

Safety solenoid interlock with bolt locking

AZM400



AZM400

Highest demands on

- Bistable, motor-driven system
- Holding force $F_{Zh} = 10,000 \text{ N}$ / $F_{max} = 13,000 \text{ N}$
- Release possible against lateral forces up to 300 N
- Individually coded version with coding level "High" according to ISO 14119



safety requirements

- PL e / cat. 4 / SIL 3 for interlocking and guard locking function
- Two-channel input signal of the guard locking function
- Operation on P/P- and P/N-switching outputs
- High tolerance to door misalignment
- Up to two diagnostic outputs
- Emergency exit or manual release
- Optional: electric manual release with auxiliary voltage
- Assembly set for simple installation on 40 mm aluminium profiles



Function and operation



Highest demands on safety with bistable operating principle

The AZM400 enhances the Schmersal family of safety locking devices to include a safety solenoid interlock with bolt locking. This consists of a locking unit with sensor technology and a motor-driven locking bolt, along with an actuator that features an encoded RFID-tag and a locking hole with two permanent magnets in which the locking bolt engages. Only once the safety door is in the correct position the locking bolt can be ejected. As soon as the locking bolt has reached a sufficient depth in the locking hole of the actuator, it is enabled by the system and the protection device is deemed to be secure.

The AZM400 solenoid interlock is a bistable system. In other words, the locking device remains in the last locked status in the event of a power failure. Safe operation is assured in any operating condition of the machine even if the system is in a run-down movement and presents a danger, the safety door remains securely closed if power has been cut-off.

Fields of application

- Machine tools with heavy doors
- Safety doors in machine and plant construction
- Actuated and motorised safety doors
- Heavy safety doors with high manual forces
- Safety doors in front of run-down and dangerous movements



Machine tools and tool centres

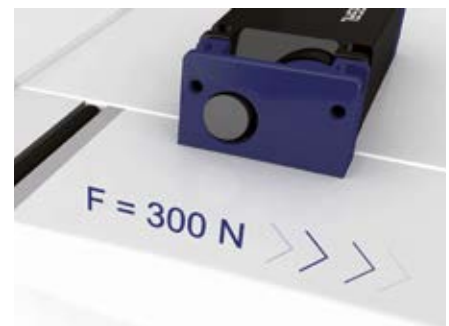
Clamping force



High holding force and unlocking against lateral force

With a holding force of $F_{Zh} = 10,000 \text{ N}$ / $F_{max} = 13,000 \text{ N}$, the AZM400 solenoid interlock is particularly well suited for heavy doors.

It is not uncommon for tension to build up in the doors due to sealing lips or misalignment of the safety door. To resolve this problem, the AZM400 enables unlocking against lateral forces of up to 300 N.



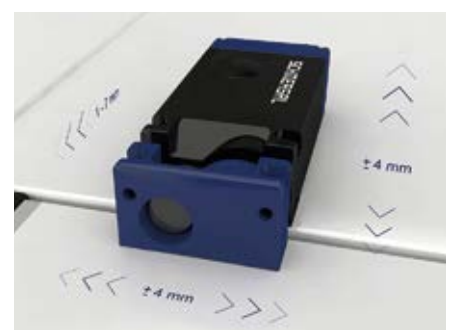
Unlocking against lateral force: 300 N

Actuator misalignment and switching distance

The actuator can be moved on both sides from the X and Y direction. In this way, simple installation in applications with sliding guards or rotating protective equipment is made possible.

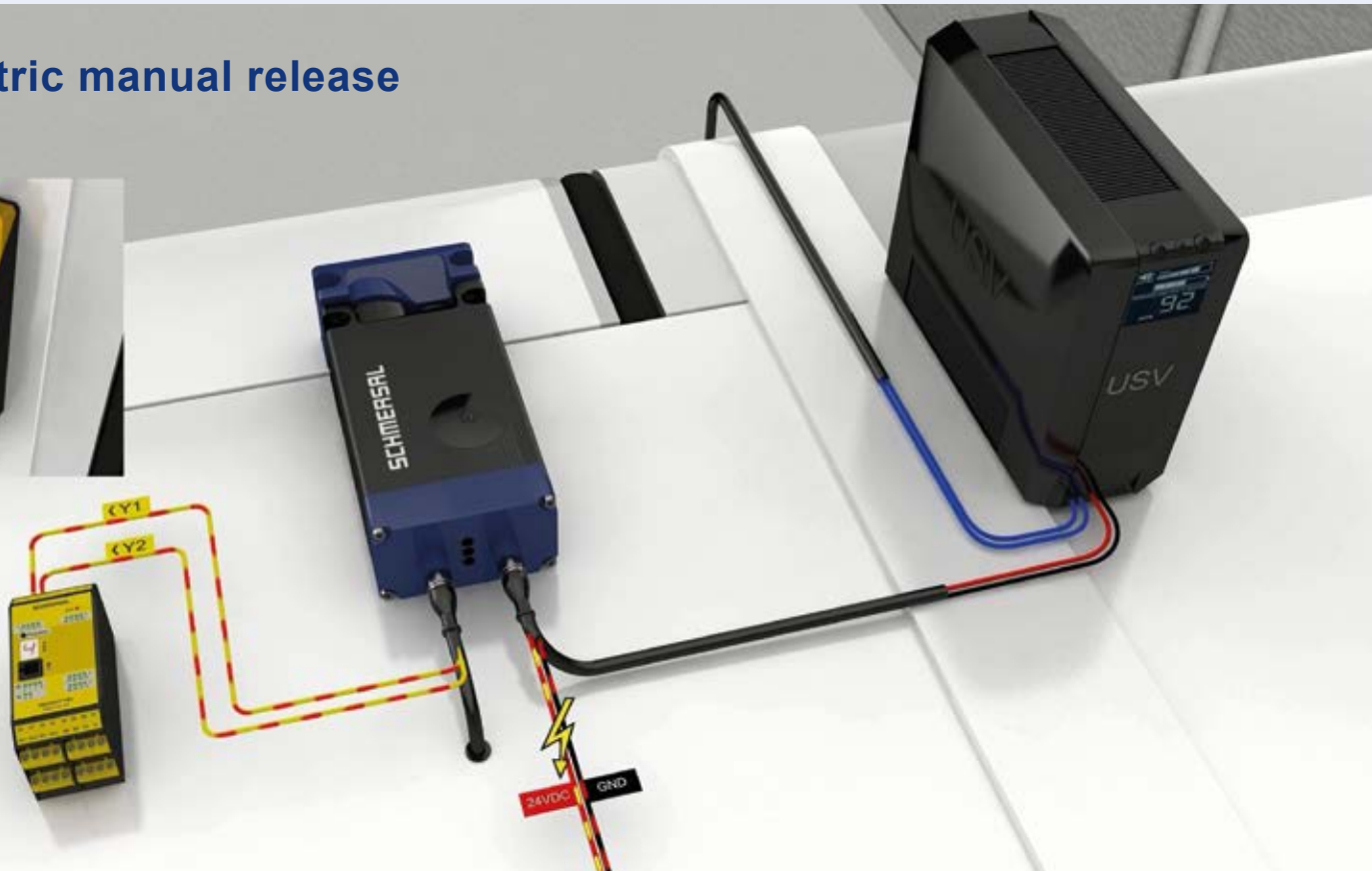
Due to the high permissible actuator offset, it can also be used where large installation tolerances on safety doors are encountered.

- Actuator tolerance in X and Y direction: $\pm 4 \text{ mm}$
- Distance between actuator and solenoid interlock 1...7 mm with max. angle offset of 2°



Actuator tolerances

Electric manual release



Electric manual release and enhanced diagnosis

As with most of the electronic switchgear from Schmersal, the basic version of AZM400 (-ST) is fitted with an 8-pole M12 connector. This version features a diagnostic output and two safety outputs.

The functionally enhanced version of AZM400 (-ST2) is also fitted with a 5-pole M12 connector in addition to the 8-pole M12 connector. This version is distinguished by an additional diagnostic output as well as the means by which an electric auxiliary release device can be connected.

The electric manual release of the functionally enhanced version of AZM400 (-ST2) can be realised by an additional auxiliary voltage supply. By connecting the auxiliary voltage supply, it is possible to release the device in the event of a power failure or if the main supply is switched-off.

Two-channel input signal of the guard locking function in accordance with ISO 14119

By means of a two-channel input signal, the AZM400 meets the highest demands in safety as prescribed by ISO 14119. In this way, the interlocking function and the guard locking function fulfills PL e / category 4 / SIL 3.

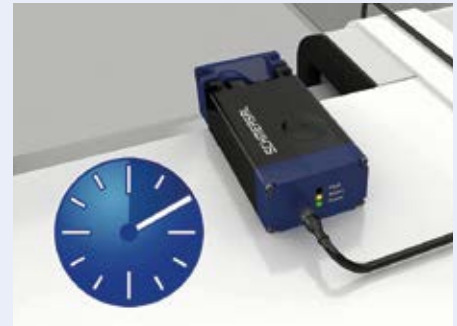
The guard locking function is significant, particularly for applications in which a hazardous situation could occur through unintended opening of the isolating guard system such as, for example, run-down movement causing a danger.

The new type of input circuit for actuation of the guard locking function makes it possible to connect the AZM400 to all common safety control systems. These safety control systems can be equipped with both P/P and P/N outputs. To do this, no different versions of the AZM400 are necessary.

Coding



Automatic teaching after the operating voltage is switched on



Ten minute release block during the teach-in procedure for the replacement actuator

Protection against defeating through individual coding

If interlocking devices are tampered with, the machine is no longer operated in accordance with the manufacturer's specifications. As a result, the operator could be exposed to a considerably higher risk.

If tampering cannot be excluded by using modified or additional operating modes, the machine builder can only take one more measure, i.e. making the tampering of the interlocking device more difficult or impossible. (Excerpt from ISO 14119)

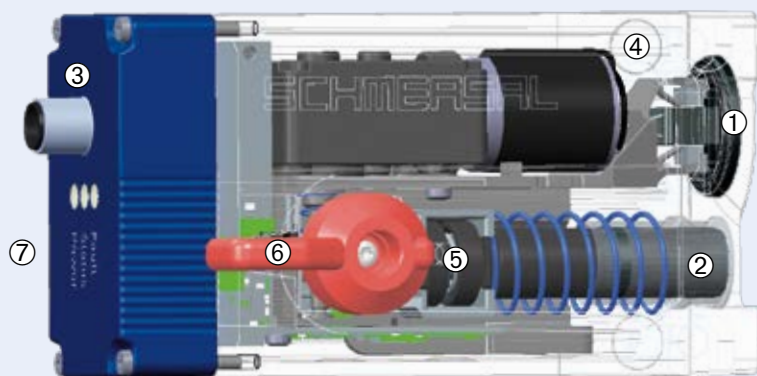
In its basic version, the AZM400 accepts any suitable actuator. By integrating RFID technology in the safety sensors, the coding level high can be reached for the individually encoded versions in accordance with ISO 14119. Version -I1 only accepts an actuator for which the teach-in process was run upon initial activation. With the third version -I2, this teach-in process can be repeated as many times as necessary. A release block of ten minutes prevents a quick change of the actuator and protects the system further against manipulation. In this way, the user can choose the most suitable coding variant for the intended application as well as the desired degree of protection against tampering.

Teaching actuators without additional tools

For the individually encoded versions -I1 and -I2, the teach-in process for the actuator requires no tools at all.

During initial start-up, the teach-in process starts automatically. Simply connect the holding device to the operating voltage and bring the actuator into the detection range. After about ten seconds, brief cyclic flashes indicate that the operating voltage is to be switched off. When the operating voltage is reactivated, the actuator must be brought into the detection range again in order for the generated actuator code to be activated.

The AZM400 in detail

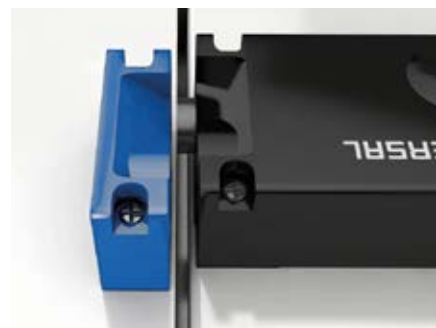


Key

- ① High protection against tampering thanks to encoded RFID sensor
- ② Motor-driven locking bolt
- ③ M12 connector plug, 8-pole
- ④ Fixing holes for M6 bolts
- ⑤ Manual release
- ⑥ Emergency exit lever
- ⑦ LED display

Detection of block run

If the locking bolt does not reach the "locked" status at the first attempt, the AZM400 makes another autonomous attempt. Only after the second attempt has failed will the AZM400 report a fault. This reduces the number of error messages and protects the device and the machine against damage.



Features



LED display

- Smart diagnostic by means of 3-colour LED's
- Red LED: Fault
- Yellow LED: Device condition
- Green LED: Supply voltage



Two connector version

- AZM400 (-ST2) version with additional M12 5-pole connector plug for connection of electric manual release and additional diagnostic output.



Manual release

- For set-up and commissioning of the machine, the solenoid interlock can be released without power with the aid of a triangular key.

New accessories for the AZM400



AZM400 with lockout tag



Bowden cable with T-grip

Lockout tag

Schmersal now offers the AZM400 with new accessories: a lockout tag prevents operating personnel on larger, accessible machines and plants from being accidentally shut out during maintenance and repair work.

Here, the service workers attach a lock to the lockout tag upon entering the hazardous area, thereby preventing the guard system from being closed and stopping the machine from running up unintentionally.

A maximum of six locks can be secured to the lockout tag, i.e. up to six people can be in the hazardous zone at the same time.

Bowden cable

In the event that an operator is accidentally shut inside a plant, a Bowden cable can be used as an emergency exit via a wire rope. The Bowden cable release is an accessory that can be used in connection with the solenoid interlock AZM400Z-...-BOW.


If deployed within the hazardous zone, the Bowden cable can be used as an emergency exit, if deployed outside a hazardous zone, it can be used as an emergency release.

On the standard version, the wire rope has a total length of six metres and a casing length of four metres so that large plants can also be safeguarded.

A T-grip is also available as an actuating element. The T-grip can be used in conjunction with the Bowden cable release ACC-AZM 400-BOW.



Technical data

Technical data	AZM400
Holding force F_{Zh}/F_{max} :	10,000 N / 13,000 N
Unlocking against lateral force:	300 N
Mechanical life:	> 1,000,000 operations
Protection class:	IP66 / IP67
Dimensions:	157 x 78 x 47 mm
Supply voltage:	24 VDC –15% / +10%
Electrical connection:	ST: Connector plug M12, 8-pole; ST2: Connector plug M12, 8-pole / M12, 5-pole
Outputs:	ST: 1 diagnostic output, 2 safety outputs, all p-type; ST2: 2 diagnostic outputs, 2 safety outputs, all p-type;
Diagnostic and status display:	3 LEDs
Classification:	ISO 13849-1, IEC 61508
- of the interlocking function:	PL e / Cat. 4 / SIL 3
- of the guard locking function:	PL e / Cat. 4 / SIL 3
Approvals:	TÜV 

Ordering details

1 connector plug ST	2 connector plugs ST2	1 diagnostic output 1P2P	2 diagnostic outputs 2P2P	Standard coding	Individual coding -I1	Individual coding, re-teaching enabled -I2	Manual release	Emergency exit T	Bowden cable BOW	Electric manual release E	Ordering details	Ordering code
■		■		■			■				AZM400Z-ST-1P2P	103003590
■		■		■					■		AZM400Z-ST-1P2P-BOW *	103015314
■		■		■				■			AZM400Z-ST-1P2P-T	103003593
■		■			■		■				AZM400Z-ST-I1-1P2P	103003732
■		■			■			■			AZM400Z-ST-I1-1P2P-T	103003840
■		■				■	■				AZM400Z-ST-I2-1P2P	103003733
■		■				■			■		AZM400Z-ST-I2-1P2P-BOW *	103015315
■		■				■		■			AZM400Z-ST-I2-1P2P-T	103003841
	■		■	■			■			■	AZM400Z-ST2-2P2P-E	103003588
	■		■	■					■	■	AZM400Z-ST2-2P2P-BOW-E *	103015312
	■		■	■				■		■	AZM400Z-ST2-2P2P-T-E	103003591
	■		■		■		■			■	AZM400Z-ST2-I1-2P2P-E	103003724
	■		■		■			■		■	AZM400Z-ST2-I1-2P2P-T-E	103003835
	■		■			■	■			■	AZM400Z-ST2-I2-2P2P-E	103003725
	■		■			■			■	■	AZM400Z-ST2-I2-2P2P-BOW-E *	103015313
	■		■			■		■		■	AZM400Z-ST2-I2-2P2P-T-E	103003836
Actuator											AZM400-B1	103003508
Mounting set											MS-AZM400	103009179
Lockout tag											SZ400	103015742
Bowden cable (Remote release)											ACC-AZM400-BOW-4M/6M	103015308
T-grip for Bowden cable release											ACC-AZM-BOW-H-1-RD	103027454

* Only in connection with Bowden cable (available separately)



The Schmersal Group

In the demanding field of machine safety, the owner-managed Schmersal Group is one of the international market leaders. The company, which was founded in 1945, has a workforce of about 2000 people and seven manufacturing sites on three continents along with its own companies and sales partners in more than 60 countries.

Customers of the Schmersal Group include global players from the area of mechanical engineering and plant manufacturing as well as operators of machinery. They profit from the company's extensive expertise as a provider of systems and solutions for machine safety. Furthermore, Schmersal specialises in various areas including food & beverage, packaging, machine tools, lift switchgear, heavy industry and automotive.

A major contribution to the systems and solutions offered by the Schmersal Group is made by tec.nicum with its comprehensive range of services: certified Functional Safety Engineers advise machinery manufacturers and machinery operators in all aspects relating to machinery and occupational safety – and do so with product and manufacturer neutrality. Furthermore, they design and realise complex solutions for safety around the world in close collaboration with the clients.

Safety Products



- Safety switches and sensors, solenoid interlocks
- Safety controllers and safety relay modules, safety bus systems
- Optoelectronic and tactile safety devices
- Automation technology: position switches, proximity switches

Safety Systems



- Complete solutions for safeguarding hazard areas
- Individual parametrisation and programming of safety controllers
- Tailor-made safety technology – be it for individual machines or a complex production line
- Industry-specific safety solutions

Safety Services



- tec.nicum academy – Seminars and training
- tec.nicum consulting – Consultancy services
- tec.nicum engineering – Design and technical planning
- tec.nicum integration – Execution and installation

The details and data referred to have been carefully checked.
Subject to technical amendments and errors.

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