EUCHNER

Operating Instructions

Non-Contact Safety System

CES-AZ-ABS-01B (Unicode)

EN

Contents

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1. About this document

1.1. Scope

This document is valid for

- Non-Contact Safety System *CES-AZ-ABS-01B*, evaluation unit for 1 read head

These operating instructions, the document *Safety information* and any available data sheet form the complete user information for your device.

1.2. Target group

Design engineers and installation planners for safety systems on machines, as well as setup and servicing staff possessing special expertise in handling safety components.

1.3. Key to symbols

Symbol/depiction	Meaning
	Printed document
	Document is available for download at www.euchner.com
DANGER **WARNING** **CAUTION**	**Signal word:** **Consequence if not observed:** **DANGER** Death or severe injuries **WARNING** Possibly death or severe injuries **CAUTION** Possibly minor injuries
NOTICE **Important!**	**Signal word:** **NOTICE** Malfunctions or device damage possible **Important!** Important information
Tip	Useful information

1.4. 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 (2100063)	(this document)	
Declaration of conformity	Declaration of conformity	

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. Simply enter the document number or the order number in the search box.

2. Correct use

Evaluation units of series CES-AZ are used to evaluate safety-related signals from EUCHNER read heads. Depending on the read heads used, the system can form an interlocking device with or without guard locking. The system meets the requirements according to EN IEC 60947-5-3.

The following applies in combination with a CES or CEM read head:

The system consists of evaluation unit, read head and actuator. It forms an interlocking device with high coding level (type 4).

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.

The following applies in combination with a CET read head:

The system comprising evaluation unit, read head with guard locking and actuator forms an interlocking device with guard locking featuring a high coding level (type 4).

In combination with a movable guard and the machine control, this system prevents the guard from being opened while a dangerous machine function 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 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 IEC 60204-1

The following components can be connected to the evaluation unit CES-AZ-ABS…:

- CES read heads
- CEM read heads
- CET read heads
- CKS key adapters

For further information, refer to the operating instructions of the corresponding component and to *Table 1: Possible combinations for CES components on page 6.*

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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 technical data).
- If a data sheet is available for the product, the information on the data sheet applies.
- It is only allowed to use components that are permissible in accordance with the table below.

Table 1: Possible combinations for CES components

Evaluation unit	Read head	Actuator										
		CES-A-BBA 071840	**CES-A-BCA** 088786	**CES-A-BDA-20** 084720	**CES-A-BMB** 077791	**CES-A-BQA** 098108	**CES-A-NBA-...** All items	**CES-A-BPA** 098775	**CEM-A-BE05** 094805	**CEM-A-BH10** 095175	**CET-A-BWK-50X** 096327	**CKS-A-BK1...** CKS key
CES-AZ-ABS-01B	**CES-A-LNA...** All items	●	●	●								
	CES-A-LNA-SC 077715	●	●	●								
	CES-A-LCA... All items	●	●	●								
	CES-A-LMN-SC 077790				●							
	CES-A-LQA-SC 095650	●	●			●						
	CEM-A-LE05K-S2 094800 **CEM-A-LE05R-S2** 095792								🔒⚙			
	CEM-A-LH10K-S3 095170 **CEM-A-LH10R-S3** 095793									🔒⚙		
	CET1-AX-L...										🔒🧍	
	CKS-A-L...											●

Key to symbols		
	●	Combination possible
	🔒⚙	Combination possible, guard locking for process protection
	🔒🧍	Combination possible, guard locking for personnel protection
		Combination not permissible

3. Description of the safety function

Devices from this series feature the following safety functions:

The following applies in combination with read heads without guard locking (CES read heads) and read heads with guard locking for process protection (CEM read heads):

Monitoring of the position of a guard
(interlocking device according to EN ISO 14119)

- Safety function:
  - The safety contacts are switched off when the guard is open (see chapter *11. Technical data on page 18*).
- Safety characteristics: category, Performance Level, PFH (see chapter *11. Technical data on page 18*).

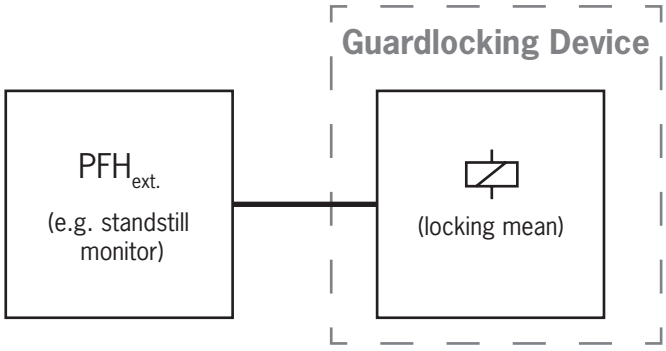
The following applies in combination with read heads with guard locking (CET-AX):

Monitoring of guard locking and the position of the guard
(interlocking device with guard locking according to EN ISO 14119)

- Safety function (see chapter *11. Technical data on page 18*):
  - The safety contacts are switched off when guard locking is released (monitoring of the locking element).
  - The safety contacts are switched off when the guard is open (monitoring of the door position).
  - Guard locking can be activated only when the actuator is located in the switch head (prevention of inadvertent locking position (faulty closure protection)).
- Safety characteristics: category, Performance Level, PFH (see chapter *11. Technical data on page 18*).

Control of guard locking

- If the device is used as guard locking for personnel protection, control of guard locking must be regarded as a safety function.
- The device does not feature a safety characteristic for control of guard locking, because the guard locking solenoid is completely disconnected from outside the device (no control function within the device). It therefore does not contribute to the failure probability.
- The safety level for the control of guard locking is defined only by the external control (e.g. $PFH_{ext.}$ for the standstill monitor).



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4. 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.

5. General safety precautions

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.
- 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.
- The number of switching operations is saved in the internal memory of the evaluation unit. If necessary, this memory can be read by the manufacturer.

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

6. Function

The safety system consists of three components:

- Coded actuator
- Read head
- Evaluation unit

1 read head can be connected to the evaluation unit.

The read heads and actuators are assigned to the device in a special teach-in operation.

Each delivered actuator possesses a unique electronic coding and so is a unique element in the system used. The code in an actuator cannot be reprogrammed.

The read head is fastened to the fixed part of the guard and is connected to the evaluation unit via a two-core shielded cable (terminals H11, H12 and SH1).

The actuator fastened to the movable part of the guard is moved towards the read head by closing the door. When the operating distance is reached, power is supplied to the actuator by the read head by induction and data can be transferred. The code read is compared with the taught-in code in the evaluation unit.

If the data match, the door monitoring output OUT (semiconductor output) is set to HIGH and the safety outputs (relay output) are enabled. The OUT LED illuminates.

Due to the combination of dynamic polling of the actuators and the redundant, diverse design of the safety electronics with redundantly controlled safety outputs, the evaluation unit will enter the safe state with every detectable fault.

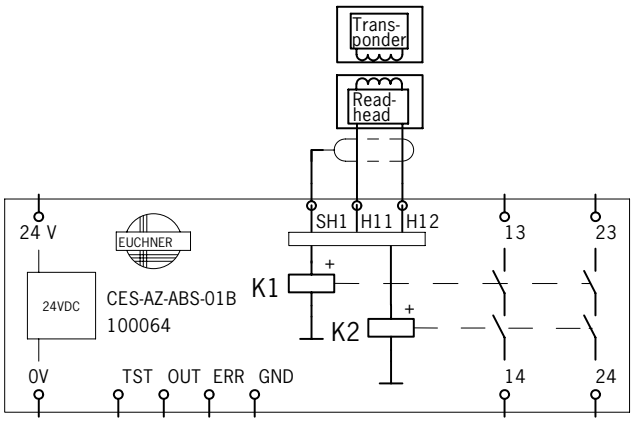
When a guard is opened, the safety outputs switch off the safety circuit and the OUT LED goes out. The state of the safety outputs is monitored internally by positively driven NC contacts (relay output).

Independent of the switching state of the safety circuit, the position of the safety door can be polled via the output OUT.

If an internal fault occurs in the evaluation unit, the safety circuit is switched off, the diagnostic output (ERR) is set HIGH and the ERROR LED illuminates red.

The safety contacts on the evaluation unit can also switch small switching currents. This allows the user to connect the device directly to a safe control system.

6.1. Block diagram for CES-AZ-ABS-01B



24V, 0V	Power supply
H11/H12	Read head 1 connection
SH1	Read head 1 shield
TST	Test input
OUT	Semiconductor monitoring output
ERR	Diagnostic output
13, 14	Connection for relay contact A, safety relay enable
23, 24	Connection for relay contact B, safety relay enable

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7. Mounting

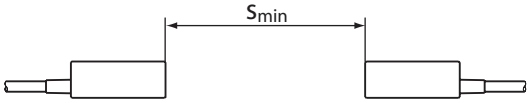
NOTICE

Device damage due to improper installation or unsuitable ambient conditions.

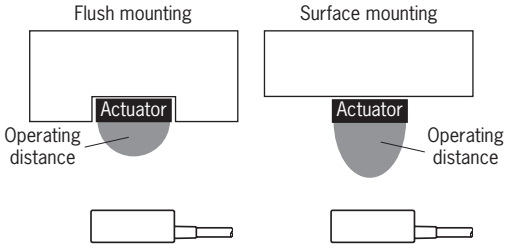
- Read heads and actuators must not be used as an end stop.
- Observe EN ISO 14119:2025, sections 6.2 and 6.3, for information about mounting the read head and the actuator.
- Observe EN ISO 14119:2025, section 8, for information about reducing the possibilities for bypassing an interlocking device.
- The evaluation unit must be installed in a control cabinet with a minimum degree of protection of IP54. A snap-in element on the rear of the device is used for fastening to a mounting rail.
- If several evaluation units are mounted side by side in a control cabinet without air circulation (e.g. fan), a minimum distance of 10 mm must be maintained between the evaluation units. This distance enables the heat from the evaluation unit to dissipate.

Important!

- From the assured release distance S_{ar}, the safety outputs are safely switched off.
- When mounting several read heads, observe the stipulated minimum distance to avoid mutual interference.
  - For CES-A-LNA/-LCA s_{min} = 50 mm
  - For CES-A-LMN s_{min} = 20 mm
  - For CES-A-LQA s_{min} = 80 mm



- If the actuator is installed flush, the operating distances change as a function of the installation depth and the guard material.



Note the following points:

- Actuator and read head must be fitted so that:
  - the front faces are at the minimum assured operating distance 0.8 x S_{ao} or closer when the guard is closed (see section Actuating ranges). To avoid entering the area of possible side lobes, a minimum distance is to be maintained in case of a side approach direction. See section Typical operating distance for the related actuator.
  - a hazard is excluded until the assured release distance (S_{ar}) is reached when the guard is open.
  - the actuator is positively mounted on the guard, e.g. by using the safety screws included.
  - they cannot be removed or tampered with using simple means.
- Pay attention to the maximum tightening torque for the read head and actuator mountings of 1 Nm. For read heads/actuators made of PE-HD, the maximum tightening torque is only 0.5 Nm.

8. Electrical connection

WARNING

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

- Monitoring outputs must not be used as safety outputs.
- Lay the connecting cables with protection to prevent the risk of short circuits.

NOTICE

Risk of damage to equipment or malfunctions as a result of incorrect connection.

- All electrical connections must either be isolated from the mains supply by a safety transformer according to IEC 61558-2-6 with limited output voltage in the event of a fault, or by other equivalent isolation measures.
- All electrical outputs must have an adequate protective circuit for inductive loads. The outputs must be protected with a free-wheeling diode for this purpose. The switch-on current may have to be limited for capacitive loads.
- The tightening torque for the screws on the connection terminals must be 0.6 … 0.8 Nm.
- The connecting cable for the read heads must be extended using only EUCHNER plug connectors, and adequate consideration must be given to EMC. Intermediate terminals must not be used.
- The shield on the connecting cable for the read head must be connected to the appropriate terminal SH on the evaluation unit. The portion of cable from which insulation is stripped should be kept as short as possible (max. 3 cm).

8.1. Notes on cULus

Important!

- This device is intended to be used with a Class 2 power source in accordance with UL1310[1)].
  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. The fuse shall be rated max. 3.3 A and be installed in the max. 30 V DC power supply to the device in order to limit the available current.

1) Note on the scope of the UL approval: the devices have been tested as per the requirements of UL508 and CSA/C22.2 no. 14 (protection against electric shock and fire).

8.2. Safety in case of faults

- The operating voltage U_B is reverse polarity protected.
- The connections for the read heads are not short circuit-proof.
- A short circuit between 13/14 and 23/24 can be detected only by means of external pulsing.
- A short circuit in the cable can be excluded by laying the cable with protection.

8.3. Fusing of the power supply and the safety contacts

- Provide external contact fuses (6 A gG fuse or 6 A circuit breaker, characteristic B or C) for relay outputs.
- The power supply must be protected with a max. 8 A fuse upstream of terminal U_B.

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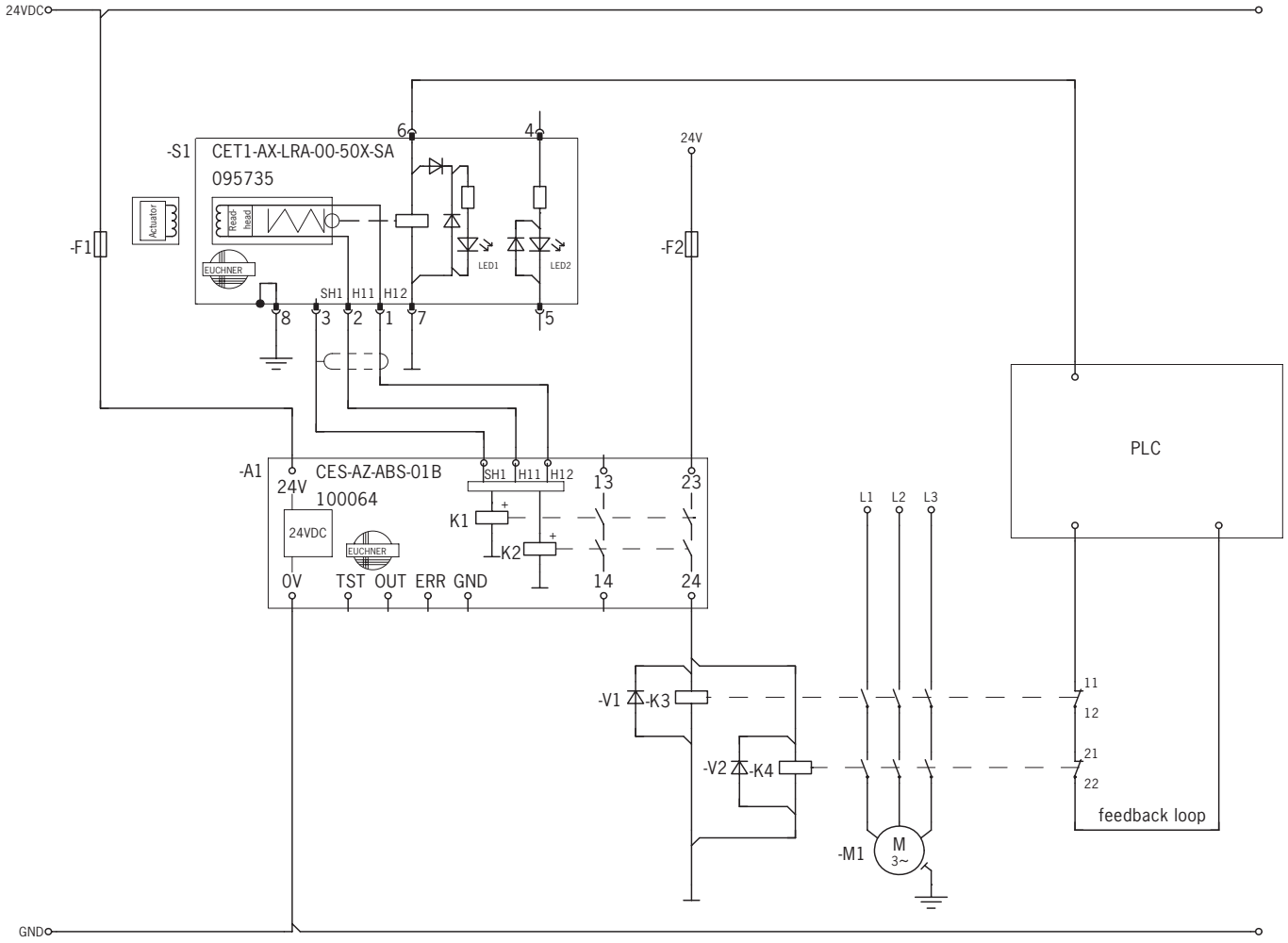
8.4. Connection examples CES-AZ-ABS-01B

8.4.1. CES-AZ-ABS-01B with read head CET



Important!

To achieve category 3 according to EN ISO 13849-1, it is necessary to monitor the downstream contactors (here: contacts on -K3 and -K4 in the feedback loop).

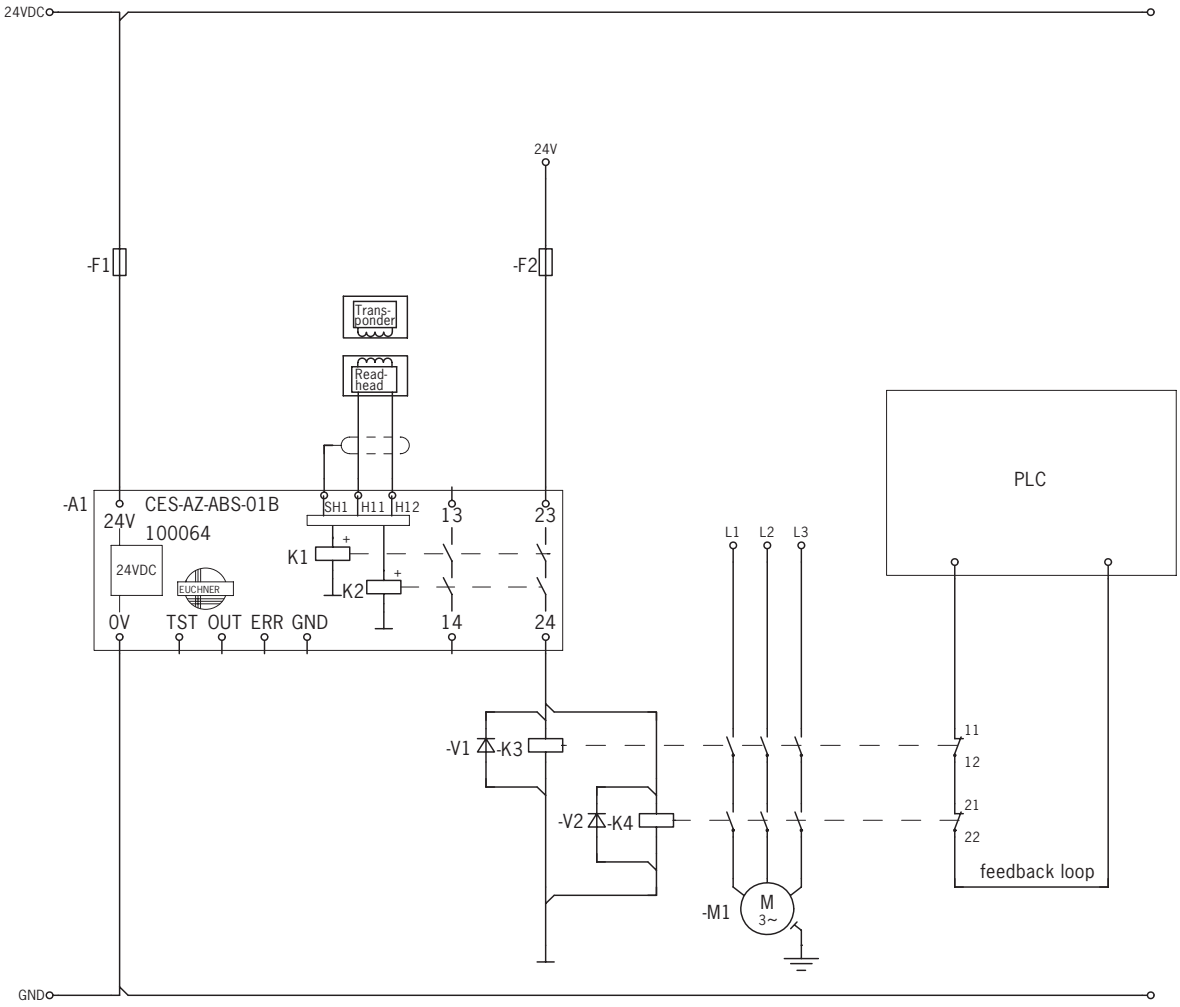
This example shows only an excerpt that is relevant for the connection of the CES system. The example illustrated here does not show complete system planning. The user is responsible for safe integration into the overall system.

If only one enable path is to be used for control (e.g. of downstream contactors), failures involving a short circuit between the contacts in the enable path and, for example, the power supply must be excluded.

With reference to EN ISO 13849-2 Table D.4, this exclusion can be provided if

- the cables are inside an electrical installation space and
- the enclosure meets the related requirements according to EN IEC 60204-1.

8.4.2. CES-AZ-ABS-01B with standard read head



Important!

To achieve category 3 according to EN ISO 13849-1, it is necessary to monitor the downstream contactors (here: contacts on -K3 and -K4 in the feedback loop).

This example shows only an excerpt that is relevant for the 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.

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- the cables are inside an electrical installation space and
- the enclosure meets the related requirements according to EN IEC 60204-1.

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9. Setup

9.1. LED displays

Designation	Color	**Meaning**
STATE	Green	Status indication (multifunction display using flashing modes)
OUT	yellow	Safety circuit closed
ERROR	Red	‣ Operating fault or ‣ External fault (fault in the feedback loop) or ‣ Teach-in operation not valid or ‣ Internal device fault or ‣ TST input activated (function test active)

9.2. Teach-in operation

The actuator must be assigned to the evaluation unit using a teach-in function before the system forms a functional unit.

During the teach-in operation, the safety outputs are open and the door monitoring output is LOW. The system is in the safe state.

Important!

- The teach-in operation can differ for read heads that are not described in this document. Observe the information in the operating instructions for the read head used.
- During the teach-in operation, the following conditions must be met:
  - No state change, e.g. opening or closing of a safety door.
  - The power supply must not be switched off.
- If these conditions are not met, the evaluation unit switches to the safe fault state (ERROR LED illuminates) and signals this operating fault with the STATE LED.
- The number of teach-in operations on an evaluation unit is limited to a maximum of 8.
- The evaluation unit can be operated only with the last actuator taught-in.
- An actuator that has not been subjected to teach-in will not be detected by the related evaluation unit.
- When the evaluation unit is switched on (operating voltage is applied), the STATE LED signals the number of possible remaining teach-in operations (see system status table).
- After the 8th teach-in operation or if an “old” actuator is placed against the read head, the system automatically switches to the teach-in mode. In both cases, a teach-in operation with a duration of 60 seconds is started, but the last actuator code remains active in the memory (see system status table) – a new code is not taught-in.

9.2.1. Carrying out teach-in for first actuator (delivery state)

To activate the first teach-in operation, the user must perform the following actions in the stipulated order:

1. Start teach-in operation
   - Switch on operating voltage (STATE LED flashes at approx. 4 Hz)
   - Close door to be monitored (the actuator must be in the actuating range of the read head)
   - Teach-in operation starts (STATE LED flashes at approx. 1 Hz)
   - Wait for acknowledgment of the teach-in operation (STATE LED goes out after approx. 60 seconds)
2. End teach-in operation
   - Interrupt operating voltage for at least 3 seconds (code for the actuator taught-in is activated).
3. Check safeguard for effectiveness

9.2.2. Carrying out teach-in for a new actuator

A maximum of 8 teach-in operations can be performed. The number of already completed teach-in operations is signaled by the flashing sequence of the STATE LED each time the power supply is connected (see *10. System status table on page 17*, area *Status indication*).

Faulty actuators can be replaced. Then a complete teach-in operation must be performed as per this section.

To activate a further teach-in operation, the user must perform the following actions in the stipulated order:

1. Start teach-in operation
   - Switch on operating voltage
   - Close door to be monitored (the new actuator must be in the actuating range of the read head)
   - Teach-in operation starts (STATE LED flashes at approx. 1 Hz)
   - Wait for acknowledgment of the teach-in operation (STATE LED goes out after approx. 60 seconds)
2. End teach-in operation
   - Interrupt operating voltage for at least 3 seconds (code for the new actuator taught-in is activated).

The newly taught-in actuator is saved and the old actuator deactivated.

3. Check safeguard for effectiveness

9.3. Functional check

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

⚠	**WARNING** Danger of fatal injury as a result of faults in installation and the 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.

1. Switch on operating voltage.
   - The evaluation unit carries out a self-test. The device signals the number of teach-in operations still possible. The STATE LED then illuminates continuously. The OUT and ERROR LEDs do not illuminate.
2. Close all guards.
   - The machine must not start automatically.
   - The green STATE LED and the yellow OUT LED illuminate continuously.
3. Enable operation in the control system.
4. Open the guard.
   - The machine must switch off and it must not be possible to start it as long as the guard is open.
   - The green STATE LED illuminates continuously; the OUT and ERROR LEDs do not illuminate.

Repeat steps 2 … 4 for each guard.

9.3.1. Self-test with test input TST

On electromechanical safety switches or magnetic switches, the function test can be performed by cyclically opening the guard.

From category 2 according to EN ISO 13849-1, EN IEC 60204-1:2018 (chapter 9.4.2.5) requires a function test to be performed on the entire safety system on start-up or after defined intervals.

Testing of the internal function of the device is not necessary because the device monitors itself in real time. Welding of an output contact (relay output) is detected by the device at the latest the next time the guard is opened. A short circuit in the output cable is not detected by the device.

In addition, the entire safety circuit can be tested without opening the guard. For this purpose, opening of the guard is simulated by applying 24 V DC to the test input TST.

The safety outputs are switched off, enabling testing of the complete safety circuit. The diagnostic output ERR on the evaluation unit is also set HIGH as a monitoring function.

When test input TST is reset, the evaluation unit resets the diagnostic output ERR to LOW, the red LED switches off and normal operation is continued.

	**Important!** After the self-test, the test input TST must be connected to 0 V again or must be disconnected.

10. System status table

Operating mode	Actuator/door position	Safety outputs 13/14 and 23/24	PLC Input	PLC Output		LED indicator Output			State
			TST	OUT (status signal)	ERR	STATE (green)	OUT (yellow)	ERROR (red)	
Normal operation	closed	on	N	1	0	☼	☼	○	Normal operation, door closed.
	open	off	N	0	0	☼	○	○	Normal operation, door open.
Setup	open	off	N	0	0	☼ 4 Hz	○	○	Initial setup after delivery. Ready for the first teach-in operation.
	closed	off	N	0	0	☼ 1 Hz (60 s)	○	○	Teach-in operation
	closed	off	N	0	0	○	○	○	Positive acknowledgment of completion of teach-in operation. To activate the actuator code from the teach-in operation in the evaluation unit, the operating voltage must then be switched off at the evaluation unit for min. 3 seconds.
Status indication	X	off	0	0	0	☼ 3 x + ☼	○	○	Indication after 1st to 5th teach-in operations.
	X	off	0	0	0	☼ 2 x + ☼	○	○	Indication of the remaining teach-in operations after the 6th teach-in operation.
	X	off	0	0	0	☼ 1 x + ☼	○	○	Indication of the remaining teach-in operations after the 7th teach-in operation.
	X	off	0	0	0	☼	○	○	Device cannot perform any further teach-in operation.
Fault display	X	off	N	0	1	○	○	☼	Internal component failure or excessively high external interference (EMC).
Operating fault	closed	off	N	0	1	☼ 1 x	○	☼	Impermissible 9th teach-in operation.
	closed	off	N	0	1	☼ 2 x	○	☼	Incorrect teach-in operation for an old actuator.
	closed	off	N	0	1	☼ 3 x	○	☼	Negative acknowledgment for teach-in operation. Actuator was held in front of the read head for less than 60 s or the transponder is faulty.
Function test	X	off	1	0	1	☼	○	☼	Function test active (TST input = 24 V)

Key to symbols	
N	0 V or not connected
1	24 V
0	0 V
○	LED not illuminated
☼	LED illuminated
☼ 15 Hz (8 s)	LED flashes for 8 seconds at 15 Hz
☼ 3 x + ☼	LED flashes three times and then illuminates continuously
☼ 3 x	LED flashes three times, and this is then repeated
X	Any state

Important!

If you do not find the displayed device status in the system status table, this indicates an internal device fault. In this case, you should contact the manufacturer.

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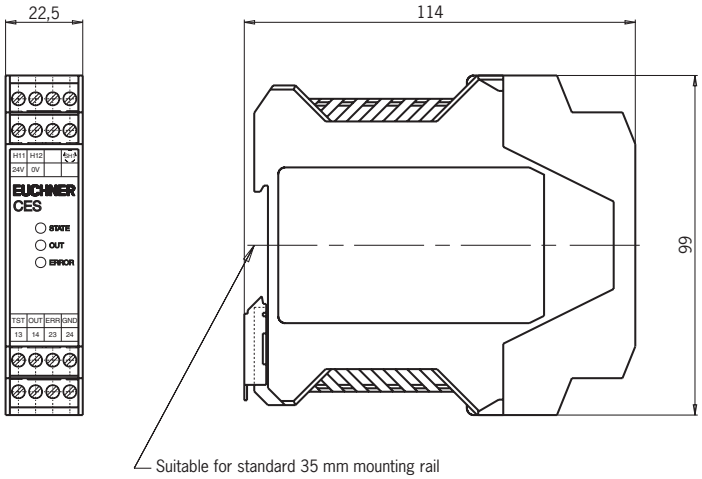
11. Technical data

11.1. Evaluation unit CES-AZ-ABS-01B

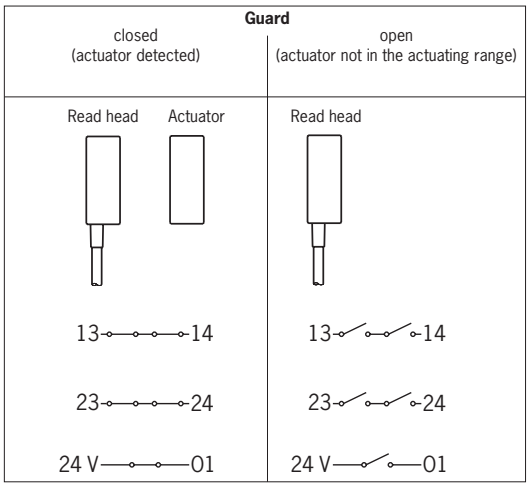
- Housing for rail mounting, IP20
- Relay output
- 1 read head can be connected

Dimension drawing



Switching characteristics

- 2 safety outputs with 2 NO contacts each (relay outputs)
- 1 door monitoring output (semiconductor output, not a safety output)



Important!

The plug-in screw terminals are not included (see chapter *12. Ordering information and accessories on page 34*).

Technical data for CES-AZ-ABS-01B

Parameter	Value			Unit
	min.	typ.	max.	
Housing material		Plastic PA6.6		
Dimensions		114 x 99 x 22.5		mm
Ambient temperature at U_B = DC 24 V	-20	-	+55	°C
Atmospheric humidity, not condensing	-	-	80	%
Degree of protection		IP20		
Degree of contamination		2		
Mounting		Mounting rail 35 mm acc. to EN 60715 TH35		
Number of read heads		1 read head per evaluation unit		
Connection (plug-in screw terminals/coded)	0.25	-	2.5	mm^2
Operating voltage U_B (regulated, residual ripple < 5%)	21	24	27	V DC
The following applies to the approval according to cULus		Operation only with UL Class 2 power source or equivalent measures		
Current consumption I_B (with relay energized) 1)	-	150	-	mA
External fuse (operating voltage U_B)	0.25	-	8	A
Safety contacts		2 (relays with internally monitored contacts)		
Switching current (relay outputs)				mA
- at switching voltage AC/DC 21 … 60 V	1	-	300	
- at switching voltage AC/DC 5 … 30 V	10	-	6,000	
- at switching voltage AC 5 … 230 V	10	-	2,000	
Switching load acc. to cULus		Class 2 max. 30 V AC/Class 2 max. 60 V DC		
External fuse (safety circuit) acc. to EN 60269-1		6 AgG or 6 A circuit breaker (characteristic B or C)		
Utilization category acc. to EN 60947-5-1		AC-12 60V 0.3A / DC-12 60V 0.3A AC-12 30V 6A / DC-12 30V 6A AC-15 230V 2A / DC-13 24V 3A		
Rated insulation voltage U_i		250		V
Rated impulse withstand voltage U_{imp}		4		kV
Rated conditional short-circuit current		100		A
Shock and vibration resistance		Acc. to EN 60947-5-2		
Mechanical operating cycles (relays)		10×10^6		
Switching delay from state change 2)	-	-	180	ms
Discrepancy time (of the switching points of both relays)	-	-	25	ms
Ready delay 3)	-	-	3	s
Dwell time 4)	0.5	-	-	s
Switching frequency max. 5)	-	-	1	Hz
Repeat accuracy R acc. to EN IEC 60947-5-3		≤ 10		%
Monitoring outputs (diagnostics ERR, door monitoring output OUT, semiconductor output, p-switching) 6)				
- Output voltage	0.8 x U_B	-	U_B	V DC
- Max. load	-	-	20	mA
Test input TST				V DC
- Input voltage LOW	0	-	2	
HIGH	15	-	U_B	
- Input current HIGH	5	8	10	mA
EMC protection requirements		Acc. to EN 60947-5-3		
Characteristics acc. to EN ISO 13849-1				
as a function of the switching current at 24 V DC	≤ 0.1 A	≤ 1 A	≤ 3 A	
Category		3		
Performance Level (PL)		e		
PFH		4.3×10^{-8}		
Mission time		20		years
Number of switching cycles/year	760,000	153,000	34,600	
$MTTF_D$		100		years

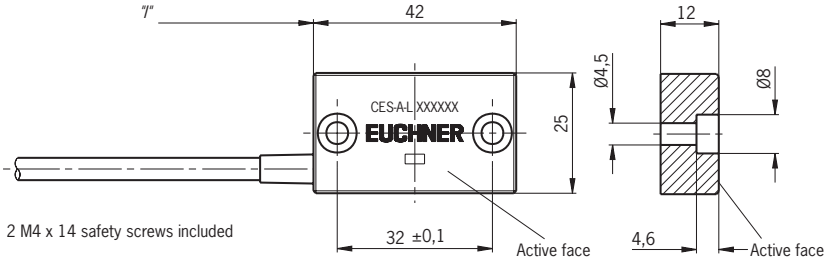
1) Without taking into account the load currents on the monitoring outputs.
2) Corresponds to the risk time according to EN 60947-5-3. This is the maximum OFF time for the safety outputs following removal of the actuator.
3) After the operating voltage is switched on, the relay outputs are switched off and the door monitoring output is set to LOW potential during the ready delay.
4) The dwell time of an actuator inside and outside the actuating range must be at least 0.5 s to ensure safe detection of internal faults in the evaluation unit (self-monitoring).
5) If the current load is > 100 mA, a switching frequency of 0.1 Hz should not be exceeded as this will affect the mechanical life of the relay contacts.
6) Not short circuit-proof.

EN

11.2. Read head CES-A-LNA-...

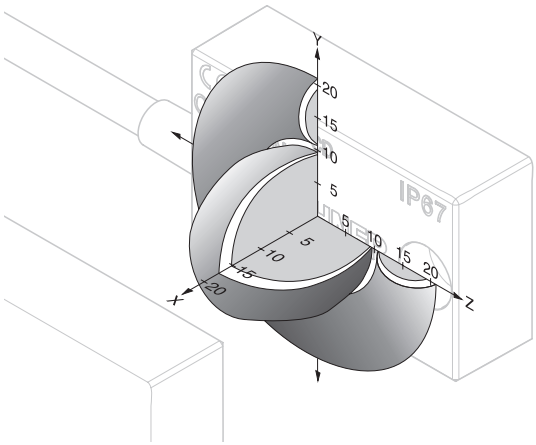
- Cube-shaped design 42 x 25 mm
- Hard-wired cable

Dimension drawing



Typical operating distance

With evaluation unit CES-AZ-ABS-... and actuator CES-A-BBA

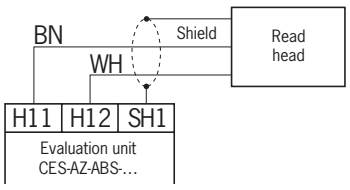


NOTICE

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

Terminal assignment

Read head with connecting cable



Technical data

Parameter	Value			Unit
	min.	typ.	max.	
Housing material	Fortron, reinforced thermoplastic, fully encapsulated			
Dimensions	42 x 25 x 12			mm
Ambient temperature	-25	-	+70	°C
Degree of protection	IP67/IP69K			
Installation position	Any			
Method of operation	Inductive			
Power supply	Via evaluation unit			
In combination with actuator CES-A-BBA on evaluation unit CES-AZ-ABS-01B				
Assured release distance S_{ar}	-	-	26	mm
Operating distance for center offset m = 0 [1]				
- Operating distance	-	15	-	
- Assured operating distance S_{ao}	10	-	-	
- Switching hysteresis	0.5	2	-	
Minimum distance s for side approach direction	-	3	-	
In combination with actuator CES-A-BDA-20 on evaluation unit CES-AZ-ABS-01B				
Assured release distance S_{ar}	-	-	33	mm
Operating distance for center offset m = 0 [2]				
- Operating distance	-	16	-	
- Assured operating distance S_{ao}	11	-	-	
- Switching hysteresis	0.5	2	-	
Minimum distance s for side approach direction	-	4	-	
Connecting cable	Hard-wired encapsulated connecting cable, with crimped ferrules PVC, ∅ 4.6 mm PUR, ∅ 4.8 mm, suitable for drag chain			
Cable length	-	-	25	m

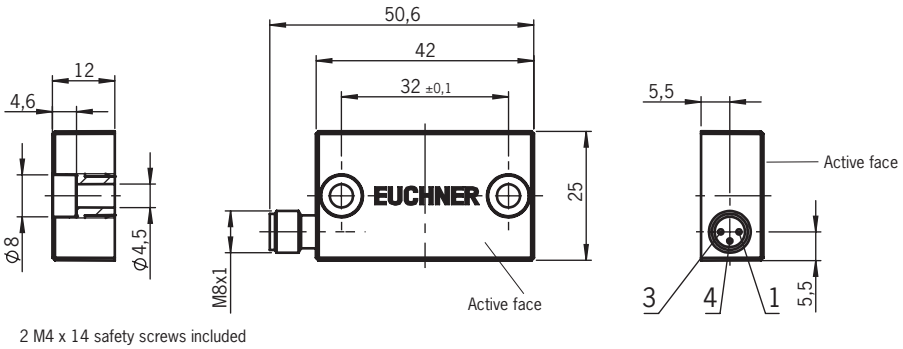
1) These values apply to surface installation of the read head and the actuator.
2) These values apply to non-metallic surrounding material. Other materials on request.

EN

11.3. Read head CES-A-LNA-SC

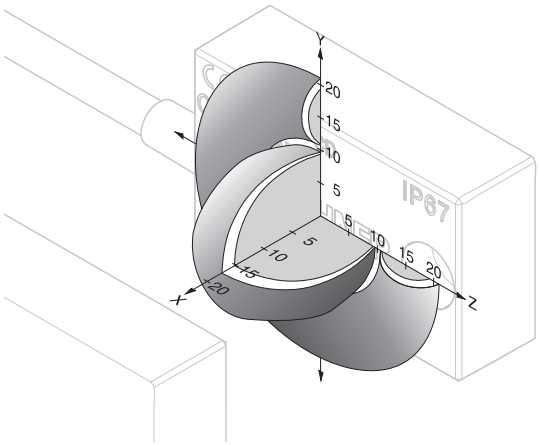
- Cube-shaped design 42 x 25 mm
- M8 plug connector

Dimension drawing



Typical operating distance

With evaluation unit CES-AZ-ABS-… and actuator CES-A-BBA

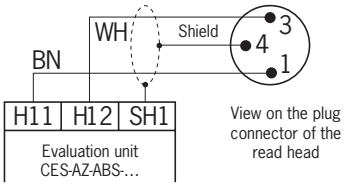


NOTICE

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

Terminal assignment

Read head with plug connector



Technical data

Parameter	Value			Unit
	min.	typ.	max.	
Housing material	Fortron, reinforced thermoplastic, fully encapsulated			
Dimensions	42 x 25 x 12			mm
Ambient temperature	-25	-	+70	°C
Degree of protection	IP67/IP69K			
Installation position	Any			
Method of operation	Inductive			
Power supply	Via evaluation unit			
In combination with actuator CES-A-BBA on evaluation unit CES-AZ-ABS-01B				
Assured release distance S_{ar}	-	-	26	mm
Operating distance for center offset m = 0 [1]				
- Operating distance	-	15	-	
- Assured operating distance S_{ao}	10	-	-	
- Switching hysteresis	0.5	2	-	
Minimum distance s for side approach direction	-	3	-	
In combination with actuator CES-A-BDA-20 on evaluation unit CES-AZ-ABS-01B				
Assured release distance S_{ar}	-	-	33	mm
Operating distance for center offset m = 0 [2]				
- Operating distance	-	16	-	
- Assured operating distance S_{ao}	11	-	-	
- Switching hysteresis	0.5	2	-	
Minimum distance s for side approach direction	-	4	-	
Connection	M8 plug connector, 3-pin			
Connecting cable	-	-	25	m

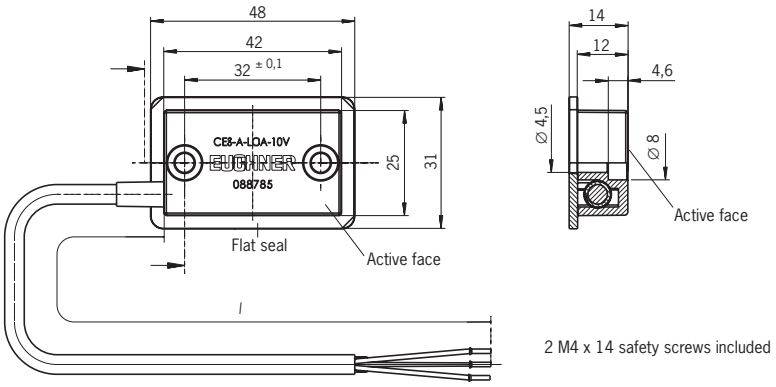
1) These values apply to surface installation of the read head and the actuator.
2) These values apply to non-metallic surrounding material. Other materials on request.

EN

11.4. Read head CES-A-LCA-...

- Cube-shaped design 42 x 25 mm
- PE-HD plastic housing material, suitable for use in aggressive media (e.g. acids, alkalis)

Dimension drawing

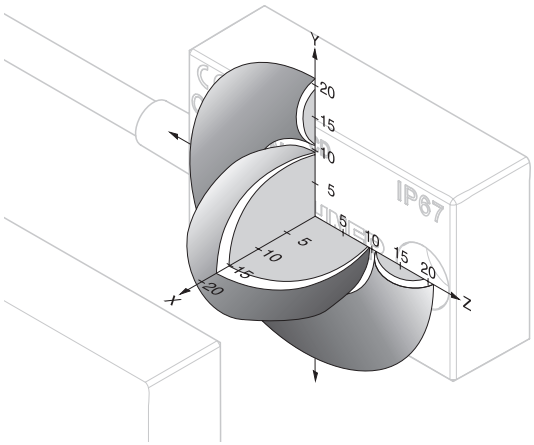


NOTICE

The flat seal provided must be used during mounting.

Typical operating distance

With evaluation unit CES-AZ-ABS-... and actuator CES-A-BCA

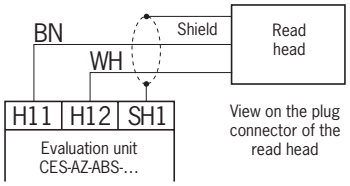


NOTICE

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

Terminal assignment

Read head with connecting cable



Technical data

Parameter	Value			Unit
	min.	typ.	max.	
Housing material	PE-HD plastic without reinforcement, fully encapsulated			
Flat seal material	Fluororubber 75 FPM 4100			
Dimensions	42 x 25 x 12			mm
Ambient temperature	-25	-	+50	°C
Degree of protection	IP67			
Installation position	Any			
Method of operation	Inductive			
Power supply	Via evaluation unit			
In combination with actuator CES-A-BBA on evaluation unit CES-AZ-ABS-01B				
Assured release distance S_{ar}	-	-	26	mm
Operating distance for center offset m = 0 [1]				
- Operating distance	-	15	-	
- Assured operating distance S_{ao}	10	-	-	
- Switching hysteresis	0.5	2	-	
Minimum distance s for side approach direction	-	3	-	
In combination with actuator CES-A-BDA-20 on evaluation unit CES-AZ-ABS-01B				
Assured release distance S_{ar}	-	-	33	mm
Operating distance for center offset m = 0 [2]				
- Operating distance	-	16	-	
- Assured operating distance S_{ao}	11	-	-	
- Switching hysteresis	0.5	2	-	
Minimum distance s for side approach direction	-	4	-	
Connecting cable	Hard-wired encapsulated connecting cable, with crimped ferrules PVC, ∅ 4.6 mm			
Cable length	-	-	25	m

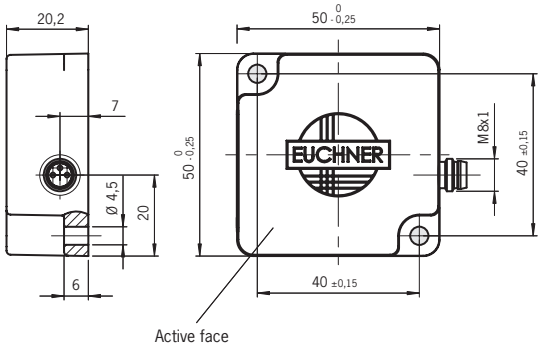
1) These values apply to surface installation of the read head and the actuator.
2) These values apply to non-metallic surrounding material. Other materials on request.

EN

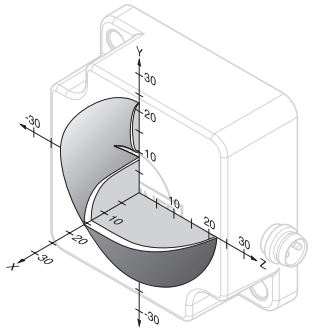
11.5. Read head CES-A-LQA-SC

- Cube-shaped design 50 x 50 mm
- M8 plug connector

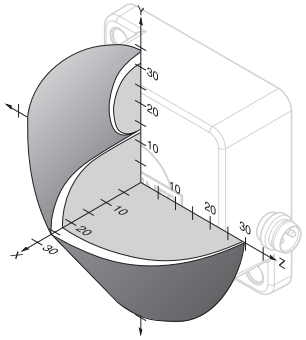
Dimension drawing



Typical operating distance



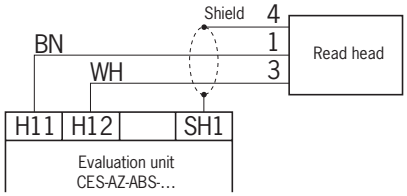
With actuator CES-A-BBA or CES-A-BCA



With actuator CES-A-BQA on evaluation unit CES-A-...-01B

Terminal assignment

Read head with connecting cable



Technical data

Parameter	Value			Unit
	min.	typ.	max.	
Housing material	Fortron, reinforced thermoplastic, fully encapsulated			
Dimensions	50 x 50 x 20.2			mm
Ambient temperature	-25	-	+70	°C
Degree of protection	IP67			
Installation position	Any			
Method of operation	Inductive			
Power supply	Via evaluation unit			
In combination with actuator CES-A-BBA or CES-A-BCA on evaluation unit CES-AZ-ABS-01B				
Assured release distance S_{ar}	-	-	47	mm
Operating distance for center offset m = 0 [1]				
- Operating distance	-	15	-	
- Assured operating distance S_{ao}	10	-	-	
- Switching hysteresis	2	3	-	
In combination with actuator CES-A-BQA on evaluation unit CES-AZ-ABS-01B				
Assured release distance S_{ar}	-	-	60	mm
Actuating range with vertical approach direction				
Center offset m = 0 [1]				
- Operating distance	-	23	-	
- Assured operating distance S_{ao}	16	-	-	
- Switching hysteresis	2	3	-	
Actuating range with side approach direction				
Distance in x direction = 10 mm				
- Operating distance	-	28	-	
- Assured operating distance S_{ao}	24	-	-	
- Switching hysteresis	1	1.3	-	
Connection	M8 plug connector, 3-pin			
Connecting cable	-	-	25	m

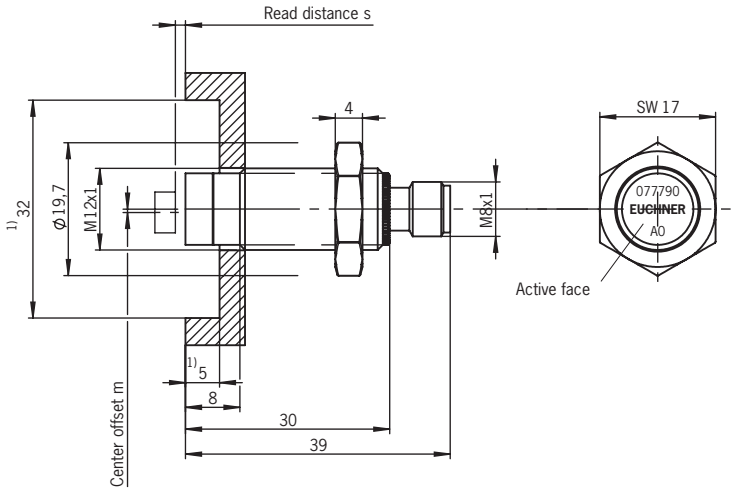
1) These values apply to surface installation of the read head and the actuator.

EN

11.6. Read head CES-A-LMN-SC

- Cylindrical design M12
- M8 plug connector

Dimension drawing



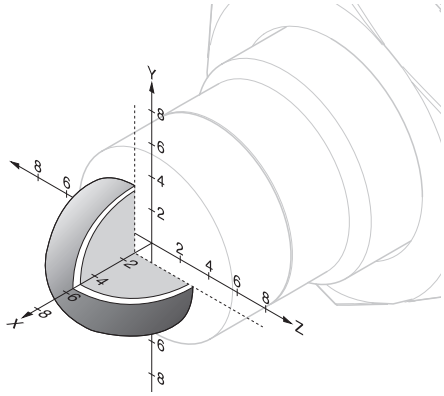
1) Clear zone (area of the active face without metal housing)

NOTICE

The read head is allowed to be installed as a maximum up to the clear zone (area of the active face without metal housing).

Typical operating distance

With evaluation unit CES-AZ-ABS-... and actuator CES-A-BMB

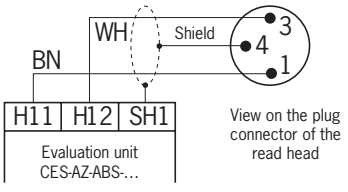


NOTICE

A minimum distance of s = 1.2 mm must be maintained.

Terminal assignment

Read head with plug connector



Technical data

Parameter	Value			Unit
	min.	typ.	max.	
Housing material	Nickel-plated CuZn housing sleeve Plastic PBT GF20 cap			
Dimensions	M12 x 1, length 38			mm
Ambient temperature	-25	-	+85	°C
Ambient pressure (only on active face in installed state)	-	-	10	bar
Degree of protection	IP65/IP67/IP69/IP69K			
Installation position	Any			
Method of operation	Inductive			
Power supply	Via evaluation unit			
In combination with actuator CES-A-BMB on evaluation unit CES-AZ-ABS-01B				
Assured release distance S_{ar}	-	-	10	mm
Operating distance for center offset m = 0 [1]				
- Operating distance	-	5	-	
- Assured operating distance S_{ao}	3.5	-	-	
- Switching hysteresis	0.1	0.3	-	
Connection	M8 plug connector, 3-pin			
Connecting cable	-	-	15	m

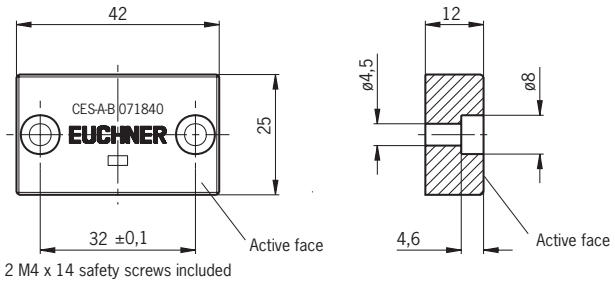
1) These values apply to surface installation of the read head in steel.
2) A distance of s = 4 mm must be maintained for a side approach direction.
3) A distance of s = 3 mm must be maintained for a side approach direction.

EN

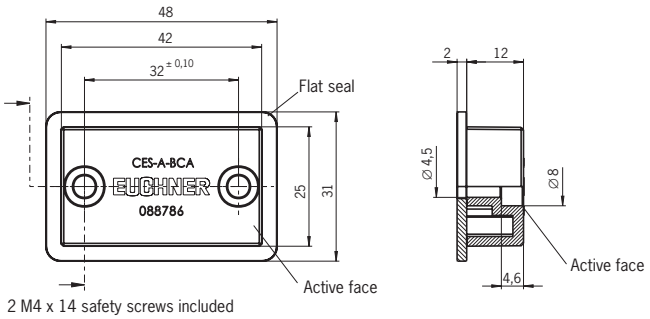
11.7. Actuator CES-A-BBA/CES-A-BCA

- Cube-shaped design 42 x 25 mm
- CES-A-BCA suitable for use in aggressive media (e.g. acids, alkalis)
- In combination with read head CES-A-LNA.../CES-A-LCA...

Dimension drawing for CES-A-BBA



Dimension drawing for CES-A-BCA



	NOTICE CES-A-BCA: The flat seal provided must be used during mounting.

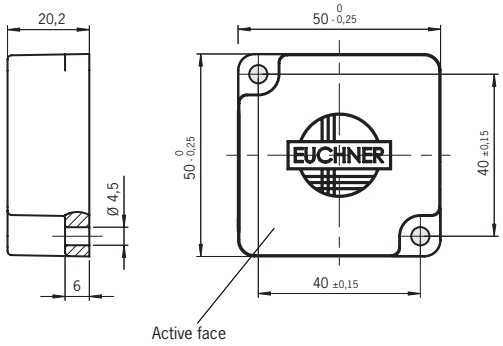
Technical data

Parameter	Value			Unit
	min.	typ.	max.	
Housing material - CES-A-BBA	Fortron, reinforced thermoplastic, fully encapsulated			
- CES-A-BCA	PE-HD plastic without reinforcement, fully encapsulated			
Flat seal material (CES-A-BCA only)	Fluororubber 75 FPM 4100			
Dimensions	42 x 25 x 12			mm
Ambient temperature				°C
- CES-A-BBA	-25	-	+70	
- CES-A-BCA	-25	-	+50	
Degree of protection	IP67/IP69K			
Installation position	Active face opposite read head			
Power supply	Inductive via read head			

11.8. Actuator CES-A-BQA

- Cube-shaped design 50 x 50 mm

Dimension drawing for CES-A-BQA



Technical data

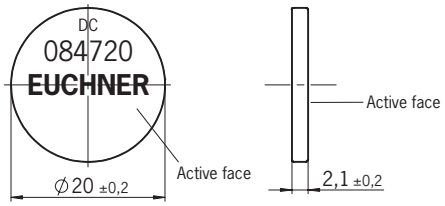
Parameter	Value			Unit
	min.	typ.	max.	
Housing material		Plastic (PPS)		
Dimensions		50 x 50 x 20.2		mm
Ambient temperature	-25	-	+70	°C
Degree of protection		IP67		
Installation position		Active face opposite read head		
Power supply		Inductive via read head		

EN

11.9. Actuator CES-A-BDA-20

- Round design ∅ 20 mm
- In combination with read head CES-A-LNA…/CES-A-LCA…

Dimension drawing



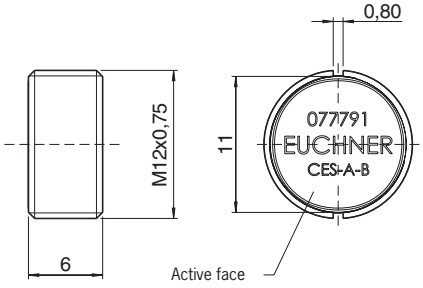
Technical data

Parameter	Value			Unit
	min.	typ.	max.	
Housing material		PC plastic		
Dimensions		∅ 20 x 2.2		mm
Ambient temperature	-25	-	+70	°C
Degree of protection		IP67		
Installation position		Active face opposite read head		
Power supply		Inductive via read head		

11.10. Actuator CES-A-BMB

- Cylindrical design M12 x 75
- In combination with read head CES-A-LMN-SC (actuating range on request for read head CES-A-LNA…/LCA…)

Dimension drawing



NOTICE

- The actuator can be screwed into the M12 x 0.75 thread provided with the aid of an insertion tool (order no. 037 662).
- Flush installation of the actuator in steel is permissible.

Technical data

Parameter	Value			Unit
	min.	typ.	max.	
Housing material	Stainless steel			
Dimensions	M12 x 0.75, depth 6			mm
Ambient temperature	-25	-	+85	°C
Degree of protection	IP67/IP69/IP69K			
Installation position	Active face opposite read head			
Power supply	Inductive via read head			

EN

12. Ordering information and accessories

Tip!

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.”

13. Inspection and service

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 (see chapter *9.3. Functional check on page 15*)
- Check the secure mounting of the devices and the connections
- Check for contamination
- Check for sealing of the plug connector on the read head
- 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.

14. Service

If servicing is required, please contact:

EUCHNER GmbH + Co. KG

Kohlhammerstraße 16

70771 Leinfelden-Echterdingen

Service telephone:

+49 711 7597-500

E-mail:

support@euchner.de

Internet:

www.euchner.com

15. Declaration of conformity

The product complies with the requirements according to

- Machinery Directive 2006/42/EC (until January 19, 2027)
- Machinery Regulation (EU) 2023/1230 (from January 20, 2027)

The EU declaration of conformity can be found at www.euchner.com. Enter the order number of your device in the search box. The document is available under *Downloads*.

EUCHNER GmbH + Co. KG
Kohlhammerstraße 16
70771 Leinfelden-Echterdingen
info@euchner.de
www.euchner.com

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