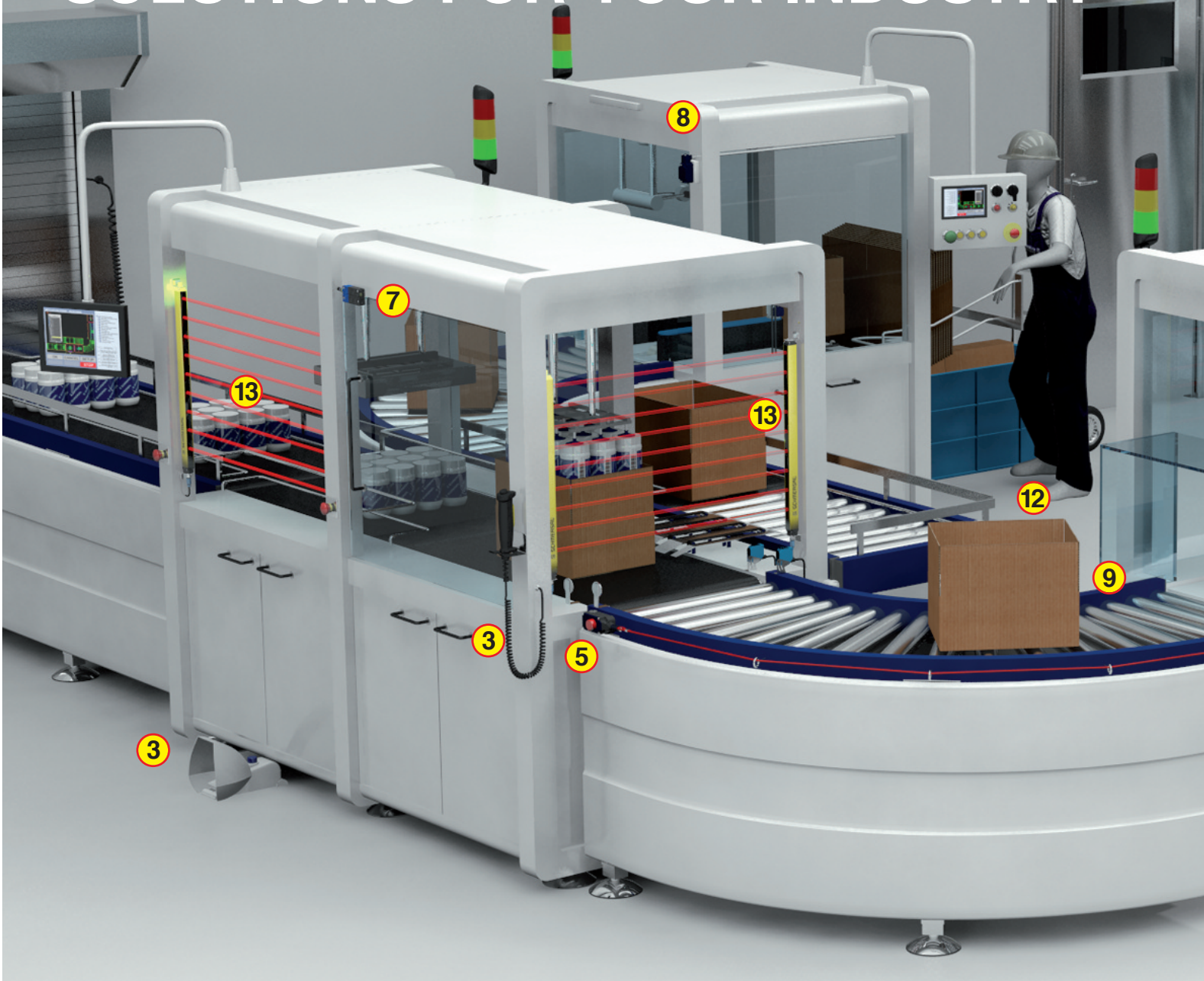# MACHINE GUARDING SAFETY PRODUCTS

- Safety Interlock Switches
- Non-Contact Safety Sensors
- Emergency Cable-Pull Switches
- Safety Controllers
- Safety Light Curtains
- Hinged Safety Interlocks
- Safety Edges/Bumpers

- Safety-Rated Limit Switches
- Safety Foot Switches
- Safety Pressure Mats
- Programmable Safety Controller
- Safe Speed Monitors
- Electronic Safety Sensors
- Serial Diagnostic Gateways

SCHMERSAL

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3

① KEYED INTERLOCK SWITCHES

AZ 15/16

AZ 17

AZ 3350

TZG

SHGV

AZ 415

SELECTION GUIDE			
Switch Series	**Housing Material**	**Envelope Dimensions**	**Contact Configurations**
AZ17 AZ17zi	Glass-fiber, reinforced thermoplastic	1.25" × 1.25" × 2.5"	1 NO & 1 NC 2 NC
AZ15/16 AZ16zi	Glass-fiber, reinforced thermoplastic	1.25" × 2" × 3"	1 NC 1 NO & 1 NC 2 NC 1 NO & 2 NC 3 NC
TZG	Glass-fiber, reinforced thermoplastic	1.75" × 2" × 3.75"	1 NO & 1 NC 2 NC
SDG	Die-cast aluminum	1.75" × 2" × 6"	1 NO & 2 NC 2 NO & 1 NC 3 NC
AZ3350	Die-cast aluminum	1.5" × 1.75" × 4.5"	1 NO & 2 NC 3 NC
SHGV (Key Transfer System)	Die-cast aluminum	1.75" × 1.75" × 4"	1 NO & 1 NC
AZ415	Die-cast aluminum	1.75" × 3.5" × 4"	2 NO & 2 NC

② KEYED INTERLOCK SWITCHES WITH SOLENOID LATCHING

TZK
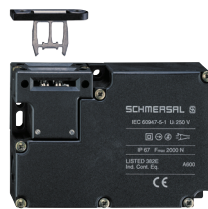
AZM 161

AZM 415

AZM 170

SELECTION GUIDE			
Switch Series	**Housing Material**	**Envelope Dimensions**	**Contact Configurations**
AZM170	Glass-fiber, reinforced thermoplastic	1.25" × 2.5" × 5"	1 NO & 1 NC 2 NC*
AZM161	Glass-fiber, reinforced thermoplastic	1.25" × 3.5" × 5.125"	2 NO & 4 NC
TZF/TZM	Glass-fiber, reinforced thermoplastic	1.5" × 4" × 5"	2 NO & 1 NC*
TKF/TKM	Die-cast aluminum	2.5" × 3.5" × 8"	2 NO & 2 NC
TZKF/ TZKM	Glass-fiber, reinforced thermoplastic	1.75" × 2" × 7"	1 NO & 2 NC*
AZM415	Die-cast aluminum	2" × 5" × 5.5"	2 NO & 2 NC 3 NO & 3 NC

*Other contact versions available. Please consult factory for additional information.

③ APPLICATION ACCESSORIES

STS with TFA/TFI

B25

BDF

ZSD

TFH

SEPK(G)

SELECTION GUIDE

STS Safety Handle Assembly with Emergency Release Option
For AZ16, AZ3350, AZ415, AZM161 & AZM415 Interlock Switches

B25 Safety Door Handle
For AZ17 & AZM170 Interlock Switches

ZSD 3-Position Hand-held Enabling Device
Provides machine stop control

TFH Safety Foot Control
3-stage operation to stop hazardous movements whether released or fully depressed in an emergency situation

SEPK(G) Two-Hand Control Consoles
Lexan or die-cast housing, integrated e-stop mushroom pushbutton, light-force mushroom pushbutton actuators requiring simultaneous operation

BDF Control Stations
An IP65 Rated enclosure with positions for up to 4 control elements: E-Stop button, illuminated and non-illuminated pushbuttons, selector switches, keyed selector switches, or LED indicator lights.
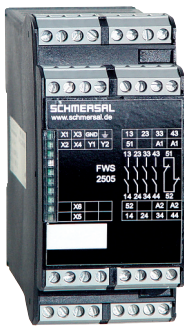
TFA/TFI Guard Alignment Aid
Self centering guide helps align guard and provides end stop. For inside or outside mounting.
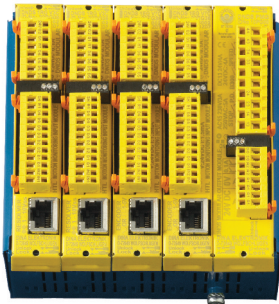
CSA-M-1 Magnetic Latch
Magnetic force helps keep guard door closed and provides end stop.

④ SPEED CONTROL

FWS

DNDS

SELECTION GUIDE

| Switch Series	Operating Voltage	Types of inputs monitored	Type of speed control	No. of enabling circuits	No of Aux. outputs
AZS 2305	24VDC 110VAC 230VAC	Time	Timer	3	2 PNP
FWS 1205	24VDC	2 impulse sensors	Standstill	2	2 PNP
FWS 2505	24-230 VAC/DC	2 impulse sensors	Standstill	4	1 NC 2 PNP
SSW 301 HV	115V AC 230V AC 24V AC 24V DC	Back EMF (up to 690V AC)	Sensor-less standstill	2	1 NC
AZR31S1	24VDC 110VAC 230VAC	Back EMF (up to 400V)	Sensor-less standstill	3	1 NC
DNDS	24VDC	Encoder Resolver Proximity switches	Upper/lower Standstill Safe Motion	Various	Various

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⑤ EMERGENCY CABLE-PULL SWITCHES

ZQ900

ZQ700
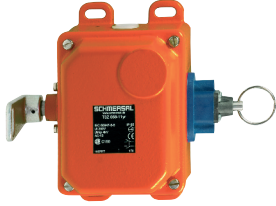
T3Z068
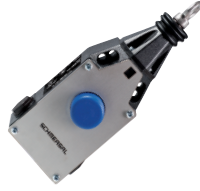
EX-ZQ900

Ready to fit wire kits

S900

SELECTION GUIDE

Switch Series	Housing Material	Max. Span	Contact Configurations	Integral E-Stop
ZQ700	Glass-fiber reinforced thermo-plastic	32.5 feet	1 NO & 1 NC 2 NC	No
ZQ900	Die-cast zinc	165 feet	1 NO & 1 NC 2 NC 2 NO & 2 NC 1 NO & 3 NC 4 NC	Available
T3Z 068	Die-cast iron	165 feet (Each Direction)	1 NO & 1 NC 2 NO & 2 NC 3 NO & 3 NC	No
EX-ZQ900	Die-cast Zinc	165 feet	1 NO & 1 NC 2 NC 2 NO & 2 NC 1 NO & 3 NC 4 NC	No

Cable and Accessories available, including S900 Tensioner.

⑥ NON-CONTACT SAFETY SENSORS

BNS 16

BNS 260

BNS 36
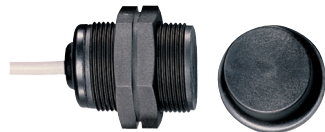
BNS 303

BNS-B20
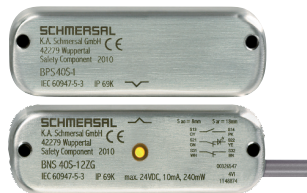
BNS40S

SELECTION GUIDE

Switch Series	Approximate Envelope Dimensions	Operating Voltage	Contact Configurations
BNS260	1.0" x 1.4" x 0.5"	24 VDC	1 NO & 1 NC, 2 NC 1 NO & 2 NC, 3 NC
BNS36	3.5" x 1.0" x 0.5"	24 VDC	1 NO & 1 NC, 2 NC 1 NO & 2 NC, 3 NC
BNS303	1.18" Dia x 1.74"	100 VAC/DC	1 NO & 1 NC 1 NO & 2 NC
BNS30 & BNS300	1.18" Dia x 3.07"	24VDC	1 NC
BNS333	4.5" x 1.7" x 1.7"	24VDC	1 NC
BNS16	1.25" x 2" x 3"	100 VAC/DC	1 NO & 2 NC
BNS40S	0.5" x 1.0" x 3.5"	24 VAC/DC	1 NO & 2 NC
BNS-B20	N/A	24 VDC	1 NO & I NC

PULSE-ECHO & RFID TECHNOLOGY ...NON-CONTACT SAFETY SENSORS

CSS 180

CSS 30S

CSS 34

CSS 16

Gateway

RSS36

SELECTION GUIDE			
Switch Series	Type	Envelope Dimensions	Output Configurations
CSS 180	Cylindrical Safety Sensor	0.7"Dia. × 3.6"	2 PNP Safety 1 Diagnostic
CSS 30S	Stainless Steel Cylindrical Safety Sensor	1.18"Dia. × 3.5"	2 PNP Safety 1 Diagnostic
CSS 34	Rectangular Safety Sensor	1" × 4" × 1"	2 PNP Safety 1 Diagnostic
CSS 16	Safety Sensor in AZ16 Housing	1.25" × 2" × 3"	2 PNP Safety 1 Diagnostic
RSS36	Rectangular RFID Sensor	1" x 1" x 4.2"	2 PNP Safety 1 Diagnostic
SD Gateways for Field Bus	Serial Diagnostic Converters		

...ELECTRONIC SAFETY SWITCHES WITH OR WITHOUT LOCKING

AZ 200

AZM200

MZM 100

MZM 120

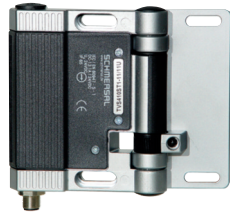| SELECTION GUIDE			
Switch Series	Type	Envelope Dimensions	Output Configurations
AZ 200	Interlock	1.57" x 1.96" x 8.66"	2 PNP Safety 1 or 3 Diagnostic
AZM 200	Solenoid Interlock	1.57" x 1.96" x 8.66"	2 PNP Safety 1 Diagnostic
MZM 100	Magnetic-Latching Interlock	1.75" × 7.25" × 1.75"	2 PNP Safety 1 Diagnostic
MZM 120	IP69K Magnetic-Latching Interlock	1.75" × 7.25" × 1.75"	2 PNP Safety 1 Diagnostic

8 HINGED SAFETY INTERLOCK SWITCHES

T.235

TESZ

TVS335

TESF

	SELECTION GUIDE		
Switch Series	**Housing Material**	**Angular Displacement for Contact Opening**	**Contact Configurations**
TESF	Die-cast zinc	3° Fixed or Adjustable	1 NO & 2 NC 2 NO & 2 NC
TESZ	Glass-fiber, reinforced thermoplastic	4.5°	1 NO & 2 NC 3 NC
TVS335	Die-cast aluminum, enamel finish	2°	1 NO & 1 NC 2 NC
T.C 235	Die-cast zinc, enamel finish	4.5°	1 NO & 1 NC 2 NC 1 NC
T.C 236	Glass-fiber, reinforced thermoplastic	4.5°	1 NO & 1 NC 2 NC 1 NC

9 SAFETY-RATED LIMIT SWITCHES

Z/T 235

Z/T 236

Z/T 335

ZSM476

T/M 250*

T/M 441*

*Heavy-duty limit switches available. Please consult factory.

|	SELECTION GUIDE			
Switch Series	**Housing Material**	**Housing Dimensions**	**Degree of Protection**	**Contact Config-urations**
Z/T235	Die-cast zinc	1.25" × 1.25" × 2.5"	IP67	1 NO & 1 NC 2 NO 2 NC
Z/T236	Glass-fibre reinforced thermoplastic	1.25" × 1.25" × 2.5"	IP67	1 NO & 1 NC 2 NO 2 NC
Z/T335	Die-cast aluminum	1.5" × 1.25" × 3"	IP67	1 NO & 1 NC 2 NO 2 NC
Z/T336	Glass-fibre reinforced thermoplastic	1.5" × 1.5" × 3"	IP67	1 NO & 1 NC 2 NO 2 NC
Z332	Die-cast aluminum	1.5" × 1.5" × 3"	IP65	1 NO & 1 NC (snap-action only)
ZSM476	Glass-fibre reinforced thermoplastic	1.4" x 1.2" x 4"	IP67	1 NC 1 NO 1 NO & 1 NC 3 NC 1 NO & 2 NC

10 ASi TECHNOLOGY

SCHMERSAL offers a diverse family of AS-Interface Safety at Work (SaW) enabled safety components. Emergency-stop command devices, safety switches, solenoid interlocks or safety light curtains are simply connected to the yellow AS-Interface (ASi) cable. A safety monitor is added for the evaluation of the safety system. ASi wiring systems are one of the most flexible networks available, replacing more complex systems and drastically simplifying wiring and diagnostics, while reducing cost and installation time.

ASi Saw system features:
- Up to 31 standard and safety slaves
- No safety PLC necessary
- Maximum response time of 40ms
- Safety-relevant signals can be integrated into plant diagnostics
- Certified up to Control Category 4 according to EN954-1
- Certified up to PLe to EN ISO 13849-1
- Certified up to SIL 3 to IEC 61508

Controller

AS-i Power AS-i Master
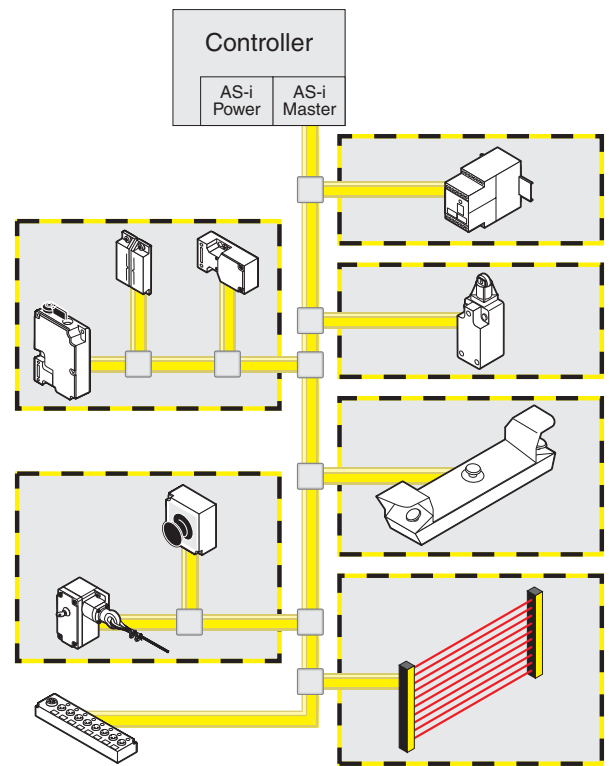
11 FAIL-TO-SAFE SAFETY EDGES

SCHMERSAL's rugged high-tear resistant rubber safety edges are available as sub-components or produced to user specifications. With a choice of aluminum mounting rails, they offer easy installation wherever crushing or shearing points must be safeguarded.

12 SAFETY PRESSURE MATS

SMS 4

SMS 5

SCHMERSAL offers a broad family of standard and custom-made industrial-grade safety pressure mats. Available in 6 standard sizes ranging from 250mm x 500mm to 1000mm x 1500mm and an infinite choice of custom shapes

SMS 4 system available with a choice of 2 different edge finishing profiles.

SMS 5 system manufactured with an integrated trim, eliminating the need for a trim kit package.
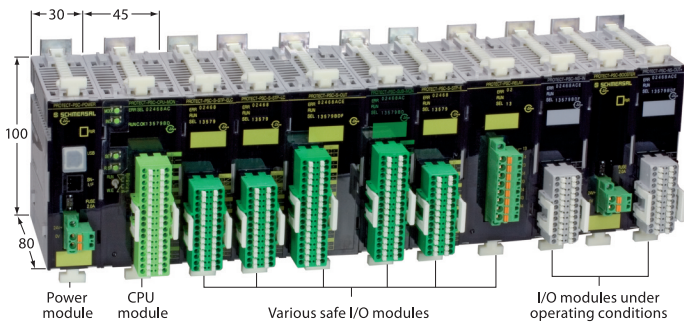
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⑬ OPTO-ELECTRONIC SAFETY DEVICES

SCHMERSAL offers a family of fully CE-compliant "Category 4" Safety Light Curtains. Units are available with 14mm, 30 and 50mm resolution for protection fields of 170mm to 1770mm. Each features an integral safety controller with dual 500mA PNP safety outputs and built-in blanking function as standard features. Units are UL & CSA certified, and IP67 rated. Models are available that provide IP69K protection — making them able to withstand high-temperature and high-pressure washdowns. Additional models are available with an integrated muting function, allowing process materials to pass through the curtain out of the hazardous area while still preventing workers from entering.

In addition SCHMERSAL offers their Series SLB Category 2 and Category 4 single light beams for perimeter guarding. Category 2 units feature a 4m sensing range. Category 4 units feature a 15m sensing range. Each is available with a compatible safety controller and plug-in cables for easy installation.

⑭ PROTECT – PSC

Power module   CPU module   Various safe I/O modules   I/O modules under operating conditions

The Protect PSC is a modular, programmable safety control system designed to accept emergency-stop command devices, safety switches and opto-electronic protective devices. The modular design gives the user the ability to select individual input and output modules to configure a system to meet their individual requirements, with future expansion possible.

Unique to the PSC is the ability to build a complex safety system without programming. This is accomplished using the Mode 1 operating mode, a "hard-wired" version where the system functions result from the arrangement or order of the individual modules at the master/sub-master module. The different system modules provide the user with a fixed number of inputs and outputs. Mode 3 is the free programmable operating mode, where different inputs and outputs of the entire system can be assigned by means of an IEC 61 131-compliant programming language. The smallest system includes 8 inputs and 6 outputs, with over 250 inputs/outputs available when the system is fully extended. The Protect PSC is suitable for Control Category 4 to EN 954-1, PLe to EN13 849-1 or SIL 3 to IEC 61 508.

For monitoring & control of machine guarding safety systems using:

- Safety Interlock Switches
- Safety Limit Switches
- Safety Light Curtains
- E-Stop Pushbuttons
- Cable-Pull Switches
- Two-Hand Controls

SELECTION GUIDE

Model	Operating Voltage (U_B)	Types of Inputs Monitored	No. of Input Devices Monitored	No. of Safety Outputs	No. of Auxiliary Outputs	Feedback Monitoring	Type of Reset	Cross-short Monitoring
SRB 201 ZH	24V DC	Two-hand control (dry contacts)	2	2	1 N.C.	Yes	Automatic	Yes
SRB 301 HC/R	24V AC/DC or 48-230V AC	Two-hand control Safety Mats	2	3	1 N.C.	Yes	Monitored-manual	Yes
SRB 301 HC/T	24V AC/DC or 48-230V AC	Safety Mats	1	3	1 N.C.	Yes	Monitored-manual or Automatic	Yes
SRB 202 MSL	24V DC	Muting module	2	2	2	Yes	Automatic	Yes
SRB 206 ST*	24V AC/DC or 48-230V AC	Dry contacts	6	2	6 PNP	Yes	Monitored-manual or Automatic	No
SRB 206 SQ*	24V AC/DC or 48-230V AC	Dry contacts	6	2	6 PNP	Yes	Monitored-manual or Automatic	Yes
SRB 211 AN	24V AC/DC	Dry contacts	1	2 (stop 0) 1 (stop 1)	1 PNP	Yes	Monitored-manual or Automatic	Yes (selectable)
SRB 211 ST	24V AC/DC	Dry contacts or PNP-type outputs	1	2 (stop 0) 1 (stop 1)	1 PNP	Yes	Monitored-manual or Automatic	Yes (selectable)
SRB 301 LC or SRB 301 LCI	24V AC/DC	Dry contacts	1	3	1 N.C.	Yes	Manual or Automatic	Yes (selectable)
SRB 301 LCB	24V AC/DC	Dry contacts or PNP-type outputs	1	3	1 N.C.	Yes	Manual or Automatic	No
SRB 301 MC	24V AC/DC	Dry contacts or PNP-type outputs	1	3	1 N.C.	Yes	Manual or Automatic	Yes
SRB 301 MA	24V AC/DC	Dry contacts or PNP-type outputs	1	3	1 N.C.	Yes	Monitored-manual	Yes (selectable)
SRB 301 ST	24V AC/DC	Dry contacts or PNP-type outputs	1	3	1 N.C.	Yes	Monitored-manual or Automatic	Yes (selectable)
SRB 301 ST-230V	48V-230V AC	Dry contacts	1	3	1 N.C.	Yes	Monitored-manual or Automatic	No
SRB 301 SQ-230V	48V-230V AC	Dry contacts	1	3	1 N.C.	Yes	Monitored-manual or Automatic	Yes
SRB 324ST	24V AC/DC	Dry contacts or PNP-type outputs	1	3 (stop 0) 2 (stop 1)	1 N.C. plus 3 PNP	Yes	Monitored-manual or Automatic	Yes
SRB 401 LC	24V AC/DC	Dry contacts	1	4	1 N.C.	Yes	Manual or Automatic	Yes
SRB 504 ST	24V AC/DC	Dry contacts or PNP-type outputs	1	5	1 N.C. plus 3 PNP	Yes	Monitored-manual or Automatic	Yes

| Model	Operating Voltage (U_B)	Types of Inputs Monitored	No. of Input Devices Monitored	No. of Safety Outputs	No. of Auxiliary Outputs	Feedback Monitoring	Type of Reset	Cross-short Monitoring
DIFFERENTIATED-INPUT SAFETY CONTROLLERS								
SRB 202 C	24V DC	Dry Contacts	2	2	2 N.C.	Yes	Depends upon model	Depends upon model
SRB 400 C	24V DC	Dry Contacts	2	4	None	Yes	Depends upon model	Depends upon model
SAFETY OUTPUT EXPANSION MODULE								
SRB 402 EM	24V AC/DC	N/A	N/A	4	2 N.C.	Yes	Automatic	N/A
SRB 401 EM	115V AC	N/A	N/A	4	1 N.C.	Yes	Automatic	N/A
INPUT EXPANSION MODULE								
Protect-IE	24V DC	Dry contacts	4	N/A	4 PNP	N/A	N/A	Yes
Protect-PE	24V DC	Dry/PNP contacts	4	N/A	5 PNP	N/A	N/A	Yes

IP69K Light Curtain

CSS30S (Pulse Echo)

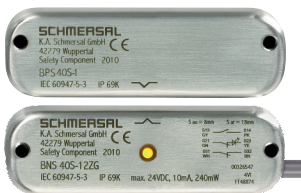**N-Series Control Devices & Indicator Lights**
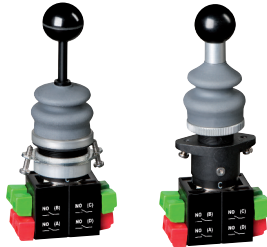
K Series joysticks

MZM120 (Pulse Echo)

RSS36 (RFID)

BNS40S (Coded-magnet)

IP69K Test environment

Schmersal offers a range of products that meet IP69K sealing requirements … tolerating high temperature (up to 80°C) steam or water washdowns at pressures up to 1500 psi. They are easy to clean, specifically designed to prevent the accumulation of process substances, dirt and/or bacteria.

The IP69K rating is ideal for applications where hygienic conditions are critical (food processing, medical equipment, meat packaging and pharmaceutical manufacturing). Also for harsh outdoor environments, including construction equipment, all-terrain vehicles, portable equipment, marine and automotive applications.

The range of IP69K-rated products include N series control devices and indicator lights, K series joysticks, Type 2 or 4 safety light curtains, and non-contact sensors which use coded magnets, RFID, or Pulse Echo technologies.

For additional product information, please consult factory.

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