

# SAFETY DEVICES



# SAFETY BUMPERS

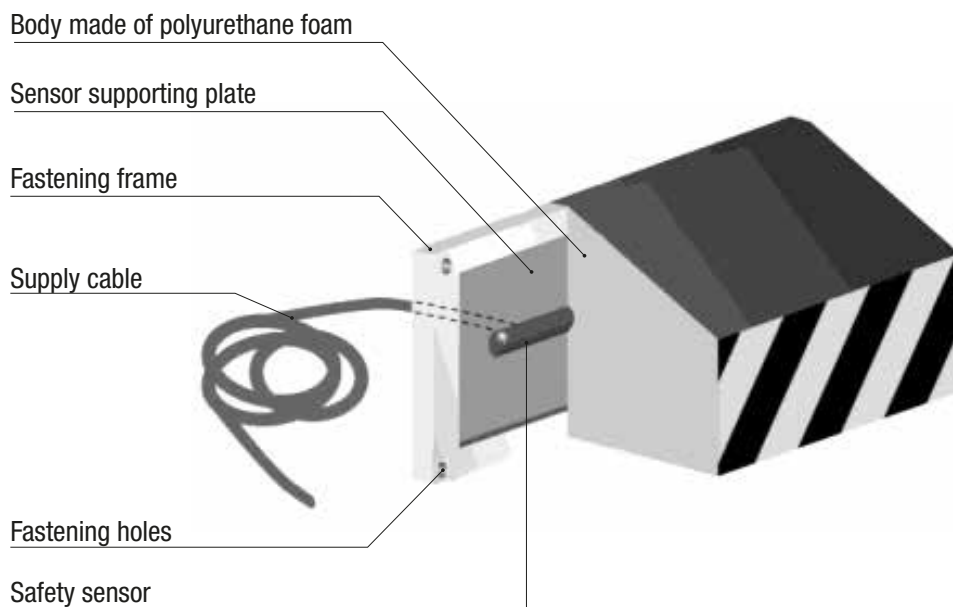
The pressure-sensitive safety bumper is used to protect personnel from collision against vehicles or moving parts of an industrial machine such as AGV, stacker cranes, wire-guided vehicles, automatic warehouses, etc...

When minimum compression is applied to the bumper, after a pre-run, the internal contact of the sensor closes and changes its state (from NO to NC). The “control unit” immediately emits a stop signal indicating that a change in the sensor state has occurred and removes the hazardous situation.

After the pre-run, the bumper still allows for a compression called “overrun”, which varies according to the bumper depth, and such to further soften the impact.

Bumpers are made of polyurethane foam glued to a fastening frame and covered with protective fabric. A pressure-sensitive sensor, called “sensor”, is housed inside the bumper.

Bumpers are available with standard maximum length of 3 m. For other lengths, they can be split into several parts (request to be indicated when ordering). *Other shapes and dimensions available upon request.*

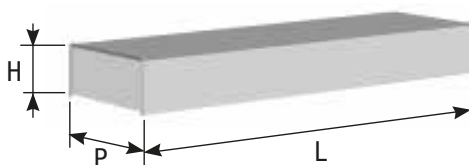


*The bumper is equipped with a 4-pole outlet cable, 4x0.35mm<sup>2</sup> FROR 300/500 – standard length 3 m.*

## STANDARD SHAPES

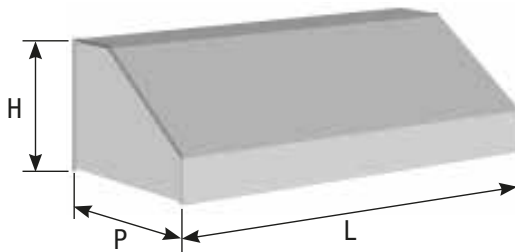
### GSBPS 01 | Rectangular bumper

Standard section  
H = 100 mm P = 200 mm



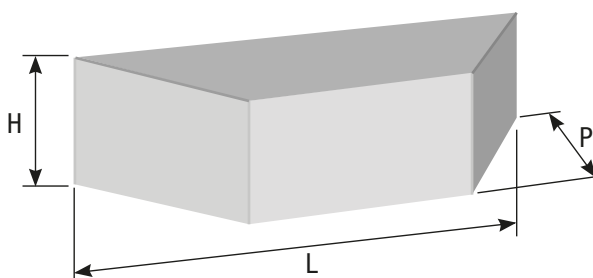
### GSBPS 02 | Tapered bumper

Standard section  
H = 200 mm P = 300 mm



### GSBPS 03 | Tapered bumper

Standard section  
H = 250 mm P = 500 mm



### GSBPS 04 | Trapezoidal bumper

## DIMENSIONING OF THE SAFETY BUMPER

To find out the correct depth of the bumper, see the following data:

- **Pre-run** (up to switching point);  
**SB** = 20% of bumper depth;
- **Overrun** (max. deformation);  
**SV** = 50% of bumper depth;
- **Non-deformable part**: **30% of bumper depth**.

The choice of bumper depth shall be made taking into consideration the stop space and the required **SV** overrun.

## HOW TO ORDER THE SAFETY BUMPER

### Code

GSBPS = Gamma System Bumper  
Safety bumper

L = Length (mm)

Customer's Initials

Coating = T: yellow/black fabric  
P: PVC  
A: Spark-proof  
L: Eco-leather  
N: Without coating

Plate = A: thru holes  
B: threaded holes  
C: Stud-bolts M6x30

Cable = X: Standard  
1: Special version

Forma = 01: Rectangular  
02: Tapered  
03: Tapered  
04: Trapezoidal  
05: To drawing

## INFORMATION REQUIRED FOR COMPLETING THE BUMPER

When ordering, please always consider the following:

- Supply a **drawing** of the bumper and specify **length, height and depth** in mm.
- Specify the **type of coating** material;
- Specify the **type of plate** for fastening to the machine;
- Specify the **cable length** if other than the standard one.

## COATING

Four types are available:

**T** - Black fabric with yellow stripes (standard coating)

**P** - PVC

**A** - Spark-proof (fireproof coating or coating resistant to aggressive products)

**L** - Eco-leather.

The standard version of the bumper is supplied with black fabric cover and front part with slanted yellow-black stripes.  
Other colours or cover types indicated above available upon request.

## CABLE

**S**: CS - Standard cable, 4x0.35 mm<sup>2</sup> length 3 m - FROR 300/500

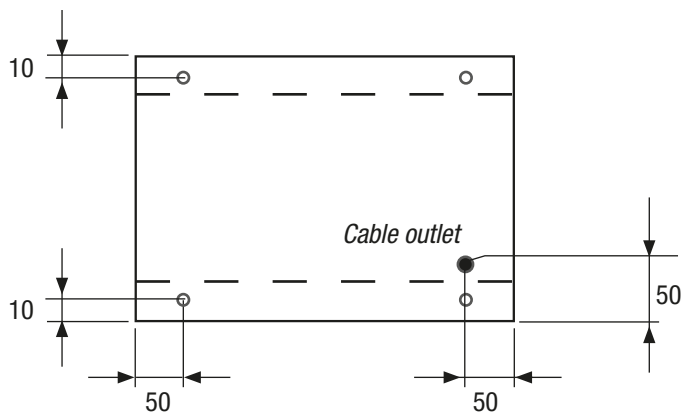
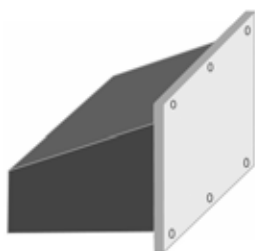
\_\_ : For lengths other than the standard one, please indicate the cable length e.g. 10 m = **C10**.

## BUMPER FASTENING

The bumper is mounted to the “machine” by means of a frame-plate which may come in three different configurations:

### Type “A”

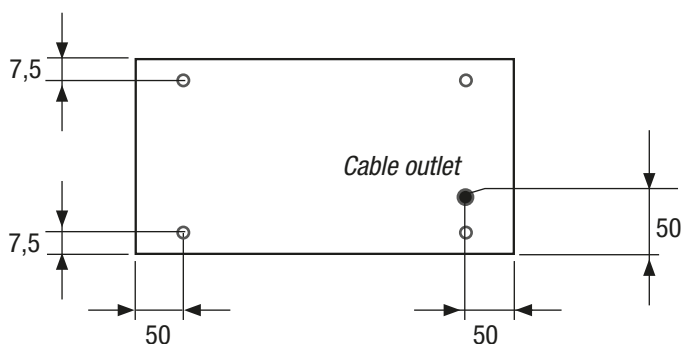
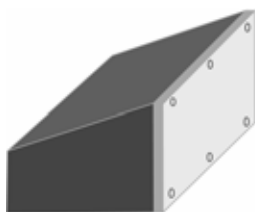
Frame-plate which protrudes from the bumper and has  $\varnothing$  8.5 mm holes for fastening to the machine via screws and bolts.



### Type “B”

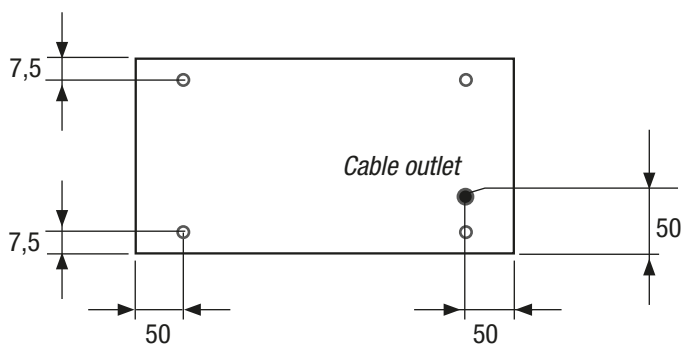
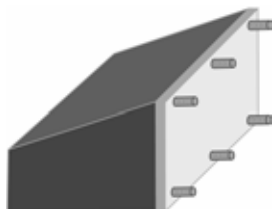
Frame-plate flush with the bumper and with threaded holes (specify when ordering) for fastening to the inside of the machine via screws.

*Version B not recommended for bumpers with PVC coating for outdoor applications.*



### Type “C”

Frame-plate flush with the bumper and with M6 stud bolts, 30 mm long, for fastening to the inside of the machine via bolts.



**N.B.** For bumpers longer than 500 mm, other additional fastening holes will be drilled (centre distance from one hole and another  $\leq$  500 mm).

## TECHNICAL FEATURES BUMPER

	GSBPS01	GSBPS02	GSBPS03
Max activation angle	$\pm 45^\circ$		
Pre-run (test piece $\varnothing$ 80, at 100 mm/s)	< 20% of sensor depth		
Overrun (test piece $\varnothing$ 80, at 100 mm/s)	50% of sensor depth		
Non-deformable part	30% of sensor depth		
Max activation force (test piece $\varnothing$ 80, at 10 mm/s) [N]	32	56	24
Max activation force (test piece $\varnothing$ 80, at 100 mm/s) [N]	48	56	32
Max admissible load [N]	500		
Max length of sensor* [mm]	3000		
Weight [kg/m]	5,5	8	11
Max operating voltage	24 Vdc		
Power cord**	4x0.35 mm <sup>2</sup> standard length 3 m 4x1 mm <sup>2</sup> length >20 m (max 100 m)		
Output contact	N.O.		
Operating temperature of sensor	-10°C to + 50°C		
Type of coating	Yellow/black fabric, PVC, spark-proof and eco-leather		
Degree of protection (according to EN 60529) of sensor	IP 54***		
B <sub>10D</sub>	260000		
Part of human body which can be detected****	Hand, limb, body		
Reference standard	EN ISO 13856-3:2013 ; EN ISO 13849-1		
<b>Safety Parameter - Sensor + control unit</b>	<b>GSBPS0x + GP02/E</b>	<b>GSBPS0x + GP02R.T</b>	<b>GSBPS0x + GP04T</b>
Category	3		
PL	d		
PFH <sub>D</sub> [1/h]	8.58*10 <sup>-8</sup>	8.58*10 <sup>-8</sup>	9.29*10 <sup>-8</sup>
No. of operations/year*****	12000		
Usage category	AC1 – 3 A DC13 – 1.5 A	AC15 (230) – 1.2 A	DC13 – 0.4 A
T10D [years] control unit	20	20	-
EC Declaration	21CMAC0014		
Other European Directives			
2012/19/UE	RAEE		
2011/65/UE	ROHS		
Regulation (CE) n. 1907/2006	REACH		

\* Max length of sensor 3000 mm. For longer lengths, sensors can be divided into several parts and connected in series.

\*\* For lengths over 20 m, use wires with section of 1 mm<sup>2</sup>.

\*\*\* With welded PVC coating; degree of protection IP65.

\*\*\*\* Bumpers are not suitable to detect fingers.

\*\*\*\*\* Considering the max number of operations. Once the time indicated on the data sheet above has elapsed, contact the Gamma System After-Sales Service.

### Recupero dopo la deformazione:

For a deformation equal to the running stroke equivalent to 250 N applied throughout the 24-hour period, the depth variation is less than 20% after 30s, less than 10% after 5 min and less than 5% after 30 min.



# ATEX BUMPER

## CODE SERIES **GSPSATExxxxxxxxxx**

Our bumpers type GSTSPATEXxx are “simple apparatuses” intended for use in intrinsically safe systems, according to what specified by the EN 60079-11:2012, art. 5.7 Standard.

The electrical circuits of such apparatuses are incapable of causing an explosion in the surrounding explosive atmospheres and therefore they do not fall into the application field of the European Directive 2014/34/EU (ATEX) (EN 60079-11:2012, Art. 5.7).

The temperature class T6 [IEC-EN 60079-11 – Simple Apparatus Form] has been assigned to the internal contacts of these bumpers. They can be incorporated into intrinsically safe systems with “ia” protection level, for substances belonging to groups IIA, IIB and IIC (gas or flammable vapours) and/or of groups IIIA, IIB and IIC (combustible dusts).

Depending on the types of expected Associated Apparatuses, these systems can feature the characteristics indicated below, in conformity with the EN 60079-0, 60079-11 and 60079-25 Standards and with the essential requests of the European Directive 2014/34/EU (ATEX).

## II 2GD Ex ia IIC T6 Gb / Ex ia IIIC T85°C Db

Here below is a short legend / description of the code and peculiarities of the system into which our product may be incorporated.

### TYPE OF USE

**II** = Apparatus / system groups for use in surface industries (no mines).

**2** = ATEX category corresponding to “high” protection level.

### ZONES OF USE/POSITIONING

**Zone 1 - 21** zones with possible risk of explosive atmosphere during the normal operation of the installation / process.

**Zone 2 - 22** zones with possible risk of explosive atmosphere ONLY in case of malfunctions or faults of the installation / process.

### SUITABLE FOR USE IN THE PRESENCE OF FLAMMABLE SUBSTANCES / COMBUSTIBLES

**GD:** G = Gas/Flammable vapours and D = Combustible dusts.

**E.g.:** Product protected against the risk of potentially explosive atmospheres.

### PROTECTION LEVEL OF INTRINSIC SAFETY

**ia:** The electric circuit ensures safety when power fed within the defined voltage, current and power limits, under normal working conditions, in the presence of ONE single FAULT and in the presence of TWO simultaneous and independent FAULTS

### SUBSTANCES WHICH CAN BE PRESENT WHERE THE PRODUCT IS USED / POSITIONED

Gas or flammable vapors of **IIA**, **IIB** and/or **IIC** Groups.

Combustible dusts of **IIIA**, **IIIB** and/or **IIIC**.

### TEMPERATURE CLASS / MAXIMUM SURFACE TEMPERATURE

**T6 / 85°C**

### PROTECTION LEVEL OF THE APPARATUS (EPL) / AREAS OF POSSIBLE USE

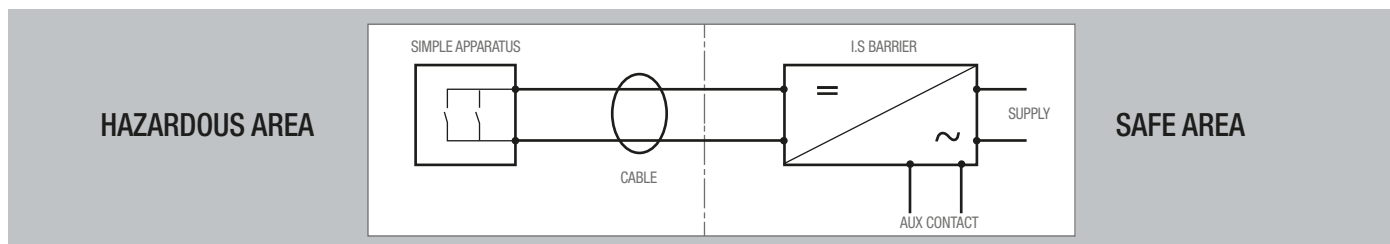
**Gb** = high protection level (for gas and/or vapours) – can be used in Zone 1 (and 2)

**Db** = high protection level (for dusts) – can be used in zone 21 (and 22)

The product is to be incorporated in an “intrinsically safe” circuit / system, interfaced to an adequately “Associated Apparatus” (Safety Barrier) for managing the electric contacts (such as for example our product type D5030S – D5030D) built in a “safe zone” / or internally to an “explosion proof Ex d” enclosure, adequately certified.

**WARNING:** In order to avoid the accumulation of electrostatic charges, the 4 parts which form the aluminium frame **must** have equipotential bonding and grounded at a point, highlighted by the symbol  $\equiv$ .

In case of use of metal plate covering / protecting the safety mat, the plate **must** be grounded at point, highlighted by the symbol  $\equiv$ .



Simple Apparatus <sup>(1)</sup>		Cable	Barrier (1 – 2 channels)	
Manufacturer: Gamma System S.r.l.		Manufacturer: Lapp Group	Manufacturer: G.M. International S.r.l.	
Type: <b>GSBPSATEX</b>		Type: ÖLFLEX® EB CY 300/500 V	Type: <b>D5030S</b> (1 channel) or <b>D5030D</b> (2 channels)	
Rated electric characteristics Un: 24Vdc – In: up to 30mA		Formation: 4 x 0.75 mm <sup>2</sup>	Protection mode: <b>[Ex ia Ga] IIC</b>	
SAFETY PARAMETERS		Capacity: 160 pF/m <sup>(2)</sup> Capacity: 250 pF/m <sup>(3)</sup>	Certified: <b>BVS 10 ATEX E 113 X</b>	
Ui: 24 V		Inductance: 0.52 µH/m	Um: 253 V	Uo: 10.5 V
Ii: 30 mA	Pi: N.A. <sup>(4)</sup>	Length: ≤ 20 m	Io: 22 mA	Po: 56 mW
Ci: negligible	Li: negligible	Total capacity (Cc) = 13.2 nF <sup>(5)</sup> Total inductance (Lc) = 10.4 µH	Co: 2.4 µF	Lo: 78.3 mH

(1) Pressure-sensitive contacts inside the safety mats | (2) Conductor / conductor | (3) Conductor / shielding.

(4) Coherent with Intrinsic Safety; **Not applicable to simple contacts.**

(5) Considered as “parallel” of 3 capacities: conductor / conductor + 2 x conductor / shielding.

### VERIFICATION OF THE SYSTEM SAFETY

$$U_i > U_o: \text{OK}$$

$$I_i > I_o: \text{OK}$$

$$C_i + C_c \ll C_o: \text{OK}$$

$$L_i + L_c \ll L_o: \text{OK}$$

Minimum requirement  
**Ex ib IIC T5 / Ex ib IIIC T100°C**

Requirement satisfied  
**Ex ia IIC T6 / Ex ia IIIC T85°C**



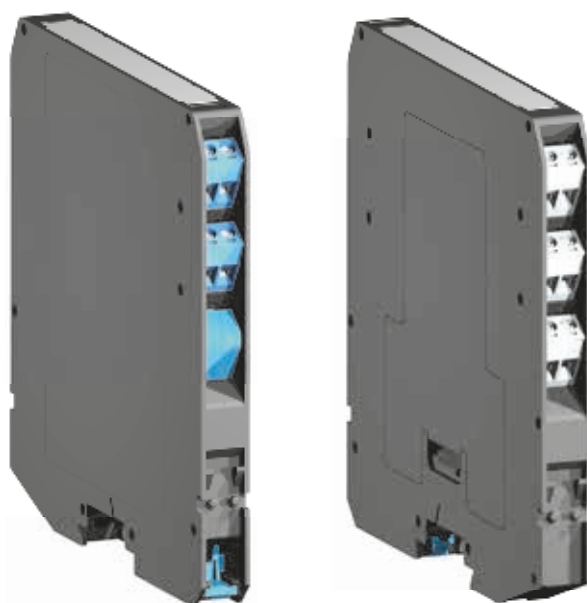
# ATEX SAFETY BARRIER

TYPE **D5030 S** (single channel)

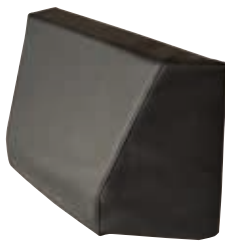
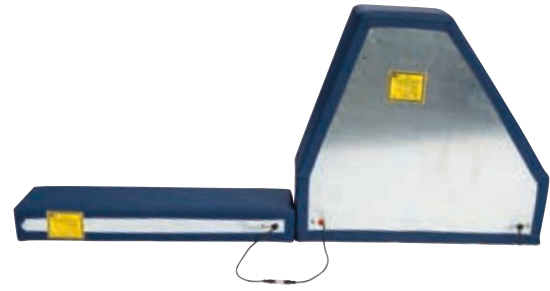
TYPE **D5030 D** (double channel)

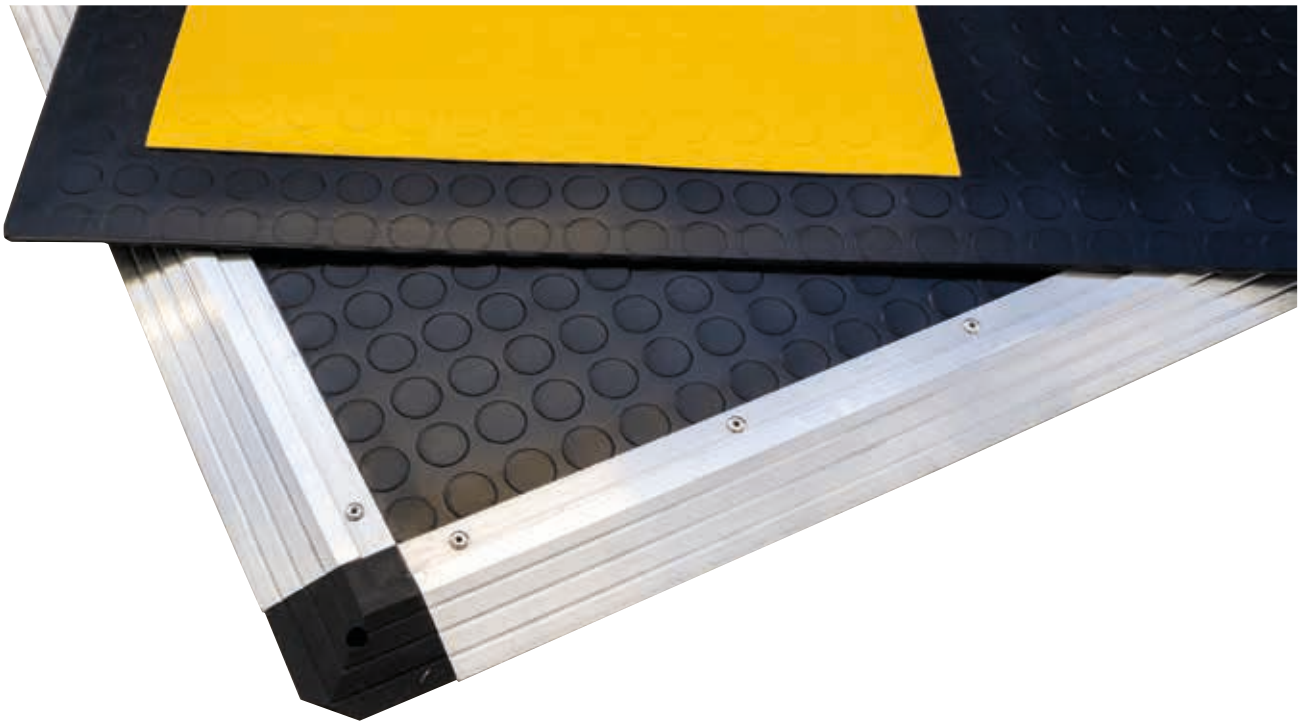


SIL 3 IEC  
6/508:2010 ed.2









# SAFETY MATS

The pressure-sensitive mat is a “safety device” which features an electro-pressure sensible element to detect the presence of persons.

The presence of one or more persons over 35 kg closes a contact inside the sensor.

The change in state of the internal sensor (NO to NC) is processed by the control unit which emits a machine stop signal and removes the hazardous situation.



# SENSITIVE EDGES

The sensitive edge is a safety component used to avoid crashing or cutting risks by sliding doors, automatic moving guards, automated moving guards, electrical gates, etc.

The edges feature a PVC coating with an internal sensor, consisting of 2 conductive blades, separated by a non-conductive part. When the edge is pressed, the blades come into contact and make the circuit.

The change in state of the internal sensor (NO to NC) is processed by the “control unit” that emits a stop signal to the machine thereby removing the hazardous situation.



N. 886



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