

## CES-I-AP-U-C04-U20-116505 (ORDER NO. 116505)

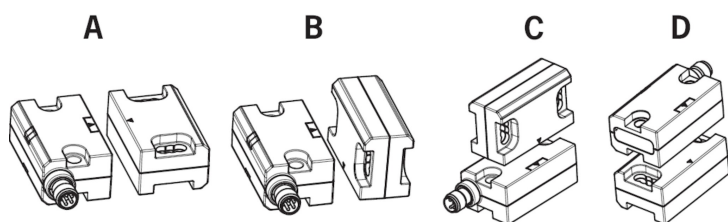
### Non-contact safety switches CES-I-AP-.-C04-..., flying lead

- ▶ 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
- ▶ Three active faces
- ▶ Connecting cable PUR, 20 m, flying lead
- ▶ Unicode
- ▶ Monitoring output OD



### Description

#### Installation position



Figure

Permissible installation position

#### Unicode evaluation

Each actuator is highly coded (unicode). The switch detects only taught-in actuators. Additional actuators can be taught-in. Only the last actuator taught-in is detected.

#### 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 according to EN ISO 13849-1, both safety outputs (FO1A and FO1B) must be evaluated.

#### LED indicator

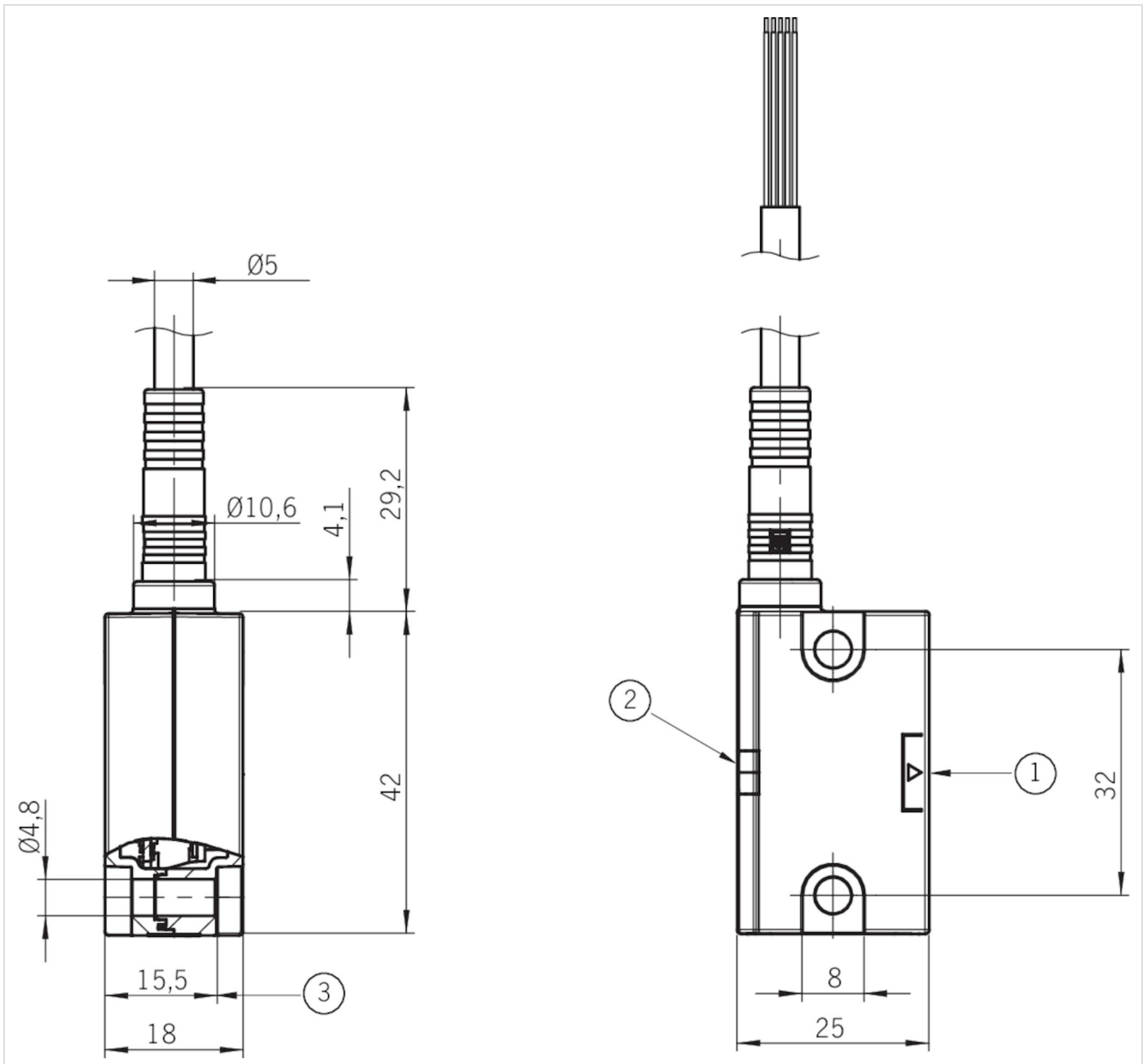
STATE Status LED

DIA Diagnostic LED

## Terminal assignment

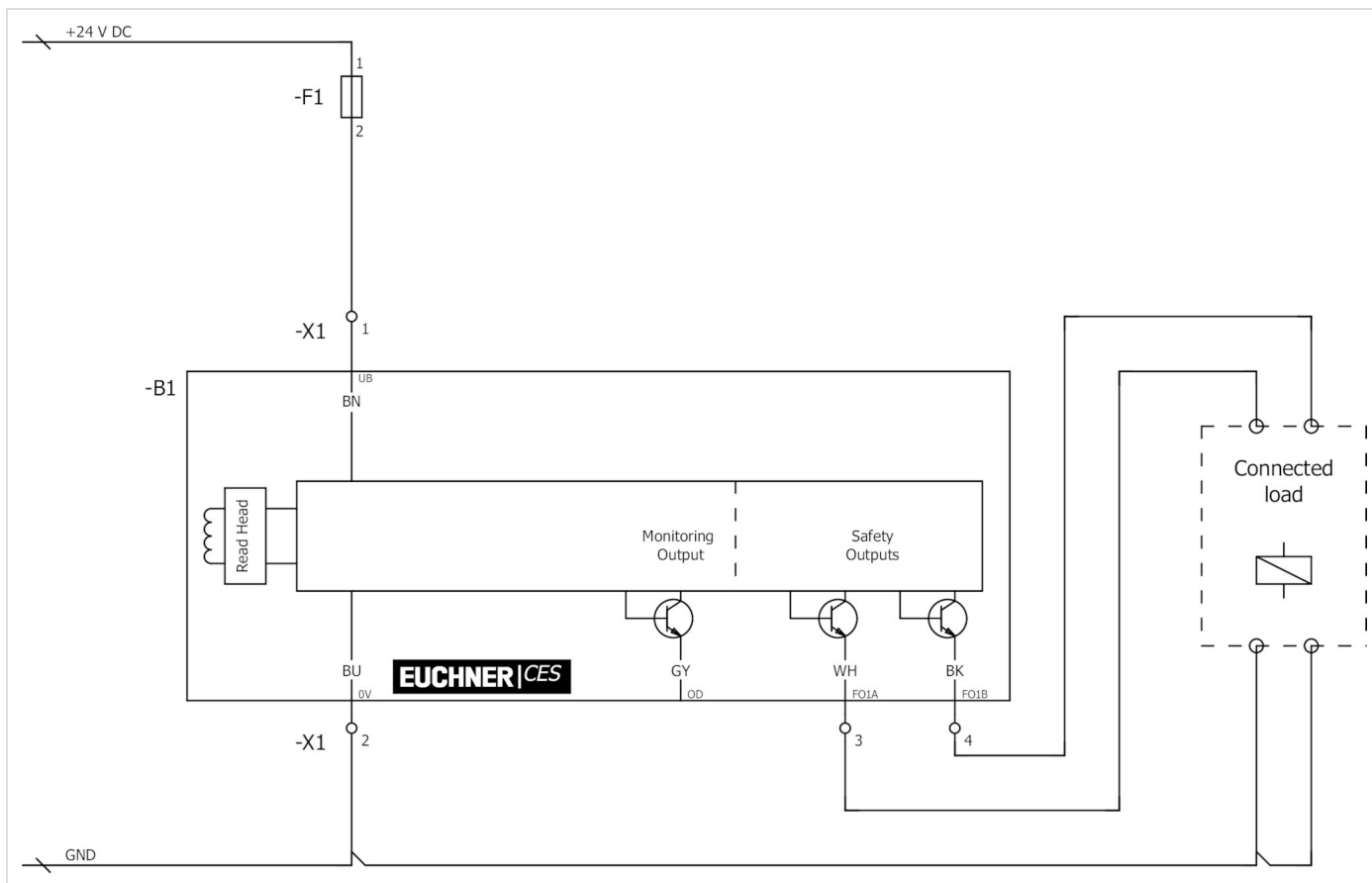
Designation	Function	Conductor coloring of connecting cable
UB	Power supply, DC 24 V	BN
FO1A	Safety output, channel 1	WH
0V	Ground, DC 0 V	BU
FO1B	Safety output, channel 2	BK
OD	Monitoring output	GY

## Dimension drawing



- 1 Active face
- 2 LED status indication
- 3 With rubber support

## Wiring diagram



## Technical data

### Approvals



### Mechanical values and environment

Cable ambient temperature (dynamic)	-25 ... 65 °C
Cable ambient temperature (static)	-25 ... 65 °C
Shock and vibration resistance	In acc. with EN 60947-5-3
Dynamic bending radius	10 x cable diameter
Static bending radius	5 x cable diameter
Material	
	Rubber support NBR 80 ±5 Shore
Housing material	
	Housing Plastic, PBT
Weight	
	Net 0,7 kg
Degree of protection	IP67
Mounting method	Surface mounting on metal
Mounting distance	
	Between 2 switches or 2 actuators min.80 mm
Installation orientation	Any
Tightening torque	
	Fixing screws max.0,8 Nm
Ready delay	0,5 s
Switching frequency	max.1 Hz
Connection	connection cable PUR, length 20m

## Electrical connection ratings

## Operating voltage DC

$U_B$  24 V DC 15% ... 15% Regulated, residual ripple < 5%, PELV  
(The device tolerates voltage interruptions in the operating voltage, e.g. test pulses, of up to 5 ms. These voltage interruptions are also output on the outputs.)

## Current consumption

No load on outputs max.35 mA

## Fusing

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

Rated insulation voltage  $U_i$  300 V

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.300 ms

Safety class III

Risk time according to EN 60947-5-3 max.260 ms

## Monitoring output OD

Type of output p-switching, short circuit-proof

Switching current max.50 mA

Output voltage 0,8 x  $U_B$  ...  $U_B$  V DC

## Safety outputs FO1A / FO1B

Test pulses max.0,3 ms  
(Applies for a load with  $C \leq 30nF$  and  $R \leq 20k\Omega$ )

Test-pulse interval min.100 ms

Type of output Semiconductor outputs, p-switching, short circuit-proof

Switching current

per safety output 1 ... 150 mA

Output voltage

HIGH  $U(FO1A)$  /  $U(FO1B)$   $U_B - 1,5V$  ...  $U_B$  V DC  
(Values at a switching current of 50 mA without taking into account the cable lengths.)

LOW  $U(FO1A)$  /  $U(FO1B)$  0 ... 1 V DC

Utilization category acc. to EN 60947-5-2

DC-13 24V 150mA  
(Caution: outputs must be protected with a free-wheeling diode in case of inductive loads.)

Rated conditional short-circuit current 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  $\leq 10$

## Other

Additional feature Rubber support included

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 <sub>D</sub>	4.1 x 10 <sup>-9</sup>
Mission time	20

## In combination with Actuator CES-A-BBN-C04-115271, CES-A-BBN-C04-EX-137527

### Actuating range

Operating distance	
Installation position A or B (front side)	15 mm
Installation position C or D (broad side)	11 mm
Assured release distance S <sub>ar</sub>	
In y direction	max.60 mm
In x/z direction	max.40 mm
Assured operating distance S <sub>ao</sub>	
Installation position A or B (front side)	min.10 mm
Installation position C or D (broad side)	min.6 mm
Switching hysteresis	min.1 mm

## In combination with Actuator CES-A-BDN-06-104730

### Actuating range

Operating distance	
Installation position A or B (front side)	19 mm
Installation position C or D (broad side)	15 mm
Assured release distance S <sub>ar</sub>	
In x/z direction	max.40 mm
In y direction	max.60 mm
Assured operating distance S <sub>ao</sub>	
Installation position A or B (front side)	min.14 mm
Installation position C or D (broad side)	min.10 mm
Switching hysteresis	min.1 mm

## In combination with Actuator CES-A-BDN-06-161742

### Actuating range

## Operating distance

Installation position A	26 mm
Installation position C	23 mm
Assured release distance $S_{ar}$	
Installation position A	max.77 mm
Installation position C	max.72 mm
Assured operating distance $S_{ao}$	
Installation position A	min.16 mm
Installation position C	min.10 mm
Switching hysteresis	min.1 mm

## In combination with Actuator CES-A-BBN-161502

### Actuating range

#### Operating distance

Installation position A + B	30 mm
Installation position C + D	25 mm

#### Assured release distance $S_{ar}$

in y direction / installation position A + B	max.77 mm
in y direction / installation position C + D	max.72 mm
in x/z direction / installation position C + D	max.63 mm
in x/z direction / installation position A + B	max.69 mm

#### Assured operating distance $S_{ao}$

in z direction / installation position A + B	min.15 mm
in x direction/installation position C + D	min.10 mm

#### Switching hysteresis

in x direction/installation position C + D	min.1 mm
in z direction / installation position A + B	min.1 mm

## Accessories

### Actuator

## Actuator CES-A-BBN-C04

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**115271**  
CES-A-BBN-C04-115271

- ▶ Cube-shaped design 42 x 25 mm
- ▶ Two safety screws M4x20 and rubber support included



**161502**  
CES-A-BBN-161502

- ▶ Cube-shaped design 42 x 25 mm, height 12 mm
- ▶ Transponder with large actuating range
- ▶ Mounting compatible with actuators: CES-A-BBA-071840, CES-BBN-106600, CES-A-BBN-C04-115271
- ▶ Two safety screws M4x14 included

## Actuator CES-A-BDN-06

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**104730**  
CES-A-BDN-06-104730

- ▶ Cylindrical design Ø 6x26 mm
- ▶ Transponder coded, high coding level



**161742**  
CES-A-BDN-06-161742

- ▶ Cylindrical design, Ø 6x38 mm
- ▶ Transponder coded, high coding level
- ▶ Large actuating range

## Bolt

### Bolt BTC-CES04-S-TH-20-X-121646 for safety switch CES04

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**121646**  
BTC-CES04-S-TH-20-X-121646

- ▶ Aluminum bolt
- ▶ For doors hinged on the left or right
- ▶ Spring catch in closed position
- ▶ Can be locked in open position with padlocks

### Bolt BTC-CES04-S-TH-21-F-123583 for safety switch CES04

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**123583**  
BTC-CES04-S-TH-21-F-123583

- ▶ Aluminum bolt
- ▶ For doors hinged on the left or right
- ▶ Escape release
- ▶ Detent knob in open position
- ▶ Spring catch in closed position
- ▶ Can be locked in open position with padlocks

## Function expansion



## Housing protection ATEX

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**137528**  
AM-C-C04-EX-137528

- ▶ ATEX protective cover
- ▶ The housing guard is suitable for all CES-C04-AP/AR switches.
- ▶ The housing guard makes it possible to use safety switches CES-C04 in potentially explosive atmospheres.
- ▶ Protection of the switch and plug connector against possible impacts
- ▶ The safety switch is not included and must be ordered separately.
- ▶ When the PBT/PC plastic housing guard is used, the CES-C04 switches (with connecting cable or plug connector) comply with the relevant explosion-protection standards according to ATEX (zone 2/22).

## Variable magnetic guard locking device CEM-C60 without permanent magnet, plug connector on left

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**163252**  
CEM-M2-C60-KZ-SE-163252

- ▶ Magnetic guard locking for process protection
- ▶ Locking force 650 N (without permanent magnet)
- ▶ With remanence
- ▶ Function expansion for safety switch CES-C04 / CES-C07
- ▶ Flexibility through a large selection of safety switches
- ▶ Maximum safety level PL e / category 4 for detection of the door position
- ▶ Transponder coding prevents high level of protection against tampering
- ▶ Simple connection of the solenoid using M12 plug connector, 5-pin
- ▶ Yellow LED to indicate voltage at the solenoid
- ▶ Nickel-plated solenoid surface with high corrosion resistance

## Variable magnetic guard locking device CEM-C60 with permanent magnet, plug connector on left

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**161320**  
CEM-M2-C60-PZ-SE-161320

- ▶ Magnetic guard locking for process protection
- ▶ Guard locking solenoid with locking force of 650 N
- ▶ Function expansion for safety switch CES-C04 / CES-C07
- ▶ Flexibility through a large selection of safety switches
- ▶ Maximum safety level PL e / category 4 for detection of the door position
- ▶ Transponder coding prevents high level of protection against tampering
- ▶ Simple connection of the solenoid using M12 plug connector, 5-pin
- ▶ Yellow LED to indicate voltage at the solenoid
- ▶ Nickel-plated solenoid surface with high corrosion resistance
- ▶ Integrated permanent magnet, 30 N adhesive force

## Mounting accessories

## Mounting plate AM-SET-PP

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**119690**  
AM-SET-PP-119690

- ▶ Set consists of two mounting plates

## Mounting set AM-SET-PPB

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**119694**  
AM-SET-PPB-119694

- ▶ Mounting plate
- ▶ angle mounting plate
- ▶ Spacer

## Safety screws M4 x 20

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**116978**  
SICHERHEITSSCHRAUBE M4X20-  
A2/V20

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

## Contacts

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