

Linde Material Handling

*Linde*

# LINDE SAFETY GUARD

The unique monitoring and warning system  
that detects hazards before they even arise





During loading and unloading, people and vehicles work closely together. The earlier hazards are detected, the more secure is the process.

# SAFETY WHEN IT MATTERS MOST

## WHAT IF PEOPLE, THEIR HANDLING EQUIPMENT AND THE INFRASTRUCTURE COULD COMMUNICATE WITH EACH OTHER?

Material handling operations like loading and unloading trucks can encounter potentially hazardous situations. Industrial trucks and personnel working together in close proximity can be challenging and difficult to control. In the worst-case scenarios this can lead to injury or property damages.

Every aspect of any material handling application demands constant vigilance by all personnel involved: blind corners, low visibility areas and distracting noises are all ever-present safety risks in intralogistics and manufacturing working environments.

### A timely warning: the Linde Safety Guard

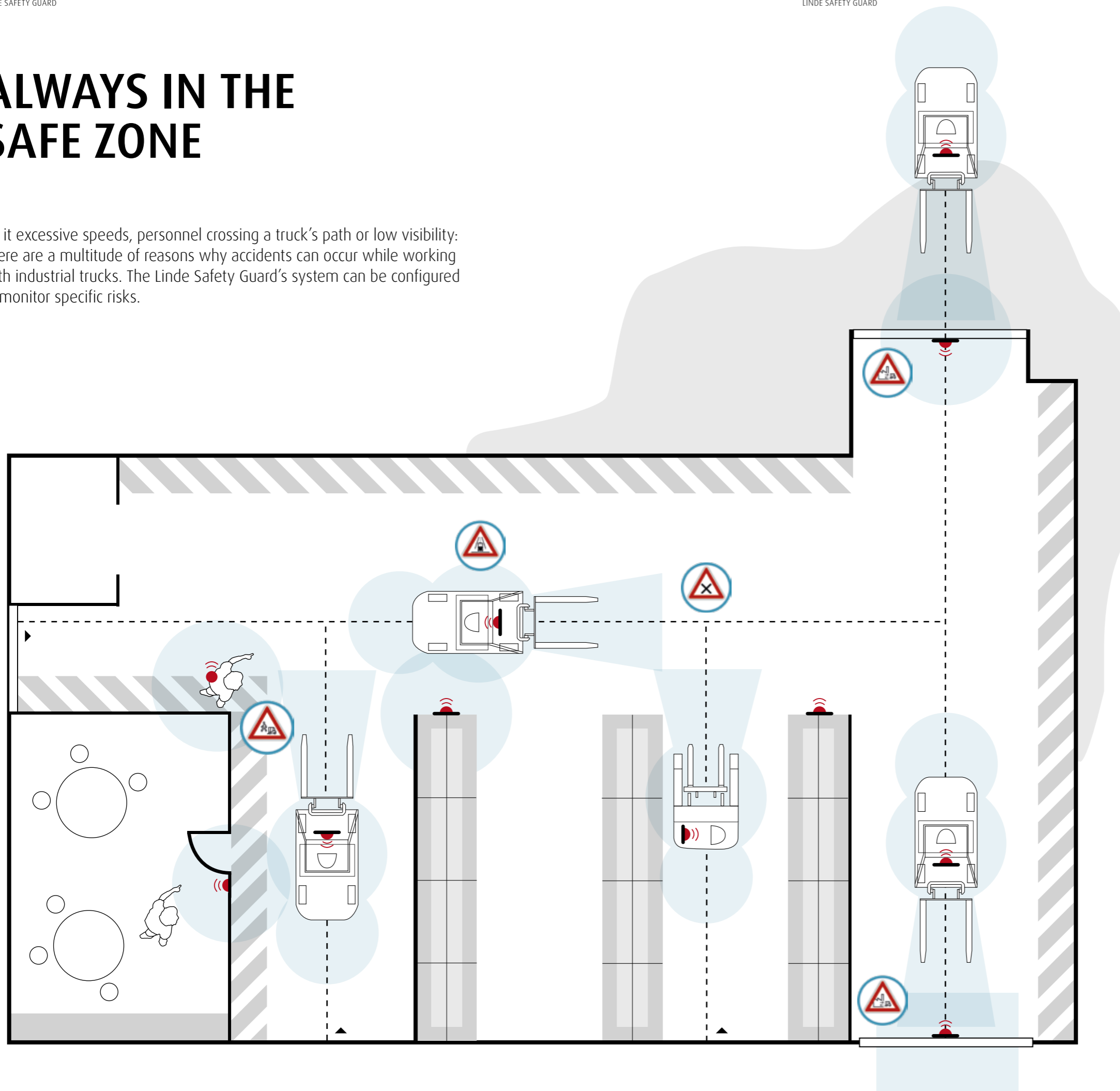
The Linde Safety Guard is an innovative assistance system that enhances safety for truck operators and pedestrian personnel in areas where trucks are in use. Active advance warning mechanisms in the event of potential hazards, means that everyone involved can react immediately. Depending on the application and the selected detection modules, the Safety Guard system warns either by sound emissions, flashing LED lights or vibrations. Hazards can then be neutralised before any physical injury or collateral damage occurs.

This unique safety system was developed by the start-up Comnovo, which has been part of Linde Material Handling since July 2017. Since then, the system, which is available for new trucks as well as a retrofit solution, has been continuously developed for a wide range of applications.

A complex interplay of man and machine exists wherever industrial trucks are in use. The Linde Safety Guard is an innovative monitoring system that provides an early warning of potential hazards.

# ALWAYS IN THE SAFE ZONE

Be it excessive speeds, personnel crossing a truck's path or low visibility: There are a multitude of reasons why accidents can occur while working with industrial trucks. The Linde Safety Guard's system can be configured to monitor specific risks.



## HAZARDOUS WORKPLACE ZONES FOR INDUSTRIAL TRUCKS AND PEDESTRIANS

At corners, junctions or hall entrances, industrial trucks can pose a risk to pedestrians. The Linde Safety Guard system provides advance warnings to both the operator and pedestrians. The warning signal can be transmitted through walls and racking and is accurate to within 10 centimetres. Warnings are only triggered when there is a clear danger, thus avoiding false alarms. An additional option reduces the travel speed in the event of danger, if necessary in a certain direction: if a person passes in front of a reversing forklift, the vehicle is not slowed down.

## COLLISIONS WITH THE INFRASTRUCTURE

With the Linde Safety Guard, high-speed doors open and close automatically. This prevents collisions, saves heating energy and reduces cases of illness as a result of drafts. Approaching forklifts are slowed down in time so that the door is fully open by the time they pass through. An additional sensor warns if the mast is not retracted. The gates themselves can be equipped with round or rectangular warning zones. Rectangular zones ensure that only the desired gate opens when gates are next to each other. They also ensure that vehicles can work directly at gate entrances without the gate opening.

## EXCESSIVE SPEED

Accidents can occur if industrial trucks travel too fast through areas where pedestrian personnel are working or walking. Long, straight stretches can also tempt truck operators to exceed a safe travel speed. The Linde Safety Guard automatically reduces travel speed in these critical areas.

## MULTI-TRUCK ACCIDENTS

Collisions between trucks can occur at crossing points where visibility is poor or restricted. In these circumstances the Linde Safety Guard system warns all the truck operators in these zones, of the other trucks' presence in their immediate vicinity. The Truck Unit displays from which direction trucks are approaching. The minimum distance between trucks before a warning is triggered is adjustable.

# TAILORED SAFETY

The Linde Safety Guard system increases the safety of the internal traffic. It can see around corners and through walls, reduces speeds automatically and can be programmed to suit any hazardous scenario.

The Linde Safety Guard uses warning zones to prevent accidents. Transmitters are positioned on industrial trucks, walls, racking and even carried by the personnel themselves. This ensures rapid detection, early warning and avoidance of hazardous situations.

If a pedestrian and a truck look likely to collide, then both the industrial truck and the pedestrian are warned simultaneously. A receiver in the truck indicates how many pedestrian personnel are approaching the danger zone and from which direction. The pedestrian is warned by the Portable Unit or the Pedestrian Warning Band with integrated transmitter. This also works through walls and racking.

Speed restriction zones can also be pre-defined and programmed, so that the system automatically reduces the truck's speed in these zones and also warns the truck operator. This minimises accidents between trucks and personnel in areas such as production, order-picking areas, and busy intersections for example. All this is only possible because the Linde Safety Guard system is able

to precisely determine the position of marked objects or personnel within ten centimetres and the warning zones are individually adjustable. This level of precision also helps to prevent false alarms. Moreover, a broadband radio signal in the 4 GHz range (UWB) helps to ensure reliability by eliminating interference from Wi-Fi, Bluetooth or RFID.

The system can be adapted to meet any safety requirements. It consists of individual modules and can be tailored to the respective risk situation on individual sites. It can also be linked to the Linde connect fleet management system. The connect:zi function allows users to set their safety zones and speeds as needed. Interactive reporting provides maximum transparency for the fleet.

The Linde Safety Guard is available for new vehicles, as a retrofit solution and for use in potentially explosive atmospheres. Therefore the entire fleet can be equipped to meet the latest safety requirements.

## Advantages at a glance

- Personnel and zone recognition
- Warning zones that can be configured within 10 centimetres of precision
- Visualisation of the number and position of personnel in the danger zone
- Mutual warning for pedestrian personnel and truck operators
- Detection through walls and racking\*
- Versatile, adaptable and rapid installation

\*Valid for typical infrastructure in intralogistics. Checked during consultancy.

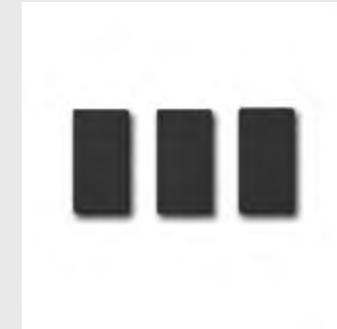


## PRODUCT MODULES



### Truck Unit

The Truck Unit is attached to the forklift and warns the industrial truck operator via LED lights and acoustic signals.



### Sensors

Detect the modules carried by pedestrians and industrial trucks in the defined potentially hazardous zones.



### Truck Unit Small

The Truck Unit Small is attached to the forklift and communicates with stationary modules such as the Static Unit or the Zone Marker. The Truck Unit Small is also available for ATEX-zones.



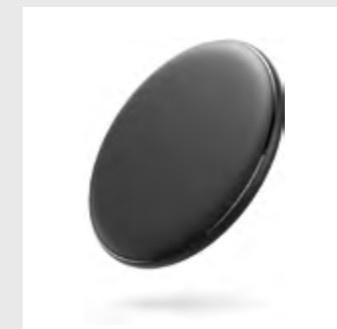
### Static Unit

The Static Unit marks hazardous zones in critical areas such as access doors or low visibility intersections. This module warns the environment via acoustic signals and LED lights.



### Zone Marker

The Zone Marker defines speed-restriction areas. The Zone Marker is also available for ATEX-zones.



### Charger

The Charger charges the Portable Unit inductively. The fully automatic activation ensures optimum ease of operation.



### Portable Unit

The Portable Unit warns personnel of approaching industrial trucks using acoustic signals, LED lights and vibration.



### Pedestrian Warning Band

In the event of danger the Warning Band warns the pedestrians and the forklift drivers. Light and sound signals alert the band carrier about approaching vehicles. The ergonomic design guarantees high wearing comfort.

### **Linde Material Handling GmbH**

Linde Material Handling, a KION Group company, is a leading global manufacturer of forklift trucks and warehouse trucks, and a solutions and service provider for intra-logistics. With a sales and service network that spans more than 100 countries, we are close to customers in all major regions around the world.

With over 100 years of experience in providing material handling solutions to companies in virtually every industry, we help our customers optimise their entire material handling process. Our experts analyse all workflows from goods receiving to shipping and work with the customer to develop solutions that fully meet their individual requirements. In the process, Linde Material Handling guarantees smooth implementation, reliable commissioning and responsive service.

For further information, please visit: [www.linde-mh.com](http://www.linde-mh.com)



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