SCHMERSAL

Version 2

EN Operating instructions. . . . . pages 1 bis 12
Original

Content

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 range of products 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.

x.000 / 05.2025 / v.A. - 103055468-EN / B / 2025-05-16 / AE-Nr. 18938

1.7 Exclusion of liability

We shall accept no liability for damages or malfunctions resulting from defective mounting or failure to comply with this operating instructions manual. We shall accept no liability for damages or malfunctions resulting from defective mounting or failure to comply with this operating instructions manual.

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

AZM40①-②-ST-1P2P-③ Solenoid interlock

No.	Option	Description
①	Z	Guard locking monitoring
	B	Actuator monitoring
②		Standard coding
	I1	Individual coding
	I2	Individual conding, re-teaching enabled
③		Counterbores for countersunk screws
	PH	Flat enclosure for protruding screws

It must be ensured that solenoid interlocks as of version ‘V2’ are always used with an actuator as of version ‘V2’ (see type plate).

In combination with:

AZM40-B1-①-② Actuator

No.	Option	Description
①		Counterbores for countersunk screws
	PH	Flat enclosure for protruding screws
②		Spring force actuator 50 N
	3121	Spring force actuator 14 N

Reduced spring force of the actuator spring 14 N for version -3121 for easier adjustment and positioning of the actuator tongue with safety doors that are not optimally aligned.

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 and use

The non-contact, electronic safety switchgear is designed for application in safety circuits and is used for monitoring the position and locking of movable safety guards.

The AZM40 interlock system is suitable for mounting to 40 mm profile systems and, thanks to the 180 degree angle flexibility of the actuator, for rotating and sliding guards. LEDs are visible from 3 sides.

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

The different variants can be used as a safety switch with guard locking either as safely monitored guard locking device.

If the risk analysis indicates the use of a **monitored guard locking** then a variant with a safely guard locking monitoring has to be used, marked with the symbol in the ordering code.
The actuator monitoring variant (B) is a safety switch with a guard locking function only for process protection.

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

The AZM40 solenoid interlock is a bi-stable system, which means the interlock remains in the last position if power is lost.

Series-wiring

Series-wiring can be set up. In the case of a series connection, the risk time remains unchanged and the reaction time increases by the sum of the reaction time of the inputs per additional unit specified in the technical data. The quantity of devices is only limited by the cable drops and the external cable fuse protection, according to the technical data.

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.

2.4 Technical data

Standards:	EN 60947-5-3, EN ISO 14119, EN ISO 13849-1, IEC 61508
Enclosure:	glass-fibre reinforced thermoplastic, self-extinguishing / light alloy die-casting
Working principle:	RFID
Frequency band:	125 kHz
Transmitter output:	max. -6 dBm
Coding level according to EN 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
Actuator:	AZM40-B1(-3121), AZM40-B1-PH(-3121)
Series-wiring:	Unlimited number of components, please observe external cable protection
Length of the sensor chain:	max. 200 m (Cable length and cable section alter the voltage drop depending on the output current)
Mechanical data	
Connection:	Connector plug M12, 8-pole, A-coded
Fixing screws:	2 x M5 (8.8 or stainless steel with min. strength class 80)
Tightening torque of the fixing screws:	4 … 6 Nm
Latching force:	40 N (± 25 %)
Holding force F_{max}:	2,600 N
Holding force F_{Zh}:	2,000 N
Actuating speed:	≤ 0.5 m/s
Mechanical lifetime:	
- locking cycles:	1,000,000 operations
- actuator cycles:	500,000 operations (as of version "V2", see type plate)

Switching distances to EN 60947-5-3	
Assured switching distance s_{ao}:	1 mm
Assured switch-off distance s_{ar}:	8 mm
Ambient conditions	
Ambient temperature:	−20 °C … +55 °C
Storage and transport temperature:	−40 °C … +85 °C
Relative humidity:	max. 93 %, non condensing, non icing
Degree of protection:	IP66 / IP67 / IP69 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 … 55 Hz, Amplitude 1 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:	≤ 0.25 Hz
Electrical data	
Rated operating voltage U_e:	24 VDC
Operating voltage U_B:	24 VDC –15 % / +10 % (stabilised PELV - power supply)
Rated operating current I_e:	1.2 A
No-load supply current I_0:	< 0.1 A
Current consumption of device at switching moment of bistable magnet:	
- Peak current:	< 0.6 A / < 100 ms
Required rated short-circuit current:	100 A
External cable and device fuse rating:	2 A gG
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:	≤ 5 mA / 24 V
Accepted test pulse duration on input signal:	≤ 1 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-12, DC-13
- Rated operating voltage U_e:	24 VDC
- Rated operating current I_e:	each max. 0.25 A
Leakage current I_r:	≤ 0.5 mA
Voltage drop U_d:	≤ 2 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-12, DC-13
- Rated operating voltage U_e:	24 VDC
- Rated operating current I_e:	max. 0.05 A
Voltage drop U_d:	≤ 2 V
Electrical data – Magnet control	
Solenoid input:	IN
Switching thresholds:	-3 V … 5 V (Low), 15 V … 30 V (High)
Power consumption:	≤ 15 mA / 24 V
Magnet switch-on time:	100 %
Accepted test pulse duration on input signal:	≤ 5 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

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.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:
(1) L'appareil ne doit pas produire de brouillage.
(2) L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.
Cet appareil est conforme aux limites d'exposition relatives à la stimulation des nerfs (ISED CNR-102) pour les opérations tactiles directes. Changements ou modifications non expressément approuvés par K.A. Schmersal GmbH & Co. KG pourrait annuler le droit de l'utilisateur à utiliser l'équipement.

ANATEL 20941-22-14519

Este equipamento nao tem direito àprotecao contra interferência prejudicial e nao pode causar interferencia em sistemas devidamente autorizados. Para maiores informacores consultar:
www.gov.br/anatel

2.5 Safety classification

- of the interlocking function:	
Standards:	EN ISO 13849-1, IEC 61508
PL:	up to e
Category:	4
PFH:	1.1×10^{-9} / h
PFD:	8.9×10^{-5}
SIL:	suitable for SIL 3 applications
Mission time:	20 years

- of the guard locking function:	
Standards:	EN ISO 13849-1, IEC 61508
PL:	up to d
Category:	2
PFH:	3.0×10^{-9} / h
PFD:	2.4×10^{-4}
SIL:	suitable for SIL 2 applications
Mission time:	20 years

The safety classification of the guard locking function only applies for standard devices with monitored guard locking AZM40Z-…-1P2P-… (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.

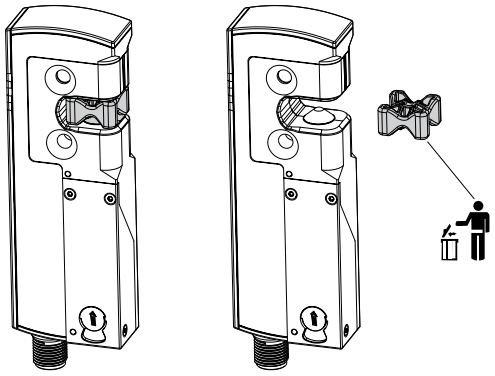
The safety classification of the guard locking function refers to the component solenoid interlock AZM as part of the complete system.
On the customer side further measures such as safe actuation and safe cable installation to prevent faults are to be implemented.
In the event of a fault resulting in 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 EN ISO 12100, EN ISO 14119 and EN ISO 14120.

Any position is possible.
The solenoid interlock must not be used as an end stop.
The transport lock must be removed.



For attachment of the solenoid interlock and the actuator, two mounting holes for M5 screws are provided.

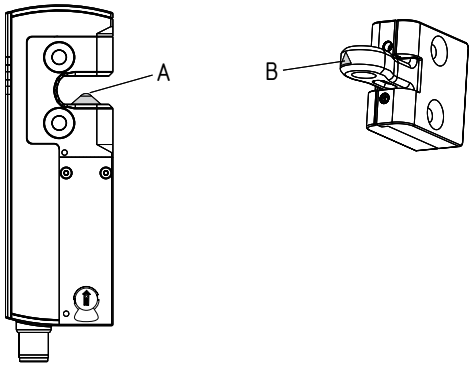
The M5 screws must be at least strength class 8.8 or, in stainless steel, strength class 80. The tightening torque of the M5 screws is 4 to 6 Nm, the maximum tightening torque depends on the fastening screws used.

The solenoid interlock is self-greasing. The grease on the locking bolt and in the actuator recess must not be removed.

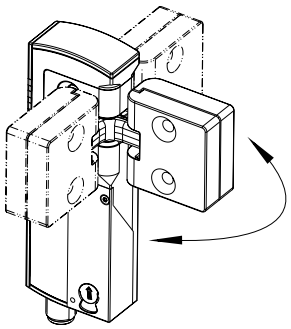
The accumulation of fine-grained dirt in the bolt area must be avoided. In that case, a mounting where the bolt goes upwards from below is not advisable.
The actuator must be mounted so that it is protected from damage due to external influences.

Use in temperatures below freezing is permitted only with dry cold. The customer must take this into account when assembling the safety switch.

The interlock with locking bolt (A) and actuator with triangular marking (B) must be installed in the same installation direction.



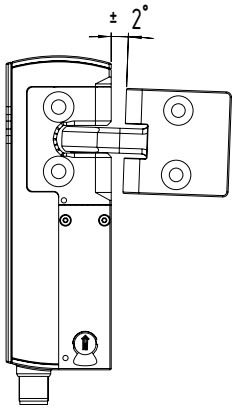
Actuating directions
The actuator can be continuously inserted by 180°.



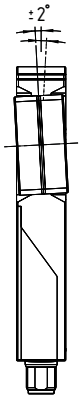
The actuator must be permanently fitted to the safety guard and protected against displacement by suitable measures (tamperproof screws, gluing, drilling of the screw heads, pinning).

Authorised actuator and interlock offset

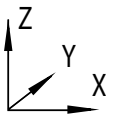
Tilt angle



Rotating angle

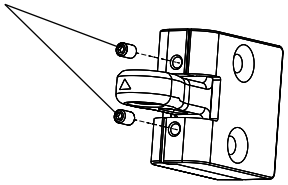


The AZM40 can be operated within the following tolerance limits:
X axis: - 3 mm
Y axis: ±1 mm
Z axis: ±1.5 mm (actuator in centre position)



Adjustment
The two hexagon socket screws M4 can be used to adjust the actuator tongue in the X direction, using a hexagonal key wrench AF 2 mm.

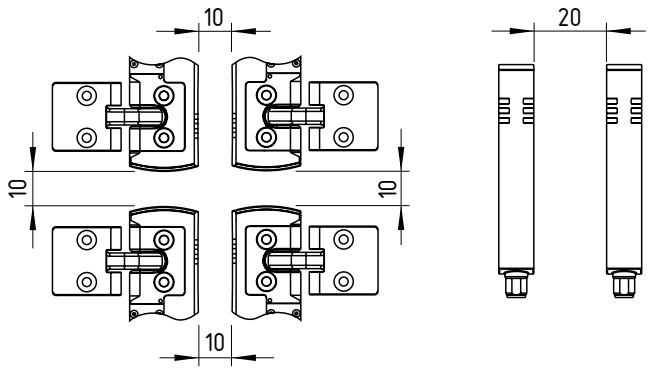
Adjustment via hexagon socket screws M4



The hexagon socket screws must not be completely unscrewed.

To avoid any interference inherent to this kind of system and any reduction of the switching distances, please observe the following guidelines:
- Metal parts and magnetic fields in the area of the solenoid interlock and the actuator can influence the switch distance or lead to malfunctions.
- Keep away from metal chips.

Minimum distance between AZM40 solenoid interlocks (in mm)



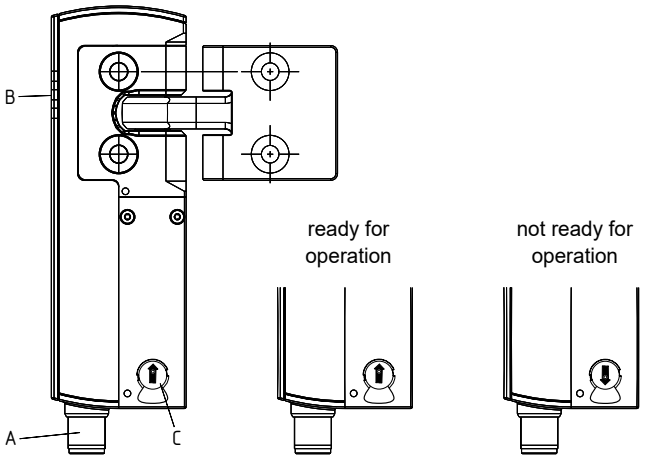
3.2 Manual release

For installation and maintenance, the solenoid interlock can be unlocked in a de-energised state. The solenoid interlock is unlocked by turning the auxiliary release anti-clockwise.
The normal locking function is only restored after the manual release has been returned to its original position.

⚠ Do not turn beyond the end stop.

A tool is required to operate the manual release (recommendation: slotted screwdriver 0.8 x 4 to 4.5 mm).

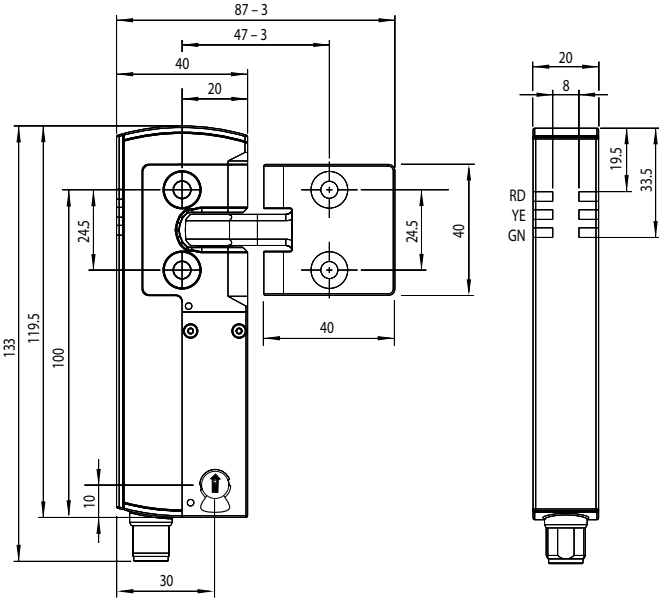
The manual release must be protected against accidental actuation, e.g. by using the enclosed seal after completing commissioning.



Key
A: connector plug M12, 8-pole
B: LED indications
C: Manual release (on both sides)

3.3 Dimensions

All measurements in mm.



3.4 Optional system components

Tamper-proof screws

	Designation	Ordering code
Tamper-proof screws M5 x 25, flat head, 2 pcs.	ACC-NRS-M5X25-FHS-2PCS	103045415
Tamper-proof screws M5 x 25, countersunk head, 2 pcs.	ACC-NRS-M5X25-CSS-2PCS	103045416

Retrofit kit for Manual release/Emergency exit
The retrofit kit is used for subsequent functional expansion of the solenoid interlock.

	Designation	Ordering code
Emergency exit	ACC-AZM40-LEV-T	103054265
Emergency release	ACC-AZM40-LEV-N	103054268
Emergency exit with pushbutton		
– for 40 mm profiles	ACC-AZM40-PT-T-40MM	103054271
– for profiles up to 170 mm	ACC-AZM40-PT-T-170MM	103054273
Emergency release with pushbutton		
– for 40 mm profiles	ACC-AZM40-PT-N-40MM	103054275
– for profiles up to 170 mm	ACC-AZM40-PT-N-170MM	103054277

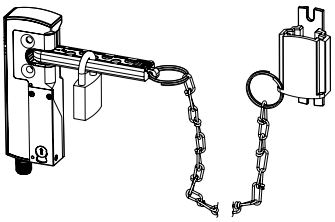
ACC-AZM40-LEV

ACC-AZM40-PT

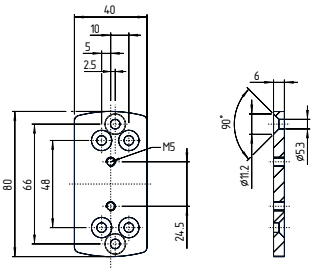
Further accessories

	Designation	Ordering code
Lockout device	SZ40	103053182
Universal mounting plate, for 20, 30, 45, 50 and 60 mm profile systems, 2 pcs.	MP-AZM40	103045324
Centring device (mounting inside)	TFI-010	101166329
Centring device (mounting outside)	TFA-010	101166328
Alignment aid (for optimum mounting of guard locking and actuator)	ACC-AZM40-ADJ-1	103059343

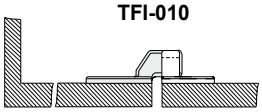
SZ40



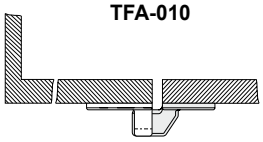
MP-AZM40



TFI-010



TFA-010



The centring device is used for pre-positioning and supports the correct alignment of the safety guard.

ACC-AZM40-ADJ-1

DHS-U1 door handle system accessories for AZM40 (and BDF40)

	Designation	Ordering code
Door handle system	DHS-U1-BKWH	103053675
	DHS-U1-BKWH-L5-5.00-RGB	103053692
	DHS-U1-BKWH-L5-5.00-LT	103053688
	DHS-U1-BKWH-L8-5.00-RGB-LT	103053689
	DHS-U1-BKWH-LST5-0.25-RGB	103053691
	DHS-U1-BKWH-LST5-0.25-LT	103053676
	DHS-U1-BKWH-LST8-0.25-RGB-LT	103053677
Connection cover AZM40 / BDF40 on the left	MS-AZM40-BDF40-L	133057001
Connection cover AZM40 / BDF40 on the right	MS-AZM40-BDF40-R	133057002
Tamper-proofing cover on the left	MS-AZM40-L	133056997
Tamper-proofing cover on the right	MS-AZM40-R	133056998

Further information on the door handle system and the AZM40/BDF40 combination can be found in the online catalogue.

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 voltage inputs A1, X1, X2 and IN must have a protection against permanent overvoltage. Supply units according to EN 60204-1 is recommended. The required electrical cable fuse protection must be integrated in the installation.

The safety outputs can be integrated in the safety circuit of the control system.

Requirements for the connected safety-monitoring module:
• Dual-channel safety input, suitable for p-type semi-conductor outputs

Configuration of the safety-monitoring module
If the safety switchgear is connected to electronic safety-monitoring modules, we recommend that you set a discrepancy time of at least 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.

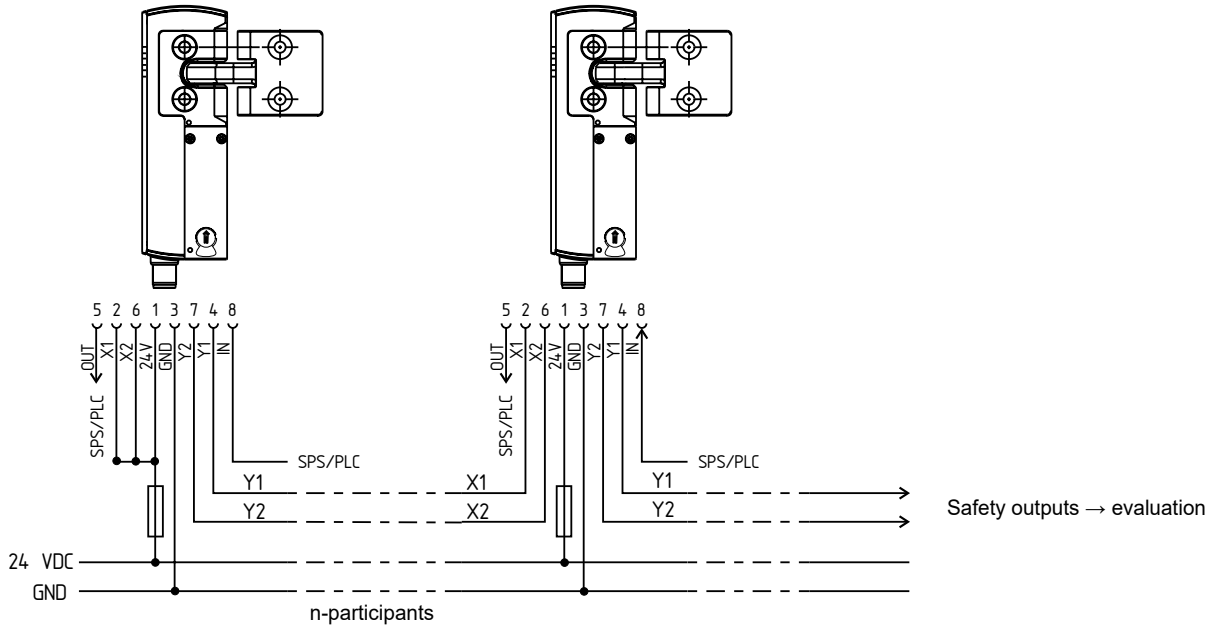
Information for the selection of suitable safety-monitoring modules can be found in the Schmersal catalogues or in the online catalogue on the Internet: products.schmersal.com.

4.2 Wiring example

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

Wiring example: series-wiring AZM40

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.



4.3 Wiring configuration and connector plug accessories

Function safety switchgear		Pin configuration of the connector	Colour codes of the Schmersal connector plugs		Poss. colour code of other commercially available connector plugs according to EN 60947-5-2
	With conventional diagnostic output		IP67 / IP69 to DIN 47100	IP69 (PVC)	
A1	U_e	1	WH	BN	BN
X1	Safety input 1	2	BN	WH	WH
A2	GND	3	GN	BU	BU
Y1	Safety output 1	4	YE	BK	BK
OUT	Diagnostic output	5	GY	GY	GY
X2	Safety input 2	6	PK	VT	PK
Y2	Safety output 2	7	BU	RD	VT
IN	Magnet control	8	RD	PK	OR

Connecting cables with coupling (female) IP67 / IP69, M12, 8-pole – 8 x 0.25 mm² to DIN 47100

Cable length	Ordering code
2.5 m	103011415
5.0 m	103007358
10.0 m	103007359
15.0 m	103011414

Connecting cables with coupling (female) IP69, M12, 8-pole – 8 x 0.21 mm²

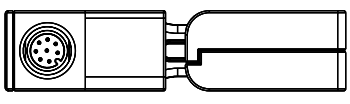
Cable length	Ordering code
5.0 m	101210560
5.0 m, angled	101210561
10.0 m	103001389

Connecting cables to connect to the SFB safety fieldbox IP67, M12, 8-pole – 8 x 0.25 mm²

Cable length	Ordering code
1.0 m	101217787
1.5 m	101217788
2.5 m	101217789
5.0 m	101217790

When using an angled connector, it is aligned parallel to the attachment surface and points to the side away from the actuator.

AZM40 **AZM40-B1**



5. Operating principle and actuator coding

5.1 Magnet control

The bistable interlock is released through operational setting of the IN signal (= 24 V). If the IN signal is not set (= 0 V), the solenoid interlock goes into locked state, so long as the correct actuator is inserted into the solenoid interlock.

5.2 Mode of operation of the safety outputs

In the standard AZM 40Z 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 AZM 40Z solenoid interlock; in that case, the safety outputs are re-enabled. **It is not necessary to open the safety guard.**

In the AZM40B version, only the opening of the safety guard causes the safety outputs to be disabled.

If the safety outputs are already enabled, any error that does not immediately affect the functionality of the solenoid interlock (e.g. too high an ambient temperature, interference potential at the safety outputs, cross-wire short) will lead to a warning message, the disabling of the diagnostic output and the delayed shutdown of the safety outputs. The safety outputs are disabled if the error warning is active for 30 minutes. The signal combination, diagnostic output disabled and safety channels still enabled, can be used to stop the production process in a controlled manner. After the rectification of the error, the error message is reset by opening the corresponding safety guard.

5.3 Actuator coding

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

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

1. Switch the solenoid interlock's voltage supply off and back on.
2. 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).
3. After 10 seconds, brief yellow cyclic flashes (3 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).
4. 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 thus executed allocation of safety switchgear 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 function

6.1 Diagnostic-LEDs

The solenoid interlock signals the operating condition, as well as errors through 3-colour LEDs.

green (Power)	supply voltage on
yellow (Status)	operating condition
red (Fault)	Error (see table 2: Error messages / flash codes red diagnostic LED)

The green LED indicates that the safety sensor is ready for operation. The supply voltage is on and all safety inputs are present. Flashing (1Hz) of the green LED signals that a voltage is missing on one or both of the safety inputs (X1 and/or X2).

System condition	LED		
No input signal at X1 and/or X2	green	red	yellow
Safety guard open and a door in the safety circuit in front of it is also open	Flashes (1Hz)	Off	Off
Safety guard closed and a door in the safety circuit in front of it is open	Flashes (1Hz)	Off	Flashes
Safety guard locked and a door in the safety circuit in front of it is open	Flashes (1Hz)	Off	On

6.2 Diagnostic output

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

The diagnostic output is not a safety-related output.

Error warning

A fault has occurred, which causes the safety outputs to be disabled after 30 minutes (LED "fault" flashes, see Table 2). The safety outputs initially remain enabled (max. 30 minutes). This enables the shutdown of the process in a controlled manner. An error warning is deleted when the cause of error is eliminated.

Error

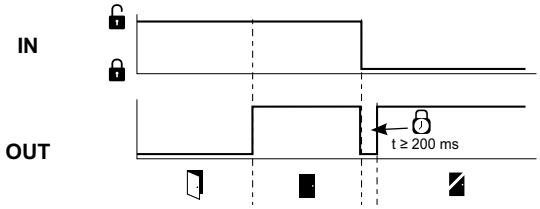
Errors, which no longer guarantee the safe function of the solenoid interlock (internal error)s cause the safety outputs to be immediately disabled. Any error that does not immediately affect the safe functionality of the solenoid interlock (e.g. excess ambient temperature, safety output to external potential, short circuit) will lead to a delayed shut-down (refer to table 2). After the rectification of the error, the error message is reset by opening the corresponding safety guard.

Forced opening of the solenoid interlock is indicated by synchronised flashing of all LEDs.
The solenoid interlock and actuator must then be replaced.

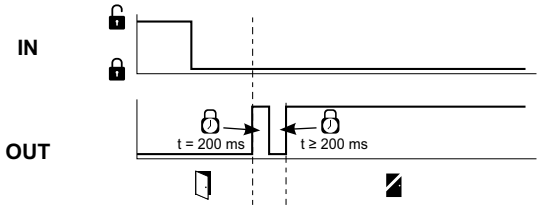
Automatic, electronic locking takes place if more than one fault is detected at the safety outputs or a cross circuit is detected between Y1 and Y2. This means that normal fault acknowledgement is no longer possible. To reset this type of interlock, the solenoid interlock must be isolated from the supply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

Behaviour of the diagnostic output

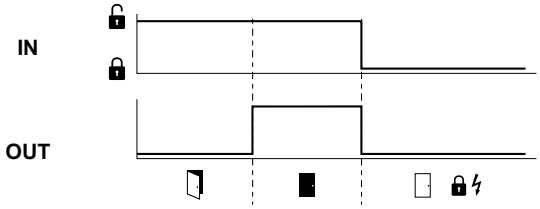
Sequence, locking signal is applied after the door is closed



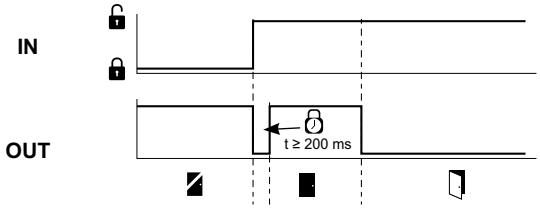
Sequence, locking signal is applied before the door is closed



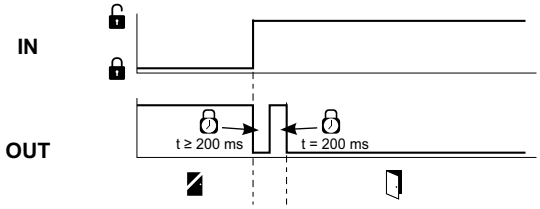
Disrupted process, door could not be locked or error



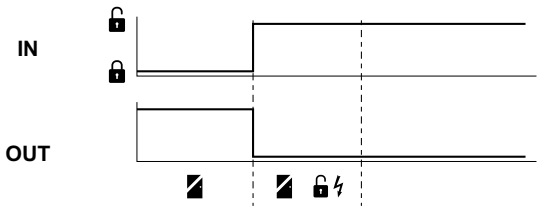
Normal sequence, door was unlocked



Sequence, door opened immediately after unlocking



Disrupted process, door could not be unlocked



Key

Lock	Unlock	Locking time
Door open	Safety guard closed	Safety guard locked
Safety guard not locked or fault	Locking blocked	Unlocking blocked

Table 1: Diagnostic information of the safety switchgear

System condition	Magnet control (bistable) IN	LED			Safety outputs Y1, Y2		Diagnostic output OUT
		green	red	yellow	AZM40Z	AZM40B	
Door open	24 V	On	Off	Off	0 V	0 V	0 V
Door closed, **not locked**	24 V	On	Off	Flashes	0 V	24 V	24 V
Door closed, **locking impossible**	0 V	On	Flashes [2)]	Flashes	0 V	24 V	0 V
Door closed and locked	0 V	On	Off	On	24 V	24 V	24 V
Error warning [1)]	0 V / 24 V	On	Flashes [2)]	on / flashes	24 V / 0 V	24 V[1)]	0 V
Error	0 V / 24 V	On	Flashes [2)]	on / flashes / off	0 V	0 V	0 V
Error, mechanical overload[3)]	0 V	flashes synchronously	flashes synchronously	flashes synchronously	0 V	0 V	0 V
Error in input circuit X1 and/or X2	0 V / 24 V	Flashes	Off	see Section Diagnostic LEDs	depending on the system status		
10,000 operations before reaching the mechanical lifetime limit	0 V / 24 V	flashes synchronously	flashes synchronously	on / flashes / off	depending on the system status		
Mechanical lifetime limit achieved	0 V / 24 V	flashes alternately	flashes alternately	Off	0 V	0 V	0 V
Additionally for variant I1/I2:							
Teach-in procedure actuator started	24 V	Off	On	Flashes	0 V	0 V	0 V
Only I2: teach-in procedure actuator (release block)	24 V	Flashes	Off	Off	0 V	0 V	0 V

[1)] after 30 min: switch-off due to error [2)] s. Flash code

[3)] In the event of complaints relating to the mechanical overload fault, the device including the associated actuator must always be sent in.

Table 2: Error messages / flash codes red diagnostic 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	Internal error	0 min	Error at control inputs
7 flash pulses	Error, interlock actuator	10 min / 0 min	Locking/unlocking blocked * / incorrect position of manual release (at one of the two sides at a minimum)
8 flash pulses	Error (warning) over/under voltage	30 min	Supply voltage outside specification
Continuous red signal	Internal error	0 min	Device defective

* If the "Locking / unlocking blocked" error occurs, the solenoid interlock attempts to unlock / lock cyclically (1 Hz), but cancels after 10 minutes. The error message (7 flashes) is displayed after a short time, but can be reset by eliminating the cause.

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 and integrity of the cable connections.
2. Check the switch enclosure for damage.
3. Remove particles of dust and soiling.

7.2 Maintenance

In the case of correct installation and adequate use, the safety switchgear features maintenance-free functionality. A regular visual inspection and functional test, including the following steps, is recommended:

- Check for a secure installation of the actuator and the solenoid interlock
- Check max. misalignment of actuator unit and solenoid interlock and max. tipping and rotary angle and adjust using M4 socket head screws, if necessary.
- Fitting and integrity of the cable connections.
- Check the switch enclosure and actuator for damage.
- Remove soiling

⚠ 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.

⚠ After reaching the mechanical lifetime limit of 1,000,000 locking cycles or 500,000 actuator cycles (as of version "V2", see type plate), the solenoid interlock can no longer be locked and must be replaced, together with the actuator.

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.

9. EU Declaration of conformity

EU Declaration of conformity

SCHMERSAL

Original

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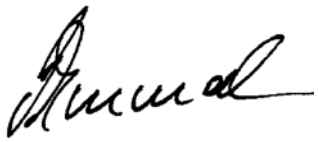
We hereby certify that the hereafter described components both in their basic design and construction conform to the applicable European Directives.

Name of the component:	AZM40
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 EN ISO 14119:2013 EN 300 330 V2.1.1:2017 EN ISO 13849-1:2015 IEC 61508 parts 1-7:2010
Notified body for Type Examination:	TÜV Rheinland Industrie Service GmbH Am Grauen Stein, 51105 Köln ID n°: 0035
EC-Type Examination Certificate:	01/205/5815.00/21
Person authorised for the compilation of the technical documentation:	Oliver Wacker Möddinghofe 30 42279 Wuppertal
Place and date of issue:	Wuppertal, April 21, 2021



Authorised signature
Philip Schmersal
Managing Director

AZM40-A-EN

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

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