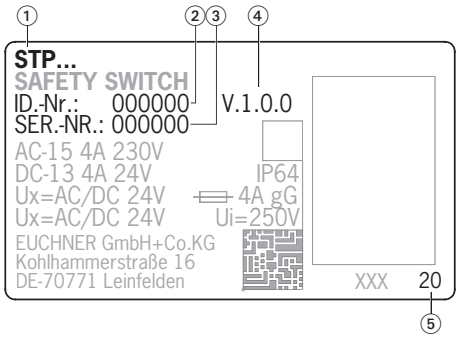
Scope

These operating instructions are valid for all STP-BI... from version V1.0.X to version V1.2.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 (2100209)	(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 STP-BI 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 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.

The STP-BI has an additional function intended to prevent

- persons from unintentionally locking themselves inside if the safety door is open in case of a power failure or if the machine is switched off
- the deactivation of the activated guard locking in case of a power failure.

Important!

This additional function is not a safety function!

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 activated 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.

Description of the safety function

Devices from this series feature the following safety functions:

Monitoring of guard locking and the position of the guard (interlocking device with guard locking according to EN ISO 14119)

- Safety function (see Function chapter):
  - The guard lock monitoring switching contacts are open when guard locking is released (monitoring of the locking element).
  - The safety contacts are open when the guard is open.
  - Guard locking can be activated only when the actuator is located in the switch head (prevention of inadvertent locking position (faulty closure protection)).
- Safety characteristics: B_{10D} (see Technical data chapter).

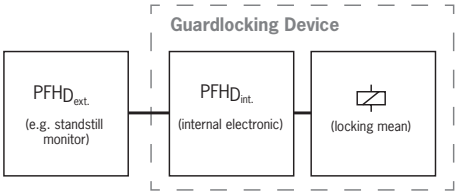
Control of guard locking

(applies only to guard locking devices according to the closed-circuit current principle)

- Safety function

  If the device is used as guard locking for personnel protection, control of guard locking must be regarded as a safety function.

  The safety level of guard locking control is determined by the device ($PFH_{D_{int.}}$) and by the external control (e.g. $PFH_{D_{ext.}}$ of the standstill monitor).



- Safety characteristics: category, Performance Level, PFH_D (see Technical data chapter).

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.

The switch has – in addition to mechanical guard locking – a fixing device for the guard locking pin. The guard locking pin is held in its current position if the operating voltage is not present. The guard locking pin can be moved only by applying the operating voltage.

In case of interruption of the power supply (operating voltage + control voltage) for the switch or if the machine is switched off for servicing, for example, the guard locking pin is held in its last position. As a result, the safety door is either permanently locked or it can be closed and opened as required without the guard locking pin locking.

Position monitoring of the guard and guard lock monitoring are performed via the same switching element.

Guard lock monitoring

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

Control of guard locking

The safety contacts are opened if the guard locking control electronics should fail.

Safety characteristics: see Technical data.

Door monitoring contact

Versions STP3 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 STP3-BI

(guard locking actuated by control voltage OFF and released by control voltage ON)

- Activating guard locking: close the guard, apply operating voltage
- Releasing guard locking: apply operating and control voltage

Switching states

The detailed switching states for your switch can be found in Fig. 2. All available switching elements are described there.

Guard open

STP3-BI:
The safety contacts ⊖ and ⊣↱ are open.

Guard closed and not locked

STP3-BI:
The safety contacts ⊖ are closed. The safety contacts ⊣↱ are open.

Guard closed and locked

STP3-BI:
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 (see table in Fig. 4).
- Additionally pay attention to the door radius and the mounting options (see Fig. 3).

The following versions are available:

- Actuator S for safety switches without insertion funnel.
- Actuator L 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.

Further 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.

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.

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

Changing the actuating direction

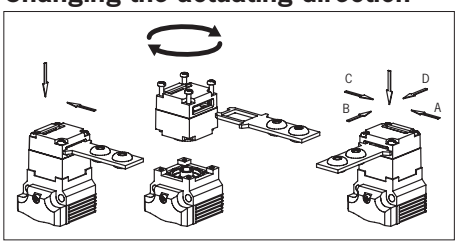


Fig. 1: Changing the actuating direction

1. Remove the screws from the actuating head.
2. Set the required direction.
3. Tighten the screws with a torque of 0.8 Nm.
4. Cover the unused actuating slot with the enclosed slot cover.

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. 2).

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. 2).

The following information applies to devices with plug connector:

- Check that the plug connector is sealed.

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.

Bi-state function test

1. Switch on operating voltage and close the guard.
2. Switch off operating voltage.

➡ It must not be possible to open the guard.

3. Switch on operating voltage.
4. Deactivate guard locking (switch on control voltage) and open the guard.
5. Switch off operating voltage.

➡ It must be possible to close and open the guard as required.

Repeat the function test individually 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 about UL

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
- 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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70771 Leinfelden-Echterdingen
Germany

Service telephone:
+49 711 7597-500

E-mail:
support@euchner.de

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www.euchner.com

Technical data

Parameter	Value	
Housing material	Reinforced thermoplastic	
Degree of protection	IP65	
Mechanical life	1 x 10^6 operating cycles	
Ambient temperature	-20 ... +55 °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	Plug connector SR11, 11-pin+PE (PE not connected)	
Rated insulation voltage	U_i = 50 V	
Rated impulse withstand voltage	U_{imp} = 1.5 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	
Operating voltage	DC	24 V (+10%/-15%)
Control voltage	DC	24 V (+10%/-15%)
Solenoid power consumption	8 W	
Duty cycle	100%	
Locking force	F_{max}	F_{Zh}
ACTUATOR S-G..., HINGED ACTUATOR S-...	2,500 N	2,000 N
ACTUATOR S-WQ-...	2,000 N	1,500 N
ACTUATOR S-W-...	1,500 N	1,100 N
ACTUATOR S-WT-..., ACTUATOR S-WQT-...	1,000 N	700 N
Switch with increased retention force STP.B..., STP.C...		
Actuating force at 20 °C	45 N	
Mechanical life, retention	1 x 10^5 operating cycles	
Characteristics acc. to EN ISO 13849-1		
Monitoring of guard locking and the guard position		
B_{10D} at DC-13 100 mA / 24 V	3 x 10^6	
Control of guard locking (applies only to guard locking devices according to the closed-circuit current principle)		
PFH	4.23 x 10^{-6}	
Category	B	
Performance Level PL	b	

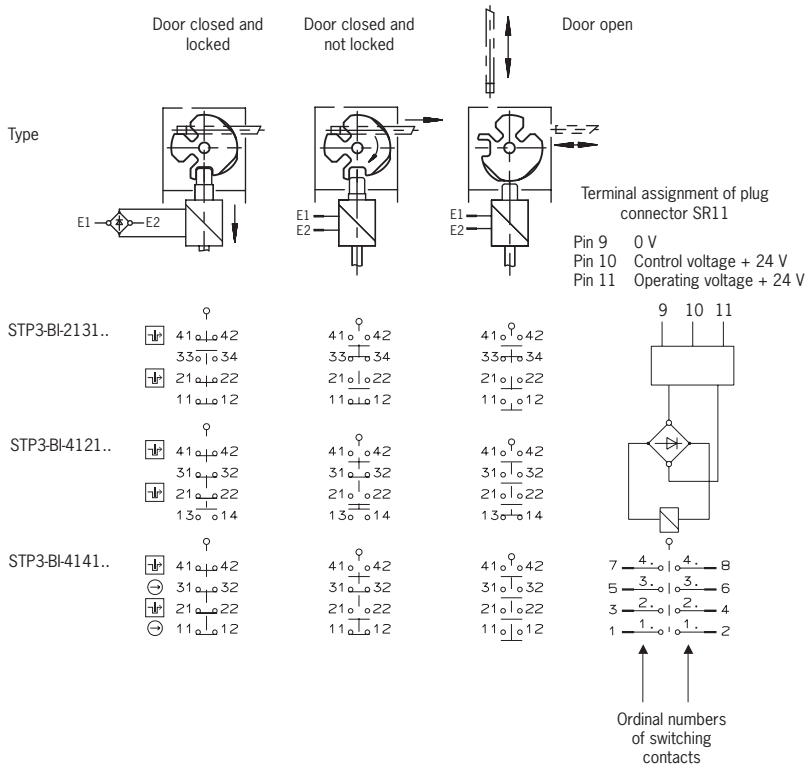
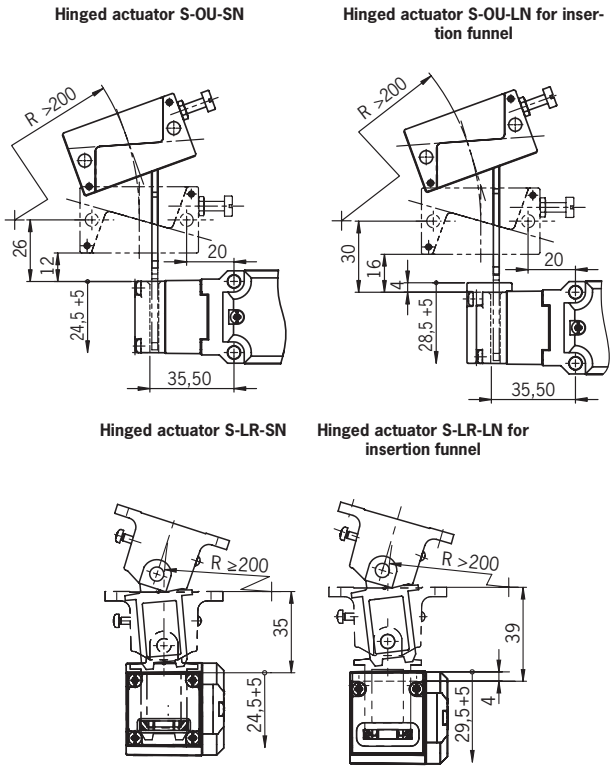


Fig. 2: Switching elements and switching functions

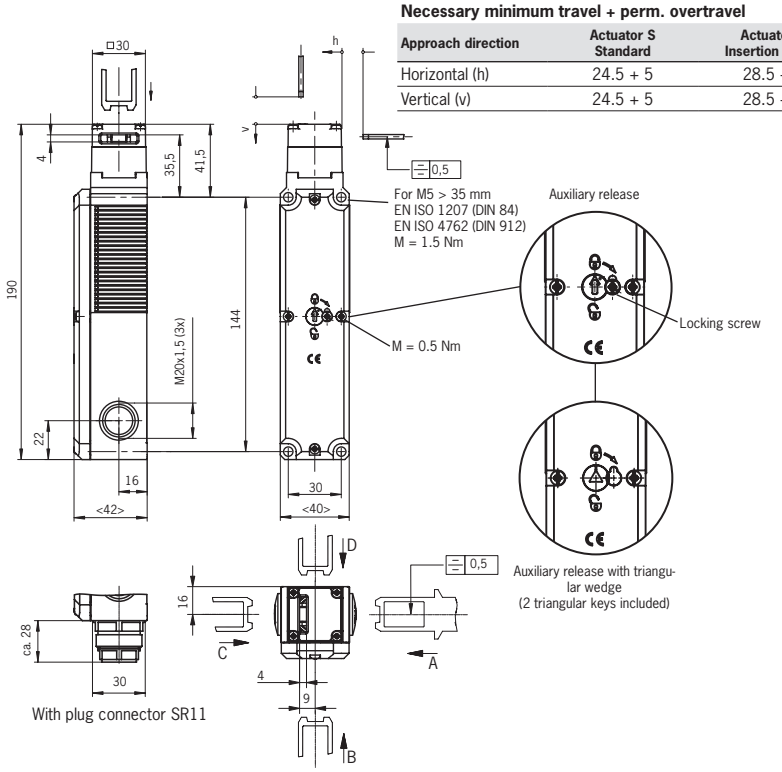


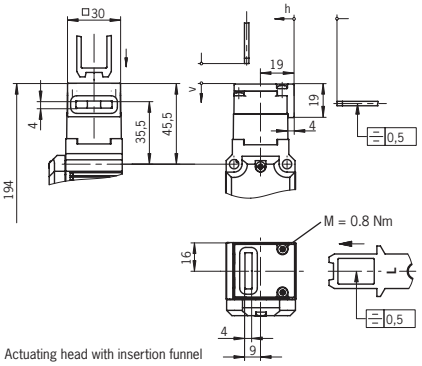
Actuator	Door radius, min. [mm]
Actuator S-G...	300
Actuator S-W...	300
Hinged actuator S-OU...	200
Hinged actuator S-LR...	200

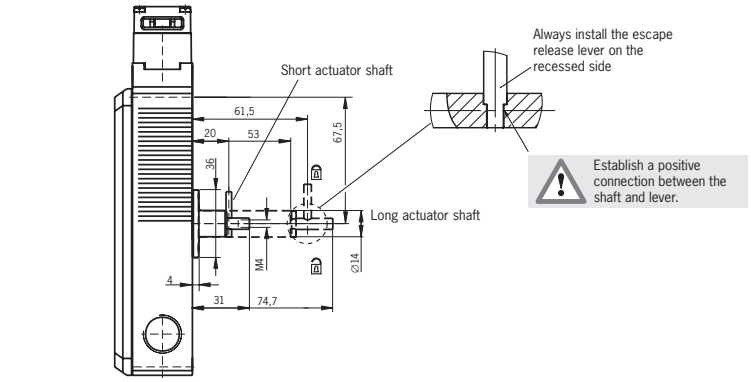
Fig. 3: Minimum door radii

Necessary minimum travel + perm. overtravel

Approach direction	Actuator S Standard	Actuator L Insertion funnel
Horizontal (h)	24.5 + 5	28.5 + 5
Vertical (v)	24.5 + 5	28.5 + 5







Key to symbols

Guard locking ready for operation

Guard locking released

Fig. 4: Dimension drawing for STP-BI... without insertion funnel and STP-BI... with insertion funnel