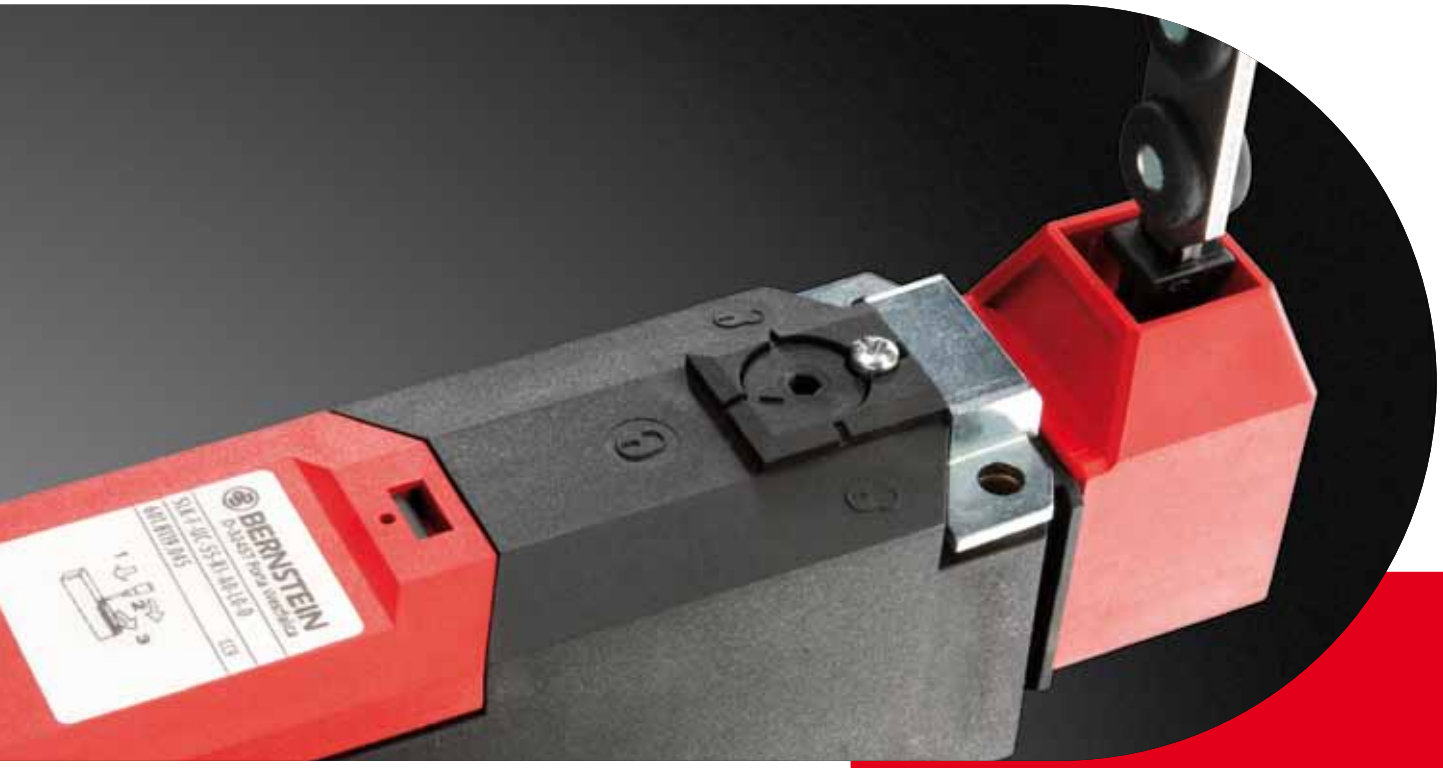
BERNSTEIN



Complete Range
Switch Systems

BERNSTEIN

BERNSTEIN AG – A Success Story

Safety for man and machine

In-depth market knowledge, the close proximity to end users as well as years of experience in mechanical engineering and electronics are reflected down to the last detail in our products.

Against this backdrop, BERNSTEIN ranks among the world's leading providers of industrial safety technology. With our comprehensive range of switches, sensors, enclosures and operator terminals, we offer our customers effective and versatile solutions. By conforming to international safety guidelines, our products perfectly integrate in individual system solutions. Our focus is complete commitment to safety for man, machine and industrial processes.

Our expertise for your safety

With sound application expertise we support our customers from all branches of industry in the planning and implementation of systems designed to meet stringent safety requirements. In addition to classic plant and machine construction, we look after customers in the lift construction, automotive, agriculture, conveyor construction, automation engineering, wood-working, renewable energy and medical technology industries.

We welcome direct dialogue with our customers to enable us to provide them with the best possible solutions for their specific applications.

Future-proof solutions

Our objective is to actively influence technical innovation and modern application solutions. BERNSTEIN has therefore always been at the centre of defining trends in technology. With an unwavering commitment to the future we will continue providing the best possible answers in terms of technology, ecology and economic efficiency.

That is our definition of progress!

BERNSTEIN AG
The Product Lines

Switch Systems

**Switch systems –
Economy meets safety**

BERNSTEIN electromechanical switches offer a convincing price/performance ratio and impress with their extreme reliability for many different operating voltages. The range extends from limit switches, encapsulated in insulating material or metal, through foot switches to safety switching devices. The AS-i compatible products save time and material in installation and provide cost advantages in operation. The comprehensive range of designs and sizes, the possible switching functions and the choice of actuators make virtually any application reality.

Sensor Systems

**Sensor systems –
Compact intelligence**

The extremely fast and exceptionally precise BERNSTEIN sensors operate without interference and wear in all applications. The tried-and-tested reliability and the compact dimensions are greatly appreciated in all branches of industry. Matching the specific application, in addition to ultrasonic sensors and level switches, customers can choose from a wide range of inductive, capacitive, magnetic or optical sensors. Alongside the complete standard range of sensors, we also offer comprehensive development and design for individual solutions.

Enclosure Systems

Enclosure systems –
Function and design

With its long tradition in manufacturing enclosures, BERNSTEIN combines superior enclosure technology, designed for encapsulating a diverse range of applications, with ultramodern and variable suspension systems. An extensive range of aluminium and plastic terminal boxes as well as the wiring and circuitry in standard and control enclosures conforming to specific customer requirements round off the product portfolio. Our enclosures conform to standards used in medical technology, industry as well as food and EX applications.

Product Line
Switch Systems

Switch systems – Economy meets safety

BERNSTEIN AG is an established manufacturer of high quality electromechanical low voltage switching devices. Our products are used in the most diverse range of applications, ranging from lift construction through wood-working and packaging machines through to machine tools.

In addition to functional reliability and high quality, BERNSTEIN switch systems also efficiently safe time in terms of installation and maintenance.These advantages further underscore the benefits for the end product as they drastically reduce downtimes for servicing and maintenance purposes. This is achieved through such features as the quick-connect head for time-saving installation at cable pull switches or the AS interface components which, in addition to shortening installation times, also reduce the number of hardware components and the space requirements in machines.

Switches are an integral part of modern processes

The primary purpose of a switch is to convert mechanical movement into electrical signals that are processed in machine and process control systems. However, switches directly connected to bus systems are being used to an ever greater extent in modern applications where mechanical movement is converted into digital information.

Besides reducing costs, our AS interface switch components also offer advantages such as the diagnostic features and uncomplicated system expansion in process applications.

BERNSTEIN switches are configured by combining different types of enclosure, switch system and actuator. Corresponding to the environmental and operating conditions, the switches are available in a metal or plastic enclosures.

The switching system is selected based on the function (slow-action or snap-action contact) and the required floating contacts. The actuator is also selected corresponding to the type and direction of actuation. Thanks to the large number of possible combinations, the scope of application is virtually unlimited.

The applications in which limit switches are used have changed in line with increasing automation. While not too long ago limit switches were mainly used for monitoring position, today they often additionally assume a safety function.

Complementing our product range we offer attractive customer services:

- Risk assessment training, DIN EN ISO 13849, EN 62061
- Assistance in assessing risk and configuring safety functions
- Preassembly of products with standard power supply lines or customised cables
- Supply of completely preassembled wiring harnesses
- Component supplied with M12 connector
- Customised adaptation of products

Safety and Standard Switches

General 12

Safety and Standard Position Switches

Insulation-enclosed limit switches (plastic)

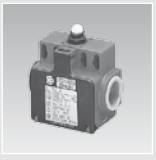
• C2 18

• Ti2 22

• IF 26

• I88 32

• SGS 38



• Bi2 40

• ENK 44

Metal-enclosed limit switches

• GC 50

• SN2 56

• ENM2 62

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Overview of actuators 72

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Electrical data 76

Safety Switches with Separate Actuator

Plastic

• SKT 80

• SKI 81

• SKC 82

• SK 83

Plastic/metal various types 86
• VTW
• VTU

Safety Switches with Separate Actuator and Latching Device

Plastic
• SLK 90

Metal
• SLM 94

Safety Switches for Hinged Protective Equipment

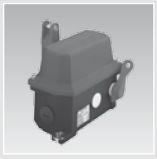
• SHS3 98

• SHS 102

• I88 VKS, -VKW, -AHDB
GC VKS, -VKW
Ti2 AHDB 106

Safety Command Devices

Safety cable pull switches **112**
• SRM
• SR



Cable pull switches spanned on both ends **118**
• SiRK
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Standard cable pull switches **122**

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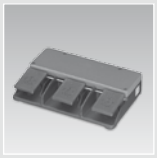

Foot switches **132**
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SCR Safety relays **142**

Bus-Compatible Safety Switches – AS Interface

AS-Interface Safety at Work **142**

AS-Interface Accessories **150**

ATEX

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Common Features of Electromechanical Switches

Switching systems

Switching elements lie at the heart of all electromechanical switching devices and must correspond to the respective application. Essentially there are two basic types of switching system that differ in terms of their mechanical design and consequently their scope of application:

- Slow-action contacts
- Snap-action contacts

Slow-action contacts

- On actuation, the normally-closed and normally-open contact functions correspond to the movement of the impact pin
- The approach speed controls the contact opening (closing) time
- Large distance/actuating travel between normally-closed and normally-open contact function
- The switching points are identical in forward and reverse travel

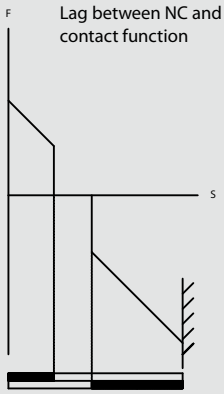


Fig. 1 shows the contact force during the switching cycle of a slow-action contact.

Overlap

- The switching principle of slap-action contacts makes overlapping of the NC/NO contact function possible. The term overlap refers to the area, in which both the normally-closed contact as well as the normally-open contact are closed in connection with a changeover switch with delay.

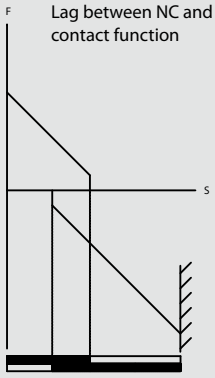


Fig. 2 shows the contact force during the switching cycle of a slow-action contact with overlap.

Snap-action contact

- On actuation, the normally-closed contact function is immediately followed by the normally-open contact function
- In this configuration there is no overlap of the NC/NO contacts. The switch provides a distinct OR-function.
- The changeover accuracy is not dependent on the approach speed
- Consistently effective suppression of DC arc
- Reliable contact-making also for extremely slow approach speeds
- The snap mechanism triggers the full opening width of the contact on reaching the changeover point
- Due to the force reversal in the mechanical system, a different switching point occurs in forward and reverse travel. The lag is referred to as hysteresis.

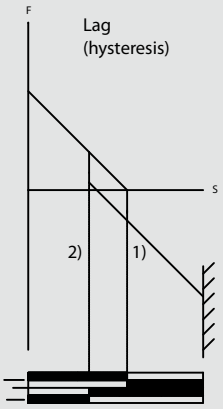


Fig. 3 shows the contact force during the switching cycle of a snap-action contact.

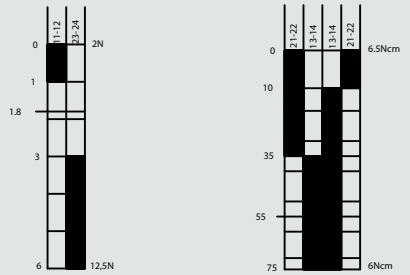
[1] Changeover point in forward travel
[2] Changeover point in reverse travel

Switching diagram

The switching diagram describes the function of the switching device in detail.

It combines the mechanical input variables that act on the contact system via the actuator with the electrical output variables. The user can deduct the following information from the switching diagram:

- Mechanical input variables (force, travel, torque, angle)
- Electrical contact-making in forward and reverse travel
- Terminal designation
- Point at which positive opening is achieved
- Type of contact system



Slow-action contact Snap-action contact

■ Contact closed
□ Contact open

Contact designation

In accordance with DIN 50013 and DIN 50005 the terminal designations of the contact elements are always make up of two digits.

The contact rows are numbered consecutively with the allocating digit (1st digit) in actuation direction. Contacts of a switching element that belong together have the same allocating digit.

The second digit is the function digit that denotes the type of contact element.

1–2 Normally-closed contact
3–4 Normally-open contact
5–6 Normally-closed contact with delayed opening
7–8 Normally-open contact with delayed closing

Protection class

The protection class of an enclosed device denotes the degree of protection. The degree of protection includes the protection of persons against contact with parts under voltage and the protection of equipment against the infiltration of foreign bodies and water. BERNSTEIN standard enclosures mainly correspond to protection classes IP65 and IP67. Higher protection ratings are also available for individual customer solutions. In accordance with DIN EN 60521 (IEC 529), the numerals used in the protection rating denote the following:

1st digit Degree of protection against contact and infiltration of foreign bodies

2nd digit Degree of protection against infiltration of water

Example IP65:

6 = ● Complete protection against contact with components under voltage or with internal moving parts
● Protection against dust infiltration

5 = ● A water jet directed from all directions at the device must not have damaging effects
● Protection against hose water

Enclosures

Limit switches are supplied either in a moulded enclosure or a metal enclosure. Which material is to be selected for a specific application depends on the ambient conditions, the location as well as several other factors.

Moulded limit switches provide protective insulation and are resistant to many aggressive chemicals and liquids. The formation of condensation water in moist environments with extreme temperature fluctuations is significantly reduced on moulded enclosures.

In insulation-enclosed switches the switching elements are integrated directly in the moulded enclosure and are therefore not replaceable (complete switching devices).

Metal-enclosed limit switches are able to withstand high mechanical loads, they can also be used wherever hot metal chips and sparks occur and are resistant to many solvents and detergents. The switching elements in metal-enclosed switches are often integrated in the metal enclosure as modular built-in switches. The enclosure has a VDE-compliant connection for the PE conductor.

Safety switches

The scope of application for limit switches has changed over time. Whereas limit switches were previously used for the purpose of detecting end positions, today they are increasingly assuming functions designed to protect persons and products in machine, equipment and plant construction.

The BERNSTEIN range of safety switches offers the right solution for the most diverse applications in many branches of industry. Particularly when it comes to safety, users appreciate the fact that they are able to procure all required safety switches and receive professional advice from one source.

The decisive factors governing the selection of safety equipment include the ambient conditions, installation situation and risk analysis.

A switching device that can be used for safety functions is identified by the standardised symbol conforming to EN 65000-41 and EN 65000-42. The switches can, of course, also be used for pure position monitoring purposes.

Safety switches are divided into two categories, Type 1 and Type 2. The difference is in the actuating elements which are completely integrated in the enclosure in Type 1 and separated from the switching element in Type 2.

Type 1

Type 2

Common Features of Electromechanical Switches

Designation

The designation of BERNSTEIN switching devices comprises:

- The enclosure designation of the switching device
- The switching function
- The type of actuator

Type code of position and safety switches

I88	**A2Z**[1]	**AH**	**M12**
Switch group	Switching system[2]	Actuator	Special features
● C2 ● Ti2 ● IF ● I88 ● Bi2 ● ENK ● GC ● SN2 ● ENM2 ● D	● U1 ● SU1 ● A2 ● SA2 ● E2 ● SE2	See Pages 72-73	● M12 connection ● Actuator turned 90°, 180°, 270° ● Special switching forces ● Special temperature ranges ● Other special features on request

[1] The letter Z suffix to the designation of the switching function denotes the mechanical positive opening action of the normally-closed contacts. In technical data sheets, the positive opening point is identified by the international symbol ⊖.

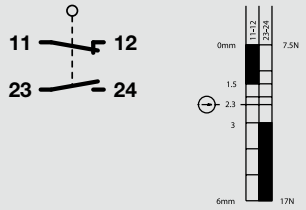
[2] Please refer to the following pages in the catalogue to establish which switching system can be used in the switch groups.

Switching function example

NC = Normally-closed contact
NO = Normally-open contact

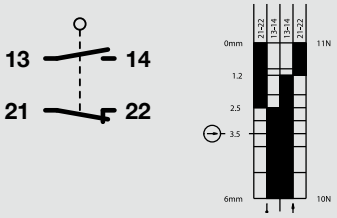
U1Z

Slow-action contact, 1 NC, 1 NO



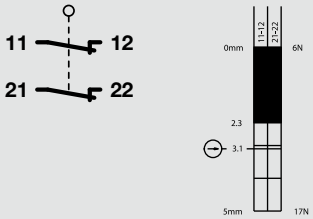
SU1Z

Snap-action contact, 1 NC, 1 NO



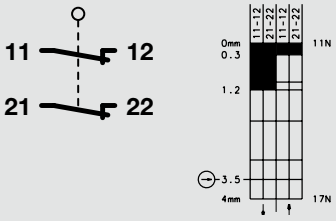
A2Z

Slow-action contact, 2 NC



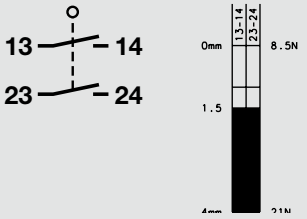
SA2Z

Snap-action contact, 2 NC



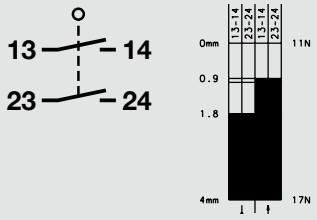
E2

Slow-action contact, 2 NO



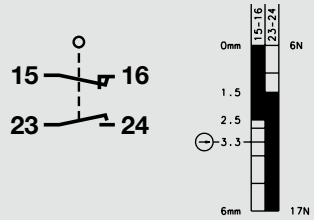
SE2

Slow-action contact, 2 NO



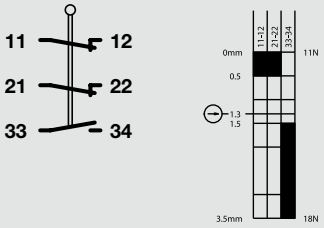
UV1Z

Slow-action contact,
with overlapping contacts,
1 NC, 1 NO



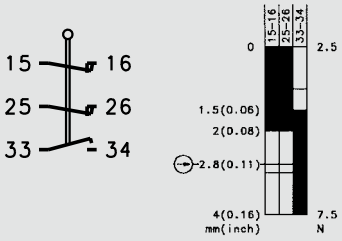
U15Z

Slow-action contact, 2 NC, 1 NO



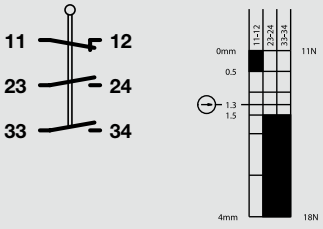
UV15Z

Slow-action contact,
with overlapping contacts,
2 NC, 1 NO



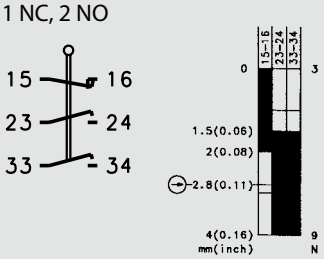
U16Z

Slow-action contact, 1 NC, 2 NO



UV16Z

Slow-action contact,
with overlapping contacts,
1 NC, 2 NO



The actuating forces and travel distances are subject to tolerances. These tolerances are listed in Table 1.
In Type 1 and Type 2 position switches, the tolerances are independent of the switching system and switching function.

Function	Tolerance
Switching travel	± 0.25 mm
Switching angle	± 3.5°
Switching force in N	± 10%
Actuating torque in	± 10%

Table 1

Common Features of Electromechanical Switches

⊖ = Mechanical positive opening action

The term positive opening action refers to contact separation as the direct result of defined movement of the switch actuator by means of non-sprung parts. All parts involved in contact separation must be form-fit connected. The positive opening distance describes the minimum travel distance from the start of actuation of the operating element up to the point where positive opening action of the opening contacts is completed.

DIN EN 60947-5-1 defines two types of positive opening action contacts with 4 connections and double break.

Type Za

- Positively opening contacts not galvanically isolated

Type Zb

- Positively opening contacts galvanically isolated

Galvanic isolation describes the isolation of electrically conducted parts by insulating material or by air gaps.

In switching devices with several contact elements, galvanically isolated contact elements make it possible to switch voltages with different potential (e.g. normally-closed contact in safety circuit, normally-open contact for indicator).

In accordance with applicable health and safety requirements, protective devices (guards) must be mounted on machines, devices and systems that perform hazardous movements. Safety switches in the form of electromechanical switching devices are predominantly used for this purpose as they offer the following advantages:

- High degree of safety
- Non-susceptibility to interference
- Safety status easily checked on site
- Rational solutions

Form-fit, mechanical drives or coupling elements in the form of levers, rods, gearwheels etc. are necessary to ensure optimum operation of these safety components.

Switching devices that are used for safety functions must be identified with the symbol ⊖ internationally standardised in accordance with DIN EN 60947-5-1.
In defining the class of switching devices, this symbol denotes two important properties that must be met for personal protection applications:

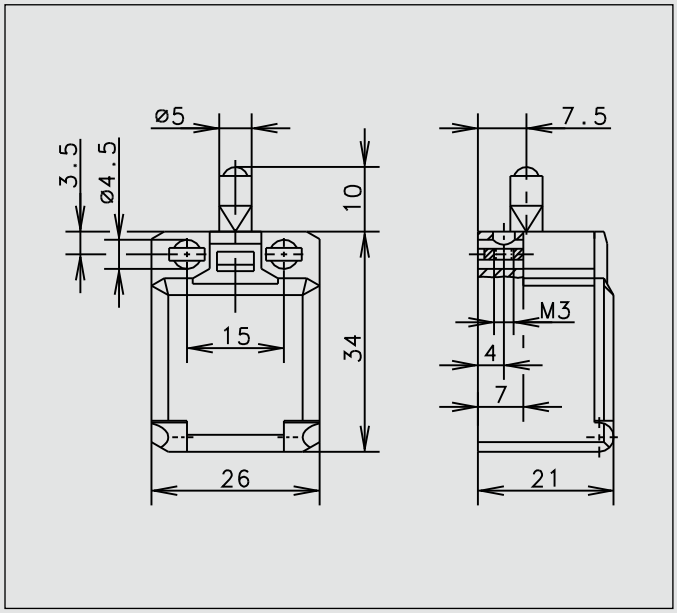
- Mechanical positive opening action
- Disruptive breakdown voltage > 2.5 kV

Disruptive breakdown voltage

In accordance with DIN EN 60947-5-1, the open contacts must be able to maintain a minimum surge voltage of 2.5 kV without disruptive breakdown.

Notes

C2



Recommended use

Ideal for safety applications and position monitoring in confined spaces.

Product advantages

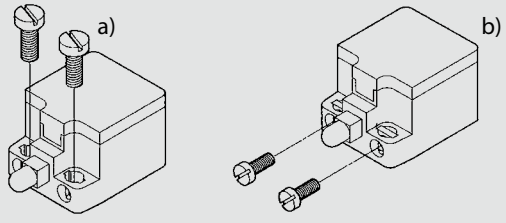
- Miniature switch for safety applications
- Two-channel safety monitoring possible
- With captive snap-on cover
- Small hysteresis in snap action system

Design layout

- Slow-action and snap-action contacts
- Versions: 1 NC/1NO, 2 NC, 2 NO
- All NC contacts with ⊖ in the circuit diagram are positively opening contacts
- Type: Zb (galvanically isolated changeover contact)

Mounting

- Also suitable for front mounting (depending on type)



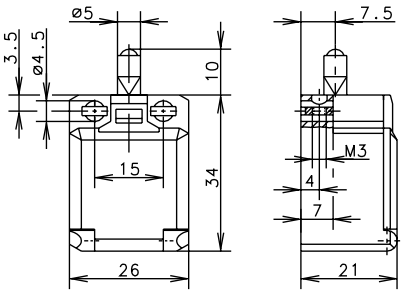
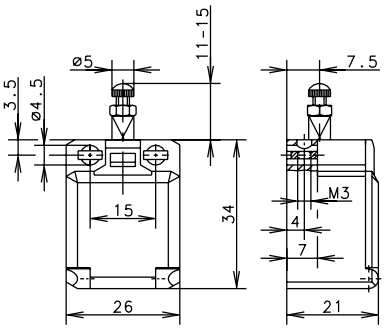
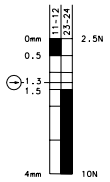
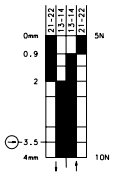
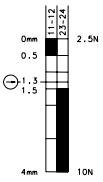
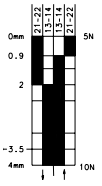
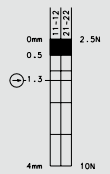
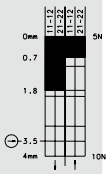
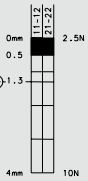
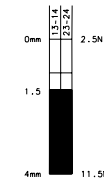
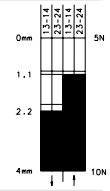
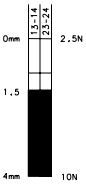
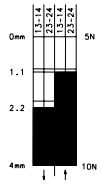
- a) 2 round holes for M4 screws
- b) 2 Integrated nuts for front mounting for M3 screws (depending on type)

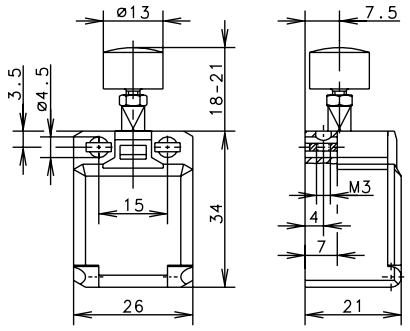
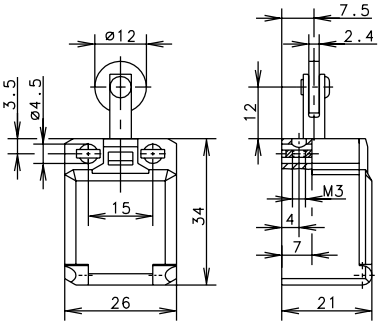
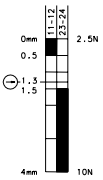
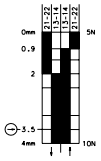
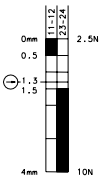
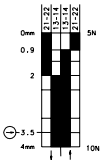
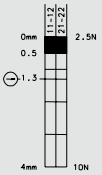
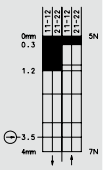
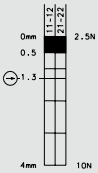
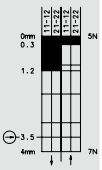
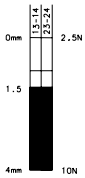
Installation advantages

- Snap-on cover can be released with screwdriver
- Cover opening range 180° (cover can also be detached from hinge)
- Cover protects switching element during installation
- Screw connections with self-lifting clamping plates
- Cover transparent for adjustment and visual inspection
- Easy-action cover lock (close and press)

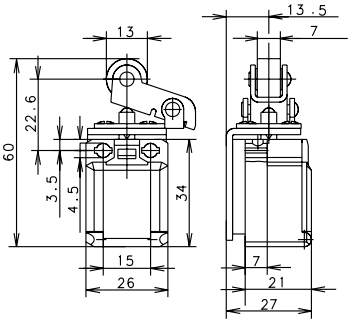
Technical data

Electrical data		
Rated insulation voltage	U_i max.	240 V AC
Conventional thermal current	I_{the}	10 A
Rated operating voltage	U_e max.	240 V
Utilization category	U_e/I_e	AC-15, U_e/I_e 240 V/3 A
Short-circuit protection		Fuse 6 A gL/gG
Protection class		II, Insulated
Mechanical data		
Enclosure material		Thermoplastic, glass fibre-reinforced (UL 94-V0)
Ambient temperature		-30 °C to +80 °C
Mechanical service life		3 x 10^6 switching cycles
B10d		6 Mio.
Switching frequency		≤ 100/min
Type of connection		Screw connections
Conductor cross sections		Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 – 1.5 mm^2
Cable entry		Rectangle 8.5 x 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		

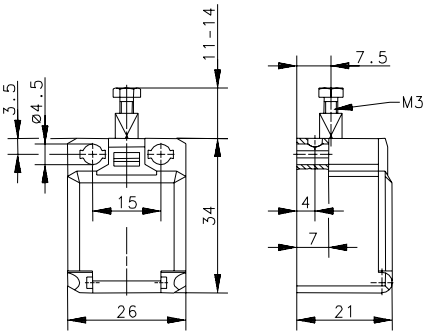
	W	ST
		
Switching operation	**Slow-action** **Snap-action**	**Slow-action** **Snap-action**
1 NC / 1 NO contact	**6008101001** C2-U1Z  **6008351002** C2-SU1Z 	**6008104025** C2-U1Z ST  **6008354026** C2-SU1Z ST 
2 NC contacts	**6008801003** C2-A2Z  **6008851004** C2-SA2Z 	**6008804027** C2-A2Z ST 
2 NO contacts	**6008801005** C2-E2  **6008851006** C2-SE2 	**6008804029** C2-E2 ST  **6008854030** C2-SE2 ST 
1 NC / 1 NO contact Overlapping		
Approvals		
	Replacement actuator: -	**Replacement actuator: -**
	Special features/variants (on request)	**Special features/variants** ● Actuator length adjustable with adjusting screw

	K	R
		
Switching operation	**Slow-action** **Snap-action**	**Slow-action** **Snap-action**
1 NC / 1 NO contact	**6008107019** C2-U1Z K  **6008357020** C2-SU1Z K 	**6008116013** C2-U1Z R  **6008366014** C2-SU1Z R 
2 NC contacts	**6008807021** C2-A2Z K  **6008857022** C2-SA2Z K 	**6008816015** C2-A2Z R  **6008866016** C2-SA2Z R 
2 NO contacts		**6008816017** C2-E2 R 
1 NC / 1 NO contact Overlapping		
Approvals		
	Replacement actuator: -	**Replacement actuator: -**
	Special features/variants ● Button actuator, for manual operation	**Special features/variants** (on request) ● Also available with roller turned by 90°

O.M.



BISTABLE O.M.



Slow-action	Snap-action
6008101007 + 3910190259 C2-U1Z O.M.	**6008351008 +** 3910190259 C2-SU1Z O.M.
6008801009 + 3910190259 C2-A2Z O.M.	

Slow-action	Snap-action
	6108351008 C2-SU1Z BISTABLE O.M.

Replacement actuator: 3910190259

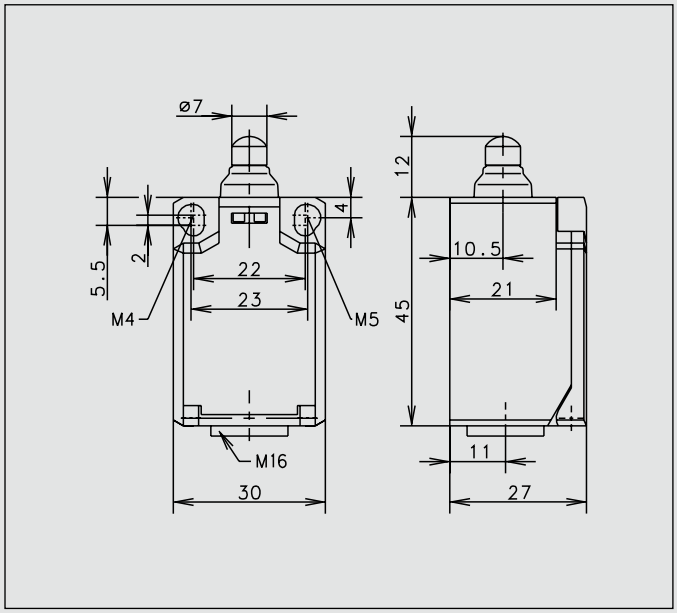
Replacement actuator: -

Special features/variants
(on request)

Special features/variants

- Bistable characteristics, actuator must be returned to initial position by external actuation (pulling)
- Actuator length adjustable with M3 adjusting screw

Ti2



Recommended use

Ideal for safety applications and position monitoring in confined spaces with high protection class IP65.

Product advantages

- Compact IP65 switch for safety applications
- Optimised size while retaining tried-and-tested connection system
- Two-channel safety monitoring possible
- With captive snap-on cover
- 2 mm contact opening width of slow-action system conforming to EN 81-1 for lift construction
- mall hysteresis in snap action system
- Actuator can be repositioned by 4 x 90°

Options

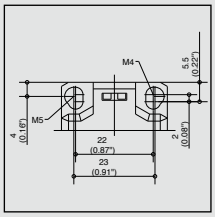
- Available with M12 connector
- AS interface variants available
- Preassembled with customer-specific cables and connectors on request

Design layout

- Slow-action and snap-action contacts
- Versions: 1 NC/1NO, 2 NC, 2 NO
- All NC contacts with ⊖ in the circuit diagram are positively opening contacts
- Type: Zb (galvanically isolated change-over contact)

Mounting

- Mounting dimensions conforming to DIN EN 50047
- 2 slots for adjustment with M4 screws (distance between centres 22 mm)



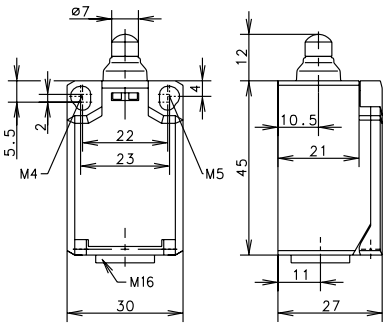
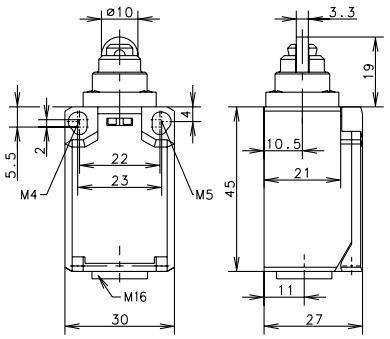
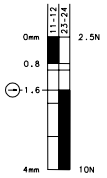
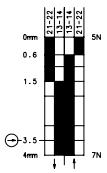
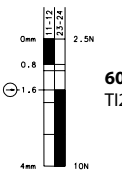
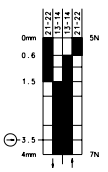
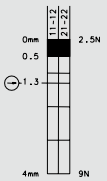
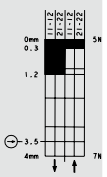
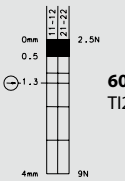
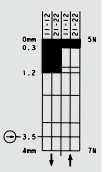
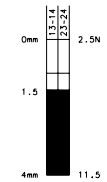
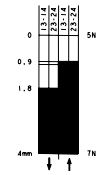
- Fixed positioning for safety applications with two M5 screws (distance between centres 23 mm)

Installation advantages

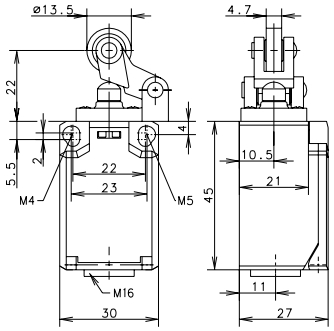
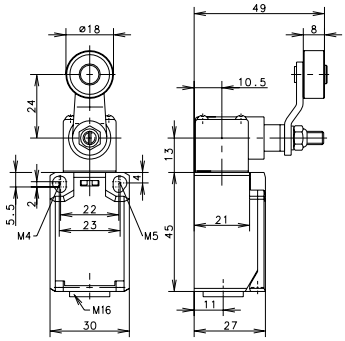
- Snap-on cover can be released with screwdriver
- Cover protects switching element during installation
- Screw connections with self-lifting clamping plates
- Cover transparent for adjustment and visual inspection
- Easy-action cover lock (close and press)

Technical data

Electrical data		
Rated insulation voltage	U_i max.	240 V AC
Conventional thermal current	I_{the}	10 A
Rated operating voltage	U_e max.	240 V
Utilization category	U_e/I_e	AC-15, U_e/I_e 240 V/3 A; DC-13, U_e/I_e 240 V/0,27 A
Short-circuit protection		Fuse 6 A gL/gG
Protection class		II, Insulated
Mechanical data		
Enclosure material		Thermoplastic, glass fibre-reinforced (UL 94-V0)
Ambient temperature		-30 °C to +80 °C
Mechanical service life		3 x 10^6 switching cycles
B10d		6 Mio.
Switching frequency		≤ 100/min.
Type of connection		Screw connections
Conductor cross sections		Single-wire 0.5 - 1.5 mm² or Stranded wire with ferrule 0.5 – 1.5 mm²
Cable entry		1 x M16 x 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		

	W (Form B)	RIW (Form C)
		
Switching operation	**Slow-action** **Snap-action**	**Slow-action** **Snap-action**
1 NC / 1 NO contact	**6088103001** TI2-U1Z W  **6088153002** TI2-SU1Z W 	**6088117007** TI2-U1Z RIW  **6088167008** TI2-SU1Z RIW 
2 NC contacts	**6088803003** TI2-A2Z W  **6088853004** TI2-SA2Z W 	**6088817009** TI2-A2Z RIW  **6088867010** TI2-SA2Z RIW 
2 NO contacts	**6088803005** TI2-E2 W 	**6088867012** TI2-SE2 RIW 
1 NC / 1 NO contact Overlapping		
Approvals		
	Replacement actuator: -	**Replacement actuator: -**
	Special features/variants (on request) ● Available with increased switching force	**Special features/variants** (on request) ● Available with increased switching force ● Available with different actuating directions ● Cannot be turned by user

Ti2

	HW (Form E)	AH (Form A)
		

Switching operation	Slow-action	Snap-action	Slow-action	Snap-action
1 NC / 1 NO contact	**6088121015** TI2-U1Z HW	**6088171016** TI2-SU1Z HW	**6088135021** TI2-U1Z AH	**6088185022** TI2-SU1Z AH
2 NC contacts	**6088821017** TI2-A2Z HW	**6088871018** TI2-SA2Z HW	**6088835023** TI2-A2Z AH	**6088885024** TI2-SA2Z AH
2 NO contacts		**6088871020** TI2-SE2 HW		
1 NC / 1 NO contact Overlapping				
Approvals				

Replacement actuator: 3918191547

Replacement actuator: 3918351166

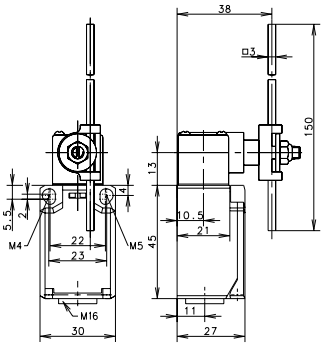
Special features/variants
(on request)

- Available with different actuating directions
- With steel roller
- Various roller diameters

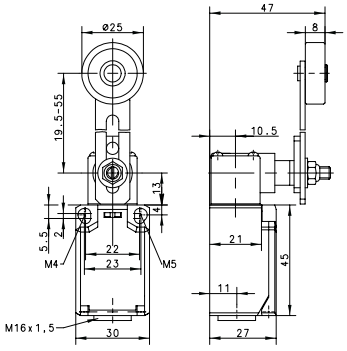
Special features/variants
(on request)

- Available with different actuating directions
- With steel roller
- Various roller diameters
- Cranked or straight lever
- Various lever lengths
- With roller over switch

AD



AV



Slow-action	Snap-action
6088137027 TI2-U1 AD	**6088187028** TI2-SU1 AD
6088837029 TI2-A2 AD	**6088887030** TI2-SA2 AD
	6088887032 TI2-SE2 AD

Slow-action	Snap-action
6088136033 TI2-U1 AV	**6088186034** TI2-SU1 AV
	6088886036 TI2-SA2 AV
6088836037 TI2-E2 AV	**6088886038** TI2-SE2 AV

Replacement actuator: 3918370986

Special features/variants
(on request)

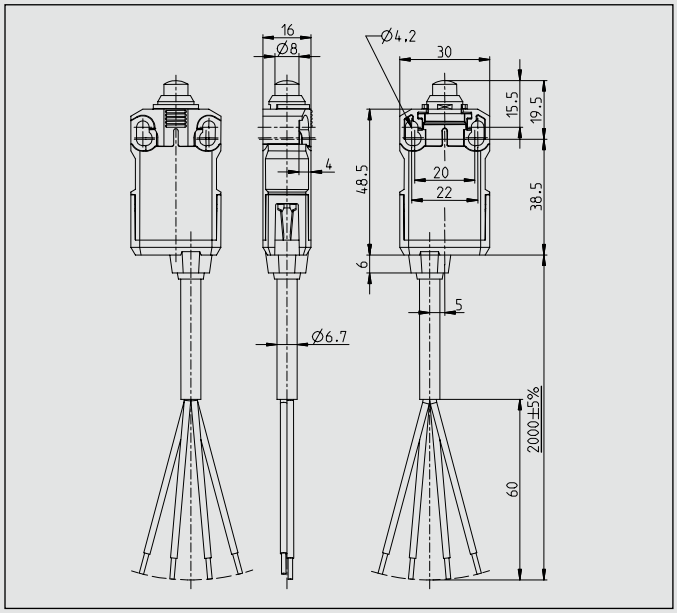
- Available with different actuating directions
- With various actuator lengths
- Available with increased switching force

Replacement actuator: -

Special features/variants
(on request)

- Available with different actuating directions
- Various roller diameters
- Various lever lengths
- With roller over switch

IF



Recommended use

Most limit switches soon come up against their limits in applications involving confined spaces and wherever high protection classes are required. Not so the IF switch from BERNSTEIN. With its slim design and full IP67 protection they are simply ideal for position monitoring and end position shutdown in safety applications.

Product advantages

- Slim line design
- With 2 m fixed cable or AMP4 connector
- High quality plastic enclosure
- Metal actuator and mounting clip
- Small hysteresis in snap action system
- Actuator can be repositioned by 4 x 90°
- Compact IP67 switch for safety applications
- Two-channel safety monitoring possible
- Other cable lengths available on request

Installation advantages

Flexibility is key in practical applications: And it is precisely here that IF switches from BERNSTEIN are a real asset. They have a modular design that makes them extremely flexible in installation and use Minimum stockkeeping: The approach direction can be quickly and easily changed by installation technician.

Options

- Various cable lengths available on request
- Can be preassembled with customised connectors on request

Design layout

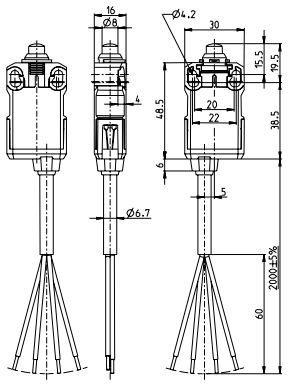
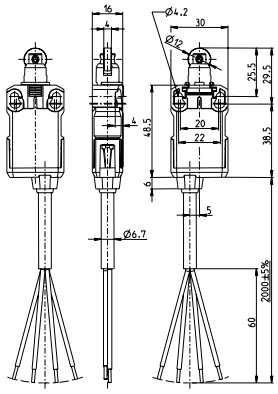
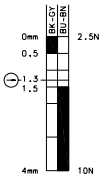
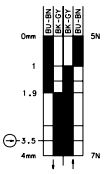
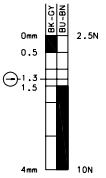
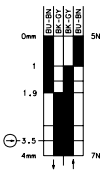
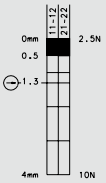
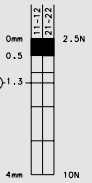
- Slow-action and snap-action contacts
- Versions: 1 NC/1NO, 2 NC, 2 NO
- All NC contacts with ⊖ in the circuit diagram are positively opening contacts
- Type: Zb (galvanically isolated changeover contact)

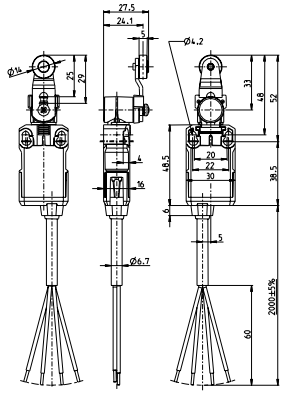
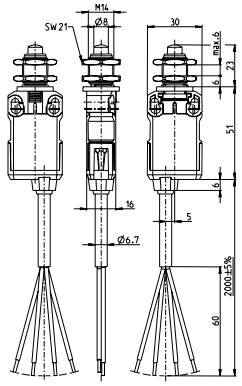
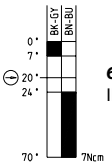
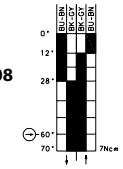
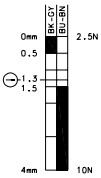
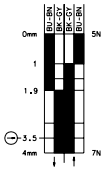
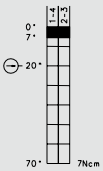
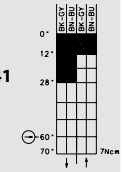
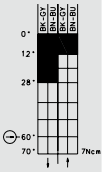
Mounting

- Two M4 screws for adjustment with slots
- Two M5 screws for safety applications; front mounting depending on type

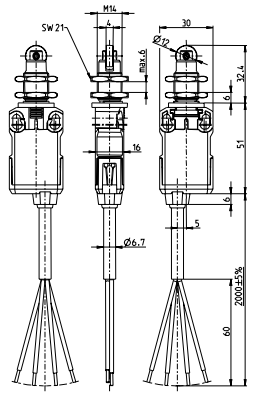
Technical data

Electrical data		
Rated insulation voltage	U_i max.	240 V AC
Conventional thermal current	I_{the}	10 A
Rated operating voltage	U_e max.	240 V
Utilization category		AC-15, U_e/I_e 240 V/3 A
Short-circuit protection		Fuse 6 A gL/gG
Protection class		II, Insulated
Mechanical data		
Enclosure material		PA6 (glass fibre-reinforced)
Ambient temperature		-25 °C to +70 °C (Connection cable installed)
Mechanical service life		3 x 10^6 switching cycles
B10d		6 Mio.
Switching frequency		≤ 30/min.
Type of connection		Cable 4 x 0.75 mm²
Protection class		IP67 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		

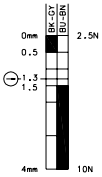
	IW	RIW
		
Switching operation	**Slow-action** **Snap-action**	**Slow-action** **Snap-action**
1 NC / 1 NO contact	**6089102001** IF-U1Z IW  **6089152006** IF-SU1Z IW 	**6089117002** IF-U1Z RIW  **6089167007** IF-SU1Z RIW 
2 NC contacts	**6089802011** IF-A2Z IW 	**6089817012** IF-A2Z RIW 
2 NO contacts		
1 NC / 1 NO contact Overlapping		
Approvals		
	Replacement actuator: -	**Replacement actuator: -**
	Special features/variants (on request)	**Special features/variants** ● Actuator can be turned in steps of 90°

	AH	IWF
		
Switching operation	**Slow-action** **Snap-action**	**Slow-action** **Snap-action**
1 NC / 1 NO contact	**6089135003** IF-U1Z AH  **6089185008** IF-SU1Z AH 	**6089102004** IF-U1Z IWF  **6089152009** IF-SU1Z IWF 
2 NC contacts	**6089835013** IF-A2Z AH  **6089885041** IF-SA2Z AH 	**6089802014** IF-A2Z IWF  **6089852043** IF-SA2Z IWF 
2 NO contacts		
1 NC / 1 NO contact Overlapping		
Approvals		
	Replacement actuator: -	**Replacement actuator: -**
	Special features/variants ● Actuator can be turned in steps of 90°	**Special features/variants** ● Front mounting

RIWF

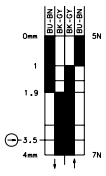


Slow-action

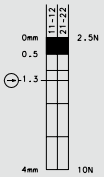


6089117005
IF-U1Z RIWF

Snap-action

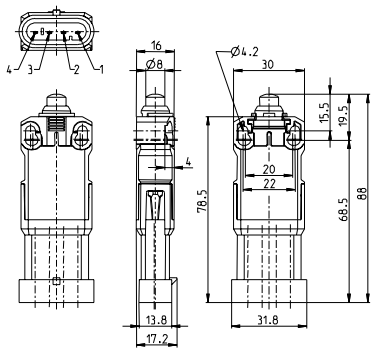


6089167010
IF-SU1Z RIWF

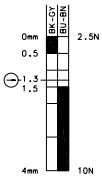


6089817015
IF-A2Z RIWF

IW AMP4



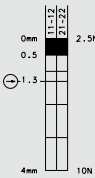
Slow-action



6089102016
IF-U1Z IW
AMP4

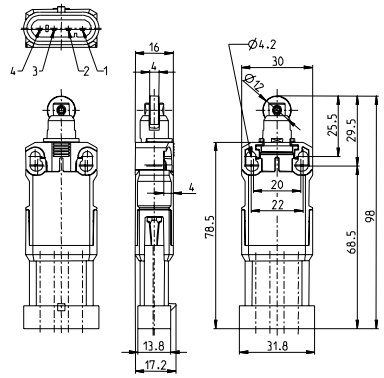
Snap-action

6089152021
IF-SU1Z IW
AMP4

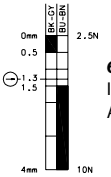


6089802026
IF-A2Z IW
AMP4

RIW AMP4

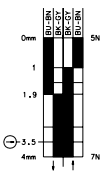


Slow-action

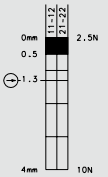


6089117017
IF-U1Z RIW
AMP4

Snap-action



6089167022
IF-SU1Z RIW
AMP4



6089817027
IF-A2Z RIW
AMP4

Replacement actuator: -

Special features/variants

- Front mounting
- Actuator can be turned in steps of 90°

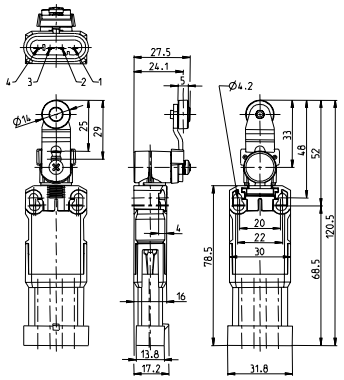
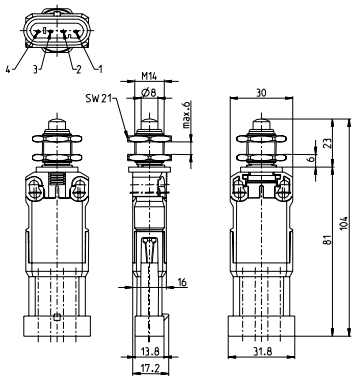
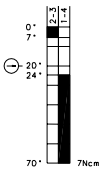
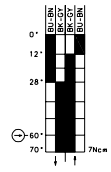
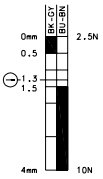
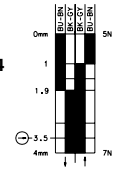
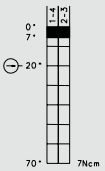
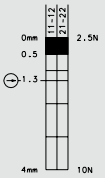
Replacement actuator: -

Special features/variants
(on request)

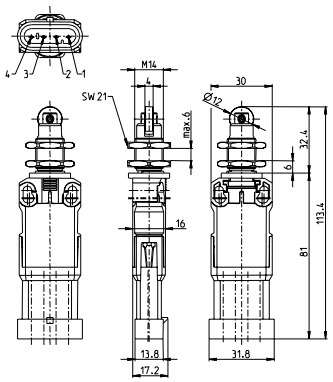
Replacement actuator: -

Special features/variants

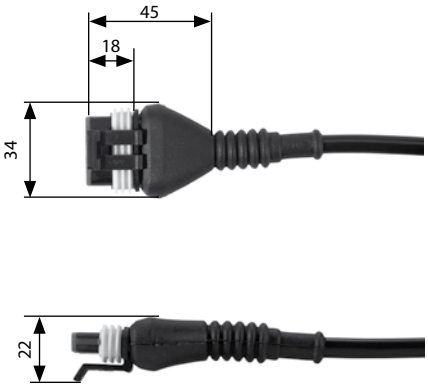
- Actuator can be turned in steps of 90

	AH AMP4	IWF AMP4
		
Switching operation	**Slow-action** **Snap-action**	**Slow-action** **Snap-action**
1 NC / 1 NO contact	**6089135018** IF-U1Z AH AMP4  **6089185023** IF-SU1Z AH AMP4 	**6089102019** IF-U1Z IWF AMP4  **6089152024** IF-SU1Z IWF AMP4 
2 NC contacts	**6089835028** IF-A2Z AH AMP4 	**6089802029** IF-A2Z IWF AMP4 
2 NO contacts		
1 NC / 1 NO contact Overlapping		
Approvals		
	Replacement actuator: -	**Replacement actuator: -**
	Special features/variants ● Actuator can be turned in steps of 90	**Special features/variants** ● Front mounting

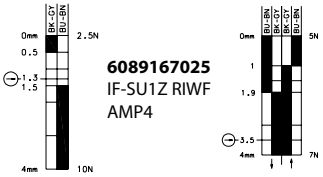
RIWF AMP4



AMP Connection cable

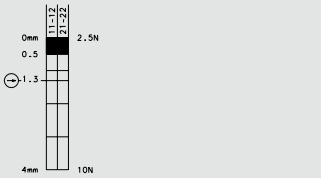


Slow-action **Snap-action**



6089117020
IF-U1Z RIWF
AMP4

6089167025
IF-SU1Z RIWF
AMP4



6089817030
IF-A2Z RIWF
AMP4

Cable length 3.5 m:
3251204309
AN-KAB.IF 3.5M AMP4

Cable length 5 m:
3251204281
AN-KAB.IF 5M AMP4

Cable
UL-CSA-S03VV2-F4x0.75 black n. UL2517, CSA C22.2/210.2 and n. VDE 0281 part 12 n. HAR 21.12 S1

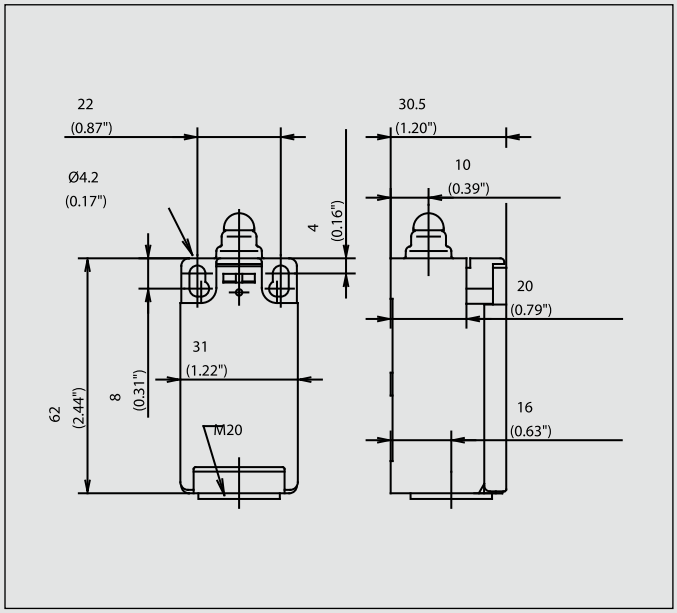
Pin assignment
1-GY, 2-BU, 3-BN, 4-BK

Replacement actuator: -

Special features/variants

- Front mounting
- Actuator can be turned in steps of 90

I88



Recommended use

Thanks to its standard dimensions as well as its wide range of contacts and actuators, this switch can be used on safety facilities and for position monitoring in virtually any industrial application.

Product advantages

- Standard switch conforming to DIN EN 50047
- Standard actuator conforming to DIN EN 50047, Type A, B, C, E
- Protection class IP65 to VDE 0470 T1
- Enclosure and cover PA 6, self-extinguishing (UL-94-V0)
- Actuator can be repositioned by 4 x 90°
- Cable entry M20 x 1.5
- Connection designation conforming to DIN EN 50013

Options

- Available with M12 connector
- AS interface variants available
- Cable entry M16 x 1.5

Design layout

- Slow-action and snap-action contacts
- Versions: 1 NC/1NO, 2 NC, 2 NO, overlapping contacts
- All NC contacts with ⊖ in the circuit diagram are positively opening contacts
- Type: Zb (galvanically isolated changeover contact)
- Latching function on request

Mounting

- Two M4 screws (distance between centres 22 mm), adjustment with slots
- Two M5 screws for safety applications without additional fixing element (Fig. 1)
- Additionally secured by guide plate for lateral approach forces (Fig. 2)
- Front mounting (depending on type, Fig. 3)

Installation advantages

- Snap-on cover can be released with screwdriver
- Cover opening range 135° (cover can also be detached from hinge)
- Cover protects switching element during installation
- Screw connections with self-lifting clamping plates
- Easy-action cover lock (close and press)
- Cover additionally secured with screw

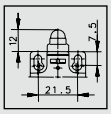


Fig. 1

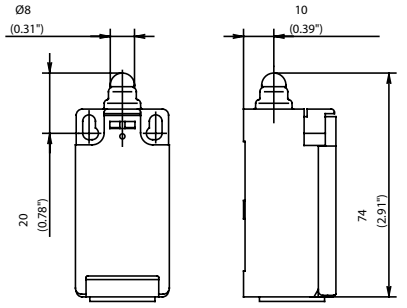
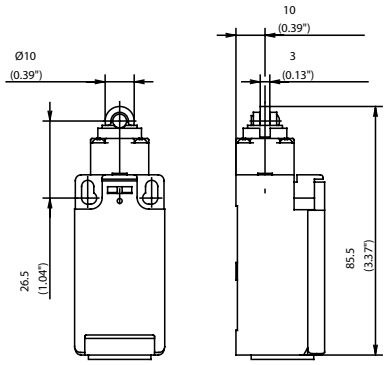
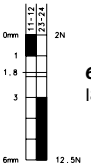
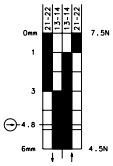
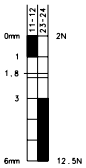
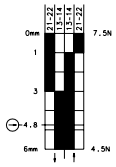
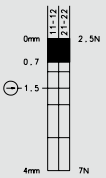
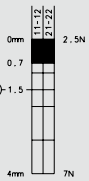
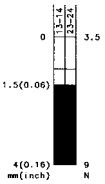
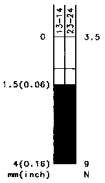
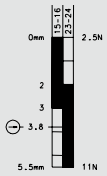

Fig. 2

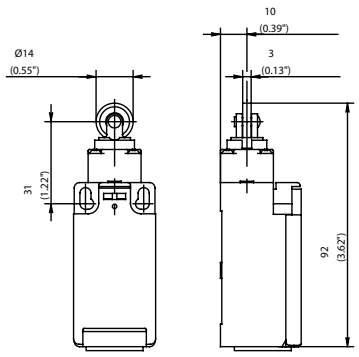
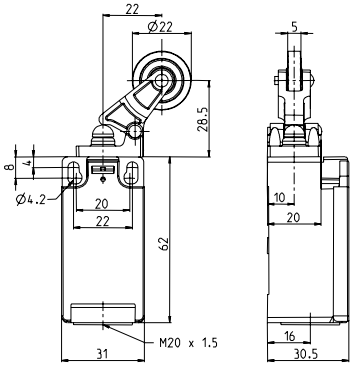

Fig. 3

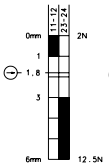
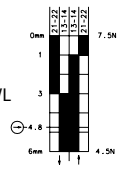
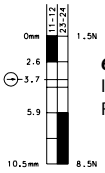
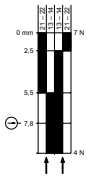
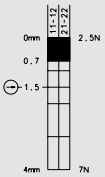
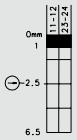
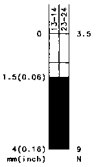
Technical data

Electrical data		
Rated insulation voltage	U_i max.	250 V AC
Conventional thermal current (up to) ①	I_{the}	10 A
Rated operating voltage	U_e max.	240 V
Utilization category (up to) ①		AC-15, U_e/I_e 240 V/3 A
Short-circuit protection (up to) ①		Fuse 10 A gL/gG
Protection class		II, Insulated
Mechanical data		
Enclosure material		Thermoplastic, glass fibre-reinforced (UL 94-V0)
Ambient temperature		-30 °C to +80 °C
Mechanical service life (up to) ①		10 x 10^6 switching cycles
B10d (up to) ①		20 Mio.
Switching frequency		≤ 100/min.
Type of connection		Screw connections
Conductor cross sections		Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 – 1.5 mm^2
Cable entry		1 x M20 x 1,5
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. See Table on Pages 76-79.

	W (Form B)	RIWK (Form C)
		
Switching operation	**Slow-action** **Snap-action**	**Slow-action** **Snap-action**
1 NC / 1 NO contact	**6086103008** I88-U1Z W  **6086153012** I88-SU1Z W 	**6086117017** I88-U1Z RIWK  **6086167018** I88-SU1Z RIWK 
2 NC contacts	**6086803013** I88-A2Z W 	**6086817087** I88-A2Z RIWK 
2 NO contacts	**6086803014** I88-E2 W 	**6086817071** I88-E2 RIWK 
1 NC / 1 NO contact Overlapping	**6086303011** I88-UV1Z W 	
Approvals		
	Replacement actuator: -	**Replacement actuator: 3918161672**
	Special features/variants (on request) ● Available with black enclosure ● With latching function and following contacts: 2 NC /1 NO contact 1 NC /2 NO contact ● Both with and without overlap	**Special features/variants** (on request) ● Available with black enclosure ● With latching function ● With steel roller and following contacts: 2 NC /1 NO contact 1 NC /2 NO contact ● Both with overlap

	RIWL	KNW RO22
		

Switching operation	Slow-action	Snap-action	Slow-action	Snap-action
1 NC / 1 NO contact	**6086117050** I88-U1Z RIWL 	**6086167051** I88-SU1Z RIWL 	**6186127112** I88-U1Z KNW RO22 	**6086177053** I88-SU1Z KNW RO22 
2 NC contacts	**6086817072** I88-A2Z RIWL 		**6186827246** I88-A2Z KNW RO22 	
2 NO contacts	**6086817069** I88-E2 RIWL 			
1 NC / 1 NO contact Overlapping				
Approvals				

Replacement actuator: 3918161673

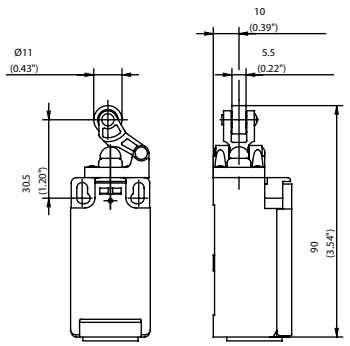
Replacement actuator: -

Special features/variants
(on request)

- Available with black enclosure
- With latching function
- Available with different actuating directions
- With steel roller

Special features/variants
(on request)

HW RO11 (Form E)



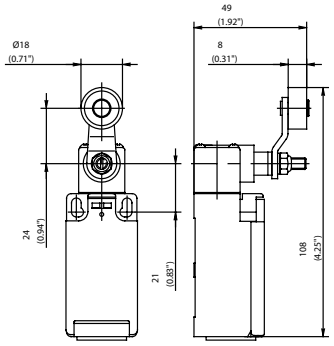
Slow-action	Snap-action
6086121021 I88-U1Z HW RO11	**6086171022** I88-SU1Z HW RO11
6086821099 I88-A2Z HW RO11	
6086821068 I88-E2 HW RO11	
6086321100 I88-UV1Z HW RO11	

Replacement actuator: 3918191547

Special features/variants
(on request)

- Available with black enclosure
- With steel roller
- Various roller diameters

AH (Form A)



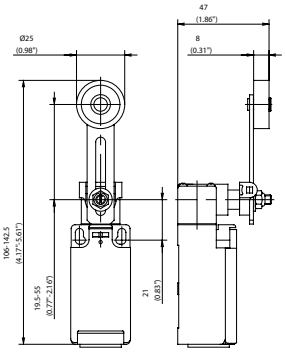
Slow-action	Snap-action
6086135033 I88-U1Z AH	**6086185034** I88-SU1Z AH
6086835059 I88-A2Z AH	
6086835116 I88-E2 AH	
6186335628 I88-UV1Z AH	

Replacement actuator: 3918351166

Special features/variants
(on request)

- Available with black enclosure
- Available with different actuating directions
- With steel roller
- Various roller diameters
- Cranked or straight lever
- Various lever lengths

AV

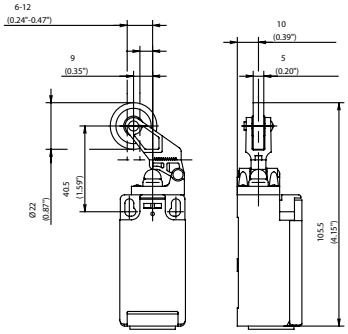
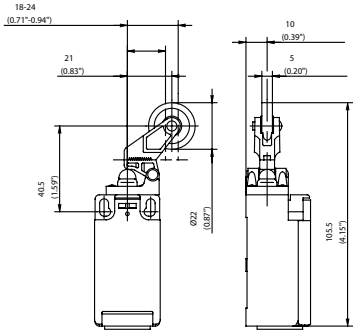


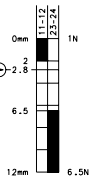
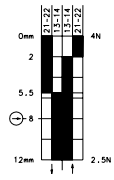
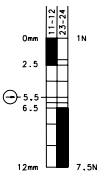
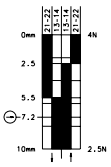
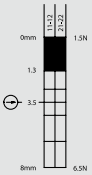
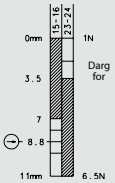
Slow-action	Snap-action
6086136037 I88-U1 AV	**6086186038** I88-SU1 AV
6086836131 I88-A2 AV	

Replacement actuator: 3918360984

Special features/variants
(on request)

- Available with black enclosure
- Various actuating directions
- Various roller diameters
- Cranked or straight lever
- Various lever lengths
- With roller over switch

	DGHW RO22	DGKW RO22
		

Switching operation	Slow-action	Snap-action	Slow-action	Snap-action
1 NC / 1 NO contact	**6086121029** I88-U1Z DGHW RO22 	**6086171030** I88-SU1Z DGHW RO22 	**6086127025** I88-U1Z DGKW RO22 	**6086177026** I88-SU1Z DGKW RO22 
2 NC contacts	**6086821120** I88-A2Z DGHW RO22 			
2 NO contacts				
1 NC / 1 NO contact Overlapping	**6186321244** I88-UV1Z DGHW RO22 			
Approvals				

Replacement actuator: 3918211529

Replacement actuator: 3918271528

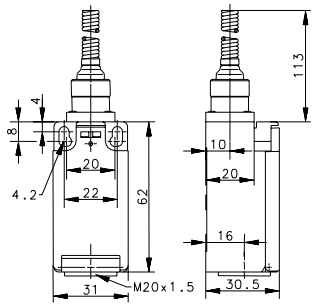
Special features/variants
(on request)

- Available with black enclosure
- Available with different actuating directions
- Various roller diameters

Special features/variants
(on request)

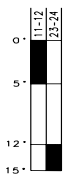
- With latching function
- Various roller diameters and with following contacts:
  2 NC /1 NO contact
  1 NC /2 NO contact
  Both with overlap

FF



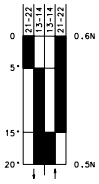
Slow-action

6186140217
I88-U1 FF



Snap-action

6086190078
I88-SU1 FF

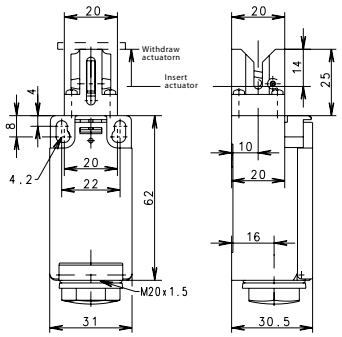


Replacement actuator: 3918401031

Special features/variants
(on request)

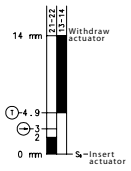
- Available with black enclosure
- Various spring lengths
- Different spring versions or spring rod

KS



Slow-action

6116819140
I88-U1Z KS

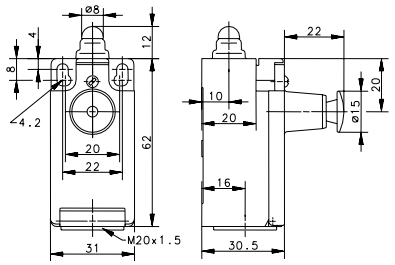


Snap-action

Replacement actuator: -

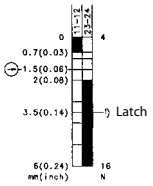
Special features/variants
(on request)

W RAST

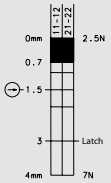


Slow-action

6186103005
I88-U1Z W
RAST



6186803155
I88-A2Z W
RAST



Replacement actuator: -

Special features/variants
(on request)

SGS

The SGS is a bistable safety switch with remote release facility. Once switched, the SGS remains in this position until it is manually reset at the plunger or via an external button. A built-in solenoid actuator controls the release action. In its rugged plastic housing, it represents an economically priced alternative to the BERNSTEIN GC Series with remote release.

The SGS can be used wherever an intentional (manual or electrical) reset function is required:

- In lift construction
- In door and gate systems
- In wind power stations or
- Wherever safety is of prime importance

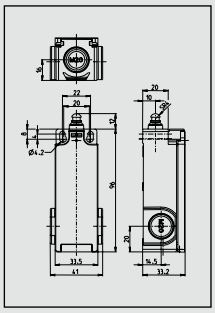
By correspondingly checking the NC contacts with positive opening action, an evaluator circuit is able to disconnect the power supply to a drive controller and shut down the machine.

SGS applications include

- Lift pre-switching (speed limiter)
- Monitoring of emergency release function
- Machine construction applications where specific reset of the switch is required
- Use in areas difficult to access
- Remote monitoring and reset over large distances

Features:

- Plunger indicates switch status
- Plunger groove for manual reset
- 2 versions: 230 V AC and 24 V DC
- Reset via built-in solenoid actuator
- 3 cable outlets M20 x 1.5
- Switching functions: 2 NC contacts
- TÜV EN 81 approval
- Other actuators from the standard range on request



Technical data

Electrical data		
Protection class		II, Insulated
Switching elements		
Rated insulation voltage	U_i	250 V AC
Thermal current	I_{the}	10 A
Utilization 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 opening	⊖	conforming IEC/EN 60947-5-1, Addendum K
Short-circuit protection		Fuse 4 A gL/gG
Electromagnet		Without free-wheeling diode
Thermal class		B (130 °C)
Rated operating voltage	U_e	24 V DC / 230 V AC (depending on type)
Rated operating current	I_e	2.3 A / 0.23 A AC
Duty factor	ED	3 %
Minimum ON time	T_i	0.2 s
Maximum ON time	T_e	0.5 s
Minimum OFF time	T_p	17 s
Mechanical data		
Enclosure		Glass fibre-reinforced thermoplastic, self-extinguishing
Cover		Glass fibre-reinforced thermoplastic, self-extinguishing
Actuation		Plunger (thermoplastic)
Approach speed	V_{max}	0.5 $^m/_s$
Ambient temperature		-25 °C bis +50 °C
Contact type		2 NC contacts (Zb) / NC contacts, 1 NO contacts (Zb)
Switching principle		Snap action system, bistable
Mechanical service life		5 x 10^4 switching cycles
B10d		0,1 Mio.
Bolt		2 x M4 / 2 x M5 for safety applications
Type of connection Switching element		Screw connections
Conductor cross sections		Single-wire 0.5 ... 1.5 mm²
Type of connection Electromagnet		2 x butt connector similar to DIN 46341 (crushing zone 0,5 – 1,5 mm²)
Cable entry		3x M20x1,5
Installation position		Any
Contact opening		4 x >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		

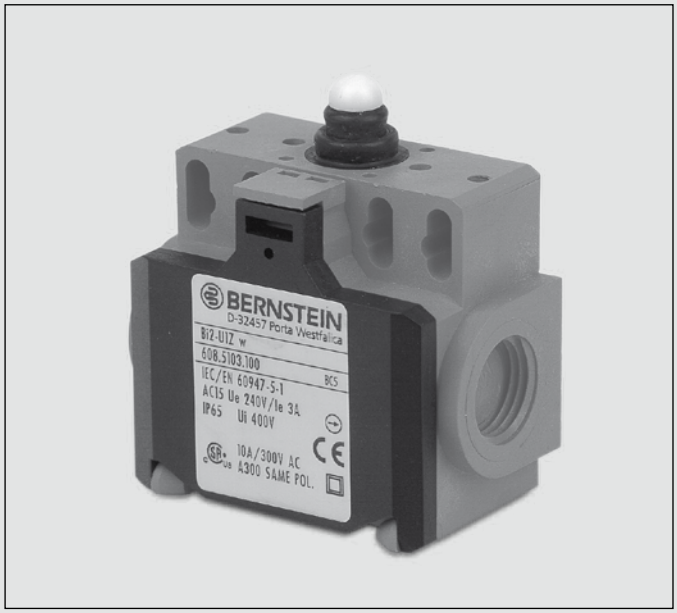
Product selection

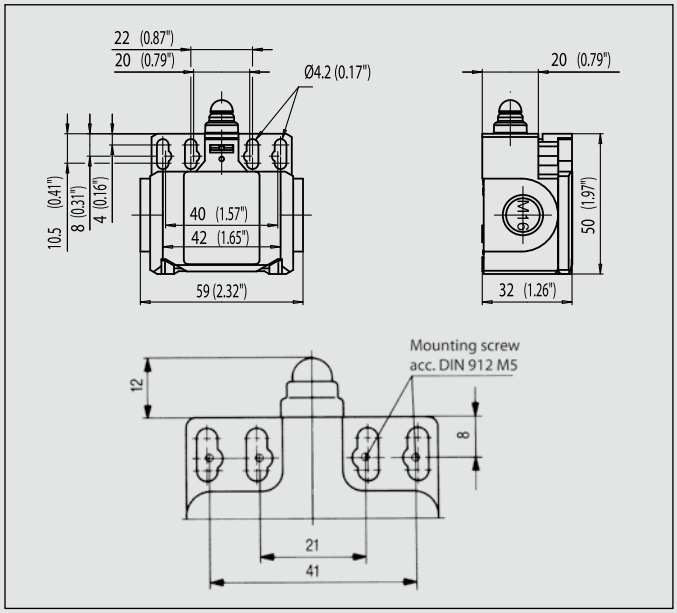
Supply voltage reset 24 Volt				
Switching operation	**Actuating force 3 N**		**Actuating force 6 N**	
1Ö/1S	-	-	-	-
2Ö	6010853002	SGS-SA2Z W F3 24 V	6010853001	SGS-SA2Z W F6 24 V

Supply voltage reset 230 Volt				
Switching operation	**Actuating force 3 N**		**Actuating force 6 N**	
1Ö/1S	-	-	6010153027	SGS-SU1Z W F6 230 V
2Ö	6010853004	SGS-SA2Z W F3 230 V	6010853003	SGS-SA2Z W F6 230 V

Notes

Bi2





Recommended use

Thanks to its two cable entries, this switch is ideal for use in series-connected monitoring facilities.

Product advantages

- Protection class IP65 to VDE 0470 T1
- Enclosure and cover PA 6, self-extinguishing (UL-94 V0)
- Actuator can be repositioned by 4 x 90°
- Cable entry 2x M16 x 1.5
- Connection designation conforming to DIN EN 50013

Options

- Available with M12 connector
- AS interface variants available
- Preassembled with customer-specific cables and connectors on request

Design layout

- Slow-action and snap-action contacts
- Versions: 1 NC/1NO, 2 NC
- All NC contacts with ⊖ in the circuit diagram are positively opening contacts
- Type: Zb (galvanically isolated changeover contact9

Mounting

- Two M4 adjustment slots (distance between centres 22 mm)
- Two M4 adjustment slots (distance between centres 42 mm)
- Two M5 holes (distance between centre 21 mm) for safety applications
- Two M5 holes (distance between centre 41 mm) for safety applications without additional securing element

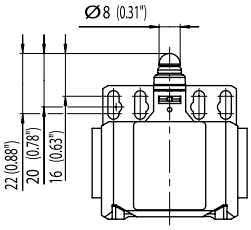
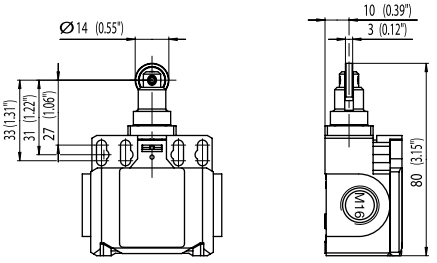
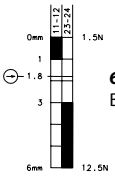
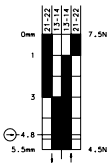
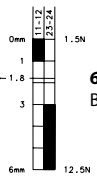
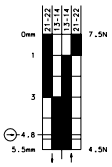
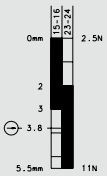
Installation advantages

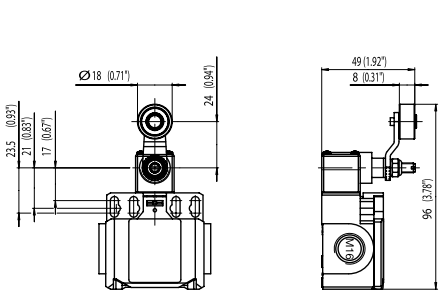
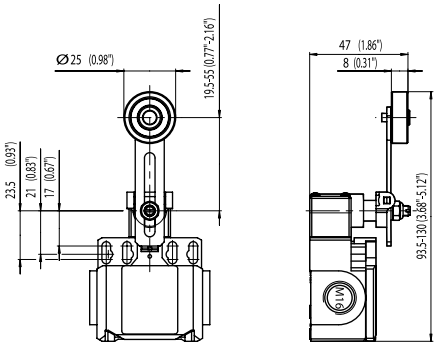
- Cover opening range 135° (cover can also be detached from hinge)
- Screw connections with self-lifting clamping plates
- Easy-action cover lock (close and press)
- Cover additionally secured with screw
- 2 cable entries for through-wiring

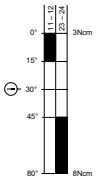
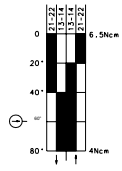
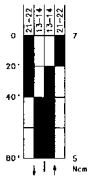
Technical data

Electrical data		
Rated insulation voltage	U_i max.	400 V AC
Conventional thermal current ①	I_{the}	10 A
Rated operating voltage	U_e max.	240 V AC
Utilization category		AC15, U_e/I_e 240 V/3 A
Short-circuit protection (up to) ①		Fuse 10 A gL/gG
Protection class		II, Insulated
Mechanical data		
Enclosure material		Thermoplastic, glass fibre-reinforced
Ambient temperature		-30 °C to +80 °C
Mechanical service life (up to) ①		10 x 10^6 switching cycles
B10d (up to) ①		20 Mio.
Switching frequency		≤ 100/min.
Type of connection		Screw connections
Conductor cross sections		Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 – 1.5 mm^2
Cable entry		2 x M16 x 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. See Table on Pages 76-79.

	W	RIW
		
Switching operation	**Slow-action** **Snap-action**	**Slow-action** **Snap-action**
1 NC / 1 NO contact	**6085103100** BI2-U1Z W  **6085153107** BI2-SU1Z W 	**6085117101** BI2-U1Z RIW  **6085167108** BI2-SU1Z RIW 
2 NC contacts	**6085803116** BI2-A2Z W 	
2 NO contacts		
1 NC / 1 NO contact Overlapping	**6085303115** BI2-UV1Z W 	
Approvals		
	Replacement actuator: -	**Replacement actuator: -**
	Special features/variants (on request)	**Special features/variants** (on request) ● With steel roller

	AH	AV
		

Switching operation	Slow-action	Snap-action	Slow-action	Snap-action
1 NC / 1 NO contact	**6085135104** BI2-U1Z AH 	**6085185111** BI2-SU1Z AH 		**6085186112** BI2-SU1 AV 
2 NC contacts				
2 NO contacts				
1 NC / 1 NO contact Overlapping				
Approvals				

Replacement actuator: 3918351166

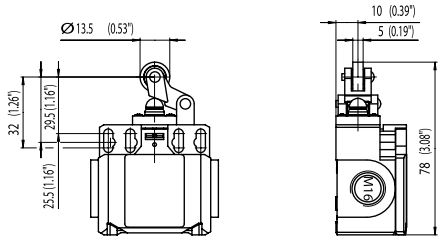
Special features/variants
(on request)

- Available with different actuating directions
- With steel roller
- Various roller diameters
- Cranked or straight lever
- Various lever lengths

Replacement actuator: -

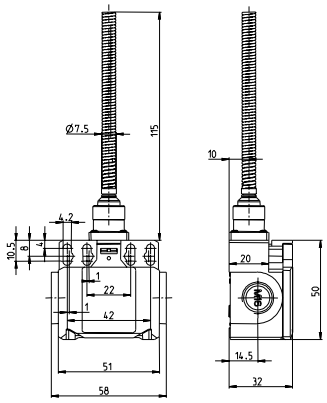
Special features/variants
(on request)

HW RO13.5



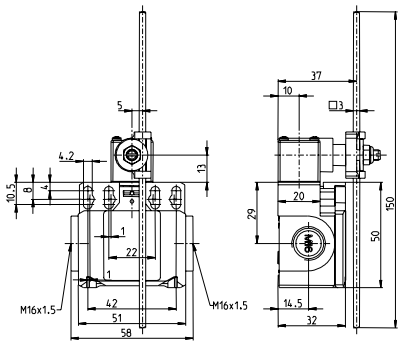
Slow-action	Snap-action
	6085171109 BI2-SU1Z HW RO13.5

FF



Slow-action	Snap-action
6185140104 BI2-U1 FF	**6085190114** BI2-SU1 FF

AD



Slow-action	Snap-action
6085137106 BI2-U1 AD	**6085187113** BI2-SU1 AD

Replacement actuator: -

Replacement actuator: -

Replacement actuator: -

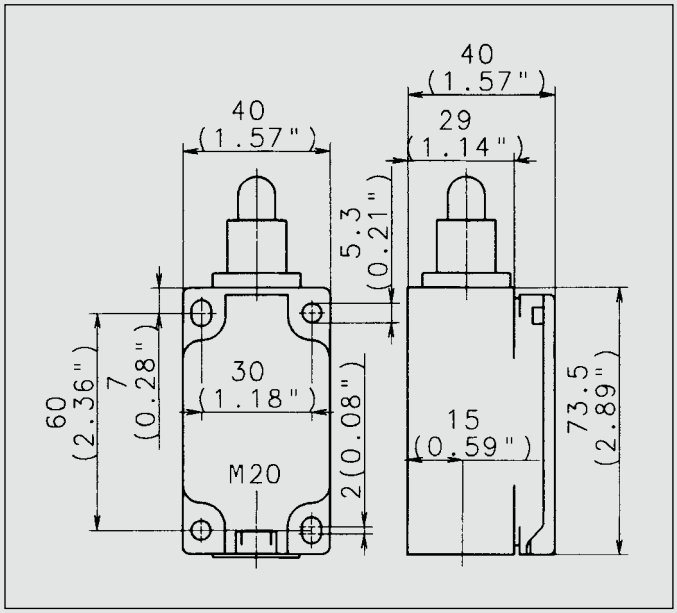
Special features/variants
(on request)

Special features/variants
(on request)

- Available with different spring lengths
- Spring rod
- Various spring versions

Special features/variants
(on request)

ENK



Recommended use

Thanks to its design and its metal actuator, the ENK limit switch is particularly suitable for applications requiring a sturdy safety switch made of plastic.

Product advantages

- Standard switch conforming to DIN EN 50041
- Standard actuator conforming to DIN EN 50041, Type A, B, C, D
- Protection class IP65 to VDE 0470 T1
- Enclosure and cover PA 6, (UL-94-V0)
- Actuator can be repositioned by 4 x 90°
- Cable entry M20 x 1.5
- Connection designation conforming to DIN EN 50013
- Metal actuators for high loads

Options

- Available with M12 connector
- AS interface variants available
- Preassembled with customer-specific cables and connectors on request

Design layout

- Slow-action and snap-action contacts
- Versions: 1 NC/1NO, 2 NC, 3 NC, overlapping contacts
- Latching function on request
- All NC contacts with ⊖ in the circuit diagram are positively opening contacts
- Type: Zb (galvanically isolated changeover contact)

Mounting

- 2 adjustment slots for M5 screws
- 2 holes for M5 mounting screws in safety applications

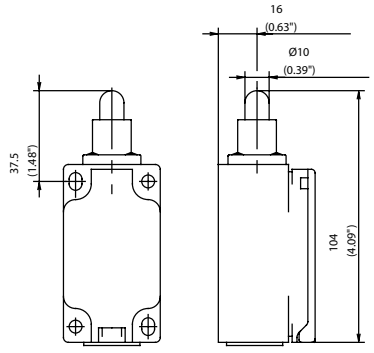
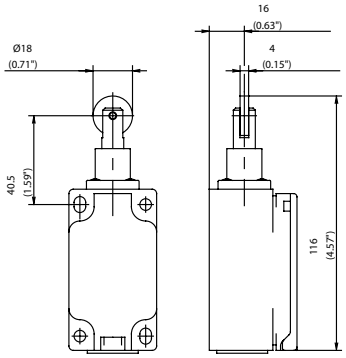
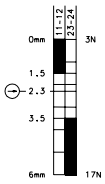
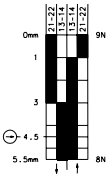
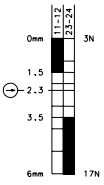
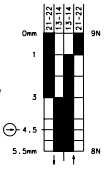
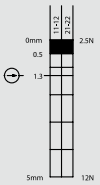
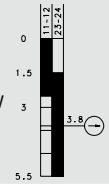
Installation advantages

- Snap-on cover can be released with screwdriver
- Cover opening range 150° (cover can also be detached from hinge)
- Cover protects switching element during installation
- Screw connections with self-lifting clamping plates
- Easy-action cover lock (close and press

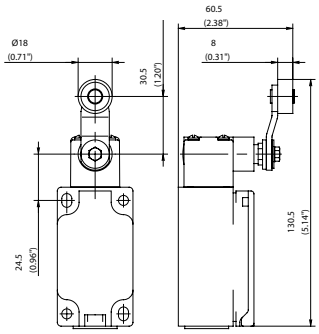
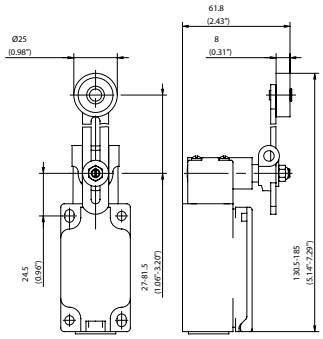
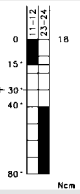
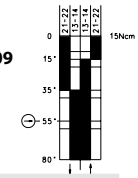
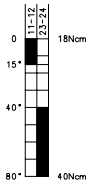
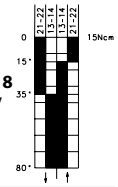
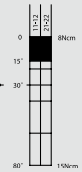
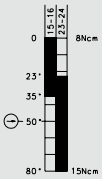
Technical data

Electrical data		
Rated insulation voltage	U_i max.	400 V AC
Conventional thermal current (up to) ①	I_{the}	10 A
Rated operating voltage	U_e max.	240 V
Utilization category		AC-15, U_e/I_e 240 V/3 A
Short-circuit protection (up to) ①		Fuse 10 A gL/gG
Protection class		II, Insulated
Mechanical data		
Enclosure material		Thermoplastic, glass fibre-reinforced
Ambient temperature		-30 °C to +80 °C
Mechanical service life (up to) ①		10 x 10^6 switching cycles
B10d (up to) ①		20 Mio.
Switching frequency		≤ 100/min.
Type of connection		Screw connections
Conductor cross sections		Single-wire 0.5 - 1.5 mm² or Stranded wire with ferrule 0.5 – 1.5 mm²
Cable entry		1 x M20 x 1.5 ≈ 0.15 kg
Protection class		IP65 onforming 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		

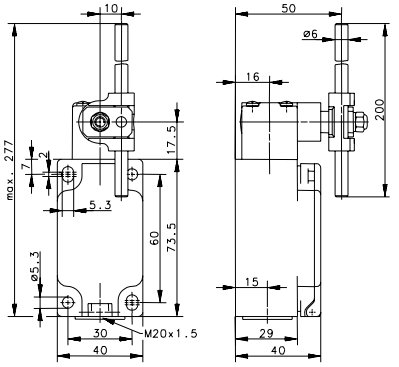
① Depending on switching system. See Table on Pages 76-79.

	IW (Form B)	RIW (Form C)
		
Switching operation	**Slow-action** **Snap-action**	**Slow-action** **Snap-action**
1 NC / 1 NO contact	**6081102001** ENK-U1Z IW  **6081152007** ENK-SU1Z IW 	**6081117002** ENK-U1Z RIW  **6081167008** ENK-SU1Z RIW 
2 NC contacts		**6081817281** ENK-A2Z RIW 
2 NO contacts		
1 NC / 1 NO contact Overlapping		**6081317307** ENK-UV1Z RIW 
Approvals		
	Replacement actuator: 3918020660	**Replacement actuator: 3918170661**
	Special features/variants (on request) ● Available with black enclosure and following contacts: 3 NC contacts	**Special features/variants** (on request) ● Available for high temperature range and following contacts: 3 NC contacts

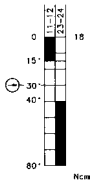
ENK

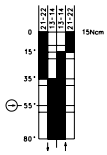
	AHS-V (Form A)	AV
		
Switching operation	**Slow-action** / **Snap-action**	**Slow-action** / **Snap-action**
1 NC / 1 NO contact	**6081135003** ENK-U1Z AHS-V  **6081185009** ENK-SU1Z AHS-V 	**6081136012** ENK-U1 AV  **6081186018** ENK-SU1 AV 
2 NC contacts	**6081835323** ENK-A2Z AHS-V 	
2 NO contacts		
1 NC / 1 NO contact Overlapping	**6081335006** ENK-UV1Z AHS-V 	
Approvals		
	Replacement actuator: -	**Replacement actuator: -**
	Special features/variants (on request) ● Available with black enclosure ● With 50 mm diameter rubber roller and following contacts: 3 NC contacts	**Special features/variants** (on request) ● Available with different lever lengths and roller diameters ● With 50 mm diameter rubber roller ● With roller over switch

AD (Form D)



Slow-action	Snap-action
6081137011 ENK-U1 AD	**6081187017** ENK-SU1 AD



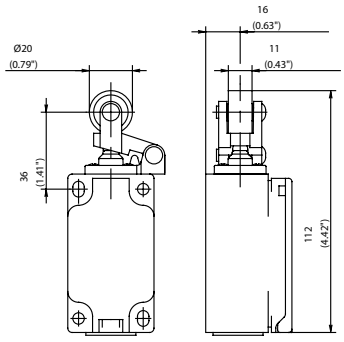


Replacement actuator: -

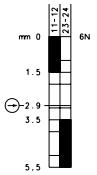
Special features/variants
(on request)

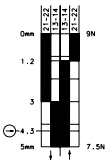
- Available with various actuator directions and actuator lengths

HW RO20



Slow-action	Snap-action
6081121095 ENK-U1Z HW RO20	**6081171096** ENK-SU1Z HW RO20



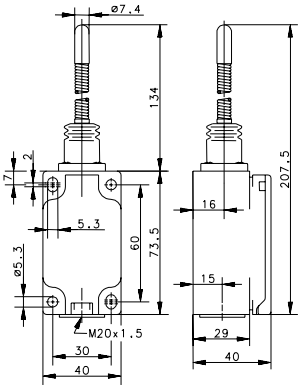


Replacement actuator: -

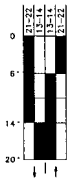
Special features/variants
(on request)

- Available with black enclosure and various roller diameters

FF



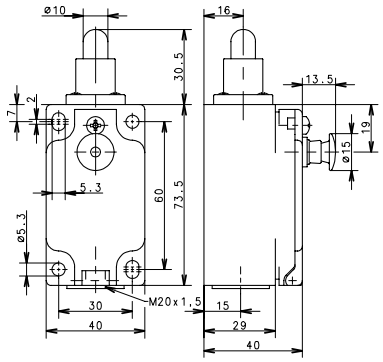
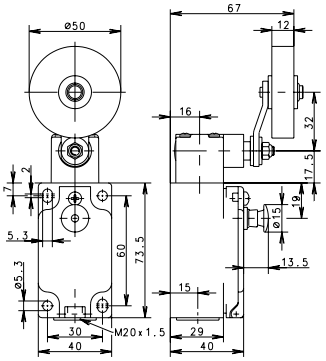
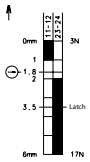
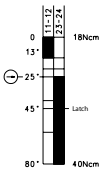
Slow-action	Snap-action
	6081190045 ENK-SU1 FF



Replacement actuator: -

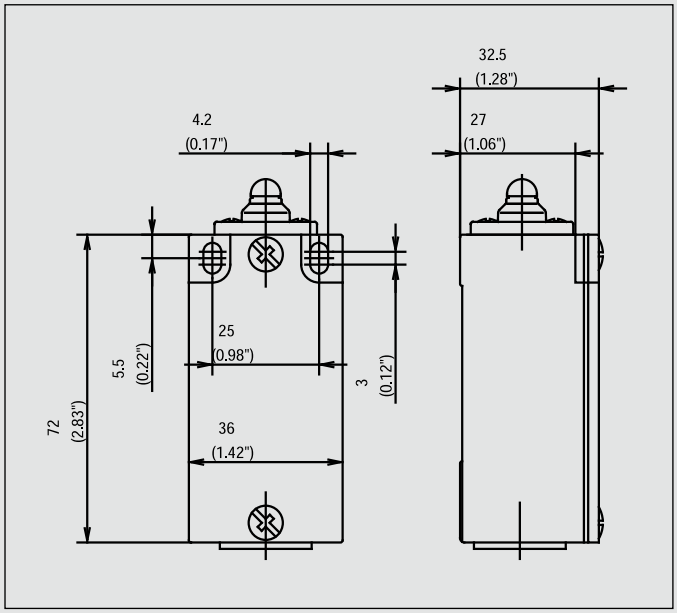
Special features/variants
(on request)

ENK

	IW RAST	AHSGU RAST RO50
		
Switching operation	**Slow-action** **Snap-action**	**Slow-action** **Snap-action**
1 NC / 1 NO contact	**6181102137** ENK-U1Z IW RAST 	**6181135251** ENK-U1Z AHSGU RAST RO50 
2 NC contacts		
2 NO contacts		
1 NC / 1 NO contact Overlapping		
Approvals		
	Replacement actuator: -	**Replacement actuator: -**
	Special features/variants (on request)	**Special features/variants** (on request)

Notes

GC



Recommended use

Thanks to its compact design, this metal-enclosed switch is ideally suited for virtually all safety and position monitoring applications.

Product advantages

- Protection class IP65 to VDE 0470 T1
- Enclosure: Aluminium pressure die-casting
- Cover: Sheet aluminium
- Actuator can be repositioned by 4 x 90°
- Cable entry M20 x 1.5
- Connection designation conforming to DIN EN 50013
- Metal actuators for high loads
- Graduated adjustment of AH lever
- Selectable direction-dependent contact-making of AH actuator (basic setting: contact-making both sides)

Options

- AS interface versions on request
- Preassembled with customer-specific cables and connectors on request

Design layout

- Slow-action and snap-action contacts
- Versions: 1 NC/1NO, 2 NC/2 NO, 2 NC, overlapping contacts
- All NC contacts with ⊣in the circuit diagram are positively opening contacts
- Type: Zb (galvanically isolated changeover contact)
- Latching function on request

Mounting

- 2 adjustment slots for M4 screws (for safety applications with blind hole for ø 4.0 mm fitted pin in enclosure base or enclosure with holes for M5)

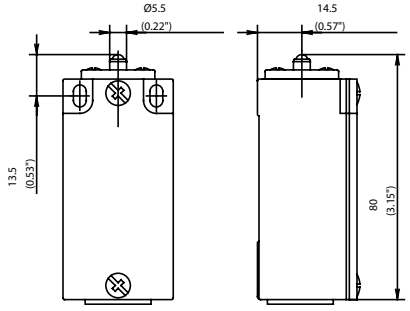
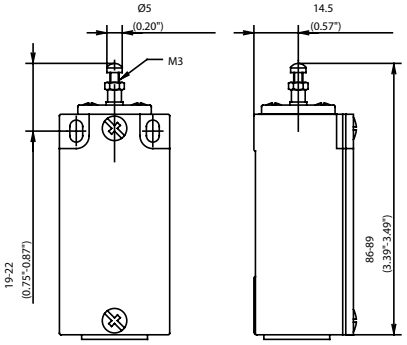
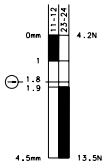
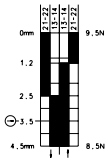
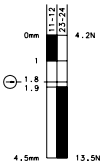
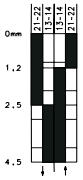
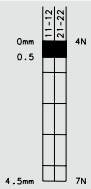
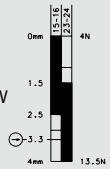
Installation advantages

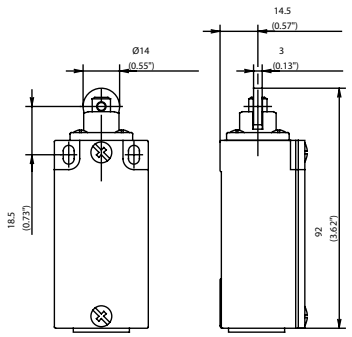
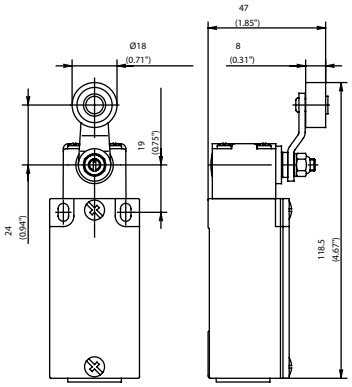
- Screw connections with self-lifting clamping plates
- Captive cover screws
- Easy-to-change switching system thanks to snap-in retainer
- Finely adjustable switching point with adjusting screw

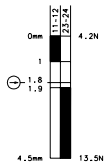
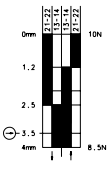
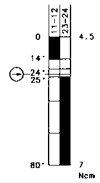
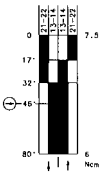
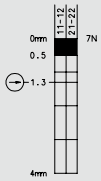
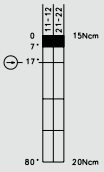
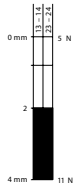
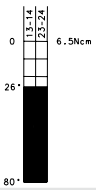
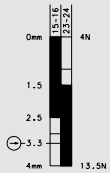
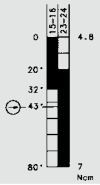
Technical data

Electrical data		
Rated insulation voltage (up to) ①	U_i max.	400 V AC
Conventional thermal current (up to ①	I_{the}	10 A
Rated operating voltage	U_e max.	240 V
Utilization category (up to) ①		AC-15, U_e/I_e 240 V/3 A
Short-circuit protection (up to) ①		Fuse 10 A gL/gG
Protection class		I
Mechanical data		
Enclosure material		Aluminium pressure die-casting
Ambient temperature		-30 °C to +80 °C
Mechanical service life (up to) ①		10 x 10^6 switching cycles
B10d (up to) ①		20 Mill.
Switching frequency		≤ 100/min.
Type of connection		Screw connections
Conductor cross sections		Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 – 1.5 mm^2
Cable entry		1 x M20 x 1.5
Protection class		IP65 conforming to IEC/EN 60529
Standards		
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1		

① Depending on switching system. See Table on Pages 76-79.

	IW	STIW
		
Switching operation	**Slow-action** **Snap-action**	**Slow-action** **Snap-action**
1 NC / 1 NO contact	**6021102001** GC-U1Z IW  **6021352620** GC-SU1Z IW 	**6021105015** GC-U1Z STIW  **6021155017** GC-SU1Z STIW 
2 NC contacts	**6021802189** GC-A2Z IW 	
2 NO contacts		
1 NC / 1 NO contact Overlapping		**6021305016** GC-UV1Z STIW 
Approvals		
	Replacement actuator: 3912030546	**Replacement actuator: 3912050523**
	Special features/variants (on request)	**Special features/variants** ● Actuator length adjustable with adjusting screw

	RIW	AH
		

Switching operation	Slow-action	Snap-action	Slow-action	Snap-action
1 NC / 1 NO contact	**6021117029** GC-U1Z RIW 	**6021367626** GC-SU1Z RIW 	**6021135102** GC-U1Z AH 	**6021385634** GC-SU1Z AH 
2 NC contacts	**6021817172** GC-A2Z RIW 		**6121835833** GC-A2Z AHS See separate datasheet 	
2 NO contacts	**6021817154** GC-E2 RIW 		**6021835160** GC-E2 AH 	
1 NC / 1 NO contact Overlapping	**6021317030** GC-UV1Z RIW 		**6021335133** GC-UV1Z AH 	
Approvals				

Replacement actuator: 3912170518

Replacement actuator: 3912350722

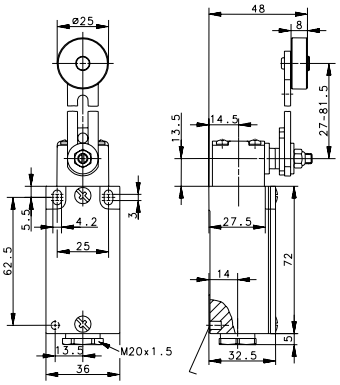
Special features/variants
(on request)

- Available for high temperature range and following contacts:
  2 NC /1 NO contact
  2 NC /2 NO contact
  (larger enclosure)

Special features/variants
(on request)

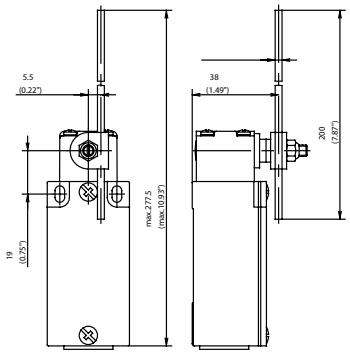
- Available with various roller diameters, cranked or straight lever and with various lever lengths
- With roller over switch and with following contacts:
  2 NC /2 NO contact
  (larger enclosure)

AV



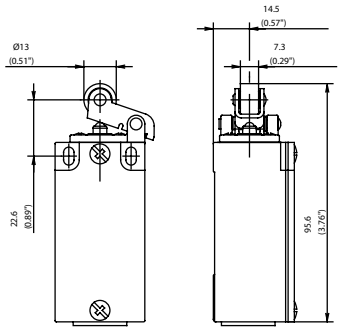
Slow-action	Snap-action
6021136104 GC-U1 AV	**6021186118** GC-SU1 AV

AD



Slow-action	Snap-action
6021137103 GC-U1 AD	**6021187125** GC-SU1 AD

HIW



Slow-action	Snap-action
6021120057 GC-U1Z HIW	**6021370629** GC-SU1Z HIW
6021820175 GC-A2Z HIW	
6021820157 GC-E2 HIW	
6021320058 GC-UV1Z HIW	

Replacement actuator: 3912360723

Special features/variants
(on request)

- Various roller diameters
- Different lever lengths
- With roller over switch and with following contacts:
  2 NC /2 NO contact

Replacement actuator: 3912370724

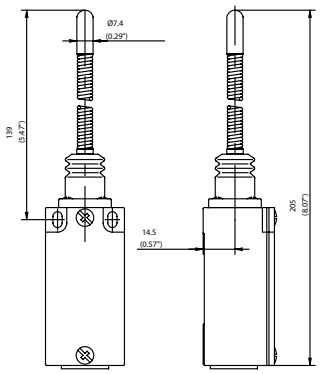
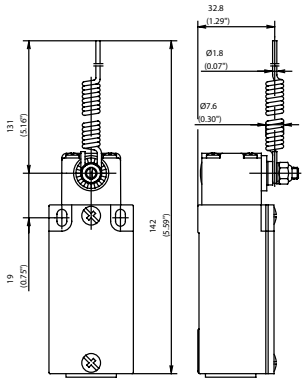
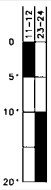
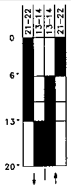
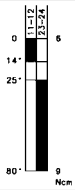
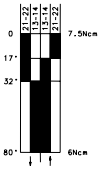
Special features/variants
(on request)

- Available with various actuator lengths and actuator directions
- With following contacts:
  2 NC /1 NO with overlap
  (larger enclosure)

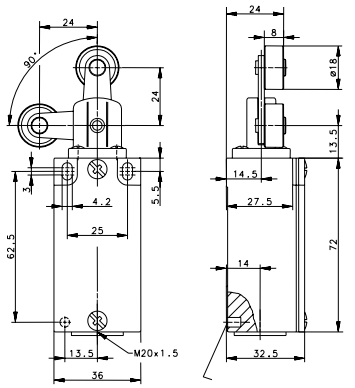
Replacement actuator: 3912200552

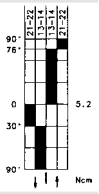
Special features/variants
(on request)

- Available with different actuating directions
- Available with steel roller
- With following contacts:
  2 NC /2 NO contact
  1 NC /2 NO with overlap
  (larger enclosure)

	FF	AF
		
Switching operation	**Slow-action** / **Snap-action**	**Slow-action** / **Snap-action**
1 NC / 1 NO contact	**6021140476** GC-U1 FF  **6021190100** GC-SU1 FF 	**6021139106** GC-U1 AF  **6021189128** GC-SU1 AF 
2 NC contacts		
2 NO contacts		
1 NC / 1 NO contact Overlapping		
Approvals		
	Replacement actuator: 3912400510	**Replacement actuator: 3912390725**
	Special features/variants (on request) ● Different spring lengths ● Different spring versions or spring rod	**Special features/variants** (on request) Available with various actuator lengths and actuator directions

DR

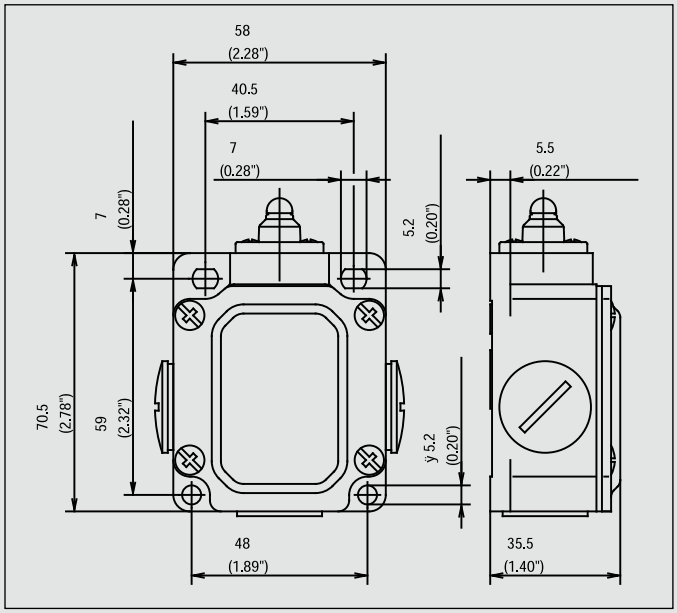


Slow-action	Snap-action	
	6021191099 GC-SU1Z DR	

Replacement actuator: 3912410593

Special features/variants
(on request)

SN2



Recommended use

With its three cable entries and spacious connection area, the SN2 limit switch is the optimum solution for through-wiring or even branching off electrical circuits.

Product advantages

- Protection class IP65 to VDE 0470 T1
- Enclosure: Aluminium pressure die-casting
- Cover: Sheet aluminium
- Actuator can be repositioned by 4 x 90°
- Cable entry 3x M20 x 1.5
- Connection designation conforming to DIN EN 50013
- Metal actuators for high loads
- Graduated adjustment of AH lever
- Selectable direction-dependent contact-making of AH actuator (basic setting: contact-making both sides)

Options

- AS interface versions on request
- Preassembled with customer-specific cables and connectors on request

Design layout

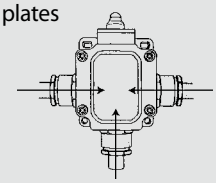
- Slow-action and snap-action contacts
- Versions: 1 NC / 1NO, 2 NC
- All NC contacts with ⊖ in the circuit diagram are positively opening contacts
- Type: Zb (galvanically isolated changeover contact)
- Latching function on request

Mounting

- 2 adjustment slots for M5 screws
- 2 addition holes for M5 mounting screws in safety applications

Installation advantages

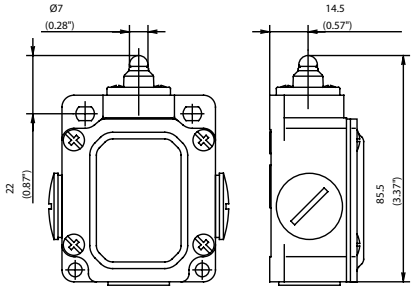
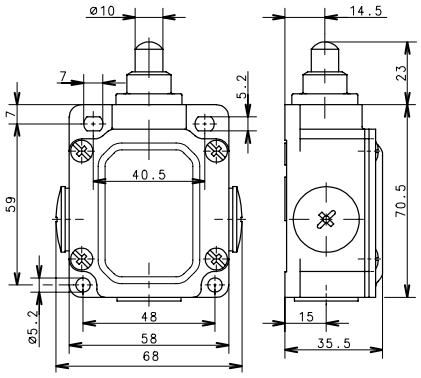
- 3 cable entries for through-wiring
- Generously dimensioned connection space
- Screw connections with self-lifting clamping plates
- Easy-to-change switching system thanks to snap-in retainer
- Finely adjustable switching point with adjusting screw

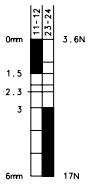
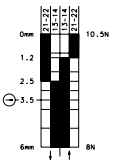
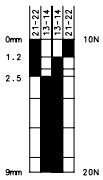


Technical data

Electrical data		
Rated insulation voltage	U_i max.	400 V AC
Conventional thermal current	I_{the}	10 A
Rated operating voltage	U_e max.	240 V
Utilization category		AC-15, A300, U_e/I_e 240 V/3 A
Short-circuit protection (up to) ①		Fuse 10 A gL/gG
Protection class		I
Mechanical data		
Enclosure material		Aluminium pressure die-casting
Ambient temperature		-30 °C to +80 °C
Mechanical service life		10 x 10^6 switching cycles
B10d (up to) ①		20 Mill.
Switching frequency		max. 100/min.
Type of connection		Screw connections
Conductor cross sections		Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 – 1.5 mm^2
Cable entry		3 x M20 x 1.5
Protection class		IP65 conforming to EN 60529, DIN VDE 0470 T1
Standards		
conforming to EN 60947-1; EN 60947-5-1		

① Depending on switching system. See Table on Pages 76-79.

	W	LIW
		

Switching operation	Slow-action	Snap-action	Slow-action	Snap-action
1 NC / 1 NO contact	**6033103023** SN2-U1Z W 	**6033353016** SN2-SU1Z W 		**6033194022** SN2-SU1 LIW 
2 NC contacts				
2 NO contacts				
1 NC / 1 NO contact Overlapping				
Approvals				

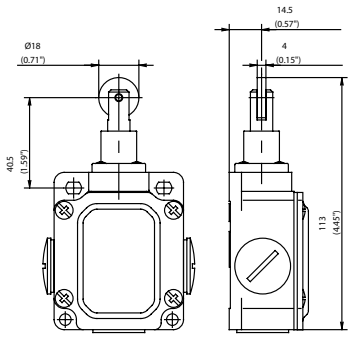
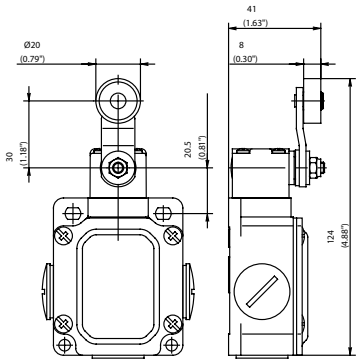
Replacement actuator: 3913030537

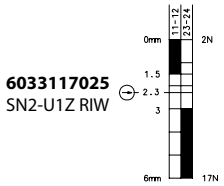
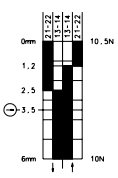
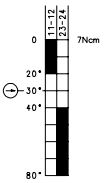
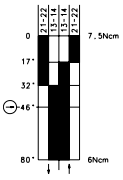
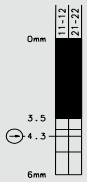
Replacement actuator: 3912440536

Special features/variants
(on request)

Special features/variants

- Telescopic plunger, particularly long actuation travel of 9 mm

	RIW	AHS
		

Switching operation	Slow-action	Snap-action	Slow-action	Snap-action
1 NC / 1 NO contact	**6033117025** SN2-U1Z RIW 	**6033367017** SN2-SU1Z RIW 	**6033135002** SN2-U1Z AHS 	**6033385018** SN2-SU1Z AHS 
2 NC contacts	**6033818038** SN2-A2Z RIW 			
2 NO contacts				
1 NC / 1 NO contact Overlapping				
Approvals				

Replacement actuator: 3918170587

Replacement actuator: 3913351913

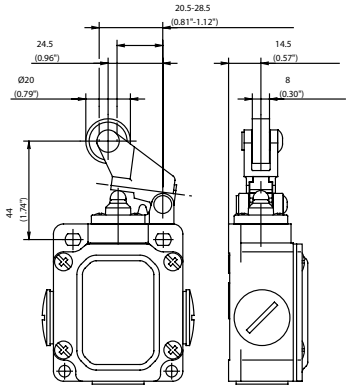
Special features/variants
(on request)

- Available with different actuating directions
- With latching function

Special features/variants
(on request)

- Available with different actuating directions

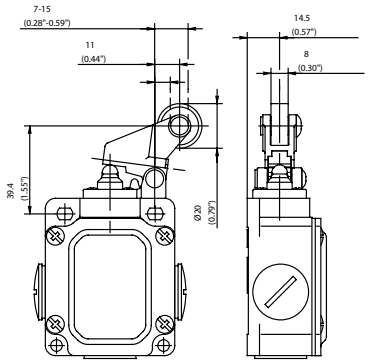
DGHW



Slow-action	Snap-action
6033121005 SN2-U1Z DGHW	**6033371004** SN2-SU1Z DGHW

Replacement actuator: 3918211656

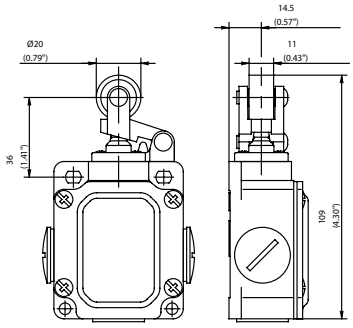
DGKW



Slow-action	Snap-action
6033127010 SN2-U1Z DGKW	**6033377011** SN2-SU1Z DGKW

Replacement actuator: 3918271655

HW



Slow-action	Snap-action
6033121007 SN2-U1Z HW	**6033371006** SN2-SU1Z HW

Replacement actuator: 3913210553

Special features/variants
(on request)

- Available with different actuating directions

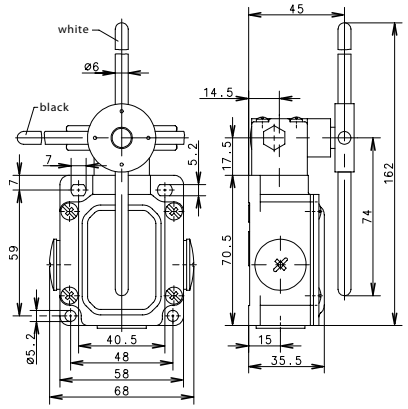
Special features/variants
(on request)

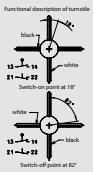
- Available with different actuating directions

Special features/variants
(on request)

- Available with different actuating directions

AD4K



Switching operation	Slow-action	Snap-action
1 NC / 1 NO contact		
2 NC contacts	**6133887022** SN2-SA2Z AD4K	
2 NO contacts		
1 NC / 1 NO contact **Overlapping**		

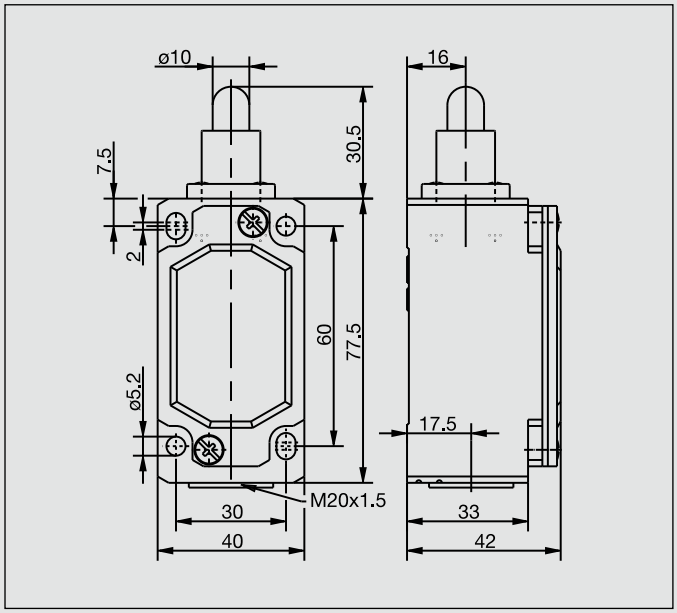
Approvals

Replacement actuator: -

Special features/variants
(on request)

Notes

ENM2



Recommended use

With its standard enclosure, the ENM2 limit switch can be used universally in all industrial and safety applications.

Product advantages

- Standard switch conforming to DIN EN 50041
- Standard actuator conforming to DIN EN 50041, Type A, B, C, D
- Protection class IP65 to VDE 0470 T1
- Enclosure: Aluminium pressure die-casting
- Cover: Sheet aluminium
- Actuator can be repositioned by 4 x 90°
- Cable entry M20 x 1.5
- Connection designation conforming to DIN EN 50013
- Metal actuators for high loads

Options

- AS interface versions on request
- Preassembled with customer-specific cables and connectors on request

Design layout

- Slow-action and snap-action contacts
- Versions: 1 NC /1NO, 2 NC, overlapping contacts
- All NC contacts with ⊖ in the circuit diagram are positively opening contacts
- Type: Zb (galvanically isolated changeover contact)

Mounting

- Two M5 adjustment screws with slots
- Two M5 screws for safety applications without additional securing element

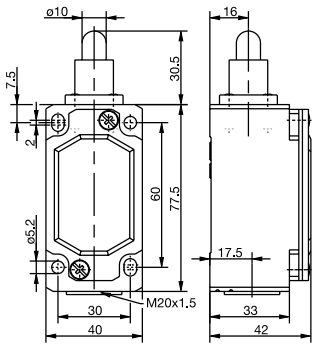
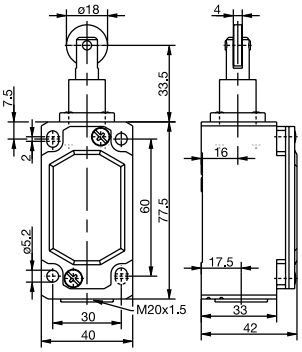
Installation advantages

- Screw connections with self-lifting clamping plates
- Easy-to-change switching system thanks to snap-in retainer (depending on type)
- Finely adjustable switching point with adjusting screw
- Captive cover screws
- Enlarged connection space
- Earthing surface on same level as switching system

Technical data

Electrical data		
Rated insulation voltage (up to) ①	U_i max.	400 V AC
Conventional thermal current (up to) ①	I_{the}	10 A
Rated operating voltage	U_e max.	240 V
Utilization category (up to) ①		A300, AC-15, U_e/I_e 240 V/3 A
Short-circuit protection (up to) ①		Fuse 10 A gL/gG
Protection class		I
Mechanical data		
Enclosure material		Aluminium pressure die-casting
Ambient temperature		-30 °C to +80 °C
Mechanical service life (up to) ①		10 x 10^6 switching cycles
B10d (up to) ①		20 Mill.
Switching frequency		≤ 100/min.
Type of connection		Screw connections
Conductor cross sections		Single-wire 0.5 - 1.5 mm² or Stranded wire with ferrule 0.5 – 1.5 mm²
Cable entry		1 x M20 x 1.5
Protection class		IP65 conforming to IEC/EN 60529
Standards		
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1		

① Depending on switching system. See Table on Pages 76-79.

	IW (Form B)	RIW (Form C)
		

Switching operation	Slow-action	Snap-action	Slow-action	Snap-action
1 NC / 1 NO contact	**6087102001** ENM2-U1Z IW	**6087352002** ENM2-SU1Z IW	**6087117004** ENM2-U1Z RIW	**6087367005** ENM2-SU1Z RIW
2 NC contacts	**6087802003** ENM2-A2Z IW		**6087817006** ENM2-A2Z RIW	**6087867051** ENM2-SA2Z RIW
2 NO contacts	**6087802021** ENM2-E2 IW			
1 NC / 1 NO contact Overlapping	**6087302027** ENM2-UV1Z IW			
Approvals				

Replacement actuator: 3918020584

Special features/variants
(on request)

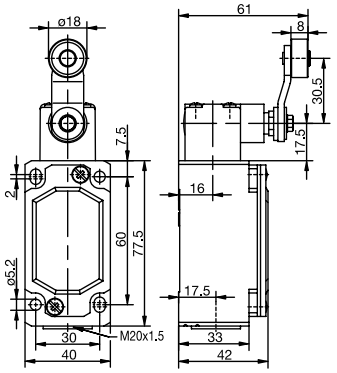
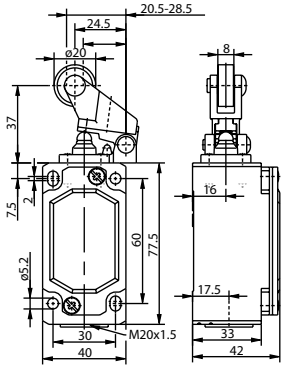
- Also available with following contacts:
  2 NC /1 NO with overlap
  1 NC /2 NO with overlap

Replacement actuator: 3918170587

Special features/variants
(on request)

- Available with different actuating directions
- High temperature range
- Various roller diameters
- Also available with following contacts:
  2 NC /1 NO with overlap
  1 NC /2 NO with overlap

ENM2

	AHS-V (Form A)	DGHW RO20
		

Switching operation	Slow-action	Snap-action	Slow-action	Snap-action
1 NC / 1 NO contact	**6087135013** ENM2-U1Z AHS-V	**6087385014** ENM2-SU1Z AHS-V	**6087121007** ENM2-U1Z DGHW RO20	**6087371008** ENM2-SU1Z DGHW RO20
2 NC contacts	**6087835015** ENM2-A2Z AHS-V		**6087821009** ENM2-A2Z DGHW RO20	
2 NO contacts				
1 NC / 1 NO contact Overlapping				
Approvals				

Replacement actuator: 3918350729

Special features/variants
(on request)

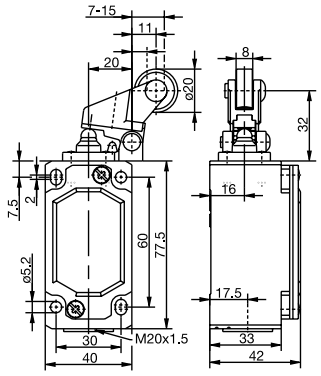
- Available with different actuating directions

Replacement actuator: 3918211656

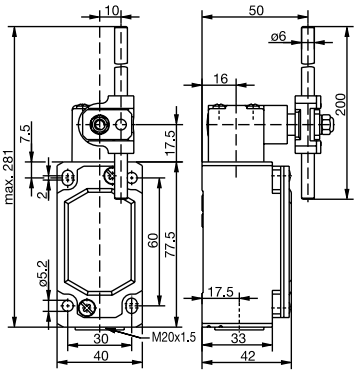
Special features/variants
(on request)

- Available with different actuating directions

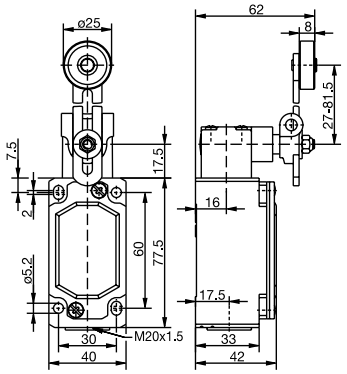
DGKW RO20



AD (Form D)



AV



Slow-action	Snap-action
6087127010 ENM2-U1Z DGKW RO20	**6087377011** ENM2-SU1Z DGKW RO20

Slow-action	Snap-action
6087137018 ENM2-U1 AD	**6087387019** ENM2-SU1 AD

Slow-action	Snap-action
6087136016 ENM2-U1 AV	**6087386017** ENM2-SU1 AV

6187836060
ENM2-E2 AV

Replacement actuator: 3918271655

Replacement actuator: 3918370731

Replacement actuator: 3918360730

Special features/variants
(on request)

- Available with different actuating directions

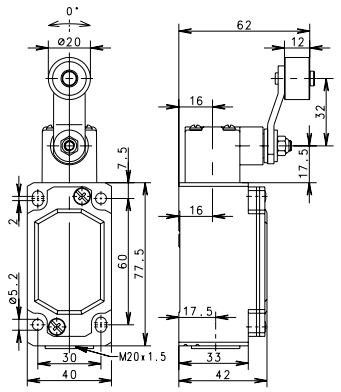
Special features/variants
(on request)

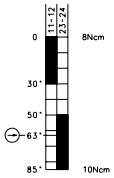
- Available with various actuator lengths and actuator directions

Special features/variants
(on request)

- Available with different actuating directions
- Various roller diameters
- Different lever lengths
- With roller over switch

AHZ



Switching operation	Slow-action	Snap-action
1 NC / 1 NO contact	**6087135030** ENM2-U1Z AHZ	
2 NC contacts		
2 NO contacts		
1 NC / 1 NO contact Overlapping		
Approvals		

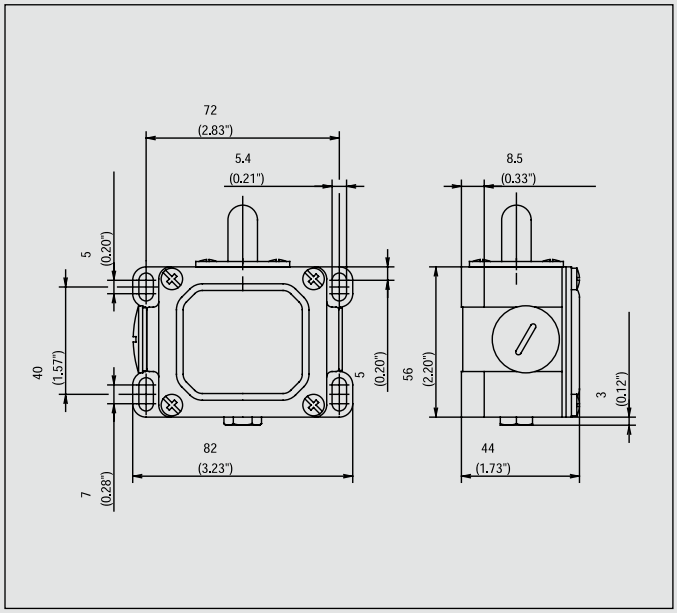
Replacement actuator: -

Special features/variants

- Positively opening action, forward and return AHZ
- For special safety applications, the positive opening action of the normally-closed contacts takes place both in forward (moving in one direction) as well as in return (moving back to home position) direction
- For personal protection applications movement of the roller must be restrained in a guide block in both directions

Notes

D



Recommended use

Heavy duty enclosure for harsh operating conditions with particularly tough design of actuator and switching systems.

Product advantages

- Protection class IP65 to VDE 0470 T1
- Enclosure: Aluminium pressure die-casting
- Cover: Sheet aluminium
- Actuator can be repositioned by 4 x 90° (depending on type)
- Cable entries 2x M20 x 1.5
- Connection designation conforming to DIN EN 50013
- Sturdy contacts
- Hard wearing guide bushes

Options

- AS interface versions on request
- Preassembled with customer-specific cables and connectors on request

Design layout

- Slow-action and snap-action contacts
- Versions: 1 NC / 1NO, 2 NC, 2 NO, 3 NC, 3 NO, overlapping contacts
- All NC contacts with ⊖ in the circuit diagram are positively opening contacts
- Latching function on request

Mounting

- 4 slots for M5 screws

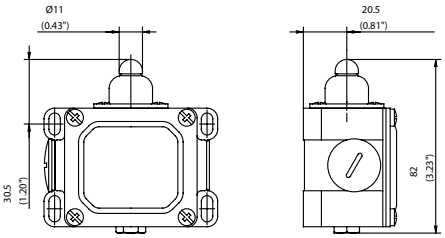
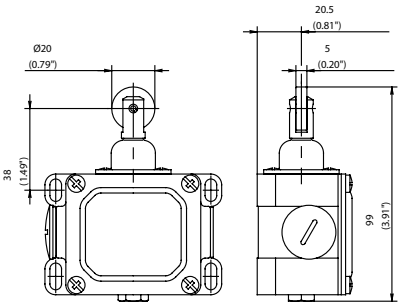
Installation advantages

- 2 cable entries for through-wiring
- Generously dimensioned connection space
- Captive cover screws

Technical data

Electrical data		
Rated insulation voltage	U_i max.	400 V AC
Conventional thermal current (up to) ①	I_{the}	10 A
Rated operating voltage	U_e max.	240 V
Utilization category		AC-15, U_e/I_e 240 V/3 A
Short-circuit protection (up to) ①		Fuse 10 A gL/gG
Protection class		I
Mechanical data		
Enclosure material		Aluminium pressure die-casting
Ambient temperature		-30 °C to +80 °C
Mechanical service life		10 x 10^6 switching cycles
B10d		20 Mill.
Switching frequency		≤ 100/min.
Type of connection		Screw connections
Conductor cross sections		Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 – 1.5 mm^2
Cable entry		2 x M20 x 1.5
Protection class		IP65 conforming to IEC/EN 60529
Standards		
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1		

① Depending on switching system. See Table on Pages 76-79.

	W	RW
		

Switching operation	Slow-action	Snap-action	Slow-action	Snap-action
1 NC / 1 NO contact	**6041103002** D-U1 W	**6041153156** D-SU1 W	**6041118229** D-U1Z RW	**6041168162** D-SU1 RW
2 NC contacts	**6041803090** D-A2 W		**6041818741** D-A2Z RW	
2 NO contacts	**6041803046** D-E2 W		**6041818052** D-E2 RW	
1 NC / 1 NO contact Overlapping	**6041303134** D-UV1Z W		**6041318140** D-UV1Z RW	
Approvals				

Replacement actuator: -

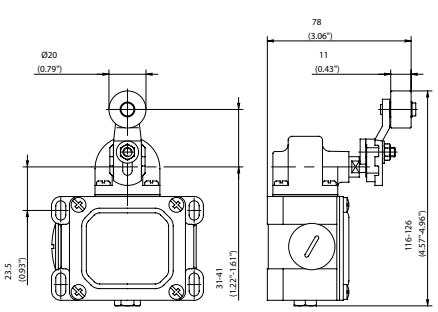
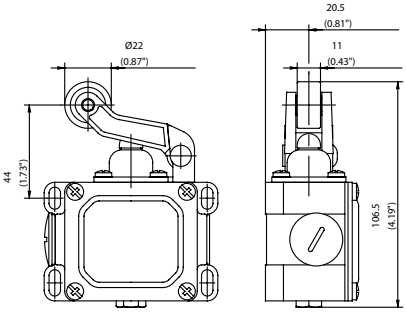
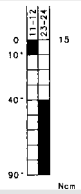
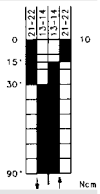
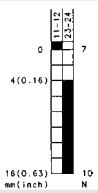
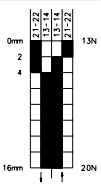
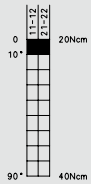
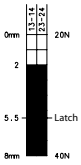
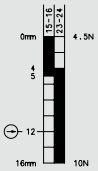
Replacement actuator: -

Special features/variants
(on request)

- Also available with following contacts:
  3 NC contacts
  3 NO contacts
  2 NC / 2 NO contact
  (larger enclosure)

Special features/variants
(on request)

- Available for high temperature range
- With following contacts:
  3 NC contacts
  3 NO contacts
  2 NC / 2 NO contact
  (larger enclosure)

	AH	HW
		
Switching operation	**Slow-action** / **Snap-action**	**Slow-action** / **Snap-action**
1 NC / 1 NO contact	**6041135019** D-U1 AH  **6041185173** D-SU1 AH 	**6041121010** D-U1 HW  **6041171164** D-SU1 HW 
2 NC contacts	**6041835107** D-A2 AH 	
2 NO contacts	**6141835709** D-E2 AH 	
1 NC / 1 NO contact Overlapping		**6041321142** D-UV1Z HW 
Approvals		
	Replacement actuator: 3914350924	**Replacement actuator: 3914211065**

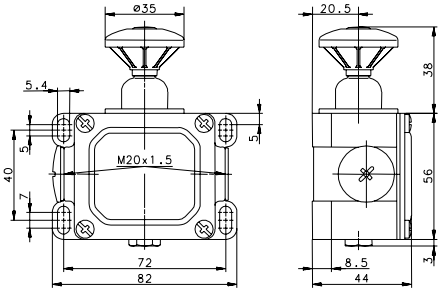
Special features/variants
(on request)

- With steel roller, various roller diameters
- Cranked or straight lever
- Different lever lengths
- Also available with following contacts:
  3 NC contacts
  2 NC / 2 NO contact

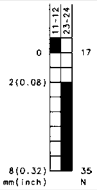
Special features/variants
(on request)

- Available for high temperature range
- With following contacts:
  3 NC contacts
  2 NC / 2 NO contact
  (larger enclosure)

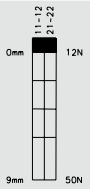
PW



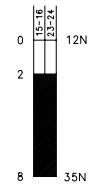
Slow-action



6041113006
D-U1 PW



6041813835
D-A2Z PW



6041813050
D-E2 PW

Replacement actuator: -

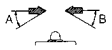
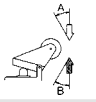
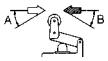
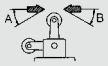
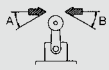
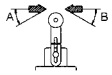
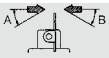
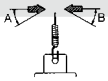
Special features/variants
(on request)

- Also available with following contacts:
  3 NC contacts
  3 NO contacts
  2 NC / 2 NO contact
  (larger enclosure)

Overview of Actuators

Actuator	Designation	Collar iw = internal w = external	Plastic series COMBI	TINY 2	I88	BIGGY 2	ENK	Metal series GC I	SN 2	ENM 2	D I
Plunger	–	iw	–	–	–	–	●	–	–	–	–
	–	w	–	●	●	●	–	–	–	–	–
	–	IP30	●	–	–	–	–	–	–	–	–
	–	IP43	–	–	–	–	–	–	–	–	○
Ball	KU	iw	–	–	–	–	–	○	○	○	–
Mushroom head	P	w	–	–	–	–	–	–	–	–	●
Telescopic plunger	L	iw	–	–	–	–	–	●	○	○	–
Adjustable plunger	ST	w	–	–	–	–	–	●	○	○	●
	ST	iw	–	–	–	–	–	●	○	○	–
	ST	IP30	●	–	–	–	–	–	–	–	–
Button	K	IP30	●	–	–	–	–	–	–	–	–
Roller	R	IP30	●	–	–	–	–	–	–	–	–
	R	iw	–	●	○	●	●	●	●	●	–
		w	–	–	–	–	–	–	–	–	●
		IP43	–	–	–	–	–	–	–	–	○
Roller, long	R ... L	iw	–	○	●	○	–	–	–	–	–
Roller, short	R ... K	iw	–	○	●	○	–	–	–	–	–
Lever	H	IP30	●	–	–	–	–	–	–	–	–
	H	w	–	●	●	●	●	–	–	–	–
	H, HT	iw	–	–	–	–	–	●	○	○	–
Lever, long	H/D-WI	w	–	–	–	–	–	●	●	○	●
	HL	iw	–	–	–	–	–	●	○	○	–
	HL/D-H	w	–	–	–	–	–	●	○	○	●
	D – H	IP43	–	–	–	–	–	–	–	–	○
Pivot joint, lever	DGH	w	–	○	●	○	○	○	●	●	–
Pivot joint, cranked lever	DGK	w	–	○	●	○	○	○	●	●	–
Cranked lever	KN	iw	–	–	–	–	–	●	○	○	–
	KN	w	–	○	●	○	–	●	○	○	○
Cranked lever link	KG	iw	–	–	–	–	–	●	○	○	–
	KG	w	–	○	●	○	–	●	○	○	–
Double roller	DR	iw	–	–	–	–	–	●	○	○	–
Spring feeler	FF	iw	–	–	–	–	–	●	●	○	–
	FF	w	–	●	○	●	●	–	–	–	–
Spring feeler, long	FFL	w	–	–	–	–	–	●	○	○	–
Spindle-mounted lever	AH	iw	–	●	●	●	–	●	○	○	●
Spindle-mounted lever, star clamping	AHS	iw	–	●	●	●	–	○	●	○	–
Spindle-mounted lever, fine spline	AHS-V	iw	–	–	–	–	●	○	●	●	–
Spindle-mounted lever for positive opening in forward/return direction	AHZ	iw	–	–	–	–	–	○	○	●	–
Spindle-mounted lever, adjustable	AV	iw	–	●	●	●	●	●	○	●	●
Spindle-mounted lever, wire	AD	iw	–	●	●	●	●	●	○	●	○
Spindle-mounted lever, spring	AF	iw	–	○	●	○	○	●	●	○	–

 ● Catalogue type (stock type or delivery time as per agreement) ○ Technical possible from modular system (from system layout) – Not included in design

Approach direction	Plunger direction	Approach speed/approach angle							Remarks
			m/s	0,1	0,5	1	2	5	
		Metal	A	20°	20°	10°	5°	–	● The values shown in the switching diagrams for switching travel/force refer **to plunger direction**
			B	20°	20°	10°	5°	–	
		Plastic	A	20°	20°	10°	5°	–	
			B	20°	20°	10°	5°	–	
		Metal	A	30°	5°	–	–	–	● The values shown in the switching diagrams for switching travel/force refer **to plunger direction** ● Plunger tip adjustable in ST version
			B	30°	5°	–	–	–	
		Plastic	A	30°	5°	–	–	–	
			B	30°	5°	–	–	–	
		Metal	A	30°	30°	20°	10°	5°	● The values shown in the switching diagrams for switching travel/force refer **to plunger direction**
			B	30°	30°	20°	10°	5°	
		Plastic	A	30°	30°	20°	10°	5°	
			B	30°	30°	20°	10°	5°	
		Metal	A	–	–	–	–	–	● The values shown in the switching diagrams for switching travel/force refer **to plunger direction**
			B	20°	20°	10°	–	–	
		Plastic	A	–	–	–	–	–	
			B	40°	40°	30°	20°	10°	
									
		Metal	A	–	–	–	–	–	● The values shown in the switching diagrams for switching travel/force refer **to plunger direction** ● Adjustable upper section of actuator with roller
			B	20°	20°	10°	–		
		Plastic	A	–	–	–	–	–	
			B	40°	40°	30°	20°	10°	
		Metal	A	–	–	–	–	–	● The values shown in the switching diagrams for switching travel/force refer to **90° to plunger direction** ● Adjustable upper section of actuator with roller
			B	30°	30°	20°	10°	–	
		Plastic	A	–	–	–	–	–	
			B	40°	40°	40°	30°	20°	
		Metal	A	–	–	–	–	–	● The values shown in the switching diagrams for switching travel/force refer to **90° to plunger direction**
			B	30°	30°	20°	10°	–	
		Plastic	A	–	–	–	–	–	
			B	40°	40°	40°	30°	20°	
		Metal	A	–	–	–	–	–	● The values shown in the switching diagrams for switching travel/force refer **to plunger direction**
			B	40°	40°	30°	20°	–	
		Plastic	A	–	–	–	–	–	
			B	40°	40°	40°	30°	20°	
		Metal	A	45°	45°	40°	30°	–	● The values shown in the switching diagrams for switching travel/force refer **to direction of rotation** ● Switch position retained after actuation
			B	45°	45°	40°	30°	–	
		Plastic	A	–	–	–	–	–	
			B	–	–	–	–	–	
		Metal	A	60°	50°	45°	–	–	● The values shown in the switching diagrams for switching angle/actuation torque refer **to any approach direction** ● Not suitable for personal protection
			B	–	–	–	–	–	
		Plastic	A	20°	20°	10°	5°	–	
			B	–	–	–	–	–	
		Metal	A	45°	45°	45°	40°	30°	● The values shown in the switching diagrams for switching angle/actuation torque refer **to direction of rotation** ● Graduated adjustment of roller lever on spindle with 180° repositioning
			B	45°	45°	45°	40°	30°	
		Plastic	A	45°	45°	45°	40°	30°	
			B	45°	45°	45°	40°	30°	
		Metal	A	45°	45°	45°	40°	30°	● The values shown in the switching diagrams for switching angle/actuation torque refer **to direction of rotation** ● Graduated adjustment of roller lever on spindle with 180° repositioning ● Not suitable for personal protection
			B	45°	45°	45°	40°	30°	
		Plastic	A	45°	45°	45°	40°	30°	
			B	45°	45°	45°	40°	30°	
		Metal	A	45°	45°	40°	30°	20°	● The values shown in the switching diagrams for switching angle/actuation torque refer **to direction of rotation** ● Graduate adjustment of rod about pivot axis and in longitudinal direction
			B	45°	45°	40°	30°	20°	
		Plastic	A	45°	45°	40°	30°	20°	
			B	45°	45°	40°	30°	20°	
		Metal	A	45°	45°	40°	30°	20°	● The values shown in the switching diagrams for switching angle/actuation torque refer **to direction of rotation** ● Graduated adjustment of spring about pivot axis ● Not suitable for personal protection
			B	45°	45°	40°	30°	20°	
		Plastic	A	45°	45°	40°	30°	20°	
			B	45°	45°	40°	30°	20°	

Limit Switch - Spindle-Mounted Lever

Switching devices with spindle-mounted lever enclosure

On delivery, contact-making takes place in both pivot directions corresponding to the switching diagrams.

Adaptation of basic actuator setting on spindle

The basic setting of the device can be varied in steps and fixed for exact positioning:

- AH, AHS, AHZ, AF, AD, AV:
  Adjustment in steps of 15° (Fig. 1)
- AHS-V:
  Adjustment in steps of 7.5° or 15° (only here ⊖) by repositioning the intermediate piece (Fig. 2)
- Adaptation AV, AD:
  Adjustment in radial direction
- AH, AHS, AHS-V, AHZ, AV:
  The roller levers can be used in a different axial actuating plane by repositioning by 180° (Fig. 3 and 4)

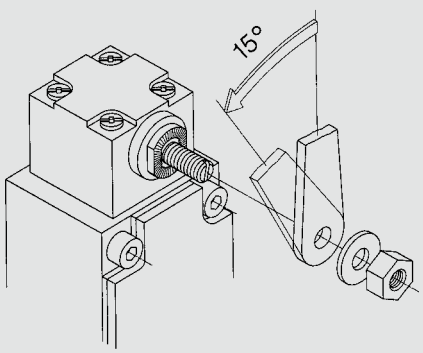


Fig.1

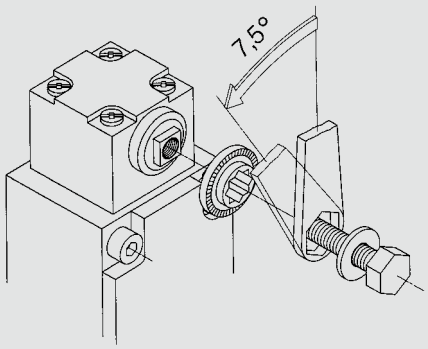


Fig. 2

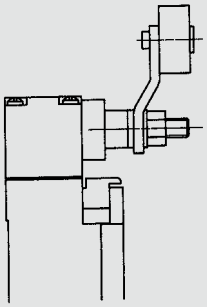


Fig. 3

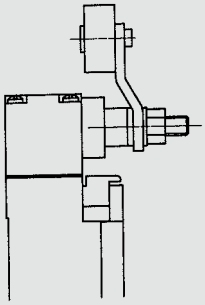


Fig. 4

Adaptation of direction-independent switching function

With actuators AHS, AHS-V, AV, AD.

On delivery, contact-making takes place in both pivot directions corresponding to the switching diagrams. An idle function in the required pivot direction is achieved by simply repositioning the actuator cam (Fig. 5 and 6).

The idle function can be used in control systems that cannot process successive rebound pulses caused by oscillatory movement of extremely long AV/AD actuators.

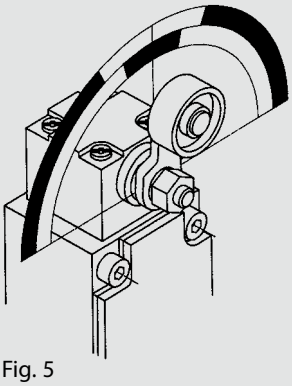


Fig. 5

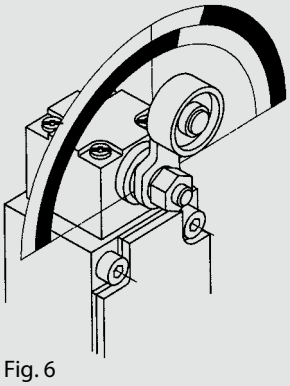


Fig. 6

Positive opening action Forward and return AHZ

For special safety applications, the positive opening action of the normally-closed contacts takes place both in forward (moving in one direction) as well as in return (moving back to home position) direction. For personal protection applications movement of the roller must be restrained in a guide block in both directions (Fig. 7 and 8).

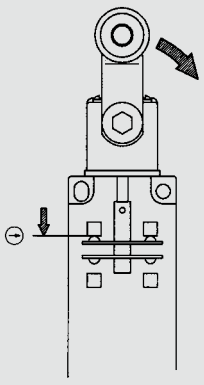


Fig. 7

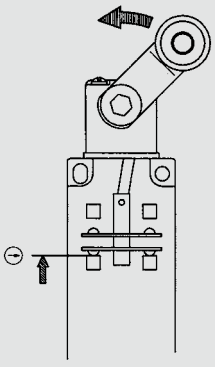


Fig. 8

Note on changing actuators AH, AHS, AHS-V, AHZ, AF, AD, AV, DGH, DGK

The guaranteed as-delivered properties change when the actuation directions are adjusted and when actuators are repositioned by 90°.

The user himself must ensure that the device achieves safe operation for its intended purpose.

Accessories for Insulation-Enclosed Limit Switches

Article	**Mounting pads**
Series	**I88**
Article number	**3191871157**

Article	**Mounting pads**
Series	**ENK**
Article number	**3191871154**

Article	**Finger guard**
Series	**I88, Biggy 2, ENK**
Article number	**3595900060**

Article	**Guide element**
Series	**I88**
Article number	**3515900209**

Article	**Mounting plate, control cabinet**
Series	**I88**
Article number	**3595900087**

Type 1 switches

Slow-action contact			C2 / Ti2							
Switching function	**Switching contacts**	**Designation**	**U_i**	**I_{the}**	**Utilization category**	**Short-circuit protection**	**Mechanical service life**	**B10d**	**U_i**	**I_{the}**
Normally-closed contact	2NC	A2Z	250 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	3×10^6	6 mill.	250 V	10 A
Changeover contact	1NC/1S	U1Z	250 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	3×10^6	6 mill.	250 V	10 A
Changeover contact, overlapping	1NC/1S	UV1Z	–	–	–	–	–	–	–	–
Normally-open contact	2S	E2	250 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	3×10^6	–	–	–

Snap-action contact			C2 / Ti2							
Switching function	**Switching contacts**	**Designation**	**U_i**	**I_{the}**	**Utilization category**	**Short-circuit protection**	**Mechanical service life**	**B10d**	**U_i**	**I_{the}**
Normally-closed contact	2NC	SA2Z	250 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	3×10^6	6 mill.	250 V	10 A
Changeover contact	1NC/1S	SU1Z	250 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	3×10^6	6 mill.	250 V	10 A
Normally-open contact	2S	SE2	250 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	3×10^6	–	–	–

Slow-action contact			Bi2							
Switching function	**Switching contacts**	**Designation**	**U_i**	**I_{the}**	**Utilization category**	**Short-circuit protection**	**Mechanical service life**	**B10d**	**U_i**	**I_{the}**
Normally-closed contact	2NC	A2Z	400 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	1×10^6	2 mill.	400 V	5 A
Changeover contact	1NC/1S	U1Z	400 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	10×10^6	20 mill.	400 V	10 A
Changeover contact, overlapping	1NC/1S	UV1Z	400 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	10×10^6	20 mill.	400 V	10 A
Normally-open contact	2S	E2	–	–	–	–	–	–	–	–

Snap-action contact			Bi2							
Switching function	**Switching contacts**	**Designation**	**U_i**	**I_{the}**	**Utilization category**	**Short-circuit protection**	**Mechanical service life**	**B10d**	**U_i**	**I_{the}**
Normally-closed contact	2NC	SA2Z	–	–	–	–	–	–	–	–
Changeover contact	1NC/1S	SU1Z	400 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 2 A gL/gG	10×10^6	20 mill.	400 V	10 A
Normally-open contact	2S	SE2	–	–	–	–	–	–	–	–

Slow-action contact			GC							
Switching function	**Switching contacts**	**Designation**	**U_i**	**I_{the}**	**Utilization category**	**Short-circuit protection**	**Mechanical service life**	**B10d**	**U_i**	**I_{the}**
Normally-closed contact	2NC	A2Z	400 V	6 A	–	Fuse 6 A gL/gG	1×10^5	2 mill.①	400 V	10 A
Changeover contact	1NC/1S	U1Z	400 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	10×10^6	20 mill.②	400 V	10 A
Changeover contact, overlapping	1NC/1S	UV1Z	400 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	10×10^6	20 mill.	–	–
Normally-open contact	2S	E2	400 V	6 A	–	Fuse 6 A gL/gG	3×10^6	–	–	–

① 6021820175 GC-A2 HIW = 20 million ② 60121100622 GC-U1Z VKS, 6121100623 GC-U1Z VKW = 2 million

Snap-action contact			GC							
Switching function	**Switching contacts**	**Designation**	**U_i**	**I_{the}**	**Utilization category**	**Short-circuit protection**	**Mechanical service life**	**B10d**	**U_i**	**I_{the}**
Normally-closed contact	2NC	SA2Z	–	–	–	–	–	–	–	–
Changeover contact	1NC/1S	SU1Z	400 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 2 A gL/gG	10×10^6	20 mill.	400 V	10 A
Normally-open contact	2S	SE2	–	–	–	–	–	–	–	–

IF				I88					
Utilization category	**Short-circuit protection**	**Mechanical service life**	**B10d**	**U_i**	**I_{the}**	**Utilization category**	**Short-circuit protection**	**Mechanical service life**	**B10d**
AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	3×10^6	6 mill.	250 V	5 A	AC-15 U_e/I_e 240 V/1.5 A	Fuse 6 A gL/gG	1×10^6	2 mill.
AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	3×10^6	6 mill.	250 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	10×10^6	20 mill.*
–	–	–	–	250 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	10×10^6	20 mill.
–	–	–	–	250 V	5 A	AC-15 U_e/I_e 240 V/1.5 A	Fuse 6 A gL/gG	1×10^6	–

*6116819140 I88-U1Z KS, 6186103005 I88-U1Z W RAST = 2 million

IF				I88					
Utilization category	**Short-circuit protection**	**Mechanical service life**	**B10d**	**U_i**	**I_{the}**	**Utilization category**	**Short-circuit protection**	**Mechanical service life**	**B10d**
AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	3×10^6	6 mill.	–	–	–	–	–	–
AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	3×10^6	6 mill.	250 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 2 A gL/gG	10×10^6	20 mill.
–	–	–	–	–	–	–	–	–	–

ENK			
Utilization category	**Short-circuit protection**	**Mechanical service life**	**B10d**
AC-15 U_e/I_e 240 V/1.5 A	Fuse 6 A gL/gG	1×10^6	2 mill.
AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	10×10^6	20 mill.*
AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	10×10^6	20 mill.
–	–	–	–

*6181135251 ENK-U1Z AHSGU RAST RO50 = 2 million

ENK			
Utilization category	**Short-circuit protection**	**Mechanical service life**	**B10d**
–	–	–	–
AC-15 U_e/I_e 240 V/3 A	Fuse 2 A gL/gG	10×10^6	20 mill.
–	–	–	–

SN2				ENM2					
Utilization category	**Short-circuit protection**	**Mechanical service life**	**B10d**	**U_i**	**I_{the}**	**Utilization category**	**Short-circuit protection**	**Mechanical service life**	**B10d**
AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	10×10^6	20 mill.	250 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	10×10^6	2 mill.
AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	–	20 mill.	400 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	10×10^6	20 mill.*
–	–	–	–	400 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	10×10^6	20 mill.
–	–	–	–	250 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	10×10^6	–

*6087135013 ENM2-U1Z AHS-V, 6087135030 ENM2-U1Z AHZ = 2 million

SN2				ENM2					
Utilization category	**Short-circuit protection**	**Mechanical service life**	**B10d**	**U_i**	**I_{the}**	**Utilization category**	**Short-circuit protection**	**Mechanical service life**	**B10d**
–	–	–	–	250 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	3×10^6	6 mill.
AC-15 U_e/I_e 240 V/3 A	Fuse 2 A gL/gG	10×10^6	20 mill.	400 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 2 A gL/gG	10×10^6	20 mill.
–	–	–	–	250 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	3×10^6	–

Electrical data

Type 1 switches

Slow-action contact			D					
Switching function	**Switching contacts**	**Designation**	**U_i**	**I_{the}**	**Utilization category**	**Short-circuit protection**	**Mechanical service life**	**B10d**
Normally-closed contact	2NC	A2Z	400 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	10×10^6	20 mill.
Changeover contact	1NC/1S	U1Z	400 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	10×10^6	20 mill.
Changeover contact, overlapping	1NC/1S	UV1Z	400 V	16 A	AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	10×10^6	20 mill.
Normally-open contact	2S	E2	400 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	10×10^6	–

Snap-action contact			D					
Switching function	**Switching contacts**	**Designation**	**U_i**	**I_{the}**	**Utilization category**	**Short-circuit protection**	**Mechanical service life**	**B10d**
			–	–	–	–	–	–
Normally-closed contact	2NC	SA2Z	–	–	–	–	–	–
Changeover contact	1NC/1S	SU1Z	400 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	10×10^6	20 mill.
Normally-open contact	2S	SE2	–	–	–	–	–	–

Type 2 switches

Slow-action contact			SKT							
Switching function	**Switching contacts**	**Designation**	**U_i**	**I_{the}**	**Utilization category**	**Short-circuit protection**	**Mechanical service life**	**B10d**	**U_i**	**I_{the}**
Normally-closed contact	1NC	A1Z								
Normally-closed contact	2NC	A2Z	250 V	10 A	AC-15 U_e/I_e 240 V/3 A DC-13 U_e/I_e 250V / 0.27 A	Fuse 6 A gL/gG	A* 1×10^6 B* 1×10^5	2 mill.	250 V	10 A
Changeover contact	1NC/1S	U1/U1Z	250 V	10 A	AC-15 U_e/I_e 240 V/3 A DC-13 U_e/I_e 250V / 0.27 A	Fuse 6 A gL/gG	A* $\times 10^6$ B* 1×10^5	2 mill.	250 V	10 A
Changeover contact, overlapping	2NC/1S	UV15Z	250 V	5 A	–	–	–	–	250 V	5 A

*A = Standard; B = Increased actuating force

Slow-action contact			SK							
Switching function	**Switching contacts**	**Designation**	**U_i**	**I_{the}**	**Utilization category**	**Short-circuit protection**	**Mechanical service life**	**B10d**	**U_i**	**I_{the}**
Normally-closed contact	1NC	A1Z	–	–	–	–	–	–	–	–
Normally-closed contact	2NC	A2Z	250 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	1×10^6	2 mill.		
Changeover contact	1NC/1S	U1/U1Z	250 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	1×10^6	2 mill.	250 V	10 A
Changeover contact, overlapping	2NC/1S	UV15Z	400 V	5 A	AC-15 U_e/I_e 240 V/1.5 A	Fuse 6 A gL/gG	1×10^6	0,2 mill.	–	–

Slow-action contact			ENM2							
Switching function	**Switching contacts**	**Designation**	**U_i**	**I_{the}**	**Utilization category**	**Short-circuit protection**	**Mechanical service life**	**B10d**	**U_i**	**I_{the}**
Normally-closed contact	1NC	A1Z	–	–	–	–	–	–	–	–
Normally-closed contact	2NC	A2Z	400 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	1×10^6	2 mill.	400 V	6 A
Changeover contact	1NC/1S	U1/U1Z	400 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	1×10^6	2 mill.	400 V	10 A
Changeover contact, overlapping	2NC/1S	UV15Z	250 V	5 A	AC-15 U_e/I_e 240 V/1.5 A	Fuse 6 A gL/gG	1×10^6	2 mill.		

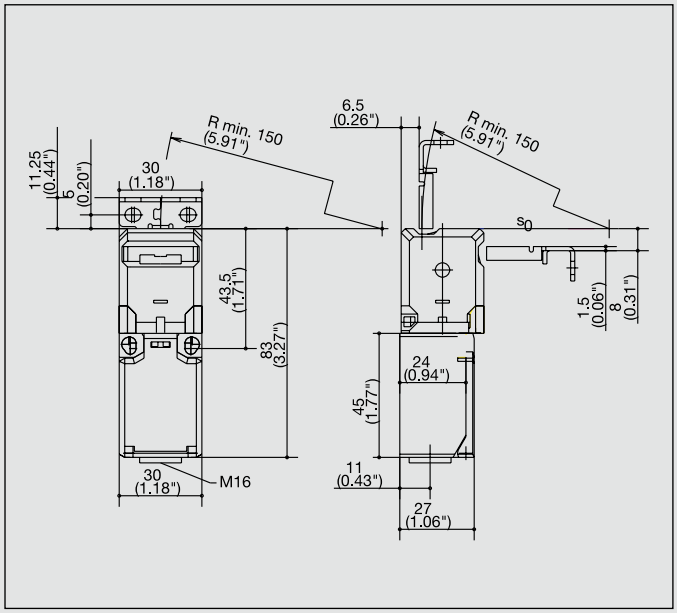
U_i Rated insulation voltage
I_{the} Conventional thermal output from devices in enclosure

SKI				SKC					
Utilization category	**Short-circuit protection**	**Mechanical service life**	**B10d**	**U_i**	**I_{the}**	**Utilization category**	**Short-circuit protection**	**Mechanical service life**	**B10d**
				250 V	5 A	AC-15 U_e/I_e 240 V/1,5 A	Fuse 6 A gL/gG	1×10^6	2 mill.
AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	A* 1×10^6 B* 1×10^5	2 mill.	–	–	–	–	–	–
AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	A* 1×10^6 B* 1×10^5	2 mill.	–	–	–	–	–	–
AC-15 U_e/I_e 240 V/1.5 A	Fuse 6 A gL/gG	A* 1×10^6 B* 1×10^5	2 mill.	–	–	–	–	–	–
		*A = Standard; B = Increased actuating force							

I88				ENK					
Utilization category	**Short-circuit protection**	**Mechanical service life**	**B10d**	**U_i**	**I_{the}**	**Utilization category**	**Short-circuit protection**	**Mechanical service life**	**B10d**
–	–	–	–	–	–	–	–	–	–
				400 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	1×10^6	2 mill.
AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	1×10^6	2 mill.	400 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	1×10^6	2 mill.
–	–	–	–	400 V	5 A	AC-15 U_e/I_e 240 V/1.5 A	Fuse 6 A gL/gG	1×10^6	2 mill.

GC			
Utilization category	**Short-circuit protection**	**Mechanical service life**	**B10d**
–	–	–	–
AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	1×10^6	2 mill.
AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	1×10^6	2 mill.

SKT



Safety switches with separate actuator are positive opening position switches. In terms of design, the switching element and actuator are separated. On actuation, the switching element and actuator are brought together or separated. The positive opening NC contact is always open when the actuator is withdrawn. These switches are assigned to Type 2.

BERNSTEIN AG offers various versions of these Type 2 switches. The differences and advantages of the individual switch groups are outlined in the following.

The SKT is the smallest safety switch with separate actuator. It is particularly suited for applications that require an extremely slim and short switch design. Its rotary head, two actuator openings and various switching functions underscore its versatility in extremely confined spaces.

Added to this, the SKT features other options to meet any requirements.

- **Integrated eject function (FE):**

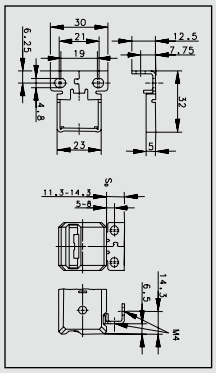
  The actuator is ejected if the door is not locked securely. Consequently, the safety contact is opened, thus preventing the machine from starting up. In addition, this function makes it apparent that the door still needs to be locked.

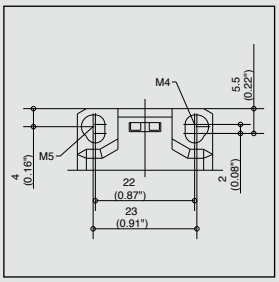
- **Actuating force (up to 50 N:**

  The standard actuating force is 10 N. Depending on the switch variant, an actuating force of 50 N can also be selected. In many applications, hatches and doors need to be secured to prevent them being opened unintentionally. This is achieved by means of bolts, fasteners or other latching mechanisms. The SKI safety switch should be selected for applications requiring increased actuating force.

- **Universeller Radiusbetätiger (MRU):**

  The MRU actuator is ideally suited for applications where the installation conditions severely restrict the actuating travel or radius. It has an adjustable actuating radius in the horizontal and vertical plane.





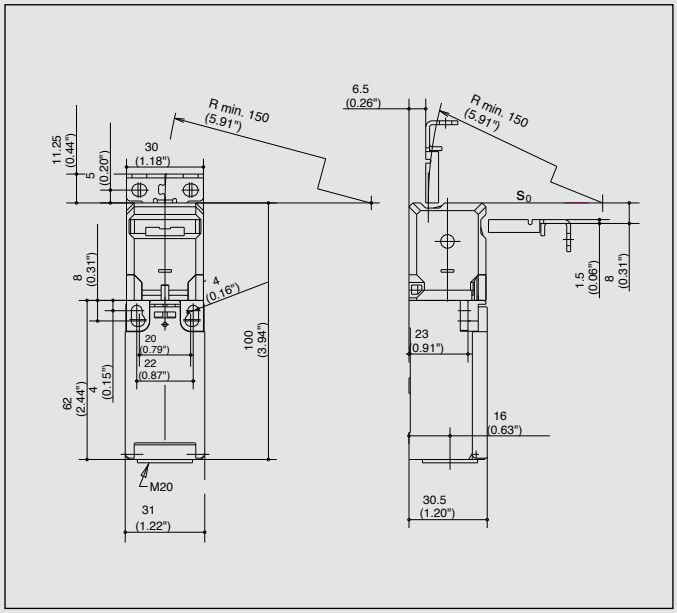
R_{min} 150 mm
Actuating forces FE to FI50

Technical data

Electrical data		
Rated insulation voltage	U_i max.	250 V
Rated operating voltage	U_e max.	240 V AC
Conventional thermal current	I_{the}	10 A
Utilization category		AC-15, U_e/I_e 240 V / 3 A; DC-13, U_e/I_e 250 V / 0.27 A
Mechanical data		
Switching frequency		≤ 30/min
Mechanical service life Standard Mechanical service life encreased actuator holding force		1 x 10^6 switching cycles 1 x 10^5 switching cycles
B10d (up to) ①		2 Mill.
Short-circuit protection		Fuse 6 A gL/gG
Protection class		II, Insulated
Ambient temperature		-30 °C to +80 °C
Protection class		IP65 conforming to IEC/EN 60529
Type of connection		Screw connections
Conductor cross sections		Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 - 1.5 mm^2
Enclosure		Thermoplastic, glass fibre-reinforced (UL94-V0)
Cable entry		M16 x 1.5
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. See Table on Pages 76-79.

SKI



The SKI is the slimline version of a safety switch with separate actuator. It is based on the BERNSTEIN I88 family. Its dimensions, not including the actuating head, correspond to EN 50047.

The actuating head is rotary mounted and has two actuator openings. The SKI safety switch is predestined for installation on section structures and in applications with confined installation conditions. Compared to the SKT, it offers more connection space for the wiring and variants with up to three switching contacts are available.

Other advantages of this series include:

- **Integrated eject function (FE):**

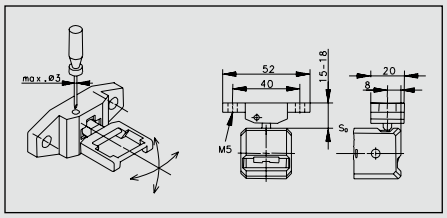
  The actuator is ejected if the door is not locked securely. Consequently, the safety contact is opened, thus preventing the machine from starting up. In addition, this function makes it apparent that the door still needs to be locked.

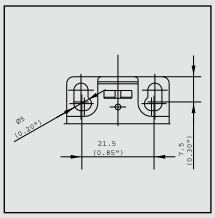
- **Actuating force (up to 50 N):**

  The standard actuating force is 10 N. Depending on the switch variant, an actuating force of 50 N can also be selected. In many applications, hatches and doors need to be secured to prevent them being opened unintentionally. This is achieved by means of bolts, fasteners or other latching mechanisms. The SKI safety switch should be selected for applications requiring increased actuating force.

- **Universal radius actuator (MRU):**

  The MRU actuator is ideally suited for applications where the installation conditions severely restrict the actuating travel or radius. It has an adjustable actuating radius in the horizontal and vertical plane.





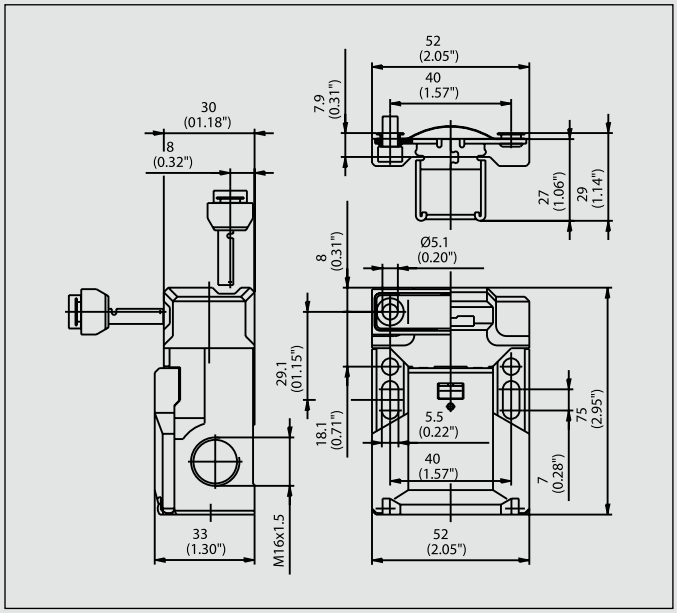
R_{min} in setting directions 50 mm
Actuating forces FE to FI50

Technical data

Electrical data		
Rated insulation voltage	U_i max.	250 V AC
Rated operating voltage	U_e max.	240 V
Conventional thermal current (up to) ①	I_{the}	10 A
Utilization category (up to) ①		AC-15, U_e /I_e 240 V / 3 A
Mechanical data		
Switching frequency		≤ 30/min.
Mechanical service life Standard Mechanical service life encreased actuator holding force		1 x 10^6 switching cycles 1 x 10^5 switching cycles
B10d (up to) ①		2 Mill.
Short-circuit protection		Fuse 6 A gL/gG
Protection class		II, Insulated
Ambient temperature		-30 °C to +80 °C
Protection class		IP65 conforming to IEC/EN 60529
Type of connection		Screw connections
Conductor cross sections		Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 - 1.5 mm^2
Enclosure		Thermoplastic, glass fibre-reinforced (UL94-V0)
Cable entry		1 x M20 x 1.5
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. See Table on Pages 76-79.

SKC



In terms of lengths, the SKC safety position switch is the 15 mm shorter variant of the SK. This makes it the right choice for confined installation conditions.

The SKC otherwise offers the same advantages as the SK: Industrial standard with particular emphasis on safety, personal protection, variable actuator head with two actuator openings.

Other decisive advantages include:

- **Different actuating forces:**

  Corresponding to your specific application, in addition to the standard 10 N, you can also choose an actuating force of 5, 20, 30 or 50 N.

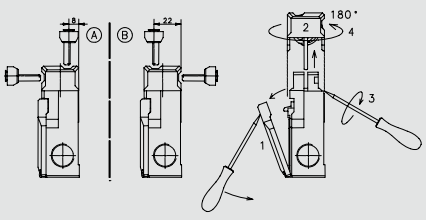
  Actuating forces from 30 to 100 N can be realised with the aid of additional components that are mounted on the outside of the switch.

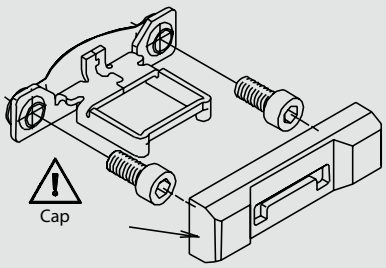
- **Anti-tamper facility:**

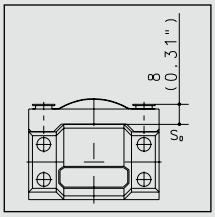
  The switching system is protected by multiple coding to ensure enhanced safety of your application.

- **Outstanding handling:**

  With the two slots you can easily adjust the SKC safety switch and lock it in position by means of the two holes accessible from the top or the two holes accessible from the front. The switch can be wired from three different sides. A transparent cover prevents foreign particles from entering the contact space while connecting the power supply cable.







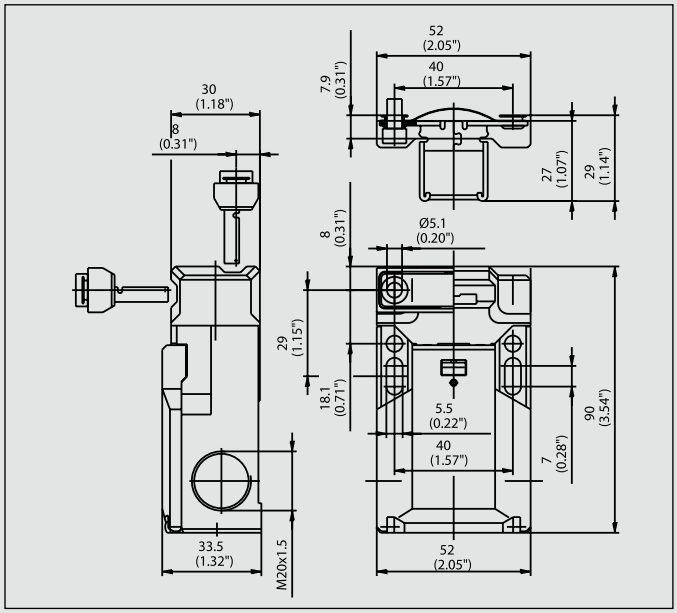
R_{min} 150 mm (5.9")
Actuator: Metal

Technical data

Electrical data		
Rated insulation voltage	U_i max.	250 V AC
Rated operating voltage	U_e max.	240 V
Conventional thermal current	I_{the}	5 A
Utilization category		AC-15, U_e /I_e 240 V / 1.5 A
Mechanical data		
Switching frequency		≤ 30/min.
Mechanical service life		1 x 10^6 switching cycles
B10d (up to) ①		2 Mill.
Short-circuit protection		Fuse 6 A gL/gG
Protection class		II, Insulated
Ambient temperature		-30 °C ... +80 °C
Protection class		IP65 conforming to IEC/EN 60529
Type of connection		Screw connections
Conductor cross sections		Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 - 1.5 mm^2
Enclosure		Thermoplastic, glass fibre-reinforced (UL94-V0)
Cable entry		3 x M16 x 1.5
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. See Table on Pages 76-79.

SK



The SK safety position switch is an industry standard and can be used in virtually any application.

Thanks to design safety features conforming to VDE 0660 T200, IEC 60947-5-1 and the test regulations GS-ET 15, the SK is particularly suitable for personal protection applications. Its versatility is enhanced by the variable actuator head and two actuator openings.

Other decisive advantages include:

- **Different actuating forces:**

  Corresponding to your specific application, in addition to the standard 10 N, you can also choose an actuating force of 5, 20 or 30 N.

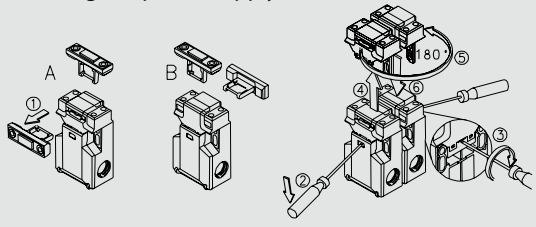
  Actuating forces from 30 to 100 N can be realised with the aid of additional components that are mounted on the outside of the switch.

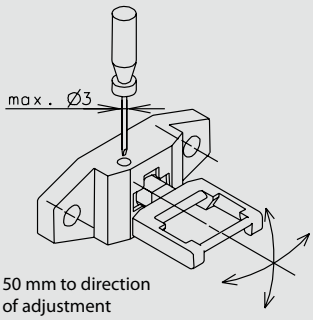
- **Anti-tamper facility:**

  The switching system is protected by multiple coding to ensure enhanced safety of your application.

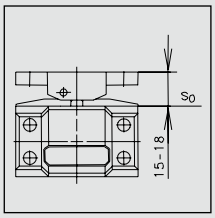
- **Outstanding handling:**

  With the two slots you can easily adjust the SK safety switch and lock it in position by means of the two holes accessible from the top or the two holes accessible from the front. The switch can be wired from three different sides. A transparent cover prevents foreign particles from entering the contact space while connecting the power supply cable.





50 mm to direction
of adjustment
Actuator: metal



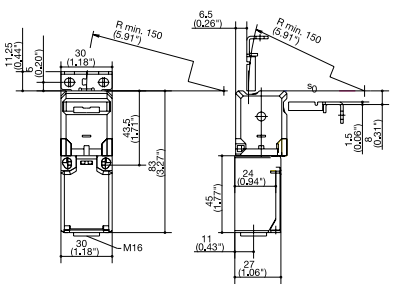
Technical data

Electrical data		
Rated insulation voltage (up to) ①	U_i max.	400 V AC
Rated operating voltage	U_e max.	240 V
Conventional thermal current (up to) ①	I_{the}	10 A
Utilization category		AC-15, U_e /I_e 240 V / 1.5 A
Mechanical data		
Switching frequency		≤ 30/min
Mechanical service life		1 x 10^6 switching cycles
B10d (bis zu) ①		2 Mill.
Short-circuit protection (up to) ①		Fuse 10 A gL/gG
Protection class		II, Insulated
Ambient temperature		-30 °C ... +80 °C
Protection class		IP65 conforming to IEC/EN 60529
Type of connection		Screw connections
Conductor cross sections		Single-wire 0.5 - 1.5 mm² or Stranded wire with ferrule 0.5 - 1.5 mm²
Enclosure		Thermoplastic, glass fibre-reinforced (UL94-V0)
Cable entry		3 x M20 x 1.5
Standards		
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1		

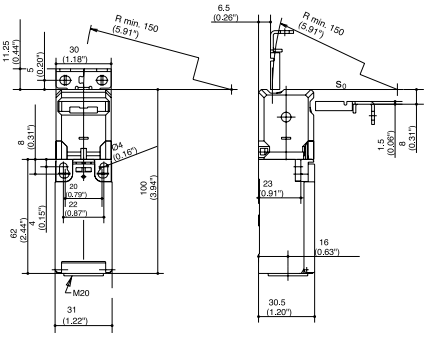
① Depending on switching system. See Table on Pages 76-79.

Safety Switches with Separate Actuator

SKT



SKI



Switching operation	Standard	High actuating force	Radius actuation
	SKT		
1 NC / 1 NO contact	**6016419059** SKT-U1Z M3		
1 NC contacts			
2 NC contacts	**6016469066** SKT-A2Z M3		
1 NC / 1 NO contact Overlapping			
Approvals			

Switching operation	Standard	High actuating force	Radius actuation
	SKI		
1 NC / 1 NO contact	**6016819052** SKI-U1Z M3	**6016819139** SKI-U1Z FI50 M3	**6016819123** SKI-U1Z MRU
1 NC contacts			
2 NC contacts	**6016869056** SKI-A2Z M3		**6016869122** SKI-A2Z MRU
1 NC / 1 NO contact Overlapping	**6016869058** SKI-UV15Z M3	**6016869145** SKI-UV15Z FI50 M3	**6016869131** SKI-UV15Z MRU
Approvals			

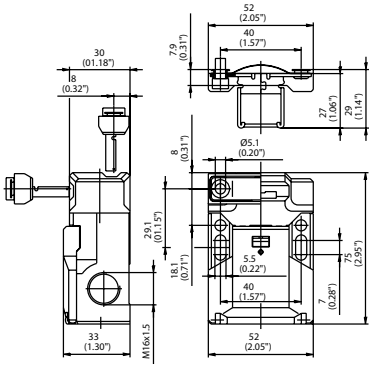
Special features/variants
(on request)

- Replacement actuator for:
  3112850340

Special features/variants
(on request)

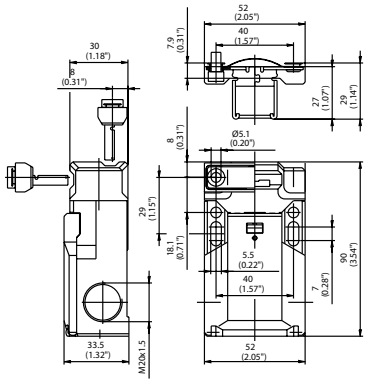
- Replacement actuator for:
  Standard **3112850340**
  High actuating force **3112850340**
  Radius actuation **3911452058**

SKC



Standard	High actuating force	Radius actuation
6016169039 SKC-A1Z M	**6116169016** SKC-A1Z F30 M	**6016169087** SKC-A1Z MRU

SK



Standard	High actuating force	Radius actuation
6016119016 SK-U1Z M	**6116119109** SK-U1Z F30 M	**6016119084** SK-U1Z MRU
6016169036 SK-A2Z M	**6016169053** SK-A2Z F30 M	**6016169085** SK-A2Z MRU
6016169026 SK-UV15Z M	**6016169061** SK-UV15Z F30 M	**6016169086** SK-UV15Z MRU

Special features/variants
(on request)

- 50 N and 100 N actuating force on request
- Replacement actuator for:
  Standard **3911452116**
  High actuating force **3911451914**
  Radius actuation **3911452058**

Special features/variants
(on request)

- 100 N actuating force on request
- Replacement actuator for:
  Standard **3911452116**
  High actuating force **3911451914**
  Radius actuation **3911452058**

Switch with VTW, VTU, VT actuator

ENM-VTW

ENK-VTU

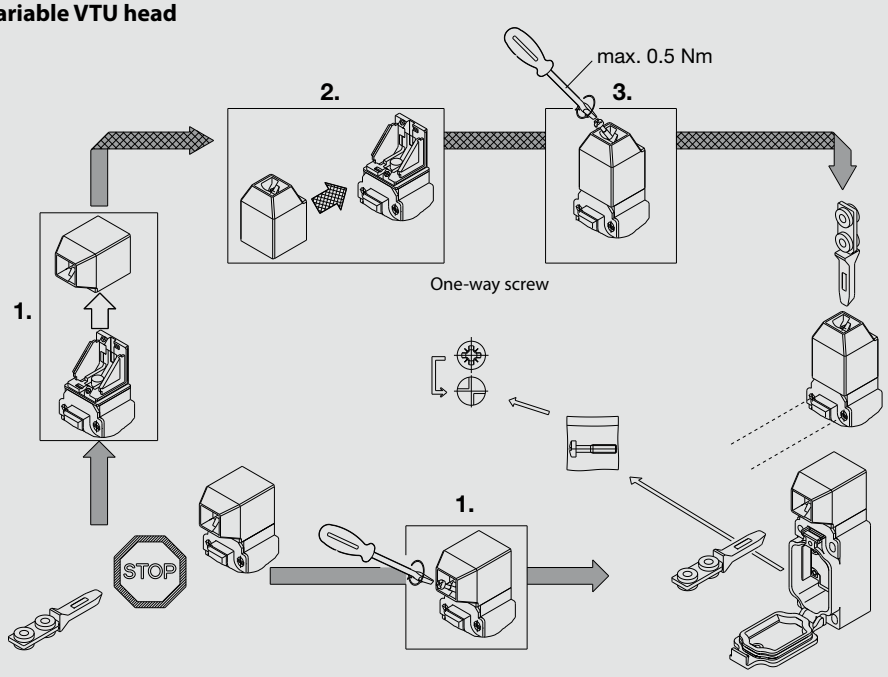
These position switches of the tried-and-tested switch families I88, ENK, ENM2 and GC correspond to Type 2.

This means that you can use Type 1 and Type 2 position switches corresponding to your applications while using one family of switches.

This results in many advantages:

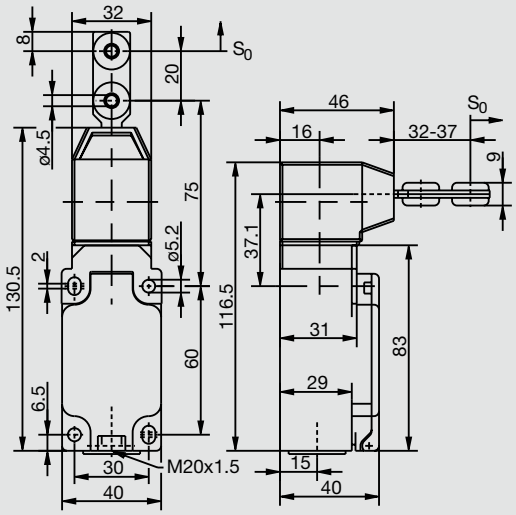
- **Standardisation:**
  Switches of one family have the same mounting dimensions and the same electrical properties.
- **Reduced costs:**
  II88, ENK, ENM2 and GC are used in large quantities. This not only reflects the quality of the products but also means lower prices compared to special designs used in small quantities.

Variable VTU head



Repositioning the actuator head either in horizontal or vertical direction results in 8 approach actuator directions.

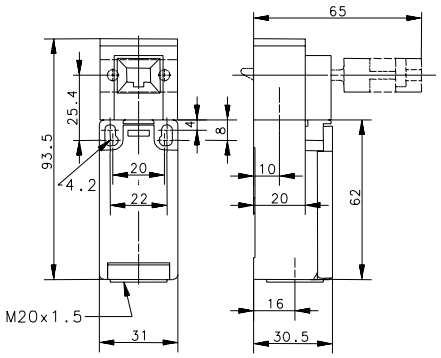
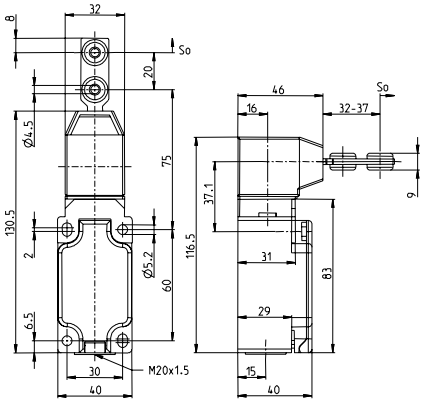
GC-VT



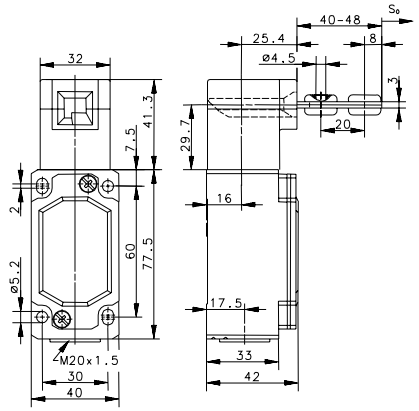
Technical data

		I88	ENK	ENM2	GC
Electrical data					
Rated insulation voltage	U_i	250 V AC	400 V AC	400 V AC	400 V AC
Conventional thermal current (up to) ①	I_{the}	10 A	10 A	10 A	10 A
Rated operating voltage	U_e	240 V	240 V	240 V	240 V
Utilization category (up to) ①		AC-15, U_e /I_e 240 V / 3 A	AC-15, U_e /I_e 240 V / 3 A	AC-15, U_e/I_e 240 V / 3 A	AC-15, U_e /I_e 240 V / 3 A
Forced disconnection	⊝	conforming to IEC/EN 60947-5-1, Addendum K	conforming to IEC/EN 60947-5-1, Addendum K	conforming to IEC/EN 60947-5-1, Addendum K	conforming to IEC/EN 60947-5-1, Addendum K
Short-circuit protection (up to) ①		Fuse 10 A gL/gG	Fuse 10 A gL/gG	Fuse 10 A gL/gG	Fuse 10 A gL/gG
Protection class		II, Insulated	II, Insulated	I	I
Mechanical data					
Enclosure		Thermoplastic, glass fibre-reinforced (UL 94-V0)	Thermoplastic, glass fibre-reinforced	Aluminium pressure die-casting	Aluminium pressure die-casting
Cover		Thermoplastic, glass fibre-reinforced (UL 94-V0)	Thermoplastic, glass fibre-reinforced	Sheet aluminium	Sheet aluminium
Actuation		Separate actuator, Thermoplastic	Separate actuator, (St/PA), Actuator (PA6 GV/Zn-GD)	Separate actuator,(St / PA)	Separate actuator
Ambient temperature		-30°C to +80°C	-30°C to +80°C	-30°C to +80°C	-30°C to +80°C
Mechanical service life		1 x 10^6 switching cycles	1 x 10^6 switching cycles	1 x 10^6 switching cycles	1 x 10^6 switching cycles
B10d		2 mill.	2 mill.	2 mill.	2 mill.
Switching frequency		≤ 50/min.	max. 30/min.	≤ 50/min.	≤ 10/min.
Mounting		2 x M4	4 x M5	4 x M5	2 x M4
Type of connection		Screw connections	Screw connections	Screw connections	Screw connections
Conductor cross sections		Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 - 1.5 mm^2	Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 - 1.5 mm^2	Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 - 1.5 mm^2	Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 - 1.5 mm^2
Cable entry		1 x M20 x 1.5	1 x M20 x 1.5	1 x M20 x 1.5	1 x M20 x 1.5
Weight		≈ 0.09 kg	≈ 0.23 kg	≈ 0.33 kg	≈ 0.32 kg
Installation position		Any	Any	Any	Any
Protection class		IP65 conforming to EN 60529	IP65 conforming to EN 60529	IP65 conforming to EN 60529	IP65 conforming to 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					

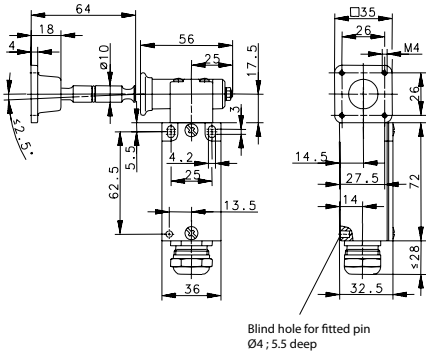
① Depending on switching system. See Table on Pages 76-79.

	I88 VTW	ENK VTU
		
Switching operation	**Standard** **High actuating force** **Radius actuation**	**Standard** **High actuating force** **Radius actuation**
1 NC / 1 NO contact	**6016819018** I88-U1Z VTW	**6016619132** ENK-U1Z VTU
2 NC contacts		**6016669133** ENK-A2Z VTU
1 NC / 1 NO contact **Overlapping**		**6016669154** ENK-UV15Z VTU
Approvals		
	Replacement actuator: 3911702100	**Replacement actuator: 3911702100**
	Special features/variants (on request) ● All actuators specified under „Safety Switches with Separate Actuator and Latching Device (SLK/SLM)“ can be used for these switches	**Special features/variants** (on request) ● All actuators specified under „Safety Switches with Separate Actuator and Latching Device (SLK/SLM)“ can be used for these switches

ENM2 VTW



GC VT



Standard | **High actuating force** | **Radius actuation**

6016219100
ENM2-U1Z VTW

6016269105
ENM2-A2Z VTW

6016269104
ENM2-UV15Z VTW

Standard | **High actuating force**

6121100555
GC-U1Z VT 90GR

6116769064
GC-A2Z VT 90GR

Replacement actuator: 3911702100

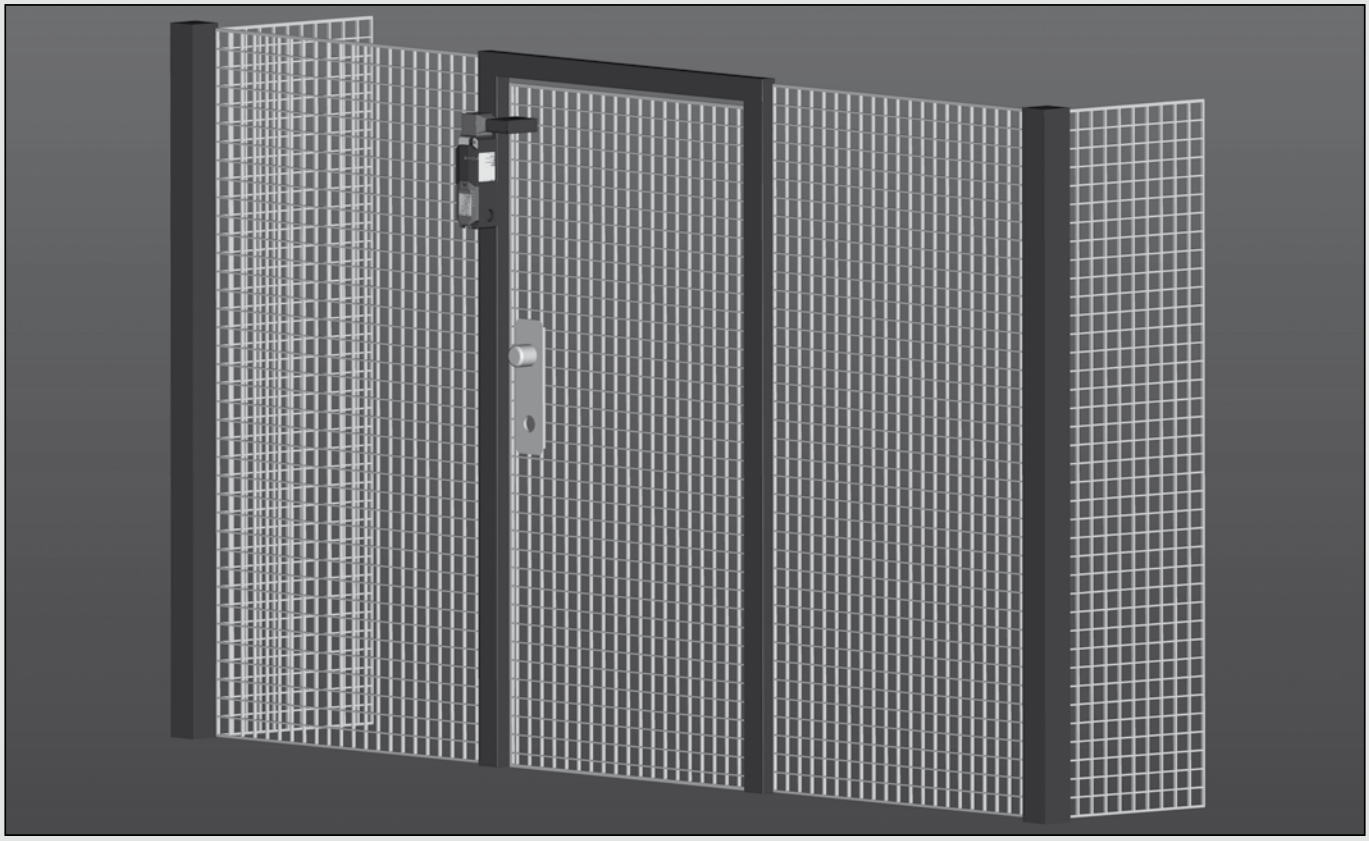
Special features/variants
(on request)

- All actuators specified under „Safety Switches with Separate Actuator and Latching Device (SLK/SLM)“ can be used for these switches

Replacement actuator: 3912001275

Special features/variants
(on request)

SLK



Machines that continue running after being switched off are often part of automated production processes. Safety guards prevent operator access and must therefore be kept closed until the hazards posed by machine movement have ceased.

Safety position switches with interlock function ensure that safety gates, safety doors and other protective guards remain closed for as long as a hazardous situation exists.

In production processes safety position switches have three main tasks:

- Enabling the machine/process when the safety guard is closed and interlocked
- Disabling the machine/process when the safety guard is opened
- Position monitoring of the safety guard and interlock

The SLK/SLM safety position switches with separate actuators and interlock enable the user to realise locking systems conforming to EN 1088, EN ISO 12100-1, 12100-2 and since 29.12.2009 to the compulsory Machinery Directive 2006/42/EC.

System description

SLK/SLM safety position switches with interlock function are available in versions with spring force locking action and magnetic force locking action. The separate actuator is connected form-fit with the safety guard. It transfers the locking force to the safety guard and monitors its position. Thanks to its triple coding, the separate actuator ensures a high degree of anti-tamper security. The interlock facility in association with the SLK/SLM safety position switches is integrated in the switch enclosure. To lock the actuator in connection with a switching mechanism, the required interlock is achieved by means of a spring mechanism in the spring-force locked version and by an electromagnet in the magnetic-force locked version.

Locking principle

Spring force (closed-circuit current)

The safety guard is locked automatically when the actuator is inserted to its end position. It is unlocked by energising the electromagnet, allowing the safety guard to be opened.

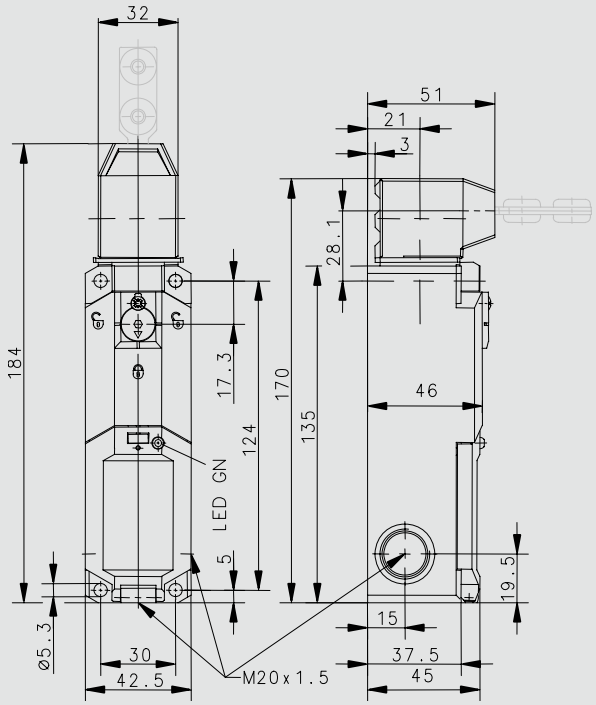
Magnetic force (working current)

The lock (interlock) is deactivated when the electromagnet is de-energised, in the event of fault in actuation or power failure. The safety guard can be opened.

Product advantages

- Two independent safety circuits ensure reliable integration
  - With two contacts, circuit 1 monitors the actuator
  - With two contacts, circuit 2 monitors the interlock

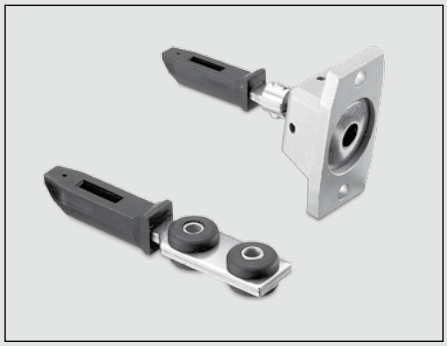
  The contact configuration is variable and may deviate from the selection table if required.
- Two different operating voltages for universal integration::
  - 24 V AC / DC
  - 110 V / 230 V AC
- Rotary actuating head (4x 90°) as well as horizontal and vertical actuation ensure complete flexibility in use
- Compact design with short overall size of only 170 mm
- Innovative installation with spring-loaded terminals
- Function conforming to GS ET 19, EN 60 204-1, EN 60 947-1 and EN 60 947-5-1



The actuator is not included and must be ordered separately.

Safe operation

The stainless steel actuator ensures safe and reliable operation. Its coding prevents tampering and bypassing the system „in an easier way". The radius actuator is ideal for monitoring smaller safety gates. It can be preset horizontally or vertically and is also made from stainless steel.

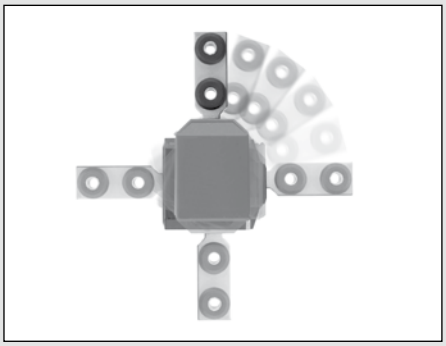


Innovative installation

The SLK is electrically connected safely and reliably by means of terminals. Spring-loaded terminals are used, into which the wires with ferrules can be inserted without the need for tools. The fact that the connection compartment is separate from the functional parts contributes to ensuring secure and reliable connection. The connection compartment conforms to protection class IP67.

Flexible in use

The SLK safety switch can be actuated in horizontal and vertical direction. Prior to installation it is preset by simply repositioning the head section.This flexibility in installation is achieved by positioning the actuator head in steps of 4 x 90°.



IMPORTANT: The actuator for the SLK must be ordered separately. You will find a corresponding overview on Pages 96-97.

SLK

Product selection

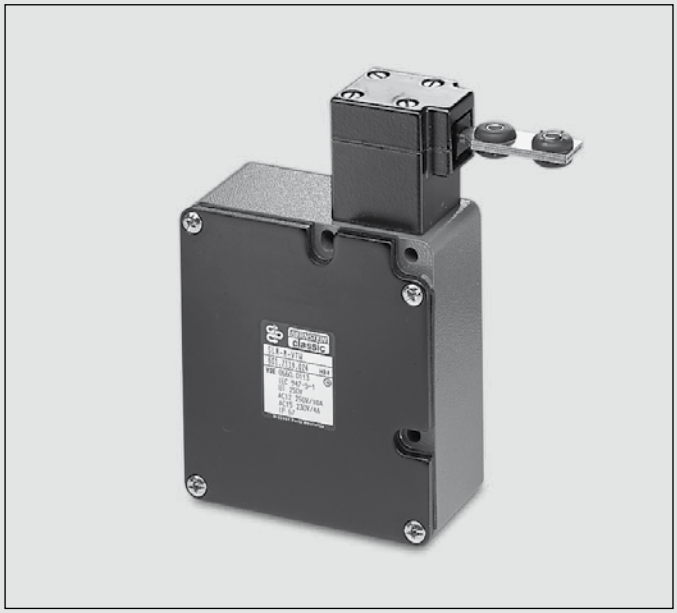
Article number	Designation	Locking action	Contacts		Supply voltage	Additional function
			Actuator	Interlock		
6018119045	SLK-F-UC-55-R1-A0-L0-0	Spring	1NC / 1NO	1NC / 1NO	24 Volt AC / DC	Auxiliary release
6018119066	SLK-F-UC-55-R1-A0-L1-0	Spring	1NC / 1NO	1NC / 1NO	24 Volt AC / DC	Auxiliary release, LED
6018169054	SLK-F-UC-22-R1-A0-L0-0	Spring	2 NC	2 NC	24 Volt AC / DC	Auxiliary release
6018169050	SLK-F-UC-25-R1-A0-L0-0	Spring	2 NC	1NC / 1NO	24 Volt AC / DC	Auxiliary release
6018169068	SLK-F-UC-25-R1-A0-L1-0	Spring	2 NC	1NC / 1NO	24 Volt AC / DC	Auxiliary release, LED
6018119061	SLK-F-UC-55-R2-A0-L0-0	Spring	1NC / 1NO	1NC / 1NO	24 Volt AC / DC	Emergency release
6018169055	SLK-F-NC-22-R1-A0-L0-0	Spring	2 NC	2 NC	110 / 230 AC	Auxiliary release
6018119046	SLK-F-NC-55-R1-A0-L0-0	Spring	1NC / 1NO	1NC / 1NO	110 / 230 AC	Auxiliary release
6018119067	SLK-F-NC-55-R1-A0-L1-0	Spring	1NC / 1NO	1NC / 1NO	110 / 230 AC	Auxiliary release, LED
6018169051	SLK-F-NC-25-R1-A0-L0-0	Spring	2 NC	1NC / 1NO	110 / 230 AC	Auxiliary release
6018169069	SLK-F-NC-25-R1-A0-L1-0	Spring	2 NC	1NC / 1NO	110 / 230 AC	Auxiliary release, LED
6018119047	SLK-M-UC-55-R0-A0-L0-0	Magnet	1NC / 1NO	1NC / 1NO	24 Volt AC / DC	
6018169052	SLK-M-UC-25-R0-A0-L0-0	Magnet	2 NC	1NC / 1NO	24 Volt AC / DC	
6018169056	SLK-M-UC-22-R0-A0-L0-0	Magnet	2 NC	2 NC	24 Volt AC / DC	
6018119048	SLK-M-NC-55-R0-A0-L0-0	Magnet	1NC / 1NO	1NC / 1NO	110 / 230 AC	
6018169053	SLK-M-NC-25-R0-A0-L0-0	Magnet	2 NC	1NC / 1NO	110 / 230 AC	
6018169057	SLK-M-NC-22-R0-A0-L0-0	Magnet	2 NC	2 NC	110 / 230 AC	

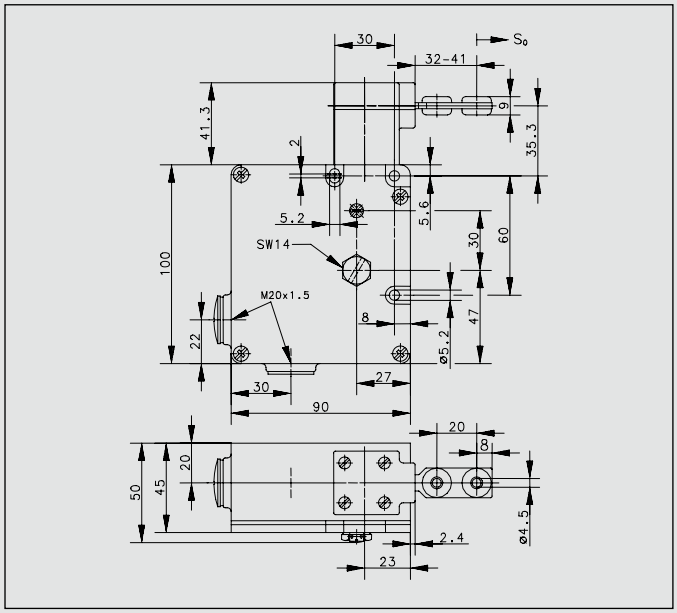
Technical data

		Spring 24 Volt AC / DC	Spring 110 / 230 AC	Magnet 24 Volt AC / DC	Magnet 110 / 230 AC
Electrical data					
Rated insulation voltage	U_i	250 V	250 V	250 V	250 V
Utilization category		AC-15, U_e /I_e 230 V / 2.5 A	AC-15, U_e /I_e 230 V / 2.5 A	AC-15, U_e /I_e 230 V / 2.5 A	AC-15, U_e /I_e 230 V / 2.5 A
Conventional thermal current	I_{the}	5 A	5 A	5 A	5 A
Short-circuit protection		4 A gL	4 A gL	4 A gL	4 A gL
Protection class		II, Insulated	II, Insulated	II, Insulated	II, Insulated
Electromagnet					
Duty factor		100 % ED (an E1; E2)	100 % ED (an E1; E2)	100 % ED (an E1; E2)	100 % ED (an E1; E2)
Thermal class		F (155 °C)	F (155 °C)	F (155 °C)	F (155 °C)
Switch-on power		12 VA (0.2 s)	65 VA (0.1 s)	12 VA (0.2 s)	12 VA (0.2 s)
Continuous power		4.4 VA	8 VA	4.4 VA	4.4 VA
Mechanical data					
Enclosure		Thermoplastic GV (UL94-V0)	Thermoplastic GV (UL94-V0)	Thermoplastic GV (UL94-V0)	Thermoplastic GV (UL94-V0)
Cover		Thermoplastic GV (UL94-V0)	Thermoplastic GV (UL94-V0)	Thermoplastic GV (UL94-V0)	Thermoplastic GV (UL94-V0)
Actuator		Thermoplastic GV / Zn-GD	Thermoplastic GV / Zn-GD	Thermoplastic GV / Zn-GD	Thermoplastic GV / Zn-GD
Ambient temperature		-25 °C to +70 °C	-25 °C to +70 °C	-25 °C to +70 °C	-25 °C to +70 °C
Switching function		2 NC contacts, 2 NO contacts	2 NC contacts, 2 NO contacts	4 NC contacts	2 NC contacts, 2 NO contacts
Switching principle		4 Slow-action contacts	4 Slow-action contacts	4 Slow-action contacts	4 Slow-action contacts
Mechanical service life		1 x 10^6 switching cycles (max. 600 switching cycles / h)	1 x 10^6 switching cycles (max. 600 switching cycles / h)	1 x 10^6 switching cycles (max. 600 switching cycles / h)	1 x 10^6 switching cycles (max. 600 switching cycles / h)
B10d		2 mill.	2 mill.	2 mill.	2 mill.
Minimum actuating radius	R_{min}	See datasheet, actuator	See datasheet, actuator	See datasheet, actuator	See datasheet, actuator
Approach speed	V_{max}	0.5 $^m/_s$	0.5 $^m/_s$	0.5 $^m/_s$	0.5 $^m/_s$
Mounting		4 x M5	4 x M5	4 x M5	4 x M5
Cross sections		0.5 - 1.5 mm^2	0.5 - 1.5 mm^2	0.5 - 1.5 mm^2	0.5 - 1.5 mm^2
Type of connection		Cage clamp terminal	Cage clamp terminal	Cage clamp terminal	Cage clamp terminal
Cable entry		3 x M20 x 1.5	3 x M20 x 1.5	3 x M20 x 1.5	3 x M20 x 1.5
Weight		≈ 0.34 kg	≈ 0.30 kg	≈ 0.30 kg	≈ 0.35 kg
Protection class		IP67 conforming to IEC/EN 60529	IP67 conforming to IEC/EN 60529	IP67 conforming to IEC/EN 60529	IP67 conforming to IEC/EN 60529
Installation position		Any	Any	Any	Any
Locking principle		Spring force	Spring force	Magnetic force	Magnetic force
Latching force	FZh	≤ 1500 N to GS-ET-19	≤ 1500 N to GS-ET-19	≤ 1500 N to GS-ET-19	≤ 1500 N to GS-ET-19

Notes

SLM



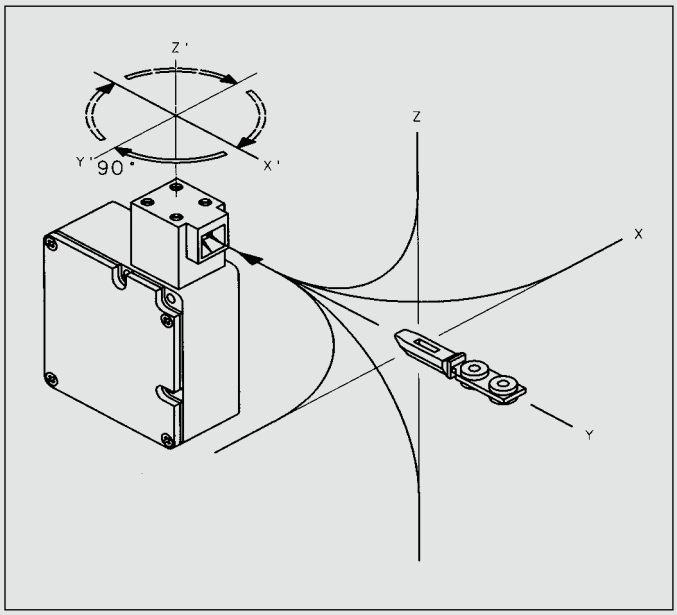


Product advantages

- Highly resistant in harsh industrial environments and with compact enclosure for space-saving installation
- Triple-coded actuator with high anti-tamper security
- Approach direction of actuator easily changed in 90° steps (repositioning only possible with actuator inserted)
- Entire function unit encapsulated on the inside
- Separate connection compartment for safe wiring at contact strip
- Two independent safety circuits ensure reliable integration
  - With two contacts, circuit 1 monitors the actuator
  - With two contacts, circuit 2 monitors the interlock
  - The contact configuration is variable and may deviate from the selection table if required
- Integrated protective circuit avoids polarity reversal and voltage peaks
- Function conforming to VDE 0660 Part 200, EN 60 947-5-1 and GS ET 19
- The SLM safety switches are supplied as standard with actuator A1

Options

- Individual contact configuration
- Radius actuator for actuating radii of less than 400 mm
- Auxiliary release
- Two independent safety circuits ensure reliable integration
- Solutions to customer specifications



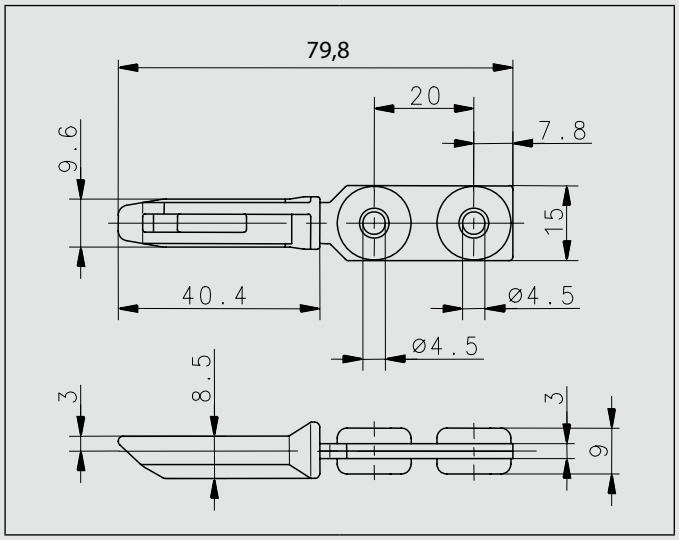
Product selection

Article number	Designation	Locking action	Contacts		Supply voltage	Additional function
			Actuator	Interlock		
6017119020	SLM-FVTW 24DC-55-AR	Spring	1NC / 1NO	1NC / 1NO	24 Volt DC	Auxiliary release
6017169067	SLM-FVTW 24DC-22-AR	Spring	2 NC	2 NC	24 Volt DC	Auxiliary release
6017119047	SLM-FVTW 24DC-55-KR	Spring	1NC / 1NO	1NC / 1NO	24 Volt DC	With key release
6017169023	SLM-FVTW 24AC-22-AR	Spring	2 NC	2 NC	24 Volt AC	Auxiliary release
6017119032	SLM-FVTW 120AC-55-AR	Spring	1NC / 1NO	1NC / 1NO	120 Volt AC	Auxiliary release
6017119022	SLM-FVTW 230AC-55-AR	Spring	1NC / 1NO	1NC / 1NO	230 Volt AC	Auxiliary release
6017169066	SLM-MVTW 24DC-22	Magnet	2 NC	2 NC	24 Volt DC	
6017119023	SLM-MVTW 24DC-55	Magnet	1NC / 1NO	1NC / 1NO	24 Volt DC	
6017119024	SLM-MVTW 230AC-55	Magnet	1NC / 1NO	1NC / 1NO	230 Volt AC	

Technical data		**Spring 24 Volt DC**	**Spring 120 Volt AC**	**Spring 230 Volt AC**	**Magnet 24 Volt DC**	**Magnet 230 Volt AC**
Electrical data						
Rated insulation voltage	U_i	250 V	250 V	250 V	250 V	250 V
Utilization category		AC-12, U_e /I_e 250 V / 10 A AC-15, U_e /I_e 230 V / 4 A	AC-12, U_e /I_e 250 V / 10 A AC-15, U_e /I_e 230 V / 4 A	AC-12, U_e /I_e 250 V / 10 A AC-15, U_e /I_e 230 V / 4 A	AC-12, U_e /I_e 250 V / 10 A AC-15, U_e /I_e 230 V / 4 A	AC-12, U_e /I_e 250 V / 10 A AC-15, U_e /I_e 230 V / 4 A
Conventional thermal current	I_{the}	5 A	5 A	5 A	5 A	5 A
Short-circuit protection		10 A gL/gG	10 A gL/gG	10 A gL/gG	10 A gL/gG	10 A gL/gG
Protection class		I	I	I	I	I
Electromagnet						
Duty factor		100 % ED	100 % ED	100 % ED	100 % ED	100 % ED
Thermal class		B (130 °C)	B (130 °C)	B (130 °C)	B (130 °C)	B (130 °C)
Continuous power		5.2 W	5.2 W	5.2 W	5.2 W	5.2 W
Operating voltage		24 V DC	120 V AC	230 V AC	24 V DC	230 V AC
Mechanical data						
Enclosure		Al die-cast	Al die-cast	Al die-cast	Al die-cast	Al die-cast
Cover		Sheet aluminium	Sheet aluminium	Sheet aluminium	Sheet aluminium	Sheet aluminium
Actuator		ZN die-cast	Al die-cast	Al die-cast	Al die-cast	Al die-cast
Ambient temperature		-30 °C to +60 °C	-30 °C to +60 °C	-30 °C to +60 °C	-30 °C to +60 °C	-30 °C to +60 °C
Switching principle		4 Slow-action contacts	4 Slow-action contacts	4 Slow-action contacts	4 Slow-action contacts	4 Slow-action contacts
Mechanical service life		1 x 10^6 switching cycles	1 x 10^6 switching cycles	1 x 10^6 switching cycles	1 x 10^6 switching cycles	1 x 10^6 switching cycles
B10d		2 mill.	2 mill.	2 mill.	2 mill.	2 mill.
Minimum actuating radius	R_{min}	400 mm	400 mm	400 mm	400 mm	400 mm
Approach speed	V_{max}	1.5 $^m/_s$	1.5 $^m/_s$	1.5 $^m/_s$	1.5 $^m/_s$	1.5 $^m/_s$
Mounting		3 x M5	3 x M5	3 x M5	3 x M5	3 x M5
Cross sections		0.5 - 1.5 mm^2	0.5 - 1.5 mm^2	0.5 - 1.5 mm^2	0.5 - 1.5 mm^2	0.5 - 1.5 mm^2
Type of connection		Screws	Screws	Screws	Screws	Screws
Cable entry		2 x M20 x 1.5	2 x M20 x 1.5	2 x M20 x 1.5	2 x M20 x 1.5	2 x M20 x 1.5
Weight		≈ 0.81 kg	≈ 0.81 kg	≈ 0.81 kg	≈ 0.81 kg	≈ 0.81 kg
Protection class		IP67 conforming to IEC/EN 60529	IP67 conforming to IEC 529	IP67 conforming to IEC 529	IP67 conforming to IEC 529	IP67 conforming to IEC 529
Installation position		Any	Any	Any	Any	Any
Locking principle		Spring force	Spring force	Spring force latching	Spring force latching	Spring force latching
Latching force		≤ 1000 N to GS-ET 19	≤ 1000 N to GS-ET 19	≤ 1000 N to GS-ET 19	≤ 1000 N to GS-ET 19	≤ 1000 N to GS-ET 19

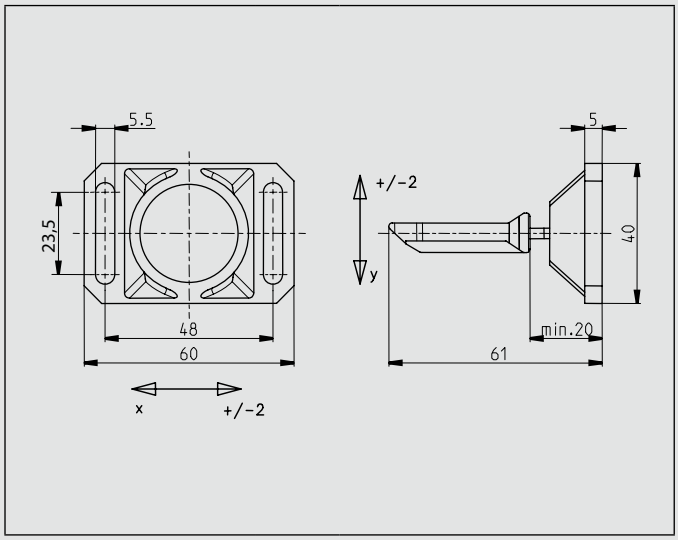
Product selection SLK, SLM, ENK-VTU, ENM2-VTW

Article number	Designation
3911702228	Actuator A1



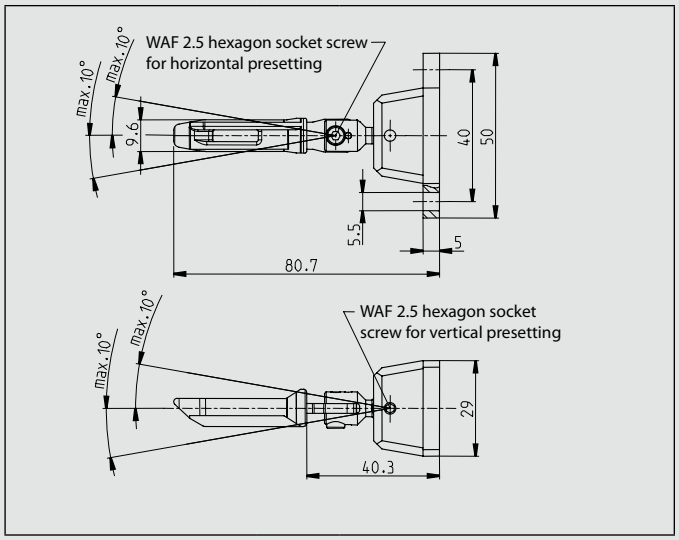
Mechanical data		
Actuator		Steel/PA
Minimum actuating radius	R_{min}	400 mm

Article number	Designation
3911702231	Actuator A4



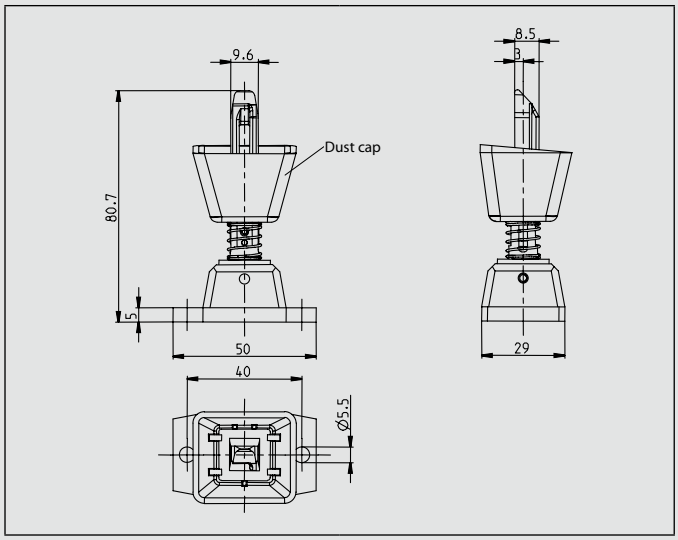
Mechanical data		
Actuator		Steel/PA
Enclosure		GD-Zn
Minimum actuating radius	R_{min}	350 mm
Repositioning of spring-mounted actuator by 4 x 90° in mounted state.		

Article number	Designation
3911702229	Actuator A2



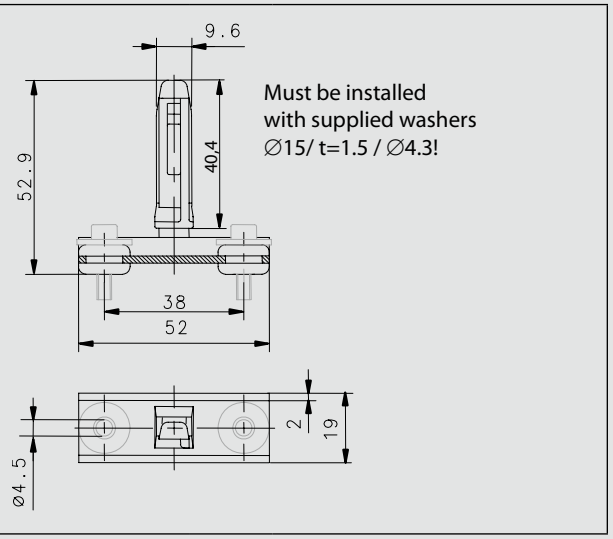
Mechanical data		
Enclosure / Actuator		Steel/PA
Minimum actuating radius	R_{min}	150 mm
Repositioning of spring-mounted actuator by 4 x 90° in not mounted state.		
WAF 2.5 Allen key, supplied		

Article number	Designation
3911702230	Actuator A3



Mechanical data		
Enclosure / Actuator		Steel/PA
Dust cap		Elastomer CR
Minimum actuating radius	R_{min}	400 mm
Repositioning of spring-mounted actuator by 4 x 90° in not mounted state.		

Article number	Designation
3911702234	Actuator A7

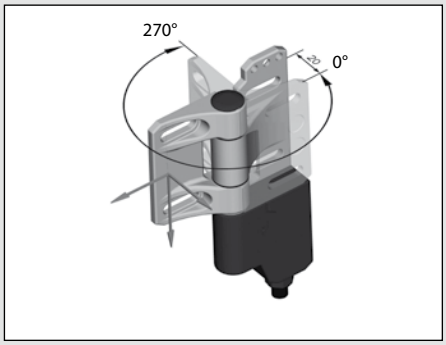


Mechanical data		
Actuator		Steel/PA
U-section		Steel
Minimum actuating radius	R_{min}	400 mm

Safety Hinge Switch – SHS3

With the SHS3 safety hinge switch BERNSTEIN presents the logical further development of the SHS series and a solution that makes it unnecessary to replace the safety hinge switch when equipment such as safety gates are damaged as the result of mechanical stress, such as after being bumped by a fork-lift truck for instance. Even after the switching point has been set, if need be, the user can now correct the hinge setting with the aid of the integrated fine adjustment system. The SHS3 hinge switch is reusable even when the entire system needs to be converted: With the aid of a change kit, the user can redefine the switching point without using the high protection rating of IP67.

The SHS3 has a swivel range from 0° to 270°. The switching point is also freely selectable within this range.



The SHS3 hinge switch has virtually no limits in terms of its installation flexibility. Not only does the SHS3 enable front and interior installation, right-hinged or left-hinged mounting or freely selectable direction of electric connection, but thanks to the switching point which can be set in an angle range of 270°, this hinge switch can also be installed in places that were previously not possible.

Safe:

With suitable system layout, the switch can be used up to performance level e. Following variants are available:

- 2 positive opening safety contacts
- 2 positive opening safety contacts with additional normally-open signalling contact
- With integrated AS interface Safety at Work.

Flexible:

- Freely and repeatedly adjustable switching point
- Switching point freely adjustable by user over a range of 270°
- Uncomplicated re-adjustment even of set switching point by ±1.5° thanks to integrated fine adjustment system
- Slots for mounting on sections and welded structures
- In addition to the plug connection version, an SHS with fixed cable connec tion at the rear is also available
- Right and left hinged systems possible for optimum cable routing
- Mounting between sections while maintaining the required finger guard gap

Fast:

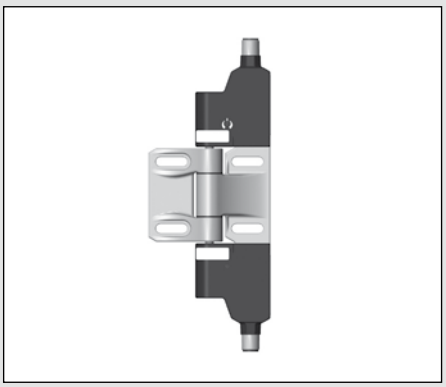
To connect the SHS3 even more efficiently, the two contacts are designed as normally-closed contacts with Ultra-Lock technology, thus enabling connection with an M12 cable.

Reliable:

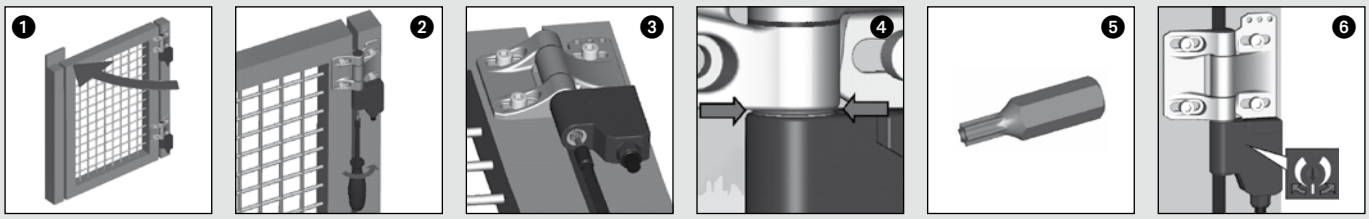
- The protection rating is IP67
- The load-bearing hinge is made from stainless steel while the switching system is housed in a high quality plastic enclosure

Double hinge

Thanks to its two switching elements on one hinge, the BG (occupational health and safety)-approved variant of the SHS3 provides two independently adjustable switching points. This arrangement not only makes it possible to monitor the opening of a safety guard but also the direction of opening of swing doors.



SHS3 – Setting the switching point



On delivery, the SHS3 hinge switch allows for all possible settings. With your specific application you define and lock the safe status of the hinged safety equipment (the closed position) (Fig. 1).

The adjusting screw located in axial direction in the switching system is then tightened with the special bit supplied with the hinge switch. The arrangement of the adjusting screw makes it possible to adjust the switching point in all installation positions (Fig. 2+3)

After establishing a form-fit connection, a green ring in the gap between the stainless steel hinge and switch enclosure indicates that the switching point has been set correctly at a min. torque of 2 Nm/+10% (Fig. 4).

A red ring at this point additionally indicates wear, e.g. caused by abrasive substances. With the same special bit you can not only freely adjust the switching point to suit your application but you can also change the mounting arrangement of your safety equipment from right-hinged to left-hinged (Fig. 5).

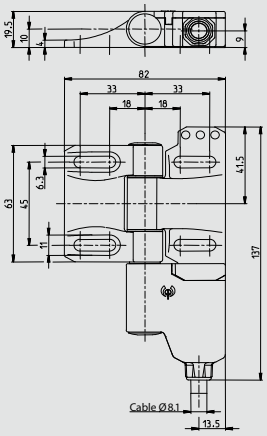
Fine adjustment

The set switching point can be subsequently varied by up to ±1.5% by turning the adjusting screw in the corresponding direction (Fig. 6).

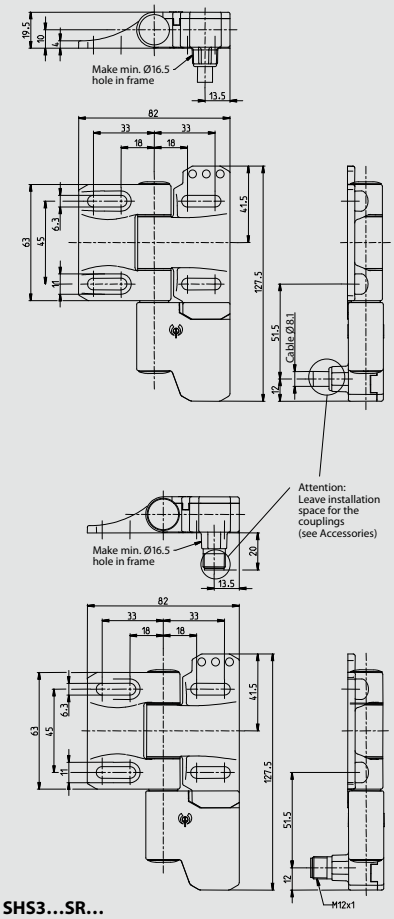
In many cases this fine adjustment makes it unnecessary to replace the switch or readjust the switching point due to mechanical deformation of the safety guard. The switching angle should generally be selected as small as possible.

Dimensioned drawings

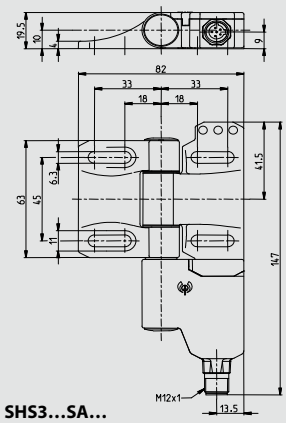
SHS3…KA…



SHS3…KR…



SHS3…SA…

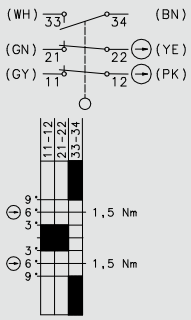


SHS3…SR…

Dimensioned drawings

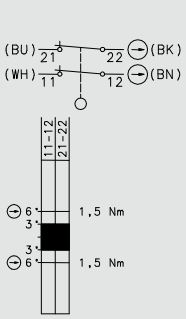
U15Z

2 NC contacts,
2 NO contacts (Zb)



A2Z

2 NC contacts (Zb)



Setting point freely selectable in range from 0°... 270° and 0°…180°

Tolerances:

Switching angle (opening) ± 1.5°
Positive opening torque 10 %
Positive opening angle ± 1.5°

Product selection

Article number	Designation	Switching contact	Max. switching voltage	Type of voltage	Type of connection and direction		Required cable coupling / type	Mounting
					radial	axial		
6019390023	SHS3-U15Z-KA 5 L	2NC/1NO	230 V	AC/DC		Cable		Left
6019390022	SHS3-U15Z-KA 5 R	2NC/1NO	230 V	AC/DC		Cable		Right
6019390025	SHS3-U15Z-KR 5 L	2NC/1NO	230 V	AC/DC	Cable			Left
6019390024	SHS3-U15Z-KR 5 R	2NC/1NO	230 V	AC/DC	Cable			Right
6019390035	SHS3-U15Z-SA L	2NC/1NO	230 V	AC/DC		M12	D	Left
6019390034	SHS3-U15Z-SA R	2NC/1NO	230 V	AC/DC		M12	D	Right
6019390037	SHS3-U15Z-SR L	2NC/1NO	230 V	AC/DC	M12		D	Left
6019390036	SHS3-U15Z-SR R	2NC/1NO	230 V	AC/DC	M12		D	Right
6019390040	SHS3-A2Z-SA-R	2NC	230 V	AC/DC		M12	E	Right
6019390041	SHS3-A2Z-SA-L	2NC	230 V	AC/DC		M12	E	Left
6019390044	SHS3-A2Z-SR-R	2NC	230 V	AC/DC	M12		E	Right
6019390042	SHS3-U1Z-SA-R	1NC/1NO	230 V	AC/DC		M12	E	Right
6019390043	SHS3-U1Z-SA-L	1NC/1NO	230 V	AC/DC		M12	E	Left
6019390045	SHS3-U1Z-SR-R	1NC/1NO	230 V	AC/DC	M12		E	Right
6019390046	SHS3-2-SA/2-SA	2 x 2NC	230 V	AC/DC		M12	2 x E	Both sides
6019390047	SHS3-5-SA/5-SA	2 x 1NC/1NO	230 V	AC/DC		M12	2 x E	Both sides
6019390048	SHS3-7-KA5/7-KA5	2 x 1NC/1NO	230 V	AC/DC	Cable			Both sides
6019390039	SHS3-7-SA/7-SA	2 x 1NC/1NO	230 V	AC/DC		M12	2 x D	Both sides
6019390038	SHS3-HINGE (blank hinge)							Both sides

Technical data

Electrical data		
Rated insulation voltage	U_i max.	250 V
Rated operating voltage	U_e max.	230 V AC; 24 V DC
Conventional thermal current	I_{the}	5 A
Utilization category	U_e /I_e	AC-15, U_e /I_e 230 V / 3 A; DC-13 U_e /I_e 24 V/1 A
Short-circuit protection		4 A gL/gG
Protection class		II, Insulated

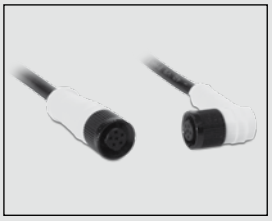
Mechanical data	
Switch	PBT / Hinge G-X22 Cr Ni 17
Ambient temperature	-25°C to +70°C (Connection cable installed)
Mechanical service life	10^6 switching cycles
Switching frequency max.	max. 300 switching cycles/hour
Mounting	4 x M6 Screws DIN EN ISO 7984
B10d	2 mill.
Type of connection	Fixed connection cable, 6 x 0.75 mm², minimum bending radius = 60 mm
Weight	approx. 0.7 kg (cable variant)
Installation position	Any
Protection class	IP67 conforming to IEC/EN 60529
Switching angle	± 3° from setting point
Positive opening angle	± 6° + 2
Positive opening torque	1.5 Nm
Mechanical load	F_{R1} = max. 1200 N, F_{R2} = max. 500 N, F_A = max. 1200 N

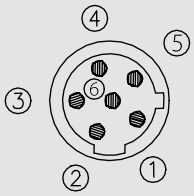
Standards
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1

SHS3 Cable Type D

Article number	Designation	Cable length	Connector type	Number of pins	Special feature
3251006291	AN-KAB.SHS3 2M STRAIGHT	2 m	Straight	6	M12 BG version
3251006292	AN-KAB.SHS3 5M STRAIGHT	5 m	Straight	6	M12 BG version
3251006293	AN-KAB.SHS3 10M STRAIGHT	10 m	Straight	6	M12 BG version
3251006294	AN-KAB.SHS3 2M ELBOW	2 m	Elbow	6	M12 BG version
3251006295	AN-KAB.SHS3 5M ELBOW	5 m	Elbow	6	M12 BG version
3251006296	AN-KAB.SHS3 10M ELBOW	10 m	Elbow	6	M12 BG version

Contact assignments, AC/DC versions





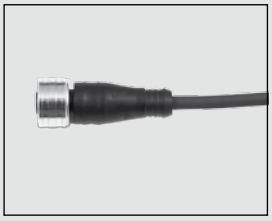
1 = White
2 = Brown
3 = Green
4 = Yellow
5 = Grey
6 = Pink

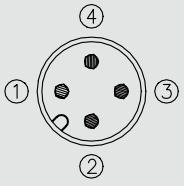
Core insulation/sheathing material:	PVC (∅ 5.6 mm)
Moulding/contact carrier material:	PUR Elastollan R3000
Max. rated voltage:	250 V AC
Max. current carrying capacity:	2.5 A (at 70 °C)
Min./max. temperature range:	–5 °C to +105 °C (moved)
	–40 °C to +105 °C (moved firmly)
Cable configuration mm²:	LiYwUL2517 6 x 0.34
Protection class when assembled:	IP68

SHS3 Cable Type E

Article number	Designation	Cable length	Connector type	Number of pins	Special feature
3251004310	AN-KAB.SHS3 4P 2M STRAIGHT	2 m	Straight	4	M12 BG version
3251004311	AN-KAB.SHS3 4P 5M STRAIGHT	5 m	Straight	4	M12 BG version
3251004312	AN-KAB.SHS3 4P 10M STRAIGHT	10 m	Straight	4	M12 BG version
3251004313	AN-KAB.SHS3 4P 2M ELBOW	2 m	Elbow	4	M12 BG version
3251004314	AN-KAB.SHS3 4P 5M ELBOW	5 m	Elbow	4	M12 BG version
3251004315	AN-KAB.SHS3 4P 10M ELBOW	10 m	Elbow	4	M12 BG version
3251004316	AN-KAB.SHS3 4P U.L. 2M STRAIGHT	2 m	Straight	4	Ultra Lock BG version
3251004317	AN-KAB.SHS3 4P U.L. 5M STRAIGHT	5 m	Straight	4	Ultra Lock BG version
3251004318	AN-KAB.SHS3 4P U.L. 10M STRAIGHT	10 m	Straight	4	Ultra Lock BG version
3251004319	AN-KAB.SHS3 4P U.L. 2M ELBOW	2 m	Elbow	4	Ultra Lock BG version
3251004320	AN-KAB.SHS3 4P U.L. 5M ELBOW	5 m	Elbow	4	Ultra Lock BG version
3251004321	AN-KAB.SHS3 4P U.L. 10M ELBOW	10 m	Elbow	4	Ultra Lock BG version

Contact assignments, AC/DC versions





1 = White
2 = Brown
3 = Blue
4 = Black

Core insulation/sheathing material:	Heat resistant PVC UL 1731 / UL 2517 black
Moulding/contact carrier material:	APEX 7500-85 / R3000 Elastollan R3000 neutral
Max. rated voltage:	250 V
Max. current carrying capacity:	4 A
Min./max. temperature range:	At rest –25 °C to +105 °C
	Moved –5 °C to +105 °C
Protection class when assembled:	IP68

Change kit for re-adjusting switching point

Article number	Designation
3991990161	SHS3 change kit
Containing:	
2 replacement caps	
1 special bit	
1 plastic ring	

Installation tool

Article number	Designation
1910000005	Bit holder 1/4" flexible stem

Safety Hinge Switch – SHS

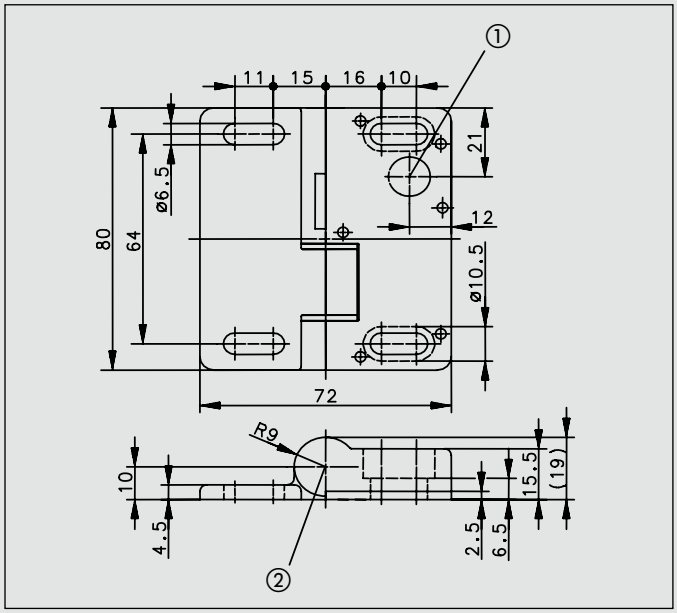


Illustration showing fixed pin and shearing bolt sheared off

① Position of connection variant 2, 5 and 6.

② Position of connection variant 1, 3 and 4.

Protective hoods and safety guards on machines such as gates in safety gate systems are often pivot mounted with hinges.

Since BERNSTEIN presented the world's first safety hinge switch SHS in 2002 it is hard to imagine modern production installations without it. It combines a hinge and safety switch in one single functional unit.

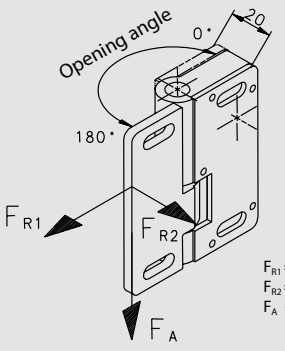
The design of the SHS safety hinge switch has been optimised to allow its effective use on aluminium section systems. Its shallow depth, even when fully opened, makes it ideally suited for use in constricted installation conditions on machines. Safety switches with separate actuators are often subjected to high mechanical stresses, especially when they are mounted on closing edges. The SHS hinge switch sets new standards. The safety guard is monitored directly in the hinge.

The concealed arrangement of the safety switch provides a high degree of protection against tampering. One or several SHS switches are be used depending on control requirements.

In many applications the conventional load bearing hinge can be replaced by a blank hinge with identical design features as the safety hinge. This has significant rationalisation benefits. The only parameter you need to take into account is the maximum extension of the hinged safety equipment that results from the switching angle and the permissible safe opening in the area of the closing edges. The SHS hinge switch provides maximum anti-tamper protection as, once set, the switching point can no longer be changed.

Safe:

- 2 SHS hinge switches, each equipped with a positively opening safety contact, allows you to configure a system up to performance level e



F_{R1} = max. 1000 N
F_{R2} = max. 500 N
F_A = max. 750 N

Flexible:

- The angle range extends from 0 to 225°
- A safety device ensures positive locking after the switch has been set
- In addition to the plug connection version, an SHS with fixed cable connection at the rear is also available

Fast:

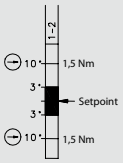
- Plug connector and fixed cable connections are available for axial and radial (rear) connection
- An AC/DC version (up to 250 V) or a DC version (up to 60 V) is available, depending on the configuration of the safety circuit

Reliable:

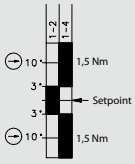
- A pressure die-cast zinc enclosure allows versatile use of the SHS switch in varied applications
- When used as a load bearing hinge, the SHS takes up loads of up to 750 N in axial direction and 1000 N in radial direction after the switching point has been finally set
- The protection rating is IP67

Switching diagram

1 NC contact (Type B)



1 Changeover contact (Type C)

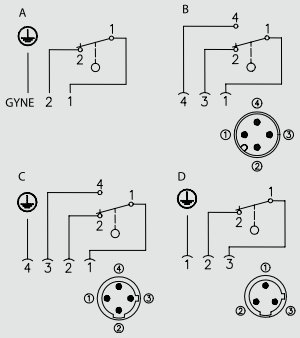


Setting point freely selectable in range from 0°... 225°

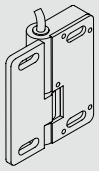
Tolerances:
Switching angle (opening) +2.0°/-1.5°
Positive opening torque 10 %
Positive opening angle +0.5°/-3°

Switching angle hysteresis (closing of normally-closed contact -1.0°) from typical hinge switch-off point

Connection drawing

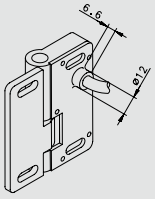


Connection variant 1



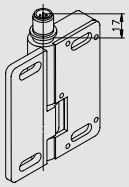
Cable, PVC

Connection variant 2



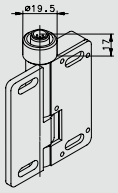
Cable, PVC

Connection variant 3



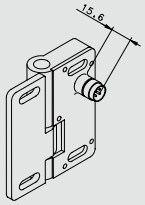
Connector M12 x 1, metal thread

Connection variant 4



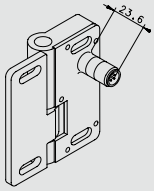
Connector M12 x 1, metal thread

Connection variant 5



Connector M12 x 1

Connection variant 6



Connector M12 x 1

Product selection

Article number	Designation	Switching contact	Max. switching voltage	Type of voltage	Type of connection and direction		Required cable coupling/type	Remarks
					radial	axial		
6019261011	SHS-A1Z-KA 5	1NC	230 V	AC/DC		Cable		BG approval
6019261014	SHS-A1Z-KR 5	1NC	230 V	AC/DC	Cable			BG approval
6019261017	SHS-A1Z-SA-BG	1NC	230 V	AC/DC		M12	A	BG approval
6019261018	SHS-A1Z-SR-BG	1NC	230 V	AC/DC	M12		A	BG approval
6019261009	SHS-A1Z-SA	1Changeover contact	230 V	AC/DC		M12	C	
6019261010	SHS-A1Z-SR	1Changeover contact	60 V	DC	M12		B	
6019261015	SHS-A1Z-SA	1Changeover contact	60 V	DC		M12	B	
6019261016	SHS-A1Z-SR	1Changeover contact	230 V	AC/DC	M12		C	
6019291013	SHS-0Z							Blank hinge

Technical data

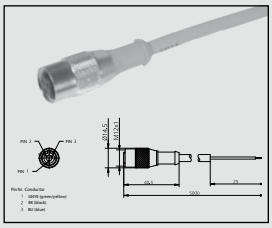
Electrical data		
Rated insulation voltage	U_i	250 V
Rated surge voltage strength	U_{imp}	2.5 kV
Thermal current	I_{the}	3 A
Rated operating voltage	U_e	230 V AC; 60 V DC
Utilization category		AC-15, 230 V AC/1.5 A;
Positive opening	⊕	conforming to IEC/EN 60947-5-1, Addendum K
Short-circuit protection		Fuse 4 A gL/gG
Mechanical data		
Switch		GD-Zn
Ambient temperature		-25°C to +70°C (Connection cable installed)
Mechanical service life		10^6 switching cycles
B10d		2 mill.
Switching frequency		max. 1200 switching cycles/hour
Mounting		4x M6 screws DIN 7984 or DIN 6912
Type of connection		Fixed connection cable, 3 x 0.5 mm^2 x 5 m (AWG20), minimum bending radius = 25 mm
Weight		approx. 0.7 kg (cable variant) approx. 0.4 kg (connector and blank hinge variant)
Installation position		Any
Protection class		IP67 as per IEC/EN 60529
Switching angle		± 3° from setting point
Positive opening angle		± 10° from setting point
Positive opening torque		1.5 Nm
Mechanical load		F_{R1}= max. 1000 N, F_{R2}= max. 500 N, F_A = max. 750 N
Standards		
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1		

SHS Cable Type A

Article number	Designation	Cable length	Connector type	Number of pins	Special feature
3251103234	AN-KAB.SHS 5M AC GERADE	5 m	Straight	3	AC/ DC BG version
3251103236	AN-KAB.SHS 5M AC WINKEL	5 m	Elbow	3	AC/ DC BG version

Contact assignments, AC/DC versions

1 = Green/yellow
2 = Black
3 = Blue



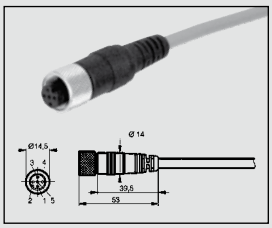
Core insulation/sheathing material:	PVC (UL)/PVC (UL)
Moulding/contact carrier material:	PUR (UL)/PUR (UL)
Max. rated voltage:	300 V AC
Max. current carrying capacity:	3 A
Min./max. temperature range:	–25 °C/+70 °C
	–13 °F/+158 °F
Cable configuration mm²:	3 x 0.5
Protection class when assembled:	IP67

SHS Cable Type B

Article number	Designation	Cable length	Connector type	Number of pins	Special feature
3251003221	AN-KAB.SHS 2M DC STRAIGHT	2 m	Straight	3	DC approval
3251003222	AN-KAB.SHS 5M DC STRAIGHT	5 m	Straight	3	DC approval
3251003223	AN-KAB.SHS 10M DC STRAIGHT	10 m	Straight	3	DC approval
3251003224	AN-KAB.SHS 2M DC ELBOW	2 m	Elbow	3	DC approval
3251003225	AN-KAB.SHS 5M DC ELBOW	5 m	Elbow	3	DC approval
3251003226	AN-KAB.SHS 10M DC ELBOW	10 m	Elbow	3	DC approval

Contact assignments, DC versions

1 = Brown
2 = –
3 = Blue
4 = Black



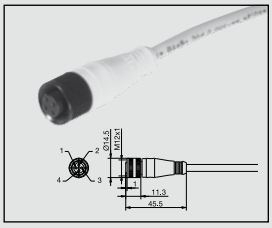
Core insulation/sheathing material:	PVC/PVC
Moulding/contact carrier material:	PUR/PUR
Max. rated voltage:	60 V AC/75 V DC
Max. current carrying capacity:	1.5 A
Min./max. temperature range:	–25 °C/+70 °C
	–13 °F/+158 °F
Cable configuration mm²:	3 x 0.34
Protection class when assembled:	IP67

SHS Cable Type C

Article number	Designation	Cable length	Connector type	Number of pins	Special feature
3251004219	AN-KAB.SHS 5M AC STRAIGHTE	5 m	Straight	4	AC/DC-approval
3251004220	AN-KAB.SHS 5M AC ELBOWE	5 m	Elbow	4	AC/DC-approval

Contact assignments, AC/DC versions

1 = Brown
2 = Black
3 = Blue
4 = Green/yellow



Core insulation/sheathing material:	PVC/PVC
Moulding/contact carrier material:	PUR/Nylon 6.6
Max. rated voltage:	300 V AC
Max. current carrying capacity:	4.0 A
Min./max. temperature range:	–5 °C/+70 °C
	–13 °F/+158 °F
Cable configuration mm²:	4 x 0.34
Protection class when assembled:	IP68

Notes

I88 VKS, -VKW, -AHDB; GC VKS, -VKW; Ti2 AHDB

I88-AHDB

I88-VKW

Safety switches for hinged protective equipment

These switches are suitable for applications where SHS switches cannot be used. They are used for safety monitoring of safety gates, safety guards and protective equipment. Two different types of actuator are available for this type of safety switch. The actuators also differ in terms of their attachment to the safety guards.

The AHDB actuator is available in the Ti2 and I88 families. The switch is attached in such a way that a spindle on the safety guard or on the hinge can enter the hole in the safety switch. The safety contact is opened by turning the spindle when opening the safety guard. The switch can be actuated in both directions without a limit stop.

The VKS and VKW actuators are part of the I88 and GC families. The switch is mounted next to the safety guard. The lever fixture is mounted on the safety guard and opens the safety contact as it moves. The integrated longitudinal guide compensates for different pivot radii.

Two different actuator functions are available to facilitate use in varied applications:

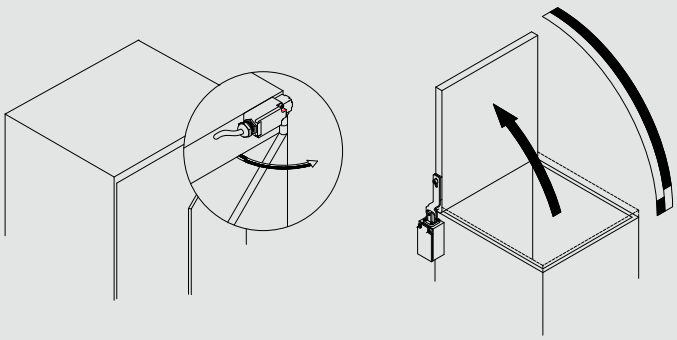
- **VKS with vertical setting**

  The safety contact is opened when the lever fixture is moved out of its vertical setting in one of the two possible pivot directions.

- **VKW with horizontal setting**

  The safety contact is opened as the lever fixture moves out of its horizontal setting. A distinction is made between VKW RE (right) and VKW LI (left) in connection with I88 switches. This designation makes it possible to identify whether the switch can be mounted on the right-hand or left-hand side of the safety guard. The GC family only contains switches for mounting on the left-hand side.

Both variants allow maximum pivot movements of 180°.

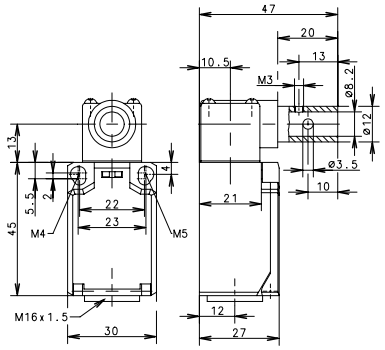
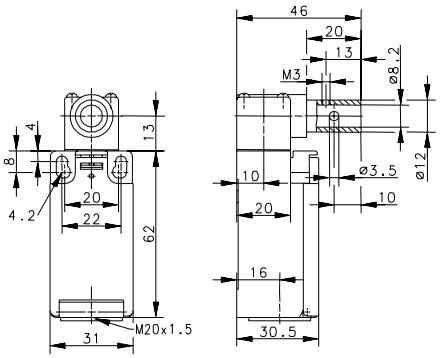
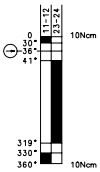
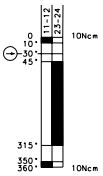
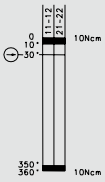


GC-VKS

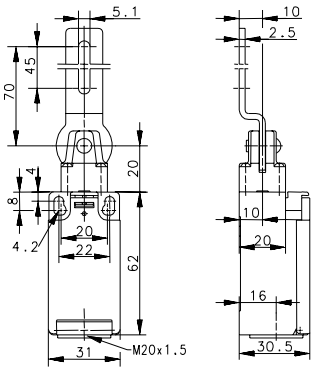
Technical data

			Ti2 AHDB	I88 AHDB	I88	GC
Electrical data						
Rated insulation voltage	U_i		250 V AC	250 V AC	250 V AC	400 V AC
Conventional thermal current	I_{the}	U1Z A2Z	10 A –	10 A 5 A	10 A 5 A	10 A 5 A
Rated operating voltage	U_e		240 V	240 V	240 V	240 V
Utilization category		U1Z A2Z	AC15, 240 V/3 A, –	AC-15, U_e /I_e 240 V / 3 A AC-15, U_e /I_e 240 V / 1.5 A	AC-15, U_e /I_e 240 V / 3 A AC-15, U_e /I_e 240 V / 1.5 A	AC-15, U_e /I_e 240 V / 3 A –
Positive opening action NC contacts	⊖		As per IEC/EN 60947-5-1, Addendum K	As per IEC/EN 60947-5-1, Addendum K	As per IEC/EN 60947-5-1, Addendum K	As per IEC/EN 60947-5-1, Addendum K
Short-circuit protection			Fuse 6A gL/gG	Fuse 10A gL/gG	Fuse 10A gL/gG	Fuse 10A gL/gG
Protection class			II, Insulated	II, Insulated	II, Insulated	I
Mechanical data						
Enclosure			PBT, glass fibre-reinforced	Thermoplastic, glass fibre-reinforced (UL 94-V0)	Thermoplastic, glass fibre-reinforced (UL 94-V0)	Aluminium pressure die-casting
Cover			PA6.6, black	Thermoplastic, glass fibre-reinforced (UL 94-V0)	Thermoplastic, glass fibre-reinforced (UL 94-V0)	Sheet aluminium
Actuation			Axis lever enclosure, lever (metal)	Axis lever enclosure, lever (metal)	Lever (metal)	Lever (steel)
Ambient temperature			-30°C to +80°C	-30°C to +80°C	-30°C to +80°C	-30°C to +80°C
Mechanical service life			1 x 10^6 switching cycles	1 x 10^6 switching cycles	1 x 10^6 switching cycles	1 x 10^6 switching cycles
B10d			2 mill.	2 mill.	2 mill.	2 mill.
Switching frequency			≤ 50 / min.	≤ 50 / min.	≤ 50 / min.	≤ 20 / min.
Mounting			2 x M4 or 2 x M5 fixed positioning for safety applications	2 x M4	2 x M4	2 x M4
Type of connection			Screw connections	Screw connections	Screw connections	Screw connections
Conductor cross sections			Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 - 1.5	Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 - 1.5	Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 - 1.5	Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 - 1.5
Cable entry			1 x M20 x 1,5	1 x M20 x 1,5	1 x M20 x 1,5	1 x M20 x 1,5
Installation position			Any	Any	Any	Any
Protection class			IP65 as per EN 60529	IP65 as per EN 60529	IP65 as per EN 60529	IP65 as per 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						

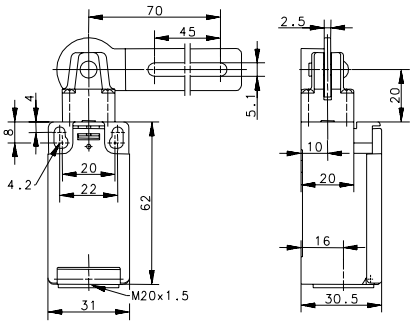
① Depending on switching system. See Table on Pages 76-79.

	Ti2 AHDB	I88 AHDB
		
Switching operation	**Slow-action** **Snap-action**	**Slow-action** **Snap-action**
1 NC / 1 NO contact	**6188100030** TI2-U1Z AHDB 	**6186100267** I88-U1Z AHDB 
2 NC contact		**6186800324** I88-A2Z AHDB 
2 NO contacts		
1 NC / 1 NO contact Overlapping		
Approvals		
	Replacement actuator: -	**Replacement actuator: -**
	Special features/variants (on request)	**Special features/variants** (on request) ● Available in different actuation directions

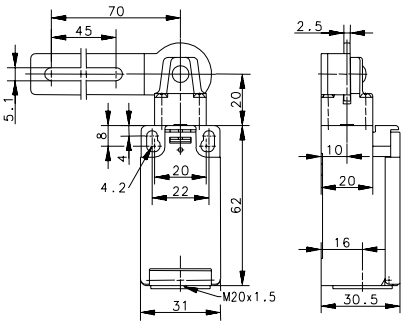
I88 VKS



I88 VKW RE



I88 VKW LI



Slow-action	Snap-action
6086100093 I88-U1Z VKS	
6186800447 I88-A2Z VKS	

Slow-action	Snap-action
6086100094 I88-U1Z VKW RE	

Slow-action	Snap-action
6086100095 I88-U1Z VKW LI	

Replacement actuator: -

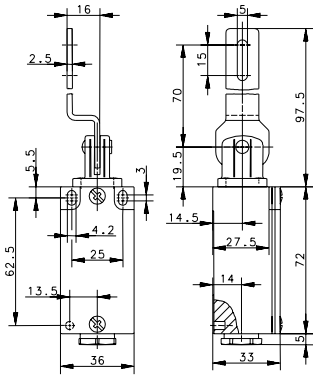
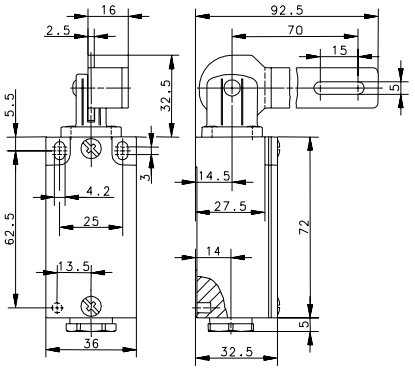
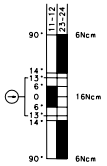
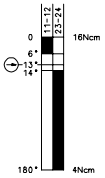
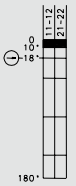
Replacement actuator: -

Replacement actuator: -

Special features/variants
(on request)

Special features/variants
(on request)

Special features/variants
(on request)

	GC VKS	GC VKW
		
Switching operation	**Slow-action** **Snap-action**	**Slow-action** **Snap-action**
1 NC / 1 NO contact	**6121100622** GC-U1Z VKS 	**6121100623** GC-U1Z VKW 
2 NC contact		**6121800940** GC-A2Z VKW 
2 NO contacts		
1 NC / 1 NO contact Overlapping		
Approvals		
	Replacement actuator: -	**Replacement actuator: -**
	Special features/variants (on request)	**Special features/variants** (on request)

Notes

SRM, SR

SRM

SR

General information on safety cable pull switches

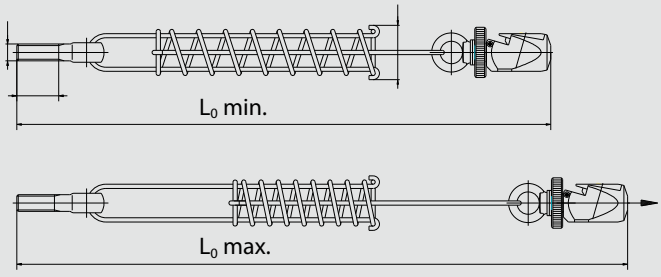
The series SR and SRM safety cable pull switching devices developed and manufactured by BERNSTEIN AG are designed and approved in accordance with the standards IEC 947-5-5, DIN EN 60947-5-5 and ISO 13850, i.e. on actuation or in the event of cable breakage, the emergency stop switching device locks automatically and can only be reset to its initial setting by means of the resetting device on the switch.

In order for the overall system to conform to the standards EN 60947-5-5 and EN 13850 governing the emergency stop function of cable pull switches it is necessary to integrate a spring in the system. The reasoning behind this requirement is that a person who triggers the emergency stop functions does not need to consider the activation direction. With the spring it is possible to pull the cable in the direction of the cable pull switch, thus activating the emergency stop function.

Safety cable pull switches may only be used in control power circuits. Safety cable pull switches are used on accessible sides of conveyor systems or machines. In contrast to Emergency Stop switching devices (e.g. mushroom pushbuttons) installed at intervals, with which the emergency stop signal can only be generated at the device itself, with the safety cable pull switch it is possible to generate the signal at any point in a section. Depending on the type of switching device, a span of up to 75 m can be achieved with a pull cable connected to the pulling element.

The maximum possible span length of a pull cable switch is always dependent on the temperature fluctuations to which the system is exposed. It is possible that the pull cable switch may trip due to the fact that, owing to its temperature coefficient, the length of the steel cable can change in response to changes in temperature. Ultimately, this change in length is dependent on the length of the cable, the difference in the temperature change and the type of springs used in the pull cable switch. Overview 1 shows which cable lengths are possible as a function of change in temperature.

Pull cable counterspringr
With overstretch safeguard based on compression spring principle



Application		
Type	SR...100/SR...175/SRM...175	SR...300/SRM...300
Spring Art. No.	**3911042153**	**3911042154**
$L_{0\,min.}$	383	483
$L_{max.}$	487	653

Advantages of SRM/SR safety cable pull switches:

- The SR (plastic enclosure) and SRM (metal enclosure) safety cable pull switches are available with the Quickfix quick-connect system, which renders unnecessary cable eye stiffeners, cable grips and turnbuckles that are otherwise required for mounting the cable. Added to this, the time required to install the cable is drastically reduced. Versions with a conventional eye are, of course, also available.

- All variants of the SRM and especially of the SR are equipped with an integrated emergency stop impact button that can be actuated by pressing in hazardous situations. In the same way as pulling the pull cable, the safety contacts are opened and the switch is locked.

- The type SRM...E-... safety cable pull switches are optionally available with a remote indicator for monitoring the cable tension. This option has an integrated sensor unit that monitors situations in which the cable tension may overshoot or undershoot the permissible value or triggering of the safety cable pull switch is imminent. This electronic output signals in good time that maintenance/adjustment is required otherwise the machine will shut down. This output can also be used for event signalling purposes or optionally available indicator lamps can be connected. This connection configuration con forms to "preventative maintenance" requirements.

- During installation/adjustment of the cable span, the correct tension of the cable can be checked through the integrated inspection window. To ensure optimum cable tension as part of the adjustment procedure, the tips of the indicator arrows should be aligned with the marking.

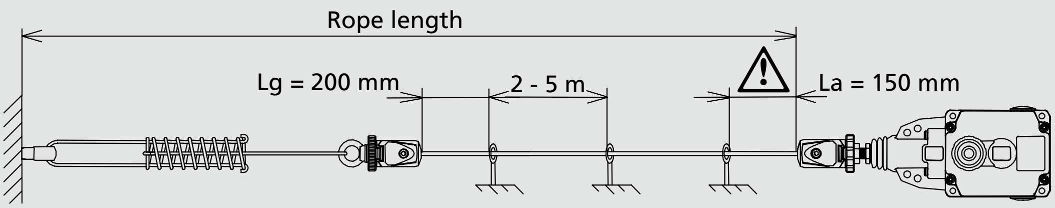
- A second inspection window integrated in the SRM version makes it possible to check the status of the locking function and of the contacts. Yellow in the inspection window indicates that the safety cable pull switch is locked. Green in the inspection window indicates that the cable pull switch is ready for operation and the cable assembly is monitored.

Overview 1

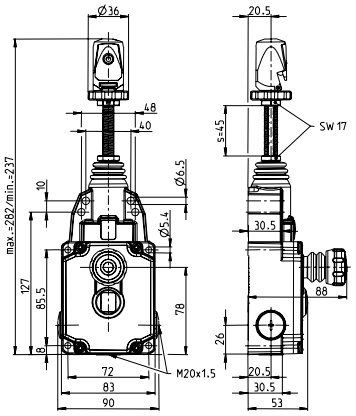
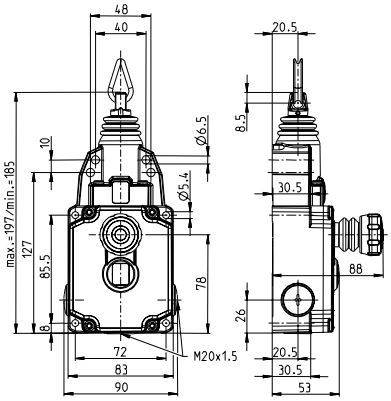
	Span L max. in metres [m]: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 55 60 65 70 75
Max. temperature variation in Kelvin (K)	+/- 40 K
	+/- 35 K
	+/- 30 K
	+/- 25 K
	+/- 20 K
	+/- 15 K
	+/- 10 K
	+/- 5 K
	+/- 3.5 K
SR...100	Max. span 25 metres
SR...175/SRM...175	Max. span 37.5 metres
SR...300/SRM...300	Max. span 75 metres

The parameter 100, 175 and 300 in the product designation indicates the force of the springs used in the cable pull switch. It should be noted that a grater actuating force is required for higher spring forces.

Installation example

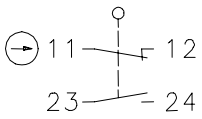
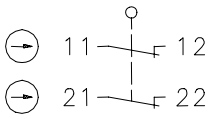


Safety Cable Pull Switches

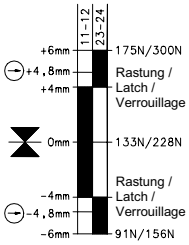
Max. span length	**75 metres** (Dimensioned drawing 1)		**37,5 metres** (Dimensioned drawing 2)	
				
	2 Ö/2 S	**3 Ö/1 S**	**2 Ö/2 S**	**3 Ö/1 S**
Quickfix (Dimensioned drawing 1)	**6012929087** SRM-U1Z/U1Z-QF-300	**6012999096** SRM-A2Z/U1Z-QF-300	**6012929085** SRM-U1Z/U1Z-QF-175	**6012999094** SRM-A2Z/U1Z-QF-175
Öse (Dimensioned drawing 2)	**6012921091** SRM-U1Z/U1Z-LU-300	**6012991100** SRM-A2Z/U1Z-LU-300	**6012921089** SRM-U1Z/U1Z-LU-175	**6012991098** SRM-A2Z/U1Z-LU-175
Quickfix **with remote monitoring** (Dimensioned drawing 1)	**6012929088** SRM-U1Z/U1Z-QF-300-E	**6012999097** SRM-A2Z/U1Z-QF-300-E	**6012929086** SRM-U1Z/U1Z-QF-175-E	**6012999095** SRM-A2Z/U1Z-QF-175-E
Eye **with remote monitoring** (Dimensioned drawing 2)	**6012921092** SRM-U1Z/U1Z-LU-300-E	**6012991101** SRM-A2Z/U1Z-LU-300-E	**6012921090** SRM-U1Z/U1Z-LU-175-E	**6012991099** SRM-A2Z/U1Z-LU-175-E
Approvals				

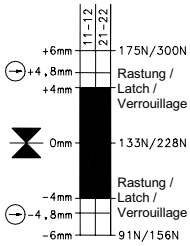
Technical data

Electrical data		
Rated insulation voltage	U_i max.	250 V AC
Rated operating voltage	U_e max.	240 V
Conventional thermal current	I_{the}	10 A
Utilization category	U_e /I_e	AC-15, U_e /I_e 240 V / 3 A; 120 V/6 A DC-13 U_e /I_e 250 V/0.27 A; 125 V/0.55 A
Short-circuit protection		6 A gL/gG
Protection class		I
Mechanical data		
Enclosure	Aluminium pressure die-casting	
Ambient temperature	-30°C to +80°C	
Mechanical service life	1 x 10^5	
Switching frequency max.	≤ 20 / min.	
Mounting	4 x M6 or 4 x M5	
B10d	0.2 mill.	
Type of connection	Screw connections	
Conductor cross sections	Single-wire 0.5 - 1.5 mm^2	
Cable entry	3 x M20 x 1.5	
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 VDE 0660 T210, DIN EN 60947-5-5, IEC 60947-5-5 ISO 13850		

Contact type	**1 Ö / 1 S (Zb)**	**2 Ö (Zb)**
Action contacts	**U1Z**	**A2Z**
Circuit symbol	**Slow-action contacts** 	**Slow-action contacts** 
Schaltdiagramm		

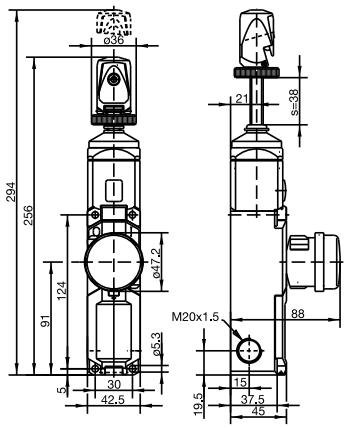
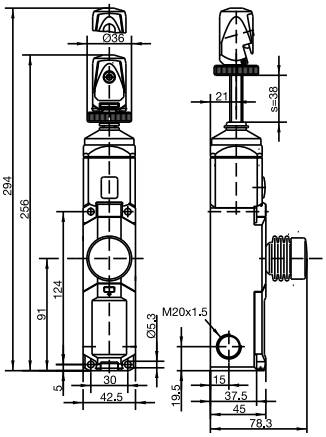
On
OFF





The pulling force data depend on the type of switch used. (SRM...175/SRM...300)
Tolerances: Switching point +/- 0.5 mm, actuating force +/- 15 %

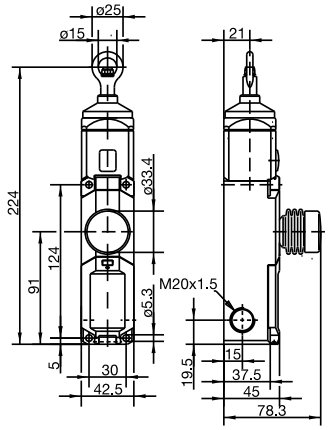
Safety Cable Pull Switches

Max. span length	**75 metres** (Dimensioned drawing 1)		**37.5 metres** (Dimensioned drawing 2)	
				
	2 Ö/2 S	**4 Ö**	**2 Ö/2 S**	**4 Ö**
Quickfix (Dimensioned drawing 1)	**6011629028** SR-U2Z-QF 300	**6011691051** SR-A4Z-QF 300	**6011629024** SR-U2Z-QF 175	**6011691050** SR-A4Z-QF 175
Quickfix N.A. (Dimensioned drawing 2)	**6011629019** SR-U2Z-NA-QF 300	**6011691054** SR-A4Z-NA-QF 300	**6011629027** SR-U2Z-NA-QF 175	**6011691053** SR-A4Z-NA-QF 175
Öse (Dimensioned drawing 3)	**6011620020** SR-U2Z 300	**6011691048** SR-A4Z 300	**6011621026** SR-U2Z 175	**6011691047** SR-A4Z 175
Approvals				

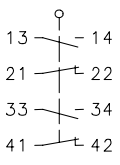
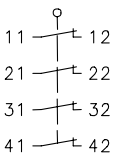
Technical data

Electrical data		
Rated insulation voltage	U_i max.	250 V AC
Rated operating voltage	U_e max.	240 V
Conventional thermal current	I_{the}	10 A
Utilization category	U_e /I_e	AC-15, U_e /I_e 240 V / 3 A
Short-circuit protection		6 A gL/gG
Protection class		II, Insulated
Mechanical data		
Enclosure	PA 6 GV (UL94-V0)	
Ambient temperature	-25°C to +70°C	
Mechanical service life	as per EN 60947-5-5	
Switching frequency max.	≤ 20 / min.	
Mounting	4 x M5	
B10d	0.02 mill.	
Type of connection	Cage clamp terminal	
Conductor cross sections	≤ 1.5 - 2 mm²	
Cable entry	3 x M20 x 1.5	
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 VDE 0660 T210, DIN EN 60947-5-5, IEC 60947-5-5 ISO 13850		

25 metres (Dimensioned drawing 3)



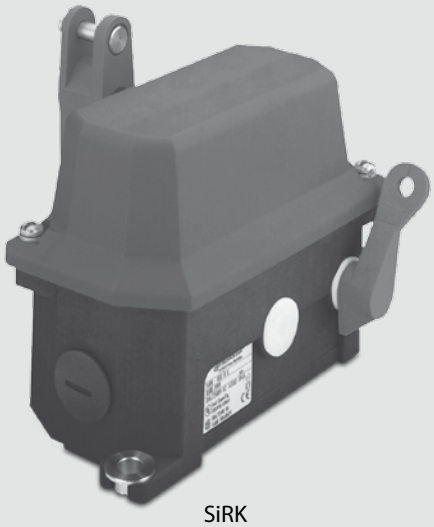
2 Ö / 2 S	4 Ö
6011629032 SR-U2Z-QF 100	**6011691049** SR-A4Z-QF 100
6011629031 SR-U2Z-NA-QF 100	**6011691052** SR-A4Z-NA-QF 100
6011621030 SR-U2Z 100	**6011691033** SR-A4Z 100

Contact type	**2 Ö / 2 S (Zb)**	**4 Ö**
Action contacts	**U2Z**	**A4Z**
Circuit symbol	**Slow-action contacts** 	**Slow-action contacts** 
Schaltdiagramm		

On
Off

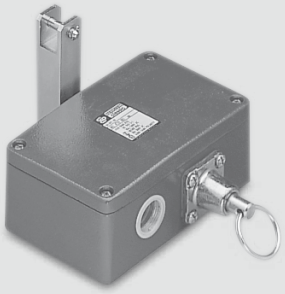
The pulling force data depend on the type of switch used. (SR...100/SR...175/SR...300)
Tolerances: Switching point +/- 0.5 mm, actuating force +/- 15 %

SiRK, Si1, Si2



SiRK

Si2



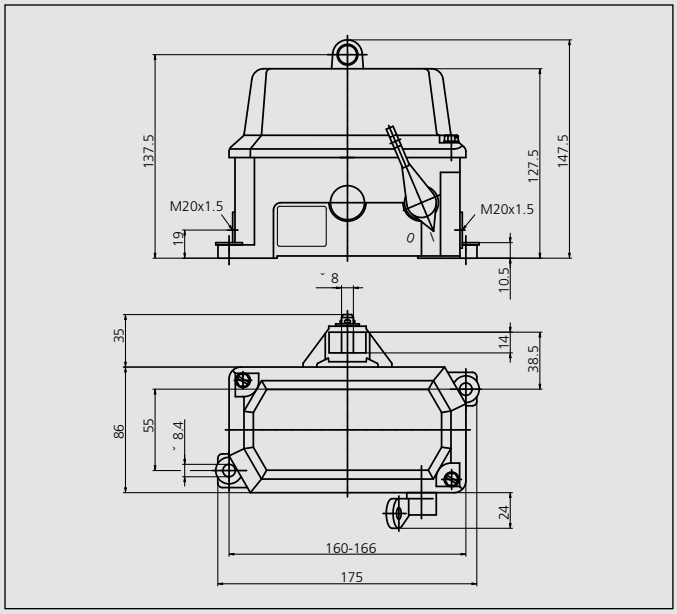
Si1

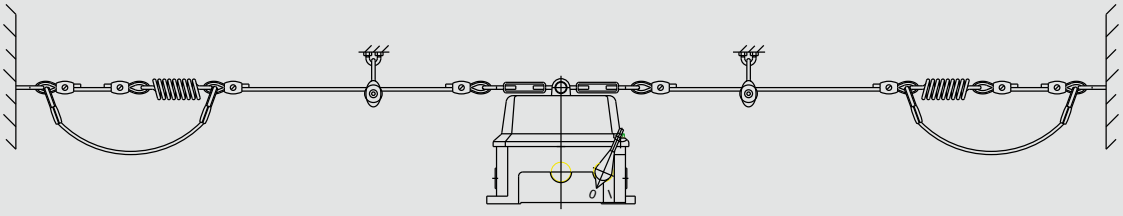
BERNSTEIN double-spanned cable pull switches (SiRK, Si1 and Si2) are also used in emergency stop applications. When the cable is pulled the switching lever is deflected in the corresponding direction and the system shut down.

The switches are available in two metal versions, the Si1 and Si2, as well as an insulation-enclosed version, the SiRK.

These types of cable pull switch are ideally suited for applications with high temperature fluctuations and long cable spans. With their sturdy enclosure, the Si1 and Si2 are the perfect switches for harsh environments.

Two cables spanned in opposite directions are attached to the switching device. The countersprings are secured to the wall at the ends of the cables. Provided the change in temperature is the same at all points along the cable, the springs will effectively compensate for the change in cable length.





Product selection

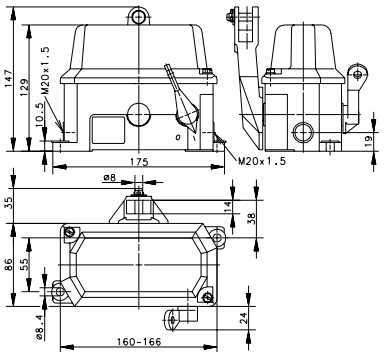
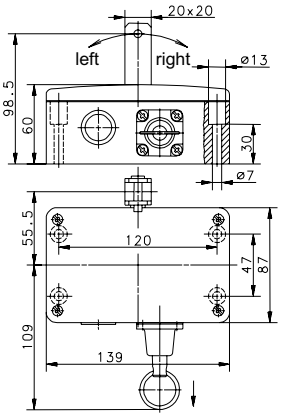
Designation	Max. span length
SI1-U2Z AK R-RAST	2 x 50 m
SI1-U1Z/U1Z AK R-RAST	2 x 50 m
SI2-U2Z AK R-RAST	2 x 50 m
SIRK-U2Z R	2 x 75 m

Technical data

		SiRK	Si1	Si2
Electrical data				
Rated insulation voltage	U_i	250 V AC	250 V AC	400 V AC
Rated operating voltage	U_e	240 V	250 V	240 V
Conventional thermal current	I_{the}	10 A	10 A	10 A
Utilization category		AC 15, A 300 240 V /3 A, 120 V /6 A DC 13, Q300 250 V/0.27 A, 125 V/0.55 A	AC-15, U_e /I_e 240 V / 3 A	AC-15, U_e /I_e 240 V / 3 A
Positive opening action	⊕	as per IEC/EN 60947-5-1, Addendum K	as per IEC/EN 60947-5-1, Addendum K	as per IEC/EN 60947-5-1, Addendum K
Short-circuit protection		Fuse 6 A gL/gG	Fuse 6 A gL/gG	Fuse 10 A gL/gG
Protection class		II, Insulated	I	I
Mechanical data				
Enclosure		ABS	Aluminium sand casting	Cast iron
Cover		ABS	Aluminium sand casting	Cast iron
Actuation		Lever, plastic (glass fibre-reinforced)	Lever (GRP)	Lever (GRP)
Ambient temperature		-30°C to +80°C	-30°C to +80°C	-30°C to +80°C
Contact type		2 NC / 2 NO contact (Zb)	2 NC / 2 NO contact (Zb)	2 NC / 2 NO contact (Zb)
Mechanical service life (up to)①		1 x 10^5 switching cycles	1 x 10^6 switching cycles	1 x 10^6 switching cycles
Switching frequency max.		Max. 30/min.	≤ 10 / min.	≤ 10 / min.
Mounting		2 x M8	4 x M8	4 x M8
B10d (up to)①		0,2 mill.	2 mill.	2 mill.
Type of connection		8 Screw connections (M3, 5)	8 Screw connections (M3, 5)	8 Screw connections (M3, 5)
Conductor cross sections		Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 - 1.5 mm^2	Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 - 1.5 mm^2	Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 - 1.5 mm^2
Cable entry		2 x M20 x 1.5	1 x M20 x 1.5	3 x M20 x 1.5
Weight		≈ 0.8 kg	≈ 1.62 kg	≈ 4.21 kg
Installation position		Any	Any	Any
Protection class		IP65 conforming to EN 60529	IP65 conforming to EN 60529	IP65 conforming to 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				

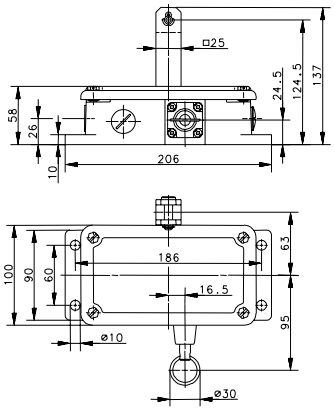
① Depending on switching system. See Table on Pages 76-79.

Double-Spanned Cable Pull Switches

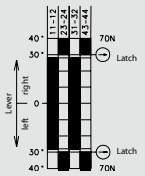
		SIRK	SI1
			
Variant 1	**Article No.** **Designation** Max. span	**6015625001** SIRK-U2Z R 2 x 75 m	**6014735001** SI1-U2Z AK R-RAST 2 x 50 m
Variant 2	**Article No.** **Designation** Max. span		**6014735025** SI1-U1Z/U1Z AK R-RAST 2 x 50 m
Variant 3	**Article No.** **Designation** Max. span		

Technical Data		
Rated insulation voltage U_i max.	250 V AC	250 V AC
Rated operating voltage U_e max	240 V	240 V
Conventional thermal current I_{the}	10 A	10 A
Utilization category U_e/I_e	AC-15, 240 V/3 A, 120 V/6	AC-15, 240 V/3 A
Approvals		

SI2



6015735002
SI2-U2Z AK R-RAST
2 x 50 m



400 V AC
240 V
10 A
AC-15, 240 V/3 A

With and Without Latching Function

SEK

SEM2

SIEM2

SD

SID

SID

SIN

Because of their specifications governed by corresponding standards (see Cable Safety Pull Switches SRM/SR), these cable pull switches are used exclusively as safety command devices.

These switches are available in metal enclosures as well as in insulation-enclosed versions. They are operated manually by pulling on the attached cable.

Thanks to their pretension, these switches, which feature a switching contact with overlap, execute a switching function when the cable is pulled or in the event of cable breakage.

The field of application for these cable pull switches includes

- Opening and closing of (garage) doors
- Starting machines
- Issuing commands in production processes

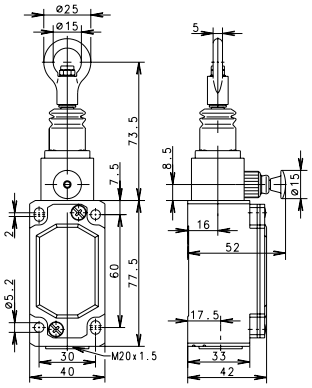
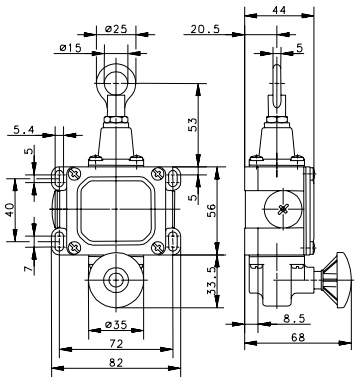
The basic design of the standard cable pull switches is based on that of position switches.

The specified cable length refers to the maximum length at minimum temperature variation. The maximum cable length may decrease under different environmental conditions.

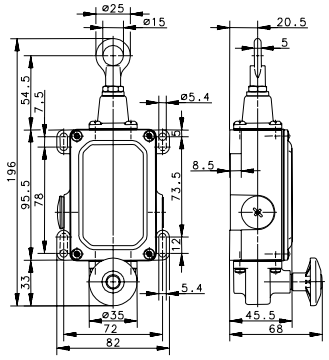
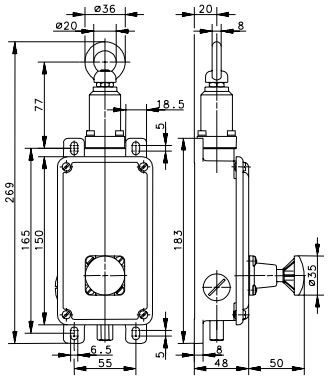
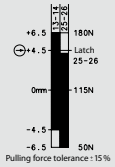
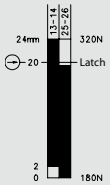
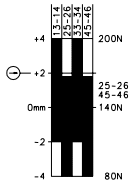
Technical data		SEK	SiEK	SEM2	SiEM2
Electrical data					
Rated insulation voltage	U_i	400 V AC	400 V AC	400 V AC	400 V AC
Rated operating voltage	U_e	240 V	240 V	240 V	240 V
Conventional thermal current	I_{the}	10 A	10 A	10 A	10 A
Utilization category	U_e / I_e	AC-15, U_e /I_e 240 V / 3 A	AC-15, U_e /I_e 240 V / 3 A	AC-15, U_e /I_e 240 V / 3 A	AC-15, U_e /I_e 240 V / 3 A
Mechanical data					
Switching frequency max.		≤ 50/min.	max. 100/min.	max. 50/min.	max. 50/min.
Mechanical service life		1 x 10^6 switching cycles	1 x 10^6 switching cycles	1 x 10^6 switching cycles	1 x 10^6 switching cycles
B10d		on request	on request	on request	on request
Short-circuit protection		Fuse 10 A gL/gG	Fuse 10 A gL/gG	Fuse 10 A gL/gG	Fuse 10 A gL/gG
Protection class		II, Insulated	II, Insulated	I	I
Ambient temperature		-30°C to +80°C	-30°C to +80°C	-30°C to +80°C	-30°C to +80°C
Protection class		IP65 conforming to IEC/EN 60529	IP65 conforming to EN 60529	IP65 conforming to EN 60529	IP65 conforming to EN 60529; DIN VDE 0470 T1
Type of connection		4 Screw connections (M3, 5)	4 Screw connections (M3, 5)	4 Screw connections (M3, 5)	Screw connections
Conductor cross sections		Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 - 1.5 mm^2	Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 - 1.5 mm^2	Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 - 1.5 mm^2	Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 - 1.5 mm^2
Enclosure		Thermoplastic, glass fibre-reinforced	Thermoplastic, glass fibre-reinforced	Aluminium pressure die-casting	Aluminium pressure die-casting
Cable entry		1 x M20 x 1.5	1 x M20 x 1.5	1 x M20 x 1.5	1 x M20 x 1.5
Standards					
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1					

Technical data		SD	SiD	SIN
Electrical data				
Rated insulation voltage	U_i	400 V AC	400 V AC	400 V AC
Rated operating voltage	U_e	240 V	240 V	240 V
Conventional thermal current	I_{the}	16 A	16 A	10 A
Utilization category	U_e / I_e	AC-15, U_e /I_e 240 V / 3 A	AC-15, U_e /I_e 240 V / 3 A	AC-15, U_e /I_e 240 V / 3 A
Mechanical data				
Switching frequency max.		≤ 20/min.	max. 20/min.	≤ 20/min.
Mechanical service life		1 x 10^6 switching cycles	1 x 10^6 switching cycles	1 x 10^6 switching cycles
B10d		on request	on request	on request
Short-circuit protection		Fuse 10 A gL/gG	Fuse 10 A gL/gG	Fuse 10 A gL/gG
Protection class		I	I	I
Ambient temperature		-30°C to +80°C	-30°C to +80°C	-30°C to +80°C
Protection class		IP65 conforming to EN 60529	IP65 conforming to EN 60529	IP65 conforming to EN 60529
Type of connection		Screw connections	Screw connections	Screw connections
Conductor cross sections		Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 - 1.5 mm^2	Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 - 1.5 mm^2	Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 - 1.5 mm^2
Enclosure		Aluminium pressure die-casting	Aluminium pressure die-casting	Aluminium pressure die-casting
Cable entry		2 x M20 x 1.5	2 x M20 x 1.5	2 x M20 x 1.5
Standards				
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1				

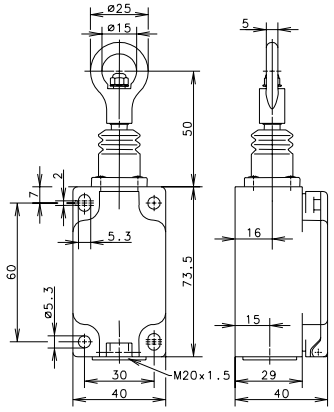
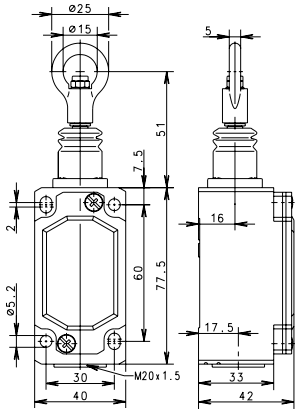
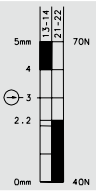
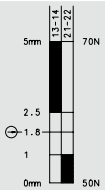
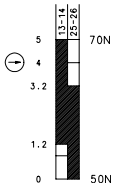
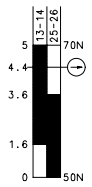
Standard Cable Pull Switches

		SIEM2 RAST	SID RAST
			
Variant 1	**Article No.** Designation Max. span	**6012831023** SIEM2-UV1Z P-RAST 6 m	**6011411868** SD-U1 P-RAST 8 m
Variant 2	**Article No.** Designation Max. span		**6111431060** SID-UV1Z P-RAST 15 m
Variant 3	**Article No.** Designation Max. span		**6011431869** SID-UV1Z P-RAST 12 m

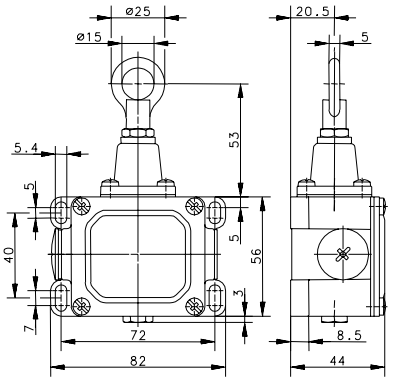
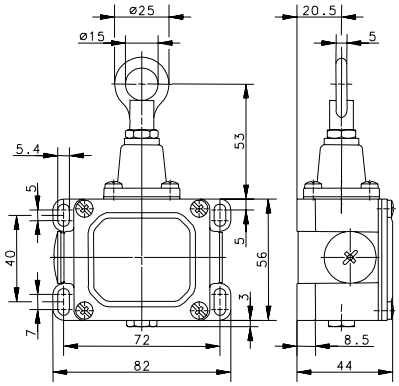
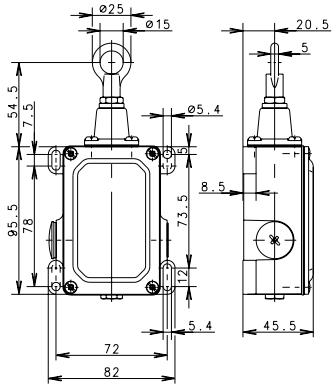
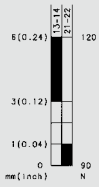
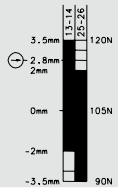
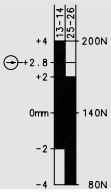
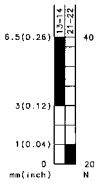
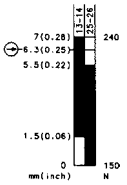
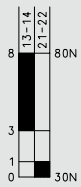
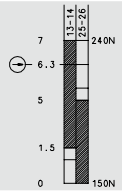
Technical data		
Rated insulation voltage U_i max.	400 V AC	400 V AC
Rated operating voltage U_e max	240 V	240 V
Conventional thermal current I_{the}	10 A	16 A
Utilization category U_e/I_e	AC-15, 240 V/3 A	AC-15, 240 V/3 A

SID RAST	SIN RAST
	
6112431050 SID-UV1Z P-RAST 35 m 	**6013531367** SIN-UV1Z P-RAST 60 m 
6012441907 SID-UV2Z P-RAST 18 m 	
400 V AC	400 V AC
240 V	240 V
16 A	10 A
AC-15, 240 V/3 A	AC-15, 240 V/3 A

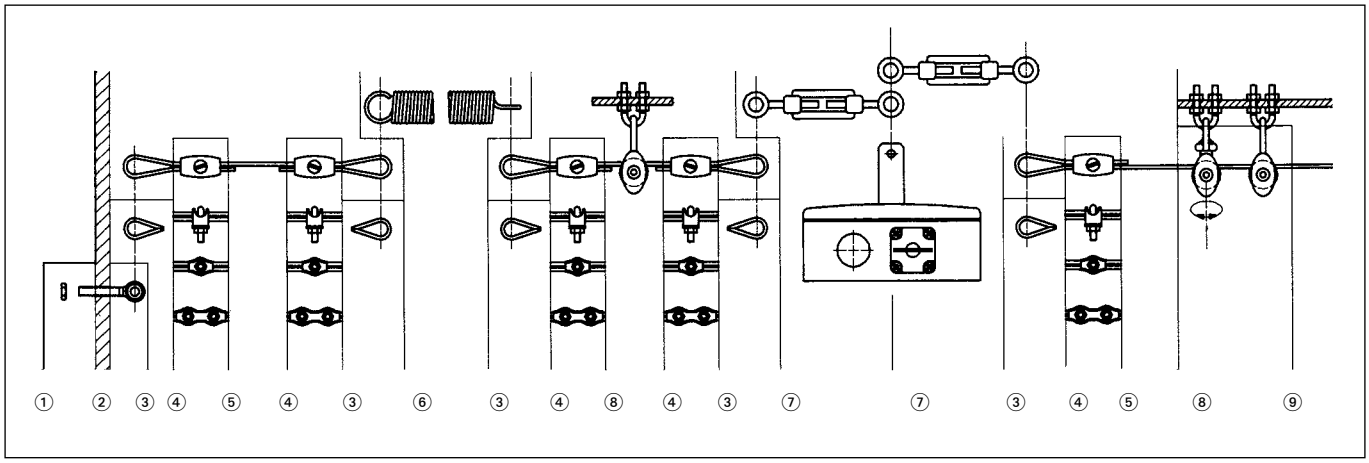
Standard Cable Pull Switches

		SEK/SIEK	SEM/SIEM2
			
Variant 1	**Article No.** Designation Max. span	**6011811133** SEK-U1Z 6 m 	**6012811029** SEM2-U1Z 6 m 
Variant 2	**Article No.** Designation Max. span	**6011831134** SIEK-UV1Z 4 m 	**6012831022** SIEM2-UV1Z 6 m 
Variant 3	**Article No.** Designation Max. span		

Technical data		
Rated insulation voltage U_i max.	400 V AC	400 V AC
Rated operating voltage U_e max	240 V	240 V
Conventional thermal current I_{the}	10 A	10 A
Utilization category U_e/I_e	AC-15, 240 V/3 A	AC-15, 240 V/3 A

SD	SID	SID
		
6011411856 SD-U1 8 m 	**6011431857** SID-UV1Z 4 m 	**6012431877** SID-UV1 8 m 
6111411029 SD-U1 6 m 	**6111431022** SID-UV1Z 8 m 	
6111411161 SD-U1 6 m 	**6111431069** SID-UV1Z 12 m 	
500 V AC	400 V AC	500 V AC
240 V	240 V	240 V
16 A	kein DB	16 A
AC-15, 240 V/3 A	AC-15, 240 V/3 A	AC-15, 240 V/3 A

Accessories for Cable Pull Switches



① Nut

Size		Strength class	Art. No.
M 6	DIN 439T2	A2-70	**2600439090**
M 8	DIN 439T2	04	**2600439187**
M 10	DIN 934	8	**2600934092**
Coating: Thick-layer passivated (M 8/M 10), RoHs-compliant			

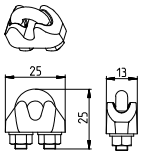
② Eye bolt

Size	Strength class	Art. No.
M 10 x 50	4.6	**2600444076**
M 6 x 50	4.6	**2600444185**
M 8 x 50	4.6	**2600444186**
Coating: Thick-layer passivated, RoHs-compliant		

③ Cable eye stiffener

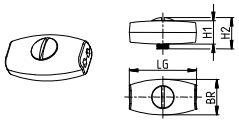
Size		Art. No.
D 2.5	to DIN 65457	**2696899013**
D 3	to DIN 65457	**2696899014**
D 4	to DIN 65457	**2696899015**
D 5	to DIN 6899B	**2696899001**
Material: Steel strip		
Coating: Blue passivated, RoHs-compliant		

④ Cable grip



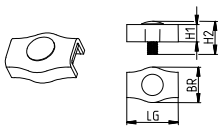
Size	Art. No.
D5	**2690741002**
Material: GTW/steel	
Coating: Yellow chromated, RoHs-compliant	

④ Cable grip, oval



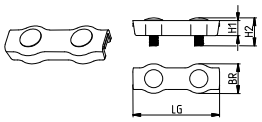
Size	LG	BR	H1	H2	Art. No.
2	28 mm	15 mm	11 mm	13 mm	**2690000004**
3	28 mm	15 mm	12 mm	13 mm	**2690000005**
4	34 mm	20 mm	14 mm	18 mm	**2690000006**
Material: Refined zinc cast alloy					
Coating: Blue passivated, RoHs-compliant					

④ Cable grip, simplex



Size	LG	BR	H1	H2	Art. No.
2	15 mm	12 mm	5 mm	11 mm	**2690000007**
3	17 mm	14 mm	6 mm	14 mm	**2690000008**
4	20 mm	17 mm	7 mm	16 mm	**2690000009**
Material: Steel strip					
Coating: Blue passivated, RoHs-compliant					

④ Cable grip, duplex



Size	LG	BR	H1	H2	Art. No.
2	35 mm	12 mm	5 mm	11 mm	**2690000010**
3	35 mm	14 mm	6 mm	14 mm	**2690000011**
4	40 mm	17 mm	7 mm	16 mm	**2690000012**

Material: Steel strip

Coating: Blue passivated, RoHs-compliant

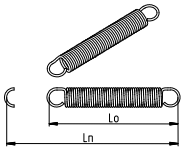
⑤ Cable

Cable Ø / Sheath Ø	Design	Minimum breaking strength		Art. No.
D 1,8 / D 5	Similar to DIN 3055	275 kp		**3699100008**
D 2 / D 2.5	to DIN 3055	239 kp		**3699100024**
D 3 / D 4	to DIN 3055	538 kp	Ideal for Quickfix (QF)	**3699100025**
D 4 / D 5	to DIN 3055	957 kp		**3699100026**

Material: Fibre-core galvanised, strength 1770 N/mm²

Coating: Blue passivated, RoHs-compliant

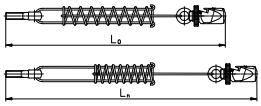
⑥ Compression spring, eye shape to DIN 1479



Fo	Fn	R	Lo	Ln	Art. No.
18 N	296 N	1.269 N/mm	188 mm	408 mm	**3652100331**
24 N	354 N	2.466N/mm	180 mm	314 mm	**3652100332**
13.3 N	153 N	0.694 N/mm	185 mm	387 mm	**3652100211**
35.2 N	450 N	3.490 N/mm	201 mm	319 mm	**3652100198**

Material: Wire to DIN 2076 - 1.4310

⑦ Pull cable spring

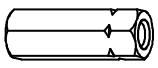


Fn	R	Lo	Ln	Art. No.
218 N	2.1 N/mm	383 mm	487 mm	**3911042153**
335 N	1.9 N/mm	483 mm	653 mm	**3911042154**

Material: Wire to DIN 2076 – 1.4310, cable grip – zinc pressure die-cast alloy, eye bolt to DIN 444 – 4.6

Coating: Thick-layer passivated (except spring), RoHs-compliant

⑦ Turnbuckle sleeve



Size	Art. No.
M 6	**2601479188**
M 8	**2601479189**

Material: Steel, min. tensile strength 330 N/mm²

Coating: Blue passivated, RoHs-compliant

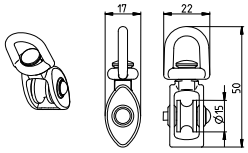
⑦ Turnbuckle similar to DIN 1480 with two eyes

Ösen	Art. No.
M 5 x 50	**2601480016**
M 6 x 60	**2601480017**

Material: Steel, forged

Coating: Blue passivated, RoHs-compliant

⑧ Pulley block, swivel version

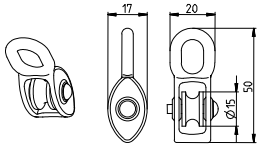


Art. No.
2690000023

Material: Zink pressure die-cast alloy (pulley polyamide)

Coating: Blue passivated, RoHs-compliant

⑧ Pulley block, fixed version

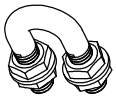


Art. No.
260000022

Material: Zink pressure die-cast alloy (pulley polyamide)

Coating: Blue passivated, RoHs-compliant

⑨ Mounting bracket for pulley to DIN 1142

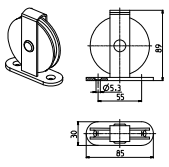


Art. No.
3911751437

Material: Steel

Coating: Blue passivated, RoHs-compliant

Deflection pulley ø 75 mm for cable diameter up to 8 mm

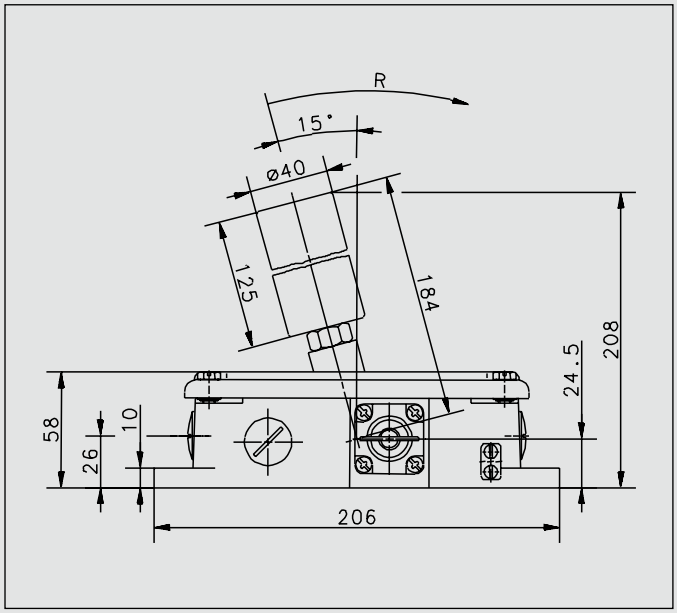


Art. No.
2690000051

Material: Steel/polyamide

Coating: Blue passivated, RoHs-compliant

Belt alignment switch

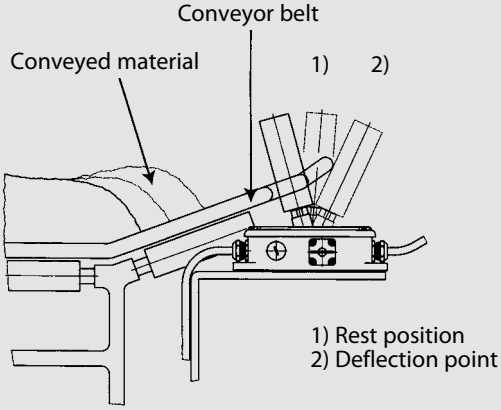


Metal-enclosed belt alignment switches for monitoring conveyor belts

In conveyor belt applications, the safety switch prevents conveyor belts from being damaged or being destroyed as the result of the belt running off track. When the roller lever is deflected by a conveyor belt running off track the safety contacts in the switch engage, thus shutting down the conveyor belt.

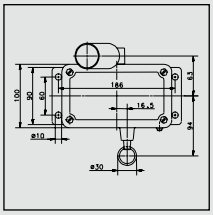
Only after eliminating the cause of the malfunction can the system be restarted by means of the pull release (key ring).

The roller lever is mounted in ball bearings. The cast iron enclosure has three M20 x 1.5 cable entries ready for through-wiring. The belt alignment switch is equipped with 2 normally-open contacts and 2 positive opening NC contacts ⊖. Thanks to its sturdy design, the device guarantees continuous trouble-free operation even under extreme operating conditions.



Product selection

Part number	Designation
6015736003	Si2-U2Z AW R-Rast



Technical data

Electrical data		
Rated insulation voltage	U_i max.	400 V
Rated operating voltage	U_e max.	240 V AC
Conventional thermal current	I_{the}	10 A
Utilization category	U_e /I_e	AC-15, U_e /I_e 240 V / 3 A
Positive opening action	⊖	as per IEC/EN 60947-5-1, Addendum K
Short-circuit protection		Fuse 10 A gL/gG
Protection class		I
Mechanical data		
Enclosure		Cast iron
Cover		Cast iron
Actuation		Roller lever
Ambient temperature		-30°C to +80°C
Contact type		2 NC / 2 NO contact (Zb)
Resetting the lock		Pulling the keyring (< 50 N)
Mechanical service life		2 x 10^6 switching cycles
Switching frequency max.		≤ 10 / min.
Mounting		4 x M8
B10d		4 mill.
Type of connection		Screw connections
Conductor cross sections		Single-wire 0.5 - 1.5 mm² or Stranded wire with ferrule 0.5 - 1.5 mm²
Cable entry		3 x M20 x 1.5
Weight		≈ 4.1 kg
Installation position		Any
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		

Notes

1-3 Pedal Foot Switches

Tailored to your applications – the modular foot switch concept from BERNSTEIN!

BERNSTEIN offers you a wide range of foot switches to meet exacting requirements in industrial applications.

From one to three pedals in versions with or without a protective hood (UN) to prevent unintentional operation of the switch, the sturdy all-metal enclosure has a protection class of IP65 as standard. The modular design enables you to define pedal functions with up to four switching combinations per pedal to suit your specific application.

Additional functions and equipment in combination with the basic enclosures and switching elements, open up further control and function variants up to BG (operational health and safety)-approved foot switches with and without mechanical latching.

The respective designation precisely describes the function of the BERNSTEIN foot switches.

❶ **Type**

Example:
F1, F2, F3

❷ **Number and type of contact elements**

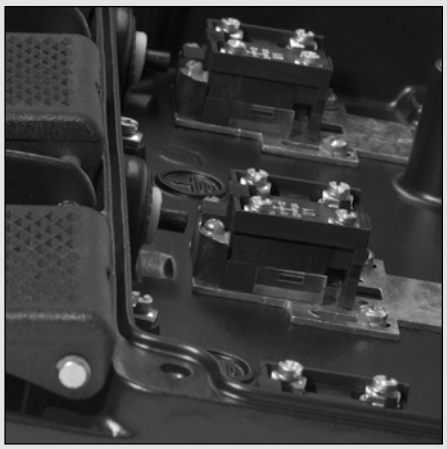
Specified from right to left for multi-pedal switches.

Example: ***F3-U1/SU1/U2***

❸ **Number and type of contact elements**

These features are denoted in the type designation directly after the corres ponding switching element.

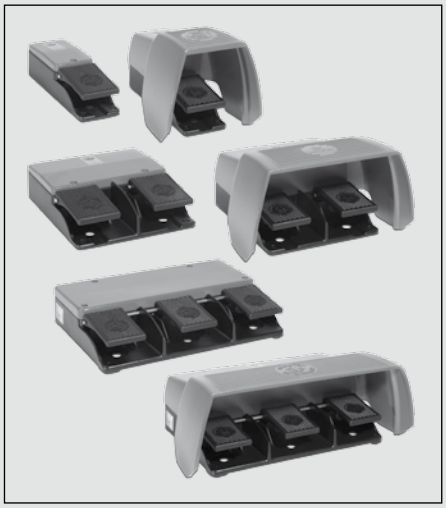
Example with latching and pressure point: ***F3-U1/SU1 Y/U2 D***



Three basic enclosures

The range of foot switches comprises:

- Three basic enclosures of the same length and height with different width dimensions for one (F1), two (F2) and three (F3) pedals



Cover panel or protective hood

The aluminium enclosures can be optionally equipped with an aluminium cover panel or a protective hood (UN).

Protective hood *UN* for *F1/F2/F3/FH*

The aluminium pressure die-cast protective hood (F3: aluminium sand casting) fully shields the pedal at the top and sides while the wide base provides a high degree of stability. It reliably prevents accidental operation from above by falling objects or careless operation from the side.

The interior of the cover is prepared ready to accommodate additional elements:

- Emergency stop button
- Contactor on standard mounting rail as main power switch
- Customer-specific built-in equipment

Mounting holes, rubber feet and separators

The mounting holes make it possible to anchor the foot switch to the floor.

Each foot switch is equipped with four rubber feet to prevent it slipping.

The separators on multi-pedal foot switches prevent several pedals being inadvertently operated simultaneously (version without separators available on request).

Type F1–F3 foot pedals are made from a thermoplastic material.

Switching function *U1Z, SU1Z, A2Z, ...*

Depending on the application, momentary-contact or snap-action systems from the BERNSTEIN modular system can be used individually or as a combination. Potentiometer (RG) versions are available for control applications.

Latch-action switching *Y*

After initially pressing the pedal, the switch setting is retained even after the pedal is released. The contact is not interrupted before the pedal is pressed again (bistable).

Fig. 2

Pressure point *D*
(Fig. 2)

Momentary-contact switching with pressure point using two built-in elements with different lead settings.

- Pedal pressed up to pressure point: Switching position for first contact element
- Pedal pressed as far as it will go beyond the pressure point: Switching point for second contact element The first contact element remains switched on.

Switching element with controller output *RG*

An integrated potentiometer enables infinitely variable control tasks to be performed via a controller output corresponding to the pedal position. A microswitch is additionally activated to provide potential isolation when at rest or in end position. Provisions are made for two microswitches for rest and end position deactivation. The standard potentiometer has a rating of 104 Ω/0.5 W. Other types are available on request.

Emergency Stop impact button *NA*
(Fig. 3)

Since the foot switch is often used in other locations than on the actual machines or systems, an Emergency Stop impact button conforming is directly available to the operator on the command unit.

Fig. 3

Power contactor *LS*

To accommodate analytical applications it is necessary to combine an auxiliary power switch with a main power switch. In line with the cost-effective design and to enable wiring without the need for an additional switch box, this version features a contactor mounted directly on a standard mounting rail in the hooded enclosure.

Hinged protective hood *UK* für *F1*

The cast aluminium protective hood UK , which must be raised with the foot before the pedals can be operated, is optionally available for the F1 enclosure to provide protection against falling objects and inadvertent pedal operation.

Pedal lock *AT* for *F1/F2/F3*
(Fig. 4)

The pedal cannot be operated before the locking lever is released with the foot. This prevents inadvertent actuation of the pedals even in the event of strong vibration/ shaking caused by incorrect handling.

Fig. 4

Footrest *FS* for *F1/F2/F3*

Applying effective workplace ergonomics to establish the right foot position (heel) is invaluable in prolonged working procedures. The wedge-shape prevents inadvertent operation.

The cast aluminium footrest can also be used under the harshest environmental conditions and, with corresponding interlinking and screw connections, it can be used together with all types of foot switch. Approved by the Swedish Accident Prevention Commission.

Enclosure specifications (on request)

- Paint finish to customer specification
- Colour of pedals
- Customer logos are possible on the UN protective hood and/or pedal
- Screen print/colour on cover with pedal function or logo
- Enclosure without separators for simultaneous pedal operation
- Additional elements with wider pedals, e.g. On/Off button in pedal or in UN protective hood
- Complete units with cable/plug connection

Ex versions

Complete units with corresponding approvals are available (see ATEX).

Foot switch in *AP*

Versions are illustrated in the Medical Technology catalogue!

1-3 Pedal Foot Switches

Safety foot switch

Safety lock with manual release

❶ **Pedal pressed up to pressure point:**

The make contact is closed and the work process is started.

❷ **Pedal pressed beyond resistance of the pressure point in an emergency situation:**

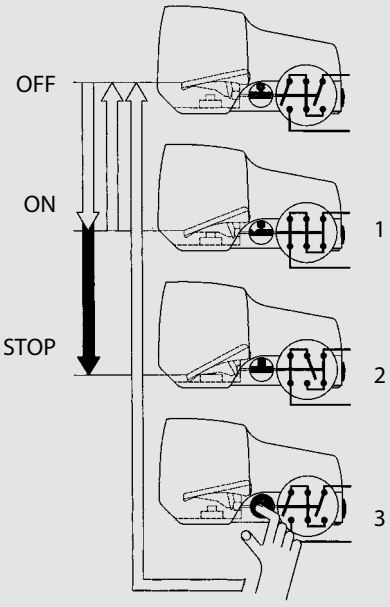
The make contact is interrupted and locked, the work process is interrupted. In this phase the lock remains in the Off position even when the pedal is not pressed. This reliably prevents uncontrolled restart of the machine or moving parts.

❸ **Release:**

Only after the hazardous situation has been remedied does manual release (pushbutton on the side of the enclosure) release the contacts again and the work process can be restarted by pressing the pedal as far as the pressure point.

Types with one-channel and two-channel safety function are available.

Ö	Normally-closed contact	**M**	Signalling contact
S	Normally-open contact	**SiPf**	Safety function on foot switches with mechanical lock
W	Changeover contact		



Description of safety function on foot switches with mechanical lock

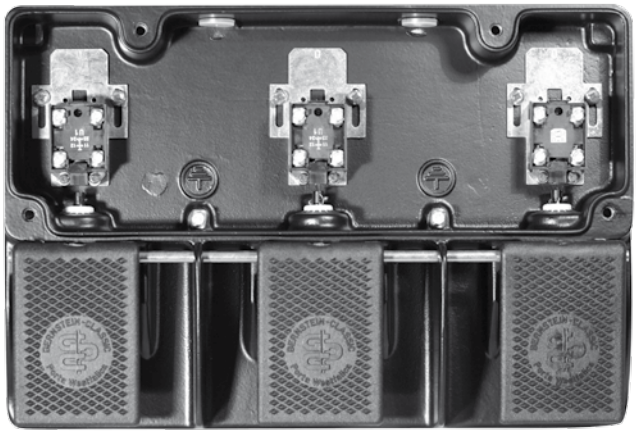
Technical data

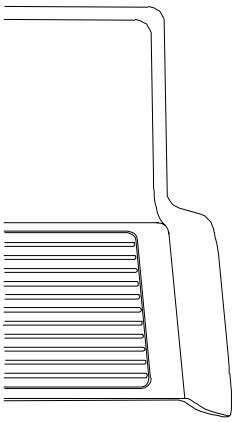
Electrical data		
Rated insulation voltage	U_i max.	400 V AC
Rated operating voltage	U_e max.	240 V
Conventional thermal current	I_{the}	10 A
Utilization category		AC-15, U_e /I_e 240 V / 3 A
Mechanical data		
Switching frequency		max. 50/min.
Mechanical service life	Off-On (-Off) Off-On-Stop-Off	10 x 10^6 switching cycles 1 x 10^6
B10d		on request
Short-circuit protection		Fuse 10 A gL/gG (Slow-action contacts) Fuse 2 A gL/gG (Slow-action contacts)
Protection class		I
Ambient temperature		-30 °C to +80 °C
Protection class		IP65 conforming to IEC/EN 60529
Type of connection		Contact screws
Conductor cross sections		Single-wire 0.5 - 1.5 mm^2 or Stranded wire with ferrule 0.5 - 1.5 mm^2
Enclosure		AL
Standards		
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1		

Ordering Instructions

Type	Pedal 1	Pedal 2	Pedal 3	Additional equipment
F1	– Switching element / Additional function			Equipment
F2	– Switching element / Additional function	Switching element / Additional function		Equipment
F3	– Switching element / Additional function	Switching element / Additional function	Switching element / Additional function	Equipment
FG	– Switching element / Additional function			Equipment

Example





F3	- U1	SU1 y	U2 D	UN

1-3 Pedal Foot Switches

Product selection

F1 Snap-action contacts

Article number	Designation	Switching contacts Pedal 1	Pressure point Pedal 1	Protective hood	Special feature
6061300011	F1-SU1Z	1NC/1NO	-	-	-
6061400061	F1-SU2Z	2NC/2NO	-	-	-
6161400493	F1-SU2ZD	2NC/2NO	30 N	-	-
6061800012	F1-SU1Z UN	1NC/1NO	-	UN	-
6161800073	F1-SU1ZD UN	1NC/1NO	200 N	UN	-
6061900062	F1-SU2Z UN	2NC/2NO	-	UN	-
6061900433	F1-SU2ZD UN	2NC2NO	200 N	UN	-
6161000487	F1-SU3 UN	3NC/3NO	-	UN	-

F1 Slow-action contacts

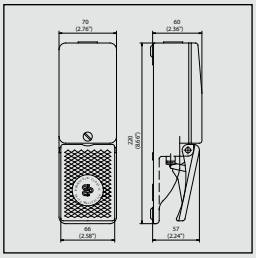
Article number	Designation	Switching contacts Pedal 1	Pressure point Pedal 1	Protective hood	Special feature
6061100005	F1-U1Z	1NC/1NO	-	-	-
6061200003	F1-U2Z	2NC2NO	-	-	-
6061200007	F1-U2ZD	2NC/2NO	200 N	-	-
6061600006	F1-U1Z UN	1NC/1NO	-	UN	-
6061600010	F1-U1ZD UN	1NC/1NO	200 N	UN	-
6061700004	F1-U2Z UN	2NC/2NO	-	UN	-
6061700008	F1-U2ZD UN	2NC/2NO	200 N	UN	-

F1 with additional functions

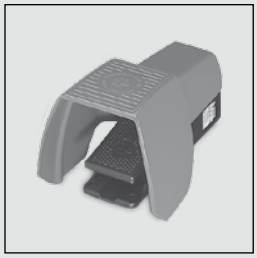
Article number	Designation	Switching contacts Pedal 1	Pressure point Pedal 1	Protective hood	Special feature
6061000288	F1-SU1ZDA 1Z UN	1M/SiPf	460 N	UN	Latching
6161500557	F1-SU1Z/UV1ZD	SiPf	460 N	-	Latching, side sealed cable gland
6161000203	F1-SU1Z/UV1ZD UN	SiPf	200 N	UN	Latching, side sealed cable gland
6161000443	F1-UV1Z/UV1ZD	2 SiPf	200 N	-	Latching, side sealed cable gland
6161000532	F1-UV1Z/UV1ZD UN	2 SiPf	200 N	UN	Latching, side sealed cable gland
6161100554	F1-U1Z AT	1NC/1NO	-	-	Pedal lock
6161800482	F1-SU1Z AT UN	2NC/2NO	-	UN	Pedal lock
6161700483	F1-U2Z AT UN	2NC/2NO	-	UN	Pedal lock
6061100001	F1-U1Y	1NC/1NO	-	-	Bistable
6161000676	F1-A2 Y	2NC	-	-	Bistable
6161200506	F1-U2Y	2NC/2NO	-	-	Bistable
6161800247	F1-SU1Y UN	1NC/1NO	-	UN	Bistable
6161700213	F1-U2ZD UK	2NC/2NO	140 N	UK	Protective hood, hinged
6061800436	F1-SU1Z-LS22-UN	1NC/1NO	-	UN	Power contactor
6061800439	F1-SU1Y-LS22-UN	1NC/1NO	-	UN	Bistable and integrated power contactor
6061600435	F1-U1Z NA2 UN	1NC/1NO	-	UN	Emergency Stop button in cover
6161700091	F1-U2Z UN FST	2NC/2NO	-	UN	Footrest
6161300327	F1-SU1 MI RG 10K2W	1W	-	-	Potentiometer 10K2W
6161800662	F1-SU1 MI RG 5K0.5W UN	1W	-	UN	Potentiometer 5K0,5W
6161800645	F1-SU1 MI RG 10K0.5W UN	1W	-	UN	Potentiometer 10K0,5W

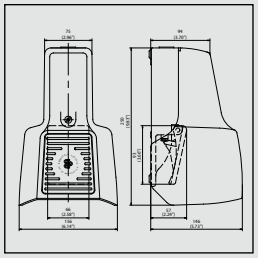
Slow-action and snap-action contacts are mixed in the special type table. The snap-action contacts are identified by the S in the contact element designation (e.g. SU1)!

F1 – Foot switch with one pedal



F1 UN – Foot switch with two pedals and protective hood





Product selection

F2 Snap-action contacts

Article number	Designation	Switching contacts		Pressure point		Protective hood	Special feature
		Pedal 1	Pedal 2	Pedal 1	Pedal 2		
6062330021	F2-SU1Z/SU1Z	1NC/1NO	-	-	-	-	-
6062440065	F2-SU2Z/SU2Z	2NC/2NO	-	-	-	-	-
6162830531	F2-SU1Z/SU1Z UN	1NC/1NO	-	-	-	UN	-
6162000418	F2-SU1Z/SU2ZD UN	1NC/1NO	-	460 N	-	UN	-
6062830417	F2-SU1Z/SU2ZD UN	1NC/1NO	-	200 N	-	UN	-
6062940066	F2-SU2Z/SU2Z UN	2NC/2NO	-	-	-	UN	-
6162000503	F2-SU4ZD/SU4ZD UN	4NC/4NO	-	200 N	-	UN	-

F2 Slow-action contacts

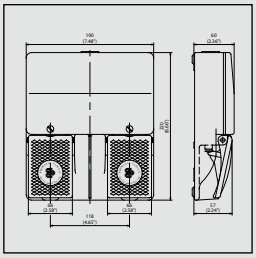
Article number	Designation	Switching contacts		Pressure point		Protective hood	Special feature
		Pedal 1	Pedal 2	Pedal 1	Pedal 2		
6062110013	F2-U1Z/U1Z	1NC/1NO	1NC/1NO	-	-	-	-
6062220015	F2-U2Z/U2Z	2NC/2NO	2NC/2NO	-	-	-	-
6062220019	F2-U2ZD/U2ZD	2NC/2NO	2NC/2NO	200 N	200 N	-	-
6062610014	F2-U1Z/U1Z UN	1NC/1NO	1NC/1NO	-	-	UN	-
6162610253	F2-U1ZD/U1Z UN	1NC/1NO	1NC/1NO	149 N	-	UN	-
6062620086	F2-U1Z/U2ZD UN	1NC/1NO	2NC/2NO	-	200 N	UN	-
6162720675	F2-U2Z/U1Z UN	2NC/2NO	1NC/1NO	-	-	UN	-
6062710376	F2-U2ZD/U1Z UN	2NC/2NO	1NC/1NO	200 N	-	UN	-
6062720016	F2-U2Z/U2Z UN	2NC/2NO	2NC/2NO	-	-	UN	-
6062720020	F2-U2ZD/U2ZD UN	2NC/2NO	2NC/2NO	200 N	200 N	UN	-
6162000651	F2-SU1ZA2ZD/SU1Z UN	3NC/1NO	1NC/1NO	460 N	-	UN	-

F2 with additional functions

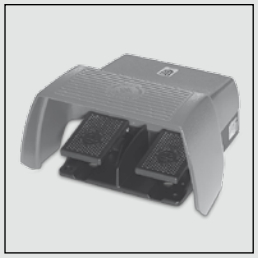
Article number	Designation	Switching contacts		Pressure point		Protective hood	Special feature
		Pedal 1	Pedal 2	Pedal 1	Pedal 2		
6162000486	F2-SU1ZUV1ZD/SU1Z UN	1M/ SiPf	1NC/1NO	460 N	-	UN	Safety lock, pedal 1
6162000364	F2-SU1ZSU1ZD/SU1Z UN	2 SiPf	1NC/1NO	200 N	-	UN	Safety lock, pedal 1
6162000338	F2-SU1ZUV1D/SU1ZUV1D UN	SiPf	SiPf	200 N	200 N	UN	Safety lock, pedal 1 and 2
6162000583	F2-UV1ZD/UV1ZD UN RAST	SiPf	SiPf	200 N	200 N	UN	Safety lock, pedal 1 and 2, 2-piece
6062610047	F2-U1Y/U1Z UN	1NC/1NO	1NC/1NO	-	-	UN	Bistable, pedal 1
6162840655	F2-SU1Y/SU2Z UN	1NC/1NO	2NC/2NO	-	-	UN	Bistable, pedal 1
6062610018	F2-U1Y/U1Y UN	1NC/1NO	1NC/1NO	-	-	UN	Bistable, pedal 1 and 2
6162720623	F2-U2ZAT/U2Z UN	2NC/2NO	2NC/2NO	-	-	UN	Pedal lock pedal 1
6162830500	F2-SU1ZAT/SU1ZAT UN	1NC/1NO	1NC/1NO	-	-	UN	Pedal lock pedal 1 und 2
6162720435	F2-U2Z/U2Z NA2 UN	2NC/2NO	2NC/2NO	-	-	UN	Emergency Stop button in cover
6162940544	F2-SU2MIRG/SU2MIRG UN	2NC/2NO	2NC/2NO	-	-	UN	10K potentiometer on pedal 1 and 2
6162630452	F2-U2Z/SU1MIRG UN	2Ö/2NO	1NC/1NO	-	-	UN	10K potentiometer on pedal 2
6162610578	F2-U1D ÜBERHUB/U1Z UN	1NC/1NO	1NC/1NO	200 N	-	UN	Extended stroke, 1
6162830680	F2-SU1D ÜBERH/SU1D ÜBERH UN	1NC/1NO	1NC/1NO	200 N	200 N	UN	Extended stroke, 1 and 2

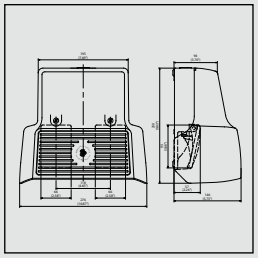
Slow-action and snap-action contacts are mixed in the special type table. The snap-action contacts are identified by the S in the contact element designation (e.g. SU1)!

F2 – Foot switch with two pedals



F2 UN – Foot switch with two pedals and protective hood





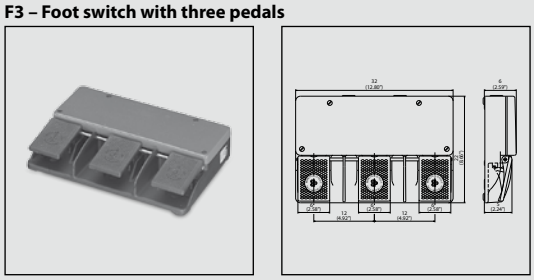
1-3 Pedal Foot Switches

Product selection

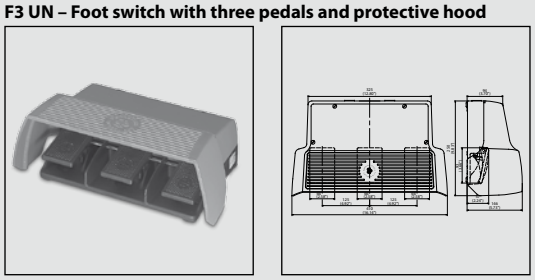
F3 Slow-action contacts

Article number	Designation	Switching contacts			Pressure point			Protective hood	Special feature
		Pedal 1	Pedal 2	Pedal 3	Pedal 1	Pedal 2	Pedal 3		
6063833045	F3-SU1Z/SU1Z/SU1Z UN	1NC/1NO	1NC/1NO	1NC/1NO	-	-	-	UN	-
6163015473	F3-SU1ZUV1D/U1/SU1Z UN	1NC/2NO	1NC/1NO	1NC/1NO	200 N	-	200 N	UN	-
6063111025	F3-U1Z/U1Z/U1Z	1NC/1NO	1NC/1NO	1NC/1NO	-	-	-	-	-
6063111025	F3-U1Z/U1Z/U1Z	1NC/1NO	1NC/1NO	1NC/1NO	-	-	-	-	-
6063611026	F3-U1Z/U1Z/U1Z UN	1NC/1NO	1NC/1NO	1NC/1NO	-	-	-	UN	-
6063612423	F3-U1Z/U1Z/U2Z UN	1NC/1NO	1NC/1NO	2NC/2NO	-	-	200 N	UN	-
6063721262	F3-U2ZD/U2ZD/U1Z UN	2NC/2NO	2NC/2NO	1NC/1NO	-	-	-	UN	-
6063722171	F3-U2ZD/U2ZD/U2ZD UN	2NC/2NO	2NC/2NO	2NC/2NO	200 N	200 N	200 N	UN	-
6163725445	F3-E2U1D/U2D/MIRGA1D UI	1NC/3NO	2NC/2NO	2 W/1Poti	200 N	-	200 N	UN	10K potentiometer on pedal 3

F3 – Foot switch with three pedals

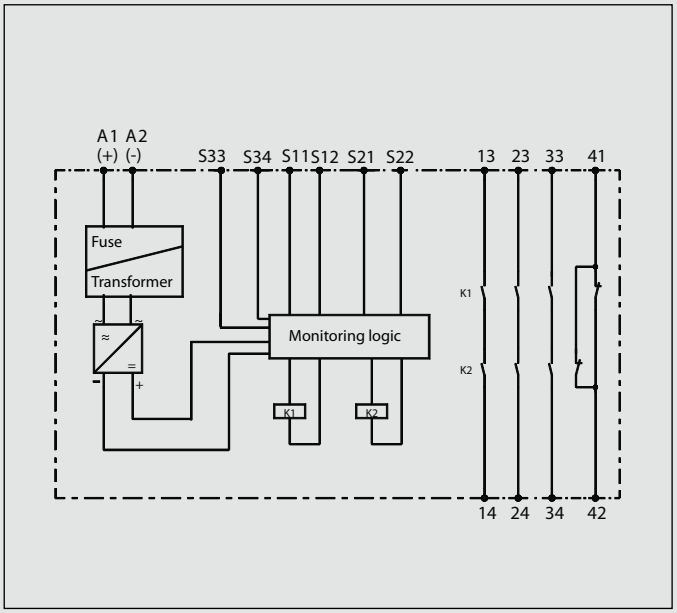


F3 UN – Foot switch with three pedals and protective hood



Notes

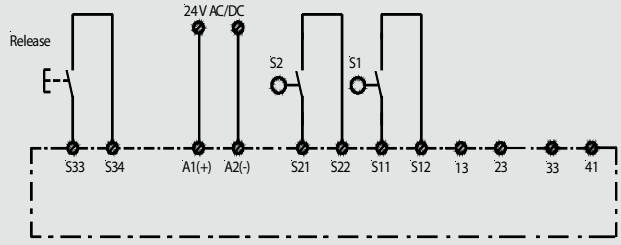
SCR – Safety Relay



Whether it's safety switches or safety relays, BERNSTEIN has the complete range of products for your application. Our SCR safety relays are used to reliably evaluate signals, such as those generated by BERNSTEIN position switches, safety switches, safety latching devices, safety cable pull switches, safety sensors or 2-hand controllers.

With their compact standard mounting rail enclosure, BERNSTEIN SCR relays impress in a wide variety of applications up to performance level e as defined by EN 13849. Conforming to this standard, the SCR relays monitor the correct position and reliable operation of safety sensors and or contacts in safety switches. This evaluation function is used to actuate power elements such as power contactors or frequency converters and stop machines in the case of emergency.

Two positive opening normally-closed contacts are required as the signalling contacts for safety gate monitors. Virtually all BERNSTEIN switches feature these contacts. They can be identified by the ⊖ symbol.



Schematic representation of safety relay system

The product range includes switching relays for evaluating:

- Safety gate monitors with and without monitored start pushbutton
- Expansion module as auxiliary switching circuit for safety relays
- Two-hand controllers
- Auxiliary controller for safety light curtains/barriers

Product selection

Article number	Designation	Enable current paths (NO contact)	Signalling contact (NC contact)	Signalling contact (NC contact)	Monitored start	Start automatic/ pushbutton (manual)	Remarks
6075111009	SCR4-W22-3.5-D	e	3	1	No	Auto / pushbutton	-
6075111010	SCR4-W22-3.5-SD	e	3	1	Yes	Pushbutton	-
6075111012	SCR4-W22-4.6-DXT	e	4	0	-	-	Expansion module only used together with another SCR
6075111015	SCR2-W22-2.5	d	2	0	No	Auto / pushbutton	-
6075111016	SCR2-W22-2.5-S	d	2	0	No	Pushbutton	-
6075111018	SCR4-W22-2.6-D2H	e	2	1	-	-	SCT for two-hand controller
6075111020	SCR ON4-W22-3.6-S	e	3	0	Programmable	Pushbutton	Pushbutton SCR for safety light barrier

Technical data

Electrical data		
Supply voltage	U_e	24 V AC/DC (6075111020 24V DC)
Voltage range		0,90 ... 1,1 U_e
Frequency		50 ... 60 Hz
Power intake		24 V DC: 3 W, 24 V AC: 5 V A
Performance data		
Conductor cross section		2 x 1.5 mm^2 / 4 x 1.5 mm^2
Contact data		
Switching voltage		230 V AC, 24 V DC
Switching current		5 A
Max. switching power		1250 V A (ohmic load)
Mechanical service life		107 switching cycles
Environmental data		
Ambient temperature		-25 °C to +50 °C
Protection class, enclosure		IP40 DIN VDE 0470 Part 1
Protection class, terminals		IP20 DIN VDE 0470 Part 1
Mechanical data		
Enclosure material		Polyamide PA 6.6
Approvals		
TÜV		
UL		
C-UL		

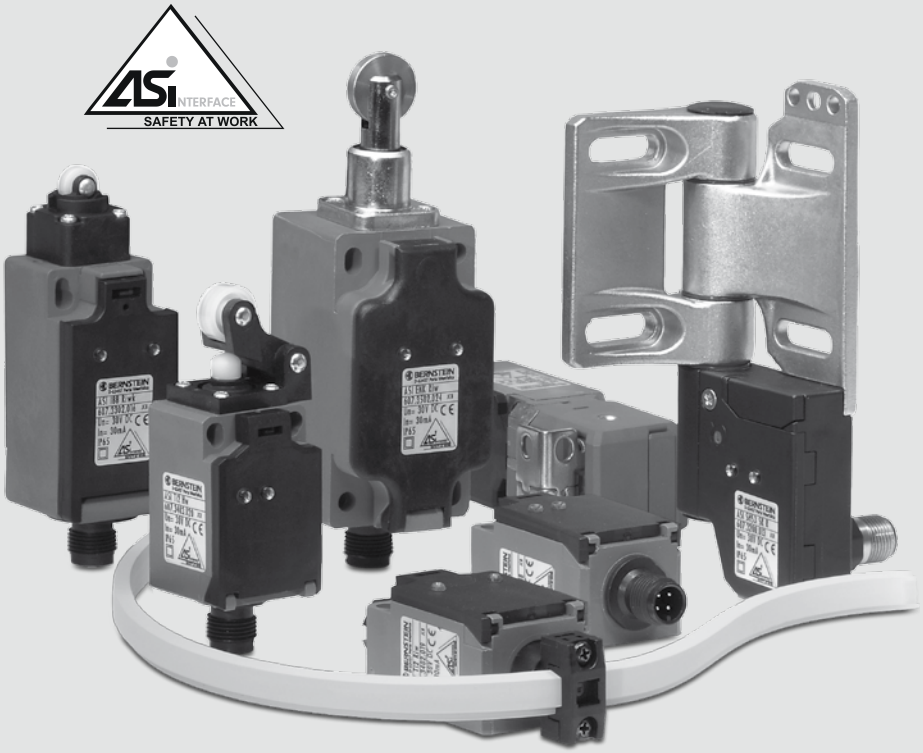
AS Interface – Safety at Work

The resounding success of the AS interface (actuator-sensor interface) that operates in accordance with the master-slave principle is attributed to its complete ease of use, its ability to be specifically adapted to the simplest elements in machine and system construction as well as the host of unparalleled application advantages it offers. The AS interface is particularly advantageous against the backdrop of the need to conform to the Machinery Directive 2006/42/EC since 29.12.2009. Performance level e and SIL 3 are achieved effortlessly. It is not always possible to set up safety systems with safety switches connected in series while conforming to EN 13849-1. Such configurations present no problems for the AS interface which provides effective solutions up to the highest performance level.

The unshielded two-wire line that carries data and power renders intricate parallel wiring between sensors and controller unnecessary, thus offering a considerably expanded range of functionality while reducing costs. With piercing technology corresponding field devices, i.e. up to 62 standard/31 safety devices or a mixed configuration, can be connected using the plug&play principle in any position on the yellow, two-core cable. The AS interface master, acting as an independent gateway to higher bus systems (e.g. Profibus), monitors the bus and cyclically polls the bus users.

As an open-ended standard, AS interface guarantees maximum compatibility while providing significant benefits in terms of overall cost considerations. These benefits are reflected in the substantial time and cost savings achieved for initial installation, retrofitting, converting and maintaining systems as well as significantly reducing hardware outlay.

The safety monitor makes the AS interface into a safety bus. It monitors communication between the slaves and the master. The safety monitor shuts down the up to 16 enable circuits as soon as it detects that a safety slave has switched or identifies a fault. A safety-oriented system can be built up by installing a safety monitor and corresponding slaves in an existing AS interface system.



The safety-oriented application is created using the ASIMON program and loaded into the monitor. Programming is carried out by means of simple drag and drop.

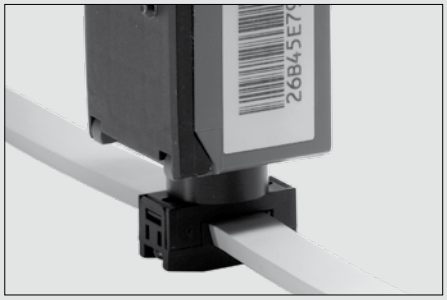
AS interface – from under one roof

All plastic-enclosed safety switches are available in the Safety at Work configuration and other products from the switch range are constantly being equipped with this functionality. With the SHS3, BERNSTEIN offers the first safety hinge switch with AS interface capabilities on the market. Integrated AS interfaces ensure BERNSTEIN components are designed with the smallest possible dimensions. For instance, the mini limit switch Ti2 is the only switch in its class on the market with AS interface capabilities. The safety switch with interlock (SLK) is, of course, also equipped with an AS interface. In addition to switches, gateway masters and terminal boxes, the BERNSTEIN product range also includes power supply units, safety monitors, hand-held programming units as well as an extensive assortment of accessories. The entire comprehensive spectrum makes it possible to offer complete systems solutions.

Master with gateways to following bus systems are available:

- Profibus
- Profinet
- Ethernet
- Powerlink
- EtherCat
- CanOpen
- DeviceNet
- Modbus
- Allen-Bradley ControlLogix

Quick-Connect Technology



Direct connection of AS interface shaped cable to BERNSTEIN AS interface switch.

The combination of the AS interface cable with ribbon cable terminals and M12 connecting lines guarantees enormous time-saving potentials in installation and connection.

This principle is supported by the direct connection technology of BERNSTEIN AS interface switches. These BERNSTEIN AS interface switches are connected directly to the AS interface cable by means of integrated ribbon cable terminals.

The use of the AS interface cable together with piercing technology ensures the ribbon cable terminal can be easily reposition-ed while retaining the cable's protection class.

Installation advantages

- Reduced installation time
- Easy installation thanks to piercing technology (in ribbon cables protected against polarity reversal)
- Safety circuits can be retrofitted and converted by simply plugging in individual slaves
- Changes to safety system can be quickly implemented by way of software
- Reduced cable requirements, consequently:
  - Small trailing cables
  - Small cable platforms
  - Easy to clean
  - Low fire load
- No terminal boxes
- No need to prepare enclosures, terminals and screw connections

Planning advantages

- Straightforward planning – intricate wiring documents are replaced by clearly arranged bus structure diagrams
  - Safety functions quickly created by drag and drop in ASIMON
  - Printout of safety configuration from programming tool

System advantages

- Uncomplicated interconnection of safety system in machines used in production lines
- Straightforward implementation of safety system cascading
- Faults in the safety system can be diagnosed with a laptop online
- Diagnostic facilities directly at the master and monitor for exact fault location
- System data/polling can be read out via higher-level bus system: Remote servicing
- Fewer I/Os at controller
- Takes up less space in control cabinet

Economic advantages

- Reduced costs through:
  - Faster installation
  - Fewer circuit diagrams need to be created
  - Faster commissioning
  - Fast troubleshooting
  - Extensive diagnostic facilities

User advantages through reduced:

- Machine downtimes thanks to extensive diagnosis and fast troubleshooting
- Commissioning costs
- Maintenance and servicing expenditure

Further advantages

- Direct connection – no need for M12 connection cable and connection adapters
- Great degrees of freedom in terms of network typology
- Tough even in harsh working environments
- Modularity and perfect integration in higher-level bus systems – an AS interface master can be integrated as a normal slave in a higher-level bus system

Technical data (for all saves, except coupling box)

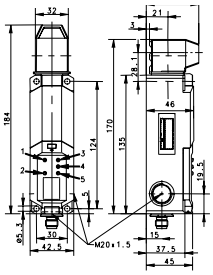
Electrical data					
Voltage range	U	26.6 ... 31.6 V; via AS interface with polarity reversal pprotection			
Power intake	I	< 30 mA			
AS interface specification		Profile S-0.B			
		IO-Code: IO-Code1:	0 x 0 0 x F	ID-Code: ID-Code2:	0 x B 0 x E
AS interface inputs		Contact 1:	Data bits D0/D1 = static 00 or dynamic code transfer		
		Contact 2:	Data bits D2/D3 = static 00 or dynamic code transfer		
Parameter bits		No function			
Mechanical data					
Display		LEDs for indicating status of ASI slave and bus			
Contact type		2 Öffner (Slow-action contact, Zb)			
Type of connection		Connector M12 male			
Plug assignment 1		1: AS-i +	2: free		
		3: AS-i –	4: free		
Installation position		Any			
Protection class		IP65 conforming to EN 60529; DIN VDE 0470 T1			
Performance Level					
PL	Conforming to 13849-1	Up to e			
Standards					
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1 EN 50295, EN ISO 13849-1					

Please refer to the corresponding standard product for further technical data.

ASI SLK

With the ASI SLK BERNSTEIN offers a switch with interlock function and integrated Safety at Work interface.
You can choose the functional principle, i.e. spring and magnet latching device.
LED integrated in the switches indicate the bus status.
The inserted actuator and the status of the latching device are also indicated by LEDs.
The LEDs can also be optionally controlled via the PLC.

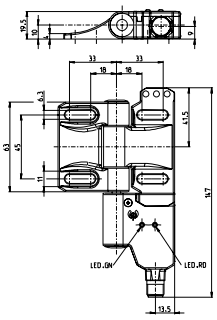
M12-connection	Direct connection
6073200058 ASI-SLK-F-R1	
6073200057 ASI-SLK-M-R0	



ASI SHS

With the SHS3 BERNSTEIN offers the only safety hinge switch with AS interface Safety at Work.
As on the standard hinge, after adjustment, the user can correct the switching point with the integrated fine adjustment system.
When converting a system you can redefine the switching point with the aid of a change kit.

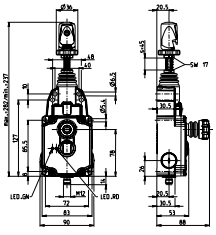
M12-connection	Direct connection
6073200011 ASI SHS3 SA R	
6073200013 ASI SHS3 SR R	



ASI SRM

Cable span lengths of up to 37.5 metres are possible with the SRM...175 (see information under Safety Cable Pull Switches).
As in the standard range, the QF variant features the quick-connect head that drastically reduces the cable installation time.

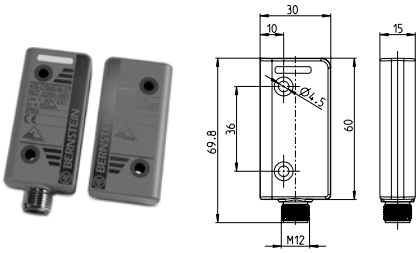
M12-connection	Direct connection
6073200007 ASI SRM-QF-175	
6073200008 ASI SRM-QF-300	
6073200009 ASI SRM-LU-175	



CSMS

The BERNSTEIN CSMS is a contactless safety sensor (transponder) with dynamically coded signal transmission for AS Interface – Safety at Work. With the unique allocation of the actuator to the safety switch, protection against tampering is already integrated in the CSMC, making it suitable for concealed installation in non-coded systems.

CSMS KIT	CSMS individual components
6073200062 ASI-CSMS-SET (kit contains: Read head and actuator)	**6073200060** ASI-CSMS-M-ST (Read head)
	6073200061 ASI-CSMS-S (Actuator)



ASI SKT

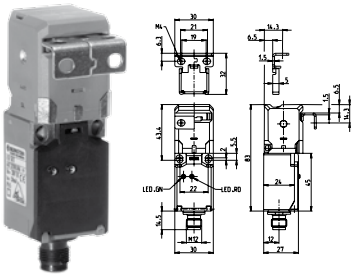
The ASI SKT with separate actuator for monitoring safety gates and guards is a Type 2 switch and is one of the smallest in its class.

The enclosure and cover are made from fibre glass-reinforced thermoplastic.

LEDs that indicate the status of the ASI slave and bus are integrated in the cover.

Protection class IP65 in accordance with IEC/EN 60529 is guaranteed.

M12-connection	Direct connection
6073200006 ASI SKT	**6073200029** ASI SKT D

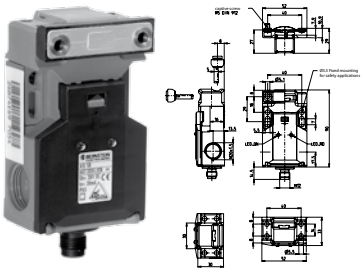


ASI SK

The ASI SK with separate actuator for monitoring safety gates and guards is a Type 2 switch.

The enclosure and cover are made from fibre glass-reinforced thermoplastic. LEDs that indicate the status of the ASI slave and bus are integrated in the cover. Protection class IP65 in accordance with IEC/EN 60529 is guaranteed.

M12-connection	Direct connection
6073205028 ASI SK M	**6073205039** ASI SK M D
6073205050 ASI SK F30 M	



ASI ENK

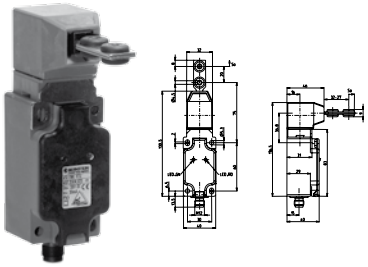
The ASI ENKK VTU with separate actuator is a very tough standard switch often used for monitoring safety gates and guards.

The enclosure and cover are made from fibre glass-reinforced thermoplastic.

LEDs that indicate the status of the ASI slave and bus are integrated in the cover.

Protection class IP65 in accordance with IEC/EN 60529 is guaranteed.

M12-connection	Direct connection
6073504025 ASI ENK VTU	**6073504038** ASI ENK VTU D

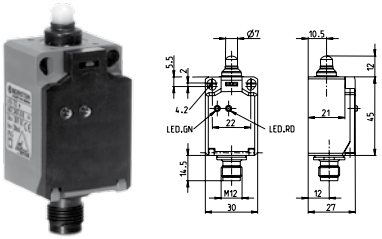


ASI Ti2

The Ti2 family with its extremely compact dimensions is the only ASI switch family in this class.

The captive snap-on cover contributes to the protection rating of IP65 in accordance with EN 60529, DIN VED 0470 T1.

M12-connection	Direct connection
6073401018 ASI Ti2 w	**6073401033** ASI TI2 W D
6073402019 ASI Ti2 Riw	**6073402034** ASI TI2 RIW D
6073403020 ASI Ti2 Hw	**6073403035** ASI TI2 HW D



ASI I88

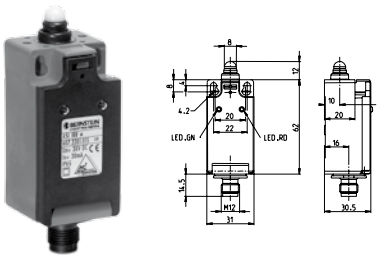
The ASI I88 conforming to EN 50047 is a standard switch used in a wide range of applications.

The enclosure and cover are made from fibre glass-reinforced thermoplastic.

LEDs that indicate the status of the ASI slave and bus are integrated in the cover.

Protection class IP65 in accordance with IEC/EN 60529 is guaranteed.

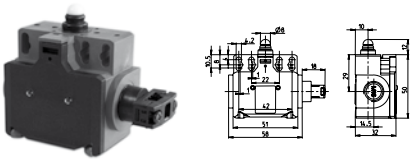
M12-connection	Direct connection
6073301015 ASI I88 w	**6073301030** ASI I88 W D
6073302016 ASI I88 RiwK	**6073302031** ASI I88 RIWK D
6073303017 ASI I88 Hw	**6073303032** ASI I88 HW D



ASI BI2

The AS interface version of the ASI Bi2 switch is designed as a very compact unit with a low overall height and side connection.

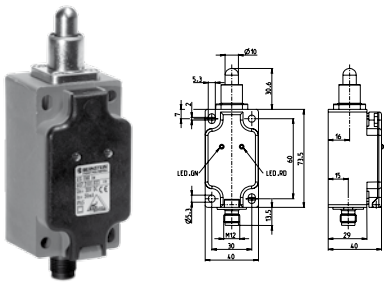
M12-connection	Direct connection
6073201052 ASI BI2 w	**6073201051** ASI BI2 w D



ASI ENK

The ASI ENK conforming to EN 50041 is an extremely sturdy standard switch used in a wide range of applications.
The enclosure and cover are made from fibre glass-reinforced thermoplastic.
LEDs that indicate the status of the ASI slave and bus are integrated in the cover.
Protection class IP65 in accordance with EN 60529, DIN VDE 0470 T1 is guaranteed.

M12-connection	Direct connection
6073501023 ASI ENK iw	**6073501036** ASI ENK IW D
6073502024 ASI ENK Riw	**6073502037** ASI ENK RIW D



ASI ANS

The standard connection box has an ASI address and integrates up to four non-safety sensors in the ASI system.
The connection box is equipped with LEDs that indicate the status of the connected user.

Connection box 6073201	
6073100027 ASI CONNECTION BOX 4 IN	

ASI MST

The ASI Master is the "head" of the AS interface system.

It organises communication on the bus and makes available all data to the higher-level system via the gateway.

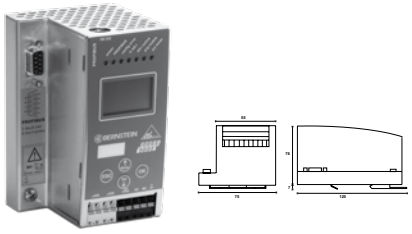
The master shown here is equipped with a Profibus gateway.

Gateways are available for following bus systems:

Profinet, Ethernet, Powerlink, EtherCat, CanOpen, Devicenet, Modbus, Allen-Bradley ControlLogix

Master

6073100001
ASI MST PROFIBUS



ASI SMO

The second generation safety monitor is an emergency stop switching device that features two integrated and a further 14 external enable circuits.

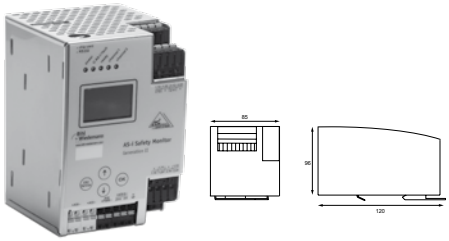
The second generation ASI safety monitor features a stainless steel enclosure and an LC display for showing slave addresses and error messages.

The safety monitor can be used in applications up to performance level e and SIL 3.

The safety application is created with the ASIMON program.

Safety monitor

6073100004
ASI SMON B+W

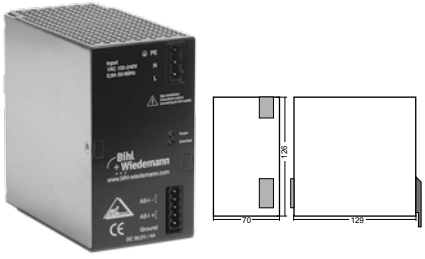


ASI NT

The primary clocked power supply unit for AS interface supplies a 4 amp current. Besides supplying power, the power supply unit is also responsible for data decoupling with respect to the feed source and balancing the two AXI output lines with respect to machine earth.

Power supply unit

6073100003
ASI NT 4A B+W



ASI HND

The ASI hand-held addressing device is a compact unit used for addressing ASI slaves (sensors, actuators and interface modules).

Electromechanical connection is made by the universal connection adapter.

ASI slaves can be addressed in accordance with ASI specifications 2.0, 2.1 and 3.0 with the ASI hand-held addressing device.

Hand-held addressing device

6073100005
ASI HND PRG

ASI PRO

The safety application of the safety monitor is created with the ASIMON software.

This program makes available a debug view for fast troubleshooting.

In addition, documentation of the safety application can be printed out.

It comes with a cable for connecting the safety monitor to a laptop.

Software

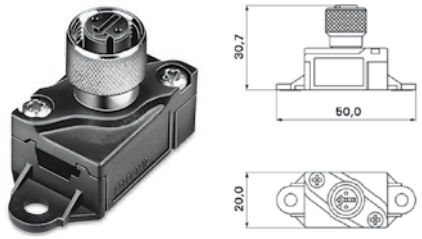
6073800021
ASI PROG SW + KBL

AS Interface Accessories

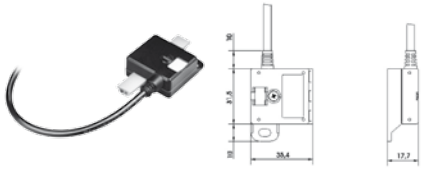
6073900040
ASI CABLE EPDM YELLOW

6073900041
ASI CABLE EPDM BLACK

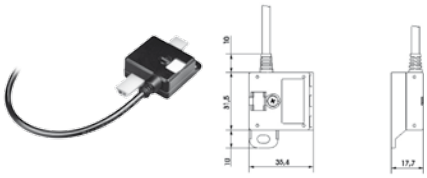
6073900042
ASI COUPLING MODULE
M12 SCREW



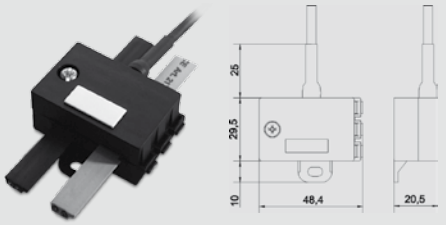
6073900043
ASI COUPLER
M. 0.3 RK U. M12 G



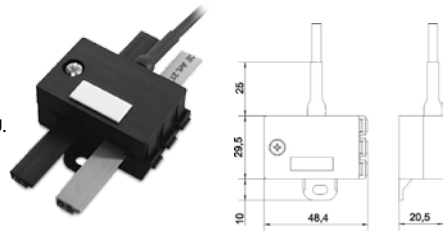
6073900044
ASI COUPLER M. 0.3 RK U.
M12 W



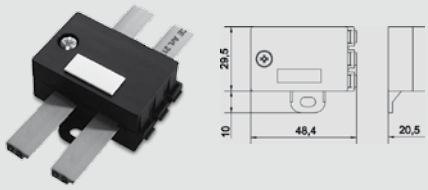
6073900045
ASI COUPLER 2F M.0.5RK
U.M12 G



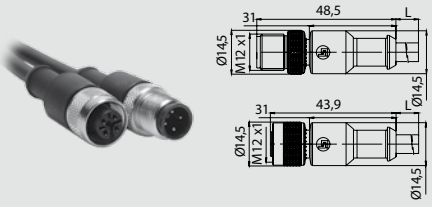
6073900046
ASI COUPLER 2F M.0.5RK U.
M12 W



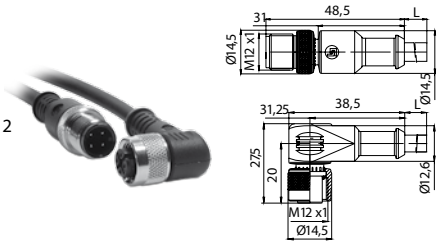
6073900047
ASI CABLE LINK



6073900048
ASI CONNECTING LEAD M12
1M G/G



6073900049
ASI CONNECTING LEAD M12
1M G/W



Notes

ATEX

ATEX-approved products for potentially explosive atmospheres

- Ex e, Ex ia and Ex e\ia terminal boxes made from polyester and aluminium
- Ex d limit switches, cable pull switches and foot switches
- Ex mb/Ex tD magnetic switches

Services, training, system solutions, project- and customer-specific solutions.

Terminal boxes and empty enclosures

Only materials that correspond to the temperature range T6 required for Ex enclosures are used in these enclosures and components.

The minimum type of protection rating of all enclosures and screw connections is IP64, other protection classes available on request.

The latching devices on the enclosures are optionally available as captive screw connections or quick-release fasteners.

Various CA versions are available with flange plates.

All built-in components must conform to the relevant approvals.

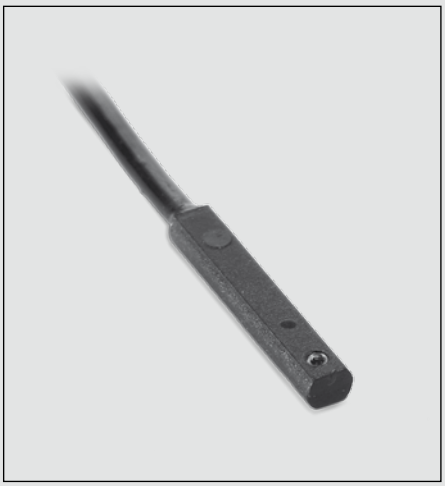
Momentary contact, cable pull and foot switches

An Ex d-certified switching element lies at the core of these Ex-approved switches.

It is mounted in the corresponding switch enclosures. The mechanical actuator and its installation are certified separately.

The approval of additional actuators and switch enclosures from other series is possi-ble on request.

All switches and momentary contact switches feature one NO contact and one NC contact.



Magnetic switches

The magnetic switches are fitted at the factory with an up to 7 m long connection cable.

The cable is permanently connected to the enclosure and is part of the approval.

All sensors are certified for a maximum ambient temperature of 80 °C.

Services offered by the BERNSTEIN-ATEX experts:

- Approval of a stainless steel enclosure with freely definable dimensions
- Approvals assistance for plant operators
- Approval of switching and control elements in all enclosures
- Approval of plug-in devices in all enclosures
- Component mounting and wiring of enclosures according to customer specifications
- Training courses for planners and plant operators
- Cross-product system solutions
- Customer-specific development and project management on request
- Gost (Russia) and NEC (North America) approvals on request

Explosion protection at a glance

BERNSTEIN

Ex	II2G	Ex	ia	IIC	T6	TÜV	2008	ATEX	1234	-
Type approval to RAL 94/9/EC	Application	Explosion protection	Protection class	Device group	Temperature class	Inspection authority	Year	As per Directive 94/9/EC	Consecutive number	Additional conditions

Types of protection for gas-explosion hazardous areas

Symbol		Type of protection	Standard
	Ex „d"	Flameproof encapsulation Switching devices, motors, transformers etc. IEC60079-1	IEC60079-1
	Ex „p"	Pressurised encapsulation Control cabinets px = Use in Zone 1, 2 py = Use in Zone 1, 2 pz = Use in Zone 2	IEC60079-2
	Ex „q"	Powder-filled encapsulation Transformers, capacitors	IEC60079-5
	Ex „o"	Oil immersion encapsulation Transformers, load resistors	IEC60079-6
	Ex „e"	Increased safety Terminal boxes, control cabinets, enclosures for installing devices of other protection class	IEC60079-7
	Ex „i"	Intrinsically safe Terminal boxes, control cabinets, sensors, measurement and control equipment ia = Use in Zone 0, 1, 2 ib = Use in Zone 1, 2	IEC60079-11
		Intrinsically safe systems	IEC60079-25
	Ex „n"	Non sparking Systems that, due to their design, cannot spark	IEC60079-15
	Ex „m"	Encapsulation Command and signalling devices, sensors, display/indicator devices ma = Use in Zone 0,1,2 mb = Use in Zone 1,2	IEC60079-18
	Ex „op"	Optical radiation op is = Intrinsically safe optical radiation op pr = Protected optical radiation op sh = Shutdown optical radiation	IEC60079-28

IP Protection Classes

IP 1st digit	Contact	Foreign bodies	IP 2nd digit	Water
0	No protection	No protection	0	No protection
1	Large body parts	Solid object > 50 mm	1	Water dripping vertically
2	Finger	Solid object > 12.5 mm	2	Water dripping at angle up to 15°
3	Tool > 2.5 mm	Solid object > 2.5 mm	3	Water sprayed at an angle up to 60°
4	Tool > 1 mm	Solid object > 1 mm	4	Spayed water 360°
5	Complete protection	Dust accumulation	5	Hose water 360°
6	Complete protection	Dust infiltration	6	Strong hose water 360°
			7	Temporary submersion
			8	Submersion

Device group I Mining

I M1	Safety provided by 2 safety measures, 2 faults
I M2	Shutdown on occurrence of explosive atmosphere

Device group II All potentially explosive atmospheres except mining

II 1	Zone 0	Zone 20	1 Zone 0 zone 20 Safety provided by 2 safety measures, 2 faults
II 2	Zone 1	Zone 21	2 Zone 1 Zone 21 Safety in the event of frequent equipment malfunctions, 1 fault
II 3	Zone 2	Zone 22	3 Zone 2 Zone 22 Safety in trouble-free operation

Zone categories, device group II

Hazard	Gas as per IEC	Dust as per IEC
Permanent or frequent	Zone 0	Zone 20
Occasional	Zone 1	Zone 21
Rare, temporarya no longer than 30 min per year	Zone 2	Zone 22

Max. permissible surface temperature	Temperature classes for gases
450°	T1
300°	T2
200°	T3
135°	T4
100°	T5
85°	T6

Explosion groups for gases

Group	Typical gas	Ignition energy
I	Methane	280 µJ
IIA	Propane	> 180 µJ
IIB	Ethylene	60...180 µJ
IIC	Hydrogen	< 60 µJ

Additional conditions

-	No restriction
X	Special conditions
U	Component certification Parts certification

ATEX Products

EX versions of the tried-and-tested BERNSTEIN switches with ATEX approval are also available for applications involving potentially gas and dust explosive atmospheres.

Approvals for gas "ii G"
in accordance with
DIN EN 60079-XX

Approvals for dust "ii D"
in accordance with
DIN EN 61241-XX

Make use of our Ex protection expertise for your applications.

What is ATEX?

ATEX = Atmosphère explosible.
The European Directive 94/4/EC governs the production and the circulation of devices and components for explosive at-mospheres in the European Union. The IEC Standards harmonised throughout the EU stipulate that ATEX products approved by a certification authority can be used anywhere throughout the EU.

In most aspects the certification authorities of non-European countries such as North America, Russia etc. closely follow ATEX-relevant standards so that various approvals can be acquired worldwide based on an ATEX approval. Corresponding national approvals are available on request.

Where are devices with ATEX approval used?

The fields of application for Ex-protected switches include mixing and processing machines in bakeries (flour dust explosion), processing machines in the food industry where spices are mixed (spice dust explosion), sewer manholes, pump stations and sewage treatment plant (explosive gases "fermentation/digester gas"), waste disposal and recycling industry (various sources of dust and gas explosion), automotive industry and wherever paints and lacquers are used (painting booth) in addition to the classic explosion-hazard branches of industry such as the chemical, petrochemical, pharmaceutical industries as well as the coal, gas and oil-producing and processing industries. Mobile equipment and systems such as vacuum cleaners, stacker lift trucks, fans etc. that are used in the above fields of application must exhibit a corresponding ATEX approval. ATEX products are therefore a part of our everyday lives..

Who is responsible for what in Ex applications?

The device or component manufacturer must obtain a type approval certificate (ATEX approval) for these devices and components. The machine manufacturer can acquire his system approval based on these approvals and the declaration of conformity.

The manufacturer of a machine or system that is used in Ex applications must obtain a corresponding system approval for the machines it markets. The entire system must be taken into consideration both from a mechanical as well as from an electrical aspect.

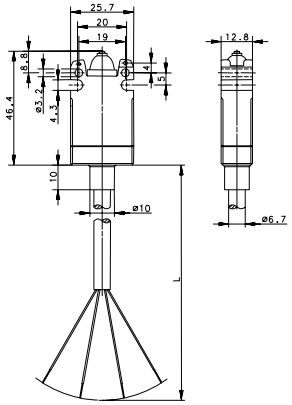
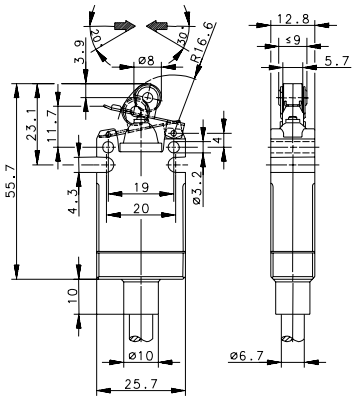
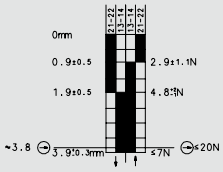
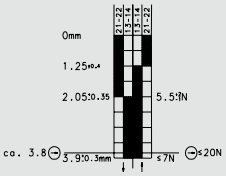
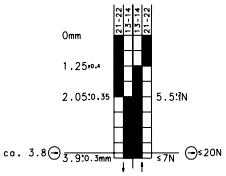
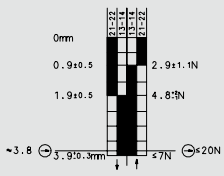
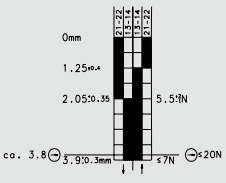
In accordance with the ATEX Operator Directive 1999/92/EC (ATEX137), the operator of technical facilities shall be responsible for avoiding or restricting the formation of explosive atmospheres (primary explosion protection), avoiding effective ignition sources (secondary or design explosion protection) and restricting the effect of an explosion to a safe level (tertiary explosion protection).An explosion protection document describing the implemented measures and hazard assessments is to be compiled.

In addition to foot switches and cable pull switches, our current ATEX-certified product range also includes various standard limit switches, limit switches and miniature limit switches.

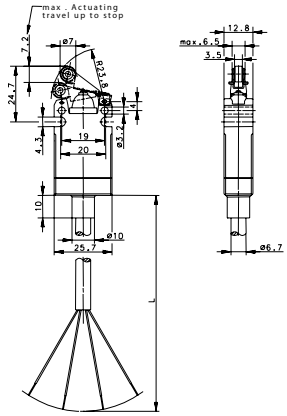
Customer-specific individual approvals or approvals for switches and components from the BERNSTEIN range not yet certified are available on request.

Technical data		EEX	GC	ENM2	F
Electrical data					
Rated insulation voltage	U_i max.	250 V	250 V	250 V	250 V
Rated operating voltage	U_e max.	230 V AC	230 V AC	230 V AC	230 V AC
Conventional thermal current	I_{the}	5 A	5 A	5 A	5 A
Utilization category: switching capacity		AC 15, 240 V / 3 A; DC 13, 250 V / 0.27 A	AC 15, 240 V / 3 A; DC 13, 250 V / 0.27 A	AC 15, 240 V / 3 A; DC 13, 250 V / 0.27 A	AC 15, 240 V / 3 A; DC 13, 250 V / 0.27 A
Mechanical data					
Mechanical Switching frequency		max. 120/min.	max. 50/min.	max. 50/min.	max. 50/min.
Mechanical service life		2 x 10^6 switching cycles	2 x 10^6 switching cycles	2 x 10^6 switching cycles	2 x 10^6 switching cycles
Contact type		1 NC /1 NO contact (Zb)	1 NC /1 NO contact (Zb)	1 NC /1 NO contact (Zb)	2 NC /2 NO contact (Zb)
B10d		4 mill.	4 mill.	4 mill.	4 mill.
Short-circuit protection		Fuse 4 A gL (Human protection function)	Fuse 4 A gL (Human protection function)	Fuse 4 A gL (Human protection function)	Fuse 4 A gL (Human protection function)
Protection class		II, Insulated	II, Insulated	II, Insulated	II, Insulated
Approval for Zone		II 2G (GAS)	II 2G (GAS)	II 2G (GAS)	II 2G (GAS)
Admissible ambient temperature		-20°C to +65°C	-20°C to +65°C	-20°C to +65°C	-20°C to +65°C
Protection class of built-in snap-action switch		IP66/IP67 conforming to IEC/EN 60529	IP66/IP67 conforming to IEC/EN 60529	IP66/IP67 conforming to IEC/EN 60529	IP66/IP67 conforming to IEC/EN 60529
Type of connection		Control line (with ferrules)	Control line (with ferrules)	Control line (with ferrules)	Control line (with ferrules)
Conductor cross sections		4 x 0,75 mm²	4 x 0,75 mm²	4 x 0,75 mm²	4 x 0,75 mm²
Enclosure		PEI	Aluminium pressure die-casting	Aluminium pressure die-casting	Aluminium pressure die-casting
Cable entry		Cast	1 x cable screw connection M20 x 1,5	1 x cable screw connection M20 x 1,5	1 x cable screw connection M20 x 1,5

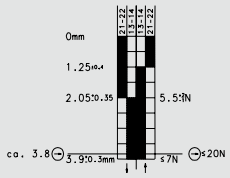
Technical data		SN2	SI2 U2Z AW	SI2 U2Z AK	
Electrical data					
Rated insulation voltage	U_i max.	400 V AC	400 V AC	400 V AC	
Rated operating voltage	U_e max.	240 V	240 V	240 V	
Conventional thermal current	I_{the}	10 A	10 A	10 A	
Utilization category: Switching capacity		AC 15, U_e /I_e 240 V / 3 A	AC 15, U_e /I_e 240 V / 3 A	AC 15, U_e /I_e 240 V / 3 A	
Mechanical data					
Mechanical Switching frequency		≤ 60/min.	≤ 10/min.	≤ 10/min.	
Mechanical service life		10 x 10^6 switching cycles	2 x 10^6 switching cycles	2 x 10^6 switching cycles	
Actuation		Achshebel (Zn-Al), Rolle (Termoplast)	Roller lever (St)	Lever (St)	
Ambient temperature		-20°C to +80°C	-20°C to +60°C	-20°C to +60°C	
Contact type		1 NC /1 NO contact	2 NC /2 NO contact (Zb)	2 NC /2 NO contact (Zb)	
B10d		20 mill.	4 mill.	4 mill.	
Short-circuit protection		Fuse 2 A gL/gG	Fuse 10 A gL/gG	Fuse 10 A gL/gG	
Protection class		I	I	I	
Approval for Zone		II 2D IP65 T85°C (STAUB)	II 3D IP65 T80°C (STAUB)	II 3D IP65 T80°C (STAUB)	
Surface temperature T		85°C	80°C	80°C	
Protection class of built-in snap-action switch		IP65 conforming to IEC/EN 60529	IP65 conforming to IEC/EN 60529	IP65 conforming to IEC/EN 60529	
Type of connection		Contact screws	Screw connections	Screw connections	
Conductor cross sections		Single-wire 0.5 - 1.5 mm² or Stranded wire with ferrule 0.5 – 1.5 mm²	Single-wire 0.5 - 1.5 mm² or Stranded wire with ferrule 0.5 – 1.5 mm²	Single-wire 0.5 - 1.5 mm² or Stranded wire with ferrule 0.5 – 1.5 mm²	
Enclosure		AL-Aluminium pressure die-casting	Cast iron	Cast iron	
Cable entry		3 x M20 x 1.5	3 x M20 x 1.5	3 x M20 x 1.5	
Standards					
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1 EN 60079-0, DIN EN 60079-0 EN 60079-1, DIN EN 60079-1 Directive 94/9 EG (ATEX 95)					

	EEX W	EEX RH
		
2 meter connection cable	**6090153002** EEX-SU1Z W -2M- 	**6090148022** EEX-SU1Z RH -2M- 
5 meter connection cable		**6090148024** EEX-SU1Z RH -5M- 
9 meter connection cable	**6090153005** EEX-SU1Z W -9M- 	**6090148025** EEX-SU1Z RH -9M- 
EX certification	II 2 G EEx d IIC T6	II 2 G EEx d IIC T6

EEX RHL



6090149027
EEX-SU1Z RHL -2M-



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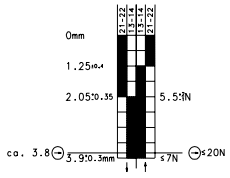
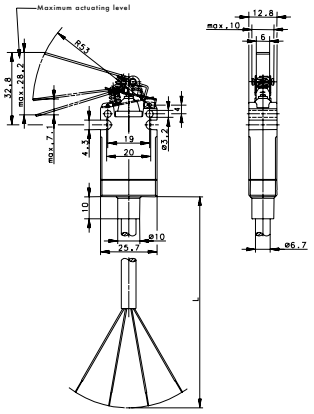


Ex II 2 G EEx d IIC T6

EEX UH



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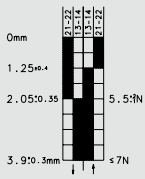

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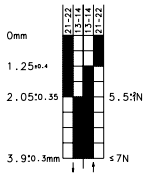
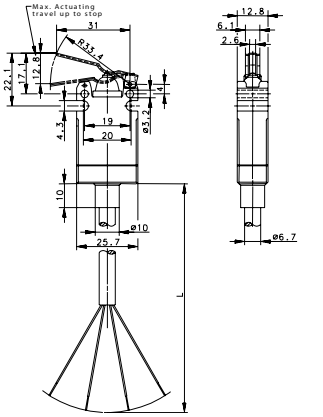


Ex II 2 G EEx d IIC T6

EEX FH



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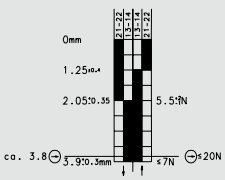

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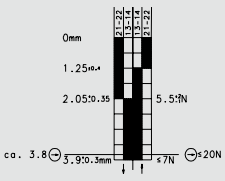
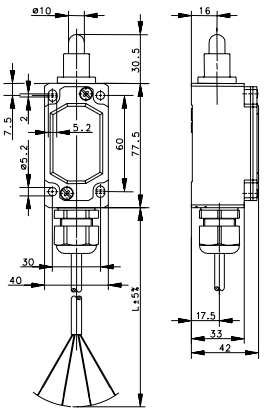
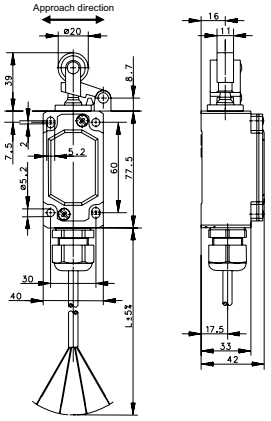
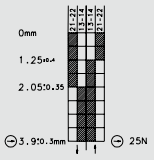
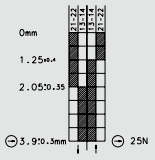
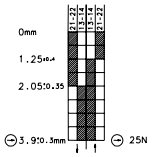
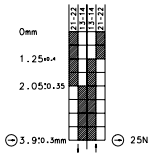
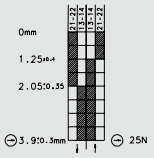
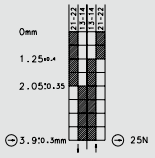
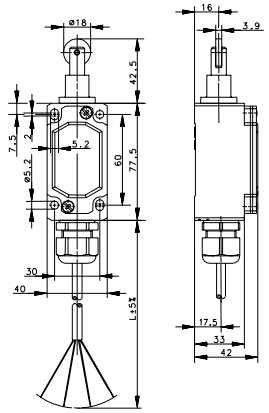


Ex II 2 G EEx d IIC T6

	ENM2 IW	ENM2 HW
		
2 meter connection cable	**6097152052** ENM2-SU1Z EX IW -2M- 	**6097171072** ENM2-SU1Z EX HW -2M- 
5 meter connection cable	**6097152054** ENM2-SU1Z EX IW -5M- 	**6097171074** ENM2-SU1Z EX HW -5M- 
9 meter connection cable	**6097152055** ENM2-SU1Z EX IW -9M- 	**6097171075** ENM2-SU1Z EX HW -9M- 
EX certification	II 2 G EEx d IIC T6	II 2 G EEx d IIC T6

ENM2 RIW



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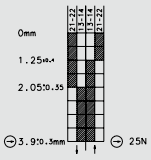

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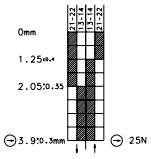

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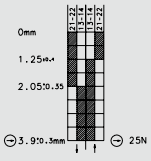
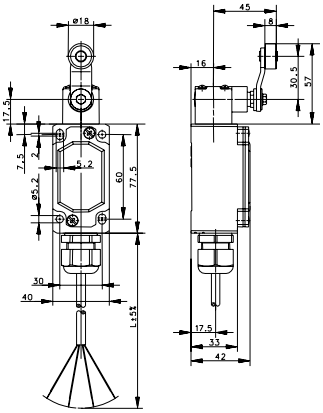


II 2 G EEx d IIC T6

ENM2 AHT



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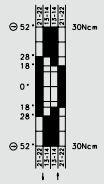

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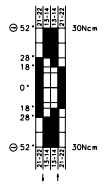

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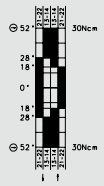
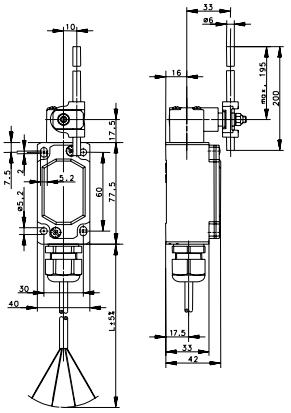


II 2 G EEx d IIC T6

ENM2 AD



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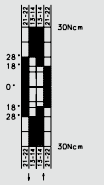

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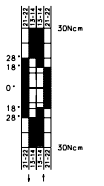

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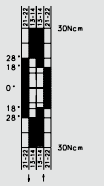
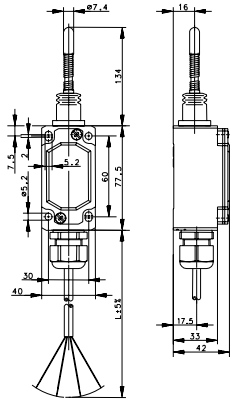
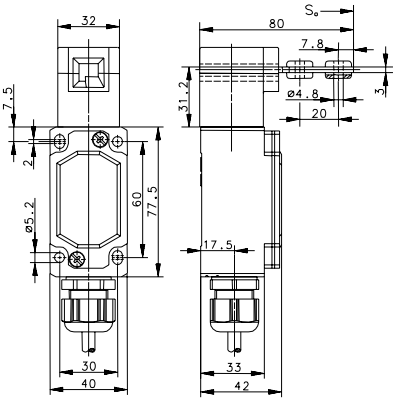
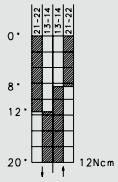
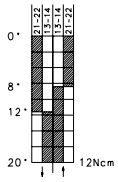
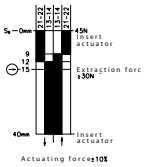
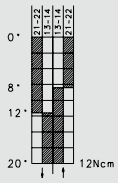
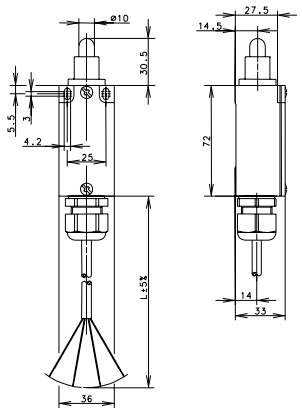


II 2 G EEx d IIC T6

	ENM2 FF	ENM2 VTW
		
2 meter connection cable	**6097190097** ENM2-SU1 EX FF -2M- 	
5 meter connection cable	**6097190099** ENM2-SU1 EX FF -5M- 	**6197100010** ENM2-SU1Z EX VTW -5M- 
9 meter connection cable	**6097190100** ENM2-SU1 EX FF -9M- 	
EX certification	II 2 G EEx d IIC T6	II 2 G EEx d IIC T6

GC IW



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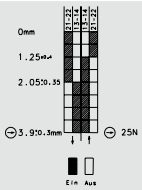
GC-SU1Z EX IW -2M-



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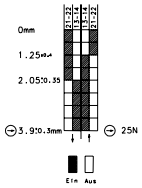

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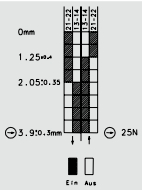
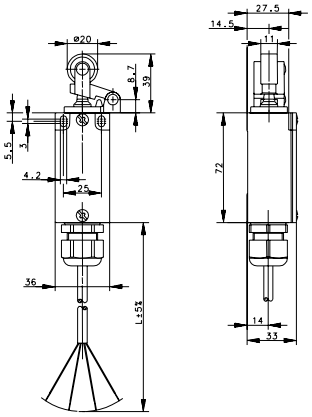


II 2 G EEx d IIC T6

GC HW



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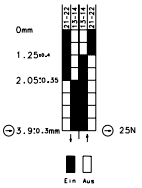
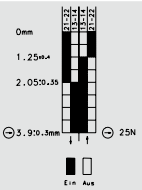
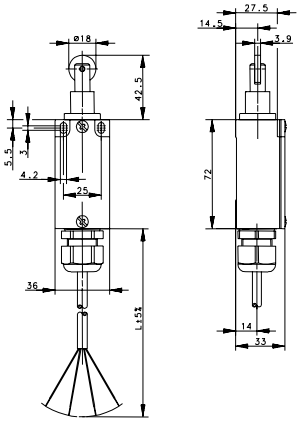


6092171025
GC-SU1Z EX HW -9M-



II 2 G EEx d IIC T6

GC RIW



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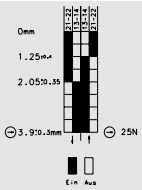
GC-SU1Z EX RIW -2M-



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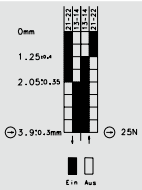
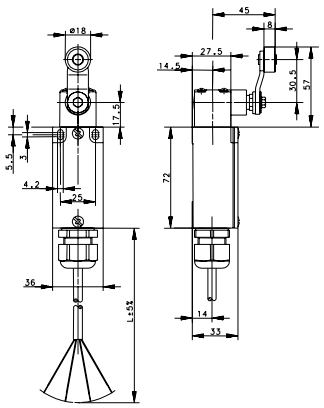
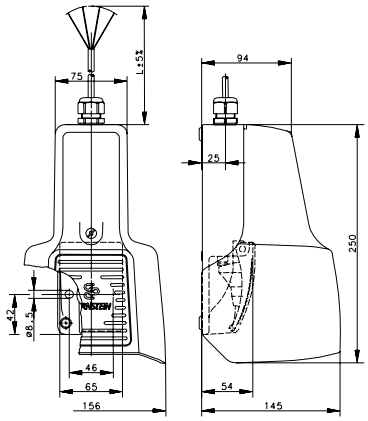
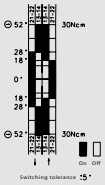
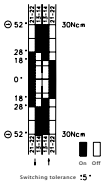
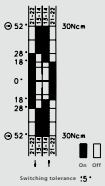
GC-SU1Z EX RIW -9M-

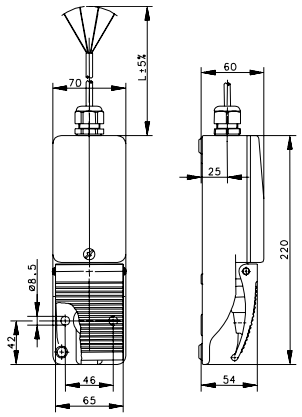


II 2 G EEx d IIC T6

ATEX Products

	GC AHT	F1 UN
		
2 meter connection cable	**6092185032** GC-SU1Z EX AHT -2M- 	**6096197017** F1-SU1Z EX UN -2M-
5 meter connection cable	**6092185034** GC-SU1Z EX AHT -5M- 	**6096197019** F1-SU1Z EX UN -5M-
9 meter connection cable	**6092185035** GC-SU1Z EX AHT -9M- 	
EX certification	II 2 G EEx d IIC T6	II 2 G EEx d IIC T6

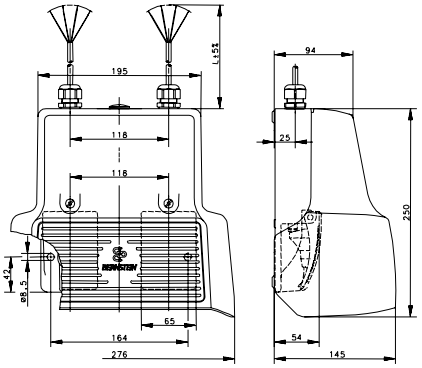
F1



6096198014
F1-SU1Z EX -5M-

II 2 G EEx d IIC T6

F2 UN



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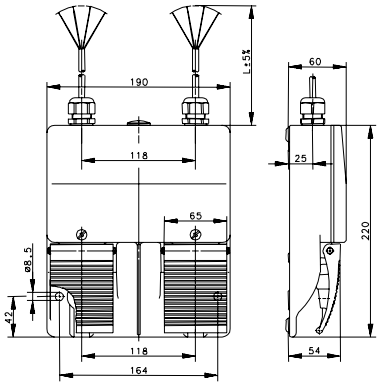
F2-SU1Z/SU1Z EX UN -5M-

II 2 G EEx d IIC T6

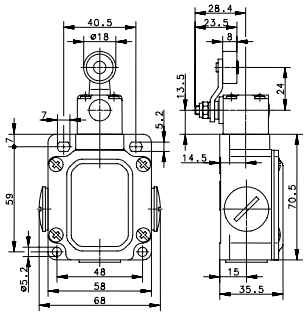
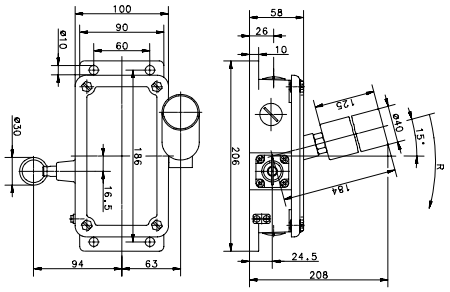
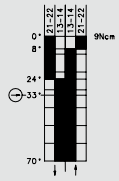
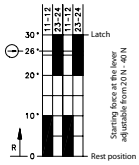
F2



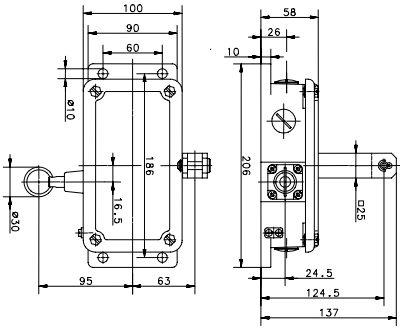
6096198022
F2-SU1Z/SU1Z EX -2M-

II 2 G EEx d IIC T6

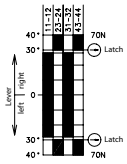
ATEX Products

	Explosion-protected metal-enclosed switch SN2	Series SI2
		
1 NC /1 NO contact	**6193285001** SN2-SU1Z AH EXD 180 Gr. 	
2 NC /2 NO contacts		**6091295025** SI2-U2Z AW EXD 
EX certification	 II 2 D IP65 T 85 °C	 II 3 D Ex tD A22 IP65 T 80°C

Series SI2



6091288024
SI2-U2Z AK EXD



II 3 D Ex tD A22 IP65 T 80°C

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