



## 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.

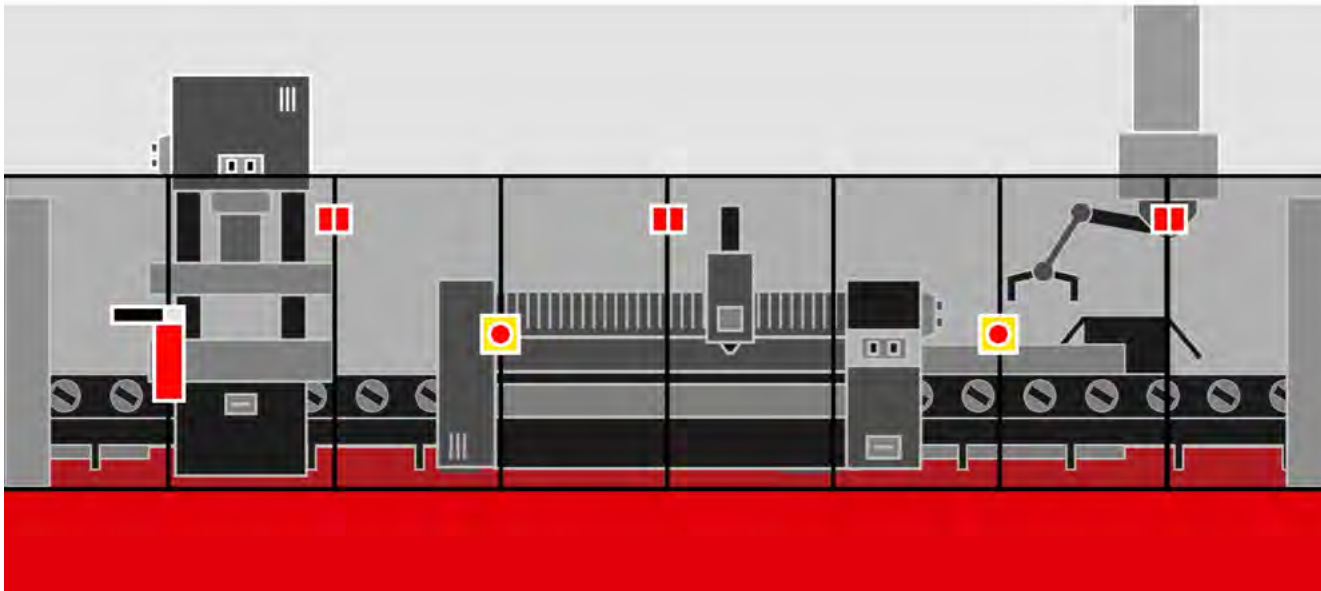
And there is a strong partner for all of them: BERNSTEIN!



Click here for the video

»For us at BERNSTEIN, good 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

## Machine Directive 2006/42/EG

Manufacturers of machines and systems who wish to market their products in the EU 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

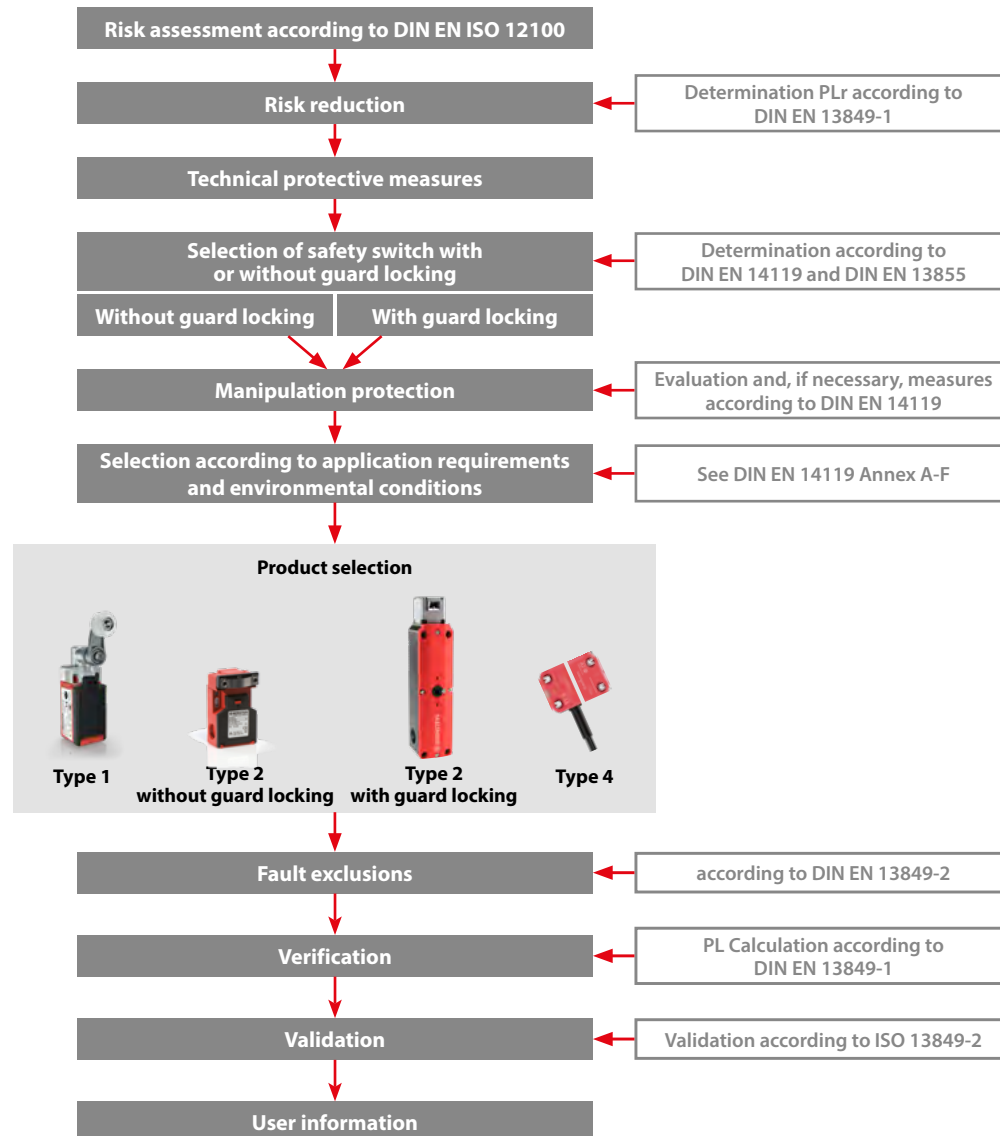
Needless to say, the BERNSTEIN AG products listed in this catalogue meet all normative requirements and are characterised by particular flexibility and userfriendliness.

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

Your BERNSTEIN Team



# Selection and design of interlocking devices on guards according to DIN EN 14119



The overview on the right and the following explanations on pages 8–13 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.

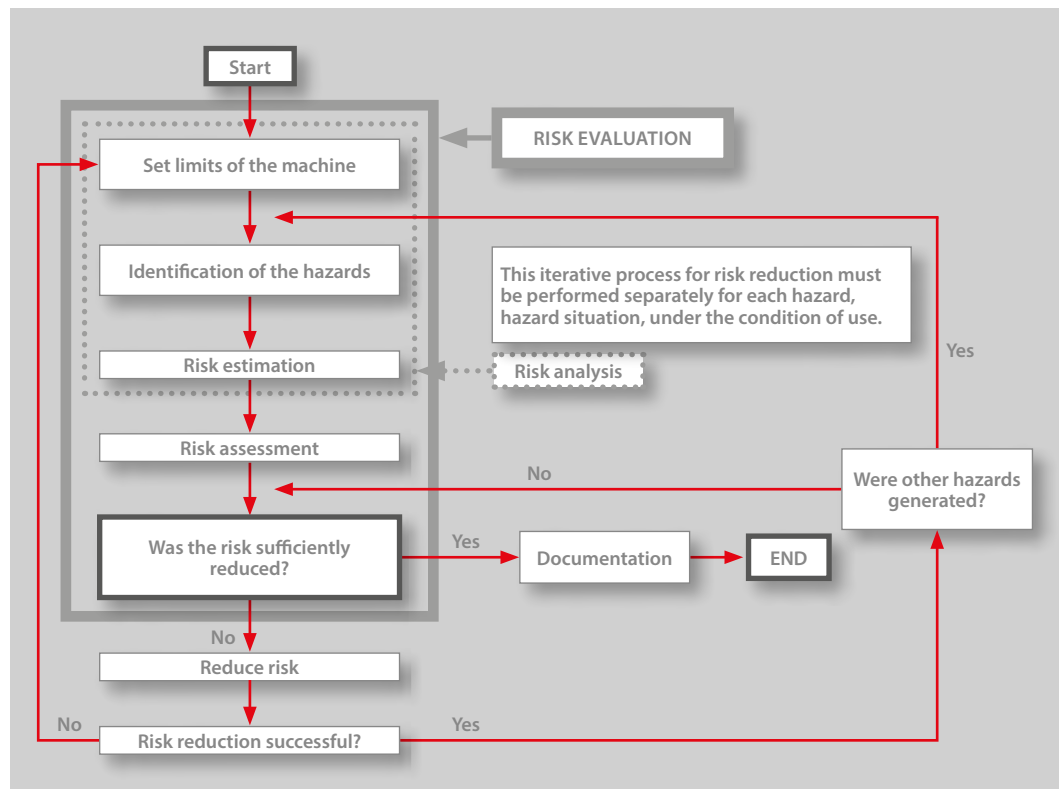
The machine must then be designed and built taking into account the results of the risk evaluation.

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 EN 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 DIN EN 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.

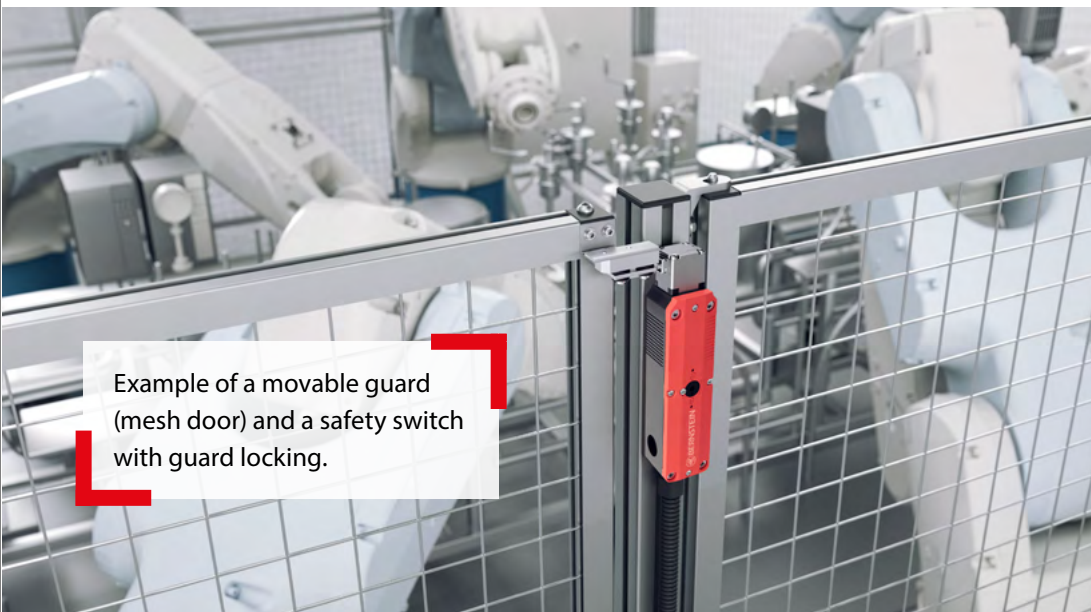
In practice, this is usually an enclosure of the hazardous area where entry or access must be available for various reasons (cleaning, maintenance, work process). This access is made possible by a movable separating protective device (usually a door, bonnet or flap), which must, however, be locked.

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 DIN EN 14119.

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



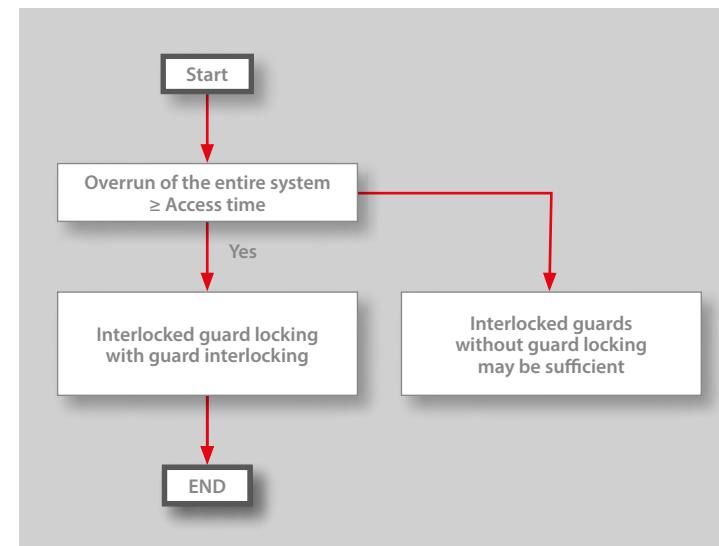
Example of a movable guard (mesh door) and a safety switch with guard locking.

## 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:

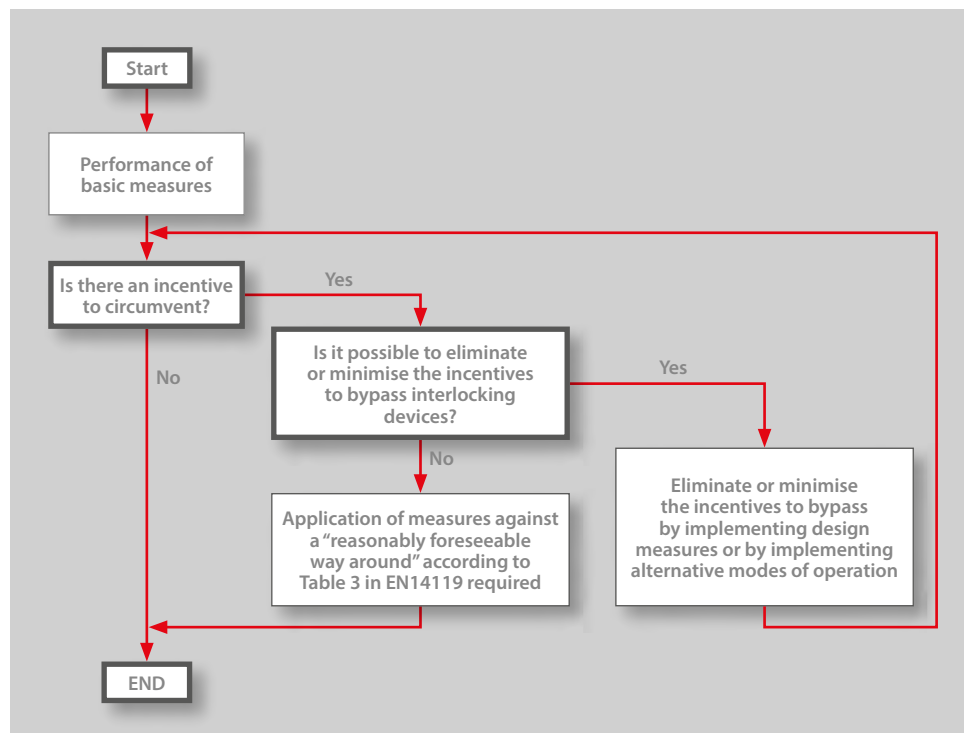


For the calculation of the access time, DIN EN ISO 13855 should be used. (Arrangement of protective devices with regard to approach speeds of body parts) should be consulted.

## Manipulation protection

The manipulation 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 EN 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:



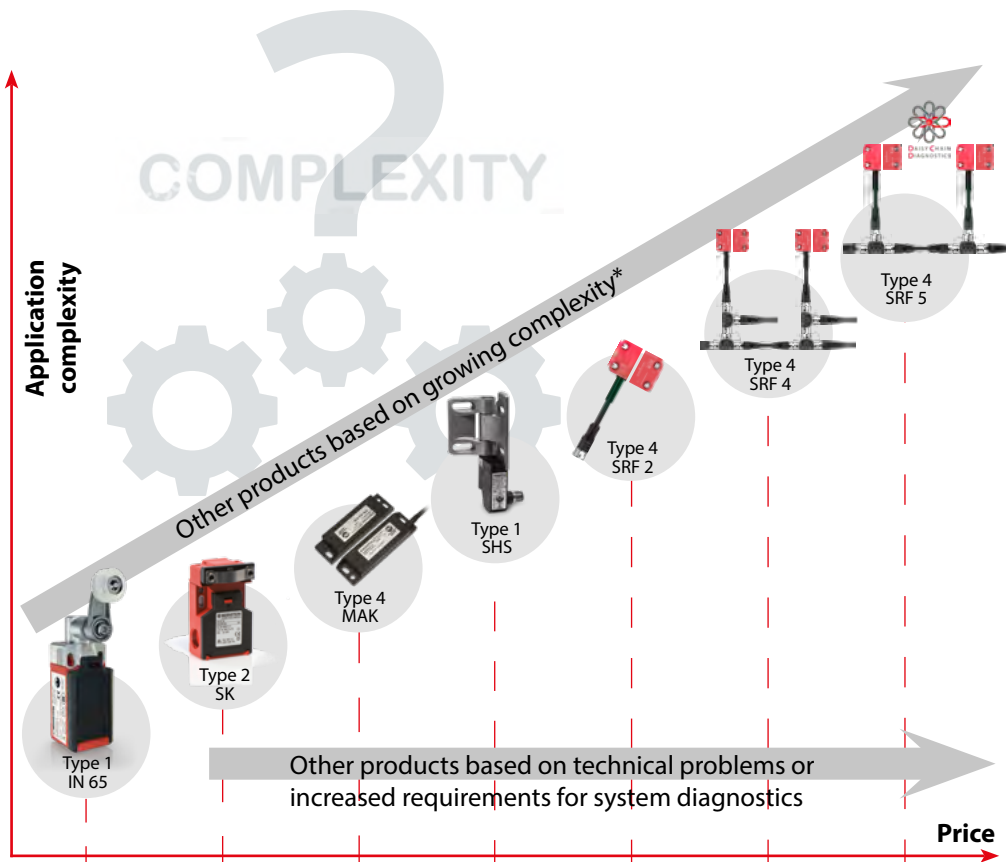
Click here for the video

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 [66 – 69](#) (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 DIN EN ISO 14119 and product example

| Application request  | Type 1 IN65 | Type 2 SK | 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/<br>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 DIN EN 13849 and DIN EN 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 errors can be avoided. Nevertheless, error consideration must also stop at some point if one wants to arrive at a reasonable and economically justifiable result/conclusion. Therefore, the error consideration typically ends after the first subsequent error.

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 DIN EN 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 DIN EN 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.

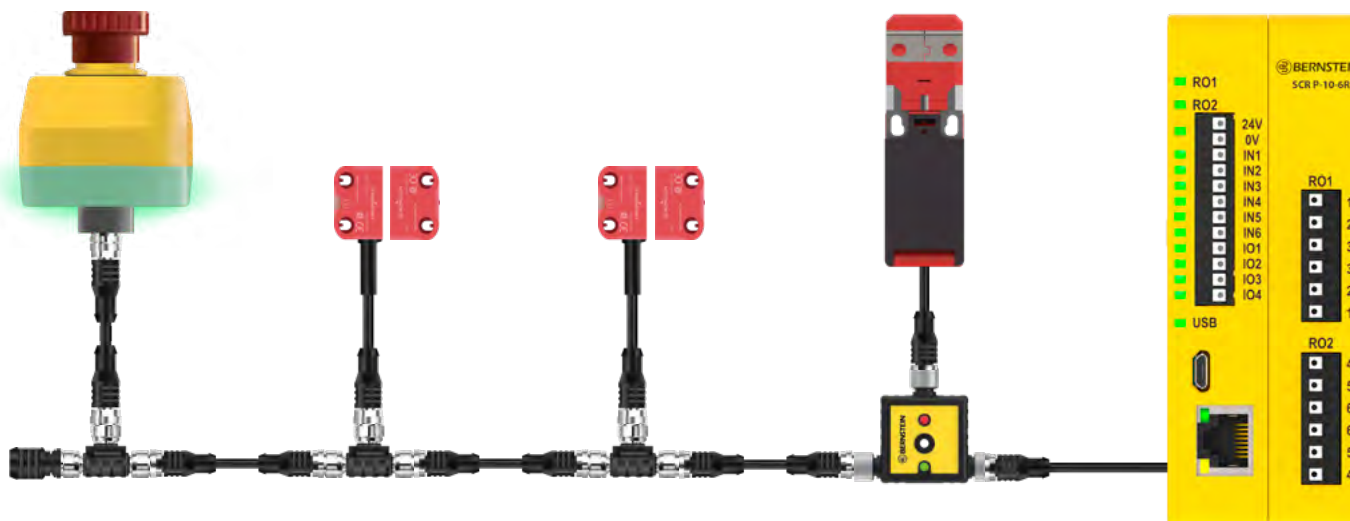
- Series connection of safety components
- Minimal wiring effort
- Integration of mechanical switches possible

## Diagnostic system DCD

The Daisy Chain Diagnostic System (DCD) provides a wealth of information to make the machines more efficient by avoiding downtime.

The DCD system is supported by the sensors (SRF-5), the emergency stop (SEU) and the safety relay (SCR DI). The data of each device is collected in the SCR DI (or stand-alone diagnostic device) and can be sent via

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



## Everything for your SMART Factory

With our **extensive selection** 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 error can be identified immediately.

- Identify sources of error 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).

- Safe up to PL e
- Avoid downtimes
- Minimise failures



# SMART Safety System

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

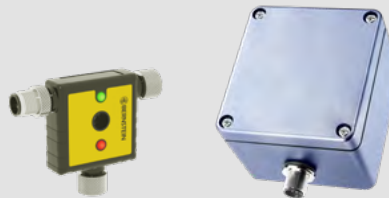
A system with many individually selectable components. With our connection options for the SMART Safety System, you receive a smart complete system for safeguarding your machines and plants on request. The system is also regularly supplemented with additional components. Feel free to make up your mind.

### Contactless safety technology



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### DCD interfaces for the integration of mechanical switches



Page 108

### Diagnostic modules



Page 114

### Emergency stop devices



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



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### Other accessories



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# The BERNSTEIN safety world

## Safety switches and sensors

### contactless

#### RFID

##### single applicable

SRF-2



p. 70

##### series-connectable

SRF-5



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SRF-4



p. 68

#### magnetic

MAK 42



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MAK 52



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MAK 53



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#### with integrated actuator

I49



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IN73



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M49



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MN78



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IN65



p. 24

### mechanical

#### with separate actuator

##### without guard locking

SK



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SKI



p. 58

SKT



p. 60

##### with guard locking

SLK



p. 50

SLC



p. 44

#### for hinged applications

SHS3



p. 34

SHS



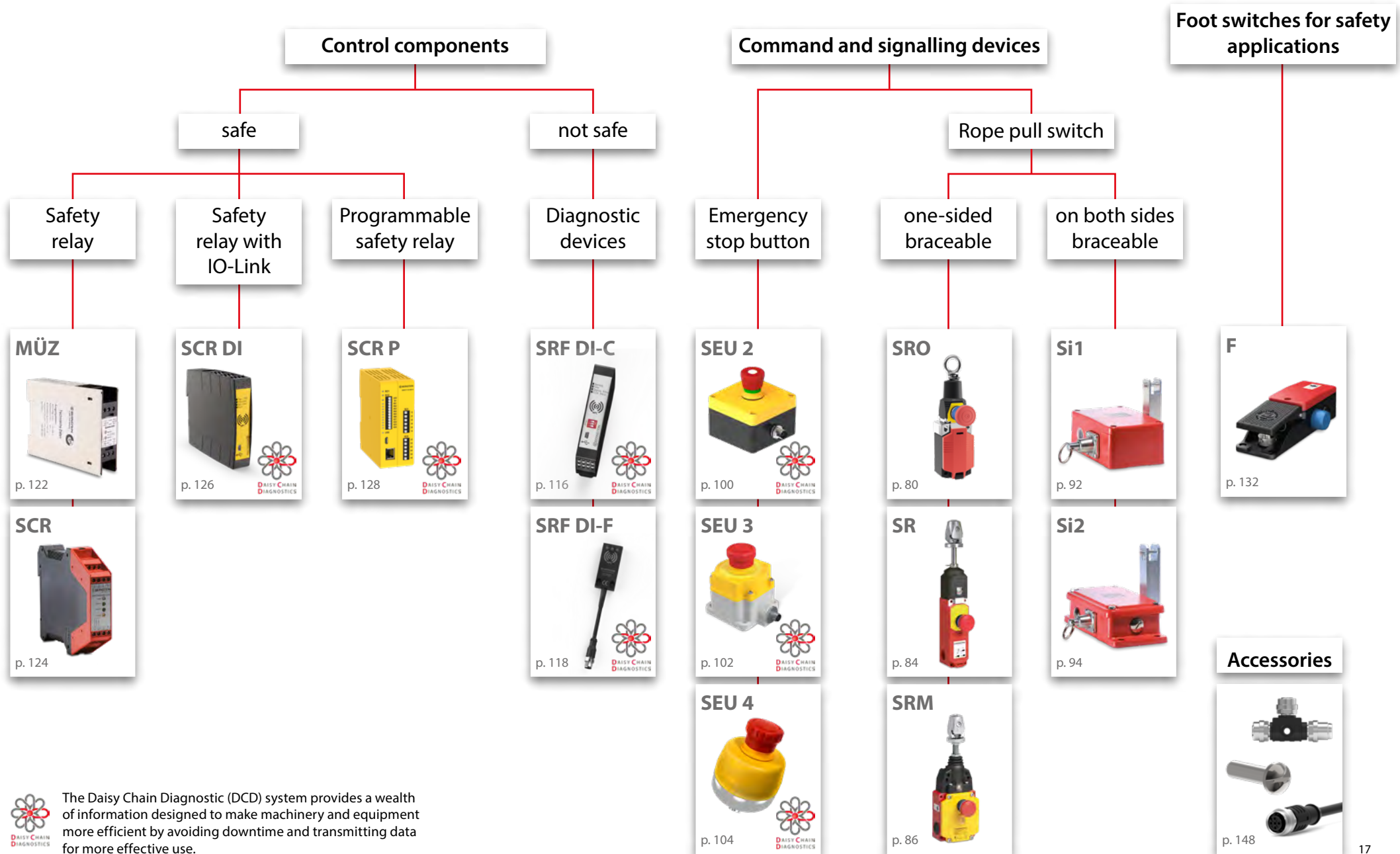
p. 32

IN62, IN65



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# The BERNSTEIN safety world



# 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 DIN EN 60947-5-1 (positive opening)

## Technical data

### Electrical data

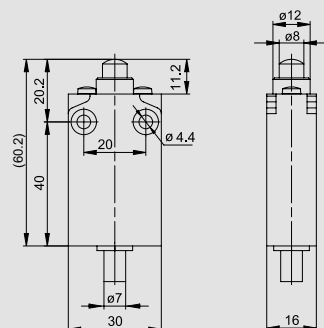
|                                     |  |
|-------------------------------------|--|
| Design insulation voltage           | $U_i$ max. 400 V AC                      |
| Conventional thermoelectric current | $I_{the}$ 10 A                           |
| Rated operating voltage             | $U_e$ max.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

### Mechanical data

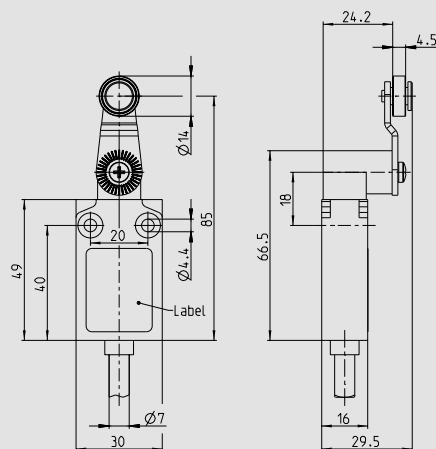
|   |  |
|---|--|
| Ambient temperature                         | -25°C to +70°C (connecting cable firmly wired) |
| Mechanical lifetime                         | 10 x 10 <sup>6</sup> switching cycles          |
| Switching frequency                         | ≤ 60/min.                                      |
| 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; DIN VDE 0470 T1   |

<sup>①</sup> Depending on switching system and actuator (applicable values in data sheet)

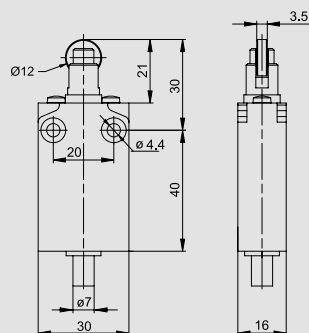
IW



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 DIN EN 60947-5-1 (positive opening)

## Technical data

### Electrical data

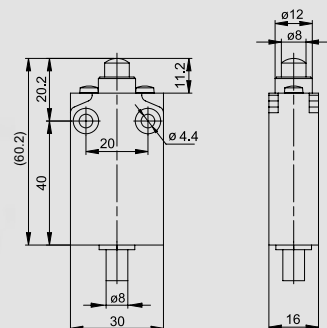
|                                     |  |
|-------------------------------------|--|
| Design insulation voltage           | U <sub>i</sub> max. 400 V AC           |
| Conventional thermoelectric current | I <sub>the</sub> 10 A                  |
| Rated operating voltage             | U <sub>e</sub> max. 240 V              |
| Utilisation category                | AC-15, 240 V/3 A;<br>DC-13, 24 V/2,8 A |
| Protection class                    | Protection class I/protective earth    |

### Mechanical data

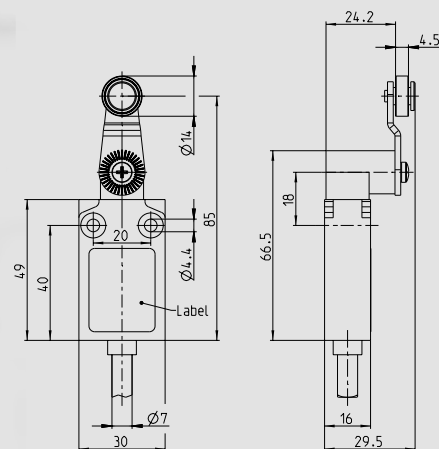
|   |  |
|---|--|
| Ambient temperature                         | –25°C to +70°C (connecting cable firmly wired) |
| Mechanical lifetime                         | 10 x 10 <sup>6</sup> switching cycles          |
| Switching frequency                         | ≤ 60/min.                                      |
| 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; DIN VDE 0470 T1   |

<sup>①</sup> Depending on switching system and actuator (applicable values in data sheet)

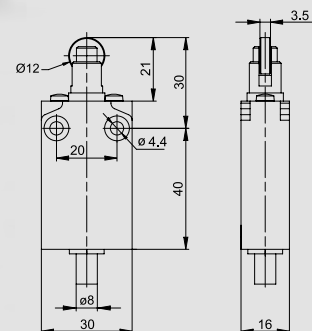
IW



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 |



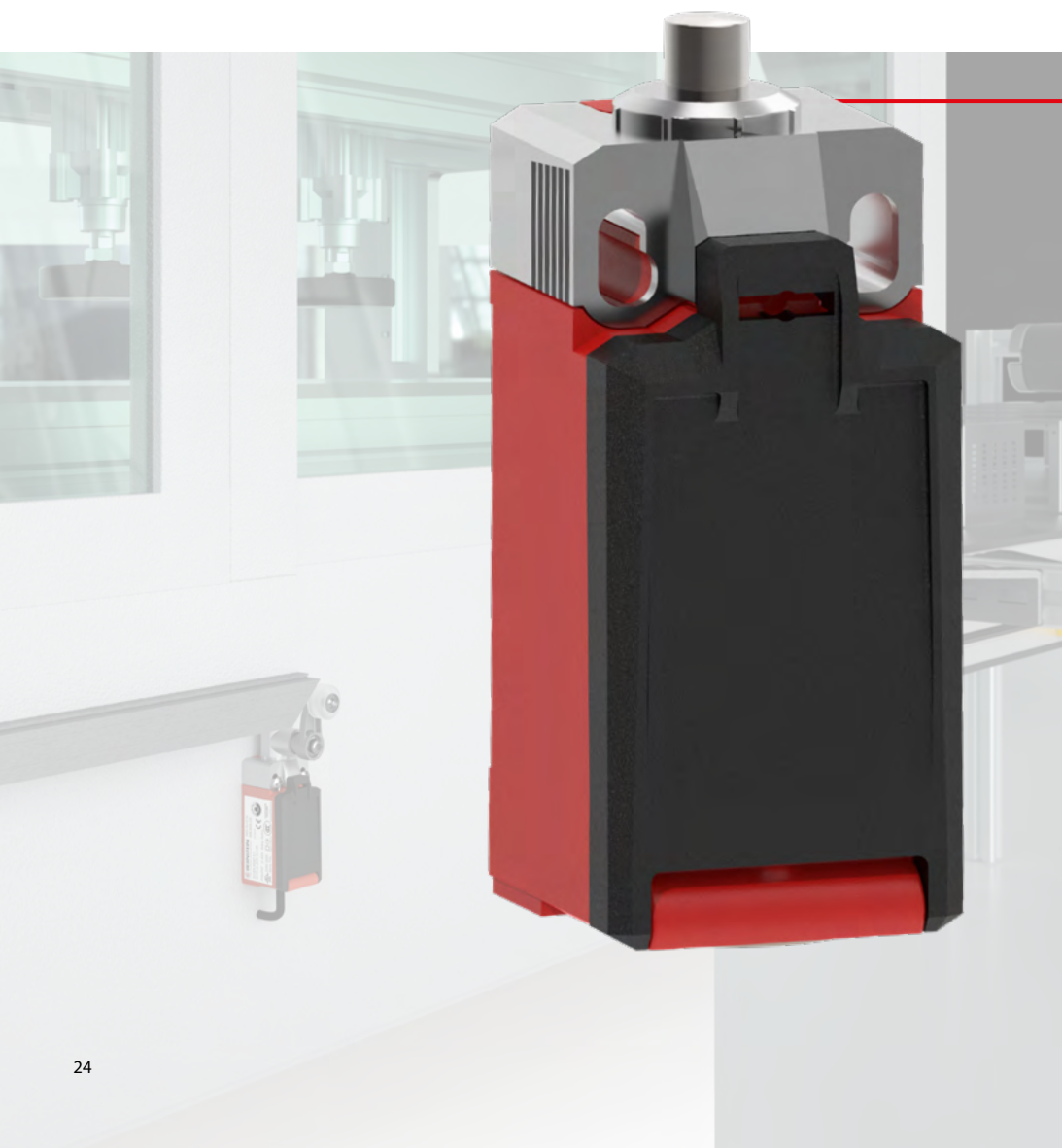
## Options

- 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 DIN EN 50047
- Protection class IP66 und IP67 conforming to EN 60529

## Technical data

### Electrical data

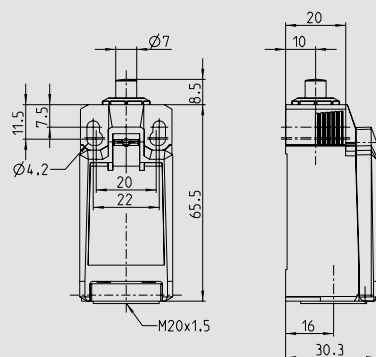
|                                     |                   |  |
|-------------------------------------|-------------------|--|
| Design insulation voltage           | $U_i$ max.        | 400 V AC   |
| Conventional thermoelectric current | (up to) $I_{the}$ | 5 A  |
| Rated operating voltage         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

### Mechanical data

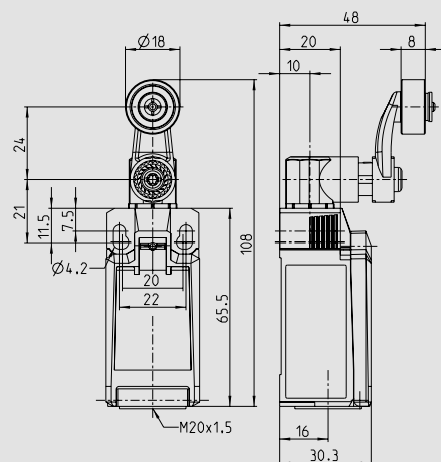
|   |   |
|---|---|
| Enclosure material                          | Thermoplastics, glass-fibre reinforced (UL 94-V0) |
| Ambient temperature                         | -30 °C to +75 °C                                  |
| Mechanical lifetime (up to)                 | $30 \times 10^6$ switching cycles                 |
| Switching frequency                         | $\leq 60$ /min.                                   |
| B10d NC Contact cycles (up to) <sup>①</sup> | 20 Mio.   |
| Protection class                            | IP66/IP67 according to EN 60529; DIN VDE 0470 T1  |

<sup>①</sup> Depending on switching system and actuator (applicable values in data sheet)

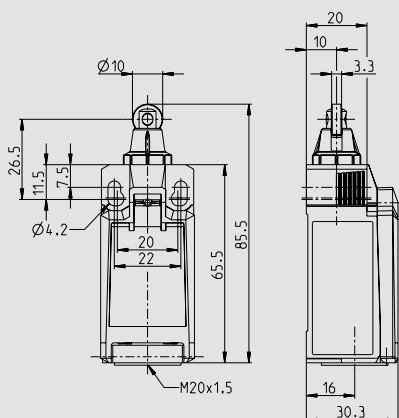
SM



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 DIN EN 50041
- Protection class IP66 and IP67 according to EN 60529

## Technical data

### Electrical data

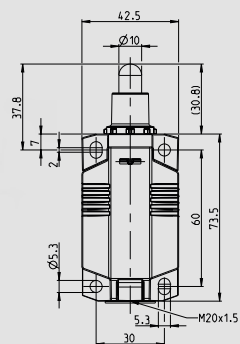
|                                     |                   |  |
|-------------------------------------|-------------------|--|
| Design insulation voltage           | $U_i$ max.        | 400 V AC   |
| Conventional thermoelectric current | (up to) $I_{the}$ | 5 A  |
| Rated operating voltage         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

### Mechanical data

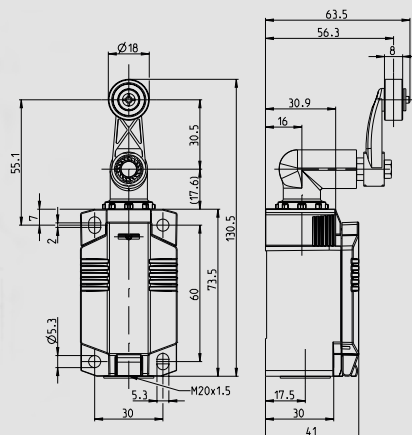
|   |   |
|---|---|
| Enclosure/Cover material                    | Thermoplastics, glass-fibre reinforced (UL 94-V0) |
| Ambient temperature                         | -30 °C to +75 °C                                  |
| Mechanical lifetime (up to)                 | $10 \times 10^6$ switching cycles                 |
| Switching frequency                         | $\leq 60$ /min.                                   |
| B10d NC Contact cycles (up to) <sup>①</sup> | 20 Mio.   |
| Protection class                            | IP66/IP67 according to EN 60529; DIN VDE 0470 T1  |

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

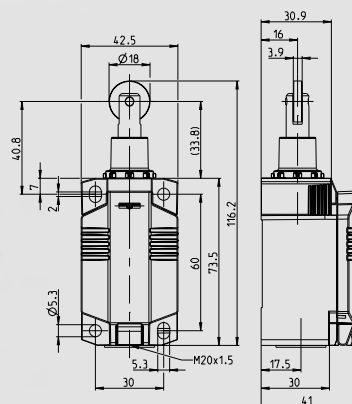
SM



AHK



RM



#### Product selection

| Article number | Designation  | Contact configuration | Function    |
|----------------|--------------|-----------------------|-------------|
| 6081000001     | IN73-S11 SM  | 1NC/1NO               | Snap action |
| 6081000002     | IN73-11 SM   | 1NC/1NO               | Slow action |
| 6081000004     | IN73-20 SM   | 2NC                   | Slow action |
| 6081000061     | IN73-S11 AHK | 1NC/1NO               | Snap action |
| 6081000062     | IN73-11 AHK  | 1NC/1NO               | Slow action |
| 6081000064     | IN73-20 AHK  | 2NC                   | Slow action |
| 6081000013     | IN73-S11 RM  | 1NC/1NO               | Snap action |
| 6081000014     | IN73-11 RM   | 1NC/1NO               | Slow action |
| 6081000016     | 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 DIN EN 50041, standard actuator according to DIN EN 50041
- Protection class IP66 and IP67 conforming to EN 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<br>DC-13 $U_e/I_e$ 24 V/1.5 A |
| Protection class                    |                   | Protection class I/Protective conductor                  |

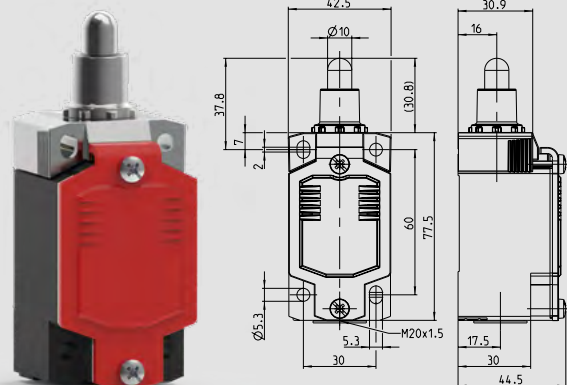
### Mechanical data

|   |  |
|---|--|
| Enclosure material                          | Metal, glass-fibre reinforced (UL 94-V0)         |
| Ambient temperature                         | -30°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; DIN VDE 0470 T1 |

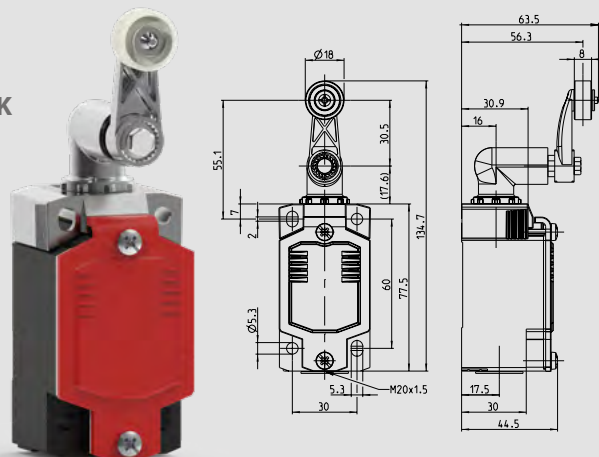
① Depending on switching system and actuator (applicable values in data sheet)



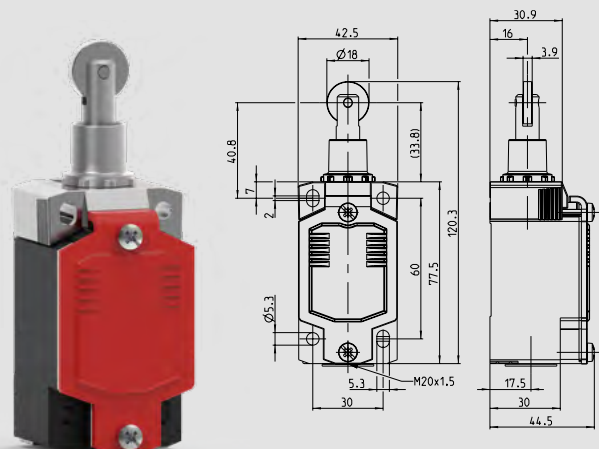
SM



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 34



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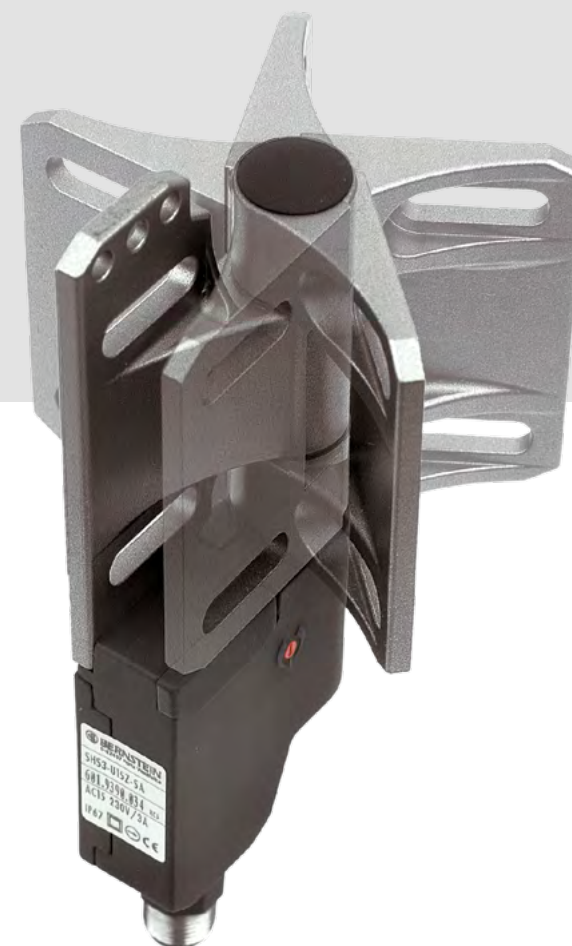


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## Secure locking by means of the hinge

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 |  |

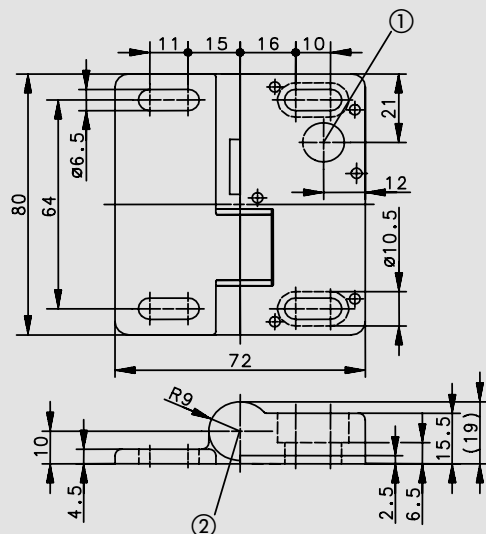
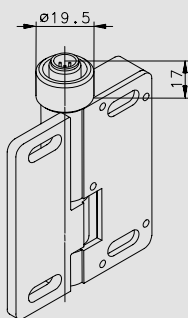


Illustration showing fixed pin and shearing bolt sheared off

① Position of connection variant 2.

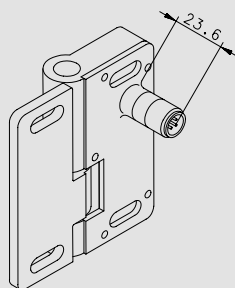
② Position of connection variant 1.

#### 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 |       | Con-<br>nection<br>variant<br>No. | Required cable cou-<br>pling/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 148](#))





# 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

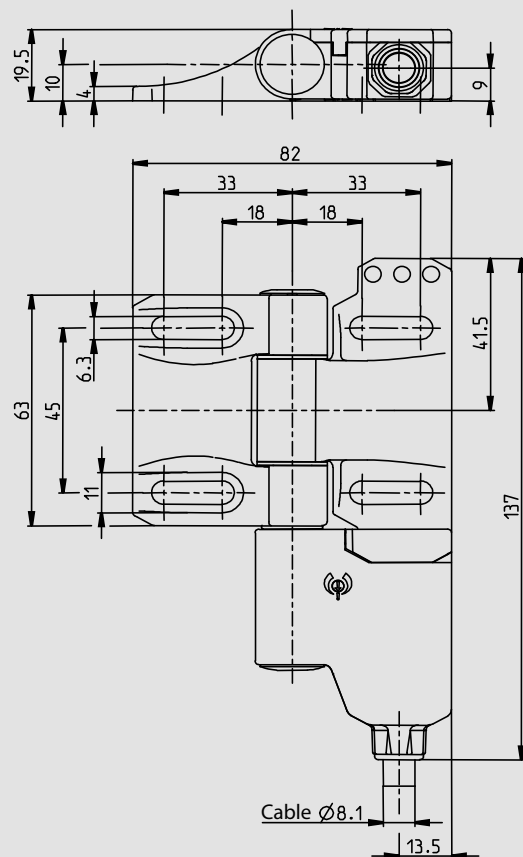
## Technical data

### 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   |  |



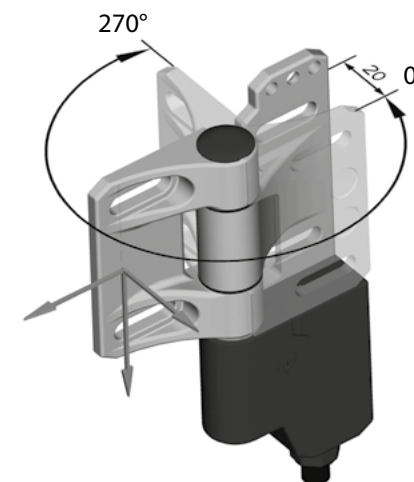
#### Product selection

| Article number | Designation     | Switching contact | max. switching voltage | Type of voltage | Connection type and direction | Material hinge  | Cable coupling/ type | Mounting   |
|----------------|-----------------|-------------------|------------------------|-----------------|-------------------------------|-----------------|----------------------|------------|
| axial          |                 |                   |                        |                 |                               |                 |                      |            |
| 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 148](#))



# 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                   |
|----------------|-------------------------------|
| 1910000005     | Bit holder 1/4" flexible stem |







# Switch for hinged applications IN62 – VKW/VKS



## MANY BENEFITS AT A GLANCE

- Standard switch conforming to DIN 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<br>DC-13 $U_e/I_e$ 24 V/1,5 A<br>(B300 table A.1) |
|------------------------------|--|

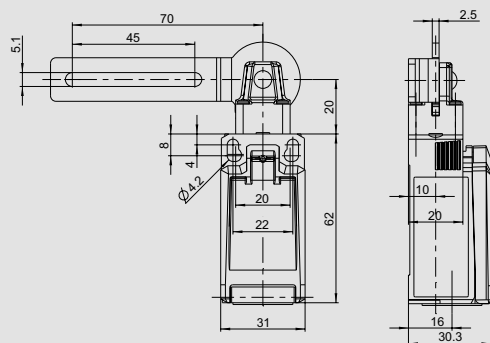
### Mechanical data

|   |  |
|---|--|
| 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<br>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; DIN VDE 0470 T1  |

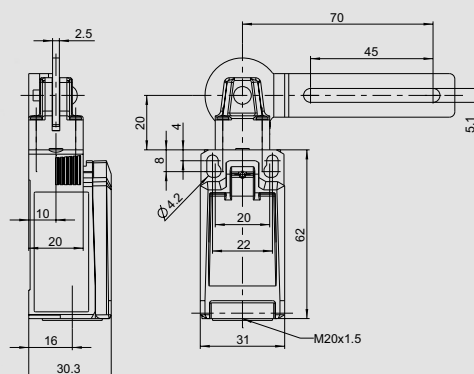
<sup>①</sup> Depending on switching system and actuator (applicable values in data sheet)



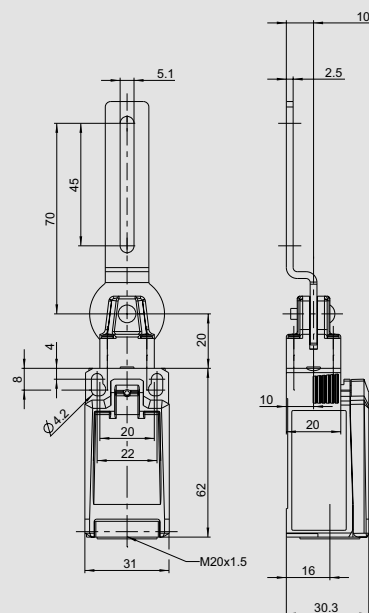
IN62-... VKW left



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 DIN EN 50047
- Highest reliability at low currents (1 mA)
- Protection class IP67
- Hinged snap-on cover

## Technical data

### Electrical data

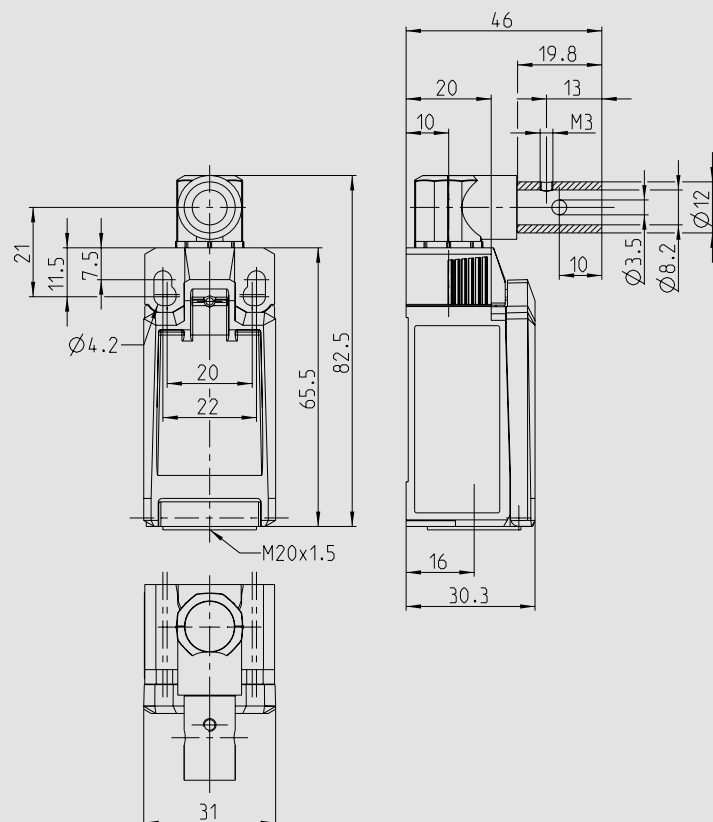
|                                     |                   |                  |
|-------------------------------------|-------------------|------------------|
| Design insulation voltage           | $U_i$ max.        | 400 V AC         |
| Rated operating voltage             | $U_e$ max.        | 240 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<br>DC-13 $U_e/I_e$ 24 V/1,5 A<br>(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<br>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; DIN VDE 0470 T1  |

<sup>①</sup> 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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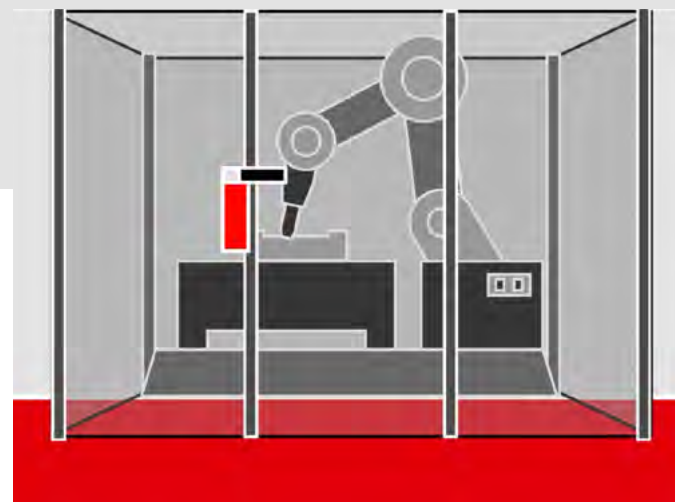


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## Safe guard locking

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

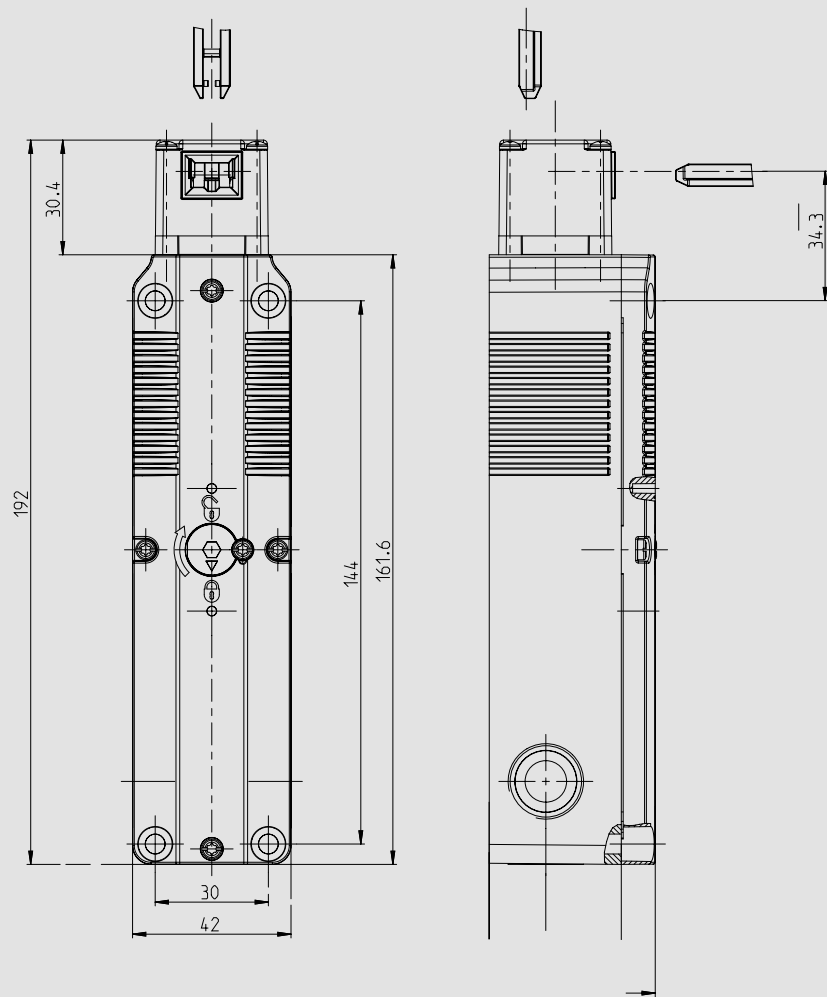
|                   |                                    |
|-------------------|------------------------------------|
| Operating voltage | 24 V AC/DC or 120 V AC or 230 V AC |
|-------------------|------------------------------------|

### Mechanical data

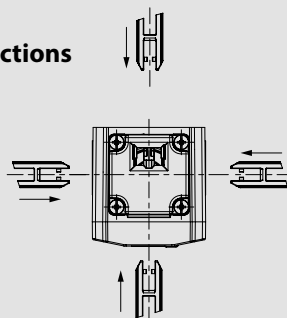
|                            |  |
|----------------------------|--|
| Material enclosure + cover | Thermoplastics, glass-fibre reinforced |
| Actuating device           | metal                                  |
| Holding force              | 1500 N (EN ISO 14119)                  |
| Ambient temperature        | -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 |
|---------|---|



### Optional actuation directions



### Product selection

| Article number | Designation           | Guard locking principle | Contact configuration |               | Connection type* |
|----------------|-----------------------|-------------------------|-----------------------|---------------|------------------|
|                |                       |                         | Door monitoring       | Guard locking |                  |
| 6018200001     | SLC-F-024-11/11-R4    | Spring                  | 1 NC/1 NO             | 1 NC/1 NO     | Standard         |
| 6018200007     | SLC-F-024-20/20-R4    | Spring                  | 2 NC                  | 2 NC          | Standard         |
| 6018200009     | SLC-F-024-20/11-R4    | Spring                  | 2 NC                  | 1 NC/1 NO     | Standard         |
| 6018200011     | SLC-F-024-10/30-R4    | Spring                  | 1 NC                  | 3 NC          | Standard         |
| 6018200012     | SLC-F-024-30/10-R4    | Spring                  | 3 NC                  | 1 NC          | Standard         |
| 6018200018     | SLC-F-024-10/20-R4-01 | Spring                  | 1 NC                  | 2 NC          | M12, 8-pin       |
| 6018200034     | SLC-F-024-01/21-R4    | Spring                  | 1 NO                  | 2 NC/1 NO     | Standard         |
| 6018200002     | SLC-M-024-11/11-R4    | Magnet                  | 1 NC/1 NO             | 1 NC/1 NO     | Standard         |
| 6018200015     | SLC-M-024-20/11-R4    | Magnet                  | 2 NC                  | 1 NC/1 NO     | Standard         |
| 6018200017     | SLC-M-024-20/20-R4    | Magnet                  | 2 NC                  | 2 NC          | Standard         |
| 6018200035     | SLC-M-024-01/21-R4    | Magnet                  | 1 NO                  | 2 NC/1 NO     | Standard         |
| 6018200036     | 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 46–47](#))
- Optional emergency unlocking ([page 48](#))
- Optional escape release ([page 48](#))
- Connection option with M12 connector
- You will find single-ended and double-ended cordsets under accessories ([from page 148](#))

The switch is not delivered with an actuator.

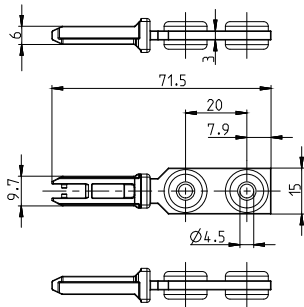
Please order the actuator separately ([page 46–47](#)).

# Actuator SLC

**Actuator ACS-1**  
Proven standard model  
among actuators.



| Product selection |             |
|-------------------|-------------|
| Article number    | Designation |
| 3911742390        | ACS-1       |

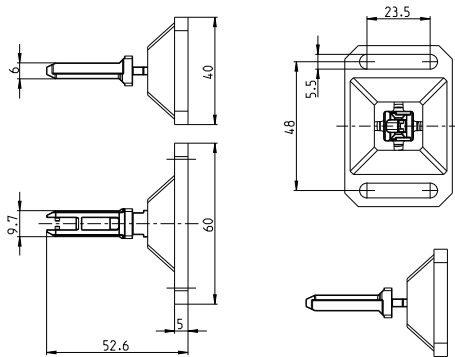


| Mechanical data                    |                        |
|------------------------------------|------------------------|
| Actuator                           | Stainless steel (Niro) |
| Minimum actuating radius $R_{min}$ | 800 mm                 |

**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                 |

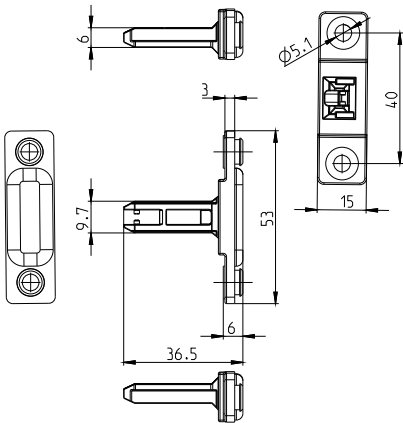
When screwed on, the actuator can be turned in 90° steps by pressing it into the actuator enclosure.

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                 |

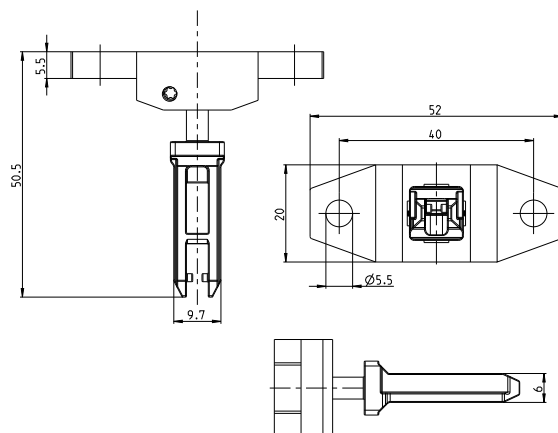
### Actuator ACR-1

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*<br>Length: 20 mm |
| 6051201006     | ESCR-40-1   | Extension module escape release*<br>Length: 40 mm |

\* Base set required to use the expansion modules.

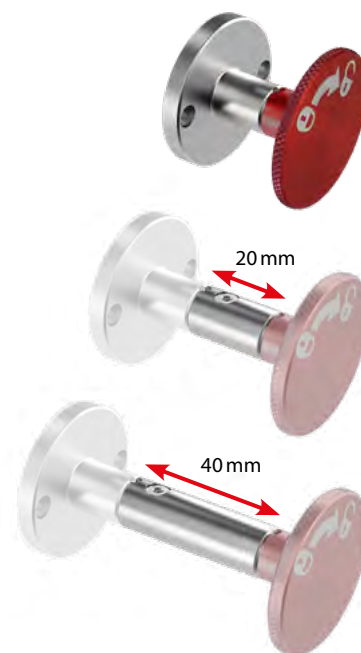
### Escape release

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



### 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  
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

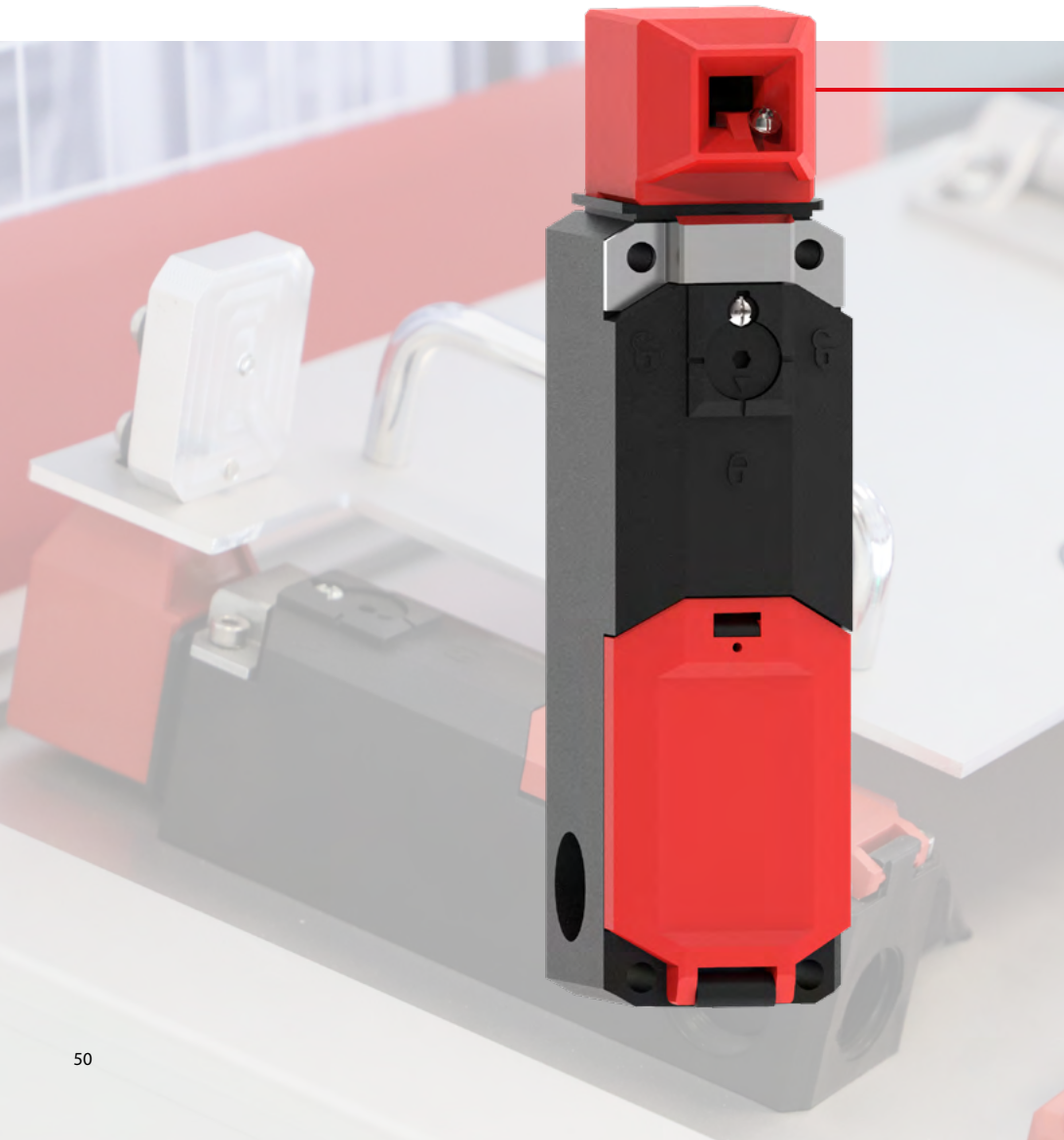
The variant with escape release (BF5-SLC ES) includes an additional handle, to be able to open the door from inside the danger zone when using the function.

#### Product selection

| Article number | Designation  | Description   |
|----------------|--------------|---|
| 6051201012     | BF5-SLC      | Door bolt for SLC   |
| 6051201010     | BF5-SLC-ESCR | Door bolt for SLC with escape release<br>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

#### Contact elements

|                               |  |
|-------------------------------|--|
| 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) |

#### Electromagnet

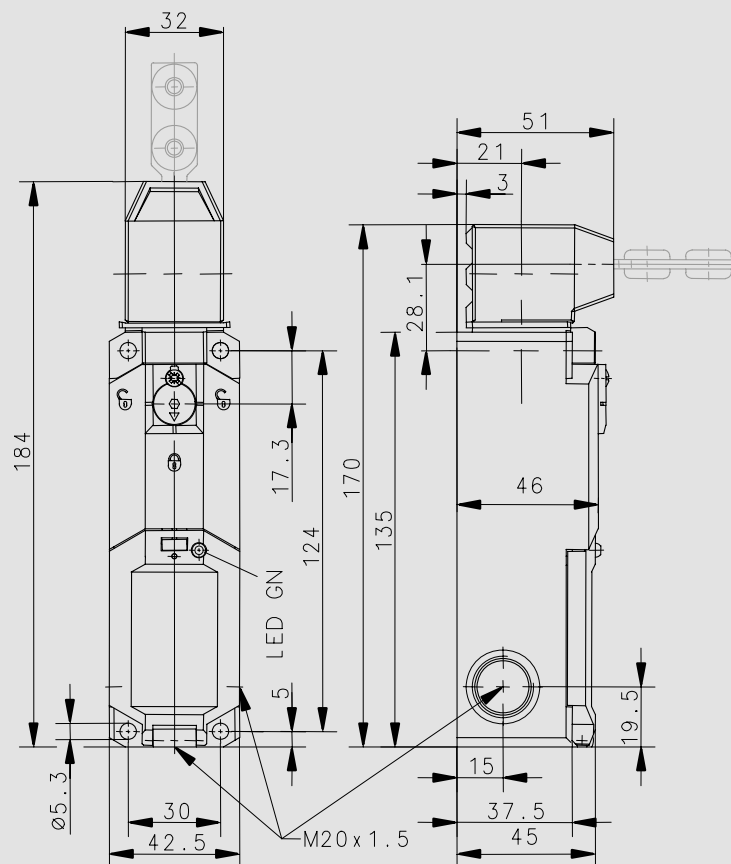
|                   |                           |
|-------------------|---------------------------|
| Operating voltage | 24V AC/DC or 110/230 V AC |
|-------------------|---------------------------|

### Mechanical data

|                            |                            |
|----------------------------|----------------------------|
| 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                       |

### ID for safety engineering

|         |  |
|---------|--|
| 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-R0-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 148](#))



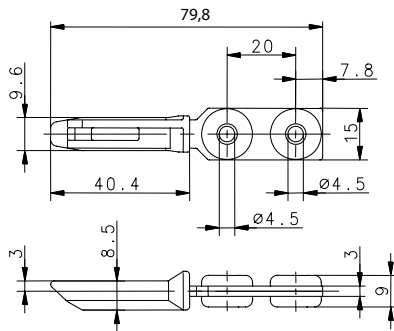
The switch is not delivered with an actuator.  
Please order the actuator separately ([p. 52–53](#)).

# Actuator SLK

**Actuator A1**  
Standard actuator



| Product selection |             |
|-------------------|-------------|
| Article number    | Designation |
| 3911702228        | Actuator A1 |

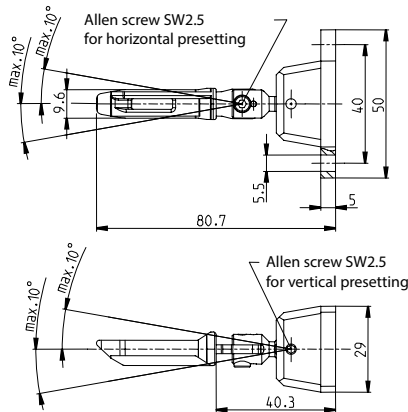


| Mechanical data                    |          |
|------------------------------------|----------|
| Actuator                           | Steel/PA |
| Minimum actuating radius $R_{min}$ | 400 mm   |

**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   |

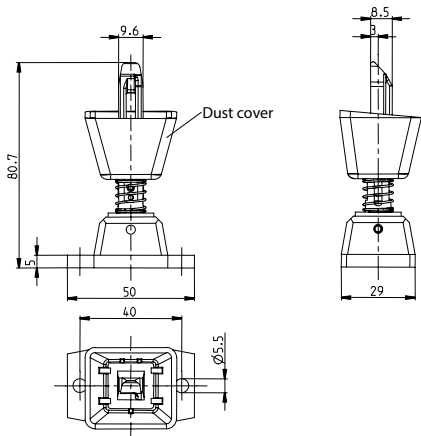
Repositioning the spring-loaded actuator by 4 x 90° when not screwed on.  
Allen key SW2.5 provided

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.

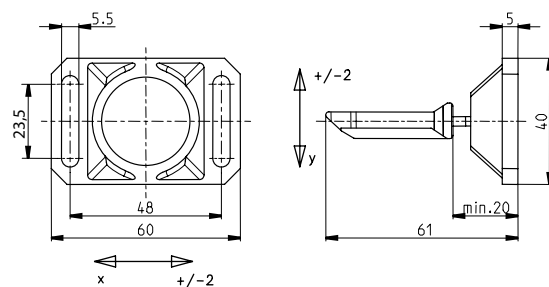


**Actuator A7**  
Transverse actuator



## Product selection

| Article number | Designation |
|----------------|-------------|
| 3911702231     | Actuator A4 |



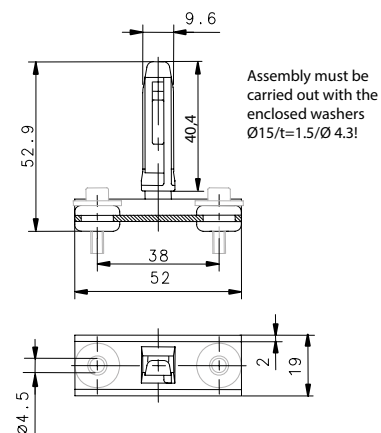
### Mechanical data

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

Repositioning of the spring-loaded actuator by  $4 \times 90^\circ$  in the screwed-on state.

## 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**



Page 56



Page 58

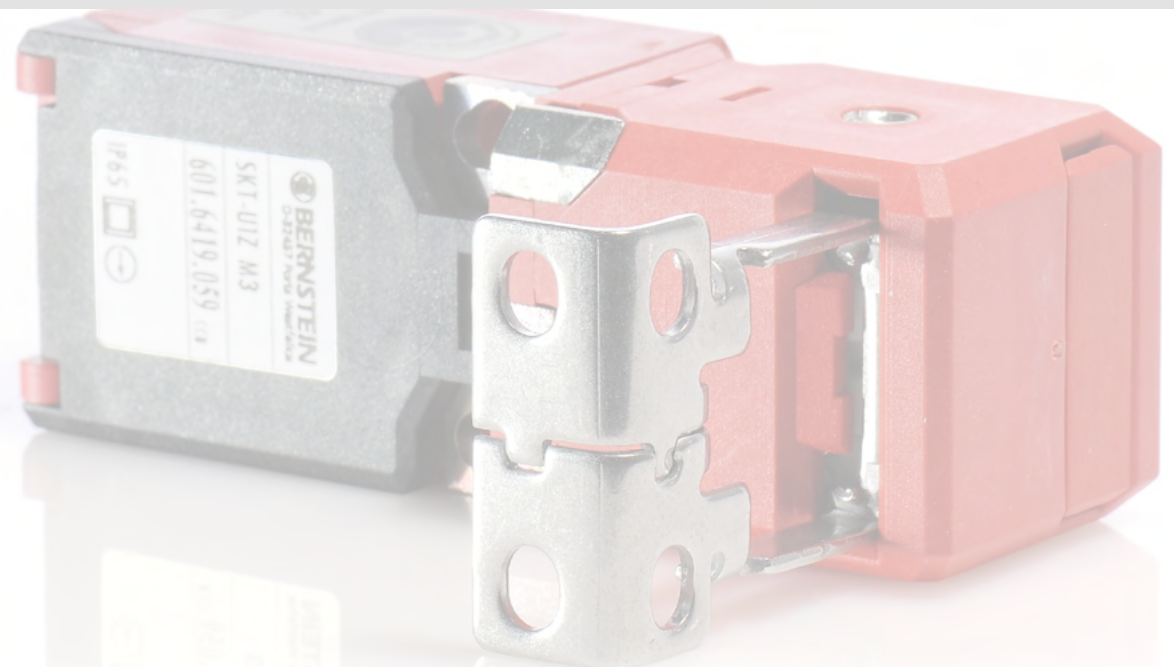


Page 60

## **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 EN ISO 14119

## Technical data

### Electrical data

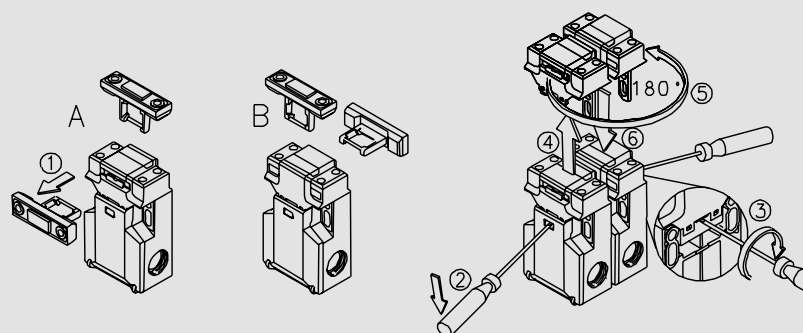
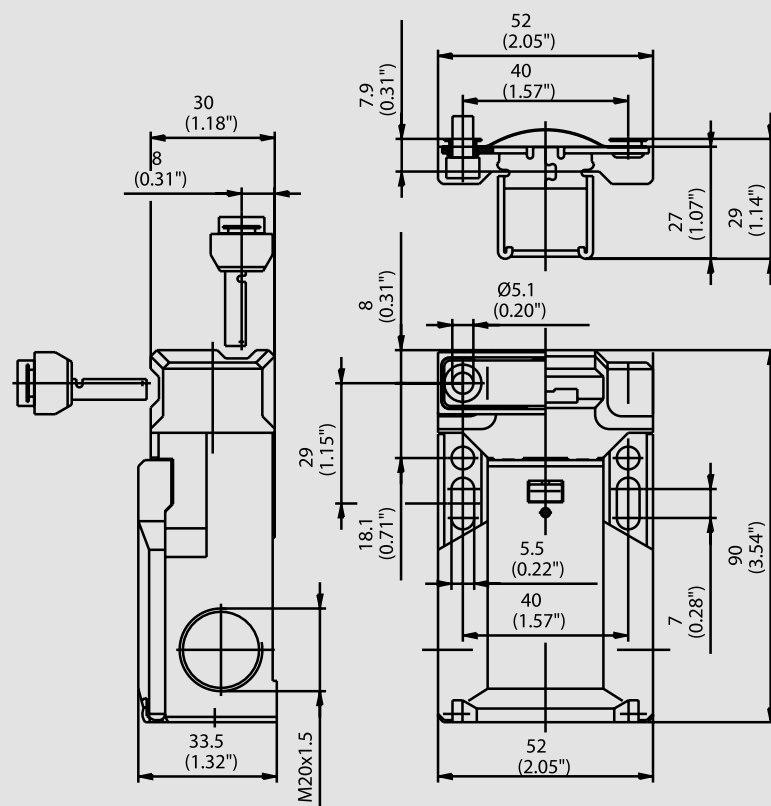
|                               |                                |
|-------------------------------|--------------------------------|
| Rated operating voltage $U_e$ | 240 V                          |
| Utilisation category          | AC-15, $U_e / I_e$ 240 V/1.5 A |

### 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. 62–63](#)).





# Safety switch with separate actuator SKI



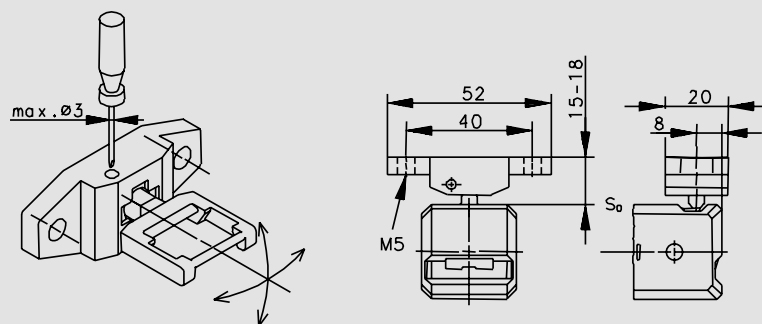
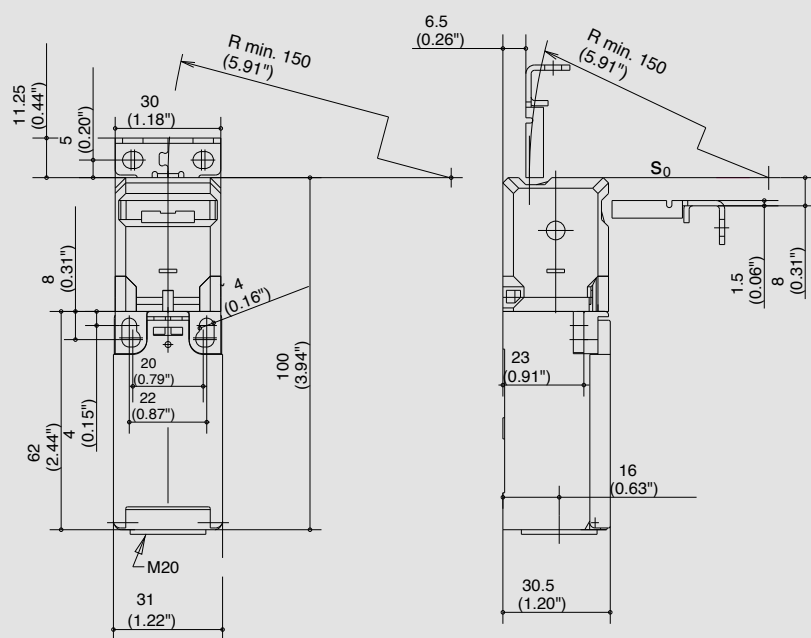
## MANY BENEFITS AT A GLANCE

- 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 EN 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. 62-63](#)).



# Safety switch with separate actuator SKT

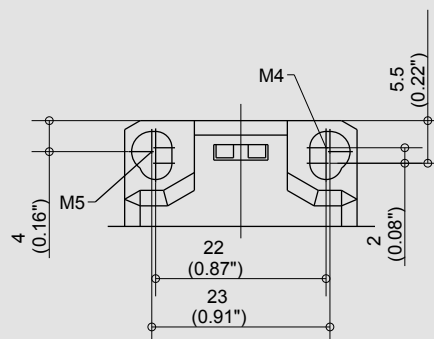
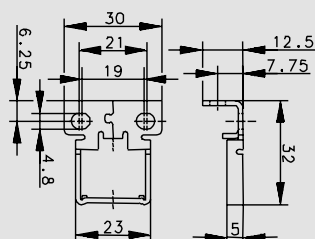
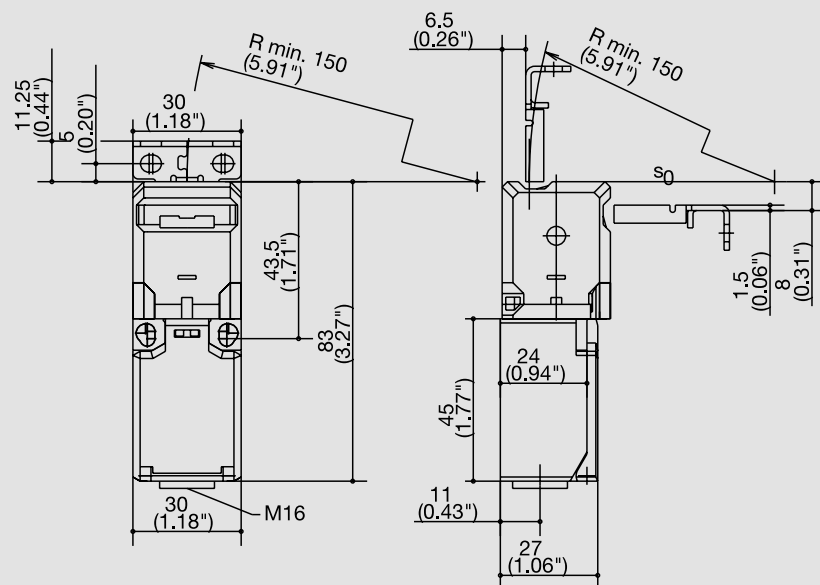


## MANY BENEFITS AT A GLANCE

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

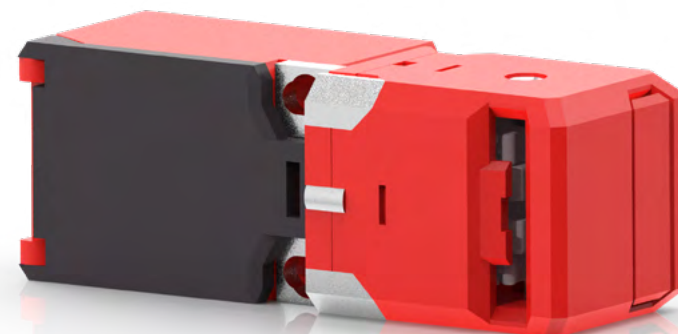
|            |         |     |          |
|------------|---------|-----|----------|
| 6016469177 | SKT-A2Z | 2NC | Standard |
|------------|---------|-----|----------|

|            |         |         |          |
|------------|---------|---------|----------|
| 6016419176 | SKT-U1Z | 1NC/1NO | Standard |
|------------|---------|---------|----------|



The switch is not delivered with an actuator.

Please order the actuator separately ([p. 62-63](#)).

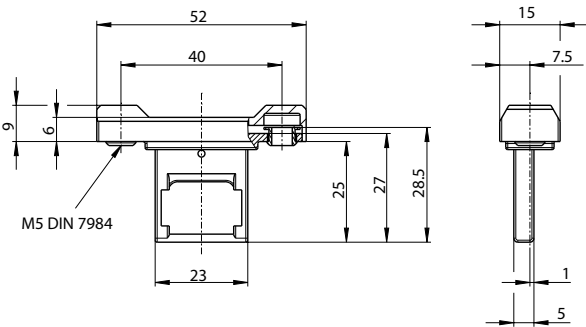


# Actuator for SK, SKI, SKT

Actuator M1

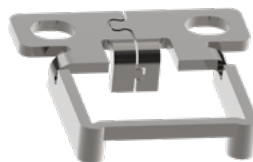


| Product selection |             |
|-------------------|-------------|
| Article number    | Designation |
| 6016999190        | Actuator M1 |

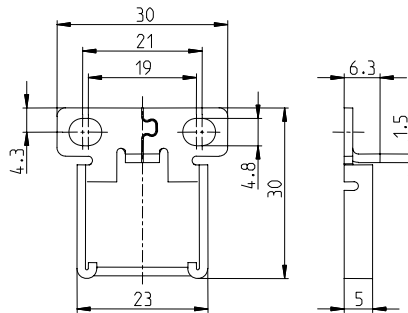


| Mechanical data          |                          |
|--------------------------|--------------------------|
| Actuator/Cap             | St-Niro/Thermoplastic PA |
| Minimum actuating radius | R <sub>min</sub> 150 mm  |

Actuator M2



| Product selection |             |
|-------------------|-------------|
| Article number    | Designation |
| 6016999191        | Actuator M2 |



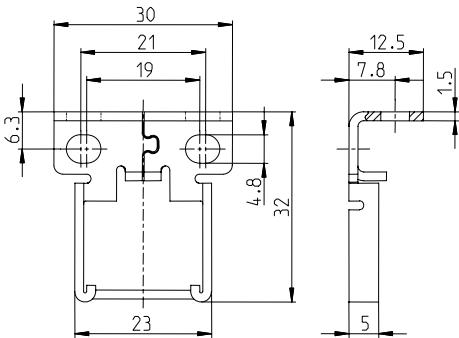
| Mechanical data          |                         |
|--------------------------|-------------------------|
| Actuator                 | St-Niro                 |
| Minimum actuating radius | R <sub>min</sub> 150 mm |

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

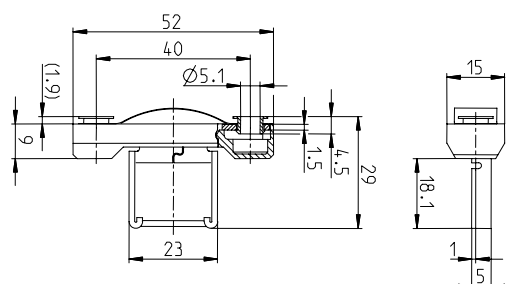
The respective actuator is not included in the scope of delivery of the guard locking and must be ordered separately.

### 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 |
|--------------------------|-----------|--------|

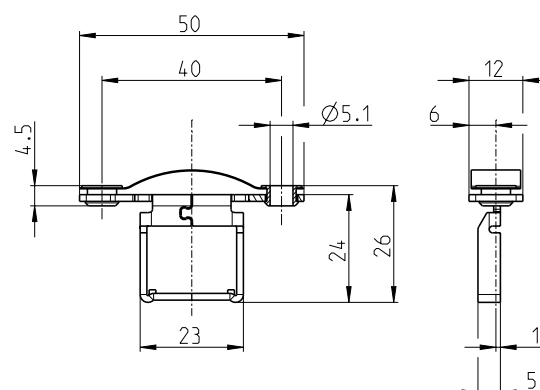
Fastening in actuating direction, with cover and spring

### Actuator M5



#### Product selection

| Article number | Designation |
|----------------|-------------|
| 6016999194     | Actuator M5 |



#### Mechanical data

|          |         |
|----------|---------|
| Actuator | St-Niro |
|----------|---------|

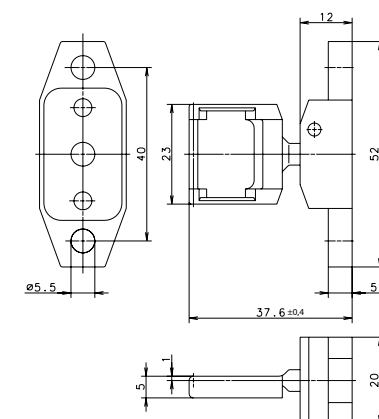
|                          |           |        |
|--------------------------|-----------|--------|
| Minimum actuating radius | $R_{min}$ | 150 mm |
|--------------------------|-----------|--------|

### 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 66



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Page 72

## 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

#### Switching elements

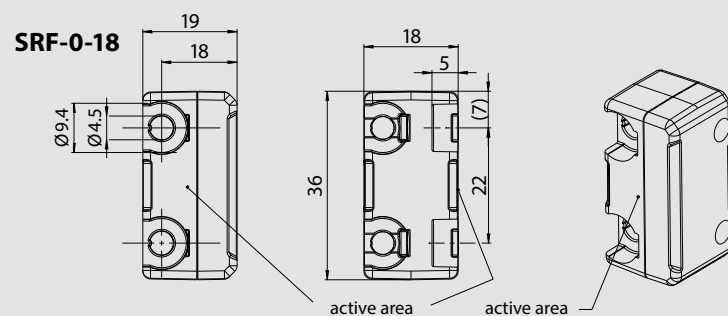
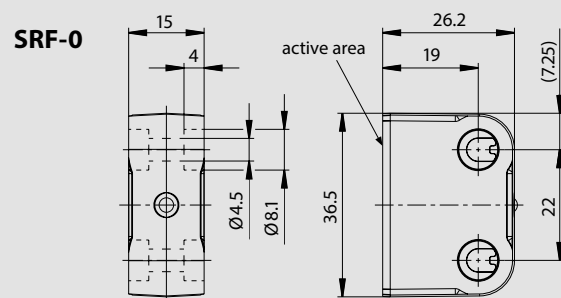
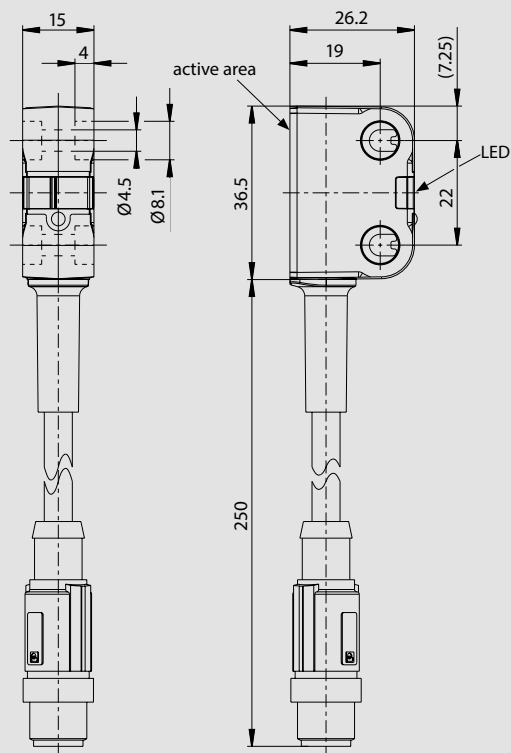
|  |       |                             |
|--|-------|-----------------------------|
| Rated operating voltage                    | $U_e$ | 24 V DC                     |
| Utilisation category of the safety outputs |       | DC-13 $U_e/I_e$ 24 V/100 mA |
| Rated operating distance                  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

#### 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 EN ISO 13849-1 |
| Category         | 4                      |                             |
| PFH <sub>D</sub> | 6x10 <sup>-9</sup> 1/h | according to DIN EN 62061   |
| SIL CL           | 3                      |                             |



#### Product selection

| Article number    | Designation       | Coding | Diagnosis | Reset | Connection                           |
|-------------------|-------------------|--------|-----------|-------|--------------------------------------|
| <b>6075685100</b> | SRF-5/1/1-E0,25-U | Unique | DCD       | No    | M12 8-pin connector with 25 cm cable |
| <b>6075685101</b> | SRF-5/1/1-E0,25-H | High   | DCD       | No    | M12 8-pin connector with 25 cm cable |
| <b>6075685102</b> | SRF-5/1/1-E0,25-L | Low    | DCD       | No    | M12 8-pin connector with 25 cm cable |
| <b>6075685080</b> | SRF-5/2/1-E0,25-U | Unique | DCD       | Yes   | M12 8-pin connector with 25 cm cable |
| <b>6075685103</b> | SRF-5/2/1-E0,25-H | High   | DCD       | Yes   | M12 8-pin connector with 25 cm cable |
| <b>6075685104</b> | 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

[\(from page 148\)](#)



SRF is an abbreviation meaning „Safety RFID“.



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# 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                       |

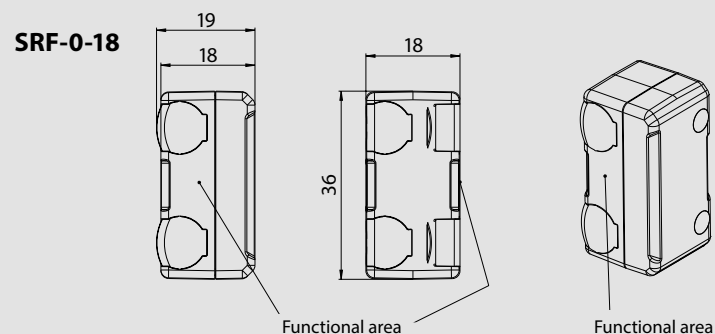
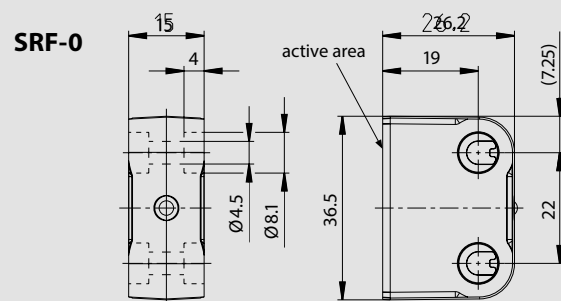
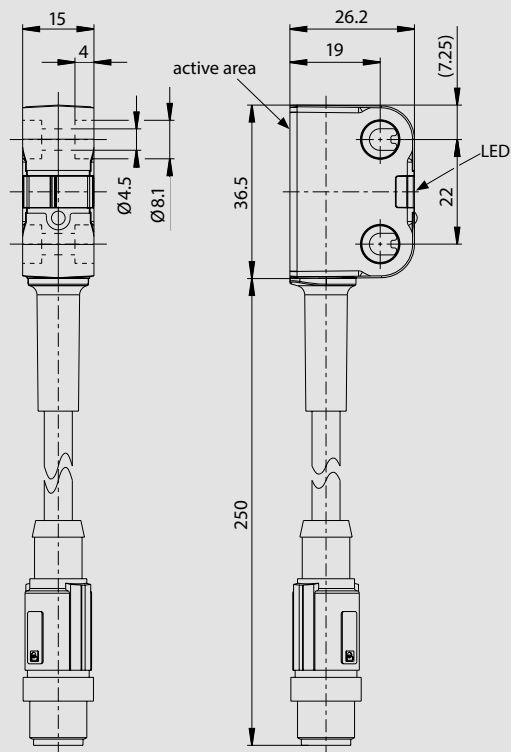
### Mechanical data

|                            |                 |
|----------------------------|-----------------|
| 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                      | according to EN ISO 13849-1 |
| Category         | 4                      |                             |
| PFH <sub>0</sub> | 6x10 <sup>-9</sup> 1/h | according to DIN EN 62061   |
| SIL CL           | 3                      |                             |





#### 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 |

**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 148)



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# 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

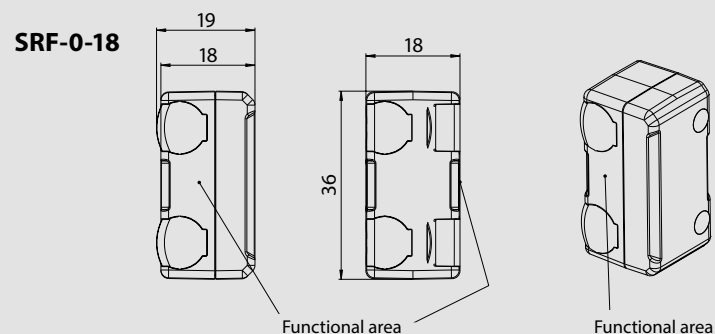
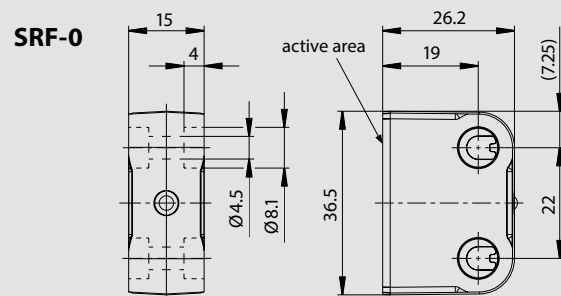
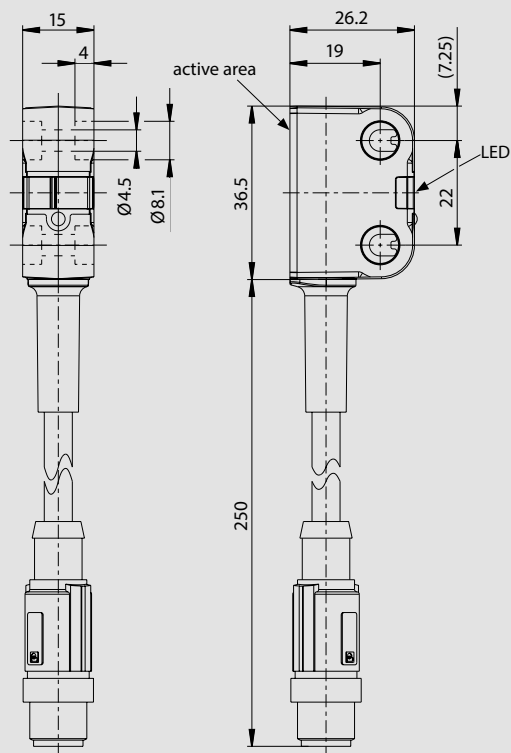
|  |       |                             |
|--|-------|-----------------------------|
| Rated operating voltage                    | $U_e$ | 24 V DC                     |
| Utilisation category of the safety outputs |       | DC-13 $U_e/I_e$ 24 V/100 mA |
| Rated operating distance                   | $S_n$ | 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 EN ISO 13849-1 |
| Category         | 4                      |                             |
| PFH <sub>0</sub> | 6x10 <sup>-9</sup> 1/h | according to DIN EN 62061   |
| SIL CL           | 3                      |                             |



#### Product selection

| Article number    | Designation       | Coding | Diagnosis | Reset | Connection                           |
|-------------------|-------------------|--------|-----------|-------|--------------------------------------|
| <b>6075685117</b> | SRF-2/1/1-A2-U    | Unique | PNP       | No    | 2 m cable with open cable end        |
| <b>6075685079</b> | SRF-2/1/1-A2-H    | High   | PNP       | No    | 2 m cable with open cable end        |
| <b>6075685118</b> | SRF-2/1/1-A2-L    | Low    | PNP       | No    | 2 m cable with open cable end        |
| <b>6075685119</b> | SRF-2/1/1-E0,25-U | Unique | PNP       | No    | M12 5-pin connector with 25 cm cable |
| <b>6075685120</b> | SRF-2/1/1-E0,25-H | High   | PNP       | No    | M12 5-pin connector with 25 cm cable |
| <b>6075685121</b> | 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 148](#))



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# Coded magnetic switch MAK 42

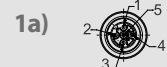
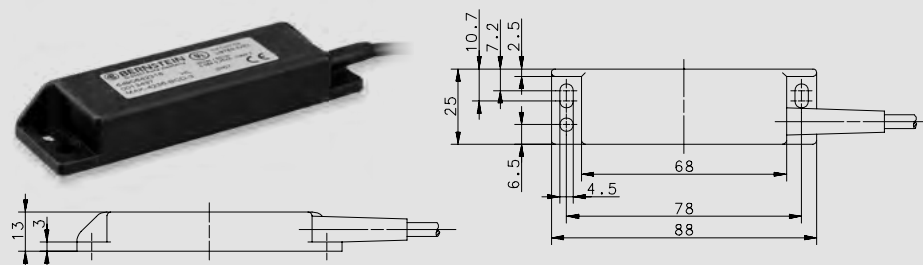
## MANY BENEFITS AT A GLANCE

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

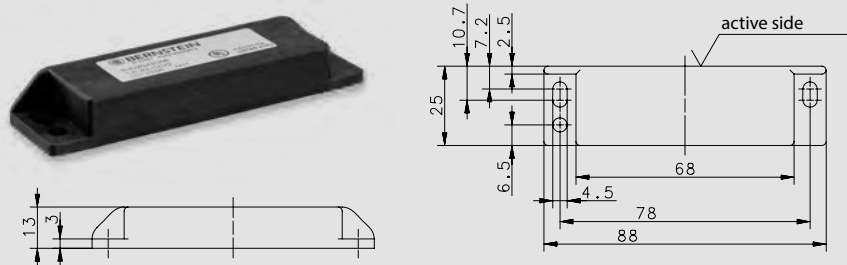
## Technical data

| 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 DIN EN 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                     |

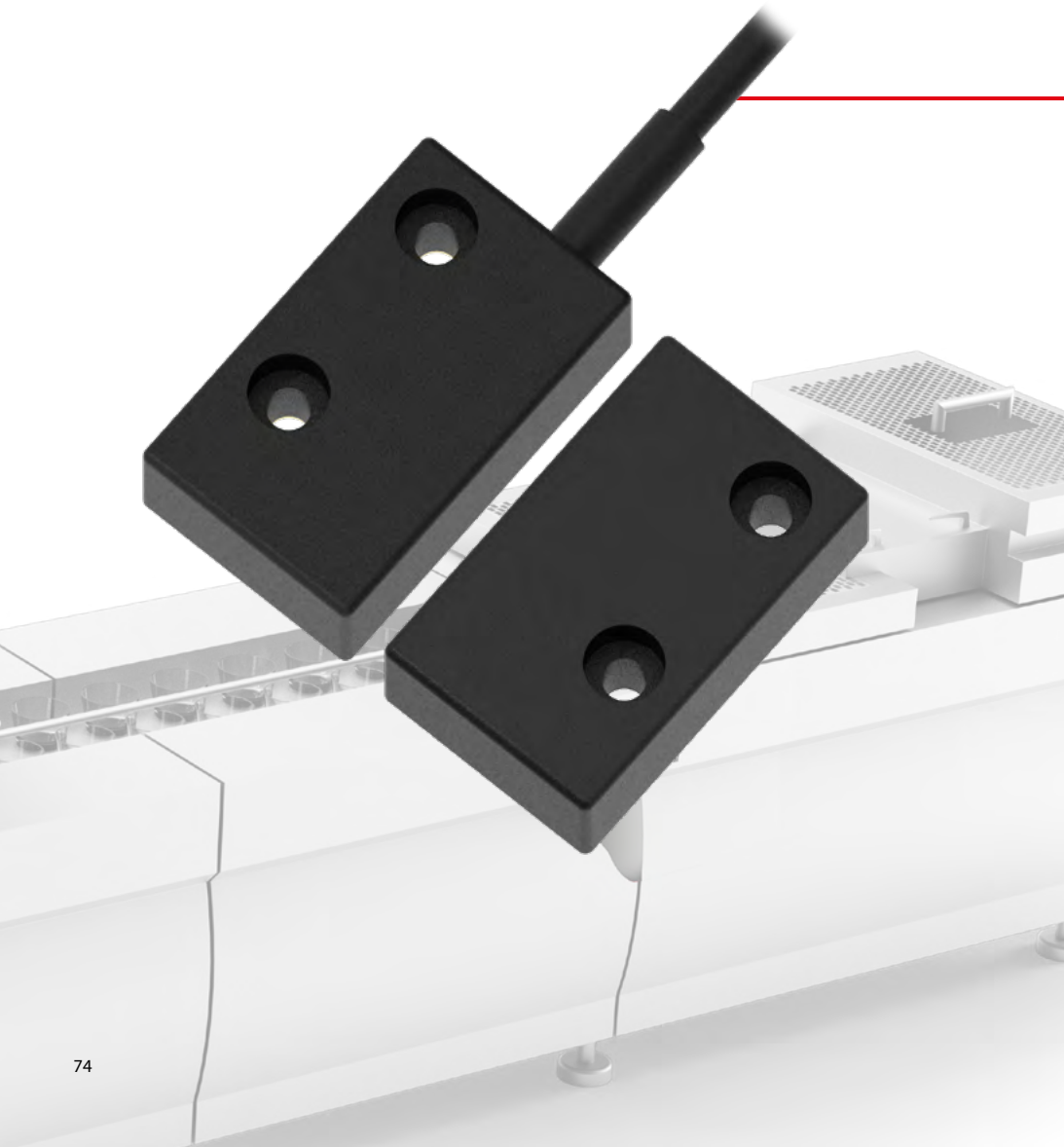


### Options

- You will find single-ended and double-ended cordsets under accessories ([from page 148](#))



# Coded magnetic switch MAK 52



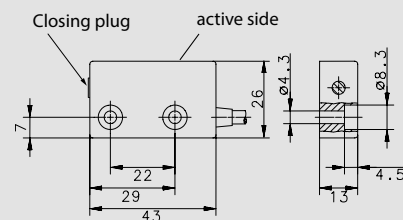
## MANY BENEFITS AT A GLANCE

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

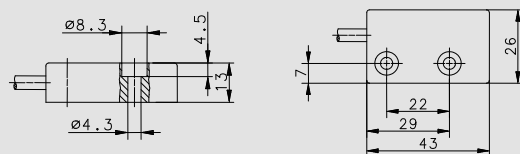
## Technical data

| 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 DIN EN 14119 |                         |                                |                              |                  |

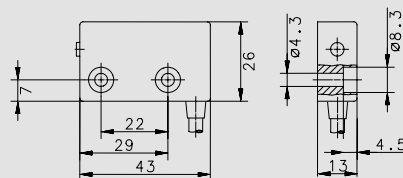
#### 4) MAK 52 Sensor, cable right



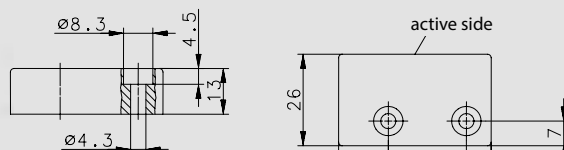
#### 5) MAK 52 Sensor, cable left



#### 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

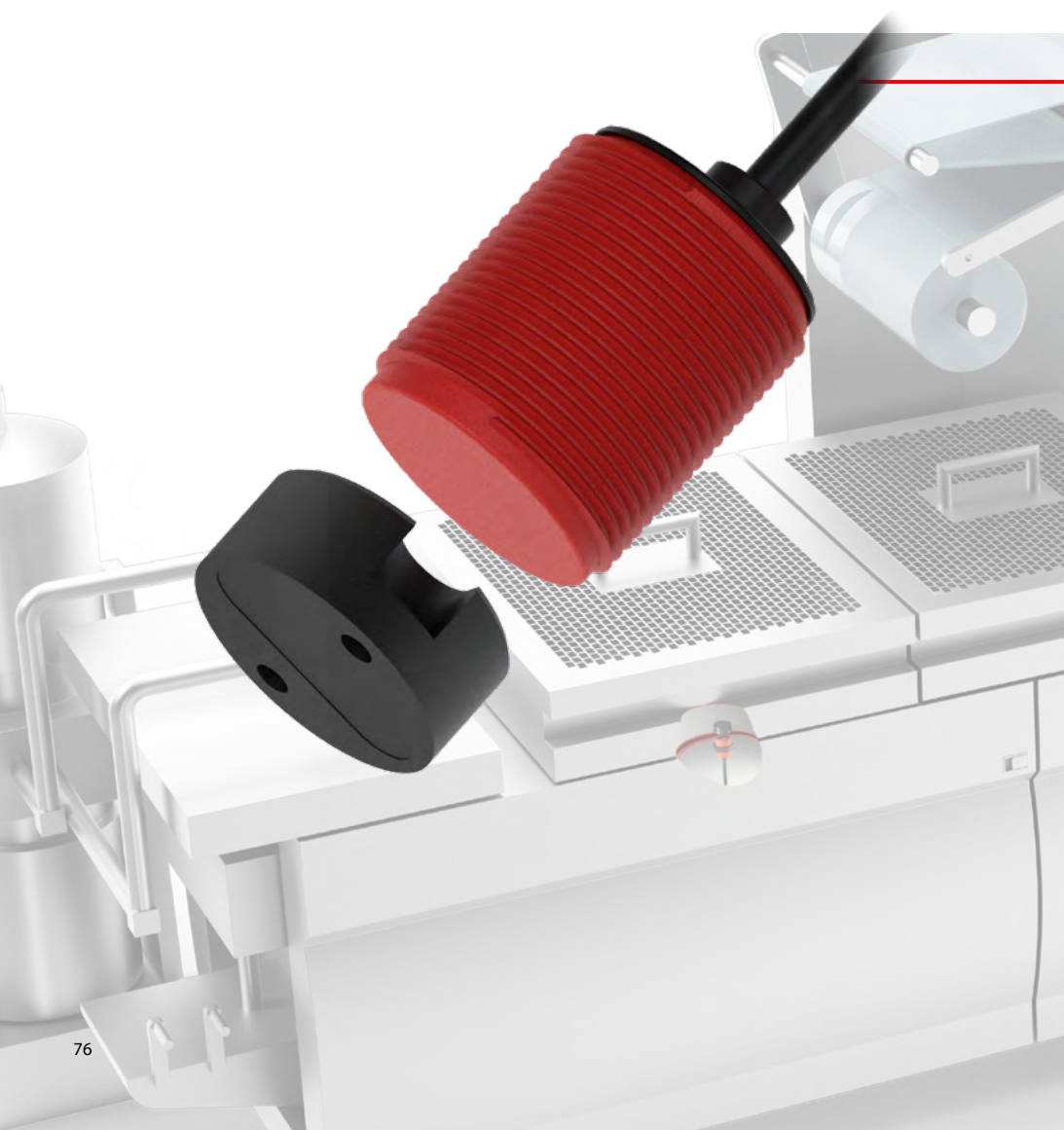
| Magnet No. | Article number | Designation    | Sao | Sar  | Dimension drawing No. |
|------------|----------------|----------------|-----|------|-----------------------|
| 1          | 6402052067     | TK-52-CD/2     | ≥ 3 | ≤ 14 | 7                     |
| 2          | 6402052075     | TK-52-CD/2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



#### Options

- You will find single-ended and double-ended cordsets under accessories ([from page 148](#))

# Coded magnetic switch MAK 53



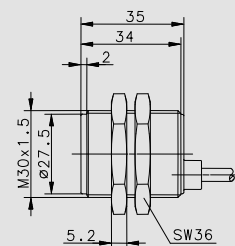
## MANY BENEFITS AT A GLANCE

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

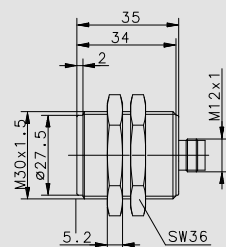
## Technical data

| 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 DIN EN 14119 |                         |                                |                              |                  |

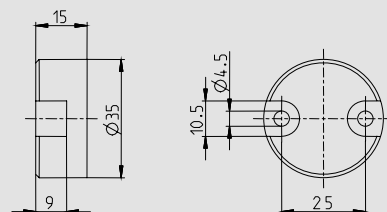
## 8) MAK 53 Sensor, cable, on the back



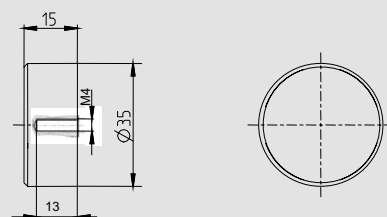
## 9) MAK 53 Sensor, 4-pin M12 connector on the back



## 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 148](#))

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



# Safety rope pull switches



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Page 84



Page 86



Page 92




Page 94



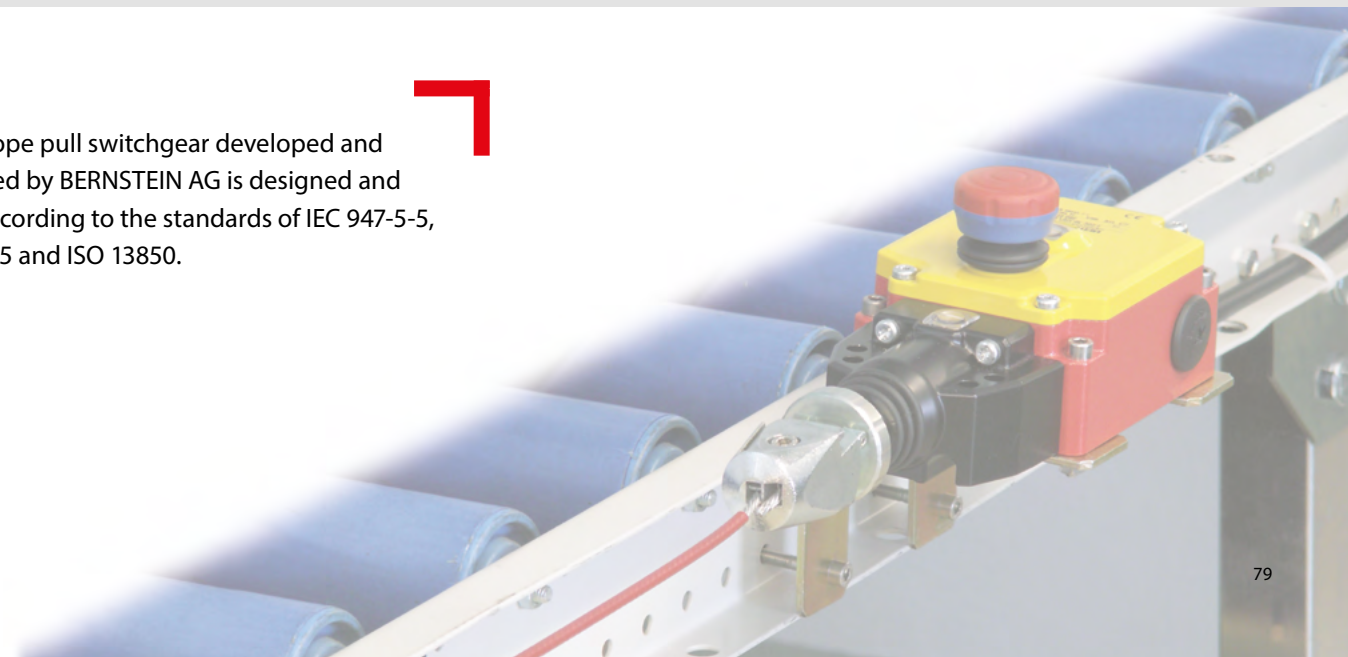

## More safety non-stop

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.

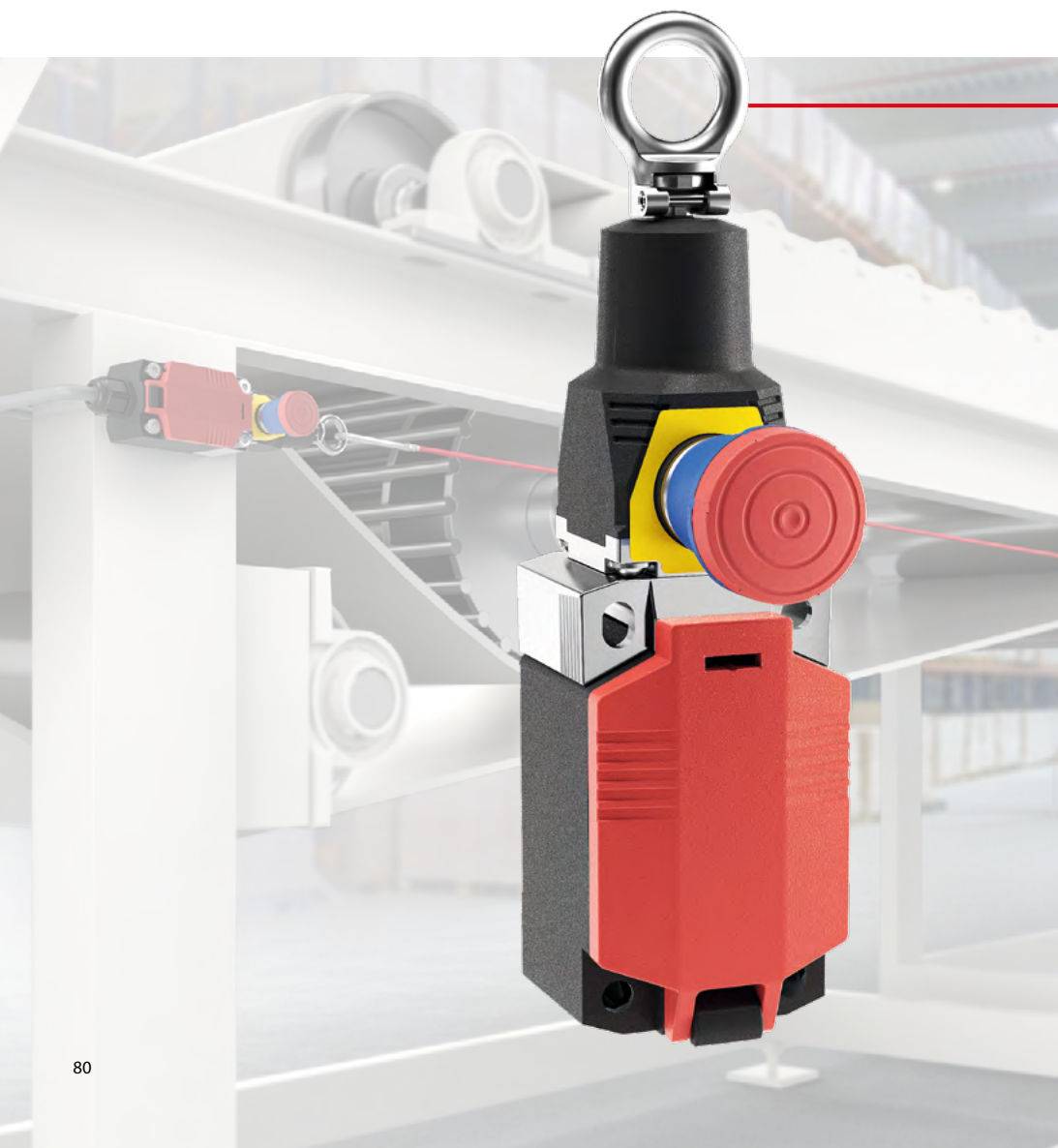
They are flexible to use, easy to install and convenient to handle.  
Most importantly, they offer maximum safety when it counts.



The safety rope pull switchgear developed and manufactured by BERNSTEIN AG is designed and approved according to the standards of IEC 947-5-5, 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.  $\leq 20/\text{min.}$

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

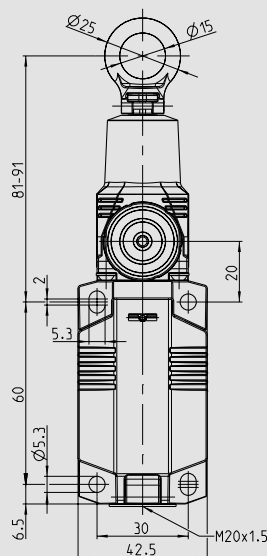
Permissible ambient temperature  $-30^\circ\text{C}$  to  $+75^\circ\text{C}$

Protection class IP67 according to IEC 60529

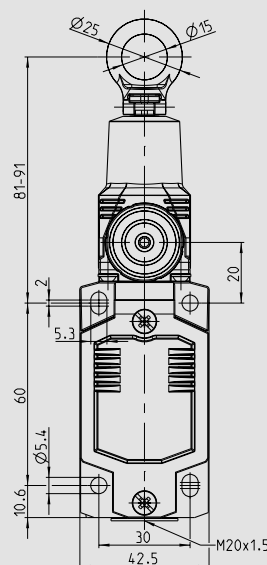
### ID for safety engineering

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

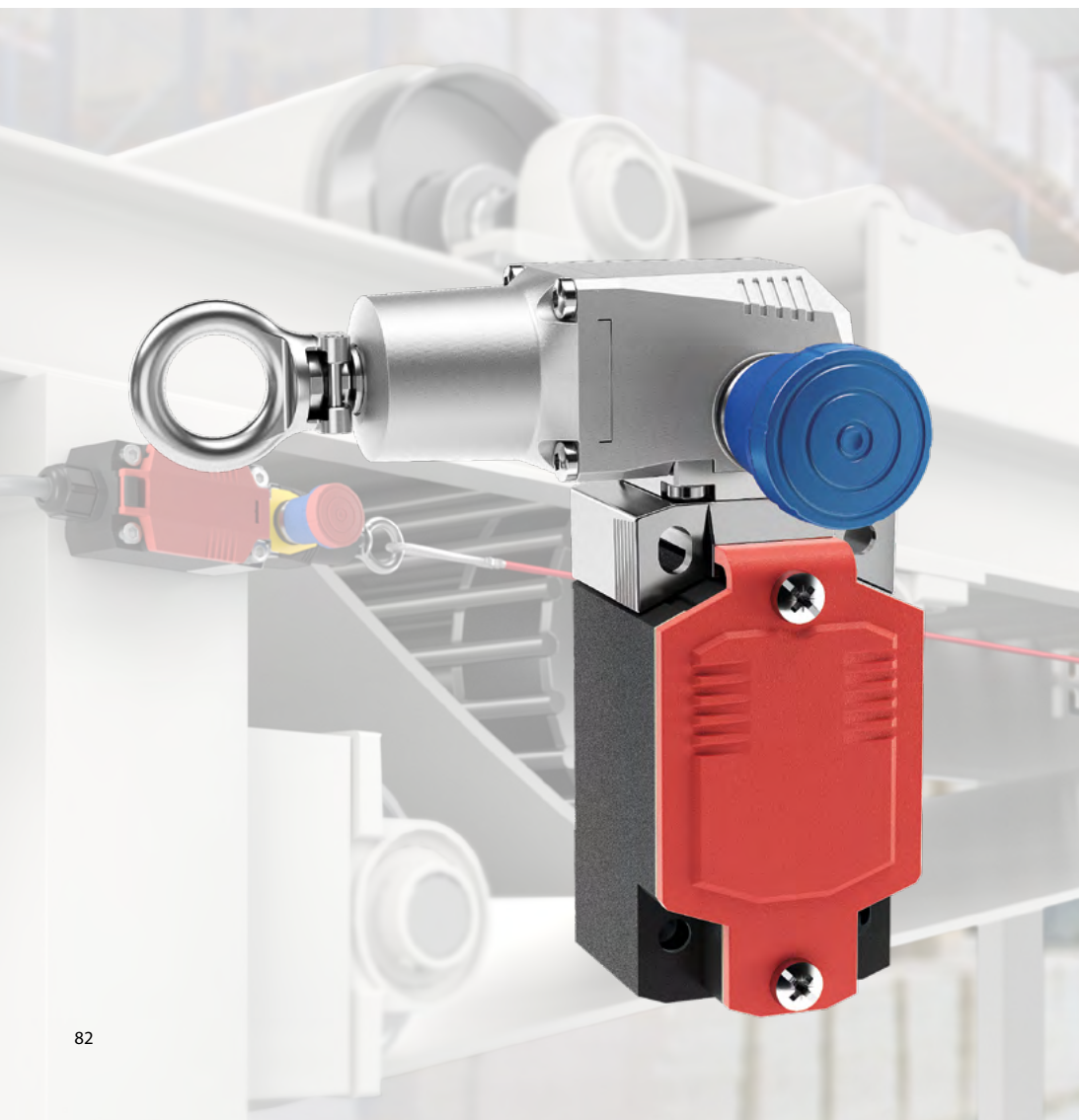


## Options

- M12 connector for easy mounting
- The quick-release clamping device "QF-40" Quick-Fix can be found in the "Accessories" chapter ([page 88](#))



# 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.  $\leq 20/\text{min.}$

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

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

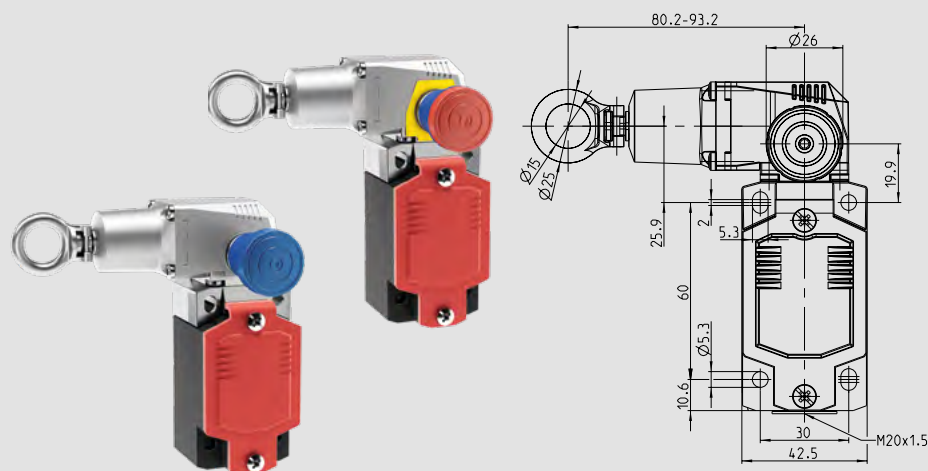
Protection class IP67 according to IEC 60529

### ID for safety engineering

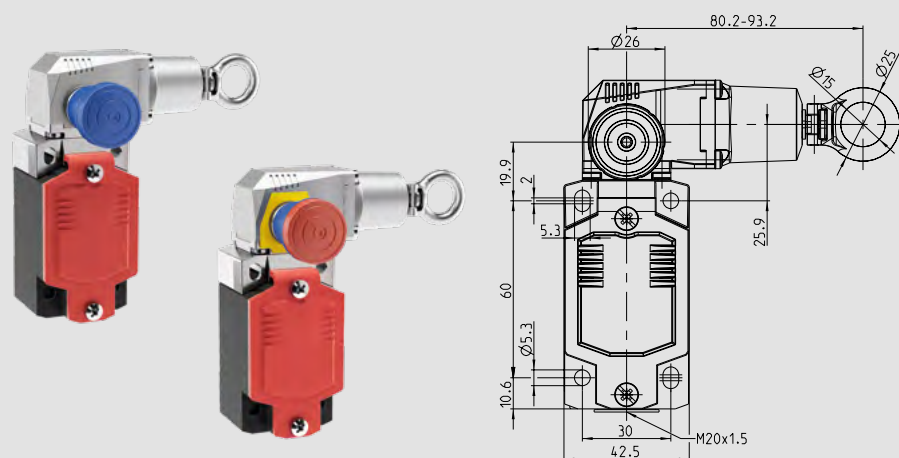
B10d NC  $2 \times 10^5$  cycles



## 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 88](#))



# 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.  $\leq 20/\text{min.}$

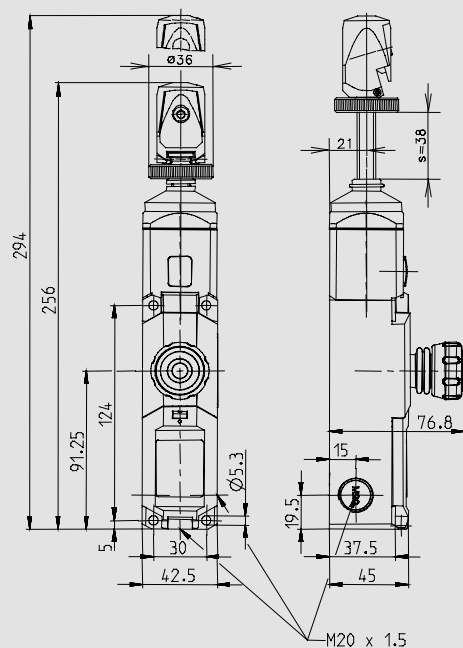
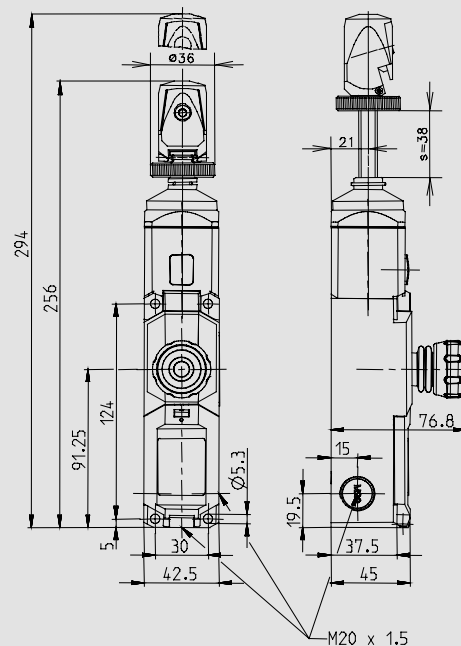
Mechanical service life  $1 \times 10^5$  switching cycles

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

Protection class IP67 according to IEC 60529

### ID for safety engineering

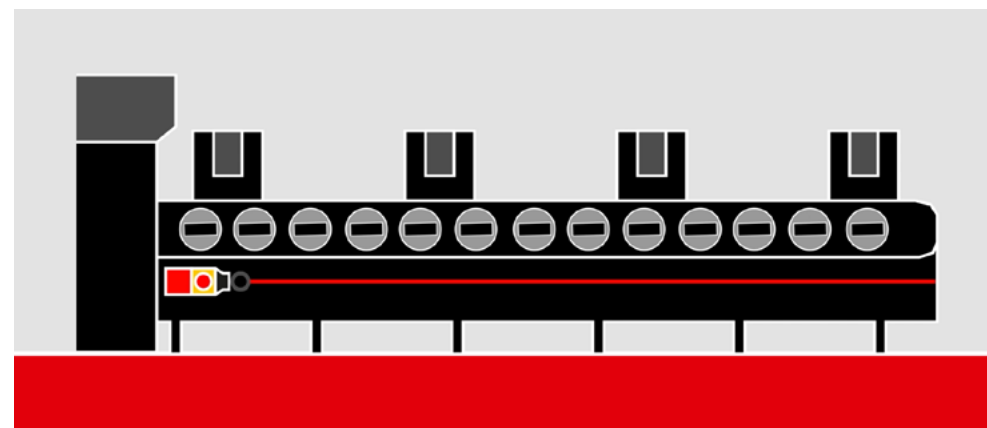
B10d NC  $1 \times 10^5$  cycles



| 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                    |



- **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

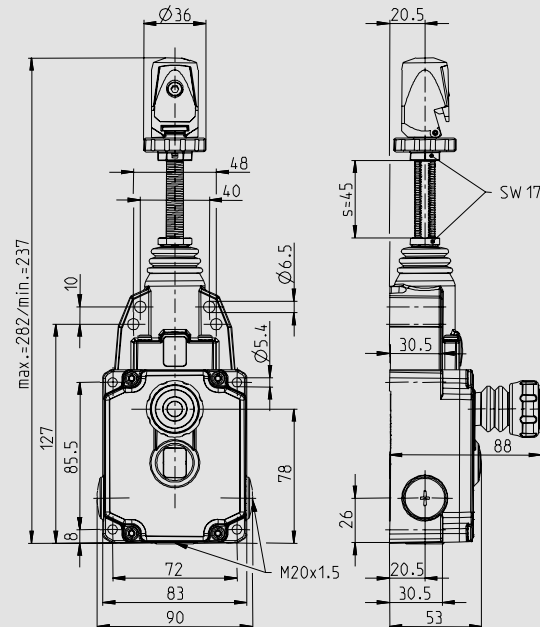
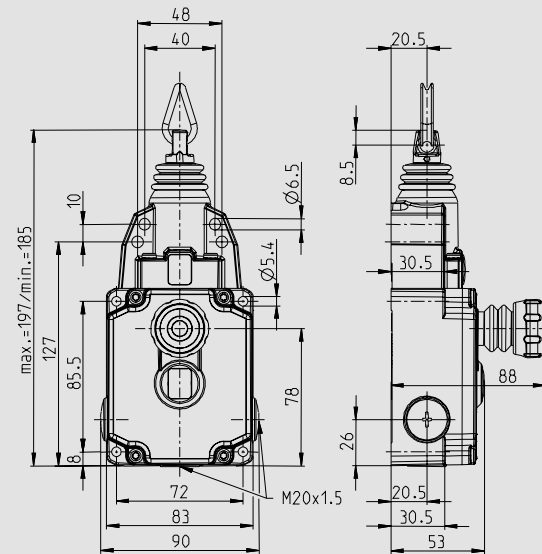
|                          |       |                                   |
|--------------------------|-------|-----------------------------------|
| Rated operating voltage  | $U_e$ | 240 V                             |
| Rated insulation voltage | $U_i$ | 250 V AC                          |
| Utilisation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

### Mechanical data

|                                 |  |
|---------------------------------|--|
| Enclosure                       | AL die-cast                                |
| Mechanical switching frequency  | max. $\leq 20/\text{min.}$                 |
| 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

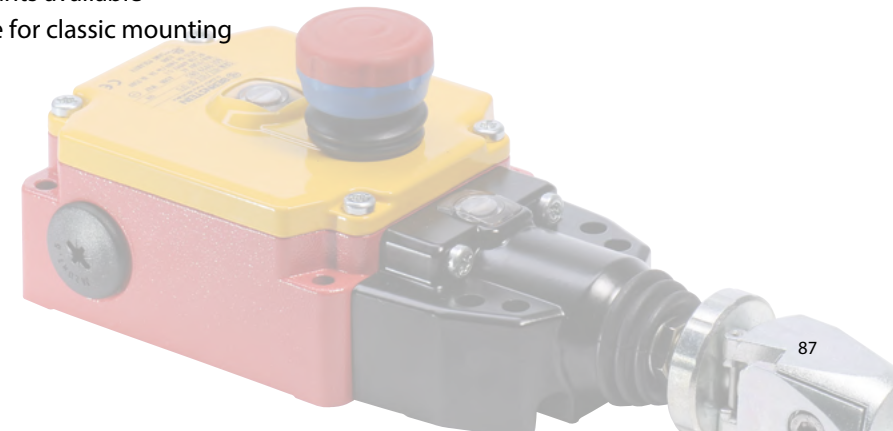
|         |                        |
|---------|------------------------|
| B10d NC | $2 \times 10^5$ cycles |
|---------|------------------------|



| 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,<br>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,<br>remote indicator E |

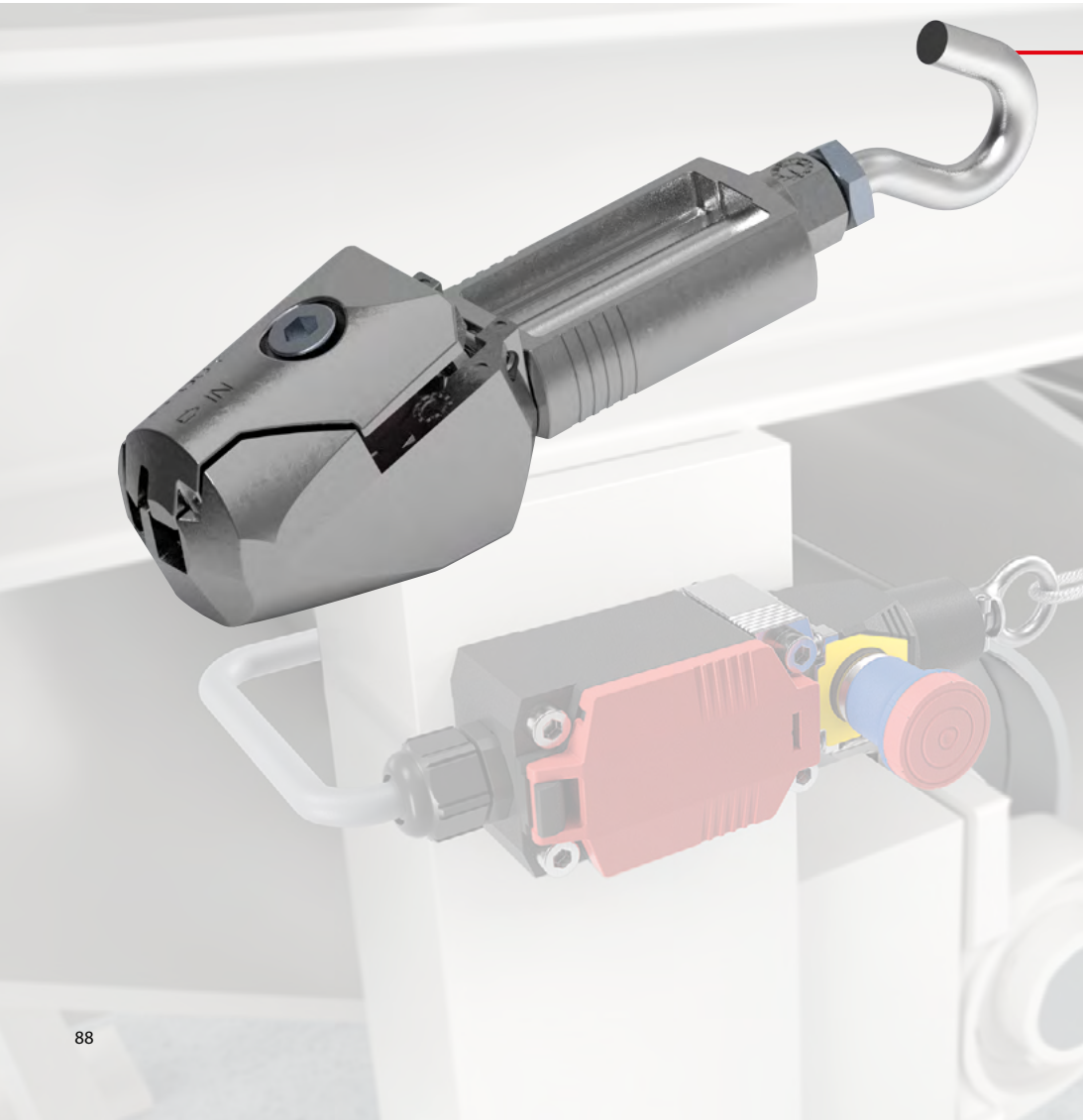


- Electronic remote monitoring
- Cable counter spring with quick-release head
- AS-Interface variants available
- With drawbar eye for classic mounting



# Accessories

## Quick-Clamping Device Quick-Fix



### MANY BENEFITS AT A GLANCE

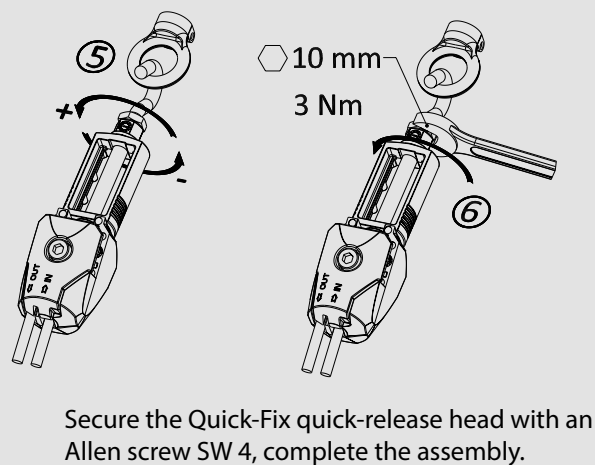
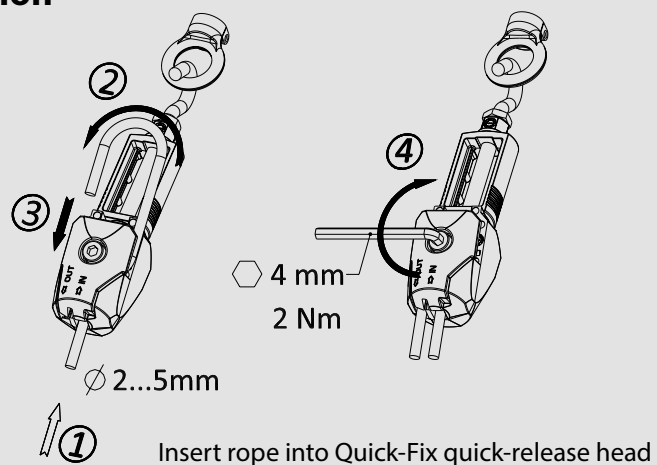
- Simplified installation of the rope pull system for emergency stop applications with rope pull switches
- Cost and time-saving
- Reduced risk of injury as no rope has to be stripped
- Easy adjustment of the rope tension
- Reduction in the number of components required
- Only 1 tool necessary
- Ergonomic 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) |

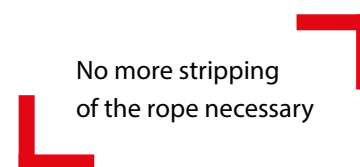
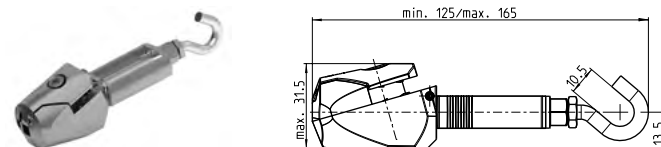


## Installation

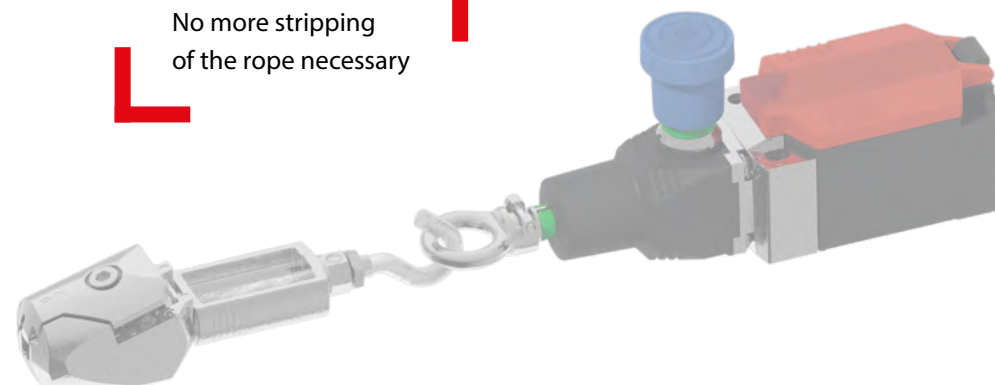


### Quick-Clamping Device QF-40

| 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 |



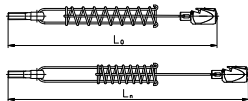
### Eye screw

| Article number | Designation    |
|----------------|----------------|
| 2600444186     | AUG.SCHR.M8X50 |



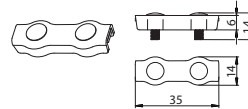
### Rope pull counter spring

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



### Rope clamp duplex

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



### Rope thimble

| Article number | Designation      |
|----------------|------------------|
| 2696899014     | SEIL-KAUSCHE RD3 |



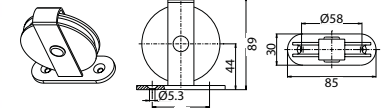
### Rope

| Article number | Designation      |
|----------------|------------------|
| 3699100025     | SEIL ID3/AD MAX4 |



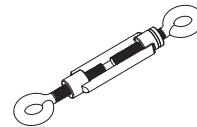
### Guide pulley

| Article number | Designation             |
|----------------|-------------------------|
| 2690000051     | UMLENKROLLE F. SEIL D75 |



### Turnbuckle

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



### Tension spring

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

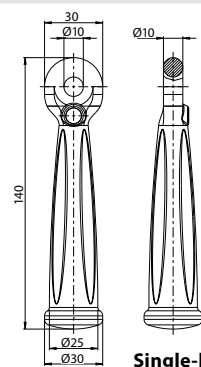
#### Rope for command devices

| Article number | Designation    |
|----------------|----------------|
| 3699100072     | SEIL D6MM WEIß |
| 3699100073     | SEIL D6MM BLAU |
| 3699100074     | SEIL D6MM GRÜN |

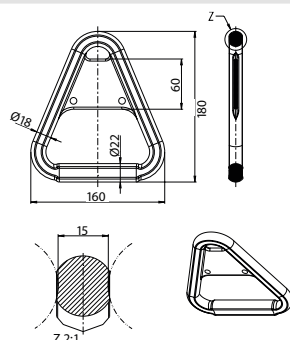


#### Single-handle

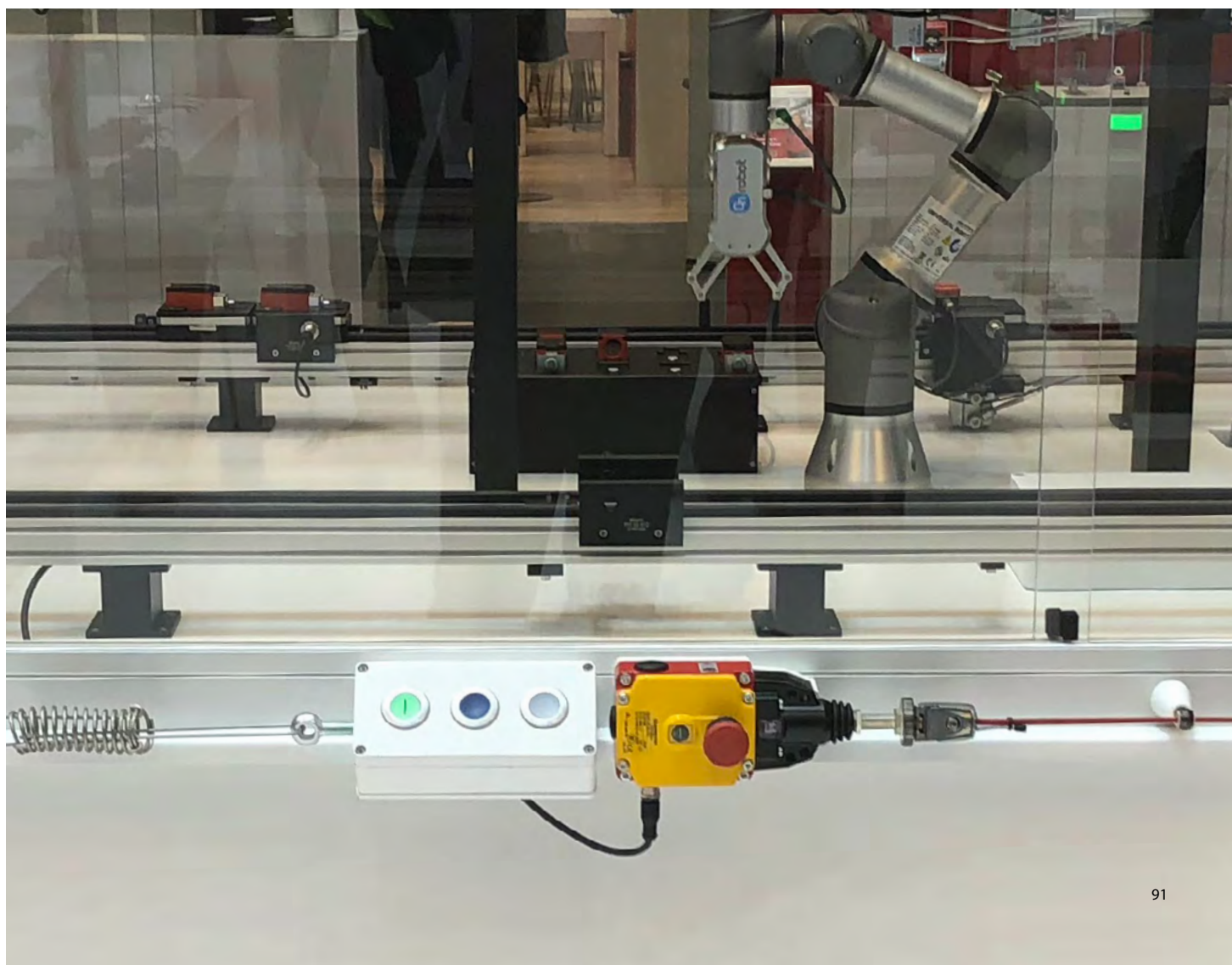
| Article number | Designation              |
|----------------|--------------------------|
| 3595900157     | EINHANDGRIFF WEIß        |
| 3595900158     | EINHANDGRIFF BLAU        |
| 3595900159     | EINHANDGRIFF GRÜN        |
| 3595900167     | EINHANDGRIFF ROT         |
| 3595900161     | EINHANDTRIANGELGRIFF 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

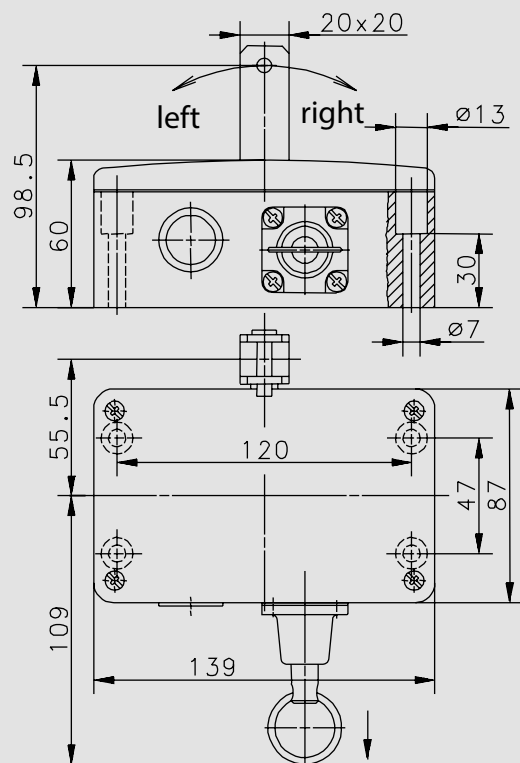
|                              |                            |          |
|------------------------------|----------------------------|----------|
| Rated operating voltage      | $U_e$                      | 250 V    |
| Rated insulation voltage     | $U_i$                      | 250 V AC |
| Utilisation 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. |
|--------------|--------|



#### 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

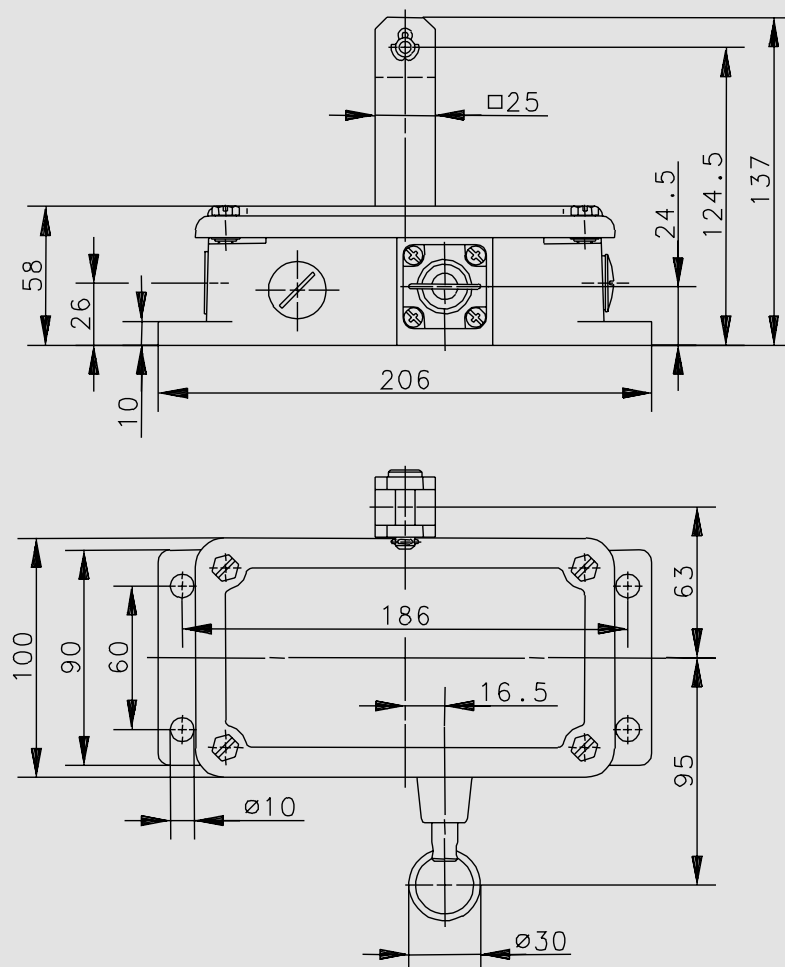
|                              |                            |          |
|------------------------------|----------------------------|----------|
| Rated operating voltage      | $U_e$                      | 240 V    |
| Rated insulation voltage     | $U_i$                      | 400 V AC |
| Utilization 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

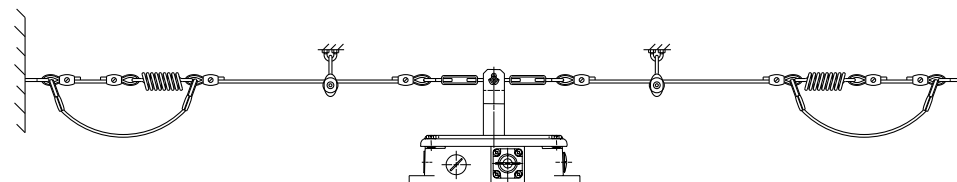
|              |        |
|--------------|--------|
| B10d (up to) | 2 Mio. |
|--------------|--------|



#### 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

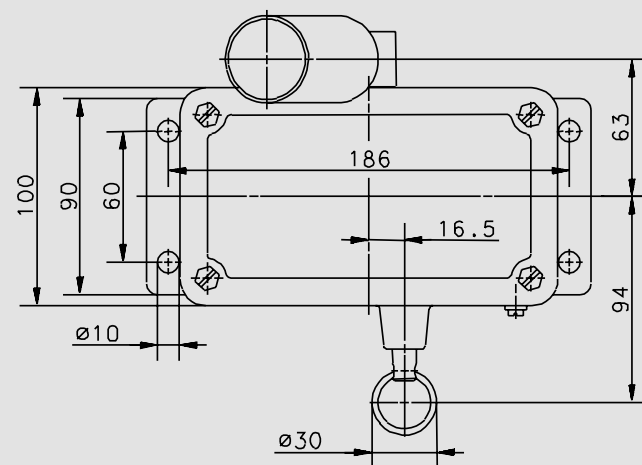
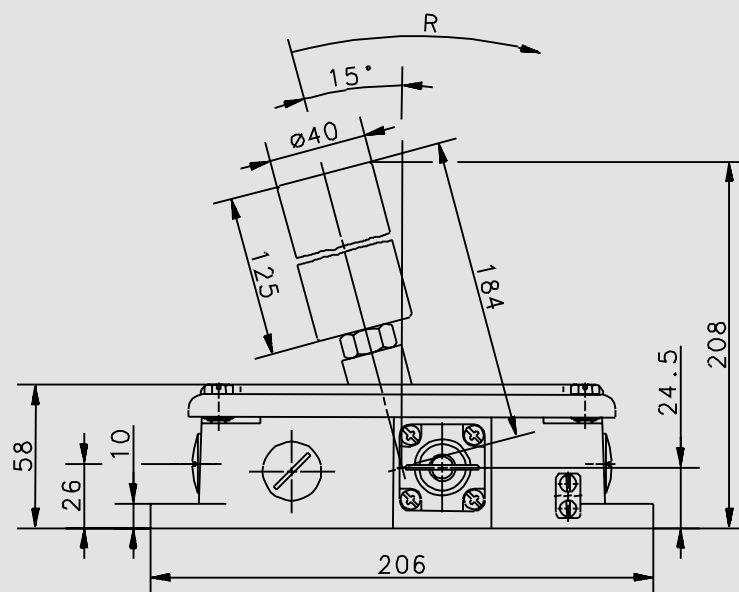
|                              |                            |          |
|------------------------------|----------------------------|----------|
| Rated operating voltage      | $U_e$                      | 240 V    |
| Rated insulation voltage     | $U_i$                      | 400 V AC |
| Utilisation 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

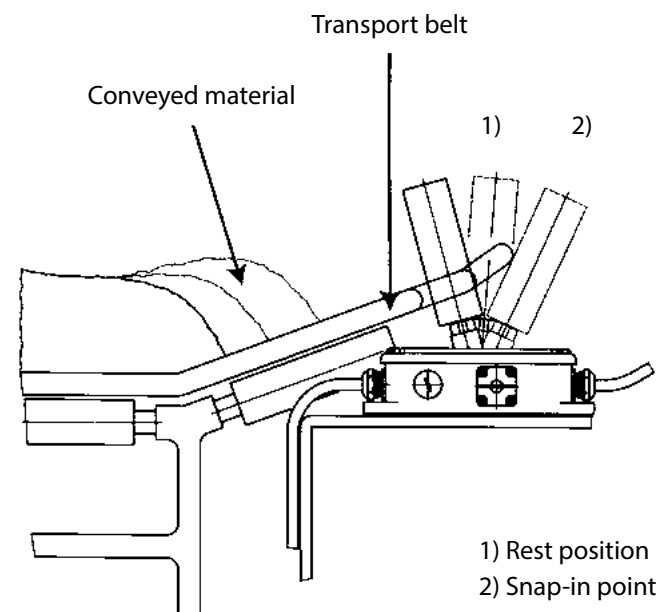
|      |                        |
|------|------------------------|
| B10d | $4 \times 10^6$ cycles |
|------|------------------------|



#### Product selection

Article number      Designation

6015736003      Si2-U2Z AW R-Rast





# Emergency stop devices



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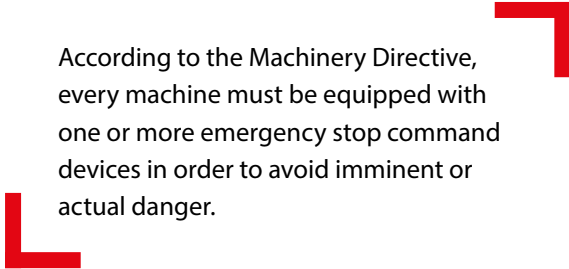


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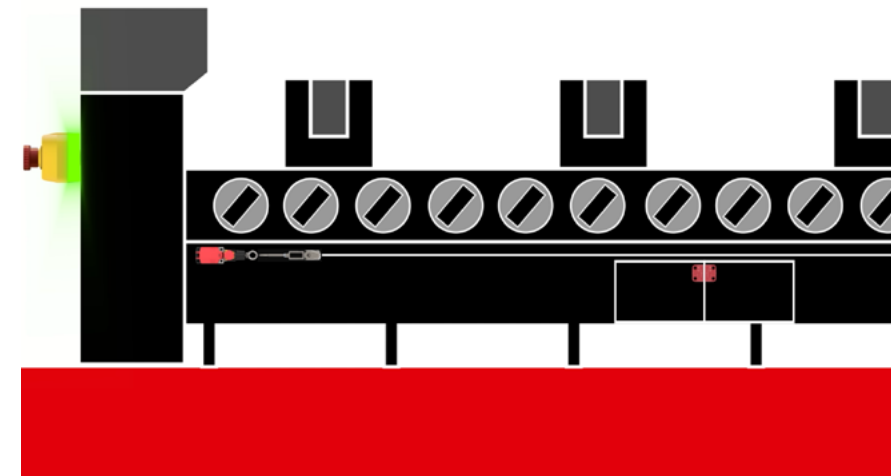


## For switching off in dangerous situations

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.

A red L-shaped graphic, composed of two perpendicular lines of equal length, positioned to the left of the text.

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

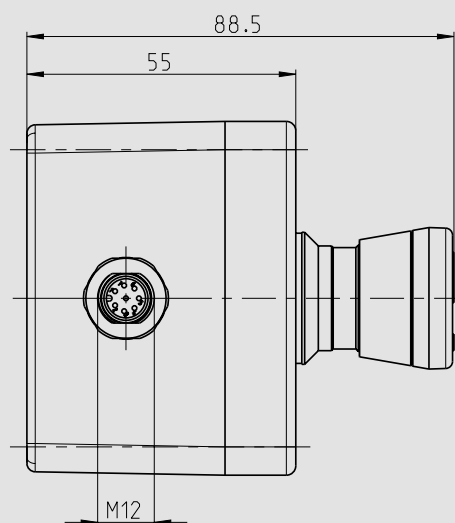
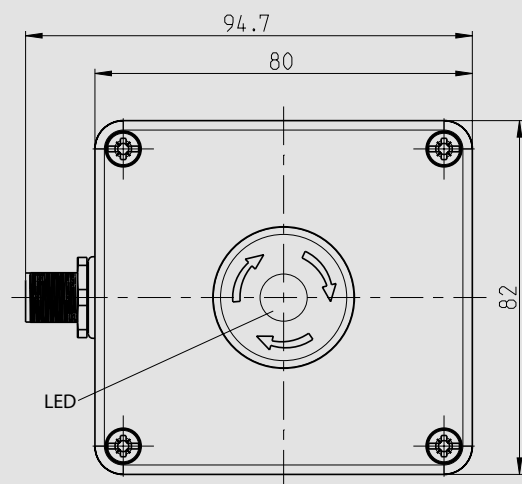
|   |       |         |
|---|-------|---------|
| Rated operating voltage                     | $U_e$ | 24 V DC |
| Output current per signalling output        | $I_e$ | 10 mA   |
| Output current of the safety outputs (OSSD) | $I_e$ | 100 mA  |

### Mechanical data

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

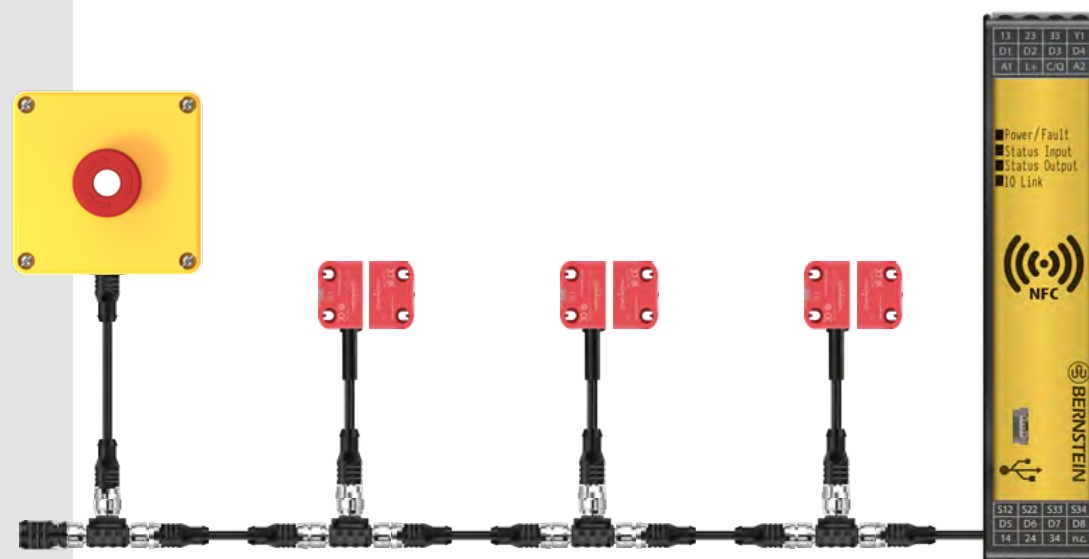
### ID for safety engineering

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

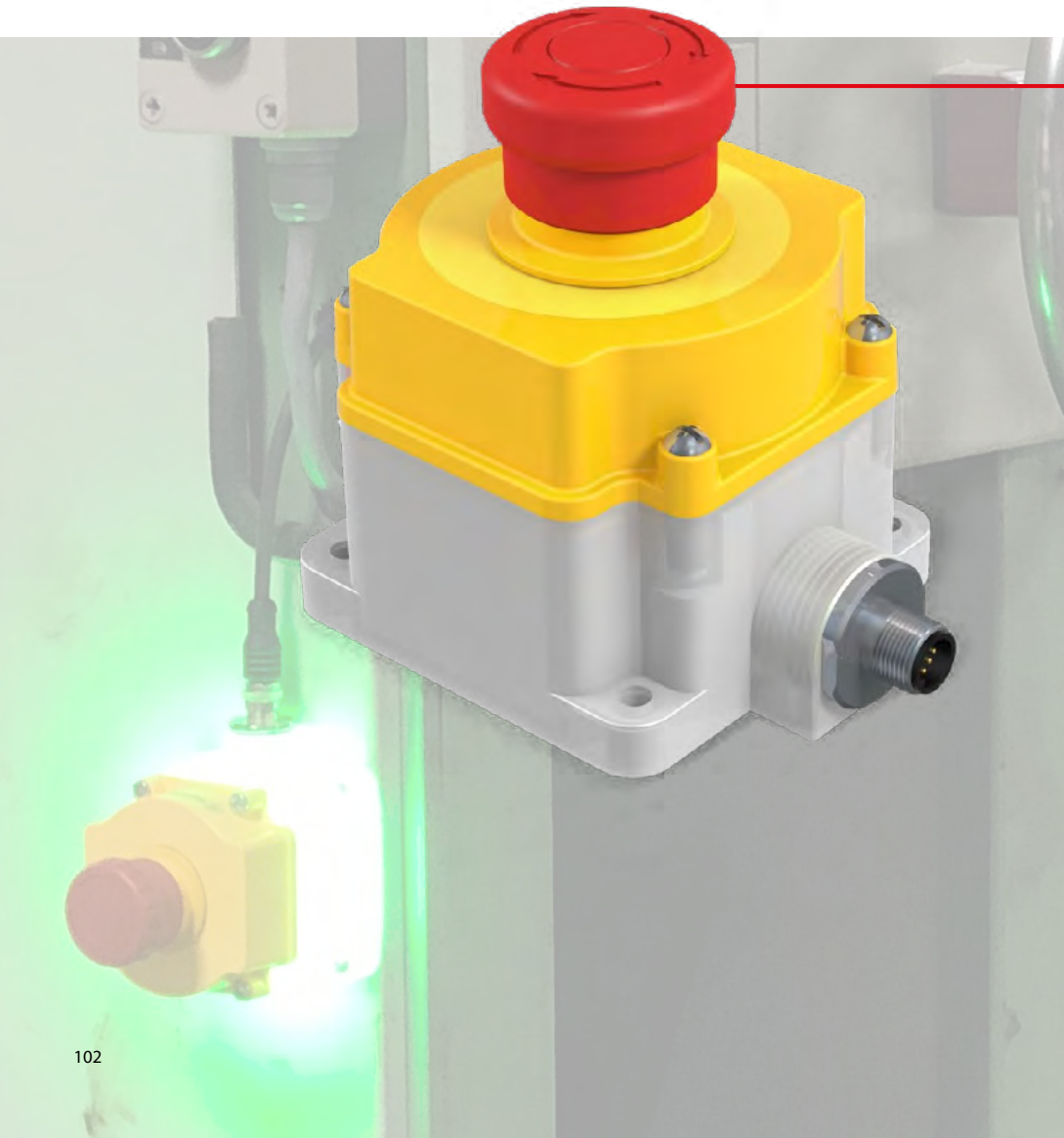


#### Product selection

| 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

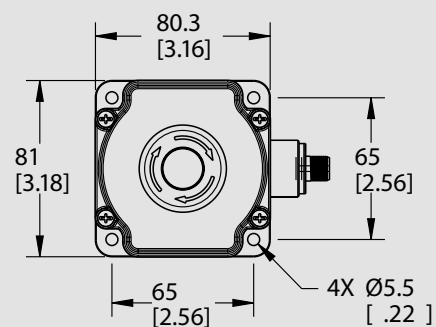
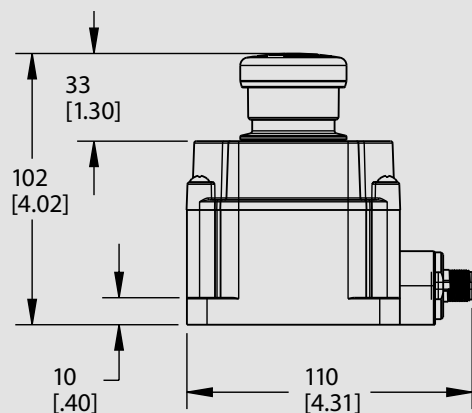
Material enclosure/push button Polycarbonate/Polyamide

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

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

### ID for safety engineering

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



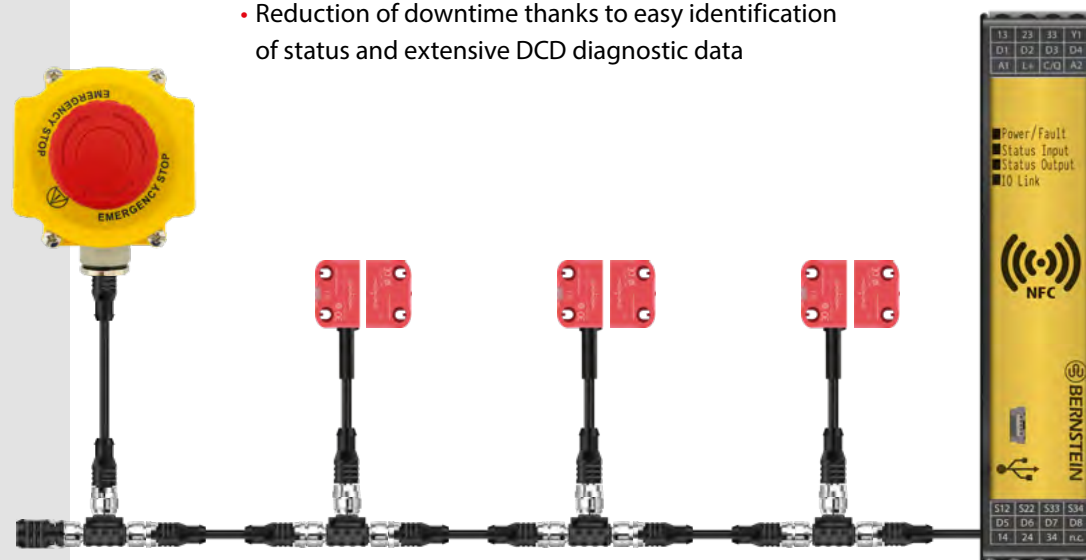
#### Product selection

| 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

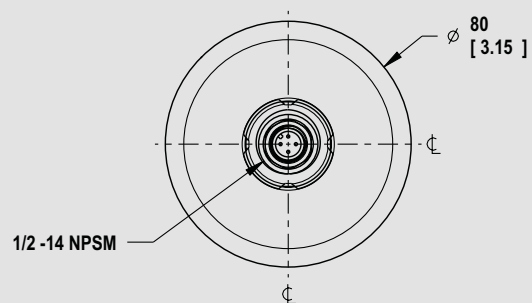
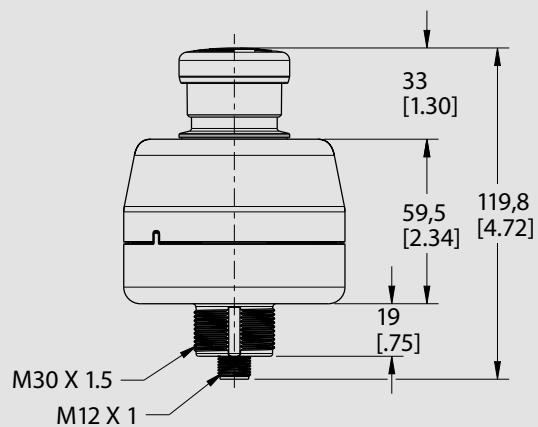
Ambient temperature  $-25^{\circ}\text{C}$  to  $+50^{\circ}\text{C}$

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

### ID for safety engineering

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





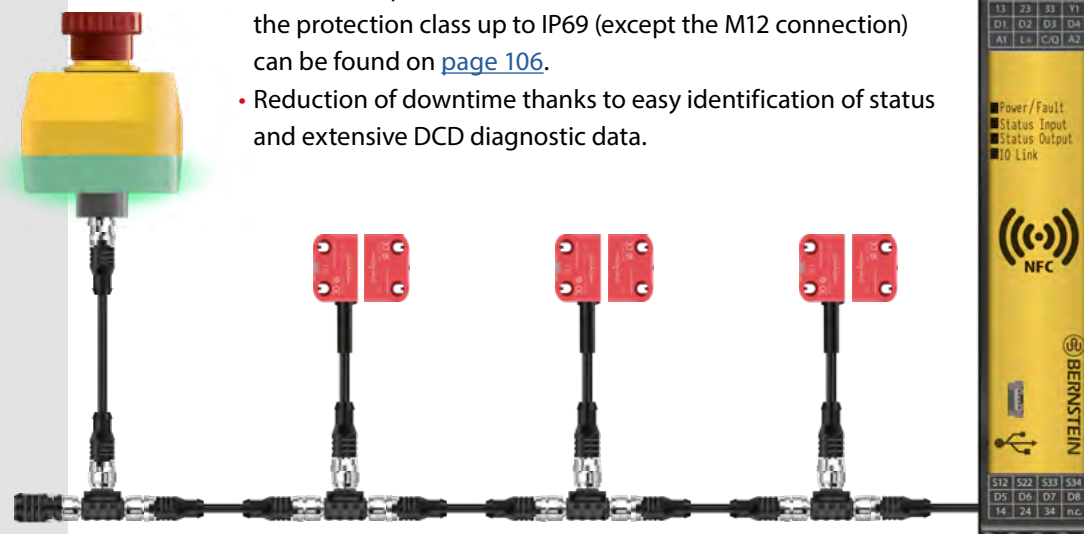
#### Product selection

| 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 106](#).
- 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

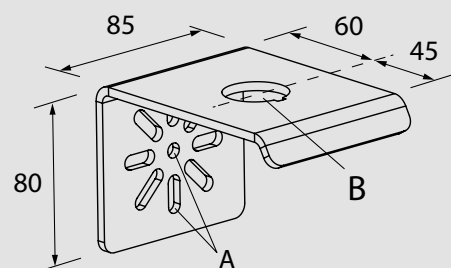


Mounting bracket,  
Stainless steel



Silicone protective cover  
SEU-WDC

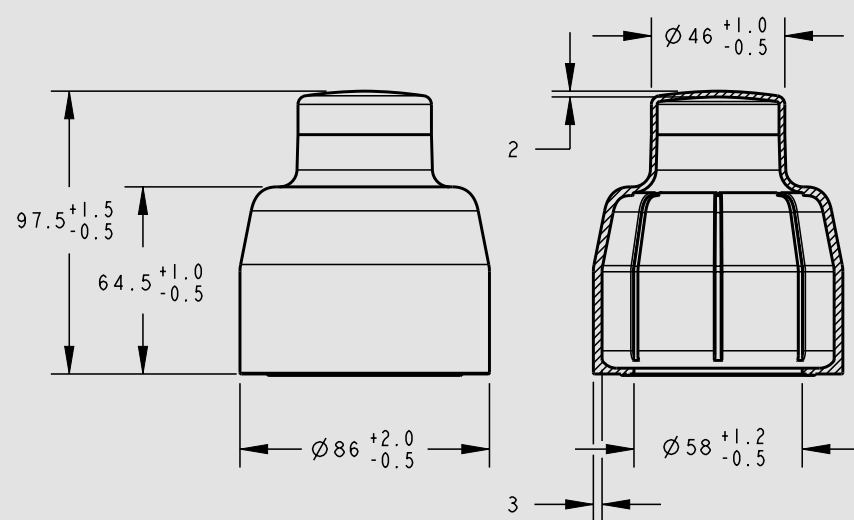




### Mounting bracket

SEU-MB1H ...

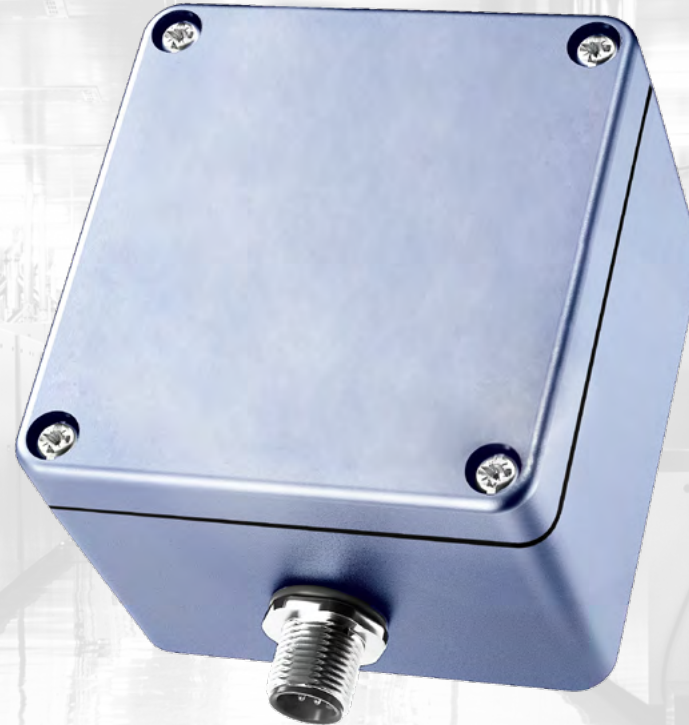
Dimensions: A= Ø 7mm, B= Ø 30 mm



# DCD Interfaces



Page 110



Page 112



## **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 8](#)) 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  |

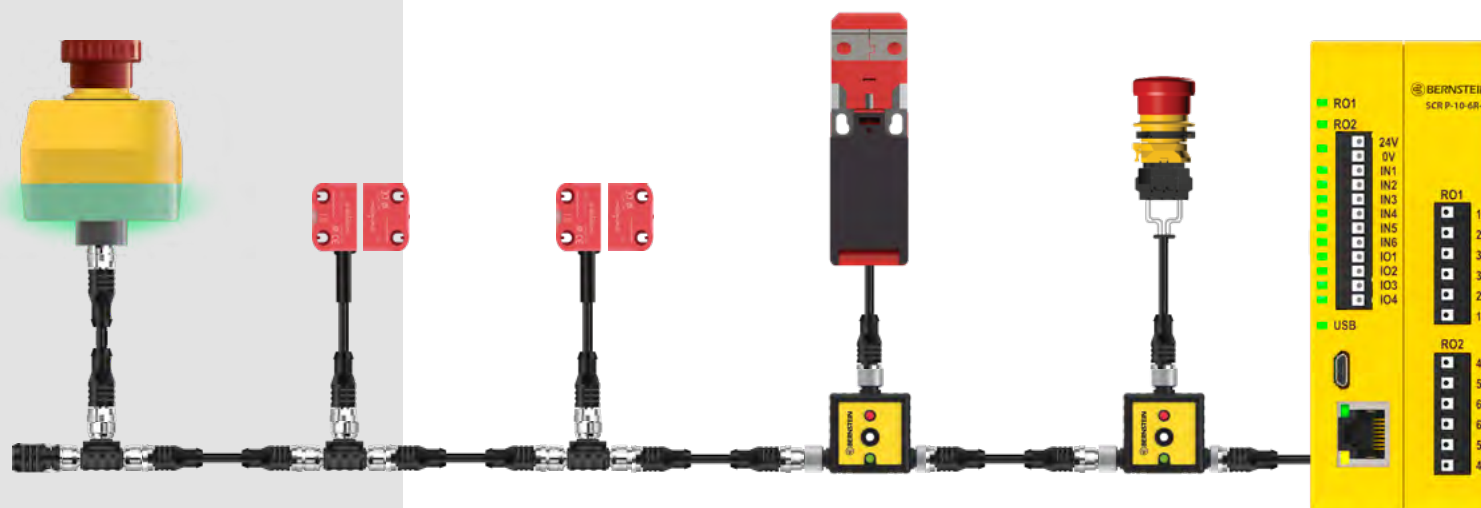
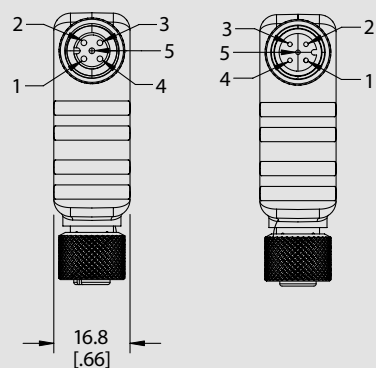
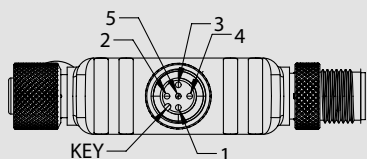
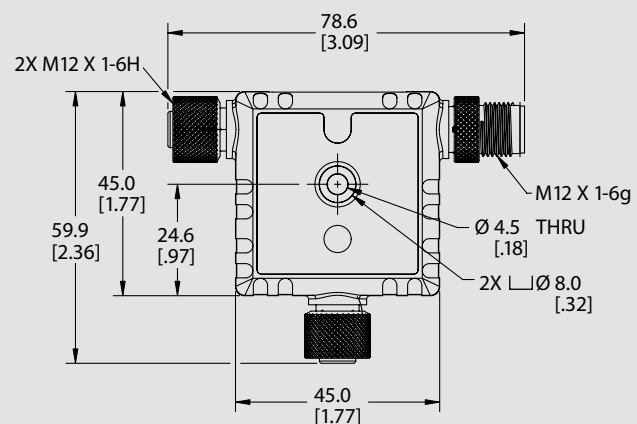
### Mechanical data

|                     |                                 |
|---------------------|---------------------------------|
| 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 EN ISO 13849-1)  
up to SIL CL 3 (according to DIN EN 62061)  
PFHD =  $6.56 \times 10^{-9}$  1/h  
Service life: 20 years





## Product selection

| Article number | Designation        | Connection for input devices |       |       |       |       |           |
|----------------|--------------------|------------------------------|-------|-------|-------|-------|-----------|
|                |                    | Pin 1                        | Pin 2 | Pin 3 | Pin 4 | Pin 5 | Display   |
| 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 148](#))

# 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  |

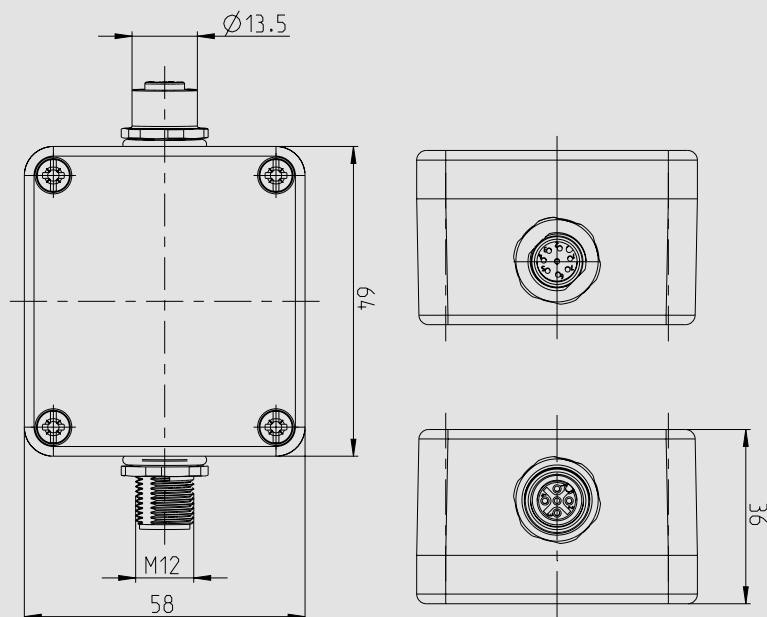
### Mechanical data

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

### ID for safety engineering

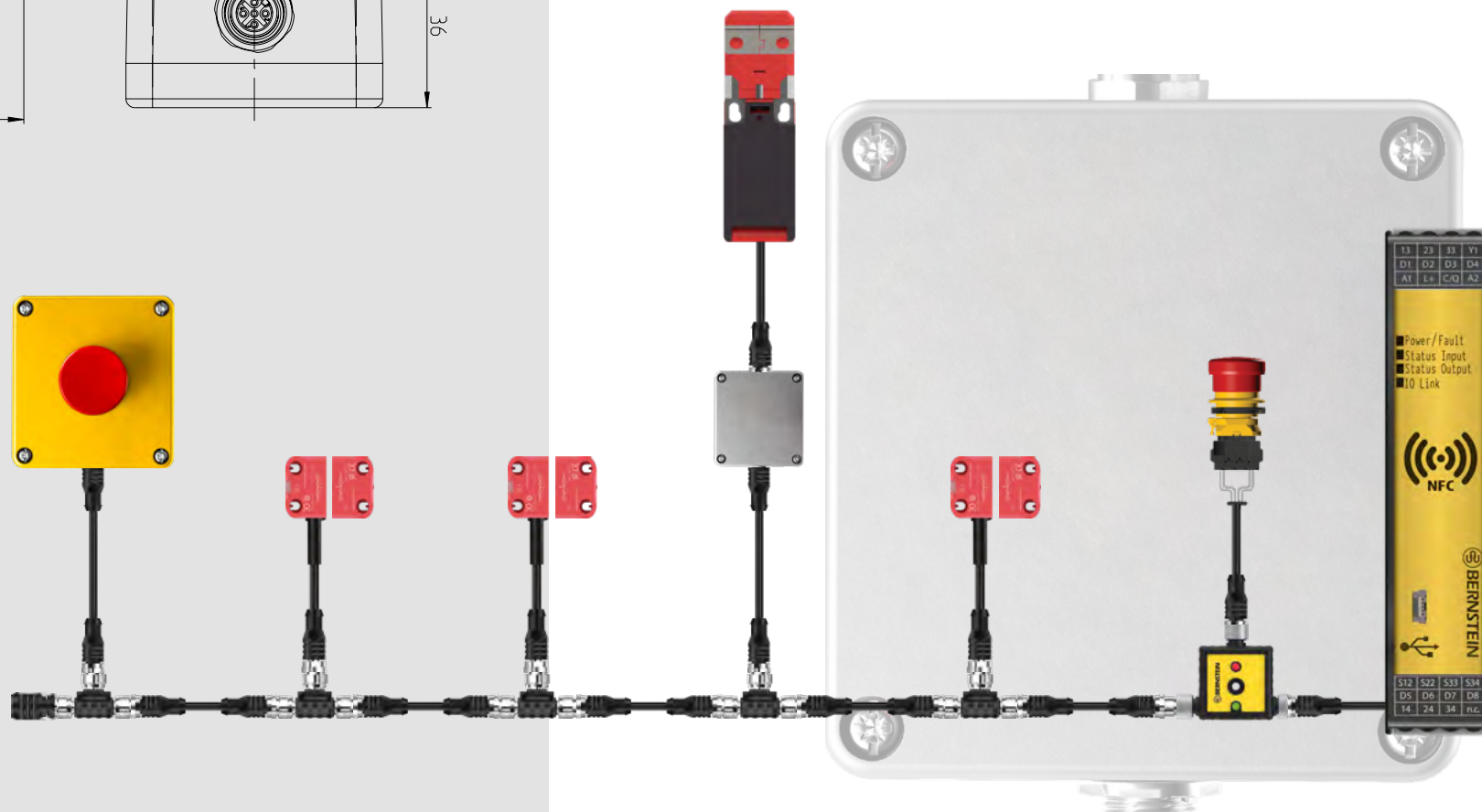
up to PL e/Cat. 4 (according to EN ISO 13849-1)  
up to SIL CL 3 (according to DIN EN 62061)





#### 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



## **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

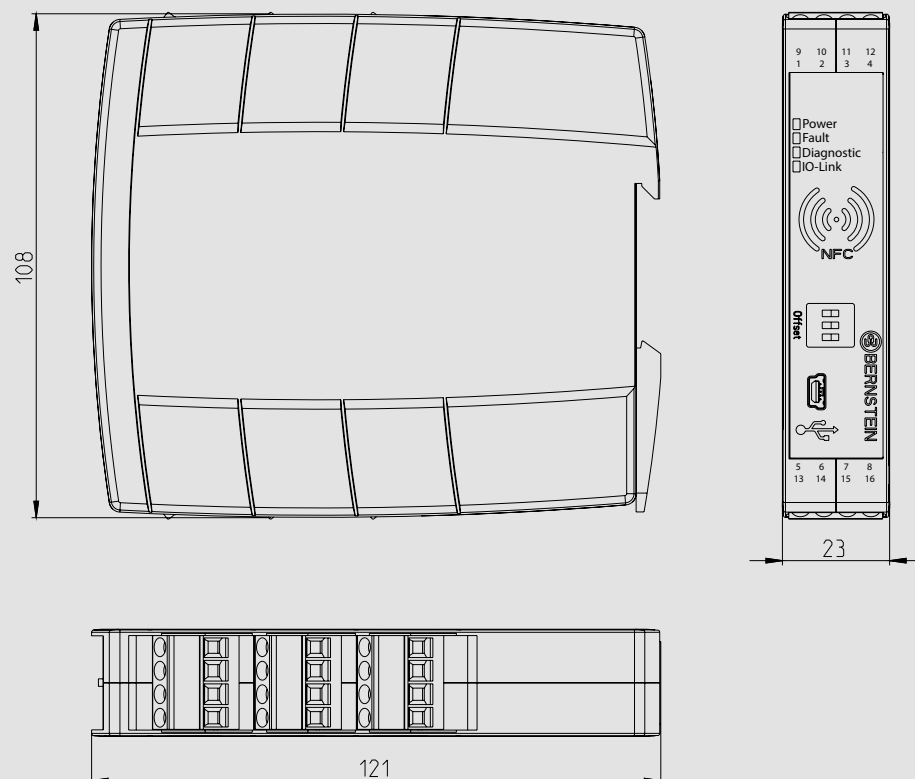


MANY BENEFITS AT A GLANCE

- 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 <sub>e</sub> | 24 V DC       |
| Output current per message output | I <sub>e</sub> | 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 |
| <b>6075619122</b> | SRF DI-C-0/1-T  | DIN rail housing 22.5 mm | 1                             | -               | x          | x   | x       |
| <b>6075619123</b> | SRF DI-C-8/1-T  | DIN rail housing 22.5 mm | 1                             | 8               | x          | x   | x       |
| <b>6075619124</b> | SRF DI-C-16/1-T | DIN rail housing 22.5 mm | 1                             | 16              | x          | x   | x       |
| <b>6075619125</b> | 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

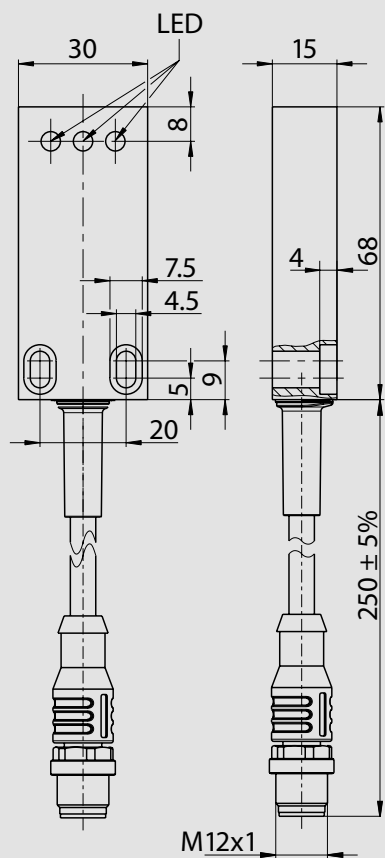
### Electrical data

|                                   |       |         |
|-----------------------------------|-------|---------|
| 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 | $-25^{\circ}\text{C}$ to $+70^{\circ}\text{C}$ |
| Protection class    | IP69   |





**Product selection**

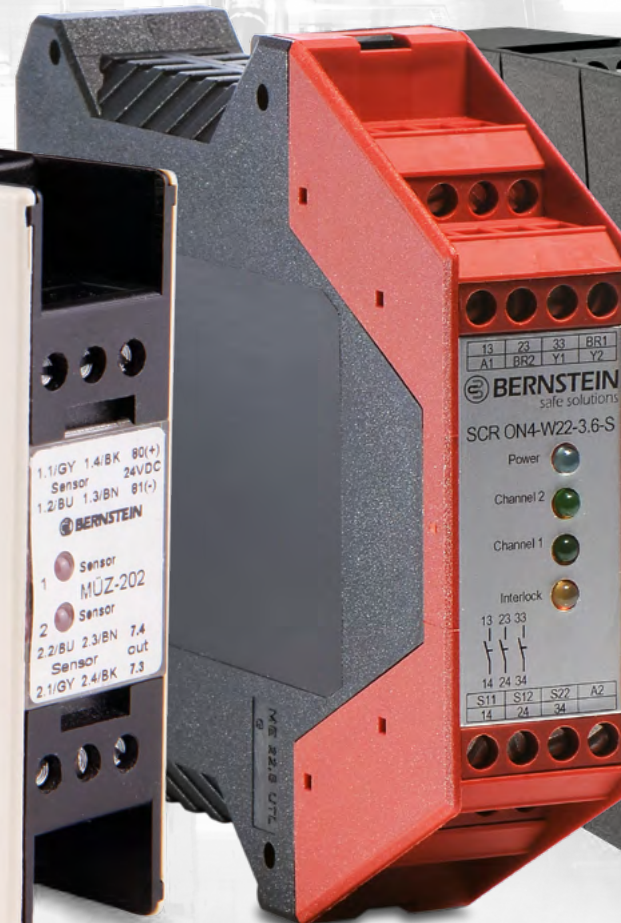
| Article number    | Designation        | Enclosure   | Number of diagnostic circuits | Digital outputs | Interfaces |     |         |
|-------------------|--------------------|---|-------------------------------|-----------------|------------|-----|---------|
|                   |                 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



# Safety relays and controllers



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Page 124



Page 126

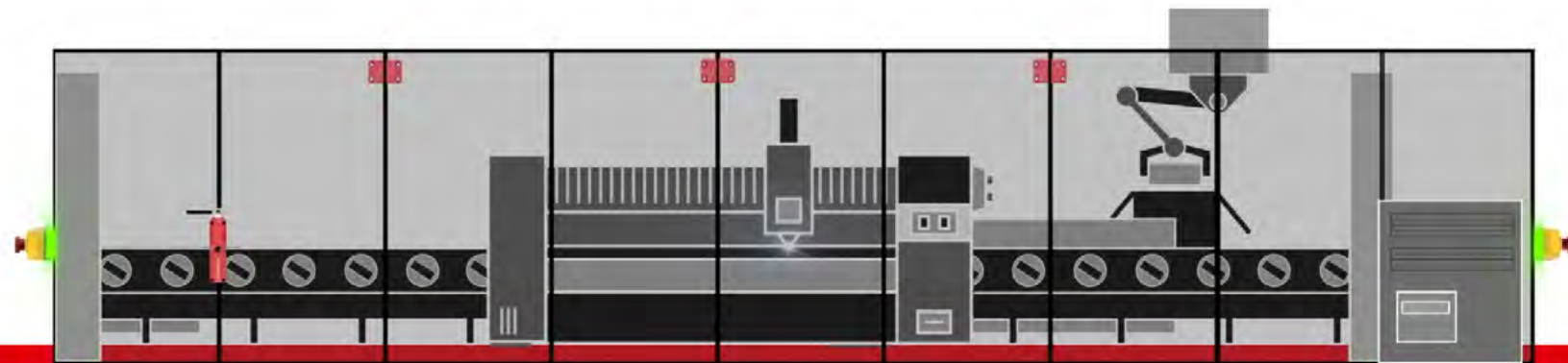


Page 128

## 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 EN ISO 13849-1
- SIL 3 according to EN 61508/EN 62061
- Single-fault safety S according to EN 60947-5-3

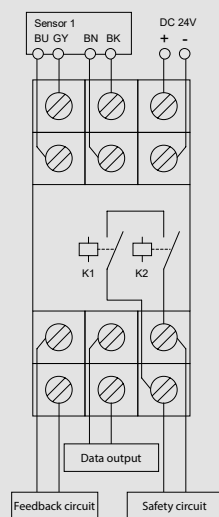
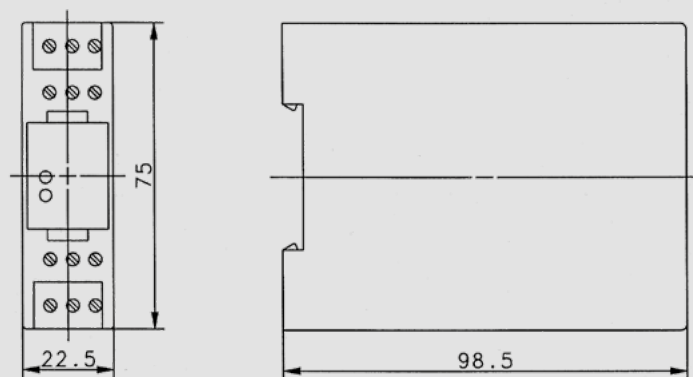
## Technical data

### Electrical data

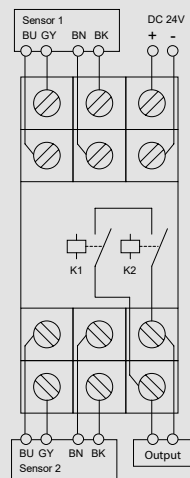
|  |          |
|--|----------|
| Operating voltage                      | 24 V DC  |
| Switching voltage of the safety output | 250 V AC |
| Switching current of the safety output | 8 A      |

### 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) |
|-------------------|-------------------|-----------------|------------------|--------------------------|
| <b>6392701306</b> | MÜZ-102/D24-FL-DA | 1               | Yes              | Yes                      |
| <b>6392702307</b> | 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 EN ISO 13849-1

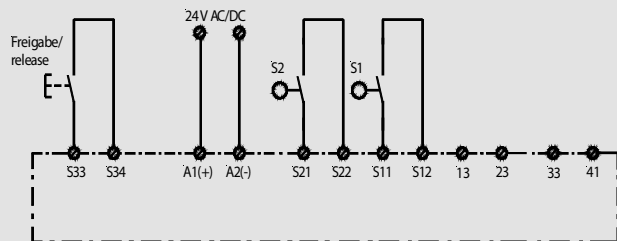
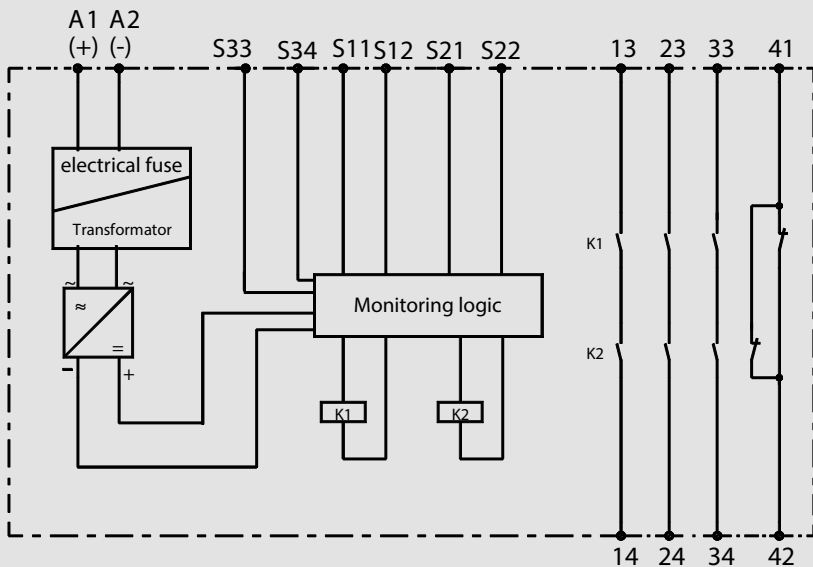
## Technical data

### 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) | Signalling 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                               | Program-mable   | 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 EN ISO 13849-1

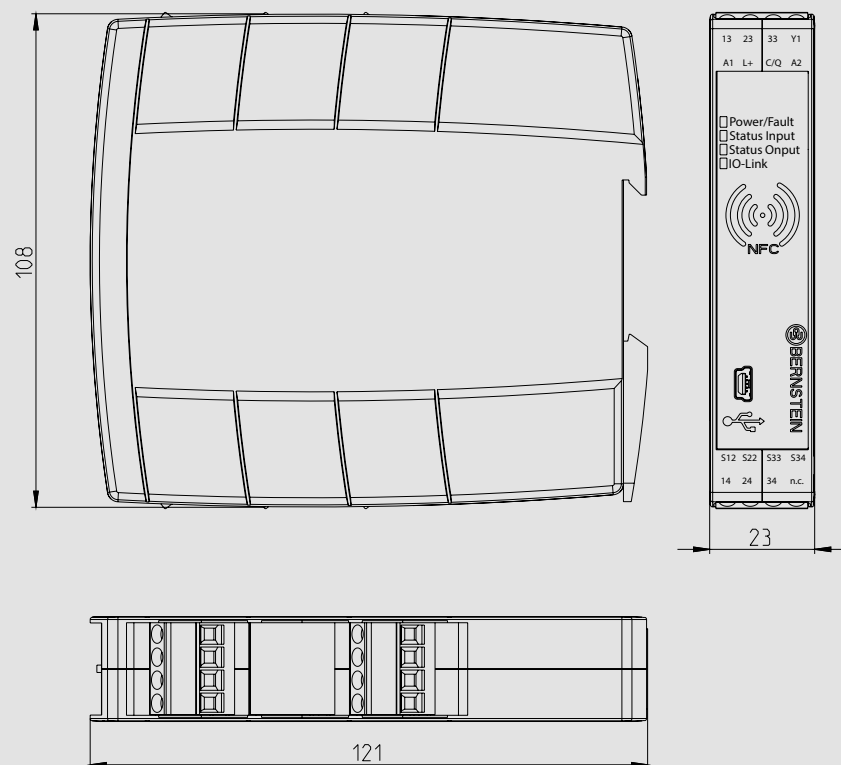
## Technical data

### 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       |





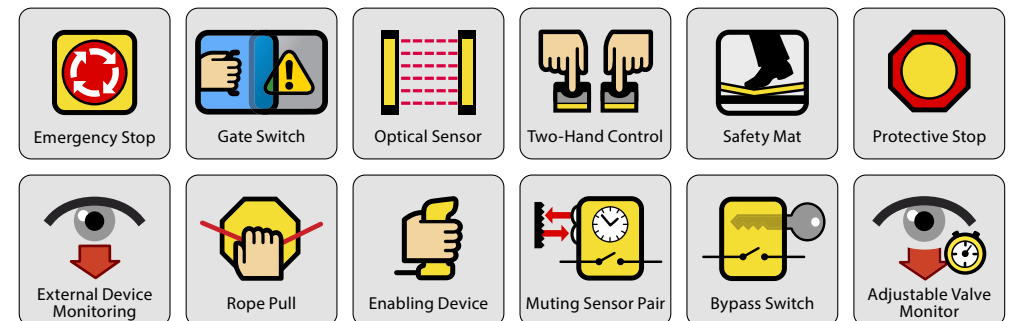
# Programmable safety controller SCR P with Ethernet interface



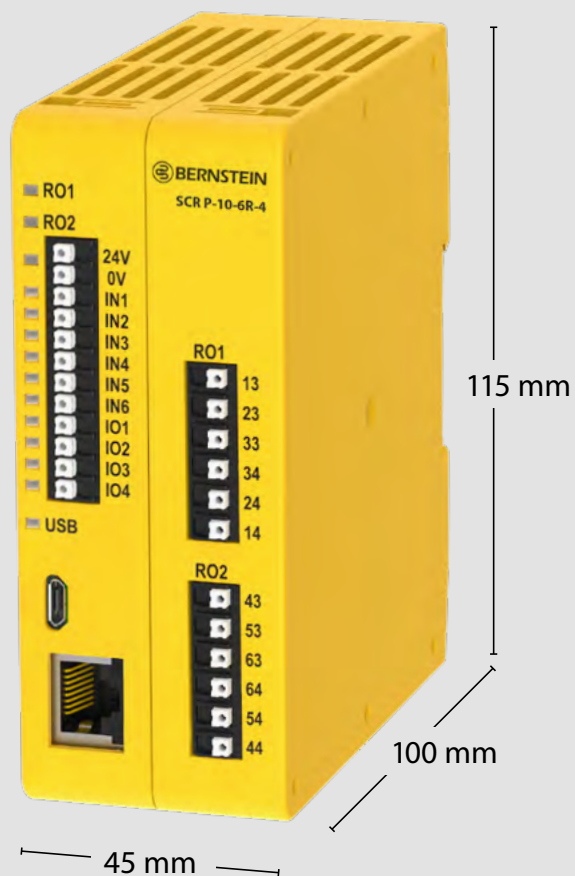
## MANY BENEFITS AT A GLANCE

- 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

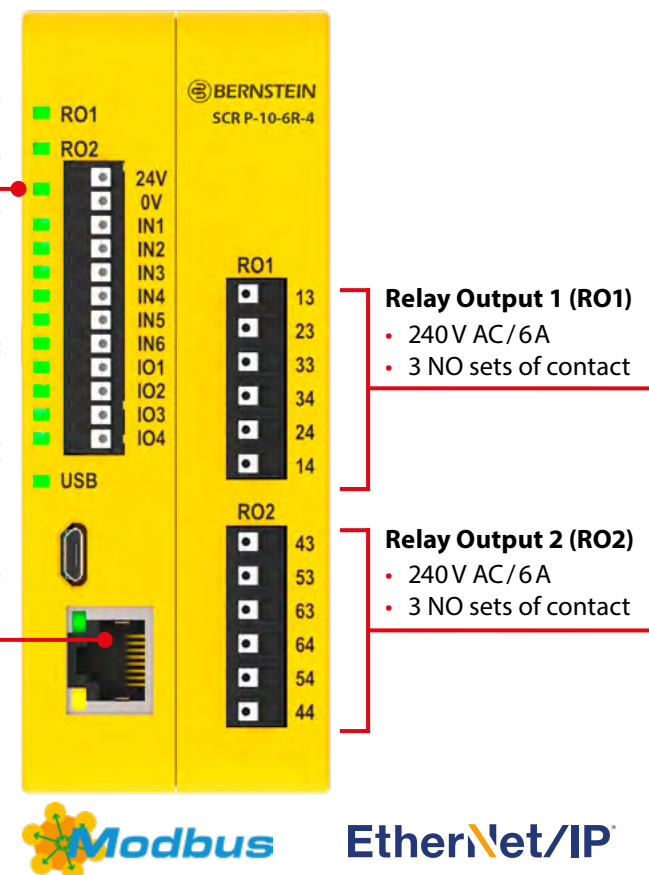
### 24 V DC Power

### 6 Safe Inputs

### 4 Safe Inputs or 4 Non-Safe Outputs

### Micro-USB

### Ethernet-Port



Accessories  
SCR P



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



USB programming adapter



USB cable



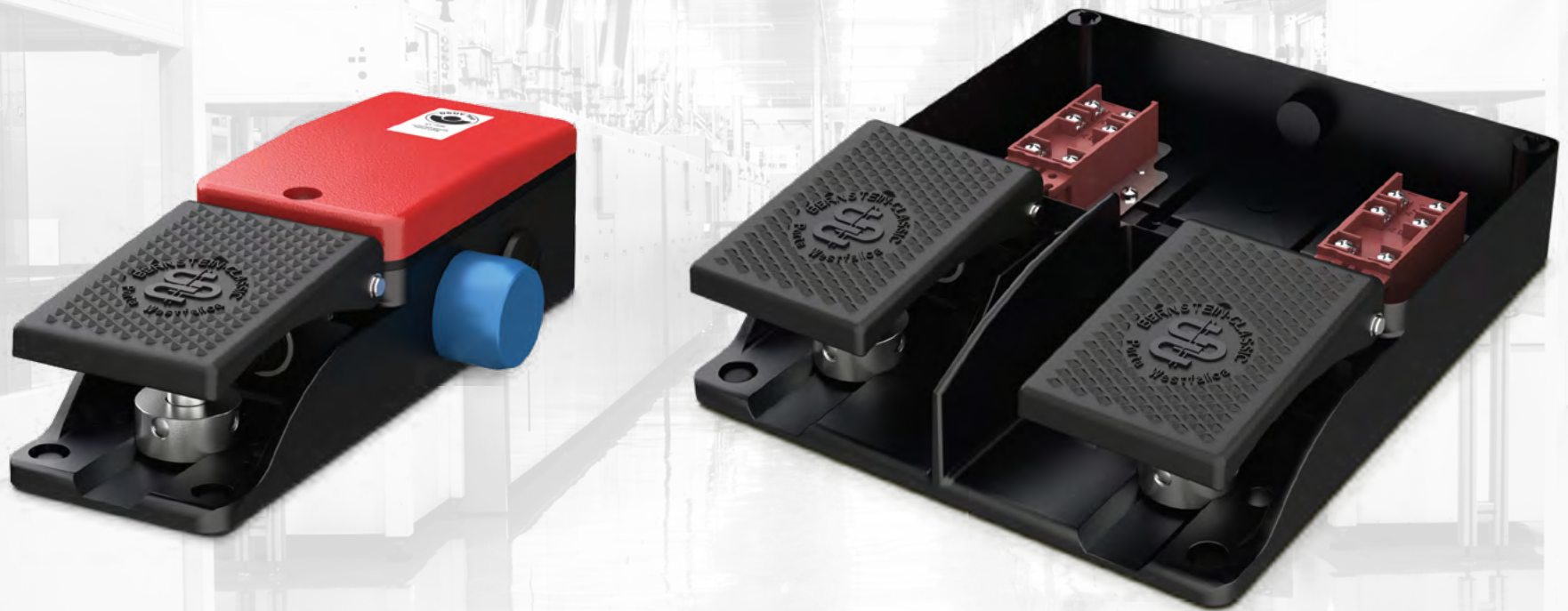
Programming flash drive







## Foot switches for safety applications



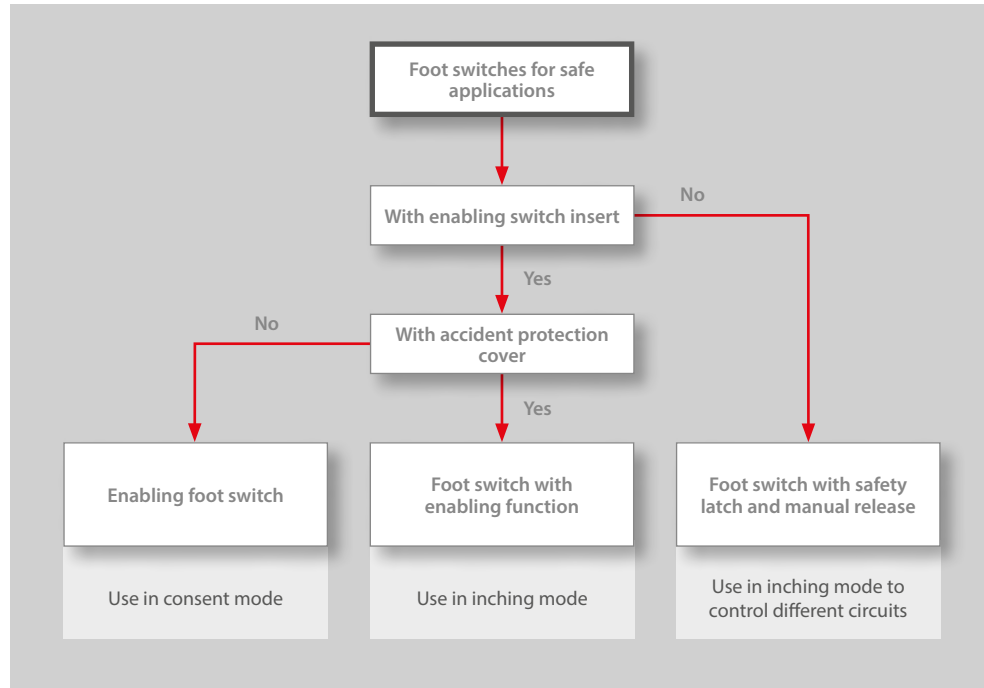
## **Enabling foot switch – When hands must remain free**

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

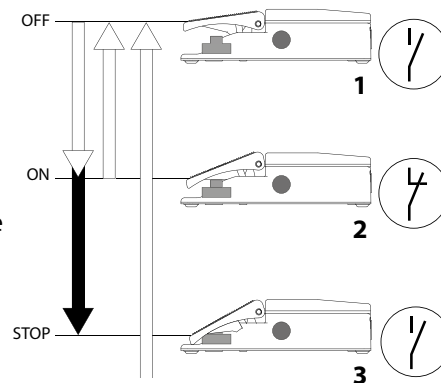


**Teaching a robot function through a manually operated enabling switch**

## 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).



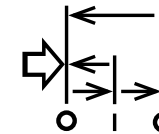
## Foot switch for enabling operation

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:

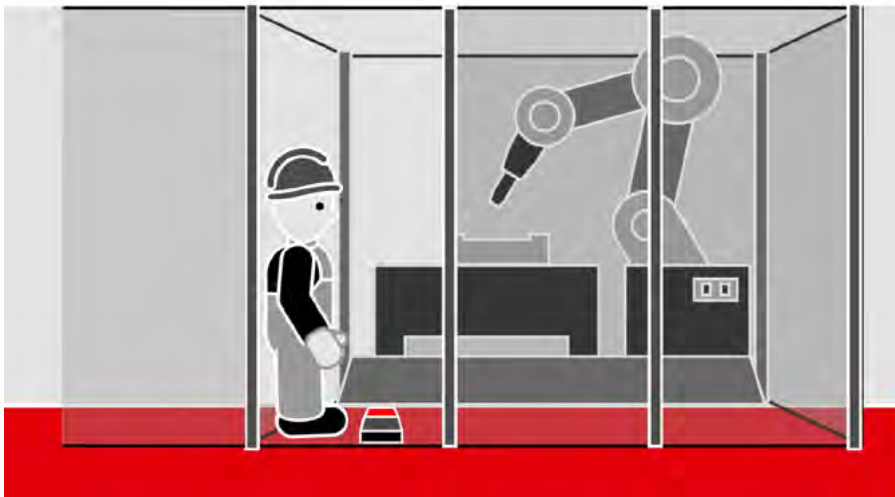


Symbol for a three-position enabling switch

### 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**

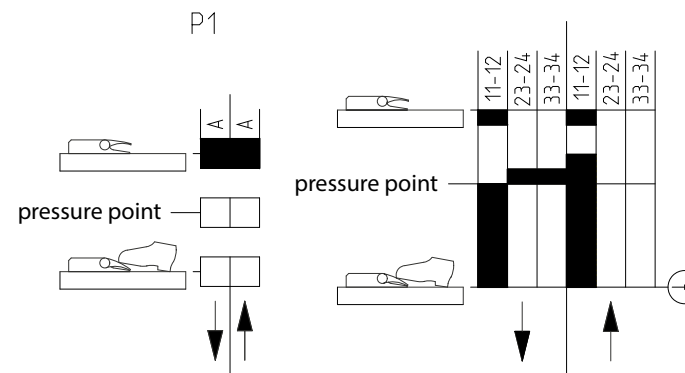
### Why now with the foot?

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?

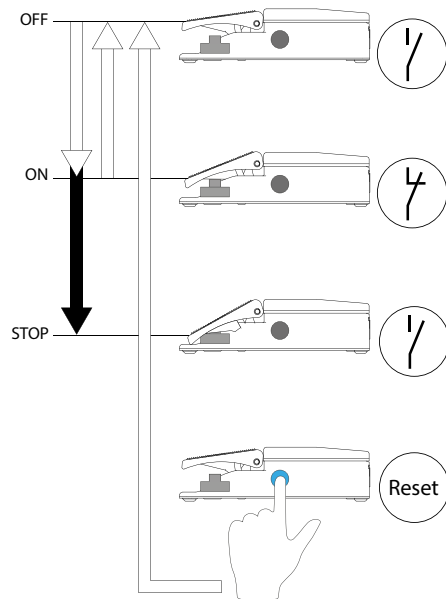
Another advantage of the BERNSTEIN enabling foot switch is the position monitoring. From a control point of view, pedal positions 1 and 3 are completely identical. In both cases, the enabling contacts are open. If you now want to evaluate the exact position of the pedal, this is not possible without 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)**

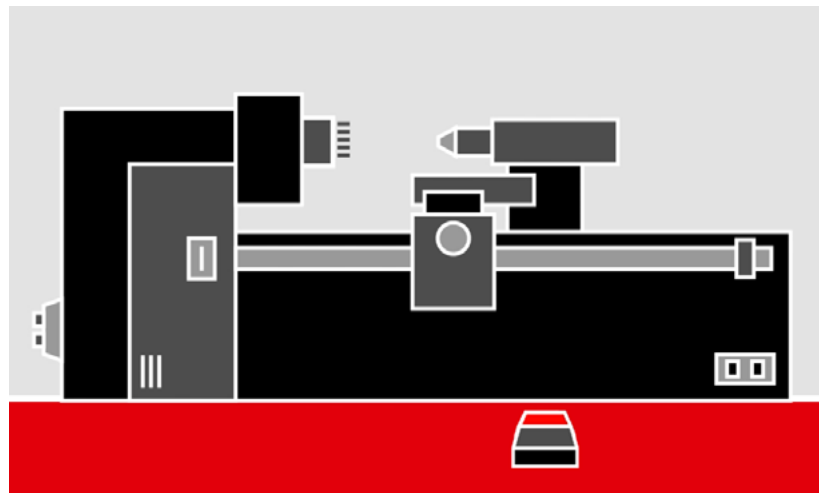
It is also possible to use a so-called accident protection cover. This protects the foot switch from unintentional actuation and damage by falling parts. However, foot switches with accident protection covers are not approved for enabling operation for ergonomic reasons. Therefore, these products are dealt with in the next chapter "Foot switches for inching operation" ([from page 140](#)).

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

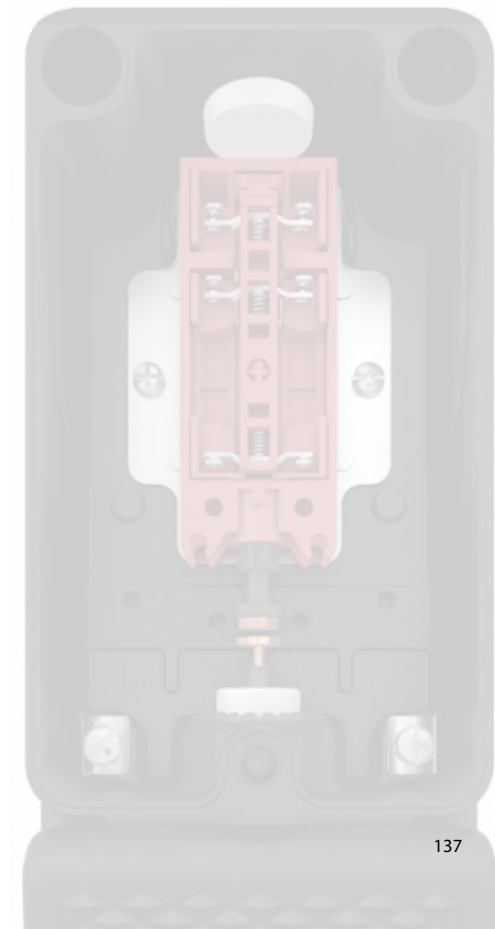
The DGUV's Wood and Metal Division has published a technical paper (FBHM-39) detailing the integration of an enabling foot switch into a safety system. The foot switch is used in this application to safely set up a lathe.



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

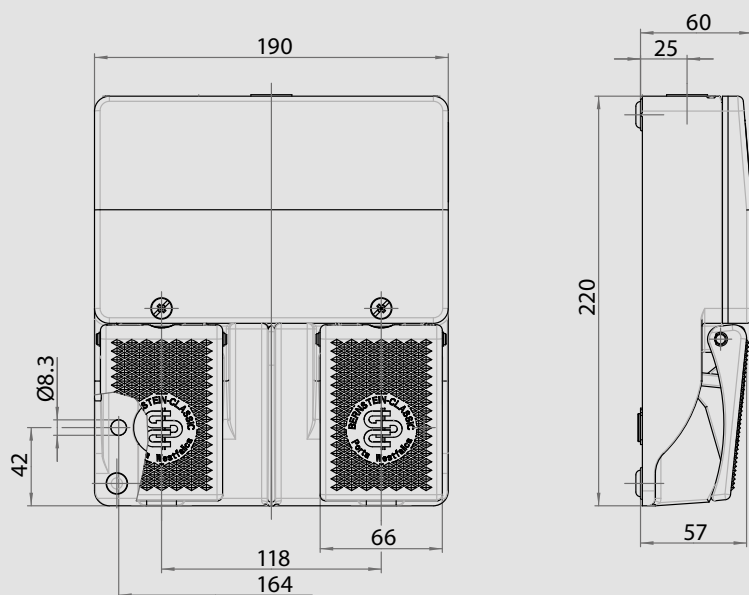
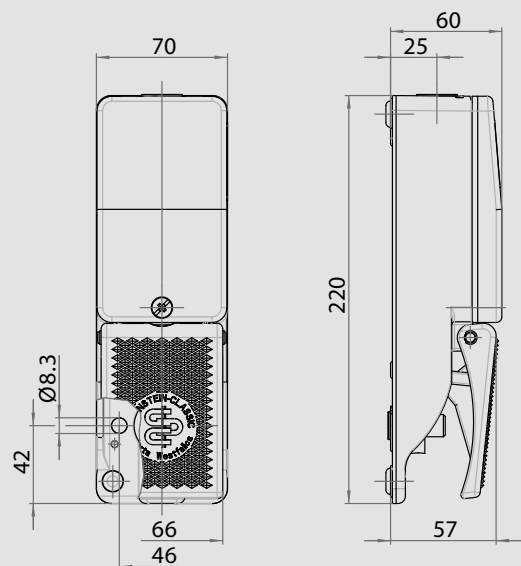
### Mechanical data

|  |   |
|--|---|
| Enclosure  | Cast aluminium (powder-coated)  |
| Cover, Protective shroud UN                            | Cast aluminium (powder-coated)  |
| Actuation  | Pedal (Thermoplastic)   |
| Ambient temperature<br>(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<br>IP67 (in type designation "ZS")                               |

### Electrical data

|                              |  |
|------------------------------|--|
| Rated insulation voltage     | $U_i$ 400 V AC<br>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<br>5 A (in type designation "ZS")   |
| Utilisation category         | AC-15, $U_e/I_e$ 240 V/3 A<br>DC-13, $U_e/I_e$ 24 V/3 A<br>AC-15, $U_e/I_e$ 240 V/1.5 A (in type designation "ZS")<br>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<br>(when reaching the pedal stop)  |





#### Product selection Single pedal foot switch F1

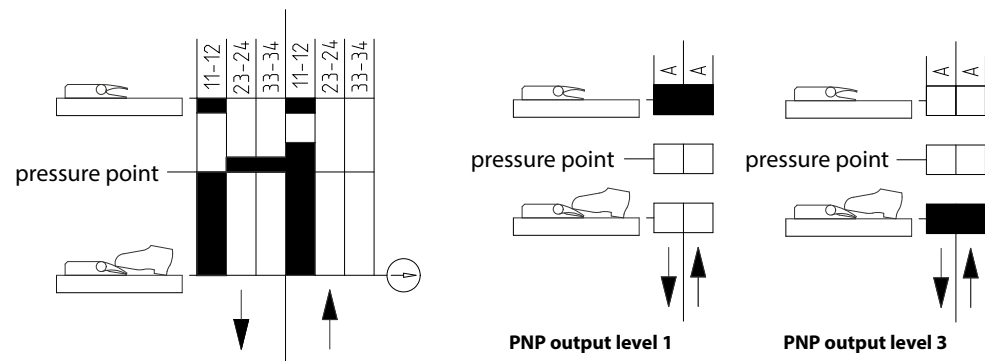
| Article number | Designation | Switching contacts | Pressure point | Special feature                      |
|----------------|-------------|--------------------|----------------|--------------------------------------|
| 6061500559     | F1-ZSD      | 1NC/2NO            | 200 N          | Pressure point 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 |

#### 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          | 200 N        | Pressure point D (Pedal 2)   |
| 6062500568     | F2-ZSDR/ZSDR | 1NC/2NO            | 1NC/2NO      | 200 N          | 200 N        | Pressure point D, Latching R |

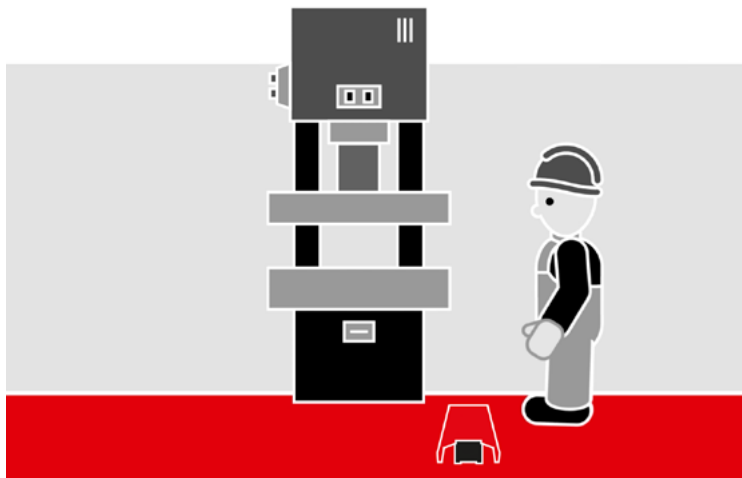


The enabling foot switch offers two enabling contacts and one signalling contact and is available both with and without latching.



# 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 detent as well as with accident protection cover.

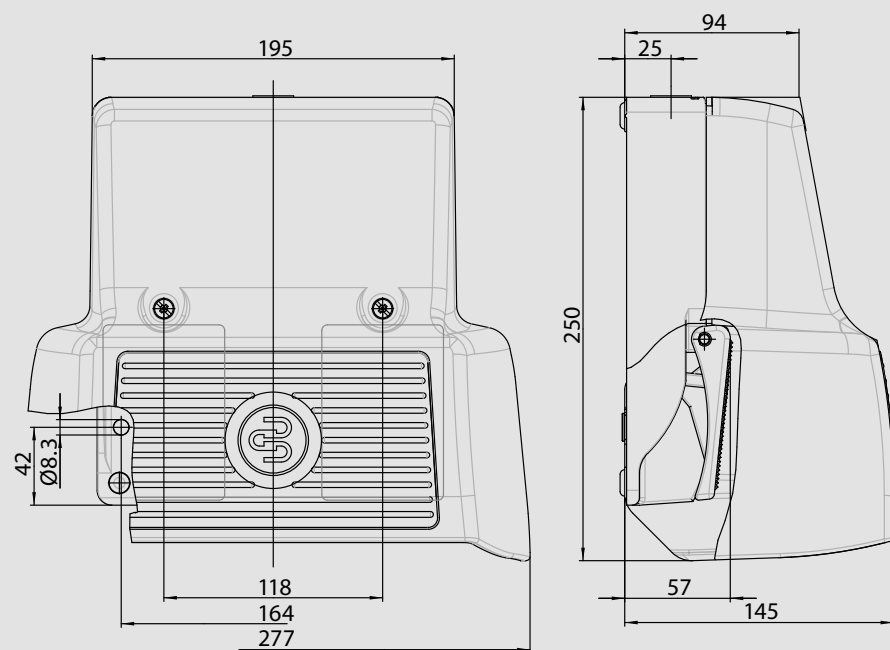
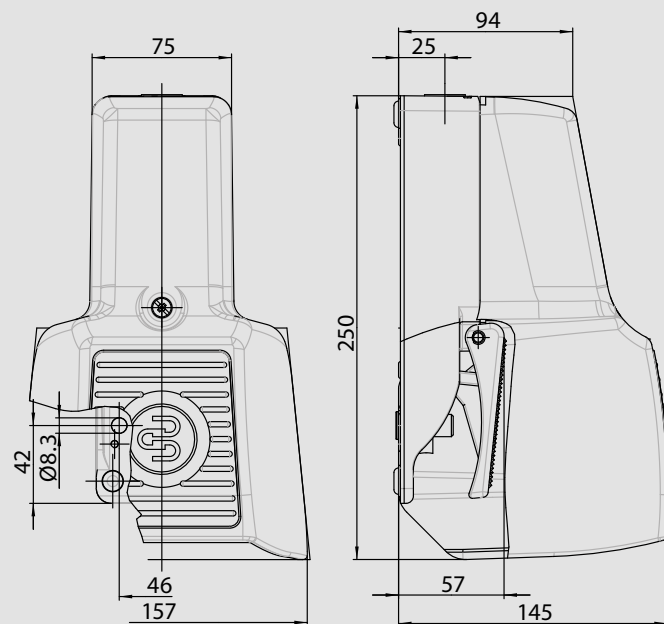


**Enabling foot switch for inching operation on a press**



### 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, Prot. shroud UN                      |
| 6061000560     | F1-ZSDR UN  | 1NC/2NO            | 200 N          | Pressure point D, Latching R, Prot. shroud UN          |
| 6061000564     | F1-ZSP1D UN | 1NC/2NO            | 200 N          | Additional board 1*, Pressure point D, Prot. shroud UN |

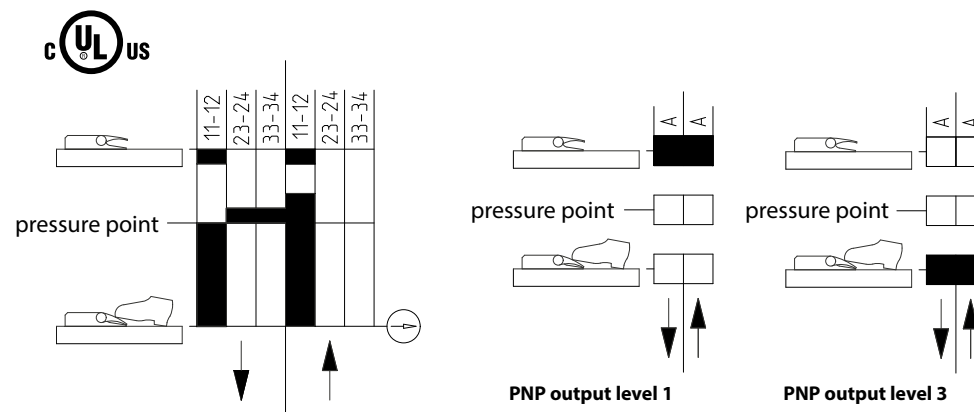
\* PNP additional board for differentiating the switching position 1

#### 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. shroud UN                         |
| 6062000563     | F2-U1Z/ZSDR UN    | 1NC/1NO            | 1NC/2NO      |                | 200 N        | Pressure point D (Pedal 2), Latching R, Prot. shroud UN             |
| 6062000565     | F2-ZSP1D/ZSP1D UN | 1NC/2NO            | 1NC/2NO      | 200 N          | 200 N        | Additional board 1*, Pressure point D (Pedal 1+2), Prot. shroud UN  |
| 6062000566     | F2-ZSP3D/ZSP3D UN | 1NC/2NO            | 1NC/2NO      | 200 N          | 200 N        | Additional board 3**, Pressure point D (Pedal 1+2), Prot. shroud UN |

\* PNP additional board for differentiating the switching position 1

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

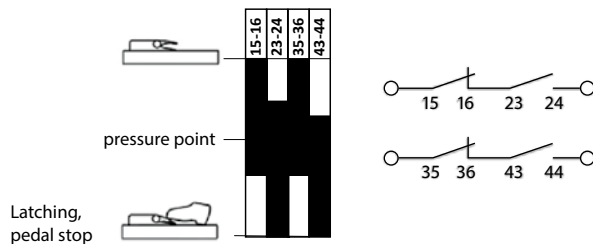


# Foot switch with safety latch and manual release

### 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.

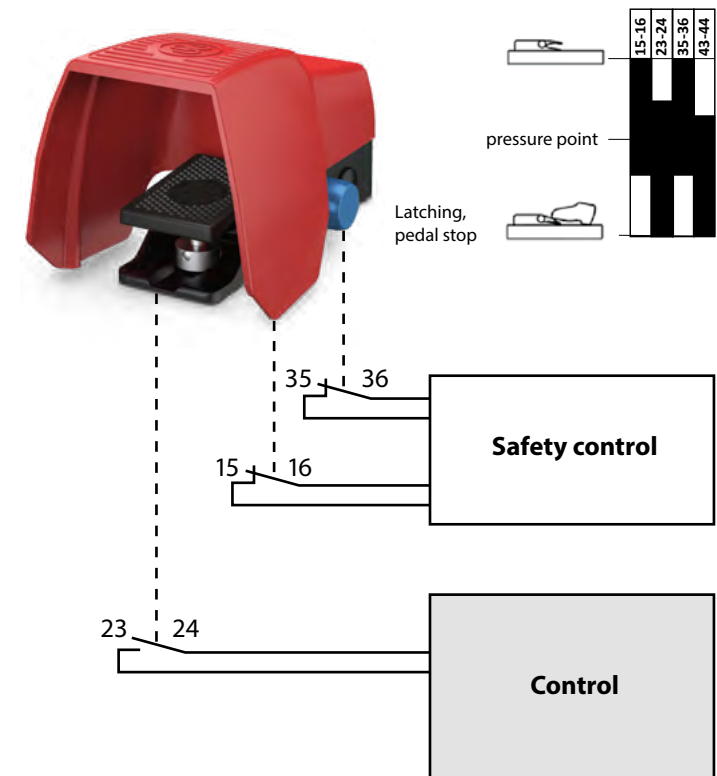
The advantage of these switches is that the contacts can also be used individually without series connection, and thus the OFF-ON-OFF function can also be achieved by control means as in the example opposite.

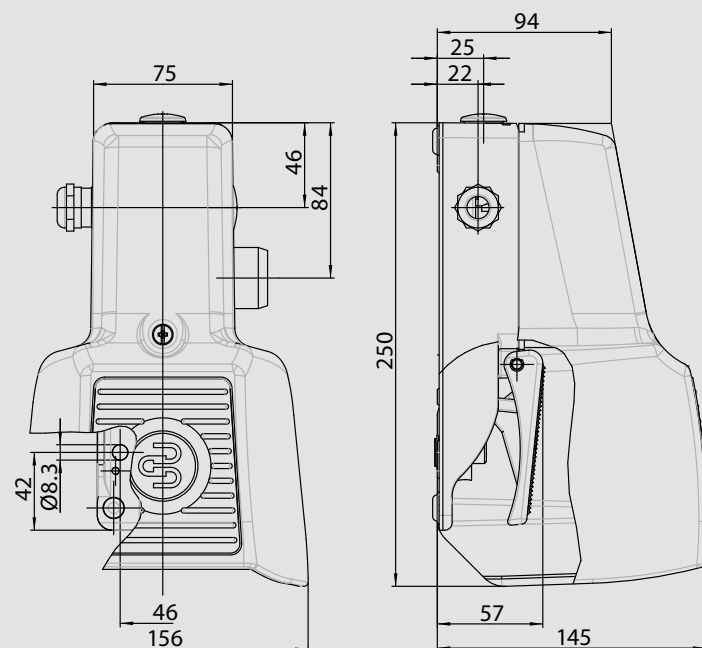
### Example application

A foot switch with safety catch 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   |
|-------------------|------------------|--------------------|----------------|---|
| <b>6161000560</b> | F1-SU1ZUV1ZDR UN | 2NC/2NO            | 200 N          | Pressure point D, Latching R, Prot. shroud UN                           |
| <b>6161000203</b> | F1-SU1ZUV1ZDR UN | 1NC/2NO            | 200 N          | Pressure point D, Latching R, Prot. shroud UN                           |
| <b>6161000626</b> | F1-SU1ZCA2ZDR UN | 3NC/1NO            | 200 N          | Pressure point D, Latching R, Prot. shroud UN                           |
| <b>6161000443</b> | F1-UV1Z/UV1ZD    | 2NC/2NO            | 200 N          | Pressure point D, Latching R  |
| <b>6161000532</b> | F1-UV1ZUV1ZDR UN | 2NC/2NO            | 200 N          | Pressure point D, Latching R, Protected release button, Prot. shroud UN |

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

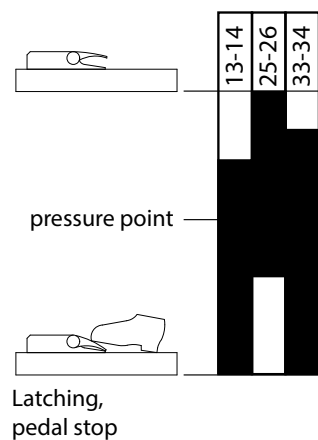
| Article number    | Designation                 | Switching contacts |               | Pressure point |             | Special feature  |
|-------------------|-----------------------------|--------------------|---------------|----------------|-------------|--|
|                   |                             | Pedal 1 (li.)      | Pedal 2 (re.) | Pedal 1 (li.)  | Pedal (re.) |  |
| <b>6162000486</b> | F2-SU1ZUV1ZDR/SU1Z UN       | 2NC/2NO            | 1NC/1NO       | 460 N          |             | Latching R (Pedal 1), Pressure point D (Pedal 1) Prot. shroud UN     |
| <b>6162000364</b> | F2-SU1ZSU1ZDR/SU1Z UN       | 2NC/2NO            | 1NC/1NO       | 200 N          |             | Latching R (Pedal 1), Pressure point D (Pedal 1) Prot. shroud UN     |
| <b>6162000553</b> | F2-SU1ZUV1DR/SU1ZUV1DR UN   | 2NC/2NO            | 2NC/2NO       | 200 N          | 200 N       | Latching R (Pedal 1+2), Pressure point D (Pedal 1+2) Prot. shroud UN |
| <b>6162000338</b> | F2-SU1ZUV1D/SU1ZUV1D UN     | 1NC/2NO            | 1NC/2NO       | 200 N          | 200 N       | Latching R (Pedal 1+2), Pressure point D (Pedal 1+2) Prot. shroud UN |
| <b>6162000709</b> | F2-SU1ZCA2ZDR/SU1ZCA2ZDR UN | 3NC/1NO            | 3NC/1NO       | 200 N          | 200 N       | Latching R (Pedal 1+2), Pressure point D (Pedal 1+2) Prot. shroud UN |
| <b>6162000583</b> | 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. shroud UN |

For wiring diagrams, see pages [144–145](#).

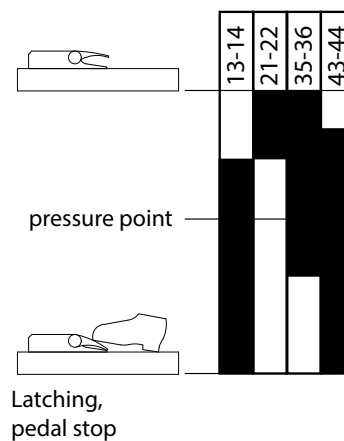


## Dimensional drawings

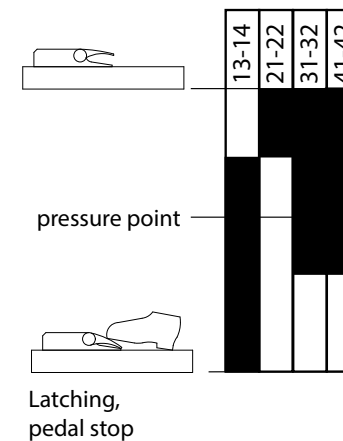
**6161000203**



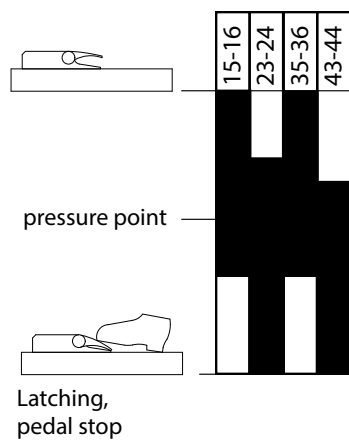
**6161000560**



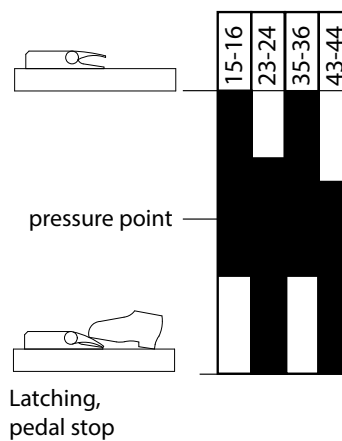
**6161000626**



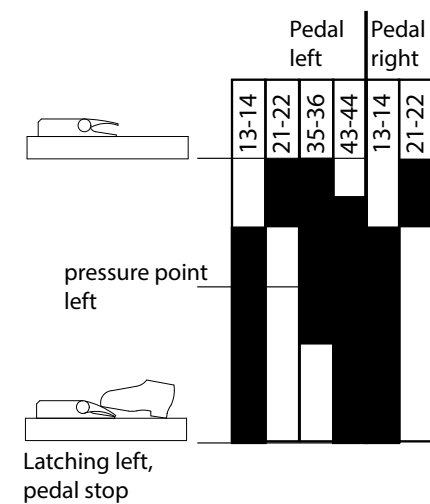
**6161000443**

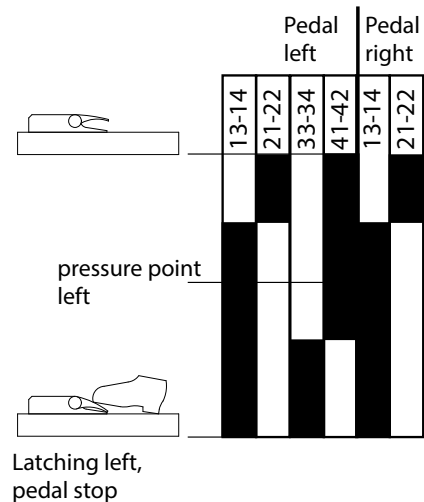
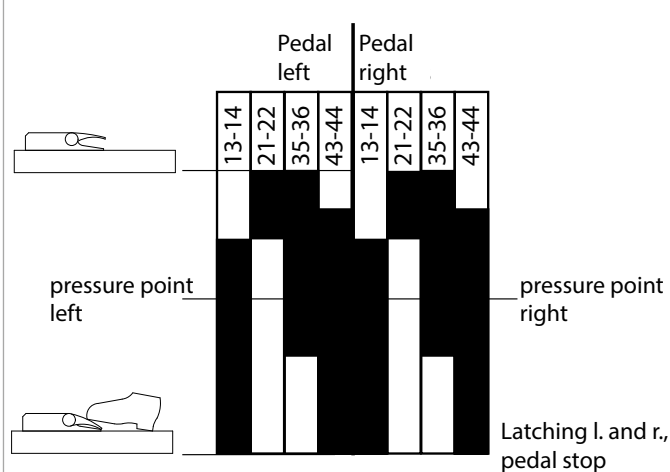
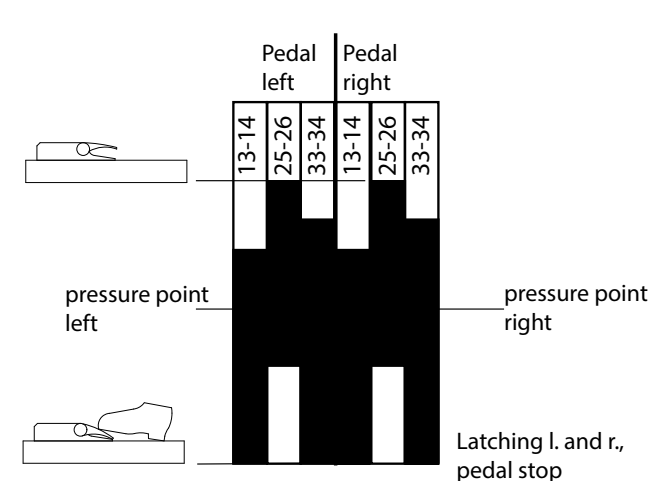
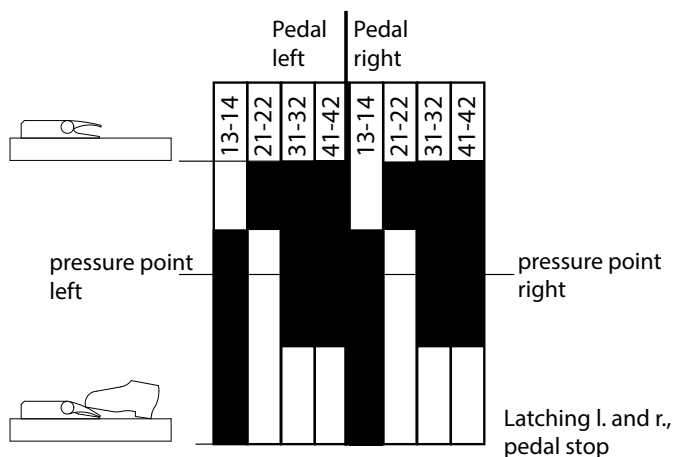
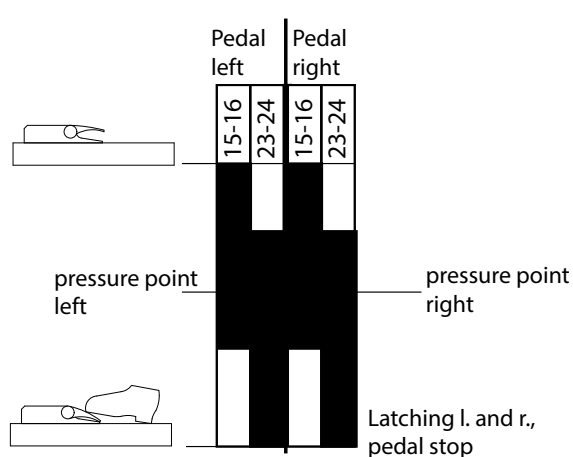
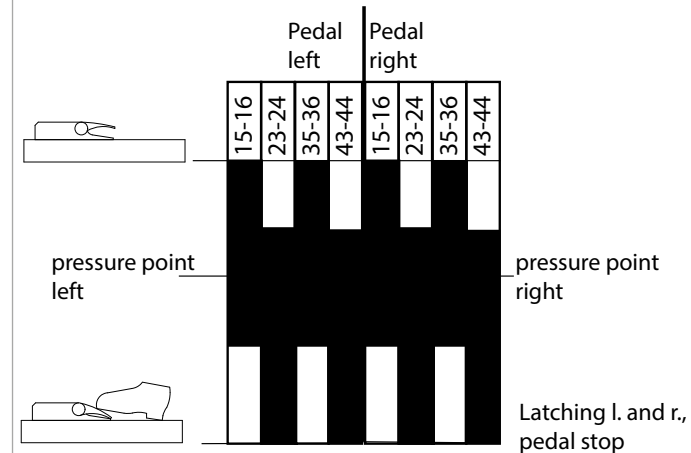


**6161000532**



**6162000486**



**6162000364**

**6162000553**

**6162000338**

**6162000709**

**6162000583**

**6162000817**


# Accessories

## Foot switches

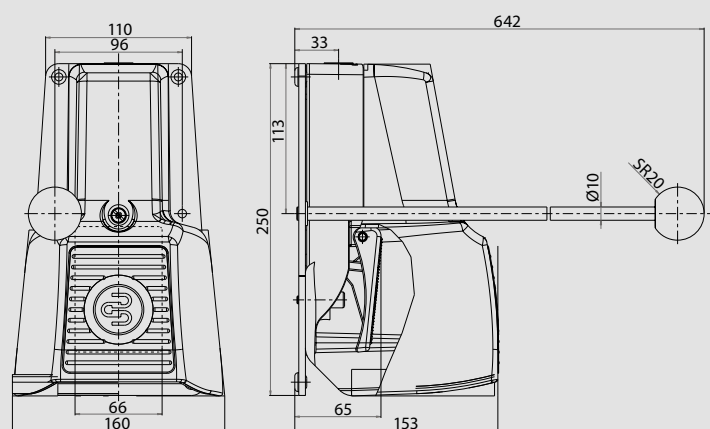
### Transport device

| Designation | Article number | Description                              |
|-------------|----------------|--|
| F1-TV       | 3996000229     | Transport device for foot switch 1-pedal |
| F2-TV       | 3996000230     | Transport device for foot switch 2-pedal |

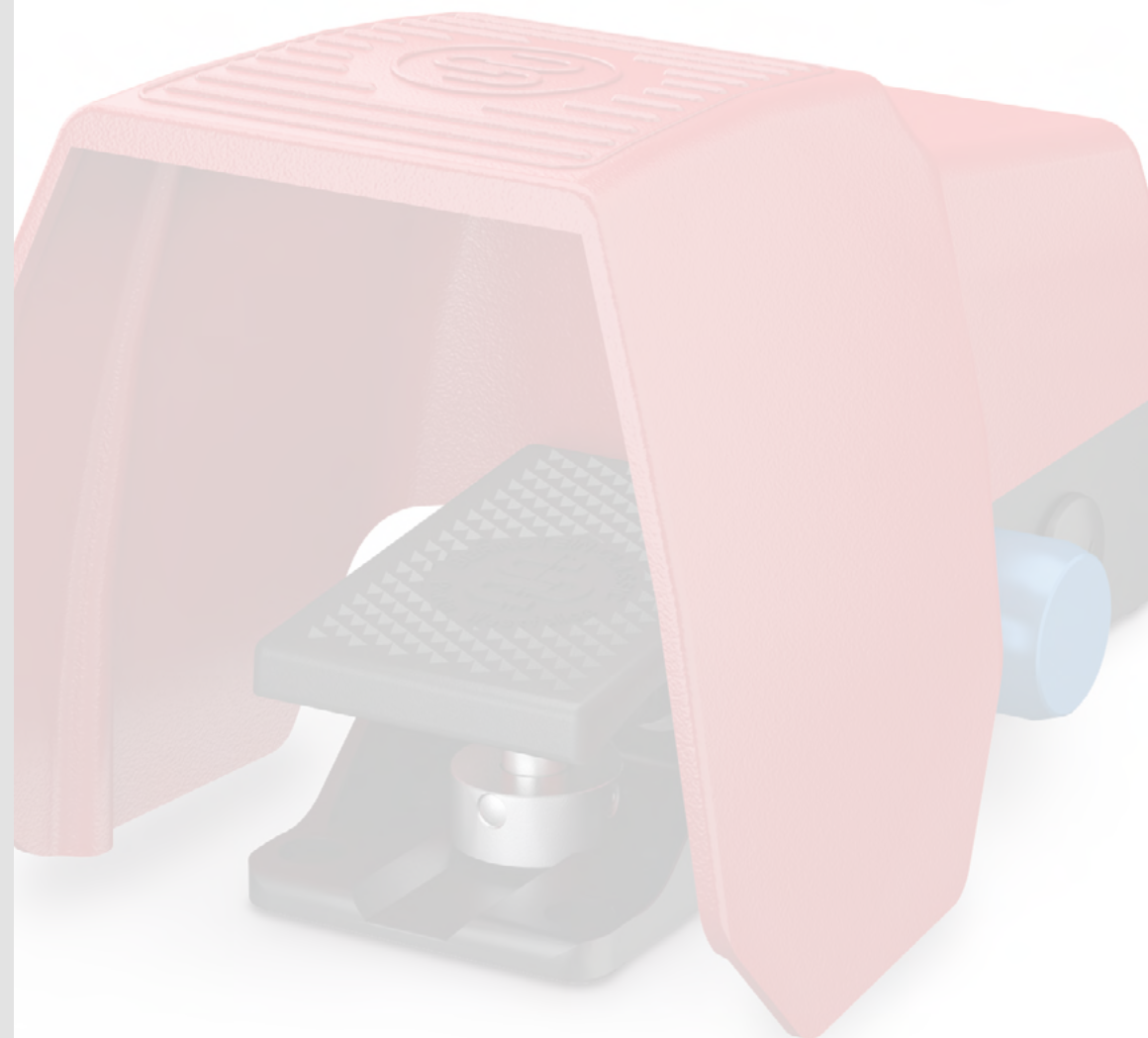
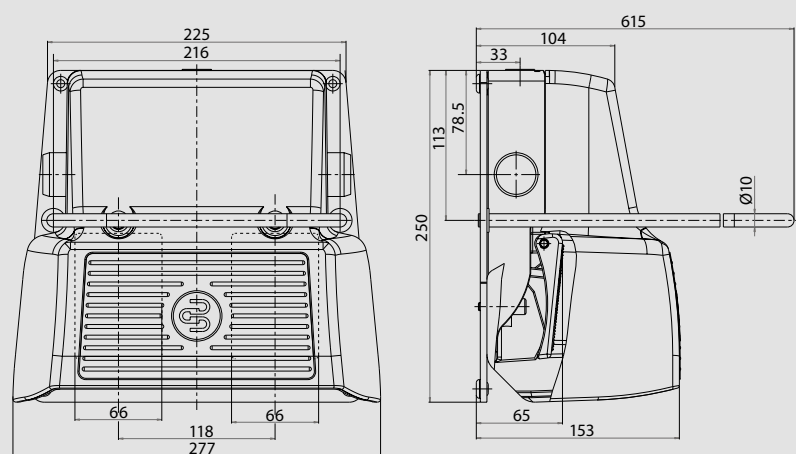
The transport device is available as an accessory set for the F1 and F2. Modifications to the foot control are not necessary, so that retrofitting is also possible.



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



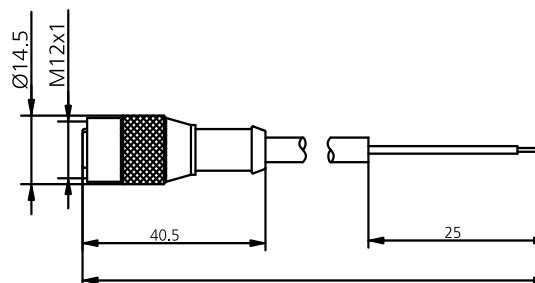
## 3-pole single-ended cordsets

### Product selection

| No. | Article number    | Designation             | Cable length | Connector/<br>alignment | Connector 1 | Connector 2 | Special feature | Use for following products |
|-----|-------------------|-------------------------|--------------|-------------------------|-------------|-------------|-----------------|----------------------------|
|     | <b>3251103234</b> | AN-KAB.SH5 5M AC GERADE | 5 m          | Straight                | F           |             | AC/ DC BG Type  | SH5                        |
|     | <b>3251103236</b> | AN-KAB.SH5 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<br>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

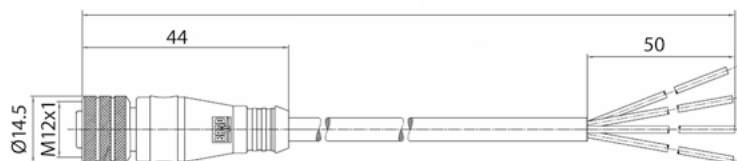
### 4-pole single-ended cordsets

| 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.SH53 4P 2M GERADE  | 2 m          | Straight            | F           |             | M12 BG Type     | 1              | - Standard and safe position switches with 4-pin M12 connector<br>- MAK-53 M12<br>- Connection for Smart Safety (pos. 3 of figure 1 on <a href="#">page 148</a> ) |
| 3                 | <b>3251004311</b> | AN-KAB.SH53 4P 5M GERADE  | 5 m          | Straight            | F           |             | M12 BG Type     | 1              |   |
| 3                 | <b>3251004312</b> | AN-KAB.SH53 4P 10M GERADE | 10 m         | Straight            | F           |             | M12 BG Type     | 1              |   |
| 3                 | <b>3251004313</b> | AN-KAB.SH53 4P 2M WINKEL  | 2 m          | Angle               | F           |             | M12 BG Type     | 1              |   |
| 3                 | <b>3251004314</b> | AN-KAB.SH53 4P 5M WINKEL  | 5 m          | Angle               | F           |             | M12 BG Type     | 1              |   |
| 3                 | <b>3251004315</b> | AN-KAB.SH53 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<br>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

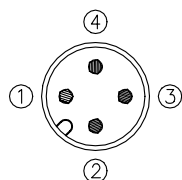
| No. | Article number    | Designation       | Cable length | Connector/alignment | Connector 1 | Connector 2 | Special feature | Technical data | Use for following products   |
|-----|-------------------|-------------------|--------------|---------------------|-------------|-------------|-----------------|----------------|------------------------------|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

### Technical data 2

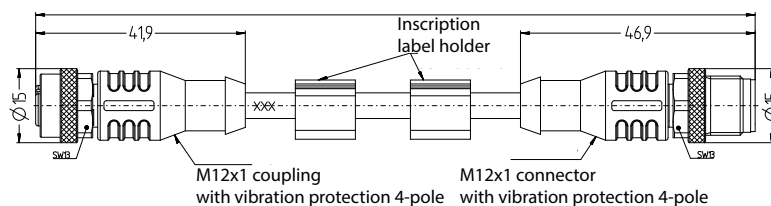
|  |  |
|--|--|
| Material core insulation/sheath              | PP/PUR   |
| Material overmoulding/contact carrier        | Plastic, TPU, BK   |
| Material union nut                           | Metal, CuZn, nickel-plated   |
| Rated voltage                                | 250 V  |
| Current carrying capacity per pin (at 40° C) | 4 A  |
| Temperature range                            | when cable is fix mounted -40°C to + 90°C<br>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

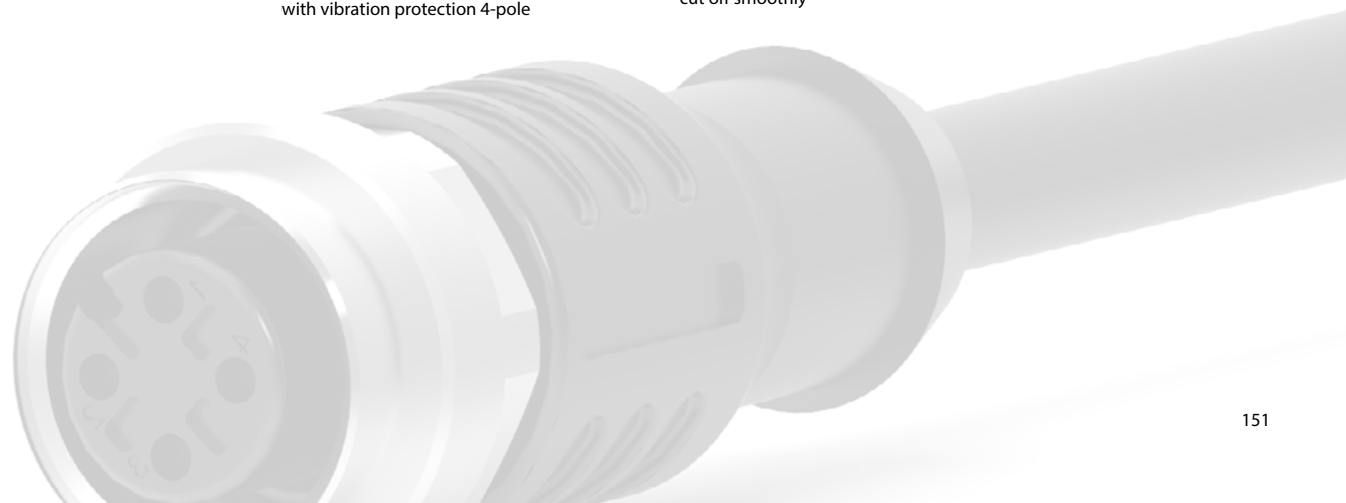
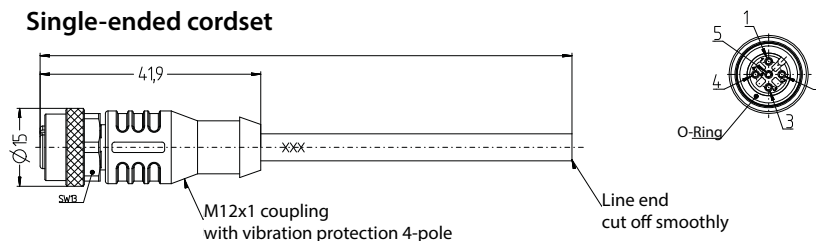
1 = brown  
2 = white  
3 = blue  
4 = black



### 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<br>(pos. 2 of figure 1 on <a href="#">page 148</a> ) |

## 5-pole double-ended cordsets

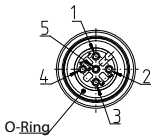
| Product selection |                |                    |              |                     |             |             |                 |                            |
|-------------------|----------------|--------------------|--------------|---------------------|-------------|-------------|-----------------|----------------------------|
| 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

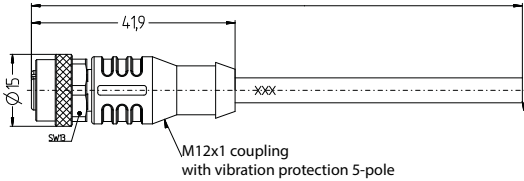
|  |  |
|--|--|
| Material core insulation/sheath              | PP/PUR   |
| Material overmoulding/contact carrier        | Plastic, TPU, BK   |
| Material union nut                           | Metal, CuZn, nickel-plated   |
| Rated voltage                                | 60 V   |
| Current carrying capacity per pin (at 40° C) | 4 A  |
| Temperature range                            | when cable is fix mounted -40°C to + 90°C<br>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

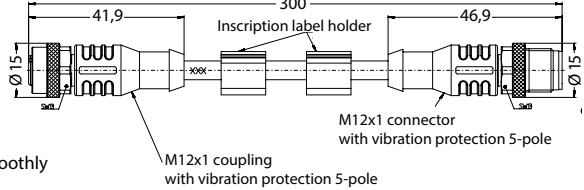
- 1 = brown
- 2 = white
- 3 = blue
- 4 = black
- 5 = grey



### Single-ended cordset



### Double-ended cordset

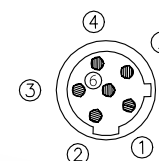
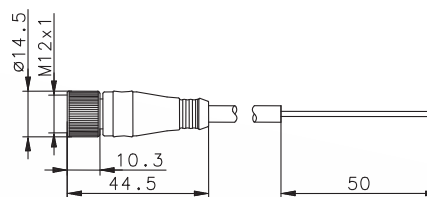


## 6-pole single-ended cordsets

| 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.SH53 2M GERADE  | 2 m          | Straight            | F           |             | M12 BG Type     | SH53                       |
|                   | <b>3251006292</b> | AN-KAB.SH53 5M GERADE  | 5 m          | Straight            | F           |             | M12 BG Type     |                            |
|                   | <b>3251006293</b> | AN-KAB.SH53 10M GERADE | 10 m         | Straight            | F           |             | M12 BG Type     |                            |
|                   | <b>3251006294</b> | AN-KAB.SH53 2M WINKEL  | 2 m          | Angle               | F           |             | M12 BG Type     |                            |
|                   | <b>3251006295</b> | AN-KAB.SH53 5M WINKEL  | 5 m          | Angle               | F           |             | M12 BG Type     |                            |
|                   | <b>3251006296</b> | AN-KAB.SH53 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<br>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           |             |                 | SRF-4 and 5, SLC, SLK      |
|                   | <b>6075689186</b> | SFW-M12A8/BW-5PU  | 5 m          | Straight            | F           |             |                 |                            |
|                   | <b>6075689187</b> | SFW-M12A8/BW-10PU | 10 m         | Straight            | F           |             |                 |                            |

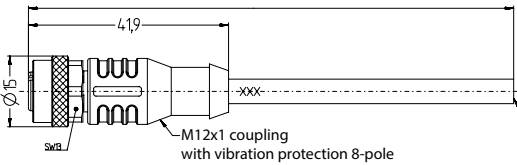
## 8-pole double-ended cordsets

| 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           |                 |   |

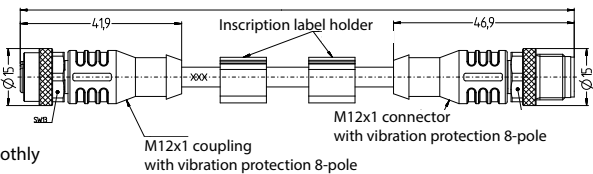
## Technical data

|  |  |
|--|--|
| 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<br>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

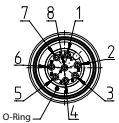


Double-ended cordset



Contact assignment  
AC/DC versions

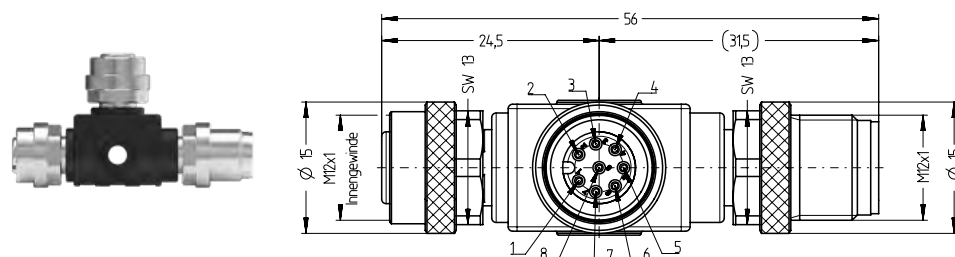
- 1 = white
- 2 = brown
- 3 = green
- 4 = yellow
- 5 = grey
- 6 = pink
- 7 = blue
- 8 = red



## Further accessories

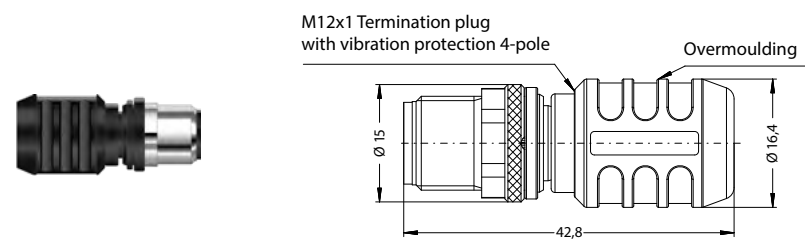
### T-adapter for series connection of the sensors

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



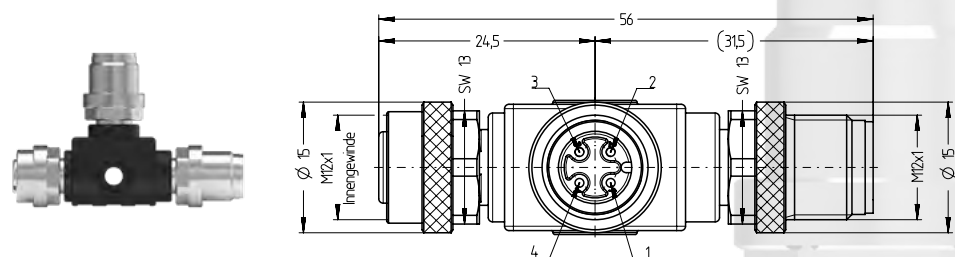
### Termination plug M12

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



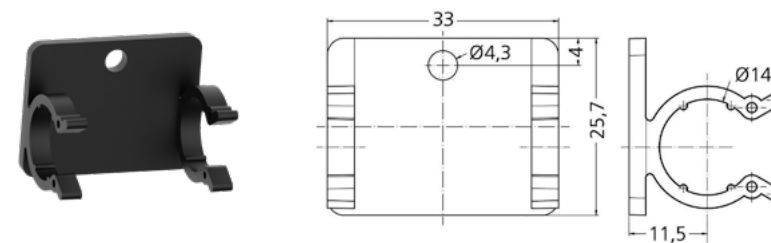
### T-adapter for connection IO-Link and reset button

| 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

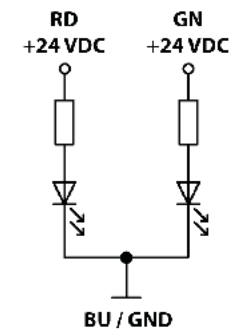
### Mechanical data

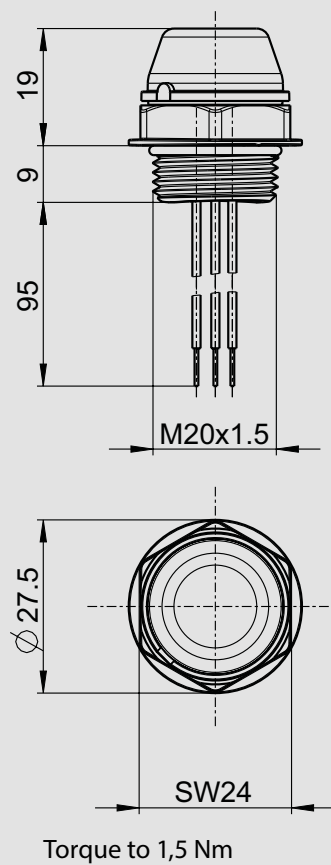
|                      |                               |
|----------------------|-------------------------------|
| Enclosure lower part | Plastic PC/ABS black          |
| Enclosure upper part | Plastic Lexan, PC transparent |
| O ring               | NBR (nitrile rubber)          |

### Electrical data

|                           |       |               |
|---------------------------|-------|---------------|
| Rated operating voltage   | $U_e$ | 24V $\pm$ 20% |
| Rated operational current | $I_e$ | 24 mA         |

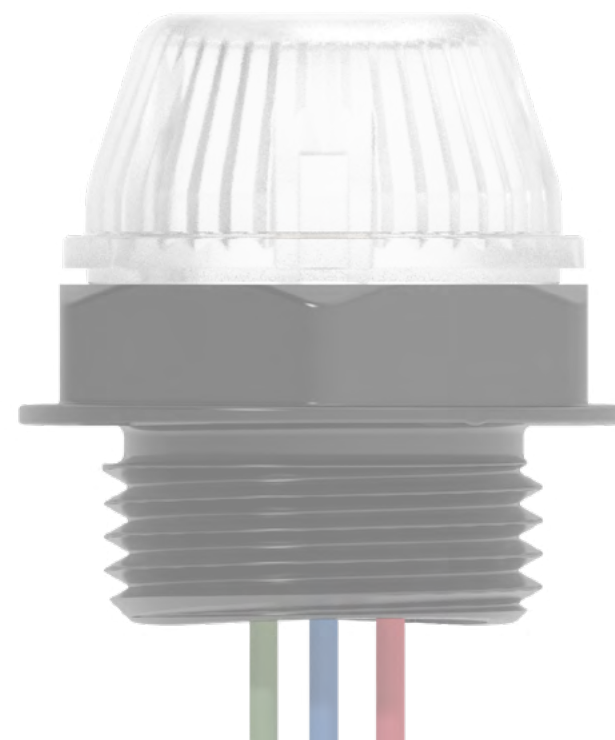
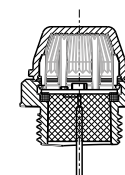
### Wiring Diagram





#### 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, DIN EN 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<br>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 6079000002 must be used.

Connector 4-pole

| Article number | Designation              |
|----------------|--------------------------|
| 6079000001     | STECKER 4P M12/M20 A-COD |

Technical drawing of the 4-pole connector. The side view shows a cylindrical body with an M12x1 thread on the left and an M20x1.5 thread on the right. Dimensions include a total length of 60 mm, a body diameter of 20.5 mm, and a mounting flange diameter of 23 mm. The front view shows four pins labeled 1, 2, 3, and 4. A legend indicates the pin colors: 1 BN, 2 WH, 3 BU, 4 BK.

### 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              |
|----------------|--------------------------|
| 6079000002     | STECKER 5P M12/M20 A-COD |

Technical drawing of the 5-pole connector. The side view shows a cylindrical body with an M12x1 thread on the left and an M20x1.5 thread on the right. Dimensions include a total length of 60 mm, a body diameter of 20.5 mm, and a mounting flange diameter of 23 mm. The front view shows five pins labeled 1, 2, 3, 4, and 5. A legend indicates the pin colors: 1 BN, 2 WH, 3 BU, 4 BK, 5 GY.

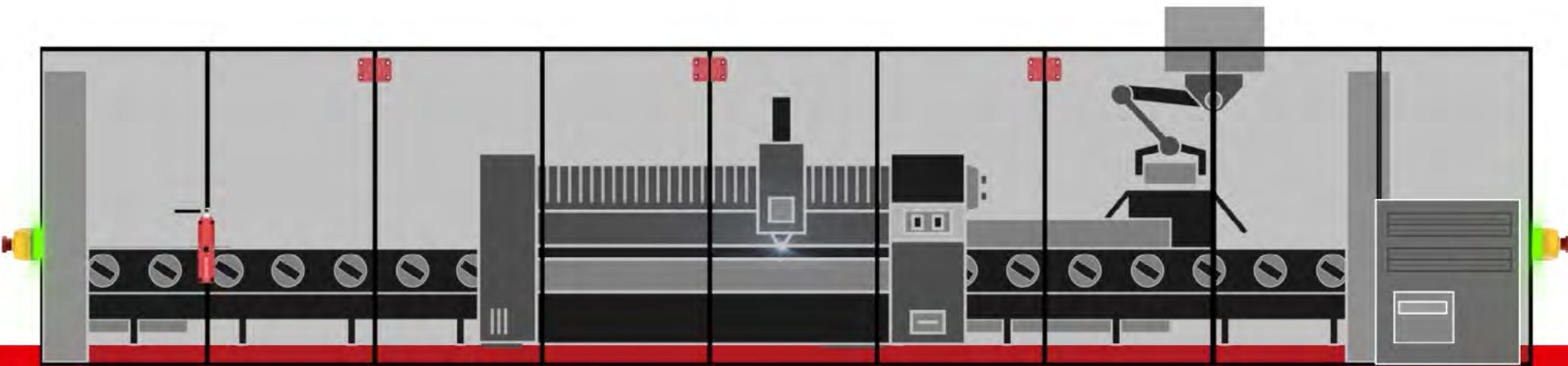
### Technical data

|  |  |
|--|--|
| 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.

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





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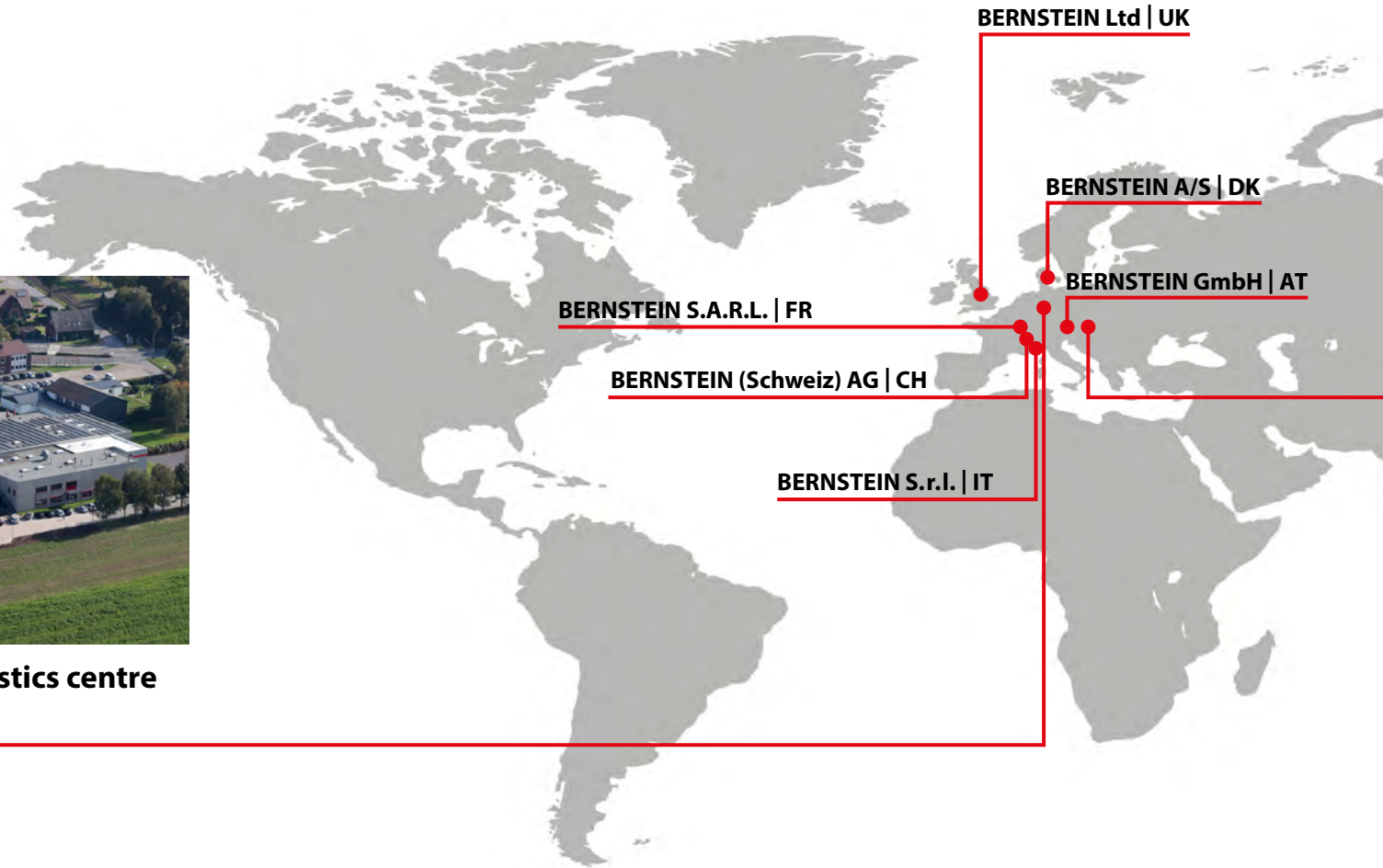
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**BERNSTEIN Safe Solutions  
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8  
4  
1

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