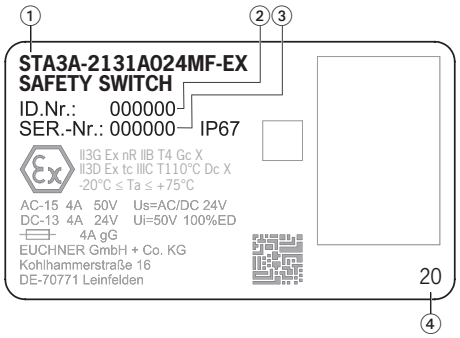
Scope

These operating instructions are valid for all STA...EX. 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 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 (2115582)	(this document)	www
Declaration of conformity	Declaration of conformity	www
Any additions to the operating instructions	Take any associated additions to the operating instructions or data sheets into account.	www

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 STA 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.
- 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 14119
- EN IEC 60204-1
- EN ISO 1127-1

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
- EN ISO 1127-1
- EN IEC 60079-14

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 at ambient temperatures above 40 °C.

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

Function

The safety switch permits the locking of movable guards.

In the switch head, there is a rotating cam that is blocked/released by 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 cam 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)).

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

Versions STA3 and STA4 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 STA3

(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 STA4

(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. 3. All available switching elements are described there.

Guard open

STA3 and STA4:
The safety contacts ⊖ and ⊣↑ are open.

Guard closed and not locked

STA3 and STA4:
The safety contacts ⊖ are closed. The safety contacts ⊣↑ are open.

Guard closed and locked

STA3 and STA4:
The safety contacts ⊖ and ⊣↑ are closed.

Explosion protection safety concept

Important!

In order to achieve the explosion protection stated, all the conditions in the operating instructions must be met. HIGH RISK product.

II3G Ex nR IIB T4 Gc X
II3D Ex tc IIIC T110°C Dc X

...Gc X = There is no test port.

...Dc X = To prevent electrostatic charging, do not subject the switch to any processes that generate a large amount of charge.

Safety switches with ATEX identification marking from EUCHNER are not safety devices as defined by the ATEX Directive.

The following components must be grounded:

- Switch/protective plate
- Actuator
- Lockout bar

Actuators with rubber bushes must not be used.

It is essential the protective plate (conductive ESD protective paint) is mounted as shock protection.

Within the stipulated operating temperature, it is not to be expected that the explosive atmosphere will be drawn into the housing.

Explosion protection when using bolt BTM-UNIP-S-TH

Only the bolt BTM-UNIP-S-TH-00-X-159951 may be used as the optional bolt. Bolts with escape release must not be used.

The bolt achieves the same explosion protection as the safety switch STA-...-EX used in the combination.

Bolts are not subject to mandatory rating according to the ATEX Directive and ATEX standards. The bolt BTM-UNIP-S-TH-00-X-159951 has no ATEX rating. However, the specifications of the ATEX Directive and ATEX standards apply to bolts as well.

- The bolt slide and switch bracket must be grounded. The bolt slide must be fastened on a grounded base material for this purpose.
- The switch bracket must either be fastened on a grounded base material or mounted on the switch using M5 x 40 fixing screws.
- In either case, the grounding terminal must be connected to the protective plate of the switch.
- Mechanical collisions must be avoided to prevent sparking. For this purpose, the door must be checked periodically for misalignment and must be realigned if necessary.
- In order to avoid sparking due to mechanically generated sparks and friction, all movements at the bolt must be performed at a maximum speed of 1 m/s.
- The energy must not exceed 20 J when the bolt tongue is actuated.
- To prevent electrostatic charging, do not subject the bolt to any processes that generate a large amount of charge.

Selection of the actuator

NOTICE

Damage to the device due to unsuitable actuator.

- Make sure to select the correct actuator (see table in Fig. 2).
- Additionally pay attention to the door radius and the mounting options (see Fig. 4).
- Actuators with rubber bushes must not be used.

The following versions are available:

- Actuator S...-SN for safety switches without insertion funnel.
- Actuator S...-LN for safety switches with insertion funnel.

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. Unscrew locking screw.
2. Using a screwdriver, turn the auxiliary release to in the direction of the arrow.

➡ 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 (with sealing lacquer, for example) before the switch is set up.
- The locking screw must be screwed back in and sealed (with sealing lacquer, for example) after mounting and after every use of the auxiliary release. Tightening torque 0.5 Nm.

Mounting

⚠ WARNING

Danger of explosion due to improper mounting and use.

- Do not operate the switch in an atmosphere containing combustible gases, such as:
  - Carbon disulfide
  - Carbon monoxide
  - Ethylene oxide
- Protection of the switch and actuator against material deposits.
- Protection against mechanical effects on the switch:
  - To achieve the indicated explosion protection, it is essential the protective plate supplied is mounted (ESD protective paint).
  - Mount the switch so that the rear side is completely covered (no shock protection).
- Actuators with rubber bushes must not be used.
- An energy of 500 J must not be exceeded during insertion of the actuator. Observe the max. approach speed (see technical data) and the weight of the guard.

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 locking screw of the auxiliary release must be sealed prior to setup (with sealing lacquer, for example).

Changing the actuating direction

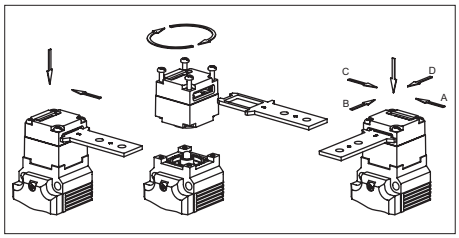


Fig. 1: Changing the actuating direction

1. Remove the screws from the actuating head.
2. Set the required direction.
3. Tighten the screws with a torque of 1.5 Nm.
4. Cover the unused actuating slot with the enclosed slot cover.

Electrical connection

⚠ WARNING

Danger of explosion due to improper connection.

- Please observe the following notes to avoid electrostatic charging:
  - All exposed ground connections must have a conductor cross-section of 4 mm².
  - The following components must be grounded:
    - Switch/protective plate
    - Actuator
    - Lockout bar
- Seal unused cable entries using enclosed screw plugs and tighten to 2 Nm. Screw plugs are not allowed to be greased.
- In order to achieve the indicated explosion protection, the supplied ATEX cable gland must be used. Observe the permissible cable diameter (7 ... 13 mm)!
  - The ATEX cable gland is approved only for hard-wired cables and wires. The installer must provide adequate strain relief.
  - Protection against loosening is to be provided with a locking nut or a suitable locking compound. As the tightening torques depend on the cables and wires used, the user must define the torque. The ATEX cable gland and the domed nut must be tightened firmly. Inadequate tightening or excessive tightening of the connection thread or the domed nut can degrade the discharge type, the sealing or the strain relief.
- The connecting cable must be laid so that it is protected against mechanical damage.

⚠ 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. 3).

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. 3).

The following information applies to devices with cable entry:

1. Fit the supplied ATEX cable gland (M20 x 1.5). Pay attention to the clamping range!
2. Connect and tighten terminals with 0.5 Nm (for terminal assignment, see Fig. 3).
3. Check that the cable entry is sealed.
4. Close the switch cover and fit the protective plate (tightening torque 1.5 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.
- Do not open, service or repair in an area in which an explosive atmosphere may be present.
- Switches and actuators must be regularly freed of deposits and cleaned.
- Avoid electrostatic charging – clean only with a damp cloth.

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.

Declaration of conformity

The product complies with the requirements according to

- Machinery Directive 2006/42/EC
- 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:

EUCHNER GmbH + Co. KG
Kohlhammerstraße 16
70771 Leinfelden-Echterdingen
Germany

Service telephone:
+49 711 7597-500

E-mail:
support@euchner.de

Internet:
www.euchner.com

Technical data

Parameter	Value	
Housing material	Die-cast alloy	
Degree of protection	IP67	
Mechanical life	$1x10^6$ operating cycles	
Ambient temperature	-20 ... +75 °C	
Degree of contamination	3 (industrial)	
Installation position	Any	
Approach speed, max.	20 m/min	
Extraction force (not locked)	30 N	
Retention force	20 N	
Actuating force, max.	35 N	
Actuation frequency	1,200/h	
Switching principle	Slow-action switching contact	
Contact material	Silver alloy, gold flashed	
Connection	Cable entry M20x1.5 (ATEX cable gland included)	
Clamping range for the cable gland	7 ... 13 mm	
Connection cross-section (flexible/rigid)	0.34 ... 1.5 mm^2	
Rated insulation voltage	U_i = 50 V	
Rated impulse withstand voltage	U_{imp} = 2.5 kV	
Conditional short-circuit current	100 A	
Switching voltage, min., at 10 mA	12 V	
Utilization category	AC-15 4 A 50 V DC-13 4 A 24 V	
Switching current, min., at 24 V	1 mA	
Short circuit protection (control circuit fuse)	4 A gG	
Convent. thermal current I_{th}	4 A	
Solenoid operating voltage/solenoid power consumption		
STA...024	AC/DC 24 V (+10%/-15%) 8 W	
Duty cycle	100%	
Locking force	F_{max}	F_{Zh}
ACTUATOR S-G-..., HINGED ACTUATOR S-...	3,000 N	2,300 N
ACTUATOR S-WQ-...	2,000 N	1,500 N
ACTUATOR S-W-...	1,500 N	1,100 N
Characteristics acc. to EN ISO 13849-1		
Monitoring of guard locking and the guard position		
B_{10D} at DC-13 100 mA/24 V	11.5×10^6	
ATEX rating		
II3G Ex nR IIB T4 Gc X II3D Ex tc IIIC T110°C Dc X		

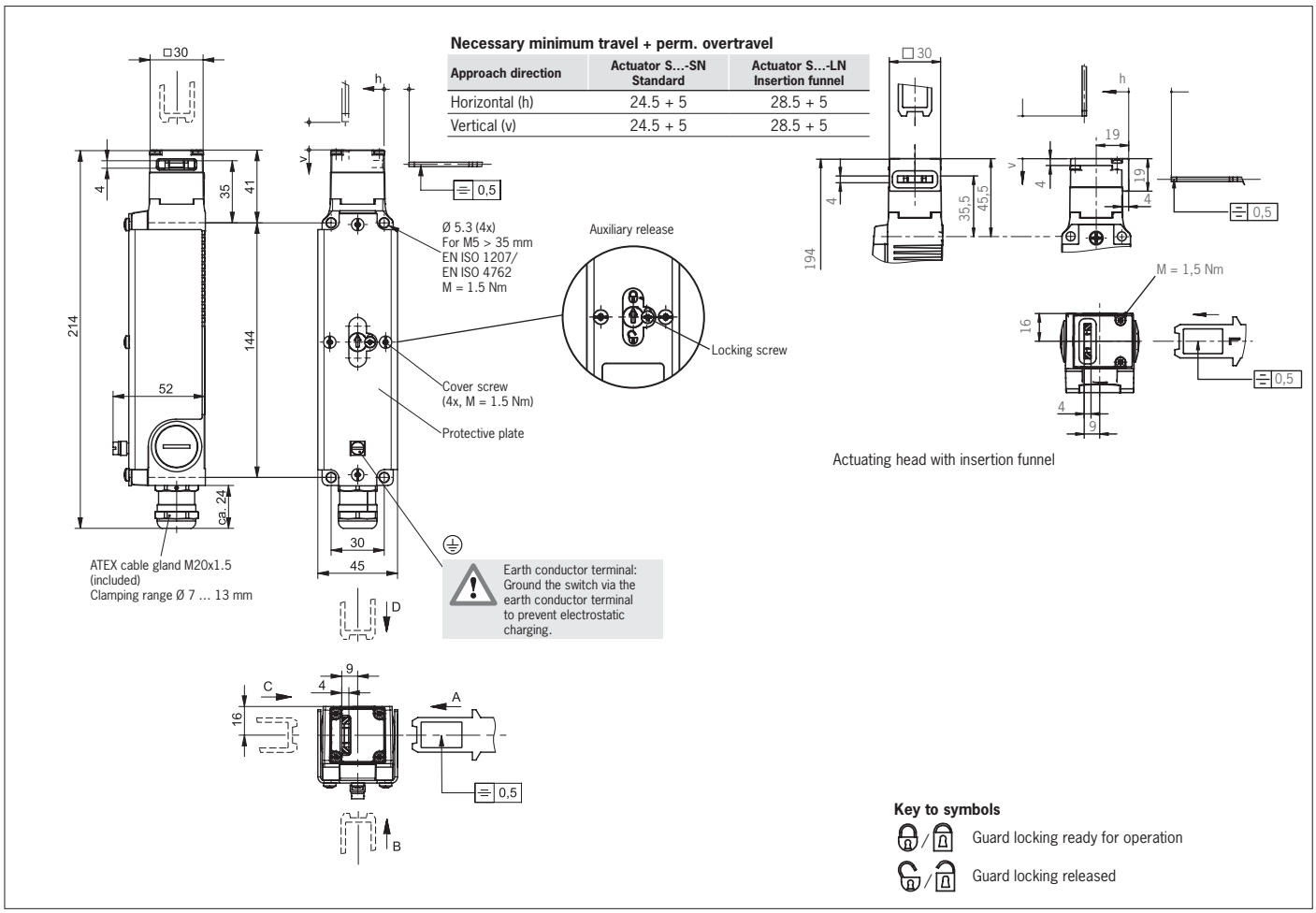


Fig. 2: Dimension drawing for STA... without insertion funnel and STA... with insertion funnel

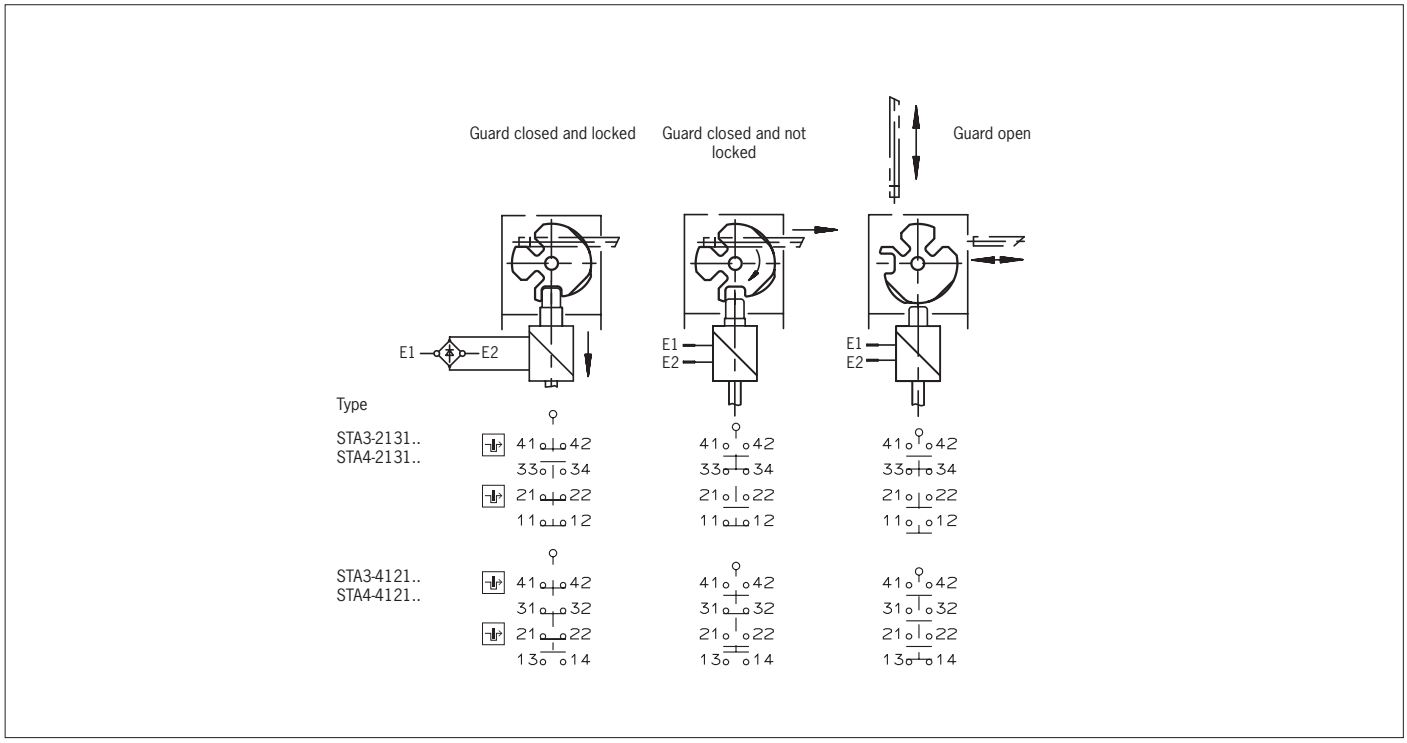
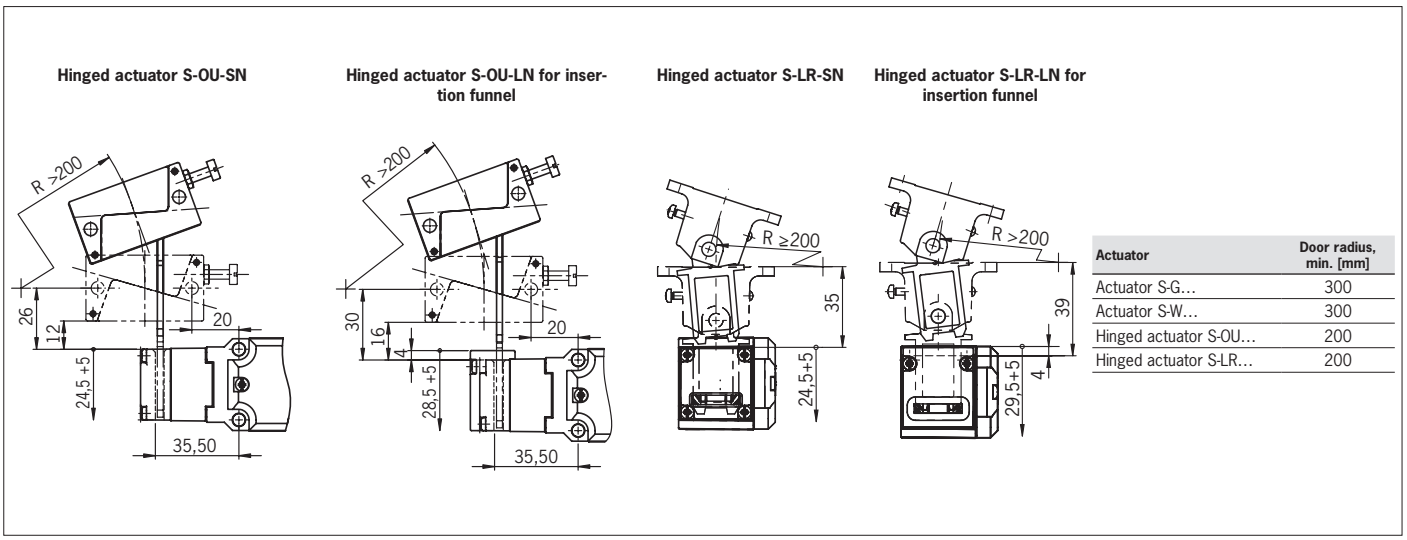


Fig. 3: Switching elements and switching functions



Actuator	Door radius, min. [mm]
Actuator S-G...	300
Actuator S-W...	300
Hinged actuator S-OU...	200
Hinged actuator S-LR...	200

Fig. 4: Minimum door radii