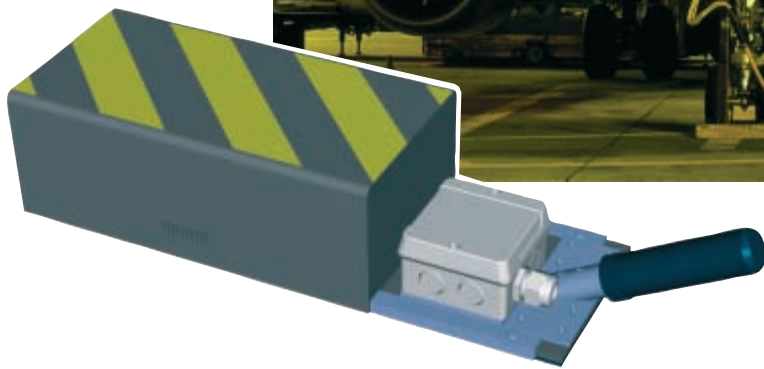




# Customer Information

## Bumper as back-up system for flight passenger bridges, flight passenger stairways and similar – type series SSG-SK.1



### Applications

This new bumper has been specially designed for use on transfer platforms located beneath open aircraft doors in order to protect individuals and machines from damage should the aircraft move downwards unexpectedly and the compensation equipment of the transfer platform fail.

In the case of flight passenger bridges and stairways the bumper act as a back-up system within the meaning of EN 12312-1/-4 should a fault develop with the compensation equipment.

The bumper of the type series SSG-SK.1 has a type test certificate from the test and certification centre of the specialised "transport" inspection committee with the BG test certificate number 020001.

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**Intended use**

This bumper has been developed as a back-up system for the automatic height-compensation equipment on flight passenger stairways and bridges in order to detect the inadmissible approach of the aircraft door to the front platform of the ground equipment. For this purpose the bumper must be manually positioned beneath the open aircraft door as described in the section “handling the bumper” (refer to page 4).

- 1. All parts of the bumper serving the purposes of a safe reset are provided twice so as to be able to deal with a fault. They are also over-dimensioned in order to withstand the extreme conditions of use and environment.

**Refer also to the right-hand side of page 2.**

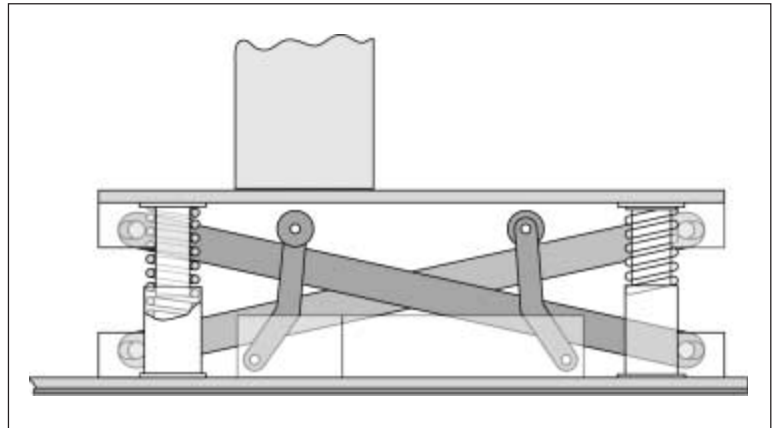
- 2. The switch signals from the bumpers operate in a differentiated manner and take the amplitude into consideration, e.g. caused from the flight passengers walking over the transfer platform.

**Refer also to page 3.**

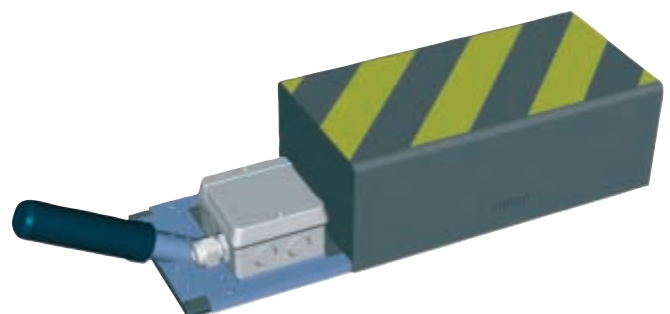
- 3. The safety-related and functional properties of the bumper are not affected. A reliable OFF or DOWN command is generated on the basis of the safety-related requirements placed on bumpers to EN 1760-2.

**Refer also to page 7.**

**In respect of 1: All parts of the bumper serving the purposes of a safe reset are provide twice so as to be able to deal with a fault. They are also over-dimensioned in order to withstand the extreme conditions of use and environment.**



- There are two robust scissors-type connections between floor and contact plate, the ends of which are located in slots in order to avoid canting.
- Two pressure springs as safety springs serve spacing and reset purposes, i.e. should a spring break the springs maintain their intended function.
- The spring force itself is 40 N, i.e. eight times the restoring force normally required.
- Two position switches with offset roller levers generate the switch signals.
- The structure is made entirely of corrosion-proof parts and is additionally protected by a kevlar fabric with PU skin.
- The type of protection of the electrical parts – consisting of switches and terminal boxes – is IP 67.
- The admissible ambient temperature range is  $-20^{\circ}$  to  $+55^{\circ}$  C.  
Please address any questions you may have concerning the technical aspects of the bumper to Mr. Uwe Schmidt, Tel. ++49 (0) 641-98 48-415, Fax ++49 (0) 641/98 48-420, E-mail uschmidt@elan.schmersal.de
- **In addition to these measures, in order for the bumper to function faultlessly the signals must be processed reliably with an intelligent combination of fault control and fault tolerance.**  
We are also your partners for these requirements. In this case please contact Mr. Thomas Rühl, Tel. ++49 (0) 641-98 48-453, Fax ++49 (0) 641-98 48-266, E-mail: truehl@elan.schmersal.de.



**In respect of 2:** The switch signals from the bumpers operate in a differentiated manner and take the amplitude into consideration, e.g. caused from the flight passengers walking over the transfer platform.

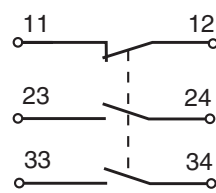
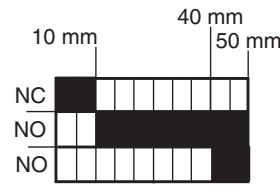
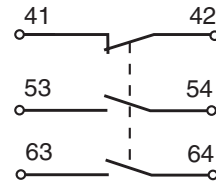
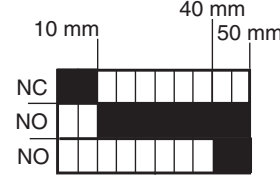
The switch signals are generated redundantly by the two position switches in the bumper. Each switch has an NC/NO contact combination with 3 poles (1 x NC/2 x NO each).

The switching behaviour of each switch is such that when an upper switching line is reached (0 position) a NC contact and NO contact is actuated (NC contact: positive opening operation to EN 60 947-5-1) and, following further travel of 5 mm corresponding to an actuating lift of approx. 30 mm in connection with the translation of the offset roller levers, an additional NO contact closes. The actuating lift up to the triggering of the 0 position is approximately 10 mm.

The empty lift of 30 mm – corresponding to the empirical calculations of the double amplitude of the transfer platform with people walking over it – can be used in such a way that a hysteresis can be created.

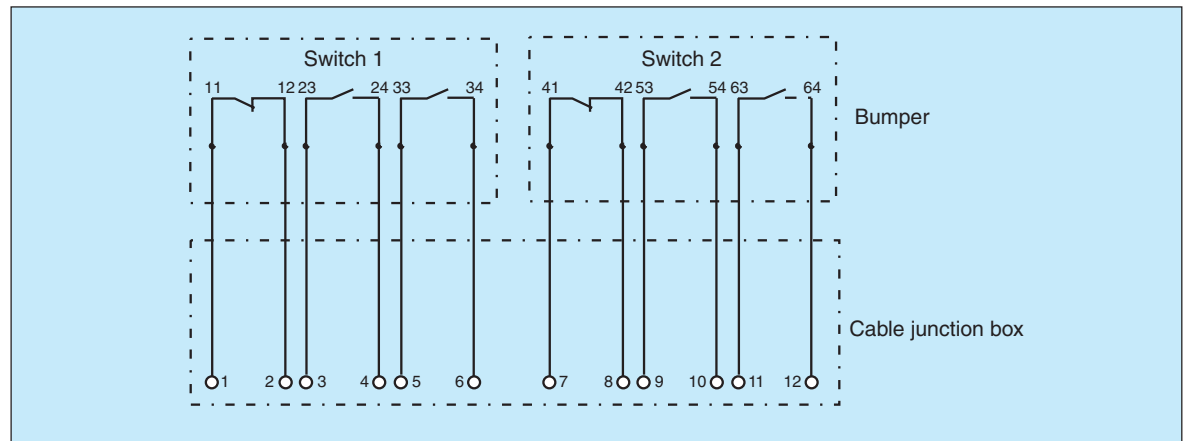
Signal processing: in agreement with the test and certification centre of the specialised “transport” inspection committee we recommend that the response system shown in the figure on page 5 be considered for the signal processing of the bumper in compliance with the control requirements specified on page 4).

**Contact assignment**

	Contact assignment	Diagram	Switching paths*
Switch 1	<ul style="list-style-type: none"> <li>- 1 NC contact</li> <li>- 2 NO contacts</li> </ul>		
Switch 2	<ul style="list-style-type: none"> <li>- 1 NC contact</li> <li>- 2 NO contacts</li> </ul>		

\* Tolerance of the switching paths 0/-4 mm

**Terminal markings**



**User information –  
Safety-related  
remarks****Handling the bumper**

- The bumper is to be positioned centrally below the open aircraft door. In order to avoid damage, the bumper must be handled carefully.
- The bumper is maintenance-free.
- If the bumper is damaged, particularly the outer skin, the cable junction box, the floor plate or the upper contact plate, it must be taken out of use immediately and replaced by a new bumper. The operating personnel must be instructed on this procedure.
- Repairs to the bumper may only be performed by us as manufacturer.
- The bumper may only be used for the at page 2 described purpose.
- The bumper must be inspected regularly by a trained person for external damage. Depending on frequency of use, we recommend minimum inspection intervals of 8–12 weeks.
- The vents (refer to figure on page 6) are protected against the penetration of coarse dirt. This protection may not be damaged or removed. The openings may not be sealed.

**Protection against inadvertent triggering**

- The bumper will inadvertently be triggered if, when the bumper is positioned beneath the aircraft door, the vertical distance between aircraft door and top edge of the bumper is equal to or smaller than the response path of the automatic compensation equipment.

**Signal processing**

- The signal processing must be 1 fault-tolerant with fault recognition in accordance with control category 3 to EN 954-1.
- The fault recognition must relate to the “correct” order of the changes in state of the contacts in the form of sequential monitoring (= order of the changes in state in undisturbed operation of the bumper). Faults must be recognised which lead to the cancellation of the redundancy of the contacts in the bumper.
- Recognised faults in the operation of the bumper must firstly be processed in a fault tolerant manner, i.e. they may not lead to an inhibition of the downward motion.
- Recognised faults must, however, trigger a fault display and (also in the case of a voltage interruption)
  - be stored permanently in a non-volatile memory
  - block renewed docking to a different aircraft.
- Since the protective effect of the bumper is not entirely determined by automatic processes, a legible journal with data and time as well as operating state and switch states of the bumper is to be kept. Manipulation of the journal must be prevented.
- The suggestion made as to response system on page 5 and the above control-related remarks do not release the user of the bumper from his duty to perform his own risk assessment and to take other appropriate measures which are suitable (or more suitable) for the purpose and protective aims to be achieved by using the bumper.

**Residual risks**

- Under consideration of the above safety-related remarks individual faults will not lead to the loss of the safety function of the bumper. An accumulation of faults can affect the safety function of the bumper, however.
- Since the protective effect of the bumper is not entirely determined by automatic purposes, the operating personnel must be given special instruction on correct handling.
- The bumper will not prevent damage or accident if the distance between platform and lower door edge is increased, e.g. during unloading of the aircraft (aircraft body rises) or in the case of an incorrect lowering movement of the platform.
- The platform cannot satisfy its function
  - if there is a power failure
  - if it is not positioned beneath the aircraft door in accordance with these instructions.

## Safety-related remarks – response system

State of the bumper	Signal processing	Contact states of the bumper				Door position
		2 x NC 11-12/ 41-42	2 x NO 23-24/ 53-54	2 x NO 33-34/ 63-64	Enabling bumper	
Bumper in home position	Signal processing of the bumper is blocked.					
Transfer platform is positioned and set up; bumper is placed beneath the aircraft door.	Signal processing of the bumper is blocked.					
Before the driver leaves the platform the signal processing of the bumper is enabled – preferably by positive operation. Door, bumper and platform in starting position.	Signal processing of the bumper is enabled. Where applicable, display “everything o.k.”.					
Door lowered to response line of the compensation equipment.	Protection against false trigger: The bumper will inadvertently be triggered if, when the bumper is positioned beneath the aircraft door the vertical distance between aircraft door, and top edge of the bumper is equal to or smaller than the response path of the automatic compensation equipment.					
Compensation equipment is not operating; door reaches top switch line of the bumper (0 position).	Contacts 11-12/41-42 open (→): – upwards movement is reliably blocked. Contacts 23-24/53-54 close: – a warning lamp lights up on the operating panel until it is reset in the switchbox. – if necessary: enabling of the downwards movement. – where applicable: signal to reset the friction wheel.					
Compensation equipment is not operating. Door lowers to bottom response line of the	Contacts 33-34/63-64 close: – Platform is lowered. – Where applicable, blocking of the docking during recommissioning. – Where applicable, signal to return the friction wheel.					
Platform is lowered until the lower switch line is reached again.	Contacts 33-34/63-64 open: – No safety-orientated signal processing (hysteresis!).					
Platform is lowered until the upper switch line (0 position) is reached again.	Contacts 23-24/53-54 open: – Downwards movement is reliably brought to a standstill, bumper remains depressed for approx. 10 mm. – Warning lamp remains. Contacts 11-12/41-42 close: – No safety-related signal processing.					

① = open aircraft door, ② = bumper, ③ = transfer platform, ④ = switch line of the compensation equipment, ⑤ = top switch line of the bumper, ⑥ = response line of the bumper; measurement details in mm

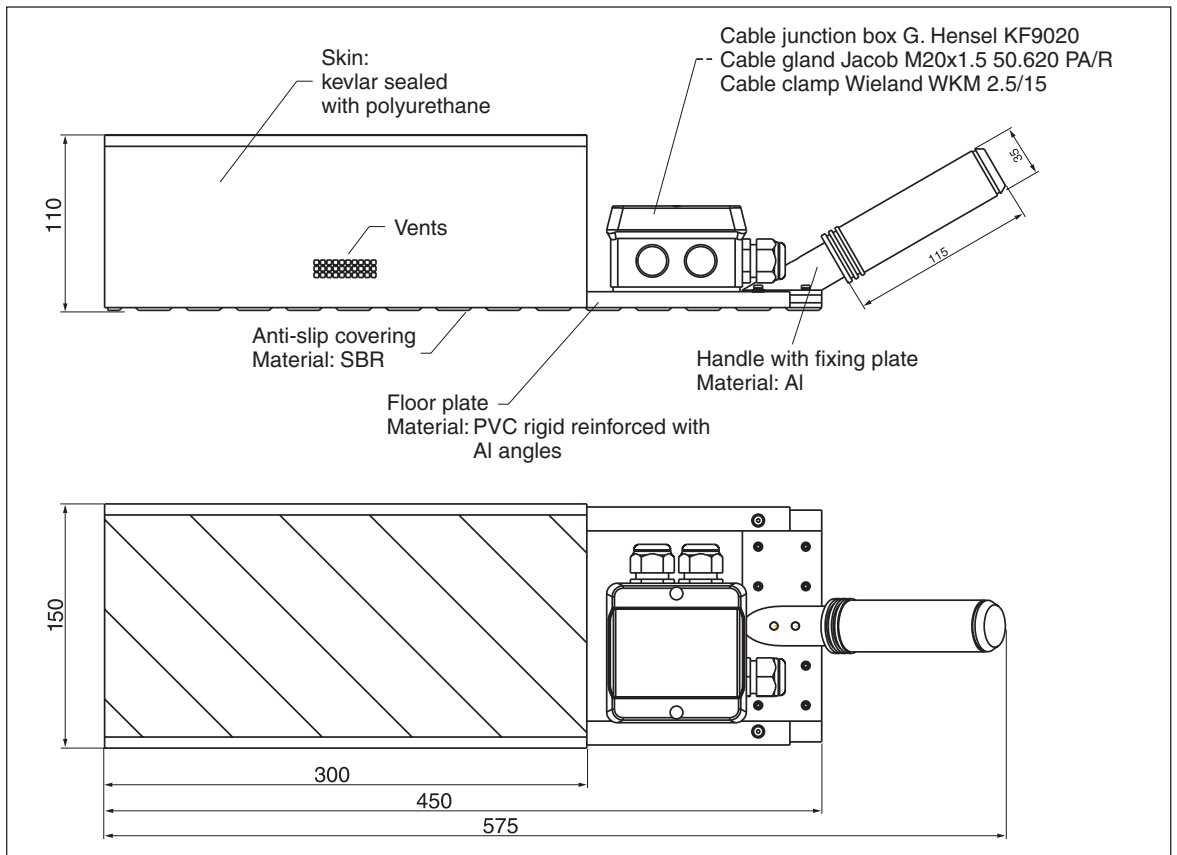
**Functional and design features**

- Bumper to monitor flight passenger stairways, flight passenger bridges and catering vehicles
- Even switching behaviour over the entire actuating surface
- Incorporation of amplitude of loaded transfer platforms
- Tough construction
- Type of protection of the switch inserts IP 67
- Easy installation at ambient temperatures of -20 ... +55° C
- Contact assignment 2 NC/4 NO contacts



- Technical data: refer to page 7
- General description: refer to page 2
- Terminal marking: refer to page 3

**Dimensions**



**Delivery range**

Delivery scope	Type designation	Order no.
Bumper	SSG-SK.1	700 7650

**Standards, regulations**

Bumper	to EN 1760-2
Positive operation	to IEC 947-1, EN 60947-1

**Mechanical data**

Type of protection	IP 67 (1 m WC/30 min.) (arcing chamber and terminal box)		
Contact system	Slow-action contact		
Ambient temperature range	-20 ... +55°C		
Materials used:			
– Contact unit	Glass-fibre reinforced thermoplastic with self-extinguishing properties to UL 94-V-0, metallic parts corrosion-protected, perbunan seals oil and petrol-resistant		
– Bumper	Kevlar fabric with polyurethane, PUR cold foam, PVC rigid; metallic parts: V2A, aluminium; cable: oil flexi-cable		
Connections	Modular terminals in terminal box		
Line connection	min. 0.5 mm <sup>2</sup> , max. 1.5 mm <sup>2</sup> flexible with wire-end ferrules, cable terminal Wieland 2.5/15		
Actuating force	NC contact 11-12/ 41-42	NO contact 1 23-24/ 53-54	NO contact 2 33-34/ 63-64
	Room temperature -20° C	ca. 60 N ca. 80 N	ca. 60 N ca. 80 N ca. 120 N ca. 150 N
Switching paths	NC contact 11-12/41-42 NO contact 23-24/53-54 NO contact 33-34/63-64 Total deformation path Tolerance of the switching paths	ca. 10 mm, ca. 10 mm, ca. 40 mm, ca. 50 mm 0/-4 mm	
Mechanical life	min. 1 x 10 <sup>5</sup> operating cycles		
Resistance to climatic changes	to DIN EN 60068 Part 2-30		
Installation and function dimensions	see description of device		

**Electrical data**

Rated voltage of the control circuits	380 VAC/440 VDC
Continuous current of the control circuits I <sub>the2</sub>	10 A
AC 15 mode	250 VAC/8 A
DC 13 mode	24 VDC/5 A
Electronic control circuits	24 V/≥ 10 mA
Insulation group	C to VDE 0110
Fuse for control circuits	10 A slow blowing

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