

**We make safety happen.**

# Safety technology

Protects people and machines





# Safety technology protects people and machines

Industries around the world use countless machines, plants and processes. SAFETY is the top priority here! To protect the operating processes and, above all, the people who work with them. That's why there are standards in all industries to protect people and machines. Safety technology for the most diverse requirements.

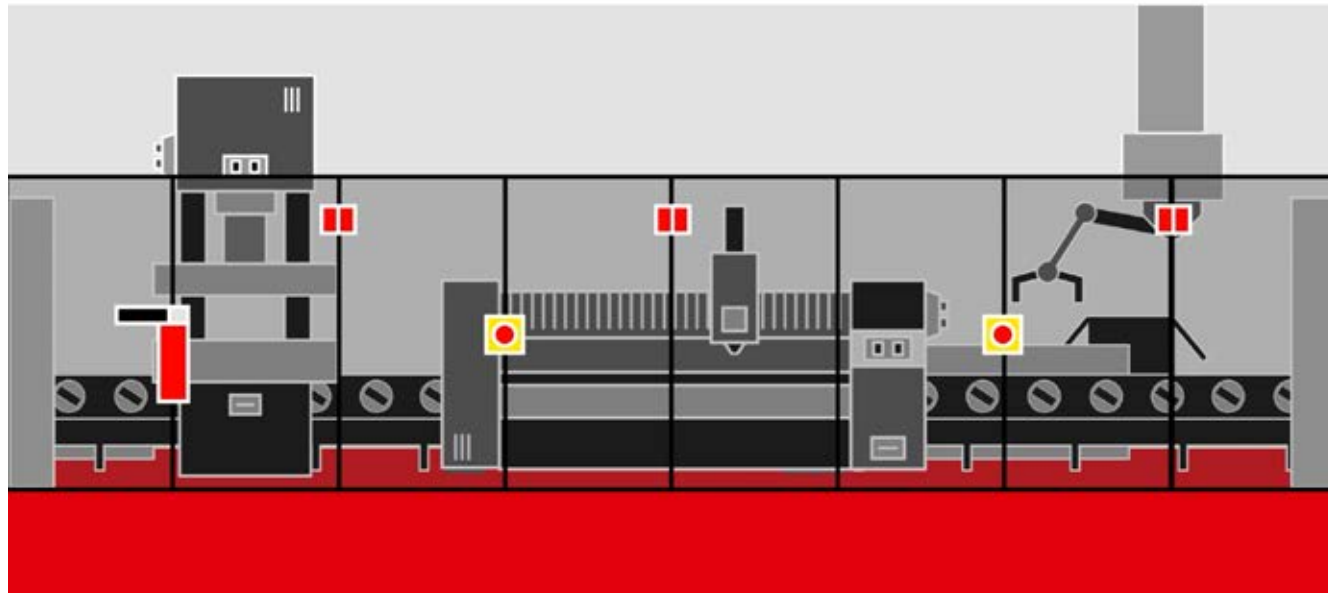
And there is a strong partner for all of them: BERNSTEIN!



Click here for the video

»For us at BERNSTEIN, safety technology is characterised first and foremost by the fact that it reliably prevents damage to people, machines and materials. Modern safety technology also meets the requirements of networking components. Diagnostic functions are the icing on the cake. In this way, safety technology components generate real added value.«

— Nicole Bernstein | Board



**1947** COMPANY FOUNDATION  
by Hans Bernstein  
in Porta Westfalica

**2018** SMART SAFETY SYSTEM  
starts its success story

**35** DISTRIBUTORS  
worldwide ensure constant  
proximity to our customers

**10** SUBSIDIARIES  
around the globe

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## Our products – your solutions



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**“Whatever you need ...”**

**– Please contact us**

We can offer all of our switches, sensors and enclosures in a customer-specific design. So do not hesitate to contact us. We are always happy to advise you.

Tel +49 571 793-0

info@bernstein.eu | [www.bernstein.eu](http://www.bernstein.eu)



# EU legislation

## Machinery Directive 2006/42

Manufacturers of machines and systems who wish to market their products in the European Union are obliged to comply with all relevant EU directives, in particular the Machinery Directive 2006/42/EC.

This is confirmed by the CE marking on the machine and by the CE declaration of conformity to be supplied with it.

The EU directives to be observed describe the basic health protection requirements that the product must meet. Given that the directives are converted into national law, these requirements have a statutory character.

Since these legal requirements are basic and very general, they are specified in the so-called harmonised standards (EN standards). These standards can be taken into account, although this is not obligatory. The legal requirements must be complied with, however.

The advantage of observing these standards is that the so-called presumption of conformity applies to them. This means that if the standards are observed correctly and in full, it is presumed that the legal requirements are complied with. Therefore, the manufacturer may, on his own responsibility, affix the CE mark to his machine, fill out the CE declaration of conformity and market the machine in the EU. So-called Annex 4 machines are an exception to this manufacturer's own declaration.

These machines listed in Annex 4 of the Machinery Directive require a type examination certificate from an approved certification body.

Interestingly, all devices that serve the safety of the machine are also covered by the Machinery Directive. Thus, the requirements of the Machinery Directive also apply to safety switch gear and sensors. In concrete terms, this means that these safety components must meet the requirements of the harmonised standards listed under the Machinery Directive, such as:

EN 12100: Risk reduction  
EN 13849-1: PL  
EN 13849-2: Fault exclusion and validation  
EN 14119: Interlocking devices

Needless to say, the BERNSTEIN AG products listed in this catalogue meet all normative requirements and are characterised by particular flexibility and userfriendliness.

We invite you to see for yourself – we look forward to discussing your specific application with you.

Your BERNSTEIN Team

# Machinery Directive becomes Machinery Ordinance

As the Machinery Directive 2006/42/EC, published in 2006, describes a technical state of the art that is now almost 20 years old, a revision was necessary in order to adapt the specifications for machine safety to the 'state of the art'. The following new requirements and adjustments were made, among others:

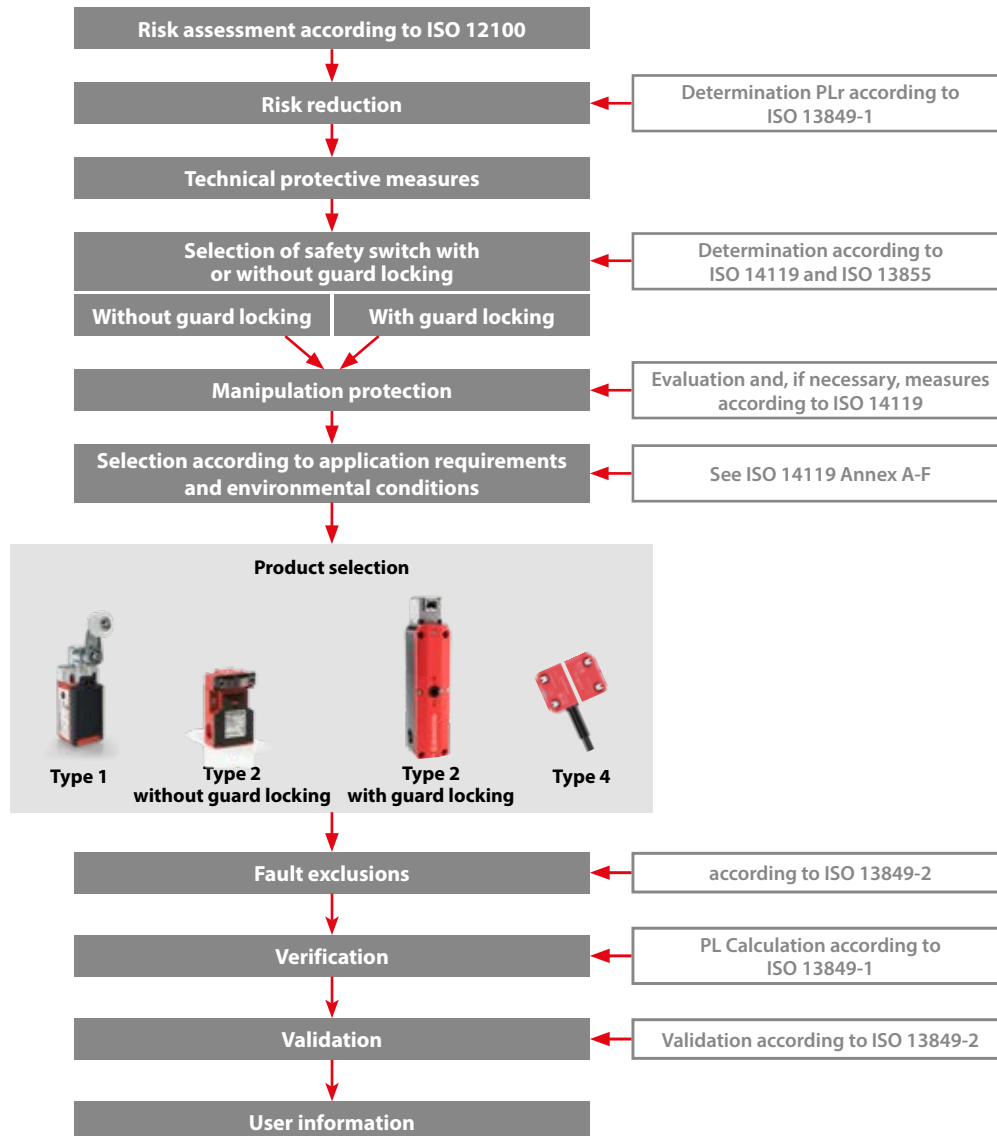
- The coverage of new risks in connection with digital technologies
- The reassessment of machinery with a particular risk ('Annex I' machinery)
- Enabling digital instructions under certain conditions
- Inclusion of 'software that performs safety functions' in Annex II – non-exhaustive list of safety components
- Definition of a substantial modification.
- Inclusion of importers and distributors as economic operators
- And many more...

These amendments were published in the Official Journal of the EU on 29 June 2023 with the Machinery Regulation (EU) 2023/1230. However, the new regulation will only apply from 20 January 2027. As this is a cut-off date regulation, the Machinery Directive 2006/42/EC is applicable until 19 January 2027; from 20 January 2027, the Machinery Regulation (EU) 2023/1230 will apply in all member states of the European Union.

There is **no** transitional phase during which either of the two legal texts can be applied. The regulation can be accessed via the following link:



# Selection and design of interlocking devices associated with guards according to ISO 14119



The overview on the right and the following explanations on pages 10–15 describe a procedure for selecting the correct products for position monitoring and, if necessary, guard locking of safety gates and hoods and for implementing their integration in the safety-related part of the control system.



## Risk evaluation

According to the Machinery Directive, the manufacturer of a machine must ensure that a risk evaluation of his machine or plant has been carried out, for example, to determine the safety requirements that apply to the machine.

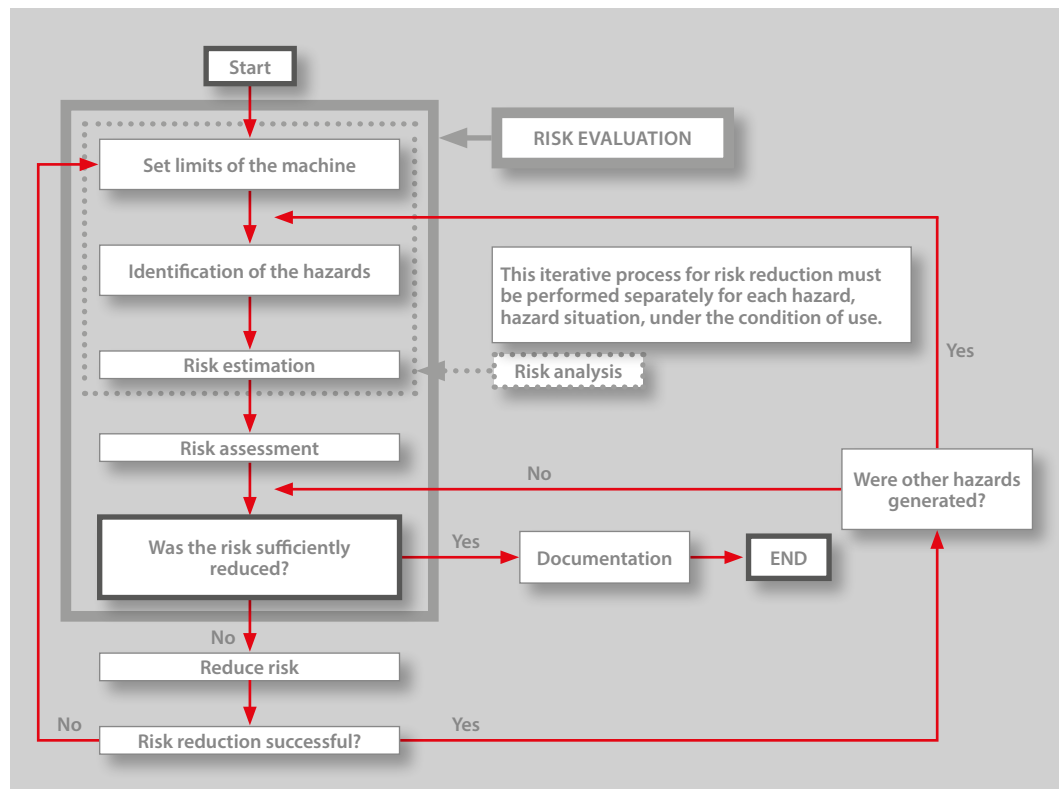
The machine must then be designed and built taking into account the results of the risk evaluation.

As a part of the risk evaluation, the risk analysis identifies,

among other things, hazards associated with the machine and then assesses their risks based on the following aspects:

- Extent of damage of the considered hazard
- Probability of occurrence of this damage

Subsequently, it must be evaluated whether a risk reduction is necessary.



Risk evaluation according to ISO 12100

## Risk reduction

A necessary reduction of the risk can be achieved either by eliminating the hazard or by mitigating one or both of the aspects already mentioned.

The risk reduction of a hazard must always be carried out according to and in the order of the so-called "3-step procedure". These 3 steps are:

### Level 1: Inherently safe design

Eliminates hazards or reduces associated risks through appropriate selection of design features.

### Level 2: Technical protective measures and/or supplementary protective measures

If all risks cannot be sufficiently reduced by level 1, a suitably selected technical and complementary protective measure may be applied.

### Level 3: User information

Remaining residual risks after application of levels 1 and 2 must be pointed out in the user information.

The quality with which the risk reduction must be carried out is determined, for example, by applying the risk graph according to ISO 13849-1, which is then used to determine the PLr (required performance level).

A precise description of how the risk evaluation and risk reduction should be carried out is included in ISO 12100.

# DETECT



## Technical protective measures

Technical protective measures include, for example, separating protective devices. These prevent access to the hazardous area or protect against the escape of workpieces, chips, radiation (e.g. heat or light/laser), gases or noise.

In practice, this is usually an enclosure of the hazardous area where entry or access must be available for various reasons (cleaning, maintenance, work process).

This access is made possible by a movable separating protective device (usually a door, bonnet or flap), which must, however, be locked.

This means that the movable guard must be monitored by an interlocking device – a safety switch (with or without guard interlocking) or safety sensor – to ensure that:

- a hazardous machine function cannot be performed until the guard is closed.  
(Note: Safety function – Preventing unexpected start-up)
- a stop command is triggered if the guard is opened during dangerous machine functions (Note: Safety function – Safety-related stop command).

The selection and installation of interlocking devices as well as the following topics are described in ISO 14119.

The interlocking device must be integrated into the safety-related control system in accordance with ISO 13849-1 or IEC 62061.



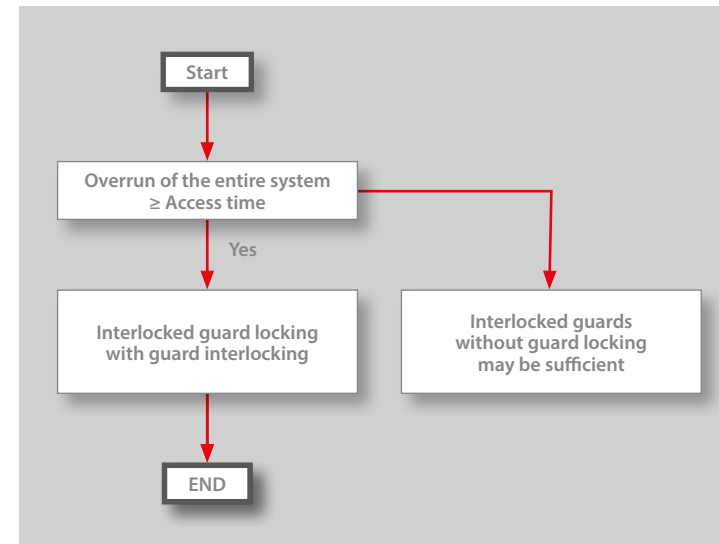
Example of a movable guard (mesh door) and a safety switch with guard locking.

## Selection of safety switch with or without guard locking



Depending on the specific application, either a safety switch/sensor or guard locking must be used. By default, guard locking is recommended for “long-lasting” dangerous running down movements of machines (e.g. saw blade of a circular saw running down), whereby the exact definition of “long” is to be made in the risk evaluation to be carried out by the machine manufacturer.

There are also other types of machines, however, that should use a solenoid interlock instead of a safety switch despite rapid stopping movements, i those with invisible hazards (toxic atmospheres, high voltage, ionised radiation). In general, the decision whether to use a safety switch with or without guard locking can be presented as described in ISO 14119:

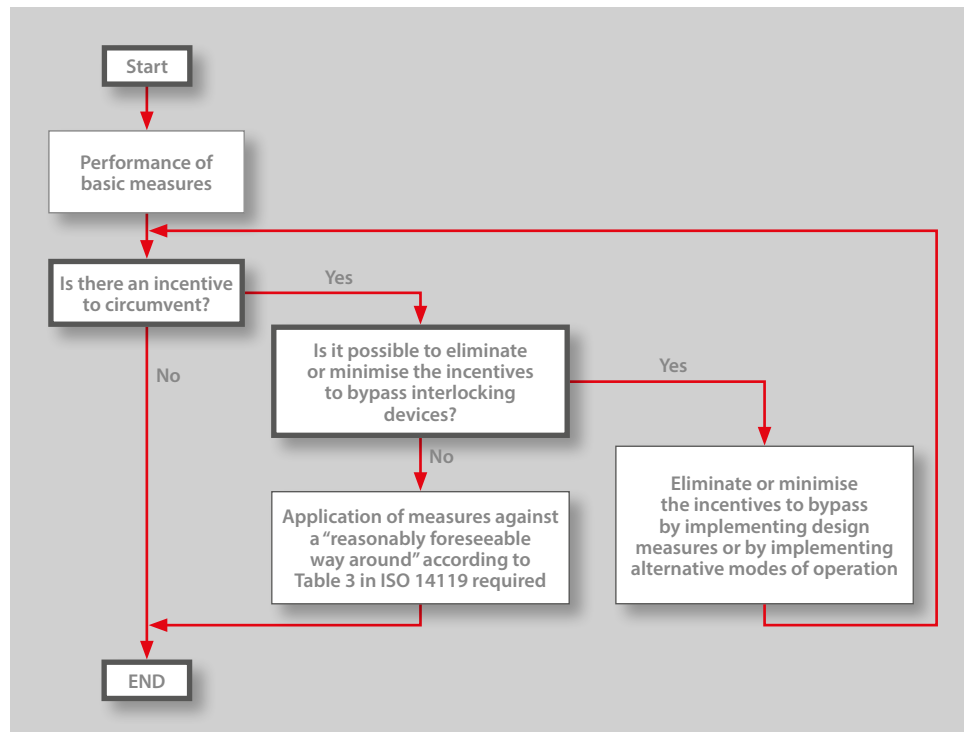


For the calculation of the access time, ISO 13855 should be used (Arrangement of protective devices with regard to approach speeds of body parts) should be consulted.

## Protection against defeating

The defeating of safety devices is to be distinguished from errors – even if in both cases the desired safety function is not carried out. Manipulation is the deliberate “disabling” of safety devices. Of course, this must be avoided at all costs (because the manipulation of safety devices very often results in hazards that can lead to injuries or even death of the machine operator).

Precisely because of the danger of manipulation, the ISO 14119 standard has an additional chapter on reducing the possibilities of circumvention. The aim is first of all to determine whether there are any incentives for manipulation at all. If the machine manufacturer finds that there are, appropriate countermeasures are suggested, e.g. different coding levels of actuators, non-detachable fastenings, etc.



## Fault masking

In addition to impermissible manipulation, there is also the problem of error masking with the series connection of mechanical contacts. Since not all possible faults can be excluded, it is at least necessary to ensure that faults are detected. But even this is not always possible.

For example, in a series connection of electromechanical safety contacts, it is not always possible to detect the faults beyond doubt and then also to switch them off: a fault in one safety contact can be overwritten, i.e. reset, by actuating another safety contact connected in series. This so-called error masking is critical in that a dangerous situation can arise from a second error.

For a more detailed description of this issue, please find an explanatory video under this QR code:

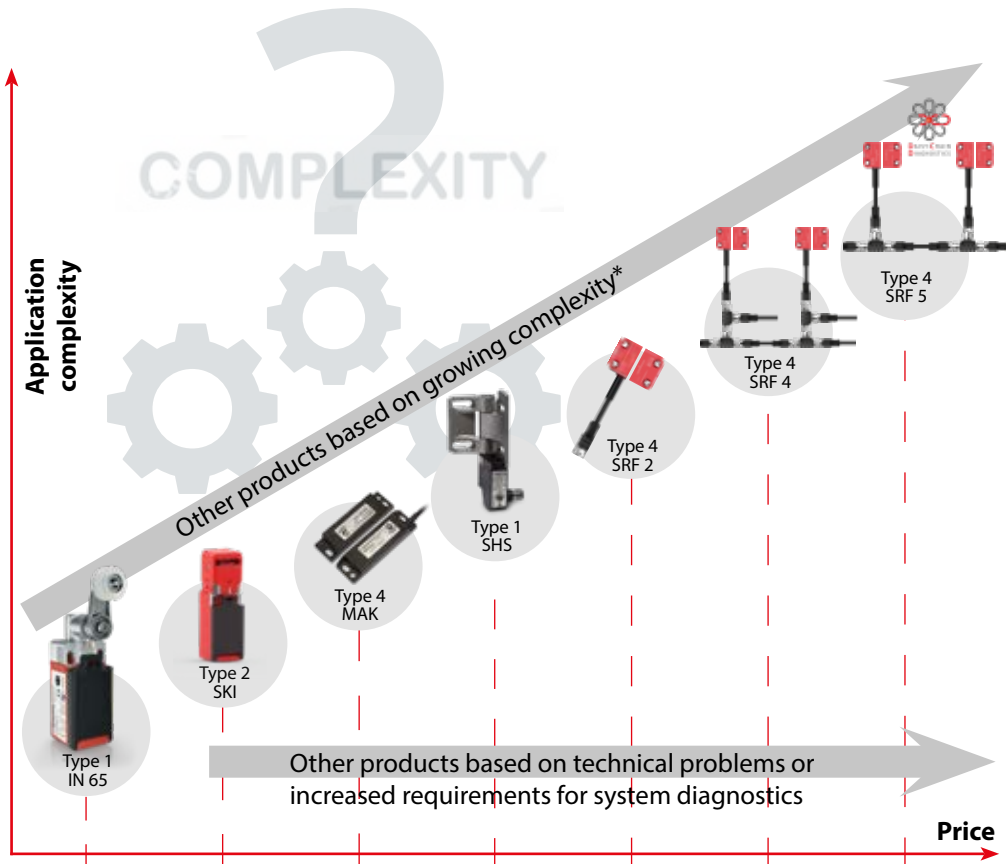


Click here for the video

In order to avoid this type of error masking, the standard setter has created the Technical Report TR24199, which addresses the issue but also provides corresponding recommendations for action. As the series connection of electromechanical safety contacts generally results in a PL max. of PL c, this is not always sufficient. An alternative solution in this event is to switch to electronic solutions – keyword: Smart Safety System, see pages 68 – 71 (SRF-5 and 4).

# Selection according to application requirements and environmental conditions

How complex is your application?  
 What is the minimum requirement a BERNSTEIN product must fulfil for you?



\* Complexity also means: Consciously using/employing added value of the product

**BERNSTEIN AG's product range of safety switches and sensors includes a large number of very different products, all of which have the same task: The safe detection of an open door or bonnet.**


**There are two main reasons for this variety of different safety switches/sensors:**

- 1 Machines and their protective devices such as doors and bonnets can be very different in many respects. These differences lie, for example, in the required performance level or protection against manipulation, but also the environmental conditions such as temperature or cleanability can lead to different products depending on the application. Reasons such as installation space or design can also strongly affect the selection.
- 2 In addition to safe door monitoring, the products can also offer other features that add value to the machine, such as the SHS3, which immediately provides the required hinge, or the diagnostic function of the SRF-5, which provides a wide range of application and sensor information and thus facilitates effective fault detection and leads to more efficient machines.

# Selection according to application requirements and environmental conditions

This overview helps you decide which product is the right choice for your application.

Design according to ISO 14119 and product example

Application request	Type 1 IN65	Type 2 SKI	Type 4 MAK	Type 1 SHS	Type 4 SRF 2	Type 4 SRF 4	Type 4 SRF 5
High pollution	⊗	⊗	✓	✓	✓	✓	✓
Simple alignment from the actuator	⊗	⊗	⊗	✓	✓	✓	✓
Occurrence of shocks and/or vibrations	✓	✓	⊗	✓	✓	✓	✓
Occurrence of voltage and/or current peaks	✓	✓	⊗	✓	✓	✓	✓
Series connection in PL d, PL e	⊗	⊗	⊗	⊗	⊗	✓	✓
Safeguarding invisible dangers	⊗	⊗	✓	⊗	✓	✓	✓
Manipulation protection	⊗	⊗	⊗	✓	✓	✓	✓
Status information/ diagnostic option 	⊗	⊗	⊗	⊗	⊗	⊗	✓
Material and time savings with high PL	⊗	⊗	⊗	⊗	⊗	✓	✓
Protection class IP69 (only with cable)	⊗	⊗	⊗	⊗	✓	✓	✓
No special magnetic switch evaluation necessary	✓	✓	⊗	✓	✓	✓	✓
Avoiding unexpected stops	⊗	⊗	⊗	⊗	✓	✓	✓

✓ well suited      ⊗ limited suitability      ⊗ not suitable

At first glance, selecting a safety switch/sensor does not appear to be a problem. You take the one you know or is already in stock and screw it on. However, as is so often the case, the devil is in the detail.

On the one hand, standards such as ISO 13849 and ISO 14119 contain specifications that must be observed. These include fastening, environmental conditions, Manipulation protection, the required performance level and much more.

On the other hand, the correct selection of the most suitable product can also have economic benefits.

For example, the correct selection facilitates a simpler construction that is significantly cheaper. Furthermore, products can be used that offer additional added value through their additional status information.

One example is the RFID "SRF-5" sensor. The status information can make the machine more efficient and significantly reduce machine downtime, making it a much more economical choice.

## Fault exclusion

Of course, not all possible fault can be avoided. Nevertheless, fault consideration must also stop at some point if one wants to arrive at a reasonable and economically justifiable result/conclusion. Therefore, the fault consideration typically ends after the first subsequent fault.

Furthermore, certain faults must simply be excluded. One such typical fault that must and may be excluded with good reason, e.g. through appropriate design measures, is the actuator break of a safety switch with separate actuator.

Any exclusion of a defect must be documented and well justified. The many tables of permissible fault exclusions in ISO 13849-2 and the conditions that must be met for such exclusions can help. For example, the non-opening of switch contacts may be excluded if the switches are positively opening (Table D.8 in ISO 13849- 2:2013).

## Verification

Verification provides evidence that the determined required PLr has been achieved for the corresponding safety function.

The methodology for determining the PLr is described in ISO 13849-1 and includes all components of a safety function, from the sensors to the logic to the actuators and their structural design.

## Validation

The validation process uses tests and analyses to prove that the relevant system meets the requirements of ISO 13849-1. Among other things, the following points must be taken into account:

- the specified safety characteristics of the safety functions
  
- the requirements for the specified performance level
  - the requirements for the specified category
  - the measures for control and prevention of systematic failures
  - the software requirements, if any
  - the ability to perform a safety function under the expected environmental conditions
  
- the ergonomic design of the user interface, e.g. so that the user is not tempted to act in a dangerous way, e.g. by bypassing the SRP/CS

## User information

In the last level of risk reduction, the operating instructions of the machine must point out the remaining residual risks that remain despite inherent design and technical protective measures.

# SMART Safety System

## SMART Safety by BERNSTEIN

Consisting of a wide range of components, the **SMART Safety System** is your scalable solution for the complete safeguarding of machines and plants of any size. The SMART Safety System **protects people, machines and processes**. And not only that - thanks to the patented Daisy Chain diagnostic system, every connected device provides comprehensive diagnostic data. This applies not only to **electronic components**, but also to any **mechanical safety components** you may have, which can easily be integrated into the series connection.

## Ready for Industry 4.0

BERNSTEIN has consistently thought ahead with the SMART Safety System. It offers you a large selection of safety switches and sensors. Select exactly the components you need. This is how you create your own individual system.

- Series connection of safety components
- Minimal wiring effort
- Integration of mechanical switches possible

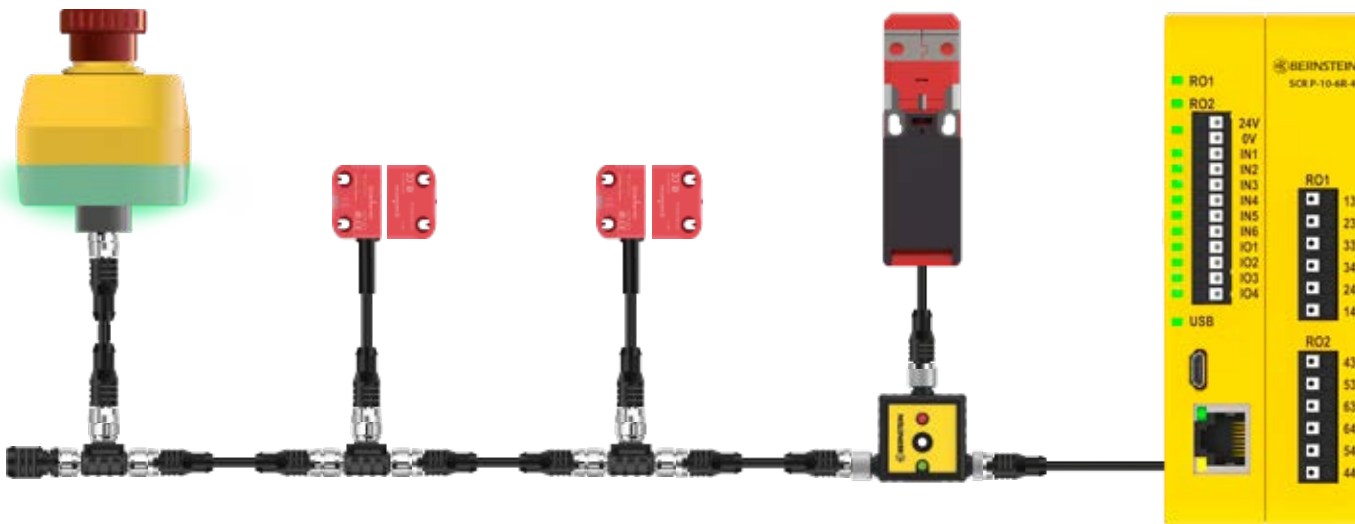
## Diagnostic system DCD

The Daisy Chain Diagnostic (DCD) system provides a wide range of information that makes machines more efficient by avoiding downtimes.

Components that support the DCD system are sensors (SRF-5), the emergency stop SEU, safety relays with DCD function, the smart T-adaptor and the SCx and SCR P safety controllers.

The data of each participant is collected in the SCR (or stand-alone diagnostic device) and can be output via different interfaces output – via

- IO-Link to a control unit
- USB to a laptop
- NFC to a smartphone
- Ethernet



DAISY CHAIN  
DIAGNOSTICS

## Everything for your SMART Factory

With our **wide range** of safety components, the SMART Safety System is always **individual** – specially adapted to your wishes and requirements. For example, if a machine is equipped with our SRF non-contact safety sensors and/or SEU emergency stop switches, a series-switchable variant is very often chosen. This **reduces the wiring effort** and the **cost** of the system.

### ● Intelligent diagnostic system

Everything in view: with our intelligent DCD diagnostic system, you receive comprehensive diagnostic data on all the installed components of your system. Sources of faults can be identified immediately.

- Identify sources of faults quickly and easily
- Minimise service costs
- Diagnostic data available for each connected unit

### ● Predictive maintenance

Service before service: thanks to the continuous analysis by the DCD, necessary maintenance work is indicated to you at an early stage. Unplanned downtimes can thus be avoided.

- Proactive maintenance thanks to diagnostic data
- Minimisation of default risks
- Higher productivity

### ● High performance level

Highest reliability: the system is designed with and for your safety. Thanks to the electronic components in the series connection, it is possible to achieve a high performance level (up to PL e).

- up to PL e
- Avoid downtimes
- Minimise failures



# SMART Safety System

## Smart security technology at all levels – your connection options

A system with many individually selectable components. With our connection options for the SMART Safety System, you receive a smart complete system for safeguarding your machines and plants on request. The system is also regularly supplemented with additional components. Feel free to make up your mind.

### Contactless safety technology



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### DCD interfaces for the integration of mechanical switches



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### Diagnostic modules



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### Emergency stop devices



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### Safety relays and controllers, e.g. with integrated diagnostic module



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### Accessories



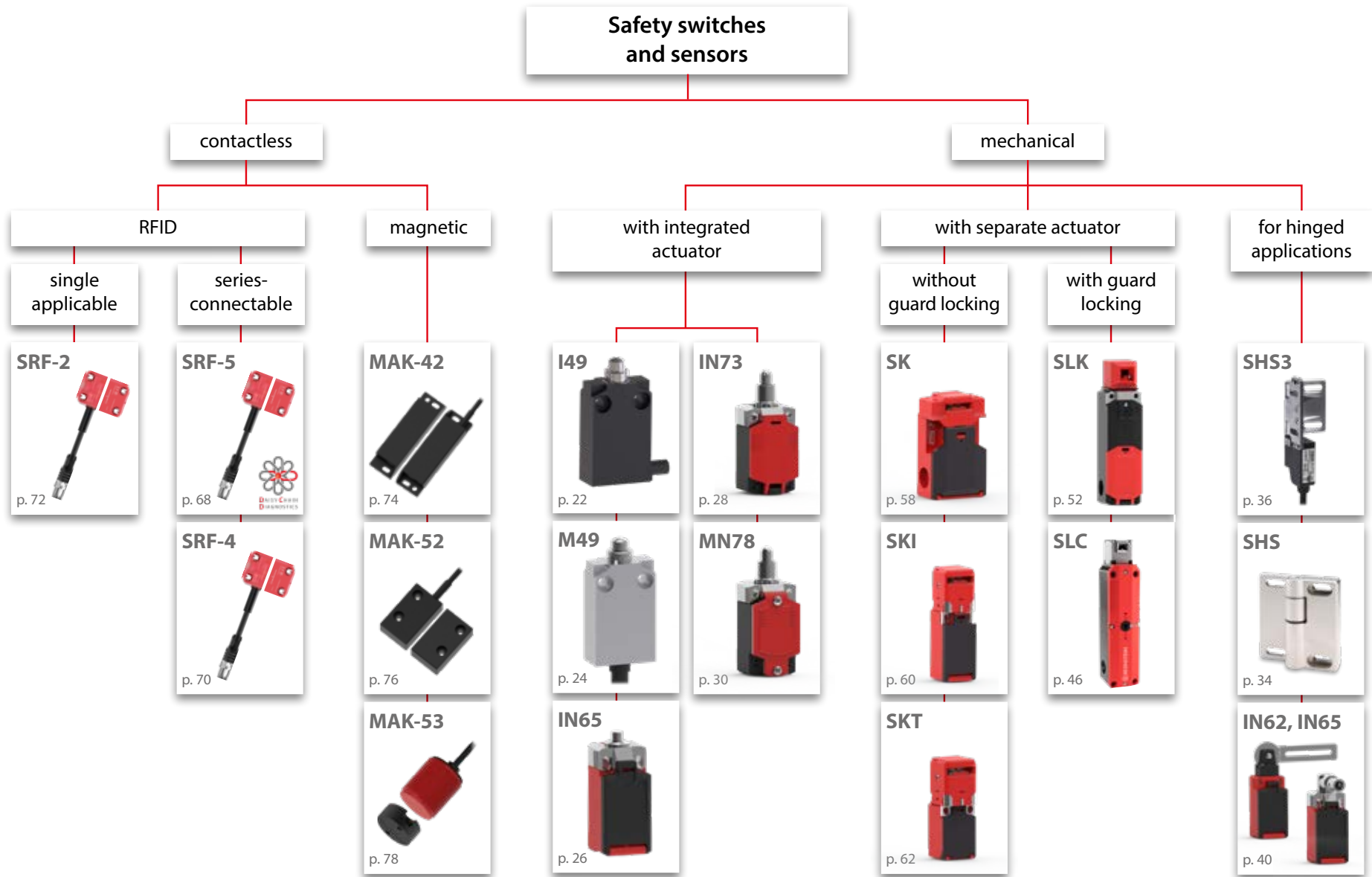
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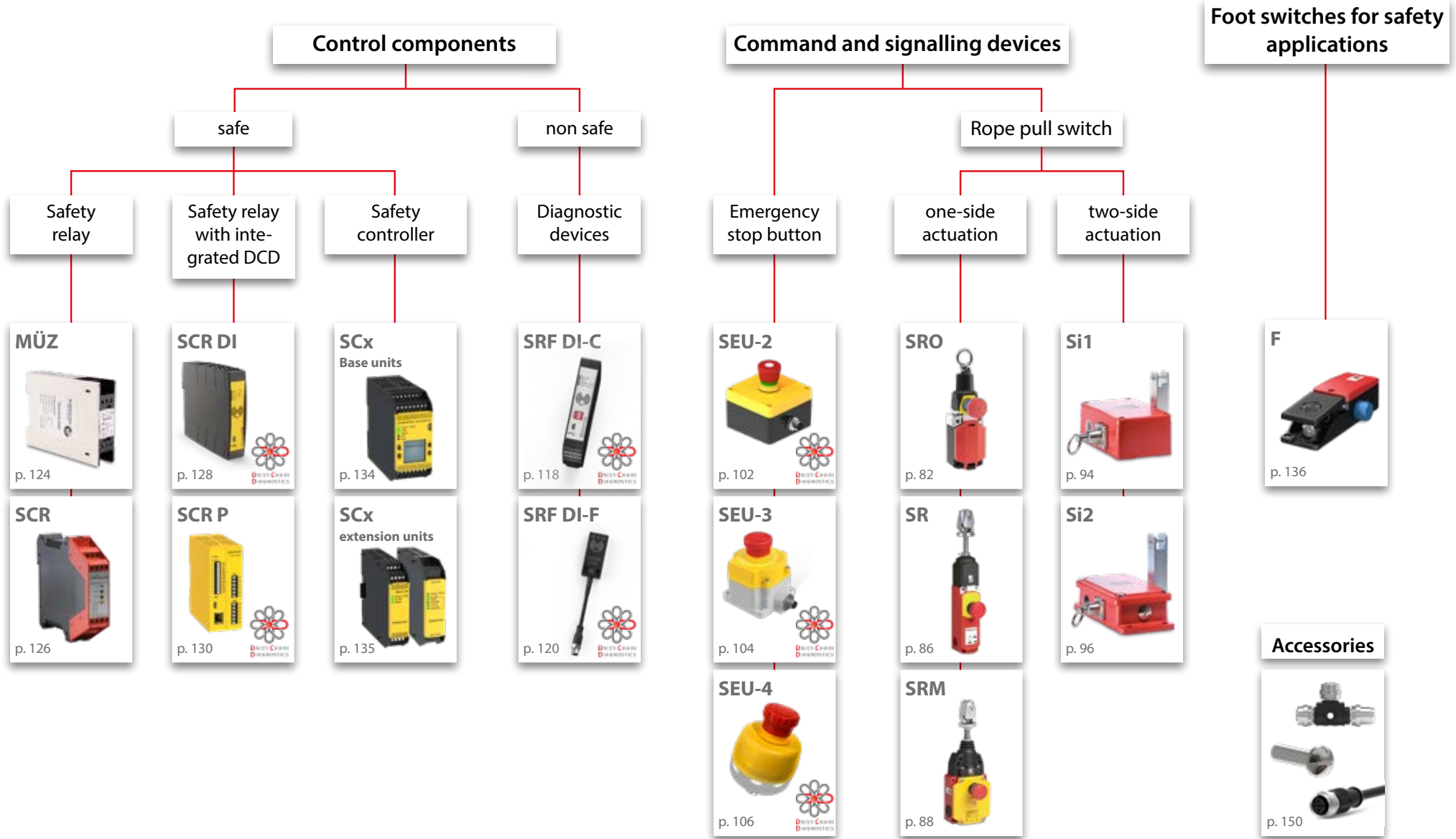





# The BERNSTEIN safety world



# The BERNSTEIN safety world



 The Daisy Chain Diagnostic (DCD) system provides a wealth of information designed to make machinery and equipment more efficient by avoiding downtime and transmitting data for more effective use.

# Type 1 Safety switches with integrated actuator



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## **Especially for safety monitoring and position detection**

Limit switches made of plastic and limit switches made of metal have been specially developed for safety monitoring and position detection under various conditions. The product portfolio of our position switches and safety switches covers all areas, from confined spaces to humid environments.



# Position switches plastic I49



## MANY BENEFITS AT A GLANCE

- Flat design, compact construction
- Easy and quick installation due to pre-installed, 1 m long connection cable
- Variants with front mounting available
- Side or straight cable outlet
- High protection class IP67
- Suitable for safety applications according to IEC 60947-5-1 (positive opening)

## Technical data

### Electrical data

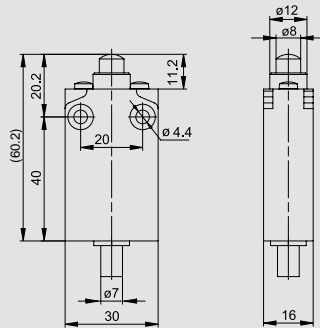
Design insulation voltage	$U_i$ max.	400 V AC
Conventional thermoelectric current	$I_{the}$	10 A
Rated operating voltage	$U_e$ max.	240 V
Utilisation category		AC-15 240 V - 3 A DC-13, 24 V - 2.8 A
Protection class		II, protective insulation

### Mechanical data

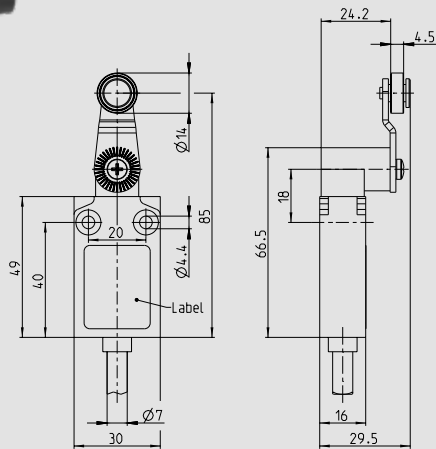
Ambient temperature		-25°C to +70°C (connecting cable firmly wired)
Mechanical lifetime		10 x 10 <sup>6</sup> switching cycles
Switching frequency		≤ 60/min.
B10d NC Contact cycles (up to) <sup>①</sup>		20 Mio.
Type of connection		Cable 4 x 0.75 mm <sup>2</sup>
Protection class		IP67 conforming to EN 60529

① Depending on switching system and actuator (applicable values in data sheet)

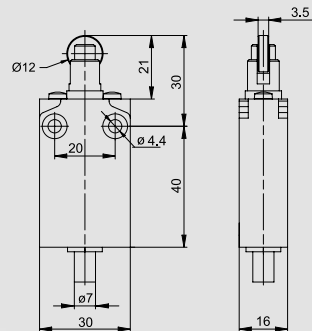
IW



AH



RIW



Product selection

Article number	Designation	Contact configuration	Function
6089152058	I49-SU1Z IW Z	1NC/1NO	Snap action
6089102059	I49-U1Z IW Z	1NC/1NO	Slow action
6089802070	I49-A2Z IW Z	2NC	Slow action
6089185066	I49-SU1Z AH Z	1NC/1NO	Snap action
6089135067	I49-U1Z AH Z	1NC/1NO	Slow action
6089835073	I49-A2Z AH Z	2NC	Slow action
6089167060	I49-SU1Z RIW Z	1NC/1NO	Snap action
6089117061	I49-U1Z RIW Z	1NC/1NO	Slow action
6089817071	I49-A2Z RIW Z	2NC	Slow action

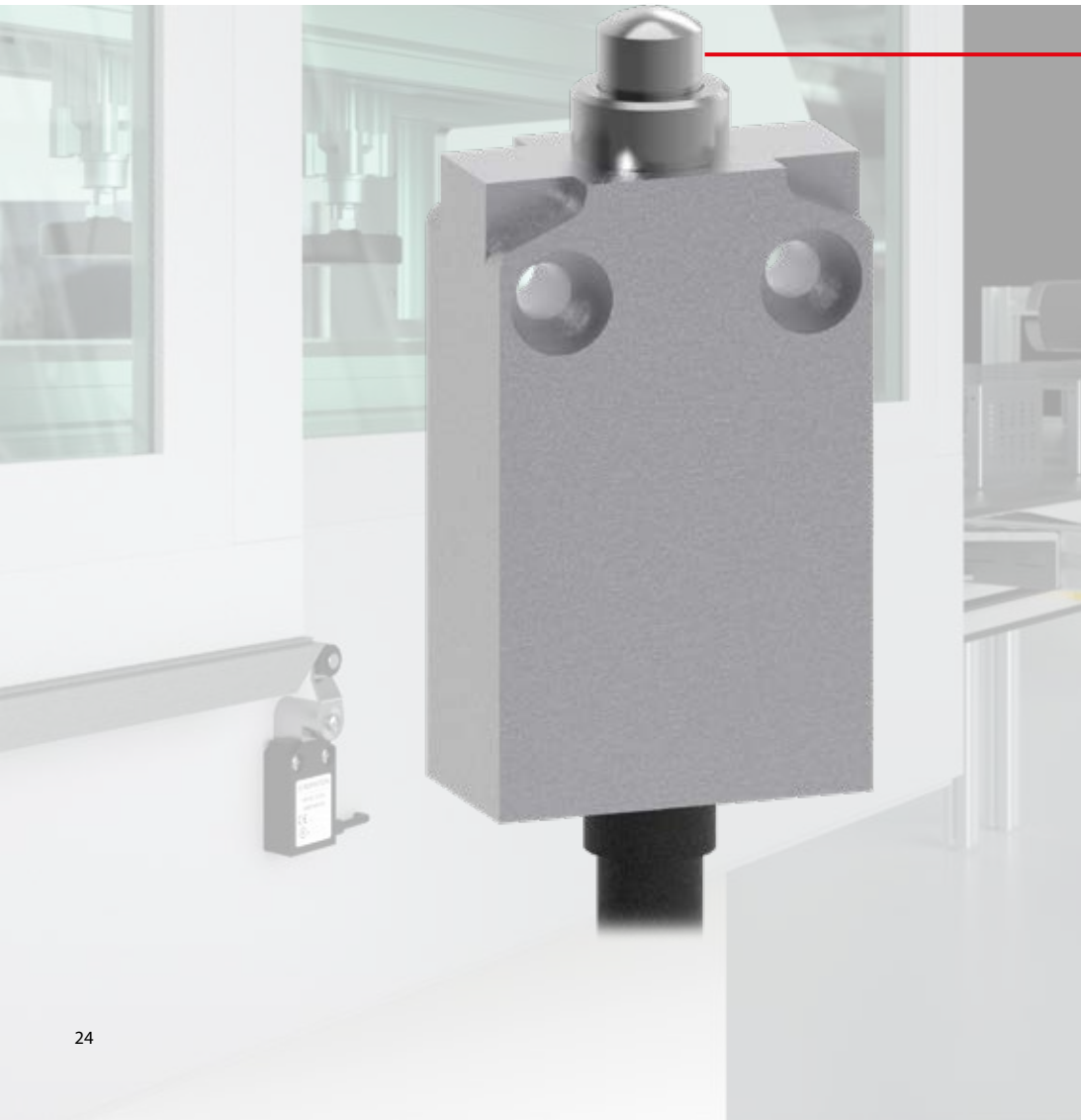


Options

- Different cable lengths available on request
- M12 plug connection

Further switch variants can be found in the BERNSTEIN catalogue "Position Switches and Sensors".

# Position switch metal M49



## MANY BENEFITS AT A GLANCE

- Flat design, compact construction
- Easy and quick installation due to pre-installed, 1 m long connection cable
- Variants with front mounting available
- Side or straight cable outlet
- High protection class IP67
- Suitable for safety applications according to IEC 60947-5-1 (positive opening)

## Technical data

### Electrical data

Design insulation voltage	$U_i$ max.	400 V AC
Conventional thermoelectric current	$I_{the}$	10 A
Rated operating voltage	$U_e$ max.	240 V
Utilisation category		AC-15, 240 V/3 A; DC-13, 24 V/2,8 A
Protection class		Protection class I/protective earth

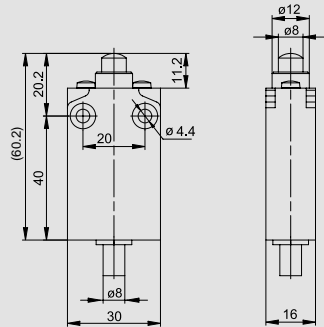
### Mechanical data

Ambient temperature		-25°C to +70°C (connecting cable firmly wired)
Mechanical lifetime		10 x 10 <sup>6</sup> switching cycles
Switching frequency		≤ 60/min.
B10d NC Contact cycles (up to) <sup>①</sup>		20 Mio.
Type of connection		Cable 5 x 0.75 mm <sup>2</sup>
Protection class		IP67 conforming to EN 60529

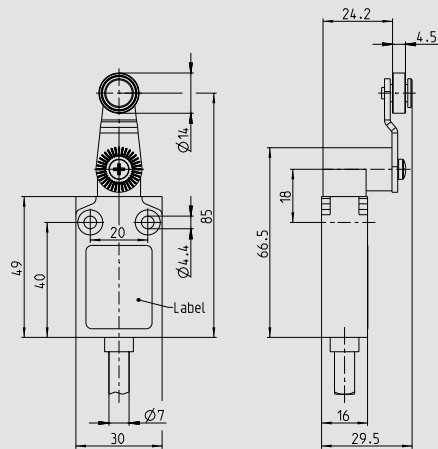
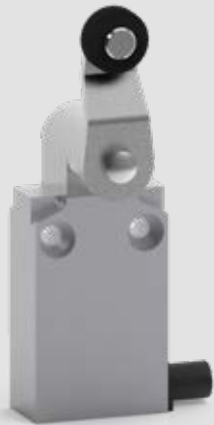
① Depending on switching system and actuator (applicable values in data sheet)



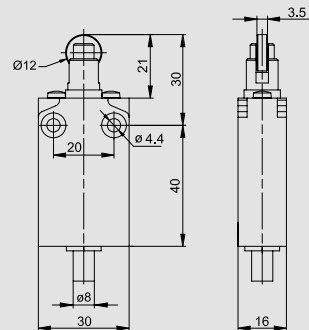
IW



AH



RIW



Product selection

Article number	Designation	Contact configuration	Function
6023000002	M49-SU1Z IW Z	1NC/1NO	Snap action
6023000004	M49-U1Z IW Z	1NC/1NO	Slow action
6023000006	M49-A2Z IW Z	2NC	Slow action
6023000074	M49-SU1Z AH Z	1NC/1NO	Snap action
6023000076	M49-U1Z AH Z	1NC/1NO	Slow action
6023000078	M49-A2Z AH Z	2NC	Slow action
6023000020	M49S-SU1Z RIW Z	1NC/1NO	Snap action
6023000022	M49-U1Z RIW Z	1NC/1NO	Slow action
6023000024	M49-A2Z RIW Z	2NC	Slow action



Options

- Different cable lengths available on request
- M12 plug connection

Further switch variants can be found in the BERNSTEIN catalogue "Position Switches and Sensors".

# Position switch plastic IN65



## MANY BENEFITS AT A GLANCE

- Highest reliability at low currents (1 mA/24VDC)
- Actuator and parts of the cover made of metal
- Tool-free rotation (8 x 45°) and changing of the actuators
- Standard switch and standard actuator conforming to EN 50047
- Protection class IP66 und IP67 conforming to IEC 60529

## Technical data

### Electrical data

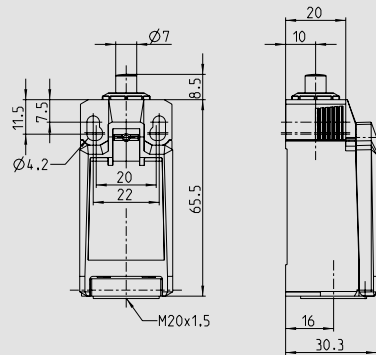
Design insulation voltage	$U_i$ max.	400 V AC
Conventional thermoelectric current	(up to) $I_{the}$	5 A
Rated operating voltage	$U_e$ max.	240 V AC / 24 V DC
Utilisation category (up to)		AC-15, $U_e/I_e$ 240 V/3 A DC-13 $U_e/I_e$ 24 V/1,5 A
Protection class		II, protective insulation

### Mechanical data

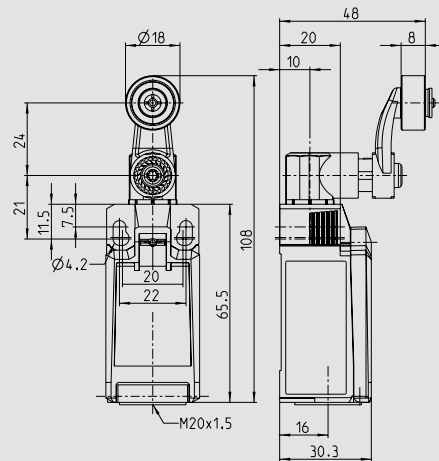
Enclosure material	Thermoplastics, glass-fibre reinforced (UL 94-V0)
Ambient temperature	-30 °C to +75 °C
Mechanical lifetime (up to)	$30 \times 10^6$ switching cycles
Switching frequency	$\leq 60$ /min.
B10d NC Contact cycles (up to) <sup>①</sup>	20 Mio.
Protection class	IP66/IP67 according to EN 60529

① Depending on switching system and actuator (applicable values in data sheet)

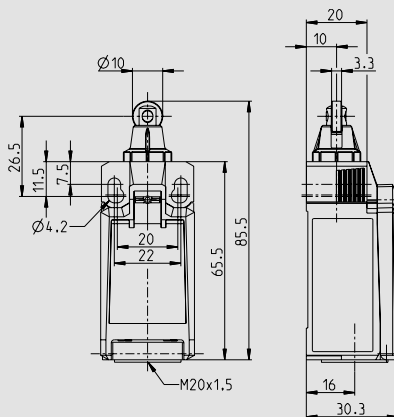
SM



AHK



RK



Product selection

Article number	Designation	Contact configuration	Function
6083000207	IN65-SU1Z SM	1NC/1NO	Snap action
6083000208	IN65-U1Z SM	1NC/1NO	Slow action
6083000210	IN65-A2Z SM	2NC	Slow action
6083000235	IN65-SU1Z AHK	1NC/1NO	Snap action
6083000236	IN65-U1Z AHK	1NC/1NO	Slow action
6083000238	IN65-A2Z AHK	2NC	Slow action
6083000214	IN65-SU1Z RK	1NC/1NO	Snap action
6083000215	IN65-U1Z RK	1NC/1NO	Slow action
6083000217	IN65-A2Z RK	2NC	Slow action



Options

- Available with M12 connector
- Assembled with customised cables and connectors on request

Further switch variants can be found in the BERNSTEIN catalogue "Position Switches and Sensors".

# Position switch plastic IN73



## MANY BENEFITS AT A GLANCE

- High reliability at low currents (1 mA/24 VDC)
- Up to 4 contacts
- Actuator and installation collar with mounting holes made of metal
- Tool-free rotation (8 x 45°) and changing of the actuators
- Standard switch and standard actuator according to EN 50041
- Protection class IP66 and IP67 according to IEC 60529

## Technical data

### Electrical data

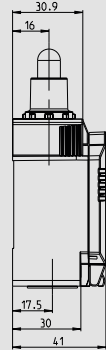
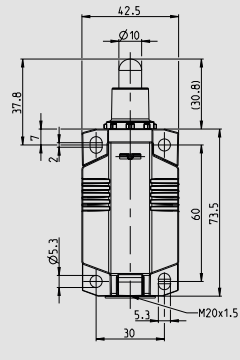
Design insulation voltage	$U_i$ max.	400 V AC
Conventional thermoelectric current	(up to) $I_{the}$	5 A
Rated operating voltage	$U_e$ max.	240 V AC
Utilisation category (up to)		AC-15, $U_e/I_e$ 240 V/3 A DC-13 $U_e/I_e$ 24 V/1.5 A
Protection class		II, protective insulation

### Mechanical data

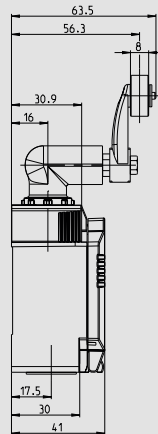
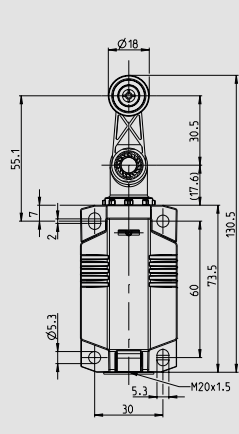
Enclosure/Cover material	Thermoplastics, glass-fibre reinforced (UL 94-V0)
Ambient temperature	-30 °C to +75 °C
Mechanical lifetime (up to)	$10 \times 10^6$ switching cycles
Switching frequency	$\leq 60$ /min.
B10d NC Contact cycles (up to) <sup>①</sup>	20 Mio.
Protection class	IP66/IP67 according to EN 60529

① Depending on switching system and actuator (applicable values in data sheet)

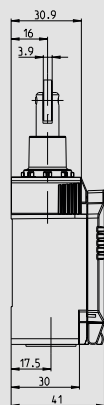
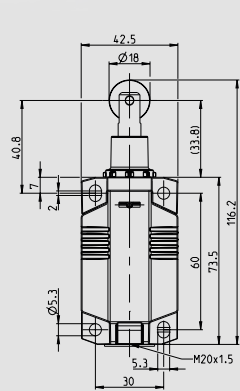
SM



AHK



RM



Product selection

Article number	Designation	Contact configuration	Function
608100001	IN73-S11 SM	1NC/1NO	Snap action
608100002	IN73-11 SM	1NC/1NO	Slow action
608100004	IN73-20 SM	2NC	Slow action
608100061	IN73-S11 AHK	1NC/1NO	Snap action
608100062	IN73-11 AHK	1NC/1NO	Slow action
608100064	IN73-20 AHK	2NC	Slow action
608100013	IN73-S11 RM	1NC/1NO	Snap action
608100014	IN73-11 RM	1NC/1NO	Slow action
608100016	IN73-20 RM	2NC	Slow action



Options

- Available with M12 connector
- Assembled with customised cables and connectors on request

Further switch variants can be found in the BERNSTEIN catalogue "Position Switches and Sensors".

# Position switch metal MN78



## MANY BENEFITS AT A GLANCE

- Standard switch according to EN 50041, standard actuator according to EN 50041
- Protection class IP66 and IP67 conforming to IEC 60529
- Enclosure: Die-cast aluminium
- Cover: Aluminium
- Actuator rotatable by  $8 \times 45^\circ$
- Cable entry M20  $\times$  1.5

## Technical data

### Electrical data

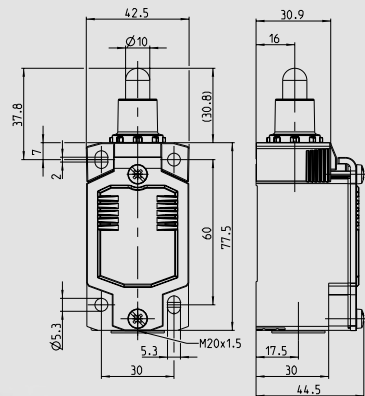
Design insulation voltage	$U_i$ max.	400 V AC
Conventional thermoelectric current	(up to) $I_{the}$	5 A
Rated operating voltage	$U_e$ max.	240 V AC/24 V DC
Utilisation category (up to)		AC-15, $U_e/I_e$ 240 V/3 A DC-13 $U_e/I_e$ 24 V/1.5 A
Protection class		Protection class I/Protective conductor

### Mechanical data

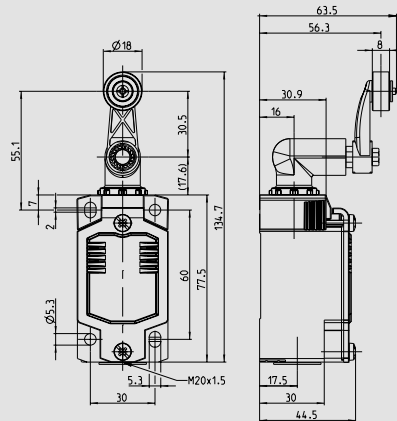
Enclosure material	Metal, glass-fibre reinforced (UL 94-V0)
Ambient temperature	$-30^\circ\text{C}$ to $+75^\circ\text{C}$
Mechanical lifetime (up to)	$10 \times 10^6$ switching cycles
Switching frequency	$\leq 60/\text{min.}$
B10d NC Contact cycles (up to) <sup>①</sup>	20 Mio.
Protection class	IP66/IP67 according to EN 60529

① Depending on switching system and actuator (applicable values in data sheet)

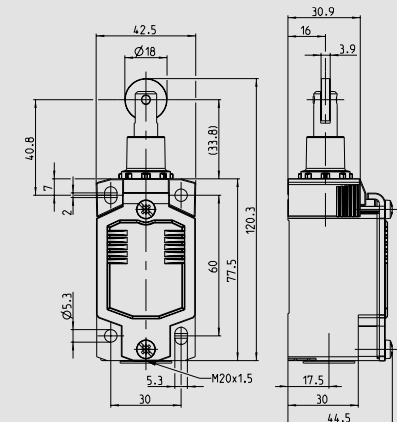
SM



AHK



RM



Product selection

Article number	Designation	Contact configuration	Function
6087000001	MN78-S11 SM	1NC/1NO	Snap action
6087000002	MN78-11 SM	1NC/1NO	Slow action
6087000004	MN78-20 SM	2NC	Slow action
6087000061	MN78-S11 AHK	1NC/1NO	Snap action
6087000062	MN78-11 AHK	1NC/1NO	Slow action
6087000064	MN78-20 AHK	2NC	Slow action
6087000013	MN78-S11 RM	1NC/1NO	Snap action
6087000014	MN78-11 RM	1NC/1NO	Slow action
6087000016	MN78-20 RM	2NC	Slow action



Options

- Available with M12 connector
- Assembled with customised cables and connectors on request

Further switch variants can be found in the BERNSTEIN catalogue "Position Switches and Sensors".



# Safety switches type 1 for hinged applications



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Page 36



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## Secure locking by means of the hinge

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

The SHS and SHS3 combine a hinge and safety switch in one single functional unit. The safety guard is monitored directly in the hinge.



# Switch for hinged applications Safety switching hinge SHS



## MANY BENEFITS AT A GLANCE

- System up to performance level e:  
2 SHS, each equipped with a positively opening safety contact
- The angle range extends from 0° to 225°
- Safety device ensures positive locking after the switch has been set
- Pressure die-cast zinc enclosure

## Technical data

### Electrical data

Design insulation voltage	$U_i$	250 V
Rated operating voltage	$U_e$	230 V AC; 60 V DC
Conventional thermoelectric current	$I_{the}$	3 A
Utilisation category/Switching capacity		AC-15, 230 V/1.5 A ; DC-13, 60 V/0.5 A

### Mechanical data

Ambient temperature		-25°C to +70°C (Connection cable installed)
Mechanical lifetime		1 x 10 <sup>6</sup> switching cycles
Switching frequency max.		≤ 1200/h
B10d NC		2 x 10 <sup>6</sup> mill.
Protection class		IP67 according to IEC/EN 60529
Mechanical load		$F_{R1}$ = max. 1000N; $F_{R2}$ = 500N; $F_A$ = 750N

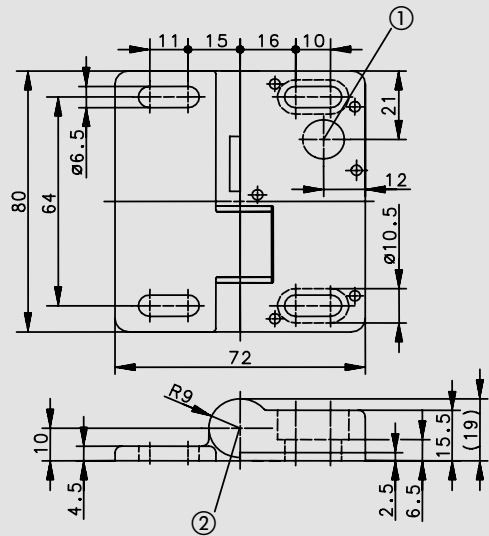
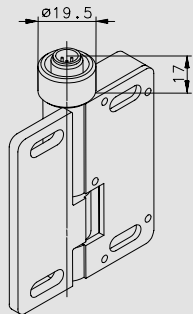


Illustration showing fixed pin and shearing bolt sheared off

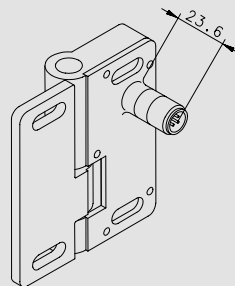
- ① Position of connection variant 2.
- ② Position of connection variant 1.

#### Connection variant 1



Connector M12 x 1, metal thread with anti-tamper facility

#### Connection variant 2



Connector M12 x 1

#### Product selection

Article number	Designation	Switching contact	max. switching voltage	Type of voltage	Connection type and direction		Required cable coupling/type
					radial	axial	
6019261017	SHS-A1Z-SA-BG	1NC	230 V	AC/DC		M12	1 A
6019261018	SHS-A1Z-SR-BG	1NC	230 V	AC/DC		M12	2 A
6019291013	SHS-OZ						



## Options

- Connector and fixed-cable connections in axial and radial (rear) connection direction
- You will find single-ended and double-ended cordsets under accessories (from page 152)
- One-way screws for fastening in accordance with EN ISO 14119 can be found from page 162 onwards.



# Switch for hinged applications Safety switching hinge **SHS3**



## MANY BENEFITS AT A GLANCE

- Flexibility and safety for use in hinged guards
- Protection class IP 67/IP 69K
- Freely and repeatedly adjustable switching point
- Switching point freely adjustable by user over a range of 270°
- Uncomplicated re-adjustment, including of set switching point by  $\pm 1.5^\circ$  thanks to integrated fine adjustment system
- Right and left-hinged systems possible for optimum cable routing

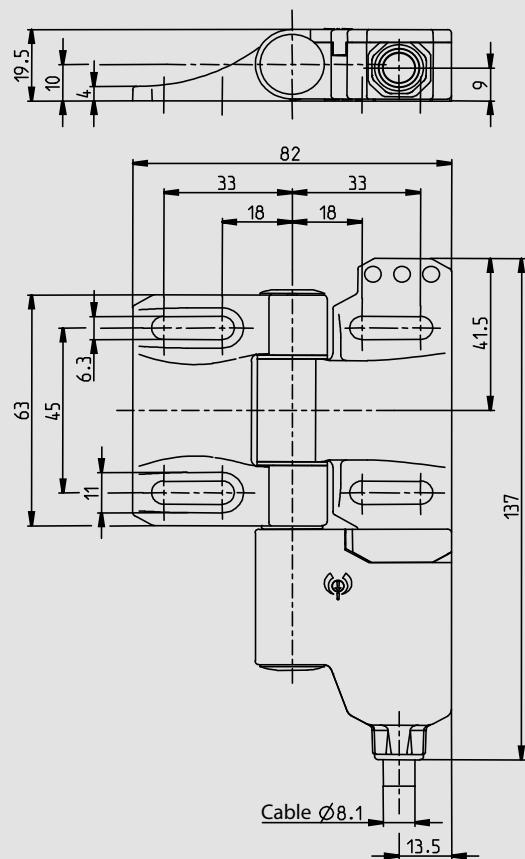
## Technical data

### Electrical data

Design insulation voltage	$U_i$	250 V
Rated operating voltage	$U_e$	240 V AC; 24 V DC
Conventional thermoelectric current	$I_{the}$	5 A (KA/KR); 4 A (SA/SR)
Utilisation category/Switching capacity		AC-15, 230 V/3 A; DC-13, 24 V/1 A

### Mechanical data

Ambient temperature	-25°C to +70°C (Connection cable installed)	
Mechanical lifetime	1 x 10 <sup>6</sup> switching cycles	
Switching frequency max.	≤ 300/h	
B10d NC	2 x 10 <sup>6</sup> mill.	
Protection class	IP67 according to IEC/EN 60529	
Mechanical load	Stainless steel: $F_{R1}$ = max. 1800 N; $F_{R2}$ = 750 N; $F_A$ = 1800 N Zinc die-cast: $F_{R1}$ = max. 1200 N; $F_{R2}$ = 500 N; $F_A$ = 1200 N	



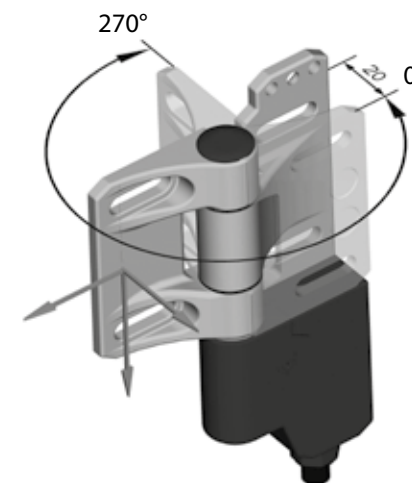
#### Product selection

Article number	Designation	Switching contact	max. switching voltage	Type of voltage	Connection type and direction	Material hinge	Cable coupling/ type	Mounting
<b>axial</b>								
6019490054	SHS3Z-U15Z-SA R	2NC/1NO	230 V	AC/DC	M12	die-cast zinc	D	right
6019490055	SHS3Z-U15Z-SA L	2NC/1NO	230 V	AC/DC	M12	die-cast zinc	D	left
6019490060	SHS3Z-A2Z-SA R	2NC	230 V	AC/DC	M12	die-cast zinc	E	right
6019490061	SHS3Z-A2Z-SA L	2NC	230 V	AC/DC	M12	die-cast zinc	E	left
6019490049	SHS3Z-Scharnier	(blank hinge)	230 V	AC/DC		die-cast zinc		both sides
6019390035	SHS3-U15Z-SA L	2NC/1NO	230 V	AC/DC	M12	stainless steel	D	left
6019390034	SHS3-U15Z-SA R	2NC/1NO	230 V	AC/DC	M12	stainless steel	D	right
6019390040	SHS3-A2Z-SA-R	2NC	230 V	AC/DC	M12	stainless steel	E	right
6019390041	SHS3-A2Z-SA-L	2NC	230 V	AC/DC	M12	stainless steel	E	left
6019390038	SHS3-Scharnier	(blank hinge)	230 V	AC/DC	M12	stainless steel	E	both sides



## Options

- Available with M12 connector
- Version with Ultra-Lock technology possible
- AS-Interface variants available
- In stainless steel also available as double hinge version with 2 switches
- You will find single-ended and double-ended cordsets under accessories (from page 152)
- One-way screws for fastening in accordance with EN ISO 14119 can be found from page 162 onwards.



# Accessories

## SHS3

### Change kit

#### Product selection

Article number	Designation
3991990161	SHS3-Change kit

For re-adjusting switching point  
Includes 2 replacement caps, 1 special bit, 1 plastic ring



### Installation tool

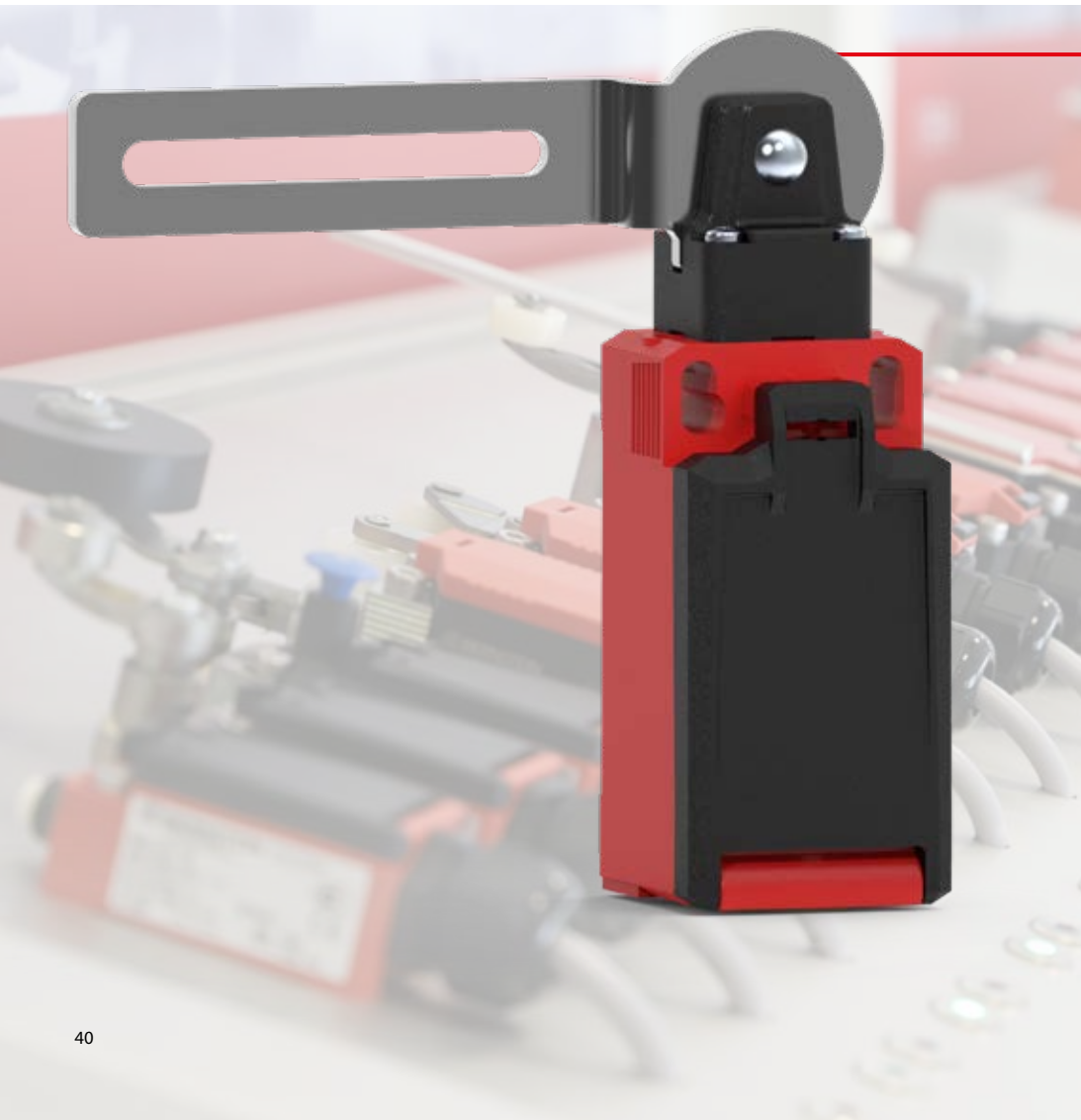
#### Product selection

Article number	Designation
191000005	Bit holder 1/4" flexible stem





# Switch for hinged applications IN62 – VKW/VKS



## MANY BENEFITS AT A GLANCE

- Standard switch conforming to EN 50047
- Highest reliability at low currents (1 mA)
- Protection class IP67
- Hinged snap-on cover

## Technical data

### Electrical data

Design insulation voltage	$U_i$ max.	400 V AC
Rated operating voltage	$U_e$ max.	240 V AC/24 V DC
Conventional thermoelectric current	(up to) $I_{the}$	5 A

Utilisation category (up to)	AC-15, $U_e/I_e$ 240 V/3 A DC-13 $U_e/I_e$ 24 V/1,5 A (B300 table A.1)
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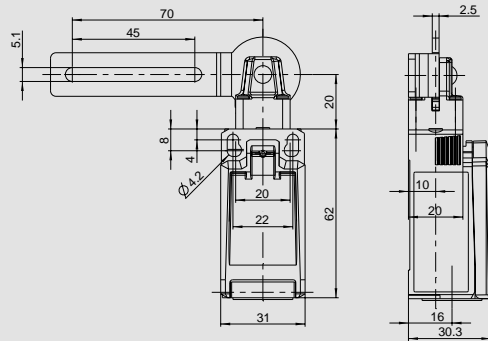
### Mechanical data

Enclosure material	Thermoplastics, glass-fibre reinforced (UL 94-V0)
Ambient temperature	-30 °C to +75 °C
Mechanical lifetime	$10 \times 10^6$ switching cycles
B10d NC Contact cycles (up to) <sup>①</sup>	20 million
B10d NO Contact cycles (up to) <sup>①</sup>	1 million
Switching frequency	≤ 60/min.
Type of connection	4 screwed connections (M3)
Conductor cross-sections	Single-wire 0.5 – 1.5 mm <sup>2</sup> or strand with wire-end ferrule 0.5 – 1.5 mm <sup>2</sup>
Cable entry	1 × M20 × 1,5
Protection class	IP67 according to EN 60529

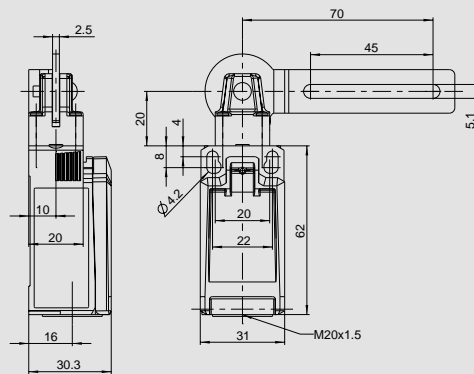
① Depending on switching system and actuator (applicable values in data sheet)



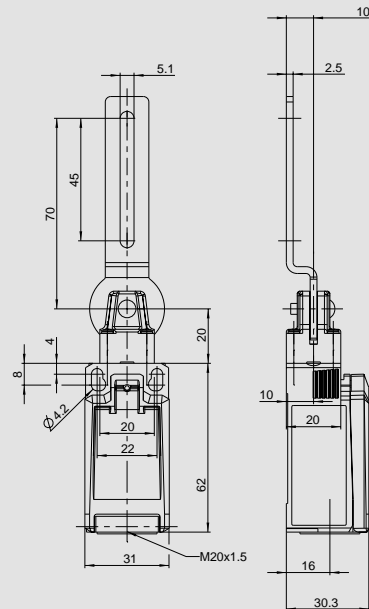
IN62-... VKW left



IN62-... VKW right

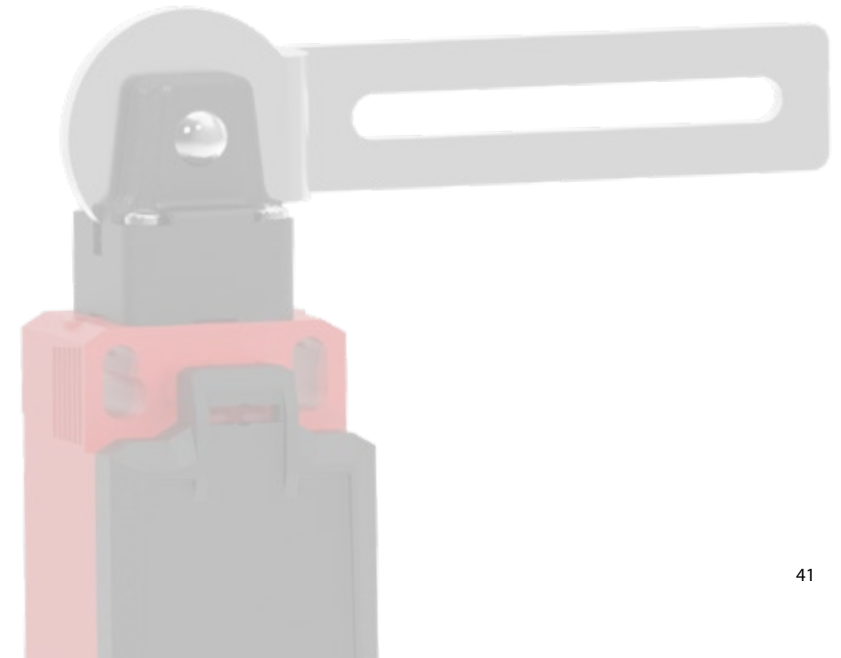


IN62-... VKS



Product selection

Article number	Designation	Contact configuration	Function
6083000393	IN62-U1Z VKW LI	1NC/1NO	Slow action
6083000396	IN62-A2Z VKW LI	2NC	Slow action
6083000392	IN62-U1Z VKW RE	1NC/1NO	Slow action
6083000394	IN62-A2Z VKW RE	2NC	Slow action
6083000395	IN62-SA2Z VKW RE	2NC	Snap action
6083000390	IN62-U1Z VKS	1NC/1NO	Slow action
6083000389	IN62-A2Z VKS	2NC	Slow action
6083000391	IN62-UV1Z VKS	1NC/1NO overlapping	Slow action



# Switch for hinged applications IN65 – AHDB



## MANY BENEFITS AT A GLANCE

- Standard switch conforming to EN 50047
- Highest reliability at low currents (1 mA)
- Protection class IP67
- Hinged snap-on cover

## Technical data

### Electrical data

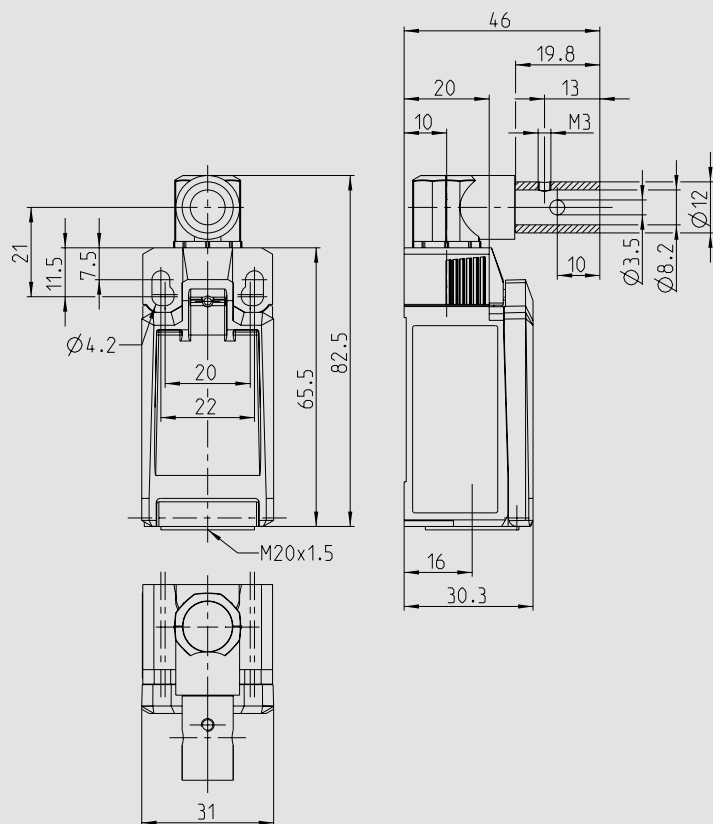
Design insulation voltage	$U_i$ max.	400 V AC
Rated operating voltage	$U_e$ max.	240 V AC/24 V DC
Conventional thermoelectric current	(up to) $I_{the}$	5 A

Utilisation category (up to)	AC-15, $U_e/I_e$ 240 V/3 A DC-13 $U_e/I_e$ 24 V/1,5 A (B300 table A.1)
------------------------------	--

### Mechanical data

Enclosure material	Thermoplastics, glass-fibre reinforced (UL 94-V0)
Ambient temperature	-30 °C to +75 °C
Mechanical lifetime	15 × 10 <sup>6</sup> switching cycles
B10d NC Contact cycles (up to) <sup>①</sup>	20 million
B10d NO Contact cycles (up to) <sup>①</sup>	1 million
Switching frequency	≤ 60/min.
Type of connection	4 screwed connections (M3)
Conductor cross-sections	Single-wire 0.5 – 1.5 mm <sup>2</sup> or strand with wire-end ferrule 0.5 – 1.5 mm <sup>2</sup>
Cable entry	1 × M20 × 1,5
Protection class	IP67 according to EN 60529

① Depending on switching system and actuator (applicable values in data sheet)



#### Product selection

Article number	Designation	Contact configuration	Function
6083000345	IN65-U1Z AHDB	1NC/1NO	Slow action
6083000347	IN65-A2Z AHDB	2NC	Slow action
6083000350	IN65-UV1Z AHDB	1NC/1NO overlapping	Slow action
6083000344	IN65-SU1Z AHDB	1NC/1NO	Snap action
6083000346	IN65-SA2Z AHDB	2NC	Snap action



Type 2

## Safety switch with separate actuator and guard locking



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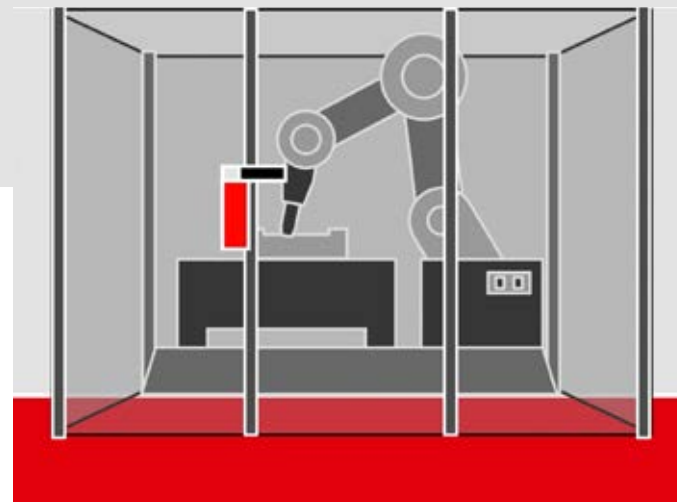
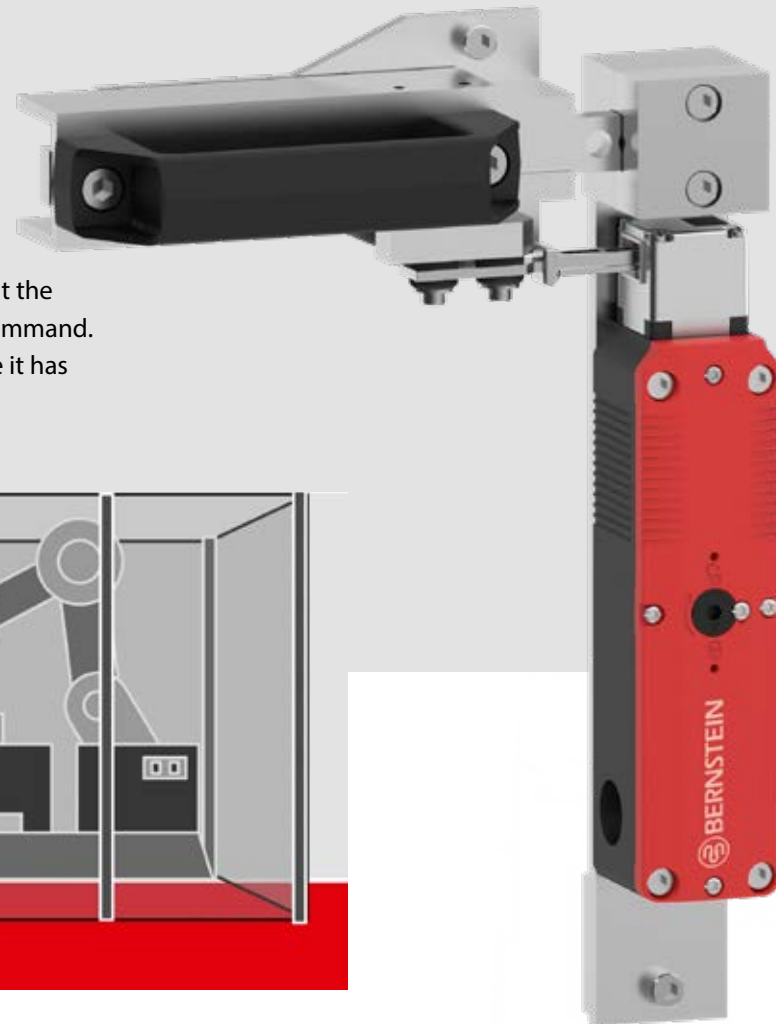


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## Safe guard locking

A special type of interlocking device with integrated locking function, whose task it is to mechanically hold the safety guard in the closed position until a safe state has been assumed.

The safety-related reason for using guard locking is to protect the machine operator from continuing danger despite a 'stop' command. The safety guard is only unlocked by the control system once it has determined that the machine is in a safe state.



# Mechanical guard locking SLC



## MANY BENEFITS AT A GLANCE

- Lightweight yet robust: a hybrid of metal and plastic
- Integrated manual release
- Five actuating positions
- Rotatable head (4×90°)
- Fail-safe guard locking system
- Optional emergency exit
- Optional emergency release
- M12 connector as an option

## Technical data

### Electrical data

#### Contact elements

Rated operating voltage $U_e$	240 V AC/24 V DC
Utilisation category	AC-15, $U_e/I_e$ 240 V/1.5 A (B300) DC-13, $U_e/I_e$ 24 V/1.5 A; 250 V/0.11 A (R300)

#### Electromagnet

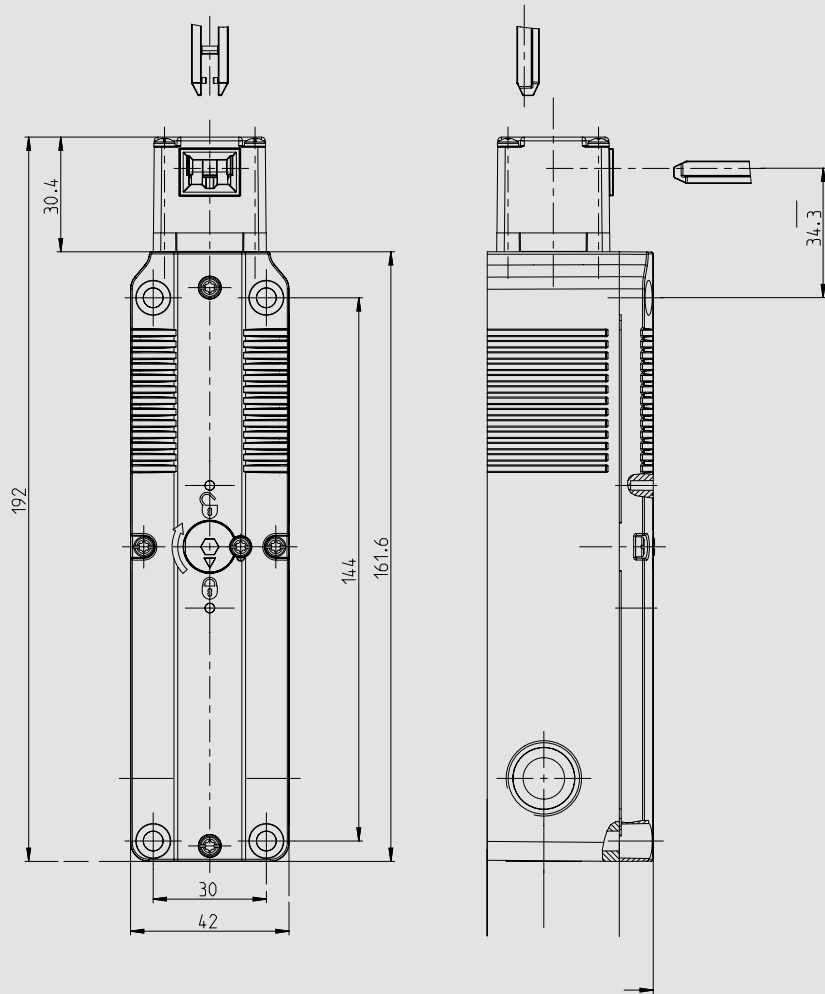
Operating voltage	24 V AC/DC or 120 V AC or 230 V AC
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### Mechanical data

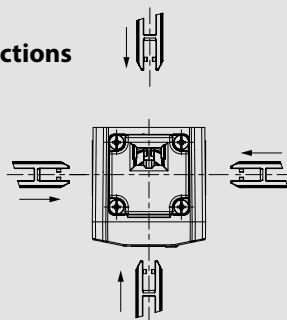
Material enclosure + cover	Thermoplastics, glass-fibre reinforced
Actuating device	metal
Holding force	1500 N (EN ISO 14119)
Ambient temperature	-25°C to +55°C
Protection class	IP67

### ID for safety engineering

B10d NC	2 × 10 <sup>6</sup> Cycles (EN ISO 13849-1) at 24V 100mA DC
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### Optional actuation directions



### Product selection

Article number	Designation	Guard locking principle	Contact configuration		Connection type*
			Door monitoring	Guard locking	
601820001	SLC-F-024-11/11-R4	Spring	1 NC/1 NO	1 NC/1 NO	Standard
601820007	SLC-F-024-20/20-R4	Spring	2 NC	2 NC	Standard
601820009	SLC-F-024-20/11-R4	Spring	2 NC	1 NC/1 NO	Standard
601820011	SLC-F-024-10/30-R4	Spring	1 NC	3 NC	Standard
601820012	SLC-F-024-30/10-R4	Spring	3 NC	1 NC	Standard
601820018	SLC-F-024-10/20-R4-01	Spring	1 NC	2 NC	M12, 8-pin
601820034	SLC-F-024-01/21-R4	Spring	1 NO	2 NC/1 NO	Standard
601820002	SLC-M-024-11/11-R4	Magnet	1 NC/1 NO	1 NC/1 NO	Standard
601820015	SLC-M-024-20/11-R4	Magnet	2 NC	1 NC/1 NO	Standard
601820017	SLC-M-024-20/20-R4	Magnet	2 NC	2 NC	Standard
601820033	SLC-M-024-10/20-R4-01	Magnet	1 NC	2 NC	M12, 8-pin
601820035	SLC-M-024-01/21-R4	Magnet	1 NO	2 NC/1 NO	Standard
601820036	SLC-M-024-30/10-R4	Magnet	3 NC	1 NC	Standard

Standard = \* 3 × M20 thread with closed housing wall

Other contact configurations and coil voltages of 230 V and 120 V are possible.



### Options

- 4 actuators for selection (page 48–49)
- Optional emergency unlocking (page 50)
- Optional escape release (page 50)
- Connection option with M12 connector
- You will find single-ended and double-ended cordsets under accessories (from page 152)
- One-way screws for fastening in accordance with EN ISO 14119 can be found from page 162 onwards.

The switch is not delivered with an actuator.

Please order the actuator separately (page 48–49).

# Actuator SLC

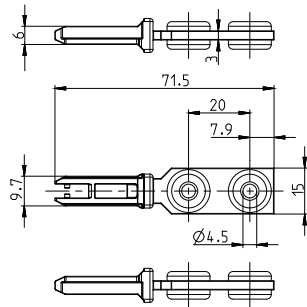
### Actuator ACS-1

Proven standard model among actuators.



#### Product selection

Article number	Designation
3911742390	ACS-1



#### Mechanical data

Actuator	Stainless steel (Niro)
Minimum actuating radius $R_{min}$	800 mm

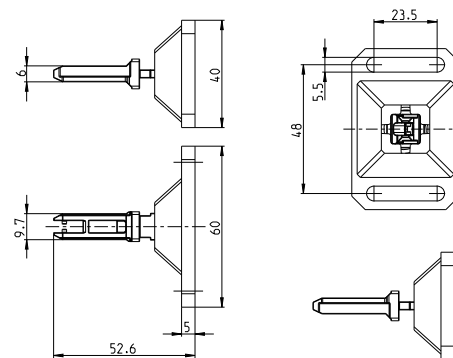
### Actuator ACF-1

Designed to provide an easy vertical/horizontal offset.



#### Product selection

Article number	Designation
3911742391	ACF-1



#### Mechanical data

Actuator	Stainless steel (Niro)
Enclosure	GD-Zn
Minimum actuating radius $R_{min}$	400 mm

When screwed on, the actuator can be turned in 90° steps by pressing it into the actuator enclosure.

The respective actuator is not included in the scope of delivery of the guard locking and must be ordered separately.

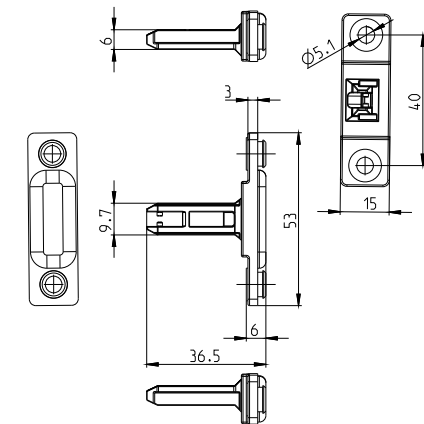
### Actuator ACC-1

The cross actuator for vertical/horizontal mounting.



#### Product selection

Article number	Designation
3911742392	ACC-1



#### Mechanical data

Actuator	Stainless steel (Niro)
Minimum actuating radius $R_{min}$	600 mm



One-way screws for fastening in accordance with EN ISO 14119 can be found from page 162 onwards.

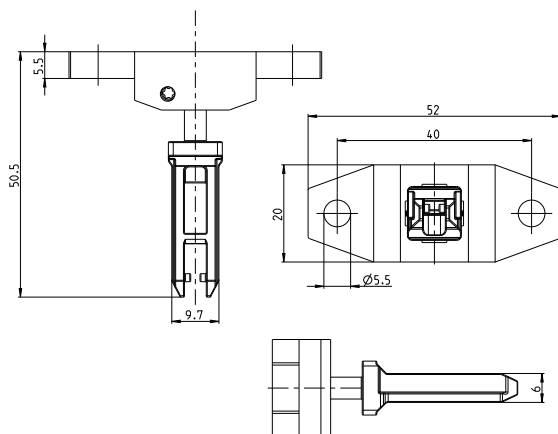
### Actuator ACR-1

Radius actuator, flexibly mounted, for use with small actuating radii.



#### Product selection

Article number	Designation
3911742398	ACR-1



#### Mechanical data

Actuator	Stainless steel (Niro)
Minimum actuating radius $R_{min}$	150 mm



# Accessories

## SLC

### For immediate release in case of emergency

Article number	Designation	Description
6051101003	EMR-F-1	Emergency release front
6051101004	EMR-B-1	Emergency release back
6051201005	ESCR-B-1	Basic set for escape release
6051201007	ESCR-20-1	Extension module escape release* Length: 20 mm
6051201006	ESCR-40-1	Extension module escape release* Length: 40 mm

\* Base set required to use the expansion modules.



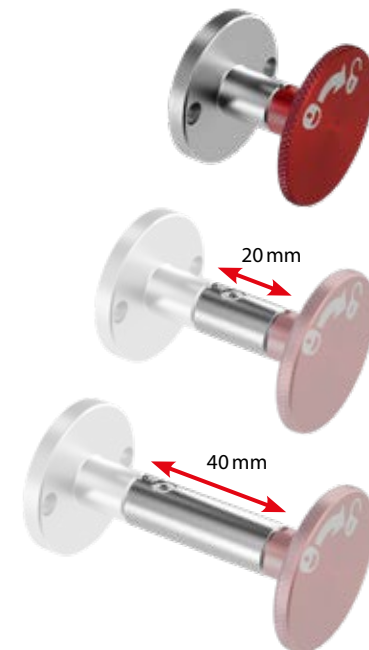
### Emergency release

The emergency unlocking device can be ordered ready-mounted with the SLC or retrofitted. In an emergency, it allows the lock to be opened immediately from outside the danger zone.



### Escape release

Optionally mounted on the back of the SLC, the escape release enables immediate opening from inside the danger zone in an emergency.



**Escape release  
Basic set  
ESCR-B-1**

**Extension module\*  
20 mm  
ESCR-20-1**

**Extension module\*  
40 mm  
ESCR-40-1**

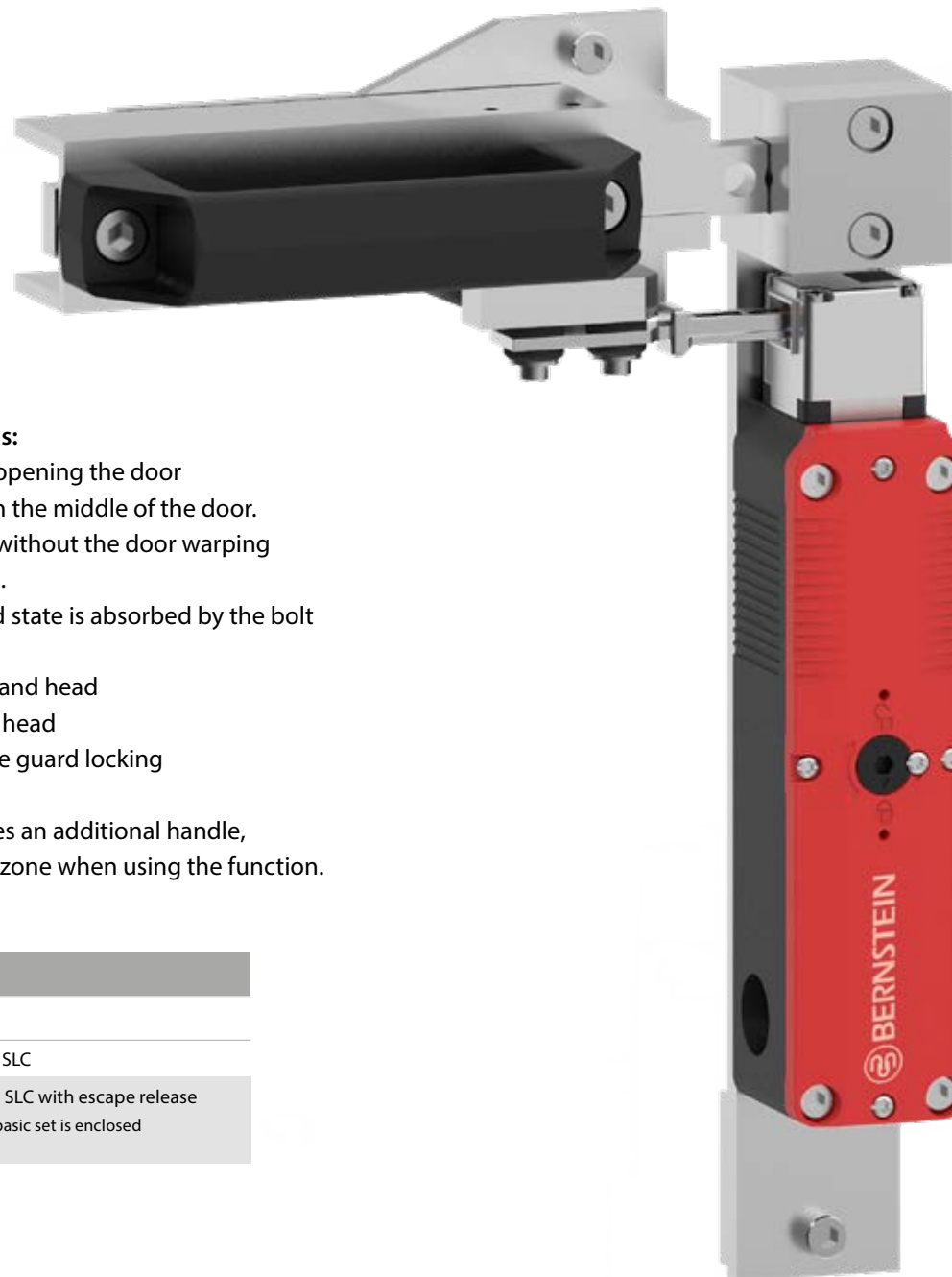
## SLC sliding handle

For robust applications

### The handle for the SLC combines various functions:

- The latch provides an ergonomic door handle for opening the door
- The guard locking is usually placed with the bolt in the middle of the door. This guarantees optimum guard locking function without the door warping or harmful lateral forces acting on the switch head.
- The force during an opening attempt in the locked state is absorbed by the bolt and not by the safety switch.
- Partial protection against damage to the actuator and head
- Optimum insertion of the actuator into the switch head
- End stop in the bolt protects against overriding the guard locking

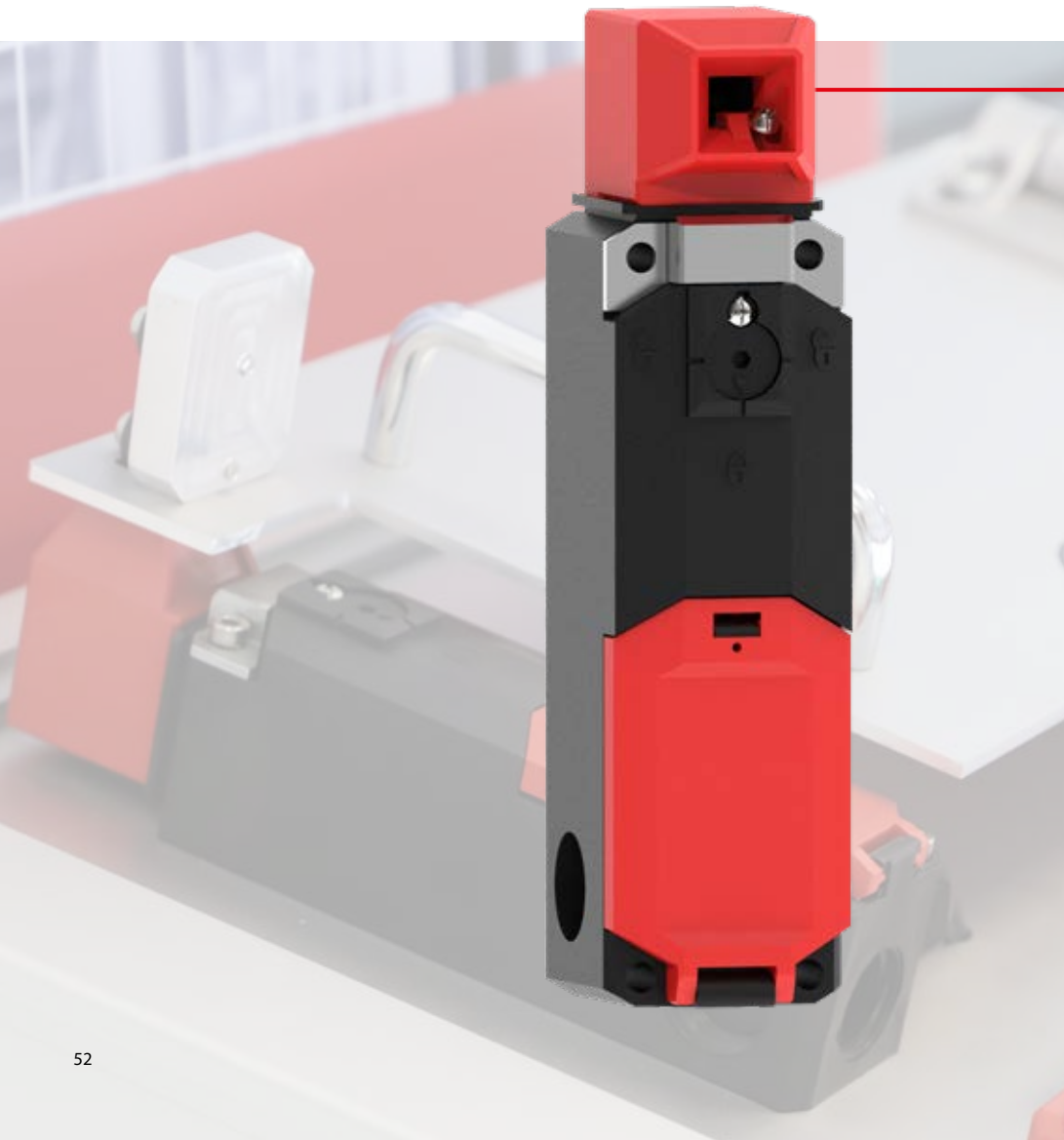
The variant with escape release (BF5-SLC ES) includes an additional handle, to be able to open the door from inside the danger zone when using the function.



#### Product selection

Article number	Designation	Description
6051201012	BF5-SLC	Door bolt for SLC
6051201010	BF5-SLC-ESCR	Door bolt for SLC with escape release The required basic set is enclosed with the bolt

# Mechanical guard locking SLK

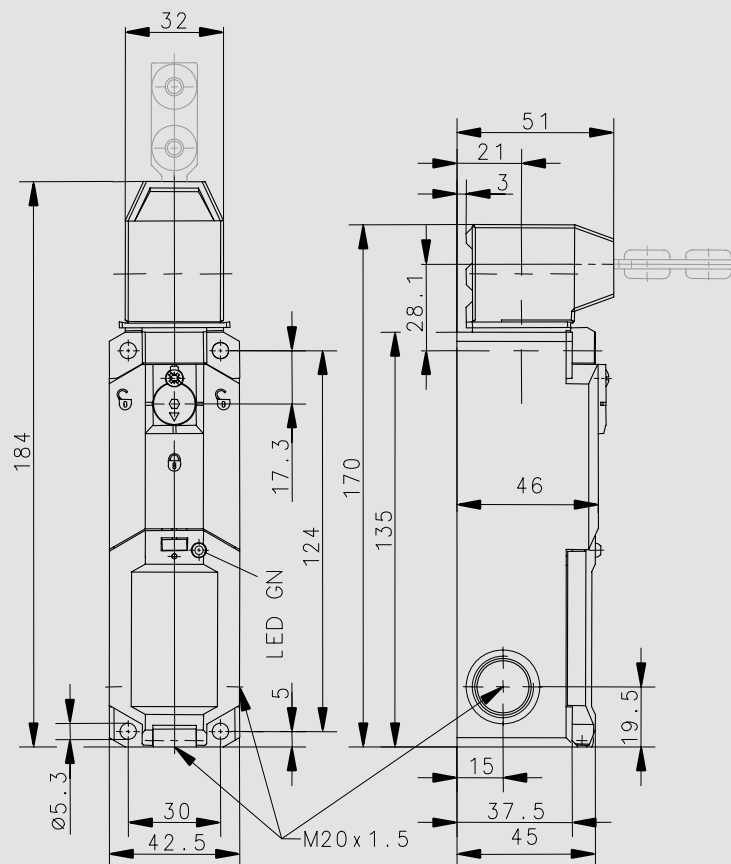


## MANY BENEFITS AT A GLANCE

- Compact design with short overall size of only 170 mm
- Rotary actuating head (4x 90°) as well as horizontal and vertical actuation ensure complete flexibility in use
- Innovative installation with spring-loaded terminals
- Can be universally integrated into the system thanks to two operating voltage variants: 24 V AC/DC and 110 V/230 V AC

## Technical data

Electrical data	
<b>Contact elements</b>	
Rated operating voltage $U_e$	250 V or 50 V AC (with M12 connector)
Utilisation category	AC-15, $U_e/I_e$ 230 V/2.5 A or AC-15, $U_e/I_e$ 24 V/2 A (with M12 connector)
<b>Electromagnet</b>	
Operating voltage	24V AC/DC or 110/230 V AC
<b>Mechanical data</b>	
Material enclosure + cover	Thermoplastic GV (UL94-V0)
Actuating device	Thermoplastic GV (UL94-V0)
Holding force	1500 N
Ambient temperature	-25°C to + 70°C
Protection class	IP67
<b>ID for safety engineering</b>	
B10d NC	$2 \times 10^6$ Cycles at 24V 100mA DC



### Product selection

Article number	Designation	Guard locking principle	Contact configuration		Connection type*
			Door monitoring	Guard locking	
6018169054	SLK-F-UC-22-R1-A0-L0-0	Spring	2NC	2NC	Standard
6018119045	SLK-F-UC-55-R1-A0-L0-0	Spring	1NC/1NO	1NC/1NO	Standard
6118169117	SLK-F-UC-22-R2-A0-L0-0 with emergency unlocking	Spring	2NC	2NC	Standard
6018169059	SLK-F-UC-17-R1-A0-L0-0	Spring	1NC	2NC/1NO	Standard
6018169063	SLK-F-UC-71-R1-A0-L0-0	Spring	2NC/1NO	1NC	Standard
6018169070	SLK-F-UC-81-R1-A0-L0-0	Spring	3NC	1NC	Standard
6018169078	SLK-F-UC-22-R1-A0-L0-4	Spring	1NC	2NC	M12, 8-pin
6018119047	SLK-M-UC-55-R0-A0-L0-0	Magnet	1NC/1NO	1NC/1NO	Standard
6018169056	SLK-M-UC-22-R0-A0-L0-0	Magnet	2NC	2NC	Standard
6018169080	SLK-M-UC-22-RO-A0-L0-4	Magnet	1NC	2NC	M12, 8-pin

\* Standard = 3 x M20 thread with sealed housing wall. Other contact configurations and coil voltages of 230 V and 120 V are possible.



### Options

- With dust cover
- You will find single-ended and double-ended cordsets under accessories (from page 152)



The switch is not delivered with an actuator. Please order the actuator separately (p. 54–55).

One-way screws for fastening in accordance with EN ISO 14119 can be found from page 162 onwards.

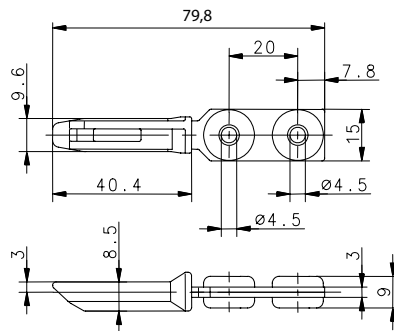
## Actuator SLK

**Actuator A1**  
Standard actuator



### Product selection

Article number	Designation
3911702228	Actuator A1



### Mechanical data

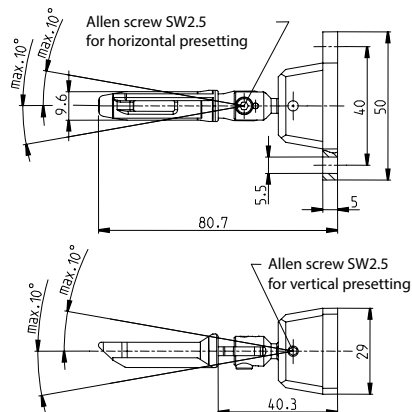
Actuator	Steel/PA
Minimum actuating radius $R_{min}$	400 mm

**Actuator A2**  
Radius actuator



### Product selection

Article number	Designation
3911702229	Actuator A2



### Mechanical data

Enclosure / Actuator	Steel/PA
Minimum actuating radius $R_{min}$	150 mm

Repositioning the spring-loaded actuator by 4 x 90° when not screwed on.  
Allen key SW2.5 provided

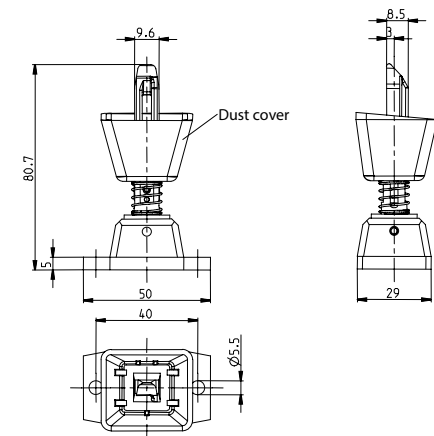
The respective actuator is not included in the scope of delivery of the guard locking and must be ordered separately.

**Actuator A3**  
Radius actuator  
with dust protection cap



### Product selection

Article number	Designation
3911702230	Actuator A3



### Mechanical data

Enclosure / Actuator	Steel/PA
Dust cover	Elastomer CR
Minimum actuating radius $R_{min}$	400 mm

Repositioning the spring-loaded actuator by 4 x 90° when not screwed on.

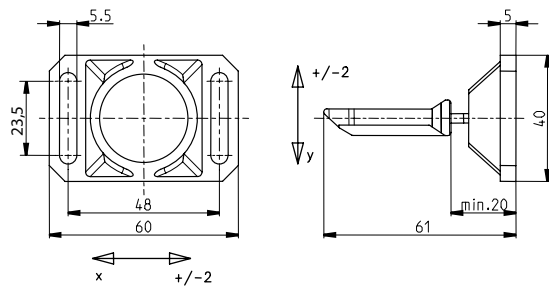
One-way screws for fastening in accordance with EN ISO 14119 can be found from page 162 onwards.

**Actuator A4**  
Flexible actuator



**Product selection**

Article number	Designation
3911702231	Actuator A4



**Mechanical data**

Actuator	Steel/PA
Enclosure	GD-Zn
Minimum actuating radius $R_{min}$	350 mm

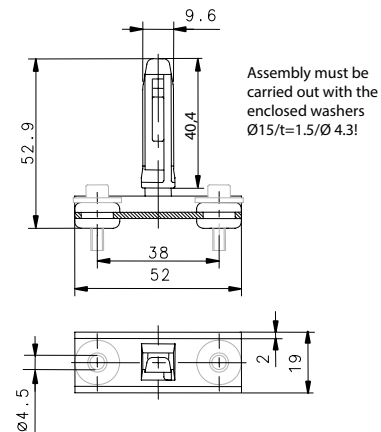
Repositioning of the spring-loaded actuator by 4 x 90° in the screwed-on state.

**Actuator A7**  
The cross actuator for vertical/horizontal mounting.



**Product selection**

Article number	Designation
3911702234	Actuator A7



**Mechanical data**

Actuator	Steel/PA
U-profile	Steel
Minimum actuating radius $R_{min}$	400 mm



Type 2

## Safety switches with separate actuator without guard locking



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Page 60



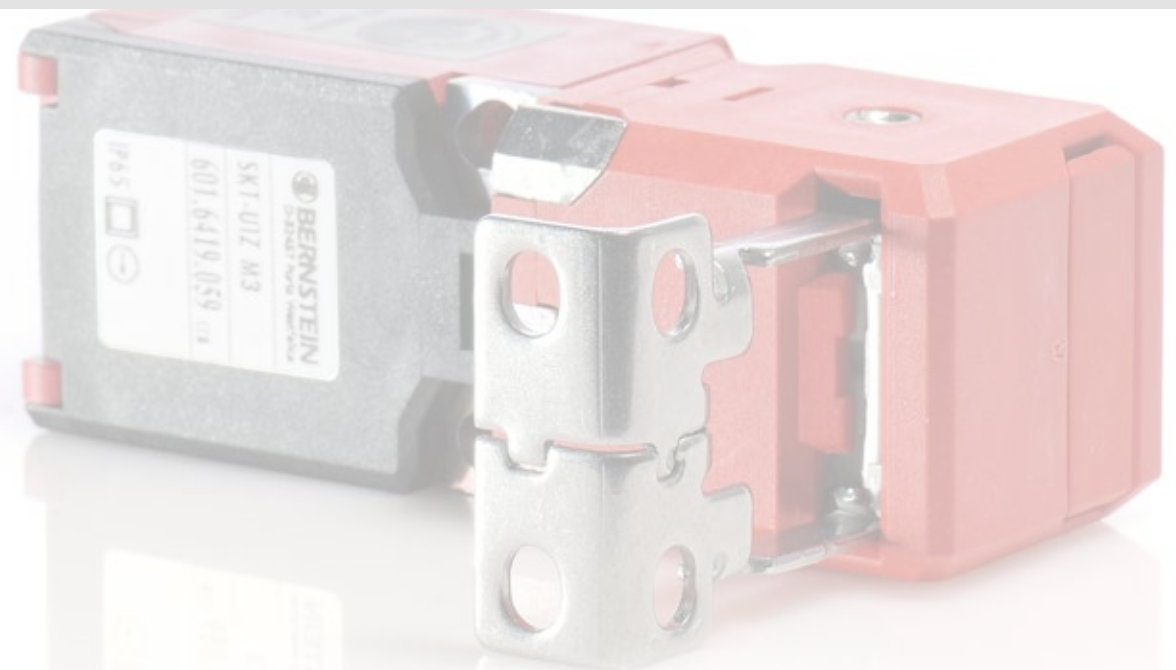
Page 62



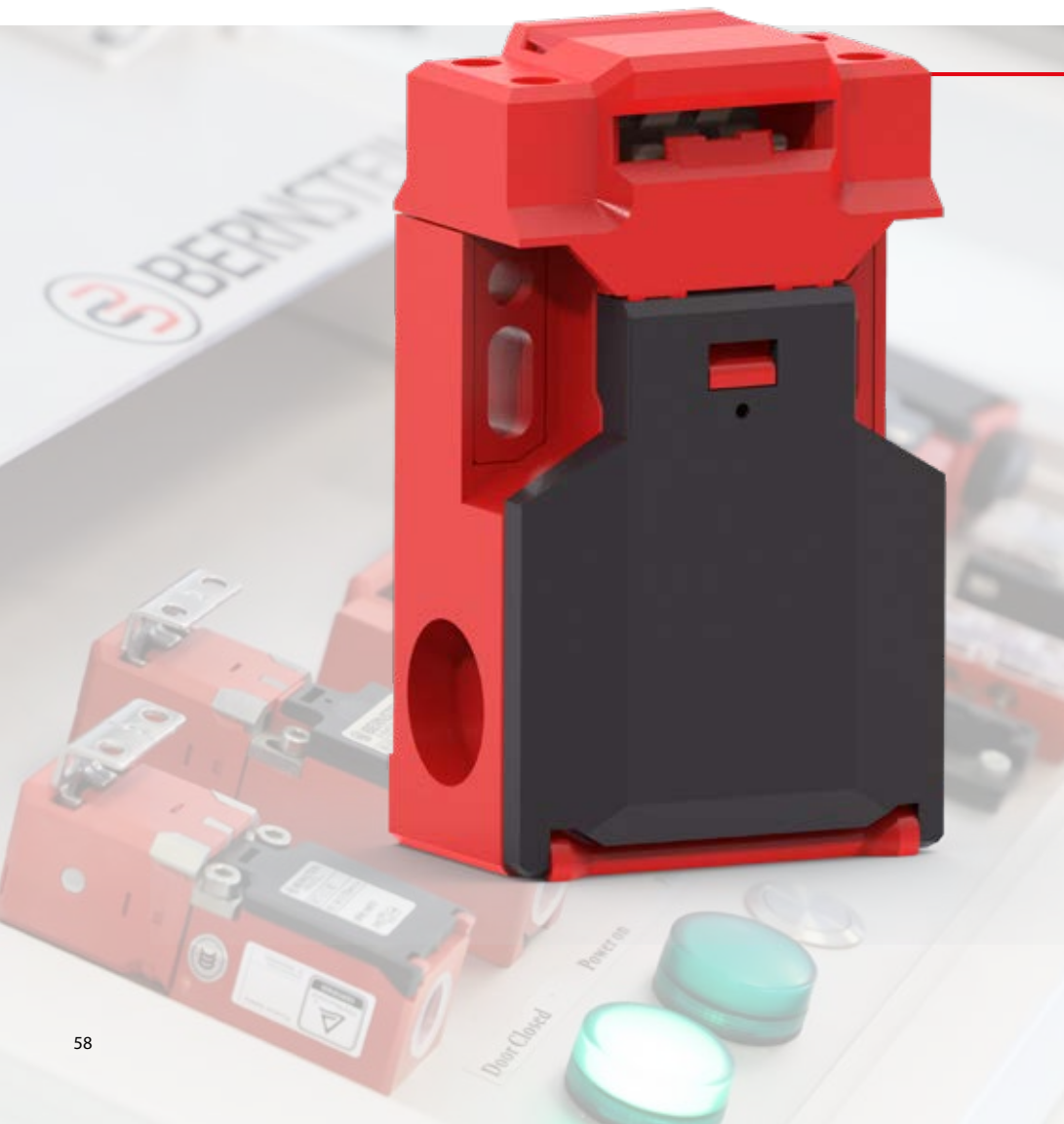
## **Positive opening position switches for safeguarding machines and systems of any complexity**

Safety switches with separate actuator are positive opening position switches. The switching element and actuator are separated by design. When actuated, the switching element and actuator are functionally combined or separated.

When the actuator is pulled out, the positive break contact is always open. These switches are assigned to type 2.



# Safety switch with separate actuator SK



## MANY BENEFITS AT A GLANCE

- Cable entry from three sides
- Three directions of actuation
- Up to three contacts
- Optional increased pull-out force
- Low coding according to ISO 14119

## Technical data

### Electrical data

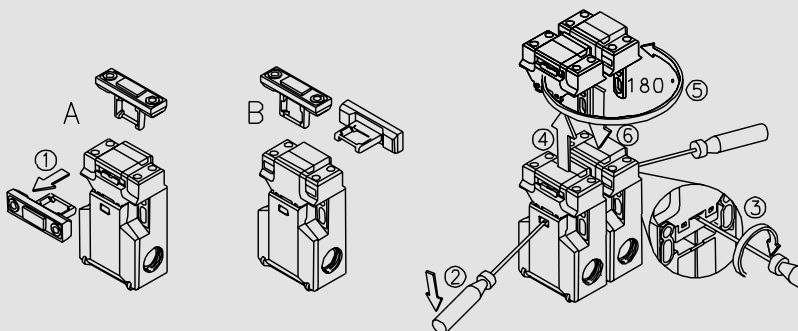
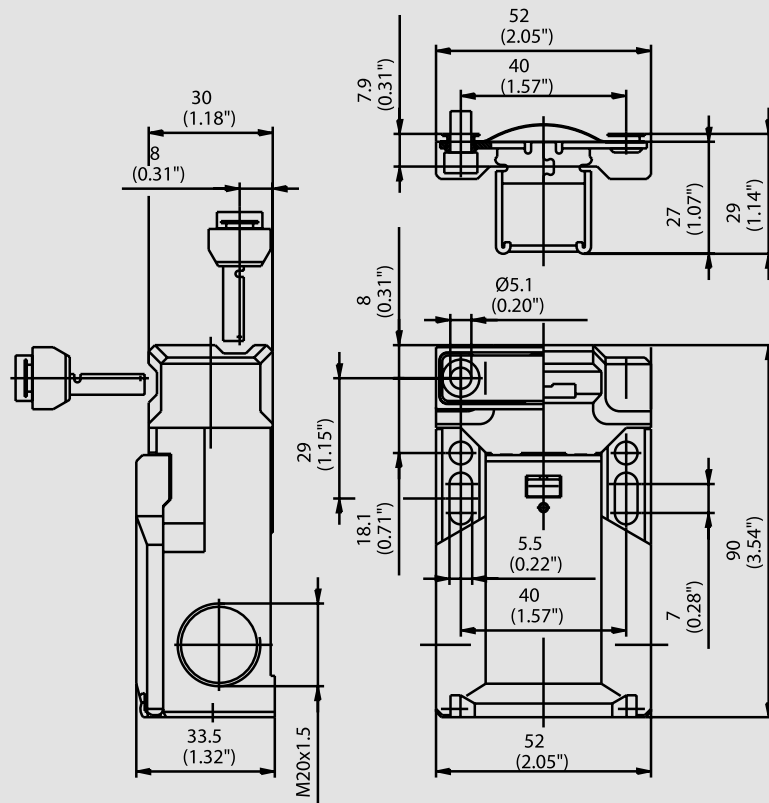
Rated operating voltage $U_e$	240 V
Utilisation category	AC-15, $U_e / I_e$ 240 V/1.5 A

### Mechanical data

Material enclosure/cover	Thermoplastics, glass-fibre reinforced (UL94-V0)
Mechanical lifetime	1 Mio.
Ambient temperature	-30°C to + 80°C
Protection class	IP65 according to IEC/EN 60529

### ID for safety engineering

B10d NC	up to 2 Mio.
---------	--------------



#### Product selection

Article number	Designation	Contacts	Connection*
6016169183	SK-UV15Z	2NC/1NO	Standard
6016169182	SK-A2Z	2NC	Standard
6016119181	SK-U1Z	1NC/1NO	Standard
6016169185	SK-A2Z	2NC	M12
6016119184	SK-U1Z	1NC/1NO	M12



The switch is not delivered with an actuator. Please order the actuator separately (p. 64–65).

One-way screws for fastening in accordance with EN ISO 14119 can be found from page 162 onwards.



# Safety switch with separate actuator SKI

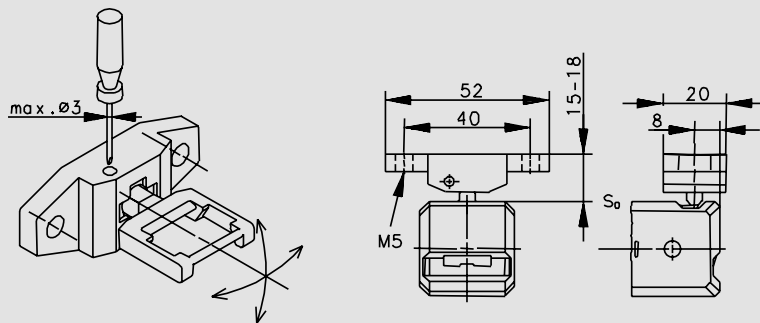
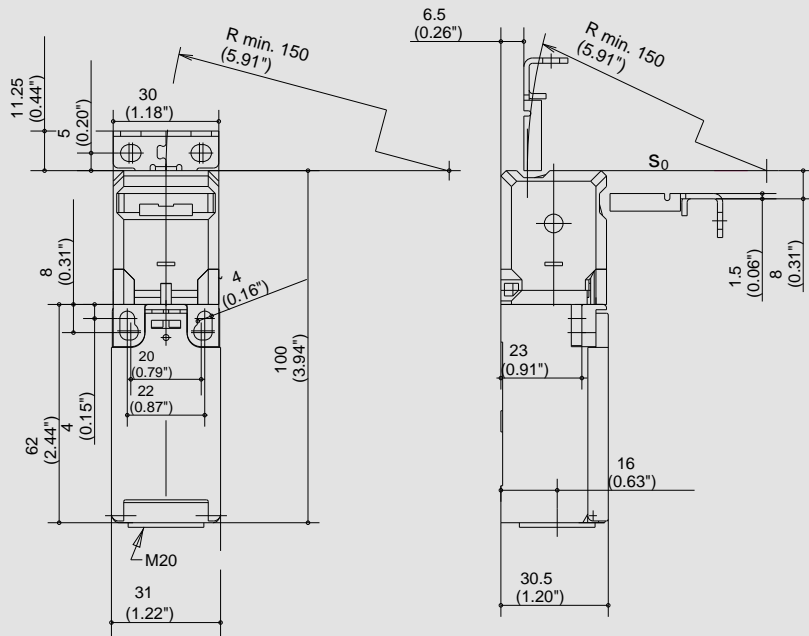


## MANY BENEFITS AT A GLANCE

- Slim design
- Rotatable actuating head
- Can be approached from five directions
- Generous connection space
- Up to three contacts
- Various actuators for almost all requirements
- Low coding according to ISO 14119

## Technical data

Electrical data	
Rated operating voltage $U_e$	240 V
Utilisation category	AC-15, $U_e/I_e$ 240 V/3 A
Mechanical data	
Material enclosure/cover	Thermoplastics, glass-fibre reinforced (UL94-V0)
Mechanical lifetime	1 Mio.
Ambient temperature	-30°C to + 80°C
Protection class	IP65 according to IEC/EN 60529
ID for safety engineering	
B10d NC	up to 2 Mio.



#### Product selection

Article number	Designation	Contacts	Connection*
6116869252	SKI-UV15Z	2NC/1NO	Standard
6016869189	SKI-A2Z	2NC	Standard
6016819178	SKI-U1Z	1NC/1NO	Standard
6016869180	SKI-A2Z	2NC	M12
6016819179	SKI-U1Z	1NC/1NO	M12



The switch is not delivered with an actuator. Please order the actuator separately (p. 64–65). One-way screws for fastening in accordance with EN ISO 14119 can be found from page 162 onwards.



# Safety switch with separate actuator SKT

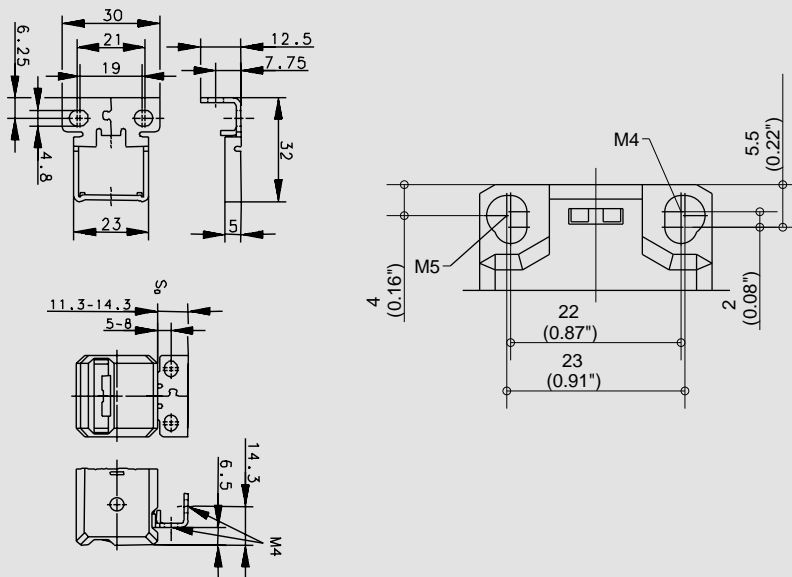
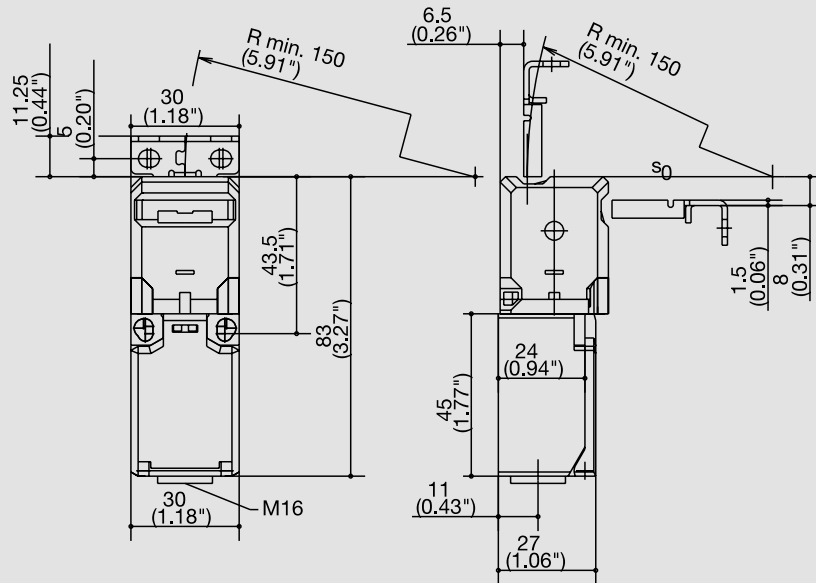


## MANY BENEFITS AT A GLANCE

- Slim design
- Particularly short for confined installation situations
- Rotatable actuating head
- Can be approached from five directions
- Low coding according to ISO 14119

## Technical data

Electrical data	
Rated operating voltage $U_e$	240 V AC
Utilisation category	AC-15, $U_e/I_e$ 240 V/3 A; DC-13, $U_e/I_e$ 250 V/0.27 A
Mechanical data	
Material enclosure/cover	Thermoplastics, glass-fibre reinforced (UL94-V0)
Mechanical lifetime	1 Mio.
Ambient temperature	-30°C to +80°C
Protection class	IP65 according to IEC/EN 60529
ID for safety engineering	
B10d NC	up to 2 Mio.



#### Product selection

Article number	Designation	Contacts	Connection
6016469177	SKT-A2Z	2NC	Standard
6016419176	SKT-U1Z	1NC/1NO	Standard



The switch is not delivered with an actuator. Please order the actuator separately (p. 64–65). One-way screws for fastening in accordance with EN ISO 14119 can be found from page 162 onwards.



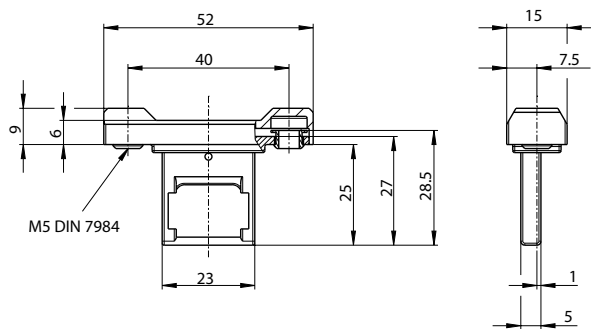
## Actuator for SK, SKI, SKT

**Actuator M1**



**Product selection**

Article number	Designation
6016999190	Actuator M1



**Mechanical data**

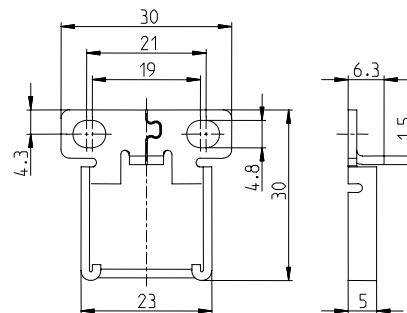
Actuator/Cap	St-Niro/Thermoplastic PA
Minimum actuating radius	R <sub>min</sub> 150 mm

**Actuator M2**



**Product selection**

Article number	Designation
6016999191	Actuator M2



**Mechanical data**

Actuator	St-Niro
Minimum actuating radius	R <sub>min</sub> 150 mm

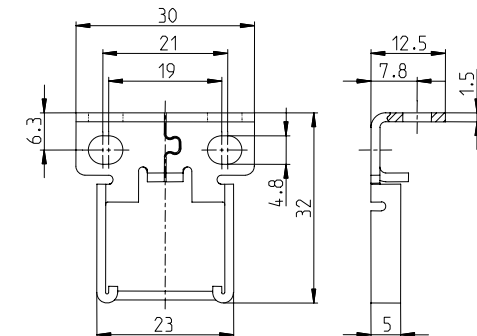
Fastening 90° offset to the actuating direction

**Actuator M3**



**Product selection**

Article number	Designation
6016999192	Actuator M3



**Mechanical data**

Actuator	St-Niro
Minimum actuating radius	R <sub>min</sub> 150 mm

Fastening in actuation direction

The respective actuator is not included in the scope of delivery of the guard locking and must be ordered separately.



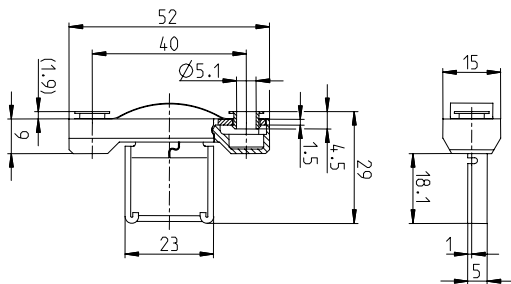
One-way screws for fastening in accordance with EN ISO 14119 can be found from page 162 onwards.

### Actuator M4



#### Product selection

Article number	Designation
6016999193	Actuator M4



#### Mechanical data

Actuator/Cap	St-Niro/Thermoplastic PA
Minimum actuating radius	$R_{min}$ 150 mm

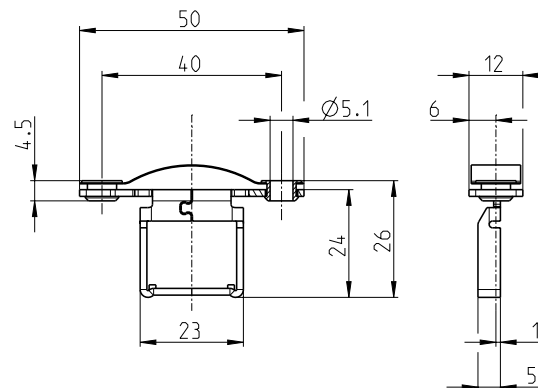
Fastening in actuating direction, with cover and spring

### Actuator M5



#### Product selection

Article number	Designation
6016999194	Actuator M5



#### Mechanical data

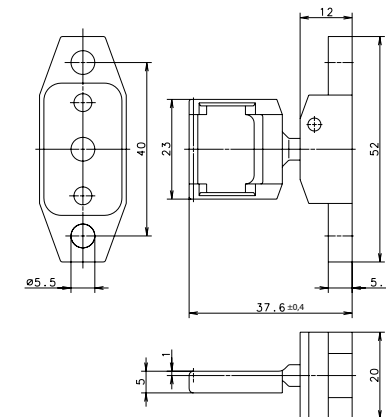
Actuator	St-Niro
Minimum actuating radius	$R_{min}$ 150 mm

### Actuator M6



#### Product selection

Article number	Designation
6016999195	Actuator M6



#### Mechanical data

Actuator	St-Niro/Brass
Minimum actuating radius	$R_{min}$ 50 mm

Developed for swivel actuation (hook latch), slightly spring-loaded, actuation radius can be preset.

# Safety switches type 4

## Coded RFID safety sensors/magnetic switches



from page 68



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## Especially for the monitoring of protective devices

The use of non-contact interlocking devices, especially for monitoring movable guards, offers the following advantages:

- Simple adjustment
- No broken actuators
- High tolerance for vibrations, warped doors and bonnets
- No wear
- High ease of cleaning

BERNSTEIN AG offers two different technologies in the field of contactless safety technology:

- RFID-based safety sensors (SRF)
- Magnet-based safety sensors (MAK family)



# RFID coded safety sensor SRF-5 with DCD diagnosis

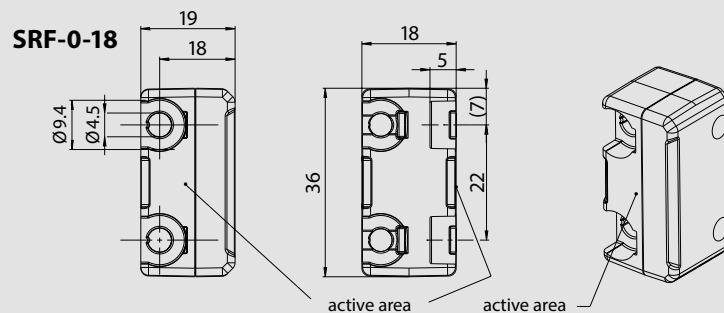
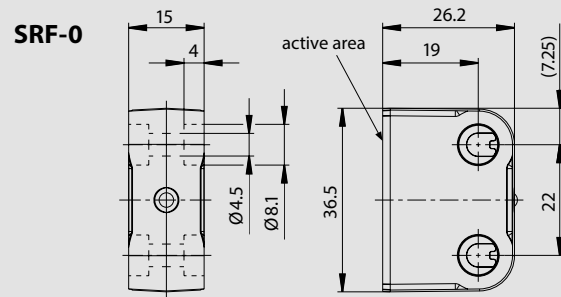
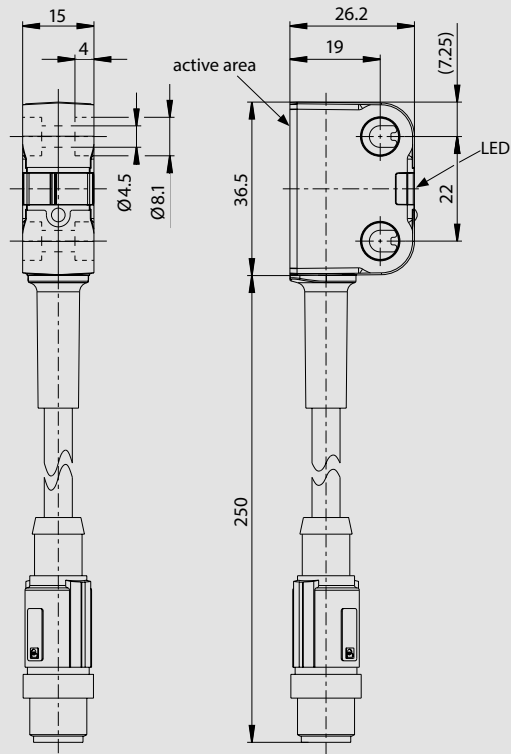


## MANY BENEFITS AT A GLANCE

- Safe up to PL e even with series connection, with high manipulation protection (according to ISO 14119)
- Low, high and unique coding according to ISO 14119
- Optional local reset
- Fault-tolerant outputs
- Detailed diagnostic system that transmits a complete status image of a sensor – even in a series connection
- Highly visible LED display of sensor status

## Technical data

Electrical data		
<b>Switching elements</b>		
Rated operating voltage	$U_e$	24 V DC
Utilisation category of the safety outputs		DC-13 $U_e/I_e$ 24 V/100 mA
Rated operating distance	$S_n$	13 mm
<b>Mechanical data</b>		
Material enclosure + cover		PA66 + PA6, rot
Risk time		100 ms
Ambient temperature		-25°C to +70°C
Protection class		IP 69
<b>ID for safety engineering</b>		
Up to PL	e	according to ISO 13849-1
Category	4	
PFH <sub>0</sub>	$6 \times 10^{-9}$ 1/h	according to IEC 62061
SIL CL	3	



### Product selection

Article number	Designation	Coding	Diagnosis	Reset	Connection
6075685100	SRF-5/1/1-E0,25-U	Unique	DCD	No	M12 8-pin connector with 25 cm cable
6075685101	SRF-5/1/1-E0,25-H	High	DCD	No	M12 8-pin connector with 25 cm cable
6075685102	SRF-5/1/1-E0,25-L	Low	DCD	No	M12 8-pin connector with 25 cm cable
6075685080	SRF-5/2/1-E0,25-U	Unique	DCD	Yes	M12 8-pin connector with 25 cm cable
6075685103	SRF-5/2/1-E0,25-H	High	DCD	Yes	M12 8-pin connector with 25 cm cable
6075685104	SRF-5/2/1-E0,25-L	Low	DCD	Yes	M12 8-pin connector with 25 cm cable
6075687078	SRF-0	SRF actuator, can be used for all coding levels*			
6075687144	SRF-0-18	SRF actuator (rectangular design), can be used for all coding levels*			

\* The actuators are not included in the scope of delivery – please order separately!



### Options

- 2 different actuator sizes available
- Other cable lengths on request
- You will find single-ended and double-ended cordsets under accessories (from page 152)
- One-way screws for fastening in accordance with EN ISO 14119 can be found from page 162 onwards.



reddot award 2018 winner

SRF is an abbreviation meaning „Safety RFID“.

# RFID coded safety sensor SRF-4 with PNP diagnosis



## MANY BENEFITS AT A GLANCE

- Safe up to PL e even with series connection, with high manipulation protection (according to ISO 14119)
- Low, high and unique coding according to ISO 14119
- Optional local reset
- Fault-tolerant outputs
- Highly visible LED display of sensor status
- PNP diagnostic output to indicate whether door is open or closed

## Technical data

### Electrical data

#### Switching elements

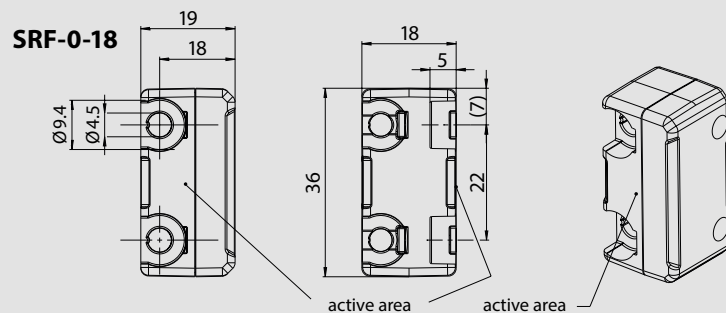
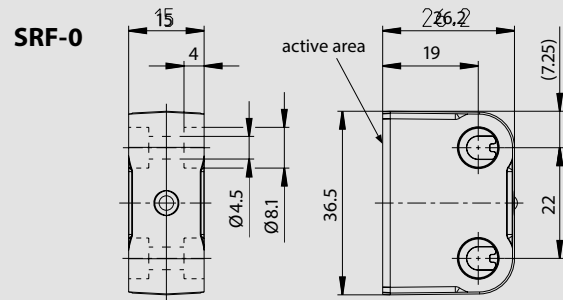
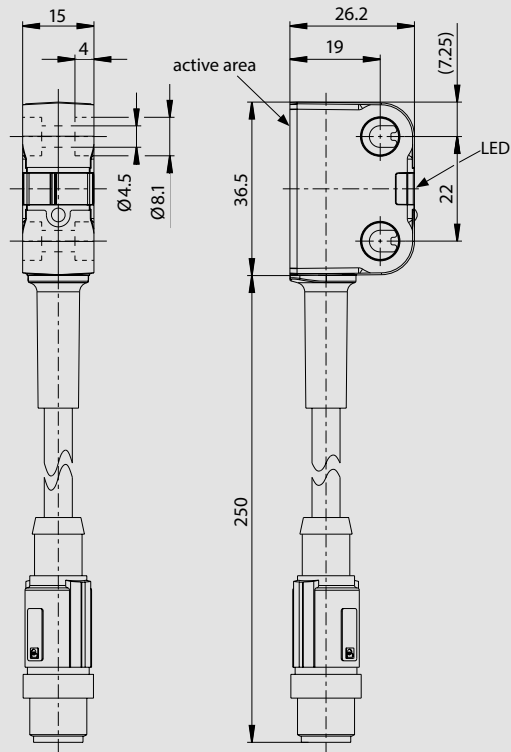
Rated operating voltage	$U_e$	24 V DC
Utilisation category of the safety outputs		DC-13 $U_e/I_e$ 24 V/100 mA
Rated operating distance	$S_n$	13 mm
Current diagnostic output		10 mA

### Mechanical data

Material enclosure + cover	PA66 + PA6, rot
Risk time	100 ms
Ambient temperature	-25°C to +70°C
Protection class	IP 69

### ID for safety engineering

Up to PL	e	
Category	4	according to ISO 13849-1
PFH <sub>b</sub>	6x10 <sup>-9</sup> 1/h	
SIL CL	3	according to IEC 62061



#### Product selection

Article number	Designation	Coding	Diagnosis	Reset	Connection
<b>6075685094</b>	SRF-4/1/1-E0,25-U	Unique	PNP	No	M12 8-pin connector with 25 cm cable
<b>6075685095</b>	SRF-4/1/1-E0,25-H	High	PNP	No	M12 8-pin connector with 25 cm cable
<b>6075685096</b>	SRF-4/1/1-E0,25-L	Low	PNP	No	M12 8-pin connector with 25 cm cable
<b>6075685097</b>	SRF-4/2/1-E0,25-U	Unique	PNP	Yes	M12 8-pin connector with 25 cm cable
<b>6075685098</b>	SRF-4/2/1-E0,25-H	High	PNP	Yes	M12 8-pin connector with 25 cm cable
<b>6075685099</b>	SRF-4/2/1-E0,25-L	Low	PNP	Yes	M12 8-pin connector with 25 cm cable
<b>6075687078</b>	SRF-0	SRF actuator, can be used for all coding levels*			
<b>6075687144</b>	SRF-0-18	SRF actuator (rectangular design), can be used for all coding levels*			

\* The actuators are not included in the scope of delivery – please order separately!



#### Options

- 2 different actuator sizes available
- Other cable lengths on request
- You will find single-ended and double-ended cordsets under accessories (from page 152)
- One-way screws for fastening in accordance with EN ISO 14119 can be found from page 162 onwards.



reddot award 2018  
winner

# RFID coded safety sensor SRF-2 for parallel wiring



## MANY BENEFITS AT A GLANCE

- Safe up to PL e even with series connection, with high manipulation protection (according to ISO 14119)
- Low, high and unique coding according to ISO 14119
- Optional local reset
- Fault-tolerant outputs
- Highly visible LED display of sensor status
- PNP diagnostic output to indicate whether door is open or closed

## Technical data

### Electrical data

#### Switching elements

Rated operating voltage	$U_e$	24 V DC
Utilisation category of the safety outputs		DC-13 $U_e/I_e$ 24 V/100 mA
Rated operating distance	$S_n$	13 mm
Current diagnostic output		10 mA

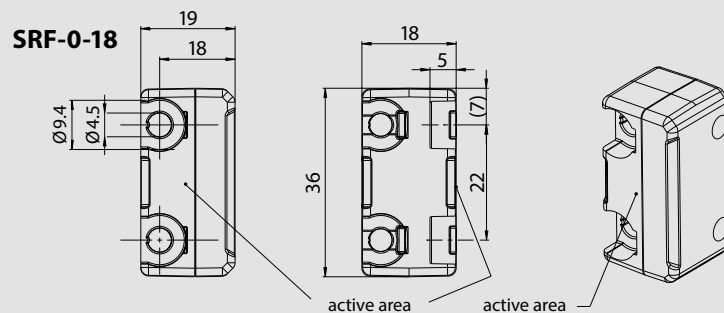
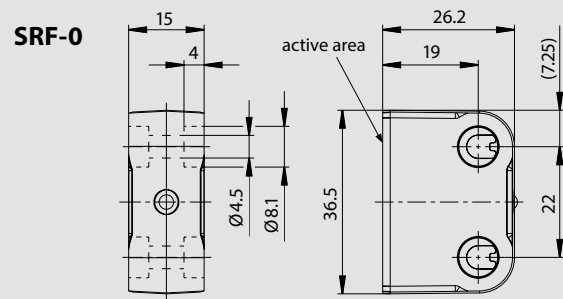
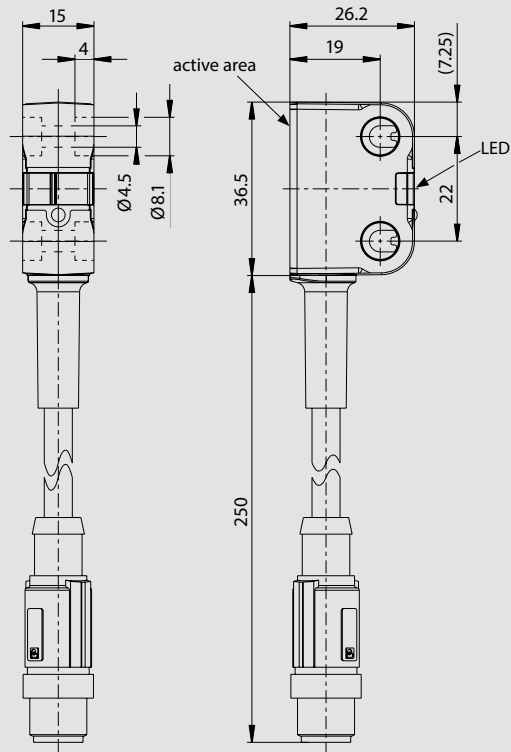
### Mechanical data

Material enclosure + cover	PA66 + PA6, rot
Risk time	100 ms
Ambient temperature	-25°C to +70°C
Protection class	IP 69

### ID for safety engineering

Up to PL	e	according to ISO 13849-1
Category	4	
PFH <sub>b</sub>	$6 \times 10^{-9}$ 1/h	according to IEC 62061
SIL CL	3	





**Product selection**

Article number	Designation	Coding	Diagnosis	Reset	Connection
6075685117	SRF-2/1/1-A2-U	Unique	PNP	No	2 m cable with open cable end
6075685079	SRF-2/1/1-A2-H	High	PNP	No	2 m cable with open cable end
6075685118	SRF-2/1/1-A2-L	Low	PNP	No	2 m cable with open cable end
6075685119	SRF-2/1/1-E0,25-U	Unique	PNP	No	M12 5-pin connector with 25 cm cable
6075685120	SRF-2/1/1-E0,25-H	High	PNP	No	M12 5-pin connector with 25 cm cable
6075685121	SRF-2/1/1-E0,25-L	Low	PNP	No	M12 5-pin connector with 25 cm cable
6075687078	SRF-0	SRF actuator, can be used for all coding levels*			
6075687144	SRF-0-18	SRF actuator (rectangular design), can be used for all coding levels*			

\* The actuators are not included in the scope of delivery – please order separately!



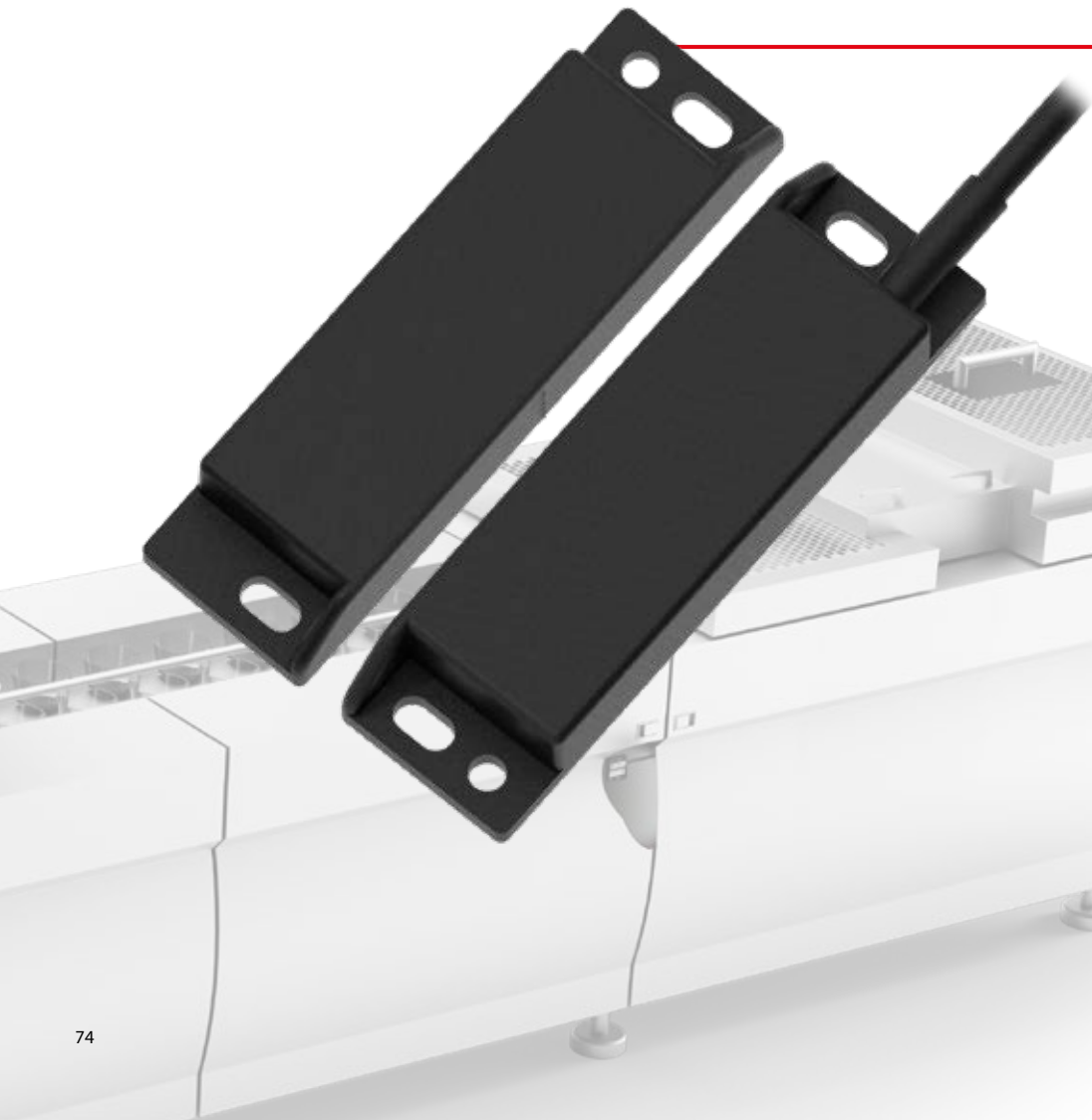
**Options**

- You will find single-ended and double-ended cordsets under accessories (from page 152)
- One-way screws for fastening in accordance with EN ISO 14119 can be found from page 162 onwards.



reddot award 2018 winner

# Magnetic coded safety sensor MAK-42



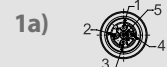
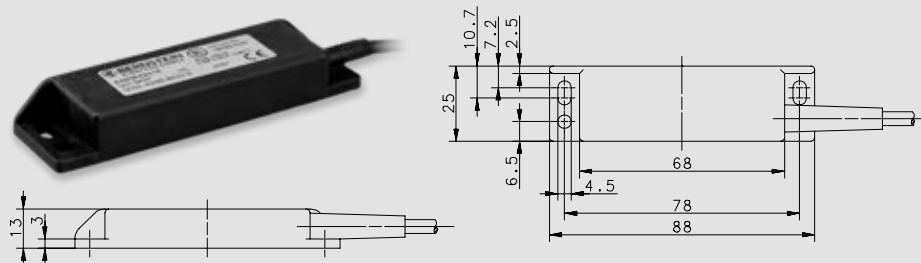
## MANY BENEFITS AT A GLANCE

- Compact
- No external moving parts
- Low susceptibility to non-metallic dusts, liquids
- Easy to clean
- Low coding
- Conditional tolerance to misalignment of the guards

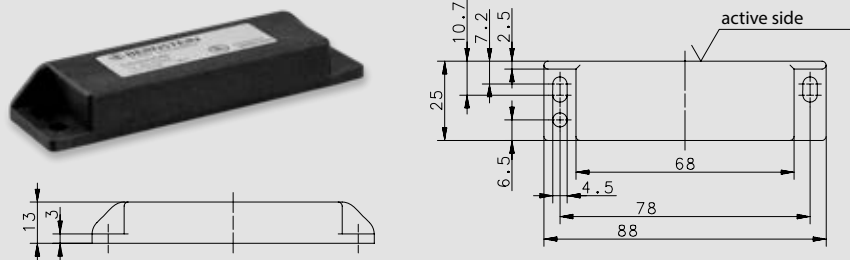
## Technical data

No.	maximum switching voltage	maximum switching current	maximum switching power	Temperature with movable cable	Temperature with fixed cable	Protection class
1	30 V DC	80 mA	0.25 W	- 10 up to +105°C	- 30 up to +105°C	IP67
2	30 V DC	250 mA	5 W	- 10 up to +105°C	- 30 up to +105°C	IP67
3	30 V DC	80 mA	0.25 W	- 5 up to +70°C	-	IP67
6	30 V DC	80 mA	0.25 W	- 5 up to +70°C	- 25 up to +70°C	IP67
Coding of all sensors		Low coding level according to ISO 14119				

### 1) MAK 42 Sensor, cable right



### 3) MAK 42 Magnet



#### Sensors

Article number	Designation	Safety contacts	Connection	Reference magnet No.	Technical data No.	Dimension drawing No.
6490642318	MAK-4236-BCD-3	1NC/1NO	3 m Cable, right	1 or 2	1	1
6490642319	MAK-4236-BCD-6	1NC/1NO	6 m Cable, right	1 or 2	1	1
6490642320	MAK-4236-BCD-9	1NC/1NO	9 m Cable, right	1 or 2	1	1
6490642352	MAK-4236-BCD-0.2-M12	1NC/1NO	20 cm cable with M12 connector, 5 pin right	1 or 2	6	1a
6490642350	MAK-4236-CD-0.2-M12	2NO	20 cm cable with M12 connector, 5 pin right	1 or 2	6	1a
6490642351	MAK-4236-CD-3	2NO	3 m cable, right	1 or 2	1	1

Other cable lengths on request.

#### Magnets

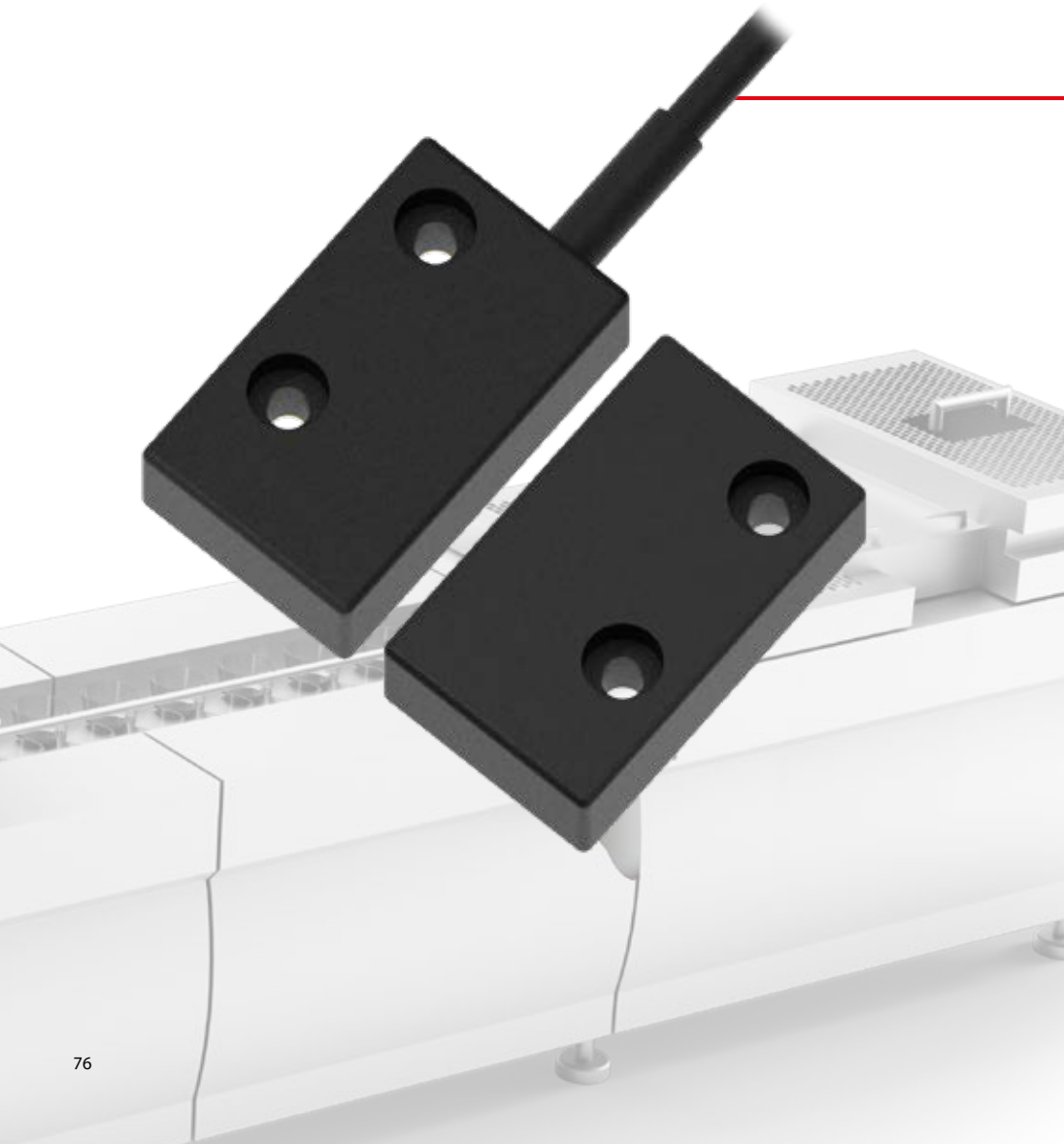
Magnet No.	Article number	Designation	Sao	Sar	Dimension drawing No.
1	6402042068	TK-42-CD/2	≥ 4	≤ 17	3
2	6402042082	TK-42-CD/2-SN8	≥ 8	≤ 17	3



### Options

- You will find single-ended and double-ended cordsets under accessories (from page 152)
- One-way screws for fastening in accordance with EN ISO 14119 can be found from page 162 onwards.

# Magnetic coded safety sensor MAK-52



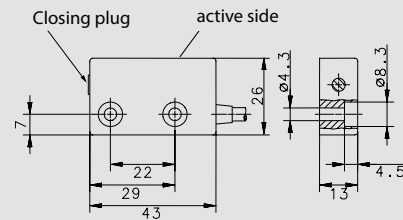
## MANY BENEFITS AT A GLANCE

- Compact
- No external moving parts
- Low susceptibility to non-metallic dusts, liquids
- Easy to clean
- Low coding
- Conditional tolerance to misalignment of the guards

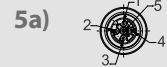
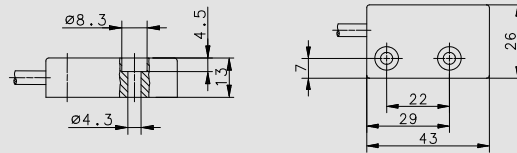
## Technical data

No.	maximum switching voltage	maximum switching current	maximum switching power	Temperature with movable cable	Temperature with fixed cable	Protection class
1	30 V DC	80 mA	0.25 W	- 10 up to +105°C	- 30 up to +105°C	IP67
2	30 V DC	250 mA	5 W	- 10 up to +105°C	- 30 up to +105°C	IP67
3	30 V DC	80 mA	0.25 W	- 5 up to +70°C	-	IP67
6	30 V DC	80 mA	0.25 W	- 5 up to +70°C	- 25 up to +70°C	IP67
Coding of all sensors		Low coding level according to ISO 14119				

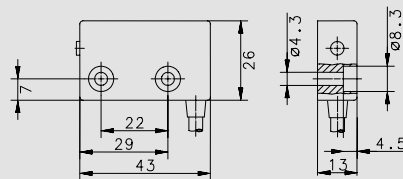
#### 4) MAK 52 Sensor, cable right



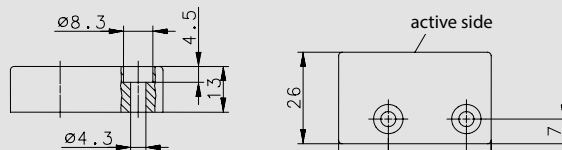
#### 5) MAK 52 Sensor, cable left



#### 6) MAK 52 Sensor, cable on the side



#### 7) MAK 52 Magnet



#### Sensors

Article number	Designation	Safety contacts	Connection	Reference magnet No.	Technical data No.	Dimension drawing No.
6490652327	MAK-5236-BCD-3	1NC/1NO	3 m cable, left	1 and 2	1	5
6490652328	MAK-5236-BCD-6	1NC/1NO	6 m cable, left	1 and 2	1	5
6490652329	MAK-5236-BCD-9	1NC/1NO	9 m cable, left	1 and 2	1	5
6490652354	MAK-5236-BCD-0.2-M12	1NC/1NO	20 cm cable with M12 connector, 5 pin left	1 and 2	6	5a
6490652353	MAK-5236-CD-3	2NO	3 m cable, left	1 and 2	1	5
6490652334	MAK-5236-CD-2S-1,5	2NO	1.5 m cable, on the side	1 and 2	2	6
6490652335	MAK-5236-CD-2S-1,5	2NO	1.5 m cable, right	1 and 2	2	4
6490652355	MAK-5236-CD-0.2-M12	2NO	20 cm cable with M12 connector, 5 pin left	1 and 2	6	5a

Other cable lengths on request.

\*Applies only in conjunction with the safety relay MÜZ.

#### Magnets

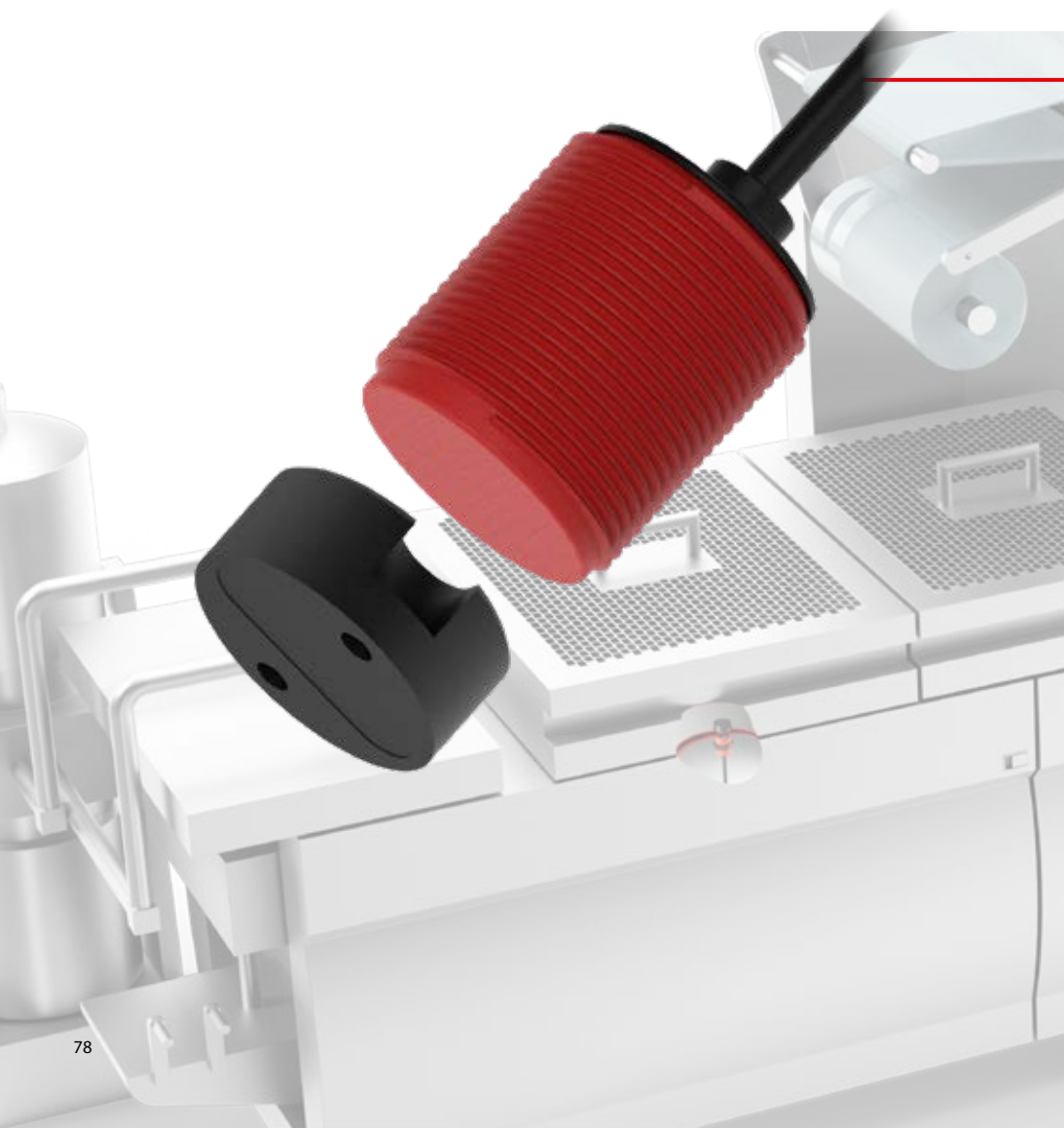
Magnet No.	Article number	Designation	Sao	Sar	Dimension drawing No.
1	6402052067	TK-52-CD/2	≥ 3	≤ 14	7
2	6402052075	TK-52-CD/2 SN8	≥ 8	≤ 17	7



#### Options

- You will find single-ended and double-ended cordsets under accessories (from page 152)
- One-way screws for fastening in accordance with EN ISO 14119 can be found from page 162 onwards.

# Magnetic coded safety sensor MAK-53



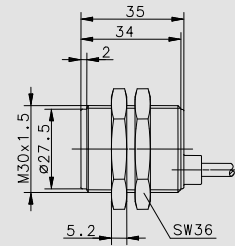
## MANY BENEFITS AT A GLANCE

- Compact
- No external moving parts
- Low susceptibility to non-metallic dusts, liquids
- Easy to clean
- Low coding
- Conditional tolerance to misalignment of the guards

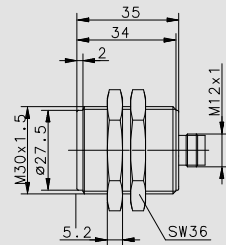
## Technical data

No.	maximum switching voltage	maximum switching current	maximum switching power	Temperature with movable cable	Temperature with fixed cable	Protection class
1	30 V DC	80 mA	0.25 W	- 10 up to +105°C	- 30 up to +105°C	IP67
2	30 V DC	250 mA	5 W	- 10 up to +105°C	- 30 up to +105°C	IP67
3	30 V DC	80 mA	0.25 W	- 5 up to +70°C	-	IP67
6	30 V DC	80 mA	0.25 W	- 5 up to +70°C	- 25 up to +70°C	IP67
Coding of all sensors		Low coding level according to ISO 14119				

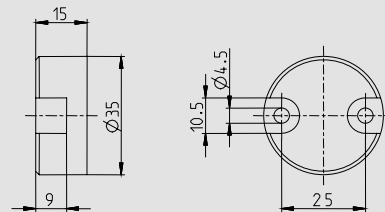
### 8) MAK 53 Sensor, cable, on the back



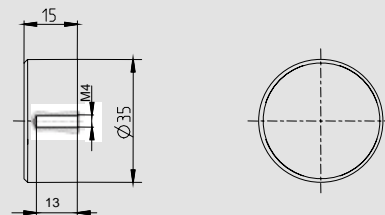
### 9) MAK 53 Sensor, 4-pin M12 connector on the back



### 10) TK 43 Magnet, plastic



### 11) TN 43 Magnet, stainless steel



### Sensors

Article number	Designation	Safety contacts	Signalling contacts	Connection	Reference magnet No.	Technical data No.	Dimension drawing No.
6490653323	MAK-5336-BCD-3	1NC/1NO	–	3 m cable, on the back	1 or 2	1	8
6490653324	MAK-5336-BCD-6	1NC/1NO	–	6 m cable, on the back	1 or 2	1	8
6490653325	MAK-5336-BCD-9	1NC/1NO	–	9 m cable, on the back	1 or 2	1	8
6490653326	MAK-5336-BCD-M12	1NC/1NO	–	4 pol. M12 Connector, back	1 or 2	3	9

Other cable lengths on request.

\*Applies only in conjunction with the safety relay MÜZ.

### Magnets

Magnet No.	Article number	Designation	Sao	Sar	Dimension drawing No.
1	6402043069	TK-43-CD/2	≥ 5	≤ 14	10
2	6408043070	TN-43-CD/2	≥ 5	≤ 14	11
3	6402043312	TK-43-CD	≥ 3	≤ 14	10



### Options

- You will find single-ended and double-ended cordsets under accessories (from page 152)
- One-way screws for fastening in accordance with EN ISO 14119 can be found from page 162 onwards.

Magnetic switches are particularly suitable for systems where high demands are placed on cleanability.

# Safety rope pull switches



Page 82



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Page 88



Page 94




Page 96



## More safety non-stop

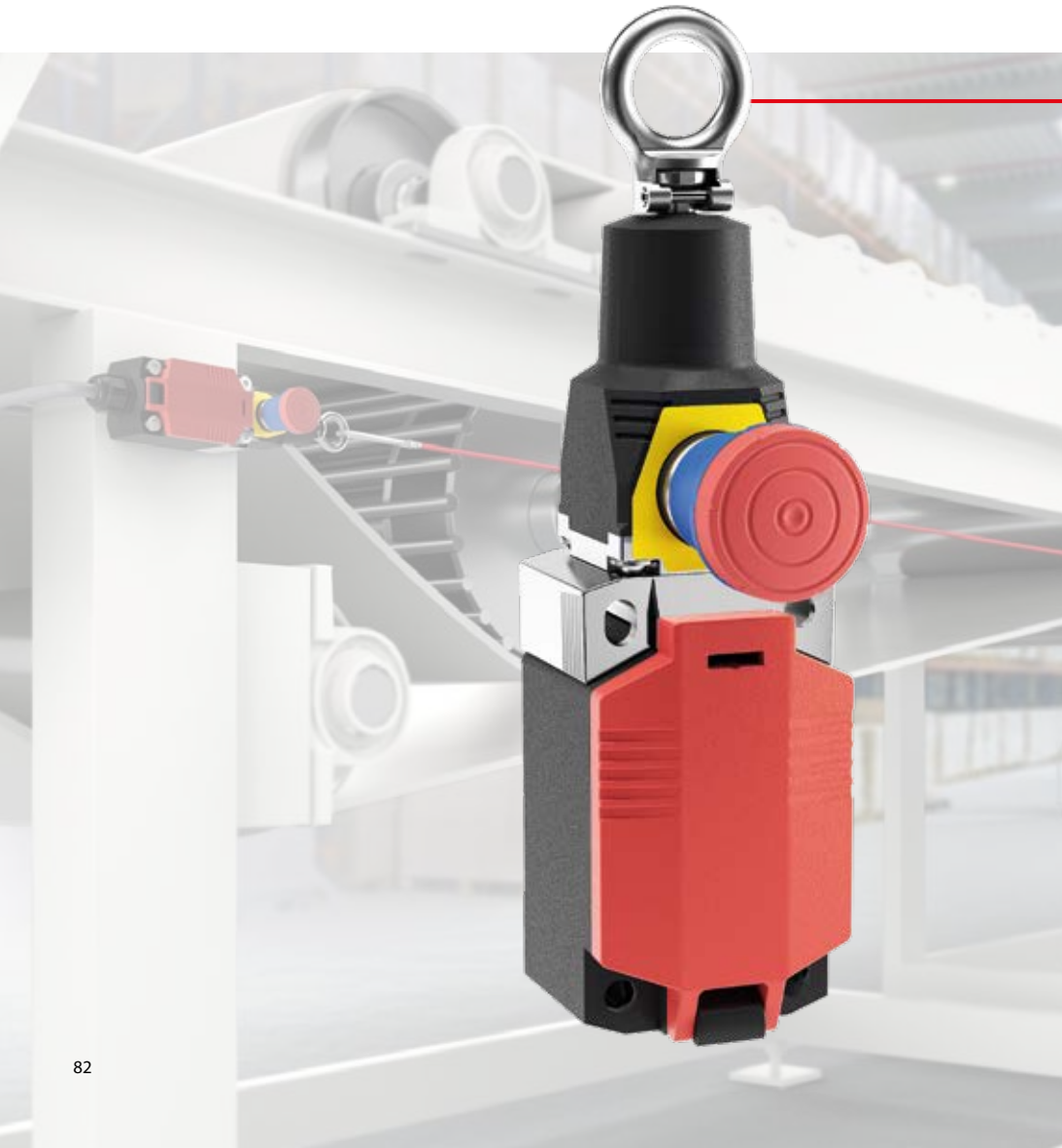
On the assembly line, in the production line or directly on the machine – when it comes to maximum safety, the rope pull switches from BERNSTEIN AG are a reliable and proven solution.

They are flexible to use, easy to install and convenient to handle. Most importantly, they offer maximum safety when it counts.

A close-up photograph of a safety rope pull switchgear installed on a conveyor belt. The switchgear is a rectangular unit with a yellow top and a red bottom. It has a red emergency stop button on top and a metal bracket on the side. A red rope is attached to the bracket and runs along the conveyor belt. The background shows a blurred industrial setting with blue rollers.

The safety rope pull switchgear developed and manufactured by BERNSTEIN AG is designed and approved according to the standards of IEC 60947-5-5 and ISO 13850.

# Rope Pull Switch SRO Metal and plastic version



## MANY BENEFITS AT A GLANCE

- As a metal or plastic variant – or as a combination of both
- Particularly compact design for use in confined spaces
- Also available with an emergency stop button as an option for the rope
- Possible tensioning range up to 30 m
- Up to 4 contacts

## Technical data

### Electrical data

#### Switching elements

Rated operating voltage  $U_e$  240 V

Rated insulation voltage  $U_i$  400 V AC

Utilisation category/  
Switching capacity AC-15, 240 V/3 A ; DC-13, 240 V/1.5 A

### Mechanical data

Mechanical switching frequency max.  $\leq$  20/min.

Mechanical service life  $1 \times 10^5$  switching cycles

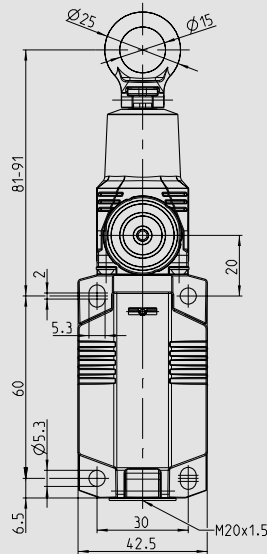
Permissible ambient temperature  $-30^\circ\text{C}$  to  $+75^\circ\text{C}$

Protection class IP67 according to IEC 60529

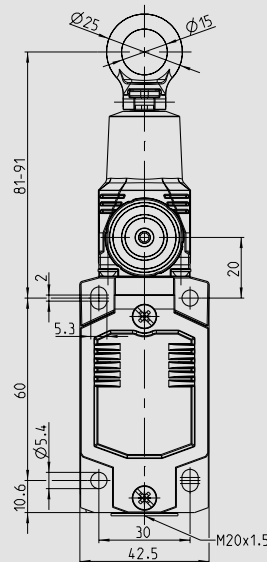
### ID for safety engineering

B10d NC  $2 \times 10^5$  cycles

**Plastic version**  
SRO-I73...VT...



**Metal version**  
SRO-M78...VT...



**Product selection**

Article number	Designation	Contact type	Max. span length *
6011811127	SRO-I73-11-VT30-1	1 NC/1 NO	max. 30 m
6011811131	SRO-I73-11-VT30-2	1 NC/1 NO	max. 30 m
6011821129	SRO-I73-22-VT30-1	2 NC/2 NO	max. 30 m
6011821133	SRO-I73-22-VT30-2	2 NC/2 NO	max. 30 m
6011861128	SRO-I73-20-VT30-1	2 NC	max. 30 m
6011861132	SRO-I73-20-VT30-2	2 NC	max. 30 m
6011891130	SRO-I73-31-VT30-1	3 NC/1 NO	max. 30 m
6011891135	SRO-I73-31-VT30-2	3 NC/1 NO	max. 30 m
6012861137	SRO-M78-20-VT30-1	2 NC	max. 30 m
6012861141	SRO-M78-20-VT30-2	2 NC	max. 30 m
6012891139	SRO-M78-31-VT30-1	3 NC/1 NO	max. 30 m
6012891143	SRO-M78-31-VT30-2	3 NC/1 NO	max. 30 m

\* Temperature-dependent



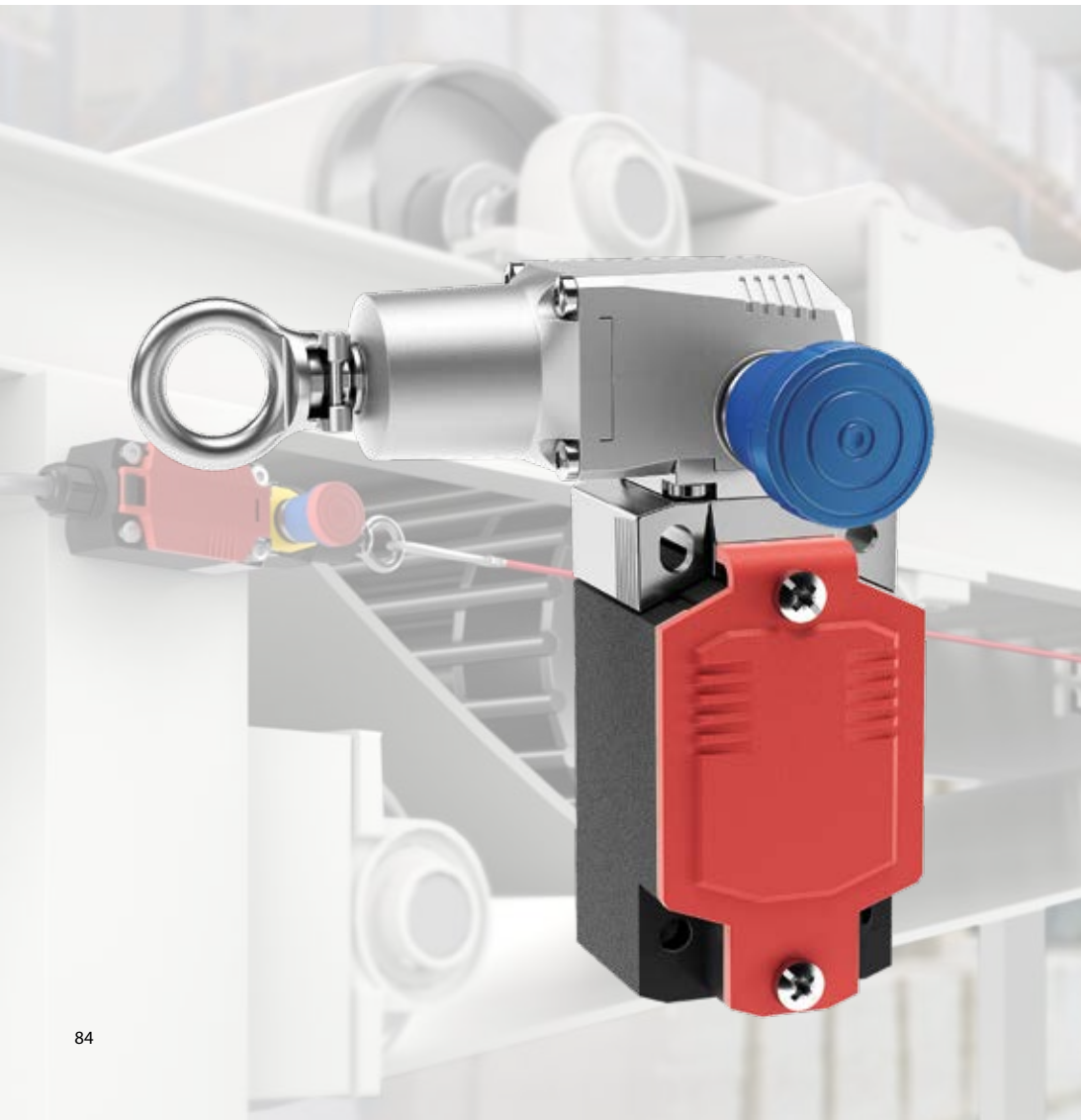
Safety rope pull switches in accordance with EN 60947-5-5 and ISO 13850

**Options**

- M12 connector for easy mounting
- The quick-release clamping device "QF-40" Quick-Fix can be found in the "Accessories" chapter (page 90)



# Rope Pull Switch SRO Metal version



## MANY BENEFITS AT A GLANCE

- As a metal or plastic variant – or as a combination of both
- Particularly compact design for use in confined spaces
- Also available with an emergency stop button as an option for the rope
- Possible tensioning range up to 30 m
- Up to 4 contacts

## Technical data

### Electrical data

#### Switching elements

Rated operating voltage  $U_e$  240 V

Rated insulation voltage  $U_i$  400 V AC

Utilisation category/  
Switching capacity AC-15, 240 V/3 A ; DC-13, 240 V/1.5 A

### Mechanical data

Enclosure Thermoplastic, glass fibre reinforced (UL 94-V0)

Mechanical switching frequency max.  $\leq 20$ /min.

Mechanical service life  $1 \times 10^5$  switching cycles

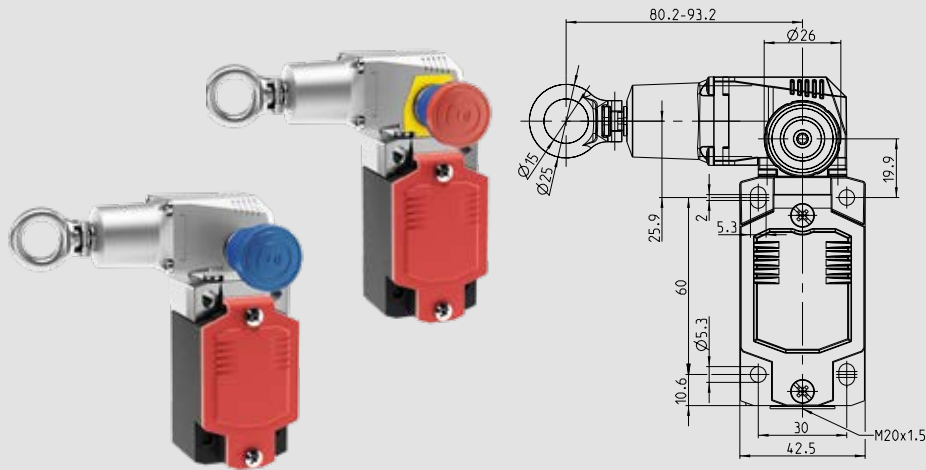
Permissible ambient temperature  $-30^\circ\text{C}$  to  $+75^\circ\text{C}$

Protection class IP67 according to IEC 60529

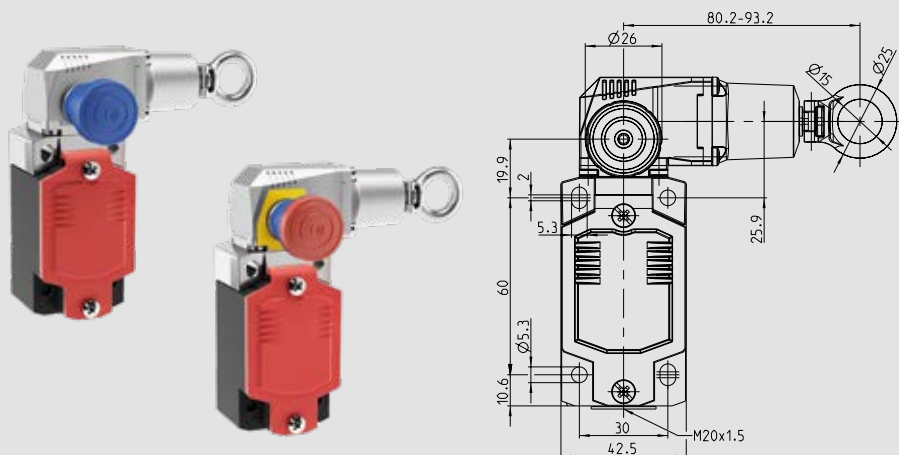
### ID for safety engineering

B10d NC  $2 \times 10^5$  cycles

### SRO-M78...HL...



### SRO-M78...HR...



#### Product selection

Article number	Designation	Contact type	Max. span length *
6012891147	SRO-M78-31-HL30-1	3 NC/1 NO	max. 30 m
6012891151	SRO-M78-31-HL30-2	3 NC/1 NO	max. 30 m
6012891155	SRO-M78-31-HR30-1	3 NC/1 NO	max. 30 m
6012891159	SRO-M78-31-HR30-2	3 NC/1 NO	max. 30 m
6012861145	SRO-M78-20-HL30-1	2 NC	max. 30 m
6012861149	SRO-M78-20-HL30-2	2 NC	max. 30 m
6012861153	SRO-M78-20-HR30-1	2 NC	max. 30 m
6012861157	SRO-M78-20-HR30-2	2 NC	max. 30 m

\* Temperature-dependent



### Optionen

- M12 connector for easy mounting
- Quick-release clamping device "QF-40"  
Quick-Fix can be found in the "Accessories"  
chapter (page 90)

Safety rope pull switches in  
accordance with EN 60947-5-5  
and ISO 13850

# Rope Pull Switch SR



## MANY BENEFITS AT A GLANCE

- Sturdy and resistant plastic enclosure
- Flexible handling due to three cable entries M20 x 1.5
- Easy installation due to maximum connection space

## Technical data

### Electrical data

#### Switching elements

Rated operating voltage  $U_e$  240 V

Rated insulation voltage  $U_i$  250 V AC

Utilisation category/  
Switching capacity AC-15, 240 V/3 A

### Mechanical data

Enclosure Glass fibre reinforced polyamide PA 6

Mechanical switching frequency max.  $\leq 20$ /min.

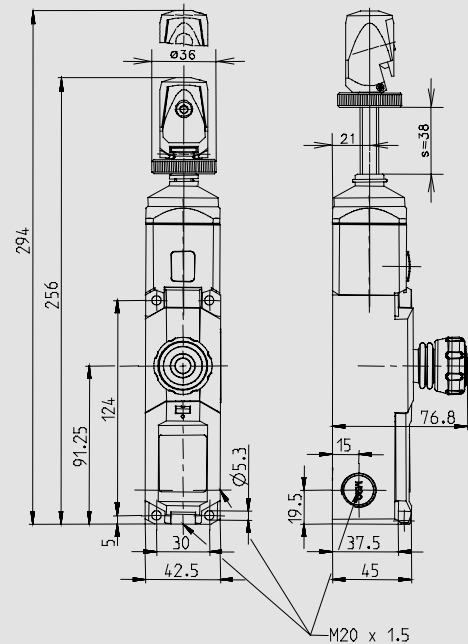
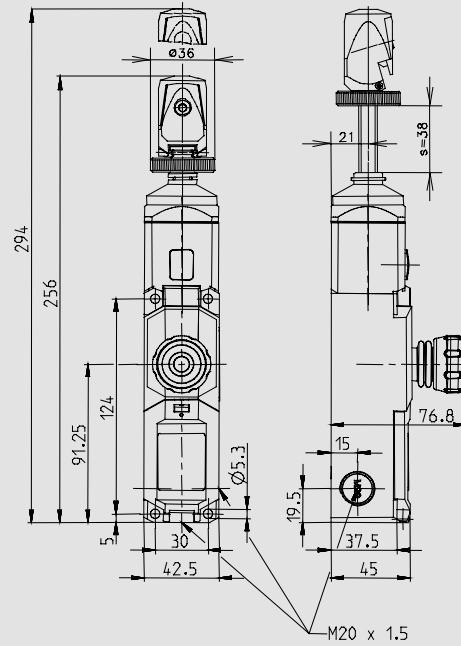
Mechanical service life  $1 \times 10^5$  switching cycles

Permissible ambient temperature  $-25^\circ\text{C}$  to  $+70^\circ\text{C}$

Protection class IP67 according to IEC 60529

### ID for safety engineering

B10d NC  $1 \times 10^5$  cycles



### Product selection

Article number	Designation	Contact type	Max. span length*	Features
6011629067	SR-U2Z-NA-QF-100-L0-0-0	2 NC/2 NO	max. 25 m	Emergency stop NA, Quick-Fix QF
6011629068	SR-U2Z-NA-QF-175-L0-0-0	2 NC/2 NO	max. 37.5 m	Emergency stop NA, Quick-Fix QF
6011629069	SR-U2Z-NA-QF-300-L0-0-0	2 NC/2 NO	max. 75 m	Emergency stop NA, Quick-Fix QF
6011629070	SR-U2Z-0-QF-100-L0-0-0	2 NC/2 NO	max. 25 m	Quick-Fix QF
6011629071	SR-U2Z-0-QF-175-L0-0-0	2 NC/2 NO	max. 37.5 m	Quick-Fix QF
6011629072	SR-U2Z-0-QF-300-L0-0-0	2 NC/2 NO	max. 75 m	Quick-Fix QF

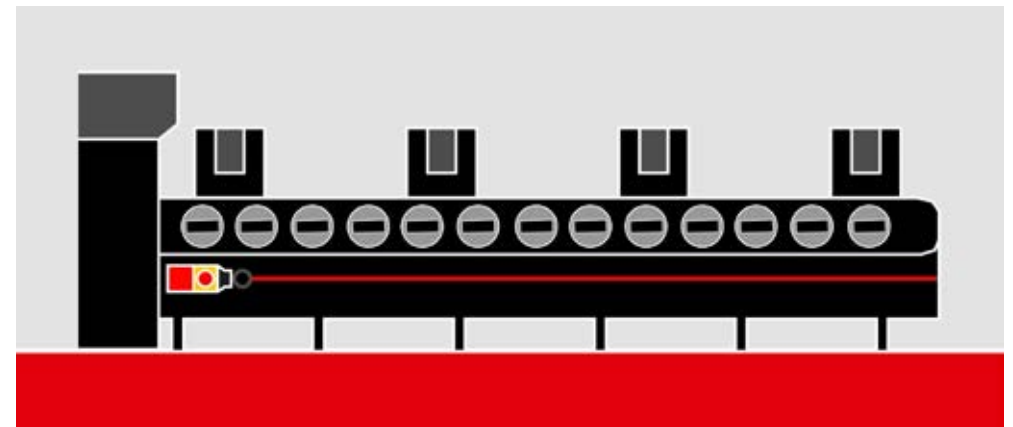
\* Temperature-dependent



Safety rope pull switches in accordance with EN 60947-5-5 and ISO 13850

### Options

- Quick-Fix counter spring with quick release head
- With towing eye for classic mounting



# Rope Pull Switch SRM



## MANY BENEFITS AT A GLANCE

- Sturdy and resistant metal enclosure
- Suitable for outdoor use
- Easy mounting due to universal hole pattern
- Flexible handling thanks to three cable entries M20 x 1.5
- Easy installation due to maximum connection space

## Technical data

### Electrical data

#### Switching elements

Rated operating voltage	$U_e$	240 V
Rated insulation voltage	$U_i$	250 V AC
Utilisation category/ Switching capacity		AC-15, 240 V/3 A; 120 V/6 A DC-13, 250 V/0.27 A; 125 V/0.55 A

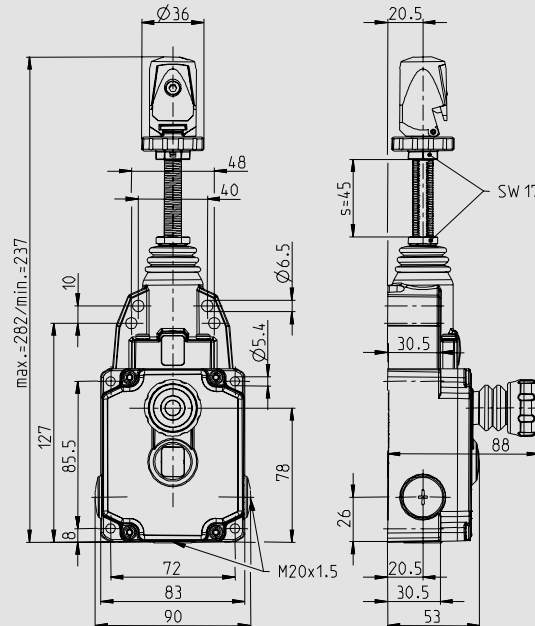
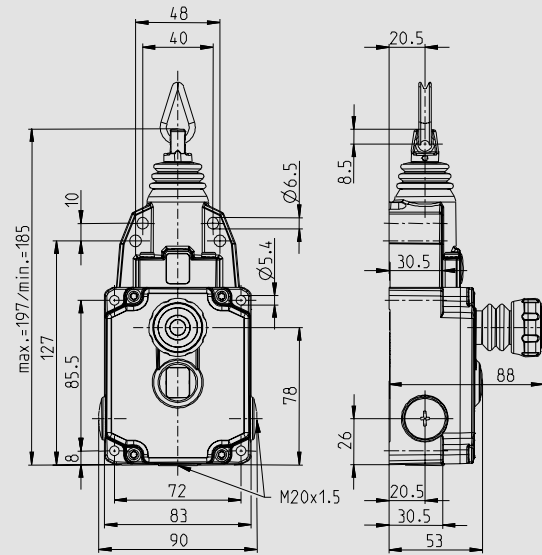
### Mechanical data

Enclosure	AL die-cast
Mechanical switching frequency	max. $\leq 20$ /min.
Mechanical service life	$1 \times 10^5$ switching cycles
Permissible ambient temperature	$-30^\circ\text{C}$ to $+80^\circ\text{C}$
Protection class	IP67 according to IEC 60529

### ID for safety engineering

B10d NC	$2 \times 10^5$ cycles
---------	------------------------





### Product selection

Article number	Designation	Contact type	Max. span length*	Features
6012921089	SRM-U1Z/U1Z-LU-175	2 NC/2 NO	max. 37.5 m	Eye LU
6012921090	SRM-U1Z/U1Z-LU-175-E	2 NC/2 NO	max. 37.5 m	Eye LU, remote indicator E
6012921091	SRM-U1Z/U1Z-LU-300	2 NC/2 NO	max. 75 m	Eye LU
6012921092	SRM-U1Z/U1Z-LU-300-E	2 NC/2 NO	max. 75 m	Eye LU, remote indicator E
6012929085	SRM-U1Z/U1Z-QF-175	2 NC/2 NO	max. 37.5 m	Quick-Fix QF
6012929086	SRM-U1Z/U1Z-QF-175-E	2 NC/2 NO	max. 37.5 m	Quick-Fix QF, remote indicator E
6012929087	SRM-U1Z/U1Z-QF-300	2 NC/2 NO	max. 75 m	Quick-Fix QF
6012929088	SRM-U1Z/U1Z-QF-300-E	2 NC/2 NO	max. 75 m	Quick-Fix QF, remote indicator E

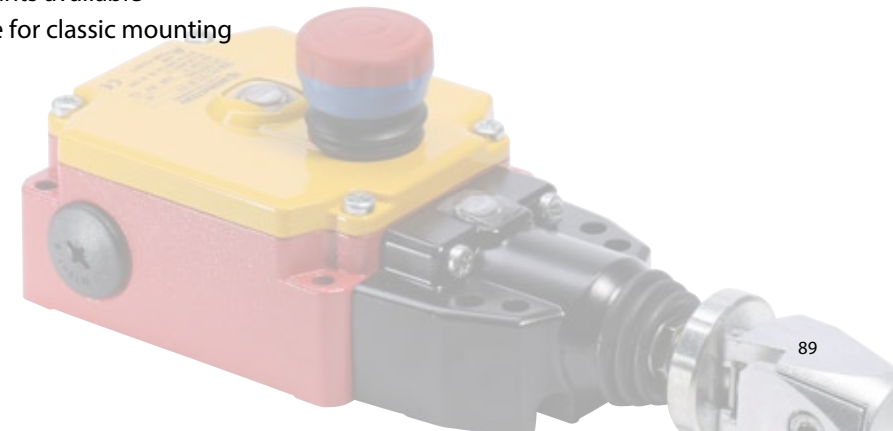
\* Temperature-dependent



### Options

- Electronic remote monitoring
- Cable counter spring with quick-release head
- AS-Interface variants available
- With drawbar eye for classic mounting

Safety rope pull switches in accordance with EN 60947-5-5 and ISO 13850



# Accessories

## Quick-Clamping Device Quick-Fix



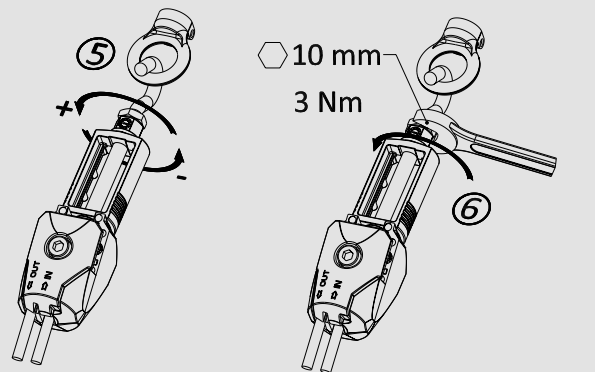
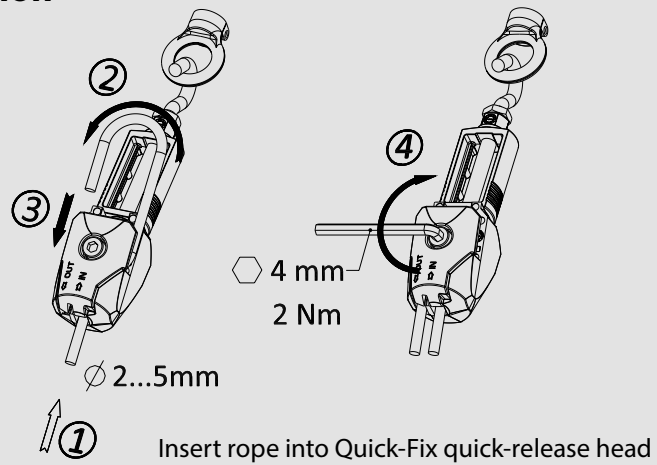
### MANY BENEFITS AT A GLANCE

- Simplified installation of the rope pull system for emergency stop applications with rope pull switches
- Cost and time-saving
- Reduced risk of injury as no rope has to be stripped
- Easy adjustment of the rope tension
- Reduction in the number of components required
- Only 1 tool necessary
- Ergonomic design (ribbed surfaces on the handle)
- Material: Zn-die cast
- Fine adjustment range: 40 mm

### Technical data

Mechanical data	
Enclosure	Zinc die-cast
Draw bolt	Galvanised steel
Idler pulley	Plastic
Weight	0.2 kg
Rope diameter	D = 2–5 mm (Wire rope with plastic coating)

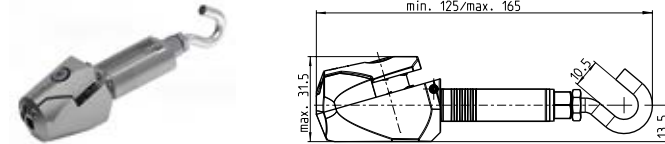
## Installation



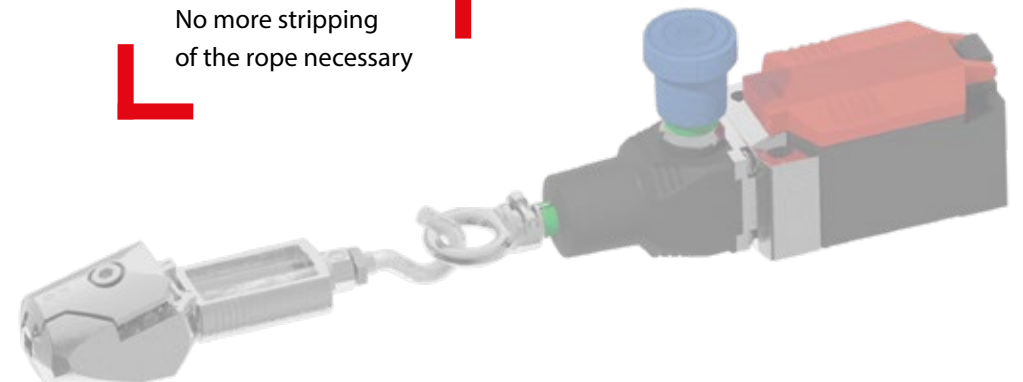
Secure the Quick-Fix quick-release head with an Allen screw SW 4, complete the assembly.

### Quick-Clamping Device QF-40

Article number	Designation
3911040001	QF-40



No more stripping  
of the rope necessary



## More accessories Rope pull switches

### Nut

Article number	Designation
2600439187	SKT.MUTTER M8



### Rope

Article number	Designation
3699100025	SEIL ID3/AD MAX4



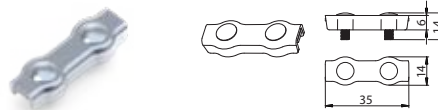
### Pulley block, hinged

Article number	Designation
2690000023	BLOCKSEILR.DREHBAR RD5



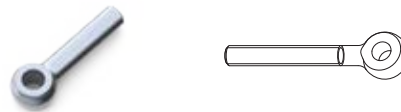
### Rope clamp duplex

Article number	Designation
2690000011	DUPLEX-KLEMME 3-3,5



### Eye screw

Article number	Designation
2600444186	AUG.SCHR.M8X50



### Pulley block clamp

Article number	Designation
3911751437	SEILROLLENLG.F.SI



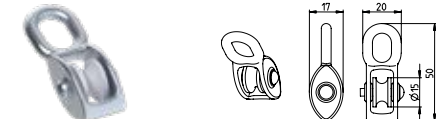
### Rope thimble

Article number	Designation
2696899014	SEIL-KAUSCHE RD3



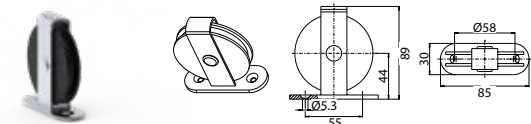
### Pulley block, fixed

Article number	Designation
2690000022	BLOCKSEILR.STARR RD5



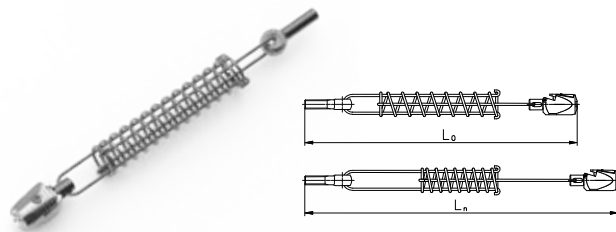
### Guide pulley

Article number	Designation
2690000051	UMLENKROLLE F. SEIL D75



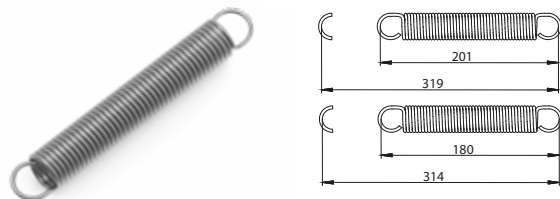
### Rope pull counter spring

Article number	Designation
3911042153	SR...100/SR...175/SRM...175
3911042154	SR...300/SRM...300/SRO



### Tension spring

Article number	Designation
3652100198	ZUGFEDER 4X201
3652100332	ZUGFEDER 3,2X180



### Turnbuckle

Article number	Designation
2691480016	SPANN.SCHL.M5X50
2691480017	SPANN.SCHL.M6X60



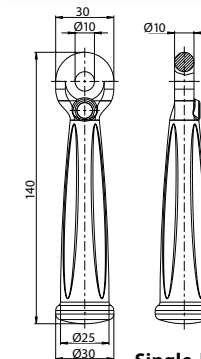
### Rope for command devices

Article number	Designation
3699100072	SEIL D6MM WEIß
3699100073	SEIL D6MM BLAU
3699100074	SEIL D6MM GRÜN
3699100075	SEIL D6MM GELB

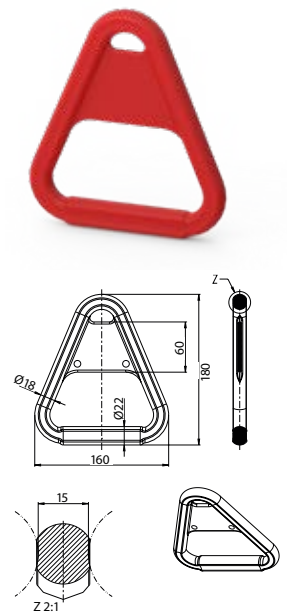


### Single-handle

Article number	Designation
3595900157	EINHANDGRIFF WEIß
3595900158	EINHANDGRIFF BLAU
3595900159	EINHANDGRIFF GRUEN
3595900167	EINHANDGRIFF ROT
3595900169	EINHANDGRIFF GELB
3595900161	EINHANDTRIANGELGRIFF ROT



Single-handle



One-hand triangle handle

# Double-Spanned Rope Pull Switch Si1



## MANY BENEFITS AT A GLANCE

- Sturdy and resistant metal enclosure
- For applications with high temperature fluctuations and long rope lengths
- Excellent for harsh environments due to the robust enclosure

## Technical data

### Electrical data

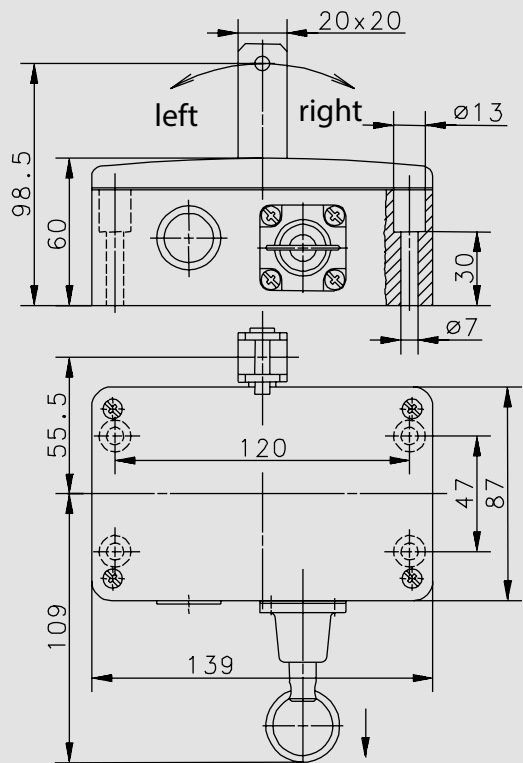
Rated operating voltage	$U_e$	250 V
Rated insulation voltage	$U_i$	250 V AC
Utilisation category		AC-15, $U_e/I_e$ 240 V/3 A
Conventional thermal current	$I_{the}$	10 A

### Mechanical data

Enclosure/Cover		AL sand casting
Mechanical switching frequency		$\leq 10/\text{min.}$
Mechanical service life (up to)		$1 \times 10^6$ Switching cycles
Permissible ambient temperature		$-30^\circ\text{C}$ to $+80^\circ\text{C}$
Protection class		IP65 according to EN 60529

### ID for safety engineering

B10d (up to)		2 Mio.
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Product selection

Article number      Designation      Max. span length

6014735001      SI1-U2Z AK R-RAST      2 x 50 m

6014735025      SI1-U1Z/U1Z AK R-RAST      2 x 50 m



# Double-Spanned Rope Pull Switch Si2



## MANY BENEFITS AT A GLANCE

- Sturdy and resistant metal enclosure
- For applications with high temperature fluctuations and long rope lengths
- Excellent for harsh environments due to the robust enclosure

## Technical data

### Electrical data

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

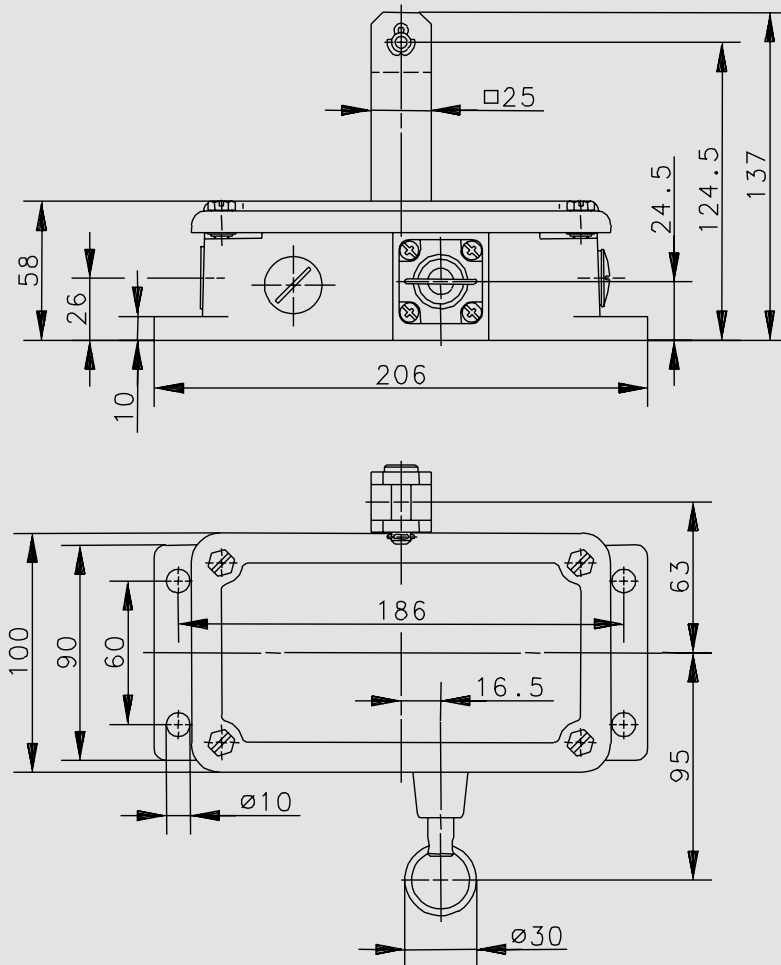
### Mechanical data

Enclosure/Cover		Grey cast iron
Mechanical switching frequency		$\leq 10/\text{min.}$
Mechanical service life (up to)		$1 \times 10^6$ switching cycles
Permissible ambient temperature		$-30^\circ\text{C}$ to $+80^\circ\text{C}$
Protection class		IP65 according to EN 60529

### ID for safety engineering

B10d (up to)		2 Mio.
--------------	--	--------

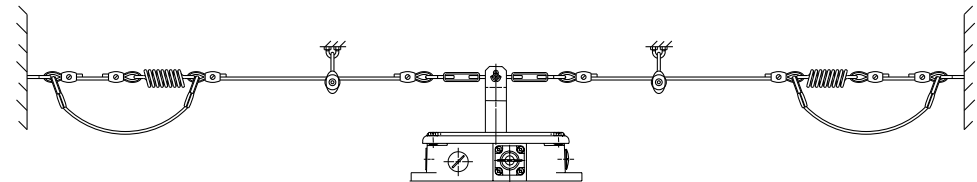




#### Product selection

Article number	Designation	Max. span length
----------------	-------------	------------------

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



#### How it works

Two ropes, tensioned in opposite directions, are attached to the switchgear. The ends of the ropes are attached to a wall with counter springs. Provided the temperature change is the same at all points of the rope, the change in length of the ropes is compensated for by the springs.

# Conveyor belt monitoring switch Si2



## MANY BENEFITS AT A GLANCE

- Roller lever with ball bearings
- Three cable entries M20 x 1.5 for through-wiring
- 2 make contacts and 2 positive break contacts
- Robust construction

## Technical data

### Electrical data

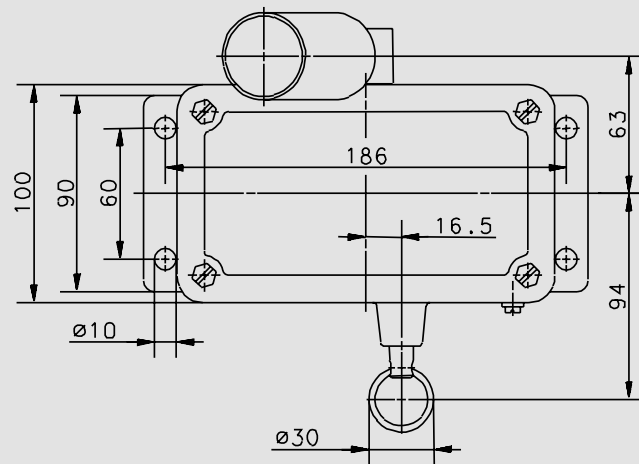
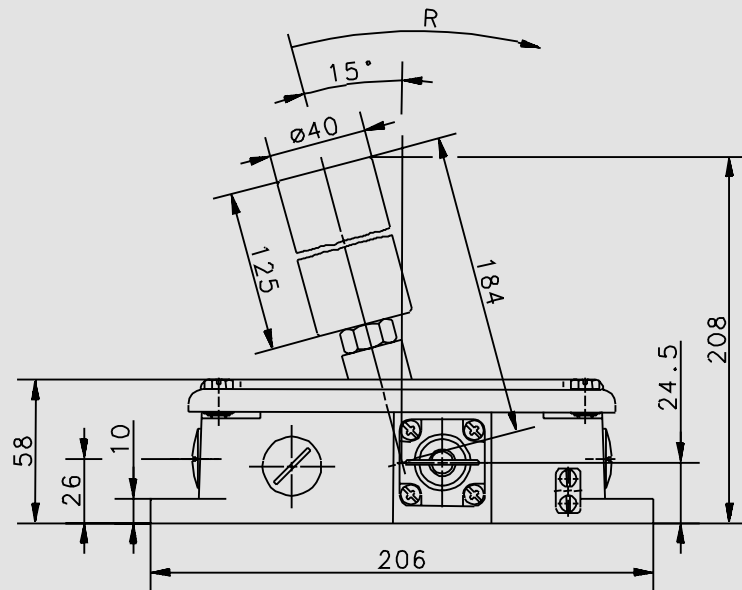
Rated operating voltage	$U_e$	240 V
Rated insulation voltage	$U_i$	400 V AC
Utilisation category		AC-15, $U_e/I_e$ 240 V/3 A
Conventional thermal current	$I_{the}$	10 A

### Mechanical data

Enclosure/Cover	Grey cast iron
Switching frequency	$\leq 10/\text{min.}$
Mechanical service life	$2 \times 10^6$ switching cycles
Permissible ambient temperature	$-30^\circ\text{C}$ to $+80^\circ\text{C}$
Protection class	IP65 according to EN 60529

### ID for safety engineering

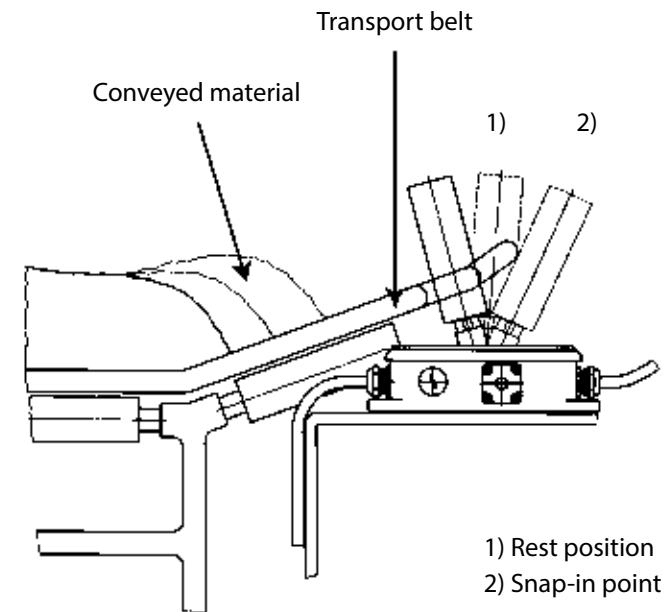
B10d	$4 \times 10^6$ cycles
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Product selection

Article number    Designation

6015736003    Si2-UZZ AW R-Rast



# Emergency stop devices



Page 102



Page 104

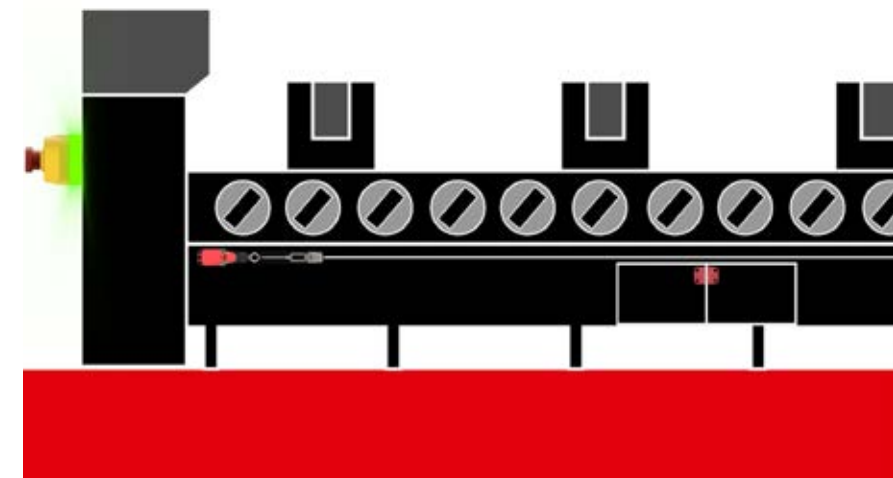


Page 106

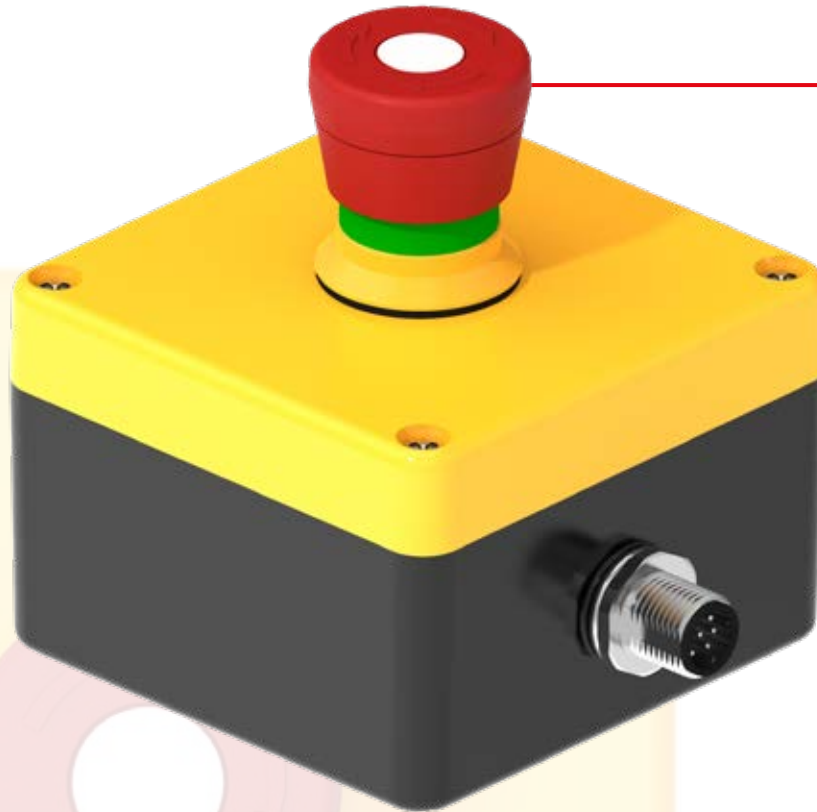
## For switching off in dangerous situations

In modern industry, man and machine work closely alongside and with each other. Above all, the safety of the employees must be guaranteed at all times. The integrity of the plant and the material are also important criteria, however. For this reason, every system must be equipped with an emergency stop in accordance with the Machinery Directive. BERNSTEIN offers the right emergency stop solution and emergency stop relay for every complexity, size and environment of your system to prevent injury to people and damage to machines and materials in an emergency.

According to the Machinery Directive, every machine must be equipped with one or more emergency stop command devices in order to avoid imminent or actual danger.



# Emergency stop SEU 2 (with OSSD output)



## MANY BENEFITS AT A GLANCE

- Simple integration of the emergency stop into the sensor chain via M12 plug connection
- Diagnostic information of each emergency stop device available
- Identification of whether the switch-off signal was triggered by the emergency stop or the door monitoring system
- Monitoring of compliance with test cycles for emergency stop possible
- TR 24119 (error masking) does not have to be taken into account
- Saving of a safe input or safety relay

## Technical data

### Electrical data

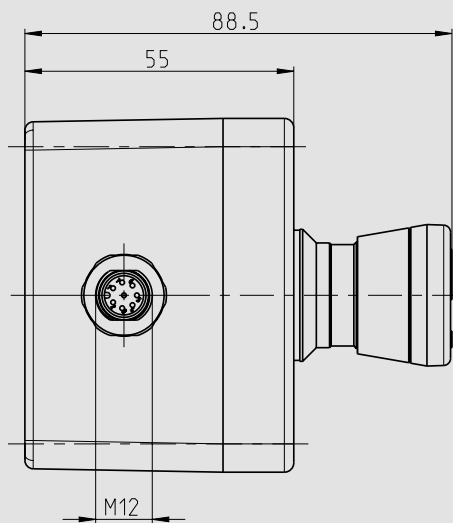
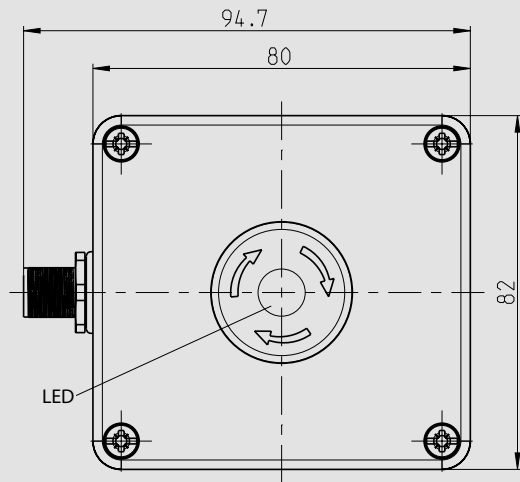
Rated operating voltage	$U_e$	24 V DC
Output current per signalling output	$I_e$	10 mA
Output current of the safety outputs (OSSD)	$I_e$	100 mA

### Mechanical data

Enclosure material	Polycarbonate
Ambient temperature	-25°C to +70°C
Protection class	IP65

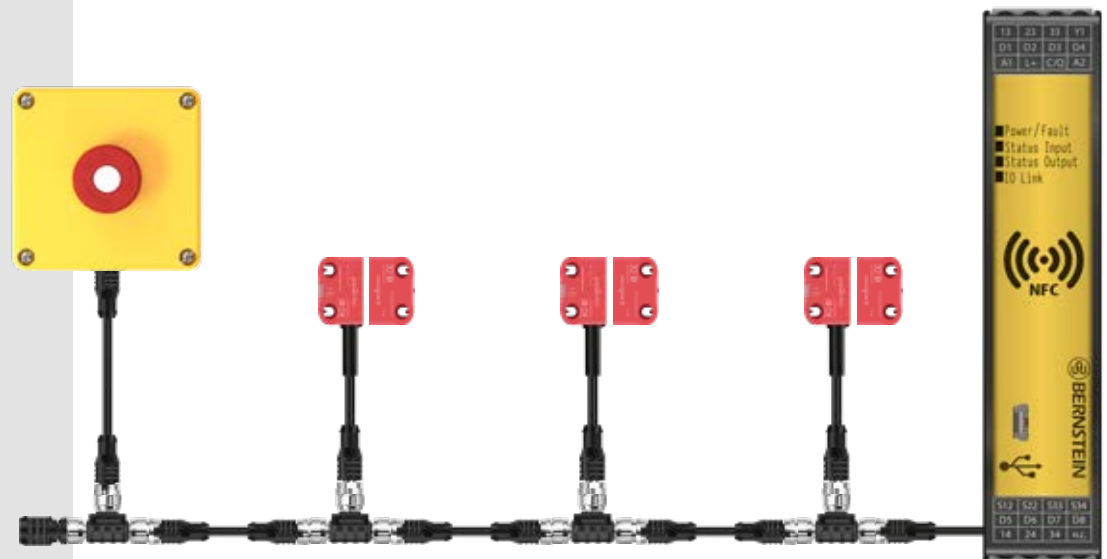
### ID for safety engineering

up to PL e/Cat. 4 (according to ISO 13849-1)  
up to SIL CL 3 (according to IEC 62061)



Product selection

Article number	Designation	Description
6075689138	SEU-2/0-P80-C	Emergency Stop Switch



# Illuminated emergency stop SEU 3 (with OSSD output)

## MANY BENEFITS AT A GLANCE

- Highly visible status display thanks to large LED display
- Full diagnostic capabilities thanks to patented BERNSTEIN DCD technology
- Easy wiring thanks to integrated M12 connector
- OPTIONAL: Local reset function maximises user safety

## Technical data

### Electrical data

Rated operating voltage  $U_e$  24 V DC

### Mechanical data

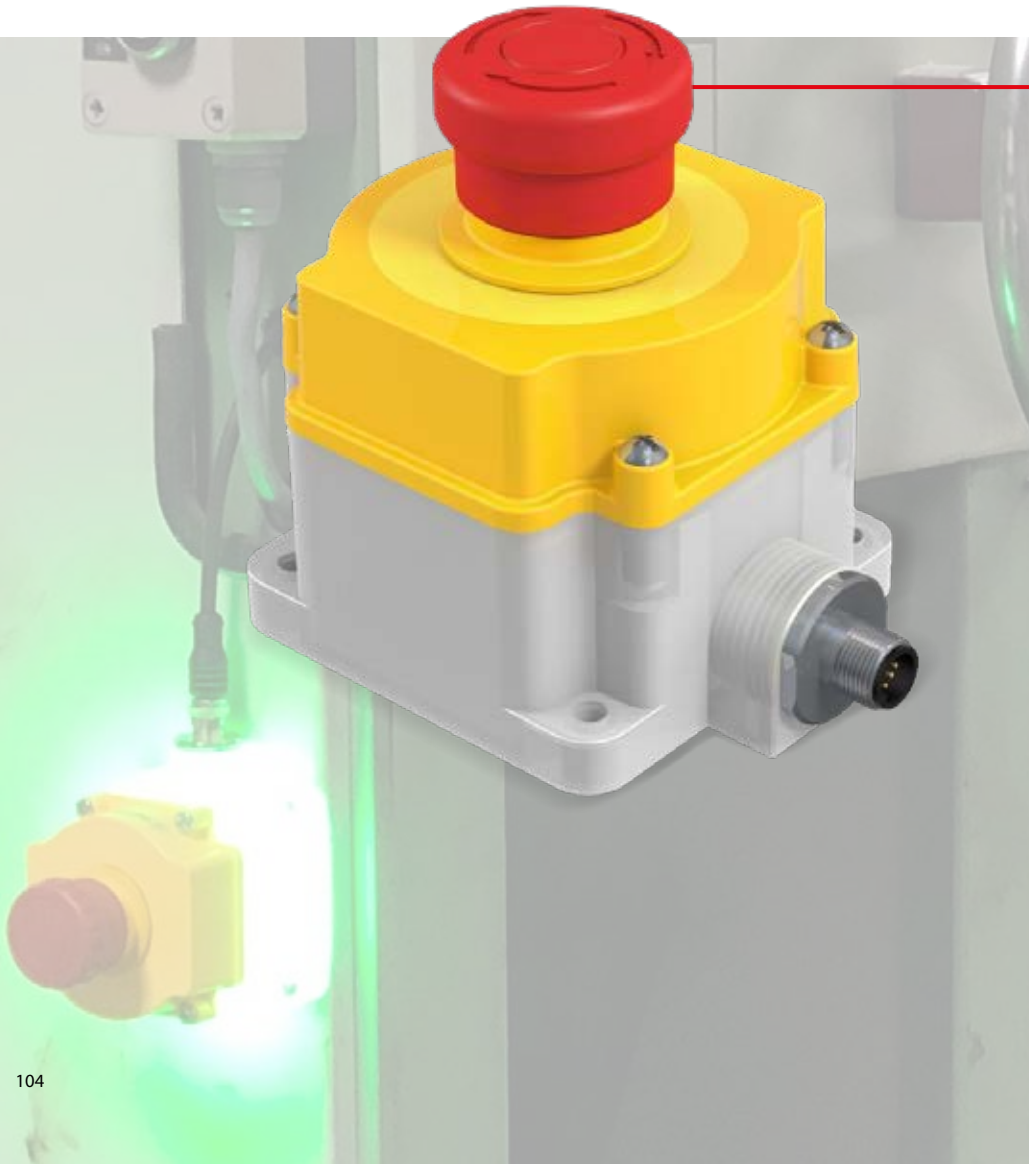
Material enclosure/push button Polycarbonate/Polyamide

Ambient temperature  $-25^{\circ}\text{C}$  to  $+50^{\circ}\text{C}$

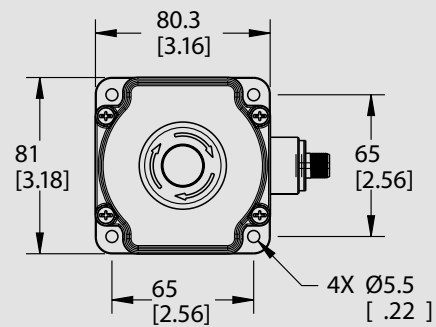
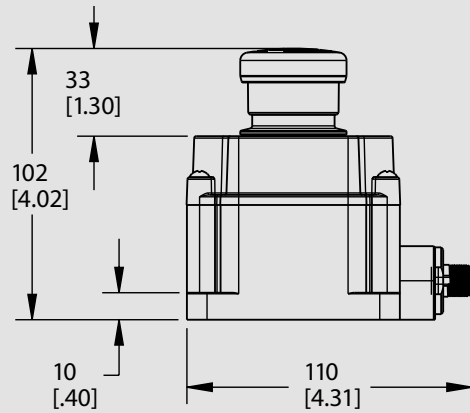
Protection class IP65/with WDC IP67/IP69 (ISO 60529)

### ID for safety engineering

up to PL e/Cat. 4 and SIL CL 3







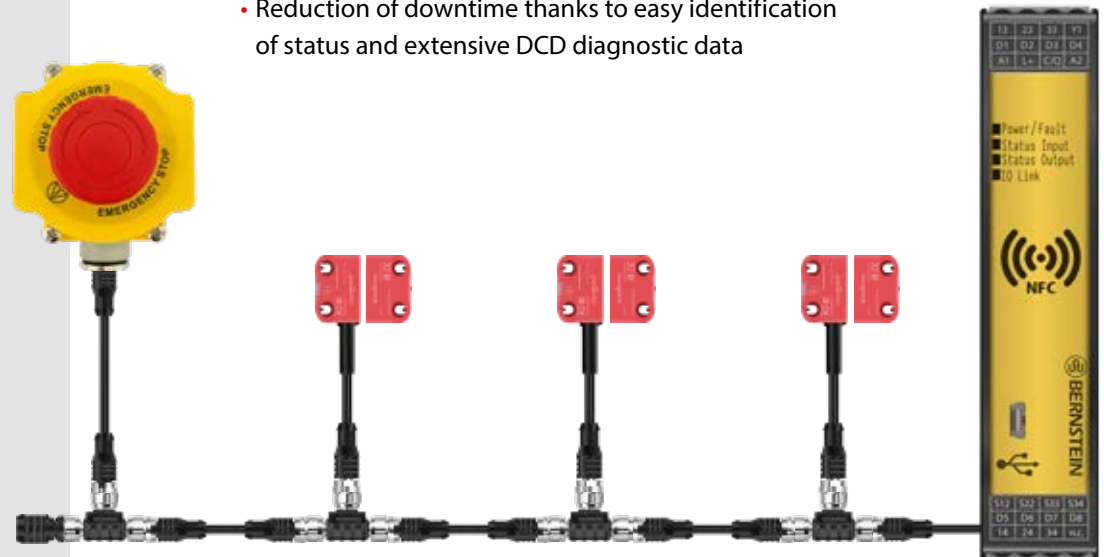
### Product selection

Article number	Designation	Reset function	Illumination colour *
6075689169	SEU-3/0/3-P81-C	No	Yellow/Red
6075689170	SEU-3/0/1-P81-C	No	Off/Red
6075689171 <sup>1</sup>	SEU-3/0/2-P81-C <sup>1</sup>	No	Green/Red
6075689175	SEU-3/3/3-P81-C	Yes	Yellow/Red
6075689176	SEU-3/3/1-P81-C	Yes	Off/Red
6075689177 <sup>1</sup>	SEU-3/3/2-P81-C <sup>1</sup>	Yes	Green/Red

\* The first colour indicates the unactuated emergency stop and the second colour the actuated emergency stop.  
<sup>1</sup> Goods in stock: Article immediately available



- Reduction of downtime thanks to easy identification of status and extensive DCD diagnostic data



# Illuminated emergency stop SEU 4 (with OSSD output)

## MANY BENEFITS AT A GLANCE

- Highly visible status display thanks to large LED display
- Full diagnostic capabilities thanks to patented BERNSTEIN DCD technology
- Easy wiring thanks to integrated M12 connector
- OPTIONAL: Local reset function maximises user safety

## Technical data

### Electrical data

Rated operating voltage  $U_e$  24 V DC

### Mechanical data

Material enclosure/push button Polycarbonate/Polyamide

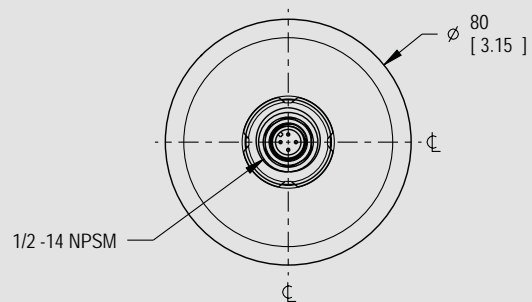
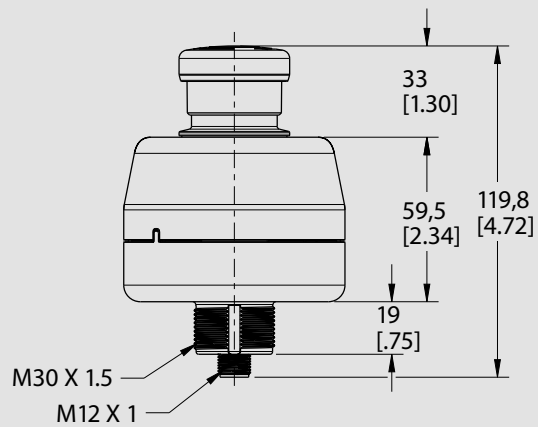
Ambient temperature  $-25^{\circ}\text{C}$  to  $+50^{\circ}\text{C}$

Protection class IP65/with WDC IP67/IP69 (ISO 60529)

### ID for safety engineering

up to PL e/Cat. 4 and SIL CL 3





#### Product selection

Article number	Designation	Reset function	Illumination colour *
6075689166	SEU-4/0/3-P86-C	No	Yellow/Red
6075689167	SEU-4/0/1-P86-C	No	Off/Red
6075689168 <sup>1</sup>	SEU-4/0/2-P86-C <sup>1</sup>	No	Green/Red
6075689172	SEU-4/3/3-P86-C	Yes	Yellow/Red
6075689173	SEU-4/3/1-P86-C	Yes	Off/Red
6075689174 <sup>1</sup>	SEU-4/3/2-P86-C <sup>1</sup>	Yes	Green/Red

\* The first colour indicates the unactuated emergency stop and the second colour the actuated emergency stop.  
<sup>1</sup> Goods in stock: Article immediately available



- The silicone protective cover "Washdown Cover" to increase the protection class up to IP69 (except the M12 connection) can be found on page 108.
- Reduction of downtime thanks to easy identification of status and extensive DCD diagnostic data.



# Accessories

## SEU



### Mounting bracket and silicone protective cover

Article number	Designation	Description
6075689178 <sup>1</sup>	SEU-MB1H <sup>1</sup>	Emergency stop mounting bracket, metal, black
6075689179 <sup>1</sup>	SEU-MB1H-S <sup>1</sup>	Emergency stop mounting bracket, stainless steel
6075689182 <sup>1</sup>	SEU-WDC <sup>1</sup>	Silicone protective cover IP67/69 for SEU-4

<sup>1</sup> Goods in stock: Article immediately available



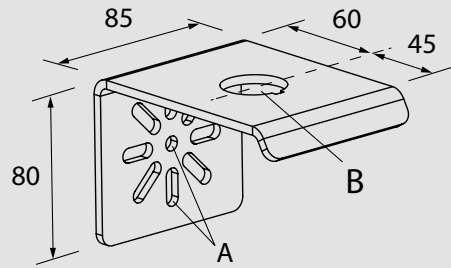
Mounting bracket,  
Metal, black



Mounting bracket,  
Stainless steel



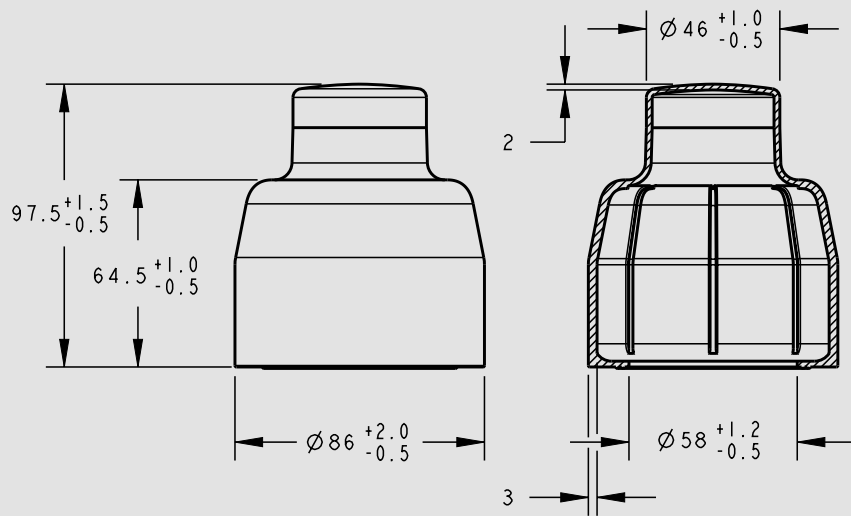
Silicone protective cover  
SEU-WDC



**Mounting bracket**

SEU-MB1H ...

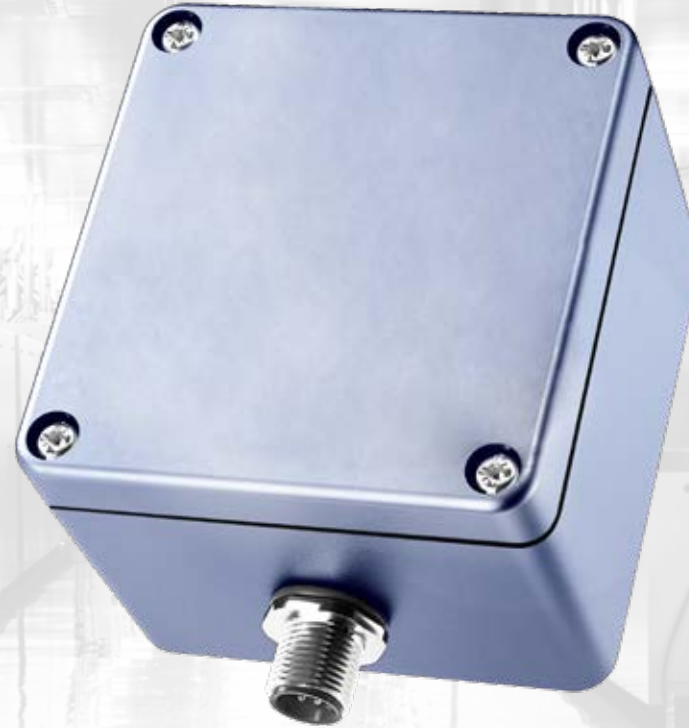
Dimensions: A=  $\varnothing$  7mm, B=  $\varnothing$  30mm



# DCD Interfaces



Page 112



Page 114

### **For the integration of mechanical switches in a series connection**

The connection interfaces are used to integrate mechanical switches, such as common emergency stop switches, in a series connection with SRF sensors or SEU emergency stop devices.

Furthermore, DCD diagnostic information is also provided for the connected switch and offers the advantage of fast fault detection and “predictive maintenance” for the mechanical switch as well.

Furthermore, when using the connection interfaces, even in the case of several mechanical switches in a series connection, the problem of error masking (see page 10) is solved and does not need to be considered further.



DAISY CHAIN  
DIAGNOSTICS

# The smart T-adapter



## MANY BENEFITS AT A GLANCE

- Saving of components
- Possible series connection to reduce the number of safety relays
- Diagnostic data is provided, enabling rapid commissioning and troubleshooting
- Significantly smaller and thus well suited for concealed installation
- Standard T-adapter not required
- Fast fault detection through LEDs

## Technical data

### Electrical data

Rated operating voltage	$U_e$	24 V DC
Output current of the safety outputs	$I_e$	100 mA

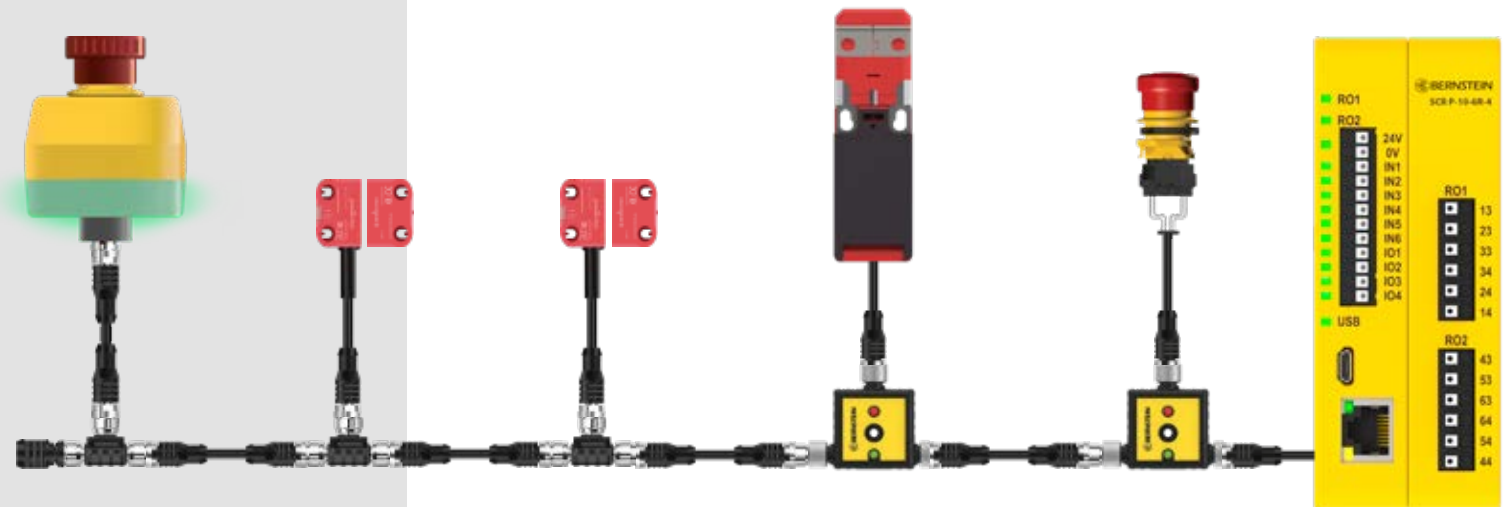
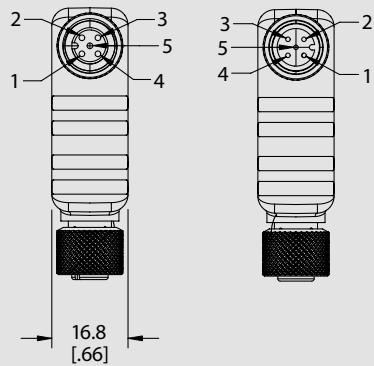
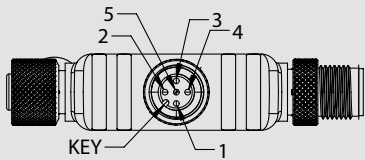
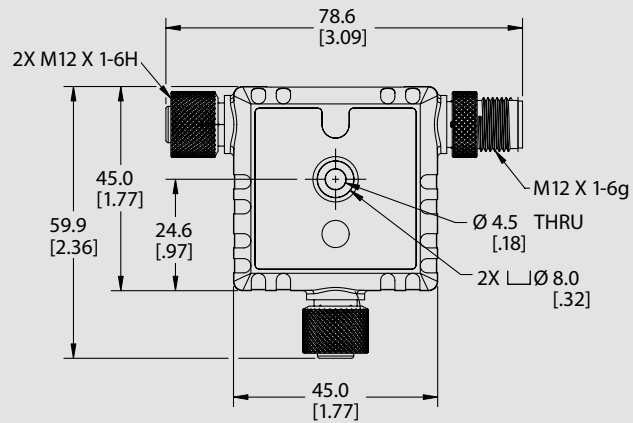
### Mechanical data

Enclosure material	polyvinyl chloride (PVC), black
Ambient temperature	-25°C to +55°C
Protection class	IP67

### ID for safety engineering

up to PL e/Cat. 4 (according to ISO 13849-1)  
up to SIL CL 3 (according to IEC 62061)  
PFHD =  $6.56 \times 10^{-9}$  1/h  
Service life: 20 years





#### Product selection

Article number	Designation	Connection for input devices					Display
		Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	
6075689191	SEU-1/0-T45-C-X-AB	CH1a	CH1b	-	CH2a	CH2b	Green/Red



#### Optionen

- You will find single-ended and double-ended cordsets under accessories (from page 152)

# The connection box SEU 1



## MANY BENEFITS AT A GLANCE

- Easy integration of electromechanical safety switches into the sensor chain via the connection box via M12 plug connection
- Diagnostic information of each connected safety switch available
- Saving of a safe input or a safety relay by integration into the sensor chain

## Technical data

### Electrical data

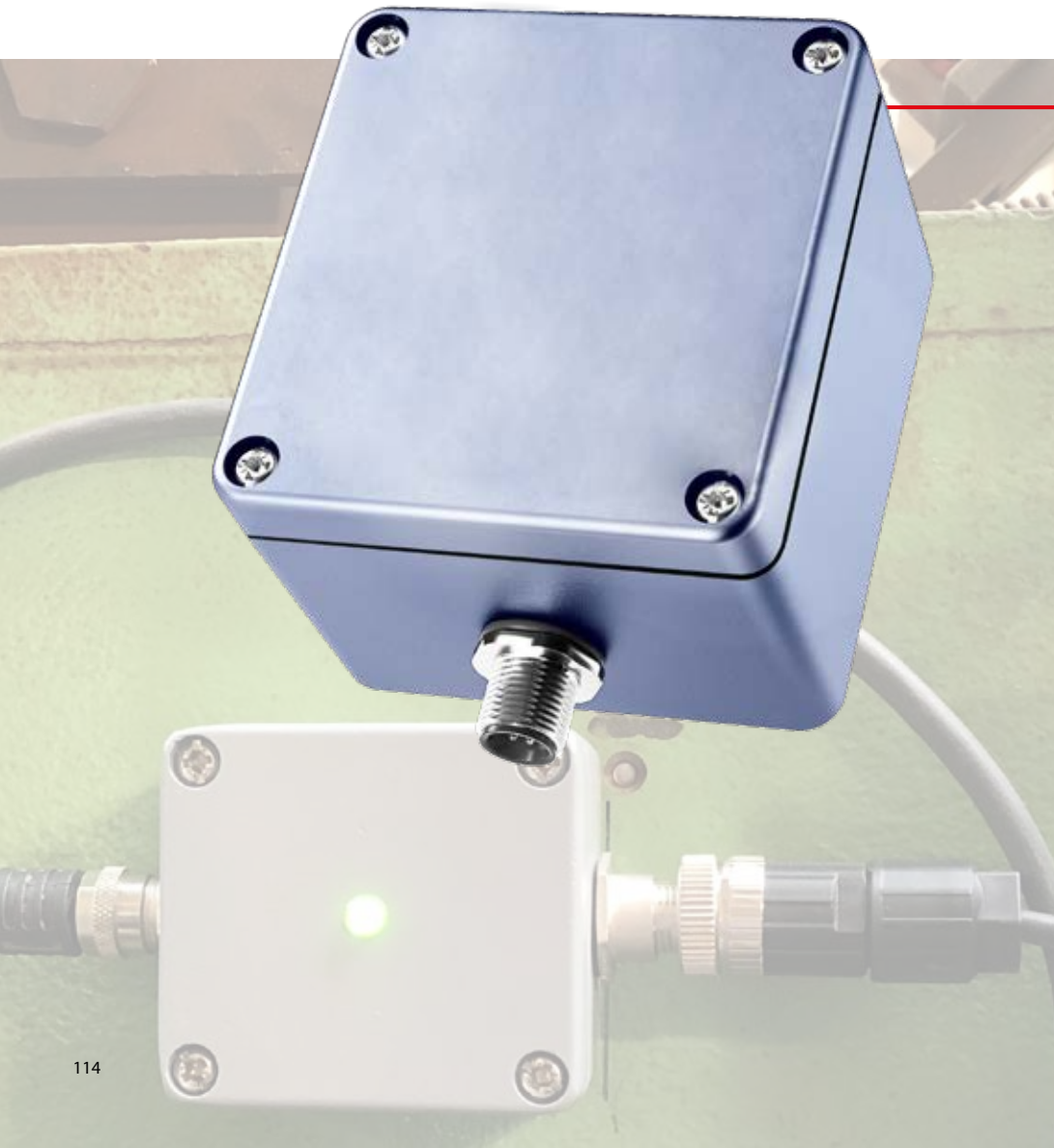
Rated operating voltage	$U_e$	24 V DC
Output current per message output	$I_e$	10 mA
Output current of the safety outputs	$I_e$	100 mA

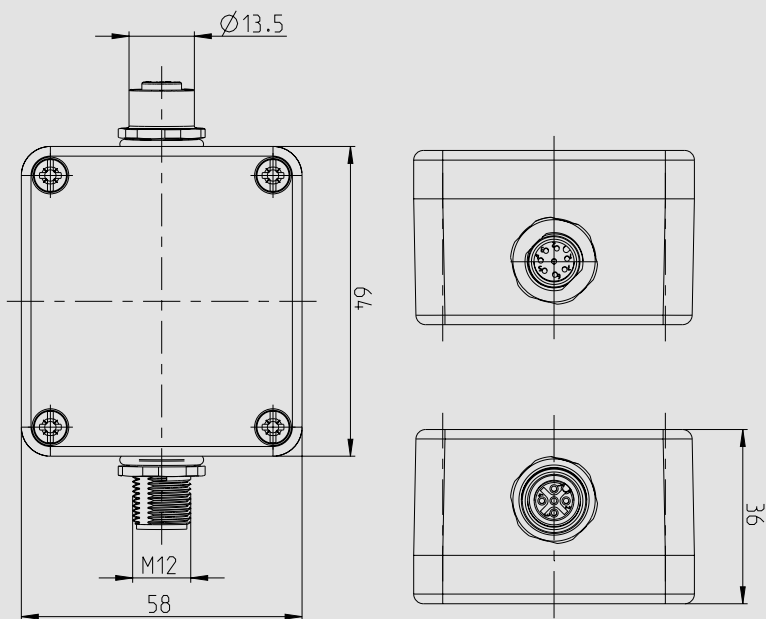
### Mechanical data

Enclosure material:	Die-cast aluminium
Ambient temperature	-25°C to + 70°C
Protection class	IP67

### ID for safety engineering

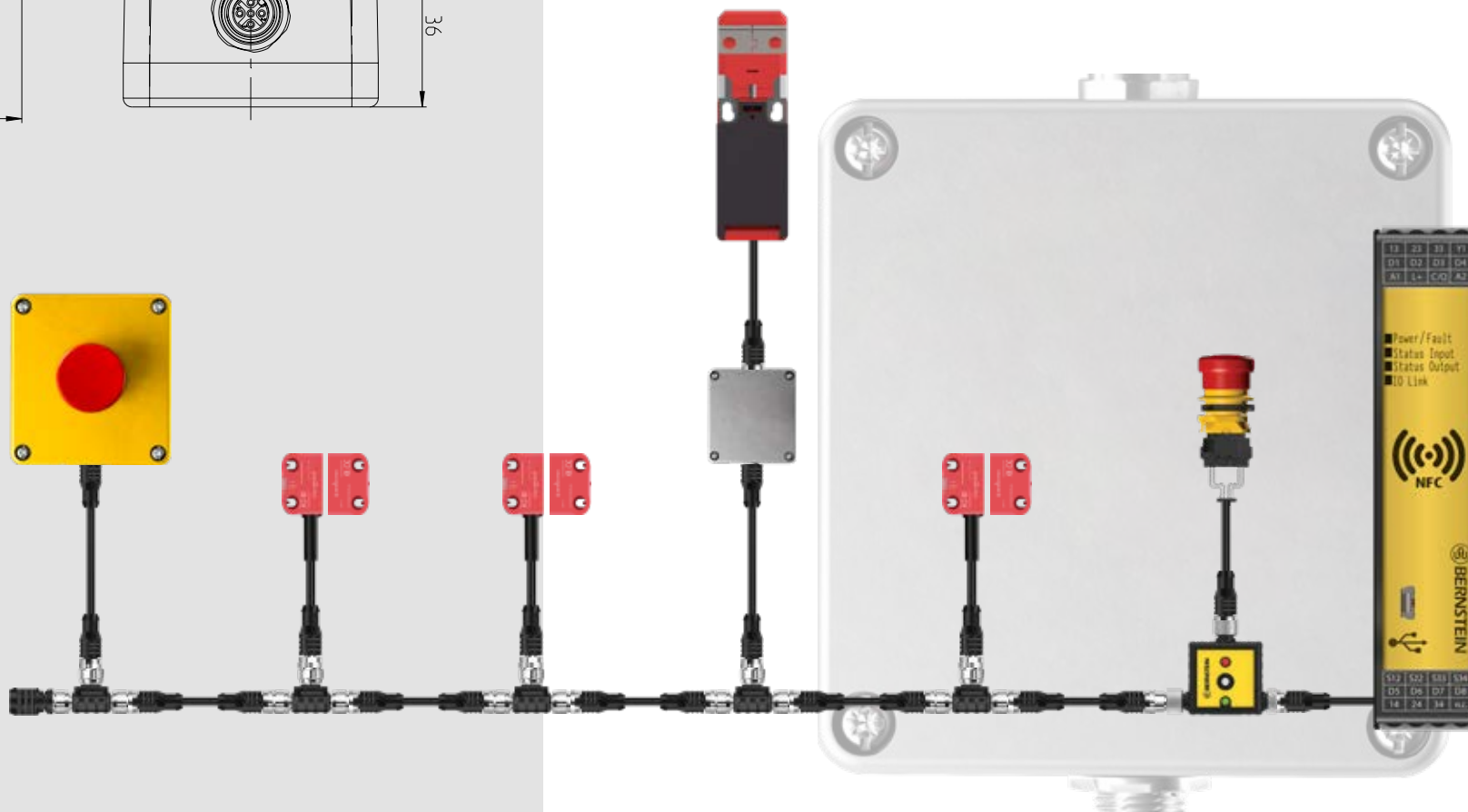
up to PL e/Cat. 4 (according to ISO 13849-1)  
up to SIL CL 3 (according to IEC 62061)





Product selection

Article number	Designation	Description
6075689137	SEU-1/0-M64-C	Connection box
6075689163	SEU-1/0-M64-C	Connection box with LED display



# DCD Gateway on IO-Link



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## **Intelligent diagnostic system**

During the development of the SMART Safety System, we placed special emphasis on the patented DCD diagnostic system. With this Daisy Chain Diagnostic (DCD), you receive comprehensive diagnostic data of all installed components of your system. Sources of error or malfunctions can thus be identified immediately. Thanks to the continuous analysis by the DCD, necessary maintenance work is flagged at an early stage and you can avoid unplanned downtimes.

# Gateway SRF DI-C



## MANY BENEFITS AT A GLANCE

- Diagnostic information via IO-Link, USB and NFC
- Space saving in the control cabinet thanks to slim design
- Provides all relevant information of each device in the chain
- Permanent exchange of all data
- Compatible with BERNSTEIN app "SRF-Diagnose" for Android and iPhone

## Technical data

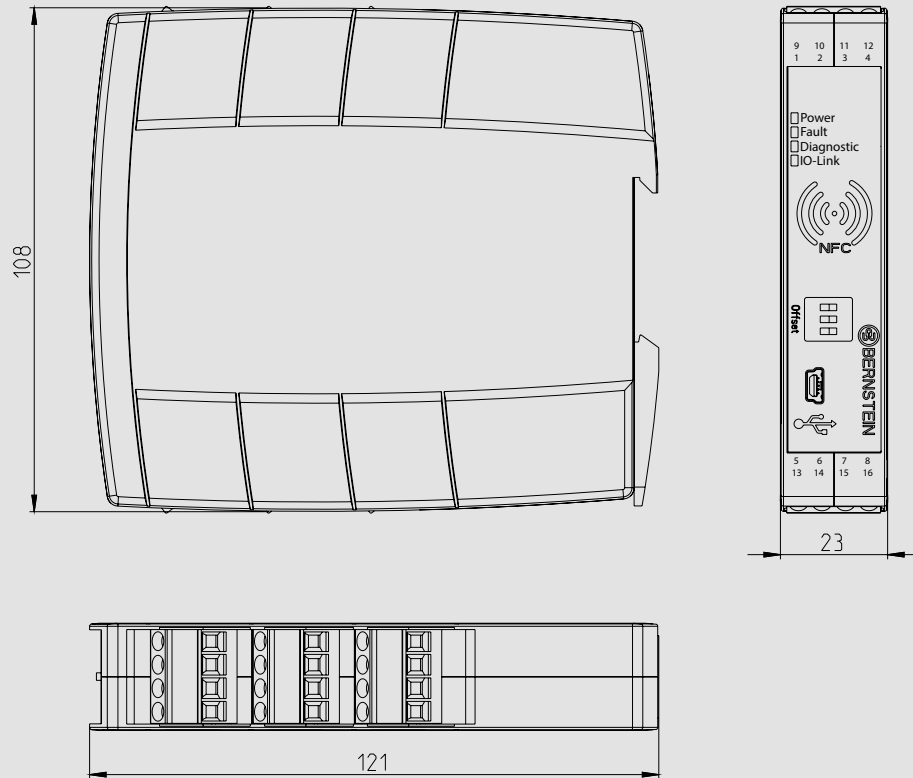
### Electrical data

Rated operating voltage	$U_e$	24 V DC
Output current per message output	$I_e$	50 mA
IO-Link Protocol		V1.1

### Mechanical data

Ambient temperature		0°C to + 60°C
Protection class		IP20





**Product selection**

Article number	Designation	Enclosure	Number of diagnostic circuits	Digital outputs	Interfaces		
					IO-Link	NFC	USB 2.0
6075619122	SRF DI-C-0/1-T	DIN rail housing 22.5 mm	1	-	x	x	x
6075619123	SRF DI-C-8/1-T	DIN rail housing 22.5 mm	1	8	x	x	x
6075619124	SRF DI-C-16/1-T	DIN rail housing 22.5 mm	1	16	x	x	x
6075619125	SRF DI6-C-0/1-T	DIN rail housing 22.5 mm	6	-	x	x	x



# Gateway SRF DI-F



## MANY BENEFITS AT A GLANCE

- Diagnostic information via IO-Link, USB and NFC
- Space saving in the control cabinet thanks to slim design
- Provides all relevant information of each device in the chain
- Permanent exchange of all data
- Compatible with BERNSTEIN app "SRF-Diagnose" for Android and iPhone

## Technical data

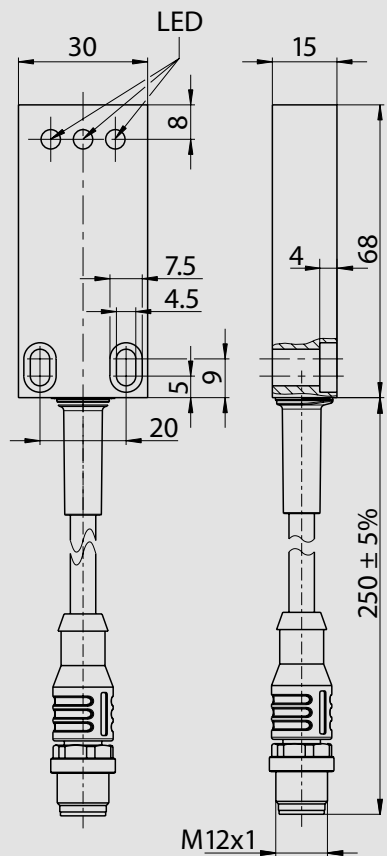
### Electrical data

Rated operating voltage	$U_e$	24 V DC
Output current per message output	$I_e$	50 mA
IO-Link protocol		V1.1

### Mechanical data

Ambient temperature		-25°C to +70°C
Protection class		IP69





Product selection

Article number	Designation	Enclosure	Number of diagnostic circuits	Digital outputs	Interfaces		
					IO-Link	NFC	USB 2.0
6075689126	SRF DI-F-0/2-E0,25	Rectangular sensor enclosure (Use directly on the machine)	1	-	x	x	



# Safety relays and controllers



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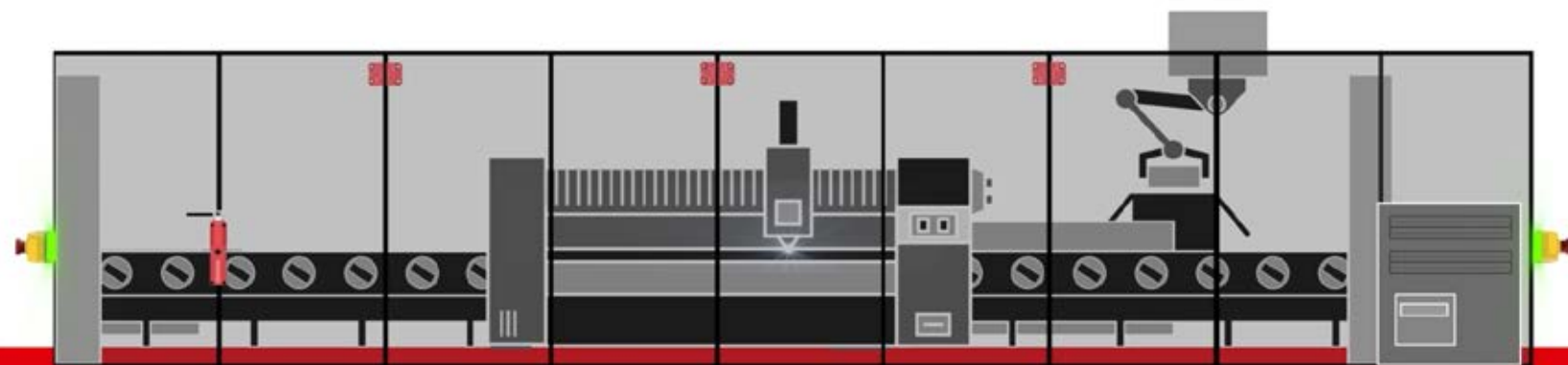


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## Safety relays and controllers

With BERNSTEIN safety relays and controllers and diagnostic modules, safeguarding your machine or system is child's play. The devices monitor position switches, emergency stop devices or even non-contact safety sensors.

Whether as a classic variant or the smart way; as a space-saving or completely configurable module: we have the right solution for your business.



# Safety relay for coded magnetic switches



## MANY BENEFITS AT A GLANCE

- TÜV type-tested safety monitoring system
- Connection for 1 or 2 coded magnetic switches
- Performance level d according to ISO 13849-1
- SIL 3 according to IEC 62061
- Single-fault safety according to IEC 60947-5-3

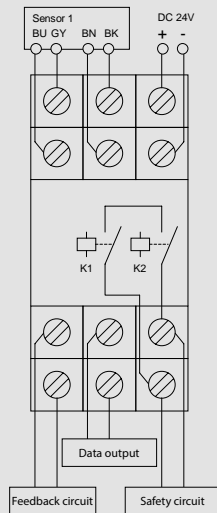
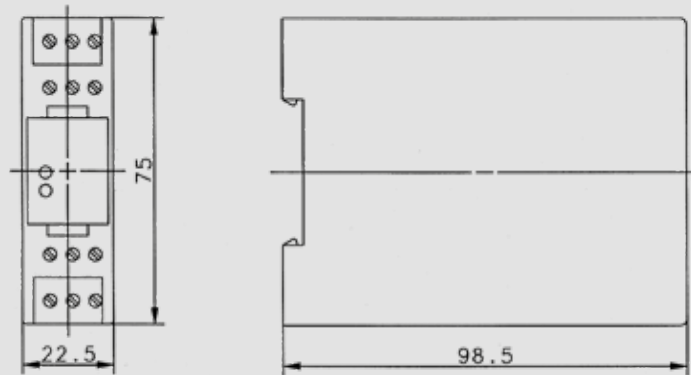
## Technical data

### Electrical data

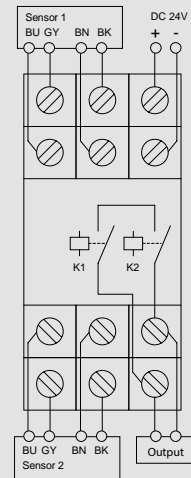
Operating voltage	24 V DC
Switching voltage of the safety output	250 V AC
Switching current of the safety output	8 A

### Mechanical data

Enclosure material	PC
Ambient temperature	0°C to + 55°C
Protection class	IP20



**MÜZ-102**



**MÜZ-202**

**Product selection**

Article number	Designation	Connectable MAK	Feedback circuit	Data output (NC contact)
6392701306	MÜZ-102/D24-FL-DA	1	Yes	Yes
6392702307	MÜZ-202/D24-FL	2	No	No



# Safety relay SCR



## MANY BENEFITS AT A GLANCE

- Safety relay, diagnostics and IO-Link communication in one device
- Space saving in the control cabinet thanks to slim design
- Provides all relevant information of each device in the chain
- Permanent exchange of all data
- Three release paths
- Category 4/PL e according to ISO 13849-1

## Technical data

### Electrical data

Rated operating voltage  $U_e$  24 V DC ( ..1200 230V AC)

Relay contacts with up to 6A switching current per enabling path 3

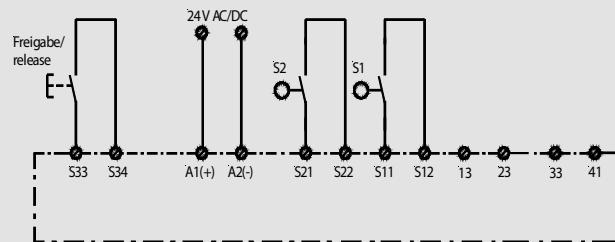
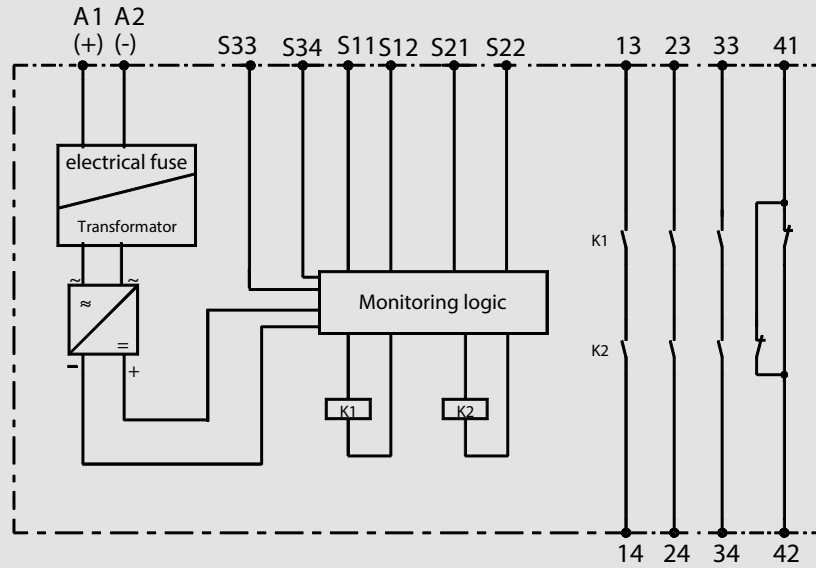
Switching current of the safety output 8 A

### Mechanical data

Enclosure material Glass-fibre reinforced polyamide PA-GF

Ambient temperature 0°C to + 60°C

Protection class IP20



Schematic diagram of the safety relay system

Product selection

Article number	Designation	Performance level	Enable current paths (NO contact)	Signaling contact (NC contact)	Monitored start	Start automatically/Button (Manual)	Comments
6075111009	SCR4-W22-3.5-D	e	3	1	No	Auto/Button	-
6075111010	SCR4-W22-3.5-SD	e	3	1	Yes	Button	-
6075111015	SCR2-W22-2.5	d	2	0	No	Auto/Button	-
6075111016	SCR2-W22-2.5-S	d	2	0	Yes	Button	-
6075111018	SCR4-W22-2.6-D2H	e	2	1	-	-	SCR for Two-hand control unit
6075111020	SCR ON4-W22-3.6-S	e	3	0	Programmable	Button	Replenishing device for electro-sensitive protective equipment
6075111200	SCR 4-W22-3.5-D	e	3	1	No	Auto/Button	Supply voltage 230 V AC



# Safety relay SCR DI with IO-Link



## MANY BENEFITS AT A GLANCE

- Safety relay, diagnostics and IO-Link communication in one device
- Space saving in the control cabinet thanks to slim design
- Provides all relevant information of each device in the chain
- Permanent exchange of all data
- Three release paths
- Category 4/PL e according to ISO 13849-1

## Technical data

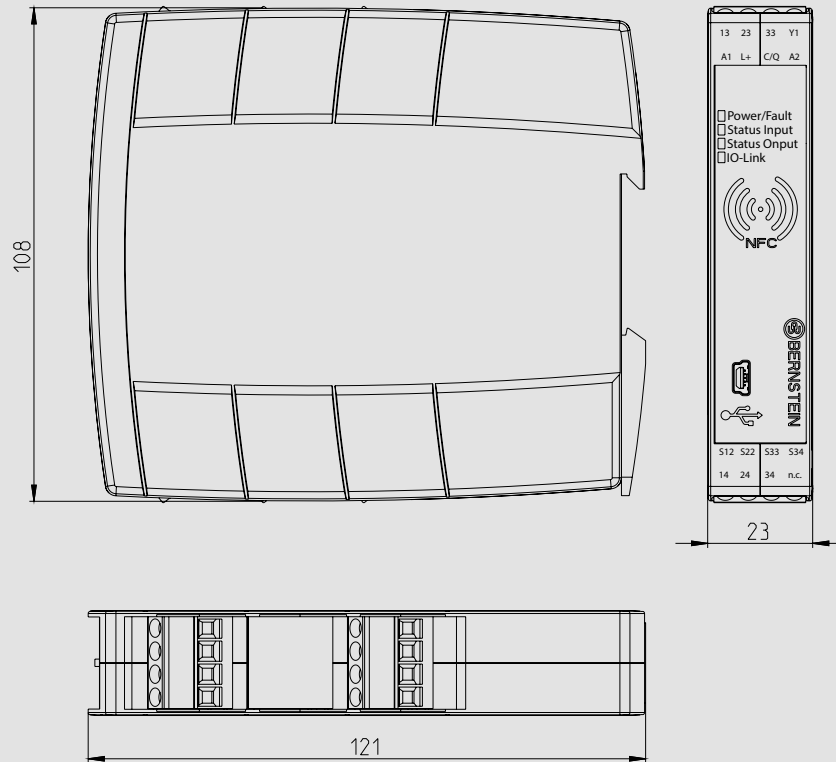
### Electrical data

Rated operating voltage	$U_e$	24 V DC
Relay contacts with up to 6A switching current per enabling path		3
Switching current of the safety output		8 A

### Mechanical data

Enclosure material	Glass-fibre reinforced polyamide PA-GF
Ambient temperature	0°C to +60°C
Protection class	IP20





Product selection

Article number	Designation	Release paths	Signal contact	Feedback circuit	Digital Outputs	Start automatic/button (manual)	Interfaces		
							IO-Link	NFC	USB 2.0
6075113139	SCR DI-1/0/3-T	3	1	-	Auto/Button	x	-	-	
6075113140	SCR DI-1/8/3-T	3	1	8	Auto/Button	x	-	-	
6075113141	SCR DI-1/0/1-T	3	1	-	Auto/Button	x	x	x	
6075113147	SCR DI-1/8/1-T	3	1	8	Auto/Button	x	x	x	
6075113149	SCR DI-2/8/1-T	3	0	8	Auto/Button	x	x	x	



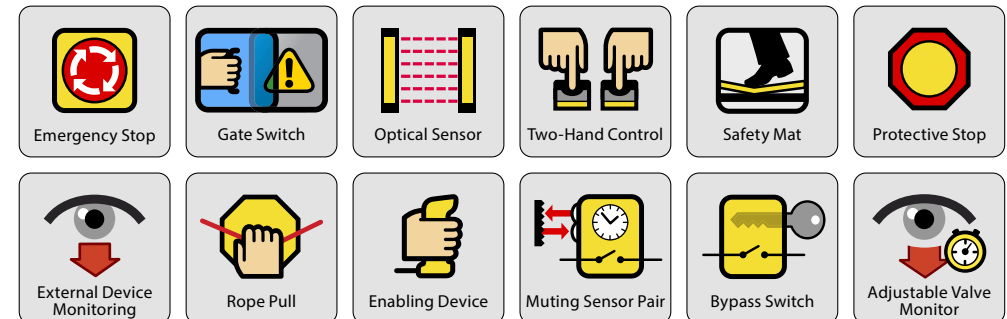
# Programmable safety controller SCR P with Ethernet interface

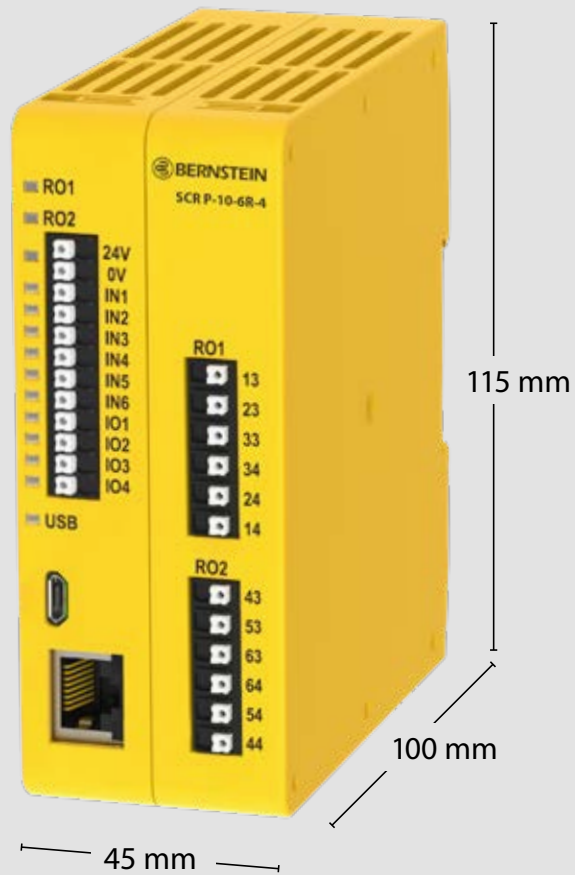


## MANY BENEFITS AT A GLANCE

- Reduction of downtimes
- Reduction in hardware costs
- Quick and simple configuration
- Testing the configuration in simulation mode
- Simple troubleshooting in live mode
- Configuration cloning via programming flash drive
- Provision of DCD diagnostic data via selectable Ethernet protocols
- Two independent enabling paths
- Intuitive user interface
- Simple program creation via Drag & Drop
- Live and simulation mode

## Various application possibilities





Product selection		
Article number	Designation	Description
6075133159	SCR P-10-6R-4	Programmable safety controller



### Technical data

**RO1 and RO2 enabling paths**

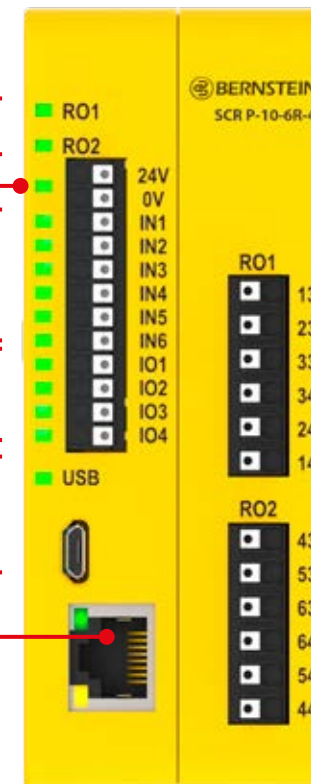
**24 V DC Power**

**6 Safe Inputs**

**4 Safe Inputs or  
4 Non-Safe Outputs**

**Micro-USB**

**Ethernet-Port**



**Relay Output 1 (RO1)**

- 240 V AC/6 A
- 3 NO sets of contact

**Relay Output 2 (RO2)**

- 240 V AC/6 A
- 3 NO sets of contact



# Accessories

## SCR P



Article number	Designation	Description
3991000250	SCR P-PA	USB programming adapter
3991000251	USB-Kabel A/ Micro-B	USB cable
3991000252	SCR P-FPS	Programming flash drive



USB programming adapter



USB cable



Programming flash drive



# Expandable safety controller SCx



## MANY BENEFITS AT A GLANCE

- PC-configurable – Flexible and easy to use
- Network-compatible – Profinet, Modbus/TCP and EtherCat
- Safe devices to connect: Up to 394
- Safety inputs: Up to 154
- Independent safety outputs: Up to 68, 0.5 A to 6 A each
- Convertible safety inputs: Up to 40 (including 8 on the base unit)
- Daisy Chain Diagnostic (DCD) provides detailed status and diagnostic information
- Optional display provides local diagnostics for efficient troubleshooting
- Up to eight possible expansion I/O modules can be added

## Technical data

### Electrical data

Rated operational voltage ( $U_e$ ) 24 V DC

### Mechanical data

Ambient temperature 0 °C to + 55 °C

IP rating IP20

Base module



Extension and communication modules



Product selection

Article number	Designation	Description	Industrial Ethernet	Safety Inputs/ of which configurable I/O	Independently controlled safe outputs	Max. Output current of the safety circuits
6075731212	SCx-B-26-2T-5	Base unit with LCD display	Profinet, Modbus/TCP	26/8	2	0.5A PNP @24 V DC
6075774216	SCx-N-Cat	EtherCat Communication module	EtherCAT	-	-	-
6075772218	SCx-I-16	16-fold safety input extension	-	16/4	-	-
6075773219	SCx-O-2R	Safety relay output module	-	-	2	6A, 2 NO, 1 NC aux
6075773222	SCx-O-4T	Safety module output module	-	-	4	0.5A PNP @24 V DC



# Foot switches for safety applications



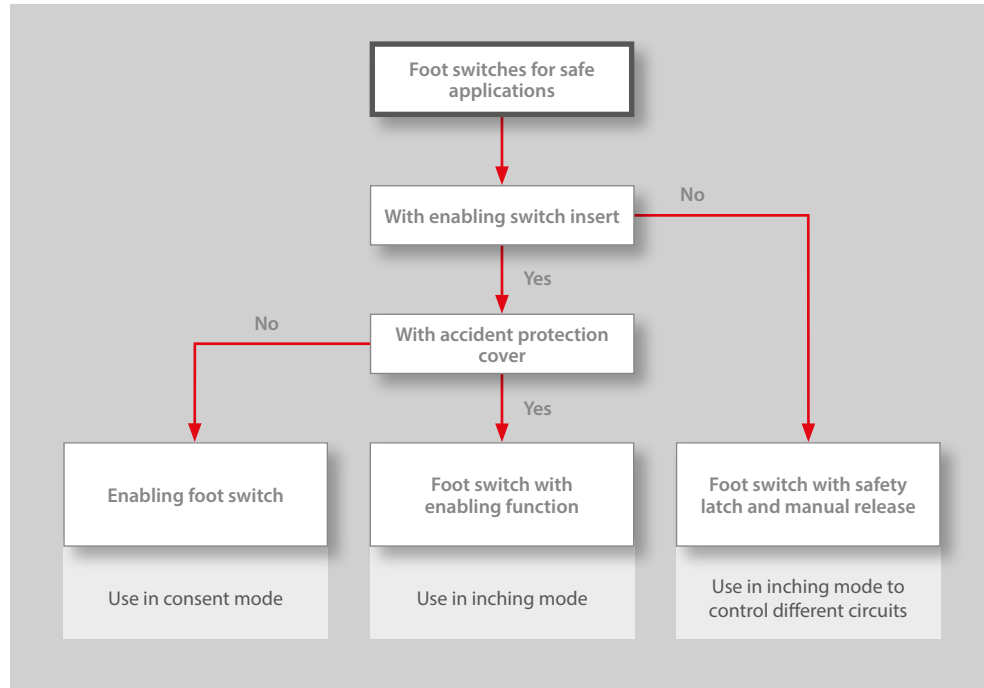


## **Enabling foot switch – When hands must remain free**

In fully automated manufacturing processes, operators are protected from any hazardous machine movements by guards such as safety gates or safety bonnets. However, how can this protection be maintained in the event of maintenance? How is the employee protected when the machine needs to be repaired or cleaned? When and how may the operator deliberately override the protective devices? This is where BERNSTEIN's three-stage enabling foot switches come into play. Because the answer to these questions is enabling function.

# FOOT SWITCHES

## Areas of use of the foot switches



## Enable function

The enabling function has been a proven function for many years and has also been part of various standards for a long time, such as EN ISO 12100. This standard deals with the safety of machines and describes the enabling function as: "Additional manually operated device used in conjunction with a start-up control which, when continuously actuated, allows the machine to function".

The regulations state that when the safety fence is open, machine operation is prevented by a door interlock. During manual operation, when the operator approaches the machine during programming, maintenance or test runs, the danger must be reduced by means of various measures.

This includes slow machine operation (reduction of kinetic energy) and restriction of the moving part of the machine.

Measures must also be taken to be able to stop the machine in an emergency. Such safety measures include the use of enabling switches.

However, no movement may be started by actuating the enabling switch alone. The movement is only permitted by and must be initiated by means of a separate start control. This is prescribed, for example, by EN 60204-1, which also deals with the safety of machines.

## Two-step and three-step enabling function

In essence, enabling switches are divided into two and three-stage variants.

The two-stage types are now obsolete and are only used in old machines.

For new products, for example, EN ISO 10218-1 (safety requirements for industrial robots) prescribes three-stage enabling switches.



Enabling switch insert



Foot switch with and without accident protection cover

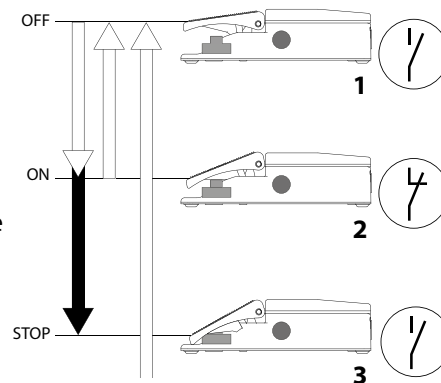


**Teaching a robot function through a manually operated enabling switch**

### Function of a three-stage enabling foot switch

A three-stage enabling switch must have the following basic switching stages:

- In the idle state (level 1), it is in the off function (control element not pressed, contacts open).
- Slightly pressed (level 2), it switches to the enabling function (actuator pressed to middle position, contacts closed).
- If it is pressed further (level 3), it switches to the off function (forced opening of the contacts, actuator fully pressed beyond the middle position).



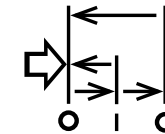
### Foot switch for enabling operation

If it is released again in level 3, the switch returns to level 1 without closing the contacts during the transition. The two-level enabling switches thus lack level 3.

However, since a person tends to tense up more in panic or severe pain, i.e. to push through, and less to let go, this level 3 is of enormous importance for the safety of the operator and is therefore prescribed for new machines.

### Compulsory labelling

Three-position enabling switches must be permanently and easily legibly marked with the following symbol in accordance with IEC 60947-5-8:

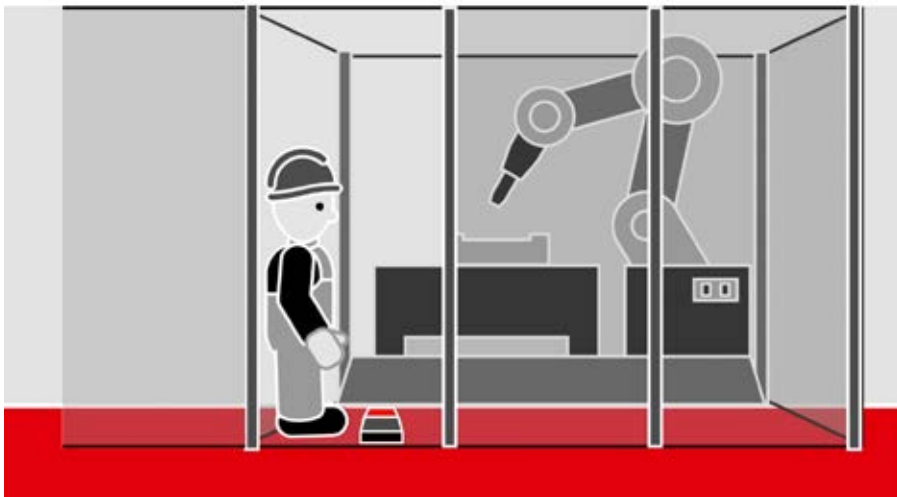


Symbol for a three-position enabling switch

### Three-stage enabling foot switch

The electromechanical design of an enabling foot switch is identical to that of the manually operated version. The difference is that the switching stages are logically operated with the foot. Level 1 is also the rest position. In level 2, the operator presses the pedal of the foot switch up to the so-called pressure point (tactile resistance) to close the enabling contacts and release the machine movement. If the pedal is fully depressed beyond the middle position (level 3), the contacts open again.

## FOOT SWITCHES



Teaching a robot function through a three-stage enabling footswitch

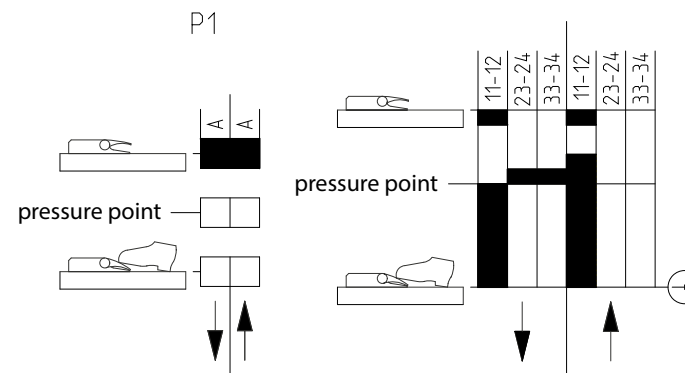
### Why now with the foot?

The advantages of an enabling foot switch in contrast to a manually operated enabling device are not difficult to explain. Especially in set-up operation, during a repair or while cleaning a machine, it is an advantage to have both hands available. Very often in these cases, the machine has to be moved through a step-by-step feed by means of stepping.

For example, the operator has both hands free when changing reels on a wire winding machine. Here, the wire of the newly inserted reel must be threaded and in the course of this, the machine moves at reduced speed and the release of the hazardous movement is given by pressing an enabling foot switch. The machine operator thus has the possibility to bring the wire to the desired position with both hands after he has started the movement by means of a separate start control.

### Why should it be a BERNSTEIN enabling foot switch?

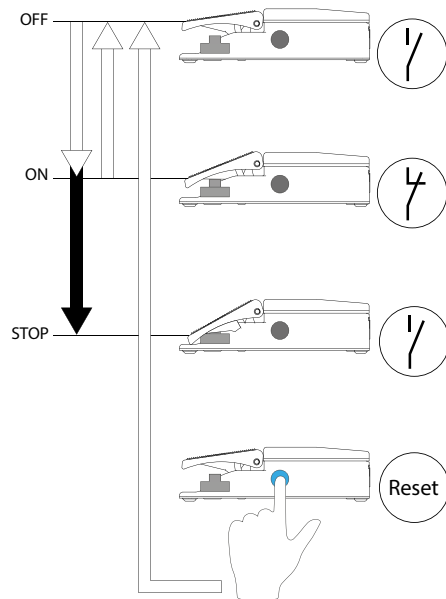
Another advantage of the BERNSTEIN enabling foot switch is the position monitoring. From a control point of view, pedal positions 1 and 3 are completely identical. In both cases, the enabling contacts are open. If you now want to evaluate the exact position of the pedal, this is not possible without aids. The BERNSTEIN enabling foot switches have an optional additional PNP signal output which indicates the exact pedal position.



Example of a switching diagram for an enabling switch with additional position detection (output A)

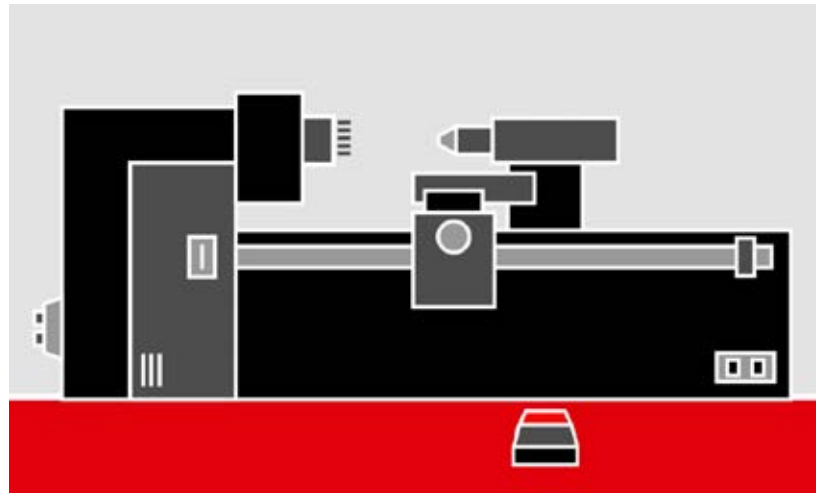
It is also possible to use a so-called accident protection cover. This protects the foot switch from unintentional actuation and damage by falling parts. However, foot switches with accident protection covers are not approved for enabling operation for ergonomic reasons. Therefore, these products are dealt with in the next chapter "Foot switches for inching operation" (from page 144).

In addition, the enabling foot switches can be equipped with a safety latching mechanism. This ensures that the foot switch engages after reaching switch position 3 and that the machine cannot be started without first being unlocked.



## Integration of an enabling foot switch into a safety system

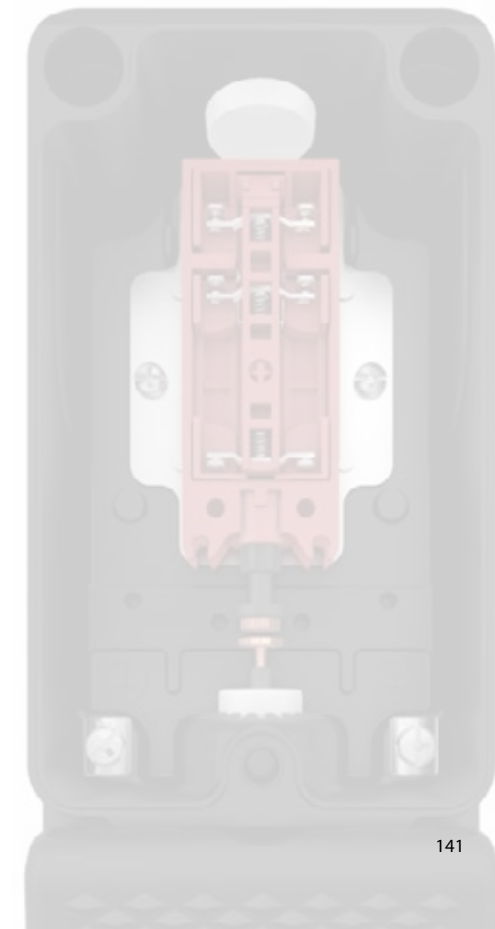
The DGUV's Wood and Metal Division has published a technical paper (FBHM-39) detailing the integration of an enabling foot switch into a safety system. The foot switch is used in this application to safely set up a lathe.



Enabling foot switch for the set-up operation of a lathe

Features:

DGUV-approved enabling foot switches do not have an accident protection cover.

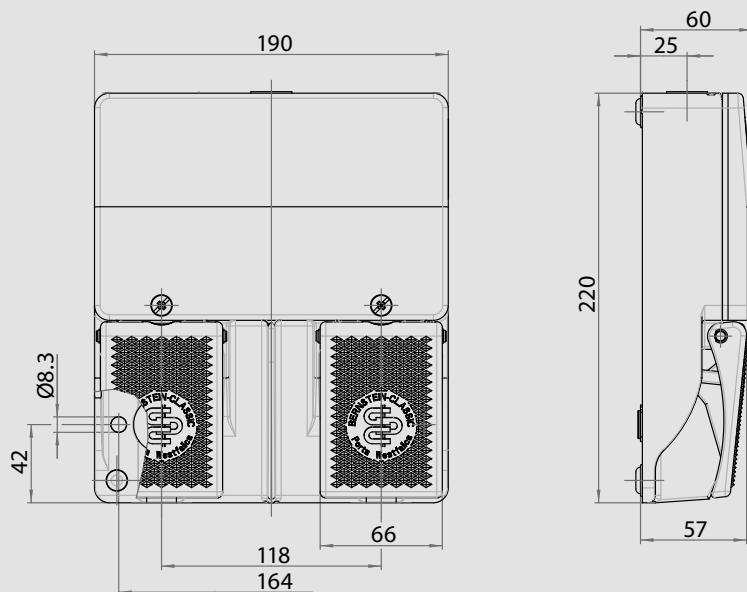
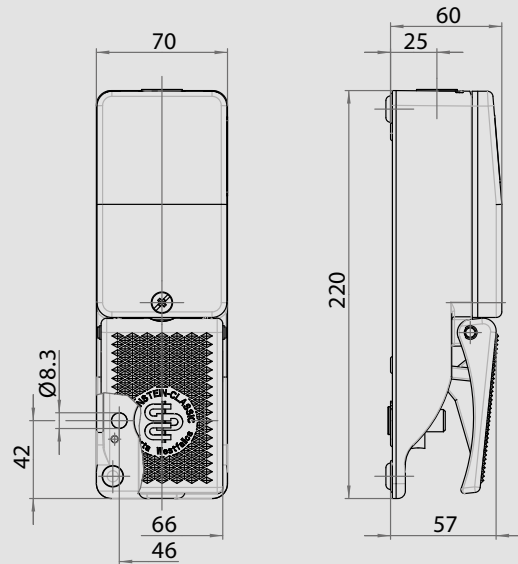


# Enabling foot switch 3-stage



## Technical data

Mechanical data	
Enclosure	Cast aluminium (powder-coated)
Cover, Protective cover UN	Cast aluminium (powder-coated)
Actuation	Pedal (Thermoplastic)
Ambient temperature (with no icing/no condensation)	-30°C to +80°C
Type of connection	Screw connections (M3,5)
Conductor cross sections	0.5 – 1.5 mm <sup>2</sup> (single-wire or stranded wire with ferrule)
Cable entry	M20x1.5
Protection class	IP65 IP67 (in type designation "ZS")
Electrical data	
Rated insulation voltage	$U_i$ 400 V AC 250 V AC (in type designation "ZS")
Rated impulse strength	$U_{imp}$ 2,5 kV (in type designation "C", "ZS")
Conventional thermal current	$I_{the}$ 10 A 5 A (in type designation "ZS")
Utilisation category	AC-15, $U_e/I_e$ 240 V/3 A DC-13, $U_e/I_e$ 24 V/3 A AC-15, $U_e/I_e$ 240 V/1.5 A (in type designation "ZS") DC-13, $U_e/I_e$ 24 V/1 A (in type designation "ZS")
Positive opening	according to IEC/EN 60947-5-1, Appendix K (when reaching the pedal stop)



#### Product selection Single pedal foot switch F1

Article number	Designation	Switching contacts	Pressure point	Special feature
6061500559	F1-ZSD	1NC/2NO	200 N	Pressure point D
6061500567	F1-ZSDR	1NC/2NO	200 N	Pressure point D, Latching R
6061500569	F1-ZSP1D	1NC/2NO	200 N	Pressure point D, PNP output level 1*
6061500570	F1-ZSP3D	1NC/2NO	200 N	Pressure point D, PNP output level 3**

\* Additional board PNP for determination of switching position 1

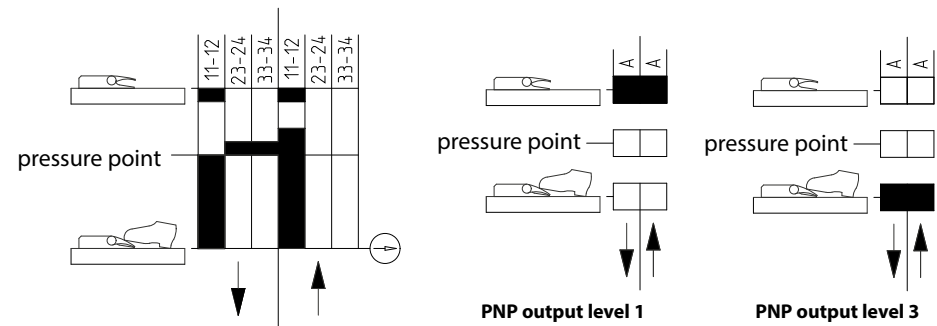
\*\* Additional board PNP for determination of switching position 3

#### Product selection Two pedal foot switch F2

Article number	Designation	Switching contacts		Pressure point		Special feature
		Pedal 1 (l.)	Pedal 2 (r.)	Pedal 1 (l.)	Pedal 2 (r.)	
6062500561	F2-U1Z/ZSD	1NC/1NO	1NC/2NO	200 N		Pressure point D (Pedal 2)
6062500568	F2-ZSDR/ZSDR	1NC/2NO	1NC/2NO	200 N	200 N	Pressure point D, Latching R



The enabling foot switch offers two enabling contacts and one signalling contact and is available both with and without latching.



# Foot switch with enabling function for inching operation

Foot switches are often used as so-called “command devices with automatic reset” or “jog switches” for short, to set a machine to the operating state. Foot switches with enabling function are ideally suited for this purpose, as they meet very high safety requirements with the integrated approved enabling switch insert. The contact design and the switching function of these switches are identical to those of the enabling foot switches. The pedal position can be detected dynamically with the signal contact or statically with the additional circuit board. The foot switch with enabling function is available with and without latch as well as with accident protection cover.



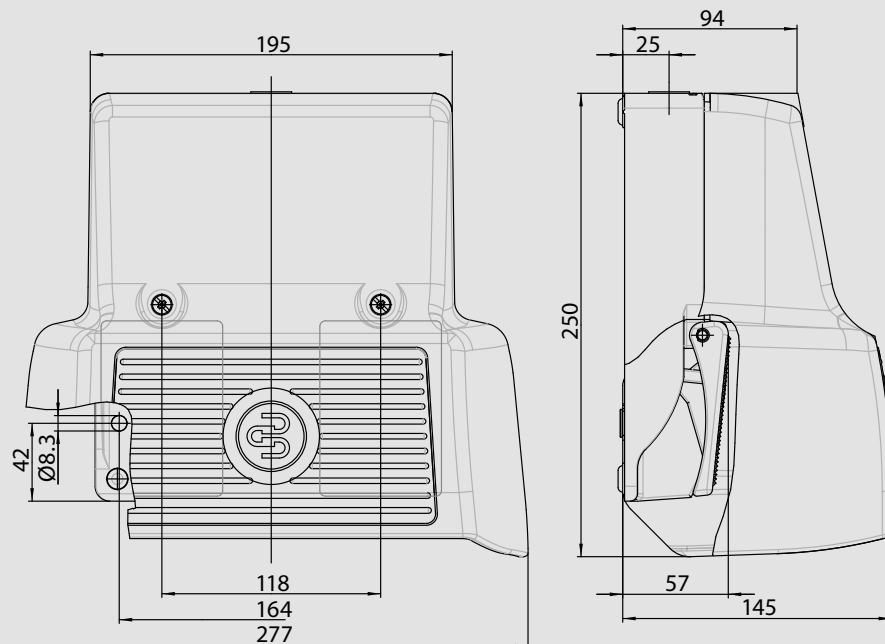
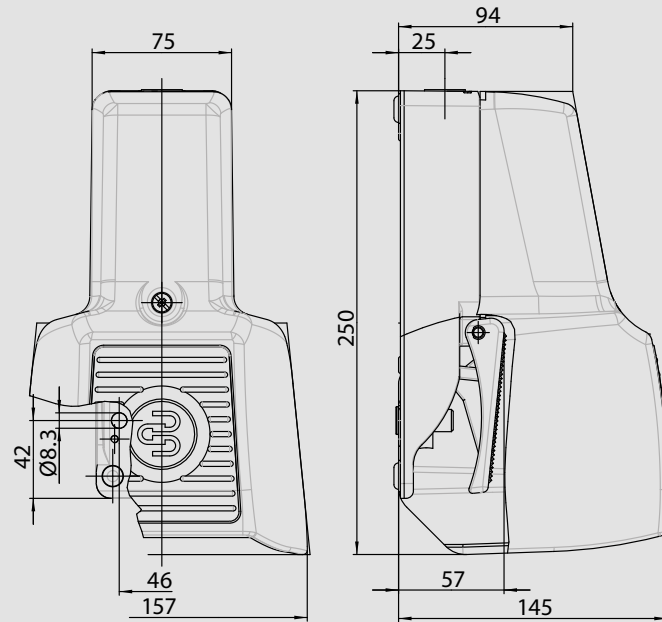
Enabling foot switch for inching operation on a press



### Features:

Foot switches for inching operation usually have an accident protection cover. As this is not permissible for enabling operation for ergonomic reasons, they are not approved for enabling operation despite having the same contact function.





**Product selection Single-pedal foot switch with enabling function F1**

Article number	Designation	Switching contacts	Pressure point	Special feature
6061000558	F1-ZSD UN	1NC/2NO	200 N	Pressure point D, Protective cover UN
6061000560	F1-ZSDR UN	1NC/2NO	200 N	Pressure point D, Latching R, Prot. cover UN
6061000564	F1-ZSP1D UN	1NC/2NO	200 N	Additional board 1*, Pressure point D, Prot. cover UN

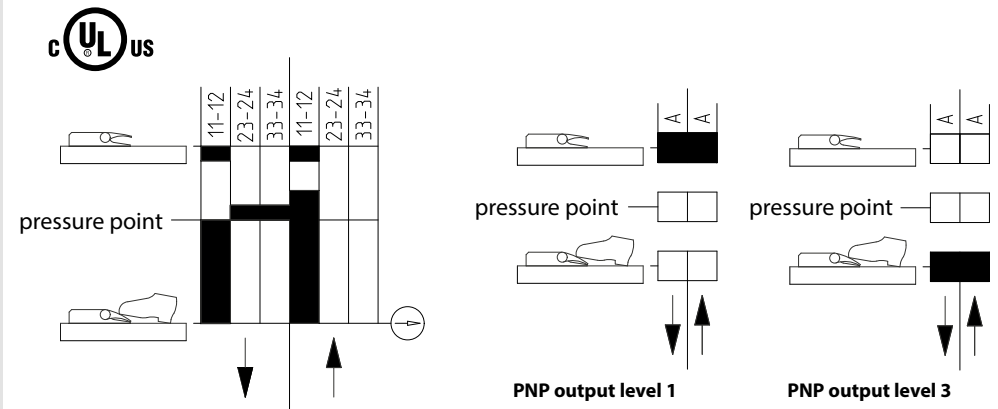
\* PNP additional board for differentiating the switching position 1

**Product selection Two-pedal foot switch with enabling function F2**

Article number	Designation	Switching contacts		Pressure point		Special feature
		Pedal 1 (l.)	Pedal 2 (r.)	Pedal 1 (l.)	Pedal 2 (r.)	
6062000562	F2-U1Z/ZSD UN	1NC/1NO	1NC/2NO		200 N	Pressure point D (Pedal 2), Prot. cover UN
6062000563	F2-U1Z/ZSDR UN	1NC/1NO	1NC/2NO		200 N	Pressure point D (Pedal 2), Latching R, Prot. cover UN
6062000565	F2-ZSP1D/ZSP1D UN	1NC/2NO	1NC/2NO	200 N	200 N	Additional board 1*, Pressure point D (Pedal 1+2), Prot. cover UN
6062000566	F2-ZSP3D/ZSP3D UN	1NC/2NO	1NC/2NO	200 N	200 N	Additional board 3**, Pressure point D (Pedal 1+2), Prot. cover UN

\* PNP additional board for differentiating the switching position 1

\*\* PNP additional board for differentiating the switching position 3

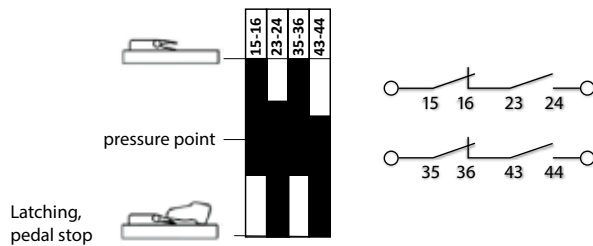


# Foot switch with safety latch and manual release

### Enabling function through contact combination

The enabling function on the foot switches with safety latch and manual release is not achieved by an enabling switch insert, but by a combination of contacts.

Example:

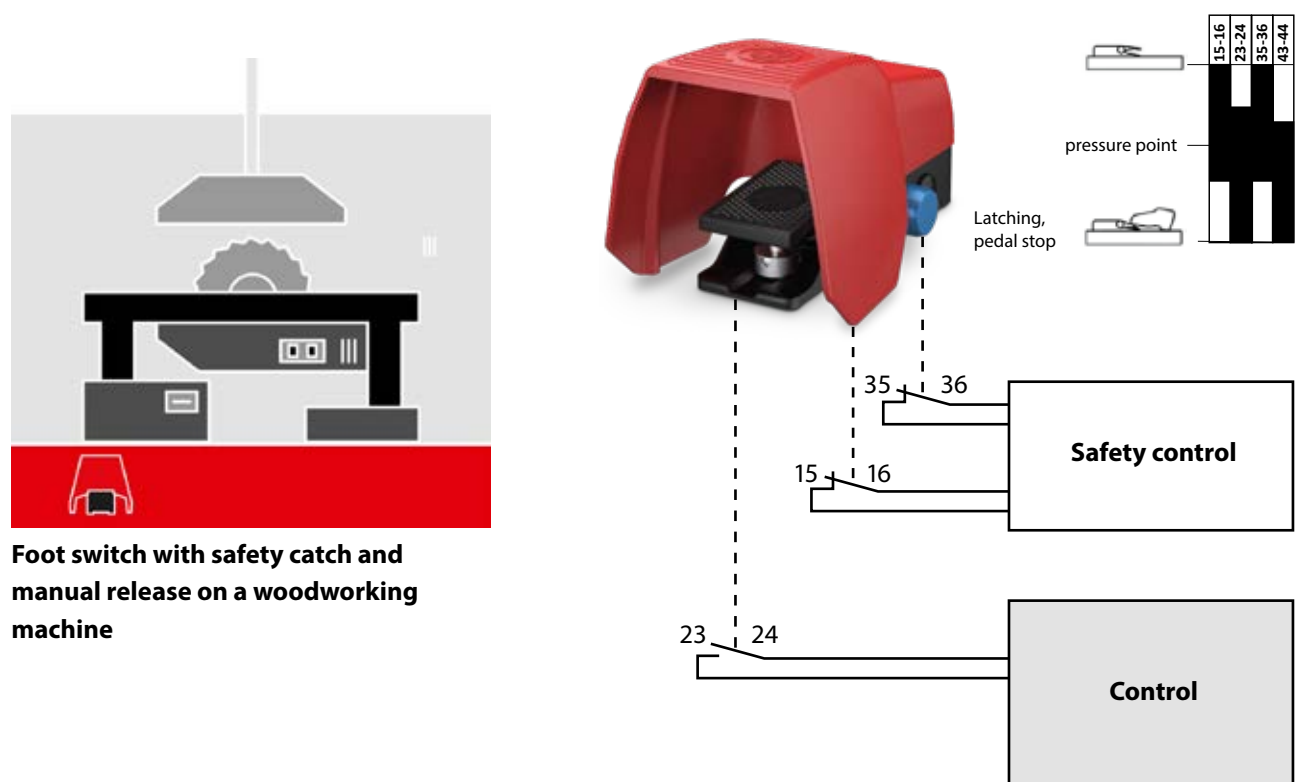


Due to the series connection of the overlapping contacts, an OFF-ON-OFF function is achieved as with the enabling function. However, when the pedal is returned from the 3rd level, the 2nd level is always passed through as well. For this reason, the foot switches with safety latch and manual release are only available with a reset button. When this button is pressed, the 2nd level is passed through within a few milliseconds.

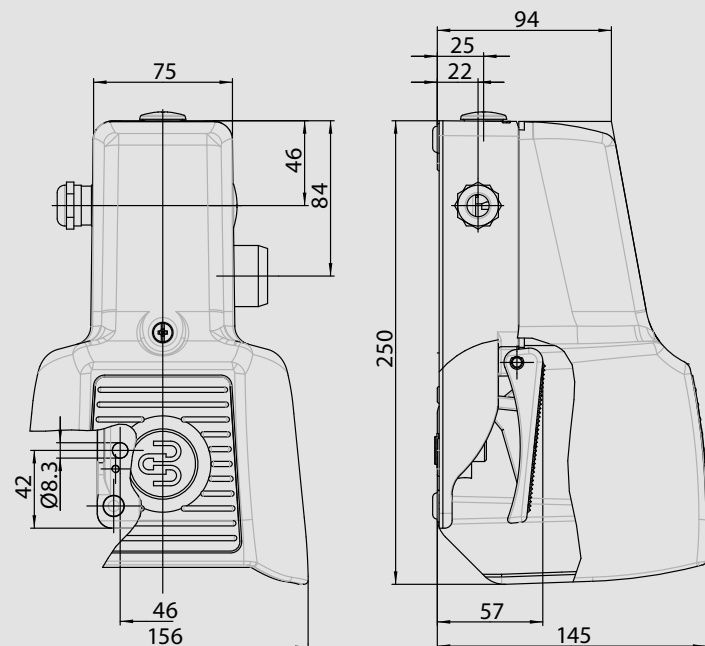
The advantage of these switches is that the contacts can also be used individually without series connection, and thus the OFF-ON-OFF function can also be achieved by control means as in the example opposite.

### Example application

A foot switch with safety latch and manual release is used on a woodworking machine to control the saw blade. The foot switch has an accident protection cover to prevent an unintentional start of the dangerous movement by falling objects. In this case, contact 23/24 acts as a make contact on the control. If the pedal is depressed to the stop by the pressure point, contacts 15/16 and 35/36 cause a safety shutdown, as an unusual situation is assumed.



**Foot switch with safety catch and manual release on a woodworking machine**



#### Product selection Single-pedal foot switch F1

Article number	Designation	Switching contacts	Pressure point	Special feature
6161000560	F1-SU1ZUV1ZDR UN	2NC/2NO	200 N	Pressure point D, Latching R, Prot. cover UN
6161000203	F1-SU1ZUV1ZDR UN	1NC/2NO	200 N	Pressure point D, Latching R, Prot. cover UN
6161000626	F1-SU1ZCA2ZDR UN	3NC/1NO	200 N	Pressure point D, Latching R, Prot. cover UN
6161000443	F1-UV1Z/UV1ZD	2NC/2NO	200 N	Pressure point D, Latching R
6161000532	F1-UV1ZUV1ZDR UN	2NC/2NO	200 N	Pressure point D, Latching R, Protected release button, Prot. cover UN

#### Product selection Two-pedal foot switch F2

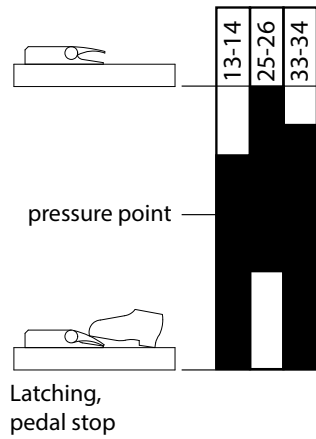
Article number	Designation	Switching contacts		Pressure point		Special feature
		Pedal 1 (li.)	Pedal 2 (re.)	Pedal 1(li.)	Pedal (re.)	
6162000486	F2-SU1ZUV1ZDR/SU1Z UN	2NC/2NO	1NC/1NO	460 N		Latching R (Pedal 1), Pressure point D (Pedal 1) Prot. cover UN
6162000553	F2-SU1ZUV1DR/SU1ZUV1DR UN	2NC/2NO	2NC/2NO	200 N	200 N	Latching R (Pedal 1+2), Pressure point D (Pedal 1+2) Prot. cover UN
6162000338	F2-SU1ZUV1D/SU1ZUV1D UN	1NC/2NO	1NC/2NO	200 N	200 N	Latching R (Pedal 1+2), Pressure point D (Pedal 1+2) Prot. cover UN
6162000709	F2-SU1ZCA2ZDR/SU1ZCA2ZDR UN	3NC/1NO	3NC/1NO	200 N	200 N	Latching R (Pedal 1+2), Pressure point D (Pedal 1+2) Prot. cover UN
6162000583	F2-UV1ZD/UV1ZD UN RAST	1NC/1NO	1NC/1NO	200 N	200 N	Latching R (Pedal 1+2), Pressure point D (Pedal 1+2) Prot. cover UN

For wiring diagrams, see pages 148–149.

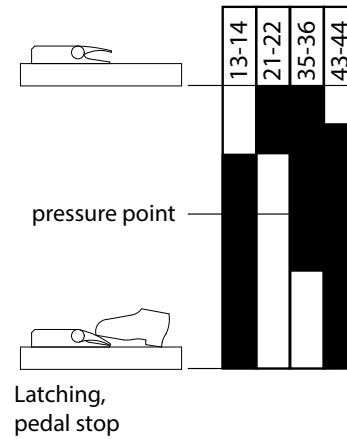
# FOOT SWITCHES

## Dimensional drawings

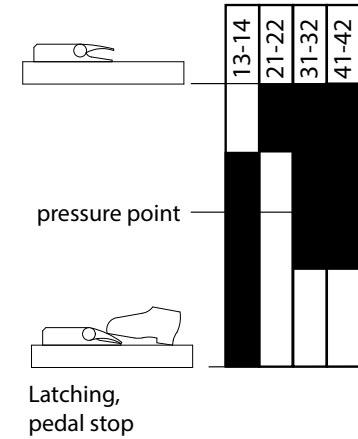
6161000203



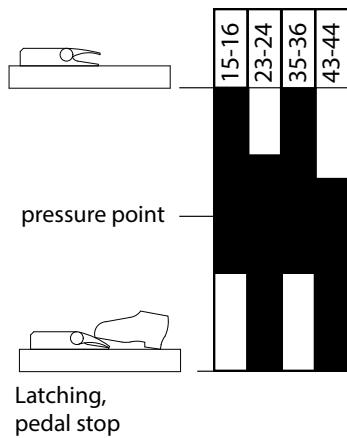
6161000560



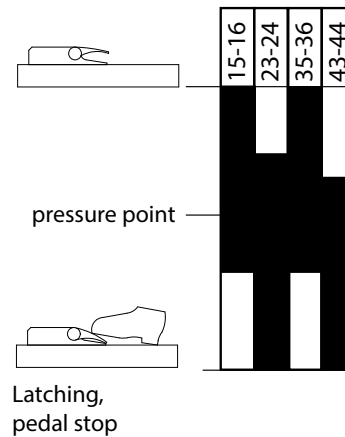
6161000626



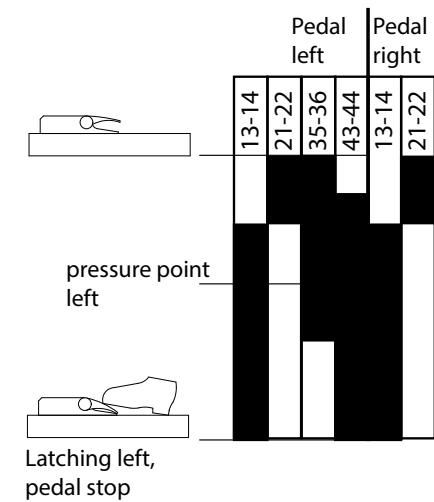
6161000443



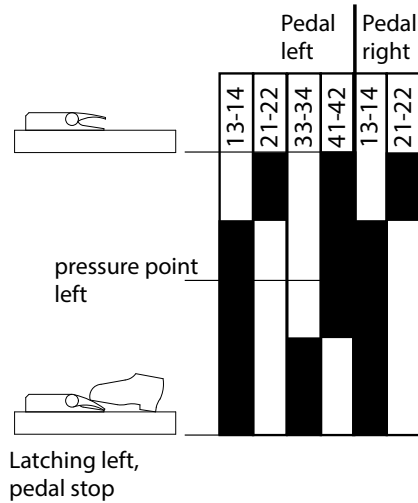
6161000532



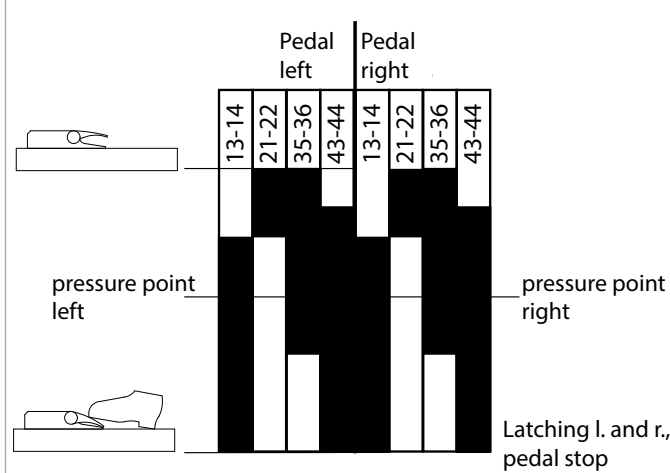
6162000486



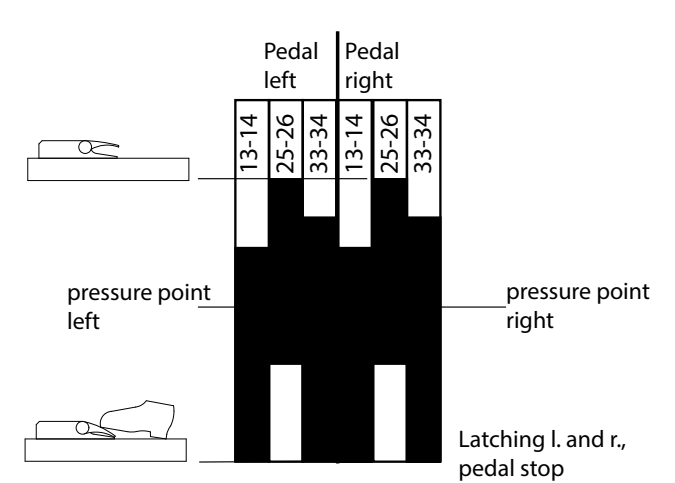
**6162000364**



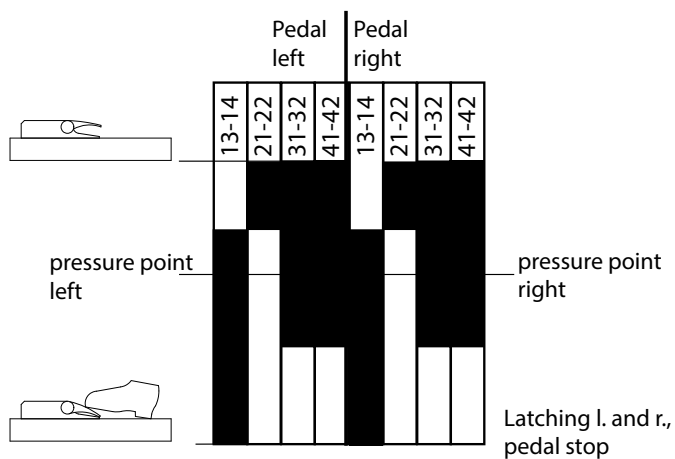
**6162000553**



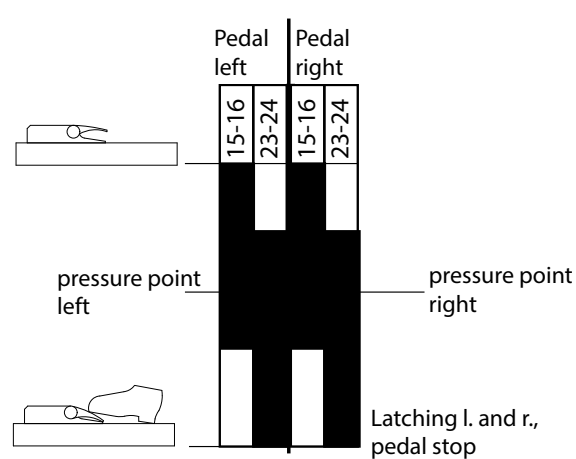
**6162000338**



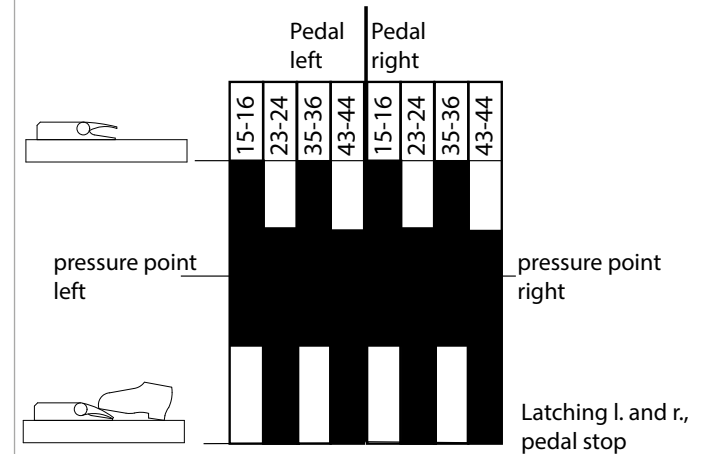
**6162000709**



**6162000583**



**6162000817**



## FOOT SWITCHES

# Accessories

## Foot switches

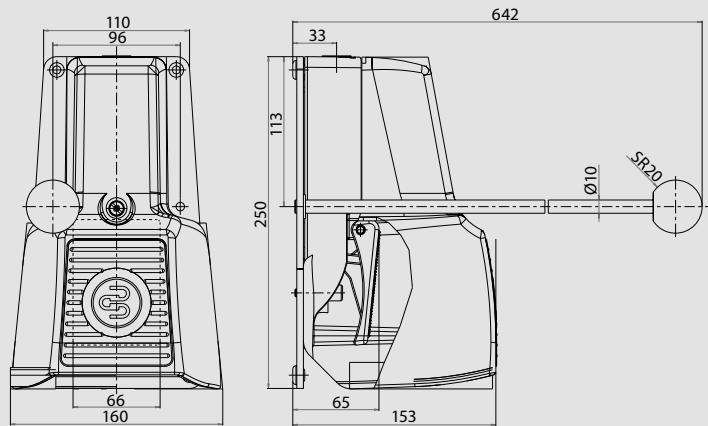
### Transport device

Designation	Article number	Description
F1-TV	<b>3996000229</b>	Transport device for foot switch 1-pedal
F2-TV	<b>3996000230</b>	Transport device for foot switch 2-pedal

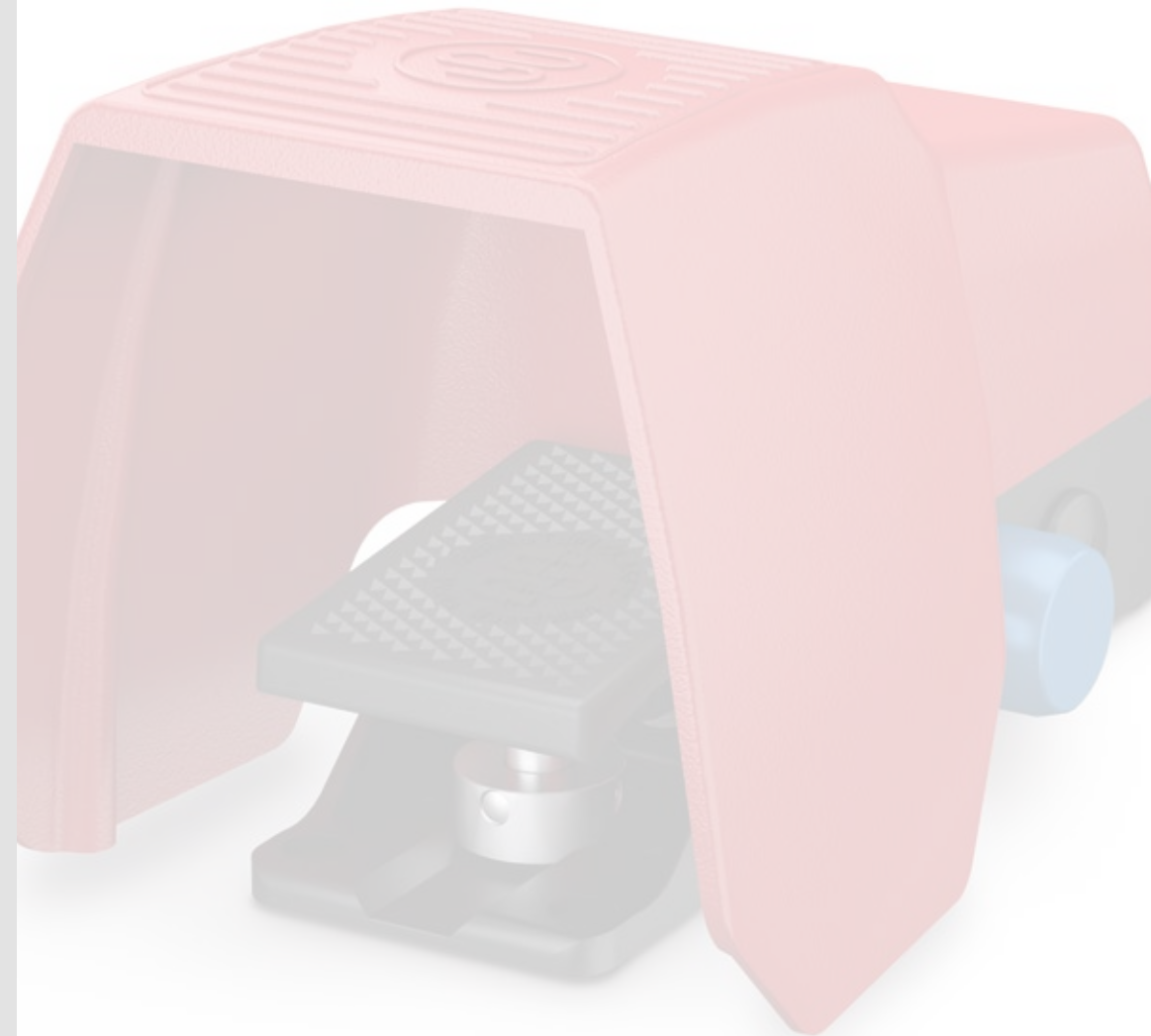
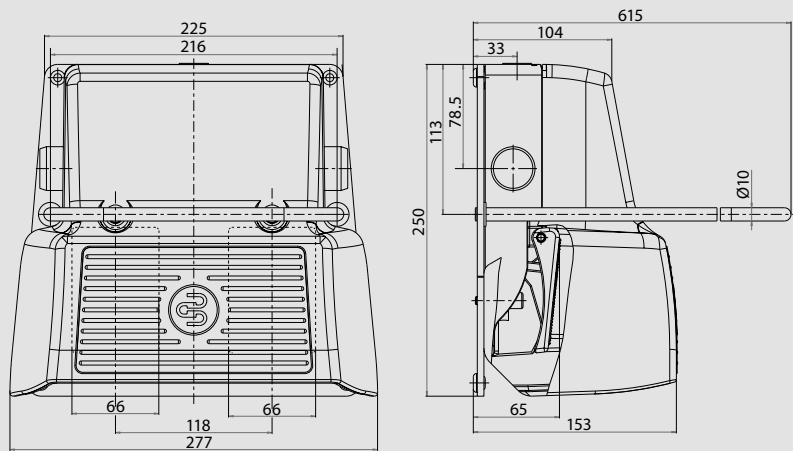
The transport device is available as an accessory set for the F1 and F2. Modifications to the foot control are not necessary, so that retrofitting is also possible.



Transport device 1-pedal



Transport device 2-pedal



# Single-ended and double-ended cordsets

## WHAT IS A SINGLE-ENDED CORDSET?

A single-ended cordset is used to connect a sensor or switch with a plug connection to a terminal block.

For this purpose, the cable is provided with a socket on one side and for assembly on the other side.



## WHAT IS A DOUBLE-ENDED CORDSET?

The double-ended cordset is used to build up the sensor chain in the BERNSTEIN Smart Safety System. It is used to connect the T-adapters to each other.

For this purpose, the cable is equipped with a socket on one side and a connector on the other.



Figure 1

- 1 Double-ended cordsets 8-pole on page 158
- 2 Double-ended cordsets 4-pole on page 155
- 3 Single-ended cordsets 4-pole on page 154
- 4 T-adapter ATS on page 159
- 5 T-adapter ATD on page 159
- 6 Termination plug AEP on page 159



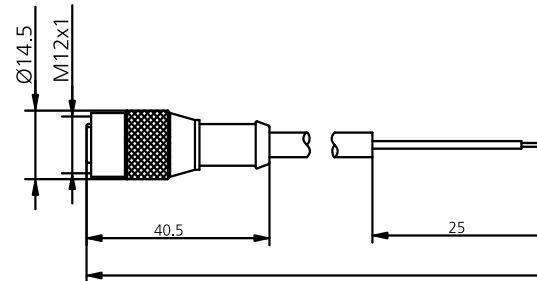
## 3-pole single-ended cordsets

### Product selection

No.	Article number	Designation	Cable length	Connector/ alignment	Connector 1	Connector 2	Special feature	Use for following products
	<b>3251103234</b>	AN-KAB.SHS 5M AC GERADE	5 m	Straight	F		AC/ DC BG Type	SHS
	<b>3251103236</b>	AN-KAB.SHS 5M AC WINKEL	5 m	Angle	F		AC/ DC BG Type	

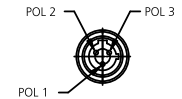
### Technical data

Material core insulation/sheath	PVC (UL)
Material overmoulding/contact carrier	PUR (UL)
Material union nut	Nickel-plated brass; with screw lock
Rated voltage max.	230 V AC
Current carrying capacity max.	3 A
Temperature range	when cable is fix mounted -25°C to + 90°C when cable can be moved +5°C to + 85°C
Cable construction	3 x 0.5 mm <sup>2</sup>
Number of poles	3
Protection class in assembled state	IP67



### Contact assignment AC/DC versions

- 1 = green-yellow**
- 2 = black**
- 3 = blue**



Pol Nr.	Leiter
1	GNYE (Grün/Gelb)
2	BK (Schwarz)
3	BU (Blau)



# ACCESSORIES

## 4-pole single-ended cordsets

Product selection									
No.	Article number	Designation	Cable length	Connector/alignment	Connector 1	Connector 2	Special feature	Technical data	Use for following products
3	<b>3251004310</b>	AN-KAB.SHS3 4P 2M GERADE	2 m	Straight	F		M12 BG Type	1	- Standard and safe position switches with 4-pin M12 connector - MAK-53 M12 - Connection for Smart Safety (pos. 3 of figure 1 on page 152)
3	<b>3251004311</b>	AN-KAB.SHS3 4P 5M GERADE	5 m	Straight	F		M12 BG Type	1	
3	<b>3251004312</b>	AN-KAB.SHS3 4P 10M GERADE	10 m	Straight	F		M12 BG Type	1	
3	<b>3251004313</b>	AN-KAB.SHS3 4P 2M WINKEL	2 m	Angle	F		M12 BG Type	1	
3	<b>3251004314</b>	AN-KAB.SHS3 4P 5M WINKEL	5 m	Angle	F		M12 BG Type	1	
3	<b>3251004315</b>	AN-KAB.SHS3 4P 10M WINKEL	10 m	Angle	F		M12 BG Type	1	
3	<b>6075689090</b>	SFW-M12C4/AW-0,5PU	0.5 m	Straight	F			2	
3	<b>6075689091</b>	SFW-M12C4/AW-2PU	2 m	Straight	F			2	
3	<b>6075689188</b>	SFW-M12C4/AW-10PU	10 m	Straight	F			2	
3	<b>6075689189</b>	SFW-M12C4/AW-20PU	20 m	Straight	F			2	

### Technical data 1

Material core insulation/sheath	PVC heat resistant UL 1731/UL 2517, black
Material overmoulding/contact carrier	APEX 7500-85/Elastollan R3000
Material union nut	Metal, CuZn, nickel-plated
Rated voltage	250 V
Current carrying capacity per pin (at 40° C)	4 A
Temperature range	when cable is fix mounted -25°C to + 105°C when cable can be moved -5°C to + 105°C
Number of poles	4
Protection class in assembled state	IP68

### Single-ended cordset



## 4-pole double-ended cordsets

### Product selection

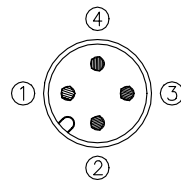
No.	Article number	Designation	Cable length	Connector/alignment	Connector 1	Connector 2	Special feature	Technical data	Use for following products
2	<b>6075689087</b>	S1W-M12C4/AW-2PU	2 m	Straight	M	F		2	
2	<b>6075689088</b>	S1W-M12C4/AW-5PU	5 m	Straight	M	F		2	Connection of T-adapters ATS
2	<b>6075689089</b>	S1W-M12C4/AW-10PU	10 m	Straight	M	F		2	

### Technical data 2

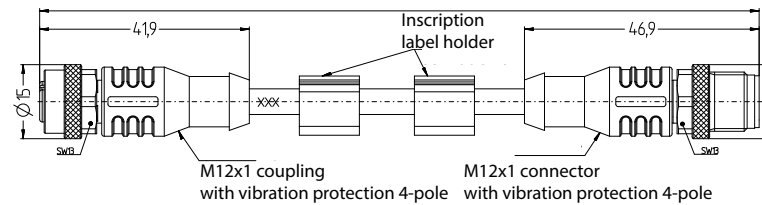
Material core insulation/sheath	PP/PUR
Material overmoulding/contact carrier	Plastic, TPU, BK
Material union nut	Metal, CuZn, nickel-plated
Rated voltage	250 V
Current carrying capacity per pin (at 40° C)	4 A
Temperature range	when cable is fix mounted -40°C to + 90°C when cable can be moved -30°C to + 90°C
Number of poles	4
Protection class in assembled state	IP68

#### Contact assignment AC/DC versions

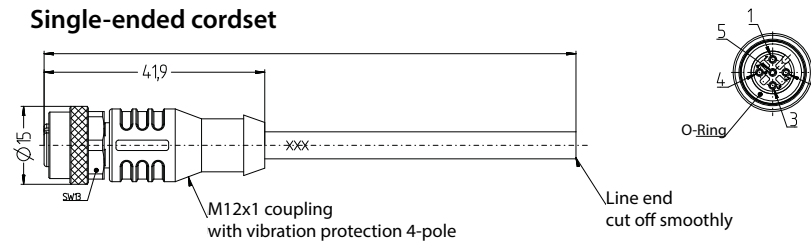
- 1 = brown
- 2 = white
- 3 = blue
- 4 = black



### Double-ended cordset



### Single-ended cordset



# ACCESSORIES

## 5-pole single-ended cordsets

Product selection								
No.	Article number	Designation	Cable length	Connector/alignment	Connector 1	Connector 2	Special feature	Use for following products
3	6075689092	SFW-M12B5/AW-2PU	2 m	Straight	F			- SRF-2
3	6075689093	SFW-M12B5/AW-5PU	5 m	Straight	F			- MAK 42 and 52 with M12
3	6075689183	SFW-M12B5/AW-10PU	10 m	Straight	F			- SLC with 5-pole M12 connection
3	6075689184	SFW-M12B5/AW-20PU	20 m	Straight	F			- Connection for Smart Safety (pos. 2 of figure 1 on page 152)

## 5-pole double-ended cordsets

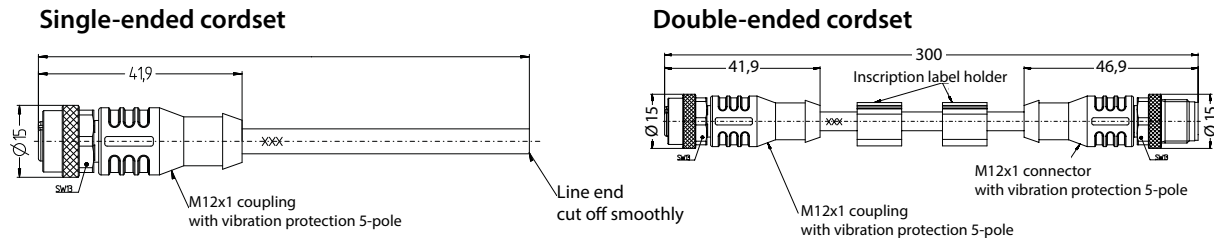
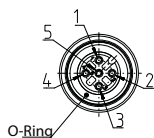
Product selection								
No.	Article number	Designation	Cable length	Connector/alignment	Connector 1	Connector 2	Special feature	Use for following products
-	6075689003	S1W-M12B5/AW-0,3PU	0,3 m	Straight	M	F		Smart T-adapter

## Technical data

Material core insulation/sheath	PP/PUR
Material overmoulding/contact carrier	Plastic, TPU, BK
Material union nut	Metal, CuZn, nickel-plated
Rated voltage	60 V
Current carrying capacity per pin (at 40° C)	4 A
Temperature range	when cable is fix mounted -40°C to + 90°C when cable can be moved -30°C to + 90°C
Cable construction	5 x 0.34 mm <sup>2</sup>
Number of poles	5
Protection class in assembled state	IP68

### Contact assignment AC/DC versions

- 1 = brown
- 2 = white
- 3 = blue
- 4 = black
- 5 = grey

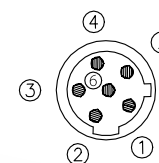
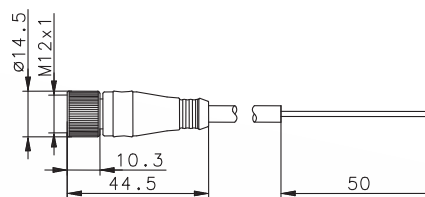


## 6-pole single-ended cordsets

Product selection								
No.	Article number	Designation	Cable length	Connector/alignment	Connector 1	Connector 2	Special feature	Use for following products
	<b>3251006291</b>	AN-KAB.SHS3 2M GERADE	2 m	Straight	F		M12 BG Type	SHS3
	<b>3251006292</b>	AN-KAB.SHS3 5M GERADE	5 m	Straight	F		M12 BG Type	
	<b>3251006293</b>	AN-KAB.SHS3 10M GERADE	10 m	Straight	F		M12 BG Type	
	<b>3251006294</b>	AN-KAB.SHS3 2M WINKEL	2 m	Angle	F		M12 BG Type	
	<b>3251006295</b>	AN-KAB.SHS3 5M WINKEL	5 m	Angle	F		M12 BG Type	
	<b>3251006296</b>	AN-KAB.SHS3 10M WINKEL	10 m	Angle	F		M12 BG Type	

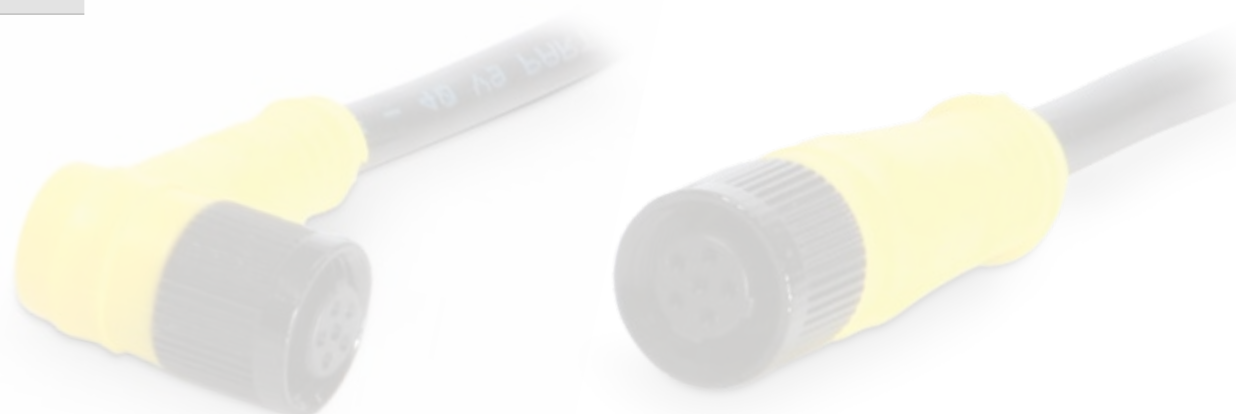
## Technical data

Material core insulation/sheath	PVC (Ø 5.6 mm)
Material overmoulding/contact carrier	PUR/Elastollan R3000
Material union nut	Gal. Zn
Rated voltage max.	250 V AC
Current carrying capacity max.	2.5 A (bei 70°C)
Temperature range	when cable is fix mounted -40°C to + 105°C when cable can be moved -5°C to + 105°C
Cable construction	6 x 0.34 mm <sup>2</sup>
Number of poles	6
Protection class in assembled state	IP68



### Contact assignment AC/DC versions

- 1 = white
- 2 = brown
- 3 = green
- 4 = yellow
- 5 = grey
- 6 = pink



# ACCESSORIES

## 8-pole single-ended cordsets

Product selection								
No.	Article number	Designation	Cable length	Connector/alignment	Connector 1	Connector 2	Special feature	Use for following products
	<b>6075689185</b>	SFW-M12A8/BW-2PU	2 m	Straight	F			
	<b>6075689186</b>	SFW-M12A8/BW-5PU	5 m	Straight	F			SRF-4 and 5, SLC, SLK
	<b>6075689187</b>	SFW-M12A8/BW-10PU	10 m	Straight	F			

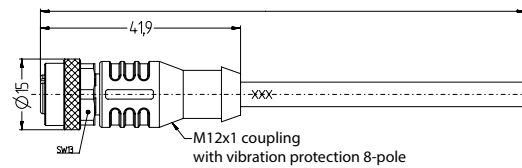
## 8-pole double-ended cordsets

Product selection								
No.	Article number	Designation	Cable length	Connector/alignment	Connector 1	Connector 2	Special feature	Use for following products
1	<b>6075689085</b>	S1W-M12A8/BW-1PU	1 m	Straight	M	F		Extension between SRF-4/5 and T-adapter
1	<b>6075689086</b>	S1W-M12A8/BW-2PU	2 m	Straight	M	F		

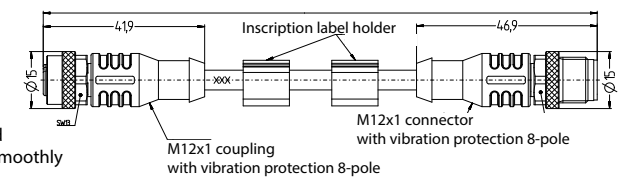
## Technical data

Material core insulation/sheath	PP/PUR
Material overmoulding/contact carrier	Plastic, TPU, BK
Material union nut	Metal, CuZn, nickel-plated
Rated voltage	30 V
Current carrying capacity per pin (at 40°C)	2 A
Temperature range	when cable is fix mounted -40°C to + 90°C when cable can be moved -30°C to + 90°C
Cable construction	8 x 0.25 mm <sup>2</sup>
Number of poles	8
Protection class in assembled state	IP68

### Single-ended cordset

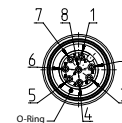


### Double-ended cordset



### Contact assignment AC/DC versions

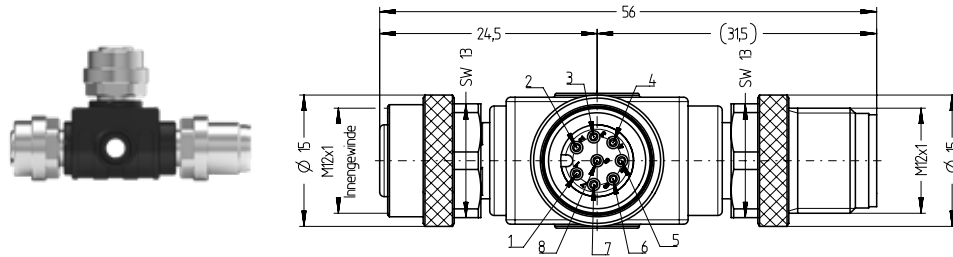
- 1 = white
- 2 = brown
- 3 = green
- 4 = yellow
- 5 = grey
- 6 = pink
- 7 = blue
- 8 = red



## Further accessories

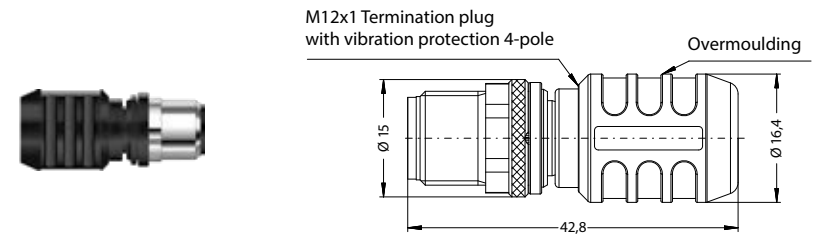
### T-adapter for series connection of the sensors

No.	Article number	Designation
4	6075989082	ATS-M12/4-M12/8



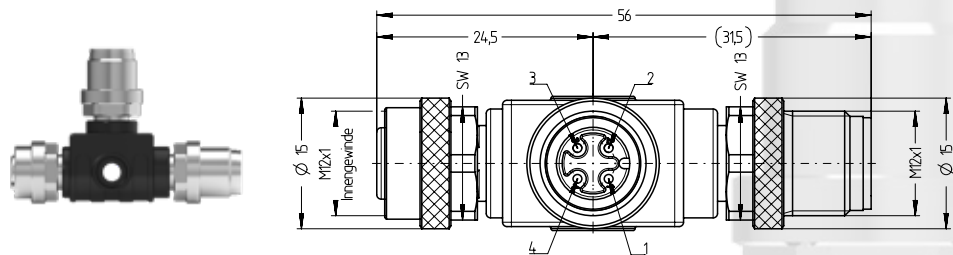
### Termination plug M12

No.	Article number	Designation
6	6075689084	AEP-M12/4



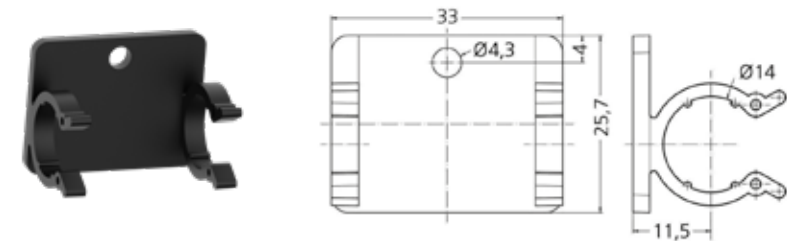
### T-adapter for connection IO-Link and reset button

No.	Article number	Designation
5	6075989083	ATD-M12/8-M12/4



### Fixing clip for T-adapter

No.	Article number	Designation
	6075689127	AT-CLIP-M12



# Accessories

## Screw-in LED



### MANY BENEFITS AT A GLANCE

- Suitable for all M20x1.5 threads
- Indication of guard locking, emergency stop status and much more
- Directly controllable via the contacts
- Supply voltage 24V DC

### Technical data

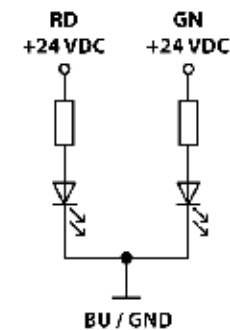
#### Mechanical data

Enclosure lower part	Plastic PC/ABS black
Enclosure upper part	Plastic Lexan, PC transparent
Ambient air temperature	-25 °C ... +85 °C
Protection type	IP67 acc. EN 60529 (only in fully locked position with enclosed sealing ring)
O ring	NBR (nitrile rubber)

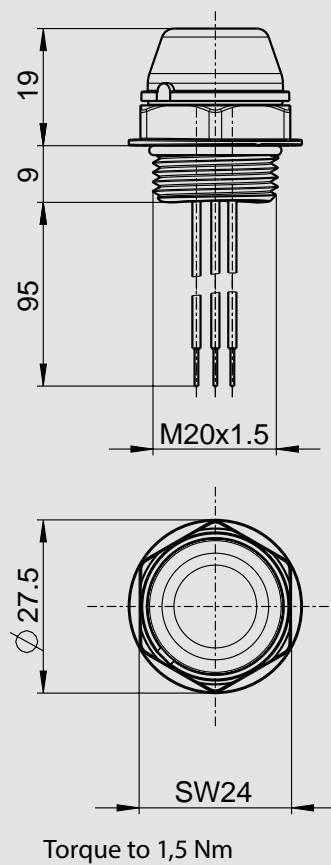
#### Electrical data

Rated operating voltage	$U_e$	24V ± 20%
Rated operational current	$I_e$	24 mA

#### Wiring Diagram

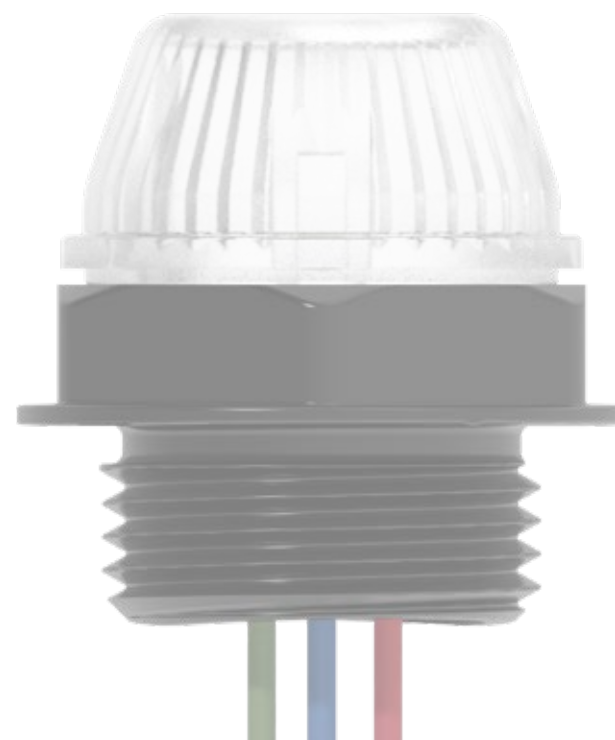
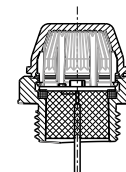






Screw-in LED

Article number	Designation	Colours
6519125001	L20-RD/GN	Red/Green



# One-way screws

## WHY ONE-WAY SCREWS?

In order to reduce the possibility of manipulation of safety switches and, if necessary, their actuators, ISO 14119 allows the fastening of switches and actuators with one-way screws.

### One-way screw M4X8

Article number	Designation	Dimensions	Packaging unit	Material
6054999015	EINWEGSCHR.M4X8	M4 x 8 mm	2	Stainless steel



#### Can be used for:

- 3112850345 M2-Actuator
- 3112850340 M3-Actuator
- 3911452116 SK-BET.M4 KPL. M.KAP.
- 3911452159 SK-BET. M4 KURZ KPL.
- 3911451949 SK-BET.M.LG-BUCHSE
- 3911451914 SK-BET.KPL.M.KAP.
- 6016999190 M1-Actuator
- 6016999191 M2-Actuator
- 6016999192 M3-Actuator
- 6016999193 M4-Actuator
- 6016999194 M5-Actuator
- TK-42
- MAK42

### One-way screw M4X16

Article number	Designation	Dimensions	Packaging unit	Material
6054999016	EINWEGSCHR.M4X16	M4 x 16 mm	2	Stainless steel



#### Can be used for:

- TK-52
- 3911702228 A1-Actuator
- 3911702234 A7-Actuator
- 3911742390 ACS-1-Actuator
- SRF and SRF Actuator
- I49
- M49
- MAK52

### One-way screw M5X10

Article number	Designation	Dimensions	Packaging unit	Material
6054999017	EINWEGSCHR.M5X10	M5 x 10 mm	2	Stainless steel



#### Can be used for:

- 3911452058 MRU-Actuator
- 3911702229 A2-Actuator
- 3911702230 A3-Actuator
- 3911702231 A4-Actuator
- 3911742392 ACC-1-Actuator
- 3911742398 ACR-1-Actuator
- 3911742391 ACF-1-Actuator
- 6016999195 M6-Actuator

#### One-way screw M5X25

Article number	Designation	Dimensions	Packaging unit	Material
6054999018	EINWEGSCHR.M5X25	M5 x 25 mm	2	Stainless steel



#### Can be used for:

SK  
SKC

#### One-way screw M5X40

Article number	Designation	Dimensions	Packaging unit	Material
6054999021	EINWEGSCHR.M5X40	M5 x 40 mm	4	Stainless steel



#### Can be used for:

IN73  
MN78

#### One-way screw M5X25

Article number	Designation	Dimensions	Packaging unit	Material
6054999019	EINWEGSCHR.M5X25 DK8,5	M5 x 25 mm	2	Stainless steel



#### Can be used for:

I88  
IN62  
IN65

#### One-way screw M5X40

Article number	Designation	Dimensions	Packaging unit	Material
6054999022	EINWEGSCHR.M5X40 DK8,5	M5 x 40 mm edited	4	Stainless steel



#### Can be used for:

SLC

#### One-way screw M5X30

Article number	Designation	Dimensions	Packaging unit	Material
6054999020	EINWEGSCHR.M5X30 DK8,5	M5 x 30 mm	2	Stainless steel



#### Can be used for:

SKT  
SKI

# Built-in connector

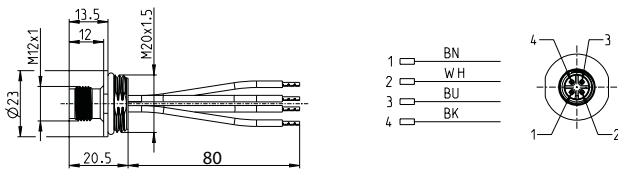
## FOR WHICH SWITCHES ARE THE CONNECTORS SUITABLE?

The M12 flush-type connectors can be installed in an M20 thread of the position and safety switches.

For use in conjunction with the SMART T-adapter 6075689191 SEU-1/0-T45-C-X-AB, the panel connector 607900002 must be used.

### Connector 4-pole

Article number	Designation
607900001	STECKER 4P M12/M20 A-COD



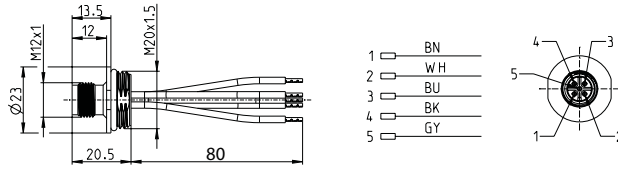
### Technical data

Rated voltage	250 V
Rated current (40°C)	4 A (3 A UL)
Enclosure, contact body	PA
Contact, surface	CuZn, Au
Mechanical life	> 50 Mating cycles
Stranded conductor with ferrule	4 x H05V2-K, 0.5 mm <sup>2</sup> , PVC
Tightening torque (flange plug – switch enclosure)	1 Nm
Protection class	IP67*

\* Only with correspondingly installed flange plug and with corresponding and mounted cable coupling.

### Connector 5-pole

Article number	Designation
607900002	STECKER 5P M12/M20 A-COD



### Technical data

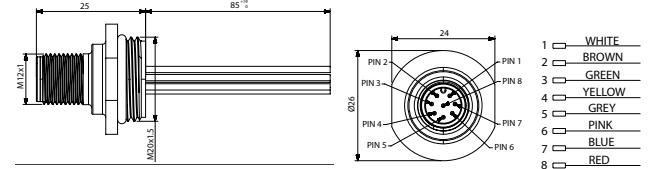
Rated voltage	60 V
Rated current (40 °C)	4 A (3 A UL)
Enclosure, contact body	PA
Contact, surface	CuZn, Au
Mechanical life	> 50 Mating cycles
Stranded conductor with ferrule	5 x H05V2-K, 0.5 mm <sup>2</sup> , PVC
Tightening torque (flange plug – switch enclosure)	1 Nm
Protection class	IP67*

\* Only with correspondingly installed flange plug and with corresponding and mounted cable coupling.

\*\* Attention: For technical reasons, the 5-pole version of the built-in plug has a rated voltage of 60 V only. This means that if this built-in plug is installed in a switch that is designed for voltages higher than 60 V, the rated voltage of the switch with the 5-pole plug is reduced to 60 V! It is not permissible to operate the switch with voltages higher than 60 V.

### Connector 8-pole

Article number	Designation
607900003	STECKER 8P M12/M20 A-COD



### Technical data

Rated voltage	30 V**
Rated current (40 °C)	2 A
Enclosure, contact body	POM/TPU
Contact, surface	Au (Gold)
Mechanical life	> 100 Mating cycles
Stranded conductor with ferrule	8 x AWG 24, PVC
Tightening torque (flange plug – switch enclosure)	4 Nm
Protection class	IP67*

\* Only in fully snapped-in position with it's plugs.

\*\* Attention: The 8-pin version of the flush-mounted plug has a rated voltage of 30 V for technical reasons. This means that the rated voltage is reduced to 30 V after installation of the built-in plug in a switch designed for voltages greater than 30 V! It is not permitted to operate the switch with voltages higher than 30 V.

# DCD Filter Clamp

The filter is used in the event of communication interruptions in a parallel connection of DCD evaluation unit and other devices (e.g. safety relays).

The filter is non-reactive, i.e. its use has no influence on the outputs and their functions or parameters of the upstream device.

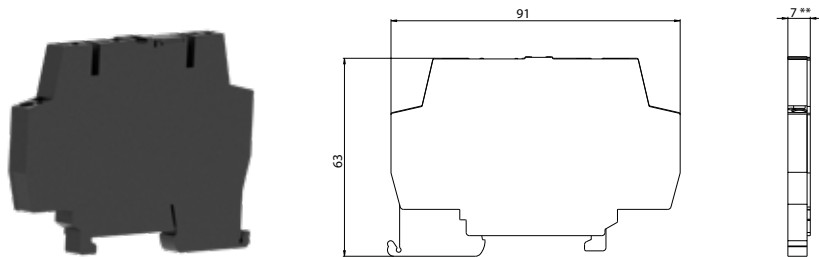
## DCD Filter Clamp

**Article number**

**Designation**

**6075689225**

DCD-LP-Filter-TB



# Position switches accessories

## Sealed cable gland

Article number	Designation
3998000120	M16
3998000121	M20



## NPT adapter M16 on 1/2" (NPT 14)

Article number	Designation
3998000115	various families



## NPT adapter M20 on 1/2" (NPT 14)

Article number	Designation
3998000116	various families



## LED Cover

Article number	Designation
3998000284	IN62 / IN65





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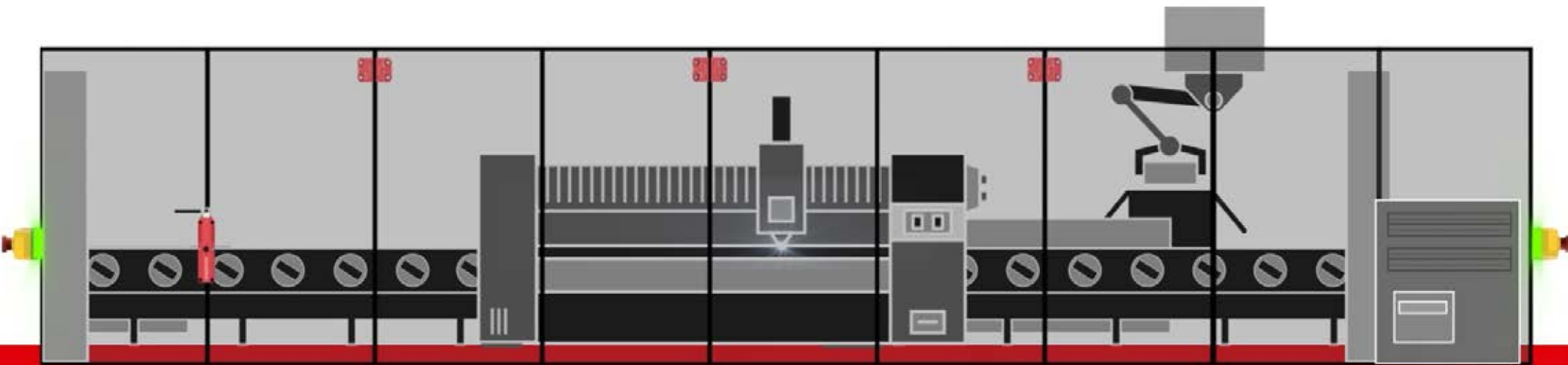
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# Safety technology – reliably averting injury to **people**, and damage to **machines** and **material**





**DETECT**

**We make  
safety happen.**



**PROTECT**

**We keep your  
visions safe.**