

Non-contact safety switches CES-AH-C03-...

- ▶ Read head with integrated evaluation electronics
- ▶ Load currents of 4 A can be switched directly
- ▶ 2 safety outputs (semiconductor outputs)
- ▶ Category 3 / PL d according to EN ISO 13849-1



For possible combinations see page 91

Approach direction

Side, cannot be changed (see dimension drawing).

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. New actuators are taught-in by fitting a jumper.

Multicode evaluation

Every actuator is detected by the evaluation unit.

Category according to EN ISO 13849-1

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

- ▶ Category 3 / PL d according to EN ISO 13849-1

Each safety path is independently safe.

LED display

STATE Status LED

DIA Diagnostics LED

Attention:

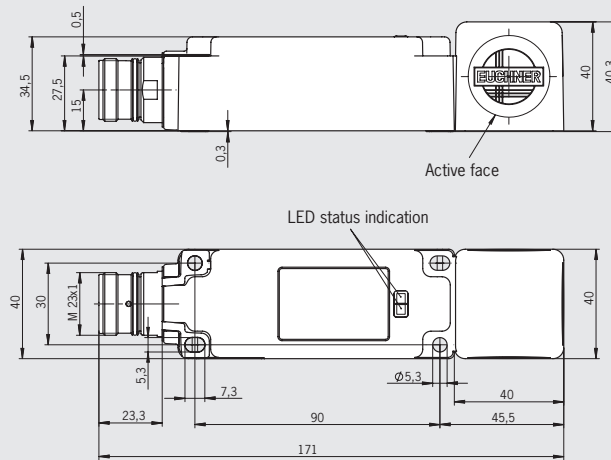
The operating distance may vary depending on the background material and installation situation.

Non-contact safety switches CES-AH-C03-...

M23 plug, 9-pin

Cat. 3
PLd

Dimension drawing



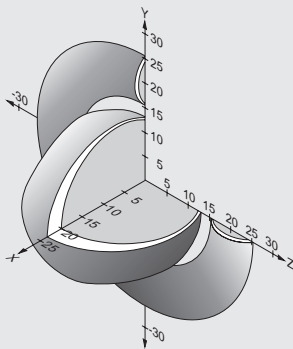
For plug connectors see Page 97

Block diagram

	NC	Start	LA	+LA	+LB	LB	UB	OV	NC
1	2	3	4	5	6	7	8	9	
M23 plug-connector (9-pin)									
CES-AH-C03-...									

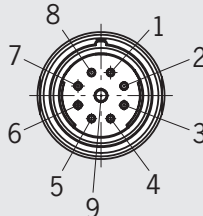
Typical operating distance

(Only in combination with actuator CES-A-BBA)



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

Pin assignment



View on the connection side of the safety switch

Pin	Designation	Description
1	NC	Not used *
2	START	Start input
3	LA	Safety output, channel 1
4	+LA	Input for channel 1
5	+LB	Input for channel 2
6	LB	Safety output, channel 2
7	UB	Power supply, DC 24 V
8	OV	Ground, DC 0 V
9	NC	Not used *

* The unused connection pins are not allowed to be connected by the user.

Ordering table

Series	Category and PL acc. to EN ISO 13849-1	Version	Order no. / item
CES-AH-C03-AH-... Unicode	3 / PL d	With M23 plug connector	106 300 CES-AH-C03-AH-SM-106300

Technical data non-contact safety switches CES-AH-C03...

Parameter	Value			Unit
	min.	typ.	max.	
Housing material	Plastic			
Dimensions	40 x 40 x 171			mm
Weight	0.35			kg
Ambient temperature at I(LA) / I(LB) > 3 A	-20	-	+55	°C
Ambient temperature at I(LA) / I(LB) < 3 A	-20	-	+70	
Storage temperature	-25	-	+70	
Degree of protection	IP67			
Protection class	III			
Degree of contamination	3			
Installation position	Any			
Connection type	M23 plug connector, 9-pin			
Operating voltage U_B (reverse polarity protected, regulated, residual ripple < 5 %)	20	-	28	V DC
Current consumption (no load on outputs)	150			mA
External fuse (operating voltage U_B , +LA and +LB)	0.25	-	10	A
Power supply for load U(+LA)/U(+LB)	U_B			V DC
Safety outputs (LA / LB, 2 semiconductor outputs, p-switching, short circuit-proof, electrically decoupled)				
- Output voltage U(LA)/U(LB) ¹⁾				
HIGH U(LA)/U(LB)	$U_B - 1.5$	-	U_B	
LOW U(LA)/U(LB)	0	-	4	
Switching current per safety output	30	-	4000	mA
Utilization category to EN 60947-5-2	DC-13 24V 4A			
	Caution: outputs must be protected with a free-wheeling diode in case of inductive loads.			
Classification according to EN 60947-5-3	PDF-S			
Start input START				
HIGH	8	-	U_B	V DC
LOW	0	-	2	
Rated insulation voltage U_i	-	-	30	V
Rated impulse withstand voltage U_{imp}	-	-	1.5	kV
Resilience to vibration	According to EN 60947-5-2			
Switching delay from state change ²⁾	-	-	260	ms
Fault detection time ³⁾	-	0.12	15	s
Difference time between the two safety outputs	-	-	50	ms
Ready delay ⁴⁾	-	-	3	s
Dwell time ⁵⁾	0.5	-	-	s
Switching frequency	-	-	1	Hz
Repeat accuracy R according to EN IEC 60947-5-3	≤ 10			%
Mounting distance between 2 switches or 2 actuators	80	-	-	mm
EMC protection requirements	In acc. with EN 60947-5-3			
In combination with CES-A-BBA actuator				
Operating distance for center offset m = 0				
- Switch-on distance	-	20	-	mm
- Assured switch-on distance s_{ao}	18	-	-	
- Switching hysteresis	2	3	-	
- Assured switch-off distance s_{ar}	-	-	40	
In combination with actuator CES-A-BPA				
Operating distance for center offset m = 0				
- Switch-on distance	-	22 ⁶⁾	-	mm
- Assured switch-on distance s_{ao}	18	-	-	
- Switching hysteresis	1	2	-	
- Assured switch-off distance s_{ar}	-	-	58	
In combination with actuator CES-A-BRN				
Operating distance for center offset m = 0				
- Switch-on distance	-	27 ⁶⁾	-	mm
- Assured switch-on distance s_{ao}	20	-	-	
- Switching hysteresis	-	3	-	
- Assured switch-off distance s_{ar}	-	-	75	
Reliability figures according to EN ISO 13849-1				
Category	3			
Performance Level (PL)	d			
PFH _d	5.4 x 10 ⁹ / h			
Mission time	20			years

1) Values at a switching current of 4 A without taking into account the cable lengths.

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.

3) The fault detection time is the time for the detection of an internal fault in the device. At least one of the switching elements on each safety output is opened during this process.

4) After the operating voltage is switched on, the semiconductor outputs are switched off during the ready delay.

5) The dwell time of an actuator inside and outside the operating distance must be at least 0.5 s to ensure reliable detection of internal faults in the evaluation unit (self-monitoring).

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

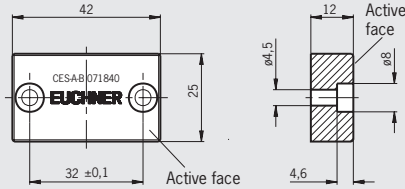
► Cube-shaped design 42 x 25 mm



For possible combinations see page 91

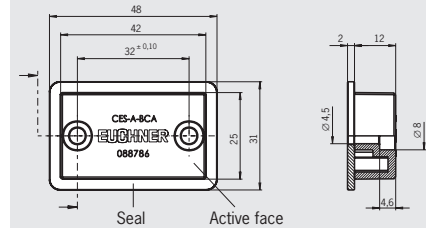
Actuator CES-A-BBA (Fortron)

Dimension drawing



2 safety screws
M4x14 are
supplied

Actuator CES-A-BCA (PE-HD) Housing material PE-HD



2 safety screws
M4x14 are
supplied

Ordering table

Series	Comment	Type	Order no. / item
CES-A-BBA	2 safety screws M4 x 14 are supplied	-	071 840 CES-A-BBA
CES-A-BBA-EX	2 safety screws M4 x 14 are supplied	ATEX ¹⁾	098 158 ¹⁾ CES-A-BBA-EX
CES-A-BCA	2 safety screws M4 x 14 are supplied Flat seal included	Housing material PE-HD ²⁾	088 786 CES-A-BCA

1) EX II 3G Ex nL IIC T70°C (zone 2 gases) and EX II 3D Ex tD A22 T70°C
2) Suitable for use in aggressive media (e. g. acids, alkalis)

Technical data

Parameter	Value			Unit
	min.	typ.	max.	
Housing material	Fortron, reinforced thermoplastic, fully encapsulated			
- 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				°C
- CES-A-BBA	-25	-	+70	
- CES-A-BBA-EX	-25	-	+60	
- 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-BPA

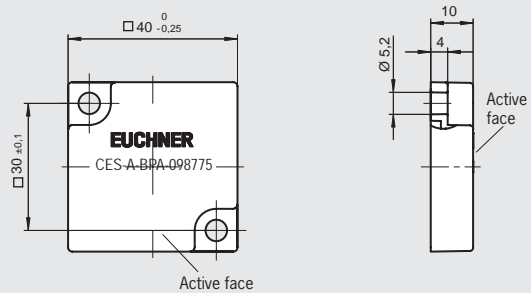
- ▶ Cube-shaped design 40 x 40 mm



For possible combinations see page 91

Actuator CES-A-BPA

Dimension drawing



2 safety screws
M4x14 are
supplied

Ordering table

Series	Comment	Type	Order no. / item
CES-A-BPA	2 safety screws M5 x 10 are supplied	-	098 775 CES-ABPA
CES-A-BPA-EX	2 safety screws M5 x 10 are supplied	ATEX ¹⁾	102 125 CES-A-BPA-EX

Technical data

Parameter	Value			Unit
	min.	typ.	max.	
Housing material	PPS			
Weight	0.025			kg
Degree of protection according to IEC 60529	IP67/IP69K			
Ambient temperature	-25	-	+70	°C
Installation position	Active face opposite read head			
Power supply	Inductive via read head			

1) EX II 3G Ex nL II C T70 °C (zone 2, gases)

EX II 3D Ex tD A22 T70 °C (zone 2, dusts)

Actuator CES-A-BRN

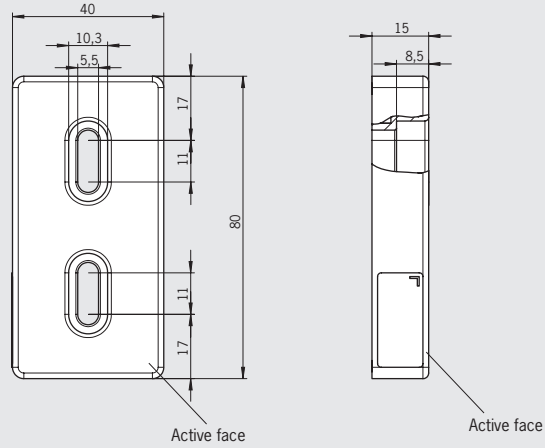
► Cube-shaped design 80 x 40 mm



For possible combinations see page 91

Actuator CES-A-BRN

Dimension drawing



Ordering table

Series	Comment	Type	Order no.
CES-A-BRN	2 safety screws M5 x 16 are supplied	-	100 251 CES-A-BRN-100251

Technical data

Parameter	Value			Unit
	min.	typ.	max.	
Housing material	PPS			
Dimensions	80 x 40 x 15			mm
Weight	0.06			kg
Ambient temperature	-25	-	+70	°C
Degree of protection acc. to EN IEC 60529	IP 67			
Installation position	Active face opposite read head			
Power supply	Inductive via read head			

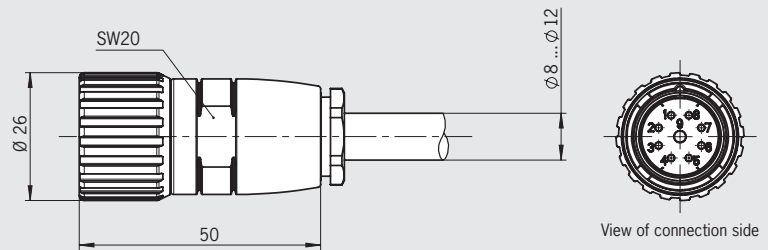
Plug connector

- Plug connector for safety switches CES-AH-C03-...

Plug connector M23

M23 plug, 9-pin

Dimension drawing



Ordering table

Designation	Version	Order no / item
M23 plug 9-pin	Mating connector for safety switches CES-AH-C03-... with soldered contacts	106 597 P-M23F09-106597

Technical data

Parameter	Value			Unit
	min.	typ.	max.	
Housing material		CuZn, nickel-plated		
Degree of protection according to EN 60529		IP67 (inserted)		