

Safety Bus System

AS-Interface Safety at Work | Version 08



You will also find detailed information regarding our product variety on our website: www.schmersal.net.



Online documentation in six languages

The online catalogue for our customers is permanently updated. The Main catalogue can be consulted on the Internet in as much as six languages. The technical data of our entire product range are available 24/7, always up-to-date. The declarations of conformity, the test certificates and the mounting instructions can be consulted or even downloaded as well.



Service for designers

The online catalogue also includes the technical drawings of our products – a special service to designers. In this way, they can be downloaded and directly fed in CAD-systems. The Schmersal homepage furthermore contains up-to-date information on general subjects, technical articles on machine safety as well as news regarding events and trainings. To be bookmarked!

The direct way

If you need further information or you want personal advice, you can call us as well: **+ 49-(0) 2 02-64 74-0.**

The addresses of our representations in Germany and abroad can be found on the front pages of this catalogue.

We are at your disposal – anyplace, anywhere, anytime!



Warning!

The Schmersal programme is not intended for private consumers, i.e. that they are not consumer products within the meaning of the European Directives (in Germany within the meaning of § 5 GPSG) or other national laws.

Subject to technical modifications and errors.

The data specified in this catalogue are carefully checked typical standard values.

Descriptions of technical correlations, details on external control units, installation and operating instructions or similar have been provided to the best of our knowledge. This however does not mean that any warranted characteristics or

other properties under liability law may be assumed, which extend beyond the "General Terms and Conditions of Delivery of Products and Services of the Electrical Industry".

We trust you will understand that the user must check our information and recommendations before using our equipment.

Content

Introduction	Page 4
Applications	Page 6
Safety monitors	
ASM	Page 8
asimon software version 3.x	Page 10
ASM G2	Page 11
Safety sensors	
BNS 260 AS	Page 12
BNS 36 AS	Page 13
BNS 16 AS	Page 14
Safety switches	
T. 235 AS	Page 15
AZ 16 AS	Page 16
AZ 200 AS	Page 18
Solenoid interlocks	
AZM 200 AS	Page 20
MZM 100 AS	Page 24
AZM 161 AS	Page 26
AZM 170 AS	Page 28
Safety input modules	
AST ... ST-AS and AST ... L-AS	Page 30
AST LC ST-AS	Page 32
Command devices with safety function	
NAS 311 AS	Page 33
Accessories	
System components	Page 34

Easy, safe and reliable



AS-Interface Safety at Work (SaW) is the first safety bus system based upon the open standard of AS-International. Safety components such as Emergency Stop command devices, safety switches, solenoid interlocks or safety light curtains are simply connected to the yellow AS-Interface cable. For the evaluation of the safety signals a "Safety Monitor" is merely added to the AS-Interface system.

Safe transmission mechanism

The communication protocol for safety relevant applications is based on the unchanged AS-Interface Standard transmission. With each AS-Interface master call each safety device answers in return with a preset data telegram. This information is analysed and in case of a deviation from the pre-set values the enabling paths are opened. The maximum response time for a safe shutdown is 40 ms.



AS-Interface Standard in accordance with EN 50295

With the integration of AS-Interface SaW the AS-Interface network will continue to operate unchanged. The well known components, like the standard AS-Interface master, the standard power supply as well as the AS-Interface yellow cable will still form the basis of all AS-Interface installations. Therefore an existing machine can easily be equipped with additional AS-i SaW components.

Cost reduction with AS-Interface Safety at Work

Reduce cost and installation time – A never ending story. During installation and machine commissioning as well as during maintenance, AS-Interface SaW supports the user with integrated system diagnosis. It provides detailed information about the cause and place of the failure, and enables the user to quickly find and analyse a malfunction and therefore minimise machine downtime. With AS-Interface Safety at Work you can directly reduce your cost.



The heart of safety

The safety monitor analyses all transmitted information from each safety device on the AS-Interface network and, in case of a safety device being activated or in case of a fault in one of the safety devices, the safety monitor immediately shuts down to create a safe condition. The safety monitor is equipped with one or two redundant pairs of enabling paths for applications up to performance level e according to EN ISO 13849-1. Each safety function of the monitor can be set with a simple drag & drop software. Afterwards the configuration is downloaded into the safety monitor and protected with a password.

More flexibility with AS-Interface Safety at Work

For the realisation of individual safety solutions, SCHMERSAL offers the maximum amount of flexibility with its diverse range of safety devices. Depending on the application the user can choose the optimal solution out of an extensive product basket. As AS-Interface SaW is an open system, the user has also the possibility to include additional Safety components from other suppliers. AS-Interface Safety at Work fulfils the safety requirements to the highest standards.

ble

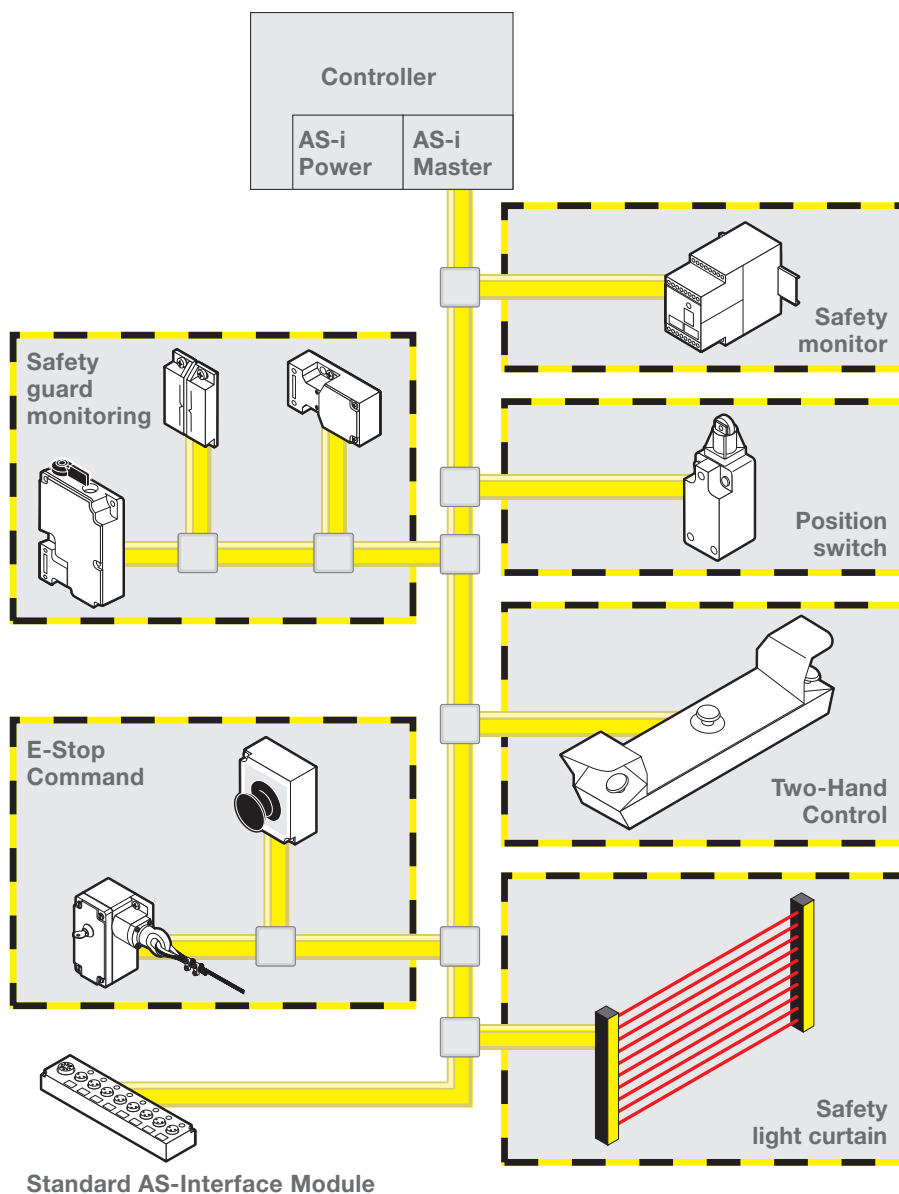
Less installation time with AS-Interface Safety at Work

Easier and quicker with AS-Interface SaW: Choose a Safety device – Connect it to the yellow AS-Interface cable – Configure the safety function in the safety monitor. – That's it.

No further settings are required at each of the safety devices, the bulky parallel wire cables between the safety devices in the field and the switching cabinet are reduced and wiring time is decreased. The power supply for all safety sensors is supplied over the single yellow AS-Interface cable.



AS-Interface Safety at Work overview



AS-Interface SaW System Features

- Up to 31 standard and safety slaves on the AS-Interface system
- No Safety PLC necessary
- Safety-relevant signals can be allocated into groups and multiple Safety monitors may be connected
- Response time is max. 40 ms
- Safety-relevant signals can be integrated into plant diagnostics
- Certified up to
 - PL e/category 4 in accordance with EN ISO 13849-1
 - SIL 3 in accordance with IEC 61508
- Certified by the TÜV (German Technical Inspectorate)

AS-i Safety at Work



STIHL AG & Co., Waiblingen

Production line with global safety concept

For its new chain guide production unit at the Waiblingen plant, STIHL, world leader in the production of chain saws, chose an innovative safety concept. All stations of the production line – both the “in-house” manufactured and the nine third-party machines – should have a uniform safety standard and communicate through AS-i SaW.

This concept was successfully implemented. STIHL requested its suppliers to use the AS-i SaW switchgear from Schmersal. More than 110 safety switching appliances were installed: 68 by Stihl, 45 by the suppliers. Basically two types are used: the AZM 161 AS solenoid interlock and the BNS 33 AS safety sensor with integrated ASi SaW interface.

Paul Giesinger, Electrical Construction Manager of the „Machine and Device Centre“ from STIHL AG & Co: „The ASi SaW components only require a minimum of wiring compared to the traditional safety switching appliances. The comfortable software moreover allows for a smooth parametrering of the safety functions.“

Hydro Aluminium, Raufoss

Fast configuring, higher transparency

The Raufoss plant of the Norwegian Hydro concern produces every year thousands of aluminium shock absorbers for the automobile industry. As production is regarded, the company considers safety of paramount importance as well: all safety components at the machines and plants are equipped with AS-Interface Safety at Work (AS-i SaW).

With AS-i SaW, Hydro Aluminium could save a lot of money as the wiring costs were regarded. Another important issue was the simplified configuration of the safety appliances through PC. The safety functions simply can be chosen and configured by Drag & Drop and then can be copied to multiple safety switching appliances if required.

Ola Överstad, project manager of the New Process & Production Equipment Division at the Raufoss plant: „The increased transparency was one of the main reasons why we chose the AS-i solution. At all times, the asimon software keeps me informed about newly installed safety components. This is particularly advantageous when transferring the safety systems from one shift to another. In this way, the safety engineers always have 100% control over the system.“

applications

Benz & Hilgers GmbH, Neuss

Installation costs reduced by 30%

Benz & Hilgers (Benhil) at Neuss is specialised in packaging machines for pasteurised products. For the new series of wrapping machines, e.g. for butter, Benhil has decided to use the safety-related communication technology.

During a thorough analysis of the different systems available, AS-i SaW revealed itself as a highly economical solution, as the safety signals are transmitted through the same cable as the conventional sensor-actor signals. This decision furthermore was facilitated as Schmersal, Benhil's usual partner for safety components, offered a comprehensive program of safety switchgear with integrated AS-i SaW interface.

Dipl.-Ing Ralph Bellin, Electrical Site Manager at Benhil's: „We essentially chose AS-i SaW because of the simplified mounting possibilities. As the burden of the costs is enormous in our field, we must save money wherever we can, including on the installation costs. Safety-related bus systems are valuable in this regard: with AS-i SaW, the installation costs were reduced by 30%. For the future generations of our machines, we will use AS-i SaW as well.“

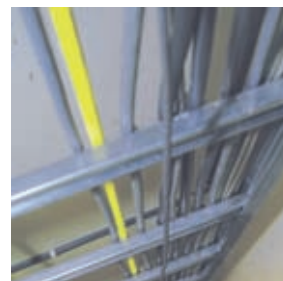
Magurit Gefrierschneider GmbH, Remscheid

Optimal signal transmission between control cabinet and machine

The company Magurit Gefrierschneider GmbH produces slicers, mincers and shredders for food industry. As these high-capacity machines are equipped with extremely sharp and powerful cutting devices to cut up fresh and frozen products, the risk of injury is very high. Furthermore, in food industry, high hygienic standards have to be maintained and simplicity of cleaning must be provided. Therefore, the different machine compartments are equipped with flaps and large sliding guards, whose position is monitored by concealed-mounted safety sensors.

When it became necessary to install the control cabinet at approximately 60 meters from the machine, Magurit decided to use safety switching appliances with AS-i SaW interface. Nine different types of safety switching appliances were installed and connected to the bus cable. The safety monitoring module is installed in the control cabinet.

Dipl.-Ing. Dino Vieth, Electrical Site Manager of Magurit: „The reduction of the wiring costs is not the sole advantage of the safety bus. It also provides the user with improved diagnostic possibilities, considering that many operational conditions can be documented and inquired.“



ASM

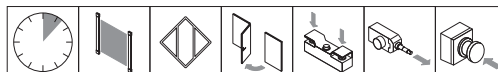


- Safety monitor for 1 AS-i circuit
 - Monitoring of up to 31 safe AS-i slaves, e.g.: safety switches, solenoid interlocks, emergency stop devices, two-hand controls, light curtains and light grids, etc.
 - Control of up to 2 redundant enabling paths
 - Configurable monitoring modules for the different safety switchgear
 - Filter functions for bouncing safety guards
 - Other functions:
 - AND operations, OR operations, start modules, on-site reset, start-up test, stop categories 0 and 1
 - Edge-sensitive start push button
 - Feedback circuit to monitor external contactors
 - LED status display
 - Signal outputs (transistor, short-circuit proof)
 - AS-i system connection
- These device types **are not suitable** for the:
 - control of safe AS-i outputs
 - connection of 2 AS-i circuits
- **Suitable for applications:**
 - up to PL e/category 4 to EN ISO 13849-1
 - up to SIL 3 to IEC 61508
 - PFH: $9,1 \times 10^{-9} / h$

Technical data

Standards:	EN 50295, EN ISO 13849-1, IEC 61508, EN 60947-5-1, IEC/EN 60204-1, EN 61496-1
Enclosure:	Polyamide PA 66, black
Mounting:	snaps onto standard DIN rail to EN 50022
Screw terminals:	max. 2.5 mm ² (incl. conductor ferrules)
Protection class:	terminals IP 20, enclosure IP 20
U _b :	24 VDC ± 15 %
Residual ripple:	< 15%
I _b :	ASM E1-R2: 0,15 A; ASM E2-R2/R2: 0,2 A
Switch-on peak current:	600 mA
AS-Interface operating voltage:	18.5 ... 31.6 V
AS-Interface operating current:	< 45 mA
AS-Interface specification:	Profile - Monitor 7.F
Configuration interface:	RS232: 9600 baud, no parity, 1 start bit, 1 stop bit, 8 data bits
Inputs:	1.Y1,1.Y2
Input signal:	„Y1, Y2“: I _e < 10 mA at 24 VDC (opto coupler, high-active)
Outputs:	ASM E1-R2: 1.13/14,1.23/24, 1 enabling path (redundant); ASM E2-R2/R2: 1.13/14,1.23/24, 2.13/14, 2.23/24, 2 enabling paths (redundant)
Utilisation category:	AC-15, DC-13
I _e /U _e :	3 A / 230 VAC; 1 A / 24 VDC
Switching voltage:	max. 230 VAC
I _{the} :	ASM E1-R2: 3 A per output circuit ASM E2-R2/R2: 2 A per output circuit
Max. fuse rating:	max. 4 A (slow blow), external
Additional outputs:	transistor outputs, 200 mA total, short-circuit proof-type, positive-switching
Switch-on time:	< 10 s
Response time:	< 40 ms
Indications:	AS-Interface: voltage LED green, communication LED red; Enabling paths: LED green, yellow, red
EMC:	to EN 61000-6-4, EN 61000-6-2
EMC rating:	conforming to EMC Directive
Overvoltage category:	III to DIN VDE 0110
Resistance to vibration:	0 ... 55 Hz, amplitude 0.35 mm
Resistance to shock:	10 g / 16 ms
Ambient temperature:	- 20 °C ... + 60 °C
Storage and transport temperature:	- 30 °C ... + 70 °C
Weight:	ASM E1-R2: approx. 350 g; ASM E2-R2/R2: approx. 450 g
Dimensions:	45 x 105 x 120 mm
Classification:	
Standards:	EN ISO 13849-1; IEC 61508
PL:	up to e
Category:	up to 4
PFH value:	$9,1 \times 10^{-9} / h$
SIL:	up to 3
Service life:	20 years

Approvals



Ordering details

ASM ①

No.	Option	Description
①	E1-R2	1 enabling path (redundant)
	E2-R2/R2	2 enabling paths (redundant)

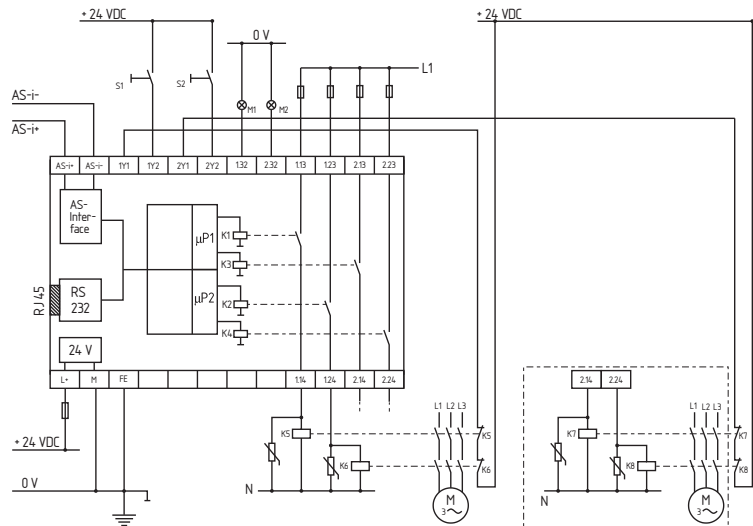
Note

The safety monitors ASM E1-R2 and ASM E2-R2/R2 evaluate all transmitted information from each safety device on the AS-Interface network. For the safe guarding of different applications various AS-Interface Safety at Work compatible safety devices are needed, i.e. safety switches, solenoid interlocks, safety sensors, E-stop buttons as well as safe input modules.

Note

- The installation of different safety areas is possible with numerous safety monitors working alongside each other. The maximum number of safety devices including the safety monitors may not exceed 31 participants.
- The allocation of the safety devices to one or more safety monitors is achieved with the help of the configuration software "asimon".
- The wiring diagram shows the safety monitor ASM E2-R2/R2 with start-pushbuttons and feedback loops.
- No safety devices are displayed, because they are installed in the field i.e. on the safety guards itself. The data connection between the safety monitor and the decentralised safety slaves is established via the AS-Interface network.
- For the operation of AS-Interface Safety at Work system, a standard controller, an AS-Interface Master and AS-Interface power supply, must be used in the application.
- With the RJ 45 connector the safety monitor is configured and started up.
- Start push button
A start push button (NO) can optionally be connected to the ASM. With the guard door(s) closed, the enabling paths are then not closed until the start push button has been operated. If neither start button nor feedback circuit are required, then no connections are required to the terminals (1Y1/2, 2Y1/2).
- Output expander module
For additional contacts by means of more enabling paths and potential-free indication contacts an output expander module is connected to the safety monitor, i.e. to the internal ASM enabling path. For the control of the additional outputs the ASM feedback loop is utilised.

Wiring diagram



Note

Further information and details of the safety monitor ASM are available on the asimon-CD-ROM.

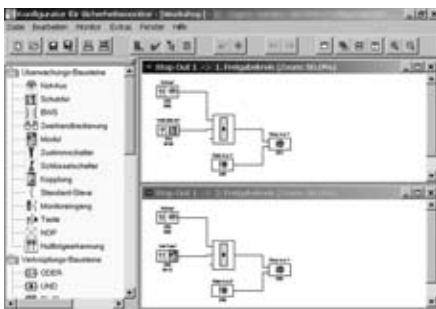
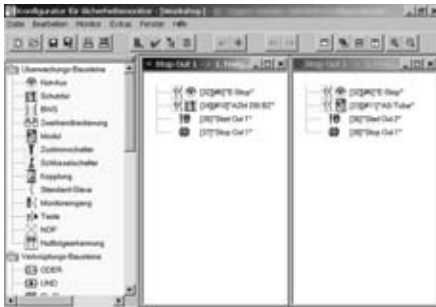
Note

The AS-i system limitations according to EN 50295 have to be considered during the planning, development and design phase of the AS-i network, especially the max. number of AS-i slaves and the total „yellow“ cable length (< 100 m without repeater).

For the control of safety outputs and for coupling multiple AS-i networks, other safety monitoring modules like ASM G2 must be used.

Inductive loads (e.g. contactors, relays, etc.) are to be suppressed by means of a suitable circuit.

asimon version 3.x



The asimon software is a tool for the configuration and commissioning of the AS-Interface safety monitor.

The configuration of the safety monitor and its safety devices, i.e. E-Stop buttons, solenoid interlocks, safety switches, 2-Hand controls, light curtains etc. is performed by an easy-to-use graphical interface. Thus providing safeguarding of hazardous areas present by power-driven machinery.

The asimon offers the user a library of icons representing different safety devices and other functional devices. For the implementation of a new safety application the required safety devices are selected from the icon library, configured and assigned to the respective enabling path.

Following the successful configuration and download, the safety monitor and the safety devices can be tested and monitored with asimon.

Besides the classic representation in table form, a representation as logical diagram (FUP) can be chosen as well.

The following functions are available with the asimon software:

- Configuration of different safety devices
- Configuration of different filter functions for bouncing safety guards
- Configuration of start-modules
- Configuration logical combinations (AND, OR, RS Flip-Flops)
- Configuration of the feedback loops
- Configuration of the operating methods
- Configuration of the system-modules
- Print out of Configuration protocol

Asimon can be used offline as well as online during development and project planning. The configuration files can be saved and loaded as desired.

The software is compatible with the Microsoft® operating system Windows 95/98/ME/NT/2000/XP/Vista®.

System components



Download cable ASM-DC1



Configuration cable ASM-KC1

Approvals



Ordering details

ASM-startup-package: SET ASM-SWP
Configuration and diagnostic software package with online documentation on CD-ROM, a configuration- and download cable

asimon software package: ASM-CD
Configuration and diagnostic software package with online documentation on CD-ROM

Note

Hardware requirements:

- A Pentium®- Intel® processor of faster (or compatible models, e.g. AMD® or Cyrix®)
- At least 32 Mb free random-access memory (RAM)
- At least 32 Mb free disk space
- A CD-ROM player
- A free RS 232 (serial) interface with 9-pole SubD connector (Using a USB-RS 232 interface convertor or a serial interface card could cause communication problems with the safety monitoring module)

Software requirements:

- Operating system: Microsoft® Windows 95/98/ME/NT/2000/XP/Vista®

Ordering details

Download cable: ASM-DC1
Interface cable with two RJ 45 connectors, Length: 0.10 m

Configuration cable: ASM-KC1
Interface cable with one RJ 45 and SUBD 9 connector, Length: 1.2 m

ASM G2



- Safety monitor for 2 AS-i circuits
- Monitoring of up to 62 safe AS-i slaves, e.g.: safety switches, solenoid interlocks, emergency stop devices, two-hand controls, light curtains and light grids, etc.
- 256 function blocks (devices) possible
- Control of up to 16 redundant enabling paths, 2 internally in the device and up to 14 external safe AS-i outputs
- Mains coupling of 2 AS-i circuits
- LCD diagnostic display with 4 buttons
- Configurable monitoring modules for different safety switchgear
- Filter functions for bouncing safety guards
- Integrated muting module
- Other functions:
 - AND-operations, OR-operations, start modules, on-site reset, start-up test, stop categories 0 & 1
- START inputs: start functions through external button
- EDM inputs: connection of feedback circuits to monitor external contactors
- LED status indication
- AS-i system connection
- **Suitable for applications:**
 - up to PL e/category 4 to EN ISO 13849-1
 - up to SIL 3 to IEC 61508
 - PFH: $5,4 \times 10^{-9}$ / h

Technical data

Standards: EN 50295, EN ISO 13849-1, IEC 61508
 Response time: < 40 ms
 Switch-on time: < 10 s
 AS-i specification: profile: S-7.5.5
 Enclosure: stainless steel
 Dimensions (L/W/H): 120 x 85 x 96 mm
 Weight: approx. 800 g
 Mounting: onto standard DIN rails
 Screw terminals: max. 2 x 1.5 mm²

Electrical data:
 AS-i operating voltage: 26.5 ... 31.6 VDC
 Power consumption from AS-i: approx. 250 mA or external supply

Operating voltage: 24 VDC $\pm$ 15 %
 Power consumption 24 VDC: approx. 200 mA
 Power consumption from AS-i: approx. 50 mA
 Insulation voltage: $\geq$ 500 V
 Inputs: 4 inputs, supplied from AS-i, as EDM or start inputs

Outputs: each time 2 output switching elements, for enabling paths 1 and 2

Contact load capacity: 3 A DC-13 at 30 V
 3 A AC-15 at 30 V

Diagnostic indications:
 LCD AS-i status and error indications
 LED green Power
 LED green/red U AS-i / Fault
 LED yellow Ready
 LED green Channel 1
 LED green Channel 2

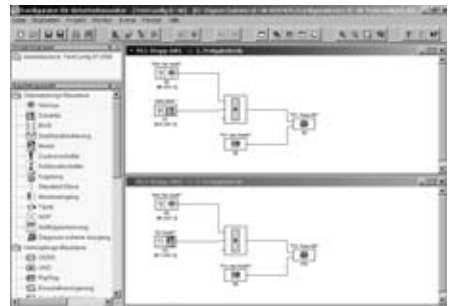
Ambient conditions:
 Operating temperature: 0 °C ... + 55 °C
 Storage and transport temperature: - 25 °C ... + 85 °C
 Protection class: IP 20 to IEC/EN 60529
 Resistance to vibrations: to EN 61131-2
 Resistance to shocks: to EN 61131-2

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

System components



Configuration cable ASM G2-CC



Configuration software asimon G2 V 3.x
 Software asimon G2 for the configuration, commissioning and diagnostics of the AS-Interface ASM G2 safety monitor

Approvals



Ordering details

Safety monitor
 for 2 AS-i circuits and for up to 16 enabling paths

ASM G2-R2/R2

* **Note:**
 UL/CSA: Class 2 power-supply only

Note

For the configuration with the asimon software, a PC or laptop is required.

Hardware requirements:

- A Pentium® Intel® processor or faster (e.g. compatible models, e.g. AMD® or Cyrix®)
- A CD-ROM player
- At least 32 MB RAM and 32 MB HDD
- A free RS 232 (serial) interface with 9-pole SubD-connector
 (Using a USB-RS 232 interface convertor or a serial interface card could cause communication problems with the safety monitor)

Operating system:

- Microsoft® Windows 2000 / XP / Vista®

Ordering details

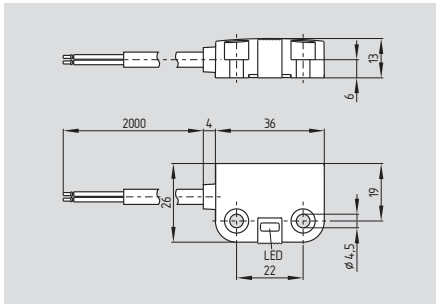
Configuration cable
 with PS2 connector and SUBD 9 connector,
 Length: 1.8 meter

ASM G2-CC

asimon G2 software package
 Configuration and diagnostic software version 3.x with documentation on CD-ROM

ASM G2-CD

BNS 260 AS



- Safety sensor
- Integrated AS-Interface interface
- AS-Interface LED
- Available with M12 plug-in connector and pre-wired cable
- Thermoplastic enclosure
- Coded actuator
- Long life, no mechanical wear
- Insensitive to transverse misalignment
- Concealed mounting possible
- Insensitive to soiling
- Protection class IP 67

Technical data

Standards: EN 50295, IEC 60947-5-3, EN ISO 13849-1, IEC 61508

Enclosure: glass-fibre reinforced thermoplastic

AS-Interface connection type: cable LSYY (black)

Cable section: 2 x 0.24 mm²

Protection class: IP 67

AS-Interface operating voltage: 26.5 ... 31.6 VDC, via AS-Interface, reverse-polarity proof

AS-Interface operating current: ≤ 50 mA

AS-Interface specification: (V 2.1)

Profile: S-0.B

IO-Code: 0x0

ID-Code: 0xB

ID-Code1: 0xF

ID-Code2: 0xE

AS-I inputs:

contact 1: data bits D0 /D1 = static code 00 or dynamic code transmission

contact 2: data bits D2 /D3 = static code 00 or dynamic code transmission

Parameter bits: P0 ... P3 not used

Input module address: Default on address 0, programmable via the AS-Interface Master or Hand-held programming device

Indications: AS-Interface: voltage LED green, communication LED orange

Mode of operation: magnetic

S_{ao}: 5 mm

S_{ar}: 15 mm

Repeat accuracy: R ≤ 0,1 S_{ao}

Switching frequency f: < 1 Hz

Actuating magnet: BPS 260, coded

EMC rating: conforming to EMC Directive

Ambient temperature: - 25 °C ... + 60 °C

Storage and transport temperature: - 25 °C ... + 70 °C

Classification:

Standards: EN ISO 13849-1; IEC 61508; IEC 60947-5-3

PL: up to e

Category: up to 4

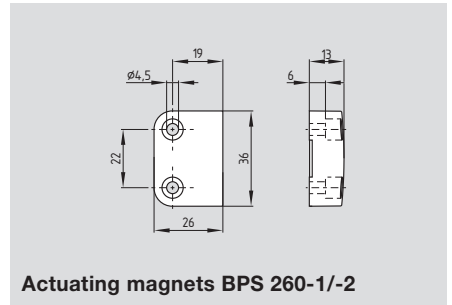
PFH value: 6,21 x 10⁻⁹ /h for max. 500.000 operations/year

SIL: up to 3

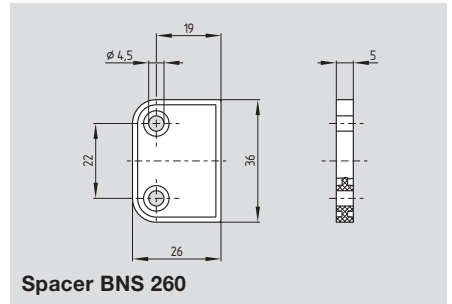
Service life: 20 years

Classification: PDF-M

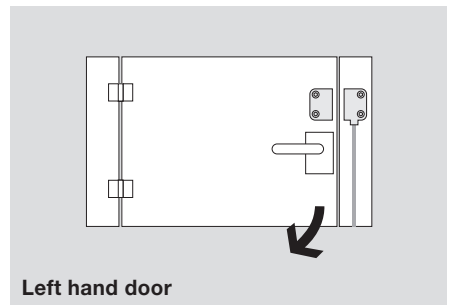
System components



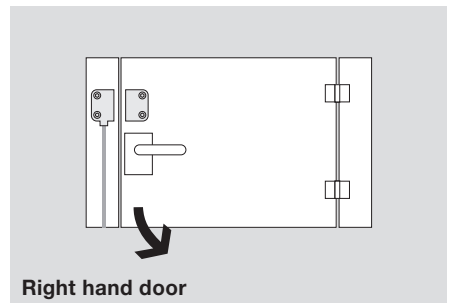
Actuating magnets BPS 260-1/-2



Spacer BNS 260



Left hand door



Right hand door

Approvals



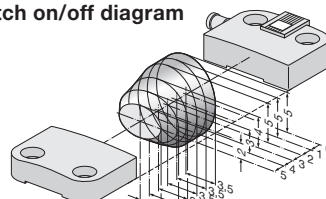
Ordering details

BNS 260^①-AS-^②

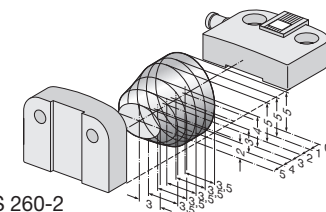
No.	Option	Description
①	STG	2 m cable
	STW	2 m cable with straight plug M12
②	L	Left hand door
	R	Right hand door

Note

Switch on/off diagram



BPS 260-1



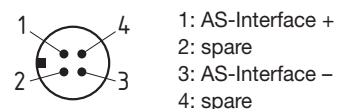
BPS 260-2

Ordering details

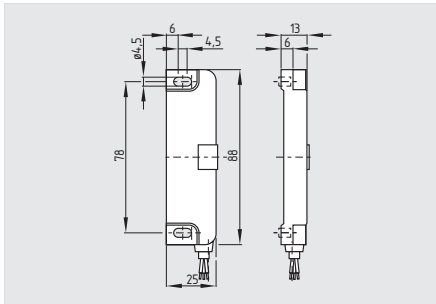
Actuating magnets
Standard **BPS 260-1**
Mounting angle of 90° **BPS 260-2**
Spacer **Distanzstück BNS 260**

The actuators for the magnetic safety sensors must be ordered separately.

The addressing must take place via the cable end or the M12 connector.



BNS 36 AS



- Safety sensor
- Integrated AS-Interface interface
- AS-Interface LED and status display
- Available with M12 plug-in connector and pre-wired cable
- Thermoplastic enclosure
- Coded actuator
- Long life, no mechanical wear
- Insensitive to transverse misalignment
- Concealed mounting possible
- Insensitive to soiling
- Protection class IP 67

Technical data

Standards: EN 50295, IEC 60947-5-3,
EN ISO 13849-1, IEC 61508
Enclosure: glass-fibre reinforced thermoplastic
Design: rectangular
Mode of operation: magnetic
AS-Interface connection type: cable LSYY (2 m);
or cable (2 m) with connector M12, 4 poles
Protection class: IP 67
Ambient temperature: -25 °C ... +60 °C
Storage/transport temp.: -25 °C ... +70 °C
Resistance to vibration: 10 ... 55 Hz,
amplitude 1 mm

Resistance to shock: 30 g / 11 ms
Switching frequency f: ≤ 1 Hz
Assured operation distance S_{ao} : 7 mm
Assured release distance S_{ar} : 17 mm

Electrical data AS-Interface:

AS-I operating voltage: 26.5 ... 31.6 VDC,
via AS-Interface, reverse-polarity proof
AS-Interface operating current: ≤ 0,05 A
AS-I specification: Profile: S-0.B
(V 2.1) IO-Code: 0x0
ID-Code: 0xB
ID-Code1: 0xF
ID-Code2: 0xE

AS-I inputs:

contact 1: data bits D0 / D1 = static code 00
or dynamic code transmission
contact 2: data bits D2 / D3 = static code 00
or dynamic code transmission

AS-i Parameter port: P0 ... P3: no function,
set parameter outputs "1111" (0xF)
AS-i input module address: default on
address 0, programmable via the AS-Interface
Master or Hand-held programming device

Diagnostic indication:

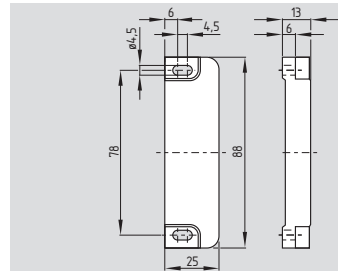
AS-i LED green AS-Interface supply voltage on
AS-i LED red AS-Interface communication error
or slave address = 0
LED yellow enabling status

Classification:

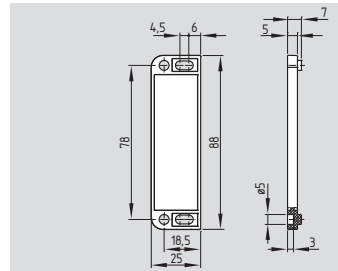
Standards: EN ISO 13849-1; IEC 61508;
IEC 60947-5-3
PL: up to e
Category: up to 4
PFH value: $1,24 \times 10^{-8}$ /h
for max. 500.000 operations/year

SIL: up to 3
Service life: 20 years
Classification: PDF-M

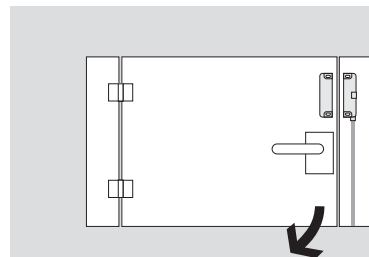
System components



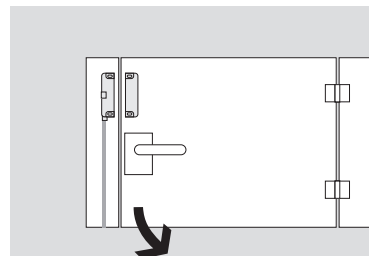
Actuating magnets BPS 36-1/-2



Spacer BNS 36



Left hand door



Right hand door

Approvals



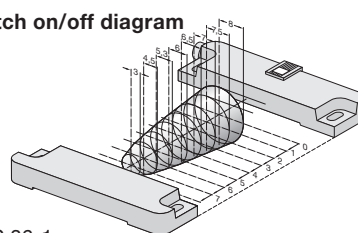
Ordering details

BNS 36 ①-AS-②

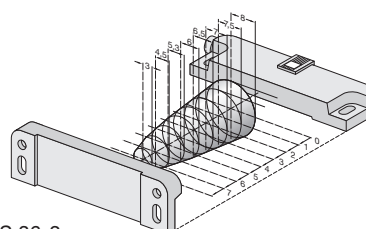
No.	Option	Description
①	STG	Cable 2 m Cable with straight connector M12
	STW	Cable with angled connector M12
②	L	Left hand door
	R	Right hand door

Note

Switch on/off diagram



BPS 36-1



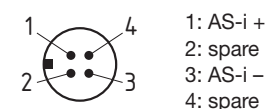
BPS 36-2

Ordering details

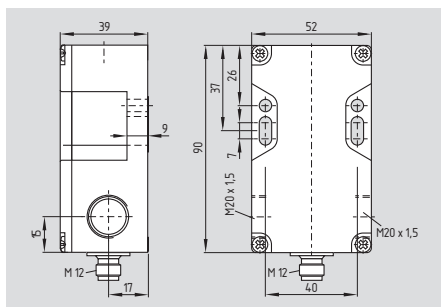
Actuating magnets
Standard **BPS 36-1**
Mounting angle of 90° **BPS 36-2**
Spacer **Distanzstück BNS 36**

The actuators for the magnetic safety sensors
must be ordered separately.

The addressing must take place via the cable
end or the M12 connector.



BNS 16 AS



- Safety sensor
- Integrated AS-Interface interface
- AS-Interface LED and status display
- Available with M12 plug-in connector and pre-wired cable
- Thermoplastic enclosure
- Coded actuator
- Long life, no mechanical wear
- Insensitive to transverse misalignment
- Concealed mounting possible
- Insensitive to soiling
- Protection class IP 67

Technical data

Standards: EN 50295, IEC 60947-5-3, EN ISO 13849-1, IEC 61508

Enclosure: glass-fibre reinforced thermoplastic, self-extinguishing

AS-Interface connection type: connector M12 x 1

Protection class: IP 67

AS-Interface operating voltage: 26.5 ... 31.6 VDC, via AS-Interface, reverse-polarity proof

AS-Interface operating current: ≤ 100 mA

AS-I specification: Profile: S-0.B (V 2.1)

IO-Code: 0x0

ID-Code: 0xB

ID-Code1: 0xF

ID-Code2: 0xE

AS-I inputs:

contact 1: data bits D0 /D1 = static code 00 or dynamic code transmission

contact 2: data bits D2 /D3 = static code 00 or dynamic code transmission

Parameter bits: P0 ... P3 not used

Input module address: Default on address 0

Indications:

AS-Interface: voltage LED green, communication LED red

Enabling status: LED yellow

Mode of operation: magnetic

Sao: 8 mm

Sar: 18 mm

Repeat accuracy: $R \leq 0,1 \times S_{ao}$

Switching frequency f: < 1 Hz

Actuating magnet: BPS 16, coded

EMC rating: conforming to EMC Directive

Ambient temperature: -25 °C ... $+60$ °C

Storage/transport temp.: -25 °C ... $+70$ °C

Classification:

Standards: EN ISO 13849-1; IEC 61508; IEC 60947-5-3

PL: up to e

Category: up to 4

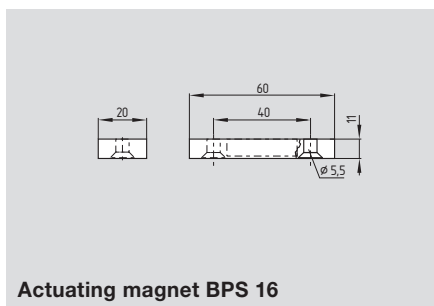
PFH value: $7,24 \times 10^{-9}$ /h for max. 500.000 operations/year

SIL: up to 3

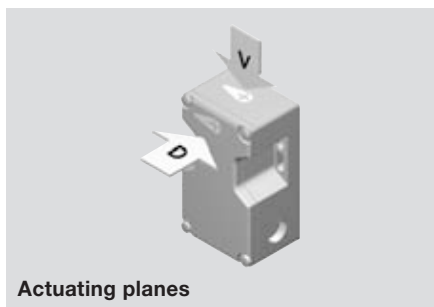
Service life: 20 years

Classification: PDF-M

System components



Actuating magnet BPS 16



Actuating planes

Approvals



Ordering details

BNS 16①-AS②

No.	Option	Description
①	ST1	Connector (middle)
	ST2	Connector (right)
	ST3	Connector (left)
②		Actuating planes:
	V	front side
	D	cover-side

Note

The addressing must take place via the M12 connector.



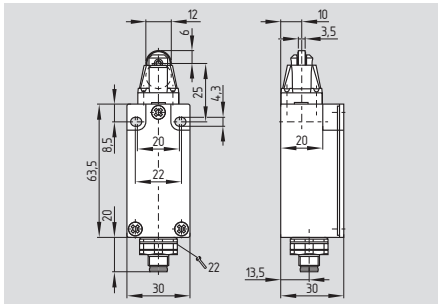
1: AS-i +
2: spare
3: AS-i -
4: spare

Ordering details

Actuating magnet **BPS 16**

Actuators must be ordered separately.

T. 235-AS



- Integrated AS-Interface
- AS-Interface LED and status display
- AS-Interface M12 connector
- Metal enclosure
- Slow action
- Wide range of alternative actuators
- Actuator heads can be repositioned by 4 x 90°
- Angle of roller lever adjustable in 10° steps
- Good resistance to oil and petroleum spirit
- Protection class IP 67

Technical data

Standards: EN 50295, EN 60947-5-1, EN ISO 13849-1, IEC 61508
 Design: fixings to EN 50047
 Enclosure: zinc die-cast, enamelled
 Switching system: slow action, positive break NC contacts ⊖
 AS-Interface connection type: connector M12 x 1
 Protection class: IP 67 to IEC/EN 60529
 AS-Interface operating voltage: 26.5 ... 31.6 VDC, via AS-Interface, reverse-polarity proof

AS-Interface operating current: AS electronics: ≤ 50 mA
 AS-Interface specification (V 2.1)
 Profile: S-0.B
 IO-Code: 0x0
 ID-Code: 0xB
 ID-Code1: 0xF
 ID-Code2: 0xE

AS-I inputs:
 contact 1: data bits D0 /D1 = static code 00 or dynamic code transmission
 contact 2: data bits D2 /D3 = static code 00 or dynamic code transmission

Outputs: A0 ... A3 not used
 Parameter bits: P0 ... P3 not used
 Input module address: Default on address 0
 Indications:

AS-Interface: voltage LED green, communication LED red
 Enabling status: LED yellow
 Mechanical life: > 1 million operations
 Switching frequency: max. 5000/h
 EMC rating: conforming to EMC Directive
 Ambient temperature: - 25 °C ... + 60 °C
 Storage and transport temperature: - 25 °C ... + 85 °C

Technical data

Classification:
 Standards: EN ISO 13849-1; IEC 61508
 PL: up to c
 Category: up to 1
 PFH value: 1,14 x 10⁻⁶ /h for max. 1.000.000 operations/year
 SIL: up to 1
 Service life: 20 years

When 2 safety switches with mutual monitoring are used and provided that an adequate protection against tampering is installed, then suitable up to:

PL: up to e
 Category: up to 4
 PFH value: 2,5 x 10⁻⁸ /h for max. 1.000.000 operations/year
 SIL: up to 3
 Service life: 20 years

Approvals



Ordering details

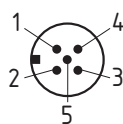
T 235-AS-ST

No.	Option	Description
①	R	Roller plunger R

A selection of actuators can be found in the Main catalogue „Safety technology“

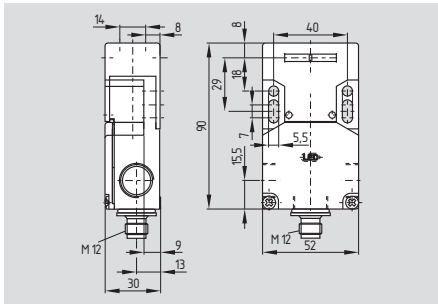
Note

The addressing must take place via the M12 connector.



- 1: AS-i +
- 2: spare
- 3: AS-i -
- 4: spare
- 5: FE (shield)

AZ 16 AS



- Safety switch with separate actuator
- Integrated AS-Interface interface
- AS-Interface LED and status display
- AS-Interface M12 connector
- Thermoplastic enclosure
- Coded actuator
- Long life
- Protection class IP 67

Technical data

Standards: EN 50295, EN 60947-5-1, EN ISO 13849-1, IEC 61508

Enclosure: glass-fibre reinforced thermoplastic, self-extinguishing

AS-Interface connection type: connector M12 x 1
Protection class: IP 67
AS-Interface operating voltage: 26.5 ... 31.6 VDC, via AS-Interface, reverse-polarity proof

AS-Interface operating current: ≤ 50 mA

AS-Interface specification:
(V 2.1)

Profile:	S-0.B
IO-Code:	0x0
ID-Code:	0xB
ID-Code1:	0xF
ID-Code2:	0xE

AS-I inputs:
contact 1: data bits D0 /D1 = static code 00 or dynamic code transmission
contact 2: data bits D2 /D3 = static code 00 or dynamic code transmission
Parameter bits: P0 ... P3 not used
Input module address: default on address 0, programmable via the AS-Interface Master or Hand-held programming device

Indications:
AS-Interface: voltage LED green, communication LED red
Enabling status: LED yellow
Mechanical life: > 1 million operations
EMC rating: conforming to EMC Directive
Ambient temperature: - 25 °C ... + 60 °C
Storage and transport temperature: - 25 °C ... + 85 °C

Technical data

Classification:

If a fault exclusion for hazardous damage of the 1-channel mechanics is authorized and an adequate protection against tampering is ensured, suitable for use up to:

Standards: EN ISO 13849-1; IEC 61508
PL: up to d
Category: up to 3
PFH value: 1,01 x 10⁻⁷ /h for max. 100.000 operations/year
SIL: up to 2
Service life: 20 years

Basically suitable up to:

Standards: EN ISO 13849-1; IEC 61508
PL: up to c
Category: up to 1
PFH value: 1,14 x 10⁻⁶ /h for max. 100.000 operations/year
SIL: up to 1
Service life: 20 years

Approvals



Ordering details

AZ 16①-AS②

No.	Option	Description
①	ST1	Connector (middle)
	ST2	Connector (right)
	ST3	Connector (left)
②		No latching
	R	Latching 30 N
	R-2254	Latching 5 N

Note

The addressing must take place via the M12 connector.

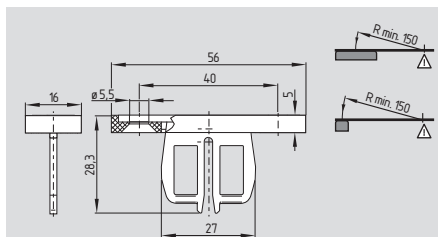


1: AS-i +
2: spare
3: AS-i -
4: spare

Note

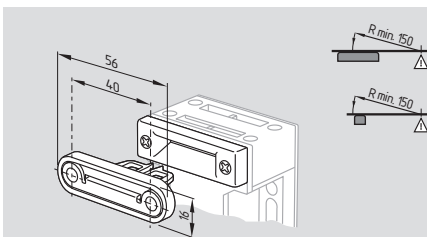
Actuators must be ordered separately.

System components



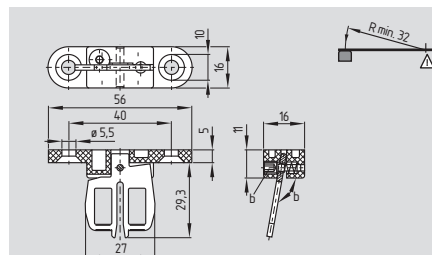
Straight actuator AZ 15/16-B1

System components

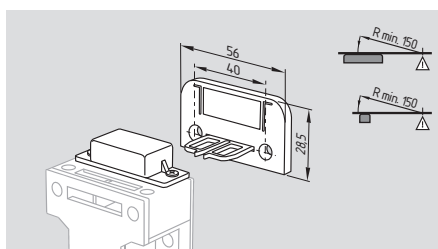


AZ 15/16-B1-2177 with centering guide

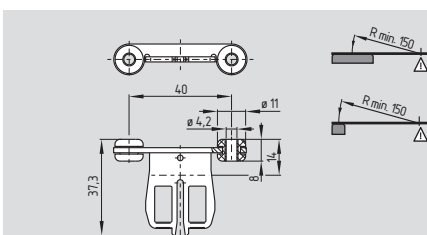
System components



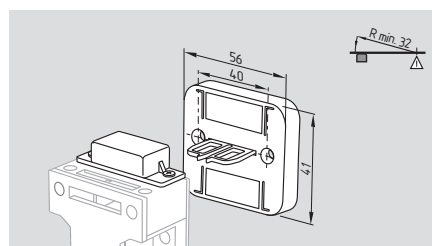
Flexible actuator AZ 15/16-B3



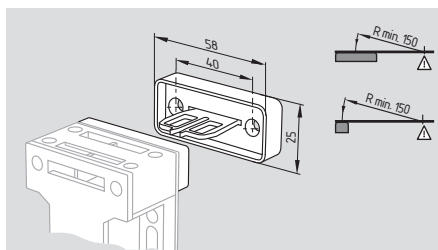
AZ 15/16-B1-1747 with magnetic latch



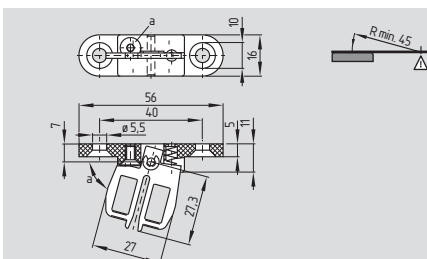
AZ 15/16-B1-2245 with rubber mounting



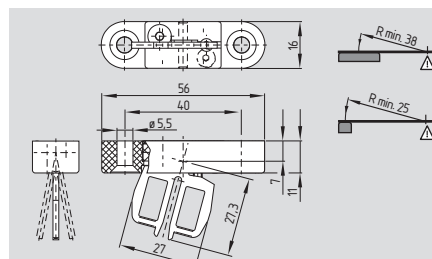
AZ 15/16-B3-1747 with magnetic latch



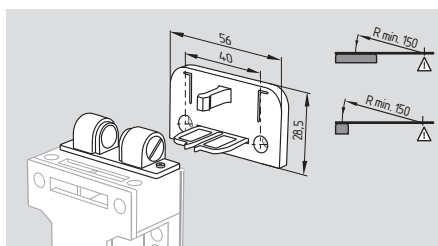
AZ 15/16-B1-2024 with slot lip-seal



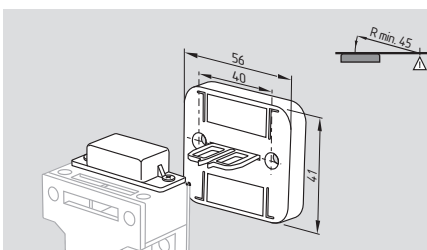
Flexible actuator AZ 15/16-B2



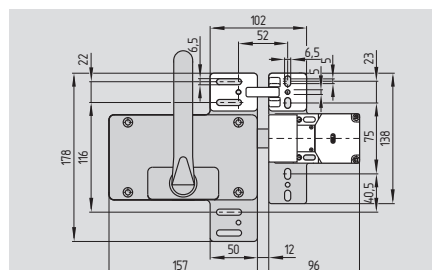
Flexible actuator AZ 15/16-B6



AZ 15/16-B1-2053 with ball latch



AZ 15/16-B2-1747 with magnetic latch



Actuator AZ 16-ST330

Ordering details

Straight actuator
with magnetic latch
with slot lip-seal
with ball latch

AZ 15/16-B1
AZ 15/16-B1-1747
AZ 15/16-B1-2024
AZ 15/16-B1-2053

Straight actuator
with centering guide
with rubber mounting
Flexible actuator
with magnetic latch

AZ 15/16-B1-2177
AZ 15/16-B1-2245
AZ 15/16-B2
AZ 15/16-B2-1747

Ordering details

Flexible actuator
with magnetic latch
Flexible actuator

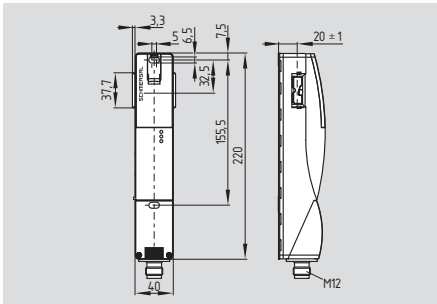
AZ 15/16-B3
AZ 15/16-B3-1747
AZ 15/16-B6

Actuator with or without
emergency handle

AZ 16-ST330

**Other actuators can be found in
the Safety Technology Catalogue!**

AZ 200 AS



- Safety switches with separate actuator
- With integrated guard detection sensor
- Integrated AS-Interface
- AS-Interface LED and status display
- AS-Interface M12 connector
- Sensor technology permits an offset between actuator and switch of ± 5 mm
- Intelligent diagnosis
- Protection class IP 67

• Suitable for applications:

- up to PL e/category 4 to EN ISO 13849-1
- up to SIL 3 to IEC 61508

Technical data

Standards: EN 50295, IEC 60947-5-3, EN ISO 13849-1, IEC 61508
 Enclosure: glass-fibre reinforced thermo-plastic, self-extinguishing
 Mechanical life: > 1 million operations
 Latching force: 30 N
 Protection class: IP 67 to IEC/EN 60529
 Insulation protection class: II, $\square$
 Overvoltage category: III
 Degree of pollution: 3
 Connection: connector M 12 x 1, four pole, 4 A

Electrical data:

Operating voltage: 26.5 ... 31.6 VDC, via AS-Interface, reverse-polarity proof
 Operating current: AS electronics: max. 0.1 A
 AS-Interface specification: (V 2.1)
 Profile: S-0.B
 IO-Code: 0x0
 ID-Code: 0xB
 ID-Code1: 0xF
 ID-Code2: 0xE

Outputs: Data bits D0 ... D3:
 static code 0 or dynamic code transmission

Inputs: none
 Parameter port:
 P0: Guard and actuator detected
 P1: Safety release
 P2: Static 0
 P3: Error

Input module address: preset to address 0, can be modified by means of the AS-Interface bus master or the hand programming device

Diagnostic display:

LED green/red AS-i supply voltage on/
 AS-i communication error/
 Slave address = 0
 LED yellow Authorisation
 LED red Device error

Technical data

Actuating distances to IEC 60947-5-3:

Rated operating distance S_n : 6.5 mm
 Assured operation distance S_{ao} : 4.0 mm
 Assured release distance S_{ar} : 30 mm
 Hysteresis: max. 1.5 mm
 Repeat accuracy R: < 0.5 mm

Ambient conditions:

Ambient temperature: $-25^\circ\text{C} \dots +70^\circ\text{C}$
 Storage and transport temperature: $-25^\circ\text{C} \dots +85^\circ\text{C}$
 Relative humidity: 30% ... 95%, non-condensing

Resistance to vibration: 10 ... 150 Hz / amplitude 0.35 mm

Resistance to shock: 30 g / 11 ms

Switching frequency f: 1 Hz

Response time: < 60 ms

Duration of risk: < 120 ms

Time to readiness: < 4 s

Actuating speed: ≤ 0.2 m/s

Classification:

Standards: EN ISO 13849-1; IEC 61508; IEC 60947-5-3

PL: up to e

Category: up to 4

PFH value: $4,0 \times 10^{-9}$ /h

SIL: up to 3

Service life: 20 years

Classification: PDF-M

Approvals



Ordering details

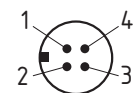
AZ 200 ST-T-AS

Note

The safety switch and the actuator unit (refer to page 22/23) must be ordered separately.

Connecting

Addressing through M12 connector.



1: AS-I +
 2: spare (max. 30 VDC)
 3: AS-I -
 4: spare (max. 30 VDC)

Note

Reading the parameter port

Parameter bits P0 to P3 contain additional status information for diagnostic and control purposes.

Diagnostic

The diagnostic function of the AZ 200 safety switch

The operating condition of the solenoid interlock as well as possible failures and faults are signalled by means of three-colour LED's, installed to the front of the device.

System condition	LED			AS-i SaW condition (D0...D3)
	green/red ³⁾	red	yellow	
Safety guard open	green	off	off	static 0
Safety guard closed, actuator not inserted	green	off	off	static 0
Safety guard closed, actuator inserted	green	off	on	dynamic
Failure warning ¹⁾ , actuator inserted, switch-off approaching	green	flashes ²⁾ /on	on	dynamic
Failure	green	flashes ²⁾	off	static 0
Internal error	green	on	off	static 0
AS-i Failure: Slave address = 0 or communication error	red	Condition- dependent		static 0

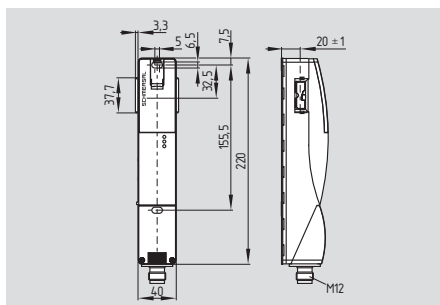
¹⁾ after 30 min -> failure / internal error

²⁾ refer to flash codes

³⁾ AS-i combination LED (green/red)

Flash codes (red)	Meaning	Autonomous switch-off after	Cause
4 flash pulses	Failure (warning) ambient temperature too high	30 min	Temperature measurement indicates too high an inner temperature
5 flash pulses	Error target	0 min	The coding (frequency) of the detected actuator does not match the required value, incorrect or defective actuator
6 flash pulses	Error target combination	0 min	An invalid combination of targets was detected at the 4 coils of the AZ 200 safety switch. (Current setting: latching bolt detected & door target not detected => latch breakage or tampering attempt)
Continuous red	Internal failure	0 min	–

AZM 200 AS



- Solenoid interlock in 3 versions:
AZM 200 ST-T-AS:
 Release, when door is locked
AZM 200 B ST-T-AS:
 Release, when door is closed
AZM 200 BZ ST-T-AS:
 AS-i split code 1, when door is closed
 AS-i split code 2, when door is locked
- With integrated guard detection sensor
- Integrated AS-Interface
- AS-Interface LED and status display
- AS-Interface M12 connector
- AS-Interface magnet control
- External magnet voltage supply
- Sensor technology permits an offset between actuator and interlock of ± 5 mm
- High holding force 2000 N
- Intelligent diagnosis
- Manual release
- **Suitable for applications:**
 - up to PL e/category 4 to EN ISO 13849-1
 - up to SIL 3 to IEC 61508

Approvals



Ordering details

AZM 200 ① ST-T-AS ②P

No.	Option	Description
①	B	Interlock monitored
	BZ	Actuator monitored
		Combined monitoring of the actuator/interlock
②	A	Power to unlock
	P	Power to lock
		Magnet supply through auxiliary voltage

Technical data

Standards: EN 50295, IEC 60947-5-3, EN ISO 13849-1, IEC 61508
 Enclosure: glass-fibre reinforced thermo-plastic, self-extinguishing
 Mechanical life: > 1 million operations
 Holding force F_{max} : 2000 N
 Latching force: typically 30 N
 Protection class: IP 67 to IEC/EN 60529
 Insulation protection class: II, $\square$
 Overvoltage category: III
 Degree of pollution: 3
 Connection: connector M 12 x 1, four pole

Electrical data AS-Interface:

Operating voltage: 26.5 ... 31.6 VDC, via AS-Interface, reverse-polarity proof
 Operating current: 0.1 A
 AS-Interface specification: (V 2.1)
 Profile: S-7.B
 IO-Code: 0x7
 ID-Code: 0xB
 ID-Code1: 0xF
 ID-Code2: 0xE

Inputs: Data bits D0 ... D3:
 static code 0 or dynamic code transmission

Outputs:

Bit 0: Solenoid control
 Bit 1 ... Bit 3: not used

Parameter port:

P0: Door and actuator detected
 P1: Door locked
 P2: Solenoid voltage within tolerance range
 P3: Error detected

Input module address: preset to address 0, can be modified by means of the AS-Interface bus master or the hand programming device

Diagnostic display:

LED green/red: AS-i supply voltage on/
 AS-i communication error/
 Slave address = 0
 LED yellow: Device status
 LED red: Device error

Magnet auxiliary voltage:

Operating voltage: 24 VDC $-15\%/+10\%$ (stabilised PELV)
 Operating current: max. 0.5 A
 Magnet: 100% ED

Technical data

Ambient conditions:

Ambient temperature: $-25^{\circ}\text{C} \dots +60^{\circ}\text{C}$
 Storage and transport temperature: $-25^{\circ}\text{C} \dots +85^{\circ}\text{C}$
 Relative humidity: 30% ... 95%, non-condensing, non-icing
 Resistance to vibration: 10 ... 150 Hz amplitude 0.35 mm / 5 g
 Resistance to shock: 30 g / 11 ms
 Switching frequency f: 1 Hz
 Response time: < 60 ms
 Duration of risk: < 120 ms
 Time to readiness: < 4 s
 Actuating speed: ≤ 0.2 m/s

Classification:

Standards: EN ISO 13849-1; IEC 61508; IEC 60947-5-3
 PL: up to e
 Category: up to 4
 PFH value: $4,0 \times 10^{-9}$ /h
 SIL: up to 3
 Service life: 20 years
 Classification: PDF-M

Note

The solenoid interlock and the actuator unit (refer to page 22/23) must be ordered separately!

Interlocks with power to lock principle may only be used 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.

Connecting

Addressing through M12 connector.



1: AS-Interface
 2: Aux - (p)
 3: AS-Interface
 4: Aux + (p)

Diagnostic of the solenoid interlock

Power supply

The AZM 200 AS solenoid interlock is powered by the AS-Interface system. The energy for the locking solenoids is supplied separately (Aux). The connection to the AS-Interface system is realised by means of an M12 connector with A-coding.

Solenoid control

The control system with the AS-Interface Master can lock and unlock the solenoid interlock through output bit DO 0 of the AS-i slave AZM 200 AS.

Reading the parameter port

Parameter ports P0 to P3 of the solenoid interlock 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 answer to a "Write parameter instruction" can be used by the user for diagnostic purposes or for the control programme.

Flash codes (red)	Meaning	Autonomous switch-off after	Cause
4 flash pulses	Failure (warning) ambient temperature too high	30 min	Temperature measurement indicates too high an inner temperature
5 flash pulses	Error target	0 min	The coding (frequency) of the detected actuator does not match the required value, incorrect or defective actuator
6 flash pulses	Error target combination	0 min	An invalid combination of targets was detected at the 4 coils of the AZM 200 solenoid interlock. (Current setting: latching bolt detected & door target not detected => latch breakage or tampering attempt)
Continuous red	Internal failure	0 min	–

The diagnostic function of the AZM 200 solenoid interlock

The operating condition of the solenoid interlock as well as possible failures and faults are signalled by means of three-colour LED's, installed to the front of the device.

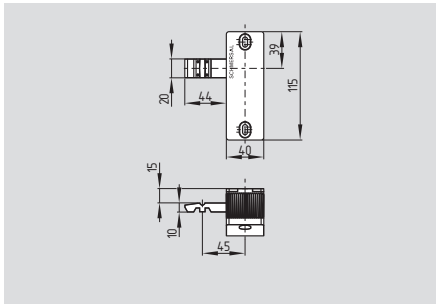
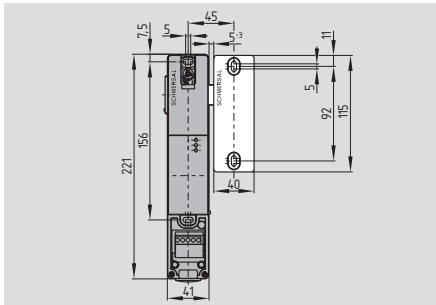
System condition	Solenoid control Bit 0		LED			AS-i SaW condition (D0...D3)
	Power-to-unlock	Power-to-lock	green/red ³⁾	red	yellow	
Safety guard open	1 (0)	0 (1)	green	off	off	static 0
Safety guard closed, actuator not inserted	1 (0)	0 (1)	green	off	off	static 0
Safety guard closed, actuator inserted, (not locked)	1	0	green	off	flashes	AZM 200 ST-T-AS: static 0 AZM 200 B ST-T-AS: dynamic AZM 200 BZ ST-T-AS: D0, D1: dynamic D2, D3: static 0
Safety guard closed, actuator inserted and locked	0	1	green	off	on	dynamic
Failure warning ¹⁾ , actuator inserted and locked, switch-off approaching	0	1	green	flashes ²⁾ / on	on	dynamic
Failure	0 (1)	1 (0)	green	flashes ²⁾	off	static 0
Internal error	0 (1)	1 (0)	green	on	off	static 0
AS-i Failure: Slave address = 0 or communication error	1 (0)	0 (1)	red	Condition-dependent		static 0

¹⁾ after 30 min -> failure / internal error

²⁾ refer to flash codes

³⁾ AS-i combination LED (green/red)

AZ/AZM 200-B1-...



- **Actuator for sliding guards**
- Actuator with return spring
- Tolerates overtravel of up to max. 5 mm
- With guard detection sensor T
- Available with or without emergency exit (P0)

Technical data

Material:

B1 enclosure:

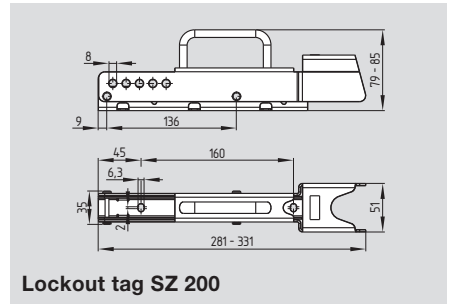
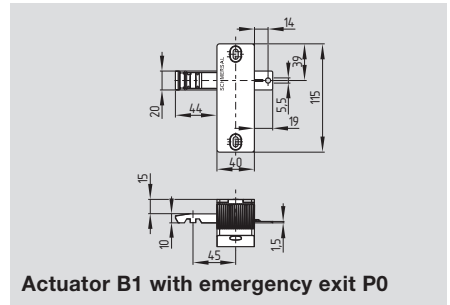
Actuator:

Mechanical life:

F_{max} AZM 200:

Grivory
zinc die-cast
≥ 1 million operations
2000 N

System components



Approvals



Approvals only in combination with AZ/AZM 200

Ordering details

AZ/AZM 200-B1-①T②

No.	Option	Description
①	L	Actuating direction left
	R	Actuating direction right
②		Without emergency exit
	P0	With emergency exit

Note

The safety switches/solenoid interlocks and the actuator unit must be ordered separately!

Ordering details

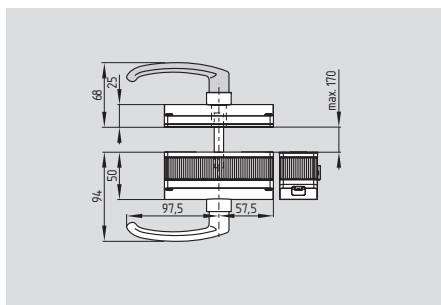
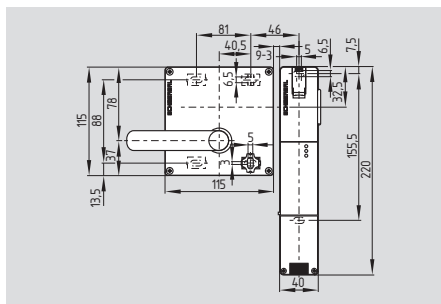
Actuator B1 with
emergency exit

AZ/AZM 200-B1-..-P0

Lockout tag

SZ 200

AZ/AZM 200-B30-...



- **Actuator for hinged guards**
- One-hand emergency exit, even in de-energised condition
- With guard detection sensor T
- Easy and intuitive operation
- NO risk of injury from protruding actuator
- No supplementary door handles required
- Does not protrude into the door opening
- Various handles available
- Can be fitted with or without emergency exit

Technical data

Material:

Actuator unit B30: glass-fibre reinforced thermoplastic, self-extinguishing, fixing holes with metal washer

Emergency exit P1: glass-fibre reinforced thermoplastic, self-extinguishing, fixing holes with metal washer

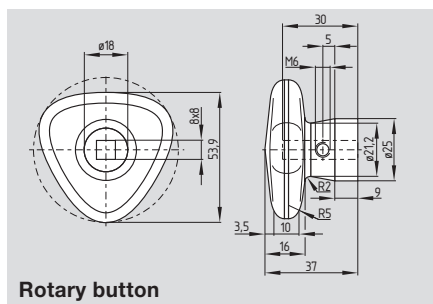
Door handle G1, G2: plastic coated aluminium

Panic handle P1, P20, P25: plastic coated aluminium

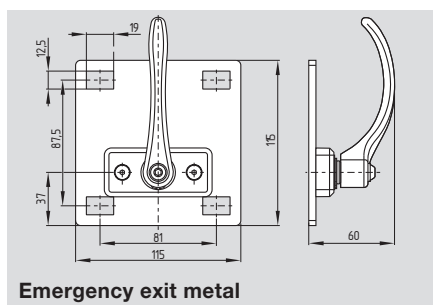
Actuator: zinc die-cast

Mechanical life: ≥ 1 million operations
 $F_{\max}$ AZM 200: 2000 N

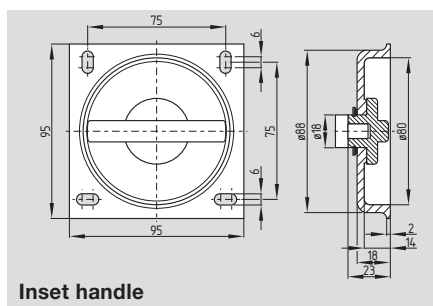
System components



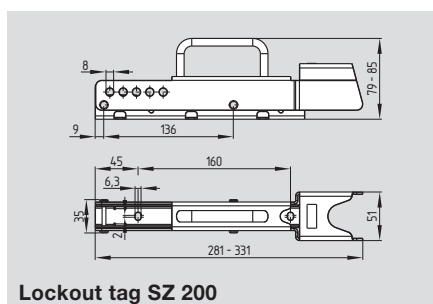
Rotary button



Emergency exit metal



Inset handle



Lockout tag SZ 200

Approvals



Approvals only in combination
with AZ/AZM 200

Ordering details

AZ/AZM 200-B30-①TA②③

No.	Option	Description
①	L	Door hinge on left-hand side
	R	on right-hand side
②	G1	With door handle
	G2	With rotary button
③	P1	With emergency exit
	P20	With emergency exit metal
	P25	With emergency exit with inset handle

Note

The safety switches/solenoid interlocks and the actuator unit must be ordered separately!

Actuator B30 can be combined with 3-point locking rod for higher mechanical stability, particularly suitable for double-leaf doors.

A selection of actuators can be found in the Main catalogue „Safety technology“.

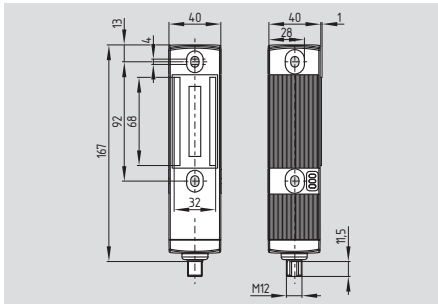
Ordering details

Actuator B30 with
rotary button **AZ/AZM 200-B30-...-G2**

emergency exit	
metal	AZ/AZM 200-B30-..-P20
inset handle	AZ/AZM 200-B30-..-P25

Lockout tag **SZ 200**

MZM 100 AS



- Safety switchgear in 2 variants
MZM 100 ST-AS ...: Solenoid interlock
MZM 100 B ST-AS ...: Safety switch with supplementary guard locking function
- Sensor technology permits an offset between actuator and interlock of ± 5 mm vertically and ± 3 mm horizontally
- Power-to-lock principle
- Holding force ≥ 500 N
- Adjustable latching force 30 N ... 170 N
- Integrated AS-Interface
- AS-Interface LED and status display
- AS-Interface M12 connector
- AS-Interface magnet control
- External magnet voltage supply
- Intelligent diagnosis functions
- Protection class IP 67
- Easy to clean

- **Suitable for applications:**
 - up to PL e/category 4 to EN ISO 13849-1
 - up to SIL 3 to IEC 61508

Approvals



* under preparation



Ordering details

MZM 100 ① ST-AS ②③ AP

No.	Option	Description
①	B	Interlock monitored Actuator monitored Without latching (only for variant "interlock monitored")
②	R	Latching force variable approx. 30 N ... 170 N Without permanent magnet
③	M	With permanent magnet approx. 30 N
	A	Power to lock
	P	Supply through auxiliary voltage

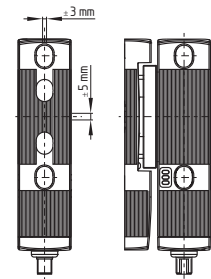
Technical data

Standards:	EN 50295, IEC 60947-5-3, EN ISO 13849-1, IEC 61508
Enclosure:	glass-fibre reinforced thermoplastic, self-extinguishing
Mechanical life:	≥ 1 million operations (for guards ≤ 5 kg; actuating speed ≤ 0.5 m/s)
F_{max} :	500 N
Holding force:	approx. 30 N ... 170 N
Protection class:	IP 67 to IEC/EN 60529
Protection class:	II, III
Overvoltage category:	III
Degree of pollution:	3
Connection:	Connector M12 x 1, 4 poles
Electrical data AS-Interface:	
Operating voltage:	26.5 ... 31.6 VDC, via AS-Interface, reverse-polarity proof
Operating current:	0.1 A
AS-Interface specification: (V 2.1)	Profile S-7.B IO-Code 0x7 ID-Code 0xB ID-Code1: 0xF ID-Code2 0xE
Inputs:	Data bits D0 ... D3: static code 0 or dynamic code transmission
Outputs:	Bit 0 Solenoid control Bit 1 ... Bit 3 adjustment latching force, steps with 20 N
Parameter port:	P0: Actuator present P1: Door locked P2: Auxiliary voltage on P3: Error detected
Input module address:	preset to address 0, can be modified by means of the AS-Interface bus master or the hand programming device
Diagnostic display:	LED green/red AS-i supply voltage on/ AS-i communication error/ Slave address = 0
LED yellow	Device status
LED red	Device error

Technical data

Auxiliary voltage:	
Operating voltage:	24 VDC $-15\%/+10\%$ (stabilised PELV)
Operating current:	max. 0.6 A
Magnet:	100% ED
Ambient conditions:	
Ambient temperature:	$-25^{\circ}\text{C} \dots +55^{\circ}\text{C}$
Storage and transport temperature:	$-25^{\circ}\text{C} \dots +85^{\circ}\text{C}$
Relative humidity:	30% ... 95%, non-condensing, non-icing
Resistance to vibration:	10 ... 150 Hz amplitude 0.35 mm / 5 g
Resistance to shock:	30 g / 11 ms
Switching frequency f:	1 Hz
Response time:	< 100 ms
Duration of risk:	< 100 ms
Time to readiness:	< 4 s
Classification:	
Standards:	EN ISO 13849-1; IEC 61508; IEC 60947-5-3
PL:	up to e
Category:	up to 4
PFH value:	$5,0 \times 10^{-9}$ /h
SIL:	up to 3
Service life:	20 years
Classification:	PDF-M

Misalignment



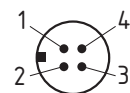
Note

The solenoid interlock and the actuator unit must be ordered separately!

Interlocks with power to lock principle may only be used 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.

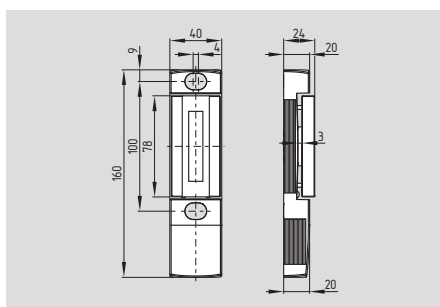
Connecting

Addressing through M12 connector.



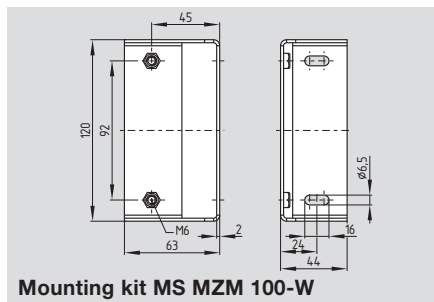
- 1: AS-Interface +
- 2: Aux - (p)
- 3: AS-Interface -
- 4: Aux + (p)

Actuator MZM 100-B1.1



- Actuator free from play, i.e. neutralisation of undesired noises
- Sensor technology permits an offset between actuator and interlock of ± 5 mm vertically and ± 3 mm horizontally

System components



Mounting kit MS MZM 100-W

Approvals



Approvals only in combination with MZM 100 AS

Ordering details

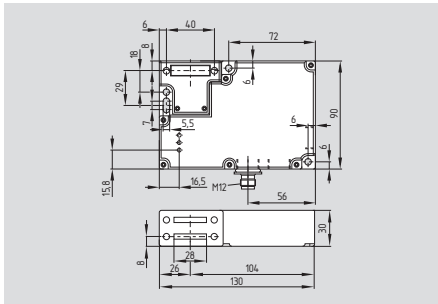
MZM 100-B1.1 Actuator

Ordering details

Mounting kit (screws included in delivery) **MS MZM 100-W**

The solenoid interlock and the actuator unit must be ordered separately!

AZM 161 AS



- Solenoid interlock in 3 versions:
AZM 161 Z ST.-AS:
 Release, when door is locked
AZM 161 B ST.-AS:
 Release, when door is closed
AZM 161 BZ ST.-AS:
 AS-i split code 1, when door is closed
 AS-i split code 2, when door is locked
- High holding force 2,000 N
- Integrated AS-Interface
- AS-Interface LED and status display
- AS-Interface M12 connector
- AS-Interface magnet control
- Solenoid power supply via AS-Interface or an external 24 VDC power supply (suffix P)
- Intelligent diagnosis functions
- Manual release, emergency exit or emergency release
- Protection class IP 67

Approvals * under preparation

Ordering details

AZM 161 ① ②-AS③④⑤⑥

No.	Option	Description
①	Z B BZ	Interlock monitored Actuator monitored Combined monitoring of actuator/solenoid interlock
②	ST1 ST2	Connector (middle) Connector (right)
③	R	Latching force 5 N Latching force 30 N
④	A	Power to unlock Power to lock
⑤		Integrated solenoid supply from AS-i External solenoid supply 24 VDC (Aux)

Technical data

Standards: EN 50295, EN 60947-5-1, EN ISO 13849-1, IEC 61508
 Enclosure: glass-fibre reinforced thermoplastic, self-extinguishing
 Actuator and locking bolt: stainless steel
 Mechanical life: ≥ 1 million operations
 F_{max}: 2000 N
 Holding force: typically 30 N for suffix R
 Protection class: IP 67 to IEC/EN 60529
 Protection class: II, III
 Overvoltage category: III
 Degree of pollution: 3
 Connection: Connector M12, 4 poles
Electrical data AS-Interface:
 Operating voltage: 26.5 ... 31.6 VDC, via AS-Interface, reverse-polarity proof
 Operating current: max. 0,25 A
 suffix P: max. 0,1 A

AS-Interface specification:
 (V 2.1) Profile S-7.B
 IO-Code 0x7
 ID-Code 0xB
 ID-Code1: 0xF
 ID-Code2: 0xE
 AS-I inputs: Data bits D0 ... D3:
 static code 0 or dynamic code transmission

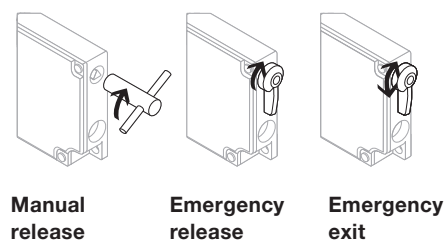
AS-I outputs:
 Bit 0 Solenoid control
 Bit 1 ... Bit 3 not used
 Parameter port:
 P0: Actuator present
 P1: Interlock locked
 P2: Auxiliary voltage on
 P3: Error "locking/unlocking" blocked
 Input module address: preset to address 0, can be modified by means of the AS-Interface bus master or the hand programming device

Diagnostic display:
 LED yellow Channel 1 / AS-i SaW-Bit 0,1
 LED green/red AS-i supply voltage on/
 AS-i communication error/
 Slave address = 0 or peripherals error
 LED yellow Channel 2 / AS-i SaW-Bit 2,3

Auxiliary voltage (Aux) (suffix P):
 Operating voltage: 24 VDC (– 15% / + 10%) (stabilised PELV)
 Operating current: max. 0,5 A

Ordering details

No.	Option	Description
⑥	N T	Manual release Emergency release Emergency exit



Technical data

Magnet: 100% ED
 Device fuse: ≤ 4 A when used to UL 508
Ambient conditions:
 Ambient temperature: – 25 °C ... + 60 °C
 Storage and transport temperature: – 25 °C ... + 85 °C
 Relative humidity: 30% ... 95%, non-condensing, non-icing
 Resistance to vibration: 10 ... 150 Hz, amplitude 0.35 mm
 Resistance to shock: 30 g / 11 ms
 Switching frequency f: ≤ 1 Hz
 Switch-off delay: < 100 ms
 Actuating speed: ≤ 2 m/s

Classification: *approvals under preparation

If a fault exclusion for hazardous damage of the 1-channel mechanics is authorized and an adequate protection against tampering is ensured, suitable for use up to:

Standards: EN ISO 13849-1; IEC 61508
 PL: up to d
 Category: up to 3
 PFH value: 1,01 x 10⁻⁷ /h for max. 100.000 operations/year
 SIL: up to 2
 Service life: 20 years

Basically suitable up to:
 Standards: EN ISO 13849-1; IEC 61508
 PL: up to c
 Category: up to 1
 PFH value: 1,16 x 10⁻⁶ /h for max. 100.000 operations/year
 SIL: up to 1
 Service life: 20 years

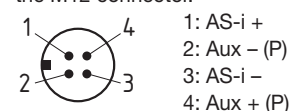
Diagnostic function:
Locking/unlocking of the solenoid interlock blocked:
 This error is detected, when the solenoid interlock can no longer be correctly locked or unlocked, for instance due to an incorrectly closed safety guard, a tilted actuator or an incorrect reset manual release.
 The error is transmitted as "peripheral error" to the control system through the AS-i Master and indicated by the alternate flashing of the red/green AS-i duo-LED on the device.

Note

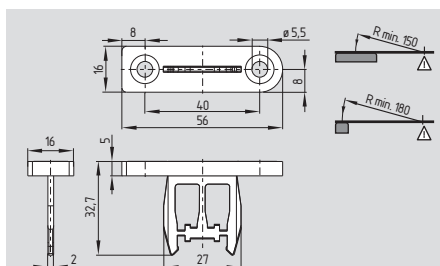
The solenoid interlock and the actuator unit must be ordered separately!

Interlocks with power to lock principle may only be used 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.

The addressing must take place via the M12 connector.

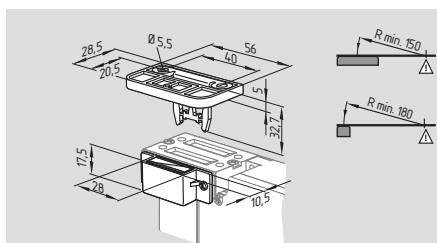


System components



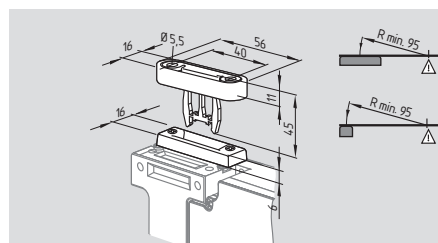
Straight actuator B1

System components

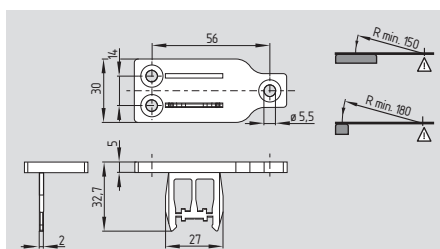


Actuator with magnetic latch B1-1747

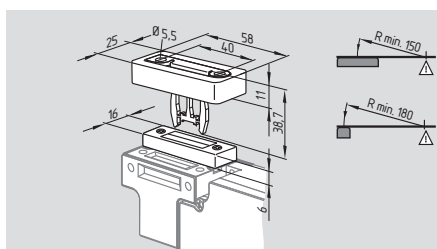
System components



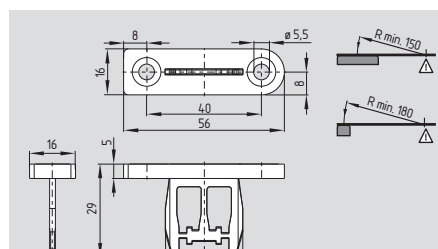
Actuator with centering guide B6-2177



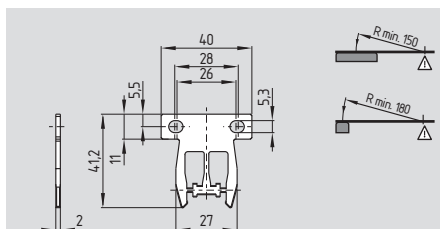
Straight actuator B1E



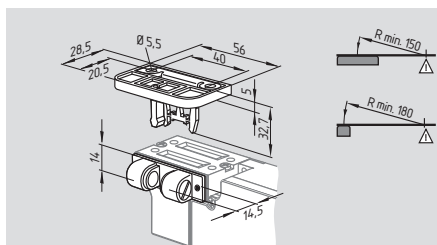
Actuator with slot lip-seal B1-2024



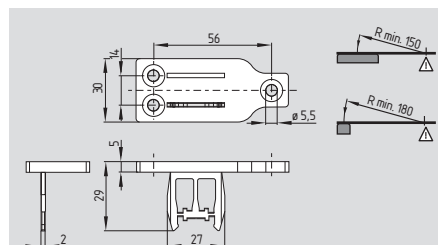
Shortened straight actuator B1S



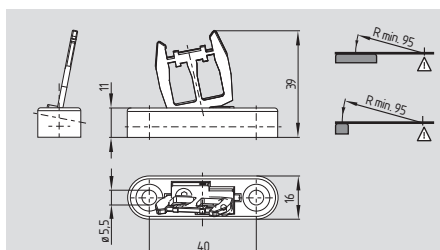
Straight actuator B1F



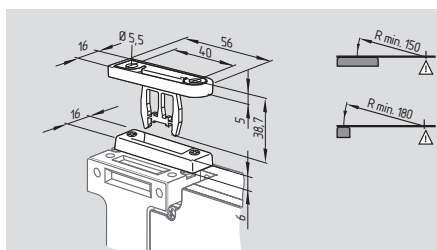
Actuator with ball latch B1-2053



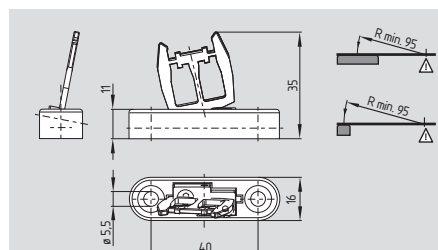
Shortened straight actuator B1ES



Flexible actuator B6



Actuator with centering guide B1-2177



Shortened angled actuator B6S

Ordering details

Straight actuator
Straight actuator
Straight actuator
Flexible actuator

AZM 161-B1
AZM 161-B1E
AZM 161-B1F
AZM 161-B6

Straight actuator
with magnetic latch
with slot lip-seal
with ball latch
with centering guide

AZM 161-B1-1747
AZM 161-B1-2024
AZM 161-B1-2053
AZM 161-B1-2177

Ordering details

Flexible actuator
with centering guide

AZM 161-B6-2177

Shortened straight actuator

AZM 161-B1S

Shortened straight actuator

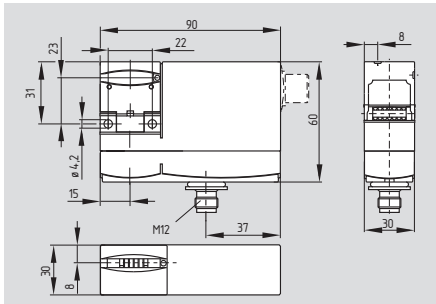
AZM 161-B1ES

Shortened angled actuator

AZM 161-B6S

Other actuators can be found in
the Safety Technology Catalogue!

AZM 170 AS



- Solenoid interlock in 2 versions:
AZM 170 B ST-AS:
 Release, when door is closed
AZM 170 BZ ST-AS:
 AS-i split code 1, when door is closed
 AS-i split code 2, when door is locked
- High holding force 1,000 N
- Integrated AS-Interface
- AS-Interface LED and status display
- AS-Interface M12 connector
- AS-Interface magnet control
- Solenoid power supply via 24 VDC
- Manual release for power to unlock
- Protection class IP 67

Approvals * under preparation

Ordering details

AZM 170 ① ST-AS ②③P④

Nr.	Option	Beschreibung
①	B BZ	Actuator monitored Combined monitoring of actuator/solenoid interlock
②		Latching force 5 N
③	R	Latching force 30 N
④	A	Power to unlock
	2197	Manual release for power to unlock

Technical data

Standards: EN 50295, EN 60947-5-1, EN ISO 13849-1, IEC 61508
 Enclosure: glass-fibre reinforced thermoplastic, self-extinguishing
 Actuator and locking bolt: stainless steel
 Mechanical life: ≥ 1 million operations
 F_{max} : 1000 N
 Holding force: typically 30 N for suffix R
 Protection class: IP 67 to IEC/EN 60529
 Protection class: II, $\square$
 Overvoltage category: III
 Degree of pollution: 3
 Connection: Connector M12, 4 poles

Electrical data AS-Interface:

Operating voltage: 26.5 ... 31.6 VDC, via AS-Interface, reverse-polarity proof
 Operating current: max. 0,1 A

AS-Interface specification:

(V 2.1)	Profile	S-7.B
	IO-Code	0x7
	ID-Code	0xB
	ID-Code1:	0xF
	ID-Code2	0xE

AS-I inputs: Data bits D0 ... D3:
 static code 0 or dynamic code transmission

AS-I outputs:

Bit 0	Solenoid control
Bit 1 ... Bit 3	not used

Parameter port:

P0:	Actuator present
P1:	Interlock locked
P2:	no function
P3:	no function

Input module address: preset to address 0, can be modified by means of the AS-Interface bus master or the hand programming device

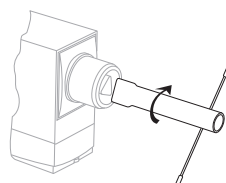
Diagnostic display:

LED grün	AS-i supply voltage on
LED rot	AS-i communication error or slave address = 0
LED gelb	Enabling status

Auxiliary voltage (Aux):

Operating voltage: 24 VDC (– 15% / + 10%) (stabilised PELV)
 Operating current: max. 0,5 A
 Magnet: 100% ED
 Device fuse: ≤ 4 A when used to UL 508

Note



Manual release from side

- For manual release using M5 triangular key, available as accessory
- Only available for power to unlock principle
- Ordering suffix -2197

Technical data

Ambient conditions:

Ambient temperature: – 25 °C ... + 55 °C

Storage and transport

temperature: – 25 °C ... + 85 °C

Relative humidity: 30% ... 95%, non-condensing, non-icing

Resistance to vibration: 10 ... 150 Hz, amplitude 0.35 mm

Resistance to shock: 30 g / 11 ms

Switching frequency f: ≤ 1 Hz

Switch-off delay: < 100 ms

Actuating speed: ≤ 2 m/s

Classification:

*approvals under preparation

If a fault exclusion for hazardous damage of the 1-channel mechanics is authorized and an adequate protection against tampering is ensured, suitable for use up to:

Standards: EN ISO 13849-1; IEC 61508

PL: up to d

Category: up to 3

PFH value: $1,01 \times 10^{-7}$ /h

for max. 100.000 operations/year

SIL: up to 2

Service life: 20 years

Basically suitable up to:

Standards: EN ISO 13849-1; IEC 61508

PL: up to c

Category: up to 1

PFH value: $1,16 \times 10^{-6}$ /h

for max. 100.000 operations/year

SIL: up to 1

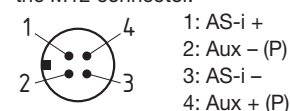
Service life: 20 years

Note

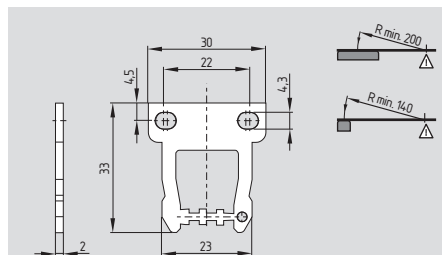
The solenoid interlock and the actuator unit must be ordered separately!

Interlocks with power to lock principle may only be used 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.

The addressing must take place via the M12 connector.

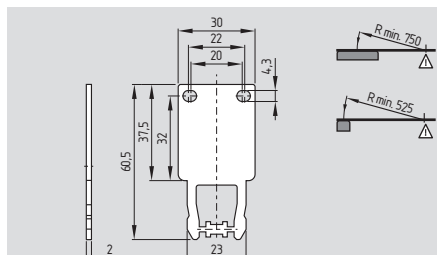


System components



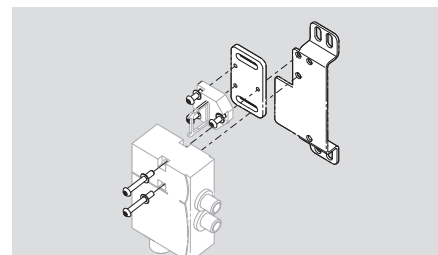
Straight actuator AZ 17/170-B1

System components

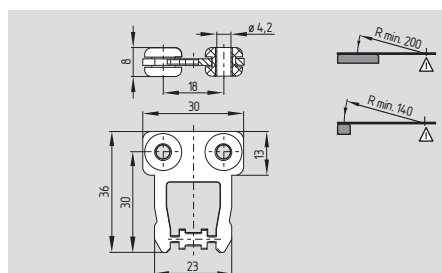


Long straight actuator AZ 17/170-B11

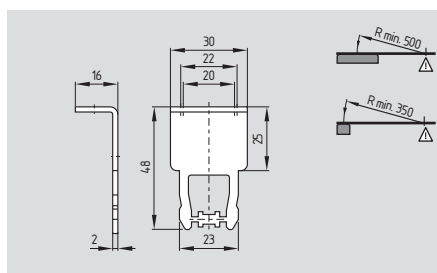
System components



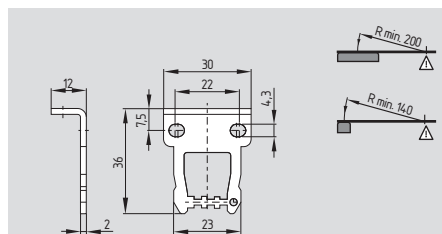
Mounting set MS AZM 170



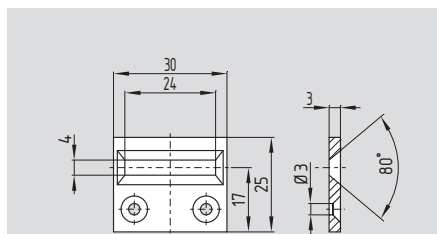
AZ 17/170-B1-2245 with rubber mounting



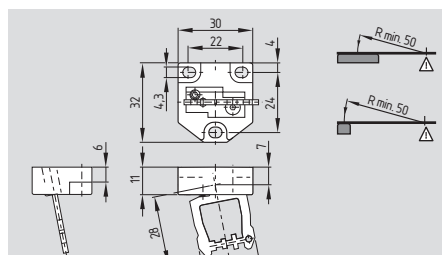
Long angled actuator AZ 17/170-B15



Angled actuator AZ 17/170-B5



Centering guide AZM 170-B



Flexible actuator AZM 170-B6

Ordering details

Straight actuator
with rubber mounting
Angled actuator
Flexible actuator

AZ 17/170-B1
AZ 17/170-B1-2245
AZ 17/170-B5
AZM 170-B6

Ordering details

Long straight actuator
Long angled actuator
Centering guide

AZ 17/170-B11
AZ 17/170-B15
AZM 170-B

Ordering details

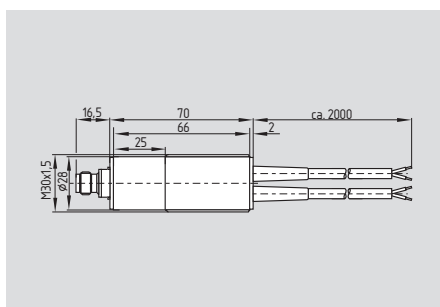
Mounting sets
Tamperproof screws with
unidirectional slots (without drawing)
M4 x 8
(Quantity 2 pcs)

MS AZM 170 P
MS AZM 170 R/P

1147463

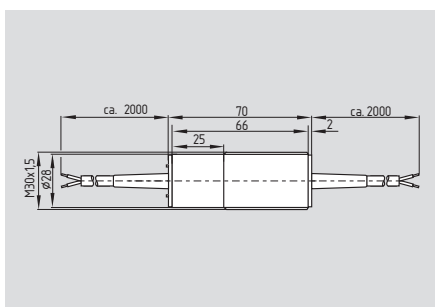
**Other actuators can be found in
the Safety Technology Catalogue!**

AST ... ST-AS



- Input module with M12 connector (AS-i)
- 2 safe inputs for mechanical contacts
- Connection of NC/NC contact or NC/NO contact combination
- Cross-wire monitoring
- Magnetic drive through AS-Interface output
- Solenoid power supply via an external 24 VDC power supply(max. 0.5 A)
- AS-Interface LED and status display
- AS-Interface M12 connector
- Thermoplastic enclosure
- Long life
- Protection class IP 67

AST ... L-AS



- Input module with cable (AS-i), length 2 m

Technical data

Standards: EN 50295, EN 60947-5-1, EN ISO 13849-1, IEC 61508
 Enclosure: glass-fibre reinforced thermoplastic, self-extinguishing

AS-Interface connection type: (see ordering data)
 Protection class: IP 67

AS-Interface operating voltage: 26.5 ... 31.6 VDC, via AS-Interface, reverse-polarity proof

AS-Interface operating current: ≤ 50 mA

AS-Interface specification:
 (V 2.1) Profile S-7.B
 IO-Code 0x7
 ID-Code 0xB
 ID-Code1 0xF
 ID-Code2 0xE

AS-I inputs:
 contact 1: data bits D0 /D1 = static code 00 or dynamic code transmission
 contact 2: data bits D2 /D3 = static code 00 or dynamic code transmission
 Outputs: A0 Solenoid control (AST ...6) (24 VDC, max. 500 mA)
 A1...A3 not used

Parameter bits: P0 ... P3 not used
 Input module address: default on address 0, programmable via the AS-Interface Master or Hand-held programming device

Indications: AS-Interface:
 supply voltage green LED,
 communication red LED,
 blinking = cross-wire short
 Enabling status: LED1/contact1, yellow/contact2

EMC rating: conforming to EMC Directive

Ambient temperature: - 25 °C ... + 55 °C

Storage and transport temperature: - 25 °C ... + 85 °C

Classification:

Standards: EN ISO 13849-1; IEC 61508
 PL: up to e
 Category: up to 4
 PFH value: 2,04 x 10⁻⁹ /h
 SIL: up to 3
 Service life: 20 years

Approvals



Ordering details

AST ①②-AS③④

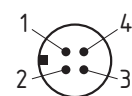
No.	Option	Description
①	02	1 NC/1 NC
	11	1 NO/1 NC
②	ST	AS-i connection: M12 connector
	L	Cable (2m)
③	2	Sensor connection: 2 x 2-single conductors (2 safety inputs)
	4	1 x 4-single conductors (2 safety inputs)
	6	1 x 6-single conductors (2 safety inputs and 1 semiconductor output)

Ordering details

No.	Option	Description
④	ST	Sensor connection: M12 connector with 2m cable (2 x 2-single con- ductors or 1 x 4-single conductors, optionally)

Note

The addressing must take place via the cable end or the M12 connector.

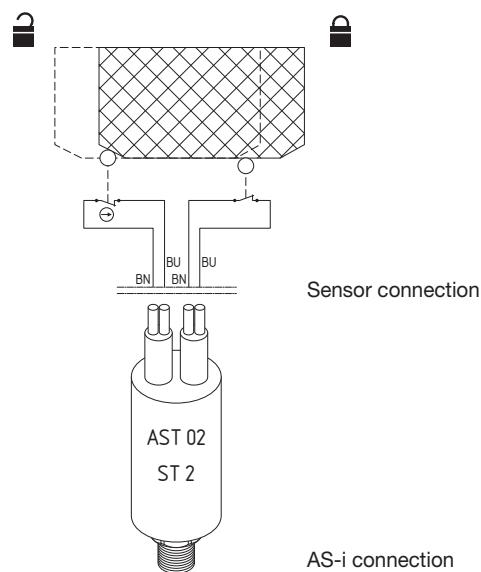


1: AS-i +
 2: Aux - (6) (AST...6)
 3: AS-i -
 4: Aux + (6) (AST...6)

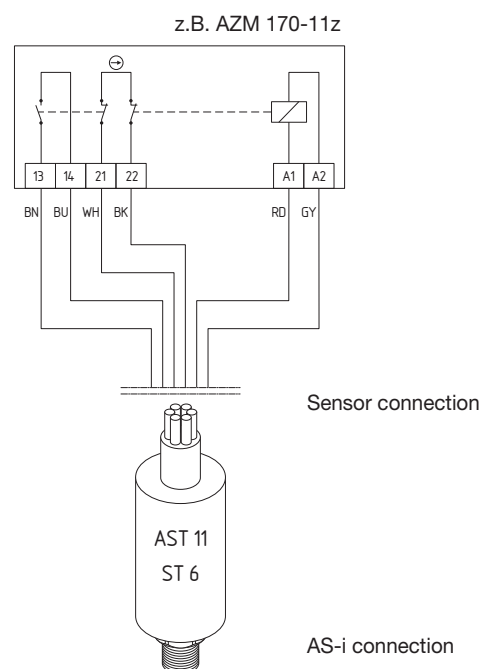
Note

- The wiring diagram is shown with guard doors closed and in de-energised condition.
- The AST module can on be used for the connection of potential-free contacts. Additional LED's on the connecting wire are not acceptable.
- Monitoring a sliding guard door using two position switches with safety function. The NC contact must have positive break when the guard door is opened.

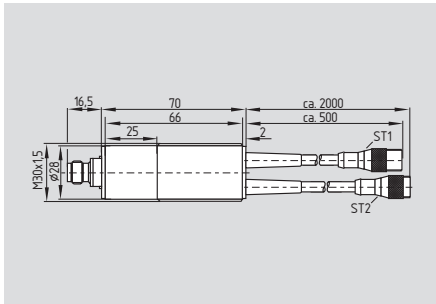
Wiring diagram



- The module AST...AS is monitored by the AS-Interface. The locking solenoid is powered by an external power supply. Connection to the AS-Interface and the auxiliary power is made via a single M12 connector or via a 4-pole connecting cable.
- The passive connection module (see page 35) links up the external solenoid power supply (auxiliary power supply, black cable) and the AS-i network connection (yellow cable) to a single M12 connector. A 4-wired cable makes the connection to the AST...ST6 module.
- An internal output controls the solenoid operation. Depending on the interlocking device, output bit A0 locks or unlocks the actuator. Output bit A0 has the same address as the safety inputs.



AST LC ST-AS



- Input module for 2 monitored PNP semiconductor outputs for safety light curtains and light grids
- AS-Interface LED and status display
- AS-Interface M12 connector
- Thermoplastic enclosure
- Long life
- Protection class IP 67

Technical data

Standards: EN 50295, EN 61496-1, EN ISO 13849-1, IEC 61508

Enclosure: glass-fibre reinforced thermoplastic, self-extinguishing

AS-Interface connection type: connector M12 x 1

Protection class: IP 67 to IEC/EN 60529

AS-Interface operating voltage: 26.5 ... 31.6 VDC, via AS-Interface, reverse-polarity proof

AS-Interface operating current: ≤ 50 mA

AS-Interface specification: (V 2.1)

Profile: S-0.B

IO-Code: 0x0

ID-Code: 0xB

ID-Code1: 0xF

ID-Code2: 0xE

AS-I inputs:

contact 1: data bits D0 /D1 = static code 00 or dynamic code transmission

contact 2: data bits D2 /D3 = static code 00 or dynamic code transmission

Outputs: A0 ... A3 not used

Parameter bits: P0 ... P3 not used

Input module address: default on address 0, programmable via the AS-Interface Master or Hand-held programming device

Indications: AS-Interface: voltage LED green, communication LED red, OSSD1/2; Enabling status: LED yellow

Power supply for AOPD: PELV power supply to IEC 364-4-41

Response time: ≤ 20 ms

EMC rating: conforming to EMC Directive

Ambient temperature: -25 °C ... $+60$ °C

Storage and transport temperature: -25 °C ... $+85$ °C

Classification:

Standards: EN ISO 13849-1; IEC 61508

PL: up to e

Category: up to 4

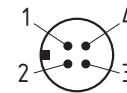
PFH value: $1,74 \times 10^{-9}$ /h

SIL: up to 3

Service life: 20 years

Note

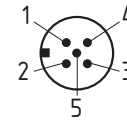
Connector male ST



AS-Interface

- 1: AS-i +
- 2: spare
- 3: AS-i -
- 4: spare

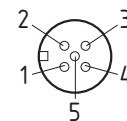
Connector male ST1



Supply voltage

- 1: + 24 VDC
- 2: spare
- 3: GND
- 4: spare
- 5: FE (shield)

Connector female ST2 Connection AOPD



- 1: + 24 VDC
- 2: OSSD 1
- 3: GND
- 4: OSSD 2
- 5: FE (shield)

Approvals



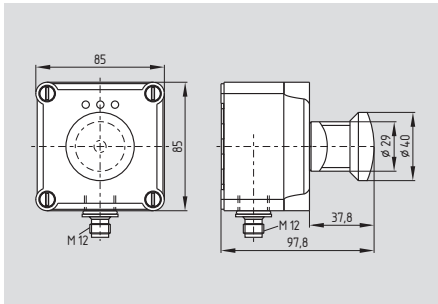
Ordering details

AST LC ST-AS

Note

The addressing must take place via the cable end or the M12 connector.

NAS 311 AS



- E-STOP station
- Integrated AS-Interface interface
- AS-Interface LED and status display
- AS-Interface M12 connector
- Thermoplastic or metal actuators and enclosures
- Pull to reset
- Resistant to chemicals
- Protection class IP 65

Technical data

Standards: EN 50295, EN 60947-5-1, EN ISO 13849-1, IEC 61508

Enclosure: glass-fibre reinforced polyamide nylon, self-extinguishing; metal enclosure, paint finish

Emergency-Stop button: thermoplastic or aluminium

AS-Interface connection type: connector M12 x 1
Protection class: IP 65

AS-Interface operating voltage: 26.5 ... 31.6 VDC, via AS-Interface, reverse-polarity proof

AS-Interface operating current: ≤ 50 mA

AS-Interface specification:
(V 2.1) Profile: S-7.B
IO-Code: 0x7
ID-Code: 0xB
ID-Code1: 0xF
ID-Code2: 0xE

AS-I inputs:
contact 1: data bits D0 /D1 = static code 00 or dynamic code transmission
contact 2: data bits D2 /D3 = static code 00 or dynamic code transmission
Parameter bits: P0 ... P3 not used
Input module address: default on address 0, programmable

Indications:
AS-Interface: voltage LED green, communication LED red

Enabling status: LED yellow

EMC rating: conforming to EMC Directive

Ambient temperature: - 25 °C ... + 60 °C

Storage and transport temperature: - 25 °C ... + 85 °C

Classification :
Standards: EN ISO 13849-1; IEC 61508
PL: up to e
Category: up to 4
PFH value: 3,16 x 10⁻⁸ /h for max. 5.000 operations/year
SIL: up to 3
Service life: 20 years

Approvals



Ordering details

NAS 311 ①-AS ②

No.	Option	Description
①	ST1	Connector
②	M	Thermoplastic enclosure
	MH	Metal enclosure
		Metal enclosure and push button with protection collar

Note

The addressing must take place via the M12 connector.



- 1: AS-Interface +
- 2: spare
- 3: AS-Interface -
- 4: spare

System components



IDC connector M

System components



Passive connection module

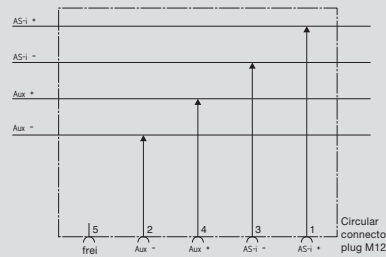
System components



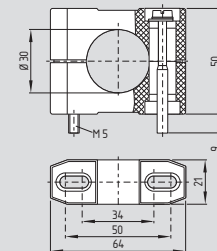
Terminal mounting



IDC connector K



Passive connection module



Terminal mounting

Ordering details

IDC connector M

Connection from the AS-i flat cable (yellow) to M12 connector

IDC connector K

Connection from the AS-i flat cable (yellow) to a circular cable

Ordering details

Passive connection module 0911 ANC 101

Passive connection module (IDC) for the yellow and black flat cable to a M12 connector plug

Ordering details

Terminal mounting H 30

Mounting brackets for all AS-i Tube modules with M30 housing

More Details



Detailed technical information at:
www.schmersal.net

Vertretungen Inland



Stammhaus

K.A. Schmersal GmbH
Industrielle Sicherheitsschaltssysteme
Postfach 24 02 63, 42232 Wuppertal
Möddinghofe 30
42279 Wuppertal
Telefon: +49-(0) 2 02-64 74-0
Telefax: +49-(0) 2 02-64 74-1 00
E-Mail: info@schmersal.com
Internet: www.schmersal.com

01 Hamburg

K.A. Schmersal GmbH
Geschäftsstelle Hamburg
Zunftstraße 8
21244 Buchholz i.d.N.
Telefon: +49-(0) 41 81-9 22 0-0
Telefax: +49-(0) 41 81-9 22 0-20
E-Mail: gshamburg@schmersal.com

02 Berlin

KSA Komponenten der Steuerungs-
und Automatisierungstechnik GmbH
Pankstr. 8-10 / Aufg. L
13127 Berlin
Telefon: +49-(0) 30-47 48 24 00
Telefax: +49-(0) 30-47 48 24 05
E-Mail: info@ksa-gmbh.de
Internet: www.ksa-gmbh.de

03 Hannover

ELTOP GmbH
Robert-Bosch-Str. 8
30989 Gehrden
Telefon: +49-(0) 51 08-92 73 20
Telefax: +49-(0) 51 08-92 73 21
E-Mail: eltop@eltop.de
Internet: www.eltop.de

04 Münster

K.A. Schmersal GmbH
Geschäftsstelle Münster
Am Vechte Ufer 22
48629 Metelen
Telefon: +49-(0) 25 56-9 38 30
Telefax: +49-(0) 25 56-93 83 73
E-Mail: gsmuenster@schmersal.com

05 Köln

Stollenwerk
Technisches Büro GmbH
Scheuermühlenstr. 40
51147 Köln
Telefon: +49-(0) 22 03-9 66 20-0
Telefax: +49-(0) 22 03-9 66 20-30
E-Mail: info@stollenwerk.de

12 Siegen

Siegfried Klein
Elektro-Industrie-Vertretungen
Schloßblick 38
57074 Siegen
Telefon: +49-(0) 2 71-67 78
Telefax: +49-(0) 2 71-67 70
E-Mail: info@sk-elektrotechnik.de

16 Frankfurt

K.A. Schmersal GmbH
Geschäftsstelle Frankfurt
Kilianstädter Straße 38
61137 Schöneck
Telefon: +49-(0) 61 87-9 09 56-0
Telefax: +49-(0) 61 87-9 09 56-6
E-Mail: gsfrankfurt@schmersal.com

08 Saarland

Herbert Neundörfer GmbH & Co. KG
Werksvertretungen
Zum Schacht 9
66287 Göttelborn
Telefon: +49-(0) 68 25-95 45-0
Telefax: +49-(0) 68 25-95 45-99
E-Mail: info@herbert-neundoerfer.de
Internet: www.herbert-neundoerfer.de

19 Leipzig

K.A. Schmersal GmbH
Geschäftsstelle Leipzig
Nonnenstraße 11c
04229 Leipzig
Telefon: +49-(0) 3 41-4 87 34 50
Telefax: +49-(0) 3 41-4 87 34 51
E-Mail: gsleipzig@schmersal.com

09 Bayern Nord

K.A. Schmersal GmbH
Geschäftsstelle Nürnberg
Lechstraße 21
90451 Nürnberg
Telefon: +49-(0)9 11- 6 49 60 53
Telefax: +49-(0)9 11-63 29 07 29
E-Mail: gsnuernberg@schmersal.com

10 Bayern Süd

Ing. Adolf Müller GmbH
Industrievertretungen
Elly-Staegmeyr-Str. 15
80999 München
Telefon: +49-(0) 89-8 12 60 44
Telefax: +49-(0) 89-8 12 69 25
E-Mail: info@ingam.de

11 Stuttgart

Gerhard Schützinger
Labor-Schütz GmbH
Industrievertretungen
Eichwiesenring 6
70567 Stuttgart
Telefon: +49-(0) 7 11-7 15 46-0
Telefax: +49-(0) 7 11-7 15 46-18
E-Mail: hv@schuetzinger.de
Internet: www.schuetzinger.de

International agencies

Argentina - Argentinien

Condelectric S. A.
Hipólito Yrigoyen 2591
1640 Martínez
Pcia. de Buenos Aires
Telefon: +54 (11) 48 36 10 53
Telefax: +54 (11) 48 36 10 53
E-Mail: info@condelectric.com.ar
Internet: www.condelectric.com.ar

Australia - Australien

Control Logic Pty. Ltd.
25 Lavarack Avenue, PO Box 1456
Eagle Farm, Queensland
Telefon: +61 (0)7 36 23 12 12
Telefax: +61 (0)7 36 23 12 11
E-Mail: sales@control-logic.com.au
Internet: www.control-logic.com.au

Austria - Österreich

AVS-Schmersal Vertriebs Ges. m.b.H.
Biróstraße 17
1232 Wien
Telefon: +43-(0) 1-6 10 28
Telefax: +43-(0) 1-6 10 28-1 30
E-Mail: info@avs-schmersal.at
Internet: www.avs-schmersal.at

Belgium - Belgien

Schmersal Belgium NV/SA
Nieuwlandlaan 16B
Industriezone B413
3200 Aarschot
Telefon: +32-(0) 16-57 16 18
Telefax: +32-(0) 16-57 16 20
E-Mail: info@schmersal.be
Internet: www.schmersal.be

Brazil - Brasilien

ACE Schmersal
Eletroeletrônica Industrial Ltda.
Rodovia Boituva-Porto Feliz, Km 12
Vila Esplanada – CEP: 18550-000
Boituva – SP
Telefon: +55-(0) 15-32 63-98 66
Telefax: +55-(0) 15-32 63-98 90
E-Mail: export@schmersal.com.br
Internet: www.schmersal.com.br

Bolivia - Bolivien

International Fil-Parts
Import/Export S.R.L
3er. Anillo, 1040, Frente al Zoo
Santa Cruz de la Sierra
Telefon: +591 (3) 3 42 99 00
Telefax: +591 (3) 3 42 36 37
E-Mail: presidente@filparts.com.bo
Internet: www.filparts.com.bo

Canada - Kanada

Schmersal Canada LTD.
10 Riverside Drive
Orangeville / Ontario L9V1A5
Telefon: (905) 495-7540
Telefax: (905) 495-7543
E-Mail: info@schmersalusa.com
Internet: www.schmersalcanada.com

Chile - Chile

Vitel S.A.
Chiloé 1189
Casilla 440-3
Santiago
Telefon: +56 (2) 5 56 26 46
Telefax: +56 (2) 5 55 57 90
E-Mail: francisco@vitel.cl
Internet: www.vitel.cl

Colombia - Kolumbien

Cimpex Ltda.
Calle 53 # 45-112 Of. 1401
Ed. Colseguros
Medellin-Antioquia
Telefon: +57 4 512 05 80
+57 4 251 05 51
Telefax: +57 4 251 46 08
E-Mail: cimpexjjo@une.net.co

Costa Rica - Costa Rica

Euro-Automation-Tec, S.A.
Apartado 461 – 1200 Pavas
1000 – San José
Tel/Fax: +5 06-22 35-60 85
E-Mail: eurotec.jhtg@yahoo.de

PR China - VR China

Schmersal Industrial Switchgear Co. Ltd.
Central Plaza 1001
Huang Pi Bei Road 227
200003 Shanghai
Telefon: +86-21-63 75 82 87
Telefax: +86-21-63 75 82 97
E-Mail: sales@schmersal.com.cn
Internet: www.schmersal.com.cn

Croatia - Kroatien

Tipteh Zagreb d.o.o.
Pescanska 170
10000 Zagreb
Telefon: +385-1-3 81 65 74
Telefax: +385-1-3 81 65 77
E-Mail: tipteh.zagreb@zg.t-com.hr

Czech Republic - Tschech. Republik

Mercom Componenta spol. s.r.o.
Ruská 67
100 00 Praha 10
Telefon: +4 20-(0) 2-67 31 46 40
Telefax: +4 20-(0) 2-71 73 32 11
E-Mail: mercom@mercom.cz

Denmark - Dänemark

Schmersal Danmark A/S
Lautruphøj 1-3
2750 Ballerup
Telefon: +45-70 20 90 27
Telefax: +45-70 20 90 37
E-Mail: info@schmersal.dk
Internet: www.schmersal.dk

Finland - Finnland

Advancetec Oy
Malminkaari 10B
PO Box 149
00701 Helsinki
Telefon: +3 58-(0) 9-3 50 52 60
Telefax: +3 58-(0) 9-35 05 26 60
E-Mail: advancetec@advancetec.fi
Internet: www.advancetec.fi

France - Frankreich

Schmersal France
BP 18 - 38181 Seyssins Cedex
8, rue Raoul Follereau
38180 Seyssins
Telefon: +33-4 76 84 23 20
Telefax: +33-4 76 48 34 22
E-Mail: info@schmersal.fr
Internet: www.schmersal.fr

Greece - Griechenland

Kalamarakis Sapounas S.A.
Ionias & Neromilou
PO Box 46566
13671 Chamomilos Acharnes
Athens
Telefon: +30-(0) 210-2 40 60 00-6
Telefax: +30-(0) 210-2 40 60 07
E-Mail: ksa@ksa.gr

Honduras - Honduras
Lusitana Intl - Honduras
2 calle entre 8 y 9 avenida N.O.
Barrio la Primavera
Choloma
Telefon: +5 (04) 61 7 - 04 55
Mobil: +5 (04) 33 96 22 90
E-Mail: jaimefernandes2002@yahoo.com

Hungary - Ungarn
NTK Ipari-Elektronikai és
Kereskedelmi Kft
Mészáros L. u. 5.
9023 Győr
Telefon: +36-(0) 96-52 32 68
Telefax: +36-(0) 96-43 00 11
E-Mail: info@ntk-kft.hu
Internet: www.ntk-kft.hu

India - Indien
Schmersal India Pvt. Ltd.
7th floor, Vatika Triangle
Block A, Sushant Lok
Phase I, Mehrauli-Gurgaon Road
122 002 Gurgaon
Telefon: +91-12-44 34 23 00
Telefax: +91-12-44 34 23 33
E-Mail: info-in@schmersal.com
Internet: www.schmersal.in

Indonesia - Indonesien
PT. Wiguna Sumber Sejahtera
Jl. Daan Mogot Raya No. 47
Jakarta Barat 11470
Telefon: +62-(0) 21-5 63 77 70-2
Telefax: +62-(0) 21-5 66 69 79
E-Mail: email@ptwiguna.com
Internet: www.ptwiguna.com

Israel - Israel
A.U. Shay Ltd.
23 Imber St. Kiriath Arie.
P.O. Box 10049
Petach Tikva
Telefon: +9 72-3-9 23 36 01
Telefax: +9 72-3-9 23 46 01
E-Mail: shay@uriel-shay.com

Italy - Italien
Schmersal Italia s.r.l.
Via Molino Vecchio, 206
25010 Borgosatollo, Brescia
Telefon: +39-0 30-2 50 74 11
Telefax: +39-0 30-2 50 74 31
E-Mail: info@schmersal.it
Internet: www.schmersal.it

Japan - Japan
Schmersal Japan Branch Office
3-39-8 Shonan, Suginami-ku
Tokyo 167-0054
Telefon: +81-3-3247-0519
Telefax: +81-3-3247-0537
E-Mail: safety@schmersaljp.com
Internet: www.schmersaljp.com

Korea - Korea
Mahani Electric Co. Ltd.
792-7, Yeosam-dong,
Kangnam-gu
Seoul 135-080
Telefon: +82-(0) 2-21 94-33 00
Telefax: +82-(0) 2-21 94-33 97
E-Mail: yskim@hanmec.co.kr

Macedonia - Mazedonien
Tipteh d.o.o. Skopje
Ul. Jani Lukrovski br. 2/33
1000 Skopje
Telefon: +389-70-39 94 74
Telefax: +389-23-17 41 97
E-Mail: tipteh@on.net.mk

Malaysia - Malaysien
Ingermark (M) SDN.BHD
No. 29, Jalan KPK 1/8
Kawasan Perindustrian Kundang
48020 Rawang, Selangor Darul Ehsan
Telefon: +6 03-60-34 27 88
Telefax: +6 03-60-34 21 88
E-Mail: ingmal@tm.net.my

Mexico - Mexiko
ISEL SA de CV
Via Lopes Mateos 128. Col Jacarandas
54050 Tlalnepantla Edo. de Mexico
Telefon: +52 (55) 53 98 80 88
Telefax: +52 (55) 53 79 39 85
E-Mail: mario.c@isel.com.mx
Internet: www.isel.com.mx

Netherlands - Niederlande
Schmersal Nederland B.V.
Lorentzstraat 31
3846 AV Harderwijk
Telefon: +31 (88) 02 01 00
Telefax: +31 (88) 02 01 50
E-Mail: info-nl@schmersal.com
Internet: www.schmersal.nl

New Zealand - Neuseeland
Hamer Automation
85A Falsgrave Street
Philippstown
Christchurch, New Zealand
Telefon: +64 (0)33 66 24 83
Telefax: +64 (0)33 79 13 79
E-Mail: sales@hamer.co.nz
Internet: www.hamer.co.nz

Norway - Norwegen
Schmersal Norge
Hoffsvæien 92
0377 Oslo
Telefon: +47-22 06 00 70
Telefax: +47-22 06 00 80
E-Mail: info-no@schmersal.com
Internet: www.schmersal.no

Paraguay - Paraguay
All-Med
Importación - Exportación -
Representaciones
Tacuary No. 1318e / 1 ra. Y 2da.
Asunción
Telefon: +595 (21) 37 04 40
Telefax: +595 (21) 37 16 87
E-Mail: allmed@telesurf.com.py

Peru - Peru
Fametal S.A.
Av. Republica de Panamá 3972
Surquillo Lima
Telefon: +511 44 11 100 / 44 10 105
Telefax: +511 42 25 120
E-Mail: fametal@fametal.com
Internet: www.fametal.com

Poland - Polen
Schmersal - Polska Sp.j.
ul. Kremowa 65A
02-969 Warszawa
Telefon: +48-(0) 22-8 16 85 78
Telefax: +48-(0) 22-8 94 64 66
Telefax: +48-(0) 22-8 16 85 80
E-Mail: info@schmersal.pl
Internet: www.schmersal.pl

Portugal - Portugal
Schmersal Ibérica, S.L.
Apartado 30
2626-909 Póvoa de Sta. Iria
Telefon: +351 - 21 959 38 35
Telefax: +351 - 21 959 42 83
E-Mail: info-pt@schmersal.com
Internet: www.schmersal.pt

Romania - Rumänien
A & C Electrics SRL
Str. A.T. Laurian Nr. 16
550228 Sibiu
Telefon: +40-(0)7 44-60 35 56
Telefax: +40-(0)2 69-21 36 26
E-Mail: caslan.nita@acelectrics.ro

Russia - Russland
OOO AT electro Moskau
ul. Avtosavodskaya 16-2
109280 Moskau
Telefon: +7- (0) 95 -1 01 44 25
Telefax: +7- (0) 95 -2 34 44 89
E-Mail: info@at-e.ru
Internet: www.at-e.ru

OOO AT electro Petersburg
Polytechnicheskaya str, d.9,B
194021 St. Petersburg
Telefon: +7-(0) 81 27 03-08-17
Telefax: +7-(0) 81 27 03-08-34
E-Mail: spb@at-e.ru

Serbia/Montenegro -
Serbien/Montenegro
Tipteh d.o.o. Beograd
Bulevar Zorana Djindjica 45D, lokal 18
11070 Novi Beograd
Telefon: +3 81-11-30 18 326
Telefax: +3 81-11-31 31 057
E-mail: damir.vecerka@tipteh.rs
Internet: www.tipteh.rs

Singapore - Singapur
Tong Sim Marine & Electric Co.
46 Kaki Bukit Crescent
Kaki Bukit Techpark 1
Singapore 416269
Telefon: +65-67 43 31 77
Telefax: +65-67 45 37 00
E-Mail: tongsim@singnet.com.sg
Internet: www.tongsim.com

Slovakia - Slowakei
Mercom Componenta spol. s.r.o.
Ruská 67
100 00 Praha 10
Czech Republic
Telefon: +4 20-(0) 2-67 31 46 40
Telefax: +4 20-(0) 2-71 73 32 11
E-Mail: mercom@mercom.cz

Slovenia - Slowenien
Tipteh d.o.o.
Ulica Ivana Roba 21
1000 Ljubljana
Telefon: +386-1-2 00 51 50
Telefax: +386-1-2 00 51 51
E-Mail: info@tipteh.si

Spain - Spanien
Schmersal Ibérica, S.L.
Pol. Ind. La Masia
Camí de les Cabòries, Nave 4
08798 Sant Cugat Sesgarrigues
Telefon: +34 - 93 897 09 06
Telefax: +34 - 93 396 97 50
E-Mail: info-es@schmersal.com
Internet: www.schmersal.es

South Africa - Südafrika
A+A Dynamic Distributors (Pty) Ltd.
3 Ruarch Street
Park Central Johannesburg
2016 Booyens
Telefon: +27-11-4 93 50 22
Telefax: +27-11-4 93 07 60
E-Mail: awkayser@africa.com
Internet: www.aanda.edx.co.za

Sweden - Schweden
Schmersal Nordiska AB
Klockarns Väg 1
43533 Mölnlycke
Telefon: +46-(0) 31-3 38 35 00
Telefax: +46-(0) 31-3 38 35 35
E-Mail: solsten@schmersal.se
Internet: www.schmersal.se

Switzerland - Schweiz
Schmersal Schweiz AG
Freilagerstr. 25
8047 Zürich
Telefon: +41-(0) 43-3 11 22 33
Telefax: +41-(0) 43-3 11 22 44
E-Mail: info-ch@schmersal.com
Internet: www.schmersal.ch

Taiwan - Taiwan
Leader Camel Enterprise Co., Ltd.
No. 453-7, Pei Tun Rd.
Taichung, Taiwan
Telefon: +886-4-22 41 32 92
Telefax: +886-4-22 41 29 23
E-Mail: camel88@ms46.hinet.net
Internet: www.leadercamel.com.tw

Thailand - Thailand
M. F. P. Engineering Co. Ltd.
64-66 Buranasart Road
Sanchaoporsva
Bangkok 10200
Telefon: +66-2-2 26 44 00
Telefax: +66-2-2 25 67 68
E-Mail: info@mfpthai.com
Internet: www.mfpthai.com

Turkey - Türkei
BETA Elektrik Sanayi ve Ticaret
Dogan Bektas
Okçumusa Caddesi
Anten Han No. 16/A
34420 Karaköy / Istanbul
Telefon: +90-212-235 99 14
Telefax: +90-212-253 54 56
E-Mail: info@betaelektrik.com
Internet: www.betaelektrik.com

UK - Großbritannien
Schmersal Ltd.
Sparrowhawk Close
Unit 1, Beauchamp Business Centre
Enigma Park
Worcs WR14 1GL, Malvern
Telefon: +44-(0) 16 84-57 19 80
Telefax: +44-(0) 16 84-56 02 73
E-Mail: support@schmersal.co.uk
Internet: www.schmersal.co.uk

Ukraine - Ukraine
AT Electronics Kiev
Zlatoustovskaya str. 32
01135 Kiev
Telefon: +38- (0) 44-4 82 22 19
+38- (0) 44-4 86 91 25
Telefax: +38- (0) 44-4 86 57 08
E-Mail: info@at-e.com.ua
Internet: www.at-e.com.ua

Uruguay - Uruguay
Gliston S.A.
Pedernal 1896 – Of. 203
CP 1800 Montevideo
Telefon: +598 (2) 2 00 07 91
Telefax: +598 (2) 2 00 07 91
E-Mail: colmedo@gliston.com.uy
Internet: www.gliston.com.uy

USA - USA
Schmersal Inc.
660 White Plains Road
Suite 160
Tarrytown, NY 10591
Telefon: +1-(0) 9 14-3 47-47 75
Telefax: +1-(0) 9 14-3 47-15 67
E-Mail: info@schmersalusa.com
Internet: www.schmersalusa.com

Venezuela - Venezuela
EMI Equipos y Sistemas C.A.
Calle 10, Edf. Centro Industrial
Martinisí, Piso 3, La Urbina
Caracas
Telefon: +58 (212) 2 43 50 72
Telefax: +58 (212) 2 43 50 72
E-Mail: jpereira@emi-ve.com



Other catalogues

- Safety technology
- Automation technology
- Lift switchgear



Subject brochures

For some product families, the Schmersal Group has published informative brochures. These brochures present the product range and provide the mechanical and safety engineer with general, practical notes as well as standard-compliant wiring examples

These brochures are available for the following subjects:

- Electronic safety sensors and solenoid interlocks
- Safety sensors
- Solenoid interlocks
- PROTECT PSC safety controllers
- AS-Interface Safety at Work
- Ex switchgear
- Command and signalling devices Heavy-Duty-series D-22R
- PROTECT SRB safety relay modules



MRL News

Since 1996, the information series MRL News appears at irregular intervals. MRL News is intended to provide interesting interpretations and innovations relating to the complicated subject of safety and machinery and machine controls as well as information about standards and directives that are currently under development or revision.



tec.nicum

The new training centre "Schmersal tec.nicum" is the logical result of our efficiency- and customer-orientated company policy. We want to share our specific knowhow and experience of many years with our customers, especially in the field of functional machine safety. In this brochure, you will find a series of professional seminars, which will take place at the Wuppertal training centre. We are looking forward to meet you there!



K.A. Schmersal GmbH

Industrielle Sicherheitsschaltssysteme

Möddinghofe 30
D-42279 Wuppertal
Postfach 24 02 63
D-42232 Wuppertal

Telefon +49 - (0)2 02 - 64 74 - 0
Telefax +49 - (0)2 02 - 64 74 - 1 00
E-Mail info@schmersal.com
Internet www.schmersal.com



Elan Schaltelemente GmbH & Co. KG

Im Ostpark 2
D-35435 Wettenberg
Postfach 11 09
D-35429 Wettenberg

Telefon +49 (0)641 9848-0
Telefax +49 (0)641 9848-420
E-Mail info-elan@schmersal.com
Internet www.elan.de