



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

The 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](http://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 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-①② 235-③Z④-⑤-⑥-⑦-3D**

No.	Option	Description
①	Z T	Snap action ⊖ Slow action ⊖
②		Actuator selection, refer to catalogue
③	02 11 20	2 NC 1 NO / 1 NC 2 NO
④	H UE	Slow action with staggered contacts Slow action with overlapping contacts
⑤	1297	Enclosure with transverse slotted holes
⑥	2138	Roller lever 7H, suitable for safety applications
⑦	1637	Gold-plated contacts



Only if the information described in this operating instructions manual are realised correctly, the compliance with 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 position switches are suitable for hinged or sliding guards, which need to be closed in order to provide for the necessary operational safety. The components can be used in explosion-endangered areas of Zone 2 and 22 equipment category 3GD. 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 provide for a protection against the permanent influence of UV rays.



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

### 2.4 Technical data

Designation in accordance with the ATEX Directive:	⊕ II 3G ⊕ II 3D
Designation in accordance with the standards:	Ex tc IIIC T90°C Dc X, Ex nC IIC T5 Gc X
Applied standards:	EN 60947-5-1, EN IEC 60079-0, EN IEC 60079-15, EN 60079-31
Design:	fixings to EN 50047
Enclosure:	zinc die-cast, enamel finish
Max. impact energy:	1 J
Protection class:	IP67
Contact material:	Silver
Contact type:	change-over with double break Zb, or 2 NC contacts, galvanically separated contact bridges
Switching system:	⊖ EN 60947-5-1, slow or snap action, NC contacts with positive break
Connection:	screw terminals
Cable section:	0,75 ... 2,5 mm <sup>2</sup> , solid and stranded wire with conductor ferrules
Cable entry:	M20 x 1.5
Rated impulse withstand voltage U <sub>imp</sub> :	6 kV
Rated insulation voltage U <sub>i</sub> :	500 V
Thermal test current I <sub>the</sub> :	10 A
Utilisation category:	AC-15 / DC-13
Rated operating voltage/	
Rated operating current I <sub>e</sub> /U <sub>e</sub> :	4 A / 230 VAC; 1 A / 24 VDC
Max. fuse rating:	6 A gG D-fuse
Required short-circuit current:	1000 A
Ambient temperature:	-20 °C ... + 60 °C
Mechanical life:	20 million operations
Switching frequency:	max. 5000/h
Max. Actuating speed:	1 m/s
Bounce duration:	slow action: < 3 ms; snap action: in accordance with actuating speed
Switchover time:	slow action: in accordance with actuating speed
Cable cross-section of the cable glands:	min. Ø 7 mm; max. Ø 12 mm
Cable glands:	⊕ II 2GD
Tightening torque:	
- Cover screws:	min. 0.6 Nm
- Cable gland:	min. 8 Nm
- Earth screws:	PE 1 Nm, PA 1.2 Nm

### 2.5 Classification

Standards:	EN ISO 13849-1
B <sub>10D</sub> (NC contact):	20,000,000
B <sub>10D</sub> (NO contact)	
at 10% ohmic contact load:	1,000,000
Mission time:	20 years

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

(Determined values can vary depending on the application-specific parameters h<sub>op</sub>, d<sub>op</sub>, t<sub>cycle</sub> as well as the load.)

### 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 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.

To ensure a proper functioning, the switch must be installed so that the required switch travel is obtained. For safety functions, at least the positive break travel indicated in the switch travel diagram (refer to catalogue) must be obtained. All components have sufficient after-travel to compensate for inaccuracies in the guidance of the actuating system. The actuation of the switch beyond its end stop however must be avoided.



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

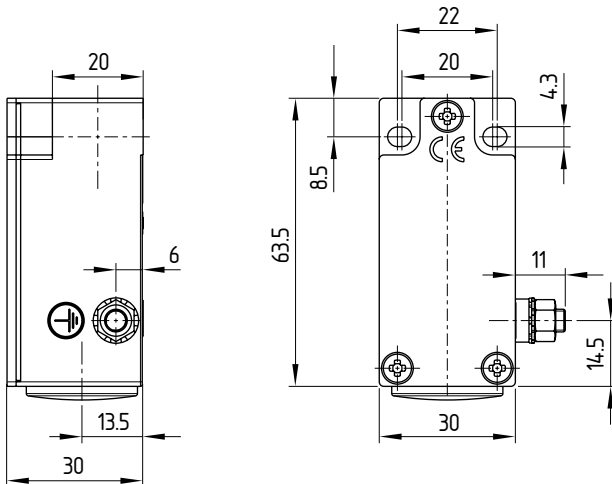


Please observe the relevant requirements of the standards EN ISO 12100, EN ISO 14119 and EN ISO 14120.

#### 3.2 Dimensions

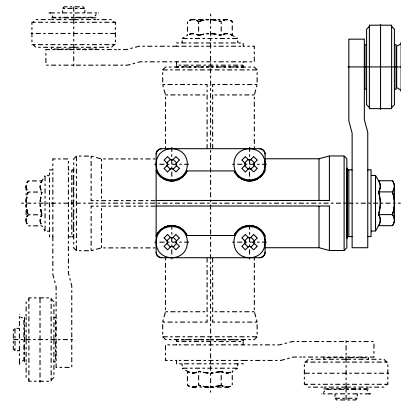
All measurements in mm.

#### Position switches EX-Z/T 235



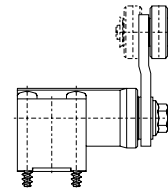
#### Mounting of the actuating heads

Repositioning the actuating heads (R, 1R, 4R, K, 3K, 4K, V.H)



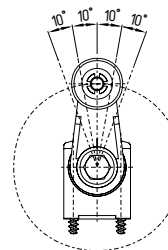
The actuating head can be repositioned by 4 x 90°. Unscrew the four screws of the actuating head (Philips tip profile PZ1), reposition the actuating head in the desired position and retighten the four screws (tightening torque 0.45 Nm).

#### Repositioning the roller lever (H.)



The (offset) roller arm may be reversed, so that the roller faces the inside of the arm.

#### Positioning the lever (H.)



The roller lever can be repositioned over 360° on the toothed shaft in 10° steps. Unscrew the hexagonal screw approx. 4 mm, reposition the lever in the desired position and retighten the screw.

#### Length-adjustable lever (7H, 10H)

To adjust the length of the lever, unscrew the fixing screw of the lever. Firmly retighten the screw after the length adjustment.



Position switches with 7H, 10H actuator or spring rod lever AF are without positive break and not suitable for safety functions. Ordering suffix for actuator 7H with positive break: -2138.

### 4. Electrical connection

#### 4.1 General information for electrical connection

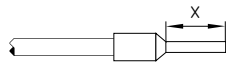


The electrical connection may only be carried out by authorised personnel in a de-energised condition.

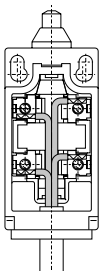
The contact labelling can be found in the wiring compartment of the switch.

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.

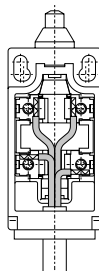
**Settle length x of the conductor: 6 mm**



**Right**



**Wrong**



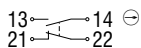
Connection to the external protective conductor terminal must be carried out in accordance with EN 60079-14 section 6.3. A ring cable lug of size M5 must be used for connection of the wire.

#### 4.2 Contact variants

Contacts are shown with safety guard closed.

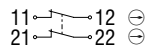
##### 1 NO / 1 NC

EX-Z/T 235-11Z-3D



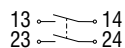
##### 2 NC

EX-Z/T 235-02Z-3D



##### 2 NO

EX-T 235-20Z-3D



Position switches with two NO contacts (-20) are not suitable for safety functions.

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### 5. Set-up and maintenance

#### 5.1 Functional testing

The function of the position switch must be tested.

The following conditions must be previously checked and met:

- Cable entry and connections are carried out in accordance with regulations
- Remove particles of dust and soiling
- Check the free movement of the actuating element
- The position switch is not damaged

#### 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 the correct fixing of the position switch
2. Remove particles of dust and soiling
3. Check cable entry and connections in a de-energised condition
4. Lubricate the shaft or plunger



Do not open the device when live.



Throughout the operative life cycles of the position switch, suitable constructive and organisational measures are to be taken to prevent against tampering and to prevent the safety device being overridden.

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

**For explosion protection reasons, the component must be exchanged after max. 20 million operations.**

### 6. Disassembly and disposal

#### 6.1 Disassembly

The position switch must be disassembled in a de-energised condition only.

#### 6.2 Disposal



The position switch 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:



2014/34/EU

2011/65/EU

#### Applied standards:

EN 60947-5-1:2017 + AC:2020

EN IEC 60079-0:2018

EN IEC 60079-15:2019

EN 60079-31:2014



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