



**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 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.



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. The entire concept of the control system, in which the safety component is integrated, must be validated to EN ISO 13849-2.

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 EN 1088 must be observed.

### 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:

#### T①V10S 500L-②Z

No.	Option	Description
①	1	with universal joint with socket
②	22	2 NO contacts / 2 NC contacts
	33	3 NO contacts / 3 NC 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 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 hinge safety switches are compliant with category 2 of the test principle for positive break position switches for safety functions BG-GS-ET 15. The safety switches are suitable for hinged guards, which need to be closed in order to ensure the necessary operational safety.

### Design/operating principle

The hinge safety switches have two/three switch inserts S1, S2 and S3, which are operating reciprocally. The positive-break NC contacts of switch insert S1 and possible S3 are opened by opening the safety guard.

### T1V10S 500

The hinge safety switches have a rigid socket for the hinge shaft. Fit the hinge safety switch so that the shaft of the hinge safety switch is aligned with the pin of the door hinge.

### TV10S 500

The hinge safety switches with double universal joint can be installed offset with regard to the hinge shaft.



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

### 2.4 Technical data

Standards:	IEC/EN 60947-5-1, BG-GS-ET-15
Design:	fixings to EN 50041
Enclosure:	light-alloy die-cast, enamel finish
Protection class:	IP67
Contact material:	Silver
Contact type:	2 or 3 change-over contacts with double break Zb
Switching system:	⊖ IEC 60947-5-1; slow action, NC contact with positive break
Connection:	screw terminals Cable section: 1.5 mm <sup>2</sup> (including conductor ferrules)
U <sub>imp</sub> :	4 kV
U <sub>j</sub> :	250 V
I <sub>the</sub> :	6 A
Utilisation category:	AC-15, DC-13
I <sub>e</sub> /U <sub>e</sub> :	4 A / 230 VAC, 1 A / 24 VDC
Short-circuit protection:	6 A gG, D-fuse (DIN EN 60269-1)
Ambient temperature:	- 25°C ... + 80°C
Mechanical life:	3 million operations
Switching frequency:	max. 1000/h
Shaft bore:	∅ 10 mm
Positive break angle:	14°
Positive break torque:	1.5 Nm

### 2.5 Safety classification

Standards:	EN ISO 13849-1
B <sub>10D</sub> (NC contact):	20,000,000
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

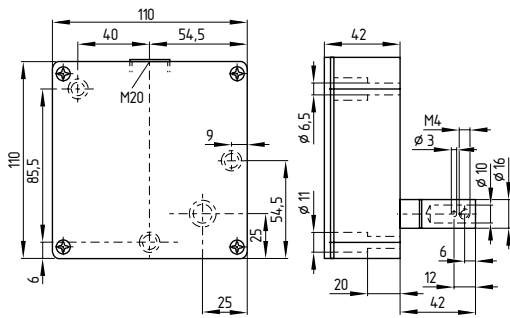
Any mounting position. To set the switching point, first adjust the plug/shaft connection by means of a threaded pin (execute the optimal setting by means of a continuity tester). Then realise the positive connection between the shaft and the door hinge. To this effect, drill the ∅ 3 mm hole of the shaft in the plug and insert the supplied tension pin 3 x 14 mm.



Positive break angle: 14° (regard settings)

### 3.2 Dimensions

All measurements in mm.



Please observe the remarks of the standards EN ISO 12100, EN 953 and EN 1088.

## 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.

For the cable entry, suitable cable glands with an appropriate degree of protection must be used. To this effect, two M20 cable entries are available. Non-used openings must be sealed by means of threaded plugs. To open the cover, the cover screws must be loosened. After wiring, the inside of the switch must imperatively be cleaned (e.g. removal of cables residues), considering that foreign bodies can affect the switching behaviour. The conductors of the connecting cables must not obstruct the movement of the switching lever. Maximum tightening torque for the screws: cover  $0.6 + 0.1$  Nm; bottom cover  $0.7 + 0.1$  Nm.



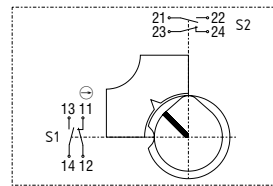
When selecting the connecting cable, a possible temperature increase of up to 8.5 K inside the switch's wiring compartment must be taken into account.

### 4.2 Contact variants

Contacts are shown with safety guard closed. The switch is in resting position.

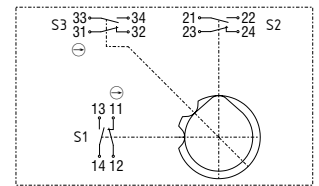
#### TV10S 500L-22Z T1V10S 500L-22Z

2 NO contacts / 2 NC contacts



#### TV10S 500L-33Z T1V10S 500L-33Z

3 NO contacts / 3 NC contacts

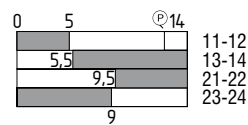


#### Key

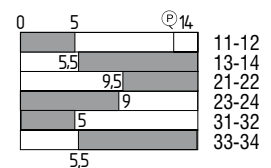
⊖ positive break

### 4.3 Switch travel diagrams

2 NO contacts / 2 NC contacts



3 NO contacts / 3 NC contacts



## 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 positive link between the shaft and the door hinge
2. Check for correct installation of the hinge safety switch
3. Check the switch enclosure for damage
4. Check the integrity of the cable entry and connections

### 5.2 Maintenance

In case of correct installation in accordance with the instructions described above, the component requires little maintenance.

A regular visual inspection and functional test, including the following steps, is recommended:

1. Check the positive link between the shaft and the door hinge
2. Check the switch enclosure for damage
3. Check for correct installation of the hinge safety switch
4. Remove particles of dust and soiling
5. Check cable entry and connections

**Damaged or defective components must be replaced.**

## 6. Disassembly and disposal


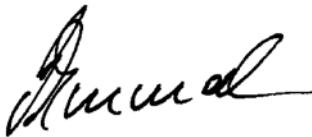
### 6.1 Disassembly

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

<b>EU Declaration of conformity</b>		
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.		
<b>Name of the component:</b>	T.V10S 500	
<b>Type:</b>	See ordering code	
<b>Description of the component:</b>	Hinge safety switch	
<b>Relevant Directives:</b>	Machinery Directive RoHS-Directive	2006/42/EC 2011/65/EU
<b>Applied standards:</b>	DIN EN 60947-5-1:2010, DIN EN ISO 14119:2014	
<b>Person authorised for the compilation of the technical documentation:</b>	Oliver Wacker Möddinghofe 30 42279 Wuppertal	
<b>Place and date of issue:</b>	Wuppertal, November 10, 2017	
		
	Authorised signature <b>Philip Schmersal</b> Managing Director	

TVS600-C-EN



The currently valid declaration of conformity can be downloaded from the internet at [www.schmersal.net](http://www.schmersal.net).



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