Operating Instructions
Read Head CET.-AX With Guard locking and Guard Lock Monitoring

EUCHNER

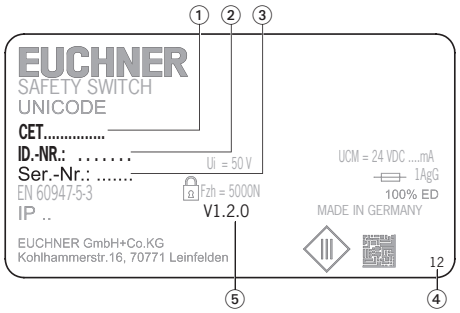
Scope

These operating instructions are valid for all CET.-AX of version V1.6.X. These operating instructions, the document *Safety information* and any available data sheet form the complete user information for your device.

Important!

Make sure to use the operating instructions valid for your product version. The version numbers can be found on the type label of your product. Please contact the EUCHNER service team if you have any questions.

Safety switch type label



① Item designation
② Item number
③ Serial number
④ Year of manufacture
⑤ Version

Supplementary documents

The overall documentation for this device consists of the following documents:

Document title (document number)	Contents	
Safety information (2525460)	Basic safety information	
Operating instructions (2098069)	(this document)	www
Declaration of conformity	Declaration of conformity	www
Any additions to the operating instructions	Take any associated additions to the operating instructions or data sheets into account.	www

Important!

Always read all documents to gain a complete overview of safe installation, setup and use of the device. The documents can be downloaded from www.euchner.com. For this purpose, enter the document number or the order number for the device in the search box.

Correct use

Series CET.-AX read heads are operated in combination with an evaluation unit in the system family CES-AZ. In this combination, the read head CET.-AX is an electromagnetic interlock device with guard locking (type 4). The coding level depends on the evaluation unit used (unicode or multicode evaluation).

In combination with a guard and the machine control, this safety system prevents the guard from being opened while a dangerous machine movement is being performed.

This means:

- Starting commands that cause a dangerous machine function must become active only when the guard is closed and locked.
- Guard locking must not be released until the dangerous machine function has ended.
- Closing and locking a 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.

Devices from this series are also suitable for process protection.

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
- EN ISO 12100
- EN IEC 62061

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

- EN ISO 13849-1
- EN ISO 14119
- EN ISO 60204-1

The read head is allowed to be operated only in conjunction with the designated EUCHNER CET actuator and the related connection components from EUCHNER. On the use of different actuators or other connection components, EUCHNER provides no warranty for safe function.

The read head CET must be operated only in combination with an evaluation unit of series CES-AZ-.ES-....

Important!

- 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 13849-1.
- Correct use requires observing the permissible operating parameters (see chapter *"Technical data"*).
- If a data sheet is included with the product, the information on the data sheet applies in case of discrepancies with the operating instructions.

Exclusion of liability and warranty

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

General safety precautions

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

Check the safe function of the 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 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 fulfill a personnel 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 14119:2025, section 8.
- 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 operational safety and accident prevention.

Function

The read head contains a plunger (1) that lifts the actuator over the recess during release (see *Fig. 1*). The actuator has a spring-mounted guard locking pin (2) in which there is a transponder. Guard locking is active when the plunger is retracted and the guard locking pin is in the recess (3) of the read head.

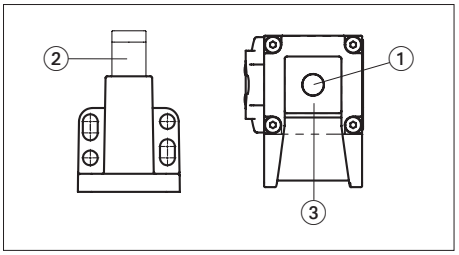


Fig. 1: Read head and actuator

Version CET1, guard locking by spring force

The plunger is pressed into the locked position by the force of the spring for the guard locking pin in the actuator and released electromagnetically by the read head. Guard locking functions in accordance with the closed-circuit current principle. The locked guard cannot be opened immediately in the event of interruption of the power supply to the solenoid.

The actuator's guard locking pin cannot be moved out of the recess and the door is locked as long as the plunger is pressed down by the guard locking pin.

When the operating voltage is present at the guard locking solenoid, the plunger is extended and lifts the actuator's guard locking pin above the edge of the recess. The safety door can then be opened.

Version CET2, guard locking by solenoid force

Important!

Use as guard locking for personnel protection is possible only in special cases, after strict assessment of the accident risk (see EN ISO 14119:2025, section 6.6.1)!

The plunger is initially extended by spring force. The spring force of the guard locking pin is not sufficient to press down the plunger. Only when the guard locking solenoid is also switched on does the plunger retract. Guard locking is active. Guard locking operates in accordance with the open-circuit current principle.

The safety door can be opened as long as the plunger is held in the extended position by spring force.

Manual release

Some situations require guard locking to be released manually (e.g. malfunctions or an emergency). A function test should be performed after release.

Further information on this topic can be found in the standard EN ISO 14119:2025, section 7.2.3. The device can feature the following release functions:

Auxiliary release and auxiliary key release (can be retrofitted)

In the event of malfunctions, the guard locking can be released with the auxiliary release irrespective of the state of the solenoid.

The safety contacts in the evaluation unit are switched off when the auxiliary release is actuated. Use the safety contacts in the evaluation unit to generate a stop command.

Actuating auxiliary release

1. Unscrew locking screw.
2. Using a screwdriver, turn the auxiliary release to in the direction of the arrow.

➡ Guard locking is released.

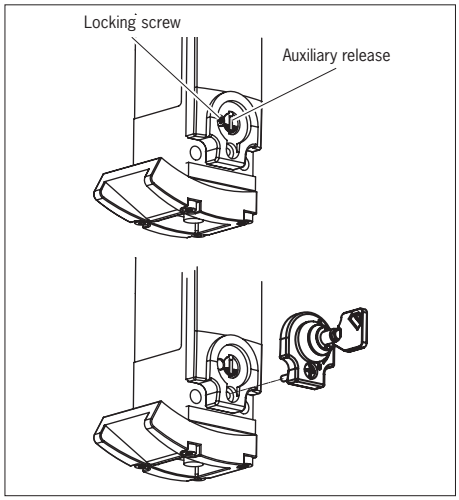


Fig. 2: Auxiliary release and auxiliary key release

Important!

- The actuator must not be under tensile stress during manual release.
- After use, reset the auxiliary release and screw in and seal the locking screw (with sealing lacquer, for example).
- The auxiliary key release must not be used to lock the switch during servicing to prevent activation of guard locking, for example. Use a lockout bar for this purpose (see chapter *"Lockout bar (optional)"*).
- Loss of the release function due to mounting errors or damage during mounting.
- Check the release function every time after mounting.
- Observe the notes on any enclosed data sheets.

Actuating auxiliary key release

On devices with auxiliary key release (can be retrofitted), simply turn the key to release. Function as for auxiliary release. For mounting, see the auxiliary key release supplement.

Emergency release (can be retrofitted)

This permits opening of a locked guard from outside the danger area without tools. For mounting, see the mounting supplement.

Important!

- It must be possible to operate the emergency release manually from outside the protected area without tools.
- The emergency release must possess a marking indicating that it may be used only in an emergency.
- The actuator must not be under tensile stress during manual release.
- The release function meets all other requirements from EN ISO 14119.
- The emergency release meets the requirements of Category B according to EN ISO 13849-1.
- Loss of the release function due to mounting errors or damage during mounting.
- Check the release function every time after mounting.
- Observe the notes on any enclosed data sheets.

Actuating emergency release

- Turn the emergency release clockwise until it clicks into place.

➡ Guard locking is released.

To reset, press the snap-in bolt inward using a small screwdriver or similar tool and turn the emergency release back.

The safety contacts in the evaluation unit are switched off when emergency release is actuated. Use the safety contacts in the evaluation unit to generate a stop command.

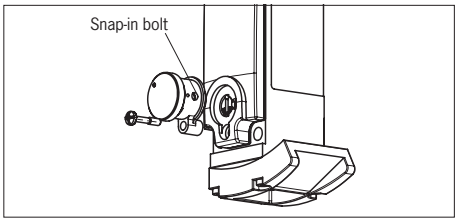


Fig. 3: Emergency release

Escape release (optional)

Permits opening of a locked guard from the danger area without tools (see *Fig. 15*).

Important!

- It must be possible to actuate the escape release manually from inside the protected area without tools.
- It must not be possible to reach the escape release from the outside.
- The actuator must not be under tensile stress during manual release.
- The escape release meets the requirements of Category B according to EN ISO 13849-1.

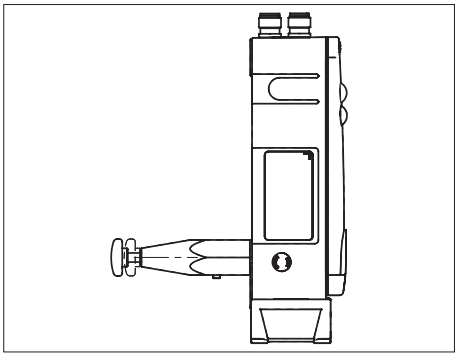


Fig. 4: Escape release

Actuating escape release

- Press the red release knob to the end stop.

➡ Guard locking is released.

Pull the knob out again to reset.

The safety contacts in the evaluation unit are switched off when the escape release is actuated. Use the safety contacts in the evaluation unit to generate a stop command.

Wire front release (optional)

Release via a pull wire. Depending on the type of attachment, the wire front release can be used as emergency release or escape release.

The following applies to non-latching wire front releases:

If the release is to be used as an emergency release, one of the following measures must be taken (see EN ISO 14119:2025, section 6.9.3):

- Install the release so that it can be reset only with the aid of a tool.
- Alternatively, the reset can be performed at the control system level. E.g. by means of a plausibility check (status of the safety outputs does not match the guard locking control signal).

Independently of this, the specifications for emergency release from chapter *"Emergency release (can be retrofitted)"* are applicable.

Important!

- The wire front release (bowden) meets the requirements of Category B according to EN ISO 13849-1.
- The correct function depends on the laying of the pull wire and the attachment of the pull handle, and this is the responsibility of the plant manufacturer.
- The actuator must not be under tensile stress during manual release.

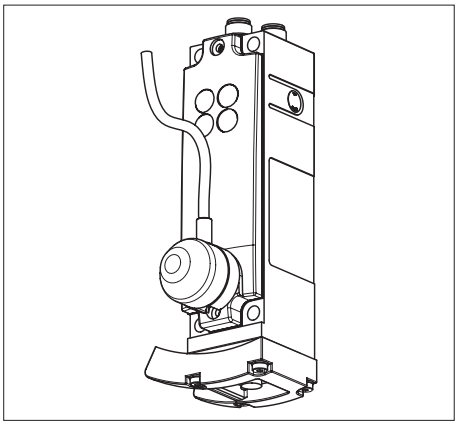


Fig. 5: Wire front release (bowden)

Laying wire front release

Important!

- Loss of the release function due to mounting errors, damage or wear.
- Check the release function every time after mounting.
- When routing the wire front release, ensure that it operates smoothly.
- Observe the min. bending radius (100 mm) and minimize the number of bends.
- The switch is not allowed to be opened.
- Observe the notes on the enclosed data sheets.

Lockout bar (optional)

Important!

- The lockout bar is not a safety function.
- The correct function must be checked at regular intervals.

The lockout bar can be used to prevent maintenance personnel from being unintentionally locked in the danger area, for example.

In locked position, the lockout bar prevents activation of guard locking. The lockout bar can be secured in locked position with up to 3 padlocks (shackle diameter between 5 and 9 mm).

Using the lockout bar

Important!

Deactivate guard locking and open the guard before using the lockout bar.

Before entering the danger area:

1. Open the guard
2. Press button, move lockout bar to locked position (*Fig. 7*, A and B) and secure with padlock (*Fig. 7*, C)

➡ Guard locking cannot be activated, and it must not be possible to start the machine.

Important!

Test this aspect before entering the danger area!

Resetting the lockout bar

1. Open the guard if necessary
2. Remove the padlock
3. Move lockout bar to basic position (*Fig. 7*, A)

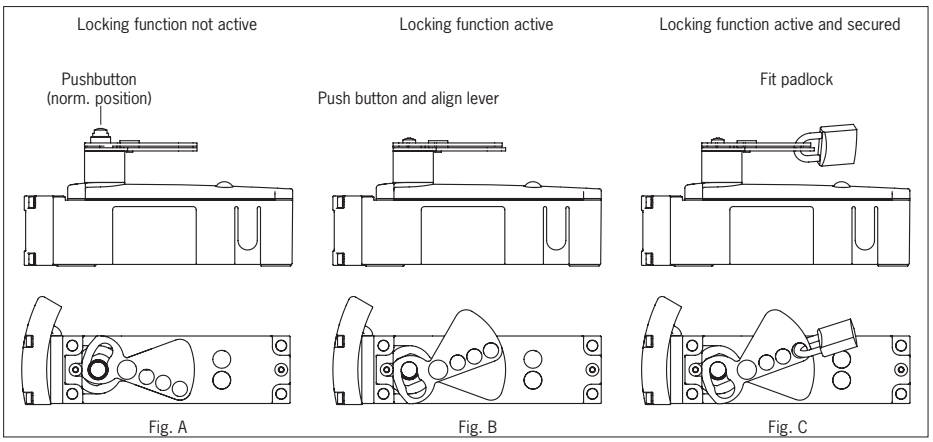


Fig. 7: Using the lockout bar

Mounting

⚠ CAUTION

Safety switches must not be bypassed (bridging of contacts), turned away, removed or otherwise rendered ineffective.

- Observe EN ISO 14119:2025, section 6.9.3, for information about reducing the possibilities for bypassing an interlocking device.
- The max. achievable category according to EN 13849-1 depends on the installation position.

NOTICE

Device damage due to improper mounting and unsuitable ambient conditions.

- Safety switches and actuators must not be used as an end stop.
- Observe EN ISO 14119:2025, sections 6.2 and 6.3, for information about mounting the safety switch and the actuator.
- Observe EN ISO 14119:2025, section 8, for information about reducing the possibilities for bypassing an interlocking device.
- Protect the switch head against damage, as well as penetrating foreign objects such as swarf, sand and blasting shot, etc. The switch should be installed with the actuating head down for this purpose.
- Observe the min. door radii (see *Fig. 10*).
- Ensure that the actuator contacts the ramp in the designated area (see *Fig. 9*). Marks on the ramp specify the prescribed approach zone.

Note the following points:

Actuator and safety switch must be fitted so that

- the active faces of the actuator and the safety switch are parallel with each other.
- the actuator is fully inserted into the switch recess when the guard is closed.
- no dirt can accumulate in the recess.

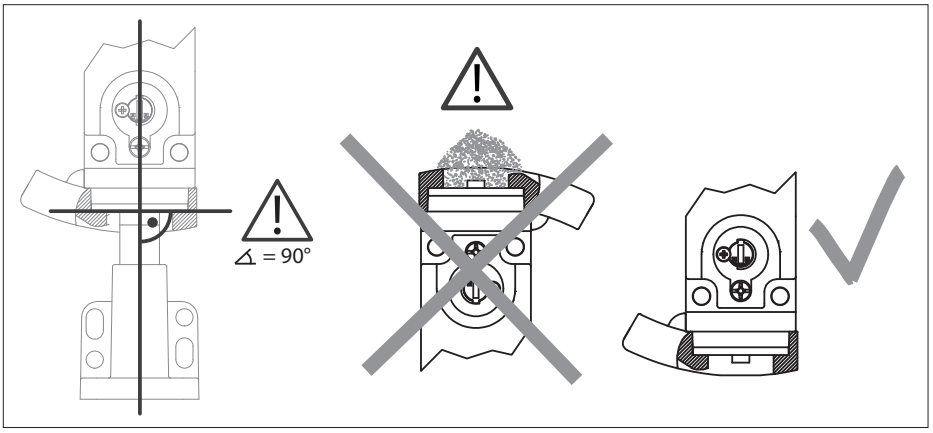


Fig. 8: Preferable mounting position

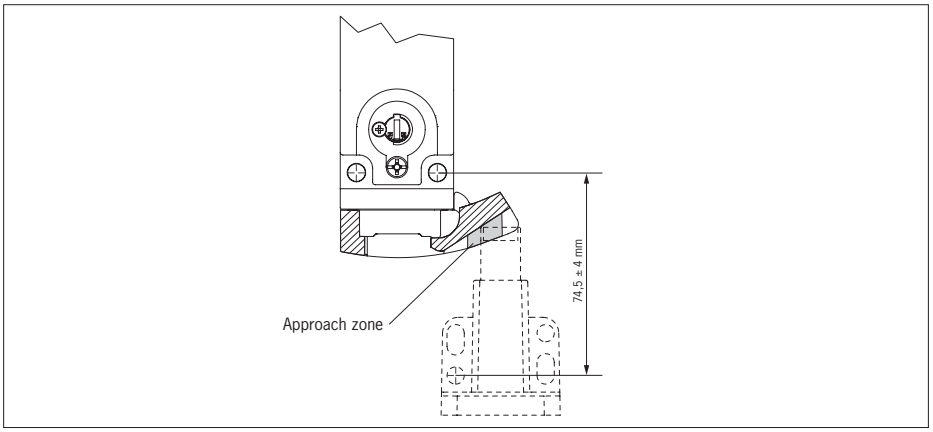


Fig. 9: Actuator approach zone

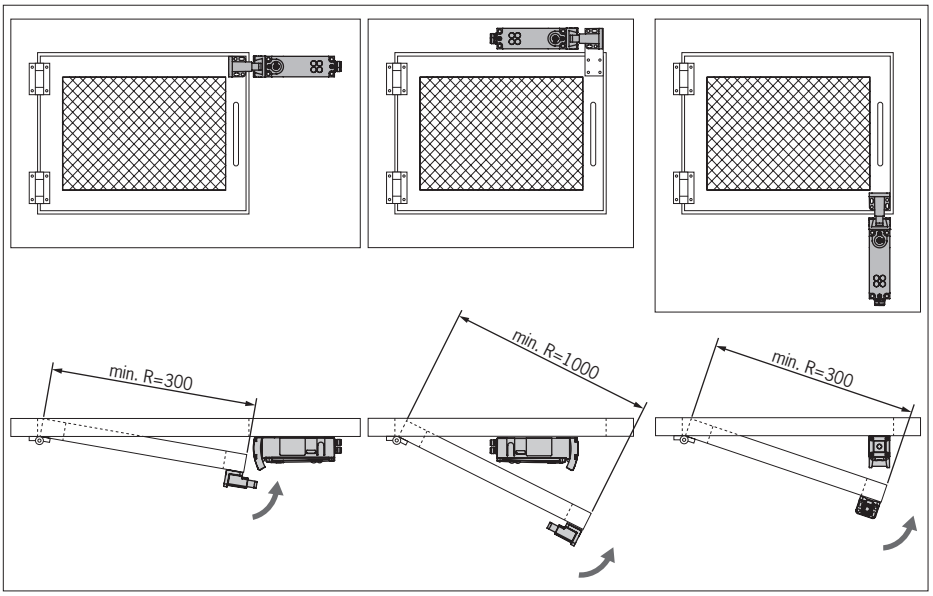


Fig. 10: Door radii and approach zone

Tip

EUCHNER offers special cover plates to improve protection against tampering. These accessories can be found at www.euchner.com.

Changing the approach direction

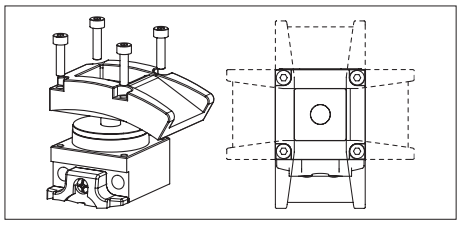


Fig. 6: Changing the approach direction

- Remove the screws from the read head.
- Set the required direction.
- Tighten the screws with a torque of 1.5 Nm

Electrical connection

⚠ WARNING

In the event of a fault, loss of the safety function due to incorrect connection.

- The read head CET is allowed to be used only in combination with a suitable EUCHNER connecting cable. The connecting cable contains two shielded cores for the signal from the read head. This shield must not be interrupted on the route to the evaluation unit or grounded at any other point (see *Fig. 12*).
- All electrical connections must either be isolated from the mains supply by a safety transformer according to IEC EN 61558-2-6 with limited output voltage in the event of a fault (PELV), or by other equivalent isolation measures.
- To avoid EMC interference, the physical environmental and operating conditions at the installation site of the device must comply with the requirements according to the standard EN 60204-1 (EMC).

Important!

For use and operation as per the cULus requirements, a power supply with the feature "for use in class 2 circuits" must be used. The same requirement applies to the safety outputs.

Alternative solutions must comply with the following requirements:

- This device shall be used with a suitable isolating source in conjunction with a fuse in accordance with UL248. This fuse should be designed for max. 3.3 A and should be integrated into the 30 V DC voltage section.
- For terminal assignment, see *Fig. 11*.
- For detailed information, see the operating instructions for the evaluation unit used.

Setup and functional check

Pay attention to the information in the system manual for the evaluation unit used during setup.

⚠ WARNING

Danger of fatal injuries as a result of faults in installation and functional check.

- Before carrying out the functional check, make sure that there are no persons in the danger area.
- Observe the valid accident prevention regulations.

Mechanical function test

The actuator must slide easily into the recess on the actuating head. Close the guard several times to check the function.

Electrical function test

After installation and any fault, the safety function must be fully checked. Proceed as follows:

1. Switch on operating voltage.
   - The machine must not start automatically.
2. Close all guards.
   In case of guard locking by solenoid force: activate guard locking.
   - The machine must not start automatically. It must not be possible to open the guard.
3. Enable operation in the control system.
   - It must not be possible to deactivate guard locking as long as operation is enabled.
4. Disable operation in the control system and deactivate guard locking.
   - Guard locking must remain active until there is no longer any risk of injury.
   - It must not be possible to start the machine as long as guard locking is deactivated.

Service and inspection

⚠ WARNING

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

- In case of damage, the entire device must be replaced.
- 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 (see chapter *"Setup and functional check"*)
- Check all additional functions (e.g. escape release, lockout bar, etc.)
- Check the secure mounting of the devices and the connections
- Check for contamination

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

Exclusion of liability under the following circumstances:

- Incorrect use
- Non-compliance with safety regulations
- Installation and electrical connection not performed by authorized personnel
- Failure to perform functional checks.

Technical data

Read head

Parameter	Value
Material - Ramp - Read head housing	 Stainless steel Die-cast aluminum
Installation position	Any (recommendation: actuating head downward)
Degree of protection	IP67 (screwed tight with the related mating connector)
Mechanical life	2 x 10^6 operating cycles
Ambient temperature	-20 ... +55 °C
Actuator approach speed, max.	20 m/min
Locking force, max.	6,500 N
Locking force F_{Zh} in acc. with test principles GS-ET-19	$F_{Zh} = \frac{F_{max}}{1.3} = 5{,}000$
Weight	Approx. 1 kg
Degrees of freedom X, Y, Z	X, Y ± 5 mm; Z ± 4 mm
Switching frequency	1 Hz (this value can deviate depending on the evaluation unit used. See operating instructions for the related evaluation unit)
Connection	See *Fig. 11*
Rated insulation voltage U_i	50 V
Rated impulse withstand voltage U_{imp}	1.5 kV
Solenoid	
Connection	Reverse polarity protected
Solenoid operating voltage/ solenoid power consumption	DC 24 V +10%, -15% 11 W
Solenoid current consumption I_{CM}	450 mA
Duty cycle	100%

Actuator

Parameter	Value
Housing material	Stainless steel
Installation position	Active face opposite read head
Degree of protection	IP67
Mechanical life	1 x 10^6 operating cycles
Ambient temperature	-20 ... +55 °C
Locking force, max.	6,500 N
Weight	Approx. 0.25 kg
Stroke, max.	15 mm
Door radius, min.	300 mm
Power supply	inductive, via read head

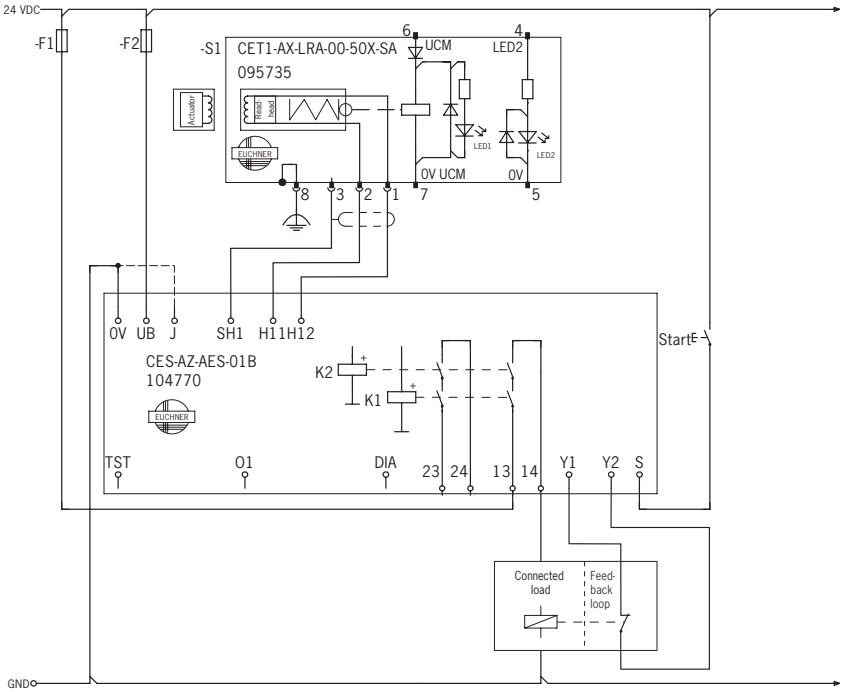
LED

Parameter	Value
Connection voltage	24 V ± 15% (reverse polarity protected)
Current consumption, max.	6 mA

Ordering information and accessories

Suitable accessories, e.g. cables or assembly material, can be found at www.euchner.com. To order, enter the order number of your item in the search box and open the item view. Accessories that can be combined with the item are listed in "Accessories."

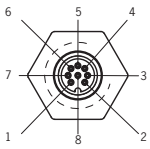
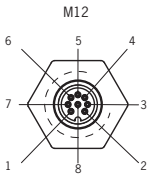
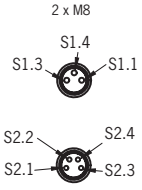
This connection example applies only to the read head CET1-AX-LRA-00-50X-SA.
Observe the corresponding connector assignment for your version.



Important!

To achieve category 4, PL e according to EN 13849-1, it is necessary to monitor the downstream contactors (implemented here via the CES evaluation unit).

This example shows only an excerpt that is relevant for connection of the CES system. The example illustrated here does not show complete system planning. The user is responsible for safe integration into the overall system.

Read head	Plug connector (view of connection side)	Pin	Function	Wire color of connecting cable*
CET1-AX-LRA-00-50X-SA **095735** CET2-AX-LRA-00-50X-SA **106039** CET1-AX-LDA-00-50X-SE **100399** CET1-AX-LRA-00-50F-SA **102161** CET1-AX-LDA-00-50F-SA **103750** CET1-AX-LRA-00-50X-SF **104051** CET1-AX-LRA-00-50X-SA-C2333-111917 **111917** CET1-AX-LRA-00-50F-SA-C2333-111918 **111918**	M12 	1	Read head data line	WH
		2	Read head data line	BN
		3	SH, data line shield	(shield)
		4	LED 2 freely configurable, 24 V	YE
		5	0V	GY
		6	UCM, solenoid operating voltage DC 24 V	PK
		7	0 V UCM, solenoid operating voltage 0 V	BU
		8	FE functional earth	RD
CET1-AX-LRA-00-50L-SA **104062**	M12 	1	Read head data line	WH
		2	Read head data line	BN
		3	SH, data line shield	(shield)
		4	LED 2 freely configurable, 24 V	YE
		5	LED 1 freely configurable, 24 V	GY
		6	UCM, solenoid operating voltage DC 24 V	PK
		7	0 V UCM, solenoid operating voltage 0 V	BU
		8	FE functional earth	RD
CET1-AX-LRA-00-50X-SC **102988** CET2-AX-LRA-00-50X-SC **109932** CET1-AX-LDA-00-50X-SC **103444**	2 x M8 	S 1.1	Read head data line	BN
		S 1.3	Read head data line	WH
		S 1.4	SH, data line shield	(shield)
		S 2.1	UCM, solenoid operating voltage DC 24 V	BN
		S 2.2	0V	WH
		S 2.3	0 V UCM, solenoid operating voltage 0 V	BU
		S 2.4	LED 2 freely configurable, 24 V	BK

* Only for standard EUCHNER connecting cable

Fig. 11: Connection example and terminal assignment

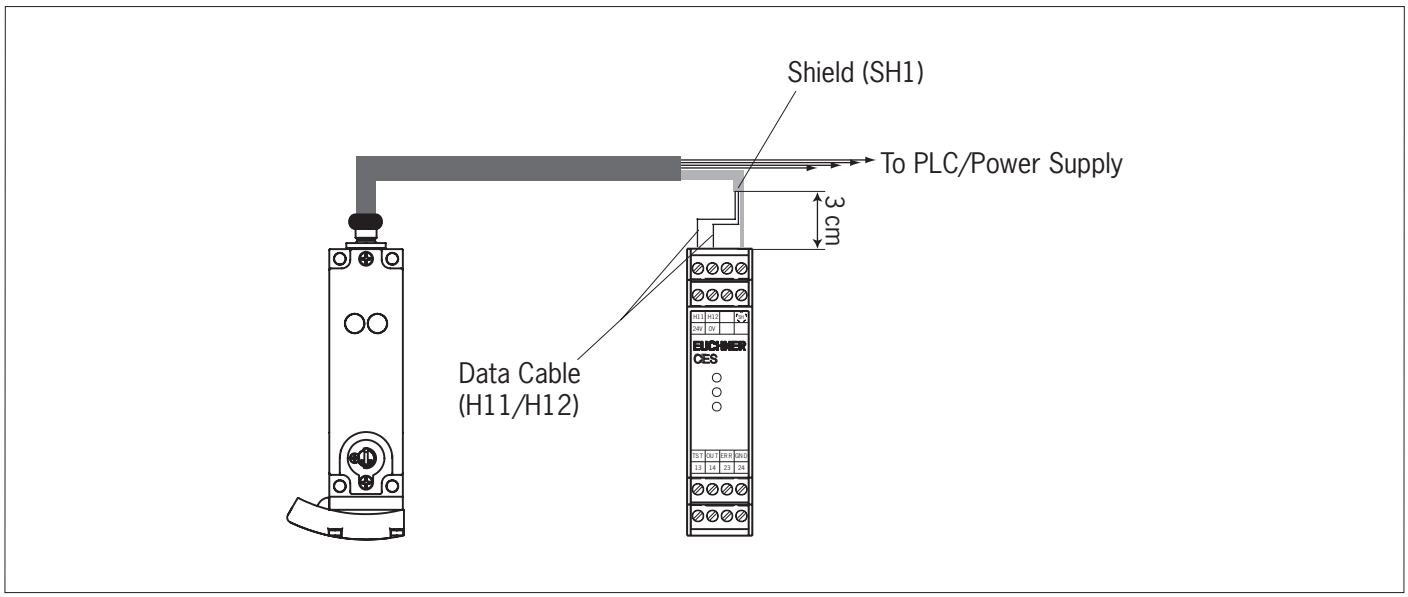


Fig. 12: Connection of suitable EMC performance

Order no./item	Closed-circuit current principle	Open-circuit current principle	Plug connector M12	2 plug connectors M8	Single ramp	Double ramp	Escape release	**2 LEDs** (1 freely configurable)	**2 LEDs** (2 freely configurable)
095735 CET1-AX-LRA-00-50X-SA	●		●		●			●	
100399 CET1-AX-LDA-00-50X-SE	●		●			●		●	
104051 [1] CET1-AX-LRA-00-50X-SF	●		●[1]		●			●	
104062 CET1-AX-LRA-00-50L-SA	●		●		●				●
102161 CET1-AX-LRA-00-50F-SA	●		●		●		75 mm	●	
103750 CET1-AX-LDA-00-50F-SA	●		●			●	75 mm	●	
106039 CET2-AX-LRA-00-50X-SA		●	●		●			●	
102988 CET1-AX-LRA-00-50X-SC	●			●	●			●	
103444 CET1-AX-LDA-00-50X-SC	●			●		●		●	
109932 CET2-AX-LRA-00-50X-SC		●		●	●			●	
096327 CET-A-BWK-50X	Actuator, locking force 6,500 N (incl. safety screws)								
073456 M5x16/V100	Safety screws M5 x 16 for actuator (replacement), packaging unit: 100 pcs.								

1) Plug connector can be rotated by 360°.

Table 1: Ordering table for read heads and actuators

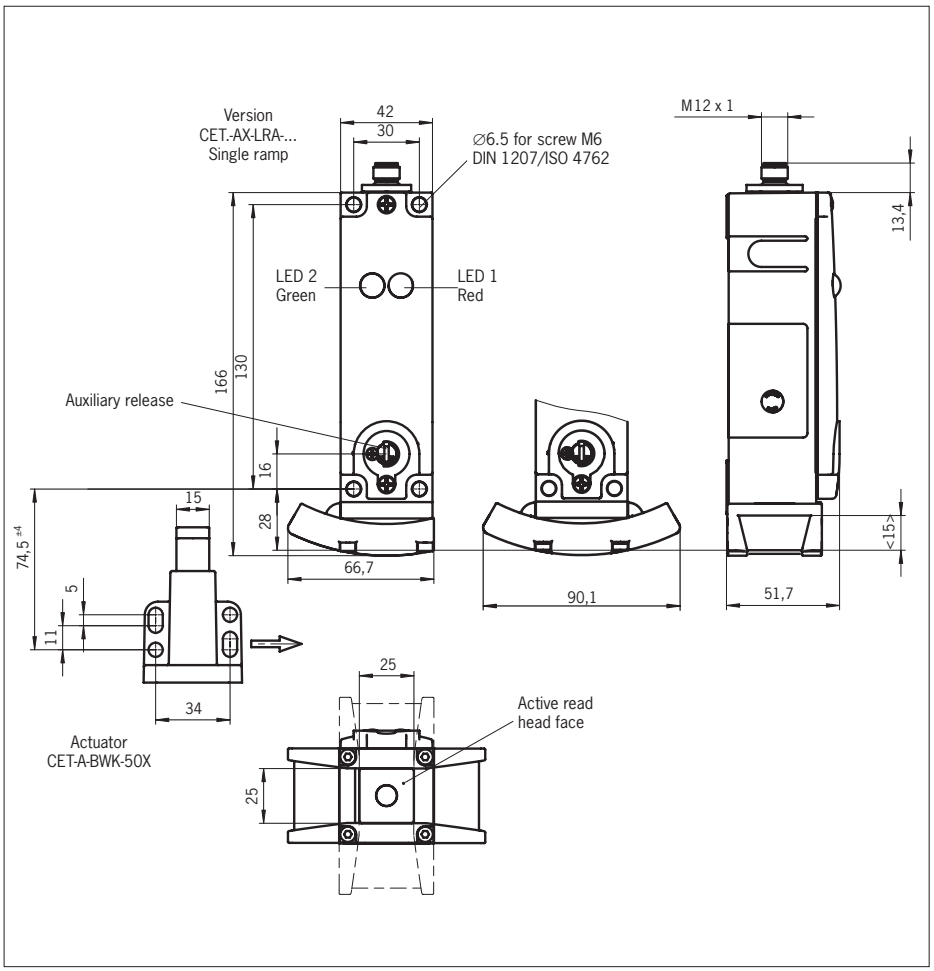


Fig. 13: Dimensions with plug connector M12

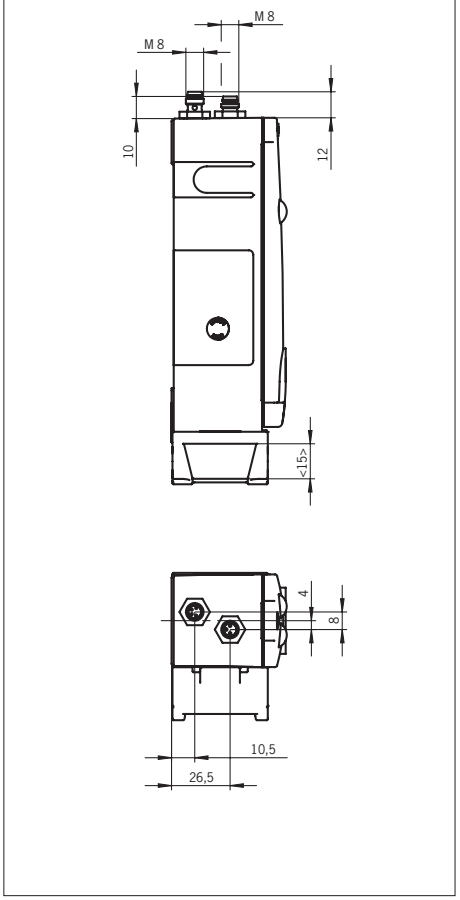


Fig. 14: Dimensions with 2 plug connectors M8

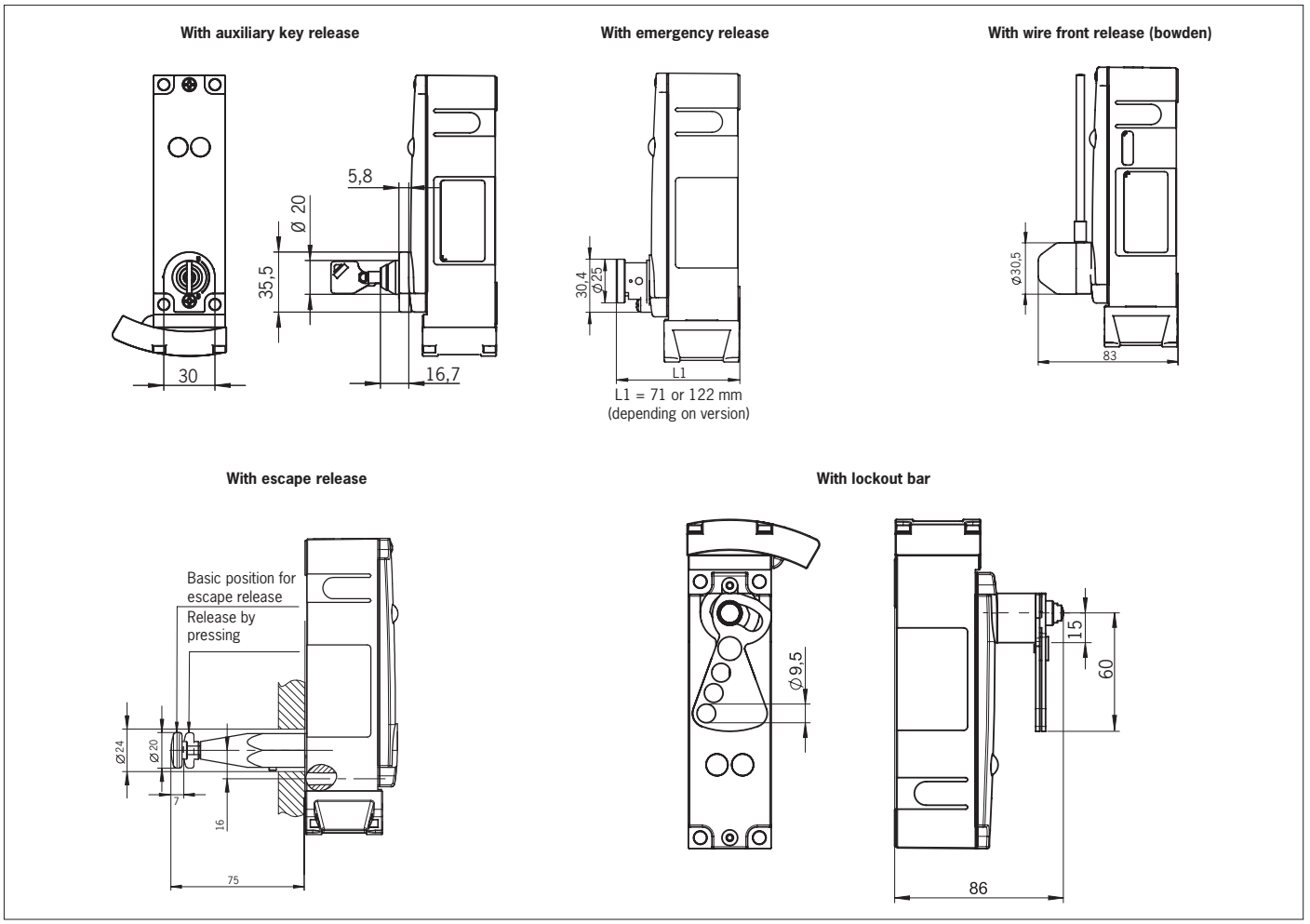


Fig. 15: Dimensions with auxiliary key release, emergency release, wire front release, escape release and lockout bar