SCHMERSAL

EN Operating Instructions . . . . . .pages 1 to 4
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.

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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-TV①S 335-②Z-3D

No.	Option	Description
①	8	Shaft bore Ø 8 mm
	10	Shaft bore Ø 10 mm
②	02	2 NC
	03	3 NC
	11	1 NO / 1 NC
	12	1 NO / 2 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 ordering code below 2.1, these specifications apply accordingly, provided that they correspond to the standard version.

2.3 Purpose

The hinge safety switches are suitable for hinged guards in explosive atmospheres of Zone 22, category 3D, which need to be closed in order to provide for the necessary operational safety. The installation and maintenance requirements to the standard series 60079 must be met.

Conditions for safe operation

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

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.

2.4 Technical Data

Marking in accordance with the ATEX Directive:	⟨Ex⟩ II 3GD
Marking in accordance with standards:	Ex tc IIIC T90°C Dc X
Applied standards:	EN 60947-5-1, EN IEC 60079-0, EN 60079-31
Enclosure:	light-alloy diecast, paint finish
Actuator:	stainless steel 1.4301
Max. impact energy:	4 J
Actuating speed:	max. 1 m/s
Degree of protection:	IP67 to EN 60529
Contact material:	Silver
Contact type:	change-over with double break Zb, or 3 NC contacts, galvanically separated contact bridges
Switching system:	⊖ EN 60947-5-1, slow action, NC contact with positive break
Connection:	screw terminals
Cable section (screw clamp):	
- solid wire:	0.75 … 2.5 mm²
- stranded wire:	0.75 … 2.5 mm² with conductor ferrules
Cable section (equipotential bonding clamp):	
- solid wire:	2.5 mm²
- stranded wire:	1.5 mm² with conductor ferrules
Cable entry:	M20 x 1.5
Rated impulse withstand voltage U_{imp}:	6 kV
Rated insulation voltage U_i:	500 V
Thermal test current I_{the}:	10 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:	10.7 mm
Positive break force:	each NC contact 5 N
Ambient temperature:	–20 °C … + 60 °C
Mechanical life:	max. 1 million operations
Switching frequency:	max. 1,000/h
Shaft bore:	Ø 8 mm / Ø 10 mm
Positive break angle:	7°
Positive break torque:	0.6 Nm
Ex cable gland:	⟨Ex⟩ II 2GD
Cable cross-section of the EX cable glands:	min. Ø 7 mm … 12 mm
Tightening torque:	
- Cover screws:	min. 1.0 Nm
- Ex cable gland:	min. 8 Nm
- Earth screws:	PE 1 Nm, PA 1.2 Nm

2.5 Safety classification

Standards:	EN 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:	20,000,000
B_{10D} NO contact at 10% ohmic contact load:	1,000,000
Mission time:	20 years

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

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

(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

Fitting is only authorised in a de-energised condition.

Please observe the remarks of the standards EN ISO 12100, EN ISO 14119 and EN ISO 14120.

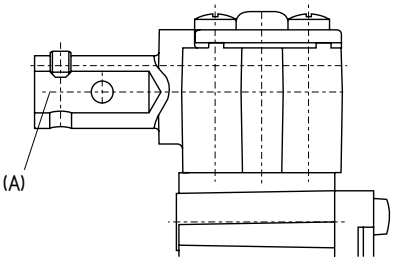
Four mounting holes are provided for fixing the enclosure. The mounting dimensions are mentioned at the rear of the enclosure. The fixing screws must be protected against unauthorised tampering. The use of a protective ground wire is imperative. The enclosure must not be used as an end stop. Any mounting position.

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

Fit the hinge safety switch so that the shaft of the hinge safety switch is aligned with the pin of the door hinge. Use the supplied tamperproof safety screws to fix the hinge safety switch. To set the switching point, first adjust the plug/shaft connection by means of a threaded pin. Then establish the positive link between the shaft and the door hinge. To that effect, use the offset arranged mounting holes and the supplied spiral clamping pin. The head can be turned by 4 x 90°. Loosen the four screws of the head by means of a Torx screwdriver (T 20), turn the head in the desired position and retighten the screws.

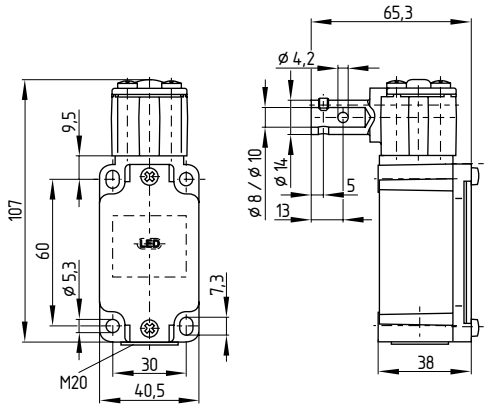
Shaft bore A

TV8S 335	Ø 8 mm
TV10S 335	Ø 10 mm



3.2 Dimensions

All measurements in mm.



4. Electrical connection

4.1 General information for electrical connection

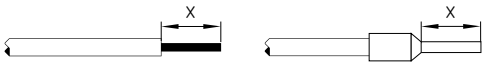
The electrical connection may only be carried out by authorised personnel in a de-energised condition.

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

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.

According to EN 60204-1, the versions with connector must only be used in PELV circuits.

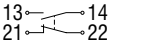
Settle length x of the conductor:
- on screw terminals: 6 mm
- on the equipotential bonding terminal: 7 mm



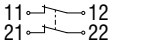
4.2 Contact Options

Contacts are shown with safety guard closed.
This is the rest position of the switch

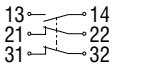
1 NO / 1 NC
EX-TV.S 335-11Z-3D



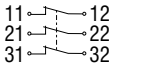
2 NC
EX-TV.S 335-02Z-3D



1 NO / 2 NC
EX-TV.S 335-12Z-3D

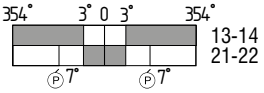


3 NC
EX-TV.S 335-03Z-3D

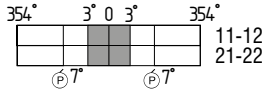


4.3 Switch travel diagrams

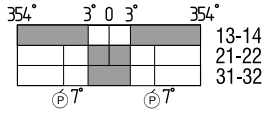
1 NO / 1 NC



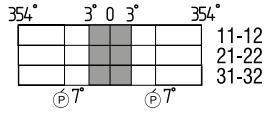
2 NC



1 NO / 2 NC



3 NC



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:
- 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
- Check for correct installation of the hinge safety switch
- Check the positive link between the shaft and the door hinge

5.2 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 for correct installation of the hinge safety switch
2. Check the positive link between the shaft and the door hinge
3. Remove particles of dust and soiling
4. 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.

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. Declaration of conformity

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

Relevant Directives:	Applied standards:
2006/42/EG	EN 60947-5-1:2017 + AC:2020
2014/34/EU	EN IEC 60079-0:2018
2011/65/EU	EN 60079-31:2014

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

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