SCHMERSAL

EN Operating instructions. . . . . .pages 1 to 8
Original

Content

1. About this document

1.1 Function

This operating instructions manual provides all the information you need for the mounting, set-up and commissioning to ensure the safe operation and disassembly of the safety switchgear. The operating instructions must be available in a legible condition and a complete version in the vicinity of the device.

1.2 Target group: authorised qualified personnel

All operations described in this operating instructions manual must be carried out by trained specialist personnel, authorised by the plant operator only.

Please make sure that you have read and understood these operating instructions and that you know all applicable legislations regarding occupational safety and accident prevention prior to installation and putting the component into operation.

The machine builder must carefully select the harmonised standards to be complied with as well as other technical specifications for the selection, mounting and integration of the components.

1.3 Explanation of the symbols used

Information, hint, note:
This symbol indicates useful additional information.

Caution: Failure to comply with this warning notice could lead to failures or malfunctions.
Warning: Failure to comply with this warning notice could lead to physical injury and/or damage to the machine.

1.4 Appropriate use

The products described in these operating instructions are developed to execute safety-related functions as part of an entire plant or machine. It is the responsibility of the manufacturer of a machine or plant to ensure the correct functionality of the entire machine or plant.

The safety switchgear must be exclusively used in accordance with the versions listed below or for the applications authorised by the manufacturer. Detailed information regarding the range of applications can be found in the chapter "Product description".

1.5 General safety instructions

The user must observe the safety instructions in this operating instructions manual, the country specific installation standards as well as all prevailing safety regulations and accident prevention rules.

Further technical information can be found in the Schmersal catalogues or in the online catalogue on the Internet: products.schmersal.com.

The information contained in this operating instructions manual is provided without liability and is subject to technical modifications.

There are no residual risks, provided that the safety instructions as well as the instructions regarding mounting, commissioning, operation and maintenance are observed.

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1.6 Warning against improper use

In case of improper use or manipulation of the safety switchgear, personal hazards or damages to machinery or plant components cannot be excluded. The relevant requirements of the standard EN ISO 14119 must be observed.

1.7 Exclusion of liability

We shall accept no liability for damages and malfunctions resulting from defective mounting or failure to comply with this operating instructions manual. The manufacturer shall accept no liability for damages resulting from the use of unauthorised spare parts or accessories.

For safety reasons, invasive work on the device as well as arbitrary repairs, conversions and modifications to the device are strictly forbidden, the manufacturer shall accept no liability for damages resulting from such invasive work, arbitrary repairs, conversions and/or modifications to the device.

2. Product description

2.1 Ordering code

This operating instructions manual applies to the following types:

SSG-SB-L①-②-③④-⑤-⑥-⑦

No.	Option	Description
①		Default skinning
	K	Skinning with kevlar
②	200 … 3000	Width in mm
③	80 … 300	Height H1 in mm
④	_50 ... xxx	Height H2 in mm (angled version only)
⑤	100 … 600	Depth in mm
⑥	SW	Color black
	SWGB	Color black with yellow stripes
	SWGBV	Color black with yellow stripes V-style
⑦	L2, L5, L10	Cable length in meters

Not all component variants, which are possible according to this order code, are available.

Only if the information described in this operating instructions manual are realised correctly, the safety function and therefore the compliance with the Machinery Directive is maintained.

2.2 Special versions

For special versions, which are not listed in the order code below 2.1, these specifications apply accordingly, provided that they correspond to the standard version.

2.3 Purpose

Safety bumpers are used for the protection of man and objects on machinery and plants with hazardous movements. They are especially destined for the protection of crushing and shearing points on moving machine parts and automatically closing doors and gates as well as the protection of the tracks of automatic guided vehicles (AGV's).

The bumper consists of a foam skinned body with integrated contact elements with 2 NC contacts (power to unlock principle, dual-channel). If the sensitive bumper is actuated, the NC contacts of the contact elements are opened. The connected safety-monitoring module stops the hazardous movement. The entire safety system (guard system for person detection in accordance with Appendix IV of the Machinery Directive) comprises bumpers(s) and a safety relay module from series SRB-E-301ST, SRB301ST-24V-(V2) or SRB301ST-230V. The safety bumpers of the SSG-SB-L… series must not be used without safety-monitoring module.

The bumpers are not suitable for finger protection.

The user must evaluate and design the safety chain in accordance with the relevant standards and the required safety level.

If multiple safety components are wired in series, the Performance Level to EN ISO 13849-1 will be reduced due to the restricted error detection under certain circumstances.

The entire concept of the control system, in which the safety component is integrated, must be validated to the relevant standards.

2.4 Determination of the after-travel

The following diagrams (Fig. 1 to 2) show the force-travel relation of the safety bumper at a bumper (size 1000 mm × 150 mm × 150 mm) at the specified actuating speed V.

The calculated stopping distance of the machine must be smaller than or equal to the after-travel S_V of the bumper. The after-travel of the bumper is calculated by means of the deformation path S_G up to the specified reference force F_G minus the actuating travel S_B.

Calculation of the after-travel: $S_V = S_G - S_B$

Key

S_B Actuating travel
S_V After-travel
S_G Deformation path
F_B Lowest actuating force
F_G Reference force

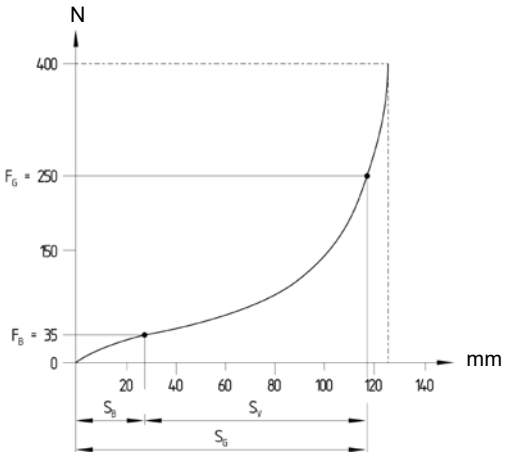

Fig. 1

V = 10 mm/s
S_B = 27 mm with F_B = 35 N
S_V = 91 mm with F_G = 250 N
S_G = 118 mm

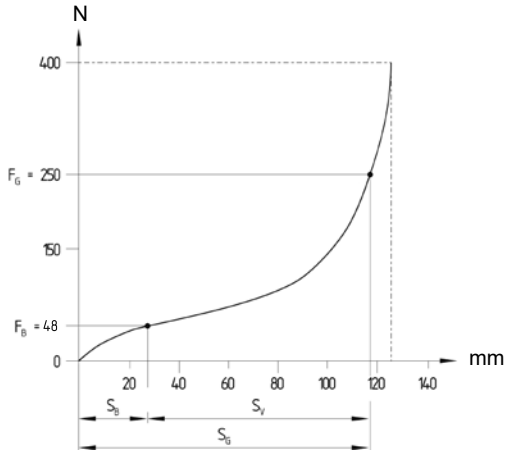

Fig. 2

V = 100 mm/s
S_B = 27 mm with F_B = 48 N
S_V = 90 mm with F_G = 250 N
S_G = 117 mm

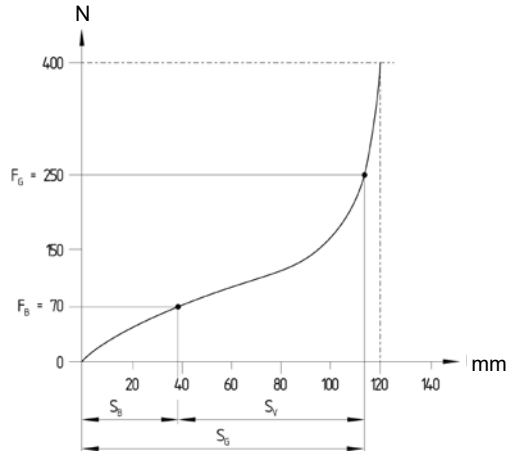

Fig. 3

V = 500 mm/s
S_B = 39 mm with F_B = 70 N
S_V = 75 mm with F_G = 250 N
S_G = 114 mm

2.5 Technical data

Standards:	DIN EN ISO 13856-3
Surface material:	polyurethane
Material bumper body:	PUR soft foam
Degree of protection:	IP54
Ambient temperature:	0 °C … +55 °C
Degree of pollution:	2
Actuating force:	< 600 N with test piece 45 × 400 mm, 90° with regard to the mounting surface
Cable:	4 × 0.34 mm²
Response time:	≤ 41 ms, test speed 100 mm/s
After-travel S_V	depending on the actuating speed V (see Fig. 1 to 3 under 2.4)
Active switching area:	± 45°
Mechanical life:	> 100,000 operations
Admissible load:	1,500 N / 80 mm Ø in actuation direction

2.6 Safety classification

Safety bumpers in combination with SRB-E-301ST, SRB301ST-24V-(V2) or SRB301ST-230V safety monitoring module

Standards:	EN ISO 13849-1
PL:	d
Control Category:	3
n_{op} (assumed):	36,500 actuations / year
PFH:	> 3.16 × 10^{-7}
Mission time:	20 years

2.7 Resistant to chemicals

For the here-after specified resistances, an intact skinning of the bumper is pre-requisite (room temperature 23°C).

Skinning	PUR	Skinning	PUR
Acetone	±	Methyl alcohol	+
Formic acid	–	Caustic soda solution 10%	+
Ammonia 10%	+	Sulphuric acid 10%	+
Petroleum	±	Sulphuric acid 50%	±
Brake fluid	–	Hydrochloric acid 10%	+
Diesel oil	+	Sanitary cleaner	+
Acetic acid 10%	+	Washing liquid	+
Ethyl acetate	–	Carbon tetrachloride	±
Ethyl alcohol	+	Rolling oil	+
Gear oil	+	Water	+
Household detergent	+	Hydrogen peroxide	+
Isopropanol	+		

Explanation of the symbols
+ = resistant
± = conditionally resistant
– = non-resistant

The specifications mentioned in the resistance table are the outcome of meticulous lab tests, which have been conducted to the best of our knowledge and belief. Basically, the suitability of the bumper for the specific application must be tested by practical tests executed by the customer.

Packaging

The bumpers are usually supplied in disposable cardboard boxes. For extended lengths, reinforced packaging material is used. During the transport and storage, it imperatively must be observed that the bumpers are not exposed to humidity or permanent pressure. The bumpers always must be stored horizontally on the side of fixation. Avoid depositing heavy goods on the packaging. Carefully open and remove the packaging material to avoid damages to the bumpers and the feed cables.

3. Mounting

3.1 General mounting instructions

The safety bumper is installed on a level machine base. When designing the protection, the stopping distance and manipulation of the guard system in particular must be taken into account. The adequacy of dimensioning and mounting must ensure that the operators are protected from hazardous movements. Bumpers must not be used as storage areas or climbing aids.

Two slot strips (1) are provided over the entire length of the bumper for the fixation of the bumper. Attachment is by means of an M6 hexagon screw inserted into the two groove strips, e.g. ISO 4018 (2) and/or M6 hexagon nut, e.g. ISO 4032 (3) and 2 washers 6.4, e.g. ISO 7090 (4) see Fig. 4. A fastening screw must be provided in each groove strip at least every 250 mm. The distance at the start and end must be max. 50 mm. The mounting surface imperativel must be plane and clean. Any mounting position, the bumpers however must not be used in the direct sphere of influence of hot chips, heavy or sharp-edged workpieces.

It must not give rise to blocking or jamming (wedging).

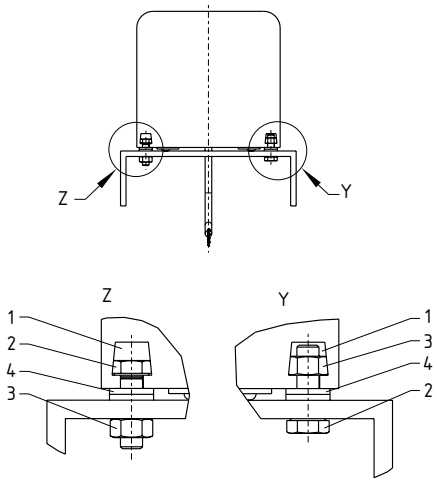

Fig. 4

For the connecting cable, a feedthrough with at least Ø 12 mm must be provided at the corresponding place of the mounting surface.
The feedthrough must be procured so that damage to the connecting cable is excluded.

All cables must be protected against damages (crushing, shearing, etc.).

When multiple safety bumper are arranged adjacently, their butts must be joined. Then realise the electrical connection of the safety bumper (refer to chapter 4 Electrical connection).

3.2 Dimensions

All measurements in mm.

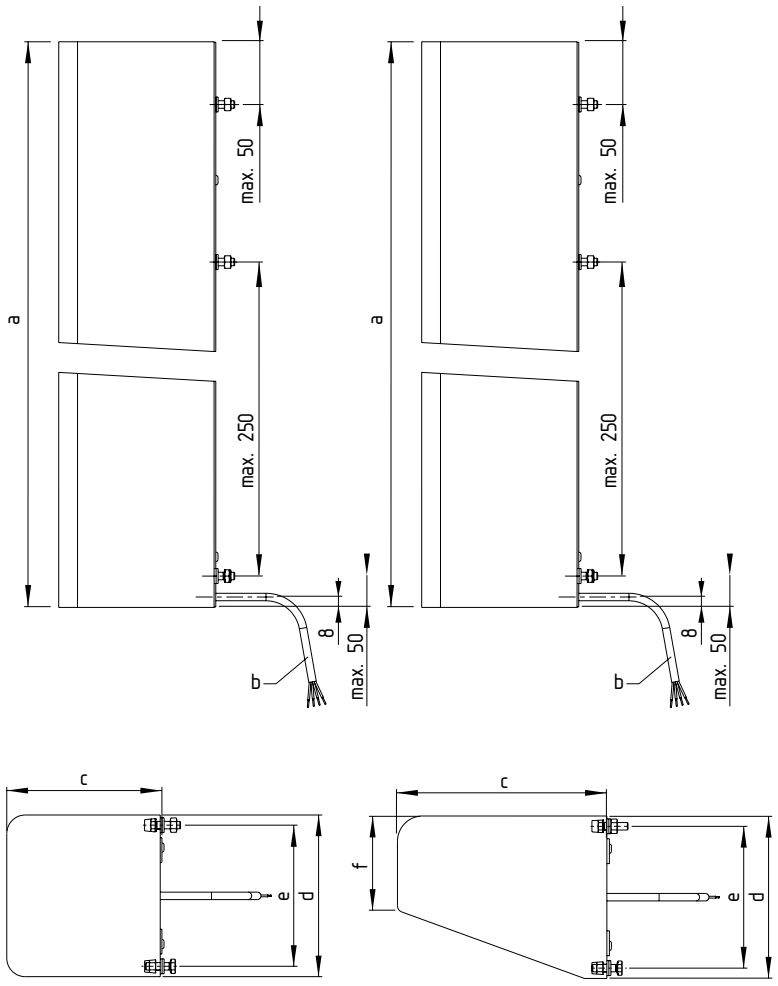

Fig. 5

Key

a) Width B = 200 … 3000 mm
b) Cable output
c) Depth T = 100 … 600 mm
d) Height H1 = 80 … 300 mm
e) Height H1 minus 16 mm
f) Height H2 = 50 … xxx mm

The active actuating surface of the bumper is determined by the sizes H1 and H2.

4. Electrical connection

4.1 General information for electrical connection

The electrical connection may only be carried out by authorised personnel in a de-energised condition.

The safety bumpers are connected through the permanently connected four-wire sheathed cable. The individual cables are marked with the digits 1 … 4 (see Fig. 6). To protect larger surfaces, multiple safety bumpers can be connected together to build a large surface. Maximum 6 bumpers may be connected to a safety-monitoring module. The maximum cable length to the safety-monitoring module must not exceed 200 m. To this effect, individual safety bumpers are wired in series (Fig. 7). More information about the connection of the safety bumpers can be found in the wiring example in appendix as well as in the operating instructions of the SRB-E-301ST, SRB301ST-24V-(V2) bzw. SRB301ST-230V safety-monitoring module.

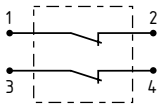

Fig. 6

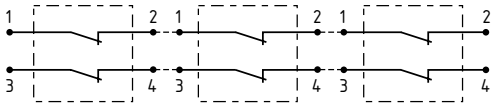

Fig. 7

5. Set-up and maintenance

5.1 Functional testing

The safety function of the safety bumper must be tested. The following conditions must be previously checked and met:

1. Firm and non-deforming fixation of the safety bumper to the floor
2. Fitting and integrity of the power cable
3. Actuate the bumper to check whether the output relays of the safety-monitoring module are disabled and stop the hazardous movement of the machine

5.2 Maintenance

A regular visual inspection and functional test, including the following steps, is recommended:

1. Check fitting of the safety bumper
2. Check the safety bumper and especially the skin for damages
3. Remove all debris (dust, chips, etc.) from the safety bumper
4. Check the cable for damages
5. Functional test to chapter 5.1
   recommended test interval: daily functional test

Maintenance: Please observe that the safety function must be triggered at least once a year to test the system!

Damaged or defective components must be replaced.

6. Disassembly and disposal

6.1 Disassembly

The safety bumper must be disassembled in de-energised condition only.

6.2 Disposal

The safety bumper must be disposed of in an appropriate manner in accordance with the national prescriptions and legislations.

7. Appendix

7.1 Wiring example

The application examples shown are suggestions. They however do not release the user from carefully checking whether the switchgear and its set-up are suitable for the individual application. The application examples shown are suggestions.

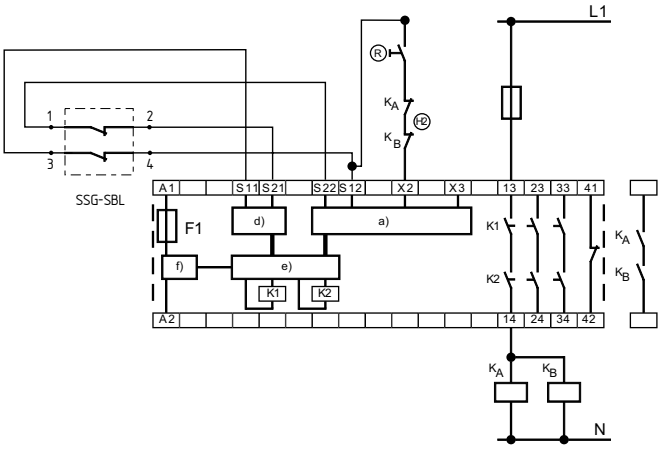

Fig. 8: Wiring example with **SRB-E-301ST**

a) Logic
Ⓡ = Reset button
H2 = Feedback circuit

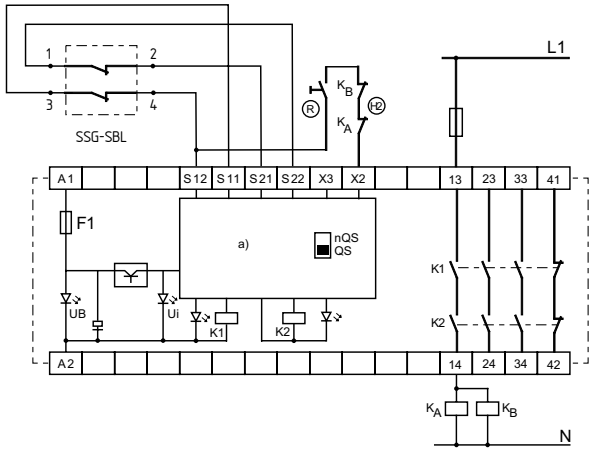

Fig. 9: Wiring example with **SRB301ST-24V-(V2)**

a) Logic
Ⓡ = Reset button
H2 = Feedback circuit

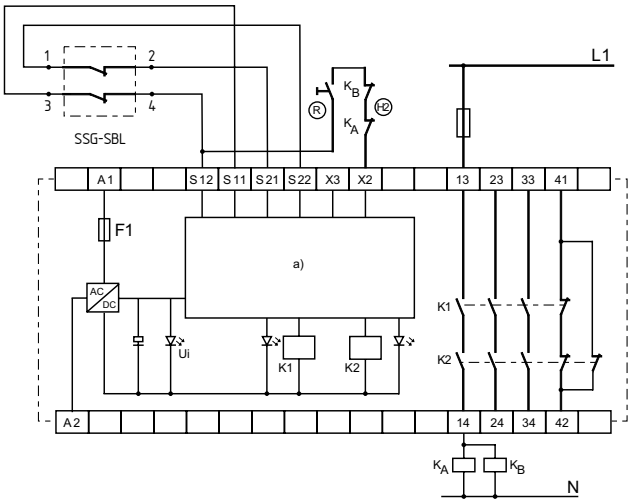

Fig. 10: Wiring example with **SRB301ST-230V**

a) Logic
Ⓡ = Reset button
H2 = Feedback circuit

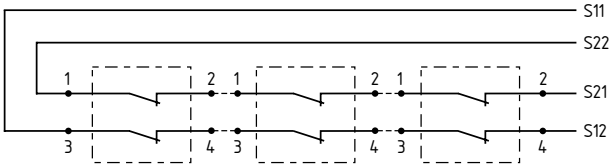

Fig. 11: Bumper series-wiring

8. EU Declaration of conformity

EU Declaration of conformity

SCHMERSAL

Original

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We hereby certify that the hereafter described components both in their basic design and construction conform to the applicable European Directives.

Name of the component: SSG-SB-L

Type: See ordering code

Description of the component: Pressure-sensitive protective device
Safety bumpers

Relevant Directives:
2006/42/EC Machinery Directive
2011/65/EU RoHS-Directive

Applied standards: DIN EN ISO 13856-3:2013

Person authorised for the compilation of the technical documentation:
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Place and date of issue: Wuppertal, 16. December 2020

Authorised signature
Philip Schmersal
Managing Director

SSG-SB-L-E-EN

The currently valid declaration of conformity can be downloaded from the internet at products.schmersal.com.

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