

Non-contact safety switches CES-AR-C01...

- ▶ Read head with integrated evaluation electronics
- ▶ Up to 20 safety switches in series
- ▶ Short circuit monitoring
- ▶ 2 safety outputs (semiconductor outputs)
- ▶ Category 4 / PL e according to EN ISO 13849-1



For possible combinations see page 127

Approach direction

Can be adjusted in 90° steps

Short circuit monitoring

The switch generates its own clock signal on the output lines OA/OB.

Pay attention to this aspect when connecting to control systems and relays.

Unicode evaluation

Each actuator is unique. The evaluation unit detects only the actuator that has been taught-in. Additional actuators can be taught-in. Only the last actuator taught-in is detected.

Multicode evaluation

Every actuator is detected by the evaluation unit.

Fixcode evaluation

An actuator is permanently allocated to the evaluation unit. The evaluation unit can be operated only with this actuator. The actuator is taught-in at EUCHNER prior to delivery. No additional actuators can be taught-in.

Category in accordance with EN ISO 13849-1

Due to two redundant design semiconductor outputs (safety outputs) with internal monitoring suitable for:

- ▶ Category 4 / PL e in accordance EN ISO 13849-1

Important: To achieve the stated category in accordance with EN ISO 13849-1, both safety outputs (OA and OB) must be evaluated.

LED display

STATE Status LED

DIA Diagnostics LED

Additional connections

OUT Monitoring output (semiconductor)

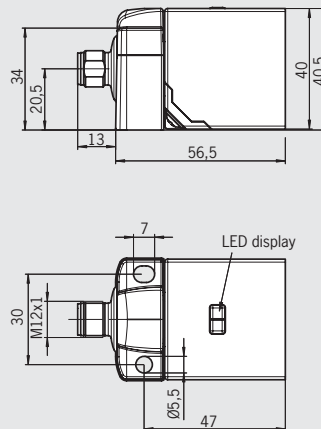
RST Reset input

Non-contact safety switches CES-AR-C01...

M12 plug, 8-pin

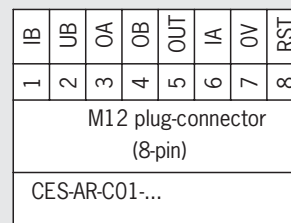


Dimension drawing



For connection cable see page 144

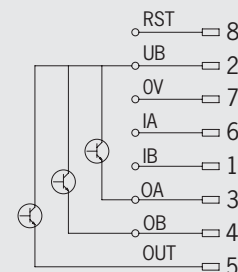
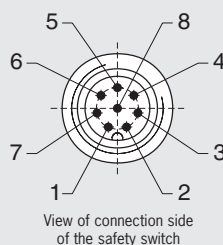
Block diagram



For connection examples see page 150

Pin assignment

Pin	Designation	Description	Wire color as per DIN 47100
1	IB	Enable input for channel 2	white
2	UB	Power supply, DC 24 V	brown
3	OA	Safety output, channel 1	green
4	OB	Safety output, channel 2	yellow
5	OUT	Monitoring output	gray
6	IA	Enable input for channel 1	pink
7	OV	Ground, DC 0 V	blue
8	RST	Reset input	red



Ordering table

Series	Category and PL according to EN ISO 13849-1	Order no.
CES-AR-C01-AH-SA Unicode	4 / PL e	098 941 CES-AR-C01-AH-SA
CES-AR-C01-CH-SA Multicode	4 / PL e	098 942 CES-AR-C01-CH-SA

Technical data non-contact safety switches CES-AR-C01...

Parameter	Value			Unit
	min.	typ.	max.	
Housing material	PBT V0 GF30			
Dimensions	According to EN 60947-5-2			mm
Weight	0.4			kg
Ambient temperature at $U_B = DC\ 24\ V$	-20	-	+55	°C
Degree of protection	IP67			
Safety class	III			
Degree of contamination	3			
Installation position	Any			
Connection type	M12 plug connector, 8-pin			
Operating voltage U_B (reverse polarity protected, regulated, residual ripple < 5 %)	24 ± 15%			V DC
For the approval according to UL the following applies	Operation with UL-class 2 power supply only, or equivalent measures			
Current consumption	80			mA
Switching load according to U_{sw}	DC 24 V, Class 2			
External fuse (operating voltage U_B)	0.25	-	8	A
Classification according to EN 60947-5-3	PDF-M			
EMC protection requirements	In acc. with EN 60947-5-3			
Safety outputs (OA/OB, 2 semiconductor outputs, p-switching, short circuit-proof)				
- Output voltage $U(OA/U(OB))$ ¹⁾				
HIGH $U(OA)$	$U_B - 1.5$	-	U_B	V DC
HIGH $U(OB)$	$U_B - 1.5$	-	U_B	
LOW $U(OA/U(OB))$	0	-	1	
Switching current per safety output	1	-	400	mA
Utilization category acc. to EN 60947-5-2	DC-13 24V 400mA Caution: outputs must be protected with a free-wheeling diode in case of inductive loads			
Off-state current I_{off}	≤ 0,25			mA
Rated insulation voltage U_i	-	-	300 ²⁾	V
Rated impulse withstand voltage U_{imp}	-	-	1.5	kV
Resilience to vibration	According to EN 60947-5-2			
Switching frequency	-	-	1	Hz
Repeat accuracy R	≤ 10			%
Monitoring output (OUT) (Semiconductor output, p-switching, short circuit-proof)				
Output voltage	$0.8 \times U_B$	-	U_B	V DC
Max. load	-	-	200	mA
In combination with actuator CES-A-BBA/CES-A-BCA				
Operating distance for center offset $m = 0$				
- Switch-on distance	-	18	-	mm
- Assured switch-on distance s_{so} ²⁾	15	-	-	
- Switching hysteresis ²⁾	1	3	-	
- Assured switch-off distance s_{sr}	-	-	45	
In combination with actuator CES-A-BPA				
Operating distance for center offset $m = 0$				
- Switch-on distance	-	22 ³⁾	-	mm
- Assured switch-on distance s_{so}	18	-	-	
- Switching hysteresis ²⁾	1	2	-	
- Assured switch-off distance s_{sr}	-	-	58	
In combination with actuator CES-A-BRN				
Operating distance for center offset $m = 0$				
- Switch-on distance	-	27 ⁴⁾	-	mm
- Assured switch-on distance s_{so}	20	-	-	
- Switching hysteresis ⁴⁾	-	3	-	
- Assured switch-off distance s_{sr}	-	-	75	
Reliability values according to EN ISO 13849-1				
Category	4			
Performance Level (PL)	e			
PFH_d	$2.1 \times 10^{-9} / \text{h}^{(5)}$			
Mission time	20			years
T_{10d}	20 years			

1) Values at a switching current of 50 mA without taking into account the cable lengths.

2) Tested by BG up to 75 V.

3) Values apply for surface mounting of the actuator.

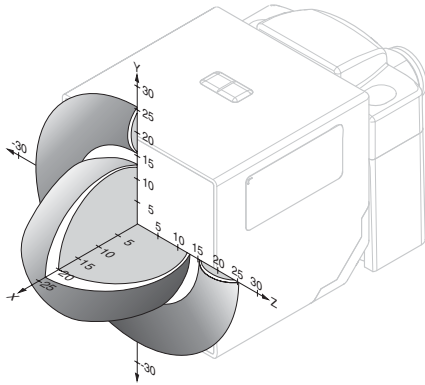
4) On surface mounting on aluminum, in a non-metallic environment the typical switching distance increases to 30 mm.

5) In case of surface mounting on steel.

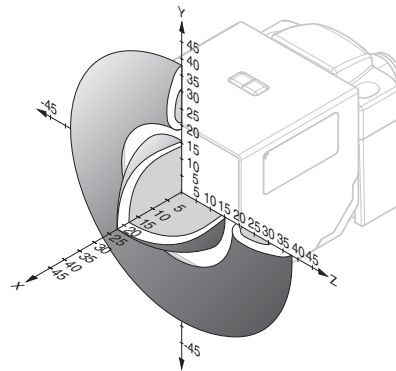
6) Applying the limit value from EN ISO 13849-1:2008, section 4.5.2 ($\text{MTTF}_d = \text{max. } 100 \text{ years}$) BG certifies a PFH_d BG certifies a 2.47×10^{-8} .

Typical operating distance safety switch CES-AR...

With actuator CES-A-BBA

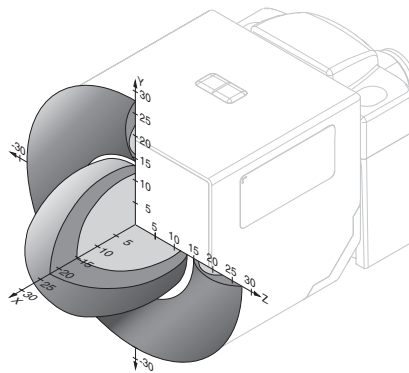


With actuator CES-A-BPA



For a side approach direction for the actuator and safety switch, a minimum distance of $s = 4 \text{ mm}$ must be maintained so that the operating distance of the side lobes is not entered.

With actuator CES-A-BRN



For a side approach direction for the actuator and safety switch, a minimum distance of $s = 4 \text{ mm}$ must be maintained so that the operating distance of the side lobes is not entered.