

Safety in system: Protection for man and machine

AS interface safety at work



Introduction



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Safety in system – Protection for man and machine

Often, it is unavoidable that people have to intervene with the workings of a machine. When this is done, the safety of the operator is imperative. This demands the responsibility of the machine operator, which is also required by the world's standards and guidelines for machine safety.

The Schmersal Group has concentrated for many years on safety at work with our products and solutions; today we can offer the industry the world's largest range of safety switchgear and systems for the protection of man and machine.

Under the guiding principle "Safety with system – protection for man and machine" we develop and produce products that carry the system concept and can be optimally integrated into the work processes. Because we are convinced that safety does not contradict higher productivity.

In our fields of activity we have a leading position due to our expertise, our innovative power and our comprehensive range of products. With this we follow a central theme: Together with you, we want to make the world a little safer. Talk to us – we look forward to working with you.

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AS interface safety at work

Introduction

Description

Fast mounting, smooth installation

The AS interface enables fast mounting and installation of the components in the safety circuit. The safety switchgear devices are connected to each other and also to the AS-i master and the safety monitor via the yellow AS-i two-wire unshielded line. The power supply also comes from the AS-i unshielded 2-wire line. For AS-i slaves with higher power requirements, the black profile cable with 24 VDC auxiliary voltage is available. It is possible to connect not only operational but also fail-safe AS-i slaves to an AS-i master in mixed configuration. The safety functions are smoothly configured in the AS-i safety monitor through the ASIMON software.

Flexible in use

Even after installation it is possible to change or enhance an AS-i safety system at any time. This applies to both safety switchgear add-ons and switchgear configuration (e.g. safety links, STOP category, filter times etc.).

A tried-and-tested "multilingual" system

With over 7 million safety switchgears in the field, AS-i Safety is the most successful safety bus in the world. In addition to the smooth wiring and configuration, the fact that AS-Interface can communicate with all conventional and commonly used bus systems, has considerably contributed to this success. For the user of the AS-i Safety System, this means that his system speaks many languages - for instance: PROFIBUS, PROFINET, EtherNet/IP and ModbusTCP. For AS-i safety there are also solutions for the field buses DeviceNet, CC-Link, CANopen and Sercos III. In this way, a universal application through different communication standards is enabled.

An economic solution – also for smaller machines

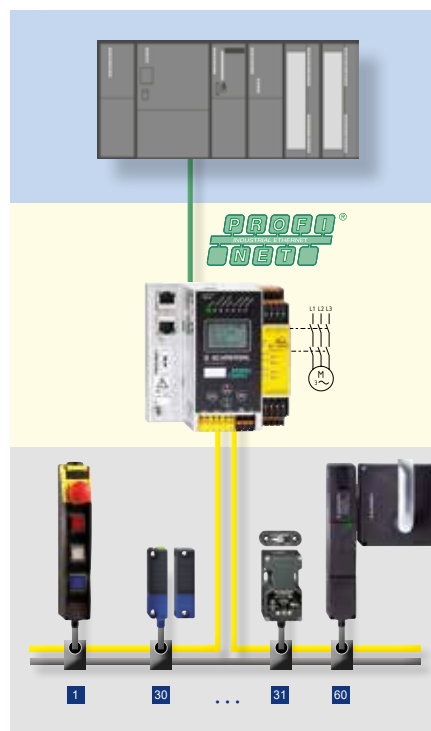
When does the installation of an AS-i Safety System generate return on investment?

When purely considering the costs, cost advantages are already generated – depending on the application – as of six safety switchgear with 6 m connecting cable each – compared to the parallel wiring. In addition to that, there are advantages, which cannot be directly included in the cost savings. These advantages include the smooth extension possibilities, the increased flexibility for making changes to the safety circuit afterwards and the clearly enhanced diagnostic possibilities. Also the comfortable configuration through the safety monitor is an advantage, which is already featured by the smallest AS-i Safety System.





System structure



User advantages

- Individually scalable safety solutions for different machine sizes
- Smooth, fail-safe installation and interface connection of the safety switchgear through AS-Interface
- Comfortable configuration of the safety solution through the "ASIMON" Drag & Drop software
- Complete diagnostics of the entire safety circuit and all connected safety switchgear by the control system
- High operational safety through individually configurable safety-monitoring modules with multiple filter functions, e.g. for bouncing safety guards
- The safety functions can be easily changed or extended at a later date
- Cost-advantageous parallel wiring, approximately six switchgears each with a 6m connecting cable

Safety sensors

Overview of the series



■ BNS 260-AS



■ BNS 36-AS



■ BNS 16-AS

Key Features

- | | | |
|---|---|--|
| <ul style="list-style-type: none"> • Thermoplastic enclosure • 1 direction of actuation | <ul style="list-style-type: none"> • Thermoplastic enclosure • 1 direction of actuation | <ul style="list-style-type: none"> • Thermoplastic enclosure • 2 different directions of actuation |
|---|---|--|

Product version

Active principle	magnetic	magnetic	magnetic
Individual coding	–	–	–
Coding level ISO 14119	Low	Low	Low
Device supply off	AS-i	AS-i	AS-i

Technical features

Assured switch-on distance s_{ao}	5 mm	7 mm	8 mm
Assured switch-off distance s_{ar}	15 mm	17 mm	18 mm
Electrical characteristics			
AS-i supply voltage	18.0 V ... 31.6 V	18.0 V ... 31.6 V	18.0 V ... 31.6 V
AS-i power consumption	≤ 50 mA	≤ 50 mA	≤ 100 mA
AS-i specification	V 2.1	V 2.1	V 2.1
AS-i profile	S-0.B.F.E	S-0.B.F.E	S-0.B.F.E
Mechanical data			
Dimensions (W x H x D)	36 x 13 x 26 mm	88 x 13 x 25 mm	52 x 39 x 90 mm
Connection	Cable or cable connector M12	Cable or cable connector M12	Connector plug M 12
Ambient conditions			
Ambient temperature	–25 °C ... +60 °C	–25 °C ... +60 °C	–25 °C ... +60 °C
Protection class	IP67	IP67	IP67

Safety classification

Standards	ISO 13849-1, IEC 61508	ISO 13849-1, IEC 61508	ISO 13849-1, IEC 61508
PL/SIL	e/3	e/3	e/3
Category	4	4	4
PFH	$6.21 \times 10^{-9}/h$	$1.24 \times 10^{-8}/h$	$7.24 \times 10^{-9}/h$
Certificates	 	 	 



■ RSS 260-AS

■ RSS 36-AS

- | | |
|--|--|
| <ul style="list-style-type: none"> • Thermoplastic enclosure • 2 different directions of actuation • Repeated universal or individual coding • High switching distance and offset possible | <ul style="list-style-type: none"> • Thermoplastic enclosure • 3 different directions of actuation • Repeated universal or individual coding • High switching distance and offset possible • Optionally with magnetic latching 18 N |
|--|--|

RFID	RFID
■	■
High ("I" variants) AS-i	High ("I" variants) AS-i

From front 10 mm, lateral 6 mm	10 mm
From front 18 mm, lateral 15 mm	20 mm
18.0 V ... 31.6 V ≤ 100 mA	18.0 V ... 31.6 V ≤ 100 mA
V 3.0	V 3.0
S-0.B.F.E	S-0.B.F.E
39.2 x 18 x 29.5 mm Connector plug M 8 Cable connector M12	106 x 25 x 22.6 mm Connector plug M 12
-25 °C ... +60 °C IP65 / IP67	-25 °C ... +70 °C IP65 / IP67 / IP69

ISO 13849-1, IEC 61508 e/3 4 3.93 x 10 ⁻¹⁰ /h	ISO 13849-1, IEC 61508 e/3 4 5.13 x 10 ⁻¹⁰ /h
  	  

Safety sensors

Preferred types

Range		Coding	Supply	Connection	Latching force	Actuation direction
RSS 260-AS		Standard coding	AS-i power	Connector M8, 4-pole and cable connector M12, 4-pole	---	From side
		Individual coding				
		Individual coding, re-teaching enabled				
RSS 36-AS		Standard coding	AS-i power	Connector M12, 4-pole	---	From side
					18 N	
		Individual coding			---	
					18 N	
		Individual coding, re-teaching enabled			---	
					18 N	
BNS 260-AS		Standard coding	AS-i power	Cable with connector M12, 4-pole	---	From side
BNS 36-AS		Standard coding	AS-i power	Cable with connector M12, 4-pole	---	From side
BNS 16-AS		Standard coding	AS-i power	Connector M12, 4-pole	---	Front side
						Cover-side

Actuators should be ordered separately. A selection can be found on page 10.
Other types can be found on www.schmersal.net.

Sao/Sar	Housing material	Actuator	Type designation	Material number
10/18 mm	Plastic	RST260-1 RST16-1 RST-U-2	RSS260-ST-AS	103004638
			RSS260-LSTM12-4-0.25M-AS	103014763
			RSS260-I1-ST-AS	103004640
			RSS260-I1-LSTM12-4-0.25M-AS	103014762
			RSS260-I2-ST-AS	103004641
			RSS260-I2-LSTM12-4-0.25M-AS	103014764
10/20 mm	Plastic	RST 36-1 RST 36-1-R RST16-1 RST-U-2	RSS 36-ST-AS	103001531
			RSS 36-ST-AS-R	103001534
			RSS 36-I1-ST-AS	103001536
			RSS 36-I1-ST-AS-R	103001537
			RSS 36-I2-ST-AS	103001538
			RSS 36-I2-ST-AS-R	103001539
5/15 mm	Plastic	BPS 260-1 BPS 260-2	BNS 260 STG-AS-R	101186155
			BNS 260 STG-AS-L	101186156
7/17 mm	Plastic	BPS 36-1 BPS 36-2	BNS 36 STG-AS-R	101194956
			BNS 36 STG-AS-L	101194955
8/18 mm	Plastic	BPS 16	BNS 16 ST1-AS-V	101177221
			BNS 16 ST1-AS-D	101177222

Safety sensors

Actuator

RST 260-1103004318	RST-U-2103005994	BPS 36-.
 ■ Actuator for RSS 260 ■ Thermoplastic enclosure	 ■ Small actuator for RSS 16, RSS 36 and RSS 260 ■ Thermoplastic enclosure	 ■ Actuator and sensor on a mounting level: BPS 36-1101190052 ■ Actuator 90° attached to the sensor: BPS 36-2101191859
RST 36-.	RST 16-1103004336	BPS 260-.
 ■ Actuator for RSS 36 RST 36-1101213820 ■ Actuator with latching magnet: RST 36-1-R101213821	 ■ Flat actuator for RSS 16, RSS 36 and RSS 260 ■ Thermoplastic enclosure	 ■ Actuator and sensor on a mounting level: BPS 260-1101184395 ■ Actuator 90° attached to the sensor: BPS 260-2101184396
		BPS 16101172566
		 ■ Actuator for BNS 16 ■ Thermoplastic enclosure

Detailed information regarding the actuator selection and other actuators can be found at www.schmersal.net.

Up-to-date without fail

The online product catalogue



For detailed information, check out
www.schmersal.net

Solenoid interlocks

Overview of the series



■ AZM 170-AS (AUX)

■ AZM 161-AS (AUX)

■ AZM 161-AS (AS-i)

Key Features

- | | | |
|---|--|--|
| <ul style="list-style-type: none"> • Thermoplastic enclosure • Holding force 1000 N • Manual release; • Power to unlock / Power to lock | <ul style="list-style-type: none"> • Thermoplastic enclosure • Holding force 2000 N • Optionally with individual coding • Manual release, emergency exit or emergency release • Power to unlock / Power to lock | <ul style="list-style-type: none"> • Thermoplastic enclosure • Holding force 2000 N • Optionally with individual coding • Manual release, emergency exit or emergency release • Power to unlock / Power to lock |
|---|--|--|

Product version

Active principle	electromechanical	electromechanical	electromechanical
Individual coding	–	– / ■	– / ■
Coding level ISO 14119	Low	Low ("I" variant = high)	Low ("I" variant = high)
Device supply off	AS-i	AS-i	AS-i
Magnet supply off	AUX	AUX	AS-i

Technical features

Clamping force	1000 N	2000 N	2000 N
Latching force	30 N (Index R)	30 N (Index R)	30 N (Index R)
Safe unlocking function possible	up to PL e	up to PL e	–
Electrical characteristics			
AS-i supply voltage	18.0 V ... 31.6 V	18.0 V ... 31.6 V	18.0 V ... 31.6 V
AS-i power consumption	≤ 100 mA	≤ 100 mA	≤ 250 mA
AUX supply voltage	24 VDC –15% / +10%	24 VDC –15% / +10%	–
AUX power consumption	≤ 500 mA	≤ 500 mA	–
AS-i specification	V 2.1	V 2.1	V 2.1
AS-i profile	S-7.B.F.E	S-7.B.F.E	S-7.B.F.E
Mechanical data			
Dimensions (W x H x D)	90 x 60 x 30 mm	130 x 90 x 30 mm	130 x 90 x 30 mm
Connection	Connector plug M 12	Connector plug M 12	Connector plug M 12
Ambient conditions			
Ambient temperature	–25 °C ... +55 °C	–25 °C ... +60 °C	–25 °C ... +60 °C
Protection class	IP67	IP67	IP67

Safety classification

Standards	ISO 13849-1, IEC 61508		
PL/SIL	c/1 up to d/2	c/1 up to d/2	c/1 up to d/2
Control category	1 to 3	1 to 3	1 to 3
PFH	up to $1.01 \times 10^{-7}/h$	up to $1.01 \times 10^{-7}/h$	up to $1.01 \times 10^{-7}/h$
Certificates	 	 	 



■ MZM 100-AS (AUX) ■ AZM 201-AS (AUX) ■ AZM 300-AS (AUX) ■ AZM 300-AS (AS-i)

- | | | | |
|--|--|--|--|
| <ul style="list-style-type: none"> • Thermoplastic enclosure • Holding force 750 N • Electromagnetic interlock function • Optional with permanent magnet engagement • Power to lock | <ul style="list-style-type: none"> • Thermoplastic enclosure • Holding force 2000 N • Repeated universal or individual coding • Manual release, emergency exit or emergency release • Power to unlock / Power to lock | <ul style="list-style-type: none"> • Thermoplastic enclosure • Holding force 1000 N • Repeated universal or individual coding • Manual release, emergency exit or emergency release • Power to unlock / Power to lock | <ul style="list-style-type: none"> • Thermoplastic enclosure • Holding force 1000 N • Repeated universal or individual coding • Manual release, emergency exit or emergency release • Power to unlock / Power to lock |
|--|--|--|--|

inductive	RFID	RFID	RFID
–	■	■	■
Low	High ("I" variants)	High ("I" variants)	High ("I" variants)
AS-i	AS-i	AS-i	AS-i
AUX	AUX	AUX	AS-i

750 N	2000 N	1000 N	1000 N
30 – 100 N (Index RE) Magnet 15 N (Index M)	30 N	25 N / 50 N	25 N / 50 N
–	up to PL e	up to PL e	–
26.5 V ... 31.6 V	26.5 V ... 31.6 V	18.0 V ... 31.6 V	26.5 V ... 31.6 V
≤ 100 mA	≤ 100 mA	≤ 100 mA	≤ 200 mA
24 VDC –15% / +10%	24 VDC –15% / +10%	24 VDC –15% / +10%	–
≤ 600 mA	≤ 500 mA	≤ 300 mA	–
V 2.1	V 3.0	V 3.0	V 3.0
S-7.B.F.E	S-7.B.F.E	S-7.B.F.E	S-7.B.F.E
40 x 167 x 40 mm	40 x 220 x 50 mm	88 x 121 x 35 mm	88 x 121 x 35 mm
Connector plug M 12	Connector plug M 12	Connector plug M 12	Connector plug M 12
–25 °C ... +55 °C	–25 °C ... +60 °C	0 °C ... +60 °C	0 °C ... +60 °C
IP67	IP67	IP66, IP67, IP69	IP66, IP67, IP69

ISO 13849-1, IEC 61508

e/3	e/3	e/3	e/3
4	4	4	4
5.00 x 10 ⁻⁹ /h	1.81 x 10 ⁻⁹ /h	1.34 x 10 ⁻⁹ /h	1.34 x 10 ⁻⁹ /h
			

Solenoid interlocks

Preferred types

Range		Coding	Supply Interlocking solenoid	Connection	Latching force	Special features
AZM 161-AS		Standard coding	AS-i power	Connector M12, 4-pole	30 N	Manual release
			AUX Power			Manual release
						Manual release
						Manual release
						Emergency exit
AZM 170-AS		Standard coding	AUX Power	Connector M12, 4-pole	30 N	Manual release
						Manual release
AZM 201-AS		Standard coding	AUX Power	Connector M12, 4-pole	30 N	Manual release
		Individual coding				Manual release
						Manual release
						Manual release
						Manual release
						Manual release
MZM 100-AS		Standard coding	AUX Power	Connector M12, 4-pole	30 ... 100 N	---
						Permanent magnet

						Permanent magnet
AZM 300-AS		Standard coding	AS-i power	Connector M12, 4-pole	25 N / 50 N	Manual release
		Individual coding				Manual release
						Emergency exit
						Manual release
						Manual release
						Emergency exit
		Individual coding, re-teaching enabled	Manual release			
			Manual release			
			Emergency exit			
			Manual release			
		Standard coding	AUX Power			Manual release
						Manual release
						Emergency exit
						Manual release
		Individual coding				Manual release
Manual release						
Emergency exit						
Manual release						
Individual coding, re-teaching enabled		Manual release				
		Manual release				
		Emergency exit				
		Emergency exit				

Actuators should be ordered separately. A selection can be found on page 16 ff.
Other types can be found on www.schmersal.net.

Guard locking monitored	Actuator monitored	Power to lock	Power to unlock	Type designation	Material number
	■	■		AZM 161 B-ST1-AS-RA	101209097
■			■	AZM 161 Z-ST1-AS-R	101209107
	■	■		AZM 161 B-ST1-AS-RAP	101209090
■			■	AZM 161 Z-ST1-AS-RP	101209109
■			■	AZM 161 Z-ST1-AS-RPT	101216398
	■	■		AZM 170 B ST-AS RAP	101210414
■	■		■	AZM 170 BZ ST-AS RP-2197	101211516
	■	■		AZM 201B-ST-T-AS-A-P	103025301
■			■	AZM 201Z-ST-T-AS-P	103025866
■	■		■	AZM 201BZ-ST-T-AS-P	103025873
	■	■		AZM 201B-I2-ST-T-AS-A-P	103025857
■			■	AZM 201Z-I2-ST-T-AS-P	103025868
■	■		■	AZM 201BZ-I2-ST-T-AS-P	103025874
	■	■		MZM 100 B ST-AS REAP	101198705
	■	■		MZM 100 B ST-AS REMAP	101209551
■		■		MZM 100 ST-AS REAP	101198704
■		■		MZM 100 ST-AS REMAP	101209553
	■	■		AZM300B-ST-AS-A	103005902
■			■	AZM300Z-ST-AS	103005916
■			■	AZM300Z-ST-AS-T	103009476
	■	■		AZM300B-I1-ST-AS-A	103005910
■			■	AZM300Z-I1-ST-AS	103005924
■			■	AZM300Z-I1-ST-AS-T	103009475
	■	■		AZM300B-I2-ST-AS-A	103005906
■			■	AZM300Z-I2-ST-AS	103005920
■			■	AZM300Z-I2-ST-AS-T	103011892
	■	■		AZM300B-ST-AS-A-P	103005899
■			■	AZM300Z-ST-AS-P	103005913
■			■	AZM300Z-ST-AS-P-T	103009481
	■	■		AZM300B-I1-ST-AS-A-P	103005908
■			■	AZM300Z-I1-ST-AS-P	103005922
■			■	AZM300Z-I1-ST-AS-P-T	103009480
	■	■		AZM300B-I2-ST-AS-A-P	103005904
■			■	AZM300Z-I2-ST-AS-P	103005918
■			■	AZM300Z-I2-ST-AS-P-T	103009483

Solenoid interlocks

AZM 161 – Actuators and accessories

AZM 161-B1 *	101145117	AZM 161-B1S	101171125	AZM 161-B1-1747	101164100
	■ Straight actuator ■ Also with individual coding *		■ Shortened straight actuator ■ Standard coding		■ Straight actuator with magnetic latch ■ Standard coding
AZM 161-B1-2024	101178199	AZM 161-B1-2053	101173089	AZM 161-B1-2177	101176642
	■ Straight actuator with slot lip-seal ■ Standard coding		■ Straight actuator with ball latch ■ Standard coding		■ Straight actuator with centering guide ■ Standard coding
B6R *	B6L *	AZM 161-B1F	101175431		
	■ Flexible actuator for right-hand side door hinge ■ Individual coding *		■ Flexible actuator for left-hand side door hinge ■ Individual coding *		■ Straight actuator ■ Standard coding

Detailed information regarding the actuator selection and other actuators can be found at www.schmersal.net.

Solenoid interlocks

AZM 161 – Actuators and accessories



AZM 161-B6	101144420	AZM 161-B6-2177	101174113	AZM 161-B6S	101170375
	- Flexible actuator - Standard coding	 - Flexible actuator with centering guide - Standard coding		 - Shortened flexible actuator - Standard coding	
Tamperproof screws					
	- Tamperproof screws with unidirectional slots - M5 x 12101135338 - M5 x 16101135339 - M5 x 20101135340 - Quantity 2 pcs				
Centering device		Slot sealing plug AZM 161	101145379	Triangular key M5	101100887
	- Centering device for pre-positioning - Mounting outside: TFA-020101172607 - Mounting inside: TFI-020101172609	 - To cover unused actuator slots - For protection against the ingress of dirt - Easy to install by just clipping in		 For manual release	

Detailed information regarding the actuator selection and other actuators can be found at www.schmersal.net.

Solenoid interlocks

AZM 170 – Actuators and accessories

AZ 17/170-B1101122893	AZ 17/170-B1-2245101137406	AZ 17/170-B5101122895
 ■ Straight actuator ■ Standard coding	 ■ Actuator with rubber mounting ■ Standard coding	 ■ Angled actuator ■ Standard coding
AZ 17/170-B11101139788	AZ 17/170-B15101139789	AZM 170-B6101123391
 ■ Long straight actuator ■ Standard coding	 ■ Long angled actuator ■ Standard coding	 ■ Flexible actuator ■ Standard coding
Centering device	Tamperproof screws	AZM 170-B101208493
 ■ Centering device for pre-positioning ■ Mounting outside: TFA-020101172607 ■ Mounting inside: TFI-020101172609	 ■ Tamperproof screws with unidirectional slots M4 x 8101147463 ■ Quantity 2 pcs	 ■ Centering guide ■ Only in combination with long actuator

Detailed information regarding the actuator selection and other actuators can be found at www.schmersal.net.

Solenoid interlocks

AZM 201 – Actuators and accessories



AZ/AZM201-B1-...  ■ Actuator for sliding safety guards ■ Left-hand side actuating direction AZ/AZM201-B1-LT 103013493 ■ Right-hand side actuating direction AZ/AZM201-B1-RT 103013494	AZ/AZM201-B1-...-P0  ■ With emergency exit P0 ■ Left-hand side actuating direction AZ/AZM201-B1-LTP0 103013496 ■ Right-hand side actuating direction AZ/AZM201-B1-RTP0 103013495	AZ/AZM201-B40-...  ■ Actuators for rotatable and moveable protection equipment, especially for hinged doors with overlapping folds
AZ/AZM201-B30-... -G1  ■ Actuator for hinged safety guards	AZ/AZM201-B30-...-SZ  ■ Actuator B30 with lockout tag	AZ/AZM201-B30-...-G2  ■ Actuator with rotating knob
AZ/AZM201-...-P1  ■ Emergency exit	AZ/AZM201-...-P20  ■ Emergency exit (metal)	AZ/AZM201-B30-...-P30/P31  ■ Three point locking linkage for requirements with increased mechanical stability (7,000 N)

Detailed information regarding the actuator selection and other actuators can be found at www.schmersal.net.

Solenoid interlocks

MZM 100 and AZM 300 – Actuators and accessories

MZM 100-B1.1	101204290	MS MZM 100-W	101185510	
	■ Actuator free from play for MZM 100 ■ Neutralisation of undesired noises	 ■ Mounting set for MZM 100 ■ Screws are included in delivery		
AZ/AZM300-B1	101218025	MP-AZ/AZM300-1	103003172	MS-AZ/AZM300-B1-1 103002891
	■ Actuator ■ 3 different directions of actuation	 ■ Mounting plate	 ■ Mounting set for actuators	
AZM300-...-T / -N			SZ 200-1	101196397
	■ Emergency exit (-T) for fitting and actuation only from within the hazardous area ■ Emergency release (-N) for fitting and actuation only on the outside of the safety guard			■ Lockout tag with 6 bore holes for AZM 200, AZM 201 and AZM 300 ■ To prevent inadvertent closing, e.g. during maintenance

Detailed information regarding the actuator selection and other actuators can be found at www.schmersal.net.

Safety light grids / light curtains

Overview of the series



■ SLC 440-AS



■ SLG 440-AS

Key Features

- | | |
|--|--|
| <ul style="list-style-type: none"> • Sturdy aluminium profile • Resolution 14 mm and 30 mm • Protection field heights 170 mm – 1770 mm • Programmable blanking functions • Integrated status indication | <ul style="list-style-type: none"> • Sturdy aluminium profile • 2-, 3-, 4-beam • Protection field heights 500 mm / 800 mm / 900 mm • Programmable blanking functions • Integrated status indication |
|--|--|

Product version

Type to EN 61496	Type 4	Type 4
Device supply off:	AS-i	AS-i
Auxiliary supply off:	AUX	AUX

Technical features

Resolution	14 mm and 30 mm	
Number of beams		2-, 3-, 4-beam
Protection field height	170 mm – 1770 mm	500 mm / 800 mm / 900 mm
Range of the protection field	0.3 ... 7.0 m / 14 mm Resolution 0.3 ... 10.0 m / 30 mm Resolution	0.3 ... 12.0 m
Blanking functions	Fixed protection field / With movable edge area / Movable protection field	Fixed protection field / With movable edge area / Movable protection field
Electrical characteristics		
AS-i supply voltage	18.0 V ... 31.6 V	18.0 V ... 31.6 V
AS-i power consumption	≤ 50 mA	≤ 50 mA
AUX supply voltage	24 VDC –15% / +10%	24 VDC –15% / +10%
AUX power consumption receiver	≤ 150 mA	≤ 150 mA
AUX power consumption emitter	≤ 75 mA	≤ 75 mA
AS-i specification	V 3.0	V 3.0
AS-i profile	S-0.B.F.E	S-0.B.F.E
Mechanical data		
Dimensions of profile (WxD)	27.8 x 33 mm	27.8 x 33 mm
Length inc. securing bracket	Protection field height + 113 mm	Protection field height + 133 mm
Connection	Connector plug M 12	Connector plug M 12
Ambient conditions		
Ambient temperature	–10 °C ... +50 °C	–10 °C ... +50 °C
Protection class	IP67	IP67

Safety classification

Standards	ISO 13849-1, IEC 61508	ISO 13849-1, IEC 61508
PL/SIL	e/3	e/3
Category	4	4
PFH	5.17 x 10 ⁻⁹ /h	5.17 x 10 ⁻⁹ /h
Certificates	 	 

Safety light grids / light curtains

Light curtains

Range	Type to EN 61496	Safety version	Supply	Connection	Special features
SLC 440-AS 	Type 4	Light curtain SLC	AUX Power	Connector M12, 4-pole	Integrated AS-i Safety Module

Resolution	Protection field height	Range	Type designation	Material number
14 mm	170 mm	0.3...7 m	SLC440AS-ER-0170-14	103007432
14 mm	250 mm	0.3...7 m	SLC440AS-ER-0250-14	103007438
14 mm	330 mm	0.3...7 m	SLC440AS-ER-0330-14	103007444
14 mm	410 mm	0.3...7 m	SLC440AS-ER-0410-14	103007450
14 mm	490 mm	0.3...7 m	SLC440AS-ER-0490-14	103007456
14 mm	570 mm	0.3...7 m	SLC440AS-ER-0570-14	103007462
14 mm	650 mm	0.3...7 m	SLC440AS-ER-0650-14	103007468
14 mm	730 mm	0.3...7 m	SLC440AS-ER-0730-14	103007474
14 mm	810 mm	0.3...7 m	SLC440AS-ER-0810-14	103007480
14 mm	890 mm	0.3...7 m	SLC440AS-ER-0890-14	103007486
14 mm	970 mm	0.3...7 m	SLC440AS-ER-0970-14	103007492
14 mm	1050 mm	0.3...7 m	SLC440AS-ER-1050-14	103007498
14 mm	1130 mm	0.3...7 m	SLC440AS-ER-1130-14	103007504
14 mm	1210 mm	0.3...7 m	SLC440AS-ER-1210-14	103007514
14 mm	1290 mm	0.3...7 m	SLC440AS-ER-1290-14	103007520
14 mm	1370 mm	0.3...7 m	SLC440AS-ER-1370-14	103007526
14 mm	1450 mm	0.3...7 m	SLC440AS-ER-1450-14	103007532
30 mm	170 mm	0.3...10 m	SLC440AS-ER-0170-30	103007435
30 mm	250 mm	0.3...10 m	SLC440AS-ER-0250-30	103007441
30 mm	330 mm	0.3...10 m	SLC440AS-ER-0330-30	103007447
30 mm	410 mm	0.3...10 m	SLC440AS-ER-0410-30	103007453
30 mm	490 mm	0.3...10 m	SLC440AS-ER-0490-30	103007459
30 mm	570 mm	0.3...10 m	SLC440AS-ER-0570-30	103007465
30 mm	650 mm	0.3...10 m	SLC440AS-ER-0650-30	103007471
30 mm	730 mm	0.3...10 m	SLC440AS-ER-0730-30	103007477
30 mm	810 mm	0.3...10 m	SLC440AS-ER-0810-30	103007483
30 mm	890 mm	0.3...10 m	SLC440AS-ER-0890-30	103007489
30 mm	970 mm	0.3...10 m	SLC440AS-ER-0970-30	103007495
30 mm	1050 mm	0.3...10 m	SLC440AS-ER-1050-30	103007501
30 mm	1130 mm	0.3...10 m	SLC440AS-ER-1130-30	103007511
30 mm	1210 mm	0.3...10 m	SLC440AS-ER-1210-30	103007517
30 mm	1290 mm	0.3...10 m	SLC440AS-ER-1290-30	103007523
30 mm	1370 mm	0.3...10 m	SLC440AS-ER-1370-30	103007529
30 mm	1450 mm	0.3...10 m	SLC440AS-ER-1450-30	103007535
30 mm	1530 mm	0.3...10 m	SLC440AS-ER-1530-30	103007538
30 mm	1610 mm	0.3...10 m	SLC440AS-ER-1610-30	103007541
30 mm	1690 mm	0.3...10 m	SLC440AS-ER-1690-30	103007544
30 mm	1770 mm	0.3...10 m	SLC440AS-ER-1770-30	103007547

Safety light grids / light curtains

Light grids

Range	Type to EN 61496	Safety version	Supply	Connection	Special features
SLG 440-AS 	Type 4	Light grids SLG	AUX Power	Connector M12, 4-pole	Integrated AS-i Safety module

Safety light grids / light curtains

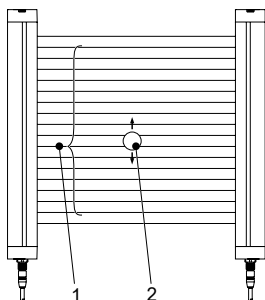
Accessories

SG.	KA-0975	1030005659	PLS-..
 ■ Protective enclosure for SLC/SLG ■ Protection field heights - to 970 mm: SG5 - to 1930 mm: SG6 103001594 103001596	 ■ Parametrisation cable for SLC/SLG 440-AS	 ■ Test rod 30 mm diameter: PLS-01 14 mm diameter: PLS-02 101207768 101207769	
MST-....	ULS-M-....	MSD.	
 ■ Mounting stands ■ Base L/W 135x135 mm ■ Height 500 ... 2000 mm	 ■ Deflecting mirror series M ■ Mirror height 350 ... 1870 mm ■ Included in delivery: tilted mirror and qty. 2 mounting brackets	 ■ Vibration damper - SLC/SLG type 2: MSD2 - SLC/SLG type 4: MSD4 ■ Included in delivery: Set with 8 pieces 101207735 101207754	

Further accessories can be found at www.schmersal.net.

Resolution	Protection field height	Range	Type designation	Material number
2 beams	500 mm	0.3...12 m	SLG440AS-ER-0500-02	103007551
3 beams	800 mm		SLG440AS-ER-0800-03	103007554
4 beams	900 mm		SLG440AS-ER-0900-04	103007557

Object blanking



- 1 Object blanking area
- 2 Movable object

For safe production, object blanking can be used in contrast to the muting function to blank just part of the protection field. This makes it possible to add objects, e.g. workpieces, or position a conveyor belt with a fixed position in the protection field without triggering a stop signal.

With integrated movable object blanking (floating blanking) of the SLC440-AS light curtains, up to 2 light beams of the light curtain can be blanked flexibly. This function is required if there is a need to be able to interrupt light beams in the protection field at a position that is not specifically defined. In this way, objects such as movable electrical cables or materials with slightly varying heights can be fed through the light curtain without triggering a stop signal.

Different blanking functions are available. The distinguishing feature of the different modes is the number of light beams that can be interrupted by an object. In addition to that, it can be defined whether the object may be in the protection field permanently or only temporarily. The interrupted light beams can be at any position in the protection field. Apart from the first infrared light beam (the beam closest to the connector), any light beam can be used for blanking.

If the floating blanking function is configured the resolution of the light curtain changes. The technical documentation of the different light curtains includes the tables with the effective resolutions to calculate the minimum safety distance according to ISO 13855.

Safety switches and Emergency-Stop buttons

Overview of the series



■ AZ 16-AS



■ AZ 201-AS



■ NAS 311-AS

Key Features

- | | | |
|--|---|---|
| <ul style="list-style-type: none"> • Thermoplastic enclosure • 3 different directions of actuation | <ul style="list-style-type: none"> • Thermoplastic enclosure • Repeated universal or individual coding • 2 different directions of actuation | <ul style="list-style-type: none"> • Thermoplastic enclosure • Thermoplastic operating element • Pull to reset |
|--|---|---|

Product version

Active principle	electromechanical	RFID	electromechanical
Individual coding	—	■	—
Coding level ISO 14119	Low	High ("I" variants)	—
Device supply off	AS-i	AS-i	AS-i

Technical features

Latching force	5 N / 30 N (Index R)	30 N	—
Electrical characteristics			
AS-i supply voltage	18.0 V ... 31.6 V	26.5 V ... 31.6 V	26.5 V ... 31.6 V
AS-i power consumption	≤ 50 mA	≤ 100 mA	≤ 50 mA
AS-i specification	V 2.1	V 3.0	V 2.1
AS-i profile	S-0.B.F.E	S-0.B.F.E	S-7.B.0.E
Mechanical data			
Dimensions (W x H x D)	52 x 90 x 30 mm	40 x 220 x 50 mm	85 x 85 x 98 mm
Connection	Connector plug M 12	Connector plug M 12	Connector plug M 12
Ambient conditions			
Ambient temperature	−25 °C ... +60 °C	−25 °C ... +65 °C	−25 °C ... +60 °C
Protection class	IP67	IP67	IP65

Safety classification

Standards	ISO 13849-1, IEC 61508	ISO 13849-1, IEC 61508	ISO 13849-1, IEC 61508
PL/SIL	c/1 up to d/2	e/3	e/3
Control category	1 to 3	4	4
PFH	up to $1.01 \times 10^{-7}/h$	$1.81 \times 10^{-9}/h$	$1.4 \times 10^{-8}/h$
Certificates			

Safety switches

Actuators AZ 16 and AZ 201



AZ 15/16-B1101083036	AZ 15/16-B1-1747101093553	AZ 15/16-B1-2024101108278
 ■ Straight actuator	 ■ Straight actuator with magnetic latch ■ Holding force approx. 30 N	 ■ Straight actuator with slot lip-seal ■ For protection against the ingress of dirt
AZ 15/16-B1-2053101111081	AZ 15/16-B1-2177101126794	AZ 15/16-B6101137434
 ■ Straight actuator with ball latch ■ Holding force approx. 100 N	 ■ Straight actuator with centering guide ■ For light non precisely guided doors (flexing etc.)	 ■ Flexible actuator ■ For small actuating radius over the wide or small edge of the actuator (adjustable)
AZ/AZM201-B1-...	AZ/AZM201-B30-... -G1	AZ/AZM201-B30-...-SZ
 ■ Actuator for sliding safety guards ■ Left-hand side actuating direction AZ/AZM201-B1-LT 103013493 ■ Right-hand side actuating direction AZ/AZM201-B1-RT 103013494	 ■ Actuator for hinged safety guards	 ■ Actuator B30 with lockout tag

Detailed information regarding the actuator selection and other actuators can be found at www.schmersal.net.

Safety switches

Preferred types

Range		Coding	Supply	Connection	Latching force	Actuation direction
AZ 16-AS		Standard coding	AS-i power	Connector M12, 4-pole	5 N	From head From top From below
					30 N	
AZ201-AS		Standard coding	AS-i power	Connector M12, 4-pole	30 N	From side
		Individual coding				

Other types can be found at www.schmersal.net.

Emergency-Stop button

Preferred types

Range		Design	Supply	Connection	Type designation	Material number
NAS 311-AS		Emergency stop button	AS-i power	Connector M12, 4-pole	NAS 311 ST1-AS	101173041

Other types can be found at www.schmersal.net.

Sao/Sar	Housing material	Actuator	Type designation	Material number
---	Plastic	AZ 15/16-B1 AZ 15/16-B2 AZ 15/16-B6	AZ 16 ST1-AS	101161809
			AZ 16 ST1-AS R	101167262
4 mm / 30 mm	Plastic	AZ/AZM201-B1 ... / B30 ...	AZ201ST-T-AS	103027843
			AZ201-I2-ST-T-AS	103027849
			AZ201-I1-ST-T-AS	103027848

Control panels BDF 200-AS

Overview of the series

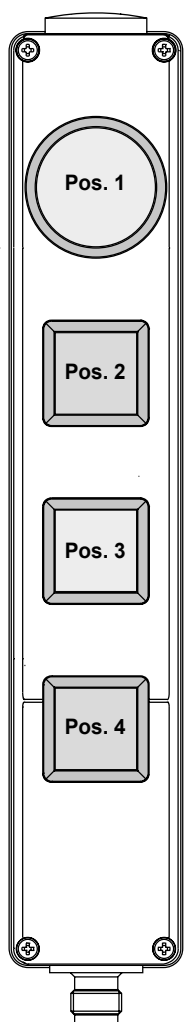
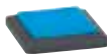


■ BDF 200-AS	
Key Features	• Thermoplastic enclosure • Control panel with emergency stop function and 3 mounting positions for command and signalling devices • Large range of emergency-stop buttons, illuminated LED pushbuttons, LED indicators, buttons, selector switches and key-operated switches • Emergency stop, start / stop and reset functions available • Optional with highly visible indicator lamp G24 (red / green)
Product version	
Device supply off	AS-i
Technical features	
Electrical characteristics	
AS-i supply voltage	18.0 V ... 31.6 V
AS-i power consumption	≤ 150 mA
AS-i specification / AS-i profile	V 2.1
Mechanical data	Safety-Slave V 3.0 / S-7.B.F.F A/B-Slave V 3.0 / S-7.A.7.F
Dimensions (W x H x D)	40 x 234 – 253 x 69 mm
Connection	Connector plug M 12
Ambient conditions	
Ambient temperature	–25 °C ... +65 °C
Protection class	IP65
Safety classification	
Standards	ISO 13849-1, IEC 61508
PL/SIL	e/3
Category	4
PFH	1.4 x 10 ⁻⁸ /h
Certificates	

Preferred types

Range	Design	Supply	Connection	Fitting Pos. 1	Pos. 2
BDF 200-AS 	Control panel with Emergency stop button	AS-i power	Connector M12, 4-pole	Emergency stop pushbutton	LMRD
					LTGN
					SWS20
				NHK pushbutton with protective collar	LMRD
					LTWH
					SWS20

Other types can be found at www.schmersal.net.

Control elements		Pos. 1	Pos. 2	Pos. 3	Pos. 4	Control panel
	NH	•				
	NHK	•				
	LT..		•	•	•	
	LM..		•	•	•	
	DT..		•	•	•	
	SWS20 SWT20		•			
	WS20 WS30 WT20 WT30 WTS30		•			

Ordering suffix		Yellow	Red	Green	Blue	Black	White
	Illuminated pushbutton LT..	LTYE	LTRD	LTGN	LTBU		LTWH
	Indicator lights LM..	LMYE	LMRD	LMGN	LMBU		LMWH
	Pushbutton DT..	DTYE	DTRD	DTGN	DTBU	DTBK	DTWH

Pos. 3	Pos. 4	Indicator lamp	Type designation	Material number
LTWH	LTBU	---	BDF200-ST1-AS-NH-LMRD-LTWH-LTBU	101214617
LTYE	LTWH	Red / Green	BDF200-ST1-AS-NH-LTGN-LTYE-LTWH-G24	103005880
LTWH	LTYE	---	BDF200-ST1-AS-NH-SWS20-LTWH-LTYE	103006605
LTWH	LTBU	---	BDF200-ST1-AS-NHK-LMRD-LTWH-LTBU	101215387
LTBU	LTWH	---	BDF200-ST1-AS-NHK-LTWH-LTBU-LTWH	101215280
LTWH	LTBU	Red / Green	BDF200-ST1-AS-NHK-SWS20-LTWH-LTBU-G24	101214618

Compact safety input module ASIM-C

Can be used for safety switchgear with 2 NC contacts



■ ASIM-C-M12-4P-...

■ ASIM-C-M12-8P-...

Key Features

Compact safe input module

- Integrated in passive distributor
- For 2 floating NC contacts
- Convenient LED displays
- Pre-wired M12 connector cables, length 0.5 m and 2.0 m

Compact safe input module

- Integrated in passive distributor
- For 2 floating NC contacts
- 50 mA output integrated for LED
- Convenient LED displays
- Pre-wired M12 connector cables, length 0.5 m and 2.0 m

Product version

Type designation / Material number

ASIM-C-M12-4P-0,5M /
103004694
ASIM-C-M12-4P-2M /
103004695

ASIM-C-M12-8P-0,5M /
103004696
ASIM-C-M12-8P-2M /
103004693

Device supply off:

AS-i

AS-i

Technical features

Length of the equipment connection cable

0.5 m and 2.0 m

0.5 m and 2.0 m

Electrical characteristics

AS-i supply voltage

26.5 V ... 31.6 V

26.5 V ... 31.6 V

AS-i power consumption

≤ 100 mA

≤ 100 mA

AS-i specification

V 3.0

V 3.0

AS-i profile

S-7.B.F.0

S-7.B.F.0

Mechanical data

Dimensions (W x H x D)

28 x 41 x 22 mm

28 x 41 x 22 mm

Connection

Cable connector M12, 4 pole

Cable connector M12, 8 pole

Ambient conditions

Ambient temperature

-20 °C ... +60 °C

-20 °C ... +60 °C

Protection class

IP67

IP67

Safety classification

Standards

ISO 13849-1, IEC 61508

ISO 13849-1, IEC 61508

PL/SIL

e/3

e/3

Category

4

4

PFH

—

—

Certificates



Compact safety input module ASIM-C

Application examples for connectable safety switchgear



The following SCHMERSAL safety switchgear can be connected based on ASIM-C-**4P** ... as an example:

Range PS116	Range PS2xx	Range PS3xx
		
BNS-B20	BNS 303	BNS 40S
		
TESK	ZQ 700-ST	ZQ 900-ST
		

The following SCHMERSAL safety switchgear can be connected based on ASIM-C-**8P** ... as an example:

BDF100-NH / BDF100-NHK	T3Z 068 with G24	ZQ 900 with G24
		

Safety monitors ASM

ASM E1-R2 and ASM E2-R2/R2



■ ASM E1-R2



■ ASM E2-R2/R2

Key Features

Safety monitor for 1 AS-i circuit

- Monitoring of up to 31 safe AS-i slaves
- **One** enabling circuit, integrated with 2 potential-free relay outputs
- Configurable monitoring modules for different safety switchgear
- Range of programmable functions:
 - AND / OR links
 - Different START modules
 - On-site confirmation / start-up testing
 - Filter functions for bouncing protective equipment
 - Stop categories 0 and 1

Safety monitor for 1 AS-i circuit

- Monitoring of up to 31 safe AS-i slaves
- **Two** enabling circuits, integrated with 2 potential-free relay outputs
- Configurable monitoring modules for different safety switchgear
- Range of programmable functions:
 - AND / OR links
 - Different START modules
 - On-site confirmation / start-up testing
 - Filter functions for bouncing protective equipment
 - Stop categories 0 and 1

Product version

Type designation / Material number	ASM E1-R2 / 101176990	ASM E2-R2/R2 / 101176991
Device supply off:	AUX	AUX

Technical features

Electrical characteristics		
AS-i supply voltage	18.0 V ... 31.6 V	18.0 V ... 31.6 V
AS-i power consumption	≤ 50 mA	≤ 50 mA
AUX supply voltage	24 VDC –15% / +10%	24 VDC –15% / +10%
AUX power consumption	≤ 150 mA	≤ 200 mA
AS-i specification	V 3.0	V 3.0
AS-i profile	7.F	7.F
Relay outputs	3 A / 230 VAC 1 A / 24 VDC	3 A / 230 VAC 1 A / 24 VDC
Mechanical data		
Dimensions (W x H x D)	45 x 105 x 120 mm	45 x 105 x 120 mm
Connection	Screw terminals	Screw terminals
Ambient conditions		
Ambient temperature	–20 °C ... +60 °C	–20 °C ... +60 °C
Protection class	IP20	IP20

Safety classification

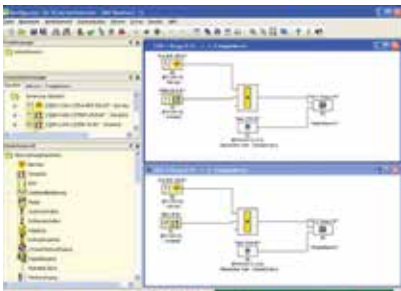
Standards	ISO 13849-1, IEC 61508	ISO 13849-1, IEC 61508
PL/SIL	e/3	e/3
Category	4	4
PFH	5.0 x 10 ⁻⁸ /h – 9.1 x 10 ⁻⁹ /h	5.0 x 10 ⁻⁸ /h – 9.1 x 10 ⁻⁹ /h
Certificates	 	 

Programming accessories

Software, programming cable, USB-COM adapter and manual address unit



ASIMON Software



Type: ASM G2-CD / mat. no.: 101206151

- Configuration software for all monitors
- Version 3.1.5.5, fully compatible with ASM safety monitors
- Smooth Drag & Drop configuration of the safety functions
- Representation of the configuration as functional plan (FUP)
- Comprehensive function modules available
 - Monitoring modules for different safety switchgear
 - Filter functions for bouncing safety guards
 - Integrated muting function module
 - START modules
 - STOP 0 and STOP 1 modules
 - EDM modules
- Compatible with Microsoft® Windows 2000/XP/Vista/7

Configuration cable



Type: ASM-KC1 / mat. no.: 101161557

- ASIMON PC programming cable
- COM port D-sub 9-pin on RJ 45 connector
- For ASM E1-R2 and ASM E2-R2/R2

USB-COM adapter



Type: ASIC-USB-COM / mat. no.: 103002272

- USB-COM (RS232) interface converter
- USB 2.0, > 1 Mbps
- For devices with RS 232 diagnostic interface

Manual addressing unit



Type: ASHH-1-V30 / mat. no.: 103001798

- AS-Interface, hand held, AS-i Spec 3.0
- Addressing of AS-Interface slaves
- Slave profile can be read out
- Slave connection short-circuit and overload-proof
- Battery charger included in delivery

Installation Accessories

Passive bus distributors and M12 connecting cables

Passive bus distributors



Type: ASSB-2P-1M12-V1 / mat. no.: 103001619

- Flat-cable distributor AS-Interface
- M12 connector, 2-poles
- Protection class IP67
- Dimensions 28 mm x 41 mm x 35 mm



Type: ASSB-4P-1M12-V1 / mat. no.: 103001616

- Flat-cable distributor AS-Interface and auxiliary voltage
- M12 connector, 4-poles
- Protection class IP67
- Dimensions 28 mm x 41 mm x 35 mm



Type: ASSB-4P-2M12-V1 / mat. no.: 103001617

- Flat-cable distributor AS-Interface and auxiliary voltage
- 2 M12 connectors, 4-poles
- Protection class IP67
- Dimensions 28 mm x 41 mm x 35 mm



Type: ASSB-2P-FKB-V1 / mat. no.: 103001620

- Flat-cable connector for 2 flat cables
- 2-pole bridge
- Protection class IP67
- Dimensions 28 mm x 41 mm x 22 mm



Type: ASSB-4P-SW-V1 / mat. no.: 103001618

- Flat-cable distributor AS-Interface and auxiliary voltage
- 4 terminals for single wires
- Protection class IP67
- Dimensions 28 mm x 41 mm x 35 mm

M12 connecting cables



Type: V-SK4P-M12-...

- M12 connector male – M12 connector female
- PUR cable, PVC-, silicone- and halogen-free
- UL/CSA homologations
- Protection class IP67, IP69
- 5 available lengths
0.5 m, 1.0 m, 1.5 m, 2.0 m, 3.0 m

Active safety distributors

Can be used for electronic safety switchgear



■ BWU3565



■ BWU3635

Key Features

Safe active AS-i distributor

- Connections for profile cable AS-i/AUX
- With 2 safe inputs for OSSDs and one non-safe output
- Convenient LED displays
- Pre-fitted 8-pin M12 connecting cable, 1.0 m in length

Can be used e.g. for equipment types:

- AZM 400

Only non-safe unlocking function!

Safe active AS-i distributor

- Connections for profile cable AS-i/AUX
- With 2 safe inputs for OSSDs and one non-safe output
- Convenient LED displays
- Pre-fitted 8-pin M12 connecting cable, 1.0 m in length

Can be used e.g. for equipment types:

- Series CSS: CSS 180, CSS 30S

- Series RSS: RSS 16

- Series AZM: AZM 201

Product version

Type designation / Material number

BWU3565 / 103016677

BWU3635 / 103016678

Device supply off:

AUX

AUX

Technical features

Length of the equipment connection cable

1.0 m

1.0 m

Electrical characteristics

AS-i supply voltage

21.6 V ... 31.6 V

21.6 V ... 31.6 V

AS-i power consumption

≤ 60 mA

≤ 60 mA

AUX supply voltage

24 VDC -15 % / +20 %

24 VDC -15 % / +20 %

AUX power consumption

max. 750 mA

max. 750 mA

AS-i Specification

V 2.1

V 2.1

AS-i profile

S-7.B.F.1

S-7.B.F.1

Mechanical data

Dimensions (W x H x D)

60 x 45 x 19 mm

60 x 45 x 19 mm

Connection

Cable connector M12, 8 pole

Cable connector M12, 8 pole

Ambient conditions

Ambient temperature

-20 °C ... +60 °C

-20 °C ... +60 °C

Protection class

IP67

IP67

Safety classification

Standards

ISO 13849-1, IEC 61508

ISO 13849-1, IEC 61508

PL/SIL

e/3

e/3

Category

4

4

Certificates



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