Operating instructions
Non-contact safety system
CES-AZ-AES-... (Unicode)

Contents

Correct Use

The **C**oded **E**lectronic **S**afety switches series **CES** are safety devices for monitoring movable safety guards.

In combination with a separating safety guard and the machine control, this safety component prevents dangerous machine movements from occurring while the safety guard is open. A stop command is triggered if the safety guard is opened during the dangerous machine function.

Before safety switches are used, a risk assessment must be performed on the machine in accordance with:

- EN ISO 13849-1, Safety of machinery. Safety related parts of control systems. General principles for design
- EN ISO 14121-1, Safety of machinery. Risk assessment. Principles
- IEC 62061, Safety of machinery – Functional safety of safety-related electrical, electronic and programmable electronic control systems.

Correct use includes compliance with the relevant requirements for installation and operation, in particular

- EN ISO 13849-1, Safety of machinery. Safety related parts of control systems. General principles for design
- EN 1088, Safety of machinery. Interlocking devices associated with guards. Principles for design and selection
- EN 60204-1, Safety of machinery. Electrical equipment of machines. General requirements
- EN 60947-5-3 Specification for low-voltage switchgear and controlgear. Control circuit devices and switching elements. Requirements for proximity devices with defined behavior under fault conditions (PDF)

The following components can be connected to the evaluation unit CES-AZ–AES...:

- 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 the following table *Possible combinations for CES components*.

Important!

- The devices permit a safety-related stop function, initiated by a safety guard according to Table 8 - DIN EN ISO 13849-1: 2008-12.
- **The safety-related function of the PDF is the opening of the output contacts (13/14, 23/24) when the actuator is absent.**
- The user is responsible for safe integration of the device in a safe overall system. For this purpose, the overall system must be validated, e.g. in accordance with EN ISO 13849-2.
- The permissible operating parameters must be observed for correct use (see Technical Data).
- If a product data sheet is included with the product, the information on the data sheet applies in case of discrepancies with the operating instructions.
- Only components may be used that are permissible in accordance with the table below.

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** 084720	**CES-A-BMB** 077791	**CEM-A-BE05** 094805	**CEM-A-BH10** 095175	**CET-A-BWK-50X** 096327	**CKS-A-BK1...** CKS key
CES-AZ-AES-01B 104770 **CES-AZ-AES-02B** 104775 **CES-AZ-AES-04B** 104780 **CES-AZ-UES-01B** 105139 **CES-AZ-UES-02B** 105140 **CES-AZ-UES-04B** 105141	**CES-A-LSP-...** All items	20											
	CES-A-LNN-... All items		15	19									
	CES-A-LCA-... All items				15	15		16					
	CES-A-LNA-... All items				15	15		16					
	CES-A-LQA-SC 095650				15	15	23						
	CES-A-LMN-SC 077790								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												
CES-AZ-AES-01B 104770 **CES-AZ-AES-02B** 104775 **CES-AZ-AES-04B** 104780	**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

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.

General Safety Instructions

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

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

Check the safe function of the safety guard particularly

- after any setup work
- after the replacement of a CES component
- after an extended period without use
- after every fault

Independent of these checks, the safe function of the safety guard should be checked at suitable intervals as part of the maintenance schedule.

Warning!

Danger of fatal injury in the event of incorrect connection or incorrect use.
- Safety switches must not be bypassed (bridging of contacts), turned away, removed or otherwise rendered ineffective.
  On this topic pay attention in particular to the measures for reducing the possibility of bypassing from EN 1088:1995+A2:2008, section 5.7.

The device is only allowed to be installed and placed in operation by authorized personnel
- who are familiar with the correct handling of safety components
- who are familiar with the applicable EMC regulations
- who are familiar with the applicable regulations on health and safety
- who have read and understood the operating instructions.

Important!

Prior to use, read the operating instructions and keep these in a safe place. Ensure that the operating instructions are always available during mounting, setup and servicing work. 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.de.

Function

The safety system CES-AZ-AES... complies with the following safety requirements:

- Category 4, PLe according to EN ISO 13849-1
- Proximity device with self-monitoring type PDF-M according to EN 60947-5-3.
- Redundant design of the circuit in the evaluation unit with self-monitoring. As a result, the safety system is still effective even if a component fails.
- When the safety guard is opened and closed, it is checked whether the safety system relays open and close correctly.

The **CES** non-contact 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-AES-01B ➡ 1 read head

CES-AZ-AES-02B ➡ 2 read heads

CES-AZ-AES-04B ➡ 4 read heads

It is also possible to connect a start button (monitoring of the falling edge) and a feedback loop for monitoring external relays and contactors.

The individual configuration is defined by a setup procedure.

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 screened cable.

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 bit pattern read is compared with the code saved in the evaluation unit. If the data match, the door monitoring output 01 or 01...02 or 01...04 (semiconductor output) on the related read head is set HIGH. If all data for all read heads activated match, the safety outputs (relay outputs) 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 release 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 two safety outputs, the evaluation unit will enter the safe state with every detectable fault.

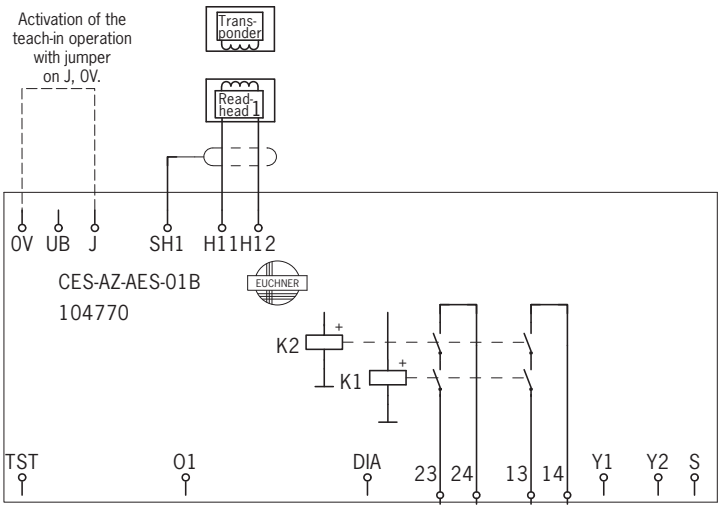
When a safety guard is opened, the safety outputs switch off the safety circuit and the OUT LED goes out. The state of the safety outputs is monitored internally by positively driven NC contacts (relay output).

Independent of the switching state of the safety circuit, the position of all safety doors can be polled via the outputs 01 or 01...02 or 01...04.

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

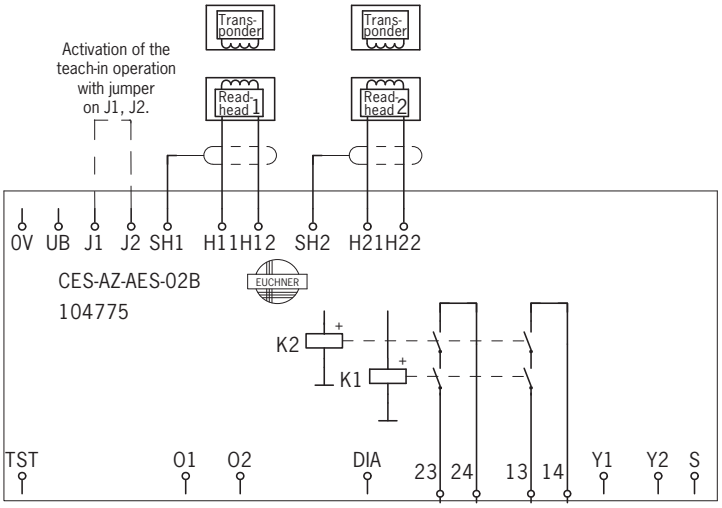
Block diagram CES-AZ-AES-...

CES-AZ-AES-01B



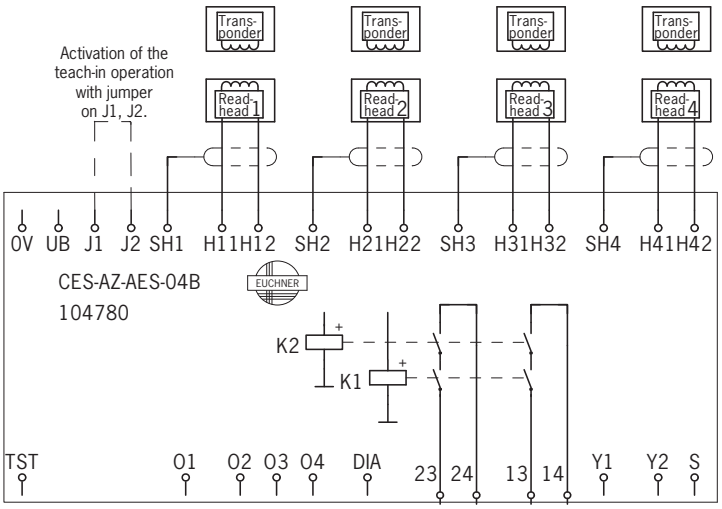
UB, 0V	Power supply
J, 0V	Jumper for teach-in operation
H11/H12	Connection for read head 1
SH1	Screen read head 1
TST	Test input (see *„Self-test with test input TST“ page 16)*
O1	Semiconductor monitoring output
DIA	Diagnostics output
13, 14	Connection for relay contact A, safety relay enable
23, 24	Connection for relay contact B, safety relay enable
Y1, Y2	Feedback loop
S	Connection for start button (monitoring of the falling edge)

CES-AZ-AES-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	Screen read heads 1 and 2
TST	Test input (see *„Self-test with test input TST“ page 16)*
O1, O2	Semiconductor monitoring outputs
DIA	Diagnostics 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	Connection for start button (monitoring of the falling edge)

CES-AZ-AES-04B



UB, 0V	Power supply
J1, J2	Jumper for teach-in operation
H11/H12...H41/H42	Connection for read heads 1..0.4
SH1...SH4	Screen read heads 1...4
TST	Test input (see *„Self-test with test input TST“ page 16)*
O1...O4	Semiconductor monitoring outputs
DIA	Diagnostics 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	Connection for start button (monitoring of the falling edge)

Installation

Caution!

Safety switches must not be bypassed (bridging of contacts), 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 1088:1995.A2:2008, sec. 5.7.
- 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 standard rails.
- 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.
  The distance enables heat from the evaluation unit to dissipate.

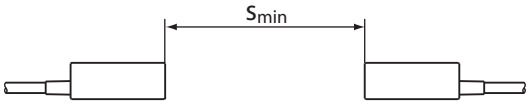
Caution!

Risk of damage to equipment as a result of incorrect installation. Read heads or actuators must not be used as a mechanical end stop.

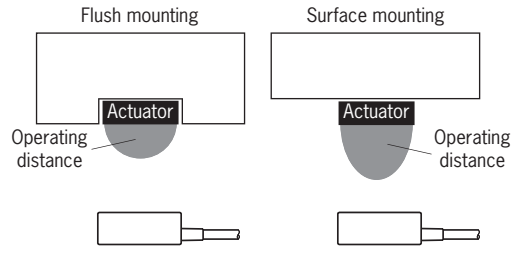
- Fit an additional end stop for the movable part of the safety guard.

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



- 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 easily accessible for inspection and replacement.
- The switching operation must only be triggered by the specific actuator designated for this purpose.
- 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 (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.
  - when the safety guard is open up to the distance S_{ar} (assured switch-off distance), a hazard is excluded.
  - 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.

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 connection cables with protection to prevent the risk of short circuits.

Caution!

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 IEC 61558-2-6 with limited output voltage in the event of a fault, or by other equivalent isolation measures.
- For use and operation as per the cULus requirements, a power supply with the feature "for use in class 2 circuits" must be used. The same requirement applies to the safety outputs.
  Alternative solutions must comply with the following requirements:
  a) Electrically isolated power supply unit with a max. open-circuit voltage of 30 V/DC and a limited current of max. 8 A.
  b) Electrically isolated power supply unit in combination with fuse as per UL248. This fuse should be designed for max. 3.3 A and should be integrated into the 30 V/DC voltage section.
- 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.
- Use cable material made of copper with a temperature resistance of at least 75 °C.
- 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 only be extended using EUCHNER plug connectors and adequate consideration must be given to EMC. Intermediate terminals must not be used.
- The screen 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).

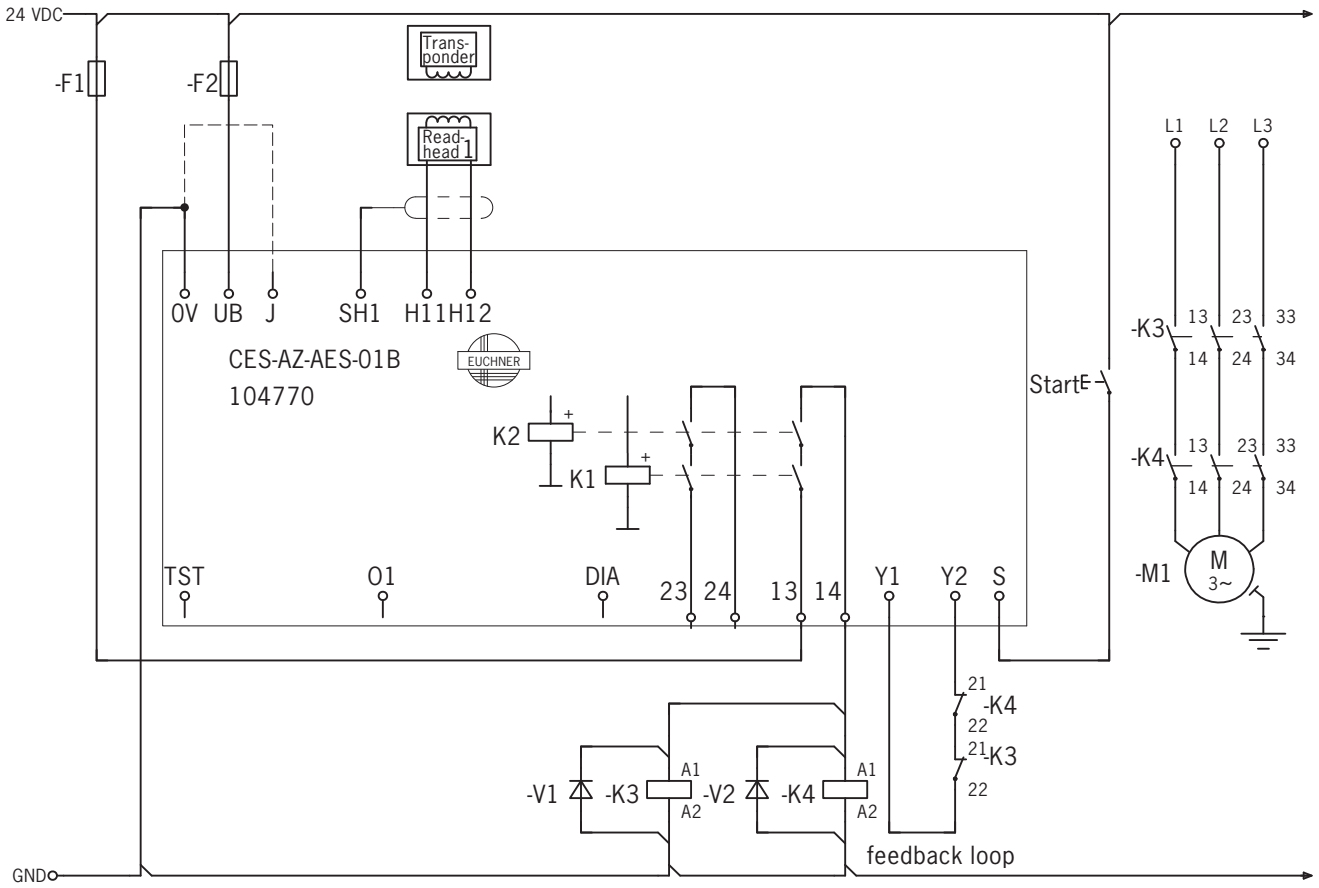
Safety in case of faults

- 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.

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 before terminal U_B.

Connection example CES-AZ-AES-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 in the overall system.

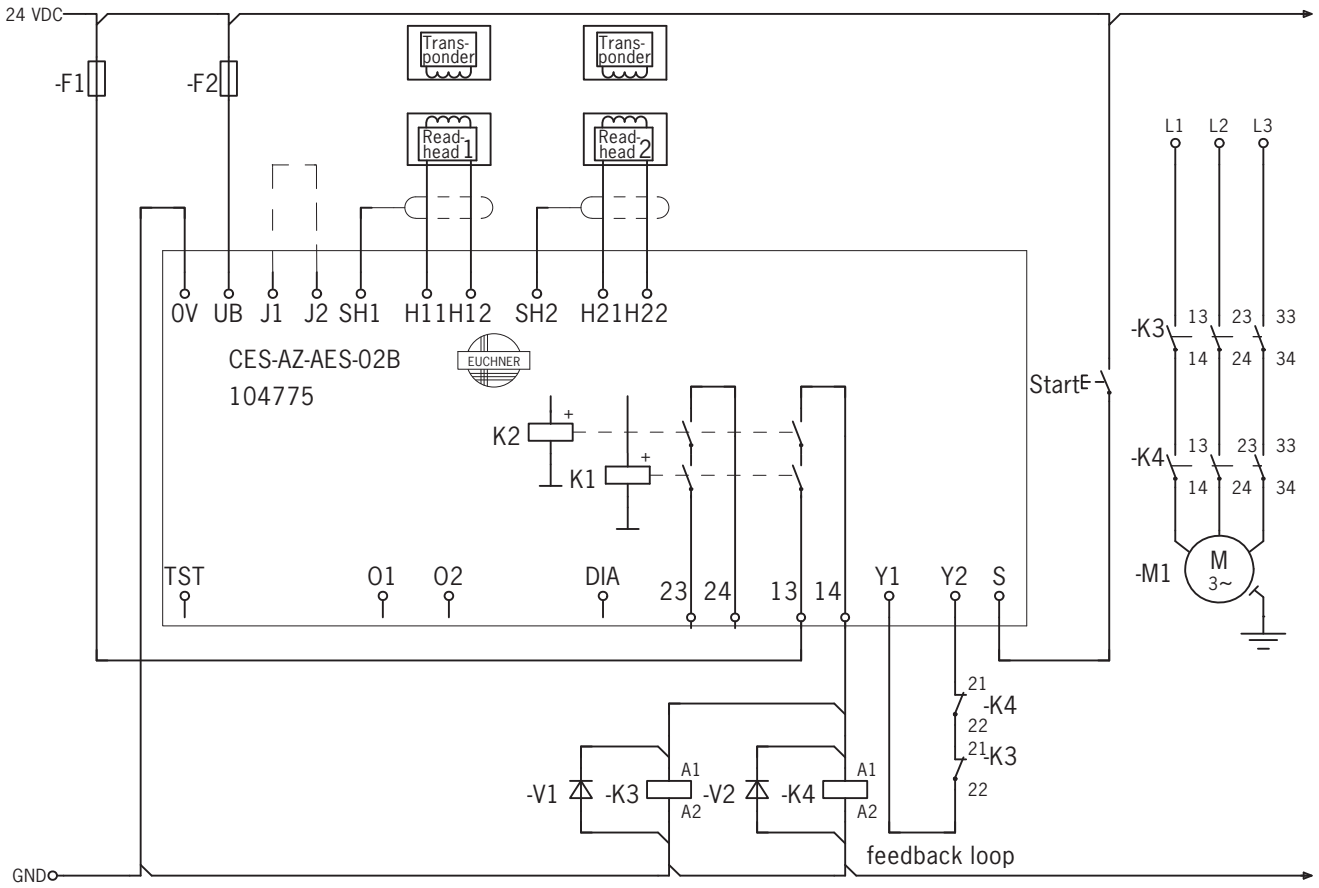
If only one enable path is to be used for control (e. g. of downstream contactors), failures involving a short circuit between the contacts on the enable path and, for example, the power supply must be excluded.

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).

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 in the overall system.

Connection example CES-AZ-AES-02B



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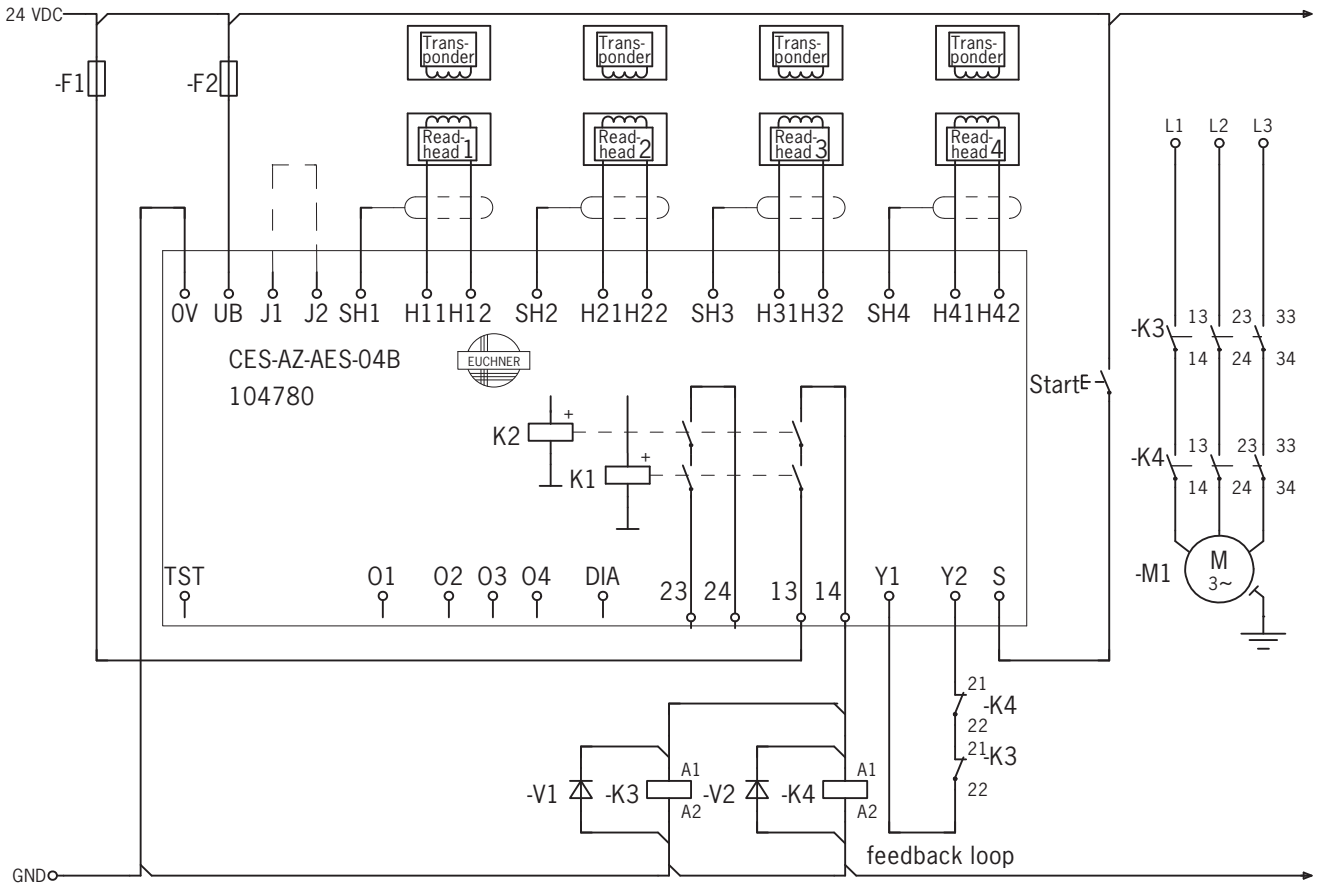
Connection example CES-AZ-AES-04B



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Commissioning

LED indicators

STATE	LED green	State display (multifunction display using flashing modes)
OUT	LED yellow	Safety circuit closed
DIA	LED red	- Operating error or - External fault (fault in the feedback loop) or - Teach-in process not valid or - Internal device fault or - TST input activated (function test active)

Teach-in operation

Before the system forms a function unit, the parameters are set in the evaluation unit in 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). In this process, the read heads are activated and the actuator code is learned.

These configuration parameters are saved in the non-volatile memory in the evaluation unit.

The safety outputs are open during the teach-in operation. The system is in a safe state.

Important!

- During the teach-in operation the following conditions must be met:
  - There must be no state change, e.g. opening a safety guard or closing a further safety guard or a change in the signal on the terminals for the start button and the feedback circuit.
  - 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 3 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-AES-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 connected	Read head connected to terminals H11, H12, SH1 connected
2	No read head connected to terminals H21, H22, SH2 connected	Read head connected to terminals H21, H22, SH2 connected
3	No read head connected to terminals H31, H32, SH3 connected	Read head connected to terminals H31, H32, SH3 connected
4	No read head connected to terminals H41, H42, SH4 connected	Read head connected to terminals H41, H42, SH4 connected
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 loop** 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 acknowledgement 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-AES-01B between J and 0V)
   - For **Manual start** operating mode: Start button must be connected
   - For **With feedback loop** operating mode: Feedback loop must be connected
   - Press reset button or 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

Changing the configuration / new actuator

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.

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 lights up continuously.
  The OUT and ERROR 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 lights up continuously; the OUT and ERROR LEDs do not light up.

Repeat steps 2-4 for each safety guard.

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 (sec. 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 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 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 HIGH as a monitoring function.

When the test input TST is reset, the evaluation unit resets the diagnostic output DIA to LOW, 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, test input TST must be reconnected to 0 V or disconnected.

System Status Table

Operating mode	LED			State
	STATE (green)	OUT (yellow)	DIA (red)	
Commissioning	4 Hz	○	○	Initial setup after delivery without jumper connected to J1, J2 or J, 0V.
	1 Hz	○	○	Teach-in operation
	○	○	○	Acknowledgement 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 inadmissible range or excessively high external interference (EMC)
Operating fault	3 x	○	☀	Configuration fault: **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 teach-in 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 when the evaluation unit was started.

Key to symbols	N	0 Volt or not connected
	1	24 Volt
	0	0 Volt
	○	LED is not lit
	☀	LED is lit
	15 Hz (10 s)	LED flashes for 10 seconds with 15 Hz
	3 x + ☀	LED flashes three times and then lights up continuously
	3 x	LED flashes three times, and this is then repeated
	X	Any state

Important!

If you cannot find the displayed device status in the system status table, this indicates that there is an internal device fault. In this case, you should contact the manufacturer.

Note!

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

Technical Data

Approvals

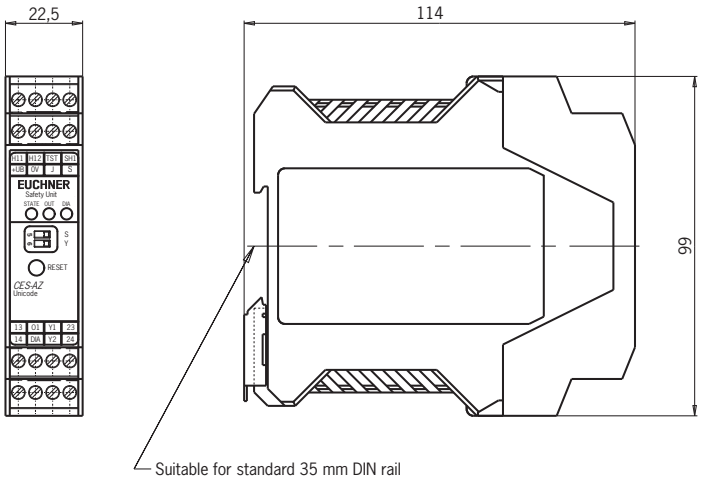
Evaluation unit CES-AZ-AES-01B

- Housing for DIN rail mounting, IP 20
- Relay output
- 1 read head can be connected

Important:

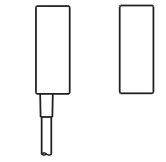
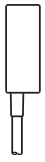
The plug-in screw terminals are not included (see page 48 Ordering information and accessories).

Dimension drawing



Switching characteristics

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

Safety guard	
Closed (actuator detected)	Open (actuator not in the operating distance)
Read head Actuator	Read head
	
13—14	13—14
23—24	23—24
24 V—01	24 V—01

Technical Data CES-AZ-AES-01B

Parameter	Value min.	Value typ.	Value max.	Unit
Housing material		Plastic PA6.6		
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		
Installation		DIN rail 35 mm according to EN 60715		
Number of read heads		1 read head per evaluation unit		
Connection (plug-in screw terminals/coded)	0.14	-	2.5	mm^2
Operating voltage U_B (regulated, residual ripple < 5 %)	21	24	27	V DC
For the approval according to cULus the following applies		Operation only with UL Class 2 power supply, 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	-	4000	
- At switching voltage AC 5 ... 230 V (160 V ATEX)	10	-	2000	
Switching load according to cULus		Max. AC 30 V, class 2 / max. DC 60 V, class 2		
External fuse (safety circuit) according to EN 60269-1		6 A gG or 6 A circuit breaker (characteristic B or C)		
Utilization category to EN 60947-5-1		AC-12 60V 0.3A / DC-12 60V 0.3A AC-12 30V 4A / DC-12 30V 4A AC-15 230V 2A / DC-13 24V 3A		
Classification according to EN 60947-5-3		PDF-M		
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		In acc. with EN 60947-5-2		
Mechanical operating cycles (relays)		10×10^6		
Switching delay from state change [2]	-	-	210	ms
Time difference (between the switching points of the two 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 according to EN IEC 60947-5-3		≤ 10		%
Monitoring outputs (diagnostics DIA, door monitoring output O1, semiconductor output, p-switching, short-circuit protected)				
- Output voltage	0.8 x U_B	-	U_B	V DC
- 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		In acc. with EN 60947-5-3		
Reliability figures according 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	

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 contact is set LOW 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 circuit is closed.

Evaluation unit CES-AZ-AES-02B

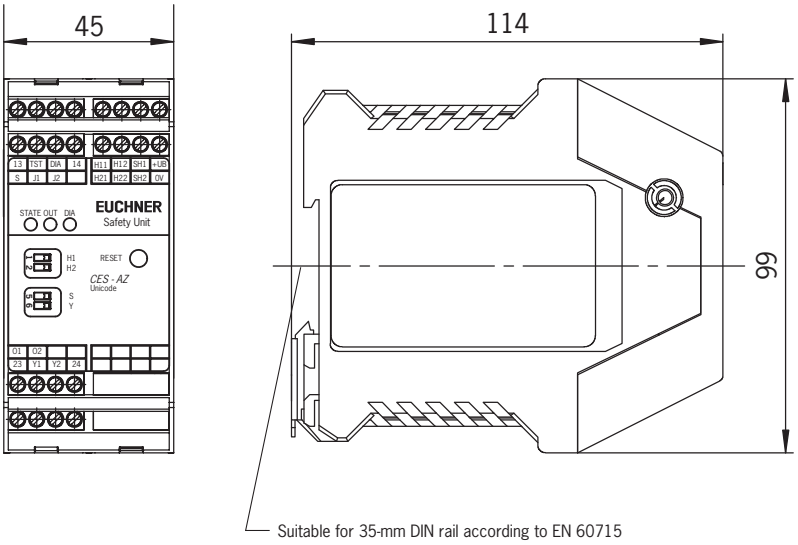
Approvals

- Housing for DIN rail mounting, IP 20
- Relay output
- 2 read heads can be connected

Dimension drawing

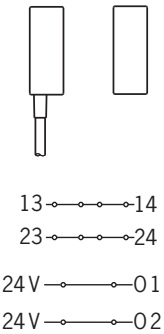
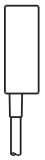
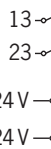
Important:

The plug-in screw terminals are not included (see page 48 Ordering information and accessories).



Switching characteristics

- 2 safety outputs with 2 NO contacts each (relay outputs)
- 2 door monitoring outputs (semiconductor outputs, 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
	
	
13 — 14 23 — 24 24 V — 01 24 V — 02	13 — 14 23 — 24 24 V — 01 24 V — 02

Technical Data CES-AZ-AES-02B

Parameter	Value min.	Value typ.	Value max.	Unit
Housing material		Plastic PA6.6		
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		
Installation		DIN rail 35 mm according to EN 60715		
Number of read heads		Max. 2 read heads per evaluation unit		
Connection (plug-in screw terminals/coded)	0.14	-	2.5	mm^2
Operating voltage U_B (regulated, residual ripple < 5 %)	21	24	27	V DC
For the approval according to cULus the following applies		Operation only with UL Class 2 power supply, or equivalent measures		
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	-	6000	
- At switching voltage AC 5 ... 230 V	10	-	2000	
Switching load according to cULus		Max. AC 30 V, class 2 / max. DC 60 V, class 2		
External fuse (safety circuit) according to EN 60269-1		6 A gG or 6 A circuit breaker (characteristic B or C)		
Utilization category 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		
Classification according to EN 60947-5-3		PDF-M		
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		In acc. with EN 60947-5-2		
Mechanical operating cycles (relays)		10×10^6		
Switching delay from state change [2]				ms
- 2 activated actuators	-	-	290	
- 1 activated actuator	-	-	210	
Time difference between the switching points of the two relays (with 2 activated actuators)	-	-	25	ms
Manual start operating mode				ms
- Duration of operation of start button	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 according to EN IEC 60947-5-3		≤ 10		%
Monitoring outputs (diagnostics DIA, release 01...02, semi-conductor output, p-switching, short circuit-protected)				
- Output voltage	0.8 x U_B	-	U_B	V DC
- 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		In acc. with EN 60947-5-3		
Reliability figures according 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	

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 LOW 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 circuit is closed.

Evaluation unit CES-AZ-AES-04B

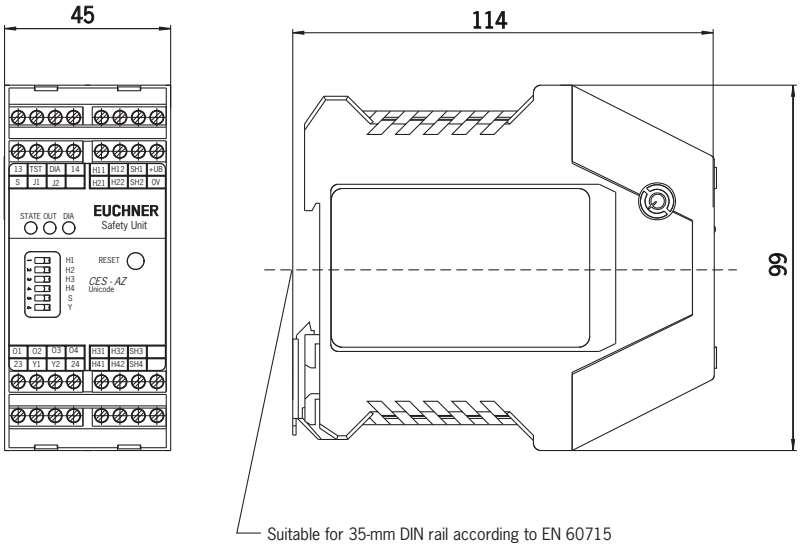
Approvals

- Housing for DIN rail mounting, IP 20
- Relay output
- 4 read heads can be connected

Dimension drawing

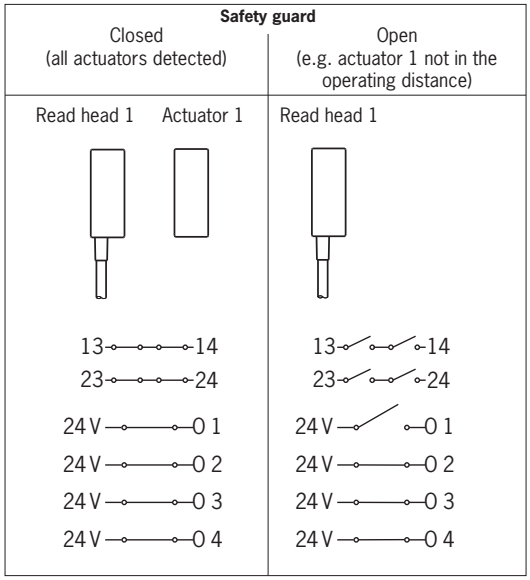
Important:

The plug-in screw terminals are not included (see page 48 Ordering information and accessories).



Switching characteristics

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



Technical Data CES-AZ-AES-04B

Parameter	Value min.	Value typ.	Value max.	Unit
Housing material		Plastic PA6.6		
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		
Installation		DIN rail 35 mm according to EN 60715		
Number of read heads		Max. 4 read heads per evaluation unit		
Connection (plug-in screw terminals/coded)	0.14	-	2.5	mm^2
Operating voltage U_B (regulated, residual ripple < 5 %)	21	24	27	V DC
For the approval according to cULus the following applies		Operation only with UL Class 2 power supply, or equivalent measures		
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)				
- At switching voltage AC/DC 21 ... 60 V	1	-	300	mA
- At switching voltage AC/DC 5 ... 30 V	10	-	6000	
- At switching voltage AC 5 ... 230 V	10	-	2000	
Switching load according to cULus		Max. AC 30 V, class 2 / max. DC 60 V, class 2		
External fuse (safety circuit) according to EN 60269-1		6 A gG or 6 A circuit breaker (characteristic B or C)		
Utilization category 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		
Classification according to EN 60947-5-3		PDF-M		
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		In acc. with EN 60947-5-2		
Mechanical operating cycles (relays)		10×10^6		
Switching delay from state change [2]				
- 4 activated actuators	-	-	450	ms
- 3 activated actuators	-	-	370	
- 2 activated actuators	-	-	290	
- 1 activated actuator	-	-	210	
Time difference between the switching points of the two relays (with 4 activated actuators)	-	-	25	ms
Manual start operating mode				
- Duration of operation of start button	250	-	-	ms
- 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 according to EN IEC 60947-5-3		≤ 10		%
Monitoring outputs (diagnostics DIA, release 01...02, semi-conductor output, p-switching, short circuit-protected)				
- Output voltage	0.8 x U_B	-	U_B	V DC
- 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		In acc. with EN 60947-5-3		
Reliability figures according 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	

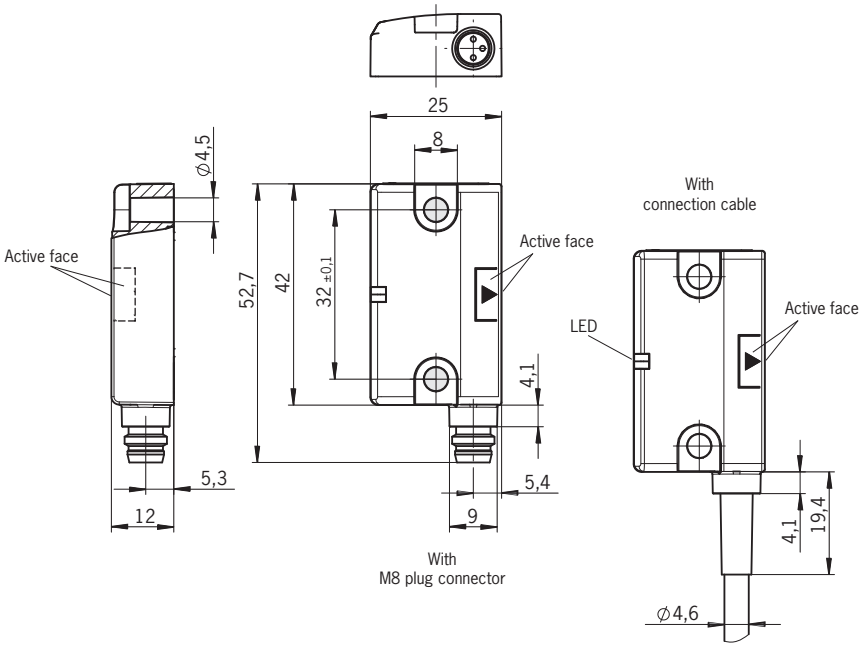
1) Without taking into account the load currents on the monitoring outputs.
2) Corresponds to the risk time according to EN 60947-5-3. This is the maximum switch-off delay for the safety outputs following removal of the actuator. In case of EMC interference in excess of the requirements in accordance 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 LOW 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 circuit is closed.

Read head CES-A-LNN-...

Approvals

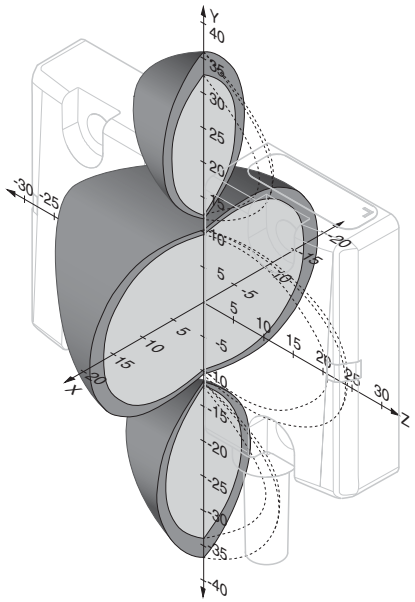
- Cube-shaped design 42 x 25 mm
- Attachment compatible with series CES-A-LNA/LCA
- LED for the indication of the door position

Dimension drawing



Typical operating distance

With evaluation unit CES-AZ-AES-... and actuator CES-A-BBN

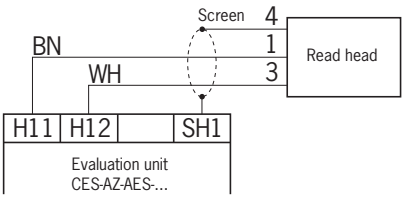


Note

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.

Pin 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		IP67			
Installation position		Any			
Method of operation		Inductive			
Power supply		Via evaluation unit			
Connection type		M8 plug connector, 3-pin or connection cable			
LED display		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	-	-	80	
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	-	
Conductor length		See ordering table		25	m

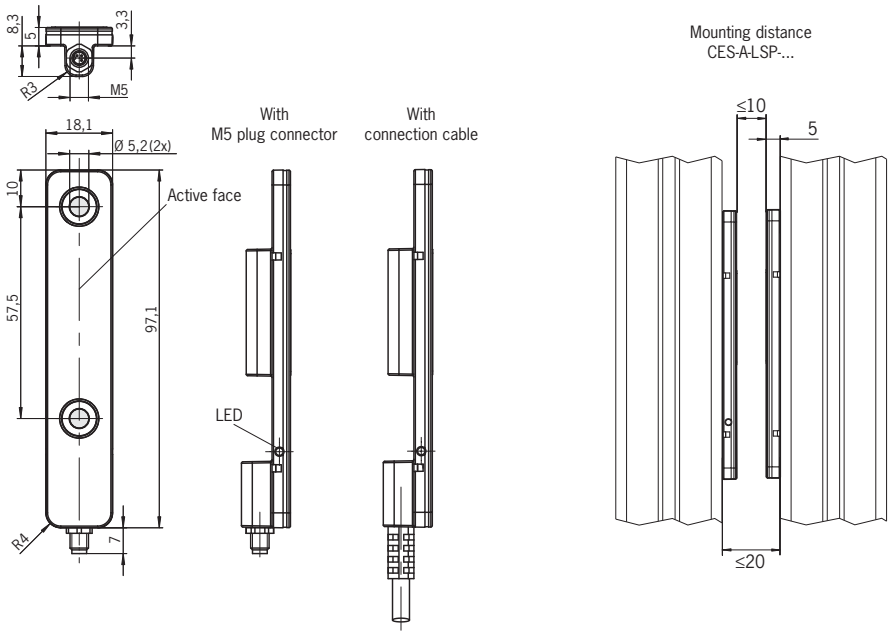
1) These values apply for the surface installation of the read head and the actuator.

Read head CES-A-LSP-...

Approvals

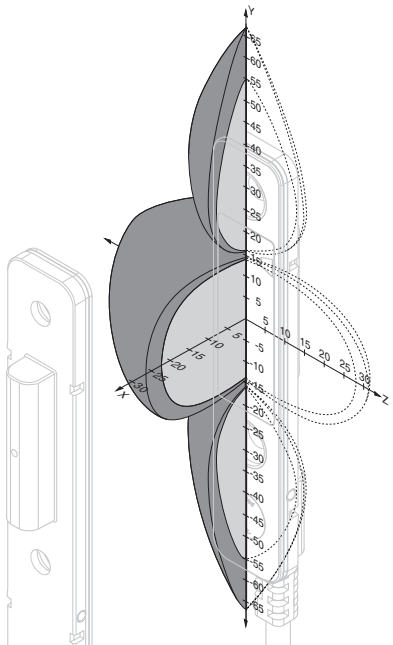
- Optimized for aluminum profile mounting
- LED for the indication of the door position

Dimension drawing



Typical operating distance

With evaluation unit CES-AZ-AES-... and actuator CES-A-BSP

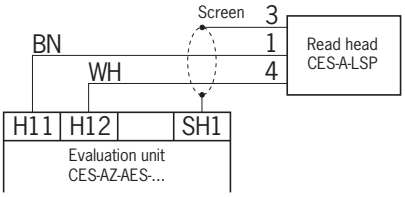


Note

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.

Pin assignment

Read head with connection cable



Technical Data

Parameter	Value			Unit
	min.	typ.	max.	
Housing material	Reinforced thermoplastic, fully encapsulated			
Weight (without connection cable)	0.02			kg
Ambient temperature	-25	-	+70	°C
Degree of protection	IP67			
Installation position	Any			
Method of operation	Inductive			
Power supply	Via evaluation unit			
Connection type	M5 plug connector, 3-pin			
LED display	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	-	
Conductor length	See ordering table		25	m

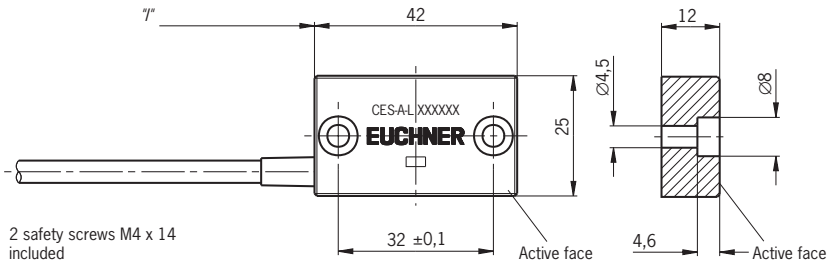
1) These values apply for the installation of the read head and the actuator in an aluminum profile 45 x 45 mm.

Read head CES-A-LNA-...

Approvals

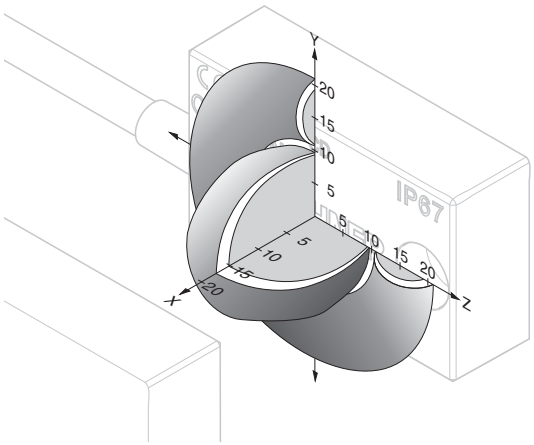
- Cube-shaped design 42 x 25 mm
- Hard-wired cable

Dimension drawing



Typical operating distance

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

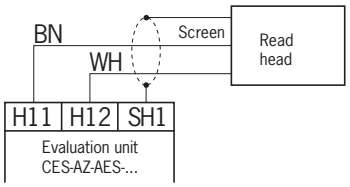


Note

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.

Pin 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	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-A-AEA...				
Assured switch-off distance S_{ar}	-	-	32	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 with lateral approach direction	-	3	-	
In combination with actuator CES-A-BDA				
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 with lateral approach direction	-	4	-	
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

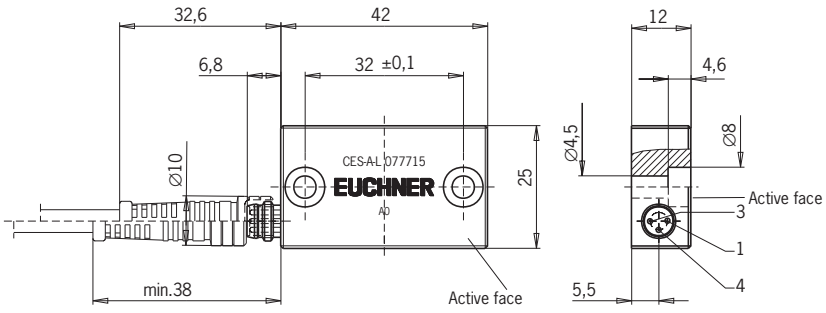
1) These values apply to non-flush installation of the read head and actuator.
2) These values apply to metal-free surrounding material. Other materials on request.

Read head CES-A-LNA-SC

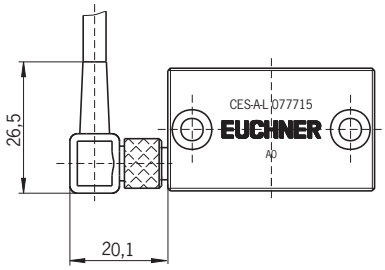
Approvals

- Cube-shaped design 42 x 25 mm
- M8 plug connector (snap-action and screw terminals)

Dimension drawing



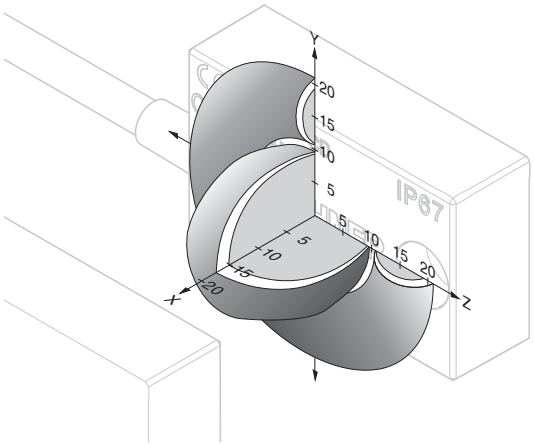
2 safety screws M4 x 14
included



Cable outlet with
angled connector

Typical operating distance

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

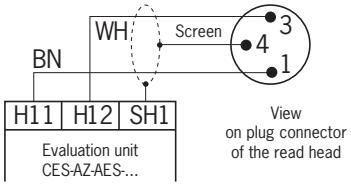


Note

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.

Pin 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	IP67/IP69K			
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}	-	-	32	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 with lateral approach direction	-	3	-	
In combination with actuator CES-A-BDA				
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 with lateral approach direction	-	4	-	
Connection	M8 plug connector (snap-action and screw terminals), 3-pin			
Connection cable	-	-	25	m

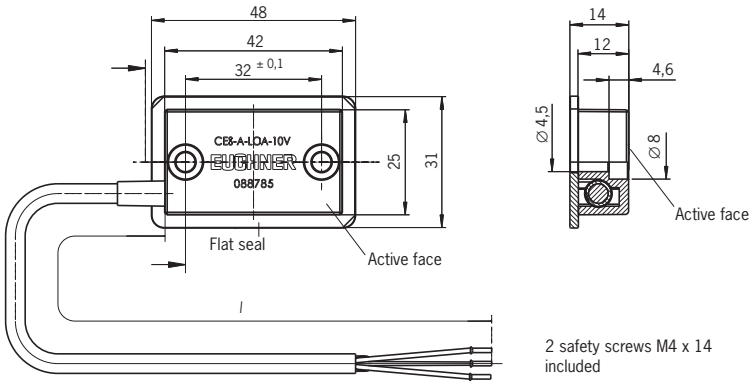
1) These values apply to non-flush installation of the read head and actuator.
2) These values apply to metal-free surrounding material. Other materials on request.

Read head CES-A-LCA-...

Approvals

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

Dimension drawing

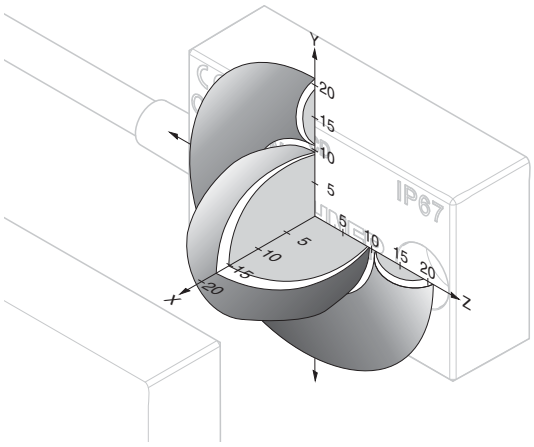


Note

The flat seal provided must be used during assembly.

Typical operating distance

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

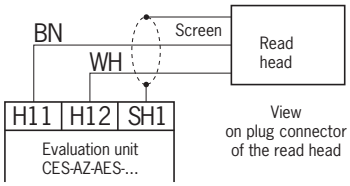


Note

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.

Pin assignment

Read head with connection cable



Technical Data

Parameter	Value			Unit
	min.	typ.	max.	
Housing material	Plastic PE-HD 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	IP67/IP69K			
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}	-	-	32	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 with lateral approach direction	-	3	-	
In combination with actuator CES-A-BDA				
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 with lateral approach direction	-	4	-	
Connection cable	Hard-wired encapsulated connection cable, with crimped ferrules PVC, ∅ 4.6 mm			
Cable length	-	-	25	m

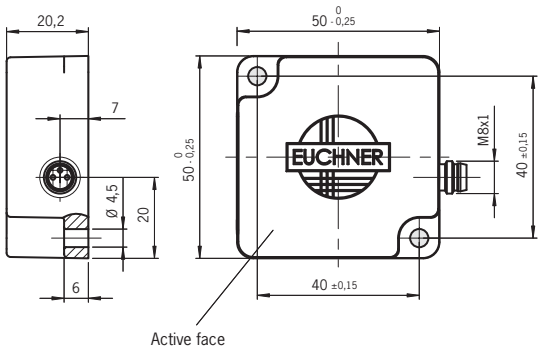
1) These values apply to non-flush installation of the read head and actuator.
2) These values apply to metal-free surrounding material. Other materials on request.

Read head CES-A-LQA-SC

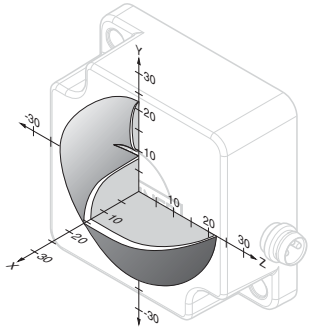
Approvals

- Cube-shaped design 50 x 50 mm
- M8 plug connector (snap-action and screw terminals)

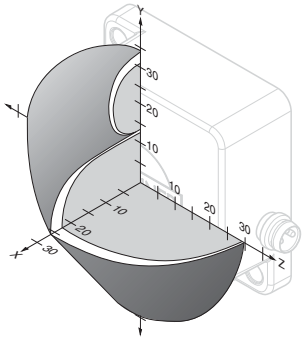
Dimension drawing



Typical operating distance



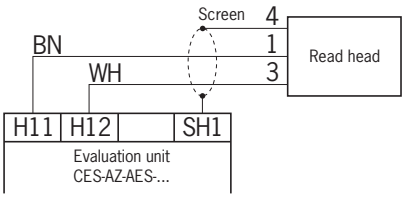
With actuator CES-A-BBA or CES-A-BCA



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

Pin 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	IP67			
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

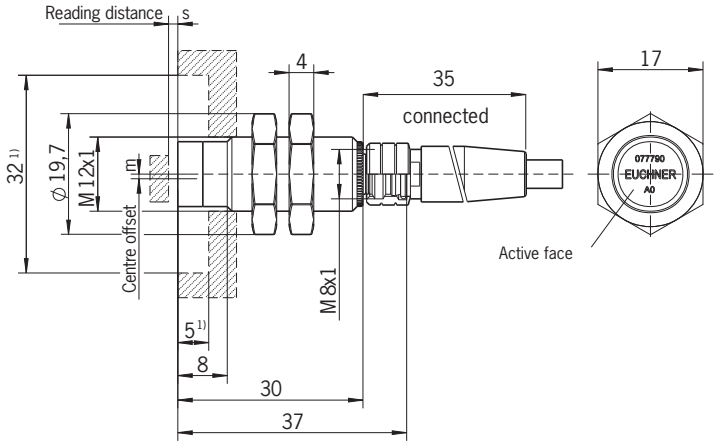
1) These values apply for surface installation of the read head and the actuator.

Read head CES-A-LMN-SC

Approvals

- Cylindrical design M12
- M8 plug connector (snap-action and screw terminals)

Dimension drawing



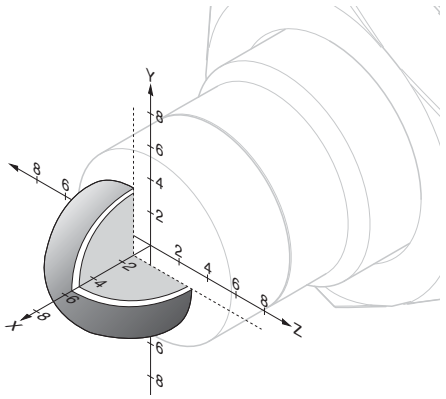
1) Clear zone (area of the active face without metal housing)

Note

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-AES-... and actuator CES-A-BMB

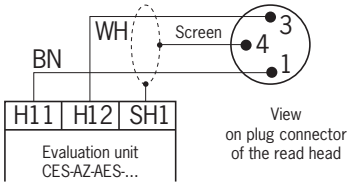


Note

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

Pin assignment

Read head with plug connector



Technical Data

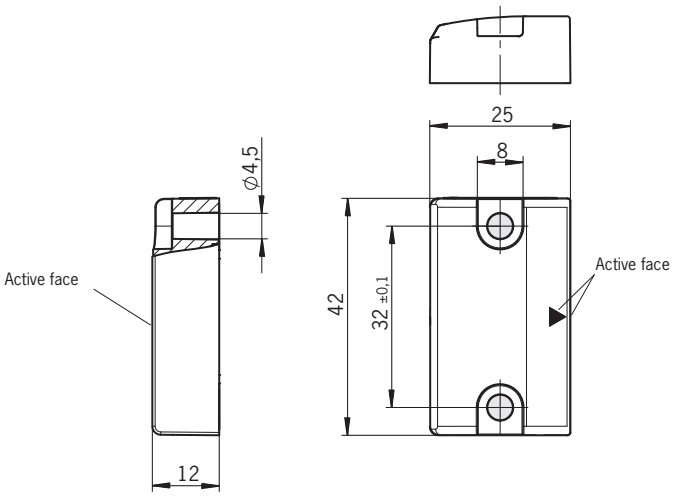
Parameter	Value			Unit
	min.	typ.	max.	
Housing material	Nickel-plated CuZn housing sleeve Plastic PBT GF20 cap			
Dimensions	M12 x 1, length 38			mm
Weight (incl. 10 m cable)	0.2			kg
Ambient temperature	-25	-	+70	°C
Ambient pressure (only of active face in installed condition)	-	-	10	bar
Degree of protection	IP67			
Installation position	Any			
Method of operation	Inductive			
Power supply	Via evaluation unit			
In combination with actuator CES-A-BMB on evaluation unit CES-AZ-AES-04B				
Assured switch-off distance S_{ar}	-	-	10	mm
Operating distance for center offset m = 0 [1]				
- Switch-on distance	-	5	-	
- Assured switch-on distance S_{ao}	3.5	-	-	
- Switching hysteresis	0.1	0.3	-	
Connection	M8 plug connector (snap-action and screw terminals), 3-pin			
Connection cable	-	-	15	m

1) These values apply for surface installation of the read head in steel.

Actuator CES-A-BBN

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

Dimension drawing CES-A-BBN



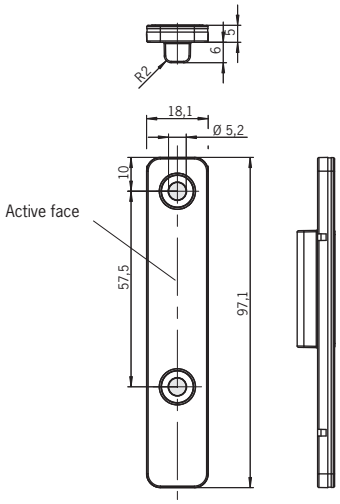
Technical Data

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	IP67			
Installation position	Active face opposite read head			
Power supply	Inductive via read head			

Actuator CES-A-BSP

- Optimized for aluminum profile mounting

Dimension drawing CES-A-BSP



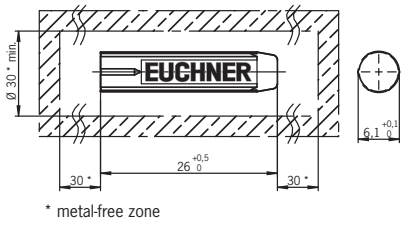
Technical Data

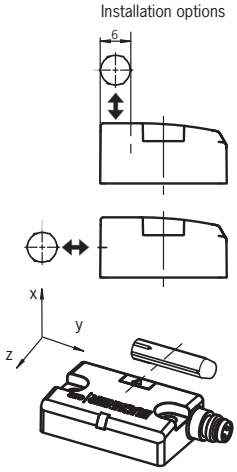
Parameter	Value			Unit
	min.	typ.	max.	
Housing material		Reinforced thermoplastic, fully encapsulated		
Weight		0.02		kg
Ambient temperature	-25	-	+70	°C
Degree of protection		IP67		
Installation position		Active face opposite read head		
Power supply		Inductive via read head		

Actuator CES-A-BDN-06

- Cylindrical design ∅ 6 mm

Dimension drawing CES-A-BDN-06





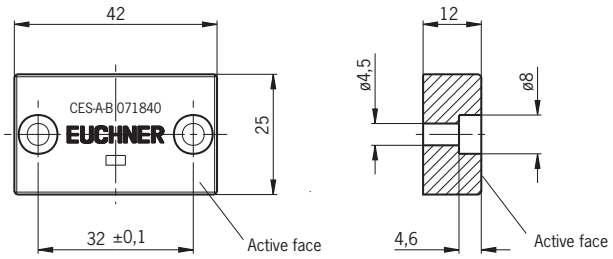
Technical Data

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	IP67			
Installation position	Active face opposite read head			
Power supply	Inductive via read head			

Actuator CES-A-BBA/CES-A-BCA

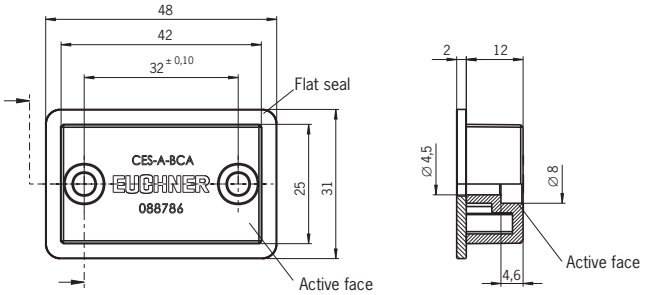
- Cube-shaped design 42 x 25 mm
- CES-A-BCA suitable for use in aggressive media (e.g. acids, alkalis)
- In combination with read head CES-A-LNA.../CES-A-LCA...

Dimension drawing CES-A-BBA



2 safety screws M4 x 14 included

Dimension drawing CES-A-BCA



2 safety screws M4 x 14 included

Note

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

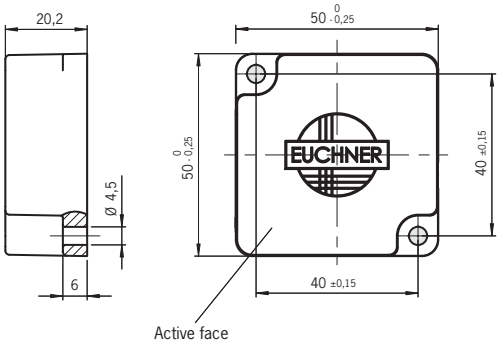
Technical Data

Parameter	Value min.	Value typ.	Value max.	Unit
Housing material - CES-A-BBA	Fortron, reinforced thermoplastic, fully encapsulated			
- CES-A-BCA	Plastic PE-HD 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	IP67/IP69K			
Installation position	Active face opposite read head			
Power supply	Inductive via read head			

Actuator CES-A-BQA

- Cube-shaped design 50 x 50 mm

Dimension drawing CES-A-BQA



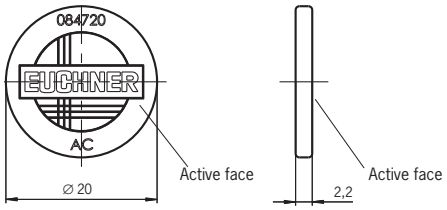
Technical Data

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	IP67			
Installation position	Active face opposite read head			
Power supply	Inductive via read head			

Actuator CES-A-BDA

- 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		Plastic PC		
Dimensions		∅ 20 x 2.2		mm
Weight		0.0008		kg
Ambient temperature	-25	-	+70	°C
Degree of protection		IP67		
Installation position		Active face opposite read head		
Power supply		Inductive via read head		

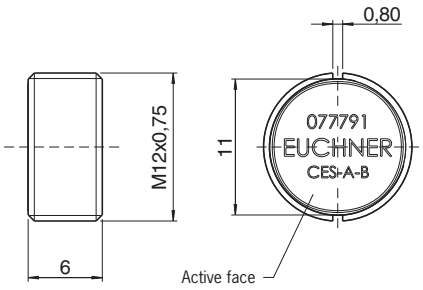
Ordering table

Series	Version/Comment	Order no./item
CES-A-BDA	-	**084720** CES-A-BDA-20

Actuator CES-A-BMB

- Cylindrical design M12 x 75
- In combination with read head CES-A-LMN-SC
  (with read head CES-A-LNA.../LCA... operating distance on request)

Dimension drawing



Notes

- 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 allowed.

Technical Data

Parameter	Value			Unit
	min.	typ.	max.	
Housing material		Stainless steel		
Dimensions		M12 x 0.75, depth 6		mm
Weight		0.002		kg
Ambient temperature	-25	-	+70	°C
Degree of protection		IP67		
Installation position		Active face opposite read head		
Power supply		Inductive via read head		

Ordering Information and Accessories

Evaluation units

Series	Category according to EN ISO 13849-1	Typ. switch-on distance [mm]	Number of read heads	Order no. / item
CES-AZ-AES...	4	15	1	**104770** CES-AZ-AES-01B
			2	**104775** CES-AZ-AES-02B
			4	**104780** CES-AZ-AES-04B

Important: The plug-in screw terminals are not included.

Read heads

Series	Cable/connection type	Cable length "*l*" [m]	Order no. / item
CES-A-LNN-...	**V** Cable PVC	5	**106602** CES-A-LNN-05V-106602
	SC M8 plug connector	-	**106601** CES-A-LNN-SC-106601
CES-A-LSP-...	**V** Cable PVC	5	**104966** CES-A-LSP-05V-104966
		10	**104967** CES-A-LSP-10V-104967
		15	**106271** CES-A-LSP-15V-1062716
		20	**106272** CES-A-LSP-20V-106272
		25	**104968** CES-A-LSP-25V-104968
	SB M5 plug connector	-	**104969** CES-A-LSP-SB-104969
CES-A-LNA-...	**V** Cable PVC	5	**071845** CES-A-LNA-05V
		10	**071846** CES-A-LNA-10V
		15	**071847** CES-A-LNA-15V
		25	**071975** CES-A-LNA-25V
	P Cable PUR	5	**077806** CES-A-LNA-05P
		10	**077807** CES-A-LNA-10P
		15	**084682** CES-A-LNA-15P
CES-A-LNA-SC	M8 plug connector	-	**077715** CES-A-LNA-SC
CES-A-LCA-...	**V** Cable PVC	10	**088785** CES-A-LCA-10V
CES-A-LQA-SC	**SC** M8 plug connector	-	**095650** CES-A-LQA-SC
CES-A-LMN-SC	M8 plug connector	-	**077790** CES-A-LMN-SC

Actuator

Series	Comment	Version	Order no. / item
CES-A-BBN	2 safety screws M4 x 14 are supplied	-	**106600** CES-A-BBN-106600
CES-A-BSP	Please order installation material separately	-	**104970** CES-A-BSP-104970
CES-A-BDN-06	-	-	**104730** CES-A-BDN-06-104730
CES-A-BBA	2 safety screws M4 x 14 are supplied	-	**071840** CES-A-BBA
CES-A-BCA	2 safety screws M4 x 14 are supplied Flat seal included	Housing material PE-HD	**088786** CES-A-BCA
CES-A-BQA	2 safety screws M4 x 14 are supplied	-	**098108** CES-A-BQA
CES-A-BDA	-		**084720** CES-A-BDA-20
CES-A-BMB	-	-	**077791** CES-A-BMB

Accessories

Series	Comment	Version	Order no. / item
Connection kit for evaluation units with plug-in screw terminals	For evaluation unit CES-AZ-AES-01B	Screw terminals	**104756**
	For evaluation unit CES-AZ-AES-02B	Screw terminals	**104771**
	For evaluation unit CES-AZ-AES-04B	Screw terminals	**104776**
Installation material for read head CES-A-LSP-... and Actuator CES-A-BSP	For Bosch profiles with 8 mm groove	2 screws and 2 clamping pieces	**106633** Installation material 8-groove Bosch
	For Bosch profiles with 10 mm groove	2 screws and 2 clamping pieces	**106634** Installation material 10-groove Bosch
	For ITEM profiles with 8 mm groove	2 screws and 2 clamping pieces	**106635** Installation material 8-groove ITEM
Insertion tool	For actuator CES-A-BMB	-	**037662**

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 section *Functional check*)
- 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 of the switch-off distance

Maintenance work is not necessary. Repairs to the device are only allowed to be made by the manufacturer.

Note!

The year of manufacture can be seen on the rating plate in the lower right corner.

Service

If service support is required, please contact:

EUCHNER GmbH + Co. KG

Kohlhammerstraße 16

D-70771 Leinfelden-Echterdingen

Service telephone:

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Declaration of Conformity

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Germany

EG-Konformitätserklärung
EC-Declaration of Conformity
CE-Déclaration de Conformité
CE-Dichiarazione di conformità
CE-Declaración de Conformidad

Original DE
Translation EN
Traduction FR
Traduzione IT
Traducción ES

077154-25-05/13

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:	2006/42/EG	Maschinenrichtlinie
	2006/42/EC	*Machinery directive*
	2006/42/CE	*Directive Machines*
	2006/42/CE	*Direttiva Macchine*
	2006/42/CE	*Directiva de máquinas*
II:	2004/108/EG	EMV Richtlinie
	2004/108/EC	*EMC Directive*
	2004/108/CE	*Directive de Compatibilité électromagnétique*
	2004/108/CE	*Direttiva EMV*
	2004/108/CE	*Directiva CEM*

Die Schutzziele der Niederspannungsrichtlinie wurden gemäß Anhang I, Nr. 1.5.1 der Maschinenrichtlinie eingehalten.
The safety objetives of the Low-Voltage Directive comply with Annex I, No. 1.5.1 of the Machinery Directive.
Les objectifs de sécurité de la Directive Basse Tension sont conformes à l'annexe I, No. 1.5.1 de la Directive Machines
Gli obiettivi di sicurezza della Direttiva Bassa Tensione sono conformi a quanto riportato all'allegato I, No. 1.5.1 della Direttiva Macchine.
Los objetivos de seguridad de la Directiva de Bajo Voltaje cumplen con el Anexo I, No. 1.5.1 de la Directiva de Máquinas

Folgende Normen sind angewandt:	a:	EN 60947-5-3:1999 + A1:2005
Following standards are used:	b:	EN 1088: 1995+A2:2008
Les normes suivantes sont appliquées:	c:	EN 50295:1999 (AS-i)
Vengono applicate le seguenti norme:	d:	EN ISO 13849-1:2008
Se utilizan los siguientes estándares:	e:	EN ISO 13849-2:2012
	f:	EN 60947-5-2:2007

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Bezeichnung der Sicherheitsbauteile *Description of safety components* *Description des composants sécurité* *Descrizione dei componenti di sicurezza* *Descripción de componentes de seguridad*	**Type** *Type* *Type* *Tipo* *Typo*	**Richtlinie** *Directives* *Directive* *Direttiva* *Directivas*	**Normen** *Standards* *Normes* *Normea* *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	a, b, d, e	ET 10126
	CES-A-AEA-02B CES-A-AEA-04B CES-A-UEA-02B CES-A-UEA-04B	I, II	a, b, d, e	ET 10124
	CES-AZ-ABS-01B CES-AZ-UBS-01B	I, II	a, b, d, e	ET 10126
	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	a, b, d, e	ET 10147
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	a, b, d, e	ET 10126 ET 10124 ET 10147
	CES-A-LSP-SB CES-A-LSP-..V-...	I, II	a, b, d, e	ET 10147
	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	a, b, d, e	ET 10126 ET 10124 ET 10147
	CET1-AX-LRA-00-50X-SA CET1-AX-LDA-00-50X-SE	I, II	a, b, d, e	ET 08072 ET 10147
Betätiger *Actuator* *Actionneur* *Azionatore* *Actuador*	CES-A-BBA CES-A-BCA CES-A-BDA CES-A-BMB CES-A-BQA	I, II	a, b, d, e	ET 10126 ET 10124 ET 10147
	CES-A-BSP CES-A-BBN	I, I	a, b, d, e	ET 10147
	CEM-A-BE05 CEM-A-BH10	I, II	a, b, d, e	ET 10126 ET 10124 ET 10147
	CET-A-BWK-50X	I, II	a, b, d, e	ET 08072 ET 1014

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

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Bezeichnung der Sicherheitsbauteile *Description of safety components* *Description des composants sécurité* *Descrizione dei componenti di sicurezza* *Descripción de componentes de seguridad*	**Type** *Type* *Type* *Tipo* *Typo*	**Richtlinie** *Directives* *Directive* *Direttiva* *Directivas*	**Normen** *Standards* *Normes* *Norma* *Estándares*	**Prüfbericht** *Test report* *Rapport du test* *Rapporto di prova* *Informe de prueba*
Auswertegerät	CES-AZ-ALS...	I, II	a, b, d, e	UQS 115948 (*)
Safety Unit	CES-A-F1B-01B-AS1	I, II	a, b, c, d, e	Euchner QS PB 62/2005
Analyseur	CES-A-V1B-01B-AS1			TÜV 4478008554376-006
Centralina	CES-A-F1B-04B-AS1	I, II	a, b, c, d, e	Euchner QS PB 28/2007
Unidad de evaluación	CES-A-V1B-04B-AS1			TÜV 4420708553977-001
Lesekopf	CES-A-LNA-...-AS1	I, II	a, b, c, d, e	Euchner QS PB 28/2007
Read head				TÜV 4420708553977-001
Tête de lecture	CEM-A-ME05K-S1	I, II	a, b, d, e	Euchner QS PB 22/2005
Testina di lettura	CEM-A-LE05H-S2			Euchner QS PB 132/2010
Cabeza lectora				
	CET1-AX-L...	I, II	a, b, d, e	Euchner QS PB 17/2008
	CET2-AX-L...			Euchner QS PB 23/2008
				Euchner QS PB 116/2009
				Euchner QS PB 115/2009
Betätiger	CES-A-BLN...	I, II	a, b, d, e	Euchner QS PB 45/2008
Actuator				
Actionneur				
Azionatore				
Actuador				
Zubehör	PM-SCL-096945	II	f	Euchner QS PB 14/2006
Accessory				
Accessoire				
Accessorio				
Accesorio				
Schlüsselaufnahme	CKS-A-L1B-SC	I, II	a, d, e	UQS 114539 (*)
Key Adapter				
Serrure				
Sedi per la chiave				
Módulo adaptador				
Schlüssel	CKS-A-BK1-RD	I, II	a, d, e	UQS 114539 (*)
Key				
Clé				
Chiave				
Ilave				

Benannte Stelle
Notified Body
Organisme notifié
Sede indicata
Entidad citada

(*) 0035
TÜV Rheinland Industrie Service GmbH
Am Grauen Stein - 51105 Köln - Germany

Leinfelden, Mai 2013

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Operating Instructions Safety System CES-AZ-AES-...
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