



EN Operating instructions.pages 1 to 4
Translation of the original operating instructions

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1. About this document

1.1 Function

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

1.2 Target group: authorised qualified personnel

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

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

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

1.3 Explanation of the symbols used



Information, hint, note:

This symbol is used for identifying useful additional information.



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

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

1.4 Appropriate use

The products described in these operating instructions are developed to execute safety-related functions as part of an entire plant or machine. It is the responsibility of the manufacturer of a machine or plant to ensure the correct functionality of the entire 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 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 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 16 ①/AS-②

No.	Option	Description
①	ST1	Connector in the middle
	ST2	Connector at the right-hand side
	ST3	Connector at the left-hand side
②	R	without latching
	R-2254	with latching 30 N with latching 5 N



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 safety switch is used in AS-Interface systems (to EN 50295) for monitoring the position of moveable safety guards to IEC/EN 60947-5-1. The combination of the AZ 16 AS safety switch, the AZ 15/16 actuator and safety monitor (ASM) ensures the safe monitoring of the condition of the corresponding safety guard. To actuate the AZ 16 AS safety switch, only the coded AZ 15/16 actuators must be used.

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 an ASM safety monitor.

The component status can be evaluated through a PLC with AS-Interface master. The safety-related functions are enabled by means of the AS-i safety monitor.



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

LED display

The LED's have the following meaning:

- Green LED:** AS-Interface supply voltage
- Red LED:** AS-Interface communication error
or slave address = 0
- Yellow LED:** Status enable

2.4 Technical data

Standards:	EN 50295, EN 60947-5-1, IEC 61508, EN ISO 13849-1
Operating principle:	electromechanical
Material of the housings:	Plastic, glass-fibre reinforced thermoplastic, self-extinguishing

Mechanical data

Execution of the electrical connection:	M12 connector plug, 4 poles
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Ambient conditions

Ambient temperature:	-25 °C ... +60 °C
Storage and transport temperature:	-25 °C ... +85 °C
Protection class:	IP67 to IEC/EN 60529

Electrical data - AS-Interface

AS-i supply voltage:	26.5 ... 31.6 VDC, protection against polarity reversal
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AS-i power consumption:

≤ 50 mA

AS-i specification:

- Version:	V 2.1
- Profile:	S-0.B.E
AS-i inputs:	
- Contact 1:	Data bits D0/D1 = dynamic code transmission
- Contact 2:	Data bits D2/D3 = dynamic code transmission
	Databits condition static 0 or dynamic code transmission

AS-i Parameter bits:

- P0 ... P3:	no function
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Parameter request: default value "1111" (0xF)

AS-i Input module address: 0

- preset to address 0, can be changed through AS-interface bus master or hand-held programming device

LED switching conditions display

(1) green LED:	Supply voltage
(2) red LED:	Communication error or Slave address = 0
(3) yellow LED:	Device condition (Enabling status)

2.5 Safety classification

Standards: EN ISO 13849-1, IEC 61508

If a fault exclusion of a hazardous damage to the 1-channel mechanics is authorised and sufficient protection against tampering is ensured.

PL: up to d

Control category: up to 3

PFH-value: 1.01×10^{-7} / h for ≤ 100,000 operations / year

SIL: up to 2

Service life: 20 years

Basically suitable up to:

PL: up to c

Control category: up to 1

PFH-value: 1.14×10^{-6} / h for ≤ 100,000 operations / year

SIL: up to 1

Service life: 20 years

3. Mounting

3.1 General mounting instructions

The mounting dimensions are indicated at the rearside. The switch enclosure 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 openings must be sealed by means of slot sealing plugs (AZ 15/16 - -1476-1 available as accessory) after fitting.



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

Mounting of the actuator

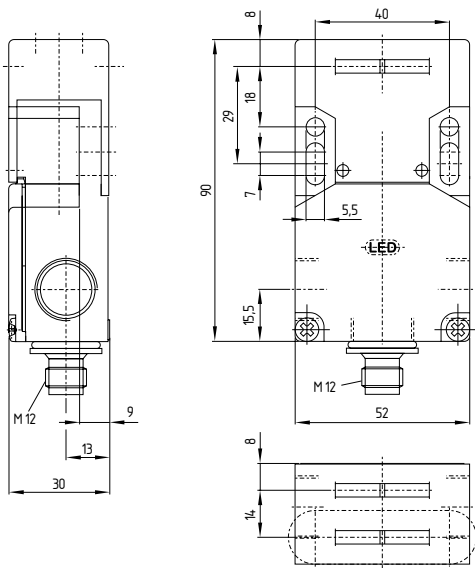
See actuator mounting instructions.



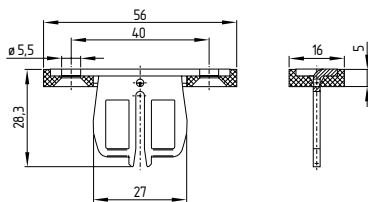
Safety sensor and actuator must be permanently fitted to the safety guards and protected against displacement by suitable measures (tamperproof screws, gluing, drilling, pinning).

3.2 Dimensions

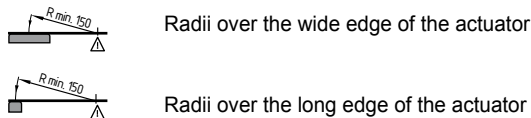
All measurements in mm.



AZ 16 AS safety switch



AZ 15/16-B1 actuator



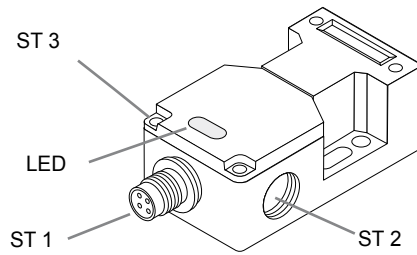
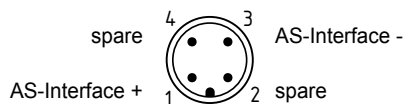
4. Electrical connection

4.1 General information for electrical connection



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

The connection to the AS-Interface system is realised through an M12 connector. The M12 connector is A-coded. The wiring configuration of the M12 connector is determined as follows (to EN 50295):



5. Configuration

5.1 Programming the slave address

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

5.2 Configuration of the safety monitor

The AZ 16 AS must be configured in the monitoring device (ASM) by default as a double channel forced module (refer to ASIMON manual).

Double channel forced

- Optionally with startup test
- Optional with local acknowledge



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

6. Set-up and maintenance

6.1 Functional testing

The safety function of the safety components must be tested. The following conditions must be previously checked and met:

1. Check the switch enclosure for damage
2. Fitting and integrity of the cable connections
3. Connect the AZ 16 AS to the AS-Interface network
4. Set the parameter outputs to "1111" (0xF)
5. Check the proper function of the AZ 16 AS system and AZ 15/16 actuator with configured safety monitor (ASM)

6.2 Maintenance

In case of correct installation in accordance with the above-described instructions, the component requires little maintenance. A regular visual inspection and functional test, including the following steps, is recommended:

1. Remove particles of dust and soiling
2. Fitting and integrity of the cable connections

Damaged or defective components must be replaced.

7. Disassembly and disposal



7.1 Disassembly

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

7.2 Disposal

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

8.1 EC Declaration of conformity

	
EC Declaration of conformity	
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 conform to the applicable European Directives.	
Name of the safety component / type:	AZ 16 AS
Description of the safety component:	Positive break position switch for safety functions with integrated AS-i Safety at Work
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
Place and date of issue:	Wuppertal, November 5, 2009
AZ 16 AS-B-EN	
	Authorised signature Heinz Schmersal Managing Director



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



K. A. Schmersal GmbH
Industrielle Sicherheitssysteme
Möddinghofe 30, D - 42279 Wuppertal
Postfach 24 02 63, D - 42232 Wuppertal

Phone: +49 - (0)2 02 - 64 74 - 0
Telefax +49 - (0)2 02 - 64 74 - 1 00
E-Mail: info@schmersal.com
Internet: <http://www.schmersal.com>