Scope

These operating instructions apply to all read heads/actuators CEM-A-... of version 1.2.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. Please contact the EUCHNER service team if you have any questions.

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 (2114342)	(this document)	
Declaration of conformity	Declaration of conformity	
Any additions to the operating instructions	Take any associated additions to the operating instructions or data sheets into account.	

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 doc. no. or the order number for the device in the search box.

Correct use

Read heads of series CEM-A are operated in combination with an evaluation unit in the system family CES-A-...B or CES-AZ-...B. In this combination, the read head CEM-A is an interlocking device with electromagnetic guard locking without guard lock monitoring (type 4). The coding level depends on the evaluation unit used (unicode or multicode evaluation). The combination is not allowed to be used as guard locking for personnel protection according to EN ISO 14119.

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

This means:

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

Before use, a risk assessment must be performed on the machine, e.g. according to the following standards:

- EN ISO 13849-1
- EN ISO 12100
- EN IEC 62061

Correct use includes observing the relevant requirements for installation and operation, e.g. according to the following standards:

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

The read head must be used only in conjunction with the designated actuator from EUCHNER. On the use of different actuators or other connection components, EUCHNER provides no warranty for safe function.

The read head CEM must be operated only in combination with evaluation units in the system family CES-A-...B or CES-AZ-...B. Please check this in the "Combination options" table in the operating instructions for the evaluation unit used.

Important!

- The user is responsible for the integration of the device in 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 technical data).
- If a data sheet is included with the product, the information on the data sheet applies.
- The PL that can be achieved depends on the evaluation unit used.

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 CEM behaves like a read head CES (see operating instructions for the evaluation unit used). As soon as the actuator reaches the actuating range of the read head, a signal is sent to the evaluation unit.

CEM read heads additionally feature a solenoid to produce the locking force. The guard locking is not monitored.

Version with remanence

The guard locking is activated as soon as the control voltage U_{CM} is present (open-circuit current principle).

The solenoid retains a slight residual magnetism after it is switched off. This decreases over time. This process is faster when the safety door is open than when it is closed.

Version with remanence and permanent magnet

A permanent magnet is installed in the CEM read head with this version.

The guard locking is activated as soon as the control voltage U_{CM} is present (open-circuit current principle). After the solenoid switches off, the permanent magnet's attractive force acts between the CEM read head and the anchor plate of the CEM actuator.

Version without remanence

The guard locking is activated when, in addition to operating voltage U_B, the control voltage U_{CM} is present (open-circuit current principle).

In particular during metal machining, the residual magnetism (remanence) in the guard locking solenoid can cause problems. In the open state, metal chips may be drawn to the contact area. The next time the guard is closed, there will be a gap between the actuator and read head that will limit the locking force. To avoid this effect there are read heads without remanence.

These read heads are demagnetized when the solenoid is switched off. For this purpose the operating voltage U_B must always be applied.

LED

CEM devices with a locking force of 650 N feature an integrated LED on plug connector X1.

An external LED can be connected to plug connector X2 on devices with a locking force of 1,000 N.

The LED illuminates when voltage is applied to the solenoid.

Mounting

NOTICE

Device damage due to improper mounting and unsuitable ambient conditions.

- Safety switches and actuators are allowed to be used as an end stop. Observe the max. permissible impact energy (see technical data).
- When the safety door is opened, the actuator must be moved away from the read head toward the front (see Fig. 1).
- 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.

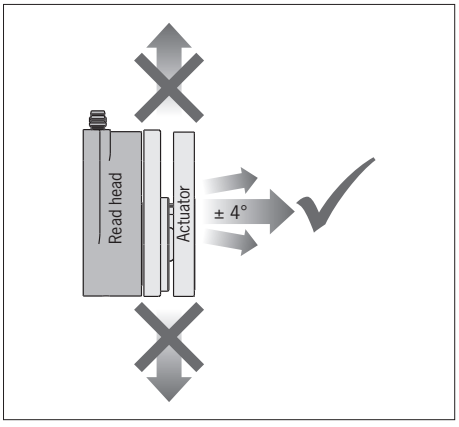


Fig. 1: Approach direction

Protection against environmental effects

Dirt on the surfaces of the read head and actuator can reduce the adhesive force and the locking force. Clean the surfaces at regular intervals.

Cover the read head, the actuator and the type label during painting work!

Electrical connection

NOTICE

- All the electrical connections must either be isolated from the mains supply by a safety transformer according to IEC EN 1558-2-6 with limited output voltage in the event of a fault or by other equivalent insulation measures.
- If a common power supply is used, all the inductive and capacitive loads (e.g. contactors) connected to the power supply must be connected to appropriate interference suppression units.

- For terminal assignment, see Fig. 4.
- For detailed information, see the operating instructions for the evaluation unit used.

Setup and functional check

Observe the information in the operating instructions for the respective evaluation unit 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.

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

- Switch on operating voltage.
  The machine must not start automatically.
- Close all guards.
- Activate the guard locking.
- Test the locking force by trying to open the guard.
  The locking force of 650 N or 1,000 N is attained when U_{CM} is applied.

Service and inspection

⚠ WARNING

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

- In case of damage, the related safety component must be replaced. The replacement of individual parts in a safety component is not permitted.

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

- Check the switching function
- Check the secure mounting of the devices and the connections
- Check for contamination
- Check for sealing of the plug connector on the safety switch
- Check for loose cable connections on the plug connector
- Check the release distance

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

NOTICE

The year of manufacture can be seen in the lower right corner of the type label.

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.

Typical operating distance

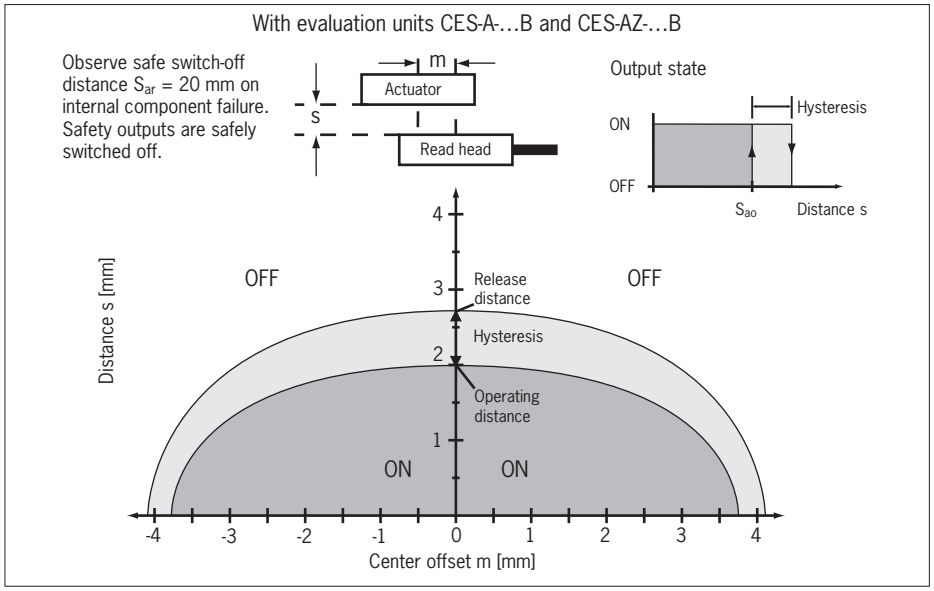


Fig. 2: Typical operating distance

Technical data

Read head

Parameter	Value
Material - Housing - Read head CES - Solenoid	 Aluminum Plastic (PPS) Steel, nickel plated
Weight - CEM-A-LE05… - CEM-A-LH10…	 Approx. 0.3 kg Approx. 0.9 kg
Mechanical life	1 x 10^6 (closing cycles) [1]
Installation position	Any
Degree of protection	IP67
Ambient temperature	-25 … +50 °C
Actuating range - Assured release distance S_{ar} for center offset m = 0 mm - Switching hysteresis for center offset m = ± 2.5 mm - Assured operating distance S_{ao}	 20 mm 0.7 mm 0 mm
Connection to evaluation unit (plug connector X3)	Plug connector M8 (male socket, 3-pin), suitable for snap-action and screw terminals
Max. cable length	25 m
External LED connection (plug connector X2, only CEM-A-LH10…)	Plug connector M8 (female socket, 4-pin), suitable for screw terminal
Max. current consumption of external LED	500 mA
Solenoid	
Locking force (not monitored) - CEM-A-LE05… - CEM-A-LH10…	 650 N 1,000 N
Adhesive force due to permanent magnet - CEM-A-LE05K-S2-P	 30 N
Adhesive force due to remanence - CEM-A-LE05R-S2 - CEM-A-LH10K-S2 - CEM-A-LH10R-S2	 Approx.0.5 N Approx.40 N ± 25% Approx.0.7 N
Max. permissible center offset between solenoid and anchor plate	± 2.5 mm
Operating voltage U_B (plug connector X1)	DC 24 V +10%, -15% reverse polarity protected
Control voltage U_{CM} (plug connector X1)	DC 24 V +10%, -15% reverse polarity protected with free-wheeling diode
Current consumption of read heads with remanence - at connection X1.1 (U_{CM}) - CEM-A-LH10K-S2	 225 mA (without external LED)
Current consumption of read heads without remanence - at connection X1.1 (U_{CM}) - CEM-A-LE05K-S2-P - CEM-A-LH10R-S3 - at connection X1.2 (U_B) - CEM-A-LH10R-S3	 100 mA 15 mA (without external LED) at UCM = 0 V 12 mA at UCM = 24 V 225 mA
Duty cycle	100%
Connection rating - CEM-A-LE05R-S2 - CEM-A-LH10K-S3 - CEM-A-LH10R-S3	 Approx.2.8 W Approx.5.4 W Approx.5.8 W
Operating voltage connection (plug connector X1)	Plug connector M8 (male socket, 4-pin) With CEM-A-LE05… LED, yellow, integrated into the plug (see circuit diagram)

1) CEM-A-LH10…: At an impact energy of max. 1 Joule
CEM-A-LE05…: At an impact energy of max. 2 Joule

Actuator

Parameter	Value
Material - Housing - Active face - Solenoid	 Aluminum Plastic (PA6) Steel, nickel plated
Weight - CEM-A-BE05… - CEM-A-BH10…	 Approx. 0.18 kg Approx. 0.30 kg
Installation position	Active face opposite CES read head
Degree of protection	IP67
Ambient temperature	-25 … +50 °C
Adjustment angle (around point X, see dimension drawing)	± 4°

Dimension drawing

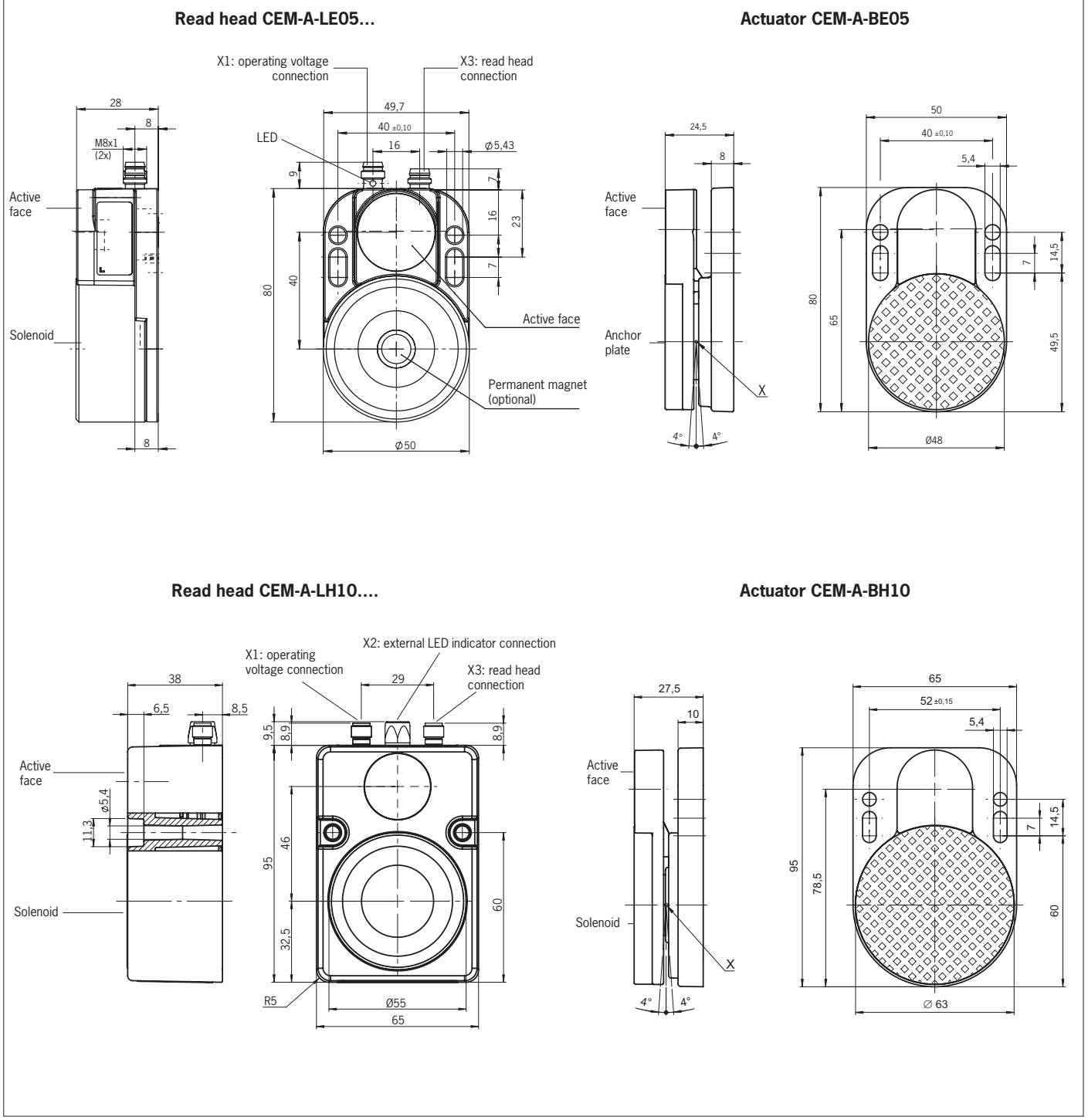
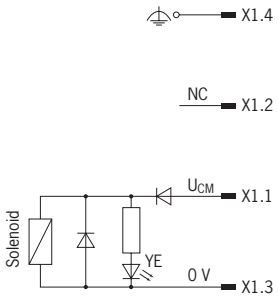


Fig. 3: Dimension drawings

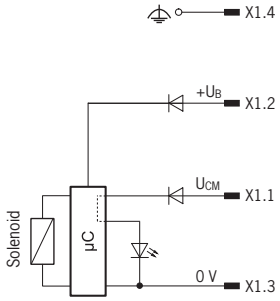
Terminal assignment

CEM-A-LE05...

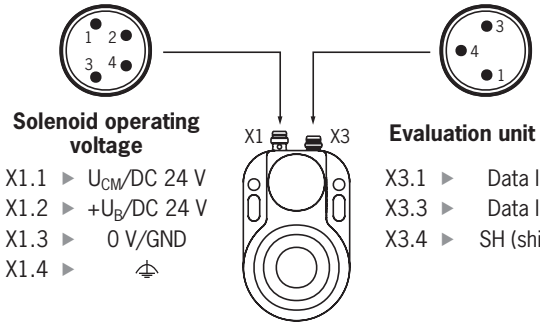
CEM-A-LE05K-S2
CEM-A-LE05K-S2-P



CEM-A-LE05R-S2



A free-wheeling diode is already integrated into each CEM



Solenoid operating voltage

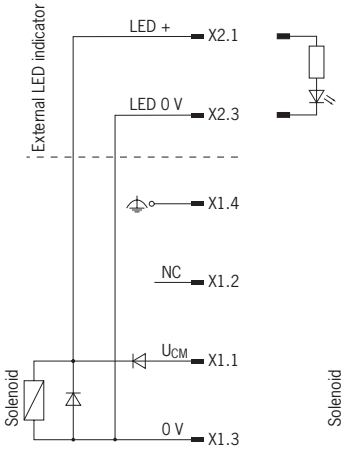
X1.1 ▶ U_{CM}/DC 24 V
X1.2 ▶ $+U_B$/DC 24 V
X1.3 ▶ 0 V/GND
X1.4 ▶ ⏚

Evaluation unit CES

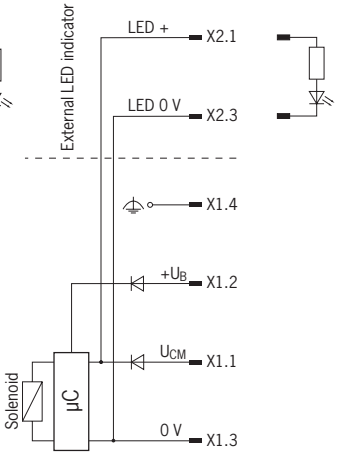
X3.1 ▶ Data line
X3.3 ▶ Data line
X3.4 ▶ SH (shield)

CEM-A-LH10...

CEM-A-LH10K-S3



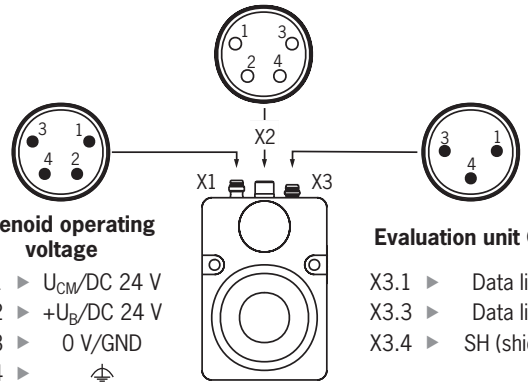
CEM-A-LH10R-S3



A free-wheeling diode is already integrated into each CEM

External LED indicator connection

X2.1 ▶ LED +
X2.2 ▶ -
X2.3 ▶ LED 0 V
X2.4 ▶ -



Solenoid operating voltage

X1.1 ▶ U_{CM}/DC 24 V
X1.2 ▶ $+U_B$/DC 24 V
X1.3 ▶ 0 V/GND
X1.4 ▶ ⏚

Evaluation unit CES

X3.1 ▶ Data line
X3.3 ▶ Data line
X3.4 ▶ SH (shield)

Fig. 4: Terminal assignment