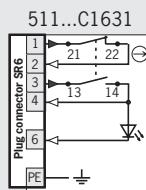
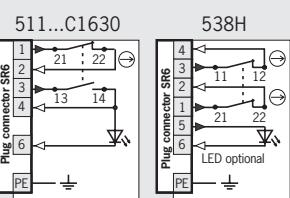
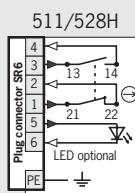
For mating connectors
see page 124



For mating connectors
see page 112

Wiring diagrams

Switch not actuated



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	2 Plug connector SR6	511 ¹⁾ 1 NC ⊖ + 1 NO		090 024 ¹⁾ NZ2RS-511	090 147 ¹⁾ NZ2RS-511L060	091 302 ¹⁾ NZ2RS-511L110	089 622 ¹⁾ NZ2RS-511L060GE
			511 ¹⁾ 1 NC ⊖ + 1 NO	C1630 Alternative wiring	On request	On request	On request	082 400 ¹⁾ NZ2RS-511L060C1630
			528H 1 NC ⊖ + 1 NO		090 950 NZ2RS-528	088 197 NZ2RS-528L060	On request	On request
			538H 2 NC ⊖		090 951 NZ2RS-538	090 952 NZ2RS-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	079 350 ¹⁾ NZ2RS-511L060C1631
	1....9C	2131H Plug connector MR9	2131H 3 NC ⊖ + 1 NO		077 362 ³⁾ NZ1RS-2131-9C-GMMF	-	-	-
			3131H 2 NC ⊖ + 2 NO		087 074 NZ1RS-3131-9C-GMMF	-	-	-
		2 Plug connector SR11	2121H 4 NC ⊖		090 974 NZ2RS-2121	-	-	-
			2131H 3 NC ⊖ + 1 NO		090 149 NZ2RS-2131	-	-	-
			3131H 2 NC ⊖ + 2 NO		090 954 NZ2RS-3131	-	-	-

1) No BG approval for switching element 511

3) No UL approval for safety switch 077 362

Safety Switches with Safety Function, Metal Housing

EUCHNER

Position switch NZ.RG with roller plunger

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



Approach direction

Horizontal
Can be adjusted 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

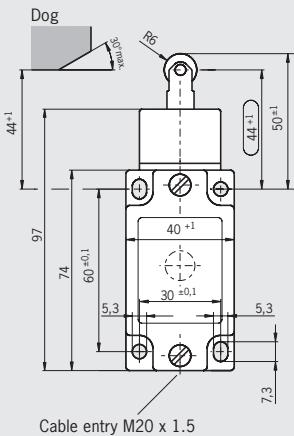
Switching elements (see also page 13/14)

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

c UL us

Cable entry M20 x 1.5

Dimension drawings

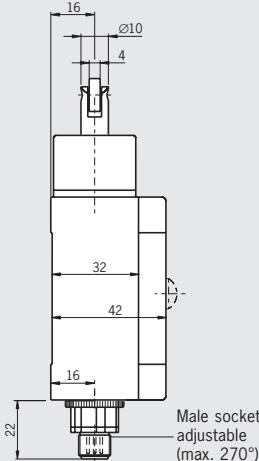


For cable glands
see page 115

c UL us

Plug connector SVM5

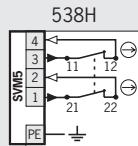
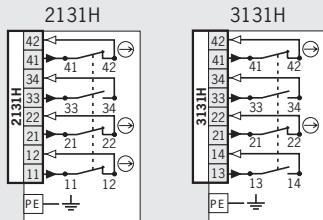
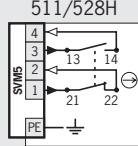
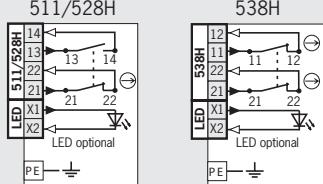
M12 plug, 5-pin



For mating connectors
see page 115

Wiring diagrams

Switch not actuated



Ordering table

Series	Actuator	Connection	Switching element	Function display		
				Without LED	12-60 V red LED	230 V red LED
NZ	RG Roller plunger	Cable entry M20 x 1.5	511 ¹⁾ 1 NC ⊖ + 1 NO	088 605 ¹⁾ NZ1RG-511-M	089 052 ¹⁾ NZ1RG-511L060-M	089 054 ¹⁾ NZ1RG-511L220-M
			528H 1 NC ⊖ + 1 NO	090 932 NZ1RG-528-M	090 008 NZ1RG-528L060-M	On request
			538H 2 NC ⊖	090 933 NZ1RG-538-M	090 009 NZ1RG-538L060-M	On request
			2131H 3 NC ⊖ + 1 NO	090 934 NZ1RG-2131-M	-	-
			3131H 2 NC ⊖ + 2 NO	090 935 NZ1RG-3131-M	-	-
	2 Plug connector (M12 plug)	511 1 NC ⊖ + 1 NO	090 026 NZ2RG-511SVM5	On request	-	-
		528H 1 NC ⊖ + 1 NO	090 961 NZ2RG-528SVM5	On request	-	-
		538H 2 NC ⊖	090 962 NZ2RG-538SVM5	On request	-	-

1) No BG approval for switching element 511

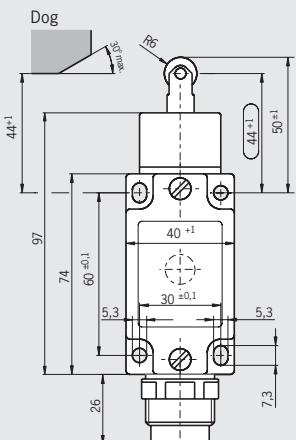


Plug connector SR6
6-pin + PE

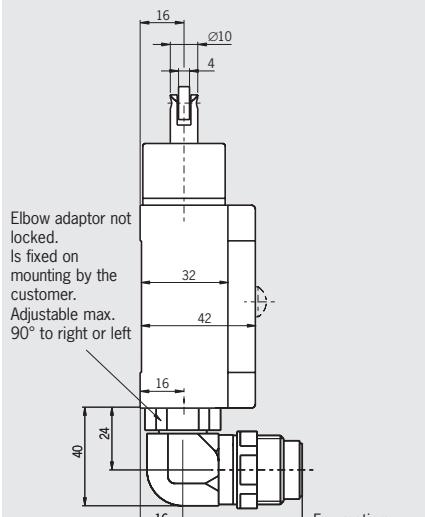
Plug connector SR6 angled
6-pin + PE

Plug connector SR11
11-pin + PE

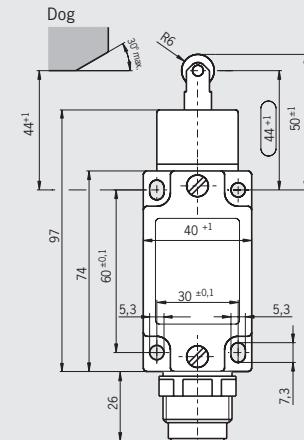
Dimension drawings



For mating connectors
see page 112



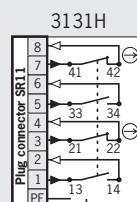
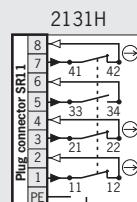
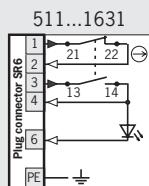
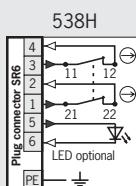
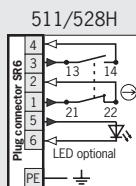
For mating connectors see
page 112



For mating connectors
see page 112

Wiring diagrams

Switch not actuated



Ordering table

Series	Actuator	Connection	Switching element	Version	Function display		
					Without LED	12-60 V red LED	12-60 V yellow LED
NZ	RG	Roller plunger	2 Plug connector SR6	511 ¹⁾ 1 NC \ominus + 1 NO	090 032 ¹⁾ NZ2RG-511	091 284 ¹⁾ NZ2RG-511L060	On request
			528H	1 NC \ominus + 1 NO	090 943 NZ2RG-528	090 944 NZ2RG-528L060	On request
			538H	2 NC \ominus	090 945 NZ2RG-538	090 946 NZ2RG-538L060	On request
	RG	Plunger roller	2 Plug connector SR6 angled	511 ¹⁾ 1 NC \ominus + 1 NO	C1631 Alternative wiring	On request	On request
			2131H	3 NC \ominus + 1 NO	090 947 NZ2RG-2131	-	-
			3131H	2 NC \ominus + 2 NO	090 948 NZ2RG-3131	-	-

1) No BG approval for switching element 511

Safety Switches with Safety Function, Metal Housing

EUCHNER

Position switch NZ.RL with roller plunger

- Steel roller Ø 18 mm
- With ball bearing Ø 16 mm optional
- LED optional
- Plug connector optional



Approach direction

Horizontal
Can be adjusted 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 element
1 NC ⊖ + 1 NO
- **528H** Slow-action switching element
1 NC ⊖ + 1 NO
- **538H** Slow-action switching element
2 NC ⊖
- **2121H** Slow-action switching element
4 NC ⊖
- **2131H** Slow-action switching element
3 NC ⊖ + 1 NO
- **3131H** Slow-action switching element
2 NC ⊖ + 2 NO

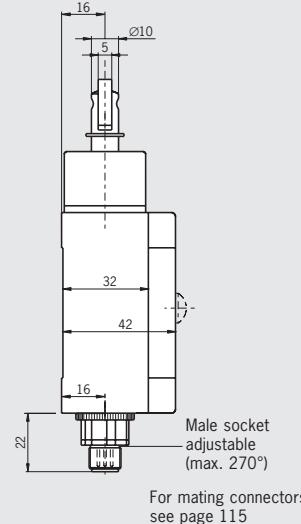
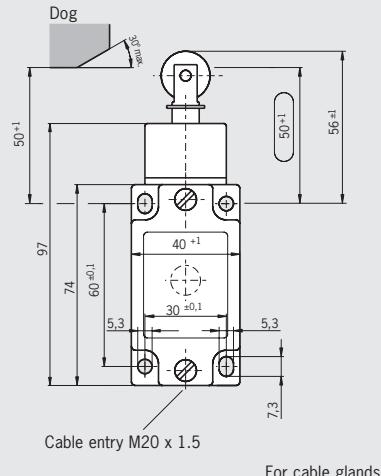
c

Cable entry M20 x 1.5

c

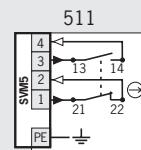
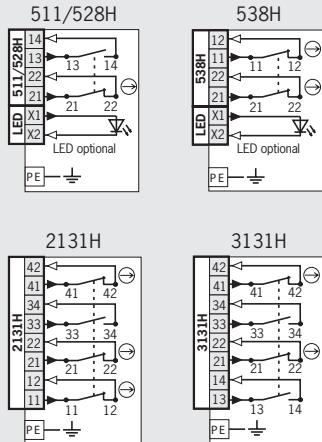
Plug connector SVM5
M12 plug, 5-pin

Dimension drawings



Wiring diagrams

Switch not actuated



Ordering table

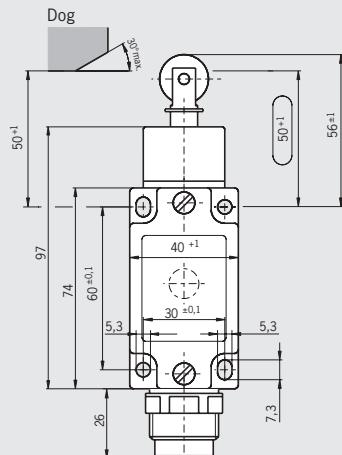
Series	Actuator	Connection	Switching element	Function display			
				Without LED	12-60 V red LED	110 V red LED	230 V red LED
NZ	RL	Cable entry M20 x 1.5	511 ¹⁾ 1 NC ⊖ + 1 NO	088 614 ¹⁾ NZ1RL-511-M	088 996 ¹⁾ NZ1RL-511L060-M	089 080 ¹⁾ NZ1RL-511L110-M	089 079 ¹⁾ NZ1RL-511L220-M
			528H 1 NC ⊖ + 1 NO	090 937 NZ1RL-528-M	090 938 NZ1RL-528L060-M	On request	089 084 NZ1RL-528L220-M
			538H 2 NC ⊖	090 939 NZ1RL-538-M	090 940 NZ1RL-538L060-M	On request	On request
		2121H 3 NC ⊖ + 1 NO	090 941 NZ1RL-2131-M			-	-
		3131H 2 NC ⊖ + 2 NO	090 942 NZ1RL-3131-M		-	-	-
	2 Plug connector SVM5 (M12 plug)	511 1 NC ⊖ + 1 NO	090 028 NZ2RL-511SVM5	On request			

¹⁾ No BG approval for switching element 511



Plug connector SR6
6-pin + PE

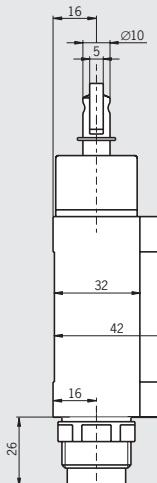
Dimension drawings



For mating connectors
see page 112

Plug connector SR11
11-pin + PE

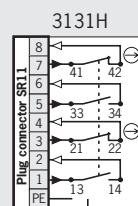
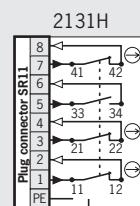
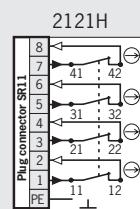
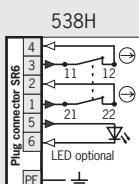
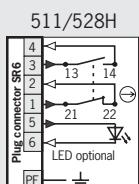
Note:
Roller diameter 16 mm on
version with ball bearing
(C1831)



For mating connectors
see page 112

Wiring diagrams

Switch not actuated



Ordering table

Series	Actuator	Connection	Switching element	Version	Function display	
					Without LED	12-60 V red LED
NZ	RL	2	511 ¹⁾ 1 NC ⊖ + 1 NO		090 025 ¹⁾ NZ2RL-511	090 955 ¹⁾ NZ2RL-511L060
			528H 1 NC ⊖ + 1 NO		090 956 NZ2RL-528	091 282 NZ2RL-528L060
		2	538H 2 NC ⊖		090 957 NZ2RL-538	091 278 NZ2RL-538L060
			2121H 4 NC ⊖		090 975 NZ2RL-2121	-
	SR11	2	2121H 4 NC ⊖	C1831	095 806 NZ2RL-2121C1831	-
			2131H 3 NC ⊖ + 1 NO		090 958 NZ2RL-2131	-
		2	3131H 2 NC ⊖ + 2 NO		090 959 NZ2RL-3131	-

1) No BG approval for switching element 511

Safety Switches with Safety Function, Metal Housing

EUCHNER

Position switch NZ.HS with roller lever arm



- ▶ Version A according to EN 50041 (steel roller Ø 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:

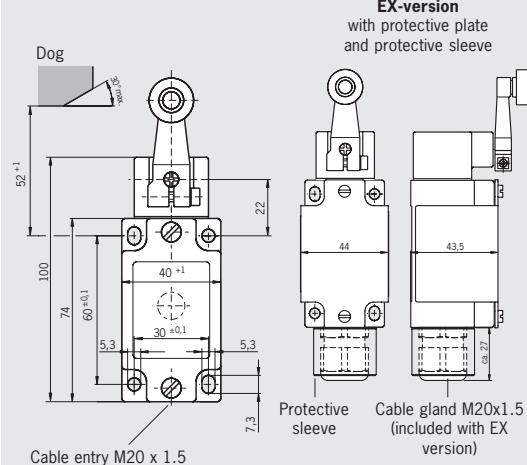
- ▶ AC/DC 12-60 V red or yellow
- ▶ AC 110 V ±15% red
- ▶ AC 230 V ±15% red

Switching elements (see also page 13/14)

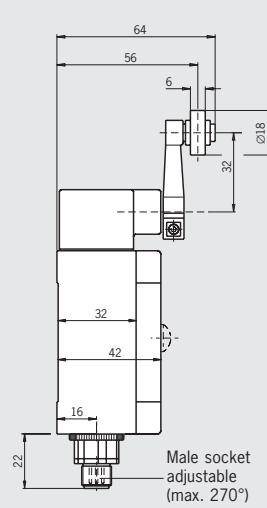
- ▶ **511** Snap-action switching element
1 NC ⊖ + 1 NO
- ▶ **528H** Slow-action switching element
1 NC ⊖ + 1 NO
- ▶ **538H** Slow-action switching element
2 NC ⊖
- ▶ **2121H** Slow-action switching element
4 NC ⊖
- ▶ **2131H** Slow-action switching element
3 NC ⊖ + 1 NO
- ▶ **3131H** Slow-action switching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

Cable entry M20 x 1.5

Dimension drawings



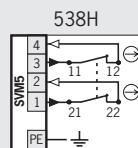
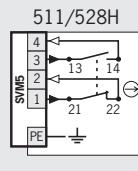
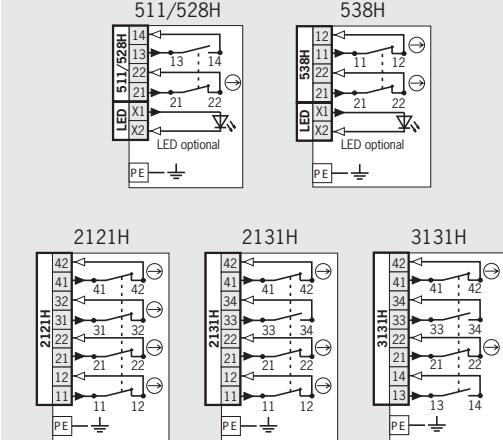
Plug connector SVM5 M12 plug, 5-pin



For mating connectors
see page 115

Wiring diagrams

Switch not actuated



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	M20 x 1.5	511 ¹⁾ 1 NC ⊖ + 1 NO		079 953 ¹⁾ NZ1HS-511-M	090 035 ¹⁾ NZ1HS-511L060-M	090 036 ¹⁾ NZ1HS-511L110-M	090 037 ¹⁾ NZ1HS-511L220-M	090 038 ¹⁾ NZ1HS-511L060GE-M
			528H 1 NC ⊖ + 1 NO		090 970 NZ1HS-528-M	090 971 NZ1HS-528L060-M	090 050 NZ1HS-528L110-M	090 052 NZ1HS-528L220-M	090 049 NZ1HS-528L060GE-M
		Cable entry	538H 2 NC ⊖		090 972 NZ1HS-538-M	090 760 NZ1HS-538L060-M	On request	On request	On request
			2121H 4 NC ⊖		090 254 NZ1HS-2121-M	-	-	-	-
			2131H 3 NC ⊖ + 1 NO		090 973 NZ1HS-2131-M	-	-	-	-
			3131H 2 NC ⊖ + 2 NO		090 747 NZ1HS-3131-M	-	-	-	-
			3131H 2 NC ⊖ + 2 NO	ATEX incl. cable gland	094 167 ²⁾ NZ1HS-3131-M-EX	-	-	-	-
	2	511 1 NC ⊖ + 1 NO			090 867 NZ2HS-511SVM5	On request	-	-	On request
		528H 1 NC ⊖ + 1 NO			090 868 NZ2HS-528SVM5	On request	-	-	On request
	538H 2 NC ⊖				090 869 NZ2HS-538SVM5	On request	-	-	On request

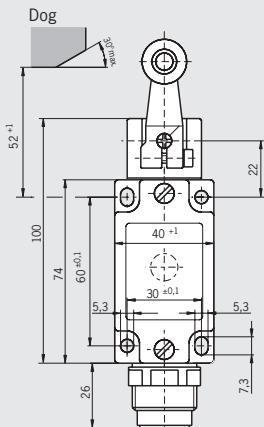
1) No BG approval for switching element 511

2) II 3 G EEx nC IIC T5 (reduced resistance to impact acc. to EN 61241-1; max. 4 J) / II 3 D Ex tD A22 T90°C (reduced resistance to impact acc. to EN 61241-1; max. 4 J)



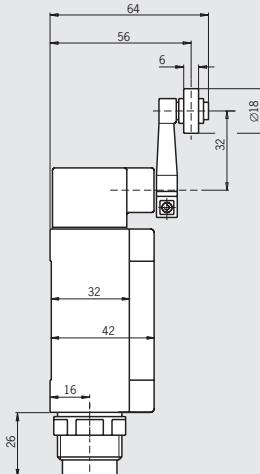
Plug connector SR6
6-pin + PE

Dimension drawings



For mating connectors
see page 112

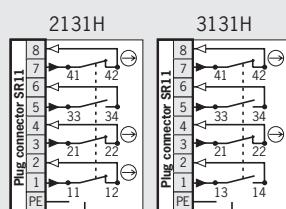
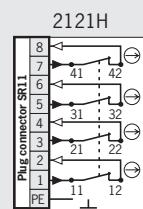
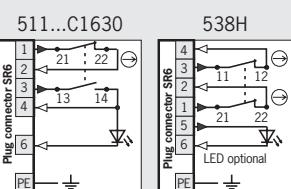
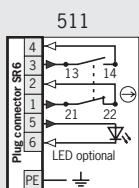
Plug connector SR11
11-pin + PE



For mating connectors
see page 112

Wiring diagrams

Switch not actuated



Please turn over

Ordering table

Series	Actuator	Connection	Switching element	Version	Function display		
					Without LED	12-60 V red LED	12-60 V yellow LED
NZ	HS Lever arm	2 Plug connector SR6	511 ¹⁾ 1 NC \ominus + 1 NO		089 093 ¹⁾ NZ2HS-511	089 094 ¹⁾ NZ2HS-511L060	090 697 ¹⁾ NZ2HS-511L060GE
			511 ¹⁾ 1 NC \ominus + 1 NO	C1630 Alternative wiring	On request	On request	078 473 ¹⁾ NZ2HS-511L060C1630
		528H Plug connector SR6	1 NC \ominus + 1 NO		090 852 NZ2HS-528	088 196 NZ2HS-528L060	On request
		538H Plug connector SR6	2 NC \ominus		090 853 NZ2HS-538	090 854 NZ2HS-538L060	On request
	2 Plug connector SR11	2121H			091 264 NZ2HS-2121	-	-
		2131H	3 NC \ominus + 1 NO		090 146 NZ2HS-2131	-	-
		3131H	2 NC \ominus + 2 NO		090 856 NZ2HS-3131	-	-

1) No BG approval for switching element 511

Safety Switches with Safety Function, Metal Housing

EUCHNER



Plug connector MR8
7-pin + PE

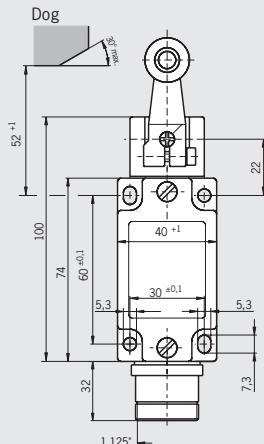
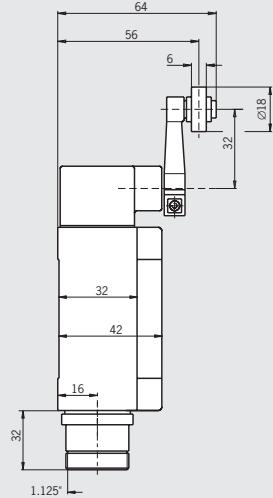
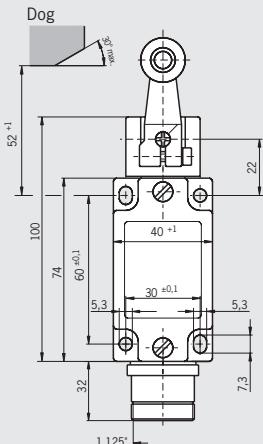


Plug connector MR9
8-pin + PE



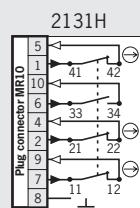
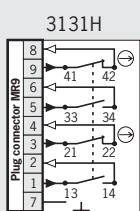
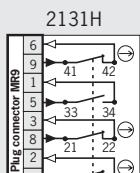
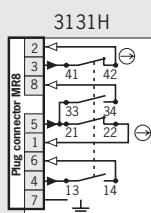
Plug connector MR10
9-pin + PE

Dimension drawings



Wiring diagrams

Switch not actuated



Ordering table

Series	Actuator	Connection element	Switching Without LED	Function display		
				12-60 V red LED	12-60 V yellow LED	
NZ	HS Lever arm	1...8C Plug connector MR8	3131H 2 NC \ominus + 2 NO	086 574 NZ1HS-3131-8C-Ford / PT60577-101K01	-	-
		1...9C Plug connector MR9	2131H 3 NC \ominus + 1 NO	077 391 ³⁾ NZ1HS-2131-9C-GMMF	-	-
		1...9C Plug connector MR9	3131H 2 NC \ominus + 2 NO	073 508 NZ1HS-3131-9C-GMMF	-	-
		1...10C Plug connector MR10	3131H 2 NC \ominus + 2 NO	086 574 NZ1HS-3131-10C-FW	-	-

3) No UL approval for safety switch 077 391

Position switch NZ.HB with roller lever arm



- ▶ Version A according to EN 50041
(plastic roller Ø 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:

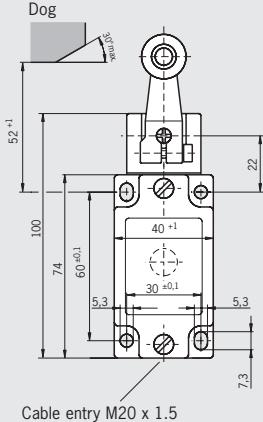
- ▶ AC/DC 12-60 V red or yellow
- ▶ AC 230 V ±15% red

Switching elements (see also page 13/14)

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

Cable entry M20 x 1.5

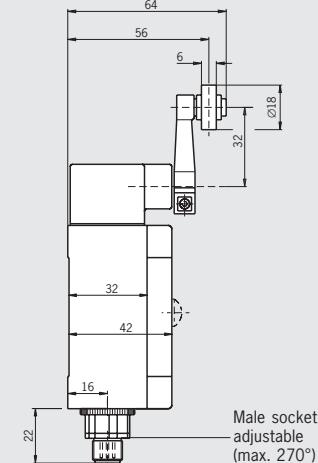
Dimension drawings



For cable glands
see page 115

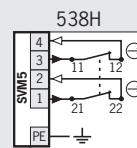
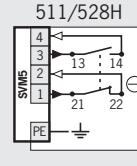
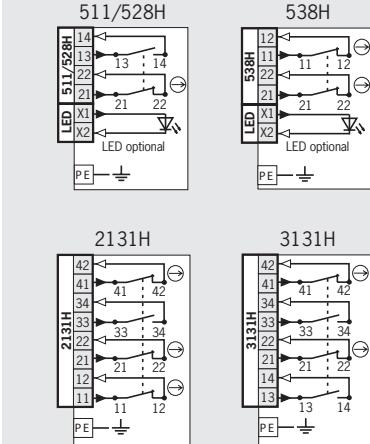
Plug connector SVM5

M12 plug, 5-pin



For mating connectors
see page 115

Wiring diagrams Switch not actuated



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	511 ¹⁾ 1 NC ⊖ + 1 NO	079 952 ¹⁾ NZ1HB-511-M	090 039 ¹⁾ NZ1HB-511L060-M	090 040 ¹⁾ NZ1HB-511L220-M	086 525 ¹⁾ NZ1HB-511L060GE-M
			528H 1 NC ⊖ + 1 NO	088 199 NZ1HB-528-M	090 965 NZ1HB-528L060-M	090 051 NZ1HB-528L220-M	086 527 NZ1HB-528L060GE-M
			538H 2 NC ⊖	090 966 NZ1HB-538-M	090 967 NZ1HB-538L060-M	On request	On request
		M20 x 1.5 2131H 3 NC ⊖ + 1 NO	2131H 3 NC ⊖ + 1 NO	090 968 NZ1HB-2131-M	-	-	-
			3131H 2 NC ⊖ + 2 NO	090 969 NZ1HB-3131-M	-	-	-
			511 1 NC ⊖ + 1 NO	090 861 NZ2HB-511SVM5	On request	-	On request
	2 Plug connector SVM5 (M12 plug)	528H 1 NC ⊖ + 1 NO	090 864 NZ2HB-528SVM5	On request	-	On request	
		538H 2 NC ⊖	090 862 NZ2HB-538SVM5	On request	-	On request	

1) No BG approval for switching element 511

Safety Switches with Safety Function, Metal Housing

EUCHNER



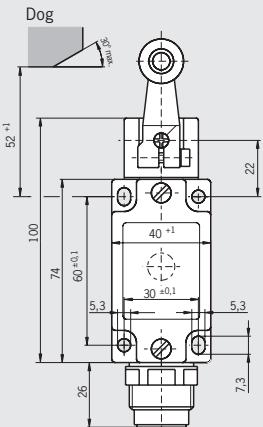
Plug connector SR6
6-pin + PE

Plug connector SR6 angled
6-pin + PE

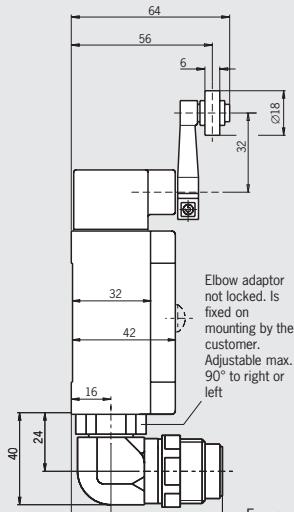


Plug connector SR11
11-pin + PE

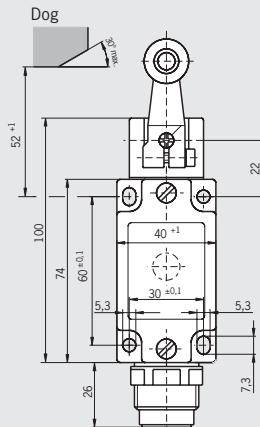
Dimension drawings



For mating connectors
see page 112



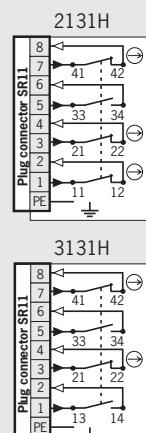
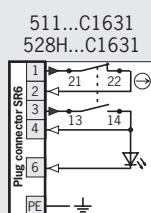
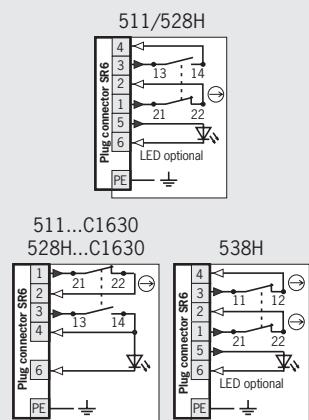
For mating
connectors see
page 112



For mating connectors
see page 112

Wiring diagrams

Switch not actuated



Ordering table

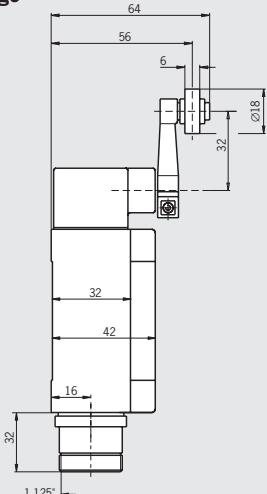
Series	Actuator	Connection	Switching element	Version	Function display			
					Without LED	12-60 V red LED	230 V red LED	12-60 V yellow LED
NZ	HB Lever arm	2 Plug connector SR6	511 ¹⁾ 1 NC ⊖ + 1 NO		089 091 ¹⁾ NZ2HB-511	089 092 ¹⁾ NZ2HB-511L060	On request	090 719 ¹⁾ NZ2HB-511L060GE
			511 ¹⁾ 1 NC ⊖ + 1 NO	C1630 Alternative wiring	On request	On request	On request	054 121 ¹⁾ NZ2HB-511L060C1630
		528H 1 NC ⊖ + 1 NO			090 845 NZ2HB-528	090 846 NZ2HB-528L060	091 281 NZ2HB-528L220	091 301 NZ2HB-528L060GE
			528H ¹⁾ 1 NC ⊖ + 1 NO	C1630 Alternative wiring	On request	On request	On request	091 346 NZ2HB-528L060C1630
		538H 2 NC ⊖			090 847 NZ2HB-538	090 848 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	054 122 ¹⁾ NZ2HB-511L060C1631
		528H ¹⁾ 1 NC ⊖ + 1 NO	C1631 Alternative wiring		On request	On request	On request	091 347 NZ2HB-528L060C1631
		2131H 3 NC ⊖ + 1 NO			090 136 NZ2HB-2131	-	-	-
		3131H 2 NC ⊖ + 2 NO			090 137 NZ2HB-3131	-	-	-

1) No BG approval for switching element 511



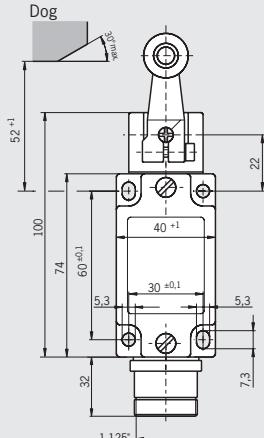
Plug connector MR9
8-pin + PE

Dimension drawings



For mating connectors
see page 124

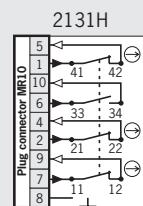
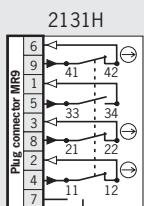
Plug connector MR10
9-pin + PE



For mating connectors
see page 124

Wiring diagrams

Switch not actuated



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 \ominus + 1 NO	077 390 NZ1HB-2131-9C-GMMF	-	-	-
		1...10C Plug connector MR10	2131H 3 NC \ominus + 1 NO	095 898 NZ1HB-2131-10C-FW	-	-	-

Position switch NZ.PS with adjustable lever arm

- Steel roller Ø 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:

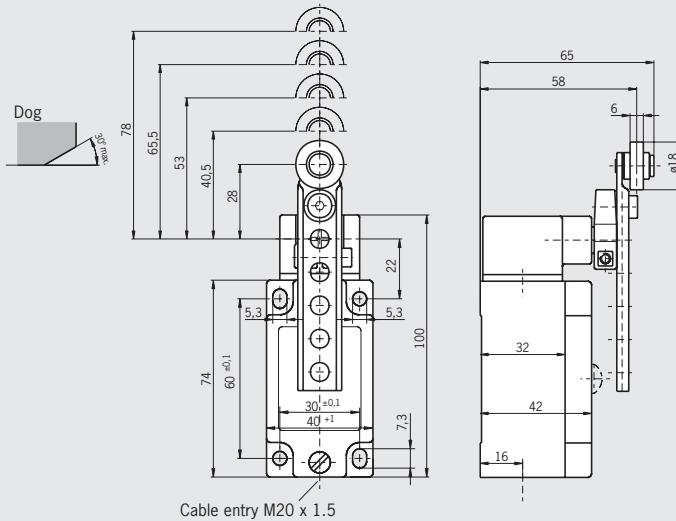
- AC/DC 12-60 V red or yellow
- AC 230 V ±15% red

Switching elements (see also page 13/14)

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

Cable entry M20 x 1.5

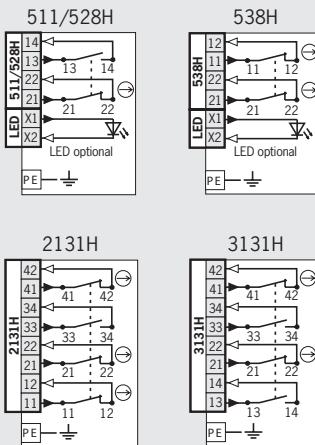
Dimension drawings



1) c UL us

For cable glands
see page 115

Wiring diagrams Switch not actuated



Ordering table

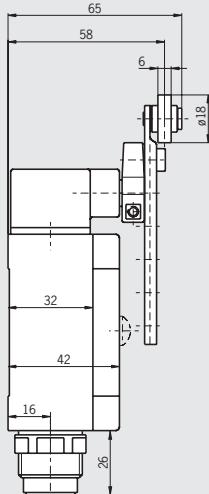
Series	Actuator	Connection	Switching element	Function display			
				Without LED	12-60 V red LED	230 V red LED	230 V yellow LED
NZ	PS Adjustable lever arm	1 Cable entry M20 x 1.5	511 1 NC ⊖ + 1 NO	088 613 NZ1PS-511-M	On request	On request	On request
			528H 1 NC ⊖ + 1 NO	090 874 NZ1PS-528-M	090 430 NZ1PS-528L060-M	093 521 NZ1PS-528L220-M	093 523 NZ1PS-528L220GE-M
			538H 2 NC ⊖	090 875 NZ1PS-538-M	On request	On request	On request
			2131H 3 NC ⊖ + 1 NO	090 876 NZ1PS-2131-M	-	-	-
			3131H 2 NC ⊖ + 2 NO	090 877 NZ1PS-3131-M	-	-	-

1) No BG approval for switching element 511



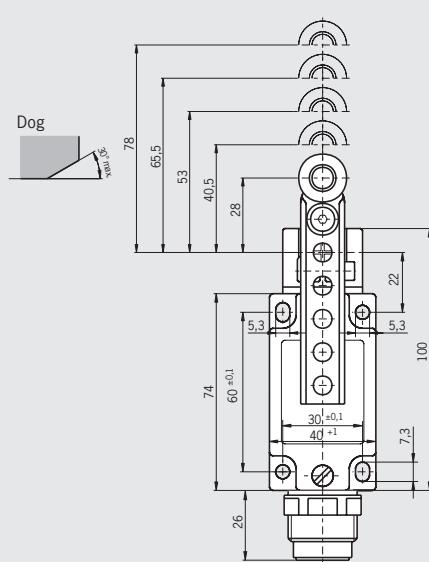
Plug connector SR6
6-pin + PE

Dimension drawings



For mating connectors
see page 112

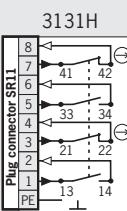
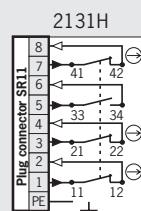
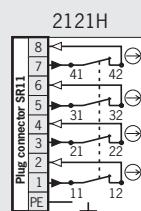
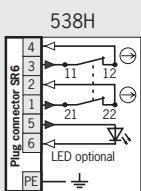
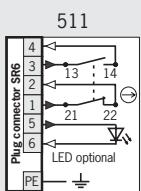
Plug connector SR11
11-pin + PE



For mating connectors
see page 112

Wiring diagrams

Switch not actuated



Ordering table

Series	Actuator	Connection	Switching element	Function display	
				Without LED	12-60 V red LED
NZ	PS Adjustable lever arm steel roller	2 Plug connector SR6	511 1 NC \ominus + 1 NO	093 112 1) NZ2PS-511	090 152 1) NZ2PS-511L060
			538H 2 NC \ominus	On request	091 632 NZ2PS-538L060
		2 Plug connector SR11	2121H 4 NC \ominus	091 268 NZ2PS-2121	-
			2131H 3 NC \ominus + 1 NO	090 151 NZ2PS-2131	-
			3131H 2 NC \ominus + 2 NO	090 150 NZ2PS-3131	-

1) No BG approval for switching element 511

Position switch NZ.PB with adjustable lever arm

► Plastic roller Ø 18

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).

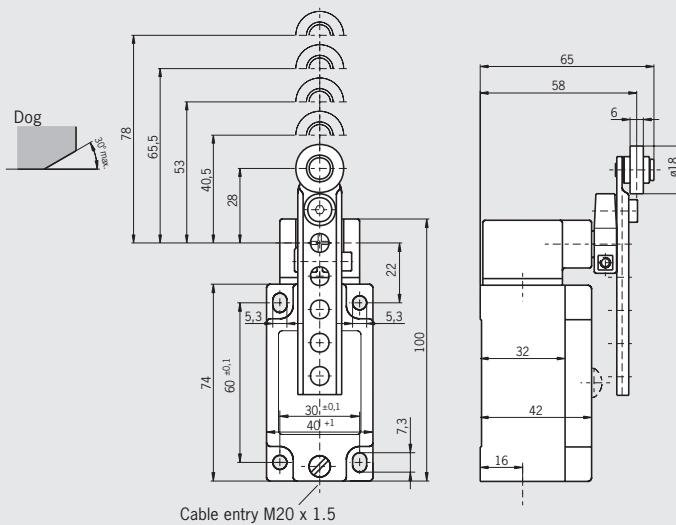
Lever arm adjustment

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

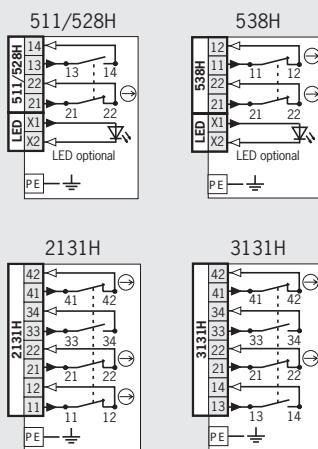
Dimension drawings



For cable glands
see page 115

Wiring diagrams

Switch not actuated



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	088 618 ¹⁾ NZ1PB-511-M	
			528H 1 NC ⊖ + 1 NO	090 870 NZ1PB-528-M	
			538H 2 NC ⊖	090 871 NZ1PB-538-M	
			2131H 3 NC ⊖ + 1 NO	090 872 NZ1PB-2131-M	
			3131H 2 NC ⊖ + 2 NO	090 873 NZ1PB-3131-M	

1) No BG approval for switching element 511

Position switch NZ.RS.C1588 with roller plunger



- ▶ Version C according to EN 50041
(steel roller Ø 12 mm)
- ▶ Exterior bellows
(CR-based material)



Approach direction

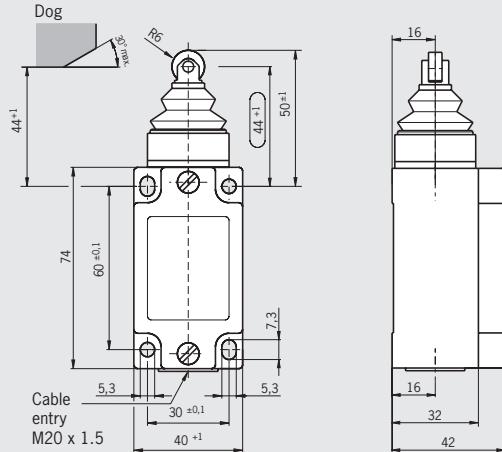
Horizontal
Switch head and lever arm can be adjusted in 90° steps.

Exterior bellows

Protection against heavy soiling (dust) and aggressive coolants.

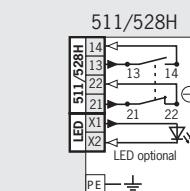
Cable entry M20 x 1.5

Dimension drawings



For cable glands
see page 115

Wiring diagrams



Ordering table

Series	Actuator	Connection	Switching element	Version	Function display
					Without LED
NZ	RS Roller plunger	1 Cable entry	511 ¹⁾ 1 NC ⊖ + 1 NO	C1588 Exterior bellows, red cover	091 352 ¹⁾ NZ1RS-511-MC1588
			528H M20 x 1.5 1 NC ⊖ + 1 NO	C1588 Exterior bellows, red cover	091 339 NZ1RS-528-MC1588

1) No BG approval for switching element 511

Position switch NZ.HB.C569 with roller lever arm

- ▶ Large plastic roller Ø 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

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

LED function display (optional)

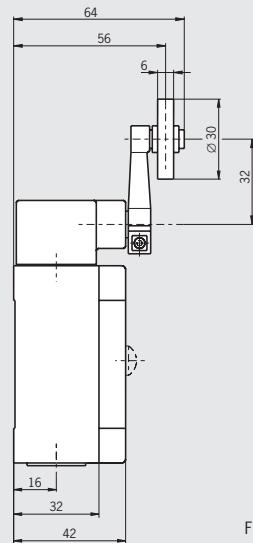
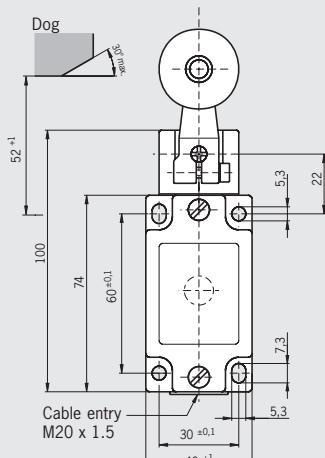
LED function display (optional)
A function display is available for the following voltage ranges:

- AC/DC 12-60 V red

Switching elements (see also page 13)

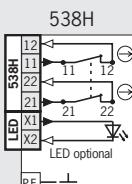
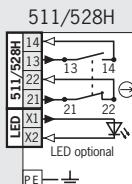
- ▶ **511** Snap-action switching element
1 NC ⊖ + 1 NO
 - ▶ **528H** Slow-action switching element
1 NC ⊖ + 1 NO
 - ▶ **538H** Slow-action switching element
2 NC ⊖

Dimension drawings



For cable glands
see page 115

Wiring diagrams Switch not actuated



Ordering table

Ordering table			Function display			
Series	Actuator	Connection	Switching element	Version	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 Ø 30 mm	079 965 ¹⁾ NZ1HB-511-MC569	091 091 ¹⁾ NZ1HB-511L060-MC569
			528H 1 NC ⊖ + 1 NO	C569 Large plastic roller Ø 30 mm	079 946 NZ1HB-528-MC569	091 330 NZ1HB-528L060-MC569
			538H 2 NC ⊖	C569 Large plastic roller Ø 30 mm	079 999 NZ1HB-538-MC569	On request

1) No BG approval for switching element 511

Position switch NZ.HS.C1779 with roller lever arm

- ▶ Steel roller Ø 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.

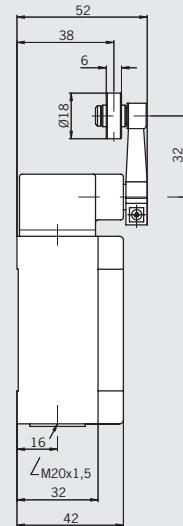
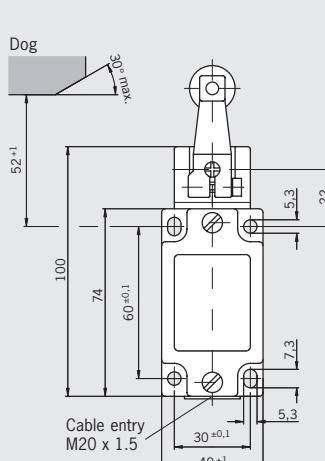
Switching direction

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

Switching elements (see also page 14)

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

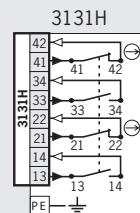
Dimension drawings



For cable glands
see page 115

Wiring diagrams

Switch not actuated



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	079 996 NZ1HS-3131-MC1779

Position switch NZ.HS.C1883 with roller lever arm

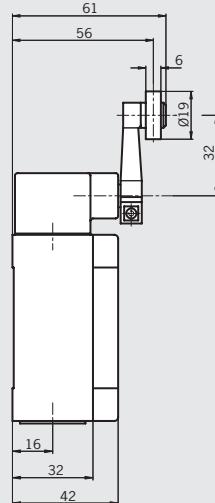
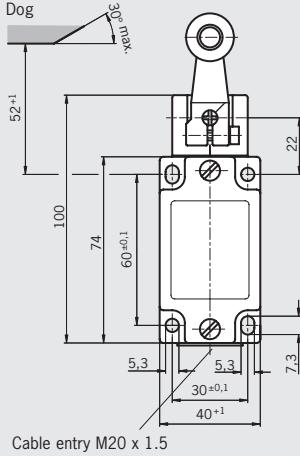


- ▶ Steel roller Ø 19 mm
- ▶ With ball bearing
- ▶ LED on request

Cable entry M20 x 1.5



Dimension drawings



For cable glands
see page 115

Approach direction



Horizontal

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

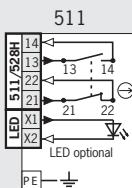
Switching direction

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

Switching elements (see also page 13)

- ▶ **511** Snap-action switching element
1 NC ⊖ + 1 NO

Wiring diagrams



Ordering table

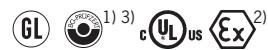
Series	Actuator	Connection	Switching element	Version	Function display
					Without LED
NZ	HS Lever arm	1 Cable entry M20 x 1.5	511 1 NC ⊖ + 1 NO	C1833 With ball bearing	091 312 NZ1HS-511-MC1833

Safety Switches with Separate Actuator, Metal Housing **EUCHNER**

Selection table for safety switches NZ.VZ

Version										
Connection										
SB	Protective plate, tamper protection on the switch head									
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	M	SVM5	C16-1	SR6	MR8	MR9	MR10	SR11	With version	Page
	●								ATEX	48
		●		●						49
									●	49
					●	●	●		●	50
●	●								●	51
●			●	●					●	52
●								●	●	52

Safety switch NZ.VZ



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



Approach direction

Horizontal

Can be adjusted in 90° steps.

LED function display (optional)

A function display is available for the following voltage ranges:

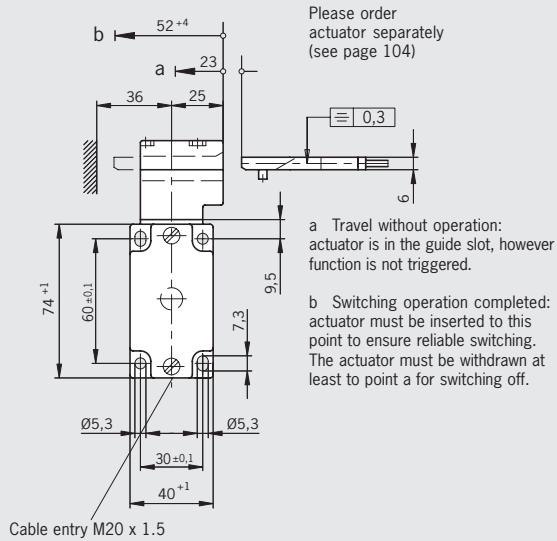
- AC/DC 12-60 V red
- AC 110 V ±15% red
- AC 230 V ±15% red

Switching elements (see also Page 13/14)

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

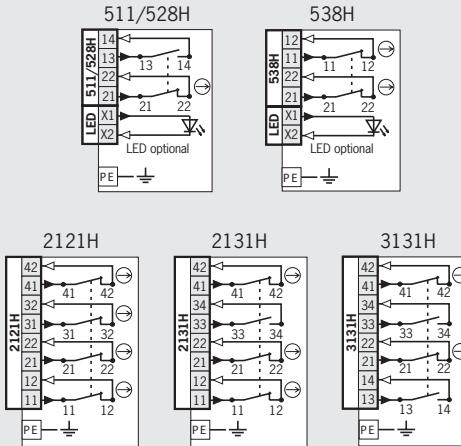
Cable entry M20 x 1.5

Dimension drawings



For cable glands
see page 115

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		089 479 ¹⁾ NZ1VZ-511E-M	On request	On request	On request
			528H 1 NC ⊖ + 1 NO		090 671 NZ1VZ-528E-M	090 566 ³⁾ NZ1VZ-528EL060-M	089 480 ³⁾ NZ1VZ-528EL110-M	082 121 ³⁾ NZ1VZ-528EL220-M
			538H 2 NC ⊖		085 676 NZ1VZ-538E-M	082 119 ³⁾ NZ1VZ-538EL060-M	089 481 ³⁾ NZ1VZ-538EL110-M	089 482 ³⁾ NZ1VZ-538EL220-M
			2121H 4 NC ⊖		089 486 NZ1VZ-2121E-M	-	-	-
			2131H 3 NC ⊖ + 1 NO		082 123 NZ1VZ-2131E-M	-	-	-
			2131H 3 NC ⊖ + 1 NO	ATEX incl. cable gland	093 660 ²⁾ NZ1VZ-2131E-M-EX	-	-	-
			3131H 2 NC ⊖ + 2 NO		082 122 NZ1VZ-3131E-M	-	-	-

1) No BG approval for switching element 511

2) II 3 G Ex nC IIC T5 X (reduced resistance to impact acc. to EN 61241-1; max. 4 J) / II 3 D Ex tD A22 T90°C X (reduced resistance to impact acc. to EN 61241-1; max. 4 J)

3) Approval pending

Safety Switches with Separate Actuator, Metal Housing

EUCHNER



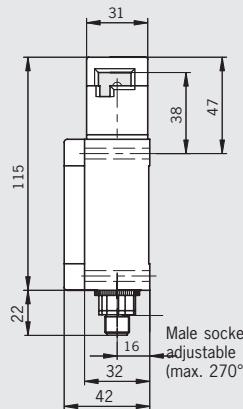
Plug connector SVM5
M12 plug, 5-pin

Plug connector SR6
6-pin + PE

Plug connector SR11
11-pin + PE

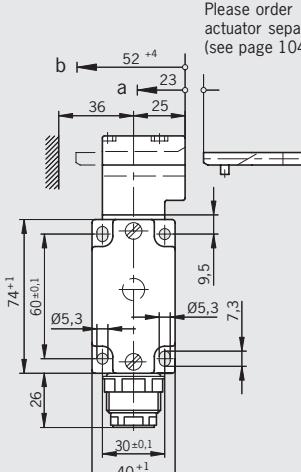
Dimension drawings

Please order
actuator separately
(see page 104)



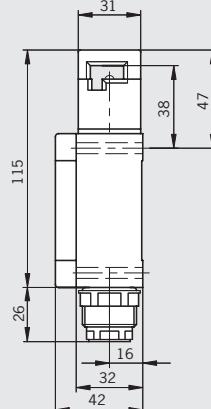
Male socket
adjustable
(max. 270°)
For mating connectors
see page 115

Please order
actuator separately
(see page 104)



For mating connectors
see page 112

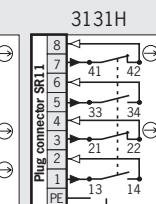
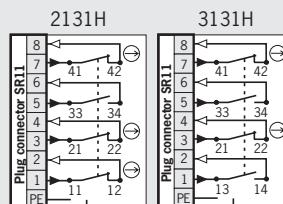
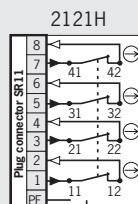
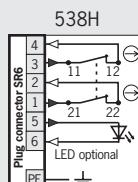
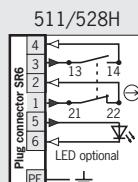
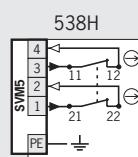
Please order
actuator separately
(see page 104)



Male socket
adjustable
(max. 270°)
For mating connectors
see page 112

Wiring diagrams

Actuator inserted



Please turn over

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 \ominus	084 905 NZ2VZ-538ESVM5	On request		
			511 1 NC \ominus + 1 NO	On request	045 551 NZ2VZ-511EL060	On request	On request
		2 Plug connector SR6	528H 1 NC \ominus + 1 NO	084 885 NZ2VZ-528E	045 801 NZ2VZ-528EL060	059 467 NZ2VZ-528EL110	038 129 NZ2VZ-528EL220
			538H 2 NC \ominus	090 143 NZ2VZ-538E	052 108 NZ2VZ-538EL060	072 234 NZ2VZ-538EL110	059 004 NZ2VZ-538EL220
		2 Plug connector SR11	2121H 4 NC \ominus	088 852 NZ2VZ-2121E			
			2131H 3 NC \ominus + 1 NO	090 144 NZ2VZ-2131E			
			3131H 2 NC \ominus + 2 NO	090 145 NZ2VZ-3131E			

3) Approval pending

Safety Switches with Separate Actuator, Metal Housing

EUCHNER

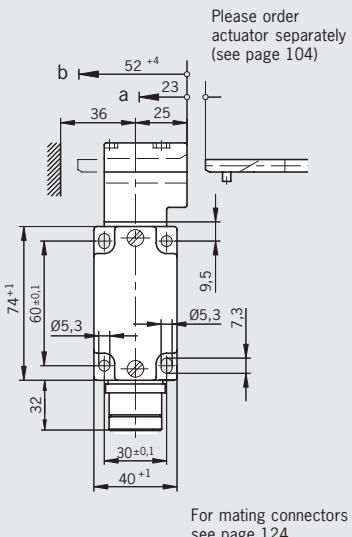
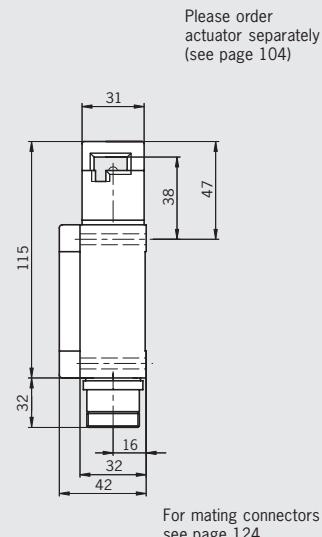
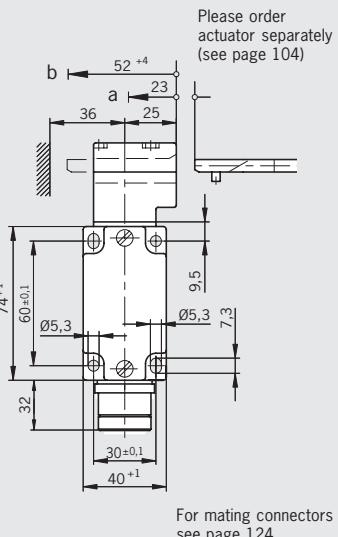


Plug connector MR8
7-pin + PE

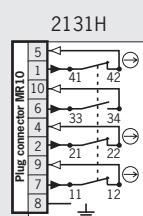
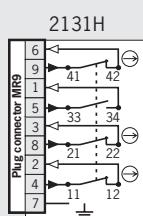
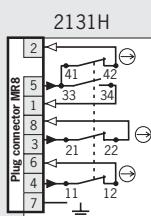
Plug connector MR9
8-pin + PE

Plug connector MR10
9-pin + PE

Dimension drawings



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	1 Plug connector MR8	2131H 3 NC ⊖ + 1 NO	092 355 NZ1VZ-2131E-8C-GMMF	-	-	-
		1 Plug connector MR9	2131H 3 NC ⊖ + 1 NO	077 363 NZ1VZ-2131E-9C-GMMF	-	-	-
		1 Plug connector MR10	2131H 3 NC ⊖ + 1 NO	095 897 NZ1VZ-2131E-10C-FW	-	-	-

3) Approval pending

Safety switch NZ.VZ

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



Approach direction

Horizontal
Can be adjusted 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 voltage ranges:

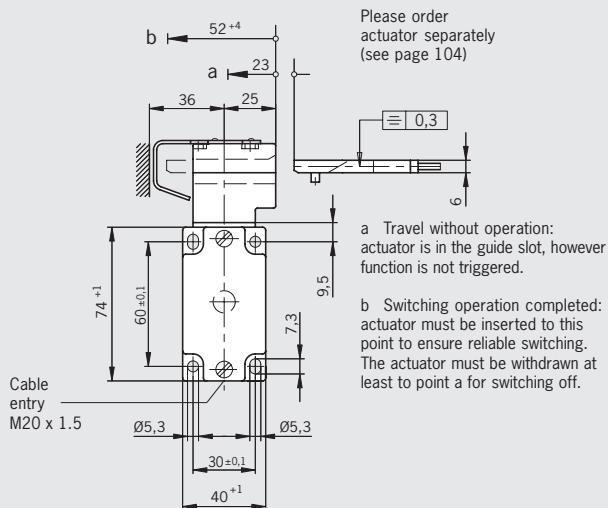
- ▶ AC/DC 12-60 V red
- ▶ AC 230 V ±15% red

Switching elements (see also Page 13/14)

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

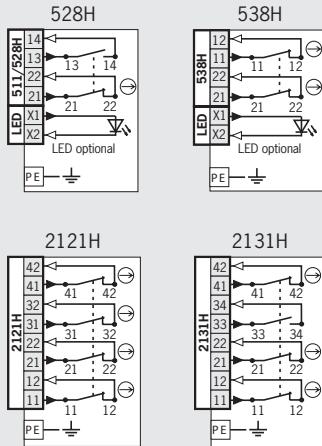
Cable entry M20 x 1.5

Dimension drawings



For cable glands
see page 115

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	082 137 ³⁾ NZ1VZ-528E-MC1233	089 497 ³⁾ NZ1VZ-528EL060-MC1233	On request
			538H 2 NC ⊖	With protective plate	093 858 ³⁾ NZ1VZ-538E-MC1233	On request	089 496 ³⁾ NZ1VZ-538EL220-MC1233
			2121H 4 NC ⊖	With protective plate	089 914 ³⁾ NZ1VZ-2121E-MC1233	-	-
			2131H 3 NC ⊖ + 1 NO	With protective plate	093 859 ³⁾ NZ1VZ-2131E-MC1233	-	-

3) Approval pending

Safety Switches with Separate Actuator, Metal Housing

EUCHNER



Plug connector C16-1
6-pin + PE

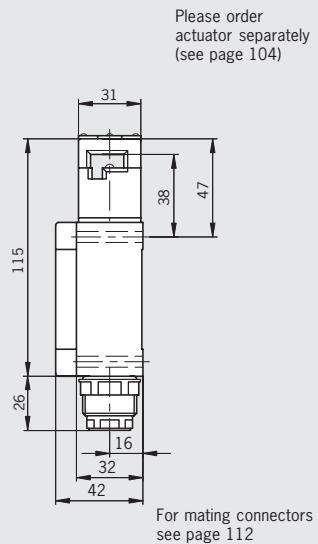
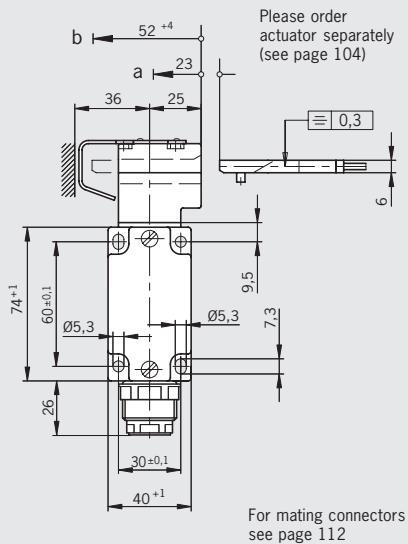
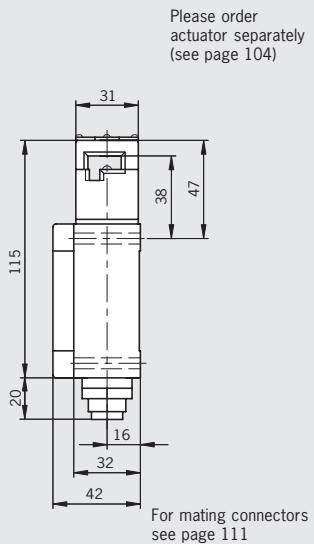


Plug connector SR6
6-pin + PE



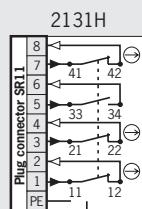
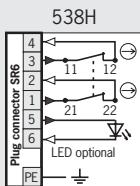
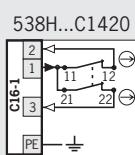
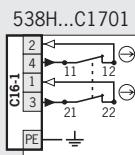
Plug connector SR11
11-pin + PE

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 ⁴⁾	538H 2 NC \ominus	C1701 With protective plate	071 200 NZ2VZ-538EC1701	
				C1420 With protective plate Alternative wiring	043 296 NZ2VZ-538EC1420	
		2 Plug connectors SR6	538H 2 NC \ominus	With protective plate	077 229 NZ2VZ-538EC1233	
		2 Plug connectors SR11	2131H 3 NC \ominus + 1 NO	With protective plate	093 857 NZ2VZ-2131EC1233	

3) Approval pending

4) Switch can be replaced by an enabling switch with C16-1 plug connector

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

Guard locking

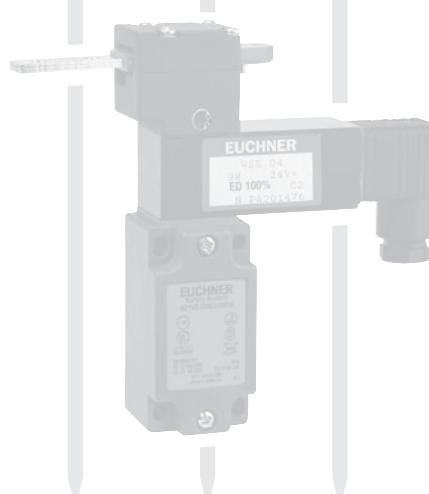
VSM	Mechanical guard locking, closed-circuit current principle		
VSE	Electrical guard locking, open-circuit current principle		
VSH	Manual release		

Connection

M	Thread M20x1.5 for cable glands		
SR6	Plug connector 6-pin + PE		
MR8	Plug connector 7-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 or 4 NC ⊖



VSM	Guard locking		M	Connection			Switching element		Page
	VSE	VSH		SR6	MR8	SR11	Two contacts	Four contacts	
●			●				●	●	54
●				●			●	●	55
●						●		●	55
	●		●				●	●	56
	●			●			●	●	57
	●					●		●	57
		●	●					●	58
		●			●			●	59

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
Can be adjusted 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% red¹⁾
- AC 230 V ±15% AC 230 V ±15% red¹⁾

Guard locking type

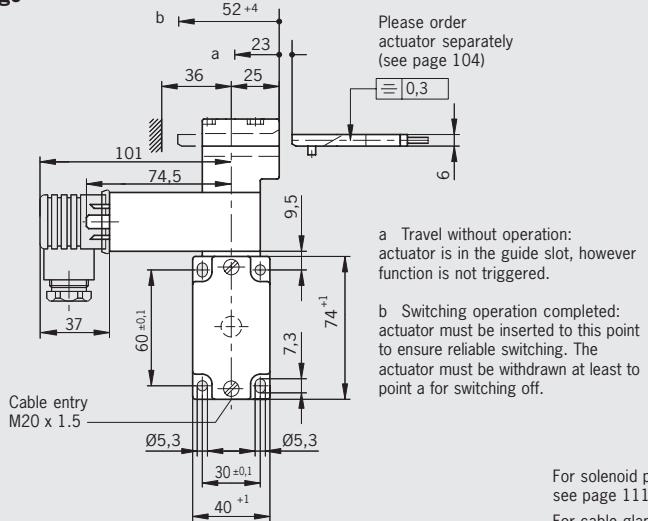
VSM Closed-circuit current principle, guard locking by spring force. Release by applying voltage to the solenoid.

Switching elements (see also page 13/14)

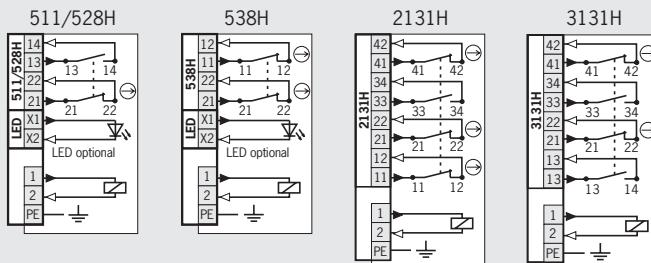
- **511** Snap-action switching element
1 NC ⊕ + 1 NO
- **528H** Slow-action switching element
1 NC ⊕ + 1 NO
- **538H** Slow-action switching element
2 NC ⊕
- **2131H** Slow-action switching element
3 NC ⊕ + 1 NO
- **3131H** Slow-action switching element
2 NC ⊕ + 2 NO

Cable entry M20 x 1.5

Dimension drawings



Wiring diagrams



Ordering table

Series	Actuator	Connection	Guard locking	Solenoid voltage	Switching element	Function display			
						Without LED	12-60V 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 principle	04 24 V DC	511 1 NC ⊕ + 1 NO	090 339 NZ1VZ-511E3VSM04-M	090 344 NZ1VZ-511E3VSM04L060-M	On request	On request
					528H 1 NC ⊕ + 1 NO	082 125 NZ1VZ-528E3VSM04-M	082 126 NZ1VZ-528E3VSM04L060-M	On request	089 488 NZ1VZ-528E3VSM04L220-M
					538H 2 NC ⊕	082 131 NZ1VZ-538E3VSM04-M	082 132 NZ1VZ-538E3VSM04L060-M	On request	090 345 NZ1VZ-538E3VSM04L220-M
					2131H 3 NC ⊕ + 1 NO	088 049 NZ1VZ-2131E3VSM04-M	-	-	-
					3131H 2 NC ⊕ + 2 NO	088 050 NZ1VZ-3131E3VSM04-M	-	-	-
				07 ¹⁾ 110 V AC	528H 1 NC ⊕ + 1 NO	082 129 NZ1VZ-528E3VSM07-M	On request	089 485 NZ1VZ-528E3VSM07L110-M	090 341 NZ1VZ-528E3VSM07L220-M
					538H 2 NC ⊕	088 046 NZ1VZ-538E3VSM07-M	On request	090 340 NZ1VZ-538E3VSM07L110-M	On request
					2131H 3 NC ⊕ + 1 NO	088 038 NZ1VZ-2131E3VSM07-M	-	-	-
					3131H 2 NC ⊕ + 2 NO	088 040 NZ1VZ-3131E3VSM07-M	-	-	-
				09 ¹⁾ 230 V AC	528H 1 NC ⊕ + 1 NO	088 045 NZ1VZ-528E3VSM09-M	090 349 NZ1VZ-528E3VSM09L060-M	On request	090 342 NZ1VZ-528E3VSM09L220-M
					538H 2 NC ⊕	088 044 NZ1VZ-538E3VSM09-M	On request	On request	On request
					2131H 3 NC ⊕ + 1 NO	088 039 NZ1VZ-2131E3VSM09-M	-	-	-
					3131H 2 NC ⊕ + 2 NO	088 041 NZ1VZ-3131E3VSM09-M	-	-	-

1) Use only solenoid plug with integrated rectifier (see page 111)

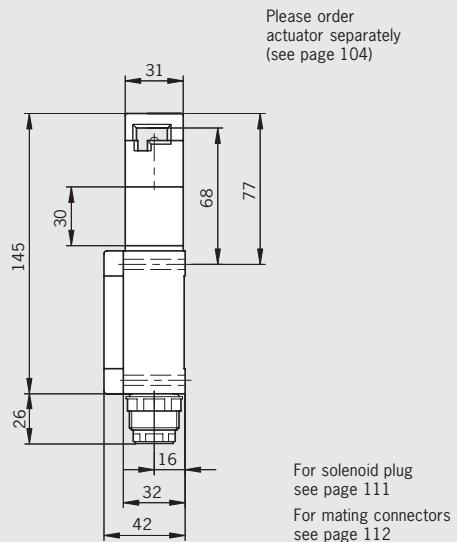
Safety Switches with Separate Actuator, Metal Housing

EUCHNER

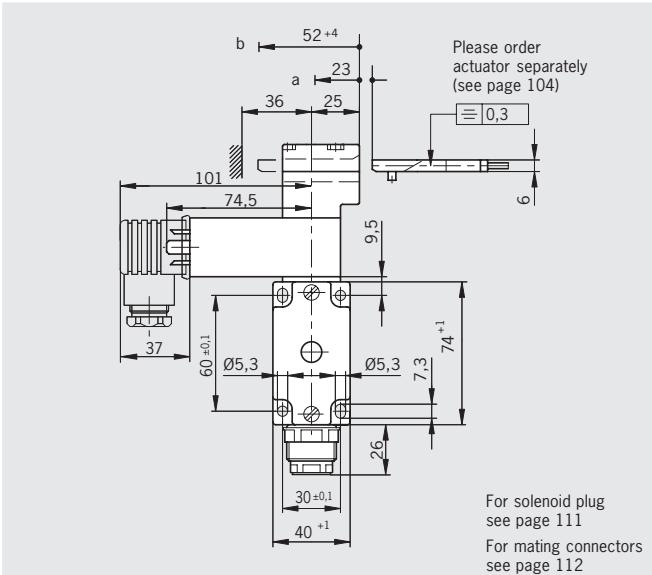


Plug connector SR6
6-pin + PE

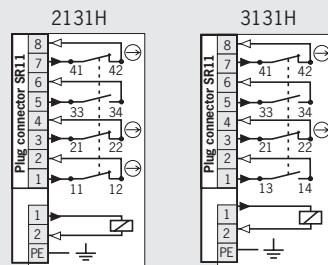
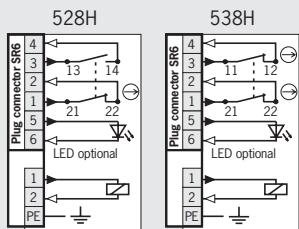
Dimension drawings



Plug connector SR11
11-pin + PE



Wiring diagrams



Ordering table

Series	Actuator	Connection	Guard locking	Solenoid voltage	Switching element	Function display		
						Without LED	12-60V red LED	230 V red LED
NZ	VZ Separate Actuator	2 Plug connector SR6	VSM Mech. guard locking closed-circuit principle 230 V AC	04 24 V DC	528H 1 NC + 1 NO	037 299 NZ2VZ-528E3VSM04	045 856 NZ2VZ-528E3VSM04L060	070 039 NZ2VZ-528E3VSM04L220
					538H 2 NC	050 428 NZ2VZ-538E3VSM04	059 427 NZ2VZ-538E3VSM04L060	On request
					528H 1 NC + 1 NO	055 718 NZ2VZ-528E3VSM09	On request	On request
		2 Plug connector SR11	VSM mech. guard locking closed-circuit principle	09 ¹⁾ 24 V DC	538H 2 NC	076 502 NZ2VZ-538E3VSM09	On request	On request
					2131H 3 NC + 1 NO	074 471 NZ2VZ-2131E3VSM04	-	-
					3131H 2 NC + 2 NO	074 472 NZ2VZ-3131E3VSM04	-	-

1) Use only solenoid plug with integrated rectifier (see page 111)

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
Can be adjusted 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% red¹⁾
- AC 230 V ±15% AC 230 V ±15% red¹⁾

Guard locking type

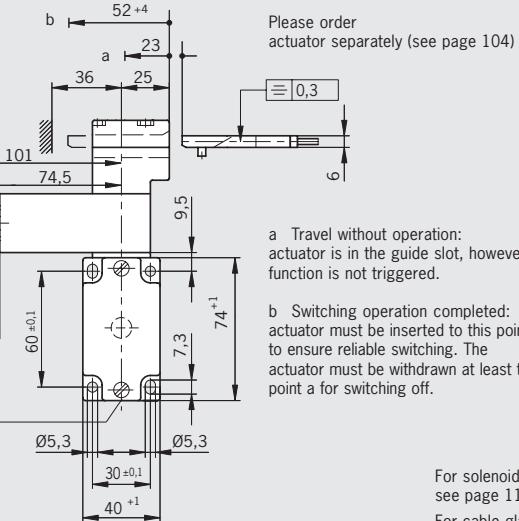
VSE Open-circuit current principle, guard locking by applying voltage to the solenoid. Release by spring force.

Switching elements (see also page 13/14)

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

Cable entry M20 x 1.5

Dimension drawings

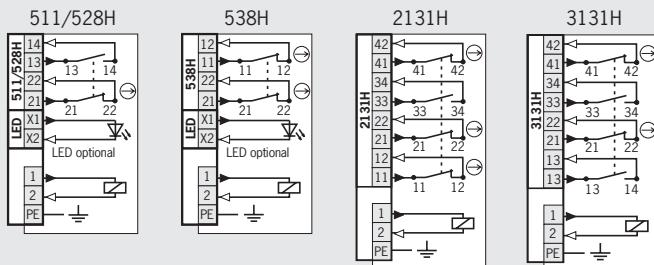


a Travel without operation:
actuator is in the guide slot, however
function is not triggered.

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 solenoid plug
see page 111
For cable glands
see page 115

Wiring diagrams



Ordering table

Series	Actuator	Connection	Guard locking	Solenoid voltage	Switching element	Function display			
						Without LED	12-60V red LED	110 V red LED	230 V red LED
NZ	VZ Separate actuator	1 Cable entry M20 x 1.5	VSE Electr. guard locking open- circuit current principle	04 24 V DC	511 1 NC ⊕ + 1 NO	090 343 NZ1VZ-511E3VSE04-M	On request	On request	On request
					528H 1 NC ⊕ + 1 NO	079 300 NZ1VZ-528E3VSE04M	082 130 NZ1VZ-528E3VSE04L060-M	On request	091 738 NZ1VZ-528E3VSE04L220-M
					538H 2 NC ⊕	089 905 NZ1VZ-538E3VSE04-M	082 128 NZ1VZ-538E3VSE04L060-M	On request	On request
					2131H 3 NC ⊕ + 1 NO	082 134 NZ1VZ-2131E3VSE04-M	-	-	-
					3131H 2 NC ⊕ + 2 NO	088 051 NZ1VZ-3131E3VSE04-M	-	-	-
					528H 1 NC ⊕ + 1 NO	082 133 NZ1VZ-528E3VSE07-M	090 337 NZ1VZ-528E3VSE07L060-M	089 484 NZ1VZ-528E3VSE07L110-M	090 336 NZ1VZ-528E3VSE07L220-M
				07 ¹⁾ 110 V AC	538H 2 NC ⊕	088 048 NZ1VZ-538E3VSE07-M	On request	090 348 NZ1VZ-538E3VSE07L110-M	On request
					2131H 3 NC ⊕ + 1 NO	088 036 NZ1VZ-2131E3VSE07-M	-	-	-
					3131H 2 NC ⊕ + 2 NO	088 042 NZ1VZ-3131E3VSE07-M	-	-	-
				09 ¹⁾ 230 V AC	528H 1 NC ⊕ + 1 NO	088 047 NZ1VZ-528E3VSE09-M	090 346 NZ1VZ-528E3VSE09L060-M	On request	090 335 NZ1VZ-528E3VSE09L220-M
					538H 2 NC ⊕	088 035 NZ1VZ-538E3VSE09-M	On request	090 334 NZ1VZ-538E3VSE09L220-M	On request
					2131H 3 NC ⊕ + 1 NO	088 037 NZ1VZ-2131E3VSE09-M	-	-	-
					3131H 2 NC ⊕ + 2 NO	088 043 NZ1VZ-3131E3VSE09-M	-	-	-

1) Use only solenoid plug with integrated rectifier (see page 111)

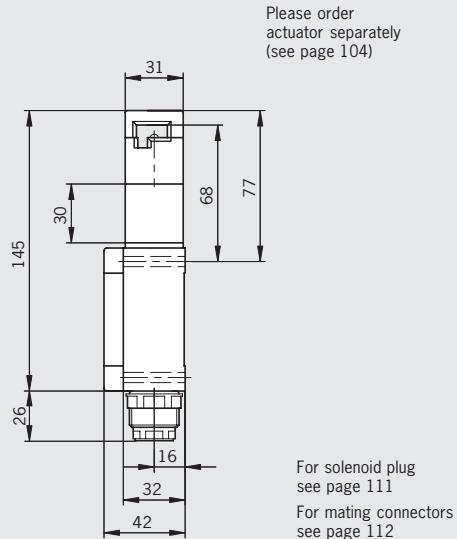
Safety Switches with Separate Actuator, Metal Housing

EUCHNER

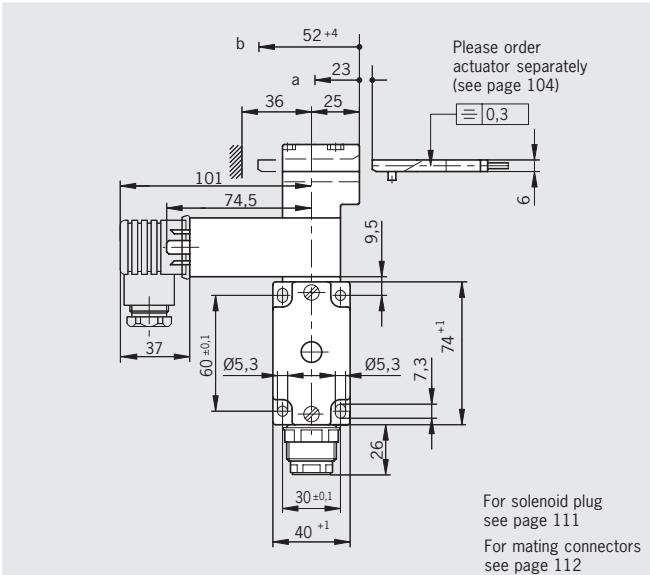


Plug connector SR6
6-pin + PE

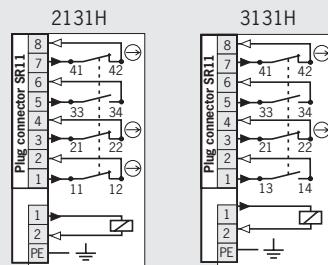
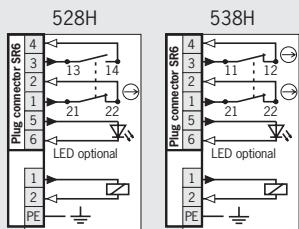
Dimension drawings



Plug connector SR11
11-pin + PE



Wiring diagrams



Ordering table

Series	Actuator	Connection	Guard locking	Solenoid voltage	Switching element	Function display		
						Without LED	12-60V red LED	110 V red LED
NZ	VZ Separate actuator	2 Plug connector SR6	VSE Electr. guard locking open-circuit	04 24 V DC	528H 1 NC \ominus + 1 NO	044 894 NZ2VZ-528E3VSE04	046 742 NZ2VZ-528E3VSE04L060	On request
			current principle	07 ¹⁾ 110 V AC	538H 2 NC \ominus	047 837 NZ2VZ-538E3VSE04	057 921 NZ2VZ-538E3VSE04L060	On request
		2 Plug connector SR11	VSE Electr. guard locking open-circuit	04 24 V DC	528H 1 NC \ominus + 1 NO	On request	On request	070 290 NZ2VZ-528E3VSE07L110
	2131H 3131H	2 Plug connector SR11	VSE Electr. guard locking open-circuit	04 24 V DC	2131H 3 NC \ominus + 1 NO	074 473 NZ2VZ-2131E3VSE04	-	-
			current principle	07 ¹⁾ 24 V DC	3131H 2 NC \ominus + 2 NO	074 474 NZ2VZ-3131E3VSE04	-	-

1) Use only solenoid plug with integrated rectifier (see page 111)

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



- Housing according to EN 50041
- Manual release
- Plug connector optional

Cable entry M20 x 1.5



Approach direction



Horizontal

Can be adjusted in 90° steps.

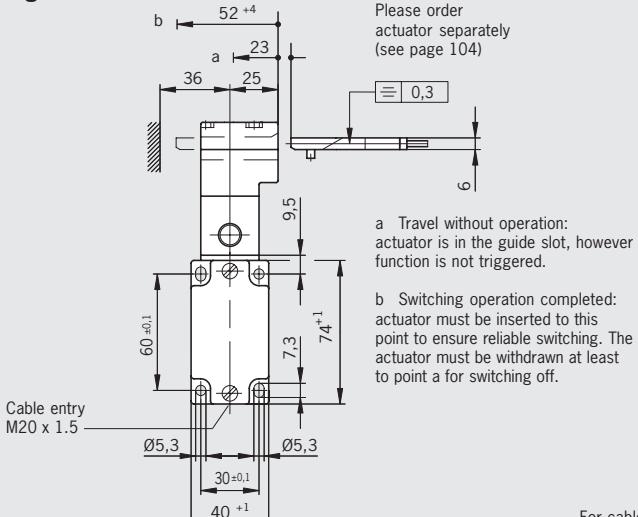
Guard locking type

VSH Mechanical locking by spring force. Manual release.

Switching elements (see also Page 13/14)

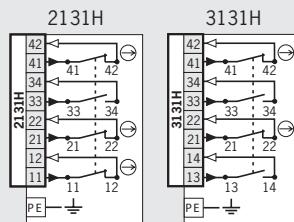
- **2131H** Slow-action switching element
3 NC \ominus + 1 NO
- **3131H** Slow-action switching element
2 NC \ominus + 2 NO

Dimension drawings



For cable glands
see page 115

Wiring diagrams

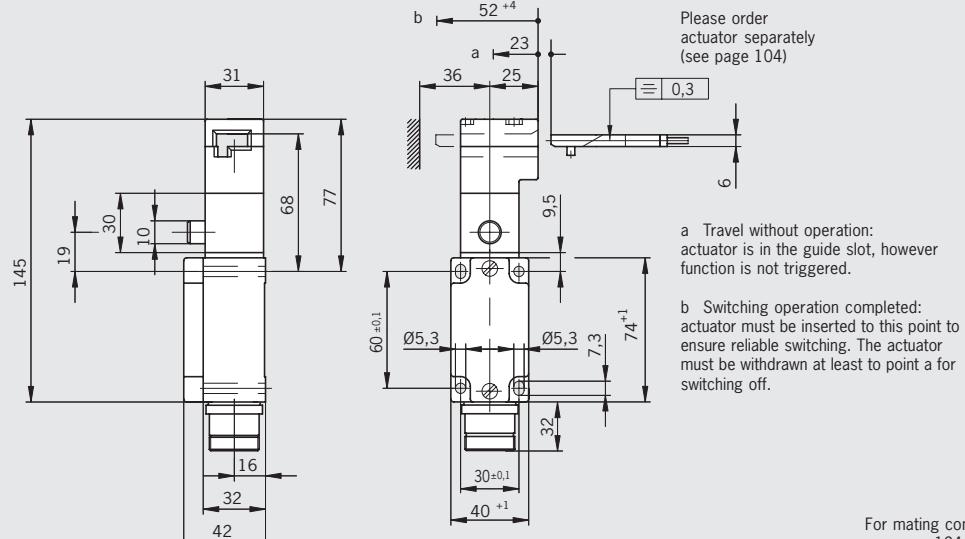


Ordering table

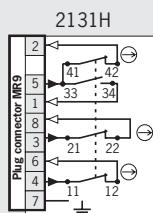
Series	Actuator	Connection	Guard locking	Switching element	Function display	
					Without LED	
NZ	VZ Separate actuator	1 Cable entry M20 x 1.5	VSH Manual guard locking not powered	2131H 3 NC \ominus + 1 NO	089 483 NZ1VZ-2131E3VSH-M	
				3131H 2 NC \ominus + 2 NO	089 915 NZ1VZ-3131E3VSH-M	

Plug connector MR8
7-pin + PE

Dimension drawings



Wiring diagrams



Ordering table

Series	Actuator	Connection	Guard locking	Switching element	Function display	
					Without LED	
NZ	VZ Separate actuator	1...8C Plug connector MR8	VSH Manual guard locking not powered	2131H 3 NC ⊖ + 1 NO	093 611 NZ1VZ-2131E3VSH-8C-GMMF	

Safety Switches with Separate Actuator, Metal Housing **EUCHNER**

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

Release feature, front													
HE	Mechanical release can be sealed												
E	Mechanical release cannot be sealed												
HD	Mechanical release for triangular key acc. to DIN 22417 (latching)												
ND	Emergency 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 12-pin												
Connection													
M	Thread M20 x 1.5 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									
HE	E	HD	ND	NR	O	FS	FD	SB	BD4	RC12	M	SR6	MR8	MR10	SR11	MR12	RC18	Two contacts	Four contacts			
●											●							●	●	C1925	62	
●												●									C1638	64
●																					C1924	66
●																					C1826	63
●																					C1933	65
●				●							●							●	●	C1815 / C1828	76	
●				●														●	●	C1815 / C1828	77	
●						●												●	●	C1684	80	
●						●												●	●	C1684	81	
●							●											●	●		68	
●							●											●	●	C1677	69	
●							●											●	●		70	
●							●											●	●	C2082	78	
●							●											●	●	C2140	79	
●							●											●	●	C1903	67	
	●																	●	●	C2159	71	
	●																	●	●	C1816 / C1823	72	
	●																	●	●	C1816 / C1823	73	
	●																	●	●		74	
	●																	●	●	C1937	75	
	●																	●	●	C2123	82	
	●											●						●	●	C1623 / C2100	83	
	●																	●	●		84	
	●																	●	●	C1902 / C1971	85	
	●																	●	●	C1662	86	
	●																	●	●	C1803	87	



Safety switch TZ with guard locking and guard lock monitoring

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



Mechanical release

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 sealing kit and tool included.

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)

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

For combinations available see ordering table:

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

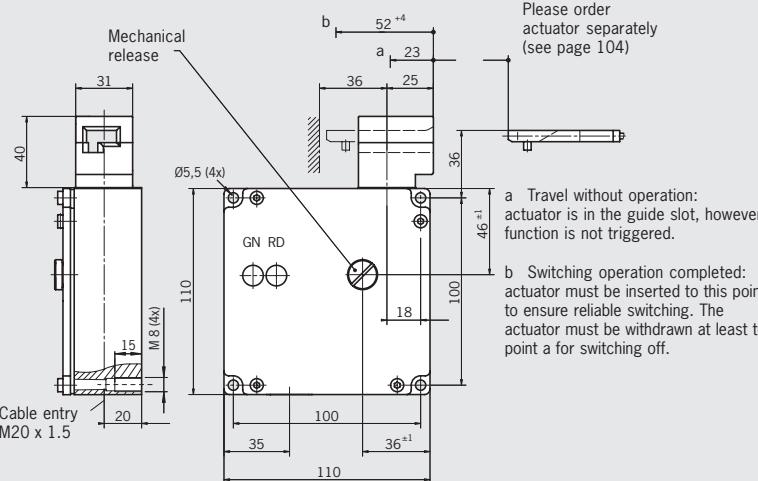
Ordering table

Series	Connection	Guard locking	Switch head	Switching element	Black cover			Red cover	
					24 V	110 V	230 V	24 V	110 V
TZ	M20x1.5	Mechanical	LE Left	SK: 528H, 1NC ⊖ + 1 NO ÜK: 528H, 1 NC ⊖ + 1 NO	082 050 TZ1LE024M	083 160 TZ1LE110M	083 166 TZ1LE220M	083 164 TZ1LE024M-R	083 168 TZ1LE110M-R
				SK: 2121H, 4 NC ⊖ ÜK: 2121H, 4 NC ⊖	On request	On request	On request	089 464 1)	On request
			RE Right	SK: 2131H, 3 NC ⊖ + 1 NO ÜK: 3131H, 2 NC ⊖ + 2 NO	083 965 TZ1LE024MVAB	088 023 TZ1LE110MVAB	088 029 TZ1LE220MVAB	089 434 TZ1LE024MVAB-R	On request
				SK: 528H, 1 NC ⊖ + 1 NO ÜK: 528H, 1 NC ⊖ + 1 NO	082 051 TZ1RE024M	083 161 TZ1RE110M	083 167 TZ1RE220M	083 165 TZ1RE024M-R	089 448 TZ1RE110M-R
				SK: 2121H, 4 NC ⊖ ÜK: 2121H, 4 NC ⊖	On request	On request	On request	089 465 1)	On request
	2	Electrical	LE Left	SK: 2131H, 3 NC ⊖ + 1 NO ÜK: 3131H, 2 NC ⊖ + 2 NO	083 966 TZ1RE024MVAB	088 024 TZ1RE110MVAB	088 030 TZ1RE220MVAB	083 233 TZ1RE024MVAB-R	On request
				SK: 528H, 1 NC ⊖ + 1 NO ÜK: 528H, 1 NC ⊖ + 1 NO	090 559 TZ2LE024M	083 162 TZ2LE110M	088 031 TZ2LE220M	089 445 TZ2LE024M-R	On request
			RE Right	SK: 2131H, 3 NC ⊖ + 1 NO ÜK: 3131H, 2 NC ⊖ + 2 NO	088 070 TZ2LE024MVAB	088 025 TZ2LE110MVAB	088 027 TZ2LE220MVAB	On request	On request
				SK: 528H, 1 NC ⊖ + 1 NO ÜK: 528H, 1 NC ⊖ + 1 NO	090 560 TZ2RE024M	083 163 TZ2RE110M	088 032 TZ2RE220M	089 446 TZ2RE024M-R	On request
				SK: 2131H, 3 NC ⊖ + 1 NO ÜK: 3131H, 2 NC ⊖ + 2 NO	088 071 TZ2RE024MVAB	088 026 TZ2RE110MVAB	088 028 TZ2RE220MVAB	On request	On request

1) No BG approval

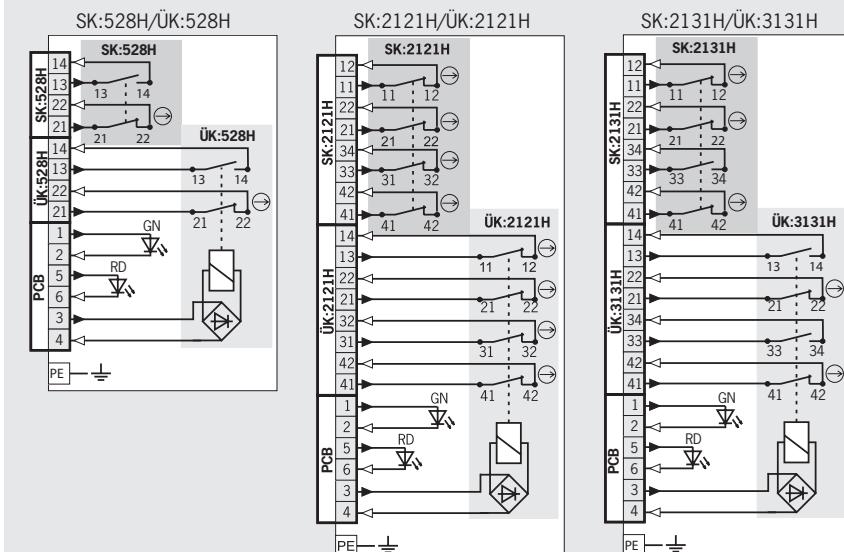
Cable entry M20 x 1.5

Dimension drawings Actuating head on left is a mirror image



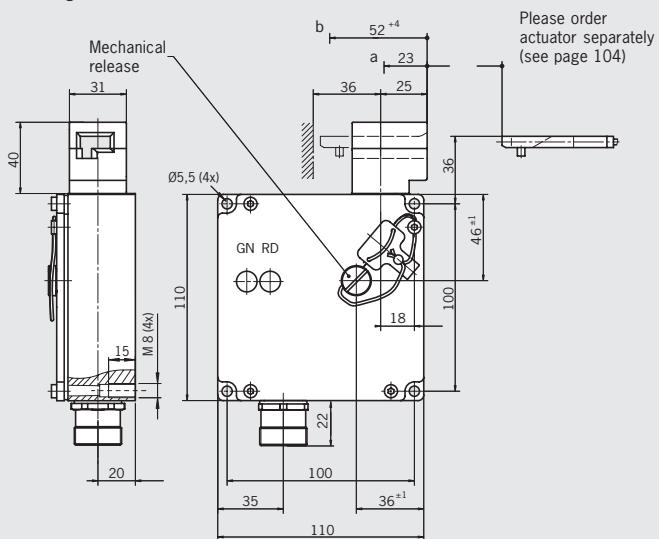
For cable glands
see page 115

Wiring diagrams Actuator inserted and locked



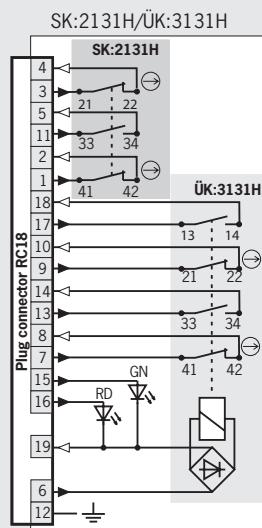
Plug connector RC18
18-pin + PE

Dimension drawings Actuating head on left is a mirror image



For mating connector
with option C1825
see page 113

Wiring diagrams Actuator inserted and locked



Ordering table

Series	Connection	Guard locking	Switch head	Switching element	Black cover	
					24 V	
TZ	RC18 ²⁾ Plug connector	1 Mechanical	LE Left	SK: 2131H, 3 NC ⊖ + 1 NO ÜK: 3131H, 2 NC ⊖ + 2 NO	084 246 ³⁾ TZ1LE024RC18VAB-C1826	
			RE Right	SK: 2131H, 3 NC ⊖ + 1 NO ÜK: 3131H, 2 NC ⊖ + 2 NO	084 247 ³⁾ TZ1RE024RC18VAB-C1826	
		2 Electrical	LE Left	SK: 2131H, 3 NC ⊖ + 1 NO ÜK: 3131H, 2 NC ⊖ + 2 NO	085 180 ³⁾ TZ2LE024RC18VAB-C1826	
			RE Right	SK: 2131H, 3 NC ⊖ + 1 NO ÜK: 3131H, 2 NC ⊖ + 2 NO	085 181 ³⁾ TZ2RE024RC18VAB-C1826	

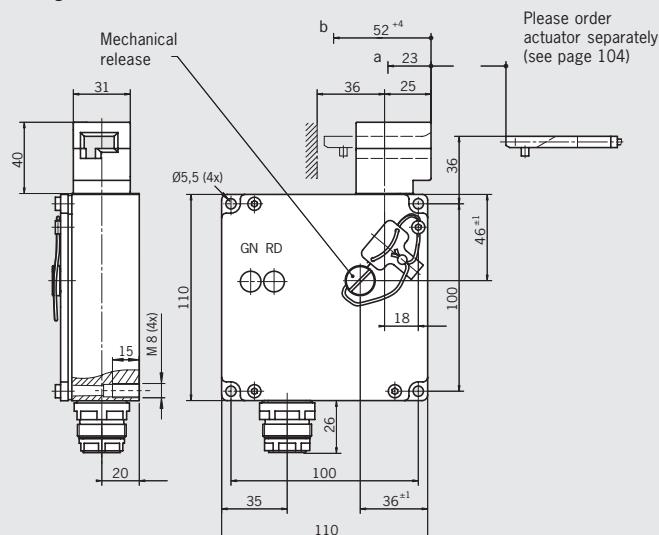
2) **Important:** use suitable mating connector with option C1825!

3) Approval pending



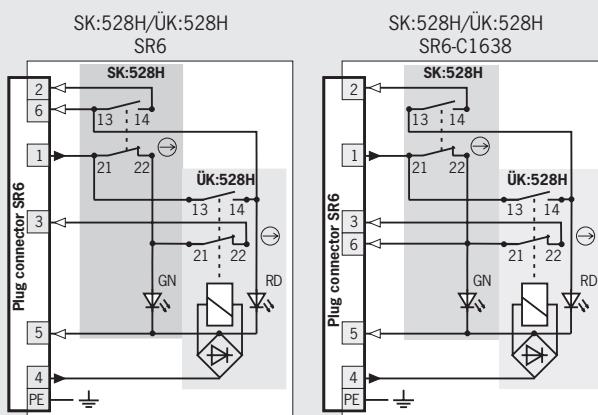
Plug connector SR6 6-pin + PE

Dimension drawings Actuating head on left is a mirror image



For mating connectors
see page 112

Wiring diagrams Actuator inserted and locked



Ordering table

Series	Connection	Guard locking	Switch head	Switching element	Version	Black cover			Red cover
						24 V	110 V	230 V	24 V
TZ	SR6 Plug connector	1 Mechanical	LE Left	SK: 528H, 1 NC \ominus + 1 NO ÜK: 528H, 1 NC \ominus + 1 NO		046 502 TZ1LE024SR6	046 503 TZ1LE110SR6	046 504 TZ1LE220SR6	On request
			RE Right	SK: 528H, 1 NC \ominus + 1 NO ÜK: 528H, 1 NC \ominus + 1 NO	C1638 ¹⁾ Wiring	089 476 ¹⁾ TZ1LE024SR6-C1638	On request	On request	On request
		2 Electrical	LE Left	SK: 528H, 1 NC \ominus + 1 NO ÜK: 528H, 1 NC \ominus + 1 NO		046 190 TZ1RE024SR6	046 191 TZ1RE110SR6	051 879 TZ1RE220SR6	On request
			RE Right	SK: 528H, 1 NC \ominus + 1 NO ÜK: 528H, 1 NC \ominus + 1 NO	C1638 ¹⁾ Wiring	070 529 ¹⁾ TZ1RE024SR6-C1638	On request	On request	On request
	SR6 Push button	1 Mechanical	LE Left	SK: 528H, 1 NC \ominus + 1 NO ÜK: 528H, 1 NC \ominus + 1 NO		049 159 TZ2LE024SR6	052 914 TZ2LE110SR6	045 450 TZ2LE220SR6	046 915 TZ2LE024SR6-R
			RE Right	SK: 528H, 1 NC \ominus + 1 NO ÜK: 528H, 1 NC \ominus + 1 NO	C1638 ¹⁾ Wiring	076 294 ¹⁾ TZ2LE024SR6-C1638	On request	On request	On request
		2 Electrical	LE Left	SK: 528H, 1 NC \ominus + 1 NO ÜK: 528H, 1 NC \ominus + 1 NO		049 102 TZ2RE024SR6	049 238 TZ2RE110SR6	047 937 TZ2RE220SR6	059 672 TZ2RE024SR6-R
			RE Right	SK: 528H, 1 NC \ominus + 1 NO ÜK: 528H, 1 NC \ominus + 1 NO	C1638 ¹⁾ Wiring	055 819 ¹⁾ TZ2RE024SR6-C1638	On request	On request	On request

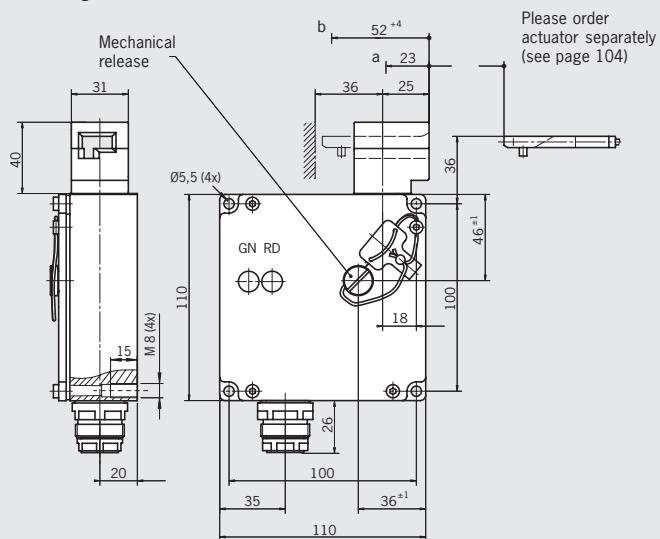
1) No BG approval



Plug connector SR11

11-pin + PE

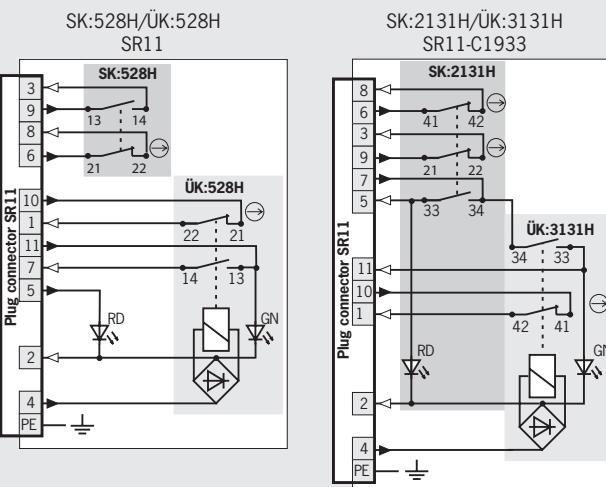
Dimension drawings Actuating head on left is a mirror image



For mating connectors
see page 112

Please turn over

Wiring diagrams Actuator inserted and locked



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 \ominus + 1 NO ÜK: 528H, 1 NC \ominus + 1 NO SK: 2131H, 3 NC \ominus + 1 NO ÜK: 3131H, 2 NC \ominus + 2 NO	C1933 ¹⁾ Alternative wiring	070 828 TZ1LE024SR11 083 230 ¹⁾ TZ1LE024SR11VAB-C1933
			RE Right	SK: 528H, 1 NC \ominus + 1 NO ÜK: 528H, 1 NC \ominus + 1 NO SK: 2131H, 3 NC \ominus + 1 NO ÜK: 3131H, 2 NC \ominus + 2 NO	C1933 ¹⁾ Alternative wiring	070 826 TZ1RE024SR11 083 231 ¹⁾ TZ1RE024SR11VAB-C1933
		2 Electrical	LE Left	SK: 528H, 1 NC \ominus + 1 NO ÜK: 528H, 1 NC \ominus + 1 NO		070 958 TZ2LE024SR11
			RE Right	SK: 528H, 1 NC \ominus + 1 NO ÜK: 528H, 1 NC \ominus + 1 NO		070 957 TZ2RE024SR11

1) No BG approval

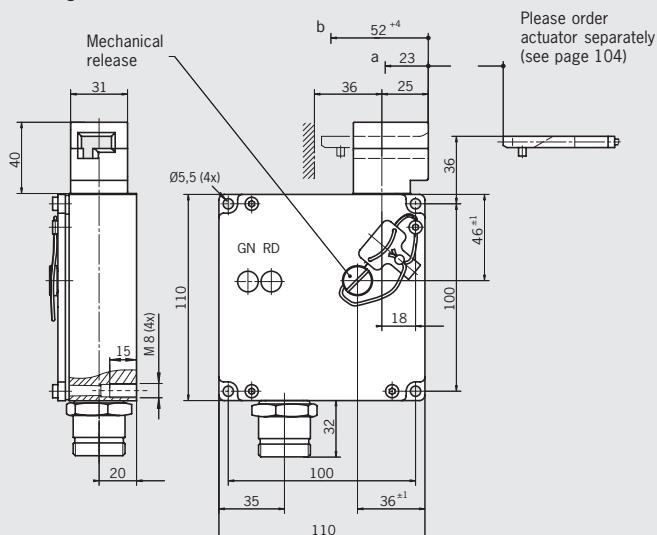
Safety Switches with Separate Actuator, Metal Housing

EUCHNER

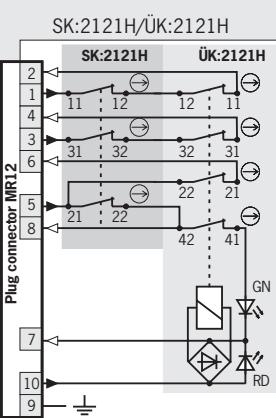


Plug connector MR12
11-pin + PE

Dimension drawings Actuating head on left is a mirror image



Wiring diagrams Actuator inserted and locked



Ordering table

Series	Connection	Guard locking	Switch head	Switching element	Version	Black cover			Red cover
						24 V	110 V	230 V	24 V
TZ	MR12 Plug connector	1 Mechanical	LE Left	SK: 2121H, 4 NC ⊖ ÜK: 2121H, 4 NC ⊖		On request	On request	On request	083 190 TZ1LE024BHAVFG-RC1924
			RE Right	SK: 2121H, 4 NC ⊖ ÜK: 2121H, 4 NC ⊖					083 191 TZ1RE024BHAVFG-RC1924

Safety Switches with Separate Actuator, Metal Housing **EUCHNER**

Safety switch TZ with guard locking and guard lock monitoring



- ▶ Mechanical release on the front
- ▶ Two LEDs, red and green
- ▶ Plug connectors
- ▶ Actuating head fitted left or right



Mechanical release

Is used for releasing the guard locking with the aid of a tool.

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:

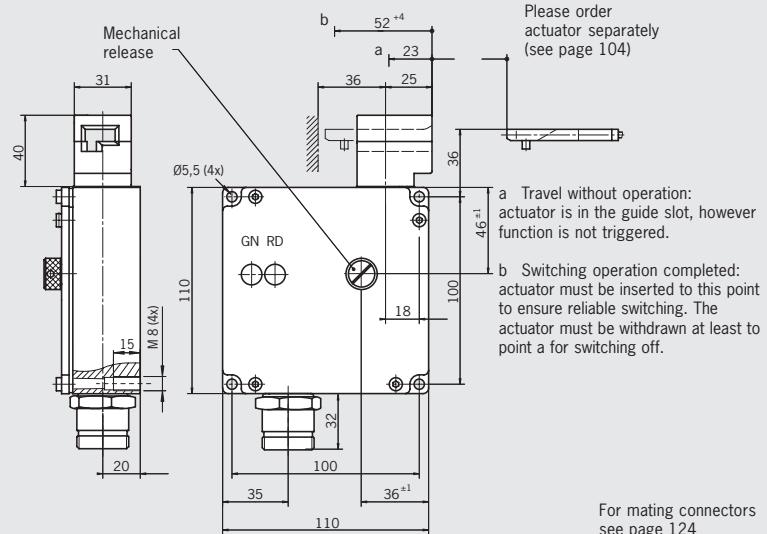
- ▶ **528H** Slow-action switching element
1 NC \ominus + 1 NO
- ▶ **2121H** Slow-action switching element
4 NC \ominus
- ▶ **2131H** Slow-action switching element
3 NC \ominus + 1 NO
- ▶ **3131H** Slow-action switching element
2 NC \ominus + 2 NO

Plug connector MR8
7-pin + PE

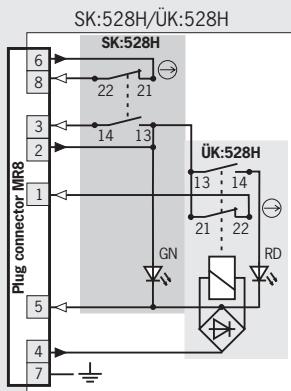


Plug connector MR10
9-pin + PE

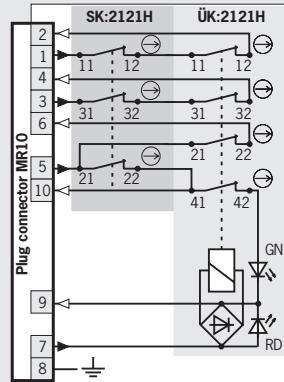
Dimension drawings Actuating head on left is a mirror image



Wiring diagrams Actuator inserted and locked



SK:2121H/ÜK:2121H
-C1903



Ordering table

Series	Connection	Guard locking	Switch head	Switching element	Version	Black cover			Red cover	
						24 V	110 V	24 V	24 V	24 V
TZ	MR8	1	LE Left	SK: 528H, 1 NC \ominus + 1 NO ÜK: 528H, 1 NC + 1 NO	Mechanical release cannot be sealed	054 964 TZ1LE024PG0R8C	074 917 TZ1LE110PG0R8C	On request		
			RE Right	SK: 528H, 1 NC \ominus + 1 NO ÜK: 528H, 1 NC \ominus + 1 NO	Mechanical release cannot be sealed	059 920 TZ1RE024PG0R8C	074 916 TZ1RE110PG0R8C	On request		
	MR10	1	LE Left	SK: 2121H, 4 NC \ominus ÜK: 2121H, 4 NC \ominus	Mechanical release cannot be sealed	On request	On request	082 095 TZ1LE024BHA-C1903		
			RE Right	SK: 2121H, 4 NC \ominus ÜK: 2121H, 4 NC \ominus	Mechanical release cannot be sealed	On request	On request	082 096 TZ1RE024BHA-C1903		
	MR10	2	LE Left	SK: 2121H, 4 NC \ominus ÜK: 2121H, 4 NC \ominus	Mechanical release cannot be sealed	On request	On request	082 083 TZ2LE024BHA-C1903		
			RE Right	SK: 2121H, 4 NC \ominus ÜK: 2121H, 4 NC \ominus	Mechanical release cannot be sealed	On request	On request	082 084 TZ2RE024BHA-C1903		

Safety switch TZ with guard locking and guard lock monitoring

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



Mechanical release

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 sealing kit and tool included.

Protective plate for switch head

Protective plate for switch head

Solenoid operating voltage and LED function display

The following voltage range is available:

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:

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

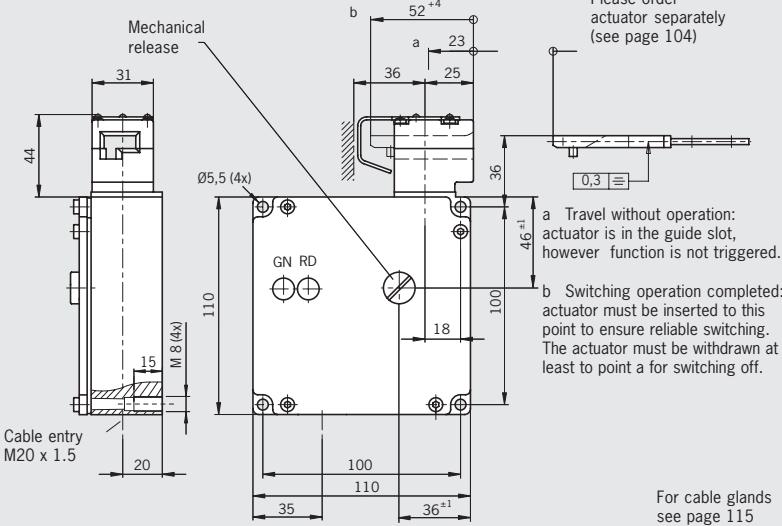
Ordering table

Series	Connection	Guard locking	Switch head	Switching element	Version	Black cover 24 V	
						TZ	M20x1.5
TZ		Mechanical	LE	SK: 528H, 1 NC ⊖ + 1 NO ÜK: 528H, 1 NC ⊖ + 1 NO	With protective plate	089 470 TZ1LE024M-089470	
			RE	SK: 528H, 1 NC ⊖ + 1 NO ÜK: 528H, 1 NC ⊖ + 1 NO	With protective plate	089 471 TZ1RE024M-089471	

Cable entry M20 x 1.5

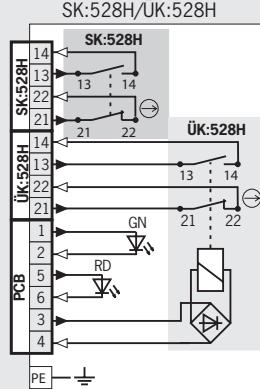
Dimension drawings Actuating head on left is a mirror image

Please order
actuator separately
(see page 104)



Wiring diagrams

Wiring diagrams Retractor inserted and locked



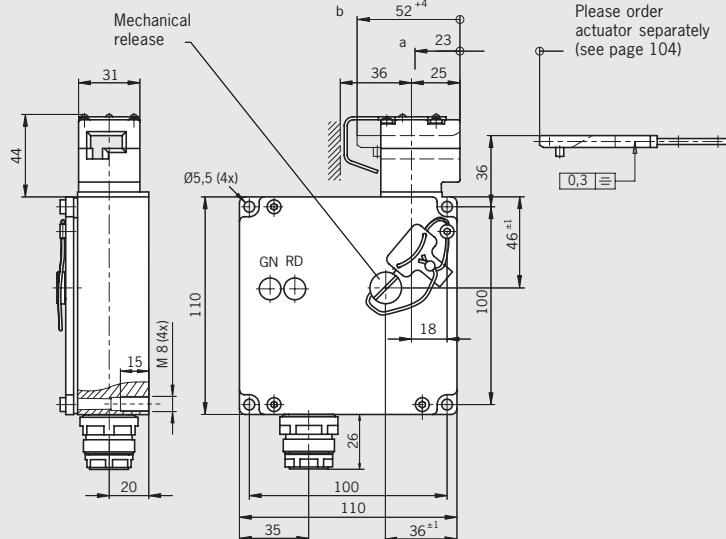
Safety Switches with Separate Actuator, Metal Housing **EUCHNER**

GL

Plug connector SR6
6-pin + PE

Plug connector SR11
11-pin + PE

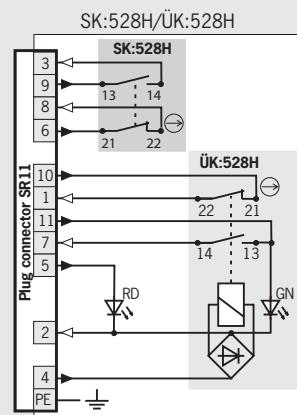
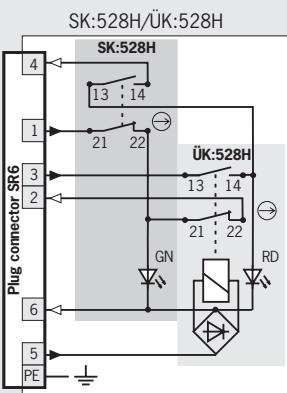
Dimension drawings Actuating head on left is a mirror image



For mating connectors
see page 112

Please turn over

Wiring diagrams Actuator inserted and locked



Ordering table

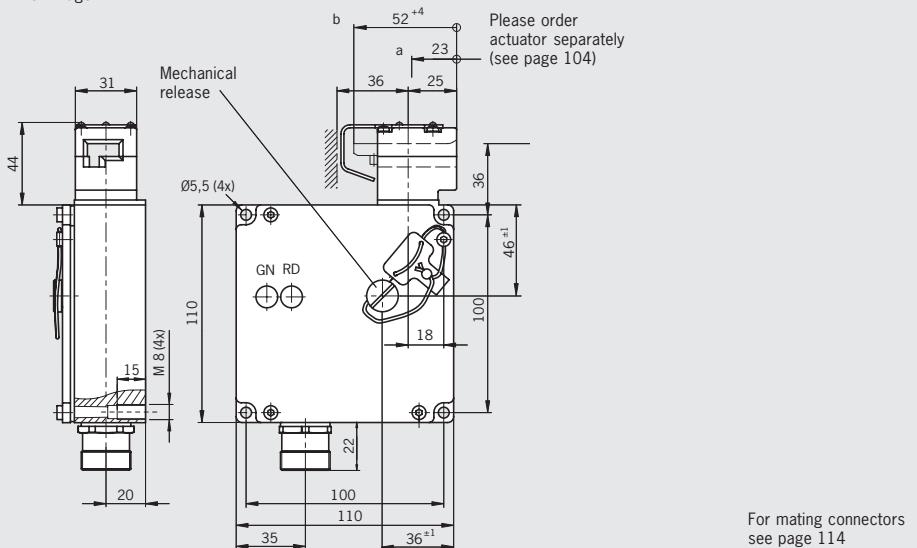
Series	Connection	Guard locking	Switch head	Switching element	Version	Black cover	
						24 V	
TZ	SR6 Plug connector	1 Mechanical	LE Left	SK: 528H, 1 NC ⊖ + 1 NO ÜK: 528H, 1 NC ⊖ + 1 NO	With protective plate	059 694	TZ1LE024SR6-C1677
			RE Right	SK: 528H, 1 NC ⊖ + 1 NO ÜK: 528H, 1 NC ⊖ + 1 NO	With protective plate	059 692	TZ1RE024SR6-C1677
		2 Electrical	LE Left	SK: 528H, 1 NC ⊖ + 1 NO ÜK: 528H, 1 NC ⊖ + 1 NO	With protective plate	059 852	TZ2LE024SR6-C1677
	SR11 Plug connector	1 Mechanical	RE Right	SK: 528H, 1 NC ⊖ + 1 NO ÜK: 528H, 1 NC ⊖ + 1 NO	With protective plate	059 699	TZ2RE024SR6-C1677
			LE Left	SK: 528H, 1 NC ⊖ + 1 NO ÜK: 528H, 1 NC ⊖ + 1 NO	With protective plate	093 860	TZ1LE024SR11-093860
			RE Right	SK: 528H, 1 NC ⊖ + 1 NO ÜK: 528H, 1 NC ⊖ + 1 NO	With protective plate	093 861	TZ1RE024SR11-093861

For safety precautions see page 164
For technical data see page 139

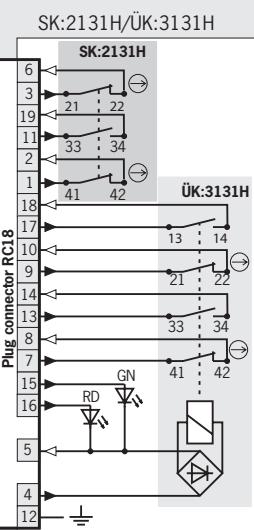


Plug connector RC18
18-pin + PE

Dimension drawings Actuating head on left is a mirror image



Wiring diagrams Actuator inserted and locked



Ordering table

Series	Connection	Guard locking	Switch head	Switching element	Version	Black cover	
						24 V	
TZ	RC18 Plug connector	2 Electrical	LE Left	SK: 2131H, 3 NC \ominus + 1 NO ÜK: 3131H, 2 NC \ominus + 2 NO	With protective plate	093 862 TZ1LE024RC18VAB-093862	
				RE Right		093 863 TZ1RE024RC18VAB-093863	

Safety switch TZ with guard locking and guard lock monitoring

- ▶ Mechanical release on the front, release with a triangular key acc. to DIN 22417
- ▶ Two LEDs, red and green
- ▶ Actuating head fitted left or right



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)

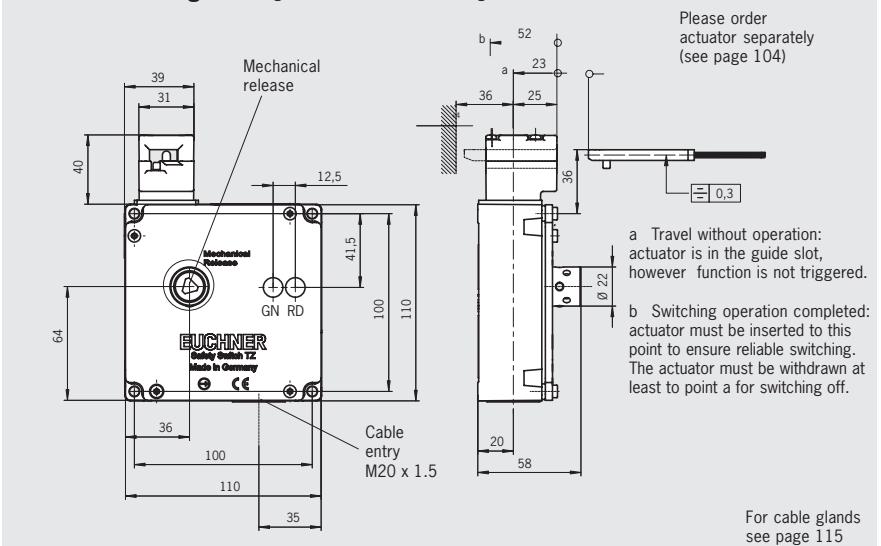
SK For monitoring the door/actuator position
ÜK For monitoring the guard locking (built-in solenoid)

For combinations available see ordering table:

- ▶ **2131H** Slow-action switching element
3 NC \ominus + 1 NO
- ▶ **3131H** Slow-action switching element
2 NC \ominus + 2 NO

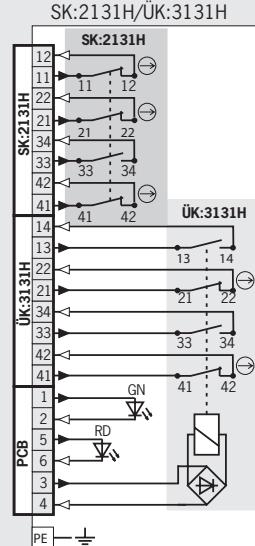
Cable entry M20 x 1.5

Dimension drawings



Wiring diagrams

Actuator inserted and locked



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 \ominus + 1 NO ÜK: 3131H , 2 NC \ominus + 2 NO	Mechanical release with triangular key	098 718 TZ1LB024MVAB-C2159
			RE Right	SK: 2131H , 3 NC \ominus + 1 NO ÜK: 3131H , 2 NC \ominus + 2 NO	Mechanical release with triangular key	098 717 TZ1RB024MVAB-C2159

Safety switch TZ with guard locking and guard lock monitoring



- ▶ Emergency release on the front with pushbutton
- ▶ Two LEDs, red and green
- ▶ Plug connector optional
- ▶ Actuating head fitted left or right



Emergency 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)

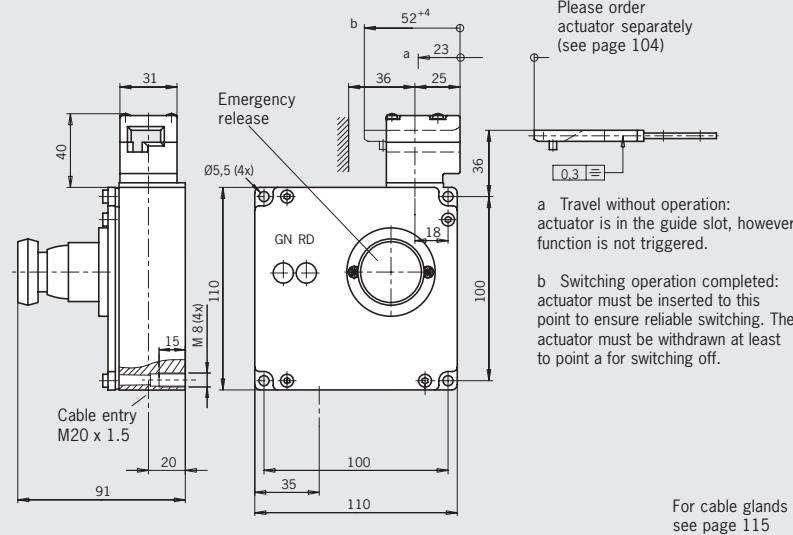
For combinations available see ordering table:

- ▶ **528H** Slow-action switching element
1 NC \ominus + 1 NO
- ▶ **2131H** Slow-action switching element
3 NC \ominus + 1 NO
- ▶ **3131H** Slow-action switching element
2 NC \ominus + 2 NO

Cable entry M20 x 1.5

Dimension drawings

Actuating head on left is a mirror image

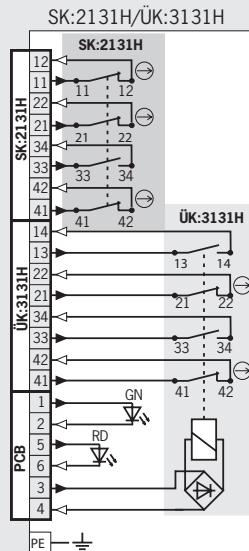
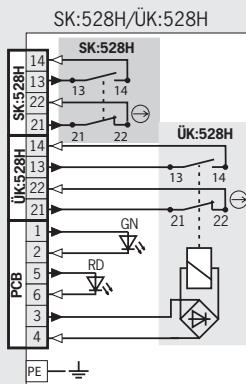


For cable glands
see page 115

- a Travel without operation:
actuator is in the guide slot, however 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.

Wiring diagrams

Actuator inserted and locked



Ordering table

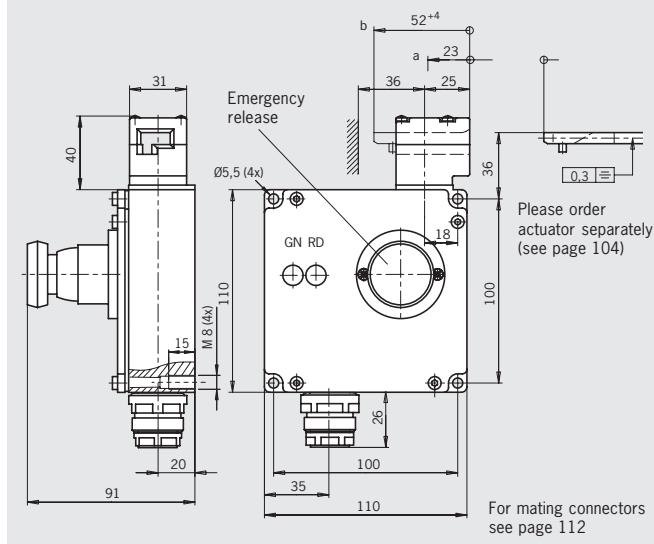
Series	Connection	Guard locking	Switch head	Switching element	Version	Black cover	
						24 V	
TZ	M20x1.5	1 Mechanical	LE Left	SK: 528H, 1 NC \ominus + 1 NO ÜK: 528H, 1 NC \ominus + 1 NO	Emergency release (blue pushbutton)	089 477	TZ1LE024M-C1816
			RE Right	SK: 528H, 1 NC \ominus + 1 NO ÜK: 528H, 1 NC \ominus + 1 NO	Emergency release (blue pushbutton)	096 901	TZ1RE024M-C1816
		2 Electrical	LE Left	SK: 528H, 1 NC \ominus + 1 NO ÜK: 528H, 1 NC \ominus + 1 NO	Emergency release (blue pushbutton)	087 992	TZ2LE024M-C1816
			SK: 2131H, 3 NC \ominus + 1 NO ÜK: 3131H, 2 NC \ominus + 2 NO	Emergency release (blue pushbutton)	089 455	TZ2LE024MVAB-C1823	
			RE Right	SK: 528H, 1 NC \ominus + 1 NO ÜK: 528H, 1 NC \ominus + 1 NO	Emergency release (blue pushbutton)	087 993	TZ2RE024M-C1816
			SK: 2131H, 3 NC \ominus + 1 NO ÜK: 3131H, 2 NC \ominus + 2 NO	Emergency release (blue pushbutton)	089 456	TZ2RE024MVAB-C1823	

Safety Switches with Separate Actuator, Metal Housing **EUCHNER**

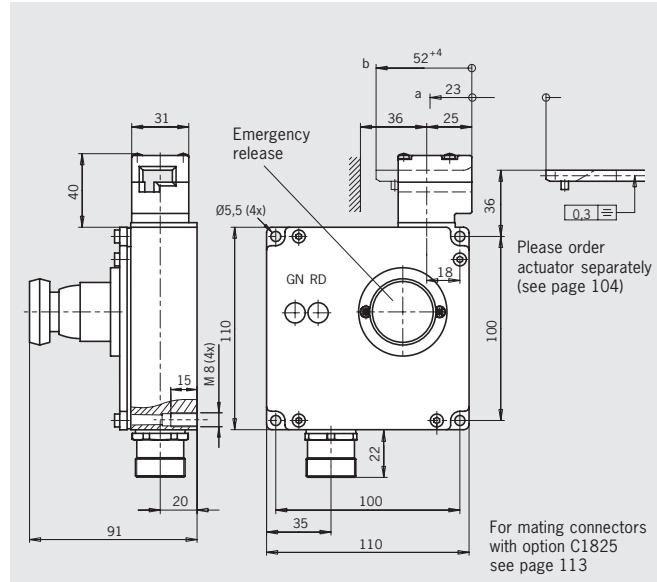
GL

Plug connector SR11
11-pin + PE

Dimension drawings Actuating head on left is a mirror image

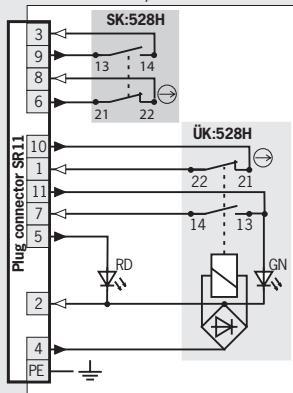


Plug connector RC18
18-pin + PE

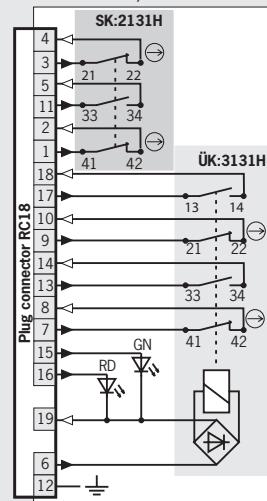


Wiring diagrams Actuator inserted and locked

SK:528H/ÜK:528H



SK:2131H/ÜK:3131H



Ordering table

Series	Connection	Guard locking	Switch head	Switching element	Version	Black cover	
						24 V	
TZ	SR11	Mechanical	1	LE Left	SK: 528H, 1 NC \ominus + 1 NO ÜK: 528H, 1 NC \ominus + 1 NO	Emergency release (blue pushbutton)	077 044 TZ1LE024SR11-C1816
				RE Right	SK: 528H, 1 NC \ominus + 1 NO ÜK: 528H, 1 NC \ominus + 1 NO	Emergency release (blue pushbutton)	077 042 TZ1RE024SR11-C1816
	RC18 ¹⁾	Mechanical	1	LE Left	SK: 2131H, 3 NC \ominus + 1 NO ÜK: 3131H, 2 NC \ominus + 2 NO	Emergency release (blue pushbutton)	088 090 TZ1LE024RC18VAB-C1823
				RE Right	SK: 2131H, 3 NC \ominus + 1 NO ÜK: 3131H, 2 NC \ominus + 2 NO	Emergency release (blue pushbutton)	088 091 TZ1RE024RC18VAB-C1823

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



Safety switch TZ with guard locking and guard lock monitoring

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



Emergency unlocking

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 sealing kit and tool included.

Protective plate for switch head

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:

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:

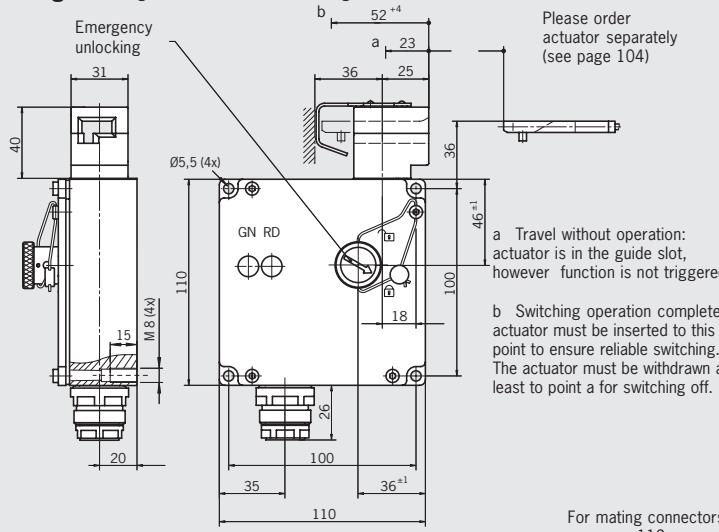
- ▶ **528H** Slow-action switching element
1 NC ⊖ + 1 NO
 - ▶ **2131H** Slow-action switching element
3 NC ⊖ + 1 NO
 - ▶ **3131H** Slow-action switching element
2 NC ⊖ + 2 NO

Ordering table

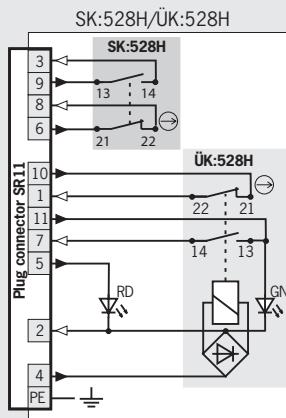
Series	Connection	Guard locking	Switch head	Switching element		Version	Black cover
							24 V
TZ	SR11	1	LE	SK: 528H, 1NC \ominus + 1 NO	Emergency unlocking (rotary knob), with protective plate	094 342	
			Left	ÜK: 528H, 1NC \ominus + 1 NO		TZ1LE024SR11-094342	
	Plug connector	Mechanical	RE	SK: 528H, 1NC \ominus + 1 NO	Emergency unlocking (rotary knob), with protective plate	094 343	
			Right	ÜK: 528H, 1NC \ominus + 1 NO		TZ1RE024SR11-094343	

Plug connector SR11 with protective plate 11-pin + PE

Dimension drawings Actuating head on left is a mirror image



Wiring diagrams

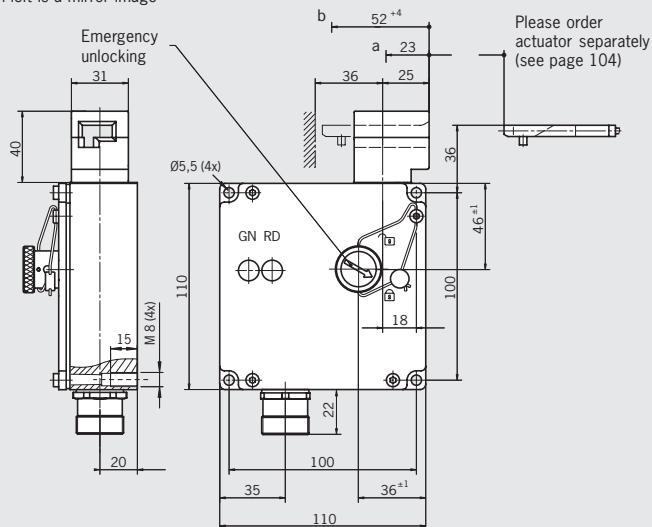




Plug connector RC18

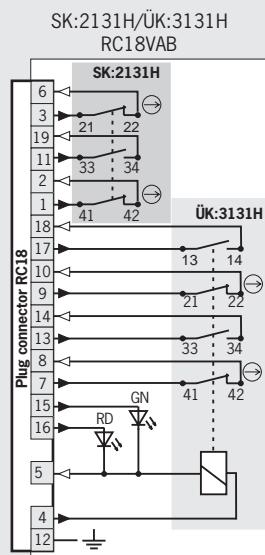
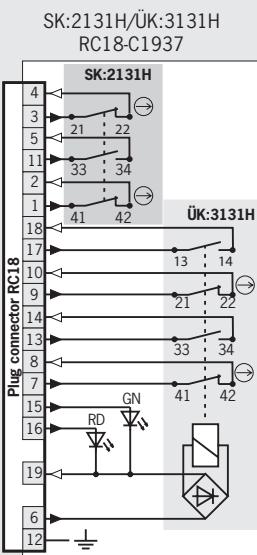
18-pin + PE

Dimension drawings Actuating head on left is a mirror image



For mating connector
with option C1825
see page 113

Wiring diagrams Actuator inserted and locked



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)	074 260 TZ1LE024RC18VAB-C1937	
			RE Right	SK: 2131H, 3 NC ⊖ + 1 NO ÜK: 3131H, 2 NC ⊖ + 2 NO	Emergency unlocking (rotary knob)	074 261 TZ1RE024RC18VAB-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	092 998 ²⁾ TZ1LE024RC18VAB-092998	
			RE Right	SK: 2131H, 3 NC ⊖ + 1 NO ÜK: 3131H, 2 NC ⊖ + 2 NO	Emergency unlocking (rotary knob), alternative wiring	092 999 ²⁾ TZ1RE024RC18VAB-092999	

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

2) No BG approval

Safety switch TZ with guard locking and guard lock monitoring



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



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)

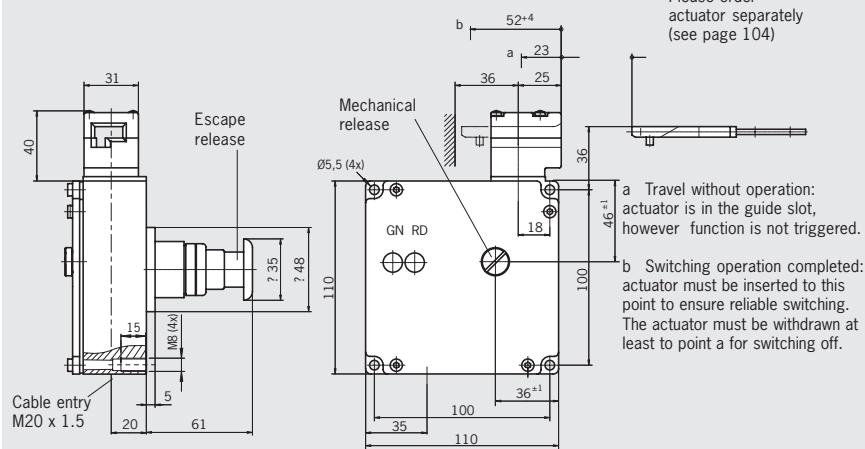
For combinations available see ordering table:

- ▶ **528H** Slow-action switching element
1 NC \ominus + 1 NO
- ▶ **2131H** Slow-action switching element
3 NC \ominus + 1 NO
- ▶ **3131H** Slow-action switching element
2 NC \ominus + 2 NO

Cable entry M20 x 1.5

Dimension drawings

Actuating head on left is a mirror image

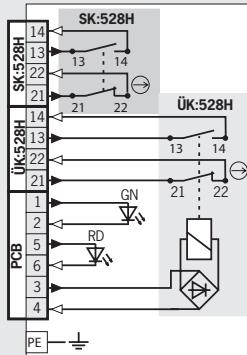


For cable glands
see page 115

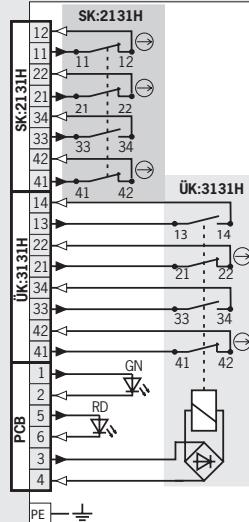
Wiring diagrams

Actuator inserted and locked

SK:528H/ÜK:528H



SK:2131H/ÜK:3131H



Ordering table

Series	Connection	Guard locking	Switch head	Switching element	Version	Black cover	
						24 V	110 V
TZ	M20x1.5	1	Left	SK: 528H, 1 NC \ominus + 1 NO ÜK: 528H, 1 NC \ominus + 1 NO	Escape release (red key button)	087 990 TZ1LE024M-C1815	On request
				SK: 2131H, 3 NC \ominus + 1 NO ÜK: 3131H, 2 NC \ominus + 2 NO	Escape release (red key button)	089 468 TZ1LE024MVAB-C1828	094 311 TZ1LE110MVAB-C1828
		2	Right	SK: 528H, 1 NC \ominus + 1 NO ÜK: 528H, 1 NC \ominus + 1 NO	Escape release (red key button)	087 991 TZ1RE024M-C1815	On request
				SK: 2131H, 3 NC \ominus + 1 NO ÜK: 3131H, 2 NC \ominus + 2 NO	Escape release (red key button)	089 469 TZ1RE024MVAB-C1828	094 312 TZ1RE110MVAB-C1828
	Electrical	1	Left	SK: 528H, 1 NC \ominus + 1 NO ÜK: 528H, 1 NC \ominus + 1 NO	Escape release (red key button)	089 460 TZ2LE024M-C1815	On request
				SK: 2131H, 3 NC \ominus + 1 NO ÜK: 3131H, 2 NC \ominus + 2 NO	Escape release (red key button)	087 290 TZ2LE024MVAB-C1828	On request
		2	Right	SK: 528H, 1 NC \ominus + 1 NO ÜK: 528H, 1 NC \ominus + 1 NO	Escape release (red key button)	089 461 TZ2RE024M-C1815	On request
				SK: 2131H, 3 NC \ominus + 1 NO ÜK: 3131H, 2 NC \ominus + 2 NO	Escape release (red key button)	087 291 TZ2RE024MVAB-C1828	On request

Safety Switches with Separate Actuator, Metal Housing **EUCHNER**



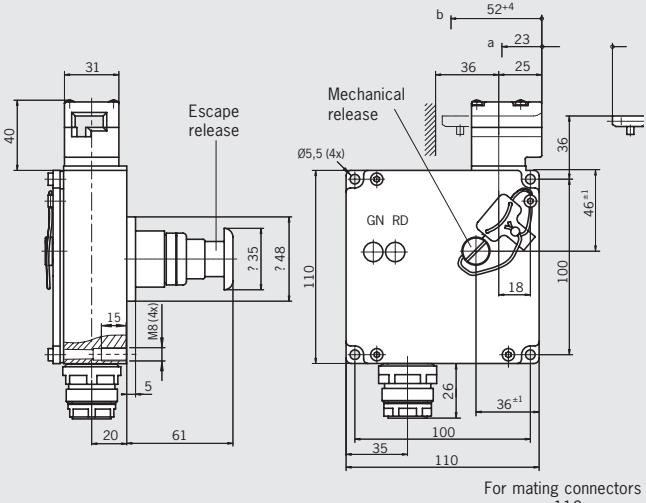
GL

Plug connector SR11

11-pin + PE

Dimension drawings Actuating head on left is a mirror image

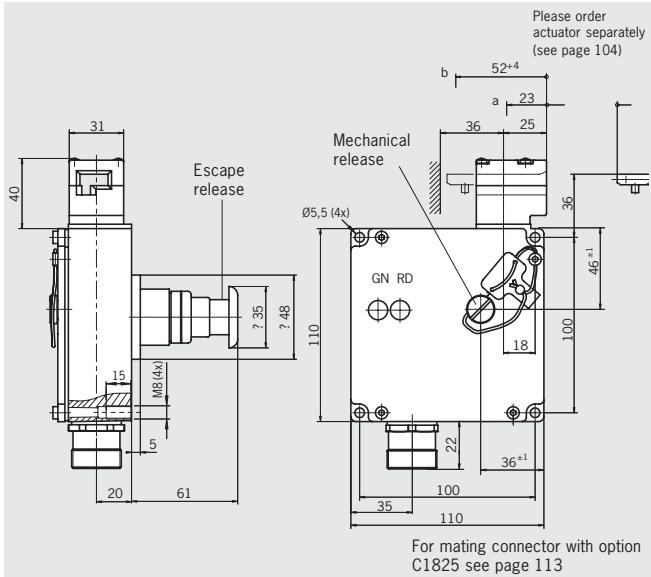
Please order
actuator separately
(see page 104)



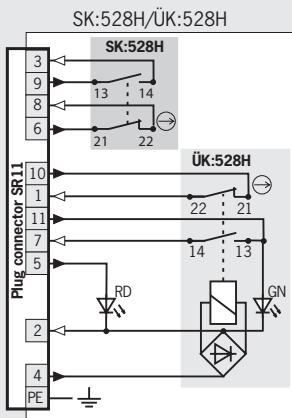
Plug connector RC18

18-pin + PE

Please order
actuator separately
(see page 104)



Wiring diagrams



SK:2131H/ÜK:3131H

Ordering table

Series	Connection	Guard locking	Switch head	Switching element	Version	Black cover	
						24 V	
TZ	SR11	2	LE	SK: 528H , 1 NC ⊖ + 1 NO	Escape release	079 660	
			Left	ÜK: 528H , 1 NC ⊖ + 2 NO	(key button)	TZ2LE024SR11-C1815	
		Electrical	RE	SK: 528H , 1 NC ⊖ + 1 NO	Escape release	079 661	
			Right	ÜK: 528H , 1 NC ⊖ + 1 NO	(key button)	TZ2RE024SR11-C1815	
	RC18 ¹⁾	1	LE	SK: 2131H , 3 NC ⊖ + 1 NO	Escape release	090 352	
			Left	ÜK: 3131H , 2 NC ⊖ + 2 NO	(key button)	TZ1LE024RC18VAB-C1828	
		Mechanical	RE	SK: 2131H , 3 NC ⊖ + 1 NO	Escape release	090 353	
			Right	ÜK: 3131H , 2 NC ⊖ + 2 NO	(key button)	TZ1RE024RC18VAB-C1828	
	Plug connector	2	LE	SK: 2131H , 3 NC ⊖ + 1 NO	Escape release	093 103	
			Left	ÜK: 3131H , 2 NC ⊖ + 2 NO	(key button)	TZ2LE024RC18VAB-C1828	
		Electrical	RE	SK: 2131H , 3 NC ⊖ + 1 NO	Escape release	093 104	
			Right	ÜK: 3131H , 2 NC ⊖ + 2 NO	(key button)	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 pushbutton
- Two LEDs, red and green
- Plug connector optional
- Actuating head fitted left or right



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)

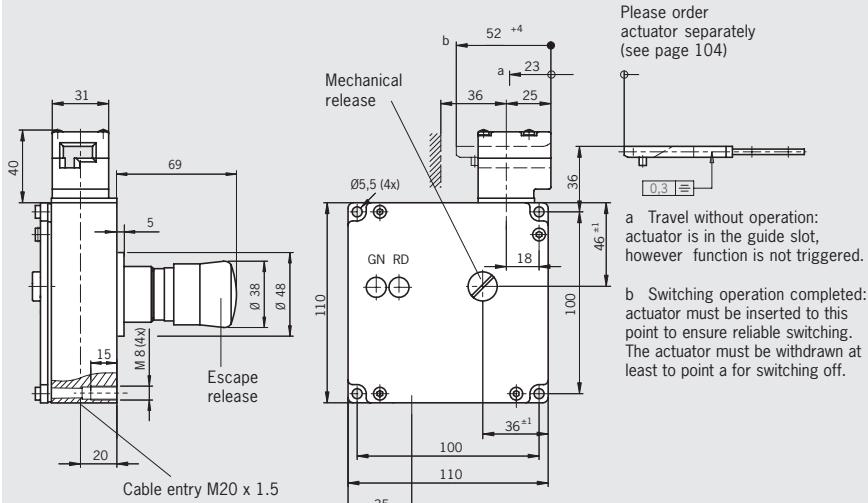
For combinations available see ordering table:

- **2131H** Slow-action switching element
3 NC \ominus + 1 NO
- **3131H** Slow-action switching element
2 NC \ominus + 2 NO

Cable entry M20 x 1.5

Dimension drawings

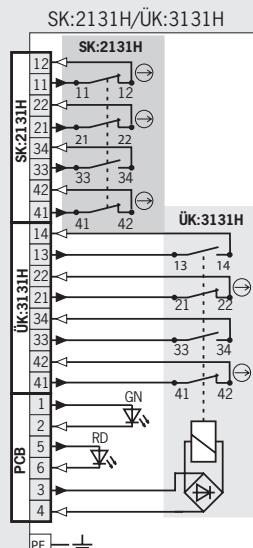
Actuating head on left is a mirror image



For cable glands see page 115

Wiring diagrams

Actuator inserted and locked



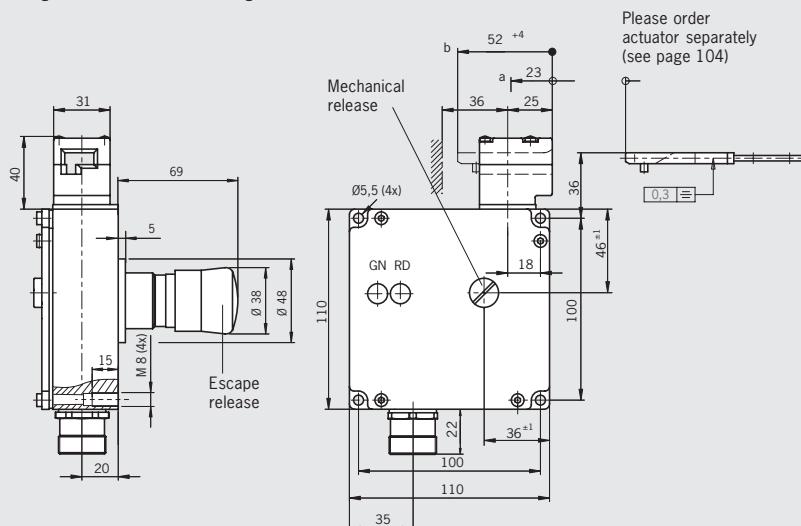
Ordering table

Series	Connection	Guard locking	Switch head	Switching element	Version	Black cover	
						24 V	110 V
TZ	M20x1.5	1 Mechanical	LE Left	SK: 2131H , 3 NC \ominus + 1 NO ÜK: 3131H , 2 NC \ominus + 2 NO	C2082 Escape release (pushbutton)	096 487 TZ1LE024MVAB-C2082	095 992 TZ1LE110MVAB-C2082
			RE Right	SK: 2131H , 3 NC \ominus + 1 NO ÜK: 3131H , 2 NC \ominus + 2 NO	C2082 Escape release (pushbutton)	096 488 TZ1RE024MVAB-C2082	095 103 TZ1RE110MVAB-C2082



Plug connector RC18 18-pin + PE

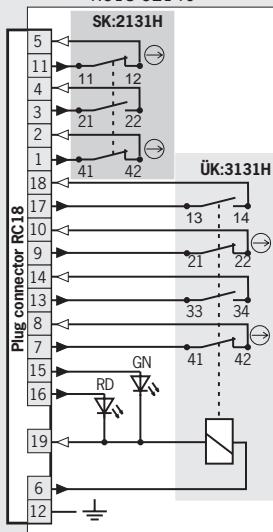
Dimension drawings Actuating head on left is a mirror image



For mating connectors see page 114

Wiring diagrams Actuator inserted and locked

SK:2131H/ÜK:3131H
RC18-C2140



Ordering table

Series	Connection	Guard locking	Switch head	Switching element	Version	Black cover 24 V	
TZ	RC18	1	Mechanical	LE Left	SK: 2131H, 3 NC ⊖ + 1 NO ÜK: 3131H, 2 NC ⊖ + 2 NO	C2140 Escape release (pushbutton)	098 297 TZ1LE024RC18VAB-C2140
				RE Right	SK: 2131H, 3 NC ⊖ + 1 NO ÜK: 3131H, 2 NC ⊖ + 2 NO	C2140 Escape release (pushbutton)	098 298 TZ1RE024RC18VAB-C2140



Safety switch TZ with guard locking and guard lock monitoring



- ▶ Mechanical release on the front
- ▶ Escape release on the rear with pushbutton
- ▶ Two LEDs, red and green
- ▶ Plug connector optional
- ▶ Actuating head fitted left or right



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)

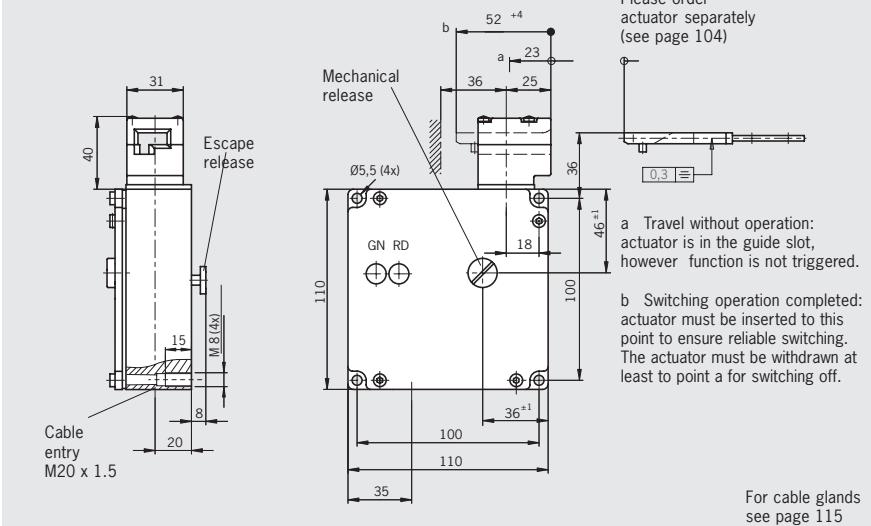
For combinations available see ordering table:

- ▶ **528H** Slow-action switching element
1 NC \ominus + 1 NO
- ▶ **2131H** Slow-action switching element
3 NC \ominus + 1 NO
- ▶ **3131H** Slow-action switching element
2 NC \ominus + 2 NO

Cable entry M20 x 1.5

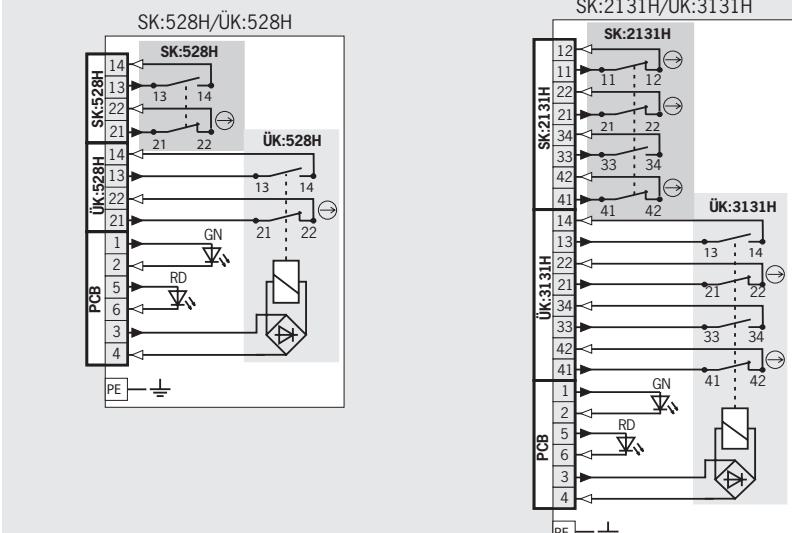
Dimension drawings

Actuating head on left is a mirror image



Wiring diagrams

Actuator inserted and locked



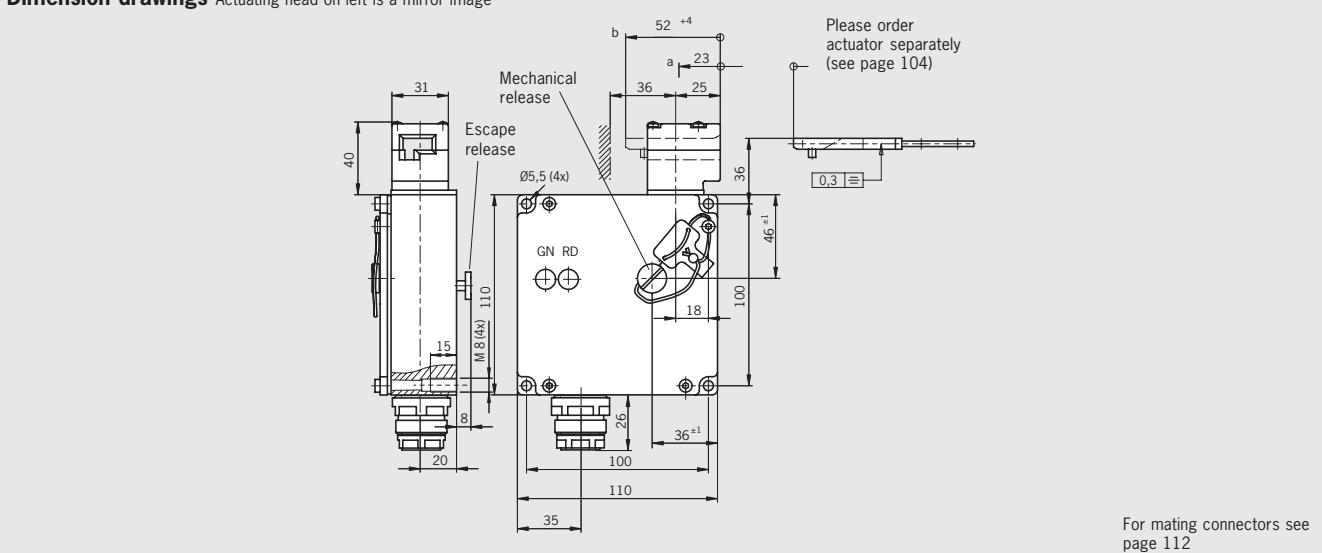
Ordering table

Series	Connection	Guard locking	Switch head	Switching element	Version	Black cover		
						24 V	110 V	230 V
TZ	M20x1.5	1 Mechanical	LE Left	SK: 528H, 1 NC \ominus + 1 NO ÜK: 528H, 1 NC \ominus + 1 NO	C1684 Escape release (pushbutton)	083 170 TZ1LE024M-C1684	089 924 TZ1LE110M-C1684	093 770 TZ1LE220M-C1684
				SK: 2131H, 3 NC \ominus + 1 NO ÜK: 3131H, 2 NC \ominus + 2 NO	C1684 Escape release (pushbutton)	084 820 TZ1LE024MVAB-C1684	on request	On request
	M20x1.5	RE Right	RE Right	SK: 528H, 1 NC \ominus + 1 NO ÜK: 528H, 1 NC \ominus + 1 NO	C1684 Escape release (pushbutton)	083 171 TZ1RE024M-C1684	089 475 TZ1RE110M-C1684	093 771 TZ1RE220M-C1684
				SK: 2131H, 3 NC \ominus + 1 NO ÜK: 3131H, 2 NC \ominus + 2 NO	C1684 Escape release (pushbutton)	088 084 TZ1RE024MVAB-C1684	On request	On request

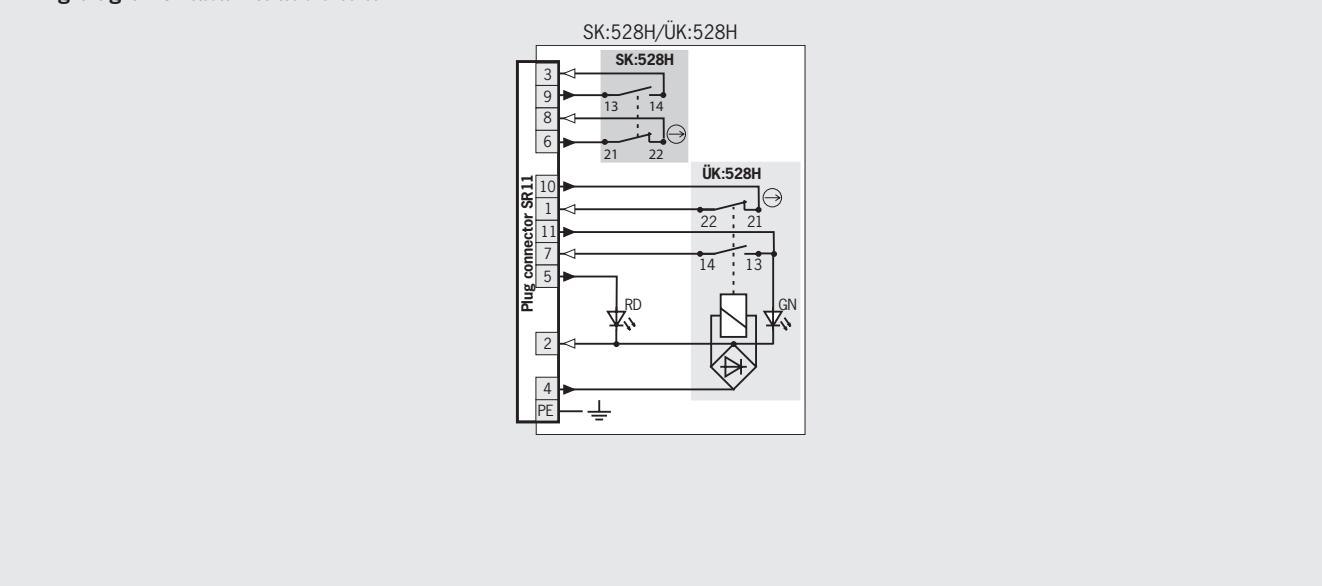
Plug connector SR11

11-pin + PE

Dimension drawings



Wiring diagrams



Ordering table

Series	Connection	Guard locking	Switch head	Switching element	Version	Black cover	
						24 V	
TZ	SR11	1	Mechanical	LE Left	SK: 528H, 1 NC \ominus + 1 NO ÜK: 528H, 1 NC \ominus + 1 NO	C1684 Escape release (pushbutton)	070 886 TZ1LE024SR11-C1684
				RE Right	SK: 528H, 1 NC \ominus + 1 NO ÜK: 528H, 1 NC \ominus + 1 NO	C1684 Escape release (pushbutton)	070 884 TZ1RE024SR11-C1684

Safety switch TZ with guard locking and guard lock monitoring



- ▶ Emergency unlocking on the front with rotary knob
- ▶ Escape release on the rear with pushbutton
- ▶ Protective plate for switch head
- ▶ Two LEDs, red and green
- ▶ Actuating head fitted left or right



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 sealing kit and tool included.

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)

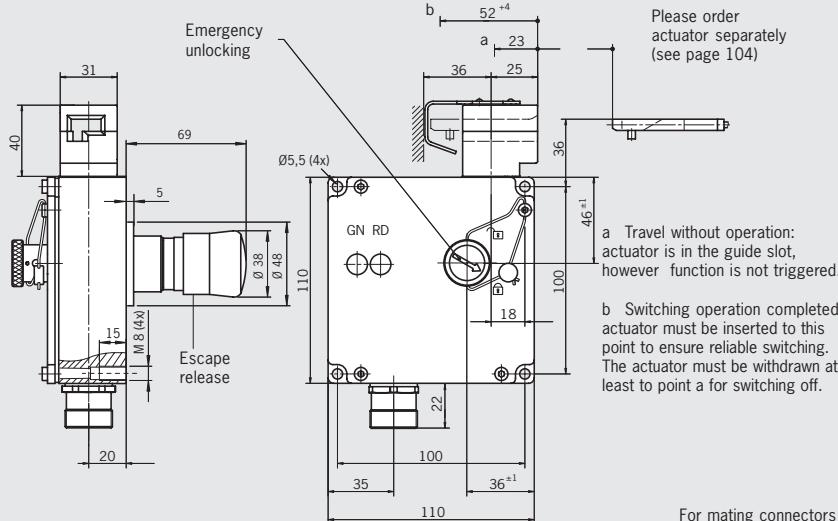
For combinations available see ordering table:

- ▶ **2131H** Slow-action switching element
3 NC ⊖ + 1 NO
- ▶ **3131H** Slow-action switching element
2 NC ⊖ + 2 NO

Plug connector RC18
18-pin + PE

Dimension drawings

Actuating head on left is a mirror image

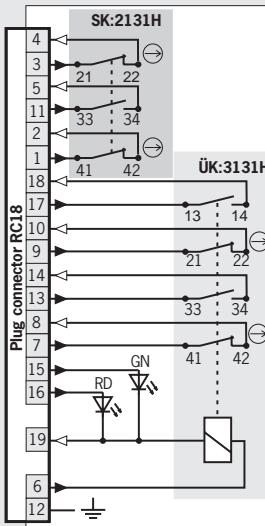


For mating connectors
see page 114

Wiring diagrams

Actuator inserted and locked

SK:2131H/ÜK:3131H
RC18-C2140



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	097 347 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	097 348 TZ1RE024RC18VAB-C2123	

Safety switch TZ with guard locking and guard lock monitoring



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



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)

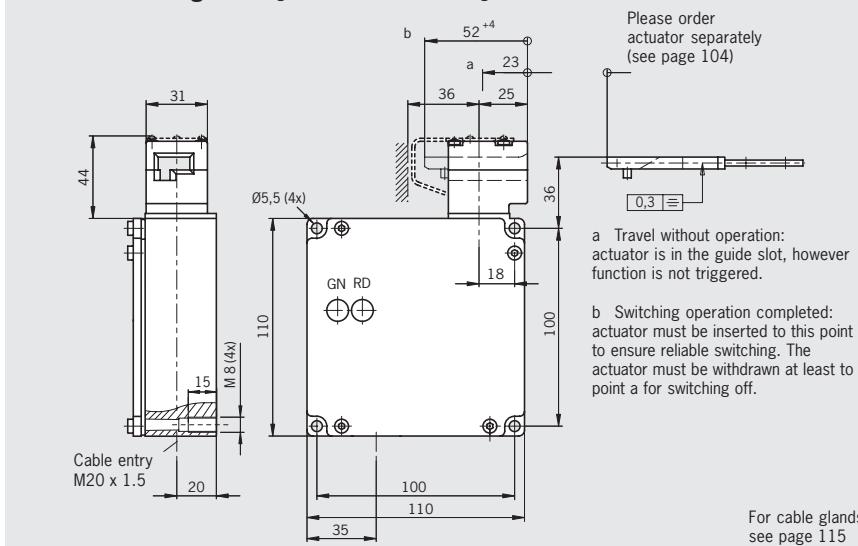
SK For monitoring the door/actuator position
ÜK For monitoring the guard locking (built-in solenoid)

For combinations available see ordering table:

- ▶ **528H** Slow-action switching element
1 NC \ominus + 1 NO
- ▶ **2121H** Slow-action switching element
4 NC \ominus
- ▶ **2131H** Slow-action switching element
3 NC \ominus + 1 NO
- ▶ **3131H** Slow-action switching element
2 NC \ominus + 2 NO

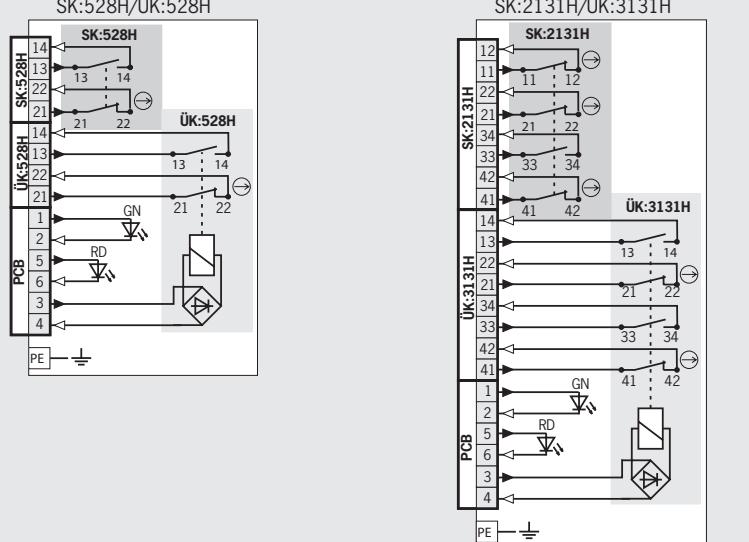
Cable entry M20 x 1.5

Dimension drawings



Wiring diagrams

Actuator inserted and locked



Ordering table

Series	Connection	Guard locking	Switch head	Switching element	Version	Red cover		Black cover	
						24 V	24 V	110 V	
TZ	M20x1.5	1	Left	SK: 528H, 1 NC \ominus + 1 NO ÜK: 528H, 1 NC \ominus + 1 NO	Without mechanical release, with protective plate			083 246	On request
				SK: 2131H, 3 NC \ominus + 1 NO ÜK: 3131H, 2 NC \ominus + 2 NO	Without mechanical release, with protective plate			085 170	089 466
				SK: 2131H, 3 NC \ominus + 1 NO ÜK: 3131H, 2 NC \ominus + 2 NO	Without mechanical release	096 052			
		Mechanical	Right	SK: 528H, 1 NC \ominus + 1 NO ÜK: 528H, 1 NC \ominus + 1 NO	Without mechanical release, with protective plate			083 247	On request
				SK: 2131H, 3 NC \ominus + 1 NO ÜK: 3131H, 2 NC \ominus + 2 NO	Without mechanical release, with protective plate			085 171	088 063
				SK: 2131H, 3 NC \ominus + 1 NO ÜK: 3131H, 2 NC \ominus + 2 NO	Without mechanical release	096 051			

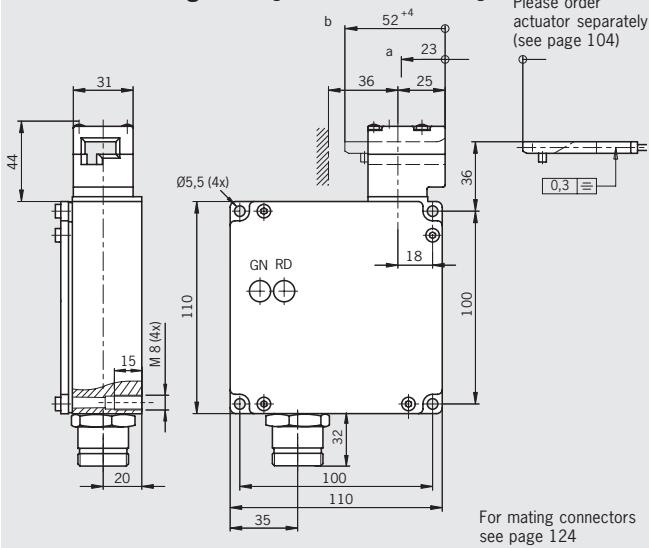
Safety Switches with Separate Actuator, Metal Housing

EUCHNER

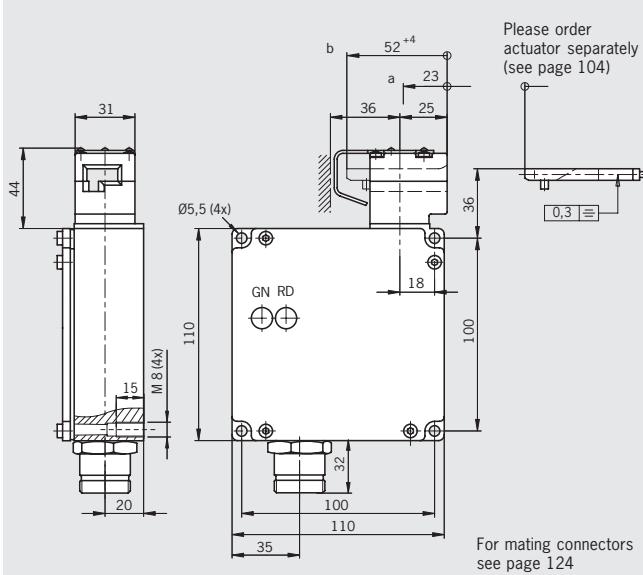


Plug connector MR10
9-pin + PE

Dimension drawings



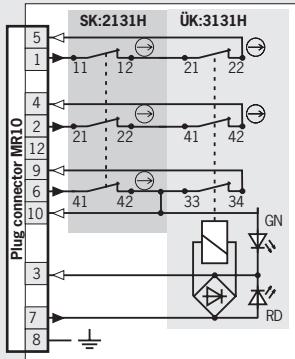
Plug connector MR12
11-pin + PE



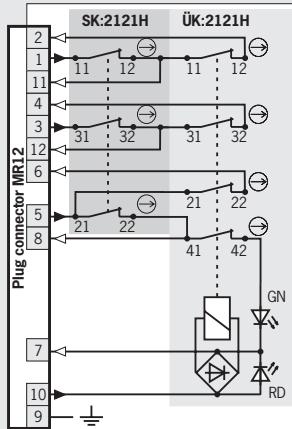
Wiring diagrams

Actuator inserted and locked

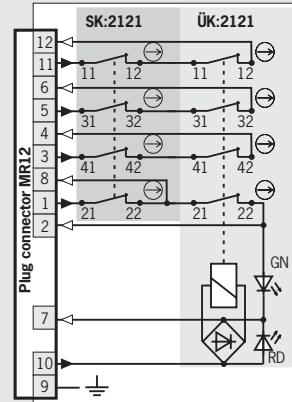
SK:2131H/ÜK:3131H
MR10 VAB-F



SK:2121H/ÜK:2121H
C1902



SK:2121H/ÜK:2121H
RC1971



Ordering table

Series	Connection	Guard locking	Switch head	Switching element	Version	Red cover	
						24 V	
TZ	MR10 Plug connector	Mechanical	LE Left	SK: 2131H, 3 NC ⊖ ÜK: 3131H, 2 NC ⊖ + 1 NO	Without mechanical release	095 904 ¹⁾ TZ1LE024MVAB-F	
			RE Right	SK: 2131H, 3 NC ⊖ ÜK: 3131H, 2 NC ⊖ + 1 NO	Without mechanical release	095 905 ¹⁾ TZ1RE024MVAB-F	
	MR12 Plug connector	Mechanical	LE Left	SK: 2121H, 4 NC ⊖ ÜK: 2121H, 4 NC ⊖	Without mechanical release, with protective plate	079 692 TZ1LE024BHA-C1902	
			C1971		Alternative wiring, without mechanical release, with protective plate	085 569 TZ1LE024BAVFG-RC1971	
			RE Right	SK: 2121H, 4 NC ⊖ ÜK: 2121H, 4 NC ⊖	Without mechanical release, with protective plate	079 693 TZ1RE024BHA-C1902	
			C1971		Alternative wiring, without mechanical release, with protective plate	085 570 TZ1RE024BAVFG-RC1971	

1) No BG approval



Safety switch TZ with guard locking and guard lock monitoring

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



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)

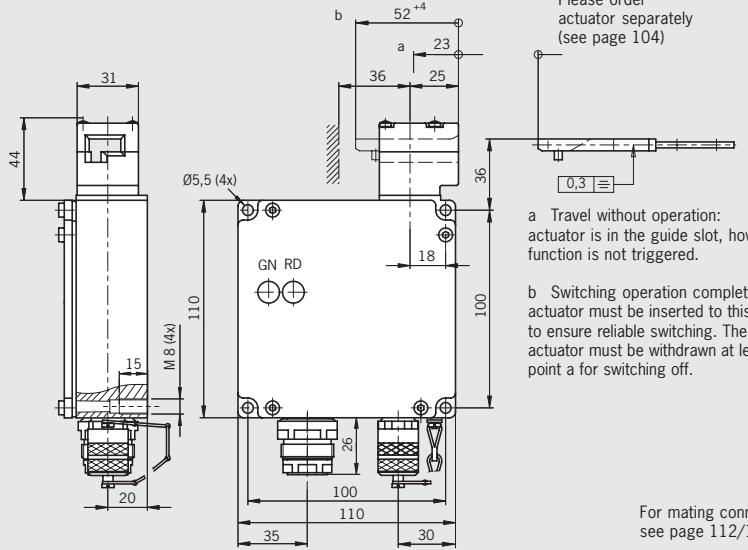
- SK** For monitoring the door/actuator position
- ÜK** For monitoring the guard locking (built-in solenoid)

For combinations available see ordering table:

- ▶ **528H** Slow-action switching element
1 NC \ominus + 1 NO
- ▶ **2131H** Slow-action switching element
3 NC \ominus + 1 NO
- ▶ **3131H** Slow-action switching element
2 NC \ominus + 2 NO

Plug connector SR6 and BD4 (enabling switch)
6-pin + PE / 4-pin

Dimension drawings Actuating head on left is a mirror image



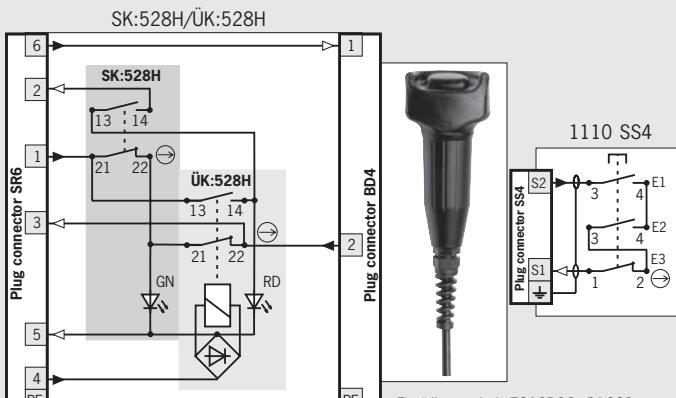
Please order actuator separately
(see page 104)

a Travel without operation:
actuator is in the guide slot, however
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 connectors
see page 112/111

Wiring diagrams Actuator inserted and locked



Enabling switch ZSA2B2G..C1662
with plug SS4 see catalog on
enabling switches. (Enabling switch
not included)

Please turn over

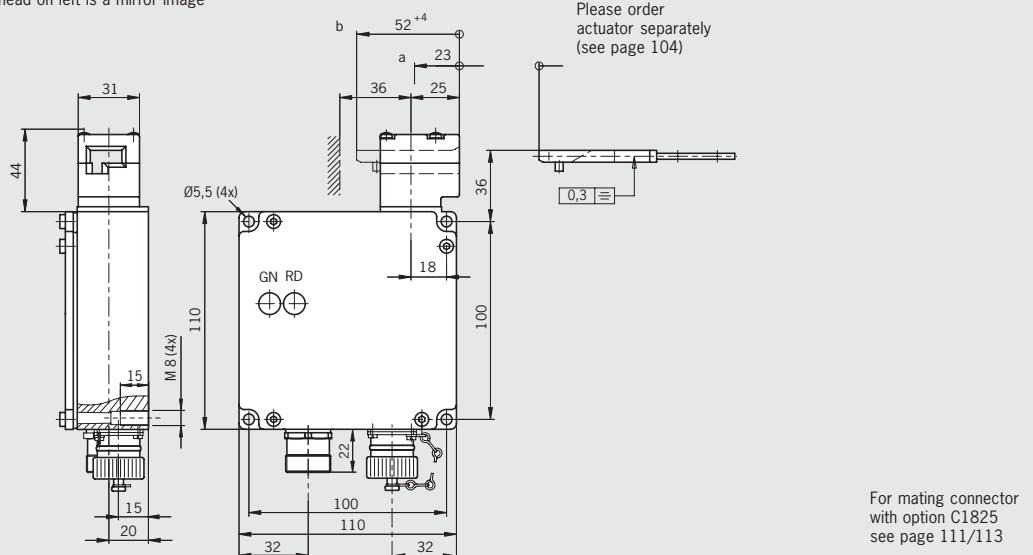
Ordering table

Series	Connection	Enabling switch connection	Guard locking	Switch head	Switching element	Version	Black cover	
							24 V	
TZ	SR6 Plug connector	Enabling switch plug BD4	1 Mechanical	LE Left	SK: 528H , 1 NC \ominus + 1 NO ÜK: 528H , 1 NC \ominus + 1 NO	Without mechanical release	070 527	TZ1LE024SR6-C1662
				RE Right	SK: 528H , 1 NC \ominus + 1 NO ÜK: 528H , 1 NC \ominus + 1 NO	Without mechanical release	054 781	TZ1RE024SR6-C1662
			2 Electrical	LE Left	SK: 528H , 1 NC \ominus + 1 NO ÜK: 528H , 1 NC \ominus + 1 NO	Without mechanical release	059 307	TZ2LE024SR6-C1662
				RE Right	SK: 528H , 1 NC \ominus + 1 NO ÜK: 528H , 1 NC \ominus + 1 NO	Without mechanical release	059 305	TZ2RE024SR6-C1662

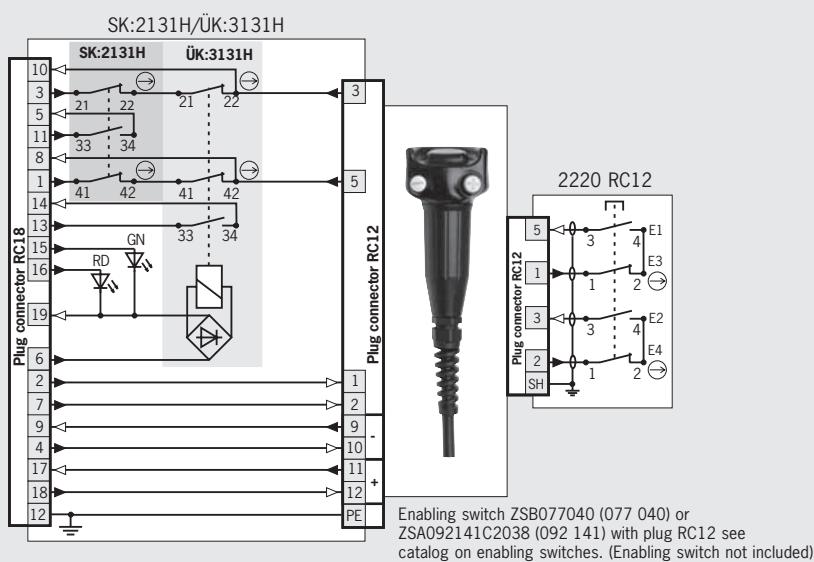


Plug connector RC18 and RC12 (enabling switch)
18-pin + PE / 12-pin

Dimension drawings Actuating head on left is a mirror image



Wiring diagrams Actuator inserted and locked



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	Mechanical	1	LE	SK: 2131H, 3 NC ⊖ + 1 NO	Without	091 062	
					Left	ÜK: 3131H, 2 NC ⊖ + 2 NO	mechanical release	TZ1LE024RC18VAB-C1803	
				2	RE	SK: 2131H, 3 NC ⊖ + 1 NO	Without	091 063	
					Right	ÜK: 3131H, 2 NC ⊖ + 2 NO	mechanical release	TZ1RE024RC18VAB-C1803	
	RC18 ¹⁾ Pushbutton		Electrical	1	LE	SK: 2131H, 3 NC ⊖ + 1 NO	Without	075 955	
					Left	ÜK: 3131H, 2 NC ⊖ + 2 NO	mechanical release	TZ2LE024RC18VAB-C1803	
				2	RE	SK: 2131H, 3 NC ⊖ + 1 NO	Without	077 149	
					Right	ÜK: 3131H, 2 NC ⊖ + 2 NO	mechanical release	TZ2RE024RC18VAB-C1803	

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

Selection table for safety switches NX

Connection			Page
M	Switching element		
Thread M20x1.5 for cable glands	Four contacts 4 NC ⊖ or 3 NC ⊖ + 1 NO or 2 NC ⊖ + 2 NO		
●	●		88

Safety switch NX

- Cable entry M20 x 1.5
- LED indicator optional



Cable entry M20 x 1.5

Approach direction



Horizontal and vertical
Can be adjusted in 90° steps

Switching elements (see also page 13/14)

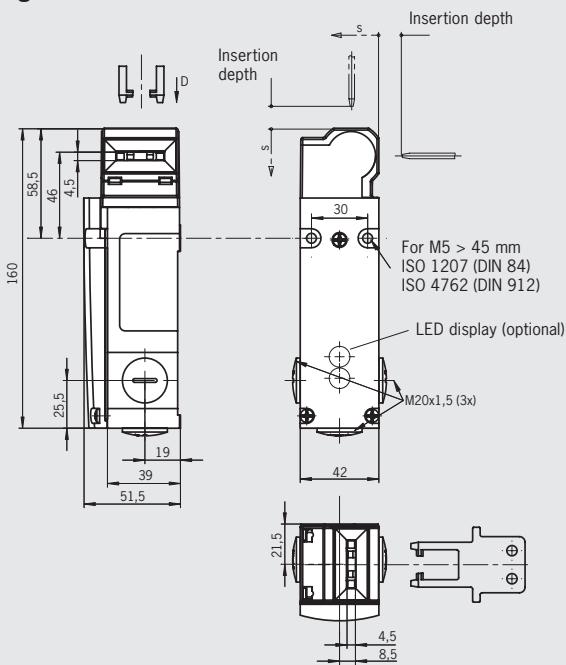
- **2121** Slow-action switching element
4 NC ⊖
- **2131** Slow-action switching element
3 NC ⊖ + 1 NO
- **3131** Slow-action switching element
2 NC ⊖ + 2 NO

LED function display (optional)

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

- DC 24 V +10%, -15%

Dimension drawing

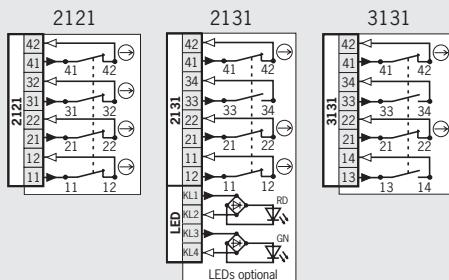


Please order
actuator separately
(see page 106)

For cable glands see page 115

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 4 NC ⊖		092 625 NX1-2121A-M
		2131 3 NC ⊖ + 1 NO		092 624 NX1-2131A-M
		2131 3 NC ⊖ + 1 NO	L024 LED display DC 24 V	091 682 NX1-2131AL024-M
		3131 2 NC ⊖ + 2 NO		092 626 NX1-3131A-M

Safety Switches with Separate Actuator, Metal Housing **EUCHNER**

Selection table for safety switches 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
----	----------------------------

Connection

M	Thread M20x1.5 for cable glands
NPT 1/2"	Thread 1/2" 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 NO or 2 NC ⊖ + 2 NC ⊖
----------------------	---

Manual release		Connection							Switching element four contacts	Version	Page	
HE	FE	M	NPT 1/2"	BH10	SR11	BH12	RC18	M12				
●		●	●						●			90
●				●					●			91
●		●	●						●			92
●					●	●	●		●			93
●	●	●							●	C1991/C2161		94
●	●						●		●	C1991		95
●								●	●	C2129		96

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

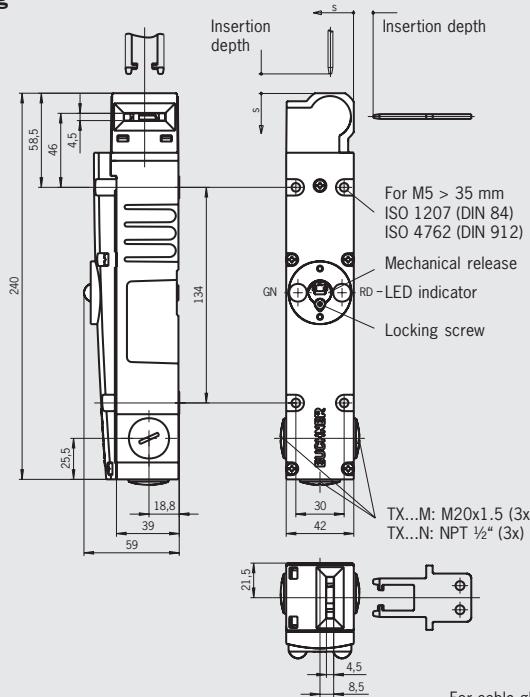
- TX1** Closed-circuit current principle, guard locking by spring force. Release by applying voltage to the solenoid.
TX2 Open-circuit current principle, guard locking by applying voltage to the solenoid.
 Release by spring force.

Switching elements (see also page 14)

- **ETX B** Slow-action switching element 2NC \ominus / 1NO + 1NC (door monit. contact)
- **ETX C** Slow-action switching element 2NC \ominus / 1NO + 1NO (door monit. contact)
- **ETX D** Slow-action switching element 2 NC \ominus + 2 NC \ominus (door monit. contacts)

Cable entry M20 x 1.5 / cable entry NPT 1/2"

Dimension drawing

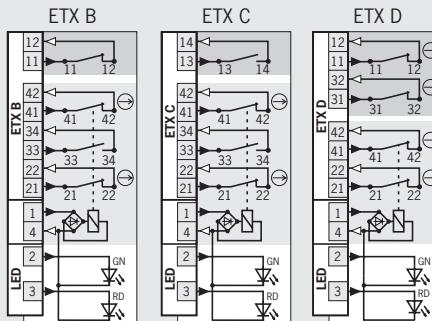


For cable glands see page 115

Please order actuator separately (see page 106)

Wiring diagrams

Actuator inserted and locked



□ Solenoid monitoring
□ Door monitoring

For switching functions see technical data on page 159

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 \ominus / 1 NO + 1 NC	082 921	085 383	085 385
			ETX C 2 NC \ominus / 1 NO + 1 NO	082 922	085 384	085 386
		2 Electrical	ETX D 2 NC \ominus + 2 NC \ominus	095 025	-	-
				TX1D-A024MC2081		
			ETX B 2 NC \ominus / 1 NO + 1 NC	082 927	085 387	085 389
	N Cable entry 3 x NPT 1/2"	1 Mechanical	ETX C 2 NC \ominus / 1 NO + 1 NO	082 928	085 388	085 390
			ETX D 2 NC \ominus + 2 NC \ominus	095 026	TX2C-A110M	TX2C-A230M
		2 Electrical	ETX B 2 NC \ominus / 1 NO + 1 NC	082 944	085 382	On request
			ETX C 2 NC \ominus / 1 NO + 1 NO	082 945	TX1B-A110N	On request
			ETX B 2 NC \ominus / 1 NO + 1 NC	082 946	On request	On request
			ETX C 2 NC \ominus / 1 NO + 1 NO	082 947	TX2B-A024N	On request
			ETX D 2 NC \ominus + 2 NC \ominus	TX2C-A024N	On request	On request

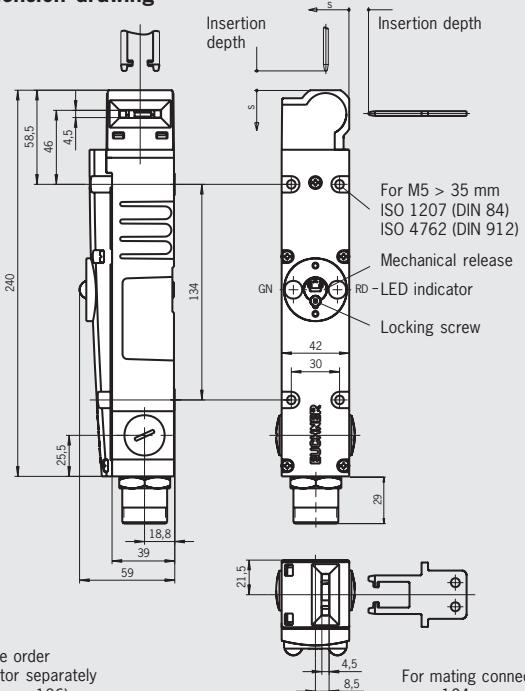
Safety Switches with Separate Actuator, Metal Housing **EUCHNER**



Plug connector BH10
9-pin + PE

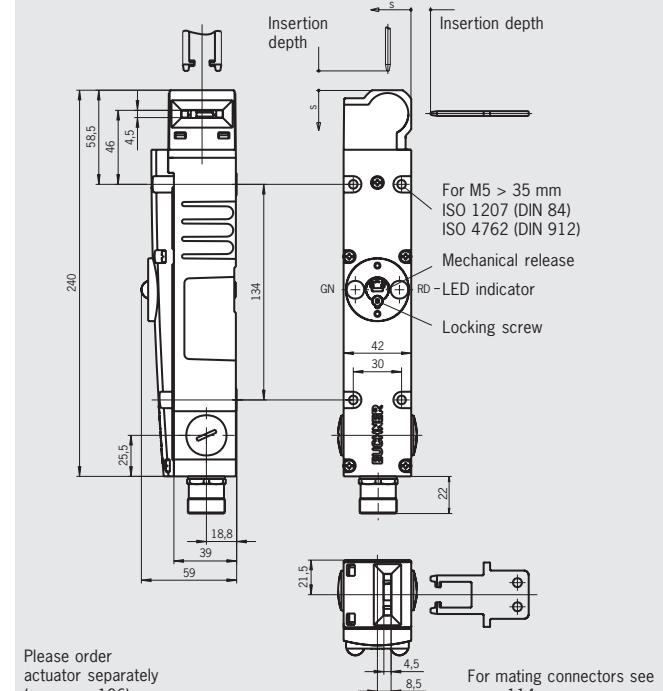
Plug connector RC18

Dimension drawing



Please order
actuator separately
(see page 106)

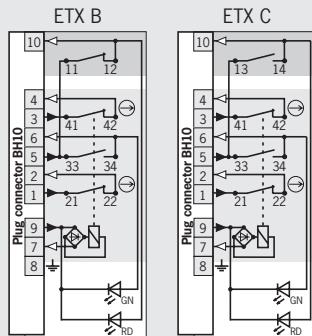
For mating connectors see page 124



Please order
actuator separately
(see page 106)

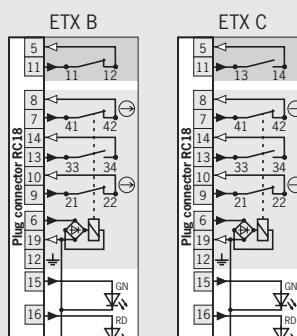
For mating connectors see page 114

Wiring diagrams



For switching functions see technical data on page 159

- Solenoid monitoring
- Door monitoring



For switching functions see technical data on page 159

- Solenoid monitoring
- Door monitoring

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	085 380 TX1B-A024BH10	On request	On request
		2 Electrical	ETX B 2 NC ⊖ / 1 NO + 1 NC	085 381 TX2B-A024BH10	On request	On request
	Plug connector RC18	1 Mechanical	ETX B 2 NC ⊖ / 1 NO + 1 NC	082 933 TX1B-A024RC18	-	-
			ETX C 2 NC ⊖ / 1 NO + 1 NO	082 934 TX1C-A024RC18	-	-
		2 Electrical	ETX B 2 NC ⊖ / 1 NO + 1 NC	082 939 TX2B-A024RC18	-	-
			ETX C 2 NC ⊖ / 1 NO + 1 NO	082 940 TX2C-A024RC18	-	-

Subject to technical modifications; no responsibility is accepted for the accuracy of this information.

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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%
- 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

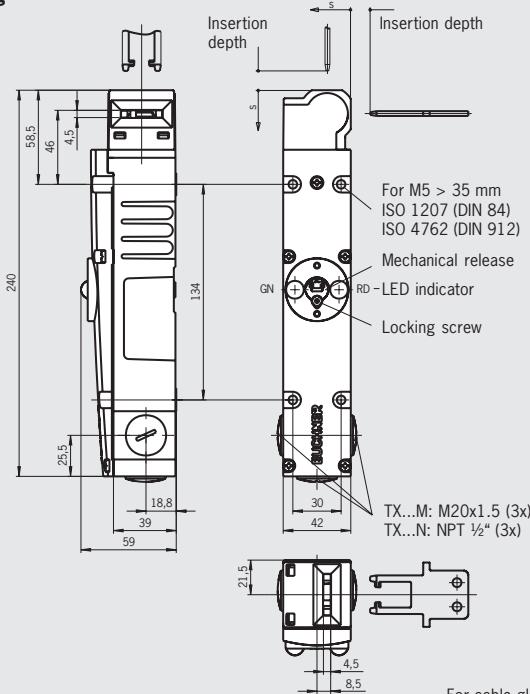
TX3 Closed-circuit current principle, guard locking by spring force. Release by applying voltage to the solenoid.
Release under load possible.

Switching elements (see also page 14)

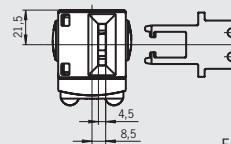
- **ETX B** Slow-action switching element
2 NC \ominus / 1 NO + 1 NC
(door monitoring contact)
- **ETX C** Slow-action switching element
2 NC \ominus / 1 NO + 1 NO
(door monitoring contact)

Cable entry M20 x 1.5 / cable entry NPT 1/2"

Dimension drawing



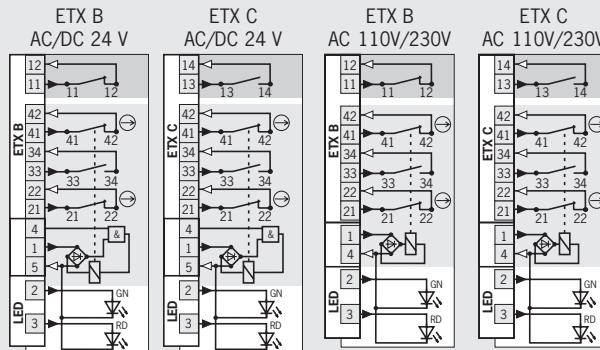
Please order actuator separately
(see page 106)



For cable glands see page 115

Wiring diagrams

Actuator inserted and locked



For switching functions see technical data on page 159

Ordering table

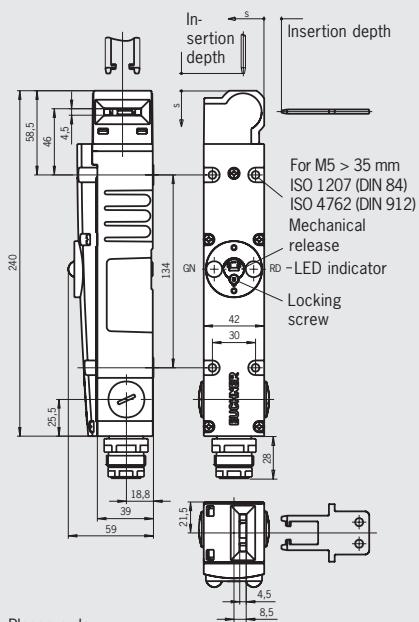
Series	Connection	Guard locking	Switching element	Solenoid operating voltage		
				AC/DC 24 V	AC 110 V	AC 230 V
TX	M Cable entry 3 x M20 x 1.5	3 Mechanical	ETX B 2 NC \ominus / 1 NO + 1 NC	082 952 TX3B-A024M	082 988 TX3B-A110M	082 976 TX3B-A230M
			ETX C 2 NC \ominus / 1 NO + 1 NO	082 953 TX3C-A024M	082 989 TX3C-A110M	082 977 TX3C-A230M
	N Cable entry 3 x NPT 1/2"	3 Mechanical	ETX B 2 NC \ominus / 1 NO + 1 NC	082 997 TX3B-A024N	On request	On request
			ETX C 2 NC \ominus / 1 NO + 1 NO	082 998 TX3C-A024N	On request	On request

Safety Switches with Separate Actuator, Metal Housing **EUCHNER**



Plug connector SR11
11-pin + PE

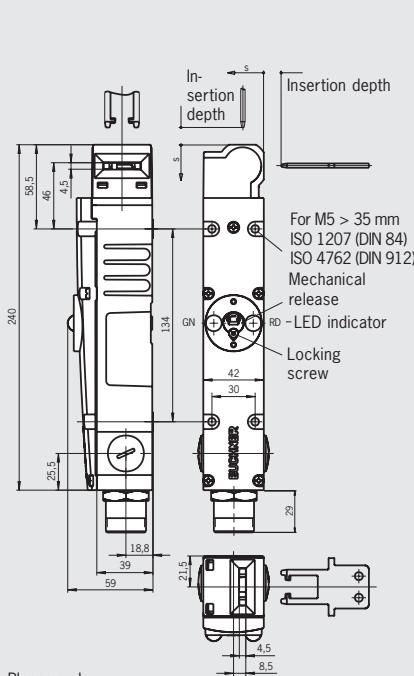
Dimension drawing



Please order
actuator separately
(see page 106)

For mating connectors see
page 112

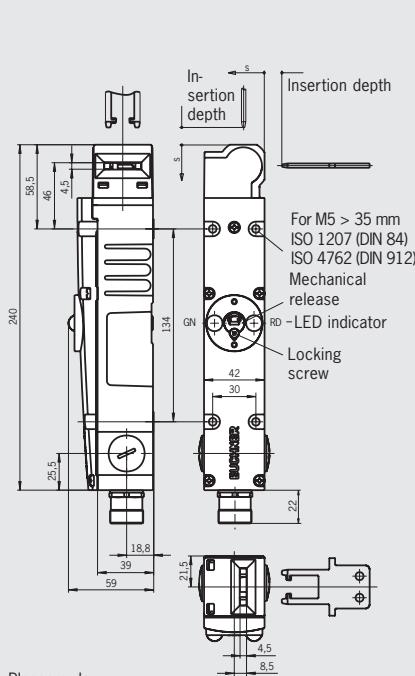
Plug connector BH12
11-pin + PE



Please order
actuator separately
(see page 106)

For mating connectors see
page 124

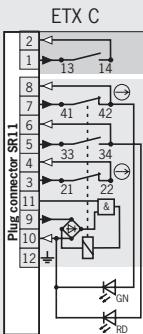
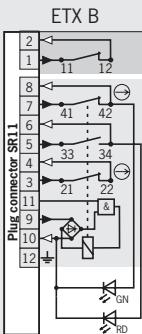
Plug connector RC18
18-pin + PE



Please order
actuator separately
(see page 106)

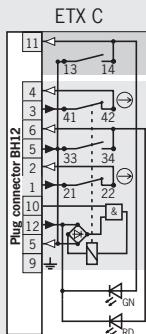
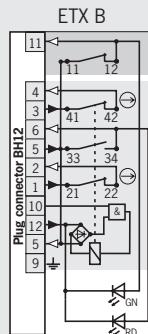
For mating connectors see
page 114

Wiring diagrams Actuator inserted and locked



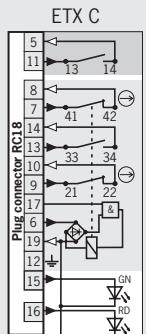
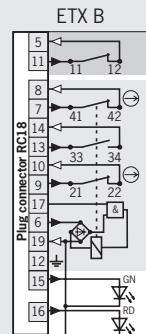
For switching functions see
technical data see page 159

Solenoid monitoring
 Door monitoring



For switching functions see
technical data see page 159

Solenoid monitoring
 Door monitoring



For switching functions see
technical data see page 159

Solenoid monitoring
 Door monitoring

Ordering table

Series	Connection	Guard locking	Switching element	Solenoid operating voltage		
				AC/DC 24 V	AC 110 V	AC 230 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	085 396 TX3C-A024SR11	-	-
	Plug connector BH12	3 Mechanical	ETX B 2 NC / 1 NO + 1 NC	082 999 TX3B-A024BH12	On request	On request
			ETX C 2 NC / 1 NO + 1 NO	083 000 TX3C-A024BH12	On request	On request
	Plug connector RC18	3 Mechanical	ETX B 2 NC / 1 NO + 1 NC	082 964 TX3B-A024RC18	-	-
			ETX C 2 NC / 1 NO + 1 NO	082 965 TX3C-A024RC18	-	-

1) With cable entry M or NPT 1/2", AC/DC 24 V

Safety switch TX with guard locking and guard lock monitoring



- ▶ Escape release on the rear
- ▶ 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

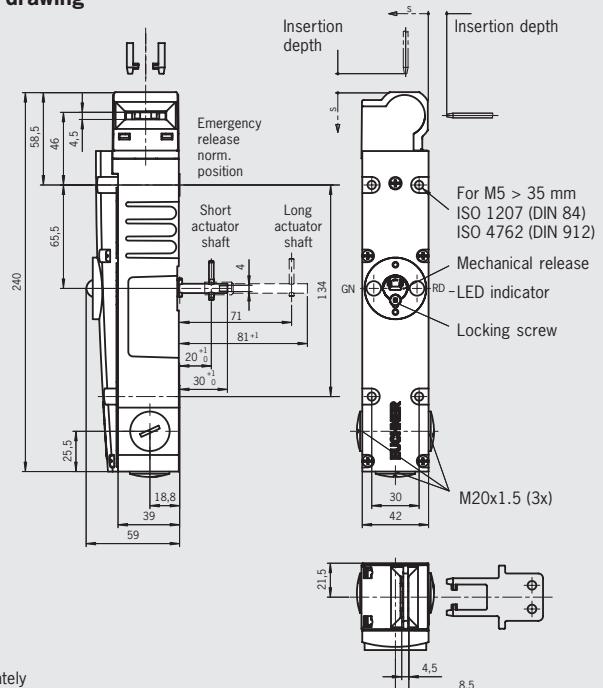
- TX1** Closed-circuit current principle, guard locking by spring force. Release by applying voltage to the solenoid.
TX3 Closed-circuit current principle, guard locking by spring force. Release by applying voltage to the solenoid.
Release under load possible.

Switching elements (see also page 14)

- ▶ **ETX B** Slow-action switching element 2NC \ominus / 1NO + 1NC (door monit. contact)
- ▶ **ETX C** Slow-action switching element 2NC \ominus / 1NO + 1NO (door monit. contact)
- ▶ **ETX D** Slow-action switching element 2NC \ominus + 2NC \ominus (door monit. contacts)

Cable entry M20 x 1.5

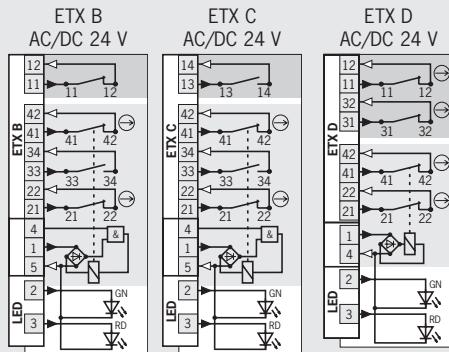
Dimension drawing



Please order actuator separately (see page 106)

For cable glands see page 115

Wiring diagrams Actuator inserted and locked



Solenoid monitoring
 Door monitoring

For switching functions see technical data on page 159

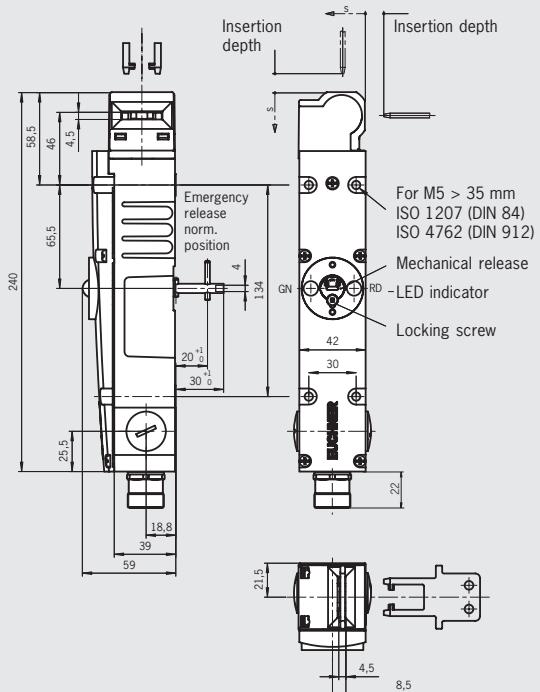
Ordering table

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 \ominus / 1 NO + 1 NO	C2161	099 489	TX1C-A024MC2161
			ETX D 2 NC \ominus + 2 NC \ominus	C1991	096 173	TX1D-A024MC1991
		3 Mechanical	ETX B 2 NC \ominus / 1 NO + 1 NC	C1991	085 391	TX3B-A024MC1991
			ETX C 2 NC \ominus / 1 NO + 1 NO	C1991	093 118	TX3C-A024MC1991
				C2161	098 946	TX3C-A024MC2161



Plug connector RC18 18-pin + PE

Dimension drawing

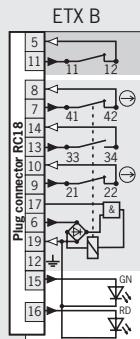


Please order
actuator separately
(see page 106)

For mating connectors see
page 114

Wiring diagrams

Actuator inserted and locked



Solenoid monitoring
 Door monitoring

For switching functions see technical data on page 159

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 <input checked="" type="checkbox"/> 1 NO + 1 NC	C1991 Short actuator shaft	093 559 TX3B-A024RC18C1991

Safety switch TX with guard locking and guard lock monitoring



- ▶ 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.

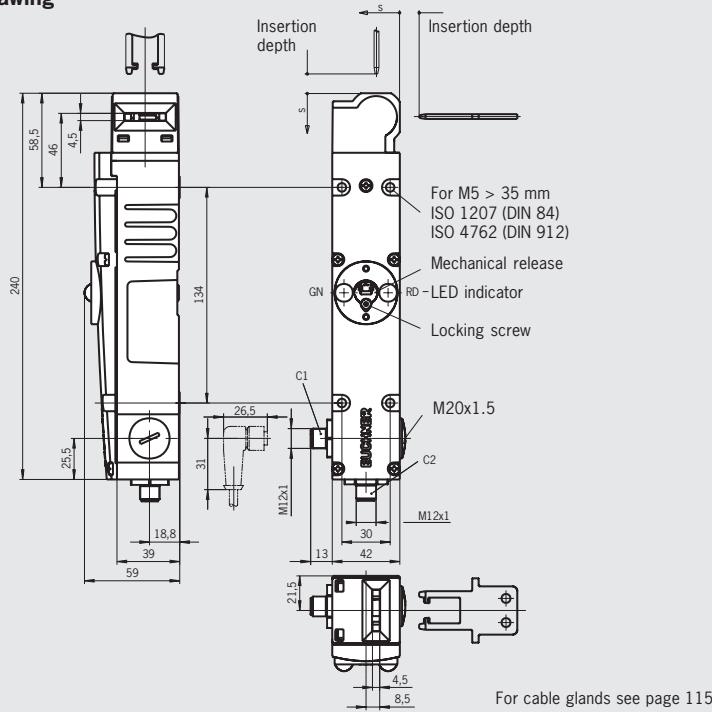
TX2 Open-circuit current principle, guard locking by applying voltage to the solenoid.
Release by spring force.

Switching elements (see also page 14)

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

Plug connector M12
2 plug connectors, 5-pin

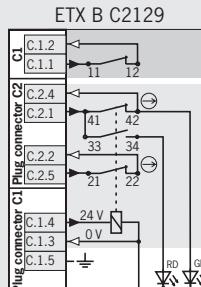
Dimension drawing



Please order
actuator separately
(see page 106)

Wiring diagrams

Actuator inserted and locked



Solenoid monitoring
 Door monitoring

For switching functions see technical data on page 159

Ordering table

Series	Connection	Guard locking	Switching element	Version	Solenoid operating voltage	
					AC/DC 24 V	
TX	Plug connector 2 x M12	1 Mechanical	ETX B 2 NC ⊖ / 1 NO + 1 NC	C2129	097 623 TX1B-A024MC2129	

Safety Switches with Separate Actuator, Metal Housing **EUCHNER**

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



Release feature

HE	Mechanical release on the front
----	---------------------------------

Door monitoring

STA3/4	STA1/2	With door monitoring contact
		Without door monitoring contact

Connection

M	Thread M20x1.5 for cable gland
---	--------------------------------

Release feature	Door monitoring		Connection	Page
HE	STA3/4	STA1/2	M	
●	●		●	98
●		●	●	99

Safety switch STA with guard locking and guard lock monitoring

- Mechanical release on the front
- With door monitoring contact



Approach direction



Horizontal and vertical

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%

Guard locking types

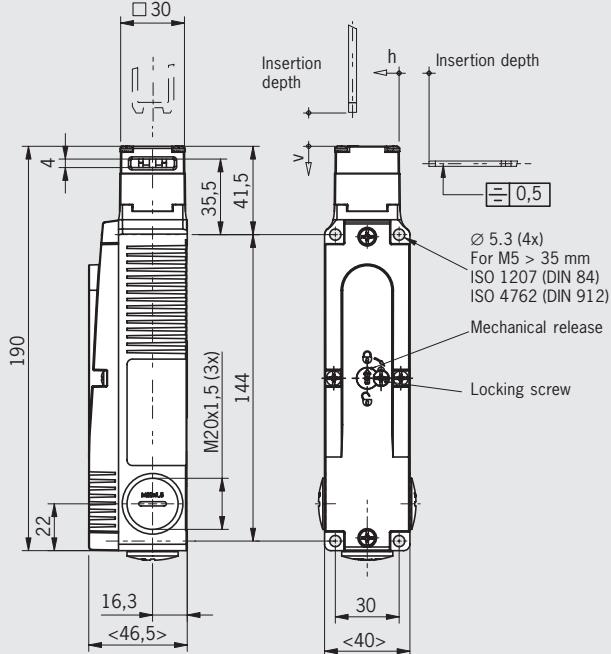
- STA3** Closed-circuit current principle, guard locking by spring force. Release by applying voltage to the interlocking solenoid.
- STA4** Open-circuit current principle, guard locking by applying voltage to the interlocking solenoid. Release by spring force.

Switching elements (see also page 13)

- 2131** Slow-action switching element
2 NC \ominus + 1 NO + 1 NC (door monit. contact)
- 4121** Slow-action switching element
2 NC \ominus + 1 NC / 1 NO (door monit. contact)
- 4131** Slow-action switching element
2 NC \ominus + 1 NO + 1 NO (door monit. contact)
- 4141** Slow-action switching element
2 NC \ominus + 2 NC (door monit. contacts)

Cable entry M20 x 1.5

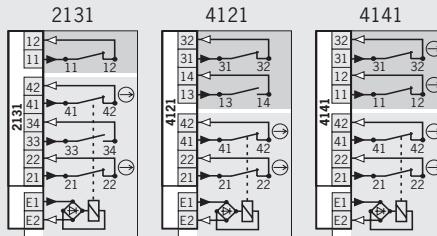
Dimension drawing



For cable glands see page 115

Wiring diagrams

Actuator inserted and locked



 Solenoid monitoring
 Door monitoring

Ordering table

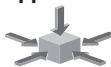
Series	Connection	Guard locking	Switching element	Version	Solenoid operating voltage	
					AC/DC 24 V	
STA	M Cable entry 3 x M20x1.5	3 Mechanical	2131 2 NC \ominus + 1 NO + 1 NC		096 938 STA3A-2131A024M	
			4121 2 NC \ominus + 1 NC / 1 NO		096 936 STA3A-4121A024M	
		4 Electrical	4141 2 NC \ominus + 2 NC		099 274 STA3A-4141A024M	
			2131 2 NC \ominus + 1 NO + 1 NC		096 939 STA4A-2131A024M	
			4121 2 NC \ominus + 1 NC / 1 NO		096 937 STA4A-4121A024M	

Safety switch STA with guard locking and guard lock monitoring

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



Approach direction



Horizontal and vertical

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%

Guard locking types

STP1 Closed-circuit current principle, guard locking by spring force. Release by applying voltage to the interlocking solenoid.

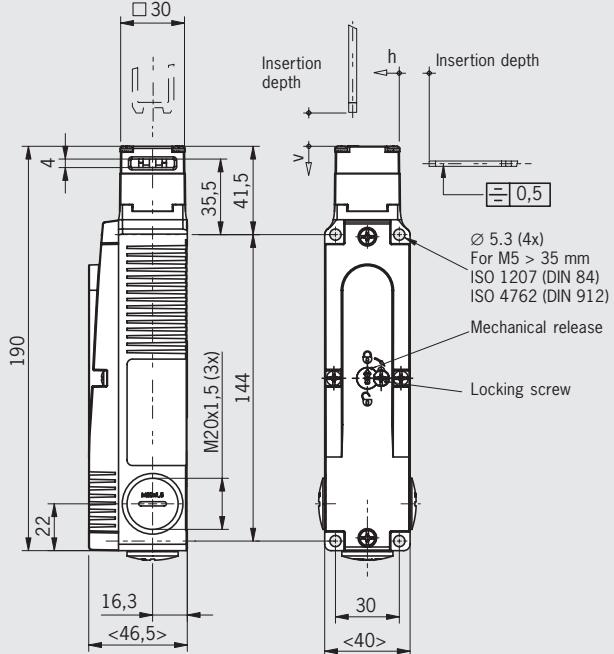
STP2 Open-circuit current principle, guard locking by applying voltage to the interlocking solenoid. Release by spring force.

Switching elements (see also page 13)

- ▶ **4131** Slow-action switching element
2 NC ⊖ + 2 NO

Cable entry M20 x 1.5

Dimension drawing

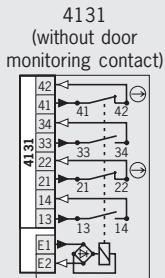


Please order actuator separately (see page 108)

For cable glands see page 115

Wiring diagrams

Actuator inserted and locked



□ Solenoid monitoring
■ Door monitoring

Ordering table

Series	Connection	Guard locking	Switching element	Version	Solenoid operating voltage	
					AC/DC 24 V	
STA	M Cable entry 3 x M20x1.5	1 Mechanical	4131 2 NC ⊖ + 2 NO		096 439 STA1A-4131A024M	
		2 Electrical	4131 2 NC ⊖ + 2 NO		096 935 STA2A-4131A024M	

Selection table for safety hinges ESH

Switching element		
Two contacts	1 NC ⊖ + 1 NO or 2 NC ⊖	
Switching element two contacts		Page
●		102

Safety hinge ESH



- Hinge with integrated safety function
- Suitable for profile assembly

Plug connector M12
4-pin + PE

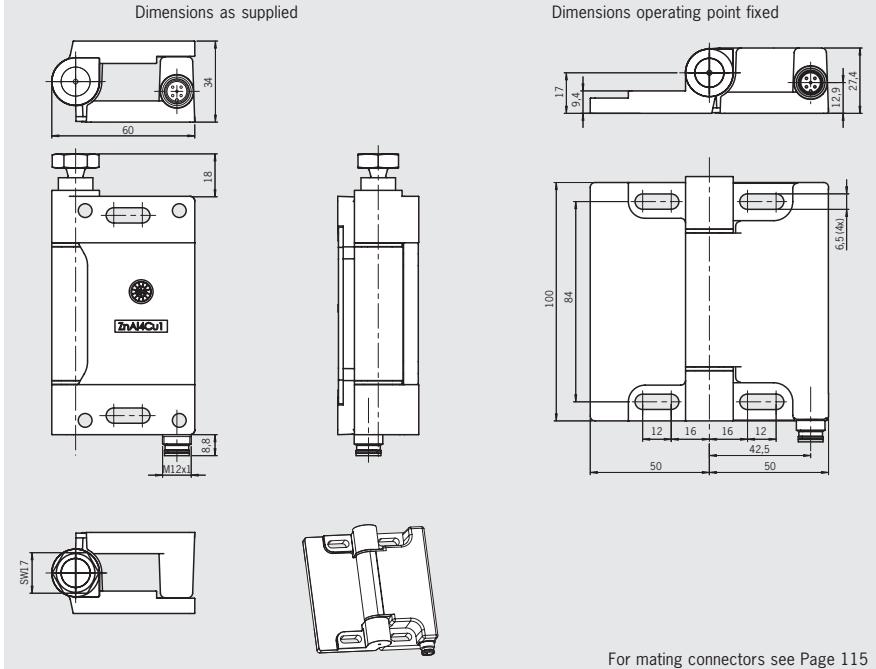


The safety hinges ESH are safety devices for monitoring movable safety guards, such as doors or covers on machinery or systems. Safety hinges comply with the regulations of EN 60947-5-1 Annex K and comply with the requirements of the employers' liability insurance associations for machines, installations and personnel protection. The safety switch signals that the safety guard is closed. The switch does not perform guard locking!

Switching elements

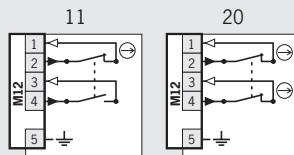
- **20** Snap-action switching element
2 NC ⊖
- **11** Snap-action switching element
1 NC ⊖ + 1 NO

Dimension drawing



For mating connectors see Page 115

Wiring diagrams



Ordering table

Designation	Switching element	Version	Order No.
Safety hinge ESH-PRO	11 1 NC ⊖ + 1 NO	Plug connector M12	095 895 ESH-PRO-11A-1205
	20 2 NC ⊖	Plug connector M12	095 894 ESH-PRO-20A-1205
	-	Plain hinge	096 007 ESH-PRO

Selection table for accessories

Actuators													
Plug connectors													
SS4											Male plug 3-pin + PE		
Solenoid											Solenoid plug connector NZ.NZ.VS 2-pin + PE		
C16-1											Female plug 6-pin + PE		
RC12											Blanking plug 12-pin		
SR6											Female plug 6-pin + PE		
SR11											Male socket 6-pin + PE		
RC18											Female plug 11-pin + PE		
SVM5											Male socket 11-pin + PE		
											Female plug 18-pin + PE		
											M12 plug connector 5-pin		
Plug connector with cable													
Cable glands													
Mounting plates													
Bolts													
Actuators	SS4	Solenoid	C16-1	RC12	SR6	SR11	RC18	SVM5	With cable	Cable glands	Mounting plates	Bolts	Page
●													104
	●												111
		●											111
			●										111
				●									111
					●								112
						●			●				112
							●						113
							●		●				114
								●	●				115
										●			115
											●		116
												●	125

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

- ▶ Two stainless safety screws per actuator
- ▶ Increased overtravel optional
- ▶ Smaller door radii 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

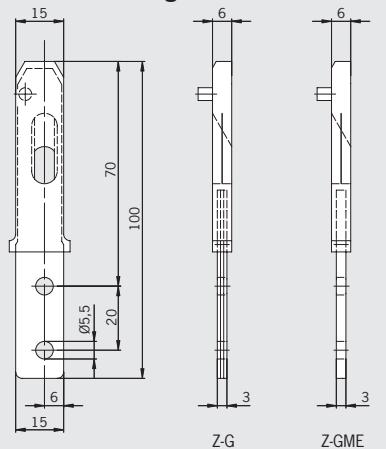
- ▶ **4 mm** for doors with normal play
- ▶ **16 mm** for doors with large play (optional)

Hinged actuator

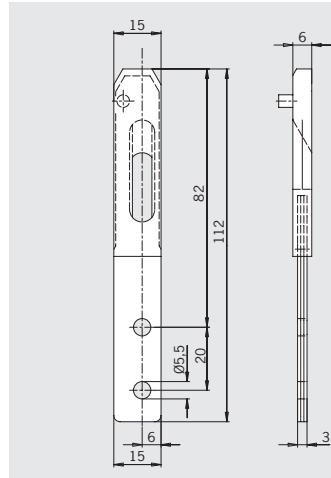
For door radii less than 1000 mm a hinged actuator should be used. The spring action movement of the actuator prevents damage due to the actuator jamming in the actuating head. Depending on the movement of the safety guard, the actuator must be selected for left/right or top/bottom.

Actuator Z-G and Z-GME straight
Overtravel 4 mm

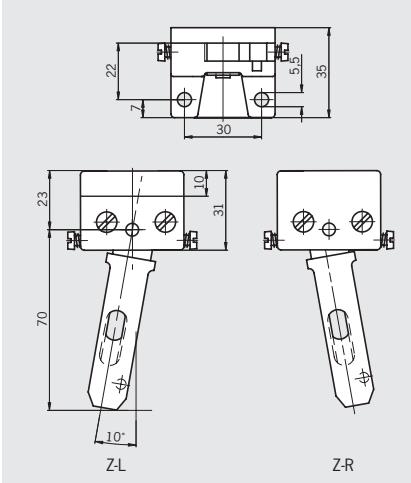
Dimension drawings



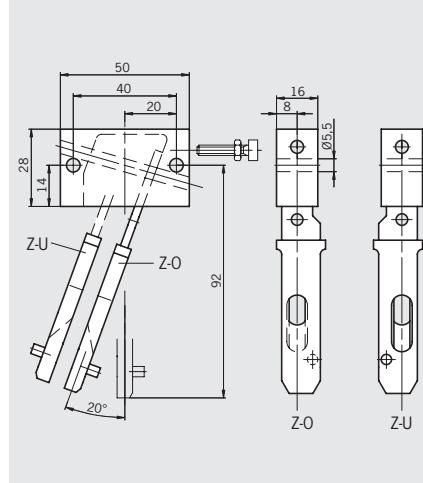
Actuator Z-GN straight
Overtravel 16 mm



Hinged actuator Z-R/Z-LL
Safety guard hinged on the right/left



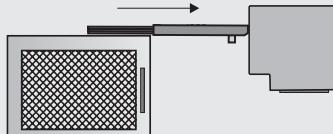
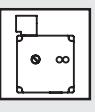
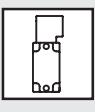
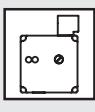
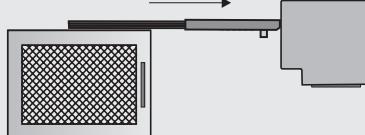
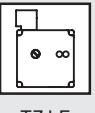
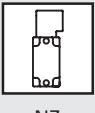
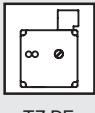
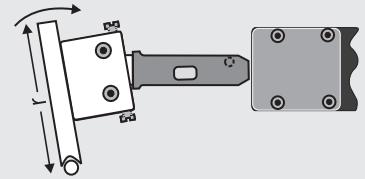
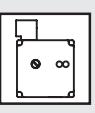
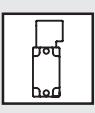
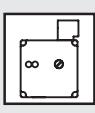
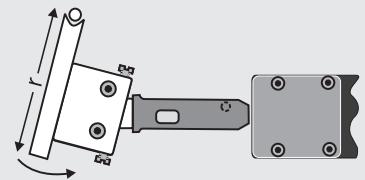
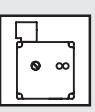
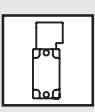
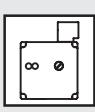
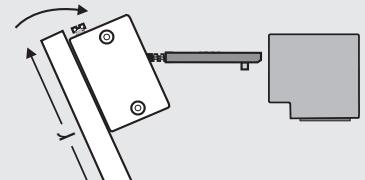
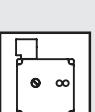
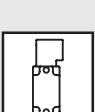
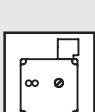
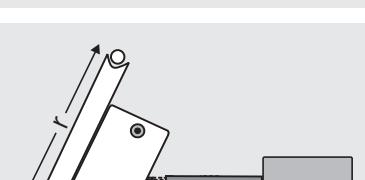
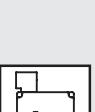
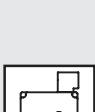
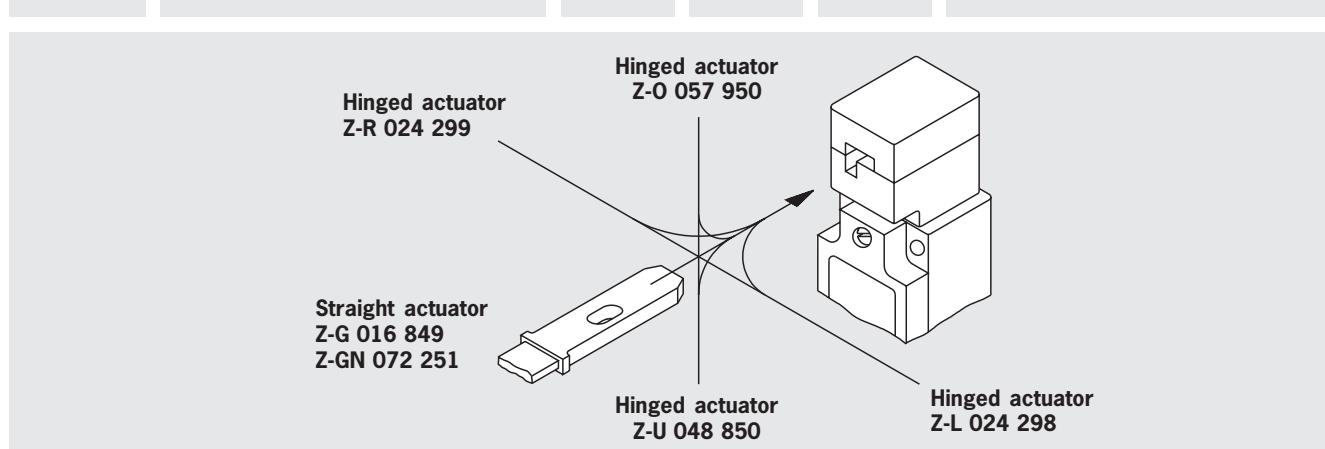
Hinged actuator Z-U/Z-O
Safety guard hinged at bottom/top



Ordering table

Designation	Version	Min. door radius r [mm]	Packaging unit	Order No.
Actuator straight	Z-G 4 mm overtravel incl. 2 safety screws M5 x 10	≥ 1000	1 ea.	016 849 ACTUATOR-Z-G
			25 ea.	074 411 ACTUATOR-Z-G/V25
	Z-GME 4 mm overtravel, made of solid stainless steel incl. 2 safety screws M5x10	≥ 1000	1 ea.	097 436 ACTUATOR-Z-GME
Hinged actuator	Z-GN 16 mm overtravel incl. 2 safety screws M5x10	≥ 1000	1 ea.	072 251 ACTUATOR-Z-GN
	Z-R Safety guard hinged on the left incl. 2 safety screws M5 x 16	≥ 400	1 ea.	024 299 HINGED ACTUATOR-Z-R
			25 ea.	074 412 HINGED ACTUATOR-Z-R/V25
	Z-L Safety guard hinged on the right incl. 2 safety screws M5 x 16	≥ 400	1 ea.	024 298 HINGED ACTUATOR-Z-L
			25 ea.	074 413 HINGED ACTUATOR-Z-L/V25
	Z-U Safety guard hinged at bottom incl. 2 safety screws M5 x 25	≥ 165	1 ea.	048 850 HINGED ACTUATOR-Z-U
			25 ea.	074 414 HINGED ACTUATOR-Z-U/V25
	Z-O Safety guard hinged at top incl. 2 safety screws M5 x 25	≥ 165	1 ea.	057 950 HINGED ACTUATOR-Z-O
			25 ea.	074 415 HINGED ACTUATOR-Z-O/V25

Selection table for actuators

Actuator				
Actuator straight Z-G 016 849 overtravel 4 mm				
Actuator straight Z-GN 072 251 overtravel 16 mm				
Hinged actuator Z-L 024 298				
Hinged actuator Z-R 024 299				
Hinged actuator Z-U 048 850				
Hinged actuator Z-O 057 950				
				

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

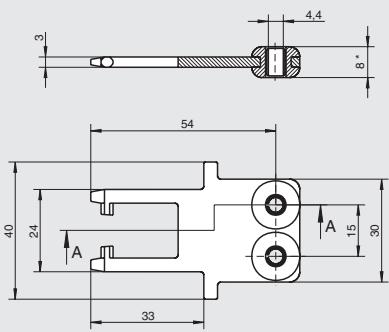
For door radii less than 300 mm a hinged actuator should be used. The spring action movement of the actuator prevents damage due to the actuator jamming in the actuating head. Depending on the movement of the safety guard, the actuator must be selected for left/right or top/bottom.

Screws made of stainless steel

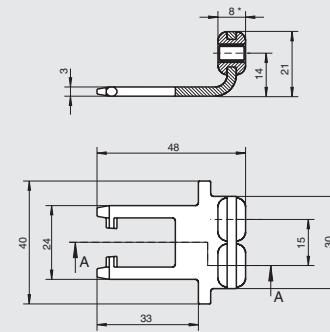
The safety screws included can be inserted with a normal tool, but cannot be removed again.

Actuator X-GQ straight
Rubber bush, overtravel 2 mm

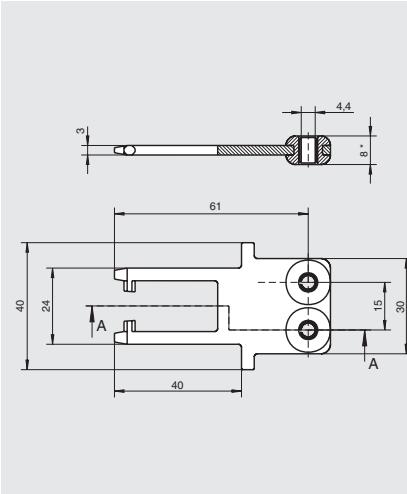
Dimension drawings



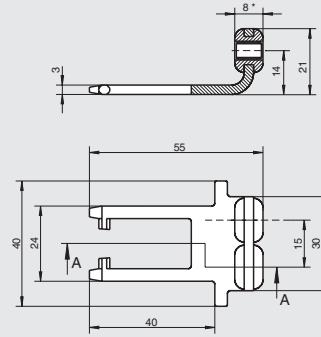
Actuator X-WQ bent
Rubber bush, overtravel 2 mm



Actuator X-GNQ straight
Rubber bush, overtravel 7 mm



Actuator X-WNQ bent
Rubber bush, overtravel 7 mm



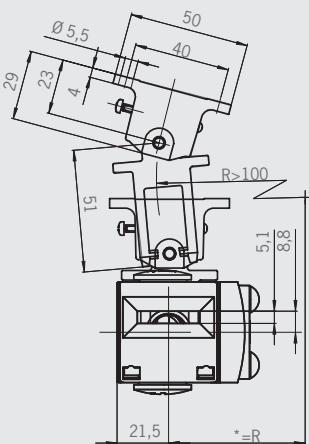
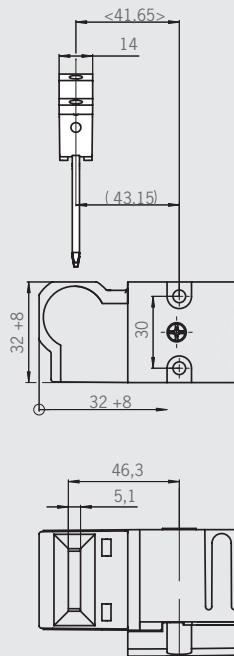
Ordering table

Designation	Version	Min. door radius r [mm]	Packaging unit	Order No.
Actuator straight rubber bush	X-GQ Overtravel 2 mm incl. 2 safety screws M4 x 14	300	1 ea.	079 739 ACTUATOR-X-GQ
Actuator bent rubber bush	X-WQ Overtravel 2 mm incl. 2 safety screws M4 x 14	300	1 ea.	079 740 ACTUATOR-X-WQ
Actuator straight rubber bush, overtravel	X-GNQ Overtravel 7 mm incl. 2 safety screws M4 x 14	440	1 ea.	079 741 ACTUATOR-X-GNQ
Actuator bent rubber bush, overtravel	X-WNQ Overtravel 7 mm incl. 2 safety screws M4 x 14	440	1 ea.	079 742 ACTUATOR-X-WNQ

* The dimension 8 relates to the fitted state

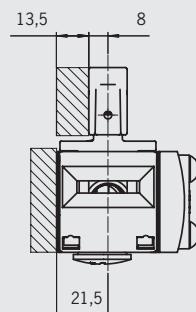
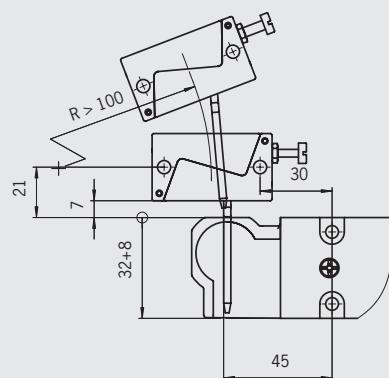
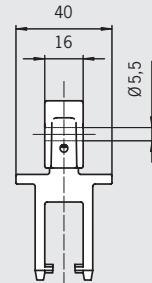
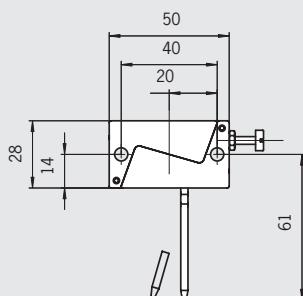
Hinged actuator X-LR-N

Safety guard hinged on the right/left



Hinged actuator X-OU-N

Safety guard hinged at bottom/top



Ordering table

Designation	Version	Min. door radius r [mm]	Packaging unit	Order No.
Hinged actuator	X-LR-N Safety guard hinged on the right or left incl. 2 safety screws M5 x 10	≥ 100	1 ea.	098 082 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.	097 906 HINGED ACTUATOR-X-OU-N

Actuators for safety switches 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 2500 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.

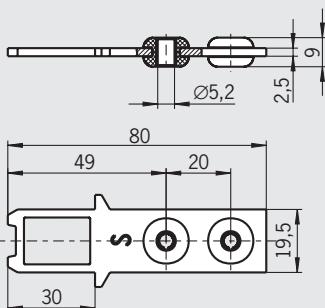
Screws made of stainless steel

The safety screws included can be inserted with a normal tool, but cannot be removed again.

Standard actuator S, straight

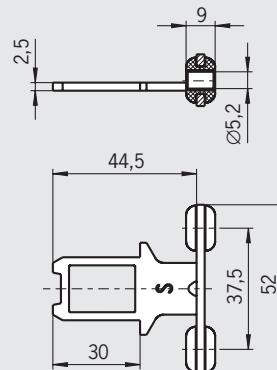
Rubber bush, overtravel 5 mm

Dimension drawings



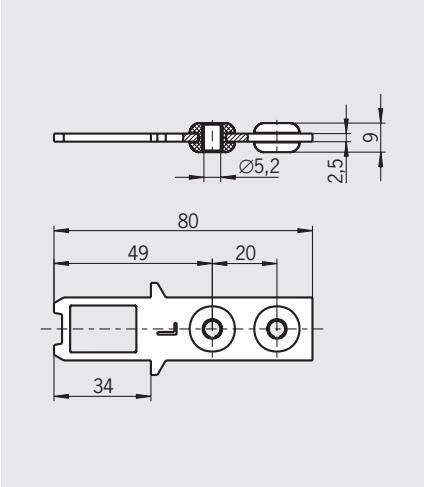
Standard actuator S, bent

Rubber bush, overtravel 5 mm



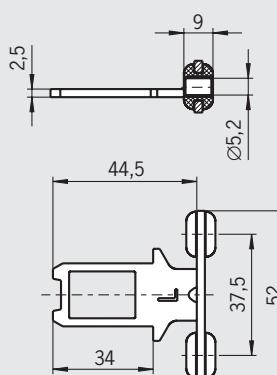
Actuator L, straight, for insertion funnel

Rubber bush, overtravel 5 mm



Actuator L, bent, for insertion funnel

Rubber bush, overtravel 5 mm



Ordering table

Designation	Version	Min. door radius r [mm]	Packaging unit	Order No.
Actuator S straight	S-GT-SN Overtravel 5 mm incl. 2 safety screws M4 x 14	300	1 ea.	095 738 ACTUATOR S-GT-SN
Actuator S bent	S-WQ-SN Overtravel 5 mm incl. 2 safety screws M4 x 14	300	1 ea.	095 740 ACTUATOR S-WQ-SN
Actuator L straight	S-GT-LN Overtravel 5 mm incl. 2 safety screws M4 x 14	300	1 ea.	095 739 ACTUATOR S-GT-LN
Actuator L bent	S-WQ-LN Overtravel 5 mm incl. 2 safety screws M4 x 14	300	1 ea.	095 741 ACTUATOR S-WQ-LN

Hinged actuators for safety switches STA

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

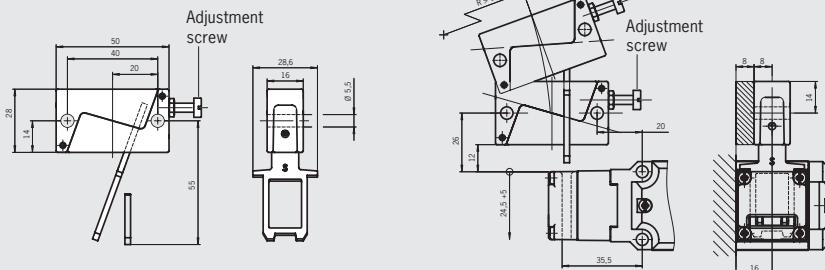
Hinged actuator

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

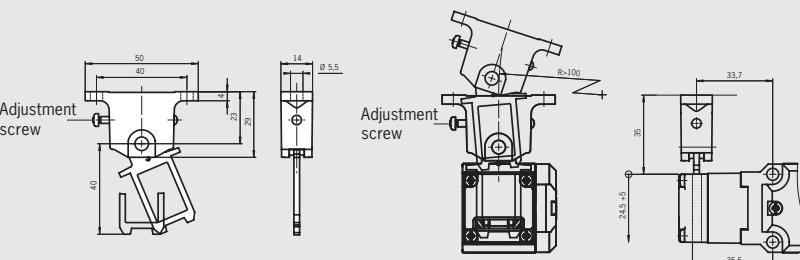
Safety guard hinged at top/bottom, overtravel 5 mm

Dimension drawings



Hinged actuator S-LR-SN

Safety guard hinged on left/right, overtravel 5 mm



Ordering table

Designation	Version	Min. door radius r [mm]	Packaging unit	Order No.
Hinged actuator	S-OU-SN For top and bottom hinged doors overtravel 5 mm incl. 2 safety screws M5 x 25	200	1 ea.	095 315 HINGED ACTUATOR-S-OU-SN
	S-LR-SN For left and right hinged doors overtravel 5 mm incl. 2 safety screws M5 x 10	100	1 ea.	096 838 HINGED ACTUATOR-S-LR-SN

Hinged actuators for safety switches STA

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

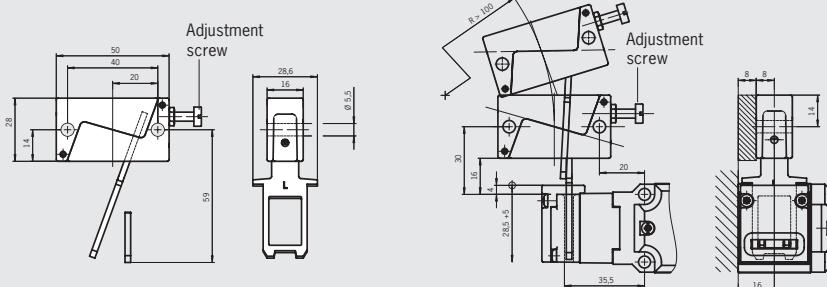
Hinged actuator

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

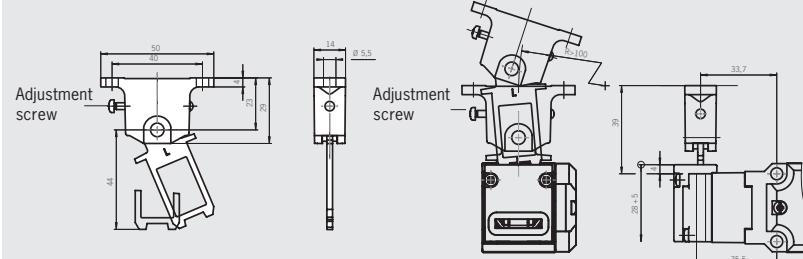
Safety guard hinged at top/bottom, overtravel 5 mm

Dimension drawings



Hinged actuator S-LR-LN for insertion funnel

Safety guard hinged on left/right, overtravel 5 mm



Ordering table

Designation	Version	Min. door radius r [mm]	Packaging unit	Order No.
Hinged actuator	O-OU-LN For top and bottom hinged doors overtravel 5 mm incl. 2 safety screws M5 x 25	200	1 ea.	096 697 HINGED ACTUATOR-S-OU-LN
	S-LR-LN For left and right hinged doors overtravel 5 mm incl. 2 safety screws M5 x 10	100	1 ea.	096 844 HINGED ACTUATOR-S-LR-LN

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

For safety switches series NZ and TZ

- ▶ Plugs and sockets
- ▶ Dummy plug
- ▶ Solenoid plugs

Blanking plug

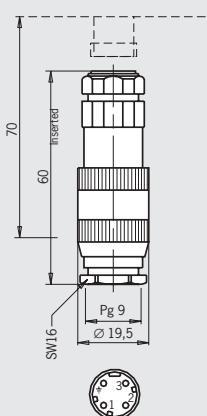
To cover the socket for the enabling switch on the safety switch TZ with socket RC12.

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.

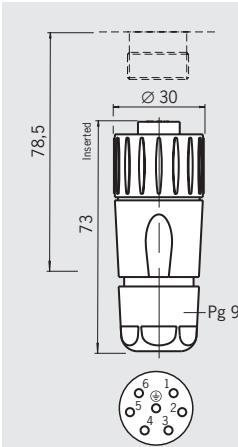
Male plug SS4
3-pin + PE

Dimension drawings



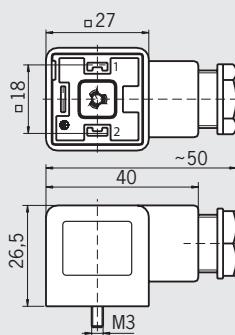
View of connection side, plug

Female plug C16-1
6-pin + PE

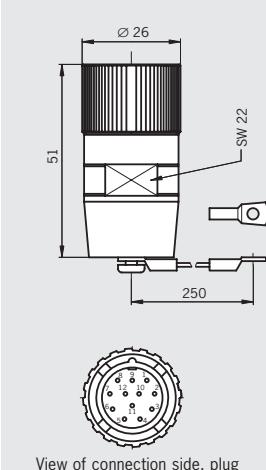


View of connection side, socket

Solenoid plug NZ.VZ.VS
2-pin + PE

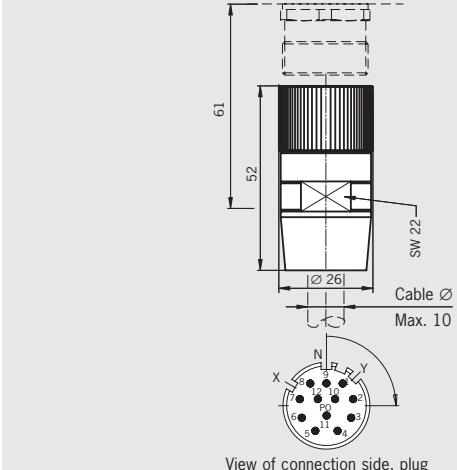


Blanking plug RC12
12-pin



View of connection side, plug

Male plug RC12
12-pin



View of connection side, plug

Ordering table

Designation	Version	Order No.
SS4 3-pin + PE	Male plug to socket BD4	002 787 SS4
C16-1¹⁾ 6-pin + PE	Female plug	043 861 Cable socket 6 + PE
RC12¹⁾ 12-pin	Male connector	073 294 RC-12PIN8A8096
	Blanking plug without bridges	073 293 RC-12PIN8A8300
Solenoid plug NZ..VZ..VS 2-pin + PE	For DC without rectifier	028 345 Plug connector for solenoid locking
	For AC with rectifier AC 110 V - AC 230 V	028 338 Plug connector with rectifier for solenoid locking

For information on crimp contacts see page 124.

1) Crimp contacts are included.

Plug connectors SR6 and SR11

For safety switches series NZ and TZ

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

Angled plug connector

On plug connectors with cables the direction of the cable exit can be chosen. On plug connectors without cables the direction 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)

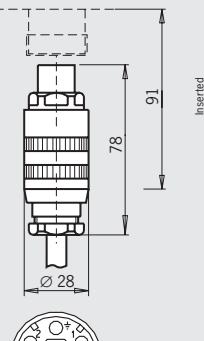
Cable sleeve PUR, color gray, wire cross-section 1.0 mm².

Pin 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
y	7	7	7
	8	8	
	9	9	
	10	10	
	11	11	
	⊕	12	

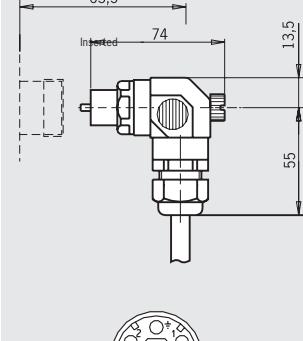
Female plug SR6 EF
6-pin + PE

Dimension drawings



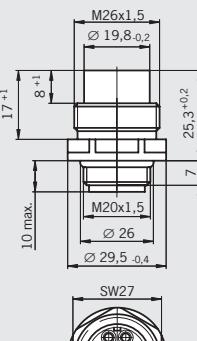
View of connection side, socket
Contact carrier can be adjusted

Female plug SR6 WF angled
6-pin + PE



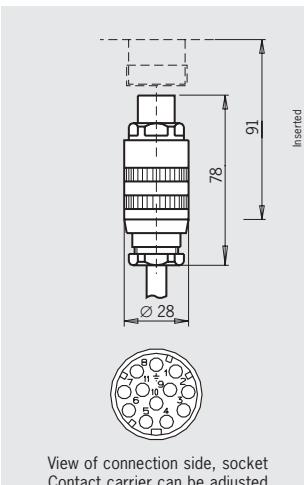
View of connection side, socket
Contact carrier can be adjusted

Male socket SR6 AM
6-pin + PE



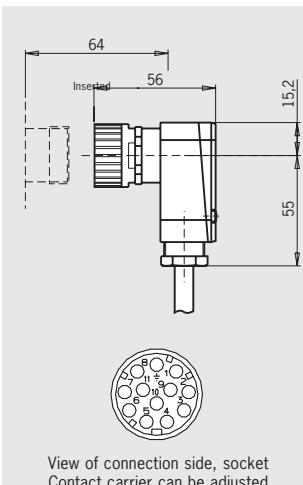
View of connection side, plug

Female plug SR11 EF
11-pin + PE



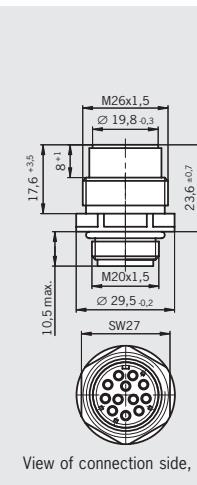
View of connection side, socket
Contact carrier can be adjusted

Female plug 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					
		None	5 m	10 m	15 m	20 m	25 m
SR6¹⁾ 6-pin + PE	EF Female plug	013 176 SR6EF	077 632 SR6EF-5000	077 633 SR6EF-10000	077 634 SR6EF-15000	098 128 SR6EF-20000	-
	WF Female plug angled	024 999 SR6WF	077 638 SR6WF-5000	077 639 SR6WF-10000	077 640 SR6WF-15000	-	-
	K Coding shells	013 178 SR6K	-	-	-	-	-
	AM Male socket, connection M20 x 1.5	087 180 SR6AM2-M20	-	-	-	-	-
SR11¹⁾ 11-pin + PE	EF Female plug	070 859 SR11EF	077 629 SR11EF-5000	077 630 SR11EF-10000	077 631 SR11EF-15000	096 632 SR11EF-20000	094 749 SR11EF-25000
	WF Female plug angled	054 773 SR11WF	077 635 SR11WF-5000	077 636 SR11WF-10000	077 637 SR11WF-15000	-	-
	AM Male socket, connection M20 x 1.5	091 296 SR11AM2-M20	-	-	-	-	-
SR6 and SR11	Socket crimp contact Wire cross-section 0.5 - 1.5 mm	071 260 SRF	-	-	-	-	-
	Pin crimp contacts Wire cross-section 0.5 - 1.5 mm	071 261 SRM	-	-	-	-	-

For information on crimp contacts see page 124.

1) Crimp contacts are included.



Plug connectors RC18 and RC18 with option C1825

For safety switches TZ

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

Crimp contacts

With 19 crimp pins for wire cross-section 0.75 - 1.00 mm².

Option C1825

With 16 crimp pins for wire cross-section 0.38 - 0.5 mm² and 3 pins for wire cross-section 0.75 - 1.0 mm² for control of the interlocking solenoid. This plug is easier to connect.

Important: only for switch with option C1825.

Plug connector angled (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.

Cable (optional)

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

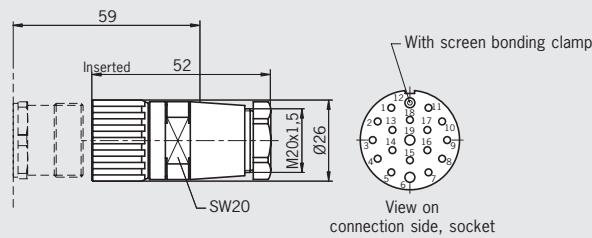
Cable halogen-free (optional)

Cable sleeve PUR, color black, halogen-free, silicone-free. Reduction of toxic gases and smoke in case of fire.

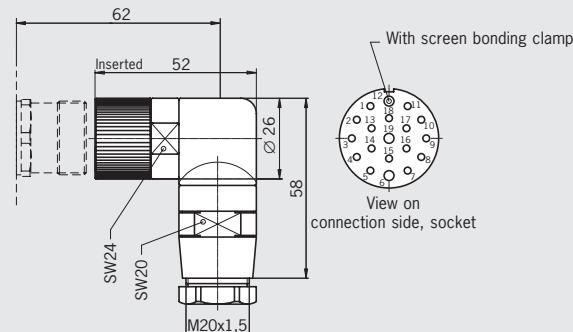
Wire cross-section 0.5 mm² or 1.0 mm².

Female plug RC18 / RC18..C1825 18-pin + PE

Dimension drawings



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



Ordering table

Designation	Version	Without cable
RC18 ²⁾ 18-pin + PE	EF Female plug ¹⁾	074 616 RC18EF
	WF Female plug angled ¹⁾	074 617 RC18WF
	Replacement socket crimp contacts ¹⁾ Wire cross-section 19 x 0.75 - 1 mm ²	094 309 Pin crimp contact RCM
	EF-C1825 Female plug	077 025 RC18EF-C1825
	WF-C1825 Female plug angled	077 026 RC187WF-C1825
	Replacement socket crimp contacts Wire cross-section 16 x 0.38 - 0.5 mm ² 3 x 0.75 - 1 mm ²	094 310 Pin crimp contact RCM-C1825

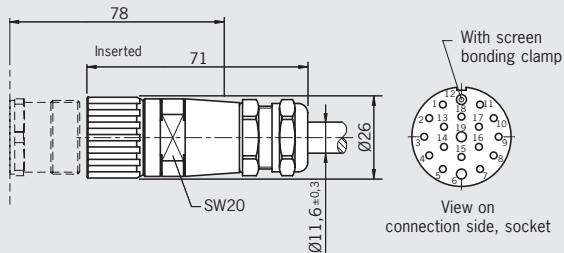
For information on crimp contacts see page 124.

1) Suitable for safety switches TZ without option C1825.

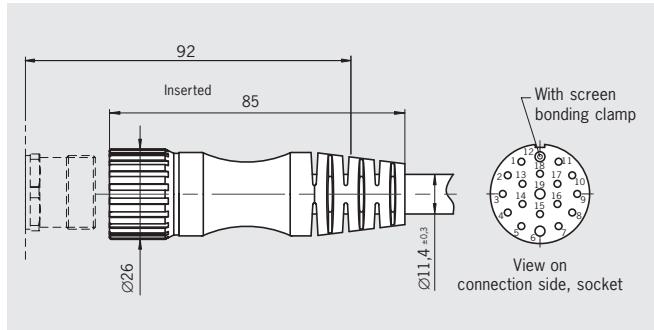
2) Crimp contacts are included.

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

Dimension drawings



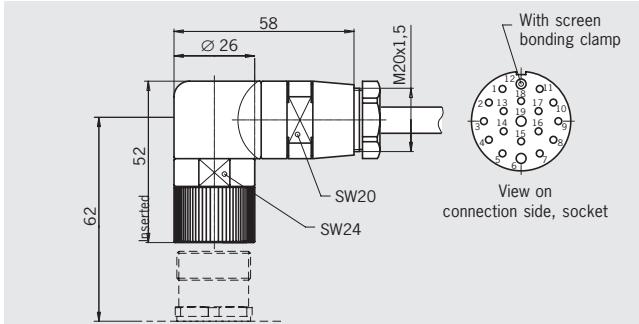
**Female plug RC18 / RC18..C1825 with cable halogen-free
18-pin + PE**



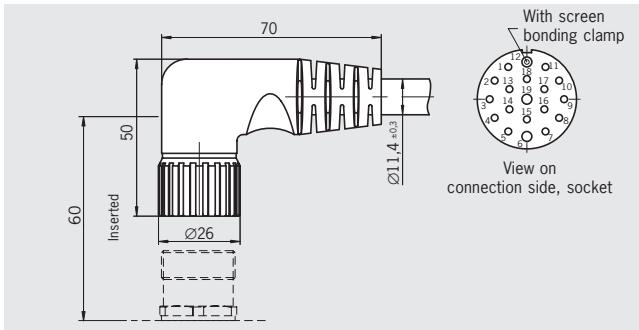
Pin assignment plug RC18 with cable and option C1825

Pin	Wire color	Wire 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

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



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



Ordering table

Desig.	Version	Cable									
		1.5 m	3 m	6 m	8 m	10 m	15 m	20 m	25 m	30 m	
RC18 + PE with cable	EF-C1825 Female plug	092 761 RC18EF1,5MC1825	092 816 RC18EF3MC1825	077 014 RC18EF6MC1825	077 015 RC18EF8MC1825	092 898 RC18EF10MC1825	077 016 RC18EF15MC1825	092 726 RC18EF20MC1825	092 727 RC18EF25MC1825	095 993 RC18EF30MC1825	
	WFL-C1825 Female plug angled left	092 906 RC18WF1,5MLC1825	092 908 RC18WF3MLC1825	077 018 RC18WF6MLC1825	077 019 RC18WF8MLC1825	092 901 RC18WF10MLC1825	077 020 RC18WF15MLC1825	092 910 RC18WF20MLC1825	092 912 RC18WF25MLC1825	-	
	WFR-C1825 Female plug angled cable exit right	092 907 RC18WF1,5MRC1825	092 909 RC18WF3MRC1825	085 194 RC18WF6MRC1825	085 195 RC18WF8MRC1825	092 902 RC18WF10MRC1825	085 196 RC18WF15MRC1825	092 911 RC18WF20MRC1825	092 913 RC18WF25MRC1825	-	
RC18 18-pin + PE with cable halogen- free	EFF-C1825 Female plug	092 883 RC18EF1,5MF-C1825	092 884 RC18EF3MF-C1825	092 885 RC18EF6MF-C1825	092 886 RC18EF8MF-C1825	092 887 RC18EF10MF-C1825	092 888 RC18EF15MF-C1825	092 889 RC18EF20MF-C1825	092 890 RC18EF25MF-C1825	-	
	WFLF-C1825 Female plug angled cable exit left	092 891 RC18WF1,5MLFC1825	092 893 RC18WF3MLFC1825	092 697 RC18WF2MLFC1825	092 895 RC18WF8MLFC1825	092 699 RC18WF10MLFC1825	092 701 RC18WF15MLFC1825	092 704 RC18WF20MLFC1825	092 724 RC18WF25MLFC1825	-	
	WFR-C1825 Female plug angled cable exit right	092 892 RC18WF1,5MRF-C1825	092 894 RC18WF3MRF-C1825	092 698 RC18WF6MRF-C1825	092 896 RC18WF8MRF-C1825	092 700 RC18WF10MRF-C1825	092 702 RC18WF15MRF-C1825	092 708 RC18WF20MRF-C1825	092 725 RC18WF25MRF-C1825	-	

Plug connectors SGLF and SWLF with cable

For safety switches series NZ and N1A

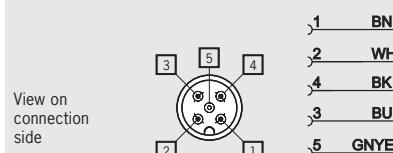
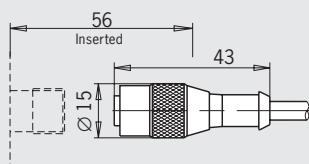
- ▶ **Plug connector M12 with cable**
- ▶ **90° angled optional**

Cable

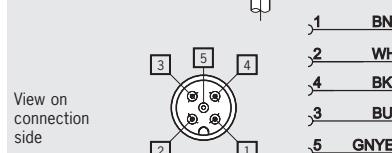
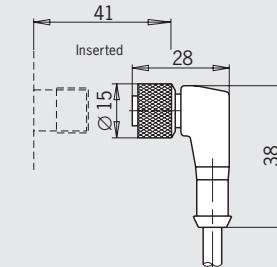
Cable sleeve PUR, color black, halogen-free, flame retardant. Reduction of toxic gases and smoke in case of fire. Wire cross-section 0.34 mm².

Plug connector SGLF with cable
M12 plug, 5-pin

Dimension drawings



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



Ordering table

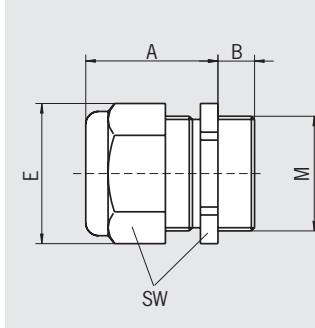
Type	Number of pins	Version	Cable length 5 m
SGLF	5	Female plug M12 for male plug SVM5	073 461 SGLF5-5000P
SWLF	5	Female plug M12 angled for male plug SVM5	073 462 SWLF5-5000P

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.



Item	Thread	Cable Ø [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 1/2"	6 - 12	22	13	27	24
EKVP.0.12/06	NPT 1/2"	6 - 12	26	13	27	24

Ordering table

Thread	Version	Material	
		Metal	Plastic
M12 x 1.5	Cable diameter 4 - 6.5 mm	086 327 EKV12/04	-
M16 x 1.5	Cable diameter 4 - 6.5 mm	086 328 EKVM16/04	-
M16 x 1.5	Cable diameter 5 - 10 mm	-	084 572 EKPM16/05
M20 x 1.5	Cable diameter 6.5 - 9.5 mm	086 330 EKVM16/06	-
M20 x 1.5	Cable diameter 6 - 12 mm	-	077 679 EKPM20/06
M20 x 1.5	Cable diameter 6.5 - 9.5 mm	077 683 EKVM20/06	-
M20 x 1.5	Cable diameter 9 - 13 mm	077 684 EKVM20/09	-
NPT 1/2"	Cable diameter 6 - 12 mm	077 691 EKVN12/06	077 692 EKPN12/06

Mounting plates EMP for safety switches NZ

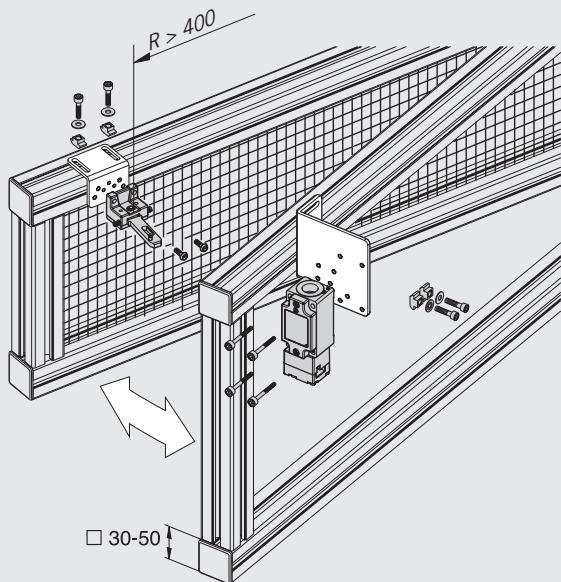
- ▶ For vertical and horizontal mounting of safety switch NZ

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: St37 galvanized

Mounting example, safety switch vertical



Ordering table

Switch	Installation method switch	Mounting plate switch	Mounting plate actuator	Actuator	Minimum distance hinge axis to switch
NZ...	A Vertical	085 753 Mounting plate NZ	093 457 EMP-B1	024 298 024 299	> 400 mm
	B Horizontal				
				Page 104	
		093 458 EMP-B2	048 850 057 950		> 165 mm
				Page 104	

Mounting plates EMP for safety switches STA

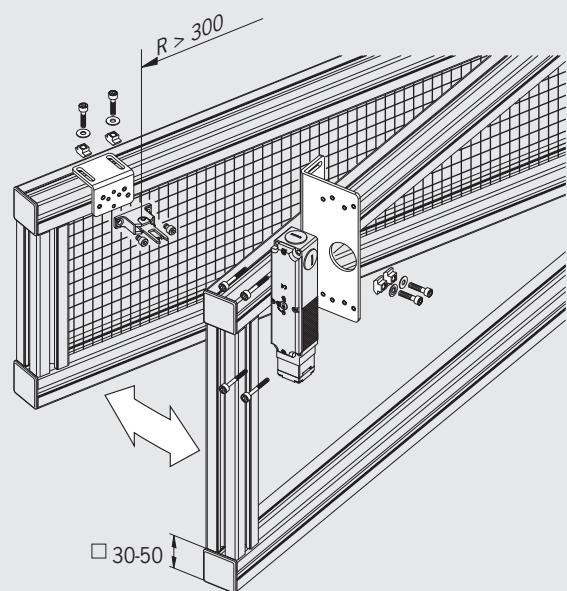
- ▶ For vertical and horizontal mounting of safety switch STA

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: St37 galvanized

Mounting example, safety switch vertical



Ordering table

Switch	Installation method switch	Mounting plate switch	Mounting plate actuator	Actuator	Minimum distance hinge axis to switch
STA...	A Vertical	093 456 EMP-SB	093 457 EMP-B1	095 740 	> 300 mm
	B Horizontal			Page 108 	> 200 mm
			093 458 EMP-B2	096 838 096 844 	Page 109/110
					> 100 mm
					Page 109/110

Mounting plates EMP for safety switches TX

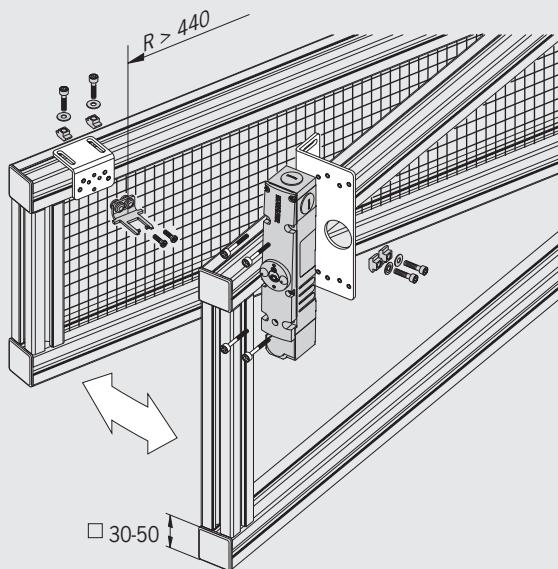
► For vertical mounting of safety switch TX

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: St37 galvanized
- 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 hinge axis to switch
TX...	C Vertical	093 456 EMP-SB	093 457 EMP-B1	079 740 079 742 Page 106 098 082	> 400 mm
					> 100 mm
			093 458 EMP-B2	097 906 Page 107	> 100 mm

Mounting plates EMP for safety switches TZ

- ▶ For vertical and horizontal mounting of safety switch TZ

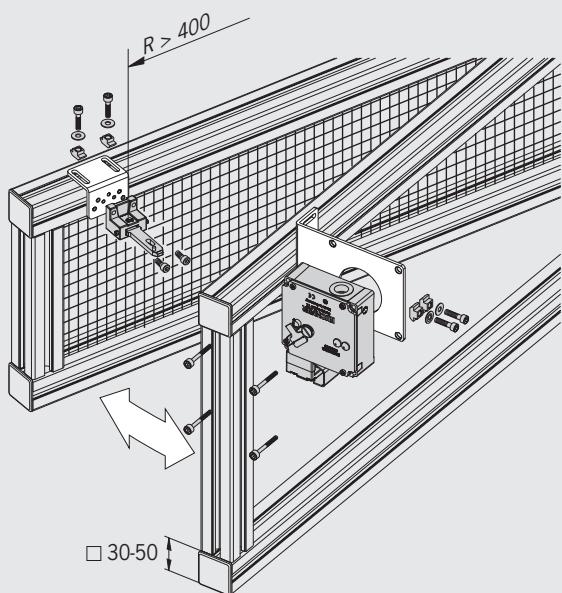
The mounting plates are used for fastening safety switches TZ and actuators to safety guards. The safety switches can be attached horizontally or vertically.

The mounting plate EMP-SA is also suitable for safety switches with escape release from the rear.

Note

- ▶ Mounting plate material: St37 galvanized
- ▶ 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 hinge axis to switch
TZ...	A Vertical	094 401 EMP-SA	093 457 EMP-B1	024 298 024 299	> 400 mm
	B Horizontal			 Page 104	
			093 458 EMP-B2	048 850 057 950	> 165 mm
				 Page 104	

Miscellaneous accessories

- ▶ Lockout bar
- ▶ Insertion funnel

Lockout bar

With the safety door open, can be slid into the actuating 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.

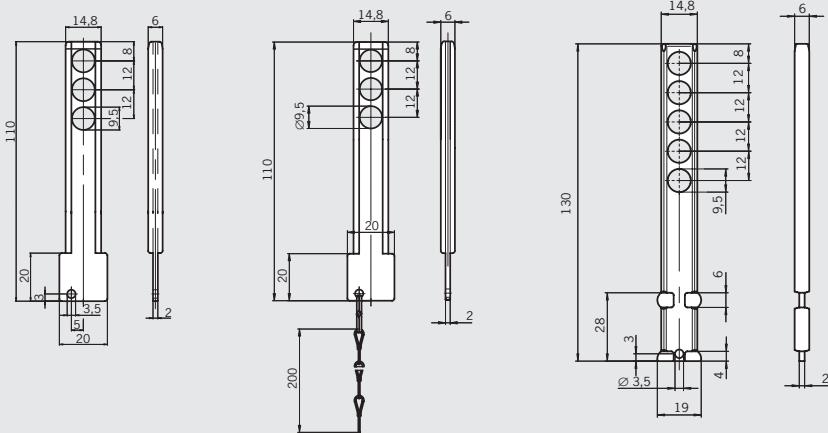
Cannot be used in combination with the protective plate.

Insertion funnel

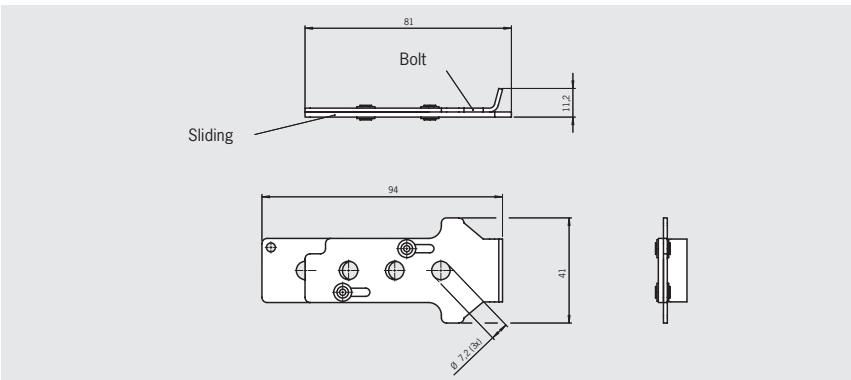
If an insertion funnel is used, even inexactly positioned actuators are inserted reliably in the actuating head due to the large opening aperture, thus protecting the safety switch against mechanical influences.

Lockout bars for safety switches NZ..VZ and TZ

Dimension drawings

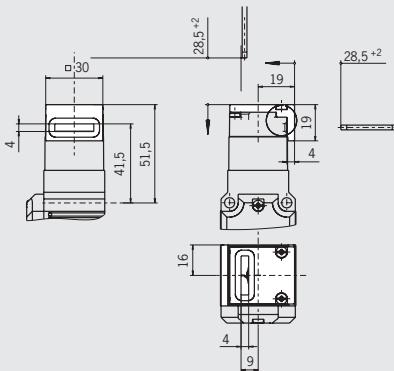


Lockout bar for safety switches NX and TX



Insertion funnel for safety switches STA/STP

Dimension drawings



Minimum door radius with insertion funnel
 $R > 300 \text{ mm}$

Ordering table

Designation	Version	Use	Order No.
Lockout bar	3 holes	For safety switches series NZ..VZ and TZ without protective plate	046 730 Lockout bar Z
	3 holes with chain	For safety switches series NZ..VZ and TZ without protective plate	091 305 Lockout bar with chain
	5 holes	For safety switches series NZ..VZ and TZ without protective plate	086 538 Lockout bar Z
	3 holes	For safety switches NX and TX	096 098 Lockout bar TX
Insertion funnel	Incl. 2 fastening screws	For safety switches STA/STP	093 157 Insertion funnel STA

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 recommend replacing the entire safety switch. Not suitable for the safety switches TZ!

Lead seal kit

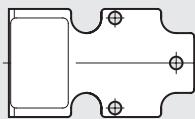
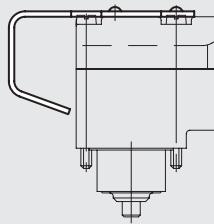
For sealing the mechanical release on the safety switch TZ. The locking screw is included.

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



Ordering table

Designation	Version	Use	Order No.
Protective plate		For safety switches with separate safety function (NZ..VZ and TZ)	059 136 Protective plate NZ/TZ
Replacement head NZ..VZ		Not suitable for safety switches TZ!	076 250 Actuating head NZVZ
Lead seal kit	Comprising seal and wire	For safety switches TZ with locking screw and key	048 257 Lead seal kit TZ
		For safety switches TZ with rotary emergency unlocking	087 256 Lead seal kit TZ-C1937
Safety screws VPE: 100 ea.	M4 x 14	For actuators 079 739, 079 740, 079 741 and 079 742	074 063 M4x14/V100
	M5 x 10	For straight actuators 016849 and 072251	073 455 M5x10/V100
	M5 x 16	For hinged actuators 024299 and 024298	073 456 M5x16/V100
	M5 x 25	For hinged actuators 048850 and 057950	073 457 M5x25/V100
	M3 x 40	For actuator head NZ and TZ	075 530 M3x40/V100
	M3 x 70	For actuator head NZ..VZ..VSE and NZ..VZ..VSM	075 531 M3x70/V100

Miscellaneous accessories

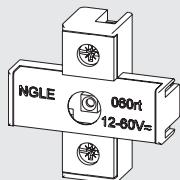
► LED function display

LED function display

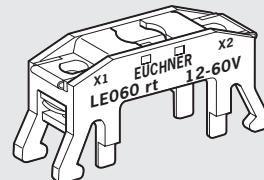
Upgrade kits with LEDs are available for the safety switches N1A and NZ. The intensity of the light from the indicators is always the same independent of the voltage applied.

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 switches NZ	029 220 NGLE060RT	029 222 NGLE060GE	029 221 NGLE060GR	045 822 NGLE110RT	045 825 NGLE220RT	045 827 NGLE220GE
LED function display LE	For safety switches N1A	035 495 LE060RT	035 497 LE060GE	035 496 LE060GR	045 579 LE110RT	045 582 LE220RT	045 584 LE220GE

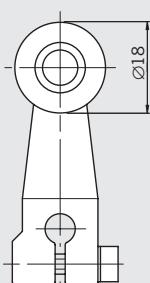
► Replacement roller arm

Replacement roller arm

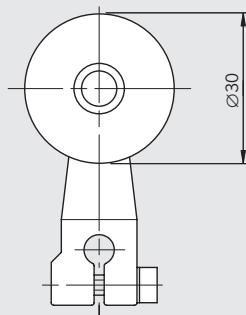
Replacement roller lever for safety switches with safety function with lever arm. As the switches are safety components, in case of defects we recommend replacing the entire switch. Complete switch heads are not available.

Replacement roller arm

Dimension drawings



NHS (steel roller)
NHB (plastic roller)



NHBC569

Ordering table

Designation	Version	Order No.
Replacement roller arm	Replacement plunger for NZ.HS	012 043 Roller arm NHS
	Replacement plunger for NZ.HB	012 042 Roller arm NHB
	Replacement plunger for NZ.HB...C569	012 044 Roller arm NHBC569

Miscellaneous accessories

- ▶ Emergency unlocking with manual return for safety switches TX
- ▶ Emergency unlocking with automatic return for safety switches TX
- ▶ Lock for emergency unlocking with manual return for safety switches TX

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.

Lockout bar

Is used for the manual release of the guard locking. The integrated spring automatically returns 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.

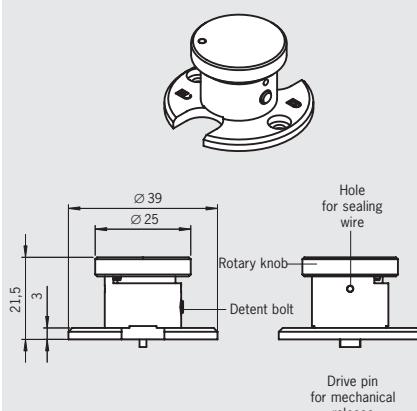
Two screws are used to fix the lock to the cover of the safety switch TX (above the mechanical release).

Attention: Prior to mounting, the locking screw for the mechanical release must be removed.

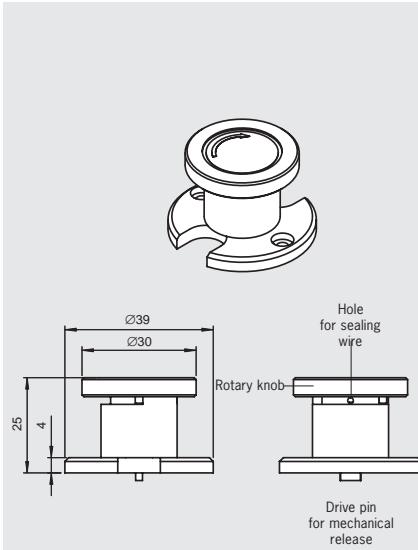
- ▶ Please order safety switch TX separately
- ▶ 2 keys are included
- ▶ Every safety switch of series TX can be upgraded to include a lock

Emergency unlocking For safety switches TX

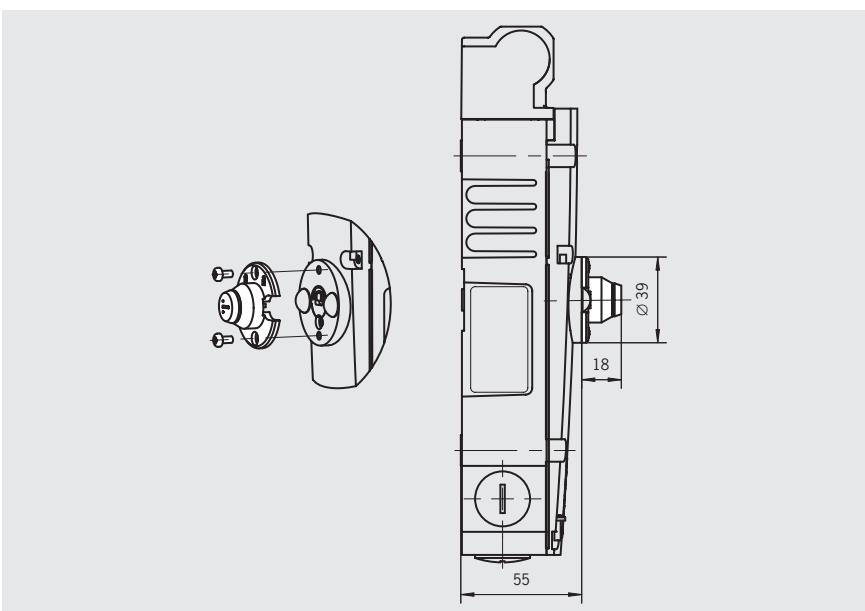
Dimension drawings



Mechanical release For safety switches TX



Lock For safety switches TX



Ordering table

Designation	Version	Use	Order No.
Emergency unlocking	Incl. 2 screws M3 x 6	For safety switches TX	094 771 Emergency unlocking TX
Mechanical release	Incl. 2 screws M3 x 6	For safety switches TX	094 773 Mechanical release TX
Lead seal kit		For emergency unlocking TX and mechanical release TX	087 256 Lead seal kit
Lock	Unique (unique key needed to open)	For safety switches TX	079 796 Lock TX
	Identical (identical locks)	For safety switches TX	079 795 Lock TX
	Replacement key (2 ea.) for identical lock	For safety switches TX	077 206 Replacement key TX

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

Type	Version	Manufacturer's designation	
SVM5 5 pins	Female plug M12	99-0436-57-05 Cable socket	Binder www.binder-connector.de
	Female flange connector M12	09-3442-700-05 Flange connector with wires	
	Dummy 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
	Female crimp contacts for C16-1, VPE 100 pcs.	VN02 016 0002 (1) Single contact, silver, 0.5-1.5 mm ²	
	Dummy plug	T6483 000 Protective cap for female receptacle	
MR 7, 8, 9, 10 and 12 pins	Straight female plug (7-pin), pre-assembled for built-in connector MR7	MIN-7FPX-.. Female plugs with cable	MENCOM www.mencomcorp.com
	Straight female plug (8-pin), pre-assembled for built-in connector MR8	MIN-8FPX-.. Female plugs with cable	
	Straight female plug (9-pin), pre-assembled for built-in connector MR9	MIN-9FP-.. Female plugs with cable	
	Straight female plug (10-pin), pre-assembled for built-in connector MR10	MIN-10FP-.. Female plugs with cable	
	Straight female plug (12-pin), pre-assembled for built-in connector MR12	MIN-12FP-.. Female plugs with cable	
HAN10 10 pins + PE	Flange connector 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 Socket crimp contacts 0.5 mm ²	
	Dummy plug	09 20 010 5425 Cover	
RC17-Y coded 17-pin	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	

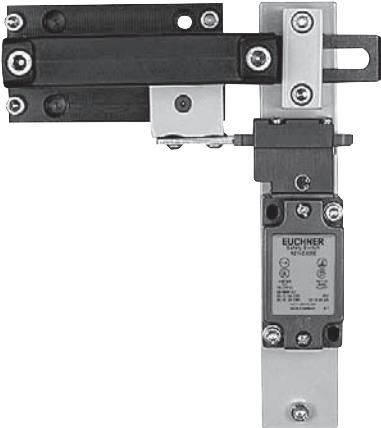
► Crimp and extraction tools

For plug connectors	Function	Manufacturer's designation	
SR6 and SR11	Crimp tool	932 507-002 XCZ 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-Z 2378 Crimp pliers for machined contacts	Coninvers www.coninvers.com
	Extraction tool	RC-Z 2097 Extraction tool/insertion tool	
RC18	Crimp tool	RC-Z 2378 Crimp pliers for machined contacts	Coninvers www.coninvers.com
	Extraction tool	RC-Z 2274 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	Y16RMC Crimping tool for machined contacts	Burndy www.burndy.com
	Extraction tool	RX2025GE1 Extraction tool	
TB24	Crimp tool	WT10-04 Crimp tool	Thomas & Betts www.tb.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



Special features

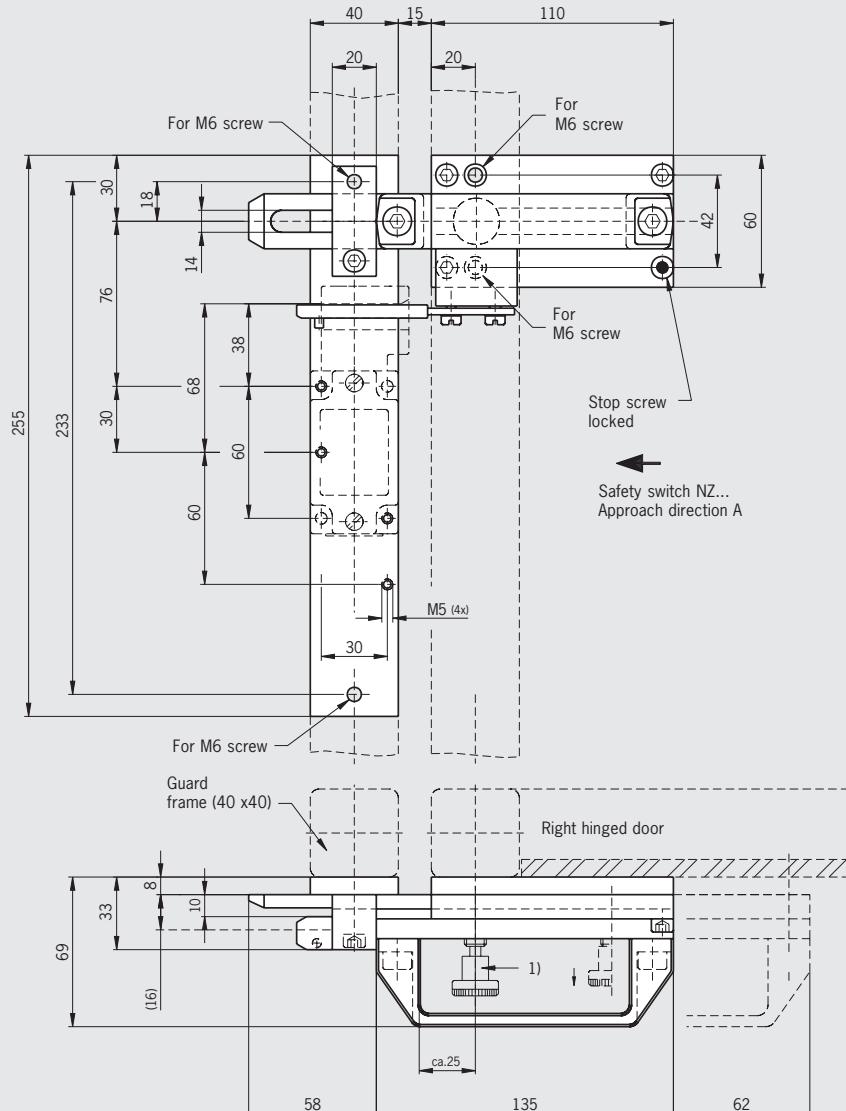
- ▶ **NZ-B** bolt engages in open and closed position
 - ▶ Prevents accidental opening and closing of the bolt
- ▶ **NZ-R2** bolt engages in open and closed position. Unlocked by pulling the detent knob upward

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

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

Dimension drawings (here: shown with detent knob)



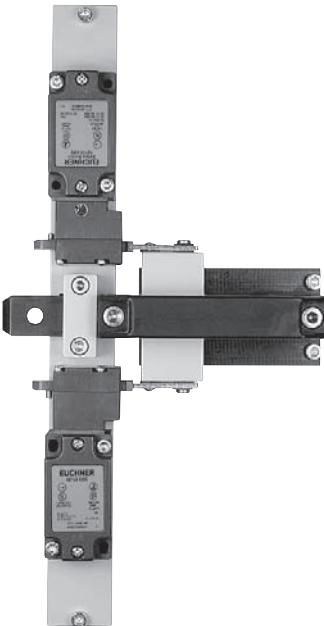
1) Bolt with detent mechanism:
Latches in open position and prevents unintended closing of the bolt.
When the bolt is closed, the knob engages and prevent unintended opening.
Unlocked by pulling the detent knob upward.

Ordering table

Designation	Detent mechanism	Version	Order No.
Bolt NZ-A	None	For right hinged doors, actuator included	057 734 Bolt NZ-A
Bolt NZ-C	None	For left hinged doors, actuator included	057 735 Bolt NZ-C
Bolt NZ-AB	Ball detent mechanism	For right hinged doors, actuator included	083 890 Bolt NZ-AB
Bolt NZ-CB	Ball detent mechanism	For left hinged doors, actuator included	083 892 Bolt NZ-CB
Bolt NZ-AR2	Detent knob	For right hinged doors, actuator included	078 455 Bolt NZ-AR2
Bolt NZ-CR2	Detent knob	For left hinged doors, actuator included	078 456 Bolt NZ-CR2

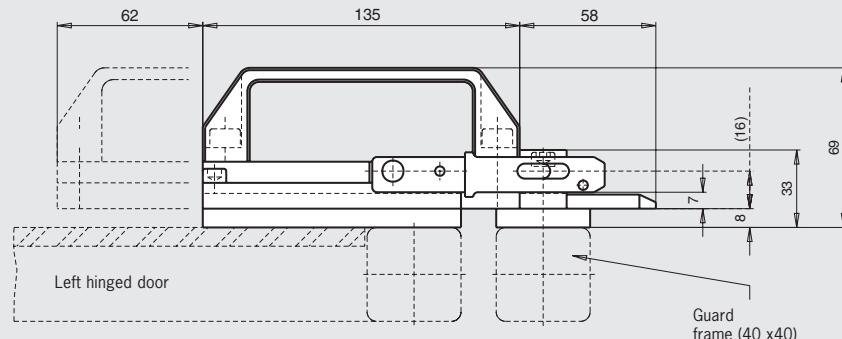
Bolts for safety guards

- For 2 safety switches NZ.VZ on one bolt



Bolt for 2 safety switches NZ.VZ on one bolt

Dimension drawings



Special features

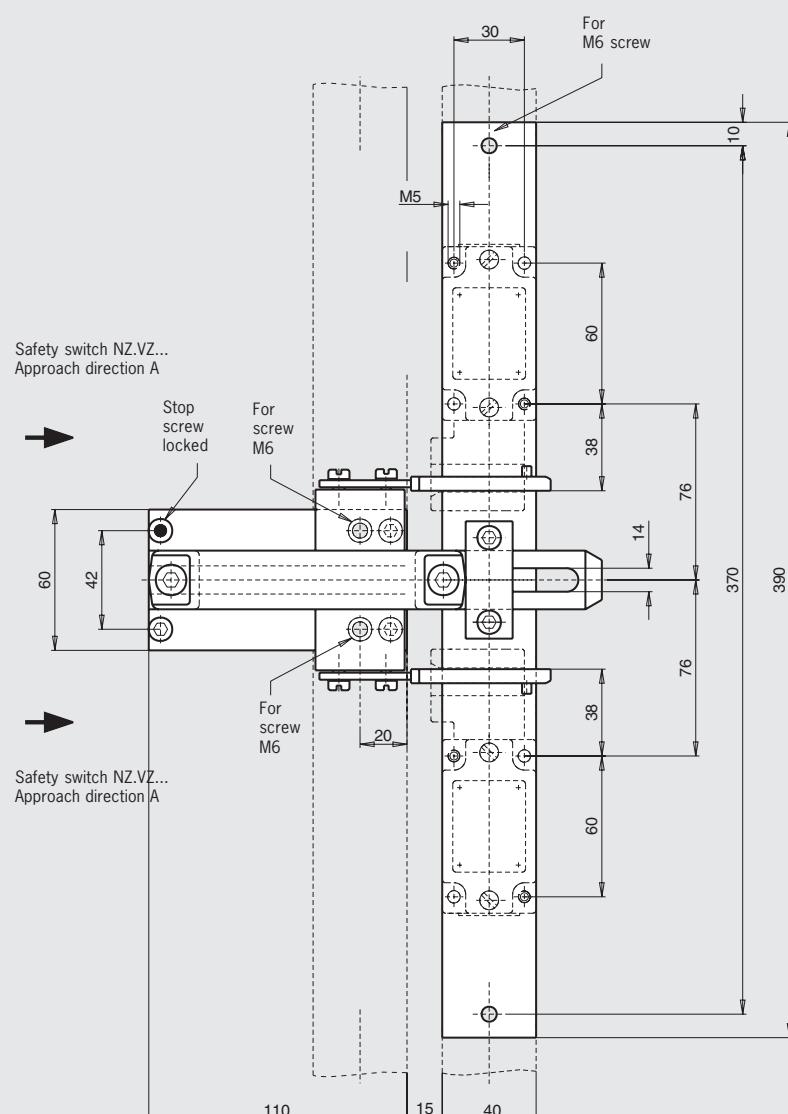
- One bolt for 2 safety switches
 - High control category
(e. g. category 4) is achieved
- Bolt can be used for doors hinged on the right or left

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

Notes

- The function of the bolt NZ-ACF with escape release is the same as the function of the bolt NZ/TZ-ACF (see page 133)

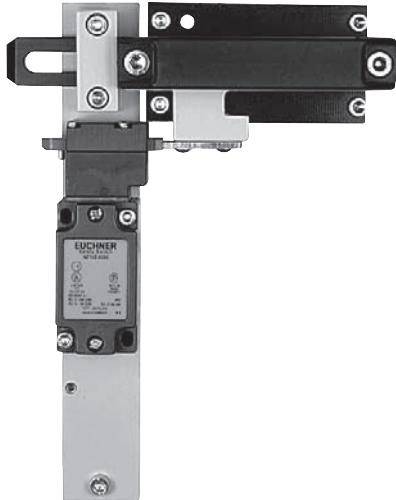


Ordering table

Designation	Detent mechanism	Version	Order No.
Bolt NZ-AC	None	For right or left hinged doors, 2 safety switches on one bolt, actuator included	076 188 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

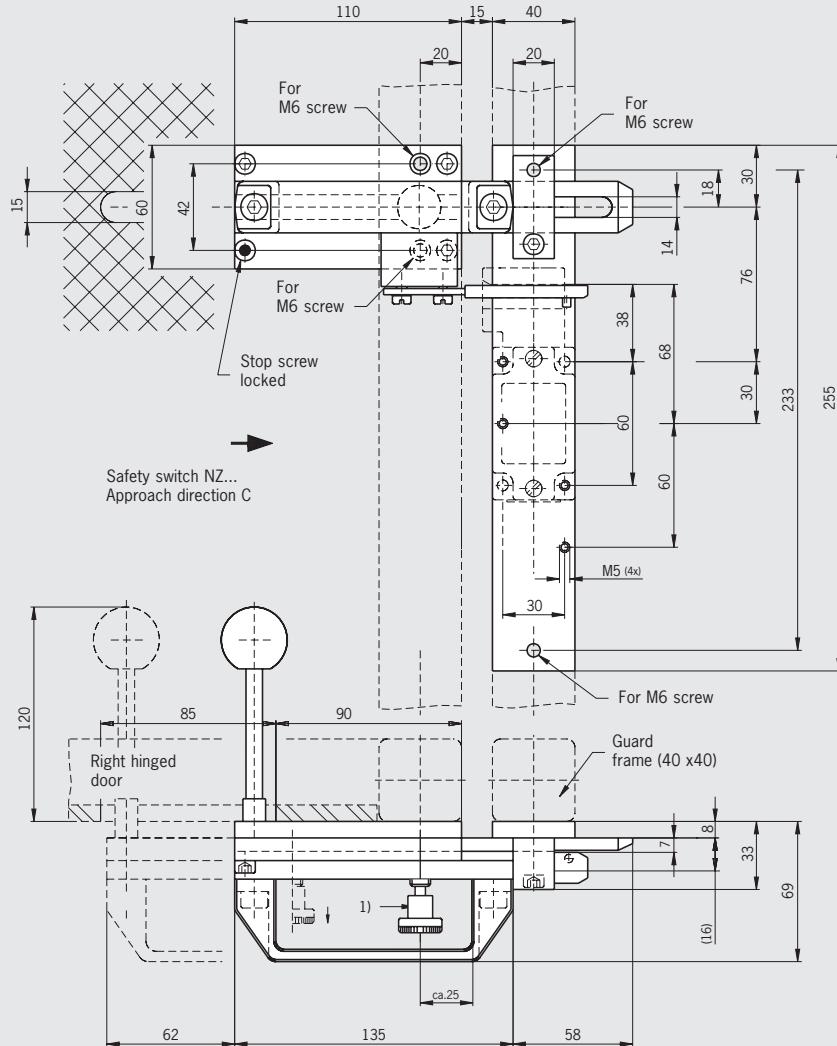
- ▶ Bolt with detent mechanism
- ▶ The bolt latches in open position to prevent unintended closing

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

Bolt for safety switches NZ.VZ

Dimension drawings



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

Ordering table

Designation	Detent mechanism	Version	Order No.
Bolt NZ-AF	Detent knob	For right hinged doors, escape release from the danger area, actuator included	078 451 Bolt NZ-AF
Bolt NZ-CF	Detent knob	For left hinged doors, escape release from the danger area, actuator included	078 452 Bolt NZ-CF

Bolts for safety guards

- ▶ For safety switches NZ.VZ, NZ.VZ.VS and TZ...
- ▶ Bolt with hand lever
- ▶ For right or left hinged doors



Special features

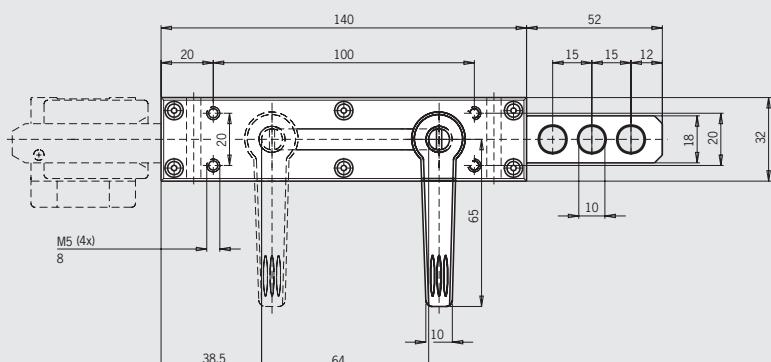
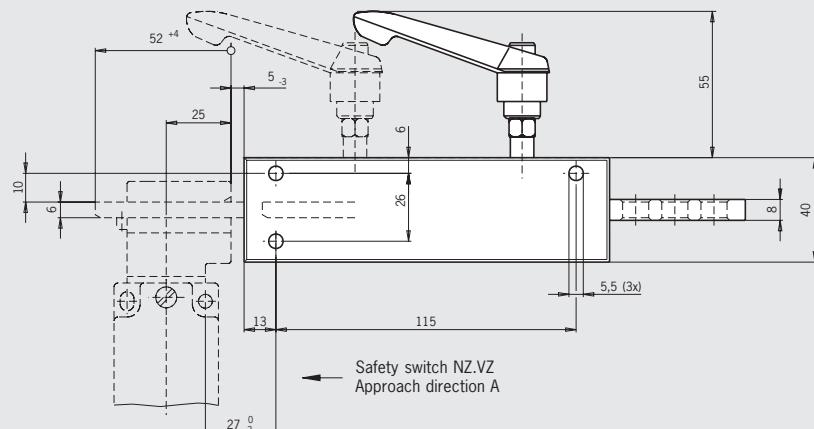
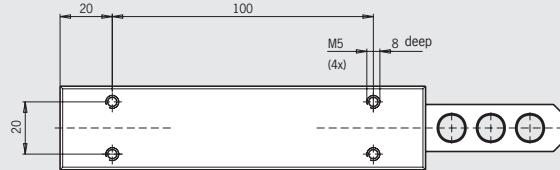
- ▶ The hand lever can be permanently set to 20 rotary positions (in 18° increments)
- ▶ On bolt **NZ/TZ-G1**, actuating pin on bottom
 - ▶ Safety switch fastened as shown in illustration
- ▶ On bolt **NZ/TZ-G2**, actuating pin on top
 - „ Safety switch fastened rotated by 180°
- ▶ After the door is opened, the actuator is automatically withdrawn into the bolt by a built-in return spring
 - ▶ The operator is protected
When the door is open there is no risk of injury due to protruding actuator
 - ▶ The actuator is protected
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.
Bolt NZ/TZ-G1	None	For right or left hinged doors, actuating pin on bottom, actuator included	028 358 Bolt NZ/TZ-G1
Bolt NZ/TZ-G2	None	For right or left hinged doors, actuating pin on top, actuator included	028 360 Bolt NZ/TZ-G2

Bolts for safety guards

- ▶ For safety switches NZ.VZ, NZ.VZ.VS and TZ...C1828
- ▶ Lever for escape release from the danger area
- ▶ Bolt with hand lever
- ▶ For right or left hinged doors



Special features

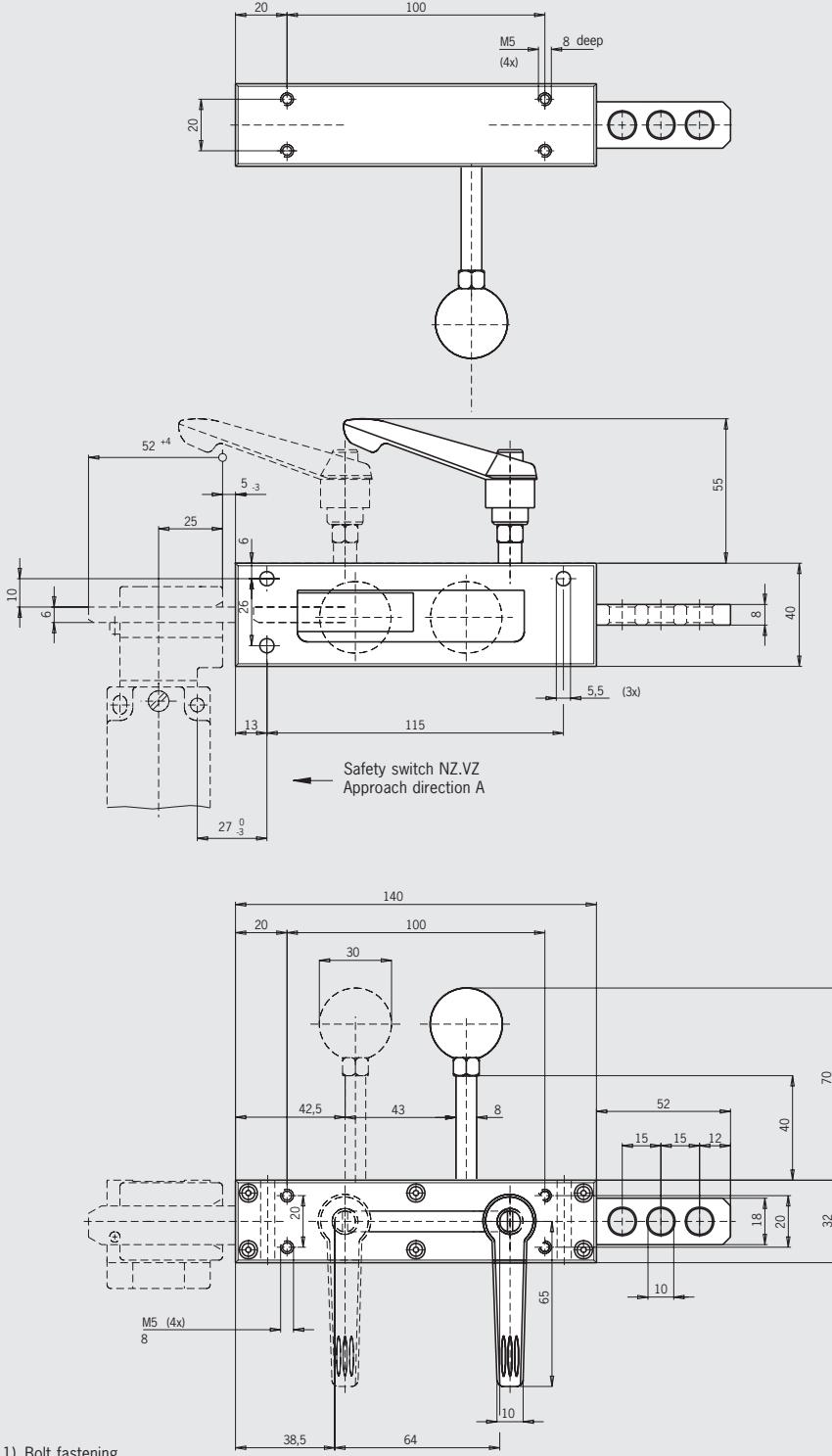
- ▶ The hand lever can be permanently set to 20 rotary positions (in 18° increments)
- ▶ After the door is opened, the actuator is automatically withdrawn into the bolt by a built-in return spring
 - ▶ The operator is protected
When the door is open there is no risk of injury due to protruding actuator
 - ▶ The actuator is protected
When hinged doors are closed it is ensured that the actuator is not used as an end stop

Features

- ▶ The lever for the escape release only enables the doors to be **opened** from inside the danger area
- ▶ Three holes enable padlocks to be attached

Bolt for safety switches NZ.VZ, NZ.VZ.VS and TZ...C1828

Dimension drawings



Ordering table

Designation	Detent mechanism	Version	Order No.
Bolt NZ/TZ-G1/AF	None	For right or left hinged doors, escape release from the danger area, actuator included	079 788 Bolt NZ/TZ-G1/AF
Bolt NZ/TZ-G1/CF	None	For right or left hinged doors, escape release from the danger area, actuator included	079 787 Bolt NZ/TZ-G1/CF

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

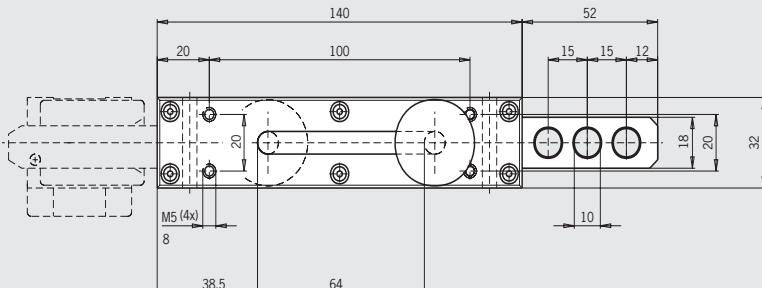
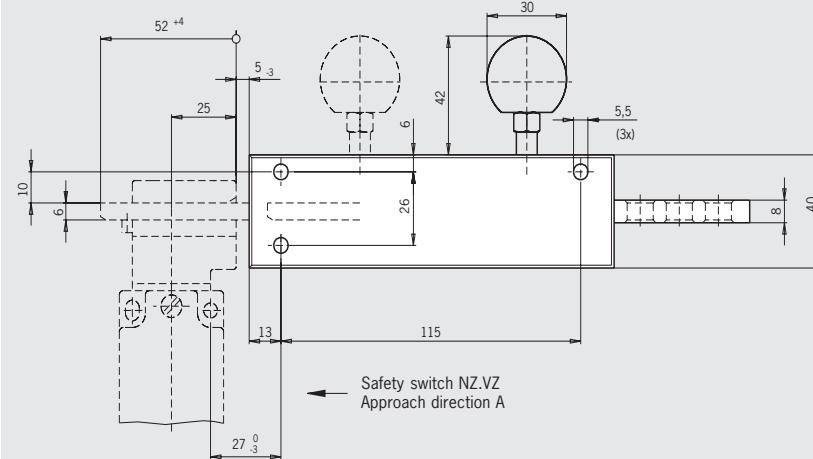
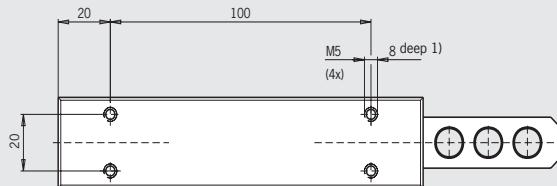
- ▶ On bolt NZ/TZ-S1, actuating pin on bottom
 - ▶ Safety switch fastened as shown in illustration
- ▶ On bolt NZ/TZ-S2, actuating pin on top
 - ▶ Safety switch fastened rotated by 180°
- ▶ After the door is opened, the actuator is automatically withdrawn into the bolt by a built-in return spring
 - ▶ The operator is protected
When the door is open there is no risk of injury due to protruding actuator
 - ▶ The actuator is protected
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



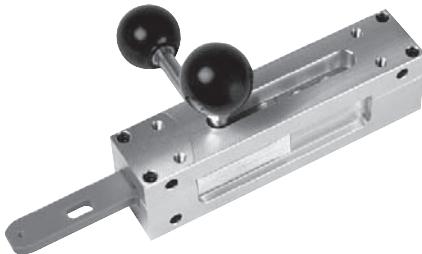
1) Bolt fastening

Ordering table

Designation	Detent mechanism	Version	Order No.
Bolt NZ/TZ-S1	None	For right or left hinged doors, actuating pin on bottom, actuator included	028 357 Bolt NZ/TZ-S1
Bolt NZ/TZ-S2	None	For right or left hinged doors, actuating pin on top, actuator included	028 359 Bolt NZ/TZ-S2

Bolts for safety guards

- ▶ For safety switches NZ.VZ, NZ.VZ.VS and TZ...C1828
 - ▶ Lever for escape release from the danger area
 - ▶ Bolt with ball handle
 - ▶ For right or left hinged doors



Special features

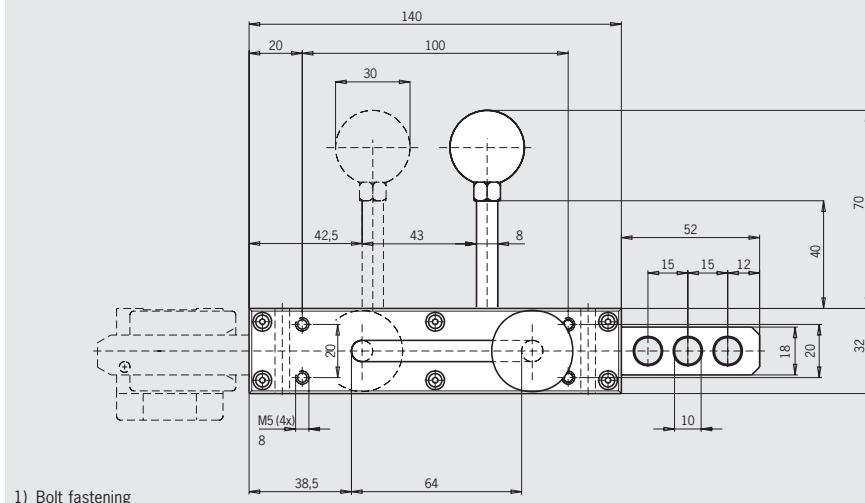
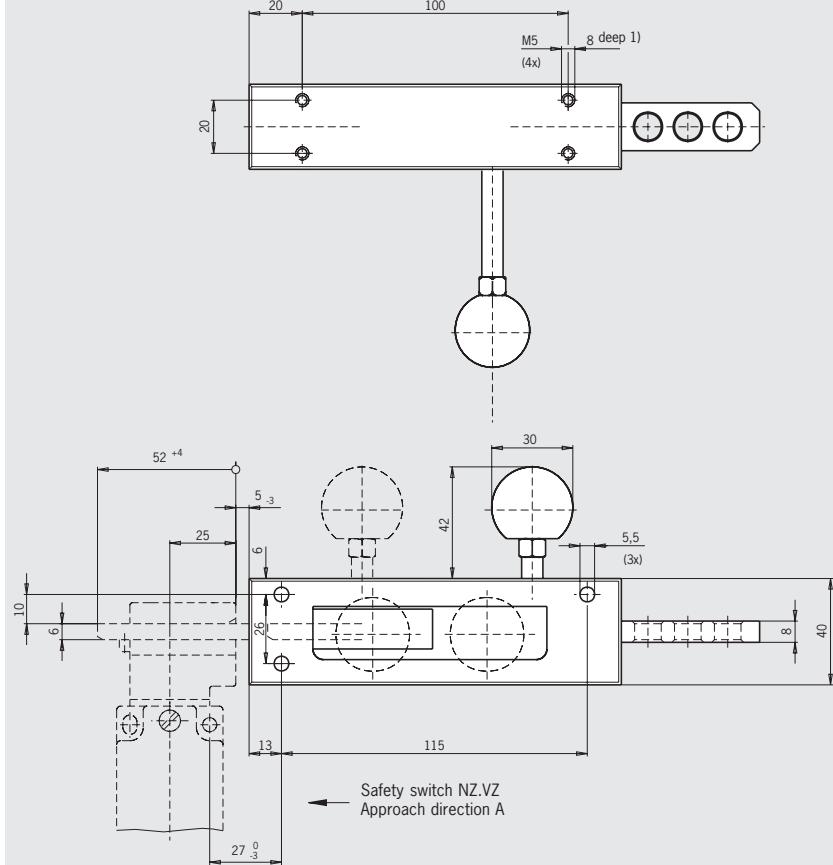
- After the door is opened, the actuator is automatically withdrawn into the bolt by a built-in return spring
 - The operator is protected
When the door is open there is no risk of injury due to protruding actuator
 - The actuator is protected
When hinged doors are closed it is ensured that the actuator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

Features

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

Bolt for safety switches NZ.VZ, NZ.VZ.VS and TZ...C1828

Dimension drawings



1) Bolt fastening

Ordering table

Designation	Detent mechanism	Version	Order No.
Bolt NZ/TZ-S1/AF	None	For right or left hinged doors, escape release from the danger area, actuator included	079 786 Bolt NZ/TZ-S1/AF
Bolt NZ/TZ-S1/CF	None	For right or left hinged doors, escape release from the danger area, actuator included	079 785 Bolt NZ/TZ-S1/CF

Subject to technical modifications; no responsibility is accepted for the accuracy of this information.

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Bolts for safety guards

- ▶ For safety switches NZ.VZ, NZ.VZ.VS and TZ...
- ▶ Bolt with knurled knob
- ▶ For right or left hinged doors



Special features

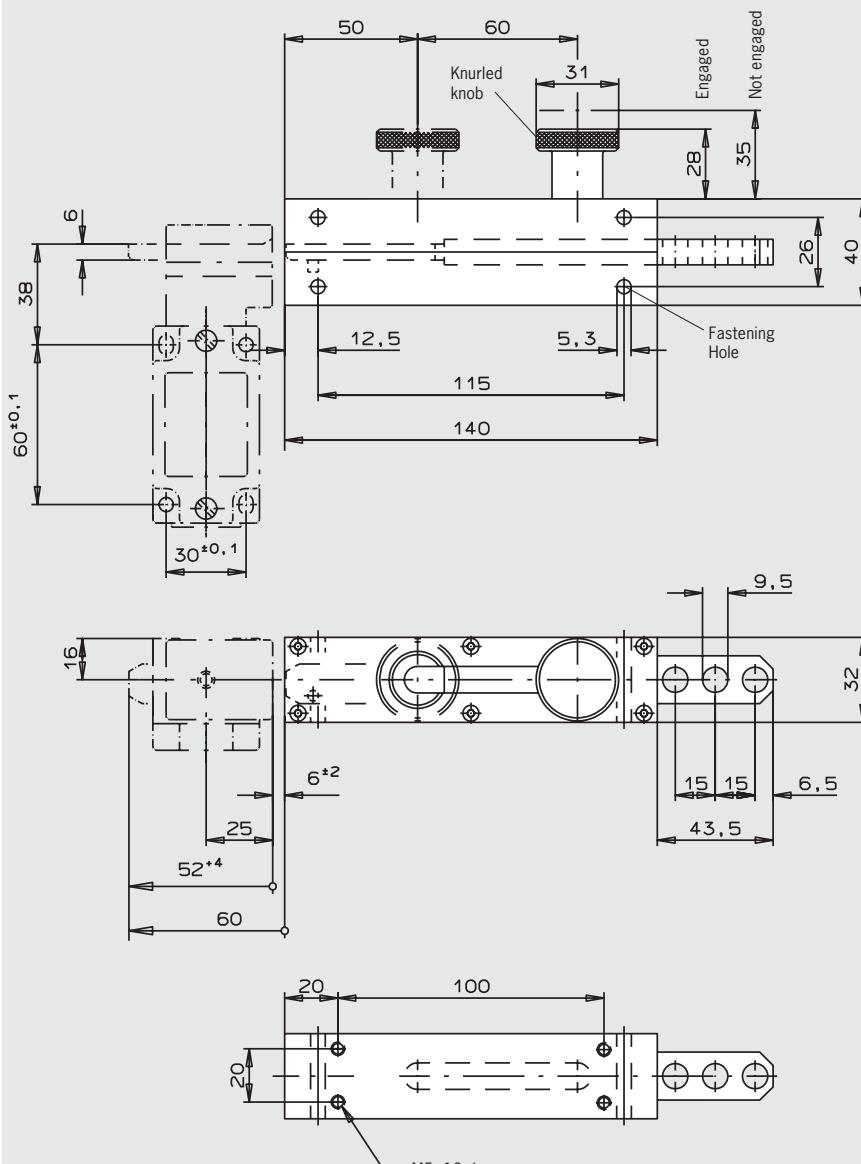
- ▶ Bolt knob engages in open and closed position. The actuator can be inserted in the safety switch by pulling the knurled knob

Features

- ▶ Three holes enable padlocks to be attached

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

Dimension drawings



Ordering table

Designation	Detent mechanism	Version	Order No.
Bolt NZ/TZ-Z	Knurled knob	For right or left hinged doors, actuator included	057 770 Bolt NZ/TZ-Z

Bolts for safety guards

- ▶ For safety switches NZ.VZ, TZ...C1684, TZ...C1815 and TZ...C1828
- ▶ Lever for escape release from the danger area
- ▶ For 2 safety switches on one bolt (NZ and TZ)
- ▶ For right or left hinged doors



Special features

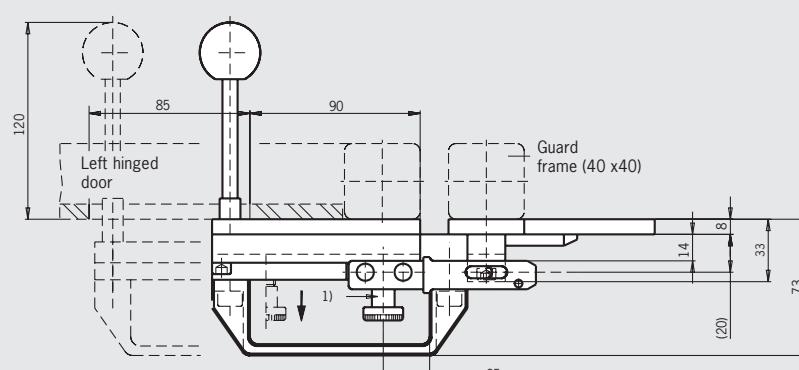
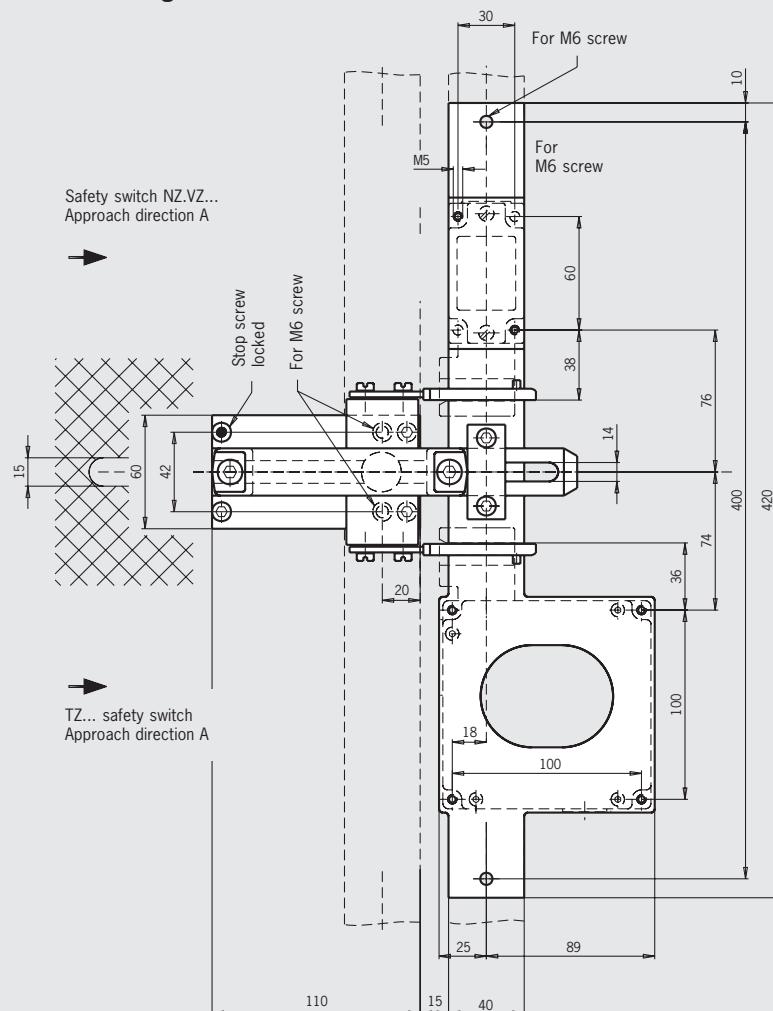
- ▶ One bolt for 2 safety switches (NZ and TZ with guard locking)
- ▶ High control category (e. g. category 4) is achieved
- ▶ Bolt with detent mechanism
- ▶ The bolt latches in open position to prevent unintended closing

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

Bolt for 2 safety switches NZ.VZ on one bolt

Dimension drawings



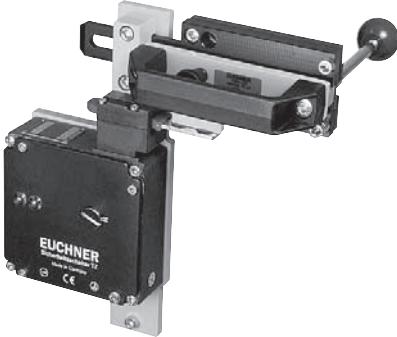
1) Bolt with detent mechanism:
Latches in open position and prevents unintended closing of the bolt.
Unlocked by pulling the detent knob upward.

Ordering table

Designation	Detent mechanism	Version	Order No.
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	083 900 Bolt NZ/TZ-ACF

Bolts for safety guards

- ▶ For safety switches with escape release TZ...C1815 and TZ...C1828
- ▶ Lever for escape release from the danger area
- ▶ For right or left hinged doors



Special features

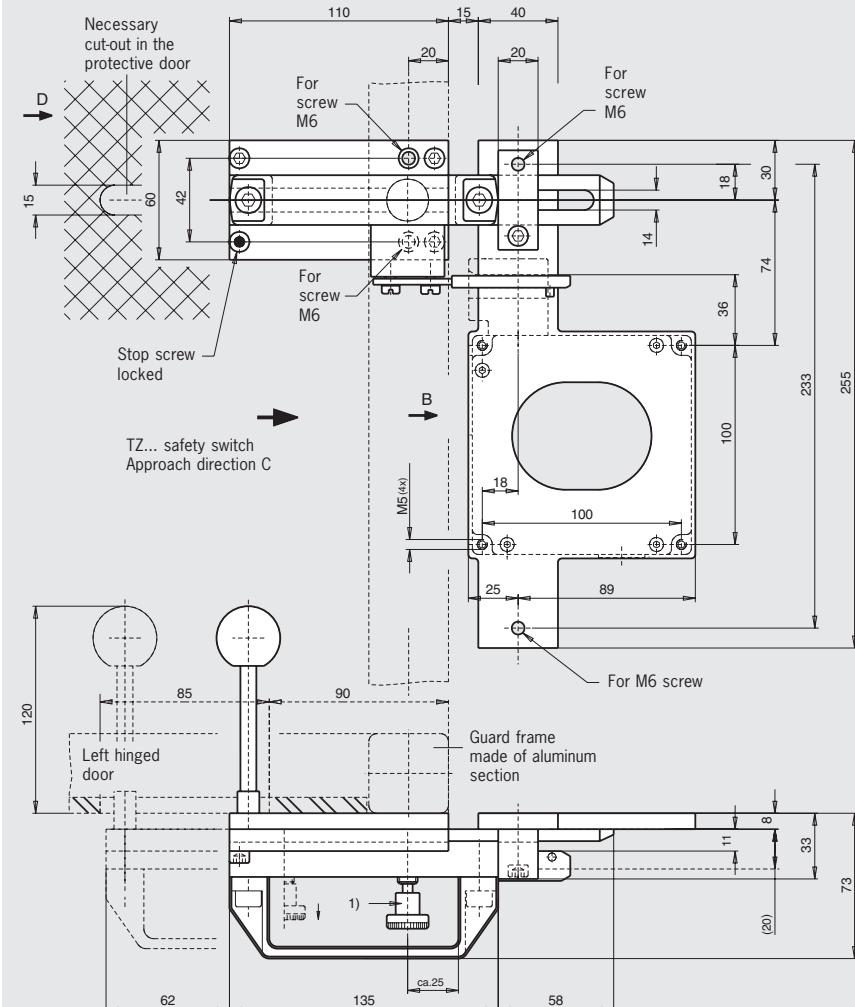
- ▶ Bolt with detent mechanism
- ▶ The bolt latches in open position to prevent unintended closing

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

Bolt for safety switches TZ...C1815 and TZ...C1828

Dimension drawings



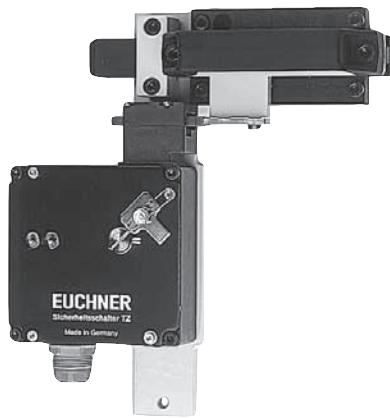
1) Bolt with detent mechanism:
Latches in open position and prevents unintended closing of the bolt.
Unlocked by pulling the detent knob upward.

Ordering table

Designation	Detent mechanism	Version	Order No.
Bolt TZ-AF	Detent knob	For right hinged doors, escape release from the danger area, actuator and switch bracket included	076 200 Bolt TZ-AF
Bolt TZ-CF	Detent knob	For left hinged doors, escape release from the danger area, actuator and switch bracket included	076 199 Bolt TZ-CF

Bolts for safety guards

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



Features

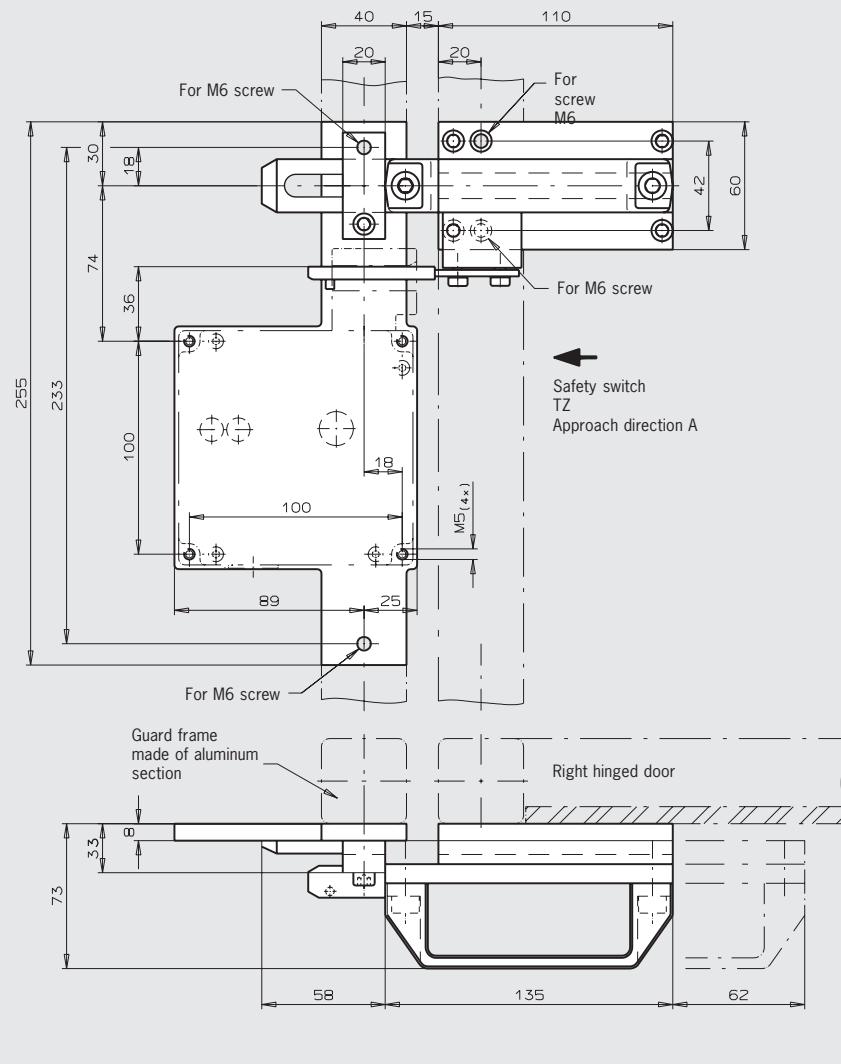
- ▶ Easily fitted to standard aluminum profiles and machine covers by screw connection
- ▶ Easy to use
- ▶ Distinctive yellow color for easy recognition
- ▶ Robust version for heavy doors
- ▶ No additional door handle necessary
- ▶ Slot on the bolt permits attachment of padlocks

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.
Bolt TZ-A	None	For right hinged doors actuator and switch bracket included	057 736 Bolt TZ-A
Bolt TZ-C	None	For left hinged doors actuator and switch bracket included	057 737 Bolt TZ-C
Bolt TZ-A-NIRO	None	For right hinged doors, bolt made of bade of stainless steel 1.4301, actuator and switch bracket included	079 798 Bolt TZ-A-NIRO
Bolt TZ-C-NIRO	None	For left hinged doors, bolt made of bade of stainless steel 1.4301, actuator and switch bracket included	079 799 Bolt TZ-C-NIRO
Bolt TZ-A-NIRO-C2101	None	For right hinged doors, bolt made of bade of stainless steel 1.4301, screws made of stainless steel V2A, handle and slide strips made of stainless steel 1.4301, actuator and switch bracket included (similar to figure)	096 057 Bolt TZ-A-NIRO-C2101
Bolt TZ-C-NIRO-C2101	None	For left hinged doors, bolt made of bade of stainless steel 1.4301, screws made of stainless steel V2A, handle and slide strips made of stainless steel 1.4301, actuator and switch bracket included (similar to figure)	096 058 Bolt TZ-C-NIRO-C2101

Bolts for safety guards

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

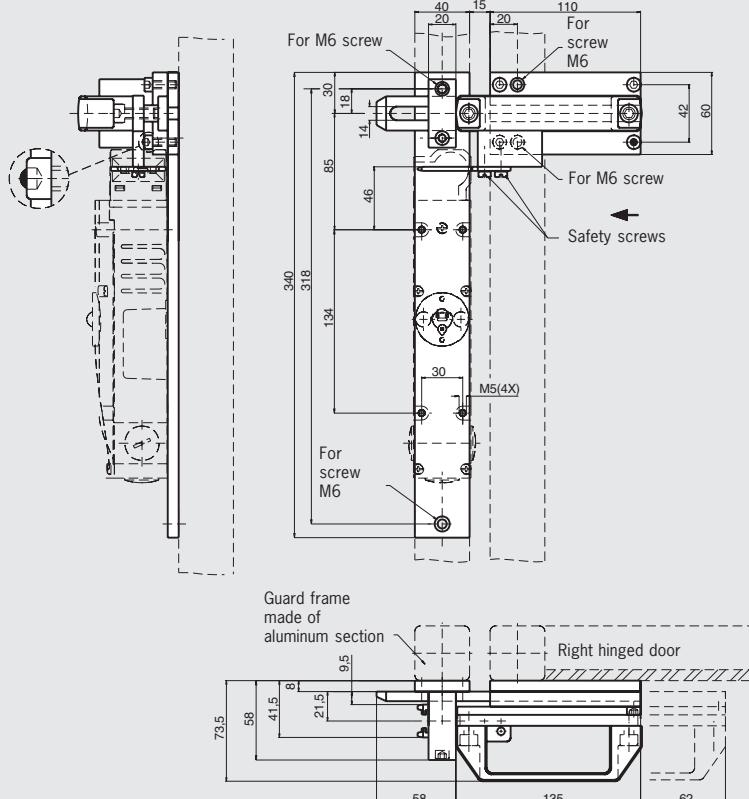


Features

- ▶ 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

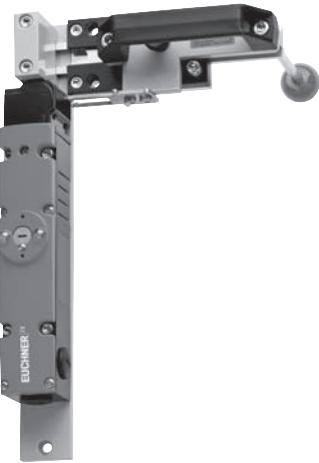


Ordering table

Designation	Detent mechanism	Version	Order No.
Bolt TX-A	None	Without escape release, for right hinged doors actuator and switch bracket included	082 990 Bolt TX-A
Bolt TX-C	None	Without escape release, for left hinged doors actuator and switch bracket included	082 991 Bolt TX-C

Bolts for safety guards

- ▶ For safety switches TX...C1991 with escape release
- ▶ For right or left hinged doors

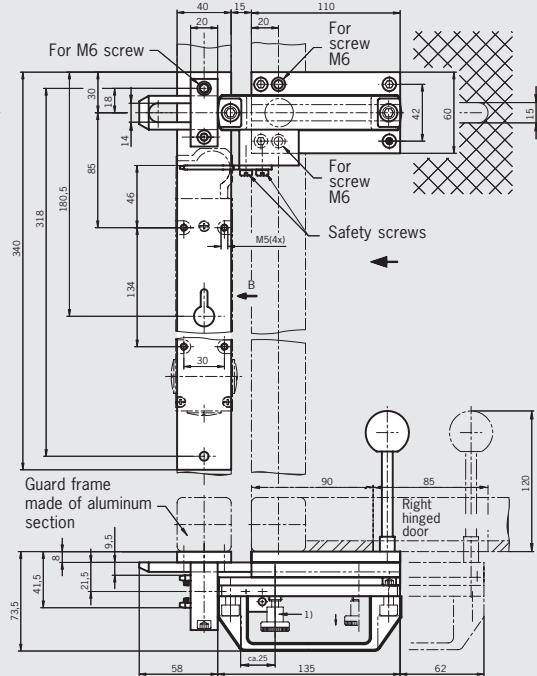
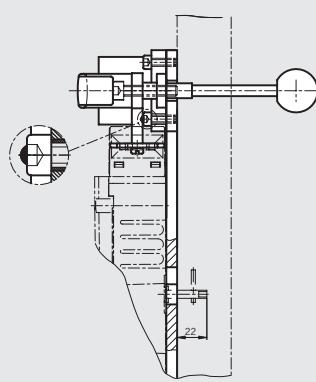


Features

- ▶ 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 with escape release

Dimension drawings



Ordering table

Designation	Detent mechanism	Version	Order No.
Bolt TX-AF	Detent knob	With escape release, for right hinged doors actuator and switch bracket included	085 392 Bolt TX-AF
Bolt TX-CF	Detent knob	With escape release, for left hinged doors actuator and switch bracket included	085 393 Bolt TX-CF

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

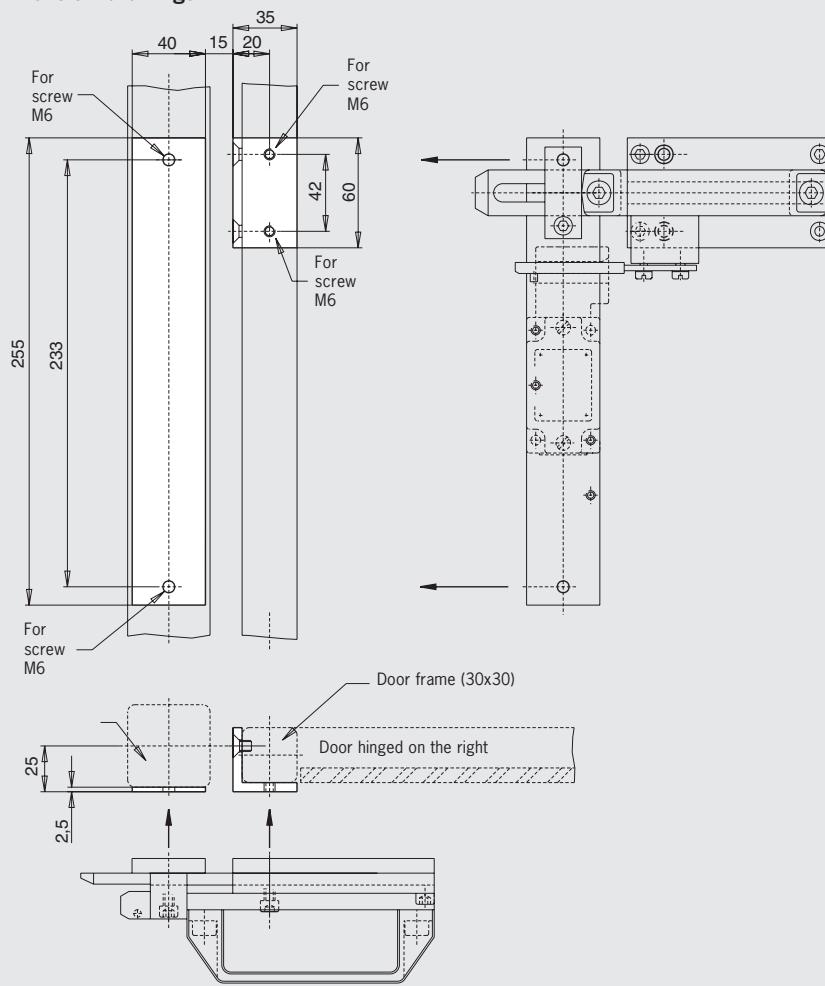
Using the adapter set the NZ... and TZ... bolts can be fastened to aluminum profiles (Bosch EcoSafe)

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

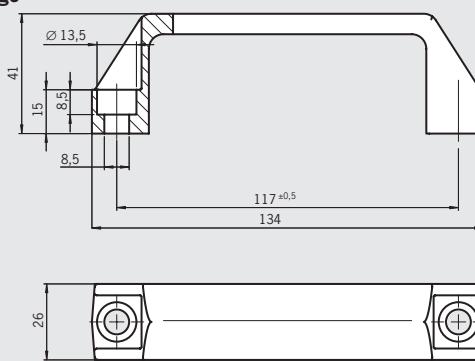


Replacement handle

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

Adapter NZ/TZ...

Dimension drawings



Ordering table

Designation	Version	Order No.
Adapter NZ/TZ 45/30	Incl. 4 fastening screws for elbow adapter	079 033 Adapter NZ/TZ 45/30
Bolt handle/V5	Packaging unit 5 pieces, screws not included	093 500 Bolt handle/V5

Overview

Safety switch series											
N1A											
NB01									Precision single limit switch		
NZ									Precision single limit switch, small design		
NZ.VZ									Position switch NZ		
NZ.VZ.VS									Safety switch NZ.VZ		
TZ									Safety switch NZ.VZ.VS		
NX									Safety switch TZ		
TX									Safety switch NX		
STA									Safety switch TX		
ESH									Safety switch STA		
									Accessories for safety switches		
Safety switch series											
N1A	NB01	NZ	NZ.VZ	NZ.VZ.VS	TZ	NX	TX	STA	ESH	Accessories	Page
●											140
	●										142
		●									143
			●								147
				●							149
					●						152
						●					155
							●				157
								●			160
									●		162
											163

Precision 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.



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	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 element	Snap-action switching element
Switching element	508			-
with 1 switching element		1 NC		
Switching element			514	
with 2 switching elements			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 wire 1.5 mm ²	
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 according to IEC 60269-1 (control circuit fuse)	6	6	A gG
Utilization category 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

Connection, plug connector SVM 5 (M12)

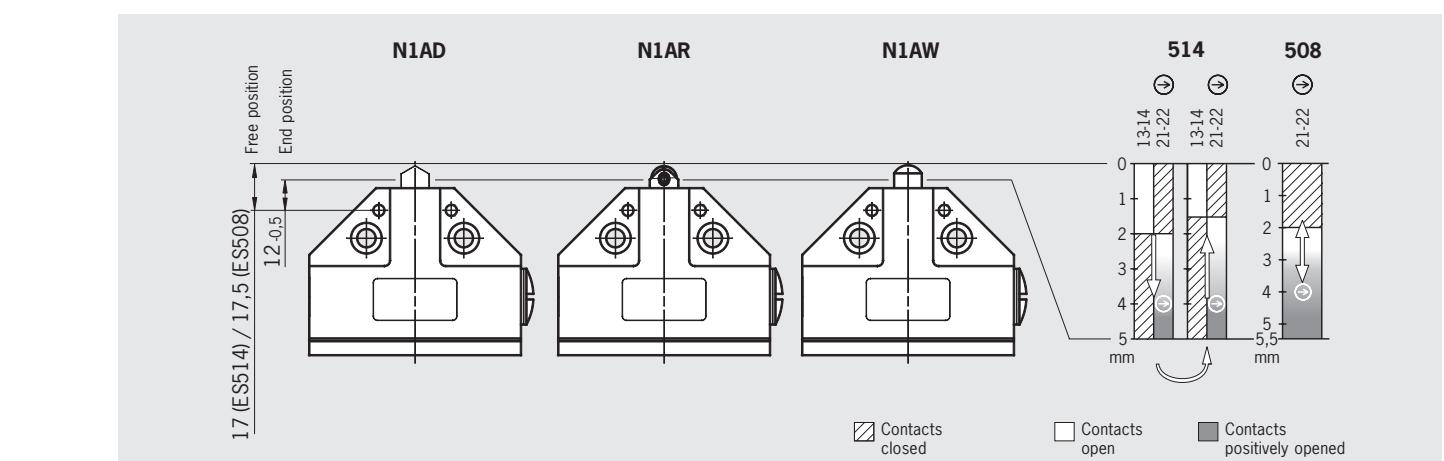
Parameter		Value	Unit
Connection		Plug connector	
Version		M12 (4-pin + PE), male socket adjustable (max. 270o) for elbow connector	
Degree of protection according to IEC 60529		IP 67 ³⁾	
Rated insulation voltage U _i	30		V AC/DC
Switching element	514		
Conventional thermal current I _{th}	4		A
Short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

3) Screwed tight with the related plug connector (see page 115)

Travel diagram N1AD/N1AR/N1AW



Travel diagram N1ARL



Precision 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.



Switch

Parameter	Value	Unit
Housing material	Die-cast aluminum, anodized	
Ambient temperature	- 5 ... + 60	°C
Weight	Approx. 0.2	kg
Switching element	NB01D	NB01R
Approach speed max. ¹⁾ depending on actuator	20	50
Operating point accuracy depending on actuator	± 0.02	± 0.05
		mm/min

Switching element

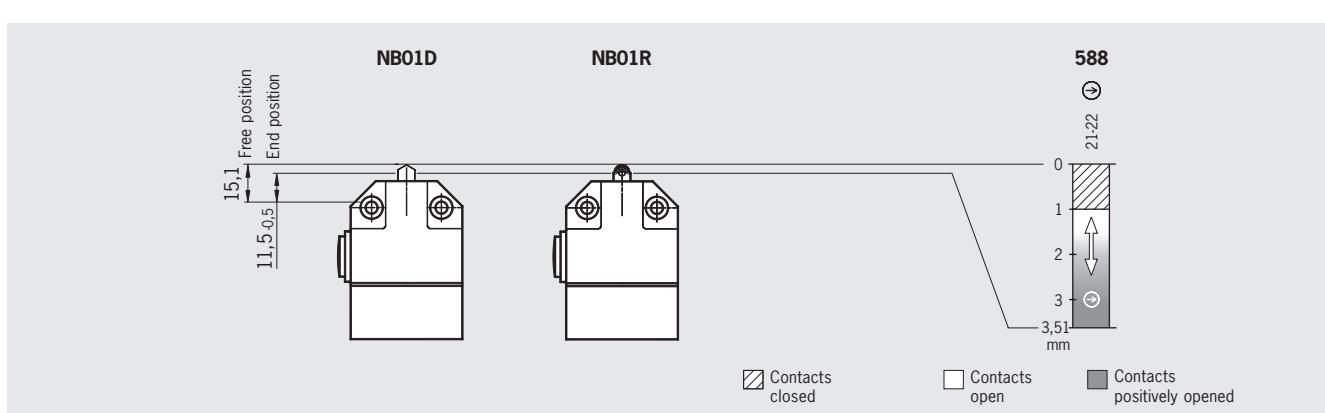
Parameter	Value	Unit
Switching principle	Slow-action switching element	
Switching element with 1 switching element	588	
Mechanical life	10 x 10 ⁶ operating cycles	
Actuating force, min.	15	N
Min. switching current at 24 V DC	1	mA
Switching current max.	6	A
Rated impulse withstand voltage U _{imp}	4	kV
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 wire 1.5 mm ²	
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 according to IEC 60269-1 (control circuit fuse)	6	A gG
Utilization category to IEC 60947-5-1	I _e 4 A U _e 230 V	
	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 switch NZ...

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



Switch							
Parameter	Value						Unit
Housing material	Anodized die-cast alloy						
Mechanical life	30×10^6 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 300	HS 60	PB 120	PS 30	RG, RL, RS 20	RK 80	WO 10
Actuating force, min.	15						N

Switching element			Value			Unit
Parameter	Value					
Switching principle	Snap-action switching element		Slow-action switching element			
Switching elements with 2 switching elements	511 1 NC + 1 NO		528H 1 NC + 1 NO		538H 2 NC	
Switching elements with 4 switching elements	-		2121H 4 NC	2131H 3 NC + 1 NO	3131H 2 NC + 2 NO	
Min. switching current at 24 V DC	10			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		Value			
Parameter	Value				Unit
Connection	Screw terminal				
Version	M20 x 1.5				
Conductor cross-section max.	Per wire 1.5 mm ²				
Degree of protection according to IEC 60529	IP 67				
Rated insulation voltage U_i	250				V AC/DC
Switching element	Snap-action switching element 511	Slow-action switching element 528H, 538H, 2121H, 2131H, 3131H			
Conventional thermal current I_{th}	6		4		A
Short circuit protection according to IEC 60269-1 (control circuit fuse)	6		4		A gG
Utilization category to IEC 60947-5-1	AC-12 AC-15 DC-13	I_e 10 A U_e 230 V I_e 6 A U_e 230 V I_e 6 A U_e 24 V		I_e 4 A U_e 230 V I_e 4 A U_e 24 V	

Connection, plug connector SVM 5 (M12)		Value			
Parameter	Value				Unit
Connection	Plug connector				
Version	M12 (4-pin + PE), male socket adjustable (max. 270°) 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 element 511 , Slow-action switching element 528H, 538H				
Conventional thermal current I_{th}	4				A
Short circuit protection according to IEC 60269-1 (control circuit fuse)	4				A gG
Utilization category to IEC 60947-5-1	AC-15 DC-13	I_e 4 A U_e 30 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.

2) Screwed tight with the related plug connector (see page 115)

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 element 511	Slow-action switching element 528H, 538H	
Conventional thermal current I _{th}	6	4	A
Short circuit protection according to IEC 60269-1 (control circuit fuse)	6	4	A gG
Utilization category 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 element 3131H		
Conventional thermal current I _{th}	4		A
Short circuit protection according to IEC 60269-1 (control circuit fuse)	4		A gG
Utilization category to IEC 60947-5-1	AC15	I _e 4 A U _e 230 V	
	DC13	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 element 2131H, 3131H		
Conventional thermal current I _{th}	4		A
Short circuit protection according to IEC 60269-1 (control circuit fuse)	4		A gG
Utilization category to IEC 60947-5-1	AC15	I _e 4 A U _e 230 V	
	DC13	I _e 4 A U _e 24 V	

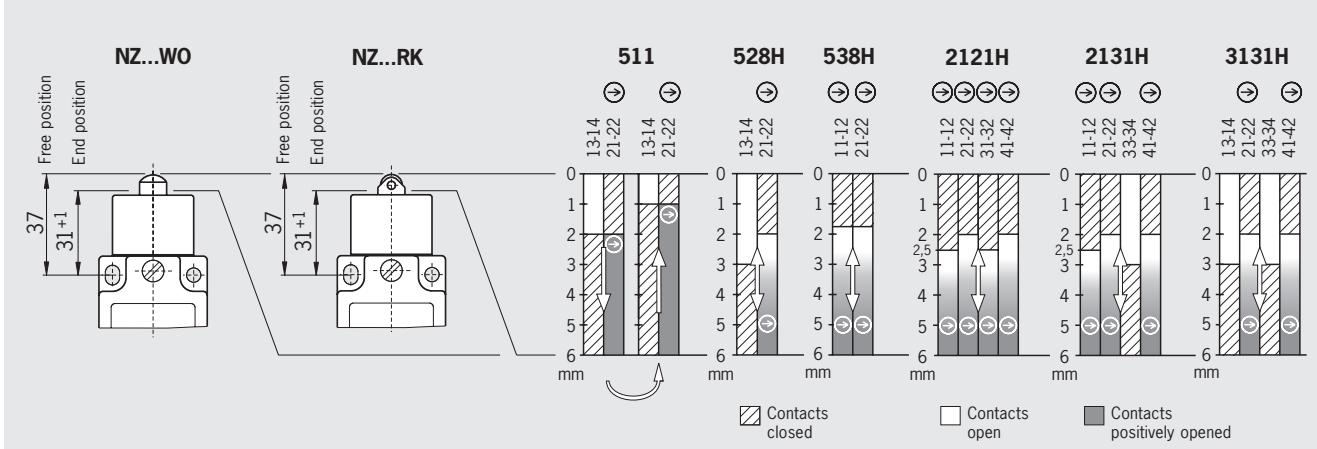
Connection, plug connector SR11



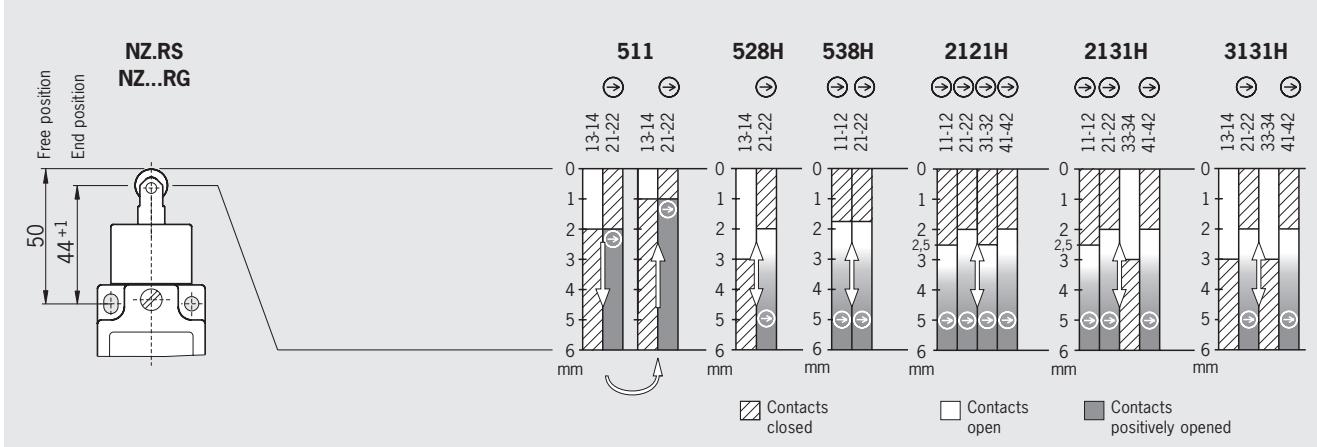
Parameter	Value		Unit
Connection	Plug connector		
Version	SR11 (11-pin + PE)		
Degree of protection according to IEC 60529	IP 65 ²⁾		
Rated insulation voltage U _i	50		V AC/DC
Switching element	Slow-action switching element 2121H, 2131H, 3131H		
Conventional thermal current I _{th}	4		A
Short circuit protection according to IEC 60269-1 (control circuit fuse)	4		A gG
Utilization category to IEC 60947-5-1	AC15	I _e 4 A U _e 50 V	
	DC13	I _e 4 A U _e 24 V	

2) Screwed tight with the related plug connector (see page 112)

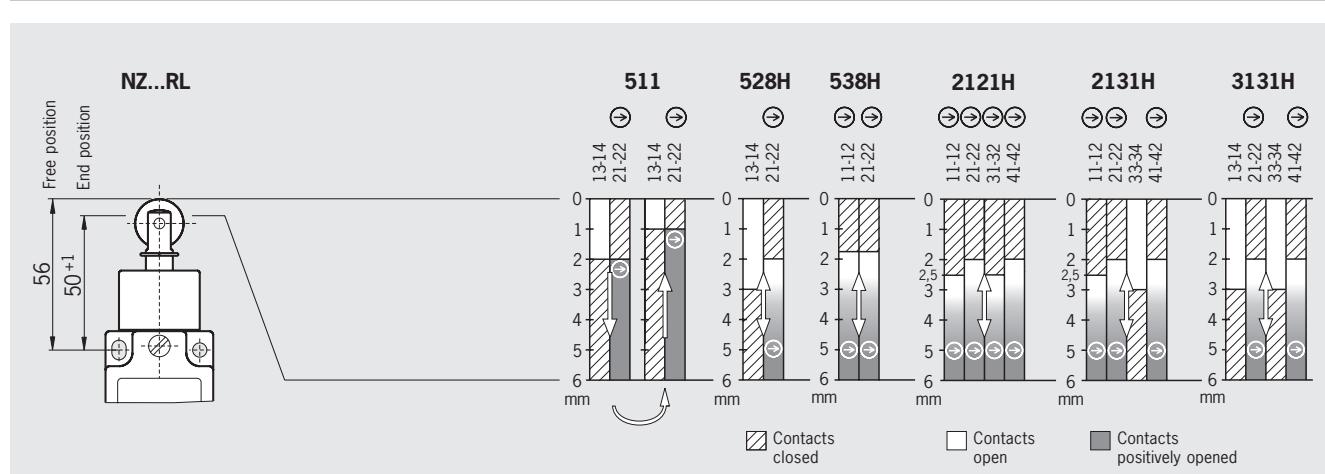
Travel diagram NZ.WO/NZ.RK



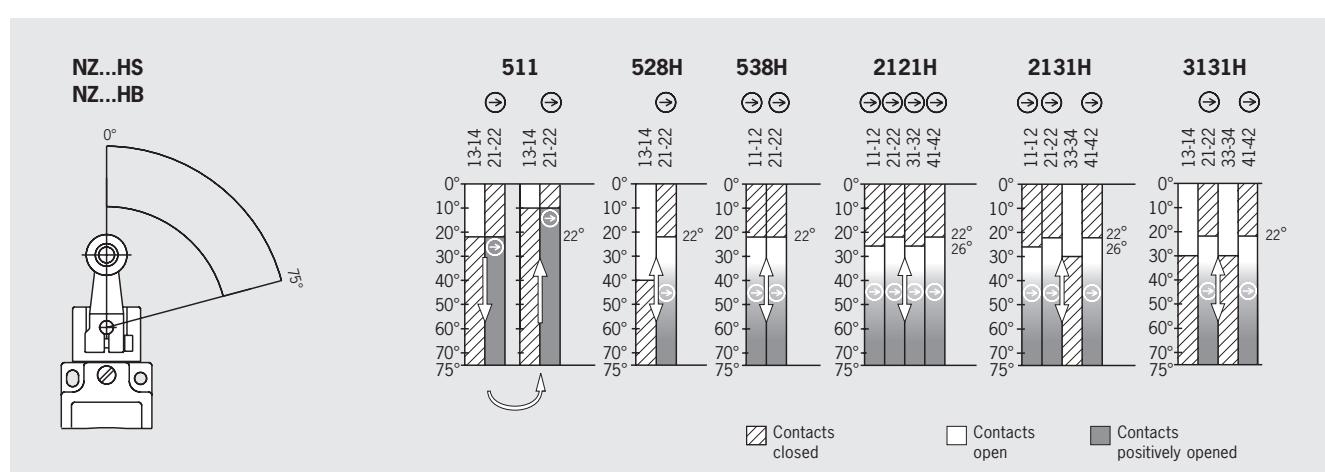
Travel diagram NZ.RS/NZ.RG



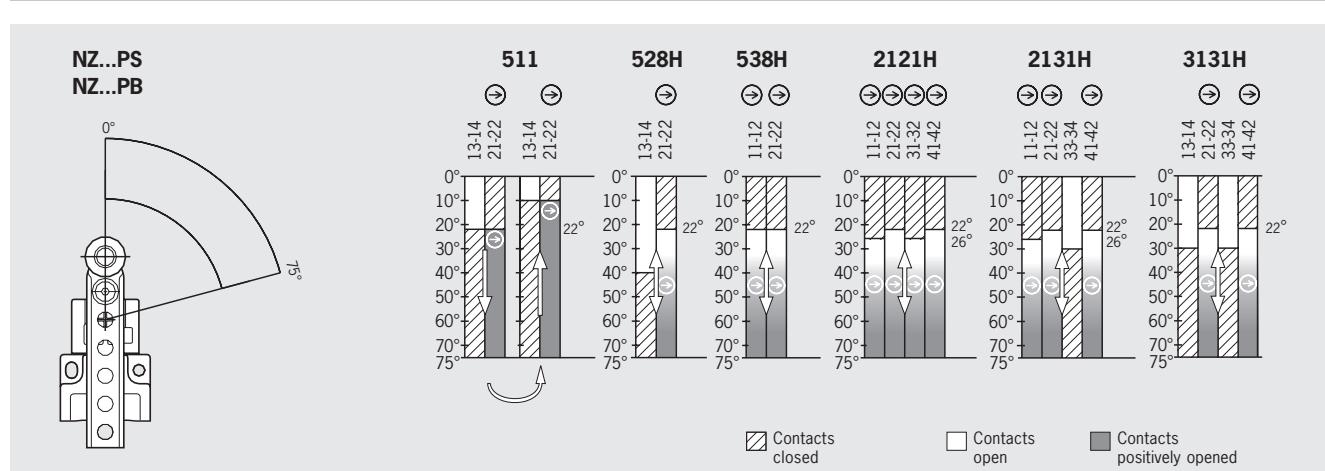
Travel diagram NZ.RL



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.

Switch		Value	Unit
Parameter			
Housing material		Anodized die-cast alloy	
Mechanical life		2×10^6 operating cycles	
Ambient temperature		-25 ... +80	°C
Weight		Approx. 0.3	kg
Max. approach speed		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		Value	Unit
Parameter			
Switching principle	Snap-action switching element	Slow-action switching element	
Switching elements with 2 switching elements	511 1 NC + 1 NO	528H 1 NC + 1 NO	538H 2 NC
Switching elements with 4 switching elements	-	2121H 4 NC	2131H 3 NC + 1 NO
Min. switching current at 24 V DC	10	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		Value	Unit
Parameter			
Connection		Screw terminal	
Version		M20 x 1.5	
Conductor cross-section max.		Per wire 1.5 mm ²	
Degree of protection according to IEC 60529		IP 67	
Rated insulation voltage U_i		250	V AC/DC
Switching element	Snap-action switching element 511	Slow-action switching element 528H, 538H, 2121H, 2131H, 3131H	
Conventional thermal current I_{th}	6	4	A
Short circuit protection according to IEC 60269-1 (control circuit fuse)	6	4	A gG
Utilization category to IEC 60947-5-1	AC-12 AC-15 DC-13	I_e 10 A U_e 230 V I_e 6 A U_e 230 V I_e 6 A U_e 24 V	- I_e 4 A U_e 230 V I_e 4 A U_e 24 V

Connection, plug connector SVM 5 (M12)		Value	Unit
Parameter			
Connection		Plug connector	
Version		M12 (4-pin + PE), male socket adjustable (max. 270°) 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 element 538H	
Conventional thermal current I_{th}		4	A
Short circuit protection according to IEC 60269-1 (control circuit fuse)		4	A gG
Utilization category to IEC 60947-5-1	AC-15 DC-13	I_e 4 A U_e 30 V I_e 4 A U_e 24 V	

1) Screwed tight with the related plug connector (see page 115)

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 element 538H	
Conventional thermal current I _{th}	4	A
Short circuit protection according to IEC 60269-1 (control circuit fuse)	4	A gG
Utilization category to IEC 60947-5-1	I _e 4 A U _e 230 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 ¹⁾	
Rated insulation voltage U _i	250	V AC/DC
Switching element	Snap-action switching element 511	Slow-action switching element 528H, 538H
Conventional thermal current I _{th}	6	4
Short circuit protection according to IEC 60269-1 (control circuit fuse)	6	4
Utilization category to IEC 60947-5-1	I _e 6 A U _e 230 V	I _e 4 A U _e 230 V
	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 element 2131H	
Conventional thermal current I _{th}	4	A
Short circuit protection according to IEC 60269-1 (control circuit fuse)	4	A gG
Utilization category to IEC 60947-5-1	I _e 4 A U _e 230 V	
	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 element 2131H	
Conventional thermal current I _{th}	4	A
Short circuit protection according to IEC 60269-1 (control circuit fuse)	4	A gG
Utilization category to IEC 60947-5-1	I _e 4 A U _e 230 V	
	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 ¹⁾	
Rated insulation voltage U _i	50	V AC/DC
Switching element	Slow-action switching element 2121H, 2131H, 3131H	
Conventional thermal current I _{th}	4	A
Short circuit protection according to IEC 60269-1 (control circuit fuse)	4	A gG
Utilization category to IEC 60947-5-1	I _e 4 A U _e 50 V	
	I _e 4 A U _e 24 V	

1) Screwed tight with the related plug connector (see page 112)

Safety switch 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.

Switch		Value	Unit
Parameter			
Housing material		Anodized die-cast alloy	
Mechanical life		2×10^6 operating cycles	
Ambient temperature		- 25 ... + 80	°C
Weight		Approx. 0.7	kg
Max. approach speed		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 accordance with test principles GS-ET-19		1500	N

Switching element			Value	Unit
Parameter				
Switching principle	Snap-action switching element	Slow-action switching element		
Switching elements with 2 switching elements	511 1 NC + 1 NO	528H 1 NC + 1 NO	538H 2 NC	
Switching elements with 4 switching elements	-	2121H 4 NC	2131H 3 NC + 1 NO	3131H 2 NC + 2 NO
Min. switching current at 24 V DC	10		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 (not for NZ.VZ.VSH)			Value	Unit
Parameter				
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 43 650		
Conductor cross-section		For technical data on the solenoid plug see page 101		
Duty cycle		100		%
Power consumption		< 10		W

Connection, cable entry M20 x 1.5		Value	Unit
Parameter			
Connection		Screw terminal	
Version		M20 x 1.5	
Conductor cross-section max.		Per wire 1.5 mm ²	
Degree of protection according to IEC 60529		IP 65	
Rated insulation voltage U_i		250	V AC/DC
Switching element	Snap-action switching element 511	Slow-action switching element 528H, 538H, 2121H, 2131H, 3131H	
Conventional thermal current I_{th}	6	4	A
Short circuit protection according to IEC 60269-1 (control circuit fuse)	6	4	A gG
Utilization category 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) Use only solenoid plug with integrated rectifier

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 element 528H, 538H	
Conventional thermal current I _{th}	4	A
Short circuit protection according to IEC 60269-1 (control circuit fuse)	4	A gG
Utilization category to IEC 60947-5-1	I _e 4 A U _e 230 V	
	I _e 4 A U _e 24 V	
AC-15		
DC-13		

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 element 2131H	
Conventional thermal current I _{th}	4	A
Short circuit protection according to IEC 60269-1 (control circuit fuse)	4	A gG
Utilization category to IEC 60947-5-1	I _e 4 A U _e 230 V	
	I _e 4 A U _e 24 V	
AC15		
DC13		

Connection, plug connector SR11

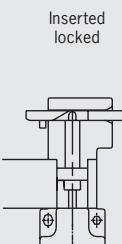


Parameter	Value	Unit
Connection	Plug connector	
Version	SR11 (11-pin + PE)	
Degree of protection according to IEC 60529	IP 65 ²⁾	
Rated insulation voltage U _i	50	V AC/DC
Switching element	Slow-action switching element 2131H, 3131H	
Conventional thermal current I _{th}	4	A
Short circuit protection according to IEC 60269-1 (control circuit fuse)	4	A gG
Utilization category to IEC 60947-5-1	I _e 4 A U _e 50 V	
	I _e 4 A U _e 24 V	
AC15		
DC13		

2) Screwed tight with the related plug connector (see page 112)

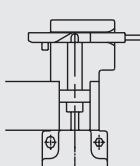
Switching functions NZ.VZ.VS

Actuator:
Switching
position:



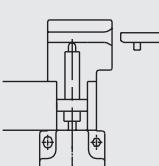
511 \ominus 21 --- 22
528 \ominus 13 --- 14

Inserted
not
locked



21 --- 22
13 --- 14

Removed
not
locked



21 --- 22
13 --- 14

538 \ominus 21 --- 22
 \ominus 11 --- 12

21 --- 22
11 --- 12

21 --- 22
11 --- 12

2121 \ominus 41 --- 42
 \ominus 31 --- 32
 \ominus 21 --- 22
 \ominus 11 --- 12

41 --- 42
31 --- 32
21 --- 22
11 --- 12

41 --- 42
31 --- 32
21 --- 22
11 --- 12

2131 \ominus 41 --- 42
 33 --- 34
 \ominus 21 --- 22
 \ominus 11 --- 12

41 --- 42
33 --- 34
21 --- 22
11 --- 12

41 --- 42
33 --- 34
21 --- 22
11 --- 12

3131 \ominus 41 --- 42
 33 --- 34
 \ominus 21 --- 22
 13 --- 14

41 --- 42
33 --- 34
21 --- 22
13 --- 14

41 --- 42
33 --- 34
21 --- 22
13 --- 14

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.

Switch



Parameter	Value	Unit
Housing material	Anodized die-cast alloy	
Mechanical life	2×10^6 operating cycles	
Ambient temperature	- 25 ... + 80	°C
Weight	Approx. 1.2	kg
Max. approach speed	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 accordance with test principles GS-ET-19	1500	N

Switching element



Parameter	Value	Unit
Switching principle	Slow-action switching element	
Switching elements with 2 switching elements	SK: 528H / ÜK: 528H 1 NC + 1 NO / 1 NC + 1 NO	
Switching elements with 4 switching elements	SK: 2131H / ÜK: 3131H 3 NC + 1 NO / 2 NC + 2 NO	SK: 2121H / ÜK: 2121H 4 NC / NC
Switching current, min., at 24 V	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%
Duty cycle ED	100	%
Power consumption	7	W

Connection, cable entry M20 x 1.5



Parameter	Value	Unit
Connection	Screw terminal	
Version	M20 x 1.5	
Conductor cross-section max.	per wire 1.5 mm ²	
Degree of protection acc. 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 according to IEC 60269-1 (control circuit fuse)	4	A gG
Utilization category to IEC 60947-5-1	AC15	I_e 4 A U_e 230 V
	DC13	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 according to IEC 60269-1 (control circuit fuse)	4	A gG
Utilization category to IEC 60947-5-1	AC15	I_e 4 A U_e 110 V
	DC13	I_e 4 A U_e 24 V

1) Screwed tight with the related plug connector (see page 113)

Connection, plug connector SR6



Parameter	Value	Unit
Connection	Plug connector	
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 according to IEC 60269-1 (control circuit fuse)	4	A gG
Utilization category to IEC 60947-5-1	I _e 4 A U _e 230 V	
	I _e 4 A U _e 24 V	

1) Screwed tight with the related plug connector (see page 112)

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

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	

The exact states of the safety circuit and the actuator can be seen in the adjacent table for the safety switch TZ...SR6.

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 according to IEC 60269-1 (control circuit fuse)	4	A gG
Utilization category to IEC 60947-5-1	I _e 4 A U _e 50 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
Conventional thermal current I _{th}	4	A
Short circuit protection according to IEC 60269-1 (control circuit fuse)	4	A gG
Utilization category to IEC 60947-5-1	I _e 4 A U _e 230 V	
	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 according to IEC 60269-1 (control circuit fuse)	4	A gG
Utilization category to IEC 60947-5-1	I _e 4 A U _e 230 V	
	I _e 4 A U _e 24 V	

Connection, plug connector MR12



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 according to IEC 60269-1 (control circuit fuse)	4	A gG
Utilization category to IEC 60947-5-1	I _e 4 A U _e 60 V	
	I _e 4 A U _e 24 V	

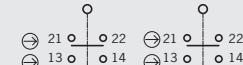
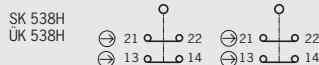
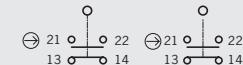
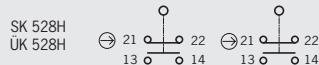
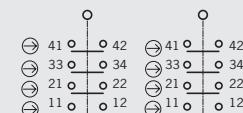
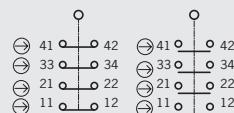
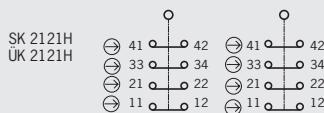
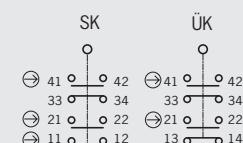
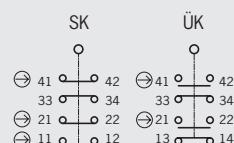
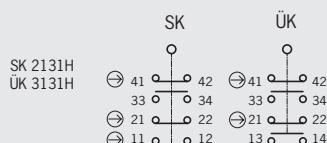
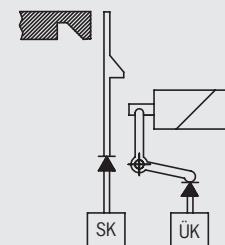
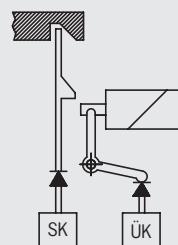
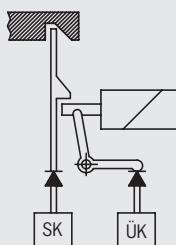
Switching functions TZ

Actuator:
Switching
position:

Inserted
locked

Inserted
not locked

Removed
not locked



Safety switch NX



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

Switch



Parameter	Value		Unit
Housing material	Die-cast alloy, cathodically dipped		
Mechanical life	2×10^6 operating cycles		
Ambient temperature	- 20 ... + 80		°C
Weight	Approx. 0.4		kg
Max. approach speed	20		m/min
Actuating force	40		N
Extraction force	50		N
Retention force	10		N
Insertion depth	Standard actuators	Overtravel actuator	
Required insertion depths s_{\min}	32	32	mm
Maximum insertion depth s_{\max}	33	40	mm
Actuator travel (in the locked state)	6	13	mm

Switching element



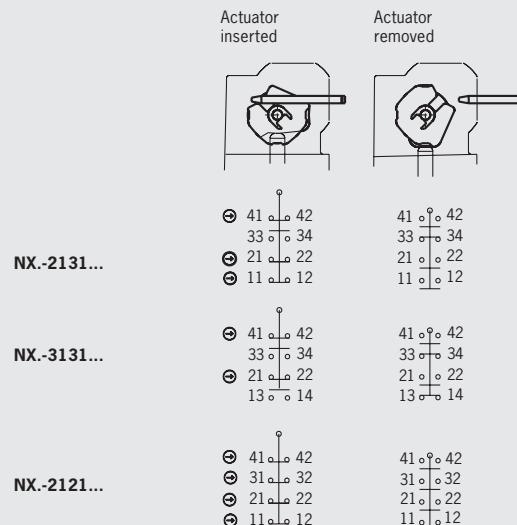
Parameter	Value			Unit
Switching principle	Slow-action switching element			
Switching elements with 4 switching elements	2121 4 NC	2131 3 NC + 1 NO	3131 2 NC + 2 NO	
Switching current, min., at 24 V DC	1			mA
Switching voltage, min., at 10 mA	12			V
Contact material	Silver alloy, gold flashed			

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 according to IEC 60269-1 (control circuit fuse)	4		A gG
Utilization category 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.

Switch



Parameter	Value		Unit
Housing material	Die-cast alloy, cathodically dipped		
Mechanical life	$> 1 \times 10^6$ operating cycles		
Ambient temperature	- 20 ... + 80		°C
Weight	approx. 0.8		kg
Max. approach speed	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 accordance with test principles GS-ET-19	1300		N
Insertion depth	Standard actuators	Overtravel actuator	
Required insertion depths 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 element			
Switching elements	ETX B	ETX C	ETX D	
with 4 switching elements	2 NC + 1 NO + 1 NC	2 NC + 1 NO + 1 NO	2 NC + 2 NC	
Switching current, min., 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%	AC 230 V +10/-15%	
Connection	Reverse polarity protected, integrated bridge rectifier			
Duty cycle ED	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 max.	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 according to IEC 60269-1 (control circuit fuse)	4			A gG
Utilization category to IEC 60947-5-1	AC15	Ie 4 A Ue 230 V		
	DC13	Ie 4 A Ue 24 V		

Connection, cable entry NPT 1/2"



Parameter	Value	Unit
Connection	Screw terminal	
Version	NPT 1/2"	
Conductor cross-section max.	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 according to IEC 60269-1 (control circuit fuse)	4	A gG
Utilization category to IEC 60947-5-1	I _e 4 A U _e 230 V	
	I _e 4 A U _e 24 V	
AC15		
DC13		

Connection, plug connector BH10



Parameter	Value	Unit
Connection	Plug connector	
Version	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 according to IEC 60269-1 (control circuit fuse)	4	A gG
Utilization category to IEC 60947-5-1	I _e 4 A U _e 24 V	
	I _e 4 A U _e 24 V	
AC-15		
DC-13		

Connection, plug connector BH12



Parameter	Value	Unit
Connection	Plug connector	
Version	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 according to IEC 60269-1 (control circuit fuse)	4	A gG
Utilization category to IEC 60947-5-1	I _e 4 A U _e 24 V	
	I _e 4 A U _e 24 V	
AC-15		
DC-13		

1) Screwed tight with the related plug connector

Connection, plug connector SR11



Parameter	Value	Unit
Connection	Plug connector	
Version	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 according to IEC 60269-1 (control circuit fuse)	4	A gG
Utilization category to IEC 60947-5-1	I _e 4 A U _e 50 V	
	I _e 4 A U _e 24 V	
AC-15		
DC-13		

Connection, plug connector RC18

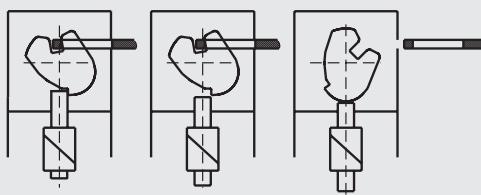


Parameter	Value	Unit
Connection	Plug connector	
Version	18-pin + PE	
Degree of protection according to IEC 60529	IP 65 ¹⁾	
Rated insulation voltage U _i	50	V AC/DC
Rated impulse withstand voltage U _{imp}	2.5	kV
Conventional thermal current I _{th}	4	A
Short circuit protection according to IEC 60269-1 (control circuit fuse)	4	A gG
Utilization category to IEC 60947-5-1	I _e 4 A U _e 24 V	
	I _e 4 A U _e 24 V	
AC-15		
DC-13		

1) Screwed tight with the related plug connector (see page 113)

Switching functions TX

Actuator:
Switching position:

Inserted
lockedInserted
not lockedRemoved
not locked

\oplus 41 \ominus 42
33 \ominus 34
 \ominus 21 \oplus 22
11 \ominus 12

41 \ominus 42
33 \ominus 34
21 \oplus 22
11 \ominus 12

41 \ominus 42
33 \ominus 34
21 \oplus 22
11 \ominus 12

ETX B

\oplus 41 \ominus 42
33 \ominus 34
 \ominus 21 \oplus 22
13 \ominus 14

41 \ominus 42
33 \ominus 34
21 \oplus 22
13 \ominus 14

41 \ominus 42
33 \ominus 34
21 \oplus 22
13 \ominus 14

ETX C

\oplus 41 \ominus 42
31 \ominus 32
 \ominus 21 \oplus 22
11 \ominus 12

41 \ominus 42
31 \ominus 32
21 \oplus 22
11 \ominus 12

41 \ominus 42
31 \ominus 32
21 \oplus 22
11 \ominus 12

ETX D

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)

Switching element	TX3...24	Actuator inserted		Actuator removed
		Locked	Not locked	
TX3...110 / TX3...230	TX3...24	\oplus 41 \ominus 42 33 \ominus 34 \ominus 21 \oplus 22 11 \ominus 12	\oplus 41 \ominus 42 33 \ominus 34 \ominus 21 \oplus 22 11 \ominus 12	\oplus 41 \ominus 42 33 \ominus 34 \ominus 21 \oplus 22 11 \ominus 12
		\oplus 41 \ominus 42 33 \ominus 34 \ominus 21 \oplus 22 13 \ominus 14	\oplus 41 \ominus 42 33 \ominus 34 \ominus 21 \oplus 22 13 \ominus 14	\oplus 41 \ominus 42 33 \ominus 34 \ominus 21 \oplus 22 13 \ominus 14
Switch version	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...24	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 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.

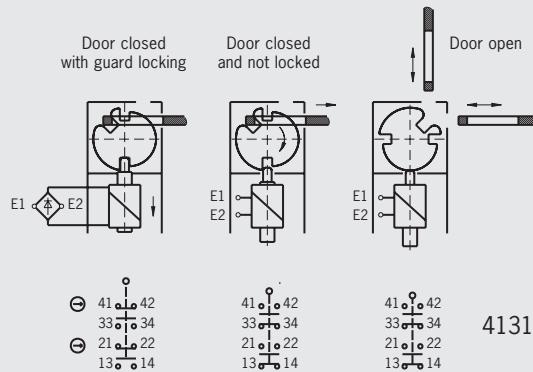
Switch			Value	Unit
Parameter				
Housing material			Anodized die-cast	
Mechanical life			1 x 10 ⁶ operating cycles	
Ambient temperature			- 20 ... + 80	°C
Weight			Approx. 0.6	kg
Max. approach speed			20	m/min
Actuating force			35	N
Extraction force (not locked)			30	N
Retention force			20	N
Locking force, max.			Approach direction	
	From top (v)		Side (h)	
	2500		2500	N
Locking force F _{Zh} in accordance with test principles GS-ET-19			Approach direction	
Straight actuator	From top (v)		Side (h)	
	2000		2000	N
Insertion depth (minimum required travel + permissible overtravel)	Standard actuator S		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			Value	Unit
Parameter				
Switching principle			Slow-action switching element	
Switching elements	2131	4121	4131	4141
with 4 switching elements	2 NC + 1 NO + 1 NC	2 NC + 1 NC + 1 NO	2 NC + 2 NO	2 NC + 2 NC
Switching current, min., at 24 V DC			1	mA
Switching voltage, min., at 10 mA			12	V
Contact material			Silver alloy, gold flashed	

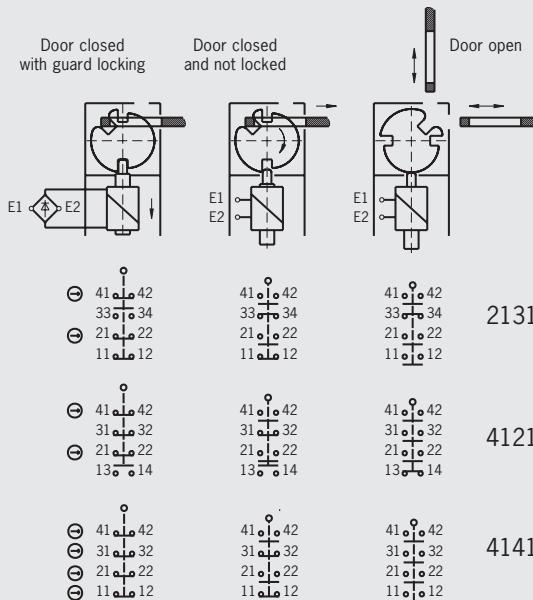
Guard locking			Value	Unit
Parameter				
Solenoid operating voltage			AC/DC 24 V +10/-15%	
Connection			Reverse polarity protected, integrated bridge rectifier	
Duty cycle ED			100	%
Power consumption			8	W

Connection, cable entry M20 x 1.5			Value	Unit
Parameter				
Connection			Screw terminal	
Version			M20 x 1.5	
Conductor cross-section max.			0.34 ... 1.5	mm ²
Degree of protection according to IEC 60529			IP 67	
Rated impulse withstand voltage U _{imp}			2.5	kV
Rated insulation voltage U _i			250	V AC/DC
Conventional thermal current I _{th}			4	A
Short circuit protection according to IEC 60269-1 (control circuit fuse)			4	A gG
Utilization category to IEC 60947-5-1	AC15		Ie 4 A Ue 230 V	
	DC13		Ie 4 A Ue 24 V	

Switching functions STA1/STA2 without door monitoring contact



Switching functions STA3/STA4 with door monitoring contact



Safety switch ESH



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

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)	

Switching element

Parameter	Value	Unit
Switching principle	Snap-action switching element	
Switching element with 2 switching elements	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 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 according to IEC 60269-1 (control circuit fuse)	2	A gG
Utilization category to IEC 60947-5-1	I _e 1.5 A U _e 30 V I _e 2 A U _e 24 V	

1) Screwed tight with the related plug connector (see page 115)

Accessories for safety switches

Solenoid plug			Value	Unit
Parameter				
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			Value	Unit
Parameter				
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			Value	Unit
Parameter				
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			Value	Unit
Parameter				
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			

RC18			Value	Unit
Parameter				
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			Value	Unit
Parameter				
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)			Value	Unit
Parameter				
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			

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.

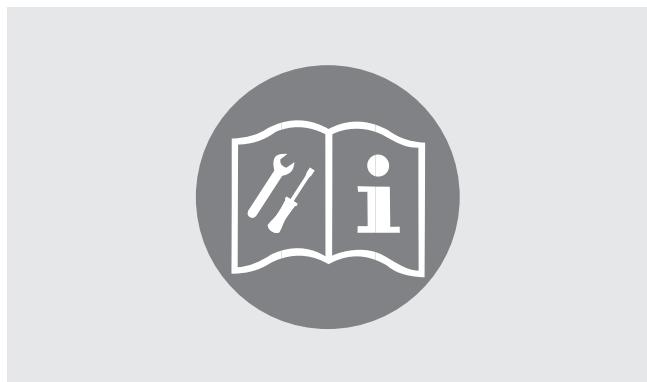
Assembly instructions

Safety switches with safety function

- ▶ To obtain the required isolating distance, 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)	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 and specifications
EN 1050 withdrawn	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.

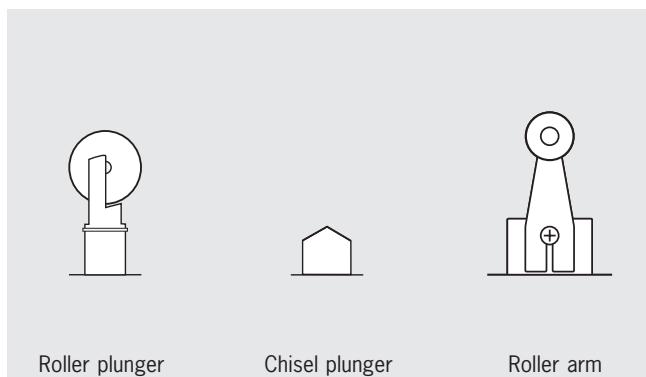
Actuation (electrical / mechanical)

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

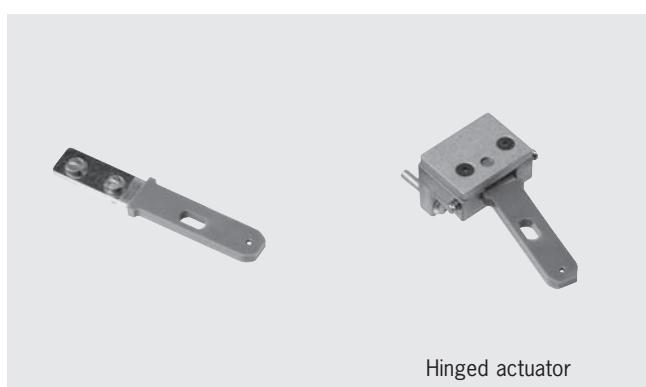
Switches with safety function:

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.



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



Approach speed

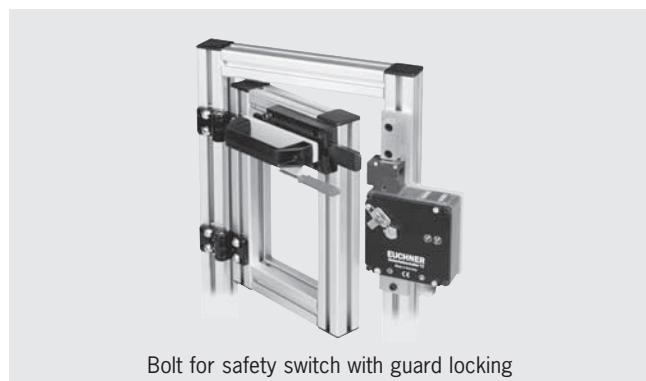
Speed at which a position switch can be mechanically actuated. The permitted approach speed is dependent on the shape and material of the **actuating element* and the approach angle. The higher the approach speed, the shallower the approach angle that should be chosen.

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.

Bolt

Bolts function as follows: the bolt tongue mechanically guides the **actuator* when it is inserted in the **safety switch* actuating head. 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 954-1 (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 interlocking 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

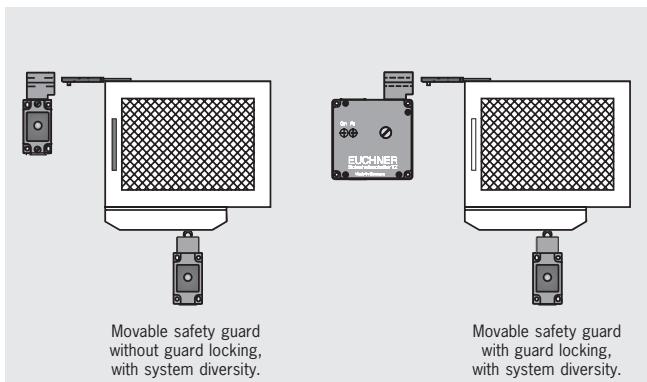
- ▶ Either be present continuously on the correct use of the machine (movement of hazardous moving parts, arcs during welding, etc.)
- ▶ Or can occur unexpectedly (unintentional, unexpected starting, etc.)

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.



Electrical guard locking

Guard locking based on the *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.



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.



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.



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

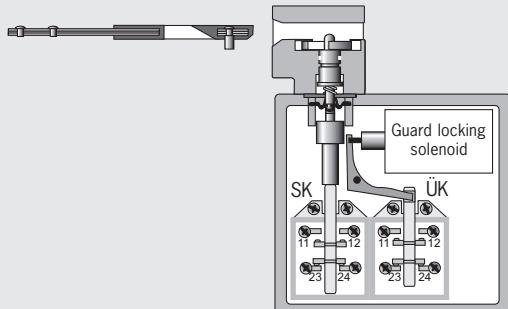
The guard locking retains a movable safety guard in the closed position until the machine can no longer pose any risk of injury. With the guard locking open, unintentional starting of the machine is prevented.

Guard lock monitoring

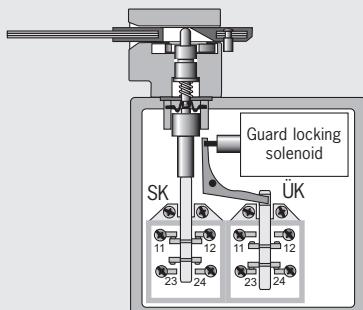
The guard lock monitoring monitors the position of the interlocking solenoids. This device is positively linked to the switching element ÜK via a locking arm. On intentional or unintentional unlocking of the interlocking solenoid, the positively driven contact in this switching element is actuated and therefore signals the position of the interlocking solenoid.

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

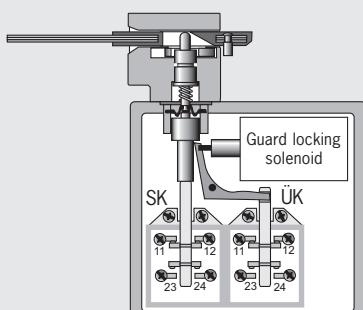
- ① Door open and not locked



- ② Door closed and not locked



- ③ Door closed and locked

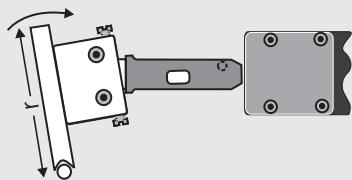


Hazardous states

Potentially hazardous conditions are states that could result in injury. Safety switches, if the safety guard used correctly, prevent 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 interlocking 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 on the 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 interlocking 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 be prevented 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 Probability of Dangerous Failure

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 Proximity Devices with defined behaviour under Fault conditions

Proximity switches with defined behavior under fault conditions (see EN 60947-5-3).

Position switch

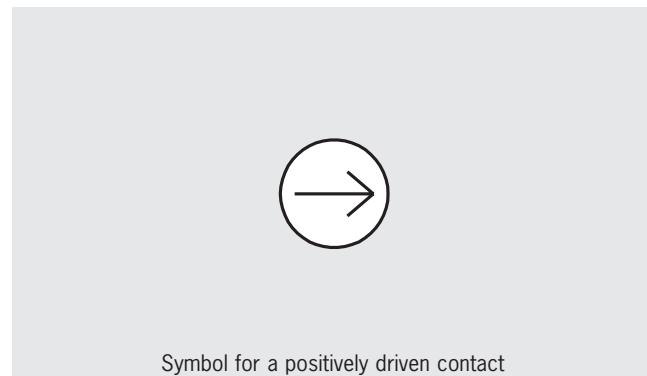
Position switches are used to acquire the position of axes or moving *safety guards*. As soon as a position switch is used as a safety-relevant component, the term position switch with safety function or safety-related position switch is used. In this case the switching element must contain at least 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.

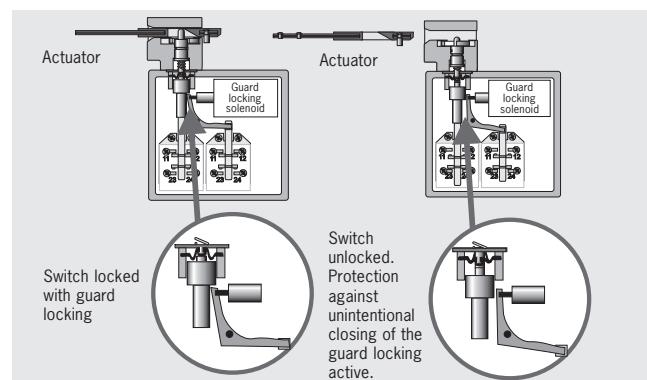
Positively driven, positively driven contact

The achievement of contact separation by a positive movement of the *actuating element* is termed positively driven. *Switching elements* with this switching behavior are termed positively driven contacts. These NC contacts are drawn with the symbol shown below. Switches must also meet the requirements of EN 60947-5-1 annex K.



Protection against unintentional closing

Protection against unintentional closing of an interlocking 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

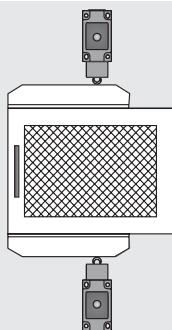
For switches with separate actuator, a protective plate is available as an option; this plate makes it more difficult to tamper with the actuating head.



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 954-1), both the mechanism (two position switches) and the electronics should be of dual-channel layout.

The safety of a redundant system is further increased by **diversity**.



Movable safety guard with redundant safety switches

Retention force

The retention force is the maximum force that is allowed to be applied to the **actuator** with the **safety switch** in the locked state so that the switch cannot 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 situations**).

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 switch

A safety switch is part of a safety chain. It provides a safe signal in the input circuit. A stop signal is generated when the **safety guard** is opened. 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 element 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 **actuator** position. The movement of the switching element 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.

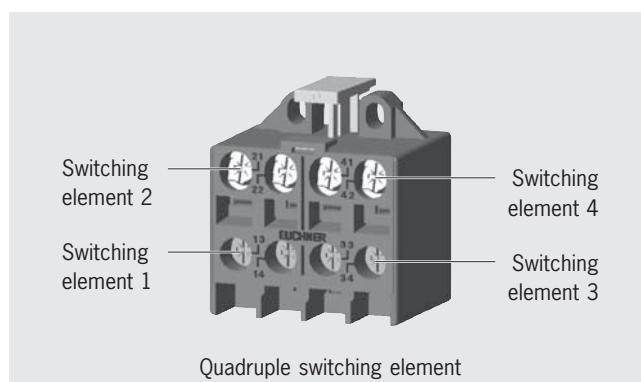
Stop category 0 means that the machine is shutdown by the immediate shutdown of the power.

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 and four contacts for the various switch types. Switching elements can be **slow-action contact elements* or **snap-action contact elements*.



Tampering

Tampering is the conscious disabling or bypassing of **safety guards* and their components. **Safety switches* and other safety device must be designed such that the protective function cannot be changed or bypassed by hand or using one simple action. Simple actions include using:

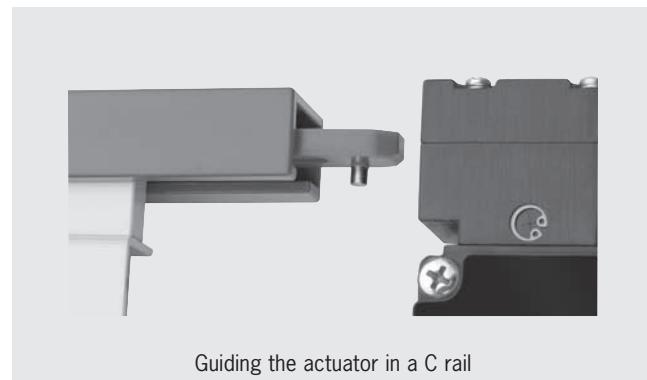
- ▶ Screwdrivers
- ▶ Ball-point pens
- ▶ Nails
- ▶ Pieces of wire
- ▶ Adhesive tape
- ▶ etc.

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 use 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.

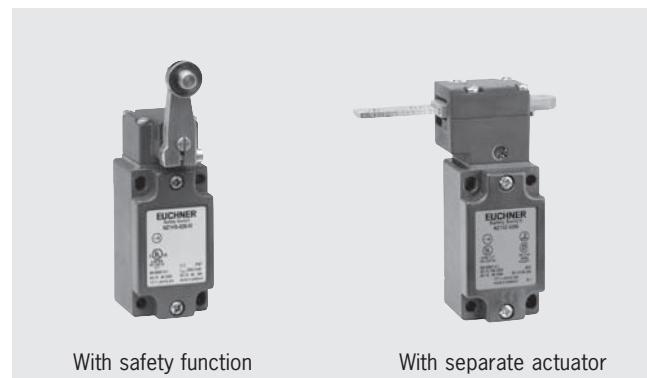


Testing

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*.



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093 861	TZ1RE024SR11-093861	69	098 946	TX3C-A024MC2161	94
093 862	TZ1LE024RC18VAB-093862	70	099 274	STA3A-4131A024M	98
093 863	TZ1RE024RC18VAB-093863	70	099 489	TX1C-A024MC2161	94
094 167	NZ1HS-3131-M-EX	34			
094 169	NZ1RS-3131-M-EX	28			
094 309	Pin crimp contact RCM	113			
094 310	Pin crimp contact RCM-C1825	113			
094 311	TZ1LE110MVAB-C1828	76			
094 312	TZ1RE110MVAB-C1828	76			
094 342	TZ1LE024SR11-094342	74			
094 343	TZ1RE024SR11-094343	74			
094 401	EMP-SA	119			



Overview of Range

Automation



Position Switches

- ▶ Position Switches
- ▶ Position Switches according to EN 50 041

Precision Multiple Limit Switches

Inductive Limit Switches

Plug Connectors

Trip Rails/Trip Dogs

Inductive Ident Systems

Safety



Safety Switches, Metal Housing

- ▶ Safety Switches NZ/TZ
- ▶ Safety Switches NX/TX

Safety Switches, Plastic Housing

- ▶ Safety Switches NM
- ▶ Safety Switches NP/GP/TP
- ▶ Safety Switches STM
- ▶ Safety Switches STP

Non-Contact Safety Switches

- ▶ Non-Contact Safety Switches CES/CEM,
Transponder Coding
- ▶ Non-Contact Safety Switches CMS,
Magnetic Coding

Safety Products with integrated Bus Interface

Bolts for Safety Guards

Enabling Switches

Safety Relays

- ▶ Safety Relays ESM
- ▶ Modular Safety System ESM-F

Rope Pull Switches

ManMachine



Joystick Switches

Electronic Handwheels

Pendant Stations

- ▶ Pendant Stations HBA
- ▶ Pendant Stations HBE/HBL

Electronic-Key-System

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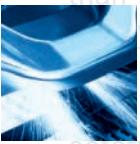
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