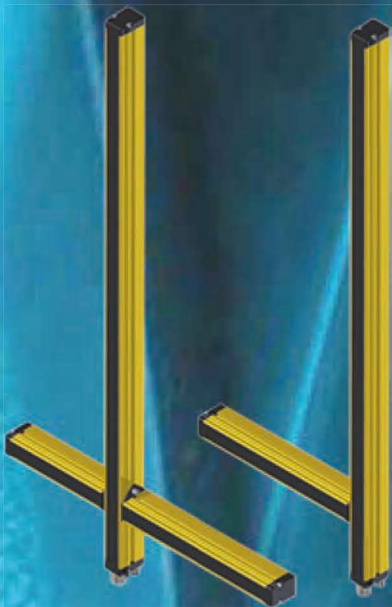
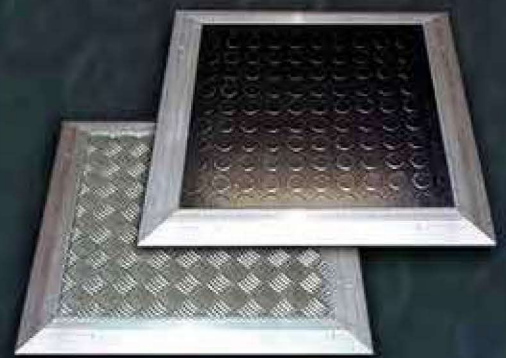


## Safety protection



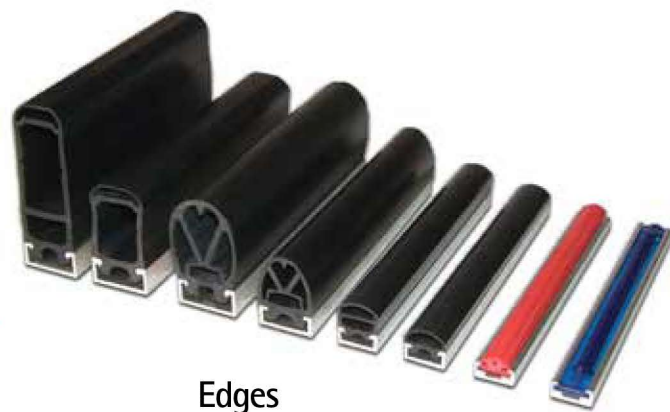
- Barriers
- Ribbon switches
- Edges
- Mats
- Bumpers



General catalogue

## ■ Pressure sensitive devices

conforming to EN-ISO 13856-2



Ribbon switches

These are electro-sensitive ribbon switches that are highly sensitive to pressure. Mounted with special rubber (EPDM) sheaths, they form edges to prevent accidents with sliding doors, gates, automatic storage systems, elevators, etc.



# Ribbon switches

## ■ Principle of operation

The system uses pressure ribbon switches that offer a broad range of sheathing materials, switch lengths, exterior colour and lead wire combinations, as well as substantial resistance to moisture and chemicals.

They are employed to control the movement of machines or other moving parts, that can cause accidents.

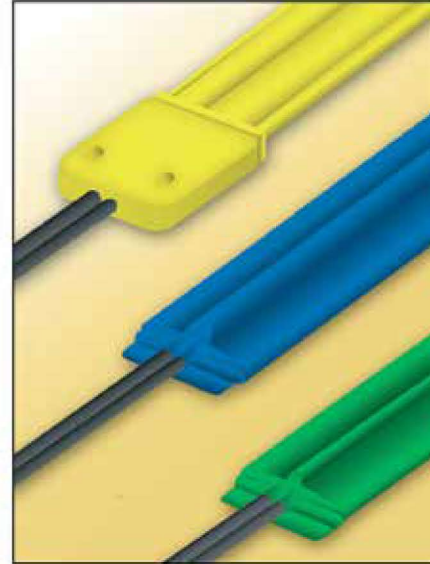
These ribbon switches are a continuous NO contact.

These ribbons have fail-safe wiring conform to category 3 of ISO-13849/1 when used in connection with our PS-3 controllers.

The elements are normally open, momentary contact, pressure actuated switches. They are available in lengths ranging from 0,2 m to 300 m. The conductors are made from a precisely formulated alloy which has a low resistance to produce a highly consistent switching action, together with an external long mechanical life expectancy. They are designed for more than 3 millions operations at any given point.

Self adhesive backing or foam tapes hold and position the switch. For permanent mounting in commercial vehicle or industrial use, we provide aluminium or PVC extruded channel.

They are also available in do-it-yourself kits for field fabrication and installation.



## Applications

### For industrial safety:

- switches of emergency on every type of machine
- control on conveyors
- for use 2 wires without resistor no safety are available
- for safety applications are models with:
  - 4 wires without resistor
  - 2 wires with resistor 8,2 kOhm

### For not industrial uses:

- entry signalings for doors opening
- controls for disabled peoples
- alarms for banks
- drive chronometres trigger for swimming pools

### Chemical characteristic:

Optimal resistance to:

- oil-petro-kerosene
- acid and alkaline
- alcohol and tetrachloride

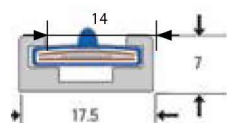
### Specifications and ratings:

|                         |                          |
|-------------------------|--------------------------|
| - Operating voltage     | 32 Vcc                   |
| - Operating current     | 1 A max.                 |
| - Dielectric resistance | 1000 V / d.c.            |
| - Electrical resistance | 4 ohm / metres           |
| - Cable connections     | PVC normal               |
| - Operating temperature | -15 +60°C                |
| - Protection degree     | IP 65                    |
| - Operating life        | 3 millions of operations |
| - Material covering     | PVC                      |
| - Typical weight        | 45 gr. / m               |

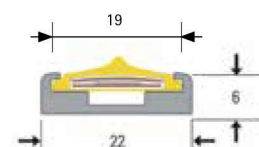


## Aluminium channel

Type 404 (for 102-A and 102-F types)






Type 406 (for 202-L type) also in PVC plastic



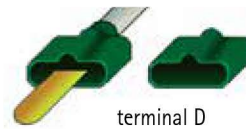
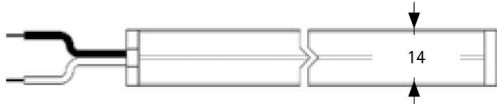
# Ribbon switches

## Standard types

| Ribbon          | 102-A   | 102-F  | 202-L   |
|-----------------|---|--|---|
| Profile         |  |   |  |
| Dimensions      | 14 x 4 mm   | 14 x 8,5 mm  | 19 x 5 mm   |
| Actuating force | 2 Newton (0,2 Kg)   | 15 Newton (1,5 Kg)   | 5 Newton (0,5 Kg)   |
| Bend radius     | 10 mm   | 60 mm  | 15 mm   |
| Description     | Lowest profile for tight spaces or to prevent accidental actuation                | Low profile contoured switch which can be bent around smoothly curved corners used as a hand or foot activated machine Stop/Start. | General purpose switch for industrial, medical, and transportation applications.    |

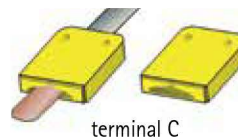
### Terminals for 102/A and 102/F

type LD with welded cable or terminal type D with cable 500mm



### Terminals with connector 202/L

type C for model 202-L with cable 500 mm



### Ribbon switches identification code:

|                                   | Model | lengths | cables | output side | cable lengths | sealing | aluminium channel |
|-----------------------------------|-------|---------|--------|-------------|---------------|---------|-------------------|
| Ribbon blue color                 | 102-A |         |        |             |               |         |                   |
| Ribbon red color                  | 102-F |         |        |             |               |         |                   |
| Ribbon yellow color               | 202-L |         |        |             |               |         |                   |
| To specify in mm                  |       |         |        |             |               |         |                   |
| 4 wires fail safe                 | F     |         |        |             |               |         |                   |
| 2 wires fail safe with R=8,2KOhm  | R     |         |        |             |               |         |                   |
| 2 wires no safety                 | S     |         |        |             |               |         |                   |
| Only one side                     | O     |         |        |             |               |         |                   |
| From two sides                    | E     |         |        |             |               |         |                   |
| From final sides (with R=8,2KOhm) | X     |         |        |             |               |         |                   |
| 500 mm                            | 1     |         |        |             |               |         |                   |
| 2000 mm                           | 2     |         |        |             |               |         |                   |
| On request                        | 3     |         |        |             |               |         |                   |
| Sealing with connector            | C     |         |        |             |               |         |                   |
| Sealing with connector            | D     |         |        |             |               |         |                   |
| Sealing with welding              | LD    |         |        |             |               |         |                   |
| Aluminium channel type 404-406    | Y     |         |        |             |               |         |                   |
| No channel                        | N     |         |        |             |               |         |                   |



# Pressure sensitive devices

## ■ Pressure sensitive devices conforming to EN ISO 13856-2



### ■ General remarks

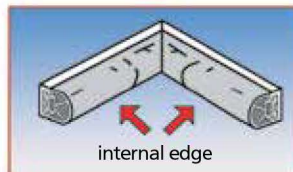
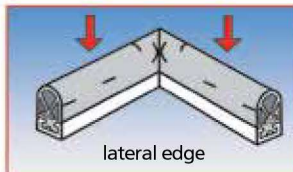
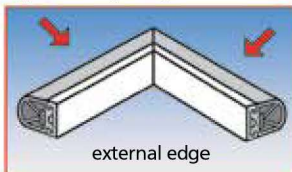
These edges are pressure sensitive devices designed to protect both personnel and equipment in industrial environments. They are in a range of different profiles and sensitivities to suit various applications. They have fail-safe wiring conforming to category 3 of ISO-13849/1 when used in conjunction with PS-3 controllers.

The construction of the sensing edge is based on a continuous length of ribbon encased in a durable housing material which is fitted into a choice of channel (see pages 38-39).

### ■ Main features

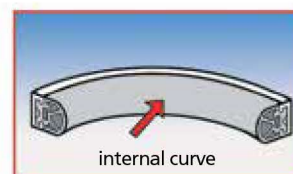
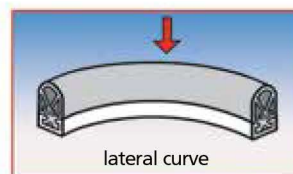
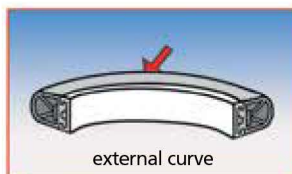
- Wide range of models
- Low pressure actuation
- Custom configuration
- Fail - safe operation
- Multiple sensors connected in series
- Operative angle more of 45 °
- Connection with 2 or 4 wires, with the use of 8,2kohm resistance with PS3/RS or PSE3RD control units
- Cable connection in PVC normal type
- Other for special applications

#### Right and angle edges



In case of special design for perimeter protection, specify on the drawing.

#### Curved edges

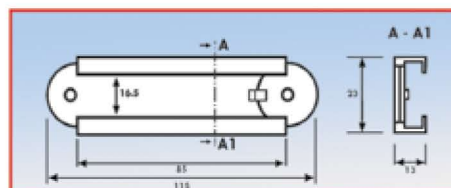


## ■ Curved edges flexible sensing for GR 503 – GR 747 –GR 748 – 757

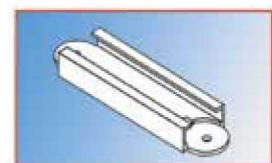
The BS-3 support is designed to solve the problem of curved edges in a very simple way irrespective of the radius required and only for GR 503 – GR 747 –GR 748 – 757.

The min. radius is 1.5 m.

This solution has big advantages in that the radius is not binding, so the customer can decide the bend value.



Overall dimensions of type BS 3



## ■ Guide to edges selection

To choose the right bump switch for the application required, consider the following three characteristics which define performance:

- Actuating force of the rubber before the contact closure
- Activation of the contact by further pressure
- Overtravel distance after the contact closure

These characteristics vary depending on the housing selected and the position of the sensor inside the rubber, as reported on the table to page 38

| Housing type   | Compliance | Activation       | Overtravel |
|----------------|------------|------------------|------------|
| low profile    | none       | immediate        | minimal    |
| medium profile | some       | after compliance | some       |
| high profile T | minimal    | immediate        | maximun    |
| high profile B | moderate   | after compliance | maximun    |

- The high profile type T edge have the sensor cavity in the top part of the rubber
- The high profile type B edge have the sensor cavity on the bottom part of the rubber

## ■ Applications

- doors and industrial gates
- personnel lifts
- automatic store
- conveyor systems
- robotics areas
- operating table

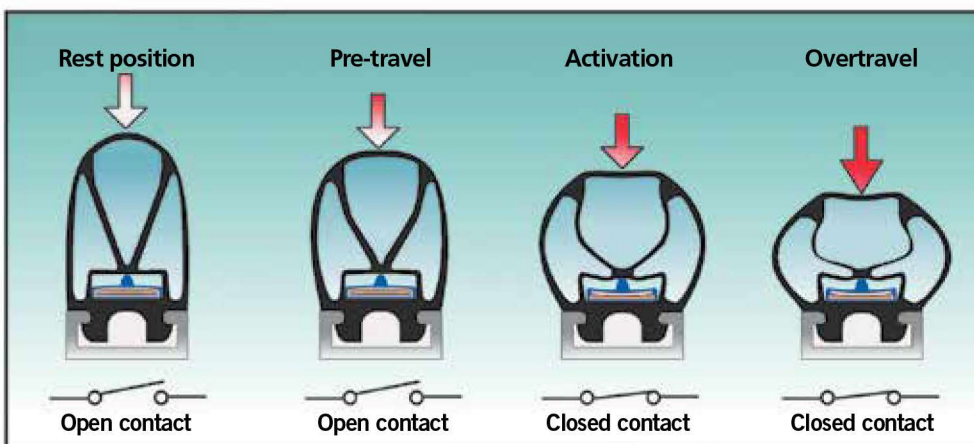
## Features

- **Rest position**  
the edge in normal condition is ready to work (with NO contact)

- **Pre-travel**  
compression of the housing before contact closure occurs (with NO contact)

- **Activation**  
the point at which contact closure occurs (with NC contact)

- **Overtravel**  
the distance of the housing can compress after contact closure occurs (with NC contact)



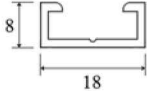
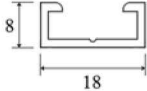
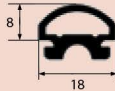
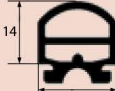
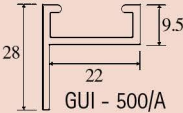
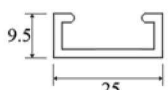
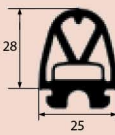
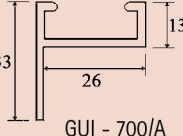

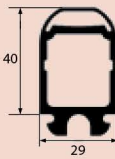
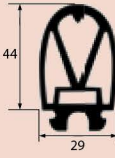
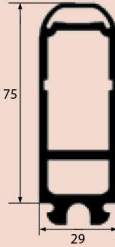
# Pressure sensitive devices

## ■ Specifications

### Nitrilic rubber edge

Operating temperature  
Protection class of the sensor  
Max operating voltage  
Max operating current  
Hardness of rubber

- 10 +65 °C  
IP 56 on request IP 65  
32 volt d.c.  
1 Ampere  
70 Shore

| Aluminium channel (angle or flat)  |  | Drawing   | Type   | Material | weight/m | Colour |
|--|--|---|--------|----------|----------|--------|
| Angle  | Flat   |   |        |          |          |        |
| <br>GUI - 300/A  | <br>GUI - 300/P  |    | GR-306 | EPDM     | 300      | Black  |
|  |  |  | GR-316 | EPDM     | 350      | Black  |
| <br>GUI - 500/A | <br>GUI - 500/P |  | GR-503 | EPDM     | 600      | Black  |
| <br>GUI - 700/A | <br>GUI - 700/P |  | GR-747 | EPDM     | 700      | Black  |
|  |  |  | GR-748 | NBR      | 900      | Black  |
|  |  |  | GR-757 | EPDM     | 1100     | Black  |



# Pressure sensitive devices

Edges available in lengths up to 5 meters

- Type NBR elastomery to resist lubricating oil and cooling liquid on tool machinery
- Type on etil-propilic resin EPDM to resist to acid and atmosferic agents

| Pre-travel distance | Overtravel movement | Actuating force        | Description  | Applications   |
|---------------------|---------------------|------------------------|--|--|
| < 1,5 mm            | 2 mm                | 50 Newton<br>< 5 Kg    | Miniature edge for compact spaces working at minimum pressure.   | <ul style="list-style-type: none"> <li>- sliding doors</li> <li>- conveyors system</li> <li>- disable facility</li> <li>- operating tables</li> </ul>        |
| 2 mm                | 2,8 mm              | 50 Newton<br>< 5 Kg    | Edge with low profile ideal for easy installation where space is restricted.   | <ul style="list-style-type: none"> <li>- sliding doors</li> <li>- robotic system</li> <li>- escalators</li> <li>- operating tables</li> </ul>                |
| < 7 mm              | 5 mm                | 100 Newton<br>< 10 Kg  | Compact edge ideal for a wide range of applications to satisfy most mounting arrangements in accordance to head-on side impact.          | <ul style="list-style-type: none"> <li>- big moving doors at high speed</li> <li>- lift door</li> <li>- mobile vehicle</li> </ul>                            |
| < 1,7 mm            | 21 mm               | 40 Newton<br>< 4 Kg    | Edge at medium profile in accordance with the performance required. It works at minimum pressure   | <ul style="list-style-type: none"> <li>- moving door</li> <li>- lift door</li> <li>- public bus door</li> <li>- theatrical stage</li> </ul>                  |
| < 6 mm              | 17 mm               | 65 NNewton<br>< 6,5 Kg | Compact edge adapt for lateral pressure ideal for a lot of applications in particular used where is the presence of oil on tool machine. | <ul style="list-style-type: none"> <li>- door of tool machine</li> <li>- lateral bumper</li> <li>- escalator mobile</li> <li>- lift door</li> </ul>          |
| < 1,5 mm            | 35 mm               | 58 Newton<br>< 5,8 Kg  | Sensing edge which is typically used where is immediate activation required with big overtravel.   | <ul style="list-style-type: none"> <li>- big mobile door at high speed</li> <li>- escalator mobile</li> <li>- lift door</li> <li>- rotating doors</li> </ul> |

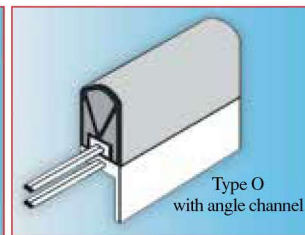
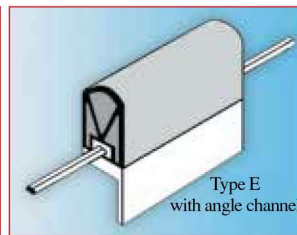
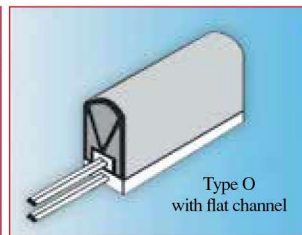
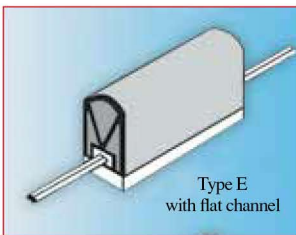
test effected with test rod diam. 80 mm



# Pressure sensitive devices

## Edges identification codes

|  | Model | length | type of channel | materials of channel | cable | cable output | cable lengths | caps fitted |
|--|-------|--------|-----------------|----------------------|-------|--------------|---------------|-------------|
| GR-306 in EPDM                               | = 306 |        |                 |                      |       |              |               |             |
| GR-316 in EPDM                               | = 316 |        |                 |                      |       |              |               |             |
| GR-503 in EPDM                               | = 503 |        |                 |                      |       |              |               |             |
| GR-747 in EPDM                               | = 747 |        |                 |                      |       |              |               |             |
| GR-748 in NBR                                | = 748 |        |                 |                      |       |              |               |             |
| GR-757 in EPDM                               | = 757 |        |                 |                      |       |              |               |             |
| to specify in mm                             |       |        |                 |                      |       |              |               |             |
| flat for every type                          | = F   |        |                 |                      |       |              |               |             |
| angle for GR-747-748-757                     | = A   |        |                 |                      |       |              |               |             |
| curve for GR-503-747-748-757                 | = C   |        |                 |                      |       |              |               |             |
| aluminium                                    | = A   |        |                 |                      |       |              |               |             |
| PVC for curve edges                          | = P   |        |                 |                      |       |              |               |             |
| fail safe 4 wires                            | = F   |        |                 |                      |       |              |               |             |
| fail safe 2 wires (with R=8,2K0hm)           | = R   |        |                 |                      |       |              |               |             |
| no safe 2 wires                              | = S   |        |                 |                      |       |              |               |             |
| output only one side                         | = O   |        |                 |                      |       |              |               |             |
| output on two sides                          | = E   |        |                 |                      |       |              |               |             |
| output with final resistor                   | = X   |        |                 |                      |       |              |               |             |
| 500 mm                                       | = 1   |        |                 |                      |       |              |               |             |
| 2000 mm                                      | = 2   |        |                 |                      |       |              |               |             |
| on request                                   | = 3   |        |                 |                      |       |              |               |             |
| end cap for types GR-306-316-503-747-748-757 | = Y   |        |                 |                      |       |              |               |             |
| no caps                                      | = N   |        |                 |                      |       |              |               |             |



## Example of applications



Theater stage  
and auditorium



Medical equipment



Factory automation



Transportation and  
disabled accessibility