

Pressure-sensitive safety devices

SSZ Series

Categories 2 & 3 per EN954

Pressure-sensitive safety mats, edges and bumpers



Attestation d'examen CE de type



Ideal for

- Area protection
- Anticollision protection

A few applications...

Pressure-sensitive safety mats

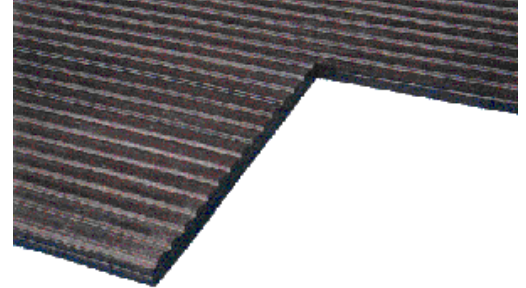
- Robots
- Machines, machining centres
- Assembly lines
- Vertical storage warehouses

Pressure-sensitive edges

- Platform hoists
- Driverless transport systems
- Machine doors automatically opened and closed
- Presses

Pressure-sensitive safety bumpers

- Wire guided trucks
- Lift trucks
- Automated installations
- Gantry cranes



Pressure-sensitive safety mats



Pressure-sensitive edges

Presentation

The pressure-sensitive safety mats, edges and bumpers are complete electrical safety systems implementing a pressure sensitive sensor and a monitoring unit.

When pressure is applied to the sensor, the sensor outputs produces an electrical signal which is immediately processed by the monitoring unit to stop dangerous movements by its built-in safety relays.

SSZ features

- System is fully independent of atmospheric pressure, temperature and vibration
- Flexible, robust, long-lasting sensor
- 4-wire technology for true safety system redundancy, ensuring a high level of safety
- Possibility for connecting different types of pressure-sensitive devices to the same monitoring unit
- Can be custom-manufactured to meet your specifications.



Polyurethane pressure-sensitive bumpers

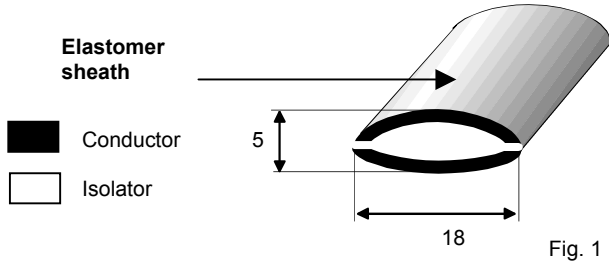


Safety bumpers with heat-resistant covering

Detection principle

The sensor used in the SSZ protection devices is common to the whole product line.

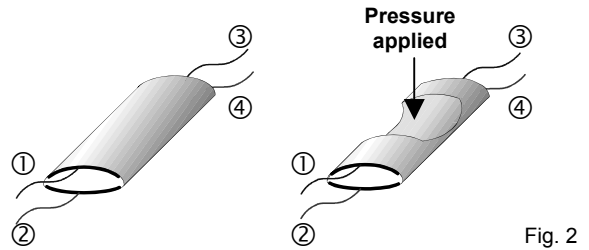
The sensor comes in the form of an oval tube made of elastomer, similar to rubber, and therefore highly flexible. The tube is formed by two coaxial, co-extruded parts. The outer part is insulating, while the inner conductive part is divided into two opposite areas, insulated with respect to each other (see fig. 1).



The sensor is connected to the monitoring unit by a 4-wire technique to satisfy the most demanding safety standards. The control unit generates two signals which are transmitted to the two conducting areas of the sensor by two wires of the cable (wires ① and ② on fig. 2), each signal having a different voltage level. This signal redundancy ensures a high level of safety and a broad fault analysis capacity.

These signals are then applied to the control unit by the two other wires of the cable (wires ③ and ④ on fig. 2).

When pressure is applied to the sensor, the two electrically conducting areas are pushed into contact, creating a short circuit between the signals generated by the monitoring unit. The short-circuit is detected by the control unit which immediately stops the dangerous movements



By this detection principle and the four-wire technology, any anomaly, such as rupture of the cable which would result in interrupting the signals generated by the control unit, is detected, immediately opening output contacts on the build-in safety relays.

Pressure-sensitive safety edges



Description

The pressure-sensitive safety edges are formed by three elements:

- A sensor
- A deformable hollow rubber extrusion, type NBR (good mechanical strength) or type EPDM (good climatic withstand capacity) in which the sensor is mounted
- An aluminium mounting extrusion in which the rubber extrusion is mounted.

The pressure-sensitive safety edges are manufactured to your specifications with lengths ranging from 5 cm to 6 meters.

For protection devices with lengths exceeding 6 m, the pressure-sensitive safety edges can be mounted in series. A monitoring unit can control up to 50 meters of pressure-sensitive safety edges.

The 4 wires connecting the safety edges to the control unit are configured 2 x 2 wires (standard configuration) and are accessible at each end of the pressure-sensitive safety edge (see fig. 3).

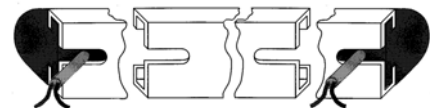
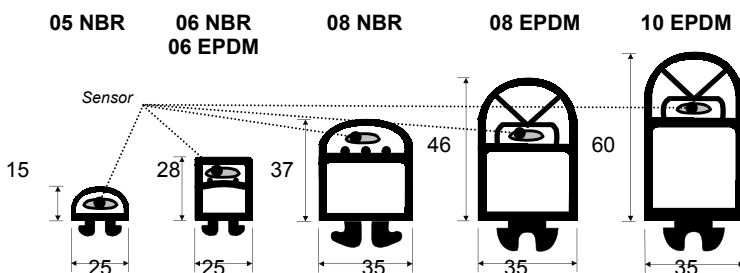


Fig. 3

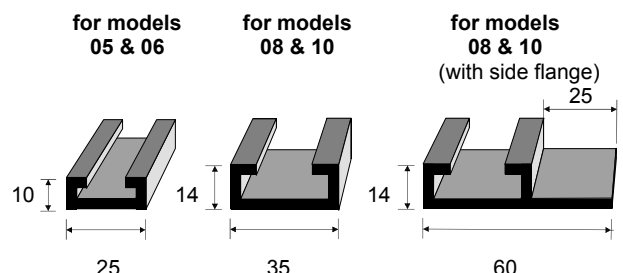
Note: On request, the cable lead-out can be provided on one side only with a 1 x 4 wire configuration.

Models and dimensions of extrusions

Models of hollow rubber extrusions



Models of aluminium mounting extrusions



Criteria for selection of pressure-sensitive safety edges

The choice of a pressure-sensitive safety edge is governed by 2 factors:

1. Environment conditions

The environment conditions of the application will determine the choice for the most appropriate external rubber envelope in which the sensor will be mounted:

- Type NBR : good resistance to oils and mechanical risks (twisting, elongation, scuff marks)
- Type EPDM : good resistance to atmospheric agents and to diluted non-oxidising acids; medium resistance to mechanical risks.

2. Machine stopping distance

The machine stopping distance and the deformation distance of the rubber extrusion will determine the most appropriate model to be selected.

The pressure actuating zone is 90° for all the models, i.e. ±45° with respect to the vertical axis as shown below. This allows for a slight lateral sensitivity.

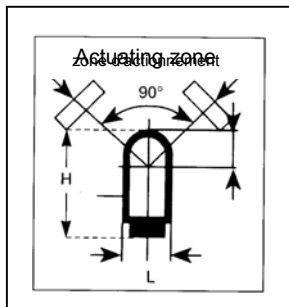


Fig. 6

DR : Response distance

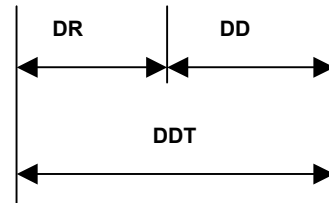
This is the actuating distance on the pressure-sensitive safety edge required to produce an electrical control signal.

DD : Actual deformation distance

This is the maximum deformation distance which will guaranty the integrity of the pressure-sensitive safety edge. This distance is measured by applying a weight of 250 N / cm² at a speed of 50 mm/s.

DDT : Total Deformation Distance

This is the total maximum deformation distance acceptable, equal to DD + DR.



Rubber extrusion model	H (mm)	L (mm)	DR (mm)	DD (mm)	DDT (mm)
05 NBR	15	25	2,5	3,5	6
06 NBR	28	25	3	6	9
06 EPDM	28	25	3	6,5	9,5
08 NBR	37	35	5	10	15
08 EPDM	46	35	8	22	30
10 EPDM	60	35	7	20	27

Other characteristics

- Protection index:
- Standard cable length (2 wires): 2 m (other lengths on request)
- Operating temperature: - 20°C to + 60°C

Note: the ends of the pressure-sensitive safety edge are inactive along approx. 20 mm.

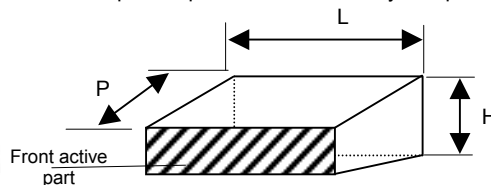
Pressure-sensitive safety bumpers



Description

The pressure-sensitive safety bumpers are shock-absorbers used when large deformation distances are required in places which cannot be monitored by pressure-sensitive safety edges.

The pressure-sensitive safety bumpers are formed by a polyurethane foam block in which the sensor is mounted, and covered either by a polyurethane or vinyl covering resistant to water and oils, or with a glass fibre reinforced flameproof material resistant to melted metal projections such as aluminium. This version is particularly suitable to the smelting industry. The bumper shape can be defined to your specifications.



Note: The maximum dimensions (mm) are: H = 1500, L = 3000, D = 1000. The depth of the safety bumper must not be more than two times the height.

Fig. 7

Mounted on the front part (see fig. 7), the sensor detects any pressure applied to any point on the active area. The electrical signal is generated after the safety bumper has been crushed by around 20 to 25 mm.

On request, the safety bumper can be provided with pressure-sensitive side parts.

The 4 connection wires leading to the control unit are configured 2 x 2 wires with a length of 2 m (standard configuration) and the cable lead-outs are defined to the customer's specification.

On request, the safety bumper can be provided with only one cable lead-out with a 1x4 wire configuration. The cable position is defined to your specifications.

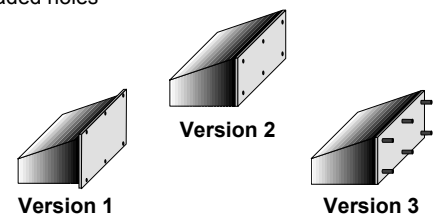
The polyurethane and vinyl bumpers are black and can be completed with diagonal yellow signalling lines.

The heat-resistant bumpers are silvered-coloured.

The bumper foam block is anchored on a 4 mm-thick aluminium plate.

The plate is produced in accordance with the customer's request according to 3 versions:

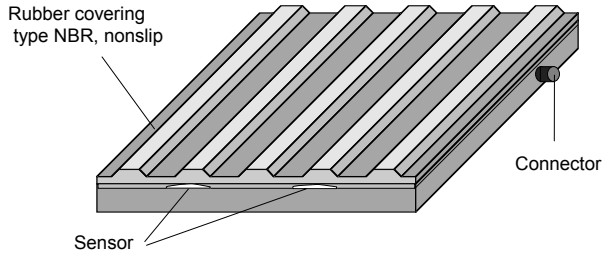
- Version 1 : through-holes
- Version 2 : threaded holes
- Version 3 : stud



Other characteristics

- Protection index: IP65 (IP53 viewed from aluminium plate side)
- Operating temperature range: - 20°C to + 60°C (+ 540°C max. for 1 min. with heat resistant covering)
- Maximum deformation on depth: 60%

Pressure-sensitive safety mats



The safety mats can be connected to the electrical power source either by a connector M8 directly built-in to the safety mat or by a 2 meter cable leading out of the safety mat (other lengths available on request).

The pressure-sensitive safety mats are built to your specifications (shapes and dimensions) with area not exceeding 4.5 m² per safety mat.

Several safety mats can be placed side by side and wired in series to create an area protection for a desired configuration.

A monitoring unit can monitor several safety mats (up to 4.5 m²).

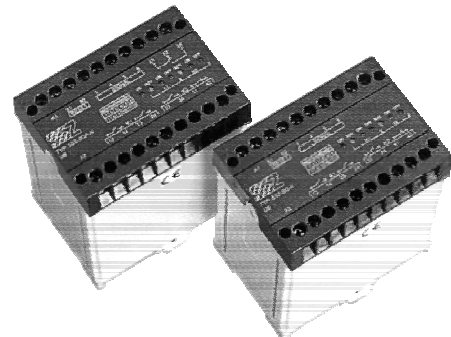
Note : Another more economical version of the pressure-sensitive safety mat, called the "low load" safety mat, is available. This safety mat is particularly suited for detection of persons only.

The "low load" safety mat cannot be used for vehicle passage-ways.

Only the monitoring unit is certified with this model.

(*) : Inert strip around safety mat: 25 mm

Monitoring units



Several monitoring unit models are available:

- model A : automatic reset, category 2
- model B : automatic reset, self-monitored outputs, category 3
- model C : manual reset, self-monitored outputs, category 3
- model D : manual reset, self-monitored outputs, category 3 with recopy information signal for API.

Various power supply possibilities are available:

- 230 VAC, 115 VAC, 24 VAC/VDC

Note : The monitoring units are the same for all the pressure-sensitive devices

Technical specifications

Power supply	230 VAC +10% / -20%
	115 VAC +10% / -20%
	24 VAC/VDC ± 10%
Output relays	AC.max 230V/2A
	DC.max 24V/0,5A

Response time	< 16 ms
Dimensions	H.70mm, W.110mm, L.110 mm
Mounting	on rail DIN EN 50022-35
Protection index	IP40
Operating temperature range	0°C à +55°C
Connection	Screw terminals, 0,5 mm ² max. 2 x 2,5 mm ²

The products described in this document are subject to change. Descriptions and characteristics are not contractually binding.



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Description

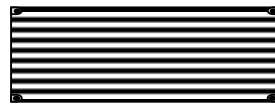
Made of high wear-resistant material, the pressure-sensitive safety mats are designed to withstand heavy continuous loads of up to 80 kg/cm² representing a total of 4 tons maximum per safety mat.

The safety mats are designed watertight. All the internal and external parts are assembled by silicone seals to ensure a protection index of IP65. The safety mats implement a type NBR rubber covering (oil-resistant) with a grooved (no slip) surface.

No insensitive or dead zone (*): anyone walking on the safety mat is detected. On the other hand, small objects dropped on the safety mat, with load less than 6 kg/cm² are not detected.

To reinforce the outer edge of the safety mat, an aluminium extrusion can be added: the extrusion is provided with holes for attachment to the floor (Fig.10).

Safety mat attached to floor without aluminium extrusions



Safety mat attached to floor with aluminium extrusions

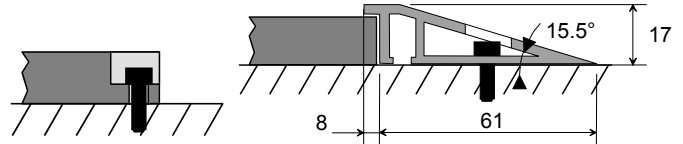


Fig. 10

Specifications

	Type of mat		
	Standard	Low load	
Height	21 mm	16 mm	
Max. width	1500 mm		
Max. length	3000 mm		
Material	Base	PVC 10 mm	PVC 4 mm
	Intermediaire	PVC 2+2 mm	PVC 4 mm
	Contact surface	NBR 7mm	PVC 2mm
Protection index	IP65	IP54	
Min. load	6 Kg/cm ²	4 Kg/cm ²	
Max. load	80 Kg/cm ²	5 Kg/cm ²	
	4 tons max.	350 Kg max.	
Operating temperature range	0°C to +55°C		