SCHMERSAL

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

Content

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 indicates 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 Schmersal range of products is not intended for private consumers.

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: products.schmersal.com.

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.

x.000 / 06.2025 / v.A. - 101212127-EN / G / 2025-06-25 / AE-Nr. 18949

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

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.

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).

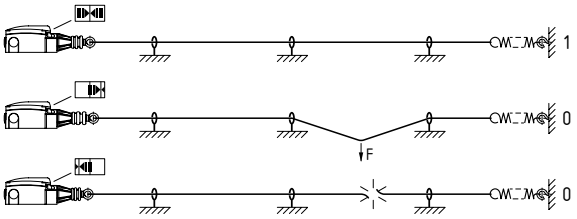


Image 1: Position indication and actuation

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 user must evaluate and design the safety chain in accordance with the relevant standards and the required safety level.

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.

The installation and maintenance requirements to the standard series 60079 must be met.

2.5 Technical data

Marking in accordance with the ATEX Directive:	⟨Ex⟩ II 3D
Marking in accordance with standards:	Ex tc IIIC T100°C Dc
Applied standards:	EN 60947-5-1, EN 60947-5-5, EN ISO 13850, EN 620, EN IEC 60079-0, EN 60079-31
Enclosure:	zinc die-cast, enamel finish
Cover:	Steel
Degree of protection:	IP67 to EN 60529 IP66 to the standard series 60079
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:	⊖ EN 60947-5-1 snap action, NC contacts with positive break
Connection:	screw terminals
Cable section:	
- solid wire:	0.75 … 2.5 mm²
- stranded wire:	0.75 … 2.5 mm² with conductor ferrules
Cable entry:	3 × M20
Rated impulse withstand voltage U_{imp}:	6 kV
Rated insulation voltage U_i:	500 V
Thermal test current I_{the}:	4 A
Utilisation category:	AC-15 / DC-13
Rated operating current/voltage I_e/U_e:	4 A / 230 VAC 1 A / 24 VDC
Max. fuse rating:	6 A gG D-fuse to 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 4)
Features:	wire pull and breakage detection
Cable cross-section of the EX cable glands:	Ø 7 … 12 mm
EX cable gland:	⟨Ex⟩ II 2GD
Tightening torque:	
- EX cable gland:	10 Nm
- EX locking screw:	8 Nm
- Cover screws:	0.6 … 0.9 Nm
- Earth screws:	PE 1 Nm PA 1.2 Nm

2.6 Safety classification

Standards:	EN ISO 13849-1
B_{10D} NC:	100,000
Mission time:	20 years

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

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

If multiple safety components are wired in series, the Performance Level to EN ISO 13849-1 will be reduced due to the restricted error detection under certain circumstances.

3. Mounting

3.1 General mounting instructions

The installation may only be carried out with the system de-energised and 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).

The device must be arranged so that unlocking by hand is entirely without risk and that the entire length of the wire can be seen from the switch.

Please observe the information on tightening torques in the technical data.

In accordance with EN 60947-5-5 (EN 620), 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. It must be ensured that when tensioned, the wire rope always follows a straight course and that it remains in the correct position at all times (including at the redirection point). External influences (temperature variations, ageing) can affect the properties of the wire rope. The information in EN ISO 13850 must be observed.

For lengths of over 10 m, intermediate wire supports must be installed after max. 3 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.

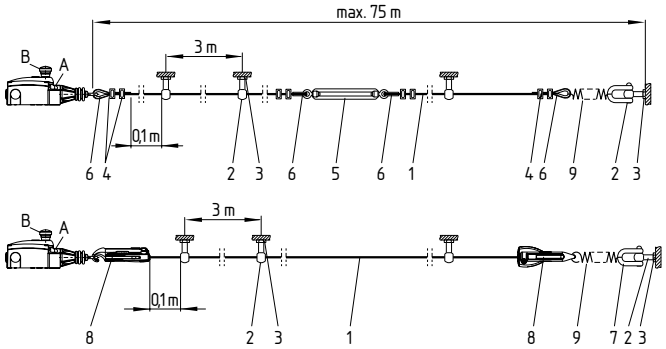


Image 2: Mounting of the components

Key

A Position indicator
B Reset button

1 Pull-wire with red PVC jacket, Ø 5 mm (steel core: Ø 3 mm)
2 Eyebolt
3 Nut
4 Wire clamp
5 Tensioner
6 Wire thimble
7 Shackle
8 Wire tensioner S900
9 Tension spring ACC-RS900-TS

We recommend the use of the ACC-RS900-TS tension spring to reduce 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 4).

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.

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 3).

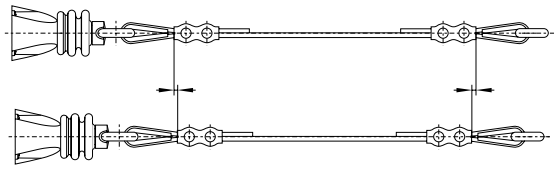
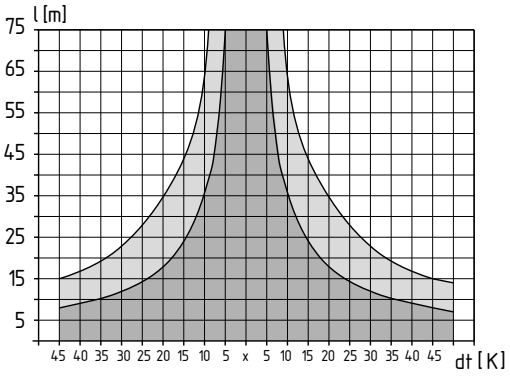


Image 3: Thimble deformation

Correct operation of the product is directly connected to the data shown in the diagram. The maximum wire length depends on the temperature change to which the hauling wire system is exposed. The corresponding wire length with and without external tension spring is shown in the diagram.



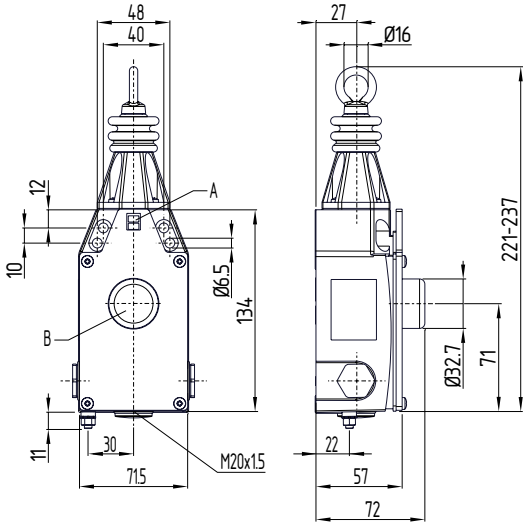
x Reference temperature
without tension spring
with tension spring

Image 4: 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).

3.2 Dimensions
All measurements in mm.

EX-ZQ 900



Legend:
A = Position indication
B = Reset-button

4. Electrical connection

4.1 General information for electrical connection

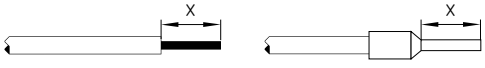
The electrical connection may only be carried out by authorised personnel in a de-energised condition.

Only use EX cable glands which are authorised for the corresponding field of application.

The cable glands must be fitted in accordance with the applicable operating instructions manual. Cable glands are only authorised for permanent cables. The constructor must provide for the necessary strain relief.
Ununused cable entries must be sealed by means of Ex approved locking screws. Cable gland and locking screws are included in the delivery.

1. Cover screws must be loosened
2. Dust shield cap remove
3. Use Ex cable gland M20 x 1.5 (included in delivery).
4. When wiring, please ensure that no cables are located within the range of the lever system and the pushbutton
5. The inside of the switch must be imperatively cleaned (e.g. removal of cable residues), considering that foreign bodies can affect the switching behaviour
6. Unused cable entries must be sealed by means of Ex locking screws (Tightening torque 8 Nm)
7. The cover screws must be tightened uniformly (tightening torque 0.6 … 0.9 Nm)

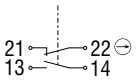
Settle length x of the conductor:
- on screw terminals: 6 mm
- on the protective conductor terminal: 5 mm



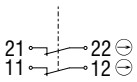
The external protective conductor terminal is to be connected in accordance with EN 60079-14 section 6.3.
A ring cable lug of size M5 must be used for connection of the conductor.

4.2 Contact Options
Contacts shown in a de-energised condition.

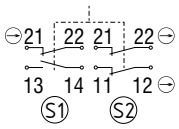
EX-ZQ 900-11-3D



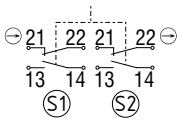
EX-ZQ 900-02-3D



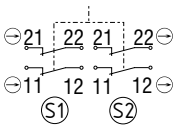
EX-ZQ 900-13-3D



EX-ZQ 900-22-3D



EX-ZQ 900-04-3D



Key
⊖ Positive break NC 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 under tension.

For explosion protection reasons, the component must be exchanged after max. 1 million operations.

Damaged or defective components must be replaced.

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

SCHMERSAL

Original

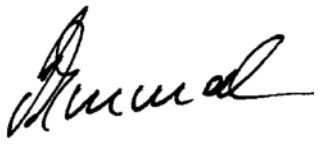
K.A. Schmersal GmbH & Co. KG
Möddinghofe 30
42279 Wuppertal
Germany
Internet: www.schmersal.com

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-…-3D
Type:	see ordering code
Marking:	Ⓔx II 3D Ex tc IIIC T100°C Dc
Description of the component:	Pull-wire emergency stop switch with safety function
Relevant Directives:	Machinery Directive 2006/42/EC Explosion Protection Directive (ATEX) 2014/34/EU RoHS-Directive 2011/65/EU
Applied standards:	EN 60947-5-1:2017 + AC:2020 EN 60947-5-5:1997 + A1:2005 + A11:2013 + A2:2017 EN 620:2021 EN ISO 13850:2015 EN IEC 60079-0:2018 + AC:2020 EN 60079-31:2014
Person authorised for the compilation of the technical documentation:	Oliver Wacker Möddinghofe 30 42279 Wuppertal

Conformity with the explosion protection directive 2014/34/EU (ATEX) is declared by the manufacturer without involving a conformity assessment center.

Place and date of issue: Wuppertal, March 31, 2025



Authorised signature
Philip Schmersal
Managing Director

EX-ZQ900-3D-F-EN

The currently valid declaration of conformity can be downloaded from the internet at products.schmersal.com.

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