

# Safety in system: Protection for man and machine

Catalogue Safety Technology | Version 04



# Introduction



Heinz and Philip Schmersal,  
Managing directors of the Schmersal Group

## **Safety in system – Protection for man and machine**

Often, it is unavoidable that people have to intervene with the workings of a machine. When this is done the safety of the operator is imperative. This demands the responsibility of the machine operator, which is also required by the world's standards and guidelines for machine safety.

The Schmersal Group has concentrated for many years on safety at work with our products and solutions; today we can offer the industry the world's largest range of safety switchgear and systems for the protection of man and machine.

Under the guiding principle "Safety with system – protection for man and machine" we develop and produce products that carry the system concept and can be optimally integrated into the work processes. Because we are convinced that safety does not contradict higher productivity.

In our fields of activity we have a leading position due to our expertise, our innovative power and our comprehensive range of products. With this we follow a central theme: Together with you, we want to make the world a little safer. Talk to us – we look forward to working with you.

# Content

■ Content and Introduction	Page	1
■ Safety guard monitoring	Page	10
1. Safety switch with separate actuator	Page	10
2. Solenoid interlocks	Page	30
3. Key trapped systems	Page	56
4. Position switches	Page	76
5. Safety switches for hinged guards	Page	98
6. Safety sensors	Page	108
■ Command devices with safety function	Page	130
7. Pull-wire emergency stop switches	Page	130
8. EMERGENCY STOP control devices	Page	136
9. Control panels	Page	150
10. Enabling switches	Page	158
11. Safety foot switches	Page	162
12. Two-hand control panels	Page	166
■ Tactile safety devices	Page	174
13. Safety edges	Page	174
14. Safety mats	Page	182
■ Optoelectronic safety devices	Page	186
15. Safety light barriers	Page	192
16. Safety light grids / light curtains	Page	194
■ Safe signal processing	Page	212
17. Safety-monitoring modules	Page	212
18. Multi-functional compact safety modules	Page	248
19. Programmable modular safety controller	Page	254
■ System solutions	Page	260
20. AS-Interface Safety at Work	Page	260
21. SD-Interface	Page	268
22. Passive distribution modules and fieldboxes	Page	270
■ tec.nicum – Developed services relating to the machine safety and the industrial safety	Page	274
■ Appendix	Page	276
Connecting wires or interconnectors	Page	276
Product index – alphabetical	Page	282
Addresses	Page	284

# Chapter Overview

## Safety guard monitoring



1. Safety switch with separate actuator  
[Page 10](#)



2. Solenoid interlocks  
[Page 30](#)

## Command devices with safety function



7. Pull-wire emergency stop switches  
[Page 130](#)



8. EMERGENCY STOP control devices  
[Page 136](#)

## Tactile safety devices

## Optoelectronic safety devices

## Safe signal processing

## System solutions





3. Key trapped systems  
Page 56



4. Position switches  
Page 76



5. Safety switches for hinged guards  
Page 98



6. Safety sensors  
Page 108



9. Control panels  
Page 150



10. Enabling switches  
Page 158



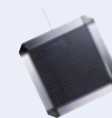
11. Safety foot switches  
Page 162



12. Two-hand control panels  
Page 166



13. Safety edges  
Page 174



14. Safety mats  
Page 182



15. Safety light barriers  
Page 192



16. Safety light grids / light curtains  
Page 194



17. Safety-monitoring modules  
Page 212



18. Multifunctional safety controller  
Page 248



19. Programmable modular safety controller  
Page 254



20. AS-Interface Safety at Work  
Page 260



21. SD-Interface  
Page 268



22. Passive distribution modules and fieldboxes  
Page 270

# Safety in system: Protection for man and machine



Safety switch  
with separate actuator



Safety solenoid  
interlocks



Safety sensors

This catalogue divides the entire program into eighteen categories and technologies. At the beginning of each chapter there is a summary of the area of application and the design and way of operation of about 25,000 different safety switchgear devices. Then follows the main technical specifications of the individual range of products.

## Invitation to information

Even if the catalogue is quite extensive with its 280 pages: It contains only the most important data of the safety switchgear and should offer the reader an overview of the overall programme and is the first step to help in making a selection. For every product group, every technology and every series there is detailed information both in print and from the online catalogue at [www.schmersal.net](http://www.schmersal.net). In addition, the worldwide network of Schmersal sales engineers as well as trading partners are available for further questions.

## Diversity as a principle

The catalogue shows the versatility of the Schmersal program when it comes to machine safety. The diversity is a principle according to which the Schmersal Group organizes and structures its cooperation with customers in the industry. For every conceivable situation for safeguarding against hazards and hazardous areas the user should be offered the optimal Technical Safety solution.

## From product to system

Based on the wide range of products – this is another principle of the market strategy of Schmersal – system solutions can be configured for example, from one or more different safety switchgear devices and the related evaluation of the safety-related signals. Here, the Schmersal programme offers not only safety relay modules but also different types of safety controllers as well as components for the system solution AS-Interface Safety at Work.

In addition, there are installation systems and installation aids for simple system integration of Schmersal safety switchgear for fast and thereby cost-effective wiring of safety switchgear in series. The solutions come either as passive distribution modules or field boxes or as versions for parallel IO wiring or wiring with the SCHMERSAL SD interface. All versions are designed for mixed series connection of different types of electronic safety switchgear, such as sensors and interlocks.



Optoelectronic safety devices



Safe signal processing



Command devices with safety function

### **The right solutions for every industry**

In addition, the Schmersal group has developed product lines for end-to-end solutions for defined target industries – such as for the packaging industry, the food industry, heavy industry, and Lift Technology. In these industries there are for example the specific requirements that apply to hygiene (food technology), on the durability of the switchgear in extreme conditions (heavy industry) or in the normative legislation (Lift Technology).

### **"Safety Services" – qualified services**

In recent years, the Schmersal Group has taken a comprehensive portfolio of professional services into the program and has a systematic approach – the cooperation with specialised engineering offices (in the CE-network), the construction of a large convention centre (the tec.nicum in Wuppertal), the qualification of certified "Functional Safety Engineers" in about 20 nations, and the creation of a new service department at the individual sites and markets.

Whatever service the machine manufacturer or the owner use: They benefit from the extensive know-how of the Schmersal group, not only when it comes to the content and understanding, but above all with the practical implementation of the contents of the individual standards for machine safety. This applies both to the customer specific programming of safety controllers (Application Engineering) as well as for the support for the CE conformity assessment procedures and the consultancy available for the safety optimisation of existing equipment (Application Consulting).

### **Comprehensive quality insurance to 2006/42/EC**

Schmersal is a certified company to appendix X of the Machinery Directive. As a result, Schmersal is entitled to autonomously conduct the conformity assessment procedure for the products listed in Appendix IV of the MD without involving a notified body. The prototype test certificates are available upon request or can be downloaded from the Internet at [www.schmersal.net](http://www.schmersal.net).

### **For good collaboration!**

If after you have reviewed the catalogue you require more information on the individual product lines or you have specific questions, please contact the worldwide Schmersal network. It is quick and you have the possibility to receive more and varied in-depth information. We look forward to working closely with you.

# History

## Milestones 1945 – 2016



Schmersal Brazil 1974



Schmersal China 2013



Startup of the new central warehouse in 2013

1945

The brothers Kurt Andreas Schmersal and Ernst Schmersal **form the company** in Wuppertal.

1950s

The **product portfolio** is continuously expanded. Many switchgears are used in safety related applications such as in explosive areas.

1970s

Schmersal is one of the first companies to begin development and production of **electronic proximity switches**.

1974

**ACE Schmersal** is formed in Boituva, Brazil.

1982

**Generational change:** Heinz and Stefan Schmersal take over the company from their fathers.

1997

**ELAN Schaltelemente GmbH & Co. KG** based in Wettenberg is acquired.

1999

The production facility **Schmersal Industrial Switchgear Co. Ltd** (SISS) is formed in Shanghai, China.

2007

Philip Schmersal joins the **third generation of the** Schmersal Group.

2008

In October 2008 the Schmersal Group takes over **Safety Control GmbH** and its affiliate Protec GmbH in Mühldorf/Inn.

2013

**Böhnke + Partner Steuerungssysteme GmbH** is acquired.  
**Schmersal India** becomes a production facility.  
Startup of the new **European central warehouse** in Wuppertal.

2015

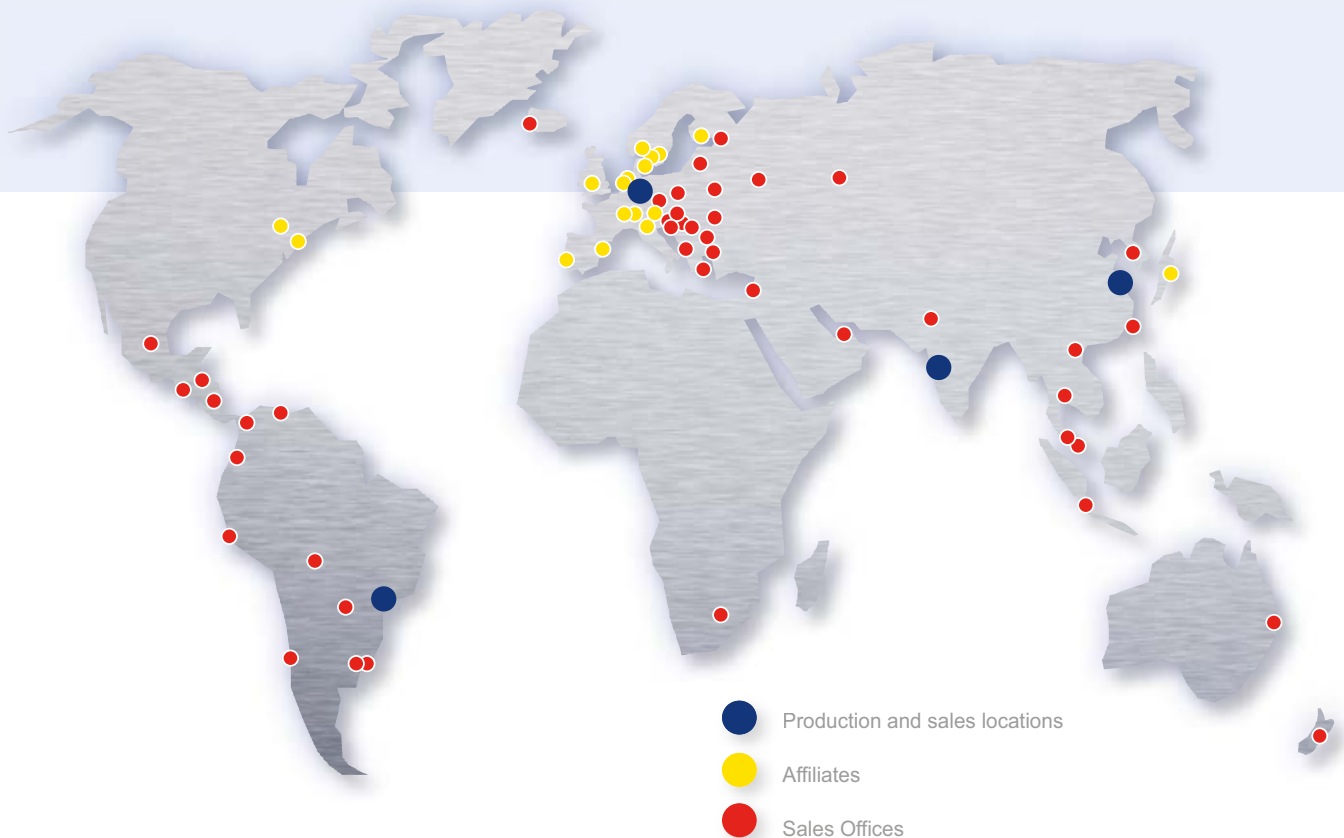
In 2015, the Schmersal Group celebrated its **70th anniversary**.

Schmersal Böhnke+Partner move into a **new production and office building** in Bergisch Gladbach.

2016

The Schmersal Group is establishing its own business area for services under the name **tec.nicum**.

## Schmersal worldwide



With its own affiliates in around 20 countries and capable sales and service partners in 30 more countries, the Schmersal Group has operations worldwide.

We started quite early with the internationalisation of sales, consultancy and production. This is also one of the reasons that we are a favoured global partner for machinery and plant construction and also an approved partner for many medium sized engineering companies with local presence. Wherever there are machines that work with Schmersal safety switches, the nearest branch or representative is not far away.

- |   |                                    |                                 |
|---|------------------------------------|---------------------------------|
| ■ Germany, Wuppertal                      | ■ Argentina, Buenos Aires          | ■ Paraguay, Minga Guazú         |
| ■ Germany, Wettenberg                     | ■ Australia, Brisbane              | ■ Peru, Lima                    |
| ■ Germany, Mühldorf                       | ■ Baltic States, Kaunas            | ■ Poland, Warsaw                |
| ■ Germany, Bergisch Gladbach              | ■ Bolivia, Santa Cruz de la Sierra | ■ Romania, Sibiu                |
| ■ Brazil, Boituva                         | ■ Bulgaria, Ruse City              | ■ Russia, Moscow                |
| ■ China, Shanghai                         | ■ Chile, Santiago                  | ■ Serbia, Belgrade              |
| ■ India, Pune                             | ■ Ecuador, Quito                   | ■ Singapore, Singapore          |
|   | ■ Greece, Athens                   | ■ Slovenia, Ljubljana           |
| ■ Belgium, Aarschot                       | ■ Guatemala, Guatemala-City        | ■ South Africa, Johannesburg    |
| ■ Denmark, Ballerup                       | ■ Indonesia, Jakarta               | ■ Taiwan, Taichung              |
| ■ Finland, Helsinki                       | ■ Iceland, Reykjavik               | ■ Thailand, Bangkok             |
| ■ France, Seyssins                        | ■ Israel, Petach Tikva             | ■ Czech Republic, Prague        |
| ■ United Kingdom, Malvern, Worcestershire | ■ Kazakhstan, Ayrán                | ■ Turkey, Istanbul              |
| ■ Italy, Borgosatollo                     | ■ Colombia, Medellín               | ■ Ukraine, Kiev                 |
| ■ Japan, Tokyo                            | ■ South Korea, Seoul               | ■ Hungary, Győr                 |
| ■ Canada, Brampton                        | ■ Croatia, Zagreb                  | ■ Uruguay, Montevideo           |
| ■ Netherlands, Harderwijk                 | ■ Malaysia, Rawang                 | ■ United Arab Emirates, Sharjah |
| ■ Norway, Oslo                            | ■ Macedonia, Skopje                | ■ Venezuela, Caracas            |
| ■ Austria, Vienna                         | ■ Mexico, Mexico City              | ■ Vietnam, Hanoi                |
| ■ Portugal, Póvoa de Sta. Iria            | ■ New Zealand, Christchurch        | ■ Belarus, Minsk                |
| ■ Sweden, Mölnlycke                       | ■ Pakistan, Islamabad              |                                 |
| ■ Switzerland, Arni                       |                                    |                                 |
| ■ Spain, Barcelona                        |                                    |                                 |
| ■ USA, Tarrytown NY                       |                                    |                                 |

# Schmersal Worldwide

## Offices in Germany

### Wuppertal



#### K.A. Schmersal GmbH & Co. KG

- Founded in 1945
- Around 700 employees

#### Focal points

- Headquarters of the Schmersal Group
- Development and manufacture of switchgears and switching systems for safety, automation and lift engineering
- Accredited test laboratory
- Central research and development
- Logistics centre for European markets

### Wettenberg



#### K.A. Schmersal GmbH & Co. KG

- Founded in 1952 (1997)
- Around 180 employees

#### Focal points

- Development and manufacture of switchgears for operation and monitoring, safety-related relay modules and controls as well as switchgears for explosion protection

### Mühdorf / Inn



#### Safety Control GmbH

- Founded in 1994 (2008)
- Around 30 employees

#### Focal points

- Development and manufacture of optical electronic components for safety and automation engineering

### Bergisch Gladbach



#### Böhnke + Partner GmbH Steuerungssysteme

- Founded in 1991 (2013)
- Around 70 employees

#### Focal points

- Development and manufacture of components, controls and remote diagnostic systems for the lift industry

( ) = inclusion in the Schmersal Group

# Schmersal Worldwide

## International Offices

### Boituva / Brazil



#### ACE Schmersal

- Founded in 1974
- Around 400 employees

#### Focal points

- Manufacture of electromechanical and electronic switchgears
- Customer-specific control systems for the North and South American market

---

### Shanghai / China



#### Schmersal Industrial Switchgear Co. Ltd

- Founded in 1999
- Around 165 employees

#### Focal points

- Development and manufacture of switchgears for safety, automation and lift engineering for the Asian market

---

### Pune / India



#### Schmersal India Private Limited

- Founded in 2013
- Around 60 employees

#### Focal points

- Development and manufacture of switchgears for safety, automation and lift engineering for the Indian market

# 1. Safety switch with separate actuator

## Description

### Area of application

Safety switches with separate actuators are widely used in the entire production. For example, they are used in almost all types of machine tools. A major reason for this is that these types of safety switches offer certain benefits when frequent access to the danger point is required for the purpose of operating machinery, repairing faults, or setting-up.

They are suitable for monitoring the position of hinged, sliding and especially for removable safety guards, which need to be closed to ensure the necessary operational safety. They are also suitable for fitting onto profile sections and existing equipment.

### Design and way of functioning

In contrast to position switches (type 1 switch), the safety switches with class 2 – according to ISO 14119 – do not have the switching element and actuator physically connected. When switching they are functionally brought together or separated. If the operator opens the safety door, the actuator is separated from the base unit. This causes the safety switch NC contacts to be opened and the NO contacts closed.

The Schmersal Group offers in this core area of its product range, an extraordinarily wide range of different product ranges. They differ, for example by their design and size, the materials used, the integration of additional functions as well as by the number of safety contacts and the connection type.

Safety switches are designed so that when they are installed their function cannot be easily changed or bypassed with simple aids (which includes, by definition, normal every day tools, nails, straight or simply curved wire pieces). If even higher demands on manipulation protection is required, there are product ranges available with individual coding. For these product ranges, there are different types of actuators that are matched by the key-lock principle. Therefore you can almost exclude the fact that the operator is able to obtain a replacement actuator.





All class 2 safety switches shown in this section correspond to at least IP67 protection type and can be used in conjunction with an appropriate safety relay module that reach the performance level d and e according to ISO 13849-1. Information for the selection of suitable safety relay modules can be found in the chapter "Safety relay modules" (refer to page 212).

The electromechanical safety switches AZ 16 and AZ 17 are also available as individually coded versions with more than 1,000 different coding variants, achieving coding level "high" in accordance with ISO 14119.

To do this, the switch is supplied with the corresponding actuator, which is specially adapted to the respective switch. Manipulation by a substitute actuator is not possible.

Included in the Schmersal Group safety switch range includes versions with integrated AS-i SaW interface (AS-Interface Safety at Work). They take advantage of the simple and proven bus system based on the open standards AS-International and can be integrated over the appropriate system modules in parent communication networks ("Safety Integrated" / "Separated Safety").

Also available are ATEX certified versions. They allow the use in potentially explosive environments.

# 1. Safety switch with separate actuator

## Overview of the series



■ AZ 15



■ AZ 16



■ AZ 17

### Key Features

- Thermoplastic enclosure
- 1 contact
- 4 actuator slots
- 3 cable entries
- Screw terminals or connector

- Thermoplastic enclosure
- Up to 3 contacts
- Individual coding possible
- 4 actuator slots
- 3 cable entries
- Screw terminals or connector

- Thermoplastic enclosure
- 2 contacts
- Individual coding possible
- Small body
- incl. cable gland
- Screw terminals or connector













### Other versions

<b>ATEX / IECEx</b>	-	■	-
<b>AS-i SaW</b> (refer to page 260)	-	■	-
<b>SD-Interface</b> (refer to page 268)	-	-	-

### Technical features

<b>Electrical characteristics</b>			
<b>Operating voltage</b>	-	-	-
<b>Power consumption</b>	-	-	-
<b>Max. switching capacity U/I</b>	230 VAC / 4 A	230 VAC / 4 A	230 VAC / 4 A
<b>Mechanical data</b>			
<b>Dimensions (W x H x D)</b>	52 x 75 x 30 mm	52 x 90 x 30 mm	30 x 85 x 30 mm
<b>Ambient conditions</b>			
<b>Ambient temperature</b>	-30 °C ... +80 °C	-30 °C ... +80 °C	-30 °C ... +80 °C
<b>Protection class</b>	IP67	IP67	IP67
<b>Actuator and accessories refer to ...</b>	page 16	page 16	page 19

### Safety classification

<b>Standards</b>	ISO 13849-1	ISO 13849-1	ISO 13849-1
<b>B<sub>10D</sub> NC contact</b>	2,000,000	2,000,000	2,000,000
<b>PL/ SIL</b>	-/-	-/-	-/-
<b>Category</b>	-	-	-
<b>PFH</b>	-	-	-
<b>Certificates</b>	   	   	   



To get detailed information about the products and certificates, visit [www.schmersal.net](http://www.schmersal.net).



■ AZ 3350



■ AZ 415



■ AZ 201

- Metal enclosure
- Up to 3 contacts
- Actuator heads can be repositioned in steps 4 x 90°
- Robust design
- 1 cable entry
- Screw terminals

- Metal enclosure
- Up to 6 contacts
- Robust design
- Screw terminals

- Thermoplastic enclosure
- Individual coding possible
- 2 safe semi-conductor outputs
- Large horizontal and vertical misalignment
- Optimised for mounting on 40 mm profiles
- Screw terminal or cage clamp or connector

■	■	-
-	-	-
-	-	■



-	-	24 VDC
-	-	0.2 A (without load)
230 VAC / 4 A	230 VAC / 4 A	24 VDC / 0.25 A
40.5 x 114 x 38 mm	84.6 x 103.6 x 46.5 mm	40 x 220 x 50 mm
-30 °C ... +90 °C	-25 °C ... +70 °C	-25 °C ... +80 °C
IP67	IP67	IP66, IP67
page 22	page 24	page 26

ISO 13849-1	ISO 13849-1	ISO 13849-1, IEC 61508
2,000,000	2,000,000	-
-/-	-/-	e/3
-	-	4
-	-	1.9 x 10 <sup>-9</sup> / h



# 1. Safety switch with separate actuator

## Preferred types

Series	Coding	Termination	Contacts or outputs	Latching force	Included in delivery	Type designation	Material number			
<b>AZ 15</b> 	Standard coding	Screw terminals	1 NC	---	---	AZ 15ZVK-M16	101152787			
				5 N		AZ 15ZVK-M20	101157375			
				30 N		AZ 15ZVRK-M16-2254	101151298			
						AZ 15ZVRK-M20-2254	101164455			
						AZ 15ZVRK-M16	101153619			
						AZ 15ZVRK-M20	101157376			
<b>AZ 16</b> 	Standard coding	Screw terminals	1 NO / 1 NC	---	---	AZ 16ZVK-M16	101152887			
				5 N		AZ 16ZVRK-M16-2254	101167057			
				30 N		AZ 16ZVRK-M20-2254	101161097			
						AZ 16ZVRK-M16	101152094			
						AZ 16ZVRK-M20	101157379			
						2 NC	---	AZ 16-02ZVK-M16	101154699	
			5 N	AZ 16-02ZVK-M20	101157377					
			30 N	AZ 16-02ZVRK-M16-2254	101156104					
				AZ 16-02ZVRK-M20-2254	101161096					
				AZ 16-02ZVRK-M16	101147145					
				AZ 16-02ZVRK-M20	101157381					
			3 NC	---	AZ 16-03ZVK-M16	101155113				
				5 N	AZ 16-03ZVK-M20	101157372				
				30 N	AZ 16-03ZVRK-M16-2254	101164458				
					AZ 16-03ZVRK-M20-2254	101164459				
					AZ 16-03ZVRK-M16	101154220				
					AZ 16-03ZVRK-M20	101157374				
			1 NO / 2 NC	---	AZ 16-12ZVK-M16	101152725				
				5 N	AZ 16-12ZVK-M20	101157371				
				30 N	AZ 16-12ZVRK-M16-2254	101153566				
					AZ 16-12ZVRK-M20-2254	101164456				
					AZ 16-12ZVRK-M16	101154221				
					AZ 16-12ZVRK-M20	101157373				
			Connector	1 NO / 1 NC	30 N	---	AZ 16ZVRK-ST	101143124		
			Individual coding	Screw terminals	3 NC	1 NO / 2 NC	---	Actuator B1	AZ 16-03ZIB1-M16	101150055
									AZ 16-03ZIB1-M20	101150637
									AZ 16-12ZIB1-M16	101150050
									AZ 16-12ZIB1-M20	101150623
								Actuator B6L	AZ 16-12ZIB6L-M16	103005854
								Actuator B6R	AZ 16-12ZIB6R-M16	103005855

A variety of other types of safety switches with separate actuators can be found at [www.schmersal.net](http://www.schmersal.net)

# 1. Safety switch with separate actuator

## Preferred types

Series	Coding	Termination	Contacts or outputs	Latching force	Included in delivery	Type designation	Material number	
<b>AZ 17</b> 	Standard coding	Cut clamps	1 NO / 1 NC	5 N	---	<b>AZ 17-11ZK</b>	<b>101121960</b>	
			2 NC			<b>AZ 17-02ZK</b>	<b>101121961</b>	
		Connector	1 NO / 1 NC	30 N	---	<b>AZ 17-02ZRK</b>	<b>101133968</b>	
				5 N		<b>AZ 17-11ZRK-ST</b>	<b>101140774</b>	
			2 NC	30 N	---	<b>AZ 17-02ZK-ST</b>	<b>101140773</b>	
				30 N		<b>AZ 17-02ZRK-ST</b>	<b>101140775</b>	
	Individual coding	Cut clamps	1 NO / 1 NC	5 N	---	Actuator B1	<b>AZ 17-11ZIB1</b>	<b>101121962</b>
						Actuator B5	<b>AZ 17-11ZIB5</b>	<b>101122853</b>
						Actuator B6L	<b>AZ 17-11ZIB6L</b>	<b>101122857</b>
			Actuator B6R			<b>AZ 17-11ZIB6R</b>	<b>101122855</b>	
			30 N			Actuator B5	<b>AZ 17-11ZRIB5</b>	<b>101136305</b>
						Actuator B6L	<b>AZ 17-11ZRIB6L</b>	<b>101136307</b>
		Actuator B6R		<b>AZ 17-11ZRIB6R</b>	<b>101136306</b>			
		2 NC	5 N	30 N	Actuator B5	<b>AZ 17-02ZIB5</b>	<b>101122854</b>	
					Actuator B6L	<b>AZ 17-02ZIB6L</b>	<b>101122858</b>	
			Actuator B6R		<b>AZ 17-02ZIB6R</b>	<b>101122856</b>		
Actuator B1	<b>AZ 17-02ZRIB1</b>		<b>101136308</b>					
Actuator B5	<b>AZ 17-02ZRIB5</b>	<b>101136309</b>						
Actuator B6L	<b>AZ 17-02ZRIB6L</b>	<b>101136311</b>						
Actuator B6R	<b>AZ 17-02ZRIB6R</b>	<b>101136310</b>						
<b>AZ 3350</b> 	Standard coding	Screw terminals	1 NO / 2 NC	---	---	<b>AZ 3350-12ZUEK</b>	<b>101214053</b>	
			3 NC			<b>AZ 3350-03ZK</b>	<b>101214052</b>	
<b>AZ 415</b> 	Standard coding	Screw terminals	4 NC	80 ... 400 N	---	<b>AZ 415-02/02ZPK-M20</b>	<b>101164609</b>	
			2 NO / 2 NC			<b>AZ 415-11/11ZPK-M20</b>	<b>101154000</b>	
			3 NO / 3 NC			<b>AZ 415-33ZPK-M20</b>	<b>101164612</b>	
<b>AZ 201</b> 	Standard coding	Cage clamps	Diagnostic output and 2 safety outputs, all p-type	30 N	---	<b>AZ201CC-T-1P2P</b>	<b>103015814</b>	
		Screw terminals				<b>AZ201SK-T-1P2P</b>	<b>103015815</b>	
		Connector				<b>AZ201ST2-T-1P2P</b>	<b>103015816</b>	
	Individual coding	Cage clamps				<b>AZ201-I2-CC-T-1P2P</b>	<b>103015817</b>	
		Screw terminals				<b>AZ201-I2-SK-T-1P2P</b>	<b>103015818</b>	
		Connector				<b>AZ201-I2-ST2-T-1P2P</b>	<b>103015819</b>	

# 1. Safety switch with separate actuator

## AZ 15/16 – Selection of the actuators



Actuator type	Actuator description	Designed for					Type designation	Material number
			R <sub>min</sub> [mm]	d [mm]	R <sub>min</sub> [mm]	d [mm]		
Flexible actuator	Standard		---	---	45	11	AZ 15/16-B2	101095558
	With magnetic latch		---	---	45	11	AZ 15/16-B2-1747	101096089
	Standard		32	11	---	---	AZ 15/16-B3	101095550
	With magnetic latch		32	11	---	---	AZ 15/16-B3-1747	101096090
	Standard		25	11	38	11	AZ 15/16-B6	101137434
Straight actuator	Standard		---	---	---	---	AZ 15/16-B1	101083036
	With magnetic latch		---	---	---	---	AZ 15/16-B1-1747	101093553
	With slot lip-seal		---	---	---	---	AZ 15/16-B1-2024	101108278
	With ball latch		---	---	---	---	AZ 15/16-B1-2053	101111081
	With centering guide		---	---	---	---	AZ 15/16-B1-2177	101126794
	With rubber mountings		---	---	---	---	AZ 15/16-B1-2245	101137408

**Actuating radii** The axis of the hinge must be d [mm] above and in a parallel plane to the top surface of the safety switch. The basis setting provides a minimum radius of R<sub>min</sub> [mm].


- Key**
- Actuating radius over the small edge of the actuator
  - Actuating radius over the wide edge of the actuator
  - Sliding and removable safety guards
  - Hinged safety guards

Actuators must be ordered separately.

# 1. Safety switch with separate actuator

## AZ 15/16 – Actuators and accessories



AZ 15/16-B1 *	101083036	AZ 15/16-B1-1747 *	101093553	AZ 15/16-B1-2024 *	101108278
 <ul style="list-style-type: none"> <li>■ Straight actuator</li> <li>■ Also with individual coding *</li> </ul>	 <ul style="list-style-type: none"> <li>■ Straight actuator with magnetic latch</li> <li>■ Also with individual coding *</li> <li>■ Holding force approx. 30 N</li> </ul>	 <ul style="list-style-type: none"> <li>■ Straight actuator with slot lip-seal</li> <li>■ Also with individual coding *</li> <li>■ For protection against the ingress of dirt</li> </ul>			
AZ 15/16-B1-2053 *	101111081	AZ 15/16-B1-2177 *	101126794	AZ 15/16-B1-2245	101137408
 <ul style="list-style-type: none"> <li>■ Straight actuator with ball latch</li> <li>■ Also with individual coding *</li> <li>■ Holding force approx. 100 N</li> </ul>	 <ul style="list-style-type: none"> <li>■ Straight actuator with centering guide</li> <li>■ Also with individual coding *</li> <li>■ For light non precisely guided doors (flexing etc.)</li> </ul>	 <ul style="list-style-type: none"> <li>■ Actuator with rubber mounting</li> </ul>			
AZ 15/16-B2	101095558	AZ 15/16-B2-1747	101096089	AZ 15/16-B3	101095550
 <ul style="list-style-type: none"> <li>■ Flexible actuator</li> <li>■ For small actuating radius over the wide edge of the actuator (adjustable)</li> </ul>	 <ul style="list-style-type: none"> <li>■ Flexible actuator with magnetic latch</li> <li>■ Holding force approx. 30 N</li> </ul>	 <ul style="list-style-type: none"> <li>■ Flexible actuator</li> <li>■ For small actuating radius over the small edge of the actuator (adjustable)</li> </ul>			

\* The actuators with individual coding cannot be delivered individually.

# 1. Safety switch with separate actuator

## AZ 15/16 – Actuators and accessories



<b>AZ 15/16-B3-1747</b> 101096090	<b>AZ 15/16-B6</b> 101137434	<b>SZ 16/335</b> 101110500
 <ul style="list-style-type: none"> <li>■ Flexible actuator with magnetic latch</li> <li>■ Holding force approx. 30 N</li> </ul>	 <ul style="list-style-type: none"> <li>■ Flexible actuator</li> <li>■ For small actuating radius over the wide or small edge of the actuator (adjustable)</li> </ul>	 <ul style="list-style-type: none"> <li>■ To prevent inadvertent closing, e.g. during maintenance</li> <li>■ Attachment of up to 6 padlocks</li> <li>■ Fixing the locking tong with a chain near to the safety switch</li> </ul>
<b>MS AZ 16 ...</b>	<b>Ball latch 2053-2</b> 101115025	<b>Slot sealing plug AZ 15/16-1476</b> 101089116
 <ul style="list-style-type: none"> <li>■ Mounting set only in combination with AZ 15/16-B6</li> <li>■ Mounting parallel to safety guard: <b>MS AZ 16 P</b>      101150373</li> <li>■ Mounting right-angled to safety guard: <b>MS AZ 16 R/P</b>      101149214</li> </ul>	 <ul style="list-style-type: none"> <li>■ Additional ball latch for stable latching of light to medium-weight guards</li> <li>■ For separate mounting on the safety guard</li> </ul>	 <ul style="list-style-type: none"> <li>■ To cover unused actuator slots</li> <li>■ For protection against the ingress of dirt</li> <li>■ Easy to install by just clipping in</li> </ul>
<b>Centering device</b>	<b>Tamperproof screws</b>	
 <ul style="list-style-type: none"> <li>■ Centring device for pre-positioning (door guidance)</li> <li>■ Mounting outside: <b>TFA-020</b>      101172607</li> <li>■ Mounting inside: <b>TFI-020</b>      101172609</li> </ul>	 <ul style="list-style-type: none"> <li>■ Tamperproof screws with unidirectional slots</li> <li>M5 x 12      101135338</li> <li>M5 x 16      101135339</li> <li>M5 x 20      101135340</li> <li>■ Quantity 2 pcs</li> </ul>	


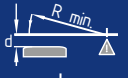


Connecting and interconnecting cables are listed in the appendix.  
Detailed information for the selection of the actuators can be found at [www.schmersal.net](http://www.schmersal.net).



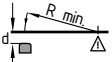
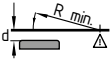


# 1. Safety switch with separate actuator

## AZ 17 – Selection of the actuators



Actuator type	Actuator description	Designed for					Type designation	Material number
			$R_{min}$ [mm]	d [mm]	$R_{min}$ [mm]	d [mm]		
Flexible actuator	AZ 17 standard		50	11	50	11	<b>AZ 17-B6</b>	<b>101126060</b>
	For left-hand side door hinge with individual coding		50	11	50	11	<b>AZ 17i-B6L</b>	<b>Included in delivery</b>
	For right-hand side door hinge with individual coding		50	11	50	11	<b>AZ 17i-B6R</b>	<b>Included in delivery</b>
Straight actuator	Standard		---	---	---	---	<b>AZ 17/170-B1</b>	<b>101122893</b>
	With rubber mountings		---	---	---	---	<b>AZ 17/170-B1-2245</b>	<b>101137406</b>
	Angled		---	---	---	---	<b>AZ 17/170-B5</b>	<b>101122895</b>
	Longer		---	---	---	---	<b>AZ 17/170-B11</b>	<b>101139788</b>
	Longer and angled		---	---	---	---	<b>AZ 17/170-B15</b>	<b>101139789</b>

**Actuating radii** The axis of the hinge must be d [mm] above and in a parallel plane to the top surface of the safety switch. The basis setting provides a minimum radius of  $R_{min}$  [mm].

- Key**
- 
Actuating radius over the small edge of the actuator
  - 
Actuating radius over the wide edge of the actuator
  - 
Sliding and removable safety guards
  - 
Hinged safety guards

Actuators must be ordered separately.

# 1. Safety switch with separate actuator

## AZ 17 – Actuators and accessories









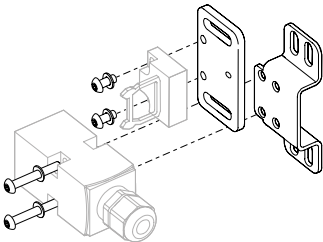
<b>AZ 17/170-B1 *</b>	<b>101122893</b>	<b>AZ 17/170-B1-2245</b>	<b>101137406</b>	<b>AZ 17/170-B5 *</b>	<b>101122895</b>
 <ul style="list-style-type: none"> <li>■ Straight actuator</li> <li>■ Also with individual coding *</li> </ul>	 <ul style="list-style-type: none"> <li>■ Actuator with rubber mounting</li> <li>■ Standard coding</li> </ul>	 <ul style="list-style-type: none"> <li>■ Angled actuator</li> <li>■ Also with individual coding *</li> </ul>			
<b>AZ 17/170-B11</b>	<b>101139788</b>	<b>AZ 17/170-B15</b>	<b>101139789</b>	<b>AZ 17-B6</b>	<b>101126060</b>
 <ul style="list-style-type: none"> <li>■ Long straight actuator</li> <li>■ Standard coding</li> </ul>	 <ul style="list-style-type: none"> <li>■ Long angled actuator</li> <li>■ Standard coding</li> </ul>	 <ul style="list-style-type: none"> <li>■ Flexible actuator</li> <li>■ Standard coding</li> </ul>			
<b>B6R *</b>	<b>B6L *</b>				
 <ul style="list-style-type: none"> <li>■ Flexible actuator for right-hand side door hinge</li> <li>■ Individual coding *</li> </ul>	 <ul style="list-style-type: none"> <li>■ Flexible actuator for left-hand side door hinge</li> <li>■ Individual coding *</li> </ul>				

\* The actuators with individual coding cannot be delivered individually.

# 1. Safety switch with separate actuator

## AZ 17 – Actuators and accessories

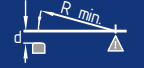
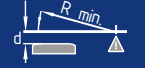

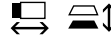


<b>AZ 17-B25-R-G1</b> 101175202	<b>AZ 17-B25-R-G2</b> 101175228	<b>MP AZ 17/170-B25</b> 101175190
 <ul style="list-style-type: none"> <li>■ Door-handle actuator with star grip</li> <li>■ For door hinge on the right-hand side</li> </ul>	 <ul style="list-style-type: none"> <li>■ Door-handle actuator with T-grip</li> <li>■ For door hinge on the right-hand side</li> </ul>	 <ul style="list-style-type: none"> <li>■ Mounting plate</li> <li>■ Accessories only for door-handle actuator AZ 17-B25-..</li> </ul>
<b>Centering device</b>	<b>Tamperproof screws</b>	<b>AZM 170-B</b> 101208493
 <ul style="list-style-type: none"> <li>■ Centering device for pre-positioning</li> <li>■ Mounting outside: <b>TFA-020</b>      101172607</li> <li>■ Mounting inside: <b>TFI-020</b>      101172609</li> </ul>	 <ul style="list-style-type: none"> <li>■ Tamperproof screws with unidirectional slots M4 x 8      101147463</li> <li>■ Quantity 2 pcs</li> </ul>	 <ul style="list-style-type: none"> <li>■ Centering guide</li> <li>■ Only in combination with long actuator</li> </ul>
<b>MS AZ 17 ...</b>		
 <ul style="list-style-type: none"> <li>■ Mounting set only in combination with AZ 17-B6</li> <li>■ Mounting parallel to safety guard:           <ul style="list-style-type: none"> <li><b>MS AZ 17 P</b>      101150363</li> </ul> </li> <li>■ Mounting right-angled to safety guard:           <ul style="list-style-type: none"> <li><b>MS AZ 17 R/P</b>      101149212</li> </ul> </li> </ul>		

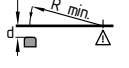
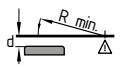


# 1. Safety switch with separate actuator

## AZ 3350 – Selection of the actuators



Actuator type	Actuator description	Designed for					Type designation	Material number
			$R_{min}$ [mm]	d [mm]	$R_{min}$ [mm]	d [mm]		
Flexible actuator	With rubber mountings		---	---	350	28	<b>AZ 3350-B1R</b>	<b>101214019</b>
	With rubber mountings and angled		---	---	350	22	<b>AZ 3350-B5R</b>	<b>101214020</b>
	Standard		650	55	400	55	<b>AZ 3350-B6</b>	<b>101214016</b>
	Standard with rear-side fixing.		650	49	400	49	<b>AZ 3350-B6H</b>	<b>101214017</b>
Straight actuator	With rubber mountings		---	---	---	---	<b>AZ 3350-B1</b>	<b>101214015</b>
	With rubber mountings and angled		---	---	---	---	<b>AZ 3350-B5</b>	<b>101214018</b>

**Actuating radii** The axis of the hinge must be d [mm] above and in a parallel plane to the top surface of the safety switch. The basis setting provides a minimum radius of  $R_{min}$  [mm].

- Key**
- 
Actuating radius over the small edge of the actuator
  - 
Actuating radius over the wide edge of the actuator
  - 
Sliding and removable safety guards
  - 
Hinged safety guards

Actuators must be ordered separately.

# 1. Safety switch with separate actuator

## AZ 3350 – Actuators and accessories

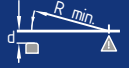
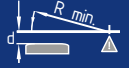




AZ 3350-B1	101214015	AZ 3350-B1R	101214019	AZ 3350-B5	101214018
 <ul style="list-style-type: none"> <li>■ Straight actuator with rubber mounting</li> <li>■ Particularly suitable for sliding safety guards</li> </ul>	 <ul style="list-style-type: none"> <li>■ Flexible actuator with rubber mounting</li> <li>■ Particularly suitable for hinged safety guards</li> </ul>	 <ul style="list-style-type: none"> <li>■ Angled actuator with rubber mounting</li> <li>■ Particularly suitable for sliding safety guards</li> </ul>			
AZ 3350-B5R	101214020	AZ 3350-B6	101214016	AZ 3350-B6H	101214017
 <ul style="list-style-type: none"> <li>■ Angled actuator with rubber mounting</li> <li>■ Particularly suitable for hinged safety guards</li> </ul>	 <ul style="list-style-type: none"> <li>■ Flexible actuator</li> <li>■ Particularly suitable for hinged safety guards</li> </ul>	 <ul style="list-style-type: none"> <li>■ Flexible actuator</li> <li>■ Particularly suitable for hinged safety guards</li> </ul>			

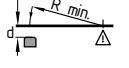
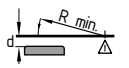


# 1. Safety switch with separate actuator

## AZ 415 – Selection of the actuators



Actuator type	Actuator description	Designed for					Type designation	Material number
			$R_{min}$ [mm]	d [mm]	$R_{min}$ [mm]	d [mm]		
Flexible actuator	For very small actuating radius over the wide edge of the actuator		---	---	250	36	AZ/AZM 415-B2	101144796
	For very small actuating radius over the small edge of the actuator		250	36	---	---	AZ/AZM 415-B3	101144797
Straight actuator	For sliding safety guards		---	---	---	---	AZ/AZM 415-B1	101128545

**Actuating radii** The axis of the hinge must be d [mm] above and in a parallel plane to the top surface of the safety switch. The basis setting provides a minimum radius of  $R_{min}$  [mm].







- Key**
- 
Actuating radius over the small edge of the actuator
  - 
Actuating radius over the wide edge of the actuator
  - 
Sliding and removable safety guards
  - 
Hinged safety guards

Actuators must be ordered separately.

# 1. Safety switch with separate actuator

## AZ 415 – Actuators and accessories



AZ/AZM 415-B1	101128545	AZ/AZM 415-B2	101144796	AZ/AZM 415-B3	101144797
 <ul style="list-style-type: none"> <li>■ Straight actuator</li> <li>■ For sliding safety guards</li> </ul>		 <ul style="list-style-type: none"> <li>■ Flexible actuator</li> <li>■ Particularly suitable for hinged safety guards</li> <li>■ For very small actuating radius over the wide edge of the actuator</li> </ul>		 <ul style="list-style-type: none"> <li>■ Flexible actuator</li> <li>■ Particularly suitable for hinged safety guards</li> <li>■ For very small actuating radius over the small edge of the actuator</li> </ul>	
 <ul style="list-style-type: none"> <li>■ For sliding safety guards</li> <li>■ with locking bolt and ball latch</li> </ul>	101142540	 <ul style="list-style-type: none"> <li>■ Lockout tag with 7 bore holes</li> <li>■ <b>SZ AZ 415-22-1</b></li> <li>■ <b>SZ AZ 415-22-2</b></li> </ul>	<p><b>101160461</b></p> <p><b>101160462</b></p>	 <ul style="list-style-type: none"> <li>■ Mounting plate</li> <li>■ For simple mounting</li> <li>■ Subsequent adjustment enabled</li> <li>■ Suitable for all conventional profile systems</li> </ul>	101142442

# 1. Safety switch with separate actuator

## AZ 201 – Selection of the actuators



Series	Door hinge		Emergency exit P0	Type designation	Material number
	Left	Right			
AZ/AZM 201-B1	■			AZ/AZM201-B1-LT	103013493
			■	AZ/AZM201-B1-LTP0	103013496
		■		AZ/AZM201-B1-RT	103013494
			■	AZ/AZM201-B1-RTP0	103013495

Series	Door hinge		Mounting		Door handle G1	Rota- ting knob G2	Emergency exit			Locking rod P30/P31	Lock- out tag	Type designation	Material number	
	Left	Right	Inside	Outside			With- out	Standard P1	Metal P20					
AZ/AZM 201-B30			■					■				AZ/AZM201-B30-RTIG1P1	103025195	
							■					AZ/AZM201-B30-LTAG1	103013501	
								■				AZ/AZM201-B30-LTAG1P1	103013498	
	■				■			■			■	AZ/AZM201-B30-LTAG1P1-SZ	103013500	
				■						■		AZ/AZM201-B30-LTAG1P30	103015820	
										■		AZ/AZM201-B30-LTAG1P31	103015821	
										■	■	AZ/AZM201-B30-LTAG1P31-SZ	103015822	
						■		■					AZ/AZM201-B30-LTAG2P1	103025248
			■					■					AZ/AZM201-B30-LTIG1P1	103025197
								■					AZ/AZM201-B30-RTAG1	103013502
									■				AZ/AZM201-B30-RTAG1P1	103013497
					■				■			■	AZ/AZM201-B30-RTAG1P1-SZ	103013499
										■			AZ/AZM201-B30-RTAG1P30	103015823
										■			AZ/AZM201-B30-RTAG1P31	103015824
									■	■		AZ/AZM201-B30-RTAG1P31-SZ	103015825	
						■		■				AZ/AZM201-B30-RTAG2P1	103025247	

Actuators must be ordered separately. Further actuator versions AZ/AZM201-B30 are available on request.



# 1. Safety switch with separate actuator

## AZ 201 – Actuators and accessories

<p><b>AZ/AZM201-B1-...</b></p>  <ul style="list-style-type: none"> <li>Actuator for sliding safety guards</li> <li>Left-hand side actuating direction <b>AZ/AZM201-B1-LT</b> 103013493</li> <li>Right-hand side actuating direction <b>AZ/AZM201-B1-RT</b> 103013494</li> </ul>	<p><b>AZ/AZM201-B1...-P0</b></p>  <ul style="list-style-type: none"> <li>With emergency exit P0</li> <li>Left-hand side actuating direction <b>AZ/AZM201-B1-LTP0</b> 103013496</li> <li>Right-hand side actuating direction <b>AZ/AZM201-B1-RTP0</b> 103013495</li> </ul>	
<p><b>AZ/AZM201-B30-... -G1</b></p>  <ul style="list-style-type: none"> <li>Actuator for hinged safety guards</li> </ul>	<p><b>AZ/AZM201-B30--SZ</b></p>  <ul style="list-style-type: none"> <li>Actuator B30 with lockout tag</li> </ul>	<p><b>AZ/AZM201-B30-...-G2</b></p>  <ul style="list-style-type: none"> <li>Actuator with rotating knob</li> </ul>
<p><b>AZ/AZM201-...-P1</b></p>  <ul style="list-style-type: none"> <li>Emergency exit</li> </ul>	<p><b>AZ/AZM201-...-P20</b></p>  <ul style="list-style-type: none"> <li>Emergency exit (metal)</li> </ul>	<p><b>AZ/AZM201-B30-...-P30/P31</b></p>  <ul style="list-style-type: none"> <li>Three point locking linkage for requirements with increased mechanical stability (7.000 N)</li> </ul>

The actuation system selection can be found at [www.schmersal.net](http://www.schmersal.net).

# 1. Safety switch with separate actuator

## AZ 201 – Accessories



SZ 200-1	SZ 200	101194438
 <ul style="list-style-type: none"><li>■ Lockout tag with 6 bore holes</li><li>■ To prevent inadvertent closing, e.g. during maintenance</li></ul>	 <ul style="list-style-type: none"><li>■ Lockout tag with 5 bore holes</li><li>■ To prevent inadvertent closing, e.g. during maintenance</li></ul>	

## Up-to-date without fail

The online product catalogue



For detailed information, check out  
[www.schmersal.net](http://www.schmersal.net)

## 2. Solenoid interlocks

### Description

#### Area of application

The solenoid interlocks of the AZM and MZM series have been designed to prevent sliding, hinged and removable safety guards (fences, flaps or doors) from being opened before hazardous conditions (e.g. run-on movements from rollers, chains, shafts etc) have been eliminated. This task is to perform in conjunction with an appropriate safety relay module, such as a fail-safe standstill monitor or a safe timer.

In addition to this application field of occupational safety, interlocks are also used in cases where the opening of a safety device causes an impermissible or unwanted intrusion into a production process (process protection).

#### Design and way of functioning

The solenoid interlock of the Schmersal Group is based on the principle of separate actuators: The actuator element is fixed in the moveable part (mostly a safety door) of the guard system. The interlock itself is fixed, such as on the post of a safety door. Shutting the safety equipment immerses the actuator in the device and interlock locks the safety door. Only then can the machine be started. The position of the locked actuator is continuously being monitored.

When the safety guard is opened in the unlocked condition, the actuator is separated from the base unit. During this process, the NC contacts are positively opened and the NO contacts closed.

There are two interlocking principles: The "Power to unlock" principle is where the locking bolt is held into position with a spring. By energizing the interlocking solenoid coil, the interlock unlatches and the NC contact is opened, and the protection equipment can be opened. With the working "Power to lock" principle, the operation is reversed. For the selection of the principle an analysis of the accident risk has to be made, as you should be able to open the protection equipment in the event of a fault (e.g. broken cable) or with a loss of power.

The solenoid interlocks, the safety switches and the safety sensors have all belonged to the core program of the Schmersal Group for decades. The variety of designs and product ranges is correspondingly large.

The solenoid interlocks AZM 161, 170, 190 and 415 are fitted with protection against incorrect locking. The AZM 201 Series is integrated with position monitoring of the safety door, interlock, door handle and if necessary other functions such as the emergency release in an installation friendly, ergonomic operated system. The AZM 300 Series is characterised by a novel interlocking system and an RFID-based safe detection of the actuator position. The AZM 400 series is a safe bolt interlock with bistable principle of operation or a motor-driven locking bolt. With the series MZM 100, non-contact-acting solenoid interlocks are also available in which the clamping force is generated electromagnetically and is continually monitored.



In several series (AZM 201, AZM 300, AZM 400, MZM 100) the monitoring of the safety door position is not electromechanical, but non-contact - either with the Schmersal developed "Coded Safety Sensor Technology" or by a safety-reinforced RFID-technology. These models offer the advantage that they provide the machine operator with additional diagnostic information. Clamping forces of up to 10,000 N are possible. For some series, the latching force (i.e. the non-safety-related clamping force) can be adjusted.

Depending on the type of device, an individual coding of the actuator is possible. The RFID-technology offers the advantage that the user can select from different types of coding. The basic version accepts any suitable target. A second version only accepts the actuator for which the teach-in process was run during initial activation (I1 variant). A third version is now also available which responds to an individually-assigned actuator only. This kind of teach-in process can be repeated any number of times (I2-variant).

This means that for individually-coded variants I1 and I2 the coding level "high" is fulfilled in accordance with ISO 14119, thereby ensuring a high level of manipulation protection for doors which are at particular risk of interference.

In addition, the solenoid interlock program offers a wide variety of additional features that are either integrated or available as an option. In addition to safety functions such as manual release and emergency release ("emergency handle"), there are integrated door stops and door handles. An extensive range of accessories as well as different plug and line variants round off the program.

The electromechanical solenoid interlocks AZ 161 and AZ 170 are also available as individually-coded versions with more than 1,000 different coding variants, achieving coding level "high" in accordance with ISO 14119.

To do this, the switch is supplied with the corresponding actuator, which is specially adapted to the respective switch. Manipulation by a substitute actuator is not possible.

Information for the selection of suitable safety relay modules can be found in the chapter "Safety relay modules" (refer to page 212).

Versions with integrated "AS-Interface Safety at Work" interface, as well as models with ATEX certification are also available.

## 2. Solenoid interlocks

### Overview of the series



■ AZM 161



■ AZM 170



■ AZM 190

#### Key Features

<ul style="list-style-type: none"> <li>• Thermoplastic enclosure</li> <li>• Individual coding possible</li> <li>• Holding force 2000 N</li> <li>• Power to unlock / Power to lock</li> <li>• Up to 6 contacts</li> <li>• Manual release, emergency exit or emergency release</li> <li>• Cut clamps, screw terminals or connector plug</li> </ul>	<ul style="list-style-type: none"> <li>• Thermoplastic enclosure</li> <li>• Compact design</li> <li>• Individual coding possible</li> <li>• Holding force 1000 N</li> <li>• Power to unlock / Power to lock</li> <li>• Up to 5 contacts</li> <li>• Manual release from side</li> <li>• Cut clamps, screw terminals or connector plug</li> </ul>	<ul style="list-style-type: none"> <li>• Thermoplastic enclosure</li> <li>• Holding force 1950 N</li> <li>• Power to unlock / Power to lock</li> <li>• 3 contacts</li> <li>• Manual release or emergency release</li> <li>• Screw terminals</li> </ul>
--	---	--

#### Other versions

<b>ATEX / IECEx</b>	■	■	-
<b>AS-i SaW</b> (refer to page 260)	■	■	-
<b>SD-Interface</b> (refer to page 268)	-	-	-

#### Technical features

<b>Electrical characteristics</b>			
<b>Operating voltage</b>	-	-	-
<b>Power consumption</b>	-	-	-
<b>Max. switching capacity U/I</b>	230 VAC / 4 A; 24 VDC / 2.5 A	230 VAC / 4 A; 24 VDC / 4 A	230 VAC / 4 A; 24 VDC / 4 A
<b>Mechanical data</b>			
<b>Dimensions (W x H x D)</b>	130 x 90 x 30 mm	90 x 100.5 x 30 mm	89 x 178 x 41 mm
<b>Ambient conditions</b>			
<b>Ambient temperature</b>	-25 °C ... +60 °C	-25 °C ... +60 °C	0 °C ... +50 °C
<b>Protection class</b>	IP67	IP67	IP67, suffix N: IP65
<b>Actuator and accessories refer to ...</b>	page 40	page 44	page 48

#### Safety classification

<b>Standards</b>	ISO 13849-1	ISO 13849-1	ISO 13849-1
<b>B<sub>10D</sub> NC contact</b>	2,000,000	2,000,000	2,000,000
<b>PL/ SIL</b>	-/-	-/-	-/-
<b>Category</b>	-	-	-
<b>PFH</b>	-	-	-
<b>Certificates</b>			



To get detailed information about the products and certificates, visit [www.schmersal.net](http://www.schmersal.net).



■ AZM 415	■ AZM 201	■ AZM 300	■ AZM 400	■ MZM 100
<ul style="list-style-type: none"> <li>• Metal enclosure</li> <li>• Holding force 3500 N</li> <li>• Power to unlock / Power to lock</li> <li>• Up to 6 contacts</li> <li>• Manual release or emergency release</li> <li>• Screw terminals or connector</li> <li>• Robust design</li> </ul>	<ul style="list-style-type: none"> <li>• Thermoplastic enclosure</li> <li>• Individual coding possible</li> <li>• Holding force 2000 N</li> <li>• 2 safety outputs and 1 diagnostic output</li> <li>• Manual release, emergency exit or emergency release (suitable for retrofitting)</li> <li>• Cut clamps, screw terminals or connector plug</li> </ul>	<ul style="list-style-type: none"> <li>• Thermoplastic enclosure</li> <li>• Individual coding possible</li> <li>• Holding force 1000 N</li> <li>• 2 safety outputs and 1 diagnostic output</li> <li>• Manual release, emergency exit or emergency release</li> <li>• 3 different directions of actuation</li> </ul>	<ul style="list-style-type: none"> <li>• Metal enclosure</li> <li>• With bolt locking</li> <li>• Bistable principle</li> <li>• Individual coding</li> <li>• Holding force 10000 N, unlocking against lateral force (&lt; 300 N)</li> <li>• 2 safety outputs and up to 2 diagnostic outputs</li> <li>• Manual/electrical auxiliary release, emergency exit or Bowden cable release</li> <li>• Two-channel unlocking signal</li> </ul>	<ul style="list-style-type: none"> <li>• Thermoplastic enclosure</li> <li>• Holding force 750 N</li> <li>• Power to lock</li> <li>• 2 safety outputs and 1 diagnostic output</li> <li>• Can be used as an end stop</li> </ul>

■	-	-	-	-
-	-	■	-	■
-	■	■	-	■

-	24 VDC	24 VDC	24 VDC	24 VDC
-	0.7 A (without load)	0.25 A (without load)	0.6 A (without load)	0.6 A (without load)
230 VAC / 4 A	24 VDC / 0.25 A	24 VDC / 0.25 A	24 VDC / 0.25 A	24 VDC / 0.25 A
130 x 100 x 46.5 mm	40 x 220 x 50 mm	88 x 135 x 35 mm	78 x 157 x 47 mm	40 x 179 x 40 mm
-25 °C ... +50 °C	-25 °C ... +60 °C	0 °C ... +60 °C	0 °C ... +55 °C	-25 °C ... +55 °C
IP67; suffix NS, RS: IP54 page 50	IP66, IP67 page 52	IP66, IP67, IP69 page 54	IP66, IP67 page 54	IP65, IP67 page 55

ISO 13849-1	ISO 13849-1, IEC 61508	ISO 13849-1, IEC 61508	ISO 13849-1, IEC 61508	ISO 13849-1, IEC 61508
2,000,000	-	-	-	-
-/-	e/3	e/3	e/3	e/3
-	4	4	4	4
-	1.9 x 10 <sup>-9</sup> / h	4.3 x 10 <sup>-9</sup> / h	1.0 x 10 <sup>-9</sup> / h	4.3 x 10 <sup>-9</sup> / h
				*

\* Schmersal is a certified company to appendix X of the Machinery Directive. As a result, Schmersal is entitled to autonomously conduct the conformity assessment procedure for the products listed in Appendix IV of the MD without involving a notified body.

## 2. Solenoid interlocks

### Preferred types

Series	Coding	Connection	Latching force	Magnetic contact /	Actuator contact	Special features	
AZM 161	Standard coding	Cage clamps	30 N	1 NO / 2 NC	3 NC	Manual release	
				1 NO / 2 NC	1 NO / 2 NC	Emergency exit	
		1 NO / 2 NC		3 NC	Manual release		
		1 NO / 2 NC		1 NO / 2 NC	Emergency exit		
	Individual coding	Screw terminals		Connector	1 NO / 1 NC	1 NO / 2 NC	Manual release
	Standard coding				1 NO / 2 NC	1 NO / 1 NC	
AZM 170	Standard coding	Connector	30 N	---	2 NC	Manual release	
				---	1 NO / 1 NC		
		Cut clamps		5 N	---		2 NC
				30 N	---		1 NO / 1 NC
	Individual coding	---	2 NC				
	Standard coding	Screw terminals	---		2 NC		
			---		1 NO / 1 NC		
	2 NC	1 NO					
AZM 190	Standard coding	Screw terminals	20 N	2 NC	1 NC	Manual release	
				2 NC	1 NO		
				1 NO / 1 NC	1 NC		
AZM 415	Standard coding	Screw terminals	150...400 N	1 NO / 1 NC	1 NO / 1 NC	---	
				2 NC	1 NO / 1 NC	Emergency exit	
				1 NO / 1 NC	2 NO / 2 NC	Manual release	
				2 NC	1 NO / 1 NC	Emergency exit	
1 NO / 1 NC	2 NO / 2 NC	Manual release					



A variety of other types of the solenoid interlocks can be found at [www.schmersal.net](http://www.schmersal.net).



	Included in delivery	Power to lock	Power to unlock	Type designation	Material number	
	---		■	AZM 161CC-12/03RK-024	101195902	
				AZM 161CC-12/12RK-024	101166283	
		■		AZM 161CC-12/12RKA-110/230	101166288	
			■	AZM 161CC-12/12RKTD-024	101187882	
				AZM 161CC-12/12RKTD-024	101187884	
		■		AZM 161SK-12/03RK-024	101195886	
				AZM 161SK-12/03RKA-024	101195892	
		■	■	AZM 161SK-12/12RK-024	101164207	
		■		AZM 161SK-12/12RKA-024	101166285	
				AZM 161SK-12/12RKEU-024	101187819	
				AZM 161SK-12/12RKT-024	101177876	
				AZM 161SK-12/12RKTD-024	101187838	
			■	AZM 161SK-12/12RKTD-024	101187849	
		Actuator B1			AZM 161SK-12/12RI-024-B1	101213351
	Actuator B6L			AZM 161SK-12/12RI-024-B6L	101215900	
	Actuator B6R			AZM 161SK-12/12RI-024-B6R	101215869	
	---	■		AZM 161ST-11/12RKA-024	101192434	
			■	AZM 161ST-12/11RK-024	101192414	
	---		■	AZM 170-02ZRK-ST-2197 24VAC/DC	101141430	
		■		AZM 170-02ZRKA-ST 24VAC/DC	101141422	
			■	AZM 170-11ZRK-ST-2197 24VAC/DC	101141425	
		■		AZM 170-11ZRKA-ST 24VAC/DC	101141455	
			■	AZM 170-02ZRK 24VAC/DC	101140795	
		■		AZM 170-02ZRKA 24VAC/DC	101141020	
				AZM 170-11ZK 24VAC/DC	101141639	
			■	AZM 170-11ZRK 24VAC/DC	101140788	
				AZM 170-11ZRK-2197 24VAC/DC	101140813	
		■		AZM 170-11ZRKA 24VAC/DC	101140796	
		Actuator B1			AZM 170-02ZRI B1 24VAC/DC	101140798
		Actuator B6L		■	AZM 170-02ZRI B6L 24VAC/DC	101140810
		Actuator B6R			AZM 170-02ZRI B6R 24VAC/DC	101140806
		---			AZM 170SK-02ZRK-2197 24VAC/DC	101144261
	■			AZM 170SK-02ZRKA 24VAC/DC	101144263	
			■	AZM 170SK-11ZRK-2197 24VAC/DC	101144260	
	■			AZM 170SK-11ZRKA 24VAC/DC	101144262	
			■	AZM 170SK-02/10ZRK-2197 24VAC/DC	101181883	
	---		■	AZM190-02/01RK 110VAC	101182115	
				AZM190-02/01RK 24VDC	101178901	
		■		AZM190-02/01RKA 24VDC	101031685	
			■	AZM190-02/10RK 24VDC	101029960	
		■		AZM190-02/10RKA 24VAC	101030182	
				AZM190-02/10RKA 24VDC	101030003	
				■	AZM190-11/01RK 230VAC	101029963
					AZM190-11/01RK 24VDC	101029937
		■			AZM190-11/01RKA 24VDC	101030129
				■	AZM 415-11/11ZPK 24 VAC/DC	101167205
				AZM 415-11/11ZPK 230 VAC	101167204	
	---	■		AZM 415-11/11ZPKA 24 VAC/DC	101167206	
				AZM 415-11/11ZPKT 24 VAC/DC	101167201	
				■	AZM 415-11/11ZPKE 24 VAC/DC	101167190
					AZM 415-11/11ZPKF 24 VAC/DC	101167209
					AZM 415-02/11ZPKT 24 VAC/DC	101168224
					AZM 415-33ZPKD 24 VAC/DC	101135487

## 2. Solenoid interlocks

### Preferred types



Series	Coding	Connection	Latching force	Diagnostic and safety outputs	Special features
<b>AZM 201</b> 	Standard coding	Screw terminals	30 N	1 diagnostic output and 2 safety outputs, all p-type, combined diagnostic signal	Manual release
		M12 connector			
		Cage clamps			
	Individual coding	Screw terminals			
		M12 connector			
	Individual coding, re-teaching enabled	Cage clamps			
		Screw terminals			
M12 connector					
				Serial diagnostic output and 2 safety outputs, all p-type	
<b>AZM 300</b> 	Standard coding	M12 connector	25 N / 50 N	1 diagnostic output and 2 safety outputs, all p-type	Manual release
				Individual coding	Serial diagnostic output and 2 safety outputs, all p-type
	1 diagnostic output and 2 safety outputs, all p-type				Manual release
	Serial diagnostic output and 2 safety outputs, all p-type				Emergency exit
	Standard coding			1 diagnostic output and 2 safety outputs, all p-type	Emergency exit
				Emergency release	

A variety of other types of the solenoid interlocks can be found at [www.schmersal.net](http://www.schmersal.net).

	Guard locking monitored	Actuator monitored	Power to lock	Power to unlock	Type designation	Material number
	■		■		AZM201Z-SK-T-1P2PW-A	103016752
		■		■	AZM201B-SK-T-1P2PW	103013910
			■		AZM201B-SK-T-1P2PW-A	103013911
				■	AZM201Z-SK-T-1P2PW	103013908
				■	AZM201Z-ST2-T-1P2PW	103013909
	■		■		AZM201Z-ST2-T-1P2PW-A	103016753
				■	AZM201Z-CC-T-1P2PW	103013912
				■	AZM201Z-CC-T-1P2PW-A	103017023
				■	AZM201Z-I1-SK-T-1P2PW	103013483
				■	AZM201Z-I1-ST2-T-1P2PW	103013485
		■		■	AZM201B-I2-CC-T-1P2PW	103013488
	■			■	AZM201Z-I2-CC-T-1P2PW	103013487
			■		AZM201Z-I2-CC-T-1P2PW-A	103017027
		■		■	AZM201B-I2-SK-T-1P2PW	103013490
			■		AZM201B-I2-SK-T-1P2PW-A	103013491
				■	AZM201Z-I2-SK-T-1P2PW	103013484
	■		■		AZM201Z-I2-SK-T-1P2PW-A	103016780
				■	AZM201Z-I2-ST2-T-1P2PW	103013486
				■	AZM201Z-I2-ST2-T-1P2PW-A	103013489
		■	■		AZM201B-I2-ST2-T-1P2PW-A	103025461
	■			■	AZM201Z-I2-ST2-T-SD2P	103013492
		■		■	AZM300B-ST-1P2P	103001411
			■		AZM300B-ST-1P2P-A	103001423
	■			■	AZM300Z-ST-1P2P	103001435
			■		AZM300Z-ST-1P2P-A	103001450
				■	AZM300Z-ST-SD2P-T	103008117
		■		■	AZM300B-ST-SD2P-T	103008176
				■	AZM300B-ST-SD2P	103001412
			■		AZM300B-ST-SD2P-A	103001424
	■			■	AZM300Z-ST-SD2P	103001436
			■		AZM300Z-ST-SD2P-A	103001451
		■		■	AZM300B-I2-ST-1P2P	103001415
			■		AZM300B-I2-ST-1P2P-A	103001427
				■	AZM300Z-I2-ST-1P2P	103001439
	■		■		AZM300Z-I2-ST-1P2P-A	103001454
				■	AZM300Z-I2-ST-SD2P-T	103008178
				■	AZM300B-I2-ST-SD2P-T	103008179
		■		■	AZM300B-I2-ST-SD2P	103001416
			■		AZM300B-I2-ST-SD2P-A	103001428
				■	AZM300Z-I2-ST-SD2P	103001440
	■		■		AZM300Z-I2-ST-SD2P-A	103001455
				■	AZM300Z-I2-ST-1P2P-T	103006863
				■	AZM300Z-ST-1P2P-T	103006865
		■		■	AZM300B-ST-1P2P-T	103006862
	■			■	AZM300Z-ST-1P2P-N	103006869
		■		■	AZM300B-ST-1P2P-N	103006867

## 2. Solenoid interlocks

### Preferred types

Series	Coding	Connection	Latching force	Diagnostic and safety outputs	Special features			
<b>AZM 400</b> 	Standard coding	1 connector plug M12, 8-pole	Unlocking against lateral forces up to 300 N	1 diagnostic output and 2 safety outputs, all p-type	Manual release			
		2 connector plugs M12, 5- and 8-pole			Manual release			
	Individual coding	1 connector plug M12, 8-pole		1 diagnostic output and 2 safety outputs, all p-type	Manual release			
		2 connector plugs M12, 5- and 8-pole			Manual release			
	Individual coding, re-teaching enabled	1 connector plug M12, 8-pole		1 diagnostic output and 2 safety outputs, all p-type	Manual release			
		2 connector plugs M12, 5- and 8-pole			Manual release			
		2 diagnostic output and 2 safety outputs, all p-type		Manual release				
				Emergency exit				
	<b>MZM 100</b> 	Standard coding		M23 connector	---	Serial diagnostic output and 2 safety outputs, all p-type	---	
					30...100 N		---	Permanent magnet (15 N)
							1 diagnostic output and 2 safety outputs, all p-type, combined diagnostic signal	---
				Permanent magnet (15 N)				
M12 connector			---	30...100 N	Serial diagnostic output and 2 safety outputs, all p-type	---		
			Permanent magnet (15 N)					
		---						
		Permanent magnet (15 N)						
			---					
		Permanent magnet (15 N)						

A variety of other types of the solenoid interlocks can be found at [www.schmersal.net](http://www.schmersal.net).

	Guard locking monitored	Actuator monitored	Power to lock	Power to unlock	Type designation	Material number
					AZM400Z-ST-1P2P	103003590
					AZM400Z-ST-1P2P-BOW *	103015314
					AZM400Z-ST-1P2P-T	103003593
and electric manual release					AZM400Z-ST2-2P2P-E	103003588
and electric manual release					AZM400Z-ST2-2P2P-BOW-E *	103015312
and electric manual release					AZM400Z-ST2-2P2P-T-E	103003591
					AZM400Z-ST-I1-1P2P	103003732
	■			Bistable principle of operation	AZM400Z-ST-I1-1P2P-T	103003840
and electric manual release					AZM400Z-ST2-I1-2P2P-E	103003724
and electric manual release					AZM400Z-ST2-I1-2P2P-T-E	103003835
					AZM400Z-ST-I2-1P2P	103003733
					AZM400Z-ST-I2-1P2P-BOW *	103015315
					AZM400Z-ST-I2-1P2P-T	103003841
and electric manual release					AZM400Z-ST2-I2-2P2P-E	103003725
and electric manual release					AZM400Z-ST2-I2-2P2P-BOW-E *	103015313
and electric manual release					AZM400Z-ST2-I2-2P2P-T-E	103003836
					MZM 100 ST-SD2P-A	101183538
	■				MZM 100 ST-SD2PRE-A	101211143
					MZM 100 ST-SD2PREM-A	101211144
					MZM 100 ST-1P2PWRE-A	101211064
		■			MZM 100 ST-1P2PWREM-A	101211065
			■		MZM 100 B ST-1P2PW2REM-A	101211069
					MZM 100 ST2-1P2PWM-A	101209059
	■				MZM 100 ST2-1P2PWRE-A	101211066
					MZM 100 ST2-1P2PWREM-A	101211067
					MZM 100 ST2-SD2PRE-A	101211145
					MZM 100 ST2-SD2PREM-A	101211146
		■			MZM 100 B ST2-SD2PRE-A	101211156
					MZM 100 B ST2-SD2PREM-A	101211153

\* Only in connection with Bowden cable (available separately)

## 2. Solenoid interlocks

### AZM 161 – Actuator selection



Actuator type	Actuator description	Designed for					Type designation	Material number
			R <sub>min</sub> [mm]	d [mm]	R <sub>min</sub> [mm]	d [mm]		
Flexible actuator	Standard		95	11	95	11	AZM 161-B6	101144420
	For right-hand side door hinge with individual coding		95	11	95	11	AZM 161i-B6R	Included in delivery
	For left-hand side door hinge with individual coding		95	11	95	11	AZM 161i-B6L	Included in delivery
	With centering guide		95	17	95	17	AZM 161-B6-2177	101174113
	Shortened		95	---	95	---	AZM 161-B6S	101170375
Straight actuator	Standard		---	---	---	---	AZM 161-B1	101145117
	Shortened		---	---	---	---	AZM 161-B1S	101171125
	With magnetic latch		---	---	---	---	AZM 161-B1-1747	101164100
	With slot lip-seal		---	---	---	---	AZM 161-B1-2024	101178199
	With ball latch		---	---	---	---	AZM 161-B1-2053	101173089
	With centering guide		---	---	---	---	AZM 161-B1-2177	101176642
	Standard		---	---	---	---	AZM 161-B1E	101144416
	Shortened		---	---	---	---	AZM 161-B1ES	101171859
	Standard		---	---	---	---	AZM 161-B1F	101175431

**Actuating radii** The axis of the hinge must be d [mm] above and in a parallel plane to the top surface of the safety switch. The basis setting provides a minimum radius of R<sub>min</sub> [mm].

- Key**
- Actuating radius over the small edge of the actuator
  - Actuating radius over the wide edge of the actuator
  - Sliding and removable safety guards
  - Hinged safety guards










Actuators must be ordered separately.

Detailed information for the selection of the actuators can be found at [www.schmersal.net](http://www.schmersal.net).

## 2. Solenoid interlocks

### AZM 161 – Actuators and accessories



AZM 161-B1 *	101145117	AZM 161-B1S	101171125	AZM 161-B1-1747 *	101164100
 <ul style="list-style-type: none"> <li>■ Straight actuator</li> <li>■ Also with individual coding *</li> </ul>		 <ul style="list-style-type: none"> <li>■ Shortened straight actuator</li> <li>■ Standard coding</li> </ul>		 <ul style="list-style-type: none"> <li>■ Straight actuator with magnetic latch</li> <li>■ Also with individual coding *</li> </ul>	
AZM 161-B1-2024 *	101178199	AZM 161-B1-2053 *	101173089	AZM 161-B1-2177 *	101176642
 <ul style="list-style-type: none"> <li>■ Straight actuator with slot lip-seal</li> <li>■ Also with individual coding *</li> </ul>		 <ul style="list-style-type: none"> <li>■ Straight actuator with ball latch</li> <li>■ Also with individual coding *</li> </ul>		 <ul style="list-style-type: none"> <li>■ Straight actuator with centering guide</li> <li>■ Also with individual coding *</li> </ul>	
AZM 161-B1E *	101144416	AZM 161-B1ES	101171859	AZM 161-B1F	101175431
 <ul style="list-style-type: none"> <li>■ Straight actuator</li> <li>■ Also with individual coding *</li> </ul>		 <ul style="list-style-type: none"> <li>■ Shortened straight actuator</li> <li>■ Standard coding</li> </ul>		 <ul style="list-style-type: none"> <li>■ Straight actuator</li> <li>■ Standard coding</li> </ul>	

\* The actuators with individual coding cannot be delivered individually.

## 2. Solenoid interlocks

### AZM 161 – Actuators and accessories



<b>AZM 161-B6</b> <b>101144420</b>	<b>B6R *</b>	<b>B6L *</b>
 <ul style="list-style-type: none"> <li>■ Flexible actuator</li> <li>■ Standard coding</li> </ul>	 <ul style="list-style-type: none"> <li>■ Flexible actuator for right-hand side door hinge</li> <li>■ Individual coding *</li> </ul>	 <ul style="list-style-type: none"> <li>■ Flexible actuator for left-hand side door hinge</li> <li>■ Individual coding *</li> </ul>
<b>AZM 161-B6-2177</b> <b>101174113</b>	<b>AZM 161-B6S</b> <b>101170375</b>	
 <ul style="list-style-type: none"> <li>■ Flexible actuator with centering guide</li> <li>■ Standard coding</li> </ul>	 <ul style="list-style-type: none"> <li>■ Shortened flexible actuator</li> <li>■ Standard coding</li> </ul>	
<b>MS AZM 161 ...</b>	<b>Slot sealing plug AZM 161</b> <b>101145379</b>	<b>Triangular key M5</b> <b>101100887</b>
 <ul style="list-style-type: none"> <li>■ Mounting set only in combination with B6</li> <li>■ Mounting parallel to safety guard: <b>MS AZM 161 P</b>      <b>101150376</b></li> <li>■ Mounting right-angled to safety guard: <b>MS AZM 161 R/P</b>      <b>101149213</b></li> </ul>	 <ul style="list-style-type: none"> <li>■ To cover unused actuator slots</li> <li>■ For protection against the ingress of dirt</li> <li>■ Easy to install by just clipping in</li> </ul>	 <ul style="list-style-type: none"> <li>■ For manual release</li> </ul>



\* The actuators with individual coding cannot be delivered individually. Connecting and interconnecting cables are listed in the appendix.



## 2. Solenoid interlocks

### AZM 161 – Actuators and accessories



Centering device	Tamperproof screws	
 <ul style="list-style-type: none"><li>■ Centering device for pre-positioning</li><li>■ Mounting outside: <b>TFA-020</b>      <b>101172607</b></li><li>■ Mounting inside: <b>TFI-020</b>      <b>101172609</b></li></ul>	 <ul style="list-style-type: none"><li>■ Tamperproof screws with unidirectional slots</li><li>M5 x 12      <b>101135338</b></li><li>M5 x 16      <b>101135339</b></li><li>M5 x 20      <b>101135340</b></li><li>■ Quantity 2 pcs</li></ul>	

## 2. Solenoid interlocks

### AZM 170 – Actuator selection



Actuator type	Actuator description	Designed for					Type designation	Material number
			R <sub>min</sub> [mm]	d [mm]	R <sub>min</sub> [mm]	d [mm]		
Flexible actuator	AZM 170 standard		50	11	50	11	<b>AZM 170-B6</b>	<b>101123391</b>
	For left-hand side door hinge with individual coding		50	11	50	11	<b>AZM 170i-B6L</b>	<b>Included in delivery</b>
	For right-hand side door hinge with individual coding		50	11	50	11	<b>AZM 170i-B6R</b>	<b>Included in delivery</b>
Straight actuator	Standard		---	---	---	---	<b>AZ 17/170-B1</b>	<b>101122893</b>
	With rubber mountings		---	---	---	---	<b>AZ 17/170-B1-2245</b>	<b>101137406</b>
	Angled		---	---	---	---	<b>AZ 17/170-B5</b>	<b>101122895</b>
	Longer		---	---	---	---	<b>AZ 17/170-B11</b>	<b>101139788</b>
	Longer and angled		---	---	---	---	<b>AZ 17/170-B15</b>	<b>101139789</b>

**Actuating radii** The axis of the hinge must be d [mm] above and in a parallel plane to the top surface of the safety switch. The basis setting provides a minimum radius of R<sub>min</sub> [mm].

- Key**
- Actuating radius over the small edge of the actuator
  - Actuating radius over the wide edge of the actuator
  - Sliding and removable safety guards
  - Hinged safety guards

Actuators must be ordered separately.

## 2. Solenoid interlocks

### AZM 170 – Actuators and accessories









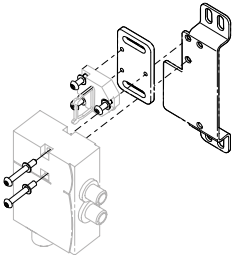
<b>AZ 17/170-B1 *</b>	<b>101122893</b>	<b>AZ 17/170-B1-2245</b>	<b>101137406</b>	<b>AZ 17/170-B5 *</b>	<b>101122895</b>
 <ul style="list-style-type: none"> <li>■ Straight actuator</li> <li>■ Also with individual coding *</li> </ul>	 <ul style="list-style-type: none"> <li>■ Actuator with rubber mounting</li> <li>■ Standard coding</li> </ul>	 <ul style="list-style-type: none"> <li>■ Angled actuator</li> <li>■ Also with individual coding *</li> </ul>			
<b>AZ 17/170-B11</b>	<b>101139788</b>	<b>AZ 17/170-B15</b>	<b>101139789</b>	<b>AZM 170-B6</b>	<b>101123391</b>
 <ul style="list-style-type: none"> <li>■ Long straight actuator</li> <li>■ Standard coding</li> </ul>	 <ul style="list-style-type: none"> <li>■ Long angled actuator</li> <li>■ Standard coding</li> </ul>	 <ul style="list-style-type: none"> <li>■ Flexible actuator</li> <li>■ Standard coding</li> </ul>			
<b>B6R *</b>	<b>B6L *</b>				
 <ul style="list-style-type: none"> <li>■ Flexible actuator for right-hand side door hinge</li> <li>■ Individual coding *</li> </ul>	 <ul style="list-style-type: none"> <li>■ Flexible actuator for left-hand side door hinge</li> <li>■ Individual coding *</li> </ul>				

\* The actuators with individual coding cannot be delivered individually.

## 2. Solenoid interlocks

### AZM 170 – Actuators and accessories



<b>AZM 170-B25-R-G1</b> 101175200	<b>AZM 170-B25-R-G2</b> 101175226	<b>MP AZ 17/170-B25</b> 101175190
 <ul style="list-style-type: none"> <li>■ Door-handle actuator with star grip</li> <li>■ For door hinge on the right-hand side</li> </ul>	 <ul style="list-style-type: none"> <li>■ Door-handle actuator with T-grip</li> <li>■ For door hinge on the right-hand side</li> </ul>	 <ul style="list-style-type: none"> <li>■ Mounting plate</li> <li>■ Accessories only for door-handle actuator AZM 170-B25-..</li> </ul>
<b>Centering device</b>	<b>Tamperproof screws</b>	<b>AZM 170-B</b> 101208493
 <ul style="list-style-type: none"> <li>■ Centering device for pre-positioning</li> <li>■ Mounting outside: <b>TFA-020</b>      101172607</li> <li>■ Mounting inside: <b>TFI-020</b>      101172609</li> </ul>	 <ul style="list-style-type: none"> <li>■ Tamperproof screws with unidirectional slots M4 x 8      101147463</li> <li>■ Quantity 2 pcs</li> </ul>	 <ul style="list-style-type: none"> <li>■ Centering guide</li> <li>■ Only in combination with long actuator</li> </ul>
<b>MS AZM 170 ...</b>		
 <ul style="list-style-type: none"> <li>■ Mounting set only in combination with B6</li> <li>■ Mounting parallel to safety guard: <b>MS AZM 170 P</b>      101150367</li> <li>■ Mounting right-angled to safety guard: <b>MS AZM 170 R/P</b>      101149211</li> </ul>		

## Up-to-date without fail

The online product catalogue



For detailed information, check out  
[www.schmersal.net](http://www.schmersal.net)

## 2. Solenoid interlocks

### AZM 190 – Actuator selection



Actuator type	Actuator description	Designed for					Type designation	Material number
			R <sub>min</sub> [mm]	d [mm]	R <sub>min</sub> [mm]	d [mm]		
Flexible actuator	Standard 2x15		350	20	650	20	AZM190-B3/2x15	101029938
	Standard 1x7.5		250	20	---	---	AZM190-B3/1x7,5	101029968
	Standard 1x15		200	20	---	---	AZM190-B3/1x15	101029967
Straight actuator	Standard		---	---	---	---	AZM190-B1	101029965
	to front mounting		---	---	---	---	AZM190-B5	101029966

**Actuating radii** The axis of the hinge must be d [mm] above and in a parallel plane to the top surface of the safety switch. The basis setting provides a minimum radius of R<sub>min</sub> [mm].

- Key**
- Actuating radius over the small edge of the actuator
  - Actuating radius over the wide edge of the actuator
  - Sliding and removable safety guards
  - Hinged safety guards

Actuators must be ordered separately.

## 2. Solenoid interlocks

### AZM 190 – Actuators and accessories



AZM190-B1	101029965	AZM190-B5	101029966	AZM190-B3/2x15	101029938
 <ul style="list-style-type: none"> <li>■ Straight actuator</li> <li>■ Compensation for tolerances by means of rubber buffers</li> </ul>		 <ul style="list-style-type: none"> <li>■ Actuator to front mounting</li> <li>■ Particularly suitable for front mounting and hinged protective equipment</li> </ul>		 <ul style="list-style-type: none"> <li>■ Flexible actuator</li> <li>■ For very small actuating radius over the small and wide edge of the actuator</li> </ul>	
AZM190-B3/1x7,5	101029968	AZM190-B3/1x15	101029967	MP190	101029969
 <ul style="list-style-type: none"> <li>■ Flexible actuator</li> </ul>		 <ul style="list-style-type: none"> <li>■ Flexible actuator</li> </ul>		 <ul style="list-style-type: none"> <li>■ Mounting plate</li> <li>■ For simple mounting of an AZM 190 on profile systems</li> </ul>	
MP190-V	103009486	ZPG190	101029970	Triangular key TZ-75	101028565
 <ul style="list-style-type: none"> <li>■ Mounting plate</li> <li>■ Internal mounting of the interlock and mounting plate with door hinge on right-hand side</li> <li>■ with left-hinged door</li> </ul> <p><b>MP190-VD</b>      <b>103009487</b></p>		 <ul style="list-style-type: none"> <li>■ Axial cable entry</li> </ul>		 <ul style="list-style-type: none"> <li>■ Angled triangular key</li> <li>■ For manual release</li> <li>■ The straight triangular key TZ-69 is included in delivery</li> </ul>	

## 2. Solenoid interlocks

### AZM 415 – Actuator selection



Actuator type	Actuator description	Designed for					Type designation	Material number
			R <sub>min</sub> [mm]	d [mm]	R <sub>min</sub> [mm]	d [mm]		
Flexible actuator	For very small actuating radius over the wide edge of the actuator		---	---	250	36	AZ/AZM 415-B2	101144796
	For very small actuating radius over the small edge of the actuator		250	36	---	---	AZ/AZM 415-B3	101144797
Straight actuator	For sliding safety guards		---	---	---	---	AZ/AZM 415-B1	101128545

**Actuating radii** The axis of the hinge must be d [mm] above and in a parallel plane to the top surface of the safety switch. The basis setting provides a minimum radius of R<sub>min</sub> [mm].

**Key**

	Actuating radius over the small edge of the actuator
	Actuating radius over the wide edge of the actuator
	Sliding and removable safety guards
	Hinged safety guards

Actuators must be ordered separately.



## 2. Solenoid interlocks

### AZM 415 – Actuators and accessories



AZ/AZM 415-B1	101128545	AZ/AZM 415-B2	101144796	AZ/AZM 415-B3	101144797
 <ul style="list-style-type: none"> <li>■ Straight actuator</li> <li>■ For sliding safety guards</li> </ul>	 <ul style="list-style-type: none"> <li>■ Flexible actuator</li> <li>■ Particularly suitable for hinged safety guards</li> <li>■ For very small actuating radius over the wide edge of the actuator</li> </ul>	 <ul style="list-style-type: none"> <li>■ Flexible actuator</li> <li>■ Particularly suitable for hinged safety guards</li> <li>■ For very small actuating radius over the small edge of the actuator</li> </ul>			
AZ/AZM 415-B4PS	101142540	Triangular key M5	101100887		
 <ul style="list-style-type: none"> <li>■ For sliding safety guards</li> <li>■ with locking bolt and ball latch</li> </ul>	 <ul style="list-style-type: none"> <li>■ For manual release</li> </ul>				

## 2. Solenoid interlocks

### AZM 201 – Actuator selection



Series	Door hinge		Emergency exit P0	Type designation	Material number
	Left	Right			
AZ/AZM 201-B1	■			AZ/AZM201-B1-LT	103013493
			■	AZ/AZM201-B1-LTP0	103013496
		■		AZ/AZM201-B1-RT	103013494
			■	AZ/AZM201-B1-RTP0	103013495

Series	Door hinge		Mounting		Door handle G1	Rota- ting knob G2	Emergency exit			Locking rod P30/P31	Lock- out tag	Type designation	Material number	
	Left	Right	In- side	Out- side			Without	Standard P1	Metal P20					
AZ/AZM 201-B30			■					■				AZ/AZM201-B30-RTIG1P1	103025195	
							■					AZ/AZM201-B30-LTAG1	103013501	
								■				AZ/AZM201-B30-LTAG1P1	103013498	
	■			■	■			■			■	AZ/AZM201-B30-LTAG1P1-SZ	103013500	
										■		AZ/AZM201-B30-LTAG1P30	103015820	
										■		AZ/AZM201-B30-LTAG1P31	103015821	
										■	■	AZ/AZM201-B30-LTAG1P31-SZ	103015822	
						■		■					AZ/AZM201-B30-LTAG2P1	103025248
			■					■					AZ/AZM201-B30-LTIG1P1	103025197
							■						AZ/AZM201-B30-RTAG1	103013502
								■					AZ/AZM201-B30-RTAG1P1	103013497
					■			■				■	AZ/AZM201-B30-RTAG1P1-SZ	103013499
			■		■					■			AZ/AZM201-B30-RTAG1P30	103015823
										■			AZ/AZM201-B30-RTAG1P31	103015824
										■	■		AZ/AZM201-B30-RTAG1P31-SZ	103015825
						■		■					AZ/AZM201-B30-RTAG2P1	103025247

Actuators must be ordered separately. Further actuator versions AZ/AZM201-B30 are available on request.

## 2. Solenoid interlocks

### AZM 201 – Actuators and accessories



<b>AZ/AZM201-B1-...</b>	<b>AZ/AZM201-B1...-P0</b>	
 <ul style="list-style-type: none"> <li>■ Actuator for sliding safety guards</li> <li>■ Left-hand side actuating direction <b>AZ/AZM201-B1-LT</b>      <b>103013493</b></li> <li>■ Right-hand side actuating direction <b>AZ/AZM201-B1-RT</b>      <b>103013494</b></li> </ul>	 <ul style="list-style-type: none"> <li>■ With emergency exit P0</li> <li>■ Left-hand side actuating direction <b>AZ/AZM201-B1-LTP0</b>      <b>103013496</b></li> <li>■ Right-hand side actuating direction <b>AZ/AZM201-B1-RTP0</b>      <b>103013495</b></li> </ul>	
<b>AZ/AZM201-B30-... -G1</b>	<b>AZ/AZM201-B30--SZ</b>	<b>AZ/AZM201-B30-...-G2</b>
 <ul style="list-style-type: none"> <li>■ Actuator for hinged safety guards</li> </ul>	 <ul style="list-style-type: none"> <li>■ Actuator B30 with lockout tag</li> </ul>	 <ul style="list-style-type: none"> <li>■ Actuator with rotating knob</li> </ul>
<b>AZ/AZM201-...-P1</b>	<b>AZ/AZM201-...-P20</b>	<b>AZ/AZM201-B30-...-P30/P31</b>
 <ul style="list-style-type: none"> <li>■ Emergency exit</li> </ul>	 <ul style="list-style-type: none"> <li>■ Emergency exit (metal)</li> </ul>	 <ul style="list-style-type: none"> <li>■ Three point locking linkage for requirements with increased mechanical stability (7.000 N)</li> </ul>

The actuation system selection can be found at [www.schmersal.net](http://www.schmersal.net).

## 2. Solenoid interlocks

### AZM 201 and AZM 300 - Actuator and accessories



SZ 200-1	101196397	SZ 200	101194438	RF-AZM200-T/-N	
 <ul style="list-style-type: none"> <li>■ Lockout tag with 6 bore holes for AZM 201 and AZM 300</li> <li>■ To prevent inadvertent closing, e.g. during maintenance</li> </ul>	 <ul style="list-style-type: none"> <li>■ Lockout tag with 5 bore holes for AZM 201</li> <li>■ To prevent inadvertent closing, e.g. during maintenance</li> </ul>	 <ul style="list-style-type: none"> <li>■ Emergency exit as retrofit kit <b>RF-AZM200-T</b> <b>103004966</b></li> <li>■ Emergency release as retrofit kit <b>RF-AZM200-N</b> <b>103003543</b></li> </ul>			
AZ/AZM300-B1	101218025	MP-AZ/AZM300-1	103003172	MS-AZ/AZM300-B1-1	103002891
 <ul style="list-style-type: none"> <li>■ Actuator</li> <li>■ 3 different directions of actuation</li> </ul>	 <ul style="list-style-type: none"> <li>■ Mounting plate</li> </ul>	 <ul style="list-style-type: none"> <li>■ Mounting set for actuators</li> </ul>			
AZM300-....-T / -N					
 <ul style="list-style-type: none"> <li>■ Emergency exit (-T) for fitting and actuation only from <b>within</b> the hazardous area</li> <li>■ Emergency release (-N) for fitting and actuation only on the <b>outside</b> of the safety guard</li> </ul>					

Actuators must be ordered separately.

## 2. Solenoid interlocks

### AZM 400 and MZM 100 – Actuators and accessories



AZM400-B1	103003508	MS-AZM400	103009179	SZ400	103015742
 <ul style="list-style-type: none"> <li>■ Actuator</li> </ul>	 <ul style="list-style-type: none"> <li>■ Mounting set for AZM 400 and actuator</li> <li>■ For simple installation on 40 mm aluminium profiles</li> </ul>			 <ul style="list-style-type: none"> <li>■ Lockout tag with 6 bore holes for AZM 400</li> <li>■ To prevent inadvertent closing, e.g. during maintenance</li> </ul>	
ACC-AZM400-BOW-4M/6M 103015308					
 <ul style="list-style-type: none"> <li>■ Remote release</li> <li>■ Unlocking via wire rope</li> <li>■ Can also be used as emergency exit or emergency release</li> <li>■ Only in combination with basic components AZM400...BOW</li> </ul>					
MZM 100-B1.1 101204290 MS MZM 100-W 101185510 MZM 100 TARGET 101210642					
 <ul style="list-style-type: none"> <li>■ Actuator free from play for MZM 100</li> <li>■ Neutralisation of undesired noises</li> </ul>	 <ul style="list-style-type: none"> <li>■ Mounting set for MZM 100</li> <li>■ Screws are included in delivery</li> </ul>			 <ul style="list-style-type: none"> <li>■ For MZM 100</li> <li>■ For the variable setting of the latching force</li> <li>■ Gradually adjustable by steps of approx. 10 N within a range from approx. 30 N to 100 N</li> </ul>	

Actuators must be ordered separately.

## 3. Trapped key system

### Description

#### Area of application

The SHGV key transfer system occurs mainly in more complex manufacturing systems and equipment. It is especially suitable for the protection of distributed maintenance and service doors that are rarely used. Further areas of application are installations installed in harsh environmental conditions and in areas with high ambient temperatures, not forgetting the potentially explosive installations in the chemical and process engineering.

#### Cost Savings

Saving costs with movable protection equipment, without affecting the safety level is possible with the safety door monitoring system SHGV. The cost savings is achieved because no wiring is needed between the moving protection equipment and switching cabinet.

Instead, the operation of the electrical locking is taken on by an intelligent key transfer between a switching element with lock mounted on the protection equipment and a key-selector-switch as control element mounted on the control panel.

#### Design and way of functioning

With the SHGV-system, the key contains the information as to whether the protection door or maintenance flap can be opened or not. In the initial state, all the keys used are each in a key-selector-switch that is mostly located in a central console, and from there releases functions of the machine control. The key can only be removed from there when the machine is in the safe operating mode. The operator can then use the key by inserting it into the lock barrel of the protection equipment and open the safety door. The key can only be removed when the safety door is closed and locked again. The machine or the hazardous movement can be started again once the key is back in the selector-switch. If the transfer time between making a selection with the key-selector-switch (removal of the key) and the unlocking of the protection equipment is insufficient, until a hazardous machine motion has come to a stop, then an additional key-selector-switch latch unit (SVE) may be required. The SHGV series also has a version with a second lock barrel which blocks the actuation of the first lock barrel, if an operator needs to enter a space and needs protection against the machine being started unintentionally by third parties.

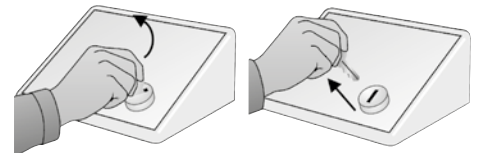
The special features of this safety and interlock system is that safety doors do not have any electrical supply, nor do they require any signal cable. The information as to whether a safety door can be opened or a machine may be set in motion is transmitted with the key. This creates additional freedom and facilitates the mounting of interlock systems in particular for larger installations.

Information for the selection of suitable safety relay modules can be found in the chapter "Safety relay modules" (refer to page 212).

## Functional sequence

The automatic mode of the machine control is released, if the NC contact(s) of a 2-digit key-selector-switch is/are closed. This corresponds to the position of the key-selector-switch, in which the key is in a non-removable position.

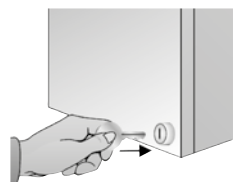
1. To interrupt or shut-down the automatic mode, the key in the key-selector-switch is switched from the non-removal position to the removal position. The NC contacts are forced open and the automatic operating mode of the machine control system is forcibly interrupted.



2. This allows the transfer of the key from key-selector-switch to the movable protection equipment.

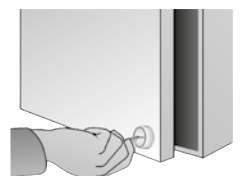


3. The unlocking of the interlock of the protection equipment is done by turning the lock barrel to the non-removal position.



4. The protection equipment can be opened.

5. The return of the key, if the protective equipment is opened, is blocked by an incorrect locking protection mechanism.



6. If the protection equipment is closed again, the blocking of the protection equipment is carried out by turning the key from the non-removal position to the removal position.

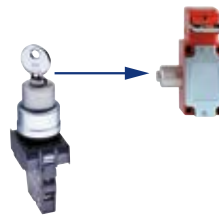
7. The return of the key to the key-selector-switch is used to switch the machine control system on again, by moving from the removal position to the non-removal position.

### 3. Trapped key system Application

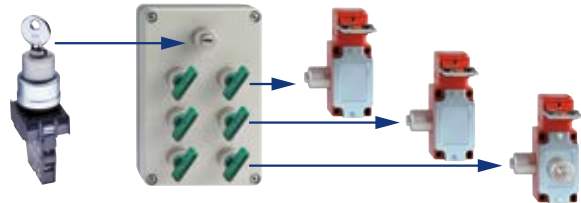
## System- Configurations

#### Hazardous run-on time < Time for the key transfer

One key-selector-switch SHGV/ESS locks one moveable piece of protection equipment

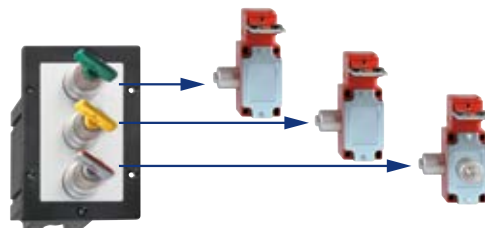


One key-selector-switch SHGV/ESS locks several moveable pieces of protection equipment using the key-distribution-station SVM

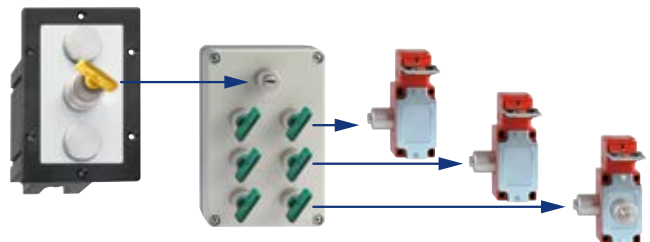


#### Hazardous run-on time > Time for the key transfer

A SVE key-selector-switch interlocking device locks up to 3 movable pieces of protection equipment depending on the run-on movements



A SVE key-selector-switch interlocking device locks several movable pieces of protection equipment using the SVM key-distribution-station depending on the run-on movements





### 3. Trapped key system

#### Overview

#### Overview

Components of the trapped key system		Please refer to
SHGV	Interlock	page 60
	Actuator	page 63
SVM	Key distribution station	page 64
SHGV/ESS21	Key-operated selector switch	page 68
SVE	Solenoid interlock with key-operated selector switch	page 70
	Accessories	page 74

### 3. Trapped key system

#### Guard locking device SHGV – Overview of the series



■ SHGV/B01/...



■ SHGV/L01/...



■ SHGV/R01/...

#### Key Features

- Lock barrel at the bottom
- With one actuating head
- Actuator head can be rotated in 90° steps

- Lock barrel to left
- With one actuating head
- Actuator head can be rotated in 90° steps

- Lock barrel to the right
- With one actuating head
- Actuator head can be rotated in 90° steps

#### Other versions

ATEX



#### Technical features

##### Mechanical data

Material of the enclosure	Aluminium	Aluminium	Aluminium
Latching force	5 N	5 N	5 N
Holding force $F_{max}$	1750 N	1250 N	1250 N
Holding force $F_{zh}$	1300 N	950 N	950 N
Dimensions (W x D x H)	40 x 87 x 103 mm	87 x 43 x 103 mm	87 x 43 x 103 mm
<b>Ambient conditions</b>			
Ambient temperature	-25 °C ... +70 °C	-25 °C ... +70 °C	-25 °C ... +70 °C
Protection class	IP65	IP65	IP65

#### Safety classification

Standards	ISO 13849-1	ISO 13849-1	ISO 13849-1
$B_{100}$ NC contact	100,000	100,000	100,000
Certificates	-	-	-



To get detailed information about the products and certificates, visit [www.schmersal.net](http://www.schmersal.net).



■ SHGV/LD1/...



■ SHGV/RD1/...



■ SHGV/B1.1/...



■ SHGV/L1.1/...



■ SHGV/R1.1/...

- Lock barrel left and secondary key on the front
- With one actuating head
- Actuator head can be rotated in 90° steps

- Lock barrel right and secondary key on the front
- With one actuating head
- Actuator head can be rotated in 90° steps

- Lock barrel at the bottom
- With two actuating heads
- Actuator head can be rotated in 90° steps

- Lock barrel to left
- With two actuating heads
- Actuator head can be rotated in 90° steps

- Lock barrel to the right
- With two actuating heads
- Actuator head can be rotated in 90° steps



Aluminium	Aluminium	Aluminium	Aluminium	Aluminium
5 N	5 N	5 N	5 N	5 N
1250 N	1250 N	1750 N	1250 N	1250 N
950 N	950 N	1300 N	950 N	950 N
87 x 87 x 103 mm	87 x 87 x 103 mm	40 x 87 x 135 mm	87 x 43 x 135 mm	87 x 43 x 135 mm
-25 °C ... +70 °C	-25 °C ... +70 °C	-25 °C ... +70 °C	-25 °C ... +70 °C	-25 °C ... +70 °C
IP65	IP65	IP65	IP65	IP65
ISO 13849-1	ISO 13849-1	ISO 13849-1	ISO 13849-1	ISO 13849-1
100,000	100,000	100,000	100,000	100,000
-	-	-	-	-

### 3. Trapped key system

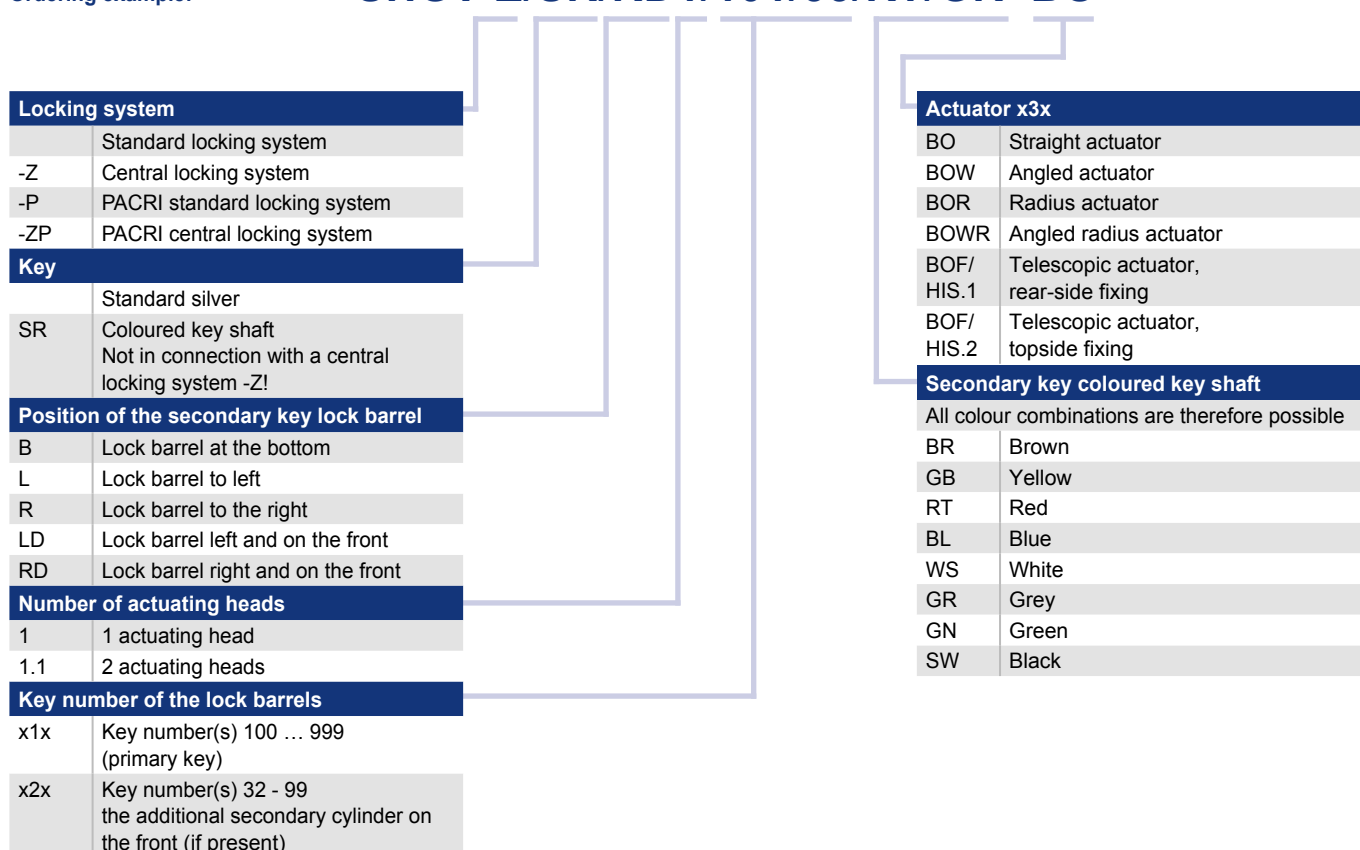
#### Guard locking device SHGV – Preferred types



Series	Lock barrel position			Number of safety guards	Type designation
	Bottom-side	Left	Right		
SHGV/B01/...	■			1	SHGV/B01/x1x+x3x
SHGV/L01/...		■		1	SHGV/L01/x1x+x3x
SHGV/R01/...			■	1	SHGV/R01/x1x+x3x
SHGV/LD1/.../...		■		1	SHGV/LD1/x1x/x2x+x3x
SHGV/RD1/.../...			■	1	SHGV/RD1/x1x/x2x+x3x
SHGV/B1.1/...	■			2	SHGV/B1.1/x1x+x3x
SHGV/L1.1/...		■		2	SHGV/L1.1/x1x+x3x
SHGVR1.1/...			■	2	SHGVR1.1/x1x+x3x

Ordering example:

### SHGV-Z/SR/RD1/101/35/RT/GR+BO



For technical reasons not all possible variations and key combinations can be delivered. The existing key type is used to translate the product type designation.

To see a wide range of other types, visit [www.schmersal.net](http://www.schmersal.net).

### 3. Trapped key system

#### Guard locking device SHGV – Actuator



BO	BOW	BOR
<p style="text-align: right;">101014460</p>  <ul style="list-style-type: none"> <li>■ Straight actuator</li> <li>■ Actuating radius <math>R_{min}</math>: 400 mm</li> </ul>	<p style="text-align: right;">101014462</p>  <ul style="list-style-type: none"> <li>■ Straight actuator</li> <li>■ Angled</li> <li>■ To front mounting</li> <li>■ Actuating radius <math>R_{min}</math>: 400 mm</li> </ul>	<p style="text-align: right;">101014461</p>  <ul style="list-style-type: none"> <li>■ Radius actuator</li> <li>■ Actuating radius <math>R_{min}</math>: 350 mm</li> </ul>
BOWR	BOF/HIS.1	BOF/HIS.2
<p style="text-align: right;">101014463</p>  <ul style="list-style-type: none"> <li>■ Radius actuator</li> <li>■ Angled</li> <li>■ To front mounting</li> <li>■ Actuating radius <math>R_{min}</math>: 350 mm</li> </ul>	<p style="text-align: right;">101025450</p>  <ul style="list-style-type: none"> <li>■ Telescopic actuator</li> <li>■ Flexible</li> <li>■ Rear-side fixing</li> <li>■ Actuating radius <math>R_{min}</math>: 400 mm</li> </ul>	<p style="text-align: right;">101025451</p>  <ul style="list-style-type: none"> <li>■ Telescopic actuator</li> <li>■ Flexible</li> <li>■ Topside fixing</li> <li>■ Actuating radius <math>R_{min}</math>: 400 mm</li> </ul>

The actuator is included in the delivery of the SHGV interlocking system.

Detailed information for the selection of the actuators can be found at [www.schmersal.net](http://www.schmersal.net).

### 3. Trapped key system

#### Key distribution station SVM – Series summary



■ SVM1/...-6/.../A

■ SVM1/...-10/.../A

■ SVM1/SR/...-6/.../A

#### Key Features

- |   |  |   |
|---|--|---|
| <ul style="list-style-type: none"> <li>• Enclosure for surface mounting</li> <li>• A primary lock barrel</li> <li>• For 6 keys</li> </ul> | <ul style="list-style-type: none"> <li>• Enclosure for surface mounting</li> <li>• A primary lock barrel</li> <li>• For 10 keys</li> </ul> | <ul style="list-style-type: none"> <li>• Enclosure for surface mounting</li> <li>• A primary lock barrel</li> <li>• For 6 keys</li> <li>• Coloured key shaft</li> </ul> |
|---|--|---|

#### Other versions

ATEX



#### Technical features

##### Mechanical data

Housing material / mounting plate	Aluminium	Aluminium	Aluminium
Dimensions (H x W x D)	120 x 113.5 x 180 mm	120 x 113.5 x 240 mm	120 x 113.5 x 180 mm
<b>Ambient conditions</b>			
Ambient temperature	-25 °C ... +50 °C	-25 °C ... +50 °C	-25 °C ... +50 °C
Protection class	IP65	IP65	IP65

#### Safety classification

Standards	ISO 13849-1	ISO 13849-1	ISO 13849-1
B <sub>100</sub> NC contact	100,000	100,000	100,000
Certificates	-	-	-



To get detailed information about the products and certificates, visit [www.schmersal.net](http://www.schmersal.net).



■ SVM1/SR/...-10/.../A

■ SVM1/...-6/.../E

■ SVM1/...-10/.../E

■ SVM1/SR/...-6/.../E

■ SVM1/SR/...-10/.../E

- Enclosure for surface mounting
- A primary lock barrel
- For 10 keys
- Coloured key shaft

- Mounting plate pre-mounted
- A primary lock barrel
- For 6 keys

- Mounting plate pre-mounted
- A primary lock barrel
- For 10 keys

- Mounting plate pre-mounted
- A primary lock barrel
- For 6 keys
- Coloured key shaft

- Mounting plate pre-mounted
- A primary lock barrel
- For 10 keys
- Coloured key shaft



Aluminium 120 x 113.5 x 240 mm	Stainless steel 120 x 52.5 x 180 mm	Stainless steel 120 x 54.5 x 240 mm	Stainless steel 120 x 52.5 x 180 mm	Stainless steel 120 x 54.5 x 240 mm
-25 °C ... +50 °C	-25 °C ... +50 °C	-25 °C ... +50 °C	-25 °C ... +50 °C	-25 °C ... +50 °C
IP65	IP65	IP65	IP65	IP65

ISO 13849-1 100,000	ISO 13849-1 100,000	ISO 13849-1 100,000	ISO 13849-1 100,000	ISO 13849-1 100,000
-	-	-	-	-

### 3. Trapped key system

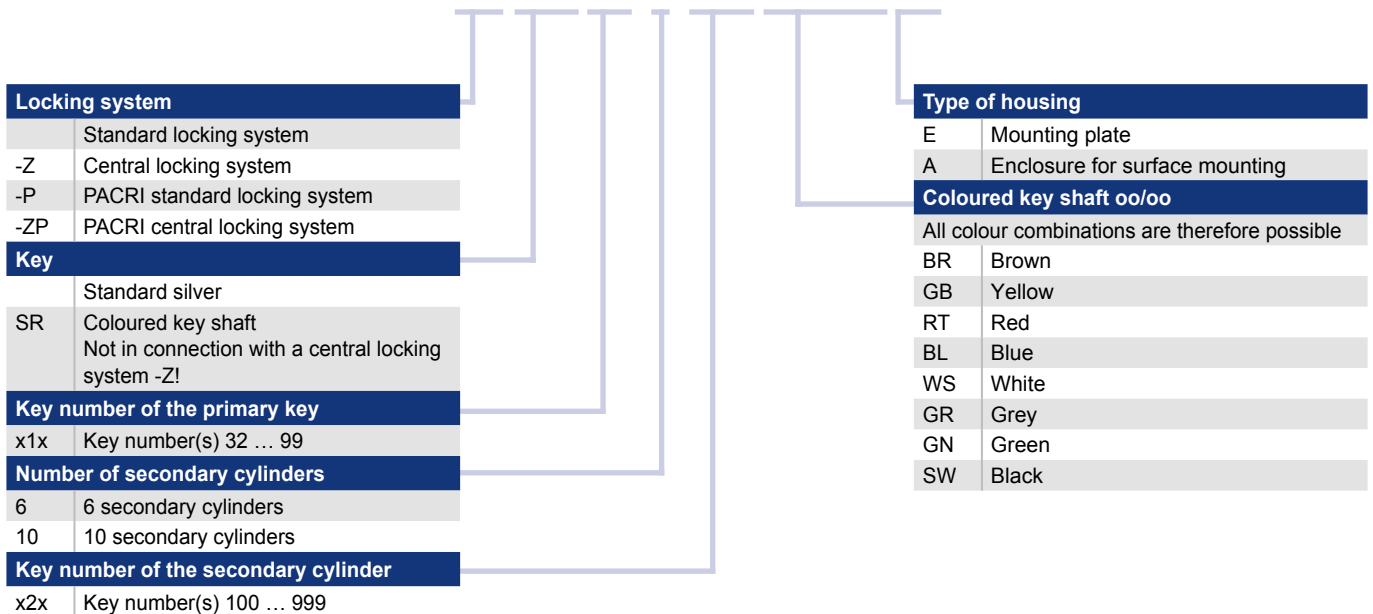
#### Key distribution station SVM – Preferred types



Series	Assembly housing	Assembly plate	Primary lock barrel	Number of lock barrels	Coloured key-shaft	Type designation
SVM1/...-6/.../A	■		1	6		SVM1/x1x-6/x2x/A
SVM1/...-10/.../A	■		1	10		SVM1/x1x-10/x2x/A
SVM1/SR/...-6/.../A	■		1	6	■	SVM1/SR/x1x-6/x2x/oo/oo/A
SVM1/SR/...-10/.../A	■		1	10	■	SVM1/SR/x1x-10/x2x/oo/oo/A
SVM1/...-6/.../E		■	1	6		SVM1/x1x-6/x2x/E
SVM1/...-10/.../E		■	1	10		SVM1/x1x-10/x2x/E
SVM1/SR/...-6/.../E		■	1	6	■	SVM1/SR/x1x-6/x2x/oo/oo/E
SVM1/SR/...-10/.../E		■	1	10	■	SVM1/SR/x1x-10/x2x/oo/oo/E

Ordering example:

### SVM1-Z/SR/35-6/115RT/GR/A

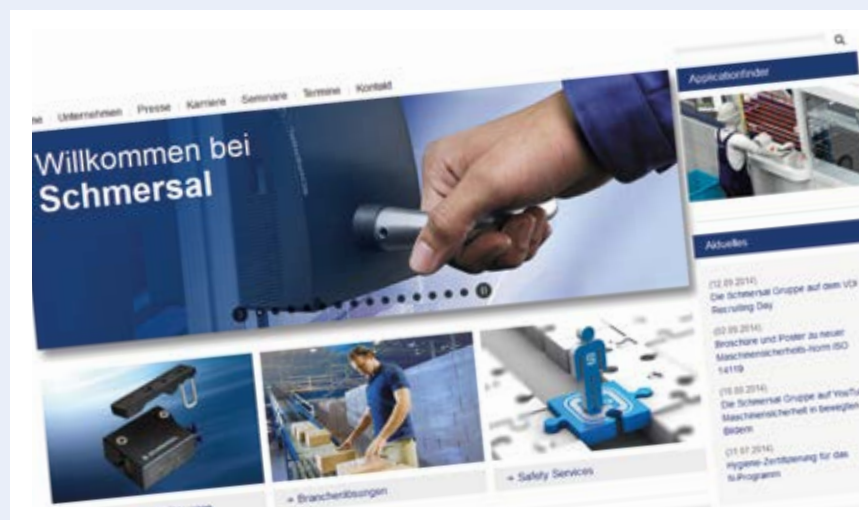


For technical reasons not all possible variations and key combinations can be delivered. The existing key type is used to translate the product type designation.

To see a wide range of other types, visit [www.schmersal.net](http://www.schmersal.net).



**Up-to-date without fail**  
Online on the world wide web



For detailed information, check out  
**[www.schmersal.com](http://www.schmersal.com)**

### 3. Trapped key system

#### Key-selector-switch SHGV/ESS21 – Series summary



■ SHGV/ESS21S2/.../103

■ SHGV/SR/ESS21S2/.../103

#### Key Features

- Variable key numbers
- Removal position in Position 1
- 1 NC contact / 1 NO contact

- Variable key numbers
- Removal position in Position 1
- 1 NC contact / 1 NO contact
- Coloured key shaft

#### Other versions

ATEX



#### Technical features

##### Electrical data

Max. switching capacity U/I

230 VAC / 8 A;  
24 VDC / 5 A

230 VAC / 8 A;  
24 VDC / 5 A

Connection

Screw terminals

Screw terminals

Cable section:

solid wire

2x 0.5 ... 2.5 mm<sup>2</sup>

2x 0.5 ... 2.5 mm<sup>2</sup>

stranded wire with conductor ferrules

2x 0.5 ... 1.5 mm<sup>2</sup>

2x 0.5 ... 1.5 mm<sup>2</sup>

##### Mechanical data

Material of the front-ring

Aluminium

Aluminium

Material of the lock barrel

Steel

Steel

Mounting hole

22.3 mm

22.3 mm

Front ring diameter

29.5 mm

29.5 mm

Installation height with key

62 mm

62 mm

Front plate thickness

1 ... 6 mm

1 ... 6 mm

Maintained switching positions

2

2

##### Ambient conditions

Ambient temperature

0 °C ... +75 °C

0 °C ... +75 °C

Protection class

IP65 (key-operated switch)

IP65 (key-operated switch)

#### Safety classification

Standards

ISO 13849-1

ISO 13849-1

B<sub>10D</sub> NC contact

100,000

100,000

Certificates



To get detailed information about the products and certificates, visit [www.schmersal.net](http://www.schmersal.net).

### 3. Trapped key system

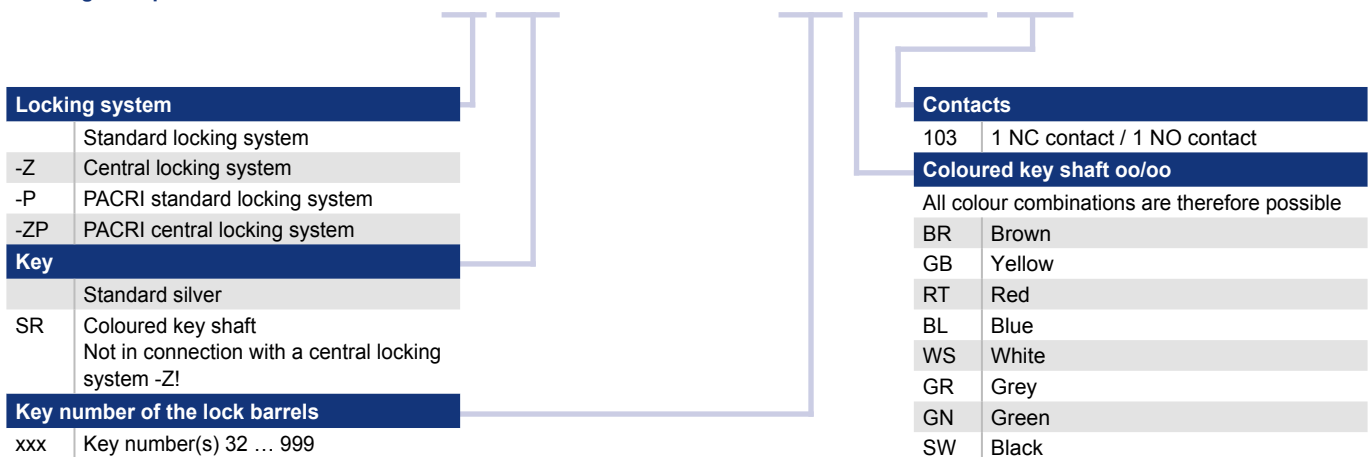
#### SHGV/ESS21 – Preferred types



Series	NC contacts	NO contacts	Removal position	Number of keys	Coloured key-shaft	Type designation
SHGV/ESS21S2/.../103	1	1	1	2		SHGV/ESS21S2/xxx/103
SHGV/SR/ESS21S2/.../103	1	1	1	2	■	SHGV/SR/ESS21S/xxxoo/oo/103

Ordering example:

## SHGV-Z/SR/ESS21S2/101RT/GR/103



For technical reasons not all possible variations and key combinations can be delivered. The existing key type is used to translate the product type designation.

To see a wide range of other types, visit [www.schmersal.net](http://www.schmersal.net).

### 3. Trapped key system

#### Solenoid interlock with key-operated selector switch SVE



■ SVE1/...

■ SVE1/SR/...

#### Key Features

- Installation housing
- One Lock barrel
- Manual release
- With up to 5 contacts

- Installation housing
- One Lock barrel
- Manual release
- Coloured key shaft
- With up to 5 contacts

#### Other versions

##### ATEX



#### Technical features

##### Electrical data

**Operating voltage** 230 VAC / 115 VAC / 24 VDC 230 VAC / 115 VAC / 24 VDC

**Power consumption** 0.35 A 0.35 A

**Max. switching capacity U/I** 230 VAC / 4 A;  
24 VDC / 4 A 230 VAC / 4 A;  
24 VDC / 4 A

**Connection** Screw terminals Screw terminals

##### Cable section:

**solid wire** 2x 0.25 ... 2.5 mm<sup>2</sup> 2x 0.25 ... 2.5 mm<sup>2</sup>

**stranded wire with conductor ferrules** 2x 0.25 ... 2.5 mm<sup>2</sup> 2x 0.25 ... 2.5 mm<sup>2</sup>

##### Mechanical data

**Material of the enclosure** Thermoplastic Thermoplastic

**Material of the mounting plate** Aluminium Aluminium

**Material of the lock barrel** Steel Steel

**Dimensions (H x W x D)** 96 x 169 x 144 mm 96 x 171 x 144 mm

##### Ambient conditions

**Ambient temperature** 0 °C ... +50 °C 0 °C ... +50 °C

**Protection class** IP65 IP65

#### Safety classification

**Standards** ISO 13849-1 ISO 13849-1

**B<sub>10d</sub> NC contact** 100,000 100,000

**Certificates** - -



To get detailed information about the products and certificates, visit [www.schmersal.net](http://www.schmersal.net).



■ SVE2/...

■ SVE2/SR/...

■ SVE3/...

■ SVE3/SR/...

- Installation housing
- Two lock barrels
- Manual release
- Screw terminals
- With up to 6 contacts

- Installation housing
- Two lock barrels
- Manual release
- Coloured key shaft
- With up to 6 contacts

- Installation housing
- Three lock barrels
- Manual release
- With up to 8 contacts

- Installation housing
- Three lock barrels
- Manual release
- Coloured key shaft
- With up to 8 contacts

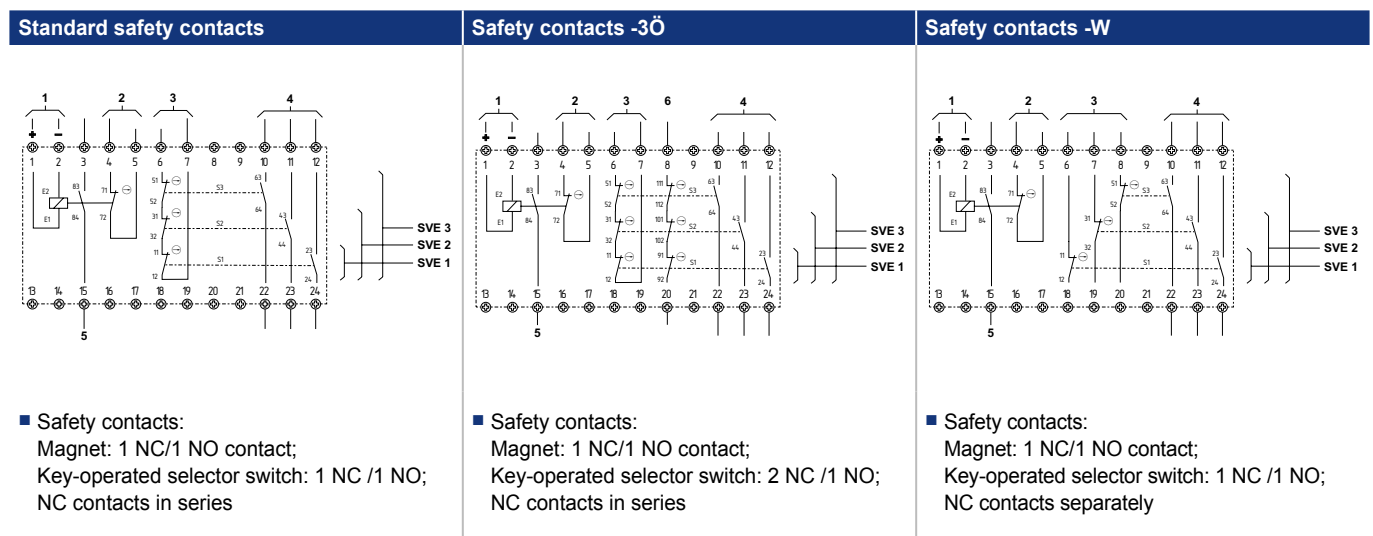


230 VAC / 115 VAC / 24 VDC	230 VAC / 115 VAC / 24 VDC	230 VAC / 115 VAC / 24 VDC	230 VAC / 115 VAC / 24 VDC
0.35 A	0.35 A	0.35 A	0.35 A
230 VAC / 4 A; 24 VDC / 4 A	230 VAC / 4 A; 24 VDC / 4 A	230 VAC / 4 A; 24 VDC / 4 A	230 VAC / 4 A; 24 VDC / 4 A
Screw terminals	Screw terminals	Screw terminals	Screw terminals
2x 0.25 ... 2.5 mm <sup>2</sup>	2x 0.25 ... 2.5 mm <sup>2</sup>	2x 0.25 ... 2.5 mm <sup>2</sup>	2x 0.25 ... 2.5 mm <sup>2</sup>
2x 0.25 ... 2.5 mm <sup>2</sup>	2x 0.25 ... 2.5 mm <sup>2</sup>	2x 0.25 ... 2.5 mm <sup>2</sup>	2x 0.25 ... 2.5 mm <sup>2</sup>
Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic
Aluminium	Aluminium	Aluminium	Aluminium
Steel	Steel	Steel	Steel
96 x 169 x 144 mm	96 x 171 x 144 mm	96 x 169 x 144 mm	96 x 171 x 144 mm
0 °C ... +50 °C	0 °C ... +50 °C	0 °C ... +50 °C	0 °C ... +50 °C
IP65	IP65	IP65	IP65
ISO 13849-1	ISO 13849-1	ISO 13849-1	ISO 13849-1
100,000	100,000	100,000	100,000
-	-	-	-

### 3. Trapped key system SVE – Preferred types



Series	Lock barrel	Lock barrel position			Coloured key-shaft	Safety contacts			Auxiliary contacts	Operating voltage	Type designation
		Left	Centered	Right		Standard	-3Ö	-W			
SVE1/...	1		■			2	3	2	2	24 VDC	SVE1/xxx-24VDC
										24 VAC	SVE1/xxx-24VAC
										115 VAC	SVE1/xxx-115VAC
										230 VAC	SVE1/xxx-230VAC
SVE1/SR/...	1		■		■	2	3	2	2	24 VDC	SVE1/SR/xxxoo/oo-24VDC
										24 VAC	SVE1/SR/xxxoo/oo-24VAC
										115 VAC	SVE1/SR/xxxoo/oo-115VAC
										230 VAC	SVE1/SR/xxxoo/oo-230VAC
SVE2/...	2	■		■		2	3	3	3	24 VDC	SVE2/xxx-24VDC
										24 VAC	SVE2/xxx-24VAC
										115 VAC	SVE2/xxx-115VAC
										230 VAC	SVE2/xxx-230VAC
SVE2/SR/...	2	■		■	■	2	3	3	3	24 VDC	SVE2/SR/xxxoo/oo-24VDC
										24 VAC	SVE2/SR/xxxoo/oo-24VAC
										115 VAC	SVE2/SR/xxxoo/oo-115VAC
										230 VAC	SVE2/SR/xxxoo/oo-230VAC
SVE3/...	3	■	■	■		2	3	4	4	24 VDC	SVE3/xxx-24VDC
										24 VAC	SVE3/xxx-24VAC
										115 VAC	SVE3/xxx-115VAC
										230 VAC	SVE3/xxx-230VAC
SVE3/SR/...	3	■	■	■	■	2	3	4	4	24 VDC	SVE3/SR/xxxoo/oo-24VDC
										24 VAC	SVE3/SR/xxxoo/oo-24VAC
										115 VAC	SVE3/SR/xxxoo/oo-115VAC
										230 VAC	SVE3/SR/xxxoo/oo-230VAC



To see a wide range of other types, visit [www.schmersal.net](http://www.schmersal.net).

### 3. Trapped key system SVE – Ordering code



Ordering example:

## SVE1-Z/SR/101RT/GR-3Ö-24VAC

Number of key-selector-switches	
1	1 key-operated selector switches
2	2 key-operated selector switches
3	3 key-operated selector switches
Locking system	
	Standard locking system
-Z	Central locking system
-P	PACRI standard locking system
-ZP	PACRI central locking system
Key	
	Standard silver
SR	Coloured key shaft Not in connection with a central locking system -Z!
Key number of the lock barrels	
xxx	Key number(s) 32 ... 999
Coloured key shaft oo/oo	
All colour combinations are therefore possible	
BR	Brown
GB	Yellow
RT	Red
BL	Blue
WS	White
GR	Grey
GN	Green
SW	Black

Rated control voltage	
24 VDC	Us 24 VDC
24VAC	Us 24 VAC
115VAC	Us 115 VAC
230VAC	Us 230 VAC
Contacts	
	Magnet: 1 NC/1 NO contact; Key-operated selector switch: 1 NC /1 NO contact; NC contacts in series
3Ö	Magnet: 1 NC/1 NO contact; Key-operated selector switch: 2 NC /1 NO contact; NC contacts in series
W	Magnet: 1 NC/1 NO contact; Key-operated selector switch: 2 NC /1 NO contact; NC contacts separately

For technical reasons not all possible variations and key combinations can be delivered. The existing key type is used to translate the product type designation.

To see a wide range of other types, visit [www.schmersal.net](http://www.schmersal.net).

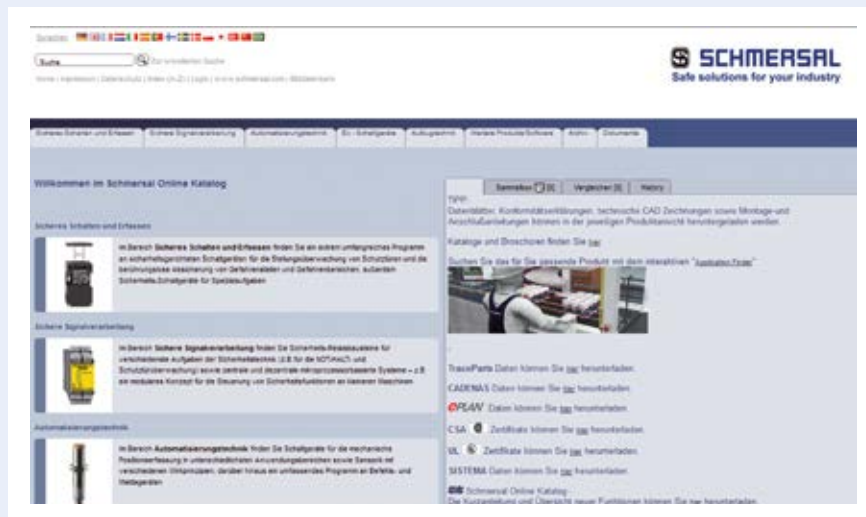
### 3. Trapped key system Accessories

Contact element EF 103.2	101006548	Contact element EF 103.3	101006549	SHGV-SK	101183035																																			
 <ul style="list-style-type: none"> <li>■ 1 NC contact / 1 NO contact</li> <li>■ Screw terminals</li> <li>■ Assembly flange position 2</li> <li>■ Contact labelling: 31 - 32; 43 - 44</li> </ul>		 <ul style="list-style-type: none"> <li>■ 1 NC contact / 1 NO contact</li> <li>■ Screw terminals</li> <li>■ Assembly flange position 3</li> <li>■ Contact labelling: 51 - 52; 63 - 64</li> </ul>		 <ul style="list-style-type: none"> <li>■ Dust shield cap</li> </ul>																																				
 <ul style="list-style-type: none"> <li>■ Both of the key shaft halves can be bonded together with commercially available cyanoacrylate adhesive for technical plastic.</li> <li>■ Quantity 5 pieces</li> <li>■ Not in connection with a central locking system!</li> </ul>	<table border="1"> <thead> <tr> <th>Colour</th> <th>Colour code</th> <th>Type designation</th> <th>Material number</th> </tr> </thead> <tbody> <tr> <td>blue</td> <td>BL</td> <td>SHGV-SR/BL</td> <td>101160194</td> </tr> <tr> <td>brown</td> <td>BR</td> <td>SHGV-SR/BR</td> <td>101181721</td> </tr> <tr> <td>yellow</td> <td>GE</td> <td>SHGV-SR/GE</td> <td>101160199</td> </tr> <tr> <td>green</td> <td>GN</td> <td>SHGV-SR/GN</td> <td>101160197</td> </tr> <tr> <td>grey</td> <td>GR</td> <td>SHGV-SR/GR</td> <td>101181719</td> </tr> <tr> <td>red</td> <td>RT</td> <td>SHGV-SR/RT</td> <td>101160196</td> </tr> <tr> <td>black</td> <td>bk</td> <td>SHGV-SR/SW</td> <td>101160193</td> </tr> <tr> <td>white</td> <td>WS</td> <td>SHGV-SR/WS</td> <td>101160200</td> </tr> </tbody> </table>	Colour	Colour code	Type designation	Material number	blue	BL	SHGV-SR/BL	101160194	brown	BR	SHGV-SR/BR	101181721	yellow	GE	SHGV-SR/GE	101160199	green	GN	SHGV-SR/GN	101160197	grey	GR	SHGV-SR/GR	101181719	red	RT	SHGV-SR/RT	101160196	black	bk	SHGV-SR/SW	101160193	white	WS	SHGV-SR/WS	101160200			
Colour	Colour code	Type designation	Material number																																					
blue	BL	SHGV-SR/BL	101160194																																					
brown	BR	SHGV-SR/BR	101181721																																					
yellow	GE	SHGV-SR/GE	101160199																																					
green	GN	SHGV-SR/GN	101160197																																					
grey	GR	SHGV-SR/GR	101181719																																					
red	RT	SHGV-SR/RT	101160196																																					
black	bk	SHGV-SR/SW	101160193																																					
white	WS	SHGV-SR/WS	101160200																																					



## Up-to-date without fail

The online product catalogue



For detailed information, check out  
[www.schmersal.net](http://www.schmersal.net)

## 4. Position switches

### Description

#### System universally deployable series

Recording and monitoring, from extraordinarily compact to very robust.

With these properties, the new position switches are aimed at a wide variety of applications across all disciplines of mechanical engineering and plant manufacturing as well as elevator technology.

The advantages of the new position switch series at a glance:

- Reliable position detection
- Highly versatile
- Robust and reliable
- Can be combined in numerous ways thanks to modular design

#### Area of application

Type 1 position switches according to ISO 14119 are for determining the position and monitoring of movable components on machines and for protective equipment that can be moved laterally or is rotatable. This allows them to be used in all industrial environments.

The protection classes IP66 an IP67 form the requirements for the use of position switches in adverse ambient conditions.

#### Design and way of functioning

All position switches are equipped with positively-opening break contacts in accordance with IEC 60947-5-1 and are available with snap action and also slow action. In conjunction with an appropriate safety controller, a single position switch can be used up to PL d. Using two position switches PL e can be achieved according to ISO 13849-1.

Information for the selection of suitable safety relay modules can be found in the chapter "Safety relay modules" (refer to page 212).

#### Flexible solutions

##### Switching elements with up to three contacts

Switching elements with three contacts ensures a redundant switch-off with additional signalling contact. All switching elements of the diverse contact combinations are equipped with galvanically separated contacts with positive break NC contacts.

##### Latching function

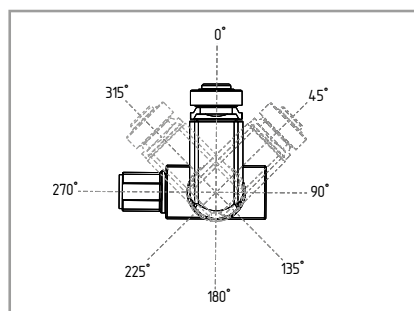
To save the switching state, versions are available with snap action and an optional latching function where the mounting element must be manually reset to the starting condition.

##### Modular diversity

The modular design with consistent components across all series reduces the number of different versions, lowers the effort required for storage and increases availability.

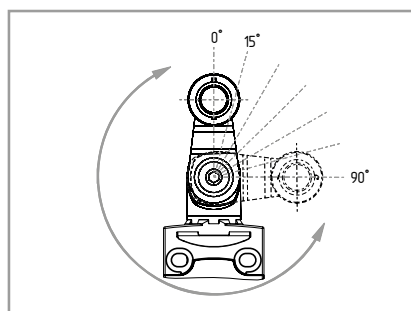


## Actuator elements and lever



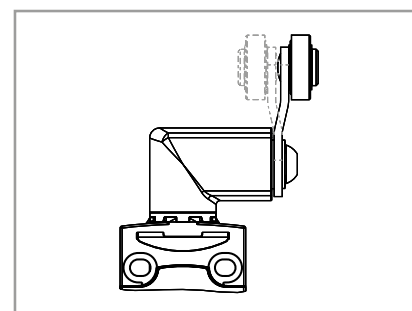
### Adjustable actuator elements

All actuating elements can be rotated in 45° steps and can be quickly replaced and implemented due to the simple mounting design.



### Adjustable lever

Roller lever can be set in 15° steps.



### Rotatable lever

For versions with a rotatable roller lever, the lever can be fitted so that the roller is on the inside.

## 4. Position switches

Order information complete device or modular construction kit

All position switches of the PS116, PS2xx and PS3xx series can be obtained either as a complete device or a modular construction kit. The complete device with actuating element S200 serves as a basic switch in the construction kit system. The following ordering example can therefore be transferred to all of the series listed.

### Ordering example

Position switch PS116, snap action 1 NO contact / 1 NC contact, roller lever, M12 connector on right



PS-K230



PS-K200



PS-K210



PS-R200



PS-H200



PS-K240



PS-K250



PS-N200



PS-J200

#### Complete device



PS116-Z11-STR-H200

#### Modular selection (construction kit) to be ordered separately



**Basic switch:**  
PS116-Z11-STR-S200

For assembly of the modular selection, the enclosure of the thrust pin included in the basic switch must be removed and replaced by the roller lever PS-H200.



#### Actuator head:

## Ordering code

### PSxxx-Z11-L200-S200

#### Switching elements (others on request)

Z11	Snap action 1 NO contact / 1 NC contact
Z12	Snap action 1 NO contact / 2 NC contacts
Z11R	Snap action 1 NO contact / 1 NC contact with latching (not for PS3xx)
T11	Slow action 1 NO contact / 1 NC contact
T12	Slow action 1 NO contact / 2 NC contacts
T03	Slow action 3 NC contacts
T11UE	Slow action 1 NO contact / 1 NC contact with overlapping contacts
T02H	Slow action 2 NC contacts with staggered contacts

#### Connection

	Cable entry M20, screw connection
ST	Connector plug M12, bottom
STR	Connector plug M12, right
L200	Pre-wired cable bottom, 2 m (PS116 only)
LR200	Pre-wired cable right, 2 m (PS116 only)

#### Actuator elements (more on request)

##### PS116 and PS2xx series

S200	Plunger
R200	Roller plunger, roller Ø 9.5 mm
K200	Offset roller lever, roller Ø 12 mm
K210	Offset roller lever, roller Ø 14 mm
K230	Angle roller lever, roller Ø 14 mm
K240	Angle roller lever, roller Ø 22 mm
K250	Angle roller lever, roller Ø 22 mm
H200	Roller lever, roller Ø 16 mm, length 24 mm
N200	Roller lever, roll Ø 20 mm, can be adjusted in 2 mm increments (24 ... 66 mm)
J200	Rod lever with plastic rod Ø 6 mm, length 200 mm

##### PS3xx series

S300	Plunger
R300	Roller plunger, roller Ø 17.2 mm
K360	Angle roller lever, roller Ø 20 mm
K370	Offset roller lever, roller Ø 20 mm
H300	Offset roller lever, roller Ø 25 mm
N300	Roller lever, roll Ø 20 mm, can be adjusted in 2 mm increments (24 ... 66 mm)
J300	Rod lever, rod Ø 6 mm, length 200 mm

## 4. PS2xx / PS3xx

Standardised construction forms, extraordinary features

Folding  
latching cover



All plastic versions are fitted with a folding and captive latching cover. The cover can be opened with the aid of a head screwdriver and needs no tools to be closed.

Reduced  
assembly times

The 45° rotated connection terminals of all switch elements reduce the assembly time considerably.



## Actuating element replace and turn

All actuating elements can be rotated in 45° steps and can be quickly replaced and implemented due to the simple mounting design. This means that adaptation to the prescribed actuating direction is possible at any time.

### PS116



1. Release locking plate  
(head screwdriver or  
accessory tool ACC-PS116-1)

2. Remove or turn existing  
actuating element

3. Position of new  
actuating element

4. Secure locking  
plate

The symmetrical layout of the enclosure means that it can be used for left-hand and right-hand versions of the same switch. This applies to both the cable and the connector design.

### PS2xx / PS3xx



1. Release locking plate  
(head screwdriver)

2. Remove or turn existing  
actuating element

3. Position of new  
actuating element

4. Secure locking  
plate

## 4. Position switches

### Overview of the series



■ PS116



■ PS215



■ PS216

#### Key Features

- Symmetrical casing
- Compact design
- Fitted (cable / M12 connector)
- Complete device or modular construction kit
- Design to EN 50047

- Simplified connection (connection terminals rotated by 45°)
- Robust design
- Fitted (M12 connector)
- Complete device or modular construction kit
- Design to EN 50047

- Simplified connection (connection terminals rotated by 45°)
- Folding latching cover
- Fitted (M12 connector)
- Complete device / modular selection
- Design to EN 50047

#### Technical features

Electrical characteristics			
<b>Switching system</b>	Snap-/slow action	Snap-/slow action	Snap-/slow action
<b>Latching variant</b>	■	■	■
<b>Max. number of contacts</b>	3	3	3
<b>Max. switching capacity U/I</b>	230 VAC / 3 A; 24 VDC / 1.5 A	230 VAC / 3 A; 24 VDC / 3 A	230 VAC / 3 A; 24 VDC / 3 A
Mechanical data			
<b>Housing material</b>	Metal / thermoplastic enclosure	Metal enclosure, painted	Thermoplastic enclosure
<b>Connection</b>	Cable 4/6 pole M12 connector 4/6 pole	1 x M20 M12 connector 5/8 pole	1 x M20 M12 connector 4/8 pole
<b>Cable section <sup>3)</sup></b>	4/6 x 0.5 mm <sup>2</sup>	max. 1.5 mm <sup>2</sup> (incl. conductor ferrules)	max. 1.5 mm <sup>2</sup> (incl. conductor ferrules)
<b>Dimensions (W x H x D)</b>	31 x 52 x 16.6 mm	31 x 66 x 33 mm	31 x 66 x 33 mm
Ambient conditions			
<b>Ambient temperature</b>	-30 °C ... +80 °C	-30 °C ... +80 °C	-30 °C ... +80 °C
<b>Protection class</b>	IP66, IP67	IP66, IP67	IP66, IP67
<b>Actuator heads</b>	see page 84	see page 84	see page 84

#### Safety classification

<b>Standards</b>	ISO 13849-1	ISO 13849-1	ISO 13849-1
<b>B<sub>10D</sub> NC contact</b>	20,000,000	20,000,000	20,000,000
<b>Certificates</b>			



To get detailed information about the products and certificates, visit [www.schmersal.net](http://www.schmersal.net).





■ PS226



■ PS315



■ PS316

- |  |   |  |
|--|---|--|
| <ul style="list-style-type: none"> <li>• Simplified connection (connection terminals rotated by 45°)</li> <li>• Folding latching cover</li> <li>• Fitted (M12 connector)</li> <li>• Complete device or modular construction kit</li> <li>• Design to EN 50047</li> </ul> | <ul style="list-style-type: none"> <li>• Simplified connection (connection terminals rotated by 45°)</li> <li>• Robust design</li> <li>• Fitted (M12 connector)</li> <li>• Complete device or modular construction kit</li> <li>• Design to EN 50041</li> </ul> | <ul style="list-style-type: none"> <li>• Simplified connection (connection terminals rotated by 45°)</li> <li>• Folding latching cover</li> <li>• Fitted (M12 connector)</li> <li>• Complete device or modular construction kit</li> <li>• Design to EN 50041</li> </ul> |
|--|---|--|

Snap-/slow action	Snap-/slow action	Snap-/slow action
■	–	–
3	3	3
230 VAC / 3 A; 24 VDC / 3 A	230 VAC / 3 A; 24 VDC / 3 A	230 VAC / 3 A; 24 VDC / 3 A
Thermoplastic enclosure	Metal enclosure, painted	Thermoplastic enclosure
2 x M20	1 x M20	1 x M20
M12 connector	M12 connector	M12 connector
4/8 pole	5/8 pole	4/8 pole
max. 1.5 mm <sup>2</sup>	max. 1.5 mm <sup>2</sup>	max. 1.5 mm <sup>2</sup>
(incl. conductor ferrules)	(incl. conductor ferrules)	(incl. conductor ferrules)
31 x 59.2 x 33 mm	40 x 77.7 x 37.2 mm	40 x 77.7 x 37.2 mm
–30 °C ... +80 °C	–30 °C ... +80 °C	–30 °C ... +80 °C
IP66, IP67	IP66, IP67	IP66, IP67
see page 84	see page 88	see page 88

ISO 13849-1	ISO 13849-1	ISO 13849-1
20,000,000	20,000,000	20,000,000

## 4. Position switches

### PS116 / PS2xx – Actuator heads



Plunger S200



Roller plunger R200

#### Actuator heads

Actuator description	Thermoplastic plunger Actuator type B to EN 50047	Thermoplastic roller plunger Actuator type C to EN 50047
<b>Positive break force</b>	> 40 N	> 40 N
<b>Actuating speed</b>	min. 10 mm/min, max. 0.5 m/s	min. 10 mm/min, max. 0.5 m/s
<b>Snap action</b>		
<b>Slow action</b>	min. 60 mm/min, max. 0.5 m/s	min. 60 mm/min, max. 0.5 m/s
<b>Positioning the lever</b>	-	-

#### Ordering data modular construction kit

Product type description	PS-S200	PS-R200
<b>Material number</b>	103010968	103010967

#### Switch travel diagrams

<b>Snap action</b>	<b>Per NO / per NC</b>		
<b>Slow action</b>	<b>Per NO / per NC</b>		
	<b>1 NO / 1 NC with overlapping</b>		
	<b>2 NC with staggered contacts</b>		

Contact closed

Contact open

Positive break travel / angle



Offset roller lever K200



Offset roller lever K210



Angle roller lever K230

Thermoplastic offset roller lever  
Actuator type E to EN 50047

> 40 N

min. 10 mm/min,  
max. 1 m/s

min. 60 mm/min,  
max. 1 m/s

-

Thermoplastic offset roller lever

> 40 N

min. 10 mm/min,  
max. 1 m/s

min. 60 mm/min,  
max. 1 m/s

-

Thermoplastic angle roller lever

> 40 N

min. 10 mm/min,  
max. 1 m/s

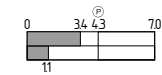
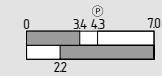
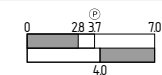
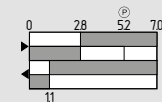
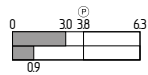
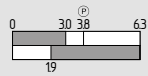
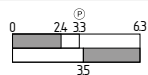
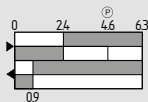
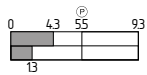
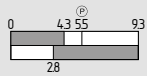
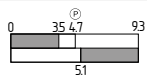
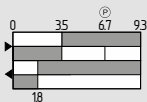
min. 60 mm/min,  
max. 1 m/s

-

PS-K200  
103010961

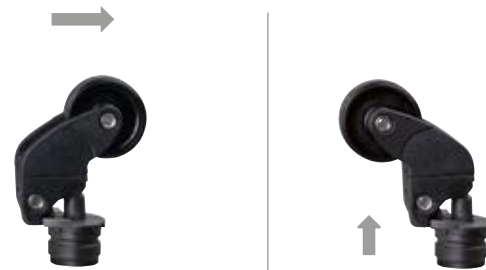
PS-K210  
103010962

PS-K230  
103010963



## 4. Position switches

### PS116 / PS2xx – Actuator heads



Angle roller lever K240

Angle roller lever K250

#### Actuator heads

Actuator description	Thermoplastic angle roller lever	Thermoplastic angle roller lever
<b>Positive break force</b>	> 40 N	> 40 N
<b>Actuating speed</b>	min. 10 mm/min, max. 1 m/s	min. 10 mm/min, max. 1 m/s
<b>Snap action</b>		
<b>Slow action</b>	min. 60 mm/min, max. 1 m/s	min. 60 mm/min, max. 1 m/s
<b>Positioning the lever</b>	-	-

#### Ordering data modular construction kit

Product type description	PS-K240	PS-K250
<b>Material number</b>	103010964	103010965

#### Switch travel diagrams

<b>Snap action</b>	<b>Per NO / per NC</b>		
<b>Slow action</b>	<b>Per NO / per NC</b>		
	<b>1 NO / 1 NC with overlapping</b>		
	<b>2 NC with staggered contacts</b>		

Contact closed

Contact open

Positive break travel / angle



**Roller lever H200**

Metal lever with plastic roller  
Actuator type A to EN 50047

> 40 N

min. 10 mm/min,  
max. 1 m/s

min 60 mm/min,  
max. 1 m/s

adjustable in 15° steps

PS-H200

103010948



**Roller lever N200**

Length adjustable metal lever  
with plastic roller  
adjustable in 2 mm increments

> 40 N

min. 10 mm/min,  
max. 1 m/s

min. 60 mm/min,  
max. 1 m/s

adjustable in 15° steps

PS-N200

103010966



**Roller lever J200**

Plastic rod, 200 mm  
Can only be used for positioning tasks

> 40 N

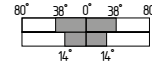
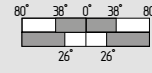
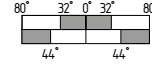
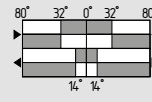
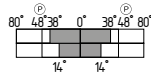
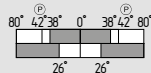
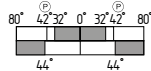
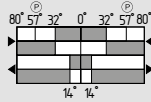
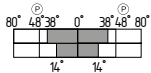
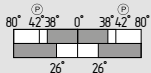
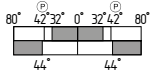
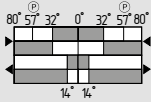
min. 10 mm/min,  
max. 1 m/s

min 60 mm/min,  
max. 1 m/s

adjustable in 15° steps

PS-J200

103010951



## 4. Position switches

### PS3xx – Actuator heads



Plunger S300



Roller plunger R300

#### Actuator heads

Actuator description	Thermoplastic plunger Actuator type B to EN 50041	Thermoplastic roller plunger Actuator type C to EN 50041
<b>Positive break force</b>	> 50 N	> 50 N
<b>Actuating speed</b>	min. 10 mm/min, max. 0.5 m/s	min. 10 mm/min, max. 0.5 m/s
<b>Snap action</b>		
<b>Slow action</b>	min. 60 mm/min, max. 0.5 m/s	min. 60 mm/min, max. 0.5 m/s
<b>Positioning the lever</b>	-	-

#### Ordering data modular construction kit

Product type description	PS-S300	PS-R300
<b>Material number</b>	103015397	103015398

#### Switch travel diagrams

Actuation	Contact configuration	Plunger S300	Roller plunger R300
<b>Snap action</b>	Per NO / per NC		
<b>Slow action</b>	Per NO / per NC		
	<b>1 NO / 1 NC with overlapping</b>		
	<b>2 NC with staggered contacts</b>		

Contact closed

Contact open

Positive break travel / angle



Angle roller lever K360

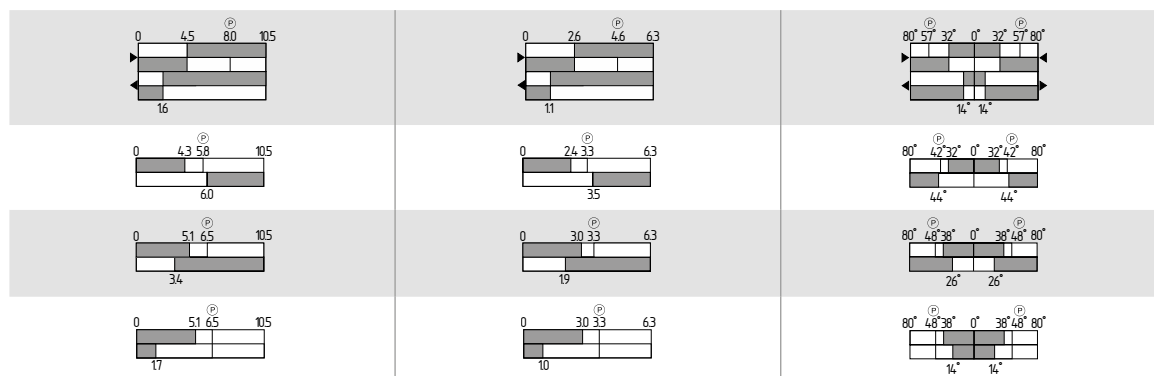


Offset roller lever K370



Roller lever H300

Thermoplastic angle roller lever	Thermoplastic offset roller lever	Metal lever with plastic roller Actuator type A to EN 50041
> 50 N	> 50 N	> 50 N
min. 10 mm/min, max. 1 m/s	min. 10 mm/min, max. 1 m/s	min. 10 mm/min, max. 1 m/s
min. 60 mm/min, max. 1 m/s	min. 60 mm/min, max. 1 m/s	min. 60 mm/min, max. 1 m/s
-	-	adjustable in 15° steps
PS-K360 103015399	PS-K370 103015400	PS-H300 103015401



## 4. Position switches

### PS3xx – Actuator heads



Roller lever N300

Roller lever J300

#### Actuator heads

Actuator description	Roller lever N300	Roller lever J300
Actuator description	Length adjustable metal lever with plastic roller adjustable in 2 mm increments	Plastic rod, 200 mm Can only be used for positioning tasks Actuator type A to EN 50041
Positive break force	> 50 N	-
Actuating speed	min. 10 mm/min, max. 1 m/s	min. 10 mm/min, max. 1 m/s
Snap action		
Slow action	min. 60 mm/min, max. 1 m/s	min. 60 mm/min, max. 1 m/s
Positioning the lever	adjustable in 15° steps	adjustable in 15° steps

#### Ordering data modular construction kit

Product type description	PS-N300	PS-J300
Material number	103015402	103015403

#### Switch travel diagrams

Snap action	Per NO / per NC	PS-N300	PS-J300
Snap action	Per NO / per NC		
Slow action	Per NO / per NC		
1 NO / 1 NC with overlapping			
	2 NC with staggered contacts		

Contact closed

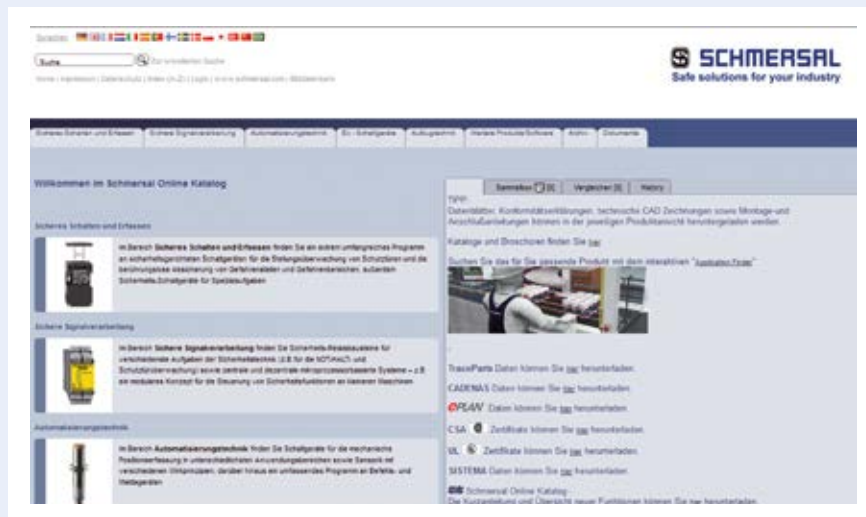
Contact open

Positive break travel / angle



## Up-to-date without fail

The online product catalogue



For detailed information, check out  
[www.schmersal.net](http://www.schmersal.net)

## 4. Position switches

### PS116 – Preferred types and ordering details



Position switch with actuating element	Connection	Switching system	NO contacts	NC contacts	Type designation	Material number
S200 Basic switch	Connector plug	Snap action	1	1	PS116-Z11-ST-S200	103006651
			1	2	PS116-Z12-ST-S200	103006662
		Slow action	1	1	PS116-T11-ST-S200	103006652
	Connecting cable	Snap action	1	1	PS116-Z11-L200-S200	103006633
			1	2	PS116-Z12-L200-S200	103006647
		Snap action with latch	1	1	PS116-Z11R-L200-S200	103009907
			0	2	PS116-Z02R-L200-S200	103012043
Slow action	1	1	PS116-T11-L200-S200	103006634		
R200	Connector plug	Snap action	1	1	PS116-Z11-ST-R200	103006653
			0	2	PS116-Z02-ST-R200	103008391
			1	2	PS116-Z12-ST-R200	103006663
		Snap action with latch	1	2	PS116-Z12R-ST-R200	103009897
			Slow action	1	1	PS116-T11-ST-R200
	2	1	PS116-T21-ST-R200	103009215		
	Connecting cable	Snap action	1	1	PS116-Z11-L200-R200	103006635
			1	1	PS116-T11-L200-R200	103006636
		Slow action	1	2	PS116-T12-L200-R200	103006648
1			1	PS116-T11-L200-R200	103006636	
K200	Connector plug	Snap action	1	1	PS116-Z11-ST-K200	103006655
			1	2	PS116-Z12-ST-K200	103006664
	Connecting cable	1	1	PS116-Z11-L200-K200	103006637	
K210	Connector plug	Snap action	1	1	PS116-Z11-ST-K210	103006656
			1	2	PS116-Z12-ST-K210	103009491
		Slow action	1	1	PS116-T11-ST-K210	103006657
			2	1	PS116-T21-ST-K210	103013834
	Connecting cable	Snap action	1	1	PS116-Z11-L200-K210	103006638
		Snap action with latch	1	2	PS116-Z12R-L200-K210	103009906
K230	Connector plug	Snap action	1	1	PS116-Z11-ST-K230	103006658
		Slow action	0	2	PS116-T02-ST-K230	103014690
	Connecting cable	Snap action	1	1	PS116-Z11-L200-K230	103006640
			0	2	PS116-Z02-L200-K230	103011608
		Slow action	1	1	PS116-T11-L200-K210	103006639
K240	Connector plug	Snap action	1	2	PS116-Z12-ST-K240	103006665
	Connecting cable		1	1	PS116-Z11-L200-K240	103006641
K250	Connector plug	Snap action	1	2	PS116-Z12-ST-K250	103006666
		Slow action	1	2	PS116-T12-ST-K250	103006667
	Connecting cable	Snap action	1	1	PS116-Z11-L200-K250	103006642
			1	1	PS116-T11-L200-K250	103006643
		Slow action	1	2	PS116-T12-L200-K250	103015281

## 4. Position switches

### PS116 – Preferred types and ordering details



Position switch with actuating element	Connection	Switching system	NO contacts	NC contacts	Type designation	Material number
<b>H200</b>	Connector plug	Snap action	1	1	<b>PS116-Z11-ST-H200</b>	<b>103006659</b>
			1	2	<b>PS116-Z12-ST-H200</b>	<b>103009490</b>
		Slow action	1	1	<b>PS116-T11-ST-H200</b>	<b>103006660</b>
			1	2	<b>PS116-T12-ST-H200</b>	<b>103006668</b>
			0	3	<b>PS116-T03-ST-H200</b>	<b>103012315</b>
	Connecting cable	Snap action	1	1	<b>PS116-Z11-L200-H200</b>	<b>103006644</b>
		Slow action	1	1	<b>PS116-T11-L200-H200</b>	<b>103006645</b>
			1	2	<b>PS116-T12-L200-H200</b>	<b>103006649</b>
	<b>N200</b>	Connector plug	Snap action	1	1	<b>PS116-Z11-ST-N200</b>
1				2	<b>PS116-Z12-ST-N200</b>	<b>103010921</b>
Slow action			1	1	<b>PS116-T11-ST-N200</b>	<b>103011367</b>
			2	0	<b>PS116-T20-ST-N200</b>	<b>103010065</b>
			1	2	<b>PS116-T12-ST-N200</b>	<b>103011553</b>
			2	1	<b>PS116-T21-ST-N200</b>	<b>103010067</b>
Connecting cable		Snap action	1	1	<b>PS116-Z11-L200-N200</b>	<b>103006646</b>
			1	2	<b>PS116-Z12-L200-N200</b>	<b>103008748</b>
		Slow action	1	2	<b>PS116-T12-L200-N200</b>	<b>103006650</b>
<b>J200</b>	Connector plug	Slow action with staggered contacts	0	2	<b>PS116-T02H-ST-J200</b>	<b>103014413</b>

## 4. Position switches

### PS2xx – Preferred types and ordering details



Position switch with actuating element	Switching system	NO contacts	NC contacts	Type designation	Material number	
<b>S200</b> Basic switch	PS215 Metal	Snap action	1	1	PS215-Z11-S200	103014952
			0	2	PS215-Z02-S200	103014953
			1	2	PS215-Z12-S200	103014954
		Slow action	1	1	PS215-T11-S200	103014977
			0	2	PS215-T02-S200	103014978
			1	2	PS215-T12-S200	103014979
	PS216 Thermoplastic	Snap action	1	1	PS216-Z11-S200	103013713
			0	2	PS216-Z02-S200	103015001
			1	2	PS216-Z12-S200	103015002
		Slow action	1	1	PS216-T11-S200	103015022
			0	2	PS216-T02-S200	103015023
			1	2	PS216-T12-S200	103015024
	PS226 Thermoplastic	Snap action	1	1	PS226-Z11-S200	103015048
			0	2	PS226-Z02-S200	103015049
			1	2	PS226-Z12-S200	103015050
		Slow action	1	1	PS226-T11-S200	103015073
			0	2	PS226-T02-S200	103015074
			1	2	PS226-T12-S200	103015075
<b>R200</b>	PS215 Metal	Snap action	1	1	PS215-Z11-R200	103014955
		Slow action	1	1	PS215-T11-R200	103014981
	PS216 Thermoplastic	Snap action	1	1	PS216-Z11-R200	103015003
			0	2	PS216-Z02-R200	103015004
			1	2	PS216-Z12-R200	103015005
		Slow action	1	1	PS216-T11-R200	103015028
			0	2	PS216-T02-R200	103015029
			1	2	PS216-T12-R200	103015030
	PS226 Thermoplastic	Snap action	1	1	PS226-Z11-R200	103015051
		Slow action	1	1	PS226-T11-R200	103015076

## 4. Position switches

### PS2xx – Preferred types and ordering details



Position switch with actuating element		Switching system	NO contacts	NC contacts	Type designation	Material number	
K200	PS216 Thermoplastic	Snap action	1	1	PS216-Z11-K200	103015006	
		Slow action	1	1	PS216-T11-K200	103015031	
K210	PS215 Metal	Snap action	1	1	PS215-Z11-K210	103014960	
		Slow action	1	1	PS215-T11-K210	103015008	
	PS216 Thermoplastic	Snap action	1	1	PS216-Z11-K210	103015008	
		Slow action	1	1	PS216-T11-K210	103015033	
K230	PS215 Metal	Snap action	1	1	PS215-Z11-K230	103014963	
		Slow action	1	1	PS215-T11-K230	103014988	
	PS216 Thermoplastic	Snap action	1	1	PS216-Z11-K230	103015010	
		Slow action	1	1	PS216-T11-K230	103015035	
	K240	PS215 Metal	Slow action	1	1	PS215-T11-K240	103014991
			Snap action	1	1	PS216-Z11-K240	103015013
PS216 Thermoplastic		Slow action	1	1	PS216-T11-K240	103015038	
	PS226 Thermoplastic	Snap action	1	1	PS226-Z11-K240	103015061	
K250	PS216 Thermoplastic	Snap action	1	1	PS216-Z11-K250	103015015	
		Slow action	1	1	PS216-T11-K250	103015040	
H200	PS215 Metal	Slow action	1	1	PS215-T11-H200	103014995	
		Snap action	1	1	PS216-Z11-H200	103013857	
	PS216 Thermoplastic	Slow action	1	2	PS216-Z12-H200	103015017	
		Snap action	1	1	PS216-T11-H200	103015042	
		Slow action	1	2	PS216-T12-H200	103015043	
N200	PS215 Metal	Snap action	1	1	PS215-Z11-N200	103014972	
		Slow action	1	1	PS215-T11-N200	103014997	
	PS216 Thermoplastic	Snap action	1	1	PS216-Z11-N200	103015018	
		Snap action	1	2	PS216-Z12-N200	103015019	
		Slow action	1	1	PS216-T11-N200	103015044	
		Slow action	1	2	PS216-T12-N200	103015045	
	J200	PS215 Metal	Snap action	1	1	PS215-Z11-J200	103014974
		PS216 Thermoplastic	Snap action	1	1	PS216-Z11-J200	103015020

## 4. Position switches

### PS3xx – Preferred types and ordering details



Position switch with actuating element	Switching system	NO contacts	NC contacts	Type designation	Material number		
<b>S200</b> Basic switch	PS315 Metal	Snap action	1	1	PS315-Z11-S200	103015406	
			0	2	PS315-Z02-S200	103015407	
			1	2	PS315-Z12-S200	103015408	
		Slow action	1	1	PS315-T11-S200	103015412	
			0	2	PS315-T02-S200	103015414	
			1	2	PS315-T12-S200	103015415	
	PS316 Thermoplastic	Snap action	1	1	PS316-Z11-S200	103015409	
			0	2	PS316-Z02-S200	103015410	
			1	2	PS316-Z12-S200	103015411	
		Slow action	1	1	PS316-T11-S200	103015417	
			0	2	PS316-T02-S200	103015418	
			1	2	PS316-T12-S200	103015419	
	<b>S300</b>	PS315 Metal	Snap action	1	1	PS315-Z11-S300	103015096
				0	2	PS315-Z02-S300	103015097
1				2	PS315-Z12-S300	103015098	
Slow action			1	1	PS315-T11-S300	103015112	
			0	2	PS315-T02-S300	103015113	
			1	2	PS315-T12-S300	103015114	
PS316 Thermoplastic		Snap action	1	1	PS316-Z11-S300	103015129	
			0	2	PS316-Z02-S300	103015130	
			1	2	PS316-Z12-S300	103015131	
		Slow action	1	1	PS316-T11-S300	103015146	
			0	2	PS316-T02-S300	103015147	
			1	2	PS316-T12-S300	103015148	
<b>R300</b>		PS315 Metal	Snap action	1	1	PS315-Z11-R300	103015099
				0	2	PS315-Z02-R300	103015100
	Slow action		1	1	PS315-T11-R300	103015116	
			0	2	PS315-T02-R300	103015117	
	PS316 Thermoplastic	Snap action	1	1	PS316-Z11-R300	103015132	
			0	2	PS316-Z02-R300	103015133	
		Slow action	1	1	PS316-T11-R300	103015152	
			0	2	PS316-T02-R300	103015153	

## 4. Position switches

### PS3xx – Preferred types and ordering details



Position switch with actuating element		Switching system	NO contacts	NC contacts	Type designation	Material number
<b>K360</b>	PS315 Metal	Snap action	1	1	<b>PS315-Z11-K360</b>	<b>103015102</b>
		Slow action	1	1	<b>PS315-T11-K360</b>	<b>103015119</b>
	PS316 Thermoplastic	Snap action	1	1	<b>PS316-Z11-K360</b>	<b>103015135</b>
		Slow action	1	1	<b>PS316-T11-K360</b>	<b>103015155</b>
<b>K370</b>	PS315 Metal	Snap action	1	1	<b>PS315-Z11-K370</b>	<b>103015104</b>
		Slow action	1	1	<b>PS315-T11-K370</b>	<b>103015121</b>
	PS316 Thermoplastic	Snap action	1	1	<b>PS316-Z11-K370</b>	<b>103015137</b>
		Slow action	1	1	<b>PS316-T11-K370</b>	<b>103015157</b>
<b>H300</b>	PS315 Metal	Snap action	1	1	<b>PS315-Z11-H300</b>	<b>103015106</b>
		Slow action	1	1	<b>PS315-T11-H300</b>	<b>103015123</b>
	PS316 Thermoplastic	Snap action	1	1	<b>PS316-Z11-H300</b>	<b>103015139</b>
		Slow action	1	1	<b>PS316-T11-H300</b>	<b>103015159</b>
			1	2	<b>PS316-T12-H300</b>	<b>103015160</b>
<b>N300</b>	PS315 Metal	Snap action	1	1	<b>PS315-Z11-N300</b>	<b>103015108</b>
		Slow action	1	1	<b>PS315-T11-N300</b>	<b>103015125</b>
	PS316 Thermoplastic	Snap action	1	1	<b>PS316-Z11-N300</b>	<b>103015141</b>
		Slow action	1	1	<b>PS316-T11-N300</b>	<b>103015161</b>
			1	2	<b>PS316-T12-N300</b>	<b>103015162</b>
<b>J300</b>	PS315 Metal	Snap action	1	1	<b>PS315-Z11-J300</b>	<b>103015110</b>
		Slow action	1	1	<b>PS315-T11-J300</b>	<b>103015127</b>
	PS316 Thermoplastic	Snap action	1	1	<b>PS316-Z11-J300</b>	<b>103015143</b>
		Slow action	1	1	<b>PS316-T11-J300</b>	<b>103015163</b>

## 5. Safety switches for hinged guards

### Description

#### Area of application

When considering the position monitoring of rotating protection equipment, the designer has different choices. For instance standard safety switches with separate actuator (page 10), position switches with safety function (page 76) and safety sensors with different working principles (page 108); he can also decide on hinged safety switches.

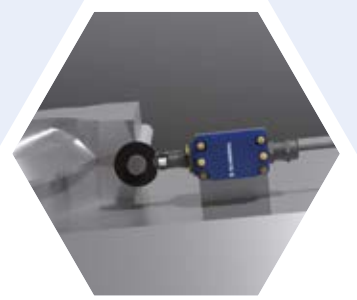
Both small rotating doors and service flaps as well as heavy doors of machines and equipment can be constructed using this special type of safety switches, which are easy to assemble and are manipulation protected. A further benefit is the very compact construction and the attractive, unobtrusive design. Therefore safety hinged switches are frequently used in design-oriented machines and equipment.

#### Design and way of functioning

A cam is integrated in the safety switches that triggers the safety function at a specific angle. Thus, the requirement in the ISO 14119 for positive linkage between cam and actuator is fulfilled. Depending on the design, the designer can eliminate one construction element, because the safety switch also acts as a hinge. This ensures a high degree of protection against manipulation, as the safety function is hidden in the hinge cover. In addition, the requirement for a compact design and a convenient access to the working area of the machine is established. No switching element is required on the opening side of the safety door.

Information for the selection of suitable safety relay modules can be found in the chapter "Safety relay modules" (refer to page 212).





## Series

The Schmersal Group offers three different Series of safety hinged switches.

The Series T.C. 235 / 236, based on the well-proven position switches with safety function and is suitable for the position monitoring of maintenance flaps and smaller rotating doors (see from page 100).

With the Series TV.S, the safety hinged switches are mounted on a door hinge using a shaft or a hinged shaft on the door hinge (see page 102). This is mainly used with heavy doors.

The TESK and TESZ Series were designed for general use on safety doors of machinery and equipment (see page 104). The central properties of these safety hinged switches is the adaptation of the hinging function, such as with the TESK, along with the freely adjustable switching angle across the entire working range and a minimal installation effort in particular with common aluminium profile systems. A fixture on the door ensures rapid alignment on the door and post.

The user can select between different contact variants with up to four contacts, as well as between wire and plug connectors. For use on transparent safety doors made from plastic there is a version with an extended hinge available.

## 5. Safety switches for hinged guards

### Hinge safety switch – Series summary



■ 235



■ 236

#### Key Features

- Metal enclosure
- Max. 2 contacts
- Design EN 50047

- Thermoplastic enclosure
- Max. 2 contacts
- Design EN 50047

#### Other versions

**ATEX / IECEx**

–

–

**AS-i SaW** (refer to page 260)

■

■

#### Technical features

##### Electrical characteristics

**Max. switching capacity U/I**

230 VAC / 4 A;  
24 VDC / 1 A

230 VAC / 4 A;  
24 VDC / 1 A

##### Mechanical data

**Housing material**

zinc die-cast, paint finish

glass-fibre reinforced thermoplastic

**Connection**

Screw terminal or  
M12 connector

Screw terminal or  
M12 connector

**Cable section:**

0.75 ... 2.5 mm<sup>2</sup>

0.75 ... 2.5 mm<sup>2</sup>

**Dimensions (W x H x D)**

30 x 63.5 x 30 mm

30 x 61.5 x 30 mm

##### Ambient conditions

**Ambient temperature**

–30 °C ... +80 °C

–30 °C ... +80 °C

**Protection class**

IP67

IP67

#### Safety classification

**Standards**

ISO 13849-1

ISO 13849-1

**B<sub>10D</sub> NC contact**

20,000,000

20,000,000

**Certificates**



To get detailed information about the products and certificates, visit [www.schmersal.net](http://www.schmersal.net).

## 5. Safety switches for hinged guards

### Flap safety switches – Preferred types

Series	Enclosure	Lever	Connection	Contacts	Type designation	Material number	
235	Metal	Left-hand model	cable entry M20	1 NC	T3C 235-01Z	101103648	
				2 NC	T3C 235-02Z-M20	101171209	
				1 NO / 1 NC	T3C 235-11Z-M20	101154218	
			M12 connector, 8 pole	1 NO / 1 NC	T3C 235-11Z-ST	101181433	
		swing-door model	cable entry M20	1 NC	T4C 235-01Z	101103651	
				2 NC	T4C 235-02Z-M20	101154990	
				1 NO / 1 NC	T4C 235-11Z-M20	101154291	
		right-hand model	cable entry M20	1 NC	T5C 235-01Z	101104201	
				2 NC	T5C 235-02Z-M20	101157475	
				1 NO / 1 NC	T5C 235-11Z-M20	101154219	
			M12 connector, 8 pole	1 NO / 1 NC	T5C 235-11Z-ST	101181431	
		236	Thermoplastic	Left-hand model	cable entry M20	1 NC	T3C 236-01Z
2 NC	T3C 236-02Z-M20					101164466	
1 NO / 1 NC	T3C 236-11Z-M20					101162012	
cable entry M16	1 NO / 1 NC				T3C 236-11Z-M16	101122970	
	M12 connector, 8 pole				2 NC	T3C 236-02Z-ST	101199528
					1 NO / 1 NC	T3C 236-11Z-ST	101212224
swing-door model	cable entry M20			1 NC	T4C 236-01Z	101108151	
				2 NC	T4C 236-02Z-M20	101162635	
				1 NO / 1 NC	T4C 236-11Z-M20	101164465	
	cable entry M16			1 NO / 1 NC	T4C 236-11Z-M16	101122397	
				M12 connector, 8 pole	2 NC	T4C 236-02Z-ST	103000113
					1 NO / 1 NC	T4C 236-11Z-ST	101108153
right-hand model	cable entry M20			2 NC	T5C 236-02Z-M20	101164467	
				1 NO / 1 NC	T5C 236-11Z-M20	101153304	
				1 NO / 1 NC	T5C 236-11Z-M16	101123244	
	cable entry M16			2 NC	T5C 236-02Z-ST	101196348	
				M12 connector, 8 pole	1 NO / 1 NC	T5C 236-11Z-ST	101212124
					1 NO / 1 NC	T5C 236-11Z-ST	101212124

## 5. Safety switches for hinged guards

### Hinge switch with actuator shaft – Series summary



■ 335



■ 355



■ 500

#### Key Features

- Metal enclosure
- Max. 3 contacts
- Design EN 50041

- Metal enclosure
- Max. 3 contacts
- Design EN 50041

- Metal enclosure
- Max. 6 contacts

#### Other versions

**ATEX / IECEx**

–

–

–

**AS-i SaW** (refer to page 260)

■

–

–

#### Technical features

##### Electrical characteristics

**Max. switching capacity U/I**

230 VAC / 4 A;  
24 VDC / 4 A

230 VAC / 4 A;  
24 VDC / 4 A

230 VAC / 4 A;  
24 VDC / 1 A

##### Mechanical data

**Housing material**

Aluminium die-cast,  
paint finish

Aluminium die-cast,  
paint finish

Aluminium die-cast

**Connection**

Screw terminal or  
M12 connector

Screw terminal or  
M12 connector

Screw terminals

**Cable section:**

0.75 ... 2.5 mm<sup>2</sup>

0.75 ... 2.5 mm<sup>2</sup>

0.75 ... 1.5 mm<sup>2</sup>

**Dimensions (W x H x D)**

40.5 x 76 x 38 mm

66.7 x 76 x 38 mm

110 x 110 x 42 mm

##### Ambient conditions

**Ambient temperature**

–25 °C ... +70 °C

–25 °C ... +70 °C

–25 °C ... +80 °C

**Protection class**

IP67

IP67

IP67

#### Safety classification

**Standards**

ISO 13849-1

ISO 13849-1

ISO 13849-1

**B<sub>10D</sub> NC contact**

20,000,000

20,000,000

20,000,000

**Certificates**



<sup>1)</sup> There is the possibility to feed the connection line through



To get detailed information about the products and certificates, visit [www.schmersal.net](http://www.schmersal.net).

## 5. Safety switches for hinged guards

### Hinge switch with actuator shaft – Preferred types

Series	Design	Shaft Ø	Termination	Contacts	Type designation	Material number				
335	slim design	8 mm	M12 x 1 connector	2 NC	TV8S 335-02Z-ST	101210086				
			cable entry M20	2 NC	TV8S 335-02Z-M20	101168631				
				3 NC	TV8S 335-03Z	101179251				
				1 NO / 1 NC	TV8S 335-11Z-G24	101117213				
				1 NO / 1 NC	TV8S 335-11Z-M20	101155141				
				1 NO / 2 NC	TV8S 335-12Z	101179250				
		10 mm	M12 x 1 connector	2 NC	TV10S 335-02Z-ST	101157472				
			cable entry M20	2 NC	TV10S 335-02Z-M20	101157473				
				3 NC	TV10S 335-03Z	101179253				
				1 NO / 1 NC	TV10S 335-11Z-G24	101117215				
				1 NO / 1 NC	TV10S 335-11Z-M20	101160104				
				1 NO / 2 NC	TV10S 335-12Z	101179252				
355	large design	8 mm	M12 x 1 connector	2 NC	TV8S 355-02Z-ST	101193647				
			Cable entry 3 x M20	2 NC	TV8S 355-02Z-M20	101153122				
				3 NC	TV8S 355-03Z	101179255				
				1 NO / 1 NC	TV8S 355-11Z	101117209				
				1 NO / 2 NC	TV8S 355-12Z	101179254				
				10 mm	Cable entry 3 x M20	2 NC	TV10S 355-02Z	101117212		
		3 NC	TV10S 355-03Z			101179258				
		1 NO / 1 NC	TV10S 355-11Z			101117211				
		1 NO / 2 NC	TV10S 355-12Z			101179256				
		500	Heavy design			10 mm with universal joint	Cable entry 2 x M20	2 NO / 2 NC	TV10S 500R-22Z	101131117
								2 NO / 2 NC	TV10S 500L-22Z-M20	101170114
				2 NO / 2 NC	TV10S 500L-22ZR			101131118		
3 NO / 3 NC	TV10S 500L-33Z-M20			101169795						
10 mm with socket	Cable entry 2 x M20			2 NO / 2 NC	T1V10S 500L-22Z	101131112				
				2 NO / 2 NC	T1V10S 500R-22Z	101131113				
				2 NO / 2 NC	T1V10S 500R-22ZR	101131115				
				3 NO / 3 NC	T1V10S 500L-33Z	101143100				

## 5. Safety switches for hinged guards

### Hinge switch as switch hinge – Series summary



■ TESZ



■ TESK

#### Key Features



- Available as stainless steel hinge
- Versions for profile systems in 30, 35, 40 and 45 mm
- Max. 3 contacts
- Restart Interlock (manual reset)

- Optimised for profile system
- Freely adjustable switching angle
- Large swivel angle of 270°
- Suitable for use with shuttle valves
- For external and internal use
- Max. 4 contacts

#### Technical features

Electrical characteristics		
Max. switching capacity U/I	230 VAC / 2 A (only screw terminal); 24 VDC / 1 A	230 VAC / 2 A (only cable) 24 VDC / 1 A
Switching of low voltages	1 mA / 5VDC	1 mA / 3VDC
Mechanical data		
Housing material	Glass-fibre reinforced thermoplastic and aluminium	Zinc die-cast
Connection	M12 connector plug, 8-pole / screw terminal	M12 connector plug, 5-pole / 8-pole / cable
Opening angle	135°	270°
Positive break angle	10°	10°
Switching frequency	120/h	120/h
Ambient conditions		
Ambient temperature	-25 °C ... +65 °C	-25 °C ... +65 °C
Protection class	IP65	IP65

#### Safety classification

Standards	ISO 13849-1	ISO 13849-1
B <sub>10D</sub> NC contact	2,000,000	2,000,000
Certificates		

<sup>1)</sup> Certification: under preparation



To get detailed information about the products and certificates, visit [www.schmersal.net](http://www.schmersal.net).

## 5. Safety switches for hinged guards

### TESZ – Preferred types

Series	Hinge	Profile system	Contacts	Type designation	Material number	
TESZ	Aluminium	30 mm	2 NC / 1 NO	TESZ1102/S/30	101030509	
			3 NC	TESZ1110/S/30	101030510	
		35 mm	2 NC / 1 NO	TESZ1102/S/35	101030520	
			3 NC	TESZ1110/S/35	103014568	
		40 mm	2 NC / 1 NO	TESZ1102/S	101029153	
			3 NC	TESZ1110/S	101029152	
		45 mm	2 NC / 1 NO	TESZ1102/S/45	101030531	
			3 NC	TESZ1110/S/45	103014569	
		Stainless steel	40 mm	2 NC / 1 NO	TESZX1102/S	101031672
				3 NC	TESZX1110/S	101031673
TESZ	Additional hinge	Profile system	Type designation	Material number		
	Aluminium	35 mm	TESZ/S/30	101030511		
		35 mm	TESZ/S/35	101030522		
		40 mm	TES/S	101027080		
		45 mm	TES/S/45	101028411		
	Stainless steel	40 mm	TESZX/S	101031680		

## 5. Safety switches for hinged guards

### TESK – Preferred types

Series	Hinge	Factory setting	Contacts	Connection	Type designation	Material number	
TESK	Standard hinge	Mounting outside	1 NO / 1 NC	Connector plug	top	TESK-SA-11ST1	103005743
					bottom	TESK-SA-11ST2	103005744
			Cable	top	TESK-SA-11L1-3M	103005740	
				bottom	TESK-SA-11L2-3M	103005742	
			1 NO / 2 NC	Connector plug	top	TESK-SA-12ST1	103005747
					bottom	TESK-SA-12ST2	103005748
		Cable	top	TESK-SA-12L1-3M	103005745		
			bottom	TESK-SA-12L2-3M	103005746		
		Mounting inside	1 NO / 1 NC	Connector plug	top	TESK-SI-11ST1	103005751
					bottom	TESK-SI-11ST2	103005752
			Cable	top	TESK-SI-11L1-3M	103005749	
				bottom	TESK-SI-11L2-3M	103005750	
			1 NO / 2 NC	Connector plug	top	TESK-SI-12ST1	103005755
					bottom	TESK-SI-12ST2	103005756
		Cable	top	TESK-SI-12L1-3M	103005753		
			bottom	TESK-SI-12L2-3M	103005754		
		Universal	1 NO / 1 NC	Connector plug	top	TESK-SU-11ST1	103005759
					bottom	TESK-SU-11ST2	103005760
				Cable	top	TESK-SU-11L1-3M	103005757
					bottom	TESK-SU-11L2-3M	103005758
			1 NO / 2 NC	Connector plug	top	TESK-SU-12ST1	103005763
					bottom	TESK-SU-12ST2	103005764
			Cable	top	TESK-SU-12L1-3M	103005761	
				bottom	TESK-SU-12L2-3M	103005762	
2 NO / 2 NC	Connector plug		top	TESK-SU-22ST1	103007170		
			bottom	TESK-SU-22ST2	103007172		
<b>Additional hinge</b>					<b>Type designation</b>	<b>Material number</b>	
For standard hinge					TESK-ZS	103002968	



## 5. Safety switches for hinged guards

### TESK – Preferred types

Series	Hinge	Factory setting	Contacts	Connection	Type designation	Material number	
TESK	Long hinge	Mounting outside	1 NO / 1 NC	Connector plug	top	TESK-LA-11ST1	103005717
					bottom	TESK-LA-11ST2	103005718
			Cable	top	TESK-LA-11L1-3M	103005712	
				bottom	TESK-LA-11L2-3M	103005716	
			1 NO / 2 NC	Connector plug	top	TESK-LA-12ST1	103005721
					bottom	TESK-LA-12ST2	103005722
		Cable	top	TESK-LA-12L1-3M	103005719		
			bottom	TESK-LA-12L2-3M	103005720		
		Mounting inside	1 NO / 1 NC	Connector plug	top	TESK-LI-11ST1	103005727
					bottom	TESK-LI-11ST2	103002969
			Cable	top	TESK-LI-11L1-3M	103005723	
				bottom	TESK-LI-11L2-3M	103005724	
			1 NO / 2 NC	Connector plug	top	TESK-LI-12ST1	103005730
					bottom	TESK-LI12-ST2	103005731
		Cable	top	TESK-LI-12L1-3M	103005728		
			bottom	TESK-LI-12L2-3M	103005729		
		Universal	1 NO / 1 NC	Connector plug	top	TESK-LU-11ST1	103005734
					bottom	TESK-LU-11ST2	103005735
				Cable	top	TESK-LU-11L1-3M	103005732
					bottom	TESK-LU-11L2-3M	103005733
			1 NO / 2 NC	Connector plug	top	TESK-LU-12ST1	103005737
					bottom	TESK-LU-12ST2	103005738
			Cable	top	TESK-LU-12L1-3M	103002970	
				bottom	TESK-LU-12L2-3M	103005736	
2 NO / 2 NC	Connector plug		top	TESK-LU-22ST1	103007173		
			bottom	TESK-LU-22ST2	103007174		
<b>Additional hinge</b>					<b>Type designation</b>	<b>Material number</b>	
For long hinge					TESK-ZL	103002966	

## 6. Safety sensors

### Description

#### Area of application

In contrast to the electro-mechanical "type 2" - safety switches, safety sensors allow contactless position sensing of safety doors. This is for the benefit of machines, where it is likely to have a high amount of dust and contamination, and in hygiene-sensitive areas such as for machinery and equipment that are used to produce foodstuffs.

The foodstuff mechanical engineering industry was one of the first sectors to use safety solenoid switches instead of electromechanical safety switches, this was in the nineteen-eighties.

Meanwhile, the application area for safety sensors has significantly expanded. One reason for this is the wide range of products, that includes quite varied designs of safety-solenoid switches. In addition, there are series that are innovative and use the active principle for sensor target communication developed by Schmersal.

These series with the identifier CSS and RSS provide additional benefits such as increased tolerance against safety door offset, simplified safe signal evaluation and deployment of diagnostic-relevant information. Also the increased degree of protection against manipulation such as by individual coding is a motive for many mechanical engineers for the use of electronic safety sensors.

All class 2 safety sensors shown in this section correspond to at least IP65 / IP67 protection type and can be used in conjunction with an appropriate safety relay module that reach the performance level d and e according to ISO 13849-1.

Information for the selection of suitable safety relay modules can be found in the chapter "Safety relay modules" (refer to page 212).

Included in the Schmersal Group safety sensor range includes versions with integrated AS-i SaW interface (AS-Interface Safety at Work). They take advantage of the simple and proven bus system based on the open standards AS-International and can be integrated over the appropriate system modules in parent communication networks ("Safety Integrated / Separated Safety").



## Design and way of functioning

Regardless of the mode of operation, the safety sensors each have a sensor and a target, that communicate with each other without making contact. If the sensor detects the target, the safety door and safety circuit are closed, and the machine can be started. Opening the safety door interrupts the safety circuit and the machine or the hazardous movement is safely shut down.

This basic principle is always the same. The method of detection for the various sensor families is however different.

---

## Magnetic safety sensors BNS

The safety-solenoid switches of the BNS-series use the proven principle of safe magnet technology. These electro-sensitive safety switchgear operate with two channels and are failsafe, as they have two safety contact paths. The combination and arrangement of the reed-tube in the sensor has the consequence that the sensor cannot be actuated with a conventional magnet, but only with the associated target. With this type of encoding a good protection against manipulation is ensured.

The BNS-sensors are compact and achieve high reacting distances. The sensors also act through plastic and stainless steel covers allowing a hidden installation. The user is on a wide program of different designs. The special features include sensors with stainless steel housing.

The magnetic-principle of the safety-oriented detectors of actuators is now being used with the safety door monitoring in integrated systems. The BNS-B20 series is an available system where the magnetic sensor is combined with the door handle and also includes the locking mechanism.

## 6. Safety sensors

### Description

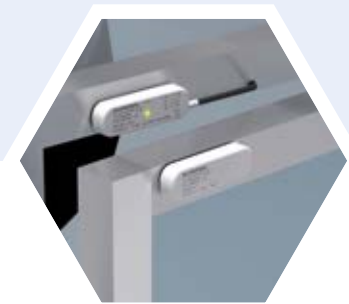
#### Electronic safety sensors CSS

As an alternative to the BNS - series is the electronic safety sensors of the CSS-series. Instead of the magnetic principle the Schmersal developed bi-directional "Coded Safety Sensor Technology (CSS)" is used; this is based on the pulse-echo technique.

This principle makes very fast reactions possible. The CSS safety sensors are characterized by exact switching points and high noise immunity. The microprocessor technology enables the serial connection of up to 31 sensors on a common signal line in the "daisy chain" principle and their evaluation over a single safety relay component.

The integrated electronics allow intelligent diagnostics, as well as simple and fast fault determination, such as with a cross-connection or a wiring fault. These non-safety-related signals can also be interfaced with the help of a SD interface with up to 31 integrated sensors and can be used with all common field bus protocols to transfer to a central control system.

Safety sensors of the CSS-series are available in cylindrical and rectangular form. The program also includes the CSS 34 F with integrated feedback circuit monitoring, which can be used without any additional safety relay module.



## Electronic safety sensors RSS

The safety sensors of the RSS-series are the most recent enlargement in the range of the electronic safety sensors for the Schmersal Group. The Schmersal developers successfully created a product using the RFID technology for safety oriented applications, which is frequently used in the industry.

The RFID-technology offers the advantage that the user can select from different types of coding. The basic version accepts any suitable target. A second version only accepts the actuator for which the teach-in process was run during initial activation (I1 variant). A third version is now also available which responds to an individually-assigned actuator only. This kind of teach-in process can be repeated any number of times (I2-variant).

This means that for individually-coded variants I1 and I2 the coding level "high" is fulfilled in accordance with ISO 14119, thereby ensuring a high level of manipulation protection for doors which are at particular risk of interference.

## 6. Safety sensors

### BNS – Rectangular design – Overview of the series



■ BNS 250



■ BNS 260



■ BNS 40S

#### Key Features

- |  |  |   |
|--|--|---|
| <ul style="list-style-type: none"> <li>• Extremely compact design</li> <li>• Max. 3 contacts</li> <li>• Thermoplastic enclosure</li> </ul> | <ul style="list-style-type: none"> <li>• Extremely compact design</li> <li>• Max. 3 contacts</li> <li>• Thermoplastic enclosure</li> </ul> | <ul style="list-style-type: none"> <li>• Suitable for food processing industry</li> <li>• Max. 3 contacts</li> <li>• Stainless steel enclosure</li> </ul> |
|--|--|---|

#### Other versions

ATEX / IECEx	■	-	■
AS-i SaW (refer to page 260)	-	■	-

#### Technical features

Electrical characteristics			
Assured switching distance $s_{ao}$	4 mm	5 mm	8 mm
Assured switch-off distance $s_{ar}$	14 mm	15 mm	18 mm
Switching voltage without LED	max. 24 VDC	max. 75 VDC	max. 100 VAC/DC
with LED	max. 24 VDC	max. 24 VDC	max. 24 VDC
with connector	-	max. 30 VDC	-
Switching current without LED	max. 100 mA	max. 400 mA	max. 250 mA
with LED	max. 10 mA	max. 10 mA	max. 10 mA
Switching capacity without LED	max. 1 W	max. 10 VA	max. 3 W
with LED	max. 240 mW	max. 240 mW	max. 240 mW
Mechanical data			
Magnetic coding	■	■	■
Integr. evaluation	-	-	-
Connection	Cable	Cable or connector plug	Cable
Cable section:	4 x 0.25 mm <sup>2</sup> ; -2187: 6 x 0.25 mm <sup>2</sup>	4 x 0.25 mm <sup>2</sup> ; -/01: 6 x 0.25 mm <sup>2</sup>	6 x 0.25 mm <sup>2</sup>
Dimensions (W x D x H)	33 x 13 x 25 mm	36 x 13 x 26 mm	88 x 14.5 x 27 mm
LED status display	-	■	■
Ambient conditions			
Ambient temperature	-25 °C ... +70 °C	-25 °C ... +70 °C	-25 °C ... +80 °C
Protection class	IP67	IP67	IP69K

#### Safety classification

Standards	ISO 13849-1	ISO 13849-1	ISO 13849-1
$B_{10D}$ (NC / NO contact)	25,000,000	25,000,000	25,000,000
Certificates			



To get detailed information about the products and certificates, visit [www.schmersal.net](http://www.schmersal.net).



■ BNS 36

■ BNS 16

- High switching distance and offset possible
- Max. 3 contacts
- Thermoplastic enclosure

- Different approach possibilities
- Max. 3 contacts
- Thermoplastic enclosure

-



-



7 mm;  
10 mm (-2750)

17 mm;  
20 mm (-2750)

max. 75 VDC

max. 24 VDC

max. 30 VDC

max. 400 mA

max. 10 mA

max. 10 VA

max. 240 mW



-

Cable or  
connector plug  
4 x 0.25 mm<sup>2</sup>;  
-/01: 6 x 0.25 mm<sup>2</sup>

88 x 13 x 25 mm



-25 °C ... +70 °C

IP67

8 mm

18 mm

max. 100 VAC/DC

-

-

max. 400 mA

-

max. 10 W

-



-

Screw terminal or  
connector plug  
2 x 1.5 mm<sup>2</sup>

55 x 39.5 x 93 mm



-25 °C ... +70 °C

IP67

ISO 13849-1  
25,000,000



ISO 13849-1  
25,000,000

















## 6. Safety sensors

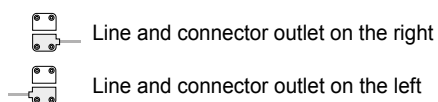
### BNS – Rectangular design – Preferred types

Series	Design	Housing material	Sao/Sar	Actuator	Integr. evaluation	Contacts
BNS 250		Thermoplastic	4 / 14	BPS 250		1 NO / 1 NC
						1 NO / 2 NC
BNS 260		Thermoplastic	5 / 15	BPS 260-1 BPS 260-2		1 NO / 1 NC
						1 NO / 1 NC + signalling contact 1 NC
						2 NC
						2 NC + signalling contact 1 NC
BNS 40S		Stainless steel	8 / 18	BPS 40S-1 BPS 40S-2 BPS 40S-1-C BPS 40S-2-C		1 NO / 2 NC
BNS 16		Thermoplastic	8 / 18	BPS 16		1 NO / 2 NC
BNS 36		Thermoplastic	7 / 17	BPS 36-1 BPS 36-2		2 NC
						2 NC + signalling contact 1 NC
						1 NO / 1 NC
						1 NO / 1 NC + signalling contact 1 NC

Actuators should be ordered separately. A selection can be found on page 120.  
Information for the selection of suitable safety relay modules can be found in the chapter "Safety relay modules" (refer to page 212).



	Connection	LED available	Description	Type designation	Material number
	Cable		---	BNS 250-11Z	101120670
		■		BNS 250-11ZG	101120671
				BNS 250-12Z	101123071
		■		BNS 250-12ZG	101123072
	Cable			BNS 260-11Z-L	101184387
				BNS 260-11Z-R	101184371
	Connector plug			BNS 260-11Z-ST-L	101184379
				BNS 260-11Z-ST-R	101184363
		■		BNS 260-11ZG-ST-L	101184383
				BNS 260-11ZG-ST-R	101184367
		■		BNS 260-11/01Z-ST-R	101184364
				BNS 260-11/01ZG-ST-L	101184384
	Cable			BNS 260-02Z-ST-L	101184377
		■		BNS 260-02ZG-ST-R	101184365
	Connector plug			BNS 260-02/01Z-L	101184386
				BNS 260-02/01Z-ST-R	101184362
	Cable	■	Continuous threaded holes	BNS 40S-12Z	101215517
				BNS 40S-12ZG	101215516
		■	Hidden, rear-side threads	BNS 40S-12Z-C	101215518
				BNS 40S-12ZG-C	101215515
	Screw terminals		Actuating planes cover-side	BNS 16-12ZD	101172563
			Actuating planes left-hand side	BNS 16-12ZL	101172554
			Actuating planes right-hand side	BNS 16-12ZR	101172556
			Actuating planes bottom	BNS 16-12ZU	101172565
			Actuating planes front side	BNS 16-12ZV	101172553
	Cable	■		BNS 36-02Z-R	101193132
				BNS 36-02ZG-R	101190050
	Connector plug	■		BNS 36-02Z-ST-L	101193156
				BNS 36-02ZG-ST-R	101193168
				BNS 36-02/01Z-ST-L	101193249
				BNS 36-02/01Z-ST-R	101190024
	Cable	■		BNS 36-11Z-L	101193125
				BNS 36-11ZG-R	101193143
	Connector plug	■		BNS 36-11Z-ST-L	101193148
				BNS 36-11ZG-ST-R	101193158
	Cable	■		BNS 36-11/01Z-R	101190042
				BNS 36-11/01ZG-R	101193177
	Connector plug	■		BNS 36-11/01Z-ST-L	101193236
				BNS 36-11/01ZG-ST-R	101193254



## 6. Safety sensors

### BNS – Cylindrical and miscellaneous design – Overview of the series



#### Key Features

	■ BNS 120	■ BNS 180	■ BNS 303
<b>Other versions</b>	<ul style="list-style-type: none"> <li>• Cylindrical design M12</li> <li>• Max. 3 contacts</li> <li>• Thermoplastic enclosure</li> </ul>	<ul style="list-style-type: none"> <li>• Cylindrical design M18</li> <li>• Max. 3 contacts</li> <li>• Thermoplastic enclosure</li> </ul>	<ul style="list-style-type: none"> <li>• Cylindrical design M30</li> <li>• Max. 3 contacts</li> <li>• Thermoplastic enclosure</li> </ul>

	■	■	■
<b>ATEX / IECEx</b>	■	■	■
<b>AS-i SaW (refer to page 260)</b>	-	-	-

#### Technical features

<b>Electrical characteristics</b>			
<b>Assured switching distance <math>s_{ao}</math></b>	10 mm (BP 6/BP 8); 20 mm (BP 10/15 SS)	10 mm (BP 6/BP 8); 20 mm (BP 10/15 SS)	5 mm; 8 mm (-2211)
<b>Assured switch-off distance <math>s_{ar}</math></b>	22 mm (BP 6/BP 8); 32 mm (BP 10/15 SS)	22 mm (BP 6/BP 8); 32 mm (BP 10/15 SS)	15 mm; 18 mm (-2211)
<b>Switching voltage without LED</b>	max. 100 VAC/DC	max. 100 VAC/DC	max. 100 VAC/DC
<b>with LED</b>	-	-	max. 24 VDC
<b>with connector</b>	-	-	max. 100 VAC/DC
<b>Switching current without LED</b>	max. 250 mA	max. 250 mA	max. 400 mA
<b>with LED</b>	-	-	max. 10 mA
<b>ordering suffix -03Z</b>	-	-	max. 250 mA
<b>Switching capacity without LED</b>	-02z: max. 3 W; -11z, -12z: max. 5 W	-02z: max. 3 W; -11z, -12z: max. 5 W	max. 10 W
<b>with LED</b>	-	-	max. 240 mW
<b>Mechanical data</b>			
<b>Magnetic coding</b>	-	-	■
<b>Integr. evaluation</b>	-	-	-
<b>Connection</b>	Cable	Cable	Cable or connector plug
<b>Cable section:</b>	4 x 0.25 mm <sup>2</sup>	4 x 0.25 mm <sup>2</sup>	4 x 0.25 mm <sup>2</sup>
<b>Dimensions (W x D x H)</b>	M12 x 38.5 mm	M18 x 36 mm	M30 x 44 mm
<b>Mounting hole</b>	M12	M18	M30
<b>LED status display</b>	-	-	■
<b>Ambient conditions</b>			
<b>Ambient temperature</b>	-25 °C ... +70 °C	-25 °C ... +70 °C	-25 °C ... +70 °C
<b>Protection class</b>	IP67	IP67	IP67

#### Safety classification

	ISO 13849-1	ISO 13849-1	ISO 13849-1
<b>Standards</b>	ISO 13849-1	ISO 13849-1	ISO 13849-1
<b>B<sub>10D</sub> (NC / NO contact)</b>	25,000,000	25,000,000	25,000,000
<b>Certificates</b>			



To get detailed information about the products and certificates, visit [www.schmersal.net](http://www.schmersal.net).



■ BNS 300



■ BNS 30



■ BNS-B20

- |   |   |  |
|---|---|--|
| <ul style="list-style-type: none"> <li>• Cylindrical design M30</li> <li>• Integrated evaluation</li> <li>• 1 contact</li> <li>• Thermoplastic encl.</li> </ul> | <ul style="list-style-type: none"> <li>• Cylindrical design M30</li> <li>• Integrated evaluation</li> <li>• 1 contact</li> <li>• Metal enclosure</li> </ul> | <ul style="list-style-type: none"> <li>• Door handle actuator</li> <li>• Latching force approx. 100 N</li> <li>• Max. 3 contacts</li> <li>• Thermoplastic encl.</li> </ul> |
|---|---|--|

-	-	-
-	-	-







5 mm; 8 mm (-2211)	5 mm; 8 mm (-2211, -2334)	0 mm
15 mm; 18 mm (-2211)	15 mm; 18 mm (-2211, -2334)	22 mm
max. 250 VAC	max. 250 VAC	max. 110 VAC/DC
-	max. 250 VAC	max. 24 VDC
-	-	max. 24 VDC
max. 3 A	max. 3 A	max. 250 mA
-	max. 3 A	max. 10 mA
-	-	-
max. 750 W	max. 750 W	max. 3 W
-	max. 750 W	max. 240 mW
■	■	■
■	■	-
Cable or connector plug 4 x 0.75 mm <sup>2</sup>	Cable or connector plug 4 x 0.75 mm <sup>2</sup>	Cable or connector plug 6 x 0.25 mm <sup>2</sup>
M30 x 78 mm	M30 x 78 mm	119.5 x 43.3 x 140 mm
M30	M30	-
■	■	■
-25 °C ... +55 °C	-25 °C ... +55 °C	-25 °C ... +70 °C
IP67	IP67	IP67

ISO 13849-1 <sup>1)</sup> 20,000,000	ISO 13849-1 <sup>1)</sup> 20,000,000	ISO 13849-1 25,000,000

<sup>1)</sup> Performance Level: PL c

## 6. Safety sensors

### BNS – Cylindrical and miscellaneous design – Preferred types

Series	Design	Housing material	Sao/Sar	Actuator	Integr. evaluation	Contacts
BNS 120		Thermoplastic	10 / 22 mm	BP 6 / BP 8 BP 10/15SS		2 NC contact
			20 / 32 mm			1 NO / 1 NC
BNS 180		Thermoplastic	10 / 22 mm	BP 6 / BP 8 BP 10/15SS		2 NC contact
			20 / 32 mm			1 NO / 1 NC
BNS 303		Thermoplastic	5 / 15 mm	BPS 300 BPS 303 BPS 303SS		1 NO / 1 NC
			8 / 18 mm			
BNS 300		Thermoplastic	5 / 15 mm	BPS 300 BPS 303 BPS 303SS	■	1 NC contact
			8 / 18 mm			
BNS 30		Metal	8 / 18 mm	BPS 300 BPS 303 BPS 303SS	■	1 NC contact
BNS-B20		Thermoplastic	0 / 22 mm	BNS-B20-B01		1 NO / 2 NC

Actuators should be ordered separately. A selection can be found on page 120.  
Information for the selection of suitable safety relay modules can be found in the chapter "Safety relay modules" (refer to page 212).

Connection	LED available	Description	Type designation	Material number	
Cable		---	<b>BNS 120-02Z</b>	<b>101144422</b>	
			<b>BNS 120-11Z</b>	<b>101128296</b>	
Cable		---	<b>BNS 180-02Z</b>	<b>101133009</b>	
			<b>BNS 180-11Z</b>	<b>101120933</b>	
Cable		---	<b>BNS 303-11Z</b>	<b>101115682</b>	
			<b>BNS 303-11ZG</b>	<b>101138262</b>	
Connector plug	■	---	<b>BNS 303-11ZG-ST</b>	<b>101174794</b>	
			<b>BNS 303-11ZG-ST-2211</b>	<b>101194346</b>	
Cable	■	---	<b>BNS 300-01ZG</b>	<b>101110514</b>	
			<b>BNS 300-01ZG-ST</b>	<b>101144214</b>	
Connector plug			<b>BNS 300-01ZG-ST-2211</b>	<b>101186264</b>	
Cable	■	Increased switching distance	<b>BNS 30-01ZG-2211</b>	<b>101166315</b>	
Connector plug			<b>BNS 30-01Z-ST-2211</b>	<b>101181851</b>	
Cable		Door hinge on the right-hand side	<b>BNS-B20-12Z-R</b>	<b>101186267</b>	
Connector plug		Door hinge on the left-hand side	<b>BNS-B20-12Z-ST-L</b>	<b>101186261</b>	
		Door hinge on the right-hand side	<b>BNS-B20-12Z-ST-R</b>	<b>101186260</b>	
		■	Door hinge on the left-hand side	<b>BNS-B20-12ZG-ST-L</b>	<b>101177733</b>
		Door hinge on the right-hand side	<b>BNS-B20-12ZG-ST-R</b>	<b>101177734</b>	

## 6. Safety sensors

### BNS – Actuators and accessories

<b>BPS 250</b> 101120594	<b>DISTANZSTUECK BNS 250</b> 101131223	<b>BPS 260-</b>
 <ul style="list-style-type: none"> <li>■ Actuator for BNS 250</li> <li>■ Thermoplastic enclosure</li> </ul>	 <ul style="list-style-type: none"> <li>■ Thermoplastic enclosure</li> <li>■ To mount the magnetic safety sensor and actuator on ferromagnetic material</li> </ul>	 <ul style="list-style-type: none"> <li>■ Actuator and sensor on a mounting level: <b>BPS 260-1</b>      <b>101184395</b></li> <li>■ Actuator 90° attached to the sensor: <b>BPS 260-2</b>      <b>101184396</b></li> </ul>
<b>DISTANZSTUECK BNS 260</b> 101184643	<b>BPS 40S-</b>	<b>BPS 40S--C</b>
 <ul style="list-style-type: none"> <li>■ Thermoplastic enclosure</li> <li>■ To mount the magnetic safety sensor and actuator on ferromagnetic material</li> </ul>	 <ul style="list-style-type: none"> <li>■ Actuator for BNS 40S</li> <li>■ Actuator and sensor on a mounting level: <b>BPS 40S-1</b>      <b>101215268</b></li> <li>■ Actuator 90° attached to the sensor: <b>BPS 40S-2</b>      <b>101215269</b></li> </ul>	 <ul style="list-style-type: none"> <li>■ Actuator for BNS 40S-...-C</li> <li>■ Actuator and sensor on a mounting level: <b>BPS 40S-1-C</b>      <b>101215266</b></li> <li>■ Actuator 90° attached to the sensor: <b>BPS 40S-2-C</b>      <b>101215267</b></li> </ul>
<b>BPS 16</b> 101172566	<b>BPS 36-</b>	<b>DISTANZSTUECK BNS 36</b> 101188624
 <ul style="list-style-type: none"> <li>■ Actuator for BNS 16</li> <li>■ Thermoplastic enclosure</li> </ul>	 <ul style="list-style-type: none"> <li>■ Actuator and sensor on a mounting level: <b>BPS 36-1</b>      <b>101190052</b></li> <li>■ Actuator 90° attached to the sensor: <b>BPS 36-2</b>      <b>101191859</b></li> </ul>	 <ul style="list-style-type: none"> <li>■ Thermoplastic enclosure</li> <li>■ To mount the magnetic safety sensor and actuator on ferromagnetic material</li> </ul>

Detailed information for the selection of actuators and accessories can be found at [www.schmersal.net](http://www.schmersal.net).

## 6. Safety sensors

### BNS – Actuators and accessories

<b>BP 6</b> 101091837	<b>BP 8</b> 101054816	<b>BP 10</b> 101057531
 <ul style="list-style-type: none"> <li>■ Actuator, unenclosed</li> <li>■ S-pole marked red</li> <li>■ Not coded</li> </ul>	 <ul style="list-style-type: none"> <li>■ Actuator, unenclosed</li> <li>■ S-pole marked red</li> <li>■ Not coded</li> </ul>	 <ul style="list-style-type: none"> <li>■ Actuator, unenclosed</li> <li>■ Colour coding of poles by labels</li> <li>■ Not coded</li> </ul>
<b>BP 15 SS</b> 101139818	<b>BPS 300</b> 101113734	<b>BPS 303</b> 101117076
 <ul style="list-style-type: none"> <li>■ Actuator, stainless steel</li> <li>■ Suitable for food processing industry</li> <li>■ Not coded</li> </ul>	 <ul style="list-style-type: none"> <li>■ Actuator, with plastic enclosure</li> </ul>	 <ul style="list-style-type: none"> <li>■ Actuator, with plastic enclosure</li> <li>■ Suitable for food processing industry</li> </ul>
<b>BPS 303 SS</b> 101141156	<b>BNS-B20-B01</b> 101177737	
 <ul style="list-style-type: none"> <li>■ Actuator, stainless steel</li> <li>■ Suitable for food processing industry</li> </ul>	 <ul style="list-style-type: none"> <li>■ Actuator for BNS-B20</li> <li>■ Order the door handle actuator separately.</li> <li>■ Thermoplastic enclosure</li> </ul>	

Detailed information for the selection of actuators and accessories can be found at [www.schmersal.net](http://www.schmersal.net).

## 6. Safety sensors

### RSS/CSS – Overview of the series



■ RSS 16



■ RSS 36



■ RSS 260

#### Key Features

- Three actuating directions
- Door stop with magnetic latching
- Thermoplastic encl.

- As end stop with magnetic latching
- Thermoplastic enclosure

- Extremely compact design
- Thermoplastic enclosure

#### Other versions

ATEX / IECEx	-	-	-
AS-i SaW (refer to page 260)	-	■	■

#### Technical features

Electrical characteristics			
Assured switching distance $s_{ao}$	12 mm, with latching: 5 mm	10 mm	From front 10 mm, lateral 6 mm
Assured switch-off distance $s_{ar}$	30 mm	20 mm	From front 18 mm, lateral 15 mm
Number of outputs	2x OSSD, 1x Diagnostic	2x OSSD, 1x Diagnostic	2x OSSD, 1x Diagnostic
Operating voltage	24 VDC (PELV)	24 VDC (PELV)	24 VDC (PELV)
Power consumption	< 0.1 A without load	< 0.1 A without load	< 0.1 A without load
Max. switching capacity U/I	24 VDC / 1 A	24 VDC / 250 mA	24 VDC / 250 mA
<b>Mechanical data</b>			
Individual coding possible	■	■	■
Serial diagnostic	■	■	■
Connection	Connector plug, cage clamps, screw terminals	Connector plug	Connector plug, Cable with connector
Cable section:	-	-	0.14 mm <sup>2</sup>
Dimensions (W x D x H)	52 x 91 x 30 mm	106 x 25 x 22.6 mm	47.5 x 18 x 29.5 mm
LED status display	■	■	■
<b>Ambient conditions</b>			
Ambient temperature	-25 °C ... +70 °C	-25 °C ... +70 °C	-25 °C ... max. +65 °C
Protection class	IP65 / IP66 / IP67	IP65 / IP67 / IP69	IP65 / IP67

#### Safety classification

Standards	ISO 13849-1, IEC 61508, IEC 62061	ISO 13849-1, IEC 61508, IEC 62061	ISO 13849-1, IEC 61508, IEC 62061
PL/SIL <sup>1)</sup>	e/3	e/3	e/3
Category <sup>1)</sup>	4	4	4
PFH	$6.3 \times 10^{-11}/h$	$2.7 \times 10^{-10}/h$	$6.8 \times 10^{-10}/h$
Certificates			



To get detailed information about the products and certificates, visit [www.schmersal.net](http://www.schmersal.net).





■ CSS 30



■ CSS 30S



■ CSS 300



■ CSS 34



■ CSS 180

- High switching distance
- Cylindrical design M30
- Metal enclosure

- Functions through stainless steel
- Cylindrical design M30
- Stainless steel encl.

- Functions through stainless steel
- Cylindrical design M30
- Thermoplastic encl.

- CSS 34 F with integrated feedback-loop monitoring saves on safety evaluation
- Thermoplastic encl.

- Cylindrical design M18
- Thermoplastic enclosure

-	-	-	-	■
-	-	-	-	-

CST 30-1: 12 mm; CST 34-S-3: 10 mm	8 mm	8 mm	depending on the actuator, see table page 128	7 mm
CST 30-1: 19 mm; CST 34-S-3: 16 mm	15 mm	15 mm	depending on the actuator, see table page 128	10 mm
2x OSSD, 1x Diagnostic	2x OSSD, 1x Diagnostic	2x OSSD, 1x Diagnostic	2x OSSD, 1x Diagnostic	2x OSSD, 1x Diagnostic
24 VDC (PELV)	24 VDC (PELV)	24 VDC (PELV)	24 VDC (PELV)	24 VDC (PELV)
< 0,1 A without load	< 0,1 A without load	< 0,1 A without load	< 0,1 A without load	< 0,1 A without load
24 VDC / 500 mA	24 VDC / 250 mA	24 VDC / 250 mA	24 VDC / 250 mA	24 VDC / 500 mA
-	-	-	-	-
-	■	■	■	-
Cable	Connector plug	Connector plug	Cable or connector plug	Cable or cable with connector plug or connector plug
0.25 mm <sup>2</sup>	-	-	0.35 mm <sup>2</sup>	0.25 ... 0.5 mm <sup>2</sup>
Ø M30	Ø M30	Ø M30	27 x 108.2 x 35 mm	Ø M18
■	■	■	■	■
-25 °C ... max. +70 °C	-25 °C ... +65 °C	-25 °C ... +60 °C	-25 °C ... max. +70 °C	-25 °C ... max. +70 °C
IP65 / IP67	IP65 / IP67 / IP68; IP69K	IP65 / IP67	IP65 / IP67	IP65 / IP67

ISO 13849-1, IEC 61508	ISO 13849-1, IEC 61508	ISO 13849-1, IEC 61508	ISO 13849-1, IEC 61508	ISO 13849-1, IEC 61508
e/3	e/3	e/3	e/3	e/3
4	4	4	4	4
2.5 x 10 <sup>-9</sup> /h	3.6 x 10 <sup>-9</sup> /h	3.6 x 10 <sup>-9</sup> /h	3.6 x 10 <sup>-9</sup> /h	2.5 x 10 <sup>-9</sup> /h

<sup>1)</sup> Also with series-wiring

## 6. Safety sensors

### RSS/CSS – Preferred types

Series	Design	Housing material	Sao/Sar	Actuator	Actuation direction
RSS 16		Thermoplastic	12 / 30	RST-16-1 RST 16-1-R RST-U-2	From head From top From below
RSS 36		Thermoplastic	10 / 20	RST 36-1 RST 36-1-R RST 16-1 RST-U-2	From side
RSS 260		Thermoplastic	10 / 18	RST 260-1 RST 16-1 RST-U-2	From side
CSS 30		Metal	12 / 19	CST 30-1 CST 34-S-3	From head
CSS 30S		Metal	8 / 15	CST 30S-1	
CSS 300		Thermoplastic	8 / 15	CST 30S-1	
CSS 34		Thermoplastic	depending on the actuator, see table page 128	CST 180-1 CST 180-2 CST 34-V-1 CST 34-S-1 CST 34-S-2 CST 34-S-3	From head  From side
CSS 180		Thermoplastic	7 / 10	CST 180-1 CST 180-2	From head

Actuators should be ordered separately. A selection can be found on page 126.

	Safety output	Diagnostic	Connection	Type designation	Material number
	2 p-type, short-circuit proof safety outputs	Conventional	Connector plug	RSS16-D-R-ST8H	103004338
				RSS16-D-ST8H	103004370
				RSS16-I2-D-R-ST8H	103004367
				RSS16-SD-ST8H	103006685
		Serial	Cage clamps	RSS16-D-CC	103004372
				RSS16-D-R-CC	103004365
				Screw connection	RSS16-D-R-SK
	2 p-type, short-circuit proof safety outputs	Conventional	Connector plug	RSS 36-D-ST	101213954
				RSS 36-I1-D-R-ST	101216957
				RSS 36-I1-D-ST	101216958
				RSS 36-I2-D-R-ST	101214773
				RSS 36-I2-D-ST	101216956
		Serial	RSS 36-SD-ST	101214772	
			2 p-type, short-circuit proof safety outputs	Conventional	Connector plug
RSS260-I1-D-ST	103003606				
RSS260-I2-D-ST	103003607				
RSS260-SD-ST	103003605				
Serial	Cable with connector			RSS260-I2-D-LSTM8-8-0,1M	103013301
		RSS260-I2-D-LSTM12-8-0,25M	103014732		
	2 p-type, short-circuit proof safety outputs	Conventional	Cable <sup>1)</sup>	CSS 15-30-2P+D-M-L	101209841
		Serial	Connector plug	CSS 11-30S-D-M-ST	101204612
				CSS 11-30S-SD-M-ST	101204613
		Conventional	Connector plug	CSS 11-300-D-M-ST	101213904
		Serial		CSS 11-300-SD-M-ST	101213905
	2 p-type, short-circuit proof safety outputs	Conventional	Cable <sup>1)</sup>	CSS 12-34-V-D-M-L	101181060
			Connector plug	CSS 12-34-V-D-M-ST	101181065
		Serial	Cable <sup>1)</sup>	CSS 12-34-V-SD-M-L	101181062
				CSS 12-34-V-SD-M-ST	101181067
		Conventional	Connector plug	CSS 12-34F0-V-D-M-ST	101189088
				CSS 12-34F1-V-D-M-ST	101188768
		Conventional	Cable <sup>1)</sup>	CSS 14-34-S-D-M-L	101181059
			Connector plug	CSS 14-34-S-D-M-ST	101181063
		Serial	Cable <sup>1)</sup>	CSS 14-34-S-SD-M-L	101181061
				CSS 14-34-S-SD-M-ST	101181066
		Conventional	Connector plug	CSS 14-34F0-S-D-M-ST	101188767
				CSS 14-34F1-S-D-M-ST	101189087
	2 p-type, short-circuit proof safety outputs	Without	Cable <sup>1)</sup>	CSS 8-180-2P-E-L	101167896
			Cable <sup>1)</sup> with connector	CSS 8-180-2P-E-LST	101167897
			Cable <sup>1)</sup>	CSS 8-180-2P-Y-L	101165294
			Cable <sup>1)</sup> with connector	CSS 8-180-2P-Y-LST	101167898
		Conventional	Cable <sup>1)</sup>	CSS 8-180-2P+D-E-L	101169552
			Cable <sup>1)</sup> with connector	CSS 8-180-2P+D-E-LST	101169553
			Cable <sup>1)</sup>	CSS 8-180-2P+D-M-L	101169558
			Cable <sup>1)</sup> with connector	CSS 8-180-2P+D-M-LST	101169560
			Connector plug	CSS 8-180-2P+D-M-ST	101209595

<sup>1)</sup> Standard cable length 2 m; other lengths upon request

## 6. Safety sensors

### RSS/CSS – Actuators and accessories

RST 16-1	103004336	RST16-1-R	103004337	RST 36-	
					
<ul style="list-style-type: none"> <li>■ Flat actuator for RSS 16, RSS 36 and RSS 260</li> <li>■ Thermoplastic enclosure</li> </ul>		<ul style="list-style-type: none"> <li>■ Actuator with latching function for RSS 16-...-R</li> <li>■ Plastic and stainless steel enclosure</li> </ul>		<ul style="list-style-type: none"> <li>■ Actuator for RSS 36</li> <li>■ Actuator with latching magnet:</li> </ul>	<p><b>RST 36-1</b> 101213820</p> <p><b>RST 36-1-R</b> 101213821</p>
ACC RSS 36-SK	101215048	RST 260-1	103004318	RST-U-2	103005994
					
<ul style="list-style-type: none"> <li>■ Sealing kit for RSS 36</li> <li>■ To seal the mounting holes and as spacer</li> </ul>		<ul style="list-style-type: none"> <li>■ Actuator for RSS 260</li> <li>■ Thermoplastic enclosure</li> </ul>		<ul style="list-style-type: none"> <li>■ Small actuator for RSS 16, RSS 36 and RSS 260</li> <li>■ Thermoplastic enclosure</li> </ul>	
CST 34-S-1	101181085	CST 34-S-2	101196101	CST 34-V-1	101181429
					
<ul style="list-style-type: none"> <li>■ Actuator for CSS 34</li> <li>■ Thermoplastic enclosure</li> <li>■ Lateral active surface (type plate)</li> </ul>		<ul style="list-style-type: none"> <li>■ Actuator for CSS 34</li> <li>■ Thermoplastic enclosure</li> <li>■ Actuator with double solenoid, for increased misalignment</li> <li>■ Lateral active surface (type plate)</li> </ul>		<ul style="list-style-type: none"> <li>■ Actuator for CSS 34</li> <li>■ Thermoplastic enclosure</li> <li>■ Frontal active surface (blue clamp)</li> </ul>	

Detailed information for the selection of actuators and accessories can be found at [www.schmersal.net](http://www.schmersal.net).

## 6. Safety sensors



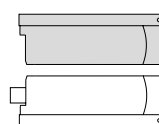
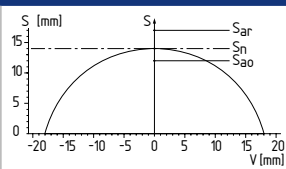

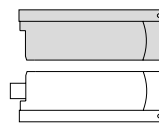
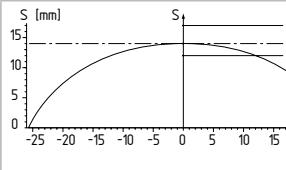

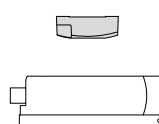
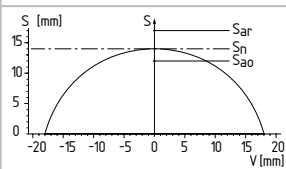

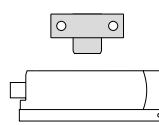
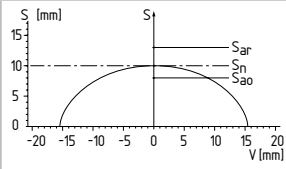


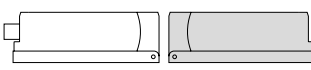
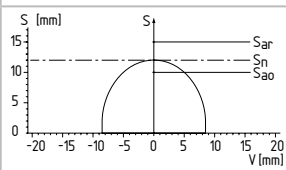

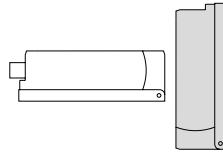
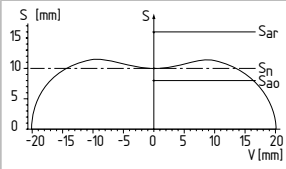

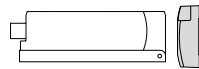
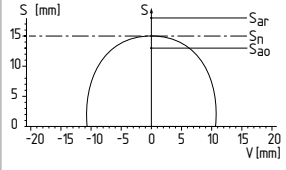

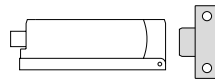
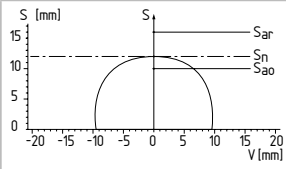
### RSS/CSS – Actuators and accessories

CST 34-S-3	101203434	CST 30-1	101209887	CST 30S-1	101193607
 <ul style="list-style-type: none"> <li>■ Small actuator for CSS 34 and CSS 30</li> <li>■ Thermoplastic enclosure</li> </ul>		 <ul style="list-style-type: none"> <li>■ Actuator for CSS 30</li> <li>■ Thermoplastic enclosure M30</li> </ul>		 <ul style="list-style-type: none"> <li>■ Actuator for CSS 30S and CSS 300</li> <li>■ Stainless steel enclosure M30</li> </ul>	
CST 180-1	101177198	CST 180-2	101179574		
 <ul style="list-style-type: none"> <li>■ Actuator for CSS 180 and CSS 34</li> <li>■ Plastic housing with cross borehole</li> <li>■ Incl. H18 clamp</li> </ul>		 <ul style="list-style-type: none"> <li>■ Actuator for CSS 180 and CSS 34</li> <li>■ Thermoplastic enclosure M18</li> <li>■ Without clamp</li> </ul>			
CSA-M-1	101173457	H 30	101068520	H 18	101068879
 <ul style="list-style-type: none"> <li>■ Magnetic snap lock</li> <li>■ For play-free interlocking of light guards</li> </ul>		 <ul style="list-style-type: none"> <li>■ Clamp for CSS 30, 30S and 300</li> <li>■ For a smooth fitting of the safety sensors with cylindrical shape Ø 30</li> </ul>		 <ul style="list-style-type: none"> <li>■ Clamp for CSS 180</li> <li>■ For a smooth fitting of the safety sensors with cylindrical shape Ø 18</li> </ul>	

Detailed information for the selection of actuators and accessories can be found at [www.schmersal.net](http://www.schmersal.net).

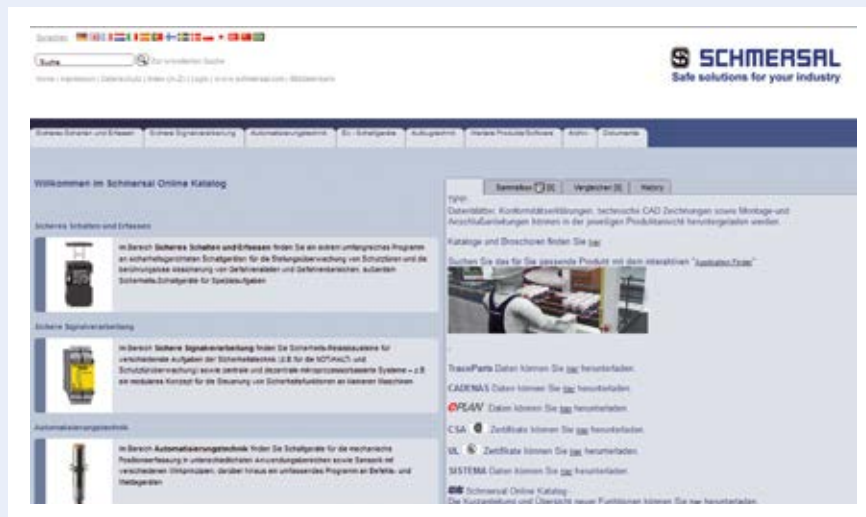
## 6. Safety sensors

### CSS 34 – Actuator-Overview

Safety sensor	Actuator	Actuation	Switching distances to IEC 60947-5-3:
<p>Lateral actuation</p>  <p>CSS 14-34-S ...</p>	<b>CST 34-S-1</b> 		$S_n$ 14 mm $S_{ao}$ 12 mm $S_{ar}$ 17 mm 
	<b>CST 34-S-2</b> 		$S_n$ 14 mm $S_{ao}$ 12 mm $S_{ar}$ 17 mm 
	<b>CST 34-S-3</b> 		$S_n$ 14 mm $S_{ao}$ 12 mm $S_{ar}$ 17 mm 
	<b>CST 180-1 / CST 180-2</b> 		$S_n$ 10 mm $S_{ao}$ 8 mm $S_{ar}$ 13 mm 
<p>Actuation from front</p>  <p>CSS 12-34-V ...</p>	<b>CST 34-V-1</b> 		$S_n$ 12 mm $S_{ao}$ 10 mm $S_{ar}$ 15 mm 
	<b>CST 34-S-2</b> 		$S_n$ 10 mm $S_{ao}$ 8 mm $S_{ar}$ 16 mm 
	<b>CST 34-S-3</b> 		$S_n$ 15 mm $S_{ao}$ 13 mm $S_{ar}$ 18 mm 
	<b>CST 180-1 / CST 180-2</b> 		$S_n$ 12 mm $S_{ao}$ 10 mm $S_{ar}$ 16 mm 

## Up-to-date without fail

The online product catalogue



For detailed information, check out  
[www.schmersal.net](http://www.schmersal.net)

## 7. Pull-wire emergency stop switch

### Description

### Area of application

Pull-wire emergency switches are used on machinery and equipment that cannot be protected by safety covers or safety doors.

Their main area of application are transport and conveyor systems. But also for large equipment such as in the recycling industry, plastics and wood processing is this type of safety switchgear widely used.

The reason for this is: In contrast to the EMERGENCY STOP mushroom pushbutton, the pull-wire emergency switch can trigger the EMERGENCY STOP function at any point along the rope. This is an important safety feature in the event of a hazard.

In conjunction with an appropriate safety analysis, a pull-wire emergency stop switch can be used up to PL e according to ISO 13849-1. Information for the selection of suitable safety relay modules can be found in the chapter "Safety relay modules" (refer to page 212).

Included in the range of pull-wire switches of the Schmersal Group are variants with integrated AS-i SaW (AS-Interface Safety at Work) or DuplineSafe® interface. Both systems have the advantage of standardised and trusted bus systems.

With the right design, they can also be used in explosively hazardous areas and under extreme temperatures.

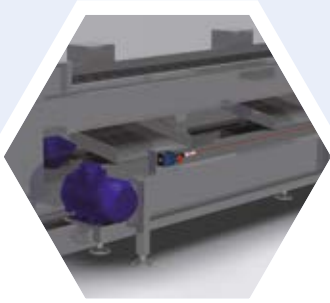
### Design and way of functioning

All pull-wire emergency switches from the Schmersal Group are in accordance with the guidelines of the IEC 60947-5-5 and ISO 13850. A wire and wire-breakage monitoring is standard equipment.

The pull-wire emergency switch is set in the operating condition by pre-tensioning the rope. Then the NC contacts are closed and the NO contacts are open. If the rope is pulled or broken the NC contacts are opened and the NO contacts closed. Thereafter the pull-wire emergency switch can only be manually set back into an operational state.

A distinction is made between one-sided and two-sided acting pull-wire emergency switches. While one-sided series are installed on one side of the system, the assembly of the two-sided pull-wire emergency switch is centrally located. In addition to the assembly possibilities, the rope length and the number of available contacts is important with the selection.

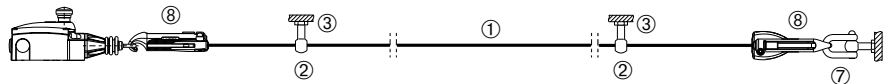




## Mounting instructions

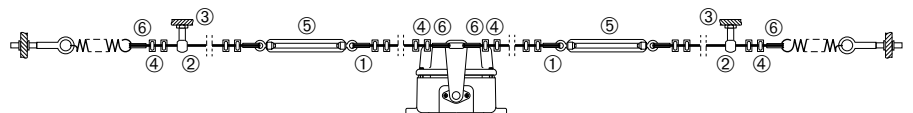
### One-side acting pull-wire emergency switch (example ZQ 900)

The pull-wire emergency switch with one-sided action is installed at either the start or the end of the hazardous area. The rope is fastened accordingly to the opposite end.



### Two-side acting pull-wire emergency switch (example T3Z 068)

The pull-wire emergency switch with two-side actuation is mounted mid-way, so that the rope can be clamped on both sides. Depending on the pulling direction, the actuating lever is swung to the left or right, thus triggering the EMERGENCY STOP command.



#### Key

- ① Wire rope
- ② Eyebolt
- ③ Nut
- ④ Wire clamp
- ⑤ Tensioner
- ⑥ Wire thimble
- ⑦ Shackle
- ⑧ Rope tensioner

## 7. Pull-wire emergency stop switch

### Overview of the series



T3Z 068



ZQ 700



ZQ 900

#### Key Features

- Maximum cable length 2 x 50 m
- 6 contacts
- Enclosure in grey cast iron, painted

- Maximum cable length 10 m
- 2 contacts
- Plastic enclosure, thermoplastic

- Maximum cable length 75 m
- 4 contacts
- Enclosure in zinc die-cast and thermoplastic




#### Other versions

ATEX / IECEx	■	–	■
AS-i SaW (refer to page 260)	–	■	■
DuplineSafe®	■	–	–

#### Technical features

Electrical characteristics			
Max. switching capacity U/I	230 VAC / 2.5 A; 24 VDC / 6 A	230 VAC / 4 A; 24 VDC / 4 A	230 VAC / 4 A; 24 VDC / 1 A
Mechanical data			
Cable entry	2 x M20	1 x M20	3 x M20
Cable section <sup>1)</sup>	0.75 ... 1.5 mm <sup>2</sup>	0.75 ... 2.5 mm <sup>2</sup>	0.75 ... 2.5 mm <sup>2</sup>
Dimensions (W x H x D)	182 x 124.5 x 178 mm	40.5 x 160 x 51 mm	71 x 220 x 69.7 mm
Ambient conditions			
Ambient temperature	–30 °C ... +90 °C <sup>2)</sup>	–25 °C ... +70 °C	–25 °C ... +70 °C
Protection class	IP65	IP67	IP67

#### Safety classification

Standards	ISO 13849-1	ISO 13849-1	ISO 13849-1
B <sub>10D</sub> NC contact	100,000	100,000	100,000
Certificates			

<sup>1)</sup> Including conductor ferrules

<sup>2)</sup> Special versions to –40 °C upon request



To get detailed information about the products and certificates, visit [www.schmersal.net](http://www.schmersal.net).

## 7. Pull-wire emergency stop switch

### Preferred types



Series	Enclosure	Operating principle	Possible wire length	Emergency stop button	Unlocking	Contacts	Indicator lamp	Type designation	Material number							
T3Z 068	Metal	2-side operation	2 x 50 m		Pull-ring	1 NO / 1 NC	---	T3Z 068-11YR	101087877							
							yellow	T3Z 068-11YRG	101087879							
							---	T3Z 068-11YR-2909	103012038*							
						2 NO / 2 NC	---	T3Z 068-22YR	101087881							
							yellow	T3Z 068-22YRG	101087883							
							---	T3Z 068-33YR	101087885							
					Key	3 NO / 3 NC	yellow	T3Z 068-33YRG	101087887							
							---	T3Z 068-11YRS	101087878							
							yellow	T3Z 068-11YRSG	101087880							
						2 NO / 2 NC	---	T3Z 068-22YRS	101087882							
							yellow	T3Z 068-22YRSG	101087884							
							---	T3Z 068-33YRS	101087886							
ZQ 700	Thermo-plastic	1-side operation	10 m		Button	2 NC	---	ZQ 700-02	101192478							
								1 NO / 1 NC	ZQ 700-11	101192476						
						ZQ 900		Metal / Thermo-plastic	1-side operation	75 m		Button	2 NC	optionally as accessories	ZQ 900-02	101186146
													4 NC		ZQ 900-04	101184416
													1 NO / 1 NC		ZQ 900-11	101184327
													1 NO / 3 NC		ZQ 900-13	101184332
													2 NO / 2 NC		ZQ 900-22	101184329
													2 NC		ZQ 900-02N	101186147
													4 NC		ZQ 900-04N	101184477
													1 NO / 1 NC		ZQ 900-11N	101184474
													1 NO / 3 NC		ZQ 900-13N	101184476
													2 NO / 2 NC		ZQ 900-22N	101184475

\* Prepared for DuplineSafe® (order number DuplineSafe® input module 103010180)

## 7. Pull-wire emergency stop switch Accessories



<p><b>Eyebolt</b></p>  <ul style="list-style-type: none"> <li>■ BM 10 x 40 <b>101084928</b></li> <li>■ BM 8 x 70 (stainless steel) <b>101192471</b></li> <li>■ Included in delivery: Eyebolt with nut</li> </ul>	<p><b>Wire clamp</b></p>  <ul style="list-style-type: none"> <li>■ Wire clamp</li> <li>■ 3 mm (stainless steel) <b>101203477</b></li> <li>■ 5 mm (stainless steel) <b>101203478</b></li> </ul>	<p><b>Duplex wire clamp</b> <b>101190917</b></p>  <ul style="list-style-type: none"> <li>■ Duplex wire clamp 3 mm (stainless steel)</li> </ul>
<p><b>Egg-shaped wire clamp</b> <b>101196043</b></p>  <ul style="list-style-type: none"> <li>■ Egg-shaped wire clamp, size 3</li> </ul>	<p><b>Wire thimbles</b></p>  <ul style="list-style-type: none"> <li>■ Wire thimble</li> <li>■ 3 mm (stainless steel) <b>101203472</b></li> <li>■ 5 mm (stainless steel) <b>101203476</b></li> </ul>	<p><b>Pulley</b> <b>101192433</b></p>  <ul style="list-style-type: none"> <li>■ Pulley (stainless steel) to guide the wire rope where the path is not a straight line</li> <li>■ According to ISO 13850, pulleys may only be mounted in such a way that the complete length of the pull-wire is visible.</li> </ul>
<p><b>Tensioning jack</b> <b>101087930</b></p>  <ul style="list-style-type: none"> <li>■ Tensioner M6</li> <li>■ For exact adjustment of the tension of the wire rope</li> <li>■ Adjustable 145 mm ... 225 mm</li> <li>■ To DIN 1480</li> </ul>	<p><b>Tension spring</b></p>  <ul style="list-style-type: none"> <li>■ Tension spring to maintain the reaction force</li> <li>■ RZ-136E (only for T3Z 068) <b>101087931</b></li> <li>■ RZ-2041 (only for ZQ 900) <b>101186696</b></li> <li>■ ACC-700-RZ1731 (only for ZQ 700) <b>103005863</b></li> </ul>	<p><b>Shackle</b> <b>101186490</b></p>  <ul style="list-style-type: none"> <li>■ Shackle (stainless steel)</li> <li>■ For fixing the wire rope to the eyebolt</li> </ul>

For detailed information on selection, visit [www.schmersal.net](http://www.schmersal.net).

## 7. Pull-wire emergency stop switch Accessories



Wire rope	Wire unit complete	S 900 rope tensioner
 <ul style="list-style-type: none"> <li>■ Wire rope</li> <li>■ With red PVC sheath</li> <li>■ Ø total 5 mm</li> <li>■ Ø of the steel core 3 mm</li> </ul> <p style="text-align: right;"><b>on request</b></p>	 <ul style="list-style-type: none"> <li>■ Wire unit complete</li> <li>■ Ready-to-fit</li> <li>■ Included in delivery: 1 Wire rope; 2 Wire clamps; 1 Duplex wire clamp; 1 Wire thimble; 1 Eyebolt</li> </ul> <p style="text-align: right;"><b>on request</b></p>	 <ul style="list-style-type: none"> <li>■ S 900 rope tensioner</li> <li>■ Smooth and time-saving adjustment</li> </ul>
Indicator lamp G24-M20	Mounting plate set	Mounting plate set
 <ul style="list-style-type: none"> <li>■ Indicator lamp G24-M20 for ZQ 900 (LED 24 VDC - red/green)</li> </ul>	 <ul style="list-style-type: none"> <li>■ Mounting plate set for ZQ 900</li> <li>■ Included in delivery: 1 Mounting plate; 4 counter sunk screws for fixing of the ZQ 900</li> </ul>	 <ul style="list-style-type: none"> <li>■ Mounting plate set for ZQ 700</li> <li>■ Included in delivery: 1 Mounting plate; 2 Counter sunk screws for fixing of the mounting plate; 4 Cylinder head screws for fixing of the ZQ 700</li> </ul>
Cable gland	Cable gland	Screw plug
 <ul style="list-style-type: none"> <li>■ M20 x 1,5 cable gland, metal</li> <li>■ For ZQ 900 / T3Z 068</li> <li>■ Brass, nickel-plated</li> <li>■ Authorised cable diameter: 6 ... 12 mm</li> <li>■ Tightening torque 8 Nm</li> </ul>	 <ul style="list-style-type: none"> <li>■ M20 x 1.5 cable gland, plastic</li> <li>■ For ZQ 700</li> <li>■ Polyamide</li> <li>■ Authorised cable diameter: 6 ... 12 mm</li> <li>■ Tightening torque 4.5 Nm</li> </ul>	 <ul style="list-style-type: none"> <li>■ M20 x 1.5 screw plug, metal</li> <li>■ For ZQ 900 / T3Z 068</li> <li>■ Brass, nickel-plated</li> <li>■ Tightening torque 8 Nm</li> </ul>

For detailed information on selection, visit [www.schmersal.net](http://www.schmersal.net).

## 8. EMERGENCY STOP control devices

### Description

### Command and signalling devices

Command and signalling devices makes communication possible between human beings and machines. People expect high levels of reliability from them. Intuitive operation is desirable not just from an ergonomic point of view, but also with regards to safety at work.

The type of machine and the environmental conditions mean that the demands made of command and signalling devices are very different. Consequently, there is a wide range of different designs available. In addition to classic command devices and indicator lights for installation on operator panels, pull-wire switches, foot switches, cross-switches and buttons as well as two-hand controls and enabling devices, for example are in common use.





As an all-rounder in the field of HMI components and systems, the Schmersal Group offers a range of products for (virtually) all areas of application. These also include a series of command and signalling devices that have been developed for dedicated use in industrial applications (series A), hygiene-sensitive areas (series N) as well as for extremely harsh ambient conditions (Series E and R).

All our series are distinguished by their very high levels of quality and their long service lives. They are of modular structure, which means you can adapt them in an optimum way to meet the exact requirements of your own individual application.

With contact systems too, users have different choices. Apart from this, assembly housings are available for all three series. If desired, command and signalling devices are supplied pre-assembled or ready-to-connect to operating systems with housings.

Information for the selection of suitable safety relay modules can be found in the chapter "Safety relay modules" (refer to page 212).

### Emergency stop command devices

"E" program	"N" program	"R" program	"A" program
Applications under difficult operating conditions	Food, hygiene and outdoor applications	Heavy-duty applications	Industrial applications
			

For a detailed description and technical data of all command and signalling devices order our special catalogue "Command and Signalling Devices". Precise product information can be found in our online catalogue at [www.schmersal.net](http://www.schmersal.net).



#### Overview "E" program

1	EMERGENCY STOP "E" program
2	EMERGENCY STOP with release by key
4	Mounting flange ELM
5	Contact element EF
6	Spring element EFR
7	Securing plate

#### Overview "N" program

3	EMERGENCY STOP "N" program
4	Mounting flange ELM
5	Contact element EF
6	Spring element EFR
7	Securing plate

#### Overview "R" program

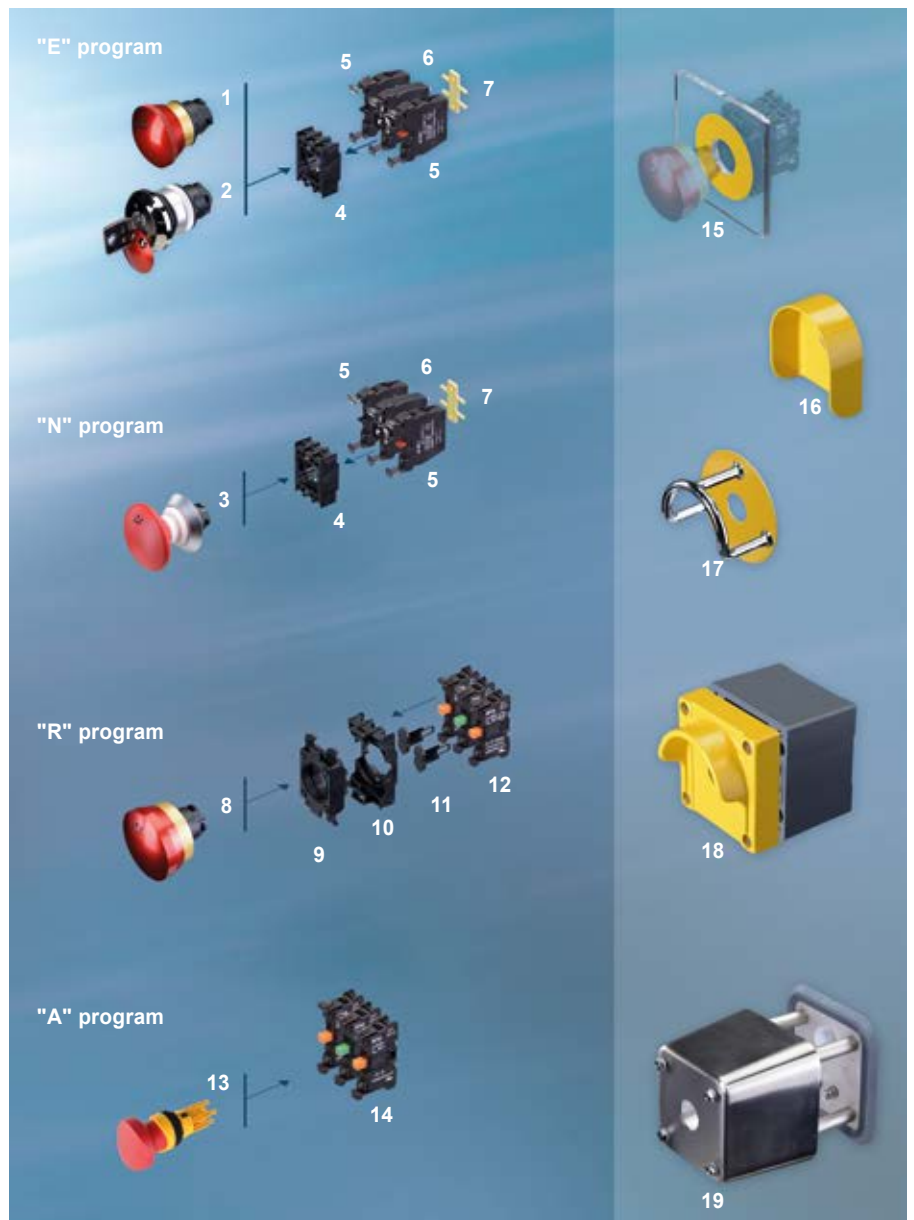
8	EMERGENCY STOP "R" program	
9	Mounting flange	RLM
10	Contact carrier	
11	Plunger elements	
12	Contact elements RF...	

#### Overview "R" program

13	EMERGENCY STOP "A" program
14	Contact element AF...

#### Overview accessories

15	Emergency stop label
16	Emergency stop protective collar
17	Emergency stop protective collar bracket
18	EMERGENCY STOP enclosure for surface mounting
19	Stainless steel enclosure for surface mounting



## 8. EMERGENCY STOP control devices

### "E" program



■ EDRZ40RT



■ EDRR40RT






■ EDRRS40RT




#### Key Features

- |  |  |   |
|--|--|---|
| <ul style="list-style-type: none"> <li>• EMERGENCY STOP command device to ISO 13850</li> <li>• Pull-to-unlatch mechanism</li> <li>• Applications under difficult operating conditions</li> <li>• Mounting-Ø 22.3 mm and 30.5 mm</li> </ul> | <ul style="list-style-type: none"> <li>• EMERGENCY STOP command device to ISO 13850</li> <li>• Twist and pull-to-unlatch mechanism</li> <li>• Applications under difficult operating conditions</li> <li>• Mounting-Ø 22.3 mm and 30.5 mm</li> </ul> | <ul style="list-style-type: none"> <li>• EMERGENCY STOP command device to ISO 13850</li> <li>• Key unlatching mechanism</li> <li>• Applications under difficult operating conditions</li> <li>• Mounting-Ø 22.3 mm and 30.5 mm</li> </ul> |
|--|--|---|

#### Technical features

<b>Mechanical data</b>			
<b>Housing material</b>			
Material of operating element	Aluminium	Aluminium	Chrome-plated brass
Material front ring	Aluminium	Aluminium	Aluminium
Colour			
Front panel thickness	1...6 mm	1...6 mm	1...6 mm
<b>Snap-action mechanism</b>			
Integrated	■	-	-
Externally via additional module	-	■	■
<b>Mounting</b>			
Mounting flange included in delivery	■	■	■
<b>Ambient conditions</b>			
Ambient temperatures	-25 °C ... +75 °C	-25 °C ... +75 °C	-25 °C ... +75 °C
Protection class	IP65	IP65	IP65

#### Safety classification \*

Standards	ISO 13849-1	ISO 13849-1	ISO 13849-1
B <sub>10D</sub> NC contact	100,000	100,000	100,000
Certificates *			

\* Note: In conjunction with the corresponding contact elements



Detailed product information can be found in our online catalogue at [www.schmersal.net](http://www.schmersal.net).



## 8. EMERGENCY STOP control devices "E" program



Type	Unlocking	Snap-action mechanism	A	B	C	Type designation	Material number
Emergency stop command devices	Pull-to-unlatch mechanism	Integrated	29 mm	22.3 mm	38.5 mm	<b>EDRZ40RT</b>	<b>101177107</b>
				30.5 mm		<b>EDRZ40VHRT</b>	<b>101182360</b>
	Twist and pull-to-unlatch mechanism	External with spring element EFR *	29 mm	22.3 mm	38.5 mm	<b>EDRR40RT</b>	<b>101021009</b>
					49 mm	<b>EDRR50RT</b>	<b>101021015</b>
				30.5 mm	38.5 mm	<b>EDRR40VHRT</b>	<b>101024290</b>
					49 mm	<b>EDRR50VHRT</b>	<b>101024299</b>
	Release by key (cover red)	External with spring element EFR.EDRRS*	29 mm	22.3 mm	37.5 mm	<b>EDRRS40RT</b>	<b>101025432</b>
				30.5 mm		<b>EDRRS40VHRT</b>	<b>101025435</b>

\* Spring element EFR or EFR.EDRRS must be ordered separately!

### Key

A	Height	Height of command device in front of the front panel
B	Mounting-Ø	Installation diameter for the command device head
C	Key Ø	Width of command device head

## 8. EMERGENCY STOP control devices

### "N" program



■ NDRZ50RT



■ NDRR50RT

#### Key Features

- EMERGENCY STOP command device to ISO 13850
- Pull-to-unlatch mechanism
- Food, hygiene and outdoor applications
- Mounting-Ø 22.3 mm

- EMERGENCY STOP command device to ISO 13850
- Pull-to-unlatch mechanism
- Food, hygiene and outdoor applications
- Mounting-Ø 22.3 mm

#### Technical features

##### Mechanical data

##### Housing material

Material of operating element

ABS

ABS

Material front ring

ABS, chrome-plated

ABS, chrome-plated

Colour of the operating element



Colour of sealing membranes



Front panel thickness

1...6 mm

1...6 mm

##### Snap-action mechanism

Integrated



-

Externally via additional module

-



##### Mounting

Mounting flange included in delivery



##### Ambient conditions

Ambient temperatures

-25 °C ... +80 °C

-25 °C ... +80 °C

Protection class

IP69K

IP69K

#### Safety classification \*

Standards

ISO 13849-1

ISO 13849-1

B<sub>10d</sub> NC contact

100,000

100,000

Certificates \*



\* Note: In conjunction with the corresponding contact elements



Detailed product information can be found in our online catalogue at [www.schmersal.net](http://www.schmersal.net).

## 8. EMERGENCY STOP control devices "N" program



Type	Unlocking	Snap-action mechanism	Front ring	Bellows	A	B	C	Type designation	Material number
Emergency stop control devices	Pull-to-unlatch mechanism	Integrated	silver	white	45 mm	22.3 mm	50 mm	NDRZ50RT	101177168
				black				NDRZ50GR/RT	101177170
				blue				NDRZ50BL/RT	103009270
			yellow	white				NDRZ50RT-2905-1 <sup>2)</sup>	103011890
				black				NDRZ50GR/RT-2905-1 <sup>2)</sup>	103011811
				blue				NDRZ50BL/RT-2905-1 <sup>2)</sup>	103011891
		External with spring element EFR <sup>1)</sup>	silver	white	45 mm	22.3 mm	50 mm	NDRR50RT	101163587
				black				NDRR50GR/RT	101163594
				blue				NDRR50BL/RT	103009269
			yellow	white				NDRR50RT-2905-1 <sup>2)</sup>	103013775
				black				NDRR50GR/RT-2905-1 <sup>2)</sup>	103013777
				blue				NDRR50BL/RT-2905-1 <sup>2)</sup>	103013778

<sup>1)</sup> Spring element EFR must be ordered separately.

<sup>2)</sup> Appendix 2905-1: Yellow front ring, which means that emergency stop sign can be dispensed with

### Key

A	Height	Height of command device in front of the front panel
B	Mounting-Ø	Installation diameter for the command device head
C	Key Ø	Width of command device head

## 8. EMERGENCY STOP control devices

### "R" program



■ RDRZ45RT

#### Key Features

- EMERGENCY STOP command device to ISO 13850
- Pull-to-unlatch mechanism
- Heavy-duty applications
- Mounting-Ø 22.3 mm

#### Other versions are available

ATEX / IECEx



#### Technical features

##### Mechanical data

##### Housing material

Material of operating element

Aluminium

Material front ring

Aluminium

Colour of the operating element



Front panel thickness

1...6 mm

##### Snap-action mechanism

Integrated



Externally via additional module

-

##### Mounting

Mounting flange included in delivery



##### Ambient conditions

Ambient temperatures

-25 °C ... +75 °C

Protection class

IP65

#### Safety classification \*

Standards

ISO 13849-1

B<sub>10D</sub> NC contact

100,000

Certificates \*



\* Note: In conjunction with the corresponding contact elements



Detailed product information can be found in our online catalogue at [www.schmersal.net](http://www.schmersal.net).

## 8. EMERGENCY STOP control devices "R" program



Type	Unlocking	Snap-action mechanism	A	B	C	Type designation	Material number
Emergency stop command device	Pull-to-unlatch mechanism	Integrated	27.5 mm	22.3 mm	45 mm	<b>RDRZ45RT</b>	<b>101193576</b>

### Key

- A Height      Height of command device in front of the front panel
- B Mounting-Ø      Installation diameter for the command device head
- C Key Ø      Width of command device head

### EMERGENCY STOP complete housing



## 8. EMERGENCY STOP control devices – A program

### Emergency stop control devices



■ ADRR40


#### Key Features

- EMERGENCY STOP command device to ISO 13850
- Pull-to-unlatch mechanism
- Industrial applications
- Mounting-Ø 22.3 mm


#### Other versions are available

Mounted in housing	MBKAC311YE-ADRR40RT-2NC
--------------------	-------------------------

#### Technical features

<b>Mechanical data</b>	
<b>Housing material</b>	
Material of operating element	Thermoplastic
Material front ring	Thermoplastic
Colour	
Design	round
Front panel thickness	1...6 mm
Unlocking type	Pull-to-unlatch mechanism
<b>Snap-action mechanism</b>	
Integrated	■
Externally via additional module	-
<b>Mounting</b>	
Connection:	Knurled nut, central mounting
Mounting position	any
<b>Ambient conditions</b>	
Ambient temperatures	-25 °C ... +60 °C
IP Protection class	IP65

#### Safety classification

Standards	ISO 13850
B <sub>10D</sub> NC contact	100,000 operations
Certificates	
Note	cULus in conjunction with the corresponding contact elements only

## 8. EMERGENCY STOP control devices – A program

### Emergency stop control devices



Type	Unlocking	Snap-action mechanism	A	B	C	Type designation	Material number
<b>EMERGENCY STOP command devices</b>	Pull-to-unlatch mechanism	Integrated	38	22.3	40	<b>ADRR40RT</b>	<b>101030271</b>
<b>EMERGENCY STOP complete housing</b>	Pull-to-unlatch mechanism	Integrated	93	–	40	<b>MBKAC311YE-ADRR40RT-2NC</b>	<b>103009572</b>
<b>EMERGENCY STOP complete housing</b>	Pull-to-unlatch mechanism	Integrated	93	–	40	<b>MBKAC311YE-ADRR40RT-2NC-1NO</b>	<b>103011887</b>

All dimensions in mm.

#### Key

- A Height      Height of command device in front of the front panel
- B Mounting-Ø      Installation diameter for the command device head
- C Key Ø      Width of command device head

#### EMERGENCY STOP complete housing



## 8. EMERGENCY STOP control devices

### Contact elements



■ EF



■ RF



■ AF

#### Key Features

	• Contact elements for "E" and "N" program	• Contact elements for "R" program	• Contact elements for "A" program
--	--	------------------------------------	------------------------------------

#### Other versions

<b>ATEX / IECEx</b>	-	■	-
---------------------	---	---	---

#### Technical features

<b>Electrical characteristics</b>			
<b>Max. switching capacity U/I</b>	250 VAC / 8 A; 24 VDC / 5 A	250 VAC / 6 A; 24 VDC / 3 A	250 VAC / 6 A; 24 VDC / 3 A
<b>Switching of low voltages</b>	> 5 VDC / 3.2 mA	>5VDC / 1 mA	-
<b>Switching frequency <sup>1)</sup></b>	1200/h	1200/h	1200/h
<b>Mechanical data</b>			
<b>Material</b>			
<b>Material of the enclosure</b>	Plastic, glass-fibre-reinforced, self-extinguishing	Plastic, glass-fibre-reinforced, self-extinguishing	Plastic, self-extinguishing
<b>Material of the contacts</b>	Fine-silver, phosphor bronze or brass carrier	Fine-silver, phosphor bronze or brass carrier	Fine-silver, phosphor bronze or brass carrier
<b>Connection</b>			
<b>Screw terminals</b>	■	■	■
<b>Flat plug-in connector</b>	■	-	-
<b>Cable section:</b>			
<b>solid wire</b>	2 x (0.5 ... 2.5 mm <sup>2</sup> )	2 x (0.5 ... 2.5 mm <sup>2</sup> )	2 x 1.5 mm <sup>2</sup>
<b>stranded wire</b>	2 x (0.5 ... 1.5 mm <sup>2</sup> )	2 x (0.5 ... 1.5 mm <sup>2</sup> )	2 x 1.5 mm <sup>2</sup>
<b>Blade terminal</b>	6.3 mm x 0.8 mm / 2 x 2.8 mm x 0.8 mm	-	-
<b>Ambient conditions</b>			
<b>Ambient temperature</b>	-25 °C ... +80 °C	-25 °C ... +75 °C	-25 °C ... +60 °C
<b>Resistance to shock</b>	110 g/4 ms...30 g/18 ms no bouncing	110 g/4 ms...30 g/18 ms no bouncing	30 g / 18 ms
<b>Resistance to vibration</b>	> 20 g / 10 ... 200 Hz	> 20 g / 10 ... 200 Hz	20 g / 10 ... 150 Hz
<b>Protection class <sup>2)</sup></b>	IP20	IP20	IP20

#### Safety classification

<b>Standards</b>	ISO 13849-1	ISO 13849-1	ISO 13849-1
<b>B<sub>10D</sub> NC contact</b>	100,000	100,000	100,000
<b>Certificates</b>			

<sup>1)</sup> The switching frequency of emergency stop command devices is only 600/h

<sup>2)</sup> With plug-in connectors, depends on the connector plug used



# 8. EMERGENCY STOP control devices

## Contact elements



Type EF	Function	Switch travel diagram	Position	Wiring configuration according to DIN 50005	Screw terminals	Flat plug-in connector
Contact element	2 NC		1	11-12/21-22	EF220.1	EF220F.1
			2	31-32/41-42	EF220.2	EF220F.2
	1 NC contact / 1 NO contact		1	11-12/23-24	EF303.1	EF303F.1
			2	31-32/43-44	EF303.2	EF303F.2

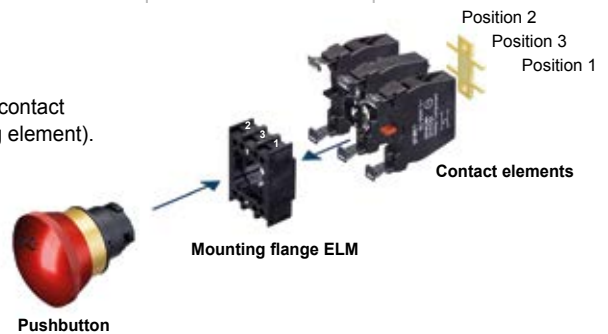
Type EF	Function	Position	Description
Spring element	Snap-action mechanism with latching	3	EFR or EFR.EDRRS

### Design

A command and signalling device consists of an actuator, a mounting flange and a contact or light element (in the case of EMERGENCY STOP devices, possibly plus a spring element).

### Assembly example

This example shows an EMERGENCY STOP push button with ELM mounting flange, an EFR spring element and 2 EF... contact elements.



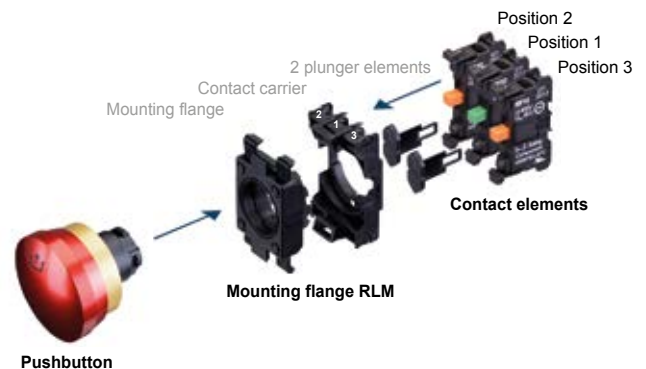
Type RF	Function	Switch travel diagram	Position	Connection	Plunger colour	Contact labelling	Type designation
Contact element	1 NC		1, 2 and 3	Screw terminals	red	1, 2	RF10
						11, 12	RF10.1
	1 NO		1, 2 and 3	Screw terminals	green	3, 4	RF03
						13, 14	RF03.1

### Design

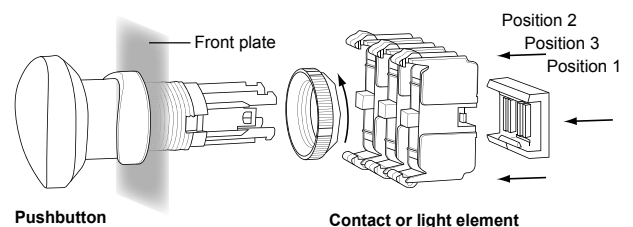
The contact bracket is for preassembling the RF contact elements or the RL or RLDE lighting elements. The scope of supply of the fastening flange includes a mounting flange, a contact carrier and 2 plunger elements.

### Assembly example

This example shows a mushroom button with an RLM mounting flange (comprising of a mounting flange, a contact carrier and two plunger elements) and 3 RF.. Contact elements



Typ AF	Function	Switch travel diagram	Position	Connection	Plunger colour	Contact labelling	Type designation
Contact element	1 NC		1, 2 and 3	Screw terminals	red	1, 2	AF10
	1 NO		1, 2 and 3	Screw terminals	green	3, 4	AF02



## 8. EMERGENCY STOP control devices

### Enclosures for surface mounting



MBK	NBG	MBGAC / MBGHAC
 <ul style="list-style-type: none"> <li>■ Housing material, plastic</li> <li>■ For EMERGENCY STOP without protective collar</li> </ul>	 <ul style="list-style-type: none"> <li>■ Enclosure material, stainless steel</li> </ul>	 <ul style="list-style-type: none"> <li>■ Enclosure material, alloy</li> <li>■ For EMERGENCY STOP without protective collar</li> <li>■ For EMERGENCY STOP with protective collar</li> </ul> <p style="text-align: right;"><b>MBGAC</b> <b>MBGHAC</b></p>

MBKAC311YE	MBGHAC311YE
 <ul style="list-style-type: none"> <li>■ EMERGENCY STOP complete housing</li> <li>■ Housing material, plastic</li> <li>■ With EMERGENCY STOP without protective collar</li> </ul>	 <ul style="list-style-type: none"> <li>■ EMERGENCY STOP complete housing</li> <li>■ Enclosure material, alloy</li> <li>■ With EMERGENCY STOP and with protective collar</li> </ul>

Type	Enclosure	Housing material	Number of drilled holes	Dimensions (W x H x D)	Mounting hole for cable entry	Type designation	Recommended for program			
							E	N	R	A
MBK	Empty enclosure	Thermo-plastic	1	85 x 84 x 85 mm	M20	<b>MBK311GB</b>	■		■	■
NBG		Stainless steel	1	110 x 88 x 110 mm	M20	<b>NBG311</b>		■		
MBKAC	Complete housing	Thermo-plastic	1	80 x 55 x 80 mm	M20	<b>MBKAC311YE</b>				■
MBGAC		Alloy	1	100 x 80 x 100 mm	M20	<b>MBGAC311YE</b>	■		■	■
		Alloy	1	100 x 80 x 100 mm	M20	<b>MBGHAC311YE</b>	■		■	

Detailed product information can be found in our online catalogue at [www.schmersal.net](http://www.schmersal.net).

## 8. EMERGENCY STOP control devices Accessories



Emergency stop label	Emergency stop protective collar	Emergency stop protective collar
 <ul style="list-style-type: none"> <li>■ NDP-70</li> <li>■ Material V4A</li> <li>■ Yellow powder-coated</li> </ul>	 <ul style="list-style-type: none"> <li>■ EDRR-1 SET</li> <li>■ Aluminium die-cast</li> <li>■ Yellow powder-coated</li> </ul>	 <ul style="list-style-type: none"> <li>■ NSK/V4A/GB</li> <li>■ Bracket material 1.4550 plate V4A powder-coated</li> </ul>
Mounting flange	Position switches	
 <ul style="list-style-type: none"> <li>■ EFMH</li> <li>■ Mounting flange for E and N product portfolio position switches PS116</li> <li>■ Depending on the version, with position switch included in delivery too</li> </ul>	 <ul style="list-style-type: none"> <li>■ PS116-...-S200</li> <li>■ Thermoplastic enclosure</li> <li>■ Symmetrical casing</li> <li>■ Protection class IP66, IP67</li> <li>■ Connector plug M12 or cable</li> </ul>	

Type	Description	Type designation	Recommended for program			
			E	N	R	A
Emergency stop label	Installation Ø for 22.3 mm, 53 mm external Ø	MDP-8	■		■	■
	Installation Ø for 22.3 mm, 100 mm external Ø	MDP-6	■		■	■
	Installation Ø for 30.5 mm, 53 mm external Ø	DPF-9	■		■	
	Installation Ø for 30.5 mm, 100 mm external Ø	DPF-7	■		■	
	Mounting-Ø for 22.3 mm, external Ø 70 mm, V4A version, colour yellow, self-adhesive, no labelling	NDP-70	■	■	■	■
	Mounting-Ø for 22.3 mm, external Ø 65 mm, plastic - as adhesive foil	NDP-65	■	■	■	■
Protective collar	EMERGENCY STOP protective collar, mounting-Ø for 22.3 mm, operating element Ø 38.5 mm	EDRR-1 SET	■			
	EMERGENCY STOP protective collar, mounting-Ø for 22.3 mm, operating element Ø 49 mm	EDRR-2 SET	■		■	
	EMERGENCY STOP protective collar, mounting-Ø for 30.5 mm, operating element Ø 38.5 mm	EDRR-1.1 SET	■			
	EMERGENCY STOP protective collar, mounting-Ø for 30.5 mm, operating element Ø 49 mm	EDRR-2.1 SET	■		■	
	EMERGENCY STOP protective collar, material 1.4550, incl. fastening screws	NSK/V4A/GB			■	
Mounting flange	Mounting flange for position switch PS116	EFMH	■	■		
Position switches	Position switch PS116 for "E" and "N" program	PS116-...-S200	■	■		

## 9. Control panels

### Description

#### Area of application

Ergonomic operation of the main machine functions at the human-machine interface is a key factor in safety. The control units should be mounted as close as possible to the safety doors so that operators have an overview of the process. BDF Series control units meet this requirement. This series has been designed for mounting onto the commercially available aluminium profile systems of machine enclosures and you can quickly attach them and integrate them in the ambient structure.

#### Design and way of functioning

The range is based on a high-quality design with slim line housing (only 40 mm) made from impact-resistant plastic. Two designs are available to accommodate one or four command devices or indicator lights.

Users can choose from a large product portfolio of illuminated control push buttons, selector switches and selector buttons, LED illuminated indicators, key-operated switches and standards-compliant Emergency-Stop command devices. Positioning of the pushbuttons on the control panel is also freely selectable. Labelling fields allow you to label the functions individually.

This makes it possible for machine builders to use the BDF range to represent the most common operator functions like Emergency Stop, ON / OFF, Forwards / Backwards, Operating Mode Selection, display of operating status conditions or error messages, etc. All the command devices and indicator lights have been developed for industrial applications and have been tried and tested in other series of the command device product portfolio.

Information for the selection of suitable safety relay modules can be found in the chapter "Safety relay modules" (refer to page 212).

The system also includes a mounting plate to combine the control panel with a solenoid interlock and an ergonomic door handle. The BDF200-AS variant is available to integrate operating devices into the AS Interface Safety at Work (AS-i SaW) communications network.



## Sample application



The photo shows a combination with the BDF200 and an AZM201 solenoid interlock, including a B30 door-handle actuator with the mounting plate as an elegant safety door solution. This positive connection between the BDF200 control panel and the AZM201 solenoid interlock offers machine operators a whole new level of convenience.

## 9. Control panels

### Overview of the series



■ BDF100...-NH



■ BDF100...

#### Key Features

- Control panel with emergency stop
- Emergency stop function with and without protective collar
- Slim, shock-resistant thermoplastic enclosure
- For mounting on commercially available aluminium profile systems

- Control panel with one control element
- Slim, shock-resistant thermoplastic enclosure
- For mounting on commercially available aluminium profile systems
- Large product portfolio of operating and lighting elements

#### Other versions

AS-i SaW (refer to 260)

-

-

#### Technical features

##### Electrical characteristics

Max. switching capacity U/I

24 VAC / 2 A;  
24 VDC / 1 A

24 VAC / 2 A;  
24 VDC / 1 A

Switching of low voltages

5 V / 1 mA

5 V / 1 mA

##### Circuit versions

Emergency stop

2 NC / 1 NO

-

Command devices

-

1 NO / 1 NC; 2 NO

Emergency stop with indicator lamp

2 NC / 1 NO

-

Command devices with indicator lamp

-

1 NO / 1 NC; 2 NO

##### Mechanical data

Housing material

glass-fibre reinforced  
thermoplastic, self-extinguishing

glass-fibre reinforced  
thermoplastic, self-extinguishing

Dimensions (W x H x D)

With protective collar

40 x 99 x 69 mm

-

Without protective collar

40 x 99 x 49 mm

40 x 99 x 49 mm

Connection

Connector plug M12,  
8-pole

Connector plug M12,  
8-pole

##### Ambient conditions

Ambient temperature

-25 °C ... +65 °C

-25 °C ... +65 °C

Protection class

IP65

IP65

#### Safety classification

Standards

ISO 13849-1

ISO 13849-1

B<sub>10D</sub> NC contact

100,000

100,000

Certificates



To get detailed information about the products and certificates, visit [www.schmersal.net](http://www.schmersal.net).



■ BDF200-NH-...

■ BDF200...

■ BDF200-NH-...-2920

■ BDF200-...-2920

- Control panel with emergency stop and 3 control elements
- Emergency stop function with and without protective collar
- Slim, shock-resistant thermoplastic enclosure
- For mounting on commercially available aluminium profile systems
- Large product portfolio of operating and lighting elements

- Control panel with 4 control elements
- Slim, shock-resistant thermoplastic enclosure
- For mounting on commercially available aluminium profile systems
- Large product portfolio of operating and lighting elements

- Connector plug M12, 12-pole
- Control panel with emergency stop and 3 control elements
- Emergency stop function with and without protective collar
- Slim, shock-resistant thermoplastic enclosure
- For mounting on commercially available aluminium profile systems
- Large product portfolio of operating and lighting elements

- Connector plug M12, 12-pole
- Control panel with 4 control elements
- Slim, shock-resistant thermoplastic enclosure
- For mounting on commercially available aluminium profile systems
- Large product portfolio of operating and lighting elements

■	■	-	-
---	---	---	---

24 VAC / 2 A; 24 VDC / 1 A 5 V / 1 mA	24 VAC / 2 A; 24 VDC / 1 A 5 V / 1 mA	24 VAC / 1.5 A; 24 VDC / 1 A 5 V / 1 mA	24 VAC / 1.5 A; 24 VDC / 1 A 5 V / 1 mA
2 NC contact/1 NO contact 1 NC / 1 NO; 2 NO	- 1 NC / 1 NO; 2 NO	2 NC contact 1 NC / 1 NO	- 1 NC / 1 NO
2 NC contact 1 NO	- 1 NO	- -	- -
glass-fibre reinforced thermoplastic, self-extinguishing	glass-fibre reinforced thermoplastic, self-extinguishing	glass-fibre reinforced thermoplastic, self-extinguishing	glass-fibre reinforced thermoplastic, self-extinguishing
40 x 220 x 69 mm 40 x 220 x 49 mm M20 cable gland with plug-in terminals	- 40 x 220 x 49 mm M20 cable gland with plug-in terminals	40 x 220 x 69 mm 40 x 220 x 49 mm Connector plug M12, 12-pole	- 40 x 220 x 49 mm Connector plug M12, 12-pole
-25 °C ... +65 °C IP65	-25 °C ... +65 °C IP65	-25 °C ... +65 °C IP65	-25 °C ... +65 °C IP65

ISO 13849-1 100,000 cULus* EAC	ISO 13849-1 100,000 cULus* EAC	ISO 13849-1 100,000 cULus* EAC	ISO 13849-1 100,000 cULus* EAC
--------------------------------------	--------------------------------------	--------------------------------------	--------------------------------------




\* Approval under preparation







## 9. Control panels

### Actuating elements



Emergency stop pushbutton NH	Emergency stop pushbutton NHK	Pushbutton DT..
 <ul style="list-style-type: none"> <li>■ Mushroom-shaped plastic button, Ø 30 mm</li> <li>■ Without protective collar: ordering suffix NH</li> <li>■ Pull to reset</li> <li>■ 1 NO / 2 NC</li> </ul>	 <ul style="list-style-type: none"> <li>■ Mushroom-shaped plastic button, Ø 30 mm</li> <li>■ With protective collar: ordering suffix NHK</li> <li>■ Pull to reset</li> <li>■ 1 NO / 2 NC</li> </ul>	 <ul style="list-style-type: none"> <li>■ With concave button, button surface 19 x 19 mm</li> <li>■ 2 NO contacts or 1 NO contact / 1 NC contact</li> <li>■ Printing is possible on request</li> <li>■ Refer to the table below for the ordering suffix</li> </ul>

Indicator lights LM..	Mushroom push button PT..	Illuminated pushbutton LT..
 <ul style="list-style-type: none"> <li>■ Illuminated surface 19 x 19 mm</li> <li>■ Lamp replacement at the front</li> <li>■ Printing is possible on request</li> <li>■ Refer to the table below for the ordering suffix</li> </ul>	 <ul style="list-style-type: none"> <li>■ Button surface 25 x 25 with rounded edges</li> <li>■ Without latching</li> <li>■ 2 NO contacts or 1 NO contact / 1 NC contact</li> <li>■ Printing is possible on request</li> <li>■ Refer to the table below for the ordering suffix</li> </ul>	 <ul style="list-style-type: none"> <li>■ With concave button, button surface 19 x 19 mm</li> <li>■ 2 NO contacts or 1 NO contact / 1 NC contact</li> <li>■ Lamp replacement at the front</li> <li>■ Printing is possible on request</li> <li>■ Refer to the table below for the ordering suffix</li> </ul>

Ordering suffix	yellow	red	green	blue	black	white
 Mushroom push button PT..	PTYE	PTRD	PTGN	PTBU	PTBK	PTWH
 Pushbutton DT..	DTYE	DTRD	DTGN	DTBU	DTBK	DTWH
 Illuminated pushbutton LT..	LYE	LTRD	LTGN	LTBU		LTWH
 Indicator lights LM..	LYE	LTRD	LTGN	LTBU		LTWH

For detailed information on selection, visit [www.schmersal.net](http://www.schmersal.net).


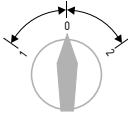

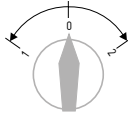
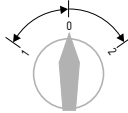





# 9. Control panels

## Actuating elements



Maintained selector switches / spring-return selector switches	Maintained selector switches / spring-return selector switches	Key-operated selector switches/buttons
 <ul style="list-style-type: none"> <li>Version with standard toggle, anthracite</li> <li>Refer to the table below for the ordering suffix</li> </ul>	 <ul style="list-style-type: none"> <li>Version with long toggle, anthracite</li> <li>Refer to the table below for the ordering suffix</li> </ul>	 <ul style="list-style-type: none"> <li>Version with high-quality cylinder lock; therefore, IP65 in this case too</li> <li>Key can be removed in all positions</li> <li>Refer to the table below for the ordering suffix</li> </ul>

Ordering suffix	Selector switch	Selector switch	Selector switch	Selector switch	Selector switches
					
	1 latched position	2 latched positions to the left/right of the zero position	1 momentary position and automatic return to the zero position	2 touch positions to the left/right of the zero position and automatic return to the zero position	1 momentary position on the right and automatic return to the zero position and 1 maintained position to the left of the zero position
	2 NO or 1 NO / 1 NC	1 NO per position or 1 NC (position 1) / 1 NO (position 2)	2 NO or 1 NO / 1 NC	1 NO per position or 1 NC (position 1) / 1 NO (position 2)	1 NO per position or 1 NC (position 1) / 1 NO (position 2)
 Standard toggle	<b>WS20</b>	<b>WS30*</b>	<b>WT20</b>	<b>WT30*</b>	<b>WTS30*</b>
 Long toggle	<b>WS21</b>	<b>WS31*</b>	<b>WT21</b>	<b>WT31*</b>	<b>WTS31*</b>
 Key-operated switch	<b>SWS20</b>		<b>SWT20</b>		


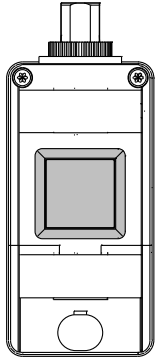



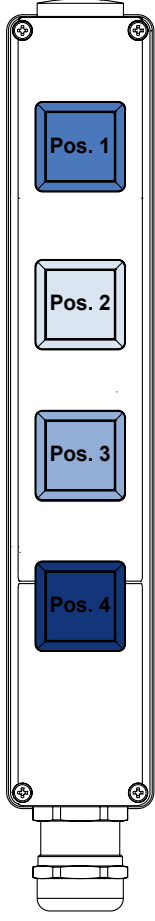





\* not for -2920 version .

For detailed information on selection, visit [www.schmersal.net](http://www.schmersal.net).

# 9. Control panels

## Combination options





Actuating elements		BDF100 with	BDF200				Control panels
			At pos. 1	At pos. 2	At pos. 3	At pos. 4	
	NH	•	•				<b>BDF100</b> 
	NHK	•	•				
	PT..		•	•	•	•	
	DT..	•	•	•	•	•	<b>BDF200</b> 
	LT..	•	•	•	•	•	
	LM..		•	•	•	•	
	SW.20	•		•	•		
	W..0	•		•	•		
	W..1	•		•	•		

## 9. Control panels

### Preferred types and accessories



Series	Fitting At pos. 1	Pos. 2	Pos. 3	Pos. 4	Indicator lamp	Type designation	Material number
<b>BDF100</b> 	NH	---	---	---	red	BDF100-NH-G-ST	101215862
	NHK	---	---	---		BDF100-NHK-G-ST	101211974
	LTBU	---	---	---	---	BDF100-11-LTBU-ST	101216402
	LTGN	---	---	---		BDF100-11-LTGN-ST	101216247
	SWS20	---	---	---		BDF100-11-SWS20-ST	101217193
	WS20	---	---	---	green	BDF100-11-WS20-G/GN-ST	103001068
	LTBU	---	---	---	---	BDF100-20-LTBU-ST	101217770
	LTGN	---	---	---		BDF100-20-LTGN-ST	101217217
<b>BDF200</b> 	NH	LTGN	LTGN	LTYE	red	BDF200-NH-10-LTGN-LTGN-LMYE-G24	103000487
		LTYE	SWS20	LTBU		BDF200-NH-10-LTYE-SWS20-LTBU-G24	103000657
		LTBU	LTRD	LTGN	---	BDF200-NHK-20-LTGN-LTBU-LTRD	101212033
		SWS20	LTGN	LTRD		BDF200-NHK-20-LTGN-LTBU-LTRD	101212023
		LT	LT	LT	red	BDF200-NH-10-LT-LT-LT-G24-2875 <sup>1)</sup>	103007781
		LT	LT	LT	---	BDF200-NH-11-LT-LT-LT-2875 <sup>1)</sup>	103007782
		LT	LT	LT		BDF200-NH-11-LT-LT-LT-2875/2920 <sup>1)2)</sup>	103015461
		LT	LT	LT		BDF200-NH-20-LT-LT-LT-2875 <sup>1)</sup>	103007783
		SWS20	LT	LT	---	BDF200-NH-11-SWS20-LT-LT-2875 <sup>1)</sup>	103007789
		SWS20	LT	LT	---	BDF200-NH-20-SWS20-LT-LT-2875 <sup>1)</sup>	103007790
	NHK	WT30	DTRD	DTGN	---	BDF200-NHK-11-WT30-DTRD-DTGN	101212034
		LTGN	LTBU	LTRD		BDF200-NHK-20-LTGN-LTBU-LTRD	101211180
		LT	LT	LT	red	BDF200-NHK-10-LT-LT-LT-G24-2875 <sup>1)</sup>	103007784
		LT	LT	LT	---	BDF200-NHK-11-LT-LT-LT-2875 <sup>1)</sup>	103007785
		LT	LT	LT		BDF200-NHK-11-LT-LT-LT-2875/2920 <sup>1)2)</sup>	on request
		LT	LT	LT		BDF200-NHK-20-LT-LT-LT-2875 <sup>1)</sup>	103007786
		SWS20	LT	LT	---	BDF200-NHK-11-SWS20-LT-LT-2875 <sup>1)</sup>	103007791
		SWS20	LT	LT	---	BDF200-NHK-20-SWS20-LT-LT-2875 <sup>1)</sup>	103007792
	LT	LT	LT	LT	---	BDF200-LT-11-LT-LT-LT-2875 <sup>1)</sup>	103007787
		LT	LT	LT		BDF200-LT-11-LT-LT-LT-2875/2920 <sup>1)2)</sup>	on request
LT		LT	LT	BDF200-LT-20-LT-LT-LT-2875 <sup>1)</sup>		103007788	

<sup>1)</sup> Type designation -2875: the coloured button caps are included in the scope of delivery as an accessory pack for customers to mount themselves.

<sup>2)</sup> with connector plug M12, 12 pole

AZM201	MP BDF 200	101214126
 <ul style="list-style-type: none"> <li>Can be combined with the AZM201 solenoid interlock</li> <li>For more information, visit <a href="http://www.schmersal.net">www.schmersal.net</a></li> </ul>	 <ul style="list-style-type: none"> <li>Mounting plate for combination of AZM201 solenoid interlock with -B30 actuator and BDF200 control panel</li> </ul>	

To see a wide range of other types, visit [www.schmersal.net](http://www.schmersal.net).

# 10. Enabling switches

## Description

### Area of application

When carrying out set-up, refitting or service work on plant or machinery, it can be beneficial to partially or completely deactivate guard systems. Typically, this includes setting up a machine (set-up mode) and monitoring machining procedures (process monitoring).

One example: The operator of a machine tool is able to check format settings better and program movements more exactly if the safety door is open. The better view of the process makes operation more convenient and reduces set-up and refitting times.

Special safety measures are needed for this case and similar ones; these measures are referred to as special operating modes and are specified in the machine directive and in some type C standards.

The measures that are required in this case include enabling devices that operators must actuate to start up the respective machine functions. In many cases, this is a slowed-down machine movement. The effect of the guard system is only partially or entirely suspended for the time in which the operator presses the enabling device.

### Design and way of functioning

Operators must put the enabling device into the centre position and hold it in this position. As soon as they release the button or press it all the way down, the system interrupts the control command on a safety-related basis.

Series ZSD5 and ZSD6 enabling devices are of ergonomic design; with series ZSD6, an additional pushbutton is integrated in the device head. Operators can select the optimum position to the machine or the process; the connection to the machine controller is guaranteed by a signal line.

Both series are suitable for robot applications in accordance with ANSI standards. There are of course suitable safety relay modules available for signal evaluation.



## Permissible speeds in enabling mode

It is controversial and standards deal differently with the question of what "reduced" speeds are justifiable in enabling mode to comply with the further condition of the machine directive (see Machine Directive Appendix I, Clause 1.2.5) that the operation of dangerous functions is only possible under minor risk conditions (= reduced speed, reduced power, step mode, etc.)

A man who has a C standard that offers concrete information that can be used for his individual application is a happy man.

Otherwise, it is advisable to differentiate between crushing and shearing hazards on the one hand and "just" collision hazards on the other. In this connection, people frequently quote values of 33 mm/sec. (2 m/min.) max. in the case of crushing and shearing hazards and 250 mm/sec. (15 m/min.) max. in the case of collision hazards A. MRL 2006/42/EG, however, "permits" higher values if absolutely technically necessary and execution is integrated into a considered and coherent safety concept [B/C].

On the question as to whether the reduced speed (power, movement etc.) can be controlled via the operational controller or whether a safety-related controller or monitoring system is required – e.g. S(afety)L(imited)S(peed) and the like as per EN/IEC 61800-5-2 – refer first to the applicable standards (in some cases enabling devices are sufficient for low risks and a safe controller or monitoring system is only required in addition for greater risks, in some case there is also the general requirement "enabling device + e.g. SLS").

You must equally consider that the state of the art is tending towards "SLS for example" (i. e. "safe controllers or monitoring systems"), since more and more drives and drive controllers with integrated safety functions are on the market. However, it is not possible to use these new options in every situation whether due to compelling technical reasons and/or for reasons of cost.

It can help to consider whether pressing the enabling device through from stage 2 to stage 3, taking into account the machine's reaction time (delay time after signalling to standstill or non-critical speed) PLUS an additional human response time of 1 second, for example, results in an operating status that is acceptable to the machine operator from a safety point of view or not.

<sup>A</sup> You can find an overview of the maximum speeds that there are for manual intervention on running machines in the IFA Manual (loose leaf collection – Lfg. 2/11 – XII/2011 – Clause 330 216).

<sup>B</sup> See Machine Directive Appendix I, Clause 1.2.5: If it is not possible to comply with these requirements at the same time, the (mode selector switch) must trigger other protective measures ..., such that a safe working area is guaranteed.

<sup>C</sup> See also specialist committee information sheet 002 of specialist committee MFS of DGUV Wood and Metal Professional Association, Mainz, Process Monitoring on the Shopfloor.

# 10. Enabling switches

## Overview of the series



■ ZSD5

■ ZSD6

### Key Features

- 3-stage grip switch OFF-ON-OFF
- Contacts do not close on resetting from stage 3 → stage 1

- 3-stage grip switch OFF-ON-OFF
- Contacts do not close on resetting from stage 3 → stage 1
- With additional pushbutton

### Technical features

#### Electrical characteristics

<b>Max. switching capacity U/I NO contacts</b>	125 VAC / 1.5 A; 250 VAC / 0.75 A; 30 VDC / 1.0 A; 125 VDC / 0.22 A; 250 VDC / 0.1 A	125 VAC / 1.5 A; 250 VAC / 0.75 A; 30 VDC / 1.0 A; 125 VDC / 0.22 A; 250 VDC / 0.1 A
<b>Auxiliary contacts</b>	125 VAC / 1.5 A; 250 VAC / 0.75 A; 30 VDC / 2.3 A; 125 VDC / 0.22 A; 250 VDC / 0.1 A	125 VAC / 1.5 A; 250 VAC / 0.75 A; 30 VDC / 2.3 A; 125 VDC / 0.22 A; 250 VDC / 0.1 A
<b>Additional pushbutton</b>	–	125 VAC / 0.3 A; 30 VDC / 0.7 A; 125 VDC / 0.1 A

#### Mechanical data

<b>Housing material</b>	Thermoplastic	Thermoplastic
<b>Contacts</b>	3	4
<b>Switching frequency</b>	max. 1200/h	max. 1200/h
<b>Connection</b>	Screw terminals	Screw terminals
<b>Cable section:</b>	0.14 ... 1.5 mm <sup>2</sup>	0.14 ... 1.5 mm <sup>2</sup>
<b>Ambient conditions</b>		
<b>Ambient temperature</b>	-10 °C ... +60 °C	-10 °C ... +60 °C
<b>Protection class</b>	IP65	IP65

### Safety classification

<b>Standards</b>	ISO 13849-1	ISO 13849-1
<b>B<sub>10D</sub> NC contact</b>	100,000	100,000
<b>Certificates</b>		



To get detailed information about the products and certificates, visit [www.schmersal.net](http://www.schmersal.net).

# 10. Enabling switches

## Ordering details and recommended evaluations



Type	Description	connecting cable	Type designation	Material number
Enabling switches	3-stage grip switch	Without	ZSD5/O.LTG	101199467
		5 m	ZSD5/5M	101199469
	3-stage grip switch with additional pushbutton	Without	ZSD6/O.LTG	101199480
		5 m	ZSD6/5M	101210087
Accessories	Mounting angle made of metal		ZSD-H	101163725

## Recommended evaluations

PROTECT SELECT	SRB-E-301ST	SRB-E-201LC
 <ul style="list-style-type: none"> <li>■ Evaluation of enabling devices</li> <li>■ STOP 0 or STOP 1, depending on the setting values in the application program</li> <li>■ For more information, visit <a href="http://www.schmersal.net">www.schmersal.net</a></li> </ul>	 <ul style="list-style-type: none"> <li>■ Function STOP 0</li> <li>■ 1- or 2-channel control</li> <li>■ Start button / autostart</li> <li>■ 3 safe relay outputs 6 A</li> <li>■ 1 signalling output</li> <li>■ For more information, visit <a href="http://www.schmersal.net">www.schmersal.net</a></li> </ul>	 <ul style="list-style-type: none"> <li>■ Function STOP 0</li> <li>■ 1- or 2-channel control</li> <li>■ Start button / autostart</li> <li>■ 2 safety outputs 2 A</li> <li>■ 1 signalling output</li> <li>■ For more information, visit <a href="http://www.schmersal.net">www.schmersal.net</a></li> </ul>

# 11. Safety foot switches

## Description

### Area of application

Safety foot switches are used as enabling devices for machines and systems where, for example, a manual enabling operation is not possible.

Typical applications include metal forming machinery, woodworking machinery and equipment and machinery for the packaging technology industry.

### Design and way of functioning

When the foot pedal is actuated as far as the pressure point, the NO contact is closed and the machine function is started. If the machine operator actuates the pedal beyond the pressure point, then the automatic NC contact is opened and the machine function is stopped.

With a mechanical bolting device, an uncontrolled restart or new start of the machine is prevented. The reset is manual by a push button on the enclosure.

All safety foot switches are mounted with a shield to protect against unintentional operation. Either one pedal or two pedal versions are available. On the two pedal version, one pedal can be used for the safety function, for example, while the other pedal can be used for a process function. The operator has the choice between different switch and contact variants, whereby there is a maximum of four contacts per pedal.

Information for the selection of suitable safety relay modules can be found in the chapter "Safety relay modules" (refer to page 212).





## Switching conditions

### Description of the switching conditions

1. Idle state
2. Initiate the workflow by actuating to the pressure point
3. Actuating through pressure point in hazardous situations
4. Return to the idle state after mechanical unlocking

### Overlapping contacts with pressure point and latching (UEDR)

Representation	Condition	Function
		Not actuated No authorised operation
		Actuated up to pressure point Safety release
		Pushed-through No authorised operation
		Unlock No authorised operation*

\* Switch-on impulse during the unlocking operation must be suppressed by means of measures at control technology level.

# 11. Safety foot switches

## Overview of the series



TFH 232

T2FH 232

### Key Features

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>• With 1 foot pedal</li> <li>• 2 or 4 contacts</li> <li>• Enclosure in Aluminium die-cast</li> </ul> | <ul style="list-style-type: none"> <li>• With 2 foot pedals</li> <li>• 4, 6 or 8 contacts</li> <li>• Enclosure in Aluminium die-cast</li> </ul> |
|---|---|

### Technical features

#### Electrical characteristics

**Max. switching capacity U/I**

230 VAC / 4 A;  
24 VDC / 1 A

230 VAC / 4 A;  
24 VDC / 1 A

#### Mechanical data

**Cable entry**

1 x M20

2 x M25

**Cable section <sup>1)</sup>**

0.75 ... 2.5 mm<sup>2</sup>

0.75 ... 2.5 mm<sup>2</sup>

**Dimensions (H x W x D)**

170 x 189 x 274 mm

295 x 189 x 274 mm

#### Ambient conditions

**Ambient temperature**

-25 °C ... +60 °C

-25 °C ... +60 °C

**Protection class**

IP65

IP65

### Safety classification

**Standards**

ISO 13849-1

ISO 13849-1

**B<sub>10D</sub> NC contact**

100,000

100,000

**Certificates**



<sup>1)</sup> Including conductor ferrules





To get detailed information about the products and certificates, visit [www.schmersal.net](http://www.schmersal.net).

# 11. Safety foot switches

## Preferred types



Series	Pedals	Pin assignment	Type designation	Material number
TFH 232 	with 1 foot pedals	1 NO / 1 NC	TFH 232-11UEDR	101181536
		2 NO / 2 NC	TFH 232-22UEDR	101192630
T2FH 232 	with 2 foot pedals	Left pedal: 1 NO / 1 NC; right pedal: 2 NO / 2 NC	T2FH 232-11/22UEDR <sup>1)</sup>	101217887
		Left pedal: 2 NO / 2 NC; right pedal: 1 NO / 1 NC	T2FH 232-22UEDR/11 <sup>1)</sup>	101217033
		Left pedal: 1 NO / 1 NC; right pedal: 1 NO / 1 NC	T2FH 232-11UEDR/11UEDR	101216987
		Left pedal: 2 NO / 2 NC; right pedal: 2 NO / 2 NC	T2FH 232-22UEDR/22UEDR	101217044

<sup>1)</sup> With the two-pedal variant, the non-safety related pedal does **not have** the functions "Overlapping" (UED) or "Latching" (R)!

Other special variants on request

## 12. Two-hand control panels

### Description

#### Area of application

The job of two-hand controls or two-hand control panels is to ensure that machine operators hands are located on the control panel when they issue the control signal for a hazardous movement. This prevents operators from reaching into the danger area on starting or shortly after starting the machine or process.

The main areas of application for two-hand controls are presses and stamping units in the metal processing or powder metallurgy industries as well as similar machines and systems that involve manual insertion and removal operations. These include printing and paper processing machines, rubber and plastics processing machines, machines involved in the chemical industry and assembly plants.

#### Design and way of functioning

The two-hand control panels of the Schmersal Group are mounted as standard with an Emergency Stop push button to ISO 13850. Apart from this, there are guard hoods over the operating elements, which prevent people from circumventing the protection function using their hands, elbows, stomach, hips, thighs or knees, for example. It is also not possible to operate from the back of the control panels.

The devices comply with the requirements of EN 574, which, amongst other things, specifies the spacing of the controls. Users can choose between different versions that differ, amongst other things, by virtue of the material of the enclosure (plastic and die-cast aluminium). In the central part of the folding enclosure, it is possible to mount up to eight additional command and signalling devices.



Accessories include, amongst other things, various stand versions. Combined with the SRB-E-201ST safety relay module, it is possible to integrate two-hand control panels into the machine controller.

## Wide selection of mounting posts

You can find appropriate mounting posts and other accessories on page 172 and in our online catalogue at [www.schmersal.net](http://www.schmersal.net).



## 12. Two-hand control panels

### Overview of the series



SEP-K02

SEP-G05

#### Key Features

- Two-hand control panel
- Plastic enclosure
- Control panel with 8 additional drilled holes that you can knock out if required
- 2-piece enclosure for simple and favourable assembly

- Two-hand control panel
- Aluminium die cast enclosure
- Control panel suitable for mounting a minimum of 8 additional command and signalling devices
- Easy assembly thanks to 2-piece folding enclosure
- Ergonomic operation due to wrist support
- Terminal strips and relay assembly possible in the interior

#### Technical features

Electrical characteristics	Depends on the mounted command device	Depends on the mounted command device
<b>Mechanical data</b>		
<b>Housing material</b>	Thermoplastic	Die-cast aluminium
<b>Colour</b>	RAL 7035 (tinted)	RAL 7035 (powder-coated)
<b>Dimensions (LxWxH)</b>	469 x 137 x 185 mm	494 x 160 x 184 mm
<b>Possible fastening</b>		
<b>On mounting post</b>	■	■
<b>Directly on the machine or wall</b>	■	■
<b>Command positions</b>		
<b>Number of drilled holes</b>	3	3
<b>Optional possible command positions</b>	8	8
<b>Ø of drilled hole</b>	22.3 mm	22.3 mm
<b>Ambient conditions</b>		
<b>Protection class</b>	IP54	IP54

#### Safety classification

<b>Standards</b>	ISO 13850; EN 574	ISO 13850; EN 574
<b>Certificates</b>	-	-



You can also find appropriate mounting posts, command devices and other accessories in our online catalogue at [www.schmersal.net](http://www.schmersal.net).



## SEP09

- Two-hand control
- Aluminium enclosure
- For separate assembly of the controls for two-hand control
- Specify on user side spacing according to EN 574

Depends on the mounted command device

Aluminium  
RAL 7035 (powder-coated)  
155 x 150 x 160 mm  
(per operating element)

–



1 per operating element

–

22.3 mm




IP54

ISO 13850; EN 574

–







## 12. Two-hand control panels

### Preferred types

Series	Enclosure	Description	Controls	Head Ø	Contacts	
SEPK02	Thermo-plastic	2-piece enclosure with 8 additional drilled holes that you can knock out if required	ADP55.3SW		55 mm	1 NO / 1 NC
			ADP55.3SW/O.F			
			Empty enclosure			
SEPG05	Metal	2-part enclosure suitable for mounting a minimum of 8 additional command and signalling devices	EDP42SW		42 mm	1 NO / 1 NC
			EDP55SW		55 mm	1 NO / 1 NC
			ADP55.3SW		55 mm	1 NO / 1 NC
			Empty enclosure			
SEPO9	Metal	For separate assembly of the controls for two-hand control with detachable aluminium cover on the bottom	EDP55SW		55 mm	1 NO / 1 NC
			EDP42SW		42 mm	1 NO / 1 NC
			Empty enclosure			





Emergency stop	Head Ø	Contacts	Type designation	Material number
ADRR40RT 	40 mm	1 NO / 1 NC	SEPK02.0.4.0.22/95	101027371
			SEPK02.0.4.0.22/95.E2	101211126
			SEPK02.0.L.22	101027369
EDRR40RT 	40 mm	1 NO / 1 NC	SEPG05.3.3.0.22/95	101172764
EDRR50RT 	50 mm	1 NO / 1 NC	SEPG05.3.2.0.22/95	101172762
EDRR40RT 	40 mm	1 NO / 1 NC	SEPG05.3.4.0.22/95	101172765
EDRR50RT 	50 mm	1 NO / 1 NC	SEPG05.3.1.0.22/95	101172760
EDRR40RT 	40 mm	1 NO / 1 NC	SEPG05.3.4.0.22/95.E1	101210845
			SEPG05.3.L.22	101172767
			SEP09.0.1.0.22/95	101022849
			SEP09.0.3.0.22/95	101022851
			SEP09.0.L.22	101022856

## 12. Two-hand control panels

### Mounting post



STPLC1	101024774	STP02.1.1	101022865	STP02.4.1	101022867
 <ul style="list-style-type: none"> <li>■ Welded structure with base-fastening tapped holes</li> <li>■ Without height adjustment, without distance ring</li> <li>■ Can be combined with SEP ... control panel for use as a two-hand foot operating station</li> </ul>	 <ul style="list-style-type: none"> <li>■ Welded structure with base-fastening tapped holes</li> <li>■ With height adjustment, without distance ring</li> </ul>	 <ul style="list-style-type: none"> <li>■ Welded structure with base-fastening tapped holes</li> <li>■ With height adjustment, with distance ring</li> </ul>			

## 12. Two-hand control panels

### Recommended evaluations



#### SRB-E-201ST



- Monitoring two-hand control panels to EN 574 IIIC
- Function STOP 0
- 1- or 2-channel control
- Start button / autostart
- 2 safety outputs 5.5 A
- 1 signalling output
- For more information, visit [www.schmersal.net](http://www.schmersal.net)

#### SRB-E-402ST



- Monitoring two-hand control panels to EN 574 IIIC
- 2x function STOP 0
- 2x 1- or 2-channel control
- 2x start button / autostart
- 2 safety contacts
- 2 safety outputs
- For more information, visit [www.schmersal.net](http://www.schmersal.net)

# 13. Safety edges

## Description

### Area of application

Tactile monitoring systems stop the hazardous movement in case of contact or when touched. The variety of application fields require different safety devices.

Everywhere, where the risk of injury from crushing and sheering needs to be safe-guarded against, be it on safety doors, table lifts, lifting platforms, portable rack storage, work benches, warehouse lifts, elevator doors, access ramps, lifting and tilting devices or even industrial doors. The SE-safety edge stops the hazardous movement safely and reliably and prevents injury to persons and damage to machinery.

The systems described, each with an appropriate downstream evaluation device reach the safety requirements of the ISO 13849-1 to the Performance Level PL c, PL d or PL e.

### Design and way of functioning

By design, the SE-safety edge is made of only three components; the aluminium profile rail, the rubber profile and the pluggable sensors.

The deformation of the rubber profile safety edge is evaluated. The centrepiece is a fail-safe transmitter and receiver unit in both ends of the rubber profile. The deformation of the rubber profile strip weakens or interrupts the IR-signal between the transmitter and receiver units. A downstream safety relay module evaluates this weakening of the IR-signal without interference and stops the hazardous movement.

The ISO 13856-2 summarises the requirements for safety edges and describes their design and evaluation. Safety-related properties, such as operating temperature ranges, response times, forces, operating distances and stopping distances are defined in this Standard.

ISO 13849-1 describes the design principles for safety-related parts of control systems.

The risk when using a mobile machine or equipment must be determined. The requirements on the safety of the controller increases the higher the risk.

The SE-safety edge system with the safety relay module SE-400C complies with the requirements of the PL e. The safe shutdown of the switch strip system is also reliable even when several faults occur in the system.

The SE-safety edge system with the safety relay module SE-304C complies with the requirements of the PL d.

For PL c applications in accordance with ISO 13849-1 the SE-switch strip can be used also with the safety relay module SE-100C.



When implementing the switch strip it must be taken into account that the speed of the hazardous movement is lower than the maximum starting speed of the switch strip. The stopping distance of the potentially dangerous parts and the profile-specific data must be adapted to each other. The stopping distance must not only be sufficient to bring the machine in the worst case situation to a standstill, but the maximum allowable force for vulnerable body parts must not be exceeded. Attention must be made during the planning to the counter-edge.

If the possible run-on distance of the selected switch strip is not sufficient, the stopping distance of the machine must be shortened or a different switch strip profile should be used.

The required minimum run-on distance must be designed with the safety factor of at least 1.2. The safety factor must be even greater as soon as the run-on distance is influenced by other machine elements. (See also ISO 13856-2 Annex C.)

# 13. Safety edges

## Overview of the series



■ SE40



■ SE70

### Key Features

- Height approx. 40 mm
- Insensitive to environmental conditions
- Dirt and moisture in the profile are compensated to a great extent

- Height approx. 70 mm
- Insensitive to environmental conditions
- Dirt and moisture in the profile are compensated to a great extent

### Technical features

<b>Material of the rubber profile</b>	EPDM, 65 Shore A; NBR Perbunan®	EPDM, 65 Shore A; NBR Perbunan®
<b>Rubber material</b>		
- International abbreviation	EPDM, 65 Shore A	EPDM, 65 Shore A
- Chemical name	Ethylene-propylene terpolymer	Ethylene-propylene terpolymer
- Rebound resilience at 20°C	good	good
- Resistance to permanent deformation	good	good
- General weather resistance	excellent	excellent
- Resistance against ozone	excellent	excellent
- Resistance against oil	low	low
- Resistance against fuel	low	low
- Resistance against solvents	low to satisfactory	low to satisfactory
- General resistance to acids	good	good
<b>Mechanical data</b>		
<b>Mechanical life</b>	20,000,000 operations	20,000,000 operations
<b>Max. permanent load</b>	500 N on the operational switching zone	500 N on the operational switching zone
<b>Response travel</b>	max. 9 mm	max. 9 mm
<b>After-travel</b>	max. 20 mm	max. 45 mm
<b>Dimensions (W x H)</b>	25 x 40 x ... mm	25 x 70 x ... mm
<b>Ambient conditions</b>		
<b>Temperature resistance</b>		
- Short term	- 50°C ... + 120°C	- 50°C ... + 120°C
- Long term	- 40°C ... + 100°C	- 40°C ... + 100°C
<b>Protection class <sup>1)</sup></b>	IP67	IP67

### Safety classification

<b>Standards</b>	ISO 13856-2	ISO 13856-2
<b>Certificates <sup>2)</sup></b>		

<sup>1)</sup> The IP67 protection rating applies to the complete signalling devices (including SE-SET).

<sup>2)</sup> Certification only in conjunction with safety relay modules SE-100C, SE-304C or SE-400C. Plastic-coated and NBR-profiles are not part of the type tests.



To get detailed information about the products and certificates, visit [www.schmersal.net](http://www.schmersal.net).



# 13. Safety edges

## Preferred types

Type	Series	Special features	Type designation	Material number		
Aluminium profile	SE40	Without aluminium leg	SE-AL10-1250	101153893		
			SE-AL10-2500	101172179		
	SE40	With aluminium leg	SE-AL12-1250	101153894		
			SE-AL12-2500	101172180		
	SE70	Without aluminium leg	SE-AL20-1250	101153895		
			SE-AL20-2500	101172186		
SE70	With aluminium leg	SE-AL22-1250	101153896			
		SE-AL22-2500	101172188			
Rubber profile	SE40	Uncoated EPDM rubber profile	SE-P40-1250	101172155		
			SE-P40-2500	101172154		
			SE-P40-5000	101172153		
			SE-P40-10000	101172151		
	SE40	Uncoated NBR rubber profile	SE-P40-NBR-1250	101174453		
			SE-P40-NBR-2500	101174454		
			SE-P40-NBR-5000	101174455		
			SE-P40-NBR-10000	101174456		
	SE40	Coated EPDM rubber profile	SE-PC40-1250	101172161		
			SE-PC40-2500	101172159		
			SE70	Uncoated EPDM rubber profile	SE-P70-1250	101172169
					SE-P70-2500	101172168
SE70	Uncoated EPDM rubber profile	SE-P70-5000	101172167			
		SE-P70-10000	101172165			
SE70	Coated EPDM rubber profile	SE-PC70-1250	101172173			
		SE-PC70-2500	101172172			
SE-SET	SE40/70	Set of transmitter and receiver with different cable lengths	SE-SET VER.2.0	101179375		
			SE-SET VER.2.0 3M/10,5M	101179373		
			SE-SET VER.2.0 10,5M/20M	101181969		
Safety monitoring module	SE40/70	Evaluation of 1 ... 2 switch strips PL c	SE-100C	101153919		
		Evaluation of 1 ... 4 switch strips PL d	SE-304C	101165883		
		Evaluation of 1 switch strip PL e	SE-400C	101153920		

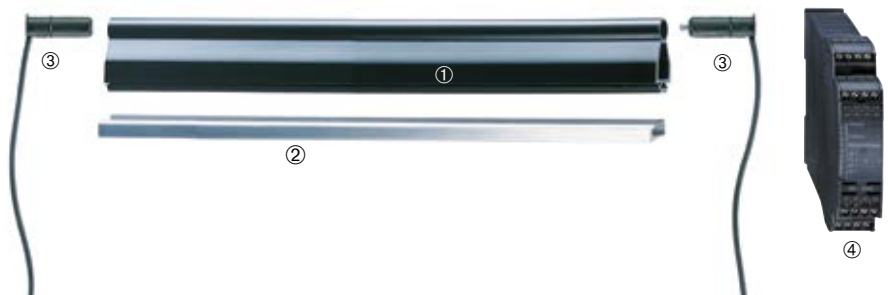
A switch strip system is assembled from individual components. The components must be ordered separately.

### Ordering example

A **SE40-System** consists of:

- ① Rubber profile, SE-P40-1250
- ② Aluminium profile, SE-AL 10-1250
- ③ Transmitter / receiver SE-SET
- ④ Safety relay module, SE-304 C

Optional accessories:  
End cap SE-T40; adhesive SE-G8406  
or further accessories



# 13. Safety edges

## System components



<p><b>SE-P40...</b></p>  <ul style="list-style-type: none"> <li>■ Rubber profile available either coated or uncoated</li> <li>■ EPDM and NBR rubber available</li> <li>■ Available lengths: 1,250, 2,500, 5,000 and 10,000 mm (other lengths on request)</li> </ul>	<p><b>SE-P70...</b></p>  <ul style="list-style-type: none"> <li>■ Rubber profile available either coated or uncoated</li> <li>■ EPDM and NBR rubber available</li> <li>■ Available lengths: 1,250, 2,500, 5,000 and 10,000 mm (other lengths on request)</li> </ul>	<p><b>SE-AL10-....</b></p>  <ul style="list-style-type: none"> <li>■ Aluminium profile section for rubber profile SE-P40...</li> <li>■ Available lengths: 1,250 and 2,500 mm (larger lengths by joining multiple AL-profiles)</li> </ul>
<p><b>SE-AL12-....</b></p>  <ul style="list-style-type: none"> <li>■ Aluminium profile with aluminium legs for rubber profile SE-P40 ...</li> <li>■ Available lengths: 1,250 and 2,500 mm (larger lengths by joining multiple AL-profiles)</li> </ul>	<p><b>SE-AL20-....</b></p>  <ul style="list-style-type: none"> <li>■ Aluminium profile section for rubber profile SE-P70...</li> <li>■ Available lengths: 1,250 and 2,500 mm (larger lengths by joining multiple AL-profiles)</li> </ul>	<p><b>SE-AL22-....</b></p>  <ul style="list-style-type: none"> <li>■ Aluminium profile with aluminium legs for rubber profile SE-P70 ...</li> <li>■ Available lengths: 1,250 and 2,500 mm (larger lengths by joining multiple AL-profiles)</li> </ul>
<p><b>SE-SET</b></p>  <ul style="list-style-type: none"> <li>■ Sensor set consisting of transmitter and receiver</li> <li>■ Different cable lengths available</li> </ul>		

To get detailed information about the products and certificates, visit [www.schmersal.net](http://www.schmersal.net).



# 13. Safety edges

## Accessories



<b>SE-T40</b> 101172204	<b>SE-T70</b> 101167879	<b>SE-J2</b> 101188728
 <ul style="list-style-type: none"> <li>■ End plugs for SE40</li> <li>■ Uncoated (coating on request)</li> </ul>	 <ul style="list-style-type: none"> <li>■ End plugs for SE70</li> <li>■ Uncoated (coating on request)</li> </ul>	 <ul style="list-style-type: none"> <li>■ Connection box M16</li> </ul>
<b>SE-CC 130.</b>	<b>SE-G 8406</b> 101175392	<b>SE-SC</b> 101153923
 <ul style="list-style-type: none"> <li>■ Coiled cable</li> <li>■ Length 1 m extendable to 3 m</li> <li>■ Cable section           <ul style="list-style-type: none"> <li>4 x 0.25 mm<sup>2</sup>: <b>SE-CC 1301</b> 101158587</li> <li>5 x 0.50 mm<sup>2</sup>: <b>SE-CC 1302</b> 101158588</li> </ul> </li> </ul>	 <ul style="list-style-type: none"> <li>■ Cyanoacrylate adhesive</li> </ul>	 <ul style="list-style-type: none"> <li>■ Rubber scissors</li> </ul>
<b>SE-PR</b> 101175381		
 <ul style="list-style-type: none"> <li>■ Primer</li> <li>■ Amount: 5 ml</li> </ul>		

To get detailed information about the products and certificates, visit [www.schmersal.net](http://www.schmersal.net).

# 13. Safety edges

## Safety monitoring modules



■ SE-100C

■ SE-304C

### Key Features

- To monitor 1 ... 2 safety edges
- 1 safety contact, STOP 0
- 1 signalling output

- To monitor 1 ... 4 safety edges
- 1 safety contact, STOP 0
- 1 signalling output

### Technical features

#### Electrical data

Operating voltage	24 VDC +20% / -10%	24 VDC +20% / -10%; 24 VAC +10% / -10%
Operating current	ca. 150 mA	approx. 500 mA (for 4 safety edges)
Electronic fuse	■	■
Power consumption	< 4 W	< 4 W
Pull-in delay with reset button	-	100 ms ... 2000 ms
Response time	16 ms	< 17 ms
Max. switching capacity of the safety contacts U/I	230 VAC / 2 A; 24 VDC / 2 A	230 VAC / 2 A; 24 VDC / 2 A
<b>Mechanical data</b>		
With removable terminals	-	-
Dimensions (H x W x D)	22.5 x 120 x 100 mm	22.5 x 121 x 100 mm
<b>Ambient conditions</b>		
Ambient temperature	-5 °C ... +55 °C	-5 °C ... +55 °C

### Safety classification

Standards	ISO 13849-1	ISO 13849-1
PL	c	d
Category	1	3
PFH	$2.24 \times 10^{-6} / h$	$1.01 \times 10^{-7} / h$
Certificates		



To get detailed information about the products and certificates, visit [www.schmersal.net](http://www.schmersal.net).



### ■ SE-400C

- To monitor 1 safety edge
- 2 safety contacts, STOP 0
- 1 signalling output

24 VDC +20% / -10%

ca. 150 mA

■

< 4 W

-

32 ms

230 VAC / 2 A;  
24 VDC / 2 A

-

22.5 x 120 x 100 mm

-5 °C ... +55 °C

ISO 13849-1

e

4

$2.47 \times 10^{-8} / \text{h}$



## 14. Safety mat

### Description

#### Area of application

Tactile protection equipment such as safety mats are used to make hazardous working areas around machinery and equipment safe. This ensures personal safety in hazardous areas.

In contrast to optoelectronic protection equipment such as safety light curtains, safety mats allow the monitoring of entire working areas and not only the access areas. Therefore we speak here of zone protection. They are also insensitive to external influences such as dust and chips.

Common uses of safety mats are, for example, the protection of hazardous areas at woodworking machines, scissor lift tables, punching machines and pipe bending machines.

#### Design and way of functioning

A safety mat consists of two separate conducting metal plates. Insulating layers separate the plates from each other. If someone steps onto the safety mat, an electrical short-circuit occurs between the metal plates. The connected safety relay module analyses this signal and switches the hazardous movement off.

In this way, a sheet-like protective device can be used for the detection of persons. Arranging several safety mats together allows large hazardous areas to be quickly and easily made safe. Four different standard sizes are available. In addition, special sizes and shapes can be made available upon request .



The Schmersal range of products includes two series of safety mats. The Series SMS 4, which is fixed to the ground using an aluminium profile and special corner connectors. The chamfered profile shape prevents any risk of tripping. The aluminium profile is additionally used as edge protection, if the area is used with forklifts or other vehicles. The Series SMS 5 has a moulded polyurethane approach profile.

Both series are characterised by a very robust design and high resistance to acids, alkalis, oil, and gasoline. In connection with the safety relay modules SRB301HC/R or SRB301HC/T they meet the requirements of the Performance Level (PL) d according to ISO 13849-1.

---

## Safety distance

The correct arrangement of the safety mat with regard to the adjacent hazardous area mainly depends on the after-travel time of the machine and the approaching speed of the operator. The standard ISO 13855 (Safety of Machinery, Approaching Speed of Body Members) provides a formula to calculate the safety distance for this connection.

# 14. Safety mat

## Overview of the series



■ SMS 4



■ SMS 5

### Key Features

- Surface material out of black polyurethane
- Robust design
- Special sizes are available on request
- Without border
- 4 wire line connection

- Surface material out of black polyurethane
- Robust design
- Special sizes are available on request
- With moulded ramp profile
- 2 x 2 wire line connection

### Technical features

Electrical characteristics		
Execution of the electrical connection	Cable	Cable
Cable section:	4 x 0.34 mm <sup>2</sup>	2 x 2 x 0.34 mm <sup>2</sup>
Mechanical data		
Permissible load	2000 N/cm <sup>2</sup> with round body Ø 80mm	2000 N/cm <sup>2</sup> with round body Ø 80mm
Actuating force	150 N with round body Ø 80mm	150 N with round body Ø 80mm
Inactive area	≤ 10 mm	≤ 10 mm
Chemical resistance		
Water	Resistant	Resistant
10 % Acids	Resistant	Resistant
10% Alkalis	Resistant	Resistant
Oils	Resistant	Resistant
Gasoline	Resistant	Resistant
Ambient conditions		
Ambient temperature	0 °C ... +60 °C	0 °C ... +60 °C
Protection class	IP65	IP65

### Safety classification <sup>1)</sup>

Standards	ISO 13849-1; ISO 13856-1	ISO 13849-1; ISO 13856-1
PL/ SIL	d/2	d/2
Category	3	3
PFH	4.2 x 10 <sup>-8</sup> / h	4.2 x 10 <sup>-8</sup> / h
Certificates	<b>TUV</b>	<b>TUV</b>





<sup>1)</sup> Only in connection with safety modules SRB301HC/R and SRB301HC/T

To get detailed information about the products and certificates, visit [www.schmersal.net](http://www.schmersal.net).

# 14. Safety mat

## Preferred types and accessories



Series	Active area	Type designation	Material number
<b>SMS 4</b> 	250 x 500 mm	<b>SMS 4-250-500</b>	<b>101208365</b>
	500 x 500 mm	<b>SMS 4-500-500</b>	<b>101208366</b>
	500 x 750 mm	<b>SMS 4-500-750</b>	<b>101210174</b>
	500 x 1000 mm	<b>SMS 4-500-1000</b>	<b>101208367</b>
	750 x 1000 mm	<b>SMS 4-750-1000</b>	<b>101208368</b>
	1000 x 1000 mm	<b>SMS 4-1000-1000</b>	<b>101208369</b>
	1000 x 1500 mm	<b>SMS 4-1000-1500</b>	<b>101208370</b>
<b>SMS 5</b> 	250 x 500 mm	<b>SMS 5-250-500</b>	<b>101208371</b>
	500 x 500 mm	<b>SMS 5-500-500</b>	<b>101208372</b>
	500 x 1000 mm	<b>SMS 5-500-1000</b>	<b>101208373</b>
	700 x 800 mm	<b>SMS 5-700-800</b>	<b>101211564</b>
	750 x 1000 mm	<b>SMS 5-750-1000</b>	<b>101208374</b>
	1000 x 1000 mm	<b>SMS 5-1000-1000</b>	<b>101208375</b>
	1000 x 1500 mm	<b>SMS 5-1000-1500</b>	<b>101208376</b>

SMS 4-BS-3000	101208378	SMS 4-RS-3000	101209478	SMS 4-EV	101208379
 <ul style="list-style-type: none"> <li>■ Mounting rail</li> <li>■ Length 3000 mm</li> </ul>		 <ul style="list-style-type: none"> <li>■ Ramp rail</li> <li>■ Length 3000 mm</li> </ul>		 <ul style="list-style-type: none"> <li>■ Corner section</li> <li>■ Included in delivery 1 unit</li> </ul>	

# 15. Optoelectronic safety devices

## Description

### Usage / selection of AOPD

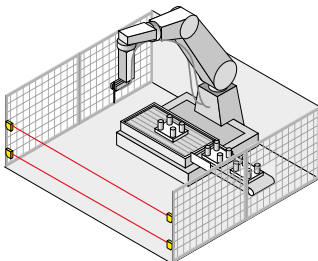
In order to choose the appropriate active optoelectronic protective device (AOPD) such as light barriers or light curtains/grids to use them correctly, both the requirements of the standards (EN 61496, ISO 13849-1, ISO 13855, C standards etc.) and product-specific features (detection sensitivity, range, etc.) must be taken into account.

AOPD's can be used, provided that:

- The dangerous movement can be stopped at all times and that it is ensured that the dangerous area can only be reached after the movement has come to standstill.
- The stopping time for the machine and all safety components used are known.
- No objects (work pieces, liquids, etc.) can be ejected.
- The AOPD meet the requirements of Type 2 or Type 4 acc. to EN 61496.
- The dangerous area can only be reached by passing through the protected field of the AOPD.
- Reaching over, under or through the protected field is impossible.
- The start or restart command devices are fitted in such a way that the entire hazardous area is completely visible from the outside and it cannot be activated from within the hazardous area.
- the safety distance is calculated and constructively applied in accordance with ISO 13855.

The effectiveness of the protection equipment is only as good as the risk analysis carried out when designing the system, which took into consideration all the marginal conditions such as surroundings, machine and functional sequences.

### Safety light barriers

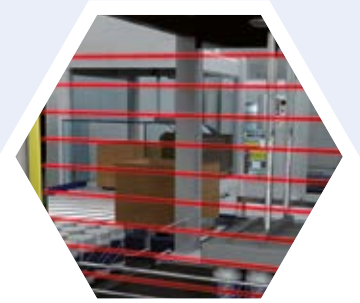
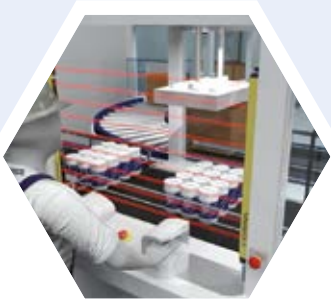


All SLB photoelectric barriers have fail-safe integrated semi-conductor outputs (2 x PNP) and can be incorporated directly in the safety circuit without external safety monitoring. The new product family meets the requirements of all type 2 or type 4 applications in accordance with IEC 61496. The safety photoelectric barriers are distinguished by extremely small dimensions which means that they can be well placed in the surrounding structure and can also be mounted easily and quickly even in tight spaces. At the same time, the compact design does not come at a cost to the range: both models have a range of 15 metres. The SLB 440...-H model features a range of up to 75 metres and, as an option, has integrated heating for use in minus temperatures.

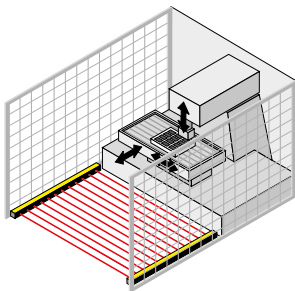
Single beam photoelectric barriers are particularly suitable for safeguarding smaller hazardous areas – such as machines with small openings or slots. In this case, the safety-orientated opto-electronics reliably protect operating personnel by triggering a signal that safely brings the hazardous machine movement to a standstill should the light beam be interrupted.

With this set of features, the new photoelectric barriers can be deployed in numerous ways – for example in work areas where assembly and material handling technology is used as well as in the wood, paper and print industry. Other areas of application are (semi) automated shelving and commissioning systems, high shelf warehouses and packaging machines as well as for confining work areas of man and machine. It can also be used in outside areas, for example in the wood and cement industry, in gravel pits or in harbours/ports.





## Safety light grids / light curtains



The safety light curtains and safety light grids of the SLC and SLG range meet the requirements of Category type 2 and type 4 according to EN 61496. Typical applications for safety light barriers are on robots, automatic-processing plants, transfer lines, rack storage and pallet loaders. In these active optoelectronic protective devices (AOPD), the emitter and receiver are fitted in two separate enclosures. An infrared signal is emitted by the transmitter and evaluated and monitored by the receiver. If the light beam is interrupted by an object or a person, a stop signal is emitted to bring the machine to standstill.

The protection field is defined by the height and width of the protection field. The protected height is the range between the first and last infrared light beam of a light curtain. The protected height defines the physical size of the system to be used. The protected width or operating range is the distance between the transmitter and receiver unit.

If the light beam is interrupted, a signal is emitted to bring the dangerous movement of the machine to a standstill. Here, the following rule applies: the smaller the distance between two adjacent light beams, the more accurate the detection sensitivity of the AOPD.

For the detection of body parts, a distinction is made between finger, hand and body protection. ISO 13855 sets the biometric data for finger protection to 14 mm, for hand detection to 30 mm, for leg detection up to 70 mm and for body detection to over 70 mm. Safety light grids are generally used to detect the penetration of the entire human body. Safety light curtains are multiple beam systems (Resolution < 40 mm) and can also detect smaller objects in case of intrusion into the protected field.

The optoelectronic safety light grids and safety light curtains can be smoothly connected through a M12 connector; they are equipped with a diagnostic interface as well as an LED for status indication. The safety light curtains or light grids feature an integrated safety-monitoring module with start/restart interlock and contactor control. Additional functions such as blanking, muting and a synchronisation function for the light curtains are also available.

The product range SLC and SLG therefore have the greatest possible flexibility for the protection of different hazards.

# 15. Optoelectronic safety devices

## Modes of operation and functions

### Operating modes



Double acknowledgement/reset

The operating modes of an AOPD must be defined according to the risk analysis of a machine.

#### Automatic / Protective mode

The protective mode switches the AOPD outputs to an ON state (protection field not interrupted), without external release of a switching device. This mode of operation creates an automatic machine restart if the protection field is not interrupted and should only be selected with the restart interlock of the machine.

#### Restart interlock (manual reset)

The restart interlock (manual reset) prevents an automatic enabling of the outputs (OSSD's ON state) after switch-on of the operating voltage or an interruption of the protection field. The system switches the outputs only to an ON state, when an external command device generates an enabling signal at the restart input (receiver).

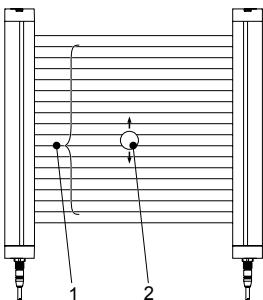
#### Restart interlock with double acknowledgement/reset

In applications with access monitoring, a complete overview of the hazardous areas is often not possible; despite that, a reset of the command device for the restart interlock outside of the hazardous area by third parties is enabled at all times, although possible persons/operators are in the non visible area. This hazardous situation of an unexpected start-up can be avoided by means of a double reset, i.e. integration of one command device inside and one outside the hazardous area.

#### Setting mode

Before commissioning an AOPD, the best possible alignment of the sensors should be determined, this will ensure a high availability of the system. The set-up mode visualises the set-up quality during the installation of the sensors by ensuring equal height (basic adjustment) and a perpendicular protection field orientation (fine adjustment). Visualisation is via a 7-segment display or status indicator at the receiver.

### Object blanking



1 Object blanking area  
2 Movable object

For safe production, object blanking can be used in contrast to the muting function to blank just part of the protection field. This makes it possible to add objects, e.g. workpieces, or position a conveyor belt with a fixed position in the protection field without triggering a stop signal.

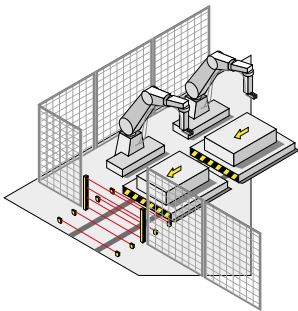
With integrated movable object blanking (floating blanking) of the SLC440/445 light curtains, up to 2 light beams of the light curtain can be blanked flexibly. This function is required if there is a need to be able to interrupt light beams in the protection field at a position that is not specifically defined. In this way, objects such as movable electrical cables or materials with slightly varying heights can be fed through the light curtain without triggering a stop signal.

Different blanking functions are available. The distinguishing feature of the different modes is the number of light beams that can be interrupted by an object. In addition to that, it can be defined whether the object may be in the protection field permanently or only temporarily. The interrupted light beams can be at any position in the protection field. Apart from the first infrared light beam (the beam closest to the connector), any light beam can be used for blanking.



If the floating blanking function is configured the resolution of the light curtain changes. The technical documentation of the different light curtains includes the tables with the effective resolutions to calculate the minimum safety distance according to ISO 13855.

## Muting



If goods or objects need to be transported in or out of the hazardous area without stopping the machine, the safety light curtain must be automatically and temporarily suspended. Two or four muting signals are used to detect whether a person is approaching the hazardous area or a transport system is entering or leaving the hazardous area. Suitable muting inputs are light barriers, proximity switches or position switches.

The integrated safety-muting controller of the safety light curtain or light grid monitors and controls the muting process. The safety outputs are not disabled. Depending on the application, different light barriers with integrated muting functions are available. Detailed product information can be found in the operating instructions.

## Cyclic operation

Cyclic operation is an AOPD operating mode to control an automatic production process with manual placement and simultaneous monitoring of the hazardous area. The light curtain additionally monitors a signal from the application controller (machine contact), which signals the end of the hazardous movement. This signal is used for the cycle reset and enables an immediate intervention in the protection zone. A cycle is defined as the one-time interruption and release of the protection zone. A single cycle operation starts a new machine cycle if the protection field is interrupted once.

### Example

The material is fed automatically without interruption of the protection zone. After initialisation, the machine starts the first cycle. The operator now interrupts the protection zone to remove the material. The next cycle starts automatically.

With a dual cycle operation, a new machine cycle is started after the protection field has been interrupted twice.

### Example

The operator loads the machine with the material to be processed and gives the start command. After the process is finished, the operator removes the processed material (1st cycle) and loads new material for processing (2nd cycle). The next cycle starts automatically.

During the dangerous movement, the machine should be stopped before any intervention in the AOPD protection field. A new start cycle is to be initialised by actuating the command device to release the restart interlock.

# 15. Optoelectronic safety devices

## Safety distance

### Safety distance

The stopping time for the complete system and the resolution capacity of the AOPD essentially determines the required safety distance of the AOPD to the dangerous area. The safety light grid or light curtain must be sized and installed so that a stop signal would be transmitted and the hazard ceased prior to a person or a body part accessing the danger zone.

The standard ISO 13855 provides the user with detailed information about the calculation of the minimum safety distances. These include the following important influencing factors:

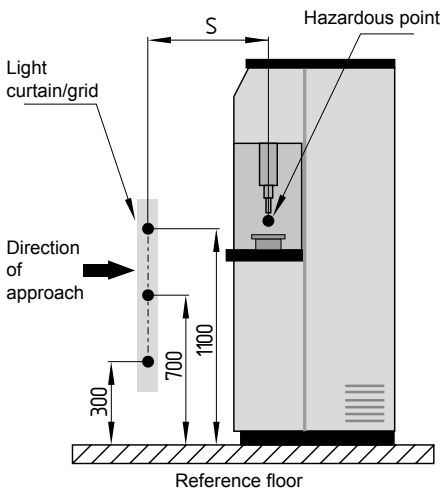
- Stopping time of the entire system, taking the different reaction times of the individual systems into account (e.g. machine, safety relay module, AOPD etc.)
- Detection capability of the AOPD to detect body parts (finger, hand and whole body)
- Arrangement of each protection device in the normal position (vertical mounting), parallel orientation (horizontal mounting) or at any angle in front of the guard system
- Approach speed to the protection field

For the calculation of the minimum safety distance  $S$  to the hazardous area, ISO 13855 presents the following general formula:

$$S = K \times T + C$$

- Key:
- S** the safety distance to the hazardous area (mm)
  - K** the approach speed of the body or the body part (mm/s)
  - T** total reaction time of the system (s)  
(inc. machine run-on time, reaction time of the safety guard and the safety relay module, etc.)
  - C** additional distance (mm) before the safety guard

If access to the hazardous area (by passing across the protection field) cannot be excluded by using vertically mounted contactless protective equipment such as a light grid, an additional minimum distance CRO should be considered. This distance is dependent on the protection field height above the ground and the position of the hazardous area (ISO 13855).



# 15. Optoelectronic safety devices

## Overview

Selection	Type to EN 61496	Special features	Series	refer to
Safety light barriers SLB	Type 2	Range to 15 m	SLB240	Page 192
	Type 4	Range to 15 m	SLB440	
		Range to 75 m	SLB440-H	
Safety light curtains SLC	Type 2	Compact	SLC240COM	Page 194
	Type 4	Standard	SLC420	Page 196
		Master / Slave	SLC420 M/S	
		High protection class	SLC420 IP69K	
		Integrated muting and override function	SLC425I	Page 198
		High protection class	SLC425I IP69K	
		Compact	SLC440COM	Page 202
	Standard	SLC440		
	Multifunctional	SLC445		
Safety light grids SLG	Type 2	Compact	SLG240COM	Page 194
	Type 4	Standard	SLG420	Page 196
		High protection class	SLG420 IP69K	
		Active-passive system with mirror	SLG422-P	
		Integrated muting and override function	SLG425I	Page 198
		High protection class	SLG425I IP69K	
		Active-passive system with mirror	SLG425I-P	
		Compact	SLG440COM	Page 202
		Standard	SLG440	
	Multifunctional	SLG445		

# 15. Safety light barriers

## Range SLB – Overview



### Key Features

- |   |   |  |
|---|---|--|
| <ul style="list-style-type: none"> <li>• Safety light barrier type 2</li> <li>• 4-stage coding</li> <li>• Integr. evaluation</li> </ul> | <ul style="list-style-type: none"> <li>• Safety light barrier type 4</li> <li>• 4-stage coding</li> <li>• Integr. evaluation</li> </ul> | <ul style="list-style-type: none"> <li>• Safety light barrier type 4</li> <li>• 4-stage coding</li> <li>• Integr. evaluation</li> <li>• Optional heater</li> </ul> |
|---|---|--|

### Technical features

<b>Range of the protection field</b>	15 m	15 m	75 m
<b>Min. object size</b>	Ø 10 mm	Ø 10 mm	Ø 70 mm
<b>Wave length of the sensor</b>	880 nm	880 nm	880 nm
<b>Electrical characteristics</b>			
<b>Response time</b>	7 ... 22 ms	7 ... 22 ms	7 ... 22 ms
<b>Automatic/restart interlock</b>	■	■	■
<b>Rated operating voltage Ue</b>	24 VDC ± 10%	24 VDC ± 10%	24 VDC ± 10%
<b>Safety outputs</b>	2 x OSSD	2 x OSSD	2 x OSSD
<b>Mechanical data</b>			
<b>Material of the enclosure</b>	Aluminium	Aluminium	Aluminium
<b>Connection</b>	ST: Connector plug M12 LST: 20 cm Cable with connector M12	ST: Connector plug M12 LST: 20 cm Cable with connector M12	ST: Connector plug M12 LST: 20 cm Cable with connector M12
<b>Connector plug (transmitter/receiver)</b>	4-pole / 5-pole	4-pole / 5-pole	4-pole / 5-pole
<b>Cable length</b>	max. 100 m	max. 100 m	max. 100 m
<b>Dimensions (H x W x L)</b>	ST: 28 x 91 x 33 mm LST: 28 x 72 x 33 mm	ST: 28 x 91 x 33 mm LST: 28 x 72 x 33 mm	ST: 28 x 131 x 33 mm LST: 28 x 111 x 33 mm
<b>Ambient conditions</b>			
<b>Ambient temperature</b>	-30 °C ... +50 °C	-30 °C ... +50 °C	-30 °C ... +50 °C
<b>Protection class</b>	IP67	IP67	IP67
<b>Recommended safety-monitoring module for the series wiring</b>	SRB-E-204ST	SRB-E-204ST	SRB-E-204ST

### Safety classification




<b>Standards</b>	ISO 13849-1 EN 62061	ISO 13849-1 EN 62061	ISO 13849-1 EN 62061
<b>PL/SIL</b>	c/2	e/3	e/3
<b>Category</b>	2	4	4
<b>PFH</b>	1.5 x 10 <sup>-8</sup> /h	1.5 x 10 <sup>-8</sup> /h	1.5 x 10 <sup>-8</sup> /h
<b>Certificates</b>			






To get detailed information about the products and certificates, visit [www.schmersal.net](http://www.schmersal.net).




# 15. Safety light barriers

## Range SLB – Preferred types and accessories

Type	Series	Type	Connection	Type designation	Material number	
Safety light barriers	SLB240		Coding 1*	Connector plug	SLB240-ER-1-ST	103013801
				Cable with connector	SLB240-ER-1-LST	103013529
	SLB440		Coding 1*	Connector plug	SLB440-ER-1-ST	103019521
				Cable with connector	SLB440-ER-1-LST	103013525
	SLB440-H		Coding 1*	Connector plug	SLB440-ER-1-ST-H	103015483
				Cable with connector	SLB440-ER-1-LST-H	103015487
				Connector plug	SLB440-ER-1-ST-H-EH	103015491
				Cable with connector	SLB440-ER-1-LST-H-EH	103015497

\*Other coding available.

Connector plug	KA-0977	103013625	MS-...
 <ul style="list-style-type: none"> <li>Connector M12, straight, 4 pole                             <ul style="list-style-type: none"> <li>5 m <b>KA-0804</b></li> <li>10 m <b>KA-0805</b></li> <li>20 m <b>KA-0808</b></li> </ul> </li> <li>Connector M12, straight, 5 pole                             <ul style="list-style-type: none"> <li>5 m <b>A-K5P-M12-S-G-5M-BK-2-X-A-1</b></li> <li>10 m <b>A-K5P-M12-S-G-15M-BK-2-X-A-1</b></li> </ul> </li> </ul>	 <ul style="list-style-type: none"> <li>Parametrisation cable for SLB series</li> <li>Y-splitter, M12, 5-pole with P-button</li> </ul>	 <ul style="list-style-type: none"> <li>Assembly sets for SLB series                             <ul style="list-style-type: none"> <li>For SLB240 / SLB440 (qty. 2 brackets, qty. 4 screws) <b>MS-1101</b></li> <li>For SLB440-H (qty. 4 brackets, qty. 8 screws) <b>MS-1100</b></li> </ul> </li> </ul>	

SMA-80	101150262	BF-SMA-80-1	101150263	BF-SMA-80-2	101150264
 <ul style="list-style-type: none"> <li>Tilted mirror for SLB series                             <ul style="list-style-type: none"> <li>Height: 80 mm</li> <li>Width: 120 mm</li> </ul> </li> </ul>	 <ul style="list-style-type: none"> <li>Mounting bracket for attachment of tilted mirror SMA-80 (horizontal tilt)</li> </ul>	 <ul style="list-style-type: none"> <li>Mounting bracket for attachment of tilted mirror SMA-80 (vertical tilt)</li> </ul>			

Detailed information for the selection of accessories can be found at [www.schmersal.net](http://www.schmersal.net).

# 16. Safety light grids / light curtains

## Type 2 – Range 240COM – Overview



■ SLC240COM



■ SLG240COM

### Key Features

- Safety light curtain
- Compact

- Safety light grid
- Compact

### Technical features

<b>Resolution</b>	14, 30, 35 mm	300, 400 or 500 mm
<b>Protection field height</b>	330 mm ... 1930 mm	500, 800 or 900 mm
<b>Number of beams</b>	11 ... 192	2, 3 or 4 beams
<b>Range of the protection field</b>	0.3 ... 12 m	0,3 ... 12 m
<b>Operating modes</b>		
- Protective mode / Automatic	■	■
- Restart interlock (manual reset)	■	■
- Parameter setting	KA-0896	KA-0896
<b>Functions integrated</b>		
- Contactor control	-	-
- Blanking of objects	■	■
- Muting	-	-
- Cyclic function	-	-
- Further functions (see key)	DM, RS	DM, RS
<b>Electrical characteristics</b>		
<b>Operating voltage</b>	24 VDC ± 10%	24 VDC ± 10%
<b>Safety output OSSD, 24 VDC</b>	2 x PNP (timing)	2 x PNP (timing)
<b>Response time OSSD</b>	10 ... 28 ms	10 ms
<b>Switching capacity OSSD</b>	500 mA	500 mA
<b>LED status display, 7-segment display</b>	Status display	Status display
<b>Mechanical data</b>		
<b>Execution of the electrical connection</b>	Connector plug	Connector plug
<b>Connector plug (transmitter/receiver)</b>	4-pole / 5-pole	4-pole / 5-pole
<b>Dimensions <sup>1)</sup></b>	27.8 x 33 mm	27.8 x 33 mm
<b>Ambient conditions</b>		
<b>Ambient temperature</b>	-10 °C ... +50 °C	-10 °C ... +50 °C
<b>Protection class</b>	IP67	IP67

### Safety classification

<b>Standards</b>	ISO 13849-1, EN 62061	ISO 13849-1, EN 62061
<b>PL/SIL</b>	c/1	c/1
<b>Category</b>	2	2
<b>PFH</b>	8.05 x 10 <sup>-9</sup> /h	8.05 x 10 <sup>-9</sup> /h
<b>Certificates</b>		





Type to EN 61496	Type	Series	Resolution	Protection field height	Range	Type designation	Material number
Type 2	Safety light curtain SLC	SLC240COM	14 mm	330 ... 1930 mm	0,3 ... 7 m	SLC240COM-ER-xxxx-14	---
			30 mm	330 ... 1930 mm	0,3 ... 12 m	SLC240COM-ER-xxxx-30	---
			35 mm	330 ... 1930 mm	0,3 ... 7 m	SLC240COM-ER-xxxx-35	---
	Safety light grids SLG	SLG240COM	2 beams	500 mm	0.3 ... 12 m	SLG240COM-ER-0500-02	103016120
			3 beams	800 mm	0.3 ... 12 m	SLG240COM-ER-0800-03	103016122
			4 beams	900 mm	0.3 ... 12 m	SLG240COM-ER-0900-04	103016127

xxxx = For different heights and other combinations, see [www.schmersal.net](http://www.schmersal.net).

--- = The material number is dependent on the protective field heights.

<sup>1)</sup> The height depends on the protection field height

#### Key

BC = Beam coding  
DQ = Double acknowledgement/reset  
MS = Multiple scan  
DM = Setting mode  
SI = Start interlock  
RS = Series-wiring

To get detailed information about the products and certificates, visit [www.schmersal.net](http://www.schmersal.net)

# 16. Safety light grids / light curtains

## Type 4 – Range 420/422 – Overview



■ SLC420



■ SLC420 M/S



■ SLC420 IP69K

### Key Features

- Safety light curtain
- Standard










- Safety light curtain
- Master/Slave

- Safety light curtain
- High protection class

### Technical features

<b>Resolution</b>	14, 30, 50 mm	14, 30, 50 mm	14, 30 mm
<b>Protection field height</b>	170 mm ... 1770 mm	170 mm ... 2420 mm	175 mm ... 1450 mm
<b>Number of beams</b>	2 ... 144	4 ... 208	2 ... 144
<b>Range of the protection field</b>	0.3 ... 18 m	0.3 ... 18 m	0.3 ... 10 m
<b>Operating modes</b>			
- Protective mode / Automatic	■	■	■
- Restart interlock (manual reset)	■	■	■
- Parameter setting	NSR-0801 (adapter)	NSR-0801 (adapter)	NSR-0801 (adapter)
<b>Functions integrated</b>			
- Contactor control	■	■	■
- Blanking of objects	■	■	■
- Muting	-	-	-
- Cyclic function	-	-	-
- Further functions (see key)	BC, SI	BC, SI	BC, SI
<b>Electrical characteristics</b>			
<b>Operating voltage</b>	24 VDC ± 10%	24 VDC ± 10%	24 VDC ± 10%
<b>Safety output OSSD, 24 VDC</b>	2 x PNP	2 x PNP	2 x PNP
<b>Response time OSSD</b>	10 ... 27 ms	10 ... 37 ms	10 ... 27 ms
<b>Switching capacity OSSD</b>	500 mA	500 mA	500 mA
<b>LED status display, 7-segment display</b>	LED	LED	LED
<b>Mechanical data</b>			
<b>Execution of the electrical connection</b>	Connector plug	Connector plug	Cable + connector plug
<b>Connector plug (transmitter/receiver)</b>	4-pole / 8-pole	4-pole / 8-pole	4-pole / 8-pole
<b>Dimensions <sup>1)</sup></b>	Ø 49 mm	Ø 49 mm	Ø 60 mm
<b>Ambient conditions</b>			
<b>Ambient temperature</b>	-25 °C ... +50 °C	-10 °C ... +50 °C	-10 °C ... +50 °C
<b>Protection class</b>	IP67	IP67	IP69K

### Safety classification

<b>Standards</b>	ISO 13849-1, EN 62061	ISO 13849-1, EN 62061	ISO 13849-1, EN 62061
<b>PL/SIL</b>	e/3	e/3	e/3
<b>Category</b>	4	4	4
<b>PFH</b>	$7.42 \times 10^{-9}$ /h	$7.42 \times 10^{-9}$ /h	$7.42 \times 10^{-9}$ /h
<b>Certificates</b>	  	  	  



To get detailed information about the products and certificates, visit [www.schmersal.net](http://www.schmersal.net).



■ SLG420



■ SLG420 IP69K



■ SLG422-P

- Safety light grid
- Standard

- Safety light grid
- High protection class

- Safety light grid
- Active-passive with deflecting mirror ULS

300, 400 or 500 mm	300, 400 or 500 mm	300 mm
500, 800 or 900 mm	500, 800 or 900 mm	500 mm
2, 3 or 4 beams	2, 3 or 4 beams	2 beams
0.3 ... 50 m	0.3 ... 18 m	0.3 ... 7 m
■	■	■
■	■	■
NSR-0801 (adapter)	NSR-0801 (adapter)	NSR-0801 (adapter)
■	■	■
■	■	-
-	-	-
-	-	-
BC, SI	BC, SI	SI
24 VDC ± 10%	24 VDC ± 10%	24 VDC ± 10%
2 x PNP	2 x PNP	2 x PNP
10 ... 15 ms	10 ... 15 ms	10 ms
500 mA	500 mA	500 mA
LED	LED	LED
Connector plug	Cable + connector plug	Connector plug
4-pole / 8-pole	4-pole / 8-pole	8-pole
Ø 49 mm	Ø 60 mm	Ø 49 mm
-25 °C ... +50 °C	-10 °C ... +50 °C	-10 °C ... +50 °C
IP67	IP69K	IP67

ISO 13849-1, EN 62061	ISO 13849-1, EN 62061	ISO 13849-1, EN 62061
e/3	e/3	e/3
4	4	4
7.42 x 10 <sup>-9</sup> /h	7.42 x 10 <sup>-9</sup> /h	7.42 x 10 <sup>-9</sup> /h
<b>TUV</b> <b>EAC</b>	<b>TUV</b> <b>EAC</b>	<b>TUV</b>

<sup>1)</sup> The height depends on the protection field height

**Key**

- BC = Beam coding
- DQ = Double acknowledgement/reset
- MS = Multiple scan
- DM = Setting mode
- SI = Start interlock

# 16. Safety light grids / light curtains

## Type 4 – Range 425I – Overview



■ SLC425I      ■ SLC425I IP69K      ■ SLG425I

### Key Features

- |  |   |   |
|--|---|---|
| <ul style="list-style-type: none"> <li>• Safety light curtain</li> <li>• Standard</li> </ul> | <ul style="list-style-type: none"> <li>• Safety light curtain</li> <li>• High protection class</li> </ul> | <ul style="list-style-type: none"> <li>• Safety light grid</li> <li>• Standard</li> </ul> |
|--|---|---|

### Technical features

<b>Resolution</b>	14, 30 mm	14, 30 mm	300, 400 or 500 mm
<b>Protection field height</b>	170 mm ... 1770 mm	170 mm ... 1450 mm	500, 800 or 900 mm
<b>Number of beams</b>	8 ... 144	8 ... 144	2, 3 or 4 beams
<b>Range of the protection field</b>	0.3 ... 10 m	0.3 ... 10 m	0.3 ... 18 m
<b>Operating modes</b>			
- Protective mode / Automatic	-	-	-
- Restart interlock (manual reset)	■	■	■
- Parameter setting	NSR-0801 (adapter)	NSR-0801 (adapter)	NSR-0801 (adapter)
<b>Functions integrated</b>			
- Contactor control	■	■	-
- Blanking of objects	■	■	■
- Muting	■	■	■
- Cyclic function	■	■	-
- Further functions (see key)	BC, SI	BC, SI	BC, SI
<b>Electrical characteristics</b>			
<b>Operating voltage</b>	24 VDC ± 10%	24 VDC ± 10%	24 VDC ± 10%
<b>Safety output OSSD, 24 VDC</b>	2 x PNP	2 x PNP	2 x PNP
<b>Response time OSSD</b>	15 ... 32 ms	15 ... 32 ms	15 ... 20 ms
<b>Switching capacity OSSD</b>	500 mA	500 mA	500 mA
<b>LED status display, 7-segment display</b>	LED	LED	LED
<b>Mechanical data</b>			
<b>Execution of the electrical connection</b>	Connector plug	Cable + connector plug	Connector plug
<b>Connector plug (transmitter/receiver)</b>	4-pole / 8-pole	4-pole / 12-pole	4-pole / 8-pole
<b>Dimensions <sup>1)</sup></b>	Ø 49 mm	Ø 60 mm	Ø 49 mm
<b>Ambient conditions</b>			
<b>Ambient temperature</b>	-10 °C ... +50 °C	-10 °C ... +50 °C	-10 °C ... +50 °C
<b>Protection class</b>	IP67	IP69K	IP67

### Safety classification

<b>Standards</b>	ISO 13849-1, EN 62061	ISO 13849-1, EN 62061	ISO 13849-1, EN 62061
<b>PL/SIL</b>	e/3	e/3	e/3
<b>Category</b>	4	4	4
<b>PFH</b>	7.42 x 10 <sup>-9</sup> /h	7.42 x 10 <sup>-9</sup> /h	7.42 x 10 <sup>-9</sup> /h
<b>Certificates</b>			



To get detailed information about the products and certificates, visit [www.schmersal.net](http://www.schmersal.net).



■ SLG425I IP69K

■ SLG425-IP

- Safety light grid
- High protection class

- Safety light grid
- Active-passive with deflecting mirror ULS

300, 400 or 500 mm	300 mm
500, 800 or 900 mm	500 mm
2, 3 or 4 beams	2 beams
0.3 ... 18 m	0.3 ... 7 m
-	-
■	■
NSR-0801 (adapter)	NSR-0801 (adapter)
-	-
■	-
■	■
-	-
BC, SI	SI
24 VDC ± 10%	24 VDC ± 10%
2 x PNP	2 x PNP
15 ... 20 ms	15 ms
500 mA	500 mA
LED	LED
Cable + connector plug	Connector plug
4-pole / 12-pole	8-pole
Ø 60 mm	Ø 49 mm
-10 °C ... +50 °C	-10 °C ... +50 °C
IP69K	IP67

ISO 13849-1, EN 62061	ISO 13849-1, EN 62061
e/3	e/3
4	4
7.42 x 10 <sup>-9</sup> /h	7.42 x 10 <sup>-9</sup> /h
<b>TUV</b> <b>ERC</b>	<b>TUV</b> <b>ERC</b>

<sup>1)</sup> The height depends on the protection field height

**Key**

- BC = Beam coding
- DQ = Double acknowledgement/reset
- MS = Multiple scan
- DM = Setting mode
- SI = Start interlock

## 16. Safety light grids / light curtains

### Type 4 – Range 420/422/425I – Preferred types

Type to EN 61496	Type	Feature	Series	Special features	
Type 4	Safety light curtain SLC	Standard	SLC420	Standard	
				High range	
		Master / Slave	SLC420 M/S	Master	
				Master + High range	
				Slave	
				Slave + High range	
	High protection class	SLC420 IP69K	Standard		
	Safety light grids SLG	Standard	SLG420	Standard	
				High range	
		High protection class	SLG420 IP69K	Standard	
Active-passive with deflecting mirror ULS		SLG422-P	Active-passive system		
Type 4	Safety light curtain SLC	Integrated muting and override function	SLC425I	Standard	
		High protection class	SLC425I IP69K		
	Safety light grids SLG	Integrated muting and override function	SLG425I	Standard	
		High protection class	SLG425I IP69K		
		Active-passive with deflecting mirror ULS	SLG425I-P		Active-passive system

xxxx = For different heights and other combinations, see [www.schmersal.net](http://www.schmersal.net).

--- = The material number is dependent on the protective field heights.

	Resolution	Protection field height	Range	Type designation	Material number
	14 mm	170 ... 1450 mm	0.3 ... 7 m	SLC420-ER-xxxx-14-RFB	---
	30 mm	170 ... 1770 mm	0.3 ... 10 m	SLC420-ER-xxxx-30-RFB	---
	50 mm	170 ... 1770 mm	0.3 ... 10 m	SLC420-ER-xxxx-50-RFB	---
	30 mm	170 ... 1770 mm	0.3 ... 18 m	SLC420-ER-xxxx-30-RFBH	---
	14 mm	170 ... 2100 mm	0.3 ... 7 m	SLC420-ER-xxxx-14-RFBM	---
	30 mm	170 ... 2420 mm	0.3 ... 10 m	SLC420-ER-xxxx-30-RFBM	---
	50 mm	170 ... 2420 mm	0.3 ... 10 m	SLC420-ER-xxxx-50-RFBM	---
	30 mm	170 ... 2420 mm	0.3 ... 18 m	SLC420-ER-xxxx-30-RFBMH	---
	14 mm	170 ... 2100 mm	0.3 ... 7 m	SLC420-ER-xxxx-14-RFBS	---
	30 mm	170 ... 2420 mm	0.3 ... 10 m	SLC420-ER-xxxx-30-RFBS	---
	50 mm	170 ... 2420 mm	0.3 ... 10 m	SLC420-ER-xxxx-50-RFBS	---
	30 mm	170 ... 2420 mm	0.3 ... 18 m	SLC420-ER-xxxx-30-RFBSH	---
	14 mm	170 ... 1450 mm	0.3 ... 7 m	SLC420-ER-xxxx-14-69-RFB	---
	30 mm	170 ... 1450 mm	0.3 ... 10 m	SLC420-ER-xxxx-30-69-RFB	---
	2 beams	500 mm	0.3 ... 18 m	SLG420-ER-0500-02-RF	101207359
	3 beams	800 mm	0.3 ... 18 m	SLG420-ER-0800-03-RF	101207360
	4 beams	900 mm	0.3 ... 18 m	SLG420-ER-0900-04-RF	101207361
	2 beams	500 mm	8 ... 50 m	SLG420-ER-0500-02-RFH	101207362
	3 beams	800 mm	8 ... 50 m	SLG420-ER-0800-03-RFH	101207363
	4 beams	900 mm	8 ... 50 m	SLG420-ER-0900-04-RFH	101207364
	2 beams	500 mm	0.3 ... 18 m	SLG420-ER-0500-02-69-RF	101207377
	3 beams	800 mm	0.3 ... 18 m	SLG420-ER-0800-03-69-RF	101207378
	4 beams	900 mm	0.3 ... 18 m	SLG420-ER-0900-04-69-RF	101207379
	2 beams	500 mm	0.3 ... 7 m	SLG422P-ER-0500-02-RF	101207547
	14 mm	170 ... 1450 mm	0.3 ... 7 m	SLC425I-ER-xxxx-14-RFBC	---
	30 mm	170 ... 1770 mm	0.3 ... 10 m	SLC425I-ER-xxxx-30-RFBC	---
	14 mm	170 ... 1450 mm	0.3 ... 7 m	SLC425I-ER-xxxx-14-69-RFB	---
	30 mm	170 ... 1450 mm	0.3 ... 10 m	SLC425I-ER-xxxx-30-69-RFB	---
	2 beams	500 mm	0.3 ... 18 m	SLG425I-ER-0500-02-RF	101207663
	3 beams	800 mm	0.3 ... 18 m	SLG425I-ER-0800-03-RF	101207664
	4 beams	900 mm	0.3 ... 18 m	SLG425I-ER-0900-04-RF	101207665
	2 beams	500 mm	0.3 ... 18 m	SLG425I-ER-0500-02-69-RF	101209656
	3 beams	800 mm	0.3 ... 18 m	SLG425I-ER-0800-03-69-RF	101209657
	4 beams	900 mm	0.3 ... 18 m	SLG425I-ER-0900-04-69-RF	101209658
	2 beams	500 mm	0.3 ... 7 m	SLG425IP-ER-0500-02-RF	101207672

# 16. Safety light grids / light curtains

## Type 4 – Range 440COM/440/445 – Overview



■ SLC440COM

■ SLC440

■ SLC445

### Key Features

	<ul style="list-style-type: none"> <li>• Safety light curtain</li> <li>• Compact</li> </ul>	<ul style="list-style-type: none"> <li>• Safety light curtain</li> <li>• Standard</li> </ul>	<ul style="list-style-type: none"> <li>• Safety light curtain</li> <li>• Multifunctional</li> </ul>
--	---	--	---

### Other versions

AS-i SaW (refer to 260)	-	■ <sup>1)</sup>	-
-------------------------	---	-----------------	---

### Technical features

<b>Resolution</b>	14, 30, 35 mm	14, 30 mm	14, 30 mm
<b>Protection field height</b>	330 mm ... 1930 mm	170 mm ... 1930 mm	170 mm ... 1770 mm
<b>Number of beams</b>	11 ... 192	8 ... 192	8 ... 144
<b>Range of the protection field</b>	0.3 ... 10 m	0.3 ... 10 m	0.3 ... 10 m
<b>Operating modes</b>			
- Protective mode / Automatic	■	■	■
- Restart interlock (manual reset)	■	■	■
- Parameter setting	Wiring	KA-0974	KA-0976
<b>Functions integrated</b>			
- Contactor control	-	■	■
- Blanking of objects	-	■	■
- Muting	-	-	■
- Cyclic function	-	-	■
- Further functions (see key)	DM	BC, DQ, DM	BC, DQ, MS, DM
<b>Electrical characteristics</b>			
Operating voltage	24 VDC ± 10%	24 VDC ± 10%	24 VDC ± 10%
Safety output OSSD, 24 VDC	2 x PNP (timing)	2 x PNP (timing)	2 x PNP (timing)
Response time OSSD	10 ... 28 ms	10 ... 28 ms	10 ... 27 ms
Switching capacity OSSD	500 mA	500 mA	500 mA
LED status display, 7-segment display	Status display	7-segment display	7-segment display
<b>Mechanical data</b>			
Execution of the electrical connection	Connector plug	Connector plug	Connector plug
Connector plug (transmitter/receiver)	4-pole / 5-pole	4-pole / 8-pole	4-pole / 12-pole
Dimensions <sup>2)</sup>	27.8 x 33 mm	27.8 x 33 mm	27.8 x 33 mm
<b>Ambient conditions</b>			
Ambient temperature	-10 °C ... +50 °C	-25 °C ... +50 °C	-25 °C ... +50 °C
Protection class	IP67	IP67	IP67

### Safety classification

<b>Standards</b>	ISO 13849-1, EN 62061	ISO 13849-1, EN 62061	ISO 13849-1, EN 62061
<b>PL/SIL</b>	e/3	e/3	e/3
<b>Category</b>	4	4	4
<b>PFH</b>	8.05 x 10 <sup>-9</sup> /h	5.14 x 10 <sup>-9</sup> /h	5.14 x 10 <sup>-9</sup> /h
<b>Certificates</b>			







■ SLG440COM

■ SLG440

■ SLG445

- Safety light grid
- Compact

- Safety light grid
- Standard

- Safety light grid
- Multifunctional

-

■ <sup>1)</sup>

-

300, 400 or 500 mm  
500, 800 or 900 mm  
2, 3 or 4 beams  
0,3 ... 12 m

300, 400 or 500 mm  
500, 800 or 900 mm  
2, 3 or 4 beams  
0,3 ... 20 m

300, 400 or 500 mm  
500, 800 or 900 mm  
2, 3 or 4 beams  
0,3 ... 20 m

■

■

■

Wiring

KA-0974

KA-0976

-

■

■

-

■

■

-

-

■

DM

BC, DQ, DM

BC, DQ, MS, DM

24 VDC ± 10%

24 VDC ± 10%

24 VDC ± 10%

2 x PNP (timing)

2 x PNP (timing)

2 x PNP (timing)

10 ms

10 ... 15 ms

10 ... 15 ms

500 mA

500 mA

500 mA

Status display

7-segment display

7-segment display

Connector plug

Connector plug

Connector plug

4-pole / 5-pole

4-pole / 8-pole

4-pole / 12-pole

27.8 x 33 mm

27.8 x 33 mm

27.8 x 33 mm

-10 °C ... +50 °C

-25 °C ... +50 °C

-25 °C ... +50 °C

IP67

IP67

IP67

ISO 13849-1,  
EN 62061

ISO 13849-1,  
EN 62061

ISO 13849-1,  
EN 62061

e/3

e/3

e/3

4

4

4

8.05 x 10<sup>-9</sup> /h

5.14 x 10<sup>-9</sup> /h

5.14 x 10<sup>-9</sup> /h



<sup>1)</sup> SLC/SLG440-AS available with AS-i SaW interface

<sup>2)</sup> The height depends on the protection field height

**Key**

BC = Beam coding

DQ = Double acknowledgement/reset

MS = Multiple scan

DM = Setting mode

SI = Start interlock

To get detailed information about the products and certificates, visit [www.schmersal.net](http://www.schmersal.net).

## 16. Safety light grids / light curtains

### Type 4 – Range 440COM/440/445 – Preferred types

Type to EN 61496	Type	Feature	Series	Special features
Type 4	Safety light curtain SLC	Compact	SLC440COM	Compact
		Standard	SLC440	Standard
				Integrated Status display
		AS-i	SLC440AS	Integrated AS-i SaW
	Multifunctional	SLC445	Muting cyclic operation with multiscan	
	Safety light grids SLG	Compact	SLG440COM	Compact
		Standard	SLG440	Standard
				High range
				Integrated Status display
				High range and integrated status display
AS-i	SLG440AS	Integrated AS-i SaW		
Multifunctional	SLG445	Muting cyclic operation with multiscan		

xxxx = For different heights and other combinations, see [www.schmersal.net](http://www.schmersal.net).

--- = The material number is dependent on the protective field heights.

	Resolution	Protection field height	Range	Type designation	Material number
	14 mm	330 ... 1930 mm	0,3 ... 7 m	SLC440COM-ER-xxxx-14	---
	30 mm	330 ... 1930 mm	0.3 ... 10 m	SLC440COM-ER-xxxx-30	---
	35 mm	330 ... 1930 mm	0,3 ... 7 m	SLC440COM-ER-xxxx-35	---
	14 mm	170 ... 1930 mm	0,3 ... 7 m	SLC440-ER-xxxx-14	---
	30 mm	170 ... 1930 mm	0.3 ... 10 m	SLC440-ER-xxxx-30	---
	14 mm	170 ... 1930 mm	0,3 ... 7 m	SLC440-ER-xxxx-14-01	---
	30 mm	170 ... 1930 mm	0.3 ... 10 m	SLC440-ER-xxxx-30-01	---
	14 mm	170 ... 1450 mm	0,3 ... 7 m	SLC440AS-ER-xxxx-14	---
	30 mm	170 ... 1770 mm	0.3 ... 10 m	SLC440AS-ER-xxxx-30	---
	14 mm	170 ... 1450 mm	0,3 ... 7 m	SLC445-ER-xxxx-14-01	---
	30 mm	170 ... 1770 mm	0.3 ... 10 m	SLC445-ER-xxxx-30-01	---
	2 beams	500 mm	0.3 ... 12 m	SLG440COM-ER-0500-02	103004060
	3 beams	800 mm	0.3 ... 12 m	SLG440COM-ER-0800-03	103004063
	4 beams	900 mm	0.3 ... 12 m	SLG440COM-ER-0900-04	103004064
	2 beams	500 mm	0,3 ... 12 m	SLG440-ER-0500-02	101216818
	3 beams	800 mm	0,3 ... 12 m	SLG440-ER-0800-03	101216819
	4 beams	900 mm	0,3 ... 12 m	SLG440-ER-0900-04	101216820
	2 beams	500 mm	3 ... 20 m	SLG440-ER-0500-02-H	103009186
	3 beams	800 mm	3 ... 20 m	SLG440-ER-0800-03-H	103009187
	4 beams	900 mm	3 ... 20 m	SLG440-ER-0900-04-H	103009188
	2 beams	500 mm	0,3 ... 12 m	SLG440-ER-0500-02-01	101216821
	3 beams	800 mm	0,3 ... 12 m	SLG440-ER-0800-03-01	101216822
	4 beams	900 mm	0,3 ... 12 m	SLG440-ER-0900-04-01	101216823
	2 beams	500 mm	3 ... 20 m	SLG440-ER-0500-02-H1	103009189
	3 beams	800 mm	3 ... 20 m	SLG440-ER-0800-03-H1	103009190
	4 beams	900 mm	3 ... 20 m	SLG440-ER-0900-04-H1	103009191
	2 beams	500 mm	0,3 ... 12 m	SLG440AS-ER-0500-02	103007551
	3 beams	800 mm	0,3 ... 12 m	SLG440AS-ER-0800-03	103007554
	4 beams	900 mm	0,3 ... 12 m	SLG440AS-ER-0900-04	103007557
	2 beams	500 mm	0,3 ... 12 m	SLG445-ER-0500-02-01	103005424
	3 beams	800 mm	0,3 ... 12 m	SLG445-ER-0800-03-01	103005425
	4 beams	900 mm	0,3 ... 12 m	SLG445-ER-0900-04-01	103005426
	2 beams	500 mm	3 ... 20 m	SLG445-ER-0500-02-H1	103006524
	3 beams	800 mm	3 ... 20 m	SLG445-ER-0800-03-H1	103006527
	4 beams	900 mm	3 ... 20 m	SLG445-ER-0900-04-H1	103006530

# 16. Safety light grids / light curtains

## Safety monitoring modules



■ SRB-E-301ST

■ SRB-E-204ST

### Key Features

- Function STOP 0
- 1- or 2-channel control
- Start button / autostart
- 3 safety contacts
- 1 auxiliary contact

- Input expander module
- Monitoring of 4 sensors
- Start button / autostart
- 2 safety outputs
- 4 signalling outputs

### Technical features

<b>Electrical characteristics</b>		
<b>Operating voltage</b>	24 VDC -20% / +20%	24 VDC -20 % / +20 %
<b>Operating current</b>	0.1 A	0.125 A
<b>Max. switching capacity of the safety contacts</b>	3 x 230 V / 6 A	–
<b>of the safe semi-conductor outputs</b>	–	2 x 24 V / 2 A
<b>of the auxiliary contacts</b>	24 VDC / 1 A	–
<b>of the signalling outputs</b>	–	4 x 24 V / 100 mA
<b>Drop-out delay STOP 0</b>	< 10 ms	< 10 ms
<b>STOP 1</b>	–	–
<b>Mechanical data</b>		
<b>With removable terminals</b>	■	■
<b>Dimensions (H x W x D)</b>	22.5 x 98 x 115 mm	22.5 x 98 x 115 mm
<b>Ambient conditions</b>		
<b>Ambient temperature</b>	-25 °C ... +60 °C	-25 °C ... +60 °C

### Safety classification

<b>Standards</b>	ISO 13849-1, IEC 61508	ISO 13849-1, IEC 61508
<b>PL/SIL</b>	e/3	e/3
<b>Category</b>	4	4
<b>PFH</b>	≤ 1.25 x 10 <sup>-9</sup> /h	≤ 2.66 x 10 <sup>-9</sup> /h
<b>Certificates</b>		



To get detailed information about the products and certificates, visit [www.schmersal.net](http://www.schmersal.net).



■ SRB301MC



■ SRB301MA-24V



■ SRB202MSL

- Function STOP 0
- 1- or 2-channel control
- Start button / autostart
- 3 safety contacts
- 1 auxiliary contact

- Function STOP 0
- 1- or 2-channel control
- Start with edge detection
- 3 safety contacts
- 1 auxiliary contact

- Muting function
- 2 or 4 muting sensors
- Lamp current monitoring
- 2 safety contacts
- 2 signalling outputs

24 VDC -15% / +20% 24 VAC -15% / +10%	24 VDC -15% / +20% 24 VAC -15% / +10%	24 VDC -15% / +20%
0.1 A	0.1 A	0.24 A
3 x 230 VAC / 8 A	3 x 230 VAC / 8 A	2 x 24 VDC / 4 A
-	-	-
24 VDC / 2 A	24 VDC / 2 A	-
-	-	24 VDC / 0.05 A
< 20 ms	< 20 ms	< 20 ms
-	-	-
-	-	■
22.5 x 100 x 121 mm	22.5 x 100 x 121 mm	45 x 100 x 121 mm
-25 °C ... +60 °C	-25 °C ... +60 °C	-25 °C ... +45 °C

ISO 13849-1, IEC 61508	ISO 13849-1, IEC 61508	ISO 13849-1, IEC 61508
e/3	e/3	e/3
4	4	4
$\leq 2.0 \times 10^{-9}/h$	$\leq 2.0 \times 10^{-9}/h$	$\leq 2.0 \times 10^{-9}/h$

# 16. Safety light grids / light curtains

## Accessories

<p><b>SG.</b></p>  <ul style="list-style-type: none"> <li>■ Protective enclosure for SLC/SLG</li> <li>■ Protection field heights to 970 mm: <b>SG5</b></li> <li>to 1930 mm: <b>SG6</b></li> </ul> <p><b>103001594</b> <b>103001596</b></p>	<p><b>SGS...</b></p>  <ul style="list-style-type: none"> <li>■ Protective Cover for SG5 and SG6</li> <li>■ Protection field heights to 970 mm: <b>SGS5</b></li> <li>to 1930 mm: <b>SGS6</b></li> </ul> <p><b>103001595</b> <b>103001597</b></p>	<p><b>ULS-SG-1000</b> <b>103002489</b></p>  <ul style="list-style-type: none"> <li>■ Tilted mirror for SG5 and SG6</li> <li>■ Height: 1000 mm</li> <li>■ Width: 90 mm</li> </ul>
<p><b>MST-....</b></p>  <ul style="list-style-type: none"> <li>■ Mounting stands</li> <li>■ Base L/W 135x135 mm</li> <li>■ Height 500 ... 2000 mm</li> </ul>	<p><b>ULS-M-....</b></p>  <ul style="list-style-type: none"> <li>■ Deflecting mirror series M</li> <li>■ Mirror height 350 ... 1870 mm</li> <li>■ Included in delivery: tilted mirror and qty. 2 mounting brackets</li> </ul>	<p><b>MSD.</b></p>  <ul style="list-style-type: none"> <li>■ Vibration damper</li> <li>SLC/SLG type 2: <b>MSD2</b> <b>101207735</b></li> <li>SLC/SLG type 4: <b>MSD4</b> <b>101207754</b></li> <li>■ Included in delivery: Set with 8 pieces</li> </ul>
<p><b>NSR-0801</b> <b>101207759</b></p>  <ul style="list-style-type: none"> <li>■ Bus converter for parameterisation and diagnostics with PC/software</li> </ul>	<p><b>LF 50-11P</b> <b>101151758</b></p>  <ul style="list-style-type: none"> <li>■ Reflection light barrier</li> <li>■ Range 0 ... 5.5 m</li> </ul>	<p><b>EA5</b> <b>101211456</b></p>  <ul style="list-style-type: none"> <li>■ Alignment kit, laser beam 30 m</li> <li>■ Alignment kit for all SLC/SLG series</li> </ul>







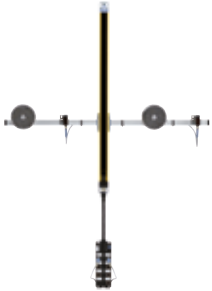


Detailed information can be found at [www.schmersal.net](http://www.schmersal.net).

## 16. Safety light grids / light curtains Accessories

PLS-..	Connector plug	Connector plug
 <ul style="list-style-type: none"> <li>■ Test rod</li> <li>30 mm diameter: <b>PLS-01</b></li> <li>14 mm diameter: <b>PLS-02</b></li> </ul>	 <ul style="list-style-type: none"> <li>■ Connector M12, straight, 5 pole</li> <li>■ Cable length</li> <li>5 m      <b>A-K5P-M12-S-G-5M-BK-2-X-A-1</b></li> <li>15 m     <b>A-K5P-M12-S-G-15M-BK-2-X-A-1</b></li> </ul>	 <ul style="list-style-type: none"> <li>■ Connector M12, straight</li> <li>■ Cable length</li> <li>4-pole      8-pole</li> <li>5 m         <b>KA-0804</b>      <b>KA-0904</b></li> <li>10 m        <b>KA-0805</b>      <b>KA-0905</b></li> <li>20 m        <b>KA-0808</b>      <b>KA-0908</b></li> </ul>
<b>KA-0974</b>	<b>101217615</b>	
 <ul style="list-style-type: none"> <li>■ Programming cable for SLC/SLG 440</li> <li>■ Y-splitter, M12, 8-pole with P-button</li> </ul>		

# 16. Safety light grids / light curtains

## Accessories – Muting

<b>MCU-02</b> <span style="float: right;">103005572</span>	<b>FR-20-PSM4</b> <span style="float: right;">103005570</span>	<b>KA-0976</b> <span style="float: right;">103005575</span>
 <ul style="list-style-type: none"> <li>■ Muting connection unit</li> <li>■ Release/override, transmitter unit (E), up to 4 muting sensors, muting lamp</li> </ul>	 <ul style="list-style-type: none"> <li>■ Muting sensor M8, 4-pole</li> <li>■ Reflection light barrier</li> <li>■ Range 0.1 ... 3.5 m</li> <li>■ Mounting brackets not included in the delivery</li> </ul>	 <ul style="list-style-type: none"> <li>■ Programming cable for SLC/SLG445</li> <li>■ P-button with connector M12, 12-pole</li> </ul>
<b>MUT-SET-L-01</b> <span style="float: right;">103006073</span>	<b>MUT-SET-L-02</b> <span style="float: right;">103006074</span>	<b>MUT-SET-T-01</b> <span style="float: right;">103006075</span>
 <ul style="list-style-type: none"> <li>■ Muting set L-version for mounting to the assembly stand MST</li> <li>■ Set complete with 2 muting sensors, MCU-02, attachment and cable</li> <li>■ Set without SLC/SLG445 and MST</li> </ul>	 <ul style="list-style-type: none"> <li>■ Muting set L-version for mounting to the sensor profile</li> <li>■ Set complete with 2 muting sensors, MCU-02, attachment and cable</li> <li>■ Set without SLC/SLG445 and MST</li> </ul>	 <ul style="list-style-type: none"> <li>■ Muting set T-version for mounting to the assembly stand MST</li> <li>■ Set complete with 2 muting sensors, MCU-02, attachment and cable</li> <li>■ Set without SLC/SLG445 and MST</li> </ul>
<b>MUT-SET-T-02</b> <span style="float: right;">103006076</span>	<b>MUT-SET-T-03</b> <span style="float: right;">103009195</span>	<b>MUT-SET-T-04</b> <span style="float: right;">103012263</span>
 <ul style="list-style-type: none"> <li>■ Muting set T-version for mounting to the sensor profile</li> <li>■ Set complete with 4 muting sensors, MCU-02, attachment and cable</li> <li>■ Set without SLC/SLG445 and MST</li> </ul>	 <ul style="list-style-type: none"> <li>■ Muting set T-version for mounting to the sensor profile</li> <li>■ Set complete with 2 muting sensors, MCU-02, attachment and cable</li> <li>■ Set without SLC/SLG445 and MST</li> </ul>	 <ul style="list-style-type: none"> <li>■ Muting set T-version for mounting to the assembly stand MST</li> <li>■ Set complete with 2 muting sensors, MCU-02, attachment and cable</li> <li>■ Set without SLC/SLG445 and MST</li> </ul>

Detailed information can be found at [www.schmersal.net](http://www.schmersal.net).



## 16. Safety light grids / light curtains

### Accessories – Mounting kits

MS-1000	MS-1030	MS-1038
 <ul style="list-style-type: none"> <li>■ Mounting kit for SLC/SLG220</li> <li>■ Included in delivery: brackets inc. screws            qty. 4 for: <b>MS-1000</b>            qty. 2 for: <b>MS-1072</b></li> </ul>	 <ul style="list-style-type: none"> <li>■ Mounting kit for SLC/SLG420</li> <li>■ Included in delivery: Angle with screws</li> <li>■ Set with 4 pieces</li> </ul>	 <ul style="list-style-type: none"> <li>■ Mounting kit for SLC/SLG420 IP69K and SLC/SLG425I IP69K in V4A</li> <li>■ Included in delivery: Angle with screws</li> <li>■ Set with 4 pieces</li> </ul>
MS-1051	MS-1031	MS-1073
 <ul style="list-style-type: none"> <li>■ Mounting kit lateral fixation for SLC/SLG420-425I</li> <li>■ Included in delivery: qty. 2 steel brackets, qty. 4 screws and qty. 4 T-slot nuts</li> </ul>	 <ul style="list-style-type: none"> <li>■ Mounting kit for deflecting mirror ULS-A4</li> <li>■ Included in delivery: Angle with screws</li> <li>■ Set with 2 pieces</li> </ul>	 <ul style="list-style-type: none"> <li>■ Mounting kit for deflecting mirror ULS-M</li> <li>■ Set with 2 pieces</li> </ul>
MS-1035	MS-1100	MS-1110
 <ul style="list-style-type: none"> <li>■ Mounting kit for SLC/SLG220 IP69K in V4A</li> <li>■ Included in delivery: Angle with screws</li> <li>■ Set with 4 pieces</li> </ul>	 <ul style="list-style-type: none"> <li>■ Mounting kit for SLC/SLG440COM and SLC/SLG445</li> <li>■ Included in delivery: Angle with screws</li> <li>■ Set with 4 pieces</li> </ul>	 <ul style="list-style-type: none"> <li>■ Mounting kit - Centre fixing for SLC/SLG440COM, SLC/SLG440 and SLC/SLG445</li> <li>■ Set with 2 pieces</li> </ul>

Detailed information can be found at [www.schmersal.net](http://www.schmersal.net).

# 17. Safety-monitoring modules

## Description

### Safety in System

Safety in system: According to this principle the Schmersal Group has been developing and manufacturing safety switchgear for decades, and such a system basically consists of a piece of safety switchgear and the associated safety-oriented signal evaluation.

For the safe signal evaluation the designer has a wide product range available. Next to universal safety relay modules e.g. for the instantaneous separation of the energy supply to potentially dangerous movement (Stop-0-category according to EN 60204-1), special safety components such as double acknowledgment, with differentiated shutdown behaviour and for potentially explosive atmospheres are included. In addition, the program includes safe standstill monitor and safe timing relays

Also for individual series of safety switchgear, which require a specific type of safe signal evaluation, there are dedicated safety relay modules available, e.g. for the monitoring of optoelectronic protective devices (AODPs) and tactile protection equipment (safety mats and bumpers).

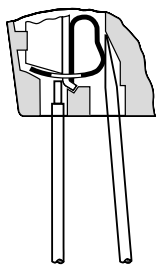
Depending on the external wiring, it is possible to make safe the protective equipment up to Performance Level e according to ISO 13849-1.

All the modules that meet the requirements of categories 3 and 4 acc. to ISO 13849-1, are set up redundantly. Also, there are many safety relay modules with pluggable screw or spring terminals already available. We can arrange a personal discussion to determine whether or not an adaptation of the modules to your needs is possible.

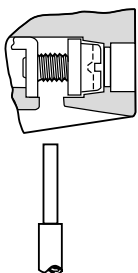
The series-connected relay NO contacts of the two positively driven relays implement the safe output contacts. Some modules have an Integrated System Diagnostics (ISD). The LED informs the user about the switching status of the evaluation circuit. In addition, the ISD detects and displays fault conditions. For the user, this means time and cost savings for troubleshooting and rectification.

Short-circuit proof auxiliary transistor outputs or auxiliary relay contacts can be used for messages, control lines and for visualisation purposes.

The program on the following pages presented in compact form, is divided into the product Series PROTECT SRB-E, SRB, AES, and FWS.



Cage clamps



Screw terminals



## Multi-functional safety relay modules SRB-E

### Area of application

The safety relay modules of the new PROTECT SRB-E series are used in safety circuits and are designed for installation in control cabinets. They serve as a means of safely evaluating signals from positive break position switches or safety sensors for safety functions on side sliding, hinged and removable safety guards as well as evaluating emergency stop control devices, safety solenoid switches and optoelectronic safety equipment (AOPDs).

All versions of the new family of safety relay modules can be used in applications up to Cat. 4 / PL e in accordance with ISO 13849-1 and up to SIL 3 in accordance with EN 62061 / IEC 61508.

A major advantage of the new SRB-E range is that, with each version, several dozen existing SRB modules can be used thanks to the multi-functionality. Each module can be configured for up to eleven different applications via a simple control element. All conventional safety sensors and electromechanical safety equipment can be monitored.

The drastic reduction in the number of variants and the clear display of the relevant functions makes it considerably easier for the machine manufacturer to select the right module for their particular application.

### Design and operating principle

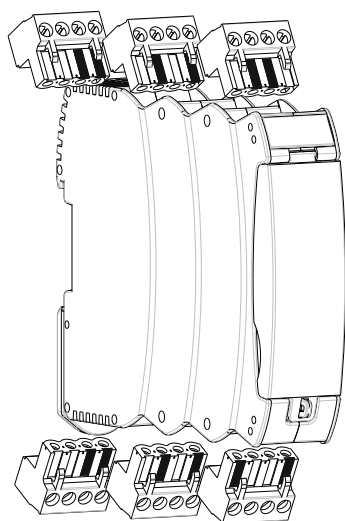
Functions such as start / reset monitoring or cross circuit monitoring, for example, can be set via a rotary switch. A second rotary switch is used to set the required drop-out delay time for the safety outputs.

Once the rotary switch has been used to set the configuration required and commissioning is complete, the transparent front panel cover can be secured using a conventional seal.

All PROTECT SRB-E versions are distinguished by very short response times in the requirements profile and signalise detailed diagnostic and status reports via LED displays.

### Design Execution

Another bonus feature of the new SRB-E range are the housings which have been optimised by Schmersal according to customer requirements. They are small, compact and feature a range of new, practical functions and properties such as plug-in termination with coding (see illustration on left).



# 17. Safety-monitoring modules

## Description

### Safety relay modules SRB

#### Area of application

The safety relay modules of the PROTECT SRB - series are for the safe evaluation of switching signals. Signalling devices are mounted to the side on slidable, rotating or removable safety equipment and can, for example be an EMERGENCY STOP button, an electromechanical position switch, a safety switch, or a solenoid interlock. Also for optoelectronic protective devices (AODPs) the PROTECT SRB modules are available.

The modules can be used universally, regardless of the manufacturer of the safety switchgear, which signals are monitored.

The PROTECT SRB-program also includes input and output extensions, as well as safety relay modules with intrinsically safe monitoring circuits (ignition protection "Intrinsically Safe" according to EN 60079-11) for the use of safety switchgear in potentially explosive atmospheres.

#### Design and operating principle

The PROTECT SRB-devices operate with conventional relay technology and are internally set up redundantly. They contain up to five safety relays with positively driven contacts. The series-connected NO contacts of the relay are the enabling paths.

All PROTECT SRB-modules share the same enclosure form of 22.5 and 45 mm overall width, developed by Schmersal, which allow easy installation with plug-in terminals and optional codeable connection terminals. The modules can be configured from the front, the 'snap on' resource identifiers (BMK) also increase the ease-of-use.

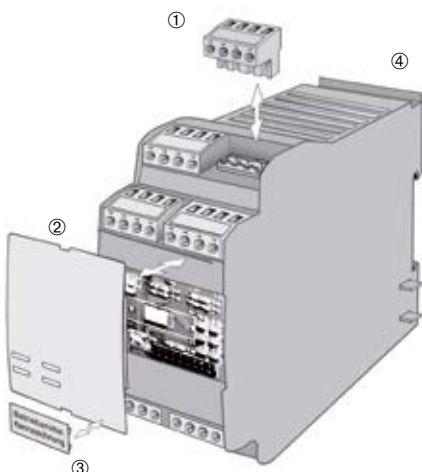
#### Design Execution

All PROTECT SRB's are constructively the same and have their own enclosure forms with 22.5 mm or 45 mm overall width, which in particular offer the following functional advantages;

- ① Pluggable and with coding optional via screw terminals (0.25 to 2.5 mm<sup>2</sup>), so that you can work with pre-fabricated cable harnesses faster and also servicing is quicker;
- ② Front-accessible setting options with a cover to protect against access for unauthorised third parties;
- ③ Snap-fit resource identifiers (BMK);
- ④ Can be used in applications with high ambient temperatures, thanks to the ventilation slits in the enclosure.

In addition, the enclosure design allows the following alternative connection techniques (on request):

- Connector with spring tension or screw terminals for conductor cross-sections 0.25 mm<sup>2</sup> to 2.5 mm<sup>2</sup>
- Irrespective of the connection technology, so-called TWIN – wire end ferrules are allowed, two (flexible) conductors for cable cross-sections of 0.5 mm<sup>2</sup> to 1.0 mm<sup>2</sup> can also be connected.





## Safety-monitoring modules AES

### Area of application

The safety modules of the AES series were developed for safe signal processing of non-contact safety-solenoid switches, such as the BNS series developed by Schmersal.

The use of safety-solenoid switches offers, compared to electromechanical safety switches, the advantage that the switchgear can be hidden when mounted (e.g. behind plastic covers). In addition, safety-solenoid switches because of their smooth surfaces are easy to clean. Depending on the design, they achieved very high degrees of protection, and a regular cleaning with steam, or with a high-pressure water jet as used in the food industry is possible, and this does not affect the service life of the safety sensors.

### Design and operating principle

The AES-modules monitor the status of the safety-solenoid switches. More precisely they monitor the reed-contact, that serves as the mechanical contacts, which are opened or closed by an external magnetic field.

At the same time the control unit functions also as a current limiter for the reed-contact. This is necessary, because a too high current can lead to the welding of the reed-contacts and therefore to a malfunction of the safety sensors. In addition, the evaluation units take into account the bounce of the reed-contacts and the possible residual vibration of the protection device, which can lead to a premature shutdown of the safety circuit.

Because of these additional functions, more AES module evaluation units are used in connection with safety-solenoid switches, which are designed specifically for this electro-sensitive safety switching devices.

Depending on the model, the AES-modules can be used in applications up to a Performance Level PL e in accordance with ISO 13849-1.

# 17. Safety-monitoring modules

## Description

### Standstill monitor / Fail-safe delay timer SRB-E / FWS / AZR

#### Area of application

The standstill monitors/fail-safe delay timers are for the reliable detection of the machine standstill or for reliable switch-on delay and activation of the connected solenoid interlocks. Depending on the external wiring in connection with a safety module it is possible to build protective equipment up to category 4, PL e in accordance with ISO 13849-1.

#### Design and operating principle

The standstill monitor and fail-safe delay timer are internally set up redundantly. They contain two safety relays with monitored positively driven contacts or fail-safe semiconductor outputs. The relay series-connected contacts are the output contacts. Only after machine standstill or a switch-on delay time can solenoid interlocks be actuated via the output contacts and the protective equipment be opened.

#### AZR 31 S1 series

The sensorless standstill monitor AZR 31 S1 is connected directly to a three-phase AC motor and measures the frequency of the induced voltage.

Once the three-phase motor is at a standstill ( $f = 0$ ) the enabling paths are closed.

The standstill monitor is equipped with LEDs for displaying the operating conditions.

#### FWS series

























With the standstill monitor Series HF the pulses generated by the rotation are evaluated, these are detected for example by inductive proximity switches. If the measured impulses are below the limit frequency, the enabling path is closed. The Series FWS standstill monitors are equipped with an integrated system diagnostics ISD for fast and simple error detection. The multifunction LED informs the user about the switching status of the standstill monitor and the connected pulse generator.

#### SRB-E-FWS-TS series

The SRB-E-FWS-TS versions include reliable standstill monitoring and fail-safe delay time functions in a single component. The SRB-E-402FWS-TS module version also offers the option of safety door monitoring contact or output monitoring. In the event of hazardous movements, this module version allows safety door opening to be blocked and, with the second safety function – safety door monitoring – movement to be reliably deactivated. In addition, fail-safe outputs prevent machine startup when a door is open.



## Overview

Series	Area of application	Page	
SRB-E	Emergency stop monitoring		218
	Safety guard monitoring		
	Pull-wire emergency stop switch, position switch		
	Safety sensors		
	AOPD monitoring		
	Input expander module		
	Two-hand control panels		
	Safe standstill monitoring		
	Fail-safe delay timer		
SRB	Emergency stop monitoring		224
	Safety guard monitoring		
	Pull-wire emergency stop switch, position switch		
	Safety sensors		
	AOPD monitoring		
	Switch mat monitoring		
	Two-hand control panels		
	Output expander module		
	Input expander module		
	Muting		
	Double acknowledgement/reset		
AES	Emergency stop monitoring		236
	Safety guard monitoring		
	Magnetic safety sensors BNS		
FWS / AZR	Safe standstill monitoring		244

# 17. Safety-monitoring modules

## SRB-E – Function overview and ordering details

PROTECT SRB-E Standard	Applications								Input signals				Start conditions	
													Start button / autostart	Start button with edge detection
SRB-E-201ST	■	■	■	■	■		■		▲	▲	▲	▲	▲	▲
SRB-E-201LC	■	■	■	■	■				▲	▲	▲	▲	▲	▲
SRB-E-301MC	■	■	■	■	■				▲	▲		▲	■	
SRB-E-301ST	■	■	■	■	■				▲	▲	▲	▲	▲	▲
SRB-E-212ST	■	■	■	■	■				▲	▲	▲	▲	▲	▲
SRB-E-322ST	■	■	■	■	■				▲	▲	▲	▲	▲	▲
SRB-E-232ST	■	■	■	■	■				▲	▲	▲	▲	▲	▲
SRB-E-204ST	■	■	■	■	■	■			▲	▲	▲	▲	▲	▲
SRB-E-204PE	■	■	■	■	■	■			▲	▲	▲	▲	■	
<b>Combination module for 2 protective devices</b>														
SRB-E-402ST	■	■	■	■	■		■		▲	▲	▲	▲	▲	▲
<b>Standstill monitoring – Time monitoring – Safety guard monitoring</b>														
SRB-E-302FWS-TS							■		▲	▲	▲	▲		
SRB-E-402FWS-TS	■	■	■	■	■		■		▲	▲	▲	▲	▲	▲

### Key







- Safety guard monitoring
- Magnetic safety sensors BNS
- Emergency stop monitoring
- Pull-wire emergency stop switch / position switch
- AOPD monitoring
- Two-hand control panels
- Safe standstill monitoring

- Input expander module for up to 4 sensors
- Input signals: 1-channel
- Input signals: 2-channel
- Input signals: antivalent
- Cross-wire detection
- Safety output contacts, STOP 0
- Safety output contacts, STOP 1

- Non-safe output contacts: Auxiliary contacts
- Non-safe output contacts: Semi-conductor
- Yes
- ▲ optional





	Output contacts						Operating voltage	Type designation	Material number
	Safe STOP 0		Safe STOP 1		not safe				
									
		2				1	24 VDC	SRB-E-201ST	103008067
		2				1	24 VDC	SRB-E-201LC	103009970
	3				1		24 VAC/DC	SRB-E-301MC	103014374
	3				1		24 VAC/DC	SRB-E-301ST	103007672
	2			1		2	24 VDC	SRB-E-212ST	103007222
	3			2	1	1	24 VDC	SRB-E-322ST	103008184
		2	3		1	1	24 VDC	SRB-E-232ST	103014308
		2				4	24 VDC	SRB-E-204ST	103009973
		2				4	24 VDC	SRB-E-204PE	103008070
	2	2			1	1	24 VDC	SRB-E-402ST	103007221
	2	1				2	24 VDC	SRB-E-302FWS-TS	103014754
	2	2			1	1	24 VDC	SRB-E-402FWS-TS	103014757

# 17. Safety-monitoring modules

## SRB-E – Overview of the series



■ SRB-E-201LC

■ SRB-E-201ST

### Key Features

- Function STOP 0
- 1- or 2-channel control
- Start button / autostart
- 2 safety outputs 2 A
- 1 signalling output

- Function STOP 0
- 1- or 2-channel control
- Start button / autostart
- 2 safety outputs 5.5 A
- 1 signalling output

### Technical features

Electrical characteristics		
Operating voltage	24 VDC -20 % / +20 %	24 VDC -20 % / +20 %
Operating current	0.1 A	0.1 A
Max. switching capacity of the safety contacts	-	-
of the safe semi-conductor outputs	2 x 24 V / 2 A	2 x 24 V / 5.5 A
of the auxiliary contacts	-	-
of the signalling outputs	1 x 24 V / 100 mA	1 x 24 V / 100 mA
Drop-out delay STOP 0	< 10 ms	< 10 ms
STOP 1	-	-
Mechanical data		
With removable terminals	■	■
Dimensions (H x W x D)	22.5 x 98 x 115 mm	22.5 x 98 x 115 mm
Ambient conditions		
Ambient temperature	-25 °C ... +60 °C	-25 °C ... +60 °C

### Safety classification

Standards	ISO 13849-1, IEC 61508	ISO 13849-1, IEC 61508
PL/SIL	e/3	e/3
Category	4	4
PFH	< 1.8 x 10 <sup>-10</sup> /h	< 1.8 x 10 <sup>-10</sup> /h
Certificates		



To get detailed information about the products and certificates, visit [www.schmersal.net](http://www.schmersal.net).



■ SRB-E-301MC



■ SRB-E-301ST



■ SRB-E-212ST



■ SRB-E-322ST

- Function STOP 0
- 1- or 2-channel control
- Start button / autostart
- 3 safety contacts
- 1 auxiliary contact

- Function STOP 0
- 1- or 2-channel control
- Monitored start button / autostart
- 3 safety contacts
- 1 auxiliary contact

- Function STOP 0/1
- 1- or 2-channel control
- 2 safety contacts, STOP 0
- 1 safety output STOP 1
- Drop-out delay 0 ... 30 s

- Function STOP 0/1
- 1- or 2-channel control
- 3 safety contacts, STOP 0
- 2 safety outputs STOP 1
- Drop-out delay 0 ... 30 s

24 VAC / VDC -20 % / +20 %	24 VAC / VDC -20 % / +20 %	24 VDC -20 % / +20 %	24 VDC -20 % / +20 %
0.1 A	0.1 A	0.125 A	0.1 A
3 x 230 V / 6 A	3 x 230 V / 6 A	2 x 230 V / 6 A	3 x 230 V / 5.5 A
-	-	1 x 24 V / 2 A	2 x 24 V / 2 A
1 x 24 V / 1 A	1 x 24 V / 1 A	-	1 x 24 V / 1 A
-	-	2 x 24 V / 100 mA	1 x 24 V / 100 mA
< 10 ms	< 10 ms	< 10 ms	< 10 ms
-	-	0 ... 30 s	0 ... 30 s
■	■	■	■
22.5 x 98 x 115 mm	22.5 x 98 x 115 mm	22.5 x 98 x 115 mm	22.5 x 98 x 115 mm
-25 °C ... +60 °C	-25 °C ... +60 °C	-25 °C ... +60 °C	-25 °C ... +60 °C

ISO 13849-1, IEC 61508	ISO 13849-1, IEC 61508	ISO 13849-1, IEC 61508	ISO 13849-1, IEC 61508
e/3	e/3	e/3	e/3
4	4	4	4
< 1.8 x 10 <sup>-10</sup> /h	< 1.8 x 10 <sup>-10</sup> /h	< 1.8 x 10 <sup>-10</sup> /h	< 1.8 x 10 <sup>-10</sup> /h

# 17. Safety-monitoring modules

## SRB-E – Overview of the series



■ SRB-E-232ST

■ SRB-E-204ST

### Key Features

- Function STOP 0/1
- 1- or 2-channel control
- 2 safety outputs STOP 0
- 3 safety contacts, STOP 1
- Drop-out delay 0 ... 30 s

- Function STOP 0
- Monitoring of 4 sensors
- Start button / autostart
- 2 safety outputs
- 4 signalling outputs

### Technical features

Electrical characteristics		
Operating voltage	24 VDC -20 % / +20 %	24 VDC -20 % / +20 %
Operating current	0.1 A	0.125 A
Max. switching capacity of the safety contacts	3 x 230 V / 5.5 A	–
of the safe semi-conductor outputs	2 x 24 V / 2 A	2 x 24 V / 2 A
of the auxiliary contacts	1 x 24 V / 1 A	–
of the signalling outputs	1 x 24 V / 100 mA	4 x 24 V / 100 mA
Drop-out delay	STOP 0	< 10 ms
	STOP 1	0 ... 30 s
		–
Mechanical data		
With removable terminals	■	■
Dimensions (H x W x D)	22.5 x 98 x 115 mm	22.5 x 98 x 115 mm
Ambient conditions		
Ambient temperature	-25 °C ... +60 °C	-25 °C ... +60 °C

### Safety classification

Standards	ISO 13849-1, IEC 61508	ISO 13849-1, IEC 61508
PL/SIL	e/3	e/3
Category	4	4
PFH	< 1.8 x 10 <sup>-10</sup> /h	< 1.8 x 10 <sup>-10</sup> /h
Certificates		



To get detailed information about the products and certificates, visit [www.schmersal.net](http://www.schmersal.net).



■ SRB-E-204PE



■ SRB-E-402ST



■ SRB-E-302FWS-TS



■ SRB-E-402FWS-TS

- Input expander module
- 1- or 2-channel control
- Monitoring of 4 sensors
- 2 safety outputs
- 4 signalling outputs

- 2x function STOP 0
- 2x 1- or 2-channel control
- 2x start button / autostart
- 2 safety contacts
- 2 safety outputs

- Standstill monitoring using 1 or 2 impulse sensors
- Additional standstill signal
- 2-channel time monitoring
- 2 safety contacts
- 1 safety output
- 2 signalling outputs

- Standstill monitoring using 1 or 2 impulse sensors
- Additional standstill signal
- 2-channel time monitoring
- 2-channel safety door monitoring
- 2 safety contacts
- 2 safety outputs
- 2 signalling outputs

24 VDC -20 % / +20 %	24 VDC -20 % / +20 %	24 VDC -20 % / +20 %	24 VDC -20 % / +20 %
0.125 A	0.15 A	0.125 A	0.15 A
–	2 x 230 V / 6 A	2 x 230 V / 6 A	2 x 230 V / 6 A
2 x 24 V / 2 A	2 x 24 V / 2 A	1 x 24 V / 2 A	2 x 24 V / 2 A
–	1 x 24 V / 1 A	–	1 x 24 V / 1 A
4 x 24 V / 100 mA	1 x 24 V / 100 mA	2 x 24 V / 100 mA	1 x 24 V / 100 mA
< 10 ms	< 10 ms	< 10 ms	< 10 ms
–	–	–	–
■	■	■	■
22.5 x 98 x 115 mm	22.5 x 98 x 115 mm	22.5 x 98 x 115 mm	22.5 x 98 x 115 mm
-25 °C ... +60 °C	-25 °C ... +60 °C	-25 °C ... +60 °C	-25 °C ... +60 °C

ISO 13849-1, IEC 61508	ISO 13849-1, IEC 61508	ISO 13849-1, IEC 61508	ISO 13849-1, IEC 61508
e/3	e/3	e/3	e/3
4	4	4	4
< 1.8 x 10 <sup>-10</sup> /h	< 1.8 x 10 <sup>-10</sup> /h	< 1.8 x 10 <sup>-10</sup> /h	< 1.8 x 10 <sup>-10</sup> /h

# 17. Safety-monitoring modules

## SRB – Function overview and ordering details

Series Standard	Applications												Output contacts			
													safe	not safe		
SRB301MC	■	■	■	■	■								3	0	1	0
SRB301MA-24V	■	■	■	■	■								3	0	1	0
SRB201LC	■	■	■		■								2	0	0	1
SRB301ST V.2	■	■	■	■	■								3	0	1	0
SRB301ST 230V	■	■	■										3	0	1	0
SRB301SQ 230V	■	■	■										3	0	1	0
SRB301HC/T	■	■				■							3	0	1	0
	■	■				■										
SRB301HC/R	■	■				■	■						3	0	1	0
	■	■				■	■									
SRB301AN	■	■	■	■									3	0	1	0
SRB211ST V.2	■	■	■	■	■								2	1	0	1
SRB211AN V.2	■	■	■	■									2	1	0	1
	■	■	■	■												
SRB324ST V.3	■	■	■	■	■								3	2	1	3

Series for special applications																				
SRB201ZH								■									2	0	1	0
SRB100DR														■			0	1	0	0
SRB202MSL															■		2	0	0	3

Input and output expander module																				
SRB402EM								■									4	0	2	0
PROTECT-PE	■	■	■	■	■									■			2	0	2	5
	■	■	■	■	■									■						
	■	■	■	■	■									■						
	■	■	■	■	■									■						
	■	■	■	■	■									■						

Key see next page



Input signals				Start conditions		Operating voltage	Type designation	Material number
				Start button / autostart	Start button with edge detection			
■	■		▲	■		24 VDC / 24 VAC	SRB301MC-24V	101190684
■	■		▲		■	24 VDC / 24 VAC	SRB301MA-24VAC/DC	101212415
■	■			■		24 VDC / 24 VAC	SRB201LC	101212555
■	■		▲	■	■	24 VDC / 24 VAC	SRB301ST-24VDC V.2	101195622
■	■		▲	■	■	48 ... 240 VAC	SRB301ST-230V	101170099
	■		■	■	■	48 ... 240 VAC	SRB301SQ-230V	101170100
	■		■	■		24 VDC / 24 VAC	SRB301HC/T-24V	101190593
	■		■	■		48 ... 240 VAC	SRB301HC/T-230V	101190595
	■		■	■	■	24 VDC / 24 VAC	SRB301HC/R-24V	101190594
	■		■	■	■	48 ... 240 VAC	SRB301HC/R-230V	101190596
		■	■	■	■	24 VDC / 24 VAC	SRB301AN	101162240
■	■		▲	■	■	24 VDC / 24 VAC	SRB211ST V.2	101208309
		■	■	■	■	24 VDC / 24 VAC	SRB211AN V.2	101209242
		■	■	■	■	24 VDC / 24 VAC	SRB211AN/PC-24V V.2	101209274
■	■		▲	■	■	24 VDC / 24 VAC	SRB324ST-24V	101195504

		■	■	■		24 VDC	SRB201ZH-24VDC	101163440
	■				■	24 VDC / 24 VAC	SRB100DR	101186279
	■		▲	■		24 VDC	SRB202MSL-24V	101181998

■	■			■		24 VDC / 24 VAC	SRB402EM-24V	101170840
■	■		▲	■		24 VDC	PROTECT-PE-02-SK	101210949
■	■		▲	■			PROTECT-PE-02	101210948
		■	■	■			PROTECT-PE-11-AN	101210944
		■	■	■			PROTECT-PE-11-AN-SK	101210946
		■	■	■			PROTECT-PE-11	101210943
		■	■	■			PROTECT-PE-11-SK	101210945

# 17. Safety-monitoring modules

## SRB – Function overview and ordering details

Combined module for 2 safety features	Safety function 1											Safety function 2								
	Applications					Input signals				Start conditions		Applications								
												Start button / autostart	Start button with edge detection							
SRB202C.	■	■	■			■					■									
						▲					■									
											■									
SRB400C.	■	■	■			■					■									
											■									

**Key**

- Safety guard monitoring
- Magnetic safety sensors BNS
- Emergency stop monitoring
- Pull-wire emergency stop switch / position switch
- AOPD monitoring
- Switch mat monitoring
- Output expander module
- Input expander module

- Two-hand control panels
- Safe standstill monitoring
- Muting
- Double acknowledgement/reset
- Safety output contacts, STOP 0
- Safety output contacts, STOP 1
- Not safe output contacts: Auxiliary contacts
- Not safe output contacts: Semi-conductor

- Input signals: 1-channel
- Input signals: 2-channel
- Input signals: antivalent
- Cross-wire detection
- Yes
- ▲ Optional





Input signals				Start conditions		Output contacts				Operating voltage	Type designation	Material number
				Start button / autostart	Start button with edge detection	safe		not safe				
		■	■	■		2	0	2	0	24 VDC	SRB202CA 24VDC	101176197
		■	■								SRB202CA/Q 24VDC	101176212
		■	■								SRB202CA/QT 24VDC	101176214
		■	■								SRB202CA/T 24VDC	101176199
▲	■										SRB202CS 24VDC	101176208
▲	■										SRB202CS/T 24VDC	101176210
		■	■									
		■	■	■		4	0	0	0	24 VDC	SRB400CA 24VDC	101176198
		■	■								SRB400CA/Q 24VDC	101176213
		■	■								SRB400CA/QT 24VDC	101176215
		■	■								SRB400CA/T 24VDC	101176201
▲	■										SRB400CS 24VDC	101176209
▲	■										SRB400CS/T 24VDC	101176211
		■	■									

# 17. Safety-monitoring modules

## SRB – Overview of the series



■ SRB301MC

■ SRB301MA-24V

### Key Features

- Function STOP 0
- 1- or 2-channel control
- Start button / autostart
- 3 safety contacts
- 1 auxiliary contact

- Function STOP 0
- 1- or 2-channel control
- Start with edge detection
- 3 safety contacts
- 1 auxiliary contact

### Technical features

Electrical characteristics		
Operating voltage	24 VDC -15% / +20% 24 VAC -15% / +10%	24 VDC -15% / +20% 24 VAC -15% / +10%
Operating current	0.1 A	0.1 A
Electronic fuse	■	■
Hybrid fuse	-	-
Pull-in delay (typ.)	100 ms	-
Automatic start with reset-button / start button	15 ms	15 ms
Max. switching capacity of the safety contacts	250 VAC / 8 A	250 VAC / 8 A
of the auxiliary contacts	24 VDC / 2 A	24 VDC / 2 A
of the signalling outputs	-	-
Switching capacity AC15, DC13		
STOP 0	230 VAC / 6 A, 24 VDC / 6 A	230 VAC / 6 A, 24 VDC / 6 A
STOP 1	-	-
Drop-out delay (typ.) in case of emergency stop	20 ms	10 ms
Mechanical data		
With removable terminals	-	-
Dimensions (H x W x D)	22.5 x 121 x 100 mm	22.5 x 121 x 100 mm
Ambient conditions		
Ambient temperature	-25 °C ... +60 °C	-25 °C ... +60 °C

### Safety classification

Standards	ISO 13849-1, IEC 61508	ISO 13849-1, IEC 61508
PL/SIL	e/3	e/3
Category	4	4
PFH	$\leq 2.0 \times 10^{-9}/h$	$\leq 2.0 \times 10^{-8}/h$
Certificates		



To get detailed information about the products and certificates, visit [www.schmersal.net](http://www.schmersal.net).



■ SRB201LC



■ SRB301ST V.2



■ SRB301ST-230V



■ SRB301SQ-230V

- Function STOP 0
- 1- or 2-channel control
- Start button / autostart
- 2 safety contacts
- 1 signalling output

- Function STOP 0
- 1- or 2-channel control
- Start button / autostart
- Start with edge detection
- 1 auxiliary contact

- Function STOP 0
- 1- or 2-channel control
- Start button / autostart
- Start with edge detection
- 1 auxiliary contact

- Function STOP 0
- 2-channel control
- Start button / autostart
- Start with edge detection
- 1 auxiliary contact

24 VDC -15% / +20%	24 VDC -15% / +20%	48 ... 240 VAC	48 ... 240 VAC
24 VAC -15% / +10%	24 VAC -15% / +10%		
0.1 A	0.1 A	0.12 A	0.12 A
■	■	■	■
-	■	-	-
100 ms	100 ms	30 ms	30 ms
-	15 ms	15 ms	-
250 VAC / 4 A	250 VAC / 8 A	250 VAC / 6 A	250 VAC / 6 A
-	24 VDC / 2 A	24 VDC / 2 A	24 VDC / 2 A
24 VDC / 100 mA	-	-	-
230 VAC / 2 A, 24 VDC / 1 A	230 VAC / 6 A, 24 VDC / 6 A	230 VAC / 6 A, 24 VDC / 6 A	230 VAC / 6 A, 24 VDC / 6 A
-	-	-	-
25 ms	25 ms	20 ms	30 ms
-	■	■	■
22.5 x 121 x 100 mm	22.5 x 121 x 120 mm	22.5 x 121 x 120 mm	22.5 x 121 x 100 mm
-25 °C ... +60 °C	-25 °C ... +60 °C	-25 °C ... +45 °C	-25 °C ... +45 °C

ISO 13849-1, IEC 61508	ISO 13849-1, IEC 61508	ISO 13849-1, IEC 61508	ISO 13849-1, IEC 61508
e/3	e/3	e	e
4	4	4	4
$\leq 2.0 \times 10^{-8}/h$	$\leq 2.0 \times 10^{-8}/h$	$\leq 2.0 \times 10^{-8}/h$	$\leq 2.0 \times 10^{-8}/h$
<b>TUV</b> EAC	<b>TUV</b> <b>us</b> EAC	<b>TUV</b> <b>us</b> EAC	<b>TUV</b> <b>us</b> EAC

# 17. Safety-monitoring modules

## SRB – Overview of the series



■ SRB301HC/T-24V

■ SRB301HC/T-230V

### Key Features

- Function STOP 0
- 2-channel control
- Start button / autostart
- Optional safety switch mats
- 1 auxiliary contact

- Function STOP 0
- 2-channel control
- Start button / autostart
- Optional safety switch mats
- 1 auxiliary contact

### Technical features

Electrical characteristics		
Operating voltage	24 VDC -15% / +20% 24 VAC -15% / +10%	48 ... 240 VAC
Operating current	0.1 A	0.1 A
Electronic fuse	■	■
Hybrid fuse	-	-
Pull-in delay (typ.)	200 ms	200 ms
Automatic start with reset-button / start button	-	-
Max. switching capacity of the safety contacts	250 VAC / 8 A	250 VAC / 8 A
of the auxiliary contacts	24 V DC / 2 A	24 V DC / 2 A
of the signalling outputs	-	-
Switching capacity AC15, DC13		
STOP 0	230 VAC / 6 A, 24 VDC / 6 A	230 VAC / 6 A, 24 VDC / 6 A
STOP 1		
Drop-out delay (typ.) in case of emergency stop	20 ms	20 ms
Mechanical data		
With removable terminals	■	■
Dimensions (H x W x D)	45 x 121 x 100 mm	45 x 121 x 100 mm
Ambient conditions		
Ambient temperature	-25 °C ... +60 °C	-25 °C ... +60 °C

### Safety classification

Standards	ISO 13849-1, IEC 61508	ISO 13849-1, IEC 61508
PL/SIL	e/3	e/3
Category	4	4
PFH	≤ 2.0 x 10 <sup>-8</sup> /h	≤ 2.0 x 10 <sup>-8</sup> /h

### Certificates



To get detailed information about the products and certificates, visit [www.schmersal.net](http://www.schmersal.net).



■ SRB301HC/R-24V



■ SRB301HC/R-230V



■ SRB301AN



■ SRB211ST V.2

- Function STOP 0
- 2-channel control
- Start with edge detection
- Optional two-hand control type IIIC
- 1 auxiliary contact

- Function STOP 0
- 2-channel control
- Start with edge detection
- Optional two-hand control type IIIC
- 1 auxiliary contact

- Function STOP 0
- 2-channel control, antivalent
- Start button / autostart
- Start with edge detection
- 1 signalling output

- Function STOP 0/1
- 1- or 2-channel control
- Start button / autostart
- Start with edge detection
- Drop-out delay 1 ... 30 s

24 VDC -15% / +20% 24 VAC -15% / +10%	48 ... 240 VAC	24 VDC -10% / +20% 24 VAC -15% / +10%	24 VDC -15% / +20% 24 VAC -15% / +10%
0.06 A	0.1 A	0.1 A	0.1 A
■	■	■	■
-	-	-	■
-	-	170 ms	120 ms
50 ms	50 ms	25 ms	10 ms
250 VAC / 8 A	250 VAC / 8 A	250 VAC / 6 A	250 VAC / 8 A (STOP 0) 250 VAC / 6 A (STOP 1)
24 V DC / 2 A	24 V DC / 2 A	24 VDC / 2 A	-
-	-	-	24 VDC / 100 mA
230 VAC / 2 A, 24 VDC / 1 A	230 VAC / 2 A, 24 VDC / 1 A	230 VAC / 6 A, 24 VDC / 6 A	230 VAC / 6 A, 24 VDC / 5 A 230 VAC / 3 A, 24 VDC / 2 A
20 ms	20 ms	15 ms	15 ms
■	■	-	■
45 x 121 x 100 mm	45 x 121 x 100 mm	22.5 x 121 x 100 mm	22.5 x 121 x 120 mm
-25 °C ... +60 °C	-25 °C ... +60 °C	-25 °C ... +45 °C	-25 °C ... +60 °C

ISO 13849-1, IEC 61508	ISO 13849-1, IEC 61508	ISO 13849-1, IEC 61508	ISO 13849-1, IEC 61508
e/3	e/3	e/3	e (STOP 0) / d (STOP 1)
4	4	4	4 (STOP 0) / 3 (STOP 1)
≤ 2.0 x 10 <sup>-8</sup> /h	≤ 2.0 x 10 <sup>-8</sup> /h	≤ 2.0 x 10 <sup>-8</sup> /h	≤ 2.0 x 10 <sup>-8</sup> /h (STOP 0) ≤ 2.0 x 10 <sup>-7</sup> /h (STOP 1)



# 17. Safety-monitoring modules

## SRB – Overview of the series



■ SRB211AN V.2

■ SRB324ST-24V V.3

### Key Features

- Function STOP 0/1
- 2-channel control, antivalent
- Start button / autostart
- Start with edge detection
- Drop-out delay 1 ... 30 s

- Function STOP 0/1
- 1- or 2-channel control
- Start button / autostart
- Start with edge detection
- Drop-out delay 1 ... 30 s

### Technical features

Electrical characteristics		
Operating voltage	24 VDC -15% / +20% 24 VAC -15% / +10%	24 VDC -15% / +20% 24 VAC -15% / +10%
Operating current	0.1 A	0.30 A
Electronic fuse	■	■
Hybrid fuse	■	■
Pull-in delay (typ.)	120 ms	250 ms
Automatic start		
with reset-button / start button	10 ms	20 ms
Max. switching capacity of the safety contacts	250 VAC / 8 A (STOP 0) 250 VAC / 6 A (STOP 1)	250 VAC / 8 A (STOP 0) 250 VAC / 6 A (STOP 1)
of the auxiliary contacts	-	24 VDC / 2 A
of the signalling outputs	24 VDC / 100 mA	24 VDC / 100 mA
Switching capacity AC15, DC13		
STOP 0	230 VAC / 6 A, 24 VDC / 5 A	230 VAC / 6 A, 24 VDC / 6 A
STOP 1	230 VAC / 3 A, 24 VDC / 2 A	230 VAC / 3 A, 24 VDC / 2 A
Drop-out delay (typ.) in case of emergency stop	15 ms	30 ms
Mechanical data		
With removable terminals	■	■
Dimensions (H x W x D)	22.5 x 121 x 120 mm	45 x 121 x 100 mm
Ambient conditions		
Ambient temperature	-25 °C ... +60 °C	-25 °C ... +60 °C

### Safety classification

Standards	ISO 13849-1, IEC 61508	ISO 13849-1, IEC 61508
PL	e (STOP 0) / d (STOP 1)	e (STOP 0) / d (STOP 1)
SIL	3 (STOP 0) / 2 (STOP 1)	3 (STOP 0) / 2 (STOP 1)
Category	4 (STOP 0) / 3 (STOP 1)	4 (STOP 0) / 3 (STOP 1)
PFH	≤ 2 x 10 <sup>-8</sup> /h (STOP 0) ≤ 2 x 10 <sup>-7</sup> /h (STOP 1)	≤ 2 x 10 <sup>-8</sup> /h (STOP 0) ≤ 2 x 10 <sup>-7</sup> /h (STOP 1)
Certificates		



To get detailed information about the products and certificates, visit [www.schmersal.net](http://www.schmersal.net).



■ SRB202CS/T-24V



■ SRB400CS-24V



■ SRB201ZH-24VDC



■ SRB100DR

- 2x function STOP 0
- 1- or 2-channel control
- Start button / autostart
- Start with edge detection
- 2 x 1 safety contact

- 2x function STOP 0
- 1- or 2-channel control
- Start button / autostart
- Start with edge detection
- 2x 2 safety contacts

- Function two-hand control type IIIC
- 2x 2-channel control
- 2 safety contacts
- 1 auxiliary contact

- Double acknowledgement/reset
- 2x start with edge detection
- Time monitoring 3 ... 30 s
- Adjustable time window
- 1 safety contact (impulse)

24 VDC -15% / +20%	24 VDC -15% / +20%	24 VDC -10% / +10%	24 VDC -15% / +20% 24 VAC -15% / +10%
0.18 A	0.18 A	0.05 A	0.14 A
■	■	■	■
-	-	-	-
-	-	50 ms	-
Switch-off level 1: 40 ms switch-off level 2: 0.5 sec.	Switch-off level 1: 40 ms switch-off level 2: 0.5 sec.	-	Dependent on time monitoring
250 VAC / 6 A	230 VAC / 4 A	250 VAC / 6 A	250 VAC / 8 A
24 VDC / 2 A	-	24 VDC / 2 A	-
-	-	-	-
230 VAC / 1.5 A, 24 VDC / 1.2 A	230 VAC / 1.5 A, 24 VDC / 1.2 A	230 VAC / 6 A, 24 VDC / 6 A	230 VAC / 3 A, 24 VDC / 2 A
50 ms	50 ms	30 ms	-
■	■	■	■
22.5 x 121 x 100 mm	22.5 x 121 x 100 mm	22.5 x 121 x 100 mm	22.5 x 121 x 100 mm
-25 °C ... +45 °C	-25 °C ... +45 °C	-25 °C ... +60 °C	-25 °C ... +60 °C

ISO 13849-1, IEC 61508	ISO 13849-1, IEC 61508	ISO 13849-1, IEC 61508	ISO 13849-1, IEC 61508
e	e	e	e
3	3	3	3
4	4	4	4
≤ 2.0 x 10 <sup>-8</sup> /h	≤ 2.0 x 10 <sup>-8</sup> /h	≤ 2.0 x 10 <sup>-8</sup> /h	≤ 2.0 x 10 <sup>-8</sup> /h



# 17. Safety-monitoring modules

## SRB – Overview of the series



■ SRB202MSL

■ SRB402EM

### Key Features

- Muting function
- 2 or 4 muting sensors
- Lamp current monitoring
- 2 safety contacts
- 2 signalling outputs

- Contact multiplication
- 4 safety contacts
- 2 auxiliary contacts
- Feedback contacts

### Technical features

Electrical characteristics		
Operating voltage	24 VDC -15% / +20%	24 VDC -15% / +20% 24 VAC -15% / +10%
Operating current	0.24 A	0.05 A
Electronic fuse	■	-
Hybrid fuse	-	-
Pull-in delay (typ.) Automatic start with reset-button / start button	200 ms - -	30 ms - -
Max. switching capacity of the safety contacts	24 VDC / 4 A	250 VAC / 6 A
of the auxiliary contacts	-	24 VDC / 2 A
of the signalling outputs	24 VDC / 0.05 A	-
Switching capacity AC15, DC13		
STOP 0	24 VDC / 1.2 A	230 VAC / 6 A, 24 VDC / 6 A
STOP 1		
Drop-out delay (typ.) in case of emergency stop	20 ms	25 ms
Mechanical data		
With removable terminals	■	■
Dimensions (H x W x D)	45 x 121 x 100 mm	22.5 x 121 x 120 mm
Ambient conditions		
Ambient temperature	-25 °C ... +45 °C	-25 °C ... +45 °C

### Safety classification

Standards	ISO 13849-1, IEC 61508	ISO 13849-1, IEC 61508
PL/SIL	e/3	e/3
Category	4	4
PFH	$\leq 2.0 \times 10^{-9}/h$	$\leq 2.0 \times 10^{-8}/h$
Certificates		



To get detailed information about the products and certificates, visit [www.schmersal.net](http://www.schmersal.net).





### ■ PROTECT-PE-..

- Input expander module
- 4 x 2-channel control
- 2 safety contacts
- 5 signalling outputs
- 2 auxiliary contacts

24 VDC -12% / +20%

0.1 A

■

-

10 ms

-

24 VDC / 2 A

24 VDC / 2 A

24 VDC / 100 mA

-

10 ms

■

65.5 x 61 x 126 mm

-25 °C ... +55 °C

ISO 13849-1, IEC 61508

d/2











3

$\leq 2 \times 10^{-7}/h$



# 17. Safety-monitoring modules

## AES – Function overview and ordering details

Series	Applications			Number of sensors that can be connected				Output contacts			Input signals				
				1	2	3	4 - 6								
AES 1337	■	■	■	■				3	0	1				■	■
AES 113x	■	■	■	■				1		2	▲	▲		■	▲
AES 116x	■	■	■		■			1						■	■
AES 123x	■	■	■	■				2	0	2	▲	▲		■	
AES 126x	■	■	■		■			2	0	2				■	■
AES 213x	■	■	■	■				1	0	2	▲	▲		■	▲
AES 233x	■	■	■	■				3	0	2	▲	▲		■	▲
AES 236x	■	■	■		■			3	0	2				■	■
AES 253x	■	■	■	■				4	1	2	▲	▲		■	▲
AES 2285	■	■	■				■	2	1	6				■	■
AES 3075			■				■	2	0	5		▲		■	▲
AES 118x	■	■	■			■		1	0	0				■	■
AES 1112			■		■			1					■	■	
AES 1102			■	■				1					■	■	

**Key**



Safety guard monitoring



Magnetic safety sensors BNS



Emergency stop monitoring



Safety output contacts, STOP 0



Not safe output contacts: Auxiliary contacts



Not safe output contacts: Semi-conductor



Input signals: 1-channel



Input signals: 2-channel



Input signals: 3-channel



Cross-wire detection



Yes



Optional



	Start conditions			Operating voltage	Type designation	Material number
	Start button / autostart	Start button with edge detection	Start-up test			
	■	▲		24 VDC / 24 VAC	AES 1337	101172210
	■		■	24 VDC	AES 1135	101170036
					AES 1136	101170038
					AES 1136-2185	101172221
	■		■	24 VDC	AES 1165	101170045
					AES 1165-2250	101170048
					AES 1166	101170046
	■		■	24 VDC	AES 1235	101170049
					AES 1236	101170050
	■		■	24 VDC	AES 1265	101170051
					AES 1266	101170052
	■		■	24 ... 230 VAC/DC	AES 2135	101180842
					AES 2136	101181677
	■		■	24 ... 230 VAC/DC	AES 2335	101180843
					AES 2336	101181678
	■		■	24 ... 230 VAC/DC	AES 2365	101181686
					AES 2366	101181687
	■		■	24 ... 230 VAC/DC	AES 2535	101180845
					AES 2536	101181681
	■			24 VDC	AES 2285	101172211
	■			24 VDC	AES 3075	101138576
	■			24 VDC	AES 1185	101131903
				24 VAC	AES 1185.3	101131929
	■			24 VDC	AES 1112	101128982
				110 VAC	AES 1112.1	101128798
				230 VAC	AES 1112.2	101128799
				24 VAC	AES 1112.3	101128800
				42 VAC	AES 1112.4	101126153
	■			24 VDC	AES 1102	101128981
				110 VAC	AES 1102.1	101128795
				230 VAC	AES 1102.2	101128796
				24 VAC	AES 1102.3	101128797
				42 VAC	AES 1102.4	101126152

# 17. Safety-monitoring modules

## AES – Overview of the series



■ AES 1337



■ AES 1135

### Key Features

- 2-channel control, antivalent
- Start button / autostart
- Start with edge detection
- 3 safety contacts
- 1 auxiliary contact

- 1- or 2-channel control
- Optionally antivalent
- Autostart or start-up test
- 1 safety contact
- Integral System Diagnostics

### Technical features

Electrical characteristics		
Operating voltage	24 VDC -10% / +20%	24 VDC ±15%
Operating current	0.1 A	0.2 A
Electronic fuse	■	-
Hybrid fuse	■	-
Pull-in delay (typ.)	120 ms	adjustable 0.1 / 1.0 second
Automatic start		
with reset-button / start button	30 ms	-
Max. switching capacity of the safety contacts	250 VAC / 6 A	250 VAC / 6 A
of the auxiliary contacts	-	-
of the signalling outputs	24 VDC / 100 mA	24 VDC / 100 mA
Switching capacity AC15, DC13	230 VAC / 6 A, 24 VDC / 6 A	230 VAC / 3 A, 24 VDC / 2 A
Drop-out delay (typ.) in case of emergency stop	20 ms	50 ms
Mechanical data		
With removable terminals	■	-
Dimensions (H x W x D)	22.5 x 121 x 100 mm	22.5 x 121 x 100 mm
Ambient conditions		
Ambient temperature	-25 °C ... +45 °C	0 °C ... +55 °C

### Safety classification

Standards	ISO 13849-1, IEC 61508	ISO 13849-1, IEC 61508
PL/SIL	e/3	d/2
Category	4	3
PFH	$5.0 \times 10^{-9}/h$	$1.6 \times 10^{-7}/h$
Certificates		



To get detailed information about the products and certificates, visit [www.schmersal.net](http://www.schmersal.net).



■ AES 1165



■ AES 1235









■ AES 1265

- 2-channel control, antivalent
- Autostart or start-up test
- 1 safety contact
- Integral System Diagnostics

- 1- or 2-channel control
- Optionally antivalent
- Autostart or start-up test
- 2 safety contacts
- Integral System Diagnostics

- 2-channel control, antivalent
- 2 Sensors
- Autostart or start-up test
- 2 safety contacts
- Integral System Diagnostics

24 VDC ±15%	24 VDC ±15%	24 VDC ±15%
0.2 A	0.2 A	0.2 A
-	-	-
-	-	-
adjustable 0.1 / 1.0 second	adjustable 0.1 / 1.0 second	adjustable 0.1 / 1.0 second
-	-	-
250 VAC / 6 A	250 VAC / 6 A	250 VAC / 6 A
-	-	-
24 VDC / 100 mA	24 VDC / 100 mA	24 VDC / 100 mA
230 VAC / 3 A, 24 VDC / 2 A	230 VAC / 3 A, 24 VDC / 2 A	230 VAC / 3 A, 24 VDC / 2 A
300 ms	50 ms	50 ms
-	-	-
22.5 x 121 x 100 mm	22.5 x 121 x 100 mm	22.5 x 121 x 100 mm
0 °C ... +55 °C	0 °C ... +55 °C	0 °C ... +55 °C

ISO 13849-1, IEC 61508	ISO 13849-1, IEC 61508	ISO 13849-1, IEC 61508
d/2	d/2	d/2
3	3	3
$1.6 \times 10^{-7}/h$	$1.6 \times 10^{-7}/h$	$1.6 \times 10^{-7}/h$
 	 	 

# 17. Safety-monitoring modules

## AES – Overview of the series



■ AES 2135



■ AES 2335

### Key Features

- 1- or 2-channel control
- Optionally antivalent
- Autostart or start-up test
- 1 safety contact
- Integral System Diagnostics

- 1- or 2-channel control
- Optionally antivalent
- Autostart or start-up test
- 3 safety contacts
- Integral System Diagnostics

### Technical features

Electrical characteristics		
Operating voltage	24 ... 230 VAC/DC	24 ... 230 VAC/DC
Operating current	0.3 A	0.3 A
Electronic fuse	-	-
Hybrid fuse	-	-
Pull-in delay (typ.)	adjustable 0.1 / 1.0 second	adjustable 0.1 / 1.0 second
Automatic start		
with reset-button / start button	-	-
Max. switching capacity		
of the safety contacts	250 VAC / 4 A	250 VAC / 6 A
of the auxiliary contacts	-	-
of the signalling outputs	24 VDC / 100 mA	24 VDC / 100 mA
Switching capacity AC15, DC13	230 VAC / 3 A, 24 VDC / 2 A	230 VAC / 3 A, 24 VDC / 2 A
Drop-out delay (typ.)	50 ms	30 ms
in case of emergency stop		
Mechanical data		
With removable terminals	-	-
Dimensions (H x W x D)	22.5 x 121 x 100 mm	45 x 121 x 100 mm
Ambient conditions		
Ambient temperature	0 °C ... +55 °C	0 °C ... +55 °C

### Safety classification

Standards	ISO 13849-1, IEC 61508	ISO 13849-1, IEC 61508
PL/SIL	d/2	d/2
Category	3	3
PFH	$1.9 \times 10^{-7}/h$	$1.9 \times 10^{-7}/h$
Certificates		



To get detailed information about the products and certificates, visit [www.schmersal.net](http://www.schmersal.net).



■ AES 2365



■ AES 2535



■ AES 2285

- 2-channel control, antivalent
- 2 Sensors
- Autostart or start-up test
- 3 safety contacts
- Integral System Diagnostics

- 1- or 2-channel control
- Optionally antivalent
- Autostart or start-up test
- 4 safety contacts
- Integral System Diagnostics

- 2-channel control, antivalent
- 6 Sensors
- Start button / autostart
- Start with edge detection
- 3 safety contacts

24 ... 230 VAC/DC	24 ... 230 VAC/DC	24 VDC -10% / +20%
0.3 A	0.3 A	0.125 A
-	-	■
-	-	-
adjustable 0.1 / 1.0 second	adjustable 0.1 / 1.0 second	120 ms
-	-	30 ms
250 VAC / 6 A	250 VAC / 6 A	250 VAC / 6 A
-	-	24 VDC / 2 A
24 VDC / 100 mA	24 VDC / 100 mA	24 VDC / 20 mA
230 VAC / 3 A, 24 VDC / 2 A	230 VAC / 3 A, 24 VDC / 2 A	230 VAC / 6 A, 24 VDC / 6 A
50 ms	30 ms	20 ms
-	-	■
45 x 121 x 100 mm	45 x 121 x 100 mm	45 x 121 x 100 mm
0 °C ... +55 °C	0 °C ... +55 °C	-25 °C ... +45 °C

ISO 13849-1, IEC 61508	ISO 13849-1, IEC 61508	ISO 13849-1, IEC 61508
d/2	d/2	d/2
3	3	3
$1.9 \times 10^{-7}/h$	$1.9 \times 10^{-7}/h$	$3.1 \times 10^{-7}/h$

# 17. Safety-monitoring modules

## AES – Overview of the series



■ AES 3075



■ AES 1185

### Key Features





- 2-channel control, antivalent
- 4 Sensors
- Start button / autostart
- 2 electronic safety contacts
- Integral System Diagnostics

- 2-channel control, antivalent
- 3 Sensors
- Autostart
- 1 safety contact
- Integral System Diagnostics

### Technical features

Electrical characteristics		
Operating voltage	24 VDC ± 15%	24 VDC ±15%
Operating current	0.3 A	0.2 A
Electronic fuse	-	-
Hybrid fuse	-	-
Pull-in delay (typ.)	adjustable 0.1 / 1.0 second	adjustable 0.1 / 1.0 second
Automatic start		
with reset-button / start button	-	-
Max. switching capacity		
of the safety contacts	24 VDC / 700 mA	250 VAC / 4 A
of the auxiliary contacts	-	-
of the signalling outputs	24 VDC / 250 mA	-
Switching capacity AC15, DC13	-	230 VAC / 2 A, 24 VDC / 2 A
Drop-out delay (typ.)	50 ms	50 ms
in case of emergency stop		
Mechanical data		
With removable terminals	-	-
Dimensions (H x W x D)	75 x 110 x 100 mm	22.5 x 110 x 75 mm
Ambient conditions		
Ambient temperature	0 °C ... +55 °C	0 °C ... +55 °C

### Safety classification

Standards	ISO 13849-1, IEC 61508	ISO 13849-1, IEC 61508
PL/SIL	d/2	d/2
Category	3	3
PFH	$3.3 \times 10^{-7}/h$	$1.6 \times 10^{-7}/h$
Certificates	 	 



To get detailed information about the products and certificates, visit [www.schmersal.net](http://www.schmersal.net).





■ AES 1102





■ AES 1112

- 3-channel control, antivalent
- 2 Sensors
- Autostart
- 1 safety contact






- 3-channel control, antivalent
- Autostart
- 1 safety contact

24 VDC ±15%	24 VDC ±15%
0.1 A	0.1 A
-	-
-	-
100 ms	100 ms
-	-
250 VAC / 4 A	250 VAC / 4 A
-	-
-	-
230 VAC / 1.5 A, 24 VDC / 1 A	230 VAC / 3 A, 24 VDC / 2 A
50 ms	50 ms
-	-
22.5 x 110 x 75 mm	22.5 x 110 x 75 mm
0 °C ... +55 °C	0 °C ... +55 °C





ISO 13849-1, IEC 61508	ISO 13849-1, IEC 61508
c/1	c/1
1	1
1.2 x 10 <sup>-6</sup> /h	1.2 x 10 <sup>-6</sup> /h
	

# 17. Safety-monitoring modules

## FWS / AZR – Function overview and ordering details

Series Standstill monitor	Application 	Standstill frequency				Integral System Diagnostics	Output contacts			
		Channel 1, 1 Hz Channel 2, 1 Hz	Channel 1, 2 Hz Channel 2, 2 Hz	Channel 1, 1 Hz Channel 2, 2 Hz	Sensorless standstill detection		safe 		not safe 	
FWS 1205	■			■		■	2	0	0	2
		■	■							
FWS 1206	■			■		■	2	0	0	2
		■								
FWS 2105	■			■		■	1	0	0	2
		■								
FWS 2505	■			■		■	4	0	1	2
		■								
AZR 31 S1	■				■		3	0	1	0

**Key**

-  Safe standstill monitoring
-  Safety output contacts, STOP 0
-  Safety output contacts, STOP 1
-  Not safe output contacts:  
Auxiliary contacts
-  Not safe output contacts:  
Semi-conductor
- Yes
- ▲ Optional



	Input signals (detect standstill)				Start conditions		Operating voltage	Type designation	Material number
	1 impulse generator	2 impulse generators	AC motors	Additional Standstill signal	Autostart	Feedback circuit			
	■	■			■		24 VDC	<b>FWS 1205A</b>	<b>101170053</b>
								<b>FWS 1205B</b>	<b>101170054</b>
								<b>FWS 1205C</b>	<b>101170056</b>
	■	■		■	■		24 VDC	<b>FWS 1206A</b>	<b>101170057</b>
								<b>FWS 1206C</b>	<b>101170058</b>
		■			■		24 ... 230 VAC/DC	<b>FWS 2105A</b>	<b>101181691</b>
								<b>FWS 2105C</b>	<b>101181696</b>
		■			■		24 ... 230 VAC/DC	<b>FWS 2505A</b>	<b>101181693</b>
								<b>FWS 2505C</b>	<b>101181697</b>
			■		■	■	24 VDC	<b>AZR31S1/24VDC</b>	<b>101049677</b>
							24 VAC	<b>AZR31S1/24VAC</b>	<b>101049678</b>
							115 VAC	<b>AZR31S1/115VAC</b>	<b>101049676</b>
							230 VAC	<b>AZR31S1/230VAC</b>	<b>101049665</b>

# 17. Safety-monitoring modules

## FWS / AZR – Overview of the series



■ FWS 1205

■ FWS 1206

### Key Features

- 2 Sensors (2-channel)
- Function Reset
- 2 safety contacts
- 2 signalling outputs

- 2 Sensors (2-channel)
- Additional standstill signal
- Function Reset
- 2 safety contacts
- 2 signalling outputs

### Technical features

#### Electrical characteristics

Operating voltage	24 VDC	24 VDC
Operating current	0.2 A	0.2 A
Electronic fuse	-	-
Sensors	NO contact, p-type	NO contact, p-type
Max. motor voltage	-	-
Max. input frequency	4000 Hz	4000 Hz
Min. impulse duration	125 µs	125 µs
Input signal "1"	10...30 VDC	10...30 VDC
Input signal "0"	0...2 VDC	0...2 VDC
Max. switching capacity of the safety contacts	250 VAC / 6 A	250 VAC / 6 A
of the auxiliary contacts	-	-
of the signalling outputs	24 VDC / 100 mA	24 VDC / 100 mA
Switching capacity AC15, DC13	230 VAC / 3 A, 24 VDC / 2 A	230 VAC / 3 A, 24 VDC / 2 A
<b>Mechanical data</b>		
With removable terminals	-	-
Dimensions (H x W x D)	22.5 x 121 x 100 mm	22.5 x 121 x 100 mm
<b>Ambient conditions</b>		
Ambient temperature	0 °C ... +55 °C	0 °C ... +55 °C

### Safety classification

Standards	ISO 13849-1, IEC 61508	ISO 13849-1, IEC 61508
PL/SIL	d/2	d/2
Category	3	3
PFH	$2.0 \times 10^{-7}/h$	$2.0 \times 10^{-7}/h$
Certificates		



To get detailed information about the products and certificates, visit [www.schmersal.net](http://www.schmersal.net).



■ FWS 2105



■ FWS 2505



■ AZR 31 S1

- 2 Sensors (2-channel)
- Function Reset
- 1 safety contact
- 2 signalling outputs

- 2 Sensors (2-channel)
- Function Reset
- 4 safety contacts
- 2 signalling outputs
- 1 auxiliary contact

- Sensorless monitoring (EMK)
- Motor voltage range  $\leq 400$  VAC
- Feedback circuit
- 3 safety contacts
- 1 auxiliary contact

24 ... 230 VAC/DC	24 ... 230 VAC/DC	24 VDC, 24 VAC, 115 VAC, 230 VAC
0,4 A	0,4 A	0.14 A
-	-	-
NO contact, p-type	NO contact, p-type	Sensorless monitoring (EMK)
-	-	400 VAC +10%
4000 Hz	4000 Hz	-
125 $\mu$ s	125 $\mu$ s	-
10...30 VDC	10...30 VDC	-
0...2 VDC	0...2 VDC	-
250 VAC / 6 A	250 VAC / 6 A	250 VAC / 6 A
-	24 VDC / 100 mA	24 VDC / 2 A
24 VDC / 100 mA	24 VDC / 100 mA	-
230 VAC / 3 A, 24 VDC / 2 A	230 VAC / 3 A, 24 VDC / 2 A	230 VAC / 6 A, 24 VDC / 6 A
-	-	■
45 x 121 x 100 mm	45 x 121 x 100 mm	45 x 121 x 73.2 mm
0 °C ... +55 °C	0 °C ... +55 °C	-25 °C ... +45 °C

ISO 13849-1, IEC 61508	ISO 13849-1, IEC 61508	ISO 13849-1, IEC 61508
d/2	d/2	e/3
3	3	4
$1.0 \times 10^{-7}/h$	$1.0 \times 10^{-7}/h$	$\leq 3.0 \times 10^{-8}/h$

## 18. Multifunctional safety controller

### Description

#### Multi-functional Safety Module with Program Selection Function

With the multi-functional PROTECT SELECT compact safety module, the engineer has greater flexibility during configuration of the safety device and its subsequent integration into the machine functions.

Four different programs are available. Each program can be precisely adapted – without any programming knowledge, simply with the menu and clear text messages – to the specific application case. This allows for example the release delay and the debounce time to be set individually, and numerous parameters such as the cross-wire monitoring to be set as required – a definite advantage in comparison to safety relay modules.

With every application program the user profits from numerous functions – such as:

- Connection of up to six dual-channel safety switching devices (with or without potential) up to PL e / SIL 3
- Safety semi-conductor and relay outputs with Stop 0 or Stop 1 (adjustable)
- Safe analogue monitoring of temperature and other process variables
- Free assignment of feedback circuit (EDM), start-up tests, periodic tests, discrepancy monitoring, auto start and manual start
- Cross-circuit detection via clock outputs
- Display of clear text messages during troubleshooting
- Input filter for safety devices with contact bounce



## Overview

Application program no.	1	2	3	4
Safety areas	1	2	1	1
<b>Inputs</b>				
Sensors with adjustable parameters	5	1+(2/3)*	6	2
Operating mode switch/enabling switch	■			
Muting function				■
Prioritised emergency stop		■	■	
RESET	1	3	2	1
Feedback circuit	1	2	1	1
<b>Relay and semi-conductor outputs</b>				
STOP 0	■	■	■	■
STOP 1 with fail-safe timer	■	■	■	■

\* This means that two safety areas are monitored: Area A with two sensors and area B with three sensors. A prioritised emergency stop is installed.

## Type designation

Series	Connection type	Type designation	Material number
<b>PROTECT SELECT</b>	Cage clamps	PROTECT SELECT-CC	101215377
	Screw terminals	PROTECT SELECT-SK	101218030

# 18. Multifunctional safety controller

## Description

### Application program 1

#### One safety area with operating mode switch/enabling switch

Program 1 allows you to connect up to four dual-channel safety switching devices, each of which can be bridged by means of operating mode switches and enabling switches. The program is ideally suited for hazardous areas where additional operating modes such as "setting-up mode" and "process monitoring" are facilitating tasks like setting up a machine or troubleshooting.

- Up to four safety switching devices can be bridged in conformance with standards
- Additional emergency stop function
- Direct control of a solenoid interlock (lock / unlock)

---

### Application program 2

#### Two safety areas

It is often useful to provide two separate safety areas for the particular workplaces on machines. Program 2 has been developed for this application. Here is an example from the packaging machine industry: The upper part of the machine is the work area, where packaging units are fed and packaged.

The lower part of the machine houses the material feed mechanism and the drive units. It must only be accessed for maintenance purposes, but must still be monitored with a safety switching device. This functionality can be achieved with application program 2 of PROTECT SELECT.

- For up to three safety switching devices per safety area
- Start/reset function for each safety area
- Feedback circuits (EDM) for each safety area
- Prioritised emergency stop with independent reset function





## Application program 3

### **One safety area with up to six safety switching devices**

Program 3 can be used for processing signals of up to six safety switching devices. The application program allows you to assign a separate reset function to one of the safety switching devices. This way, even the most complex safety areas which are monitored by several safety switching devices can be conveniently configured.

- For up to six safety switching devices
- Direct control of a solenoid interlock (lock / unlock)
- Prioritised emergency stop with independent reset function

---

## Application program 4

### **One safety area with safe bridging (muting)**

In order to ensure a material transport into and out of a safety area without provoking a machine stop, an optoelectronic safety device which is bridged automatically and for a limited amount of time should be used.

Usually a safety light-grid with integrated muting function is required for this purpose. When PROTECT SELECT is used, the muting function can be monitored directly via standard safety light-grids and sensors. In addition, signals from two other safety switching devices can be processed. This enables the user to realise a complete muting application with e.g. an additional guard door and an emergency stop function.

- Muting function with standard optoelectronic safety devices
- Flexible muting time parameterisation
- Connection of additional emergency stop function and safety switching device
- Direct control of a solenoid interlock (lock / unlock)

# 18. Multifunctional safety controller

## Overview of the series



### ■ PROTECT SELECT

#### Technical features

General data		
Start conditions	automatic or start button (optionally monitored)	
Start input available	■	
Feedback circuit available	■	
Start-up test available	■	
Automatic reset function	■	
Reset with edge detection	■	
Response time	<b>Switch on <sup>1)</sup></b>	<b>Shut-down</b>
safe digital output via digital / analogue input	< 45 ms / < 120 ms	< 30 ms / < 100 ms
safe relay output via digital / analogue input	< 65 ms / < 140 ms	< 50 ms / < 120 ms
Electrical characteristics		
Number of safety digital inputs	up to 18 x, application dependent	
Number of safety analogue inputs	2 x	
Number of safety digital outputs	2 x p-type, 1 x p/n-type, OEM: 2 x p/n-type	
Number of safety relay outputs	2 x with common centre-tap	
Number of signalling outputs	up to 4 x, application dependent	
Number of pulse outputs	3x	
Cross / short circuit detection possible	■	
Supply voltage	24 VDC - / +10% (stabilised PELV)	
Power consumption	max. 500 mA, plus load current	
Device fuse rating	3 A slow blow	
Mechanical data		
Connection type	Cage terminals or screw terminals	
Dimensions (H x W x D)	52.5 x 118 x 100 mm	
Ambient temperature	-25 °C ... +55 °C	

<sup>1)</sup> To the indicated switch-on times, the set stabilising time must be added.




To get detailed information about the products and certificates, visit [www.schmersal.net](http://www.schmersal.net).

# 18. Multifunctional safety controller

## Overview of the series



### Safety classification

<b>Standards</b>	ISO 13849-1, EN 62061, IEC 60947-5-1, IEC 61508
<b>PL</b>	up to e
<b>Category</b>	up to 4
<b>DC</b>	medium
<b>CCF</b>	> 65 points
<b>PFH-value</b>	$\leq 1.78 \times 10^{-9}/h$ (Valid for dual channel and 60% relay load)
<b>SIL</b>	up to 3
<b>SFF</b>	> 90 %
<b>Service life</b>	20 years
<b>Hardware fault tolerance</b>	1
<b>Demand rate</b>	High or continuous
<b>Certificates</b>	

# 19. Programmable modular safety controller

## Description

### Programmable modular safety controller PROTECT PSC1

The safety control system PSC1 consists of freely programmable compact safety controllers and I/O extension modules for reliable signal processing of EMERGENCY STOP switches, guard door switches, light grids and additional mechanical and electronic safety switchgear. Additionally there is the possibility via numerous functions to monitor axes. Using the universal communications interface a connection can be established to all the standard field bus systems.

- Safe logic control according to Annex IV of the Machinery Directive 2006/42/EC
- Connection for all standard safety relays up to PL e and SIL 3
- Modular expansion with up to 272 inputs / outputs
- Four secure 2 A p-switching semiconductor outputs, can be switched to secure pn-switching semiconductor outputs
- Freely programmable inputs / outputs, 2 A p-switching
- Safe drive monitoring according to EN 61800-5-2 (SDM – Safe Drive Monitoring)
- Up to 12 axes
- Universal communication interface:
  - Supports all standard fieldbus systems
  - Setting and resetting of fieldbus protocols by software
  - Safe remote I/Os via Ethernet Safety Device to Device Communication (SDDC)
  - Safe cross communication via Ethernet Safety Master to Master Communication (SMMC)
- Integrated Schmersal SD Bus connection to the standard field bus systems
- Safety functionalities up to SIL 3 according to IEC 61508 / IEC 62061, PL e and Cat. 4 according to ISO 13849-1

### Programming software SafePLC2

- Modern, object oriented application development environment
- Preconfigured elements for safe electronic and electromechanical switching devices
- Easy reuse of application code by macros
- Programming assistance by various search functions
- Simple signal tracking by different colour representation and status messages
- Safety functions are easy to configure thanks to practical libraries for logic elements, input elements, output elements, Safe Drive monitoring elements, SD bus and encoder elements
- Configurable user permissions



## System performance

### PSC1-C-10

- Up to 64 inputs/outputs possible
- Extendable by up to 2 I/O modules
- Monitoring for up to 2 axes
- Working memory for 800 instructions
- Response time 8 ms
- Fast Channel shutoff time 2 ms

### PSC1-C-100

- Up to 272 inputs/outputs possible
- Can be extended by up to 8 modules
- Monitoring for up to 12 axes
- Working memory for 3,000 instructions
- Response time 16 ms
- Fast Channel shutoff time 2 ms

## Compact controller PSC1-C-10

The PSC1-C-10 is a modular and freely programmable compact controller for safe signal processing of safety switchgear with the options of an integrated drive monitoring and/or a universal communications interface. The base version of the PSC1-C-10 controller has the following properties:

- 14 safe inputs up to PL e respectively SIL 3
- 4 / 2 fail-safe semiconductor outputs, with adjustable parameters:  
2 A p-switching or pn-switching
- 2 safe relay outputs for 24 VDC or 230 VAC, 2 A
- 2 signalling outputs, 250 mA
- 2 pulse outputs (clock outputs) for contact sensors
- SDHC card slot for storing application programs (optional)
- Modular expandable with up to 2 I/O expansion modules (central / decentral)
- Optional expansions: Universal communication interface, memory card (SDHC), safe drive monitoring
- Universal communication interface (optional)

## Compact controller PSC1-C-100

The PSC1-C-100 is a modular and freely programmable compact controller for safe signal processing of safety switchgear with the option of a universal communications interface. The base version of the PSC1-C-100 controller has the following properties:

- 14 safe inputs up to PL e respectively SIL 3
- 10 adjustable safe in-/outputs up to PL e respectively SIL 3, 2 A p-switching
- 10 adjustable safe in-/outputs up to PL e respectively SIL 3, 0.5 A p-switching
- 4 / 2 fail-safe semiconductor outputs with adjustable parameters:  
2 A p-switching or pn-switching
- 2 safe relay outputs for 24 VDC or 230 VAC, 2 A
- 2 signalling outputs, 250 mA
- 2 pulse outputs (clock outputs) for contact sensors
- SDHC card slot for storing application programs (optional)
- Modular expandable up to 8 I/O modules (central / decentral)
- Modular expandable with up to 6 safe drive monitoring modules (max. 12 axes)
- Universal communication interface (optional)

# 19. Programmable modular safety controller

## Description

### Safe I/O expansion modules

The I/O expansion modules can be freely used for the compact controllers and differ in their application:

1. Central applications  
in the same control cabinet directly stackable to the compact controller and communication takes place via the backwall bus
2. Decentral applications  
spatially separate control cabinet,  
communication to the compact controller is via Ethernet SDDC

#### **Modular compact controller PSC1-C-10 – 2 expansion modules / up to 64 I/Os**

The compact controller PSC1-C-10 can be expanded with up to 2 I/O expansion modules.

#### **Modular compact controller PSC1-C-100 – 8 expansion modules / up to 272 I/Os**

The compact controller PSC1-C-100 can be expanded with up to 8 I/O expansion modules.

**A mixture of centralised and decentralised applications are possible for both compact controller systems PSC1-C-10 and PSC1-C-100.**

### Safe remote I/O communication

#### **Ethernet SDDC (Safety Device to Device Communication)**

For the decentral application structure the I/O remote expansion module PSC1-E-37-14DI-4DO-2RO-RIO is available.

The local communication is realised via the Ethernet SDDC protocol.

The universal communication interface allows for operation with simultaneous safe cross-communication and remote I/O communication.

### Safe cross-communication

#### **Ethernet SMMC (Safety Master to Master Communication)**

The safe cross-communication is used as a composite of safety controllers to safely exchange data via the local Ethernet SMMC communication.

In a complete system (consisting of individual system components) with concatenated EMERGENCY STOP signals or concatenated signals from solenoid interlocks, this requirement can be solved by using the safe cross-communication.

The simultaneous operation of safe cross-communication and safe remote I/O communication and a field-bus communication for a superordinate control is possible.

- Safe cross-communication with up to 4 compact controllers PSC1
- Free mixing of compact controllers PSC1-C-10 and PSC1-C-100



## Universal communication interface

### Universal field-bus connection

Using the universal communication interface the required field-bus protocol can be manually selected via software.

Parallel to the active field-bus protocol, the local communication within the PSC1 control system can be realised via the Ethernet SDDC and SMMC.

### Integrated SD Bus gateway

Up to 31 Schmersal SD bus sensors can be connected and evaluated with their extended diagnostic data directly onto the compact controller PSC1.

In doing so, the universal communication interface takes on the task of a gateway to the respective field-bus protocols, set via software (communication to machine controller).

## Safe Drive Monitoring (SDM)

### Safe drive monitoring for up to 12 axes

For safe drive monitoring many safety features are supported:

- Safe shut-down: Safe Torque OFF (STO), Safe Break Control (SBC)
- Safe stopping: Safe Stop 1 (SS1), Safe Stop 2 (SS2), Safe Operating Stop (SOS)
- Safe movement: Safely-Limited Speed (SLS), Safe Speed Range (SSR), Safe Direction (SDI), Safely-Limited Acceleration (SLA), Safe Acceleration Range (SAR)
- Safe monitoring: Safe Speed Monitor (SSM), Safe Cam (SCA)
- Safe Positioning: Safely-Limited Position (SLP), Safely-Limited Increment (SLI), Safely Emergency Limit (SEL)

The drive monitoring is carried out depending on the application requirements, with one or two encoder systems. The following encoder signals are supported:

- 1 encoder system: TTL, SIN/COS, SSI (Gray code / binary code)
- 2 encoder systems: TTL, SIN/COS, SSI (Gray code / binary code), Resolver, HTL

### Safe drive monitoring of the compact controller PSC1-C-10

The safe drive monitoring with the compact controller PSC1-C-10 is realised by an integrated solution. Depending on the order option, the compact controller can safely monitor 1 or 2 axes with one encoder system.

### Safe drive monitoring of the compact controller PSC1-C-100 monitoring up to 12 axes with up to 6 expansion modules

A safe drive monitoring is realised with the compact controller PSC1-C-100 via extension modules. In this case, each axis can be safely monitored by one or two encoders. The drive monitoring modules are available for one or two encoders.

# 19. Programmable modular safety controller

## Technical specification

	Safe inputs	Safe programmable inputs / outputs	Safe semi-conductor outputs	Safe relay outputs	Signalling outputs	Pulse outputs (clock outputs)	Number of expansion modules, maximum	Safe drive monitoring, number of axes	Universal field bus communication	SDHC Memory Card	SD-Bus Gateway	Safe cross and remote I/O communication	Type designation	
<b>PSC1 - C - 10</b>	<b>Compact safety controllers</b>													
	14		4	2	2	2	2						<b>PSC1-C-10</b>	
	14		4	2	2	2	2		X	X	X	X	<b>PSC1-C-10-FB1</b>	
	14		4	2	2	2	2		X	X	X	X	<b>PSC1-C-10-FB2</b>	
	14		4	2	2	2	2			X			<b>PSC1-C-10-MC</b>	
	14		4	2	2	2	2	1					<b>PSC1-C-10-SDM1</b>	
	14		4	2	2	2	2	1	X	X	X	X	<b>PSC1-C-10-SDM1-FB1</b>	
	14		4	2	2	2	2	1	X	X	X	X	<b>PSC1-C-10-SDM1-FB2</b>	
	14		4	2	2	2	2	1		X			<b>PSC1-C-10-SDM1-MC</b>	
	14		4	2	2	2	2	2					<b>PSC1-C-10-SDM2</b>	
	14		4	2	2	2	2	2	X	X	X	X	<b>PSC1-C-10-SDM2-FB1</b>	
	14		4	2	2	2	2	2	X	X	X	X	<b>PSC1-C-10-SDM2-FB2</b>	
	14		4	2	2	2	2	2		X			<b>PSC1-C-10-SDM2-MC</b>	
	<b>Expansion modules</b>													
	12	10			2	2								<b>PSC1-E-31-12DI-10DIO</b>
	12	6		4	2	2								<b>PSC1-E-33-12DI-6DIO-4RO</b>
	<b>Remote I/O module</b>													
	14		4	2	2	2							X	<b>PSC1-E-37-14DI-4DO-2RO-RIO</b>





	Safe inputs	Safe programmable inputs / outputs	Safe semi-conductor outputs	Safe relay outputs	Signalling outputs	Pulse outputs (clock outputs)	Number of expansion modules, maximum	Safe drive monitoring, number of axes	Universal field bus communication	SDHC Memory Card	SD-Bus Gateway	Safe cross and remote I/O communication	Type designation	
<b>PSC1 - C - 100</b>	<b>Compact safety controllers</b>													
	14	20	4	2	6	2	8		X	X	X	X	<b>PSC1-C-100-FB1</b>	
	14	20	4	2	6	2	8		X	X	X	X	<b>PSC1-C-100-FB2</b>	
	14	20	4	2	6	2	8			X			<b>PSC1-C-100-MC</b>	
	<b>Expansion modules</b>													
	12	10			2	2								<b>PSC1-E-131-12DI-10DIO</b>
	12	6		4	2	2								<b>PSC1-E-133-12DI-6DIO-4RO</b>
	<b>Remote I/O module</b>													
	14		4	2	2	2						X		<b>PSC1-E-37-14DI-4DO-2RO-RIO</b>
	<b>Safe Drive Monitoring modules</b>													
	12								1					<b>PSC1-E-21-SDM1</b>
	12								1					<b>PSC1-E-22-SDM1-2</b>
	12								2					<b>PSC1-E-23-SDM2</b>
	12								2					<b>PSC1-E-24-SDM2-2</b>

# 20. AS-Interface Safety at Work

## Overview

### Description

#### Fast mounting, smooth installation

The AS interface enables fast mounting and installation of the components in the safety circuit. The safety switchgear devices are connected to each other and also to the AS-i master and the safety monitor via the yellow AS-i two-wire unshielded line. The power supply also comes from the AS-i unshielded 2-wire line. For AS-i slaves with higher power requirements, the black profile cable with 24 VDC auxiliary voltage is available. It is possible to connect not only operational but also fail-safe AS-i slaves to an AS-i master in mixed configuration. The safety functions are smoothly configured in the AS-i safety monitor through the ASIMON software.

#### Flexible use

Even after installation it is possible to change or enhance an AS-i safety system at any time. This applies to both safety switchgear add-ons and switchgear configuration (e.g. safety links, STOP category, filter times etc.).

#### A tried-and-tested "multilingual" system

With over 7 million safety switchgears in the field, AS-i Safety is the most successful safety bus in the world. In addition to the smooth wiring and configuration, the fact that AS-Interface can communicate with all conventional and commonly used bus systems, has considerably contributed to this success. For the user of the AS-i Safety System, this means that his system speaks many languages – for instance: PROFIBUS, PROFINET, EtherNet/IP and ModbusTCP. For AS-i safety there are also solutions for the field buses DeviceNet, CC-Link, CANopen and Sercos III. In this way, a universal application through different communication standards is enabled.

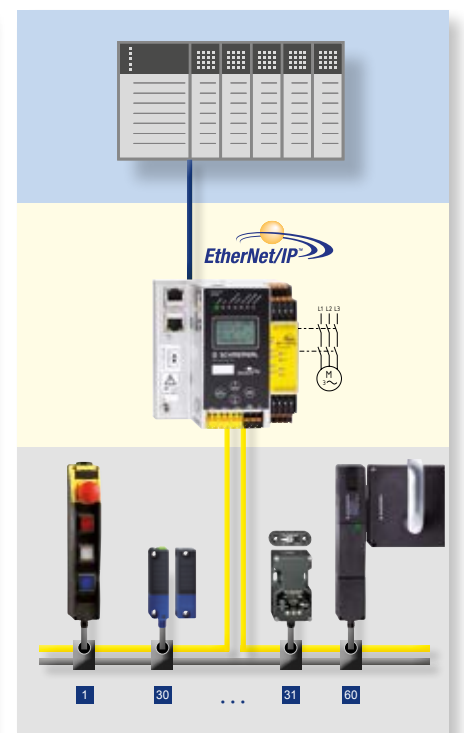
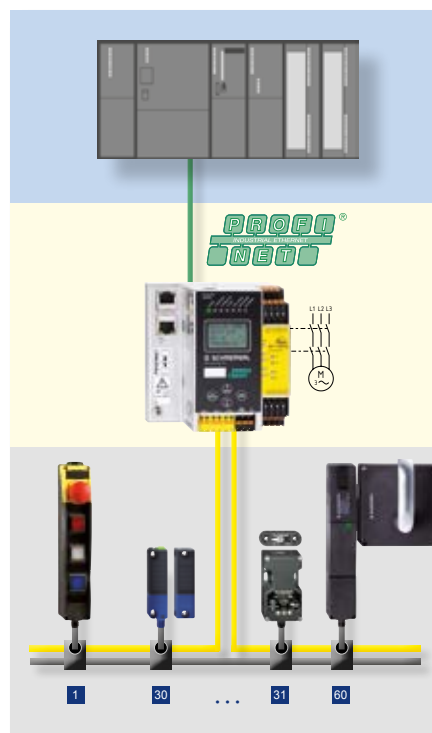
#### An economic solution - also for smaller machines

When does the installation of an AS-i Safety System generate return on investment? When purely considering the costs, cost advantages are already generated – depending on the application – as of six safety switchgear with 6 m connecting cable each – compared to the parallel wiring. In addition to that, there are advantages, which cannot be directly included in the cost savings. These advantages include the smooth extension possibilities, the increased flexibility for making changes to the safety circuit afterwards and the clearly enhanced diagnostic possibilities. Also the comfortable configuration through the safety monitor is an advantage, which is already featured by the smallest AS-i Safety System.





## System structure



## User advantages



- Individually scalable safety solutions for different machine sizes
- Smooth, fail-safe installation and interface connection of the safety switchgear through AS-Interface
- Comfortable configuration of the safety solution through the "ASIMON" Drag & Drop software
- Complete diagnostics of the entire safety circuit and all connected safety switchgear by the control system
- High operational safety through individually configurable safety-monitoring modules with multiple filter functions, e.g. for bouncing safety guards
- The safety functions can be easily changed or extended at a later date
- Cost-advantageous parallel wiring, approximately six switchgears each with a 6m connecting cable

## 20. AS-Interface Safety at Work

### Safety switches and sensors (Preferred types)

Series		Coding	Supply	Connection	Latching force	Actuation direction
AZ 16 AS		Standard coding	AS-i power	Connector M12, 4-pole	5 N	From head From top From below
					30 N	
RSS 260 AS		Standard coding	AS-i power	Connector M8, 4-pole	---	From side
		Individual coding				
RSS 36 AS		Standard coding	AS-i power	Connector M12, 4-pole	---	From side
		Individual coding			18 N	
					18 N	
BNS 260 AS		Standard coding	AS-i power	Cable with connector M12, 4-pole	---	From side
BNS 36 AS		Standard coding	AS-i power	Cable with connector M12, 4-pole	---	From side
BNS 16 AS		Standard coding	AS-i power	Connector M12, 4-pole	---	Front side
						Cover-side

### Emergency stop command devices (Preferred types)

Series		Design	Supply	Connection	Fitting Pos. 1	Pos. 2
NAS 311 AS		Emergency stop button	AS-i power	Connector M12, 4-pole	Emergency stop pushbutton	---
BDF 200 AS		Control panel with Emergency stop button	AS-i power	Connector M12, 4-pole	Emergency stop pushbutton	LMRD
						LTGN
					NHK pushbutton with protective collar	SWS20
						LMRD
						LTWH
SWS20						

A wide variety of other types can be found at [www.schmersal.net](http://www.schmersal.net) and in our AS-i brochure.

Sao/Sar	Housing material	Actuator	Type designation	Material number
---	Thermoplastic	AZ 15/16-B1 AZ 15/16-B2 AZ 15/16-B6	AZ 16 ST1-AS	101161809
			AZ 16 ST1-AS R	101167262
10/18 mm	Thermoplastic	RST260-1 RST16-1 RST-U-2	RSS260-ST-AS	103004638
			RSS260-I2-ST-AS	103004641
10/20 mm	Thermoplastic	RST 36-1 RST 36-1-R RST16-1 RST-U-2	RSS 36-ST-AS	103001531
			RSS 36-ST-AS-R	103001534
			RSS 36-I2-ST-AS	103001538
			RSS 36-I2-ST-AS-R	103001539
5/15 mm	Thermoplastic	BPS 260-1 BPS 260-2	BNS 260 STG-AS-R	101186155
			BNS 260 STG-AS-L	101186156
7/17 mm	Thermoplastic	BPS 36-1 BPS 36-2	BNS 36 STG-AS-R	101194956
			BNS 36 STG-AS-L	101194955
8/18 mm	Thermoplastic	BPS 16	BNS 16 ST1-AS-V	101177221
			BNS 16 ST1-AS-D	101177222


Pos. 3	Pos. 4	Indicator lamp	Type designation	Material number
---	---	---	NAS 311 ST1-AS	101173041
LTWH	LTBU	---	BDF200-ST1-AS-NH-LMRD-LTWH-LTBU	101214617
LTYE	LTWH	Red / Green	BDF200-ST1-AS-NH-LTGN-LTYE-LTWH-G24	103005880
LTWH	LTYE	---	BDF200-ST1-AS-NH-SWS20-LTWH-LTYE	103006605
LTWH	LTBU	---	BDF200-ST1-AS-NHK-LMRD-LTWH-LTBU	101215387
LTBU	LTWH	---	BDF200-ST1-AS-NHK-LTWH-LTBU-LTWH	101215280
LTWH	LTBU	Red / Green	BDF200-ST1-AS-NHK-SWS20-LTWH-LTBU-G24	101214618

## 20. AS-Interface Safety at Work

### Safety solenoid interlocks (Preferred types)

Series	Coding	Supply Interlocking solenoid	Connection	Latching force	Special features
<b>AZM 161 AS</b> 	Standard coding	AS-i power	Connector M12, 4-pole	30 N	Manual release
		AUX Power			Manual release
		Manual release			
		Manual release			
		Emergency exit			
<b>AZM 170 AS</b> 	Standard coding	AUX Power	Connector M12, 4-pole	30 N	Manual release
					Manual release
<b>AZM 200 AS</b> 	Standard coding	AUX Power	Connector M12, 4-pole	30 N	Manual release
					Manual release
					Manual release
<b>MZM 100 AS</b> 	Standard coding	AUX Power	Connector M12, 4-pole	30 ... 100 N	---
					Permanent magnet
					---
					Permanent magnet
<b>AZM 300 AS</b> 	Standard coding	AS-i power	Connector M12, 4-pole	25 N / 50 N	Manual release
	Individual coding				Manual release
	Standard coding				Emergency exit
	Individual coding				Manual release
	Standard coding	AUX Power			Manual release
	Individual coding				Emergency exit
	Standard coding				Manual release
	Individual coding				Emergency exit

## Safety light grids

Series	Type to EN 61496	Safety version	Supply	Connection	Special features
<b>SLG 440 AS</b> 	Type 4	Light grids SLG	AUX Power	Connector M12, 4-pole	Integrated AS-i Safety Module

A wide variety of other types can be found at [www.schmersal.net](http://www.schmersal.net) and in our AS-i brochure.




Guard locking monitored	Actuator monitored	Power to lock	Power to unlock	Type designation	Material number
	■	■		AZM 161 B-ST1-AS-RA	101209097
■			■	AZM 161 Z-ST1-AS-R	101209107
	■	■		AZM 161 B-ST1-AS-RAP	101209090
■			■	AZM 161 Z-ST1-AS-RP	101209109
■			■	AZM 161 Z-ST1-AS-RPT	101216398
	■	■		AZM 170 B ST-AS RAP	101210414
■	■		■	AZM 170 BZ ST-AS RP-2197	101211516
	■	■		AZM 200 B ST-T-AS AP	101194498
■	■		■	AZM 200 BZ ST-T-AS P	101194499
■			■	AZM 200 ST-T-AS P	101190921
	■	■		MZM 100 B ST-AS REAP	101198705
	■	■		MZM 100 B ST-AS REMAP	101209551
■		■		MZM 100 ST-AS REAP	101198704
■		■		MZM 100 ST-AS REMAP	101209553
	■	■		AZM300B-ST-AS-A	103005902
■			■	AZM300Z-ST-AS	103005916
■			■	AZM300Z-ST-AS-T	103009476
	■	■		AZM300B-I2-ST-AS-A	103005906
■			■	AZM300Z-I2-ST-AS	103005920
■			■	AZM300Z-I2-ST-AS-T	103011892
	■	■		AZM300B-ST-AS-A-P	103005899
■			■	AZM300Z-ST-AS-P	103005913
■			■	AZM300Z-ST-AS-P-T	103009481
	■	■		AZM300B-I2-ST-AS-A-P	103005904
■			■	AZM300Z-I2-ST-AS-P	103005918
■			■	AZM300Z-I2-ST-AS-P-T	103009483

Resolution	Protection field height	Range	Type designation	Material number
2 beams	500 mm	0,3...12 m	SLG440AS-ER-0500-02	103007551
3 beams	800 mm		SLG440AS-ER-0800-03	103007554
4 beams	900 mm		SLG440AS-ER-0900-04	103007557

## 20. AS-Interface Safety at Work

### Safety light curtains

Series	Type to EN 61496	Safety version	Supply	Connection	Special features	
SLC 440 AS		Type 4	Light curtain SLC	AUX Power	Connector M12, 4-pole	Integrated AS-i Safety Module



Resolution	Protection field height	Range	Type designation	Material number
14 mm	170 mm	0.3...7 m	SLC440AS-ER-0170-14	103007432
14 mm	250 mm	0.3...7 m	SLC440AS-ER-0250-14	103007438
14 mm	330 mm	0.3...7 m	SLC440AS-ER-0330-14	103007444
14 mm	410 mm	0.3...7 m	SLC440AS-ER-0410-14	103007450
14 mm	490 mm	0.3...7 m	SLC440AS-ER-0490-14	103007456
14 mm	570 mm	0.3...7 m	SLC440AS-ER-0570-14	103007462
14 mm	650 mm	0.3...7 m	SLC440AS-ER-0650-14	103007468
14 mm	730 mm	0.3...7 m	SLC440AS-ER-0730-14	103007474
14 mm	810 mm	0.3...7 m	SLC440AS-ER-0810-14	103007480
14 mm	890 mm	0.3...7 m	SLC440AS-ER-0890-14	103007486
14 mm	970 mm	0.3...7 m	SLC440AS-ER-0970-14	103007492
14 mm	1050 mm	0.3...7 m	SLC440AS-ER-1050-14	103007498
14 mm	1130 mm	0.3...7 m	SLC440AS-ER-1130-14	103007504
14 mm	1210 mm	0.3...7 m	SLC440AS-ER-1210-14	103007514
14 mm	1290 mm	0.3...7 m	SLC440AS-ER-1290-14	103007520
14 mm	1370 mm	0.3...7 m	SLC440AS-ER-1370-14	103007526
14 mm	1450 mm	0.3...7 m	SLC440AS-ER-1450-14	103007532
30 mm	170 mm	0.3...10 m	SLC440AS-ER-0170-30	103007435
30 mm	250 mm	0.3...10 m	SLC440AS-ER-0250-30	103007441
30 mm	330 mm	0.3...10 m	SLC440AS-ER-0330-30	103007447
30 mm	410 mm	0.3...10 m	SLC440AS-ER-0410-30	103007453
30 mm	490 mm	0.3...10 m	SLC440AS-ER-0490-30	103007459
30 mm	570 mm	0.3...10 m	SLC440AS-ER-0570-30	103007465
30 mm	650 mm	0.3...10 m	SLC440AS-ER-0650-30	103007471
30 mm	730 mm	0.3...10 m	SLC440AS-ER-0730-30	103007477
30 mm	810 mm	0.3...10 m	SLC440AS-ER-0810-30	103007483
30 mm	890 mm	0.3...10 m	SLC440AS-ER-0890-30	103007489
30 mm	970 mm	0.3...10 m	SLC440AS-ER-0970-30	103007495
30 mm	1050 mm	0.3...10 m	SLC440AS-ER-1050-30	103007501
30 mm	1130 mm	0.3...10 m	SLC440AS-ER-1130-30	103007511
30 mm	1210 mm	0.3...10 m	SLC440AS-ER-1210-30	103007517
30 mm	1290 mm	0.3...10 m	SLC440AS-ER-1290-30	103007523
30 mm	1370 mm	0.3...10 m	SLC440AS-ER-1370-30	103007529
30 mm	1450 mm	0.3...10 m	SLC440AS-ER-1450-30	103007535
30 mm	1530 mm	0.3...10 m	SLC440AS-ER-1530-30	103007538
30 mm	1610 mm	0.3...10 m	SLC440AS-ER-1610-30	103007541
30 mm	1690 mm	0.3...10 m	SLC440AS-ER-1690-30	103007544
30 mm	1770 mm	0.3...10 m	SLC440AS-ER-1770-30	103007547

## 21. SD-Interface Overview

### Description

#### Schmersal SD-Interface

The "Series Diagnostic" interface is used for transferring non-safe data where electronic safety switchgear is connected in series.

Safety sensors and interlocks that feature the SD interface can transfer extensive diagnostic data from the individual devices with series-wiring via the SD gateway and a field bus to a control system. Interlocks with series-wiring can also be locked or unlocked individually via the SD interface. There are additional control functions on some interlocks from Schmersal, such as the latching force adjustment on the MZM 100-SD.



Mixed installation of sensors and interlocks to form a safety function can be realised easily in the field with the SD interface. The diagnosis data and the actuating data are transferred in the SD interface in series via one wire from the SD gateway to the first SD slave, and from there to the next SD slave and so on. Addressing of the SD slaves takes place automatically. An SD gateway can communicate with up to 31 SD slaves. These 31 SD slaves can also be divided into several different safety functions.

#### Example SD data of solenoid interlock MZM 100-SD





Bit n°	Request byte	Response byte	Diagnosis message: Error warning	Diagnosis message: Error
Bit 0:	Magnet in, error reset	Safety output activated	Error output Y1	Error output Y1
Bit 1:	Latching force bit	Actuator detected	Error output Y2	Error output Y2
Bit 2:	Latching force bit	Solenoid interlock locked	Cross-wire short	Cross-wire short
Bit 3:	Latching force bit	–	Magnet temperature too high	Magnet temperature too high
Bit 4:	–	Input condition X1 and X2	Locking blocked or F < 500 N	incorrect or defective actuator
Bit 5:	–	–	Internal device error	Internal device error
Bit 6:	–	Error warning	Communication error between the field bus Gateway and the safety switching device	Violent separation of actuator and solenoid interlock (only in connection with "Solenoid interlock monitored")
Bit 7:	Error reset	Error (enabling path switched off)	Operating voltage too low	Operating voltage too low



## SD-Interface Gateways

	Description	Type designation	Material number
	SD-Gateway PROFIBUS	<b>SD-I-DP-V02</b>	<b>101192805</b>
	SD-Gateway PROFINET	<b>SD-I-U-PN</b>	<b>101209434</b>
	SD-Gateway Ethernet/IP	<b>SD-I-U-EIP</b>	<b>101210747</b>
	SD-Gateway EtherCAT	<b>SD-I-U-EC</b>	<b>103008132</b>
	SD-Gateway DeviceNET	<b>SD-I-U-DN</b>	<b>101209432</b>
	SD-Gateway CC-Link	<b>SD-I-U-CCL</b>	<b>101209435</b>
	SD-Gateway CANopen	<b>SD-I-U-CAN</b>	<b>101209433</b>
	SD-Gateway ModbusTCP	<b>SD-I-U-MT</b>	<b>101218029</b>

## SD-Interface Accessories

	Description	Type designation	Material number
	<ul style="list-style-type: none"> <li>Passive distribution module for SD interface</li> <li>4 device connections for electronic safety switchgear (see page 271)</li> </ul>	<b>PDM-SD-4CC-SD</b>	<b>103012161</b>
	<ul style="list-style-type: none"> <li>Passive field box IP67 for SD interface systems</li> <li>4 device connections for electronic safety switchgear (see page 271)</li> </ul>	<b>PFB-SD-4M12-SD</b>	<b>103013574</b>
	<ul style="list-style-type: none"> <li>Y-adapter</li> <li>2 couplings, 8-pole;</li> <li>1 connector, 8-pole</li> <li>M12 screw locking</li> </ul>	<b>CSS-Y-8P</b>	<b>101209416</b>
	<ul style="list-style-type: none"> <li>Terminating plug for Y-adapter</li> <li>1 connector, 8-pole</li> <li>M12 screw locking</li> </ul>	<b>CSS-Y-A-8P</b>	<b>101209414</b>

## 22. Passive distribution modules and fieldboxes

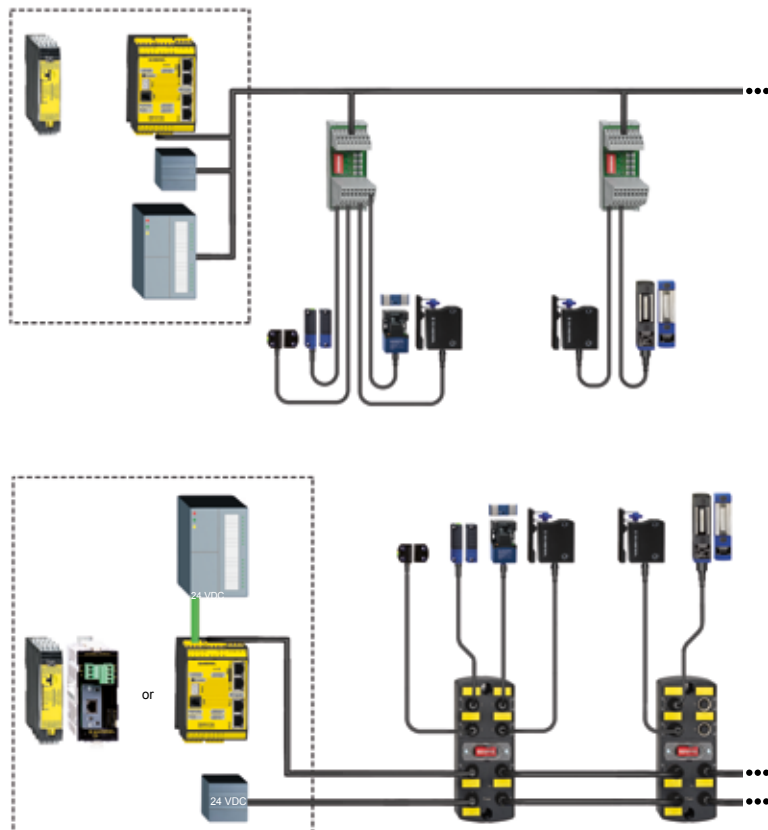
### Overview

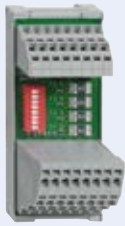
#### Area of application

The installation systems for fail-safe series-wiring are installation aids for fast, simple and thereby low cost wiring of safety switchgear in series.

The solutions come either as passive distribution modules or field boxes or as versions for parallel IO wiring or wiring with the SCHMERSAL SD interface. All versions are designed for mixed series connection of different types of electronic safety switchgear, such as sensors and interlocks.

Further information can be found in the brochure "Installation systems for fail-safe series-wiring".





## Passive distribution modules PDM







- Installation in a switching cabinet or in terminal boxes
- Mixed series connection possible of 1–4 electronic safety sensors or solenoid interlocks
- Several modules can be switched in series for more comprehensive safety functions
- Individual safeguarding of safety switchgear for every device connection with auto-reset fuses
- Can be configured easily via DIP switches
- Individual diagnosis and actuation of connected safety switchgear
- Wiring via spring-type terminals suitable for 0.25–1.5 mm<sup>2</sup> / 10 A
- Compact design with a width of only 45 mm on the profile rail
- Versions available for parallel IO wiring and for SD interface

## Passive fieldboxes PFB



- Heavy duty IP67 version for installation in the field
- Mixed series connection possible of 1–4 electronic safety sensors or solenoid interlocks
- Several field boxes can be switched in series for more comprehensive safety functions
- Individual safeguarding of safety switchgear for every device connection with auto-reset fuses
- Can be configured easily via DIP switches
- Individual diagnosis and actuation of connected safety switchgear
- Voltage supply via new M12 power plug with cross section of 1.5 mm<sup>2</sup> / 10 A
- Compact field box with dimensions 63 mm x 156 mm
- Versions available for parallel IO wiring and for SD interface

## 22. Passive distribution modules and fieldboxes

		Description	Type designation	Material number
Passive distribution modules PDM		Passive distribution module for IO parallel wiring of safety switchgear	<b>PDM-IOP-4CC-IOP</b>	<b>103012160</b>
		Passive distribution module for SD interface systems of safety switchgear	<b>PDM-SD-4CC-SD</b>	<b>103012161</b>
Passive field boxes PFB		Passive field box for IO parallel wiring of safety switchgear	<b>PFB-IOP-4M12-IOP</b>	<b>103013573</b>
		Passive field box for SD interface systems of safety switchgear	<b>PFB-SD-4M12-SD</b>	<b>103013574</b>

	Description	Length [m]	Type designation	Material number
<b>M12 power cables, 4-pin, straight, T-coded</b>	Pre-wired cable, female connector	5.0	A-K4P-M12P-S-G-5M-BK-2-X-T-4	103013430
		10.0	A-K4P-M12P-S-G-10M-BK-2-X-T-4	103013431
	Connecting cable, male / female connectors	3.0	V-SK4P-M12P-S-G-3M-BK-2-X-T-4	103013432
		5.0	V-SK4P-M12P-S-G-5M-BK-2-X-T-4	103013433
		7.5	V-SK4P-M12P-S-G-7,5M-BK-2-X-T-4	103013434
<b>M12 SD wires, IN and OUT signals, 4-pin, straight, A-coded</b>	Pre-wired cable, male connector	5.0	A-S4P-M12-S-G-5M-BK-2-X-A-4-69	103013421
		10.0	A-S4P-M12-S-G-10M-BK-2-X-A-4-69	103013422
	Connecting cable, male / male connectors	3.0	V-SS4P-M12-S-G-3M-BK-2-X-A-4-69	103013423
		5.0	V-SS4P-M12-S-G-5M-BK-2-X-A-4-69	103013424
		7.5	V-SS4P-M12-S-G-7,5M-BK-2-X-A-4-69	103013425
<b>M12 IO wires, 8-pin, straight, A-coded</b>	Pre-wired cable, male connector	5.0	A-S8P-M12-S-G-5M-BK-2-X-A-4-69	103013426
		10.0	A-S8P-M12-S-G-10M-BK-2-X-A-4-69	103013427
<b>M12 device connection cables, 8-pin, straight, A-coded</b>	Connecting cable, male / female connectors	0.5	V-SK8P-M12-S-G-0,5M-BK-2-X-A-4-69	101217786
		1.0	V-SK8P-M12-S-G-1M-BK-2-X-A-4-69	101217787
		1.5	V-SK8P-M12-S-G-1,5M-BK-2-X-A-4-69	101217788
		2.5	V-SK8P-M12-S-G-2,5M-BK-2-X-A-4-69	101217789
		3.5	V-SK8P-M12-S-G-3,5M-BK-2-X-A-4-69	103013428
		5.0	V-SK8P-M12-S-G-5M-BK-2-X-A-4-69	101217790
		7.5	V-SK8P-M12-S-G-7,5M-BK-2-X-A-4-69	103013429

	Description	Amount	Type designation	Material number
<b>Further accessories</b>	Adhesive seal for PFB / SFB	4	ACC-PFB-SFB-SLLAB-4PCS	103013919
	M12 protective caps for PFB / SFB	10	ACC-PFB-SFB-M12-PCAP-10PCS	103013920
	Labels for PFB / SFB	20	ACC-PFB-SFB-LAB-SN-20PCS	103013921



# tec.nicum

excellence in safety

## **tec.nicum – Developed services relating to the machine safety and industrial safety**

In the Schmersal Group, tec.nicum is the department for services relating to machine and industrial safety. The experts at tec.nicum implement all sorts of safety-related projects for their customers – from analysis of the status quo through planning and documentation to the final handover of the finished, norm-compliant machine.

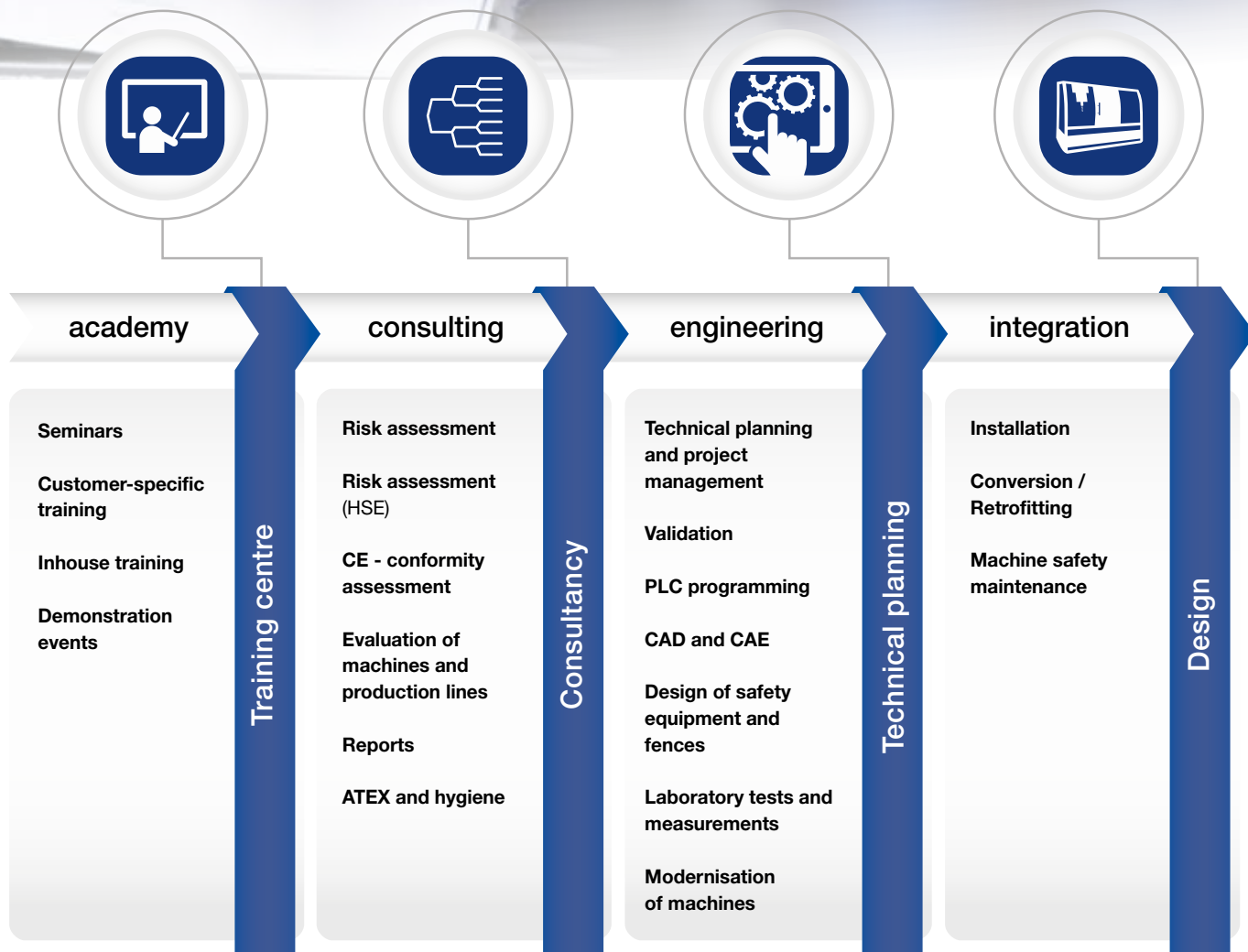
tec.nicum offers companies a global network of TÜV Rheinland -certified Functional Safety Engineers, so the services of the international tec.nicum organisation can be accessed quickly and easily wherever the customer is. tec.nicum experts not only have sound knowledge of the applicable regional and national guidelines, laws and ordinances, they also have technical know-how and extensive experience in project implementation.



The experts at tec.nicum aim to offer customers a capable, product and manufacturer-neutral consultancy on all the latest statutory guidelines and support them in designing their machines and workplaces to be norm-compliant.

For all of its consultancy and solution strategies, tec.nicum sets great store by objectivity.





The range at tec.nicum covers four columns: learning in the **academy section**, consultancy services in the **consultancy section**, designing safety solutions in the **engineering section** and practical implementation in the **integration section**.

The head office of the tec.nicum organisation, which operates all over the world, is in Wuppertal, Germany.

**Contact:**

**tec.nicum**

K.A. Schmersal GmbH & Co. KG  
 Möddinghofe 30  
 42279 Wuppertal  
 Phone: +49 202 6474-932  
 Telefax: +49 202 6474-100  
 E-Mail: info-de@tecnicum.com  
 www.tecnicum.com



## Pre-wired and connecting cables

### Connecting cables M8, 3 pole

Description	Length	Type designation	Part number:
Pre-wired cable with female plug	2.0 m	A-K3P-M8-R-G-2M-BK-2-X-X-4-69	103011093
Pre-wired cable with female plug	2.0 m	A-K3P-M8-S-G-2M-BK-2-X-X-4-69	103011091
Pre-wired cable with female plug	2.5 m	A-K3P-M8-R-G-2,5M-GY-1-X-X-4	103011095
Pre-wired cable with female plug	5.0 m	A-K3P-M8-S-G-5M-BK-2-X-X-4-69	103011092
Pre-wired cable with female plug	2.0 m	A-K3P-M8-S-W-2M-GY-1-2LP-X-4	103011096

### Connecting cables M8, 4 pole

Description	Length	Type designation	Part number:
Pre-wired cable with female plug	2.0 m	A-K4P-M8-R-G-2M-GY-1-X-X-4	103011341
Pre-wired cable with female plug	5.0 m	A-K4P-M8-R-G-5M-GY-1-X-X-4	103011342
Pre-wired cable with female plug	10.0 m	A-K4P-M8-R-G-10M-GY-1-X-X-4	103011343
Pre-wired cable with female plug	2.0 m	A-K4P-M8-R-W-2M-GY-1-X-X-4	103011344
Pre-wired cable with female plug	5.0 m	A-K4P-M8-R-W-5M-GY-1-X-X-4	103011345
Pre-wired cable with female plug	10.0 m	A-K4P-M8-R-W-10M-GY-1-X-X-4	103011346
Pre-wired cable with female plug	2.0 m	A-K4P-M8-S-G-2M-BK-2-X-X-1	101209946
Pre-wired cable with female plug	2.0 m	A-K4P-M8-S-G-2M-BK-2-X-X-4-69	103011340
Pre-wired cable with female plug	5.0 m	A-K4P-M8-S-G-5M-BK-2-X-X-1	101209942
Pre-wired cable with female plug	5.0 m	A-K4P-M8-S-G-5M-BK-2-X-X-2	103007356
Pre-wired cable with female plug	10.0 m	A-K4P-M8-S-G-10M-BK-2-X-X-2	103007357
Pre-wired cable with female plug	10.0 m	A-K4P-M8-S-G-10M-GY-1-X-X-4	103011347
Pre-wired cable with female plug	2.0 m	A-K4P-M8-S-W-2M-GY-1-X-X-4	103011348
Pre-wired cable with female plug	5.0 m	A-K4P-M8-S-W-5M-GY-1-X-X-4	103011349
Pre-wired cable with female plug	10.0 m	A-K4P-M8-S-W-10M-BK-1-X-X-1	101209997
Pre-wired cable with female plug	10.0 m	A-K4P-M8-S-W-10M-GY-1-X-X-4	103011350

### Connecting cables M8, 8 pole

Description	Length	Type designation	Part number:
Pre-wired cable with female plug	2.0 m	A-K8P-M8-S-G-2M-BK-2-X-A-4	103003638
Pre-wired cable with female plug	5.0 m	A-K8P-M8-S-G-5M-BK-2-X-A-4	103003639
Pre-wired cable with female plug	10.0 m	A-K8P-M8-S-G-10M-BK-2-X-A-4	103003640
Pre-wired cable with female plug	15.0 m	A-K8P-M8-S-G-15M-BK-2-X-A-4	103009042
Pre-wired cable with female plug	2.0 m	A-K8P-M8-S-W-2M-BK-2-X-A-4	103003641
Pre-wired cable with female plug	5.0 m	A-K8P-M8-S-W-5M-BK-2-X-A-4	103003642
Pre-wired cable with female plug	10.0 m	A-K8P-M8-S-W-10M-BK-2-X-A-4	103003643

## Pre-wired and connecting cables

### Connecting cables M12, 3 pole

Description	Length	Type designation	Part number:
Pre-wired cable with female plug	2.0 m	A-K3P-M12-S-G-2M-GY-1-X-A-4	103010722
Pre-wired cable with female plug	2.0 m	A-K3P-M12-S-W-2M-GY-1-2LP-A-4	103010718
Pre-wired cable with female plug	2.0 m	A-K3P-M12-S-W-2M-GY-1-X-A-4	103010724
Pre-wired cable with female plug	3.0 m	A-K3P-M12-S-W-3M-BK-2-2LP-A-4-69	103010720
Pre-wired cable with female plug	5.0 m	A-K3P-M12-S-W-5M-BK-1-2LP-A-1	101209929
Pre-wired cable with female plug	5.0 m	A-K3P-M12-S-W-5M-BK-2-2LP-A-4-69	103010721
Pre-wired cable with female plug	5.0 m	A-K3P-M12-S-W-5M-GY-1-X-A-4	103010723
Pre-wired cable with female plug	5.0 m	A-K3P-M12-S-W-5M-OG-1-2LP-A-2	101209931
Pre-wired cable with female plug	10.0 m	A-K3P-M12-S-W-10M-GY-1-2LP-A-4	103010719

### Connecting cables M12, 4 pole

Description	Length	Type designation	Part number:
Pre-wired cable with female plug	2.0 m	A-K4P-M12-S-G-2M-BK-2-X-A-1	101208522
Pre-wired cable with female plug	5.0 m	A-K4P-M12-S-G-5M-BK-1-X-A-4	103006760
Pre-wired cable with female plug	5.0 m	A-K4P-M12-S-G-5M-BK-2-X-A-1	101209918
Pre-wired cable with female plug	5.0 m	A-K4P-M12-S-G-5M-BK-2-X-B-1	101209938
Pre-wired cable with female plug	10.0 m	A-K4P-M12-S-G-10M-BK-2-X-A-1	101209937

### Connecting cables M12, 5 pole

Description	Length	Type designation	Part number:
Pre-wired cable with female plug	5.0 m	A-K5P-M12-S-G-5M-BK-2-X-A-4-69	103010816
Pre-wired cable with female plug	10.0 m	A-K5P-M12-S-G-10M-BK-2-X-A-4-69	103010818
Pre-wired cable with female plug	15.0 m	A-K5P-M12-S-G-15M-BK-2-X-A-4-69	103010820

### Connecting cables M12, 8 pole

Description	Length	Type designation	Part number:
Pre-wired cable with female plug	5.0 m	A-K8P-M12-S-G-5M-BK-1-X-A-4-69-VA	101210560
Pre-wired cable with female plug	10.0 m	A-K8P-M12-S-G-10M-BK-1-X-A-4-69-VA	103001389
Pre-wired cable with female plug	2.5 m	A-K8P-M12-S-G-2.5M-BK-2-X-A-4-69	103011415
Pre-wired cable with female plug	5.0 m	A-K8P-M12-S-G-5M-BK-2-X-A-4-69	103007358
Pre-wired cable with female plug	10.0 m	A-K8P-M12-S-G-10M-BK-2-X-A-4-69	103007359
Pre-wired cable with female plug	2.0 m	A-K8P-M12-S-W-2M-BK-2-X-A-2	101209969
Pre-wired cable with female plug	5.0 m	A-K8P-M12-S-W-5M-BK-1-X-A-4-69-VA	101210561

## Pre-wired and connecting cables

### Pre-wired cables M23, 8+1 pole

Description	Length	Type designation	Part number:
Pre-wired cable with female plug	5.0 m	A-K8+1P-M23-S-G-5M-BK-1-X-X-4	101209959
Pre-wired cable with female plug	10.0 m	A-K8+1P-M23-S-G-10M-BK-1-X-X-4	101209958
Pre-wired cable with female plug	15.0 m	A-K8+1P-M23-S-G-15M-BK-1-X-X-4	103001384

### Pre-wired cables M23, 12 pole

Description	Length	Type designation	Part number:
Pre-wired cable with female plug	5.0 m	A-K12P-M23-S-G-5M-GY-1-X-X-1-2568	101208520
Pre-wired cable with female plug	10.0 m	A-K12P-M23-S-G-10M-GY-1-X-X-1-2568	103007354
Pre-wired cable with female plug	10.0 m	A-K12P-M23-S-G-10M-GY-1-X-X-2	101210707

### Connecting cables M12, 4 pole

Description	Length	Type designation	Part number:
Connecting cable, male / female connectors	0.5 m	V-SK4P-M12-S-G-0.5M-BK-2-X-A-4-69	103002576
Connecting cable, male / female connectors	1.0 m	V-SK4P-M12-S-G-1.0M-BK-2-X-A-4-69	103002577
Connecting cable, male / female connectors	1.5 m	V-SK4P-M12-S-G-1.5M-BK-2-X-A-4-69	103002571
Connecting cable, male / female connectors	2.0 m	V-SK4P-M12-S-G-2.0M-BK-2-X-A-4-69	103002573
Connecting cable, male / female connectors	3.0 m	V-SK4P-M12-S-G-3.0M-BK-2-X-A-4-69	103002575

### Connecting cables M12, 8 pole

Description	Length	Type designation	Part number:
Connecting cable, male / female connectors	0.25 m	V-SK8P-M12-S-G-0.25M-BK-2-X-A-4-69	103014812
Connecting cable, male / female connectors	0.5 m	V-SK8P-M12-S-G-0,5M-BK-2-X-A-4-69	101217786
Connecting cable, male / female connectors	1.0 m	V-SK8P-M12-S-G-1M-BK-2-X-A-4-69	101217787
Connecting cable, male / female connectors	1.5 m	V-SK8P-M12-S-G-1,5M-BK-2-X-A-4-69	101217788
Connecting cable, male / female connectors	2.5 m	V-SK8P-M12-S-G-2,5M-BK-2-X-A-4-69	101217789
Connecting cable, male / female connectors	3.5 m	V-SK8P-M12-S-G-3,5M-BK-2-X-A-4-69	103013428
Connecting cable, male / female connectors	5.0 m	V-SK8P-M12-S-G-5M-BK-2-X-A-4-69	101217790
Connecting cable, male / female connectors	7.5 m	V-SK8P-M12-S-G-7,5M-BK-2-X-A-4-69	103013429
Connecting cable, male / female connectors	10.0 m	V-SK8P-M12-S-G-10M-BK-2-X-A-4-69	103013125
Connecting cable, male / female connectors, VA	0.5 m	V-SK8P-M12-S-G-0,5M-BK-2-X-A-2-69-VA	103008416
Connecting cable, male / female connectors, VA	1.0 m	V-SK8P-M12-S-G-1,0M-BK-2-X-A-2-69-VA	103008417
Connecting cable, male / female connectors, VA	1.5 m	V-SK8P-M12-S-G-1,5M-BK-2-X-A-2-69-VA	103008418
Connecting cable, male / female connectors, VA	2.0 m	V-SK8P-M12-S-G-2,0M-BK-2-X-A-2-69-VA	103008419
Connecting cable, male / female connectors, VA	2.5 m	V-SK8P-M12-S-G-2,5M-BK-2-X-A-2-69-VA	103008420
Connecting cable, male / female connectors, VA	3.0 m	V-SK8P-M12-S-G-3,0M-BK-2-X-A-2-69-VA	103008980
Connecting cable, male / female connectors, VA	5.0 m	V-SK8P-M12-S-G-5,0M-BK-2-X-A-2-69-VA	103008981

## Pre-wired and connecting cables

### Connector without cable M8 / 4 pole

Description	Length	Type designation	Part number:
Connector, female plug	---	S-K4P-M8-S-G-X-X-X-X-1	101210015

### Connector without cable M12 / 4 pole

Description	Length	Type designation	Part number:
Connector, female plug	---	S-K4P-M12-S-G-X-X-X-X-A	101209950
Connector, female plug	---	S-K4P-M12-S-G-X-X-X-X-B-1	101209976
Connector, female plug	---	S-K4P-M12-S-W-X-X-X-2LP-A-1	101209977

### Connector without cable M18 / 4 pole

Description	Length	Type designation	Part number:
Connector, female plug	---	S-K4P-M18-S-G-X-X-X-X-A-1	101209979
Connector, female plug	---	S-K4P-M18-S-W-X-X-X-X-A-1	101209984

### Connector without cable M23 / 8+1 pole

Description	Length	Type designation	Part number:
Connector, female plug, screw terminals	---	S-K8+1P-M23-S-G-X-X-X-X-X-4	101209970
Connector, female connector, crimping technology	---	S-K8+1P-M23-S-G-X-X-X-X-X-4 (CRIMP)	101209994

### Connector without cable DIN43650

Description	Length	Type designation	Part number:
Connector, female plug	---	S-K2P+PE-DIN43650-S-W-X-X-X-X-X-4	101209972
Connector, female plug	---	S-K3P+PE-DIN43650-S-W-X-X-X-X-X-3	101209974

## Pre-wired and connecting cables

### Connecting cable M8 to M12

Description	Length	Type designation	Part number:
4-pin connecting cable M8 to M12	1.0 m	V-SK4P-M12/M8-S-G-1M-BK-2-X-A-4	103003648
4-pin connecting cable M8 to M12	2.0 m	V-SK4P-M12/M8-S-G-2M-BK-2-X-A-4	103003649
4-pin connecting cable M8 to M12	3.0 m	V-SK4P-M12/M8-S-G-3M-BK-2-X-A-4	103003651
8-pin connecting cable M8 to M12	0.3 m	V-SK8P-M12/M8-S-G-0,3M-BK-2-X-A-4	103009832
8-pin connecting cable M8 to M12	2.0 m	V-SK8P-M12/M8-S-G-2M-BK-2-X-A-4	103003645
8-pin connecting cable M8 to M12	3.0 m	V-SK8P-M12/M8-S-G-3M-BK-2-X-A-4	103014814
8-pin connecting cable M8 to M12	5.0 m	V-SK8P-M12/M8-S-G-5M-BK-2-X-A-4	103014815

### Adapter cable for KAS devices to 5-pin M12

Description	Length	Type designation	Part number:
Adapter cable 8-pin M12 to 5-pin M12	0.5 m	VFB-SK5P/8P-M12-S-G-0,5M-BK-2-X-A-4	103013303

### PFB: M12 power cables, 4-pin, straight, T-coded

Description	Length	Type designation	Part number:
Pre-wired cable, female connector	5.0 m	A-K4P-M12P-S-G-5M-BK-2-X-T-4	103013430
Pre-wired cable, female connector	10.0 m	A-K4P-M12P-S-G-10M-BK-2-X-T-4	103013431
Connecting cable, male / female connectors	3.0 m	V-SK4P-M12P-S-G-3M-BK-2-X-T-4	103013432
Connecting cable, male / female connectors	5.0 m	V-SK4P-M12P-S-G-5M-BK-2-X-T-4	103013433
Connecting cable, male / female connectors	7.5 m	V-SK4P-M12P-S-G-7,5M-BK-2-X-T-4	103013434

### PFB: M12 SD cables, IN & OUT signals, 4-pin, straight, A-coded

Description	Length	Type designation	Part number:
Pre-wired cable, male connector	5.0 m	A-S4P-M12-S-G-5M-BK-2-X-A-4-69	103013421
Pre-wired cable, male connector	10.0 m	A-S4P-M12-S-G-10M-BK-2-X-A-4-69	103013422
Connecting cable, male / male connectors	3.0 m	V-SS4P-M12-S-G-3M-BK-2-X-A-4-69	103013423
Connecting cable, male / male connectors	5.0 m	V-SS4P-M12-S-G-5M-BK-2-X-A-4-69	103013424
Connecting cable, male / male connectors	7.5 m	V-SS4P-M12-S-G-7,5M-BK-2-X-A-4-69	103013425

### PFB: M12 IO cables, 8-pin, straight, A-coded

Description	Length	Type designation	Part number:
Pre-wired cable, male connector	5.0 m	A-S8P-M12-S-G-5M-BK-2-X-A-4-69	103013426
Pre-wired cable, male connector	10.0 m	A-S8P-M12-S-G-10M-BK-2-X-A-4-69	103013427

# Pre-wired and connecting cables

## Ordering code

(1)-(2)-(3)-(4)-(5)-(6)-(7)-(8)-(9)-(10)-(11)-(12)-(13)-(14)

No.	Option	Description	No.	Option	Description	
(1)	<b>A</b>	<b>Cable</b> Connecting cable		<b>2M</b>	2 m	
	<b>V</b>	Connecting cable		<b>2.5M</b>	2.5 m	
	<b>S</b>	Connector without cable		<b>3M</b>	3 m	
	<b>AIE</b>	Pre-wired cable Industrial Ethernet		<b>3.5M</b>	3.5 m	
	<b>VIE</b>	Connecting cable Industrial Ethernet		<b>5M</b>	5 m	
	<b>VFB</b>	Connecting cable for fieldboxes		<b>7.5M</b>	7.5 m	
(2)a		<b>Connection</b>		<b>10M</b>	10 m	
	<b>K</b>	Female plug		<b>15M</b>	15 m	
	<b>KK</b>	Female plug – female plug		<b>20M</b>	20 m	
	<b>S</b>	Connector	(7)	<b>X</b>	<b>Cable colour</b> Without	
	<b>SS</b>	Connector – connector		<b>BK</b>	Black	
<b>SK</b>	Connector – female plug	<b>GN</b>		Green		
		<b>GY</b>		Grey		
		<b>OG</b>		Orange		
(2)b		<b>Number of pins</b>	(8)	<b>X</b>	<b>Material of the cable</b> –	
	<b>3P</b>	3-pin		<b>1</b>	PVC	
	<b>4P</b>	4-pin		<b>2</b>	PUR	
	<b>5P</b>	5-pin		<b>3</b>	Rubber	
	<b>6P</b>	6-pin	(9)	<b>4</b>	Silicone	
	<b>7P</b>	7-pin		<b>X</b>	<b>Miscellaneous</b> Neutral	
	<b>8P</b>	8-pin		<b>1LP</b>	1x LED – PNP	
	<b>9P</b>	9-pin		<b>2LP</b>	2x LED – PNP	
	<b>10P</b>	10-pin		<b>3LP</b>	3x LED – PNP	
	<b>11P</b>	11-pin		(10)	<b>X</b>	<b>Coding</b> Without
	<b>12P</b>	12-pin			<b>A</b>	A-coding
	<b>23P</b>	23-pin			<b>B</b>	B-Coding
	<b>2P+PE</b>	2-pin +PE			<b>D</b>	D-coding
<b>3P+PE</b>	3-pin +PE	<b>T</b>	T-coding			
(3)		<b>Connection</b>	(11)	<b>1</b>	<b>Approval</b> Without	
	<b>M8</b>	M8 / round 8 mm		<b>2</b>	UL	
	<b>M12</b>	M12		<b>3</b>	CSA	
	<b>M18</b>	M18		<b>4</b>	USA/CAN	
	<b>M23</b>	M23				
	<b>M12P</b>	M12 Power				
	<b>RJ45</b>	RJ45				
<b>DIN43650</b>	DIN 43650					
(4)		<b>Interlocking device</b>	(12)	<b>69</b>	<b>Protection class</b> IP69	
	<b>R</b>	Latching interlocking		<b>69K</b>	IP69K	
(5)		<b>Design</b>	(13)	<b>VA</b>	<b>Material of thread/union nut</b> VA	
	<b>G</b>	straight				
(6)	<b>W</b>	angled	(14)	<b>075</b>	<b>Special cross section of cores</b> 0.75 mm <sup>2</sup>	
	<b>X</b>	Without				
	<b>0.3M</b>	0.3 m				
	<b>0.5M</b>	0.5 m				
	<b>1M</b>	1 m				
	<b>1.5M</b>	1.5 m				

### Note

The existing key type is used to translate the product type designation. Not all versions can be supplied.

## Appendix

### Product index – alphabetical

Series	Chapter	Page	Series	Chapter	Page	Series	Chapter	Page
<b>A</b>			<b>BNS 260</b>	6	112	<b>PS315</b>	4	83
<b>ADRR40</b>	8	144	<b>BNS 30</b>	6	117	<b>PS316</b>	4	83
<b>AES 1102</b>	17	243	<b>BNS 300</b>	6	117	<b>R</b>		
<b>AES 1112</b>	17	243	<b>BNS 303</b>	6	116	<b>RDRZ45RT</b>	8	142
<b>AES 1135</b>	17	238	<b>BNS 36</b>	6	113	<b>RF</b>	8	146
<b>AES 1165</b>	17	239	<b>BNS 40S</b>	6	112	<b>RSS 16</b>	6	122
<b>AES 1185</b>	17	242	<b>BNS-B20</b>	6	117	<b>RSS 260</b>	6	122
<b>AES 1235</b>	17	239	<b>C</b>			<b>RSS 36</b>	6	122
<b>AES 1265</b>	17	239	<b>CSS 180</b>	6	123	<b>S</b>		
<b>AES 1337</b>	17	238	<b>CSS 30</b>	6	123	<b>SD Gateway</b>	21	268
<b>AES 2135</b>	17	240	<b>CSS 300</b>	6	123	<b>SE-100C</b>	13	180
<b>AES 2285</b>	17	241	<b>CSS 30S</b>	6	123	<b>SE-304C</b>	13	180
<b>AES 2335</b>	17	240	<b>CSS 34</b>	6	123	<b>SE40</b>	13	176
<b>AES 2365</b>	17	241	<b>E</b>			<b>SE-400C</b>	13	181
<b>AES 2535</b>	17	241	<b>EDRR40RT</b>	8	138	<b>SE70</b>	13	176
<b>AES 3075</b>	17	242	<b>EDRRS40RT</b>	8	138	<b>SEP09</b>	12	169
<b>AF</b>	8	146	<b>EDRZ40RT</b>	8	138	<b>SEPG05</b>	12	168
<b>AZ 15</b>	1	12	<b>EF</b>	8	146	<b>SEPK02</b>	12	168
<b>AZ 16</b>	1	12	<b>F</b>			<b>SHGV</b>	3	60
<b>AZ 17</b>	1	12	<b>FWS 1205</b>	17	246	<b>SHGV/ESS21</b>	3	68
<b>AZ 201</b>	1	13	<b>FWS 1206</b>	17	246	<b>SLB240</b>	15	192
<b>AZ 3350</b>	1	13	<b>FWS 2105</b>	17	247	<b>SLB440</b>	15	192
<b>AZ 415</b>	1	13	<b>FWS 2505</b>	17	247	<b>SLB440-H</b>	15	192
<b>AZM 161</b>	2	32	<b>M</b>			<b>SLC240COM</b>	16	194
<b>AZM 170</b>	2	32	<b>MBGAC</b>	8	148	<b>SLC420</b>	16	196
<b>AZM 190</b>	2	32	<b>MBK</b>	8	148	<b>SLC420 IP69K</b>	16	196
<b>AZM 201</b>	2	33	<b>MZM 100</b>	2	33	<b>SLC420 M/S</b>	16	196
<b>AZM 300</b>	2	33	<b>N</b>			<b>SLC425I</b>	16	198
<b>AZM 400</b>	2	33	<b>NBG</b>	8	148	<b>SLC425I IP69K</b>	16	198
<b>AZM 415</b>	2	33	<b>NDRR50RT</b>	8	140	<b>SLC440</b>	16	202
<b>AZR 31 S1</b>	17	247	<b>NDRZ50RT</b>	8	140	<b>SLC440COM</b>	16	202
<b>B</b>			<b>P</b>			<b>SLC445</b>	16	202
<b>BDF100</b>	9	152	<b>PDM</b>	22	270	<b>SLG240COM</b>	16	194
<b>BDF200</b>	9	153	<b>PFB</b>	22	270	<b>SLG420</b>	16	197
<b>BNS 120</b>	6	116	<b>PROTECT PSC1-C-10</b>	19	258	<b>SLG420 IP69K</b>	16	197
<b>BNS 16</b>	6	113	<b>PROTECT PSC1-C-100</b>	19	259	<b>SLG422-P</b>	16	197
<b>BNS 180</b>	6	116	<b>PROTECT SELECT</b>	18	252	<b>SLG425I</b>	16	198
<b>BNS 250</b>	6	112	<b>PROTECT-PE</b>	17	235	<b>SLG425I IP69K</b>	16	199
			<b>PS116</b>	4	82	<b>SLG425-IP</b>	16	199
			<b>PS215</b>	4	82	<b>SLG440</b>	16	203
			<b>PS216</b>	4	82	<b>SLG440COM</b>	16	203
			<b>PS226</b>	4	83	<b>SLG445</b>	16	203



## Appendix

### Product index – alphabetical

Series	Chapter	Page	Series	Chapter	Page
SMS 4	14	184	TESK	5	104
SMS 5	14	184	TESZ	5	104
SRB100DR	17	233	TFH 232	11	164
SRB201LC	17	229	TV.S 335	5	102
SRB201ZH-24VDC	17	233	TV.S 355	5	102
SRB202CS/T-24V	17	233	Z		
SRB202MSL	17	234	ZQ 700	7	132
SRB211AN V.2	17	232	ZQ 900	7	132
SRB211ST V.2	17	231	ZSD5	10	160
SRB301AN	17	231	ZSD6	10	160
SRB301HC/R-230V	17	231			
SRB301HC/R-24V	17	231			
SRB301HC/T-230V	17	230			
SRB301HC/T-24V	17	230			
SRB301MA-24V	17	228			
SRB301MC	17	228			
SRB301SQ-230V	17	229			
SRB301ST-230V	17	229			
SRB301ST-V2	17	229			
SRB324ST-24V V.3	17	232			
SRB400CS-24V	17	233			
SRB402EM	17	234			
SRB-E-201LC	17	220			
SRB-E-201ST	17	220			
SRB-E-204PE	17	223			
SRB-E-204ST	17	222			
SRB-E-212ST	17	221			
SRB-E-232ST	17	222			
SRB-E-301MC	17	221			
SRB-E-301ST	17	221			
SRB-E-302FWS-TS	17	223			
SRB-E-322ST	17	221			
SRB-E-402FWS-TS	17	223			
SRB-E-402ST	17	223			
SVE	3	70			
SVM	3	64			
T					
T.C 235	5	100			
T.C 236	5	100			
T.V10S 500	5	102			
T2FH 232	11	164			
T3Z 068	7	132			

## Addresses

■ **Hauptsitz – Headquarters**  
**K.A. Schmersal GmbH & Co. KG**  
Postfach 24 02 63,  
42232 Wuppertal  
Möddinghofe 30  
42279 Wuppertal  
Phone: +49 202 6474-0  
Fax: +49 202 6474-100  
info@schmersal.com  
www.schmersal.com

### Germany

■ **Leipzig**  
**K.A. Schmersal GmbH & Co. KG**  
**Vertriebsbüro Leipzig**  
Servicepark  
Druckereistraße 4  
04159 Leipzig  
Phone: +49 341 48734-50  
Fax: +49 341 48734-51  
vbleipzig@schmersal.com

■ **Berlin**  
**KSA Komponenten der Steuerungs-  
und Automatisierungstechnik GmbH**  
Pankstraße 8-10 / Aufg. L  
13127 Berlin  
Phone: +49 30 474824-00  
Fax: +49 30 474824-05  
info@ksa-gmbh.de  
www.ksa-gmbh.de

■ **Hamburg / Münster**  
**K.A. Schmersal GmbH & Co. KG**  
**Vertriebsbüro Hamburg**  
Innungsstraße 3  
21244 Buchholz i.d.N.  
Phone: +49 41 81 9220-0  
Fax: +49 41 81 9220-20  
vbhamburg@schmersal.com

■ **Hannover**  
**ELTOP GmbH**  
Robert-Bosch-Straße 8  
30989 Gehrden  
Phone: +49 51 089273-20  
Fax: +49 51 089273-21  
eltop@eltop.de  
www.eltop.de

■ **Wettenberg**  
**K.A. Schmersal GmbH & Co. KG**  
**Vertriebsbüro Wettenberg**  
Im Ostpark 2  
35435 Wettenberg  
Phone: +49 641 9848-575  
Fax: +49 641 9848-577  
vbwettenberg@schmersal.com

■ **Köln**  
**Stollenwerk**  
**Technisches Büro GmbH**  
Scheuermühlenstraße 40  
51147 Köln  
Phone: +49 2203 96620-0  
Fax: +49 2203 96620-30  
info@stollenwerk.de  
www.stollenwerk.de

■ **Siegen**  
**Siegfried Klein**  
**Elektro-Industrie-Vertretungen**  
In der Steinwiese 46  
57074 Siegen  
Phone: +49 271 6778  
Fax: +49 271 6770  
info@sk-elektrotechnik.de  
www.sk-elektrotechnik.de

■ **Saarland**  
**Herbert Neundörfer Werks-  
vertretungen GmbH & Co. KG**  
Am Campus 5  
66287 Göttelborn  
Phone: +49 6825 9545-0  
Fax: +49 6825 9545-99  
info@herbert-neundoerfer.de  
www.herbert-neundoerfer.de

■ **Bietigheim**  
**K.A. Schmersal GmbH & Co. KG**  
**Technologiezentrum**  
Pleidelsheimer Straße 15  
74321 Bietigheim-Bissingen  
Phone: +49 7142 91028-0  
Fax: +49 7142 91028-28  
tzbw@schmersal.com

■ **Bayern Süd**  
**INGAM Ing. Adolf Müller GmbH**  
**Industrievertretungen**  
Elly-Staegmeyr-Straße 15  
80999 München  
Phone: +49 89 8126044  
Fax: +49 89 8126925  
info@ingam.de  
www.ingam.de

■ **Nürnberg**  
**K.A. Schmersal GmbH & Co. KG**  
**Vertriebsbüro Nürnberg**  
Lechstraße 21  
90451 Nürnberg  
Phone: +49 911 6496053  
Fax: +49 911 63290729  
vbnuernberg@schmersal.com

### Europe

■ **Austria – Österreich**  
**AVS-Schmersal Vertriebs Ges.m.b.H.**  
Biróstraße 17  
1232 Wien  
Phone: +43-1-6 10 28  
Fax: +43-1-6 10 28-1 30  
info@avs-schmersal.at  
www.avs-schmersal.at

■ **Belgium – Belgien**  
**Schmersal Belgium NV/SA**  
Nieuwlandlaan 73  
Industriezone B413  
3200 Aarschot  
Phone: +32-16-57 16 18  
Fax: +32-16-57 16 20  
info@schmersal.be  
www.schmersal.be

■ **Bosnia and Herzegovina**  
**Tipteh d.o.o. Sarajevo**  
Ulica Ramiza Salčina 246  
71000 Sarajevo  
Phone: +387-61 92 36 23  
nadir.durmic@tipteh.ba  
www.tipteh.ba

■ **Bulgaria – Bulgarien**  
**CDL Sensorik Ltd.**  
Chavdar Voivoda Str, No.12, Office 1  
7002 Ruse City  
Phone: +359 82 82 00 52  
office@cdlsensorik.com  
www.cdlsensorik.com

■ **Croatia – Kroatien**  
**Tipteh Zagreb d.o.o.**  
Ratarska 35  
10000 Zagreb  
Phone: +385 1-3 81 65 74  
Fax: +385 1-3 81 65 77  
tipteh@tipteh.hr  
www.tipteh.hr

■ **Czech Republic – Tschech. Republik**  
**MERCOM COMPONENTA s.r.o.**  
Bechyňská 640  
199 00 Praha 9 – Letňany  
Phone: +4 20-267 31 46 40-2  
mercom@mercom.cz  
www.mercom.cz  
www.schmersal.cz

■ **Denmark – Dänemark**  
**Schmersal Danmark A/S**  
Lautruphøj 1-3  
2750 Ballerup  
Phone: +45-70 20 90 27  
Fax: +45-70 20 90 37  
info@schmersal.dk  
www.schmersal.dk

■ **Finland – Finnland**  
**Advancetec Oy**  
Äyritie 12 B  
01510 Vantaa  
Phone: +3 58-2 07 19 94 30  
Fax: +3 58-9 35 05 26 60  
advancetec@advancetec.fi  
www.schmersal.fi

■ **France – Frankreich**  
**Schmersal France**  
BP 18 – 38181 Seyssins Cedex  
8, rue Raoul Follereau  
38180 Seyssins  
Phone: +33-4 76 84 23 20  
technique@schmersal.com  
info-fr@schmersal.com  
www.schmersal.fr

■ **Greece – Griechenland**  
**Kalamarakis Sapounas S.A.**  
**Ionias & Neromilou**  
PO Box 46566 Athens  
13671 Chamomilos Acharnes  
Athens  
Phone: +30-210-2 40 60 00-6  
Fax: +30-210-2 40 60 07  
ksa@ksa.gr  
www.ksa.gr

■ **Hungary – Ungarn**  
**NTK Ipari-Elektronikai és**  
**Kereskedelmi Kft**  
Gesztenyefa u. 4.  
9027 Győr  
Phone: +36-96-52 32 68  
Fax: +36-96-43 00 11  
info@ntk-kft.hu  
www.ntk-kft.hu

■ **Iceland – Island**  
**Reykjafell Ltd.**  
Skipholt 35  
125 Reykjavik  
Phone: +354-5 88 60 10  
Fax: +354-5 88 60 88  
reykjafell@reykjafell.is

■ **Italy – Italien**  
**Schmersal Italia s.r.l.**  
Via Molino Vecchio, 206  
25010 Borgosatollo, Brescia  
Phone: +39-0 30-2 50 74 11  
Fax: +39-0 30-2 50 74 31  
info@schmersal.it  
www.schmersal.it

■ **Lithuania/Estonia/Latvia -  
Litauen/Estland/Lettland**  
**BOPLALIT**  
Mus galite rasti:  
Baltų pr. 145, LT-47125, Kaunas  
Phone: +370 37 298989  
Phone: +370 37 406718  
info@boplalit.lt  
www.boplalit.lt

■ **Macedonia – Mazedonien**  
**Tipteh d.o.o. Skopje**  
Bul Partizanski odredi br:80, Lok:5  
1000 Skopje  
Phone: +389-70-39 94 74  
Fax: +389-23-17 41 97  
info@tipteh.mk  
www.tipteh.mk

■ **Netherlands – Niederlande**  
**Schmersal Nederland B.V.**  
Lorentzstraat 31  
3846 AV Harderwijk  
Phone: +31-3 41-43 25 25  
Fax: +31-3 41-42 52 57  
info-nl@schmersal.com  
www.schmersal.nl

■ **Norway – Norwegen**  
**Schmersal Norge**  
Hoffsveien 92  
0377 Oslo  
Phone: +47-22 06 00 70  
Fax: +47-22 06 00 80  
info-no@schmersal.com  
www.schmersal.no

■ **Poland – Polen**  
**Schmersal - Polska Sp.j.**  
ul. Baletowa 29  
02-867 Warszawa  
Phone: +48-22-8 16 85 78  
Fax: +48-22-8 16 85 80  
info@schmersal.pl  
www.schmersal.pl

■ **Portugal – Portugal**  
**Schmersal Ibérica, S.L.**  
Apartado 30  
2626-909 Póvoa de Sta. Iria  
Phone: +351-30 880 09 33  
info-pt@schmersal.com  
www.schmersal.pt

■ **Romania – Rumänien**  
**CD SENSORIC SRL**  
Str. George Enescu 21  
550248 Sibiu  
Phone: +40-2 69-25 33 33  
Fax: +40-2 69-25 33 44  
proiecte@cdl.ro  
www.cdl.ro

■ **Russia – Russland**  
**OOO AT electro Moskau**  
ul. Avtosavodskaya 16-2  
109280 Moskau  
Phone: +7-49 5-9 21 44 25  
Fax: +7-49 5-9 26 46 45  
info@at-e.ru  
www.at-e.ru

**OOO AT electro Petersburg**  
Polytechniskaya str, d.9,B  
194021 St. Petersburg  
Phone: +7-81 2-7 03 08 17  
Fax: +7-81 2-7 03 08 34  
spb@at-e.ru

**AT-Electronics Ekaterinburg**  
Bebelya str. 17, room 405  
620034 Ekaterinburg  
Phone: +7-34 3-2 45 22 24  
Fax: +7-34 3-2 45 98 22  
ural@at-e.ru

■ **Serbia – Serbien**  
**Tipteh d.o.o. Beograd**  
Moše Pijade 17A  
11070 Vrčin, Belgrade  
Phone: +3 81 (0)11 – 8053 628  
Fax: +3 81 (0)11 – 8053 045  
office@tipteh.rs  
www.tipteh.rs

■ **Slovakia – Slowakei**  
**MERCOM COMPONENTA s.r.o.**  
Bechyňská 640  
199 00 Praha 9 – Letňany  
Phone: +4 20-267 31 46 40-2  
mercom@mercom.cz  
www.mercom.cz  
www.schmersal.cz

■ **Slovenia – Slowenien**  
**Tipteh d.o.o.**  
Ulica Ivana Roba 21  
1000 Ljubljana  
Phone: +386-1-2 00 51 50  
Fax: +386-1-2 00 51 51  
info@tipteh.si  
www.tipteh.si

■ **Spain – Spanien**  
**Schmersal Ibérica, S.L.**  
Rambla P. Catalanes, 12  
08800 Vilanova i la Geltrú  
Phone: +34-902 56 64 57  
info-es@schmersal.com  
www.schmersal.es

■ **Sweden – Schweden**  
**Schmersal Nordiska AB**  
F O Petersons gata 28  
421 31 Västra Frölunda  
Phone: +46-31-3 38 35 00  
Fax: +46-31-3 38 35 39  
info-se@schmersal.com  
www.schmersal.se

## Addresses

- **Switzerland – Schweiz**  
**Schmersal Schweiz AG**  
 Moosmattstraße 3  
 8905 Arni  
 Phone: +41-43-3 11 22 33  
 Fax: +41-43-3 11 22 44  
 info-ch@schmersal.com  
 www.schmersal.ch
- **Turkey – Türkei**  
**Entek Otomasyon Urunleri San. ve Tic. A.S.**  
 Mahmutbey Mah.  
 Tasocagi Yolu Cad. No: 9 Entek Plaza  
 34218 Bagcilar / Istanbul  
 Phone: +90 850 201 4141  
 Fax: +90 212 320 1188  
 info@entek.com.tr  
 www.entek.com.tr
- **Ukraine – Ukraine**  
**VBR Ltd.**  
 41, Demiyivska Str.  
 03040 Kyiv Ukraine  
 Phone: +38 (044) 259 09 55  
 Fax: +38 (044) 259 09 55  
 office@vbr.com.ua  
 www.vbr-electric.com.ua/schmersal
- **United Kingdom – Großbritannien**  
**Schmersal Ltd.**  
 Sparrowhawk Close  
 Enigma Business Park  
 Malvern Worcestershire WR14 1GL  
 Phone: +44-16 84-57 19 80  
 Fax: +44-16 84-56 02 73  
 uksupport@schmersal.com  
 www.schmersal.co.uk
- **Canada – Kanada**  
**Schmersal Canada LTD.**  
 15 Regan Road Unit #3  
 Brampton, Ontario L7A 1E3  
 Phone: +1 905 495-7540  
 Fax: +1 905 495-7543  
 Info-ca@schmersal.com  
 www.schmersal.ca
- **Chile – Chile**  
**Vitel S.A.**  
 francisco@vitel.cl  
 www.vitel.cl  
**SOLTEX**  
 central@soltext.cl  
 www.soltext.com.cl  
**INSTRUTEC**  
 gcaceres@instrutec.cl  
 www.instrutec.cl  
**OEG**  
 jmp@oegggroup.com  
 www.oegggroup.cl  
**EECOL INDUSTRIAL ELECTRIC**  
 ventas@eecol.cl  
 www.eecol.cl
- **PR China – VR China**  
**Schmersal Industrial Switchgear (Shanghai) Co. Ltd.**  
 Cao Ying Road 3336  
 201712 Shanghai / Qingpu  
 Phone: +86-21-63 75 82 87  
 Fax: +86-21-63 75 82 97  
 sales@schmersal.com.cn  
 www.schmersal.com.cn
- **Colombia – Kolumbien**  
**EQUIPELCO**  
 aospina@equipelco.com  
 www.equipelco.com  
**SAMCO**  
 jvargas@samcoingenieria.com  
 www.samcoingenieria.com
- **Ecuador – Ecuador**  
**SENORTEC S.A**  
 AV. Napo y Pinto Guzmán  
 Quito  
 Phone: +593 091 40 27 65  
 +593 095 04 86 11  
 infogy@sensortecsa.com  
 www.sensortecsa.com
- **Guatemala – Guatemala**  
**PRESTELECTRO**  
 AV Petapa 44-22,  
 Zona 12; Cent. Com Florencia 01012  
 Phone: +502 24 42-33 46  
 Anabella.Barrios@prestelectro.com  
 www.prestelectro.com
- **India – Indien**  
**Schmersal India Private Limited**  
 Plot No G 7/1,  
 Ranjangaon MIDC,  
 Taluka Shirur,  
 District Pune 412220, India  
 Phone: +91 21 38 61 47 00  
 Fax: +91 20 66 86 11 14  
 info-in@schmersal.com  
 www.schmersal.in
- **Indonesia – Indonesien**  
**PT. Wiguna Sarana Sejahtera**  
 Jl. Daan Mogot Raya No. 47  
 Jakarta Barat 11470  
 Phone: +62-21-5 63 77 70-2  
 Fax: +62-21-5 66 69 79  
 email@ptwiguna.com  
 www.ptwiguna.com
- **Iran – Iran**  
**Omid Electric**  
 No. 1-5, 1st Floor, Azizi passage,  
 Southern Lalehzar Str. Tehran  
 ZIP: 1144944181  
 Phone: +98 21 33924027  
 +98 21 33911022  
 Fax: +98 21 33936635  
 sales@omidelectric.com  
 www.omidelectric.com
- **Israel – Israel**  
**A.U. Shay Ltd.**  
 23 Imber St. Kiriat. ArieH.  
 P.O. Box 10049  
 Petach Tikva 49222 Israel  
 Phone: +9 72-3-9 23 36 01  
 Fax: +9 72-3-9 23 46 01  
 shay@uriel-shay.com  
 www.uriel-shay.com
- **Japan – Japan**  
**Schmersal Japan KK**  
 3-39-8 Shoa, Suginami-ku  
 Tokyo 167-0054  
 Phone: +81-3-3247-0519  
 Fax: +81-3-3247-0537  
 safety@schmersaljp.com  
 www.schmersal.jp
- **Korea – Korea**  
**Mahani Electric Co. Ltd.**  
 20, Gungmal-ro, Gwacheon-si,  
 Gyeonggi-do 427-060, Korea  
 Phone: +82-2-21 94-33 00  
 Fax: +82-2-21 94-33 97  
 yskim@mec.co.kr  
 www.mec.co.kr
- **Malaysia – Malaysien**  
**Ingermark (M) SDN.BHD**  
 No. 29, Jalan KPK 1/8  
 Kawasan Perindustrian Kundang  
 48020 Rawang, Selangor Darul Ehsan  
 Phone: +6 03-60-34 27 88  
 Fax: +6 03-60-34 21 88  
 enquiry@ingermark.com
- **Mexico – Mexiko**  
**ISEL SA de CV**  
 mario.c@isel.com.mx  
 www.isel.com.mx  
**INNOVATIVE AUTOMOTION SOLUTIONS**  
 ias@iasmx.com  
 www.iasautomation.com.mx  
**EASA ENERGIA Y AUTOMATIZACIÓN**  
 ias@iasmx.com  
 www.iasautomation.com.mx  
**DINAMICA S.A de C.V**  
 ias@iasmx.com  
 www.iasautomation.com.mx  
**SIGRAMA S.A de C.V**  
 ias@iasmx.com  
 www.iasautomation.com.mx  
**VGR TECHNOLOGIES**  
 ias@iasmx.com  
 www.iasautomation.com.mx
- **New Zealand – Neuseeland**  
**Hamer Automation**  
 85A Falsgrave Street  
 Philipstown  
 Christchurch, New Zealand  
 Phone: +64-33 66 24 83  
 Fax: +64-33 79 13 79  
 sales@hamer.co.nz  
 www.hamer.co.nz
- **Pakistan – Pakistan**  
**Schmersal India Private Limited**  
 Plot No G 7/1,  
 Ranjangaon MIDC,  
 Taluka Shirur,  
 District Pune 412220, India  
 Phone: +91 21 38 61 47 00  
 Fax: +91 20 66 86 11 14  
 info-in@schmersal.com  
 www.schmersal.in
- **Paraguay – Paraguay**  
**Brasguay S.R.L.**  
 R. Internacional 07  
 KM 14 ; Minga Guazu  
 Phone: +595 (61) 583-418 218 577  
 brasguay@brasguay.com.py  
 www.brasguay.com.py
- **Peru – Peru**  
**Fametal S.A.**  
 fametal@fametal.com  
 www.fametal.com  
**AYD**  
 informes@ayd.com.pe  
 www.ayd.com.pe
- **Singapore – Singapur**  
**AZAREL International Pte Ltd.**  
 Empire Techno Centre  
 30 Kaki Bukit Road 3 #01-10  
 Singapore 417819  
 Phone: +65-67 42 29 88  
 Fax: +65-67 42 26 28  
 sales@azarel.com.sg  
 www.azarel.com.sg
- **South Africa – Südafrika**  
**A+A Dynamic Distributors (Pty) Ltd.**  
 20-24 Augusta Road  
 Regents Park  
 2197 Booyens  
 Phone: +27-11-6 81 59 00  
 Fax: +27-11-4 35 13 18  
 awkayser@iafrika.com
- **Taiwan – Taiwan**  
**Golden Leader Camel Ent. Co., Ltd.**  
 No. 453-7, Pei Tun Rd.  
 Taichung City 40648, Taiwan  
 Phone: +886-4-22 41 29 89  
 Fax: +886-4-22 41 29 23  
 camel88@ms46.hinet.net  
 www.leadercamel.com.tw
- **Thailand – Thailand**  
**Isensor Co. Ltd.**  
 57/65 Soi Song Sa-ard  
 Vibhavadirangsit Road  
 Chomphon, Chatuchak  
 Bangkok 10900  
 Phone: +66 - 2 - 276 8783  
 Fax: +66 - 2 - 275 5875  
 info@isensor.co.th  
 www.isensor.co.th
- **United Arab Emirates – Vereinigte Arabische Emirate**  
**Kempston Controls LLC**  
 PO Box: 60998  
 St. 13, Umm Ramool,  
 Dubai, U.A.E.  
 Tel: +971 4 2987 111  
 Fax: +971 4 2987 113  
 Email: sales@kempstoncontrols.ae  
 www.kempstoncontrols.ae
- **Uruguay – Uruguay**  
**Gliston S.A.**  
 Pedernal 1896 – Of. 203  
 Montevideo  
 Phone: +598 (2) 2 00 07 91  
 colmedo@gliston.com.uy  
 www.gliston.com.uy
- **USA – USA**  
**Schmersal Inc.**  
 15 Skyline Drive  
 Hawthorne, NY 10532  
 Phone: +1 8 88-4 96-51 43  
 Fax: +1 9 14-3 47-15 67  
 infousa@schmersal.com  
 www.schmersalusa.com
- **Venezuela – Venezuela**  
**EMI Equipos y Sistemas C.A.**  
 Calle 10, Edf. Centro Industrial  
 Martinisi, Piso 3, La Urbina, Caracas  
 Phone: +58 (212) 2 43 50 72  
 ventas@emi-ve.com  
 www.emi-ve.com
- **Vietnam – Vietnam**  
**Ingermark (M) Sdn Bhd, Rep Office**  
 Unit 208, C6 Bldg., Block 1  
 My Dinh 1, New Urban Area  
 Tu Liem District, Hanoi  
 Phone: +84-4 287 2638  
 Fax: +84-4 287 2639  
 ingvietn18@ymail.com

## Worldwide



# The Schmersal Group

In the demanding field of machine safety, the owner-managed Schmersal Group is one of the international market leaders. The company, which was founded in 1945, has a workforce of about 2000 people and seven manufacturing sites on three continents along with its own companies and sales partners in more than 60 nations.

Customers of the Schmersal Group include global players from the area of mechanical engineering and plant manufacturing as well as operators of machinery. They profit from the company's extensive expertise as a provider of systems and solutions for machine safety. Furthermore, Schmersal specialises in various areas including foodstuff production, the packaging industry, machine tool industry, lift switchgear, heavy industry and the automotive industry.

A major contribution to the systems and solutions offered by the Schmersal Group is made by tec.nicum with its comprehensive range of services: certified Functional Safety Engineers advise machinery manufacturers and machinery operators in all aspects relating to machinery and occupational safety – and do so with product and manufacturer neutrality. Furthermore, they plan and realise complex solutions for safety around the world in close collaboration with the clients.

## Safety Products



- Safety switches and sensors, solenoid interlocks
- Safety controllers and safety relay modules, safety bus systems
- Optoelectronic and tactile safety devices
- Automation technology: position switches, proximity switches

## Safety Systems



- Complete solutions for safeguarding hazard areas
- Individual parametrisation and programming of safety controllers
- Tailor-made safety technology – be it for individual machines or a complex production line
- Industry-specific safety solutions

## Safety Services



- tec.nicum academy – Seminars and training
- tec.nicum consulting – Consultancy services
- tec.nicum engineering – Design and technical planning
- tec.nicum integration – Execution and installation

The details and data referred to have been carefully checked.  
Subject to technical amendments and errors.

[www.schmersal.com](http://www.schmersal.com)



x.000 / L+W / 05.2018 / Material-Nr. 103009198 / EN / Ausgabe 04

 **SCHMERSAL**  
Safe solutions for your industry