



EN Operating instructions.pages 1 to 6
Original

Content

1 About this document

1.1 Function 1

1.2 Target group: authorised qualified personnel. 1

1.3 Explanation of the symbols used 1

1.4 Appropriate use 1

1.5 General safety instructions 1

1.6 Warning about misuse 2

1.7 Exclusion of liability 2

2 Product description

2.1 Ordering code 2

2.2 Special versions. 2

2.3 Purpose 2

2.4 Signal processing. 2

2.5 Technical data 3

2.6 Safety classification 3

3 Mounting

3.1 Dimensions 3

3.2 Mounting of the position switches 4

4 Rear side Electrical connection

4.1 General information for electrical connection. 4

4.2 Contact variants. 4

5 Set-up and maintenance

5.1 Functional testing. 4

5.2 Maintenance 4

6 Disassembly and disposal

6.1 Disassembly. 4

6.2 Disposal. 4

7 Safety technological recommendations - response systematics

8 EU Declaration of conformity

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 is used for identifying 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:
www.schmersal.net.

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.

The switching cushion cannot execute its function

- in case of voltage drop

- if it is not positioned below the aeroplane door in accordance with this manual

As the protective function of the switching cushion is not exclusively defined by automatic inevitabilities, the operating staff must be instructed in the correct handling.

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-SK^①

No.	Option	Description
①	1	Standard version
	1.1	reinforced design

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

The switching cushion is suitable as a backup system for the automatic height-compensation equipment on flight passenger stairs, passenger boarding bridges, and loading and unloading vehicles as it detects when an open aircraft door gets prohibitively near to the front platform of aircraft ground equipment and hence guarantees the required operational safety.

The switching signals are redundantly generated by both position switches, which are integrated in the switching cushion (1 NC / 2 NO each).

The switching behaviour of both position switches is designed so that when the top switching line of the switching cushion is reached (0 position), a NC and a NO contact is actuated after an actuating stroke of the switching cushion of approx. 10 mm, and another NO contact is closed after another actuating stroke of approx. 30 mm. On the basis of empirical calculations, this 30 mm idle stroke corresponds to the double vibration amplitude of automatic height compensation equipment when accessed; it can be used to create a hysteresis between the switching point and the switchback point.

For the signal processing of the switching cushion, we recommend that the response systematics are observed in accordance with the specifications sub 7.1 taking the control technological requirements of point 2.4 into account.



The switching cushion does not avoid damages or accidents if the distance between the platform and the bottom of the door is increased, e.g. during the unloading of the aircraft (the aircraft body raises) or if the lowering movement is executed incorrectly by the platform control.

The switching cushion reacts inadvertently, when during the positioning of the switching cushion below the aircraft door, the vertical distance between the aircraft door and the top of the switching cushion is identical to or smaller than the response travel of the automated height compensation equipment.

2.4 Signal processing



The signal processing of the switching cushion must be executed 1-fault safe with error detection in accordance with PL d to ISO 13849-1.

The fault detection must refer to the right sequence of the status change of the contacts in the form of a sequence monitoring (sequence of the status changes during the unimpaired operation of the switching cushion). Errors, which lead to a suppression of the redundancy of the contacts in the switching cushion, must be detected.

The errors detected during the operation of the switching cushion first must be processed error-tolerant, i.e. they must not lead to an operational inhibition of the downward movement. Detected errors however must trigger an error indication as well as (also in case of a power failure)

- be saved permanently in a non-volatile memory
- block the redocking to another aircraft

As the protective function of the switching cushion is not completely determined by automatic inevitabilities, a readout protocol (journal) with date and hour as well as the operating condition and the switching conditions of the switching cushion must be registered as well. Any manipulation of the protocol registration must be avoided.

The suggested response systematics as described below 7.1 as well as the here-mentioned control technological recommendations do not release the user of the switching cushion from his obligation to execute his own risk analysis and to implement corresponding or possible diverging measures, which are (more) suitable with regard to the intended use and the protective goals to be reached by the use of the switching cushion.

If the above-described control technological recommendations are observed, individual errors will not lead to the loss of the safety function of the switching cushion. However, a fault accumulation can affect the safety function of the switching cushion.



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.

2.5 Technical data

Standards:	IEC 60947-5-1, ISO 13849-1, EN 12312-1/ -4
Material:	Kevlar fabric with polyurethane, PUR cold foam, PVC; V2A, aluminium Oilflex cable
Switch insert:	glass-fibre reinforced thermoplastic, self-extinguishing
Contacts:	Silver
Protection class:	IP 67 (interrupters and terminal boxes)
Contact type:	Change-over with double break Zb, galvanically separated contact bridges
Switching system:	⊖ IEC 60947-5-1; slow action, NC contact with positive break
Termination:	Wieland cable clamp 2.5/15
Cable section:	min. 0.5 mm ² , max. 2.5 mm ² , with conductor ferrules
Ambient temperature:	-25 °C ... +55 °C
Mechanical life:	100.000 operations
Switching frequency:	max. 12/h
Max. actuating speed:	0,5 m/s
Bounce duration:	in accordance with actuating speed
Switchover time:	in accordance with actuating speed
Electrical data:	
Utilisation category:	AC-15, DC-13
Rated operating current/voltage I _e /U _e :	8 A / 230 VAC; 5 A / 24 VDC
Rated impulse withstand voltage U _{imp} :	2.5 kV
Rated insulation voltage U _i :	300 V
Thermal test current I _{the} :	10 A
Max. fuse rating:	10 A gG D-fuse
Switching of low voltages:	3 mA / 24 VDC; 5 mA / 12 VDC

2.6 Safety classification

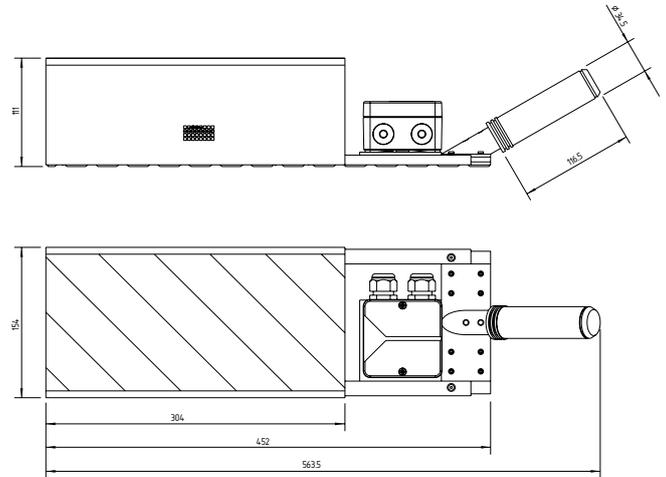
Standards:	ISO 13849-1
B _{10D} (NC contact):	20,000,000
B _{10D} (NO contact) at 10% ohmic contact load:	1,000,000
Service life:	20 years

3. Mounting

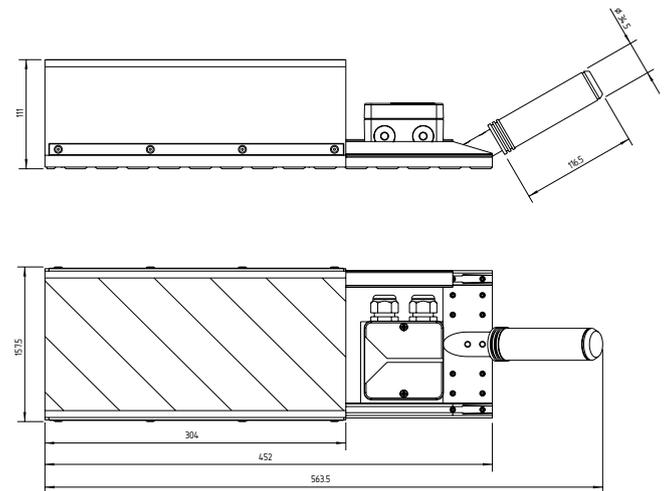
3.1 Dimensions

All measurements in mm.

Dimensions SSG-SK1



Dimensions SSG-SK1.1



3.2 Mounting of the position switches

The switching cushion must be placed in a central position below the open aircraft door. To avoid any damages, the switching cushion must be handled with care.



Please observe the remarks of the standard EN 12312-1 and EN 12312-4.

4. Rear side Electrical connection

4.1 General information for electrical connection



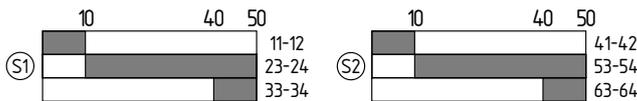
The electrical connection may only be carried out by authorised personnel in a de-energised condition.

The contact designations are specified in the terminal box. For the cable entry, suitable cable glands with an appropriate degree of protection must be used. Correct routing of the cables in the terminal box must be assured. Once connected, make absolutely sure that the interior of the terminal box is free of waste (e.g. remove remains of cables). Tighten the cover screws of the terminal box to at least 1 Nm. The SSG-SK series switching cushions are double insulated. The use of a protective ground connector therefore is not authorised.

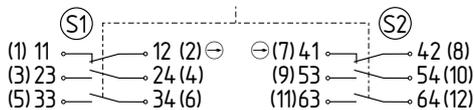
4.2 Contact variants

The contacts are shown in a non-actuated condition.

SSG-SK1 and SSG-SK1.1



Tolerance of the switching travels 0/-4mm



5. Set-up and maintenance

5.1 Functional testing

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

1. Check the switching cushion for damages
2. Check the free movement of the switching cushion
3. Check the integrity of the cable entry and connections

5.2 Maintenance

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

1. Check the switching cushion for external damages
2. Check the free movement of the switching cushion
3. Remove particles of dust and soiling
4. Check cable entry and connections

We recommend a test interval of at least every 8 - 12 weeks, depending on the frequency of use.

Damaged or defective components must be replaced.

6. Disassembly and disposal

6.1 Disassembly

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

6.2 Disposal

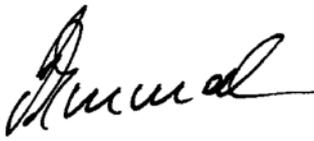
The safety switchgear must be disposed of in an appropriate manner in accordance with the national prescriptions and legislations.

7. Safety technological recommendations - response systematics

Condition of the switching cushion	Signal processing	Condition of the contacts of the switching cushion				Door position
		2 x NC 11-12/ 41-42	2 x NO 23-24/ 53-54	2 x NO 33-34/ 63-64	Switching cushion authorised operation	
Switching cushion in idle position	Signal processing of the switching cushion blocked.					
The platform is being positioned and set-up. The switching cushion is placed under the aircraft door.	Signal processing of the switching cushion blocked					
Before the driver leaves the platform, the signal processing of the switching cushions - preferably inevitably - is enabled. Door, switching cushion and platform in initial state	The signal form of the switching cushion is enabled. Possibly message "Everything OK"					
Lower door up to the response line of the automatic height compensation system	Protection against false triggering: The switching cushion reacts inadvertently, when during the positioning of the switching cushion below the aircraft door, the vertical distance between the aircraft door and the top of the switching cushion is identical to or smaller than the response travel of the automated height compensation equipment.					
Automatic height compensation system inoperational, door reaches the top switching line of the switching cushion (0 position)	Contacts 11-12/41-42 open ⊖: - Upward movement is safely blocked. Contacts 23-24/53-54 close: - At the control panel, a warning lamp is illuminated in locked condition, until it is reset in the control cabinet. - If necessary: enabling signal for the downward movement - Possibly signal to return the friction wheel					
Automatic height compensation system inoperational, door lowers below the bottom response line of the switching cushion (0 position)	Contacts 33-34/63-64 close: - Platform is lowering - Possibly lock the docking of the automatic height compensation system in case of putting back into service - Possibly signal to return the friction wheel.					
The platform has lowered until the lower switching line is reached again.	Contacts 33-34/63-64 open: - No safety-related signal processing (hysteresis!).					
The platform has lowered until the top switching line (0 position) is reached again.	Contacts 23-24/53-54 open: - Downward movement is safely stopped, switching cushion remains depressed for approx. 10 mm. - Warning remains on Contacts 11-12/41-42 are closed: - No safety-related signal processing.					

1 = aircraft door open, 2 = switching cushion, 3 = platform, 4 = switching line of the automatic height compensation system, 5 = top switching line of the switching cushion, 6 = response line of the switching cushion; measures in mm

8. 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:	SSG-SK	
Type:	See ordering code	
Description of the component:	Switching cushion for safety functions	
Relevant Directives:	Machinery Directive RoHS-Directive	2006/42/EC 2011/65/EU
Applied standards:	DIN EN 60947-5-1:2010	
Person authorised for the compilation of the technical documentation:	Oliver Wacker Möddinghofe 30 42279 Wuppertal	
Place and date of issue:	Wuppertal, August 23, 2017	
SSG-SK-C-EN		
	Authorised signature Philip Schmersal Managing Director	



The currently valid declaration of conformity can be downloaded from the internet at www.schmersal.net.



K. A. Schmersal GmbH & Co. KG
Möddinghofe 30, D - 42279 Wuppertal
Postfach 24 02 63, D - 42232 Wuppertal

Phone: +49 - (0)2 02 - 64 74 - 0
Telefax: +49 - (0)2 02 - 64 74 - 1 00
E-Mail: info@schmersal.com
Internet: <http://www.schmersal.com>