

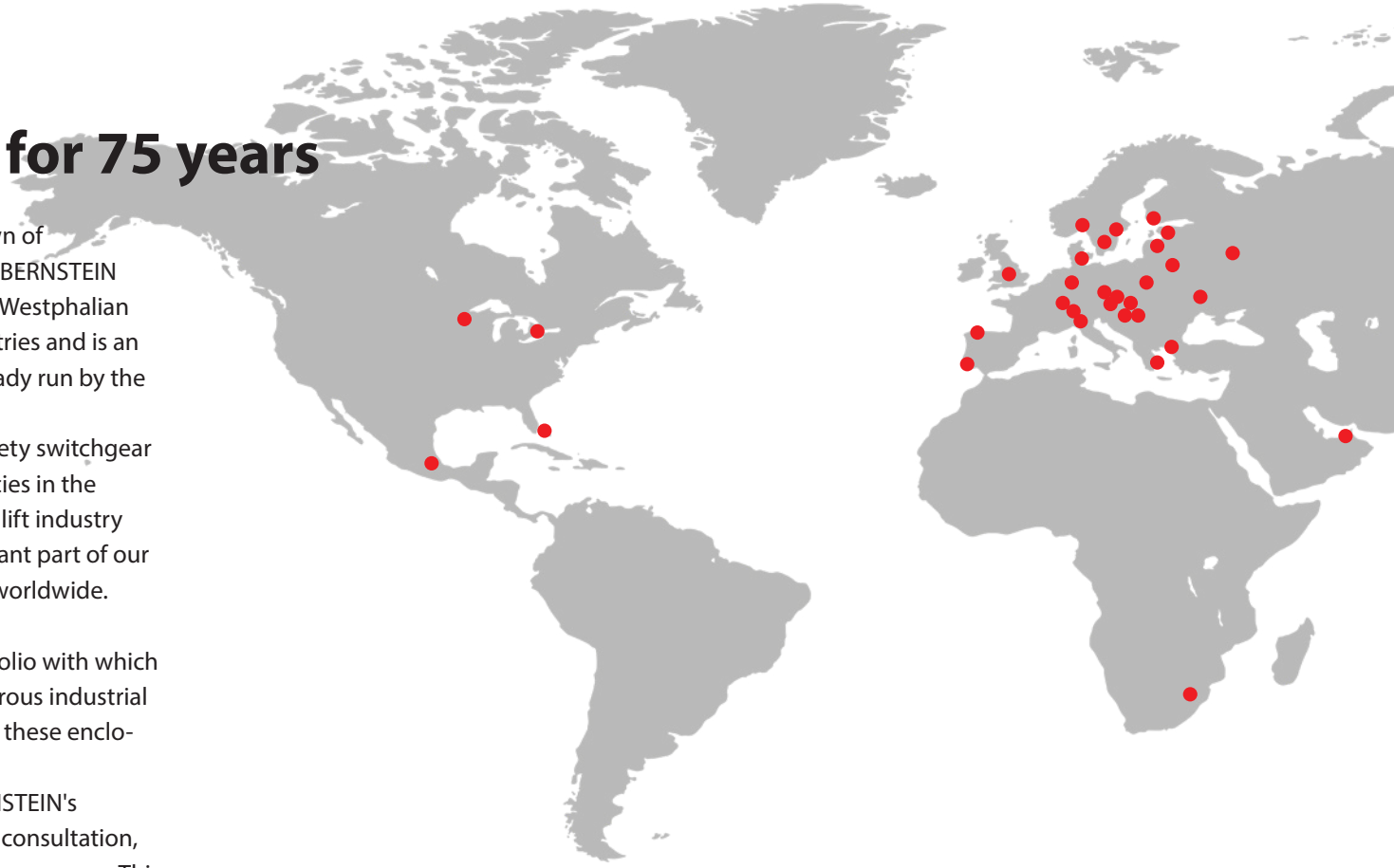


Switchgear, sensors and enclosures

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 Borcherding** | Production Manager, BERNSTEIN AG

A real milestone.



1947

COMPANY FOUNDING
by Hans Bernstein in Porta Westfalica

2016

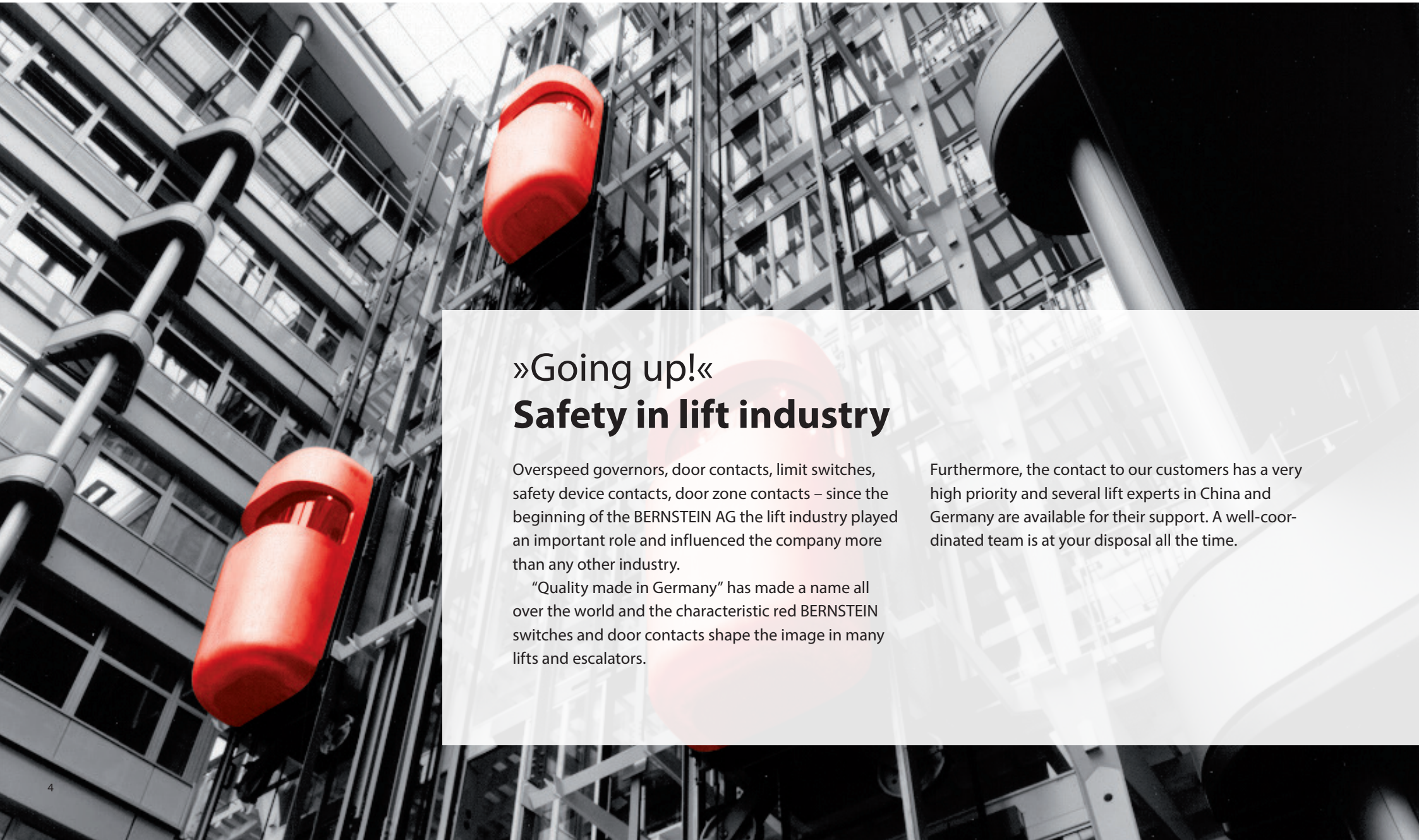
IN62, IN65 AND I81
supplement the product range of position switches

36

DISTRIBUTORS
are acting worldwide ensuring first class customer support

3

GENERATIONS
characterise the successful family business

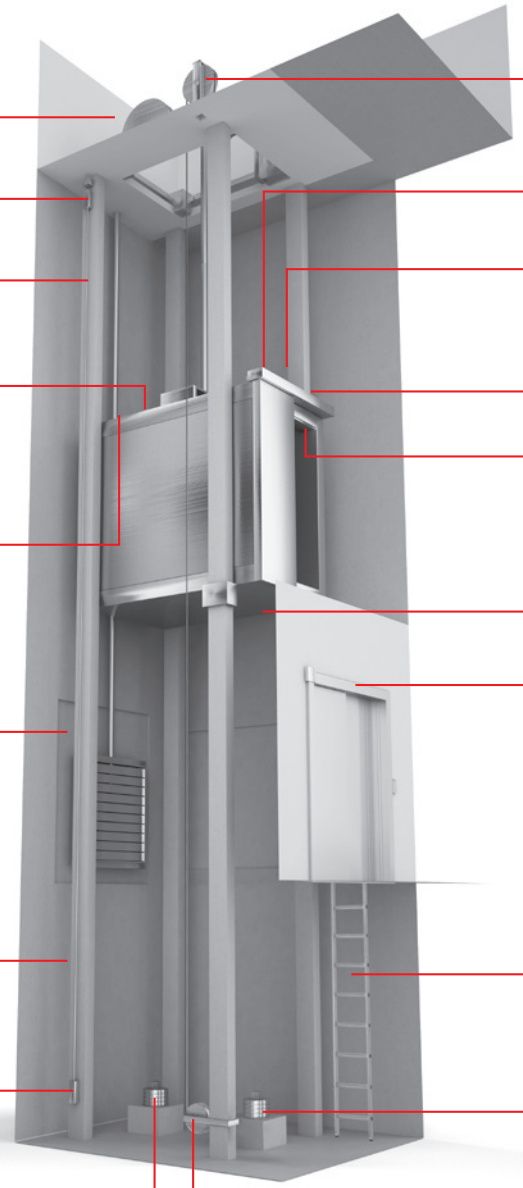


»Going up!«
Safety in lift industry

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.



Brake monitoring
50 | 56 | 94

Limit switch – shaft head
24 | 40 | 46

Speed-monitoring – shaft head
24 | 40 | 46

Cabin escape hatch monitoring
10 | 24 | 59 | 72

Shaft Copy
84

Inspection door shaft monitoring
10 | 24 | 59 | 72

Shaft pit – speed monitoring
24 | 40 | 46

Limit switch – shaft pit
24 | 40

Hydraulic buffer monitoring of counterweight
24 | 40 | 46 | 56 | 66

Overspeed governor speed monitoring
24 | 36

Safety-device monitoring
24 | 69

Telescopic handrail monitoring
59 | 72

Door zone signal
84

Door contacts
10 | 59 | 72

Telescopic apron monitoring
59 | 72

Door contacts
10 | 59 | 72

Ladder monitoring
59 | 72

Hydraulic buffer monitoring
24 | 40 | 46 | 56 | 66

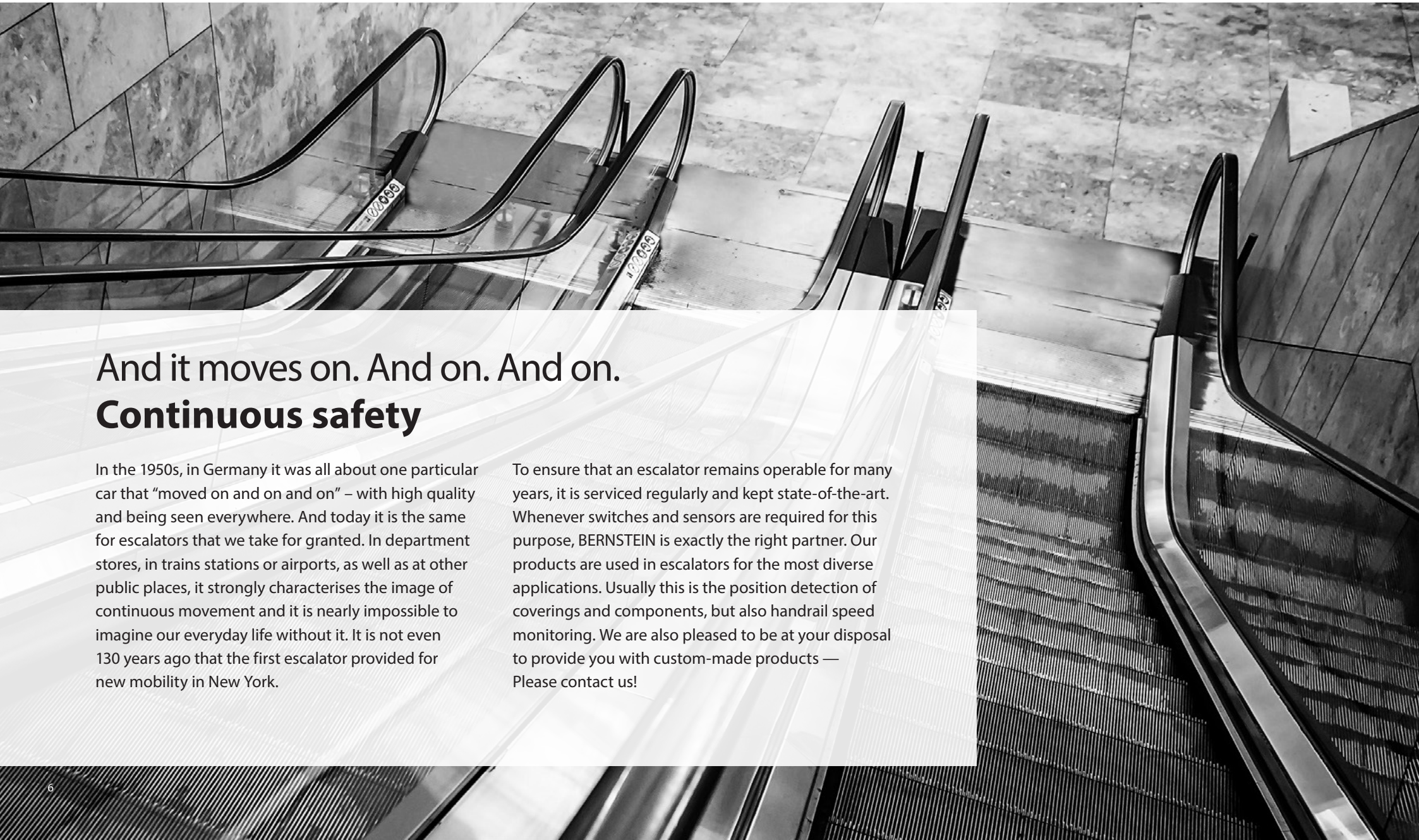
Slack rope monitoring
24 | 40 | 46 | 66

Did you know that …

… lifts were already known in ancient times?

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

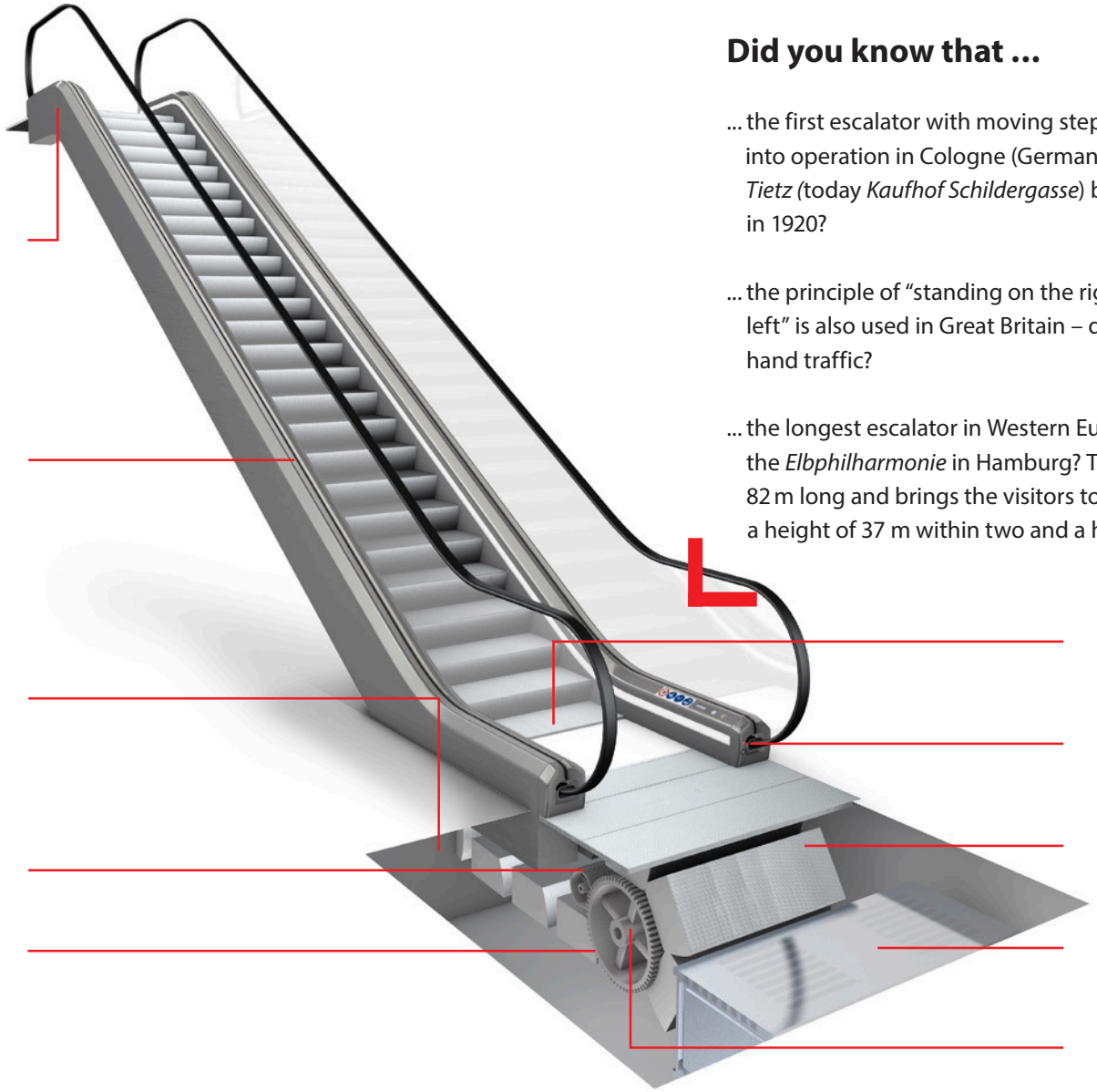
… people are still researching on a space lifts since the 1960s? A counterweight is to be positioned geostationarily at a height of 35,786 m and connected to the earth via a carrying system. The actual lift could be a self-driving cabin.



And it moves on. And on. And on.
Continuous safety

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

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



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

Did you know that ...

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

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

... the longest escalator in Western Europa is the *Tube* in the *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.

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

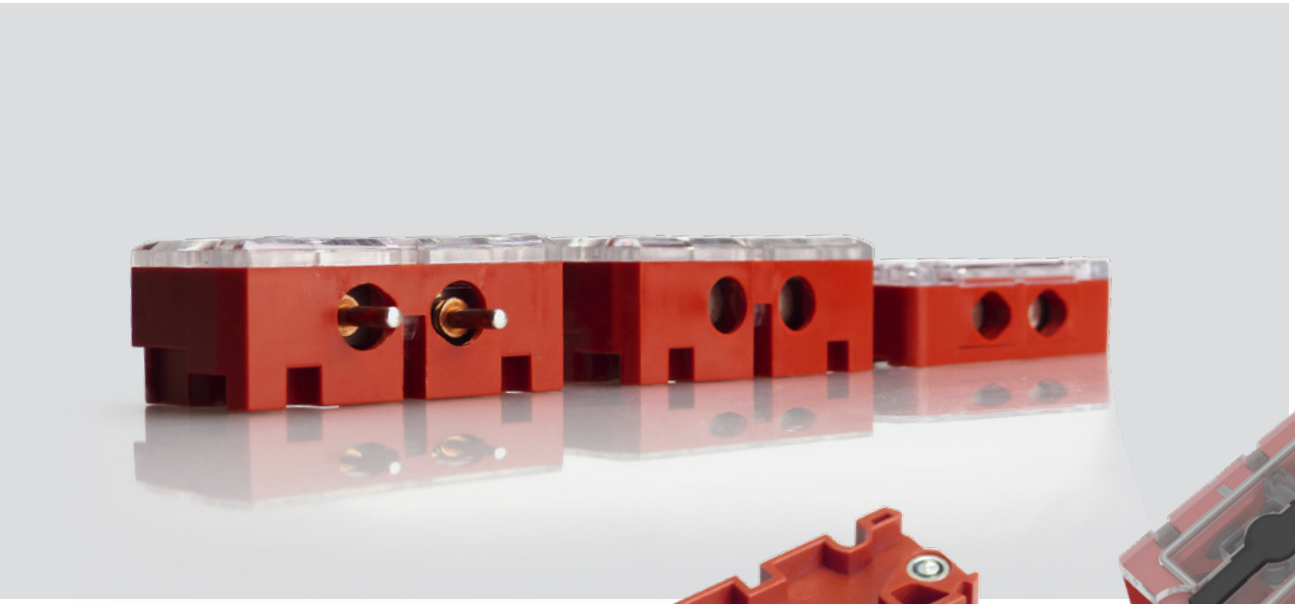
Certainly, we are offering all of our switches, sensors and enclosures in a customer-specific design. Do not hesitate to contact us. We would be happy to provide you with advice.

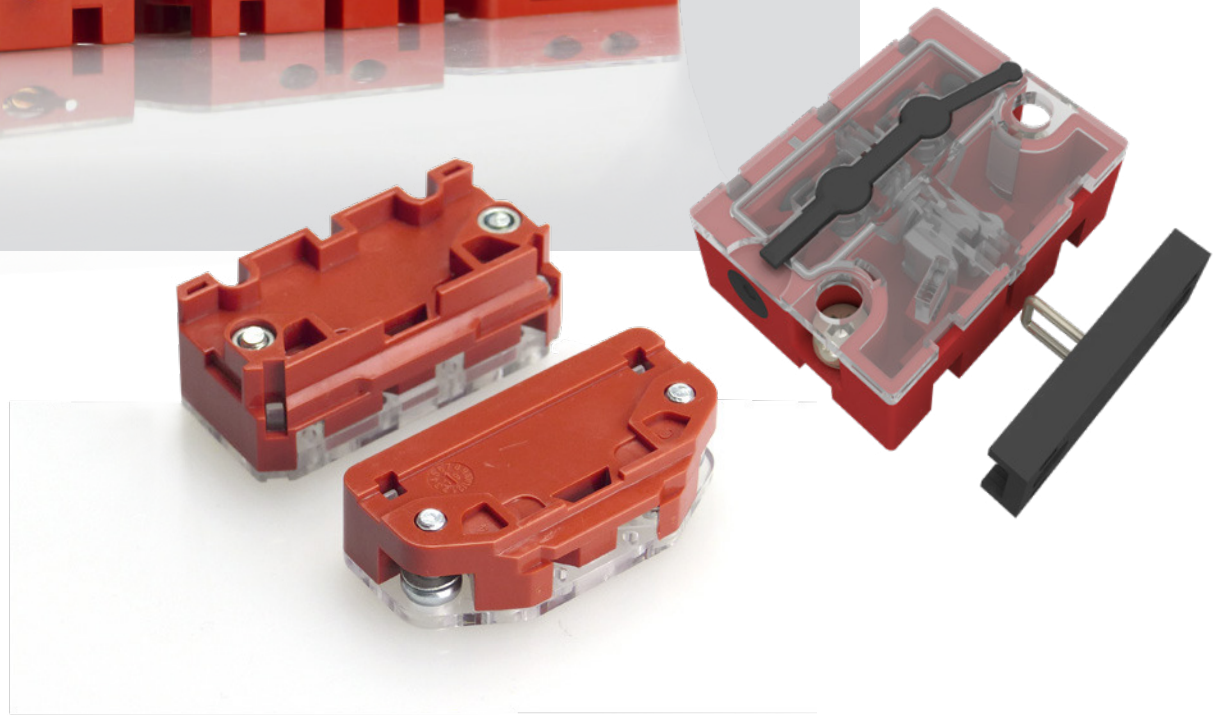
Tel +49 571 793-0 | Fax +49 571 793-555
info@de.bernstein.eu | www.bernstein.eu





A good team
Door contacts of the SEL series





SEL switch family

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

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

Product characteristics

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

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

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

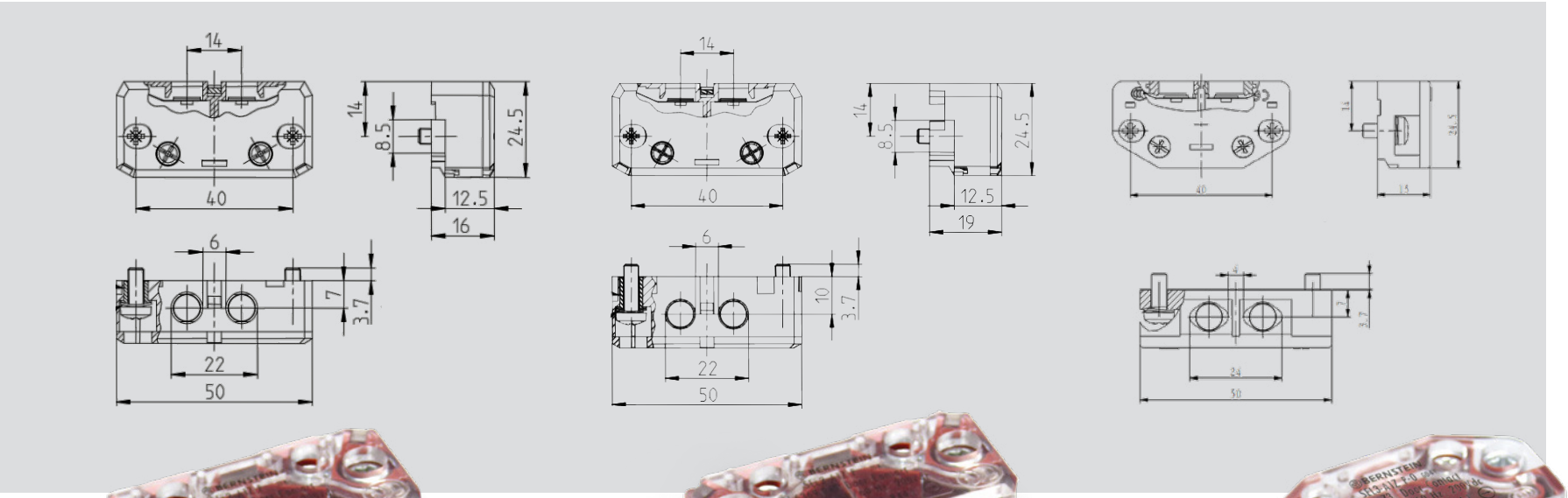
Please find the SEL1 and the SEL2 also as contact pin version PL in the BERNSTEIN product portfolio.

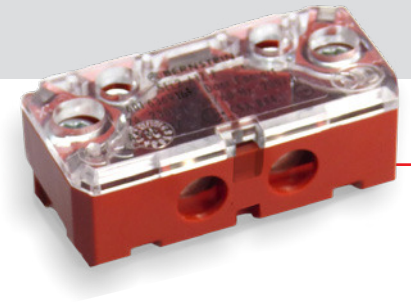




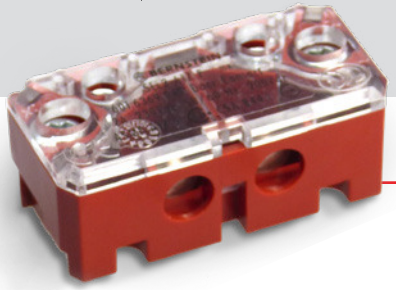
With separated actuator

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

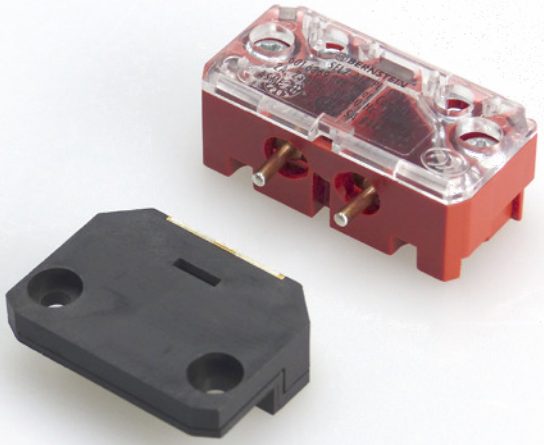
Electrical data		
Rated operating current	I_e	2 A AC / DC
Rated operating voltage	U_e	230 V AC; 200 V DC
Conventional thermoelectric current	I_{the}	4 A
Positive break	p	accor. to IEC/EN 60947-5-1, Annex K
Isolating distance – NC contacts	Ⓣ	DIN EN 81-20
Short-circuit protection device		Safety fuse 6 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	10×10^6 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 mm² Strand with wire-end ferrule 0.5 – 1.5 mm²	
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

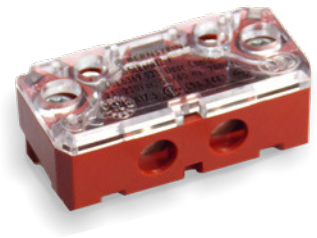
- Classical door contact with contact plates or contact pins, as well as integrated, bottom side cable duct (with SEL2)
- SEL1: 16mm height, 50mm width and 24.5mm depth
- SEL2: 19mm height, 50mm width and 24.5mm depth
- SEL3: 15 mm height, 50mm width and 24.5mm depth
- Distance of fixing screws: 40 mm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

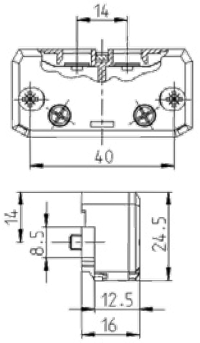
Options

- 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



SEL 1...P

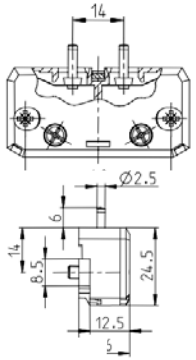




	1 NC contact	
Transparent cover Red enclosure	**6016369045** SEL1-A1Z P	
Transparent enclosure	**6016369038** SEL1-A1Z P	
Special features/ variants		

SEL 1...PL

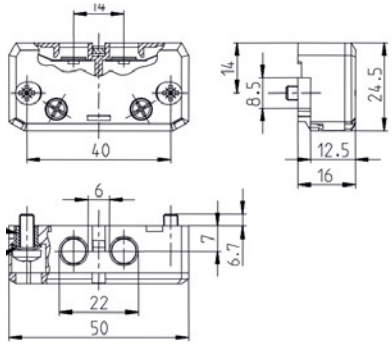


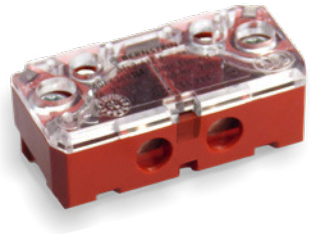


	1 NC contact	
Transparent cover Red enclosure	**6016369125** SEL1-A1Z PL0	
Transparent enclosure	**6016369037** SEL1-A1Z PL	
Special features/ variants	Contact pins	

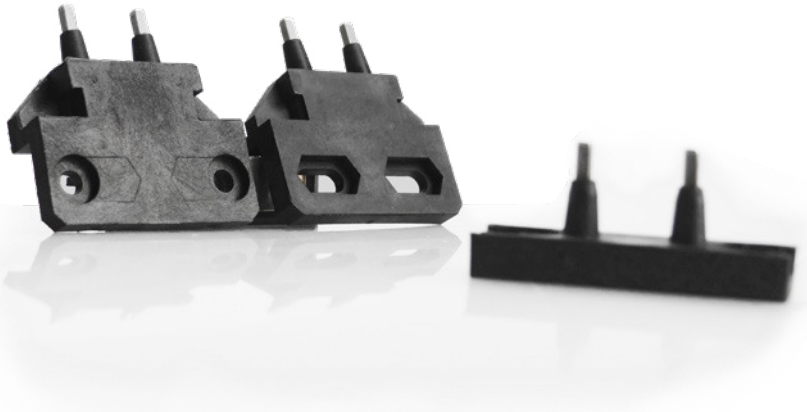
SEL 1...P with extended mounting screws

	1 NC contact
Transparent cover Red enclosure	**6016369164** SEL1-A1Z P
Special features / variants	**Extended mounting screws, excess length 6.7mm**

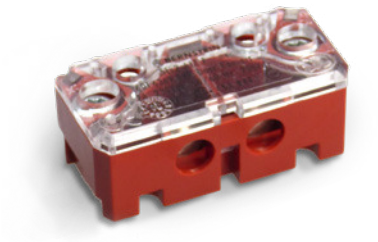


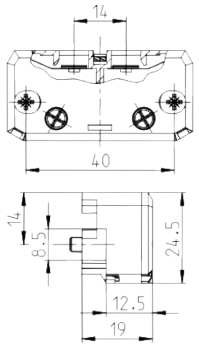






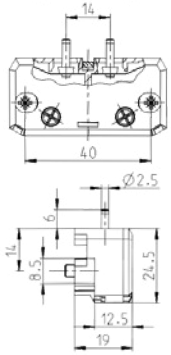
SEL 2 ... P



1 NC contact		
	Transparent cover Red enclosure	**6016369049** SEL2-A1Z P
Special features / variants	Cable duct on the bottom side	

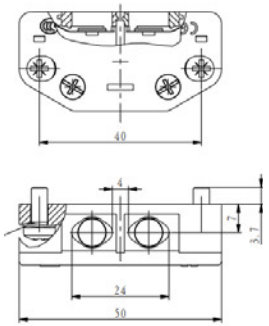
SEL 2...PL



1 NC contact		
	Transparent cover Red enclosure	**6016369031** SEL2-A1Z PL0
Special features / variants	Contact pins, with cable duct on the bottom side	

SEL 3 ... P

	1 NC contact
Transparent cover Red enclosure	**6016369173** SEL3-A1Z P
Particularities/variants	Just 15mm hight, inclined corners.

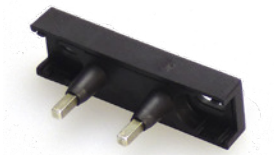




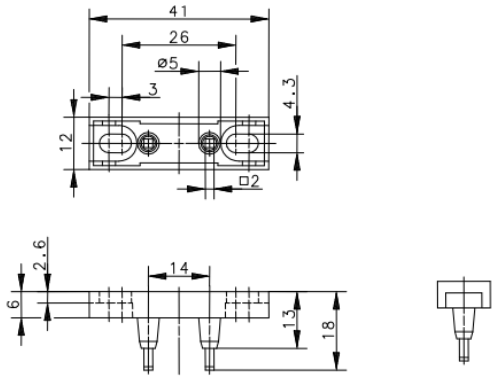


SEL actuators

P0 actuator



Product range	
Article number	**Designation**
3911462082	P0-BET.

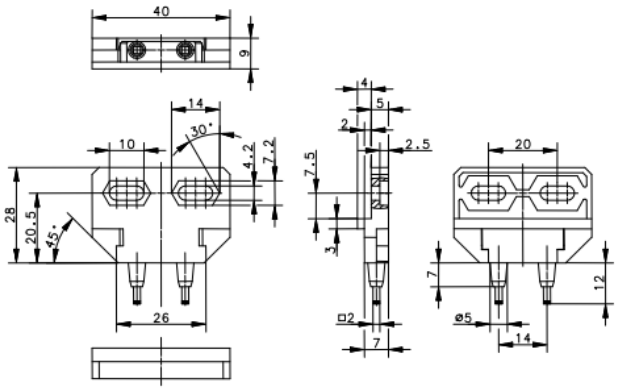


Mechanical data	
Enclosure	PA 6.6 (UL 94-V0) black
Ambient temperature	–30 °C ... +70 °C
Contact material	AgCu3 on CuNi18Zn20
Mounting	2 × M4
Weight	≈ 0.01 kg
Remarks	Actuators may not be used as end stop. Only use the door contacts of the SEL series with BERNSTEIN actuators.

P1 actuator



Product range	
Article number	**Designation**
3911462088	P1-BET.

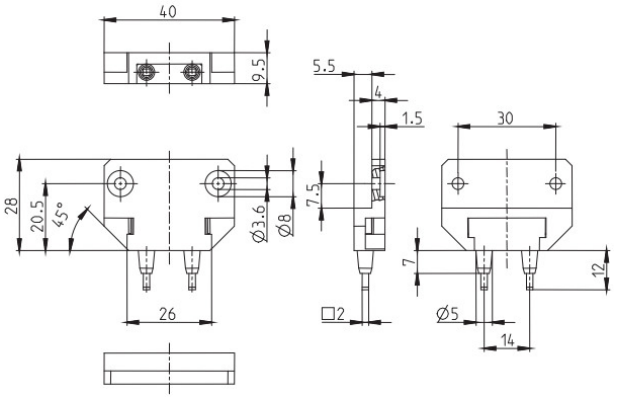


Mechanical data	
Enclosure	PA 6.6 (UL 94-V0) black
Ambient temperature	–30 °C ... +70 °C
Contact material	AgCu3 on CuNi18Zn20
Mounting	2 × M4
Weight	≈ 0.01 kg
Remarks	Actuators may not be used as end stop. Only use the door contacts of the SEL series with BERNSTEIN actuators.

P3 actuator



Product range	
Article number	**Designation**
3911462155	P3-BET.

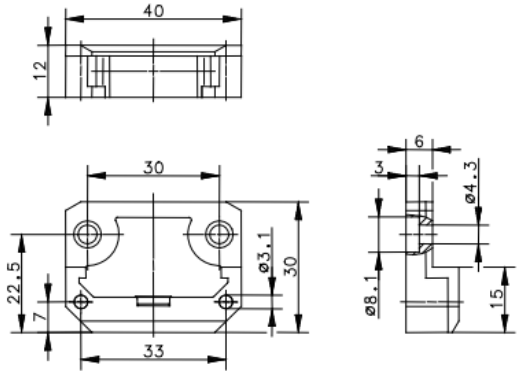


Mechanical data	
Enclosure	PA 6.6 (UL 94-V0) black
Ambient temperature	–30 °C ... +70 °C
Contact material	AgCu3 on CuNi18Zn20
Mounting	2 × M4
Weight	≈ 0.01 kg
Remarks	Actuators may not be used as end stop. Only use the door contacts of the SEL series with BERNSTEIN actuators.

PL actuator



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



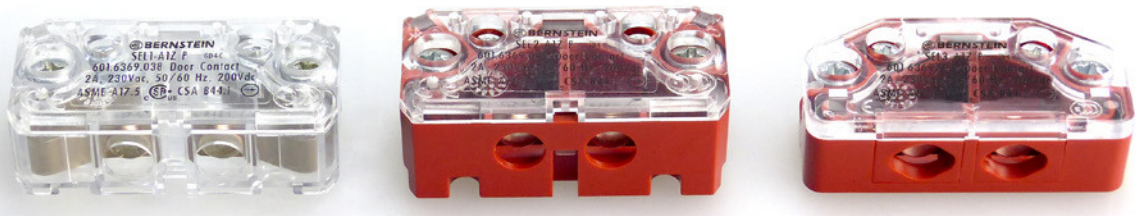
Mechanical data	
Enclosure	PA 6.6 (UL 94-V0) black
Ambient temperature	–30 °C ... +70 °C
Contact material	AgCu3 on CuNi18Zn20
Mounting	2 × M4
Weight	≈ 0.01 kg
Remarks	Actuators may not be used as end stop. Only use the door contacts of the SEL series with BERNSTEIN actuators.

Did you know that …

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

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

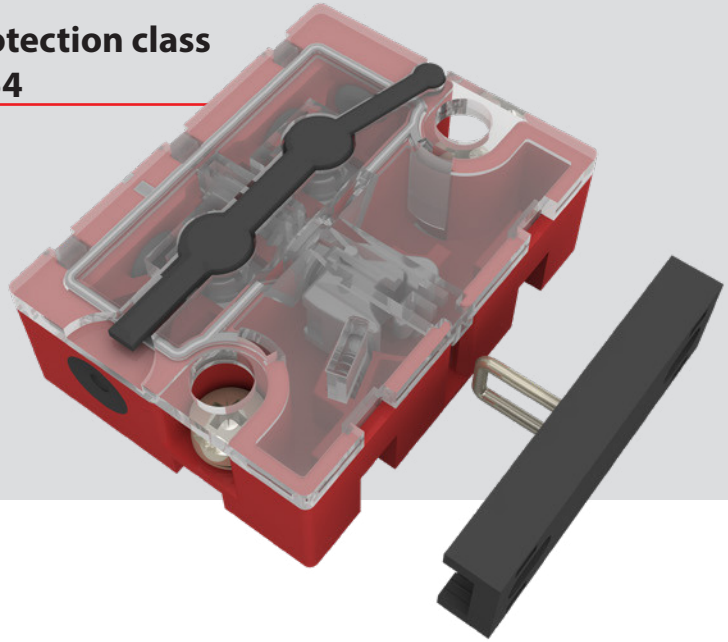
… our door contacts have a mechanical lifetime of >10.000.000 operations? If a lift would make approx. 1.000 travels per day, the door contacts can be used for more than 27 years before they reach their mechanical end of life.

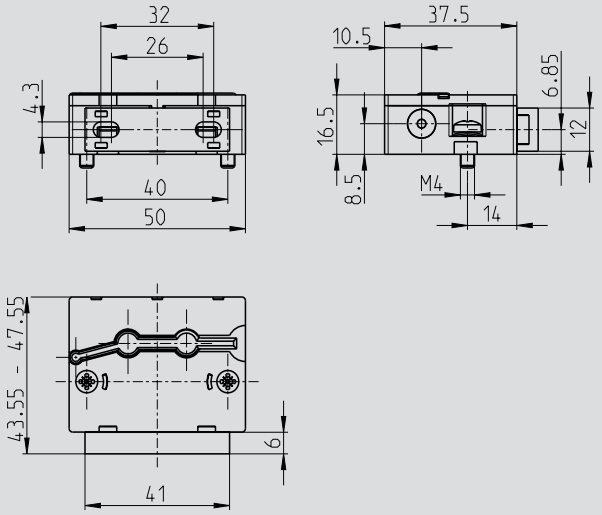


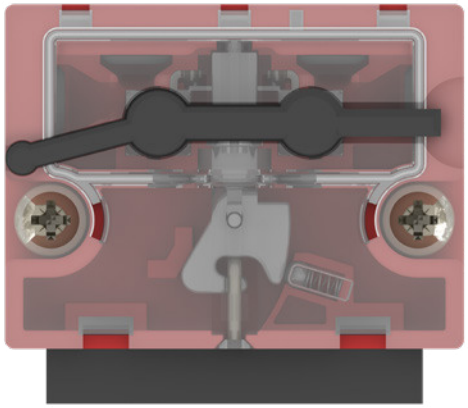
High protection class in all mounting positions
Door contact SEL54

NEW

Protection class IP54





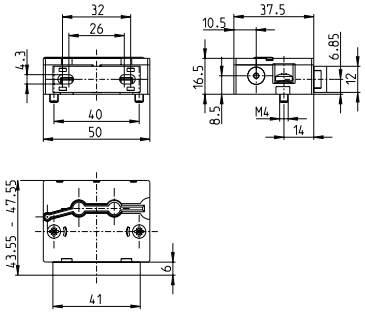


Product characteristics

- 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 Red enclosure	**6016369188** SEL54-A1Z PC0-S
Special features / variants	



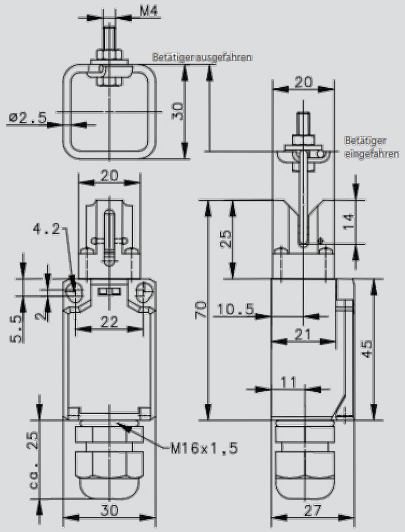
Technical data

Electrical data		
Rated insulation voltage	U_i	400 V
Rated impulse withstand voltage	U_{imp}	4 KV
Conventional thermal current	I_{the}	4 A
Rated operating voltage	U_e	230 V AC
Rated operating current	I_e	1 A
Utilization category		AC 15, U_e/I_e 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 10^6 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^2 or Strand with wire-end ferrule: 0.34 - 1.5 mm^2
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.

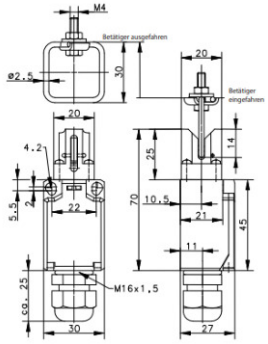
Product characteristics

- 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

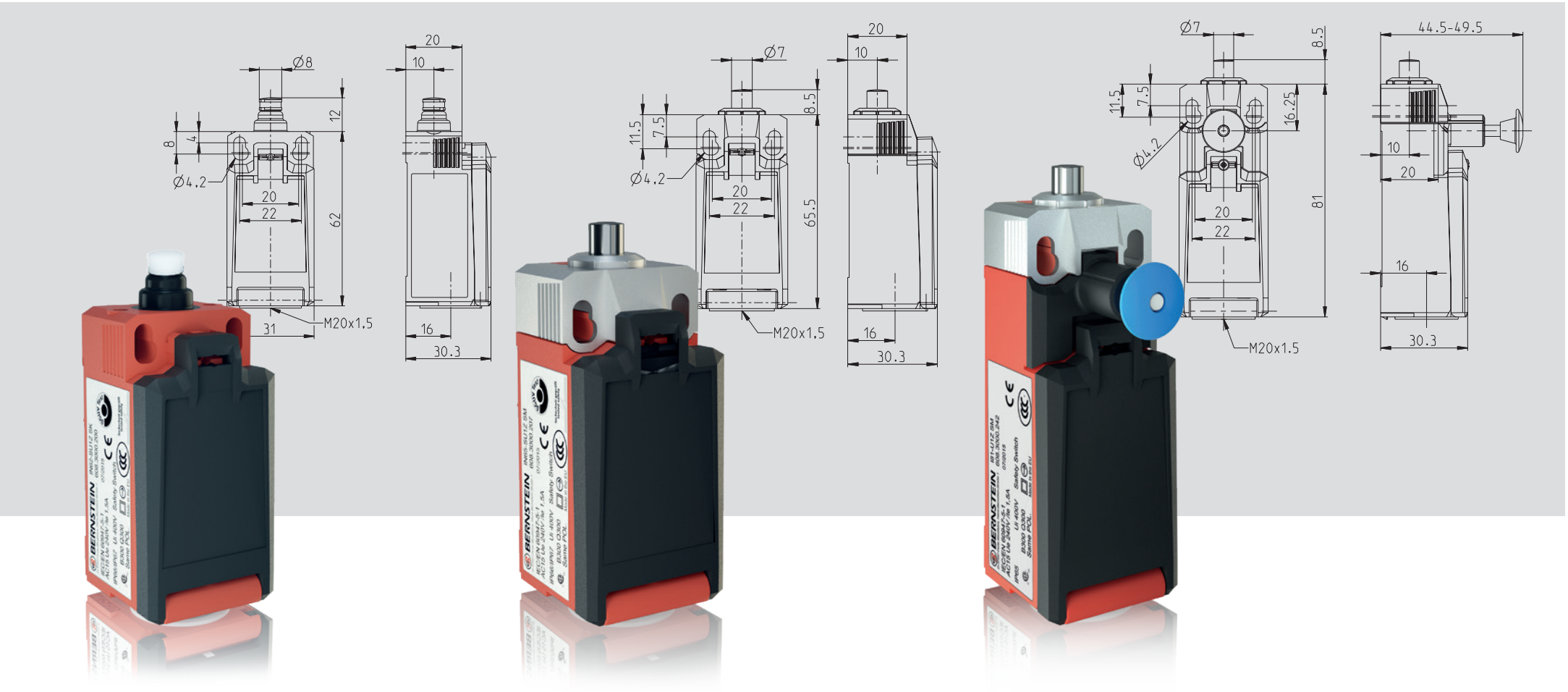
Please find further details in the total overview for the position switches of the Ti2 series on pages 56 to 59.

TI2-KS actuator



Product range	
Article number	**Designation**
3918452237	KS actuator
Mechanical data	
Actuator	St-VA steel

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 × 45°) and changing of the actuators (IN65 and I81) possible without tool
- Standard switch and standard actuator conforming to DIN EN 50047
- Protection classes IP66 and IP67 conforming to VDE 0470 T1



C14 SWITCH INSERT

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.

Technical data

Electrical data		
Rated insulation voltage	U_i max.	400 V AC
Conventional thermoelectric current	(up to) I_{the}	5 A
Rated operating voltage	U_e max.	240 V AC/24 V DC
Utilisation category (up to)		AC-15, U_e/I_e 240 V/1.5 A DC-13 U_e/I_e 24 V/1.5 A (B300 Table A.1)
Short circuit protection (up to)		Safety fuse 4 A gG
Protection class		II, protective insulation
Mechanical data		
Enclosure material	Thermoplastics, glass-fibre reinforced (UL 94-V0)	
Ambient temperature	–30 °C to +75 °C	
Mechanical lifetime (up to)	30×10^6 switching cycles	
B10d NC contact cycles (up to) B10d NO contact cycles (up to)	30 million 1 million	
Switching frequency	≤ 60/min.	
Type of connection	4 screwed connections (M3)	
Conductor cross-sections	Single-wire 0.5 – 1.5 mm² or strand with wire-end ferrule 0.5 – 1.5 mm²	
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)

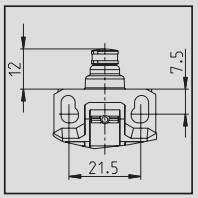
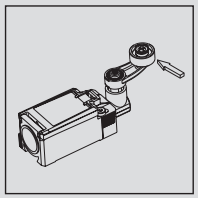
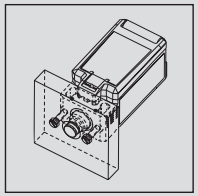
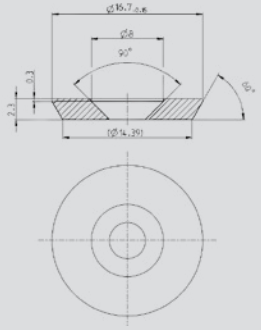


Fig. 1

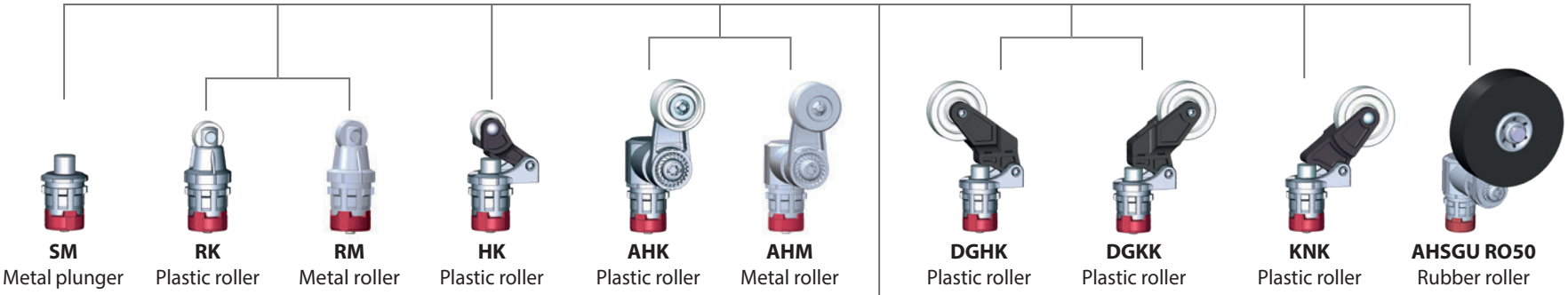

Fig. 2


Fig. 3


Guide disc for additional fixation

IN65 and I81 actuators

Further actuators are available on request.



SM
Metal plunger

RK
Plastic roller

RM
Metal roller

HK
Plastic roller

AHK
Plastic roller

AHM
Metal roller

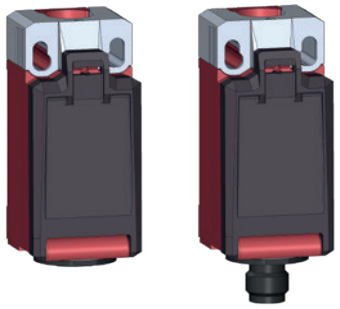
DGHK
Plastic roller

DGKK
Plastic roller

KNK
Plastic roller

AHSGU RO50
Rubber roller

IN65

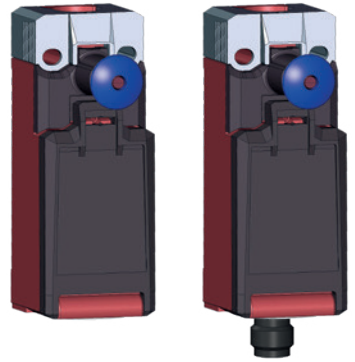


Modular concept

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.

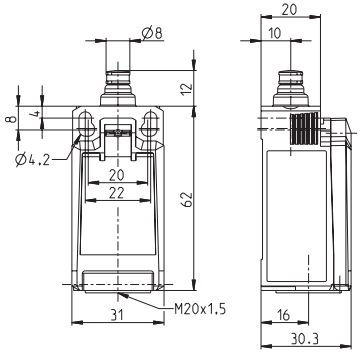
Optional
Usually our position switches are equipped with an M20 thread for cable glands. All switches are further available with M12-connectors.

I81 with latching



IN62 ... SK

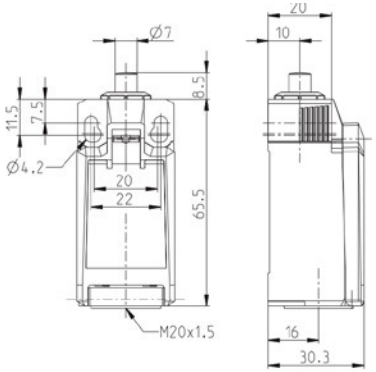




	1 NC / 1 NO	2 NC contact	2 NO contact	1 NC contact / 1 NO contact overlapping
Slow-action system	**6083000201** IN62-U1Z SK	**6083000203** IN62-A2Z SK	**6083000205** IN62-E2 SK	**6083000206** IN62-UV1Z SK
Snap-action system	**6083000200** IN62-SU1Z SK	**6083000202** IN62-SA2Z SK	**6083000204** IN62-SE2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

IN65-... SM

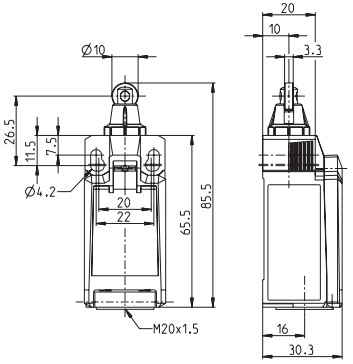




	1 NC / 1 NO	2 NC contact	2 NO contact	1 NC contact / 1 NO contact overlapping
Slow-action system	**6083000208** IN65-U1Z SM	**6083000210** IN65-A2Z SM	**6083000212** IN65-E2 SM	**6083000213** IN65-UV1Z SM
Snap-action system	**6083000207** IN65-SU1Z SM	**6083000209** IN65-SA2Z SM	**6083000211** IN65-SE2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

IN65-... RK

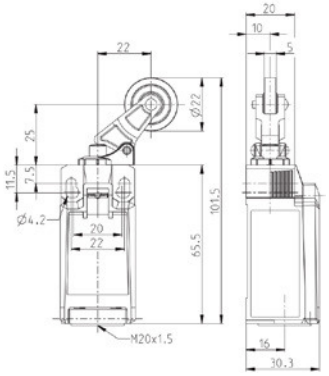
	1 NC / 1 NO
Slow-action system	**6083000215** IN65-U1Z RK
Snap-action system	**6083000214** IN65-SU1Z RK
Special features / variants	Actuator exchangable, suitable for low current (1mA/24CVD)





IN65-... KNK

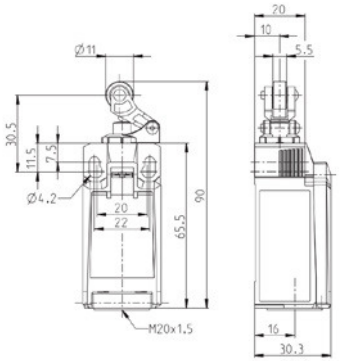
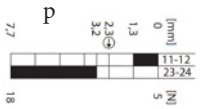
	1 NC / 1 NO
Slow-action system	**6083000262** IN65-U1Z KNK
Snap-action system	**6083000261** IN65-SU1Z KNK
Special features / variants	Actuator exchangable, suitable for low current (1mA/24CVD)





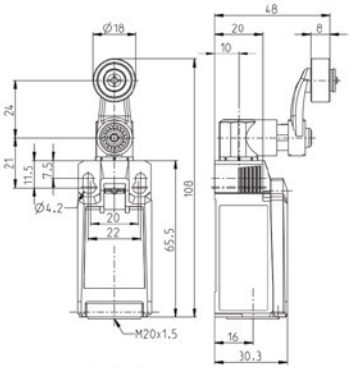
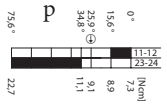
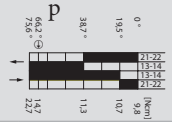
IN65 ... HK



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

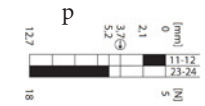
IN65 ... AHK

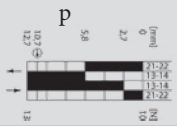


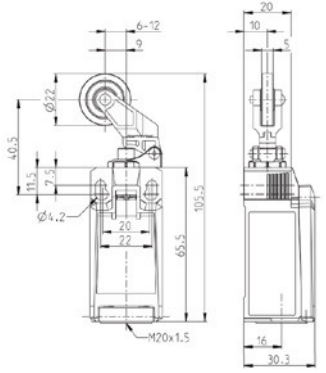
1 NC / 1 NO		
	Slow-action system	**6083000236** IN65-U1Z AHK 
	Snap-action system	**6083000235** IN65-SU1Z AHK 
Special features / variants	Actuator exchangable, suitable for low current (1mA/24CVD)	

IN65-... DGHK

	1 NC / 1 NO
Slow-action system	**6083000229** IN65-U1Z DGHK
Snap-action system	**6083000228** IN65-SU1Z DGHK
Special features / variants	Actuator exchangable, suitable for low current (1mA/24CVD)



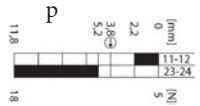


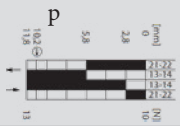


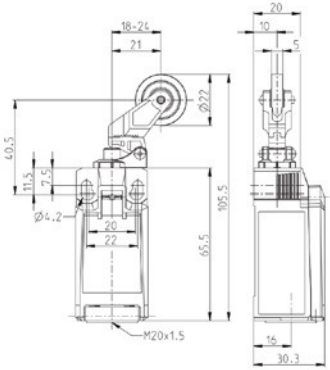


IN65-... DGKK

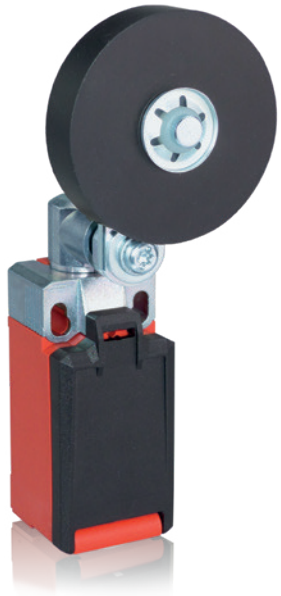
	1 NC / 1 NO
Slow-action system	**6083000255** IN65-U1Z DGKK
Snap-action system	**6083000254** IN65-SU1Z DGKK
Special features / variants	Actuator exchangable, suitable for low current (1mA/24CVD)



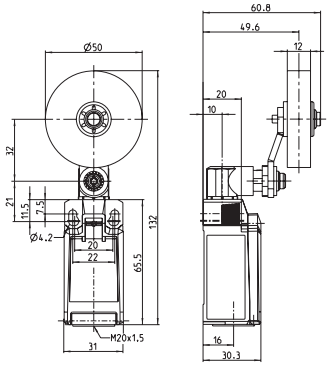






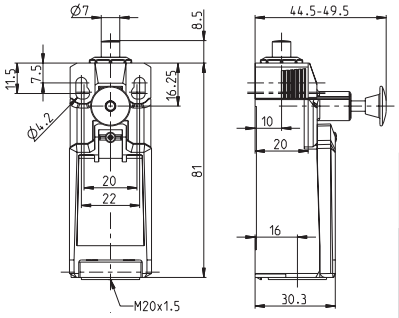


IN65 ... AHSGU RO50

1 NC / 1 NO		
	Slow-action system	**6083000296** IN65-U1Z AHSGU RO50
	Snap-action system	**6083000300** IN65-SU1Z AHSGU RO50
Special features / variants		Actuator exchangable, suitable for low current (1mA/24CVD)

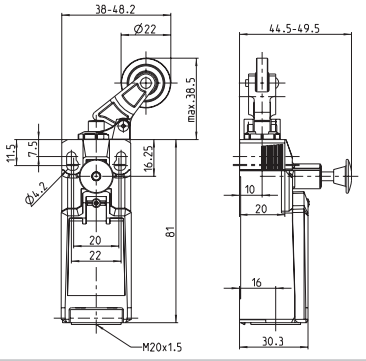
I81 ... SM

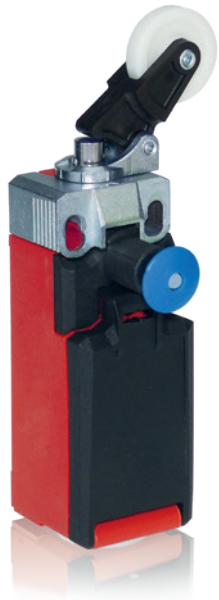


1 NC / 1 NO		
	Slow-action system	**6083000242** I81-U1Z SM
Special features / variants		Bistable, resetting by pulling out of the blue knob. Actuator exchangable, suitable for low current (1mA/24CVD)

I81 ... KNK

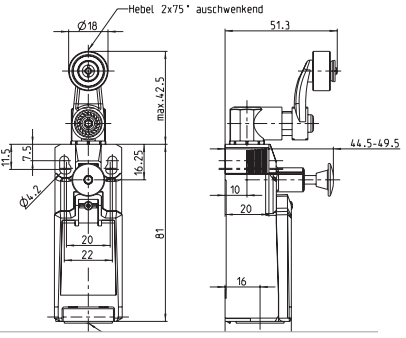
	1 NC / 1 NO
Slow-action system	**6083000269** I81-U1Z KNK
Special features / variants	Bistable, resetting by pulling out of the blue knob. Actuator exchangable, suitable for low current (1mA/24CVD)

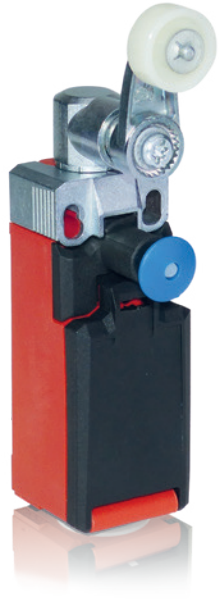




I81 ... AHK

	1 NC / 1 NO
Slow-action system	**6083000246** I81-U1Z AHK
Special features / variants	Bistable, resetting by pulling out of the blue knob. Actuator exchangable, suitable for low current (1mA/24CVD)

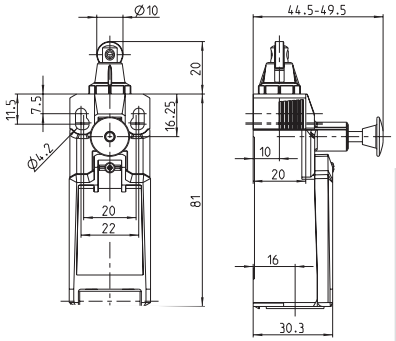




I81 ... RK

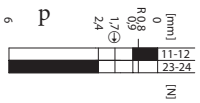


1 NC / 1 NO



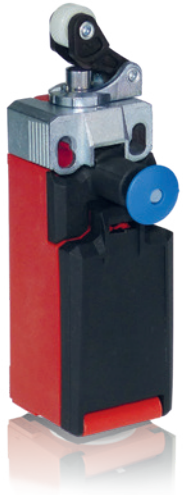
Slow-action system

6083000243
I81-U1Z RK

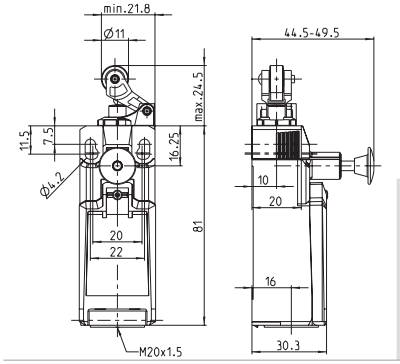


Special features / variants	Bistable, resetting by pulling out of the blue knob. Actuator exchangable, suitable for low current (1mA/24CVD)

I81 ... HK

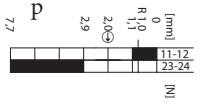


1 NC / 1 NO



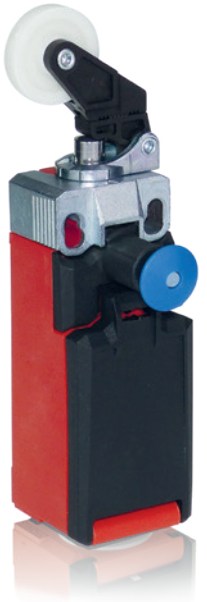
Slow-action system

6083000244
I81-U1Z HK

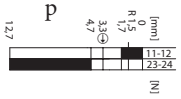


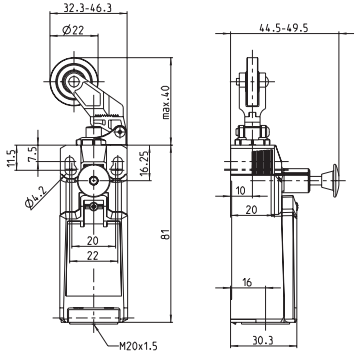
Special features / variants	Bistable, resetting by pulling out of the blue knob. Actuator exchangable, suitable for low current (1mA/24CVD)

I81 ... DGHK

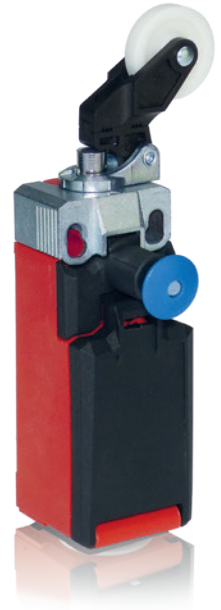


	1 NC / 1 NO
Slow-action system	**6083000245** I81-U1Z DGHK
Special features / variants	Bistable, resetting by pulling out of the blue knob. Actuator exchangable, suitable for low current (1mA/24CVD)

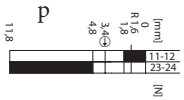


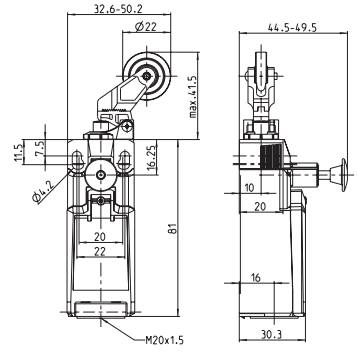


I81 ... DGKK

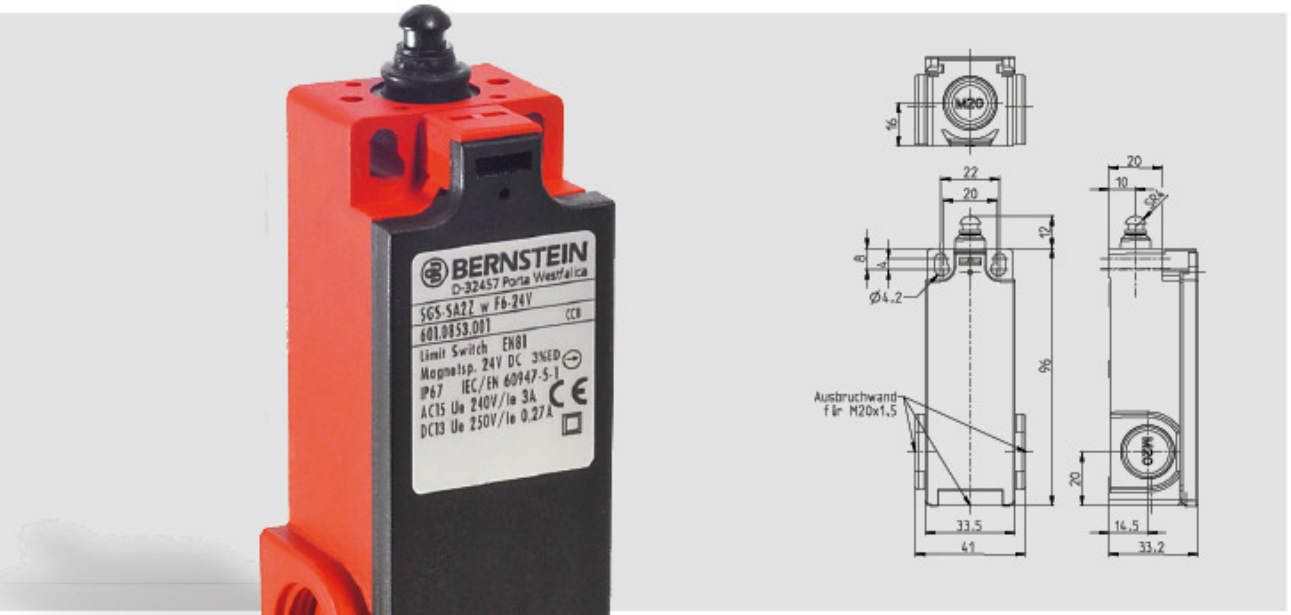


	1 NC / 1 NO
Slow-action system	**6083000268** I81-U1Z DGKK
Special features / variants	Bistable, resetting by pulling out of the blue knob. Actuator exchangable, suitable for low current (1mA/24CVD)





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_{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
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
Solenoid		Without free-wheeling diode
Heat class		B (130 °C)
Rated operating voltage	U_e	24 V DC / 230 V AC (type-related)
Rated operating current	I_e	2.3 A / 0.23 A AC
Switch-on duration	ED	3 %
Minimum make time	T_i	0.2 s
Maximum make-time	T_e	0.5 s
Minimum break-time	T_p	17 s

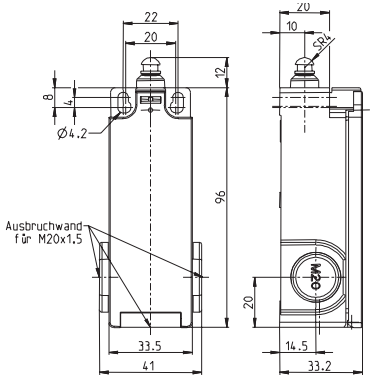
Mechanical data	
Enclosure material	Thermoplastics GV self-extinguishing
Cover	Thermoplastics GV self-extinguishing
Operation	Plunger (thermoplastics)
Approach speed V_{max}	0.5 m/s
Ambient temperature	–25 °C to +50 °C
Type of contact	2 NC (Zb) / 1NC, 1NO (Zb)
Switching principle	Snap-action system, bistable
Mechanical lifetime (up to)[1]	5×10^4 switching cycles
B10d	1×10^5 cycles
Mounting	2 × M4 / 2 × M5 for safety applications
Type of connection Switching elements	Screwed terminals
Conductor cross-sections	Single-wire 0.5 .. 1.5 mm²
Type of connection - solenoid	2 × butt connector similar to DIN 46341 (crushing area 0.5 – 1.5 mm²)
Cable entry	3 × M20× 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

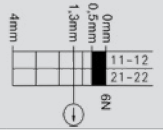
Standards
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1 DIN EN 81-1

SGS solenoid voltage — 24 Volt



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

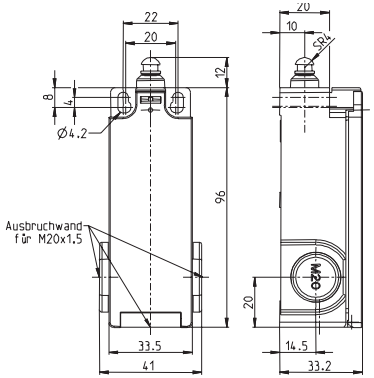


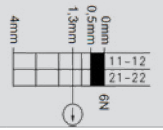


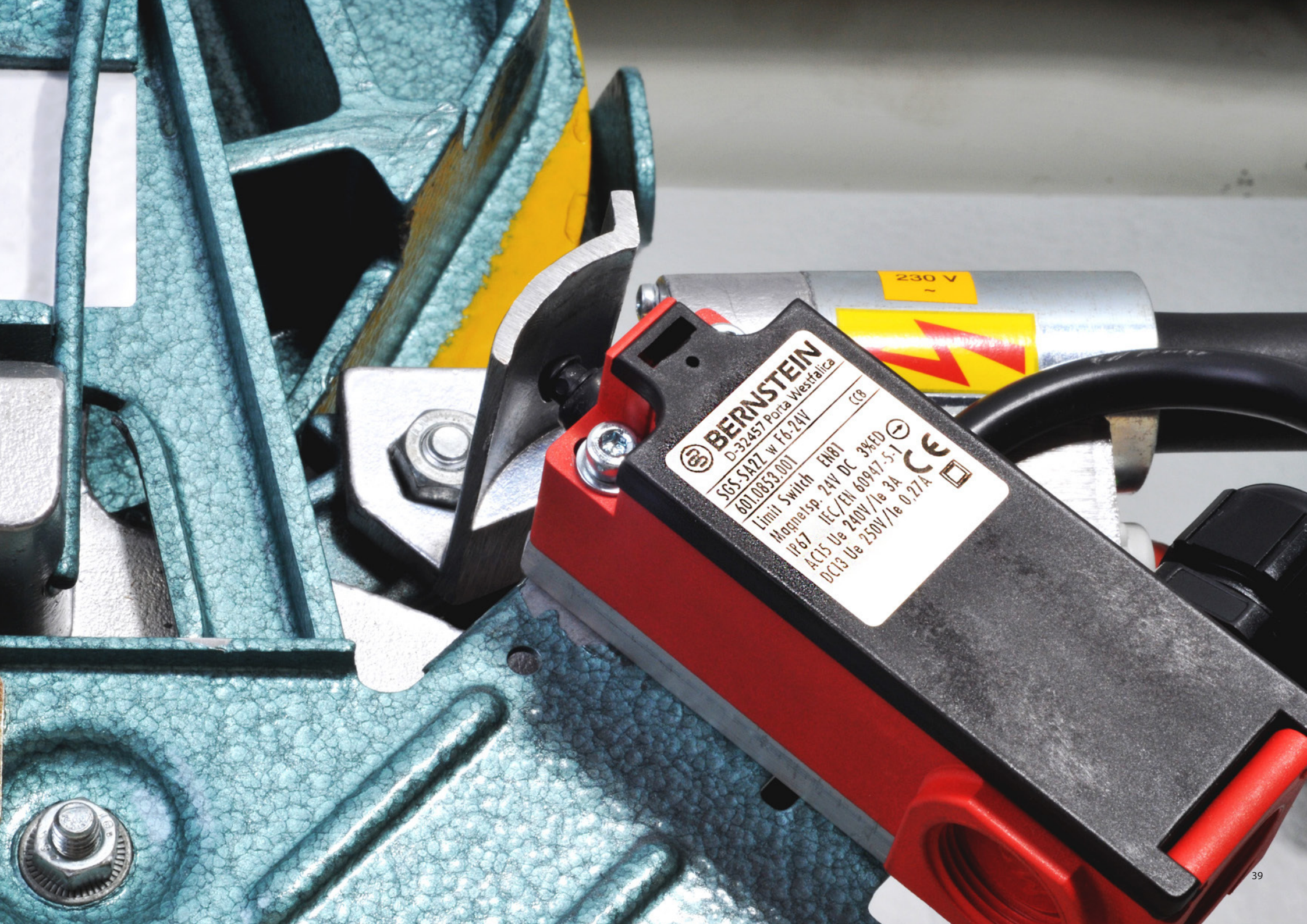
SGS solenoid voltage — 230 Volt



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

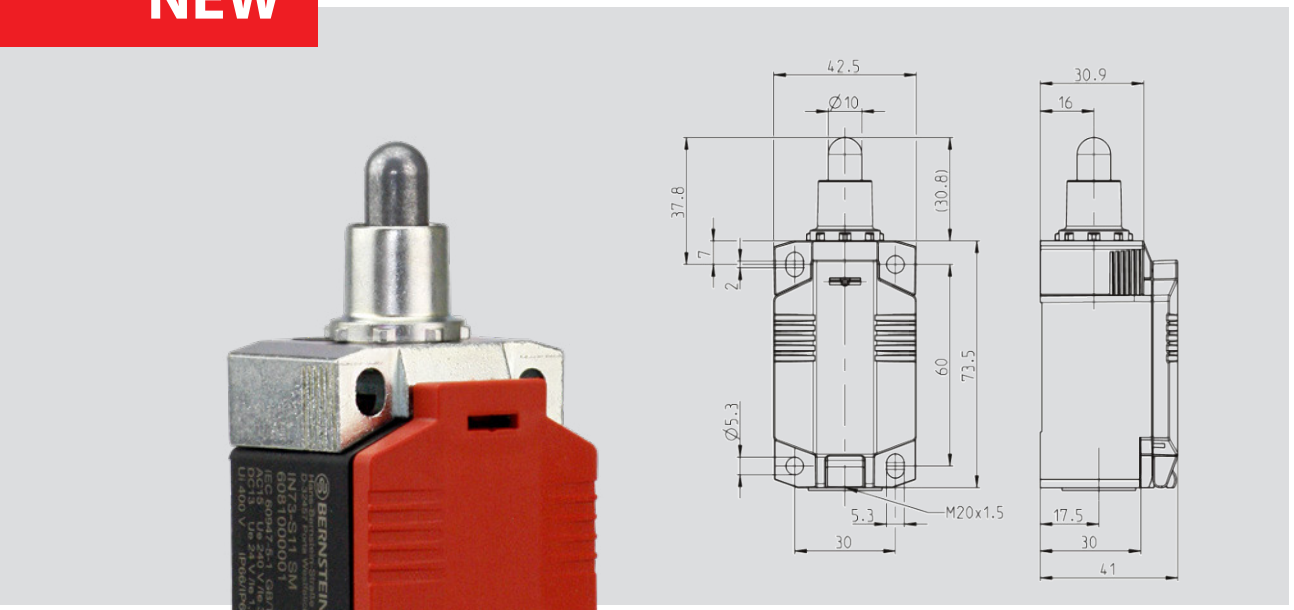





230 V
~
BERNSTEIN
D-32457 Porta Westfalica
SGS-SA2Z w F6-24V
601.0853.001
Limit Switch EN81
Magnetsp. 24V DC 3%ED
IP67 IEC/EN 60947-5-1
AC15 Ue 240V/Ie 3A
DC13 Ue 250V/Ie 0,27A

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 equiped with the C17 switch insert with 4 contacts.

The modulare design and the easy way to change the actuator allowes 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

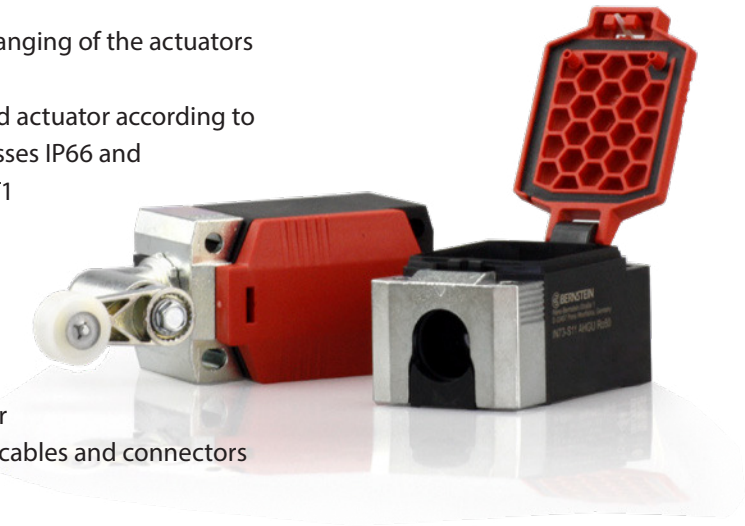
- Slow- and snap-action
- **Versions**:
  With C14 switch insert: 2 NCs, 2 NOs, 1 NC/1 NO
  With C17 switch insert: 4 NOs, 4 NCs, 2 NOs/2 NCs
  1 NC/ 3 NOs and 3 NCs/ 1 NO

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)	10×10^6 switching cycles	
B10d NC contact Cycles (up to) B10d NO contact Cycles (up to)	20×10^6 1×10^6	
Switching frequency	≤ 60/min.	
Type of connection	4 screwed connections (M3)	
Conductor cross-sections	Solid or Litz wire with ferrules 0,34 mm² –1,5 mm²; 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 × 45°) and changing of the actuators without tool
- Standard switch and standard actuator according to DIN EN 50041, protection classes IP66 and IP67 according to VDE 0470 T1



Options

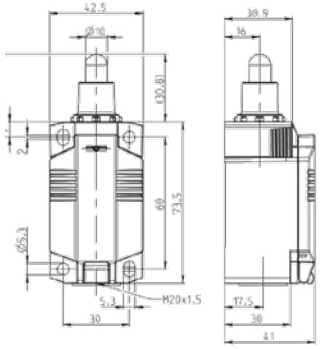
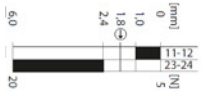
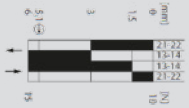
- Available with M12 connector
- On request with customised cables and connectors

Mounting

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

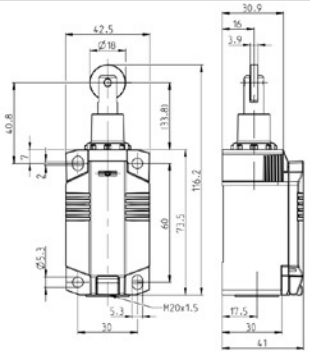
IN73 ... SM



1 NC / 1 NO		
	Slow-action system	**6081000002** IN73-11 SM 
	Snap-action system	**6081000001** IN73-S11 SM 
Special features / variants		

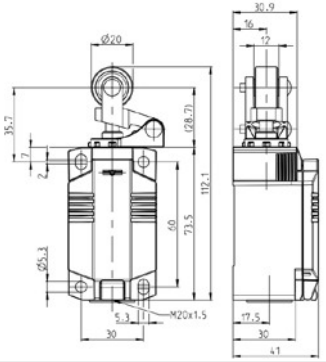
IN73 ... RM



1 NC / 1 NO		
	Slow-action system	**6081000014** IN73-11 RM 
	Snap-action system	**6081000013** IN73-S11 RM 
Special features / variants		

IN73 ... HK

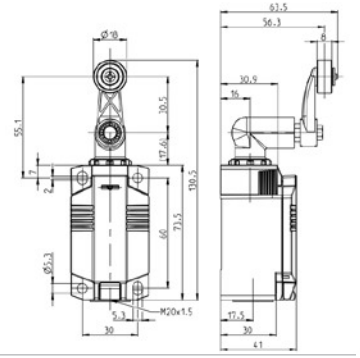
	1 NC / 1 NO
Slow-action system	**6081000026** IN73-11 HK
Snap-action system	**6081000025** IN73-S11 HK
Special features / variants	





IN73 ... AHK

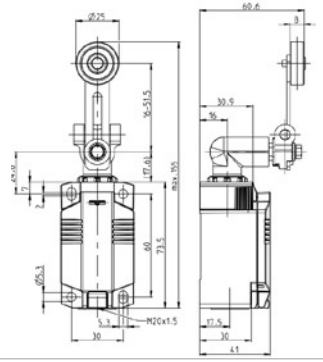
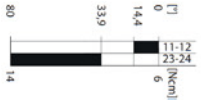
	1 NC / 1 NO
Slow-action system	**6081000062** IN73-11 AHK
Snap-action system	**6081000061** IN73-S11 AHK
Special features / variants	







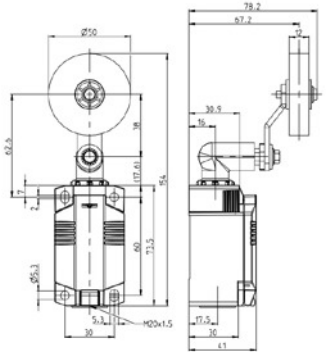
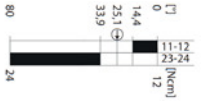
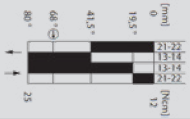
IN73 ... AVK

1 NC / 1 NO	
	Slow-action system **6081000074** IN73-11 AVK 
	Snap-action system **6081000073** IN73-S11 AVK 

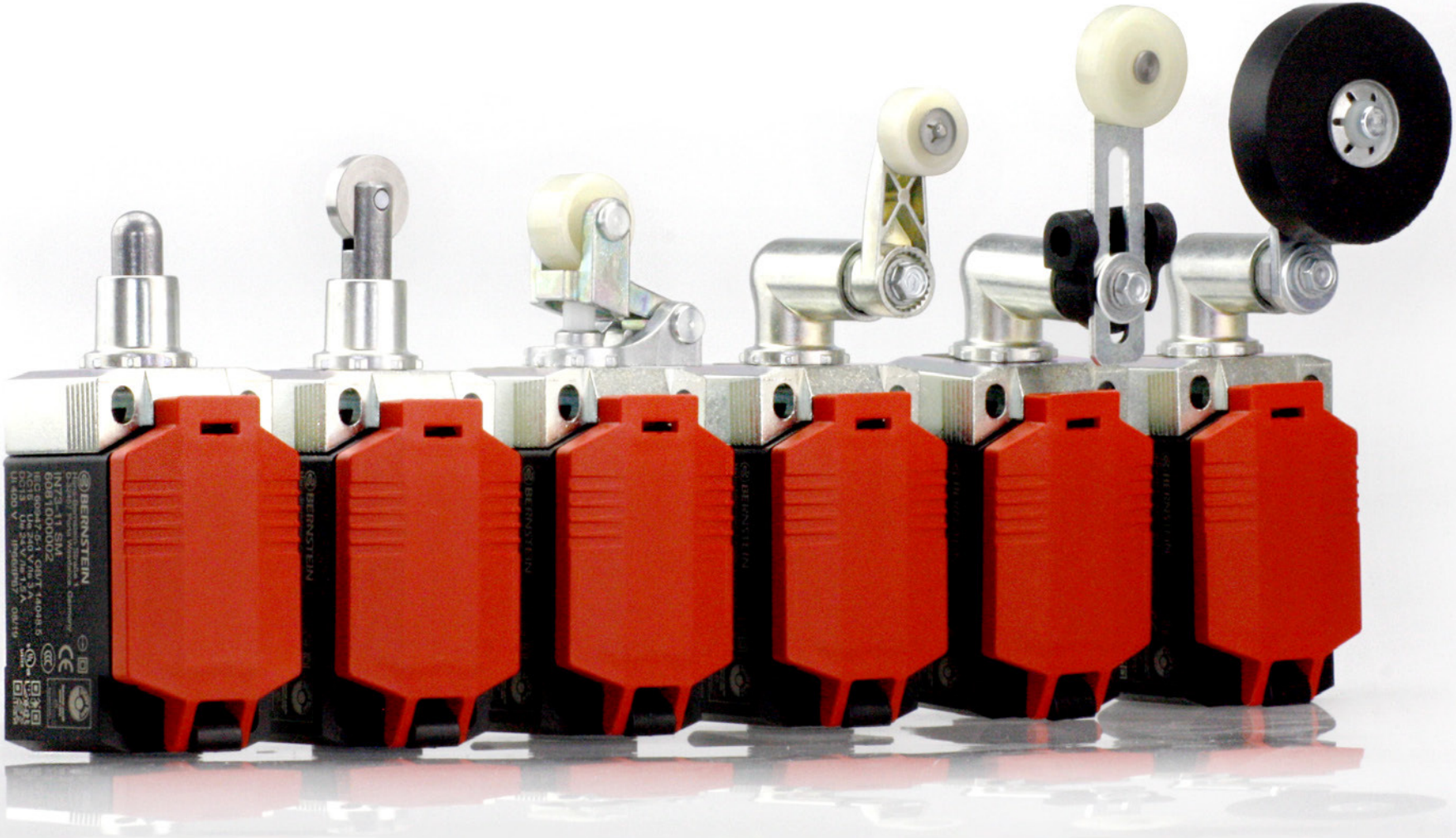
Special features / variants



IN73 ... AHSGU RO50

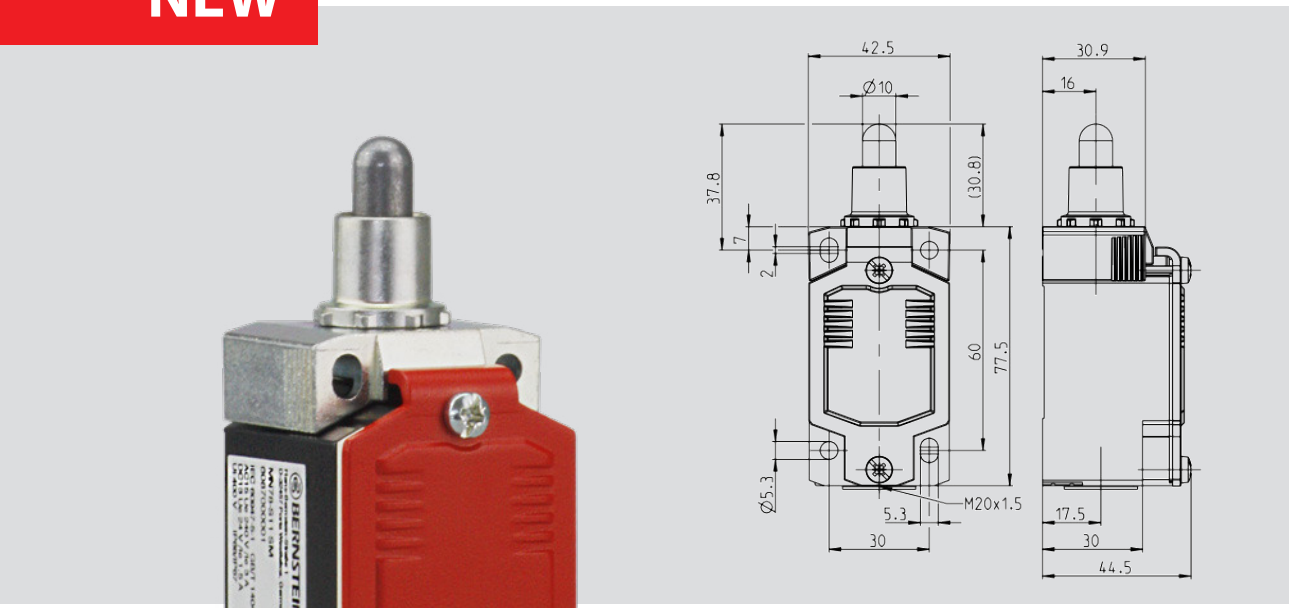
1 NC / 1 NO	
	Slow-action system **6081000109** IN73-11 AHSGU RO50 
	Snap-action system **6081000108** IN73-S11 AHSGU RO50 

Special features / variants


BERNSTEIN
IN73-11 SM
6081000002

Metal enclosed
Position switch MN78

NEW





2 OR 4 CONTACTS

Good to know …

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

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

Technical design

- Slow- and snap action
- **Versions**:
  With C14 switch insert: 2 NCs, 2 NOs, 1 NC/1 NO
  With C17 switch insert: 4 NOs, 4 NCs, 2 NOs/2 NCs
  1NC/ 3 NOs and 3 NCs/ 1 NO

Technical data

Electrical data		
Design insulation voltage	U_i max.	400 V AC
Conventional thermoelectric current	(up to) I_{the}	5 A
Rated operating voltage	U_e max.	240 V AC/24 V DC
Utilisation category (up to)		AC-15, U_e/I_e 240 V/1.5 A DC-13 U_e/I_e 24 V/1.5 A
Short circuit protection (up to)		Safety fuse 4 A gG
Protection class		I
Mechanical data		
Enclosure-/ Cover material	Die-cast aluminium/ sheet aluminium	
Ambient temperature	–30 °C to +75 °C	
Mechanical lifetime	10×10^6 switching cycles	
B10d NC contact Cycles (up to) B10d NO contact Cycles (up to)	20×10^6 1×10^6	
Switching frequency	≤ 60/min.	
Type of connection	4 screwed connections (M3)	
Conductor cross-sections	Solid or Litz wire with ferrules 0,34 mm² –1,5 mm²; AWG 22–16	
Cable entry	1 × M20 × 1.5	
Standards		
VDE 0660 T211, DIN EN 60947-5-4, IEC 60947-5-4 DIN EN ISO 13849-1, DIN EN ISO 13849-2		

Product characteristics

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

Options

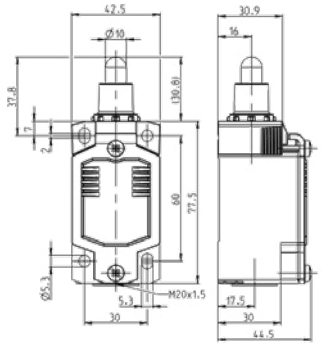
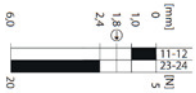
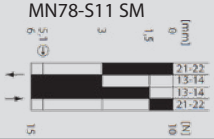
- Available with M12 connector
- On request with customised cables and connectors

Mounting

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

MN78 ... SM

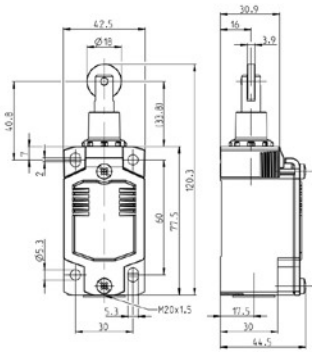
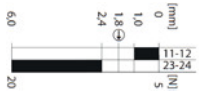
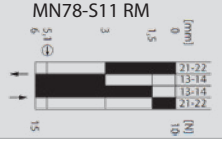


1 NC / 1 NO		
	Slow-action system	**6087000002** MN78-11 SM 
	Snap-action system	**6087000001** MN78-S11 SM 

Special features / variants

MN78 ... RM

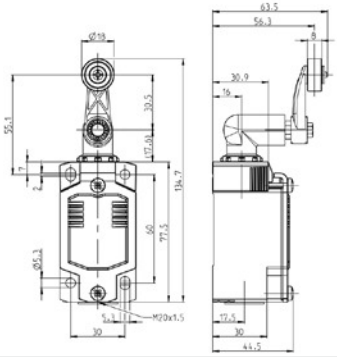


1 NC / 1 NO		
	Slow-action system	**6087000014** MN78-11 RM 
	Snap-action system	**6087000013** MN78-S11 RM 

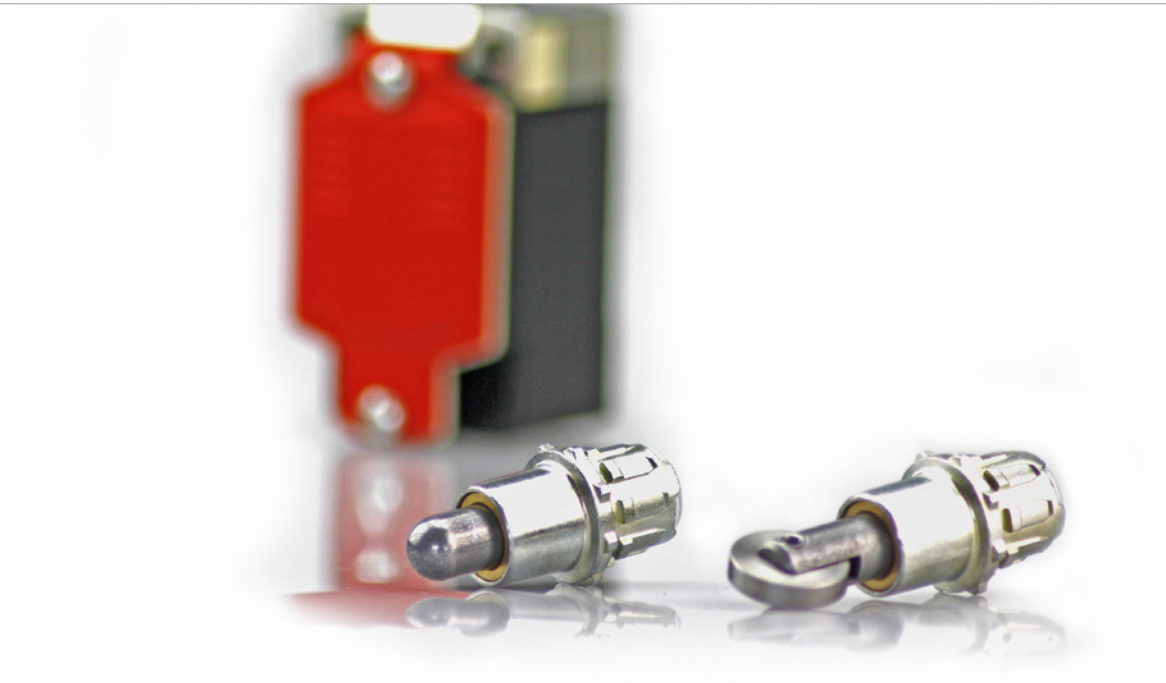
Special features / variants

MN78 ... AHK

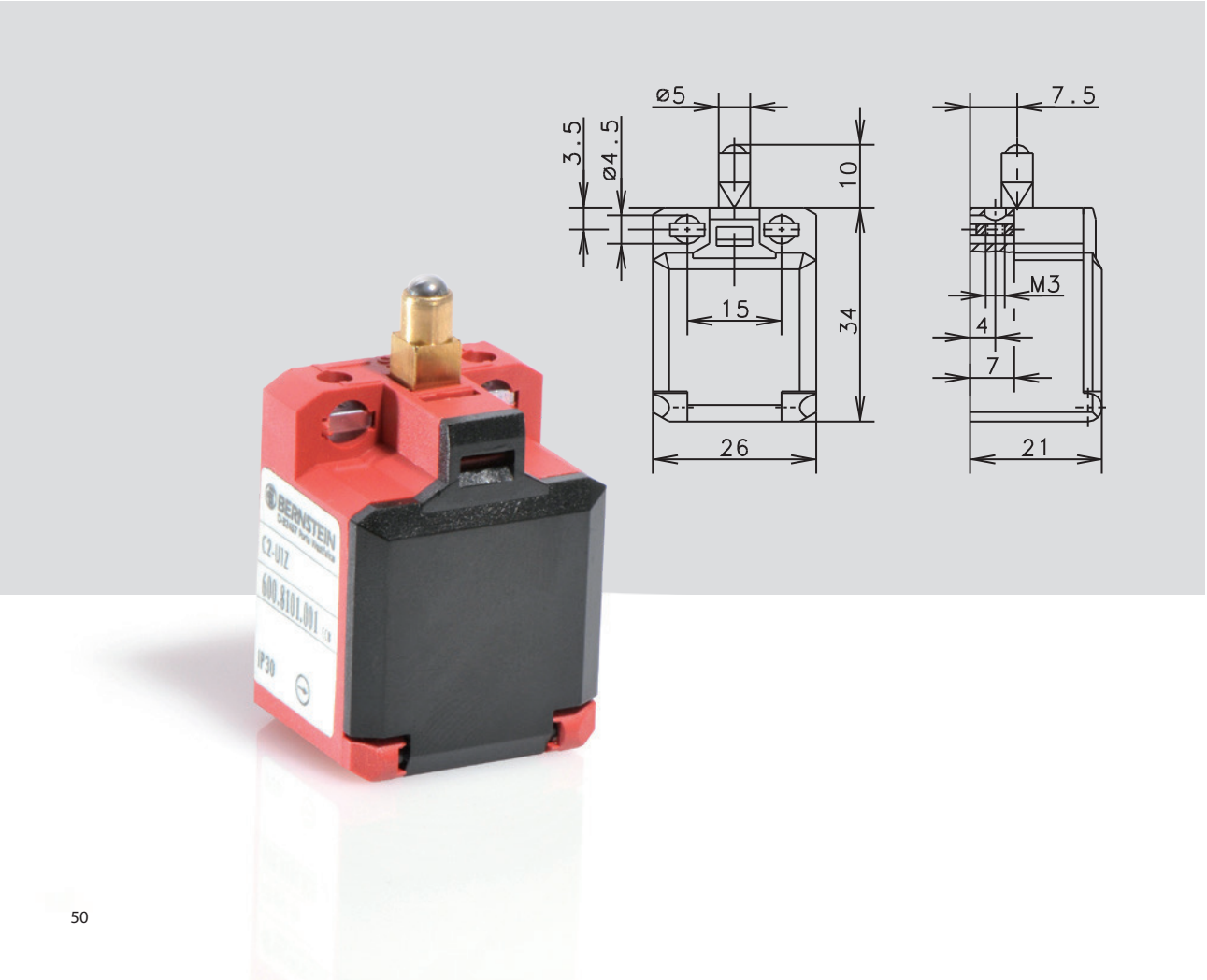
	1 NC / 1 NO
Slow-action system	**6087000062** MN78-11 AHK
Snap-action system	**6087000061** MN78-S11 AHK
Particularities/variants	







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

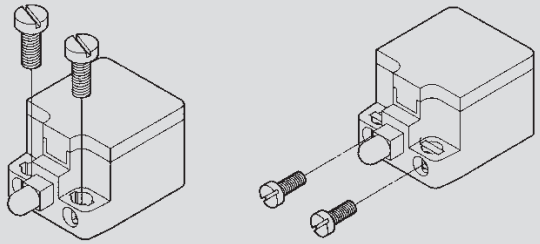
- Slow- and snap action
- Versions: 1 NC / 1 NO, 2 NC, 2 NO

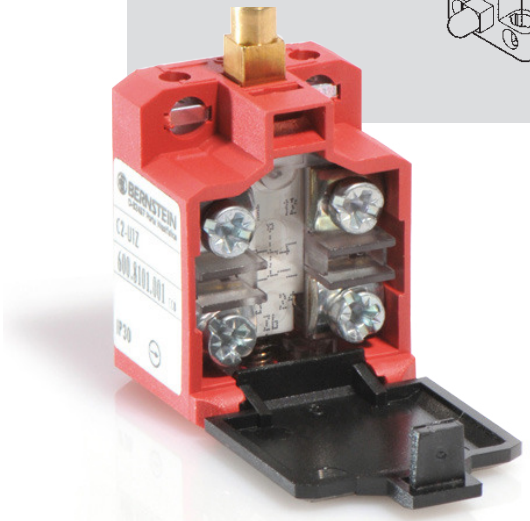
Technical data

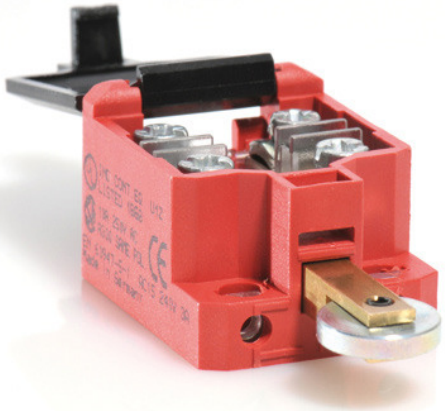
Electrical data		
Design insulation voltage	U_i max.	250 V AC
Conventional thermoelectric current	I_{the}	10 A
Rated operating voltage	U_e max.	240 V
Utilisation category	U_e/I_e	AC-15, U_e/I_e 240 V/3 A
Short-circuit protection		Safety fuse 6 A gL/gG
Protection class		II, protective insulation
Mechanical data		
Enclosure material		Thermoplastics, glass-fibre reinforced (UL 94-V0)
Ambient temperature		–30 °C to +80 °C
Mechanical lifetime		3 × 10^6 switching cycles
B10d		6 million
Switching frequency		≤ 100/min
Type of connection		4 screwed connections (M3.5)
Conductor cross-sections		Single-wire 0.5 – 1.5 mm² or strand with wire-end ferrule 0.5 – 1.5 mm²
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)

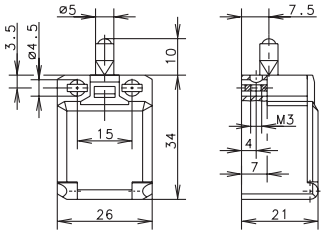






C2-... W

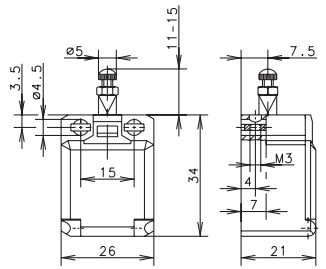




		1 NC / 1 NO	2 NC contact
	Slow-action system	**6008101001** C2-U1Z	**6008801003** C2-A2Z
	Snap-action system	**6008351002** C2-SU1Z	**6008851004** C2-SA2Z
Special features / variants	Plunger with ball head		

C2-... ST

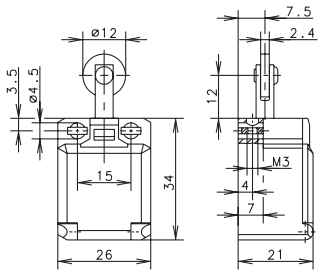




		1 NC / 1 NO	2 NC contact
	Slow-action system	**6008104025** C2-U1Z ST	**6008804027** C2-A2Z ST
	Snap-action system	**6008354026** C2-SU1Z ST	
Special features / variants	Plunger, length adjustable, with adjusting screw		

C2-... R

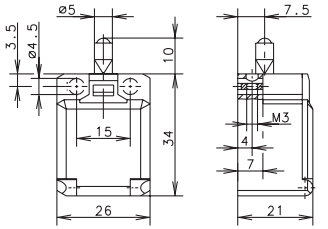
	1 NC / 1 NO	2 NC contact
Slow-action system	**6008116013** C2-U1Z R	**6008816015** C2-A2Z R
Snap-action system	**6008366014** C2-SU1Z R	**6008866016** C2-SA2Z R
Special features / variants	Even available with 90° rotated roller plunger	





C2-... O.M.

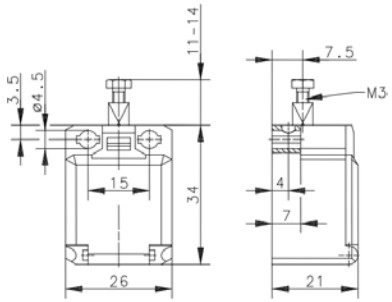
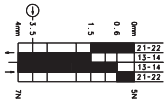
	1 NC / 1 NO	2 NC contact
Slow-action system	**6008101007** C2-U1Z O.M.	**6008801009** C2-A2Z O.M.
Snap-action system	**6008351008** C2-SU1Z O.M.	
Special features / variants	Also available with 90° rotated actuator	





C2-... BISTABIL O.M.

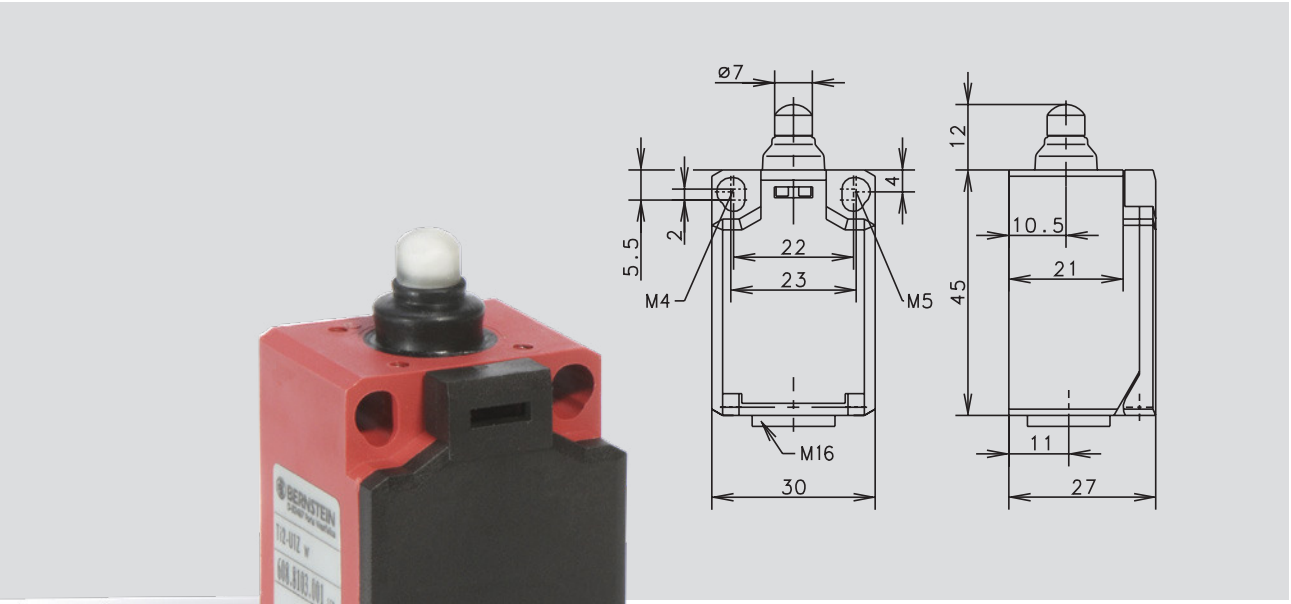


1 NC / 1 NO	
	Snap-action system **6108351008** C2-SU1Z BISTABLE O.M. 
Special features / variants	Bistable (latching), height-adjustable plunger





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 applicataions.

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

Options

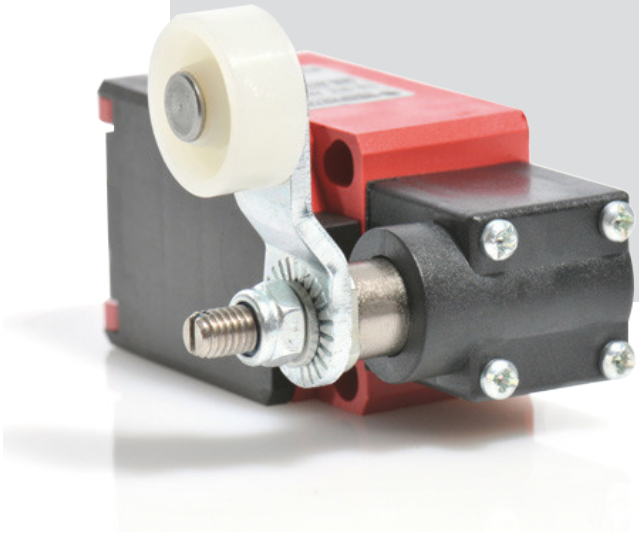
- Available with M12 connectors
- Customised cables and connectors upon request

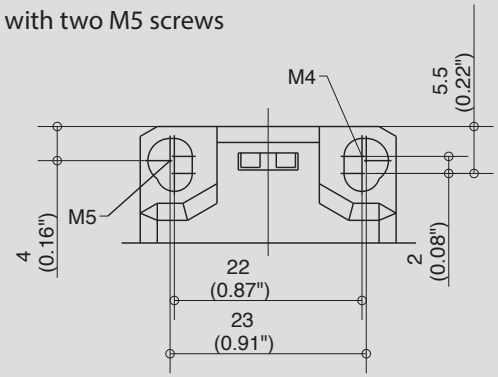
Technical data

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/0.27A
Short-circuit protection		Safety fuse 6 A gL/gG
Protection class		II, protective insulation
Mechanical data		
Enclosure material	Thermoplastics, glass-fibre reinforced (UL 94-V0)	
Ambient temperature	–30 °C to +80 °C	
Mechanical lifetime	3×10^6 switching cycles	
B10d	6 million	
Switching frequency	≤ 100/min.	
Type of connection	Screwed terminals	
Conductor cross-sections	Single-wire 0.5 –1 ,5 mm² or strand with wire-end ferrule 0.5 – 1.5 mm²	
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		

Mounting

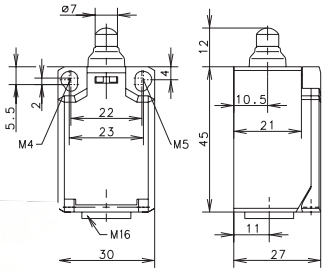
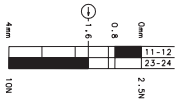
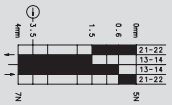
- Mounting dimension according to DIN EN 50047
- 2 oval holes for adjustment for screws M4 (distance 22 mm)
- Fixed positioning for safety applications with two M5 screws (distance 23 mm)





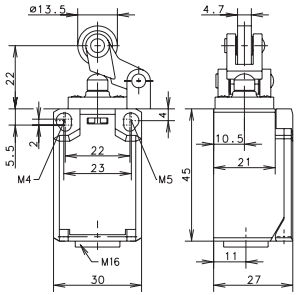
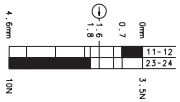
TI2-... W



1 NC / 1 NO		
	Slow-action system	**6088103001** TI2-U1Z W 
	Snap-action system	**6088153002** TI2-SU1Z W 
Special features / variants		

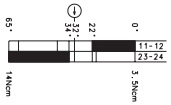
TI2-... HW

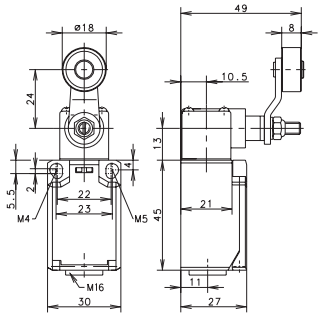


1 NC / 1 NO		
	Slow-action system	**6088121015** TI2-U1Z HW 
Special features / variants		Different directions of actuation available, also available with steel roller, different roller diameters on request

TI2-... AH

	1 NC / 1 NO
Slow-action system	**6088135021** TI2-U1Z AH



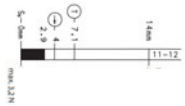


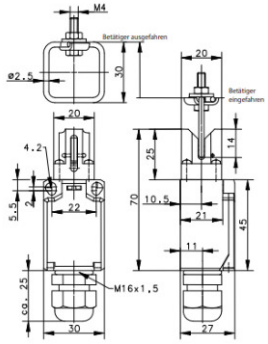


Special features / variants	Different directions of actuation available, also available with steel roller, different roller diameters on request, cranked and straight levers, different lever lengths

Protection class IP54 TI2-... KS

	1 NC / 1 NO
Slow-action system	**6116469043** TI2-A1Z KS

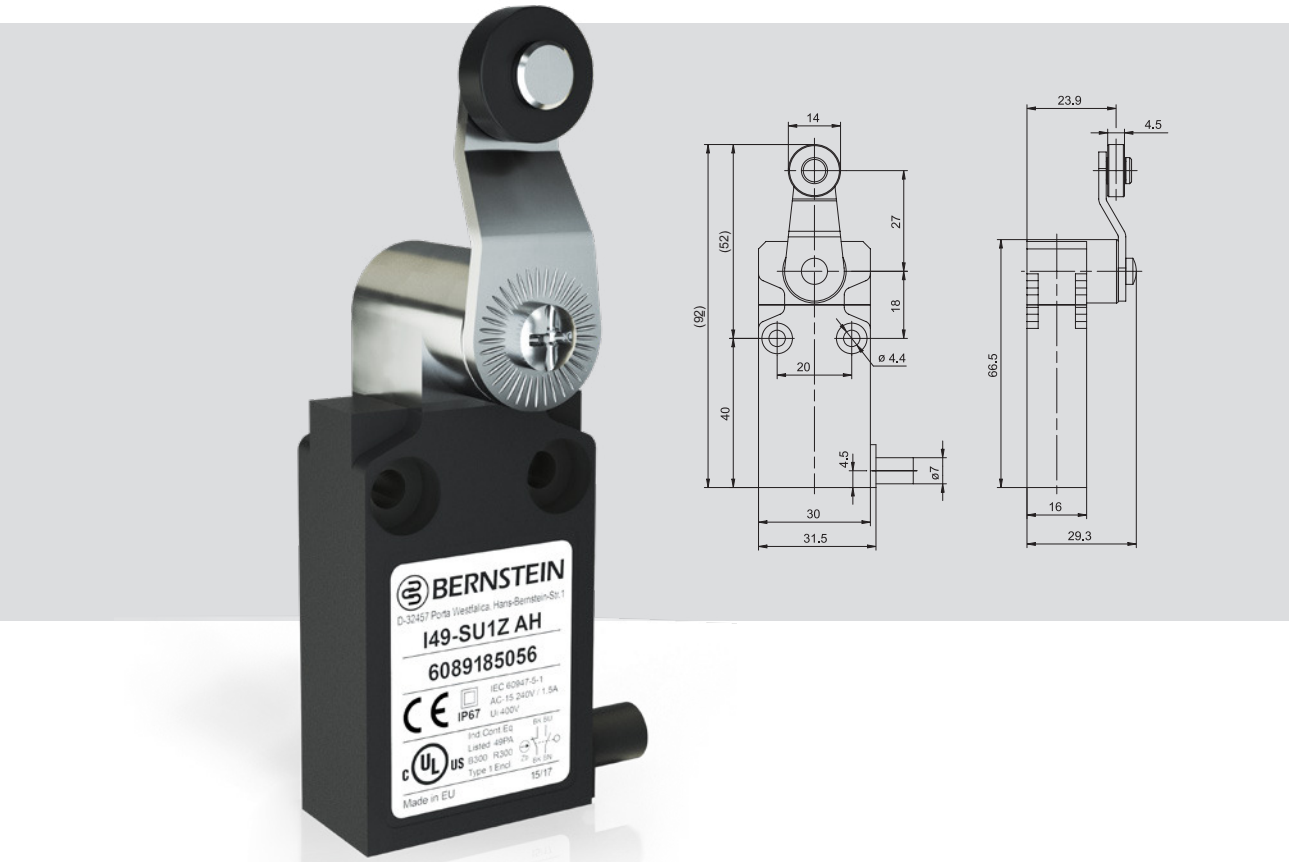






Special features / variants	Use the KS-version as door contact with separated actuator and protection class IP54 for applications where a higher protection class as IP20 is required, for example at fire-service lifts or similar. The specified protection class (IP54) only applies with closed cover and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

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 buttom
- 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	10×10^6 switching cycles	
Switching frequency	≤ 60/min.	
Type of connection	Cable 4×0.75 mm²	
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		

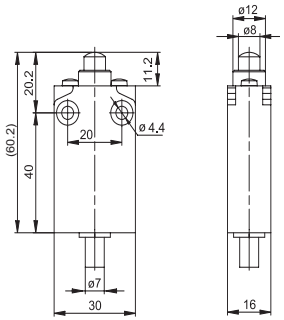
Options

- Different cable lengths available on request



I49-... IW

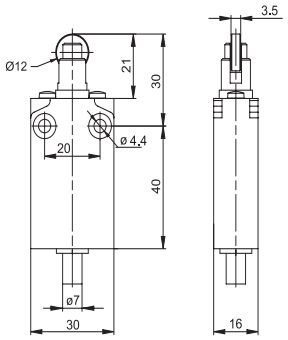




	1 NC / 1 NO
Slow-action system	**6089102059** I49-U1Z IW Z
Snap-action system	**6089152058** I49-SU1Z IW Z
Special features / variants	Central cable outlet available on request

I49-... RIW

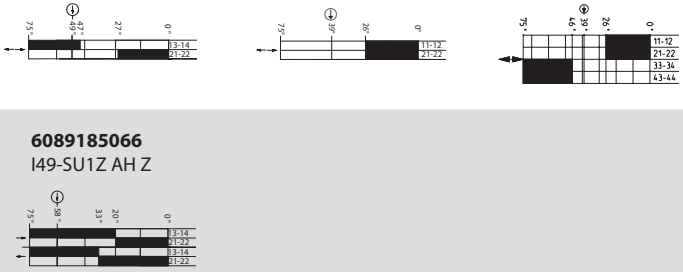


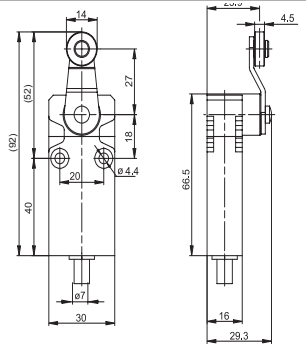


	1 NC / 1 NO	2 NC contact	2 NC / 2 NO
Slow-action system	**6089117061** I49-U1Z RIW Z	**6089817071** I49-A2Z RIW Z	**6089217076** I49-U2Z RIW Z
Snap-action system	**6089167060** I49-SU1Z RIW Z		
Special features / variants	Central cable outlet available on request		

I49-... AH

	1 NC / 1 NO	2 NC contact	2 NC / 2 NO
Slow-action system	**6089135067** I49-U1Z AH Z	**6089835073** I49-A2Z AH Z	**6089235078** I49-U2Z AH Z
Snap-action system	**6089185066** I49-SU1Z AH Z		
Special features / variants	Central cable outlet available on request		

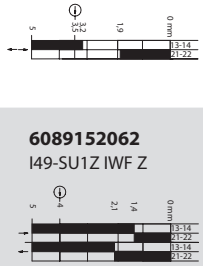


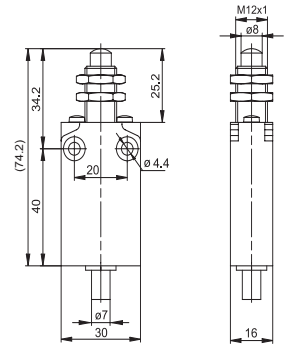




I49-... IWF

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

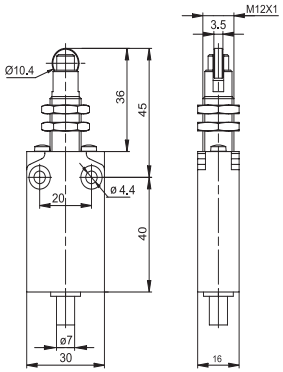
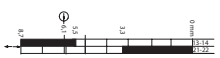
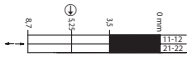
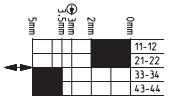






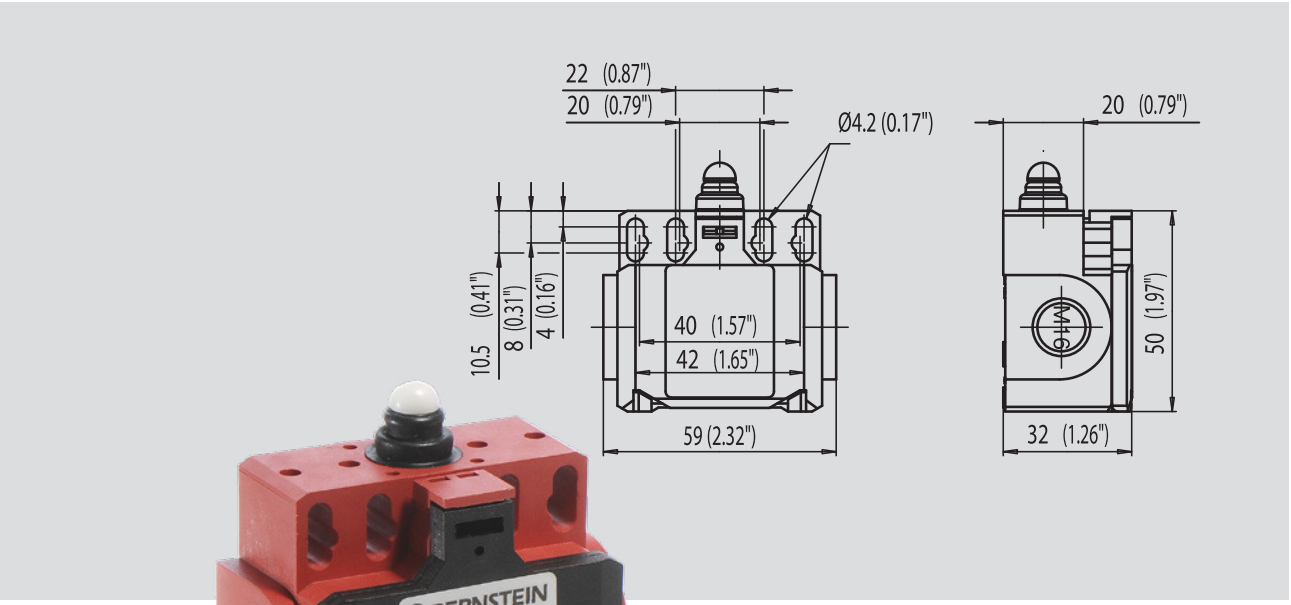


I49-... RIWF

		1 NC / 1 NO	2 NC contact	2 NC / 2 NO
	Slow-action system	**6089117065** I49-U1Z RIWF Z	**6089817072** I49-A2Z RIWF Z	**6089217077** I49-U2Z RIWF Z
				
	Snap-action system	**6089167064** I49-SU1Z RIWF Z		
				
Special features / variants		Central cable outlet available on request; front mounted		


5
6
3
4
2

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 × 90°
- Cable entry 2 × M16 × 1.5

Technical design

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

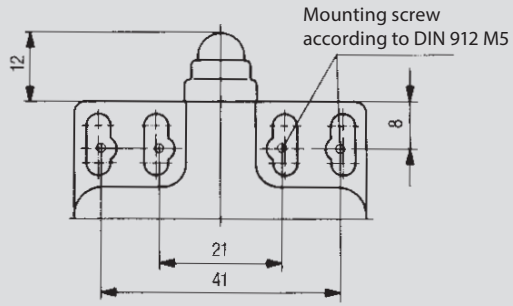
Technical data

Electrical data		
Design insulation voltage	U_i max.	400 V AC
Conventional thermoelectric current[1]	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) [1]		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)[1]	10×10^6 switching cycles	
B10d (up to) [1]	20 million	
Switching frequency	≤ 100/min.	
Type of connection	Screwed terminals	
Conductor cross-sections	Single-wire 0.5 – 1.5 mm² or strand with wire-end ferrule 0.5 – 1.5 mm²	
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		

1 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

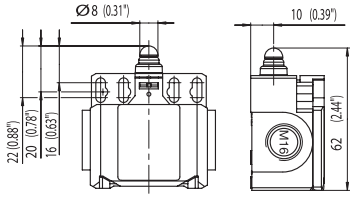
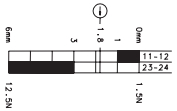
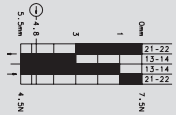


Options

- Available with M12 plugs

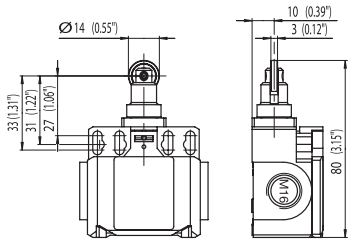
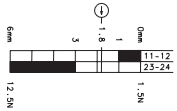
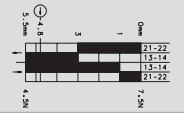
BI2 ... W



1 NC / 1 NO		
	Slow-action system	**6085103100** BI2-U1Z W 
	Snap-action system	**6085153107** BI2-SU1Z W 
Special features / variants		

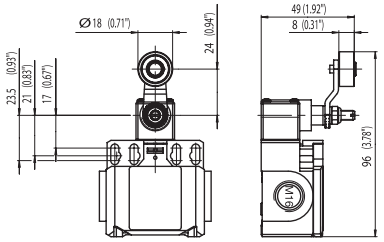
BI2 ... RIW



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

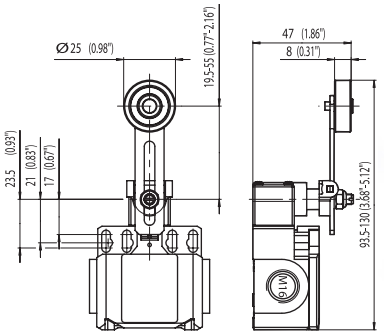
	1 NC / 1 NO
Slow-action system	**6085135104** BI2-U1Z AH
Snap-action system	**6085185111** BI2-SU1Z AH
Special features / variants	Available with different directions of actuation, also available with steel roller, different roller diameters on request, cranked and straight levers, different lever lengths f





BI2 ... AV

	1 NC / 1 NO
Snap-action system	**6085186112** BI2-SU1 AV
Special features / variants	Roller levers with adjustable lengths

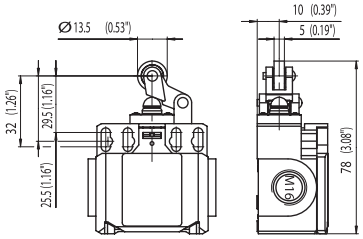




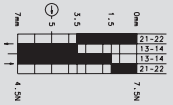
BI2 ... HW RO13.5



1 NC / 1 NO



Snap-action system	**6085171109** BI2-SU1Z HW RO13.5



Special features / variants



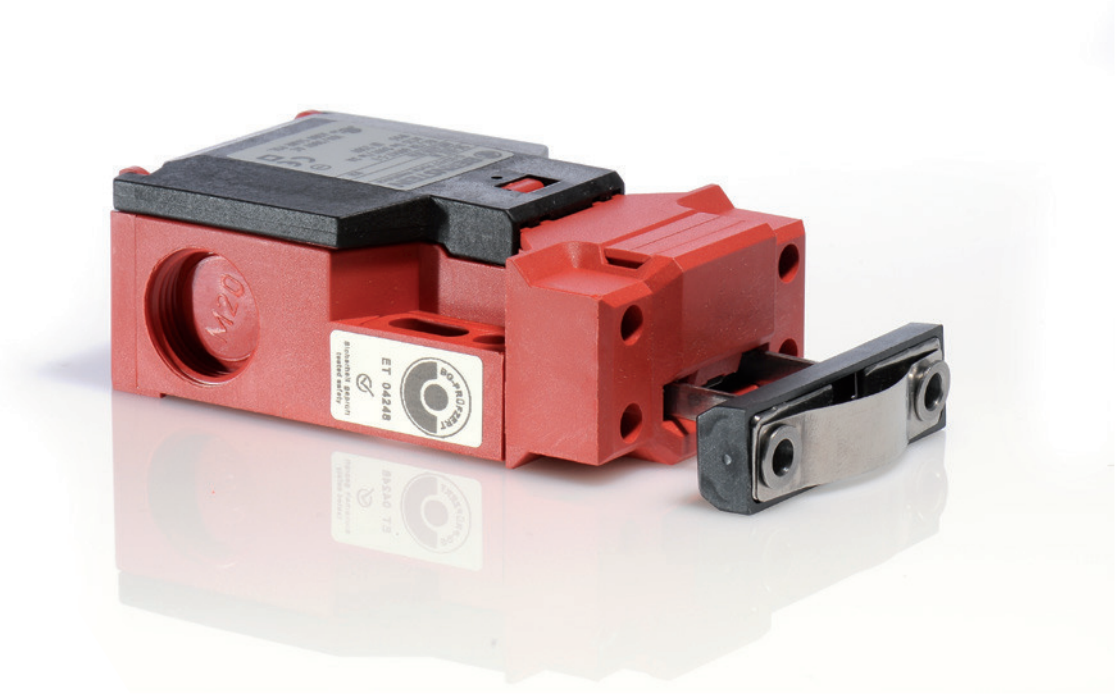
Insulated encapsulation
SK series



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.

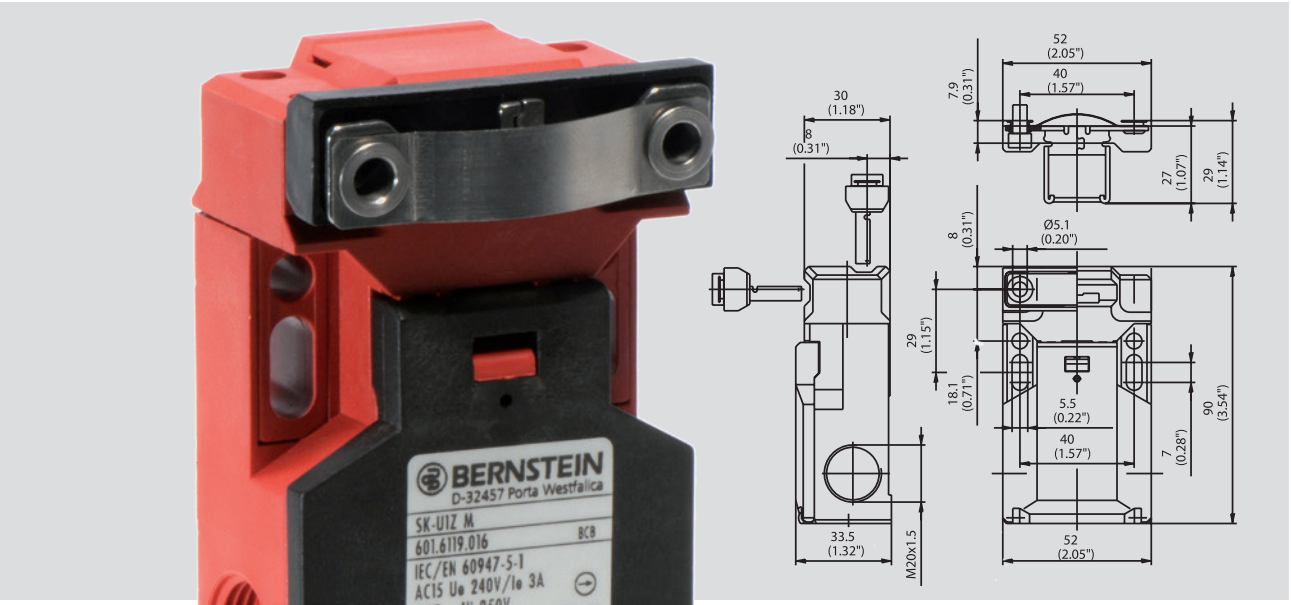


Product characteristics

- 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

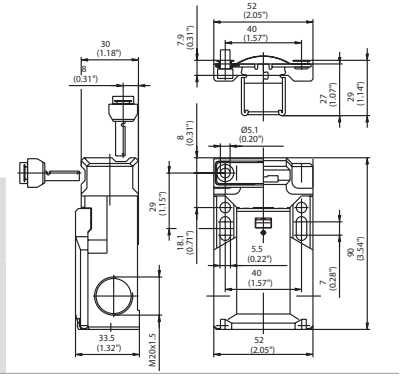


Good to know …

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



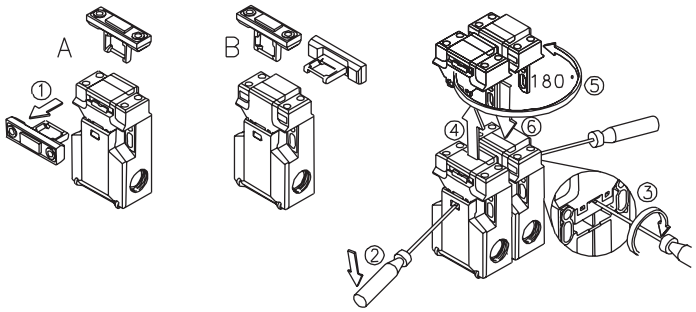
	1 NC / 1 NO
Standard	**6016119016** SK-U1Z M
Radius actuator	**6016119084** SK-U1Z MRU
Special features / variants	Actuator selection on page 82 / 83. On request: Higher actuation forces available





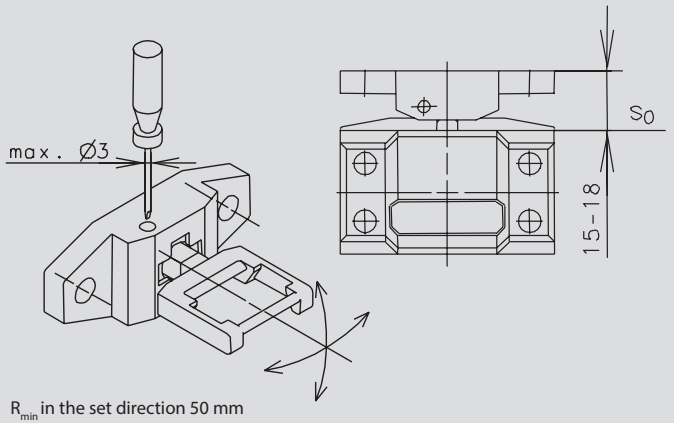
Technical data

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



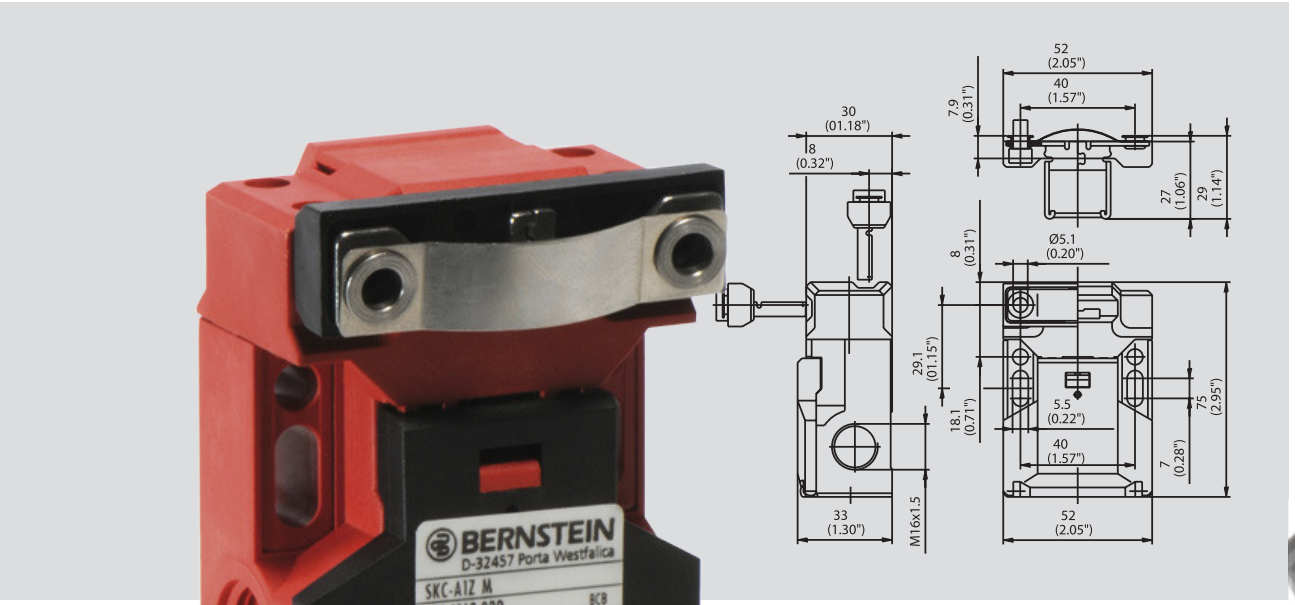
Mechanical data	
Enclosure material	Thermoplastics, glass-fibre reinforced (UL94-V0)
Switching frequency	≤ 30/min
Ambient temperature	–30 °C to +80 °C
Mechanical lifetime	1×10^6 switching cycles
B10d (up to) [1]	2 million
Short-circuit protection device	Safety fuse 10 A gL/gG
Type of connection	Screwed terminals
Conductor cross-sections	Single-wire 0.5 – 1.5 mm² Strand with wire-end ferrule 0.5 – 1.5 mm²
Cable entry	3 × M20 × 1.5
Protection class	IP65 conforming to IEC/EN 60529
Standards	
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1	

1 Depending on switching system.



R_{min} in the set direction 50 mm
SK actuator MRU (item-No. 3911452058)

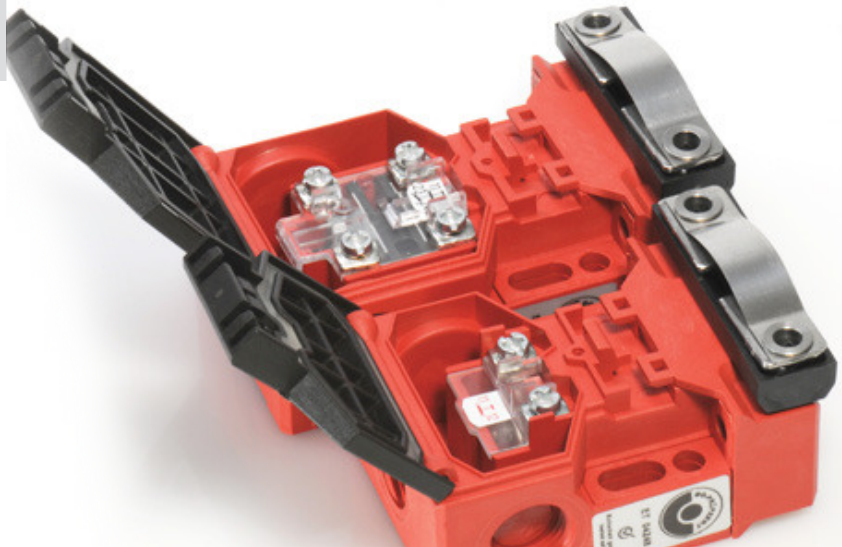
Insulated encapsulation
SKC



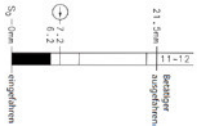


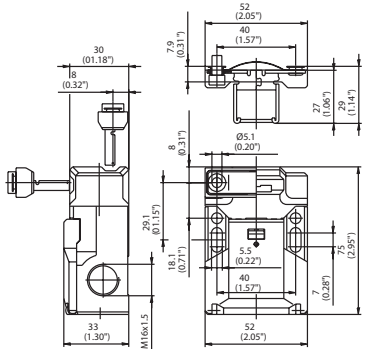
Good to know …

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



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



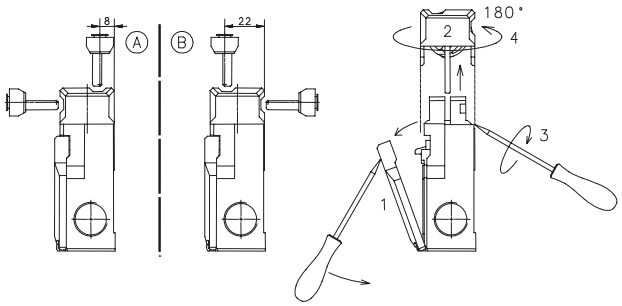




Special features / variants	Actuator selection on page 82 / 83. On request: Higher actuation forces available

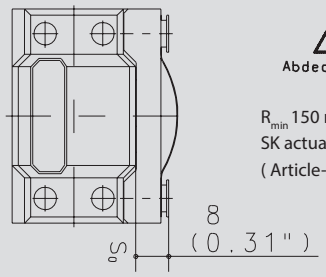
Technical data

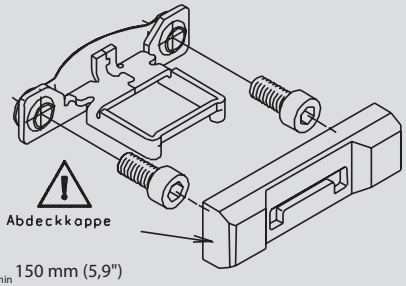
Electrical data		
Protection class	II, protective insulation	
Design insulation voltage	U_i max.	250 V
Rated operating voltage	U_e max.	240 V AC
Conventional thermoelectric current	I_{the}	5 A
Utilisation category		AC-15, U_e / I_e 240 V / 1,5 A



Mechanical data	
Enclosure material	Thermoplastics, glass-fibre reinforced (UL94-V0)
Switching frequency	≤ 30/min
Ambient temperature	–30 °C to +80 °C
Mechanical lifetime	1×10^6 switching cycles
B10d (up to) [1]	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 mm² Strand with wire-end ferrule 0.5 – 1.5 mm²
Cable entry	3 × M16 × 1.5
Protection class	IP65 conforming to IEC/EN 60529
Standards	
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1	

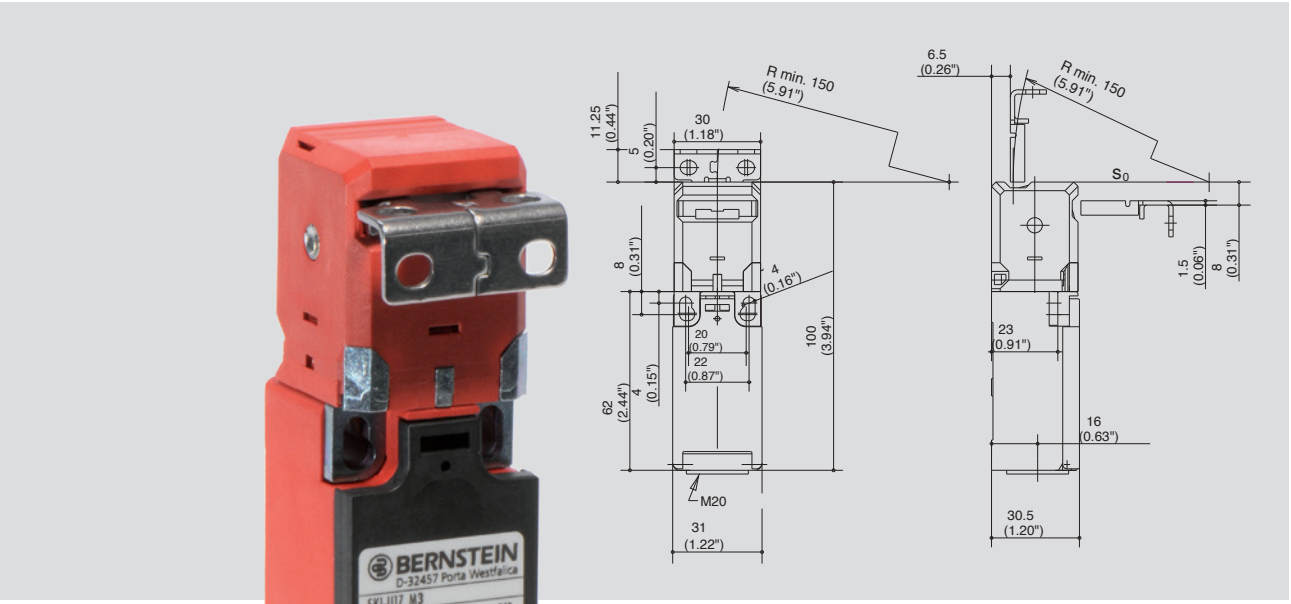
1 Depending on switching system.





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

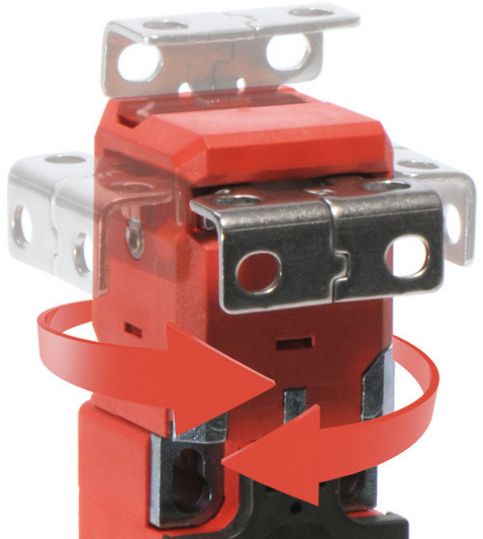
Insulated encapsulation
SKI



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.

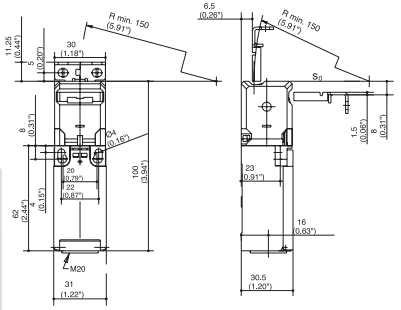
The actuator type MRU is especially made for swivelling operations (hook locks), is slightly resilient and the operating radius can be adjusted.



SKI

	1 NC / 1 NO	2 NC contact
Standard	**6016819052** SKI-U1Z M3	**6016869056** SKI-A2Z M3







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

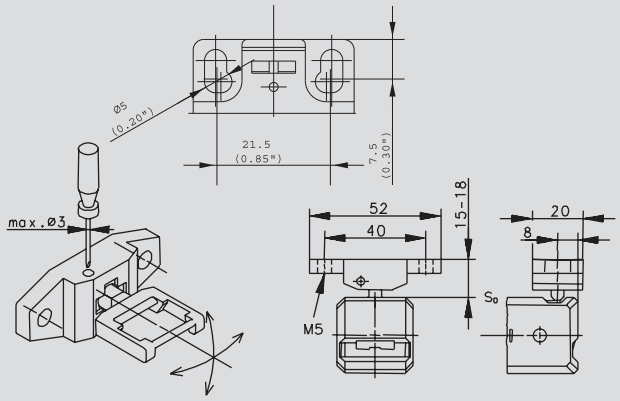
Technical data

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

Mechanical data		
Enclosure material	Thermoplastics, glass-fibre reinforced (UL94-V0)	
Switching frequency	≤ 30/min	
Ambient temperature	–30 °C to +80 °C	
Mechanical lifetime	Standard Increased actuation force	1×10^6 switching cycles 1×10^5 switching cycles
B10d (up to) [1]	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 mm² Strand with wire-end ferrule 0.5 – 1.5 mm²	
Cable entry	1 × M20 × 1.5	
Protection class	IP65 conforming to IEC/EN 60529	

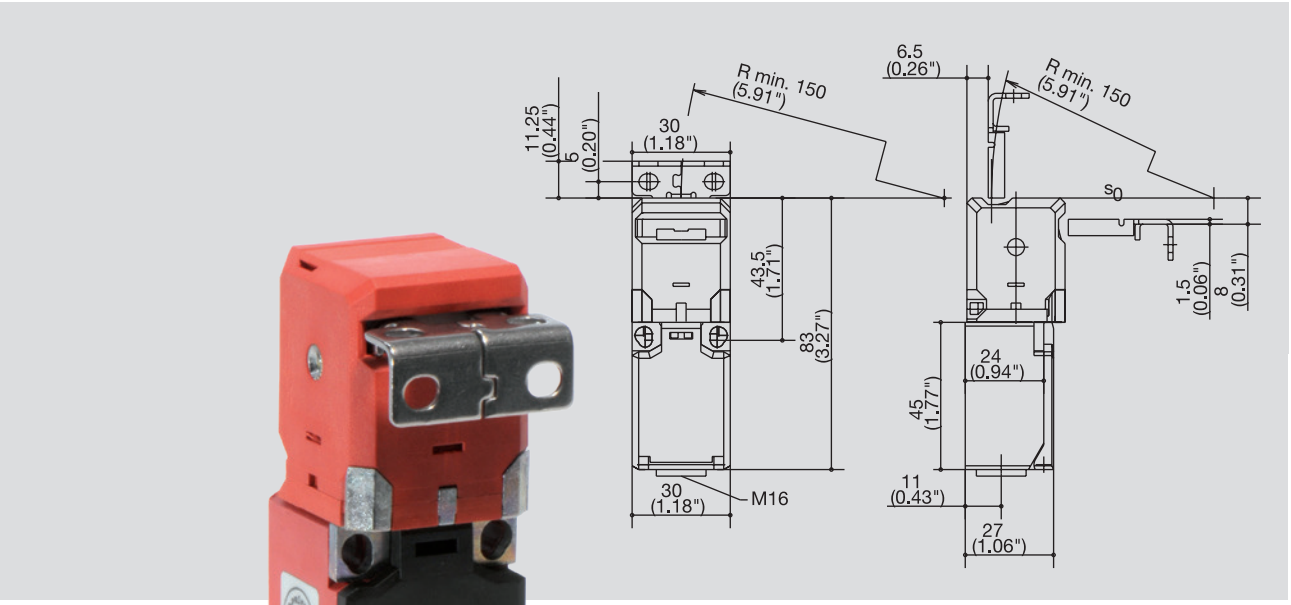
Standards
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1

1 Depending on switching system.



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

Insulated encapsulation
SKT

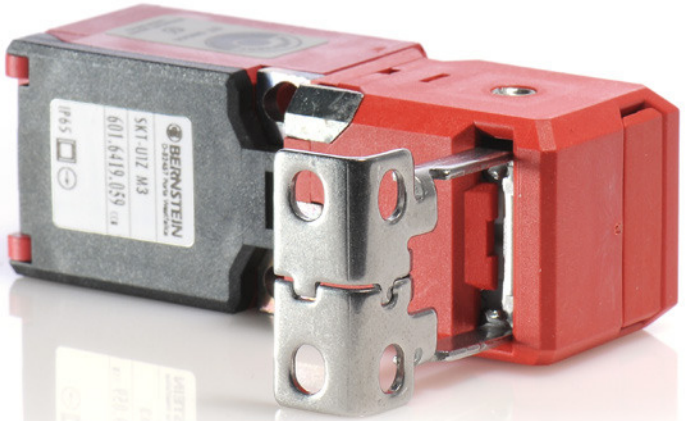




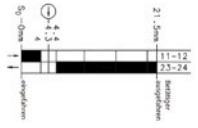
Good to know …

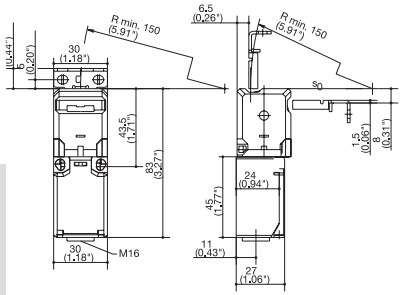
As all switches of the SK series, the SKT includes a separated actuator. It is even more compact than the SKI and therefore it is especially suitable for applications in confined spaces. The operating head is rotatable and therefore, it can be actuated from five different directions. The standard actuation 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.



	1 NC / 1 NO	2 NC contact
Standard	**6016419059** SKT-U1Z M3	**6016469066** SKT-A2Z M3







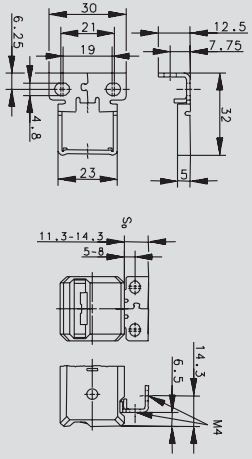
Special features / variants	Actuator selection on page 82 / 83. On request: Higher actuation forces available

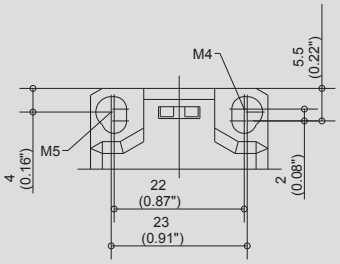
Technical data

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	≤ 30/min	
Ambient temperature	–30 °C to +80 °C	
Mechanical lifetime	Standard Increased actuation force	1×10^6 switching cycles 1×10^5 switching cycles
B10d (up to) [1]	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 mm² Strand with wire-end ferrule 0.5 – 1.5 mm²	
Cable entry	M16 × 1.5	
Protection class	IP65 conforming to IEC/EN 60529	
Standards		
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1		

1 Depending on switching system.





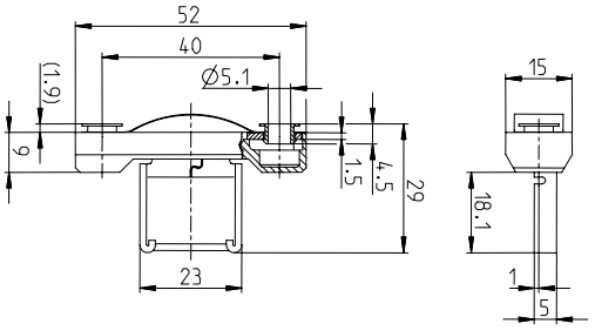
R_{min} 150 mm
actuation forces only FE to FI50
SK-actuator M3 (item-No. 3112850340)

Selection of actuators



SK actuator M4 (complete with enclosure)

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

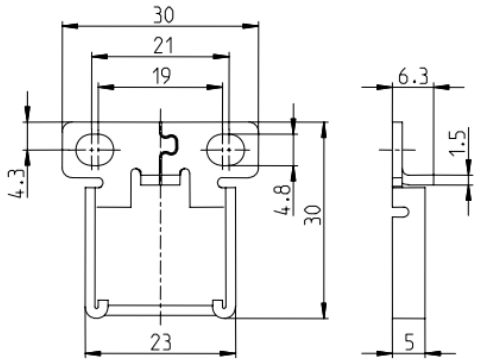


Mechanical data	
Actuator	St-VA steel
Enclosure	Thermoplastics PA
Minimum actuation radius R_{min}	150 mm



SK actuator M2

Product range	
Article number	**Designation**
3112850345	SK actuator M2

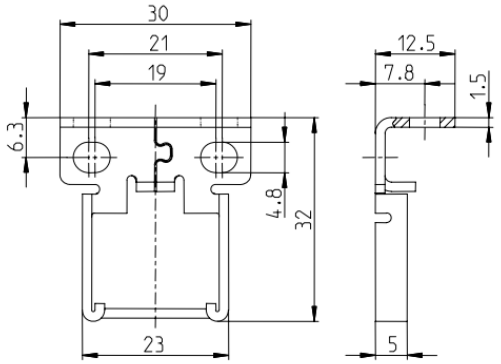


Mechanical data	
Actuator	St-VA steel
Minimum actuation radius R_{min}	150 mm



SK actuator M3

Product range	
Article number	**Designation**
3112850340	SK actuator M3



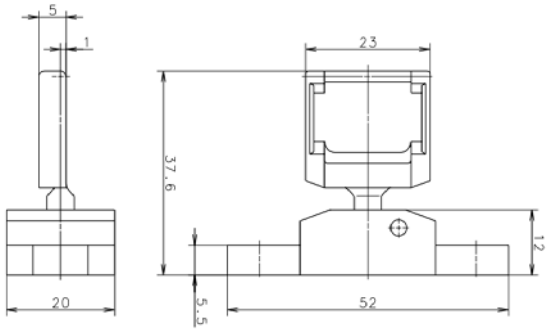
Mechanical data	
Actuator	St-VA steel
Minimum actuation radius R_{min}	150 mm

Other actuators on request.



MRU actuator

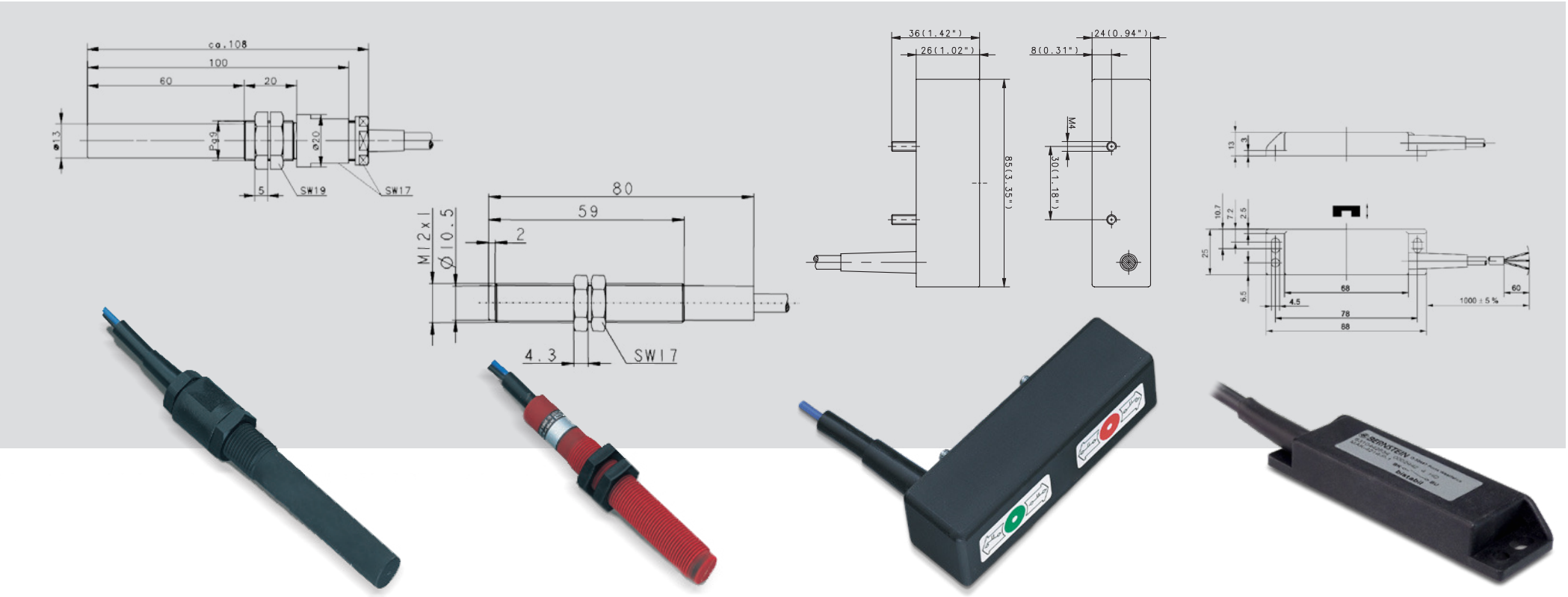
Product range	
Article number	**Designation**
3911452058	SK actuator MRU



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



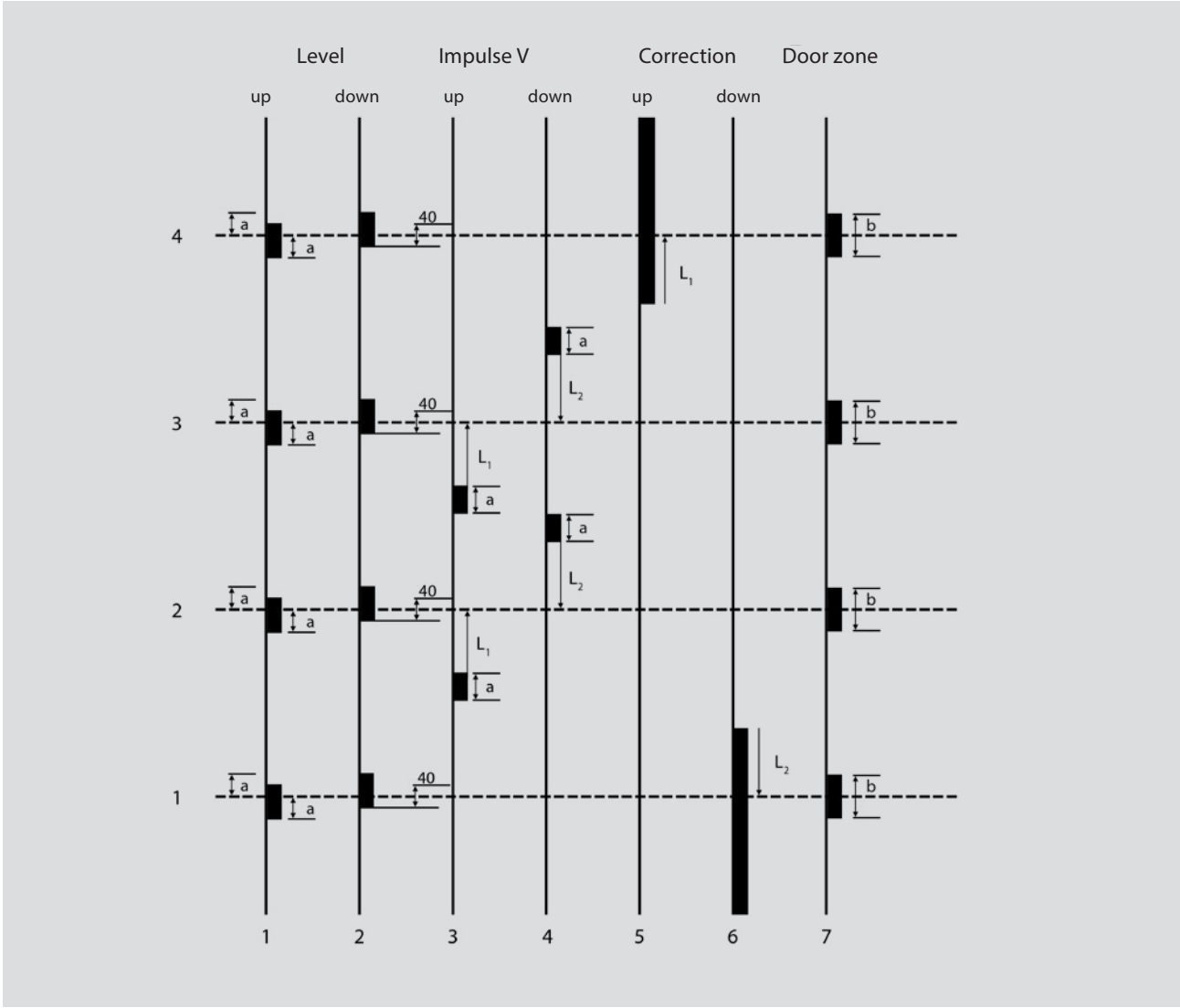
Magnetically operated
MAK series



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.

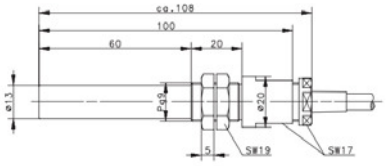
Our bistable reed contacts are typically actuated by a south pole magnet. After taking away the target they stay in their condition. Reversing or changing the actuation direction or the target polarity (north pole) will switch them back to the initial condition.



MAK-3614-P-2 bistable



Design	Ø 13 mm
Design switching interval (San)	13 mm
Reference magnet	T-62 N/S
Type of connection	Cable 2 m



6310436553
MAK-3614-P-2

Bistable reed contact

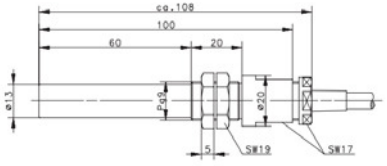
Technical data		Mechanical data	
Switching voltage (max)	250 V	Ambient temperature (min/max)	–5 °C ... to +70 °C
Switching current (max)	5 A (2 ms)	Protection class accor. to IEC 526, EN 60529	IP67
		Enclosure material	PA 6.6 black
Switching capacity (max)	250 VA	Connection	2 × 0.75 mm²
Mechanical lifetime	3 × 10⁸ 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
Design switching interval (San)	20 mm
Reference magnet	T-62 N/S
Type of connection	Cable 1 m



6310536617
MAK-3615-L-1

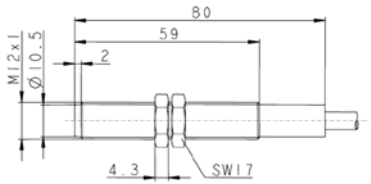
Bistable change-over reed contact

Technical data		Mechanical data	
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 mm²
Mechanical lifetime	3 × 10⁸ 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_a)	7 mm
				Reference magnet	T-62 N/S
				Type of connection	Cable 2 m
Switching voltage (max)	250 V AC / DC	Ambient temperature (min/max)	–5 °C ... to +70 °C	**6314233708** 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	3×10^8 Switching cycles depending on load	Connection	Cable 2 × AWG20 × 2 m ± 5 %; PVC jacket, black		
Shock resistance	50 g (11 ms, ½ sinus wave)	Installation position	arbitrary		

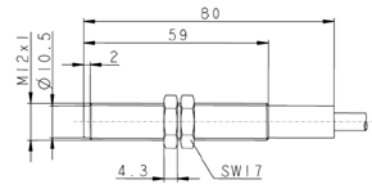




Special features / variants	Cylindrical, mono-stable magnetically operated switch with continuous M12 thread

MAK-3313-D-1 change-over switch

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



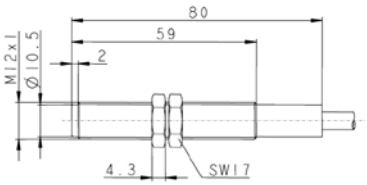


Special features / variants	Cylindrical, mono-stable magnetically operated switch with continuous M12 thread and change-over contact



MAK-3314-A-2 bistable

Design	Ø 10.5 mm
Secured switching interval (S_a)	22 mm
Reference magnet	T-62 N/S
Type of connection	Cable 2 m



6314233710
MAK-3314-A-2

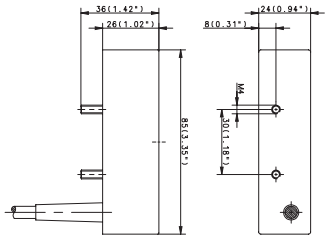
Bistable On-Off

Technical data		Mechanical data	
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	3×10^8 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 Secured switching interval (S_a) Reference magnet Type of connection	85 × 24 × 26 mm 17 mm T-62 N/S Cable 3 x 0.5 mm²
Switching voltage (max)	250 V AC / DC	Ambient temperature (min/max)	–5 °C ... to +70 °C	**6314432706** 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 × 10^8 Switching cycles depending on load	Enclosure material	PBT, black, reed contact encapsulated		
Shock resistance	50 g (11 ms, ½ sinus wave)	Installation position	arbitrary		

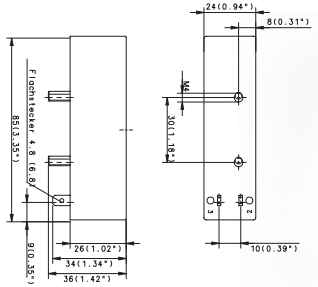




Special features / variants	With connecting cable, 3 m long. Switch travel of up to 15 mm. UL-approval (for current up to 2A)

MAK-3214-P-STK 4.8 bistabil

Technical data		Mechanical data		Design Secured switching interval (S_a) Reference magnet Type of connection	85 × 24 × 26 mm 17 mm T-62 N/S Flat connectors 4.8 mm
Switching voltage (max)	250 V	Ambient temperature (min/max)	–25 °C ... to +70 °C	**6310432590** 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 × 10^8 Switching cycles depending on load	Enclosure material	PBT, black, reed contact encapsulated		
		Installation position	arbitrary		



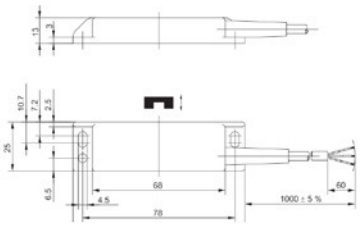


Special features / variants	Classical cuboid design, bistable, flat connector 4.8mm. The switch is equipped with a shielding plate on the side; additionally its inner space is block-moulded, to minimise mechanical influences on the reed contact.

MAK-4212-A-1 NO contact



Design	88 × 25 × 13 mm
Secured switching interval (S_a)	19 mm
Reference magnet	TK-42
Type of connection	Cable 2 × AWG20



6314242713
MAK-4212-A-1

Normally open contact NO

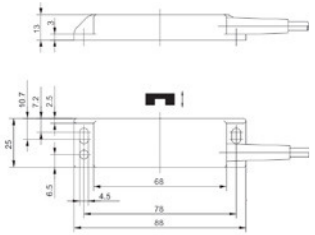
Technical data		**Mechanical data**	
Switching voltage (max)	30 V AC / 60 V DC	Ambient temperature (min/max)	–5 °C ... to +70 °C
Switching current (max)	2 A	Protection class accor. to IEC 526, EN 60529	IP67
Switching capacity (max)	100 VA	Enclosure material	PA 6.6, black
Mechanical lifetime	3×10^8 Switching cycles depending on load	Connection	Cable 2 × 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_a)	22 mm
Reference magnet	T-42
Type of connection	Cable 3 × AWG20



6317342714
MAK-4213-D-1

Change-over switch

Technical data		**Mechanical data**	
Switching voltage (max)	125 V AC / 175V DC	Ambient temperature (min/max)	–5 °C ... to +70 °C
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	3×10^8 Switching cycles depending on load	Connection	Cable 3 × AWG20 × 1 m ± 5 %; PVC jacket, black
		Installation position	arbitrary

Special features / variants: Square design, monostable, change-over contact. Connection via connecting cable of 1m length. Block-moulded inner space to minimise mechanical influences on the reed contact.

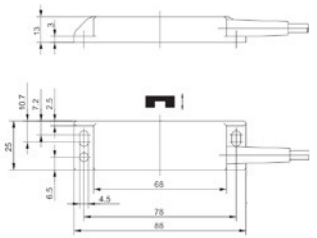
MAK-4214-A-1 bistable

Technical data		Mechanical data	
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 4)
Switching capacity (max)	120 VA	Enclosure material	PA 6.6, black
Mechanical lifetime	3×10^8 Switching cycles depending on load	Connection	Cable 2 × AWG20 × 1 m ± 5 %; PVC jacket, black
Shock resistance	50 g (11 ms, ½ sinus wave)	Installation position	arbitrary

Design	88 × 25 × 13 mm
Secured switching interval (S_a)	2-20mm
Reference magnet	T-62 N/S
Type of connection	Cable 2 × AWG20

6310442715
MAK-4214-A-1

Bistable On-Off





Special features / variants

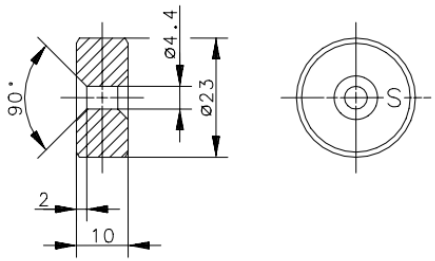
Square design, bistable, connection via connecting cable of 1 m length. Block-moulded inner space to minimise mechanical influences on the reed contact.

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

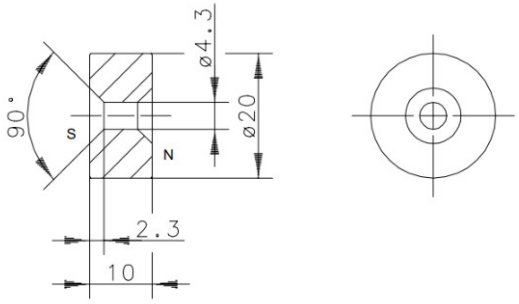


Mechanical data	
Magnet	Hard ferrite 24/16; axially magnetised; marking on the south-pole side
Ambient temperature	–40°C … +150°C
Application	General
Tightening torque	2 Nm ± 0.25 Nm (with fixing material attached)

T-67 Round magnet



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

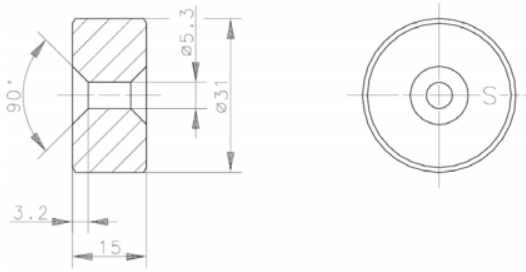


Mechanical data	
Magnet	Hard ferrite 24/23; axially magnetised; marking on the south-pole side
Ambient temperature	–20°C … +80°C
Application	General
Tightening torque	2 Nm ± 0.25 Nm

T-69 Round magnet



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

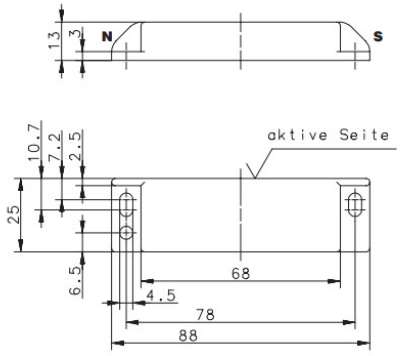


Mechanical data	
Magnet	Hard ferrite 24/16; axially magnetised; marking on the south-pole side
Ambient temperature	–20°C … +80°C
Application	General
Tightening torque	2 Nm ± 0.25 Nm

TK-42 Enclosed magnet



Product range	
Article number	**Designation**
6302142049	TK-42

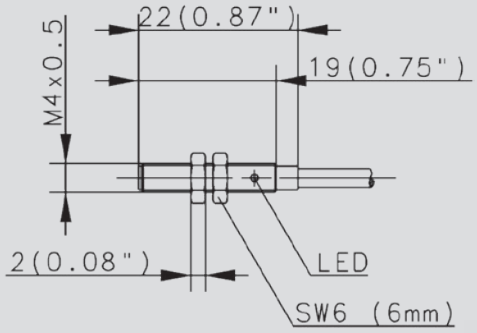


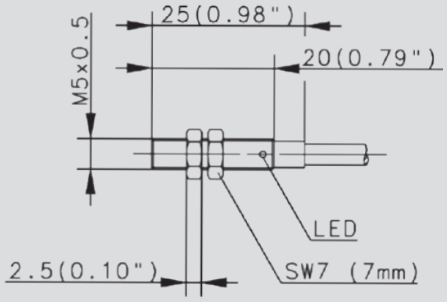
Mechanical data	
Magnet	AlNiCo – 50
Enclosure	PA 6.6, Magnet encapsulated
Ambient temperature	–20°C … +80°C
Application	General

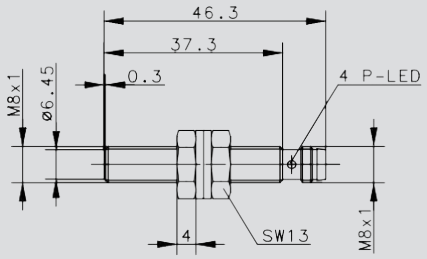
Switching distances in the overview

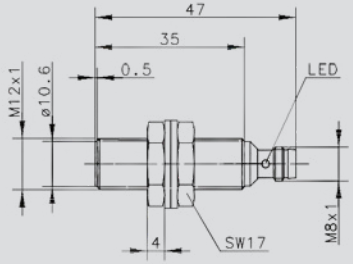
Magnetically operated switch		Magnets		
Designation	**Article number**	**T-62N/S** 6301262039	**T-69N/S** 6301269031	**TK-42** 6302142049
MAK-3312-A-2	**6314233708**	7 mm		
MAK-3313-D-1	**6316333709**	29 mm		
MAK-3314-A-2	**6310433710**	22 mm		
MAK-3214-P-STK 4.8	**6310432590**	17 mm		
MAK-3214-P-1	**6310432598**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

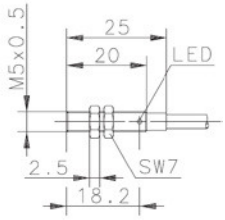
The selection of the sensor depends on the correct environmental and application conditions and the technical requirements. Besides the sensoring technology used – inductive and magnetic sensors are mainly used in the lift industry – the output function (PNP, NPN, …) is also of importance. Furthermore 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).

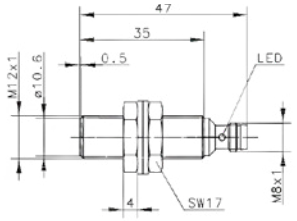




KIB M5

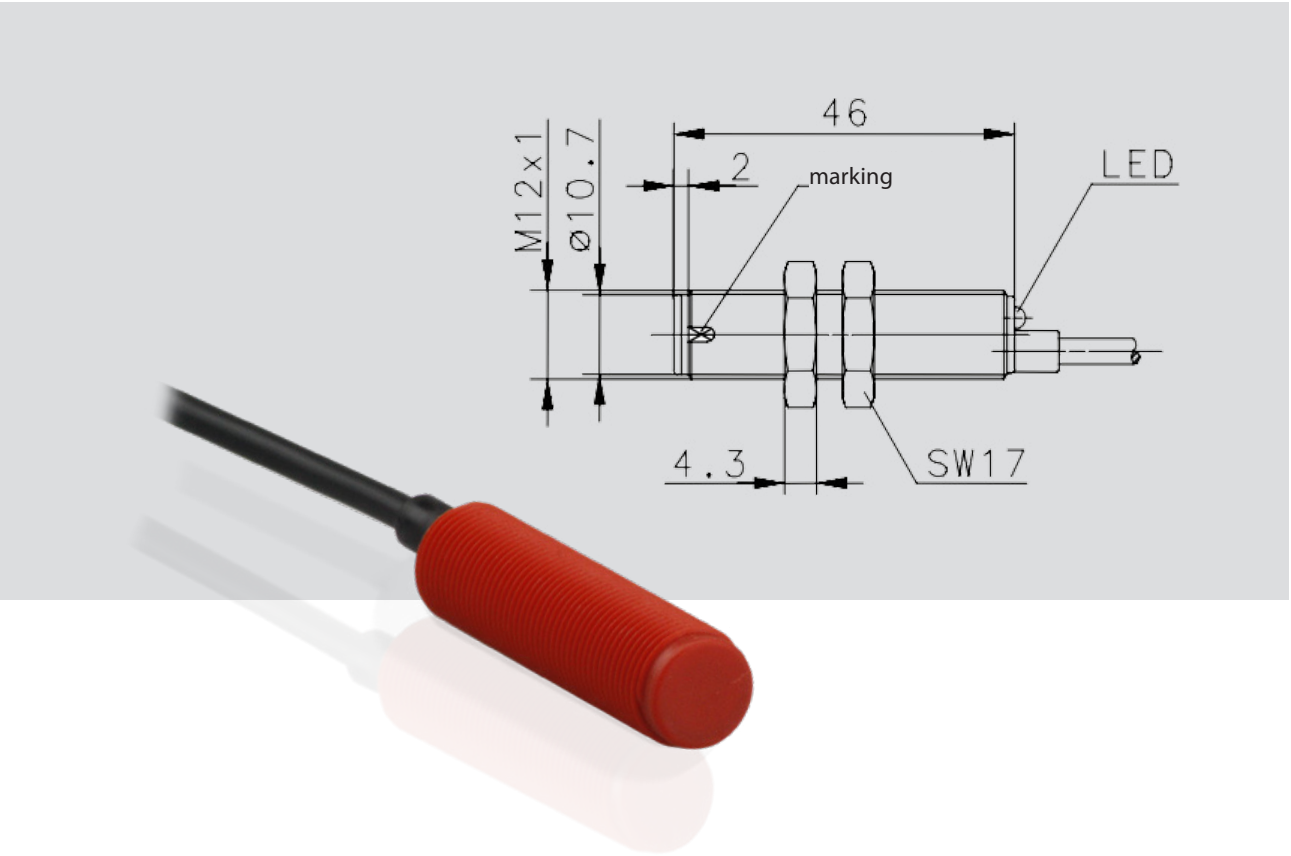
Type of installation	Flush	**Technical data**		**Mechanical data**	
Rated switching interval	1 mm				
Type of connection	Cable 2 m				
Particularity					
	**6532999002** KIB-M05PS/001-KL2I NO contact	Rated operating voltage U_e	12 – 24 V DC	Ambient temperature (min/max)	–25 °C ... to +70 °C
		Rated operating current I_e	≤ 200 mA	Protection class accor. to IEC 526, EN 60529	IP67/ NEMA type 1
		Switching frequency (max)	1000 Hz	Enclosure material	Brass, nickel-plated
		Short-circuit protection	Clocking	Connection	3 × 0.14 mm²
		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_e	10–30 VDC	Ambient temperature (min/max)	–25 °C ... to +70 °C	**6502943008** KIB-M12PS/002-KLSM8V	
Rated operating current I_e	≤ 200 mA	Protection class accor. to IEC 526, EN 60529	IP67		
Switching frequency (max)	800 Hz	Enclosure material	CuZn39Pb3	PNP NO contacts	
Short-circuit protection	Clocking	Connection	M8 × 1		
Function and operating voltage display	LED/-				
Switching interval, adjustable					
Special features / variants	Cylindrical enclosure in M12, 47mm long, 3-pole M8 connector, IP67. Can be installed flush and as output it has a DC signal (NO contact). Enclosure made of brass, nickel-plated.				



Speed sensor
MEK

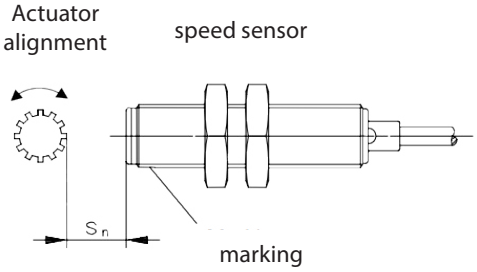


Good to know …

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

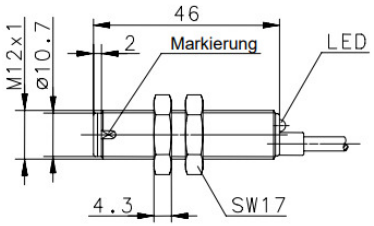
Use these sensors, as the name says, for measuring the speed on a toothed wheel, e.g. in an escalator, to measure the speed of the handrail.

Connection diagram



MEK M12

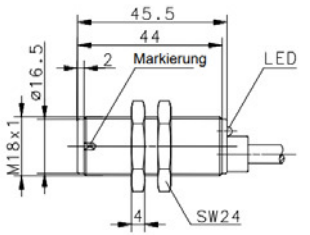
Technical data		Mechanical data		Function mode	Hall
				Magnetic sensitivity	–
				Switching interval (Sn)	0–2 mm
				Reference magnet	–
				Type of connection	Cable 2 m
				Particularity	Speed
Rated operating voltage U_e	10–39 VDC	Ambient temperature (min/max)	–25 °C ... to +70 °C	**6379262119** MEK-M12PD/H-KL2	
Rated operating current I_e	400 mA	Protection class accor. to IEC 526, EN 60529	IP67		
Switching frequency (max)	10 kHz	Enclosure material	PA, red	PNP NO contacts	
Short-circuit protection	Clocking	Connection	3 × 0.14 mm²		
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).				





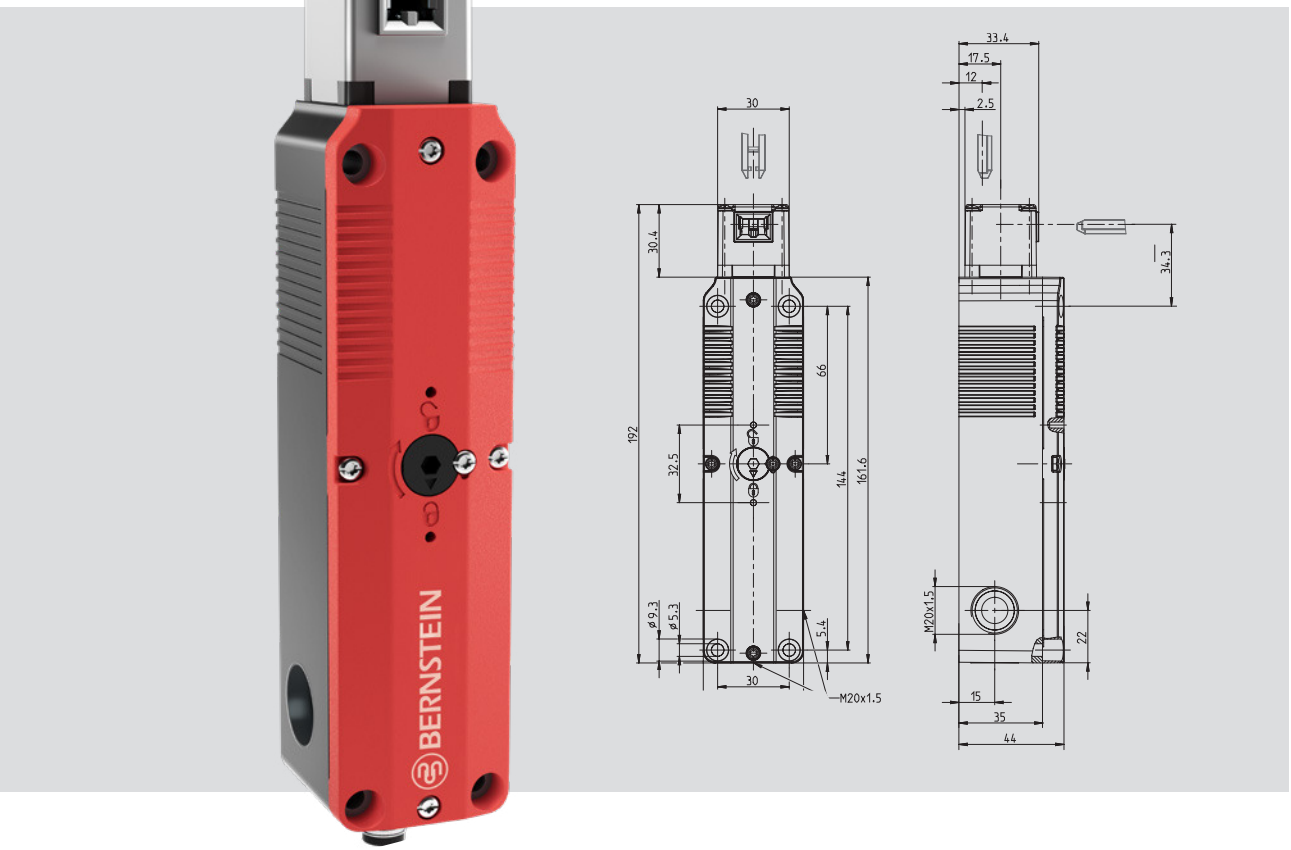
MEK M18

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_e	10–39 VDC	Ambient temperature (min/max)	–25 °C ... to +70 °C	**6379263121** MEK-M18PD/H-KL2	
Rated operating current I_e	400 mA	Protection class accor. to IEC 526, EN 60529	IP67		
Switching frequency (max)	10 kHz	Enclosure material	PBT, black	PNP NO contacts	
Short-circuit protection	Clocking	Connection	3 × 0.14 mm²		
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 × 90°)
- 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, Ue / Ie 240 V / 1.5 A DC-13, Ue / Ie 24 V / 1.5 A; 250 V / 0.11 A
Utilisation category accor. to UL/CSA	B300 R300 General use 240 V / 1.5 A General use M12 connector 24 V / 1.5 A
Positive Break p	accor. to IEC/EN 60947-5-1, Annex K
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 %)

Mechanical data		
Enclosure material	Thermoplastics, glass-fibre reinforced (UL 94-V0)	
Cover	Thermoplastics, glass-fibre reinforced (UL 94-V0)	
Direction of actuation	Metal	
Operation	Separate actuator	
Minimum actuation radius	R_{min}	See data sheet - actuator
Starting speed	V_{max}	0.5 m/s
Extraction force	≥ 10 N	
Interlocking principle	Spring and magnetic force	
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	1×10^6 switching cycles	
Mounting	4 × M5	
Type of connection	Screwed terminal	
Conductor cross-sections	0.34 ... 1.5 mm² flexible	
Cable entry	3 × M20 × 1.5	
Weight	≈ 0.484 kg	
Installation position	arbitrary	
Protection class [2]	IP67 accor. to IEC/EN 60529; (UL 50 E / CSA C22.2) type 6 - Indoor use	
Key figures for safety technology		
B10d	2×10^6 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		

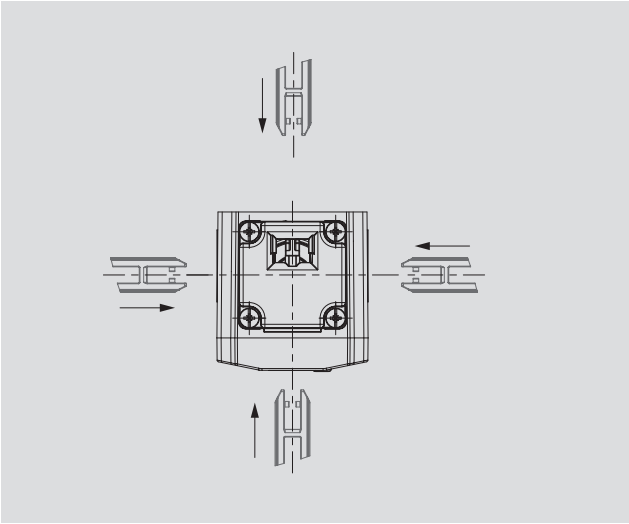
[1] Depending on switching system.
[2] The specified protection class (IP code) only applies with closed cover and the use of at least an equivalent cable gland with the belonging cable.

Technical design

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

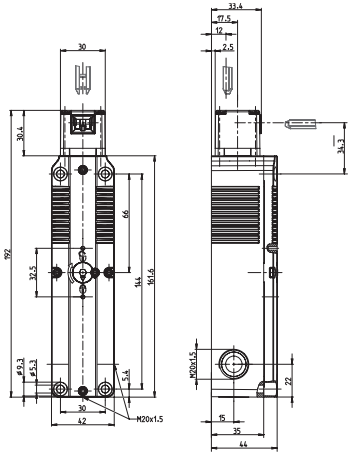
Options

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



SLC-...





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

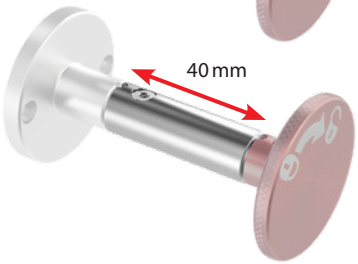
Selection of accessories



Escape release
Basic set
ESCR-B-1



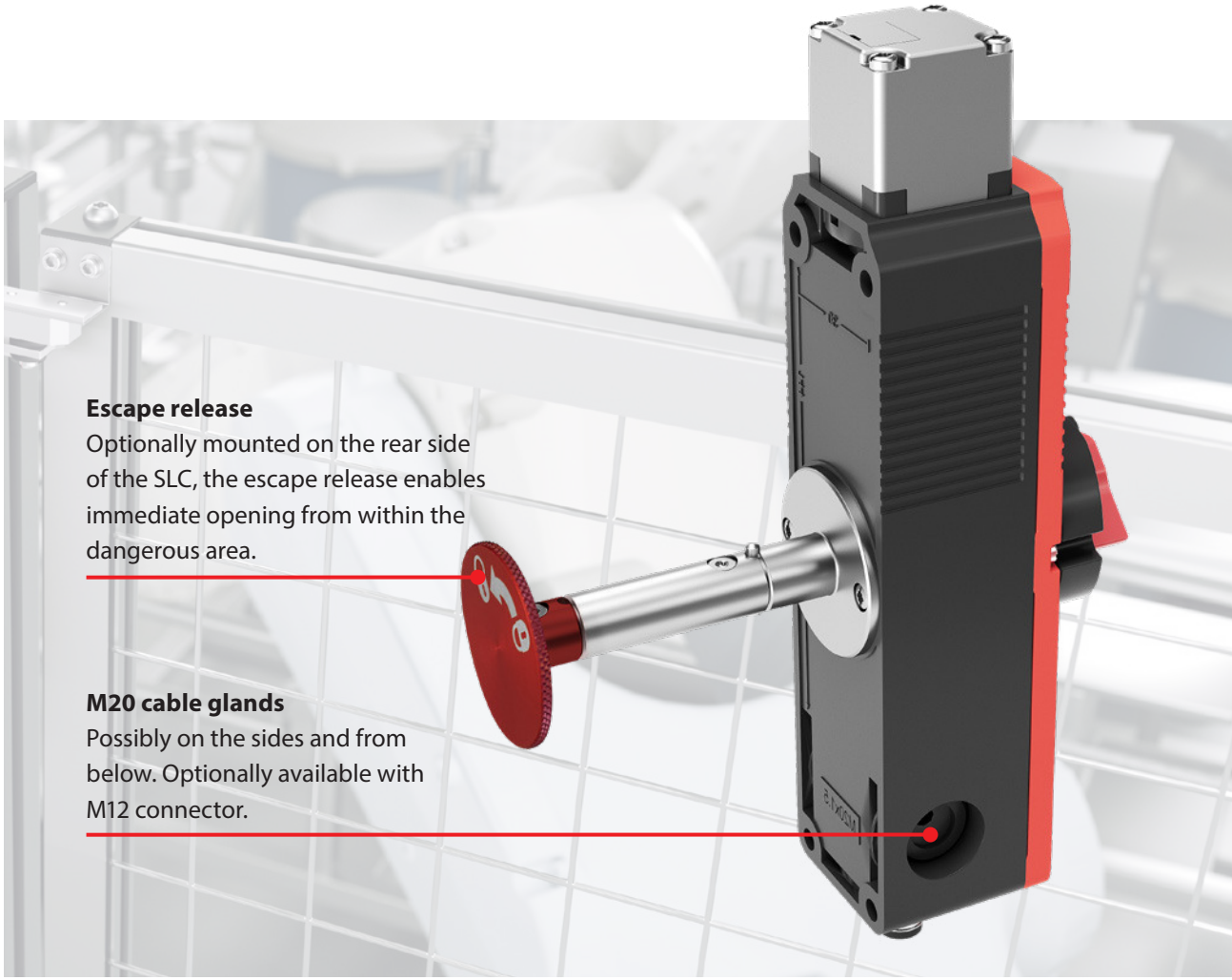
Extension module *
20 mm
ESCR-20-1



Extension module *
40 mm
ESCR-40-1

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

* Basic set required to use the expansion modules.



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

M20 cable glands
Possibly on the sides and from below. Optionally available with M12 connector.

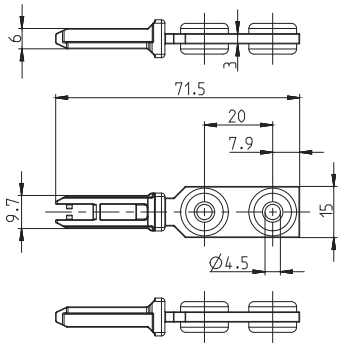
Actuators

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

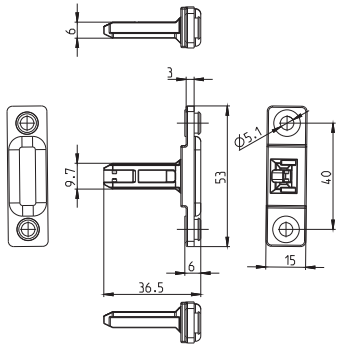


Mechanical data	
Actuator	Stainless steel (AV steel)
Minimum actuation radius R_{min}	800 mm

ACC-1 actuator
The transverse actuator – for vertical / horizontal mounting.



Produkt range	
Article number	**Designation**
3911742392	ACC-1

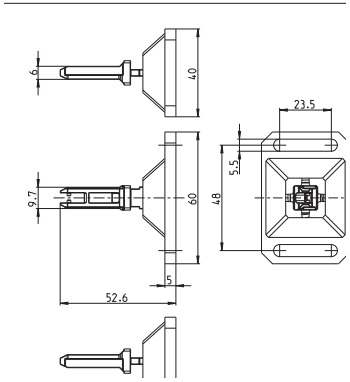


Mechanical data	
Actuator	Stainless steel (AV steel)
Minimum actuation radius R_{min}	600 mm

ACF-1 actuator
Designed to compensate a slight vertical/ horizontal offset.



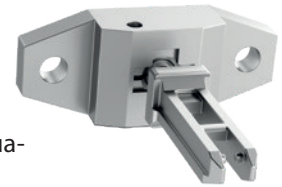
Produkt range	
Article number	**Designation**
3911742391	ACF-1



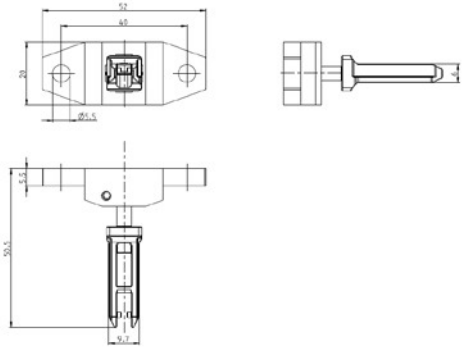
Mechanical data	
Actuator	Stainless steel (AV steel)
Enclosure	GD-Zn
Minimum actuation radius R_{min}	400 mm

ACR-1 actuator

Radius actuator, flexibly, for the use with small actuation 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





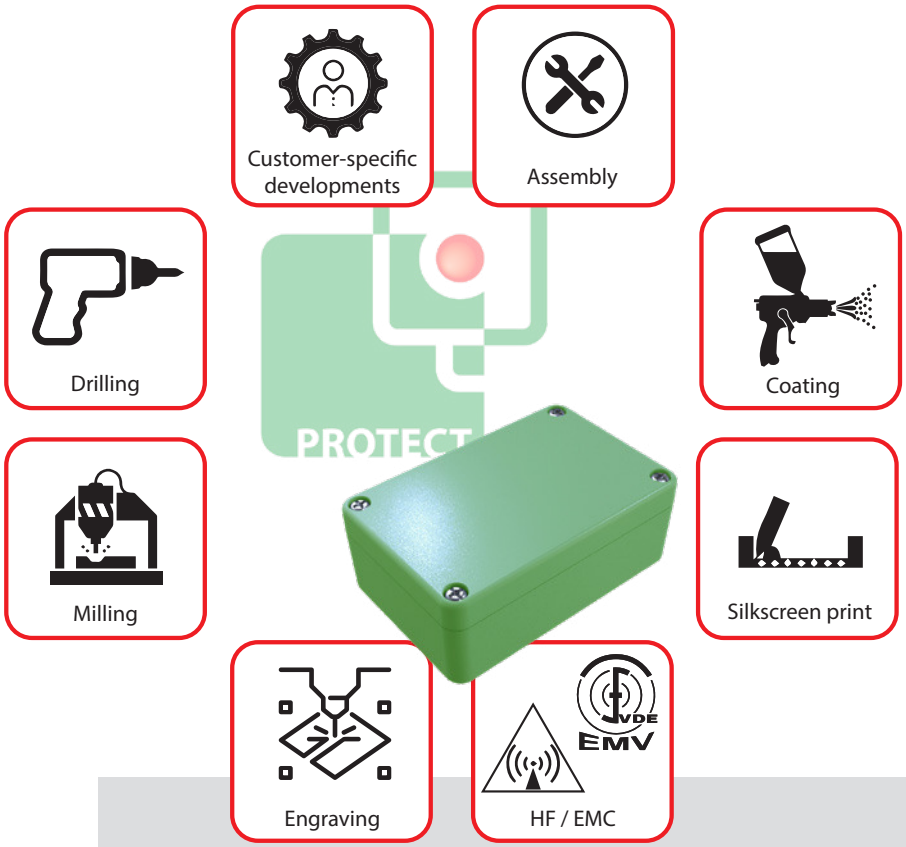
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Our evergreen

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.



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— as well as the requirements of our customers.
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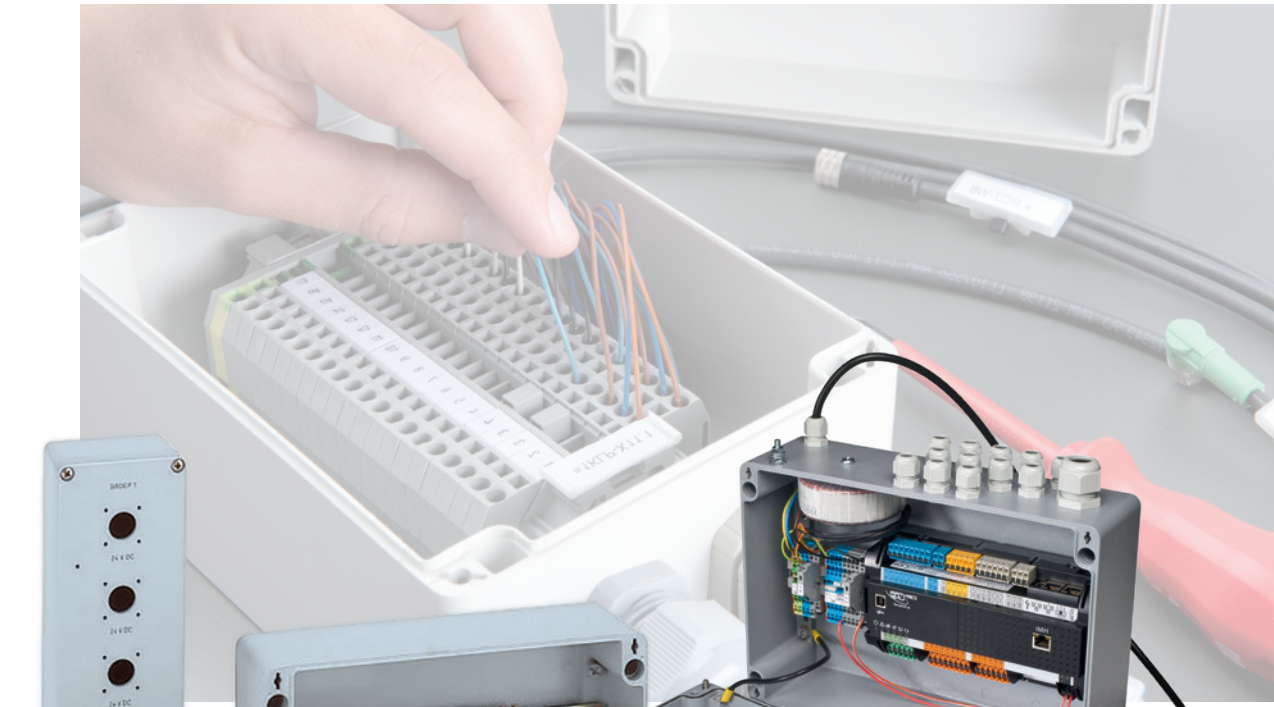
From machining to finishing, pre-assembly of DIN rails and terminals to a complete wired solution, BERNSTEIN can satisfy your every need.

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

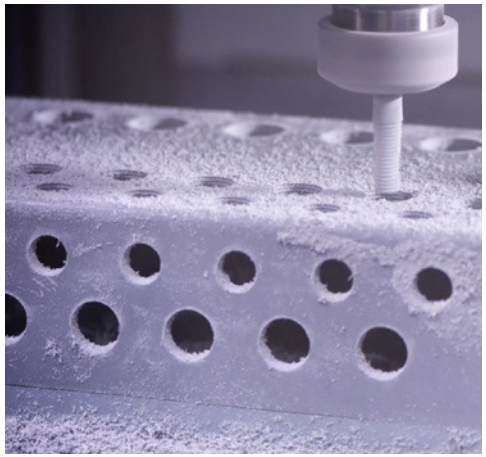
As a solution specialist, BERNSTEIN has core competencies in mechanical engineering, this combined with an extensive ultra-modern machining and powder-coating facility, BERNSTEIN can deliver any solution to meet your exact needs. Whether it's CNC machining, pre-processing or specialised finishes, we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

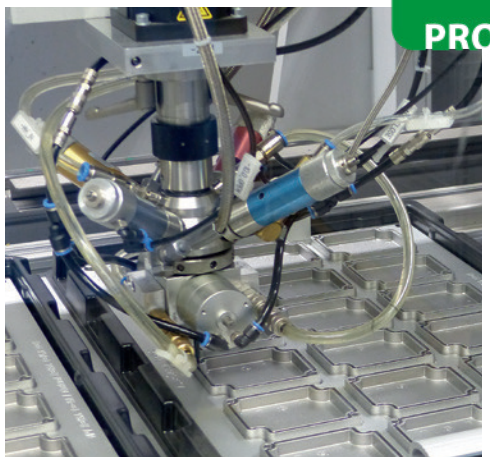
We are not only a solution provider, we are also the right partner to assist in your design process. With our in-house design team, we can advise on colours, printing etc., or even on the design and production of bespoke enclosure solutions.

BERNSTEIN offers customer service

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











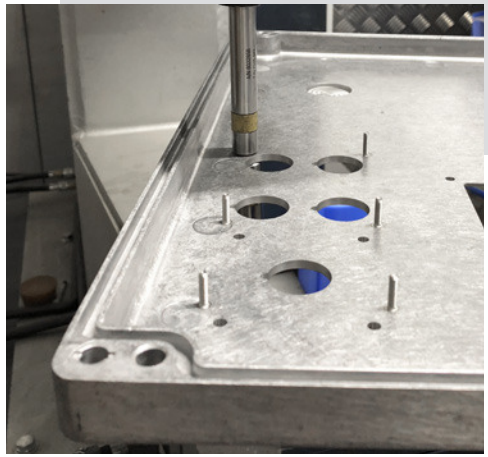


CA series Aluminium



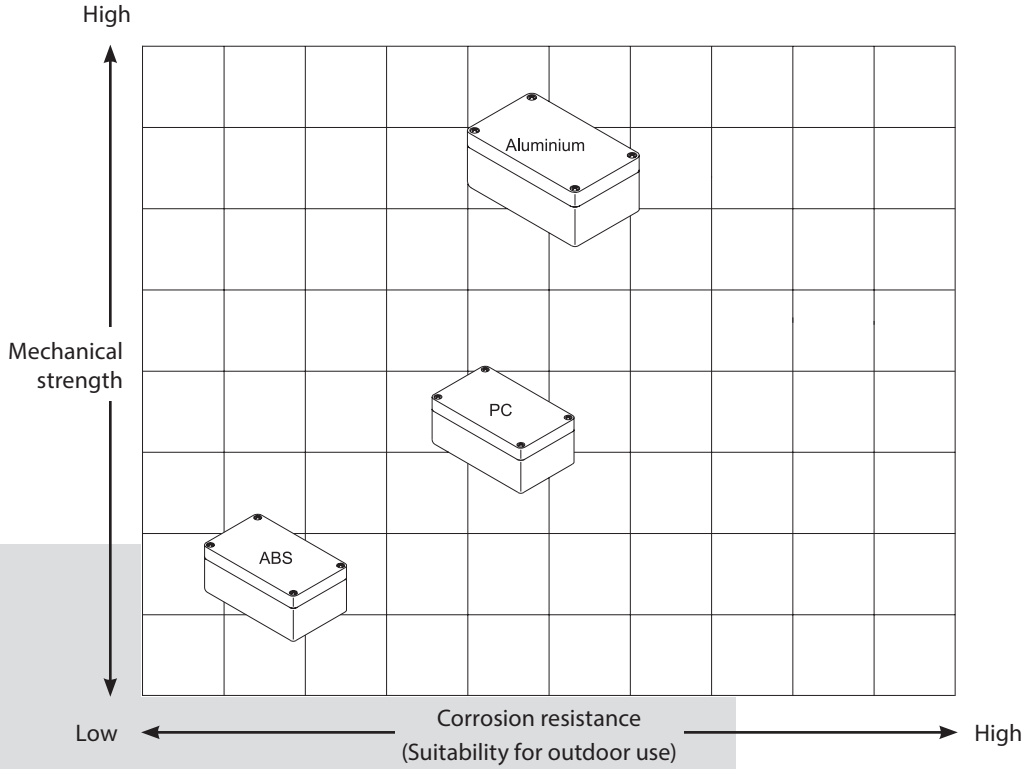
CT series Polycarbonate **CT series** ABS





STANDARD ENCLOSURES CA und CT





Material properties	Standard	Unit	Aluminium	Polycarbonate	ABS
Density	DIN 53479	g/cm³	2.65	1.2	1.05
Impact resistance	DIN 53453	mJ/mm²	150 – 300	65	60
Impact strength	DIN 53453	mJ/mm²	90 – 200	20	10
Tension strength	DIN 53455	N/mm²	180 – 300	65	43
Elongation at break	DIN 53455	%	60 – 90	90	20
Modulus of elasticity (bending test)	DIN 53457	N/mm²	75000	2300	2100
Limit bending stress	DIN 53452	N/mm²		95	90
Flammability	UL 94	Class		V 2	HB
Volume resistivity	DIN 53482	Ohm × cm		10^{15}	10^{13}
Surface resistance	DIN 53482	Ohm × cm		≥ 10^{15}	4 x 10^{14}
Dielectric strength	DIN 53481	kV/mm		25 – 40	24
Thermal conductivity (20°C)	DIN 52612	W/mK	120 – 160	0.21	0.18
Electrical conductivity (20°C)		m/Ohm mm²	15 – 22		

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

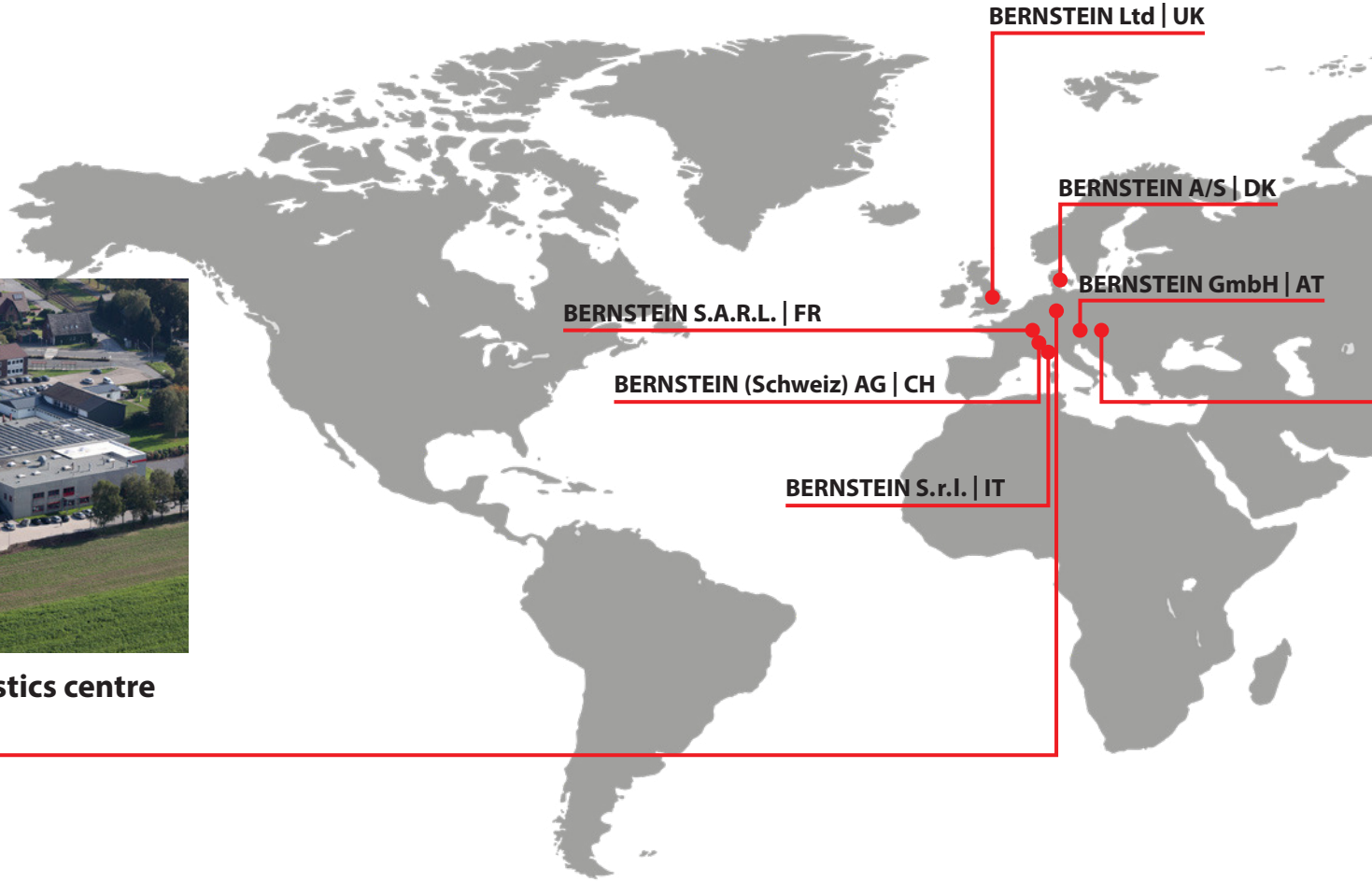


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