

Safety in system
Protection for man and machine

PRODUCT OVERVIEW SAFETY TECHNOLOGY



SCHMERSAL
THE DNA OF SAFETY



INTRODUCTION

How does one introduce a new customer or an interested designer to a portfolio of around 18,000 products and diverse but always complex services?

Our sales engineers are faced with this question whenever they need to talk about our company and its range of services.

This brochure is intended to give you an initial overview of what you can expect from us in the field of safety technology. We present the individual product groups from which we have increasingly developed complete solutions for machine safety in recent years.

An increasingly important component of our range is qualified services, which we provide through our tec.nicum division and which, in conjunction with our products and solutions, embody our key objective. It is our desire to provide you with up-to-date safety engineering solutions, thereby making the world of work a little safer.

Heinz and Philip Schmersal
Managing Directors of the Schmersal Group

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Web shop

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Here you will find all details and data on our products
which you can order directly online:

products.schmersal.com



ELECTRONIC SOLENOID INTERLOCKS DESCRIPTION

The solenoid interlocks 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.

With electronic solenoid interlocks, the safety guard position is monitored not electromechanically but contactless – either by the 'Coded Safety Sensor' technology developed by Schmersal (pulse echo method) or by safety-engineered RFID technology. These models offer the advantage that they provide the machine operator with additional diagnostic information. Holding forces of up to 10,000 N are possible. For some series, the latching force (i.e. the non-safety-related holding 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 EN ISO 14119, thereby ensuring a high level of manipulation protection for doors which are at particular risk of interference.



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ELECTRONIC SOLENOID INTERLOCKS

OVERVIEW OF THE SERIES



Range	■ AZM40	■ AZM201	■ AZM300	■ AZM400	■ MZM100
Technology	RFID	RFID	RFID	RFID	Pulse Echo
Holding force F_{zh}	Bistable magnet, 2,000 N	Solenoid, 2,000 N	Solenoid, 1,150 N	Motorised bolt, 10,000 N	Electromagnet, 500 N
Housing material	Metal and thermoplastic	Thermoplastic	Thermoplastic	Die-cast aluminium	Thermoplastic
IP rating	IP66, IP67, IP69	IP66, IP67	IP66, IP67, IP69	IP66, IP67	IP65, IP67
Dimensions (W × H × D)	40 × 119.5 × 20 mm	40 × 220 × 50 mm	88 × 135 × 35 mm	157 × 78 × 47 mm	40 × 177 × 40 mm
Connection	Connector plug	Screw connection Cage clamps Connector plug	Connector plug	1x Connector plug 2x Connector plug	Connector plug
Contact options	2 safety outputs (OSSD) + 1 diagnostic output	2 safety outputs (OSSD) + 1 diagnostic output 2 safety outputs (OSSD) + 1 serial diagnostic output	2 safety outputs (OSSD) + 1 diagnostic output 2 safety outputs (OSSD) + 1 serial diagnostic output	2 safety outputs (OSSD) + 1 diagnostic output 2 safety outputs (OSSD) + 2 diagnostic outputs	2 safety outputs (OSSD) + 1 diagnostic output 2 safety outputs (OSSD) + 1 serial diagnostic output
Features	<ul style="list-style-type: none"> Individual coding Countersink or plan housing (PH) Lockout tag Emergency exit Door interlock system with DHS-U1 and BDF40 	<ul style="list-style-type: none"> Individual coding Lockout tag Emergency exit Door interlock system with BDF200 	<ul style="list-style-type: none"> Individual coding Door stop Adjustable latching Lockout tag Emergency exit Bowden cable (optional) 	<ul style="list-style-type: none"> Individual coding Emergency exit Electric by-pass Bowden cable (optional) 	<ul style="list-style-type: none"> Door stop Magnetic latching
Actuators (order separately)	AZM40-B1 AZM40-B1-PH	B1 (for sliding guards), B30 (for hinged guards), B40 (for hinged doors with overlapping hinge)	AZ/AZM300-B1	AZM400-B1	MZM100-B1.1
Special versions	-	AS-i, SD	AS-i, SD, ATEX	-	AS-i, SD



SOLENOID INTERLOCKS DESCRIPTION

Solenoid interlocks enable a separating protective device to be held closed until dangerous conditions that may occur immediately after the power supply is switched off have been eliminated.

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).

The electromechanical solenoid interlocks AZM150, AZM161 and AZM170 are also available as individually-coded versions with more than 1,000 different coding variants, achieving coding level "high" in accordance with EN 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.



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SOLENOID INTERLOCKS

OVERVIEW OF THE SERIES



Range	■ AZM150	■ AZM161	■ AZM170	■ AZM415	■ AZM190	■ TZF/TZM
Holding force F_{zh}	1,500 N	2,000 N	1,000 N	3,500 N	1,950 N	1,500 N
Housing material	Thermoplastic	Thermoplastic	Thermoplastic	Die-cast aluminium	Thermoplastic	Thermoplastic
IP rating	IP65, IP67	IP67	IP67	IP67	IP67	IP67
Dimensions (W × H × D)	40 × 204 × 48 mm	130 × 90 × 30 mm	90 × 100.5 × 30 mm	130 × 100 × 46.5 mm	89 × 178 × 41 mm	129 × 92.5 × 41 mm
Connection	Screw connection Connector plug	Cage clamps Screw connection Connector plug	IDC connection Screw connection Connector plug	Screw connection Connector plug	Screw connection	Screw connection
Contact options	Potential free contacts Various NO/NC combinations	Potential free contacts Various NO/NC combinations	Potential free contacts Various NO/NC combinations	Potential free contacts Various NO/NC combinations	Potential free contacts Various NO/NC combinations	Potential free contacts Various NO/NC combinations
Features	<ul style="list-style-type: none"> Individual coding Rotatable actuator head (4x 90°) Emergency exit Bowden cable 	<ul style="list-style-type: none"> Emergency exit Individual coding 	<ul style="list-style-type: none"> Emergency exit Individual coding 	<ul style="list-style-type: none"> Emergency exit 	<ul style="list-style-type: none"> Manual release or emergency release 	<ul style="list-style-type: none"> Rotatable actuator head (3x 90°)
Actuators (order separately)	AZM150-B1 AZM150-B5 (angled) AZM150-B6 (flexible)	AZM161-B1 AZM161-B6 (flexible) STS (door handle)	AZ17/170-B1 AZ17/170-B5 AZM170-B6 (flexible) B25 (door handle)	AZ/AZM415-B1 AZ/AZM415-B2 (flexible) AZ/AZM415-B3 (flexible) STS (door handle)	AZM190-B1 AZM190-B3 (flexible) AZM190-B5 (front mounting)	TZ/CO TZ/CW
Special versions	ATEX	AS-i, ATEX	AS-i, ATEX	ATEX	-	-

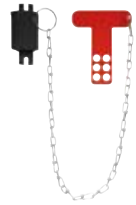
SOLENOID INTERLOCKS

ACCESSORIES – DOOR-HANDLE ACTUATOR



Range	■ DHS-U1	■ DHS-150	■ B30	■ STS	■ B25	■ B4PS
Compatible with	AZM40 RSS260 RSS36	AZM150	AZ201 AZM201	AZM161 AZM415	AZ17 AZM170	AZ415 AZM415
Emergency exit	–	Optional	Optional	Optional	–	–
Material	Thermoplastic	Metal with thermoplastic	Thermoplastic	Die-cast aluminium	Thermoplastic	Metal
Features	<ul style="list-style-type: none"> Optional LED signalling in handle Optional pushbutton Actuator inserts RST-U or for standalone units available separately. 	<ul style="list-style-type: none"> Left or right opening Mounting plate for switch Actuator ordered separately 	<ul style="list-style-type: none"> Handle options Inside or outside mount Left or right opening Retracting actuator Lockout tag (optional) 3 point locking option 	<ul style="list-style-type: none"> Handle options Inside or outside mount Left or right opening Retracting actuator Lockout device (optional) 	<ul style="list-style-type: none"> Handle options Left or right opening Retracting actuator 	<ul style="list-style-type: none"> Sliding bolt with handle Left or right opening Retracting actuator Ball latch on retraction

SOLENOID INTERLOCKS ACCESSORIES



Range	■ Lockout tags	■ TFA / TFI	■ Mounting plates	■ CSA-M-1	■ PL-M20	■ Tamperproof screws
Description	<ul style="list-style-type: none"> Available for most models, ordered separately 	<ul style="list-style-type: none"> Centering device for safety guard 	<ul style="list-style-type: none"> Available for most models, ordered separately 	<ul style="list-style-type: none"> Magnetic latch 	<ul style="list-style-type: none"> Pilot light kits, M16 or M20 	<ul style="list-style-type: none"> Various types of tamper-proof screws

SOLENOID INTERLOCKS CONNECTION ACCESSORIES



Range	■ Pre-wired cable M8, straight	■ Pre-wired cable M8, angled	■ Pre-wired cable M12, straight	■ Pre-wired cable M12, angled	■ Connecting cables	■ Pre-wired cable M23



SAFETY SWITCHES WITH SEPARATE ACTUATOR DESCRIPTION

The safety switches with separate actuators are suitable for sliding, hinged and especially for removable safety guards, which need to be closed to ensure the necessary operational security. They can also be fitted on profile sections and retrofitted on existing equipment.

Since the separate actuator for each series has its own shape, this is a type 2 coded locking in accordance with EN ISO 14119, which cannot be easily operated with a standard object. The actuator is often ordered separately, as different mounting types are available.

Several series offer individual coding versions, where a unique key is provided specifically to match the cams settings in the switch. With over 1,000 possible unique actuators, they are considered 'highly coded'.



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SAFETY SWITCHES WITH SEPARATE ACTUATOR

OVERVIEW OF THE SERIES



Range	■ AZ15 / AZ16	■ AZ17	■ AZ215/216/315/316	■ AZ3350	■ AZ415	■ TZG	■ AZ201
Housing material	Thermoplastic	Thermoplastic	215, 315: Metal 216, 316: Thermoplastic	Die-cast metal	Die-cast metal	Thermoplastic	Thermoplastic
IP rating	IP67	IP67	IP66, IP67	IP67	IP67	IP67	IP66, IP67
Dimensions (W × H × D)	AZ15: 52 × 75 × 30 mm AZ16: 52 × 90 × 30 mm	30 × 85 × 30 mm	215, 216: 31 × 102.3 × 35.6 mm 315, 316: 40 × 114 × 37 mm	40.5 × 114 × 38 mm	84.6 × 103.6 × 46.5 mm	50 × 106.5 × 39.5 mm	40 × 220 × 50 mm
Connection	Screw connection Connector plug	IDC connection Connector plug	Screw connection Connector plug M12	Screw connection	Screw connection	Screw connection	Screw connection Cage clamps Connector plug
Contact options	Potential free contacts Various NO/NC combinations	Potential free contacts Various NO/NC combinations	Potential free contacts Various NO/NC combinations	Potential free contacts Various NO/NC combinations	Potential free contacts Various NO/NC combinations	Potential free contacts Various NO/NC combinations	2 safety outputs (OSSD) + 1 diagnostic output
Features	<ul style="list-style-type: none"> 4 actuator entries Lockout device Individual coding (optional) 	<ul style="list-style-type: none"> 2 actuator entries Individual coding (optional) 	<ul style="list-style-type: none"> Rotatable head (4x 90°) 2 actuator entries 	<ul style="list-style-type: none"> Rotatable head (4x 90°) 	<ul style="list-style-type: none"> Adjustable ball latch (up to 400 N) 	<ul style="list-style-type: none"> Rotatable head (4x 90°) 	<ul style="list-style-type: none"> RFID technology Individual coding Lockout tag
Actuators (order separately)	AZ15/16-B1 AZ15/16-B2 (flexible) AZ15/16-B3 (flexible) AZ15/16-B6 (flexible) STS (door handle)	AZ17/170-B1 AZ17/170-B5 AZ17-B6 B25 (door handle)	AZ21X/31X-B1 AZ21X/31X-B5 AZ21X/31X-B6	AZ3350-B1 STS (door handle)	AZ/AZM415-B1 AZ/AZM415-B2 (flexible) AZ/AZM415-B3 (flexible) STS (door handle)	TZ/CO TZ/CW	B1 (for sliding guards), B30 (for hinged guards), B40 (for hinged doors with overlapping hinge)
Special versions	AS-i, ATEX	-	-	ATEX	ATEX	-	-



SAFETY SWITCHES FOR HINGED GUARDS DESCRIPTION

For hinged safety doors, there's an elegant, space saving and tamper-proof alternative to safety switches with separate actuator and position switches with safety function. Hinged safety switches fixed to the hinge side of the safety door eliminate the need for switches on the door itself and hence keep the operator's work area free of switches.

Positive fixing of the hinge switches means they are particularly tamper-proof.



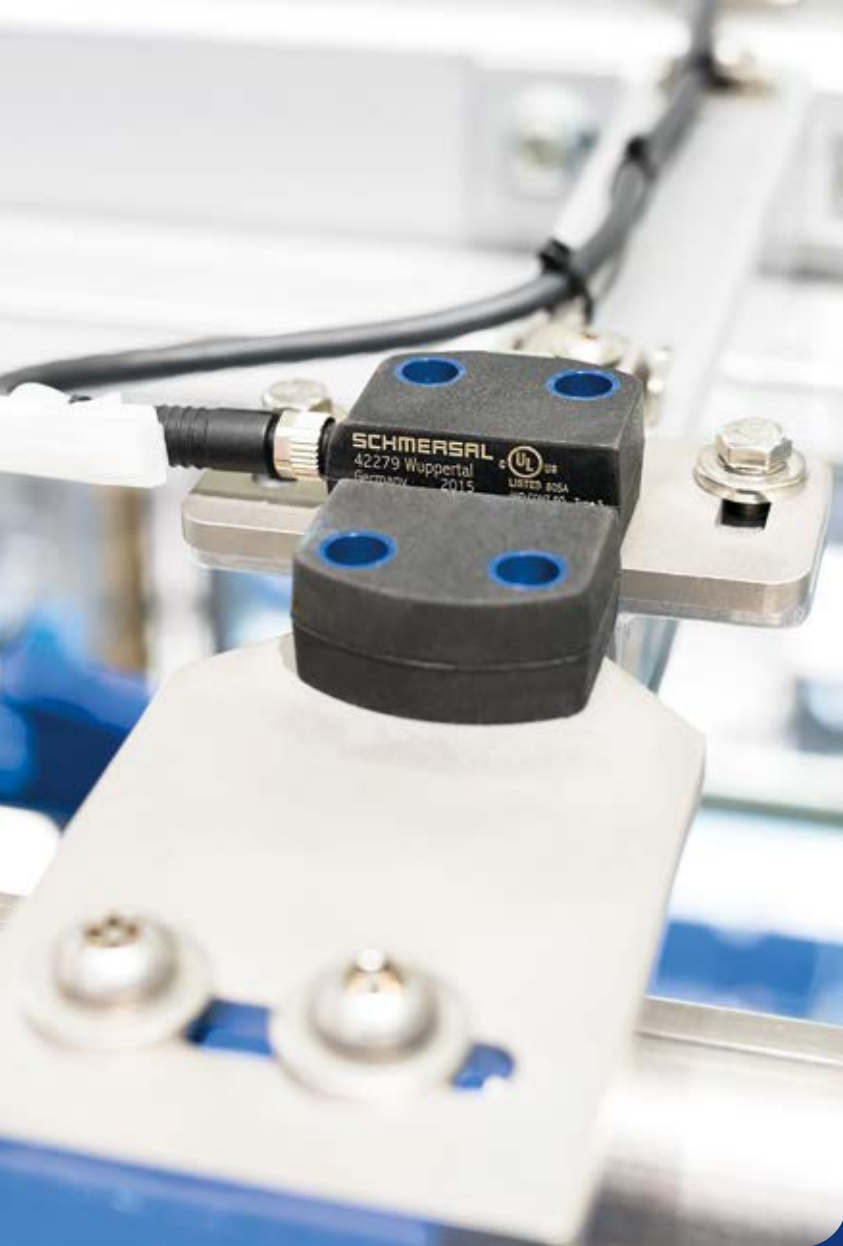
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SAFETY SWITCHES FOR HINGED GUARDS

OVERVIEW OF THE SERIES



Range	■ T.C235	■ T.C236	■ TV.S335	■ TESZ	■ TESF	■ TESK
Type	Flap safety switches	Flap safety switches	Hinge safety switch	Hinge safety switch	Hinge safety switch	Hinge safety switch
Housing material	Metal	Thermoplastic	Metal	Thermoplastic	Zinc die-cast	Zinc die-cast
Max. rotation	180°	180°	360°	135°	180°	270°
Opening angle	4.5° (preset for left, right or swing doors)	4.5° (preset for left, right or swing doors)	2°	4°	3° (Adjustable or preset at 0° or 180°)	3° (Adjustable or preset at 0° or 180°)
IP rating	IP67	IP67	IP67	IP65	IP65	IP65
Dimensions (W × H × D)	30 × 63.5 × 30 mm	30 × 61.5 × 30 mm	40.5 × 76 × 38 mm	111.5 × 92 × 36 mm	141 × 115 × 21.5 mm	98 × 116 × 20 mm
Connection	Screw connection	Screw connection	Screw connection Connector plug	Screw connection	Screw connection Connector plug	Connector plug Pre-wired cable
Contact options	Potential free contacts Various contact combinations available	Potential free contacts Various contact combinations available	Potential free contacts Various contact combinations available	Potential free contacts Various contact combinations available	Potential free contacts Various contact combinations available	Potential free contacts Various contact combinations available
Features	▪ Rotatable head (90° steps)	▪ Rotatable head (90° steps)	▪ Universal joint ▪ Rotatable head (90° steps)	▪ Additional matching hinge	▪ Additional matching hinge ▪ Inside or surface mounting	▪ Additional matching hinge ▪ Inside or surface mounting
Special versions	-	--	ATEX	-	-	-



ELECTRONIC SAFETY SENSORS DESCRIPTION

Electronic safety sensors have integrated processors that enable continuous internal function testing and monitoring of the safety outputs. They can be wired in series without detriment to the safety levels. Diagnostic LEDs on the sensor indicate various errors, misalignments and the message 'Safety guard open/closed'. Several models are available with serial diagnostics for advanced displays and data transfer to fieldbus systems.

Models which use radio frequency identification (RFID) can offer the option of individual coding: The basic version of the sensor responds to any target actuator; The "I1" version only accepts the coded ID number of the specific target actuator which is taught in during the first start-up; The "I2" version allows the teach-in process to be repeated, allowing replacement of a lost or damaged actuator.



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ELECTRONIC SAFETY SENSORS

OVERVIEW OF THE SERIES



Range	■ RSS260	■ RSS36	■ RSS16	■ CSS180	■ CSS30S	■ CSS34
Technology	RFID	RFID	RFID	Pulse echo	Pulse-echo	Pulse-echo
Housing material	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic	Stainless steel	Thermoplastic
IP rating	IP65, IP67	IP65, IP67, IP69	IP65, IP66, IP67	IP65, IP67	IP65, IP67, IP68, IP69	IP65, IP67
Dimensions (W × D × H)	47.5 × 18 × 29.5 mm	25 × 22.6 × 106 mm	52 × 30 × 91 mm	Ø M18 × 98 mm	Ø M30 × 99.5 mm	108.2 × 27 × 35 mm
Connection	Connector plug	Connector plug	Screw connection Cage clamps Connector plug	Connector plug Pre-wired cable	Connector plug	Connector plug Pre-wired cable
Contact options	2 safety outputs (OSSD) + 1 diagnostic output 2 safety outputs (OSSD) + 1 serial diagnostic output	2 safety outputs (OSSD) + 1 diagnostic output 2 safety outputs (OSSD) + 1 serial diagnostic output	2 safety outputs (OSSD) + 1 diagnostic output 2 safety outputs (OSSD) + 1 serial diagnostic output	2 safety outputs (OSSD) + 1 diagnostic output	2 safety outputs (OSSD) + 1 diagnostic output 2 safety outputs (OSSD) + 1 serial diagnostic output	2 safety outputs (OSSD) + 1 diagnostic output 2 safety outputs (OSSD) + 1 serial diagnostic output
Features	<ul style="list-style-type: none"> Individual coding Integrated LED EDM and emergency stop monitoring 	<ul style="list-style-type: none"> Individual coding Integrated LED Magnetic latching version (18 N) with door stop EDM and emergency stop monitoring 	<ul style="list-style-type: none"> Individual coding Integrated LED Magnetic latching version (40/60 N) with door stop 	<ul style="list-style-type: none"> Flush mounting Integrated LED 	<ul style="list-style-type: none"> Concealed mounting Integrated LED 	<ul style="list-style-type: none"> Actuation from top or side Integrated LED EDM monitoring
Actuators (order separately)	RST260-1 RST16-1 RST-U-2	RST36-1 RST36-1-R RST-U-2	RST16-1 RST16-1-R RST-U-2	CST180-1 CST180-2	CST30S-1	CST34-V-1 CST34-S-1 CST34-S-3
Special versions	AS-i, SD	AS-i, SD	ATEX, SD	ATEX	SD	SD

MAGNETIC SAFETY SENSORS DESCRIPTION

The safety solenoid switches of the BNS-series use the proven principle of safe magnet technology. The safety sensors are electromagnetic, contactless and operate on two channels. As they have two safety contact paths, they are also fail-safe. The sensor can only be activated with the corresponding coded magnet, which is why a conventional magnet does not work. This is achieved by the combination and arrangement of the reed tubes in the sensor. This ensures a high level of protection against tampering.

Despite their compact design, the BNS sensors achieve high switching distances. Concealed mounting is also possible, as the sensor technology works through plastic and even stainless steel covers.

This is an advantage for machines that are exposed to high levels of dirt and dust. The sensors are also frequently used in hygiene-sensitive areas, such as the food industry.



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MAGNETIC SAFETY SENSORS

OVERVIEW OF THE SERIES



Range	■ BNS260	■ BNS36	■ BNS16	■ BNS40S	■ BNS120	■ BNS30/300/303	■ BNS-B20
Housing material	Thermoplastic	Thermoplastic	Thermoplastic	Stainless Steel	Thermoplastic	Thermoplastic Metal (BNS30)	Thermoplastic
IP rating	IP67	IP67	IP67	IP69	IP67	IP67	IP67
Dimensions (W × D × H)	36 × 13 × 26 mm	88 × 13 × 25 mm	55 × 39.5 × 93 mm	88 × 14.5 × 27 mm	M12 × 38.5 mm	M30 × 78 mm	119.5 × 43.3 × 140 mm
Connection	Connector plug Pre-wired cable	Connector plug Pre-wired cable	Screw connection Connector plug	Pre-wired cable	Pre-wired cable	Connector plug Pre-wired cable	Connector plug Pre-wired cable
Contact Options	1 NO + 1 NC 2 NC 1 NO + 2 NC 3 NC	1 NO + 1 NC 2 NC 1 NO + 2 NC 3 NC	1 NO + 2 NC	1 NO + 2 NC	1 NO + 1 NC 1 NO + 2 NC 2 NC	30/300: 1 NC 303: 1 NO + 1 NC 2 NC 1 NO + 2 NC 3 NC	1 NO + 1 NC 2 NC 1 NO + 2 NC
Features	• Optional LED	• Optional LED	• Double actuation option	• Rear side mounting • Optional LED • Suitable for food processing industry	• Suitable for food processing industry	• Optional LED	• Optional LED
Actuators (order separately)	BPS260-1 BPS260-2	BPS36-1 BPS36-2	BPS16	BPS40S-1, -C BPS40S-2, -C	BP 8 BP 10 BP 15 SS (stainless steel)	BPS300 BPS303 BPS303 SS (stainless steel)	BNS-B20-B01 (door handle)
Special versions	AS-i	AS-i	AS-i	ATEX	ATEX	ATEX (303)	-

You can find the right actuating magnets directly under the respective items at products.schmersal.com.

POSITION SWITCHES WITH SAFETY FUNCTION DESCRIPTION

Typically used to determine the position or presence of moving parts, work pieces, or conveyed materials, or to monitor the position of rotating or sliding machine guards, these limit switches can be utilised in automation, elevator, and safety applications. They are dust-tight and resistant to powerful water jets (IP66) and immersion in water (IP67), making them suitable for use in harsh industrial environments.

The actuator elements can be adjusted on site: rotated to one of eight positions – in 45° increments relative to the housing – or replaced by other elements. With many actuator elements to choose from, they are easily adaptable to many applications.



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POSITION SWITCHES WITH SAFETY FUNCTION

OVERVIEW OF THE SERIES



Range	■ PS116	■ PS215	■ PS216	■ PS226	■ PS315	■ PS316
Housing material	Thermoplastic Metal (head)	Metal	Thermoplastic	Thermoplastic	Metal	Thermoplastic
IP rating	IP66, IP67	IP66, IP67	IP66, IP67	IP66, IP67	IP66, IP67	IP66, IP67
Dimensions (W × H × D)	31 × 52 × 16.6 mm	31 × 66 × 33 mm	31 × 66 × 33 mm	59 × 56 × 33 mm	40 × 77.7 × 37.2 mm	40 × 77.7 × 37.2 mm
Connection	Connector plug Pre-wired cable	Screw connection Connector plug	Screw connection Connector plug	Screw connection Connector plug	Screw connection Connector plug	Screw connection Connector plug
Contact options	1 NO + 1 NC 2 NO + 1 NC 1 NO + 2 NC 2 NC 3 NC	1 NO + 1 NC 2 NO + 1 NC 1 NO + 2 NC 2 NO 2 NC 3 NC	1 NO + 1 NC 2 NO + 1 NC 1 NO + 2 NC 2 NO 2 NC 3 NC	1 NO + 1 NC 2 NO + 1 NC 1 NO + 2 NC 2 NO 2 NC 3 NC	1 NO + 1 NC 2 NO + 1 NC 1 NO + 2 NC 2 NO 2 NC 3 NC	1 NO + 1 NC 2 NO + 1 NC 1 NO + 2 NC 2 NO 2 NC 3 NC
Ambient temperature	-30 °C ... +80 °C	-30 °C ... +80 °C	-30 °C ... +80 °C	-30 °C ... +80 °C	-30 °C ... +80 °C	-30 °C ... +80 °C
Features	<ul style="list-style-type: none"> Large range of actuating elements Rotatable heads 45° steps 	<ul style="list-style-type: none"> Large range of actuating elements Rotatable heads 45° steps Optional with LED 	<ul style="list-style-type: none"> Large range of actuating elements Rotatable heads 45° steps Optional with LED 	<ul style="list-style-type: none"> Large range of actuating elements Rotatable heads 45° steps Optional with LED 	<ul style="list-style-type: none"> Large range of actuating elements Rotatable heads 45° steps Optional with LED 	<ul style="list-style-type: none"> Large range of actuating elements Rotatable heads 45° steps Optional with LED
Actuator selection *						
Special versions	-	ATEX	-	-	ATEX	-

* Most rollers are also available in stainless steel or brass. Please contact our technical sales department or visit products.schmersal.com.



SAFETY-MONITORING MODULES DESCRIPTION

PROTECT SRB-E

The PROTECT SRB-E series are multifunctional, configurable, electronic safety controllers. Each module in the series can be set to one of up to 11 preset configurations. This includes selecting the type of reset, activating or deactivating cross-lock monitoring and selecting the monitored contact configuration – all via a rotary switch on the front panel. Once changed to the desired setting, the dials are protected from further adjustment by a transparent front cover which can be easily secured.

All conventional safety sensors and electromechanical safety equipment can be monitored.

The PROTECT SRB-E series of safety relay modules can be used in applications up to Category 4, PL e according to EN ISO 13849 and SIL 3 according to IEC 61508.

Safe drive speed and standstill monitoring

Many machines pose a danger to the operator when attempting to clear jams, set up the machine or perform other work steps that require interaction. There are many safe drive monitoring features that can be applied to make the operation safer, with safe speed monitoring and standstill monitoring the most prevalent. These are used not only during the normal automatic operation of the machine but also during manual operation of the machine to lower the risk and keep the operator safe.



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SAFETY-MONITORING MODULES

METHODS OF MONITORING SPEED OR STANDSTILL

DRIVE SPEED AND STANDSTILL MONITORING

Monitoring sensor signals

There are a variety of devices that can generate a signal based on the movement of the machine, such as proximity sensors, resolvers, and encoders. The signals generated are picked up by the monitor to determine speed or standstill. The SRB-E...FWS Series uses proximity sensors to monitor standstill while the PSC1 can use various types of encoders to monitor multiple axis.

Fail to safe timer

Another method to insure standstill is to incorporate a fail-to-safe timer in the circuit. If energy is removed from a motor running at a certain speed, it will usually come to a standstill after a certain amount of time. The timer can be set to delay the enabling signal to unlock the guard doors for the duration needed for the motion to stop. The SRB-E...FWS Series can be used to safely unlock guards at a consistent defined time.

Back EMF monitoring

Back electromotive force, or Back EMF, is a phenomenon that occurs in electric motors where the rotating armature in the presence of a magnetic field produces a voltage which opposes the original applied voltage. Since the Back EMF is proportional to the armature speed and remains even after the supply voltage is removed, it can be used by monitoring devices for indirect measurement of the motor speed or to determine when the motor is at a standstill. The SSW303HV standstill monitor uses this method.

Range	Type	Operating Voltage	Input types	Enabling circuits	Auxiliary outputs
SRB-E-302FWS-TS	Standstill, timer	24 VDC	1 or 2 impulse sensors	2 relays, 1 PNP	2 PNP
SRB-E-402FWS-TS	Standstill, timer, guard door monitoring	24 VDC	1 or 2 impulse sensors	2 relays, 2 PNP	1 NC, 1 PNP
SSW303HV	Sensorless standstill	24 VAC ... 230 VAC / 24 VDC	Back EMF	3 relays	3

SAFETY-MONITORING MODULES

OVERVIEW OF THE SERIES



Range	■ SRB-E-201LC	■ SRB-E-201ST	■ SRB-E-204ST	■ SRB-E-301ST	■ SRB-E-301MC	■ SRB-E-302ST	■ SRB-E-212ST
Type	General	General	General	General	General	General	General
Operating voltage U_b	24 VDC	24 VDC	24 VDC	24 VAC/DC	24 VAC/DC	24 VAC/DC	24 VDC
Monitored inputs	Dry + PNP	Dry + PNP Two-hand control panels	Dry + PNP	Dry + PNP Safety mats	Dry + PNP	Dry + PNP	Dry + PNP Two-hand control panels
No. of devices monitored	1	1	4	1	1	2	1
No. of safety outputs	2x PNP	2x PNP	2x PNP	3x relay	3x relay	2x relay 1x PNP	2x relay, STOP 0 1x PNP, STOP 1
Number of signalling outputs	1	1	4	1	1	2	2
Feedback monitoring	■	■	■	■	■	■	■
Type of reset	Monitored-manual, Automatic or Manual	Monitored-manual, Automatic or Manual	Monitored-manual, Automatic or Manual	Monitored-manual, Automatic or Manual	Automatic or Manual	Monitored-manual, Automatic or Manual	Monitored-manual, Automatic or Manual
Cross-wire monitoring	Selectable	Selectable	Selectable	Selectable	Selectable	Selectable	Selectable

* Output expander SRB-E-602EM, 1x 6 potential-free safety outputs with one safety controller OR 2x 3 potential-free safety outputs with two safety controllers.

** Input expander SRB-E-204PE, monitoring of safety outputs is carried out using safety relay modules or safety controllers.



■ SRB-E-232ST	■ SRB-E-322ST	■ SRB100DR	■ SRB-E-402ST	■ SRB-E-402EM	■ SRB-E-602EM	■ SRB-E-204PE
General	General	Double reset	General 2 safety functions	Output expander	Output expander	Input expander
24 VDC Dry + PNP	24 VDC Dry + PNP	24 VAC/DC Potential free contacts	24 VDC Dry + PNP Two-hand control panels	24 VAC/DC -	24 VAC/DC -	24 VDC Dry + PNP
1 3x relay, STOP 1 2x PNP, STOP 0	1 3x relay, STOP 0 2x PNP, STOP 1	2 1x relay	2 2x relay 2x PNP	- 4x relay	- 6x relay *	4 2x PNP **
2	2	-	2	2	2	4
■	■	-	■	■	■	-
Monitored-manual, Automatic or Manual Selectable	Monitored-manual, Automatic or Manual Selectable	Monitored-manual, Double reset -	Monitored-manual, Automatic or Manual Selectable	- -	- -	- Selectable

PROGRAMMABLE MODULAR SAFETY CONTROLLER DESCRIPTION

Increasing demands on ease of use or new normative requirements are making today's machines more and more complex. This concerns both the safety-related consideration and the realisation of the safety functions. In addition, constantly changing markets require quick reactions and thus modular and easily scalable concepts.

The PROTECT PSC1 safety controller system consists of freely programmable compact controllers and I/O expansion modules for safe signal processing of emergency stop switches, interlocks, light grids and other 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.



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PROGRAMMABLE MODULAR SAFETY CONTROLLER

OVERVIEW OF THE SERIES



Range	■ PSC1-C-10	■ PSC1-C-100	■ SafePLC2
Inputs	<ul style="list-style-type: none"> ■ 14 safe inputs (up to PL e / SIL 3) 	<ul style="list-style-type: none"> ■ 14 safe inputs (up to PL e / SIL 3) ■ 20 adjustable safety-related inputs/outputs 	Programming software <ul style="list-style-type: none"> ■ Modern and intuitive development environment ■ Preconfigured elements ■ Application code reuse by macros ■ Search functions ■ Simple signal tracking by different colour representation and status messages ■ Easy to detect safety functions through practice oriented libraries for logic, Safe Drive Monitoring, SD-bus and encoder elements ■ Configurable user permissions
Outputs	<ul style="list-style-type: none"> ■ 4 adjustable safe semiconductor outputs: 2 A p-switching or p-/n-switching ■ 2 safe relay outputs for 24 VDC or 230 VAC, 2 A ■ 2 signalling outputs, 250 mA ■ 2 pulse outputs (clock outputs) for monitoring the potential-free contacts 	<ul style="list-style-type: none"> ■ 4 adjustable safe semiconductor outputs: 2 A p-switching or p-/n-switching ■ 2 safe relay outputs for 24 VDC or 230 VAC, 2 A ■ 2 signalling outputs, 250 mA ■ 2 pulse outputs (clock outputs) for monitoring the potential-free contacts 	
Options	<ul style="list-style-type: none"> ■ Modular expandable with up to 2 I/O expansion modules (central) ■ Universal communication interface ■ Memory card (SDHC) ■ Safe drive monitoring, for 1 or 2 axes ■ Integrated serial diagnostic (SD) gateway 	<ul style="list-style-type: none"> ■ Modular expandable with up to 8 I/O modules (central / decentral) ■ Universal communication interface ■ Memory card (SDHC) ■ Modular expandable up to 6 safe drive monitoring modules (max. 12 axes) 	

PROGRAMMABLE MODULAR SAFETY CONTROLLER FUNCTIONS

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. This is possible in conjunction with the FB1 and FB2 variants of the PSC1-C-100 series



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).



MEMORY CARD

Written programs can be loaded into the PSC1 module either via a computer connection or via an SDHC memory card.

The 'Memory Card' option enables quick programming of multiple identical systems.

SAFE CROSS COMMUNICATION

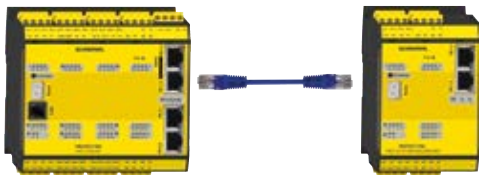


Safe cross-communication is used to exchange data between participants in a network of safety controllers in a safety-oriented manner.

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 REMOTE I/O COMMUNICATION



In conjunction with the FB1 and FB2 variants of the PSC1-C-100 series, the remote I/O expansion module PSC1-E-37-14DI-4DO-2RO-RIO is available for decentralised application requirements.

Communication is realised via the Ethernet SDDC protocol.

Simultaneous operation with safe cross and remote I/O communication via the universal communication interface is possible.

SAFE DRIVE MONITORING (SDM)

For safe drive monitoring many safety features are supported:

- **Safe shutdown:** Safe Torque OFF (STO)
- **Safe stopping:** Safe Stop 1 (SS1), Safe Stop 2 (SS2), Safe Operating Stop (SOS)
- **Safe movement:** Safely-Limited Speed (SLS), Safe Direction (SDI)
- **Safe monitoring:** Safe Cam (SCA)
- **Safe positioning:** Safely-Limited Position (SLP), Safely-Limited Increment (SLI), Safe 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



SAFETY FIELD BOXES DESCRIPTION

The safety fieldbox SFB, in the 3 fieldbus variants for PROFINET with PROFIsafe, EtherNet/IP with CIP-Safety and EtherCAT with FSoE, is suitable for the simple 'plug & play' installation of up to eight safety switchgear devices. The universal device interface with 8-pole M12 connector allows connection of a wide range of different switchgear devices: electromechanical and electronic solenoid interlocks, switches, sensors, light curtains and control panels.

The safety signals from the connected safety switchgear devices are forwarded to a safety controller for evaluation via the safe fieldbus interface. Parallel transfer of safety signals allows free connection of the safety switchgear devices in the F control.

The diagnostic signals from the connected safety switchgear devices can also be analysed. An additional digital input is integrated on every M12 device port for this purpose. In addition, the device connections on the field box can also be configured for connection for a range of devices to allow for maximum flexibility in the conception of safety solutions. All device connections can also be equipped with a self-resetting fuse for wiring protection. After eliminating the overload at one of the device ports, the fuse resets itself after a short cool-down phase.

The safety field box is a simple and cost-effective installation solution for complex machinery and systems that allows flexible safety solutions to be individually configured.









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SAFETY FIELD BOXES

OVERVIEW OF THE SERIES



Range	■ SFB-PN-IRT-8M12-IOP-V2	■ SFB-EIP-8M12-IOP	■ SFB-EC-8M12-IOP
Technology	 	 	 Safety over 
Standards	EN 61131-1, EN 61131-2, EN 60947-5-3, EN ISO 13849-1, IEC 61508		
Ambient temperature	-20 °C ... +55 °C		
IP rating	IP66, IP67		
Supply voltage U_b	24 VDC -15% / +10%		
Operating current I_b	10 A		
Field bus interface			
Integrated switch	Dual Port, 100 Mbit/s		
Service interface	WEB-Interface HTTP		
Safety values			
2-channel safety inputs	PL e, Category 4, SIL 3		
1-channel safety inputs	PL c, Category 1, SIL 1		
Safety outputs, 1 cable	PL d, Category 3, SIL 2		
Safety outputs, 2 cables	PL e, Category 4, SIL 3		



INSTALLATION SYSTEMS FOR SAFE SERIES CONNECTION DESCRIPTION

Schmersal offers various systems for simple and cost-effective plug-and-play field installation for series connection of safety switchgear that can achieve up to Cat. 4 / PL e / SIL 3. These systems enable individual evaluation of diagnostic signals from each connected safety switch device in separately operated interlocks.

Most installation systems can communicate with the PROTECT PSC1 programmable modular safety controller or a universal gateway with common fieldbuses.



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INSTALLATION SYSTEMS FOR SAFE SERIES CONNECTION OVERVIEW

...WITH CSS-Y ADAPTORS



CSS-Y-8P
CSS-Y-A-8P

Adaptor with M12 connection used to series connect up to 31 electronic safety devices with Serial Diagnostics (SD).



...WITH PFB



PFB-IOP-4M12-IOP
PFB-SD-4M12-SD

The PFB is an IP67 rated passive field box which can connect up to 4 electronic safety devices or Serial Diagnostic (SD) devices in series. It features integrated LEDs to show status of each device, and is easy to configure via DIP switches.



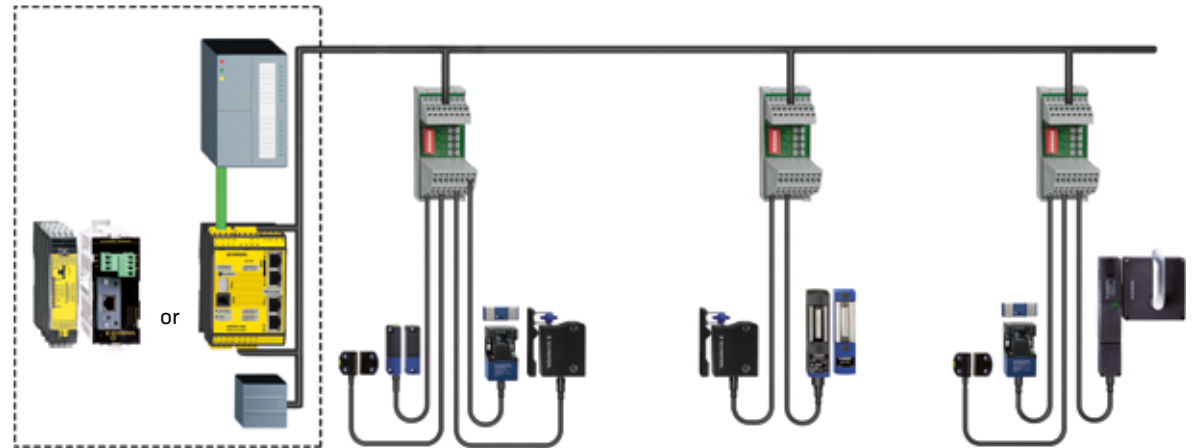
INSTALLATION SYSTEMS FOR SAFE SERIES CONNECTION OVERVIEW

...WITH PDM



PDM-IOP-4CC-IOP
PDM-SD-4CC-SD

The PDM Passive distribution module for series-wiring, designed for mounting in panels. It can connect up to 4 electronic safety devices or Serial Diagnostic (SD) devices in series. It features integrated LEDs to show status of each device, and is easy to configure via DIP switches.

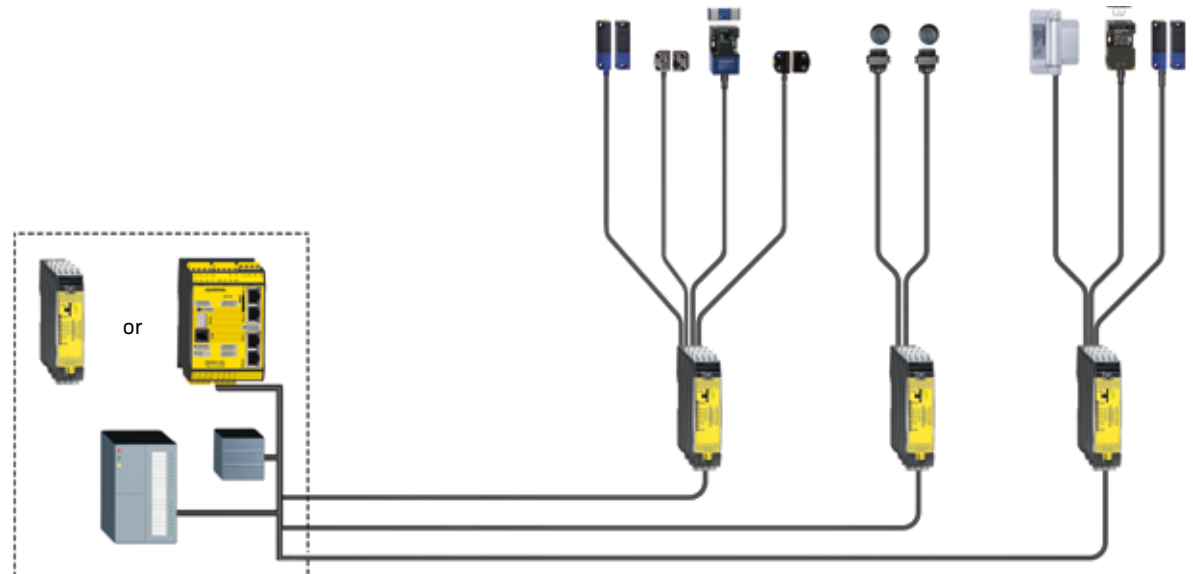


...WITH SRB-E-204PE



SRB-E-204PE

The active input expander modules SRB-E-204PE are used for safe series connection of electro-mechanical with dry contacts or electronic devices having OSSD semiconductor outputs. Up to 4 devices can be connected per module. The module can be configured for up to 15 different application settings via a rotary knob on the face of the unit.





SFB

...WITH SFB

The SFB is a safety field box for various safety field bus systems which allows simple plug-and-play installation via M12 connectors, of up to eight safety devices per box.

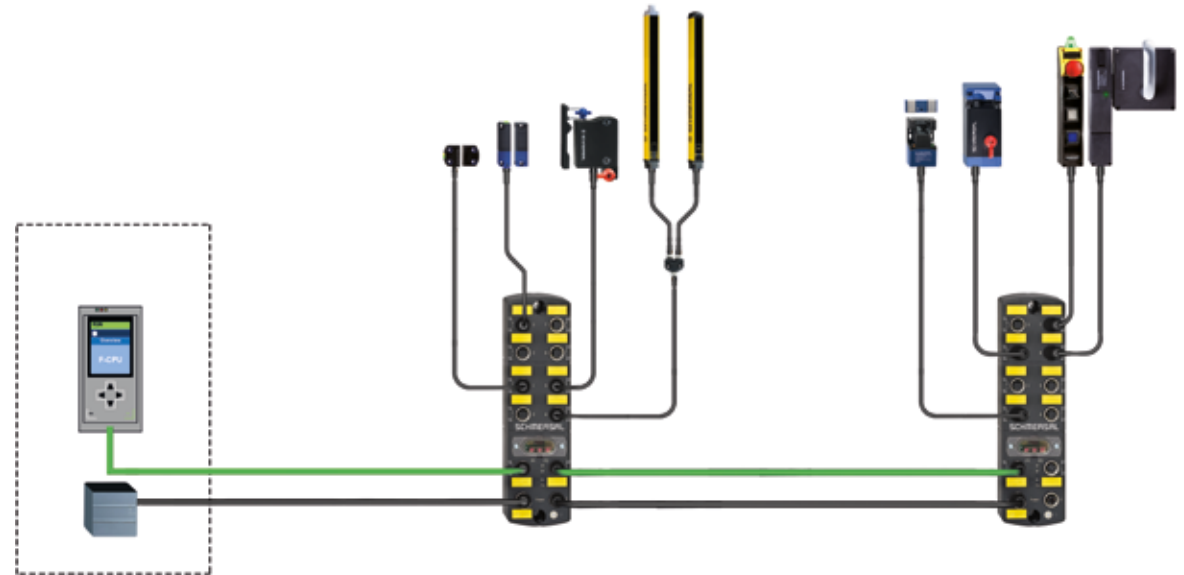
SFB-PN-IRT-8M12-IOP-V2



SFB-EIP-8M12-IOP



SFB-EC-8M12-IOP



...WITH AS-INTERFACE SAFETY AT WORK

AS-Interface Safety at Work is a safety bus system based upon the open standard of AS-International. It is a simple yet flexible solution to quickly, efficiently and cost-effectively integrate a vast safety system. Safety and non-safety components are connected to a central two wire cable which carries power and signals to a monitor. The system can be connected to popular field buses.

On page 51, you will find a list of safety switching devices with integrated AS-i. The AS-i designation in this brochure also indicates compatible devices.



SERIAL DIAGNOSTIC GATEWAY DESCRIPTION

The 'Serial Diagnostics' interface offers the option of analysing detailed status data from electronic safety switching devices. This is particularly advantageous with a series connection, as the benefits of simple installation are combined with detailed, individualised status information. The SD interface is available as an option for many electronic safety sensors, solenoid interlocks and control panels.

Products equipped with an SD interface can transmit extensive diagnostic data to a control system via the SD gateway using the fieldbus. Guard locking devices connected in series can also be individually locked or unlocked via the SD interface. Some Schmersal guard locking devices also have additional control functions, such as latching force adjustment on the MZM 100-SD. Lighting elements of control panels can also be individually controlled and the corresponding pushbuttons evaluated.



Mixed set-ups of sensors, guard locking devices and control panels connected in series are easy to realise in the field with the SD interface. With the SD interface, the diagnostic data and the control of the devices are transmitted serially via a single wire from the SD gateway to the first SD slave, from there to the next SD slave and so on. An SD gateway can communicate with up to 31 SD slaves, which can be automatically addressed and assigned to different safety functions. A wide range of cables, connection and distribution modules are available for installation.







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SERIAL DIAGNOSTIC GATEWAY OVERVIEW OF THE SERIES

SD-Interface Gateways

	Description	Type
	NEW EtherCAT	SDG-ETC-RJ
	NEW PROFINET	SDG-PRN-RJ
	NEW EtherNet/IP (under preparation)	SDG-EIP-RJ
	NEW Modbus TCP (under preparation)	SDG-MBT-RJ
	SD-Gateway PROFIBUS	SD-I-DP-V02
	SD-Gateway PROFINET (discontinued; successor: SDG-PRN-RJ)	SD-I-U-PN
	SD-Gateway Ethernet/IP (discontinued; successor: SDG-EIP-RJ)	SD-I-U-EIP
	SD-Gateway EtherCAT (discontinued; successor: SDG-ETC-RJ)	SD-I-U-EC
	SD-Gateway DeviceNET	SD-I-U-DN
	SD-Gateway CC-Link	SD-I-U-CCL
	SD-Gateway CANopen	SD-I-U-CAN
	SD-Gateway ModbusTCP (discontinued; successor: SDG-MBT-RJ)	SD-I-U-MT
	PROFINET	PROTECT PSC1
	EtherNet/IP	
	EtherCAT	
	ModbusTCP	
	Profibus	
	CANopen	

SD interface accessories

	Description	Type
	<ul style="list-style-type: none"> Passive distribution module for SD interface 4 device connections for electronic safety switching devices 	PDM-SD-4CC-SD
	<ul style="list-style-type: none"> Passive fieldbox IP67 for SD interface systems 4 device connections for electronic safety switching devices 	PFB-SD-4M12-SD
	<ul style="list-style-type: none"> Y-adapter 2 female connectors, 8-pole; 1 connector, 8-pole M12 screw locking 	CSS-Y-8P
	<ul style="list-style-type: none"> Terminating plug for Y-adapter 1 connector, 8-pole M12 screw locking 	CSS-Y-A-8P

KEY TRAPPED SYSTEMS DESCRIPTION

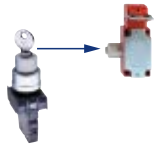
With the SHGV-system, the trapped key determines whether the guard door can be opened or not. In the initial state, the trapped key is in a key-selector-switch which is usually located in a central control console where the stop function of the machine is.

The key can only be removed from there when the machine is in the safe operating mode. The operator can then take the key from the console selector switch and insert it into the lock barrel of the guard door to open it. The key can only be removed from this lock barrel once safety door is closed and locked again.

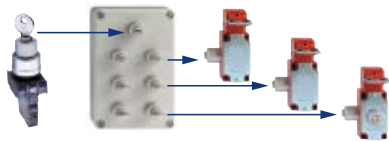
The machine or the hazardous movement can be restarted once the key is back in the selector-switch at the central console.

Hazardous run-on time < Time for the key transfer

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

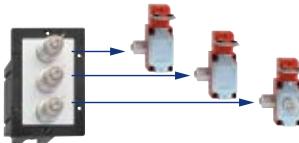


One key-selector-switch SHGV/ESS locks several moveable pieces of protection equipment using the key-distribution-station SVM

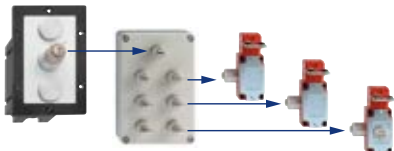


Hazardous run-on time > Time for the key transfer

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

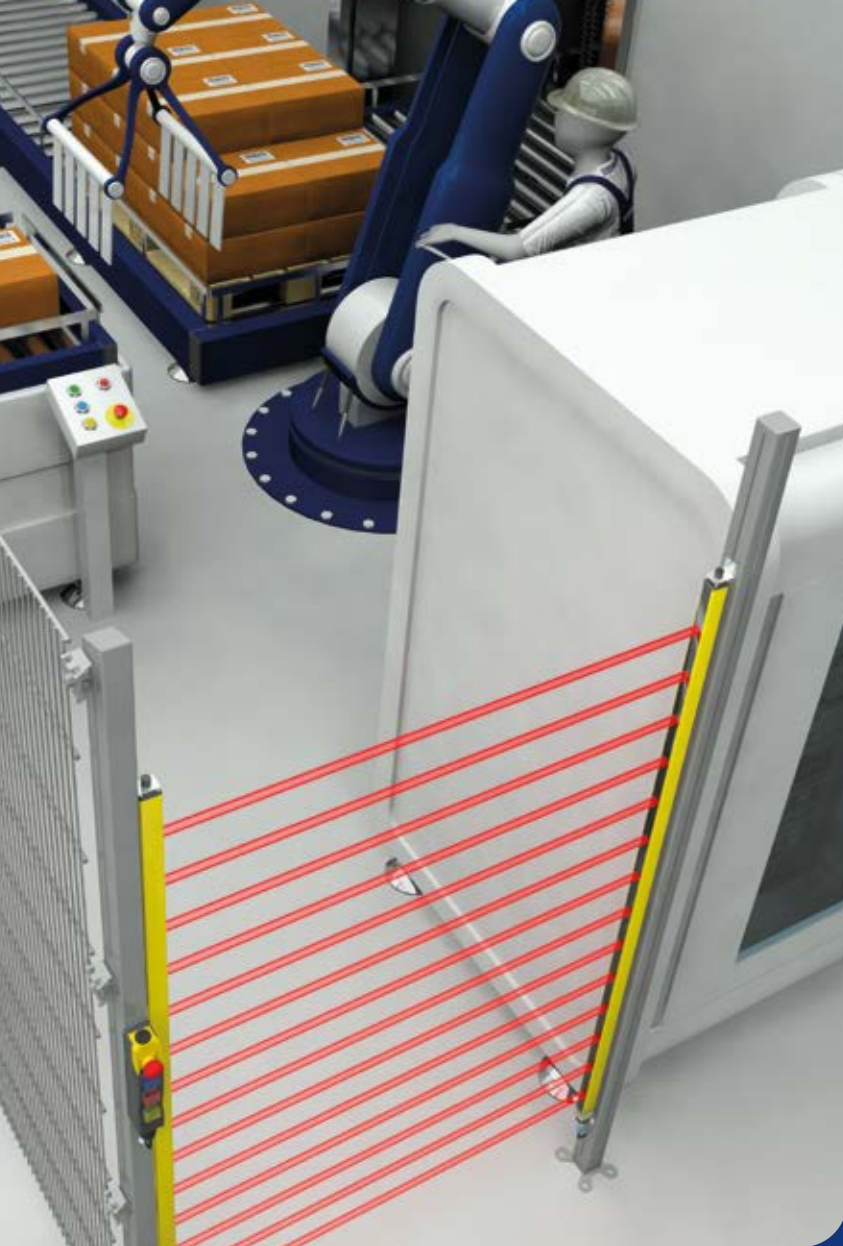


KEY TRAPPED SYSTEMS

OVERVIEW OF THE SERIES



Range	■ SHGV	■ SHGV/ESS21S2	■ SVE	■ SVM
Type	Guard locking device	Key-operated selector switch	Key-operated selector switch interlocking device	Key distribution station
Housing material	Metal	Metal/thermoplastic	Thermoplastic	Aluminium (box) Stainless steel (plate)
IP rating	IP65	IP65	IP65	IP65 (enclosure) / IP40 (plate)
Connection	-	Screw connection	Screw connection	-
Contact options	-	1 NO + 1 NC	Magnet: 1 NO + 1 NC Selector switch: 1 NO + 1 NC 1 NO + 2 NC	-
Features	<ul style="list-style-type: none"> 1 or 2 locking barrels Double reset 	<ul style="list-style-type: none"> Additional contacts Coloured key grips 	<ul style="list-style-type: none"> 1, 2 or 3 selector switches 	<ul style="list-style-type: none"> 6 or 10 keys
Special versions	ATEX	ATEX	ATEX	-



OPTOELECTRONIC SAFETY DEVICES DESCRIPTION

Safety Light Beams (SLB) provide a single infrared beam and Safety Light Grids (SLG) are 2, 3, or 4 beam systems, typically used for presence detection and perimeter guarding. Safety Light Curtains (SLC) are multiple beam arrays used in point of operation applications to detect hands (30mm resolution) or fingers (14mm resolution) in the protection field.

Muting and blanking functions allow objects to pass through the protective field but prevent persons from entering the danger zone. Beam coding allows several devices to work in the same area without interfering with each other.

Safety light curtains and light grids with Bluetooth interface enable data transmission to Android and iOS smartphones and tablets equipped with the Schmersal SLC Assist app. An IP69 enclosure is available for applications that require high-temperature or high-pressure cleaning, as is typical in hygiene-sensitive areas.



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OPTOELECTRONIC SAFETY DEVICES

OVERVIEW OF THE SERIES



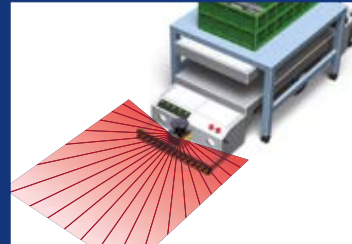
Range	■ SLC440COM	■ SLC440COM IP69	■ SLC440	■ SLC440 IP69	■ SLC445	■ SLB440
Dimensions	27.8 × 33 mm	∅ 50 mm	27.8 × 33 mm	∅ 50 mm	27.8 × 33 mm	28 × 72 × 33 mm
Resolution	14 mm, 30 mm, 35 mm	14 mm, 30 mm, 35 mm	14 mm, 30 mm	14 mm, 30 mm	14 mm, 30 mm	-
Protection field height	330 mm ... 1930 mm	330 mm ... 1770 mm	170 mm ... 1930 mm	170 mm ... 1770 mm	170 mm ... 1770 mm	1 beam
Range	0.3 m ... 10 m 8 m ... 30 m	0.3 m ... 10 m 8 m ... 30 m	0.3 m ... 10 m 4 m ... 20 m	0.3 m ... 10 m 4 m ... 20 m	0.3 m ... 10 m	12 m ... 75 m
Features	<ul style="list-style-type: none"> Start Interlock LED end cap Bluetooth interface for SLC ASSIST App 	<ul style="list-style-type: none"> IP69 housing Plastic end caps All SLC440COM functions apply including Bluetooth Interface 	<ul style="list-style-type: none"> LED end cap 7 segment display Blanking Contact control Beam coding Start Interlock Double reset High range (20 m) Bluetooth interface 	<ul style="list-style-type: none"> IP69 housing Stainless steel or plastic end caps All SLC440COM functions apply including Bluetooth Interface 	<ul style="list-style-type: none"> LED end cap 7 segment display Muting Cyclic function Multiscan + SLC440 functions Complete muting sensor set available 	<ul style="list-style-type: none"> Single beam LED end cap Start Interlock Beam Coding
IP rating	IP67	IP69	IP67	IP69	IP67	IP67
Type 2 version	SLC240COM	-	-	-	-	SLB240
Light grid version	SLG440COM 2-, 3- or 4-beam	SLG440COM IP69 2-, 3- or 4-beam	SLG440 2-, 3- or 4-beam	SLG440 IP69 2-, 3- or 4-beam	SLG445 2-, 3- or 4-beam	-
Special versions	-	-	AS-i, ATEX	-	-	High range up to 75 m Optional heater, frost-free to -30 °C



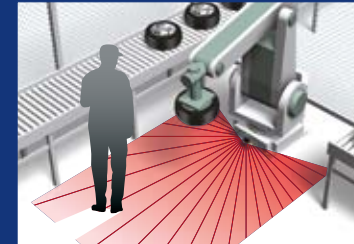
SAFETY LASER SCANNER DESCRIPTION

Safety Laser Scanners are presence sensing devices, also known as active opto-electronic protective devices responsive to diffuse reflection (AOPDDR). Safety Laser Scanners are one of the most effective presence sensing technologies as they can cover a wider area than compared to other solutions. The safety monitoring area generally comprises a wide warning zone and a narrower protection zone.

APPLICATIONS



Collision avoidance
Switching between 32 safe zone sets enables collision avoidance for AGVs



Presence detection
Detection of persons or objects entering the safety zone



Access control
Arm and hand protection for critical safety zones in the work area, for example during insertion or placement work



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SAFETY LASER SCANNER

OVERVIEW OF THE SERIES



Range	■ UAM-05LP-T301	■ UAM-05LP-T301C	■ UAM-05LPA-T301	■ UAM-05LPA-T301C
Dimensions (W × H × L)	80 × 95 × 80 mm	80 × 95 × 80 mm	80 × 95 × 80 mm	80 × 95 × 80 mm
Range	Detection angle: 270° Protection field: 5 m Warning zone: 20 m	Detection angle: 270° Protection field: 5 m Warning zone: 20 m	Detection angle: 270° Protection field: 5 m Warning zone: 30 m	Detection angle: 270° Protection field: 5 m Warning zone: 30 m
Connection	3 m cable, open cable ends	Cable with connector, 0.3 m	3 m cable, open cable ends	Cable with connector, 0.3 m
IP rating	IP65	IP65	IP65	IP65
Features	<ul style="list-style-type: none"> • Dual protection zone mode • Configuration Software • Measurement and diagnostic data via Ethernet • Master/slave • Configuration interface: USB 	<ul style="list-style-type: none"> • Dual protection zone mode • Configuration Software • Measurement and diagnostic data via Ethernet • Master/slave • Configuration interface: USB 	<ul style="list-style-type: none"> • Dual protection zone mode • Configuration Software • Measurement and diagnostic data via Ethernet • Master/slave • Configuration interface: USB and Ethernet • Increased resistance to contamination and extraneous light 	<ul style="list-style-type: none"> • Dual protection zone mode • Configuration Software • Measurement and diagnostic data via Ethernet • Master/slave • Configuration interface: USB and Ethernet • Increased resistance to contamination and extraneous light



SAFETY MATS DESCRIPTION

Safety mats are used for the protection of man on machinery and plants with hazardous movements. Typical fields of application are, for instance, the protection of hazardous areas and surfaces on wood-processing machines, scissor lifts or punching presses. The safety mats are characterised by a very robust construction and high resistance to acids, alkalis, oil and petrol.

The safety pressure mat consists of two current-carrying thin steel plates separated by insulating strips. Applying pressure to the mat surface creates an electrical cross-wire short between the steel plates. The connected safety controller evaluates this signal and stops the hazardous movement.

SAFETY EDGES DESCRIPTION

If there is a risk of crushing or piercing from automatically moving machine or machine parts, these areas can be secured using safety edges, for example, on lift tables, lifting platforms, or the lift gates of automated production plants, driverless transportation systems (DTS) and mobile shelving systems.

This system uses an infrared sensor that is inserted into the round channel at the top of the rubber profile. The deformation of the rubber profile interrupts/weakens the signal between the transmitter and receiver. This is sensed by the safety controller, disabling the outputs to signal the hazardous movement to stop.



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SAFETY MATS / SAFETY EDGES

OVERVIEW OF THE SERIES



Range	■ SMS4	■ SMS5
Type	Safety mat	Safety mat
Dimensions *	250 mm × 500 mm 500 mm × 500 mm 500 mm × 1000 mm 750 mm × 1000 mm 1000 mm × 1000 mm 1000 mm × 1500 mm	250 mm × 500 mm 500 mm × 500 mm 500 mm × 1000 mm 750 mm × 1000 mm 1000 mm × 1000 mm 1000 mm × 1500 mm
Mounting ramp edge	Separate	Integrated
Accessories	SMS 4-RS-3000	----
Safety-monitoring module	SRB301HC, SRB-E-301ST	

Range	■ SE-P40	■ SE-P70
Type	Safety edge	Safety edge
Dimensions (W × H)	25 × 40 × ... mm	25 × 70 × ... mm
Mounting rails	SE-AL10-1250 SE-AL12-1250	SE-AL20-1250 SE-AL22-1250
Additional Components	SE-T.40 end cap SE-SET sensor set SE-100C safety-monitoring module SE-304C safety-monitoring module SE-400C safety-monitoring module	SE-T.70 end cap SE-SET sensor set SE-100C safety-monitoring module SE-304C safety-monitoring module SE-400C safety-monitoring module

* Custom sizes, colours and profile patterns are available.
Please contact our technical sales department or visit products.schmersal.com.



CONTROL DEVICES WITH SAFETY FUNCTION

DESCRIPTION

Enabling switches

Enabling switches are used – perhaps together with other safety measures to provide personal protection in potentially hazardous environments where the special operating modes of a machine necessitate partial or complete removal of the safety guards. The current Machinery Directive (2006/42/EC) as well as diverse product-specific EC standards specially underline how machine operation can be simplified.

Safety foot switches

Safety foot switches are used as enabling devices for machines and systems where, for example, manual operation is not possible. The main application areas are machines in the metal working industry. The safety foot switch switches OFF-ON-OFF. Initiate the workflow by stepping on the foot pedal to the pressure point. The machine process now runs until you either release the pedal or press it further down until the pressure point is exceeded. If you press the pedal all the way down, it will lock until it is reset manually.

Two-hand control panels

Two-hand control panels belong to the family of non-separating protective equipment. In general, they serve to ensure the machine operator's hands are located on the control panel when the control signal for a hazardous movement is issued. These command devices thus ensure the operator is not in the way of dangerous moving parts when a machine or plant is started.

Control panels

BDF products are enclosed in a high quality slimline housing made from shock-resistant plastic and are easily attached to the machine's commercially available aluminium profile system, with space for up to four operating controls. The user can choose from a large product portfolio of illuminated control push buttons, selector switches, LED illuminated indicators, key-operated switches and standard-compliant Emergency-Stop command devices.



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CONTROL DEVICES WITH SAFETY FUNCTION

OVERVIEW OF THE SERIES



Range	■ ZSD	■ TFH232	■ SEPK / SEPG	■ BDF20	■ BDF40	■ BDF100	■ BDF200
Type	Enabling switch	Safety foot switch	Two-hand control panel	Control panel	Control panel	Control panel	Control panel
IP rating	IP65	IP65	IP65	IP65	IP65	IP65	IP65
Features	<ul style="list-style-type: none"> • OFF-ON-OFF switch • Optional top button 	<ul style="list-style-type: none"> • OFF-ON-OFF switch • Hooded housing • 2-pedal version available (T2FH 232) • Reset pushbutton 	<ul style="list-style-type: none"> • Plastic or metal housing • Custom versions • Stands available 	<ul style="list-style-type: none"> • Up to 2 operating elements • Emergency stop, pushbuttons, and indicator lights 	<ul style="list-style-type: none"> • Up to 4 operating elements • Door interlocking system with AZM40 and DHS • E-Stop, push buttons, and indicator lights 	<ul style="list-style-type: none"> • 1 operating element • Integrated indicator lamp • Wide variety of control elements 	<ul style="list-style-type: none"> • Up to 4 operating elements • Door interlocking system with AZM201 • Wide variety of control elements
Special versions	-	-	-	-	-	-	AS-i, SD



PULL-WIRE EMERGENCY STOP SWITCHES DESCRIPTION

For machine parts which can't be protected using safety covers, pull-wire emergency stop switches with their "extended arm" offer an excellent alternative to emergency stop buttons. The advantage of pull-wire switches over mushroom head emergency stop pushbuttons is that the emergency stop command can be triggered anywhere along the wire.

Schmersal pull-wire emergency stop switches feature the required reset function, double-break contact blocks offering a choice of several contact variations, optional integrated emergency stop button and the required means of tension monitoring. Once the pull-wire is tensioned, the switch will initiate an emergency shutdown if an operator falls into, is pulled into, or pulls on the pull-wire, even if the pull-wire is cut or slack.



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PULL-WIRE EMERGENCY STOP SWITCHES

OVERVIEW OF THE SERIES



Range	■ ZQ700	■ ZQ900	■ ZQ901	■ RS655 / RS656	■ T3Z068	■ ZQ215 / ZQ315
Housing material	Thermoplastic	Metal Thermoplastic (cover)	Stainless steel (V4A)	Grey cast iron Thermoplastic	Metal	Metal
IP rating	IP67	IP65, IP67	IP65, IP67, IP69	IP66, IP67	IP65	IP66, IP67
Dimensions (W × H × D)	40.5 × 160 × 51 mm	71 × 220 × 69.7 mm	73 × 220 × 75 mm	234 × 108 × 119 mm	182 × 124.5 × 178 mm	215: 31 × 93.5 × 32.5 mm 315: 40 × 93.5 × 32.5 mm
Connection	Screw connection Connector plug	Screw connection Connector plug	Screw connection	Screw connection	Screw connection	Screw connection Connector plug
Contact options	1 NO + 1 NC 2 NC	1 NO + 1 NC 2 NO + 2 NC 1 NO + 3 NC 2 NC, 4 NC	1 NO + 1 NC 2 NO + 2 NC 1 NO + 3 NC 2 NC, 4 NC	2 NO + 2 NC	1 NO + 1 NC 2 NO + 2 NC 3 NO + 3 NC	2 NC 1 NO + 1 NC 1 NO + 2 NC
Max. wire length	10 m	75 m	75 m	100 meters (both directions)	50 meters (both directions)	25 m
Features	<ul style="list-style-type: none"> Reset pushbutton 	<ul style="list-style-type: none"> Reset pushbutton Optional emergency stop button 	<ul style="list-style-type: none"> Reset pushbutton 	<ul style="list-style-type: none"> Bi-directional Reset pushbutton Optional: DuplineSafe 	<ul style="list-style-type: none"> Bi-directional Reset by pull ring 	<ul style="list-style-type: none"> Straight, left or right alignment Reset pushbutton
Special versions	-	ATEX	-	ATEX (RS655 only)	-	-

ACCESSORIES

Wire rope	Eyebolt	Tension spring	Wire clamp	Turnbuckle	Wire thimbles	Rope tensioner S900	Shackle

EMERGENCY STOP BUTTONS DESCRIPTION

These command and signalling devices are very important for man-machine interfaces in industrial applications. They are typically used in control cabinets, control panels, two-hand control panels, elevator construction or conveyor and material handling plants. When manually triggered, the devices initiate the switching off procedure.

Emergency stop button requirements include a red coloured mushroom button with latching function (twist or pull to reset) mounted on a yellow background or housing.



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EMERGENCY STOP BUTTONS

OVERVIEW OF THE SERIES



Range	■ EDRRZ40RT	■ EDRRS40RT	■ RDRZ45RT	■ HDRZ40-BL-RT-GB	■ ADRR40RT	■ MBKAC311YE	■ NAS311ST1-AS
Material	Metal	Metal	Metal	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic
IP rating	IP65	IP65	IP65	IP69K	IP65	IP65	IP65
Features	<ul style="list-style-type: none"> • Button only • Separate contacts 	<ul style="list-style-type: none"> • Button only • Separate contacts 	<ul style="list-style-type: none"> • Button only • Separate contacts 	<ul style="list-style-type: none"> • Button only • Separate contacts • Suitable for hygiene-sensitive applications 	<ul style="list-style-type: none"> • Button only • Separate contacts 	<ul style="list-style-type: none"> • Complete kit with contacts and enclosure 	<ul style="list-style-type: none"> • Complete set, M12 connector plug for AS-i
Reset	Pull	Keyed	Pull	Pull	Pull	Pull	Pull
Special versions	-	-	ATEX	-	-	-	-

ACCESSORIES

Yellow label signs



NDP-65	Self-adhesive plastic film, yellow (IP69)
MDP-8	Metal plate, yellow

Enclosures



MBKAC311YE	Plastic, yellow cover
MBGAC311YE	Aluminium, yellow cover

SPECIAL APPLICATIONS OVERVIEW

IP69/IP69K – FOR HYGIENE APPLICATIONS

Schmersal offers a constantly expanding range of products for highly dusty environments and for high pressure and temperature conditions (up to 100 bar and approx. 80 °C), such as those encountered in washing down in hygiene applications.



Electronic solenoid interlocks

- AZM300

Optoelectronic safety devices

- SLC/SLG440COM
- SLC/SLG440

Safety sensors

- RSS36
- BNS40S
- CSS30S
- BNS16

Joysticks

- RK/NK

Command and signalling devices

- Pushbuttons
- Emergency stop
- Indicator lights
- Selector switches
- Step selector switches
- Potentiometer drives
- Main switches

ATEX – FOR EXPLOSIVE APPLICATIONS

Areas with potentially explosive atmospheres due to the presence of gas and dust need special components that will not ignite a fire or explosion. Schmersal offers a diverse range of intrinsically safe components, EX rated for use in Zones 1, 2, 21, and 22.



- Solenoid interlocks
- Safety switches with separate actuator
- Safety sensors
- Magnetic reed switches
- Safety light grids / light curtains
- Safety switches for hinged guards
- Position switches
- Belt alignment/slack-wire switches

- Pull-wire emergency stop switches
- Command and signalling devices
- Trapped key systems
- Safety-monitoring modules



AS INTERFACE SAFETY AT WORK

AS-Interface Safety at Work is a safety bus system based upon the open standard of AS-International. It is a simple yet flexible solution to quickly, efficiently and cost-effectively integrate a vast safety system. Schmersal offers a wide range of safety switchgear with integrated AS-i:



Safety switch with separate actuator

- AZ16-AS

Solenoid interlocks

- MZM100-AS
- AZM201-AS
- AZM300-AS
- AZM161-AS

- AZM170-AS

Optoelectronic safety devices

- SLC/SLG440-AS

Command and signalling devices

- BDF200-AS
- NAS311-AS (Emergency stop)

Safety sensors

- BNS260-AS
- BNS36-AS
- BNS16-AS
- RSS260-AS
- RSS36-AS



INDUSTRY SOLUTIONS

Schmersal presents a selection of safety switchgear suitable for the specific challenges faced in various industries in a series of guides. Check our website or contact your local Schmersal representative for more information on Industry Solutions.



- Food and beverages
- Packaging
- Machine tools
- Intralogistics
- Lift switchgear
- Robotics

- Wood industry
- Heavy industry
- Automotive
- Airports
- Semiconductor industry
- Mechanical engineering

- Pharmacy
- Plastics and rubber
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tec.nicum – Solutions & Services GmbH is a subsidiary of the Schmersal Group. It offers a wide range of services relating to machine and occupational safety.

tec.nicum consists of a global consultancy network of TÜV Rheinland-certified engineers for functional safety and Machinery CE Experts. The services can be utilised worldwide.

The range of services at tec.nicum is based on six modules: knowledge transfer in the academy section, consultancy services in the consulting section, designing safety solutions in the engineering section, practical implementation in the integration section, the development of software solutions and new digital technologies in the digitalisation section and the provision of complete solutions in the outsourcing section.



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The range of services offered by tec.nicum comprises six segments: academy (knowledge transfer), consulting (advisory services), engineering (technical planning), integration (execution and implementation), digitalisation (software solutions and new digital technologies) as well as outsourcing (complete solutions).

<p>academy</p> <p>Education center</p> <ul style="list-style-type: none"> ■ Training courses ■ Customer-specific workshops ■ In-house seminars ■ Certified courses (MCEexpert and FSE) 	<p>consulting</p> <p>Analysis and documentation</p> <ul style="list-style-type: none"> ■ Technical support ■ Risk assessments ■ CE conformity assessment ■ Evaluation of machines and production lines ■ Reports
<p>engineering</p> <p>Planning and design</p> <ul style="list-style-type: none"> ■ Technical project planning ■ Conceptual project development ■ Electrical and mechanical design ■ Executive project management 	<p>integration</p> <p>Practical application</p> <ul style="list-style-type: none"> ■ Turnkey approach ■ Installation ■ Retrofit
<p>digitalisation</p> <p>Software integration</p> <ul style="list-style-type: none"> ■ tec.ps (Product Service System) ■ tec.ssm (Schmersal Smart Machine) ■ tec.cvs (AI and Computational Vision Solutions) ■ tec.dloto (Digital Lockout Tagout) ■ tec.ems (Energy Monitoring System) 	<p>outsourcing</p> <p>Serial solutions</p> <ul style="list-style-type: none"> ■ Plug & Play products ■ Engineer to Order projects ■ Systems and cabinets



THE SCHMERSAL GROUP

PROTECTION FOR MAN AND MACHINE

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 2,000 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" in mechanical engineering and plant manufacturing and operators of machinery. They benefit from the company's extensive expertise as a provider of systems and solutions for machine safety. In addition, Schmersal specialises in various areas including intralogistics, 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 design and realise complex solutions for safety around the world in close collaboration with the clients.



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The details and data referred to have been carefully checked.
Technical amendments and errors possible.

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