



A full spectrum of sensing and signaling products for protection, detection, and safety



- SWITCH PRODUCTS
- SAFETY & SIGNAL MATS
- SENSING EDGES
- SENSING BUMPERS
- INTERFACE CONTROLLERS
- LIGHT CURTAINS
- CUSTOM DESIGNS
- INTERLOCKS



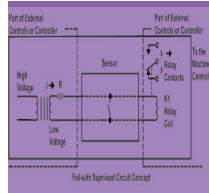
At **Tapeswitch** we design and manufacture innovative sensing, switching, and control products for use in a wide range of safety and non-safety applications. Our products include ribbon switches, sensing edges and bumpers, safety mats, touch pads, controllers, light curtains and non-contact and trapped key interlocks.

If a standard product just won't do the job, we offer extensive custom design services. We manufacture many specially-designed products, so if you don't find precisely what you need within our standard product offering, we can still most likely meet your exact application needs.

Whether you have an immediate requirement or are planning a long-term project, you can count on our mechanical and electrical engineers to come through for you.

For further information on our products or to request one of our other catalogs please call us toll-free at **1-800-234-8273** or visit us online at **[www.tapeswitch.com](http://www.tapeswitch.com)**.

## Pressure-Sensitive Sensing Bumpers



- pg. 2 ■ Using Bumpers in Safety Applications  
Understanding the Fail-Safe concept



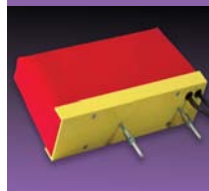
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For general purpose, heavy duty applications  
4in. and 7in. widths, up to 5-3/8in. high and 12ft. long



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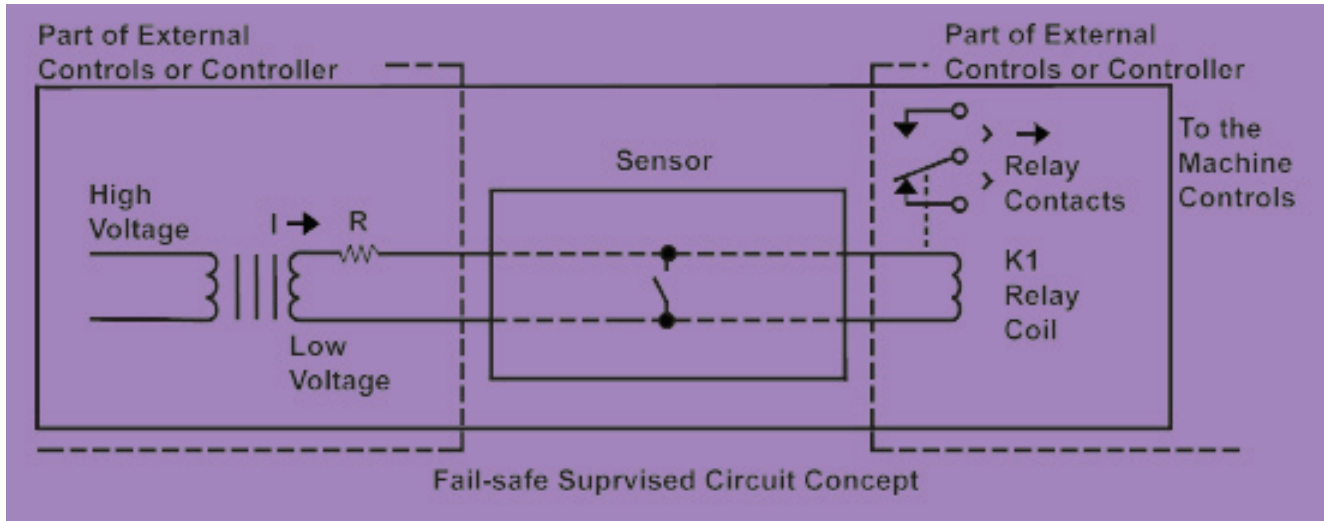
# USING BUMPERS IN SAFETY APPLICATIONS

## Understanding the Fail-Safe concept

**Tapeswitch** sensing bumpers often provide the first-line of protection for personnel and equipment. They are highly sensitive and feature press-at-any-point actuation. Properly installed and connected, they continuously monitor contact. However, to properly function as safety devices, bumpers must be installed with a Fail-Safe monitoring circuit as shown below or with an equivalent Fail-Safe methodology. **Tapeswitch Offers Controllers that Employ the Fail-Safe Concept.**

### Understanding and Implementing the 4-wire Fail-Safe Concept Principle of Safety

The fail-safe concept monitors the sensor status at all times. In the event of a failure, the Fail-Safe concept will simulate a protected position. The “protected” position is when the sensor is activated (closed) and the “normal” or “run” position is when the sensor is not activated (open).



- Normal Conditions – constant current flow (I) holding relay coil (K1) energized
- Loss of Power – no current flow (I) and relay coil (K1) is de-energized
- Actuation of Sensor – relay coil (K1) is shorted and de-energized
- Failure of Sensor in the closed position – relay coil (K1) is shorted and de-energized
- Failure of Sensor in the open position – (broken wire, severed switch or conductor) leaves no path for current flow (I) and relay coil (K1) is de-energized
- Resistor R – limits current flow through the sensor when actuated

### Fail-Safe (4-wire)

Fail-Safe is a shorthand term used to mean Fail to a Safe condition. In machinery with known hazards, the system is Fail-Safe when any failure leaves the machinery in a safe condition. The 4-wire Fail-Safe concept is illustrated in the figure above. A small current is constantly flowing through the sensor at all times, holding the relay coil energized at all times. The machine controls, interrupt, or stop circuitry is connected to the contacts of this relay. If the sensor is actuated, the relay coil will be shorted, causing the relay to de-energize. A resistor in series provides current limiting from overdrawing the power supply and limits the current through the sensor in the actuated position. If the sensor fails in the closed position the relay will be shorted and cannot be energized until the failure is corrected. If the sensor fails in the open position, the current path for the relay coil no longer exists and the relay coil cannot be energized until the current path is restored and the failure corrected.

**In addition to the safety aspects achieved with Fail-Safe, it also provides:**

- Isolation of the machine controls and sensor(s)
- Isolation of high amperage and high voltage machine switching from the low voltage sensors
- Conversion of a normally open switch to required normally closed machine controls

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# SE-45 & SE-75 SENSING BUMPERS

For general purpose, heavy duty applications

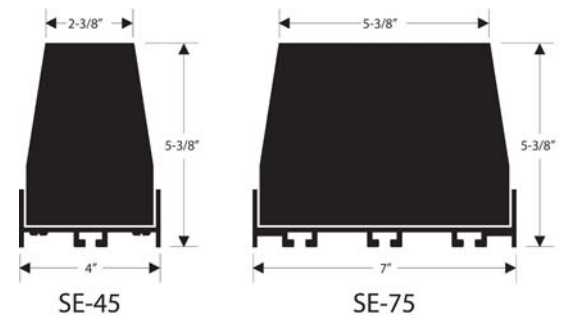


**SE-45 & SE-75 Sensing Bumpers** are designed for general-purpose, heavy-duty applications. When deformed by contact or impact, they provide a signal in the form of an electrical contact closure. At the same time, the large, compliant surface and substantial overtravel cushioning helps protect personnel and equipment from injury or damage. Operating force is 20lbs nominal.

These bumpers feature easy bolt-on mounting with adjustable bolt locations. The exterior housings are EPDM rubber, which is resistant to water, oil, hydraulic fluids, and coolants. The internal switching elements are rated for 3 million operations at any point. All SE Series bumpers are supplied with 4-lead, Fail-Safe wiring and are compatible with Tapeswitch Interface Controllers.

## Features & Benefits

- Large sensing area maximizes the detection zone
- Less than 10% compliance before activation and 60% overtravel cushioning after activation
- Straight and corner configurations available
- Fail-Safe wiring is standard
- Compliance before activation: 1/2in. max
- Overtravel after activation: 3in.
- Available lengths: 6in. to 12ft.
- SE-75 corner bumper available



## Applications

- Collision detection on AGVs, mobile work platforms, and material handling equipment
- Obstruction detection on large moving doors, mobile work stations, and telescoping conveyors
- Protection of stationary devices in proximity to moving equipment

## Specifications

Exterior Housing	Fiber-reinforced black EPDM rubber
Actuation Force	20lbs (89N) nominal @ 68°F
Recommended Voltage & Current	24VAC or VDC at 1.0amps max.
Environment	-10 to 155°F (-23 to 68°C)
Chemical Resistance	Excellent to water, mild acids and bases, many solvents
Mounting	Black anodized aluminum channel with bolt slots

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# HERCULES RUGGEDIZED SENSING BUMPER

For hostile environments off-limits to conventional bumpers



The **Hercules Ruggedized Sensing Bumper** is designed to operate in hostile environments that are off-limits to conventional bumpers. Originally designed for marine environments, it is encapsulated in a rugged polyurethane shell that meets MIL-STD-810E salt fog requirements and is resistant to many common industrial chemicals and fluids.

The **Hercules bumper** is abrasion-resistant, impact-resistant, and crush-resistant. It is suitable for use on AGVs, mobile platforms, traveling conveyors, and other moving equipment.

## Features & Benefits

- Encapsulated in a rugged polyurethane shell
- Water resistant - meets MIL-STD-810E salt fog
- Suitable for outdoor and marine applications
- Crush, impact, and abrasion resistant
- Available in lengths up to 12ft.
- Fail-Safe wiring is standard

Hercules bumpers are available in 4in. and 7in. widths, up to 18in. high, and with a maximum length of 12ft.. Special capabilities include multiple sensing zones and corner bumper designs.

## Applications - Detect impact or collisions on:

- Automatic guided vehicles
- Moving work platforms
- Large moving doors
- Mobile conveyors
- Telescoping equipment
- Passenger loaders

## Specifications

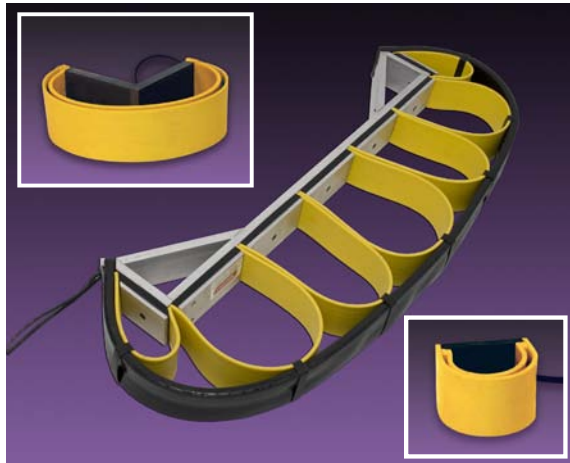
Exterior Housing	Polyurethane
Actuation Force	20 to 30lbs (89 to 133N) nominal, depending on model
Compliance before actuation	1in.(25mm) typical
Recommended Voltage & Current	24VAC or VDC at 1.0amps max.
Environment	-10 to 155°F (-23 to 68°C)
	Water resistant per MIL-STD-810E salt fog
Color	Black is standard, other colors available on request

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# VB-250 & VB-250 HIGH-IMPACT SENSING BUMPER

For applications subject to repeated high impacts

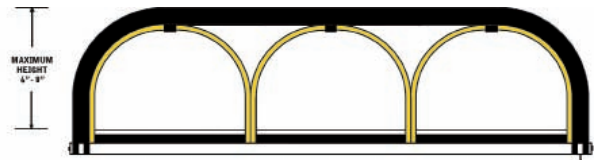
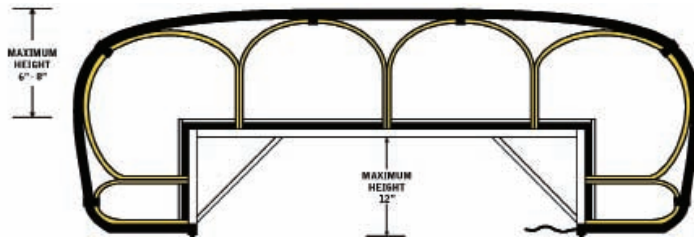


The **VB-Series High-Impact Sensing Bumpers** are designed to survive repeated crushing impacts that would destroy conventional bumpers, and to continue functioning perfectly. When deformed by contact or impact, they provide a signal in the form of an electrical contact closure. They are suitable for use on AGVs, mobile platforms, traveling conveyors, and other moving equipment or machinery. Sensitivity is uniform over the entire bumper surface, including any curved areas.

**VB-Series Bumpers** are available in lengths from 4in. to 16ft. and in linear, winged, or corner configurations. The VB-125 is 1.23in. wide at the base and the VB-250 is 1.25in. wide. Yellow is standard, but other colors can be provided. An optional polyurethane cover is available for added durability. The bumper contact area has a rugged polyurethane cover for added durability.

## Features & Benefits

- Survives repeated severe impacts
- Requires no guide wires and no adjustments
- Simple mounting options for easy installation
- Standard and winged versions
- Available in lengths up to 16ft.
- Fail-Safe wiring is standard



## Applications

- Automatic guided vehicle bumpers
- Protective edging on moving work platforms
- Horizontal or vertical sensing on large moving doors
- Contact detection on large and small mobile conveyors
- Collision detection on telescoping devices
- Position sensing on passenger loaders

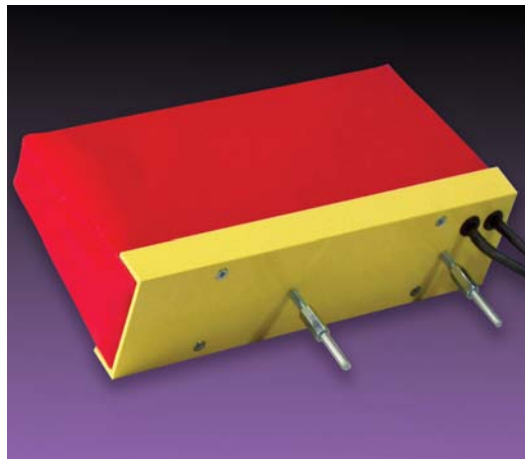
## Specifications

Exterior Housing	PVC
Actuation Force	4lbs. (18N) nominal @ 68°F
Dimensions	Length: 4in. to 16ft. long Width: 1.25in. (VB-125) or 2.50in. (VB-250) Height: 8in. max
Recommended Voltage & Current	24VAC or VDC at 1.0amps max.
Environment	50 to 120°F (10 to 49°C) Waterproof per MIL-STD-810E salt fog
Color	Yellow is standard, other colors on request

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## Various sensitivities, profiles, colors, and lengths



**SE-C Custom Sensing Bumpers** are designed to fit specific application needs. When deformed by contact or impact, they provide a signal in the form of an electrical contact closure. They have a large, compliant surface that helps protect personnel and equipment from injury or damage. The nylon-reinforced exterior housings are resistant to water, oil, hydraulic fluids, and coolants. Mounting options include studs and threaded holes.

These bumpers can be made in various sensitivities, profiles, colors, and lengths. Special options include multiple-surface detection, multiple zones, and high sensitivity. Extra-large sizes and corner designs are also available. All SE-C Series bumpers are supplied with 4-lead, Fail-Safe wiring and are compatible with Tapeswitch Interface Controllers.

### Features & Benefits

- Straight and corner configurations available
- Standard 4-lead Fail-Safe wiring
- Options for multi-surface detection and multiple zones
- Large sensing area to maximize the collision-sensing zone
- Available in extra-large sizes and with extra overtravel
- Custom mounting options, including quick disconnects

### Applications

- Collision detection on AGVs, mobile work platforms, and material handling vehicles
- Obstruction detection on large moving doors, mobile work stations, and telescoping conveyors
- Protection of stationary devices in proximity to moving equipment
- General hazard protection requiring overtravel cushioning

### Specifications

Exterior Housing	Nylon-reinforced fabric
Actuation Force	Per customer specifications
Recommended Voltage & Current	24VAC or VDC at 1.0amps max.
Operating Temperature	32 to 122°F (0 to 50°C)
Color	Black (heavy weight) or yellow (medium weight) Other colors available on request

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# SAFETY INTERFACE MODULES FOR SENSING EDGES

## Compatible controllers for safety applications

Tapeswitch manufactures Safety Interface Modules (SIM) that are compatible with all of the **Sensing Bumper** products shown in this catalog. These devices provide an interface between the low-voltage **Sensing Bumper Switches** and the machine or device being controlled. Be certain to select the appropriate controller for the application. For detailed specifications, see our catalog for Interface Controllers, or visit [www.tapeswitch.com](http://www.tapeswitch.com).

Safety applications require the use of both a Fail-Safe **sensing bumper** and a Fail-Safe rated Interface Controller. For non-safety applications, any mix of Fail-Safe and non-Fail-Safe devices may be used.

### C6 Multifunction Interface Controller

- Fully Fail-Safe for hazardous applications
- Self-contained, supports up to 6 zones
- Detects sensor, cabling or internal faults
- NEMA enclosure with LED status display



### PRSU/4 & PRSU/5 Control Unit

- Fully Fail-Safe for hazardous applications
- Detects sensor, cabling or internal faults
- PRSU/4 requires a 24VAC or VDC supply and the PRSU/5 requires a 115VAC supply
- DIN rail mounting



### PSSU Control Unit

- Fully Fail-Safe for highest-risk applications
- Detects sensor, cabling or internal faults
- 100/240VAC or 24VDC
- DIN rail or wall mounting options



### PSCU Control Unit

- Suitable for low-risk applications only
- 100/240VAC or 24VDC
- 11-pin plug-in or DIN rail mounting



### PRSX/4 Expansion Module

- Increases safe force guided outputs by four
- Works with all tapeswitch controllers
- 24VAC or VDC




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SAFETY MATS



A full spectrum of sensing and signaling products for protection, detection, and safety



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- SAFETY & SIGNAL MATS
- SENSING EDGES
- SENSING BUMPERS
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RIBBON SWITCHES



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LIGHT CURTAINS



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SAFETY CONTROLLERS



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SHORT FORM



A full spectrum of sensing and signaling products for protection, detection, and safety



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INTERLOCKS



A full spectrum of sensing and signaling products for protection, detection, and safety



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TRANSPORTATION

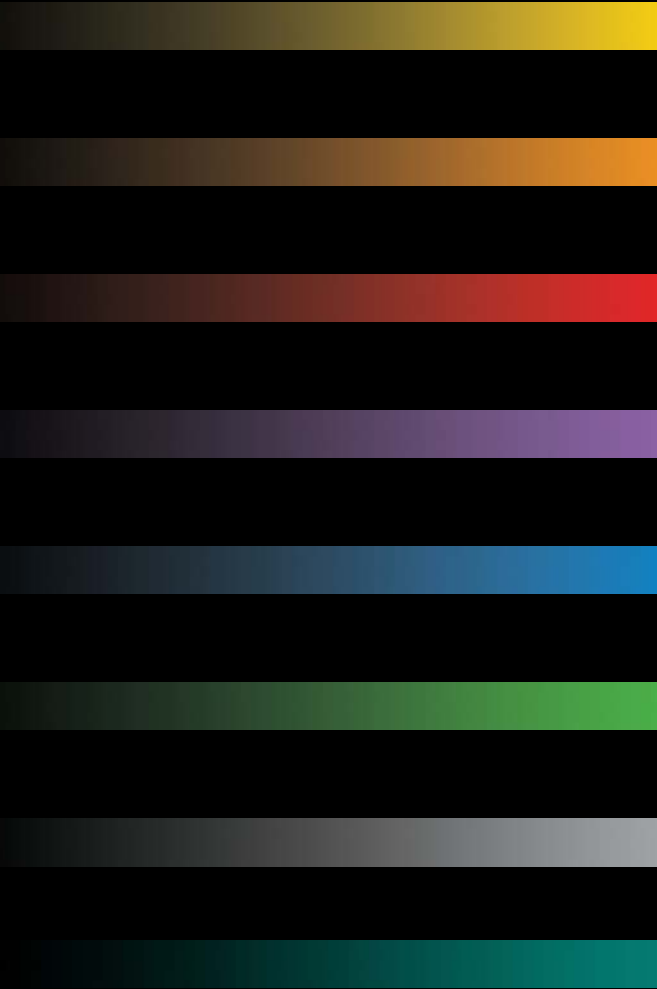


A full spectrum of sensing and signaling products for protection, detection, and safety



TRANSPORTATION PRODUCTS

- Treadle Mats
- Passenger Signaling
- Door Edges



# A sample of industries we serve.



MANUFACTURING

MILITARY



MINING

MEDICAL



TRANSPORTATION

ENTERTAINMENT



Please refer to our web site to locate your nearest representative.



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