



**EN** Operating Instructions . . . . .pages 1 to 4  
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 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](https://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.

### 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:	Ⓔ 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 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:	Ⓔ 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.

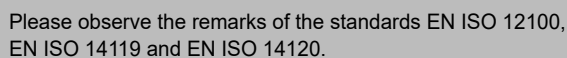
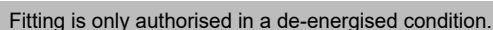
$$MTTF_D = \frac{B_{10D}}{0,1 \times n_{op}} \quad n_{op} = \frac{d_{op} \times h_{op} \times 3600 \text{ s/h}}{t_{cycle}}$$

(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.

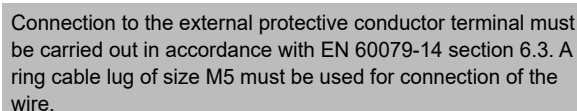
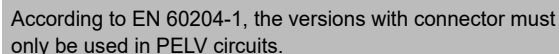
#### 4. Electrical connection

#### 4.1 General information for electrical connection

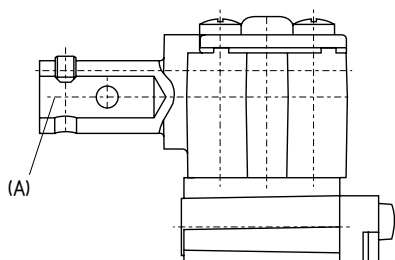


The electrical connection may only be carried out by authorised personnel in a de-energised condition.

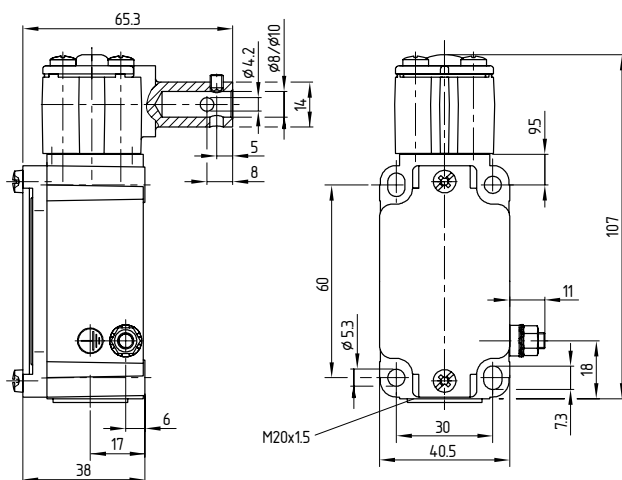
Cable glands (included in delivery) are only authorised for permanent cables. The constructor must provide for the necessary strain relief. After wiring, dust and soiling must be removed from the wiring compartment.



<b>Shaft bore A</b>	TV8S 335	Ø 8 mm
	TV10S 335	Ø 10 mm



All measurements in mm.



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

A diagram of a 2-to-2 multiplexer. It has two inputs on the left, labeled 13 and 21, and two outputs on the right, labeled 14 and 22. The input lines are connected to a central switching mechanism represented by a diamond shape. The output lines are connected to the right side of the diamond.

A diagram of a 2x2 multiplexer. It has four inputs on the left: 11 (top), 21 (bottom), 12 (top), and 22 (bottom). On the right, there are two outputs: 12 (top) and 22 (bottom). A dashed vertical line connects the two input lines (11 and 21) in the center, indicating a control signal or a specific configuration.

354°      3° 0 3°      354°


13-14  
21-22

(P) 7°      (P) 7°

Diagram illustrating a 2D lattice structure with angles and labels:

- Top row labels:  $35^\circ$ ,  $3^\circ$ ,  $0$ ,  $3^\circ$ ,  $35^\circ$
- Bottom row labels: 11-12, 21-22
- Central shaded region: A  $2 \times 2$  grid of cells.
- Labels below the grid:  $(P) 7^\circ$  (under the first and fourth columns).

354°      3° 0' 3°      354°


(P) 7°      (P) 7°

13-14  
21-22  
31-32

35° 3° 0 3° 35°

11-12  
21-22  
31-32

(P) 7° (P) 7°

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.**


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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/EC	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](http://products.schmersal.com).