



## Switchgear, sensors and enclosures **Lifts and escalators**

Approved. Safe. Individual – for your application.

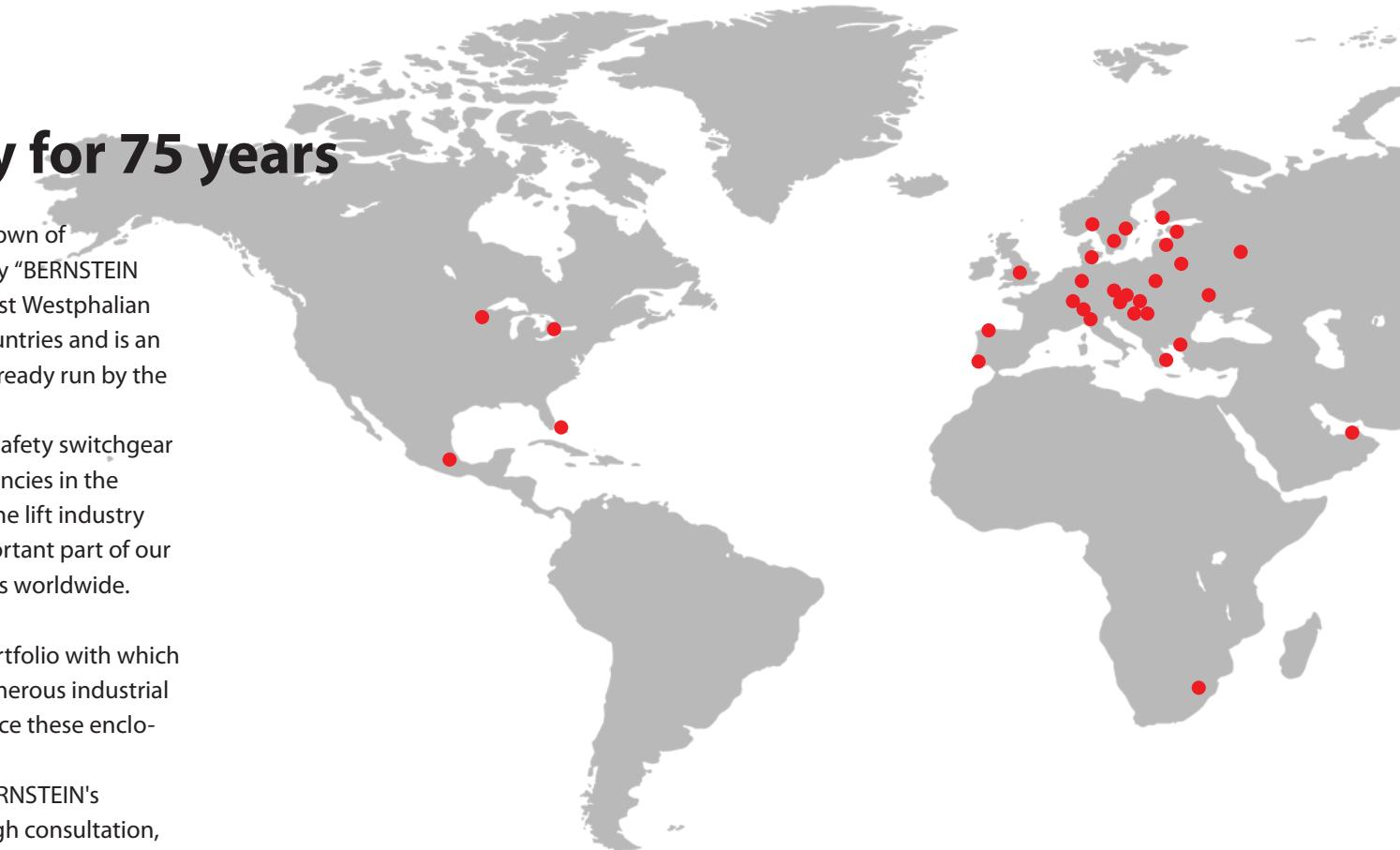
## Already successfully Serving your industry for 75 years

At the foot of the Emperor William Monument in the town of Porta Westfalica, Hans Bernstein founded the company "BERNSTEIN Spezialfabrik für Schaltkontakte" in 1947. Today, the East Westphalian BERNSTEIN AG has more than 500 employees in 10 countries and is an internationally acting family-owned business that is already run by the third generation.

As a worldwide leading manufacturer of industrial safety switchgear and enclosures – BERNSTEIN combines these competencies in the business areas DETECT and PROTECT. Switchgear for the lift industry located in the business area DETECT has been an important part of our enterprise for many years and is used by our customers worldwide.

The business area PROTECT includes our enclosure portfolio with which BERNSTEIN has been establishing its reputation in numerous industrial segments for many years. In this catalogue we introduce these enclosures to our lift customers the first time.

Especially customer-specific solutions belong to BERNSTEIN's strengths that we realise starting from the idea, through consultation, development, processing and implementation, all from one source. This is a service which distinguishes us from other competitors and pushes our customers a decisive step forward.





# 1947 2016

**COMPANY FOUNDING**  
by Hans Bernstein in  
Porta Westfalica

**IN62, IN65 AND I81**  
supplement the product  
range of position switches

# 36 3

**DISTRIBUTORS**  
are acting worldwide  
ensuring first class  
customer support

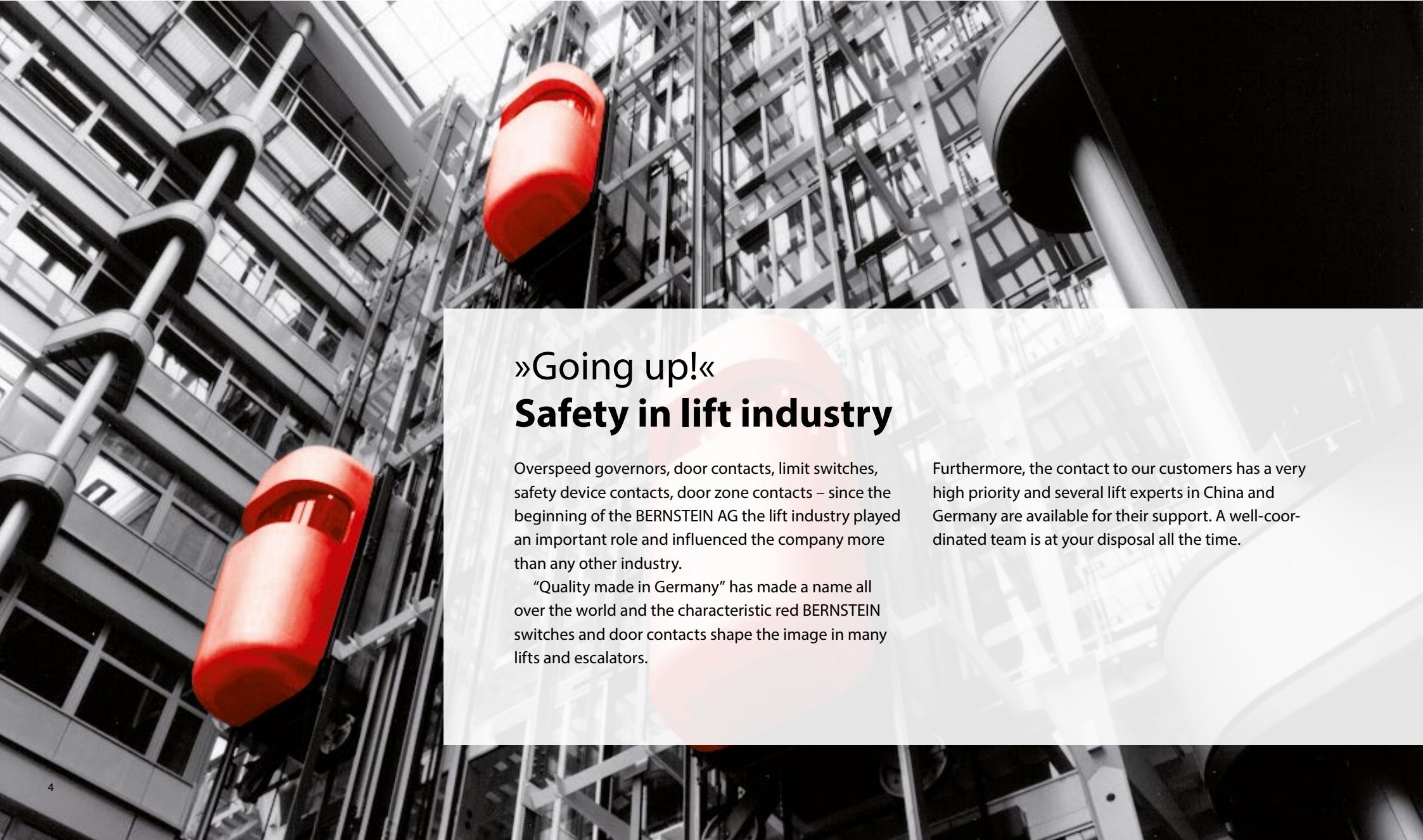
**GENERATIONS**  
characterise the  
successful family  
business

»Over the years, I experienced not only the creation of new but also significant switch series changes in our manufacturing technology. Our fully automatic manufacturing line for the C14 switch insert is state of the art technology – an important milestone for us in the BERNSTEIN factory in Hartum.«

— **Bernd Borcherding** | Production Manager, BERNSTEIN AG

*A real milestone.*



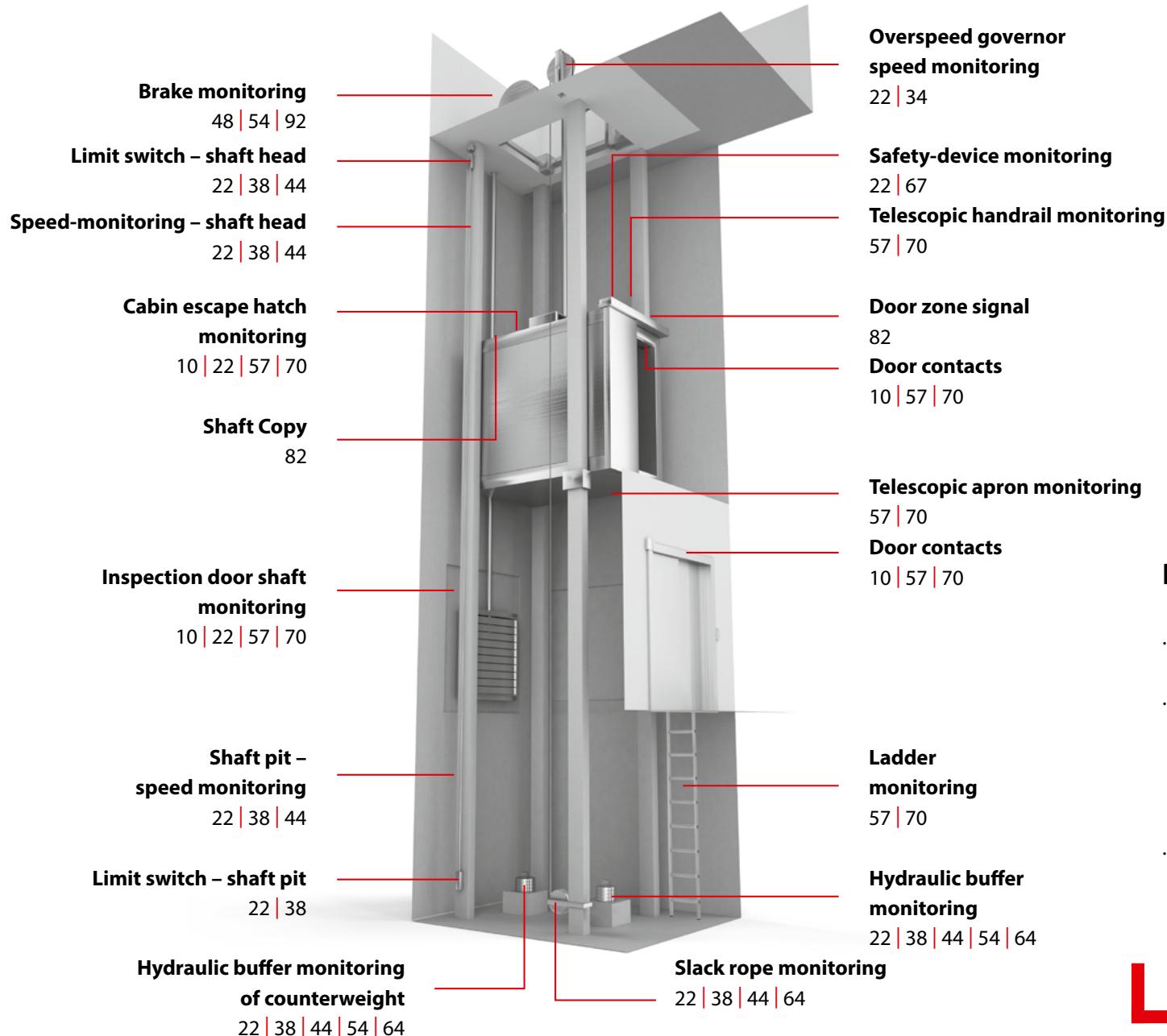


## »Going up!« **Safety in lift industry**

Overspeed governors, door contacts, limit switches, safety device contacts, door zone contacts – since the beginning of the BERNSTEIN AG the lift industry played an important role and influenced the company more than any other industry.

“Quality made in Germany” has made a name all over the world and the characteristic red BERNSTEIN switches and door contacts shape the image in many lifts and escalators.

Furthermore, the contact to our customers has a very high priority and several lift experts in China and Germany are available for their support. A well-coordinated team is at your disposal all the time.



## Did you know that ...

... lifts were already known in ancient times?

... Elisha Gravis Otis 1854 introduced the first safety device at the International Exposition *Industry of all Nations* in New York? This was the birth of the modern lift.

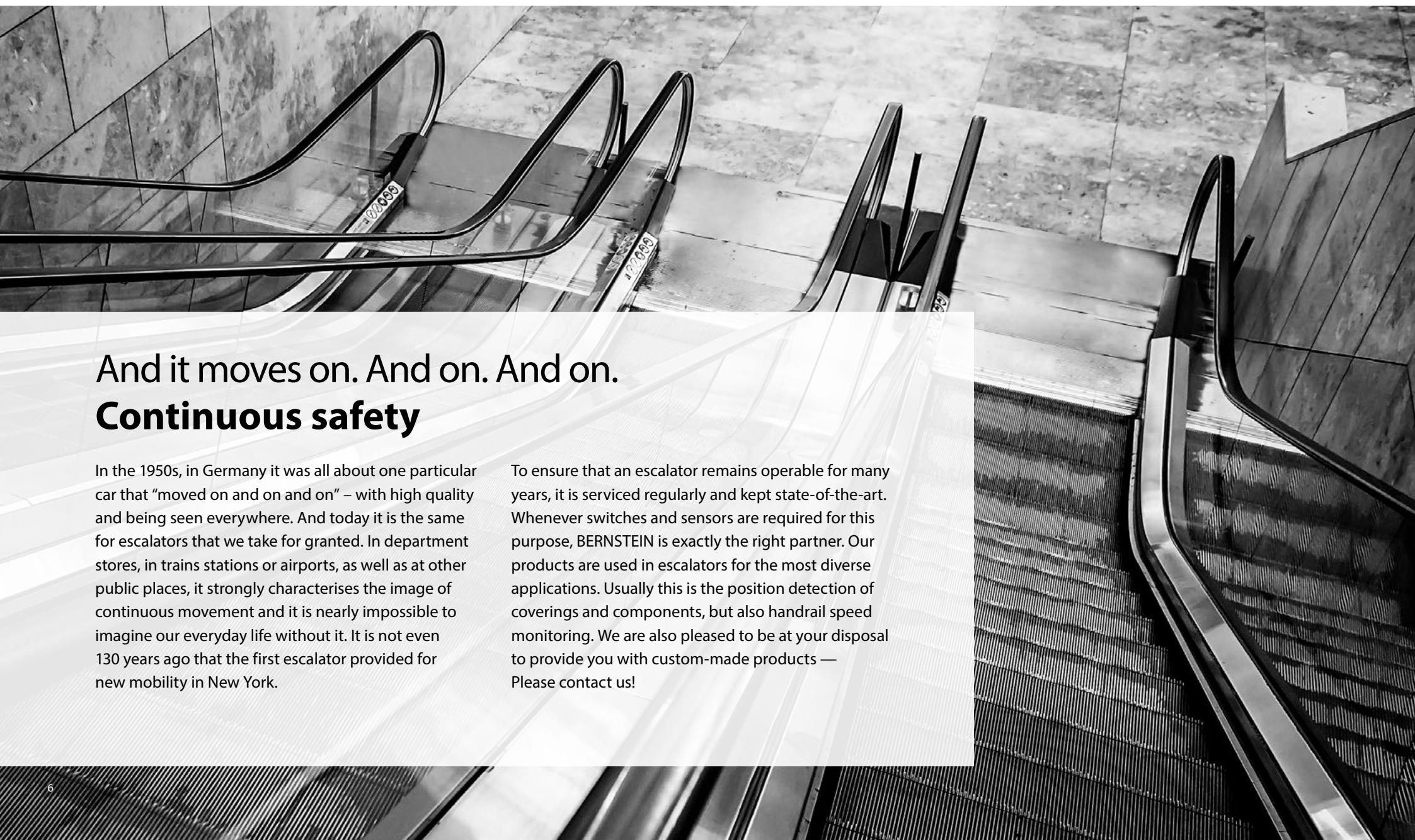
... people are still researching on a space lifts since the 1960s? A counterweight is to be positioned geostationarily at a height of 35,786 m and connected to the earth via a carrying system.

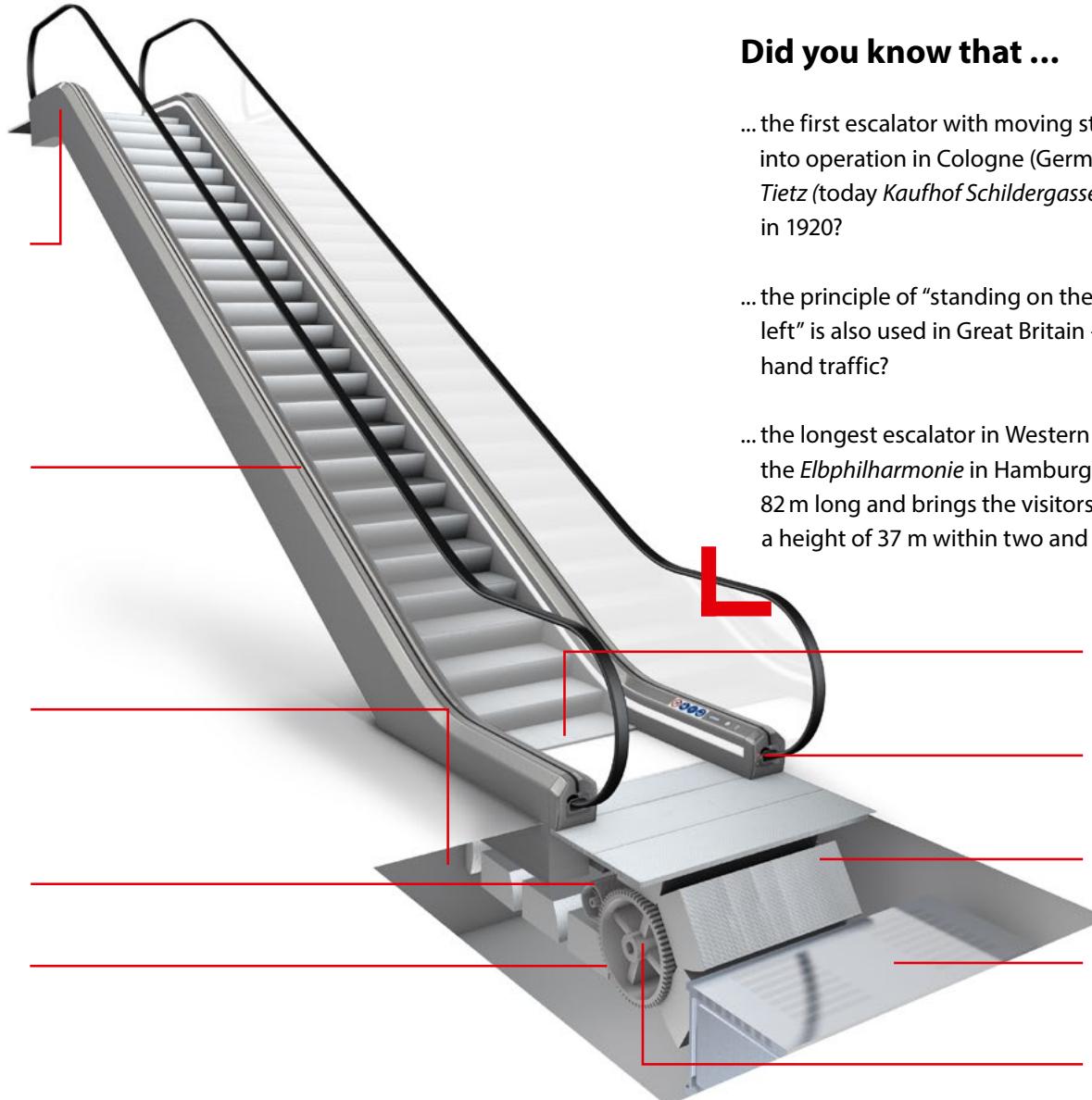
The actual lift could be a self-driving cabin.

## And it moves on. And on. And on. **Continuous safety**

In the 1950s, in Germany it was all about one particular car that "moved on and on and on" – with high quality and being seen everywhere. And today it is the same for escalators that we take for granted. In department stores, in trains stations or airports, as well as at other public places, it strongly characterises the image of continuous movement and it is nearly impossible to imagine our everyday life without it. It is not even 130 years ago that the first escalator provided for new mobility in New York.

To ensure that an escalator remains operable for many years, it is serviced regularly and kept state-of-the-art. Whenever switches and sensors are required for this purpose, BERNSTEIN is exactly the right partner. Our products are used in escalators for the most diverse applications. Usually this is the position detection of coverings and components, but also handrail speed monitoring. We are also pleased to be at your disposal to provide you with custom-made products — Please contact us!





## Did you know that ...

... the first escalator with moving steps was already put into operation in Cologne (Germany) in the *Kaufhaus Tietz* (today *Kaufhof Schildergasse*) by the company *Otis* in 1920?

... the principle of "standing on the right, walking on the left" is also used in Great Britain – despite of the left-hand traffic?

... the longest escalator in Western Europa is the *Tube* in the *Elphilharmonie* in Hamburg? The bent escalator is 82 m long and brings the visitors to the public Plaza at a height of 37 m within two and a half minutes.

## **CONTENT** Our products – Your solutions



- 10 Door contacts**
- 22 Position- and standard switches | Special switches**
- 70 Position switches with separated actuator**
- 82 Reed contacts**
- 92 Inductive sensors**
- 98 Guard locking device**
- 104 Standard enclosures**



**"Just one more thing ..."**  
**— Please contact us**

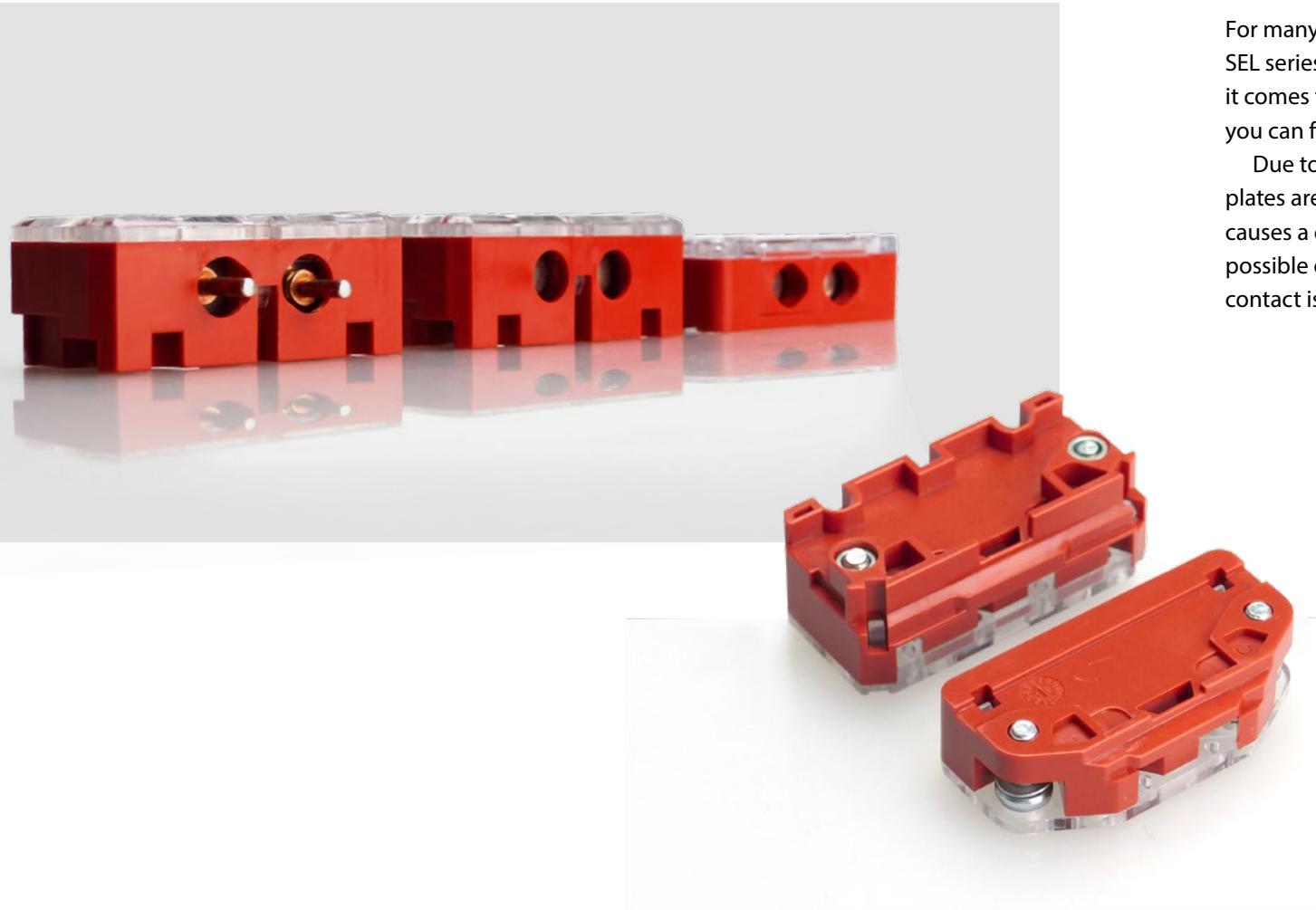
Certainly, we are offering all of our switches, sensors and enclosures in a customer-specific design. Do not hesitate to contact us. We would be happy to provide you with advice.

Tel +49 571 793-0 | Fax +49 571 793-555  
[info@de.bernstein.eu](mailto:info@de.bernstein.eu) | [www.bernstein.eu](http://www.bernstein.eu)



## **DOOR CONTACTS**

# A good team **Door contacts of the SEL series**



### **SEL switch family**

For many years, the BERNSTEIN door contacts of the SEL series are an integral part of the lift industry. When it comes to supplying OEMs of delivering spare parts – you can find us everywhere in the world.

Due to its elastic design of the contacts, the contact plates are mechanically moved with each actuation; this causes a cleaning effect by the actuator. Dirt, dust, and possible oxide layers are rubbed away – the electrical contact is made reliably.

## Product characteristics

The SEL1 is the basic switch with a height of 16 mm, a width of 50 mm and a depth of 24.5 mm. The fixing screws are in a usual distance of 40mm.

The SEL2 has a height of 19 mm; the other dimensions are the same as for SEL1. Additional to the SEL1 it has an integrated cable duct on the bottom side – therefore the wires for the connection of the contacts can be led through below the door contact.

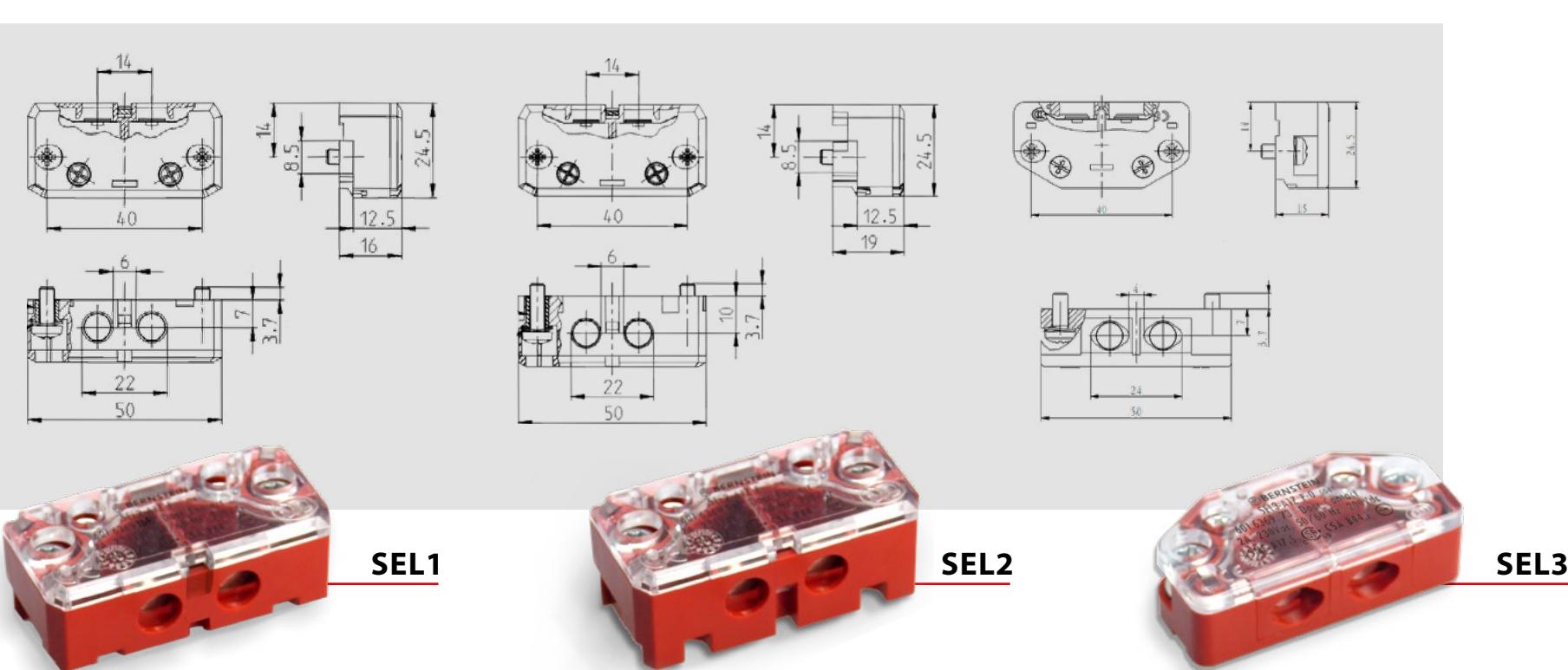
The SEL3 is the youngest member of our door contact family. It is designed similar to the SEL1. However, the lower edges were reduced here to further reduce the dimensions. It has a height of 15 mm and with this it is flatter than the SEL1 by 1 mm. The operating height of the contact plates (7 mm) as well as the fixing dimensions are the same for the two switches.

Please find the SEL1 and the SEL2 also as contact pin version PL in the BERNSTEIN product portfolio.



## DOOR CONTACTS

With separated actuator  
**Door contacts SEL1, SEL2 and SEL3**



## Technical design

- Contact plate design (Fig. left)
- PL-contact pin design (Fig. right)
  - here on the right side,  
using the example of SEL2



## Technical data

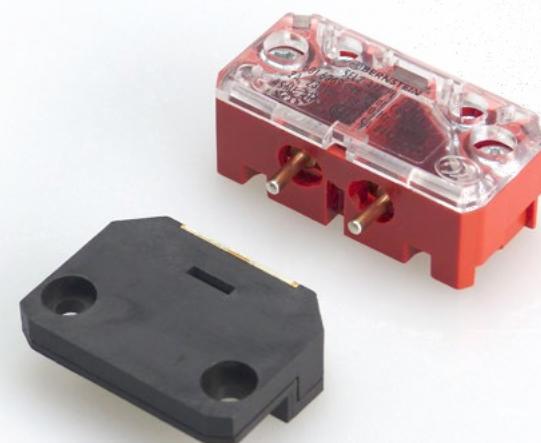
Electrical data		
Rated operating current	$I_e$	2 A AC / DC
Rated operating voltage	$U_e$	230 V AC; 200 V DC
Conventional thermoelectric current	$I_{the}$	4 A
Positive break	p	accor. to IEC/EN 60947-5-1, Annex K
Isolating distance – NC contacts	①	DIN EN 81-20
Short-circuit protection device		Safety fuse 6 A gG
Mechanical data		
Enclosure material	PC (UL 94-V0) red/transparent	
Cover	PC (UL 94-V0) transparent/transparent	
Ambient temperature	-30 °C ... +70 °C	
Type of contact	1 NC contact	
Mechanical lifetime	10 × 10 <sup>6</sup> switching cycles	
Switching frequency	$\leq 30$ /min	
Mounting of safety switch	2 × M4 self-tapping screws accor. to DIN 7500 captive	
Type of connection	2 screwed connections (M3.5)	
Conductor cross-sections	Single-wire 0.5 – 1.5 mm <sup>2</sup> Strand with wire-end ferrule 0.5 – 1.5 mm <sup>2</sup>	
Weight	$\approx 0.02$ kg	
Mounting position	arbitrary	
Protection class	IP20 conforming to EN 60529	
Standards		
VDE VDE 0660 T100, DIN EN 60947-1, IEC 60947-1		
VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1		
EN 81-20, EN 81-50		

## Product characteristics

- Classical door contact with contact plates or contact pins, as well as integrated, bottom side cable duct (with SEL2)
- SEL1: 16mm height, 50mm width and 24.5mm depth
- SEL2: 19mm height, 50mm width and 24.5mm depth
- SEL3: 15 mm height, 50mm width and 24.5mm depth
- Distance of fixing screws: 40 mm
- Available as red-transparent enclosure and as overall-transparent variant

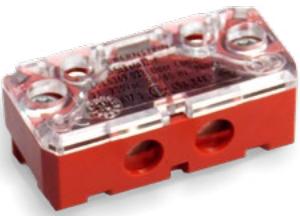
## Options

- PO standard actuator
- P1 and P3 actuator with transverse mounting
- PL actuator in case of the contact pin version (Fig. on the right using the example of SEL2)
- Selection of actuator on pages 18–19

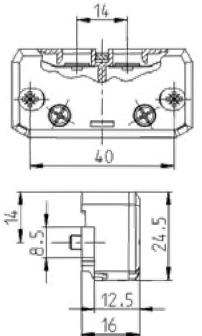


## DOOR CONTACTS

### SEL 1...P



#### 1 NC contact



Transparent cover  
Red enclosure

**6016369045**  
SEL1-A1Z P

Transparent  
enclosure

**6016369038**  
SEL1-A1Z P

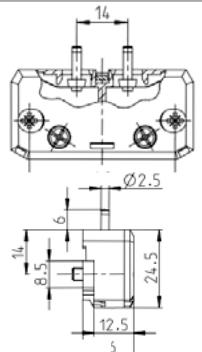
Special features/ variants



### SEL 1...PL



#### 1 NC contact



Transparent cover  
Red enclosure

**6016369125**  
SEL1-A1Z PL0

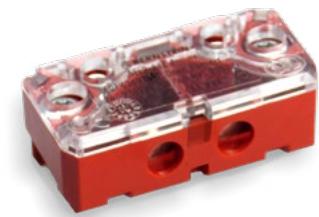
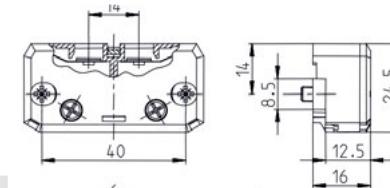
Transparent  
enclosure

**6016369037**  
SEL1-A1Z PL

Special features/ variants

Contact pins



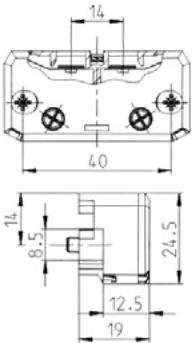
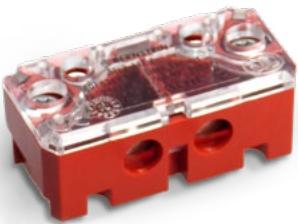
**SEL 1...P with extended mounting screws****1 NC contact**Transparent cover  
Red enclosure**6016369164**  
SEL1-A1Z P

Special features/variants

**Extended mounting screws, excess length 6.7mm**

## DOOR CONTACTS

### SEL 2 ... P



Transparent cover  
Red enclosure

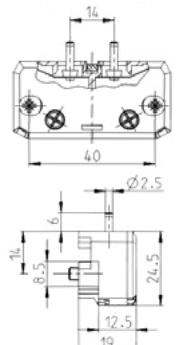
1 NC contact

**6016369049**  
SEL2-A1Z P

Special features/variants

Cable duct on the bottom side

### SEL 2...PL



Transparent cover  
Red enclosure

1 NC contact

**6016369031**  
SEL2-A1Z PL0

Special features/variants

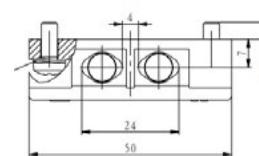
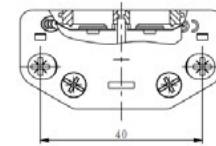
Contact pins, with cable duct on the bottom side

**SEL 3 ... P**

1 NC contact

Transparent cover  
Red enclosure

**6016369173**  
SEL3-A1Z P



Particularities/variants

Just 15mm hight, inclined corners.



# DOOR CONTACTS

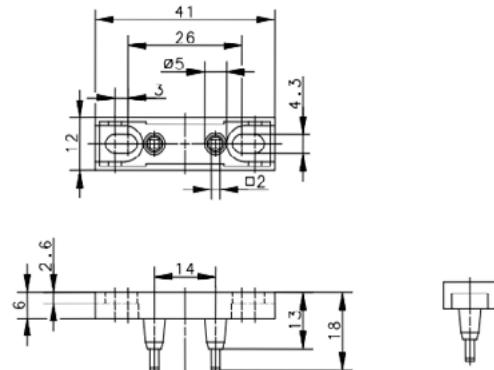
## SEL actuators

**P0 actuator**



**Product range**

Article number	Designation
3911462082	P0-BET.



**Mechanical data**

Enclosure	PA 6.6 (UL 94-V0) black
Ambient temperature	-30 °C ... +70 °C
Contact material	AgCu3 on CuNi18Zn20
Mounting	2 × M4
Weight	≈ 0.01 kg

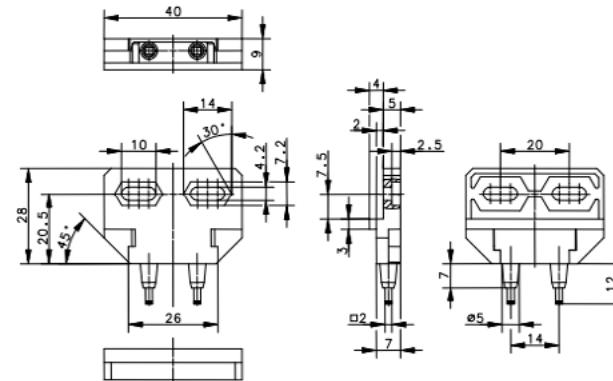
**Remarks** Actuators may not be used as end stop. Only use the door contacts of the SEL series with BERNSTEIN actuators.

**P1 actuator**



**Product range**

Article number	Designation
3911462088	P1-BET.



**Mechanical data**

Enclosure	PA 6.6 (UL 94-V0) black
Ambient temperature	-30 °C ... +70 °C
Contact material	AgCu3 on CuNi18Zn20
Mounting	2 × M4
Weight	≈ 0.01 kg

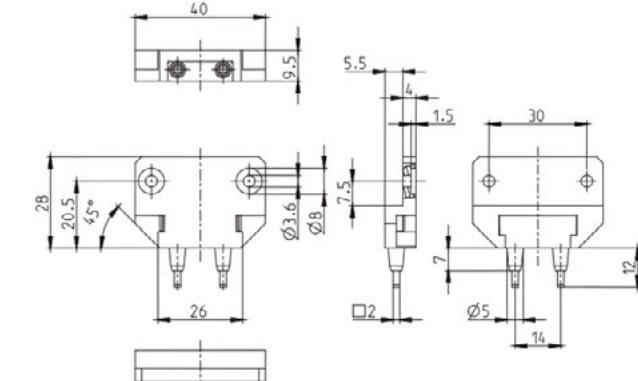
**Remarks** Actuators may not be used as end stop. Only use the door contacts of the SEL series with BERNSTEIN actuators.

**P3 actuator**



**Product range**

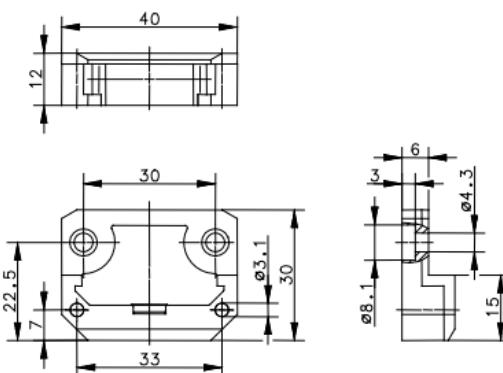
Article number	Designation
3911462155	P3-BET.



**Mechanical data**

Enclosure	PA 6.6 (UL 94-V0) black
Ambient temperature	-30 °C ... +70 °C
Contact material	AgCu3 on CuNi18Zn20
Mounting	2 × M4
Weight	≈ 0.01 kg

**Remarks** Actuators may not be used as end stop. Only use the door contacts of the SEL series with BERNSTEIN actuators.


**PL actuator**
**Product range**
**Article number**      **Designation**
**3911462094**      PL1-BET.

**Mechanical data**
**Enclosure**      PA 6.6 (UL 94-V0) black

**Ambient temperature**      -30 °C ... +70 °C

**Contact material**      AgCu3 on CuNi18Zn20

**Mounting**      2 × M4

**Weight**      ≈ 0.01 kg

**Remarks**      Actuators may not be used as end stop. Only use the door contacts of the SEL series with BERNSTEIN actuators.

## Did you know that ...

... door contacts, in addition to the driving contactors, are the most actuated switchgear in a lift?

... the door contacts in the car door are integrated in the active safety circuit and are actuated with each travel?

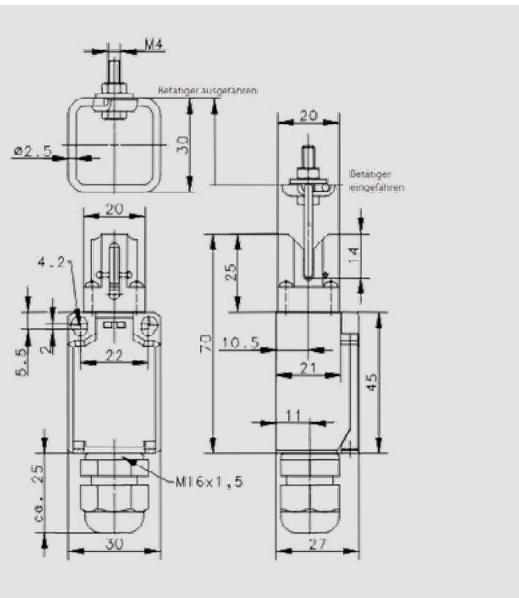
... our door contacts have a mechanical lifetime of >10.000.000 operations? If a lift would make approx. 1.000 travels per day, the door contacts can be used for more than 27 years before they reach their mechanical end of life.



## DOOR CONTACTS

# With protection class IP54 **TI2-KS**

**Protection class  
IP54**



### Good to know ...

The TI2-A1Z KS is a very special door contact. As already described in chapter TI2, it's a compact position switch of protection class IP54 with separate actuator. The design of the actuator ensures the positive break when the actuator is pulled out.

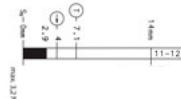
The position switch TI2 KS is used in places where door contacts with high protection class are required – for outdoor applications or in fire-service lifts.

### Product characteristics

- Compact dimensions
- 1 contact, positive break contacts
- Protection class IP54
- Separated actuator

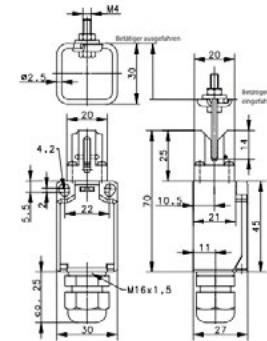

**1 NC / 1 NO**

Slow-action system

**6116469043**  
 TI2-A1Z KS


Particularities/variants

The specified protection class (IP code) only applies with closed cover and the use of a cable suitable for the cable gland of the terminal area specified above. Position switch with separated actuator, positive break; it can be used as door contact. Spare actuator: 3918452237

**TI2-... KS**


## Technical design

- Slow-action and snap action switching elements
- Versions: 1 NC / 1 NO, 2 NC, 2 NO

Please find further details in the total overview for the position switches of the Ti2 series on pages 54 to 57.

### TI2-KS actuator



#### Product range

Article number	Designation
<b>3918452237</b>	KS actuator

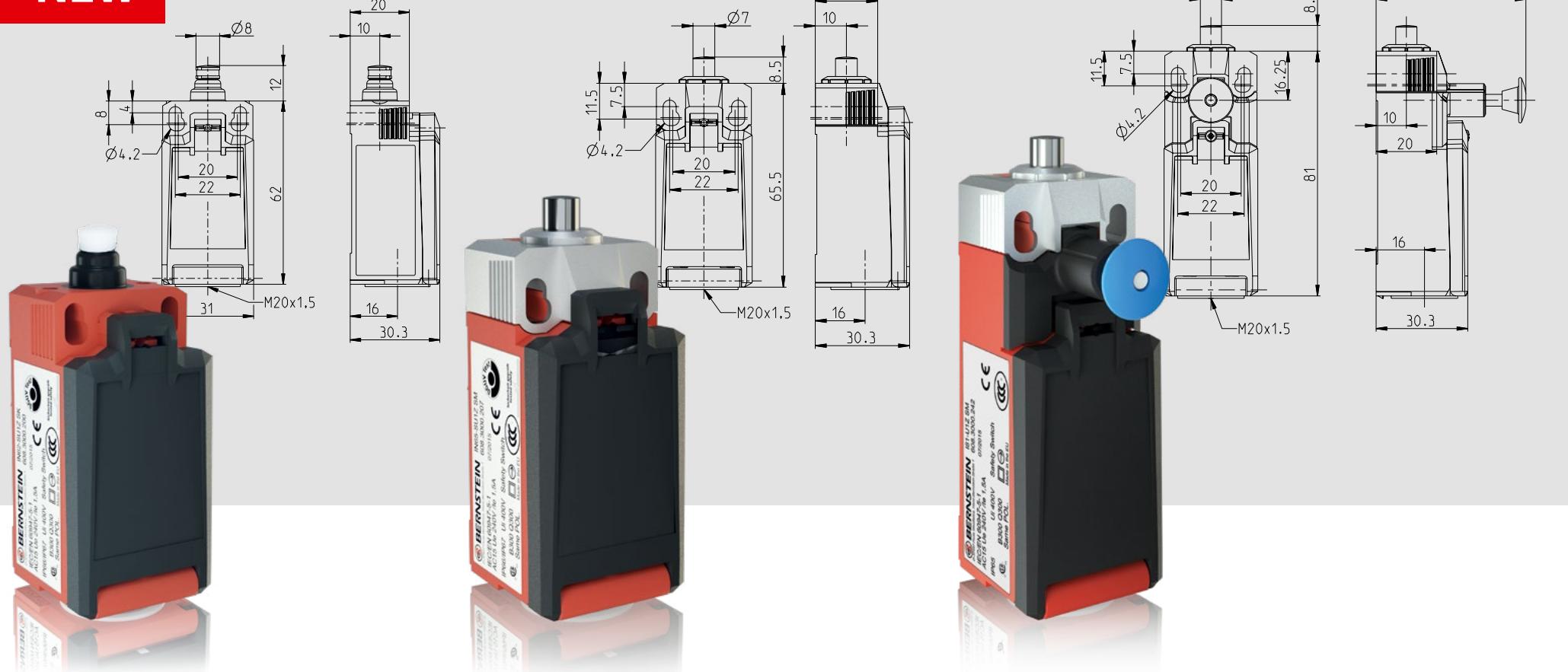
#### Mechanical data

Actuator	St-VA steel
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## POSITION SWITCHES

# Insulated encapsulation Position switches IN62, IN65 and I81

NEW



## Good to know ...

The new standard switches IN62 and IN65 and the position switch I81 are the advancement of our I88 series. All three switches, i.e. IN62, IN65 and I81, include the integrated new switch insert of type C14. The C14 has encapsulated contacts that ensure a well function at very low currents (1mA / 24 VDC). Due to the modular design and the easy-to-change actuator, they are used in many lift applications, for example as limit switches with large rubber rolls in the shaft head or as slack rope monitor in the shaft pit.

**The standard switch IN62** is the basic switch. With its actuators, it can handle many lift and escalator applications.

**The standard switch IN65** is the "allrounder". It is as effective as a moulded plastic switch, as robust as a metal switch and clever due to its modular design and the easy-to-change actuator.

**The position switch I81** completes the new series of position switches. It is the bistable version of the IN65, our "latching" switch.

## Product characteristics

- Highest reliability at low currents (1 mA/24VDC)
- Actuator and parts of the cover made of metal (IN65 and I81)
- Tool-free rotating (8 x 45°) and changing of the actuators (IN65 and I81) possible without tool
- Standard switch and standard actuator conforming to DIN EN 50047
- Protection classes IP66 and IP67 conforming to VDE 0470 T1

## What's so special about the C14?

We installed a modern assembly line in our factory in Hille-Hartum to produce the new C14 switch inserts (1 NC/ 1 NO, 2 NCs, 2NOs). The modular design of the line allows maximum flexibility for the production of different switch inserts. During the full-automatic manufacturing process all switch inserts are tested to ensure the highest quality. More than 800 switch inserts can be produced per hour.

The most important feature of the C14 switch insert are the encapsulated contacts. The production takes place in a cleanroom environment to ensure extreme clean contact surfaces already during the assembly. Due to the encapsulated enclosure of the C14 switch insert we can ensure that even after the manufacturing process no dirt or dust can contaminate the contacts. Therefore the switch can handle very low currents of 1mA at 24VDC.



C14 SWITCH INSERT

# POSITION SWITCHES

## Technical data

Electrical data				
Rated insulation voltage	$U_i$ max.	400 V AC		
Conventional thermoelectric current (up to)	$I_{the}$	5 A		
Rated operating voltage	$U_e$ max.	240 V AC/24 V DC		
Utilisation category (up to)		AC-15, $U_i/I_e$ 240 V/1.5 A DC-13 $U_e/I_e$ 24 V/1.5 A (B300 Table A.1)		
Short circuit protection (up to)		Safety fuse 4 A gG		
Protection class		II, protective insulation		
Mechanical data				
Enclosure material	Thermoplastics, glass-fibre reinforced (UL 94-V0)			
Ambient temperature	−30 °C to +75 °C			
Mechanical lifetime (up to)	30 × 10 <sup>6</sup> switching cycles			
B10d NC contact cycles (up to)	30 million			
B10d NO contact cycles (up to)	1 million			
Switching frequency	≤ 60/min.			
Type of connection	4 screwed connections (M3)			
Conductor cross-sections	Single-wire 0.5 – 1.5 mm <sup>2</sup> or strand with wire-end ferrule 0.5 – 1.5 mm <sup>2</sup>			
Cable entry	1 × M20 × 1.5			
Standards				
VDE 0660 T211, DIN EN 60947-5-4, IEC 60947-5-4 DIN EN ISO 13849-1, DIN EN ISO 13849-2				

## Technical design

- Slow- and snap action
- Versions: 1 NC / 1 NO, 2 NC, 2 NO, overlapping contacts

## Options

- Available with M12 connector
- Cable entry M16 × 1.5

## Mounting

- 2 screws M4 (distance 22 mm), adjustment with oval holes
- 2 screws M5 for safety applications without additional fixation (Fig. 1)
- Additional fixation by guide disc in case of lateral approach forces (Fig. 2 and on the right)
- Front mounted (type-related, Fig. 3)

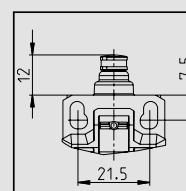


Fig. 1

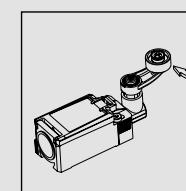


Fig. 2

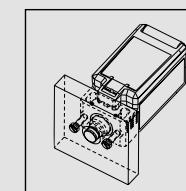
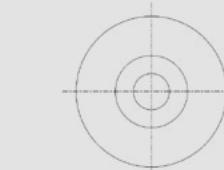
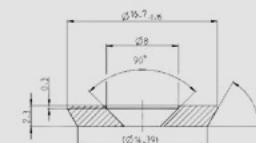


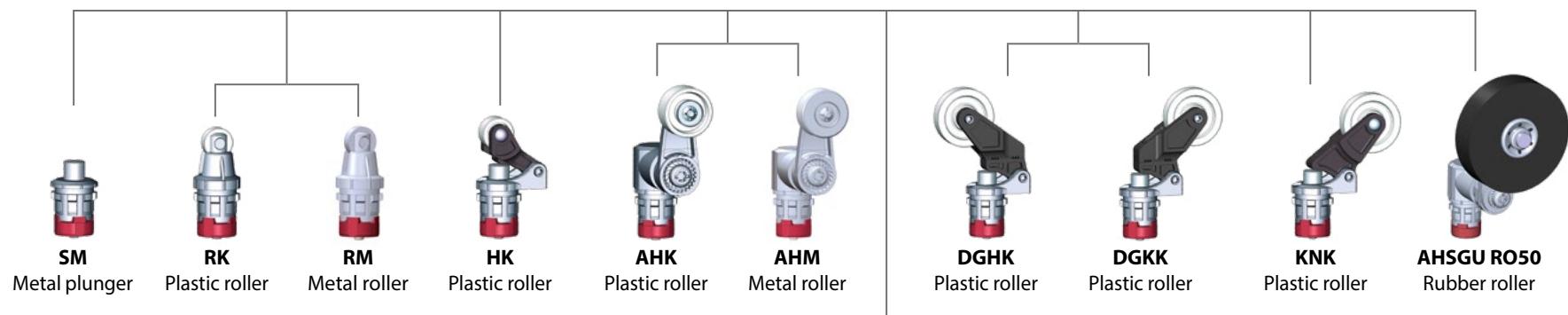
Fig. 3



Guide disc for additional fixation

## IN65 and I81 actuators

Further actuators are available on request.



**IN65**



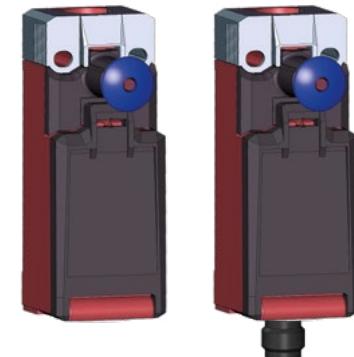
### Modular concept

Changing an actuator or our new position switches is very easy, no tools are required: Simply pull the metal clamp to the front, remove the actuator, insert the new actuator and push the metal clamp back — done.

#### Optional

Usually our position switches are equipped with an M20 thread for cable glands. All switches are further available with M12-connectors.

**I81 with latching**



## POSITION SWITCHES

### IN62 ... SK



	1 NC / 1 NO	2 NC contact	2 NO contact	1 NC contact / 1 NO contact overlapping
Slow-action system	<b>6083000201</b> IN62-U1Z SK 	<b>6083000203</b> IN62-A2Z SK 	<b>6083000205</b> IN62-E2 SK 	<b>6083000206</b> IN62-UV1Z SK 
Snap-action system	<b>6083000200</b> IN62-SU1Z SK 	<b>6083000202</b> IN62-SA2Z SK 	<b>6083000204</b> IN62-SE2 SK 	
Special features/variants		Plunger actuator		

### IN65... SM



	1 NC / 1 NO	2 NC contact	2 NO contact	1 NC contact / 1 NO contact overlapping
Slow-action system	<b>6083000208</b> IN65-U1Z SM 	<b>6083000210</b> IN65-A2Z SM 	<b>6083000212</b> IN65-E2 SM 	<b>6083000213</b> IN65-UV1Z SM 
Snap-action system	<b>6083000207</b> IN65-SU1Z SM 	<b>6083000209</b> IN65-SA2Z SM 	<b>6083000211</b> IN65-SE2 SM 	
Special features/variants		Actuator exchangeable, suitable for low current (1mA/24CVD)		

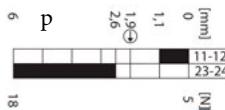
DGUV  
Deutsche Gesetzliche  
Unfallversicherung




**1 NC / 1 NO**

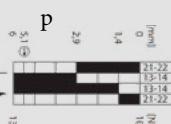
Slow-action system

**6083000215**  
IN65-U1Z RK



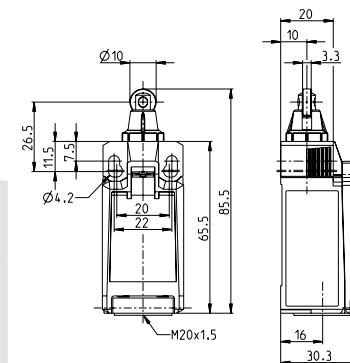
Snap-action system

**6083000214**  
IN65-SU1Z RK



Special features/variants

Actuator exchangeable, suitable for low current (1mA/24CVD)

**IN65-... RK**

**1 NC / 1 NO**

Slow-action system

**6083000262**  
IN65-U1Z KNK



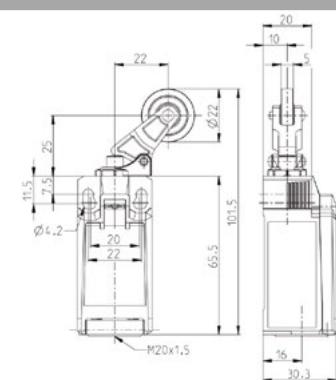
Snap-action system

**6083000261**  
IN65-SU1Z KNK



Special features/variants

Actuator exchangeable, suitable for low current (1mA/24CVD)

**IN65-... KNK**


## POSITION SWITCHES

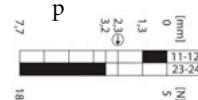


### IN65 ... HK

1 NC / 1 NO

Slow-action system

**6083000222**  
IN65-U1Z HK



Snap-action system

**6083000221**  
IN65-SU1Z HK



Special features/variants

Actuator exchangeable, suitable for low current (1mA/24VDC)

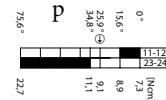


### IN65 ... AHK

1 NC / 1 NO

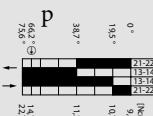
Slow-action system

**6083000236**  
IN65-U1Z AHK



Snap-action system

**6083000235**  
IN65-SU1Z AHK



Special features/variants

Actuator exchangeable, suitable for low current (1mA/24VDC)

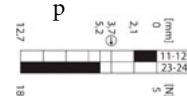




**1 NC / 1 NO**

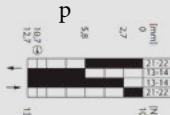
Slow-action system

**6083000229**  
IN65-U1Z DGHK



Snap-action system

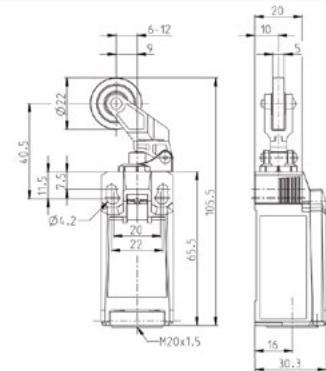
**6083000228**  
IN65-SU1Z DGHK



Special features/variants

Actuator exchangeable, suitable for low current (1mA/24CVD)

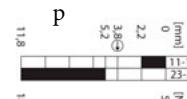
**IN65-... DGHK**



**1 NC / 1 NO**

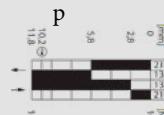
Slow-action system

**6083000255**  
IN65-U1Z DGKK



Snap-action system

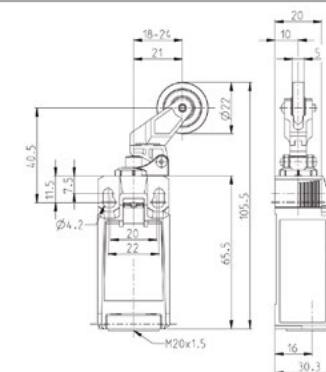
**6083000254**  
IN65-SU1Z DGKK



Special features/variants

Actuator exchangeable, suitable for low current (1mA/24CVD)

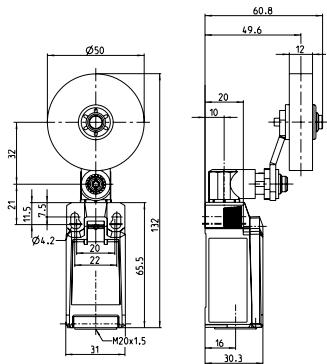
**IN65-... DGKK**



## POSITION SWITCHES



### IN65 ... AHSGU RO50

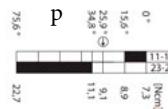


Special features/variants

1 NC / 1 NO

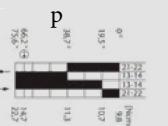
Slow-action system

**6083000296**  
IN65-U1Z AHSGU RO50



Snap-action system

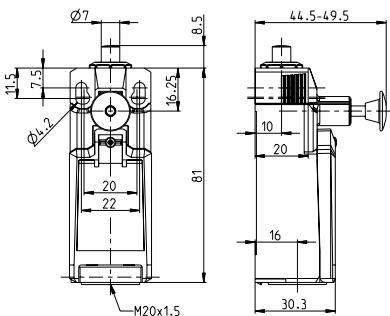
**6083000300**  
IN65-SU1Z AHSGU RO50



Actuator exchangeable, suitable for low current (1mA/24CVD)



### I81 ... SM

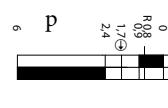


Special features/variants

1 NC / 1 NO

Slow-action system

**6083000242**  
I81-U1Z SM



Bistable, resetting by pulling out of the blue knob. Actuator exchangeable, suitable for low current (1mA/24CVD)

DGUV  
Deutsche Gesetzliche  
Unfallversicherung

CCC

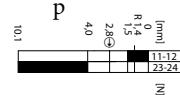
SA  
US



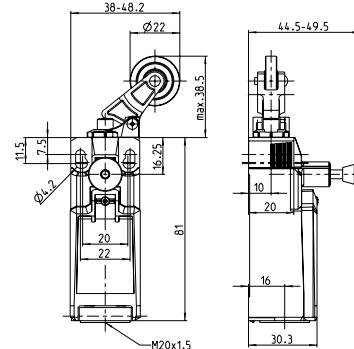
1 NC / 1 NO

Slow-action system

**6083000269**  
I81-U1Z KNK



**I81 ... KNK**



Special features/variants

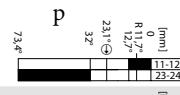
Bistable, resetting by pulling out of the blue knob. Actuator exchangeable, suitable for low current (1mA/24CVD)



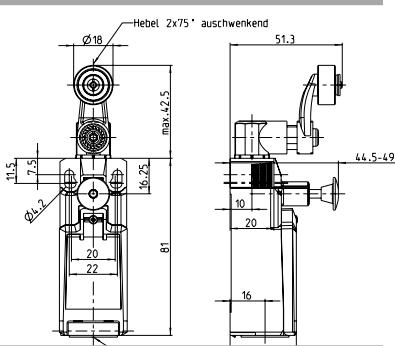
1 NC / 1 NO

Slow-action system

**6083000246**  
I81-U1Z AHK



**I81 ... AHK**



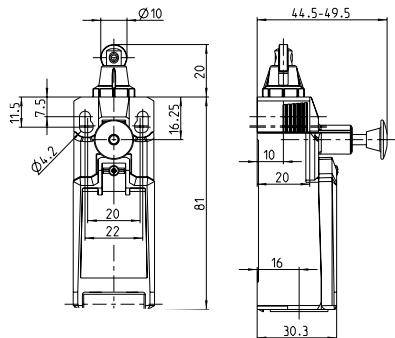
Special features/variants

Bistable, resetting by pulling out of the blue knob. Actuator exchangeable, suitable for low current (1mA/24CVD)

## POSITION SWITCHES



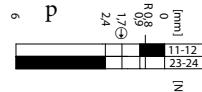
### I81 ... RK



Special features/variants

1 NC / 1 NO

6083000243  
I81-U1Z RK

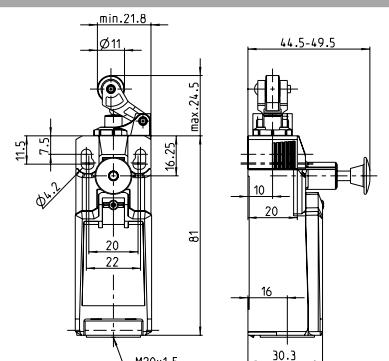


Slow-action system

Bistable, resetting by pulling out of the blue knob. Actuator exchangeable, suitable for low current (1mA/24CVD)



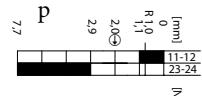
### I81 ... HK



Special features/variants

1 NC / 1 NO

6083000244  
I81-U1Z HK



Slow-action system

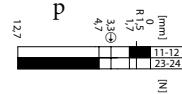
Bistable, resetting by pulling out of the blue knob. Actuator exchangeable, suitable for low current (1mA/24CVD)



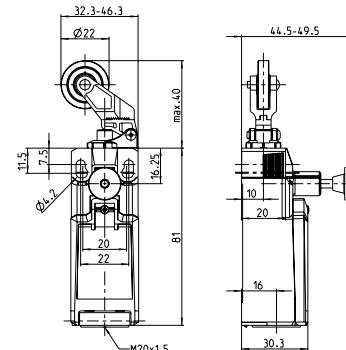
1 NC / 1 NO

Slow-action system

**6083000245**  
I81-U1Z DGHK



**I81 ... DGHK**



Special features/variants

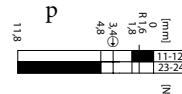
Bistable, resetting by pulling out of the blue knob. Actuator exchangeable, suitable for low current (1mA/24CVD)



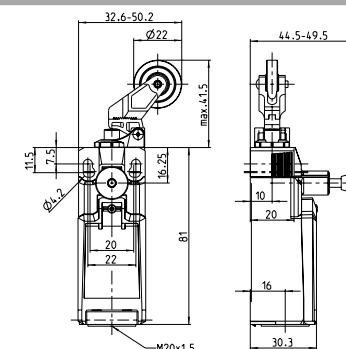
1 NC / 1 NO

Slow-action system

**6083000268**  
I81-U1Z DGKK



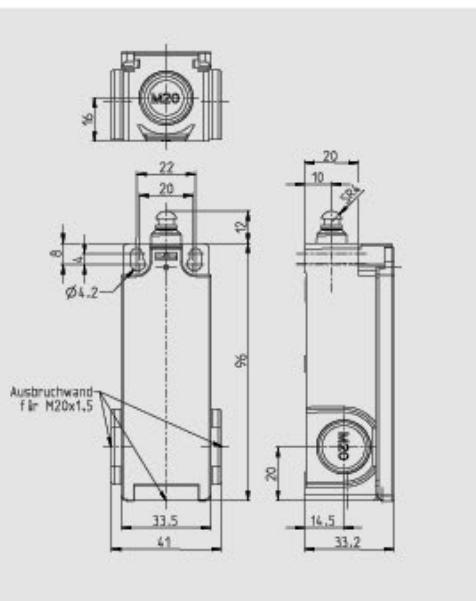
**I81 ... DGKK**



Special features/variants

Bistable, resetting by pulling out of the blue knob. Actuator exchangeable, suitable for low current (1mA/24CVD)

# Electrical reset Safety switch SGS



### Good to know ...

The SGS was primarily designed for overspeed governors. The main features are the very low switch travel of 0,5 mm, the bistable behaviour (latching) and the positive break of the NC-contacts.

It has the possibility of a mechanical and electrical reset (integrated solenoid), because of this it can be used at application with no direct access to the switch. It has a EC-type-examination certificate according to EN81-20.

### Product characteristics

- Very low switch travel of 0,5mm for applications in overspeed governors
- Bistable
- Positive break contacts
- Electrical or mechanical resets
- 230 VAC and 24 VDC variants available for resetting
- 3 cable entries with M20 thread
- Switching functions: 2 NC contacts
- EC-type-examination certificate according to EN81-20
- Other actuators from the standard range on request

## Technical data



Electrical data		Mechanical data	
Protection class	II, protective insulation	Enclosure material	Thermoplastics GV self-extinguishing
Design insulation voltage	U <sub>d</sub> 250 V AC	Cover	Thermoplastics GV self-extinguishing
Thermoelectric current	I <sub>te</sub> 10 A	Operation	Plunger (thermoplastics)
Utilisation category	AC-15, U <sub>ac</sub> /I <sub>ac</sub> 240V / 3 A DC-13, U <sub>dc</sub> /I <sub>dc</sub> 250V / 0.27 A	Approach speed V <sub>max</sub>	0.5 m/s
Minimum switching voltage	24 V	Ambient temperature	-25 °C to +50 °C
Minimum switching current	5 mA	Type of contact	2 NC (Zb) / 1NC, 1NO (Zb)
Positive Break	P accor. to IEC/EN 60947-5-1, Annex K	Switching principle	Snap-action system, bistable
Short-circuit protection	Safety fuse 4 A gL/gG	Mechanical lifetime (up to) <sup>1</sup>	5 × 10 <sup>4</sup> switching cycles
Solenoid	Without free-wheeling diode	B10d	1×10 <sup>5</sup> cycles
Heat class	B (130 °C)	Mounting	2 × M4 / 2 × M5 for safety applications
Rated operating voltage	U <sub>r</sub> 24 V DC / 230 V AC (type-related)	Type of connection	Screwed terminals
Rated operating current	I <sub>r</sub> 2.3 A / 0.23 AAC	Switching elements	Conductor cross-sections
Switch-on duration	ED 3 %	Conductor cross-sections	Single-wire 0.5 .. 1.5 mm <sup>2</sup>
Minimum make time	T <sub>m</sub> 0.2 s	Type of connection - solenoid	2 × butt connector similar to DIN 46341 (crushing area 0.5 – 1.5 mm <sup>2</sup> )
Maximum make-time	T <sub>m</sub> 0.5 s	Cable entry	3 × M20x 1.5 with cut-out wall in the enclosure
Minimum break-time	T <sub>b</sub> 17 s	Mounting position	Arbitrary
		Contact opening	4 × > 2 mm
		Protection class	IP65 conforming to IEC/EN 60529
Standards			
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1			
VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1			
DIN EN 81-1			

## POSITION SWITCHES Special Switches



### SGS solenoid voltage — 24 Volt



	1 NC / 1 NO	2 NC contact
<b>Actuating force 3 N</b>		<b>6010853002</b> SGS-SA2Z W F3 24V 
<b>Actuating force 6 N</b>		<b>6010853001</b> SGS-SA2Z W F6 24V 

### SGS solenoid voltage — 230 Volt



	1 NC / 1 NO	2 NC contact
<b>Actuating force 3 N</b>		<b>6010853004</b> SGS-SA2Z W F3 230V 
<b>Actuating force 6 N</b>	<b>6010153027</b> SGS-SU1Z W F6 230V 	<b>6010853003</b> SGS-SA2Z W F6 230V 

 BERNSTEIN  
D-32457 Porta Westfalica

SGS-SA21 W E6-24V  
601.0853.001

Limit Switch EN81  
Magnelsg. IEC/EN 60947-5-1

IP67 AC15 U<sub>a</sub> 240V/1~ 3A  
DC13 U<sub>a</sub> 250V/1~ 0.27A



230 V  
~

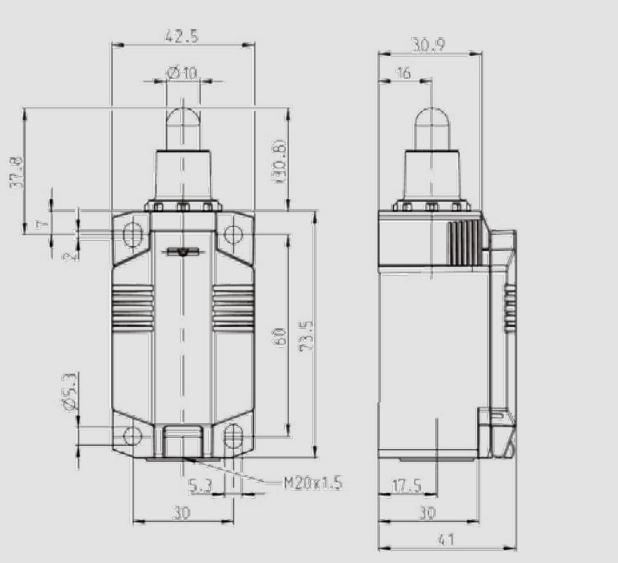
## POSITION SWITCHES

# Insulated encapsulation Position switch IN73

**NEW**



**2 OR 4 CONTACTS**



## Good to know ...

Our new standard switch IN73 is the advancement of our ENK-series. It offers a modular, robust enclosure and a wide range of actuators made of metal. Use it in rough environments, for a better installation it features additional fixing holes.

The "big brother" of the IN65 has a similar modular design, however there is an important difference: Additional to the C14 switch insert (introduced on page 23) with 2 contacts the IN73 can be equipped with the C17 switch insert with 4 contacts.

The modular design and the easy way to change the actuator allows a huge variety of applications, for example as limit switch in the shaft head, for safety device monitoring on the car or for slack rope monitoring in the shaft pit. The IN73 is as cost effective as a plastic enclosed switch, robust to install like a metal switch and clever due to its modular design and easy to change actuator.

## Technical design

- Slow- and snap-action

### Versions:

With C14 switch insert: 2 NCs, 2 NOs, 1 NC/1 NO  
 With C17 switch insert: 4 NOs, 4 NCs, 2 NOs/2 NCs  
 1 NC/ 3 NOs and 3 NCs/ 1 NO

## Technical data

### Electrical data

Design insulation voltage	$U_i$ max.	400 V
Conventional thermoelectric current (up to) $I_{the}$		5 A
Rated operating voltage	$U_e$ max.	240 V AC / 24V DC
Utilisation category (up to)		AC-15, $U_e/I_e$ 240 V/1,5 A DC-13 $U_e/I_e$ 24 V/1,5 A
Short circuit protection (up to)		Safety fuse 4 A gG
Protection class		II, protective insulation

### Mechanical data

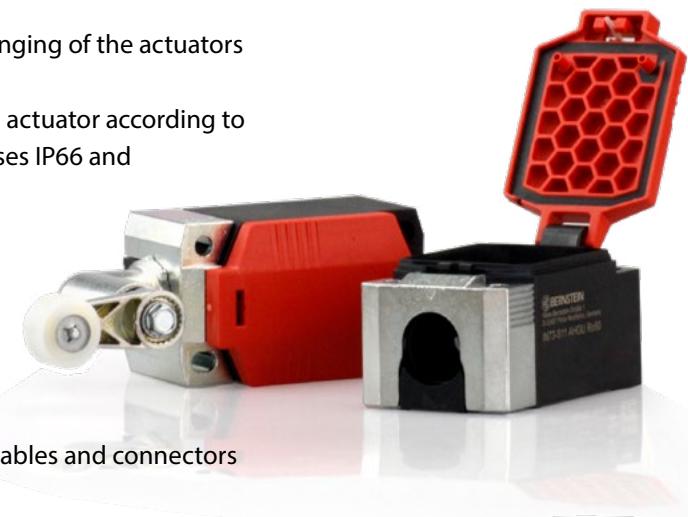
Enclosure/cover material	Thermoplastics, glass-fibre reinforced (UL 94-V0)
Ambient temperature	-30 °C to +75 °C
Mechanical lifetime (up to)	$10 \times 10^6$ switching cycles
B10d NC contact Cycles (up to)	$20 \times 10^6$
B10d NO contact Cycles (up to)	$1 \times 10^6$
Switching frequency	≤ 60/min.
Type of connection	4 screwed connections (M3)
Conductor cross-sections	Solid or Litz wire with ferrules 0,34 mm <sup>2</sup> – 1,5 mm <sup>2</sup> ; AWG 22–16
Cable entry	1 x M20 x 1.5

### Standards

VDE 0660 T211, DIN EN 60947-5-4, IEC 60947-5-4  
 DIN EN ISO 13849-1, DIN EN ISO 13849-2

## Product characteristics

- High reliability, C14 or C17 switch insert
- Up to 4 contacts
- Actuator and installation collar with mounting holes made of metal
- Easy turning (8 × 45°) and changing of the actuators without tool
- Standard switch and standard actuator according to DIN EN 50041, protection classes IP66 and IP67 according to VDE 0470 T1



## Options

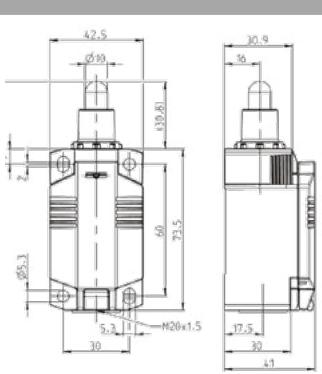
- Available with M12 connector
- On request with customised cables and connectors

## Mounting

- 2 oval holes for adjustment for screws M5
- 2 round holes for screws M5 for fixing in case of safety applications

## POSITION SWITCHES

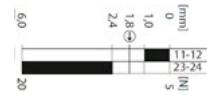
### IN73 ... SM



1 NC / 1 NO

Slow-action system

**6081000002**  
IN73-11 SM



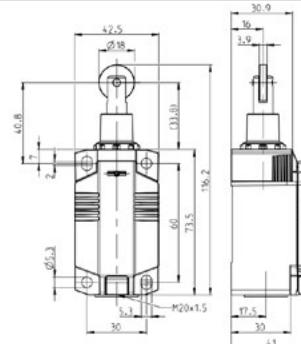
Snap-action system

**6081000001**  
IN73-S11 SM



Special features/variants

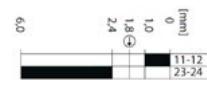
### IN73 ... RM



1 NC / 1 NO

Slow-action system

**6081000014**  
IN73-11 RM



Snap-action system

**6081000013**  
IN73-S11 RM



Special features/variants

## IN73 ... HK

**1 NC / 1 NO**

Slow-action system

**6081000026**  
IN73-11 HK

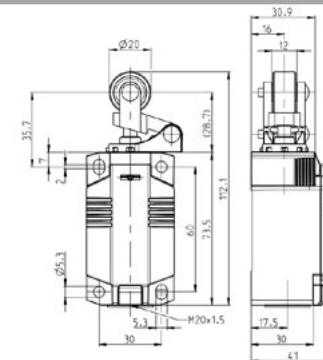


Snap-action system

**6081000025**  
IN73-S11 HK



Special features/variants

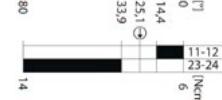


## IN73 ... AHK

**1 NC / 1 NO**

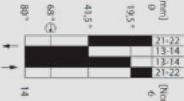
Slow-action system

**6081000062**  
IN73-11 AHK

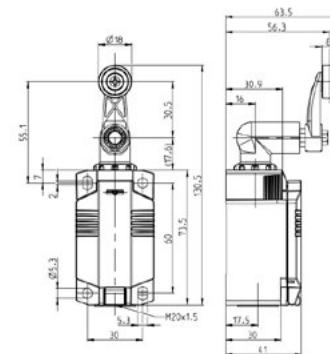


Snap-action system

**6081000061**  
IN73-S11 AHK

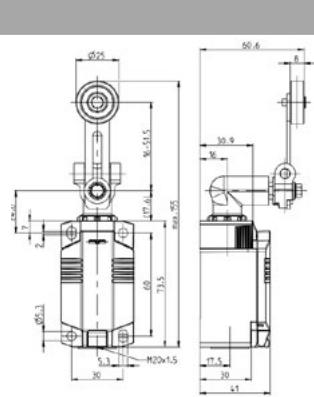


Special features/variants



## POSITION SWITCHES

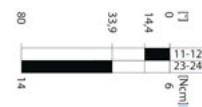
### IN73 ... AVK



1 NC / 1 NO

Slow-action system

**6081000074**  
IN73-11 AVK



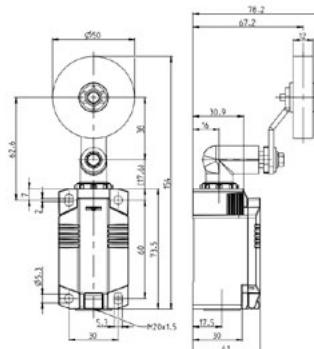
Snap-action system

**6081000073**  
IN73-S11 AVK



Special features/variants

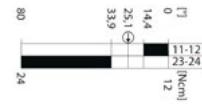
### IN73 ... AHSGU RO50



1 NC / 1 NO

Slow-action system

**6081000109**  
IN73-11 AHSGU RO50

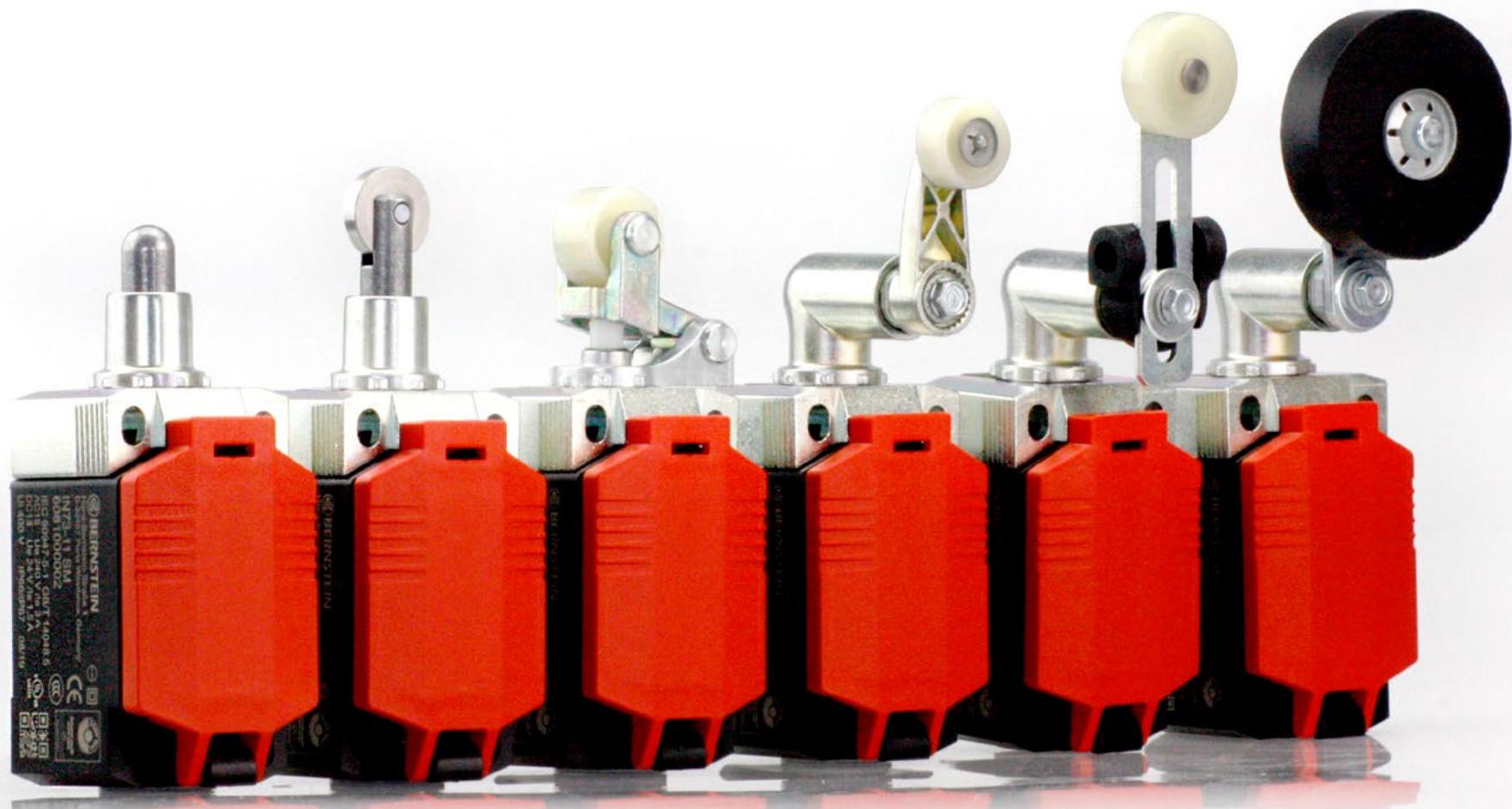


Snap-action system

**6081000108**  
IN73-S11 AHSGU RO50



Special features/variants



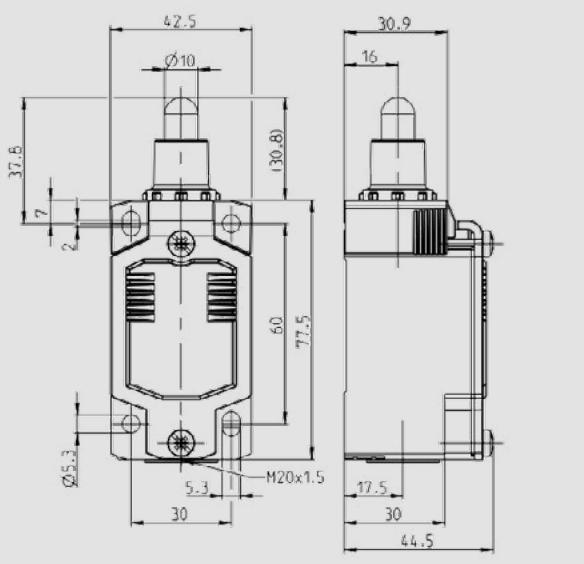
## POSITION SWITCHES

# Metal enclosed Position switch MN78

**NEW**



**2 OR 4 CONTACTS**



## Good to know ...

The MN78 is the metal version of the IN73, designed for the use in very rough environments. Modular, robust metal enclosure, wide range of metalast actuators. Same as the IN73, the MN78 offers additional fixing holes for safe installation.

It can be equipped with the C14 or C17 switch insert (2 contacts or 4 contacts). Rough environments, outdoor areas, high mechanical load, these are no problems for the MN78. Typical use at outdoor lift shafts and on escalators – even at heavy duty applications.

## Technical design

- Slow- and snap action

**Versions:**

With C14 switch insert: 2 NCs, 2 NOs, 1 NC/1 NO  
 With C17 switch insert: 4 NOs, 4 NCs, 2 NOs/2 NCs  
 1NC/ 3 NOs and 3 NCs/ 1 NO

## Technical data

### Electrical data

Design insulation voltage	$U_i$ max.	400 V AC
Conventional thermoelectric current (up to)	$I_{the}$	5 A
Rated operating voltage	$U_e$ max.	240 V AC/24 V DC
Utilisation category (up to)		AC-15, $U_e/I_e$ 240 V/1.5 A DC-13 $U_e/I_e$ 24 V/1.5 A
Short circuit protection (up to)		Safety fuse 4 A gG
Protection class		I

### Mechanical data

Enclosure-/ Cover material	Die-cast aluminium/ sheet aluminium
Ambient temperature	-30 °C to +75 °C
Mechanical lifetime	10 × 10 <sup>6</sup> switching cycles
B10d NC contact Cycles (up to)	20 × 10 <sup>6</sup>
B10d NO contact Cycles (up to)	1 × 10 <sup>6</sup>
Switching frequency	≤ 60/min.
Type of connection	4 screwed connections (M3)
Conductor cross-sections	Solid or Litz wire with ferrules 0,34 mm <sup>2</sup> –1,5 mm <sup>2</sup> ; AWG 22–16
Cable entry	1 × M20 × 1.5

### Standards

VDE 0660 T211, DIN EN 60947-5-4, IEC 60947-5-4  
 DIN EN ISO 13849-1, DIN EN ISO 13849-2

## Product characteristics

- Standard switch according to DIN EN 50041, standard actuator according to DIN EN 50041
- Protection class IP65 according to VDE 0470 T1
- Enclosure: Die-cast aluminium
- Cover: Aluminium
- Actuator turnable by 4 × 90°
- Cable entry M20 × 1.5

## Options

- Available with M12 connector
- On request with customised cables and connectors

## Mounting

- 2 screws M5, adjustment with oval holes
- 2 screws M5 for safety applications without additional fixation

## POSITION SWITCHES

### MN78 ... SM



1 NC / 1 NO

Slow-action system    **6087000002**  
MN78-11 SM

Snap-action system    **6087000001**  
MN78-S11 SM

Special features/variants

### MN78 ... RM



1 NC / 1 NO

Slow-action system    **6087000014**  
MN78-11 RM

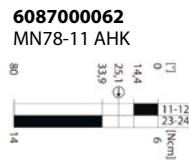
Snap-action system    **6087000013**  
MN78-S11 RM

Special features/variants

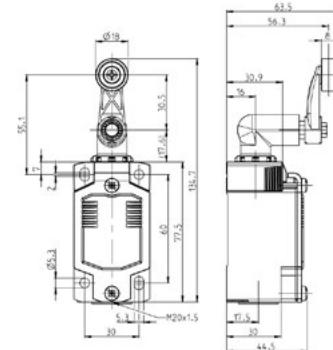
## MN78 ... AHK

1 NC / 1 NO

Slow-action system

**6087000062**  
MN78-11 AHK

Snap-action system

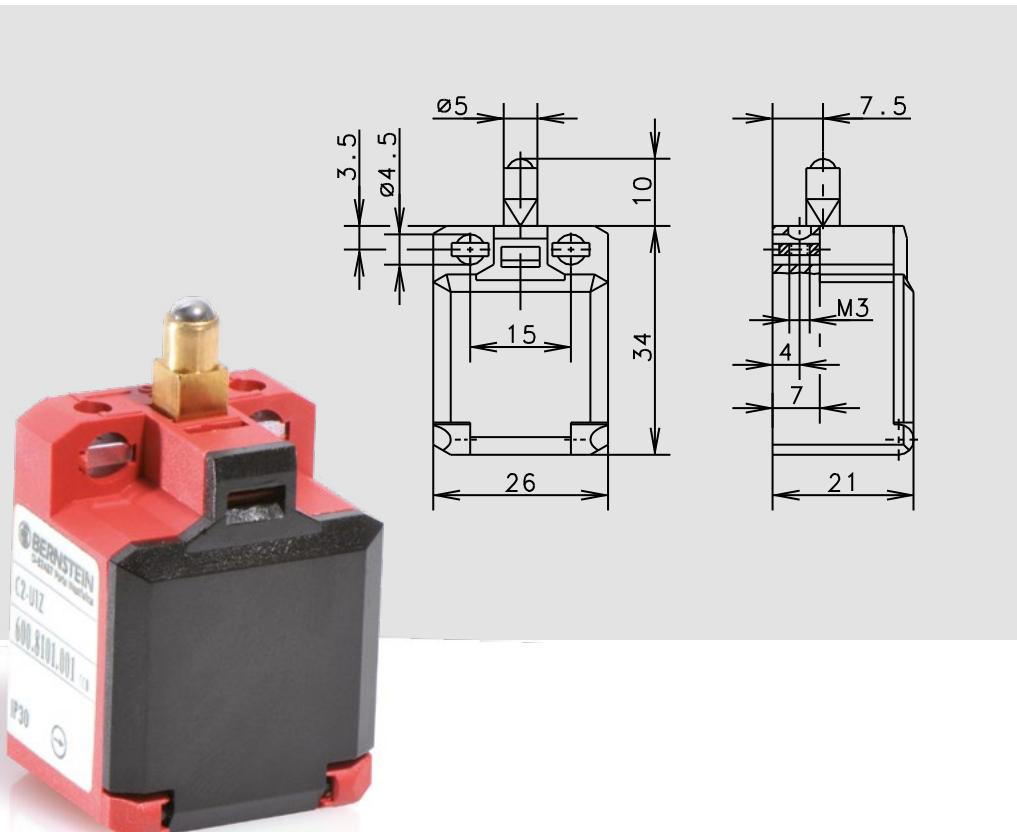
**6087000061**  
MN78-S11 AHK

Particularities/variants



## POSITION SWITCHES

### Insulated encapsulation Position switch C2



#### Good to know ...

The position switch C2 has the smallest dimensions and therefore it is perfect for applications in very confined spaces.

The two contacts are positive break ones. It can therefore be used in safety applications.

#### Product characteristics

- Very small dimensions
- 2 positive break contacts
- Front- and top mounting
- Different actuators

## Technical design

- Slow- and snap action
- Versions: 1 NC / 1 NO, 2 NC, 2 NO

## Technical data

### Electrical data

Design insulation voltage U<sub>i</sub> max. 250 V AC

Conventional thermoelectric current I<sub>the</sub> 10 A

Rated operating voltage U<sub>e</sub> max. 240 V

Utilisation category U<sub>e</sub>/I<sub>e</sub> AC-15, U<sub>e</sub>/I<sub>e</sub> 240 V/3 A

Short-circuit protection Safety fuse 6 A gL/gG

Protection class II, protective insulation

### Mechanical data

Enclosure material Thermoplastics, glass-fibre reinforced (UL 94-V0)

Ambient temperature -30 °C to +80 °C

Mechanical lifetime 3 × 10<sup>6</sup> switching cycles

B10d 6 million

Switching frequency ≤ 100/min

Type of connection 4 screwed connections (M3.5)

Conductor cross-sections Single-wire 0.5 – 1.5 mm<sup>2</sup> or strand with wire-end ferrule 0.5 – 1.5 mm<sup>2</sup>

Cable entry Rectangle 8.5 × 3.5 mm

Protection class IP20 conforming to EN 60529; DIN VDE 0470 T1

### Standards

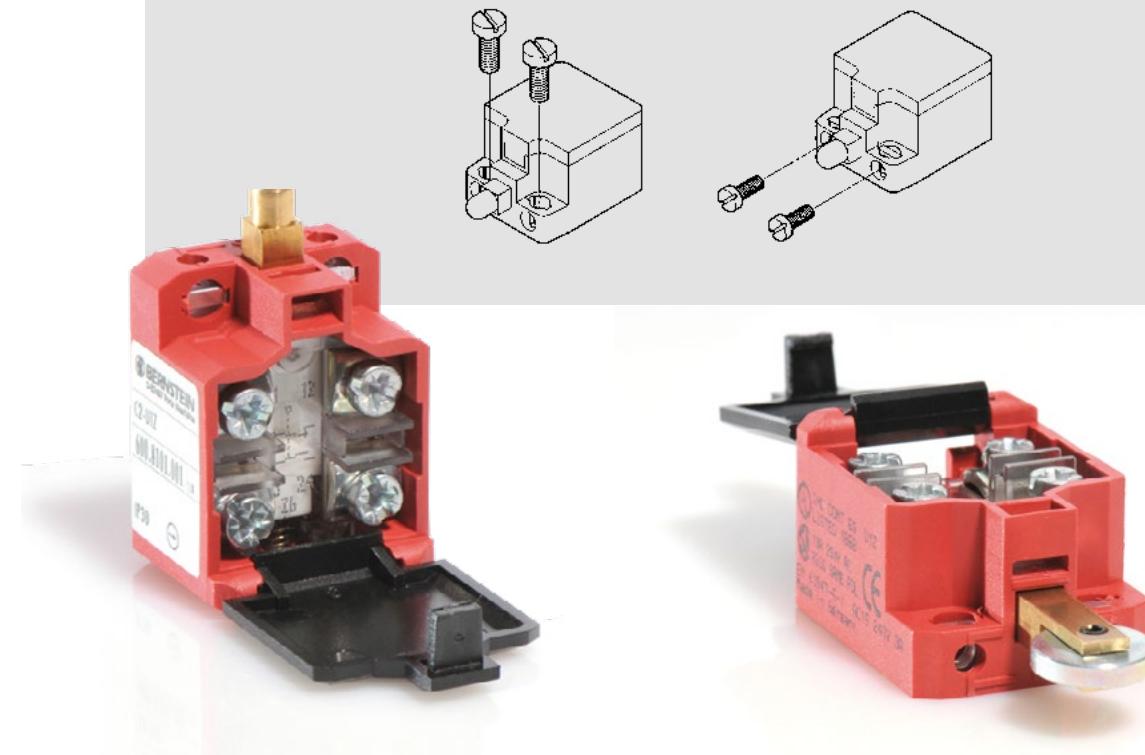
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1

VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1

## Mounting

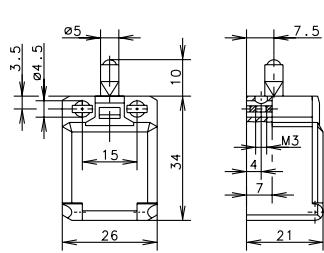
Front- and top mounting (type-related)

- 2 × round holes for screws M4
- 2 × insert nuts for front-side installation for M3 screws M3 (type-related)



## POSITION SWITCHES

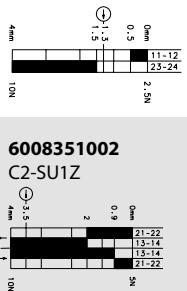
### C2-... W



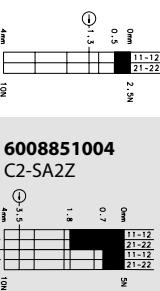
Special features/variants

Slow-action system

**1 NC / 1 NO**  
6008101001  
C2-U1Z

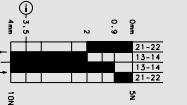


**2 NC contact**  
6008801003  
C2-A2Z

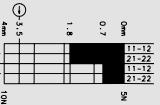


Snap-action system

**1 NC / 1 NO**  
6008351002  
C2-SU1Z

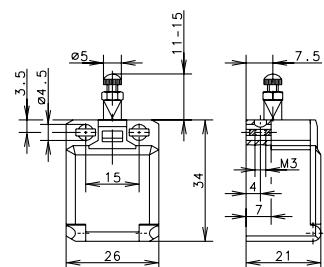


**2 NC contact**  
6008851004  
C2-SA2Z



Plunger with ball head

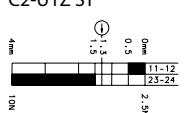
### C2-... ST



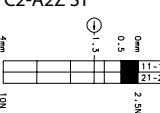
Special features/variants

Slow-action system

**1 NC / 1 NO**  
6008104025  
C2-U1Z ST

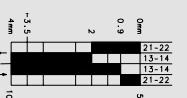


**2 NC contact**  
6008804027  
C2-A2Z ST



Snap-action system

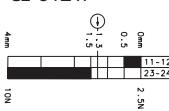
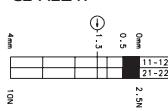
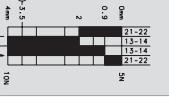
**1 NC / 1 NO**  
6008354026  
C2-SU1Z ST

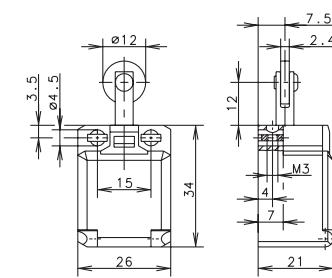


Plunger, length adjustable, with adjusting screw

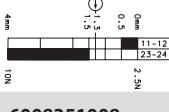
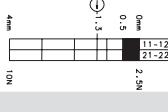
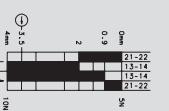


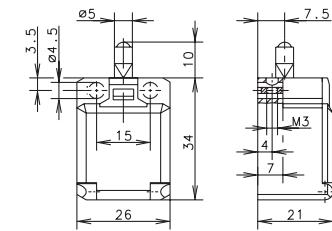
## C2...R

	1 NC / 1 NO	2 NC contact
Slow-action system	<b>6008116013</b> C2-U1Z R 	<b>6008816015</b> C2-A2Z R 
Snap-action system	<b>6008366014</b> C2-SU1Z R 	<b>6008866016</b> C2-SA2Z R 
Special features/variants	Even available with 90° rotated roller plunger	



## C2...O.M.

	1 NC / 1 NO	2 NC contact
Slow-action system	<b>6008101007</b> C2-U1Z O.M. 	<b>6008801009</b> C2-A2Z O.M. 
Snap-action system	<b>6008351008</b> C2-SU1Z O.M. 	
Special features/variants	Also available with 90° rotated actuator	

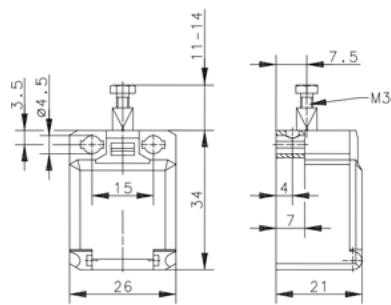


## POSITION SWITCHES

### C2-... BISTABIL O.M.



1 NC / 1 NO



Special features/variants

Snap-action system

**6108351008**  
C2-SU1Z BISTABLE O.M.



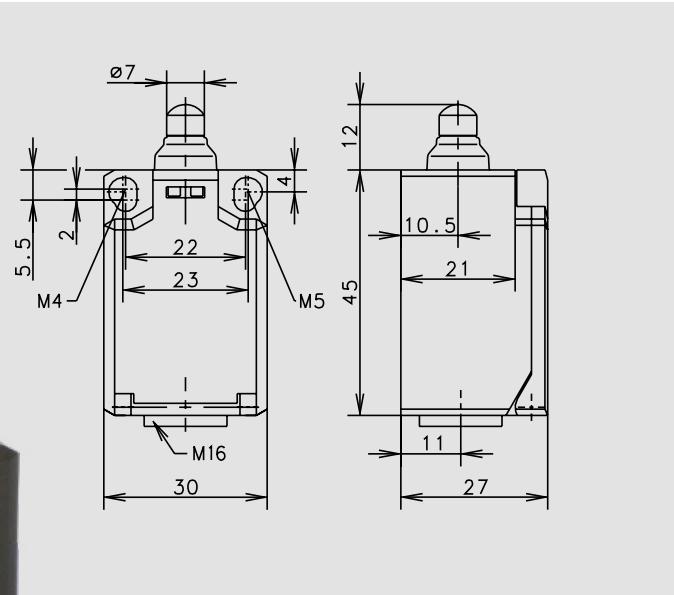
Bistable (latching), height-adjustable plunger





## POSITION SWITCHES

### Insulated encapsulation Position switch TI2



#### Good to know ...

With a higher protection class (IP65) and a wider range of actuators as the C2, the TI2 is suitable for many different applications.

We like to point out our TI2-A1Z KS version (pages 20 and 57). With its separated actuator and its positive break contact it can be used as door contact – with IP54 protection class.



#### Product characteristics

- Compact dimensions
- 2 contacts,
- 1 or 2 positive break contacts
- Protection class IP65 / IP54 (KS version)
- Different actuators

#### TI2 AS DOOR CONTACT KS

With separate actuator/ protection class IP54



## Technical design

- Slow- and snap action
- Versions: 1 NC / 1 NO, 2 NC, 2 NO

## Technical data

### Electrical data

Design insulation voltage	$U_i$ max.	240 V AC
Conventional thermoelectric current	$I_{the}$	10 A
Rated operating voltage	$U_e$ max.	240 V
Utilisation category	$U_e/I_e$	AC-15, $U_i/I_i$ 240 V/3 A; DC-13, $U_e^f/I_e^f$ 240 V/0.27A

Short-circuit protection Safety fuse 6 A gL/gG

Protection class II, protective insulation

### Mechanical data

Enclosure material	Thermoplastics, glass-fibre reinforced (UL 94-V0)
Ambient temperature	-30 °C to +80 °C
Mechanical lifetime	3 × 10 <sup>6</sup> switching cycles
B10d	6 million
Switching frequency	≤ 100/min.
Type of connection	Screwed terminals
Conductor cross-sections	Single-wire 0.5 – 1.5 mm <sup>2</sup> or strand with wire-end ferrule 0.5 – 1.5 mm <sup>2</sup>
Cable entry	1 × M16 × 1.5
Protection class	IP65 conforming to EN 60529; DIN VDE 0470 T1

### Standards

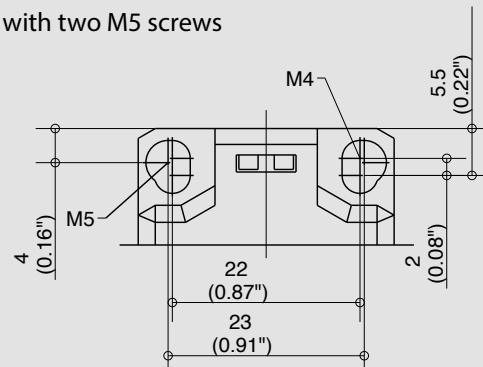
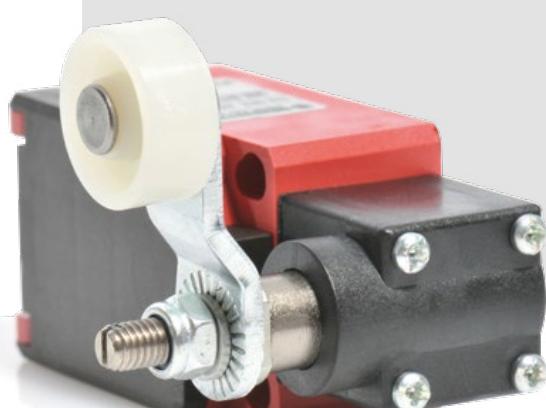
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE  
0660 T200, DIN EN 60947-5-1, IEC 60947-5-1

## Options

- Available with M12 connectors
- Customised cables and connectors upon request

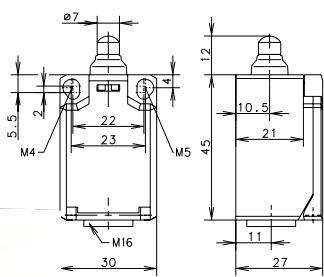
## Mounting

- Mounting dimension according to DIN EN 50047
- 2 oval holes for adjustment for screws M4 (distance 22 mm)
- Fixed positioning for safety applications with two M5 screws (distance 23 mm)



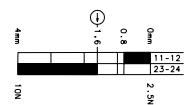
## POSITION SWITCHES

### TI2-... W



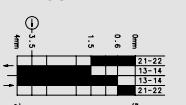
Slow-action system

**6088103001**  
TI2-U1Z W



Snap-action system

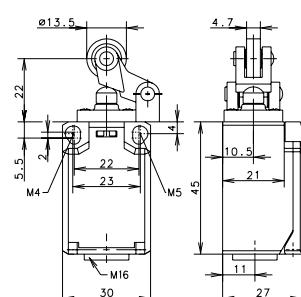
**6088153002**  
TI2-SU1Z W



Special features/variants

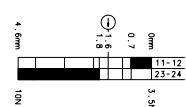


### TI2-... HW



Slow-action system

**6088121015**  
TI2-U1Z HW



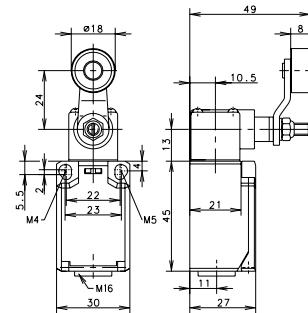
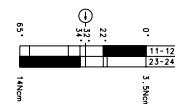
Special features/variants

Different directions of actuation available, also available with steel roller, different roller diameters on request




**TI2... AH**
**1 NC / 1 NO**

Slow-action system

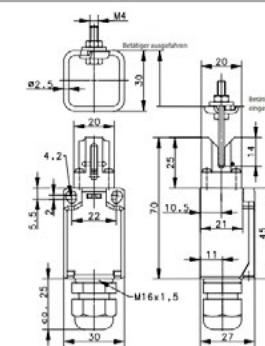
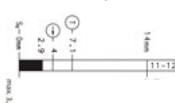
**6088135021**  
 TI2-U1Z AH
 

Special features/variants

Different directions of actuation available, also available with steel roller, different roller diameters on request, cranked and straight levers, different lever lengths

**Protection class IP54 TI2... KS**
**1 NC / 1 NO**

Slow-action system

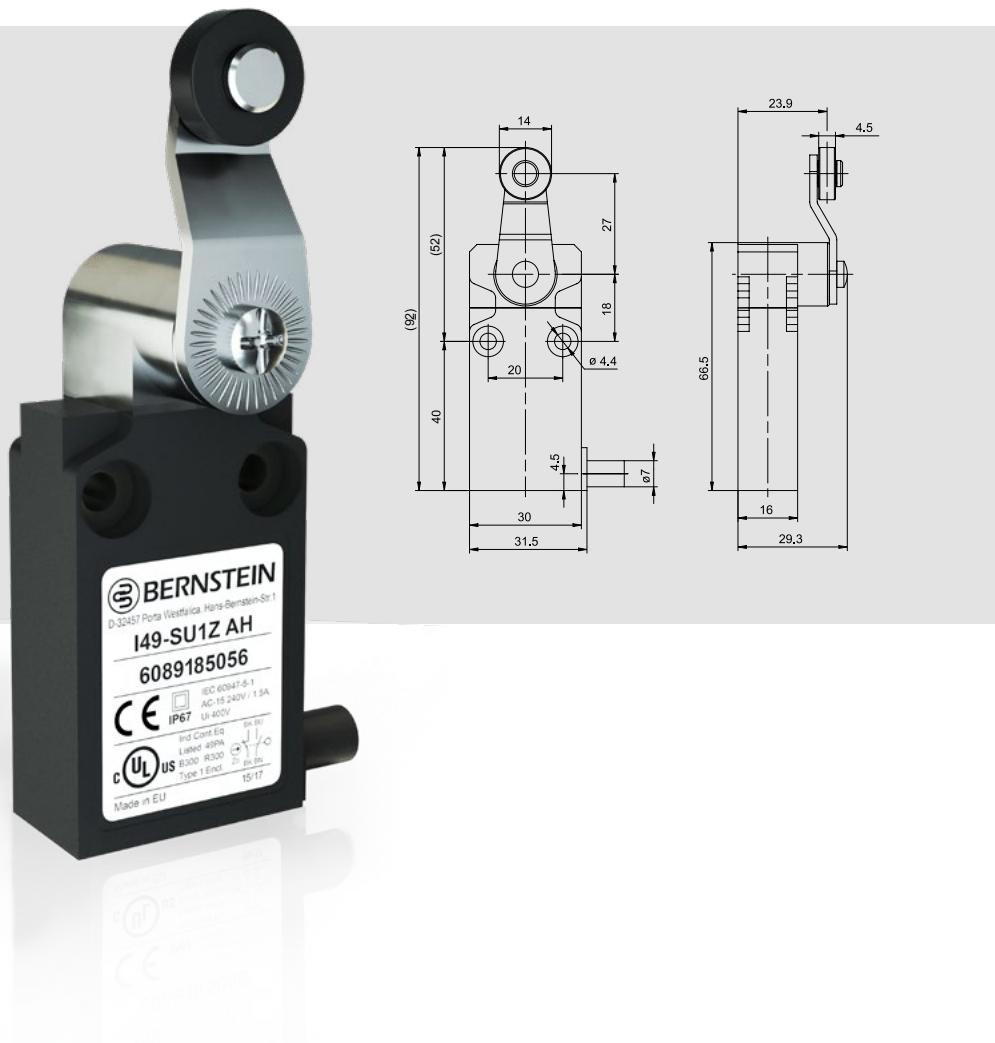
**6116469043**  
 TI2-A1Z KS
 

Special features/variants

Use the KS-version as door contact with separated actuator and protection class IP54 for applications where a higher protection class as IP20 is required, for example at fire-service lifts or similar. The specified protection class (IP54) only applies with closed cover and use of a cable gland / cable.  
 The KS version has only one NC contact. Reserved actuator: 3918452237

## POSITION SWITCHES

# Insulated encapsulation Position switch I49



## Good to know ...

Due to the space-saving enclosures and the high protection class IP67 the position switches of the I49 series are perfect for the installation where a flat design and a high protection class of IP67 is required. The switches are often used for monitoring of covers and inspection doors, for position monitoring applications and similar applications. The high protection class allows outdoor applications.

## Product characteristics

- Flat and compact design
- Pre-installed connecting cable (1m length) for easy and quick installation
- Top-mounting versions available
- Cable outlet on the side or at the bottom
- High protection class IP67
- Suitable for safety applications according to DIN EN 60947-5-1 (positive break)

## Technical design

- Slow- and snap action
- Versions: 1 NC contact / 1 NO contact

## Technical data

### Electrical data

Design insulation voltage	$U_i$ max.	400 V AC
Conventional thermoelectric current	$I_{the}$	10 A
Rated operating voltage	$U_e$ max.	240 V
Utilisation category		AC-15; 24 V /10A; 240V/3A
Protection class		II, protective insulation

### Mechanical data

Ambient temperature	-25 °C to +70 °C (connecting cable firmly wired)
Mechanical lifetime	$10 \times 10^6$ switching cycles
Switching frequency	$\leq 60$ /min.
Type of connection	Cable 4 x 0.75 mm <sup>2</sup>
Protection class	IP67 conforming to IEC/EN 60529

### Standards

VDE 0660 T100, DIN EN 60947-1, IEC 60947-1  
 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1

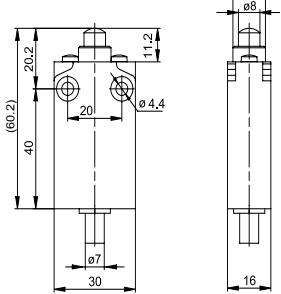
## Options

- Different cable lengths available on request



## POSITION SWITCHES

### I49-... IW



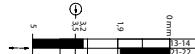
Special features/variants

1 NC / 1 NO

Slow-action system

**6089102059**

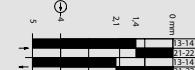
I49-U1Z IW Z



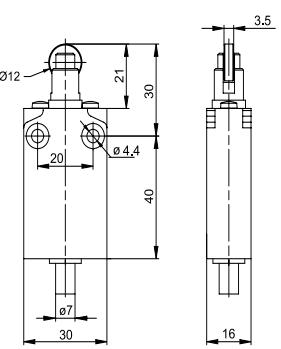
Snap-action system

**6089152058**

I49-SU1Z IW Z



### I49-... RIW



Special features/variants

1 NC / 1 NO

Slow-action system

**6089117061**

I49-U1Z RIW Z



2 NC contact

**6089817071**

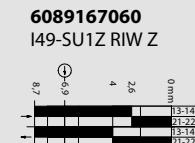
I49-A2Z RIW Z



2 NC / 2 NO

**6089217076**

I49-U2Z RIW Z

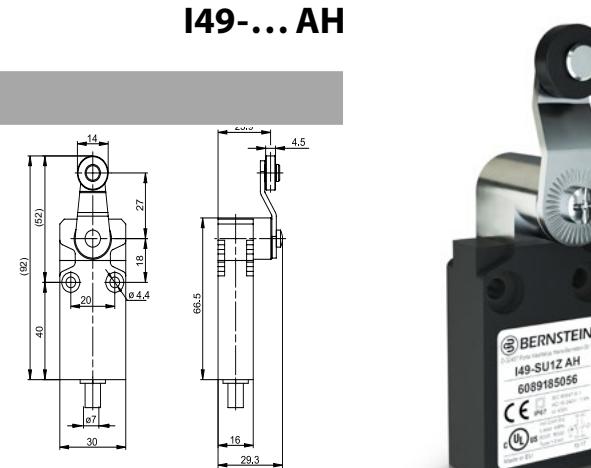


Central cable outlet available on request

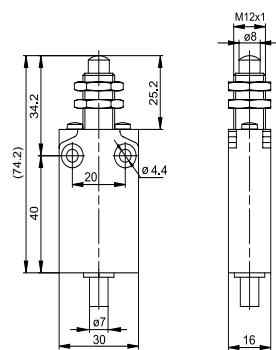




	<b>1 NC / 1 NO</b>	<b>2 NC contact</b>	<b>2 NC / 2 NO</b>	
Slow-action system	<b>6089135067</b> I49-U1Z AH Z	<b>6089835073</b> I49-AZZ AH Z	<b>6089235078</b> I49-UZZ AH Z	
Snap-action system	<b>6089185066</b> I49-SU1Z AH Z			
Special features/variants	Central cable outlet available on request			

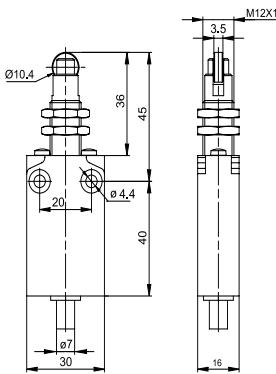


	<b>1 NC / 1 NO</b>	
Slow-action system	<b>6089102063</b> I49-U1Z IWF Z	
Snap-action system	<b>6089152062</b> I49-SU1Z IWF Z	
Special features/variants	Central cable outlet available on request	



## POSITION SWITCHES

### I49-... RIWF



Special features/variants

1 NC / 1 NO

2 NC contact

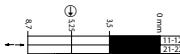
2 NC / 2 NO

Slow-action system

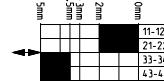
**6089117065**  
I49-U1Z RIWF Z



**6089817072**  
I49-A2Z RIWF Z

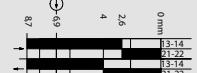


**6089217077**  
I49-U2Z RIWF Z



Snap-action system

**6089167064**  
I49-SU1Z RIWF Z

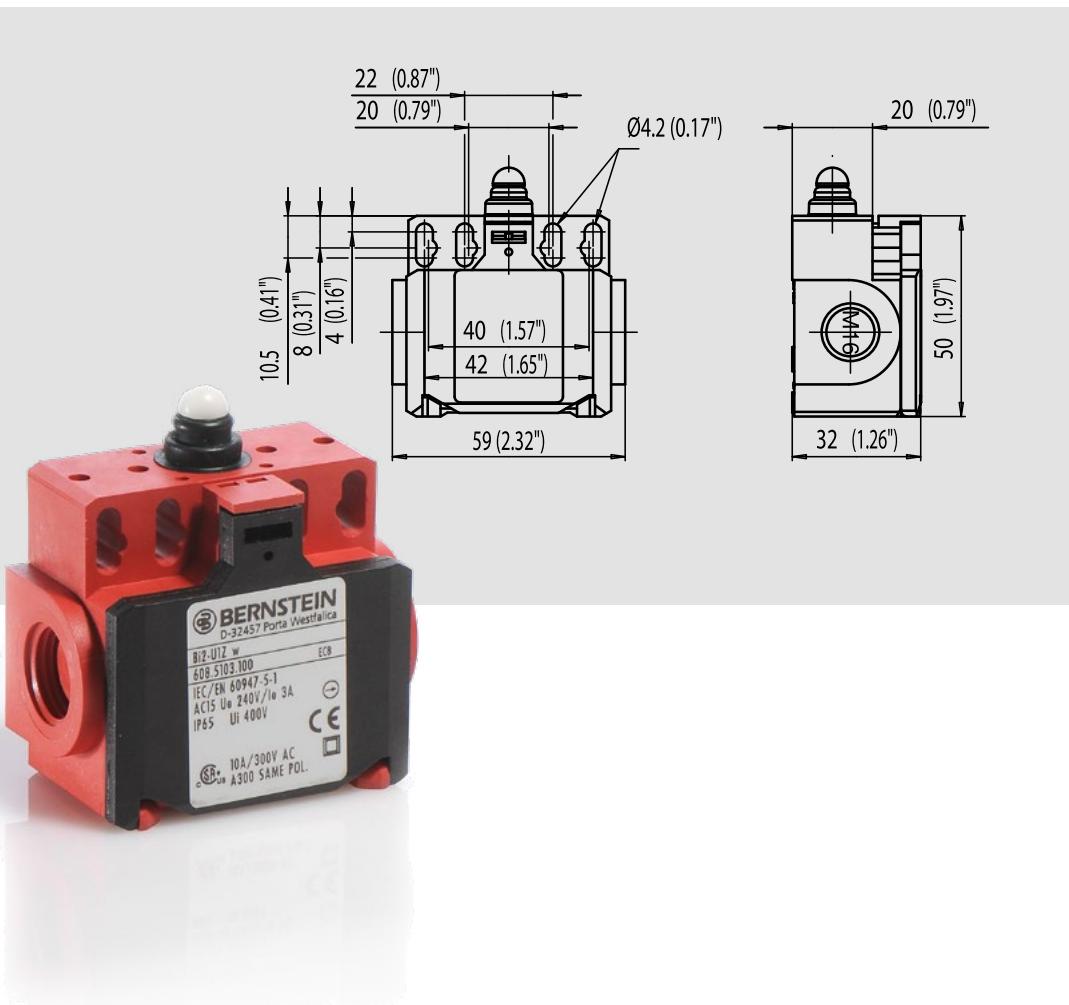


Central cable outlet available on request; front mounted



## POSITION SWITCHES

# Insulated encapsulation Position switch BI2



### Good to know ...

Due to its two cable entries this switch is very well suitable for the connection of two cables, for example in case of serial wiring in the safety circuit. A large number of actuators are available. Please do not hesitate to contact us for support to choose the best solution for your application.

### Product characteristics

- Protection class IP65 according to VDE 0470 T1
- Enclosure and cover PA 6, self-extinguishing (UL-94 V0)
- Actuator turnable by  $4 \times 90^\circ$
- Cable entry  $2 \times M16 \times 1.5$

## Technical design

- Slow- and snap action
- Versions: 1 NC / 1 NO, 2 NCs

## Technical data

### Electrical data

Design insulation voltage	$U_i$ max.	400 V AC
Conventional thermoelectric current <sup>1</sup>	$I_{the}$	10 A
Rated operating voltage	$U_e$ max.	240 V AC
Utilisation category		AC15, $U_e/I_e$ 240 V/3 A
Short circuit protection (up to) <sup>1</sup>		Safety fuse 10 A gL/gG
Protection class		II, protective insulation

### Mechanical data

Enclosure material	Thermoplastics, glass-fibre reinforced
Ambient temperature	-30 °C to +80 °C
Mechanical lifetime (up to) <sup>1</sup>	10 × 10 <sup>6</sup> switching cycles
B10d (up to) <sup>1</sup>	20 million
Switching frequency	≤ 100/min.
Type of connection	Screwed terminals
Conductor cross-sections	Single-wire 0.5 – 1.5 mm <sup>2</sup> or strand with wire-end ferrule 0.5 – 1.5 mm <sup>2</sup>
Cable entry	2 × M16 × 1.5
Protection class	IP65 conforming to EN 60529; DIN VDE 0470 T1

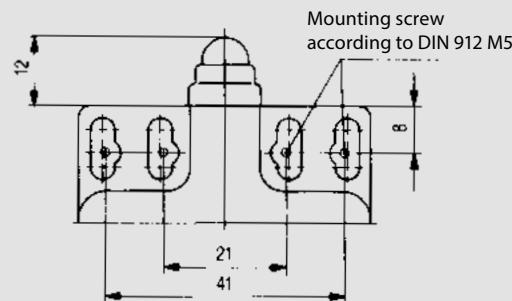
### Standards

VDE 0660 T100, DIN EN 60947-1, IEC 60947-1  
VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1

<sup>1</sup> Depending on switching system.

## Mounting

- 2 × M4 oval holes (distance 22 mm) for adjustment
- 2 × M4 oval holes (distance 42 mm) for adjustment
- 2 × M5 round holes (distance 21 mm) for adjustment for safety applications
- 2 × M5 round holes (distance 41 mm) for safety applications without additional fixation
- Top mounted

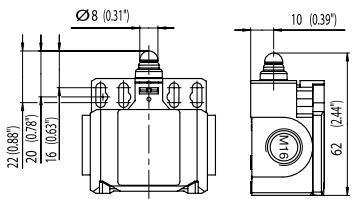


## Options

- Available with M12 plugs

## POSITION SWITCHES

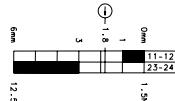
### BI2 ... W



1 NC / 1 NO

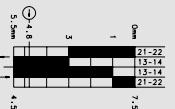
Slow-action system

**6085103100**  
BI2-U1Z W



Snap-action system

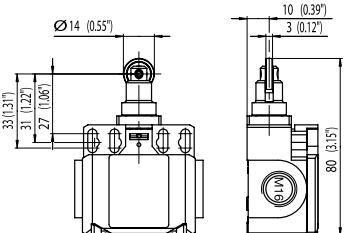
**6085153107**  
BI2-SU1Z W



Special features/variants



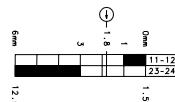
### BI2 ... RIW



1 NC / 1 NO

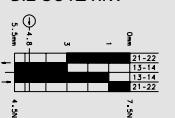
Slow-action system

**6085117101**  
BI2-U1Z RIW



Snap-action system

**6085167108**  
BI2-SU1Z RIW



Special features/variants

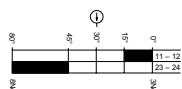
Available with steel roller on request




**1 NC / 1 NO**

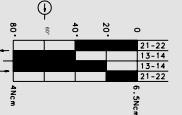
Slow-action system

**6085135104**  
BI2-U1Z AH



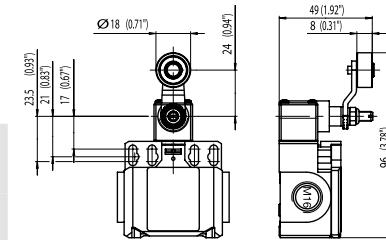
Snap-action system

**6085185111**  
BI2-SU1Z AH



Special features/variants

Available with different directions of actuation, also available with steel roller, different roller diameters on request, cranked and straight levers, different lever lengths f


**1 NC / 1 NO**

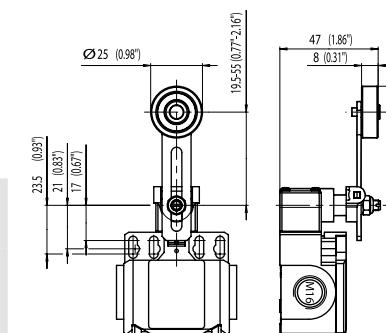
Snap-action system

**6085186112**  
BI2-SU1 AV



Special features/variants

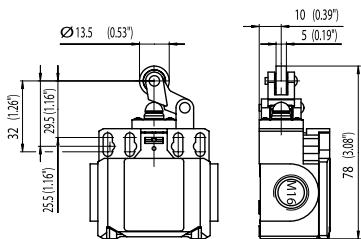
Roller levers with adjustable lengths



## POSITION SWITCHES

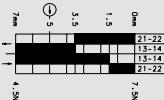
**BI2 ... HW RO13.5**

1 NC / 1 NO



Snap-action system

**6085171109**  
BI2-SU1Z HW  
RO13.5



Special features/variants



## **POSITION SWITCHES** with separated actuator

### Insulated encapsulation **SK series**



## SK switch family

The switches of the SK series are position switches with separated actuators and a high protection class, that can be used as door contacts despite of their relatively big size. The actuators are tamper proof (coded).

Position switches with separated actuator are used for monitoring of folding railings on the cabin, telescopic aprons, monitoring of removable parts and inspection doors, etc. Certainly, these are positive break switches with several contacts that have been developed for safety applications.

The actuator type MRU (pages 77 and 81) is especially made for swivelling operations (hook locks), is slightly resilient and the operating radius can be adjusted.



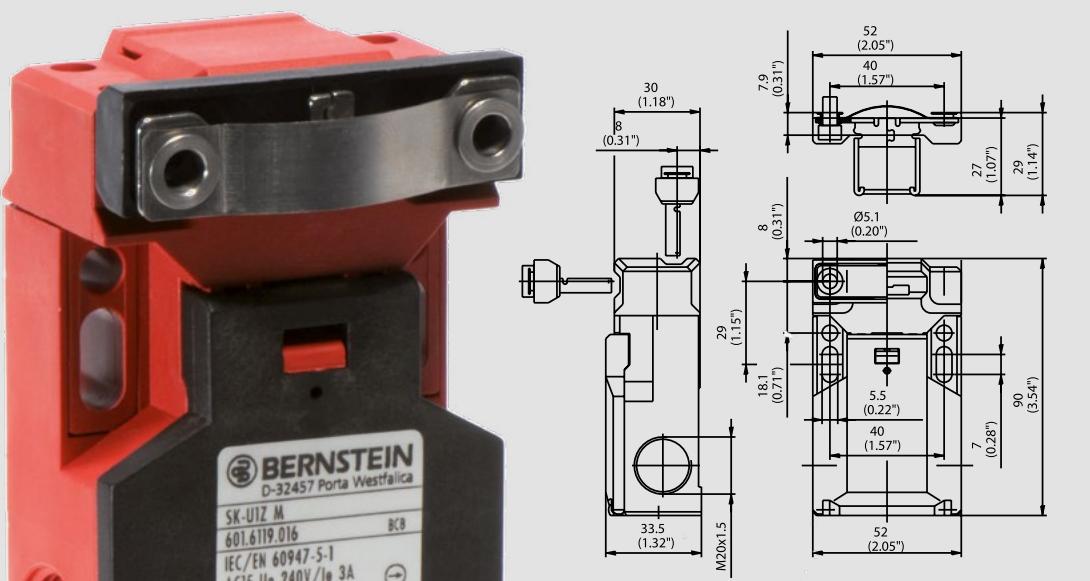
### Product characteristics

- Safety position switch according to VDE 0660 T200 and IEC60947-5-1
- Different actuation directions
- Different actuation forces available (standard 10N)
- Tamper-proof actuator
- Easy installation



## **POSITION SWITCHES** with separated actuator

# Insulated encapsulation **SK**



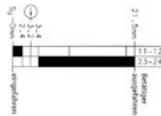
## Good to know ...

The design of the safety position switch SK can meanwhile be seen as industrial standard and is versatilely applicable. According to VDE 0660 T200, IEC 60947-5-1 and GS-ET 15 the SK is made for safety applications. Select the actuation direction by turning the device head and choosing the actuator entry. As standard it is delivered with an actuation force of 10 N, 5 N, 20 N and 30 N are also available.

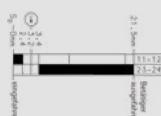



**SK**
**1 NC / 1 NO**
**Standard**
**6016119016**

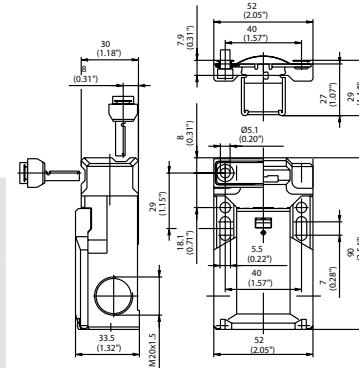
SK-U1Z M


**Radius actuator**
**6016119084**

SK-U1Z MRU


**Special features/variants**

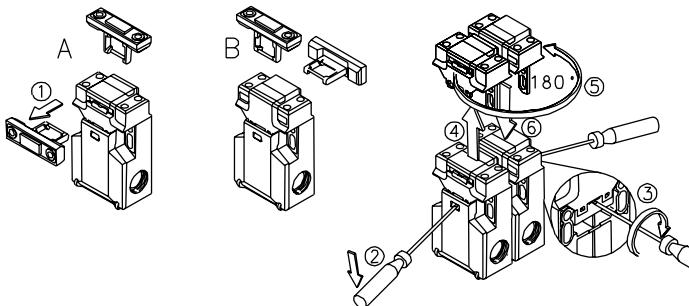
Actuator selection on page 80 / 81. On request: Higher actuation forces available



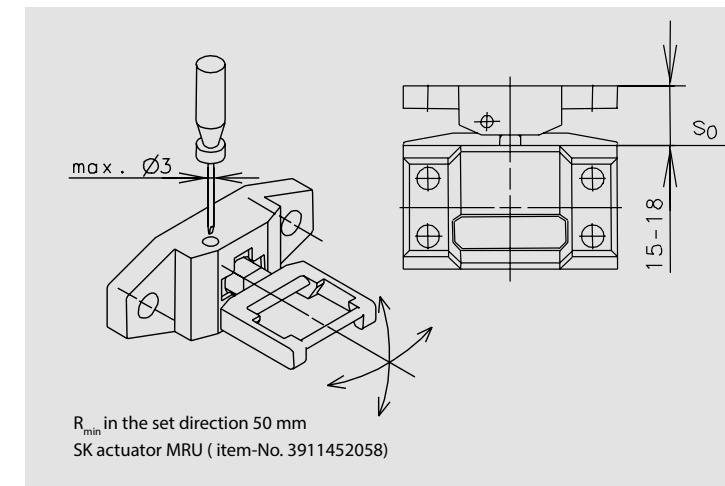
## Technical data

**Electrical data**

Protection class	II, protective insulation
Design insulation voltage	U <sub>i</sub> max. 400 V AC
Rated operating voltage	U <sub>e</sub> max. 240 V
Conventional thermoelectric current I <sub>the</sub>	10 A
Utilisation category	AC-15, U <sub>e</sub> /I <sub>e</sub> 240 V / 1,5 A

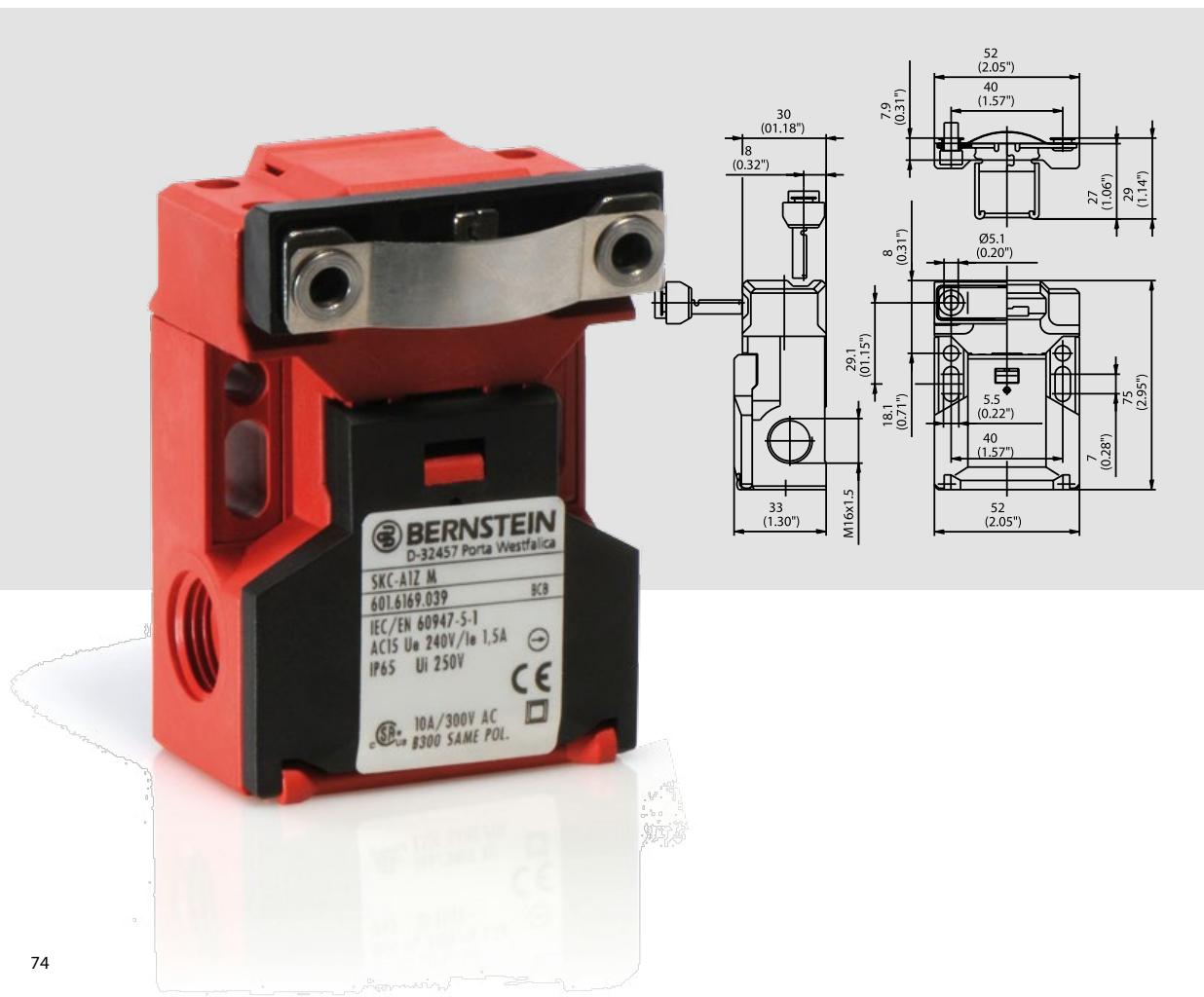

**Mechanical data**

Enclosure material	Thermoplastics, glass-fibre reinforced (UL94-V0)
Switching frequency	≤ 30/min
Ambient temperature	-30 °C to +80 °C
Mechanical lifetime	1 × 10 <sup>6</sup> switching cycles
B10d (up to) <sup>1</sup>	2 million
Short-circuit protection device	Safety fuse 10 A gL/gG
Type of connection	Screwed terminals
Conductor cross-sections	Single-wire 0.5 – 1.5 mm <sup>2</sup> Strand with wire-end ferrule 0.5 – 1.5 mm <sup>2</sup>
Cable entry	3 × M20 × 1.5
Protection class	IP65 conforming to IEC/EN 60529
Standards	VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1

<sup>1</sup> Depending on switching system.


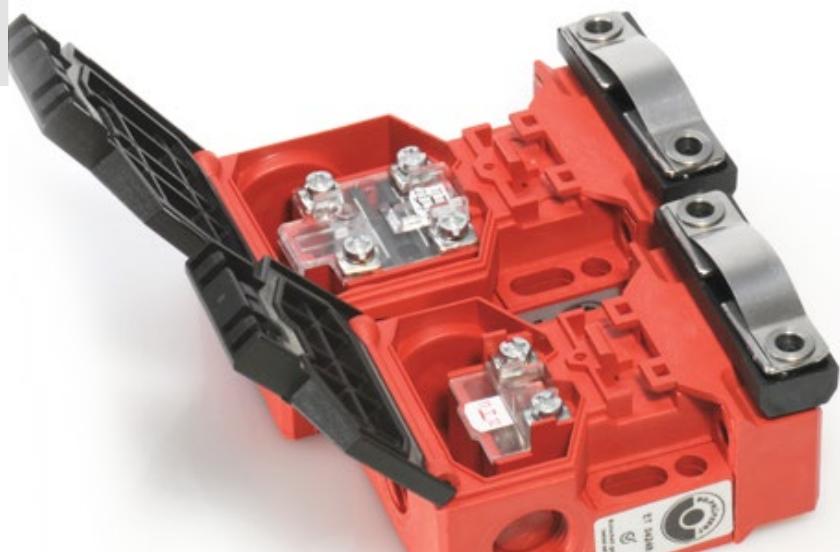
## **POSITION SWITCHES** with separated actuator

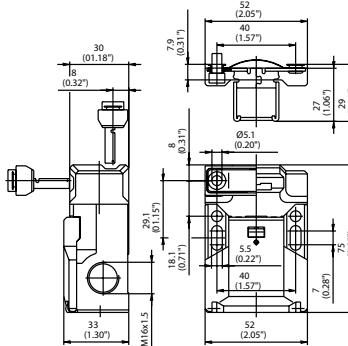
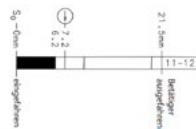
### Insulated encapsulation **SKC**



### **Good to know ...**

The safety position switch SKC is the 15 mm shorter version of the SK series. Therefore it can be used in more confined installation conditions. It has one contact and offers the same characteristics as the other switches of the SK series.



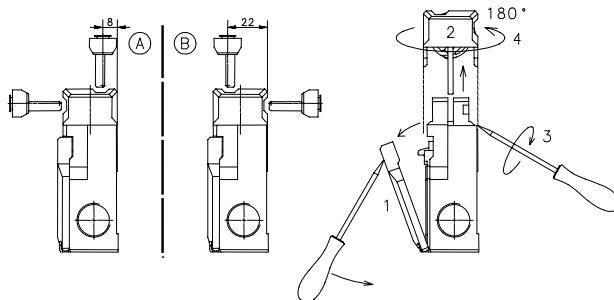

**SKC**
**1 NC contact**
**Standard**
**6016169039**  
**SKC-A1Z M**

**Special features / variants**

Actuator selection on page 80 / 81. On request: Higher actuation forces available

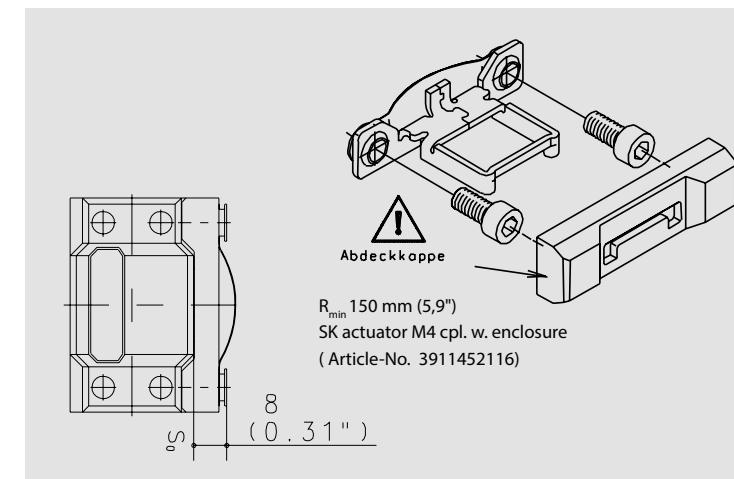
## Technical data

**Electrical data**

Protection class	II, protective insulation
Design insulation voltage	U <sub>i</sub> max. 250 V
Rated operating voltage	U <sub>e</sub> max. 240 V AC
Conventional thermoelectric current I <sub>the</sub>	5 A
Utilisation category	AC-15, U <sub>e</sub> /I <sub>e</sub> 240 V / 1,5 A

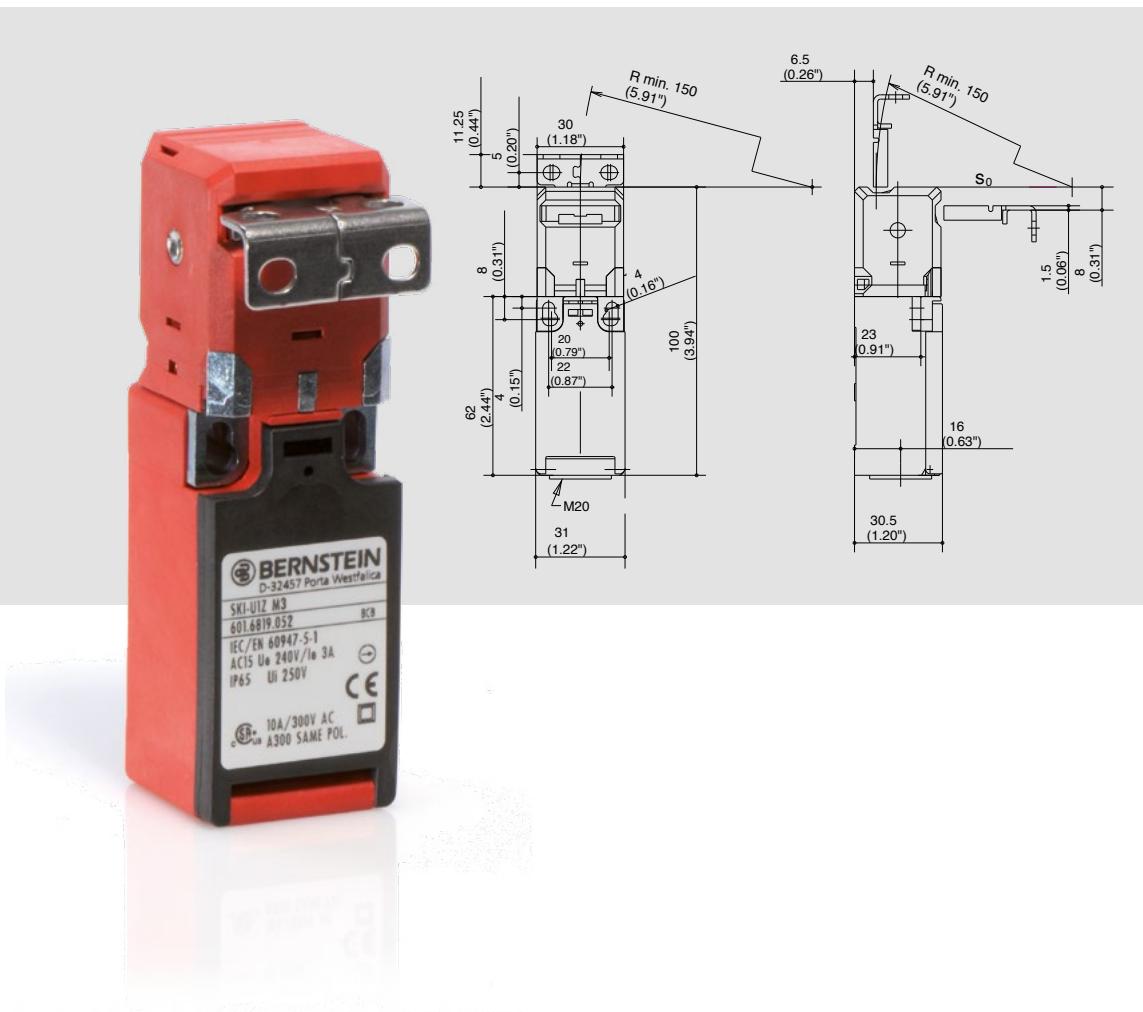

**Mechanical data**

Enclosure material	Thermoplastics, glass-fibre reinforced (UL94-V0)
Switching frequency	≤ 30/min
Ambient temperature	-30 °C to +80 °C
Mechanical lifetime	1 × 10 <sup>6</sup> switching cycles
B10d (up to) <sup>1</sup>	2 million
Short-circuit protection device	Safety fuse 6 A gL/gG
Type of connection	Screwed terminals
Conductor cross-sections	Single-wire 0.5 – 1.5 mm <sup>2</sup> Strand with wire-end ferrule 0.5 – 1.5 mm <sup>2</sup>
Cable entry	3 × M16 × 1.5
Protection class	IP65 conforming to IEC/EN 60529
Standards	VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1

<sup>1</sup> Depending on switching system.


## **POSITION SWITCHES** with separated actuator

# Insulated encapsulation **SKI**



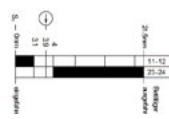
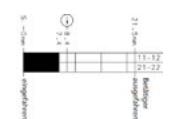
## Good to know ...

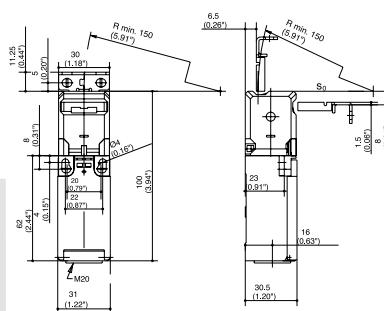
The SKI switches are small safety switches with separated actuator. Made for profile system installation and for applications with small space. The operating head is rotatable so that the switch can be actuated from five different directions. Compared with the SKT switch, it has a larger wiring compartment and can be equipped with up to 3 contacts. The standard actuation force is 10 N and can be selected in steps up to 50 N. Different actuators complete the program.

The actuator type MRU is especially made for swivelling operations (hook locks), is slightly resilient and the operating radius can be adjusted.




**SKI**

	<b>1 NC / 1 NO</b>	<b>2 NC contact</b>
Standard	<b>6016819052</b> SKI-U1Z M3	<b>6016869056</b> SKI-A2Z M3
		



Special features/variants

Actuator selection on page 80 / 81. On request: Higher actuation forces available

## Technical data

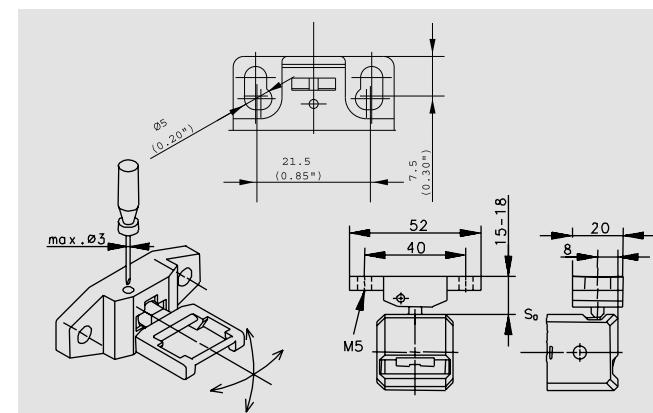
### Electrical data

Protection class	II, protective insulation
Design insulation voltage	$U_i$ max. 250 V AC
Rated operating voltage	$U_e$ max. 240 V
Conventional thermoelectric current $I_{the}$	10 A
Utilisation category	AC-15, $U_e/I_e$ 240 V / 3

### Mechanical data

Enclosure material	Thermoplastics, glass-fibre reinforced (UL94-V0)
Switching frequency	$\leq 30/\text{min}$
Ambient temperature	-30 °C to +80 °C
Mechanical lifetime	Standard $1 \times 10^6$ switching cycles Increased actuation force $1 \times 10^5$ switching cycles
B10d (up to) <sup>1</sup>	2 million
Short-circuit protection device	Safety fuse 6 A gL/gG
Type of connection	Screwed terminals
Conductor cross-sections	Single-wire 0.5 – 1.5 mm <sup>2</sup> Strand with wire-end ferrule 0.5 – 1.5 mm <sup>2</sup>
Cable entry	1 x M20 x 1.5
Protection class	IP65 conforming to IEC/EN 60529
Standards	VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1

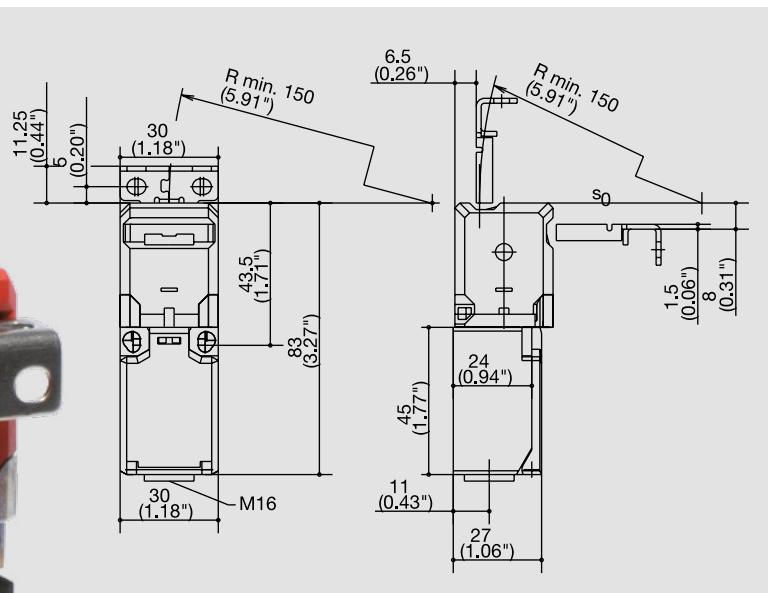
<sup>1</sup> Depending on switching system.



$R_{\min}$  in the set directions 50 mm — actuation forces only FE to F30  
SK-actuator MRU (item-No. 3911452058)

## **POSITION SWITCHES** with separated actuator

# Insulated encapsulation **SKT**



## Good to know ...

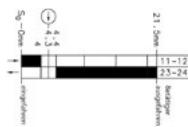
As all switches of the SK series, the SKT includes a separated actuator. It is even more compact than the SKI and therefore it is especially suitable for applications in confined spaces. The operating head is rotatable and therefore, it can be actuated from five different directions. The standard actuation force is 10 N and can be selected in steps up to 50 N. Different actuators complete the programme.

The actuator type MRU is especially made for swivelling operations (hook locks), is slightly flexibly to mount and the operating radius can be calibrated.

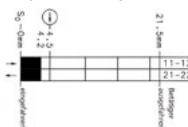



**SKT**
**1 NC / 1 NO**
**2 NC contact**
**Standard**
**6016419059**

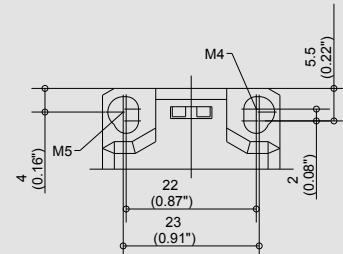
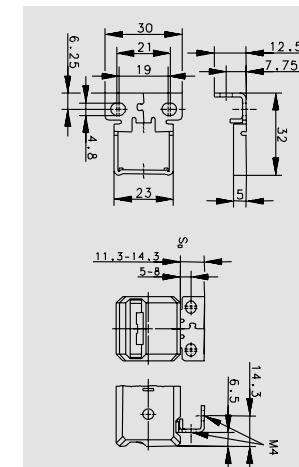
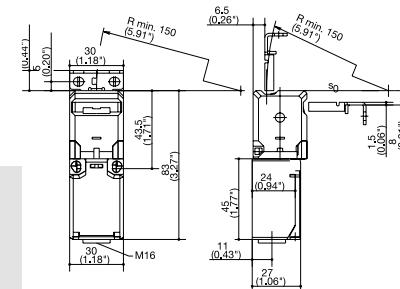
SKT-U1Z M3


**6016469066**

SKT-A2Z M3


**Special features/variants**

Actuator selection on page 80 / 81. On request: Higher actuation forces available



$R_{\min}$  150 mm  
actuation forces only FE to FI50  
SK-actuator M3 (item-No. 3112850340)

## Technical data

**Electrical data**

Protection class	II, protective insulation
Design insulation voltage	$U_i$ max. 250 V
Rated operating voltage	$U_e$ max. 240 V AC
Conventional thermoelectric current $I_{the}$	10 A
Utilisation category	AC-15, U / I: 240 V / 3 A; DC-13, $U_e^f / I_e^f$ : 250 V / 0,27 A

**Mechanical data**

Enclosure material	Thermoplastics, glass-fibre reinforced (UL94-V0)
Switching frequency	$\leq 30/\text{min}$
Ambient temperature	-30 °C to +80 °C
Mechanical lifetime	Standard $1 \times 10^6$ switching cycles Increased actuation force $1 \times 10^5$ switching cycles
B10d (up to) <sup>1</sup>	2 million
Short-circuit protection device	Safety fuse 6 A gL/gG
Type of connection	Contact screws
Conductor cross-sections	Single-wire 0.5 – 1.5 mm <sup>2</sup> Strand with wire-end ferrule 0.5 – 1.5 mm <sup>2</sup>
Cable entry	M16 x 1.5
Protection class	IP65 conforming to IEC/EN 60529
Standards	VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1

<sup>1</sup> Depending on switching system.

## **POSITION SWITCHES** with separated actuator

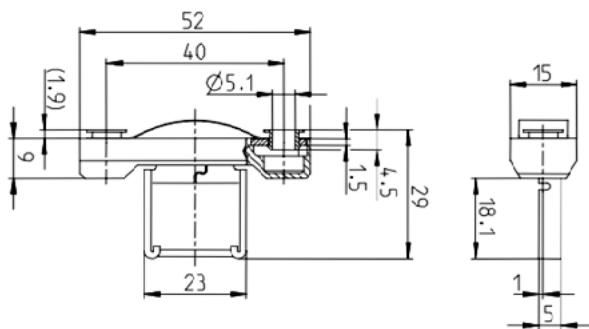
### **Selection of actuators**



**SK actuator M4 (complete with enclosure)**

#### **Product range**

<b>Article number</b>	<b>Designation</b>
3911452116	SK actuator M4 (with enclosure)



#### **Mechanical data**

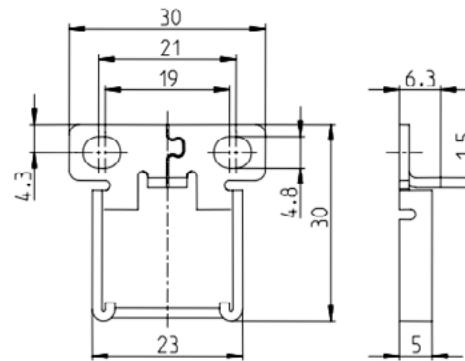
Actuator	St-VA steel
Enclosure	Thermoplastics PA
Minimum actuation radius R <sub>min</sub>	150 mm



**SK actuator M2**

#### **Product range**

<b>Article number</b>	<b>Designation</b>
3112850345	SK actuator M2



#### **Mechanical data**

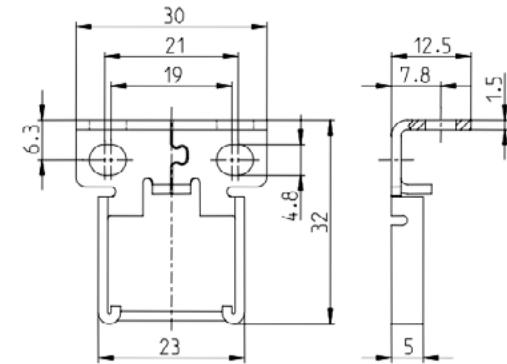
Actuator	St-VA steel
Minimum actuation radius R <sub>min</sub>	150 mm



**SK actuator M3**

#### **Product range**

<b>Article number</b>	<b>Designation</b>
3112850340	SK actuator M3



#### **Mechanical data**

Actuator	St-VA steel
Minimum actuation radius R <sub>min</sub>	150 mm

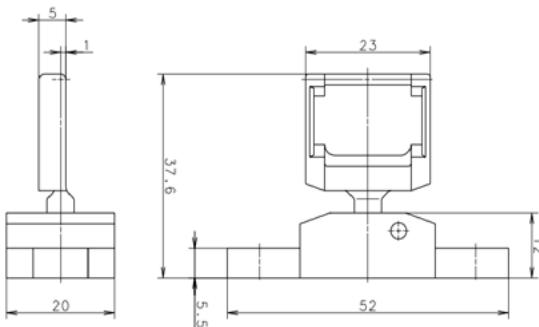
Other actuators on request.



MRU actuator

## Product range

Article number	Designation
<b>3911452058</b>	SK actuator MRU



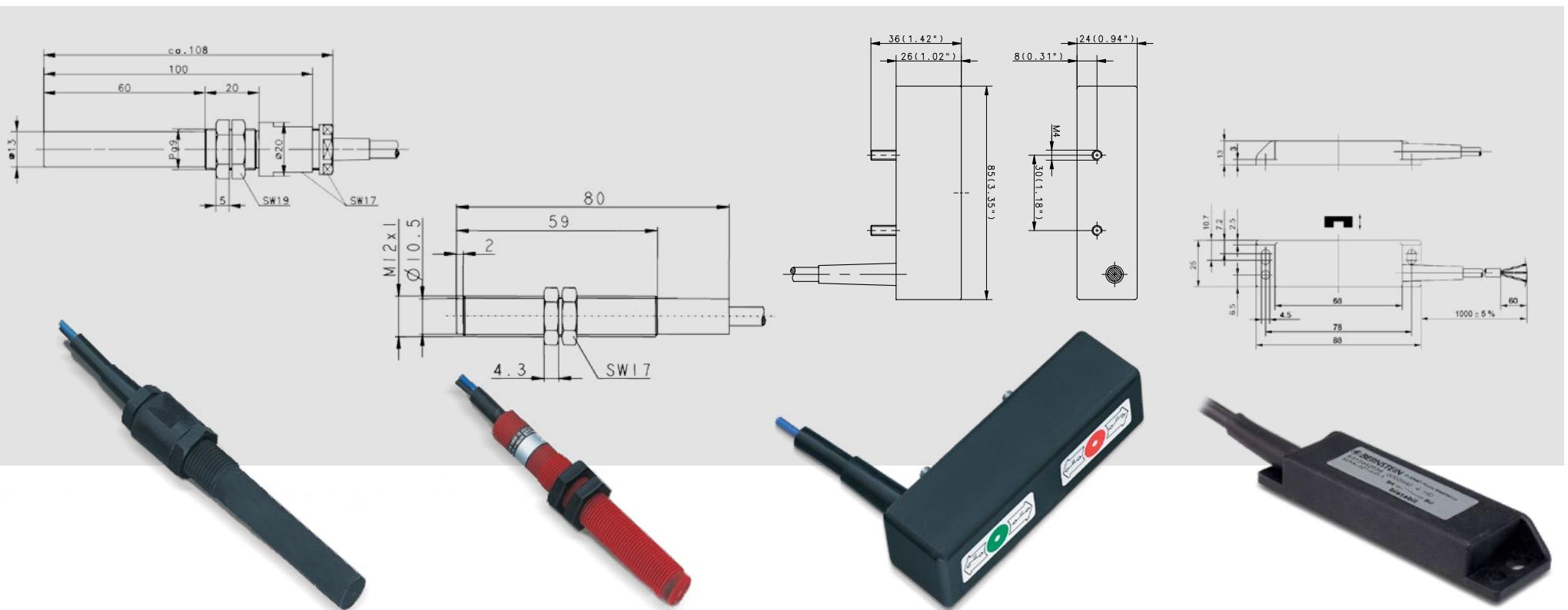
## Mechanical data

Actuator	St-VA steel/ brass
Minimum actuation radius $R_{\min}$	50 mm



## REED CONTACTS

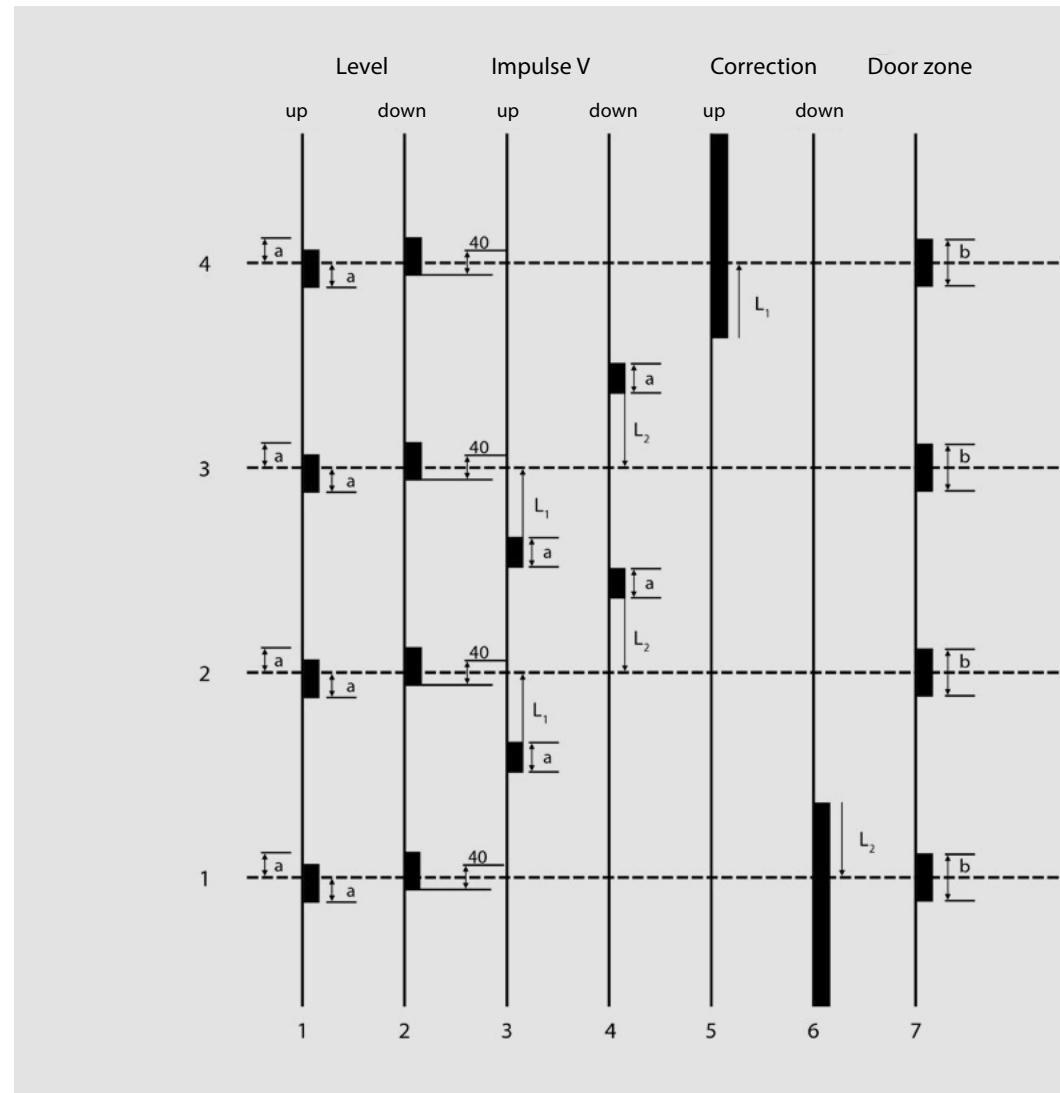
### Magnetically operated **MAK series**



## MAK series

The magnetically operated switches of the MAK series are classical reed contacts that have been used for shaft copy and door zone signals for many years. Monostable and bistable versions are available — right in the way you need it for your application. Monostable reed contacts are actuated by the target (magnet), take it away they switch back to the initial condition.

Our bistable reed contacts are typically actuated by a south pole magnet. After taking away the target they stay in their condition. Reversing or changing the actuation direction or the target polarity (north pole) will switch them back to the initial condition.



## REED CONTACTS

### MAK-3614-P-2 bistable



Design	Ø 13 mm	Technical data	Mechanical data
Design switching interval (San)	13 mm		
Reference magnet	T-62 N/S		
Type of connection	Cable 2 m		
<b>6310436553</b> MAK-3614-P-2  Bistable reed contact		Switching voltage (max) 250V Switching current (max) 5 A (2 ms) Switching capacity (max) 250 VA Mechanical lifetime $3 \times 10^8$ switching cycles	Ambient temperature (min/max) -5 °C ... to +70 °C Protection class accor. to IEC 526, EN 60529 Enclosure material PA 6.6 black Connection 2 × 0.75 mm <sup>2</sup> Installation position arbitrary
Special features/variants	Bistable cylindrical reed contact with front-side actuation. It is used for classical shaft copies, also as door zone switch.		

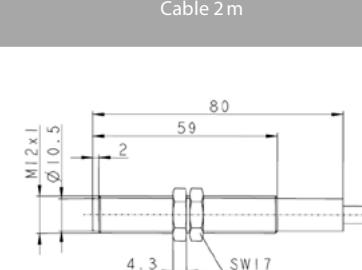
### MAK-3615-L-1 bistable change-over contact



Design	Ø 13 mm	Technical data	Mechanical data
Design switching interval (San)	20 mm		
Reference magnet	T-62 N/S		
Type of connection	Cable 1 m		
<b>6310536617</b> MAK-3615-L-1  Bistable change-over reed contact		Switching voltage (max) 250V Switching current (max) 1 A Switching capacity (max) 60 VA Mechanical lifetime $3 \times 10^8$ switching cycles	Ambient temperature (min/max) -5 °C ... to +70 °C Protection class accor. to IEC 526, EN 60529 Enclosure material PA 6.6 black Connection 3 × 0.75 mm <sup>2</sup> Installation position arbitrary
Special features/variants	Also the MAK-3615-L-1 is a bistable magnetically operated switch; however it is equipped with a change-over contact. It is also used in classical shaft copies or as door zone switch.		

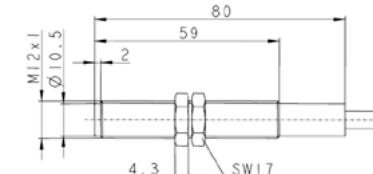
## MAK-3312-A-2 NO contact

Technical data		Mechanical data		Design	Ø 10.5 mm
				Secured switching interval ( $S_a$ )	7 mm
				Reference magnet	T-62 N/S
				Type of connection	Cable 2 m
Switching voltage (max)	250 V AC / DC	Ambient temperature (min/max)	-5 °C ... to +70 °C	<b>6314233708</b> MAK-3312-A-2	
Switching current (max)	3 A	Protection class accor. to IEC 526, EN 60529	IP67 (NEMA 4)		
Switching capacity (max)	120 VA	Enclosure material	PA 6, red	Normally open contact NO	
Mechanical lifetime	$3 \times 10^8$ Switching cycles depending on load	Connection	Cable 2 × AWG20 × 2 m ± 5 %; PVC jacket, black		
Shock resistance	50 g (11 ms, ½ sinus wave)	Installation position	arbitrary		
Special features/variants	Cylindrical, mono-stable magnetically operated switch with continuous M12 thread				



## MAK-3313-D-1 change-over switch

Technical data		Mechanical data		Design	Ø 10.5 mm
				Secured switching interval ( $S_a$ )	29 mm
				Reference magnet	T-62 N/S
				Type of connection	Cable 1 m
Switching voltage (max)	125 V AC / 175 V DC	Ambient temperature (min/max)	-5 °C ... to +70 °C	<b>6314233709</b> MAK-3313-D-1	
Switching current (max)	280 mA AC/400 mA DC	Protection class accor. to IEC 526, EN 60529	IP67 (NEMA 4)		
Switching capacity (max)	5 VA	Enclosure material	PA 6.6, red	Change-over switch	
Mechanical lifetime	$3 \times 10^8$ Switching cycles depending on load	Connection	Cable 3 × AWG20 × 1 m ± 5 %; PVC jacket, black		
		Installation position	arbitrary		
Special features/variants	Cylindrical, mono-stable magnetically operated switch with continuous M12 thread and change-over contact				



## REED CONTACTS



### MAK-3314-A-2 bistable



Design	Ø 10.5 mm	Technical data		Mechanical data	
Secured switching interval ( $S_a$ )	22 mm				
Reference magnet	T-62 N/S				
Type of connection	Cable 2 m				
		<b>6314233710</b> MAK-3314-A-2	Switching voltage (max) Switching current (max) Switching capacity (max) Mechanical lifetime	250 V AC / DC 3 A 120 VA $3 \times 10^8$ Switching cycles depending on load	Ambient temperature (min/max) Protection class accor. to IEC 526, EN 60529 Enclosure material Connection Installation position
		Bistable On-Off			-5 °C ... to +70 °C IP67 (NEMA A4) PA 6.6, red Cable 2 × AWG20 x 1 m ± 5 %; PVC jacket, black arbitrary

Special features/variants

Cylindrical, bistable magnetically operated switch with continuous M12 thread

### Series MAK-3214-P-1 bistable



Design	85 × 24 × 26 mm	Technical data		Mechanical data	
Switching interval ( $S_a$ )	17 mm				
Reference magnet	T-62 N/S				
Type of connection	Cable 2 × 0.5 mm <sup>2</sup>				
		<b>6310432598</b> MAK-3214-P-1	Switching voltage (max) Switching current (max) Switching capacity (max) Mechanical lifetime	250 V 5 A (2 ms) 250 VA $3 \times 10^8$ Switching cycles depending on load	Ambient temperature (min/max) Protection class accor. to IEC 526, EN 60529 Connection Enclosure material Installation position
		Bistable On-Off			-5 °C ... to +70 °C -25 °C ... to +70 °C (Cable firmly wired) IP67 Cable 2 × 0.5 mm <sup>2</sup> ; PVC jacket, black PBT, black; reed contact encapsulated arbitrary

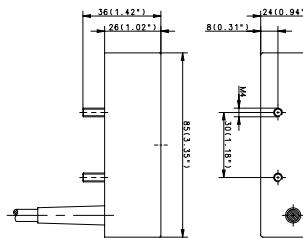
Special features/variants

With connecting cable, 1 m long. Switching interval up to 17 mm. Suitable for currents up to 5A.



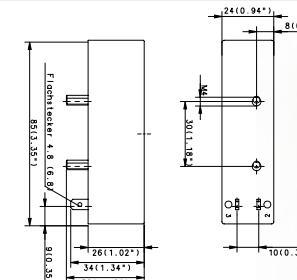
## MAK-3214-P-A-3 bistable

Technical data		Mechanical data		Design	85 x 24 x 26 mm
				Secured switching interval ( $S_a$ )	17 mm
Switching voltage (max)	250 V AC / DC	Ambient temperature (min/max)	-5 °C ... to +70 °C	<b>6314432706</b> MAK-3214-A-3	
Switching current (max)	3 A	Protection class accor. to IEC 526, EN 60529	IP67 (NEMA A4)		
Switching capacity (max)	120 VA	Connection	Cable 2 x AWG20 x 3 m ± 5 %; PVC, black	Bistable On-Off	
Mechanical lifetime	$3 \times 10^8$ Switching cycles depending on load	Enclosure material	PBT, black, reed contact encapsulated		
Shock resistance	50 g (11 ms, $\frac{1}{2}$ sinus wave)	Installation position	arbitrary		
Special features/variants		With connecting cable, 3 m long. Switch travel of up to 15 mm. UL-approval (for current up to 2A)			



## MAK-3214-P-STK 4.8 bistabil

Technical data		Mechanical data		Design	85 x 24 x 26 mm
				Secured switching interval ( $S_a$ )	17 mm
Switching voltage (max)	250 V	Ambient temperature (min/max)	-25 °C ... to +70 °C	<b>6310432590</b> MAK-3214-P-STK 4.8	
Switching current (max)	5 A (2ms)	Protection class accor. to IEC 526, EN 60529	IP67, connection IP00	Bistable On-Off	
Switching capacity (max)	250 VA	Connection	Flat connector 4.8 mm		
Mechanical lifetime	$3 \times 10^8$ Switching cycles depending on load	Enclosure material	PBT, black, reed contact encapsulated		
		Installation position	arbitrary		
Special features/variants		Classical cuboid design, bistable, flat connector 4.8mm. The switch is equipped with a shielding plate on the side; additionally its inner space is block-moulded, to minimise mechanical influences on the reed contact.			



## REED CONTACTS



### MAK-4212-A-1 NO contact



Design	88 × 25 × 13 mm	Technical data		Mechanical data	
Secured switching interval ( $S_a$ )	19 mm				
Reference magnet	TK-42				
Type of connection	Cable 2 × AWG20				
		Switching voltage (max)	30 V AC / 60 V DC	Ambient temperature (min/max)	-5 °C ... to +70 °C
		Switching current (max)	2 A	Protection class accor. to IEC 526, EN 60529	IP67
		Switching capacity (max)	100 VA	Enclosure material	PA 6.6, black
		Mechanical lifetime	$3 \times 10^8$ Switching cycles depending on load	Connection	Cable 2 × AWG20 PVC jacket, black
		Shock resistance	50 g (11 ms, $\frac{1}{2}$ sinus wave)	Installation position	arbitrary
Special features/variants	Square design, monostable, connection via connecting cable of 1m length. Block-moulded inner space to minimise mechanical influences on the reed contact.				

### MAK-4213-D-1 change-over switch

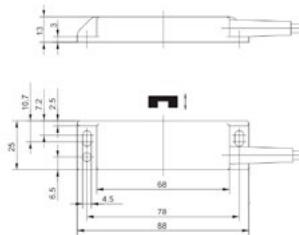


Design	88 × 25 × 13 mm	Technical data		Mechanical data	
Secured switching interval ( $S_a$ )	22 mm				
Reference magnet	T-42				
Type of connection	Cable 3 × AWG20				
		Switching voltage (max)	125 V AC / 175V DC	Ambient temperature (min/max)	-5 °C ... to +70 °C
		Switching current (max)	280 mA AC / 400 mA DC	Protection class accor. to IEC 526, EN 60529	IP67 (NEMA 4)
		Switching capacity (max)	5 VA	Enclosure material	PA 6.6, black
		Mechanical lifetime	$3 \times 10^8$ Switching cycles depending on load	Connection	Cable 3 × AWG20 × 1 m ± 5 %; PVC jacket, black
				Installation position	arbitrary
Special features/variants	Square design, monostable, change-over contact. Connection via connecting cable of 1m length. Block-moulded inner space to minimise mechanical influences on the reed contact.				



## MAK-4214-A-1 bistable

Technical data		Mechanical data		Design	88 × 25 × 13 mm
				Secured switching interval ( $S_a$ )	2-20mm
				Reference magnet	T-62 N/S
				Type of connection	Cable 2 × AWG20
Switching voltage (max)	250 V AC / DC	Ambient temperature (min/max)	-5 °C ... to +70 °C	<b>6310442715</b> MAK-4214-A-1	
Switching current (max)	3 A	Protection class accor. to IEC 526, EN 60529	IP67 (NEMA 4)	Bistable On-Off	
Switching capacity (max)	120 VA	Enclosure material	PA 6.6, black		
Mechanical lifetime	$3 \times 10^8$ Switching cycles depending on load	Connection	Cable 2 × AWG20 × 1 m ± 5 %; PVC jacket, black		
Shock resistance	50 g (11 ms, $\frac{1}{2}$ sinus wave)	Installation position	arbitrary		
Special features/variants	Square design, bistable, connection via connecting cable of 1 m length. Block-moulded inner space to minimise mechanical influences on the reed contact.				



## REED CONTACTS Actuating magnets

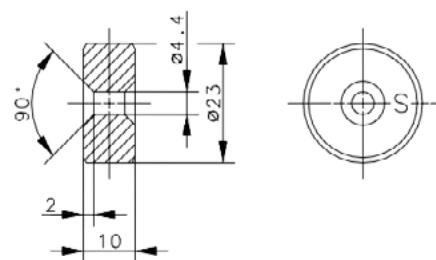
To ensure stable, reproducible actuation we recommend using our actuating magnets.

Please find the exact switch travel in the following table:

**T-62 Round magnet**



Product range	
Article number	Designation
6301262039	T-62 N/S

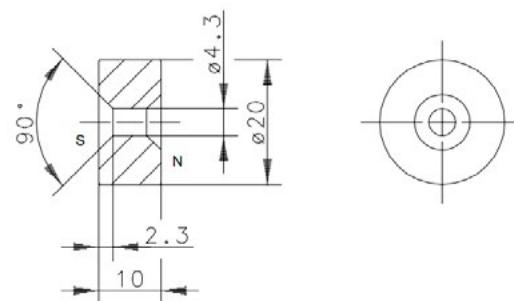


Mechanical data	
Magnet	Hard ferrite 24/16; axially magnetised; marking on the south-pole side
Ambient temperature	-40°C ... +150°C
Application	General
Tightening torque	2 Nm ± 0.25 Nm (with fixing material attached)

**T-67 Round magnet**



Product range	
Article number	Designation
6404167017	T-67 N/S

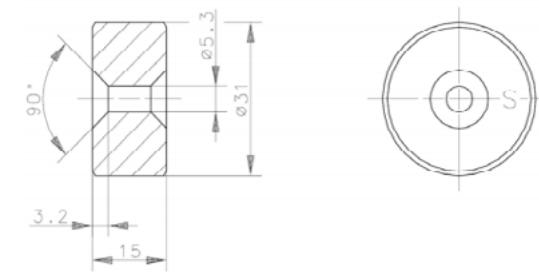


Mechanical data	
Magnet	Hard ferrite 24/23; axially magnetised; marking on the south-pole side
Ambient temperature	-20°C ... +80°C
Application	General
Tightening torque	2 Nm ± 0.25 Nm

**T-69 Round magnet**



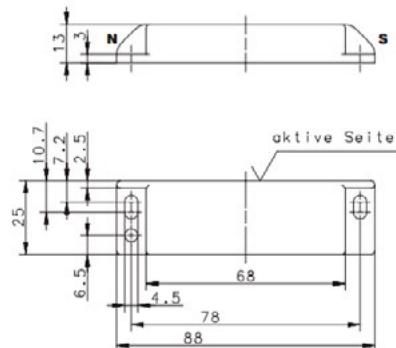
Product range	
Article number	Designation
6301269031	T-69 N/S



Mechanical data	
Magnet	Hard ferrite 24/16; axially magnetised; marking on the south-pole side
Ambient temperature	-20°C ... +80°C
Application	General
Tightening torque	2 Nm ± 0.25 Nm


**TK-42 Enclosed magnet**

Product range	Designation
Article number	
<b>6302142049</b>	TK-42



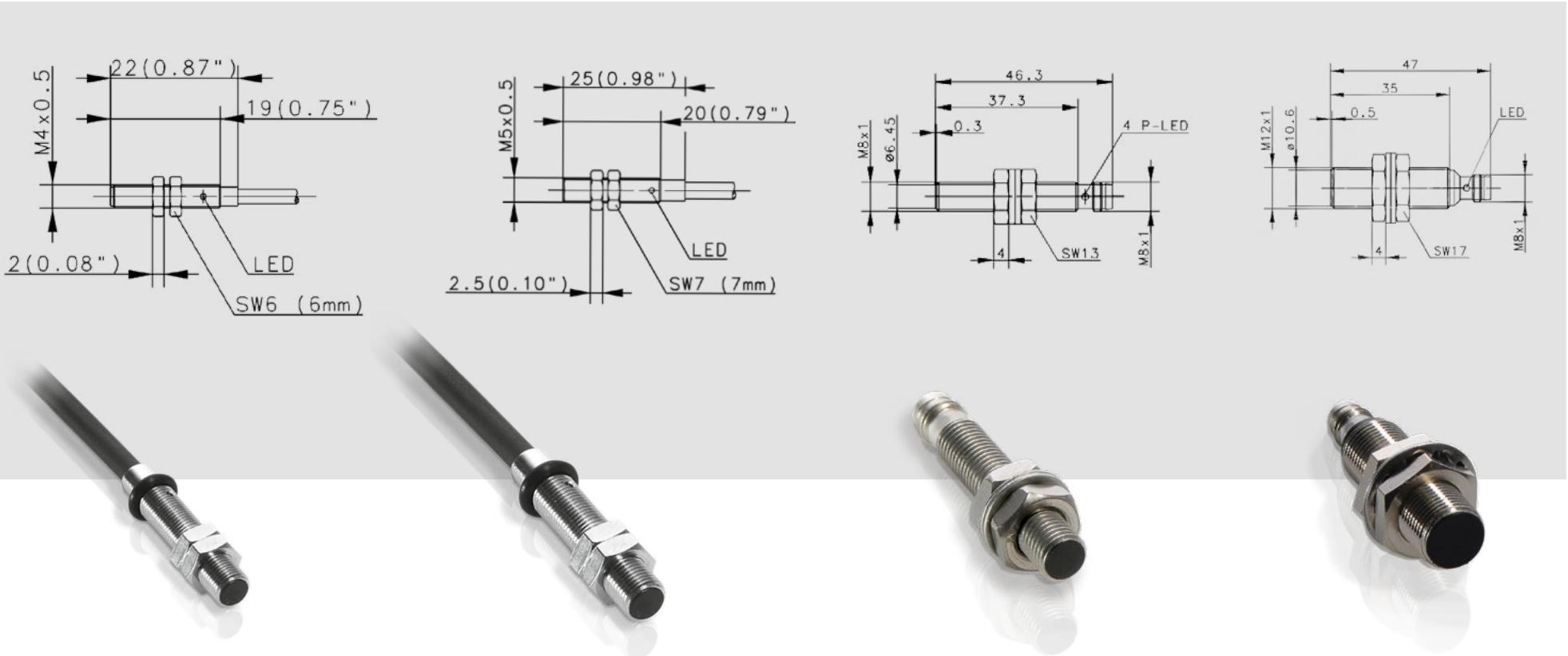
Mechanical data	
Magnet	AlNiCo – 50
Enclosure	PA 6.6, Magnet encapsulated
Ambient temperature	-20°C ... +80°C
Application	General

### Switching distances in the overview

Magnetically operated switch		Magnets		
Designation	Article number	T-62N/S 6301262039	T-69N/S 6301269031	TK-42 6302142049
MAK-3614-P-2	<b>6310436553</b>	13 mm		
MAK-3615-L-1	<b>6310536617</b>	20 mm		
MAK-3312-A-2	<b>6314233708</b>	7 mm		
MAK-3313-D-1	<b>6316333709</b>	29 mm		
MAK-3314-A-2	<b>6310433710</b>	22 mm		
MAK-3214-P-STK 4.8	<b>6310432590</b>	17 mm		
MAK-3214-P-1	<b>6310432598</b>	17 mm		
MAK-4212-A-1	<b>6314242713</b>	-		19 mm
MAK-4213-D-1	<b>6317342714</b>	-		22 mm
MAK-4214-A-2	<b>6310442715</b>	2–20 mm	5–25 mm	

## INDUCTIVE SENSORS

### Inductive proximity sensors **KIB**



## Good to know ...

Non-contact sensors distinguish by high reliability and a wide range of applications. Their general purpose is to convert mechanical movements in electrical signals that are processed in the controls.

The selection of the sensor depends on the correct environmental and application conditions and the technical requirements. Besides the sensing technology used – inductive and magnetic sensors are mainly used in the lift industry – the output function (PNP, NPN, ...) is also of importance. Furthermore the switching distance, the direction and type of approach are important selection criteria.

In the lift industry there are several possibilities to use the sensors of the KIB series, for example brake lining monitoring. However – they are still used in escalator applications for speed monitoring (MEK-series).



## INDUCTIVE SENSORS

### KIB M4



Type of installation	Flush	Technical data		Mechanical data
Rated switching interval	0.6mm			
Type of connection	Cable 2 m			
Particularity				
		Rated operating voltage $U_e$	10–30 VDC	Ambient temperature (min/max) –25 °C ... to +70 °C
		Rated operating current $I_e$	≤ 100 mA	Protection class accor. to IEC 526, EN 60529 IP67
	<b>6502999020</b> KIB-M04PS/0,6-KL2PU	Switching frequency (max)	3000 Hz	Enclosure material VA steel 1.4305
	PNP NO contacts	Short-circuit protection	Clocking	Connection 3 × 0.055 mm <sup>2</sup>
		Function and operating voltage display	LED/-	
		Switching interval, adjustable		
Special features/variants	Our "small one". Cylindrical enclosure in M4, 22mm long, IP67. Can be installed flush and as output it has a DC signal (NO contact). Enclosure made of VA steel 1.4305.			

### KIB M5

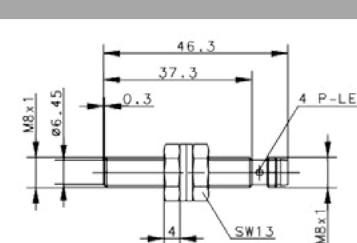


Type of installation	Flush	Technical data		Mechanical data
Rated switching interval	1 mm			
Type of connection	Cable 2 m			
Particularity				
		Rated operating voltage $U_e$	12–24 V DC	Ambient temperature (min/max) –25 °C ... to +70 °C
		Rated operating current $I_e$	≤ 200 mA	Protection class accor. to IEC 526, EN 60529 IP67/NEMA type 1
	<b>6532999002</b> KIB-M05PS/001-KL2I	Switching frequency (max)	1000 Hz	Enclosure material Brass, nickel-plated
	NO contact	Short-circuit protection	Clocking	Connection 3 × 0.14 mm <sup>2</sup>
		Function and operating voltage display	LED, yellow	
		Switching interval, adjustable		
Special features/variants	Cylindrical enclosure in M5, 25mm long, IP67. Can be installed flush and as output it has a DC signal (NO contact). Enclosure made of brass, nickel-plated.			



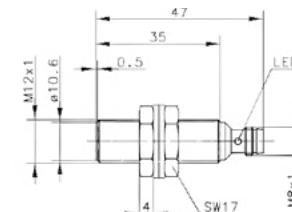
## KIB M8

Technical data		Mechanical data		Type of installation	Flush
				Rated switching interval	1.5 mm
				Type of connection	Plug M8
				Particularity	
Rated operating voltage $U_e$	10-36 VDC	Ambient temperature (min/max)	-25 °C ... to +70 °C	<b>6932942001</b>	
Rated operating current $I_e$	≤ 200 mA	Protection class accor. to IEC 526, EN 60529	IP67	KIB-M08PS/1,5-KLSM8	
Switching frequency (max)	1000 Hz	Enclosure material	VA steel 1.4305	PNP NO contacts	
Short-circuit protection	Clocking	Connection	M8 × 1		
Function and operating voltage display	LED/-				
Switching interval, adjustable					
Special features/variants	Cylindrical enclosure in M8, 46.3mm long, 3-pole M8 connector, IP67. Can be installed flush and as output it has a DC signal (NO contact). Enclosure made of VA steel 1.4305.				

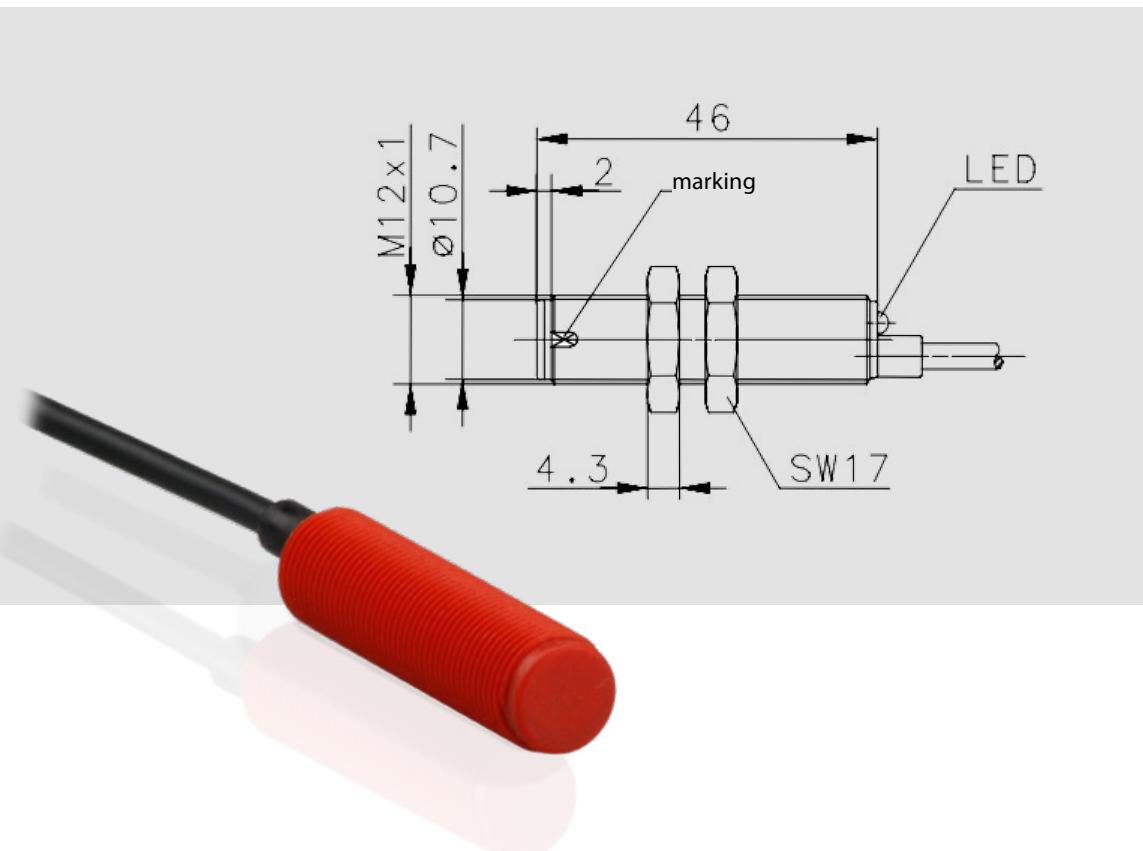


## KIB M12

Technical data		Mechanical data		Type of installation	Flush
				Rated switching interval	2 mm
				Type of connection	Plug M8
				Particularity	
Rated operating voltage $U_e$	10–30 VDC	Ambient temperature (min/max)	-25 °C ... to +70 °C	<b>6502943008</b>	
Rated operating current $I_e$	≤ 200 mA	Protection class accor. to IEC 526, EN 60529	IP67	KIB-M12PS/002-KLSM8V	
Switching frequency (max)	800 Hz	Enclosure material	CuZn39Pb3	PNP NO contacts	
Short-circuit protection	Clocking	Connection	M8 × 1		
Function and operating voltage display	LED/-				
Switching interval, adjustable					
Special features/variants	Cylindrical enclosure in M12, 47mm long, 3-pole M8 connector, IP67. Can be installed flush and as output it has a DC signal (NO contact). Enclosure made of brass, nickel-plated.				



### Speed sensor MEK



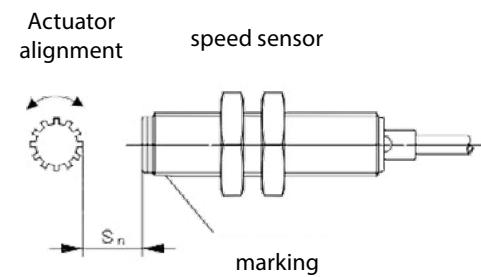
#### Good to know ...

The essential difference between our speed sensors of the MEK series and the sensors of the KIB series is the kind of actuation. The MEK series can be actuated by a metal surface and does not need a magnetic target.

Use these sensors, as the name says, for measuring the speed on a toothed wheel, e.g. in an escalator, to measure the speed of the handrail.

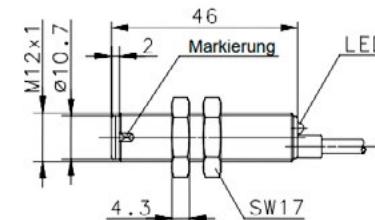


#### Connection diagram



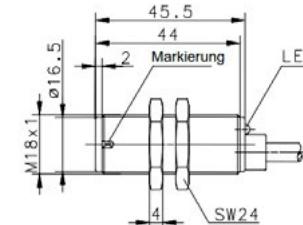
## MEK M12

Technical data		Mechanical data		Function mode	Hall
				Magnetic sensitivity	-
Rated operating voltage $U_e$	10–39 VDC	Ambient temperature (min/max)	-25 °C ... to +70 °C	Switching interval (Sn)	0–2 mm
Rated operating current $I_e$	400 mA	Protection class accor. to IEC 526, EN 60529	IP67	Reference magnet	-
Switching frequency (max)	10 kHz	Enclosure material	PA, red	Type of connection	Cable 2 m
Short-circuit protection	Clocking	Connection	$3 \times 0.14 \text{ mm}^2$	Particularity	Speed
Function and operating voltage display	LED/-				
Special features/variants	Cylindrical enclosure in M12, 46 mm long, 2m connecting cable, enclosure made of PA 6 (red).				



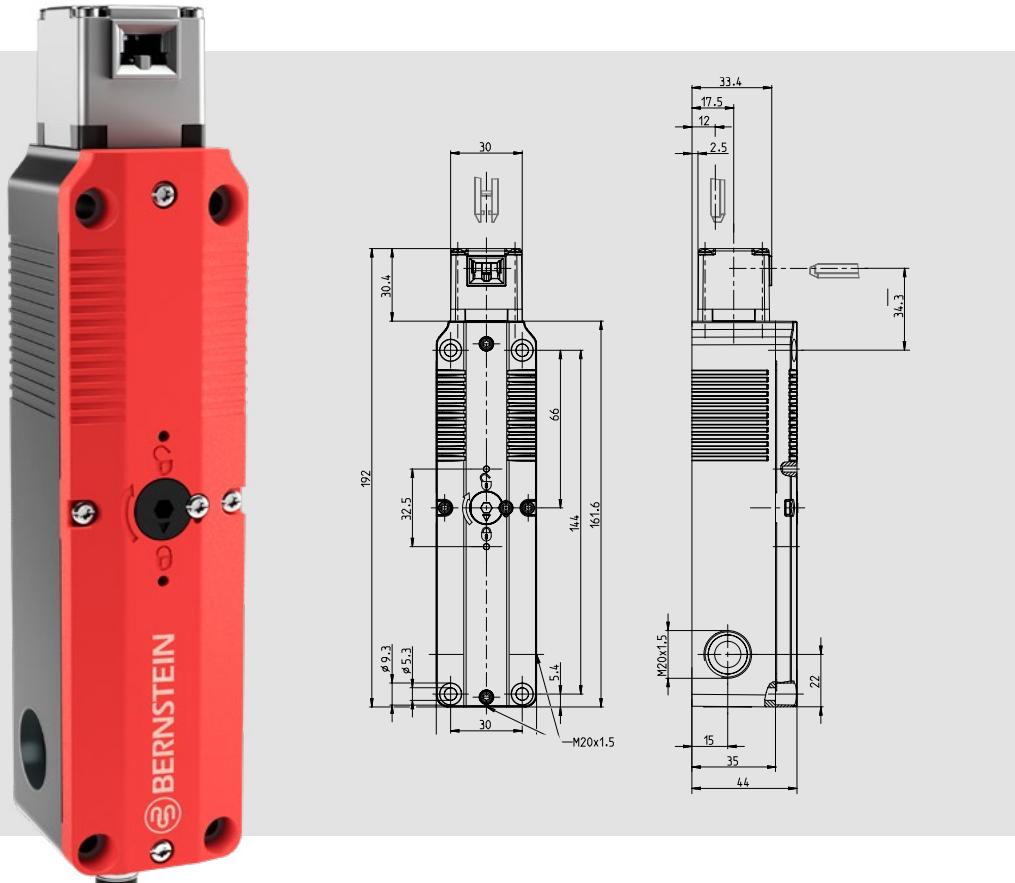
## MEK M18

Technical data		Mechanical data		Function mode	Hall
				Magnetic sensitivity	-
Rated operating voltage $U_e$	10–39 VDC	Ambient temperature (min/max)	-25 °C ... to +70 °C	Switching interval (Sn)	0–2 mm
Rated operating current $I_e$	400 mA	Protection class accor. to IEC 526, EN 60529	IP67	Reference magnet	-
Switching frequency (max)	10 kHz	Enclosure material	PBT, black	Type of connection	Cable 2 m
Short-circuit protection	Clocking	Connection	$3 \times 0.14 \text{ mm}^2$	Particularity	Speed
Function and operating voltage display	LED/-				
Special features/variants	Cylindrical enclosure in M18, 45.5mm long, 2m connecting cable, enclosure made of PBT (black).				



## GUARD LOCKING DEVICE

# Mechanical guard locking safety switch **SLC**



## Good to know ...

Step by step electromechanical interlocks find their way into the lift industry. Whether in lifting platforms in public buildings or in lifting devices for bypassing a few stairs, the guard locking safety switch SLC can be used in many applications.



## Product characteristics

- Lightweight yet robust: Hybrid of metal and plastics
- Flexible contact assembly
- Integrated manual release
- Five actuating positions
- Rotatable head ( $4 \times 90^\circ$ )
- Fail-safe guard locking system
- Optional emergency release
- Optional escape release
- Optional connection possibilities with M12

## Technical data

Electrical data	
Protection class	II, protective insulation
<b>Switch elements</b>	
Rated insulation voltage $U_i$	250 V
Rated impulse voltage immunity $U_{imp}$	2.5 kV
Rated operating voltage $U_e$	240 V AC / 24 V AC/DC
Conventional thermoelectric current $I_{the}$	5 A
Utilisation category accor. to IEC	AC-15, $U_e$ / $I_e$ 240 V / 1.5 A DC-13, $U_e$ / $I_e$ 24 V / 1.5 A; 250 V / 0.11 A B300 R300
Utilisation category accor. to UL/CSA	General use 240 V / 1.5 A General use M12 connector 24 V / 1.5 A accor. to IEC/EN 60947-5-1, Annex K
Positive Break	P
Short-circuit protection	4 A gG
Conditional rated short-circuit current	400 A
<b>Electromagnet</b>	
Switch-on duration	100 % ED (on E1; E2)
Heat class	F (155 °C)
Continuous output	6.7 VA (W)
Operating switching cycles permanent	600 / h
Operating voltage	24 V AC / DC (+10 % /-15 %)

## Technical design

- Slow-action and snap action switching elements
- Versions: 1 NC / 1 NO, 2 NCs, overlapping contacts

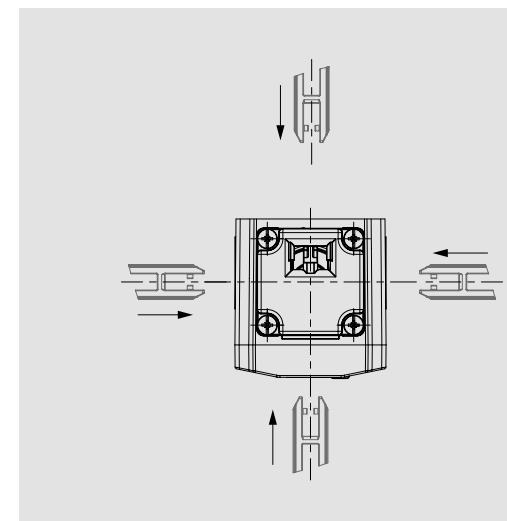
Mechanical data	
Enclosure material	Thermoplastics, glass-fibre reinforced (UL 94-V0)
Cover	Thermoplastics, glass-fibre reinforced (UL 94-V0)
Direction of actuation	Metal
<b>Operation</b>	
Minimum actuation radius	$R_{min}$ See data sheet - actuator
Starting speed	$V_{max}$ 0.5 m/s
Extraction force	≥ 10 N
Interlocking principle	Spring and magnetic force a) Magnetic force b) Auxiliary unlocking mechanism of front and rear side
Unlocking device	
Locking force	$F_{zh}$ 1500 N (EN ISO 14119)
Ambient temperature	-25 °C ... +55 °C
Switch function	depending on product type (Art. No.)
Switching principle	4 slow-action contacts
Mechanical lifetime	1 × 10 <sup>6</sup> switching cycles
Mounting	4 × M5
Type of connection	Screwed terminal
Conductor cross-sections	0.34 ... 1.5 mm <sup>2</sup> flexible
Cable entry	3 × M20 × 1.5
Weight	≈ 0.484 kg
Installation position	arbitrary
Protection class <sup>2</sup>	IP67 accor. to IEC/EN 60529; (UL 50 E / CSA C22.2) type 6 - Indoor use
<b>Key figures for safety technology</b>	
B10d	2 × 10 <sup>6</sup> cycles
<b>Standards</b>	
DIN EN 60947-5-1 • UL 508 18th edition, CSA-C22.2 No.14-18 • GS-ET-19 (DGUV)	
DIN EN ISO 14119 • DIN EN ISO 13849-1	

<sup>1</sup>Depending on switching system.

<sup>2</sup>The specified protection class (IP code) only applies with closed cover and the use of at least an equivalent cable gland with the belonging cable.

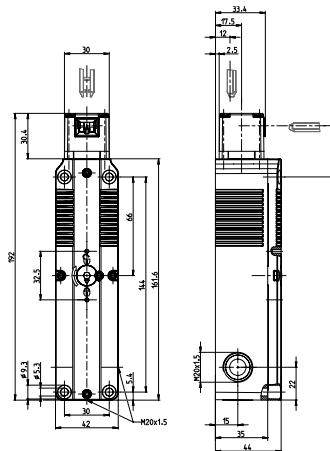
## Options

- 4 optional actuators (page 102–103)
- Emergency release available
- Optional escape release
- Connecting possibilities with M12



## GUARD LOCKING DEVICE

**SLC-...**



Special features/variants

**Principle  
of guard locking**

**1 NC / 1 NO**

Spring  
24 V AC/DC  
**6018200001**  
SLC-F-024-11/11-R4

**2 NC contact**

**6018200007**  
SLC-F-024-20/20-R4

Magnet  
24 V AC/DC  
**6018200002**  
SLC-M-024-11/11-R4

**6018200017**  
SLC-M-024-20/20-R4

Spring  
230 V AC  
**6018200005**  
SLC-F-230-11/11-R4

Magnet  
230 V AC  
**6018200006**  
SLC-M-230-11/11-R4

The actuator may not be used as buffer.  
In the event of power failure, the tumbler of the guard remains closed.



### Guard locking principles

#### Spring-To-Lock

Guard locked by spring force. To unlock, the solenoid needs to be energised.

#### Power-To-Lock

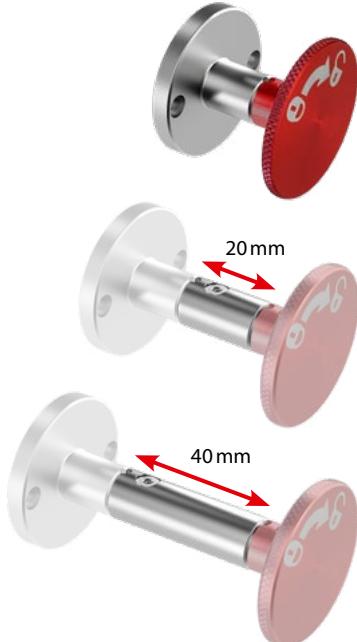
Guard locked by energised solenoid. To unlock, the energy needs to be switched off.

**DGUV**  
Deutsche Gesetzliche  
Unfallversicherung

**SAE**  
US

**CCC**

## Selection of accessories



**Escape release**

**Basic set**

ESCR-B-1

**Extension module \***

**20 mm**

ESCR-20-1

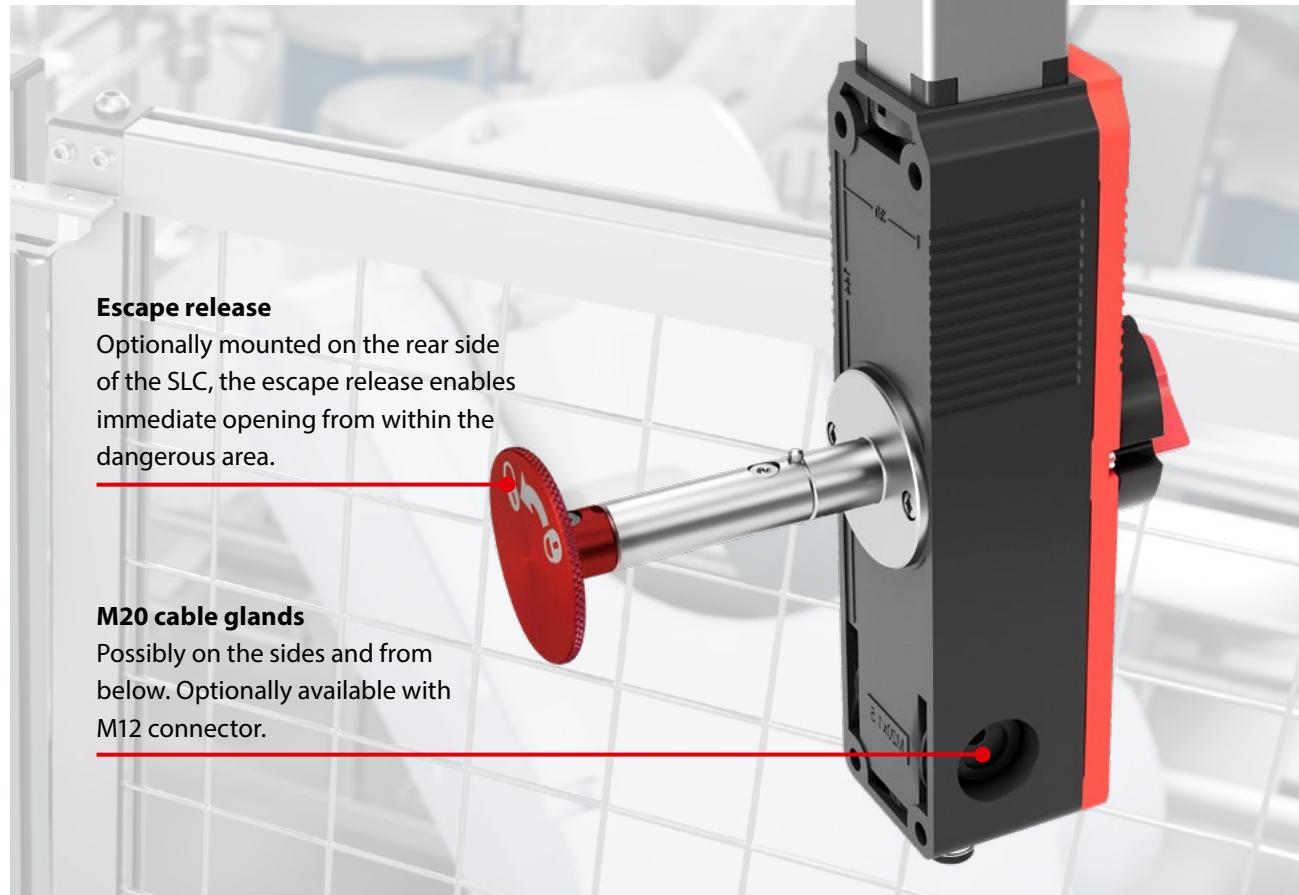
**Extension module \***

**40 mm**

ESCR-40-1

Article number	Designation	Description
6051201005	ESCR-B-1	Basic set for escape release
6051201009	ESCR-B-2	Basic set for escape release with bolt BF1-SLC ES
6051201007	ESCR-20-1	Extension module - escape release * Length: 20 mm
6051201006	ESCR-40-1	Extension module - escape release * Length: 40 mm

\* Basic set required to use the expansion modules.



**Escape release**

Optionally mounted on the rear side of the SLC, the escape release enables immediate opening from within the dangerous area.

**M20 cable glands**

Possibly on the sides and from below. Optionally available with M12 connector.

# GUARD LOCKING DEVICE

## Actuators

Actuators are not included in the scope of delivery of the SLC and must be ordered separately.

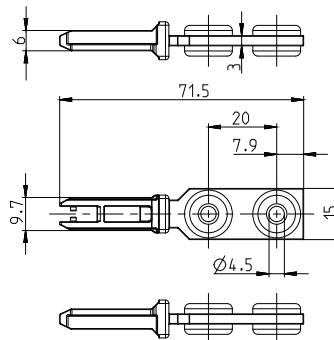
### ACS-1 actuator

Proven standard model among the actuators.



#### Produkt range

Article number	Designation
3911742390	ACS-1



#### Mechanical data

Actuator	Stainless steel (AV steel)
----------	----------------------------

Minimum actuation radius R <sub>min</sub>	800 mm
---	--------

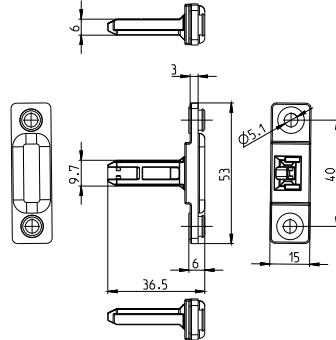
### ACC-1 actuator

The transverse actuator – for vertical / horizontal mounting.



#### Produkt range

Article number	Designation
3911742392	ACC-1



#### Mechanical data

Actuator	Stainless steel (AV steel)
----------	----------------------------

Minimum actuation radius R <sub>min</sub>	600 mm
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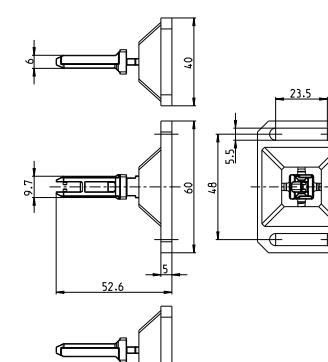
### ACF-1 actuator

Designed to compensate a slight vertical/ horizontal offset.



#### Produkt range

Article number	Designation
3911742391	ACF-1



#### Mechanical data

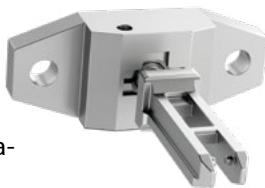
Actuator	Stainless steel (AV steel)
----------	----------------------------

Enclosure	GD-Zn
-----------	-------

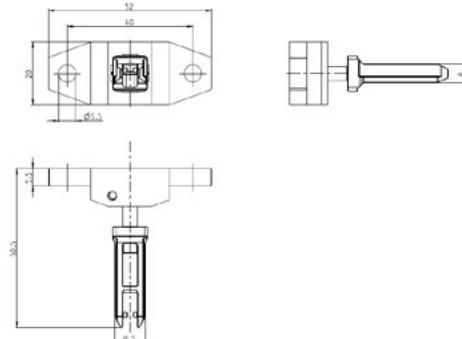
Minimum actuation radius R <sub>min</sub>	400 mm
---	--------

**ACR-1 actuator**

Radius actuator, flexibly,  
for the use with small actua-  
tion radii.


**Product range**

Article number	Designation
<b>3911742398</b>	ACR-1


**Mechanical data**

Actuator	Stainless steel (AV steel)
Enclosure	Stainless steel (AV steel)
Clamping cams	Stainless steel (AV steel)
Minimum actuation radius $R_{\min}$	150 mm

**Emergency release**

As a ready-to-use switch or as an accessory,  
mounted on the front/rear of the SLC, the  
emergency release enables immediate  
opening from outside the dangerous area.


**Article number**   **Designation**   **Description**

<b>6051101003</b>	EMR-F-1	Emergency release - front
<b>6051101004</b>	EMR-B-1	Emergency release - backside



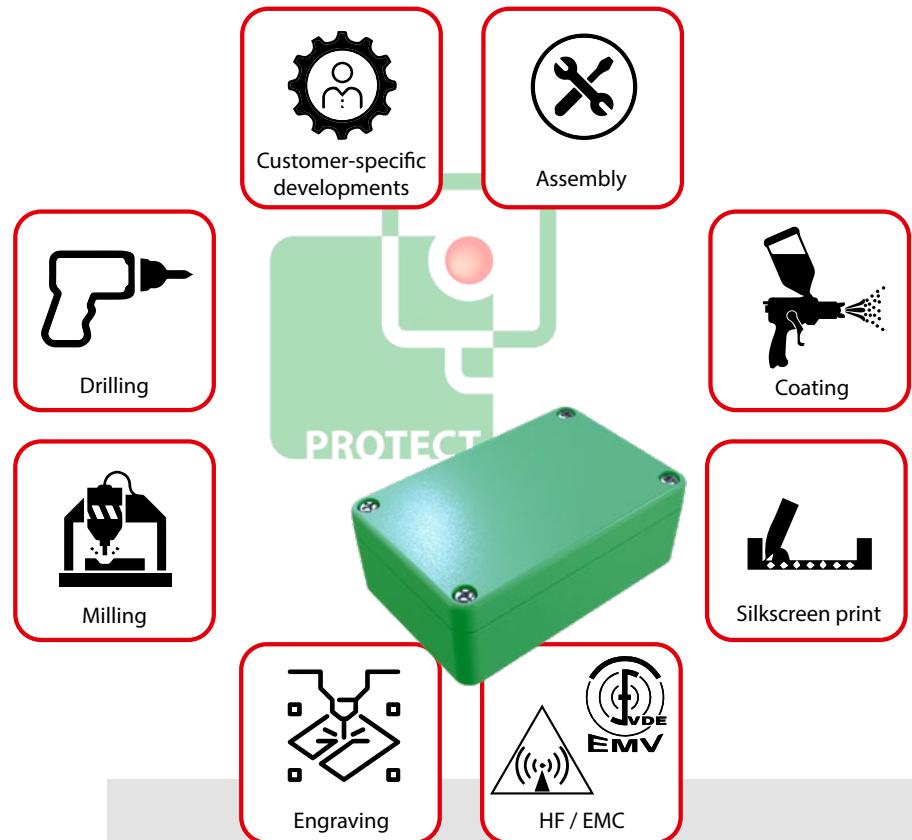
# Standard enclosures **Our evergreen**

### **Function and Design**

For decades, the traditional area of standard enclosures has been connected with the name BERNSTEIN and is well-known in the automation and safety industry. What is more obvious than to introduce these traditional products from BERNSTEIN also in the lift and escalator industry?

We present the standard enclosures of the CA and CT series to you and as it can be seen on the next pages, we have some more that we can offer you in this respect. We are looking forward to your enquiry!

Terminal box, enclosure, connecting box ... or sometimes regionally called "Käschtle": Our customers have many different names for our standard enclosures. However they always mean the proven and simple possibility to safely accommodate electrical, electronic, or pneumatic components as well as small controls in a robust enclosure made of aluminium, polycarbonate or ABS.



### **OUR SERVICE**

You know BERNSTEIN as a supplier of innovative and reliable enclosure products? We offer even more!

Benefit from the economic advantage using BERNSTEIN: Because we support you with a complete enclosure solution, fully machined, wired, assembled and individually coated.

**Personally special. Individually special.**

**Technically innovative.**

— as well as the requirements of our customers.

These are the strengths of our "Evergreen".

From machining to finishing, pre-assembly of DIN rails and terminals to a complete wired solution, BERNSTEIN can satisfy your every need.

Custom-made wiring and component assembly is integrated into our enclosure production facility.

Starting with the pre-assembly of mounting rails and terminals, through to component procurement and complete enclosure assembly, BERNSTEIN manages all these processes, for you, saving you time and money.

## Your advantages

- Shorter assembly time
- No coordination of external service providers
- Cost savings thanks to assembled products from one business partner
- Simplified logistics chain
- Reduced inventory and overheads



# Standard enclosure Infinite processing possibilities

As a solution specialist, BERNSTEIN has core competencies in mechanical engineering, this combined with an extensive ultra-modern machining and powder-coating facility, BERNSTEIN can deliver any solution to meet your exact needs. Whether it's CNC machining, pre-processing or specialised finishes, we have the right solution for you.

We are not only a solution provider, we are also the right partner to assist in your design process. With our in-house design team, we can advise on colours, printing etc., or even on the design and production of bespoke enclosure solutions.

## **BERNSTEIN offers customer service**

- Customisation of standard products according to your wishes
- A finished product from a "one stop" solution provider

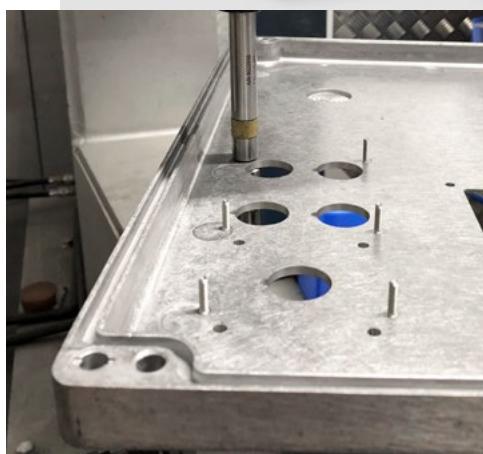




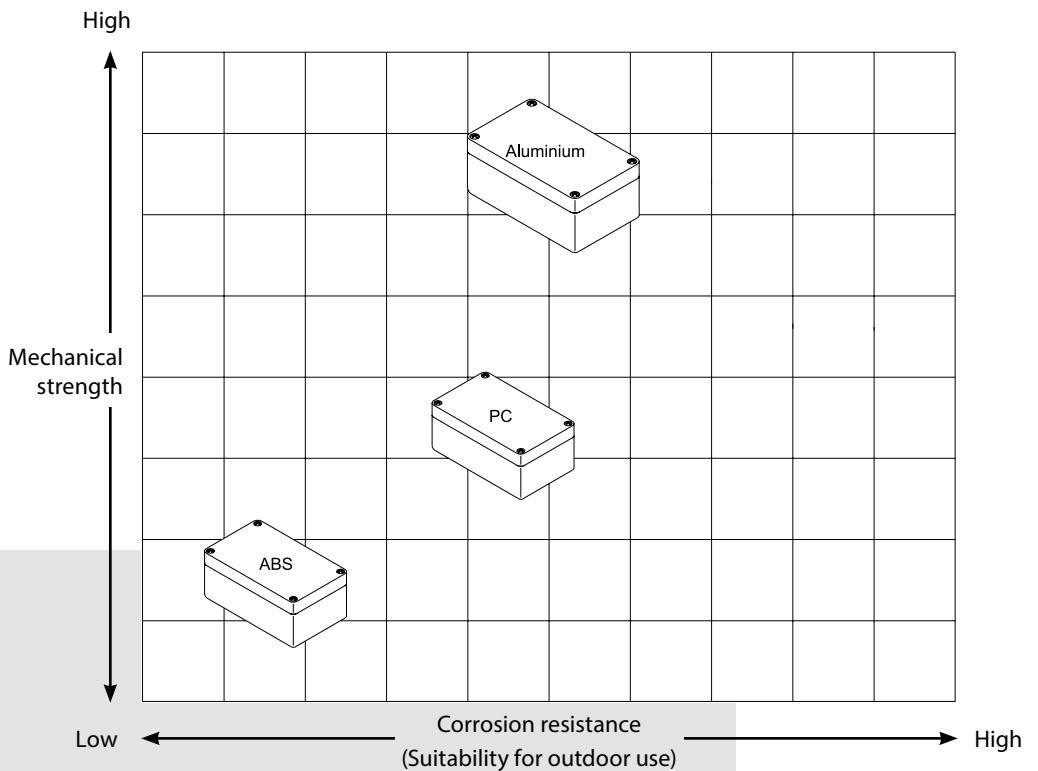
**CA series Aluminium**



**CT series Polycarbonate** **CT series ABS**



## STANDARD ENCLOSURES CA und CT



Material properties	Standard	Unit	Aluminium	Polycarbonate	ABS
Density	DIN 53479	g/cm <sup>3</sup>	2.65	1.2	1.05
Impact resistance	DIN 53453	mJ/mm <sup>2</sup>	150 – 300	65	60
Impact strength	DIN 53453	mJ/mm <sup>2</sup>	90 – 200	20	10
Tension strength	DIN 53455	N/mm <sup>2</sup>	180 – 300	65	43
Elongation at break	DIN 53455	%	60 – 90	90	20
Modulus of elasticity (bending test)	DIN 53457	N/mm <sup>2</sup>	75000	2300	2100
Limit bending stress	DIN 53452	N/mm <sup>2</sup>		95	90
Flammability	UL 94	Class		V 2	HB
Volume resistivity	DIN 53482	Ohm x cm		$10^{15}$	$10^{13}$
Surface resistance	DIN 53482	Ohm x cm		$\geq 10^{15}$	$4 \times 10^{14}$
Dielectric strength	DIN 53481	kV/mm		25 – 40	24
Thermal conductivity (20°C)	DIN 52612	W/mK	120 – 160	0.21	0.18
Electrical conductivity (20°C)		m/Ohm mm <sup>2</sup>	15 – 22		

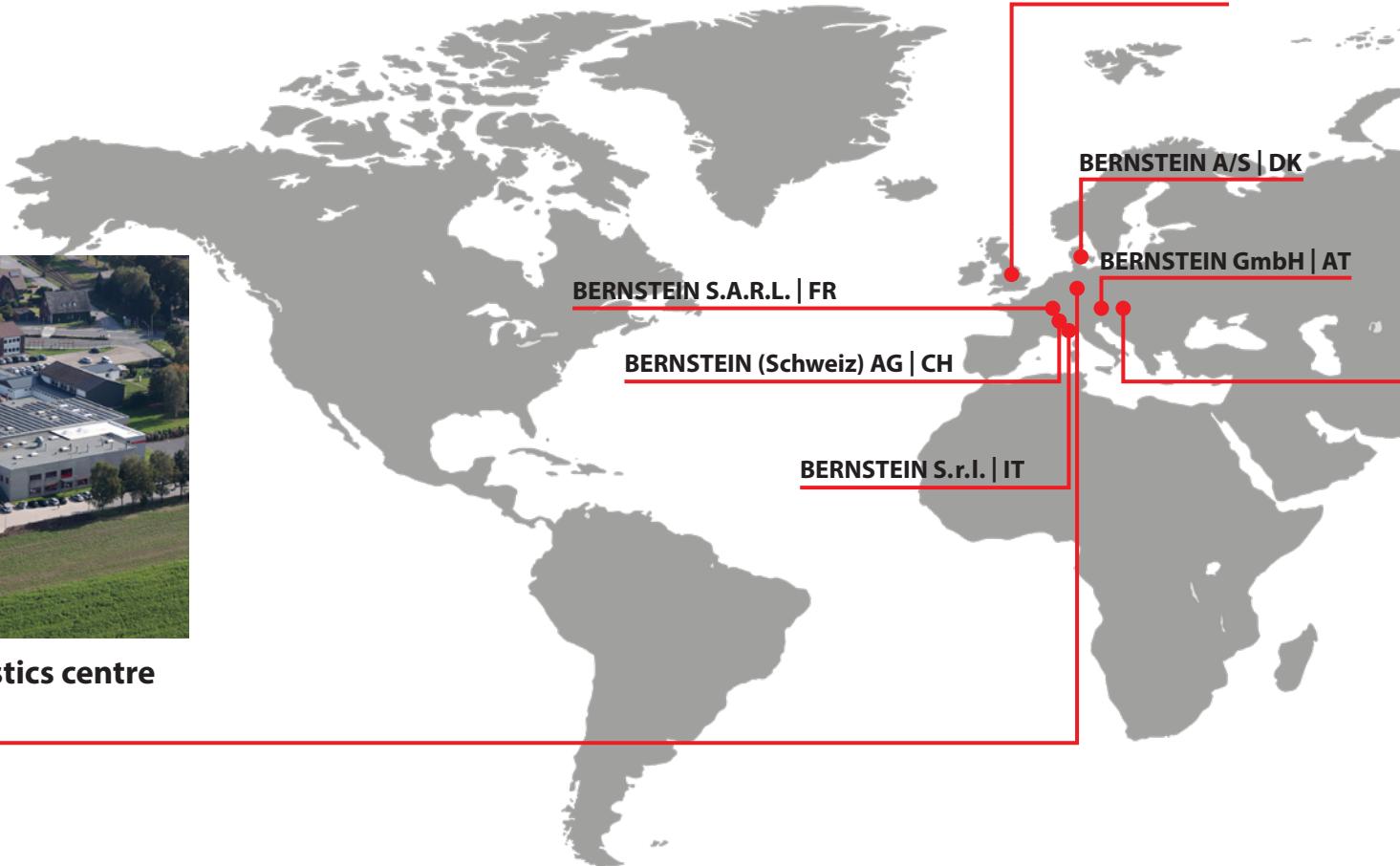
The illustration shows the suitability of different enclosure materials (standard) for mechanical load and corrosion-protecting conditions.



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