



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: www.schmersal.net.

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 when safety switchgear is used. The relevant requirements of the standard 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:

AZM190-①RK②③-④-⑤-⑥

No.	Option	Description
①	02/01	Magnet: 2NC; Actuator: 1NC
	02/02	Magnet: 2NC; Actuator: 2NC
	02/10	Magnet: 2NC; Actuator: 1NO
	02/11	Magnet: 2NC; Actuator: 1NC/1NO
	11/01	Magnet: 1NC/1NO; Actuator: 1NC
	11/02	Magnet: 1NC/1NO; Actuator: 2NC
	11/10	Magnet: 1NC/1NO; Actuator: 1NO
②		Magnet: 1NC/1NO; Actuator: 1NC/1NO
	A	Power to unlock Power to lock
③		With manual release on the cover side
	E0	Without manual release
	E1	With manual release from side (right)
	N	Emergency release
④	T	Emergency exit
		Without LED display
	G	With LED display (only for 24 VAC/DC; not for -E1 and -T)
⑤	MPV	With mounting plate MP190-V
	MPVD	With mounting plate MP190-VD
⑥	24VAC	U _s 24 VAC
	24 VDC	U _s 24 VDC
	48VAC	U _s 48 VAC
	110VAC	U _s 110 VAC
	230VAC	U _s 230 VAC

Not all component variants, which are possible according to this order code, are available.



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 Destination and use

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.



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

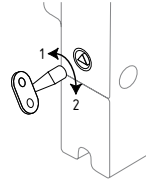


The safety switchgears are classified according to ISO 14119 as type 2 interlocking devices.

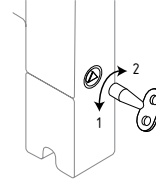
Manual release (for set-up, maintenance, etc.)

The manual release is realised by turning the triangular key (included in delivery) to the left (1), so that the locking bolt is pulled into the release position. The normal locking function is only restored after the triangular key has been returned to its original position (2). The manual release must be sealed after being put into operation (e.g. sealant etc.) to prevent its utilisation during operation. The manual release must not be actuated when loaded by the safety guard.

Manual release on the cover side



Lateral manual release (Ordering suffix E1)



Emergency release

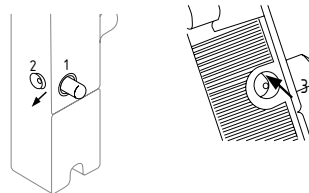
(mounting only on the outside of the safety guard)



The power supply of the plant must be switched off prior to opening the sealing plug.

Press the release button (1) to enable an emergency release. In this position, the safety guard can be opened. The release button latches. To neutralise the blocked condition, the sealing plug (2) must be opened. Keep the locking bolt (3) pressed with a screwdriver until the release button returns to its original position. Then put the sealing plug back and seal tight. The released condition may only be cancelled by an authorised person. The emergency release must not be used when the machinery/plant is in operation.

Emergency release (Ordering suffix N)

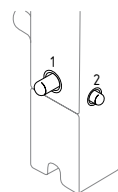


Emergency exit

(Fitting and actuation only from within the hazardous area)

To release an emergency exit, the release button (1) must be pressed. In this position, the safety guard can be opened. The release button latches. To neutralise the release, the reset button (2) must be pressed. In the unlocked condition, the safety guard is protected against unintentional locking.

Emergency exit (Ordering suffix T)



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:	IEC 60947-5-1; ISO 14119; BG-GS-ET-19
Enclosure:	glass-fibre reinforced thermoplastic
Actuator and locking bolt:	Galvanised steel / zinc die-cast
Holding force:	1950 N
Latching force:	20 N
Coding level according to ISO 14119:	low
Protection class:	IP67
- Ordering suffix N and T:	IP65
Contact material:	Silver
Contact type:	change-over contact with double break, or 2 NC contacts, with galvanically separated contact bridges
Switching system:	⊖ IEC 60947-5-1; slow action, NC contact with positive break
Connection:	screw terminals
Cable type:	solid and stranded wire
Cable section:	0.5 ... 2.5 mm ² , (max. 1.5 mm ² with conductor ferrules);
- Components with 4 contacts:	0.5 ... 1.5 mm ² (incl. conductor ferrules)
Cable entry:	2x M20
Rated impulse withstand voltage U _{imp} :	4 kV;
- Device with 4 contacts or 3 contacts with LED:	1. 5 kV
Rated insulation voltage U _i :	250 V;
- Device with 4 contacts or 3 contacts with LED:	60 VAC
Thermal test current I _{the} :	4 A
Utilisation category:	AC-15, DC-13
Rated operating current/voltage I _e /U _e :	4 A / 230 VAC; 4 A / 24 VDC;
- Device with 4 contacts or 3 contacts with LED:	AC-15: 4 A / 60 VAC
Max. fuse rating:	4 A gG D-fuse to IEC 60269-1
Required short-circuit current:	1000 A
Positive break travel:	2 × 3,5 mm
Positive break force:	20 N
Magnet:	100% ED
Rated control voltage U _s :	24 VDC, 24 VAC 50/60 Hz, 48 VAC 50/60 Hz, 110 VAC 50/60 Hz, 230 VAC 50/60 Hz
Power consumption:	max. 8.5 W
Actuating speed:	max. 20 m/min
Actuating frequency:	max. 1,200/h
Ambient temperature:	0 °C ... +50 °C
Mechanical life:	1 × 10 ⁶ operations



Listed 15 HA - Industrial Control Equipment - Enclosure Type I - "Use Copper Wire Only" - "Use 60/75° Wire Only" - Tightening Torque 0.8 Nm. The hub shall be connected to the conduit before it is connected to the enclosure.

2.5 Safety classification

Standards:	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 _{10d} NC contact:	2,000,000
B _{10d} NO contact at 10% ohmic contact load:	1,000,000
Service life:	20 years

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

(Determined values can vary depending on the application-specific parameters h_{op}, d_{op} and t_{cycle} as well as the load.)

If multiple safety components are wired in series, the Performance Level to ISO 13849-1 will be reduced due to the restricted error detection under certain circumstances.

3. Mounting

3.1 General mounting instructions



Please observe the relevant requirements of the standards ISO 12100, EN 953 and ISO 14119.

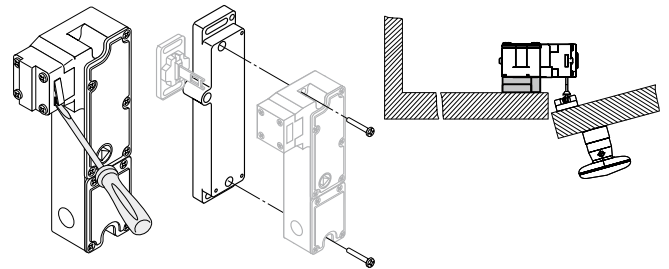
Three mounting holes are provided for fixing the enclosure. The solenoid interlock is double insulated. The use of an earth wire is not authorised. The solenoid interlock must not be used as an end stop. Any mounting position. The components however must be mounted so that the opening of the actuating head is protected against the penetration of dirt (e.g. sand, dust, chips).

In case of painting activities, the components must be covered. In case of horizontal mounting, the cover plate (Fig. 1) situated at the back of the actuating head must be removed.

Assembly with mounting plate MP 190 and actuator AZM 190-B3 ... see fig. 2. (Internal mounting of the interlock and mounting plate with door hinge on right-hand side).

Fig. 1

Fig. 2



Where the door hinge is on the left, the mounting plate along with the interlock is rotated through 180°.



Alternative mounting plates that can be used in combination with actuator AZM190-B3V... especially for attaching aluminium profiles, see www.schmersal.net.

MP190-V For internal mounting with right-hinged door

MP190-VD For internal mounting with left-hinged door

By default, the key hole is at the top. If another actuating direction is desired, the four screws of the actuating head must be loosened. Turn the actuating head in the desired direction and retighten the screws (tightening torque 0.5 Nm). The default screws installed in the actuating head can be replaced with the supplied tamperproof screws.



For power-to-unlock devices the actuator must be inserted when the actuating head is turned. Any non-observance of this prescription could result in the components being damaged.



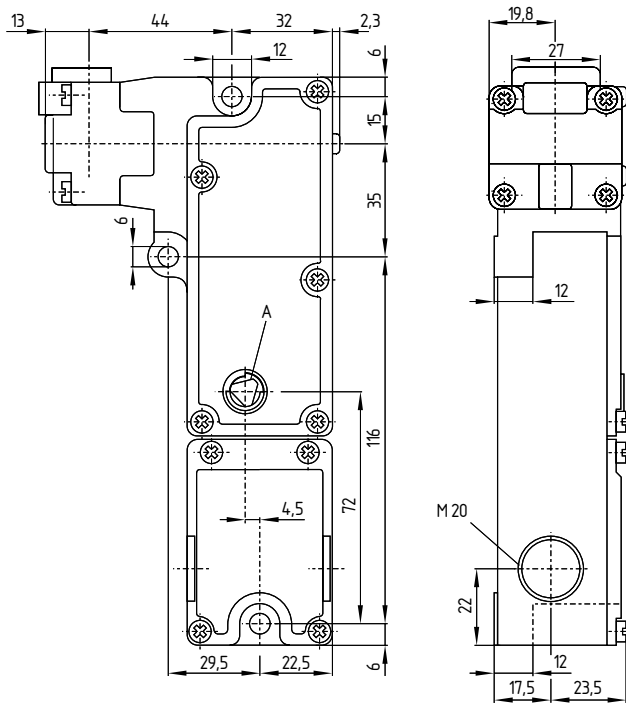
The safety component and the actuator must be permanently fitted to the safety guards and protected against displacement by suitable measures (such as tamperproof screws, gluing, drilling, or pinning).



When used in ambient temperatures > 40°C, the solenoid interlock must be protected against contact with inflammable materials or inadvertent personal contact.

3.2 Dimensions

All measurements in mm.



Legend:

A Manual release

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 a monitored interlock they are to be connected in the safety circuit with the contacts indicated with the symbol

For the cable entry, suitable cable glands with an appropriate degree of protection must be used.

After wiring, the wiring compartment must be cleaned (i.e. remove excess cables etc.). The fixing screws of the wiring compartment cover must be tightened with 0.8 Nm tightening torque.



Components with LED indication only for 24VDC. The monitoring contacts of the LED versions are not potential-free. In combination with these devices, only sequential circuits can be used, in which both channels are controlled with positive potential.

4.2 Contact variants

Contacts shown in a de-energised condition and with the actuator inserted. The contact configurations of the versions with or without LED are identical.



LED display:

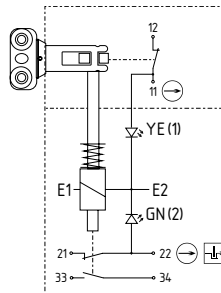
- YE (1) Safety guard closed
- GN (2) Safety guard closed and locked
- YE (3) Safety guard open

Power to unlock

Power to lock

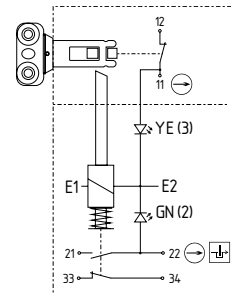
AZM190-11/01RK

AZM190-11/01RK..-G with LED



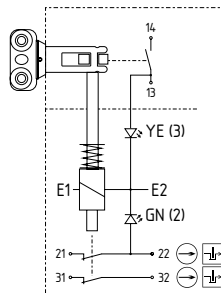
AZM190-11/01RKA

AZM190-11/01RKA..-G with LED



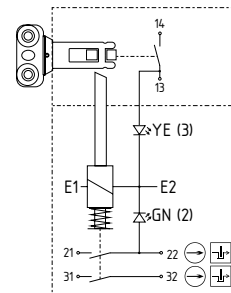
AZM190-02/10RK

AZM190-02/10RK..-G with LED



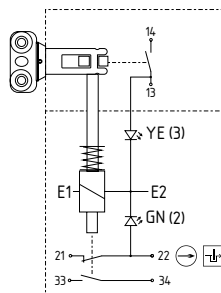
AZM190-02/10RKA

AZM190-02/10RKA..-G with LED



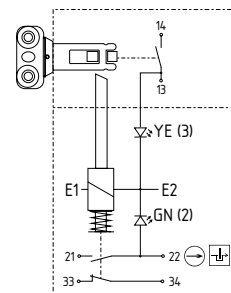
AZM190-11/10RK

AZM190-11/10RK..-G with LED



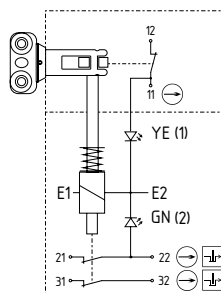
AZM190-11/10RKA

AZM190-11/10RKA..-G with LED



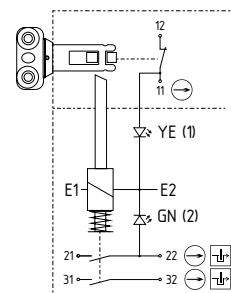
AZM190-02/01RK

AZM190-02/01RK..-G with LED



AZM190-02/01RKA

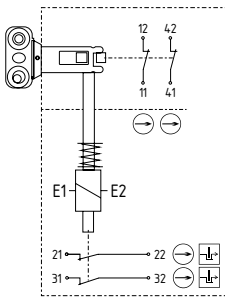
AZM190-02/01RKA..-G with LED



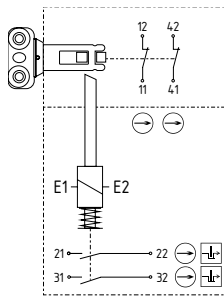
Power to unlock

Power to lock

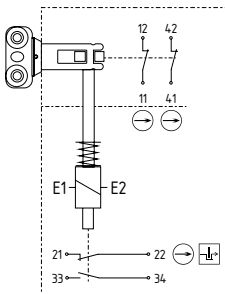
AZM190-02/02RK



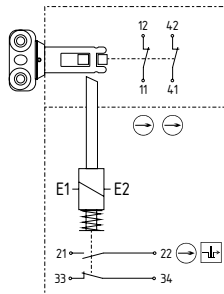
AZM190-02/02RKA



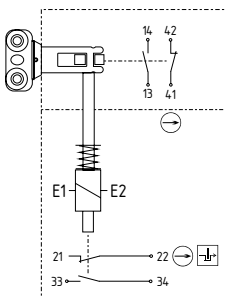
AZM190-11/02RK



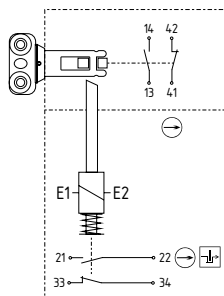
AZM190-11/02RKA



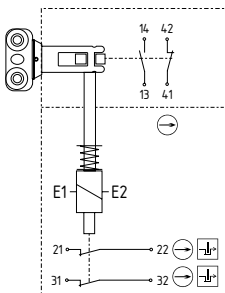
AZM190-11/11RK



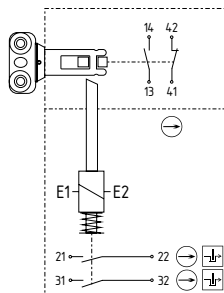
AZM190-11/11RKA



AZM190-02/11RK



AZM190-02/11RKA



Key

- ⊖ Positive break
- ⊕ Monitoring the interlock according to ISO 14119

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 cable entry and 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 cable entry and 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


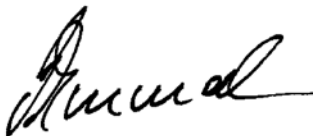
6.1 Disassembly

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		 SCHMERSAL
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.		
Name of the component:	AZM190	
Type:	See ordering code	
Description of the component:	Interlocking device with electromagnetic interlock for safety functions (solenoid interlock)	
Relevant Directives:	Machinery Directive RoHS-Directive	2006/42/EC 2011/65/EU
Applied standards:	DIN EN 60947-5-1:2010, DIN EN ISO 14119:2014	
Person authorised for the compilation of the technical documentation:	Oliver Wacker Möddinghofe 30 42279 Wuppertal	
Place and date of issue:	Wuppertal, February 25, 2016	
		
	Authorised signature Philip Schmersal Managing Director	

AZM190-E-EN



The currently valid declaration of conformity can be downloaded from the internet at www.schmersal.net.



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