

## CES-I-AP-U-C04-USI-115150 (ORDER NO. 115150)

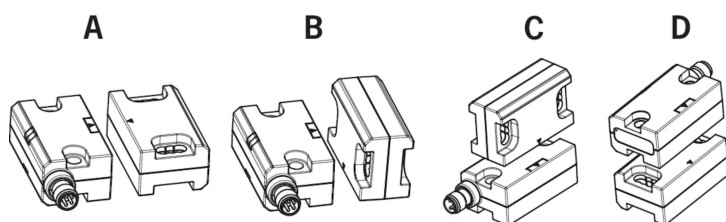
Non-contact safety switches CES-I-AP-.-C04-, M12, pin 5 not used

- ▶ 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, 0.1 m, plug connector M12, 5-core, pin 5 not used
- ▶ Unicode



### 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

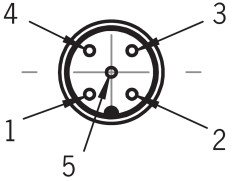
**Important:** To achieve the stated category according to EN ISO 13849-1, both safety outputs (FO1A and FO1B) must be evaluated.

#### LED indicator

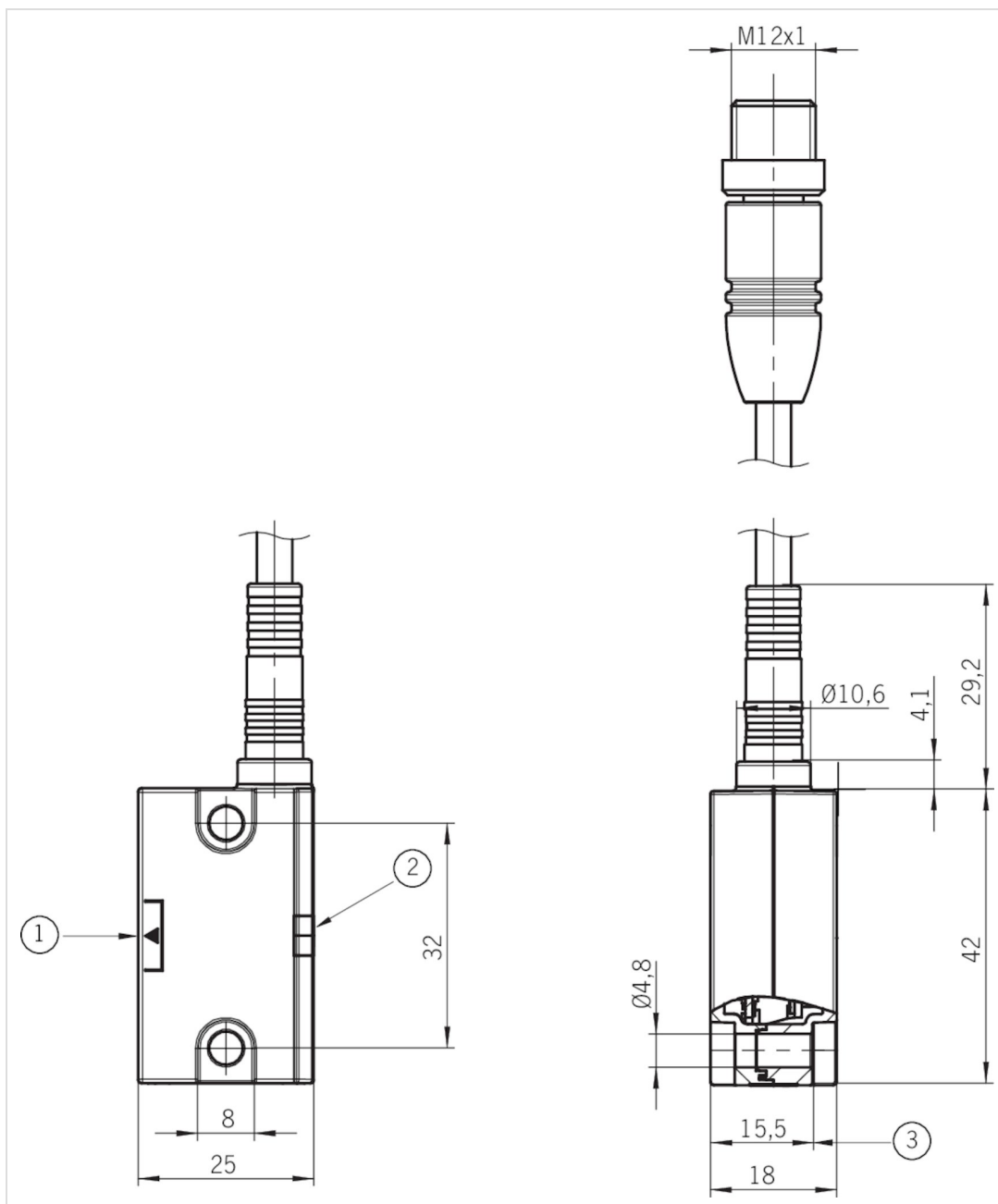
STATE Status LED

DIA Diagnostic LED

## Connector assignment

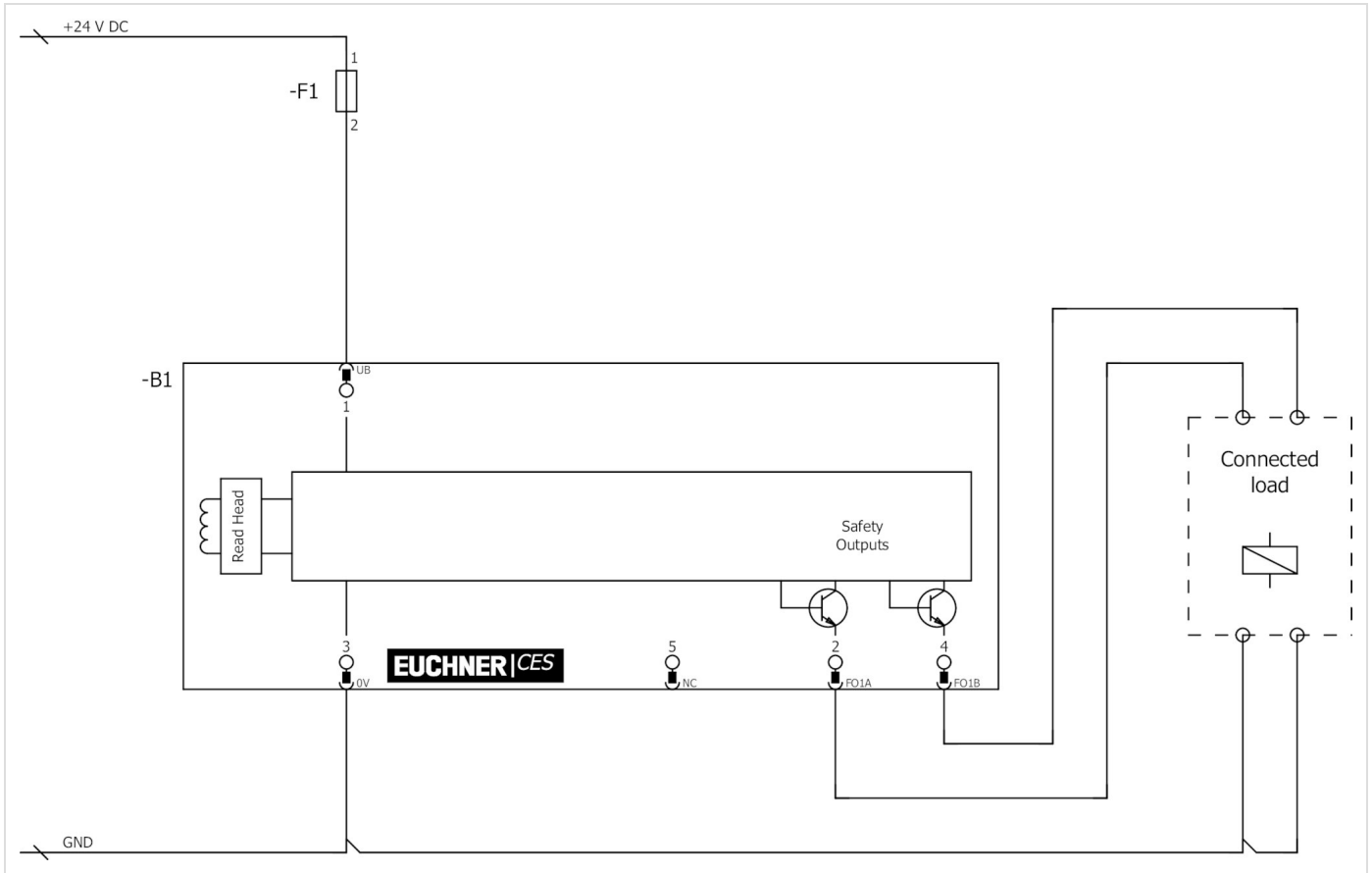
Plug connector (view of connection side)	Pin	Designation	Function	Conductor coloring of connecting cable
	1	UB	Power supply, DC 24 V	BN
	2	F01A	Safety output, channel 1	WH
	3	0V	Ground, DC 0 V	BU
	4	F01B	Safety output, channel 2	BK
	5	-	n.c.	GY

## 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 0,05 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	PUR cable 100mm with plug connector M12x1, 5-pin, pin 5 not used

## 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

### 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

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

HIGH  $U(FO1A) / U(FO1B)$   $U_B - 1,5V \dots U_B$  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 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-BDN-06-161742****Actuating range**

Operating distance	
Installation position A	26 mm
Installation position C	23 mm
Assured release distance S <sub>ar</sub>	
Installation position A	max.77 mm
Installation position C	max.72 mm
Assured operating distance S <sub>ao</sub>	
Installation position A	min.16 mm
Installation position C	min.10 mm
Switching hysteresis	min.1 mm

**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-BBN-161502****Actuating range**

## Operating distance

Installation position C + D	25 mm
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Installation position A + B	30 mm
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## Assured release distance $S_{ar}$

in x/z direction / installation position A + B	max.69 mm
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in x/z direction / installation position C + D	max.63 mm
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in y direction / installation position A + B	max.77 mm
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in y direction / installation position C + D	max.72 mm
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## Assured operating distance $S_{ao}$

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

in z direction / installation position A + B	min.1 mm
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in x direction/installation position C + D	min.1 mm
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## In combination with Actuator CES-A-BDN-06-104730

### Actuating range

#### Operating distance

Installation position C or D (broad side)	15 mm
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Installation position A or B (front side)	19 mm
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#### Assured release distance $S_{ar}$

In y direction	max.60 mm
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In x/z direction	max.40 mm
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#### Assured operating distance $S_{ao}$

Installation position A or B (front side)	min.14 mm
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Installation position C or D (broad side)	min.10 mm
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Switching hysteresis	min.1 mm
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## 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

## Connection material

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

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**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 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

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**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

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**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

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**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

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**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

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**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

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**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

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**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**  
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



**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



**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

#### 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

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**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)

## 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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