Read head CEM with guard locking without guard lock monitoring

- **With transponder coding**
- **Integrated solenoid (without monitoring of the guard locking)**
- **Up to category 4 / PL e nach EN ISO 13849-1 for monitoring the safety guard**

Important: The device is only allowed to be used as guard locking if there is no hazard due to overtravelling machine movements. The guard locking is only used for process protection.

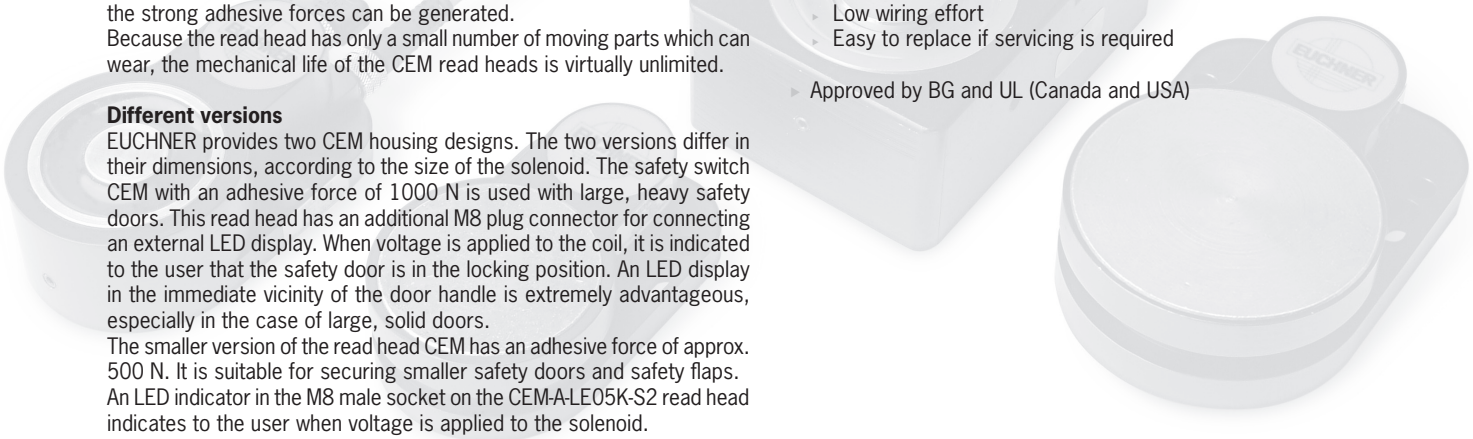
Design and functionality
A CES read head and a solenoid are integrated into the CEM read head. The CEM read head is connected to the CES evaluation unit with a round M8 plug connector. The CEM actuator of identical design also has a metal plate in addition to the transponder; this plate acts as an armature for the solenoid coil.
When the safety door is closed, the CEM actuator enters the operating distance of the CEM read head. The transponder signals are transferred, and then the evaluation unit closes the safety contacts and sets the OUT output "high". By applying voltage to the solenoid for the CEM read head, strong magnetic forces can be generated between the coil (in the read head) and the armature (in the actuator).
Depending on the design, adhesive forces of approx. 500 N or 1000 N respectively are applied between the CEM actuator and the CEM read head. Practical experience has shown that these magnetic adhesive forces effectively prevent any opening, even if the user applies considerable effort.

Use of the read head even in extremely harsh environments
The read heads CEM have an extremely robust design. The high degree of protection IP 67 and the metal housing allow the read head to be used in extremely harsh environments. The armature plate for the CEM actuator has spring mountings and can be tilted up to an angle of ± 4°. Therefore, when a maladjusted safety door is closed, the CEM actuator adjusts itself independently to the surface of the CEM read head. It is not necessary to readjust the safety door when using the read heads CEM. When mounting the read head CEM, it is only necessary to ensure that the CEM actuator is guided in front of the CEM read head when the door is closed, so that the strong adhesive forces can be generated.
Because the read head has only a small number of moving parts which can wear, the mechanical life of the CEM read heads is virtually unlimited.

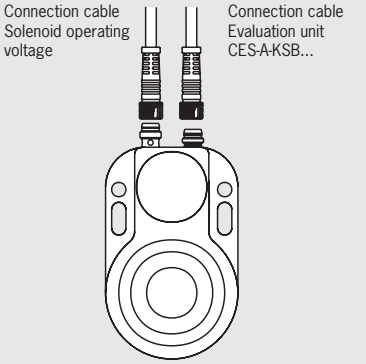
Different versions
EUCHNER provides two CEM housing designs. The two versions differ in their dimensions, according to the size of the solenoid. The safety switch CEM with an adhesive force of 1000 N is used with large, heavy safety doors. This read head has an additional M8 plug connector for connecting an external LED display. When voltage is applied to the coil, it is indicated to the user that the safety door is in the locking position. An LED display in the immediate vicinity of the door handle is extremely advantageous, especially in the case of large, solid doors.
The smaller version of the read head CEM has an adhesive force of approx. 500 N. It is suitable for securing smaller safety doors and safety flaps.
An LED indicator in the M8 male socket on the CEM-A-LE05K-S2 read head indicates to the user when voltage is applied to the solenoid.

With or without remanence
In particular during metal machining, the residual magnetism (remanence) in the 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 adhesive force. To avoid this effect there are read heads without remanence. These are de-magnetized when the safety guard is opened such that metal chips adhering to the surface fall off.

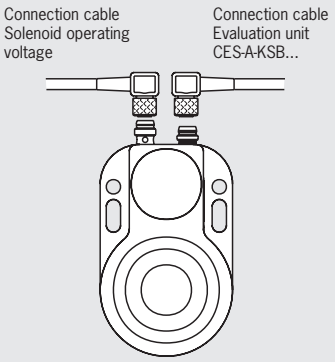
Your advantages
- Safety switch with transponder coding
  - Every actuator is unique
  - Absolutely secure against tampering
- Integrated solenoid for process protection
  - Unintentional opening of the safety door is prevented
- Safety switch and solenoid form a single compact unit
- High adhesive forces from the solenoids (500 N or 1000 N)
  - Protection of the machining process
- Simple operating principle
  - No wearing parts
- Robust housing for harsh environments
- Connection via M8 plug connector
  - Low wiring effort
  - Easy to replace if servicing is required
- Approved by BG and UL (Canada and USA)



Connection variants read head CEM-A-LE05K-S2/CEM-A-LE05R-S2

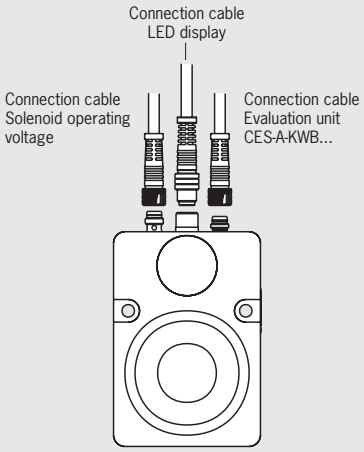


Cable outlet, straight plug connector

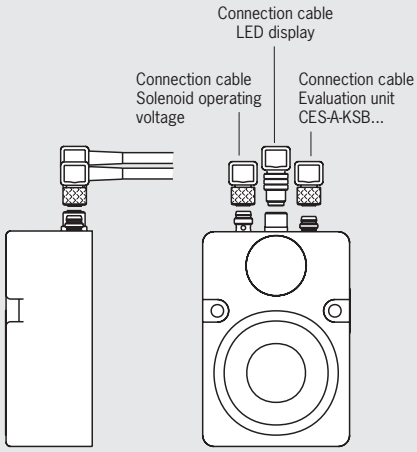


Cable outlet, angled plug connector

Connection variants read head CEM-A-LH10K-S3/CEM-A-LH10R-S3



Cable outlet, straight plug connector



Cable outlet, angled plug connector

Read head CEM-A-LE05.../CEM-A-LE05...-EX

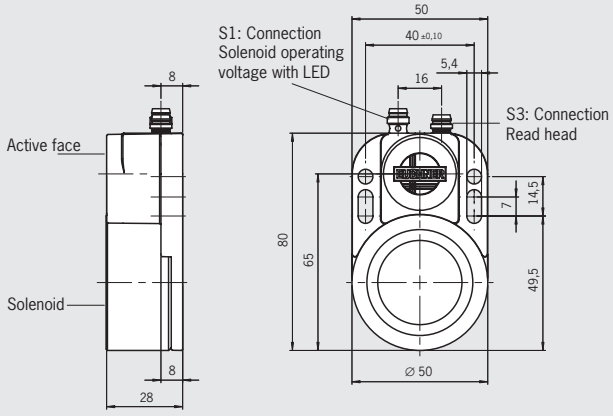
- **Read head with solenoid**
- **Adhesive force 500 N**
- **With and without remanence**
- **Up to categorie 4 according to EN ISO 13849-1**

For possible combinations see page 24

Remanence
Read heads without remanence are de-magnetized when the solenoid is switched off.
For this purpose the operating voltage U_B must always be applied.

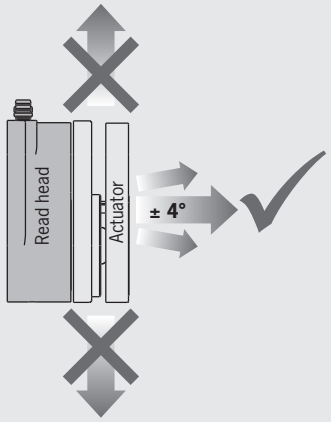
Read head CEM-A-LE05.../CEM-A-LE05...-EX

Dimension drawing



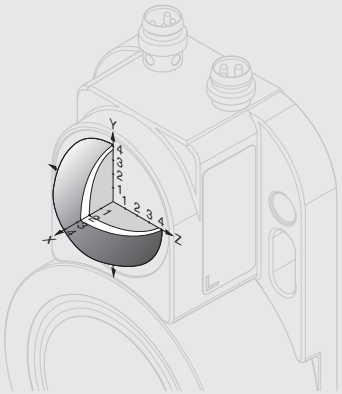
For connection cables see page 65/66

Approach direction



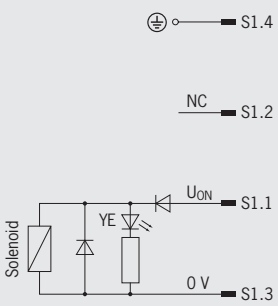
Typical operating distance

Safe switch-off distance
Note s_{ar} = 20 mm for internal component failure.
Safety outputs are safely switched off.

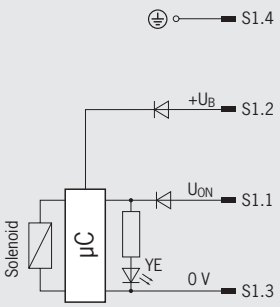


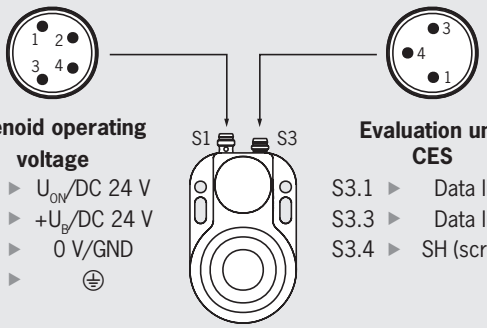
Wiring diagram

CEM-A-LE05K-S2



CEM-A-LE05R-S2





Solenoid operating voltage

- S1.1 ▶ U_{ON}/DC 24 V
- S1.2 ▶ $+U_B$/DC 24 V
- S1.3 ▶ 0 V/GND
- S1.4 ▶ ⏚

Evaluation unit CES

- S3.1 ▶ Data line
- S3.3 ▶ Data line
- S3.4 ▶ SH (screen)

Circuit diagram connection solenoid operating voltage plug S1
A free-wheeling diode is already integrated into each CEM

Ordering table

Series	Adhesive force [N]	Type	Order no / item
CEM-A-LE05K-S2	500	With remanence	**094 800** CEM-A-LE05K-S2
CEM-A-LE05K-S2-EX	500	ATEX, with remanence	**097 174** [1] CEM-A-LE05K-S2-EX
CEM-A-LE05R-S2	500	Without remanence	**095 792** CEM-A-LE05R-S2

1) EX II 3G Ex nA IIC T6

Technical data read head CEM-A-LE05.../CEM-A-LE05...-EX

Parameter	Value min.	Value typ.	Value max.	Unit
General				
Housing material		Aluminum		
Material, read head CES		Plastic (PPS)		
Solenoid material		Galvanized steel		
Weight		Approx. 0.3		kg
Ambient temperature	-25	-	+50	°C
Degree of protection according to IEC 60529		IP67		
Installation position		Any		
Solenoid				
Adhesive force in axial direction		500		N
Adhesive force due to remanence				N
- CEM-A-LE05K-S2/CEM-A-LE05K-S2-EX [1]		Approx. 10 ± 25 %		
- CEM-A-LE05R-S2		Approx. 0.5		
Solenoid center offset max.		± 2.5		mm
Operating voltage U_B plug S1		24 +10%/-15%		V DC
Solenoid voltage U_{ON} plug S1		24 +10%/-15%		
Reverse polarity protection		Yes		
Free-wheeling diode		Yes		
Current consumption CEM-A-LE05K-S2/CEM-A-LE05K-S2-EX				mA
- at connection S1.1 (U_{ON})		100		
Current consumption CEM-A-LE05R-S2				mA
- at connection S1.2 (U_B) at U_{ON} = 0 V		12		
at U_{ON} = 24 V		100		
- at connection S1.1 (U_{ON})		15		
Power consumption				W
- CEM-A-LE05K-S2/CEM-A-LE05K-S2-EX		Approx. 2.5		
- CEM-A-LE05R-S2		Approx. 2.8		
Solenoid operating voltage connection		M8 plug connector (male socket), 4-pin Yellow LED integrated in the plug connector (see circuit diagram)		
Read head				
Operating distance for center offset m = 0				mm
- Assured switch-off distance S_{ar}	-	-	20	
Cable length l = 0 to 25 m				
- Switch-on distance	-	2	-	
- Assured switch-on distance S_{ao}	0	-	-	
- Switching hysteresis	-	0.7	-	
Connection evaluation unit plug S3		M8 plug connector (male socket), 3-pin		
Connection cable	-	-	25	m

1) The remanence disappears immediately when the door is opened and over time in de-energized solenoids.

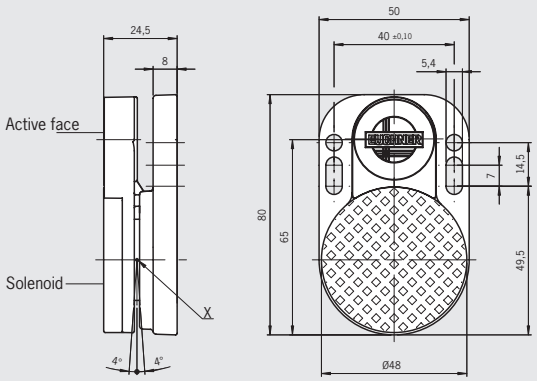
Actuator CEM-A-BE05/CEM-A-BE05-EX

- **Adhesive force 500 N**

For possible combinations see page 24

Actuator CEM-A-BE05/CEM-A-BE05-EX

Dimension drawing



2 safety screws M5x16 are supplied

Ordering table

Series	Order no / item
CEM-A-BE05	**094 805** CEM-A-BE05
CEM-A-BE05-EX	**097 178** 1) CEM-A-BE05-EX

Technical data

Parameter	Value min.	Value typ.	Value max.	Unit
Housing material		Aluminum		
Material, read head CES		Plastic (PPS)		
Solenoid mating plate material		Galvanized steel		
Weight		Approx. 0.18		kg
Ambient temperature	-25	-	+50	°C
Degree of protection according to IEC 60529		IP67		
Installation position		Active face opposite read head		
Adjustment angle (around point X, see dimension drawing)		± 4		°

1) EX II 3G Ex nA IIC T6