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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 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.

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. The relevant requirements of the standard ISO 14119 must be observed.

x.000 / 09.2017 / v.A. - 101187092-EN / G / 2017-09-08 / AE-Nr. 8086

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-AZ 415-①ZPK-②-3D

No.	Option	Description	
①		**S1**	**S2**
	11 / 11	1 NO Contact 1 NC contact	1 NO Contact 1 NC contact
	02 / 11	2 NC	1 NO Contact 1 NC contact
	02 / 20	2 NC	2 NO
	02 / 02	2 NC	2 NC
②	1637	Gold-plated contacts	

⚠ 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 safety switch has been designed to prevent, in conjunction with the control part of a machine, movable safety guards from being opened before hazardous conditions have been eliminated.

ℹ The safety switchgears are classified according to ISO 14119 as type 2 interlocking devices.

The components can be used in explosion-endangered areas of Zone 22 equipment category 3D. Installation and maintenance requirements to the standard series EN 60079 must be met.

⚠ 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

Due to their specific impact energy, the components must be fitted with a protection against mechanical stresses. The specific ambient temperature range must be observed.

2.4 Technical data

Equipment category:	⟨Ex⟩ II 3D
Ex protection:	Ex tc IIIC T60°C Dc X
Standards:	IEC 60947-5-1, EN 60079-0, EN 60079-31, BG-GS-ET-15
Enclosure:	light-alloy diecast, paint finish
Actuator:	zinc-plated brass / aluminium
Max. impact energy:	4 J
Actuating speed:	max. 1 m/s
Protection class:	IP67 to IEC 60529
Contact material:	Silver
Coding level according to ISO 14119:	low
Contact type:	change-over with double break Zb, or 2 NC contacts, galvanically separated contact bridges
Switching system:	⊖ IEC 60947-5-1; slow action, NC contact with positive break
Connection:	screw terminals
Cable section:	min. 0.75 mm² ... max. 1.5 mm² (including conductor ferrules)
Cable entry:	2 x M20 x 1.5
Rated impulse withstand voltage U_{imp}:	4 kV
Rated insulation voltage U_i:	250 V
Thermal test current I_{the}:	6 A
Utilisation category:	AC-15 / DC-13
Rated operating current/voltage I_e/U_e:	4 A / 230 VAC 4 A / 24 VDC
Max. fuse rating:	6 A gG D-fuse
Positive break travel:	3.8 mm
Positive break force:	min. 31 N
Ambient temperature:	–10 °C ... +50 °C
Mechanical life:	max. 1 million operations
Latching force:	80 - 400 N (adjustable)
Cable gland and locking screws:	⟨Ex⟩ II 2GD
Cable cross-section of the cable glands:	min. Ø 7 mm; max. Ø 12 mm
Tightening torques:	cover screws: min. 0.6 Nm Bottom cover screws: min. 0.7 Nm Cable gland: min. 8 Nm Locking screw: min. 8 Nm

2.5 Safety classification

Standards:	ISO 13849-1
Envisaged structure:	
- Basically:	applicable up to Cat. 1 / PL c
- With 2-channel usage and fault exclusion mechanism*:	applicable up to Cat. 3 / PL d with suitable logic unit
B_{10D} NC contact:	2,000,000
B_{10D} NO contact at 10% ohmic contact load:	1,000,000
Service life:	20 years

* If a fault exclusion to the 1-channel mechanics is authorised.

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

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

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

3. Mounting

3.1 General mounting instructions

Fitting is only authorised in a de-energised condition

The enclosure can be fixed by means of 2 mounting holes. The mounting holes are accessible after removal of the cover. The use of a protective ground wire is imperative. The enclosure must not be used as an end stop. Any mounting position. The mounting position must be chosen so as to avoid the penetration of dirt in the used holes.

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

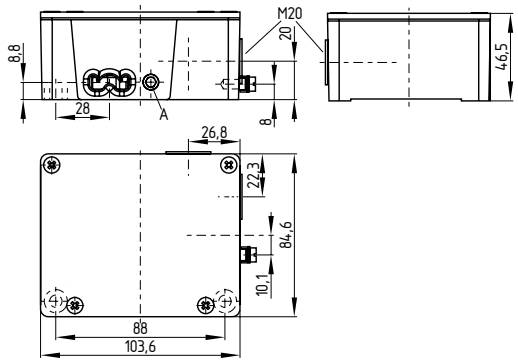
Mounting of the actuators: See mounting instructions actuators.

Please observe the relevant requirements of the standards ISO 12100, ISO 14119 and ISO 14120.

The safety component and the actuator must be permanently fitted to the safety guards and protected against displacement by suitable measures (tamperproof screws, gluing, drilling, pinning).

3.2 Dimensions

All measurements in mm.



4. Rear side Electrical connection

4.1 General information for electrical connection

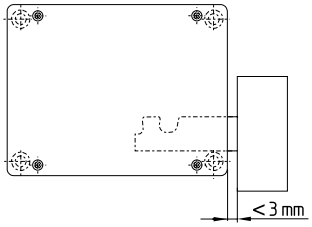
The electrical connection may only be carried out by authorised personnel in a de-energised condition.

The contact labelling can be found in the wiring compartment of the switch.

At least one magnetic contact ⊖ with positive break contacts must be integrated in the safety circuit.

Cable glands (included in delivery) are only authorised for permanent cables. The constructor must provide for the necessary strain relief. After wiring, dust and soiling must be removed from the wiring compartment.

The conductors of the connecting cables must not obstruct the movement of the switching lever. Unused openings must be sealed with EX-certified locking screws (included in delivery).

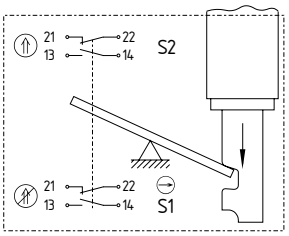


The distance between the actuator flange and the switch enclosure must be < 3 mm when the actuator is inserted.

4.2 Contact variants

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

EX-AZ 415-11/11ZPK-3D



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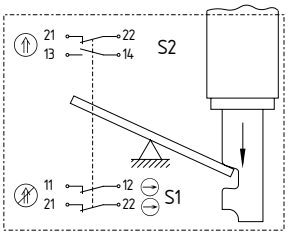

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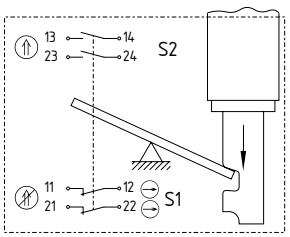

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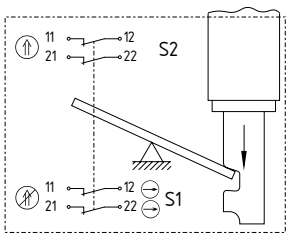

Legend: A positive break
P actuated
⊘ not actuated

Information for the selection of suitable safety-monitoring modules can be found in the Schmersal catalogues or in the online catalogue on the Internet: www.schmersal.net.

5.

6. Set-up and maintenance

6.1 Functional testing

The safety function of the safety components must be tested.
The following conditions must be previously checked and met:
- The installation is executed according to the instructions
- The connection is executed correctly
- The cable is correctly executed and connected
- Check the free movement of the actuating element
- The safety component is not damaged
- Remove particles of dust and soiling
- Check cable entry and connections in de-energised condition

6.2 Maintenance

In case of correct installation in accordance with the instructions described above, the component requires little maintenance. For use in extreme conditions, we recommend routine maintenance including the following steps:
1. Check the correct fixing of the actuator and the safety switchgear
2. Remove particles of dust and soiling
3. Check cable entry and connections in a de-energised condition

⚠ Do not open the device when live.

⚠ Adequate measures must be taken to ensure protection against tampering either to prevent tampering of the safety guard, for instance by means of replacement actuators.

Damaged or defective components must be replaced.

7. Disassembly and disposal

7.1 Disassembly

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

7.2 Disposal

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

8. EU Declaration of conformity

EU Declaration of conformity

SCHMERSAL

Original

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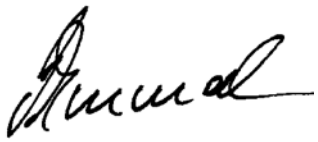
We hereby certify that the hereafter described components both in their basic design and construction conform to the applicable European Directives.

Name of the component:	EX-AZ 415 Ⓔx II 3D Ex tc IIIC T60°C Dc X
Type:	See ordering code
Description of the component:	Positive break position switch with separate actuator for safety functions
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, EN 60079-0:2012 + A11:2013, 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 Am Grauen Stein 51105 Köln ID n°: 0035
Person authorised for the compilation of the technical documentation:	Oliver Wacker Möddinghofe 30 42279 Wuppertal
Place and date of issue:	Wuppertal, May 2, 2017



Authorised signature
Philip Schmersal
Managing Director

EX-AZ415-C-EN

The currently valid declaration of conformity can be downloaded from the internet at www.schmersal.net.

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