



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

Approved. Safe. Individual – for your application.

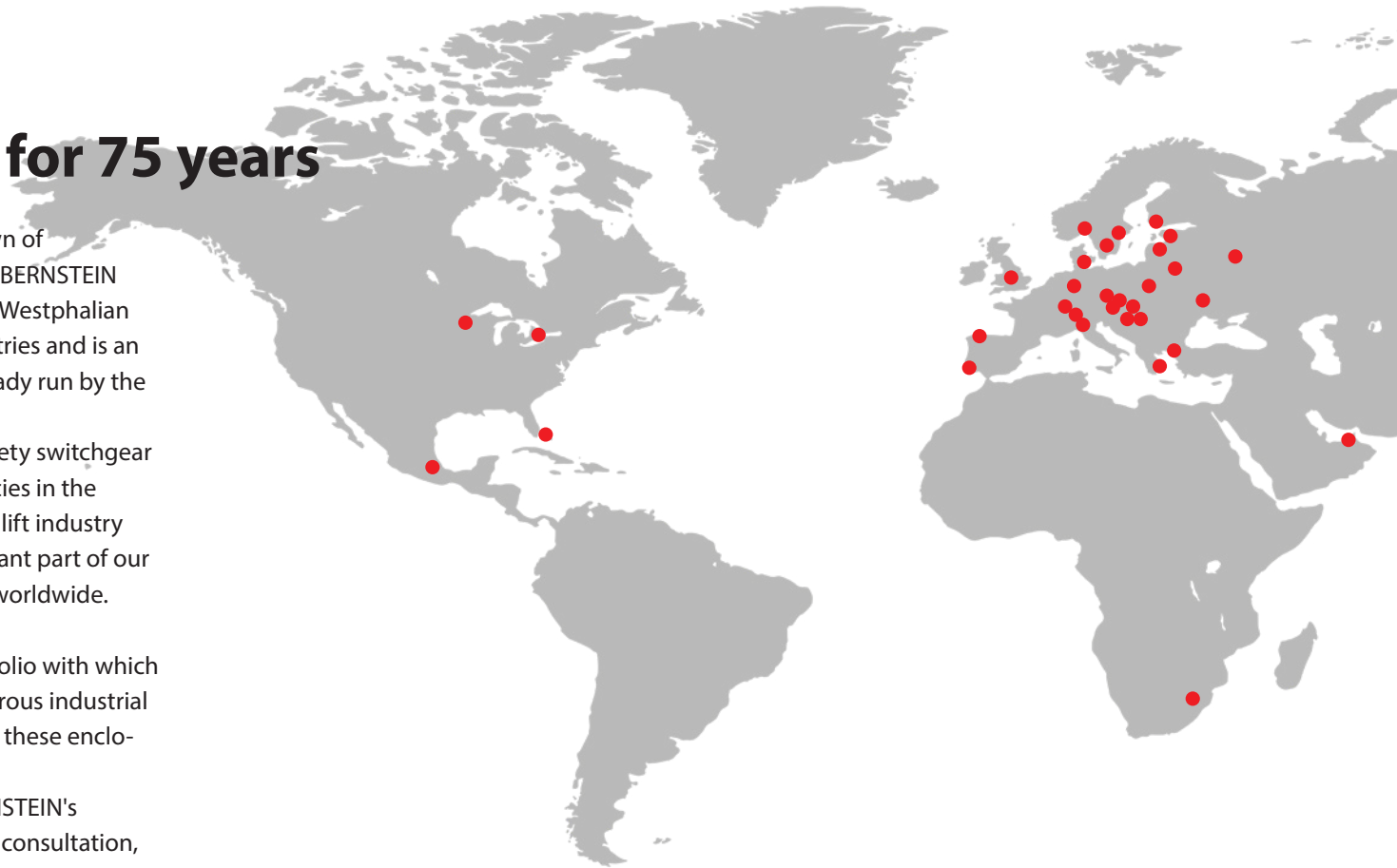
## Already successfully Serving your industry for 75 years

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.





»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 Borcharding** | Production Manager, BERNSTEIN AG

*A real milestone.*



**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



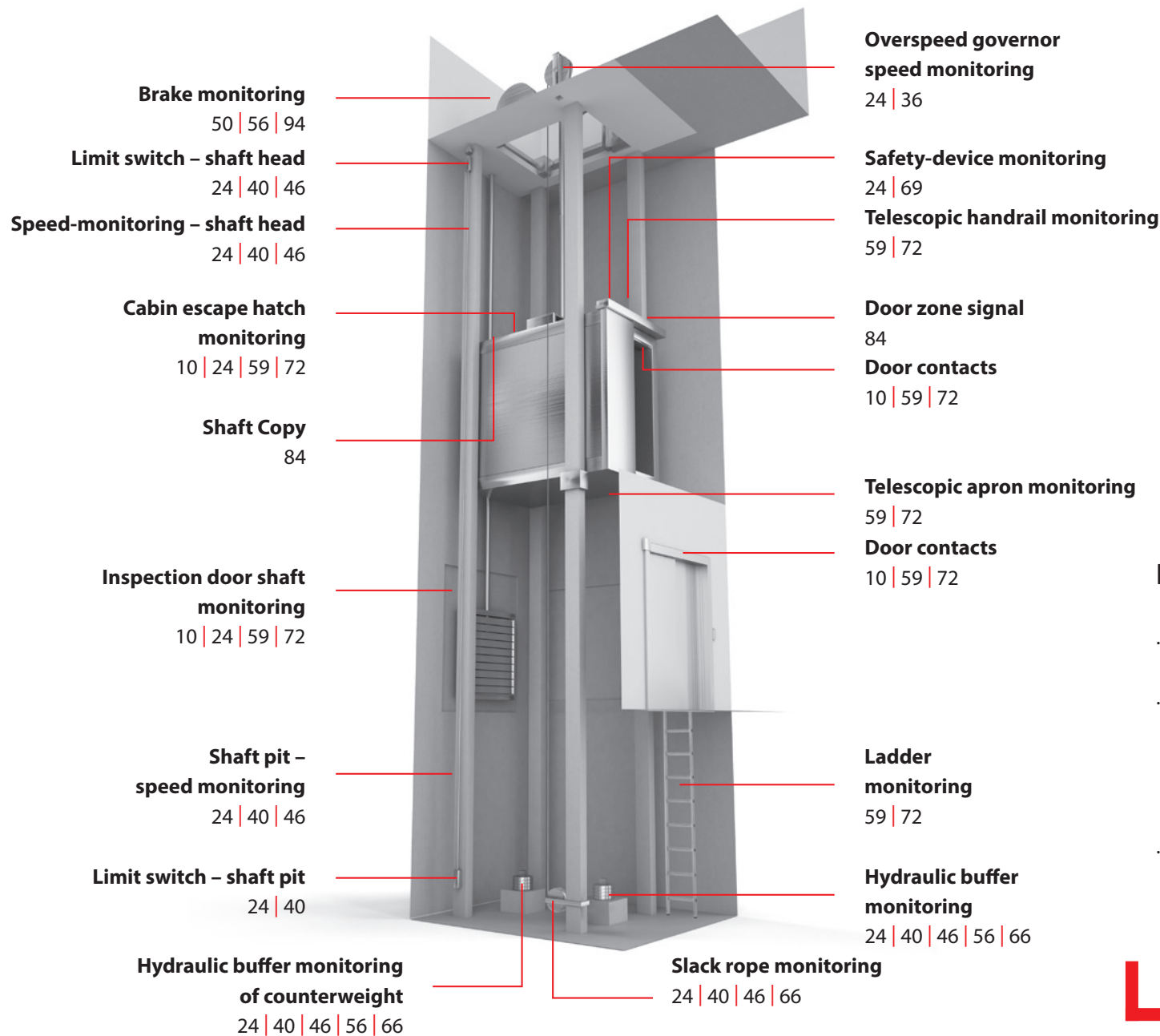
## »Going up!« **Safety in lift industry**

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 Graves 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 Europe is the *Tube* in the *Elbphilharmonie* 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.

**Handrail speed**  
94 | 98

**Base plate monitoring**  
24 | 40 | 46 | 56 | 60 | 66 | 72

**Cover monitoring**  
24 | 40 | 46 | 56 | 60 | 66 | 72

**Step chain monitoring**  
24 | 40 | 46 | 66

**Step chain tension monitoring**  
24 | 40 | 46 | 66

**Comb plate open monitoring**  
24 | 40 | 46 | 56 | 60 | 66

**Hand rail guard monitoring / entrance**  
24 | 56 | 60

**Missing step monitoring**  
24 | 40 | 46 | 56 | 60 | 66

**Door-open monitoring**  
24 | 40 | 46 | 56 | 60 | 66

**Speed monitoring**  
94 | 98

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





- 10 Door contacts**
- 24 Position- and standard switches | Special switches**
- 72 Position switches with separated actuator**
- 84 Reed contacts**
- 94 Inductive sensors**
- 100 Guard locking device**
- 106 Standard enclosures**



**“Just one more thing ...”  
— Please contact us**

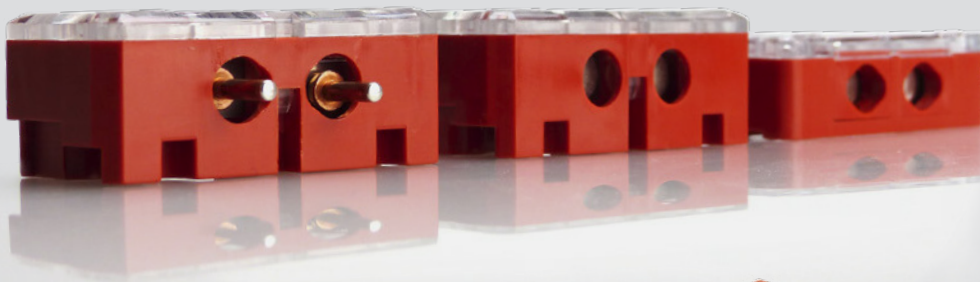
Certainly, we are offering all of our switches, sensors and enclosures in a customer-specific design. Do not hesitate to contact us. We would be happy to provide you with advice.

Tel +49 571 793-0 | Fax +49 571 793-555  
info@de.bernstein.eu | www.bernstein.eu



## DOOR CONTACTS

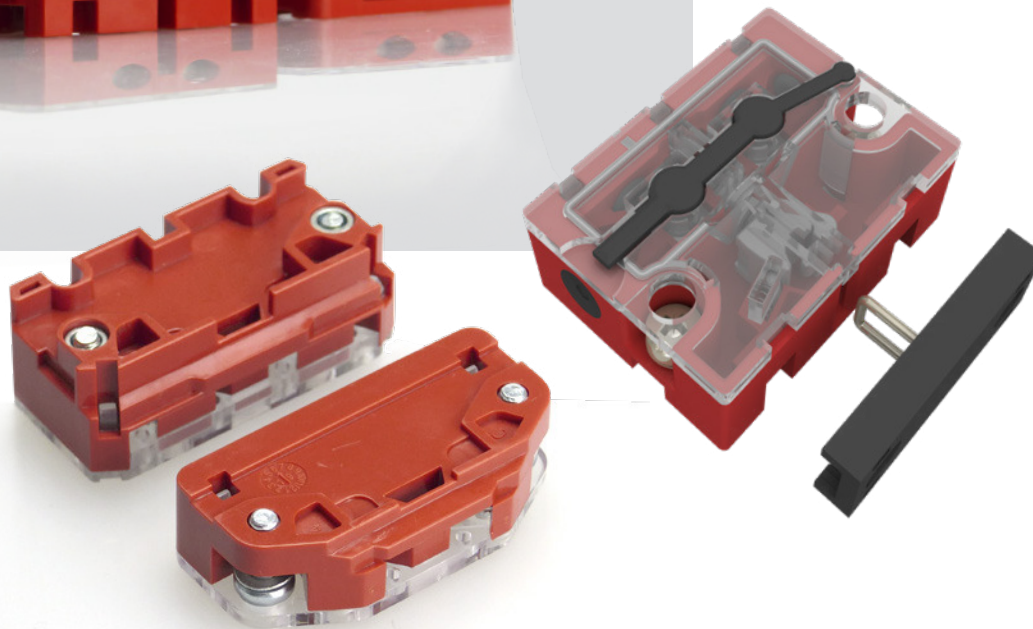
### A good team Door contacts of the SEL series



#### 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 or 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.





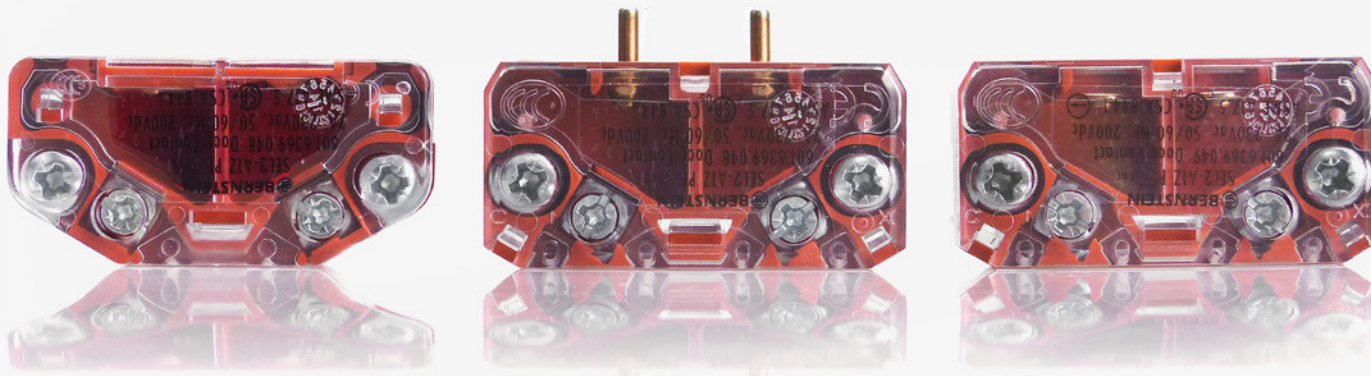
## Product characteristics

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 40 mm.

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.

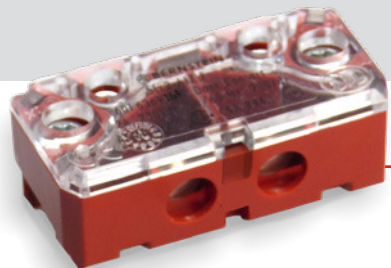
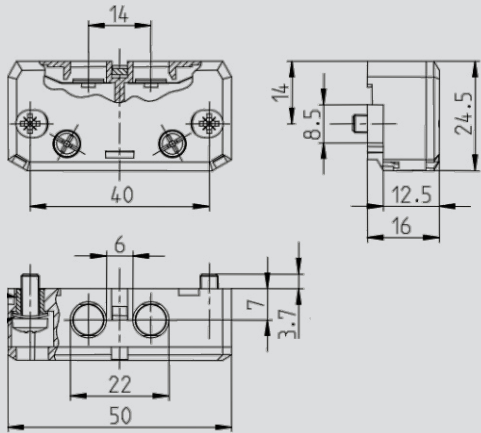
Please find the SEL1 and the SEL2 also as contact pin version PL in the BERNSTEIN product portfolio.



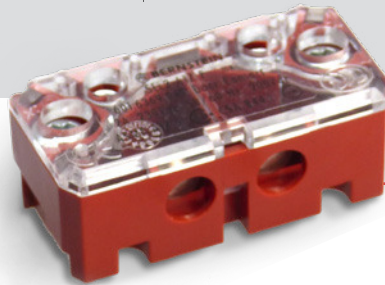
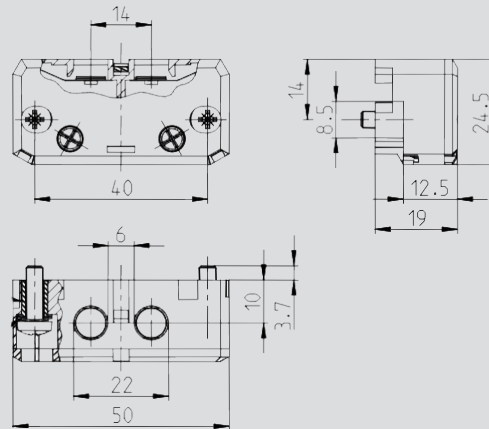
## DOOR CONTACTS

With separated actuator

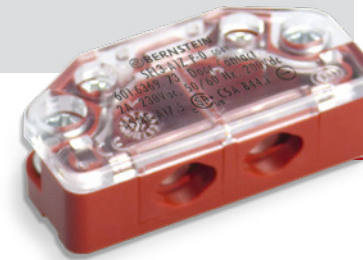
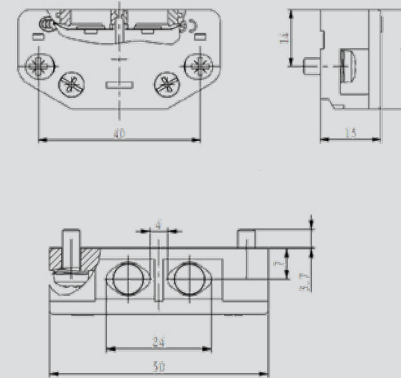
### Door contacts SEL1, SEL2 and SEL3



**SEL1**



**SEL2**



**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	Ⓢ	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 ... to +70 °C
Type of contact	1 NC contact
Mechanical lifetime	10 × 10 <sup>6</sup> switching cycles
Switching frequency	≤ 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	≈ 0.02 kg
Mounting position	arbitrary
Protection class	IP20 conforming to EN 60529

### Standards

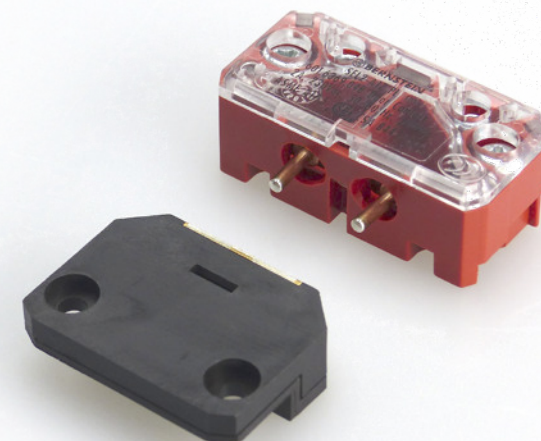
VDE VDE 0660 T100, DIN EN 60947-1, IEC 60947-1  
VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1  
EN 81-20, EN 81-50

## 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

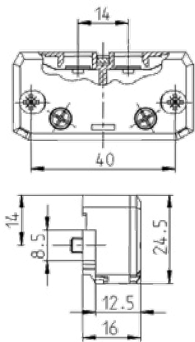
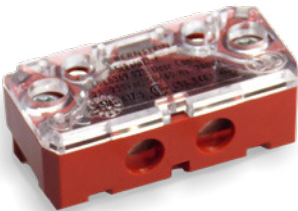
## Options

- 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



Transparent cover  
Red enclosure

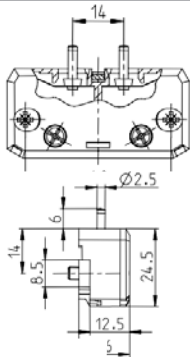
**6016369045**  
SEL1-A1Z P

Transparent enclosure

**6016369038**  
SEL1-A1Z P

Special features/ variants

## SEL 1...PL



Transparent cover  
Red enclosure

**6016369125**  
SEL1-A1Z PL0

Transparent enclosure

**6016369037**  
SEL1-A1Z PL

Special features/ variants

Contact pins



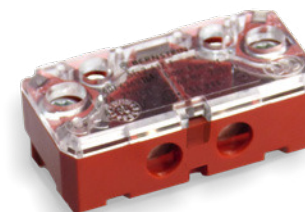
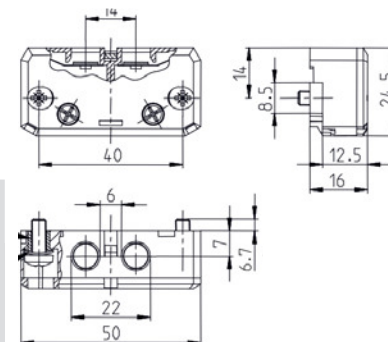


## SEL 1...P with extended mounting screws

1 NC contact

Transparent cover  
Red enclosure

**6016369164**  
SEL1-A1Z P



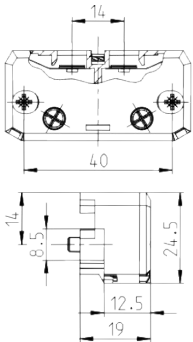
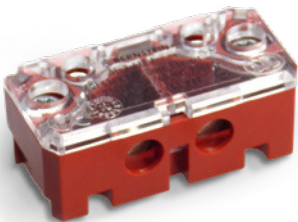
Special features/variants

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



# DOOR CONTACTS

## SEL 2 ... P



Transparent cover  
Red enclosure

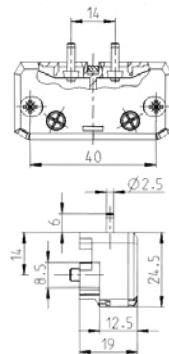
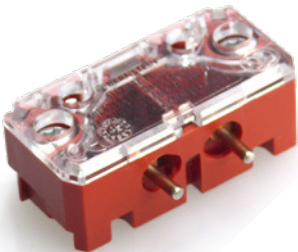
1 NC contact

**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



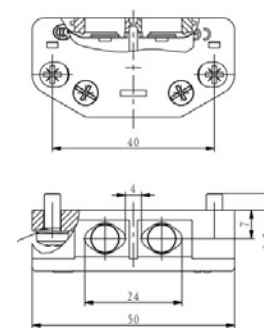


## SEL 3 ... P

1 NC contact

Transparent cover  
Red enclosure

**6016369173**  
SEL3-A1Z P



Particularities/variants

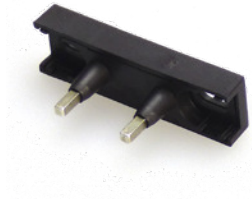
Just 15mm high, inclined corners.



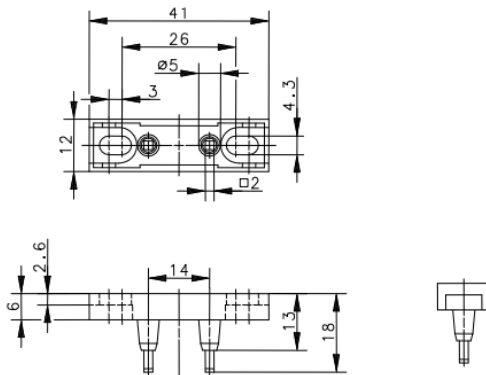
# DOOR CONTACTS

## SEL actuators

### P0 actuator



Product range	
Article number	Designation
3911462082	P0-BET.

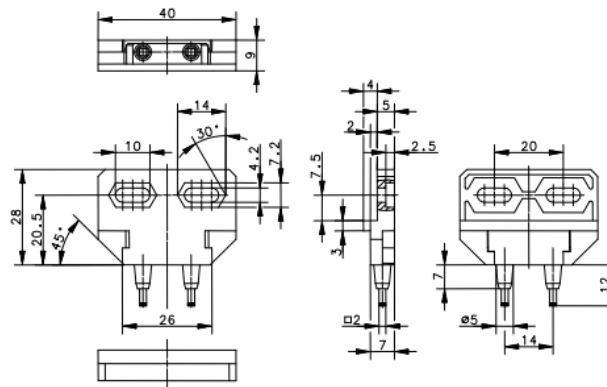


Mechanical data	
Enclosure	PA 6.6 (UL 94-V0) black
Ambient temperature	-30 °C ... +70 °C
Contact material	AgCu3 on CuNi18Zn20
Mounting	2 × M4
Weight	≈ 0.01 kg
Remarks	Actuators may not be used as end stop. Only use the door contacts of the SEL series with BERNSTEIN actuators.

### P1 actuator



Product range	
Article number	Designation
3911462088	P1-BET.

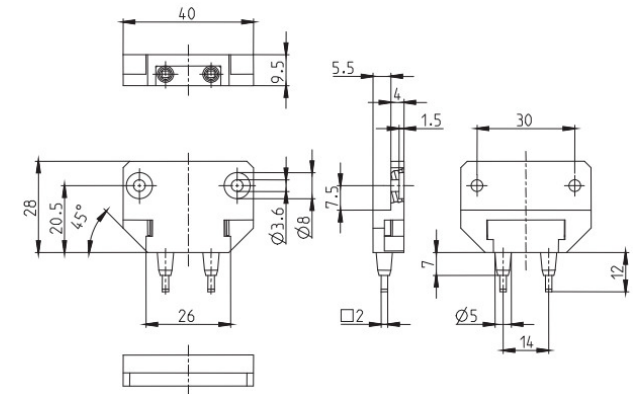


Mechanical data	
Enclosure	PA 6.6 (UL 94-V0) black
Ambient temperature	-30 °C ... +70 °C
Contact material	AgCu3 on CuNi18Zn20
Mounting	2 × M4
Weight	≈ 0.01 kg
Remarks	Actuators may not be used as end stop. Only use the door contacts of the SEL series with BERNSTEIN actuators.

### 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.

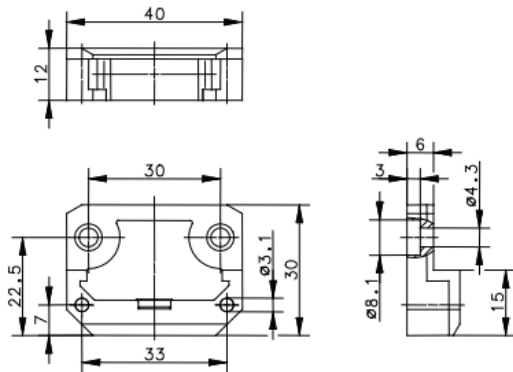




## PL actuator

### 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 x 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.

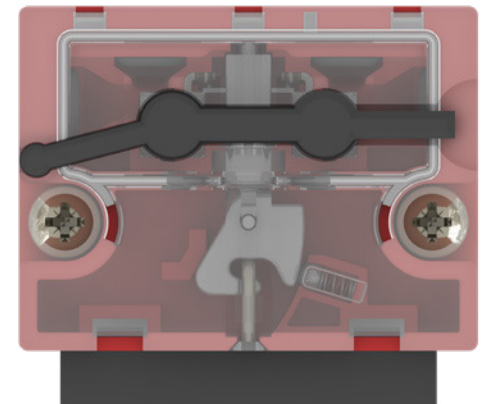
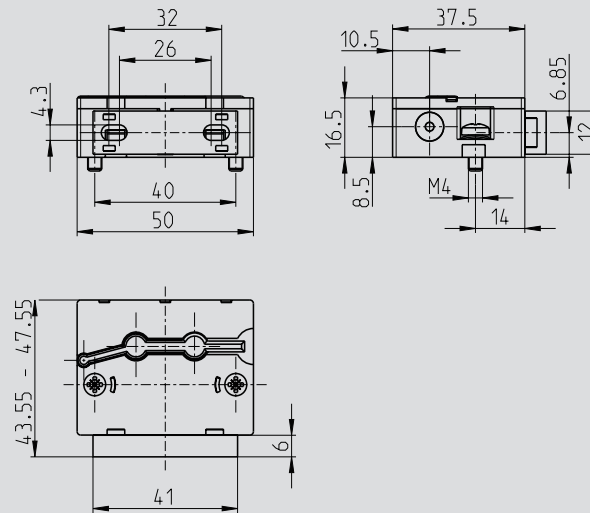
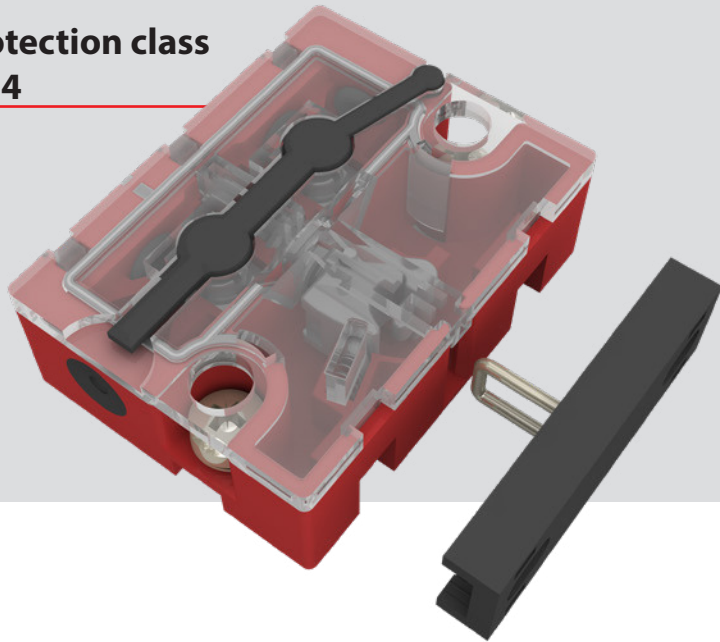


## DOOR CONTACTS

# High protection class in all mounting positions Door contact SEL54

**NEW**

**Protection class  
IP54**



## Product characteristics

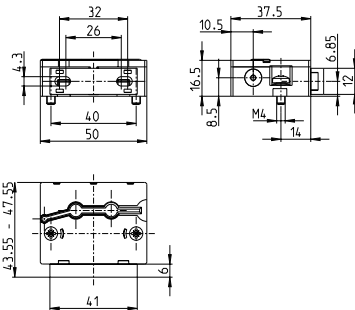
- Protection class IP54
- Compact size 50 x 37.5 x 16 mm
- High reliability at low currents (1mA)
- Minimized contact resistance down to 25 mOhm (unused), great benefits for series connection
- Self-cleaning contacts
- Positive break contacts
- Separate actuator

## SEL54




1 NC contact

Transparent cover **6016369188**  
 Red enclosure SEL54-A1Z PC0-S



Special features/variants

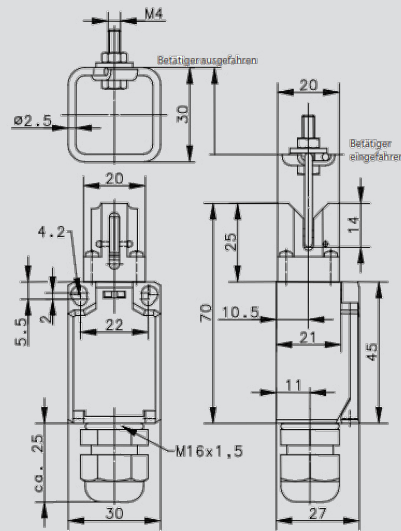
## Technical data

Electrical data		
Rated insulation voltage	U <sub>i</sub>	400 V
Rated impulse withstand voltage	U <sub>imp</sub>	4 kV
Conventional thermal current	I <sub>the</sub>	4 A
Rated operating voltage	U <sub>e</sub>	230 V AC
Rated operating current	I <sub>e</sub>	1 A
Utilization category	AC 15, U <sub>e</sub> /I <sub>e</sub> 230 V / 1 A	
Short-circuit protective device	Safety fuse 4 A gG	
Positive break		acc. to IEC/EN 60947-5-1, Annex K
Minimum current	1 mA for 24VDC	
Max. contact resistance	25 mOhm (unused)	
Mechanical data		
Enclosure material	PA, self-extinguishing	
Cover	PC transparent, self-extinguishing	
Actuator	The actuator is included in the scope of delivery	
Ambient temperature	-30 °C to +70 °C	
Type of contact	1 N.C.	
Mechanical lifetime	10 x 10 <sup>6</sup> operating cycles (pending)	
Switching frequency	≤ 60/min.	
Mounting	Safety switch	2 x M4 thread rolling captive screws according to DIN 7500
	Actuator	2 x M4
Type of connection	2 screw connections, bottom connection (M3)	
Conductor cross-sections	Solid wire: 0.34 - 1.5 mm <sup>2</sup> or Strand with wire-end ferrule: 0.34 - 1.5 mm <sup>2</sup>	
Weight	≈ 0.03 kg	
Mounting position	arbitrary	
Protection class	IP54 acc. to EN 60529	



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

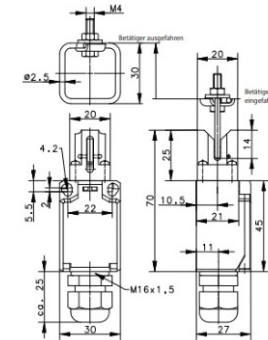
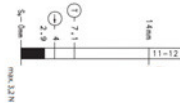


## Ti2-... KS

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



## 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 56 to 59.



### Ti2-KS actuator

#### Product range

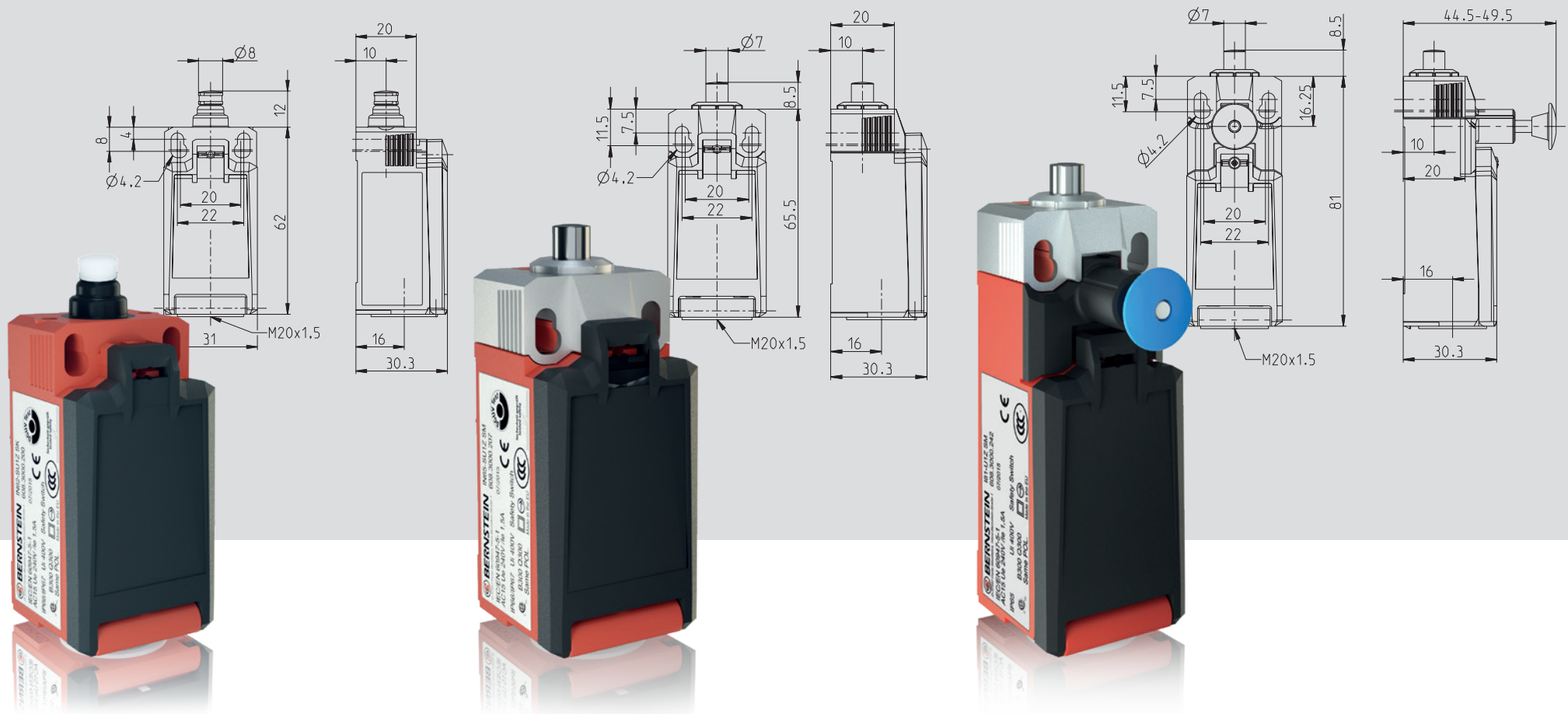
Article number	Designation
<b>3918452237</b>	KS actuator

#### Mechanical data

Actuator	St-VA steel
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## POSITION SWITCHES

### Insulated encapsulation Position switches IN62, IN65 and I81



## 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 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 ( $8 \times 45^\circ$ ) 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 <sub>i</sub> max.	400 V AC
Conventional thermoelectric current	(up to) I <sub>the</sub>	5 A
Rated operating voltage	U <sub>e</sub> max.	240 V AC/24 V DC
Utilisation category (up to)	AC-15, U <sub>e</sub> /I <sub>e</sub> 240 V/1.5 A DC-13 U <sub>e</sub> /I <sub>e</sub> 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)

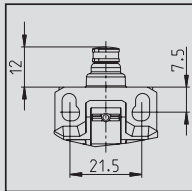


Fig. 1

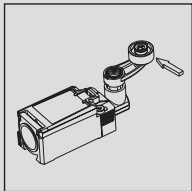


Fig. 2

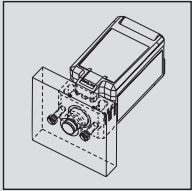
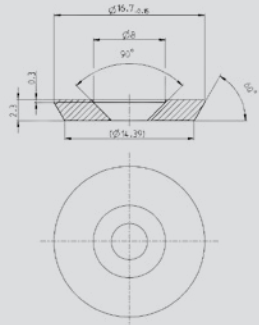


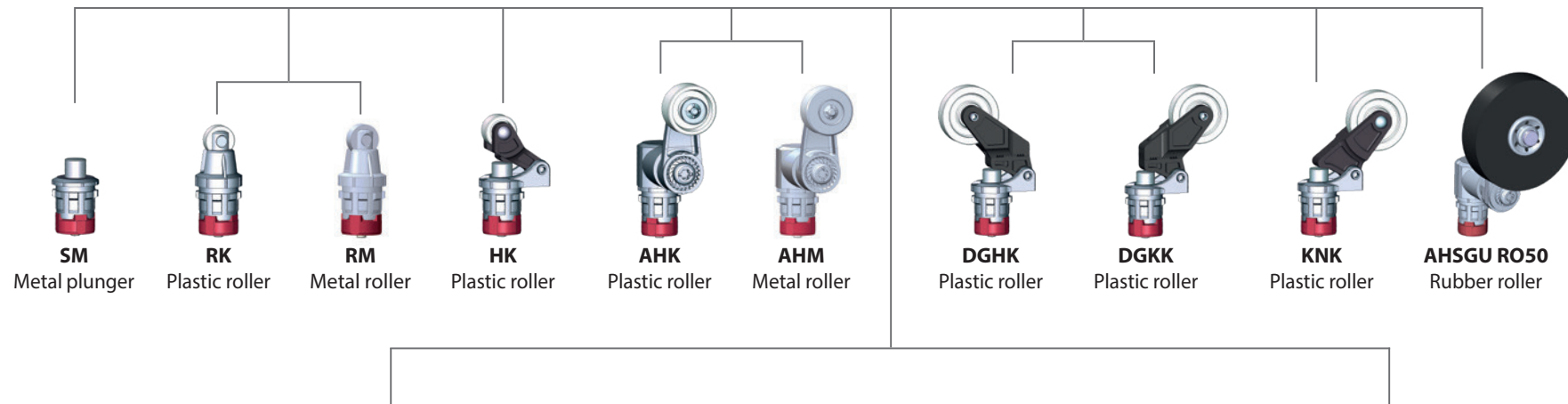
Fig. 3



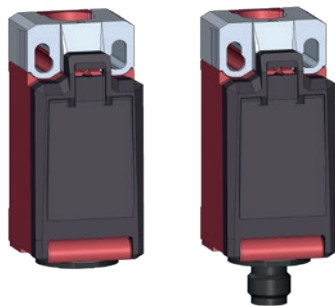
Guide disc for additional fixation

## IN65 and I81 actuators

Further actuators are available on request.



### IN65



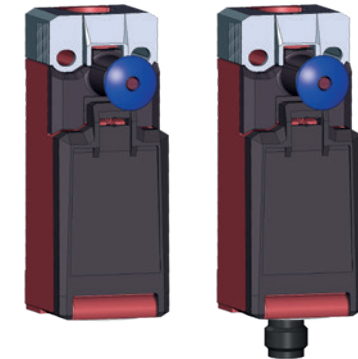
### Modular concept

Changing an actuator of 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

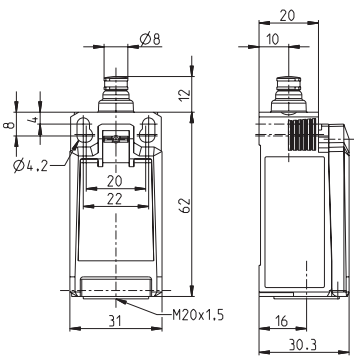
Usually our position switches are equipped with an M20 thread for cable glands. All switches are further available with M12-connectors.

### I81 with latching



# POSITION SWITCHES

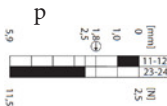
## IN62 ... SK



Slow-action system

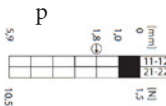
1 NC / 1 NO

**6083000201**  
IN62-U1Z SK



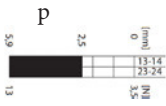
2 NC contact

**6083000203**  
IN62-A2Z SK



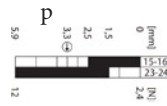
2 NO contact

**6083000205**  
IN62-E2 SK



1 NC contact / 1 NO contact overlapping

**6083000206**  
IN62-UV1Z SK



Snap-action system

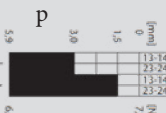
**6083000200**  
IN62-SU1Z SK



**6083000202**  
IN62-SA2Z SK



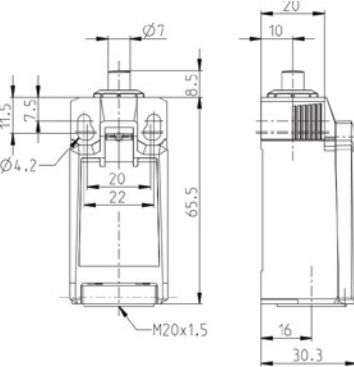
**6083000204**  
IN62-SE2 SK



Special features/variants

Plunger actuator

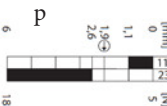
## IN65-... SM



Slow-action system

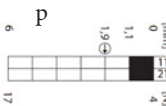
1 NC / 1 NO

**6083000208**  
IN65-U1Z SM



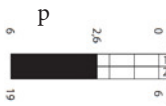
2 NC contact

**6083000210**  
IN65-A2Z SM



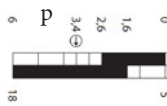
2 NO contact

**6083000212**  
IN65-E2 SM



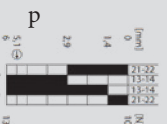
1 NC contact / 1 NO contact overlapping

**6083000213**  
IN65-UV1Z SM

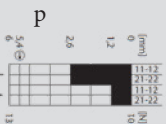


Snap-action system

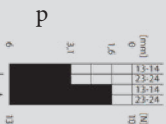
**6083000207**  
IN65-SU1Z SM



**6083000209**  
IN65-SA2Z SM



**6083000211**  
IN65-SE2 SM



Special features/variants

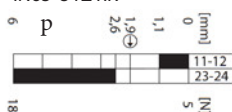
Actuator exchangeable, suitable for low current (1mA/24CVD)

## IN65-... RK

1 NC / 1 NO

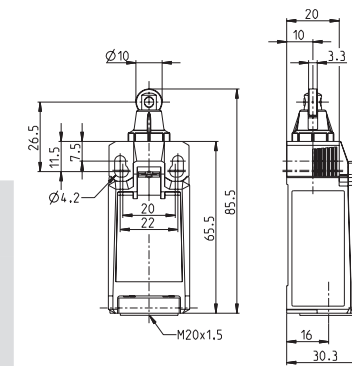
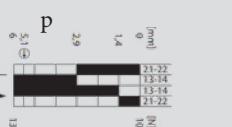
Slow-action system

**6083000215**  
IN65-U1Z RK



Snap-action system

**6083000214**  
IN65-SU1Z RK



Special features/variants

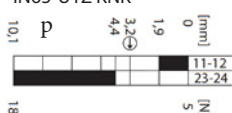
Actuator exchangeable, suitable for low current (1mA/24CVD)

## IN65-... KNK

1 NC / 1 NO

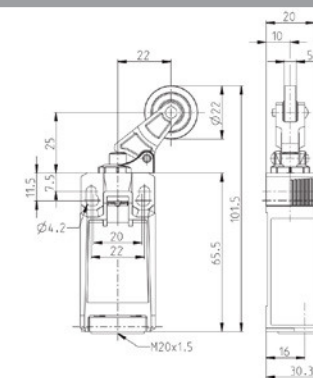
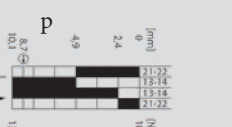
Slow-action system

**6083000262**  
IN65-U1Z KNK



Snap-action system

**6083000261**  
IN65-SU1Z KNK



Special features/variants

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



## POSITION SWITCHES

### IN65 ... HK

DGUV  
Deutsche Gesetzliche  
Unfallversicherung



1 NC / 1 NO		
	Slow-action system	<b>6083000222</b> IN65-U1Z HK P 
	Snap-action system	<b>6083000221</b> IN65-SU1Z HK P 
Special features/variants	Actuator exchangeable, suitable for low current (1mA/24CVD)	

### IN65 ... AHK

DGUV  
Deutsche Gesetzliche  
Unfallversicherung



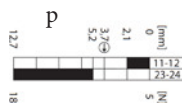
1 NC / 1 NO		
	Slow-action system	<b>6083000236</b> IN65-U1Z AHK P 
	Snap-action system	<b>6083000235</b> IN65-SU1Z AHK P 
Special features/variants	Actuator exchangeable, suitable for low current (1mA/24CVD)	

## IN65-... DGHK

1 NC / 1 NO

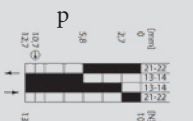
Slow-action system

**6083000229**  
IN65-U1Z DGHK



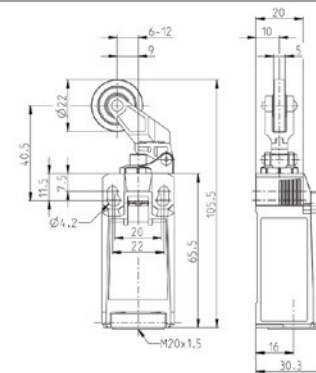
Snap-action system

**6083000228**  
IN65-SU1Z DGHK



Special features/variants

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

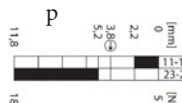


## IN65-... DGKK

1 NC / 1 NO

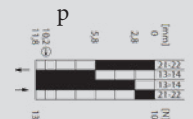
Slow-action system

**6083000255**  
IN65-U1Z DGKK



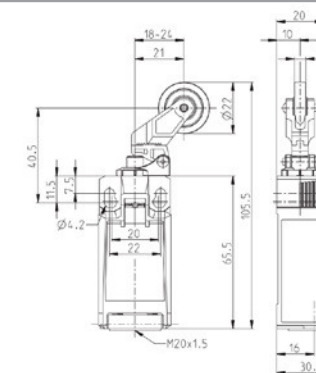
Snap-action system

**6083000254**  
IN65-SU1Z DGKK



Special features/variants

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

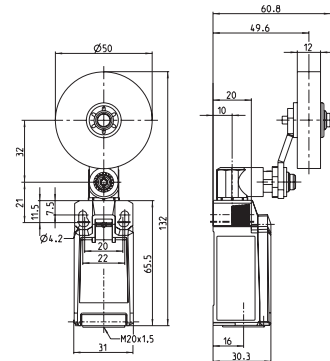
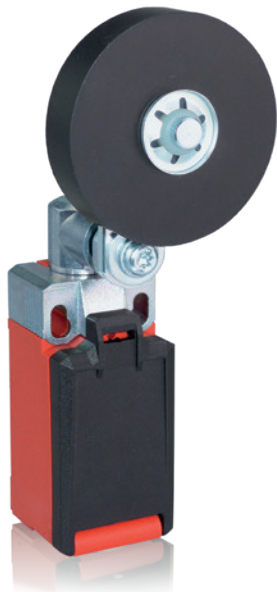


## POSITION SWITCHES



### IN65 ... AHSGU RO50

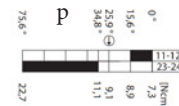
1 NC / 1 NO



Slow-action system

**6083000296**

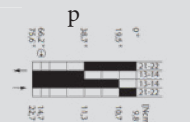
IN65-U1Z AHSGU RO50



Snap-action system

**6083000300**

IN65-SU1Z AHSGU RO50



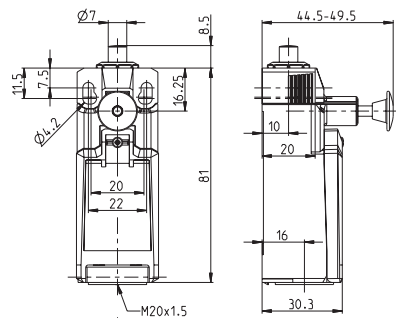
Special features/variants

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

### I81 ... SM



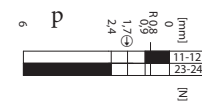
1 NC / 1 NO



Slow-action system

**6083000242**

I81-U1Z SM



Special features/variants

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

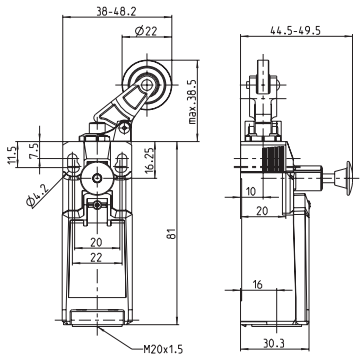
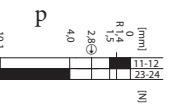


## I81 ... KNK

1 NC / 1 NO

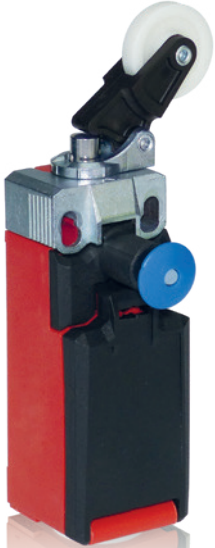
Slow-action system

**6083000269**  
I81-U1Z KNK



Special features/variants

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

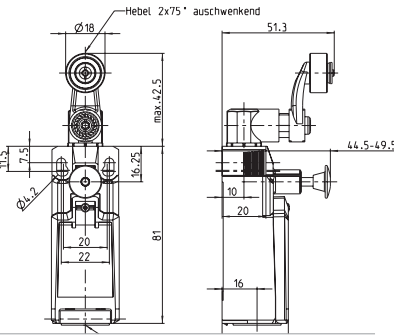
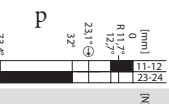


## I81 ... AHK

1 NC / 1 NO

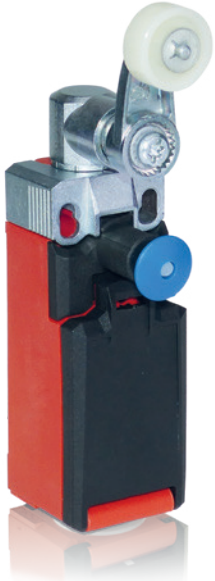
Slow-action system

**6083000246**  
I81-U1Z AHK



Special features/variants

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







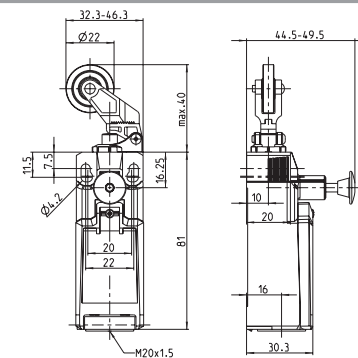
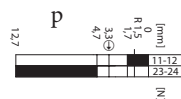


## I81 ... DGHK

1 NC / 1 NO

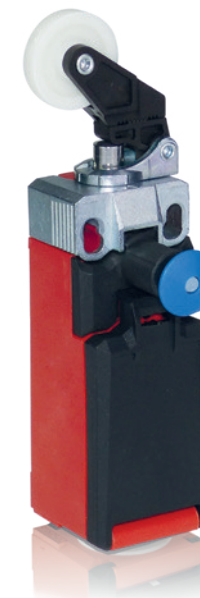
Slow-action system

**6083000245**  
I81-U1Z DGHK



Special features/variants

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

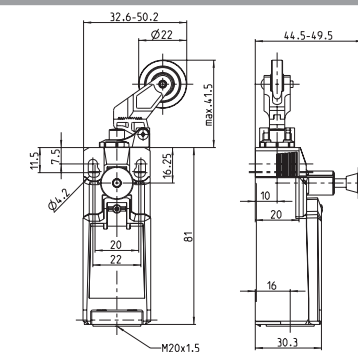
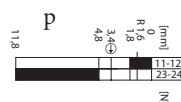


## I81 ... DGKK

1 NC / 1 NO

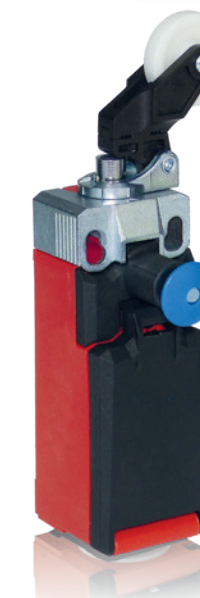
Slow-action system

**6083000268**  
I81-U1Z DGKK

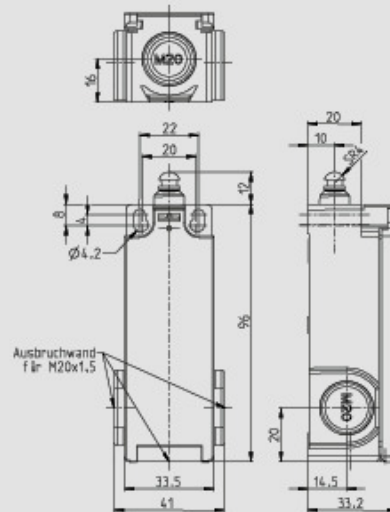


Special features/variants

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		
Protection class		II, protective insulation
Design insulation voltage	$U_i$	250 V AC
Thermoelectric current	$I_{he}$	10 A
Utilisation category		AC-15, $U_i / I_n$ 240 V / 3 A DC-13, $U_i / I_n$ 250 V / 0.27 A
Minimum switching voltage		24 V
Minimum switching current		5 mA
Positive Break	P	accor. to IEC/EN 60947-5-1, Annex K
Short-circuit protection		Safety fuse 4 A gL/gG
<b>Solenoid</b>		Without free-wheeling diode
Heat class		B (130 °C)
Rated operating voltage	$U_n$	24 V DC / 230 V AC (type-related)
Rated operating current	$I_n$	2.3 A / 0.23 A AC
Switch-on duration	ED	3 %
Minimum make time	$T_i$	0.2 s
Maximum make-time	$T_o$	0.5 s
Minimum break-time	$T_p$	17 s

Mechanical data	
Enclosure material	Thermoplastics GV self-extinguishing
Cover	Thermoplastics GV self-extinguishing
Operation	Plunger (thermoplastics)
Approach speed $V_{max}$	0.5 m/s
Ambient temperature	-25 °C to +50 °C
Type of contact	2 NC (Zb) / 1NC, 1NO (Zb)
Switching principle	Snap-action system, bistable
Mechanical lifetime (up to) <sup>1</sup>	5 × 10 <sup>4</sup> switching cycles
B10d	1 × 10 <sup>5</sup> cycles
Mounting	2 × M4 / 2 × M5 for safety applications
Type of connection	Screwed terminals
Switching elements	
Conductor cross-sections	Single-wire 0.5 .. 1.5 mm <sup>2</sup>
Type of connection - solenoid	2 × butt connector similar to DIN 46341 (crushing area 0.5 – 1.5 mm <sup>2</sup> )
Cable entry	3 × M20x 1.5 with cut-out wall in the enclosure
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	
	Actuating force 3 N	<b>6010853002</b> SGS-SA2Z W F3 24V	
	Actuating force 6 N	<b>6010853001</b> SGS-SA2Z W F6 24V	

### SGS solenoid voltage — 230 Volt



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





**BERNSTEIN**  
D-32457 Porta Westfalica  
SGS-SA27 w F6-24V C08  
601.0853.001  
Limit Switch EN81  
Magnetsp. 24V DC 3%ED  
IP67 IEC/EN 60947-5-1  
AC15 Ue 240V/le 3A  
DC13 Ue 250V/le 0.27A  
CE



## 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 25) 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 / 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	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	$\leq 60$ /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

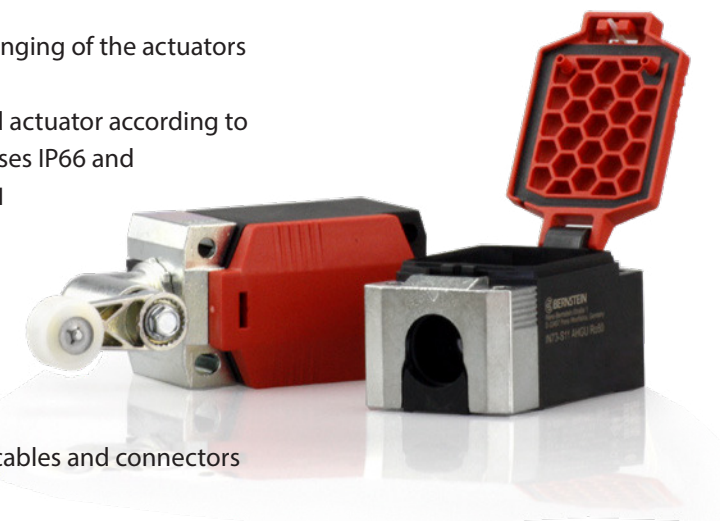
VDE 0660 T211, DIN EN 60947-5-4, IEC 60947-5-4  
DIN EN ISO 13849-1, DIN EN ISO 13849-2

## Product characteristics

- High reliability, C14 or C17 switch insert
- Up to 4 contacts
- Actuator and installation collar with mounting holes made of metal
- Easy turning ( $8 \times 45^\circ$ ) 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



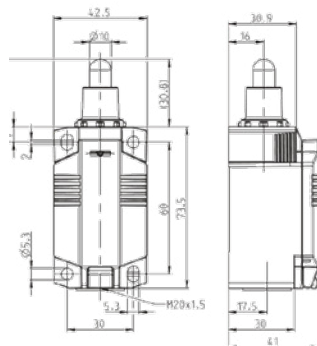
## Mounting

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



## POSITION SWITCHES

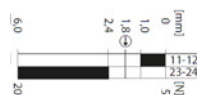
## IN73 ... SM



### Slow-action system

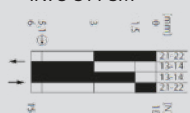
**1 NC / 1 NO**

**6081000002**  
IN73-11 SM



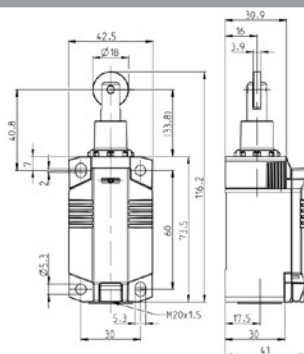
## Snap-action system

**6081000001**  
IN73-S11 SM



Special features/variants

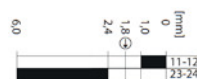
## IN73 ... RM



Slow-action system

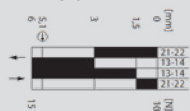
1 NC / 1 NO

**6081000014**  
IN73-11 RM



## Snap-action system

**6081000013**  
IN73-S11 RM



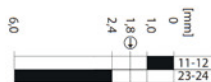
Special features/variants

## IN73 ... HK

1 NC / 1 NO

Slow-action system

**6081000026**  
IN73-11 HK

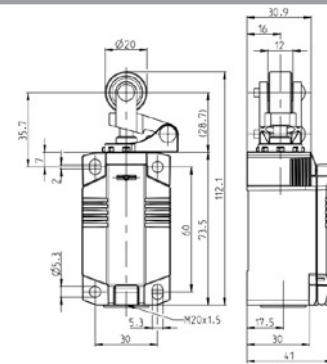


Snap-action system

**6081000025**  
IN73-S11 HK



Special features/variants

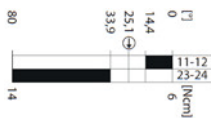


## IN73 ... AHK

1 NC / 1 NO

Slow-action system

**6081000062**  
IN73-11 AHK

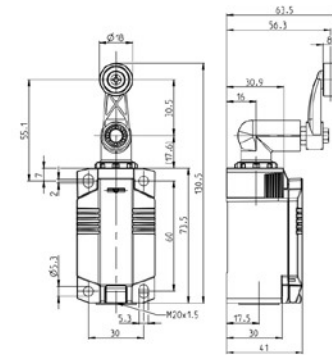


Snap-action system

**6081000061**  
IN73-S11 AHK



Special features/variants



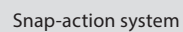
## 44



1 NC / 1 NO



[M]	[Ncm]
0	6
14.4	6
33.9	6
80	14



Special features/variants

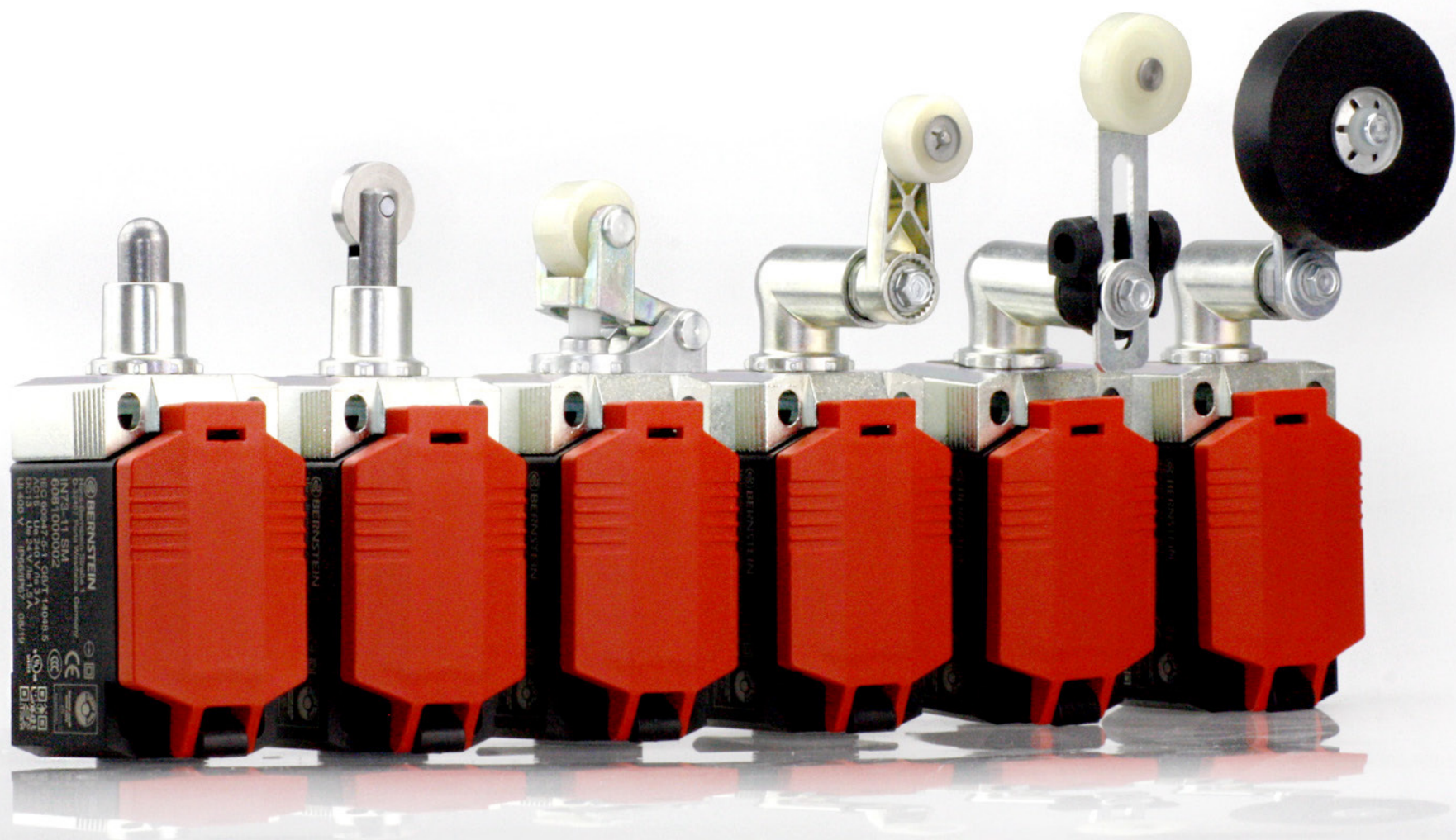
1 NC / 1 NO



[Nem]	Temperature Range (°C)	[°]
0	11-12	14.4
0	23-24	25.1
12	11-12	33.9
24	11-12	24



Special features/variants

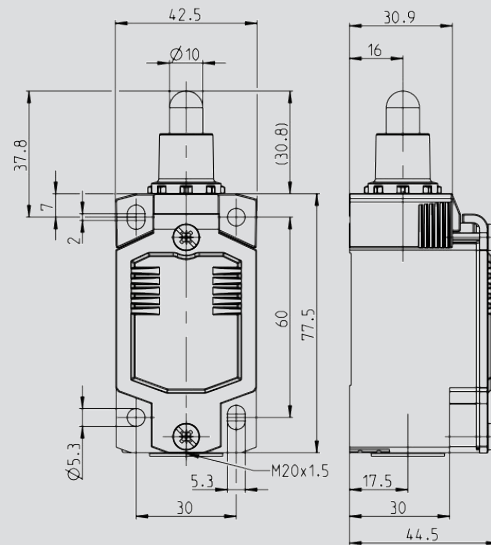




## POSITION SWITCHES

# 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		$10 \times 10^6$ switching cycles
B10d NC contact Cycles (up to)		$20 \times 10^6$
B10d NO contact Cycles (up to)		$1 \times 10^6$
Switching frequency		$\leq 60$ /min.
Type of connection		4 screwed connections (M3)
Conductor cross-sections		Solid or Litz wire with ferrules $0,34 \text{ mm}^2 - 1,5 \text{ mm}^2$ ; AWG 22-16
Cable entry		$1 \times M20 \times 1.5$
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  $4 \times 90^\circ$
- Cable entry  $M20 \times 1.5$

## Options

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

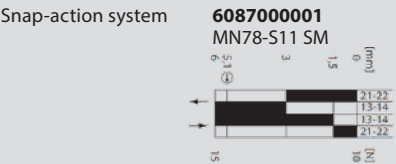
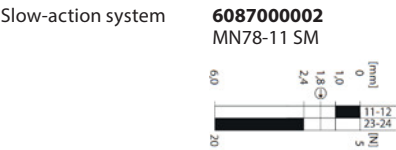
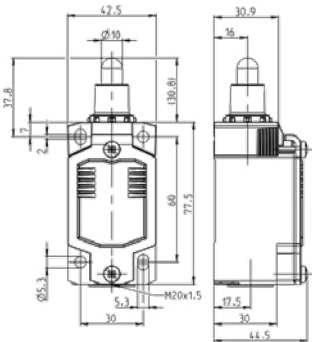
## Mounting

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

# POSITION SWITCHES

## MN78 ... SM

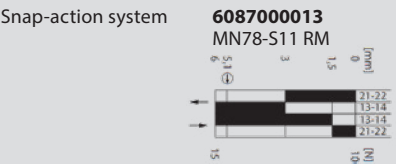
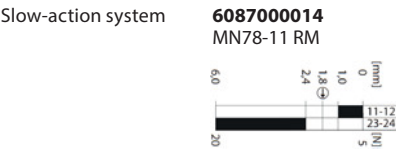
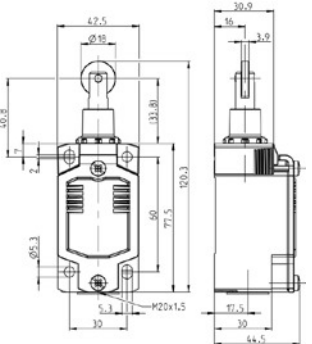
1 NC / 1 NO



Special features/variants

## MN78 ... RM

1 NC / 1 NO



Special features/variants

**MN78 ... AHK**

**1 NC / 1 NO**

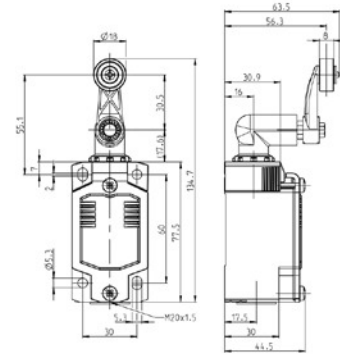
### Slow-action system

**6087000062**  
MN78-11 AHK

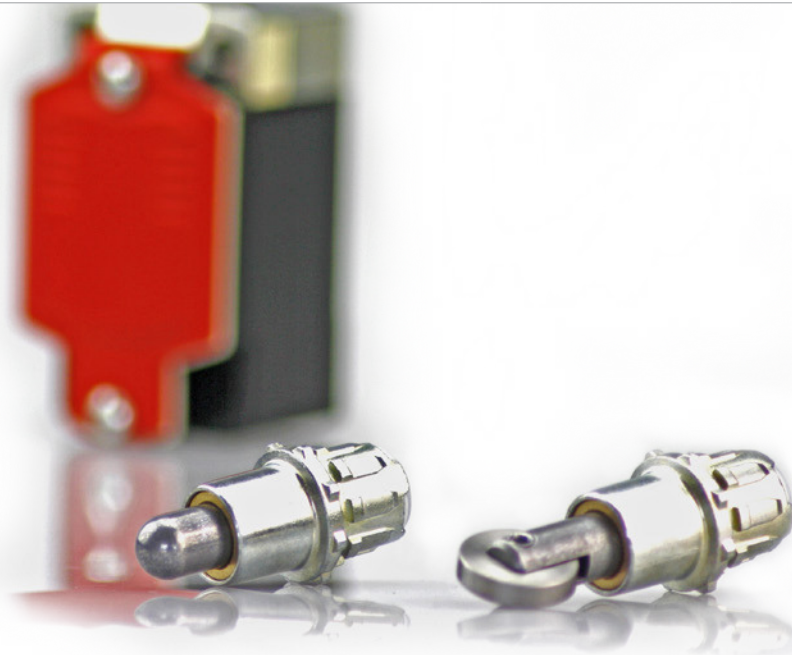


## Snap-action system

**6087000061**  
MN78-S11 AHK

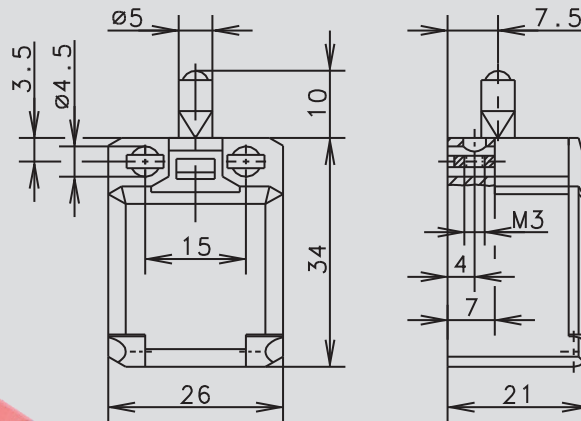


Particularities/variants



## 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	$U_i$ max.	250 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, $U_e/I_e$ 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	$3 \times 10^6$ switching cycles
B10d	6 million
Switching frequency	$\leq 100/\text{min}$
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

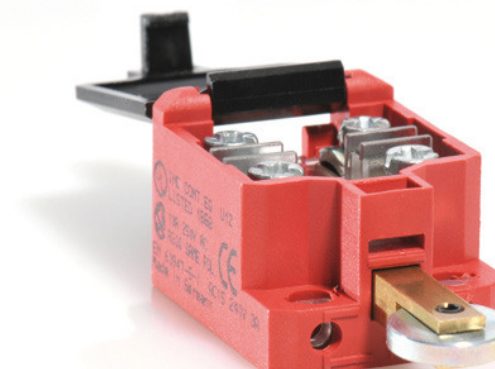
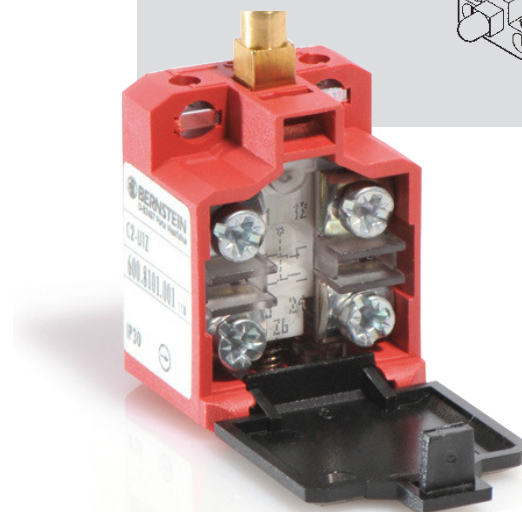
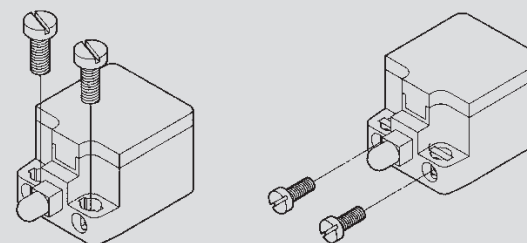
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1  
VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1

## Mounting

Front- and top mounting (type-related)

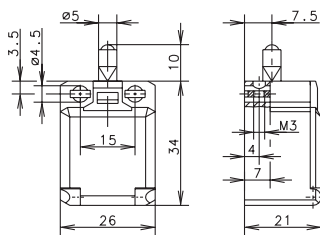
a) 2 × round holes for screws M4

b) 2 × insert nuts for front-side installation for M3 screws M3 (type-related)



# POSITION SWITCHES

## C2-... W

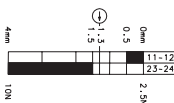


1 NC / 1 NO

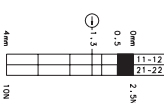
2 NC contact

Slow-action system

**6008101001**  
C2-U1Z

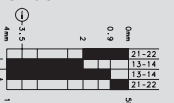


**6008801003**  
C2-A2Z

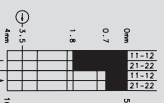


Snap-action system

**6008351002**  
C2-SU1Z



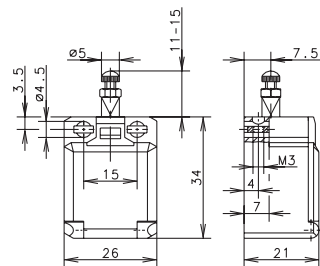
**6008851004**  
C2-SA2Z



Special features/variants

Plunger with ball head

## C2-... ST

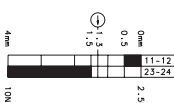


1 NC / 1 NO

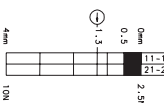
2 NC contact

Slow-action system

**6008104025**  
C2-U1Z ST

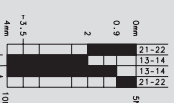


**6008804027**  
C2-A2Z ST



Snap-action system

**6008354026**  
C2-SU1Z ST

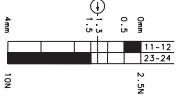
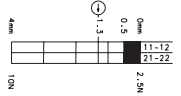
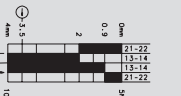



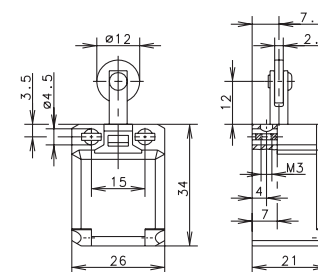
Special features/variants

Plunger, length adjustable, with adjusting screw

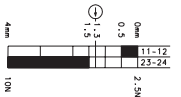
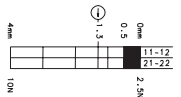
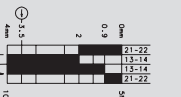


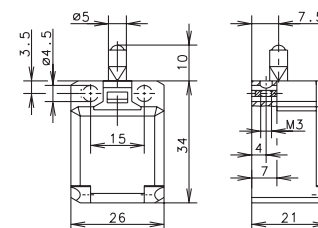
## C2-... R

	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	

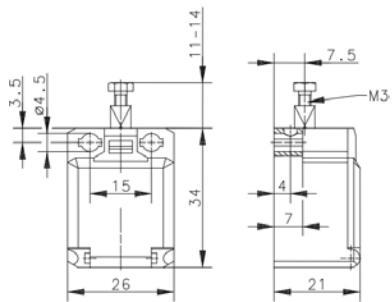


POSITION SWITCHES

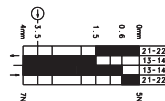
C2-... BISTABIL O.M.



1 NC / 1 NO



Snap-action system **6108351008**  
C2-SU1Z BISTABLE O.M.



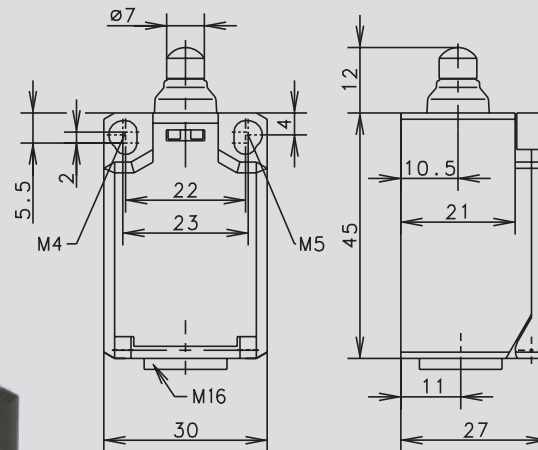
Special features/variants      Bistable (latching), height-adjustable plunger







# 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 22 and 59). 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, $U_e/I_e$ 240 V/3 A; DC-13, $U_e/I_e$ 240 V/0.27 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		$3 \times 10^6$ switching cycles
B10d		6 million
Switching frequency		$\leq 100/\text{min.}$
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		

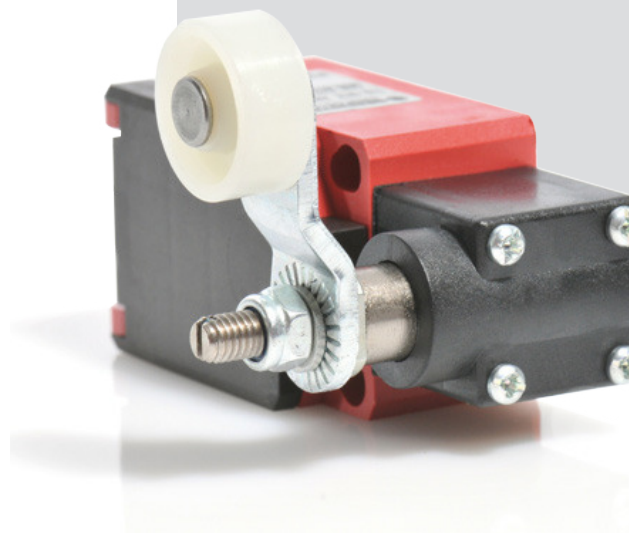
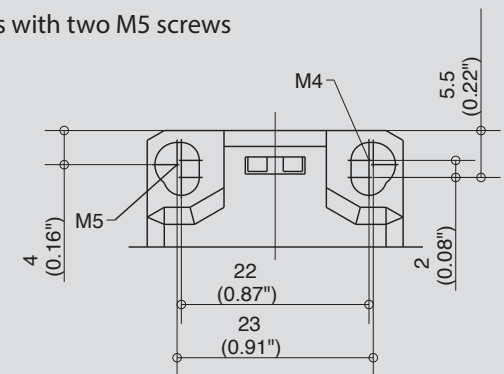
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1VDE  
0660 T200, DIN EN 60947-5-1, IEC 60947-5-1

## 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)

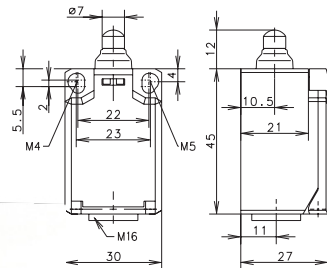


# POSITION SWITCHES

## TI2-... W



1 NC / 1 NO



Slow-action system

**6088103001**  
 TI2-U1Z W

Snap-action system

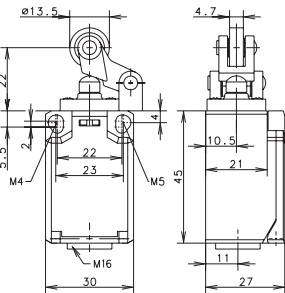
**6088153002**  
 TI2-SU1Z W

Special features/variants

## TI2-... HW



1 NC / 1 NO

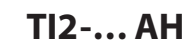


Slow-action system

**6088121015**  
 TI2-U1Z HW

Special features/variants

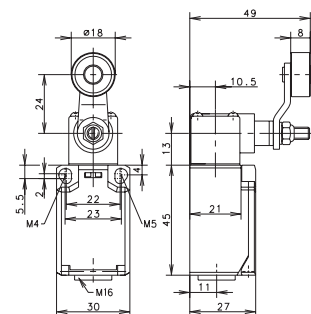
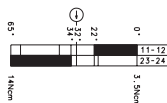
Different directions of actuation available, also available with steel roller, different roller diameters on request



1 NC / 1 NO

### Slow-action system

6088135021  
TI2-U1Z AH



Special features/variants

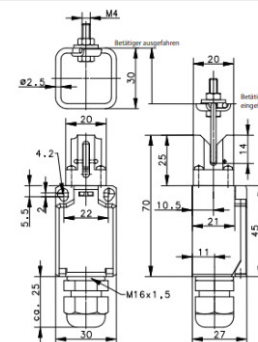
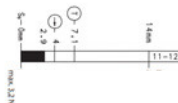
Different directions of actuation available, also available with steel roller, different roller diameters on request, cranked and straight levers, different lever lengths

Protection class IP54 **TI2-... KS**

**1 NC / 1 NO**

Slow-action system

**6116469043**  
TI2-A1Z KS



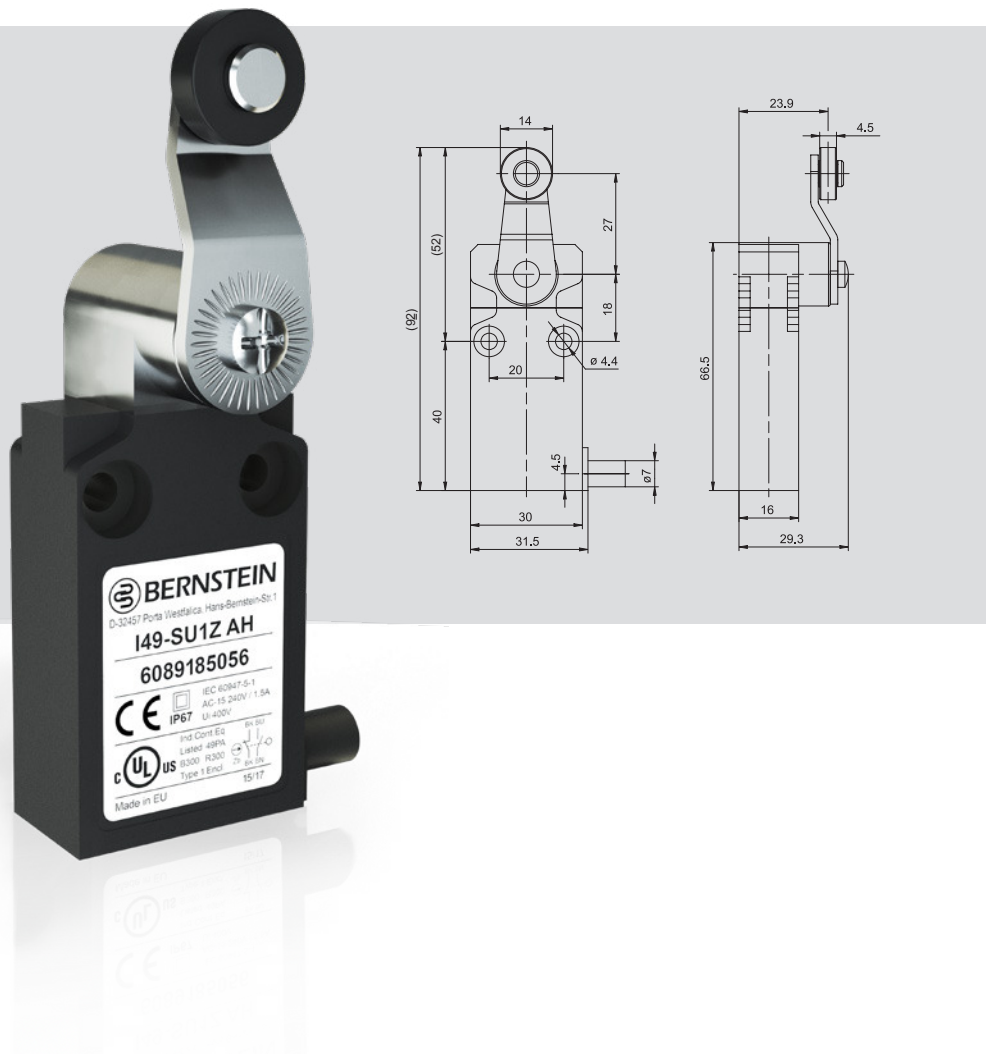
Special features/variants

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 $4 \times 0.75 \text{ mm}^2$
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

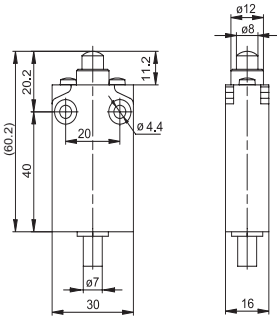
## Options

- Different cable lengths available on request



# POSITION SWITCHES

## I49-... IW



1 NC / 1 NO

Slow-action system **6089102059**  
I49-U1Z IW Z



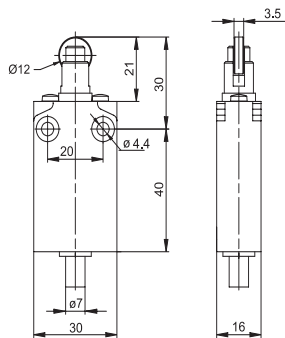
Snap-action system **6089152058**  
I49-SU1Z IW Z



Special features/variants

Central cable outlet available on request

## I49-... RIW



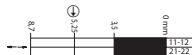
1 NC / 1 NO

Slow-action system **6089117061**  
I49-U1Z RIW Z



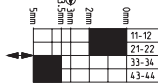
2 NC contact

**6089817071**  
I49-A2Z RIW Z



2 NC / 2 NO

**6089217076**  
I49-U2Z RIW Z



Snap-action system **6089167060**  
I49-SU1Z RIW Z

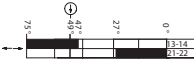

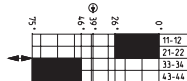


Special features/variants

Central cable outlet available on request

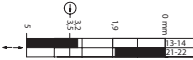



## I49-... AH

	1 NC / 1 NO	2 NC contact	2 NC / 2 NO	
Slow-action system	<p><b>6089135067</b> I49-U1Z AH Z</p> 	<p><b>6089835073</b> I49-A2Z AH Z</p> 	<p><b>6089235078</b> I49-U2Z AH Z</p> 	



## I49-... IWF

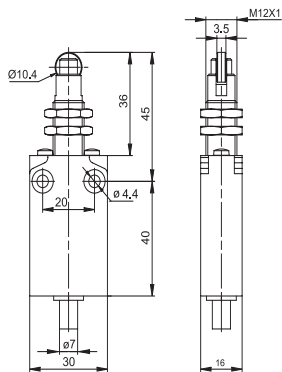
1 NC / 1 NO		
Slow-action system	<div><b>6089102063</b> I49-U1Z IWF Z</div> <div></div>	<div></div>
Snap-action system	<div><b>6089152062</b> I49-SU1Z IWF Z</div> <div></div>	
Special features/variants	Central cable outlet available on request	





# POSITION SWITCHES

## I49-... RIWF



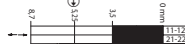
Slow-action system

**6089117065**  
I49-U1Z RIWF Z



2 NC contact

**6089817072**  
I49-A2Z RIWF Z



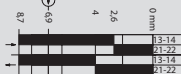
2 NC / 2 NO

**6089217077**  
I49-U2Z RIWF Z



Snap-action system

**6089167064**  
I49-SU1Z RIWF Z



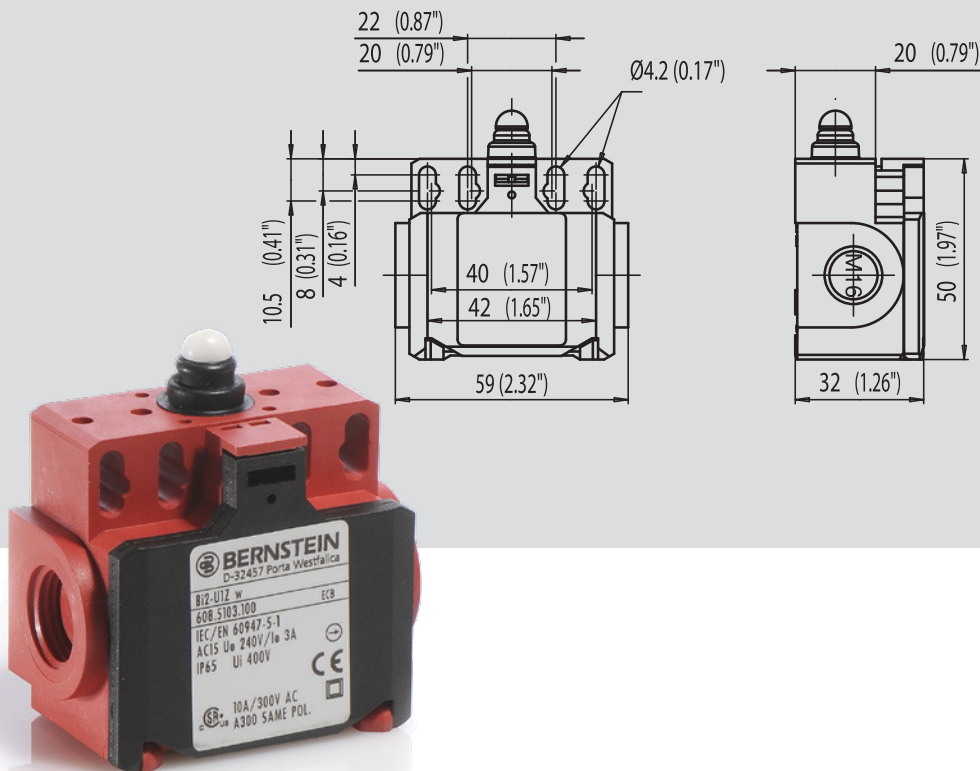
Special features/variants

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>	$10 \times 10^6$ switching cycles
B10d (up to) <sup>1</sup>	20 million
Switching frequency	$\leq 100/\text{min.}$
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

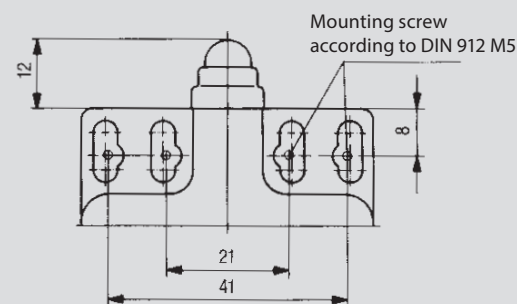
### Standards

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

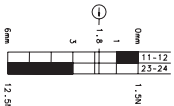
## BI2 ... W



1 NC / 1 NO

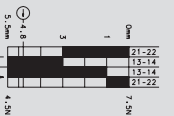
Slow-action system

**6085103100**  
BI2-U1Z W



Snap-action system

**6085153107**  
BI2-SU1Z W



Special features/variants

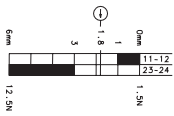
## BI2 ... RIW



1 NC / 1 NO

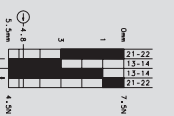
Slow-action system

**6085117101**  
BI2-U1Z RIW



Snap-action system

**6085167108**  
BI2-SU1Z RIW



Special features/variants

Available with steel roller on request



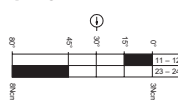


## BI2 ... AH

1 NC / 1 NO

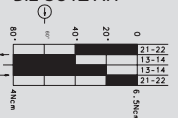
Slow-action system

**6085135104**  
BI2-U1Z AH



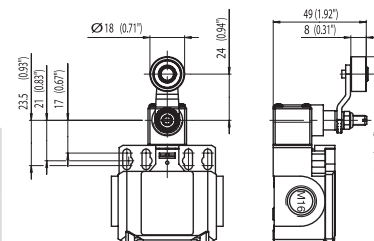
Snap-action system

**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



## BI2 ... AV

1 NC / 1 NO

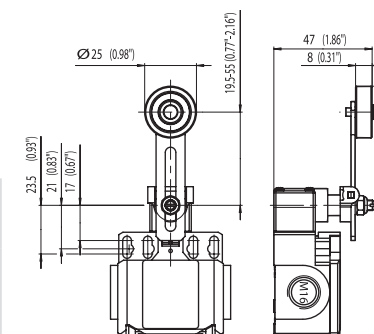
Snap-action system

**6085186112**  
BI2-SU1 AV



Special features/variants

Roller levers with adjustable lengths

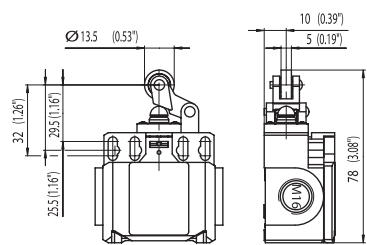


# POSITION SWITCHES

## BI2 ... HW RO13.5

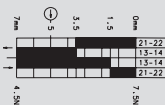


1 NC / 1 NO



Snap-action system

6085171109  
BI2-SU1Z HW  
RO13.5



Special features/variants



## POSITION SWITCHES with separated actuator

### Insulated encapsulation SK series





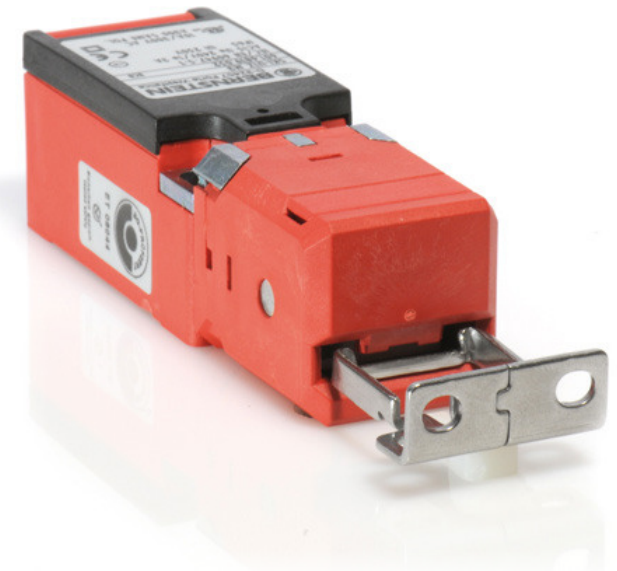
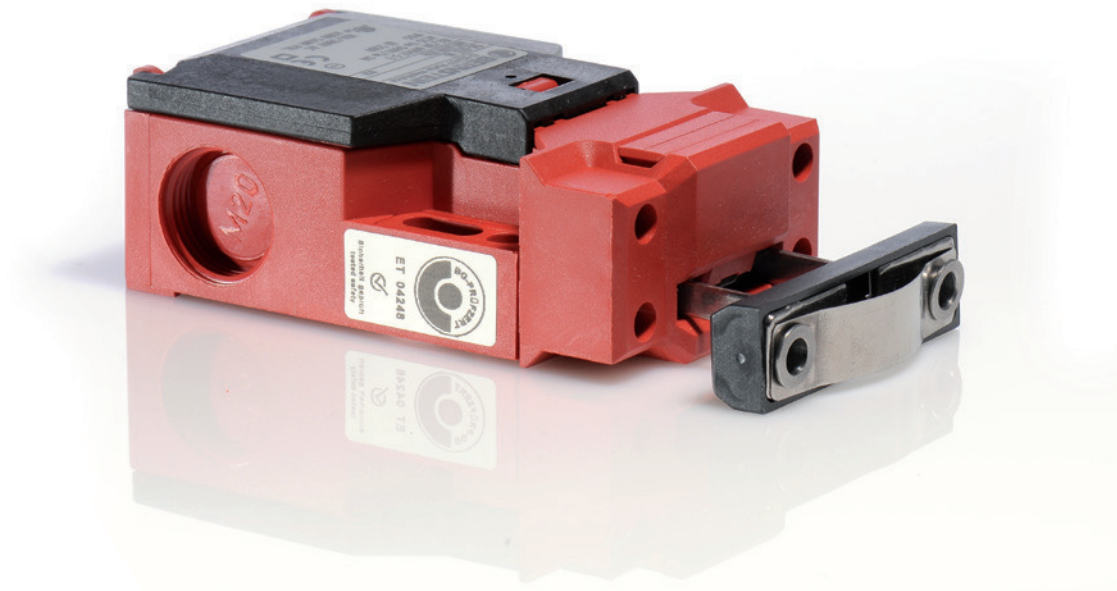
## SK switch family

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 79 and 83) is especially made for swivelling operations (hook locks), is slightly resilient and the operating radius can be adjusted.

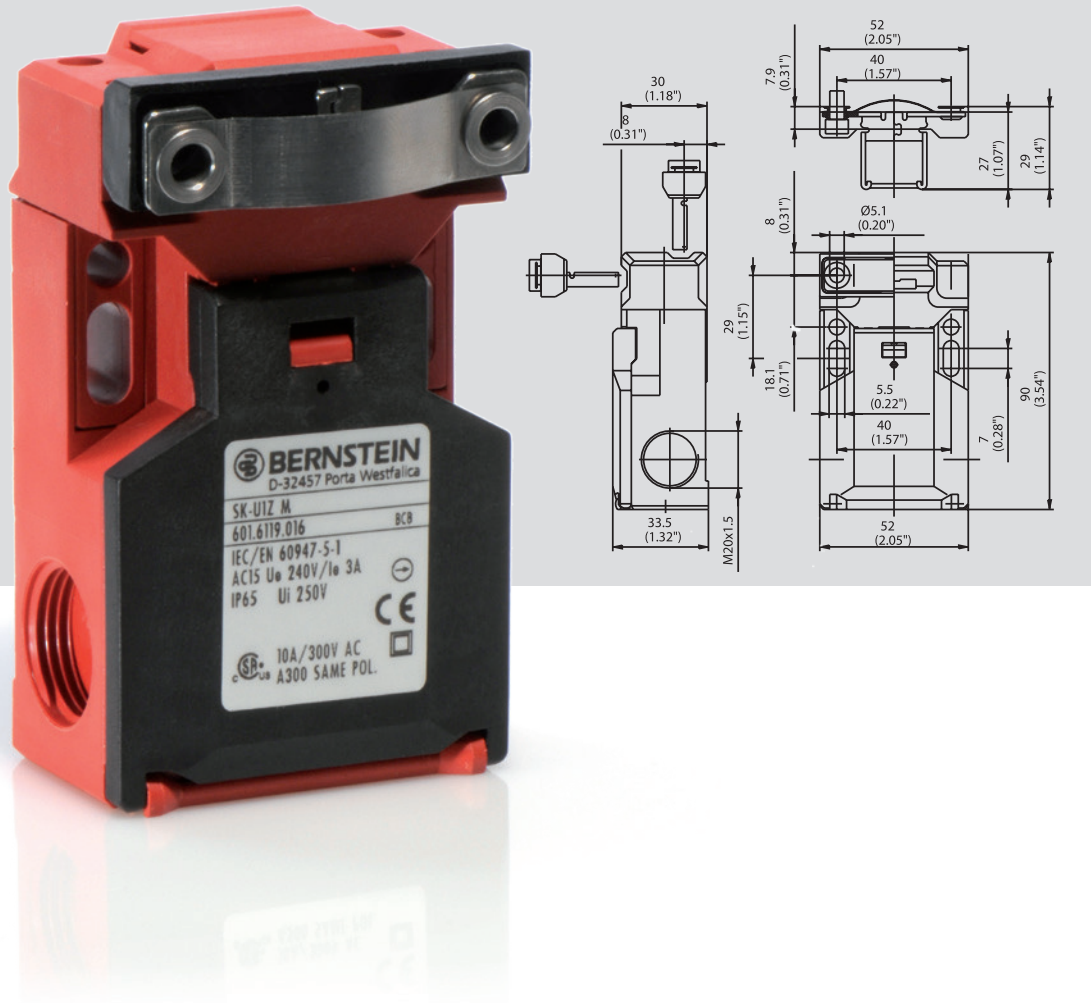
### Product characteristics

- 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





## Insulated encapsulation SK



### Good to know ...

The design of the safety position switch SK can meanwhile be seen as industrial standard and is versatily 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.



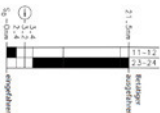


SK

1 NC / 1 NO

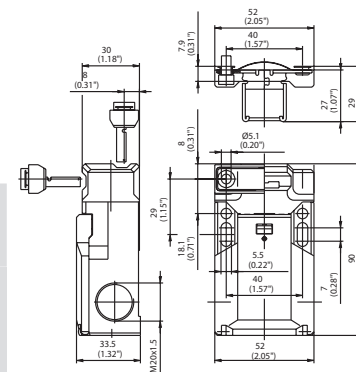
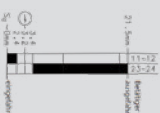
Standard

**6016119016**  
SK-U1Z M



Radius actuator

**6016119084**  
SK-U1Z MRU



Special features/variants

Actuator selection on page 82 / 83. On request: Higher actuation forces available

## Technical data

### Electrical data

Protection class	II, protective insulation
Design insulation voltage	$U_i$ max. 400 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 / 1,5 A

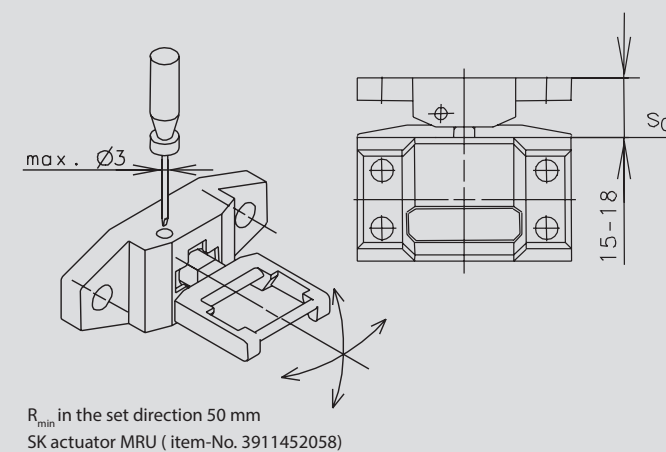
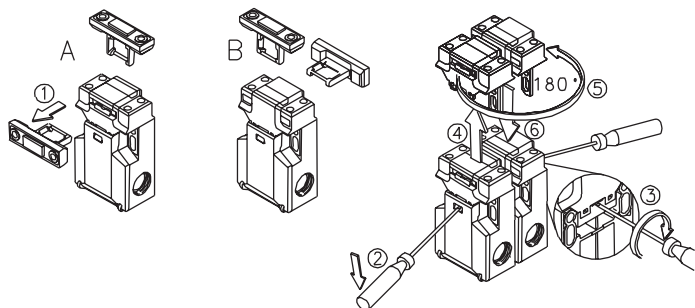
### Mechanical data

Enclosure material	Thermoplastics, glass-fibre reinforced (UL94-V0)
Switching frequency	$\leq 30$ /min
Ambient temperature	$-30^\circ\text{C}$ to $+80^\circ\text{C}$
Mechanical lifetime	$1 \times 10^6$ 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	$3 \times M20 \times 1.5$
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.

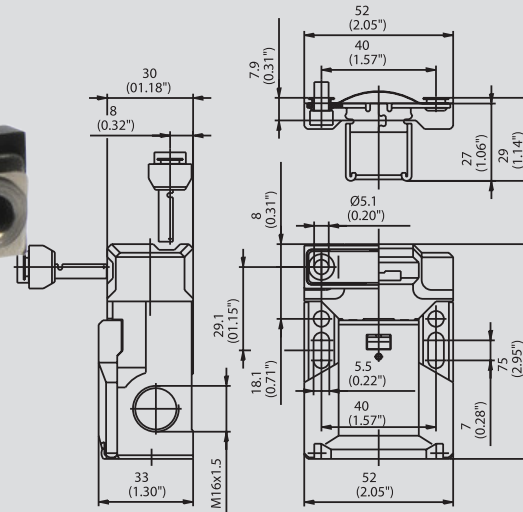


## POSITION SWITCHES with separated actuator

# Insulated encapsulation SKC

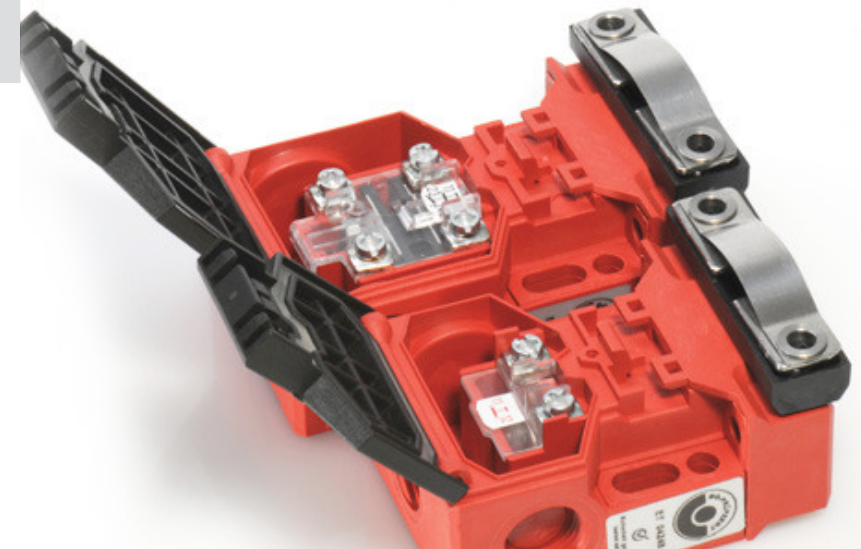


**BERNSTEIN**  
D-32457 Porta Westfalica  
SKC-A1Z M BCB  
601.6169.039  
IEC/EN 60947-5-1  
AC15 U<sub>e</sub> 240V/ I<sub>e</sub> 1.5A  
IP65 U<sub>i</sub> 250V  
CE  
10A/300V AC  
8300 SAME POL.



### 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.



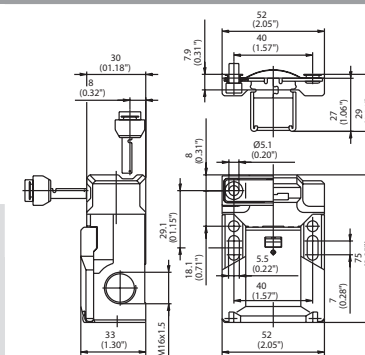
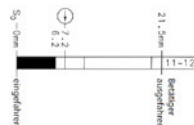


SKC

## 1 NC contact

Standard

**6016169039**  
SKC-A1Z M



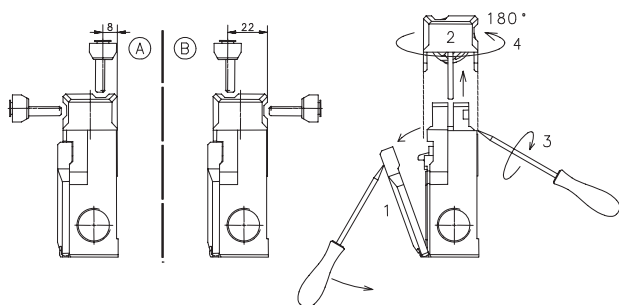
Special features/variants

Actuator selection on page 82 / 83. On request: Higher actuation forces available

## 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	$I_{the}$ 5 A
Utilisation category	AC-15, $U_e / I_e$ 240 V / 1,5 A



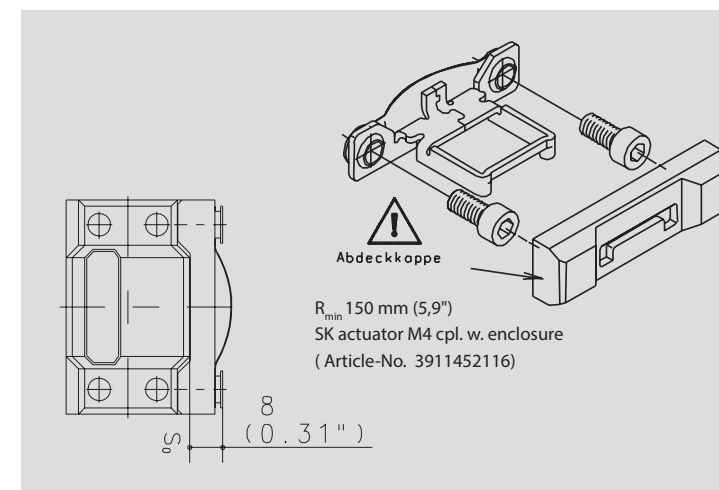
### Mechanical data

Enclosure material	Thermoplastics, glass-fibre reinforced (UL94-V0)
Switching frequency	$\leq 30$ /min
Ambient temperature	$-30^\circ\text{C}$ to $+80^\circ\text{C}$
Mechanical lifetime	$1 \times 10^6$ 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	$3 \times M16 \times 1.5$
Protection class	IP65 conforming to IEC/EN 60529

### Standards

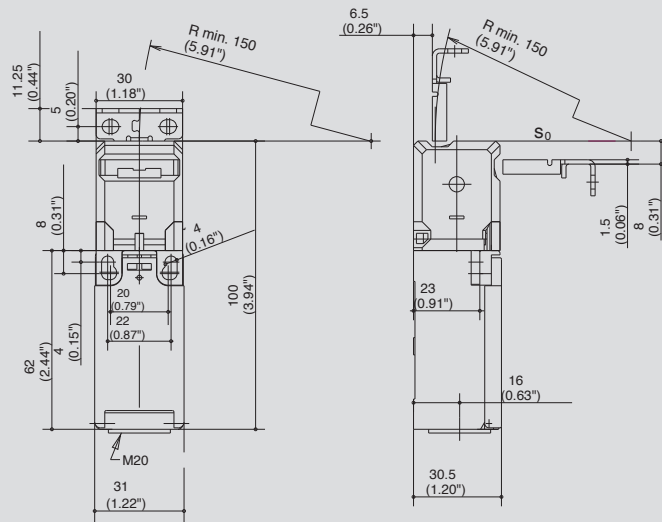
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1  
VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1

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



$R_{min}$  150 mm (5,9")  
SK actuator M4 cpl. w. enclosure  
(Article-No. 3911452116)

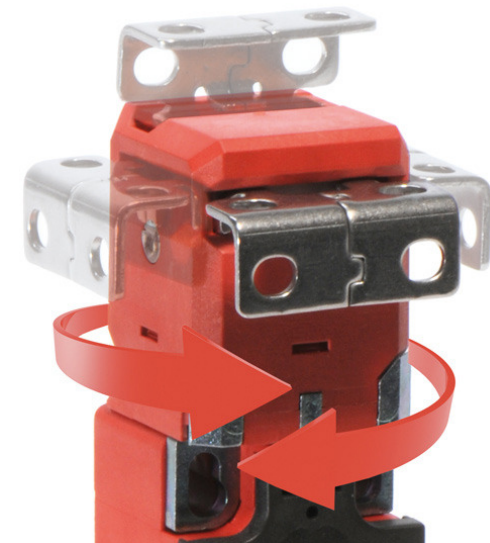
# Insulated encapsulation SKI



### 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.

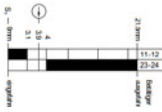
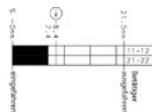
The actuator type MRU is especially made for swivelling operations (hook locks), is slightly resilient and the operating radius can be adjusted.

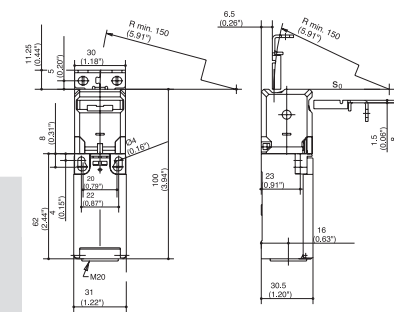






SKI

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



Special features/variants      Actuator selection on page 82 / 83. On request: Higher actuation forces available

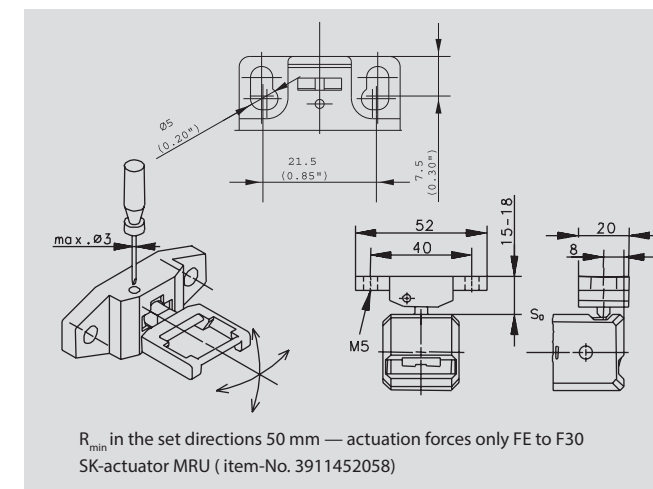
## Technical data

Electrical data		
Protection class	II, protective insulation	
Design insulation voltage	U <sub>i</sub> max.	250 V 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 / 3	

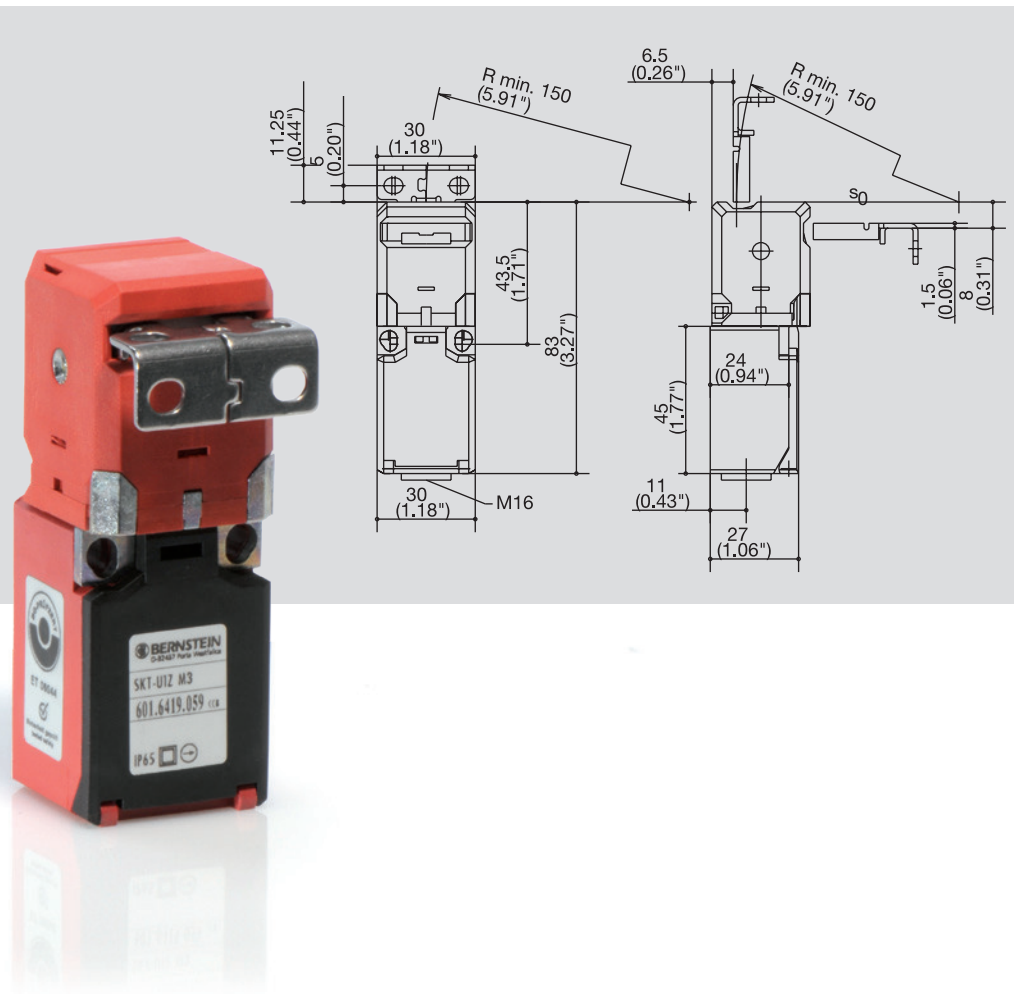
Mechanical data		
Enclosure material	Thermoplastics, glass-fibre reinforced (UL94-V0)	
Switching frequency	≤ 30/min	
Ambient temperature	−30 °C to +80 °C	
Mechanical lifetime	Standard	1 × 10 <sup>6</sup> switching cycles
	Increased actuation force	1 × 10 <sup>5</sup> switching cycles
B10d (up to) <sup>1</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	1 × 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.



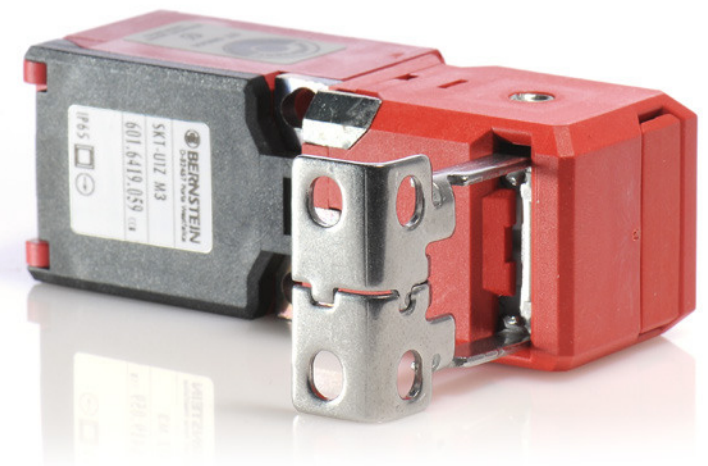
## Insulated encapsulation SKT



### 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.





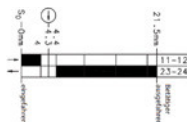
SKT

1 NC / 1 NO

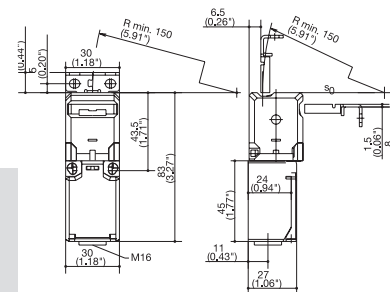
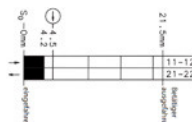
2 NC contact

Standard

**6016419059**  
SKT-U1Z M3



**6016469066**  
SKT-A2Z M3



Special features/variants

Actuator selection on page 82 / 83. On request: Higher actuation forces available

## 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, $U_e/I_e$ 240 V / 3 A; DC-13, $U_e/I_e$ 250 V / 0,27 A

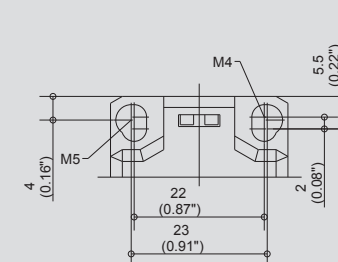
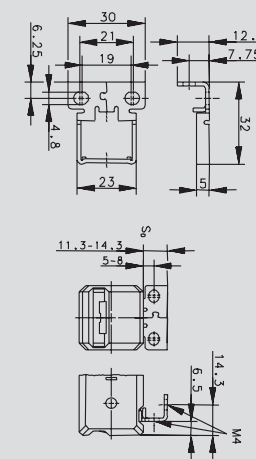
### Mechanical data

Enclosure material	Thermoplastics, glass-fibre reinforced (UL94-V0)
Switching frequency	$\leq 30$ /min
Ambient temperature	$-30^\circ\text{C}$ to $+80^\circ\text{C}$
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 $\times$ 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.



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

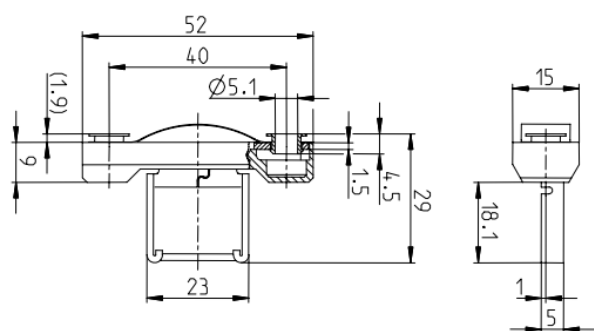
## POSITION SWITCHES with separated actuator

### Selection of actuators



SK actuator M4 (complete with enclosure)

Product range	
Article number	Designation
3911452116	SK actuator M4 (with enclosure)

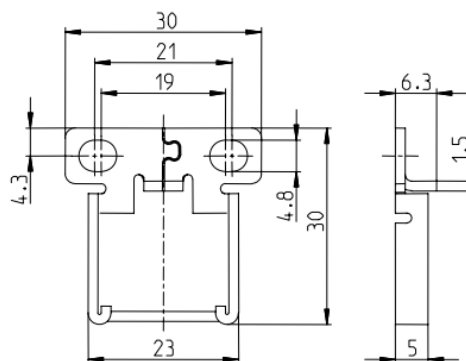


Mechanical data	
Actuator	St-VA steel
Enclosure	Thermoplastics PA
Minimum actuation radius $R_{min}$	150 mm



SK actuator M2

Product range	
Article number	Designation
3112850345	SK actuator M2

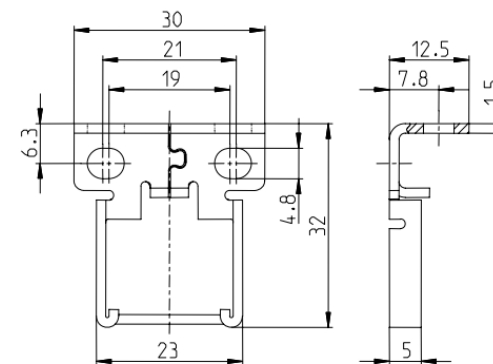


Mechanical data	
Actuator	St-VA steel
Minimum actuation radius $R_{min}$	150 mm



SK actuator M3

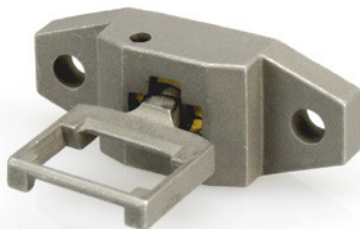
Product range	
Article number	Designation
3112850340	SK actuator M3



Mechanical data	
Actuator	St-VA steel
Minimum actuation radius $R_{min}$	150 mm

Other actuators on request.

## MRU actuator



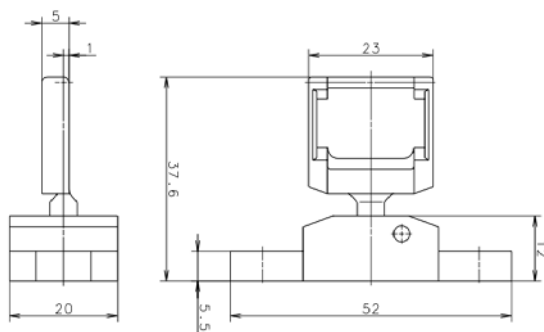
### Product range

#### Article number

3911452058

#### Designation

SK actuator MRU

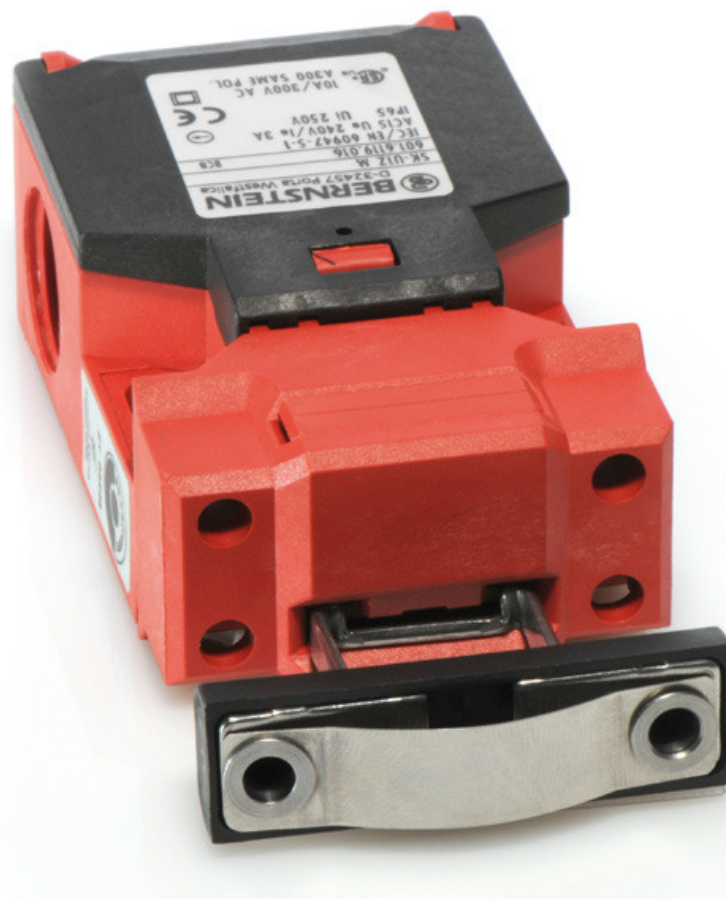


### Mechanical data

#### Actuator

St-VA steel/ brass

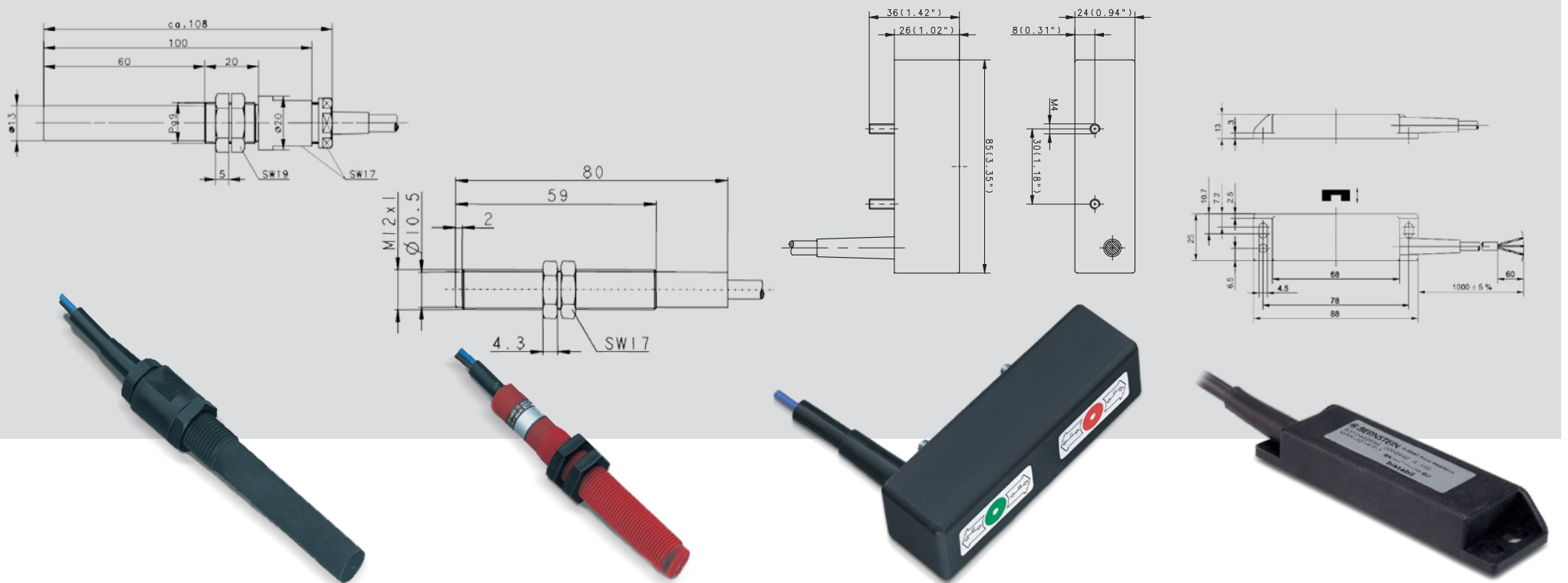
Minimum actuation radius  $R_{min}$  50 mm





## REED CONTACTS

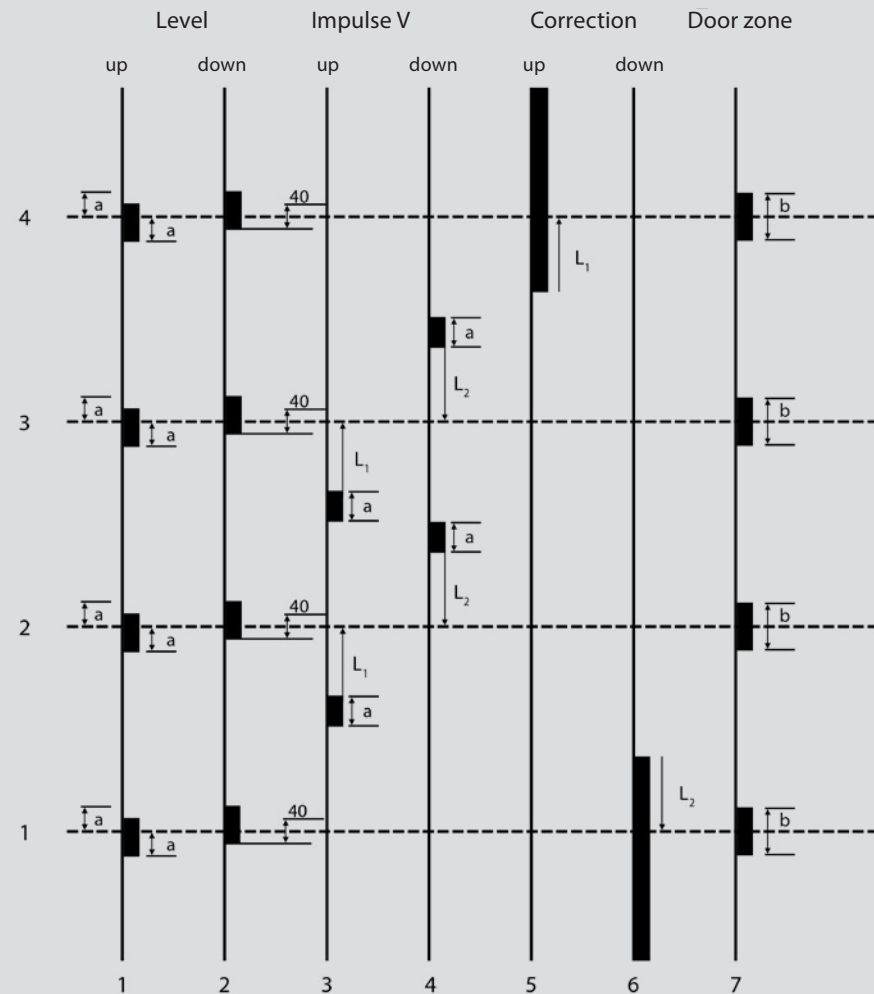
### Magnetically operated **MAK series**



## 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.

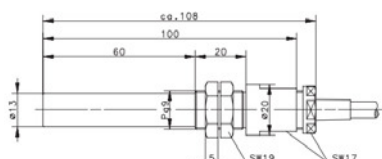
Our bistable reed contacts are typically actuated by a south pole magnet. After taking away the target they stay in their condition. Reversing or changing the actuation direction or the target polarity (north pole) will switch them back to the initial condition.



## 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				
		Switching voltage (max)	250 V	Ambient temperature (min/max)	-5 °C ... to +70 °C
<b>6310436553</b> MAK-3614-P-2		Switching current (max)	5 A (2 ms)	Protection class accor. to IEC 526, EN 60529	IP67
Bistable reed contact				Enclosure material	PA 6.6 black
		Switching capacity (max)	250 VA	Connection	2 × 0.75 mm <sup>2</sup>
		Mechanical lifetime	3 × 10 <sup>8</sup> switching cycles	Installation position	arbitrary

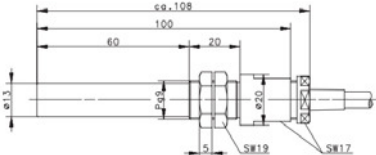
Special features/variants

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



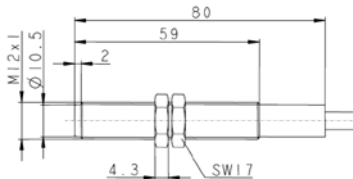
Design	Ø 13 mm	Technical data	Mechanical data
Design switching interval (San)	20 mm		
Reference magnet	T-62 N/S		
Type of connection	Cable 1 m		

 <p><b>6310536617</b> <b>MAK-3615-L-1</b></p> <p>Bistable change-over reed contact</p>	Switching voltage (max)	250 V	Ambient temperature (min/max)	-5 °C ... to +70 °C
	Switching current (max)	1 A	Protection class accor. to IEC 526, EN 60529	IP67
			Enclosure material	PA 6.6 black
	Switching capacity (max)	60 VA	Connection	3 × 0.75 mm <sup>2</sup>
	Mechanical lifetime	3 × 10 <sup>8</sup> switching cycles	Installation position	arbitrary

Special features/variants

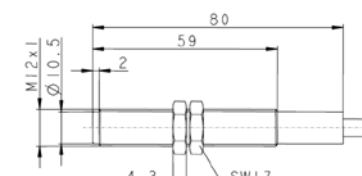
Also the MAK-3615-L-1 is a bistable magnetically operated switch; however it is equipped with a change-over contact. It is also used in classical shaft copies or as door zone switch.

## MAK-3312-A-2 NO contact

Technical data		Mechanical data		Design	Ø 10.5 mm
				Secured switching interval (S <sub>a</sub> )	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 × 10 <sup>8</sup> 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

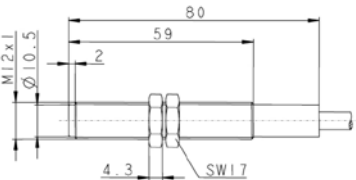
Technical data		Mechanical data		Design	Ø 10.5 mm
				Secured switching interval (S <sub>a</sub> )	29 mm
				Reference magnet	T-62 N/S
				Type of connection	Cable 1 m
Switching voltage (max)	125 V AC / 175 V DC	Ambient temperature (min/max)	−5 °C ... to +70 °C	<b>6314233709</b> MAK-3313-D-1  Change-over switch	
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		
Mechanical lifetime	3 × 10 <sup>8</sup> 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 <sub>a</sub> )	22 mm				
Reference magnet	T-62 N/S				
Type of connection	Cable 2 m				
	<b>6314233710</b> MAK-3314-A-2  Bistable On-Off	Switching voltage (max)	250 V AC / DC	Ambient temperature (min/max)	-5 °C ... to +70 °C
		Switching current (max)	3 A	Protection class accor. to IEC 526, EN 60529	IP67 (NEMA A4)
		Switching capacity (max)	120 VA	Enclosure material	PA 6.6, red
		Mechanical lifetime	3 × 10 <sup>8</sup> Switching cycles depending on load	Connection	Cable 2 × AWG20 × 1 m ± 5 %; PVC jacket, black
				Installation position	arbitrary
Special features/variants	Cylindrical, bistable magnetically operated switch with continuous M12 thread				



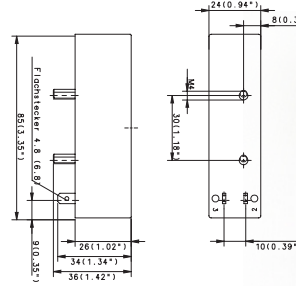


## MAK-3214-P-A-3 bistable

Technical data		Mechanical data		Design	85 × 24 × 26 mm
				Secured switching interval (S <sub>j</sub> )	17 mm
				Reference magnet	T-62 N/S
				Type of connection	Cable 3 x 0.5 mm <sup>2</sup>
Switching voltage (max)	250 V AC / DC	Ambient temperature (min/max)	−5 °C ... to +70 °C	<b>6314432706</b> MAK-3214-A-3  Bistable On-Off	
Switching current (max)	3 A	Protection class accor. to IEC 526, EN 60529	IP67 (NEMA A4)		
Switching capacity (max)	120 VA	Connection	Cable 2 × AWG20 × 3 m ± 5 %; PVC, black		
Mechanical lifetime	3 × 10 <sup>8</sup> Switching cycles depending on load	Enclosure material	PBT, black, reed contact encapsulated		
Shock resistance	50 g (11 ms, ½ 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

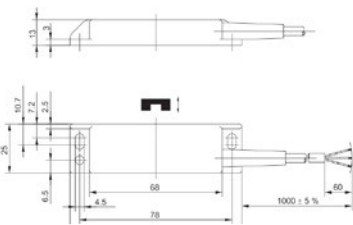
Technical data		Mechanical data		Design	85 × 24 × 26 mm
				Secured switching interval (S <sub>a</sub> )	17 mm
				Reference magnet	T-62 N/S
				Type of connection	Flat connectors 4.8 mm
Switching voltage (max)	250 V	Ambient temperature (min/max)	−25 °C ... to +70 °C	<b>6310432590</b> MAK-3214-P-STK 4.8  Bistable On-Off	
Switching current (max)	5 A (2 ms)	Protection class accor. to IEC 526, EN 60529	IP67, connection IP00		
Switching capacity (max)	250 VA	Connection	Flat connector 4.8 mm		
Mechanical lifetime	3 × 10 <sup>8</sup> 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

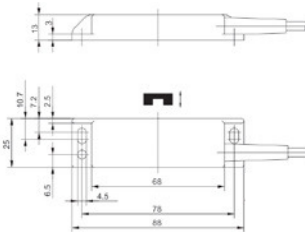
### MAK-4212-A-1 NO contact



Design		88 x 25 x 13 mm			
Secured switching interval (S <sub>a</sub> )		19 mm			
Reference magnet		TK-42		Technical data	
Type of connection		Cable 2 x AWG20		Mechanical data	
 <p><b>6314242713</b> <b>MAK-4212-A-1</b></p> <p>Normally open contact NO</p>		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 x 10 <sup>8</sup> Switching cycles depending on load	Connection	Cable 2 x AWG20 PVC jacket, black
		Shock resistance	50 g (11 ms, ½ 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			
Secured switching interval (S <sub>a</sub> )		22 mm			
Reference magnet		T-42		Technical data	
Type of connection		Cable 3 × AWG20		Mechanical data	
	<b>6317342714</b> MAK-4213-D-1	Switching voltage (max)	125 V AC / 175V DC	Ambient temperature (min/max)	–5 °C ... to +70 °C
	Change-over switch	Switching current (max) mA DC	280 mA AC / 400	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 × 10 <sup>8</sup> 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.			



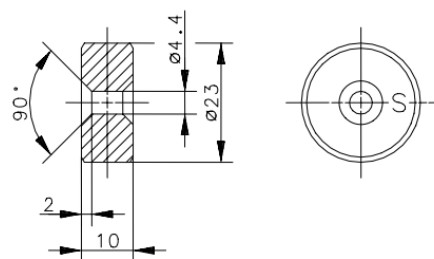
## REED CONTACTS Actuating magnets

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

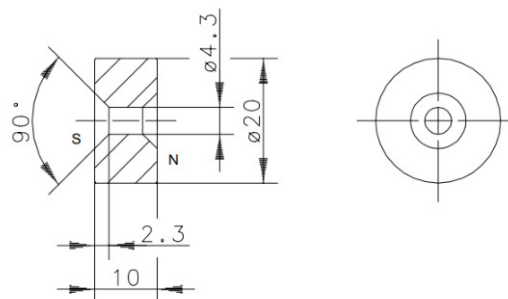


Mechanical data	
Magnet	Hard ferrite 24/16; axially magnetised; marking on the south-pole side
Ambient temperature	-40°C ... +150°C
Application	General
Tightening torque	2 Nm ± 0.25 Nm (with fixing material attached)

**T-67 Round magnet**



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

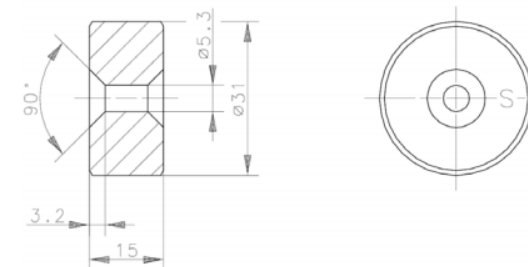


Mechanical data	
Magnet	Hard ferrite 24/23; axially magnetised; marking on the south-pole side
Ambient temperature	-20°C ... +80°C
Application	General
Tightening torque	2 Nm ± 0.25 Nm

**T-69 Round magnet**



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



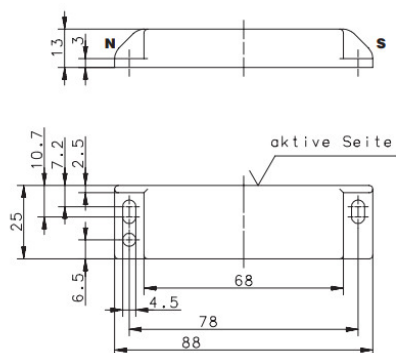
Mechanical data	
Magnet	Hard ferrite 24/16; axially magnetised; marking on the south-pole side
Ambient temperature	-20°C ... +80°C
Application	General
Tightening torque	2 Nm ± 0.25 Nm



## TK-42 Enclosed magnet

### Product range

Article number	Designation
6302142049	TK-42



### Mechanical data

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

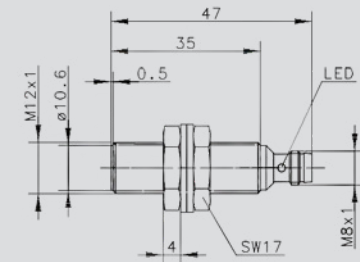
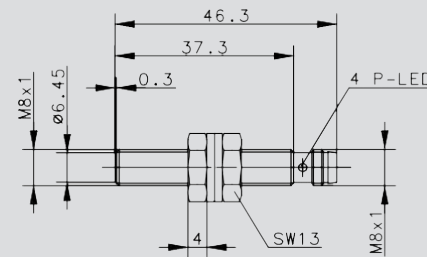
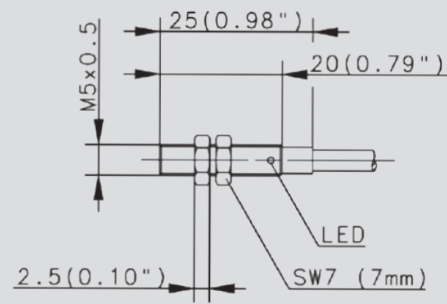
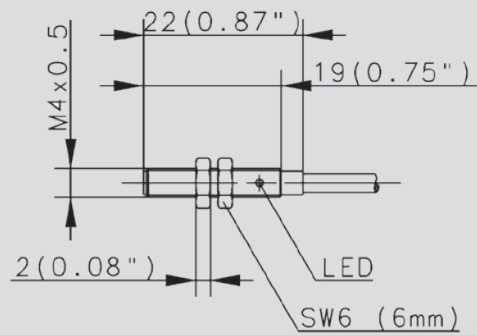
## Switching distances in the overview

Magnetically operated switch		Magnets		
Designation	Article number	T-62N/S 6301262039	T-69N/S 6301269031	TK-42 6302142049
MAK-3312-A-2	6314233708	7 mm		
MAK-3313-D-1	6316333709	29 mm		
MAK-3314-A-2	6310433710	22 mm		
MAK-3214-P-STK 4.8	6310432590	17 mm		
MAK-3214-P-1	6310432598	17 mm		
MAK-4212-A-1	6314242713	-		19 mm
MAK-4213-D-1	6317342714	-		22 mm
MAK-4214-A-2	6310442715	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.

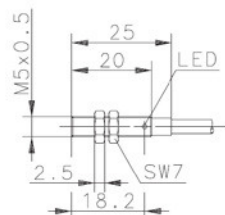
In the lift industry there are several possibilities to use the sensors of the KIB series, for example brake lining monitoring. However – they are still used in escalator applications for speed monitoring (MEK-series).



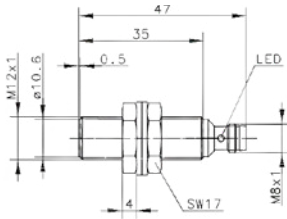
## INDUCTIVE SENSORS

### KIB M5



Type of installation	Flush	Technical data		Mechanical data	
Rated switching interval	1 mm				
Type of connection	Cable 2 m				
Particularity					
	<b>6532999002</b>	Rated operating voltage $U_e$	12–24 V DC	Ambient temperature (min/max)	–25 °C ... to +70 °C
	KIB-M05PS/001-KL2I	Rated operating current $I_e$	≤ 200 mA	Protection class accor. to IEC 526, EN 60529	IP67/NEMA type 1
	NO contact	Switching frequency (max)	1000 Hz	Enclosure material	Brass, nickel-plated
		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.			

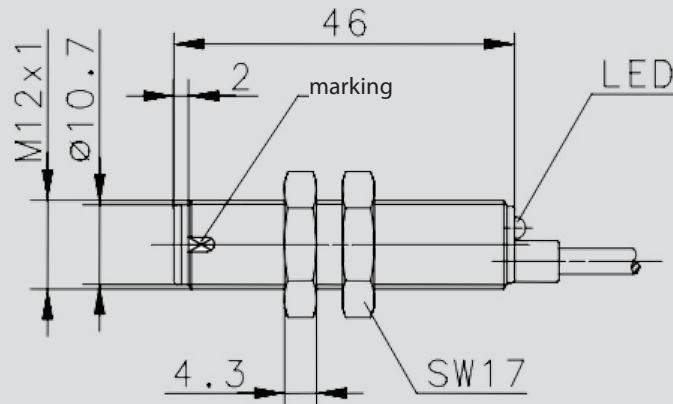
KIB M12

Technical data		Mechanical data		Type of installation	Flush
				Rated switching interval	2 mm
				Type of connection	Plug M8
				Particularity	
Rated operating voltage U <sub>e</sub>	10–30 VDC	Ambient temperature (min/max)	–25 °C ... to +70 °C	<b>6502943008</b> KIB-M12PS/002-KLSM8V  PNP NO contacts	
Rated operating current I <sub>e</sub>	≤ 200 mA	Protection class accor. to IEC 526, EN 60529	IP67		
Switching frequency (max)	800 Hz	Enclosure material	CuZn39Pb3		
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.				



## INDUCTIVE SENSORS

### Speed sensor MEK

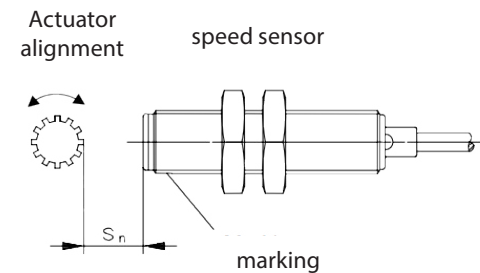


#### Good to know ...

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.

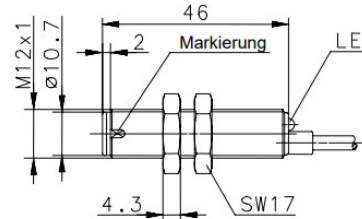
Use these sensors, as the name says, for measuring the speed on a toothed wheel, e.g. in an escalator, to measure the speed of the handrail.

#### Connection diagram



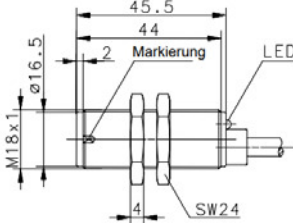


## MEK M12

Technical data				Mechanical data		Function mode		Hall	
						Magnetic sensitivity		–	
						Switching interval (Sn)		0–2 mm	
						Reference magnet		–	
						Type of connection		Cable 2 m	
						Particularity		Speed	
Rated operating voltage U <sub>e</sub>	10–39 VDC	Ambient temperature (min/max)	–25 °C ... to +70 °C	<b>6379262119</b> MEK-M12PD/H-KL2  PNP NO contacts					
Rated operating current I <sub>e</sub>	400 mA	Protection class accor. to IEC 526, EN 60529	IP67						
Switching frequency (max)	10 kHz	Enclosure material	PA, red						
Short-circuit protection	Clocking	Connection	3 × 0.14 mm <sup>2</sup>						
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).							

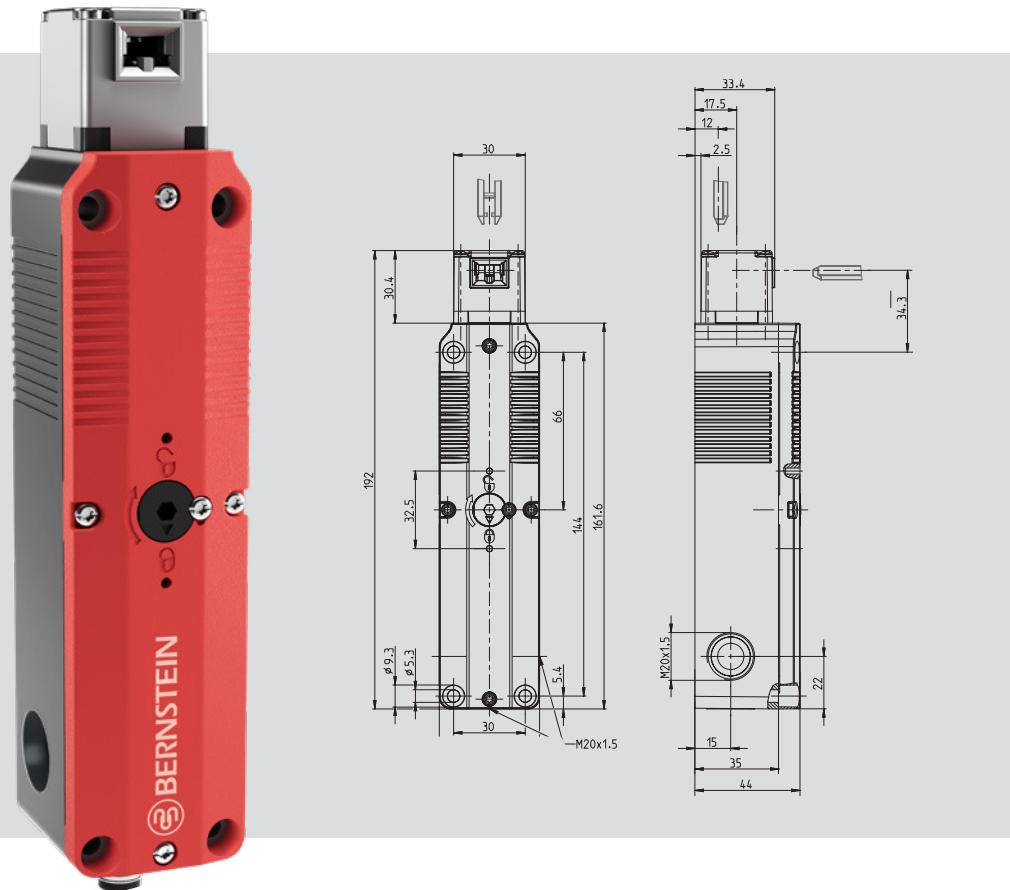


## MEK M18

Technical data				Mechanical data		Function mode		Hall			
						Magnetic sensitivity		-			
						Switching interval (Sn)		0-2 mm			
						Reference magnet		-			
						Type of connection		Cable 2 m			
						Particularity		Speed			
Rated operating voltage U <sub>e</sub>	10-39 VDC	Ambient temperature (min/max)	-25 °C ... to +70 °C	<b>6379263121</b> MEK-M18PD/H-KL2		PNP NO contacts					
Rated operating current I <sub>e</sub>	400 mA	Protection class accor. to IEC 526, EN 60529	IP67								
Switching frequency (max)	10 kHz	Enclosure material	PBT, black								
Short-circuit protection	Clocking	Connection	3 x 0.14 mm <sup>2</sup>								
Function and operating voltage display	LED/-										
Special features/variants		Cylindrical enclosure in M18, 45.5mm long, 2m connecting cable, enclosure made of PBT (black).									



# 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
Switch elements	
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
Positive Break	P
Short-circuit protection	4 A gG
Conditional rated short-circuit current	400 A
Electromagnet	
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

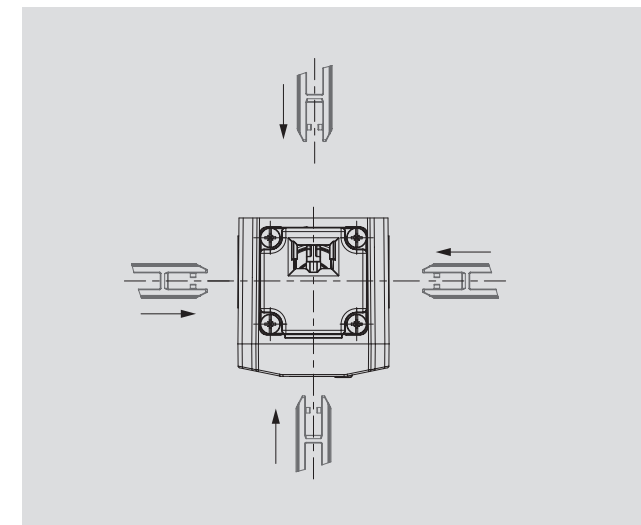
Mechanical data	
Enclosure material	Thermoplastics, glass-fibre reinforced (UL 94-V0)
Cover	Thermoplastics, glass-fibre reinforced (UL 94-V0)
Direction of actuation	Metal
Operation	
Minimum actuation radius	$R_{min}$ See data sheet - actuator
Starting speed	$V_{max}$ 0.5 m/s
Extraction force	$\geq 10$ N
Interlocking principle	Spring and magnetic force
Unlocking device	a) Magnetic force b) Auxiliary unlocking mechanism of front and rear side
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	$1 \times 10^6$ switching cycles
Mounting	$4 \times M5$
Type of connection	Screwed terminal
Conductor cross-sections	0.34 ... 1.5 mm <sup>2</sup> flexible
Cable entry	$3 \times M20 \times 1.5$
Weight	$\approx 0.484$ 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
Key figures for safety technology	
B10d	$2 \times 10^6$ cycles
Standards	
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.

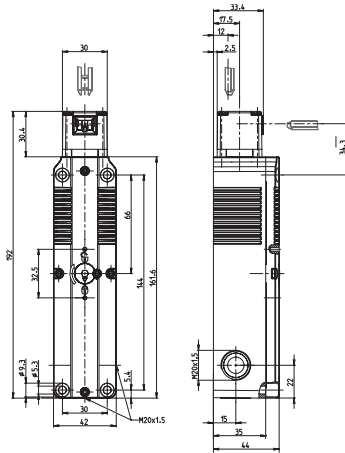
## Options

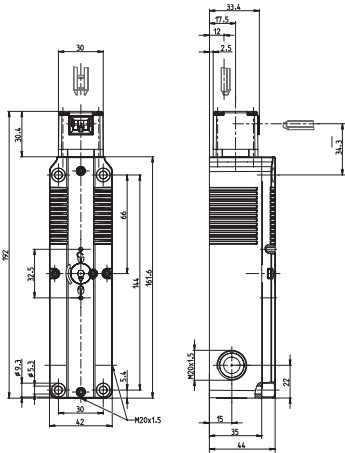
- 4 optional actuators (page 104–105)
- Emergency release available
- Optional escape release
- Connecting possibilities with M12




## GUARD LOCKING DEVICE

## SLC-...



	Principle of guard locking	1 NC / 1 NO	2 NC contact
	Spring 24 V AC/DC	<b>6018200001</b> SLC-F-024-11/11-R4	<b>6018200007</b> SLC-F-024-20/20-R4
	Magnet 24 V AC/DC	<b>6018200002</b> SLC-M-024-11/11-R4	<b>6018200017</b> SLC-M-024-20/20-R4
	Spring 230 V AC	<b>6018200005</b> SLC-F-230-11/11-R4	
	Magnet 230 V AC	<b>6018200006</b> SLC-M-230-11/11-R4	



Special features/variants

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

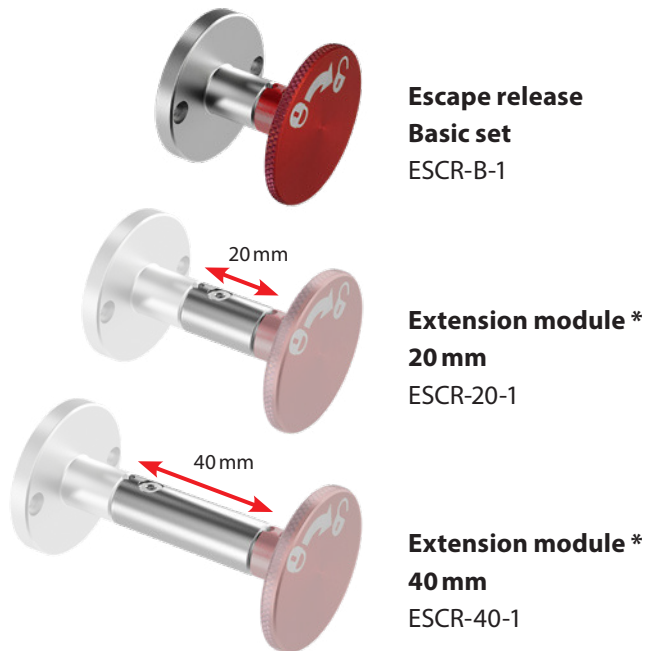
Guard locked by spring force. To unlock, the solenoid needs to be energised.

## Power-To-Lock

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

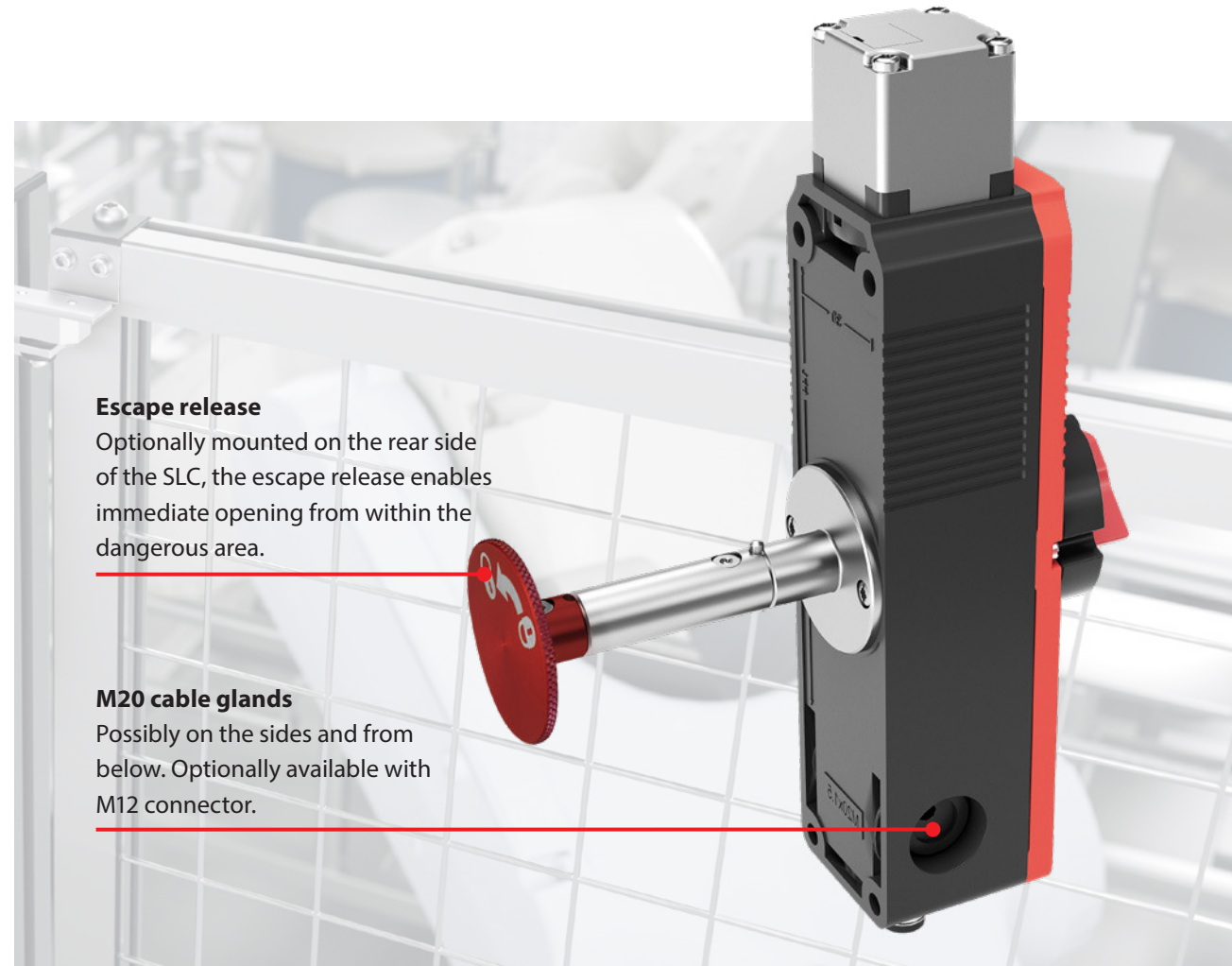


## Selection of accessories



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.





# GUARD LOCKING DEVICE

## Actuators

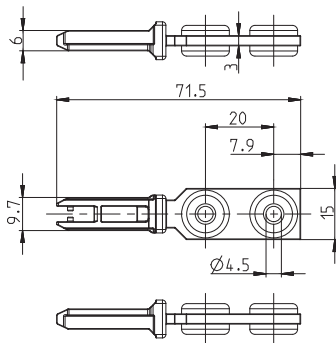
Actuators are not included in the scope of delivery of the SLC and must be ordered separately.

### ACS-1 actuator

Proven standard model among the actuators.



Produkt range	
Article number	Designation
3911742390	ACS-1



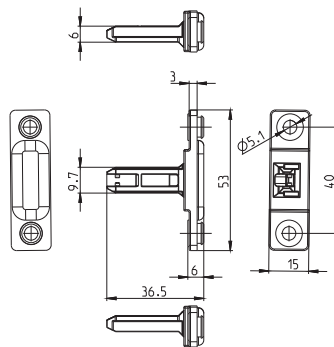
Mechanical data	
Actuator	Stainless steel (AV steel)
Minimum actuation radius $R_{min}$	
800 mm	

### ACC-1 actuator

The transverse actuator – for vertical / horizontal mounting.



Produkt range	
Article number	Designation
3911742392	ACC-1



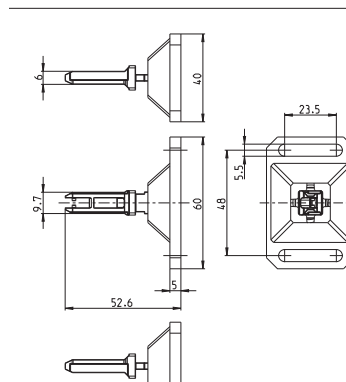
Mechanical data	
Actuator	Stainless steel (AV steel)
Minimum actuation radius $R_{min}$	
600 mm	

### ACF-1 actuator

Designed to compensate a slight vertical/ horizontal offset.



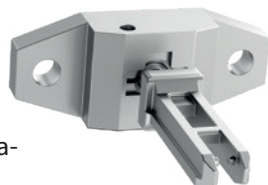
Produkt range	
Article number	Designation
3911742391	ACF-1



Mechanical data	
Actuator	Stainless steel (AV steel)
Enclosure	GD-Zn
Minimum actuation radius $R_{min}$	
400 mm	

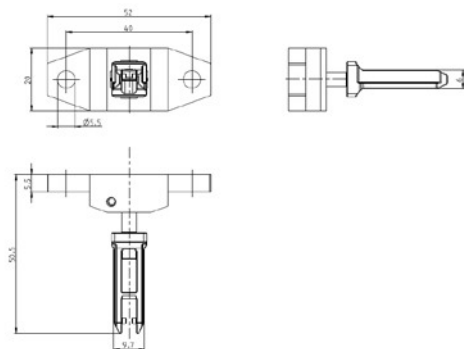
### ACR-1 actuator

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



#### Product range

Article number	Designation
3911742398	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
6051101003	EMR-F-1	Emergency release - front
6051101004	EMR-B-1	Emergency release - backside



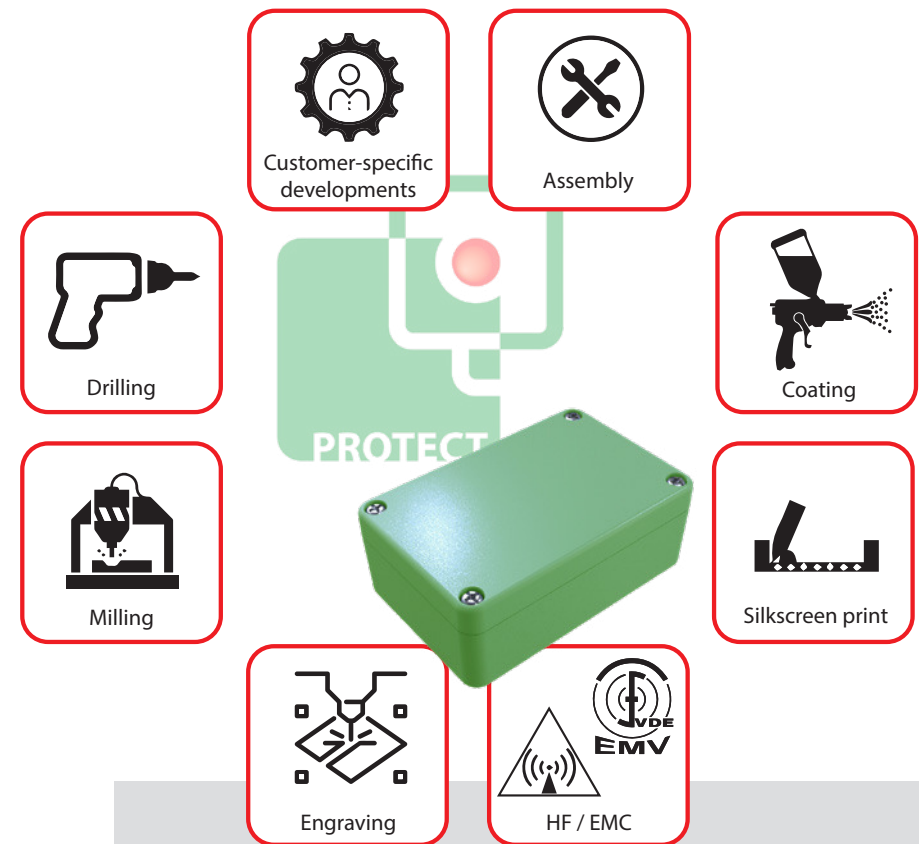
# Standard enclosures Our evergreen

## 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





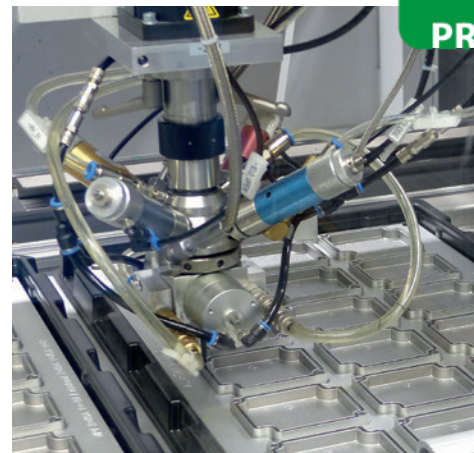
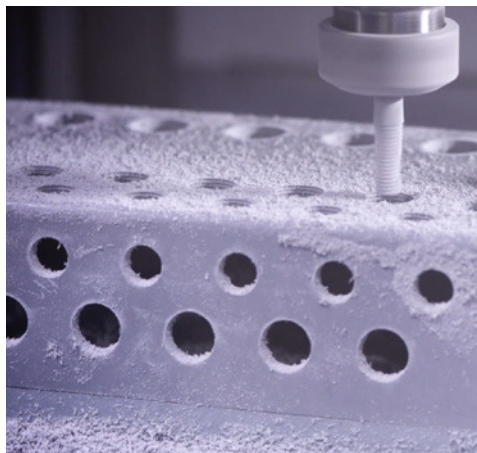
# Standard enclosure Infinite processing possibilities

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



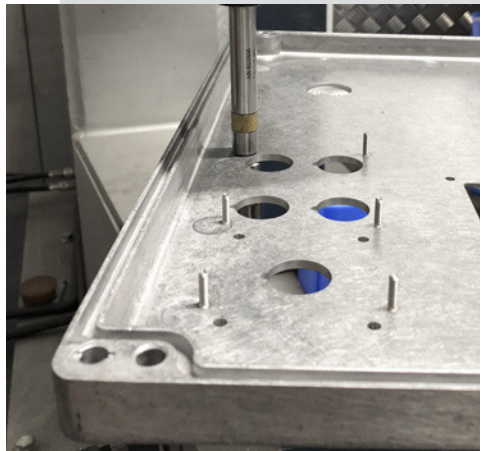




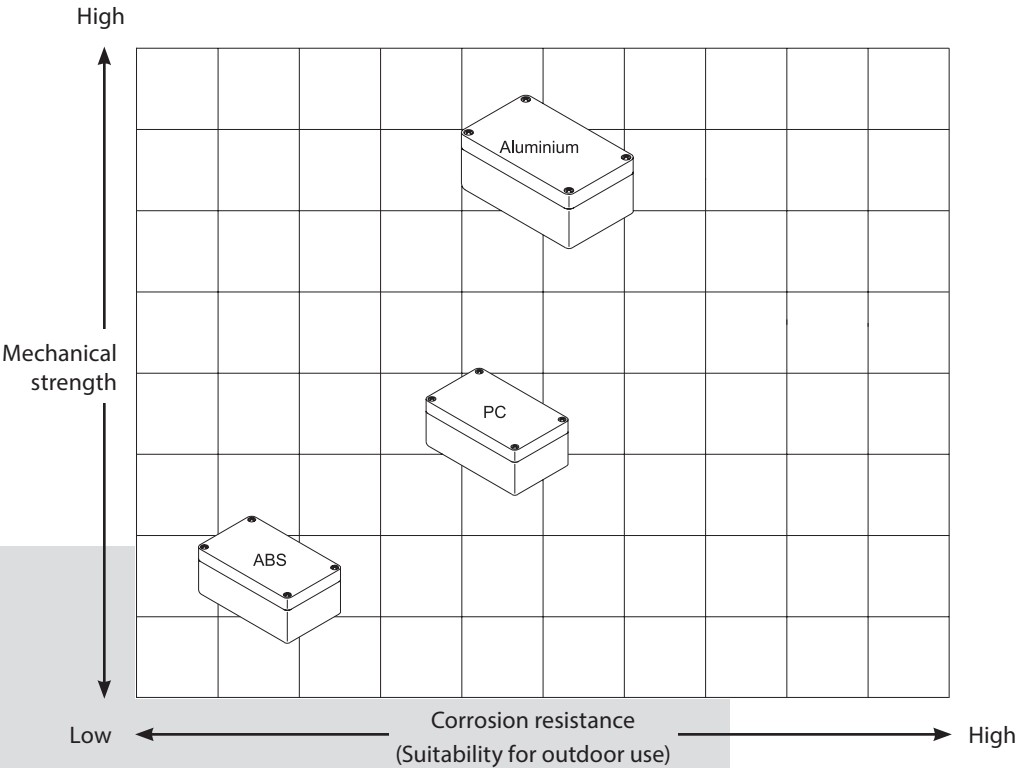
**CA series** Aluminium



**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 × cm		10 <sup>15</sup>	10 <sup>13</sup>
Surface resistance	DIN 53482	Ohm × cm		≥ 10 <sup>15</sup>	4 x 10 <sup>14</sup>
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.

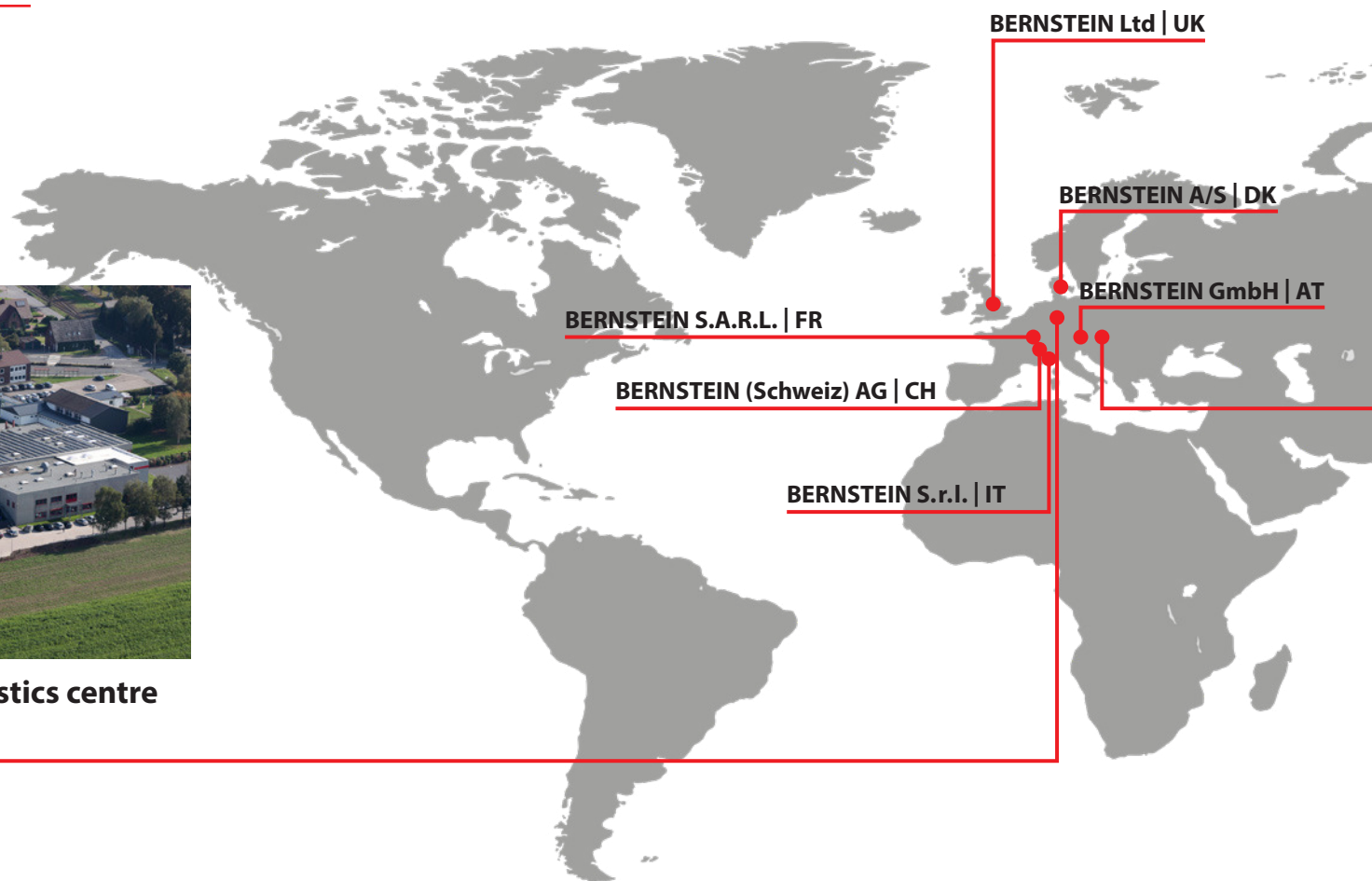




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