



EN Operating instructions..... pages 1 to 6
Translation of the original operating instructions

FR Vous trouverez la version actuelle du mode d'emploi dans votre langue nationale officielle sur l'Internet, www.schmersal.net.

ES Encontrará el manual de instrucciones actual en su idioma oficial de la UE en nuestra página de Internet www.schmersal.net.

NL U vindt de huidige versie van de gebruikshandleiding in uw officiële landstaal op het Internet, www.schmersal.net.

IT Il manuale d'istruzioni aggiornato nella vostra lingua (lingua ufficiale UE) è scaricabile in Internet all'indirizzo www.schmersal.net.

JP EU公用語で書かれた最新の取扱説明書は、インターネット(www.schmersal.net)からダウンロードできます。

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1 About this document

1.1 Function

This operating instructions manual provides all the information you need for the mounting, set-up and commissioning to ensure the safe operation and disassembly of the safety switchgear. The operating instructions must be available in a legible condition and a complete version in the vicinity of the device.

1.2 Target group: authorised qualified personnel

All operations described in this operating instructions manual must be carried out by trained specialist personnel, authorised by the plant operator only.

Please make sure that you have read and understood these operating instructions and that you know all applicable legislations regarding occupational safety and accident prevention prior to installation and putting the component into operation.

The machine builder must carefully select the harmonised standards to be complied with as well as other technical specifications for the selection, mounting and integration of the components.

1.3 Explanation of the symbols used



Information, hint, note:

This symbol is used for identifying useful additional information.



Caution: Failure to comply with this warning notice could lead to failures or malfunctions.

Warning: Failure to comply with this warning notice could lead to physical injury and/or damage to the machine.

1.4 Appropriate use

The products described in these operating instructions are developed to execute safety-related functions as part of an entire plant or machine. It is the responsibility of the manufacturer of a machine or plant to ensure the proper functionality of the entire machinery or plant.

The safety switchgear must be exclusively used in accordance with the versions listed below or for the applications authorised by the manufacturer. Detailed information regarding the range of applications can be found in the chapter "Product description".

1.5 General safety instructions

The user must observe the safety instructions in this operating instructions manual, the country-specific installation standards as well as all prevailing safety regulations and accident prevention rules.



Further technical information can be found in the Schmersal catalogues or in the online catalogue on the Internet: www.schmersal.net.

The information contained in this operating instructions manual is provided without liability. 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 inadequate or improper use or manipulations of the safety switchgear, personal hazards or damage to machinery or plant components cannot be excluded. The relevant requirements of the standard EN 1088 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:

AZ 200 ST-T-AS



Only if the information described in this operating instructions manual are realised correctly, the safety function and therefore the compliance with the Machinery Directive is maintained.

2.2 Special versions

For special versions, which are not listed in the order code below 2.1, these specifications apply accordingly, provided that they correspond to the standard version.

2.3 Destination and use

The safe combination of the AZ 200 ST-T-AS safety switch with electronic non-contact safety sensors and the ASM safety monitor (device for the evaluation of the safe bus protocol AS-Interface SaW) is used for monitoring the position of movable safety guards.

The door detection sensors in the AZ 200 ST-T-AS additionally monitor the closed position of the safety guard and the position of the actuator. The safety function consists in safely switching off the code transmission when the safety guard is opened and maintaining the safe switched off condition for as long as the safety guard is open.

An AS-Interface Safety at Work component functions on the basis of an individual code generator (8 x 4 bit). This safety code is cyclically transmitted over the AS-i network and monitored by the ASM safety monitor.



The user must evaluate and design the safety chain in accordance with the relevant standards and the required safety level.

LED indication

The LED's have the following meaning (to EN 50295):

LED green-red (AS-i Duo LED):	AS-Interface supply voltage/ AS-Interface communication error or slave address = 0
LED red:	internal device error
LED yellow:	device condition

2.4 Technical data

Standards:	IEC 60947-5-3, EN ISO 13849-1, IEC 61508, EN 50295	
Enclosure:	glass-fibre reinforced thermoplastic, self-extinguishing	
Mechanical life:	≥ 1 million operations	
Latching force:	30 N	
Protection class:	IP 67	
Protection class:	II ▢	
Overvoltage category:	III	
Degree of pollution:	3	
Termination:	M12 x 1 connector, 4-pole	
Tightening torque for the cover screws:	0.7 ... 1 Nm (Torx T10)	
EMC rating:	in accordance with EN 61000-6-2	
Switch distances:	To EN 60947-5-3:	
Rated operating distance S_n :	6.5 mm	
Assured switching distance S_{a0} :	4.0 mm	
Assured switch-off distance S_{ar} :	30 mm	
Hysteresis:	max. 1.5 mm	
Repeat accuracy R:	< 0.5 mm	
Electrical data AS-Interface:		
Rated operating voltage U_{e1} :		
Rated operating current I_{e1} :	0.1 A	
Rated impulse withstand voltage U_{imp} :	800 V	
Rated insulation voltage U_{i1} :	32 VDC	
No-load current I_{o1} :	typically 0.05 A	
Device fuse rating:	internal short-circuit proof	
Specification (V 2.1):	Profile:	S-0.B
	ID-Code:	0x0
	ID-Code:	0xB
	ID-Code 1:	0xF
	ID-Code 2:	0xE
AS-interface inputs:	Databits D0...D3: condition static 0 or dynamic code transmission	
AS-interface outputs:	P0:	None
	P1:	Safety guard and actuator detected
	P2:	Safety release static 0
	P3:	Error
Input module address:	preset to address 0, can be changed through AS-interface bus master or hand-held programming device	
Diagnostic display:	LED green/red	AS-Interface supply voltage / AS-Interface communication error or slave address = 0
	Red LED	Internal device error
	Yellow LED	Device status
Ambient conditions:		
Ambient temperature:	- 25°C ... +70°C	
Storage and transport temperature:	- 25°C ... +85°C	
Relative humidity:	30...95%, no condensation	
Resistance to vibration:	10 ... 150 Hz, (amplitude 0.35 mm)	
Resistance to shock:	30 g / 11 ms	
Switching frequency f:	1 Hz	
Actuating speed:	≤ 0.2 m/s	
Response time:	< 60 ms	
Duration of risk:	< 120 ms	
Time to readiness:	< 4 s	

2.5 Safety classification

Standards:	EN ISO 13849-1, IEC 61508, IEC 60947-5-3
PL:	up to e
Control category:	up to 4
PFH value:	$4 \times 10^{-9} / h$
SIL:	up to 3
Service life:	20 years
Classification:	PDF-M

3 Mounting

3.1 General mounting instructions

For fitting the AZ 200 AS safety switch and the actuator, two mounting holes for M6 screws with washers (washers included in delivery) are provided. The safety switch must not be used as 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).

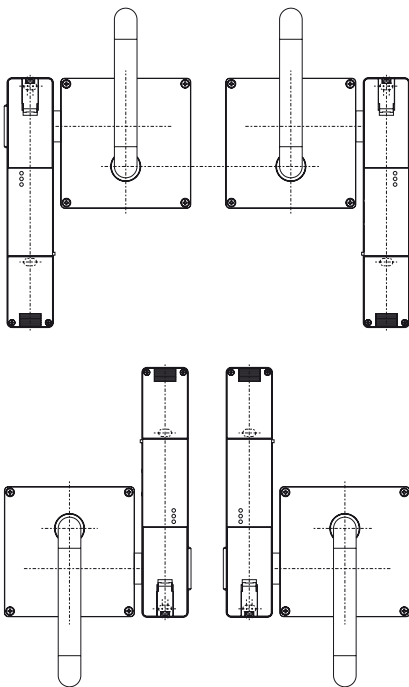
Fitting of the actuator

Refer to the mounting instructions manual for the corresponding actuator.

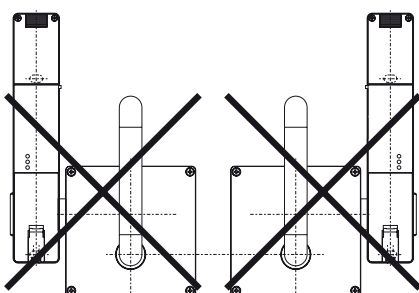


Please observe the remarks of the standards EN ISO 12100, EN 953 and EN 1088.

Admissible mounting set-up



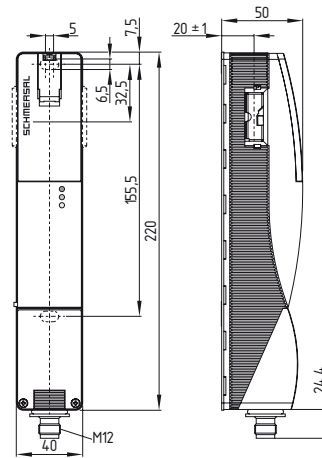
Inadmissible mounting set-up



3.2 Dimensions

All measurements in mm.

Safety switch



4 Electrical connection

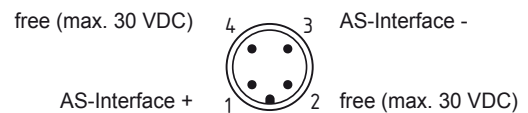
4.1 General information for electrical connection



The electrical connection may only be carried out by authorised personnel in a de-energised condition.

The AZ 200 AS solenoid interlock is supplied through the AS-Interface system. The power supply for the solenoid interlock must provide protection against permanent overvoltage. To that effect, stabilised PELV supply units must be used.

The connection to the AS-Interface system is realised through an M12 connector. The M12 x 1 connector has an A-coding. The wiring configuration of the M12 connector is defined as follows (to EN 50295):



5 Functions and configuration

5.1 Mode of operation of the safety outputs

The opening of the AZ 200 AS safety switch causes the safety outputs of the AS-i ASM safety monitor to be disabled. When the safety guard is closed, the safety outputs are re-enabled.

5.2 Configuration of the safety monitor

The AZ 200 AS component must be parameterised in the configuration software ASIMON as dual-channel dependent monitoring module with a synchronisation time of typically 100 ms. (Optional: start-up test and local acknowledge, refer to ASIMON manual).



The configuration of the safety monitor must be tested and confirmed by a qualified and authorised safety expert/safety engineer.

5.3 Programming the slave address

The slave address is programmed through the M12 connector. Any address from 1 to 31 can be set by means of the AS-i bus master or a hand-held programming device.

5.4 Status signal "safety release"

The "safety release" status signal from a Safety at Work slave can be cyclically queried by the control system through the AS-i master. To that effect, the 4 input bits with the varying SaW code of a Safety at Work slave are evaluated through an OR operation with 4 inputs in the control system.

6 Diagnostic

6.1 Read-out of the parameter port

The parameter port P0 to P3 of an AS-i slave can be read out through the control interface of the AS-i master (see component description) by means of the "Write parameter" instruction (with hexadecimal value F). This (non-safe) diagnostic information from the reflected parameters or the answer to a "Write parameter instruction" can be used by the user for diagnostic purposes or for the control programme.

Table 1: diagnostic information (P0...P3)

Parameter bit	Condition = 1	Condition = 0
0	Safety guard and actuator detected	Safety guard and actuator not detected
1	Safety release enabled	Safety release not enabled
2	Not used (static 0)	Not used (static 0)
3	Error* detected	No error detected

*To be observed: refer to error warning (switch-off after 30 min.)

Table 2: Diagnostic information of the AZM 200 AS safety switchgear

The safety switchgear signals the operational state as well as errors through three coloured LED's installed on both sides of the device.

System condition	LED	LED	LED	Condition AS-i SaW (D0 ... D3)
	green-red ³⁾	red	yellow	
guard open	green	Off	Off	static 0
Guard closed, actuator not inserted	green	Off	Off	static 0
Door closed, actuator inserted	green	Off	On	dynamic
Error warning ¹⁾ , actuator inserted, shutdown approaching	green	flashes ^{2)/on}	On	dynamic
Error	green	flashes ²⁾	Off	static 0
Internal error	green	On	Off	static 0
AS-i error: slave address = 0 or communication error	red	depending on the condition	depending on the condition	static 0

¹⁾ after 30 min. => fault / internal fault

²⁾ refer to flash code

³⁾ refer to duo LED (green/red)

Error

Errors, which no longer guarantee the function of the AZ 200 AS (internal errors) cause the safety outputs to be disabled. Any error that does not immediately affect the safe functionality of the AZ 200 AS (e.g. the ambient temperature too high) will lead to a delayed shut-down (refer to table 2).

After fault rectification, the sensor can be reset by opening the relevant guard door. The safety outputs of the ASM can be switched back on, thus enabling the machine.

Error warning

If a fault has occurred, which still guarantees the function of the safety switch, the system is safely switched off after 30 minutes. The safety outputs of the ASM initially remain enabled. The error message can be read out through the parameter port (refer to Table 1). Depending on the type of fault, the machine is not immediately shut down. The control system obtains a preliminary message, which enables a controlled shutdown of the process.

An error warning is deleted/reset as soon as the error cause is eliminated.

Table 3: Error messages

Flash codes (red)	Description	Autonomous switch-off after	Error cause
4 flash pulses	Error (warning) temperature too high	30 min.	The temperature measurement reveals an internal temperature that is too high
5 flash pulses	Error false target	0 min.	The coding (frequency) of the detected targets diverges too much from the desired value, wrong target
6 flash pulses	Error target combination	0 min.	An invalid combination of targets was detected at the 4 coils of the AZ 200 ST-T-AS. (Currently set: blocking bolt detected & door target not detected => blocking bolt breakage detection or tamper attempt)
continuous red signal	internal error	max. 30 min.	

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. Check max. axial misalignment of actuator and safety switchgear
2. Check the switch enclosure for damage
3. Remove particles of dust and soiling

7.2 Maintenance

We recommend a regular maintenance, including the following steps:

- Check the fixing of the safety switch and the actuator
- Check max. axial misalignment of actuator and safety switch
- Check the switch enclosure for damages
- Remove soiling

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.

9.1 EC Declaration of conformity

	
<h2>EC Declaration of conformity</h2>	
Translation of the original declaration of conformity valid as of December 29, 2009	K.A. Schmersal GmbH Industrielle Sicherheitssysteme Möddinghofe 30 • 42279 Wuppertal Germany Internet: www.schmersal.com
We hereby certify that the hereafter described safety components both in its basic design and construction conforms to the applicable European Directives.	
Name of the safety component / type:	AZ 200 AS
Description of the safety component:	Safety switch with integrated door detection sensor for safety functions with integrated Safety at Work Interface
Harmonised EC-Directives:	2006/42/EC EC-Machinery Directive 2004/108/EC EMC-Directive
Person authorized for the compilation of the technical documentation:	Ulrich Loss Möddinghofe 30 42279 Wuppertal
Notified body, which approved the full quality assurance system, referred to in Appendix X, 2006/42/EC:	TÜV Rheinland Industrie Service GmbH Alboinstr.6 12103 Berlin ID n°: 0035
Place and date of issue:	Wuppertal, December 9, 2009
AZ 200 AS-B-EN	
	Authorised signature Heinz Schmersal Managing Director



Note

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



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