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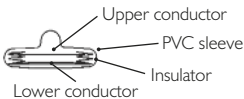
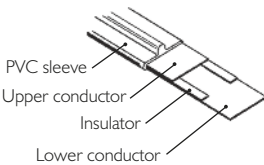
# Introduction to . . .



## Tapeswitch technology

Tapeswitch edges and mats utilise ribbon switch technology. Ribbon switches provide a reliable normally open switch that is manufactured to the customer's required length.

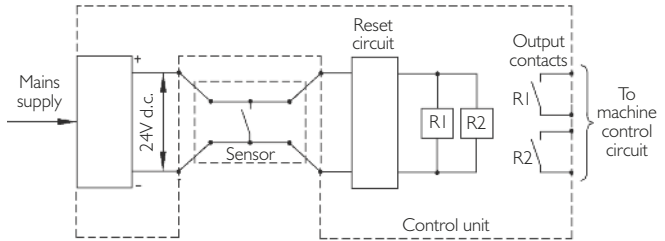
When pressure is applied to any point along the top of the edge or mat, the contacts are forced together closing the switch. Wires are connected to the end of the switch and sealed to provide an IP65 rating, various connection options allow signalling or safety switching to be achieved. The diagram below shows the simple but effective construction.



### Safety applications

To achieve fail safe switching Tapeswitch products must be used with a safety control unit.

The diagram below illustrates the principle of using a 4 wire switch with a controller to achieve fail safe switching.



### Current limiting function

The 24V d.c. supply with a current limiting function provides power to the safety circuit and output relays, via the Tapeswitch switch. If the switch is actuated or a connection lost the reset circuit and relays are de-energised.

### Failsafe 2 wire control

Failsafe 2 wire control can be achieved by fitting a resistor or zener diode inside the ribbon switch. The control unit monitors this value and if the switch is actuated or goes open in circuit the control unit de-energises the relays and reset circuit.

**Safety mats**  
made to your exact  
size & requirements



Some manufacturers only supply safety mats in standard sizes, so customers often compromise between their actual requirements and the size of mats available.

With Tapeswitch safety mats, you don't need to compromise. All their safety mats can be manufactured to the exact size you need. Odd shapes are also possible. UK production ensures lead times are short enough to satisfy most projects and end-user requirements.



**Call**  
**01254**  
**685900**  
**for further**  
**details**



## TS sensing edges

TS sensing edges are pressure sensitive devices designed to protect personnel and equipment from being trapped or crushed by moving parts.

Consisting of a continuous ribbon switch within a flexible outer housing, they are all fitted using an aluminium mounting channel (supplied with each switch).

### Range features

- 2- or 4-wire safety wiring
- Simple, reliable technology
- Durable construction
- Simple to install
- Made in Britain and quickly supplied, finished to required length
- Supplied with a flat, aluminium mounting channel (other mounting options are available)
- All edges are supplied with end caps

### Range technical specification

Protection rating ..... IP65  
 Operating temperature ... -20 to +50°C  
 Recommended max voltage ... 30V d.c.  
 Switching current @ 30V d.c. ... 1A max  
 Housing colour ..... Black  
 Lead length ..... 2m  
 Lead exit ..... one end  
 End caps ..... fitted as standard  
 Max single length ..... 4.8m

|                                  |             |
|----------------------------------|-------------|
| EN 954-1 Category                | Cat 3       |
| EN ISO 13849-1 Performance Level | PLd         |
| EN 62061 SIL Claim               | SIL CL 2    |
| B10d value                       | 5.6 million |

Safety standards are applicable when sensing edges are used with Tapeswitch control units.

## Control units

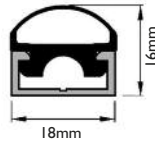



PSSR/2      PRSU/4

See page 461

www.lcautomation.com

## TS6 – 16mm, low profile



### Technical specification

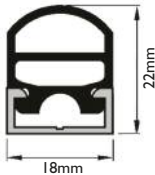
Actuating force ..... <55N (5.5kg)  
 Overtravel movement to 250N ... 1mm  
 Actuating distance ..... approx. 3.5mm  
 Housing material ..... PVC  
 Typical weight ..... 300g/m

A low profile, mini edge designed for pinch point applications which require a pressure sensitive switch, but with added cushioning.

| Description         | Order Code            | Basic Cost | + Cost per m |
|---------------------|-----------------------|------------|--------------|
| 2-wire sensing edge | TS6/LCA/XXXX/2W/BLACK | £66.70     | £23.82       |
| 4-wire sensing edge | TS6/LCA/XXXX/4W/BLACK | £66.70     | £23.82       |

The order code for a 4-wire, 2m sensing edge would be: TS6/LCA/2000/4W/BLACK and the list price would be: £114.34 (XXXX is your required length in mm)

## TS16S – 22mm



### Technical specification

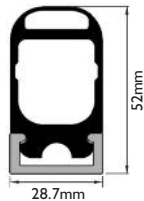
Actuating force ..... <120N (12kg)  
 Overtravel movement to 250N ... 2mm  
 Actuating distance ..... approx. 3.5mm  
 Housing material ..... PVC  
 Typical weight ..... 350g/m

A small sensing edge which is ideal for control and safety based applications where space is restricted.

| Description         | Order Code              | Basic Cost | + Cost per m |
|---------------------|-------------------------|------------|--------------|
| 2-wire sensing edge | TS16S/LCA/XXXX/2W/BLACK | £73.20     | £34.10       |
| 4-wire sensing edge | TS16S/LCA/XXXX/4W/BLACK | £73.20     | £34.10       |

The order code for a 4-wire, 2m sensing edge would be: TS16S/LCA/2000/4W/BLACK and the list price would be: £141.40 (XXXX is your required length in mm)

## TS47 – 52mm



### Technical specification

Actuating force ..... <120N (6kg)  
 Overtravel movement to 250N ... 24mm  
 Actuating distance ..... approx. 2mm  
 Housing material ..... Santoprene  
 Typical weight ..... 1100g/m

A highly sensitive, durable sensing edge typically used in applications which require immediate activation with considerable overtravel.

| Description         | Order Code             | Basic Cost | + Cost per m |
|---------------------|------------------------|------------|--------------|
| 2-wire sensing edge | TS47/LCA/XXXX/2W/BLACK | £117.08    | £62.88       |
| 4-wire sensing edge | TS47/LCA/XXXX/4W/BLACK | £117.08    | £62.88       |

The order code for a 4-wire, 2m sensing edge would be: TS47/LCA/2000/4W/BLACK and the list price would be: £242.84 (XXXX is your required length in mm)

# TS sensing edges with V profile construction



TS sensing edges with V profile construction are pressure sensitive devices that respond to head-on or side activation.

Consisting of a continuous ribbon switch within a flexible outer housing, they are all fitted using an aluminium mounting channel (supplied with each switch).

### Range features

- 2- or 4-wire safety wiring
- Simple, reliable technology
- Durable construction
- Simple to install
- Made in Britain and quickly supplied, finished to required length
- Supplied with a flat, aluminium mounting channel as standard (other mounting options are available)
- All edges are supplied with end caps

### Range technical specification

Protection rating ..... IP65  
 Recommended max voltage ... 30V d.c.  
 Operating temperature ... -20 to +50°C  
 Switching current @ 30V d.c. ... 1A max  
 Housing colour ..... Black  
 Lead length ..... 2m  
 Lead exit ..... one end  
 End caps ..... fitted as standard

|                                  |             |
|----------------------------------|-------------|
| EN 954-1 Category                | Cat 3       |
| EN ISO 13849-1 Performance Level | PLd         |
| EN 62061 SIL Claim               | SIL CL 2    |
| Bitrd value                      | 5.6 million |

Safety standards are applicable when sensing edges are used with Tapeswitch control units.

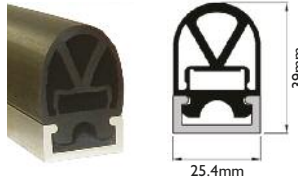
## CUSTOM DESIGNS AVAILABLE

Some of the options available:

- Sensing edge colour
- Connection type/lead length
- Mounting options and material
- Signalling edges for non-safety applications
- Built-in LED indication
- Custom branding

Please call 01254 685900 to discuss your requirements

## TS26C – 39mm



### Technical specification

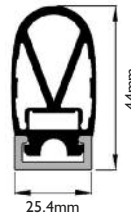
Actuating force ..... < 140N (14kg)  
 Operating temperature ... -20 to +50°C  
 Overtravel movement to 250N ... 8mm  
 Actuating distance ..... Approx. 2mm  
 Housing material ..... Santoprene  
 Typical weight ..... 700g/m  
 Max single length ..... 3m

A compact and durable sensing edge ideal for a wide range of safety applications.

| Description         | Order Code             | Basic Cost | + | Cost per m |
|---------------------|------------------------|------------|---|------------|
| 2-wire sensing edge | TS26/LCA/XXXX/2W/BLACK | £113.98    |   | £47.34     |
| 4-wire sensing edge | TS26/LCA/XXXX/4W/BLACK | £113.98    |   | £47.34     |

The order code for a 4-wire, 2m sensing edge would be: TS26/LCA/2000/4W/BLACK and the list price would be: £208.66 (XXXX is your required length in mm)

## TS28 – 44mm



### Technical specification

Actuating force ..... < 60N (6kg)  
 Overtravel movement to 250N ... 27mm  
 Actuating distance ..... 7mm  
 Housing material ..... EPDM  
 Typical weight ..... 1100g/m  
 Max single length ..... 6.5m

An extremely robust sensing edge ideal for a range of personnel safety applications.

| Description         | Order Code             | Basic Cost | + | Cost per m |
|---------------------|------------------------|------------|---|------------|
| 2-wire sensing edge | TS28/LCA/XXXX/2W/BLACK | £119.84    |   | £53.20     |
| 4-wire sensing edge | TS28/LCA/XXXX/4W/BLACK | £119.84    |   | £53.20     |

The order code for a 4-wire, 2m sensing edge would be: TS28/LCA/2000/4W/BLACK and the list price would be: £226.24 (XXXX is your required length in mm)

## TS48 – 55.5mm



### Technical specification

Actuating force ..... < 120N (6kg)  
 Overtravel movement to 250N ... 21mm  
 Actuating distance ..... 7mm  
 Housing material ..... Santoprene  
 Typical weight ..... 1390g/m  
 Max single length ..... 4.8m

This sensing edge benefits from having a snap-in mounting channel which makes it particularly suited to places where space is restricted.

| Description         | Order Code             | Basic Cost | + | Cost per m |
|---------------------|------------------------|------------|---|------------|
| 2-wire sensing edge | TS48/LCA/XXXX/2W/BLACK | £119.56    |   | £60.74     |
| 4-wire sensing edge | TS48/LCA/XXXX/4W/BLACK | £119.56    |   | £60.74     |

The order code for a 4-wire, 2m sensing edge would be: TS48/LCA/2000/4W/BLACK and the list price would be: £241.04 (XXXX is your required length in mm)

# Control units for sensing edges and safety mats



PSSR/2

PRSU/4

The control units are designed to be used with Tapeswitch sensing edges and safety mats.

**PSSR/2** – For use with 2-wire sensing edges. End-of-line resistor.

**PRSU/4** – For use with 4-wire sensing edges and safety mats.

### Range technical specification

Safety performance . . . PFHd = 1.03x10<sup>-7</sup>  
 Operating temperature . . . -10 to +50°C  
 Reset function . . . . . Auto or manual  
 Supply voltage . . . . . 24V d.c.  
 Device type . . . . . Safety relay  
 Rating . . . . . 5A @ 240V a.c.  
 Maximum sensor length . . . . . 100m  
 Enclosure protection rating . . . . . IP20  
 Mounting . . . . . DIN rail  
 Monitoring . . . . . Self-monitored

### Technical specification

Response time  
 PSSR/2 . . . . . 13ms  
 PRSU/4 . . . . . 30ms  
 Contacts  
 PSSR/2 . . . 2 N/O (safety), 1 N/C (monitor)  
 PRSU/4 . . . 3 N/O (safety), 1 N/C (monitor)  
 Dimensions  
 PSSR/2 . . . . . h84 x w22.5 x d119mm  
 PRSU/4 . . . . . h114.5 x w22.5 x d114.5mm

|                                  |             |
|----------------------------------|-------------|
| EN 954-1 Category                | Cat 3       |
| EN ISO 13849-1 Performance Level | PLd         |
| EN 62061 SIL Claim               | SIL CL 2    |
| Btd value                        | 5.6 million |

Safety standards are applicable when control units are used with Tapeswitch sensing edges.

| Description                    | Order Code | List Price |
|--------------------------------|------------|------------|
| PSSR/2 for 2-wire sensing edge | PSSR/2     | £177.58    |
| PRSU/4 for 4-wire sensing edge | PRSU/4     | £178.60    |

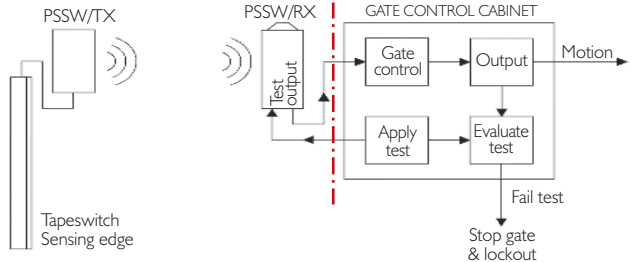
# PSSW wireless control system



Transmitter

Receiver

The wireless transmitter is mounted on the gate or door and connects to the safety edge. The battery operated transmitter has a specified 10m range (a range of over 40m is typical). The receiver is normally mounted next to the gate and wired into the gate control circuit. To maintain safety integrity a test pulse is required to check the system performance.



### Technical specification

#### Transmitter

Power supply . . . . . 3V d.c.  
 2 x 1.5V LR 6AA batteries  
 Battery life . . . . . 2 years  
 Operating frequency . . . . . 868.90Mhz  
 Operating temperature . . . -20 to +55°C  
 Protection rating . . . . . IP66  
 Dimensions . . . . . h160 x w53 x d20mm

#### Receiver

Power supply . . . . . 12/24V a.c./d.c.  
 Supply range . . . . . 9-35V d.c./8-28V. a.c.  
 Output relays . . . . . 2 N/O  
 Relay contact rating . . . . . 1A  
 Self test inputs . . . . . 2 12/24V a.c./d.c.  
 with selectable polarity  
 Operating temperature . . -20 to +85°C  
 Protection rating . . . . . IP65  
 Dimensions . . . . . h190 x w83 x d40mm

|                                  |       |
|----------------------------------|-------|
| EN 954-1 Category                | Cat 2 |
| EN ISO 13849-1 Performance Level | PLC   |

### Features

- Replaces vulnerable cable runs
- Ideal for sliding gates/roller shutter doors
- Interfaces with Tapeswitch's 2-wire safety edges
- Accepts test pulses from most door control systems
- Up to 6 transmitters can communicate with each receiver
- Easy to install

| Description | Order Code | List Price |
|-------------|------------|------------|
| Transmitter | 920062     | £85.77     |
| Receiver    | 920061     | £104.82    |

# Introduction to . . .

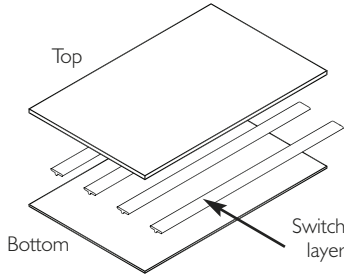


## Tapeswitch safety mats

Safety mats guard the floor area around dangerous machinery. They can provide primary guarding where other types of guards are not practical or they can be used as secondary guarding in conjunction with other safeguards such as interlocked fences or light curtains.

Tapeswitch safety mats comprise of an array of ribbon switches sandwiched between 2 other layers (see diagram opposite). A system consists of a CKP mat sensor and a PRSU/4 safety control unit. When a person stands on the mat, one or more switches are operated, transmitting a stop signal to the machine control system.

They can be used as trip devices i.e. to stop dangerous movement when someone stands on a mat, or as presence sensing devices to prevent



dangerous motion from being started when someone is standing on a mat.

**Tapeswitch safety mats can be made to your exact size and requirements**

Call LC Automation on 01254 685900 for details and to specify the right mat for your application.

## Separation distances for safety mats

The positioning of a safety mat is of primary importance.

When used as a trip device, the mat must extend far enough from the machine to ensure that it can stop before the person can reach any dangerous parts (bearing in mind that the operator can take a full stride on to the mat before being detected).

### System response time

The overall system response time in milliseconds (T) is calculated by:

$$T = t1 + t2$$

Where t1 is the maximum response time between actuation of the safety device and generation of a stop signal and t2 is the response time of the machine between receiving the stop signal and the dangerous parts coming to rest.

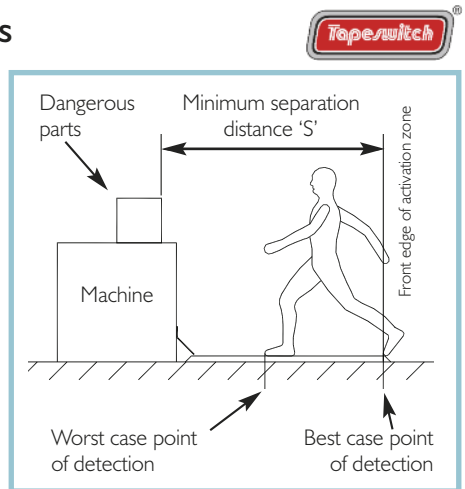
The size and position of the safety mat must ensure that a person cannot reach the dangerous parts before they have stopped moving.

EN ISO 13855 states that the minimum separation distance S in millimetres (i.e. the distance to the farthest part of the mat) should be:

$$S = (1.6 \times T) + 1200$$

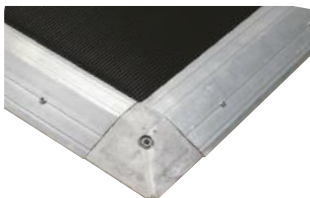
### Secondary guarding

When a mat is used to provide secondary guarding (as a presence sensing device), the above formula does not apply. However, the mat must completely cover the area between the primary guarding device and the machine so that a person cannot remain undetected in a dangerous position. A Tapeswitch safety mat can be made in almost any size and shape to suit these specific applications.





## Armormat – Heavy duty safety mat



The Armormat combines all the features of the CKP/S1 mat with an extra heavy-duty layer, designed to minimise damage caused by impact from heavy, sharp objects.

The mat incorporates a rubber membrane and a layer of tough polycarbonate, which means the switching elements are protected even if the surface material is pierced. Armormats will easily withstand abuse that would destroy standard safety mats. They can be made in custom shapes, sizes and colours to suit your specific application.

### Features

- Durable construction
- Extremely heavy duty
- Chemical and abrasion resistant
- Non-slip ribbed surface
- Can be manufactured to the exact size and shape you require
- Optional colours are available as an extra cost option
- Supplied with AE13 aluminium edging

### Technical specification

|                            |                                      |
|----------------------------|--------------------------------------|
| Colour                     | Black                                |
| Surface pattern            | Ribbed                               |
| Material                   | Koroseal PVC                         |
| Actuation force            | <300N (30kg)<br>with 80mm test piece |
| Maximum length             | 2.4m                                 |
| Maximum width              | 1.2m                                 |
| Protection rating          | IP65                                 |
| Weight                     | Approx 21kg/m <sup>2</sup>           |
| Static load (max)          | 75kg/cm <sup>2</sup>                 |
| Operating temperature      | 0 to +50°C                           |
| Connection lead (standard) | 2m                                   |

|                                  |       |                    |           |
|----------------------------------|-------|--------------------|-----------|
| EN 954-1 Category                | Cat 3 | EN 62061 SIL Claim | SIL CL 2  |
| EN ISO 13849-1 Performance Level | PLd   | B10d value         | 4 million |

Safety standards are applicable when safety mats are used with the Tapeswitch PRSU/4 control unit.

**Example order code** (see *Order code generator* on page 463)

| Description         | Example Order Code            |
|---------------------|-------------------------------|
| Armormat safety mat | Armormat/SE/LD/1500X1000X2000 |

This example order code is for a Armormat mat, with a square edge and dual leads on the long edge.  
Mat size: 1000 x 1500mm with standard 2000mm leads

### Control unit

| Description         | Order Code | List Price |
|---------------------|------------|------------|
| PRSU/4 control unit | PRSU/4     | £178.60    |

See page 461 for full specification of the Tapeswitch control units

## DPM – Very heavy duty safety mat



The DPM safety mat system has extremely high durability in harsh industrial environments.

The system comprises of a Tapeswitch safety mat fitted below an aluminium diamond plate, which is held in position by extruded aluminium edge strips. The system is manufactured to the required size and supplied in kit form for on-site assembly.

The mat gives excellent resistance to impacts and is particularly useful in applications where hot materials can fall.

### Features

- Durable construction
- Extremely heavy duty
- Chemical and abrasion resistant
- Non-slip diamond plate surface
- Excellent resistance to heat
- Can be manufactured to the exact size and shape you require
- Optional colours are available as an extra cost option
- Aluminium ramped edging included

### Technical specification

|                            |                                      |
|----------------------------|--------------------------------------|
| Surface material           | 6061 T6 aluminium                    |
| Actuation force            | <300N (30kg)<br>with 80mm test piece |
| Maximum length             | 2.4m                                 |
| Maximum width              | 1.2m                                 |
| Protection rating          | IP65                                 |
| Weight                     | Approx 32kg/m <sup>2</sup>           |
| Static load (max)          | 75kg/cm <sup>2</sup>                 |
| Operating temperature      | 0 to +50°C                           |
| Connection lead (standard) | 2m                                   |

|                                  |       |                    |           |
|----------------------------------|-------|--------------------|-----------|
| EN 954-1 Category                | Cat 3 | EN 62061 SIL Claim | SIL CL 2  |
| EN ISO 13849-1 Performance Level | PLd   | B10d value         | 4 million |

Safety standards are applicable when safety mats are used with the Tapeswitch PRSU/4 control unit.

**Example order code** (see *Order code generator* on page 463)

| Description    | Example Order Code       |
|----------------|--------------------------|
| DPM safety mat | DPM/SE/LD/1500X1000X2000 |

This example order code is for a DPM mat, with a square edge and dual leads on the long edge.  
Mat size: 1000 x 1500mm with standard 2000mm leads

### Control unit

| Description         | Order Code | List Price |
|---------------------|------------|------------|
| PRSU/4 control unit | PRSU/4     | £178.60    |

See page 461 for full specification of the Tapeswitch control units

Call LC Automation on  
01254 685900 for more details of  
how to specify the right mat  
for your application