SCHMERSAL

EN Operating Instructions . . . . . .pages 1 to 6
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 Schmersal range of products is not intended for private consumers.

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.

1.6 Warning about misuse

In case of improper use or manipulation of the safety switchgear, personal hazards or damages to machinery or plant components cannot be excluded.

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.

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2. Product description

2.1 Ordering code

This operating instructions manual applies to the following types:

STW-SL-N-①-②-③-④

No.	Option	Description
①	05	Profile NBR, 25 x 24.5 mm (W x H)
	06	Profile NBR, 25 x 36 mm (W x H)
	08	Profile NBR, 40 x 61 mm (W x H)
②	120...6000	Length of the safety edge in mm
③	1	Cable output, single-side, 4-wire (profile 06 and 08 only)
	2	Cable output, double-side, 2 x 2-wire
④	L2	Cable length 2 m
	L5	Cable length 5 m
	L10	Cable length 10 m

The active area of the safety edge consists of the total length of the safety edge minus 60 mm (profile 05,06) and 80 mm (profile 08) in each end area.

Special versions, e.g. angled, rectangular, etc. on request.

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 ordering code below 2.1, these specifications apply accordingly, provided that they correspond to the standard version.

2.3 Purpose

STW series safety edges are used for the protection of man and objects on systems and machinery with hazardous movements. They are especially destined for the protection of crushing and shearing points on moving machine parts and automatically closing doors.
The suitability of the safety edge for the local application and the requirements with respect to the resistivity must be checked.
The safety edge comprises an STW-C C support profile (not included in delivery) and an STW-SL rubber profile with integrated signal generator. This signal generator is a rubber profile made of co-extruded elastomers, the opposing and separate sides of which are electrically conductive. Actuating the safety edge closes the signal generator (power to lock) and triggers the downstream safety evaluation device SRB303SQP-SS (dual-channel).

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 a safety edge and a safety relay module from series SRB303SQP-SS. The safety edge must not be operated without safety relay module.

The safety edges 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.

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 run-on distance

The following diagrams (Fig. 1 to 2) show the force-travel relation of a safety edge at the specified actuating speed V.

The calculated stopping distance of the machine must be smaller than or equal to the run-on distance S_V of the safety edge. The run-on distance of the safety edge 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 run-on distance paths: $S_V = S_G - S_B$

The requirements of Section 4.23 of EN ISO 13586-2 are only satisfied as the exceeded limit values can be compensated by reducing the run-on distance path.

STW-SL-N-05

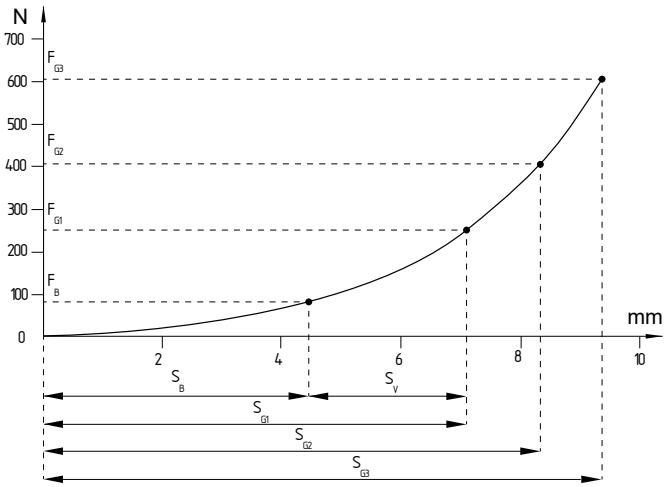


Fig. 1: Force-travel diagram, profile STW-SL-N-05

Actuating force F_B / Reference force F_G	Actuation path S_B	Deformation path S_G	Run-on distance S_V
F_B = 82 N	4.41 mm	-	-
F_{G1} = 252 N	-	7.12 mm	2.71 mm
F_{G2} = 404 N	-	8.32 mm	3.91 mm
F_{G3} = 604 N	-	9.36 mm	4.95 mm

F_B at maximum actuating speed V=90 mm/s, F_G at actuating speed V=10 mm/s, measurement temperature 21°C, mounting position: C support profile lower, vertical actuating direction from above

STW-SL-N-06

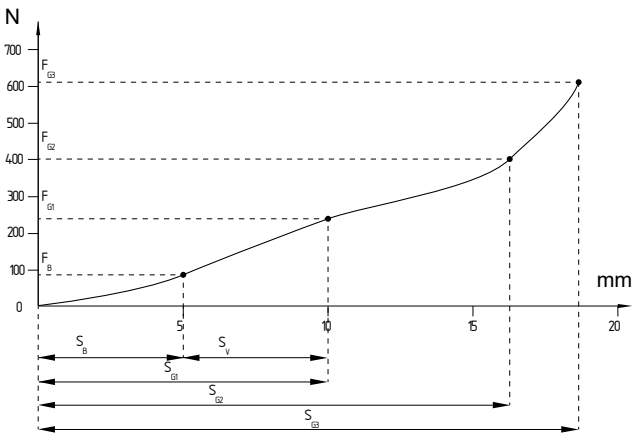


Fig. 2: Force-travel diagram, profile STW-SL-N-06

Actuating force F_B / Reference force F_G	Actuation path S_B	Deformation path S_G	Run-on distance S_V
F_B = 94 N	5 mm	-	-
F_{G1} = 252 N	-	10 mm	5 mm
F_{G2} = 400 N	-	16.5 mm	11.5 mm
F_{G3} = 608 N	-	18.3 mm	13.3 mm

F_B at maximum actuating speed V=100 mm/s, F_G at actuating speed V=10 mm/s, measurement temperature 24.5 °C, mounting position: C support profile lower, vertical actuating direction from above

STW-SL-N-08

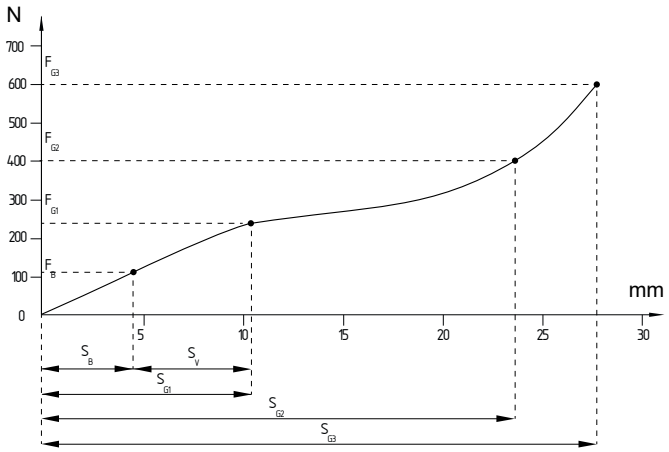


Fig. 3: Force-travel diagram, profile STW-SL-N-08

Actuating force F_B / Reference force F_G	Actuation path S_B	Deformation path S_G	Run-on distance S_V
F_B = 120 N	4.41 mm	-	-
F_{G1} = 252 N	-	10.3 mm	5.89 mm
F_{G2} = 400 N	-	23.6 mm	19.19 mm
F_{G3} = 600 N	-	27.4 mm	22.99 mm

F_B at maximum actuating speed V=8 mm/s, F_G at actuating speed V=10 mm/s, measurement temperature 23°C, mounting position: C support profile lower, vertical actuating direction from above

Technical Data

Standards:	EN ISO 13856-2
Surface material:	NBR
Degree of protection:	IP66 / IP67
Ambient temperature:	+5 °C … +50 °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 (in combination with SRB303SQP-SS):	
- Profile 05, Actuating speed V = 90 mm/s:	< 49 ms
- Profile 06, Actuating speed V = 100 mm/s:	< 50 ms
- Profile 08, Actuating speed V = 8 mm/s:	< 790 ms
Active switching area:	
- Profile 05 and 06:	± 20°
- Profile 08:	± 15°
Mechanical life:	> 100,000 operations
Admissible load:	1,500 N / 80 mm Ø in actuation direction
Weight of NBR without C support profile:	
- Profile 05:	340 g/m
- Profile 06:	530 g/m
- Profile 08:	1075 g/m

2.5 Safety classification

Safety edge in combination with SRB303SQP-SS safety relay module

Standards:	EN ISO 13849-1
PL:	up to d
Category:	3
n_{op} (assumed):	36,500 actuations / year
PFH:	≤ 2,0 x 10^{-8}/h
Mission time:	20 years

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.

2.6 Resistant to chemicals

For the following specified resistances, an intact skinning of the safety edge is a pre-requisite (room temperature 23 °C).

	NBR resistance
Acetone	-
Formic acid	-
Ammonia	-
Petroleum	+
Brake fluid	-
Diesel oil	+
Acetic acid	-
Ethyl acetate	-
Ethyl alcohol	±
Gear oil	-
Household detergent	
Methyl alcohol	-
Caustic soda, aqueous	±
Hydrochloric acid aqueous 36%	-
Sanitary cleaner	
Sulphuric acid 10%	+
Sulphuric acid 30%	-
Washing liquid	
Carbon tetrachloride	-
Rolling oil	
Water	+
Hydrogen peroxide 0.5%	±
Hydrogen peroxide 30%	-

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

The data in the resistance table are general data for NBR. Basically, the suitability of the safety edge for the specific application must be tested by practical tests executed by the customer.

Packaging

The safety edges are usually supplied in disposable cardboard boxes. For extended lengths, reinforced packaging material is used. During transport and storage, the safety edge must not exposed to humidity or permanent pressure. Avoid depositing heavy goods on the packaging. Carefully open and remove the packaging material to avoid damage to the safety edges and the feed cables.

The safety edge may only be stored in the undeformed condition and lying on the attachment side.

3. Mounting

3.1 General mounting instructions

The installation may only be carried out by authorised personnel.

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. Safety edges must not be used as climbing aids.

The active switching range with vertical actuation from above:
- Profile 05 and 06: ±20°
- Profile 08: ±15°

The mounting surface must be level and clean. Any mounting position, the safety edges must, however, not be used in the direct sphere of influence of hot chips, heavy or sharp-edged workpieces.

The C support profile (not included in delivery), which extends the entire length of the safety edge, is bolted to the body of the machine for mounting. A fixing screw must be provided at least every 250 mm. The distance at the start and end must be max. 50 mm.
M5 countersunk head screws with strength 8.8 must be used for mounting. Flat-head or pan-head screws must not be used as they can damage the safety edge.

Insert one side of the rubber profile into the C support profile and press the other side with the thumb or a flat, blunt object. Soapy water may be used as a lubricant. Long and straight rubber profiles can also be installed by carefully alternating pulling and pushing into the C support profile.
When inserting the rubber profile into an angled safety edge, start at the bevel.

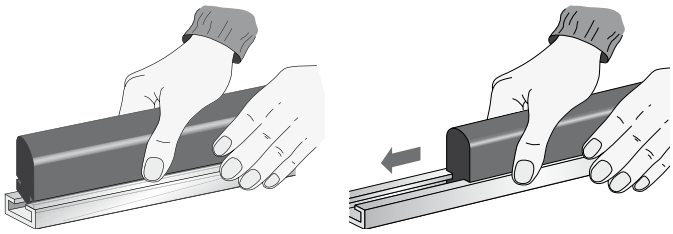


Fig. 4

In the case of angled safety edge, no point pressure may be exercised on the bevel.

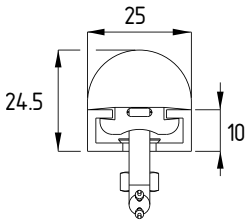
When inserting the rubber profile into the C support profile, there must be no blocking or chocking. This can permanently damage the safety edge.

For the connecting cable of the safety edge, a feed-through of 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 lines must be protected against damage (crushing, shearing, etc.) when routed.
When assembling multiple safety edges in series, they must be butted together. Then, establish the electrical connection to the safety edges (refer to chapter 4 'Electrical connection').

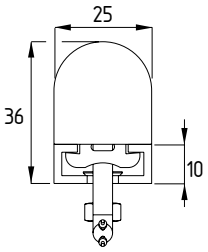
3.2 Dimensions

All measurements in mm.

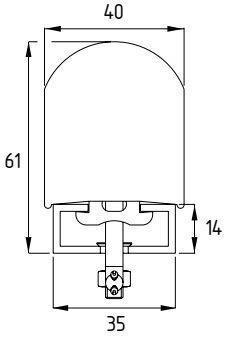
STW-SL-N-05 on C support profile
STW-C 10x25



STW-SL-N-06 on C support profile
STW-C 10x25



STW-SL-N-08 on C support profile
STW-C 14x35



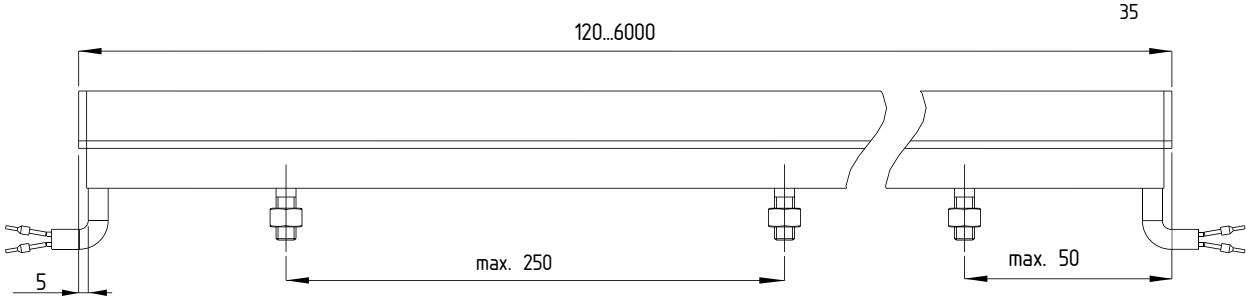


Fig. 5

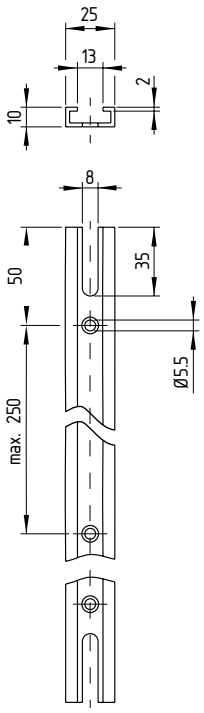
3.3 Accessories support profiles STW-C

The support profiles STW-C must be ordered separately according to the design and length of the NBR profile. For logistical reasons, longer lengths are divided into several sections.

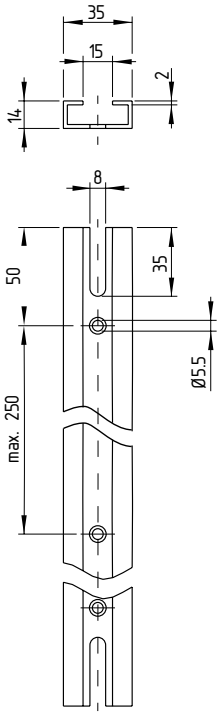
The aluminium profile is supplied with one or two recesses for the cable outlet, depending on the version of the safety edge. Holes for fastening are not provided at the factory. Special versions are possible after consultation with Technical Support.

Further information can be found at www.products.schmersal.com.

STW-C 10x25



STW-C 14x35

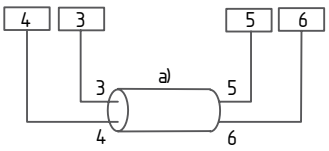


4. Electrical connection

4.1 General information for electrical connection

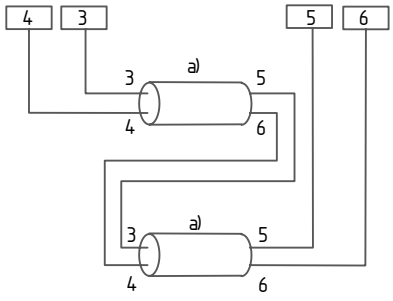
The electrical connection may only be carried out by authorised personnel in a de-energised condition.

The safety edge is connected through the permanently connected sheathed cable. The individual cables are marked with the digits 3 … 6 (see Fig. 5). Safety edges can be wired in series up to a total length of 24 m (see Fig. 6). The maximum cable length to the safety monitoring module must not exceed
200 m. Information on the connection of the safety edge can be found in the wiring example as well as in the operating instructions of the SRB303SQP-SS.



Key
a) Safety edge

Fig. 6

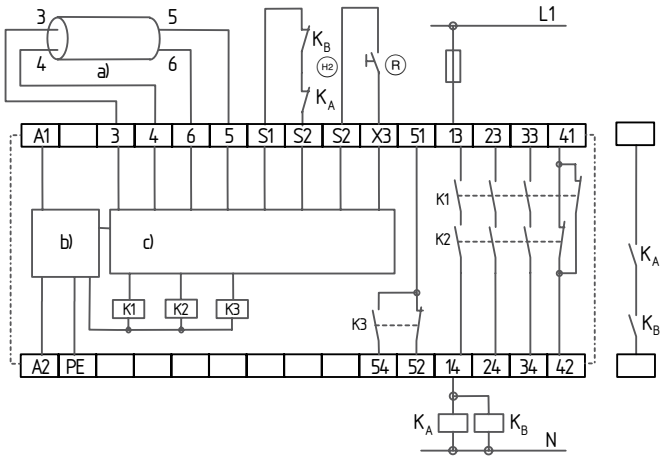


Key
a) Safety edge

Fig. 7

4.2 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.



Key
a) Safety inputs
b) Power
c) Processing

Fig. 8: Wiring example with **SRB303SQP-SS**

5. Set-up and maintenance

5.1 Functional testing

The safety function of the safety edge must be tested. The following conditions must be previously checked and met:
1. Firm and non-deforming seating of the safety edge
2. Fitting and integrity of the power cable
3. Actuate the safety edge to check whether the output relays of the safety relay 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 the seating of the safety edge
2. Check the safety edge for damage
3. Remove all debris (dust, chips, etc.) from the safety edge
4. Check the cable for damages

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 edge must be disassembled in a de-energised state only.

6.2 Disposal

The safety edge must be disposed of in an appropriate manner in accordance with national legislation.

7. EU Declaration of conformity

EU Declaration of conformity

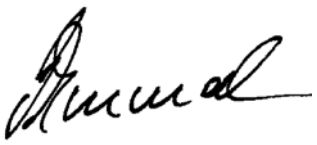
SCHMERSAL

Original

K.A. Schmersal GmbH & Co. KG
Möddinghofe 30
42279 Wuppertal
Germany
Internet: www.schmersal.com

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:	STW-SL
Type:	See ordering code
Description of the component:	Pressure-sensitive protective device, safety edge
Relevant Directives:	Machinery Directive 2006/42/EC RoHS-Directive 2011/65/EU
Applied standards:	EN ISO 13856-2:2013
Person authorised for the compilation of the technical documentation:	Oliver Wacker Möddinghofe 30 42279 Wuppertal
Place and date of issue:	Wuppertal, August 16, 2021



Authorised signature
Philip Schmersal
Managing Director

STW-SL-A-EN

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

K.A. Schmersal GmbH & Co. KG
Möddinghofe 30, 42279 Wuppertal
Germany
Phone: +49 202 6474-0
Telefax: +49 202 6474-100
E-Mail: info@schmersal.com
Internet: www.schmersal.com