



EN Operating instructions.pages 1 to 6
Original

Content

1 About this document

1.1 Function 1

1.2 Target group: authorised qualified personnel. 1

1.3 Explanation of the symbols used 1

1.4 Appropriate use 1

1.5 General safety instructions 1

1.6 Warning about misuse 1

1.7 Exclusion of liability 2

2 Product description

2.1 Ordering code 2

2.2 Special versions. 2

2.3 Purpose 2

2.4 Technical data 3

2.5 Safety classification of the interlocking function. 3

2.6 Safety classification of the guard locking function 3

3 Mounting

3.1 General mounting instructions 4

3.2 Dimensions 4

4 Electrical connection

4.1 General information for electrical connection. 4

4.2 Contact Options 4

4.3 Connector accessories 5

5 Set-up and maintenance

5.1 Functional testing. 5

5.2 Maintenance 5

6 Disassembly and disposal

6.1 Disassembly. 5

6.2 Disposal 5

7 EU Declaration of conformity

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 delivery programme 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.

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 161^{①-②}-FB-^{③④⑤}

| No. | Option | Description |
|-----|--------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| ① | Z | Guard locking function monitors  (not in power to lock version) |
| | B | Actuator monitoring |
| ② | ST1 | Connector plug M12 centre |
| | ST2 | Connector plug M12 right |
| ③ | | Latching force 5 N |
| | R | Latching force 30 N |
| ④ | | Power to unlock |
| | A | Power to lock |
| ⑤ | | Manual release |
| | N | Emergency release |
| | T | Emergency Exit |
| | TD | Emergency exit on the cover side |
| | TU | Emergency exit on the rear side |



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 ordering 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.



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.

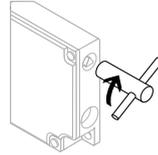
The AZM 161-FB is for use in combination with the safety field box SFB made by Schmersal.

Manual release

(for set-up, maintenance, etc.)

Manual release is realised by turning the triangular key by 180° (M5 triangular key available as accessory), so that 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 plastic cover, which is included in delivery.

Lateral manual release



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

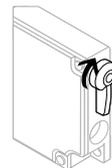
Emergency release (ordering suffix -N)

(Fitting and actuation only from outside the hazardous area)



The emergency release should only be used in an emergency. The solenoid interlock should be installed and/or protected so that an inadvertent opening of the interlock by an emergency release can be prevented. The emergency release must be clearly labelled that it should only be used in an emergency. The label can be used that was included in the delivery.

To activate the emergency release in case of an emergency, the orange lever must be turned to the stop in the direction marked by the arrow. In this position, the safety guard can be opened. The lever is latched and cannot be returned to its original position. To cancel the blocking condition, the central mounting screw must be loosened to such extent that the lever can be turned back into its original position. The screw must then be re-tightened.



Emergency exit

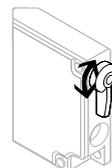
(Fitting and actuation only from within the hazardous area)

To activate the emergency exit of the T version in case of an emergency, the orange lever must be turned to the stop in direction marked by the arrow. The emergency exit function of the TD and TU versions is activated by pressing the red pushbutton.

In this position, the safety guard can be opened. The blocking condition is cancelled by turning the lever in opposite direction or by pulling back the pushbutton. In unlocked position, the safety guard is protected against unintentional closing.

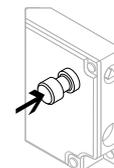
Lateral emergency exit

(ordering suffix -T)



Emergency exit on the cover side or on the rear side

(ordering suffix -TD/-TU)





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: | DIN 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} : | 2,600 N |
| Holding force F_{Zh} : | 2,000 N |
| Latching force: | 30 N for ordering suffix R |
| Coding level according to EN ISO 14119: | low |
| Degree of protection: | IP67 |
| Contact material: | Silver |
| Contact type: | Change-over contact with double break type Zb, with galvanically separated contact bridges |
| Switching system: | ⊖ acc. DIN EN 60947-5-1 slow action, NC contact with positive break |
| Connection: | Connector plug M12, 8-pole, A-coded |

| | |
|-----------------------------------|---------------------------------|
| Positive break travel (unlocked): | 10 mm |
| Positive break force (unlocked): | 10 N for each NC contact fitted |
| Actuating speed: | max. 2 m/s |
| Actuating frequency: | max. 1,000 operations/h |
| Mechanical life: | > 1 million operations |
| Ambient temperature: | -25 °C ... +60 °C |

Electrical data:

| | |
|---------------------------------------------|--------------|
| Utilisation category: | DC-13 |
| Rated operating current/voltage I_e/U_e : | 2 A / 24 VAC |
| Rated impulse withstand voltage U_{imp} : | 0.8 kV |
| Rated insulation voltage U_i : | 60 V |
| Thermal test current I_{the} : | 2 A |
| Required rated short-circuit current: | 1,000 A |
| Rated control voltage U_s : | 24 VDC |

Electrical data – Magnet control:

| | |
|-----------------------------------------------|-----------|
| 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 |



Use Type 4X (Indoor Use) and 12 connector fittings.
Tightening torque rating: 4.4 lb in.

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: | |
| - Mechanical life: | 2,000,000 |
| - Electrical life: | on request |
| 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} .)

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 161-FB to the safety field box SFB.



The classification of the unlocking 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 × 10 ⁻⁷ / 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 161-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 161-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

Three 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.



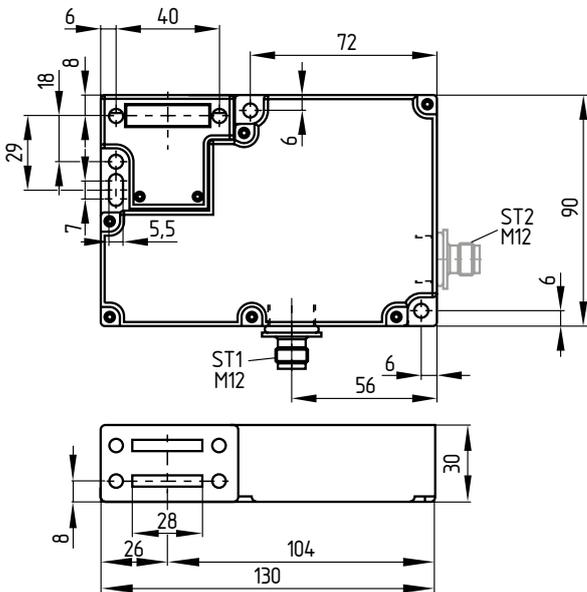
The actuator must be permanently fitted to the safety guards and protected against displacement by suitable measures (tamperproof screws, gluing, drilling of the screw heads).



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

3.2 Dimensions

All measurements in mm.



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.

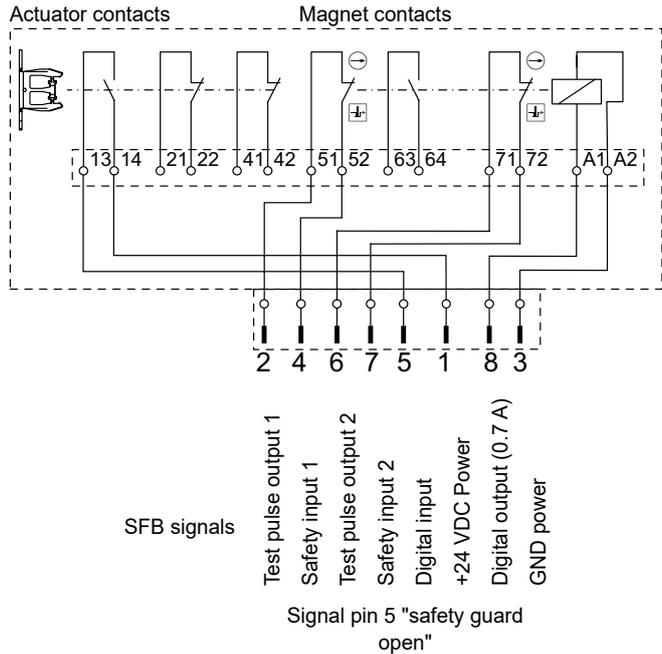


If the risk analysis indicates the use of monitored guard locking, a variant of the AZM161Z (power to unlock version only) must be used.

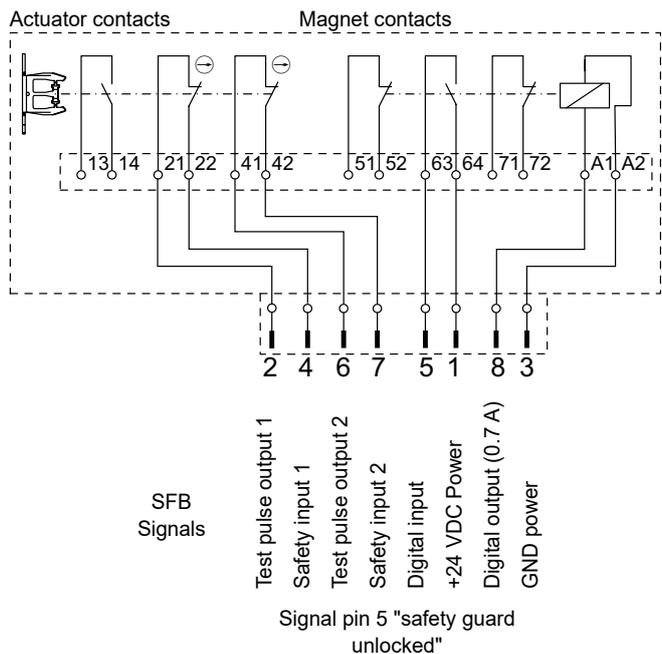
4.2 Contact Options

Contact variants are shown in a locked condition with 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 mm², 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.

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

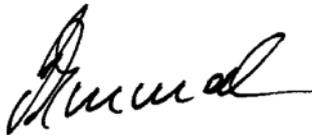
6.1 Disassembly

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

| | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| EU Declaration of conformity | |  |
| Original | K.A. Schmersal GmbH & Co. KG Mödinghofe 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. | | |
| Name of the component: | AZM 161-FB | |
| 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 |
| | RoHS-Directive | 2011/65/EU |
| Applied standards: | DIN EN 60947-5-1:2018 EN ISO 14119:2013 | |
| Person authorised for the compilation of the technical documentation: | Oliver Wacker Mödinghofe 30 42279 Wuppertal | |
| Place and date of issue: | Wuppertal, November 9, 2021 | |
| |  | |
| | Authorised signature Philip Schmersal Managing Director | |

AZM161FB-C-EN



The currently valid declaration of conformity can be downloaded from the internet at products.schmersal.com.

