

Safety Switches with AS-Interface



EUCHNER

More than safety.

EUCHNER

More than safety.



Headquarters in Leinfelden-Echterdingen



Logistics center in Leinfelden-Echterdingen



Production location in Unterböhringen

Internationally successful – the EUCHNER company

EUCHNER GmbH + Co. KG is a world-leading company in the area of industrial safety technology. EUCHNER has been developing and producing high-quality switching systems for mechanical and systems engineering for more than 50 years.

The medium-sized family-operated company based in Leinfelden, Germany, employs more than 500 people around the world, 400 in Germany alone.

In addition to the production locations in Unterböhringen and Shanghai/China, 14 subsidiaries and other sales partners in Germany and abroad work for our international success on the market.

Quality and innovation – the EUCHNER products

A look into the past shows EUCHNER to be a company with a great inventive spirit. We take the technological and ecological challenges of the future as an incentive for extraordinary product developments.

EUCHNER safety switches monitor safety doors on machines and installations, help to minimize dangers and risks and thereby reliably protect people and processes. Today, our products range from electromechanical and electronic components to intelligent integrated safety solutions. Safety for people, machines and products is one of our dominant themes.

We define future safety technology with the highest quality standards and reliable technology. Extraordinary solutions ensure the great satisfaction of our customers. The product ranges are subdivided as follows:

- ▶ Transponder-coded Safety Switches (CES)
- ▶ Transponder-coded Safety Switches with guard locking (CET)
- ▶ Interlocking and guard locking systems (Multifunctional Gate Box MGB)
- ▶ Access management systems (Electronic-Key-System EKS)
- ▶ Electromechanical Safety Switches
- ▶ Magnetically coded Safety Switches (CMS)
- ▶ Enabling Switches
- ▶ Safety Relays
- ▶ Emergency Stop Devices
- ▶ Hand-Held Pendant Stations and Handwheels
- ▶ Safety Switches with AS-Interface
- ▶ Joystick Switches
- ▶ Position Switches

 **made
in
Germany**

Safety Switches with AS-Interface

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Bus systems in safety systems

Bus systems are also used for wiring safety products. The AS-Interface bus is recognized by accredited certification bodies. 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 the AS-Interface Safety at Work, a monitor is employed as an additional bus subscriber to monitor the 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 monitor is thus ultimately a programmable small safety control system. The bus technology thus considerably reduces the amount of wiring, not only in the field, but especially in the control cabinet as well.

AS-Interface Safety at Work in safety systems

AS-Interface is a low-level bus system that is used for the transfer of small data volumes. It is particularly suitable where digital signals are required in the field. However, analog signals can also be processed. Thanks to its simple structure, AS-Interface does not require any programming. For most bus subscribers, 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 stated bodies 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.

Operation of AS-Interface Safety at Work

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. This exchange thus progresses very rapidly and without the use of a programming device. 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 a "push of a button" are 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 large selection of different 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 an integrated gateway.

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.

Minimization of the costs for hardware

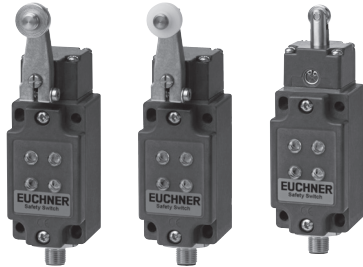
Instead of a separate monitor, EUCHNER also offers devices on which the monitor is directly integrated in the gateway. As a result the costs for hardware are reduced and the functionality increased at the same time. On the integrated gateway with monitor GMOx two complete AS-i buses can be connected; in the application these buses act like a single larger AS-i bus.

In addition, the number of safe outputs increases to up to 16 per device used. On the GMOx devices, safe distributed outputs SOM can be used on the AS-i bus. These outputs have relay contacts for shut down, but can also read inputs at the same time. Control and also diagnostics in this case are via the GMOx. In addition the output SOM can be controlled by the machine control system during operation. This feature of course only works if the GMOx also provides an enable.

Position switch NZ with integrated actuator

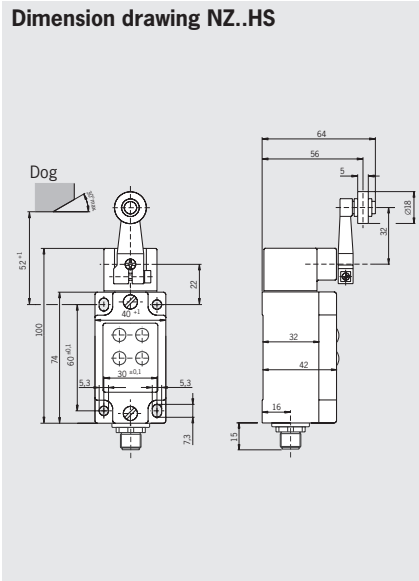


- ▶ **Version A according to EN 50041 NZ.HS**
(steel roller $\varnothing 18$)
- ▶ **Version A according to EN 50041 NZ.HB**
(plastic roller $\varnothing 18$)
- ▶ **Type C according to EN 50041 NZ.RS**
(steel roller $\varnothing 12$ mm)

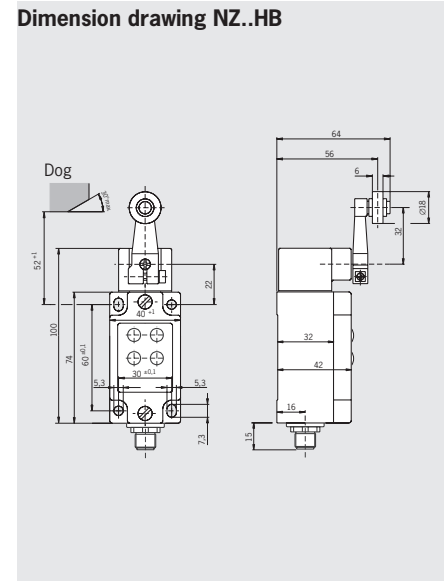


Plug connector M12
4-pin

Dimension drawing NZ..HS



Dimension drawing NZ..HB



Approach direction

Type A according to EN 50041 NZ.HS/NZ.HB



Horizontal
Switch head and lever arm can be adjusted in 90° steps.

Switching direction

Right, left or both sides.

Type C according to EN 50041 NZ.RS



Horizontal
Adjustable in 90° steps.

AS-Interface inputs

- ▶ **D0, D1** Positively driven NC contact 1
 - ▶ **D2, D3** Positively driven NC contact 2
- Evaluation is performed via a safety monitor.

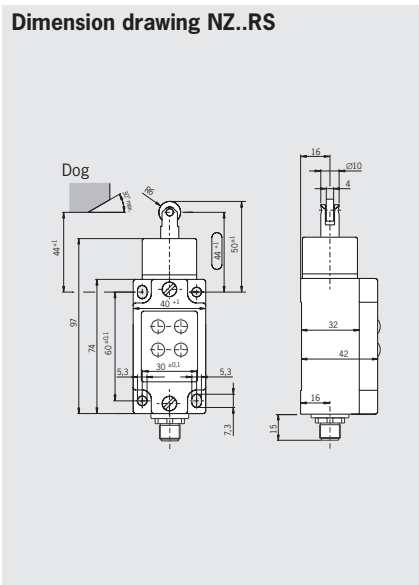
AS-Interface outputs

- ▶ **D1** Red LED
- ▶ **D2** Green LED

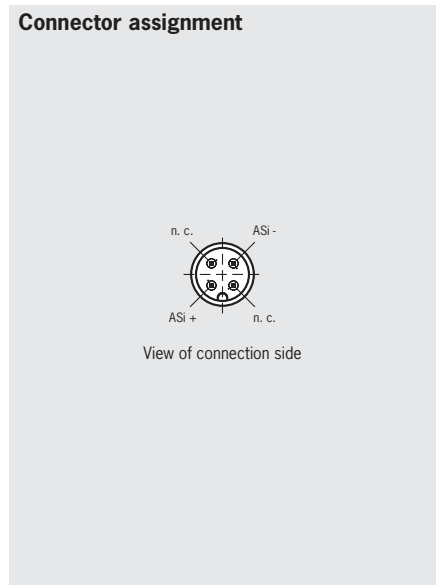
LED function display

- ▶ The *Power* LED indicates the operating voltage at the bus.
- ▶ The *Fault* LED indicates if a fault has been detected on the AS-Interface bus.
- ▶ The green and the red LEDs can be optionally controlled with bits D1 and D2 by the control system via the bus.

Dimension drawing NZ..RS



Connector assignment



For trip rails and trip dogs, see the catalog "Multiple limit switches"

Ordering table

Series	Connection	Actuator	Switching element	Order no./item
NZ	SEM 4 Plug connectors M12	HS Lever arm Steel roller $\varnothing 18$	2 NC \rightarrow	095201 NZ2HS-538SEM4AS1
		HB Lever arm Plastic roller $\varnothing 18$	2 NC \rightarrow	097591 NZ2HB-538SEM4AS1
		RS Roller plunger Steel roller $\varnothing 12$	2 NC \rightarrow	095046 NZ2RS-538SEM4AS1

Safety switch NZ.VZ



- ▶ Housing according to EN 50041

Plug connector M12
4-pin



Approach direction

Horizontal
Adjustable in 90° steps.

AS-Interface inputs

- ▶ **D0, D1** Positively driven NC contact 1
 - ▶ **D2, D3** Positively driven NC contact 2
- Evaluation is performed via a safety monitor.

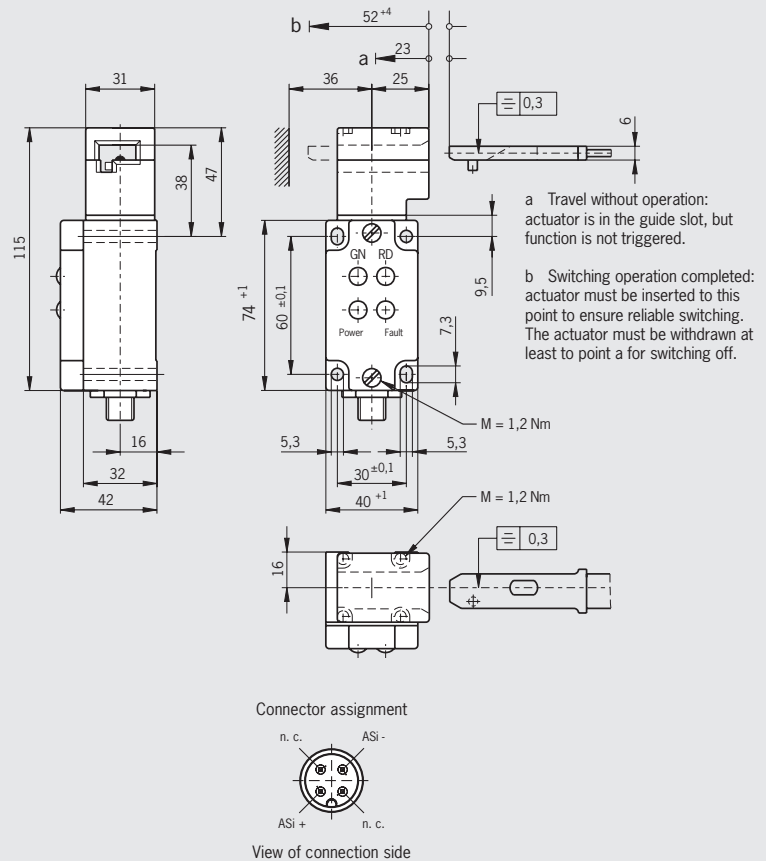
AS-Interface outputs

- ▶ **D1** Red LED
- ▶ **D2** Green LED

LED function display

- ▶ The *Power* LED indicates the operating voltage at the bus.
- ▶ The *Fault* LED indicates if a fault has been detected on the AS-Interface bus.
- ▶ The green and the red LEDs can be optionally controlled with bits D1 and D2 by the control system via the bus.

Dimension drawing



Please order actuator separately
(see catalog "Safety switches
with metal housing")

Ordering table

Series	Connection	Actuator	Switching element	Order no./item
NZ	SEM 4 Plug connectors M12	VZ Separate actuator	2 NC ⊕	090742 NZ2VZ-538ESEM4-AS1

Safety switch TZ with guard locking and guard lock monitoring



- ▶ Mechanical release on the front
- ▶ Actuating head fitted left or right



Mechanical release

Is used for releasing the guard locking with the aid of a tool. A seal and auxiliary tool are fitted to protect against tampering.

Guard locking types

TZ1 Closed-circuit current principle, guard locking by spring force. Release by control of AS-i output O.

TZ2 Open-circuit current principle, guard locking by control of AS-i output O. Release by spring force.

Control of the guard locking solenoid

The guard locking solenoid is controlled by the control system via AS-Interface bus bit D0. In addition the 24V connection can be switched safely.

AS-Interface inputs

- ▶ **D0, D1** Door monitoring contact SK
 - ▶ **D2, D3** Solenoid monitoring contact ÜK
- Evaluation is performed via a safety monitor.

AS-Interface outputs

- ▶ **D0** Guard locking solenoid
- ▶ **D1** Red LED
- ▶ **D2** Green LED

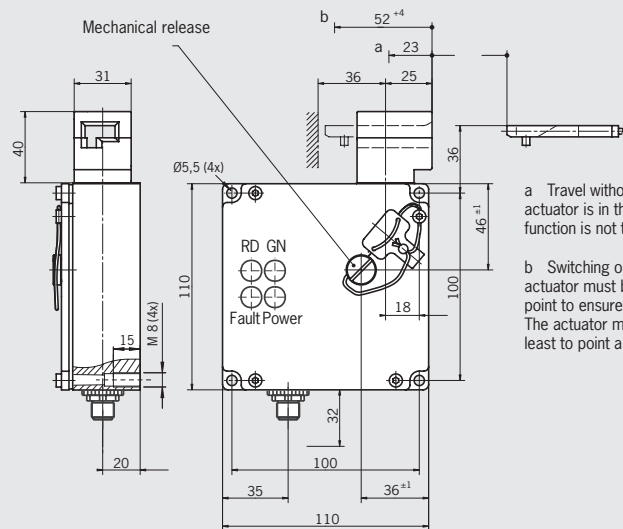
LED function display

- ▶ The *Power* LED indicates the operating voltage at the bus.
- ▶ The *Fault* LED indicates if a fault has been detected on the AS-Interface bus.
- ▶ The green and the red LEDs can be optionally controlled with bits D1 and D2 by the control system via the bus.

Plug connector M12
4-pin

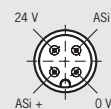
Dimension drawings

Actuating head on the left is a mirror image



- a Travel without operation: actuator is in the guide slot, but function is not triggered.
- b Switching operation completed: actuator must be inserted to this point to ensure reliable switching. The actuator must be withdrawn at least to point a for switching off.

Connector assignment



View of connection side

Please order actuator separately (see catalog "Safety switches with metal housing")

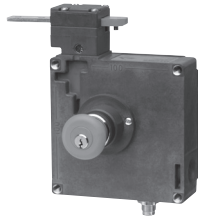
Ordering table

Series	Connection	Guard locking	Switch head	Switching element	Order no./item
TZ	SEM 4 Plug connectors M12	1 Mechanical	LE left	SK: 1 NC ⊖ ÜK: 1 NC ⊖	086140 TZ1LE024SEM4AS1
			RE right	SK: 1 NC ⊖ ÜK: 1 NC ⊖	086141 TZ1RE024SEM4AS1
		2 Electrical	LE left	SK: 1 NC ⊖ ÜK: 1 NC ⊖	086990 TZ2LE024SEM4AS1
			RE right	SK: 1 NC ⊖ ÜK: 1 NC ⊖	086991 TZ2RE024SEM4AS1

Safety switch TZ with guard locking and guard lock monitoring



- ▶ Mechanical release on the front
- ▶ Escape release on the rear with key button
- ▶ Actuating head fitted left or right



Mechanical release

Is used for releasing the guard locking with the aid of a tool. A seal and auxiliary tool are fitted to protect against tampering.

Escape release

Is used for the manual release of the guard locking from within the danger area without tools. The disable can only be removed and the switch returned to its operating state using a key included.

Guard locking type

TZ1 Closed-circuit current principle, guard locking by spring force. Release by control of AS-i output 0.

Control of the guard locking solenoid

The guard locking solenoid is controlled by the control system via AS-Interface bus bit D0. In addition the 24V connection can be switched safely.

AS-Interface inputs

- ▶ **D0, D1** Door monitoring contact SK
 - ▶ **D2, D3** Solenoid monitoring contact ÜK
- Evaluation is performed via a safety monitor.

AS-Interface outputs

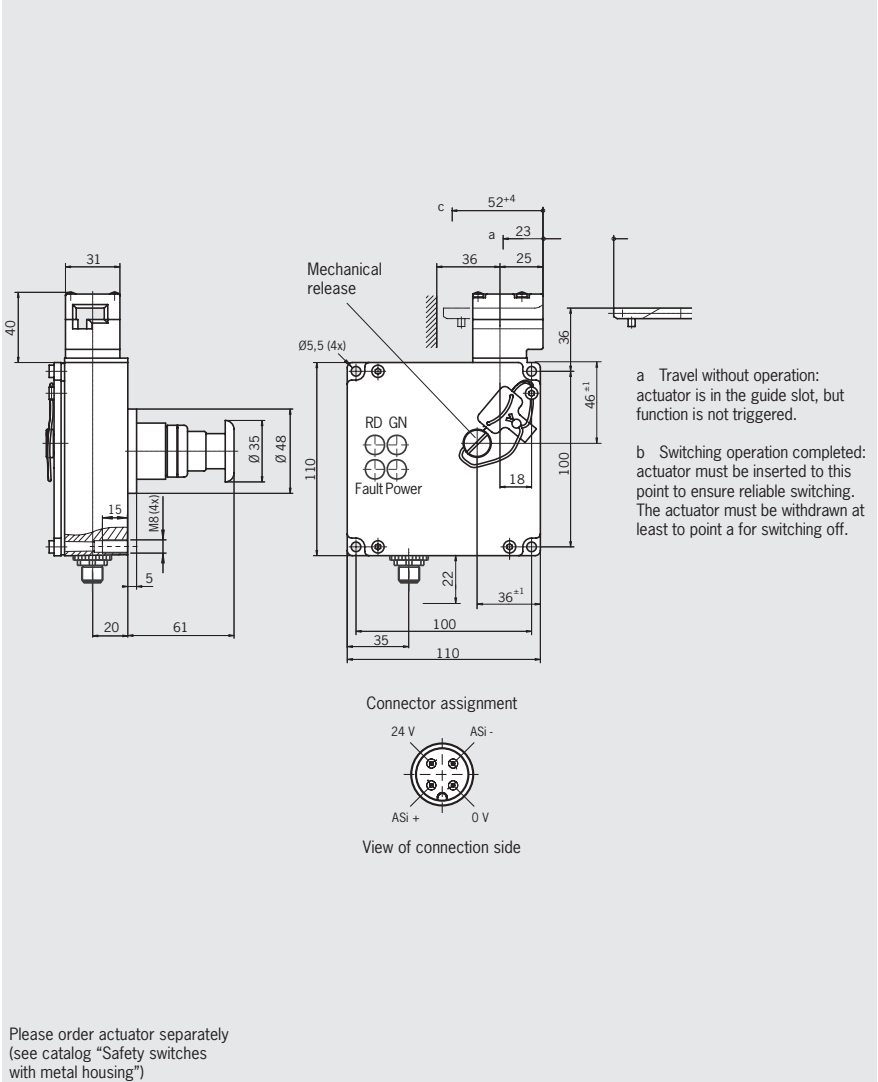
- ▶ **D0** Guard locking solenoid
- ▶ **D1** Red LED
- ▶ **D2** Green LED

LED function display

- ▶ The Power LED indicates the operating voltage at the bus.
- ▶ The Fault LED indicates if a fault has been detected on the AS-Interface bus.
- ▶ The green and the red LEDs can be optionally controlled with bits D1 and D2 by the control system via the bus.

Plug connector M12
4-pin

Dimension drawings Actuating head on the left is a mirror image



Ordering table

Series	Connection	Guard locking	Switch head	Switching element	Version	Order no./item
TZ	SEM 4 Plug connectors M12	1 Mechanical	LE left	SK: 1 NC ⊖ ÜK: 1 NC ⊖	C1815 Escape release (red key button)	094422 TZ1LE024SEM4ASI-C1815
			RE right	SK: 1 NC ⊖ ÜK: 1 NC ⊖	C1815 Escape release (red key button)	094423 TZ1RE024SEM4ASI-C1815

Safety switch TZ with guard locking and guard lock monitoring



- ▶ Emergency unlocking on the front with rotary knob
- ▶ Actuating head fitted left or right



Emergency unlocking

Is used for the manual release of the guard locking without tools. The emergency unlocking mechanism must be returned to the locked state manually. A sealing wire is fitted to protect against tampering.

Guard locking type

TZ1 Closed-circuit current principle, guard locking by spring force. Release by control of AS-i output O.

Control of the guard locking solenoid

The guard locking solenoid is controlled by the control system via AS-Interface bus bit D0. In addition the 24V connection can be switched safely.

AS-Interface inputs

- ▶ **D0, D1** Door monitoring contact SK
 - ▶ **D2, D3** Solenoid monitoring contact ÜK
- Evaluation is performed via a safety monitor.

AS-Interface outputs

- ▶ **D0** Guard locking solenoid
- ▶ **D1** Red LED
- ▶ **D2** Green LED

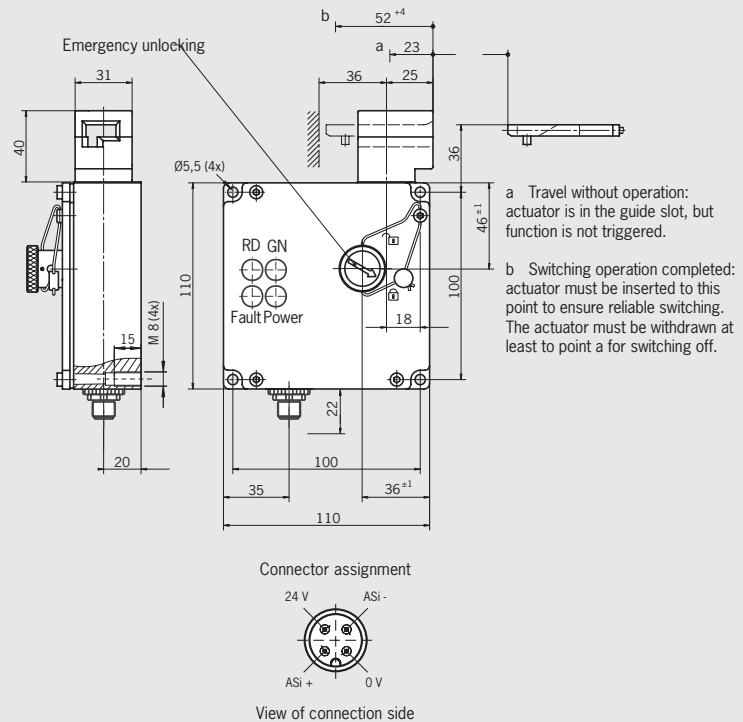
LED function display

- ▶ The *Power* LED indicates the operating voltage at the bus.
- ▶ The *Fault* LED indicates if a fault has been detected on the AS-Interface bus.
- ▶ The green and the red LEDs can be optionally controlled with bits D1 and D2 by the control system via the bus.

Plug connector M12
4-pin

Dimension drawings

Actuating head on the left is a mirror image



Please order actuator separately (see catalog "Safety switches with metal housing")

Ordering table

Series	Connection	Guard locking	Switch head	Switching element	Version	Order no./item
TZ	SEM 4 Plug connectors M12	1 Mechanical	LE left	SK: 1 NC ⊕ ÜK: 1 NC ⊖	C1937 Emergency unlocking	090278 TZ1LE024SEM4AS1-C1937
			RE right	SK: 1 NC ⊕ ÜK: 1 NC ⊖	C1937 Emergency unlocking	090279 TZ1RE024SEM4AS1-C1937



Safety switch NX

- ▶ LED function display



Approach direction



Horizontal and vertical
Adjustable in 90° steps.

AS-Interface inputs

- ▶ **D0, D1** Positively driven NC contact 1
 - ▶ **D2, D3** Positively driven NC contact 2
- Evaluation is performed via a safety monitor.

AS-Interface outputs

- ▶ **D1** Red LED
- ▶ **D2** Green LED

Internal LED function display

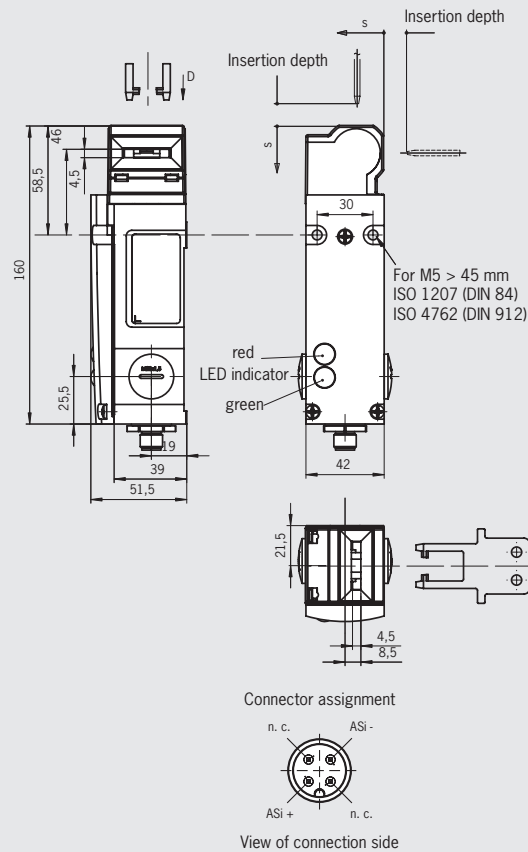
- ▶ The *Power* LED indicates the operating voltage at the bus.
- ▶ The *Fault* LED indicates if a fault has been detected on the AS-Interface bus.

External LED function display

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

Plug connector M12 4-pin

Dimension drawing



Please order actuator separately
(see catalog "Safety switches
with metal housing")

Ordering table

Series	Connection	Switching element	Order no./item
NX	SEM 4 Plug connectors M12	2 NC ⊖	094362 NX1-2131ASEM4-AS1

Safety switch TX with guard locking and guard lock monitoring



- ▶ Mechanical release on the front
- ▶ Escape release on the rear side optional

Without escape release
Plug connector M12, 4-pin

With escape release
Plug connector M12, 4-pin



Approach direction

Horizontal
Adjustable in 90° steps.

Mechanical release

Is used for releasing the guard locking with the aid of a tool. To protect against tampering, the mechanical release is sealed with sealing lacquer.

Escape release

Is used for the manual release of the guard locking from within the danger area without tools. With identification of On/Off position..

Guard locking type

TX1 Closed-circuit current principle, guard locking by spring force. Release by control of AS-i output 0.

Control of the guard locking solenoid

The guard locking solenoid is controlled by the control system via AS-Interface bus bit D0. In addition the 24V connection can be switched safely.

AS-Interface inputs

- ▶ **D0, D1** Positively driven NC contact 1 (safety door monitor)
- ▶ **D2, D3** Positively driven NC contact 2 (guard lock monitoring)

Evaluation is performed via a safety monitor.

AS-Interface outputs

- ▶ **D1** Red LED
- ▶ **D2** Green LED

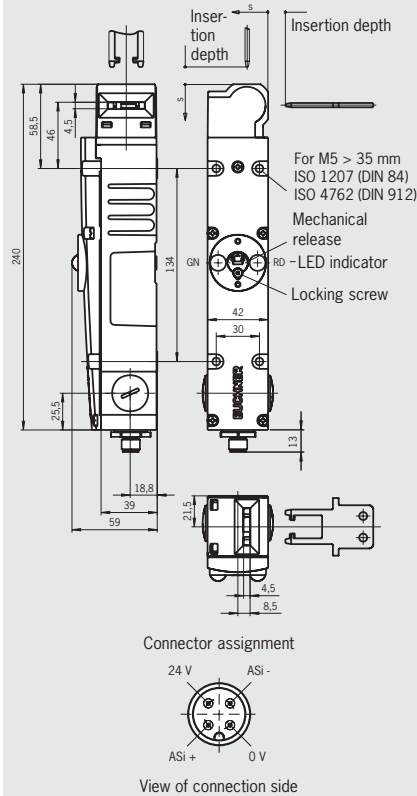
Internal LED function display

- ▶ The *Power* LED indicates the operating voltage at the bus.
- ▶ The *Fault* LED indicates if a fault has been detected on the AS-Interface bus.

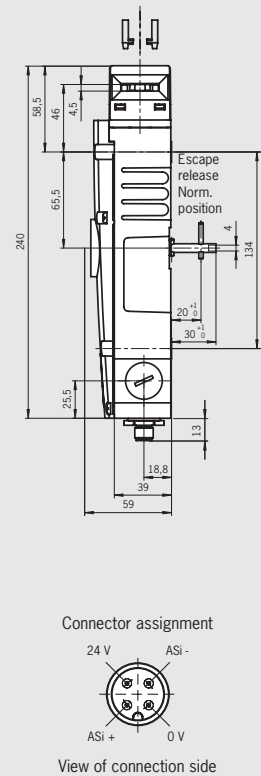
External LED function display

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

Dimension drawing



Please order actuator separately (see catalog "Safety switches with metal housing")



Please order actuator separately (see catalog "Safety switches with metal housing")

Ordering table

Series	Connection	Guard locking	Switching element	Version	Order no./item
TX	SEM 4 Plug connectors M12	1 Mechanical	SK: 1 NC ⊖ UK: 1 NC ⊖		094403 TX1BA024SEM4AS1
				C1991 with escape release	095914 TX1BA024SEM4AS1C1991

Safety Switches with Separate Actuator, Plastic Housing **EUCHNER**

Safety switch STA with guard locking and guard lock monitoring



- ▶ Mechanical release on the front



Mechanical release

Is used for releasing the guard locking with the aid of a tool. To protect against tampering, the mechanical release is sealed with sealing lacquer.

Guard locking type

STA3 Closed-circuit current principle, guard locking by spring force. Release by control of AS-i output 0.

STA4 Open-circuit current principle, guard locking by control of AS-i output 0. Release by spring force.

Control of the guard locking solenoid

The guard locking solenoid is controlled by the control system via AS-Interface bus bit D0. In addition the 24V connection can be switched safely.

AS-Interface inputs

- ▶ **D0, D1** Door monitoring contact SK
 - ▶ **D2, D3** Solenoid monitoring contact ÜK
- Evaluation is performed via a safety monitor.

AS-Interface outputs

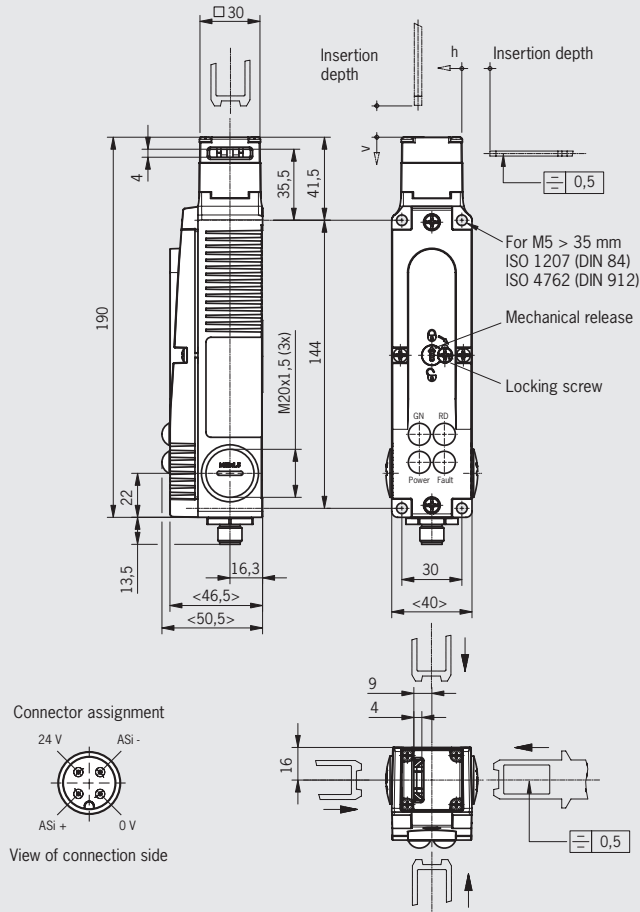
- ▶ **D0** Guard locking solenoid
- ▶ **D1** Red LED
- ▶ **D2** Green LED

LED function display

- ▶ The *Power* LED indicates the operating voltage at the bus.
- ▶ The *Fault* LED indicates if a fault has been detected on the AS-Interface bus.
- ▶ The green and the red LEDs can be optionally controlled with bits D1 and D2 by the control system via the bus.

Plug connector M12
4-pin

Dimension drawing



Please order actuator separately
(see catalog "Safety switches with metal housing" or
catalog "Safety switches with plastic housing")

Ordering table

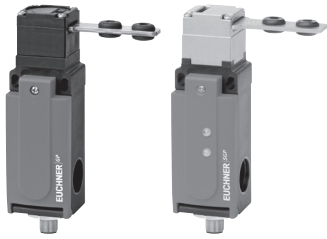
Series	Connection	Guard locking	Switching element	Order no./item
STA	SEM 4 Plug connectors M12	3 Mechanical	SK: 1 NC ⊖ ÜK: 1 NC ⊖	098993 STA3A-4141A024SEM4AS1
		4 Electrical	SK: 1 NC ⊖ ÜK: 1 NC ⊖	105305 STA4A-4141A024SEM4AS1

Safety Switches with Separate Actuator, Plastic Housing **EUCHNER**



Safety switches GP and SGP

- ▶ For metal SGP actuating head
- ▶ External LED function display optional



Approach direction



Can be adjusted horizontally and vertically in 90° steps.

AS-Interface inputs

- ▶ **D0, D1** Positively driven NC contact 1
 - ▶ **D2, D3** Positively driven NC contact 2
- Evaluation is performed via a safety monitor.

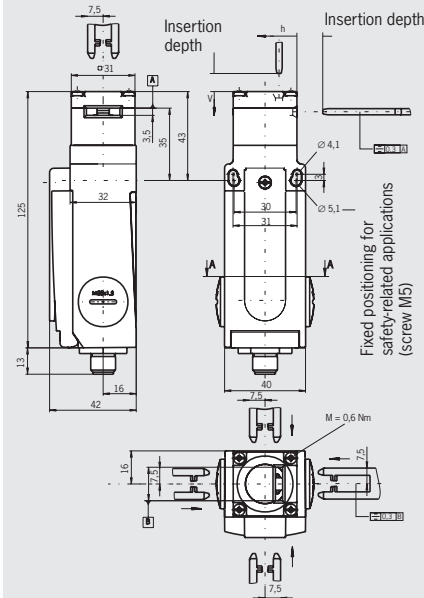
LED function display

(Depending on version internal with open cover or external)

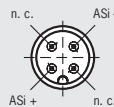
- ▶ The *Power* LED indicates the operating voltage at the bus.
- ▶ The *Fault* LED indicates if a fault has been detected on the AS-Interface bus.

GP, plug connector M12 4-pin

Dimension drawing



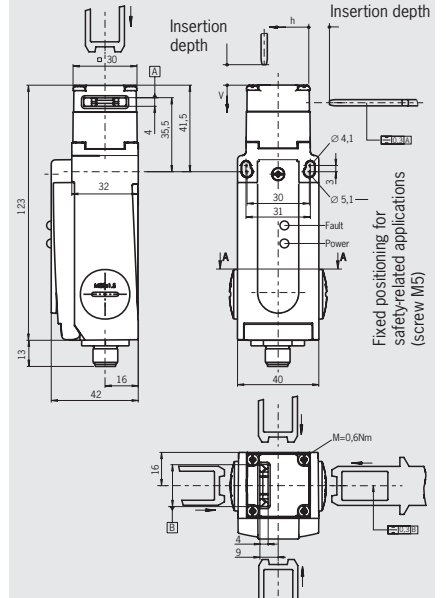
Connector assignment



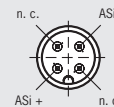
View of connection side

Please order actuator separately (see catalog "Safety switches with plastic housing")

SGP, plug connector M12 4-pin



Connector assignment



View of connection side

Please order actuator separately (see catalog "Safety switches with plastic housing")

Ordering table

Series	Connection	Switching element	LED function display	Order no./item
GP	SEM 4 Plug connectors M12	2 NC ⊖	internal	091193 GP3-538ASEM4AS1
			external	106352 SGP3E-538ASEM4AS1L
SGP	SEM 4 Plug connectors M12	2 NC ⊖	internal	099126 SGP3E-538ASEM4AS1
			external	106352 SGP3E-538ASEM4AS1L

Safety Switches with Separate Actuator, Plastic Housing **EUCHNER**

Safety switch TP with guard locking



- ▶ Mechanical release on the front
- ▶ Increased horizontal overtravel
- ▶ Optional without guard lock monitoring



Mechanical release

Is used for releasing the guard locking with the aid of a tool. To protect against tampering, the mechanical release is sealed with sealing lacquer.

Guard locking types

TP3 Closed-circuit current principle, guard locking by spring force. Release by control of AS-i output 0.

TP4 Open-circuit current principle, guard locking by control of AS-i output 0. Release by spring force.

Control of the guard locking solenoid

The guard locking solenoid is controlled by the control system via AS-Interface bus bit D0. In addition the 24V connection can be switched safely.

AS-Interface inputs version AS1

- ▶ **D0, D1** Door monitoring contact SK
- ▶ **D2, D3** Solenoid monitoring contact ÜK

AS-Interface inputs version AS2

- ▶ **D0, D1** Door monitoring contact SK 1
- ▶ **D2, D3** Door monitoring contact SK 2

Evaluation is performed via a safety monitor.

AS-Interface outputs

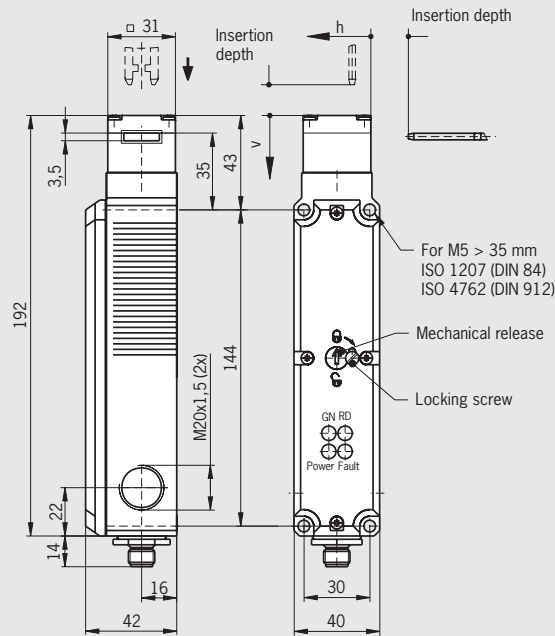
- ▶ **D0** Guard locking solenoid
- ▶ **D1** Red LED
- ▶ **D2** Green LED

LED function display

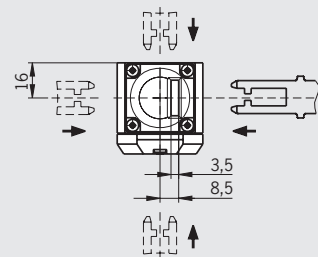
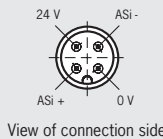
- ▶ The *Power* LED indicates the operating voltage at the bus.
- ▶ The *Fault* LED indicates if a fault has been detected on the AS-Interface bus.
- ▶ The green and the red LEDs can be optionally controlled with bits D1 and D2 by the control system via the bus.

Plug connector M12
4-pin

Dimension drawing



Connector assignment



Please order actuator separately (see catalog "Safety switches with plastic housing")

Ordering table

Series	Connection	Guard locking	Switching element	Version	Order no./item
TP	SEM 4 Plug connectors M12	3 Mechanical	SK: 1 NC ⊖ ÜK: 1 NC ⊖	AS1 with guard lock monitoring	088256 TP3-4141A024SEM4AS1
		4 Electrical	SK: 1 NC ⊖ ÜK: 1 NC ⊖	AS1 with guard lock monitoring	088257 TP4-4141A024SEM4AS1
			SK: 2 NC ⊖	AS2 without guard lock monitoring	091676 TP4-4141A024SEM4AS2

Safety Switches with Separate Actuator, Plastic Housing EUCHNER

Safety switch STP with guard locking and guard lock monitoring



- ▶ Actuating head made of metal
- ▶ Mechanical release on the front



Mechanical release

Is used for releasing the guard locking with the aid of a tool. To protect against tampering, the mechanical release is sealed with sealing lacquer.

Guard locking types

STP3 Closed-circuit current principle, guard locking by spring force. Release by control of AS-i output O.

STP4 Open-circuit current principle, guard locking by control of AS-i output O. Release by spring force.

Control of the guard locking solenoid

The guard locking solenoid is controlled by the control system via AS-Interface bus bit D0. In addition the 24V connection can be switched safely.

AS-Interface inputs

- ▶ **D0, D1** Door monitoring contact SK
 - ▶ **D2, D3** Solenoid monitoring contact ÜK
- Evaluation is performed via a safety monitor.

AS-Interface outputs

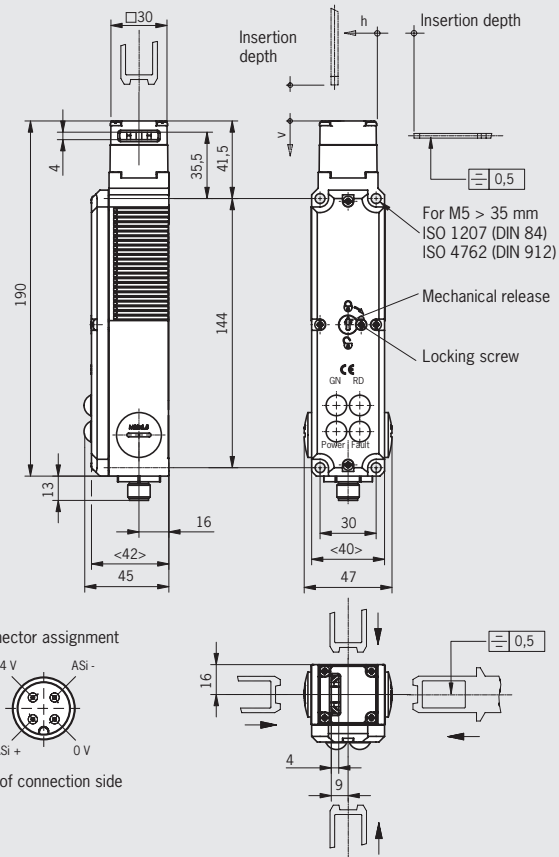
- ▶ **D0** Guard locking solenoid
- ▶ **D1** Red LED
- ▶ **D2** Green LED

LED function display

- ▶ The *Power* LED indicates the operating voltage at the bus.
- ▶ The *Fault* LED indicates if a fault has been detected on the AS-Interface bus.
- ▶ The green and the red LEDs can be optionally controlled with bits D1 and D2 by the control system via the bus.

Plug connector M12
4-pin

Dimension drawing



Please order actuator separately
(see catalog "Safety switches with plastic housing")

Ordering table

Series	Connection	Guard locking	Switching element	Order no./item
STP	SEM 4 Plug connectors M12	3 Mechanical	SK: 1 NC ⊖ ÜK: 1 NC ⊖	097790 STP3A-4141A024SEM4AS1
		4 Electrical	SK: 1 NC ⊖ ÜK: 1 NC ⊖	097789 STP4A-4141A024SEM4AS1

Safety switch STP with guard locking and guard lock monitoring



- ▶ Power supply for the guard locking solenoid from AS-i bus
- ▶ Actuating head made of metal
- ▶ Mechanical release on the front
- ▶ According to AS-Interface specification 3.1



Mechanical release

Is used for releasing the guard locking with the aid of a tool. To protect against tampering, the mechanical release is sealed with sealing lacquer.

Guard locking types

STP3 Closed-circuit current principle, guard locking by spring force. Release by control of AS-i output 0.

STP4 Open-circuit current principle, guard locking by control of AS-i output 0. Release by spring force.

Control of the guard locking solenoid

The guard locking solenoid is controlled by the control system via AS-Interface bus bit D0. It is only supplied from the AS-i bus, an additional supply of auxiliary power is not necessary. The current consumption with solenoid switched on is 400 mA.

AS-Interface inputs

- ▶ **D0, D1** Door monitoring contact SK
 - ▶ **D2, D3** Solenoid monitoring contact ÜK
- Evaluation is performed via a safety monitor.

AS-Interface outputs

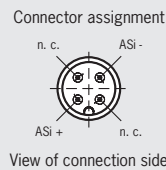
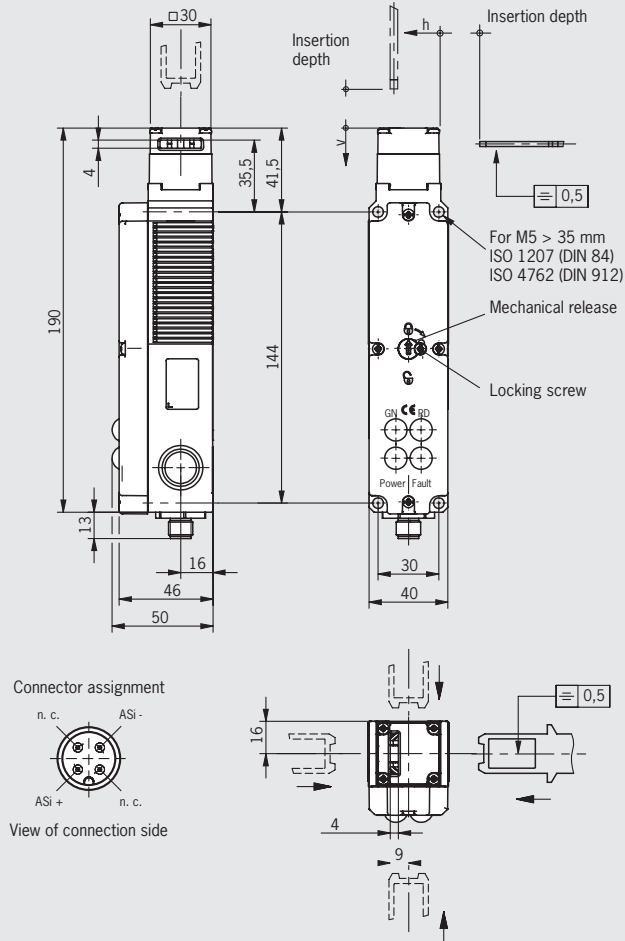
- ▶ **D0** Guard locking solenoid
- ▶ **D1** Red LED
- ▶ **D2** Green LED

LED function display

- ▶ The Power LED indicates the operating voltage at the bus.
- ▶ The Fault LED indicates if a fault has been detected on the AS-Interface bus.
- ▶ The green and the red LEDs can be optionally controlled with bits D1 and D2 by the control system via the bus.

Plug connector M12
4-pin

Dimension drawing



Please order actuator separately
(see catalog "Safety switches
with plastic housing")

Ordering table

Series	Connection	Guard locking	Switching element	Order no./item
STP	SEM 4 Plug connectors M12	3 Mechanical	SK: 1 NC ⊕ ÜK: 1 NC ⊕	106648 STP3A-4141A024SEM4AS3
		4 Electrical	SK: 1 NC ⊕ ÜK: 1 NC ⊕	106649 STP4A-4141A024SEM4AS3

Safety switch STP-TW with guard locking and guard lock monitoring



- ▶ Actuating heads made of metal
- ▶ Mechanical release on the front
- ▶ Mechanical key release optional



Function

In the safe state, both actuators must be inserted into the switch head.

Mechanical release

Is used for releasing the guard locking with the aid of a tool. To protect against tampering, the mechanical release is sealed with sealing lacquer.

Guard locking types

STP-TW3 Closed-circuit current principle, guard locking by spring force. Release by control of AS-i output 0.

Control of the guard locking solenoid

The guard locking solenoid is controlled by the control system via AS-Interface bus bit D0. In addition the 24V connection can be switched safely.

AS-Interface inputs

- ▶ **D0, D1** Door monitoring contact SK
 - ▶ **D2, D3** Solenoid monitoring contact UK
- Evaluation is performed via a safety monitor.

AS-Interface outputs

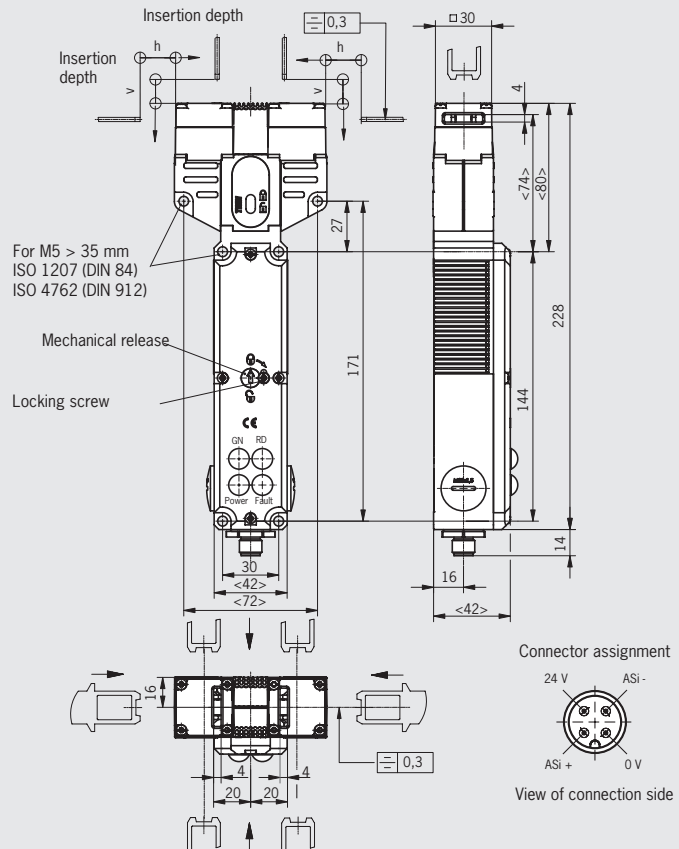
- ▶ **D0** Guard locking solenoid
- ▶ **D1** Red LED
- ▶ **D2** Green LED

LED function display

- ▶ The *Power* LED indicates the operating voltage at the bus.
- ▶ The *Fault* LED indicates if a fault has been detected on the AS-Interface bus.
- ▶ The green and the red LEDs can be optionally controlled with bits D1 and D2 by the control system via the bus.

Plug connector M12
4-pin

Dimension drawing



Please order actuator separately
(see catalog "Safety switches
with plastic housing")

Ordering table

Series	Connection	Guard locking	Switching element	Order no./item
STP-TW	SEM 4 Plug connectors M12	3 Mechanical	SK: 1 NC ⊖ UK: 1 NC ⊖	102354 STP-TW-3A-4141AC024SEM4AS1
		4 Electrical	SK: 1 NC ⊖ UK: 1 NC ⊖	109813 STP-TW-4A-4141AC024SEM4AS1

Rope pull switch RPS with turn-to-reset button for emergency stop device



- ▶ Emergency stop device with detent mechanism according to EN ISO 13850 and EN 60204-1
- ▶ Clamping head for pull rope
- ▶ Display of the correct rope tension



AS-Interface inputs

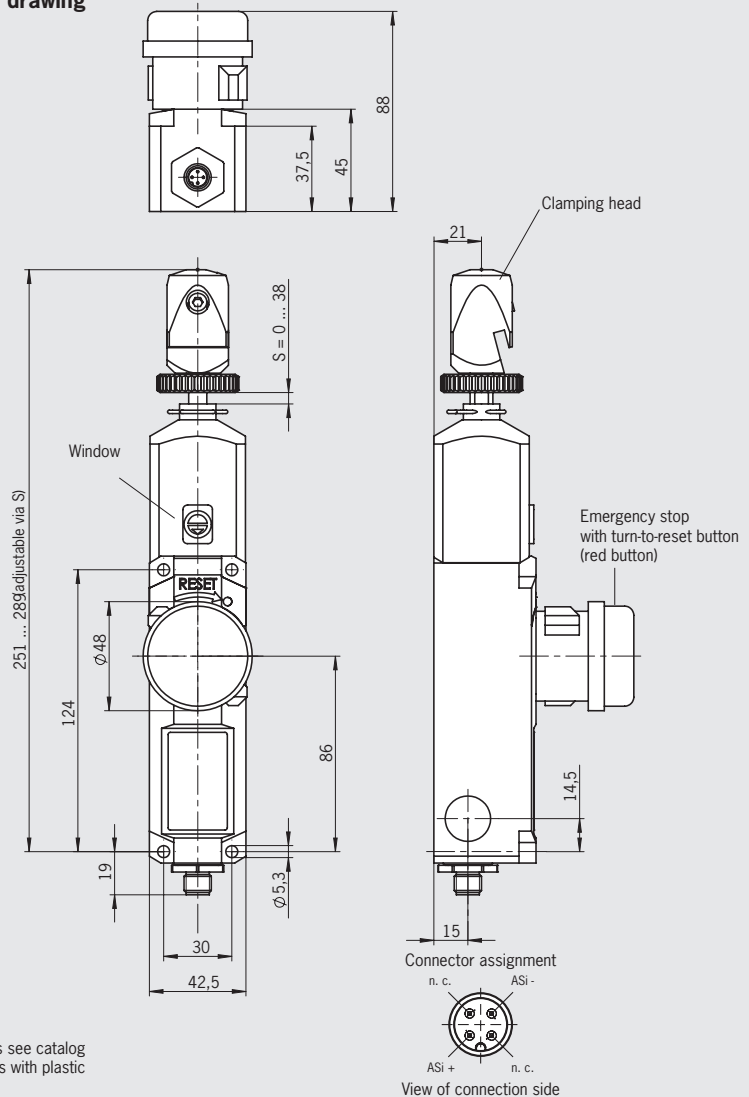
- ▶ **D0, D1** Positively driven NC contact 1
 - ▶ **D2, D3** Positively driven NC contact 2
- Evaluation is performed via a safety monitor.

Internal LED function display

- ▶ The *Power* LED indicates the operating voltage at the bus.
- ▶ The *Fault* LED indicates if a fault has been detected on the AS-Interface bus.
- ▶ The green and the red LEDs can be optionally controlled with bits D1 and D2 by the control system via the bus.

Plug connector M12
4-pin, turn-to-reset button for emergency stop, clamping head for tensioning rope

Dimension drawing



For accessories see catalog "Safety switches with plastic housing"

Ordering table

Series	Connection	Rope attachment	Reset	Switching element	Actuating force [N]	Order no./item
RPS	SEM 4 Plug connectors M12	C Clamping head	S Turn-to-reset button	2 NC ⊖	100	102801 RPS2121SC100SEM4AS1
					175	102803 RPS2121SC175SEM4AS1
					300	102804 RPS2121SC300SEM4AS1

Enabling switches ZSA and ZSB



- ▶ Housing G1
- ▶ 3-stage function
- ▶ Positively driven contacts
- ▶ Dual-channel version
- ▶ Optional with 2 buttons (+ and -)



3-stage function

Enabling function is only active in the second stage (middle position, actuating point). Enabling is canceled when the button is released or pushed all the way down (panic function).

+ and - buttons

These buttons can be configured individually. For example, for moving axes in positive or negative direction.

AS-Interface inputs

- ▶ **D0, D1** NO contact E1
- ▶ **D2, D3** NO contact E2

Evaluation is performed via a safety monitor.

AS-Interface parameters

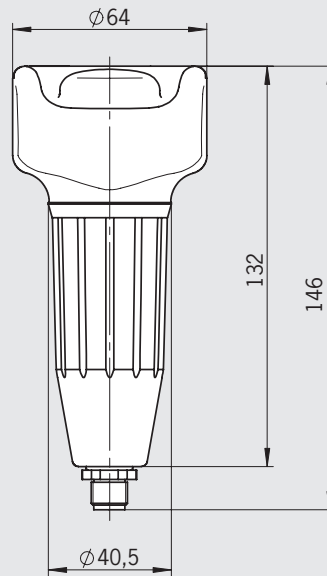
The buttons (+ and -) are transferred when the AS-i parameters are read out.

- ▶ **P0** Parameter bit, Plus button
- ▶ **P1** Parameter bit, Minus button

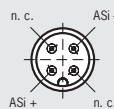
ZSA, 3-stage function

Plug connector M12, 4-pin

Dimension drawings



Connector assignment

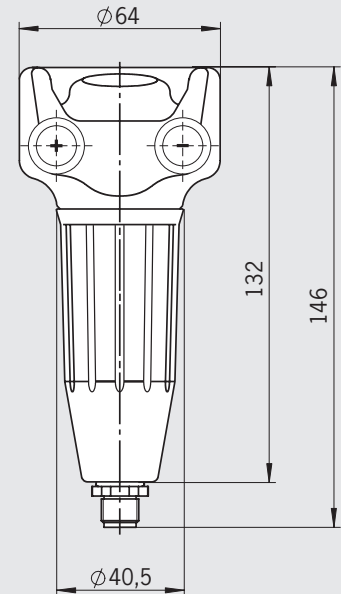


View of connection side

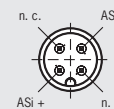
See catalog "Enabling switches" for accessories

ZSB, 3-stage function

Plug connector M12, 4-pin



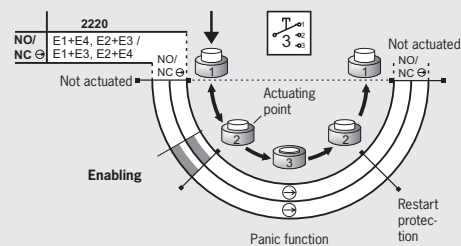
Connector assignment



View of connection side

See catalog "Enabling switches" for accessories

Function sequence



Contact
 □ open
 ■ closed
 ■ closed, enabling

Ordering table

Series	Connection	Switching element	Switching element	Order no./item
G1 3-stage	SEM 4 Plug connectors M12	2 NO three-stage		091580 ZSA2B2CAS1
			2 buttons (+ and -)	096703 ZSB2B7CAS1

Emergency stop devices ES-X... built-in devices



- ▶ In accordance with EN ISO 13850 and EN 60204-1
- ▶ Button head red \varnothing 29 mm
- ▶ Latching monitoring
- ▶ Reset by pulling or turning
- ▶ Optionally with built-in LED



AS-Interface inputs

- ▶ **D0, D1** Positively driven NC contact 1
 - ▶ **D2, D3** Positively driven NC contact 2
- Evaluation is performed via a safety monitor.

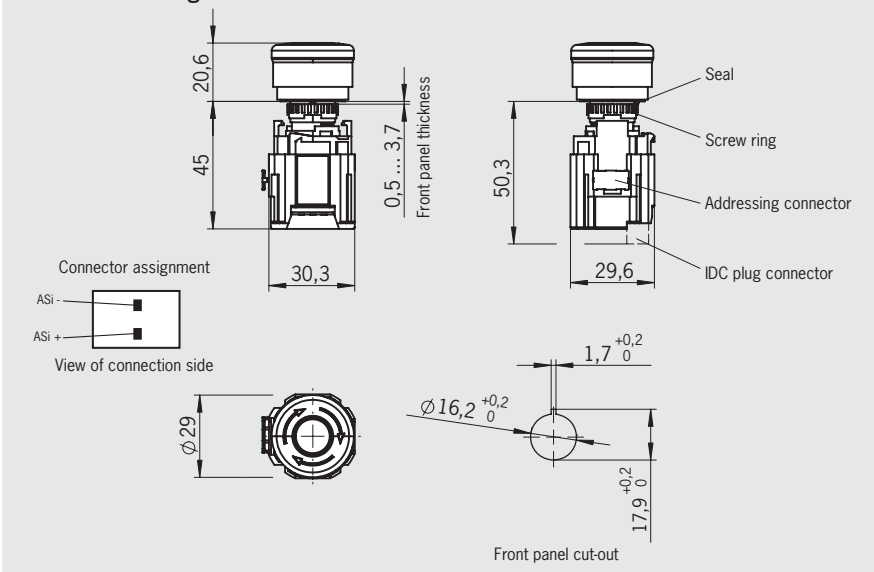
AS-Interface outputs

- ▶ **D0** LED, button head lighting

Emergency stop device ES-XA built-in device 16 mm

Button head red \varnothing 29 mm

Dimension drawing



- ▶ Button head red \varnothing 40 mm
- ▶ Latching monitoring
- ▶ Reset by pulling or turning
- ▶ Optionally with built-in LED



AS-Interface inputs

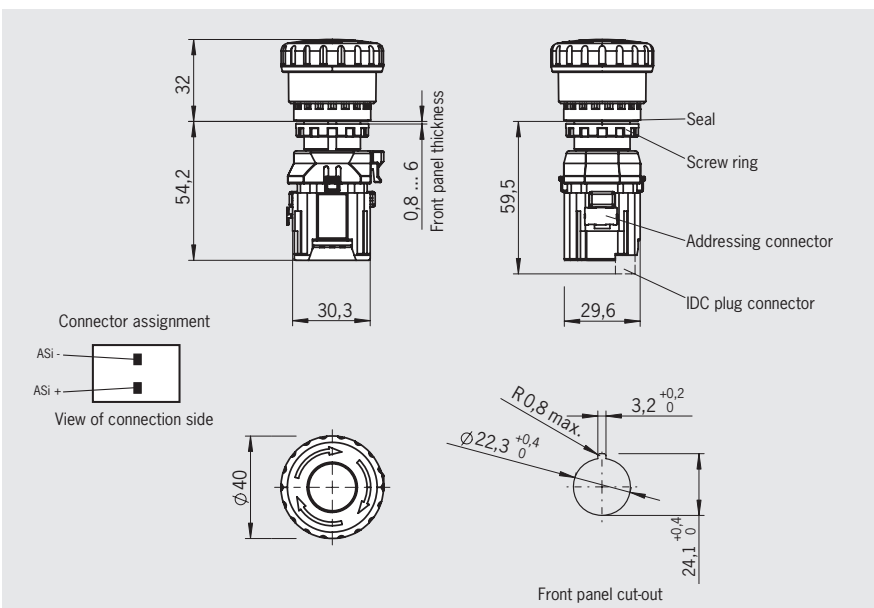
- ▶ **D0, D1** Positively driven NC contact 1
 - ▶ **D2, D3** Positively driven NC contact 2
- Evaluation is performed via a safety monitor.

AS-Interface outputs

- ▶ **D0** LED, button head lighting

Emergency stop device ES-XW built-in device 22 mm

Button head red \varnothing 40 mm



Ordering table

Series	Connection	Built-in LED	Mushroom-head button	Order no./item
ES-XA	IE Plug connectors IDC	BV Without	3Z10C1R \varnothing 29 mm red	105019 ES-XA1E-BV3Z10C1R
		LV With	3Z114C1R \varnothing 29 mm red transparent	105020 ES-XA1E-LV3Z114C1R
ES-XW	IE Plug connectors IDC	BV Without	4Z10C1R \varnothing 40 mm red	105022 ES-XW1E-BV4Z10C1R
		LV With	4Z114C1R \varnothing 40 mm red transparent	105023 ES-XW1E-LV4Z114C1R

Emergency stop devices ES-FB... with housing



- ▶ In accordance with EN ISO 13850 and EN 60204-1
- ▶ Button head red \varnothing 40 mm
- ▶ Latching monitoring
- ▶ Reset by pulling or turning
- ▶ Optionally with built-in LED



AS-Interface inputs

- ▶ **D0, D1** Positively driven NC contact 1
 - ▶ **D2, D3** Positively driven NC contact 2
- Evaluation is performed via a safety monitor.

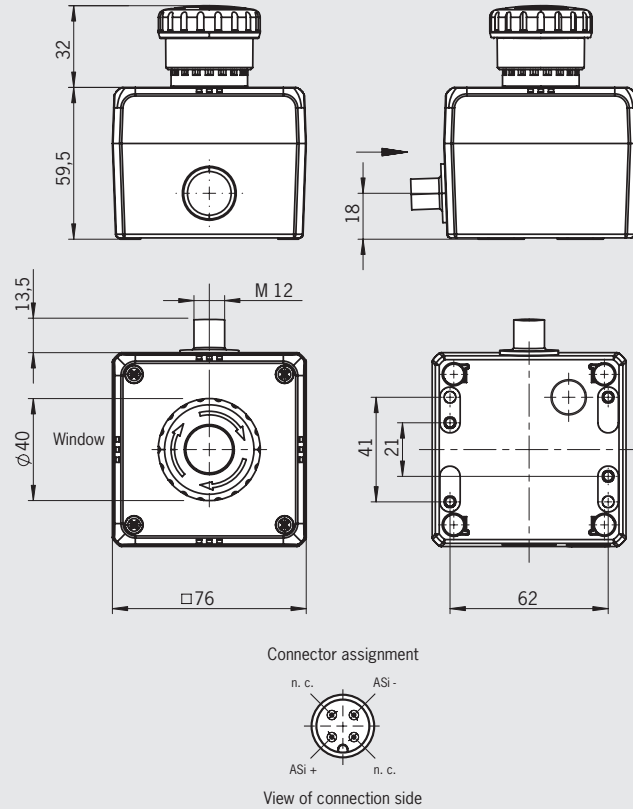
AS-Interface outputs

- ▶ **D0** LED, button head lighting

Emergency stop device ES-FB with housing

Button head red \varnothing 40 mm

Dimension drawing



Ordering table

Series	Connection	Built-in LED	Mushroom-head button	Order no./item
ES-FB1W-XW	1E Plug connectors M12	BV Without	4Z10C2R-YO-1 \varnothing 40 mm red	105024 ES-FB1W-XW1E-BV4Z10C2R-YO-1
		LV With	4Z114C2R-YO-1 \varnothing 29 mm red transparent	105025 ES-FB1W-XW1E-LV4Z114C2R-YO-1

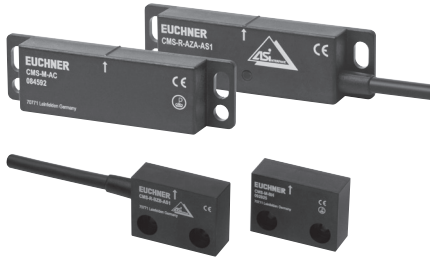
Accessories for emergency stop devices ES

Series	Designation	Order no./item
ES-MW9Z-T1	Key for fastening the ring screw on ES-XW... devices	106337
ES-MT-001	Key for fastening the ring screw on ES-XA... devices	106339
ES-HWAV-27	Emergency stop label for 40 mm buttons on ES-XW devices with text "Emergency Stop"	106340
ES-HAAV-27	Emergency stop label for 29 mm buttons on ES-XA devices with text "Emergency Stop"	106342
ES-XW9Z-C100-1PN05	IDC connector 2-pin 2.54 mm for ES-XW AS-i types (end connector)	106343
ES-XW9Z-C100-2PN05	IDC connector 2-pin 2.54 mm for ES-XW AS-i types (intermediate connector)	106344
ES-MMIT-156F	Wiring tool for IDC plug connectors	106345
ES-XW9Z-C210	Cable with IDC plug, 1 m	106346

Non-contact safety switches CMS...AS1

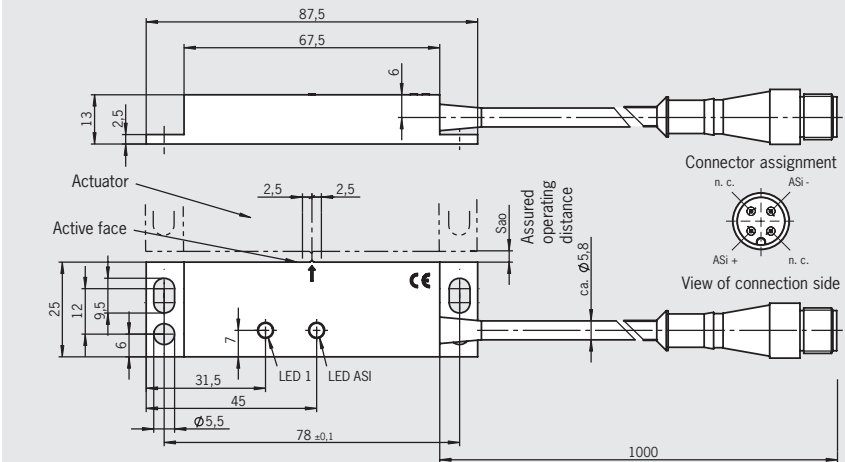


- ▶ Safety switches with integrated read head and integrated evaluation unit.
- ▶ LED diagnostic displays optional



Non-contact safety switch CMS-R-AZA-01VL-AS1/actuator CMS-M-AC Plug connector M12, switch-on distance 9 mm

Dimension drawing



The dimensions of the actuators are the same as those of the read heads, although the former have no connection cable.

Actuator

An appropriate actuator to suit the read head selected is required. The dimensions of the actuators are the same as those of the read heads, although the former have no connection cable.

AS-Interface inputs

- ▶ **D0 - D3** Switch actuated/open
Evaluation is performed via a safety monitor.

AS-Interface outputs

- ▶ **D1** LED 1 on read head (only CMS-R-AZA...)

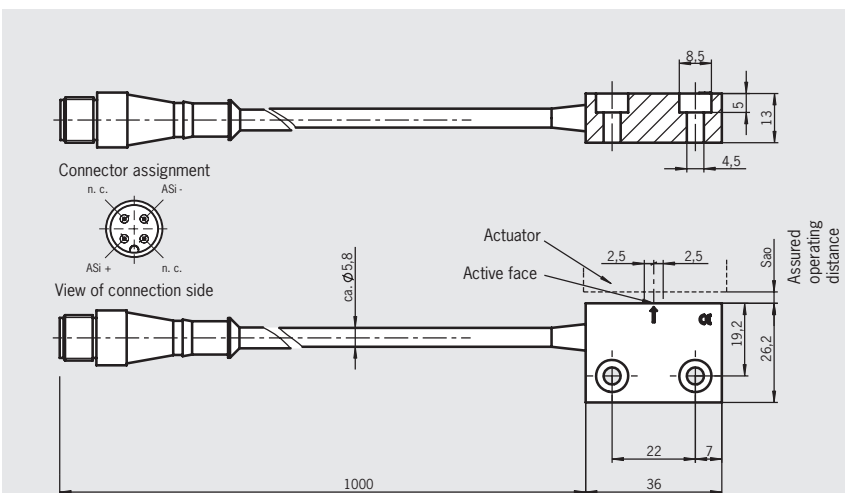
LED function display

- ▶ The ASI (red/green dual LED) displays the colors red, green and yellow. The status of the switch and the bus is indicated via this LED.
- ▶ LED 1 can be connected via the AS-Interface bus, e.g. to indicate the door state.

Operating principle

Reed contacts are installed in the read head of the safety system CMS. The contacts blades on the reed contacts will close when under the influence of the magnetic field from the actuator. The read head only responds to the specific mating component, that is a specific actuator which is allocated to the read head type.

Non-contact safety switch CMS-R-BZB-01V-AS1/actuator CMS-M-BH Plug connector M12, switch-on distance 7 mm



The dimensions of the actuators are the same as those of the read heads, although the former have no connection cable.

Ordering table

Series	Connection	Assured switch-on distance sa0 [mm]	Order no./item	
			Safety switches	Related actuator
CMS	PVC connection cable, length 1 m, with plug connector M12	9	105090 CMS-RAZA-01VL-AS1	084592 CMS-M-AC
		7	105094 CMS-R-BZB-01V-AS1	092025 CMS-M-BH

Evaluation unit for non-contact read head CES, CEM, CET or CKS

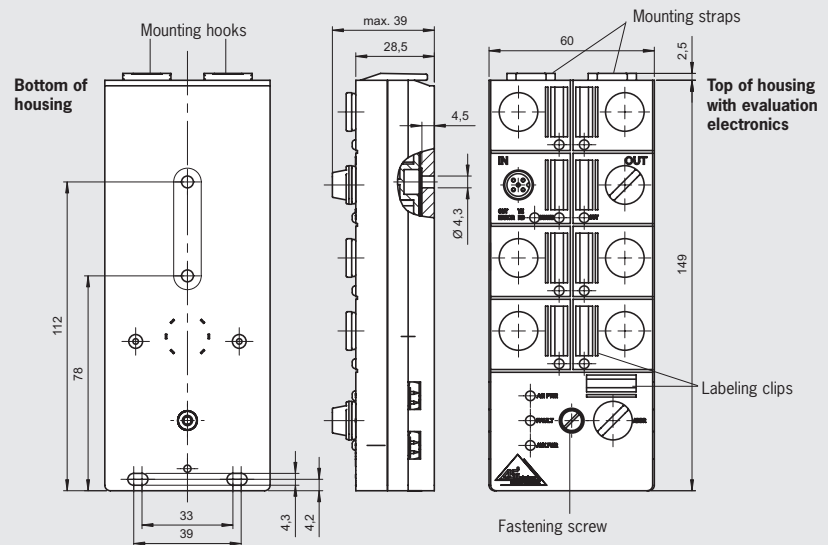


- ▶ Evaluation unit for direct connection of a CES read head
- ▶ Connection of a CEM solenoid
- ▶ LED diagnostic displays
- ▶ Connection of CET guard locking



Evaluation unit CES-A-.1B-01B-AS1

Dimension drawings



For accessories, refer to page 25/26 and the catalog "Non-contact safety system CES"

Connection of read head CES or CKS

The CES series read heads can be connected to the evaluation unit using an M12 plug connector. The read head is not included with the evaluation unit.

Connection of a read head CEM or CET

The read heads are connected using two M12 plug connectors. Connection cables with M12 plug connectors are required for the evaluation unit, and connection cables with M8 plug connectors are needed for the read head. Connection cables and read head are not included with the evaluation unit.

Note: The separate auxiliary power must also be connected.

Versions

Unicode: Only the actuator that undergoes a teach-in operation in the device is recognized.

Multicode: All EUCHNER actuators are recognized without a teach-in operation.

Actuator

An actuator with programmed code to suit the read head selected is needed.

AS-Interface inputs

- ▶ **D0 - D3** Input IN for read head

Evaluation is performed via a safety monitor.

AS-Interface outputs

- ▶ **D0** Output OUT to control CEM or CET

Operating principle

The non-contact safety systems CES operate on the basis of a uniquely electronically coded actuator (transponder). The transponder (actuator) receives and processes the electromagnetic field from a transceiver (read head), and the data signals are then sent back to the read head as a response depending on the transponder coding. Power is supplied and data transmitted to the coded actuator by induction using a read head.

Ordering table

Series	Version	Version	Housing	Order no./item
CES	F unicode	01B 1 read head switch-on distance 15 mm	IP 65 Field device	094230 CES-AF1B-01B-AS1
	V multicode	01B 1 read head switch-on distance 15 mm	IP 65 Field device	096631 CES-AV1B-01B-AS1

Evaluation unit for non-contact read head CES, CEM, CET or CKS



- ▶ Evaluation unit for direct connection of up to four CES read heads
- ▶ LED diagnostic displays



Connection of read head CES or CKS

The CES series read heads can be connected to the evaluation unit using an M12 plug connector. The read heads are not included with the evaluation unit.

Connection of a read heads CEM or CET

An additional standard AS-Interface module with outputs (DO) is required for connection of these read heads.

Version

Unicode: Only the actuator that undergoes a teach-in operation in the device is recognized.

Multicode: All EUCHNER actuators are recognized without a teach-in operation.

Actuator

An actuator with programmed code to suit the read head selected is needed.

AS-Interface inputs

- ▶ **DO - D3** Input IN for CES read head

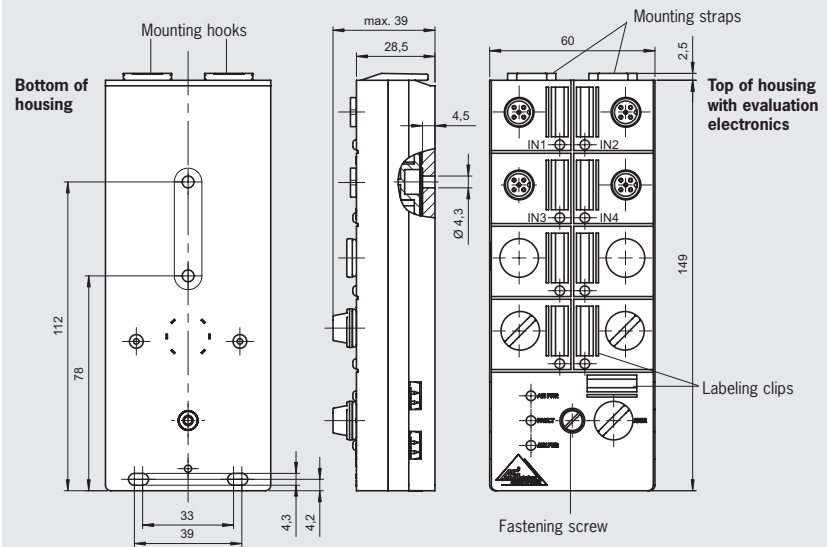
Evaluation is performed via a safety monitor.

Operating principle

The non-contact safety systems CES operate on the basis of a uniquely electronically coded actuator (transponder). The transponder (actuator) receives and processes the electromagnetic field from a transceiver (read head), and the data signals are then sent back to the read head as a response depending on the transponder coding. Power is supplied and data transmitted to the coded actuator by induction using a read head.

Evaluation unit CES-A-F1B-04B-AS1

Dimension drawings



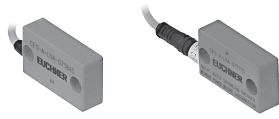
For accessories, refer to page 25/26 and the catalog "Non-contact safety system CES"

Ordering table

Series	Version	Version	Housing	Order no./item
CES	F unicode	04B 4 read heads switch-on distance 15 mm	IP 65 Field device	097660 CES-A-F1B-04B-AS1
	V multicode	04B 4 read heads switch-on distance 15 mm	IP 65 Field device	100206 CES-A-V1B-04B-AS1

Accessories for CES...AS1 evaluation units

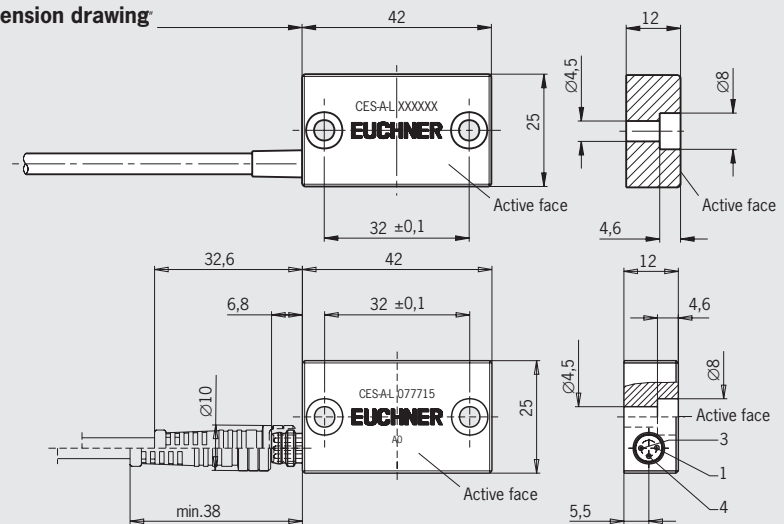
► Read head CES-A-LNA...



The read heads CES are suitable for connection directly to the evaluation units CES-AF1B... or CES-AV1B...

Read head CES-A-LNA...

Dimension drawing



2 safety screws M4x14 included

The dimensions of the actuators are the same as those of the read heads, although the former have no connection cable.

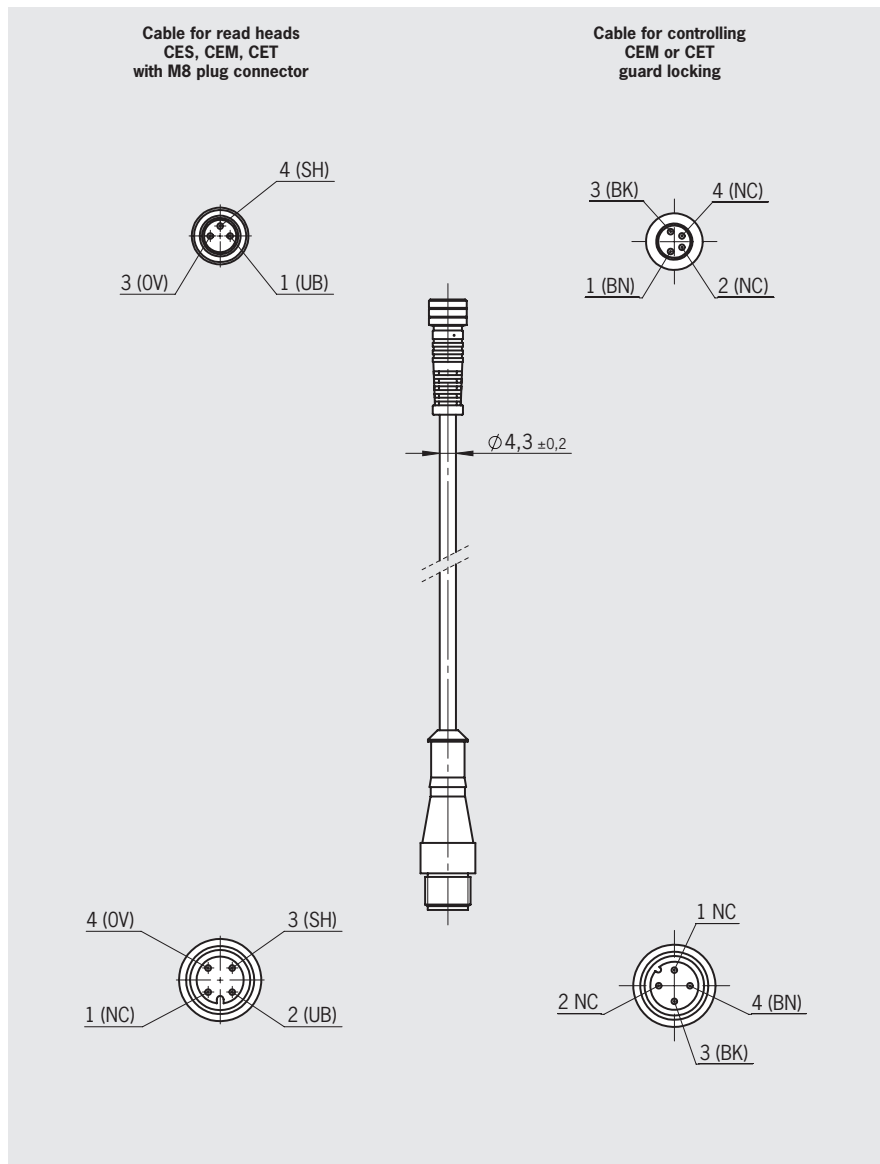
Ordering table

Series	Connection	Length	Order no./item	
			Read head	Related actuator
CES-A-LNA	PVC connection cable	1 m	094031 CESA-LNA-01VAS1	071840 CES-ABBA
		2 m	094032 CESA-LNA-02VAS1	071840 CES-ABBA
	Plug connector M8	-	077715 CESA-LNA-SC	071840 CES-ABBA

Accessories for CES...AS1 evaluation units

► Connection cables for read heads CES, CEM and CET

For the connection of the CES-LNA... read head and the CEM and CET read heads with integrated M8 plug connector, connecting cables with M8 and M12 plug connectors are available.



Ordering table

Version	Cable	Length	Order no./item
Cable for read heads CES, CEM, CET with M8 plug connector	PUR	2 m	095005 C-M08F03-02X025PU02,0-M12M04-095005
		5 m	095357 C-M08F03-02X025PU05,0-M12M04-095357
		10 m	099167 C-M08F03-02X025PU10,0-M12M04-099167
		30 m	099168 C-M08F03-02X025PU30,0-M12M04-099168
Cable for controlling CEM or CET guard locking in read heads with M8 plug connectors	PUR	2 m	100818 C-M08F04-04X025PV02,0-M12M05
		5 m	100817 C-M08F04-04X025PV05,0-M12M05

Safety switches CET...AS1



- ▶ Safety switch with guard locking and integrated evaluation electronics
- ▶ Locking force up to 6,500 N
- ▶ Up to category 4 / PL e according to EN ISO 13849-1



Unicode evaluation

Each actuator is unique. The safety switch detects only the actuator that has been taught-in. Additional actuators can be taught-in. Only the last actuator taught-in is detected.

Mechanical release

Is used for releasing the guard locking with the aid of a tool. The mechanical release must be sealed to prevent tampering (for example with sealing lacquer).

CET3 Closed-circuit current principle, guard locking by spring force. Release by control of AS-i output 0.

CET4 Open-circuit current principle, guard locking by control of AS-i output 0. Release by spring force.

Control of the guard locking solenoid

The guard locking solenoid is controlled by the control system via AS-Interface bus bit D0.

AS-Interface inputs

- ▶ **D0, D1** Door monitoring
- ▶ **D2, D3** Guard lock monitoring

Evaluation is performed via a safety monitor.

AS-Interface outputs

- ▶ **D0** Guard locking
- ▶ **D1** Red LED
- ▶ **D2** Green LED

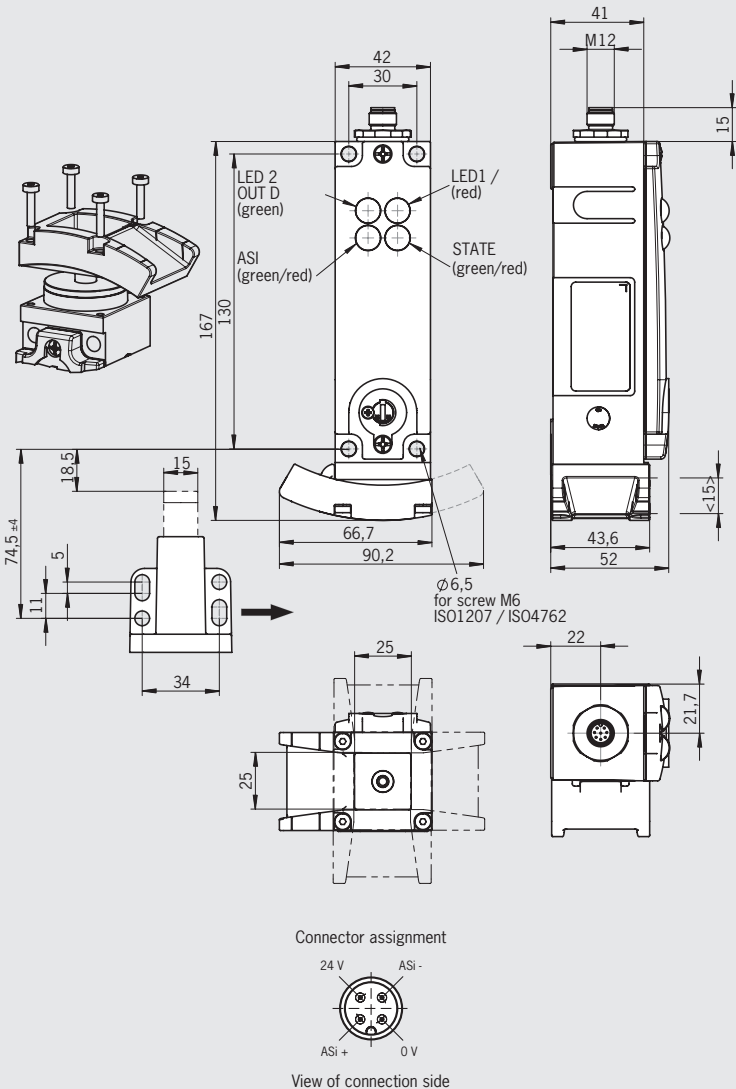
LED function display

- ▶ The ASI LED indicates the operating voltage at the bus.
- ▶ The State LED indicates if a fault has been detected on the AS-Interface bus.
- ▶ The green and the red LEDs can be optionally controlled with bits D1 and D2 by the control system via the bus.

Safety switches CET...AS1

Plug connector M12

Dimension drawing



Ordering table

Series	Connection	Guard locking	Switching element	Order no./item
CET	SEM 4 Plug connectors M12	3 Mechanical	SK: 1 NC ⊖ UK: 1 NC ⊖	111214 CET3-AS-CRA-AB-50X-SJAS1-111214
		4 Electrical	SK: 1 NC ⊖ UK: 1 NC ⊖	113631 CET4-AS-CRA-AB-50X-SJAS1-113631



Safety Basis Monitor SBM

- ▶ Four safe inputs, two safe semiconductor outputs
- ▶ AS-i monitor, master and connection for 24V power supply unit (AS-interface Power 24V) integrated
- ▶ Chip card and USB for parameter assignment
- ▶ Connectable to AS-i power supply unit or standard power supply unit



AS-i master

The SBM includes an AS-i Master, which can be switched off as an option. This permits several SBMs to be operated on an AS-Interface circuit. Configuration is performed with a PC. LEDs signal the state on the device.

OSSDs (Output Signal Switching Devices)

- ▶ Two OSSDs (Output Signal Switching Device) with semiconductor outputs
- ▶ 14 additional safe AS-i outputs can be controlled

Safe inputs

There are four safe inputs to which safety devices without AS-i bus can be directly connected. The inputs can be optionally used as standard inputs/monitoring outputs, e.g. for feedback circuit or start button.

Logic functions

Programmable with AsiMon software. All safety components can be programmed with different functions as inputs. The inputs can be linked with AND or OR gates or via logic functions such as FlipFlop, switch-on delay, turn-off delay or pulses. Different programs can be stored on memory cards.

AS-Interface monitor

The monitor controls one AS-i circuit with up to 31 safe slaves and up to 16 OSSDs, of which 2 are built into the device. 14 circuits can be used externally in addition.

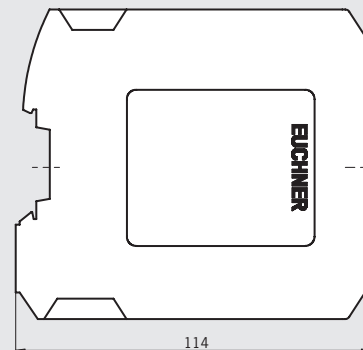
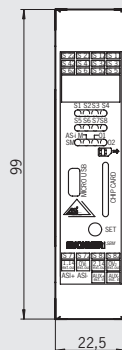
Power supply

Type S is suitable for connection to a conventional AS-i power supply unit.

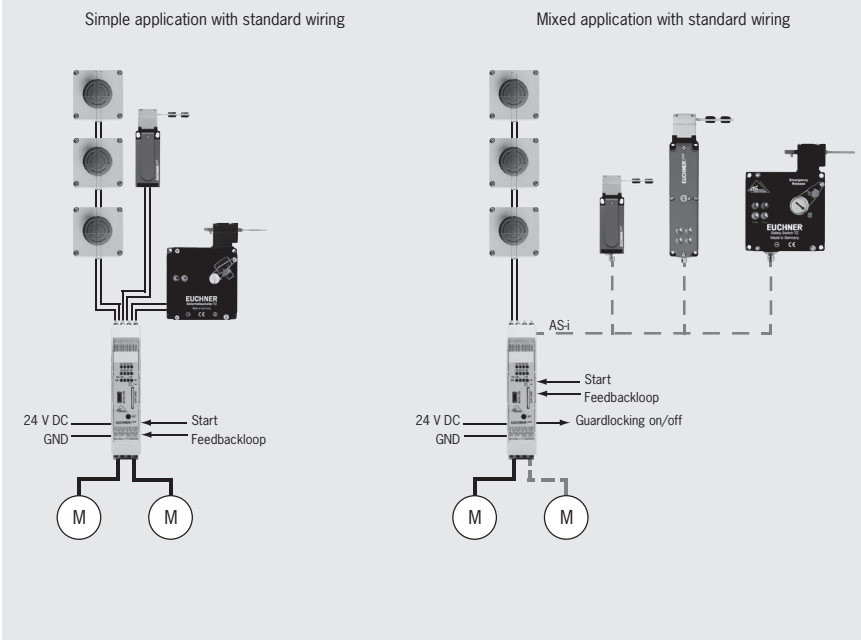
Type N permits connection of several SBM devices to the same standard power supply unit. Up to ten AS-i 24 slaves can be operated with one 24V standard power supply unit.

Safety Basis Monitor SBM

Dimension drawings



Block diagrams



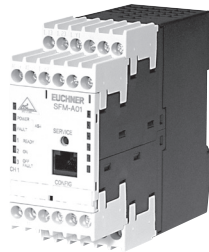
Ordering table

Series	Version	Inputs	Number of AS-i OSSDs	Order no./item
SBM	N With power supply isolation	4	2 internal, 14 external	113830 SBM-11-N08
	S Without power supply isolation	4	2 internal, 14 external	113831 SBM-11-S08

AS-Interface Safety at Work safety monitors SFM



- ▶ Single-channel or dual-channel
- ▶ Start inputs
- ▶ Door monitoring outputs
- ▶ Adjustable time-delay



OSSDs (Output Signal Switching Devices)

- SFM-...1:** One OSSD with 2 normally closed contacts
- SFM-...2:** Two OSSDs with 4 normally closed contacts

Auxiliary contacts

One auxiliary contact per channel.

Inputs

One start input per channel and one feedback loop per channel. Freely usable on SFM-B...

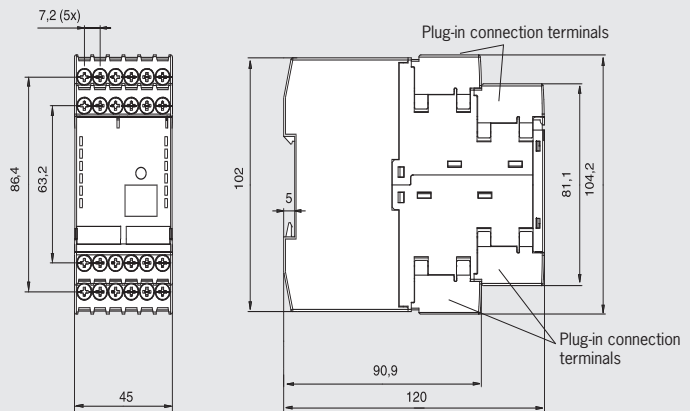
Logic functions

Programmable with AsiMon software. All safety components can be programmed with different functions as inputs. The inputs can be linked with AND or OR gates.

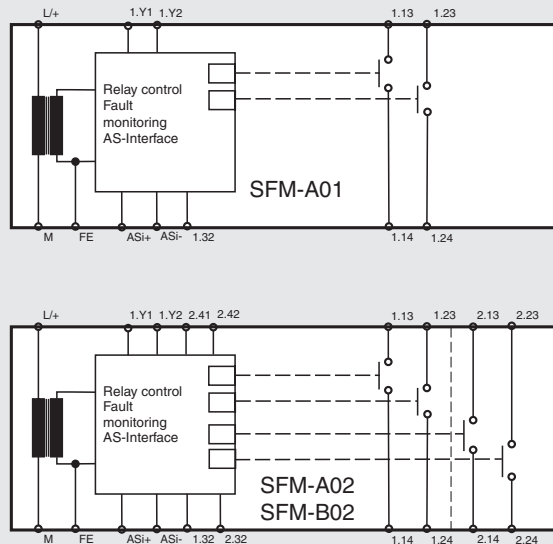
With the monitors SFM-B..., additional logic functions such as FlipFlop, switch-on delay, turn-off delay or pulses are available. The number of links and the memory depth are larger than on the SFM-A... devices.

Safety monitors SFM

Dimension drawings



Block diagrams



For connector assignment, see technical data on Page 57

Ordering table

Series	Version	Number of AS-i outputs	Channels	Order no./item
SFM	A standard	0	1	085638 SFM-A01
		0	2	085639 SFM-A02
	B Expanded	0	2	087891 SFM-B02

AS-Interface Safety at Work safe output SOM



- ▶ 1 redundant OSSD
- ▶ Control by SMO_x/GMO_x
- ▶ Control by machine control
- ▶ Up to 4 inputs
- ▶ Diagnostics via AS-Interface



OSSD (Output Signal Switching Device)

The OSSD is of redundant design according to category 4 EN ISO 138491. Safety-related control is via the bus by a suitable monitor, for example by a GMO_x or SMO_x. Operational switching is also possible directly by the control system with appropriate parameter settings.

Inputs and outputs

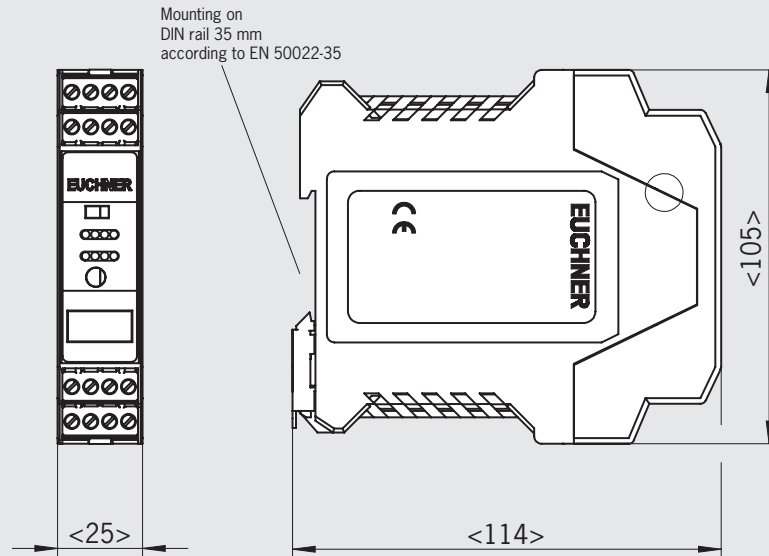
A feedback loop can be connected directly to the SOM. Depending on the parameter settings, further inputs and outputs can also be used.

LED function display

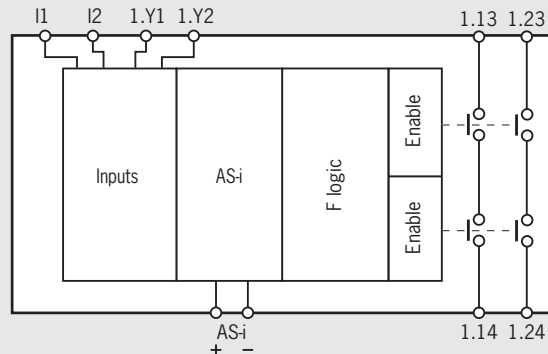
- ▶ **PWR** Green, AS-Interface power
- ▶ **ASi** Red, bus communication
- ▶ **OUT** Yellow, state of enabling circuit
- ▶ **ALARM** Red, can be set as required by control system
- ▶ **I1...I3** State of the corresponding input
- ▶ **1.Y1** State of the input

Safe output SOM

Dimension drawings



Block diagram



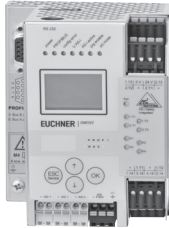
Ordering table

Series	Inputs	Outputs	OSSDs (Output Signal Switching Devices)	Order no./item
SOM	4	0	1	103489 SOM-4E-0A-C1

AS-Interface Safety at Work safety monitor SMOx



- ▶ Display and buttons for diagnostics and adjustment
- ▶ Memory card for different programs
- ▶ Adjustable time-delay
- ▶ 16 OSSDs



OSSDs (Output Signal Switching Devices)

- ▶ Two OSSDs (Output Signal Switching Devices) with two redundant normally closed contacts each
- ▶ Two OSSDs (Output Signal Switching Device) with semiconductor outputs
- ▶ 12 additional safe AS-i outputs can be controlled

Inputs

- ▶ 4 inputs, freely selectable

Logic functions

Programmable with AsiMon software. All safety components can be programmed with different functions as inputs. The inputs can be lined with AND and OR gates or via logic functions such as FlipFlop, switch-on delay, turn-off delay or pulses. Different programs can be stored on a memory card.

AS-Interface monitor

The monitor controls two AS-i circuits with up to 62 safe slaves and up to 16 enabling circuits, four of which are installed in the device. 12 circuits can be used externally in addition.

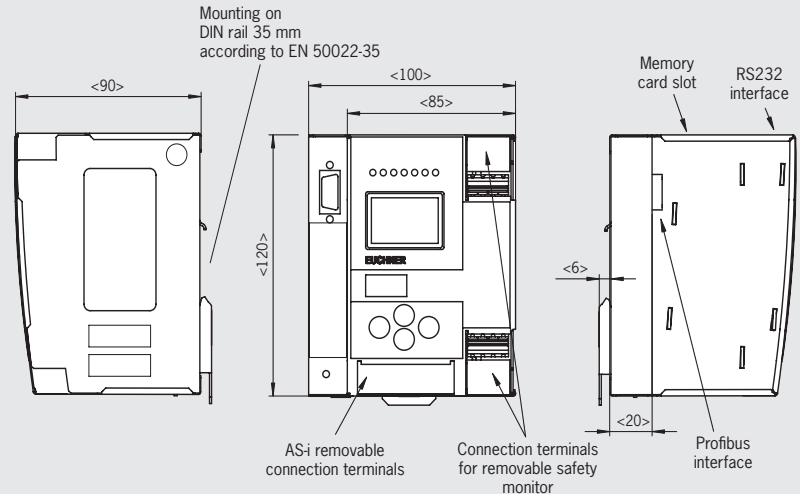
Display and buttons

The display is used to operate the monitor. The diagnostics and maintenance functions are considerably expanded compared to the SFM monitors. They can also be launched on the display without a PC monitor. Incorporated security functions allow the programmed functionality to be protected and monitored.

Important: One connection set must be ordered for each safety monitor (see page 34).

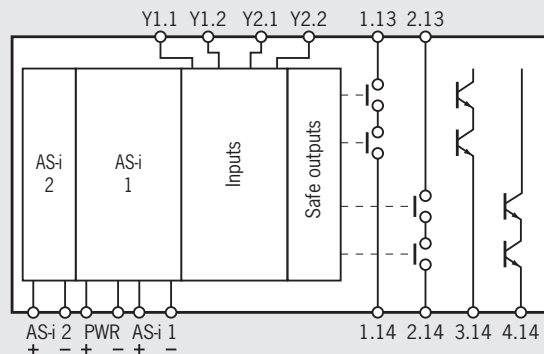
Safety monitor SMOx

Dimension drawing



Please order connection set separately; see page 34

Block diagram



For connector assignment, see technical data on Page 59

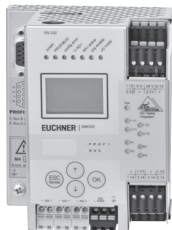
Ordering table

Series	Version	Inputs	Number of AS-i OSSDs	Order no./item
SMOx	C Expanded with safe AS-i outputs	4	4 internal, 12 external	103303 SMOx-MO-2D-C16

AS-Interface Safety at Work safety monitor with integrated gateway GMOx



- ▶ One or two AS-i masters
- ▶ Display and buttons for diagnostics and adjustment
- ▶ Memory card for different programs
- ▶ Adjustable time-delay
- ▶ 16 OSSDs



Gateway to Profibus

For connection to a Profibus DP as a slave and as a master for one or two AS-i buses according to specification 3.0. Recognition of ground shunt, double addressing and EMC problems. Rapid commissioning with the display without PC. Direct display of faults with plain-text messages. Comprehensive AS-i diagnostics integrated. AS-i configuration software is available.

OSSDs (Output Signal Switching Devices), AS-i outputs

- ▶ Two OSSDs (Output Signal Switching Devices) with two redundant normally closed contacts each
- ▶ Two OSSDs (Output Signal Switching Device) with semiconductor outputs
- ▶ 12 additional safe AS-i outputs can be controlled

Inputs

- ▶ 4 inputs, freely selectable

Logic functions

Programmable with AsiMon software. All safety components can be programmed with different functions as inputs. The inputs can be lined with AND and OR gates or via logic functions such as FlipFlop, switch-on delay, turn-off delay or pulses. Different programs can be stored on a memory card.

AS-Interface monitor

The monitor controls two AS-i circuits with up to 62 safe slaves and up to 16 outputs.

Display and buttons

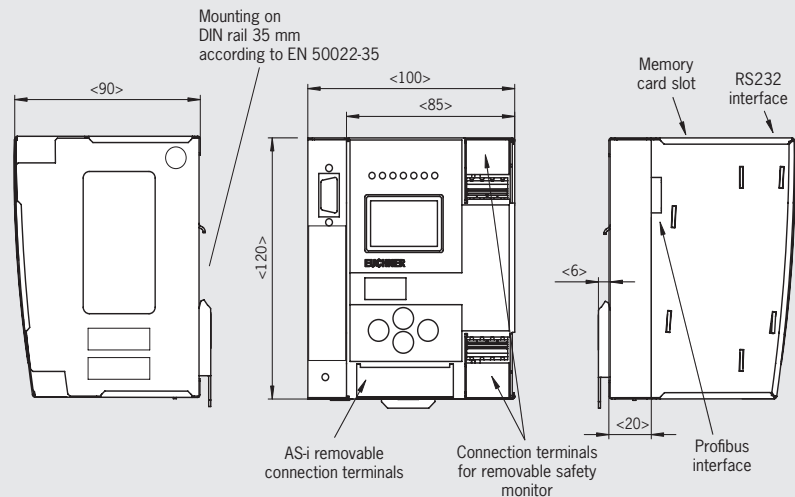
The display is used to operate the gateway functionality as well as the monitor at the same time. The diagnostics and maintenance functions are considerably expanded compared to the SFM monitors. They can also be launched on the display without a PC monitor. Incorporated security functions allow the programmed functionality to be protected and monitored.

Ordering table

Series	Bus connection	AS-i master	Number of AS-i outputs	Power supply	OSSDs	Order no./item
GMOx	PR Profibus	1	16	N	4 + 12 external	103267 GMOX-PR-12DN-C16
		2	16	N	4 + 12 external	103302 GMOX-PR-22DN-C16

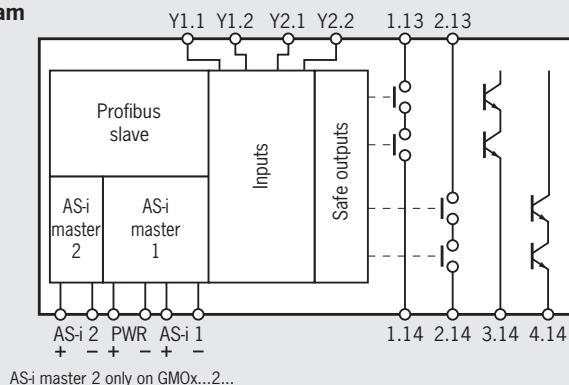
Safety monitor GMOx

Dimension drawing



Please order connection set separately; see page 34

Block diagram



For connector assignment, see technical data on Page 60

Power supply

Type N permits connection of several GMOx devices to the same power supply unit.

Important: One connection set must be ordered for each safety monitor (see page 34).

Accessories

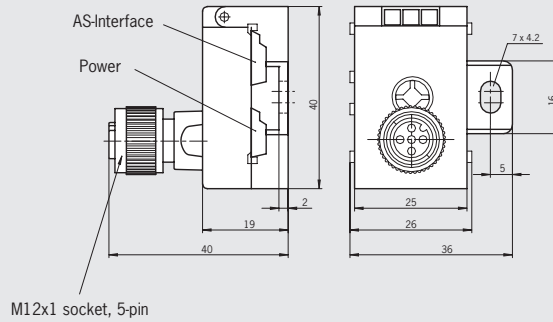
► Passive bus coupling module BCM-A-P2...



For connection of components with integrated AS-Interface and M12 plug connector to the AS-Interface ribbon cables. Both the bus and auxiliary power are converted from the ribbon cable to an M12 socket. The coupling module is suitable for safety components and for standard components. It is particularly suitable for EUCHNER safety switches with guard locking.

Passive bus coupling module BCM-A-P2...

Dimension drawing



Ordering table

Version	Connections	Order no./item
BCM-A-P2	AS-Interface ribbon cable, auxiliary power ribbon cable M12 socket	105756 BCM-A-P2-SEM4-1
Connection cable M12 with straight plug connectors, length 1 m PUR		089420 Connection cable M12

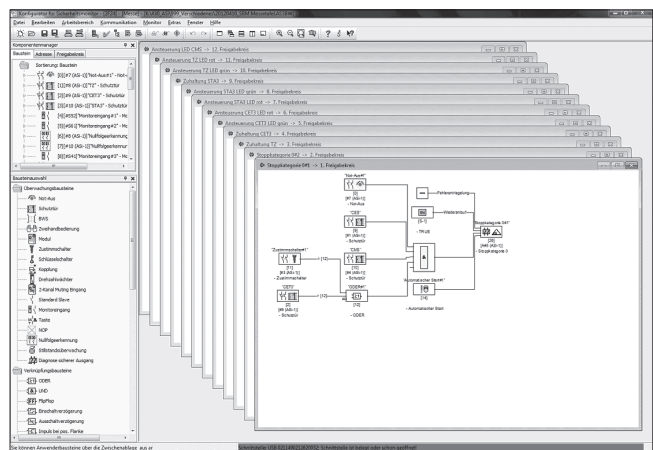
Accessories and software for monitors SBM, SFM, SMOx and GMOx

The software is required for programming the EUCHNER safety monitors. All safety monitors can be programmed with the same software. A Windows ®-equipped PC is required. All Safety at Work manuals in various languages are included on the CD.

A cable set SFM or the cable SMOx-GMOx is required to connect the PC. The cable set SFM includes a transfer cable for direct read-out from monitor to monitor.

Additional memory cards can be ordered for the monitors SMOx and the gateway monitors GMOx.

Plug-in connections with screw terminals and cage pull springs are available.



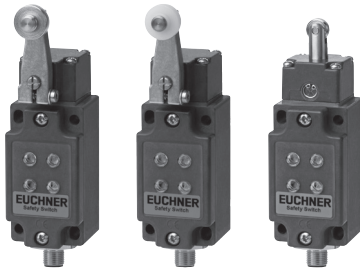
Ordering table

Version	Suitability	Order no./item
AsiMon Configuration software	For all AS-Interface Safety at Work safety monitors	088053 AsiMon SW
Cable set SFM ¹⁾	For all monitors SFM...	087299 Cable set SFM
Connection kit Cage-pull clamps SMOx and GMOx	For monitors SMOx and gateway monitors GMOx	100256 ZMO-ZB-KK8-M
Connection kit Cage-pull clamps ESM-F	4 ea. For monitors SBM	097195 ESM-F-KK4
Programming cable SMOx and GMOx	For monitors SMOx and gateway monitors GMOx	100437 ZMO-ZB-PGK
USB connection cables SBM	For monitors SBM	113832 SBM-ZB-PGK
1 memory card	For monitors SMOx and gateway monitors GMOx	103580 ZMO-ZB-MB1
	For monitors SBM	100875 ZMO-ZB-MB10

1) For programming and exchange

For technical data see page 36

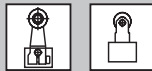
Position switch NZ



Reliability values according to EN ISO 13849-1

Parameter	Value	Unit
B10d	2 x 10 ⁷ operating cycles	

Switch



Parameter	Value	Unit						
Housing material	Anodized die-cast alloy							
Mechanical life	30 x 10 ⁶ operating cycles							
Ambient temperature	- 25 ... + 70	°C						
Weight	Approx. 0.3	kg						
Approach speed, min.	0.1	m/min						
Approach speed, max. ¹⁾ Depending on actuator	<table border="1"> <thead> <tr> <th>HB</th> <th>HS</th> <th>RS</th> </tr> </thead> <tbody> <tr> <td>300</td> <td>60</td> <td>20</td> </tr> </tbody> </table>	HB	HS	RS	300	60	20	m/min
HB	HS	RS						
300	60	20						
Actuating force, min.	30	N						

AS-Interface connection

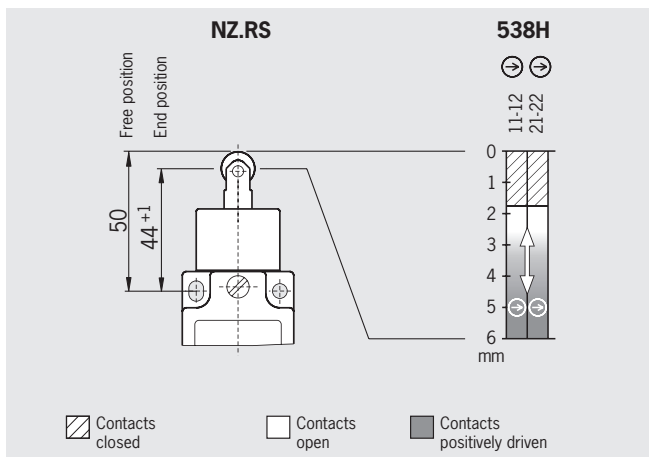


Parameter	Value	Unit
Connection	Plug connectors	
Version	M12 (4-pin)	
Degree of protection according to IEC 60529	IP 67 ²⁾	
Rated insulation voltage U _i	50	V AC/DC
Switching principle	Slow-action switching contact 2 NC ⊖	
EMC protection requirements	Acc. to EN 50295 (AS-Interface standard) and IEC 62026	
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 voltage present	
AS-Interface LED Fault	Red, offline phase or address 0	

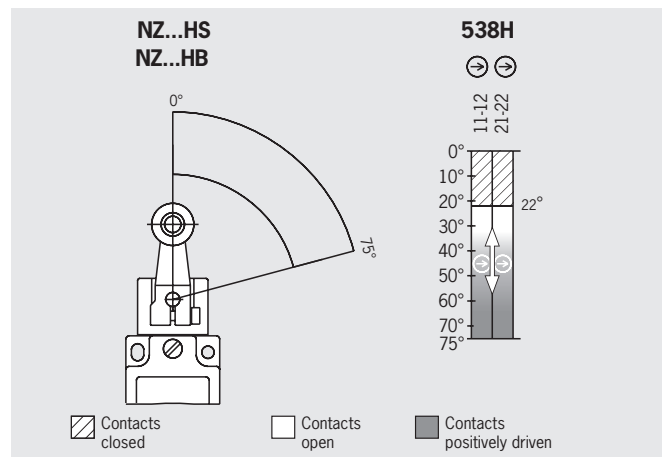
1) The approach speed given applies in conjunction with EUCHNER trip dogs at an approach angle of 30°. At a smaller approach angle this approach speed can be exceeded.

2) Screwed tight with the related plug connector

Travel diagram, NZ.RS



Travel diagram, NZ.HS/NZ.HB



Safety switch NZ.VZ



Reliability values according to EN ISO 13849-1

Parameter	Value	Unit
B10d	4.5 x 10 ⁶ operating cycles	

Switch



Parameter	Value	Unit
Housing material	Anodized die-cast alloy	
Mechanical life	2 x 10 ⁶ operating cycles	
Ambient temperature	- 25 ... + 70	°C
Weight	Approx. 0.3	kg
Approach speed, max.	20	m/min
Approach speed, min.	0.1	m/min
Actuating force	35	N
Extraction force	35	N
Retention force	8	N

AS-Interface connection



Parameter	Value	Unit
Connection	Plug connectors	
Version	M12 (4-pin)	
Degree of protection according to IEC 60529	IP 67 ²⁾	
Rated insulation voltage U _i	50	V AC/DC
Switching principle	Slow-action switching contact 2 NC ⊖	
EMC protection requirements	Acc. to EN 50295 (AS-Interface standard) and IEC 62026	
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 voltage present	
AS-Interface LED Fault	Red, offline phase or address 0	

2) Screwed tight with the related plug connector

Safety switch TZ with guard locking and guard lock monitoring



Reliability values according to EN ISO 13849-1

Parameter	Value	Unit
B10d	3 x 10 ⁶ operating cycles	

Switch



Parameter	Value	Unit
Housing material	Anodized die-cast alloy	
Mechanical life	1 x 10 ⁶ operating cycles	
Ambient temperature	- 25 ... + 55	°C
Weight	Approx. 1.2	kg
Approach speed, max.	20	m/min
Actuating force	35	N
Extraction force	30	N
Retention force	10	N
Locking force, max.	2,000	N
Locking force F _{zh} in acc. with GSET-19	1,500	N
Guard locking solenoid		
Solenoid operating voltage (auxiliary power on black AS-Interface cable)	24 V +10/-15% Power supply unit with electrical isolation (IEC 60742, PELV)	V DC
Solenoid operating current	350	mA
Duty cycle	100	%

AS-Interface connection



Parameter	Value	Unit
Connection	Plug connectors	
Version	M12 (4-pin)	
Degree of protection according to IEC 60529	IP 67 ²⁾	
Rated insulation voltage U _i	50	V AC/DC
Switching principle SK, UK	Slow-action switching contact 1 NC contact each ⇄	
EMC protection requirements	Acc. to EN 50295 (AS-Interface standard) and IEC 62026	
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	Guard locking solenoid, 1 = solenoid energized	
D1	Red LED, 1 = LED on	
D2	Green LED, 1 = LED on	
AS-Interface LED Power	Green, AS-Interface voltage present	
AS-Interface LED Fault	Red, offline phase or address 0	

2) Screwed tight with the related plug connector

Safety switch NX



Reliability values according to EN ISO 13849-1

Parameter	Value	Unit
B10d	4.5 x 10 ⁶ operating cycles	

Switch



Parameter	Value		Unit
Housing material	Die-cast alloy, cathodically dipped		
Mechanical life	2 x 10 ⁶ operating cycles		
Ambient temperature	- 20 ... + 70		°C
Weight	Approx. 0.4		kg
Approach speed, max.	20		m/min
Actuating force	40		N
Extraction force	50		N
Retention force	10		N
Insertion depth	Standard actuator	Overtravel actuator	
Required insertion depth s_{min} .	32	32	mm
Maximum insertion depth s_{max} .	33	40	mm
Actuator travel (in the locked state)	6	13	mm

AS-Interface connection



Parameter	Value		Unit
Connection	Plug connectors		
Version	M12 (4-pin)		
Degree of protection according to IEC 60529	IP 67 ²⁾		
Rated insulation voltage U_i	50		V AC/DC
Switching principle	Slow-action switching contact 2 NC ⊖		
EMC protection requirements	Acc. to EN 50295 (AS-Interface standard) and IEC 62026		
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 voltage present		
AS-Interface LED Fault	Red, offline phase or address 0		

2) Screwed tight with the related plug connector

Safety switch TX with guard locking and guard lock monitoring



Reliability values according to EN ISO 13849-1

Parameter	Value	Unit
B10d	6 x 10 ⁶ operating cycles	

Switch



Parameter	Value	Unit	
Housing material	Die-cast alloy, cathodically dipped		
Mechanical life	> 1 x 10 ⁶ operating cycles		
Ambient temperature	- 20 ... + 50	°C	
Weight	Approx. 0.8	kg	
Approach speed, max.	20	m/min	
Actuating force	35	N	
Extraction force	35	N	
Retention force	20	N	
Locking force, max.	1,700	N	
Locking force F _{zh} in acc. with GSET-19	1,300	N	
Insertion depth	Standard actuator	Overtravel actuator	
Required insertion depth S _{min} .	32	32	mm
Maximum insertion depth S _{max} .	33	40	mm
Actuator travel (in the locked state)	6	13	mm
Guard locking solenoid			
Solenoid operating voltage (auxiliary power on black AS-Interface cable)	24 V +10/-15% Power supply unit with electrical isolation (IEC 60742, PELV)	V DC	
Solenoid operating current	330	mA	
Duty cycle	100	%	

AS-Interface connection



Parameter	Value	Unit
Connection	Plug connectors	
Version	M12 (4-pin)	
Degree of protection according to IEC 60529	IP 67 ²⁾	
Rated insulation voltage U _i	50	V AC/DC
Switching principle	Slow-action switching contact 2 NC \Rightarrow	
EMC protection requirements	Acc. to EN 50295 (AS-Interface standard) and IEC 62026	
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	Guard locking solenoid, 1 = solenoid energized	
D1	Red LED, 1 = LED on	
D2	Green LED, 1 = LED on	

2) Screwed tight with the related plug connector

Safety switch STA with guard locking and guard lock monitoring



Reliability values according to EN ISO 13849-1

Parameter	Value	Unit
B10d	1.2 x 10 ⁷ operating cycles	

Switch



Parameter	Value		Unit
Housing material	Anodized die-cast		
Mechanical life	1 x 10 ⁶ operating cycles		
Ambient temperature	- 20 ... + 55		°C
Weight	Approx. 0.6		kg
Approach speed, max.	20		m/min
Actuating force	35		N
Extraction force (no locked)	30		N
Retention force	20		N
Locking force, max.	3,000		N
Locking force F _{Zh} in acc. with GS-ET-19	2,300		N
Insertion depth (minimum required travel + permissible overtravel)	Actuator S standard	Actuator L for insertion funnel	
Approach direction side (h)	24.5 + 5	28.5 + 5	mm
Approach direction from top (v)	24.5 + 5	28.5 + 5	mm
Guard locking solenoid			
Solenoid operating voltage (auxiliary power on black AS-Interface cable)	24 V +10/-15% Power supply unit with electrical isolation (IEC 60742, PELV)		V DC
Solenoid operating current	300		mA
Duty cycle	100		%

AS-Interface connection



Parameter	Value		Unit
Connection	Plug connectors		
Version	M12 (4-pin)		
Degree of protection according to IEC 60529	IP 67 ²⁾		
Rated insulation voltage U _i	50		V AC/DC
Switching principle	Slow-action switching contact 1 NC contact each ⊕		
EMC protection requirements	Acc. to EN 50295 (AS-Interface standard) and IEC 62026		
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	Guard locking solenoid, 1 = solenoid energized		
D1	Red LED, 1 = LED on		
D2	Green LED, 1 = LED on		
AS-Interface LED Power	Green, AS-Interface voltage present		
AS-Interface LED Fault	Red, offline phase or address 0		

2) Screwed tight with the related plug connector

Safety switch GP



Reliability values according to EN ISO 13849-1

Parameter	Value	Unit
B10d	3 x 10 ⁶ operating cycles	

Switch



Parameter	Value	Unit	
Housing material	Reinforced thermoplastic		
Mechanical life	2 x 10 ⁶ operating cycles		
Ambient temperature	- 20 ... + 55	°C	
Weight	Approx. 0.16	kg	
Approach speed, max.	20	m/min	
Actuating force	10	N	
Extraction force	20	N	
Retention force	2	N	
Insertion depth (minimum required travel + permissible overtravel)	Actuator S standard	Actuator L overtravel	
Approach direction side (h)	28 + 2	28 + 7	mm
Approach direction from top (v)	29.5 + 1.5	29.5 + 7	mm

AS-Interface connection



Parameter	Value	Unit
Connection	Plug connectors	
Version	M12 (4-pin)	
Degree of protection according to IEC 60529	IP 67 ²⁾	
Rated insulation voltage U _i	50	V AC/DC
Switching principle	Slow-action switching contact 2 NC ⊖	
EMC protection requirements	Acc. to EN 50295 (AS-Interface standard) and IEC 62026	
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 LED Power	Green, AS-Interface voltage present	
AS-Interface LED Fault	Red, offline phase or address 0	

2) Screwed tight with the related plug connector

Safety switch SGP



Reliability values according to EN ISO 13849-1

Parameter	Value	Unit
B10d	3 x 10 ⁶ operating cycles	

Switch



Parameter	Value	Unit	
Material	Housing	Reinforced thermoplastic	
	Actuating head	Die-cast aluminum	
	Cam in actuating head	Stainless steel	
Mechanical life	2 x 10 ⁶ operating cycles		
Ambient temperature	- 20 ... + 55	°C	
Weight	Approx. 0.16	kg	
Approach speed, max.	20	m/min	
Actuating force	25	N	
Extraction force	25	N	
Retention force	10	N	
Insertion depth (minimum required travel + permissible overtravel)	Actuator S standard	Actuator L for insertion funnel	
Approach direction side (h)	24.5 + 5	28.5 + 5	mm
Approach direction from top (v)	24.5 + 5	28.5 + 5	mm

AS-Interface connection



Parameter	Value	Unit
Connection	Plug connectors	
Version	M12 (4-pin)	
Degree of protection according to IEC 60529	IP 67 ²⁾	
Rated insulation voltage U _i	50	V AC/DC
Switching principle	Slow-action switching contact 2 NC ⊖	
EMC protection requirements	Acc. to EN 50295 (AS-Interface standard) and IEC 62026	
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		
Positively driven NC contact 1	Acc. to AS-Interface Safety at Work D0, D1	
Positively driven NC contact 2	D2, D3	
AS-Interface LED Power	Green, AS-Interface voltage present	
AS-Interface LED Fault	Red, offline phase or address 0	

2) Screwed tight with the related plug connector

Safety switch TP with guard locking and guard lock monitoring



Reliability values according to EN ISO 13849-1

Parameter	Value	Unit
B10d	3 x 10 ⁶ operating cycles	

Switch



Parameter	Value	Unit	
Housing material	Reinforced thermoplastic		
Mechanical life	1 x 10 ⁶ operating cycles		
Ambient temperature	- 20 ... + 55	°C	
Weight	Approx. 0.5	kg	
Approach speed, max.	20	m/min	
Actuating force	10	N	
Extraction force (not locked)	20	N	
Retention force	10	N	
Locking force, max.	1,300	N	
Locking force F_{Zs} in acc. with GSET-19	1,000	N	
Insertion depth (minimum required travel + permissible overtravel)	Actuator S standard	Actuator L for insertion funnel	
Approach direction side (h)	28 + 2	28 + 7	mm
Approach direction from top (v)	29.5 + 1.5	-	mm
Guard locking solenoid			
Solenoid operating voltage (auxiliary power on black AS-Interface cable)	24 V +10/-15% Power supply unit with electrical isolation (IEC 60742, PELV)	V DC	
Solenoid operating current	300	mA	
Duty cycle	100	%	

AS-Interface connection



Parameter	Value	Unit
Connection	Plug connectors	
Version	M12 (4-pin)	
Degree of protection according to IEC 60529	IP 67 ²⁾	
Rated insulation voltage U_i	50	V AC/DC
Switching principle	Slow-action switching contact 1 NC contact each ⊖	
EMC protection requirements	Acc. to EN 50295 (AS-Interface standard) and IEC 62026	
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		
Type AS1	D0, D1 ▶ Door monitoring contact SK	
	D2, D3 ▶ Solenoid monitoring contact UK	
Type AS2	D0, D1 ▶ Positively driven NC contact SK 1	
	D2, D3 ▶ Positively driven NC contact SK 2	
AS-Interface outputs		
D0	Guard locking solenoid, 1 = solenoid energized	
D1	Red LED, 1 = LED on	
D2	Green LED, 1 = LED on	
AS-Interface LED Power	Green, AS-Interface voltage present	
AS-Interface LED Fault	Red, offline phase or address 0	

2) Screwed tight with the related plug connector

Safety switch STP with guard locking and guard lock monitoring



Reliability values according to EN ISO 13849-1

Parameter	Value	Unit
B10d	5 x 10 ⁶ operating cycles	

Switch				Value	Unit
Parameter					
Material	Housing			Reinforced thermoplastic	
	Actuating head			Die-cast aluminum	
	Cam in actuating head			Stainless steel	
Mechanical life			1 x 10 ⁶ operating cycles		
Ambient temperature			- 20 ... + 55	°C	
Weight			Approx. 0.5	kg	
Approach speed, max.			20	m/min	
Actuating force			35	N	
Extraction force (not locked)			30	N	
Retention force			20	N	
Locking force, max.			2,500	N	
Locking force F_{th} in acc. with GSET-19			2,000	N	
Insertion depth (minimum required travel + permissible overtravel)	Actuator S standard	Actuator L for insertion funnel			
Approach direction side (h)	24.5 + 5	28.5 + 5		mm	
Approach direction from top (v)	24.5 + 5	28.5 + 5		mm	
Guard locking solenoid					
Solenoid operating voltage (auxiliary power on black AS-Interface cable)	24 V +10/-15% Power supply unit with electrical isolation (IEC 60742, PELV)			V DC	
Solenoid operating current	300			mA	
Duty cycle	100			%	

AS-Interface connection				Value	Unit
Parameter					
Connection			Plug connectors		
Version			M12 (4-pin)		
Degree of protection according to IEC 60529			IP 67 ²⁾		
Rated insulation voltage U_i			50		V AC/DC
Switching principle			Slow-action switching contact 1 NC contact each \ominus		
EMC protection requirements			Acc. to EN 50295 (AS-Interface standard) and IEC 62026		
AS-Interface data					
Acc. to AS-Interface Specification 2.1	EA code: 7	ID code: B			
Total current consumption, max.			45		mA
Solenoid supply via auxiliary power			400		
Solenoid supply via AS-i			1 - 31		
Valid AS-Interface addresses			1 - 31		
AS-Interface inputs					
Door monitoring contact SK			D0, D1		
Solenoid monitoring contact $\dot{U}K$			D2, D3		
AS-Interface outputs					
D0			Guard locking solenoid, 1 = solenoid energized		
D1			Red LED, 1 = LED on		
D2			Green LED, 1 = LED on		
AS-Interface LED Power			Green, AS-Interface voltage present		
AS-Interface LED Fault			Red, offline phase or address 0		

2) Screwed tight with the related plug connector

Rope Pull Switch RPS



Reliability values according to EN ISO 13849-1

Parameter	Value	Unit
Bi0d	1 x 10 ⁹ operating cycles	

Switch

Parameter	Value	Unit		
Housing material	Reinforced thermoplastic			
Actuation material	Die-cast zinc, steel			
Degree of protection according to IEC 60529	IP 67			
Mechanical life	According to EN ISO 13850			
Ambient temperature	- 25 ... + 50	°C		
Weight	Approx. 0.48	kg		
Latching device	Acc. to EN 418			
	RPS...100	RPS...175	RPS...300	
Actuating force	100	175	300	N
Rope length max.	25	37.5	75	m
Rope diameter	2 ... 5			mm
Rope attachment	Via clamping head			
Reset Emergency Stop	Turn-to-reset button			

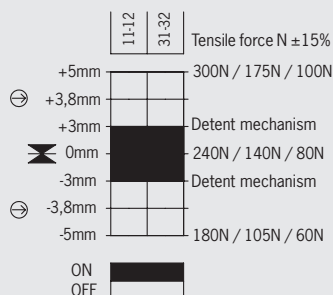
AS-Interface connection



Parameter	Value	Unit
Connection	Plug connectors	
Version	M12 (4-pin)	
Degree of protection according to IEC 60529	IP 67 ²⁾	
Rated insulation voltage U _i	50	V AC/DC
Switching principle	Slow-action switching contact 2 NC ⊖	
EMC protection requirements	Acc. to EN 50295 (AS-Interface standard) and IEC 62026	
AS-Interface data		
Acc. to AS-Interface Specification 2.1	EA code: 0	ID code: B
Total current consumption, max.	45	mA
Valid AS-Interface addresses	1 - 31	
AS-Interface inputs		
Positively driven NC contact 1	D0, D1	
Positively driven NC contact 2	D2, D3	
AS-Interface LED Power	Green, AS-Interface voltage present	
AS-Interface LED Fault	Red, offline phase or address 0	

2) Screwed tight with the related plug connector

Travel diagram RPS2121...



Enabling Switches ZSA and ZSB



Reliability values according to EN ISO 13849-1

Parameter	Value	Unit
B10d	1 x 10 ⁵ operating cycles	

Hand-held type G1

Parameter	Value	Unit
Housing material	Polyamide, black	
Protective cap material	CR (neoprene), black	
Ambient temperature	- 5 ... + 50	°C
Weight	Approx. 0.4 (no cable)	kg

AS-Interface connection

Parameter	Value	Unit
Connection	Plug connectors	
Version	M12 (4-pin)	
Degree of protection according to IEC 60529	IP 67 ²⁾ / IP 65 with buttons ²⁾	
Rated insulation voltage U _i	50	V AC/DC
Switching principle	Three-stage, two-channel 2 NO	
EMC protection requirements	Acc. to EN 50295 (AS-Interface standard) and IEC 62026	
AS-Interface data		
Acc. to AS-Interface Specification 2.1	EA code: 0 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	
NO contact E1	D0, D1	
NO contact E2	D2, D3	
Plus button (only ZSB)	Parameter bit P0	
Plus button (only ZSB)	Parameter bit P1	

2) Screwed tight with the related plug connector

Emergency stop devices ES



Reliability values according to EN ISO 13849-1

Parameter	Value	Unit
B10d	1 x 10 ⁹ operating cycles	

Switch/housing

Parameter	Value	Unit
Housing material	Button	Reinforced thermoplastic
	Housing	Polycarbonate
Mechanical life	250,000 operating cycles	
Ambient temperature	Not illuminated	- 25 ... + 60
	Illuminated	- 25 ... + 55
Weight	Approx. 0.4 (no cable)	kg
Degree of protection according to IEC 60529	Button	IP 20
	Housing	IP 65 ²⁾

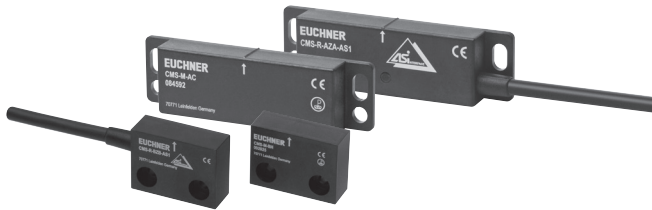
AS-Interface connection



Parameter	Value	Unit
Connection	Built-in version	Plug connector IDC
	Housing version	Plug connector M12
Rated insulation voltage U _i	50	V AC/DC
Switching elements	2 NC ⊕	
EMC protection requirements	Acc. to EN 50295 (AS-Interface standard) and IEC 62026	
AS-Interface data		
As per AS-Interface specification 2.1	Not illuminated	EA code: 0 ID code: B
	Illuminated	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	LED, 1 = LED on	

2) Screwed tight with the related plug connector

Non-contact safety switches CMS




Reliability values according to EN ISO 13849-1

Parameter	Value	Unit
Category	3	
Performance Level (PL)	e	
PFH _d	4.29 x 10 ⁻⁸	
Mission time	20	years

Evaluation unit

Parameter	Value	Unit
Read head		
Housing material	Reinforced PPS	
Ambient temperature	-20 ... +60	°C
Degree of protection according to EN 60529	IP 67	
Installation position	Any, alignment with actuator should be kept in mind (markings)	
Connection	Connection cable with M12 plug connector	
Cable length	1	m
Cable material	PVC	
Method of operation	Magnetic, reed contact	
Mechanical Life	100 x 10 ⁶ operating cycles	
Vibration resistance	10 ... 55 Hz, amplitude 1 mm	
Shock resistance	30 g / 11 ms	
Actuator		
Housing material	Reinforced PPS	
Ambient temperature	-20 ... +60	°C
Degree of protection according to EN 60529	IP 67	
Installation position	Any, alignment with read head should be kept in mind (markings)	
Method of operation	Magnetic	
Vibration resistance	10 ... 55 Hz, amplitude 1 mm	
Shock resistance	30 g / 11 ms	
Distances with read head		
	CMS...AZA...	CMS...BZB...
Switch-on distance S _{ao}	9	7
Assured switch-off distance S _{ar}	70	40
Center offset m between actuator and read head	± 2.5 at a distance of s = 3	
Times		
Max. time delay from state change	5	ms

AS-Interface connection

Parameter			Value	Unit
AS-Interface data				
Acc. to AS-Interface Specification 3.2	CMS-R-AZA...	EA code: 7	ID code: B	
	CMS-R-BZB...	EA code: 0	ID code: B	
Operating voltage AS-Interface			26.5 ... 31.5	V DC
Total current consumption, max.			30	mA
Valid AS-Interface addresses			1 - 31	
AS-Interface inputs				
Acc. to AS-Interface Safety at Work				
Switch actuated			D0 ... D3, code sequence	
Switch open			D0 ... D3, zero sequence	
AS-Interface outputs (only CMS-R-AZA)				
Output D1			LED, 1 = LED on	

Non-contact safety switches CES



Reliability values according to EN ISO 13849-1

Parameter	Value	Unit
Category	4	
Performance Level (PL)	e	
PFH _d	6.5 x 10 ⁻⁹	
Mission time	20	years

Evaluation unit

Parameter	Value	Unit
Housing material	Plastic	
Ambient temperature	0 ... +50	°C
Weight	Approx. 0.4	kg
Operating voltage	DC 24 V +10% -15% Power supply unit with electrical isolation (IEC 61558-2-6:1998)	
Current consumption, max. (through auxiliary power)	600	mA

CES-A-.1B-01B-AS1

Parameter	Value	Unit		
Times				
Max. time delay from state change	180	ms		
Risk time ¹⁾	180			
Difference time (of the two dependent AS-Interface inputs)	120			
Ready delay	3	s		
Distances ²⁾				
	min.	typ.	max.	
Assured switch-off distance sar	-	-	32	mm
Assured switch-on distance sao	10	17	-	
Switching hysteresis	0.5	2	-	
Cable length l	-	-	25	m

AS-Interface connection, CES-A-.1B-01B-AS1

Parameter	Value	Unit
Connection		
AS-Interface and auxiliary power	Ribbon cable AS-i	
Read heads	M12 plug connector	
Degree of protection according to IEC 60529	IP 67 ³⁾	
EMC protection requirements	Acc. to EN 50295 (AS-Interface standard)	
AS-Interface data		
Acc. to AS-Interface Specification 3.2	EA code: 7	ID code: B
Operating voltage AS-Interface	22.5 ... 31.5	V DC
Total current consumption, max.	100	mA
Valid AS-Interface addresses	1 - 31	
AS-Interface inputs		
Acc. to AS-Interface Safety at Work		
CES input IN	D0 ... D3	
Dwell time min.	0.5	s
AS-Interface outputs		
Current consumption, max.	600	mA
OUT output	D0	

1) According to EN 60947-5-3:2000

2) With evaluation unit CES-A-F1B-01B-AS1 in conjunction with read head CES-A-LNA...AS1 or CES-ALNA-SC and actuator CES-A-BBA on surface mounting of the read head and the actuator. If installed flush, the switching distance changes as a function of the installation depth and the safety guard material.

3) Screwed tight with the related plug connector.

CES-A-1B-04B-AS1

Parameter	Value			Unit
Times				
Max. time delay from state change ¹⁾				
- 4 activated actuators	450			ms
- 3 activated actuators	370			
- 2 activated actuators	290			
- 1 activated actuator	210			
Difference time (of the two dependent AS-Interface inputs)	400 (with 4 monitored read heads)			ms
Ready delay	12			s
Distances ²⁾	min.	typ.	max.	
Assured switch-off distance s_{ar}	-	-	32	mm
Assured switch-on distance s_{ao}	10	15	-	
Switching hysteresis	0.5	2	-	
Cable length l	-	-	50	

AS-Interface connection, CES-A-1B-04B-AS1



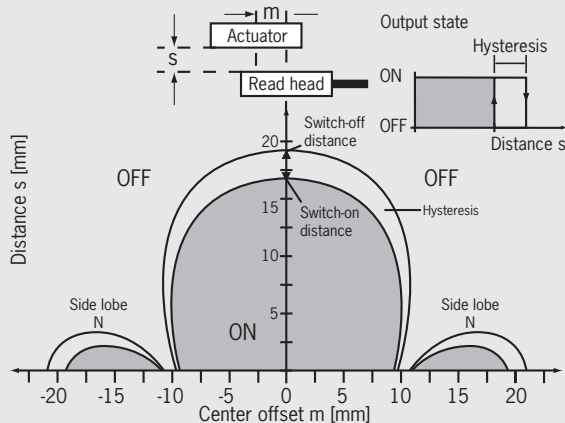
Parameter	Value			Unit
Connection				
AS-Interface and auxiliary power	Ribbon cable AS-i			
Read heads	M12 plug connector			
Degree of protection according to IEC 60529	IP 67 ³⁾			
EMC protection requirements	Acc. to EN 50295 (AS-Interface standard)			
AS-Interface data				
Acc. to AS-Interface Specification 3.2	EA code: 0	ID code: B		
Operating voltage AS-Interface	22.5 ... 31.5			V DC
Total current consumption, max.	130			mA
Valid AS-Interface addresses	1 - 31			
AS-Interface inputs				
Acc. to AS-Interface Safety at Work				
CES inputs IN1 ... IN4 (all inputs safe)	D0 ... D3			
Status signals of CES inputs IN1 ... IN4	P0 ... P3			
Dwell time min.	0.5			s

1) Corresponds to the risk time according to EN 60947-5-3. This is the maximum switch-off delay for the safety outputs following removal of the actuator.

2) With evaluation unit CES-A-F1B-04B-AS1 in conjunction with read head CES-A-LNA...AS1 or CES-A-LNA-SC and actuator CES-A-BBA on surface mounting of the read head and the actuator. If installed flush, the switching distance changes as a function of the installation depth and the safety guard material.

3) Screwed tight with the related plug connector

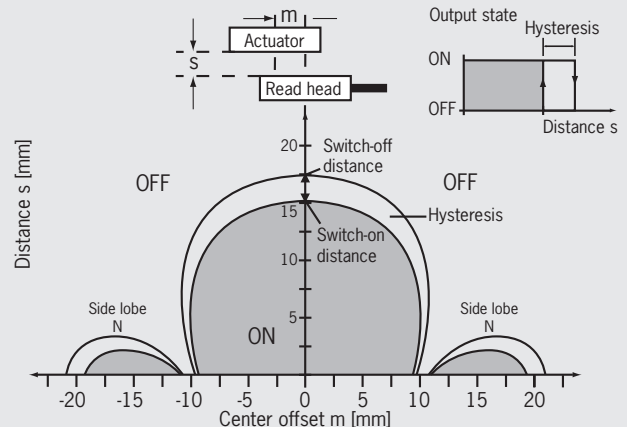
Typical operating distance CES-A-1B-01B-AS1



With evaluation unit CES-A-F1B-01B-AS1 in conjunction with read head CES-A-LNA...AS1 or CES-A-LNA-SC and actuator CES-A-BBA on surface mounting of the read head and the actuator. If installed flush, the switching distance changes as a function of the installation depth and the safety guard material.

For a side approach direction for the actuator and read head, a minimum distance of $s = 3$ mm must be maintained so that the operating distance of the side lobes is not entered.

Typical operating distance CES-A-1B-04B-AS1



With evaluation unit CES-A-F1B-04B-AS1 in conjunction with read head CES-A-LNA...AS1 or CES-A-LNA-SC and actuator CES-A-BBA on surface mounting of the read head and the actuator. If installed flush, the switching distance changes as a function of the installation depth and the safety guard material.

For a side approach direction for the actuator and read head, a minimum distance of $s = 3$ mm must be maintained so that the operating distance of the side lobes is not entered.

Safety switch CET-AS1 with guard locking and integrated evaluation electronics



Reliability values according to EN ISO 13849-1

Parameter	Value		Unit
	Head downward or horizontal	Head upward	
Category	4	3	
Performance Level (PL)	e	e	
PFH _d	3.1×10^{-9}	4.29×10^{-8}	
Mission time	20	20	years

Switch/evaluation electronics

Parameter	Value	Unit
Material	Slide Switch housing	Stainless steel Die-cast aluminum
Installation position	Any (recommendation: switch head downward)	
Mechanical life	1×10^6	
Ambient temperature	- 20 ... + 55	°C
Weight	Approx. 1	kg
Actuator approach speed, max.	20	m/min
Locking force, max.	6,500	N
Locking force F_{zh} in acc. with GS-ET-19	5,000	N
Degrees of freedom X, Y, Z	± 5 mm	
Guard locking solenoid		
Solenoid operating voltage (auxiliary power on black AS-Interface cable)	24 V +10/-15% Power supply unit with electrical isolation (IEC 60742, PELV)	V DC
Current consumption	50	mA
Current consumption solenoid I_{CM}	400	

AS-Interface connection

Parameter	Value	Unit
Connection	Plug connectors	
Version	M12 (4-pin)	
Degree of protection according to IEC 60529	IP 67 ²⁾	
Rated insulation voltage U_i	50	V AC/DC
Switching principle	Slow-action switching contact 1 NC contact each \ominus	
EMC protection requirements	Acc. to EN 50295 (AS-Interface standard) and IEC 62026	
AS-Interface data		
Acc. to AS-Interface Specification 2.1	EA code: 7	ID code: B
Total current consumption, max.	30	mA
Valid AS-Interface addresses	1 - 31	
AS-Interface inputs		
Door monitoring contact SK	D0, D1	
Solenoid monitoring contact $\dot{U}K$	D2, D3	
AS-Interface outputs		
D0	Guard locking solenoid, 1 = solenoid energized	
D1	Red LED, 1 = LED on	
D2	Green LED, 1 = LED on	

2) Screwed tight with the related plug connector

Safety Basis Monitor SBM



Reliability values according to EN ISO 13849-1

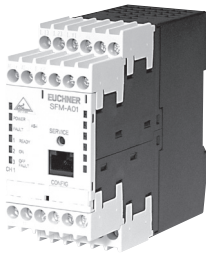
Parameter	Value	Unit
Category	4	
Performance Level (PL)	e	
PFH _d	5.08 x 10 ⁻⁹	
Mission time	20	years

SBM



Parameter	Value			Unit
	min.	typ.	max.	
Housing	Connecting strip housing			
Ambient temperature	0	-	+55	°C
Storage temperature	-25	-	+85	
Dimensions (H x W x D)	99 x 22.5 x 114			mm
Degree of protection according to IEC 60529	IP 20			
Connection	COMBICON plug			
AS-i voltage	18	-	31.6	V
Safety monitor	Safety Basis Monitor			
OSSD (Output Signal Switching Device)	2-channel			
Response time	< 40			ms
Inputs	4 safe inputs of Cat. 4 or 8 standard inputs and outputs			
Switching current at 24 V	static	4		mA
	dynamic (T = 100 µs)	30		
Connection conditions between the input terminals				
- Resistance	-	-	150	Ω
- Cable length	-	-	200	m
Outputs: 2 output switching elements	Semiconductor outputs (output circuits 1 and 2)			
Contact capacity DC13 at 24 V	-	-	700	mA
AS-i current draw	-	-	200	
AUX voltage (PELV)	20	-	30	V
AUX current draw	-	-	4	A
AS-i/AUX insulation voltage	-	500	-	V
Input supply voltage	from 24V auxiliary power			
Output supply voltage				
Output current for monitoring outputs (per output)	-	-	10	mA
Output current for OSSD supply	-	1.4	-	A
Test pulse when output is switched on				
- Interval between 2 test pulses	250	-	-	ms
Pulse length up to	-	1	-	ms
Display elements and switches				
4 x LED yellow (S1, S2, S3, S4)	State of inputs S1, S2, S3, S4			
4 x LED yellow (S5, S6, S7, S8)	State of inputs S5, S6, S7, S8			
LED green/yellow/red (SM)	State of safety monitor			
LED green/yellow/red (AS-i M)	State of AS-i master			
LED green/yellow/red (O1)	Output 1 has switched			
LED green/yellow/red (O2)	Output 2 has switched			
Button	1 x service			
Applicable standards	EN 954-1 Cat. 4, IEC 61508 SIL 3, EN IEC 62061 SIL 3 EN 13849-1 2006/PL e			

Safety monitors SFM



Reliability values according to EN ISO 13849-1

Parameter	Value	Unit
Category	4	
Performance Level (PL)	e	
PFH _d	9.1 x 10 ⁻⁹	
Mission time	20	years

SFM-A01, SFM-A02, SFM-B02, SFM-C12



Parameter	Value	Unit
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	°C
Mounting	35 mm DIN rail acc. to DIN EN 50022-35	
Operating voltage U _b	24+15%/-15% Power supply unit with electrical isolation (IEC 60742, PELV)	V DC
Residual ripple	< 15 %	
Rated operating current	SFM...1: 150 SFM...2: 200	mA
Response time	< 40	ms
Switch-on delay	< 10	s
Connection		
Connection	Plug-in screw terminals	
Connection terminals	0.14 ... 2.5	mm ²
Degree of protection according to EN 60529	IP 20	
EMC protection requirements	Acc. to EN 50295 (AS-Interface standard)	
Inputs		
Start	Optocoupler input, active high PNP transistor output, 200 mA, short-circuit and reverse polarity protection	
Feedback loop	Optocoupler input, active high Input current approx. 10 mA at 24 V DC	
Outputs		
Door monitoring outputs	4 door monitoring outputs PNP transistor output, 200 mA, short-circuit and reverse polarity protection	
OSSDs (Output Signal Switching Devices)	2 relay outputs	
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	
AS-Interface data		
Acc. to AS-Interface Specification 3.2	EA code: 7 ID code: B	
Operating voltage AS-Interface	18.5 ... 31.6	V
Total current consumption, max.	45	mA

AS-Interface Safety at Work safe output SOM



Reliability values according to EN ISO 13849-1

Parameter	Value	Unit
Category	4	
Performance Level (PL)	e	
PFH _d	3.2 x 10 ⁻⁸	
Mission time	20	years

SOM



Parameter	Value	Unit
Housing material	Plastic PA6.6	
Dimensions	22.5 x 105 x 114	mm
Weight	Approx. 0.2	kg
Operating temperature	0 ... + 55	°C
Storage temperature	- 25 ... + 85	°C
Mounting	35 mm DIN rail acc. to DIN EN 50022-35	
Supply current or sensors	100	mA
Insulation voltage	≥ 6	kV
Connection		
Connection	Plug-in screw terminals	
Connection terminals	0.14 ... 2.5	mm ²
Degree of protection according to EN 60529	IP 20	
EMC protection requirements	Acc. to EN 50295 (AS-Interface standard)	
Inputs	2 conventional + 2 EDM	
Outputs	Relay (2 redundant)	
AS-Interface data		
Acc. to AS-Interface Specification 3.2	EA code: 7	ID code: F
Operating voltage AS-Interface	18.5 ... 31.6	V
Total current consumption, max.	45	mA

Safety monitors SMOx



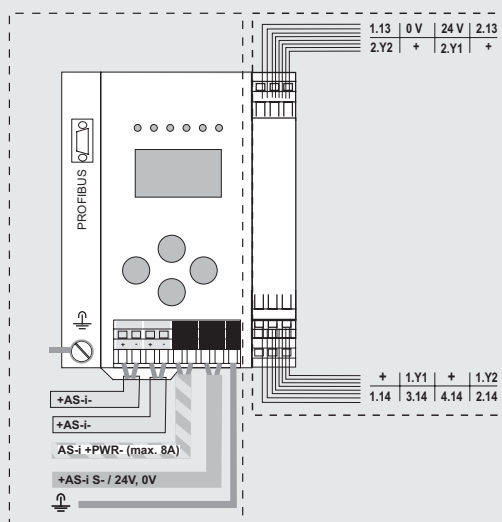
Reliability values according to EN ISO 13849-1

Parameter	Value	Unit
Category	4	
Performance Level (PL)	e	
PFH _d	5.36 x 10 ⁻⁹	
Mission time	20	years

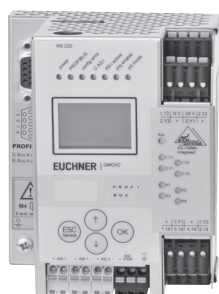
SMOx

Parameter	Value	Unit
Housing material	Stainless steel	
Dimensions	120 x 96 x 85	mm
Weight	0.8	kg
Ambient temperature	0 ... + 55	°C
Permissible shock and vibration load	Acc. to EN 61131-2	
Operating voltage (AS-i voltage)	30	V DC
Operating current (from AS-i circuit)	45	mA
Insulation voltage	≥ 500	V
Standards	EN 61000-6-2, EN 61000-6-4, EN 62 061 (SIL 3), EN ISO 13849-1 (PL e)	
Connection		
Connection	Plug-in connection terminals	
Degree of protection according to EN 60529	IP 20	
Display elements and switches		
LC display	AS-i slave, error messages	
LEDs	8 (4 inputs, EDM/Start, 4 output circuits) 6 (power, fault, ready, U AS-i 1, U AS-i 2, AUX)	
Button	4	
Safety monitor interface		
OSSD (Output Signal Switching Device)	16-channel	
Switch-on delay	< 10	s
Response delay	< 40	ms
Inputs	4 x EDM/Start	
OSSDs (Output Signal Switching Devices)	2 relay contacts, 2 semiconductor	
Card slot	Memory card to store the configuration data	
Serial interface	RS232	

Terminal assignment



Safety monitors GMOx



Reliability values according to EN ISO 13849-1

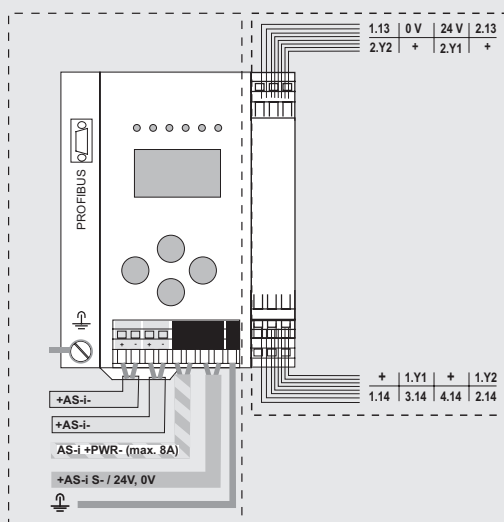
Parameter	Value	Unit
Category	4	
Performance Level (PL)	e	
PFH _d	5.36 x 10 ⁻⁹	
Mission time	20	years

GMOx



Parameter	Value	Unit
Housing material	Stainless steel	
Dimensions	120 x 96 x 100	mm
Weight	0.8	kg
Ambient temperature	0 ... + 55	°C
Permissible shock and vibration load	Acc. to EN 61131-2	
Operating voltage (AS-i voltage)	30	V DC
Operating current (from AS-i circuit)	300	mA
Insulation voltage	≥ 500	V
Standards	EN 61000-6-2, EN 61000-6-4, EN 62 061 (SIL 3), EN ISO 13849-1 (PL e)	
Connection		
Connection	Plug-in connection terminals	
Degree of protection according to EN 60529	IP 20	
Display elements and switches		
LC display	AS-i slave, error messages	
LEDs	8 (4 inputs, 4 outputs, AUX) 7 (power, PROFIBUS, config error, U AS-i, AS-i active, pgr enable, prj mode)	
Button	4	
Profibus interface		
	Acc. to EN 50170-3	
Transfer rates	9.6 ... 12,000	
DP functions	Mapping of the AS-i slaves as I/O process data in the Profibus; complete diagnostics and configuration via PROFIBUS DP master	
Safety monitor interface		
Switch-on delay	< 10	s
Response delay	< 40	ms
Inputs	2 x EDM, 2 x start	
OSSDs (Output Signal Switching Devices)	2 relay contacts, 2 semiconductor	
Card slot	Memory card to store the configuration data	
Serial interface	RS232	

Terminal assignment



BCM Bus Coupling Module



BCM-A-P2-SEM4-1

Parameter	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. 30	g
Voltage max.	36	V DC
Current max.	4	A
AS-Interface to power insulation voltage	200	V
Mounting	Screw mounting (1 x M6)	
Connection		
AS-Interface and auxiliary power	Ribbon cable AS-i	
Line 1	AS-Interface bus ribbon cable (AS-Interface +, AS-Interface -)	
Line 2	Power ribbon cable (+24 V, 0 V)	
Safety switches	M12 socket	

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Representatives

International

Australia

Micromax Sensors & Automation
Unit 2, 106-110 Beaconsfield Street
Silverwater, NSW 2128
Tel. +61 2 87482800
Fax +61 2 96482345
info@micromaxsa.com.au

Austria

EUCHNER GmbH
Süddruckgasse 4
2512 Tribuswinkel
Tel. +43 2252 42191
Fax +43 2252 45225
info@euchner.at

Benelux

EUCHNER (BENELUX) BV
Visschersbuurt 23
3356 AE Papendrecht
Tel. +31 78 615-4766
Fax +31 78 615-4311
info@euchner.nl

Brazil

EUCHNER Ltda
Av. Prof. Luiz Ignácio Anhaia Mello,
no. 4387
S. Lucas
São Paulo - SP - Brasil
CEP 03295-000
Tel. +55 11 29182200
Fax +55 11 23010613
euchner@euchner.com.br

Canada

IAC & Associates Inc.
2180 Fasan Drive
Unit A
Oldcastle, Ontario
NOR 1L0
Tel. +1 519 737-0311
Fax +1 519 737-0314
sales@iacnassociates.com

China

EUCHNER (Shanghai)
Trading Co., Ltd.
No. 8 Workshop A, Hi-Tech Zone
503 Meinengda Road Songjiang
201613 Shanghai
Tel. +86 21 5774-7090
Fax +86 21 5774-7599
info@euchner.com.cn

Czech Republic

EUCHNER electric s.r.o.
Videňská 134/102
61900 Brno
Tel. +420 533 443-150
Fax +420 533 443-153
info@euchner.cz

Denmark

Duelco A/S
Systemvej 8
9200 Aalborg SV
Tel. +45 7010 1007
Fax +45 7010 1008
info@duelco.dk

Finland

Sähkölehto Oy
Holkkitie 14
00880 Helsinki
Tel. +358 9 7746420
Fax +358 9 7591071
office@sahkolehto.fi

France

EUCHNER France S.A.R.L.
Parc d'Affaires des Bellevues
Allée Rosa Luxembourg
Bâtiment le Colorado
95610 ERAGNY sur OISE
Tel. +33 1 3909-9090
Fax +33 1 3909-9099
info@euchner.fr

Hong Kong

Imperial
Engineers & Equipment Co. Ltd.
Unit B 12/F
Cheung Lee Industrial Building
9 Cheung Lee Street Chai Wan
Hong Kong
Tel. +852 2889 0292
Fax +852 2889 1814
info@imperial-elec.com

Hungary

EUCHNER Ges.mBH
Magyarországi Fióktelep
2045 Törökbálint
FSD Park 2.
Tel. +36 2342 8374
Fax +36 2342 8375
info@euchner.hu

India

EUCHNER (India) Pvt. Ltd.
401, Bremen Business Center,
City Survey No. 2562,
University Road
Aundh, Pune - 411007
Tel. +91 20 64016384
Fax +91 20 25885148
info@euchner.in

Israel

Ilan & Gavish Automation Service Ltd.
26 Shenkar St. Qiryat Arie 49513
P.O. Box 10118
Petach Tikva 49001
Tel. +972 3 9221824
Fax +972 3 9240761
mail@ilan-gavish.com

Italy

TRITECNICA S.r.l.
Viale Lazio 26
20135 Milano
Tel. +39 02 541941
Fax +39 02 55010474
info@tritecnica.it

Japan

EUCHNER
Representative Office Japan
8-20-24 Kamitsurumhoncho
Minami-ku, Sagami-hara-shi
Kanagawa 252-0318
Tel. +81 42 8127767
Fax +81 42 7642708
hayashi@euchner.jp

Solton Co. Ltd.

2-13-7, Shin-Yokohama
Kohoku-ku, Yokohama
Japan 222-0033
Tel. +81 45 471-7711
Fax +81 45 471-7717
sales@solton.co.jp

Korea

EUCHNER Korea Co., Ltd.
RM 810 Daerung Technotown 3rd
#448 Gasang-Dong
Gumcheon-gu, Seoul
Tel. +82 2 2107-3500
Fax +82 2 2107-3999
info@euchner.co.kr

Mexico

SEPIA S.A. de C.V.
Maricopa # 10
302, Col. Napoles.
Del. Benito Juarez
03810 Mexico D.F.
Tel. +52 55 55367787
Fax +52 55 56822347
alazcano@sepia.mx

Poland

ELTRON
Pl. Wolności 7B
50-071 Wrocław
Tel. +48 71 3439755
Fax +48 71 3460225
eltron@eltron.pl

Republic of South Africa

RUBICON
ELECTRICAL DISTRIBUTORS
4 Reith Street, Sidwell
6061 Port Elizabeth
Tel. +27 41 451-4359
Fax +27 41 451-1296
sales@rubiconelectrical.com

Romania

First Electric SRL
Str. Ritmului Nr. 1 Bis
Ap. 2, Sector 2
021675 Bucuresti
Tel. +40 21 2526218
Fax +40 21 3113193
office@firstelectric.ro

Singapore

Sentronics
Automation & Marketing Pte Ltd.
Blk 3, Ang Mo Kio Industrial Park 2A
#05-06
Singapore 568050
Tel. +65 6744 8018
Fax +65 6744 1929
sentronics@pacific.net.sg

Slovakia

EUCHNER electric s.r.o.
Videňská 134/102
61900 Brno
Tel. +420 533 443-150
Fax +420 533 443-153
info@euchner.cz

Slovenia

SMM proizvodni sistemi d.o.o.
Jaskova 18
2000 Maribor
Tel. +386 2 4502326
Fax +386 2 4625160
franc.kit@smm.si

Spain

EUCHNER, S.L.
Gurutzegi 12 - Local 1
Polígono Belartza
20018 San Sebastian
Tel. +34 943 316-760
Fax +34 943 316-405
comercial@euchner.es

Sweden

Censit AB
Box 331
33123 Värnamo
Tel. +46 370 691010
Fax +46 370 18888
info@censit.se

Switzerland

EUCHNER AG
Grofstrasse 17
8887 Mels
Tel. +41 81 720-4590
Fax +41 81 720-4599
info@euchner.ch

Taiwan

Daybreak Int'l (Taiwan) Corp.
3F, No. 124, Chung-Cheng Road
Shihlin 11145, Taipei
Tel. +886 2 8866-1234
Fax +886 2 8866-1239
day111@ms23.hinet.net

Turkey

Entek Otomasyon Urunleri
San.ve Tic.Ltd.Sti.
Perpa Tic.Mer. B Blok
Kat: 11 No:1622 - 1623
34384 Okmeydani / Istanbul
Tel. +90 212 320-2000 / 01
Fax +90 212 320-1188
entekotomasyon@entek.com.tr

Germany

Chemnitz

EUCHNER GmbH + Co. KG
Ingenieur- und Vertriebsbüro
Am Vogelherd 2
09627 Bobritzsch
Tel. +49 37325 906000
Fax +49 37325 906004
jens.zehrtner@euchner.de

Düsseldorf

EUCHNER GmbH + Co. KG
Ingenieur- und Vertriebsbüro
Sunderholz 24
45134 Essen
Tel. +49 201 43083-93
Fax +49 201 43083-94
juergen.eumann@euchner.de

Essen/Dortmund

Thomas Kreißl
fördern - steuern - regeln
Hackenbergweg 8a
45133 Essen
Tel. +49 201 84266-0
Fax +49 201 84266-66
info@kreissl-essen.de

Wiesbaden

EUCHNER GmbH + Co. KG
Ingenieur- und Vertriebsbüro
Schiersteiner Straße 28
65187 Wiesbaden
Tel. +49 611 98817644
Fax +49 611 98895071
giancarlo.pasquesi@euchner.de

Freiburg

EUCHNER GmbH + Co. KG
Ingenieur- und Vertriebsbüro
Steige 5
79206 Breisach
Tel. +49 7664 4038-33
Fax +49 7664 4038-34
peter.seifert@euchner.de

Hamburg

EUCHNER GmbH + Co. KG
Ingenieur- und Vertriebsbüro
Bleickenallee 13
22763 Hamburg
Tel. +49 40 636740-57
Fax +49 40 636740-58
volker.behrens@euchner.de

Magdeburg

EUCHNER GmbH + Co. KG
Ingenieur- und Vertriebsbüro
Tismarstraße 10
39108 Magdeburg
Tel. +49 391 736279-22
Fax +49 391 736279-23
bernhard.scholz@euchner.de

München

EUCHNER GmbH + Co. KG
Ingenieur- und Vertriebsbüro
Obere Bahnhofstraße 6
82110 Germering
Tel. +49 89 800846-85
Fax +49 89 800846-90
st.kornes@euchner.de

United Kingdom

EUCHNER (UK) Ltd.
Unit 2 Petre Drive,
Sheffield
South Yorkshire
S4 7PZ
Tel. +44 114 2560123
Fax +44 114 2425333
info@euchner.co.uk

USA

EUCHNER USA Inc.
6723 Lyons Street
East Syracuse, NY 13057
Tel. +1 315 701-0315
Fax +1 315 701-0319
info@euchner-usa.com

EUCHNER USA Inc.

Detroit Office
130 Hampton Circle
Rochester Hills, MI 48307
Tel. +1 248 537-1092
Fax +1 248 537-1095
info@euchner-usa.com



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www.euchner.com

EUCHNER GmbH + Co. KG

Kohlhammerstraße 16
70771 Leinfelden-Echterdingen
Germany
Tel. +49 711 7597-0
Fax +49 711 753316
info@euchner.de
www.euchner.com

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