



**EN** Operating instructions. . . . .pages 1 to 6  
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: [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 safety switchgear, personal hazards or damages to machinery or plant components cannot be excluded. The relevant requirements of the standard 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:

#### AZM 170<sup>①</sup>-ST-FB-<sup>②</sup><sup>③</sup>-<sup>④</sup>

No.	Option	Description
①	Z	Guard locking function monitors  (not in power to lock version)
	B	Actuator monitored
②	R	Latching force 5 N
	R	Latching force 30 N
③	A	Power to unlock
	A	Power to lock
④	2197	Manual release for Power to unlock
	2405	Emergency exit



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 solenoid interlock AZM 170-FB has been designed to prevent movable safety guards in conjunction with the control part of a machine from being opened before hazardous conditions have been eliminated.



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.

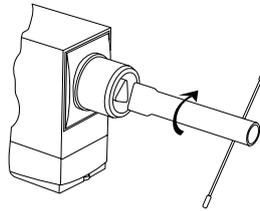


The safety switchgears are classified according to EN ISO 14119 as type 2 interlocking devices.

The AZM 170-FB is for use in combination with the safety field box SFB made by Schmersal.

### 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.



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

### Emergency exit

Fitting and actuation only from within the hazardous area.

To activate the emergency exit, turn the red lever in the direction of the arrow to the end stop. Please ensure that jamming by external influence on the actuator is avoided.



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

Standards:	EN 60947-5-1, EN ISO 14119
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 EN ISO 14119:	low
Protection class:	IP67
Contact material:	Silver
Contact type:	change-over contact with double break, type Zb, with galvanically separated contact bridges
Switching system:	⊖ acc. EN 60947-5-1 slow action, NC contact with positive break
Connection:	Connector plug
Ambient temperature:	-25 °C ... +60 °C
Positive break travel (unlocked):	11 mm
Positive break force (unlocked):	8.5 N for each NC contact fitted
Actuating speed:	max. 2 m/s
Actuating frequency:	max. 1,000 operations/h
Mechanical life:	> 1,000,000 operations
<b>Electrical data:</b>	
Utilisation category:	DC-13
Rated operating current/voltage $I_e/U_e$ :	2 A / 24 VDC
Rated impulse withstand voltage $U_{imp}$ :	0.8 kV
Rated insulation voltage $U_i$ :	60 V
Thermal test current $I_{the}$ :	2 A
Max. fuse rating:	2 A gG D-fuse
Required rated short-circuit current:	1,000 A
Rated control voltage $U_s$ :	24 VDC
<b>Electrical data – Magnet control:</b>	
Magnet switch-on time:	100 %
Power consumption:	max. 12 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
- With dual-channel use and Mechanical fault exclusion *:	usable to cat. 3/PL d when connected to the SFB
$B_{10D}$ NC contact:	2,000,000
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.)

### 2.6 Safety classification of the guard locking 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 classification of the release function applies to connection of an AZM 170-FB to the safety field box SFB.



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).

Standards:	EN ISO 13849-1
PL:	d
Control Category:	2
PFH:	≤ 3.01 x 10 <sup>-7</sup> / h
Mission time:	20 years

For the electromechanical part of the locking device, it can be assumed that no errors can occur. The safety level is determined exclusively by the external activation of release function.

The safety field box SFB activates the unlocking function of the guard lock with a secure and monitored output. In the event of a fault resulting in the unlocking of the guard locking function, it will be reliably detected by the SFB.



The safety analysis of the guard locking function refers to the component solenoid interlock AZM 170-FB as part of the complete system. In the event of a fault resulting in the unlocking of the guard locking function, it will be reliably detected by the SFB. If a fault is detected, the SFB passivates the slot used and switches the safety function of the AZM 170-FB in the safety controller off. When such a fault occurs the protection equipment may open immediately, just once, before the safe condition of the machine is reached. The system reaction of category 2 allows that a fault can occur between tests causing the loss of the safety function which is detected by the test.

### 3. Mounting

#### 3.1 General mounting instructions

Two mounting holes are provided for fixing the enclosure. The solenoid interlock is double insulated. The use of an earth wire is not authorised. The solenoid interlock must not be used as an end stop. Any mounting position. The mounting position however must be chosen so that the ingress of dirt and soiling in the used opening is avoided. Unused actuator openings must be sealed with slot sealing plugs.



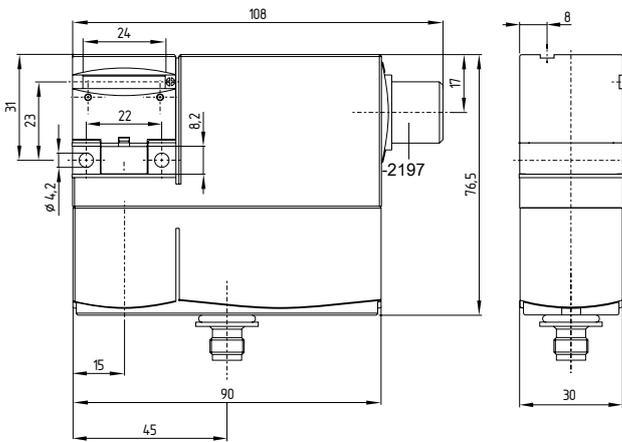
The actuator must be permanently fitted to the safety guards and protected against displacement by suitable measures (tamperproof screws, gluing, drilling of the screw heads).



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

#### 3.2 Dimensions

All measurements in mm.



**Key:** Manual release from side, ordering suffix -2197

### 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.

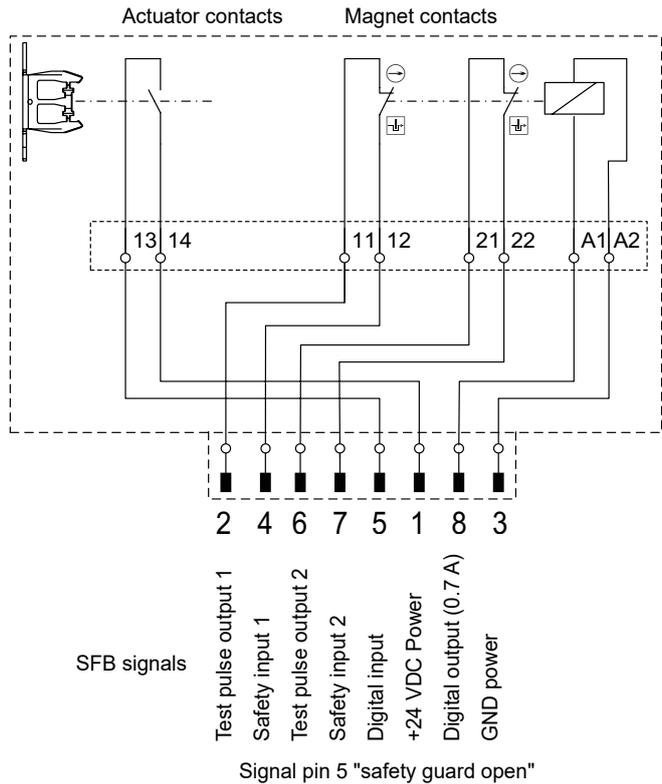


If the risk analysis indicates the use of monitored guard locking, a variant of the AZM170Z (power to unlock version only) must be used.

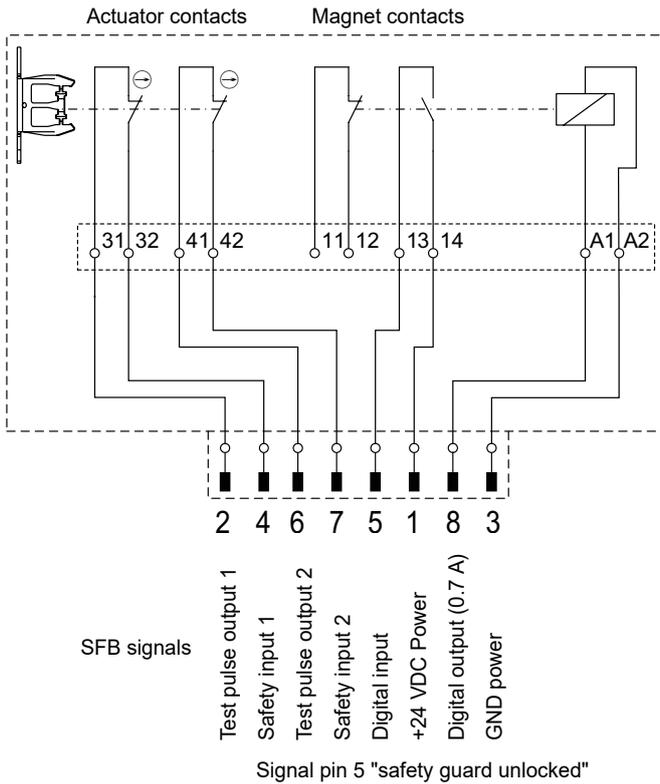
#### 4.2 Contact variants

Contacts shown in a de-energised condition and with the actuator inserted.

#### Z variant (power to unlock version)



### B variant (power to lock version)

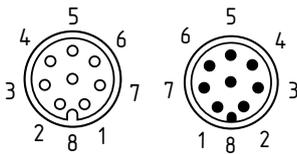


#### Key

- ⊖ Positive break NC contact
- ☒ Monitoring the interlock according to EN ISO 14119

#### 4.3 Connector accessories

Connecting cables  
M12, 8-pole - 8 x 0.25 mm<sup>2</sup>, IP68



Cable length	Ordering code
0.25 m	103014812
0.5 m	101217786
1.0 m	101217787
1.5 m	101217788
2.5 m	101217789
3.5 m	103013428
5.0 m	101217790
7.5 m	103013429
10.0 m	103013125



Information for available connectors can be found on our website: [products.schmersal.com](http://products.schmersal.com).

## 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. Fitting of the solenoid interlock and the actuator
2. Check the integrity of the connections
3. Check the switch enclosure for damage

### 5.2 Maintenance

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

1. Check for tight installation of the actuator and the switch
2. Remove particles of dust and soiling
3. Check the integrity of the connections



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.**

## 6. Disassembly and disposal

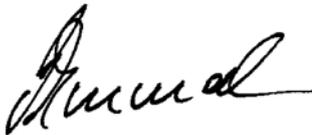
### 6.1 Disassembly

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>	AZM 170-FB	
<b>Type:</b>	See ordering code	
<b>Description of the component:</b>	Interlocking device with electromagnetic interlock for safety functions	
<b>Relevant Directives:</b>	Machinery Directive	2006/42/EC
	EMC-Directive	2014/30/EU
	RoHS-Directive	2011/65/EU
<b>Applied standards:</b>	EN 60947-5-1:2017 EN ISO 14119:2013	
<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, July 22, 2020	
		
	Authorised signature <b>Philip Schmersal</b> Managing Director	

AZM170FB-A-DE



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

