EUCHNER

Operating instructions

Rope Pull Switches

RPS-C...

EN

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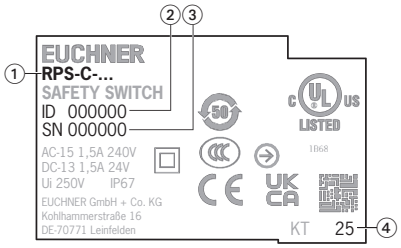
1. About this document

1.1. Scope

These operating instructions are valid for all rope pull switches RPS-C…. 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. Please contact the EUCHNER service team if you have any questions.

1.2. Rope pull switch RPS-C... type label



① Item designation
② Item number
③ Serial number
④ Year of manufacture

1.3. Target group

Design engineers and installation planners for safety systems on machines, as well as setup and servicing staff possessing special expertise in handling safety components.

1.4. Key to symbols

Symbol/depiction	Meaning
	Printed document
	Document is available for download at www.euchner.com
DANGER **WARNING** **CAUTION**	Safety precautions **Danger** of death or severe injuries **Warning** about possible injuries **Caution** slight injuries possible
NOTICE **Important!**	**Notice** about possible device damage **Important** information
Tip	Useful information

1.5. 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 (MAN20001761)	(this document)	
Declaration of conformity	Declaration of conformity	
Possibly available data sheet	Item-specific information about deviations or additions	

ⓘ	**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. in the search box.

2. Correct use

According to EN IEC 60947-5-5 and EN ISO 13850, safety rope pull switches can be used in order to activate an emergency stop function to prevent existing or impending hazard situations.

The following applicable standards must be taken into account for this purpose:

- EN ISO 13849-1
- EN ISO 12100
- EN ISO 13850

The purpose of these regulations is to prevent any danger for persons or damage to machines.

The safety rope pull switches of series RPS-C have been designed and tested in accordance with the EN IEC 60947-5-5 and EN ISO 13850 standards. They must be used only in control circuits.

Safety rope pull switches are used on the accessible sides of conveyor systems or machines. In contrast to emergency stop switches (e.g. mushroom-head pushbuttons) located at certain intervals that allow the emergency stop signal to be generated only at the devices themselves, rope pull switches allow signal generation at any point along the rope section.

The safety rope pull switches of the type RPS-C… are suitable for use only in closed rooms.

3. Design

Safety rope pull switches of the type RPS-C… have a housing made of polyamide. They achieve the specified degree of protection IP67 if the cover is properly closed and if a cable gland is used that offers at least equivalent protection. The RPS-C has a cable entry M20x1.5.

The switches comply with the international requirements according to EN IEC 60947-5-5 and EN ISO 13850, i.e. after actuation or a rope tear, the emergency stop switch locks automatically and can be reset to the initial position only by means of the resetting device on the device.

It is possible to achieve a rope length of up to 30 m. It must be taken into account here that the friction in the overall system can become so high due to the rope guides that this makes it difficult or impossible to reset the system (see “Mounting” section).

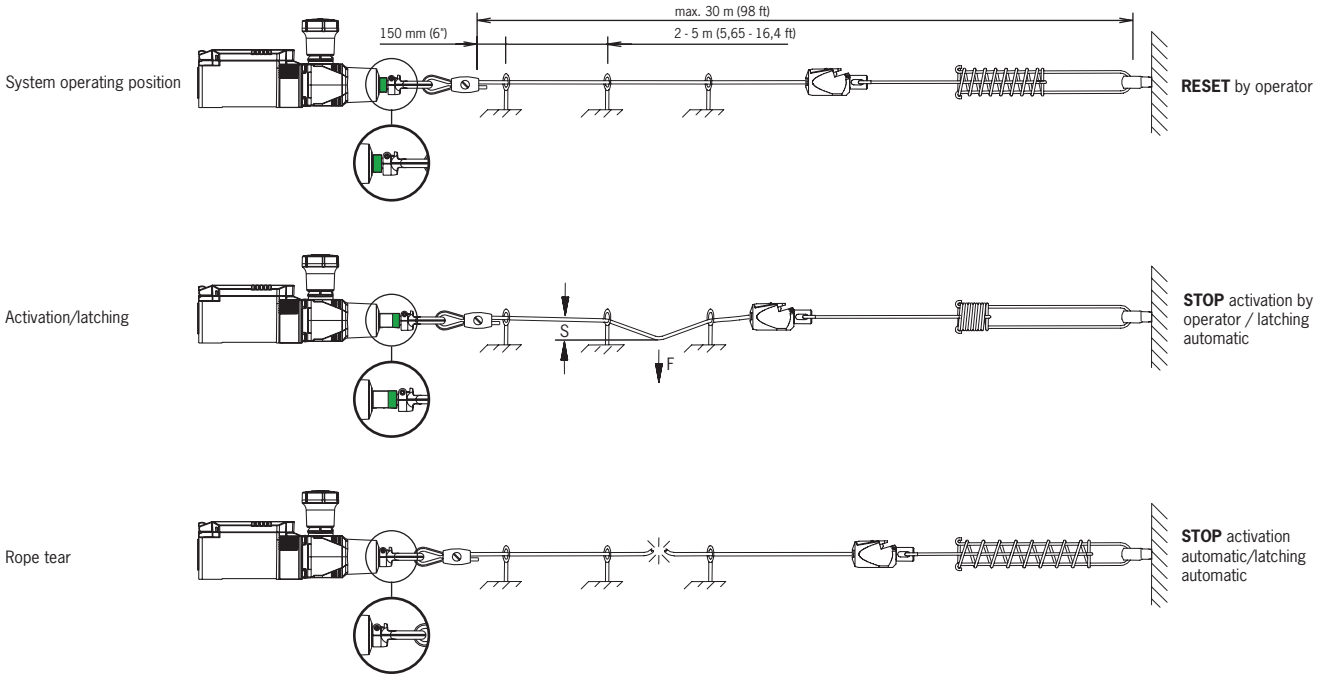
This can be avoided by choosing different system components.

The user is responsible for ensuring that the system functions properly.

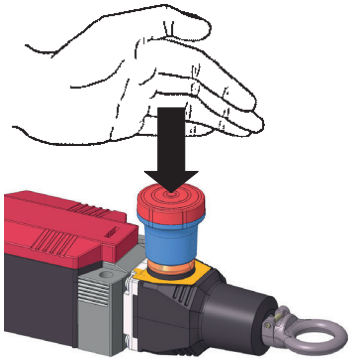
4. Function

The system consists of the switch, a red pull wire, the support points and the counterspring.

The pull device of the rope pull switch is connected with a pull wire. The emergency stop function can be activated by pulling this rope. Since the rope pull system is pretensioned by an integrated spring, switch latching and the emergency stop function are activated immediately if the rope tears. The safety contacts remain latched after activation. After the hazardous situation has been remedied and after examination of the entire rope pull section, the system may be manually reset to readiness for operation again. If necessary, the rope section can also be retensioned during operation using adjusting screws/turnbuckle.



4.1. RPS-C...

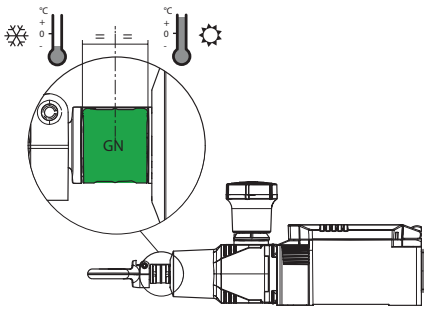


The RPS-C types have an integrated red emergency stop slam button that can be actuated by pressing it if a hazardous situation occurs. Analogously to operation of the pull wire, the safety contacts are then opened and the switch is latched. After the hazardous situation has been remedied, the system can be reset manually to readiness for operation by pulling.

Please also refer to item 3 in chapter *10. Mounting sequence*.

After the hazard situation has been remedied, and with the rope system tensioned, the rope pull switch is unlatched and so made operational again by pulling the reset button.

4.1.1. Rope tension display



The rope tension is indicated by a green field becoming visible in the tensioned state. The rope-tensioning springs integrated in the RPS-C devices are ideally matched to the various rope lengths. Please observe chapter *9. Selection of system components* and chapter *10. Mounting sequence*.

5. ⚠ Safety precautions ⚠

- All system components must be mounted on surfaces that can safely withstand all the forces that may occur.
- Routing the rope as straight as possible results in low frictional forces in the system. From a system length of 25 m, only rope pulley blocks may be used as rope supports. Rope pulley blocks and other accessories are optionally available.
- Positioning the support points at irregular intervals prevents rope oscillations that might cause false activation.
- The red pull wire must have sufficient space between the support points to ensure that safe gripping and activation are possible. To improve visibility, marking flags can be attached to the pull wire along its length; however, these must not interfere with activation of the emergency stop function.
- When a rope pull section is being set up and planned, it is necessary to take into account and comply with the applicable regulations, as well as the maximum permitted actuating travel of S= 400 mm and maximum actuating force of F=200 N applied perpendicularly to the rope.
- Suitable guide rollers (roller diameter ≥ 50 mm) must be used for rope routing at angles. The rope pull section must be angled by no more than 180° (e.g. 2 x 90°).
- Improper installation of or tampering with the rope pull switch will lead to loss of the personnel protection function and can cause severe or fatal injuries.
- Rope pull switches must not be bypassed (bridging of contacts), removed or otherwise rendered ineffective.
- Mounting, electrical connection and setup only by authorized personnel.
- Replacement of other individual parts or assemblies is not permitted.
- The user is responsible for safe 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 13849-2.
- If the simplified method according to section 6.2.3 of EN ISO 13849-1:2023 is used for validation, the Performance Level (PL) might be reduced if several devices are connected in series.
- If a data sheet is available, the information on the data sheet applies in case of discrepancies with the operating instructions.

⚠

DANGER

Danger to life due to explosion, electric shock or arc

Failure to observe these instructions will lead to death or severe injuries.

- Mounting must not damage any live parts.
- Switch off the power supply for the safety rope pull switch.
- Use a cable entry with IP66 or IP67 degree of protection, as required.
- Protect installation from overvoltages.

Danger to life due to uncontrolled machine start

Failure to observe these instructions will lead to death or severe injuries.

- Do not apply any lateral forces on the actuating head.
- Fasten the product on its mounting surface using 4 screws.
- Place the rope supports at intervals of no less than 2 meters and no more than 5 meters.
- Remove sheath from the rope clamping points.
- Remove all objects placed on or concealing the rope.
- Ensure that the rope is accessible along the entire pull area.
- Ensure that the area of the reset/emergency stop slam button remains clear and is protected against contamination.
- Ensure that no device components are deformed by an electric cable after the cover has been closed.
- Check whether the cover is safely closed.
- Check whether the safety rope pull switch, cable, rope and accessories are safely fastened in place.
- Mounting must be performed only by authorized personnel.
- Contamination can impair the system's function. This must be prevented.

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⚠	**DANGER** ‣ Before restarting, examine the entire rope length to find the cause for the emergency stop.

6. Identification of the rope pull switch

6.1. Identification by designation

RPS- C - 538 -SR- 95M ...

E.g. 95 N max. spring force to tension the rope.

R With pull lug/thimble

S Emergency stop

538
2131 Switching function depends on the type used. Further information about the switching elements is available in chapter *16*.

C Plastic housing

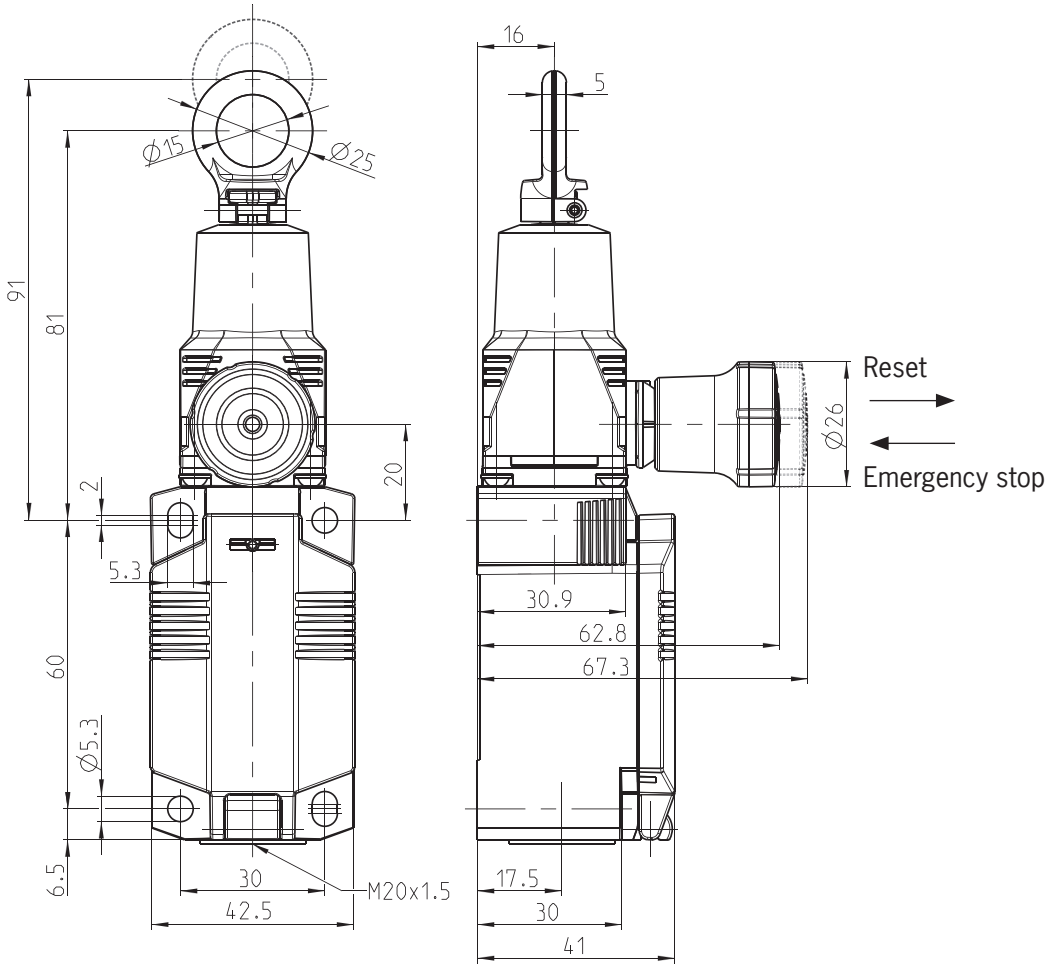
RPS Rope pull switch (switch series)

6.2. Identification by item number

The item number of the switch is located beneath the switch designation on the switch label. Please state this number in correspondence with and orders to EUCHNER GmbH + Co. KG.

7. Dimensions

RPS-C...



All dimensions in millimeters

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8. Mounting

Important!

Mounting must be performed according to ISO 13850.

NOTICE

- Under ideal installation conditions, it is possible to achieve a maximum rope length of 30 m.
- Depending on the actual situation, there may be increased friction in the system. This friction may be so high that automatic resetting is no longer possible as described above. However, activation in the event of a rope tear must be guaranteed in all cases.
- The amount of friction depends on:
  - Number of eyebolts used
  - Number of contact angles and deflections
  - Number and size of guide rollers
  - Alignment of rollers and eyebolts with respect to each other.
- The friction can be reduced by using guide rollers with a larger diameter. The system should be divided up if there is too much friction. The user is responsible for component selection and correct functioning of the system.
- It is recommended to remove the sheath in the undefined operating area of the support points.

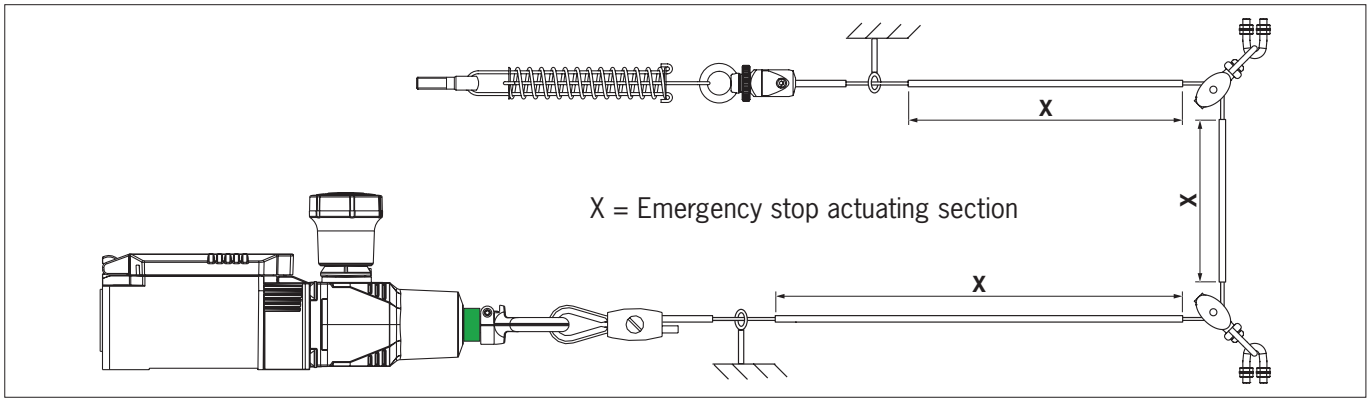


Fig. 1: Example of proper installation

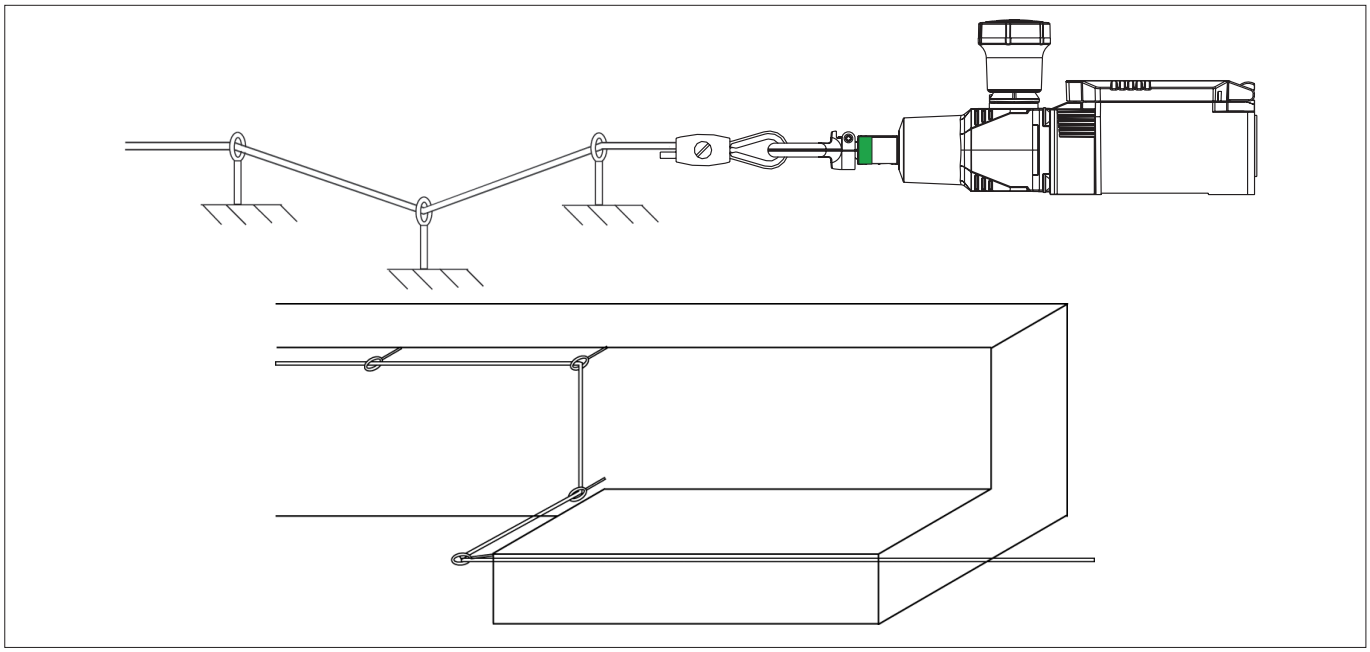


Fig. 2: Examples of improper installation

9. Selection of system components

A tensioner spring must be installed on the counter bearing in order to ensure proper and safety-compliant implementation of the rope pull system. This is a precondition for direction-independent activation at any point along the rope section. In order to achieve fast and simple compliance with this requirement, we recommend the use of EUCHNER tensioner springs with integrated overstretch protection (see *Table 1*). Additional fixing and installation materials as well as ropes are also optionally available. A detailed overview is provided in the “Accessories” chapter.

9.1. Tensioner spring

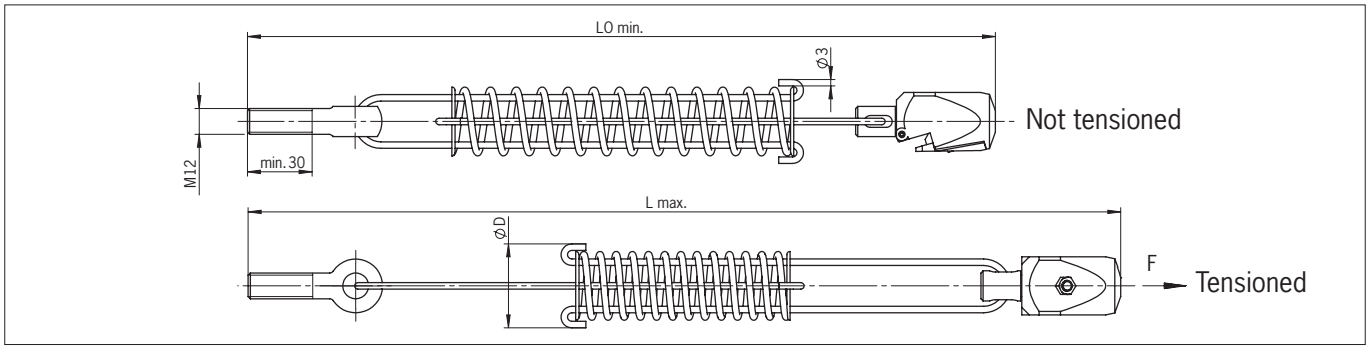


Table 1: Tensioner springs

RPS type	RPS...100/175	RPS...300
Item number	**092136**	**092138**
$LO_{min.}$ [mm]	383	483
$L_{max.}$ [mm]	487	653
Ø D [mm]	42	48

Tensioner springs are supplied with quick fastener and an eyebolt according to DIN 444 – M12 x 50.

When mounting and adjusting the rope pull switch, it is necessary to take into account the physical changes in the rope length as a result of fluctuations in temperature.

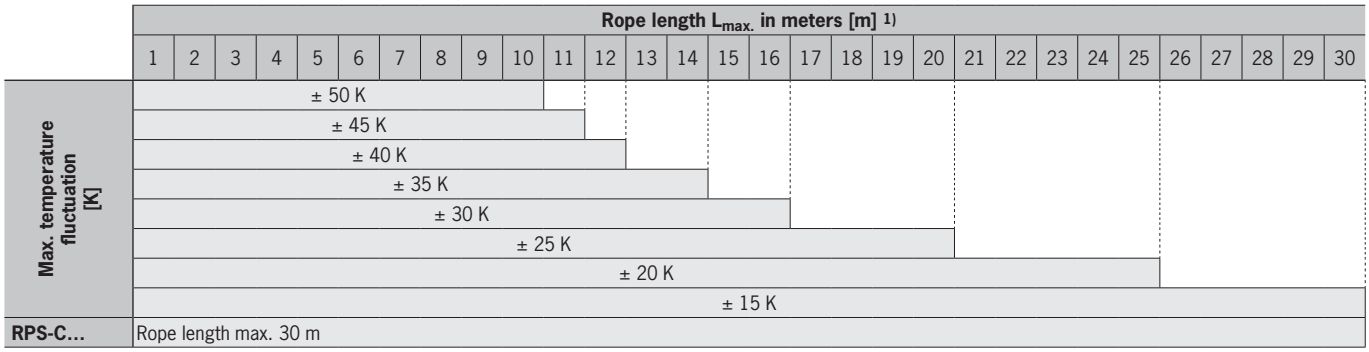
Table 2 shows the permitted rope lengths as a function of the expected temperature difference.

The diagram also shows the maximum permitted rope length for the different spring forces of the respective switch types. It also permits selection of the appropriate switch corresponding to the expected temperature fluctuations.

Table 2: Permissible rope lengths

NOTICE

The temperature specifications apply to a system for applications with counterspring.
The temperature specifications must be halved if there is no counterspring.



1) Information applies to tensioner spring RPS...300

Rope supports must be provided at intervals of 2 – 5 m when planning and installing the system. Refer also to the “Safety precautions” chapter.

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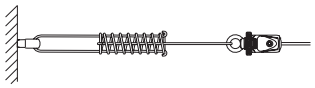
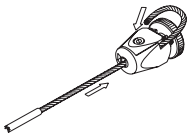
10. Mounting sequence

Mounting must be performed only by authorized personnel.

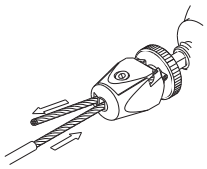
1 A



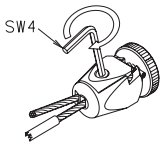
1.1 A



1.2 A

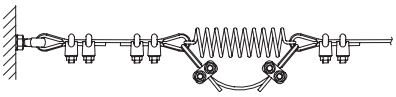


1.3 A



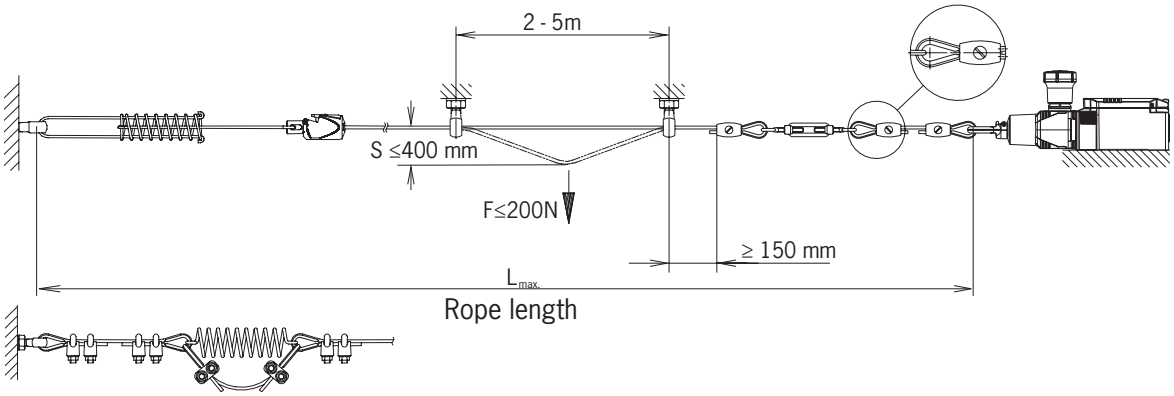
Attach bearing element with tensioner spring; mount pull wire: insert rope into the fast-action clamping head as shown and secure.

B



Attach bearing element with counterspring; mount pull wire: secure rope as shown; attach rope bridge to limit travel of counterspring with thimbles and rope clamps.

2

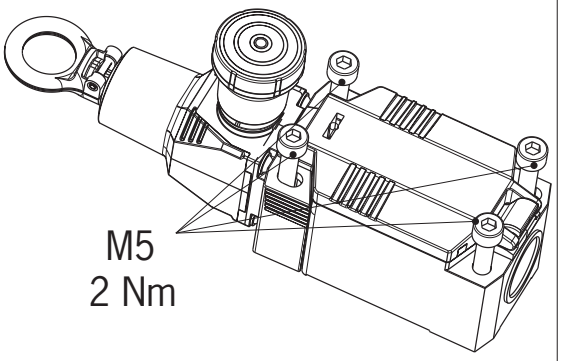


Observe distance to the 1st support points. The 1st rope support toward the switch must be installed after La = 150 mm. On the counterspring side, observe the distance Lg = 200 mm for sufficient activation travel of the switch. Install supports at intervals of 2 – 5 m.

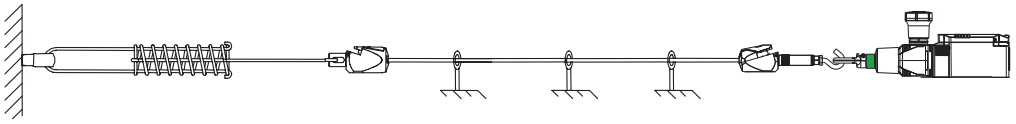
3 Fasten the RPS switch with 4 M5 screws.

Maximum tightening torque M = 2 Nm

Emergency stop switches must be positioned so that the rope or emergency stop slam button can be reached without obstacles in hazardous situations.

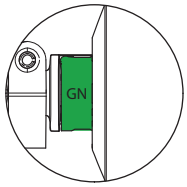


4 A



Connect pull wire with fast-action clamping head (see Item 1).

Pretension pull wire.



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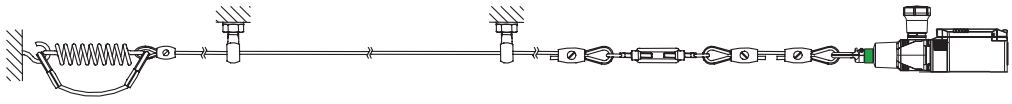


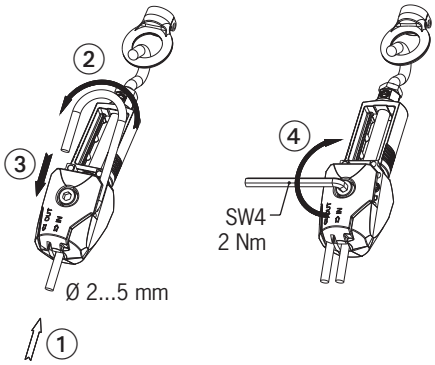
Connect pull wire with turnbuckle as shown (3x rope clamp with thimble)

5 Basic setting should take place at a temperature corresponding to the prevailing operating conditions.

The length of the pull wire changes if there is a large change in the ambient temperature. Under these conditions, long rope lengths mean a frequent change in the basic setting.

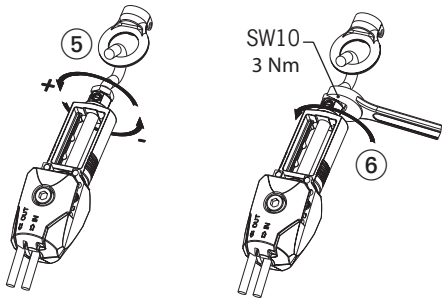
This can be remedied by re-adjustment (Item 5) or shortening the rope length (Table 3).

A

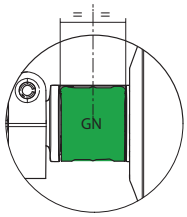


1 - 3: Place rope in fast-action clamping head

4: Secure fast-action clamping head



5 - 6: Complete mounting



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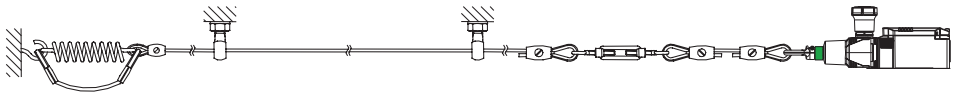

1. Tension the rope using the turnbuckle until the indication is between the markings.
2. Unlock the device by pulling the reset button; the entire green label should be visible.

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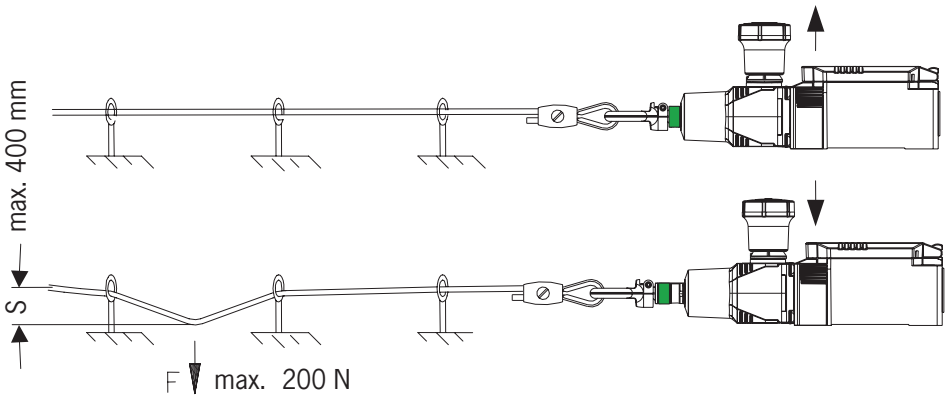
11. Mechanical function test

6 Pull button up:
- safety contacts closed.

Actuate pull wire or press button:
- safety contacts open.

For each test procedure:
- actuate button or
- actuate pull wire.



Operability of the pushbutton must be ensured.

Forcefully actuate the pull wire several times to settle the rope pull section.

If necessary, correct the adjustment with the adjusting screw/turnbuckle.

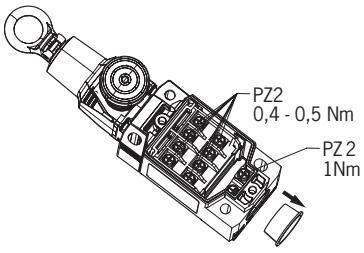
12. Electrical connection

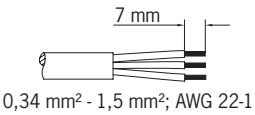
WARNING
- Electrical connection must be performed only by authorized personnel.
- Strip the insulation from the ends of the individual wires over a length of 6 ± 1 mm to ensure a safe contact.

NOTICE
- At least one contact ⊖ must be used.

12.1. Connection of RPS-C...

1. Remove cover – to do this, unscrew the cover screws with a screwdriver and remove the cover.
2. Sealing of housing entries – remove dust protection cap. Use cable entry with suitable M20x1.5 cable gland with appropriate degree of protection. Close all unused cable entries using the supplied dummy caps.
3. Electrical connection – the electrical contacts of the switching contacts can be mounted using a PZ 2 screwdriver. For terminal assignment, see chapter *16. Switching elements*. The connection must be made as a multiple conductor with cable end sleeve or as a single conductor with the conductor cross-sections 0.5 … 1.5 mm². Stripping length 7 … 8 mm, tightening torque of the contact screws 0.8 Nm.
4. Close cover – place the cover on the housing as shown and tighten the cover screws with a torque of 1 Nm.





0,34 mm² - 1,5 mm²; AWG 22-1

WARNING
- Flexible wires or similar items must not be trapped.
- Observe the tightening torques.
- The rope pull switch must be operated only when the cover is closed.
- Rope pull switches identified with ⋘ are subject to safety class III. The requirements of the IEC 61140 standard must be observed.

NOTICE
- Install a type 4 AgG fuse. Use an SELV or PELV power supply unit.

13. Connection example

The following connection example shows a possible circuit structure with redundant design at the cable level as well.

The signal of the emergency stop chain is evaluated by a safety relay (ESM from EUCHNER).

The overall control concept into which the rope pull switch RPS is integrated must be evaluated by the end consumer/ machine design engineer in accordance with EN ISO 13849-2.

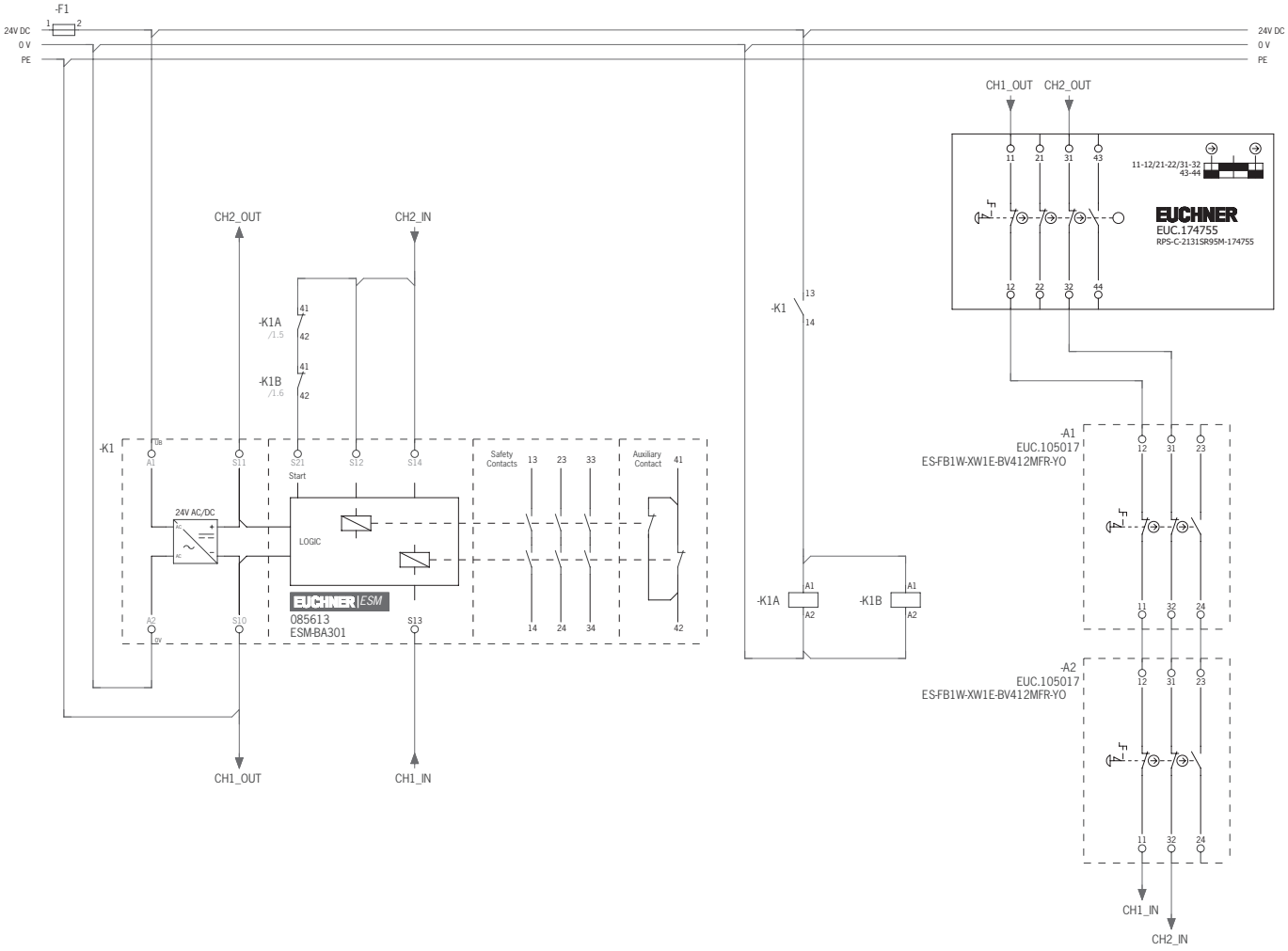


Fig. 3: Connection example

14. Setup

14.1. Mechanical function test

It must be possible to actuate the pull wire easily at every point of the rope pull system. As a check, actuate the pull wire several times.

14.2. Electrical function test

1. Activate the rope pull safety system by means of the RESET actuating cylinder.
2. Start the installation/machine.
3. Actuate the pull wire/emergency stop button ➡ This results in the safety contacts ⊖ opening immediately.
4. Pull the RESET actuating cylinder to close the safety contacts ⊖.

EN

15. Technical data

Version		RPS-C...538	RPS-C...2131
Electrical data (these refer to the switch without plug connector)			
Rated insulation voltage	U_i	400 V	250 V
Rated operating voltage	U_e	240 V AC/24 V DC	
Rated impulse withstand voltage	U_{imp}	4 kV	2.5 kV
AC frequency		50/60 Hz	
Safety class		II	
Rated conditional short-circuit current		400 A	
Continuous thermal current	I_{the}	5 A	
Minimum current		1 mA	
Utilization category		AC 15; 240 V/3 A DC 13; 24 V/1.5 A	AC 15; 240 V/1.5 A DC 13; 24 V/1.5 A
Short circuit protection		4 A gG acc. to EN IEC 60269-1	
Positively driven NC contacts		⊖ EN IEC 60947-5-1, Annex K	
Mechanical data			
Housing/cover		Thermoplastic, fiber glass reinforced (UL 94-V0)	
Emergency stop		Thermoplastic, fiber glass reinforced (UL 94-V0)	
Actuation		Pull lug (die-cast zinc)	
Actuating force		95 N	
Ambient temperature		-30°C to +75°C	
Storage temperature		-40°C to +80°C	
Degree of protection		IP66/IP67 acc. to EN 60529; Type 4X	
Degree of contamination (built-in switch)		3	
Contact material		Silver	
Contact type		2 NC contacts (form Zb)	3 NC contacts (form Zb), 1 NO contact
Latching device		Acc. to IEC 60947-5-5, DIN EN 60947-5-5, ISO 13850 (DIN EN 418)	
Latching reset		Pulling the emergency stop button acc. to IEC/EN 60947-5-5	
Mechanical life		1 x 10^5 operating cycles	
Mission time		≤ 20 years	
Switching frequency		≤ 20/min.	
Rope length		30 m (depending on the max. temperature fluctuation, see *Table 2*)	
Rope Ø		D = Ø 2 – 5 mm	
Rope attachment		RPS...SC/PC... fast-action clamping device; PR.../SR... by means of pull lug/thimble	
Connection		4 screw terminals (M3) 0.34 ... 1.5 mm² flex.	8 screw terminals (M3) 0.34 ... 1.5 mm² flex.
Cable entry		1 x M20x1.5	
Mounting		4 x M5 or 4 x M6	
Installation position		Any	
Characteristics acc. to EN ISO 13849-1			
B_{10D} at DC-13 100 mA/24 V		2 x 10^5	

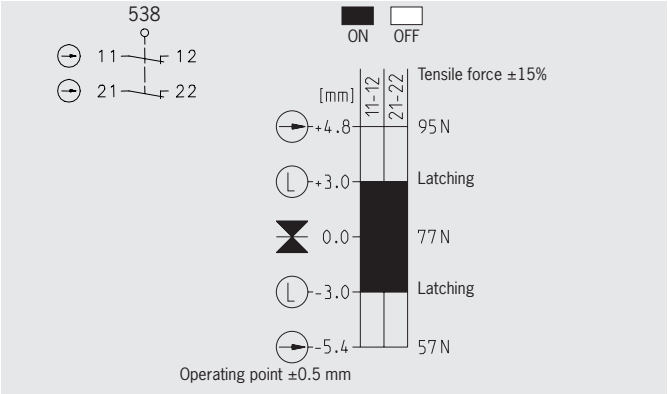
Regulations DIN EN 60947-5-1, DIN EN 60947-5-5, UL 508/CSA C22.2, ISO 13850, DIN EN ISO 13849-1

16. Switching elements

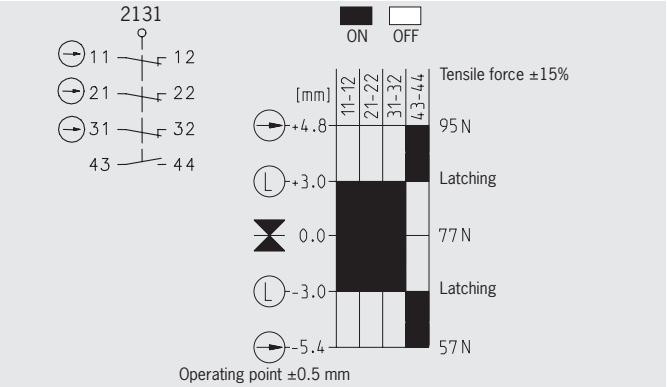
Tensile force tolerance ± 15%

Operating point accuracy

Travel diagram for RPS-C...538



Travel diagram for RPS-C...2131



17. Maintenance/service

In order to ensure trouble-free, long-term operation, it is necessary to perform regular, documented inspection of the following:

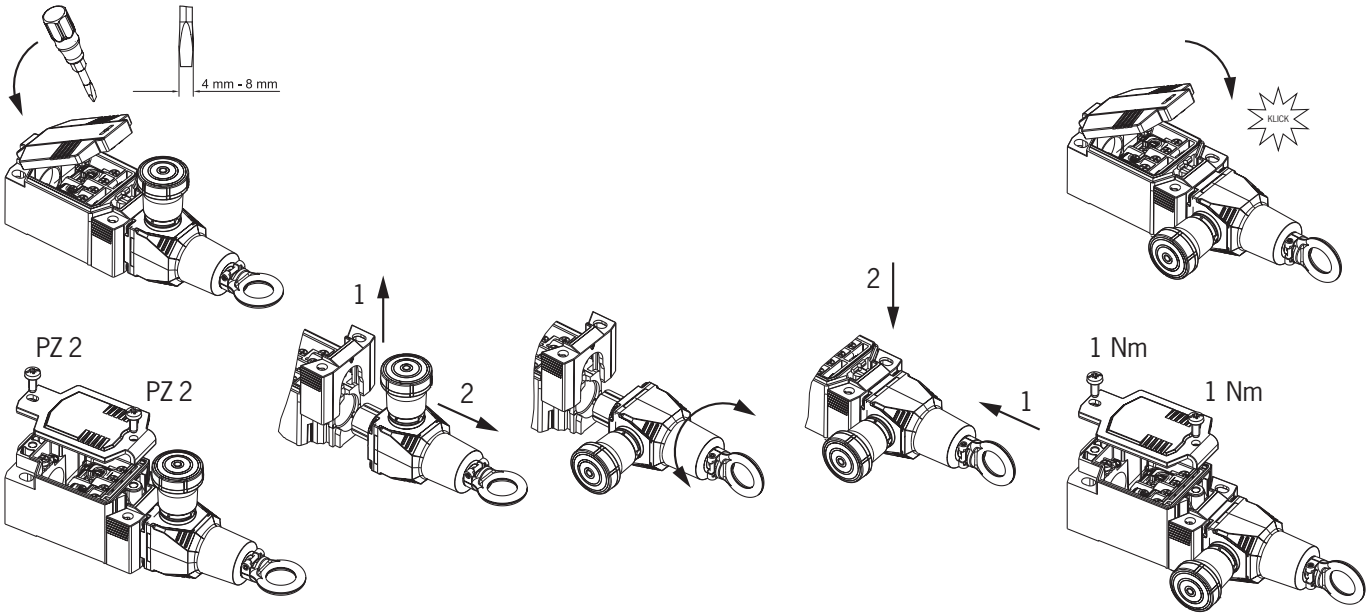
- Smooth actuation
- Correct switching function
- Correct rope tension
- Secure mounting of components
- Dirt and wear
- Sealing of cable entry
- loose cable connections or plug connectors.

After servicing or repair, correct functioning of the system should be checked by actuating the pull wire several times. It must be ensured that the switch latches properly.

In the event of a fault in the switching system or latching device, the switch must be replaced and can be sent to EUCHNER GmbH + Co. KG for inspection.

EN

17.1. Turning actuating head



18. Exclusion of liability

If the instructions (correct use, safety regulations, mounting and connection by trained personnel, check for safe function) are violated, this renders the manufacturer's liability null and void.

19. Accessories

Designation	Description/version	Packaging unit	Order no./item
Eyebolt	Thread M8	5 pcs.	**092495** RPS-O-8-50/V5
Rope set	Consisting of thimble and rope clamp	5 pcs.	**092496** RPS-RS/V5
Pulley set RPS-PS/V5	Rope pulley block with swiveling lug (roller Ø 6 mm) and fastening clamp	5 pcs.	**092501** RPS-PS/V5
Rope pulley block RPS-P/V1	Rope pulley block (roller Ø 14 mm)	1 pcs.	**096251** RPS-P/V1
Tensioning rope	Length 50 m	1 pcs.	**092813** RPS-I-3-4/50M
	Length 100 m	1 pcs.	**092814** RPS-I-3-4/100M
Turnbuckle	M6 x 60	5 pcs.	**092498** RPS-B-6-60/V5
	M6 x 110	1 pcs.	**092500** RPS-B-6-110
Tensioner spring	For RPS 100, 175	1 pcs.	**092136** RPS-W-100-175
	For RPS 300	1 pcs.	**092138** RPS-W-300
Fast-action clamping head	For RPS	1 pcs.	**174877** RPS-CMP-40-174877

20. 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*.

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