



EN Operating instructions. . . . .pages 1 to 6  
Original

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**1. About this document**

**1.1 Function**

This operating instructions manual provides all the information you need for the mounting, set-up and commissioning to ensure the safe operation and disassembly of the safety switchgear. The operating instructions must be available in a legible condition and a complete version in the vicinity of the device.

**1.2 Target group: authorised qualified personnel**

All operations described in this operating instructions manual must be carried out by trained specialist personnel, authorised by the plant operator only.

Please make sure that you have read and understood these operating instructions and that you know all applicable legislations regarding occupational safety and accident prevention prior to installation and putting the component into operation.

The machine builder must carefully select the harmonised standards to be complied with as well as other technical specifications for the selection, mounting and integration of the components.

**1.3 Explanation of the symbols used**



**Information, hint, note:**

This symbol is used for identifying useful additional information.



**Caution:** Failure to comply with this warning notice could lead to failures or malfunctions.

**Warning:** Failure to comply with this warning notice could lead to physical injury and/or damage to the machine.

**1.4 Appropriate use**

The products described in these operating instructions are developed to execute safety-related functions as part of an entire plant or machine. It is the responsibility of the manufacturer of a machine or plant to ensure the correct functionality of the entire machine or plant.

The safety switchgear must be exclusively used in accordance with the versions listed below or for the applications authorised by the manufacturer. Detailed information regarding the range of applications can be found in the chapter "Product description".

**1.5 General safety instructions**

The user must observe the safety instructions in this operating instructions manual, the country specific installation standards as well as all prevailing safety regulations and accident prevention rules.



Further technical information can be found in the Schmersal catalogues or in the online catalogue on the Internet: [www.schmersal.net](http://www.schmersal.net).

The information contained in this operating instructions manual is provided without liability and is subject to technical modifications.

There are no residual risks, provided that the safety instructions as well as the instructions regarding mounting, commissioning, operation and maintenance are observed.

**1.6 Warning about misuse**



In case of improper use or manipulation of the safety switchgear, personal hazards or damages to machinery or plant components cannot be excluded.

### 1.7 Exclusion of liability

We shall accept no liability for damages and malfunctions resulting from defective mounting or failure to comply with this operating instructions manual. The manufacturer shall accept no liability for damages resulting from the use of unauthorised spare parts or accessories.

For safety reasons, invasive work on the device as well as arbitrary repairs, conversions and modifications to the device are strictly forbidden; the manufacturer shall accept no liability for damages resulting from such invasive work, arbitrary repairs, conversions and/or modifications to the device.

## 2. Product description

### 2.1 Ordering code

This operating instructions manual applies to the following types:

#### EX-ZQ 900-①-3D

No.	Option	Description
①	11	1 NO / 1 NC
	13	1 NO / 3 NC
	22	2 NO / 2 NC
	02	2 NC
	04	4 NC



Only if the information described in this operating instructions manual are realised correctly, the safety function and therefore the compliance with the Machinery Directive and the Explosion Protection Directive is maintained.

### 2.2 Special versions

For special versions, which are not listed in the order code below 2.1, these specifications apply accordingly, provided that they correspond to the standard version.

### 2.3 Purpose

The emergency stop switch meets the requirements of EN ISO 13850, IEC/EN 60947-5-1 and IEC/EN 60947-5-5. Pull-wire emergency stop switches are used on machinery and plants in explosion-endangered areas of Zone 22 equipment category 3D, where triggering the emergency stop command must be enabled at arbitrary points on the wire run. The installation and maintenance requirements to the standard series EN 60079 must be met.

If the tensioned pull-wire is pulled or in case of wire breakage, the switching function of the pull-wire emergency stop switch is activated. (refer to image 1)

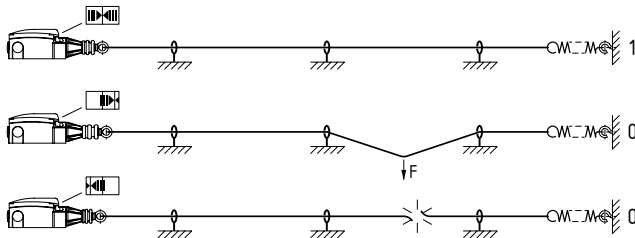


Image 1: position indication and actuation

### 2.4 Design/operating principle

The pull-wire emergency stop switches are brought into the operational condition by the proper pre-tensioning of the wire. Up to two switching elements located on the inside of the switch have either 2 or 4 contacts, whereby the NC contacts are closed and the NO contacts are opened in tensioned condition.

After actuation of the emergency stop function, a latching mechanism maintains the stop command until the switch is released by pushing the blue reset button. Prior to the reset of the emergency stop signal, the reason why the switch has been actuated must be determined. The switch can only be reset if the switch is correctly pre-tensioned (position indication in central position, refer to image 1).



The entire concept of the control system, in which the safety component is integrated, must be validated to the relevant standards.

### Conditions for safe operation

The specific ambient temperature range must be observed. The user must provide for a protection against the permanent influence of UV rays.

### 2.5 Technical data

Equipment category:	⊕ II 3D
Ex protection:	Ex tc IIIC T100°C Dc
Standards:	IEC/EN 60947-5-1, IEC/EN 60947-5-5, EN ISO 13850, EN 60079-0, EN 60079-31
Enclosure:	zinc die-cast, enamel finish
Cover:	Steel
Protection class:	IP67 to IEC/EN 60529
Contact material:	Silver
Max. impact energy:	7 J
Contact type:	1 NC / 1 NO or 2 NC / 2 NO or 3 NC / 1 NO or 2 NC or 4 NC
Switching system:	⊖ IEC 60947-5-1 snap action, NC contacts with positive break
Connection:	screw terminals
Cable section:	max. 2.5 mm <sup>2</sup> (incl. conductor ferrules)
Cable entry:	3 × M20
Rated impulse withstand voltage U <sub>imp</sub> :	6 kV
Rated insulation voltage U <sub>i</sub> :	500 V
Thermal test current I <sub>the</sub> :	4 A
Utilisation category:	AC-15 / DC-13
Rated operating current/voltage I <sub>e</sub> /U <sub>e</sub> :	4 A / 230 VAC; 1 A / 24 VDC
Max. fuse rating:	6 A gG D-fuse to IEC/EN 60269-1
Ambient temperature:	-20 °C ... +55 °C
Mechanical life:	max. 1 million operations
Wire length:	max. 75 m depending in relation to the range of ambient temperature (see image 3)
Features:	wire pull and breakage detection
Cable cross-section of the cable glands:	min. Ø 7 mm; max. Ø 12 mm
Cable glands:	⊕ II 2GD
Tightening torque:	
- Cable gland:	8 Nm
- Cover screws:	min. 0.6 Nm, max. 0.9 Nm

### 2.6 Safety classification

Standards:	EN ISO 13849-1
B <sub>10D</sub> NC contact:	100,000
Service life:	20 years

$$MTTF_D = \frac{B_{10D}}{0,1 \times n_{op}} \quad n_{op} = \frac{d_{op} \times h_{op} \times 3600 \text{ s/h}}{t_{cycle}}$$

(Specifications can vary depending on the application-specific parameters  $h_{op}$ ,  $d_{op}$  and  $t_{cycle}$  as well as the load.)

### 3. Mounting

#### 3.1 General mounting instructions



Fitting is only authorised in a de-energised condition

The fitting may only be carried out by authorised personnel. The pull-wire emergency stop switch is fitted by means of two screws (distance of the drill holes 40 mm or 48 mm), so that a release by hand can be realised without hazard. The component must be fitted so that the entire length of the wire can be viewed from the position of the switch.

In accordance with IEC/EN 60947-5-5, the maximum perpendicular traction force to be exercised on the wire in order to activate the emergency pull-wire switch is 200 N, the maximum deflection is 400 mm. Sufficient space must be provided so that the required actuating deflection can be reached. For tensioned span lengths up to 10 m, intermediate wire supports are required every 3 to 5 m. To avoid resonance vibrations in the wire on machines with high vibrations, it is recommended to realise the individual support length differently. Assembly: refer to image 2.



Please observe the recommendations regarding maximum impact energy, actuating speed and tightening torque in the technical data.

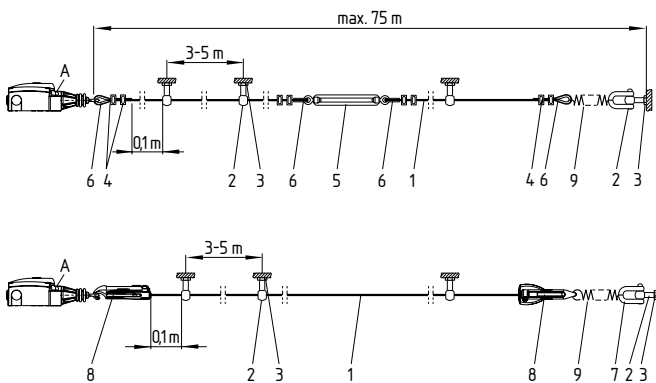


Image 2: mounting of the components

#### Key

- 1 Pull-wire with red PVC sheath  $\varnothing$  5 mm (steel core:  $\varnothing$  3 mm)
- 2 Eyebolt
- 3 Nut
- 4 Wire clamp
- 5 Tensioner
- 6 Wire thimble
- 7 Shackle
- 8 S900 wire tensioner
- 9 Tension spring RZ-2041

- A Position indication
- B Reset button

We recommend the use of the RZ-2041 tension spring to attenuate the effects of temperature variations. Due to the thermal expansion behaviour of the wire, the maximum authorised wire length is determined by the ambient temperature range (refer to image 3).

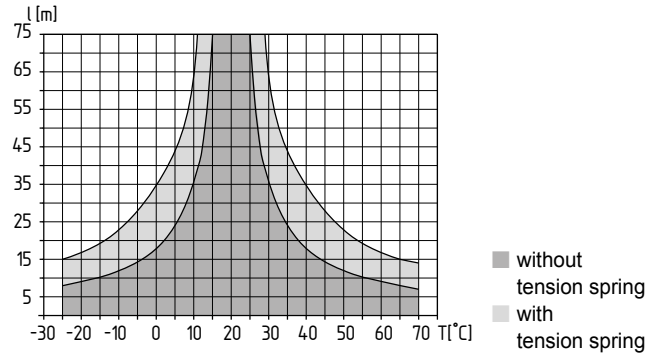


Image 3: temperature-dependent maximum wire length with or without tension spring

The pull-wire must be fixed to the ring and then be pre-tensioned until the position indication is in the central position (refer to image 1).

As the thimbles are subject to deformation in case of wire pull, the wire should be pulled several times after fitting. After that, the wire must be re-tensioned (see image 4).

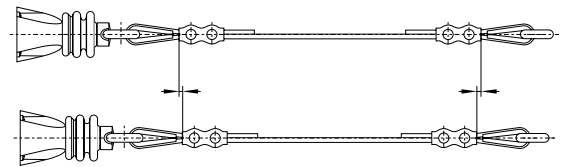


Image 4: deformation of the wire thimbles

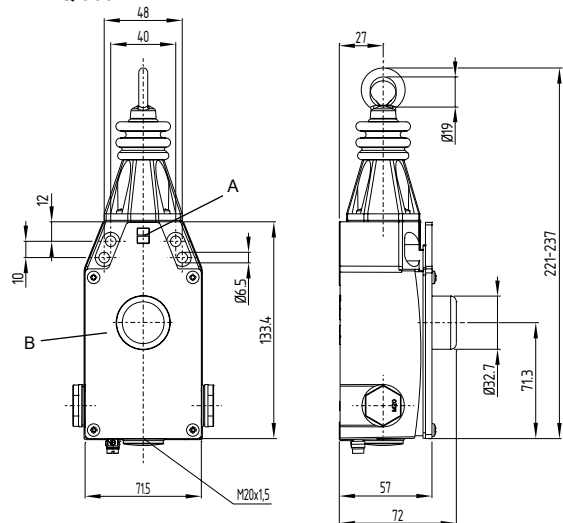


In order to ensure an optimal operation safety and to save time during fitting, we recommend using the wire rope and the combined fixing and tensioning system from Schmersal. Alternatively, wire thimbles and wire clamps can be used in conjunction with a tensioner. In this case, the red PVC sheet must be removed in the clamp area prior to installing the wire rope.

#### 3.2 Dimensions

All measurements in mm.

##### EX-ZQ 900



#### Legend:

- A = Position indication
- B = Reset-button

### 4. Rear side Electrical connection

#### 4.1 General information for electrical connection



The electrical connection may only be carried out by authorised personnel in a de-energised condition.

Cable glands (included in delivery) are only authorised for permanent cables. The constructor must provide for the necessary strain relief. To open the cover, the cover screws must be loosened. When wiring, please ensure that no cables are located within the range of the lever system and the pushbutton. After wiring, the inside of the switch must be imperatively cleaned (e.g. removal of cable residues), considering that foreign bodies can affect the switching behaviour. Screw back the cover after that and uniformly tighten the cover screws.



The external potential equalisation terminal is to be connected in accordance with EN 60079-14 section 6.3.

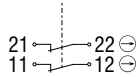
#### 4.2 Contact variants

Contact variants are shown in a de-energised condition with actuator inserted.

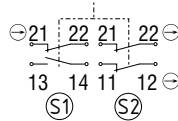
EX-ZQ 900-11-3D



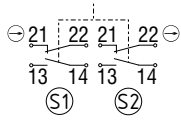
EX-ZQ 900-02-3D



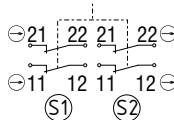
EX-ZQ 900-13-3D



EX-ZQ 900-22-3D



EX-ZQ 900-04-3D



#### Key

⊖ Positive break contact

### 5. Set-up and maintenance

#### 5.1 Functional testing

The safety function of the safety components must be tested. The following conditions must be previously checked and met:

1. Check the correct fitting of the pull-wire emergency stop switch
2. Check cable entry and connections in a de-energised condition
3. Check the switch enclosure for damage
4. Check the functionality of the switch by actuating the wire
5. Check the cable tensioning by means of the position indicator

#### 5.2 Maintenance

In case of correct installation in accordance with the above-described instructions, the component requires little maintenance. For use in extreme conditions, we recommend routine maintenance including the following steps:

1. Check the correct fitting of the pull-wire emergency stop switch
2. Check the functionality of the switch by actuating the wire
3. Check cable entry and connections in a de-energised condition
4. Remove particles of dust and soiling
5. Check the wire tension through the wire position indication and check the wire and the wire guides for damages and proper fitting



Do not open the device when live.

**Damaged or defective components must be replaced. For explosion protection reasons, the component must be exchanged after max. 1 million operations.**

### 6. Disassembly and disposal

#### 6.1 Disassembly

The safety switchgear must be disassembled in a de-energised condition only.

#### 6.2 Disposal

The safety switchgear must be disposed of in an appropriate manner in accordance with the national prescriptions and legislations.

7. EU Declaration of conformity

EU Declaration of conformity



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We hereby certify that the hereafter described components both in their basic design and construction conform to the applicable European Directives.

**Name of the component:** EX-ZQ 900  
⊗ II 3D Ex tc IIIC T100°C Dc

**Type:** See ordering code

**Description of the component:** Pull-wire emergency stop switch for safety applications

**Relevant Directives:** Machinery Directive 2006/42/EC  
Explosion Protection Directive (ATEX) 2014/34/EU  
RoHS-Directive 2011/65/EU

**Applied standards:** DIN EN 60947-5-1:2010,  
DIN EN 60947-5-5:2015,  
DIN EN ISO 13850:2016,  
EN 60079-0:2012,  
EN 60079-31:2014

**Notified body, which approved the full quality assurance system, referred to in Appendix IV, 2014/34/EU:** TÜV Rheinland Industrie Service GmbH  
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**Place and date of issue:** Wuppertal, March 29, 2017

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Managing Director

EX-ZQ 900-C-EN



Die aktuell gültige Konformitätserklärung steht im Internet unter [www.schmersal.net](http://www.schmersal.net) zum Download zur Verfügung.



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