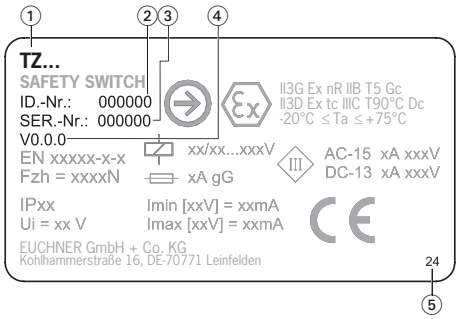
Scope

These operating instructions are valid for all TZ... of version V1.0.X. These operating instructions, the document *Safety information* and any available data sheet form the complete user information for your device.

Important!

Make sure to use the operating instructions valid for your product version. The version numbers can be found on the type label of your product. Please contact the EUCHNER service team if you have any questions.

Safety switch type label



① Item designation
② Item number
③ Serial number
④ Product version
⑤ Year of manufacture

Supplementary documents

The overall documentation for this device consists of the following documents:

Document title (document number)	Contents	
Safety information (2525460)	Basic safety information	
Operating instructions (2088062)	(this document)	
Declaration of conformity	Declaration of conformity	
Any additions to the operating instructions	Take any associated additions to the operating instructions or data sheets into account.	

Important!

Always read all documents to gain a complete overview of safe installation, setup and use of the device. The documents can be downloaded from www.euchner.com. For this purpose, enter the doc. no. or the order number for the device in the search box.

Correct use

Safety switches series TZ are interlocking devices with guard locking solenoid (type 2). The actuator has a low coding level. In combination with a movable guard and the machine control, this safety component prevents the guard from being opened while a dangerous machine function is being performed.

This means:

- Starting commands that cause a dangerous machine function must become active only when the guard is closed and locked.
- Guard locking must not be released until the dangerous machine function has ended.
- In applications for the protection of persons, the position of the guard locking must be monitored by evaluating the contact for solenoid monitoring (ÜK) in the safety circuit.
- Closing and locking a guard must not cause automatic starting of a dangerous machine function. A separate start command must be issued. For exceptions, refer to EN ISO 12100 or relevant C-standards.

Devices from this series are also suitable for process protection.

Before the device is used, a risk assessment must be performed on the machine, e.g. in accordance with the following standards:

- EN ISO 13849-1
- EN ISO 12100
- EN IEC 62061

Correct use includes observing the relevant requirements for installation and operation, particularly based on the following standards:

- EN ISO 13849-1
- EN ISO 14119
- EN IEC 60204-1

Important!

- The user is responsible for the proper integration of the device into a safe overall system. For this purpose, the overall system must be validated, e.g. in accordance with EN ISO 13849-1.
- If the simplified method according to section 6.2.3 of EN ISO 13849-1:2023 is used for determining the Performance Level (PL), the PL might be reduced if several devices are connected in series.
- The logical series connection of safe contacts may limit the achievable Performance Level (PL) in certain circumstances. More information about this is available in EN ISO 14119:2025, section 9.4.
- If a data sheet is included with the product, the information on the data sheet applies in case of discrepancies with the operating instructions.

Safety precautions

⚠ WARNING

Danger to life due to improper installation or due to bypassing (tampering). Safety components fulfill a personnel protection function.

- Safety components must not be bypassed, turned away, removed or otherwise rendered ineffective. On this topic pay attention in particular to the measures for reducing the possibility of bypassing according to EN ISO 14119:2025, section 8.
- The switching operation must be triggered only by actuators designated for this purpose.
- Prevent bypassing by means of replacement actuators. For this purpose, restrict access to actuators and to keys for releases, for example.
- Mounting, electrical connection and setup only by authorized personnel possessing special knowledge about handling safety components.

⚠ CAUTION

Danger due to high housing temperature.

- Protect switch against touching by personnel or contact with flammable material.

Function

The safety switch permits the locking of movable guards.

The switch contains a rotating switching disk and a locking arm that block/release the guard locking pin.

The guard locking pin is moved on the insertion/removal of the actuator and on the activation/release of the guard locking. During this process, the switching contacts are actuated.

If the guard locking pin is blocked (guard locking active), the actuator cannot be pulled out of the switch head. For design reasons, guard locking can be activated only when the guard is closed (prevention of inadvertent locking position (faulty closure protection)).

Position monitoring of the guard and monitoring of interlocking are performed via two separate switching elements.

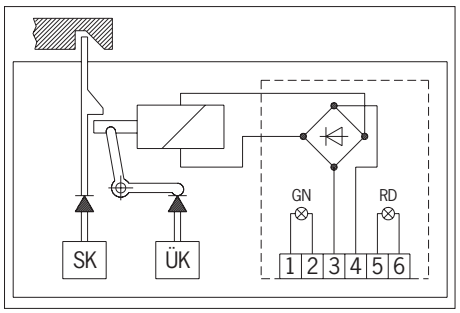


Fig. 1: Function of safety switch TZ

The safety switch is designed so that fault exclusions for internal faults in accordance with EN ISO 13849-2:2013, Table A4, can be assumed.

Guard lock monitoring

All versions feature at least one safe contact for monitoring guard locking. The contacts are opened when guard locking is released.

Door monitoring contact

All versions additionally feature at least one door monitoring contact. Depending on the switching element, the door monitoring contacts can be either positively driven (contacts ⊖) or not positively driven.

The door monitoring contacts are actuated when the guard is opened.

Version TZ1

(guard locking actuated by spring force and released by power-ON)

- Activating guard locking: close guard; no voltage at the solenoid
- Releasing guard locking: apply voltage to the solenoid

The spring-operated guard locking functions in accordance with the closed-circuit current principle. If the voltage is interrupted at the solenoid, guard locking remains active and the guard cannot be opened directly.

If the guard is open when the power supply is interrupted and is then closed, guard locking is activated. This can lead to persons being locked in unintentionally.

Version TZ2

(guard locking actuated by power-ON and released by spring force)

Important!

- Guard locking devices according to the open-circuit current principle are not intended for protecting personnel.
- Use as guard locking for personnel protection is possible only in special cases, after strict assessment of the accident risk (see EN ISO 14119:2025, section 6.6.1).

- Activating guard locking: apply voltage to the solenoid
- Releasing guard locking: disconnect voltage from the solenoid

The magnetically actuated guard locking operates in accordance with the open-circuit current principle. If the voltage is interrupted at the solenoid, the guard locking is released and the guard can be opened directly.

Switching states

The detailed switching states for your switch can be found in Fig. 5. All available switching elements are described there.

Guard open

The safety contacts ⊖ and ⊣ are open.

Guard closed and not locked

The safety contacts ⊖ are closed. The safety contacts ⊣ are open.

Guard closed and locked

The safety contacts ⊖ and ⊣ are closed.

Selection of the actuator

NOTICE

- Damage to the device due to unsuitable actuator. Make sure to select the correct actuator.
- Additionally pay attention to the door radius and the mounting options (see Fig. 10).

Manual release

Some situations require guard locking to be released manually (e.g. malfunctions or an emergency). A function test should be performed after release.

More information on this topic can be found in the standard EN ISO 14119:2025, section 7.2.3. The device can feature the following release functions:

Auxiliary release

In the event of malfunctions, the guard locking can be released with the auxiliary release irrespective of the state of the solenoid.

The contacts ⊣ are opened when the auxiliary release is actuated. A stop command must be generated with these contacts.

Actuating auxiliary release

1. Remove key from sealing wire.
2. Remove the screw plug.
3. Release by turning the key.

➡ Guard locking is released.

Important!

- The actuator must not be under tensile stress during manual release.
- To prevent tampering, the auxiliary release must be sealed before the switch is set up.
- Reset the auxiliary release after use and screw in the screw plug (tightening torque 0.5 Nm).
- Restore the sealing with a new seal.

Auxiliary key release/auxiliary release with triangular wedge

Function as for auxiliary release.

Important!

- The actuator must not be under tensile stress during manual release.

Escape release

This permits opening of a locked guard from the danger area without tools.

Important!

- It must be possible to actuate the escape release manually from inside the protected area without tools.
- It must not be possible to reach the escape release from the outside.
- The actuator must not be under tensile stress during manual release.
- The escape release meets the requirements of Category B according to EN ISO 13849-1.

The contacts ⊣ are opened when the escape release is actuated. A stop command must be generated with these contacts.

Emergency release

This permits opening of a locked guard from outside the danger area without tools.

Important!

- It must be possible to operate the emergency release manually from outside the protected area without tools.
- The emergency release must possess a marking indicating that it may be used only in an emergency.
- The actuator must not be under tensile stress during manual release.
- The release function meets all other requirements from EN ISO 14119.
- The emergency release meets the requirements of Category B according to EN ISO 13849-1.

The contacts ⊣ are opened when the emergency release is actuated. A stop command must be generated with these contacts.

Mounting

NOTICE

Device damage due to improper mounting and unsuitable ambient conditions.

- Safety switches and actuators must not be used as an end stop.
- Observe EN ISO 14119:2025, sections 6.2 and 6.3, for information about mounting the safety switch and the actuator.
- Observe EN ISO 14119:2025, section 8, for information about reducing the possibilities for bypassing an interlocking device.
- Protect the switch head against damage, as well as penetrating foreign objects such as swarf, sand and blasting shot, etc.
- The specified IP degree of protection is applicable only if the housing screws, cable entries and plug connectors are properly tightened. Observe the tightening torques.
- The screw plug of the auxiliary release must be sealed prior to setup.

Changing the actuating direction

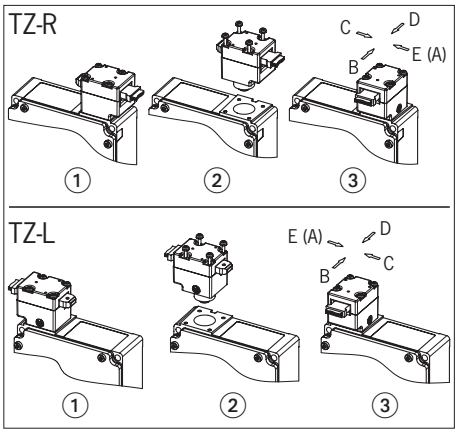


Fig. 2: Changing the actuating direction

1. Insert the actuator into the actuating head.
2. Remove the screws from the actuating head.
3. Set the required direction.
4. Tighten the screws with a torque of 1.2 Nm.

Electrical connection

⚠ WARNING

Loss of the safety function due to incorrect connection.

- Use only safe contacts (⊖ and ⊣) for safety functions.
- When choosing the insulation material and wires for the connections, pay attention to the required temperature resistance and the max. mechanical load.
- Strip the insulation from the ends of the individual wires over a length of $6^{\pm 1}$ mm to ensure a safe contact.

Use of the safety switch as guard locking for personnel protection

At least one contact ⊣ must be used. It signals the guard locking state (for terminal assignment, see Fig. 6 and Fig. 5).

Use of the safety switch as guard locking for process protection

At least one contact ⊖ must be used. Contacts with the ⊣ symbol can also be used (for terminal assignment, see Fig. 6 and Fig. 5).

The following information applies to devices with plug connector:

- Check that the plug connector is sealed.

The following information applies to devices with cable entry:

1. Fit the cable gland with the appropriate degree of protection.
2. Connect and tighten the terminals with 0.5 Nm (for terminal assignment, see Fig. 6 and Fig. 5).
3. Check that the cable entry is sealed.
4. Close the switch cover and screw in place (tightening torque 1.2 Nm).

Function test

⚠ WARNING

Fatal injury due to faults during the function test.

- Before carrying out the function test, make sure that there are no persons in the danger area.
- Observe the valid accident prevention regulations.

Check the device for correct function after installation and after every fault.

Proceed as follows:

Mechanical function test

The actuator must slide easily into the actuating head. Close the guard several times to check the function. The function of any manual releases (except for the auxiliary release) must also be tested.

Electrical function test

1. Switch on operating voltage.
2. Close all guards and activate guard locking.

➡ The machine must not start automatically.

➡ It must not be possible to open the guard.

3. Start the machine function.

➡ It must not be possible to release guard locking as long as the dangerous machine function is active.

4. Stop the machine function and release guard locking.

➡ The guard must remain locked until there is no longer any risk of injury (e.g. due to movements with overtravel).

➡ It must not be possible to start the machine function as long as guard locking is released.

Repeat steps 2 - 4 for each guard.

Inspection and service

⚠ WARNING

Danger of severe injuries due to the loss of the safety function.

- If damage or wear is found, the complete switch and actuator assembly must be replaced. Replacement of individual parts or assemblies is not permitted.
- Check the device for proper function at regular intervals and after every fault. For information about possible time intervals, refer to EN ISO 14119:2025, section 9.2.1.

Inspection of the following is necessary to ensure trouble-free long-term operation:

- Correct switching function
- Secure mounting of all components
- Damage, heavy contamination, dirt and wear
- Sealing of cable entry
- Loose cable connections or plug connectors.

Info: The year of manufacture can be seen in the bottom right corner of the type label.

Exclusion of liability and warranty

In case of failure to comply with the conditions for correct use stated above, or if the safety regulations are not followed, or if any servicing is not performed as required, liability will be excluded and the warranty void.

Notes on UL requirements

The following information applies to devices with cable entry:

This device is intended to be used and applied in accordance with the UL requirements with copper wire for the temperature range 60/75 °C.

The following information applies to devices with plug connector:

This device is intended to be used with a Class 2 power source in accordance with UL1310. Connecting cables for safety switches installed at the place of use must be separated from all moving and permanently installed cables and un-insulated active elements of other parts of the system that operate at a voltage of over 150 V. A constant clearance of 50.8 mm must be maintained. This does not apply if the moving cables are equipped with suitable insulation materials that possess an identical or higher dielectric strength compared to the other relevant parts of the system.

Declaration of conformity

The product complies with the requirements according to

- Machinery Directive 2006/42/EC (until January 19, 2027)
- Machinery Regulation (EU) 2023/1230 (from January 20, 2027)

The EU declaration of conformity can be found at www.euchner.com. Enter the order number of your device in the search box. The document is available under *Downloads*.

Service

If servicing is required, please contact:

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Kohlhammerstraße 16

70771 Leinfelden-Echterdingen

Service telephone:

+49 711 7597-500

E-mail:

support@euchner.de

Internet:

www.euchner.com

Technical data

Parameter	Value
Material	Housing Die-cast alloy
	Contact Silver alloy, gold flashed
Degree of protection	
Cable entry	IP67
Connecting cable	IP65
Plug connector	IP65
Mechanical life	1 x 10^6 operating cycles
Ambient temperature	-25 ... +80 °C
Degree of contamination	3 (industrial)
Installation position	Any
Approach speed	max. 20 m/min
Extraction force (not locked)	30 N
Retention force	10 N
Actuating force	35 N
Actuation frequency	1,200/h
Switching principle	Slow-action switching contact
Connection	
TZ...M	Cable entry M20 x 1.5
TZ..C1527	Connecting cable (7 x 0.75 mm²)
TZ..SEM4-C1888	Plug connectors 2 x M12, 4-pin
TZ...SR6	Plug connector SR6, 6-pin+PE
TZ...SR11	Plug connector SR11, 11-pin+PE
TZ...RC18	Plug connector RC18, 18-pin+PE
TZ...BHA8	Plug connector BHA8, 8-pin
TZ...BHA10	Plug connector BHA10, 10-pin
TZ...BHA12	Plug connector BHA12, 12-pin
Connection cross-section (flexible/rigid)	0.34 ... 1.5 mm²
Rated insulation voltage	
TZ...M, TZ...SR6, TZ...BHA, TZ..SEM4-C1888, TZ..C1527	U_i = 250 V
TZ...SR11, TZ...RC18	U_i = 50 V
TZ..C2189/2198/2199	U_i = 30 V
Rated impulse withstand voltage	
TZ...M, TZ...SR6, TZ...BHA, TZ..C1527	U_{imp} = 2.5 kV
TZ...SR11, TZ...RC18, TZ..SEM4-C1888, TZ..C2189/2198/2199	U_{imp} = 1.5 kV
Conditional short-circuit current	100 A
Switching voltage	min. at 10 mA 12 V
Utilization category	
TZ...M, TZ...SR6, TZ...BHA, TZ..C1527	AC-15 4 A 230 V / DC-13 4 A 24 V
TZ...SR11, TZ...RC18	AC-15 4 A 50 V / DC-13 4 A 24 V
TZ..SEM4-C1888	AC-15 3 A 230 V / DC-13 3 A 24 V
TZ..C2189/2198/2199	DC-13 1 A 24 V
Switching current	min. at 24 V 1 mA
Short circuit protection (control circuit fuse)	
TZ...M, TZ...SR6, TZ...SR11, TZ...RC18, TZ...BHA, TZ..C1527	4 A gG
TZ..SEM4-C1888	3 A gG
TZ..C2189/2198/2199	1 A gG
Thermal rated current I_{th}	
TZ...M, TZ...SR6, TZ...SR11, TZ...RC18, TZ...BHA, TZ..C1527	4 A
TZ..SEM4-C1888	3 A
TZ..C2189/2198/2199	1 A
Solenoid operating voltage/solenoid power consumption	
TZ...024	AC/DC 24 V (+10%/-15%) 10 W
TZ...110	AC 110 V (+10%/-15%) 10 W
TZ...230	AC 230 V (+10%/-15%) 10 W
Duty cycle	100%

Locking force	F_{max}	F_{Zh}
ACTUATOR Z-G..., HINGED ACTUATOR Z-...	2,000 N	1,500 N

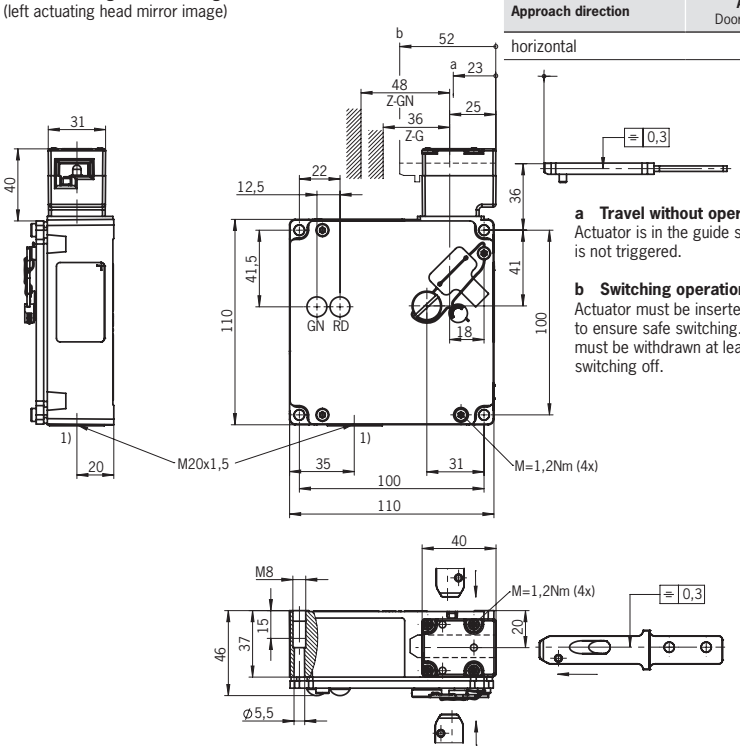
Limitations at ambient temperature above +70 ... +80 °C	
Utilization category	
TZ...M, TZ...SR6, TZ...BHA, TZ..C1527	AC-15 2 A 230 V / DC-13 2 A 24 V
TZ...SR11, TZ...RC18	AC-15 2 A 50 V / DC-13 2 A 24 V
TZ..SEM4-C1888	AC-15 2 A 230 V /x DC-13 2 A 24 V
TZ..C2189/2198/2199	DC-13 1 A 24 V

Parameter	Value
Short circuit protection (control circuit fuse)	
TZ...M, TZ...SR6, TZ...SR11, TZ...RC18, TZ...BHA, TZ..C1527	2 A gG
TZ..SEM4-C1888	2 A gG
TZ..C2189/2198/2199	1 A gG
Thermal rated current I_{th}	
TZ...M, TZ...SR6, TZ...SR11, TZ...RC18, TZ...BHA, TZ..C1527	2 A
TZ..SEM4-C1888	2 A
TZ..C2189/2198/2199	1 A
Characteristics acc. to EN ISO 13849-1	
Monitoring of the guard position	
Important: Values valid at DC-13 100 mA/24 V	
$B10_D$	3 x 10^6
Mission time	20 y
Guard lock monitoring	
Important: Values valid at DC-13 100 mA/24 V	
$B10_D$	3 x 10^6
Mission time	20 y
Control of guard locking	
PL	Depending on external control of guard locking
Maximum SIL	
Category	
Mission time	20 y

Illustration:
TZ.R.. Actuating head on the right
(left actuating head mirror image)

Necessary minimum travel b + perm. overtravel

Approach direction	Actuator Z-G Door with normal play	Actuator Z-GN Door with large play
horizontal	52 + 4	52 + 16



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

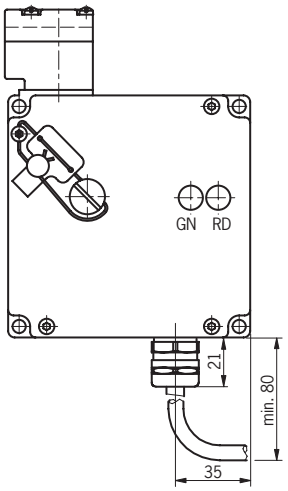
b Switching operation completed:
Actuator must be inserted to this point to ensure safe switching. The actuator must be withdrawn at least to point **a** for switching off.

1)

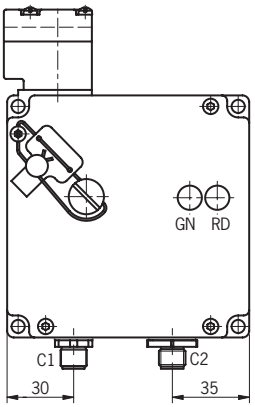
TZ...	Version
C2087	Plug
C2256, C2372, C2472	Screw plug M20x1.5

Key to symbols	
	Guard locking ready for operation
	Guard locking released

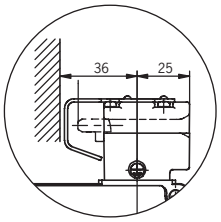
TZ...C1527 with connecting cable



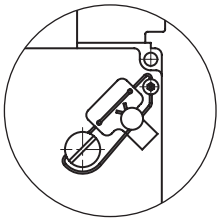
TZ...C1888 with plug connectors 2 x M12



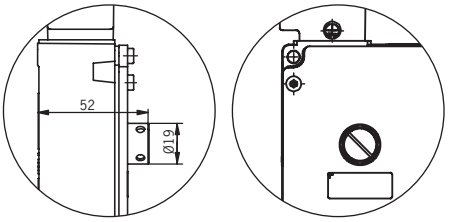
With protective plate



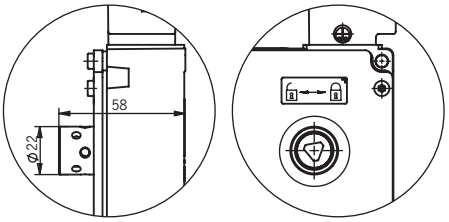
Auxiliary release



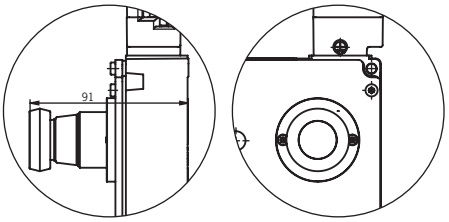
Manual release



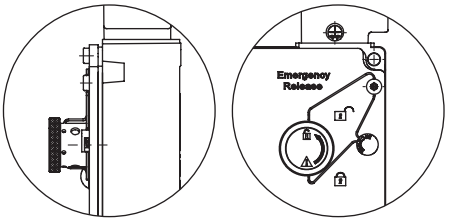
Auxiliary release with triangular wedge
(2 triangular keys included)



Emergency release with pushbutton

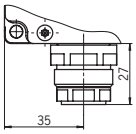


Emergency release

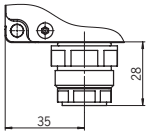


With plug connector

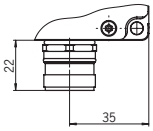
TZ...SR6



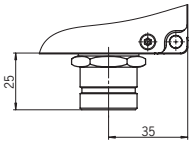
TZ...SR11



TZ...RC18



TZ...BHA8



TZ...BHA10 / TZ...BHA12

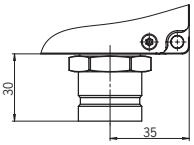
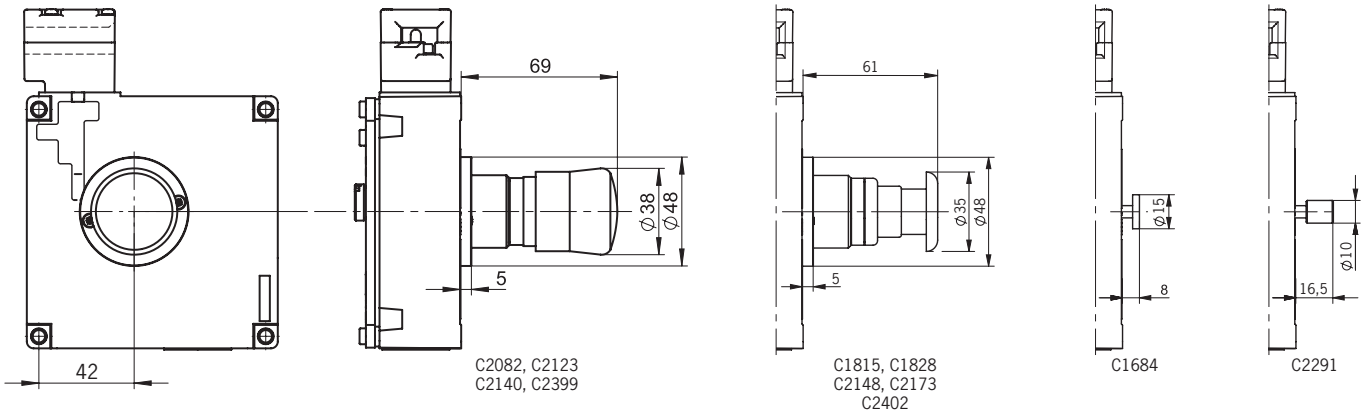
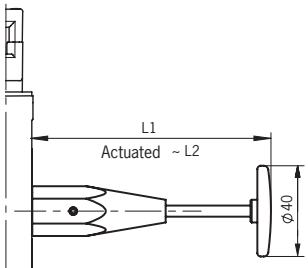


Fig. 3: Dimension drawing for TZ...

Illustration: TZ.L.. Left actuating head (right actuating head mirror image)

With escape release





Length of escape release

Type	L1	L2
TZ...C2381	75	69
TZ...C2372	106	100

Fig. 4: Dimension drawings for escape releases

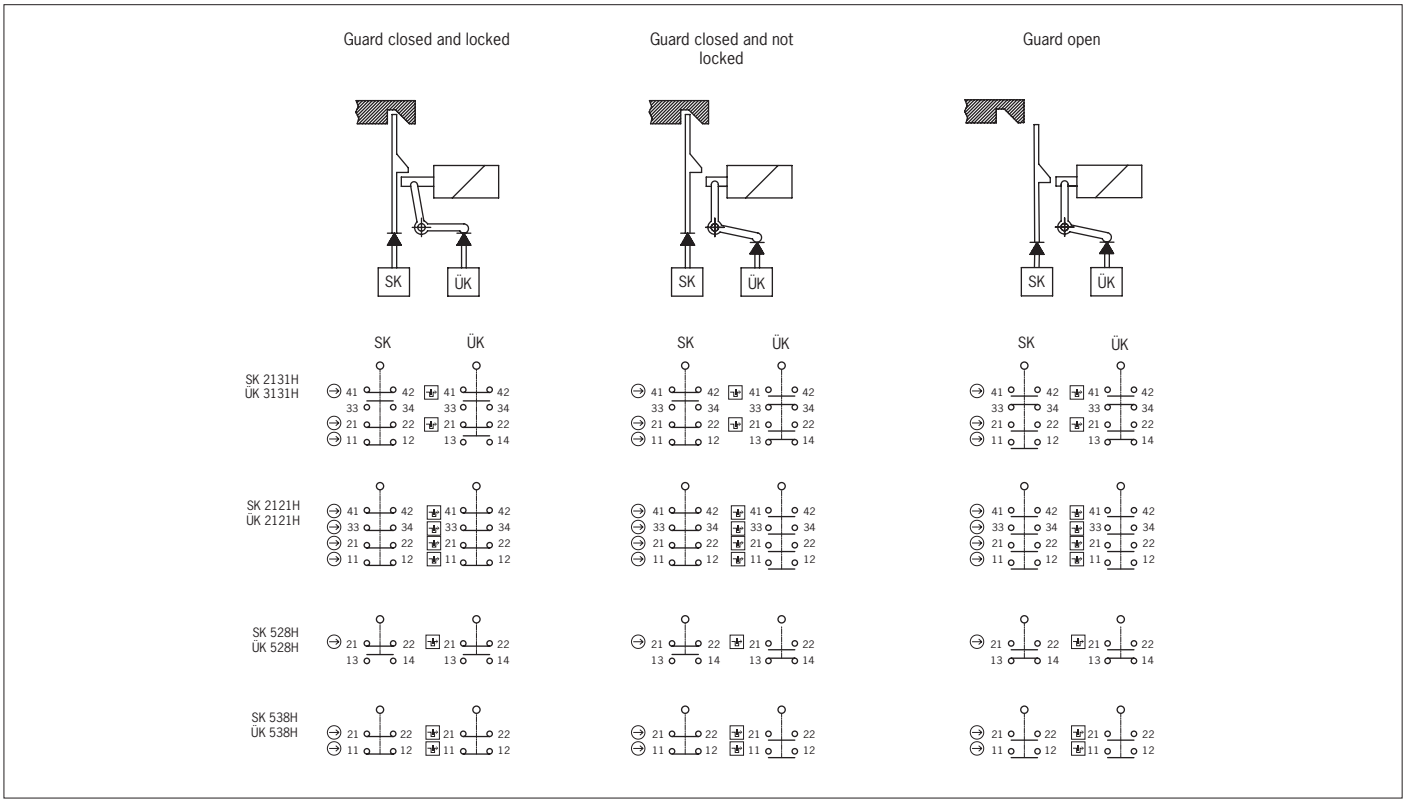
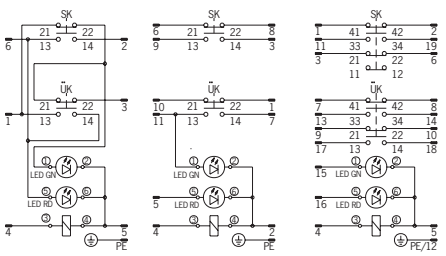


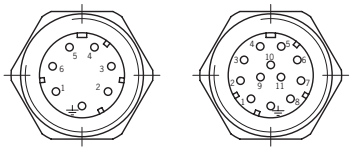
Fig. 5: Switching elements and switching functions

Illustration: guard closed, actuator locked

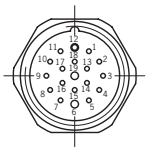
TZ..SR6 **TZ..SR11** **TZ..RC18**



TZ..SR6 **TZ..SR11**

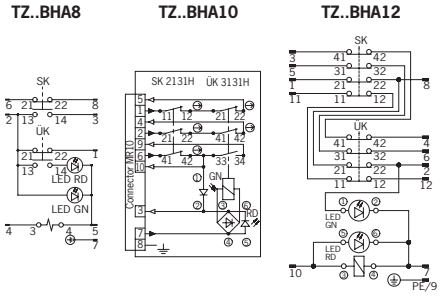


TZ..RC18

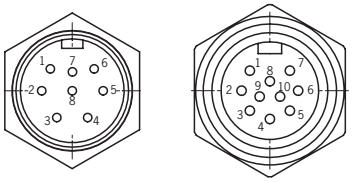


View of connection side on the safety switch

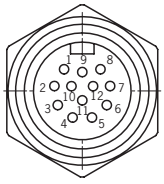
TZ..BHA8 **TZ..BHA10** **TZ..BHA12**



TZ..BHA8 **TZ..BHA10**

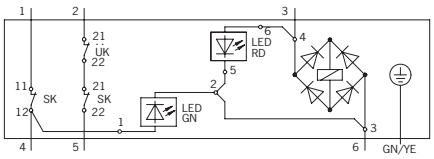


TZ..BHA12

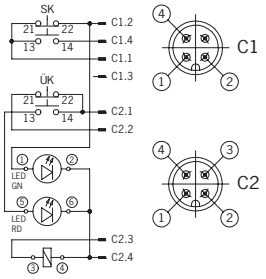


View of connection side on the safety switch

TZ..C1527
(with connecting cable)

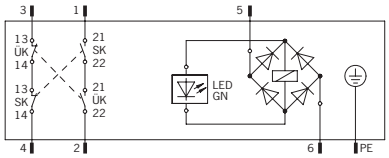


TZ..SEM4-C1888
(with plug connectors 2 x M12 according to DESINA)

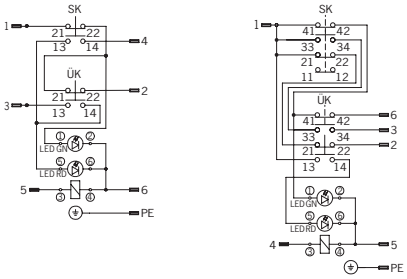


View of connection side on the safety switch

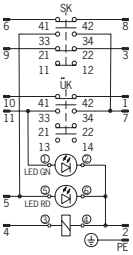
TZ...045177/045181/048492
(with plug connector SR6)



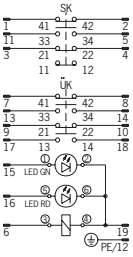
TZ..SR6...C1677 **TZ..SR6...C1847**



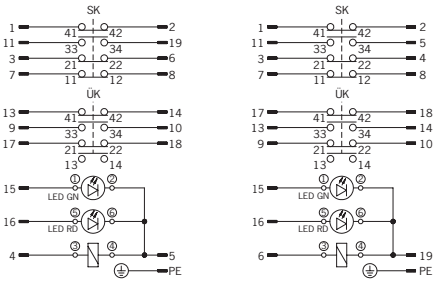
TZ..SR11...C1933



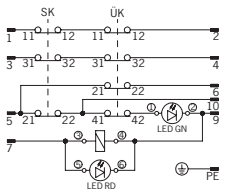
TZ..RC18...C1823/C1826/C1828/C1937/
C2123/C2140/C2173



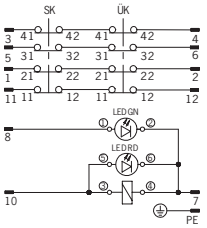
TZ..RC18...C2070 **TZ..RC18...C2163**



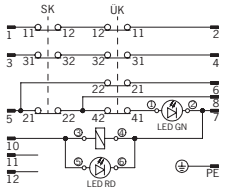
TZ..BHA...C1903/C2148/C2399
(with plug connector BHA12)



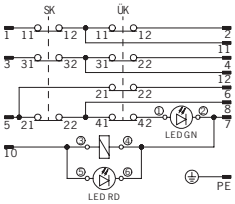
TZ..BHA...RC2408
(with plug connector BHA12)



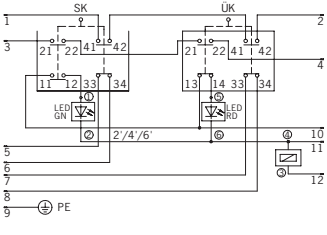
TZ..BHA...RC1924
(with plug connector BHA12)



TZ..BHA...C1902
(with plug connector BHA12)



TZ..BHA...C1781
(with plug connector BHA12)



TZ..VABL12C-MF
(with plug connector BHA12)

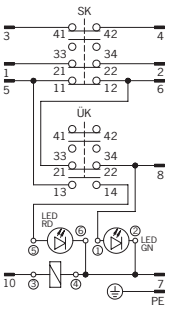


Fig. 6: Connector assignments

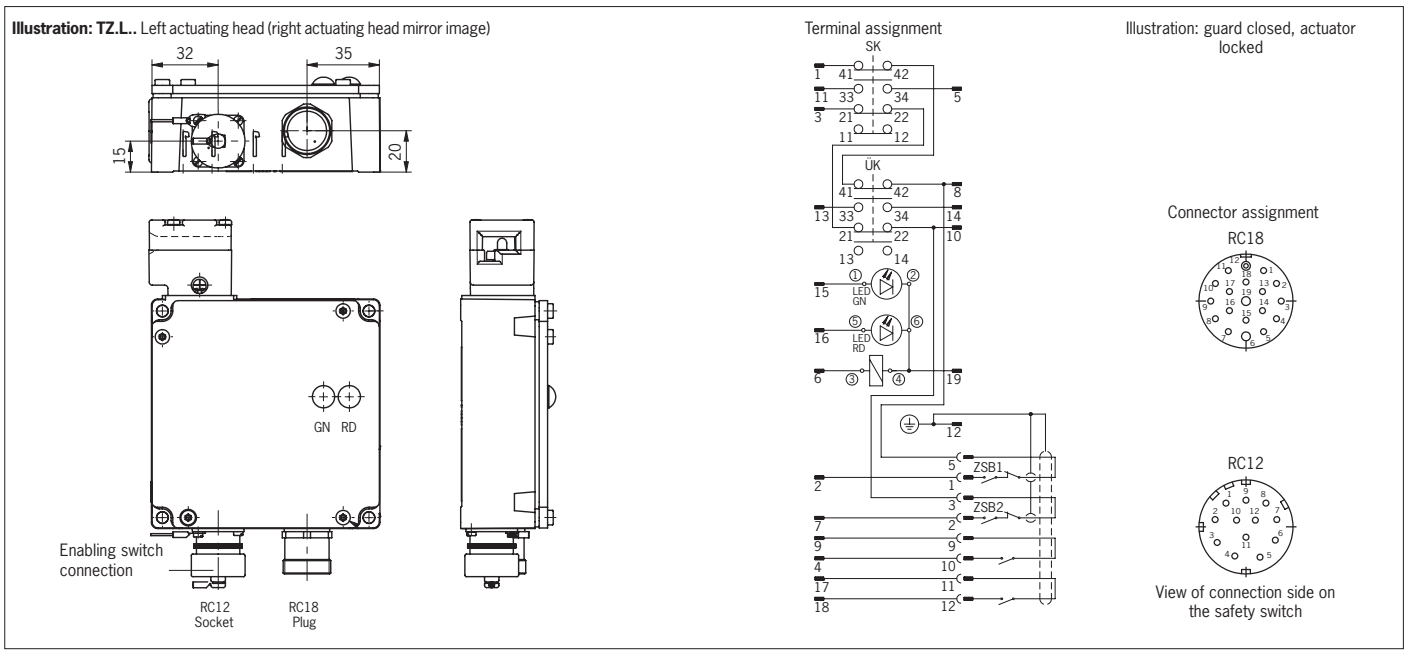


Fig. 7: TZ..VAB-C1803 with enabling switch connection

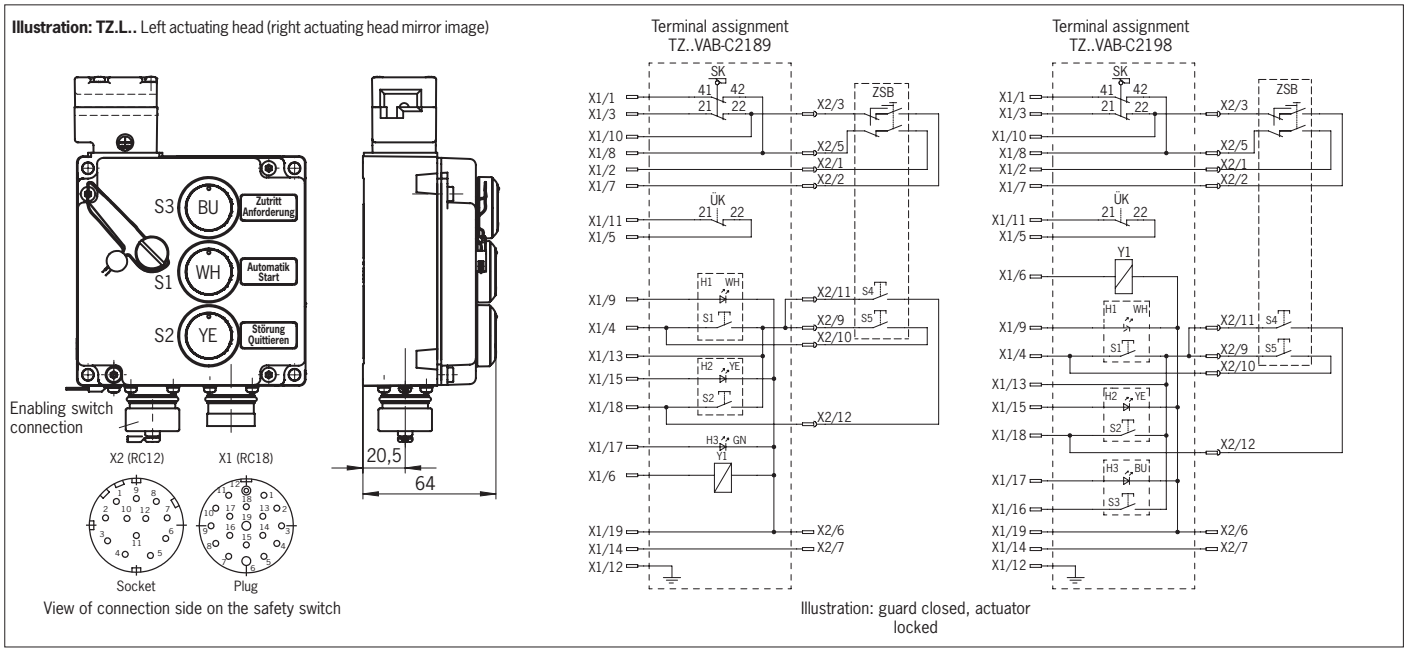


Fig. 8: TZ..VAB-C2189/2198 with lamps/illuminated pushbuttons and enabling switch connection

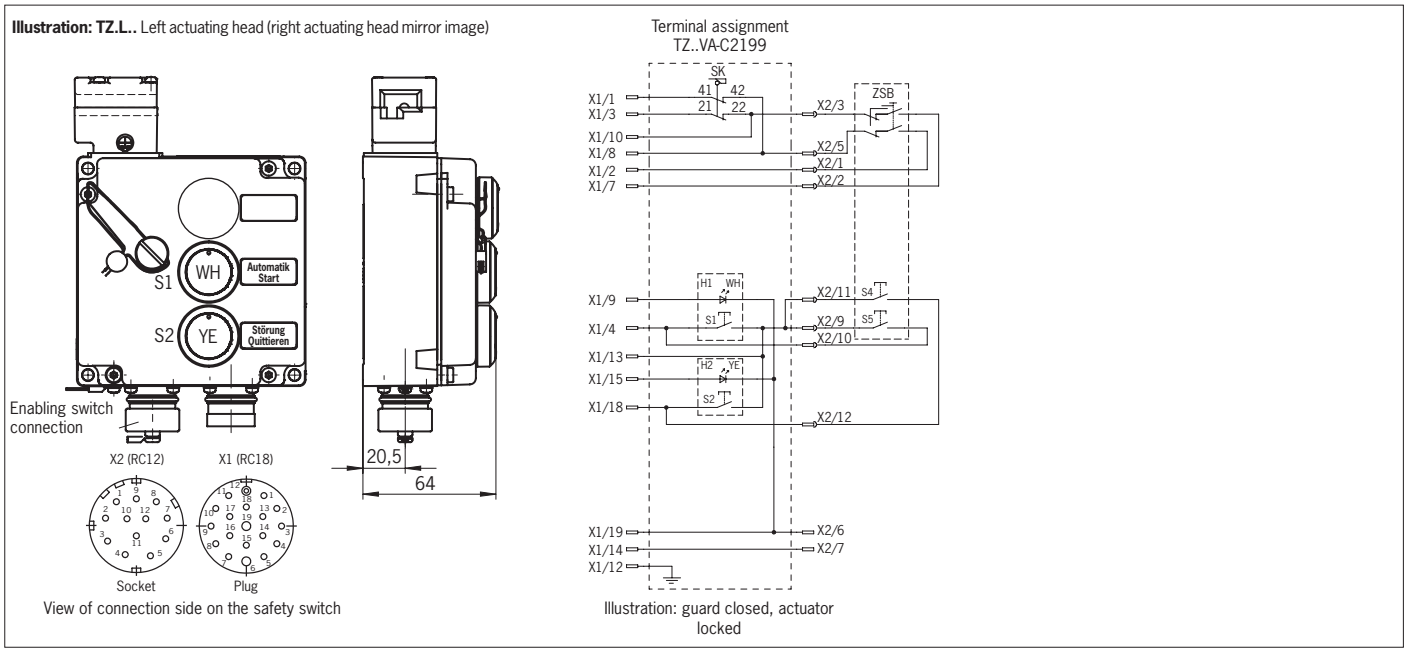
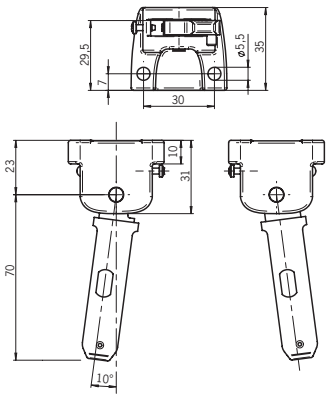


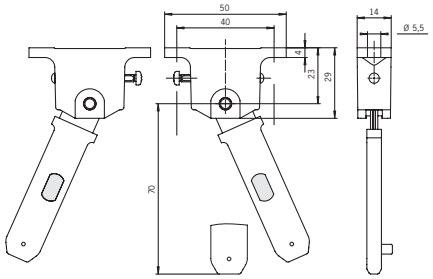
Fig. 9: TZ..VA-C2199 with illuminated pushbuttons and enabling switch connection

Hinged actuator Z-L / Z-R



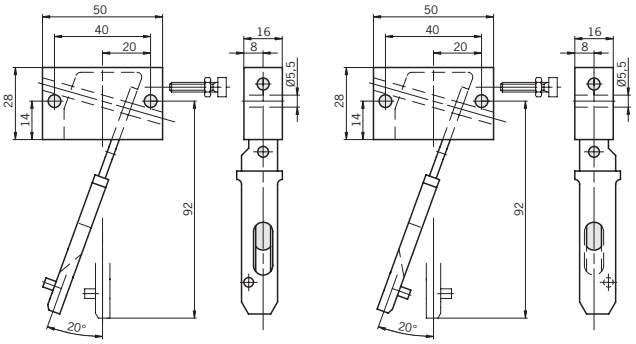
Z-L Z-R

Hinged actuator Z-L-C2194 / Z-R-C2194



Z-L Z-R

Hinged actuator Z-U / Z-O



Z-U Z-O

Actuator	Door radius, min. [mm]
Actuator Z-G...	1,000
Hinged actuator Z-R	200
Hinged actuator Z-L	200
Hinged actuator Z-.-C2194	200
Hinged actuator Z-U	165
Hinged actuator Z-O	165

Fig. 10: Minimum door radii