



**QUALITY FROM TRADITION**

**SINCE 1989**



**MADE IN GERMANY**



Our products are certified acc. to EN ISO 13849-1  
and EN ISO 13856 : 1-3

# SAFETY-SYSTEMS

## ZIMMERMANN GMBH

Our company develops, manufactures and distributes electronic safety systems for protecting people against dangerous movements of machines. These are so-called pressure sensitive protective devices, which include:

- SSZ-Safety Mats
- SSZ-Safety Switching Rails
- SSZ-Safety Bumpers
- SSZ-Safety Control Units

As well as so-called non-contact functioning safety systems:

- SSZ-Mobile Safety-Laser-Scanner



# OUR PRODUCTS

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## SSZ-SAFETY MATS

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Are safety devices for the protection of large-sized danger areas. Safety mats are produced in accordance with customer specifications using SSZ-sensor elements.



## SSZ-SAFETY RAILS

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Consist of a hollow-chamber rubber profile with an integrated SSZ-sensor element.  
Selection criteria for the rubber profile of an SSZ-safety rail are the material specifications and the desired deformation distances.





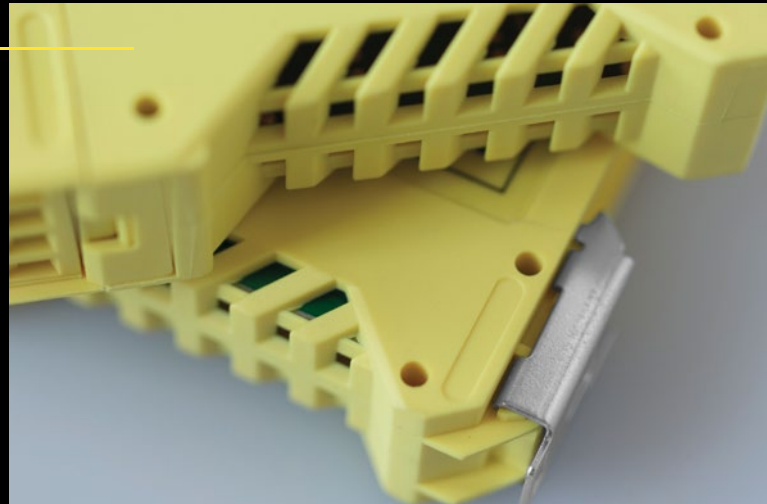
## SSZ-SAFETY BUMPER

Shock absorbers, e.g. for driverless transport systems (AGV), which generate a signal as a result of force action in the same way as the SSZ-safety rails and the SSZ-safety mats. SSZ-Safety bumpers can be used where long deformation distances are required and cannot be controlled by the SSZ-safety rails.



## SSZ-SAFETY CONTROL UNITS

Are designed to control the safety devices: SSZ-safety mats, SSZ-safety rails and SSZ-safety bumpers.



## SSZ-MOBILE SAFETY SYSTEM

### FOR WAREHOUSE-TRUCKS

The mobile safety-system SSZ-PSA-S, which includes the SSZ-SFE controller, was designed for the application of the Laser scanner for fork-lift trucks. The laser scanners are mounted on both sides (forward and backward directions) of the fork-lift truck and connected to the SSZ-SFE controller.



# GENERAL

## INFORMATION

More and more complex and faster operation frequencies lead to higher demands of personal safety for machines and units. The fundamental obligation to take the necessary precautions is laid down in different laws. The required safety targets have been rendered precisely by the many regulations, guidelines and recommendations issued by trade associations, standards and other institutions.

Danger caused by machines and units can be caused by mechanical movements, electrical energy, thermic influences, radiation, various materials, etc.

This requires partly different and partly the same safety measures. Our EG-approved SSZ-Safety Units are made to protect you from dangerous movements.

SSZ-Safety Switching Rails, SSZ-Safety Mats and SSZ-Safety Bumpers (a kind of shock absorber for driverless vehicles) are safety systems that through the influence of some activity in cooperation with an electronic evaluation unit -produce a control command, usually a Stop command and the connected protection of dangers and dangerous areas.

These can be applied everywhere where dangerous conditions, e.g. dangerous movements, can lead to the injury of operating personnel and where prevention units are not possible.

### ADVANTAGES OF ELECTRICAL SYSTEMS

The SSZ-devices, including the signal transmitter, operate as an electrical system. In comparison to other principles there are many fundamental advantages. For example, connection in series is possible, and there are many possibilities to connect signal transmitters sufficiently sturdy and insensitive enough to meet industrial requirements, to be able to use them without special consideration of vibration and temperature fluctuation, and to maintain these characteristics for long periods of operation and frequent use.

Furthermore, electrical systems have the advantage that no minimum operation speed to trigger the signal is required, and the switching signal is preserved if actuation continues. The system is based on a closed circuit principle. Broken cables or damaged sensors are automatically recognized.

We can offer various electronic SSZ-evaluations units according to customers' specifications. We produce 2 channel redundant designs, PLC, self-acknowledging, as well as 2channel self-controlling or self-locking with potential-free feedback contact for SPS controllers or similar, PLd.

Of course, the self-locking units are with external acknowledgement for the falling edge, which means that a bridging of the external acknowledgement is not possible!

### THE PRINCIPLE

The SSZ-sensor is used for all our signal transmitters, which are SSZ-Safety Mats, SSZ-Safety Switching Rails and SSZ-Safety Bumpers. This is a co-extruded elastomer rubber profile whose opposing and isolated surfaces are electrically conductive. These surfaces are held apart by the special profile shape. Touching the electrically conductive surface triggers the signal. The mode of operation of the SSZ-safety system is based on the principle of transmission and receiving in the form of a 4-wire system in accordance with the closed-circuit principle, whereby two different voltages are generated by the evaluation unit which has opposing polarity at the same time.

The two signals are transmitted via the two highly-resistive conductors of the SSZ-sensor element, received at the end again and processed.

If the SSZ-sensor element is actuated or a voltage fails, e.g. owing to a cable break, this is recognized by the electronic evaluation circuitry, which then immediately switches off the output relay and interrupts a dangerous movement. The actuating time for the system is  $\leq 20$  ms.





**SSZ-PRODUCTS ARE SAFETY SYSTEMS THAT THROUGH THE INFLUENCE OF SOME ACTIVITY IN COOPERATION WITH AN ELECTRONIC EVALUATION UNIT - PRODUCE A CONTROL COMMAND, USUALLY A STOP COMMAND AND THE CONNECTED PROTECTION OF DANGERS AND DANGEROUS AREAS.**

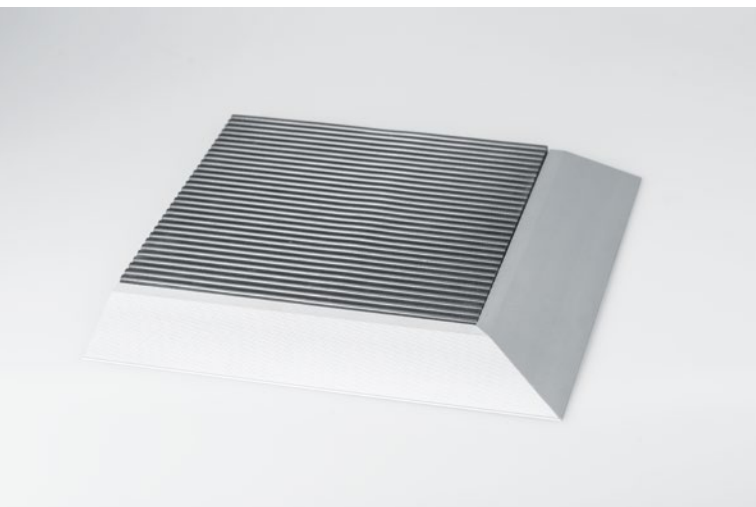
## SSZ-SAFETY MATS

SSZ-Safety mats are safety devices for the protection of large-sized danger areas. SSZ-safety mats are produced in accordance with customer specifications using SSZ-sensor elements.

These can be produced in all required sizes and shapes up to a size of 3.000 x 1.500 mm, whereby the overall height is 21 mm and the inactive edges are 25 mm wide.

For maximum robustness SSZ-safety mats are equipped with a 6 mm oil resistant NBR-surface (other surfaces on request). Eloxicated aluminium profiles, which are flattened and mitred, and provided with step securing bores  $\varnothing 10/6$  mm which can be connected with special corner connectors, are provided as standard for securing purposes.

The electrical connection is a 4 plug-in connector whereby the male is built into the safety mat. Other connection-solutions are available on customer request.

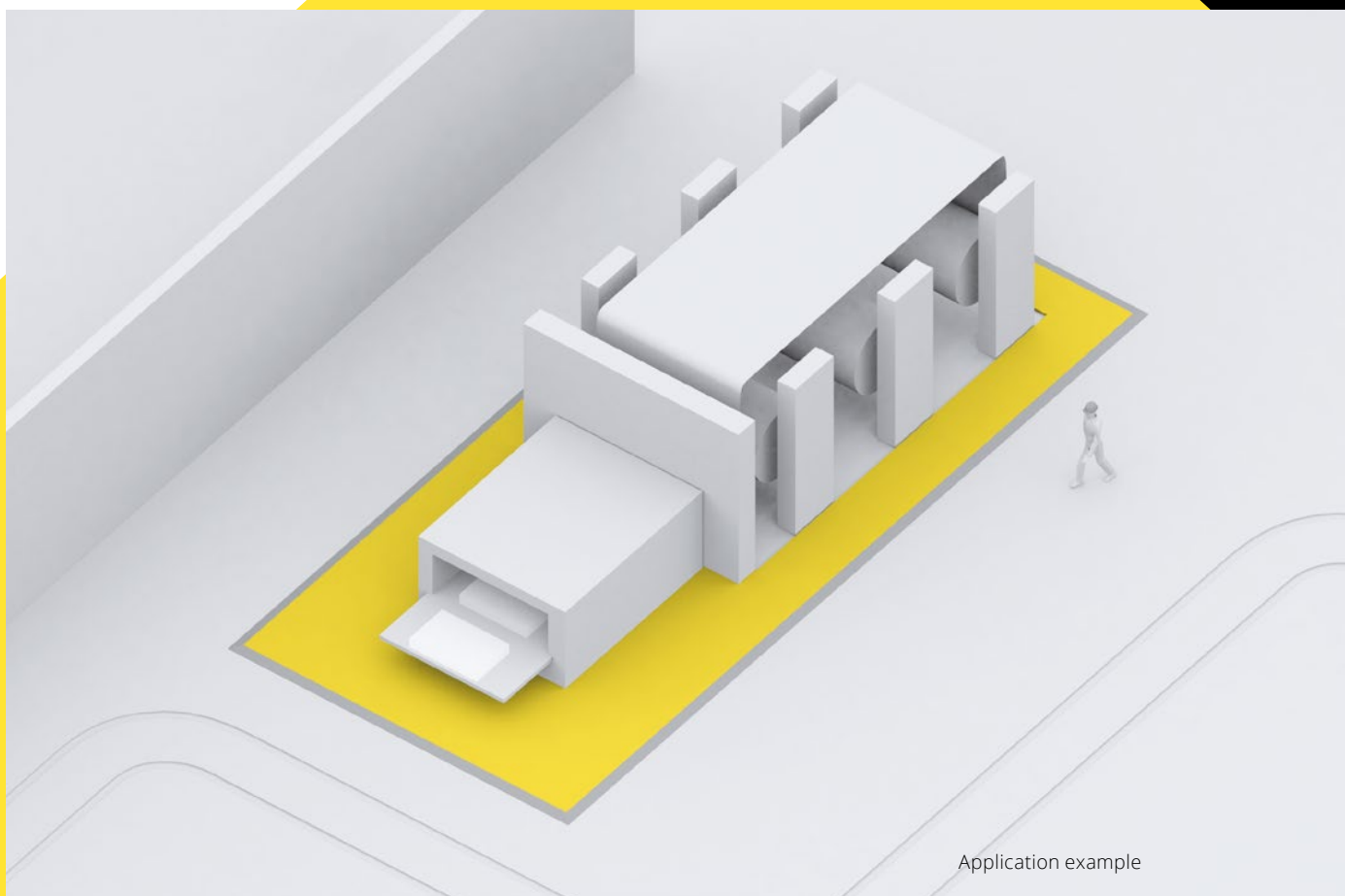




## AREAS OF APPLICATION

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1. for dangerous areas on machines and plants
2. to safeguard shearing and crushing edges, and many more applications



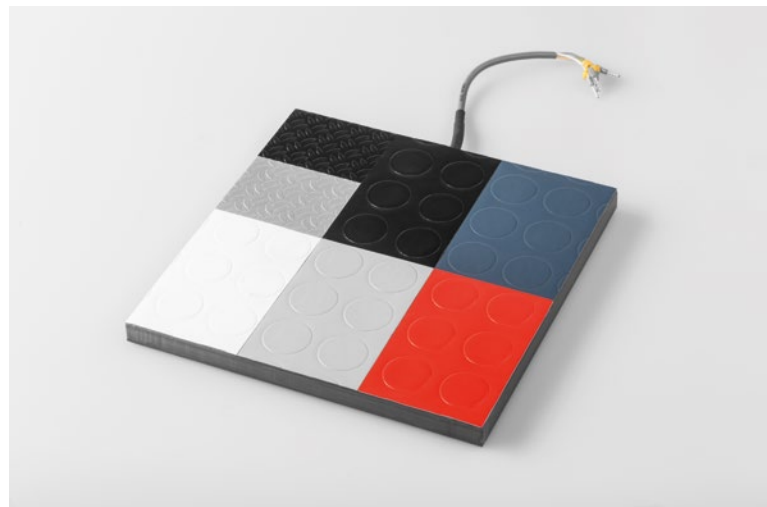
Application example

## **THE SSZ-SAFETY MAT TYPE BAT IS DESIGNED FOR VERY HEAVY DUTY APPLICATIONS.**

The SSZ-safety mat type BAT is designed for very heavy duty applications. This safety mat is made of welded steel frames which are covered with aluminium tear drop sheets. As the control element a safety positioning switch is used.

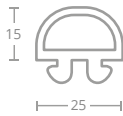


The Low cost safety mat is being used in applications for human and light objects only. It is generally made with a PVC cover in different colors according to customer's requirements. The SSZ low cost mat is not water-resistant and cannot be overdriven.

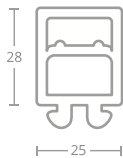


# SSZ-SAFETY SWITCHING RAILS

Profil 05  
NBR/EPDM



Profil 06  
NBR/EPDM



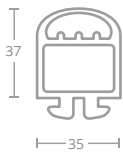
C-Profil  
C 2510



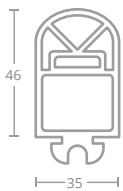
C-Profil  
4010



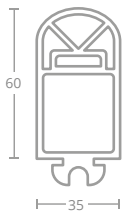
Profil 08  
NBR



Profil 08  
EPDM



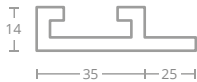
Profil 10  
NBR/EPDM



C-Profil  
C 3514



C-Profil  
C 6014



SSZ-Safety Switching Rails consist of a hollow-chamber rubber profile with an integrated SSZ-sensor element. A control signal is generated in the evaluation unit by an actuating force acting on the signal transmitter. The rubber profiles of the switching rails are tailor-made to customer specifications up to a maximum length of 6000, mm and are fitted as standard in an aluminium C-profile for mounting. The inactive areas at both ends are approx. 20 mm. The degree of protection of the switching rails is IP65. Cable connection is optionally possible at both ends with a 2 x 2-wire cable (standard) or, for the profiles 06-10, at one end with a 1 x 4-wire cable if requested by the customer. The standard cable length is 2000 mm, both for connection at both ends and at one end (other cable lengths according to customer specifications). SSZ- switching rails are available in oil-resistant quality NBR and ozone-resistant quality EPDM and can be sequential wired up to a total length of 50 meters.





## MOUNTING ADVICE



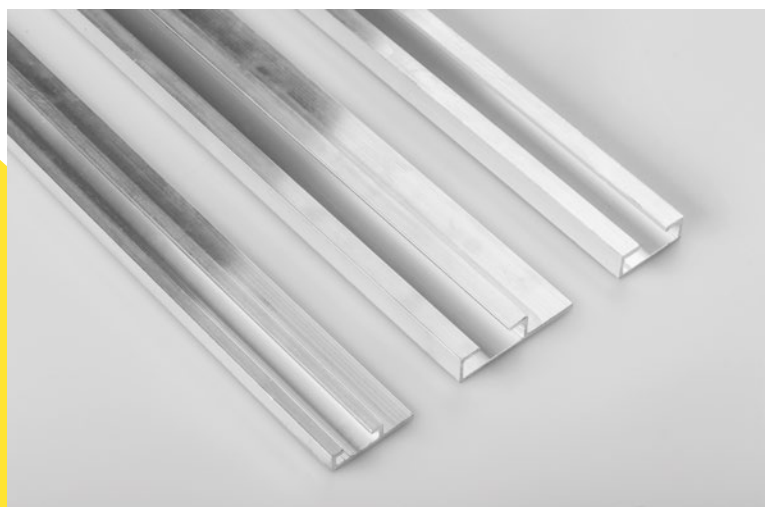
The SSZ-safety rails have to be fitted into the aluminium-profile by snapping, and not by pulling. You are advised to use glycerine or blunt tools.

The deformation distance of the safety edges must be longer than the stop distance of the protected device.



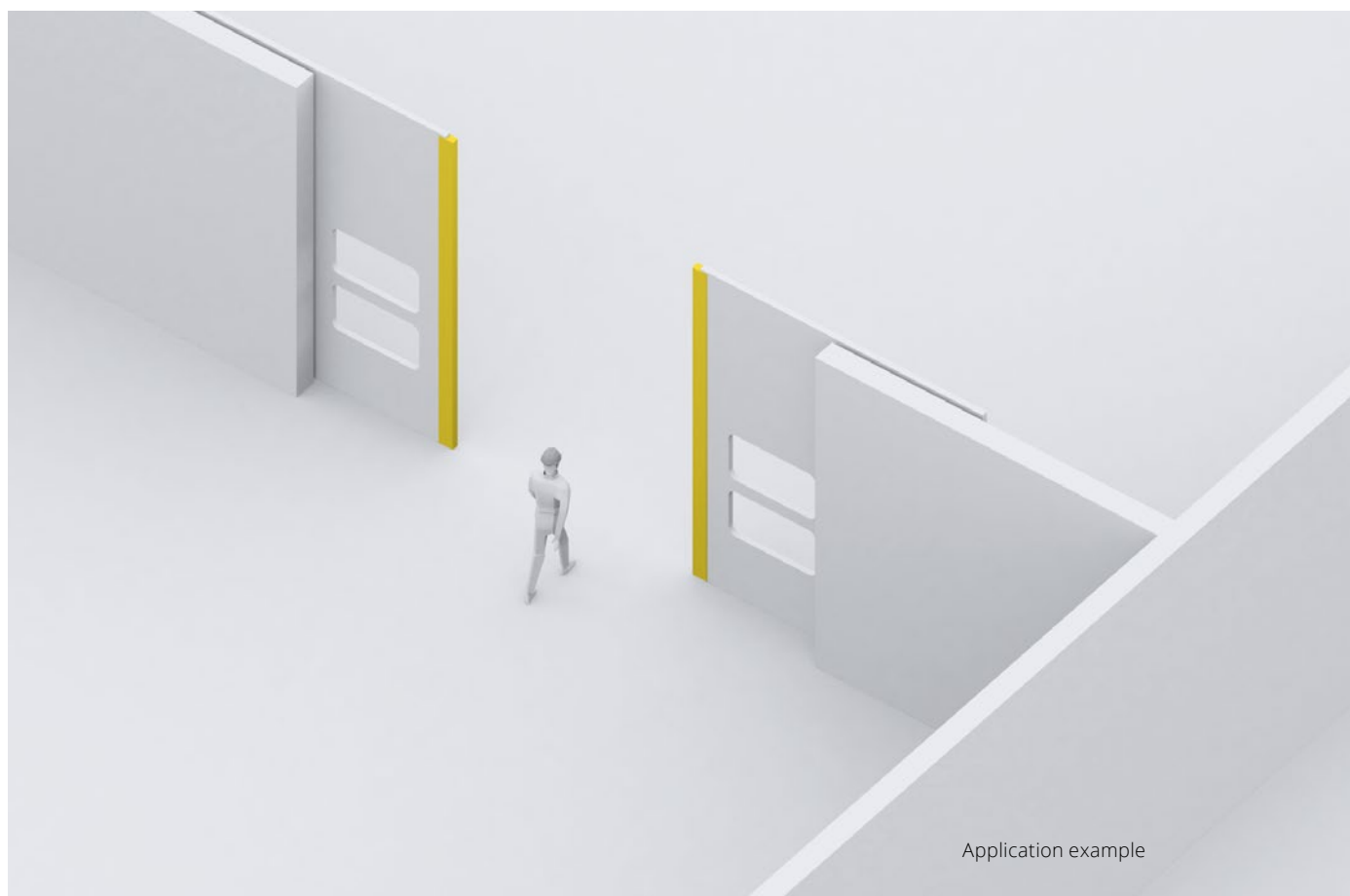
## AREAS OF APPLICATION

1. for computer controlled devices
2. for driverless vehicles
3. for dangerous areas on machines and plants
4. to safeguard shearing and crushing edges
5. to safeguard automatic windows, doors and gates and many more applications





RESISTANT AGAINST	EPDM	NBR
Smoke	very good	potential
Froth	very good	average
Acetone	very good	low
Steam	very good	good
Fuel	weak	good
Resolvent	weak	good
Mineral oil	low	very good
Ozone	very good	average
Acids	very good	low
Petrol	low	very good
Weather	very good	good



Application example

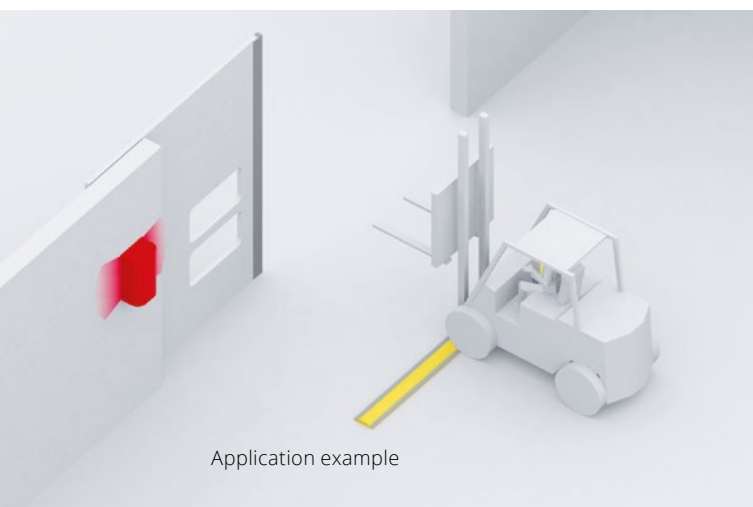
## SSZ-SPECIAL SWITCHING ELEMENTS

Frequently, switching elements that are not available as standard models are required. The SSZ-sensor element is very often the solution. As a foot switch, a big dimension switch or an SSZ switching element it offers the correct alternative. The floor-contact-switch of the series SSZ-BKS was developed as drive-over switching element.

These are fastened to the floor and give a signal when activated, no matter whether the signal is given by a vehicle or a fork-lift truck, etc. driving-over, or by rolling over materials coils e. g. paper or sheet metal.

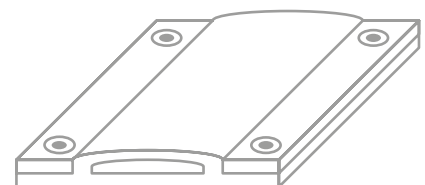
A further frequent application is the position control of material or the circumference control of winding paper or textiles. The wear resistant surface made of oil-resistant material, as well as the switching element are both extremely sturdy and long-lasting.

For controls that are irrelevant to safety technological applications, all SSZ switching elements without self monitoring function control can be used. The switching unit type SSZ-CD transforms the switching signal of the switching element to a potential-free contact.



Application example

Mounting profiles



Rubber profile

SSZ-BKS

## SSZ-SAFETY BUMPERS

SSZ-safety bumpers are shock absorbers e.g. for driverless transport systems (AGV), which generate a signal as a result of force action in the same way as the SSZ-safety rails and the SSZ-safety mats.

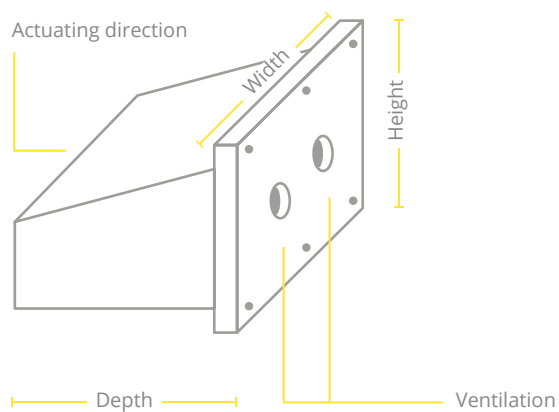
SSZ-safety bumpers can be used where long deformation distances are required and cannot be controlled by the SSZ-safety switching rails.

SSZ-safety bumpers are manufactured individually according to customer specifications.

Special contours, cuts and angles can be considered.

The body of the bumper is coated with polyurethane, artificial leather, temperature-resistant special fabric or an extreme tear-resistant textile cover.

The bumpers are secured on an aluminium support profile by means of stud bolts or threaded holes.

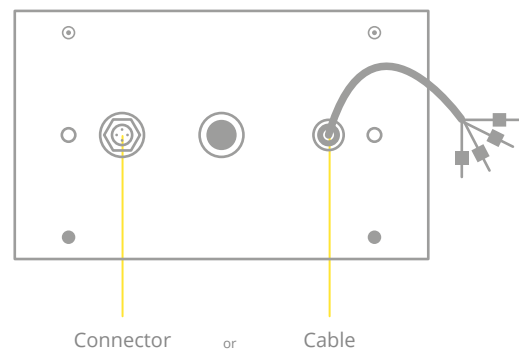


## FITTING – POSSIBILITIES



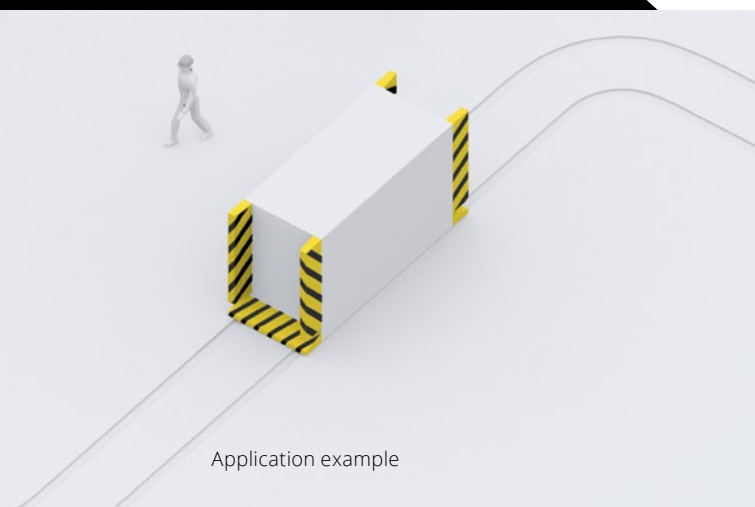
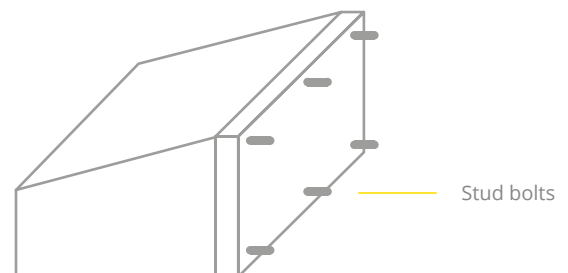
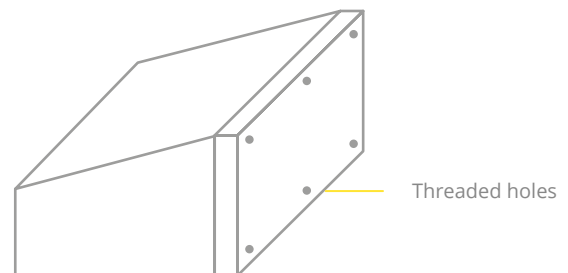
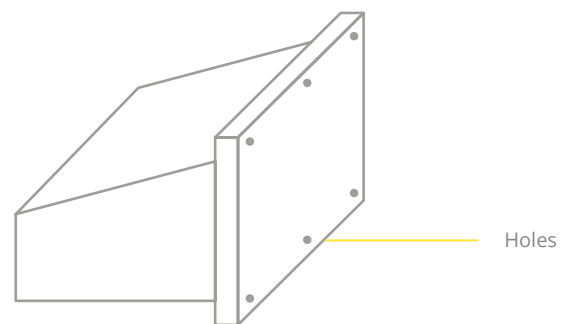
Always ensure that the ventilation holes on the reverse side of the bumper are not covered. These are for the bumper's ventilation.

The deformation-distance of the safety bumper must be longer than the stop distance of the pro-ected device.



## AREAS OF APPLICATION

1. for dangerous areas on machines and plants
2. to safeguard shearing and crushing edges
3. for robotics
4. for automatic doors



Application example



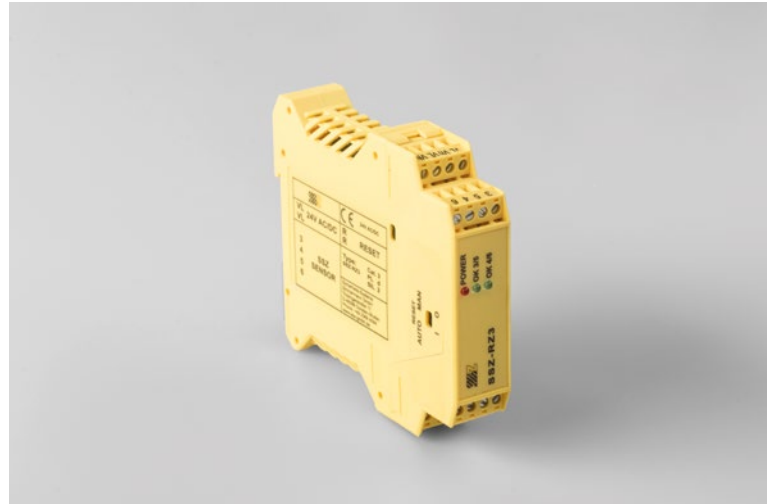
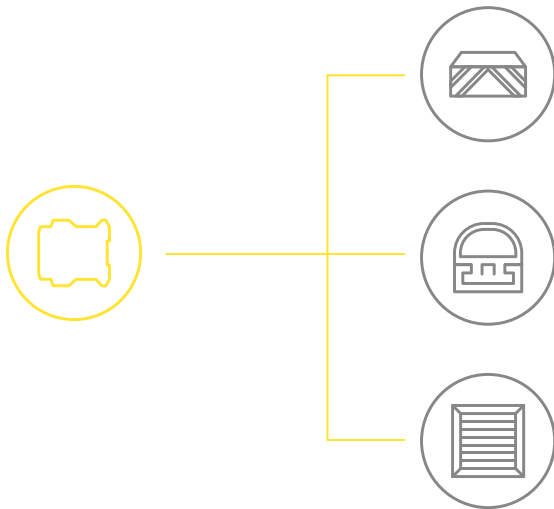
# SSZ-SAFETY CONTROL UNITS

SSZ- safety units are used for the stoppage of dangerous machines and other equipment, whose functioning can be dangerous for people present in their hazardous zone.

Units are designed for cooperation with 2- channel sensing resistors-Pressure Sensitive SSZ Safety Devices: SSZ-safety mat, SSZ-safety rail, SSZ-safety bumper.

SSZ-control units can control up to a maximum of 50 m of SSZ-safety rail or 4,5 m<sup>2</sup> of SSZ-safety mat.

It is also possible to connect various SSZ products in a series.



## MOUNTING ADVICE



The control units can only be used on currency circuits that have the same safety standards.



# MOBILE SAFETY SYSTEM FOR WAREHOUSE-TRUCKS

## TYPE PSA/S

The mobile safety-system SSZ-PSA-S, which includes the SSZ-SFE controller, is designed for the application of a Laser scanner for fork-lift trucks. This is a central unit where 2 units can be attached. The laser scanners are mounted on both sides (forward and backward directions) of the fork-lift truck and are connected to the SSZ-SFE controller.

With the help of the SSZ-SFE controller it is possible to detect differential driving directions and deactivate the scanner which is opposite the driving direction.

Features of SSZ-PSA-S:

- recognition of driving direction
- automatic deactivation when out of aisle
- programmable protective field  $r = 6.5 \text{ m}$  at  $180^\circ$
- programmable warning field  $r = 15 \text{ m}$  at  $180^\circ$
- automatic slowdown when warning field is active
- automatic stop when protective field is active
- manual override (slowest velocity enabled)
- optical feedback for warning/ protective field activation

### FUNCTION

Detected objects in the warning area causes reduced speed to creep speed. Detected objects in the safety area causes immediately stop of the vehicle. The operator has the possibility to override ( mute ) the stop signal by pushing and holding the mute button. If he does so, it is on his own responsibility but the vehicle is only able to operate in reduced speed - creep speed.

Attention : there is no more safety function given from the system during operation in mute mode.





Application example

**THE LASER SCANNERS ARE MOUNTED ON BOTH SIDES (FORWARD AND BACKWARD DIRECTIONS) OF THE FORK-LIFT TRUCK AND ARE CONNECTED TO THE SSZ-SFE CONTROLLER.**



**A:** Thüringerstrasse 17, 46286 Dorsten-Wulfen

**P:** + 49 2369/4094

**F:** + 49 2369/21597

**E:** [info@ssz-gmbh.de](mailto:info@ssz-gmbh.de)

**W:** [ssz-gmbh.de](http://ssz-gmbh.de)

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