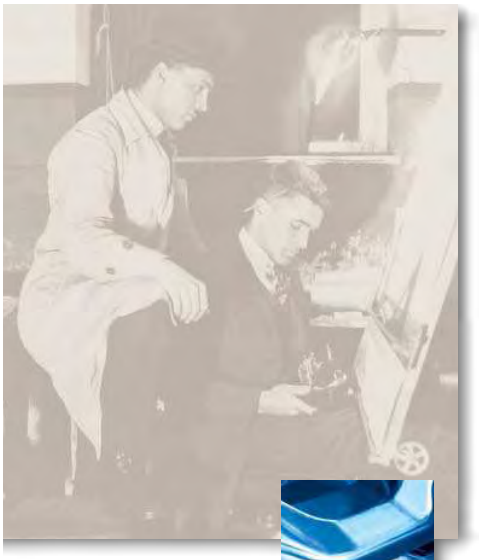
Safety Products with Integrated Bus Interface

More than safety.

EUCHNER

More than safety.



Emil Euchner, the company's founder and inventor of the multiple limit switch, circa 1928.

Around the world – the Swabian specialists in motion sequence control for mechanical and systems engineering.

EUCHNER's history began in 1940 with the establishment of an engineering office by Emil Euchner. Since that time, EUCHNER has been involved in the design and development of switchgear for controlling a wide variety of motion sequences in mechanical and systems engineering. In 1953, Emil Euchner founded EUCHNER + Co., a milestone in the company's history. In 1952, he developed the first multiple limit switch – to this day a symbol of the enterprising spirit of this family-owned company.

Automation – Safety – ManMachine

Today, our products range from electromechanical and electronic components to complex system solutions. With this wide range of products we can provide the necessary technologies to offer the right solution for special requirements – regardless of whether these relate to reliable and precise positioning or to components and systems for safety engineering in the automation sector.
EUCHNER products are sold through a world-wide sales network of competent partners. With our closeness to the customer and the guarantee of reliable solutions throughout the globe, we enjoy the confidence of customers all over the world.

Quality, reliability, precision

Quality, reliability and precision are the hallmarks of our corporate philosophy. They represent concepts and values to which we feel totally committed.
At EUCHNER, quality means that all our employees take personal responsibility for the company as a whole and, in particular, for their own field of work. This individual commitment to perfection results in products which are ideally tailored to the customers' needs and the requirements of the market. After all: our customers and their needs are the focus of all our efforts. Through efficient and effective use of resources, the promotion of personal initiative and courage in finding unusual solutions to the benefit of our customers, we ensure a high level of customer satisfaction. We familiarize ourselves with their needs, requirements and products and we learn from the experiences of our customers' own customers.

EUCHNER – More than safety.

Quality – made by EUCHNER

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General information

Bus systems in safety systems

Bus systems can now also be used in safety systems. The *AS-Interface* bus is recognized by the relevant certification body. A consortium comprising various international companies was established to develop the safety-relevant part of the bus protocol. EUCHNER is actively involved in the development and production process in this organization.

With *AS-Interface*, a monitor is employed as an additional bus subscriber to monitor the *Safety at Work* protocol. This protocol is embedded in the *AS-Interface* protocol and its purpose is to guarantee safety on the bus. With *Safety at Work*, the monitor also assumes the link functions realized using safety relays and terminals when parallel wiring is used in the control cabinet. The bus technology thus considerably reduces the amount of wiring, not only in the field, but also in the control cabinet.

AS-Interface Safety at Work in safety systems

AS-Interface is a low-level bus system used for the transfer of small amounts of data.
It is particularly suitable where digital signals are required in the field. However, analogue signals, which change much more slowly, can also be processed. Thanks to its simple structure, *AS-Interface* does not require any programming. For most bus subscribers, in particular safety devices, it is only necessary to set the address of the bus subscriber. No special knowledge of the bus is required.

Any safety component can be connected to the bus. The monitor is designed so that these components can be connected irrespective of their manufacturer. Device compatibility is guaranteed at all times. When connecting an *AS-Interface Safety at Work* device, it is important not only to ensure compatibility with the bus, but also to facilitate compliance with the Machinery Directive. *AS-Interface* certification ensures that the bus subscribers also comply with the standards that apply to the bus. Certification by the notified certification body ensures that all safety components are in compliance with the Machinery Directive.

The *ASiMon* software is used to implement the links in the monitor. All settings for the safety components are thus made in the monitor. Setup diagnostics can be selected and the logical component links can be implemented. The monitor thus represents the core of the entire safety system. It replaces both the wiring and the safety relays.

The simple construction of a bus system practically eliminates the possibility of errors in the wiring. The bus and monitor diagnostic functions also facilitate rapid error detection. Consequently, setup can be performed directly after the planning phase and the preparation of the monitor configuration. The bus subscribers then simply have to be connected.

The extremely effective bus diagnostic function is also useful during operation. Should an error occur during operation, all situations can be detected and displayed in the control system. Most EUCHNER safety switches have freely programmable LEDs that can be used for an effective diagnostic function. Any system standstills can thus be dealt with quickly.

Replacing faulty components is very easy with *AS-Interface Safety at Work*. A bus subscriber that needs to be replaced only has to be substituted with a device with its address set to 0. The bus starts this device automatically when a button is pressed. Because a maximum of four wires are connected to each device, or a plug is even fitted, the replacement process takes no time at all to complete. It is even possible to replace the monitor with a new device without the use of a computer. In this case, a new device and the push of a button is all that is needed to get the system up and running again.

Because of the many advantages of *AS-Interface Safety at Work* and the availability of safety components, this system is also ideal as an autarchic safety system within an installation that uses a higher-level fieldbus. If the diagnostic function is required in this case, it can easily be incorporated in the higher-level bus by means of a gateway. The gateway can also function simultaneously as the master in the AS-Interface system.

EUCHNER safety switches maximize all of the features that the bus has to offer. Switches with guard locking do more than just signal the position of the movable safety guards to the control system. They also distinguish and signal the position of the guard locking compared with the position of the door. Complete visualization of the safety guard is thus possible. EUCHNER provides full diagnostic functionality for the most common control systems.

With EUCHNER switches, the guard locking is controlled using the bus. Because of the separate supply cable for the auxiliary power, the guard locking can also be activated as a safe channel.

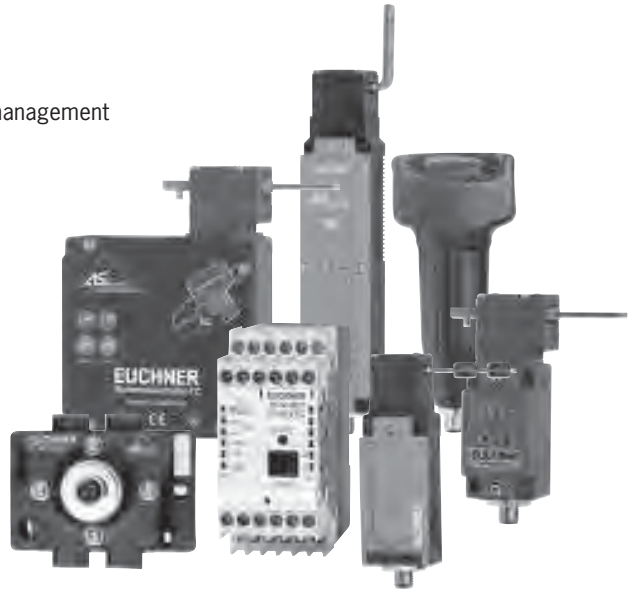
Many switches have LEDs integrated on the front; these LEDs can be controlled using the bus. On-site diagnosis can therefore be performed with the control system without the need for additional wiring.

AS-Interface bus technology offers important advantages

- Easy bus assembly
- Proven safety systems with direct bus connection
- AS-Interface Safety at Work as an internationally standardized bus protocol
- Bus wiring generally in category 4 in accordance with EN 954-1
- 100% compatibility with the Safety at Work products from other manufacturers
- Easy system expansion
- Can be used together with standard AS-Interface bus subscribers
- Far less wiring work in the field
- Far less wiring work in the control cabinet
- Greater availability during operation
- Small number of types
- Straightforward installation planning
- Changes can be made to the installation very quickly without changing the wiring
- Diagnostics in higher-level bus systems also possible when a gateway is used
- No need for numerous safety relays

EUCHNER safety switches with AS-Interface Safety at Work give you the following advantages

- Control of the guard locking via the bus
- Control of the LEDs via the bus
- Personal protection possible with separate auxiliary power management
- Based on proven technology
- All series available with and without guard locking

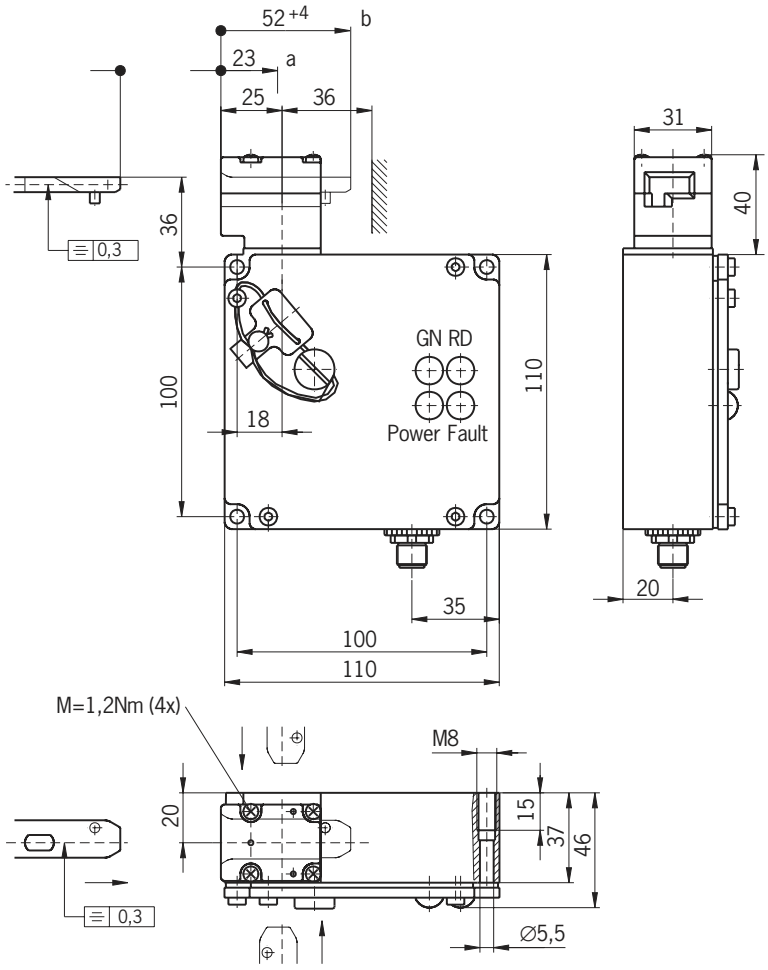


Metal-encapsulated safety switches with guard locking and guard locking monitoring series TZ...

- **2 positively driven NC contacts** (via M12 connector for AS-Interface)
- **Door monitoring contact**
- **LED function display**
- **Actuating head fitted left or right**

Dimension drawing TZ...SEM4AS1

Left actuating head (right head mirror image)



Please order actuator separately
(see catalog *Safety Switches NZ/TZ/ZS*).

Locking methods

- **TZ1...** Actuator inserted, mechanically locked, release by applying voltage to the solenoid.
- **TZ2...** Lock by applying voltage to the solenoid.

Control of the interlocking solenoid

The interlocking solenoid is controlled by the control system via ASInterface bus bit D0. Simple connection to the bus is sufficient for process protection. For personal protection, further measures must be taken to ensure safe power switching.

LED function display

- The *Power* LED indicates the supply of power to the bus.
- The *Fault* LED shows if a fault has been detected on the ASInterface bus.
- The green and the red LEDs can be controlled as required by the control system via the bus using bits D1 and D2.

Mechanical release

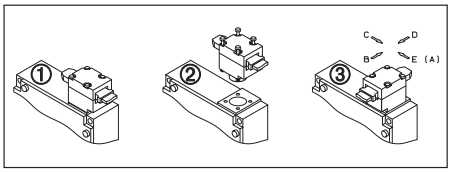
Safety switches can be unlocked by means of the mechanical release in the event of power failure, for example. The mechanical release must be sealed to prevent tampering (lead seal kit included).

Notes on installation

The safety switch and actuator must be installed properly. The actuator must be positively connected with the mounting surface, e.g. by using safety screws or by welding, riveting, pinning. The safety switch must not be used as an end stop.

Changing the approach direction

Upon removal of the actuating head fixing screws, the approach direction can be changed to any 90° increment. The setting on delivery is approach direction E.



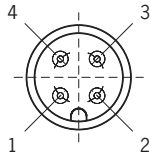
⚠ In the event of faults, the complete safety switch must be replaced.

Technical data

Parameters	Value	Unit
Housing material	Anodized die-cast alloy	
Degree of protection according to IEC 529	IP 67, mating connector inserted and screwed tight	
Mechanical life	$2x10^6$ operating cycles	
Ambient temperature	-25 ... +55	°C
Installation position	Any	
Approach speed, max.	20	m/min
Actuating force, min.	35	N
Locking force, max.	1000 (guard locking in locked position)	N
Weight	Approx. 1.07	kg
Switching principle SK, ÜK	Positively driven, slow-action switching element	
EMC protection requirements	Acc. to EN 50295 (AS-Interface standard) and IEC 62026	
Interlocking solenoid		
Solenoid operating voltage (auxiliary power on black AS-Interface cable)	24 +10%/-15% Power supply unit with electrical isolation (IEC 60742, PELV)	DC V
Solenoid operating current	350	mA
Duty cycle	100	%
Type of connection	M12 plug connector	
AS-Interface data Acc. to AS-Interface Specification 2.1	EA code: 7 ID code: B	
Total current consumption, max.	45	mA
Valid AS-Interface addresses	1 - 31	
AS-Interface inputs	Acc. to AS-Interface Safety at Work	
Door monitoring contact SK	D0, D1	
Solenoid monitoring contact ÜK	D2, D3	
AS-Interface outputs		
D0	Interlocking solenoid, 1 = solenoid energized	
D1	Red LED, 1 = LED on	
D2	Green LED, 1 = LED on	
AS-Interface LED Power	Green, AS-Interface Power on	
AS-Interface LED Fault	Red, offline phase or address 0	

Pin assignment TZ...SEM4AS1

View of connection side



1 ▶ AS-Interface +
2 ▶ Auxiliary voltage 0 V
3 ▶ AS-Interface -
4 ▶ Auxiliary voltage 24 V

Ordering table

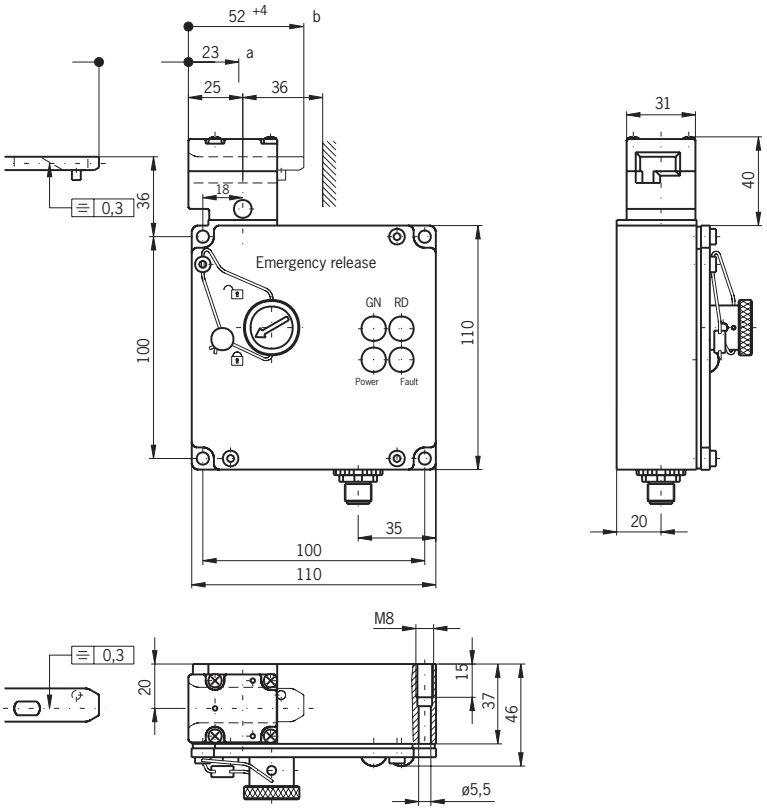
Series / Design / Locking method / Type of connection	Actuating head	Article	Order No. Solenoid operating voltage 024
TZ1-...SEM4AS1	**L** (left)	TZ1-LE024SEM4AS1	086 140
mechanical interlocking	**R** (right)	TZ1-RE024SEM4AS1	086 141
TZ2-...SEM4AS1	**L** (left)	TZ2-LE024SEM4AS1	086 990
electrical locking	**R** (right)	TZ2-RE024SEM4AS1	086 991

Metal-encapsulated safety switches with guard locking and guard locking monitoring series TZ...

- **2 positively driven NC contacts** (via M12 connector for AS-Interface)
- **Emergency release**
- **LED function display**
- **Actuating head fitted left or right**

Dimension drawing TZ...SEM4AS1-C1937

Left actuating head (right head mirror image)



Please order actuator separately
(see catalog *Safety Switches NZ/TZ/ZS*).

Locking method

- **TZ1...** Actuator inserted, mechanically locked, release by applying voltage to the solenoid.

Control of the interlocking solenoid

The interlocking solenoid is controlled by the control system via ASInterface bus bit D0. Simple connection to the bus is sufficient for process protection. For personal protection, further measures must be taken to ensure safe power switching.

LED function display

- The *Power* LED indicates the supply of power to the bus.
- The *Fault* LED shows if a fault has been detected on the ASInterface bus.
- The green and the red LEDs can be controlled as required by the control system via the bus using bits D1 and D2.

Emergency release

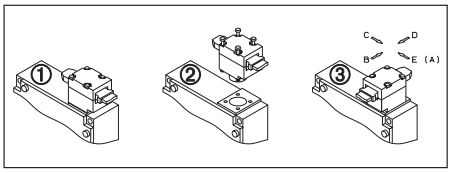
The emergency release allows the guard locking to be opened without any tools in order to gain access to the machine in an emergency. The emergency release can only be closed again using a tool. The emergency release can be sealed (lead seal kit included).

Notes on installation

The safety switch and actuator must be installed properly. The actuator must be positively connected with the mounting surface, e.g. by using safety screws or by welding, riveting, pinning. The safety switch must not be used as an end stop.

Changing the approach direction

Upon removal of the actuating head fixing screws, the approach direction can be changed to any 90° increment. The setting on delivery is approach direction E.



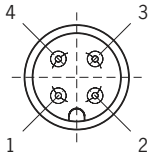
⚠ In the event of faults, the complete safety switch must be replaced.

Technical data

Parameters	Value	Unit
Housing material	Anodized die-cast alloy	
Degree of protection according to IEC 529	IP 67, mating connector inserted and screwed tight	
Mechanical life	$2x10^6$ operating cycles	
Ambient temperature	-25 ... +55	°C
Installation position	Any	
Approach speed, max.	20	m/min
Actuating force, min.	35	N
Locking force, max.	1000 (guard locking in locked position)	N
Weight	Approx. 1.07	kg
Switching principle SK, ÜK	Positively driven, slow-action switching element	
EMC protection requirements	Acc. to EN 50295 (AS-Interface standard) and IEC 62026	
Interlocking solenoid		
Solenoid operating voltage (auxiliary power on black AS-Interface cable)	24 +10%/-15% Power supply unit with electrical isolation (IEC 60742, PELV)	DC V
Solenoid operating current	350	mA
Duty cycle	100	%
Type of connection	M12 plug connector	
AS-Interface data Acc. to AS-Interface Specification 2.1	EA code: 7 ID code: B	
Total current consumption, max.	45	mA
Valid AS-Interface addresses	1 - 31	
AS-Interface inputs	Acc. to AS-Interface Safety at Work	
Door monitoring contact SK	D0, D1	
Solenoid monitoring contact ÜK	D2, D3	
AS-Interface outputs		
D0	Interlocking solenoid, 1 = solenoid energized	
D1	Red LED, 1 = LED on	
D2	Green LED, 1 = LED on	
AS-Interface LED Power	Green, AS-Interface Power on	
AS-Interface LED Fault	Red, offline phase or address 0	

Pin assignment TZ...SEM4AS1-C1937

View of connection side



1 ▶ AS-Interface +
2 ▶ Auxiliary voltage 0 V
3 ▶ AS-Interface -
4 ▶ Auxiliary voltage 24 V

Ordering table

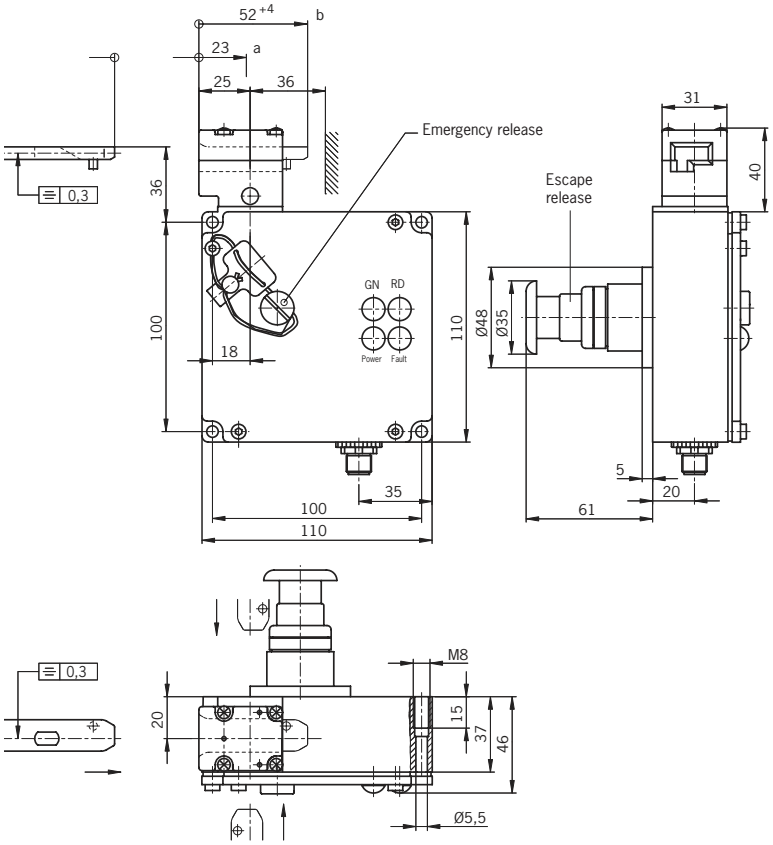
Series / Design / Locking method / Type of connection	Actuating head	Emergency release	Article	Order No. Solenoid operating voltage 024
TZ1-...SEM4AS1 mechanical interlocking	**L** (left)	**-C1937**	TZ1-LE024SEM4AS1-C1937	090 278
	R (right)		TZ1-RE024SEM4AS1-C1937	090 279

Metal-encapsulated safety switches with guard locking and guard locking monitoring series TZ...

- **2 positively driven NC contacts** (via M12 connector for AS-Interface)
- **Door monitoring contact**
- **Escape release**
- **LED function display**
- **Actuating head fitted left or right**

Dimension drawing TZ...SEM4AS1-C1815

Left actuating head (right head mirror image)



Please order actuator separately
(see catalog *Safety Switches NZ/TZ/ZS*).

Locking method

- **TZ1...** Actuator inserted, mechanically locked, release by applying voltage to the solenoid.

Control of the interlocking solenoid

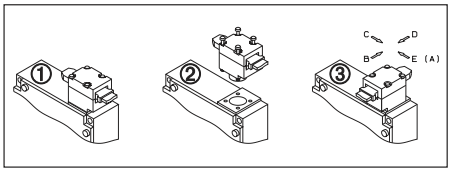
The interlocking solenoid is controlled by the control system via ASInterface bus bit D0. Simple connection to the bus is sufficient for process protection. For personal protection, further measures must be taken to ensure safe power switching.

LED function display

- The *Power* LED indicates the supply of power to the bus.
- The *Fault* LED shows if a fault has been detected on the ASInterface bus.
- The green and the red LEDs can be controlled as required by the control system via the bus using bits D1 and D2.

Changing the approach direction

Upon removal of the actuating head fixing screws, the approach direction can be changed to any 90° increment. The setting on delivery is approach direction E.



⚠ In the event of faults, the complete safety switch must be replaced.

Escape release

Is used for unlocking the guard locking without tools in case of danger. The locking is reset and the operating state restored using a key (supplied).

Emergency release

The emergency release allows the guard locking to be opened without any tools in order to gain access to the machine in an emergency. The emergency release can only be closed again using a tool. The emergency release can be sealed (lead seal kit included).

Notes on installation

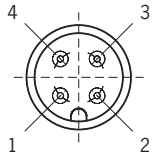
The safety switch and actuator must be installed properly. The actuator must be positively connected with the mounting surface, e.g. by using safety screws or by welding, riveting, pinning. The safety switch must not be used as an end stop.

Technical data

Parameters	Value	Unit
Housing material	Anodized die-cast alloy	
Degree of protection according to IEC 529	IP 67, mating connector inserted and screwed tight	
Mechanical life	$2x10^6$ operating cycles	
Ambient temperature	-25 ... +55	°C
Installation position	Any	
Approach speed, max.	20	m/min
Actuating force, min.	35	N
Locking force, max.	1000 (guard locking in locked position)	N
Weight	Approx. 1.07	kg
Switching principle SK, ÜK	Positively driven, slow-action switching element	
EMC protection requirements	Acc. to EN 50295 (AS-Interface standard) and IEC 62026	
Interlocking solenoid		
Solenoid operating voltage (auxiliary power on black AS-Interface cable)	24 +10%/-15% Power supply unit with electrical isolation (IEC 60742, PELV)	DC V
Solenoid operating current	350	mA
Duty cycle	100	%
Type of connection	M12 plug connector	
AS-Interface data Acc. to AS-Interface Specification 2.1	EA code: 7 ID code: B	
Total current consumption, max.	45	mA
Valid AS-Interface addresses	1 - 31	
AS-Interface inputs	Acc. to AS-Interface Safety at Work	
Door monitoring contact SK	D0, D1	
Solenoid monitoring contact ÜK	D2, D3	
AS-Interface outputs		
D0	Interlocking solenoid, 1 = solenoid energized	
D1	Red LED, 1 = LED on	
D2	Green LED, 1 = LED on	
AS-Interface LED Power	Green, AS-Interface Power on	
AS-Interface LED Fault	Red, offline phase or address 0	

Pin assignment TZ...SEM4AS1-C1815

View of connection side



1 ▶ AS-Interface +
2 ▶ Auxiliary voltage 0 V
3 ▶ AS-Interface -
4 ▶ Auxiliary voltage 24 V

Ordering table

Series / Design / Locking method Type of connection	Actuating head	Emergency release	Article	Order No. Solenoid operating voltage 024
TZ1-...SEM4AS1 mechanical interlocking	**L** (left)	**-C1815**	TZ1-LE024SEM4AS1-C1815	094 422
	R (right)		TZ1-RE024SEM4AS1-C1815	094 423

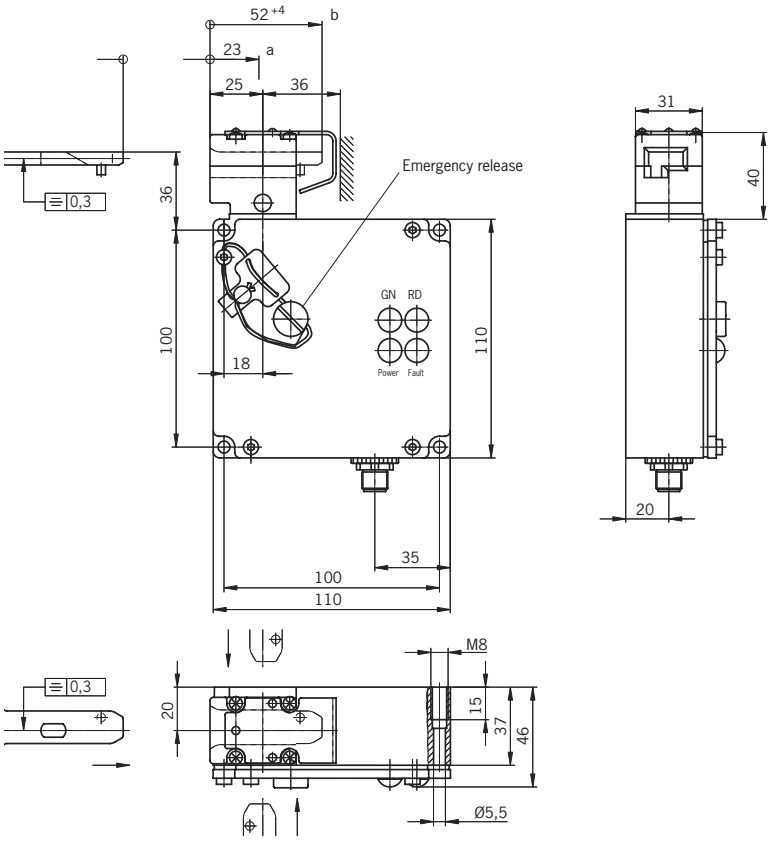
Metal-encapsulated safety switches with guard locking and guard locking monitoring series TZ...

* Approvals pending

- **2 positively driven NC contacts** (via M12 connector for AS-Interface)
- **Door monitoring contact**
- **Protective plate for switch head**
- **LED function display**
- **Actuating head fitted left or right**

Dimension drawing TZ...SEM4AS1-C1233

Left actuating head (right head mirror image)



Please order actuator separately
(see catalog *Safety Switches NZ/TZ/ZS*).

Locking method

- **TZ1...** Actuator inserted, mechanically locked, release by applying voltage to the solenoid.

Control of the interlocking solenoid

The interlocking solenoid is controlled by the control system via ASInterface bus bit D0. Simple connection to the bus is sufficient for process protection. For personal protection, further measures must be taken to ensure safe power switching.

LED function display

- The *Power* LED indicates the supply of power to the bus.
- The *Fault* LED shows if a fault has been detected on the ASInterface bus.
- The green and the red LEDs can be controlled as required by the control system via the bus using bits D1 and D2.

Protective plate

Makes it more difficult to tamper with the switch.

Emergency release

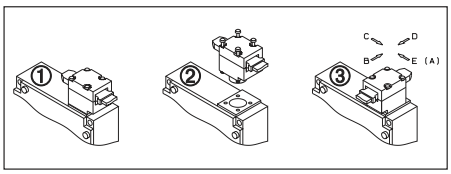
The emergency release allows the guard locking to be opened without any tools in order to gain access to the machine in an emergency. The emergency release can only be closed again using a tool. The emergency release can be sealed (lead seal kit included).

Notes on installation

The safety switch and actuator must be installed properly. The actuator must be positively connected with the mounting surface, e.g. by using safety screws or by welding, riveting, pinning. The safety switch must not be used as an end stop.

Changing the approach direction

Upon removal of the actuating head fixing screws, the approach direction can be changed to any 90° increment. The setting on delivery is approach direction E.



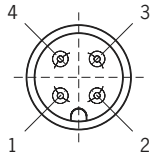
⚠ In the event of faults, the complete safety switch must be replaced.

Technical data

Parameters	Value	Unit
Housing material	Anodized die-cast alloy	
Degree of protection according to IEC 529	IP 67, mating connector inserted and screwed tight	
Mechanical life	$2x10^6$ operating cycles	
Ambient temperature	-25 ... +55	°C
Installation position	Any	
Approach speed, max.	20	m/min
Actuating force, min.	35	N
Locking force, max.	1000 (guard locking in locked position)	N
Weight	Approx. 1.07	kg
Switching principle SK, ÜK	Positively driven, slow-action switching element	
EMC protection requirements	Acc. to EN 50295 (AS-Interface standard) and IEC 62026	
Interlocking solenoid		
Solenoid operating voltage (auxiliary power on black AS-Interface cable)	24 +10%/-15% Power supply unit with electrical isolation (IEC 60742, PELV)	DC V
Solenoid operating current	350	mA
Duty cycle	100	%
Type of connection	M12 plug connector	
AS-Interface data Acc. to AS-Interface Specification 2.1	EA code: 7 ID code: B	
Total current consumption, max.	45	mA
Valid AS-Interface addresses	1 - 31	
AS-Interface inputs	Acc. to AS-Interface Safety at Work	
Door monitoring contact SK	D0, D1	
Solenoid monitoring contact ÜK	D2, D3	
AS-Interface outputs		
D0	Interlocking solenoid, 1 = solenoid energized	
D1	Red LED, 1 = LED on	
D2	Green LED, 1 = LED on	
AS-Interface LED Power	Green, AS-Interface Power on	
AS-Interface LED Fault	Red, offline phase or address 0	

Pin assignment TZ...SEM4AS1-C1233

View of connection side



1 ▶ AS-Interface +
2 ▶ Auxiliary voltage 0 V
3 ▶ AS-Interface -
4 ▶ Auxiliary voltage 24 V

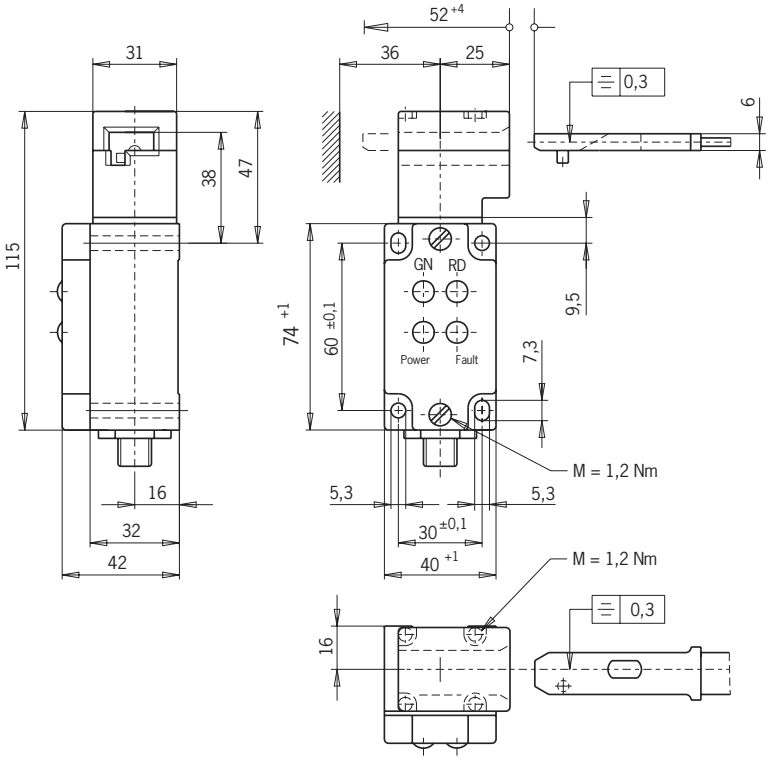
Ordering table

Series / Design / Locking method / Type of connection	Actuating head	Protective plate	Article	Order No. Solenoid operating voltage 024
TZ1-...SEM4AS1 mechanical interlocking	**L** (left)	**-C1233**	TZ1-LE024SEM4AS1-C1233	092 964
	R (right)		TZ1-RE024SEM4AS1-C1233	092 965

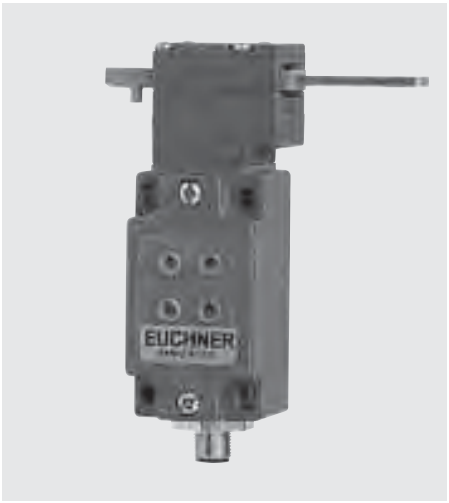
Metal-encapsulated safety switches series NZ...

- **M12 connector for AS-Interface**
- **Door monitoring contact**
- **LED function display**

Dimension drawing NZ...SEM4AS1



Please order actuator separately
(see catalog *Safety Switches NZ/TZ/ZS*).



LED function display

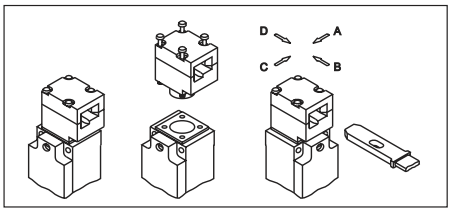
- The *Power* LED indicates the supply of power to the bus.
- The *Fault* LED shows if a fault has been detected on the ASInterface bus.
- The green and the red LEDs can be controlled as required by the control system via the bus using bits D1 and D2.

Notes on installation

The safety switch and actuator must be installed properly. The actuator must be positively connected with the mounting surface, e.g. by using safety screws or by welding, riveting, pinning. The safety switch must not be used as an end stop.

Changing the approach direction

Upon removal of the actuating head fixing screws, the approach direction can be changed to any 90° increment. The setting on delivery is approach direction E.



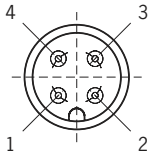
⚠ In the event of faults, the complete safety switch must be replaced.

Technical data

Parameters	Value	Unit
Housing material	Anodized die-cast alloy	
Degree of protection according to IEC 529	IP 67, mating connector inserted and screwed tight	
Mechanical life	$2x10^6$ operating cycles	
Ambient temperature	-25 ... +55	°C
Installation position	Any	
Approach speed, max.	20	m/min
Approach speed, min.	0.1	m/min
Actuating force, min.	35	N
Weight	Approx. 0.3	kg
Switching principle	Positively driven, slow-action switching element	
EMC protection requirements	Acc. to EN 50295 (AS-Interface standard) and IEC 62026	
Type of connection	M12 plug connector	
AS-Interface data Acc. to AS-Interface Specification 2.1	EA code: 7 ID code: B	
Total current consumption, max.	45	mA
Valid AS-Interface addresses	1 - 31	
AS-Interface inputs	Acc. to AS-Interface Safety at Work	
Positively driven NC contact 1	D0, D1	
Positively driven NC contact 2	D2, D3	
AS-Interface outputs		
D0 and D3	Not used	
D1	Red LED, 1 = LED on	
D2	Green LED, 1 = LED on	
AS-Interface LED Power	Green, AS-Interface Power on	
AS-Interface LED Fault	Red, offline phase or address 0	

Pin assignment NZ...SEM4AS1

View of connection side



1 ▶ AS-Interface +
2 ▶ Not used
3 ▶ AS-Interface -
4 ▶ Not used

Ordering table

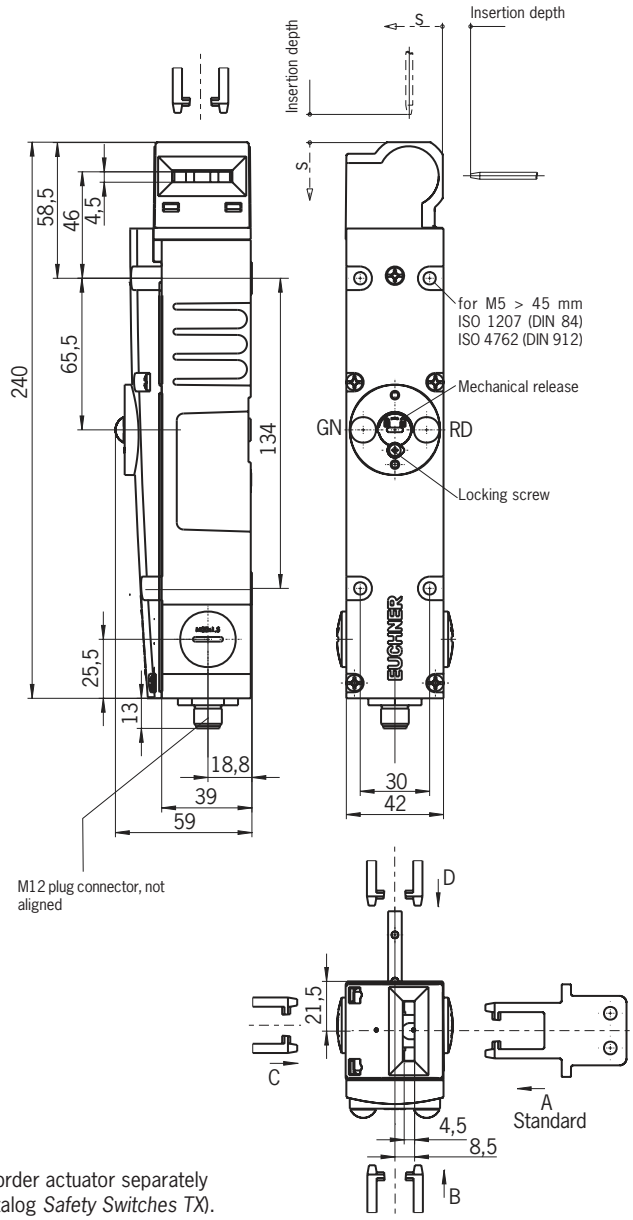
Series / Version / Type of connection	Switching element	Article	Order No.
NZ2VZ-...SEM4AS1	**538HE**	NZ2VZ-538ESEM4AS1	090 742

Metal-encapsulated safety switches series TX...

- **2 positively driven NC contacts**
- **Door monitoring contact**
- **LED function display**

* Approvals pending

Dimension drawing TX...AS



Please order actuator separately (see catalog *Safety Switches TX*).

Locking methods

- **TX1...** Actuator inserted, mechanically locked, release by applying voltage to the solenoid.

LED function display

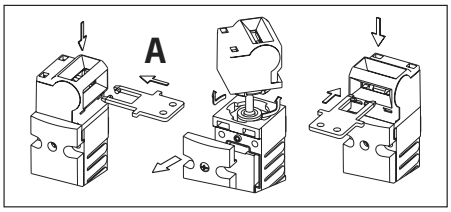
- The green and the red LEDs can be optionally controlled with bits D1 and D2 by the control via the bus.

Notes on installation

The safety switch and actuator must be installed properly. The actuator must be positively connected with the mounting surface, e.g. by using safety screws or by welding, riveting, pinning. The safety switch must not be used as an end stop.

Changing the approach direction

Upon removal of the actuating head fixing screws, the approach direction can be changed to any 90° increment. The setting on delivery is approach direction E.



⚠ In the event of faults, the complete safety switch must be replaced.

Control of the interlocking solenoid

The interlocking solenoid is controlled by the control system via ASInterface bus bit D0. Simple connection to the bus is sufficient for process protection. For personal protection, further measures must be taken to ensure safe power switching.

Mechanical release

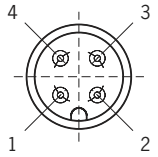
Safety switches can be unlocked by means of the mechanical release in the event of power failure, for example. The mechanical release must be sealed to prevent tampering (for example with sealing lacquer).

Technical data

Parameters	Value	Unit
Housing material	Die-cast alloy, cathodically dipped	
Degree of protection according to IEC 60529	IP 67, mating connector inserted and screwed tight	
Installation position	Any	
Mechanical life	> 1 x 10^6 operating cycles	
Ambient temperature	- 20 to +50	°C
Approach speed, max.	20	m/min
Insertion/extraction force (not locked)	Approx. 20	N
Locking force, max.	1500 (guard locking in locked position)	N
Weight	Approx. 0.8	kg
Switching principle SK, ÜK	Positively driven, slow-action switching element	
EMC protection requirements	Acc. to EN 50295 (AS-Interface standard) and IEC 62026	
Interlocking solenoid		
Solenoid operating voltage (auxiliary power on black AS-Interface cable)	24 -15%/+10% Power supply unit with electrical isolation (IEC 60742, PELV)	DC V
Solenoid operating current	330	mA
Duty cycle	100	%
Type of connection	M12 plug connector	
AS-Interface data Acc. to AS-Interface Specification 2.1	EA code: 7 ID code: B	
Total current consumption, max.	45	mA
Valid AS-Interface addresses	1 - 31	
AS-Interface inputs	Acc. to AS-Interface Safety at Work	
Door monitoring contact SK	D0, D1	
Solenoid monitoring contact ÜK	D2, D3	
AS-Interface outputs		
D0	Interlocking solenoid, 1 = solenoid energized	
D1	Red LED, 1 = LED on	
D2	Green LED, 1 = LED on	

Pin assignment TX...SEM4AS.

View of connection side



1 ▶ AS-Interface +
2 ▶ Auxiliary voltage 0 V
3 ▶ AS-Interface -
4 ▶ Auxiliary voltage 24 V

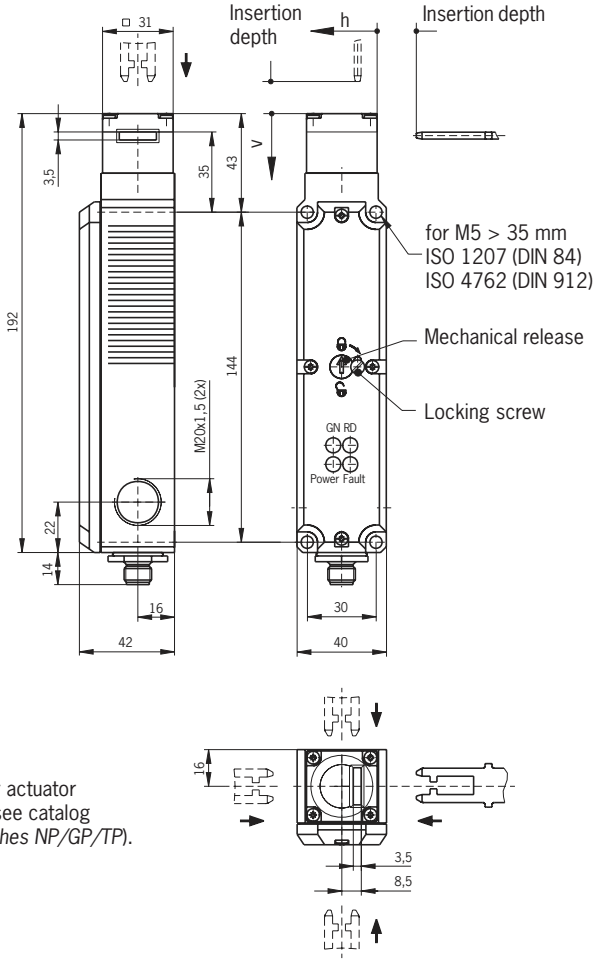
Ordering table

Series / Design / Locking method / Type of connection	Switching element	Approach direction	Article	Order No. Solenoid operating voltage 024
TX1-...SEM4AS1 mechanical locking, with guard locking monitoring	**ETX B**	**A** (side)	TX1B-A024SEM4AS1	094 403

Plastic-encapsulated safety switches with guard locking series TP...

- **TP..AS1 with guard locking monitoring**
- **TP..AS2 without guard locking monitoring**
- **2 positively driven NC contacts** (via M12 connector for AS-Interface)
- **Door monitoring contact**
- **LED function display**

Dimension drawing TP...SEM4AS.



Please order actuator separately (see catalog *Safety Switches NP/GP/TP*).

Locking methods

- **TP3...** Actuator inserted, mechanically locked, release by applying voltage to the solenoid.
- **TP4...** Lock by applying voltage to the solenoid.

LED function display

- The *Power* LED indicates the supply of power to the bus.
- The *Fault* LED shows if a fault has been detected on the ASInterface bus.
- The green and the red LEDs can be controlled as required by the control system via the bus using bits D1 and D2.

Control of the interlocking solenoid

The interlocking solenoid is controlled by the control system via AS-Interface bus bit D0. Simple connection to the bus is sufficient for process protection. For personal protection, further measures must be taken to ensure safe power switching.

Mechanical release

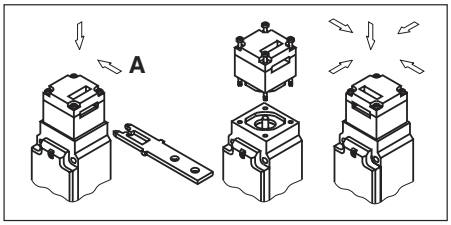
Safety switches can be unlocked by means of the mechanical release in the event of power failure, for example. The mechanical release must be sealed to prevent tampering (for example with sealing lacquer).

Notes on installation

The safety switch and actuator must be installed properly. The actuator must be positively connected with the mounting surface, e.g. by using safety screws or by welding, riveting, pinning. The safety switch must not be used as an end stop.

Changing the approach direction

Upon removal of the actuating head fixing screws, the approach direction can be changed to any 90° increment. The standard setting is approach direction A.



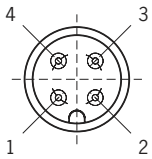
⚠ In the event of faults, the complete safety switch must be replaced.

Technical data

Parameters	Value		Unit
Housing material	Reinforced thermoplastic		
Degree of protection according to IEC 60529	IP 67, mating connector inserted and screwed tight		
Installation position	Any		
Mechanical life	1 x 10^6 operating cycles		
Ambient temperature	- 20 to +55		°C
Approach speed, max.	20		m/min
Insertion/extraction force (not locked)	TP3: approx.10 / TP4: Approx. 15		N
Locking force, max.	1200 (guard locking in locked position)		N
Weight	Approx. 0.5		kg
Switching principle	Positively driven, slow-action switching element		
EMC protection requirements	Acc. to EN 50295 (AS-Interface standard) and IEC 62026		
Interlocking solenoid			
Solenoid operating voltage (auxiliary power on black AS-Interface cable)	24 -15%/+10% Power supply unit with electrical isolation (IEC 60742, PELV)		DC V
Solenoid operating current	300		mA
Duty cycle	100		%
Type of connection	M12 plug connector		
AS-Interface data Acc. to AS-Interface Specification 2.1	EA code: 7	ID code: B	
Total current consumption, max.	45		mA
Valid AS-Interface addresses	1 - 31		
AS-Interface inputs	Acc. to AS-Interface Safety at Work		
ASInterface inputs influenced by safety door	D0, D1		
ASInterface inputs influenced by guard locking	D2, D3		
AS-Interface outputs			
D0	Interlocking solenoid, 1 = solenoid energized		
D1	Red LED, 1 = LED on		
D2	Green LED, 1 = LED on		
AS-Interface LED Power	Green, AS-Interface Power on		
AS-Interface LED Fault	Red, offline phase or address 0		
Insertion depth (minimum required travel + permissible overtravel)	Standard actuators	Overtravel actuators	
Approach direction side (h)	28 + 2	28 + 7	mm
Approach direction from top (v)	29.5 + 1.5	–	mm

Pin assignment TP...SEM4AS

View of connection side



1 ▶ AS-Interface +
2 ▶ Auxiliary voltage 0 V
3 ▶ AS-Interface -
4 ▶ Auxiliary voltage 24 V

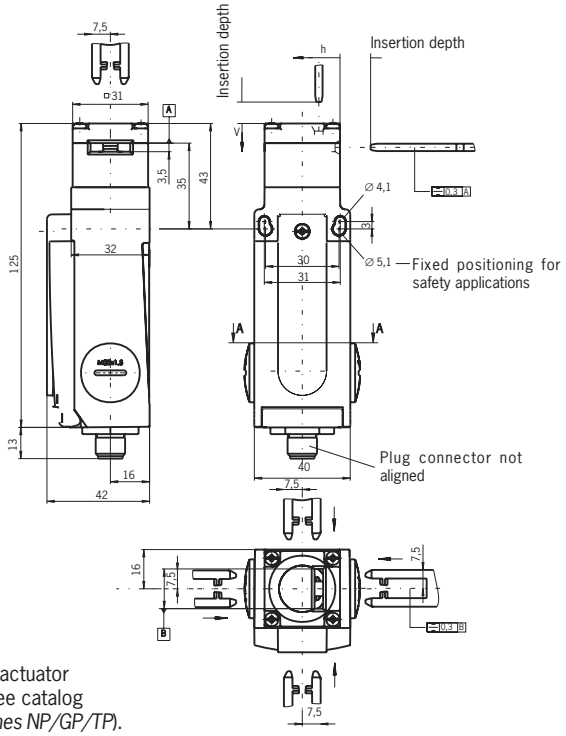
Ordering table

Series / Design / Locking method / Type of connection	Switching element	Article	Increased overtravel	Order No. Solenoid operating voltage 024
TP3-...SEM4AS1 mechanical locking, with guard locking monitoring	**4141H**	**A** (side)	TP3-4141A024SEM4AS1	088 256
TP4-...SEM4AS1 electrical locking, with guard locking monitoring			TP4-4141A024SEM4AS1	088 257
TP4-...SEM4AS2 electrical locking, without guard locking monitoring			TP4-4141A024SEM4AS2	091 676

Plastic-encapsulated safety switches series GP...

- **2 positively driven NC contacts** (via M12 connector for AS-Interface)
- **Attachment compatible with safety switches TP...**
- **Actuators as for safety switches TP...**
- **Internal LED function display**

Dimension drawing GP...SEM4AS1



Please order actuator separately (see catalog *Safety Switches NP/GP/TP*).

Internal LED function display

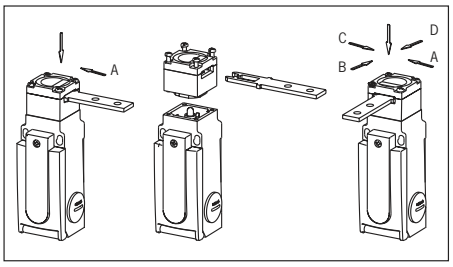
- The *Power* LED indicates the supply of power to the bus.
- The *Fault* LED shows if a fault has been detected on the ASInterface bus.
- The green and the red LEDs can be controlled as required by the control system via the bus using bits D1 and D2.

Notes on installation

The safety switch and actuator must be installed properly. The actuator must be positively connected with the mounting surface, e.g. by using safety screws or by welding, riveting, pinning. The safety switch must not be used as an end stop.

Changing the approach direction

Upon removal of the actuating head fixing screws, the approach direction can be changed to any 90° increment. The setting on delivery is approach direction E.



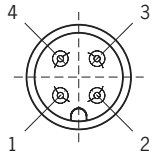
⚠ In the event of faults, the complete safety switch must be replaced.

Technical data

Parameters	Value	Unit
Housing material	Reinforced thermoplastic	
Degree of protection according to IEC 529	IP 67, mating connector inserted and screwed tight	
Mech. life	$1x10^6$ operating cycles	
Ambient temperature	-25 ... +55	°C
Installation position	Any	
Approach speed, max.	20	m/min
Actuating force, min.	35	N
Weight	Approx. 0.11	kg
Switching principle	Positively driven, slow-action switching element	
Type of connection	M12 plug connector	
AS-Interface data Acc. to AS-Interface Specification 2.1	EA code: 7 ID code: B	
Total current consumption, max.	45	mA
Valid AS-Interface addresses	1 - 31	
AS-Interface inputs	Acc. to AS-Interface Safety at Work	
Positively driven NC contact 1	D0, D1	
Positively driven NC contact 2	D2, D3	
AS-Interface outputs		
D0 and D3	Not used	
D1	Red LED, 1 = LED on	
D2	Green LED, 1 = LED on	
AS-Interface LED Power	Green, AS-Interface Power on	
AS-Interface LED Fault	Red, offline phase or address 0	

Pin assignment GP...SEM4AS1

View of connection side



1 ▶ AS-Interface +
2 ▶ Not used
3 ▶ AS-Interface -
4 ▶ Not used

Ordering table

Series / Version / Type of connection	Switching element	Article	Order No.
GP3-...SEM4AS1	**538HA**	GP3–538ASEM4AS1	091 193

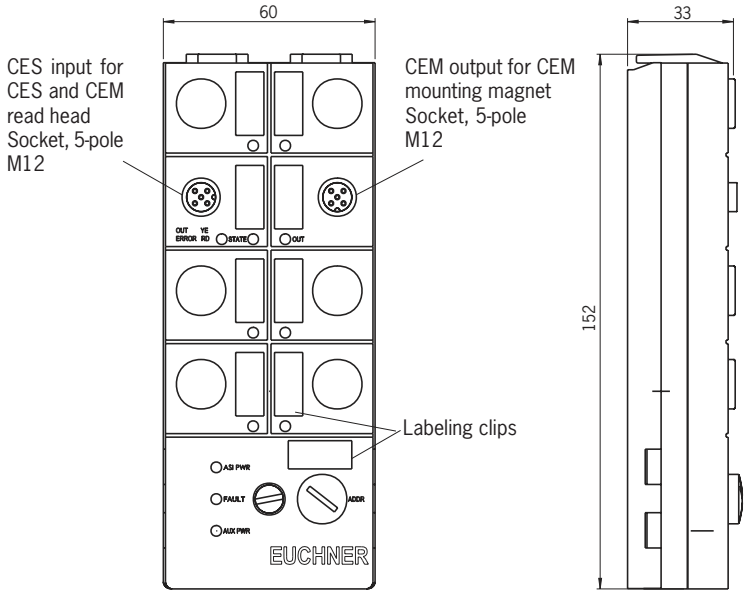
Non-contact safety switches with transponder technology CES...

* Approvals pending

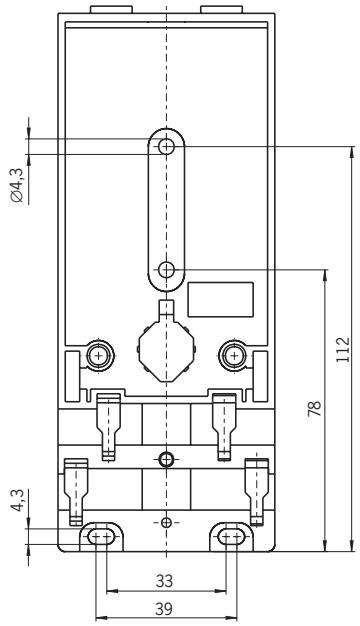
- **Evaluation unit for the direct connection of a CES read head**
- **Connection of a CEM solenoid**
- **LED diagnostic displays**

Dimension drawing CES...AS1

Top of housing



Floor plate



Bus connection and power supply

The AS-Interface bus is connected directly to the evaluation unit using the familiar yellow ribbon cable. This connection is sufficient if only one CES read head is connected.
If the device is used for a CEM read head with integrated electromagnet, auxiliary power must be connected using a further ribbon cable.

Read head connection

The CES series read head can be connected to the evaluation unit using an M12 plug connector. Read heads with different cable lengths are available especially for this evaluation unit. The read head is not included with the evaluation unit.

CEM read head connection

The CEM read heads are connected using two M12 plug connectors. Cables with an M12 plug connector for the evaluation unit and an M8 plug connector for the read head are required. Neither the cable nor the read head are included with the evaluation unit.

CES actuator

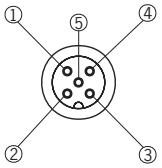
An actuator with programmed code to suit the read head selected is needed. The actuator is not included with the evaluation unit.

Technical data

Parameters	Value	Unit
Housing material	Plastic	
Degree of protection according to IEC/EN 60529	IP67	
Ambient temperature	0 ... +50	°C
Mass Weight	Approx. 0.4	kg
Risk time max.	180	ms
Dwell time min.	0.5	s
Operating voltage	19.2 ...28.2	DC V
Current consumption, max. (through auxiliary power)	600	mA
Connections	M12 plug connector CES (input) 1 M12 plug connector CEM (output)	
AS-Interface data Acc. to AS-Interface Specification 2.1	EA code: 7 ID code: B	
Current consumption, max.	150	mA
Valid AS-Interface addresses	1 - 31	
AS-Interface inputs	Acc. to AS-Interface Safety at Work	
CES input (for CES read head)	AS-Interface bit D0 - D3	
AS-Interface outputs		
CEM output (for CEM mounting magnet)	AS-Interface bit D0	

Pin assignment CES input
for CES and CEM read head

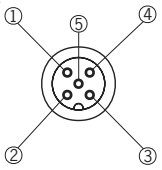
View of connection side



1 ▶ Not used
2 ▶ H1
3 ▶ SH (screen)
4 ▶ H2
5 ▶ Not used

Pin assignment CEM output
for CEM mounting magnet

View of connection side



1 ▶ Not used
2 ▶ Not used
3 ▶ M1
4 ▶ M2
5 ▶ Not used

Ordering table

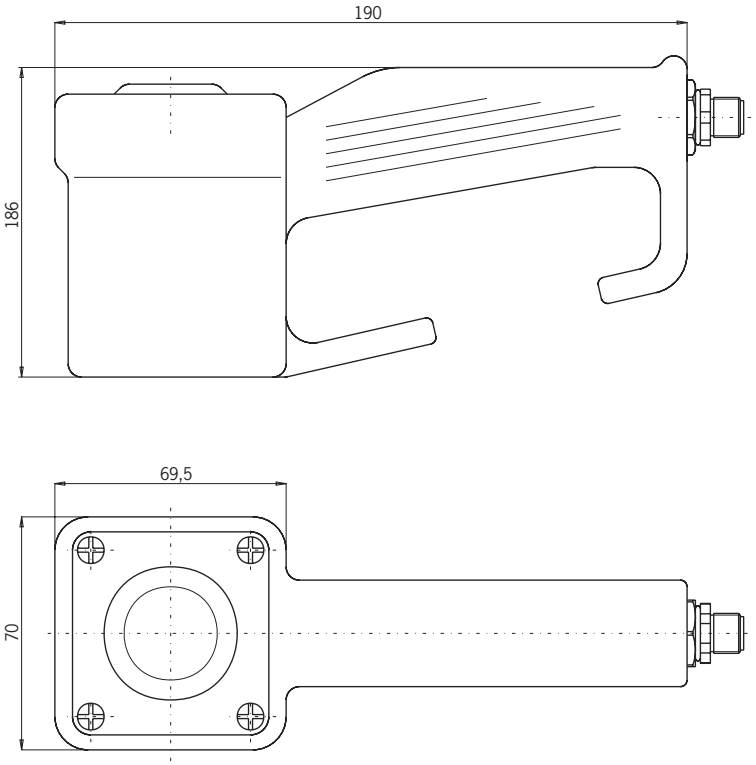
Article		Order No.
Evaluation unit CES-A-F1B-01B-AS1		094 230
Read head CES-A-LNA-01V-AS1	Cable length 1 m	094 031
Read head CES-A-LNA-02V-AS1	Cable length 2 m	094 032

Enabling switches series ZSR...

- **M12 connector for AS-Interface**
- **Three-stage**
- **Robust industrial housing**

* Approvals pending

Dimension drawing ZSR...AS1



AS-Interface Safety at Work

The enabling switch monitors the position of the switch via the bus. The signal can be evaluated in the control system. The status is signaled by means of eight 4-bit code sequences on the bus.

Monitoring safe bus subscribers

The safe devices on the AS-Interface bus must be monitored by EUCHNER bus monitors SFM.

Connection to the AS-Interface bus

The bus signals and auxiliary voltage are carried on the M12 plug connector. A passive bus interface is used for the connection to the AS-Interface ribbon cable. The bus coupling module BCM from EUCHNER is suitable for this purpose.

Function

The enabling switch ZSR has three positions; these positions are signaled to the monitor and bus master via the bus.
The contacts are open in the free position (stage 0). Enabling occurs in stage 1. If the button is pressed from stage 1 to stage 2, the contacts are opened and enabling is no longer active. If the button is then released, stage 1 (enabling) is not reached, thereby preventing accidental start-up of the machine upon release.
If the button is released in stage 1 (enabling), stage 0 is reached directly.

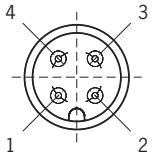
⚠ In the event of faults, the complete enabling switch must be replaced.

Technical data

Parameters	Value	Unit
Housing material	Plastic	
Degree of protection according to IEC 529	IP 65, mating connector inserted and screwed tight	
Ambient temperature	-25 ... +60	°C
Weight	Approx. 0.45	kg
Switching principle	Positively driven, slow-action switching element	
Switching elements	Three-stage, two-channel 2 NO contacts	
EMC protection requirements	Acc. to EN 50295 (AS-Interface standard) and IEC 62026	
Type of connection	M12 plug connector	
AS-Interface data Acc. to AS-Interface Specification 2.1	EA code: 7 ID code: B	
Total current consumption, max.	45	mA
Valid AS-Interface addresses	1 - 31	
AS-Interface inputs	Acc. to AS-Interface Safety at Work	
NC contact 1	D0, D1	
NC contact 2	D2, D3	

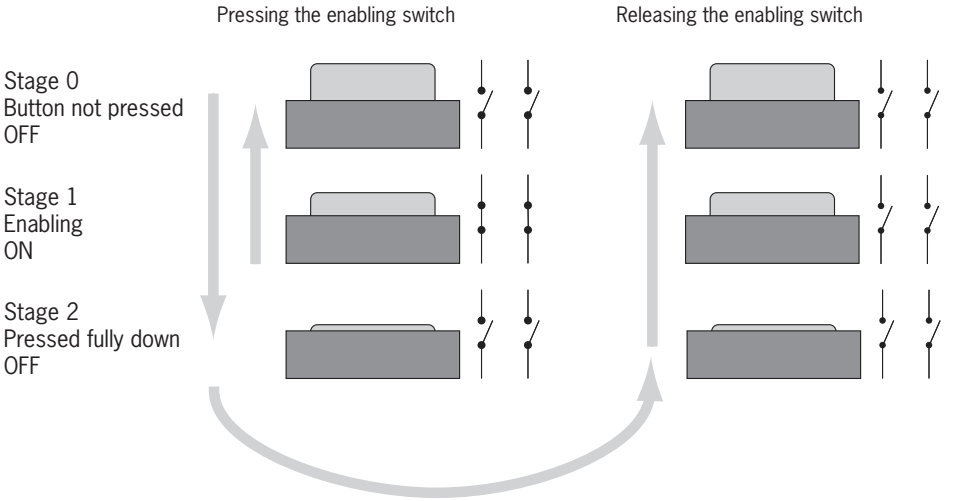
Pin assignment ZSR...AS1

View of connection side



1 ▶ AS-Interface +
2 ▶ Not used
3 ▶ AS-Interface -
4 ▶ Not used

Function of the enabling switch



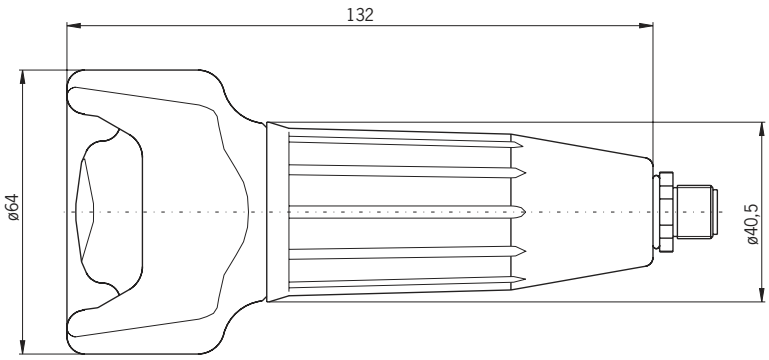
Ordering table

Series / Version / Type of connection	Switching elements	Article	Order No.
ZSR...AS1	2 NO contacts	ZSR2B2CAS1	091 475

Enabling switches series ZSA...

- **M12 connector for AS-Interface**
- **Three-stage**
- **Internal panic circuit**

Dimension drawing ZSA...AS1



AS-Interface Safety at Work

The enabling switch monitors the position of the switch via the bus. The signal can be evaluated in the control system. The status is signaled by means of eight 4-bit code sequences on the bus.

Monitoring safe bus subscribers

The safe devices on the AS-Interface bus must be monitored by EUCHNER bus monitors SFM.

Connection to the AS-Interface bus

The bus signals and auxiliary voltage are carried on the M12 plug connector. A passive bus interface is used for the connection to the AS-Interface ribbon cable. The bus coupling module BCM from EUCHNER is suitable for this purpose.

Function

The enabling switch ZSA has three positions; these positions are signaled to the monitor and bus master via the bus.
The contacts are open in the free position (stage 0). Enabling occurs in stage 1. If the button is pressed from stage 1 to stage 2, the contacts are opened and enabling is no longer active. If the button is then released, stage 1 (enabling) is not reached, thereby preventing accidental start-up of the machine upon release.
If the button is released in stage 1 (enabling), stage 0 is reached directly.

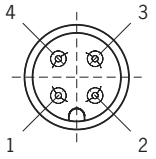
⚠ In the event of faults, the complete enabling switch must be replaced.

Technical data

Parameters	Value	Unit
Housing material	Plastic	
Degree of protection according to IEC 529	IP 67, mating connector inserted and screwed tight	
Ambient temperature	-25 ... +60	°C
Weight	Approx. 0.2	kg
Switching principle	Positively driven, slow-action switching element	
Switching elements	Three-stage, two-channel 2 NO contacts	
EMC protection requirements	Acc. to EN 50295 (AS-Interface standard) and IEC 62026	
Type of connection	M12 plug connector	
AS-Interface data Acc. to AS-Interface Specification 2.1	EA code: 7 ID code: B	
Total current consumption, max.	45	mA
Valid AS-Interface addresses	1 - 31	
AS-Interface inputs	Acc. to AS-Interface Safety at Work	
NC contact 1	D0, D1	
NC contact 2	D2, D3	

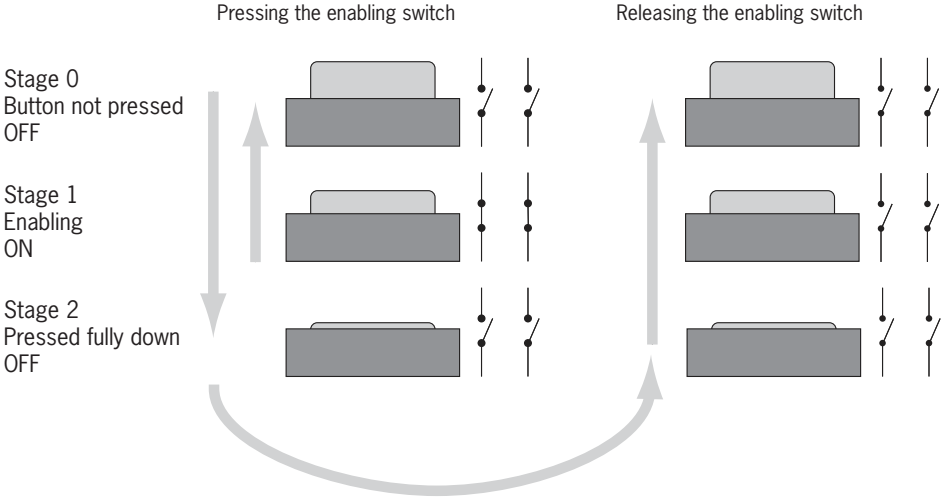
Pin assignment ZSA...AS1

View of connection side



1 ▶ AS-Interface +
2 ▶ Not used
3 ▶ AS-Interface -
4 ▶ Not used

Functions of the enabling switch



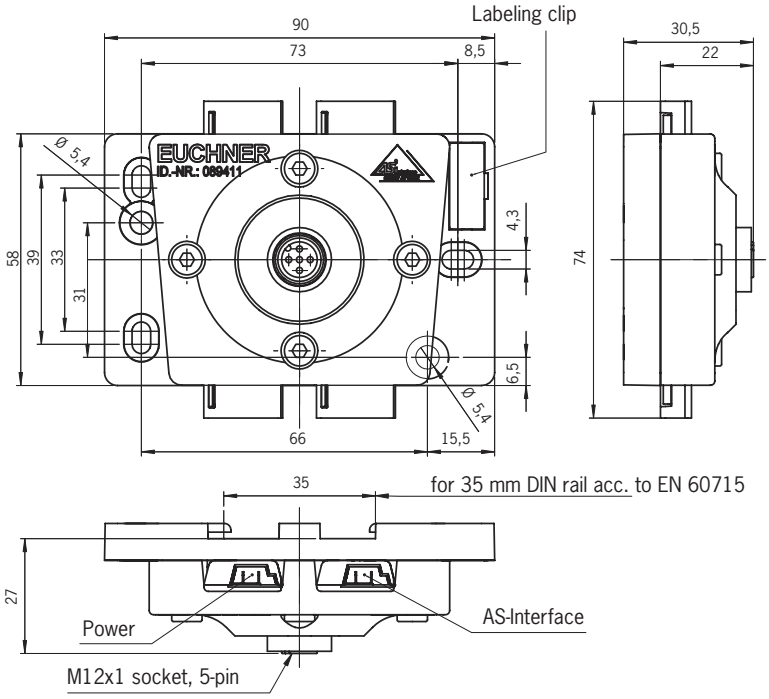
Ordering table

Series / Version / Type of connection	Switching elements	Article	Order No.
ZSA...AS1	2 NO contacts	ZSA2B2CAS1	091 580

Bus coupling module BCM...

- For connecting the AS-Interface bus to EUCHNER safety switches
- Connections: M12 socket
  AS-Interface bus ribbon cable
  AS-Interface power ribbon cable

Dimension drawing BCM...SEM4-1



Coupling to the AS-Interface bus

With the bus coupling module, the ribbon cables for the AS-Interface bus and power are converted to an M12 socket with four contacts. The coupling module makes it easy to connect EUCHNER AS-Interface safety switches to the ribbon cables of the AS-Interface bus.

Use

The coupling modules have the degree of protection IP 67, which makes them suitable for use in the field. The seal around the ribbon cable also guarantees the high degree of protection with piercing technology.

Mounting

The base plate is removable and can be assembled together with the AS-Interface ribbon cables before the safety switches are connected.

Reverse polarity protection

The profiled shape of the ASInterface ribbon cable provides protection against polarity reversal. With most of the modules currently available, the wire can therefore only be inserted in one direction. This means that the cable has to be twisted when assembled.
With the EUCHNER coupling module, the cable can be inserted in any direction thanks to the additional coding in the seal and is still reverse polarity protected.

AS-Interface cable

The piercing technology of the ASInterface ribbon cable means that there is no need for time-consuming stripping of the wire.
The ribbon cables are inserted in the coupling module and the upper part of the housing is screwed on. The screwing action presses the piercing pins into the ribbon cable, thus establishing the contact.

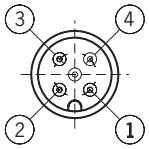
⚠ In the event of faults, the complete coupling module must be replaced.

Technical data

Parameters	Value	Unit
Housing material	Reinforced thermoplastic	
Degree of protection according to IEC 529 (mating connector inserted)	IP 67 on single insertion of the cable	
Ambient temperature	-20...+ 70	°C
Installation position	Any	
Weight	Approx. 60	g
Voltage max.	36	DC V
Current max.	4	A
AS-Interface to power insulation voltage	200	V
Mounting	Screw mounting (2 x M6)	
Connection	M12 socket	
Line 1	AS-Interface bus ribbon cable (AS-Interface +, AS-Interface –)	
Line 2	Power ribbon cable (+24 V, 0 V)	

Socket assignment for bus coupling module BCM...SEM4-1

View of connection side



1 ▶ AS-Interface +
2 ▶ Auxiliary voltage 0 V
3 ▶ AS-Interface -
4 ▶ Auxiliary voltage 24 V

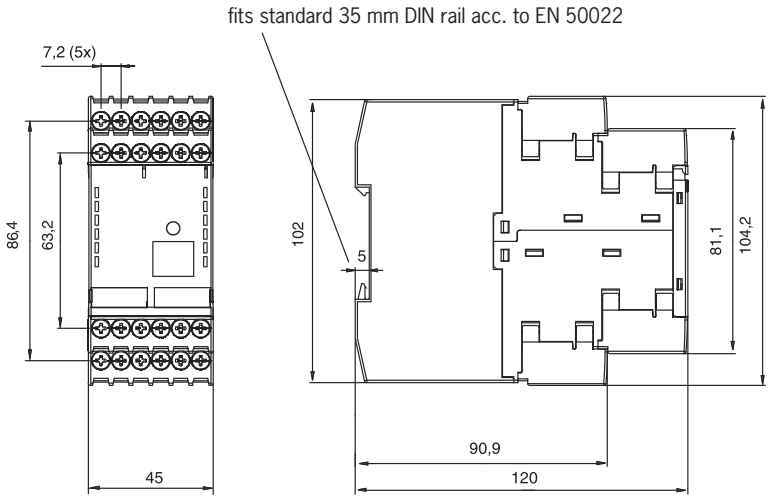
Ordering table

Article	Order No.
BCM-A-P1-SEM4-1	089 411
Connection cable M12 with straight plug connectors, length 1 m PUR	089 420

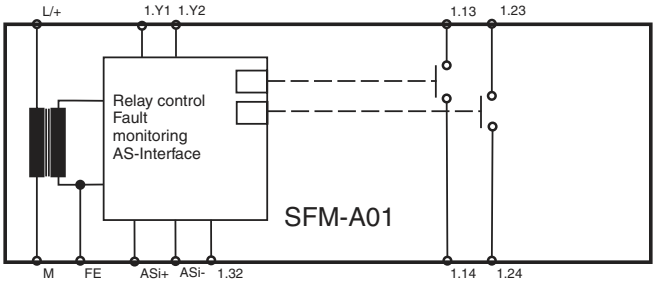
AS-Interface Safety at Work safety monitor SFM-A01

- **Single-channel**
- **STOP category 0 and 1**
- **Up to safety category 4 in acc. with EN 954-1**
- **2 safety contacts**
- **Start input, automatic start, start via bus subscriber**
- **Feedback loop**

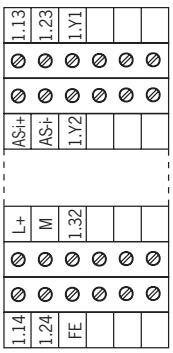
Dimension drawing



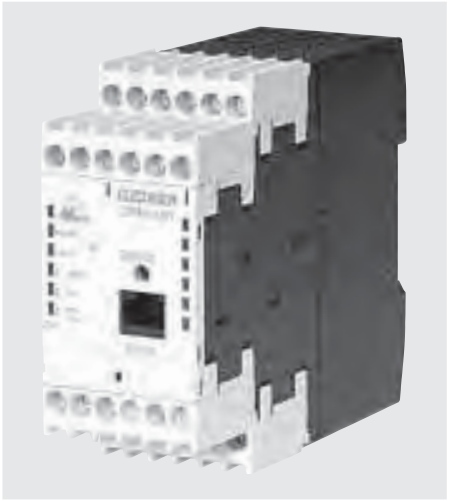
Block diagram



Pin assignment



AS-Interface +	Connection to AS-Interface bus
AS-Interface -	Connection to AS-Interface bus
L +	24 V DC
M	GND / reference ground
FE	Function earth
1.Y1	EDM / feedback loop
1.Y2	Start input
1.13	Safety output 1.13
1.14	Safety output 1.14
1.23	Safety output 1.23
1.24	Safety output 1.24
1.32	Door monitoring output



Output contacts, positively driven

- 2 safety outputs with one NO contact each
- 1 door monitoring output (semiconductor output)

Connection options

- Safety guard switch, EMERGENCY STOP, 2-hand control, pressure sensitive mats, light barrier/ grid, all AS-Interface Safety at Work modules

Operating methods

- Stop 0
- Stop 1, door monitoring and time-delayed safety output

Notes on installation

- The safety monitor must be installed in a suitable operating area (control cabinet, protective housing – at least IP54).
- The safety monitor is installed by clipping it to a standard 35 mm DIN rail in accordance with EN 50022.

Notes on the electrical connection

- All electrical inputs must be isolated from the mains by an isolating transformer (safety class III in accordance with EN 60742) or by a similar isolating method.

Safety precautions

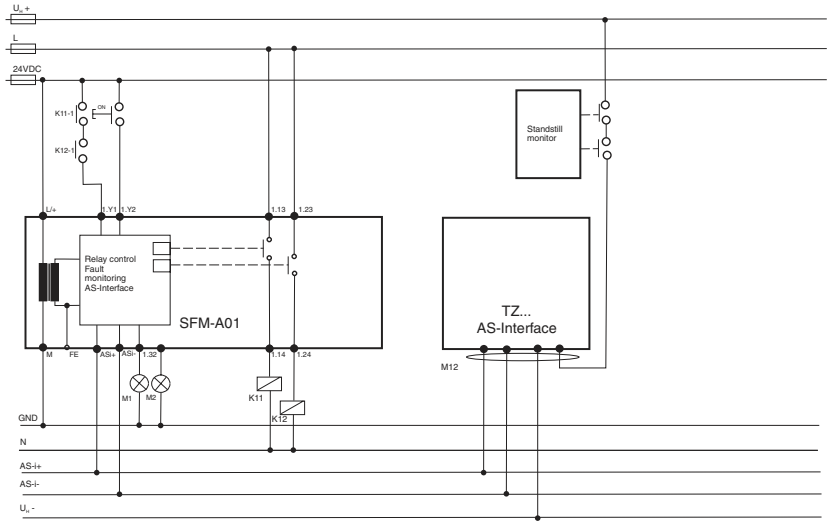
- The monitor has a redundant switching design with automatic control.
  This means that the safety system is still effective even if a component fails.

⚠ In the event of faults, the complete safety monitor must be replaced.

Technical data

Parameters	Value			Unit
	min.	typ.	max.	
Housing material	Plastic PA6.6			
Dimensions	45 x 105 x 120			mm
Weight	Approx. 0.35			kg
Operating temperature	- 20	-	+ 60	°C
Storage temperature	- 30	-	+ 70	
Degree of protection according to EN 60 529	IP 20			
Mounting	35 mm DIN rail acc. to DIN EN 50022-35			
EMC protection requirements	Acc. to EN 50295 (AS-Interface standard)			
Type of connection	Screw terminals			
Terminals	0.14	-	2.5	mm^2
Operating voltage U_B	24+15%/-15% Power supply unit with electrical isolation (IEC 60742, PELV)			V DC
Residual ripple	< 15 %			
Rated operating current	150			mA
Response time	< 40			ms
Switch-on delay	< 10			s
AS-Interface data acc. to Specification 2.1	EA code: 7 ID code: F			
Total current consumption, max.	45			mA
AS-Interface voltage range	18.5	-	31.6	V
Inputs				
Start	Optocoupler input, active high Input current approx. 10 mA at 24 V DC			
Feedback loop	Optocoupler input, active high Input current approx. 10 mA at 24 V DC			
Outputs				
Safety on	1 door monitoring output PNP transistor output, 200 mA, short-circuit and reverse polarity protection			
Safety output	2 floating NO relay contacts			
Max. contact load	1 A DC-13 at 24 V DC / 3 A AC-15 at 230 V AC			
Continuous thermal current	3 A per output circuit			
External fusing, max.	4 A medium slow-blow			
Overvoltage category	3 for rated operating voltage, 300 V AC according to VDE 0110 Part 1			

Connection example safety door connection



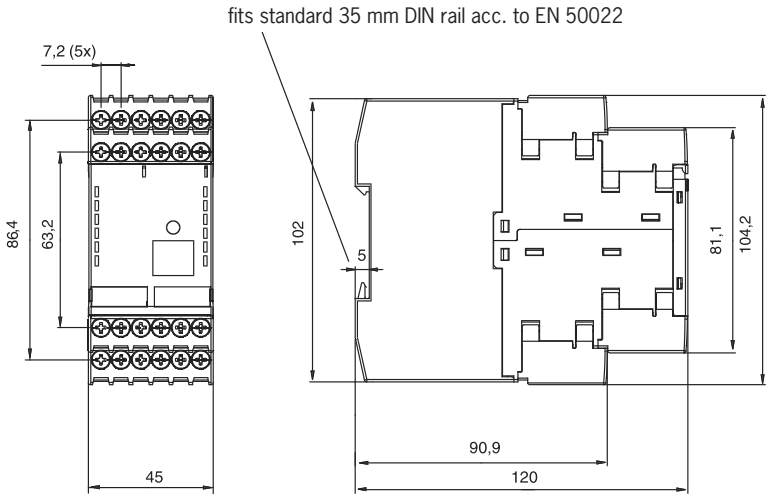
Ordering table

Article	Operating voltage	Safety contacts	Door monitoring output	Order No.
SFM-A01	24 V DC ± 15%	2 NO contacts	1 semiconductor output	085 638
Configuration software				see page 28
SFM cable set				

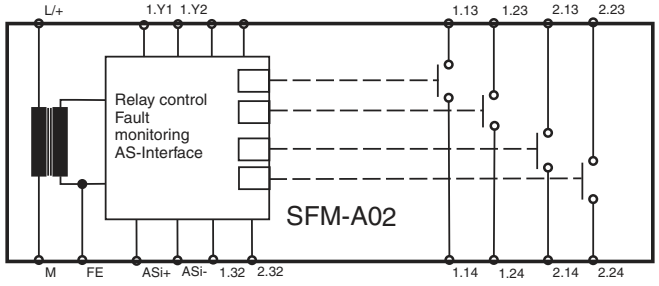
AS-Interface Safety at Work safety monitor SFM-A02

- **Two channel, can be configured as independent or dependent**
- **STOP category 0 and 1, door locking via time-delay or standstill monitor**
- **Up to safety category 4 in acc. with EN 954-1**
- **4 safety contacts**
- **Start input, automatic start, start via bus subscriber**
- **Feedback loop for every channel**

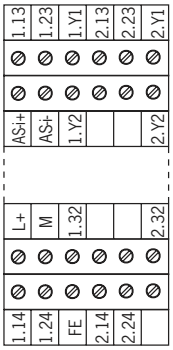
Dimension drawing



Block diagram



Pin assignment



AS-Interface +	Connection to AS-Interface bus
AS-Interface -	Connection to AS-Interface bus
L +	24 V DC
M	GND / reference ground
FE	Function earth
1.Y1	EDM / feedback loop 1
1.Y2	Start input 1
1.13	Safety output 1.13
1.14	Safety output 1.14
1.23	Safety output 1.23
1.24	Safety output 1.24
1.32	Door monitoring output 1
2.Y1	EDM / feedback loop 2
2.Y2	Start input 2
2.13	Safety output 2.13
2.14	Safety output 2.14
2.23	Safety output 2.23
2.24	Safety output 2.24
2.32	Door monitoring output 2

Switch outputs

- 4 safety outputs with one NO contact each
- 2 door monitoring outputs (semiconductor output)

Connection options

- Safety guard switch, EMERGENCY STOP, 2-hand control, pressure sensitive mats, light barrier/grid, all AS-Interface Safety at Work modules

Operating methods

- Stop 0
- Stop 1, door monitoring and time-delayed safety output
- Stop 1, two safety outputs
- Door locking via standstill monitor and time-delay
- Door locking via time-delay

Notes on installation

- The safety monitor must be installed in a suitable operating area (control cabinet, protective housing – at least IP54).
- The safety monitor is installed by clipping it to a standard 35 mm DIN rail in accordance with EN 50022.

Instructions for electrical connection

- All electrical inputs must be isolated from the mains by an isolating transformer (safety class III in accordance with EN 60742) or by a similar isolating method.

Safety precautions

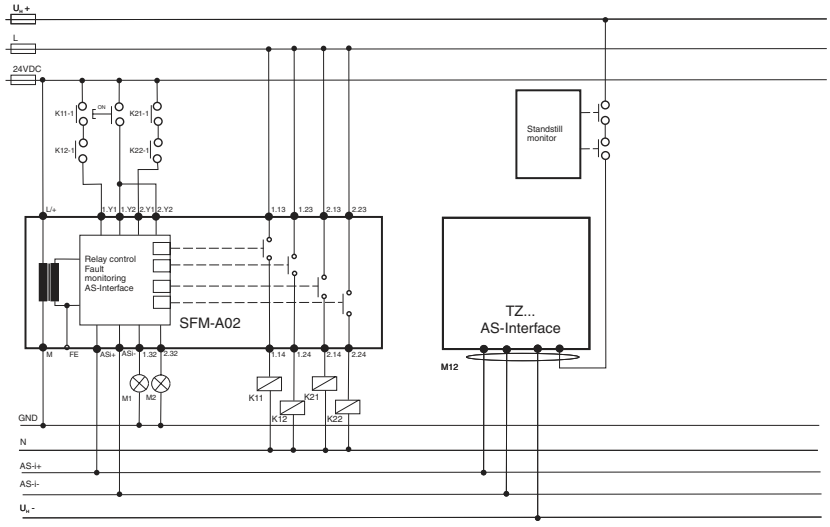
- The monitor has a redundant switching design with automatic control.
  This means that the safety system is still effective even if a component fails.

⚠ In the event of faults, the complete safety monitor must be replaced.

Technical data

Parameters	Value			Unit
	min.	typ.	max.	
Housing material		Plastic PA6.6		
Dimensions		45 x 105 x 120		mm
Weight		Approx. 0.45		kg
Operating temperature	- 20	-	+ 60	°C
Storage temperature	- 30	-	+ 70	
Degree of protection according to EN 60 529		IP 20		
Mounting		35 mm DIN rail acc. to DIN EN 50022-35		
EMC protection requirements		Acc. to EN 50295 (AS-Interface standard)		
Type of connection		Screw terminals		
Terminals	0.14	-	2.5	mm^2
Operating voltage U_B		24+15%/-15% Power supply unit with electrical isolation (IEC 60742, PELV)		DC V
Residual ripple		< 15 %		
Rated operating current		200		mA
Response time		< 40		ms
Switch-on delay		< 10		s
AS-Interface data acc. to Specification 2.1		EA code: 7 ID code: F		
Total current consumption, max.		45		mA
AS-Interface voltage range	18.5	-	31.6	V
Inputs				
Start		Optocoupler input, active high Input current approx. 10 mA at 24 V DC		
Feedback loop		Optocoupler input, active high Input current approx. 10 mA at 24 V DC		
Outputs				
Safety on		2 door monitoring outputs PNP transistor output, 200 mA, short-circuit and reverse polarity protection		
Safety output		4 floating NO relay contacts		
Max. contact load		1 A DC-13 at 24 V DC / 3 A AC-15 at 230 V AC		
Continuous thermal current		3 A per output circuit		
External fusing, max.		4 A medium slow-blow		
Overvoltage category		3 for rated operating voltage, 300 V AC according to VDE 0110 Part 1		

Connection example safety door with standstill monitor connection



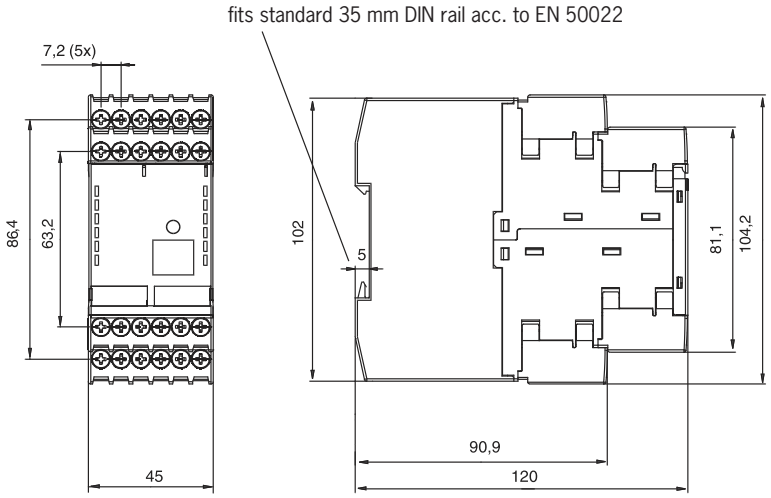
Ordering table

Article	Operating voltage	Safety contacts	Door monitoring output	Order No.
SFM-A02	24 V DC ± 15%	4 NO contacts	2 semiconductor outputs	085 639
Configuration software				see page 28
SFM cable set				

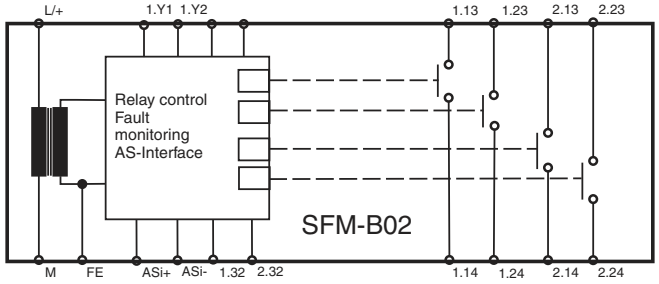
AS-Interface Safety at Work safety monitor with enhanced functionality SFM-B02

- **Two channel, can be configured as independent or dependent**
- **STOP category 0 and 1, door locking via time-delay or standstill monitor**
- **Up to safety category 4 in acc. with EN 954-1**
- **4 safety contacts**
- **Start input, automatic start, start via bus subscriber**
- **Feedback loop for every channel**

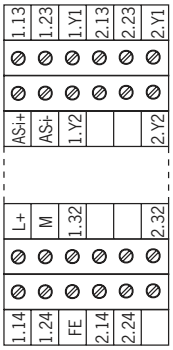
Dimension drawing



Block diagram



Pin assignment



AS-Interface +	Connection to AS-Interface bus
AS-Interface -	Connection to AS-Interface bus
L +	24 V DC
M	GND / reference ground
FE	Function earth
1.Y1	EDM / feedback loop 1
1.Y2	Start input 1
1.13	Safety output 1.13
1.14	Safety output 1.14
1.23	Safety output 1.23
1.24	Safety output 1.24
1.32	Door monitoring output 1
2.Y1	EDM / feedback loop 2
2.Y2	Start input 2
2.13	Safety output 2.13
2.14	Safety output 2.14
2.23	Safety output 2.23
2.24	Safety output 2.24
2.32	Door monitoring output 2

Switch outputs

- 4 safety outputs with one NO contact each
- 2 door monitoring outputs (semiconductor output)

Connection options

- Safety guard switch, door locking mechanisms, slow-action contact element, EMERGENCY STOP, 2-hand control, pressure sensitive mats, light barrier/grid, all AS-Interface Safety at Work modules

Operating methods

- Stop 0
- Stop 1, door monitoring and time-delayed safety output
- Stop 1, two safety outputs
- Door locking via standstill monitor and time-delay
- Door locking via time-delay

Notes on installation

- The safety monitor must be installed in a suitable operating area (control cabinet, protective housing – at least IP54).
- The safety monitor is installed by clipping it to a standard 35 mm DIN rail in accordance with EN 50022.

Instructions for electrical connection

- All electrical inputs must be isolated from the mains by an isolating transformer (safety class III in accordance with EN 60742) or by a similar isolating method.

Safety precautions

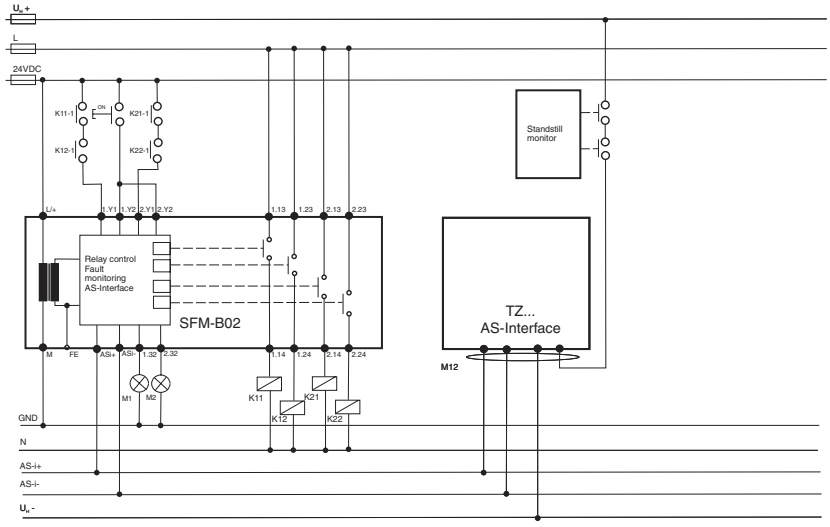
- The monitor has a redundant switching design with automatic control.
  This means that the safety system is still effective even if a component fails.

⚠ In the event of faults, the complete safety monitor must be replaced.

Technical data

Parameters	Value			Unit
	min.	typ.	max.	
Housing material		Plastic PA6.6		
Dimensions		45 x 105 x 120		mm
Weight		Approx. 0.45		kg
Operating temperature	- 20	-	+ 60	°C
Storage temperature	- 30	-	+ 70	
Degree of protection according to EN 60 529		IP 20		
Mounting		35 mm DIN rail acc. to DIN EN 50022-35		
EMC protection requirements		Acc. to EN 50295 (AS-Interface standard)		
Type of connection		Screw terminals		
Terminals	0.14	-	2.5	mm^2
Operating voltage U_B		24+15%/-15% Power supply unit with electrical isolation (IEC 60742, PELV)		DC V
Residual ripple		< 15 %		
Rated operating current		200		mA
Response time		< 40		ms
Switch-on delay		< 10		s
AS-Interface data acc. to Specification 2.1		EA code: 7 ID code: F		
Total current consumption, max.		45		mA
AS-Interface voltage range	18.5	-	31.6	V
Inputs				
Start		Optocoupler input, active high Input current approx. 10 mA at 24 V DC		
Feedback loop		Optocoupler input, active high Input current approx. 10 mA at 24 V DC		
Outputs				
Safety on		2 door monitoring outputs PNP transistor output, 200 mA, short-circuit and reverse polarity protection		
Safety output		4 floating NO relay contacts		
Max. contact load		1 A DC-13 at 24 V DC / 3 A AC-15 at 230 V AC		
Continuous thermal current		3 A per output circuit		
External fusing, max.		4 A medium slow-blow		
Overvoltage category		3 for rated operating voltage, 300 V AC according to VDE 0110 Part 1		

Connection example safety door with standstill monitor connection



Ordering table

Article	Operating voltage	Safety contacts	Door monitoring output	Order No.
SFM-B02	24 V DC ± 15%	4 NO contacts	2 semiconductor outputs	087 891
Configuration software				see page 28
SFM cable set				

Accessories

Cable set for safety monitor SFM

Cable set consisting of programming cable and transmission cable.
The programming cable is used to load data from the ASiMon configuration software on the PC to the safety monitor.
The transmission cable is used to connect 2 safety monitors and it facilitates the direct transfer of parameters between two safety monitors without a PC.

Article	Order No.
Cable set for safety monitor SFM	087 299

Configuration software ASiMon

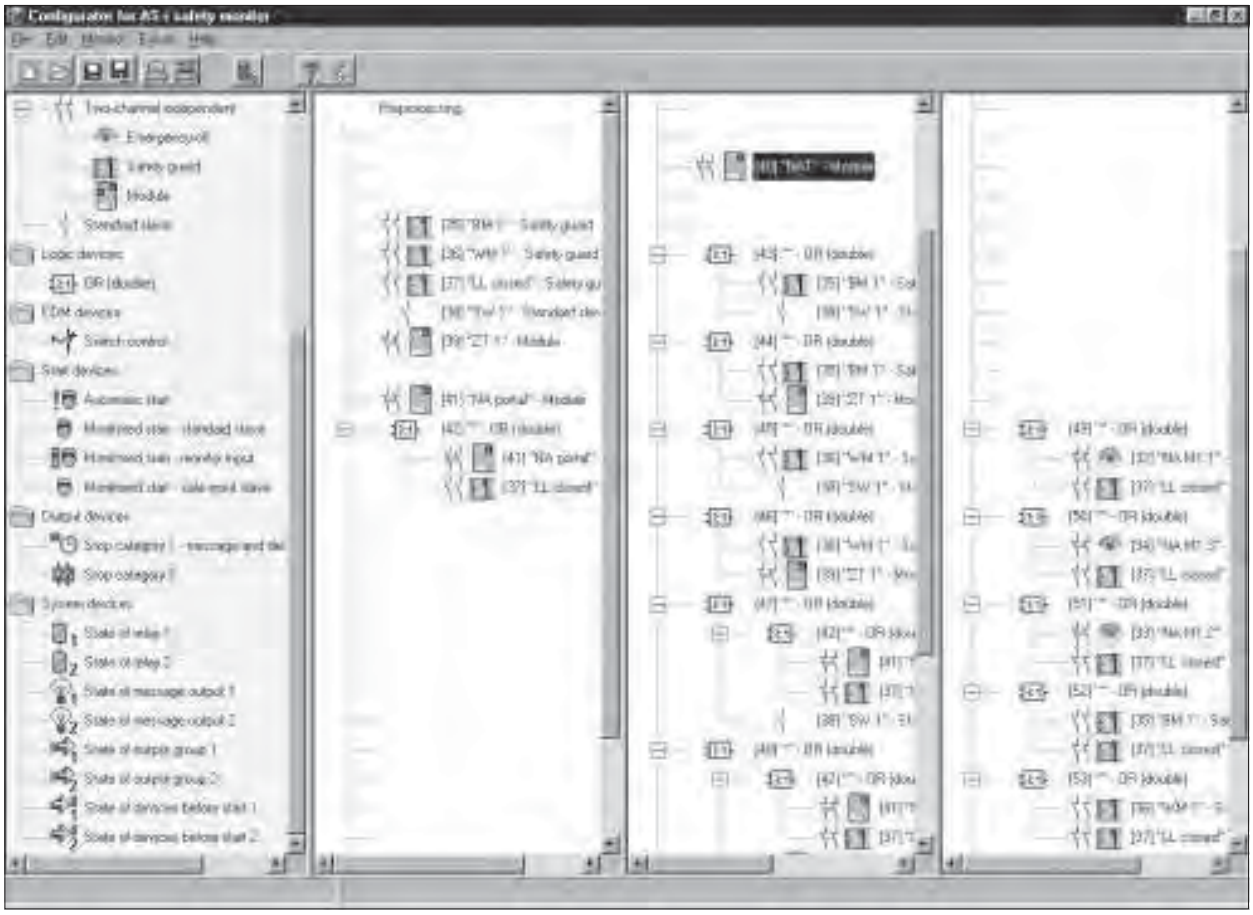
The Windows®-based ASiMon configuration software is used to configure the safety monitors.
The software is used to configure the safe slaves on the AS-Interface Safety at Work bus and to specify the linkage operating method for the OSSD.
Another important function is the diagnostic option for putting a system into operation, and the documentation of the finished system.

Article	Order No.
Configuration software ASiMon	088 053

The following are the requirements for using the software:

- Processor: Pentium® or better
- CD ROM drive for installation
- Mouse for operation
- Free COM interface
- Windows® operating system (95, 98, ME, NT, 2000 or XP)
- At least 8 MB of RAM
- At least 8 MB free space on the hard disk

The CD also contains the manual for the ASiMon configuration software and the manual for the safety monitor in a PDF file.



Appendix - Products in preparation

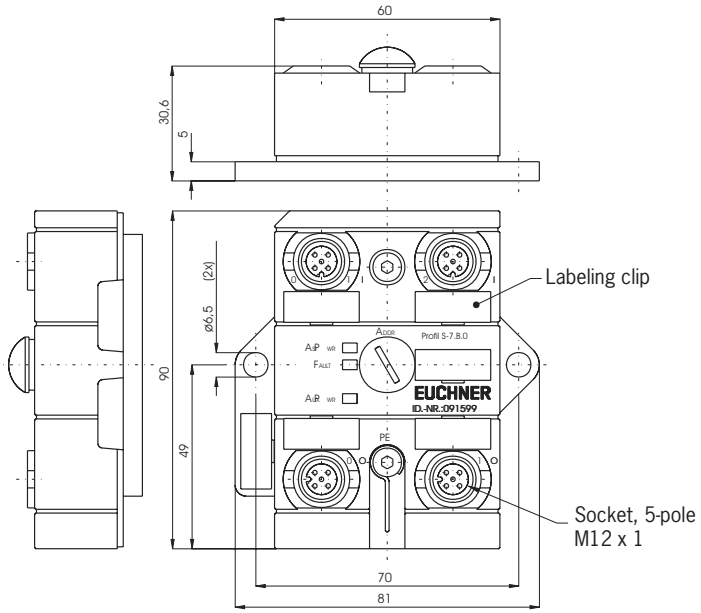
I/O AS-Interface Safety at Work BCM-A...

* Approvals pending

- **Direct connection to AS-Interface Safety at Work**
- **AS-Interface and auxiliary power cables**
- **1 or 2 safe inputs (M12 plug connector) e.g. for securing a safety door**
- **2 outputs (M12 plug connectors)**
- **LED diagnostic displays**

Available from autumn 2004

Dimension drawing BCM-A...



Provisional technical data

Parameters	Value	Unit
Housing material	Plastic	
Degree of protection according to IEC 529	IP 67, mating connector inserted and screwed tight, sealing caps fitted to unused connectors	
Ambient temperature	0 ... +50	°C
Weight	Approx. 0.3	kg
Operating voltage	19.2 ... 28.8	V
Residual ripple, max.	500	mV_{PP}
Current consumption, max. (through auxiliary power)	1	A
Connections	4 M12 plug connectors, two safe inputs, two outputs	
Inputs		
Input voltage High Low	11 ... 28.8 0 ... 8	V
Outputs		
Switching current max.	500	mA
Short-circuit current, max.	2.4	A
AS-Interface data Acc. to AS-Interface Specification 2.1	EA code: 7 ID code: B	
Total current consumption, max.	45	mA
Valid AS-Interface addresses	1 - 31	
AS-Interface inputs	Acc. to AS-Interface Safety at Work	
Plug connector 1	D0, D1 and D2, D3	
Plug connector 2	D2, D3	
AS-Interface outputs		
Plug connector 1	D0	
Plug connector 2	D1	