



## Industry, Logistics & Aviation

Mayser protects people, material and technology

## Safety in production and logistics

Production and storage processes are increasingly automated to increase economic efficiency. That requires reliable protection of danger zones on machines, systems and transfer lines in industrial production and storage halls according to the Machinery Directive. Mayser specialises in securing pinching and shearing edges as well as in detecting people to keep them from being bumped. A special area of application is ground handling in aviation.

Pressure-sensitive protection devices from Mayser can be combined to create a comprehensive solution. This reliably protects the entire working environment of the area directly surrounding the machine, all the way to the transfer lines.

Our tactile protection devices at a glance:

- Safety mats
- Safety edges and sensor profiles
- Safety shoes
- Safety bumpers

Mayser offers custom solutions for many sectors of industry. In-house development departments, a broad vertical range of manufacture, and competent advice from acknowledged specialists guarantee the process reliability required by large and small companies alike. All safety components from Mayser comply with the EN ISO 13849 and/or EN ISO 13856 standards and therefore meet the requirements of the Machinery Directive.



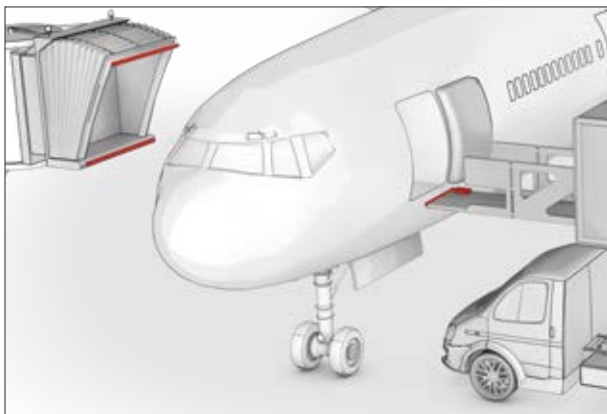
## Table of contents

<b>1</b>	<b>Areas of application</b>	<b>4</b>
	Machine safety	4
	Logistics	4
	Ground handling	4
	AGV systems	5
	Tool protection	5
<b>2</b>	<b>Our solutions</b>	<b>6</b>
	Safety mats	6
	Safety edges, miniature safety edges & sensor profiles	6
	Safety shoes	7
	Safety bumpers	7
<b>3</b>	<b>Safety mats</b>	<b>8</b>
	Technical data	8
	Your benefits	9
<b>4</b>	<b>Safety edges · miniature safety edges · sensor profiles</b>	<b>10</b>
	Your benefits	10
	Technical data	11
<b>5</b>	<b>Safety shoes</b>	<b>12</b>
	Your benefits	12
	Technical data	13
<b>6</b>	<b>Safety bumpers</b>	<b>14</b>
	Technical data	15
	Your benefits	15

# 1 Areas of application

Our safety systems are used wherever moving objects or automated processes could endanger the safety of people and property. Classic areas of application for pressure-sensitive safety components from Mayser are to be found in industry, as well as ground handling in aviation. Examples that meet all IATA requirements are:

- Proximity sensors between ground support equipment (GSE) and the aircraft
- Level control of platforms

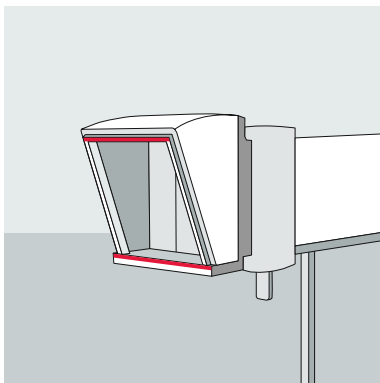


The system provides access detection of any type for hazardous industrial areas in the vicinity of machines and transfer lines, but also provides obstacle detection for protection at linear closing edges, and collision protection for automated guided vehicle systems (AGVS).

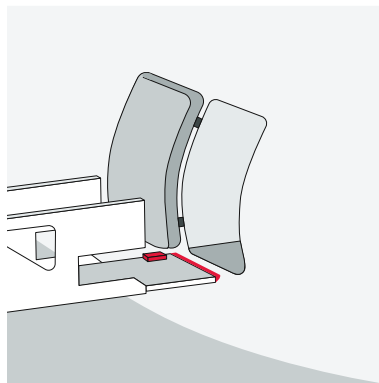
With low pressure on the safety mats, safety edges or the safety bumper, a signal is sent to the evaluation device which deenergises the voltage-free relay contacts or the OSSD outputs. The dangerous movement is stopped and a safe condition created.

We offer solutions for applications including:

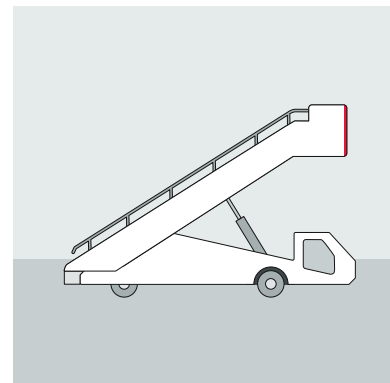
- Dangerous movement areas in production halls
- Movable elements in mechanical engineering
- Collision protection for AGVs



Passenger bridges



Level control

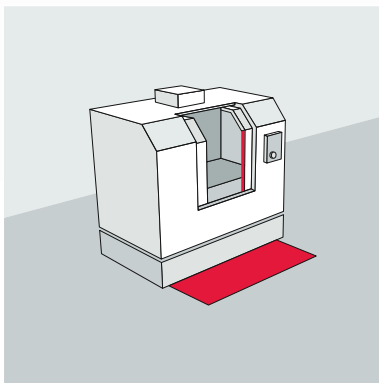


Passenger stairs

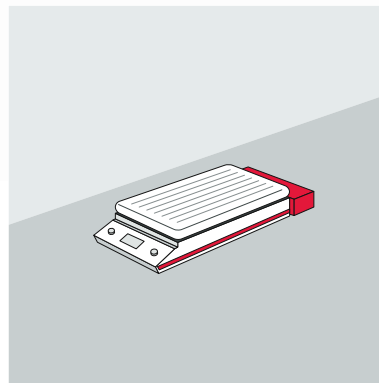




- 1 Safety edges
- 2 Safety mats
- 3 Safety bumpers



Machine safety



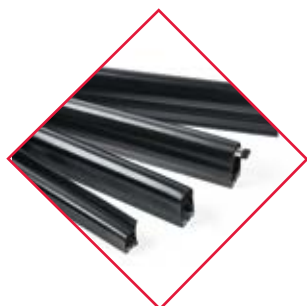
AGV systems

## 2 Our solutions



### Safety mats

Pressure-sensitive safety mats detect persons in dangerous movement areas (e.g. on robots and machines). This solution is especially suitable for dirty environmental conditions.



### Safety edges, miniature safety edges & sensor profiles

Safety edges provide anti-pinch protection for people at pinching and shearing edges.





## Safety shoes

The safety shoe is designed for the level control of passenger boarding bridges, catering lift platforms and maintenance platforms, and prevents damage to aircraft doors.



## Safety bumpers

Safety bumpers protect people against machine components with long overtravel distances, for instance in machining centres, AGVs, measuring machines and lifting platforms.

### 3 Safety mats

Safety mats serve to detect a presence in dangerous movement areas, for instance on machines or in collaboratively used space with cobot applications. The presence of humans or objects in the protected area slows or stops the movement of the machine or the robot.

#### Technical data

	<b>SM15</b>	<b>SM11</b>	<b>SM8</b>	<b>TS</b>
<b>General data</b>				
Height	15	11	8	11
Covering	GM1 GM4 GM5	2-Component coating structured surface	Rubber surface topping with moulded ramp edge	Rubber surface coating (+ moulded logo)
Colours	Black, green, yellow	Black	Black	Black
<b>Functional data</b>				
Chemical resistance	+++	++	+	+
Degree of protection	IP65	IP65	IP65	IP65
Forms	Variable	Variable	Standard sizes, rectangular	Standard sizes, rectangular
Maximum size (single mat)	1.5 m <sup>2</sup>	1.5 m <sup>2</sup>	1.5 m <sup>2</sup>	1.6 m <sup>2</sup>
Structure of ramps	Mitre cut according to drawing	Standard with corner joints, no drawing	Moulded profile	standard with corner joints, no drawing
Safety mat system	Max. 10 per control unit	Max. 10 per control unit	Max. 10 per control unit	Max. 10 per control unit
Applied standards	ISO 13856-1 ISO 13849-1	ISO 13856-1 ISO 13849-1	ISO 13856-1 ISO 13849-1	ISO 13856-1 ISO 13849-1
Operating principle	NO	NO	NO	NO
Terminal resistance	•	•	•	•
4 conductor connection	•	•	•	•
Slip protection	R9	R9	R9	R9
Special version	•	•		





## Your benefits

- ✓ Maintenance-free
- ✓ Robust construction
- ✓ Resistant to environmental influences and normal chemical influences
- ✓ Reliable functionality in dirty environmental conditions

## 4 Safety edges · miniature safety edges · sensor profiles

Safety edges are sensors that provide anti-pinch protection at pinching and shearing edges. If the safety edge encounters an obstacle, a signal is triggered that makes it possible to immediately stop the dangerous movement.

### Your benefits

- ✓ Diverse profile geometries
- ✓ Maintenance-free
- ✓ Custom-tailored solutions possible
- ✓ Optimal solution for different installation heights
- ✓ High degree of protection (IP67)
- ✓ Pre-assembly or DIY installation possible





## Technical data

	<b>Safety edge</b>	<b>Miniature safety edge/ anti-pinch sensor</b>	<b>Sensor profile</b>
Operating principle	Pressure-sensitive Non-touch	Pressure-sensitive	Pressure-sensitive
	NC contact and NO contact principle	NO contact principle	NO contact principle
Overall height	20 – 137 mm	4 – 16 mm	20 – 70 mm
Actuation angle	Up to $\pm 45^\circ$	Up to $\pm 45^\circ$	Up to $\pm 50^\circ$
DIY solution		•	•
Applied standards	EN 12978 ISO 13849-1 ISO 13856-2	ISO 13849-1 ISO 13856-2	EN 12978 ISO 13856-2 ISO 13849-1
Degree of protection	IP67	IP67	IP67
Operating temperature	Min. $-20^\circ\text{C}$ max. $+55^\circ\text{C}$	Min. $-25^\circ\text{C}$ max. $+80^\circ\text{C}$	Min. $-25^\circ\text{C}$ max. $+55^\circ\text{C}$
Actuating distance	8 – 17 mm	$\leq 1,0$ mm	6 – 8 mm
Rubber envelope profile	EPDM NBR CR	TPE	TPE
Custom adaptation	Bending radii Angled geometries Active ends		



## 5 Safety shoes

The safety shoe is designed for level control in mobile ground handling platforms. Sinking of the aircraft during loading exerts force on the safety shoe. This causes a signal to be sent to the lift platform control system, which then lowers the platform until the level is compensated. The especially rugged construction makes the safety shoe ideal for use in harsh environments.

### Your benefits

- ✓ Robust construction
- ✓ Maintenance-free
- ✓ ISO 13849-1, Category 3 PL d can be achieved
- ✓ Reliable operation
- ✓ Flexible use in different vehicles



## Technical data

Applied standard	ISO 13856-3
Actuation force Test stamp Ø 80 mm	< 150 N
Effective actuation angle	90°
Actuation distance	< 5 mm
Overtravel distance	15 mm
ISO 13856: Reset function	None
ISO 13849-1: 2016	Up to Category 3 PL d is possible
MTTF <sub>0</sub> (sensor)	381 a
B <sub>10D</sub> (sensor)	2 x 10 <sup>6</sup>
Sensor size (W x H x D) with handle	300 x 69 x 104 mm 450 x 99 x 104 mm
Weight	1,1 kg
IEC 60529: Degree of protection	IP67 with screwed plug connector
Operating temperature	-20 bis +45 °C
Storage temperature	-20 bis +45 °C
EN 60947 -5-1: Utilisation category	AC 15: 230 V / 1,5 A DC 13: 60 V / 0,5 A
Switching voltage (max.)	AC 230 V DC 60 V
Switching current (max.)	1,5 A 0,5 A
Constant current (max.)	8 A 8 A

## 6 Safety bumpers

Safety bumpers protect people against machine components with long overtravel distances, for instance in machining centres, AGVs, measuring machines and lifting platforms.

Safety bumpers thus expand the range in the collision protection system field.

Typical applications are protection in mechanical engineering, stage technology, medical technology and on large, heavy gates. Safety bumpers provide collision protection on automated guided vehicle systems.





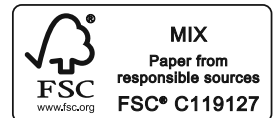
## Technical data

Operating principle	Pressure-sensitive (NC contact or NO contact principle)
Max. depth	
Standard version	400 mm
Bumpers based on drawings	1200 mm
Areas to be protected	Pinching and shearing edges Collision protection
Applied standards	ISO 13856-3 ISO 13849-1
Degree of protection	IP54 (up to IP65 possible)
Operating temperature	-20 °C to +55 °C
Surfaces	PUR skin Polyester coverings Resistant against sparks during welding Synthetic leather
Chemical resistance (depending on the surface)	Diluted acids Alkaline solutions Cleaning products Lubricants Alcohol Disinfectants Bodily fluids Oils
Customer-specific adjustment options	Form Design Layout

## Your benefits

- ✓ High-quality materials and craftsmanship
- ✓ Custom solutions
- ✓ All RAL colours possible
- ✓ Virtually all geometries possible
- ✓ Maintenance-free
- ✓ Safety bumpers adjust to various applications with their design, form and surface, regardless of external-influences like weather or chemicals
- ✓ Optional fire resistance

The technical data is applicable as of the date of printing. Technical specifications, design and features are subject to change without notice, due to continued development at Mayser – errors excepted. Illustrations are not binding and may contain options.



[www.mayser.com](http://www.mayser.com)

**Mayser GmbH & Co. KG**

Bismarckstraße 2  
88161 Lindenberg  
GERMANY

Phone: +49 8381 507-0  
info.lindenberg@mayser.com

**Mayser GmbH & Co. KG**

Örlinger Straße 1–3  
89073 Ulm  
GERMANY

Phone: +49 731 2061-0  
info.ulm@mayser.com

**Mayser USA, Inc.**

6200 Schooner Drive  
48111 Belleville /  
Michigan  
USA

Phone: +1 734 858-1290  
usa@mayser.com

**Mayser France**

Les Aunettes  
12M Bd. Louise Michel  
91030 Evry Cedex  
FRANCE

Phone: +33 1 6077-3637  
france@mayser.com

**Mayser Slovakia s.r.o.**

Gemerska 564  
04951 Brzotin  
SLOVAKIA

Phone: +421 58-7884870  
roznava@mayser.com