



Aviation

Mayser makes ground handling safe.

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The standards of the International Air Transport Association (IATA) for operational safety are stringent, and compliance with these standards is a prerequisite for membership in the association. Accidents during loading and unloading, parking, towing or servicing not only impair safety, but also result in high unnecessary expenses.

Mayser Safety Technology offers solutions for the prevention of accidents, as well as support for the drivers of ground handling vehicles and service personnel.

Mayser has the right sensor solution for compliance with IATA regulations, in addition to many years of industry-wide experience. As a partner of the automotive industry Mayser cooperates with numerous well-known OEMs and also equips buses and rail vehicles, as well as automated guided vehicle (AGV) systems with reliable sensor technology. Sensors are also installed as standard equipment in ground support equipment (GSE) vehicles.

Pressure-sensitive and non-touch safety components are used:

- Ultrasonic sensors
- Safety bumpers
- Safety shoes
- Safety edges · miniature safety edges · sensor profiles

Our in-house development department can generate custom solutions. The components of the safety systems can be used separately or in combination, both as original equipment and for retrofitting. Mayser is known for its high-quality products and meets or exceeds the industry standards.





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1 Our solutions

Areas of application

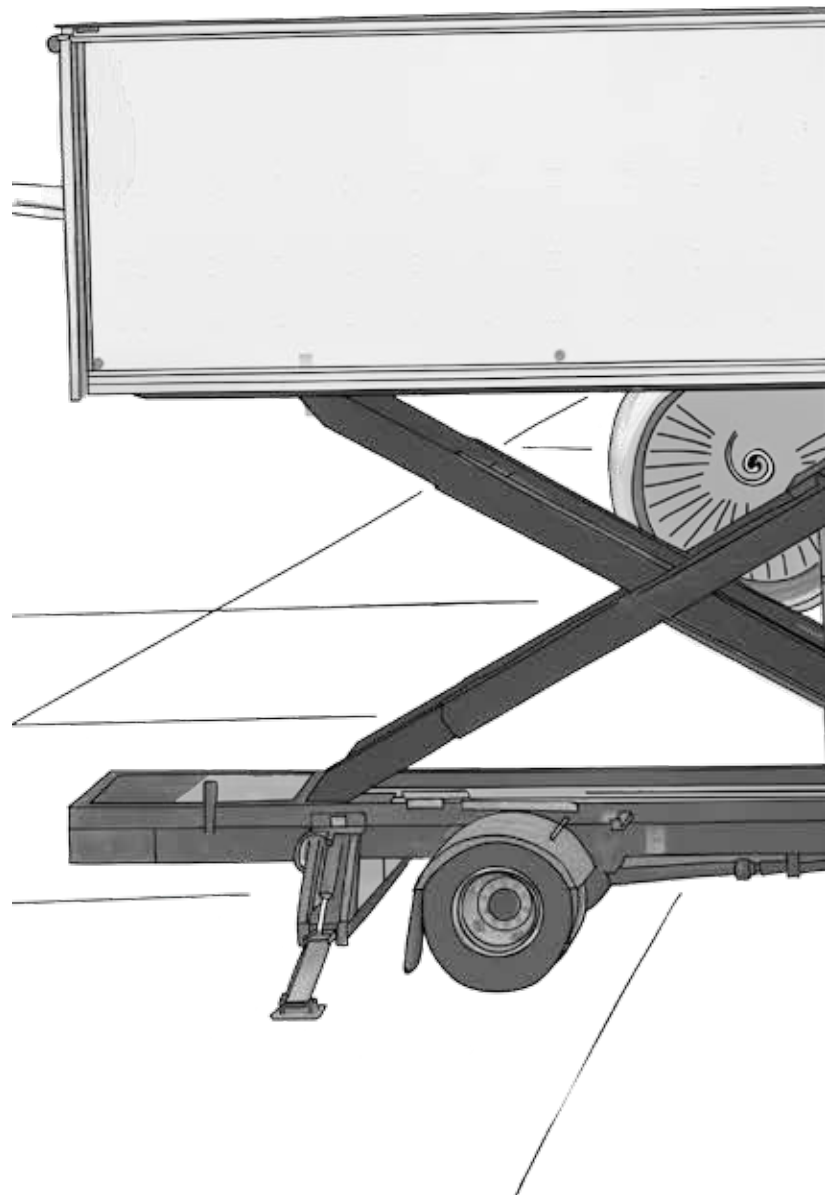
Our safety systems are used wherever moving objects pose a hazard that can result in material damage or human injury.

Pressure-sensitive and non-touch safety components from Mayser make it possible to detect and adjust conditions to different zones, stop dangerous movements, reduce speeds and minimise potential damage in the event of contact.

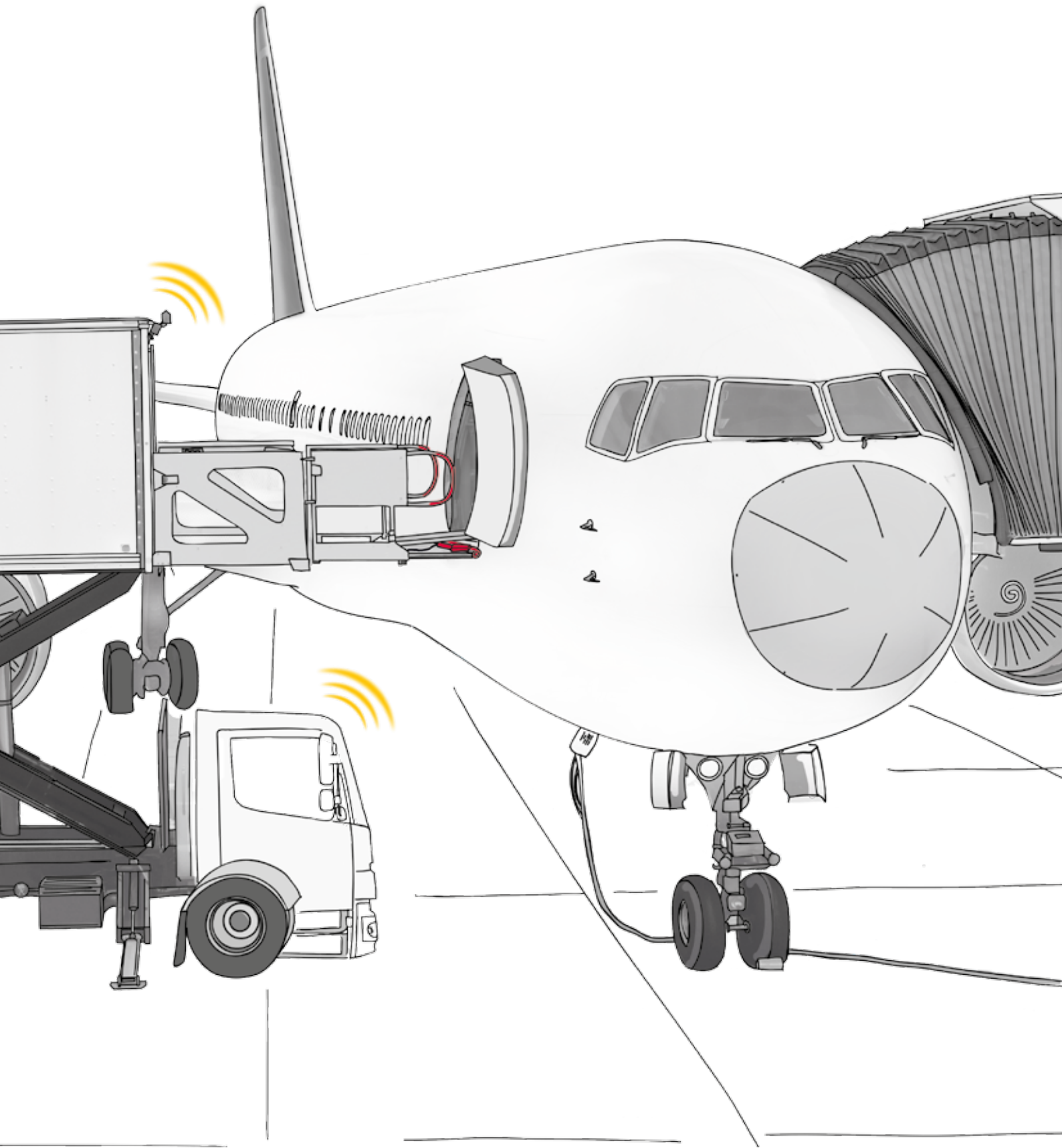
- Proximity sensors between ground support equipment (GSE) and the aircraft
- Collision protection between objects and the aircraft
- Level control of platforms

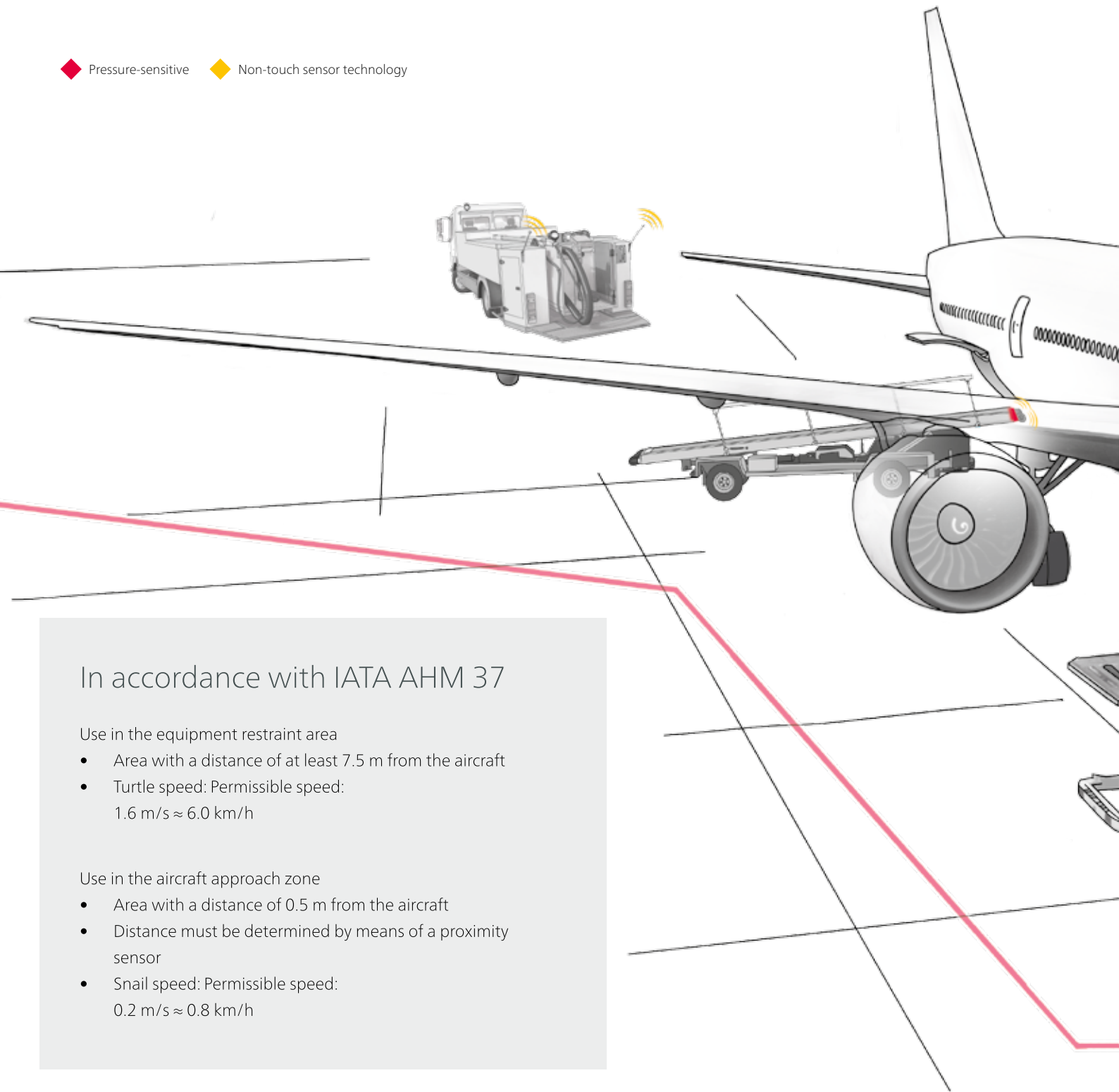


Our safety sensors can be combined with all GSE vehicles, regardless of the aircraft type and size.



◆ Pressure-sensitive sensors ◆ Non-touch sensor technology





In accordance with IATA AHM 37

Use in the equipment restraint area

- Area with a distance of at least 7.5 m from the aircraft
- Turtle speed: Permissible speed:
1.6 m/s \approx 6.0 km/h

Use in the aircraft approach zone

- Area with a distance of 0.5 m from the aircraft
- Distance must be determined by means of a proximity sensor
- Snail speed: Permissible speed:
0.2 m/s \approx 0.8 km/h



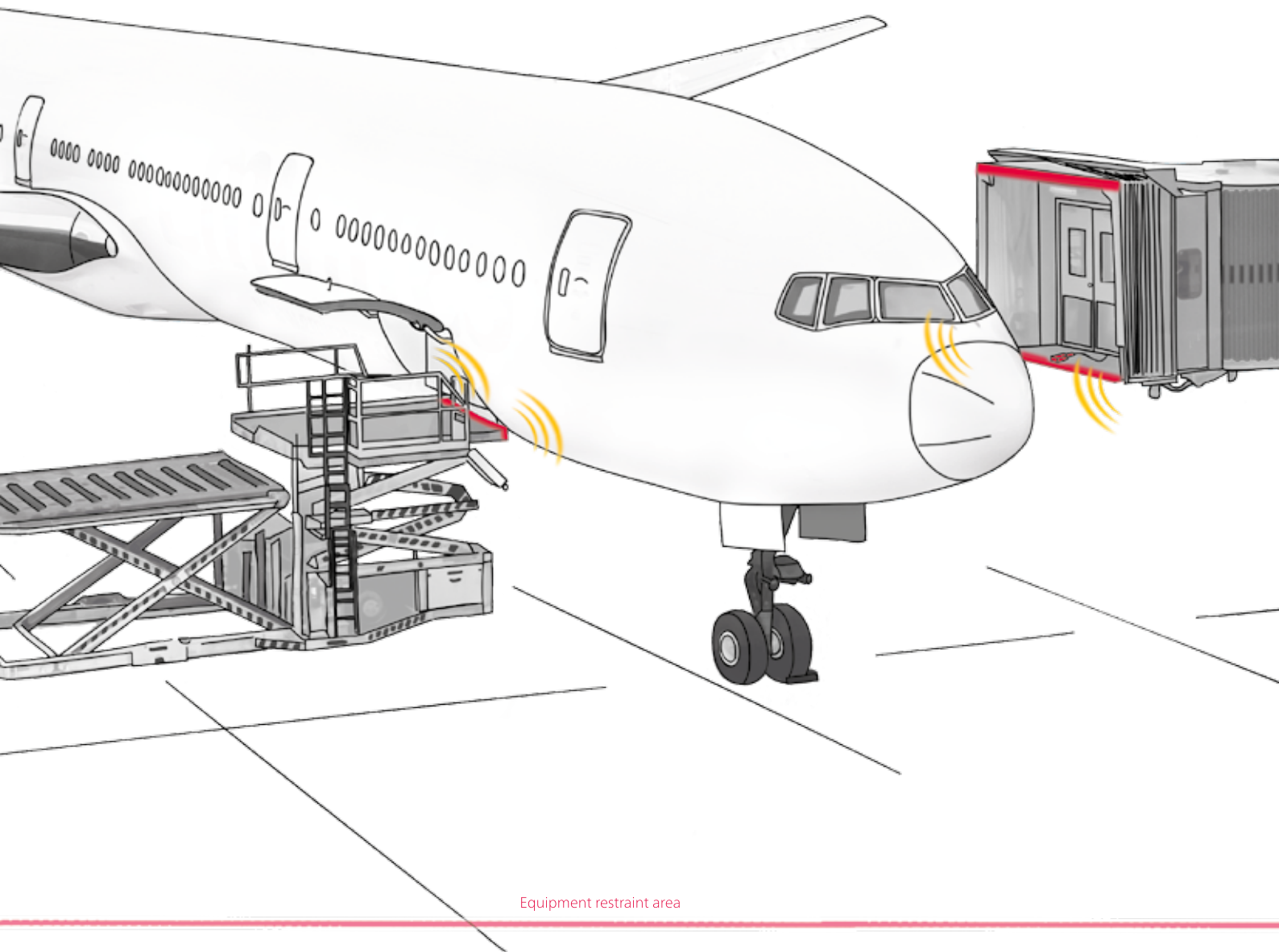
Ultrasonic sensors

The ultrasonic industrial sensor USi and our ultrasonic safety features non-touch object detection and distance measurement for all materials.



Safety bumpers

These impact cushions provide soft impact protection with long overtravel distances and integrated pressure-sensitive sensors. They are used for example in lift and stairway vehicles.

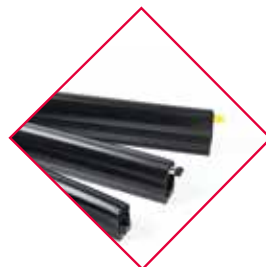


Equipment restraint area



Safety shoes

The safety shoe is designed as collision protection for the level control of passenger, baggage, catering and maintenance platforms, and prevents the collision of two platforms.



Safety edges, miniature safety edges & sensor profiles

Safety edges send signals upon the introduction of low forces. This ensures the safety of people and objects at shearing and pinching edges.

2 Ultrasonic sensors

Environment, distance and area monitoring via ultrasound is the ideal solution for non-touch detection of persons and objects, as well as distance measurement. If an object is detected within the monitored area, a movement (from

GSE units or ground servicing vehicles) can be slowed down or stopped. Even the smallest objects are reliably detected across the entire distance, regardless of material, form, transparency and colour.

Your benefits

- ✓ Non-touch monitoring of three-dimensional spaces
- ✓ Two very small ultrasonic transducers which can be positioned freely and separate from the electronics and will fit anywhere
- ✓ Reliably detects people, as well as objects made of various materials regardless of shape, transparency and colour
- ✓ Insensitive to contamination, extraneous sound, air flows and moisture, and thus suitable for ambient surveillance, collision protection or access control
- ✓ Detects virtually without blind zone in an elliptical sound field ($\pm 17^\circ$, $\pm 5^\circ$) up to a distance of 2.50 meters
- ✓ A teach-in function allows the system to learn the complete measuring environment

Additional advantages of ultrasonic safety



- ✓ Dual-channel system for personnel safety
- ✓ Certified according to ISO 13849-1, Category 3 PL d
- ✓ Unique development in the ultrasonic field



Currently ultrasonic safety is the only ultrasonic sensor system that is certified in accordance with EN ISO 13849-1, Category 3 PL d.



Technical data

	Ultrasonic safety	Industrial ultrasonic sensor USi
		
Measuring principle	Ultrasonic pulse echo method	Ultrasonic pulse echo method
Sensor	Enclosure 27x13x21 mm	Cable 1500 mm
Applied standards	IEC 60947-5-2, IEC 60204-1	IEC 60947-5-2, IEC 60204-1
Safety category	EN ISO 13849, Category 3 PL d	
IEC 60529: Degree of protection		
Evaluation unit	IP65	IP65
Sensor	IP69K	IP69K
Ultrasonic frequency	Typ. 103 kHz	103 kHz
Sound field geometry	$\pm 17^\circ / \pm 5^\circ$	$\pm 17^\circ / \pm 5^\circ$
Measurement frequency	33 Hz	Typ. 20 Hz (2 – 250 Hz)
Measurement distance	Typ. 200 cm	Typ. 2000 mm (100 – 2500 mm)
Resolution	1 cm	1 mm
Connection type	M12 plug-in connector	M12 plug-in connector
OSSD outputs as safe outputs	2 OSSD per connected ultrasonic transducer results in 2 x 2 safe PNP semiconductor outputs, each with 150 mA, short-circuit-proof, cross-circuit monitored	
Outputs OUT as message outputs	1 output for each connected ultrasonic transducer, for 2 x 1 PNP semiconductor outputs, each with 150 mA	USi-PP: 4 x Power FET PNP USi-IP: 1 x 4 to 20 mA 3 x Power FET PNP USi-UP: 1 x 0 to 10 V 3 x Power FET PNP
Interface / software	USB 2.0	USB 2.0

3 Safety bumpers

Safety bumpers are designed for impact protection as active impact cushions made of soft polyurethane foam with integrated safety sensors.

The soft foam body prevents damage to objects with short and long stopping distances. Safety bumpers are used in the aviation industry to protect sensitive components made of pressure-sensitive materials in aircrafts that could come into contact with GSE units.



Technical data

Operating principle	Pressure-sensitive (NC contact or NO contact principle)
Max. depth	
Standard version	500 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 IP 65 possible)
Surfaces	PUR skin Polyester coverings 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



The design, form and surface of safety bumpers can be adapted to the different areas of application.

Your benefits

- ✓ Eliminates costs caused by collision of vehicles
- ✓ High-quality materials and processing
- ✓ Low specific contact pressure
- ✓ Customer-specific solutions
- ✓ Nearly all geometries possible
- ✓ Maintenance-free
- ✓ Optimal resistance
- ✓ Not susceptible to influences such as weather and chemicals (e.g. kerosene, de-icing agents, ...)
- ✓ No residue in case of collision

4 Safety shoes

The safety shoe is designed to provide collision protection for the level control of mobile ground handling platforms. A signal is sent as a result of the pressure from pinching and

the lifting platform control system receives the command to lower until the level is compensated. The especially rugged construction makes it ideal for use in harsh environments.



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 ₀ (sensor)	381 a
B ₁₀₀ (sensor)	2 x 10 ⁶
Sensor size (W x H x D)	300 x 69 x 104 mm
with handle	450 x 99 x 104 mm
Weight	1.1 kg
IEC 60529: Degree of protection	IP67 with screwed plug connector
Operating temperature	-20 to +45 °C
Storage temperature	-20 to +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

Your benefits

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

5 Safety edges · miniature safety edges · sensor profiles

These sensors detect objects when pressure is exerted on the effective actuation area. The linear tripping devices provide protection at shearing and pinching edges.



We offer complete inhouse services from development to design all the way to series delivery.

Your benefits

- ✓ Various profile geometries with safety edges
- ✓ Maintenance-free
- ✓ Customer-specific solutions possible
- ✓ Optimal solution for different installation heights
- ✓ High degree of protection possible (IP67)
- ✓ Pre-assembly or self-assembly possible
- ✓ Customer specific surfaces and colours





Technical data

	Safety edge	Miniature safety edge / anti-pinch sensor	Sensor profile
Operating principle	Pressure-sensitive Non-touch	Pressure-sensitive	Pressure-sensitive
	NC contact and NO contact principle	N/O switch principle	N/O switch principle
Overall height	20 – 137 mm	4 – 16 mm	20 – 70 mm
Actuation angle	±30° to ±45°	up to ±45°	±45° to ±50 °
Self-fabrication		•	•
Applied standards	EN 12978 ISO 13856-2 ISO 13849-1	ISO 13849-1	EN 12978 ISO 13856-2 ISO 13849-1
Degree of protection	IP67	IP65	IP65
Actuating distance	8–17 mm	≤1.0 mm	6–8 mm
Customer-specific adjustment	Bending radii Angled geometries Active ends		
Switching forces at room temperature	< 150 N (test bar Ø = 80 mm)	< 30 N (test bar Ø = 200 mm)	< 150 N (test bar Ø = 80 mm)

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