



**EN** Operating instructions. . . . .pages 1 to 8  
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 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 against improper use



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 DIN EN ISO 14119 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:

EX-AZM 170-①Z②K③-24VAC/DC-3G/D		
No.	Option	Description
①	11	1 NO / 1 NC
	02	2 NC contacts
②		Latching force 5 N
	R	Latching force 30 N
③		Power to unlock
	A	Power to lock


 Only if the information described in these operating instructions are realised correctly can the safety function and therefore the compliance with the Machinery/Explosion Protection Directive be 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 solenoid interlock 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. The components can be used in potentially explosive atmospheres of Zone 2 and 22 equipment category 3GD. Installation and maintenance requirements to the standard series EN 60079 must be met.

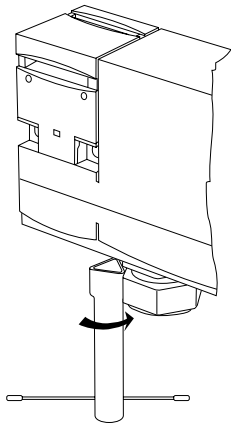
 The safety switchgears are classified according to DIN EN ISO 14119 as type 2 interlocking devices.

 Interlocks with power to lock principle may only be used in special cases after a thorough evaluation of the accident risk, since the safety guard can be opened immediately on failure of the power supply or upon activation of the main switch.

**Manual release**

A manual release is available as a mounting tool and in the event of a power failure in case the power to unlock principle is used. If the triangular key is turned 180°, the locking bolt is pulled into the unlocking position. Please ensure that jamming by external influence on the actuator is avoided. The normal locking function is only restored after the triangular key has been returned to its original position. After being put into operation, the manual release must be secured by installing the sealing plug, which is included in delivery.


Manual release




Triangular key TK-M5 (101100887) available as accessory.

**Conditions for safe operation**

Due to the specific impact energy, the devices must be installed protected against mechanical loads of min. 7 J (for protective enclosure accessories, see the section on mounting). 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.

 The entire concept of the control system, in which the safety component is integrated, must be validated to the relevant standards.

<b>2.4 Technical data</b>	
Designation in accordance with the ATEX Directive:	⊕ II 3GD
Designation in accordance with standards:	Ex nC IIB T5 Gc X, Ex tc IIIC T80°C Dc X
Applied standards:	EN 60947-5-1, EN 60079-0, EN 60079-15, EN 60079-31
Enclosure:	glass-fibre reinforced thermoplastic, self-extinguishing
Actuator and locking bolt:	stainless steel 1.4301
Holding force $F_{max}$ :	1,300 N
Holding force $F_{Zh}$ :	1,000 N
Latching force:	5 N
- Ordering suffix R:	30 N
Coding level according to DIN EN ISO 14119:	low
Degree of protection:	IP67
Contact material:	Silver
Contact types:	Change-over contact with double break, type Zb or 2 NC contacts, with galvanically separated contact bridges
Switching system:	⊖ EN 60947-5-1, slow action, NC contact with positive break

Connection:	cut clamp terminals
Cable entry:	M16
Cable section:	0.75 ... 1.0 mm <sup>2</sup> , flexible
Cable glands:	⊗ II 2GD
Cable cross-section:	Ø 6.5 ... 12 mm
Tightening torque:	
- Screwed cable gland:	4.5 Nm
- Cover screws:	0.4 ... 0.5 Nm
	(cylindrical screw M3 x 20)
Ambient temperature:	-15 °C ... +45 °C
Positive break travel (unlocked):	11 mm
Positive break force (unlocked):	6 N for each NC contact fitted
Actuating speed:	max. 1 m/s
Actuating frequency:	max. 1,000 operations/h
Mechanical life:	max. 1 million operations
Max. impact energy:	1 J
- with mechanical enclosure:	7 J
<b>Electrical data:</b>	
Utilisation category:	DC-13
Rated operating current/voltage I <sub>e</sub> /U <sub>e</sub> :	2 A / 24 VAC
Rated impulse withstand voltage U <sub>imp</sub> :	4 kV
Rated insulation voltage U <sub>i</sub> :	250 V
Thermal test current I <sub>the</sub> :	2 A
Max. fuse rating:	2 A gG D-fuse
Required rated short-circuit current:	1,000 A
Rated control voltage U <sub>s</sub> :	24 VDC
<b>Electrical data – Magnet control:</b>	
Magnet switch-on time:	100%
Power consumption:	max. 10 W
Accepted test pulse duration on input signal:	≤ 5.0 ms
- With test pulse interval of:	≥ 50 ms

### 2.5 Safety classification of the interlocking function

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 <sub>10D</sub> NC contact:	2,000,000
B <sub>10D</sub> 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<sub>op</sub>, d<sub>op</sub> and t<sub>cycle</sub> 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.

### 2.6 Safety classification of the interlock function

If the device is used as an interlock for personal safety, a safety classification of the guard locking function is required.

When classifying the interlock function, a distinction must be made between monitoring of the interlock function (locking function) and controlling the unlocking function.

The following safety classification of the unlocking function is based on the application of the principle of safety energy disconnection for the solenoid supply

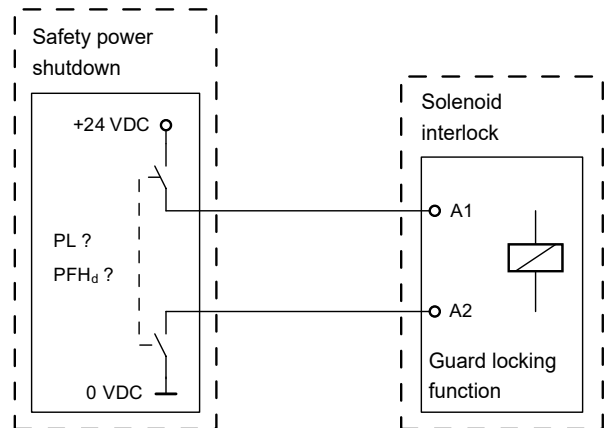


The classification of the release function is only valid for devices with monitored guard locking function and in the power to unlock version (see ordering code).

A fault exclusion for the guard locking function can be assumed by an external safety energy disconnection

In this case, the guard locking function does not have an effect on the failure probability of the unlock function.

The safety level of the unlock function is determined exclusively by the external safety power shutdown.

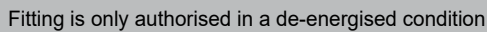


Fault exclusion with regard to wiring routing must be observed.

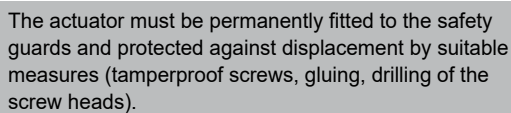
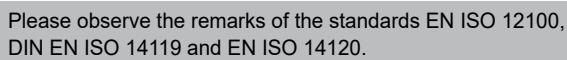
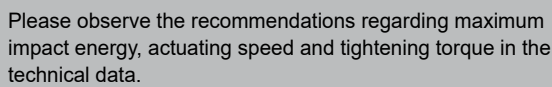


If for a certain application the power to unlock version of a solenoid interlock cannot be used, for this exception an interlock with power to lock can be used if additional safety measure need to be realised that have an equivalent safety level.

### 3.1 General mounting instructions



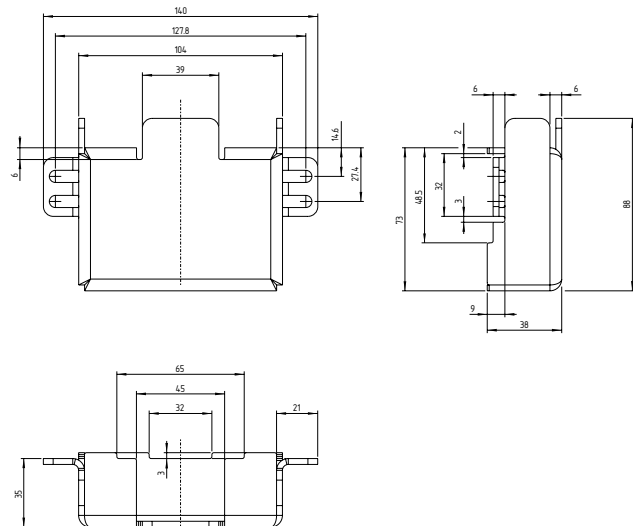
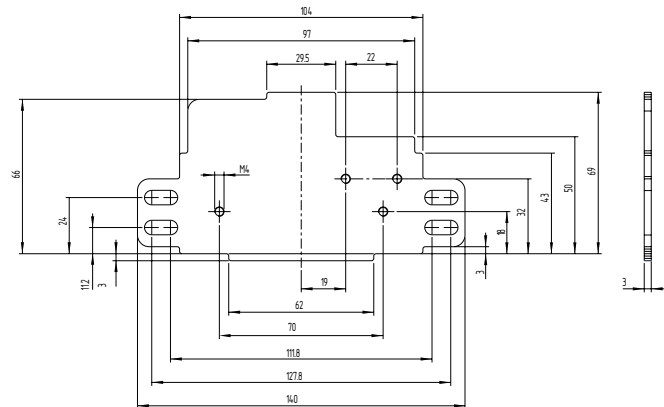
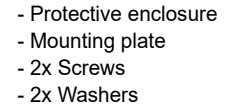
The component must be mechanically protected. In order to provide for increased mechanical protection (7Y impact resistance), the solenoid interlock can be fitted with an additional protective enclosure (available as accessory).



All measurements in mm.

[illegible]

(Mounting parallel to safety guard)



## 5

### 5. Set-up and maintenance



The installation, operation and maintenance must be executed by qualified professionals. The requirements to be met for the installation and the maintenance can be found in this operating instructions manual. Do not expose the device to mechanical and/or thermal loads or stresses, which exceed the limits specified in the operating instructions manual.

For the set-up and the operation of the safety switchgear, the applicable (also national) safety and accident prevention regulations as well as the generally acknowledged codes of practice of technology must be observed.

#### 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
- The sealing is correctly located in the enclosure.  
(Do not remove the sealing!)
- The safety component is not damaged
- Remove particles of dust and soiling
- Check cable entry and connections

#### 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 actuator and the safety switchgear
2. Remove particles of dust and soiling
3. Check cable entry and connections in a de-energised condition



Avoid electrostatic charging. Clean with damp cloth. 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.**

**For explosion protection reasons, the component must be exchanged after max. 1 million operations.**

### 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

EU Declaration of conformity



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-AZM 170

**Marking:** Ⓢ II 3G Ex nC IIB T5 Gc X  
Ⓢ II 3D Ex tc IIIC T80°C Dc X

**Type:** See ordering code

**Description of the component:** Interlocking device with electromagnetic interlock for safety functions

**Relevant Directives:**

Machinery Directive	2006/42/EC
EMC-Directive	2014/30/EU
Explosion Protection Directive (ATEX)	2014/34/EU
RoHS-Directive	2011/65/EU

**Applied standards:** EN 60947-5-1:2017  
DIN EN ISO 14119:2014  
EN 60079-0:2012 + A11:2013  
EN 60079-15:2010  
EN 60079-31:2014

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**Place and date of issue:** Wuppertal, January 7, 2021

Authorised signature  
**Philip Schmersal**  
Managing Director

EX-AZM170-F-EN



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



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