

CES-AP-C01-CH-SB-111708 (ORDER NO. 111708)

Non-contact safety switch CES-AP-C01-...

- ▶ Safety switch with integrated evaluation electronics
- ▶ No series connection
- ▶ Short circuit monitoring
- ▶ 2 safety outputs (semiconductor outputs)
- ▶ Category 4/PL e according to EN ISO 13849-1
- ▶ M12 plug connector 5-pin, pin 5 not used
- ▶ Multicode



Description

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.

Multicode evaluation

Every suitable actuator is detected by the switch.

Category according to EN 13849-1

Due to two redundantly designed semiconductor outputs (safety outputs) with internal monitoring suitable for:

- ▶ Category 4 / PL e according to EN 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 indicator

STATE Status LED

DIA Diagnostic LED

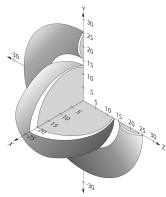
Additional connections

DIA Diagnostics output (semiconductor)

RST Reset input

Typical actuating ranges

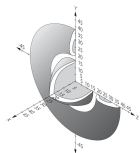
With actuators CES-A-BBA and CES-A-BCA



Figure

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

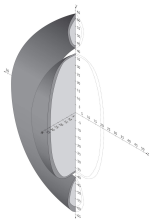
With actuator CES-A-BPA



Figure

For a side approach direction for the actuator and safety switch, a minimum distance of $s = 6$ mm must be maintained so that the actuating range of the side lobes is not entered.

With actuator CES-A-BRN



Figure

For a side approach direction for the actuator and safety switch, a minimum distance of $s = 6$ mm must be maintained so that the actuating range of the side lobes is not entered.

With actuator CES-A-BDA-18



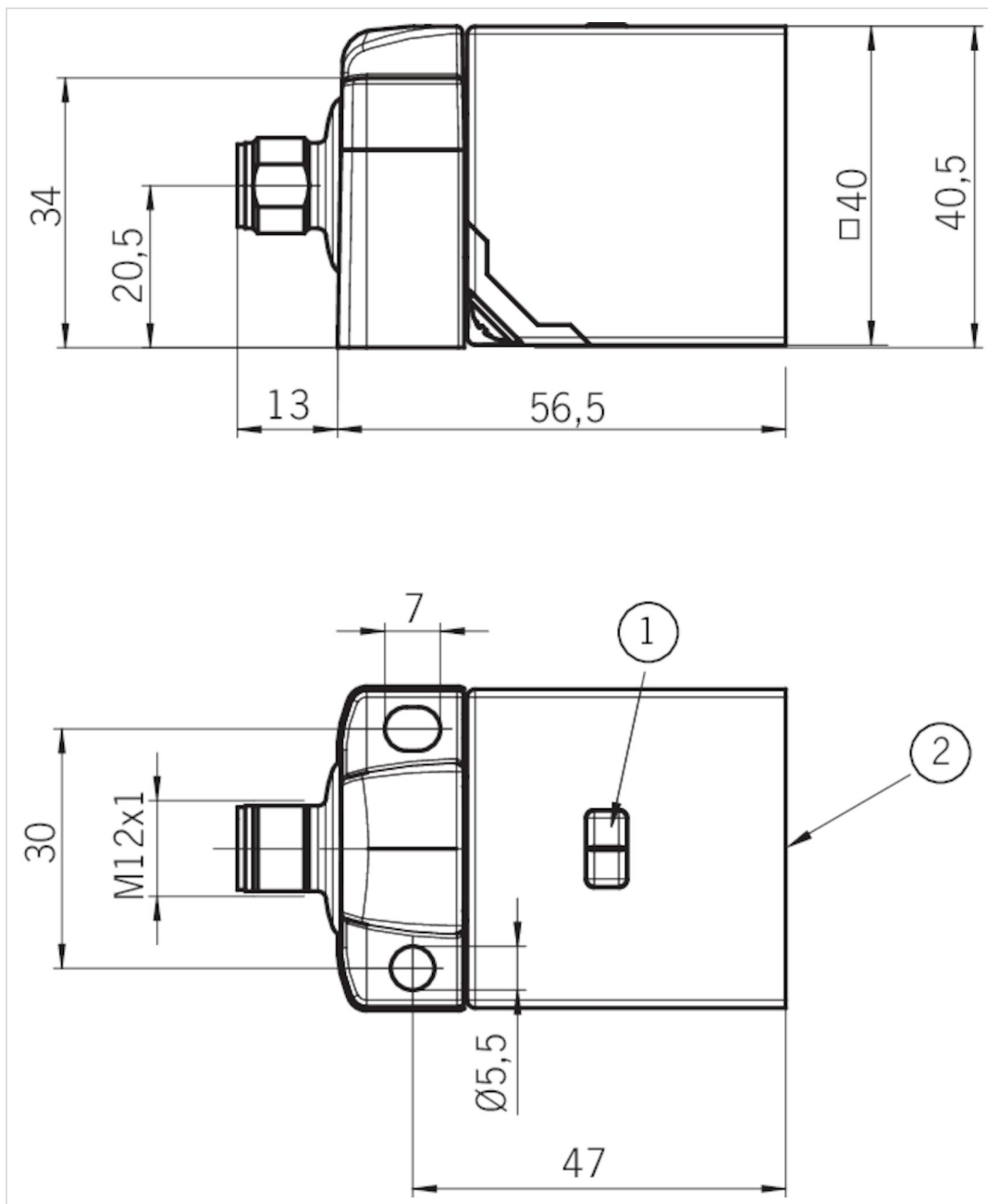
Figure

For a side approach direction for the actuator and safety switch, a minimum distance of $s = 8$ mm must be maintained so that the actuating range of the side lobes is not entered.

Connector assignment

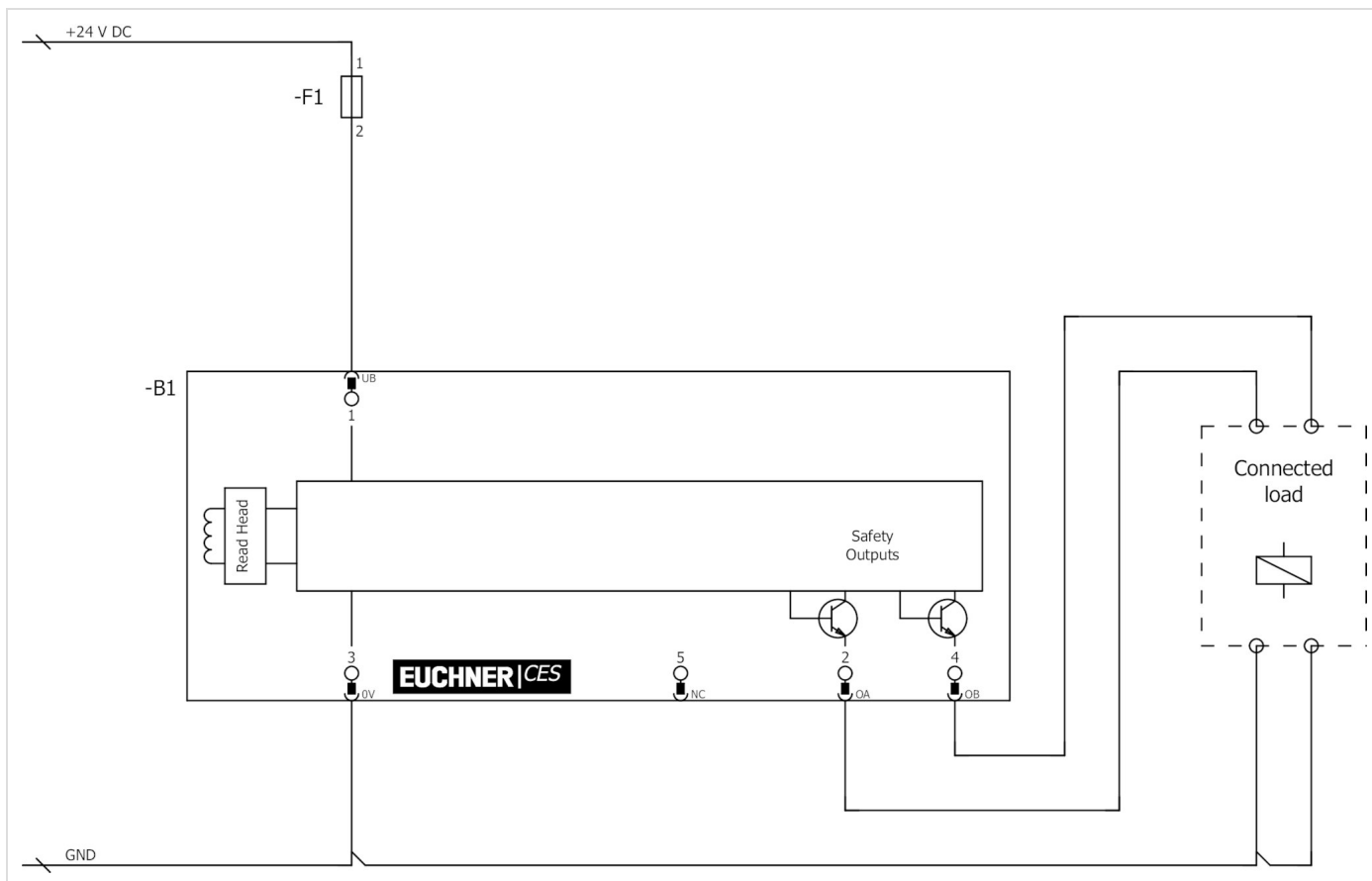
Plug connector (view of connection side)	Pin	Designation	Function	Conductor coloring of connecting cable
	1	UB	Power supply, DC 24 V	BN
	2	OA	Safety output, channel 1	GN
	3	OV	Ground, DC 0 V	BU
	4	OB	Safety output, channel 2	YE
	5	-	n.c.	GY

Dimension drawing



- 1 LED status indication
- 2 Active face

Wiring diagram



Technical data

Approvals



Mechanical values and environment

Shock and vibration resistance In acc. with EN 60947-5-3

Housing material

Housing Plastic, PBT

Weight

Net 0,12 kg

Ambient temperature

-20 ... 55 °C

Degree of protection

IP67

Mounting distance

min.40 mm

Installation orientation

Any

Tightening torque

Fixing screws max.1 Nm

Ready delay

0,5 s

Switching frequency

max.1 Hz

Connection

M12 plug connector, 5-pin, pin 5 not used

Electrical connection ratings

Operating voltage DC

U_B 24 V DC 15% ... 15% Reverse polarity protected, regulated, residual ripple < 5%, PELV

Current consumption

No load on outputs max.50 mA

Fusing

External (operating voltage) 0,25 ... 8 A

Rated insulation voltage U_i

300 V
(Tested by employers' liability insurance association up to 75V.)

Rated impulse withstand voltage U_{imp}

1,5 kV

EMC protection requirements

In acc. with EN IEC 60947-5-3

Degree of contamination (external, according to EN 60947-1)

3

Turn-on time

Safety outputs max.400 ms

Safety class

III

Risk time according to EN 60947-5-3

max.260 ms

Safety outputs OA/OB

Test pulses

max.0,4 ms

Type of output

Semiconductor outputs, p-switching, short circuit-proof

Switching current

per safety output 1 ... 400 mA

Output voltage

LOW $U(OA) / U(OB)$ 0 ... 1 V DC

HIGH $U(OA) / U(OB)$ $U_B - 1,5 \dots U_B$ V DC
(Values at a switching current of 50 mA without taking into account the cable lengths.)

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.)

Rated conditional short-circuit current

max.100 A

Off-state current I_r

max.0,25 mA

Discrepancy time

max.10 ms

Work area

Repeat accuracy R

According to EN 60947-5-2 ≤ 10

Other

For the approval acc. to UL the following applies

Operation only with UL class 2 power supply, or equivalent measures

Reliability values according to EN ISO 13849-1

Monitoring of the safety guard position

Category	4
Performance Level	PL e
PFH _D	2.1 x 10 ⁻⁹ (Applying the limit value from EN ISO 13849-1:2008, section 4.5.2 (MTTFd = max. 100 years), BG certifies a PFHd of max. 2.47x10 ⁻⁸ .)
Mission time	20

In combination with Actuator CES-A-BRN-100251

Actuating range

Operating distance	27 mm
Assured release distance S _{ar}	max.75 mm
Assured operating distance S _{ao}	min.20 mm (The values apply for surface installation of the actuator on steel.)
Switching hysteresis	3 mm (The values apply for surface installation of the actuator on steel.)

In combination with Actuator CES-A-BDA-18-156935

Actuating range

Operating distance	19 mm
Assured release distance S _{ar}	max.45 mm (The values apply for surface installation)
Assured operating distance S _{ao}	min.10 mm (The values apply for surface installation)
Switching hysteresis	min.1 mm (The values apply for surface installation)

In combination with Actuator CES-A-BPA

Actuating range

Operating distance	22 mm (For surface mounting on aluminum. In a non-metallic environment the typical operating distance increases to 30 mm)
Assured release distance S _{ar}	max.58 mm
Assured operating distance S _{ao}	min.18 mm
Switching hysteresis	min.1 mm

In combination with Actuator CES-A-BBA

Actuating range

Operating distance	18 mm
Assured release distance S_{ar}	max.45 mm (The values apply for surface installation)
Assured operating distance S_{ao}	min.15 mm (The values apply for surface installation)
Switching hysteresis	min.1 mm (The values apply for surface installation)

Accessories

Actuator

Actuator CES-A-BBA



071840
CES-A-BBA

- ▶ Cube-shaped design 42 x 25 mm
- ▶ Two safety screws M4x14 included

Actuator CES-A-BCA



088786
CES-A-BCA

- ▶ Cube-shaped design 42 x 25 mm
- ▶ Two safety screws M4x14 included
- ▶ PE-HD housing material, suitable for use in aggressive media (e.g. acids, alkalis)

Actuator CES-A-BDA



156935
CES-A-BDA-18-156935

- ▶ For safety switch CES-C01
- ▶ For CES-AZ safety systems in combination with the read heads CES-A-LNA and CES-A-LMN
- ▶ Round design \varnothing 18 mm
- ▶ For use in applications in very confined spaces
- ▶ Mounting on metal or plastic is permissible
- ▶ Flush mounting is permissible only in plastic

Actuator CES-A-BPA



098775
CES-A-BPA

- ▶ Cube-shaped design 40 x 40 mm

Actuator CES-A-BRN



100251
CES-A-BRN-100251

- ▶ Cube-shaped design 80 x 40 mm

Bolt

Bolt CES-A-C



082220
RIEGEL CES-A-C

- ▶ Steel bolt
- ▶ For non-contact safety switch CES-A-C.../CES-A-W.../CES-AR...
- ▶ For doors hinged on the left or right
- ▶ Ball detent mechanism in closed position
- ▶ Can be locked in open position with padlocks
- ▶ Actuator included

Bolt CES-A-C/F with escape release



098357
RIEGEL CES-A-C/F

- ▶ Steel bolt
- ▶ For doors hinged on the left or right
- ▶ Lever for escape release from the danger zone
- ▶ For non-contact safety switches CES-A-C5E...
- ▶ Connection via M12 plug connector
- ▶ Detent knob in open position
- ▶ Can be locked in open position with padlocks
- ▶ CES actuator integrated in the bolt tongue

Connection material

Connecting cable with 2 plug connectors M12, 5-pin, 0.22 m, AIDA standard



163573
C-M12F05-05X034PU0,22-M12M05-163573

- ▶ M12 female plug to M12 plug connector, 5-pin
- ▶ Straight female plug and plug connector
- ▶ Connecting cable according to AIDA standard
- ▶ PUR cable, sheath color yellow
- ▶ Cable length 0.22 m

Connecting cable with straight plug connector M12, 5-pin, 50 m



156064
C-M12F05-05X034PV50,0-MA-156064

- ▶ M12 female plug, 5-pin
- ▶ Straight plug connector
- ▶ PVC cable
- ▶ Cable length 50 m
- ▶ With flying lead

Connecting cable with two plug connectors M12, 5-pin, 1 m, AIDA standard



159362
C-M12F05-05X034PU01,0-M12M05-159362

- ▶ M12 female plug to M12 plug connector, 5-pin
- ▶ Straight female plug and plug connector
- ▶ Connecting cable according to AIDA standard
- ▶ PUR cable, sheath color yellow
- ▶ Cable length 1 m

Connecting cable with two plug connectors M12, 5-pin, 1.5m, AIDA standard



159363
C-M12F05-05X034PU01,5-M12M05-159363

- ▶ M12 female plug to M12 plug connector, 5-pin
- ▶ Straight female plug and plug connector
- ▶ Connecting cable according to AIDA standard
- ▶ PUR cable, sheath color yellow
- ▶ Cable length 1.5 m

Connecting cable with two plug connectors M12, 5-pin, 3m, AIDA standard



159364
C-M12F05-05X034PU03,0-M12M05-
159364

- ▶ M12 female plug to M12 plug connector, 5-pin
- ▶ Straight female plug and plug connector
- ▶ Connecting cable according to AIDA standard
- ▶ PUR cable, sheath color yellow
- ▶ Cable length 3 m

Connecting cable with two plug connectors M12, 5-pin, 5m, AIDA standard



159365
C-M12F05-05X034PU05,0-M12M05-
159365

- ▶ M12 female plug to M12 plug connector, 5-pin
- ▶ Straight female plug and plug connector
- ▶ Connecting cable according to AIDA standard
- ▶ PUR cable, sheath color yellow
- ▶ Cable length 5 m

Connecting cable with two plug connectors M12, 5-pin, 8m, AIDA standard



159919
C-M12F05-05X034PU08,0-M12M05-
159919

- ▶ M12 female plug to M12 plug connector, 5-pin
- ▶ Straight female plug and plug connector
- ▶ Connecting cable according to AIDA standard
- ▶ PUR cable, sheath color yellow
- ▶ Cable length 8 m

Connecting cable with two plug connectors M12, 5-pin, 10m, AIDA standard



159920
C-M12F05-05X034PU10,0-M12M05-
159920

- ▶ M12 female plug to M12 plug connector, 5-pin
- ▶ Straight female plug and plug connector
- ▶ Connecting cable according to AIDA standard
- ▶ PUR cable, sheath color yellow
- ▶ Cable length 10 m

Connecting cable with two plug connectors M12, 5-pin, 15m, AIDA standard



159921
C-M12F05-05X034PU15,0-M12M05-
159921

- ▶ M12 female plug to M12 plug connector, 5-pin
- ▶ Straight female plug and plug connector
- ▶ Connecting cable according to AIDA standard
- ▶ PUR cable, sheath color yellow
- ▶ Cable length 15 m

Connection cable with 2 plug connectors M12, 5-pin, 5m



100180
C-M12F05-05X034PV05,0-M12M05-
100180

- ▶ M12 female plug to M12 plug connector, 5-pin
- ▶ Straight female plug and plug connector
- ▶ PVC cable
- ▶ Cable length 5 m

Connection cable with 2 plug connectors M12, 5-pin, 10m



100181
C-M12F05-05X034PV10,0-M12M05-
100181

- ▶ M12 female plug to M12 plug connector, 5-pin
- ▶ Straight female plug and plug connector
- ▶ PVC cable
- ▶ Cable length 10 m

Connection cable with 2 plug connectors M12, 5-pin, 20m



100182

- ▶ M12 female plug to M12 plug connector



100182
C-M12F05-05X034PV20,0-M12M05-100182

- ▶ M12 female plug to M12 plug connector, 5-pin
- ▶ Straight female plug and plug connector
- ▶ PVC cable
- ▶ Cable length 20 m

Connection cable with angled plug connector M12, 5-pin, 10m



113187
C-M12F05-05X025PU10,0-MA-113187

- ▶ M12 female plug, 5-pin
- ▶ Angled plug connector
- ▶ PUR cable
- ▶ Cable length 10 m
- ▶ Cable exit A (right)
- ▶ With flying lead



113190
C-M12F05-05X025PU10,0-MA-113190

- ▶ M12 female plug, 5-pin
- ▶ Angled plug connector
- ▶ PUR cable
- ▶ Cable length 10 m
- ▶ Cable exit C (left)
- ▶ With flying lead

Connection cable with straight plug connector M12, 5-pin, 5m



100183
C-M12F05-05X034PV05,0-MA-100183

- ▶ M12 female plug, 5-pin
- ▶ Straight plug connector
- ▶ PVC cable
- ▶ Cable length 5 m
- ▶ With flying lead

Connection cable with straight plug connector M12, 5-pin, 10m



100184
C-M12F05-05X034PV10,0-MA-100184

- ▶ M12 female plug, 5-pin
- ▶ Straight plug connector
- ▶ PVC cable
- ▶ Cable length 10 m
- ▶ With flying lead

Connection cable with straight plug connector M12, 5-pin, 20 m



100185
C-M12F05-05X034PV20,0-MA-100185

- ▶ M12 female plug, 5-pin
- ▶ Straight plug connector
- ▶ PVC cable
- ▶ Cable length 20 m
- ▶ With flying lead

M12 extension PUR 5-pin, plug connectors at both ends, 10m



115565
C-M12F05-05X025PU10,0-M12M05-115565

- ▶ M12 female plug, 5-pin (angled) to M12 plug connector (straight)
- ▶ plug connectors at both ends
- ▶ PUR cable
- ▶ Cable length 10 m
- ▶ With cable exit A (right)



115566
C-M12F05-05X025PU10,0-M12M05-115566

- ▶ M12 female plug, 5-pin (angled) to M12 plug connector (straight)
- ▶ plug connectors at both ends
- ▶ PUR cable
- ▶ Cable length 10 m
- ▶ With cable exit C (left)

Mounting accessories

Safety screws M4 x 14

071863
M4X14-CES/V20

- ▶ Safety screws M4 x 14
- ▶ Packaging unit 20 pieces

Safety screws M5 x 10

073455
M5X10-NIRO/V100 NZ/TZ

- ▶ Safety screws M5 x 10
- ▶ Packaging unit 100 pieces

Safety screws M5 x 16

073456
M5X16/V100

- ▶ Safety screws M5 x 16
- ▶ Packaging unit 100 pieces

Contacts

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