



EN Operating instructions. pages 1 to 14
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.

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 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:

Solenoid interlock

AZM201Z-CC-...-2719(-1)
AZM201Z-CC-...-2784

Actuator unit (with emergency exit)

AZ/AZM201-B30-...(P)2719(-1)
AZ/AZM201-B30-...(P.)-2719(-1)
AZ/AZM201-B30-...(P.)-2784



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 Comprehensive quality insurance to 2006/42/EC

Schmersal is a certified company to appendix X of the Machinery Directive. As a result, Schmersal is entitled to autonomously conduct the conformity assessment procedure for the products listed in Appendix IV of the MD without involving a notified body. The prototype test certificates are available upon request or can be downloaded from the Internet at products.schmersal.com.

2.4 Purpose

The AZM201 with non-contact electronic safety sensors is designed for application in safety circuits and is used for monitoring the position of movable safety guards.



The safety switchgears are classified according to ISO 14119 as type 4 interlocking devices. Designs with individual coding are classified as highly coded.

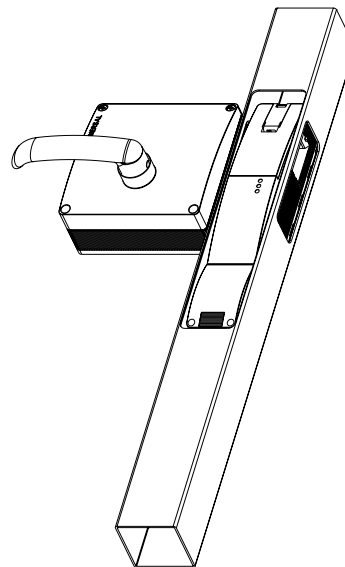
The safety function consists of safely switching off the safety outputs when the safety guard is unlocked or opened and maintaining the safe switched off condition of the safety outputs for as long as the safety guard is open or unlocked.



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.

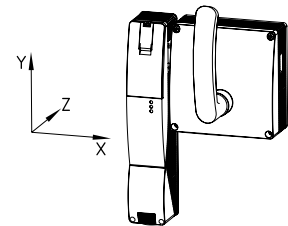
In conjunction with the solenoid interlock, the actuator unit is suitable for fitting inside the hollow profiles of hinged and sliding safety guards. The safety guard can be opened and closed from outside by turning the door-handle.

The actuator is pulled into the actuator unit by a spring. The actuator unit with emergency exit is used to open the safety guard inside the hazardous area. By actuating the emergency exit, the safety guard can be opened from within the hazardous area without the need for unlocking the solenoid interlock. The safety guard cannot be locked from inside.



Actuator unit play

X = ± 1.5 mm
Y = ± 5.0 mm
Z = ± 1.0 mm



Series-wiring

Series-wiring can be set up. The reaction and risk times increase by up to 1.5 ms per additional device when connected in series. The quantity of devices is only limited by the cable drops and the external cable fuse protection, according to the technical data.

Wiring examples for series-wiring, refer to appendix.



The user must evaluate and design the safety chain in accordance with the relevant standards and the required safety level. If multiple safety switchgears are involved in the same safety function, the PFH values of the individual components must be added.



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

2.5 Technical data

Standards:	EN 60947-5-3, ISO 14119, EN ISO 13849-1, EN 61508
Enclosure:	glass-fibre reinforced thermoplastic, self-extinguishing
Active principle:	RFID
Frequency band:	125 kHz
Transmitter output:	max. -6 dBm
Coding level according to ISO 14119:	
- I1-version:	high
- I2-version:	high
- Standard coding version:	low
Reaction time, switching off outputs Y1, Y2 via:	
- Actuator:	≤ 100 ms
- Inputs X1, X2:	≤ 1.5 ms
Duration of risk:	< 200 ms
Time to readiness:	< 4 s
Series-wiring:	Unlimited number of components, please observe external cable protection
Cable length:	max. 200 m
	(Cable length and cable section alter the voltage drop depending on the output current)

Mechanical data:

Holding force F_{max} :	2,600 N
Holding force F_{zh} :	2,000 N
Latching force:	30 N
Termination:	Cage clamps
Cable entry:	M20
Cable type:	rigid single-wire, rigid multi-wire or flexible
Cable section:	min. 0.25 mm ² , max. 1.5 mm ² (including conductor ferrules)
Tightening torque for the cover screws:	0.7 ... 1 Nm (Torx T10)
Actuating speed:	≤ 0.2 m/s
Mechanical life:	≥ 1,000,000 operations

Switching distances to EN 60947-5-3

Assured switching distance s_{ao} :	4 mm
Assured switch-off distance s_{ar} :	30 mm
Hysteresis:	≤ 1.5 mm
Repeat accuracy:	< 0.5 mm
Switching frequency:	≤ 1 Hz

Ambient conditions:

Ambient temperature:	-25 °C ... +60 °C
Storage and transport temperature:	-25 °C ... +85 °C
Relative humidity:	max. 93 %, non condensing, non icing
Degree of protection:	IP66, IP67 to EN 60529
Installation altitude above sea level:	max. 2,000 m
Protection class:	III
Resistance to shock:	30 g / 11 ms
Resistance to vibration:	10 ... 150 Hz, amplitude 0.35 mm
Insulation values to EN 60664-1:	
- Rated insulation voltage U_i :	32 VDC
- Rated impulse withstand voltage U_{imp} :	0.8 kV
- Over-voltage category:	III
- Degree of pollution:	3
Switching frequency:	≤ 1 Hz

Electrical data:

Operating voltage U_o :	24 VDC -15% / +10% (stabilised PELV power supply)
No-load supply current I_o :	≤ 0.05 A
Operating current device with magnet switched on:	
- Averaged:	< 0.2 A
- Peak current:	< 0.7 A / 100 ms
Required rated short-circuit current:	100 A
External cable and device fuse rating:	
- cage clamps:	4 A gG
	when used in accordance with UL 508

Electrical data - Safety inputs:

Safety inputs:	X1 and X2
Switching thresholds:	-3 V ... 5 V (Low) 15 V ... 30 V (High)
Current consumption per input:	typically 2 mA / 24 V
Accepted test pulse duration on input signal:	≤ 1.0 ms
- With test pulse interval of:	≥ 100 ms
Classification:	ZVEI CB24I
Sink:	C1
Source:	C1 C2 C3

Electrical data - Safety outputs:

Safety outputs:	Y1 and Y2
Switching elements:	OSSD, p-type, short-circuit proof
Utilisation category:	DC-13
- Rated operating voltage U_o :	24 VDC
- Rated operating current I_o :	each max. 0.25 A
Leakage current I_l :	≤ 0.5 mA
Voltage drop U_d :	≤ 4 V
Cross-wire monitoring by device:	Yes
Test pulse duration:	< 0.5 ms
Test pulse interval:	1,000 ms
Classification:	ZVEI CB24I
Source:	C2
Sink:	C1 C2

Electrical data - Diagnostic output:

Diagnostic output:	OUT
Switching element:	p-type, short-circuit proof
Utilisation category:	DC-13
- Rated operating voltage U_o :	24 VDC
- Rated operating current I_o :	max. 0.05 A
Voltage drop U_d :	≤ 4 V

Electrical data - Magnet control:

Solenoid input:	IN
Switching thresholds:	-3 V ... 5 V (Low) 15 V ... 30 V (High)
Current consumption per input:	typical 10 mA / 24 V, dynamic 20 mA
Magnet switch-on time:	100%
Accepted test pulse duration on input signal:	≤ 5.0 ms
- With test pulse interval of:	≥ 40 ms
Classification:	ZVEI CB24I
Sink:	C0
Source:	C1 C2 C3

LED switching conditions display:

green LED:	Supply voltage
yellow LED:	Device condition
red LED:	Fault

 Use isolated power supply only. For use in NFPA 79 Applications only. Adapters providing field wiring means are available from the manufacturer. Refer to manufacturers information.



This device complies with part 15 of the FCC Rules and contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s): Operation is subject to the following two conditions:
(1) This device may not cause harmful interference,
AND
(2) this device must accept any interference received, including interference that may cause undesired operation.
This device complies with the Nerve Stimulation Exposure Limits (ISED SPR-002) for direct touch operations. Changes or modifications not expressly approved by K.A. Schmersal GmbH & Co. KG could void the user's authority to operate the equipment.

Operating instructions Solenoid interlock

AZM201Z-CC-...-2719(-1) / -2784
AZ/AZM201-B30-...-2719(-1) / -2784

2.6 Safety classification

- of the interlocking function:

Standards:	EN ISO 13849-1, EN 61508
PL:	up to e
Control Category:	4
PFH:	$1.9 \times 10^{-9} / h$
PFD:	1.6×10^{-4}
SIL:	suitable for SIL 3 applications
Mission time:	20 years

- of the guard locking function:

Standards:	EN ISO 13849-1, EN 61508
PL:	up to d
Control Category:	2
PFH:	$1.0 \times 10^{-8} / h$
PFD:	8.9×10^{-4}
SIL:	suitable for SIL 2 applications
Mission time:	20 years



The safety consideration of the guard locking function only applies for standard devices with monitored solenoid interlock AZM201Z-...-1P2PW-... (see Ordering code).



The actuation of the interlock must be compared externally with the OSSD release. If a shut-down now occurs due to an unintentional unlocking this is detected by an external diagnostic.



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.



The safety analysis of the guard locking function refers to the component solenoid interlock AZM as part of the complete system.

On the customer side further measures such as safe actuation and safe cable installation to prevent faults are to be implemented.

In the event of a fault resulting in the unlocking of the guard locking, this is detected by the solenoid interlock and the safety gates Y1/Y2 switch 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



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

For fitting the solenoid interlock, two mounting holes for M6 screws with washers (washers included in delivery) are provided. 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. The unused actuator opening must be sealed by means of the dust-proof flap (included in delivery).



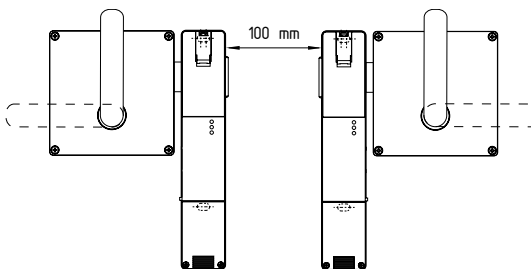
The actuator must be permanently fitted to the safety guards and protected against displacement by suitable measures (tamperproof screws, gluing, drilling of the screw heads).



Suitable measures to prevent that the hazardous spot is reached through the door opening must be implemented.

Minimum distance between two solenoid interlocks

as well as to other systems with same frequency (125 kHz): 100 mm.



Manual release

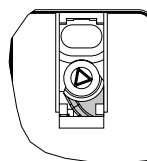
For the machine set-up, the solenoid interlock can be unlocked in de-energised condition. After opening of the plastic flap "A" (refer to image "Dimensions"), the triangular key must be turned clockwise to bring the blocking bolt in unlocking condition. The normal locking function is only restored after the triangular key has been returned to its original position.



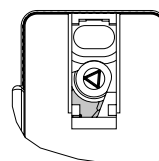
Caution: do not turn beyond the latching point, maximum tightening torque: 1.3 Nm.

After being put into operation, the manual release must be secured by closing the plastic flap "A" and affixing the seal, which is included in delivery.

Component ready for operation

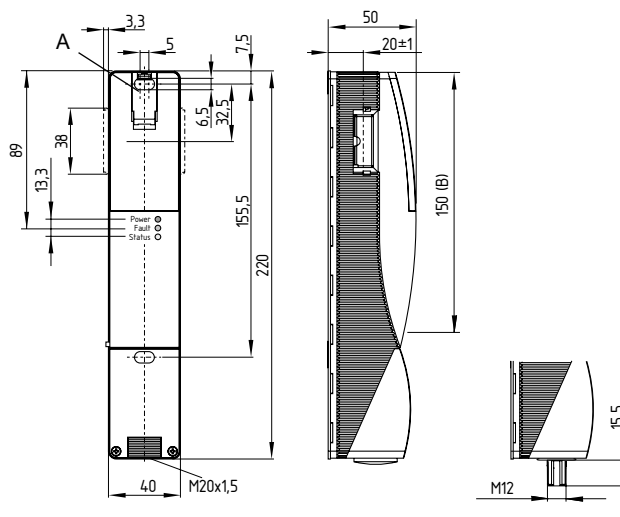


Component not ready for operation



3.2 Dimensions

All measurements in mm.



Key

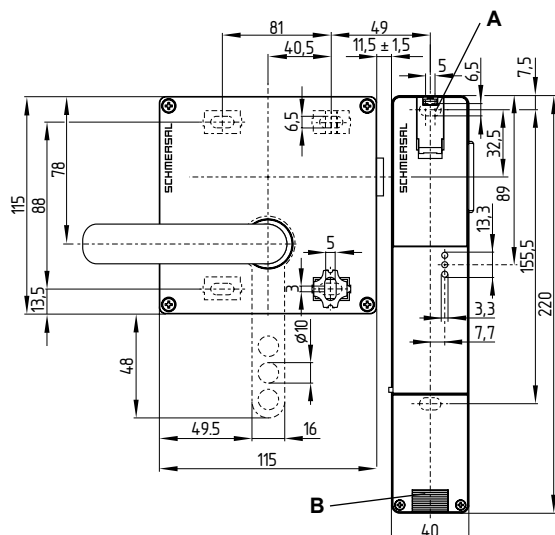
A: Manual release

B: Active RFID area



Metal parts and magnetic fields in the lateral RFID area of the solenoid interlock and the actuator can influence the switching distance or lead to malfunctions.

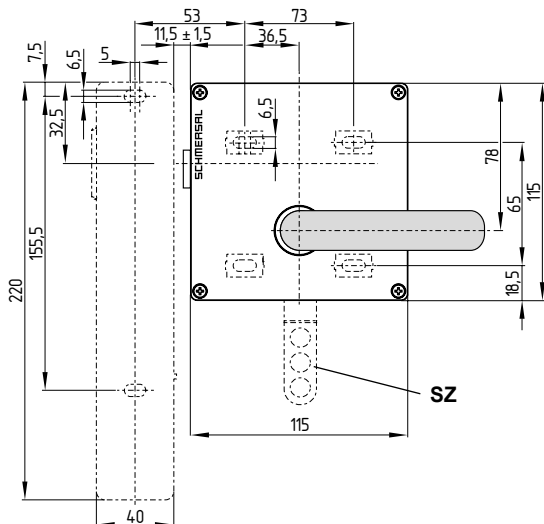
AZM201 with actuator unit



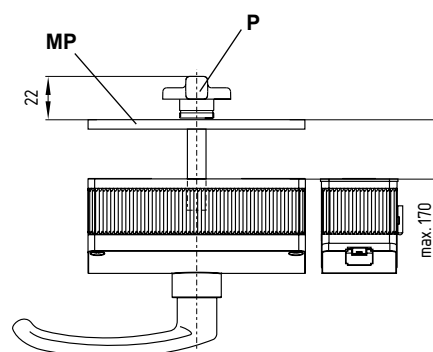
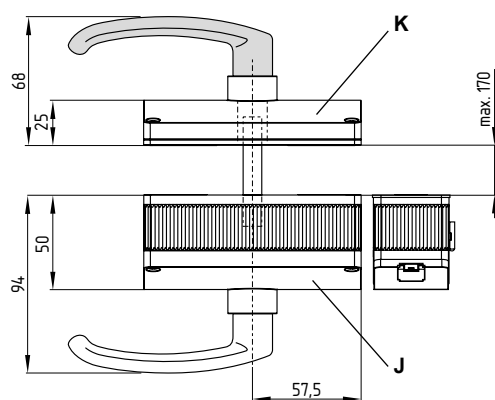
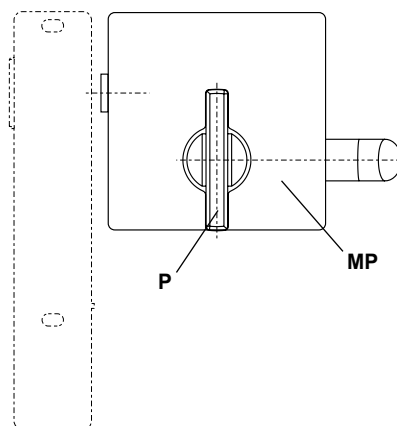
Key

- A = Manual release behind cover
- B = Cable entry M20 x 1.5
- J = Actuator unit G1
- K = Emergency exit P1
- P = Emergency exit P2719-1 or P26-2784
- MP = Mounting plate (not included in delivery)
- SZ = Lockout tag

Emergency exit P1



Emergency exit P2719-1 or P26-2784



3.3 Mounting set-up

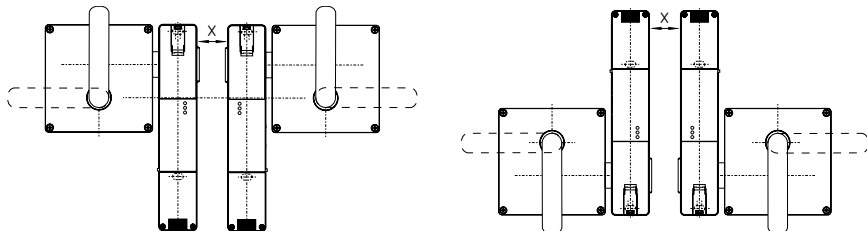


The installation may only be carried out by authorised personnel.

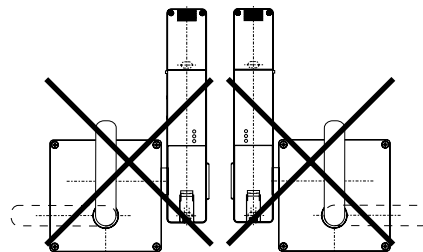
Minimum distance X between two devices: 100 mm

For ergonomic reasons, a vertical handle position is recommended when closed.

Admissible mounting set-up



Inadmissible mounting set-up



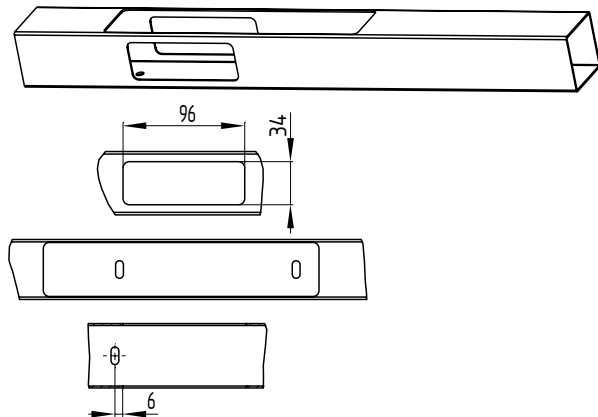
3.4 Fitting of solenoid interlock and actuator unit

Step 1

- Cut-out for 50 x 50 mm hollow profile
- Install and fix solenoid interlock in hollow profile

To be observed:

- Material for hollow profile: ST 37
- Contact surface for the fixation of the solenoid interlock level with the edge of the hollow profile
- For the observance of the tolerance between the actuator and the component enclosure, the hollow profile must be provided with 7 mm longitudinal holes.
- Distance between the top mounting hole (M6) for the solenoid interlock and the front of the lateral cut-out: 6 mm

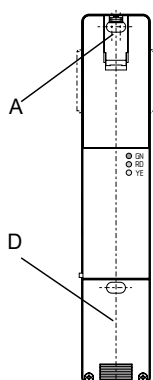


Step 2

- Unscrew cover D for the wiring compartment and open flap A manual release

To be observed:

- Actuation of the manual release by triangular key (included in delivery)

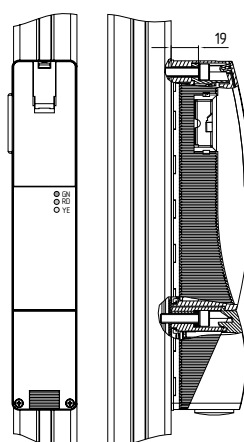


Step 3

- Fit the AZM enclosure in the hollow profile flush with the doorpost.

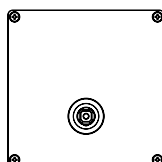
To be observed:

- Screws M6, DIN 912
- Max. torque for solenoid interlock = 8 Nm,
- cover screw = 0.7...1 Nm (Torx T10)
- Wall thickness of the device 19 mm
- Washers Ø 6.4 DIN 125 (included in delivery)
- For applications with strong vibrations, please observe a proper securing of the screws



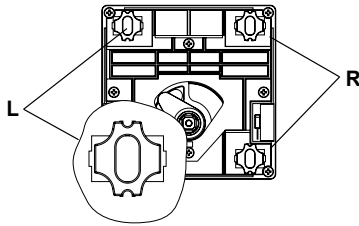
Step 4

- Unscrew the cover of the actuator unit



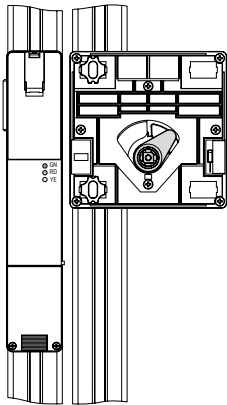
Step 5

- Insert sliding blocks as shown (included in delivery)
- To be observed:**
 - Observe the alignment (notch) of the sliding blocks
 - L = LHS door hinge
 - R = RHS door hinge



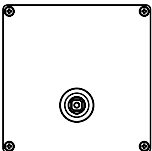
Step 6

- Fit the actuator unit to the doorpost.
- To be observed:**
 - Actuator unit completely retracted
 - Distance between solenoid interlock and actuator unit 11.5 ± 1.5 mm
 - Screws M6, DIN 912
 - Torque = 8 Nm
 - Wall thickness of the device 8 mm
 - Washers $\varnothing 6.4$ DIN 125 (included in delivery)
 - For applications with strong vibrations, please observe a proper securing of the screws



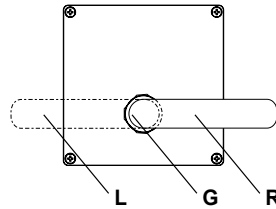
Step 7

- Mount the cover on the actuator unit
- To be observed:**
 - Actuator unit completely retracted



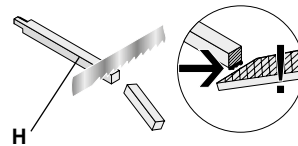
Step 8

- Fit the door-handle
- To be observed:**
 - Door-handle horizontal
 - L = Door hinge on the left-hand side
 - R = Door hinge on the right-hand side
 - G = Hexagonal screw SW 3 with screw lock (included in delivery)
 - When fitted without emergency exit, proceed with step 16



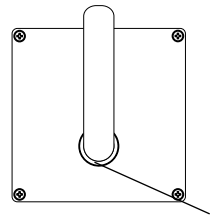
Step 9 - Mounting emergency exit

- If an emergency exit is available, cut square tube H at length
- Deburr the cut sides
- To be observed**
 - Through-hole for square tube H $\varnothing 16$ mm
 - The square tube must be entered 12^2 mm in the actuator enclosure
 - When fitted with emergency exit P2719-1 or P26-2784, proceed with step 15



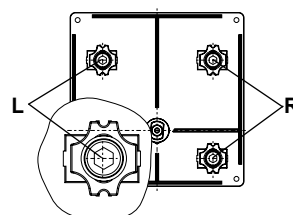
Step 10 - Mounting emergency exit P1

- Unscrew the cover of the emergency exit
- To be observed**
 - The emergency exit handle is screwed tight to axle I (do not unscrew!)



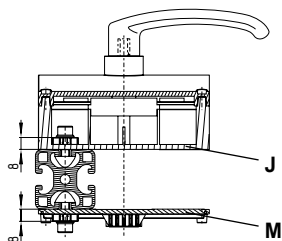
Step 11 - Mounting emergency exit P1

- Insert sliding blocks as shown (included in delivery)
- To be observed**
 - Observe the alignment (notch) of the sliding blocks
 - L = LHS door hinge
 - R = RHS door hinge



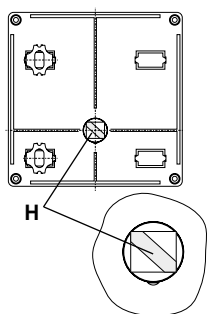
Step 12 - Mounting emergency exit P1

- Fit the bottom plate of the emergency exit P1 (**M**) to the door
- To be observed**
- Actuator completely inserted into the actuator unit **J**
- Bottom plate **M** parallel to actuator unit **J**
- Screws M6, DIN 912
- Torque = 8 Nm
- Wall thickness of the device 8 mm
- Washers Ø 6.4 DIN 125 (included in delivery)
- For applications with strong vibrations, please observe a proper securing of the screws



Step 13 - Mounting emergency exit P1

- Insert square tube **H** in the rear-side of the actuator unit (position of the chamfer as shown, when actuator unit **G1** is actuated)
- To be observed**
- Insert chamfer of the square into the emergency exit or the cut off side of the square into the actuator unit



Step 14 - Mounting emergency exit P1

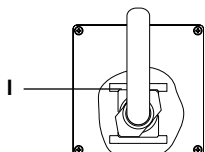
- Fit the cover and the handle onto the emergency exit **P1**
- To be observed**
- Position of the driving shaft **I** as shown, when actuator unit **G1** is actuated
- Functional test of the emergency exit handle:

it should be possible to open the safety guard inside the hazardous area; it should not be possible to lock the safety guard from inside.

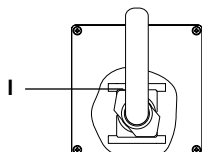
The emergency exit handle must be in upright position when closed.

- After the assembly of the emergency exit P1, proceed with step 16

For left hinged door



For right hinged door



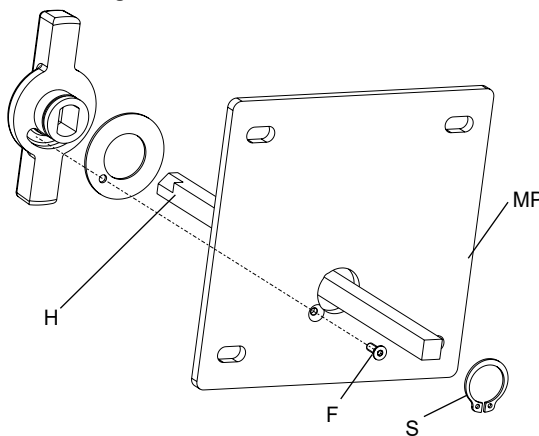
Step 15 - Mounting emergency exit P2719(-1) or P26-2784

- Insert square rod **H** in the rear of the actuator unit
- Screw the countersunk bolt **F** in the mounting plate **MP** (not included in delivery) or restrict the rotating angle of the emergency exit to 90° by suitable measures
- Insert the emergency exit handle onto the socket of the square rod, tighten and secure with locking ring **S**

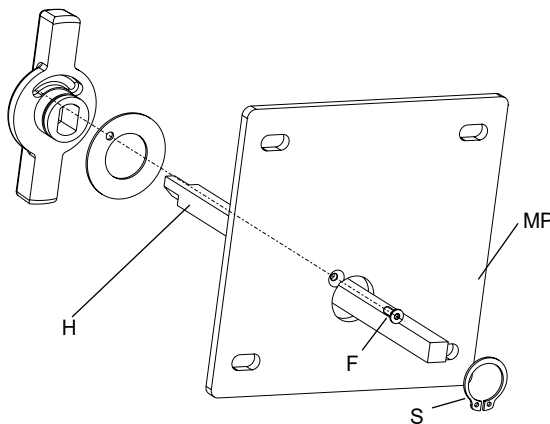
To be observed:

- Please observe the position of the emergency exit handle and the socket of the square rod (the image shows the actuator in inserted condition)
- For applications with strong vibrations, please observe a proper securing of the screws
- Functional test of the emergency exit handle:
it should be possible to open the safety guard inside the hazardous area; it should not be possible to lock the safety guard from inside.
The emergency exit handle must be in upright position when closed.

For left hinged door



For right hinged door



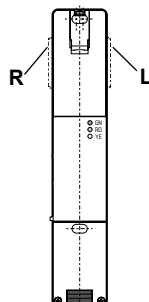
Step 16

- Clip the dust-proof flap in the unused side

To be observed:

L = Door hinge on the left-hand side

R = Door hinge on the right-hand side

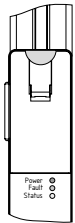


Step 17

- Seal the cover of the manual release **A**

To be observed:

- After being put into operation, the manual release must be secured by installing the seal, which is included in delivery.



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 power supply for the solenoid interlock must provide protection against permanent overvoltage. To that effect, stabilised PELV supply units must be used. The required electrical cable and device fuse protection must be integrated in the installation.

The safety outputs can be directly integrated in the safety circuit of the control system. For applications up to PL e / control category 4 in accordance with EN ISO 13849-1, the safety outputs of the safety switch must have an assessment with the same category (refer to wiring examples). Inductive loads (e.g. contactors, relays, etc.) are to be provided with suitable interference suppression circuitry.

Requirements for the connected safety-monitoring module:

- Dual-channel safety input, suitable for 2 p-type semi-conductor outputs



Configuration of the safety controller

If the safety switchgear is connected to electronic safety-monitoring modules, we recommend that you set a discrepancy time of 100 ms. The safety inputs of the safety-monitoring module must be able to blank a test impulse of approx. 1 ms.

The safety-monitoring module does not need to have a cross-wire short monitoring function, if necessary, the cross-wire short monitoring function must be disabled.



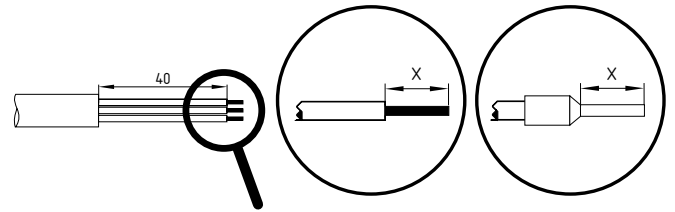
Information for the selection of suitable safety-monitoring modules can be found in the Schmersal catalogues or in the online catalogue on the Internet: products.schmersal.com.

If the safety component is wired to relays or to non-safety relevant control components, a new risk analysis must be carried out.

4.2 Cable

The cable entry is realised by a metric M20 gland. This gland must be dimensioned by the user so that it is suitable for the cable used. A cable gland with strain relief and suitable IP protection class must be used.

Settle length x of the conductor: 7.5 mm



5. Operating principle and actuator coding

5.1 Magnet control

In the power to unlock version of the AZM201, the solenoid interlock is unlocked when the IN signal (= 24V) is set.

In the power to lock version of the AZM201, the solenoid interlock is locked when the IN signal (= 24 V) is set.

5.2 Mode of operation of the safety outputs

In the standard AZM201 variant, the unlocking of the solenoid interlock causes the safety outputs to be disabled. The unlocked safety guard can be relocked as long as the actuator is inserted in the AZM201 solenoid interlock; in that case, the safety outputs are re-enabled.

The safety guard must not be opened.

5.3 Actuator teaching / actuator detection

Solenoid interlocks with standard coding are ready to use upon delivery.

Individually coded solenoid interlocks and actuators will require the following "teach-in" procedure:

- Switch the solenoid interlock's voltage supply off and back on.
- Introduce the actuator in the detection range. The teach-in procedure is signalled at the solenoid interlock, green LED off, red LED on, yellow LED flashes (1 Hz).
- After 10 seconds, brief yellow cyclic flashes (5 Hz) request the switch-off of the operating voltage of the solenoid interlock. (If the voltage is not switched off within 5 minutes, the solenoid interlock cancels the "teach-in" procedure and signals a false actuator by 5 red flashes).
- After the operating voltage is switched back on, the actuator must be detected once more in order to activate the taught actuator code. In this way, the activated code is definitively saved!

For ordering suffix -I1, the executed allocation of safety interlock and actuator is irreversible.

For ordering suffix -I2, the "teach-in" procedure for a new actuator can be repeated an unlimited number of times. When a new actuator is taught, the code, which was applicable until that moment, becomes invalid. Subsequent to that, an enabling inhibit will be active for ten minutes, thus providing for an increased protection against tampering. The green LED will flash until the expiration of the time of the enabling inhibit and the detection of the new actuator. In case of power failure during the lapse of time, the 10-minutes tampering protection time will restart.

6. Diagnostic functions

6.1 Diagnostic-LEDs

The solenoid interlock signals the operational state as well as errors through three coloured LED's installed on the front side of the device.

green (Power) Supply voltage on

yellow (Status) Switching condition

red (Fault) Error (see table: Error messages / flash codes red diagnostic LED)

6.2 Operating principle of the electronic diagnostic output

The short-circuit proof diagnostic output can be used for central visualisation or control functions, e.g. in a PLC.

The diagnostic output is not a safety-related output.

Error

Errors, which no longer guarantee the function of the solenoid interlock (internal errors) cause the safety outputs to be disabled immediately. Any error that does not immediately affect the safe functionality of the solenoid interlock (e.g. excess ambient temperature, safety output to external potential, short circuit) will lead to a delayed shut-down (refer to table 1).

After fault rectification, the sensor can be reset by opening and relocking the relevant guard door. The safety outputs enable and allow a restart. An interlocking chain must be permanently "locked" to enable the reactivation.



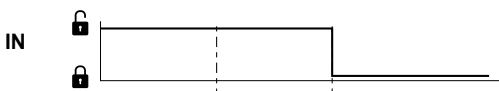
Automatic, electronic locking takes place if more than one fault is detected at the safety outputs or a cross circuit is detected between Y1 and Y2. This means that normal fault acknowledgement is no longer possible. To reset this type of interlock, the solenoid interlock must be isolated from the supply voltage after elimination of the error causes.

Error warning

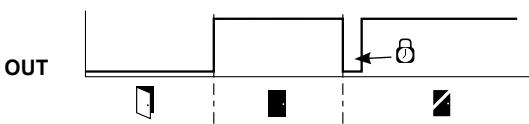
A fault has occurred, which causes the safety outputs to be disabled after 30 minutes. This signal combination, diagnostic output disabled and safety channels still enabled, can be used to stop the production process in a controlled manner. An error warning is deleted when the cause of error is eliminated.

Behaviour of the diagnostic outputs of the W variant
(Example: power to unlock version)

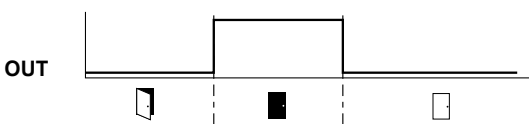
Input signal magnet control



Normal sequence, door was locked



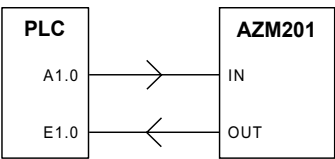
Door could not be locked or fault



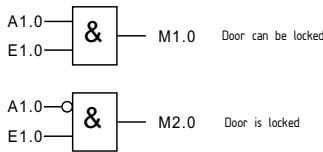
Key

- Lock
 - Unlock
 - Safety guard open
 - Safety guard closed
 - Safety guard not locked or fault
 - Safety guard locked
- Locking time: 150 ... 250 ms, typically 200 ms

Evaluation of the diagnostic outputs of the W variant



Power to unlock: IN = 0 = locking



Power to lock: IN = 1 = locking

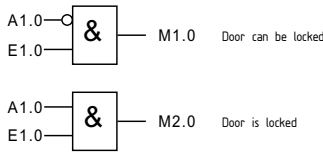


Table 1: the diagnostic function of the AZM201 solenoid interlock

System condition	Solenoid control IN		LED			Safety outputs Y1, Y2 AZM201Z	Diagnostic output OUT -1P2PW
	Power to unlock	Power to lock	green	red	yellow		
Guard open	24 V (0 V)	0 V (24 V)	On	Off	Off	0 V	0 V
Door closed, actuator not inserted	24 V	0 V	On	Off	Off	0 V	0 V
Door closed, actuator inserted, not locked	24 V	0 V	On	Off	Flashes	0 V	24 V
Door closed, actuator inserted, inter-locking blocked	0 V	24 V	On	Off	Flashes	0 V	0 V
Guard closed, actuator inserted and locked	0 V	24 V	On	Off	On	24 V	24 V
Error warning ¹⁾ solenoid interlock locked	0 V	24 V	On	Flashes ²⁾	On	24 V ¹⁾	0 V
Error	0 V (24 V)	24 V (0 V)	On	Flashes ²⁾	Off	0 V	0 V
Additionally for variant I1/I2:							
Teach-in procedure actuator started			Off	On	Flashes	0 V	0 V
Only I2: teach-in procedure actuator (release block)			Flashes	Off	Off	0 V	0 V

1) after 30 min: disabling due to fault

2) refer to flash code

Table 2: flash codes red LED

Flash codes (red)	Designation	Autonomous switch-off after	Error cause
1 flash pulse	Error (warning) at output Y1	30 min	Fault in output test or voltage at output Y1, although the output is disabled.
2 flash pulses	Error (warning) at output Y2	30 min	Fault in output test or voltage at output Y2, although the output is disabled.
3 flash pulses	Error (warning) cross-wire short	30 min	Cross-wire short between the output cables or fault at both outputs
4 flash pulses	Error (warning) temperature too high	30 min	The temperature measurement reveals an internal temperature that is too high
5 flash pulses	Actuator fault	0 min	Incorrect or defective actuator
6 flash pulses	Error actuator combination	0 min	An invalid combination of actuators was detected (blocking bolt detection or tamper attempt)
Continuous red	Internal fault / overvoltage or undervoltage fault	0 min	Device defective / supply voltage not within specifications

7. Set-up and maintenance

7.1 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

7.2 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. Check max. axial misalignment of actuator and solenoid interlock.
3. Remove particles of dust and soiling
4. 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.

8. Disassembly and disposal

8.1 Disassembly

The safety switchgear must be disassembled in a de-energised condition only.

8.2 Disposal

The safety switchgear must be disposed of in an appropriate manner in accordance with the national prescriptions and legislations.

The application examples shown are suggestions. They do not release the user from carefully checking whether the switchgear and its set-up are suitable for the individual application.

The voltage is supplied at both safety inputs of the terminal safety component of the chain (considered from the safety-monitoring module). The safety outputs of the first safety component are wired to the safety-monitoring module.

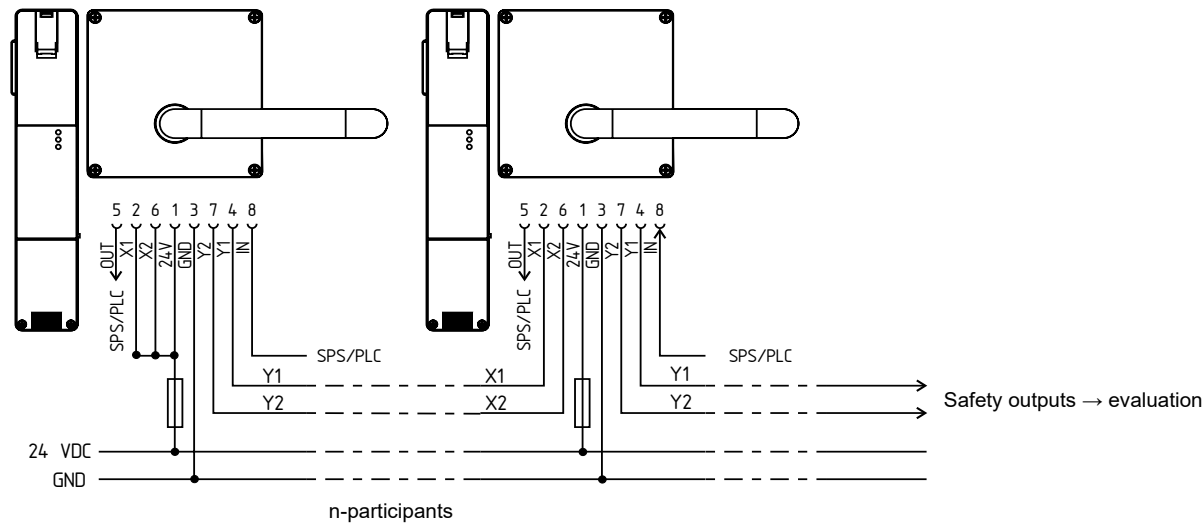


Table 4: wiring of the solenoid interlock with cable

Pin configuration of the connector	Wiring, safety switch with 1 diagnostic output ...-1P2P
Pin 1	24 V Operating voltage
Pin 2	X1 safety input 1
Pin 3	GND Ground
Pin 4	Y1 safety output 1
Pin 5	OUT diagnostic output
Pin 6	X2 safety input 2
Pin 7	Y2 safety output 2
Pin 8	IN solenoid control
Pin 9	spare

24V	24V	X1	X2	IN
AZM201.-1P2P.				
GND		Y1	Y2	OUT

10. Set-up and maintenance checklist



Checklist Set-up and maintenance

Checking of the AZM201 safety door-handle system

Under the scope of the commissioning and the regular maintenance of the machine, the following items of the safety door-handle system, consisting of the AZM201, the corresponding actuator unit and the emergency exit, must be checked and inspected by a professional:

1. Fixation:

All fixing screws installed and tightened with the specified torque

☐

2. Distance:

Distance 11.5 ± 1.5 mm between AZM201 and actuator unit observed.

☐

3. Emergency exit handle:

After locking, the correct closing of the door must be checked.
It should be possible to open the safety guard inside the hazardous area;
it should not be possible to lock the safety guard from inside
It should be possible to open the safety guard inside the hazardous area,
it should not be possible to lock the safety guard from inside.
The emergency exit handle must be in the upright position when closed.

☐

4. Dust shield cap:

Check the tight fitting of the dust-proof cover.

☐

5. Functional testing:

The enabling signal is only transmitted to the safety circuit,
if the actuator unit is within range of the solenoid interlock and locked.

☐

LED	Status
green	Operating voltage
yellow	Actuator inserted and locked
flashes yellow	Actuator inserted and not locked
red	Error

6. Cover for manual release:

Cover is sealed.

☐

Date / Signature:

11. EU declaration of conformity

EU Declaration of conformity

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: AZM201

Type: See ordering code

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

Relevant Directives:
Machinery Directive 2006/42/EC
RED-Directive 2014/53/EU
RoHS-Directive 2011/65/EU

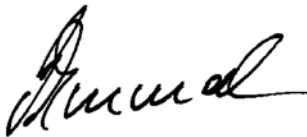
Applied standards:
EN 60947-5-3:2013
ISO 14119:2013
EN 300 330 V2.1.1:2017
EN ISO 13849-1:2015
EN 61508 parts 1-7:2010

Notified body for the prototype test: TÜV Rheinland Industrie Service GmbH
Am Grauen Stein, 51105 Köln
ID n°: 0035

EC-prototype test certificate: 01/205/5608.00/17

Person authorised for the compilation of the technical documentation: Oliver Wacker
Möddinghofe 30
42279 Wuppertal

Place and date of issue: Wuppertal, 18. February, 2021



Authorised signature
Philip Schmersal
Managing Director

AZM201-H-EN



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

