

Scope

This safety information is part of the operating instructions for safety switches CEM-AR and CEM-AY.

Correct use

The aforementioned safety switches are interlocking devices with guard locking (type 4) for process protection without guard lock monitoring. Devices with unicode evaluation possess a high coding level, devices with multicode evaluation possess a low coding level.

In combination with a movable safety guard and the machine control, this safety component prevents dangerous machine functions from occurring while the safety guard is open. A stop command is triggered if the safety guard is opened during the dangerous machine function.

This means:

- ▶ Starting commands that cause a dangerous machine function must become active only when the safety guard is closed.
- ▶ Opening the safety guard triggers a stop command.
- ▶ Closing a safety guard must not cause automatic starting of a dangerous machine function. A separate start command must be issued. For exceptions, refer to EN ISO 12100 or relevant C-standards.

Before the device is used, a risk assessment must be performed on the machine, e.g. in accordance with the following standards:

- ▶ EN ISO 13849-1, Safety of machinery – Safety-related parts of control systems – Part 1: General principles for design
- ▶ EN ISO 12100, Safety of machinery – Basic concepts – General principles for design – Risk assessment and risk reduction
- ▶ IEC 62061, Safety of machinery – Functional safety of safety-related electrical, electronic and programmable electronic control systems

Correct use includes observing the relevant requirements for installation and operation, particularly based on the following standards:

- ▶ EN ISO 13849-1, Safety of machinery – Safety-related parts of control systems – Part 1: General principles for design
- ▶ EN ISO 14119 (supersedes EN 1088), Safety of machinery – Interlocking devices associated with guards – Principles for design and selection
- ▶ EN 60204-1, Safety of machinery – Electrical equipment of machines.

The safety switch must be used only in conjunction with the designated actuators from EUCHNER. On the use of different actuators, EUCHNER provides no warranty for safe function.

The following applies to AR devices: Connection of several devices in an AR switch chain is permitted only using devices intended for series connection in an AR switch chain. Check this in the instructions of the device in question.

A maximum of 20 safety switches are allowed to be operated in a switch chain.

Important!

- ▶ Correct use requires observing the permissible operating parameters (see technical data).
- ▶ The user is responsible for the proper integration of the device into a safe overall system. For this purpose, the overall system must be validated, e.g. in accordance with EN ISO 13849-2.

Exclusion of liability and warranty

In case of failure to comply with the conditions for correct use stated above, or if the safety instructions are not followed, or if any servicing is not performed as required, liability will be excluded and the warranty void.

General safety instructions

Safety switches fulfill personal protection functions. Incorrect installation or tampering can lead to fatal injuries to personnel.

Check the safe function of the safety guard particularly

- ▶ after any setup work
- ▶ after the replacement of a system component
- ▶ after an extended period without use
- ▶ after every fault

Independent of these checks, the safe function of the safety guard should be checked at suitable intervals as part of the maintenance schedule.

⚠ WARNING

Danger to life due to improper installation or due to bypassing (tampering). Safety components perform a personal protection function.

- ▶ Safety components must not be bypassed, turned away, removed or otherwise rendered ineffective. On this topic pay attention in particular to the measures for reducing the possibility of bypassing according to EN ISO 14119:2013, section 7.

- ▶ The switching operation must be triggered only by actuators designated for this purpose.

- ▶ Prevent bypassing by means of replacement actuators (only for multicode evaluation). For this purpose, restrict access to actuators and to keys for releases, for example.

- ▶ Mounting, electrical connection and setup only by authorized personnel possessing the following knowledge:

- specialist knowledge in handling safety components
- knowledge about the applicable EMC regulations
- knowledge about the applicable regulations on occupational safety and accident prevention.

Important!

Prior to use, read the operating instructions and keep these in a safe place. Ensure the operating instructions are always available during mounting, setup and servicing. EUCHNER cannot provide any warranty in relation to the readability of the CD for the storage period required.

For this reason you should archive a printed copy of the operating instructions. You can download the operating instructions from www.euchner.de.

Operating instructions on CD/DVD

Each device is supplied with operating instructions on CD/DVD, which contain detailed information on the overall system. The following system requirements must be met to be able to display or print the document:

- ▶ PC with PDF reader installed
- ▶ CD/DVD drive

Opening and printing the documents

Important: The autoplay function for the drive must be enabled (see operating system help), and you will need an up-to-date PDF reader.

1. Insert CD/DVD
 - ➔ Selection table is opened in the browser
2. Click the related document for your system
 - ➔ The document is opened and can be printed.

Mounting, setup and troubleshooting

For detailed instructions on mounting, setup and troubleshooting, please refer to the operating instructions on the CD/DVD.

NOTICE

Risk of damage to equipment and malfunctions as a result of incorrect installation.

- ▶ Safety switches and actuators are allowed to be used as an end stop.
- ▶ Observe EN ISO 14119:2013, sections 5.2 and 5.3, for information about fastening the safety switch and the actuator.

Electrical connection

For detailed information on the electrical connection, please refer to the operating instructions on the CD/DVD.

⚠ WARNING

In case of an error, loss of the safety function through incorrect connection.

- ▶ To ensure safety, both safety outputs must always be evaluated.
- ▶ The monitoring outputs must not be used as safety outputs.
- ▶ Lay the connection cables with protection to prevent the risk of short circuits.

Inspection and service

⚠ WARNING

Loss of the safety function because of damage to the system.

In case of damage, the affected module must be replaced completely. Only accessories or spare parts that can be ordered from EUCHNER may be replaced.

Regular inspection of the following is necessary to ensure trouble-free long-term operation:

- ▶ Check the switching function
- ▶ Check the secure fastening of the devices and the connections
- ▶ Check for soiling

Check the safe function of the safety guard particularly

- ▶ after any setup work
- ▶ after the replacement of a system component
- ▶ after an extended period without use
- ▶ after every fault

No servicing is required; repairs to the device are only allowed to be made by the manufacturer.

Technical data (extract)

Safety switch CEM-AR

Parameter	Value		
	min.	typ.	max.
Operating voltage U_B (reverse polarity protected, regulated, residual ripple < 5%)	DC 24 V \pm 15%		
Current consumption			
- Guard locking inactive	80 mA		
- Guard locking active	350 mA		
External fuse (operating voltage)	1 A		
Safety outputs FO1A/FO1B	Semiconductor outputs, p-switching, short circuit-proof		
- Output voltage ¹⁾			
HIGH	$U_B \cdot 1.5$	-	U_B
LOW	0 V		1 V
Switching current per safety output	1 mA		150 mA
Solenoid			
Locking force in axial direction	600 N ²⁾		
Adjustable adhesive force	0, 30, 50 N		
Solenoid center offset	\pm 5 mm (in all directions)		
Current consumption at control input I_{MP}	min. 20 mA		
Reliability values acc. to EN ISO 13849-1			
Monitoring of the safety guard position			
Category	4		
Performance Level	PL e		
PFH_d	4.5×10^{-9} / h		
Mission time	20 years		

1) Values at a switching current of 50 mA without taking into account the cable lengths.

2) On the activation of the guard locking, the device checks whether the locking force is at least 400 N. If this is not the case, this is signaled by the LOCK LED.