EUCHNER

Operating Instructions

Non-Contact Safety System

CES-AZ-ALS-... (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-ALS-01B*, evaluation unit for one read head (on request)
- Non-Contact Safety System *CES-AZ-ALS-02B*, evaluation unit for two read heads (on request)
- Non-Contact Safety System *CES-AZ-ALS-04B*, evaluation unit for four read heads (order no. 113090)

1.2. Target group

Design engineers and installation planners for safety devices 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
	Document on CD
 **DANGER WARNING CAUTION**	**Signal word:** **DANGER** **WARNING** **CAUTION** **Consequence if not observed:** Death or severe injuries Possibly death or severe injuries Possibly minor injuries
 **NOTICE Important!**	**Signal word:** **NOTICE** **Important!** Malfunction or device damage possible 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 and maintenance CES-A…/ CES-AZ/CES-FD (2109083)	‣ Basic safety information ‣ Maintenance instructions	
Operating instructions (2113996)	(This document)	

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. in the search box.

2. Correct use

Evaluation units of the series CES-AZ are used to evaluate safety-related signals of 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 safety guard and the machine control, this system prevents dangerous machine functions from occurring while the safety guard is open. A stop command is triggered if the safety guard is opened during the dangerous machine function.

This means:

- Starting commands that cause a dangerous machine function must become active only when the safety guard is closed.
- Opening the safety guard triggers a stop command.
- Closing a safety guard must not cause automatic starting of a dangerous machine function. A separate start command must be issued. For exceptions, refer to EN 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 safety guard and the machine control, this system prevents the safety 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 safety guard is closed and locked.
- The guard locking device must not be unlocked until the dangerous machine function has ended.

Closing and locking a safety guard must not cause automatic starting of a dangerous machine function. A separate start command must be issued. For exceptions, refer to EN 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
- 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 following components can be connected to the evaluation unit:

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

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

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 13849-2.
- 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.
- 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-BSP-104970 104970	**CES-A-BBN-106600** 106600	**CES-A-BDN-06-104730** 104730	**CES-A-BBA** 071840	**CES-A-BCA** 088786	**CES-A-BQA** 098108	**CES-A-BDA-20** 084720	**CES-A-BDA-18** 156935	**CES-A-BMB** 077791	**CEM-A-BE05** 094805	**CEM-A-BH10** 095175	**CET-A-BWK-50X** 096327	**CKS-A-BK1…** CKS key
CES-AZ-ALS-01B On request CES-AZ-ALS-02B On request CES-AZ-ALS-04B 113090	CES-A-LSP-… All items	20												
	CES-A-LNN-… All items		15	19										
	CES-A-LCA-… All items				15	15		16	16					
	CES-A-LNA-… All items				15	15		16	16					
	CES-A-LQA-SC 095650				15	15	23							
	CES-A-LMN-SC 077790				8	8		9	9	5				
	CEM-A-LE05K-S2 094800 CEM-A-LE05R-S2 095792													
	CEM-A-LH10K-S3 095170 CEM-A-LH10R-S3 095793													
	CET1-AX-LRA-… 095735 CET1-AX-LDA-… 100399													
	CKS-A-L1B-… 113130													●

Key to symbols	●	Combination possible
	15	Combination possible, typ. switch-on distance 15 mm
		Combination possible, guard locking for process protection
		Combination possible, guard locking for personal 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 safety guard (interlocking device according to EN ISO 14119)

- Safety function:
  - The safety contacts are switched off when the safety guard is open (see chapter *11. Technical data on page 20*).
- Safety characteristics: category, Performance Level, PFH_D (see chapter *11. Technical data on page 20*).

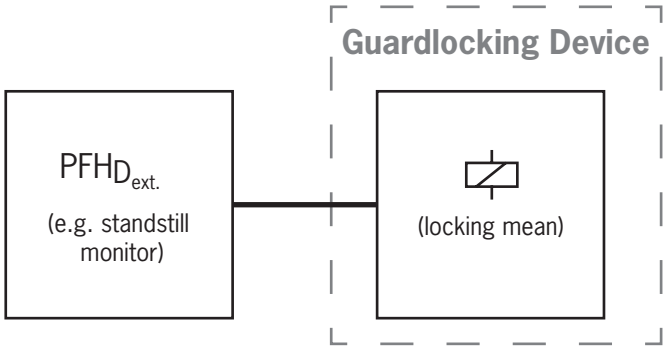
The following applies in combination with read heads with guard locking (CET-AX):

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

- Safety function (see chapter *11. Technical data on page 20*):
  - The safety guards are switched off when guard locking is released (monitoring of the locking device).
  - The safety contacts are switched off when the safety guard is open.
  - Guard locking can be activated only when the actuator is located in the switch head (failsafe locking mechanism).
- Safety characteristics: category, Performance Level, PFH_D (see chapter *11. Technical data on page 20*).

Activation of guard locking

- If the device is used as guard locking for personal protection, activation of guard locking must be regarded as a safety function.
- The device does not feature a safety characteristic for activation of guard locking, because the guard locking solenoid is completely disconnected from the outside (no activation function within the device). It therefore does not contribute to the failure probability.
- The safety level for the control of guard locking is determined exclusively by the external control (e.g. $PFH_{D_{ext.}}$ 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 instructions are not followed, or if any servicing is not performed as required, liability will be excluded and the warranty void.

5. General safety instructions

WARNING

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

- Safety components must not be bypassed, turned away, removed or otherwise rendered ineffective. On this topic pay attention in particular to the measures for reducing the possibility of bypassing according to EN ISO 14119:2013, section 7.
- The switching operation must be triggered only by actuators designated for this purpose.
- Mounting, electrical connection and setup only by authorized personnel possessing the following knowledge:
  - specialist knowledge in handling safety components
  - knowledge about the applicable EMC regulations
  - knowledge about the applicable regulations on occupational safety and accident prevention.
- The number of teach-in and 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. EUCHNER cannot provide any warranty in relation to the readability of the CD for the storage period required. For this reason you should archive a printed copy of the operating instructions. You can download the operating instructions from www.euchner.com.

6. Function

The safety system consists of three components:

- Coded actuator
- Read head
- Evaluation unit

The number of read heads that can be connected depends on the evaluation unit:

- CES-AZ-ALS-01B: ➡ one read head
- CES-AZ-ALS-02B: ➡ two read heads
- CES-AZ-ALS-04B: ➡ four read heads

The evaluation unit can be configured so that a start button (monitoring of the falling edge) and a feedback loop can be connected to monitor external relays and contactors. The individual configuration is defined by a setup procedure (see chapter *9. Setup on page 16*).

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 heads are fastened to the fixed part of the safety guard and are each connected to the evaluation unit via a two-core shielded cable (terminals H.1, H.2 and SH.).

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

If the data match, the door monitoring output O1 or O1…O2 or O1…O4 (semiconductor outputs, n-switching) of the corresponding read head is set to LOW. If all data for all read heads activated match, the safety outputs (relay output) are then enabled. The OUT LED illuminates.

Optionally, a feedback loop can be connected to the evaluation unit. The evaluation unit can then only be started with the feedback loop closed. A welded contactor contact in the enable path will thus be detected the next time the machine is started.

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 safety guard is opened or when guard locking is released, 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).

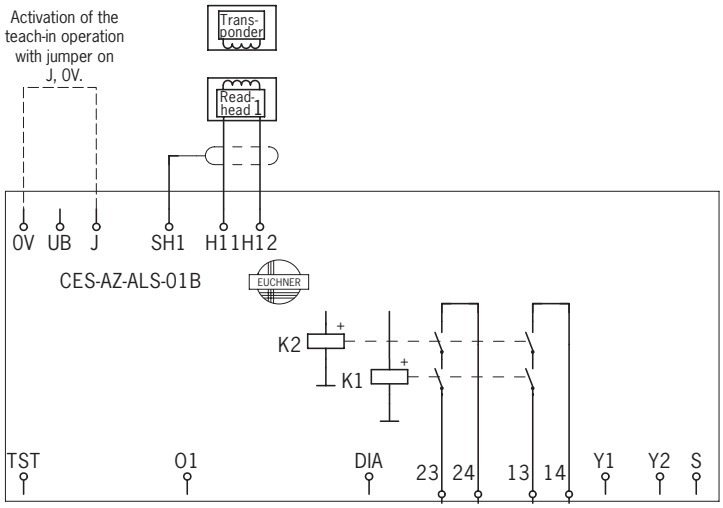
Independent of the switching state of the safety circuit, the position of all safety doors can be polled via the outputs O1 or O1…O2 or O1…O4.

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

6.1. Block diagrams for CES-AZ-ALS-...

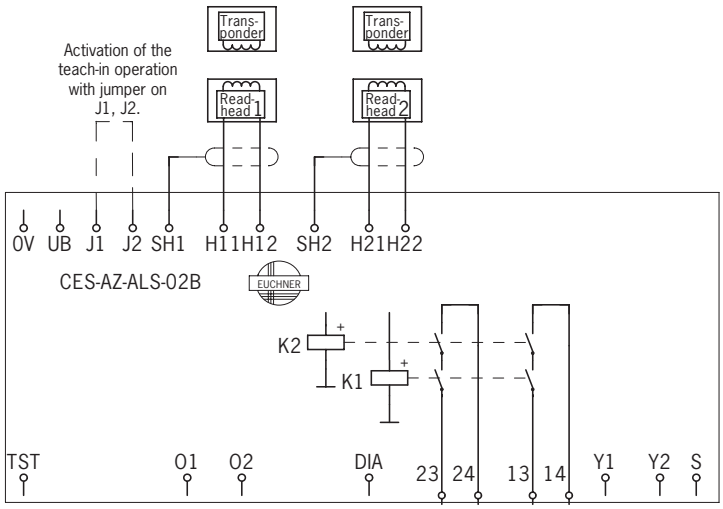
CES-AZ-ALS-01B

UB, 0V	Power supply
J, 0V	Jumper for teach-in operation
H11/H12	Read head 1 connection
SH1	Read head 1 shield
TST	Test input (see chapter *9.3.1. Self-test with test input TST on page 18)*
O1	Semiconductor monitoring output
DIA	Diagnostic output
13, 14	Connection for relay contact A, safety relay enable
23, 24	Connection for relay contact B, safety relay enable
Y1, Y2	Feedback loop
S	Start button connection (monitoring of the falling edge)



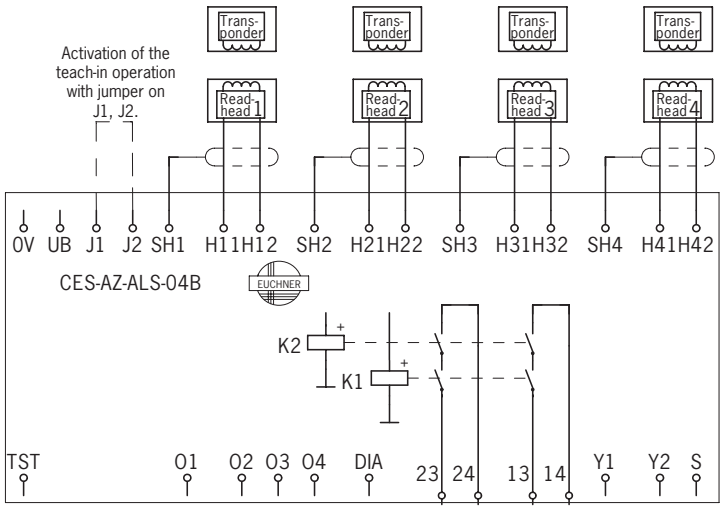
CES-AZ-ALS-02B

UB, 0V	Power supply
J1, J2	Jumper for teach-in operation
H11/H12, H21/H22	Connection for read heads 1 and 2
SH1, SH2	Shield for read heads 1 and 2
TST	Test input (see chapter *9.3.1. Self-test with test input TST on page 18)*
O1, O2	Semiconductor monitoring outputs
DIA	Diagnostic output
13, 14	Connection for relay contact A, safety relay enable
23, 24	Connection for relay contact B, safety relay enable
Y1, Y2	Feedback loop
S	Start button connection (monitoring of the falling edge)



CES-AZ-ALS-04B

UB, 0V	Power supply
J1, J2	Jumper for teach-in operation
H11/H12...H41/H42	Connection for read heads 1...4
SH1...SH4	Shield for read heads 1...4
TST	Test input (see chapter *9.3.1. Self-test with test input TST on page 18)*
O1...O4	Semiconductor monitoring outputs
DIA	Diagnostic output
13, 14	Connection for relay contact A, safety relay enable
23, 24	Connection for relay contact B, safety relay enable
Y1, Y2	Feedback loop
S	Start button connection (monitoring of the falling edge)



7. Mounting

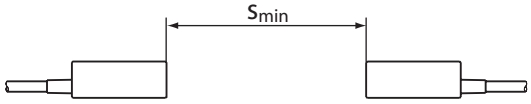
NOTICE

Device damage due to improper installation or unsuitable ambient conditions.

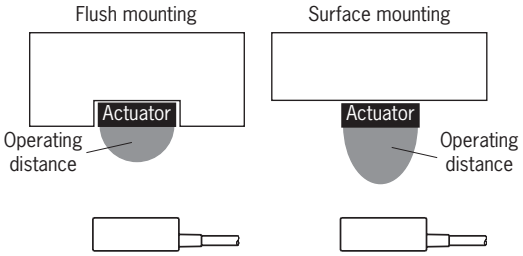
- Read heads and actuators must not be used as a mechanical end stop.
- Observe EN ISO 14119:2013, sections 5.2 and 5.3, for information about fastening the safety switch and the actuator.
- Observe EN ISO 14119:2013, section 7, for information about reducing the possibilities for bypassing an interlocking device.
- The evaluation unit must be mounted in a control cabinet with a minimum degree of protection of IP 54. 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 switch-off distance S_{ar}, the safety outputs are safely shut down.
- 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
  - For CES-A-LNN s_{min} = 160 mm



- If the actuator is installed flush, the switching distance changes as a function of the installation depth and the safety guard material.



Note the following points:

- Actuator and read head must be fitted so that
  - the front faces are at the minimum switch-on distance 0.8 x S_{ao} or closer when the safety guard is closed (see section Operating distances). 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 switch-off distance (S_{ar}) is reached when the safety guard is open.
  - the actuator is positively mounted on the safety 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 or safety switch and actuator mountings of 1 Nm. For read heads/actuators made of PE-HD, the maximum tightening torque is only 0.5 Nm.

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8. Electrical connection

WARNING

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

- Monitoring outputs must not be used as safety outputs.
- Lay the connection 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 the 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 connection cable for the read heads must be extended only using EUCHNER plug connectors, and adequate consideration must be given to EMC. Intermediate terminals must not be used.
- The shield on the connection cable for the read head must be connected to the appropriate terminal SH1 … 4 on the evaluation unit. The portion of cable from which insulation is stripped should be kept as short as possible (max. 3 cm).

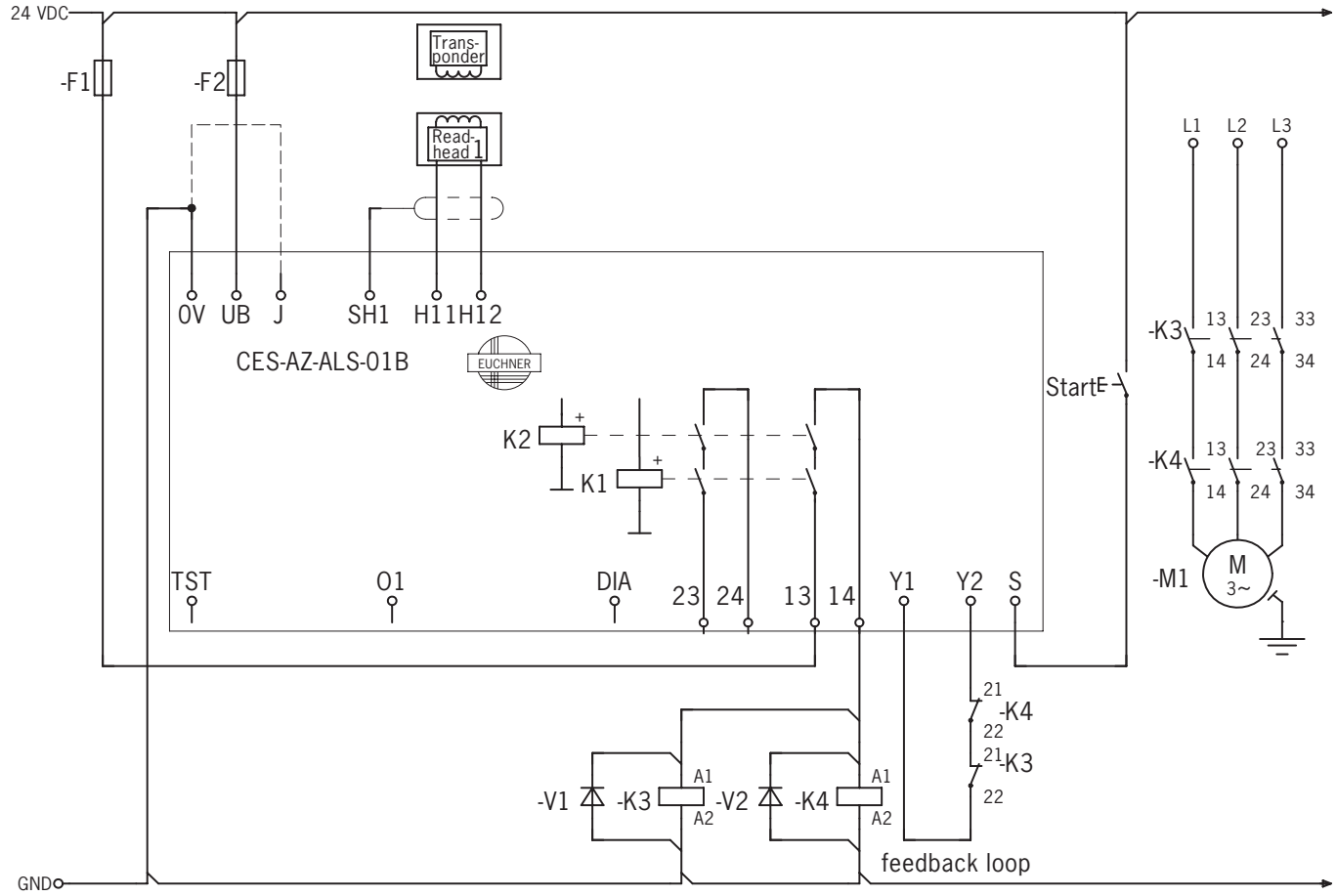
8.1. Safety in case of faults

- 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.

8.2. 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 ahead of terminal U_B.

8.3. Connection example for CES-AZ-ALS-01B



Important!

To achieve category 4 according to EN ISO 13849-1, it is necessary to monitor the downstream contactors (here: contacts of -K3 and -K4 in the feedback loop).

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.

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

With reference to EN ISO 13849-2 Table D.5, this exclusion can be provided if

- the cables are inside an electrical installation space and
- the enclosure meets the related requirements (see EN 60204-1 or IEC 60204-1).

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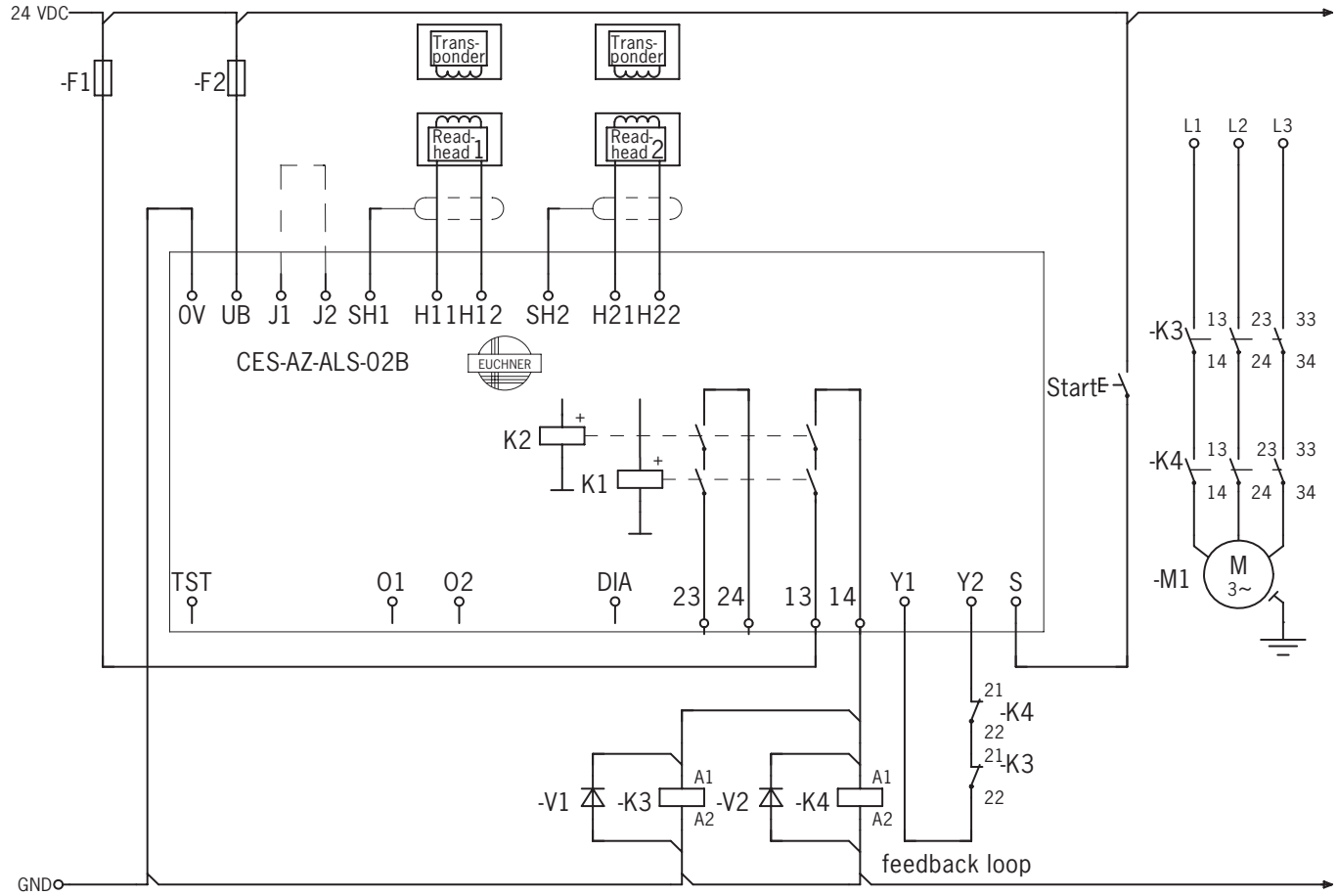
8.4. Connection example for CES-AZ-ALS-02B



Important!

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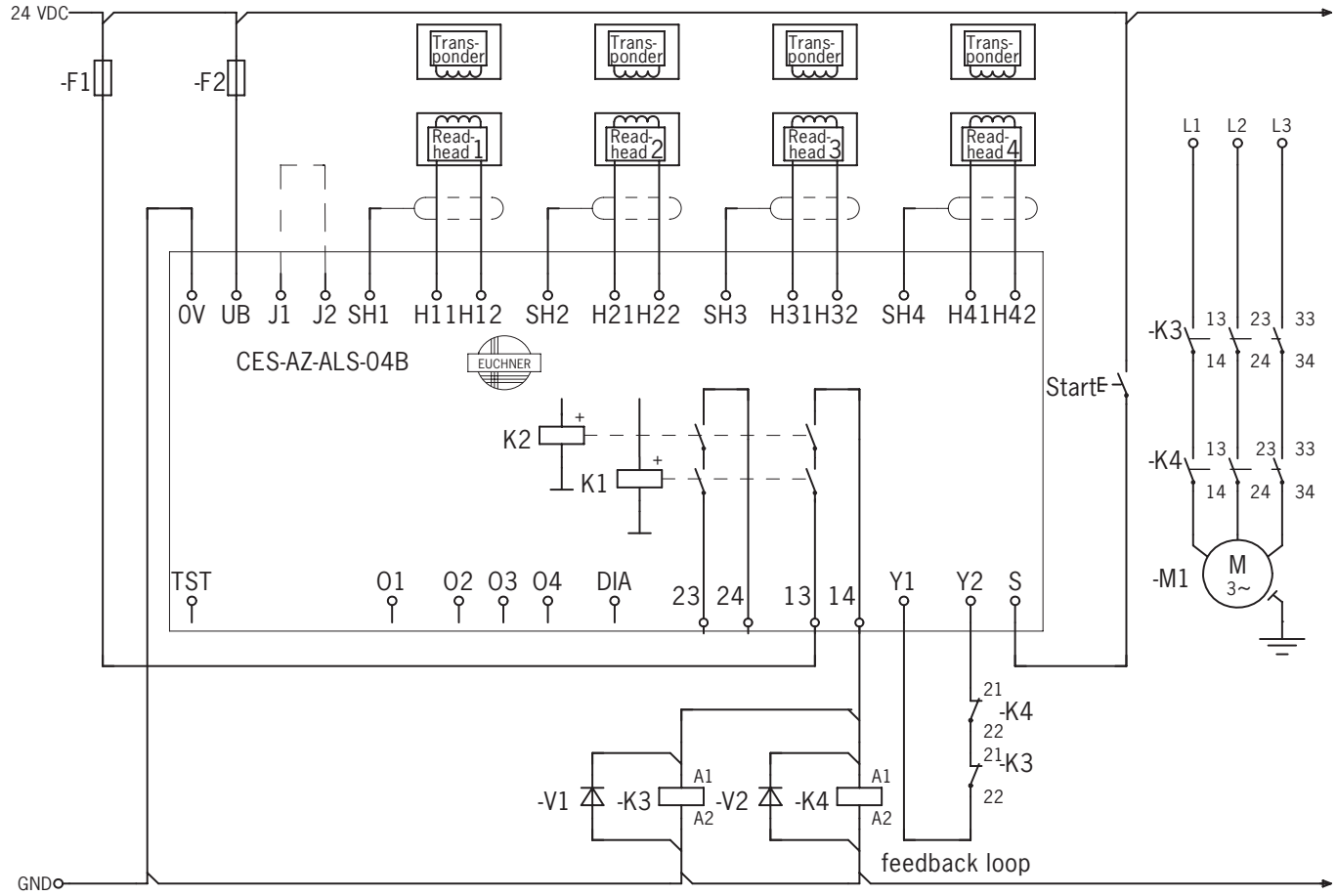
- the cables are inside an electrical installation space and
- the enclosure meets the related requirements (see EN 60204-1 or IEC 60204-1).

8.5. Connection example for CES-AZ-ALS-04B



Important!

To achieve category 4 according to EN ISO 13849-1, it is necessary to monitor the downstream contactors (here: contacts of -K3 and -K4 in the feedback loop).

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.

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

With reference to EN ISO 13849-2 Table D.5, this exclusion can be provided if

- the cables are inside an electrical installation space and
- the enclosure meets the related requirements (see EN 60204-1 or IEC 60204-1).

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9. Setup

9.1. LED indicators

Designation	Color	**Meaning**
STATE	green	Status indication (multifunction display using flashing modes)
OUT	yellow	Safety circuit closed
DIA	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

Before the system forms a functional unit, the parameters are set in the evaluation unit using a teach-in operation (number of connected read heads, assignment of the actuators to the read heads, with or without automatic start, with or without feedback loop). During this process the read heads are activated and the actuator code taught-in.

These configuration parameters are saved in the device.

During the teach-in operation the safety outputs are open. 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:
  - There must be no state change, e.g. through the opening or closing of a safety door or a change in the signal on the terminals for the start button and the feedback loop.
  - The power supply must not be switched off.
- If these conditions are not met, the evaluation unit switches to the safe fault state (diagnostics LED illuminates) and signals this operating fault with the STATE LED by three short flashes that are repeated every second. The teach-in operation must be repeated.
- The number of teach-in operations is unlimited. The evaluation unit can be re-configured as often as required.
- Actuators cannot be interchanged without a renewed teach-in operation.
- An actuator that has not been subjected to teach-in will not be detected by the related read head.
- Even if only one new actuator needs to be taught, a complete new teach-in operation must be carried out as described in the section *Setup*.
- Do not change DIP switches during operation.

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

1. Prepare for teach-in operation
   - Switch off power supply U_B
   - Fit a jumper between terminals J1 and J2 (for CES-AZ-ALS-01B between J and 0V)
2. Set required configuration on DIP switches

Switch designation	Switch position left (OFF)	Switch position right (ON)
1	No read head connected to terminals H11, H12, SH1	Read head connected to terminals H11, H12, SH1
2	No read head connected to terminals H21, H22, SH2	Read head connected to terminals H21, H22, SH2
3	No read head connected to terminals H31, H32, SH3	Read head connected to terminals H31, H32, SH3
4	No read head connected to terminals H41, H42, SH4	Read head connected to terminals H41, H42, SH4
5	Automatic start (no start button connected)	Manual start (start button connected)
6	No feedback loop connected	Feedback loop connected

3. Set required configuration on machine
   - Close all doors to be monitored (the actuators must be in the operating distance of the related read head)
   - For **Manual start** operating mode: keep start button closed
   - For **With feedback** operating mode: keep feedback loop closed

4. Start teach-in operation
   - Switch on operating voltage
   - Wait for self-test (STATE LED flashes for approx. 10 seconds at 15 Hz)
   - 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. 10 seconds)
5. End teach-in operation
   - Remove jumper between J1 and J2 (for CES-AZ-ALS-01B between J and 0V)
   - For **Manual start** operating mode: start button must be connected
   - For **With feedback** operating mode: feedback loop must be connected
   - Interrupt operating voltage for at least 10 seconds
   - Wait for self-test (STATE LED flashes for approx. 10 seconds at 15 Hz)
6. Check all safety guards for effectiveness

9.2.1. Changing the configuration/new actuators

The evaluation unit can be re-configured as often as required. For this purpose you must proceed as per the first teach-in operation according to the Setup procedure section.

Faulty actuators can be replaced. Then a complete teach-in operation must be performed as per the section *Setup*. The number of teach-in operations is unlimited.

	**Tip!** After acknowledging the teach-in operation you can use the monitoring outputs O1 ... O4 for the diagnostics. All actuators that are in the operating distance of a read head at this time are signaled on the related monitoring output. In the event of a fault, you can quickly see which actuators have not been detected, e. g. because it has been forgotten to close a safety door prior to teach-in. This function is only available during setup.

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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 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 safety switch carries out a self-test.
     The green STATE LED flashes for approx. 10 seconds at 15 Hz.
     The STATE LED then illuminates continuously.
     The OUT and DIA LEDs do not light up.
2. Close all safety guards.
   - The machine must not start automatically.
   - The green STATE LED and the yellow OUT LED light up continuously.
3. Enable operation in the control system.
4. Open the safety guard.
   - The machine must switch off and it must not be possible to start it as long as the safety guard is open.
   - The green STATE LED illuminates continuously; the OUT and DIA LEDs do not illuminate.

Repeat steps 2 … 4 separately for each safety 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 safety guard.

From category 2 according to EN ISO 13849-1 and in accordance with EN 60204-1 : 1997 (chapter 9.4.2.4), a function test must be performed on the entire safety system on start-up or after defined intervals.

Testing of the internal function of the unit 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 safety 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 safety guard. For this purpose, opening of the safety guard can be 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 DIA of the evaluation unit is also set to LOW as a monitoring function.

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

In Manual start operating mode, the start button must be pressed again to start the system.

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	LED indicator			State
	STATE (green)	OUT (yellow)	DIA (red)	
Setup	☼ 4 Hz	○	○	Initial setup after delivery without jumper connected to J1, J2 or J, 0V.
	☼ 1 Hz	○	○	Teach-in operation
	○	○	○	Acknowledgment of completion of teach-in operation.
Normal operation	☼ 15 Hz (10 s)	○	○	Self-test, duration approx. 10 seconds, is performed after the application of the operating voltage U_B
	✳	○	○	Normal operation, not all monitored doors are closed.
	✳	✳	○	Normal operation, all monitored doors are closed (**after** pressing the start button, for Manual start operating mode)
Function test	✳	○	✳	Function test active (TST input = 24 V)
Fault display	○	○	✳	Internal component failure or actuator CES-A-BMB in the impermissible range or excessively high external interference (EMC)
Operating fault	☼ 3 x	○	✳	Configuration error: **Teach-in operation must be performed again** Possible causes: - State change during the teach-in operation - The DIP switch setting and the configuration did not match during the teach-in operation - DIP switch setting has been changed without teach-in operation - The jumper (J1, J2 or J, 0V) was fitted with power supply switched on - Closed feedback loop (Y1,Y2) present, although a feedback loop was not present during teach-in - 24 V signal present at the start button input (S) although teach-in was performed with “Automatic start” operating mode.
	☼ 4 x	○	✳	Fault in feedback loop Possible causes: - Malfunction of the monitored contactor - Following removal from the operating distance, actuator is not outside the operating distance long enough; as a result the feedback loop cannot be closed in this short time. Note the release time for the monitored contactor. - Feedback loop was not closed on starting the evaluation unit - Feedback loop was not closed on applying the operating voltage +UB.

Key to symbols	
N	0 Volt or not connected
1	24 Volt
0	0 Volt
○	LED not illuminated
✳	LED illuminated
☼ 15 Hz (10 s)	LED flashes for 10 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.

NOTICE

The read heads CES-A-LNN and CES-A-LSP have an integrated LED to indicate the door position. The LED illuminates with the safety guard closed.

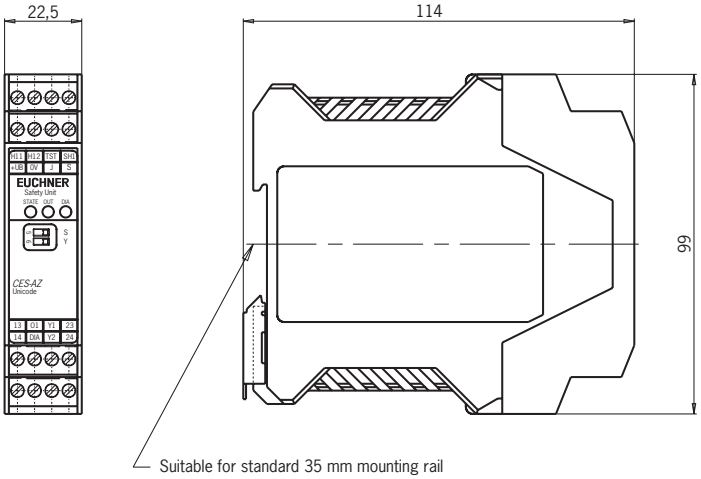
EN

11. Technical data

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

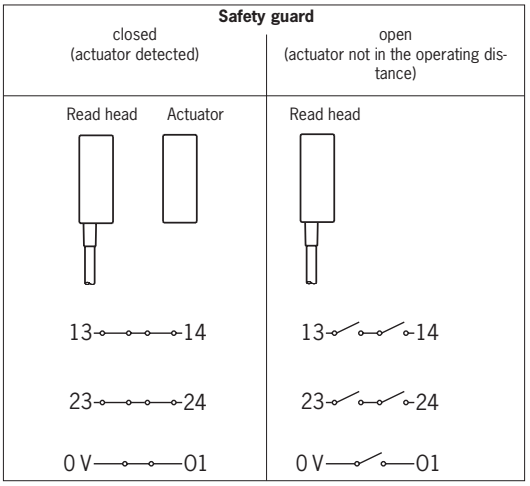
- Housing for rail mounting, IP20
- Relay output
- One read head can be connected
- Door monitoring output n-switching

Dimension drawing



Switching characteristics

- Two safety outputs with two NO contacts each (relay outputs)
- One door monitoring output (semiconductor output, n-switching, not a safety output)



Technical data of CES-AZ-ALS-01B

Parameter	Value min.	Value typ.	Value max.	Unit
Housing material		PA6.6 plastic		
Dimensions		114 x 99 x 22.5		mm
Weight		0.2		kg
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 according to DIN EN 60715		
Number of read heads		One read head per evaluation unit		
Connection		Screw terminals		
Connection cross-section	0.25	-	2.5	mm^2
Operating voltage U_B (regulated, residual ripple < 5%)	21	24	27	V DC
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)				
- at switching voltage AC/DC 21 ... 60 V	1	-	300	mA
- at switching voltage AC/DC 5 ... 30 V	10	-	6,000	
- at switching voltage AC5 ... 230 V (160 V ATEX)	10	-	2,000	
External fuse (safety circuit) according to EN 60269-1		6 AgG or 6 A circuit breaker (characteristic B or C)		
Utilization category according to EN 60947-5-1		AC-12 60 V 0.3 A/DC-12 60 V 0.3 A AC-12 30 V 6 A/DC-12 30 V 6 A AC-15 230 V 2 A / DC-13 24 V 3 A		
Rated insulation voltage U_i		250		V
Rated impulse withstand voltage U_{imp}		4		kV
Rated conditional short-circuit current		100		A
Resilience to vibration		Acc. to EN 60947-5-2		
Mechanical operating cycles (relays)		10×10^6		
Switching delay from state change 2)	-	-	210	ms
Discrepancy time (of the switching points of both relays)	-	-	25	ms
Current via feedback loop Y1/Y2	5	8	10	mA
Permissible resistance via feedback loop	-	-	600	Ω
Ready delay 3)	-	10	12	s
Dwell time 4)	3	-	-	s
Switching frequency max. 5)	-	-	0.25	Hz
Repeat accuracy R acc. to EN IEC 60947-5-3		≤ 10		%
Monitoring outputs (diagnostics DIA, door monitoring output O1, semiconductor output, n-switching, short circuit-protected)				
- Output voltage switched (low)	0	-	1	V DC
- Switching voltage	21	24	27	
- Max. load	-	-	20	mA
Start button input S, test input TST				
- Input voltage LOW	0	-	2	V DC
HIGH	15	-	U_B	
- Input current HIGH	5	8	10	mA
EMC protection requirements		Acc. to EN 60947-5-3		
Reliability values 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		4		
Performance Level (PL)		e		
PFH_D		1.9×10^{-8}		
Mission time		20		years
Number of switching cycles/year	760000	153000	34600	
Diagnostic coverage DC		99		%
$MTTF_D$		136		years

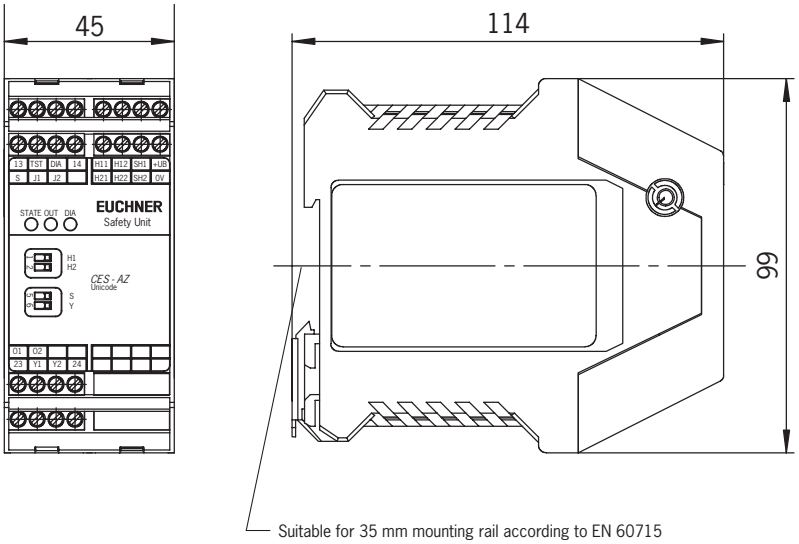
1) Without taking into account the load currents on the monitoring outputs.
2) Corresponds to the risk time according to EN 60947-5-3. This is the maximum switch-off delay for the safety outputs following removal of the actuator. In case of EMC interference in excess of the requirements in accordance with EN 60947-5-3, the switch-off delay can increase to max. 250 ms. After a brief actuation < 0.25 s, the switch-on delay can increase to max. 3 s if this is followed immediately by further actuation.
3) After the operating voltage is switched on, the relay outputs are switched off and the door monitoring output is set to HIGH potential during the ready delay. For the visual indication of the delay, the green STATE LED flashes at a frequency of approx. 15 Hz.
4) The dwell time is the time that the actuator must be outside the operating distance.
5) In case of monitoring with feedback loop, the actuators must remain outside the operating distance, e.g. with a door open, until the feedback loop is closed.

EN

11.2. Evaluation unit CES-AZ-ALS-02B

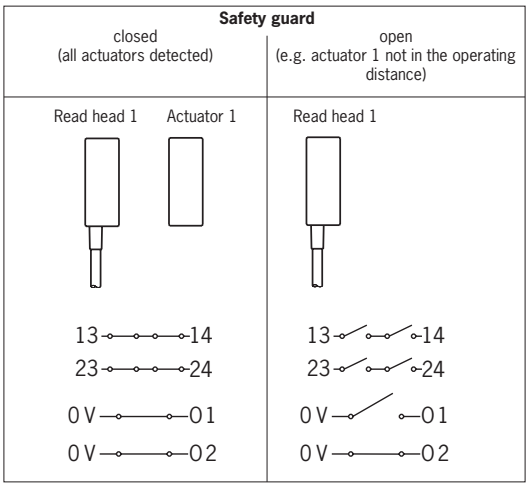
- Housing for rail mounting, IP20
- Relay output
- Two read heads can be connected
- Door monitoring outputs n-switching

Dimension drawing



Switching characteristics

- Two safety outputs with two NO contacts each (relay outputs)
- Two door monitoring outputs (semiconductor outputs, n-switching, not safety outputs)



Technical data of CES-AZ-ALS-02B

Parameter	Value min.	Value typ.	Value max.	Unit
Housing material		PA6.6 plastic		
Dimensions		114 x 99 x 45		mm
Weight		0.25		kg
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 according to DIN EN 60715		
Number of read heads		Max. two read heads per evaluation unit		
Connection		Screw terminals		
Connection cross-section	0.25	-	2.5	mm^2
Operating voltage U_B (regulated, residual ripple < 5%)	21	24	27	V DC
Current consumption I_B (with relay energized) [1]	-	150	-	mA
External fuse (operating voltage U_B)	0.4	-	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	
External fuse (safety circuit) according to EN 60269-1		6 AgG or 6 A circuit breaker (characteristic B or C)		
Utilization category according to EN 60947-5-1		AC-12 60 V 0.3 A/DC-12 60 V 0.3 A AC-12 30 V 6 A/DC-12 30 V 6 A AC-15 230 V 2 A / DC-13 24 V 3 A		
Rated insulation voltage U_i		250		V
Rated impulse withstand voltage U_{imp}		4		kV
Rated conditional short-circuit current		100		A
Resilience to vibration		Acc. to EN 60947-5-2		
Mechanical operating cycles (relays)		10×10^6		
Switching delay from state change [2]				ms
- Two activated actuators	-	-	290	
- One activated actuator	-	-	210	
Discrepancy time of the operating points of both relays (with two activated actuators)	-	-	25	ms
Manual start operating mode				ms
- Start button actuating duration	250	-	-	
- Start button response delay	-	200	300	
Current via feedback loop Y1/Y2	5	8	10	mA
Permissible resistance via feedback loop	-	-	600	Ω
Ready delay [3]	-	10	12	s
Dwell time [4]	3	-	-	s
Switching frequency, max [5]	-	-	0.25	Hz
Repeat accuracy R acc. to EN IEC 60947-5-3		≤ 10		%
Monitoring outputs (diagnostics DIA, door monitoring outputs 01...02, semiconductor output, n-switching, short circuit-protected)				
- Output voltage switched (low)	0	-	1	V DC
- Switching voltage	21	24	27	
- Max. load	-	-	20	mA
Start button input S, 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		
Reliability values 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		4		
Performance Level (PL)		e		
PFH_D		1.9×10^{-8}		
Mission time		20		years
Number of switching cycles/year	760000	153000	34600	
Diagnostic coverage DC		99		%
$MTTF_D$		136		years

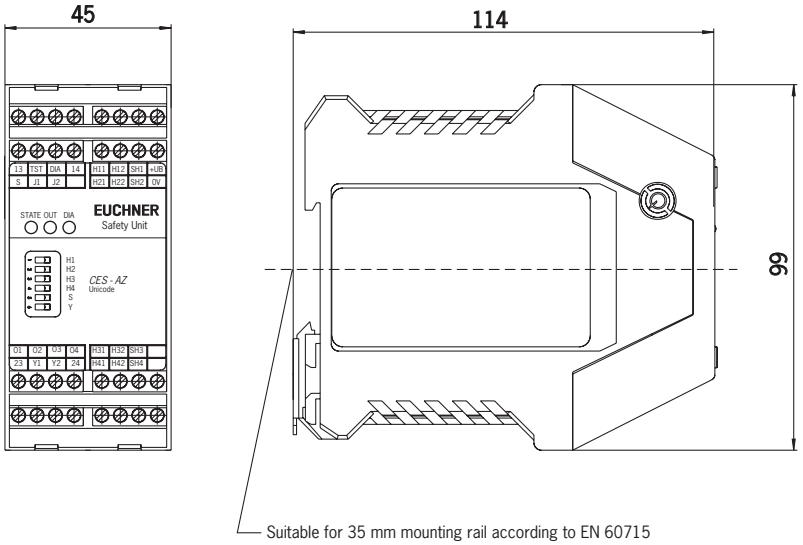
1) Without taking into account the load currents on the monitoring outputs.
2) Corresponds to the risk time according to EN 60947-5-3. This is the maximum switch-off delay for the safety outputs following removal of the actuator. In case of EMC interference in excess of the requirements in accordance with EN 60947-5-3, the switch-off delay can increase to max. 430 ms. After a brief actuation < 0.4 s, the switch-on delay can increase to max. 3 s if this is followed immediately by further actuation.
3) After the operating voltage is switched on, the relay outputs are switched off and the monitoring outputs are set HIGH during the ready delay. For the visual indication of the delay, the green STATE LED flashes at a frequency of approx. 15 Hz.
4) The dwell time is the time that the actuator must be inside or outside the operating distance.
5) In case of monitoring with feedback loop, the actuators must remain outside the operating distance, e.g. with a door open, until the feedback loop is closed.

EN

11.3. Evaluation unit CES-AZ-ALS-04B

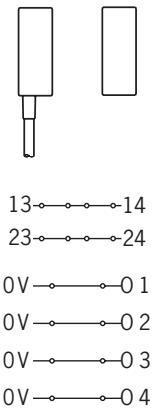
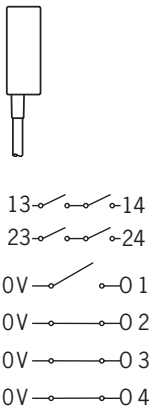
- Housing for rail mounting, IP20
- Relay output
- Four read heads can be connected
- Door monitoring outputs n-switching

Dimension drawing



Switching characteristics

- Two safety outputs with two NO contacts each (relay outputs)
- Four door monitoring outputs (semiconductor outputs, n-switching, not safety outputs)

Safety guard	
closed (all actuators detected)	open (e.g. actuator 1 not in the operating distance)
Read head 1 Actuator 1	Read head 1
	

Technical data of CES-AZ-ALS-04B

Parameter	Value min.	Value typ.	Value max.	Unit
Housing material		PA6.6 plastic		
Dimensions		114 x 99 x 45		mm
Weight		0.25		kg
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 according to DIN EN 60715		
Number of read heads		Max. four read heads per evaluation unit		
Connection		Screw terminals		
Connection cross-section	0.25	-	2.5	mm^2
Operating voltage U_B (regulated, residual ripple < 5%)	21	24	27	V DC
Current consumption I_B (with relay energized) [1]	-	150	-	mA
External fuse (operating voltage U_B)	0.4	-	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	
External fuse (safety circuit) according to EN 60269-1		6 AgG or 6 A circuit breaker (characteristic B or C)		
Utilization category according to EN 60947-5-1		AC-12 60 V 0.3 A/DC-12 60 V 0.3 A AC-12 30 V 6 A / DC-12 30 V 6 A AC-15 230 V 2 A / DC-13 24 V 3 A		
Rated insulation voltage U_i		250		V
Rated impulse withstand voltage U_{imp}		4		kV
Rated conditional short-circuit current		100		A
Resilience to vibration		Acc. to EN 60947-5-2		
Mechanical operating cycles (relays)		10 x 10^6		
Switching delay from state change [2]				ms
- Four activated actuators	-	-	450	
- Three activated actuators	-	-	370	
- Two activated actuators	-	-	290	
- One activated actuator	-	-	210	
Discrepancy time of the operating points of both relays (with four activated actuators)	-	-	25	ms
Manual start operating mode				ms
- Start button actuating duration	250	-	-	
- Start button response delay	-	200	300	
Current via feedback loop Y1/Y2	5	8	10	mA
Permissible resistance via feedback loop	-	-	600	Ω
Ready delay [3]	-	10	12	s
Dwell time [4]	3	-	-	s
Switching frequency, max [5]	-	-	0.25	Hz
Repeat accuracy R acc. to EN IEC 60947-5-3		≤ 10		%
Monitoring outputs (diagnostics DIA, door monitoring outputs 01...04, semiconductor output, n-switching, short circuit-protected)				V DC
- Output voltage switched (low)	0	-	1	
- Switching voltage	21	24	27	
- Max. load	-	-	20	mA
Start button input S, 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		
Reliability values 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		4		
Performance Level (PL)		e		
PFH_D		1.9 x 10^{-8}		
Mission time		20		years
Number of switching cycles/year	760000	153000	34600	
Diagnostic coverage DC		99		%
$MTTF_D$		136		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 switch-off delay for the safety outputs following removal of the actuator. In case of EMC interference in excess of the requirements in accordance with EN 60947-5-3, the switch-off delay can increase to max. 750 ms. After a brief actuation < 0.8 s, the switch-on delay can increase to max. 3 s if this is followed immediately by further actuation.
3) After the operating voltage is switched on, the relay outputs are switched off and the monitoring outputs are set HIGH during the ready delay. For the visual indication of the delay, the green STATE LED flashes at a frequency of approx. 15 Hz.
4) The dwell time is the time that the actuator must be inside or outside the operating distance.
5) In case of monitoring with feedback loop, the actuators must remain outside the operating distance, e.g. with a door open, until the feedback loop is closed.

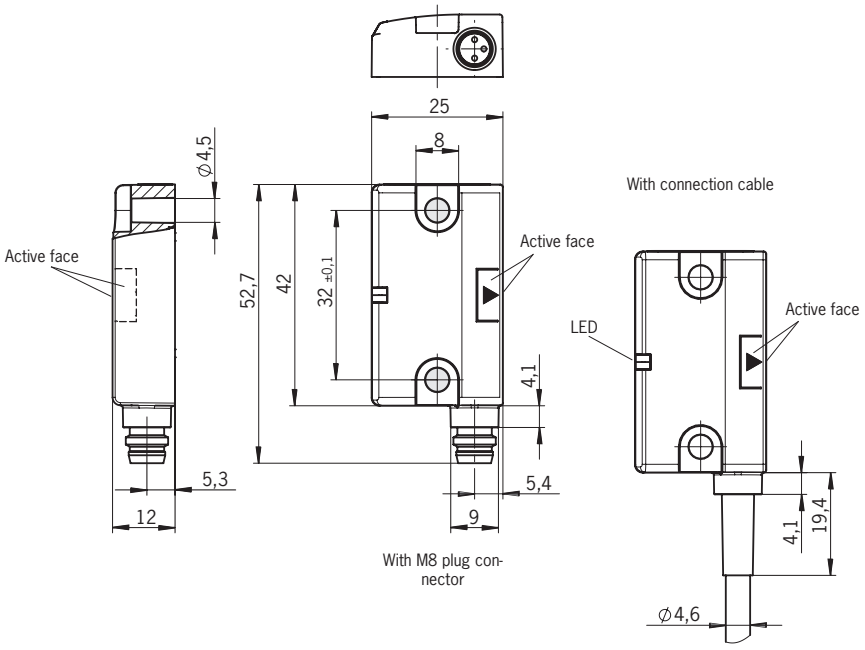
EN

11.4. Read head CES-A-LNN-…

Approvals

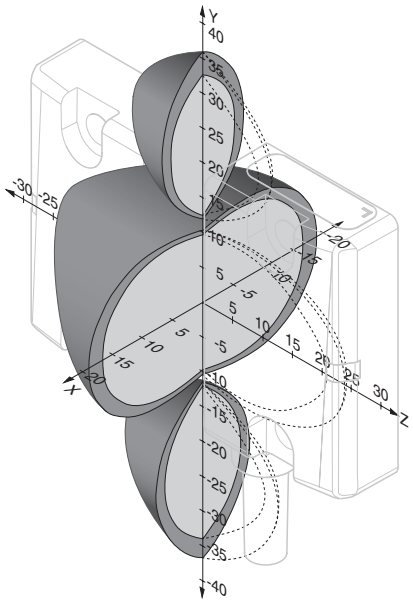
- Cube-shaped design 42 x 25 mm
- Attachment compatible with series CES-A-LNA/LCA
- LED for the indication of the door position

Dimension drawing



Typical operating distance

With evaluation unit CES-AZ-ALS-… and actuator CES-A-BBN

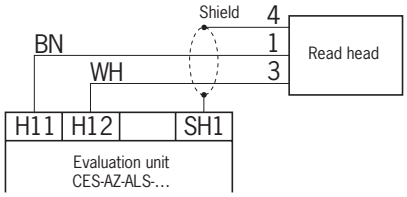


NOTICE

For a side approach direction for the actuator and read head, a minimum distance of s = 6 mm must be maintained so that the operating distance of the side lobes is not entered.

Terminal assignment

Read head with connection cable



Technical data

Parameter		Value min.	Value typ.	Value max.	Unit
Housing material		Reinforced thermoplastic (PBT), fully encapsulated			
Dimensions		42 x 25 x 12			mm
Weight (without connection cable)		0.025			kg
Ambient temperature		-25	-	+70	°C
Degree of protection		IP 67			
Installation position		Any			
Method of operation		Inductive			
Power supply		Via evaluation unit			
Connection		M8 plug connector, 3-pin or connection cable			
LED indicator		White, valid actuator detected			
In combination with actuator CES-A-BBN-106600					
Assured switch-off distance S_{ar}	in x/z direction	-	-	50	mm
	in y direction	-	-	100	
Operating distance for center offset m = 0 [1]					
- Switch-on distance		-	15	-	
- Assured switch-on distance S_{ao}		10	-	-	
- Switching hysteresis		1	4	-	
In combination with actuator CES-A-BDN-06-104730					
Assured switch-off distance S_{ar}	in x/z direction	-	-	50	mm
	in y direction	-	-	80	
Operating distance for center offset m = 0 [1]					
- Switch-on distance		-	19	-	
- Assured switch-on distance S_{ao}		14	-	-	
- Switching hysteresis		-	4	-	
Cable length		See chapter *12. Ordering information and accessories on page 48*		25	m

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

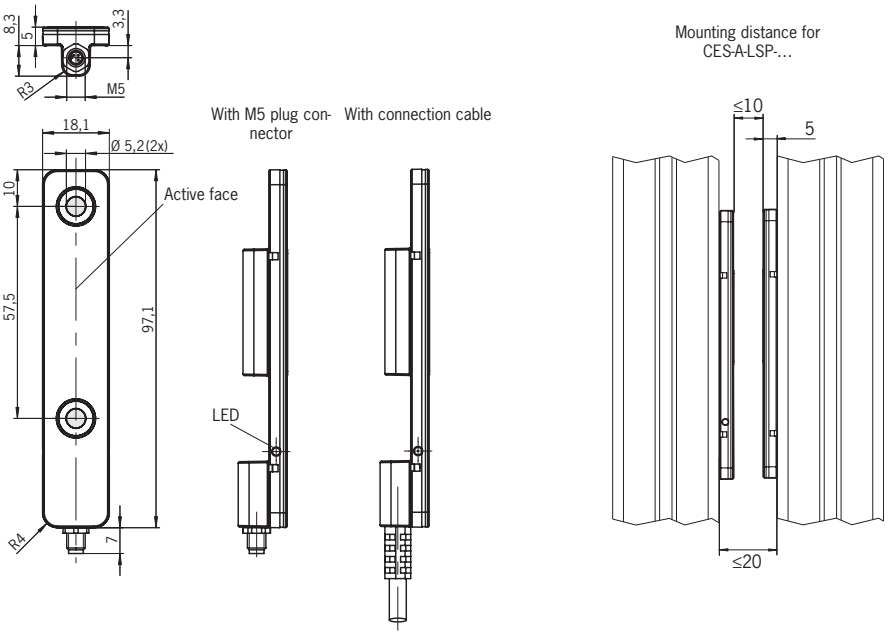
EN

11.5. Read head CES-A-LSP-…

Approvals

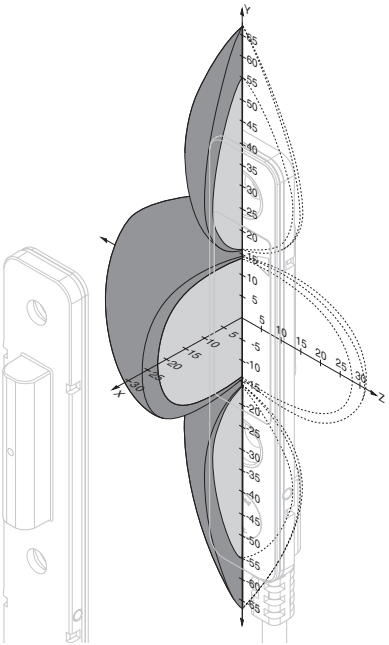
- Optimized for aluminum profile mounting
- LED for the indication of the door position

Dimension drawing



Typical operating distance

With evaluation unit CES-AZ-ALS-… and actuator CES-A-BSP

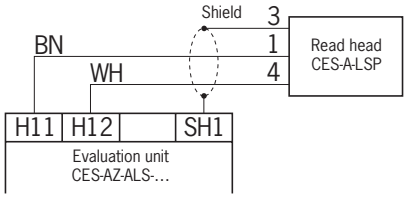


NOTICE

For a side approach direction for the actuator and read head, a minimum distance of s = 6 mm must be maintained so that the operating distance of the side lobes is not entered.

Terminal assignment

Read head with connection cable



Technical data

Parameter	Value			Unit
	min.	typ.	max.	
Housing material		PA6 GF30		
Weight (without connection cable)		0.02		kg
Ambient temperature	-25	-	+70	°C
Degree of protection		IP 67		
Installation position		Any		
Method of operation		Inductive		
Power supply		Via evaluation unit		
Connection		M5 plug connector, 3-pin		
LED indicator		White, valid actuator detected		
In combination with actuator CES-A-BSP-104970				
Assured switch-off distance S_{ar}	-	-	45	mm
Operating distance for center offset m = 0 [1] with vertical approach direction (x direction)				
- Switch-on distance	-	20	-	
- Assured switch-on distance S_{ao}	10	-	-	
- Switching hysteresis	1	4	-	
Cable length	See chapter *12. Ordering information and accessories on page 48*		25	m

1) These values apply to installation of the read head and the actuator in an aluminum profile 45 x 45 mm.

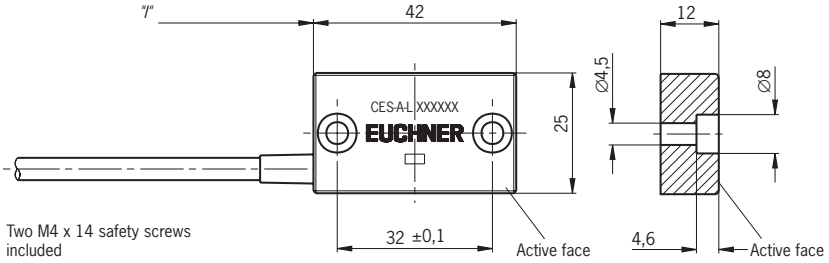
EN

11.6. Read head CES-A-LNA-…

Approvals

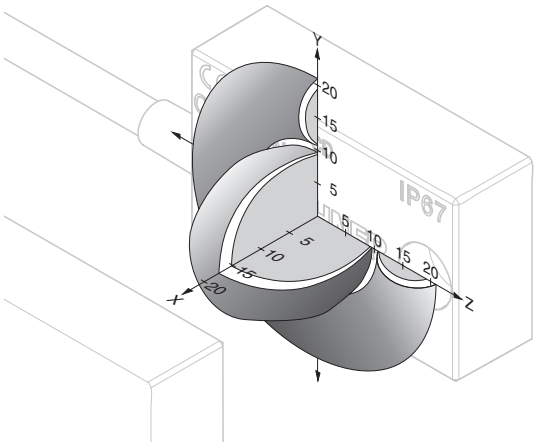
- Cube-shaped design 42 x 25 mm
- Hard-wired cable

Dimension drawing



Typical operating distance

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

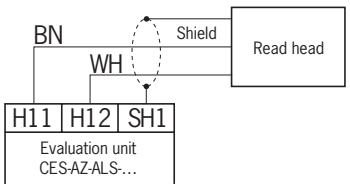


NOTICE

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

Terminal assignment

Read head with connection cable



Technical data

Parameter	Value			Unit
	min.	typ.	max.	
Housing material		Fortron, reinforced thermoplastic, fully encapsulated		
Dimensions		42 x 25 x 12		mm
Weight (incl. 10 m cable)		0.3		kg
Ambient temperature	-25	-	+70	°C
Degree of protection		IP 67/IP 69K		
Installation position		Any		
Method of operation		Inductive		
Power supply		Via evaluation unit		
In combination with actuator CES-A-BBA				
Assured switch-off distance S_{ar}	-	-	26	mm
Operating distance for center offset m = 0 [1]				
- Switch-on distance	-	15	-	
- Assured switch-on 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				
Assured switch-off distance S_{ar}	-	-	33	mm
Operating distance for center offset m = 0 [2]				
- Switch-on distance	-	16	-	
- Assured switch-on distance S_{ao}	11	-	-	
- Switching hysteresis	0.5	2	-	
Minimum distance s for side approach direction	4	-	-	
In combination with actuator CES-A-BDA-18				
Assured switch-off distance S_{ar}	-	-	32	mm
Operating distance for center offset m = 0 [1]				
- Switch-on distance	-	16	-	
- Assured switch-on distance S_{ao}	10	-	-	
- Switching hysteresis	0.5	1.4	-	
Minimum distance s for side approach direction	5	-	-	
Connection cable		Hard-wired encapsulated connection 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.

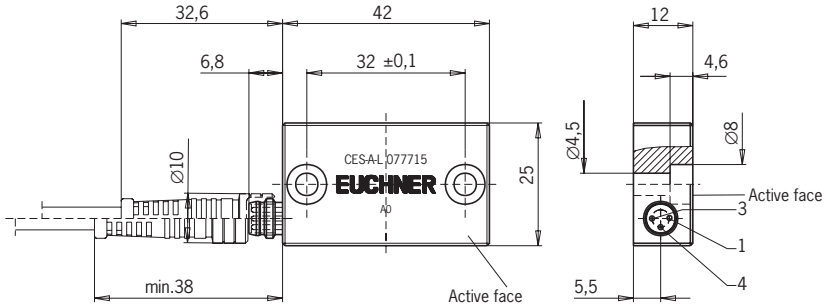
EN

11.7. Read head CES-A-LNA-SC

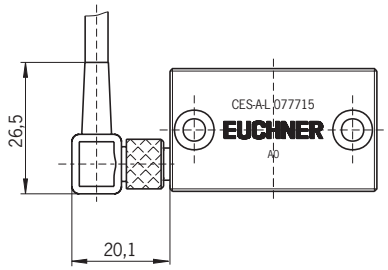
Approvals

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

Dimension drawing



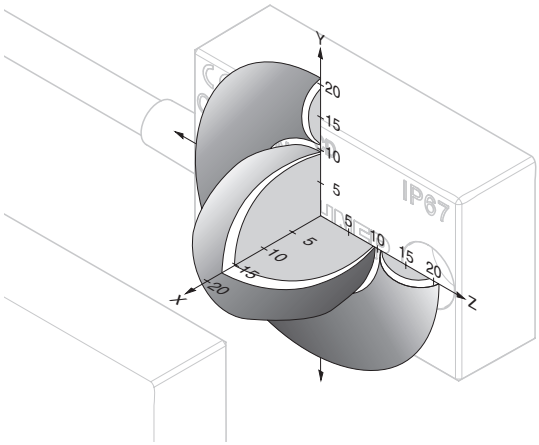
Two M4 x 14 safety screws included



Cable outlet with angled connector

Typical operating distance

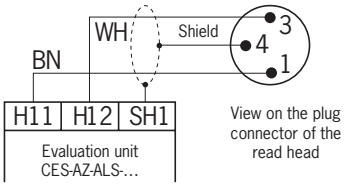
With evaluation unit CES-AZ-ALS-… and actuator CES-A-BBA



	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 operating distance 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
Weight (incl. 10 m cable)	0.3			kg
Ambient temperature	-25	-	+70	°C
Degree of protection	IP 67/IP 69K			
Installation position	Any			
Method of operation	Inductive			
Power supply	Via evaluation unit			
In combination with actuator CES-A-BBA				
Assured switch-off distance S_{ar}	-	-	26	mm
Operating distance for center offset m = 0 [1]				
- Switch-on distance	-	15	-	
- Assured switch-on 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				
Assured switch-off distance S_{ar}	-	-	33	mm
Operating distance for center offset m = 0 [2]				
- Switch-on distance	-	16	-	
- Assured switch-on distance S_{ao}	11	-	-	
- Switching hysteresis	0.5	2	-	
Minimum distance s for side approach direction	4	-	-	
In combination with actuator CES-A-BDA-18				
Assured switch-off distance S_{ar}	-	-	32	mm
Operating distance for center offset m = 0 [1]				
- Switch-on distance	-	16	-	
- Assured switch-on distance S_{ao}	10	-	-	
- Switching hysteresis	0.5	1.4	-	
Minimum distance s for side approach direction	5	-	-	
Connection	M8 plug connector, 3-pin			
Connection 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.

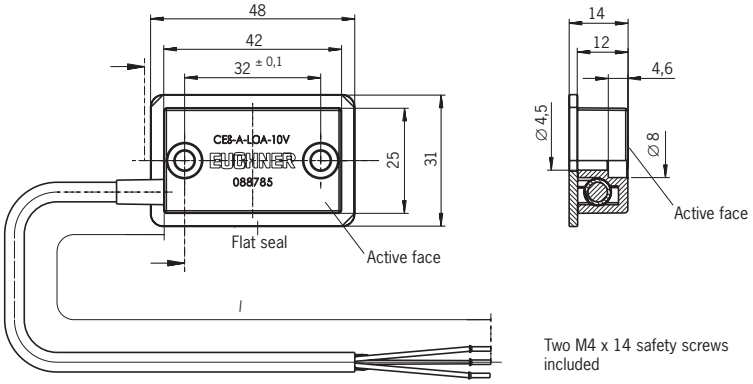
EN

11.8. Read head CES-A-LCA-…

Approvals

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

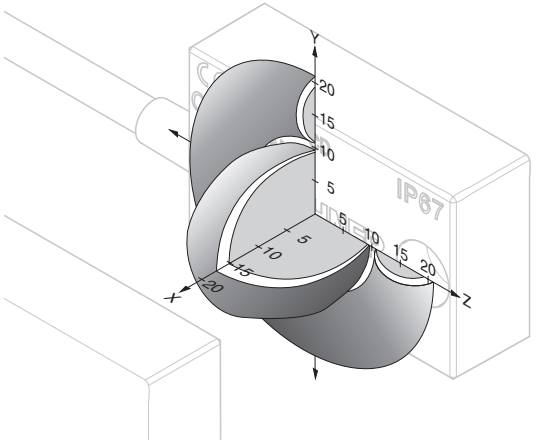
Dimension drawing



	NOTICE The flat seal provided must be used during assembly.

Typical operating distance

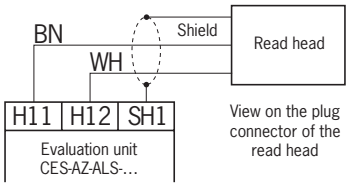
With evaluation unit CES-AZ-ALS-… and actuator CES-A-BCA



	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 operating distance of the side lobes is not entered.

Terminal assignment

Read head with connection 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
Weight (incl. 10 m cable)	0.3			kg
Ambient temperature	-25	-	+50	°C
Degree of protection	IP 67/IP 69K			
Installation position	Any			
Method of operation	Inductive			
Power supply	Via evaluation unit			
In combination with actuator CES-A-BCA				
Assured switch-off distance S_{ar}	-	-	26	mm
Operating distance for center offset m = 0 [1]				
- Switch-on distance	-	15	-	
- Assured switch-on 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				
Assured switch-off distance S_{ar}	-	-	33	mm
Operating distance for center offset m = 0 [2]				
- Switch-on distance	-	16	-	
- Assured switch-on distance S_{ao}	11	-	-	
- Switching hysteresis	0.5	2	-	
Minimum distance s for side approach direction	4	-	-	
In combination with actuator CES-A-BDA-18				
Assured switch-off distance S_{ar}	-	-	32	mm
Operating distance for center offset m = 0 [1]				
- Switch-on distance	-	16	-	
- Assured switch-on distance S_{ao}	10	-	-	
- Switching hysteresis	0.5	1.4	-	
Minimum distance s for side approach direction	5	-	-	
Connection cable	Hard-wired encapsulated connection 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.

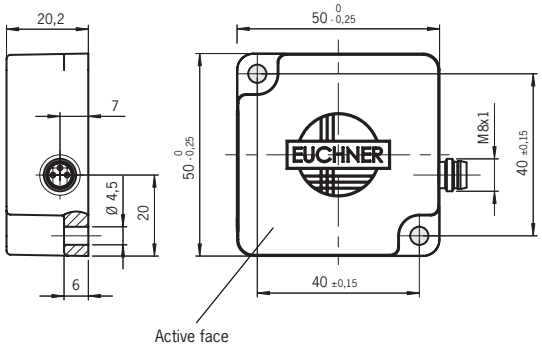
EN

11.9. Read head CES-A-LQA-SC

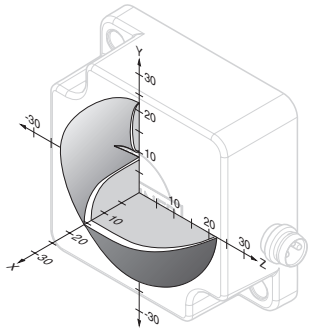
Approvals

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

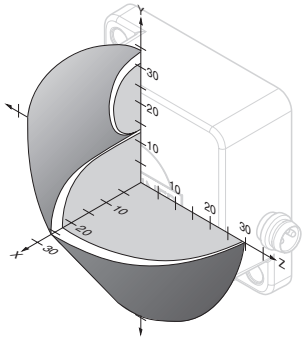
Dimension drawing



Typical operating distance



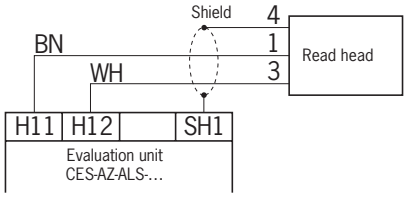
With actuator CES-A-BBA or CES-A-BCA



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

Terminal assignment

Read head with connection cable



Technical data

Parameter	Value			Unit
	min.	typ.	max.	
Housing material	Fortron, reinforced thermoplastic, fully encapsulated			
Dimensions	50 x 50 x 20.2			mm
Weight	0.08			kg
Ambient temperature	-25	-	+70	°C
Degree of protection	IP 67			
Installation position	Any			
Method of operation	Inductive			
Power supply	Via evaluation unit			
In combination with actuator CES-A-BBA or CES-A-BCA				
Assured switch-off distance S_{ar}	-	-	47	
Operating distance for center offset m = 0 [1]				
- Switch-on distance	-	15	-	mm
- Assured switch-on distance S_{ao}	10	-	-	
- Switching hysteresis	2	3	-	
In combination with actuator CES-A-BQA on evaluation unit CES-AZ-...-01B				
Assured switch-off distance S_{ar}	-	-	60	
Operating distance with vertical approach direction				
Center offset m = 0 [1]				
- Switch-on distance	-	23	-	
- Assured switch-on distance S_{ao}	16	-	-	
- Switching hysteresis	2	3	-	mm
Operating distance with side approach direction				
Distance in x direction = 10 mm				
- Switch-on distance	-	28	-	
- Assured switch-on distance S_{ao}	24	-	-	
- Switching hysteresis	1	1.3	-	
Connection cable	-	-	25	m

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

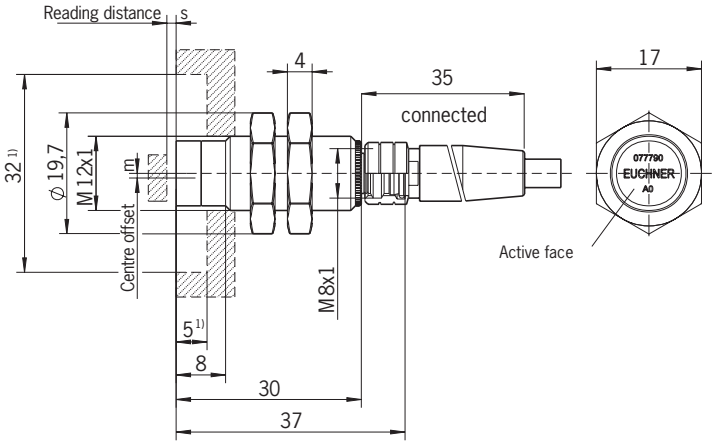
EN

11.10. Read head CES-A-LMN-SC

Approvals

- Cylindrical design M12
- M8 plug connector

Dimension drawing



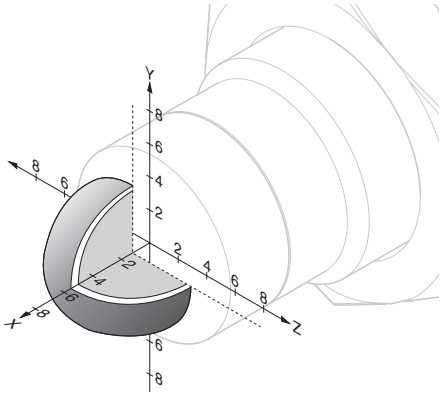
1) Clear zone (area of the active face without metal housing)

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-ALS-… and actuator CES-A-BMB

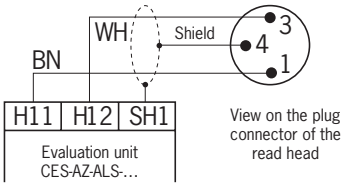


NOTICE

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

Terminal assignment

Read head with plug connector



Technical data

Parameter	Value min.	Value typ.	Value max.	Unit
Housing material		Nickel-plated CuZn housing sleeve Plastic PBT GF20 cap		
Dimensions		M12 x 1, length 38		mm
Weight (incl. 10 m cable)		0.2		kg
Ambient temperature	-25	-	+85	°C
Ambient pressure (only of active face in installed condition)	-	-	10	bar
Degree of protection		IP 67/IP 69/IP 69K		
Installation position		Any		
Method of operation		Inductive		
Power supply		Via evaluation unit		
Connection		M8 plug connector, 3-pin		
Connection cable	-	-	15	m
In combination with actuator CES-A-BMB				
Assured switch-off distance S_{ar}	-	-	10	
Operating distance for center offset m = 0 [1]				
- Switch-on distance	-	5	-	mm
- Assured switch-on distance S_{ao}	3.5	-	-	
- Switching hysteresis	0.1	0.3	-	
In combination with actuator CES-A-BDA-20				
Assured switch-off distance S_{ar}	-	-	26	
Operating distance for center offset m = 0 [1]				
- Switch-on distance [2]	-	9	-	mm
- Assured switch-on distance S_{ao}	6	-	-	
- Switching hysteresis	1	1.8	-	
In combination with actuator CES-A-BDA-18				
Assured switch-off distance S_{ar}	-	-	21	
Operating distance for center offset m = 0 [1]				
- Switch-on distance [3]	-	9	-	mm
- Assured switch-on distance S_{ao}	6	-	-	
- Switching hysteresis	0,5	1	-	
In combination with actuator CES-A-BBA				
Assured switch-off distance S_{ar}	-	-	25	
Operating distance for center offset m = 0 [1]				
- Switch-on distance [3]	-	8	-	mm
- Assured switch-on distance S_{ao}	5	-	-	
- Switching hysteresis	1	1.83	-	

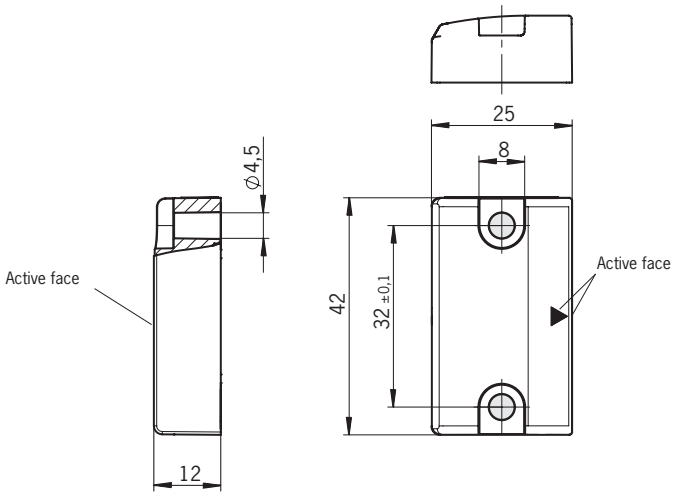
1) These values apply to surface installation of the read head in steel.
2) A distance of s = 4 mm must be maintained for a side approach direction.
3) A distance of s = 3 mm must be maintained for a side approach direction.

EN

11.11. Actuator CES-A-BBN

- Cube-shaped design 42 x 25 mm
- Attachment compatible with series CES-A-LNA/LCA

Dimension drawing for CES-A-BBN



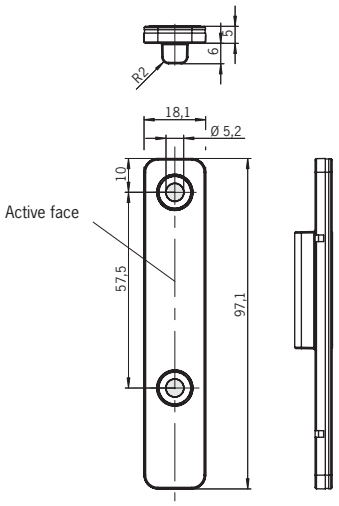
Technical data

Parameter	Value min.	Value typ.	Value max.	Unit
Housing material	Reinforced thermoplastic (PBT), fully encapsulated			
Dimensions	42 x 45 x 12			mm
Weight	0.025			kg
Ambient temperature	-25	-	+70	°C
Degree of protection	IP 67			
Installation position	Active face opposite read head			
Power supply	Inductive via read head			

11.12. Actuator CES-A-BSP

- Optimized for aluminum profile mounting

Dimension drawing for CES-A-BSP



Technical data

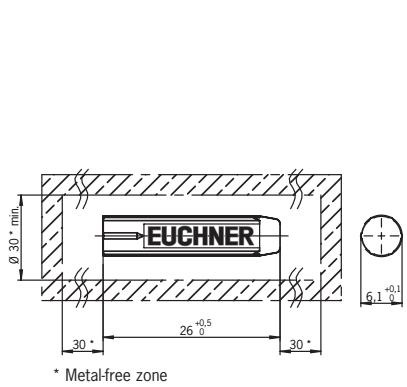
Parameter	Value min.	Value typ.	Value max.	Unit
Housing material		PA6 GF30		
Weight		0.02		kg
Ambient temperature	-25	-	+70	°C
Degree of protection		IP 67		
Installation position		Active face opposite read head		
Power supply		Inductive via read head		

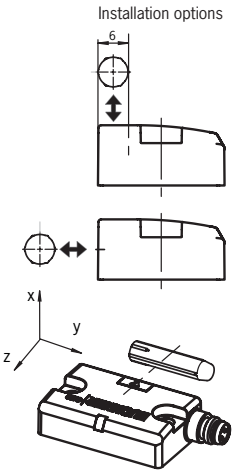
EN

11.13. Actuator CES-A-BDN-06

- Cylindrical design ∅ 6 mm

Dimension drawing for CES-A-BDN-06





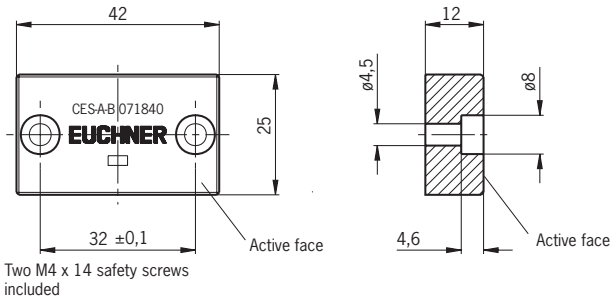
Technical data

Parameter	Value min.	Value typ.	Value max.	Unit
Housing material		Macromelt PA-based plastic		
Dimensions		26 x ∅ 6		mm
Weight		0.005		kg
Ambient temperature	-25	-	+70	°C
Degree of protection		IP 67		
Installation position		Active face opposite read head		
Power supply		Inductive via read head		

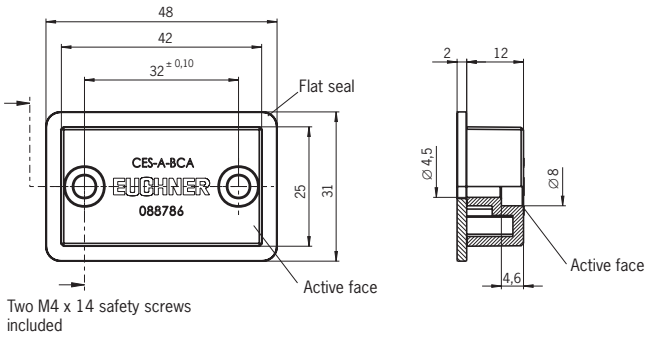
11.14. Actuator CES-A-BBA/CES-A-BCA

- 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 assembly.

Technical data

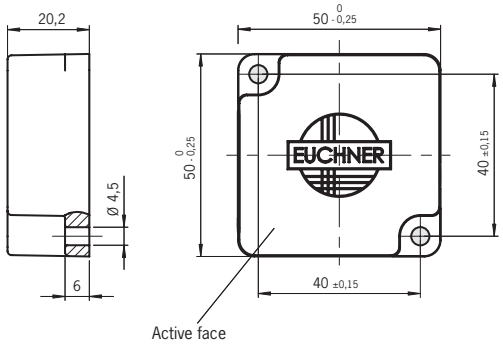
Parameter	Value min.	Value typ.	Value max.	Unit
Housing material - CES-A-BBA	Fortron, reinforced thermoplastic, fully encapsulated			
- CES-A-BCA	PE-HD plastic without reinforcement, fully encapsulated			
Flat seal material (CES-A-BCA only)	Fluororubber 75 FPM 4100			
Dimensions	42 x 25 x 12			mm
Weight	0.02			kg
Ambient temperature				
- CES-A-BBA	-25	-	+70	°C
- CES-A-BCA	-25	-	+50	
Degree of protection	IP 67/IP 69K			
Installation position	Active face opposite read head			
Power supply	Inductive via read head			

EN

11.15. Actuator CES-A-BQA

- Cube-shaped design 50 x 50 mm

Dimension drawing for CES-A-BQA



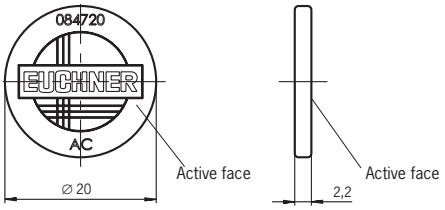
Technical data

Parameter	Value min.	Value typ.	Value max.	Unit
Housing material	Fortron, reinforced thermoplastic, fully encapsulated			
Dimensions	50 x 50 x 20.2			mm
Weight	0.07			kg
Ambient temperature	-25	-	+70	°C
Degree of protection	IP 67			
Installation position	Active face opposite read head			
Power supply	Inductive via read head			

11.16. Actuator CES-A-BDA-20

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

Dimension drawing



Technical data

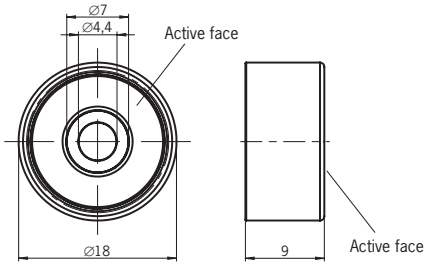
Parameter	Value min.	Value typ.	Value max.	Unit
Housing material		PC plastic		
Dimensions		∅ 20 x 2.2		mm
Weight		0.0008		kg
Ambient temperature	-25	-	+70	°C
Degree of protection		IP 67		
Installation position		Active face opposite read head		
Power supply		Inductive via read head		

EN

11.17. Actuator CES-A-BDA-18

- Round design ∅ 18 mm
- In combination with read head CES-A-LNA…/CES-A-LCA…

Dimension drawing



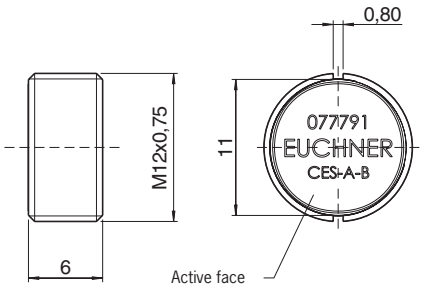
Technical data

Parameter	Value min.	Value typ.	Value max.	Unit
Housing material - Hull - Active face		PBT-GF30, thermoplastic PEEK 450, thermoplastic		
Tightening torque fixing screw		2		Nm
Dimensions		∅ 18 x 9		mm
Weight		0.003		kg
Ambient temperature	-25	-	+70	°C
Degree of protection		IP65/IP67		
Installation position		Active face opposite read head		
Power supply		Inductive via read head		

11.18. Actuator CES-A-BMB

- Cylindrical design M12 x 75
- In combination with read head CES-A-LMN-SC
  (operating distance 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 min.	Value typ.	Value max.	Unit
Housing material	Stainless steel			
Dimensions	M12 x 0.75, depth 6			mm
Weight	0.002			kg
Ambient temperature	-25	-	+85	°C
Degree of protection	IP 67/IP 69/IP 69K			
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 under “Accessories.”

13. Inspection and service

WARNING

Loss of the safety function because of damage to the system.
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 18*)
- Check the secure fastening of the devices and the connections
- Check for soiling
- Check for sealing of the plug connector on the safety switch
- Check for loose cable connections on the plug connector
- Check the switch-off 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 service support 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

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EU-Konformitätserklärung
EU declaration of conformity
Déclaration UE de conformité
Dichiarazione di conformità UE
Declaración UE de conformidad

Original DE
Translation EN
Traduction FR
Traduzione IT
Traducción ES

2077154-34-01/17

Die nachfolgend aufgeführten Produkte sind konform mit den Anforderungen der folgenden Richtlinien (falls zutreffend):
The beneath listed products are in conformity with the requirements of the following directives (if applicable):
Les produits mentionnés ci-dessous sont conformes aux exigences imposées par les directives suivantes (si valable)
I prodotti sotto elencati sono conformi alle direttive sotto riportate (dove applicabili):
Los productos listados a continuación son conforme a los requisitos de las siguientes directivas (si fueran aplicables):

I:	Maschinenrichtlinie	2006/42/EG	
	Machinery directive	*2006/42/EC*	
	Directive Machines	*2006/42/CE*	
	Direttiva Macchine	*2006/42/CE*	
	Directiva de máquinas	*2006/42/CE*	
II:	Funkanlagen-Richtlinie (RTTE / RED)	1999/5/EC bis 2017-06-12	2014/53/EU ab 2017-06-13
	Radio equipment directive	*1999/5/EC until 2017-06-12*	*2014/53/EU from 2017-06-13*
	Directive équipement radioélectrique	*1999/5/CE*	*2014/53/UE*
	Direttiva apparecchiatura radio	*1999/5/CE*	*2014/53/UE*
	Directiva equipo radioeléctrico	*1999/5/CE*	*2014/53/UE*
III:	RoHS Richtlinie	2011/65/EU	
	RoHS directive	*2011/65/EU*	
	Directive de RoHS	*2011/65/UE*	
	Direttiva RoHS	*2011/65/UE*	
	Directiva RoHS	*2011/65/UE*	

Die Schutzziele der Niederspannungsrichtlinie 2014/35/EU und EMV Richtlinie 2014/30/EU werden gemäß Artikel 3.1 der Funkanlagen-Richtlinie eingehalten.
The safety objectives of the Low-voltage directive 2014/35/EU and EMC Directive 2014/30/EU comply with article 3.1 of the Radio equipment directive.
Les objectifs de sécurité de la Directive basse tension 2014/35/UE et Directive de CEM 2014/30/EU sont conformes à l'article 3.1 de la Directive équipement radioélectrique.
Gli obiettivi di sicurezza della Direttiva bassa tensione 2014/35/UE e Direttiva EMV 2014/30/UE sono conformi a quanto riportato nell´articolo 3.1 della Direttiva apparecchiatura radio.
Los objetivos de seguridad de la Directiva de bajo voltaje 2014/35/UE y Directiva CEM 2014/30/UE cumplen con el artículo 3.1 de la Directiva equipo radioeléctrico.

Folgende Normen sind angewandt:
Following standards are used:
Les normes suivantes sont appliquées:
Vengono applicate le seguenti norme:
Se utilizan los siguientes estándares:

a: EN 60947-5-3:2013
b: EN ISO 14119:2013
c: EN 62026-2:2013 (ASi)
d: EN ISO 13849-1:2015
e: EN ISO 13849-2:2012
f: EN 60947-5-2:2007/A1:2012
g: EN 61326-3-1:2008
h: EN 61131-6:2012
i: EN 50581:2012 (RoHS)
j: EN 50364:2010
k: EN 300 330-2 V1.6.1

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EUCHNER GmbH + Co. KG Kohlhammerstraße 16 70771 Leinfelden-Echterdingen Tel. +49/711/7597-0 Fax +49/711/753316 www.euchner.de info@euchner.de

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Bezeichnung der Bauteile *Description of components* *Description des composants* *Descrizione dei componenti* *Descripción de componentes*	**Type** *Type* *Type* *Tipo* *Typo*	**Richtlinie** *Directives* *Directive* *Direttiva* *Directivas*	**Normen** *Standards* *Normes* *Norme* *Estándares*	**Zertifikats-Nr.** *No. of certificate* *Numéro du certificat* *Numero del certificato* *Número del certificado*
Auswertegerät *Safety Unit* *Analyseur* *Centralina* *Unidad de evaluación*	CES-A-ABA-01 CES-A-UBA-01 CES-A-ABA-01B CES-A-UBA-01B	I, II, III	a, b, d, e, i, j, k	ET 15038
	CES-A-AEA-02B CES-A-AEA-04B CES-A-UEA-02B CES-A-UEA-04B	I, II, III	a, b, d, e, i, j, k	ET 15050
	CES-AZ-ABS-01B CES-AZ-UBS-01B	I, II, III	a, b, d, e, i, j, k	ET 15038
	CES-AZ-AES-01B CES-AZ-AES-02B CES-AZ-AES-04B CES-AZ-UES-01B CES-AZ-UES-02B CES-AZ-UES-04B	I, II, III	a, b, d, e, i, j, k	ET 15042
Lesekopf *Read head* *Tête de lecture* *Testina di lettura* *Cabeza lectora*	CES-A-LMN-SC CES-A-LNA-SC CES-A-LNA-xxx CES-A-LCA-xxx CES-A-LQA-SC CES-A-LNN-SC CES-A-LNN-..V-...	I, II, III	a, b, d, e, i, j, k	ET 15038 ET 15050 ET 15042
	CES-A-LSP-SB CES-A-LSP-...	I, II, III	a, b, d, e, i, j, k	ET 15042
	CEM-A-LE05K-S2 CEM-A-LE05R-S2 CEM-A-LH10K-S3 CEM-A-LH10R-S3 CEM-A-LE05K-S1-10V CEM-A-LH10K-S2-10V	I, II, III	a, b, d, e, i, j, k	ET 15038 ET 15050 ET 15042
	CET.-AX-L...	I, II, III	a, b, d, e, i, j, k	ET 13050
Betätiger *Actuator* *Actionneur* *Azionatore* *Actuador*	CES-A-BBA... CES-A-BCA... CES-A-BDA... CES-A-BMB... CES-A-BQA...	I, II, III	a, b, d, e, i, j, k	ET 15038 ET 15050 ET 15042
	CES-A-BSP... CES-A-BBN...	I, II, III	a, b, d, e, i, j, k	ET 15042
	CEM-A-BE05 CEM-A-BH10	I, II, III	a, b, d, e, i, j, k	ET 15038 ET 15050 ET 15042
	CET-A-BW...	I, II, III	a, b, d, e, i, j, k	ET 13050

Benannte Stelle *Notified Body* *Organisme notifié* *Sede indicata* *Entidad citada*	0340 DGUV Test Prüf- und Zertifizierungsstelle Fachausschuss Elektrotechnik Gustav-Heinemann-Ufer 130 50968 Köln - Germany

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Bezeichnung der Bauteile *Description of components* *Description des composants* *Descrizione dei componenti* *Descripción de componentes*	**Type** *Type* *Type* *Tipo* *Typo*	**Richtlinie** *Directives* *Directive* *Direttiva* *Directivas*	**Normen** *Standards* *Normes* *Norma* *Estándares*	**Zertifikats-Nr.** *No. of certificate* *Numéro du certificat* *Numero del certificato* *Número del certificado*
Auswertegerät *Safety Unit*	CES-CB-AC-C-A1	I, II, III	a, b, d, e, g, h, i, j, k	TÜV 01/205/5375.00/14
	CES-AZ-ALS... CES-AZ-AMS...	I, II, III	a, b, d, e, i, j, k	UQS 115948
Analyseur *Centralina* *Unidad de evaluación*	CES-A-F1B-01B-AS1 CES-A-V1B-01B-AS1	I, II, III	a, b, c, d, e, i, j, k	Euchner QS PB 62/2005 TÜV 4478008554376-006
	CEM-A-ME05K-S1 CEM-A-LE05H-S2 CEM-RIBI...	I, II, III	a, b, d, e, i, j, k	Euchner QS PB 22/2005 Euchner QS PB 132/2010 Euchner QS PB 126/2013
	CET1-AX-L... CET2-AX-L...	I, II, III	a, b, d, e, i, j, k	Euchner QS PB 17/2008 Euchner QS PB 23/2008 Euchner QS PB 116/2009 Euchner QS PB 115/2009
Lesekopf *Read head* *Tête de lecture* *Testina di lettura* *Cabeza lectora*	CES-A-LFP...	I, II, III	a, b, d, e, i, j, k	Euchner QS PB 110/2010
Betätiger *Actuator* *Actionneur* *Azionatore* *Actuador*	CES-A-BFP...	I, II, III	a, b, d, e, i, j, k	Euchner QS PB 110/2010
Zubehör *Accessory* *Accessoire* *Accessorio* *Accesorio*	PM-SCL-096945	III	f, i	Euchner QS PB 14 /2006

Genehmigung der umfassenden Qualitätssicherung (UQS) durch die benannte Stelle
Approval of the full quality assurance system by the notified body
Approbation du système d'assurance qualité complet par l'organisme notifié
Approvazione del sistema di garanzia di qualità totale da parte dell'organismo notificato
Aprobación del sistema de aseguramiento de calidad total por parte del organismo notificado

0035
TÜV Rheinland
Industrie Service GmbH
Alboinstr. 56 - 12103 Berlin
Germany

Die alleinige Verantwortung für die Ausstellung dieser Konformitätserklärung trägt der Hersteller:
This declaration of conformity is issued under the sole responsibility of the manufacturer:
La présente déclaration de conformité est établie sous la seule responsabilité du fabricant:
La presente dichiarazione di conformità è rilasciata sotto la responsabilità esclusiva del fabbricante:
La presente declaración de conformidad se expide bajo la exclusiva responsabilidad del fabricante:

EUCHNER GmbH + Co. KG
Kohlhammerstraße 16
70771 Leinfelden-Echterdingen
Germany

Leinfelden, Januar 2017

EUCHNER GmbH + Co. KG
Kohlhammerstraße 16
70771 Leinfelden-Echterdingen
Germany

i.A. Dipl.-Ing. Richard Holz
Leiter Elektronik-Entwicklung
Manager Electronic Development
Responsable Développement Électronique
Direttore Sviluppo Elettronica
Director de desarrollo electrónico

i.A. Dipl.-Ing. (FH) Duc Binh Nguyen
Dokumentationsbevollmächtigter
Documentation manager
Responsable documentation
Responsabilità della documentazione
Agente documenta

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EUCHNER GmbH + Co. KG Kohlhammerstraße 16 70771 Leinfelden-Echterdingen Tel. +49/711/7597-0 Fax +49/711/753316 www.euchner.de info@euchner.de

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

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