

## PRESSURE SENSITIVE DEVICES

### Mats and bumpers

Conforming to EN 1760/1

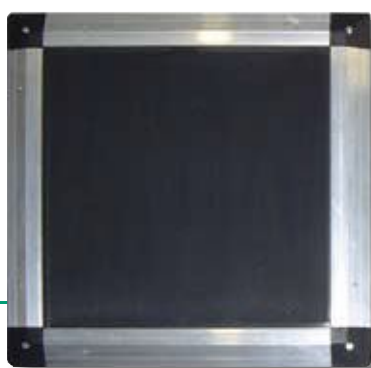


## ■ Main features on mats

Safety mats are devices which are used to guard the floor area around a dangerous zone. They can be used to provide primary guarding where other type of guarding may be inflexible or impractical and also to provide secondary guarding i.e. they can be used in conjunction with an interlocked fence or light curtain to protect awkward shaped machinery. In essence to provide presence-sensing of operators for as long as they remain inside a dangerous area.

A safety mat operates when pressure (usually from an operator's foot) is applied to the mat surface.

The result is a signal being to the safety mat controller which in turn will be send a stop to the machine control system. The dimensions and the positioning of the mats should be in accordance with the guidelines in EN 999. The mat will be supplied for every form and dimensions. An aluminium edge is be used to fix the mats in position on the floor.



### Accessories

- aluminium edging

## ■ Technical characteristics

- Maximum dimension for single mat 1500 x 2500 mm
- Top on PVC of 4 mm thickness
- Bottom on PVC of 3 mm tickness
- Depht 9 mm
- Weight about 12 Kgs/sqm
- Actuation force 25 Kgs with test rod of 80 mm diam.  
45 Kgs " " " 200 mm "
- Static load 60 kgs/sqm
- Operating voltage 32 volt d.c.
- Switching current 1 Ampere 24 volt
- Dead zone 30 mm around outer edge
- Operating temperature - 10 ° + 60 ° C
- Response time 40 msec.

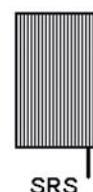
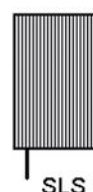
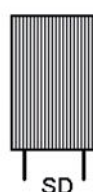
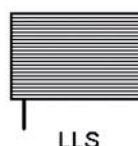
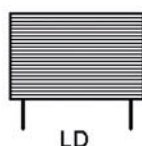
### Range of types

- Models TO/1 - 2 - 3 standard type in bull PVC
- Models MO/1 - 2 - 3 standard plus aluminium protection cover
- Models MZ/1 - 2 - 3 standard as MO plus zinc metal sheet on the bottom when the surface of the floor is not uniform
- Type 1 is intended for a surface up to 1 sqm
- Type 2 is intended for max width up to 1m and max length of 2.5m
- Type 3 is " " " " " 1.5 m " " " "
- The cable of 4 wires are normally supplied

### Side of output cable:

For series TO-MO-MZ under customer specifications  
For series CKP/S1 see following specification:

- LD on long side 2 + 2 wires
- SD on short side 2 + 2 wires
- LLS on long left side 4 wires
- LRS on right left side 4 wires
- SLS on left short side 4 wires
- SRS on right short side 4 wires



## ■ Identification code

| Type                                                              | Code                        |
|-------------------------------------------------------------------|-----------------------------|
| For surfaces in PVC up to 1 sqm.                                  | TO-1 (+ size to specify)    |
| For surfaces in alluminium up to 1 sqm.                           | MO-1 (+ size to specify)    |
| For surfaces with zinc metal sheet up to 1 sqm.                   | MZ-1 (+ size to specify)    |
| For surfaces width 1 m and lenght up to 2,5 m in PVC              | TO-2 (+size to specify)     |
| For surfaces width 1 m in alluminium and lenght up to 2,5 m       | MO-2 (+ size to specify)    |
| For surfaces width 1 m with zinc metal sheet lenght up to 2,5 m   | MZ-2 (+ size to specify)    |
| For surfaces width 1,5 m and lenght up to 2,5 m in PVC            | TO-3 (+ size to specify)    |
| For surfaces width 1,5 m in alluminium and lenght up to 2,5 m     | MO-3 (+ size to specify)    |
| For surfaces width 1,5 m with zinc metal sheet lenght up to 2,5 m | MZ-3 (+ size to specify)    |
| Mat for strong application                                        | CKP/ S1 (+ size to specify) |
| Alluminium edging AG-11 / 1                                       | AG-11 / 1                   |
| Alluminium edging AL-12 / 2                                       | AL-12 / 2                   |
| Alluminium edging AE-13 / 2                                       | AE-13 / 2                   |
| Corner in PVC SGFG / 05                                           | SGFG / 05                   |
| Type of mat without aluminium edging                              | SB                          |
| Type of mat with aluminium edging fixed on the unit               | BM                          |
| Type of mat with aluminium edging not fixed                       | BS                          |

Cable lenght standard 3 m 4 wires

### Example: MZ1-0800-0800-3000-AL12/2-BS

Mat 800 x 800 mm with cable L = 3000 mm. with aluminium protection cover plus zinc metal sheet on the bottom complete of aluminium edging supplied melted.

### Accessories

#### Aluminium edging to fix the mat on the ground

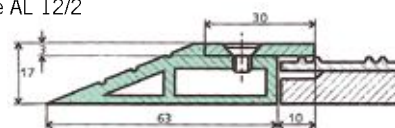
Type AG-11/1 for mats type TO-1-2-3

Type AG11 /1



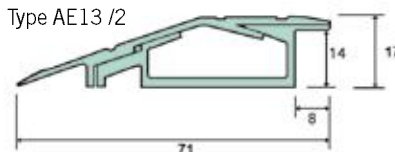
Type AL - 12/2 for mats type MO 1-2-3

Type AL 12/2

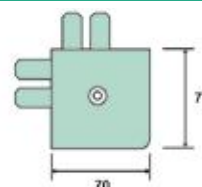


Type AE-13/2 for mat type CKP/S1

Type AE13 /2



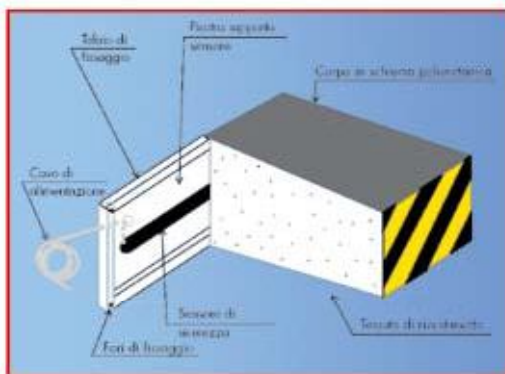
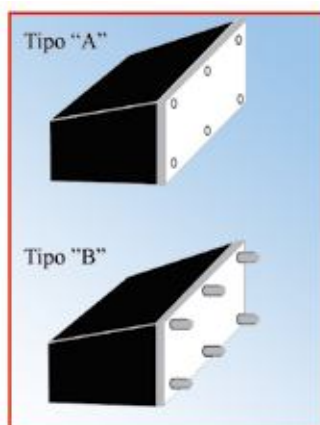
Corner in black PVC type SGFG/05 to use only with the profile AE/13-2



## ■ Main features on bumper

The bumpers are the latest innovation for safety on transport vehicles or on moving machinery that can crash and harm personnel. This sensing device utilizes a highly durable and flexible thermoplastic material which when pressed, closes the internal sensors.

They are formed by a poliuretanic foam (designed under customer drawing) with ribbon switches incorporated inside. The bumper is designed for fail-safe circuit to ensure proper monitoring of the system.



## ■ Technical characteristics

- Zinc steel frame for fixing to the machine
- Aluminum plate to close the bumper and to fix the ribbons
- Corp on poliuretanic foam
- External housing:
  - Standard with water proof tissue
  - Special with anti-flame to resist to melting metal
  - Special design with PVC cover for out-side installation i.e. for tripod
- Colour black with oblique yellow lines on front
- Activation force 5-7 Kgs
- Electrical circuit 1 A 24 volt d.c.
- Chemical resistance : good for water - acid - base - alcohol - solvent ect.
- Cable for power 5 wires L = 3 m
- Water tight IP 65
- Temperature 0 - 55 C °
- Actuating distance about 10-30 mm (depending from dimensions)
- Compression of the housing before contact closure occurs: depending on depth of bumper. It is very important to avoid the collision with operators.

### Applications

- Pallets wrap machinery
- Automatic guided vehicle
- Large moving equipments
- Work plat form
- Telescopic conveyors
- Aircraft loaders

### Brackets system for installation:

The metal sheet can be supply on two different versions:

**Type A)** sheet with holes 8.5 mm the number depend from the length.

**Type B)** sheet with captive screws M 6 L = 30 mm

### Characteristics

|                                     |      |              |
|-------------------------------------|------|--------------|
| Compression before contact closure: | 10 % | of the depth |
| Max compression                     | 60 % | " "          |
| Indeformabile part                  | 30 % | " "          |
| Heigth of bumper                    | 0.5  | of width     |
| Max length                          | 3    | m            |

# SAFETY INTERFACE CONTROLLERS

## For Ribbons - Edges - Mats - Bumpers

### ■ Main features

This control units are designed to be used in conjunction with Safety Mats, Sensing Edge, Ribbon Switches and Sensing Bumpers, to form a complete safety system. They exceed the levels of Category 3 as given by EN954-1. Four versions of the PS controller are available, all with the same high level of safety integrity but varying in the type.

The range of the control units is formed by 4 types:

- PS-1 for level 1 application's at low risk with 2 wires of connection (No safety)
- PS-3 for level 3 application's "Fail Safe" with 4 wires of connection without resistance
- PS-3/RS for level 3 application's "Fail Safe" with 2 wire with resistor of 8,2Kohm for 1 sensor or edge.
- PS-3/RD as above but for 2 sensors or edges.

#### General for type PS1 (no safety with 2 wires)

This controller is designed for low risk safety application to monitor a sensor or a number of them connected in series. At open circuit (switch-edge-mat bumper) on normal condition, the relay is supplied, while the pressure on the sensor (with NC contact) causes the relay to switch OFF. A limiting circuit prevents short circuit on

### ■ Characteristics

the power. The interruption of the cables or of the sensors is not detected by the system due to the design of the circuit: for this reason the system must be apply only to signalling - to monitor - or others and it is of category 1 as given in EN 954.

- Choice of supply voltages
- EC Type examined
- Self-monitoring
- Fail-safe manual and automatic reset

#### Technical characteristics

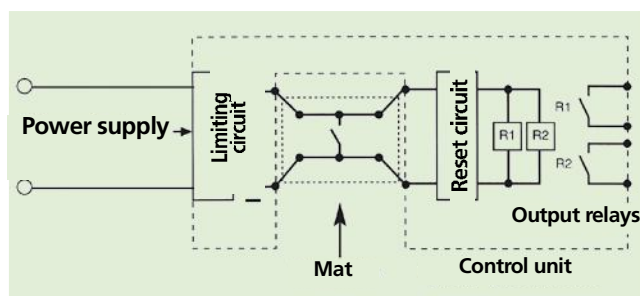
- automatic and manual reset
- enclosure protection IP 20 or IP 56
- working temperature  $-10^{\circ} + 65^{\circ}$
- output relè 2NO+1NC 2 A 230 V
- response time from 9 to 16 msec
- DIN rail mounting
- power supply see table
- power consumption 300 mA
- max controlled lenght for edges 60 m
- max controlled area for mats 15 sqm

#### General for safety model PS3 (with 4 wires) without resistor

##### Level 3 "Fail-Safe"

The connections can be with 2 or 4 wires. All the control box are designed to supply safety to the plant against the short circuit or the cut of the connection cable.

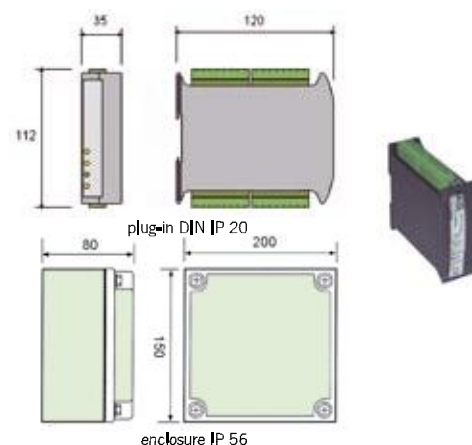
At open circuit (switch-edge-mat-bumper) on normal condition the two relays are supplied, while the pressure on the sensors (with NC contact) causes the relays to switch OFF. A limiting circuit prevents short circuit of the supply. The interruption of the cable or the sensors are detected in the OFF condition of two relays, as the short circuit on the contacts of relays. For these reasons the circuit is named "fail-safe" and meets category 3 as given by EN 954.



#### Technical characteristics

- automatic and manual reset
- enclosure protection IP 20 or IP 56
- working temperature  $-10^{\circ} + 65^{\circ}$
- output relè 1NO/NC 2 A 230 V
- response time from 9 to 16 msec
- DIN rail mounting
- power supply see table
- power consumption 300 mA
- max controlled lenght for edges 60 m
- max controlled area for mats 15 sqm

#### Dimensions



## Control PS 3/RS with 2 wires with resistor for 1 sensor

### Box of level 3

When are required the connection with 2 wires is necessary to connect a resistance of 8,2 kohm (inside the sensor) in order to guaranty the safety of level 3.

This type of box, control only 1 sensor.

## Control PS 3/RS with 2 wires with resistor for 2 sensors

It is identical to the previous type with the difference that are controlled two independent sensors, particular applied for the frontal and the rear protection of the machine.

The technical characteristics are identical of PS3/RS with the difference of the output relè with contacts 2NO 2A 250 V as the wiring.

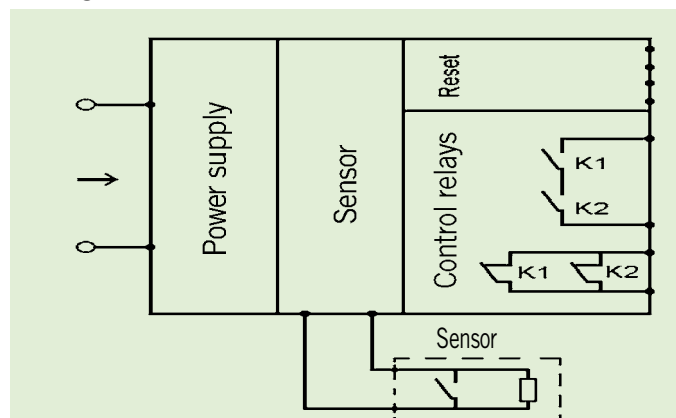
## Dimensions and code identifications of the boxes

| Level 1 with 2 wires                                     | Power supply | Code |
|----------------------------------------------------------|--------------|------|
| PS-1 / A1 DIN box                                        | 24 V c.a.    | P-01 |
| PS-1 / A2 DIN box                                        | 110 V c.a.   | P-02 |
| PS-1 / A3 DIN box                                        | 220 V c.a.   | P-03 |
| PS-1 / A5 DIN box                                        | 24 V c.c.    | P-04 |
| PS-1-56 / A1 enclosure IP56                              | 24 V c.a.    | P-05 |
| PS-1-56 / A2 enclosure IP56                              | 110 V c.a.   | P-06 |
| PS-1-56 / A3 enclosure IP56                              | 220 V c.a.   | P-07 |
| PS-1-56 / A5 enclosure IP56                              | 24 V c.c.    | P-08 |
| <b>Level 3 with 4 wires</b>                              |              |      |
| PS-3 / A1 DIN box                                        | 24 V c.a.    | P-09 |
| PS-3 / A2 DIN box                                        | 110 V c.a.   | P-10 |
| PS-3 / A3 DIN box                                        | 220 V c.a.   | P-11 |
| PS-3 / A5 DIN box                                        | 24 V c.c.    | P-12 |
| PS-3-56 / A1 enclosure IP56                              | 24 V c.a.    | P-13 |
| PS-3-56 / A2 enclosure IP56                              | 110 V c.a.   | P-14 |
| PS-3-56 / A3 enclosure IP56                              | 220 V c.a.   | P-15 |
| PS-3-56 / A5 enclosure IP56                              | 24 V c.c.    | P-16 |
| <b>Level 3 for 1 sensor with 2 wires with resistance</b> |              |      |
| PS-3RS / A1 DIN box                                      | 24 V c.a.    | P-21 |
| PS-3RS / A5 DIN box                                      | 24 V c.c.    | P-22 |
| PS-3RS / 56A1 enclosure IP56                             | 24 V c.a.    | P-23 |
| PS-3RS / 56A5 enclosure IP56                             | 24 V c.c.    | P-24 |
| <b>Level 3 for 2 sensor with 2 wires with resistance</b> |              |      |
| PS-3RD / A1 DIN box                                      | 24 V c.a.    | P-25 |
| PS-3RD / A5 DIN box                                      | 24 V c.c.    | P-26 |
| PS-3RD / 56A1 enclosure IP56                             | 24 V c.a.    | P-27 |
| PS-3RD / 56A5 enclosure IP56                             | 24 V c.c.    | P-28 |

## Technical characteristics

- automatic and manual reset
- enclosure protection IP 20 or IP 56
- working temperature -10° + 65°
- output relè 1NO/NC 2 A 230 V
- response time 10 msec
- DIN rail mounting
- power supply see table
- power consumption 300 mA
- max controlled length for edges 60 m
- max controlled area for mats 15 sqm
- max length of connection wires 250m with the section of 0,35 sqmm

### Wiring connection of PS3/RS



### Wiring connection of PS3/RD

