



Linde Operator Assistance System Original instructions

Linde Material Handling— Your Partner



Selling over 125,000 forklift and warehouse trucks per year, Linde Material Handling ranks as one of the leading intralogistics manufacturers and solution providers.

And there is a reason for this success. Linde products not only win over customers with their innovative technology with a reputation for excellent performance, but in particular with reduced energy and operating costs, which are up to 40% lower than those of the competition.

The high level of manufacturing quality is also a benchmark for the quality of our advice and services. With an extensive network of distribution partners, we are at our customers' disposal both around the clock and around the world.

Your local Linde dealer offers a complete service package from a single

source — from expert advice to sales and servicing, and with the right financing, of course. Whether leasing, hiring or hire purchase — you maintain your flexibility. In your work and in your decisions.

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1	Introduction	
	Linde Operator Assistance System	2
	Intended use.....	3
	Limitations for commissioning or for the permission to operate.....	4
	Symbols used	5
2	Safety	
	Safety information	8
	Service personnel.....	9
3	Operating devices and display elements	
	Overview.....	12
	Truck Unit.....	14
	Truck Unit Small.....	18
	Distance Beeper.....	26
	Charging station	28
	Sensor Truck Unit.....	30
	Static Unit.....	31
	Zone Marker	33
4	Operation	
	Installation	36
	Attaching the Distance Beeper	37
	Installing a Static Unit.....	38
	Installing the Zone Marker.....	39
	Pre-shift checks	40
	Service plan.....	40
	Checking the charge state of the Distance Beeper	41
	Checking the function of the Distance Beeper	41



Charging the Distance Beeper	43
Checking the operational readiness of the Truck Unit	44
Checking the operational readiness sensors.....	45
Performing a functional test	46
Operation	49
Switching on the Truck Unit	49
Switching on the Distance Beeper	49
Pairing the Distance Beeper	50
Displays during operation	50
5 Maintenance and disposal	
Maintenance	62
Disposal	63
6 Technical data	
Truck Unit	66
Interactive Pedestrian Vest.....	66
Distance Beeper	66
Sensor Truck Unit	67
Truck Unit Small	67
Static Unit	68
Zone Marker	68

1

Introduction

Linde Operator Assistance System

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Linde Operator Assistance System

The Linde Operator Assistance System (LOAS) is a system for the working environment of industrial trucks. It gives signals to the driver and pedestrians in case of proximity.



It is explicitly not a safety system!

As the LOAS does not exempt the driver and all people within the workplace from their responsibility and duty of care, drivers and all other people have to ensure that they are behaving in a safe manner in all situations.

Functional description

The Linde Operator Assistance System is a wireless radio-based assistance system for giving signals to people and objects in defined detection areas in industrial environments.

The system wirelessly measures the distance between the component mounted on the industrial truck, components at fixed positions in the working area and the mobile components that individuals carry on their person.

In this way, the assistance system can effectively use LED displays, sounds and vibration alarms to inform people of the presence of industrial trucks.

For an early and effective signal, the Truck Unit has configurable signaling zones. The shape of the zones are designed to respect the typical movement of an industrial truck.

The size of the areas can be configured and have to be adapted to the work environment before initial commissioning.

The extended area can be configured in such a way that it covers a cone shaped area to the front and rear (refer to Figure 1). Within this area, the direction towards people equipped with a Distance Beeper is displayed.

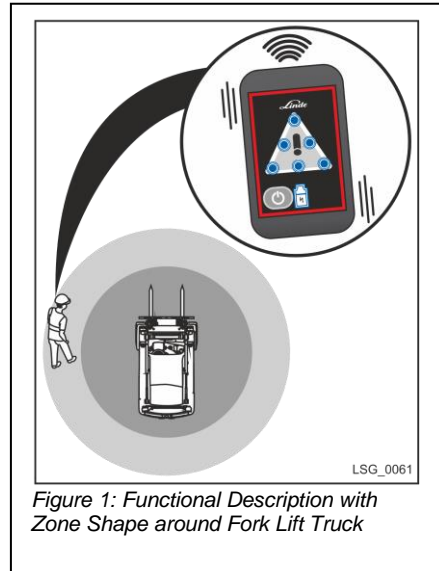


Figure 1: Functional Description with Zone Shape around Fork Lift Truck

Components

As standard, LOAS contains the following components. The description is structured in truck, fixed and mobile components:

Truck components



TRUCK UNIT

The Truck Unit is the display unit for the truck driver. Sensors are connected via cables to detect fixed and mobile components via local radio network



SENSORS

Sensors that are connected to the Truck Unit. Typically, four sensors are used per truck.

5th SENSOR

Additional sensor for signaling that another industrial truck with Truck Unit is in proximity



TRUCK UNIT SMALL

Truck Unit Small to interact with fixed components and between trucks. Detection of mobile components is not possible.

Fixed Components



STATIC UNIT

For signals at points that are difficult to overview



ZONE MARKER

For setting up zones in which Truck Units give optical signals and optionally can give a signal to the truck interface, so that for example the truck reduces the speed

Mobile Components



DISTANCE BEEPER

Gives signal if it is inside the detection zone of Truck Units or optionally Static Units or Zone Markers



Inductive Charging

Inductive charging station for the Distance Beeper

User groups

During the installation, setup and usage, different user groups are needed to ensure the correct usage of the system and the correct behavior of the people. The following definition of the user groups will be used throughout this manual



USER

The user of the system is either the driver of the industrial vehicle or the pedestrian wearing the signaling device



SUPER USER

The Super User is trained by the LOAS Expert or EHS Officer and is thereby able to instruct other users of LOAS



LOAS EXPERT (TECHNICIAN)

The Expert is able to install, configure and maintain the system. The person is trained and certified by KION NA.



EHS OFFICER

The Environment, Health and Safety Officer is with the company of the users and is doing the risk assessment during the usage of LOAS

Risk Assessment



Risk assessment has to be performed by your Environmental Health and Safety officer. In case you do not have an EHS manager, please get in contact with KION NA or your local dealer for further assistance.

Although the Linde Operator Assistance System is an assistance system and the users are still in full responsibility, to assess any potential impact on the company, people, trucks and infrastructure, it is in the company's responsibility to do a risk assessment to utilize the Linde Operator Assistance System.

1 Introduction



Installation report

The installation report is an agreement between the operating company and the service partner (e.g. KION NORTH AMERICA or qualified resellers).

The report contains all framework conditions plus details of the configuration of the system and any adaptations made to the work environment.

The installation report is distributed as a form along with the technical documents. Once commissioning is complete, the Linde Operator Assistance System is fully documented.

User report and training

To support users to be aware of the system as an assistance system it is mandatory to:

1. Initially train the users about functionality of the system
2. Training of at least one super user is mandatory. This can be the EHS or logistics manager. This super user has to be able to train users.
3. Training has to be repeated on an annual basis and a test has to be passed by each user (truck driver and pedestrians at the workplace)

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Intended use

The components of the Linde Operator Assistance System has to be used only for their intended purpose. The safety information has to be observed.

use results in adjustments to suit local conditions, re-registration and approval may be necessary.

Restricted approval for use



Linde Operator Assistance System is approved for use in the United States of America, Canada and Mexico. Use in other countries is not authorized by Linde Material Handling nor KION NORTH AMERICA.

Usage

The components of the Linde Operator Assistance System are used in the working environment of industrial trucks.

The system wirelessly measures the distance between the component mounted on the industrial truck, components at fixed positions in the working area and the mobile components that individuals carry on their person.



It is prohibited to use the assistance system as a guide when visibility is poor.

General

The Linde Operator Assistance System is a wireless assistance system for informing pedestrians and forklift truck drivers in defined areas in industrial environments.

The truck and mobile components of LOAS can generally be used inside and outside.



The use of devices mounted on outdoor structures, e.g. Static Units mounted on the outside of a building or any fixed outdoor infrastructure is prohibited

If radio frequency interference at the place of

Installation

The installation of LOAS has to be fulfilled by a qualified and authorized service technician. After the installation, the system has to be configured and tested for functionality. This test has to be documented and signed by the technician and the EHS Manager of your company.



It is prohibited to install LOAS with a non-authorized service technician.

The components on the industrial truck are

permanently connected to the on-board electronics. Only authorized service technicians with electrical knowledge and the relevant experience are permitted to install components at fixed points in the working area and to carry out servicing work and repairs. Usually, the persons that install the fixed components are not KION NA service technicians, but electricians.

Environment

The assistance system has to be tested by the service technician at the place of use. Incorrect installation or other wireless networks can cause malfunctions.

NOTICE

Only the approved service partner is permitted to make adjustments to suit local conditions in the event of radio frequency interference. In this situation, it may be necessary to register and obtain approval again.

Wireless Spectrum Site Survey

WARNING

Carry out a functional test in the target environment covering all aspects of the installation. It is the responsibility of the applying company to analyze the radio spectrum in regular time intervals and especially if new wireless systems are activated.

The survey must show that the frequency band at which the LOAS system will operate is free from external interferences.

Radio interference in the same spectrum may result in a malfunction of LOAS.

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Limitations for commissioning or for the permission to operate

This user guide belongs to the Linde Operator Assistance System. It contains important notes for the initial operation and correct operation/use of the system. Review and follow all instructions prior to operation and keep this guide for future reference.

- and receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult KION NORTH AMERICA or your qualified reseller for further assistance

FCC and ISED regulatory specification

This equipment has been tested and found to comply with the limits of a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.



However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment

Important Note

Changes or modifications made to this equipment not expressly approved by KION NORTH AMERICA or its authorized reseller respectively WILL void the FCC authorization to operate this equipment.



Operation onboard or in the proximity of an aircraft, ship or satellite is prohibited as well as the use within a nominated distance of a specified radio-astronomy site.



Furthermore, the use of devices mounted on outdoor structures, e.g. Static Units mounted on the outside of a building or any fixed outdoor infrastructure is prohibited.

Only handheld devices may be used in mobile scenarios in mixed in-/ outdoor mode. For example, Truck Unit together with external sensor nodes, Distance Beepers, Truck Unit Small etc.

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Symbols used

The terms **DANGER**, **WARNING**, **CAUTION**, **NOTICE** and **ENVIRONMENT NOTICE** are used in these operating instructions for notes on particular hazards or for unusual information that needs to be highlighted:



Means that failure to comply can cause risk to life and/or major damage to property



Means that failure to comply can cause risk of serious injury and/or major damage to property.



Means that failure to comply can cause risk of material damage or destruction.



Means that particular attention is drawn to combinations of technical factors which may not be evident even to a specialist.



The instructions listed here must be complied with as otherwise environmental damage may result.



This label is found on the truck in the areas where particular care and attention are required.

You should refer to the appropriate section in these operating instructions.

For your safety, additional symbols are also used. Please heed the various symbols.

2

Safety

Safety information

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Safety information

The operating company has to ensure that all people in the area of application of the Linde Operator Assistance System (LOAS) are informed of its use.



It is explicitly not a safety system!

The components of the assistance system must be properly installed and parameterized to ensure that LOAS works without errors and that the signaling zones are indicated correctly.

Additional acoustic signaling systems and the background noise in the area of operation have to be taken into account when setting the volume level of LOAS to ensure a good user experience. However, the driver should always observe visually beside the acoustic signals, too.



The unrestricted function of the assistance system is not guaranteed in every operating status imaginable. Interference can have a negative effect on the system and lead to malfunctions. Even if there is a malfunction, the driver of the industrial truck has to resolve the situation safely by himself.



The assistance system functions perfectly up to a speed of 8mph. As the speed of industrial trucks that are connected to the system increases, the reaction times of the system and the driver will mean that a greater distance is required to decelerate and stop.

NOTICE

Parameterizing an industrial truck with a speed reduction to 0 mph is prohibited. As a comfort function it must only reduce the speed of the truck to a predefined speedlevel, but never 0 mph!

NOTICE

Heavy mechanical stress can lead to malfunctions. In the event of a malfunction signified by smoke or an odor, switch off the industrial truck.

NOTICE

The following cases can affect operation:

- ***Damage to components of the assistance system***
- ***Extended storage in adverse conditions***
- ***Challenging application conditions***

Contact your service partner in case of observed malfunctions.

Risk assessment

Although the Linde Operator Assistance System is an assistance system and the users are still in full responsibility, to assess any potential impact on the company, people, trucks and infrastructure, it is in the companies responsibility to do a risk-assessment to utilize the Linde Operation Assistance System.

It is therefore necessary to adapt the risk assessment in line with national health and safety directives when installing the system. Drivers of industrial trucks with LOAS and persons with mobile components have to be instructed on the functionality of LOAS.

The drivers have to familiarize themselves with the operation of an industrial truck in combination with LOAS.



It is in the responsibility of the EHS manager to analyze if there are circumstances that may harm people during the usage of the system e.g.:

- Blink LEDs might cause epileptic seizure
- Heart pump medicine devices needs to be evaluated in terms or EMC emissions

Furthermore it needs to be analyzed that every user is capable to receive and analyze the signals coming from the devices:

- Problems could be caused Red/Green weakness

Risk assessment of driving speed reduction

In case of entering an signaling zone, the driving speed reduction for the truck can be activated by the service technician. This drive speed reduction serves as a comfort feature for the driver.



The impact of the reduction in the driving speed on the use of the industrial truck must be analyzed, evaluated and documented in order to arrange additional health and safety measures if necessary. The driver and any people in the area of operation must not be endangered.

NOTICE

Please note that a speed reduction down to full stop or 0 mph is prohibited. As a comfort function it must only reduce the speed of the truck to a predefined speedlevel, but never 0 mph!

Safety during installation

Installation of LOAS on the industrial truck is permitted only when the industrial truck is not moving.



For safety reasons, conversions of or changes to LOAS are not permitted. Only authorized service technicians may install, open and connect the components.



Connections that change the behavior of a third party system, for example a speed reduction of a truck or connections to a door-/gate-control-unit or other third party devices must be done by certified technicians from the third parties.



The stationary components may be installed, opened, and connected only when the system is not connected to the power supply.



Install all devices with the proper covers.



Make sure that seals and screws are properly seated.

NOTICE

Only qualified electricians are permitted to install, open and modify Static Units. This means that authorized service technicians are usually not allowed to perform electrical installations on 110 VAC power supplies. This kind of installations have to be done by qualified licensed electricians.

The equipment have to be checked after these actions.

Check the local mains voltage before commissioning. The permissible system voltage range have to be in line with the local mains voltage.

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Service personnel

Any work to exchange, align and set components of LOAS and to make adaptations to the industrial truck must be performed by trained and authorized service personnel.

The authorized service technician must have

specialist knowledge in the field of industrial trucks. In addition, they must have specific system knowledge of the Linde Operator Assistance System, and the relevant training.

For installing infrastructure nodes, e.g. Static Unit

which use a main power supply, the permission by law and profound knowledge in terms of electrical installations is required.

Hence, these tasks must be performed by qualified licensed electricians. Usually, fork lift truck service technicians do not have this required knowledge and are, hence, not allowed to do installations of fixed components or only if they are qualified to do so.

Contact your authorized service partner.

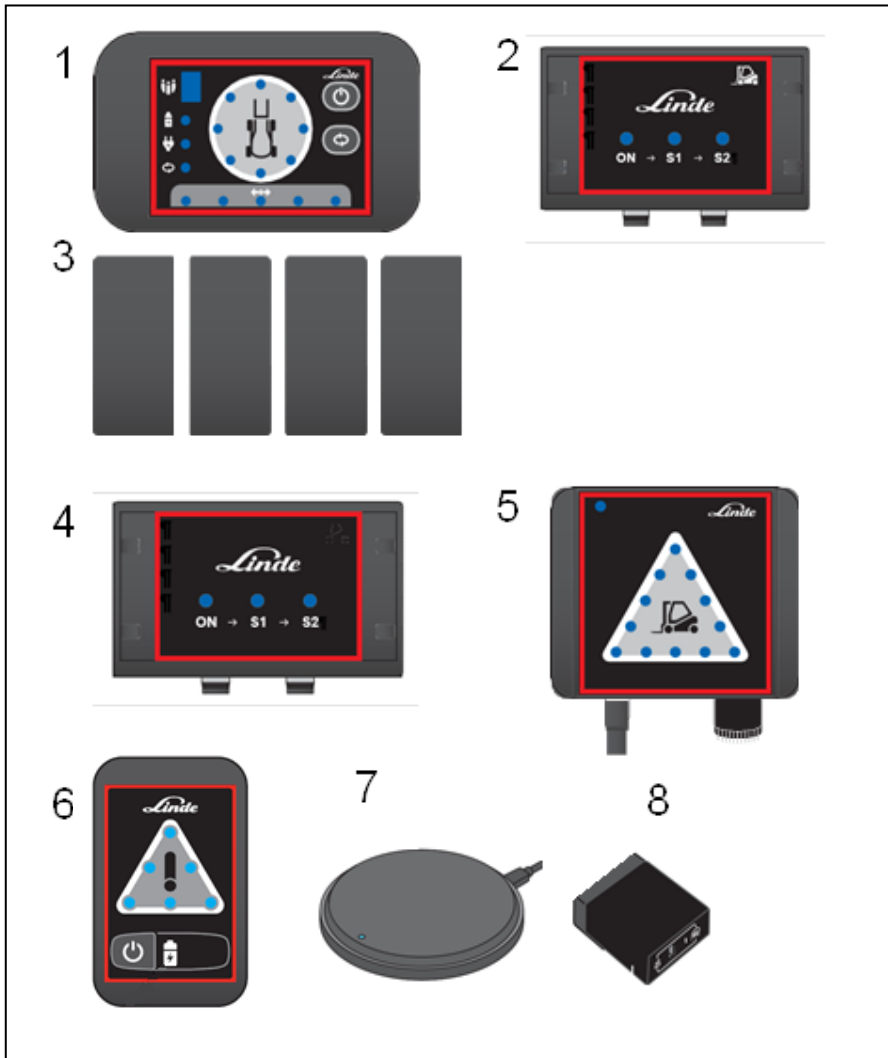
3

Operating devices and display elements

Overview

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Overview

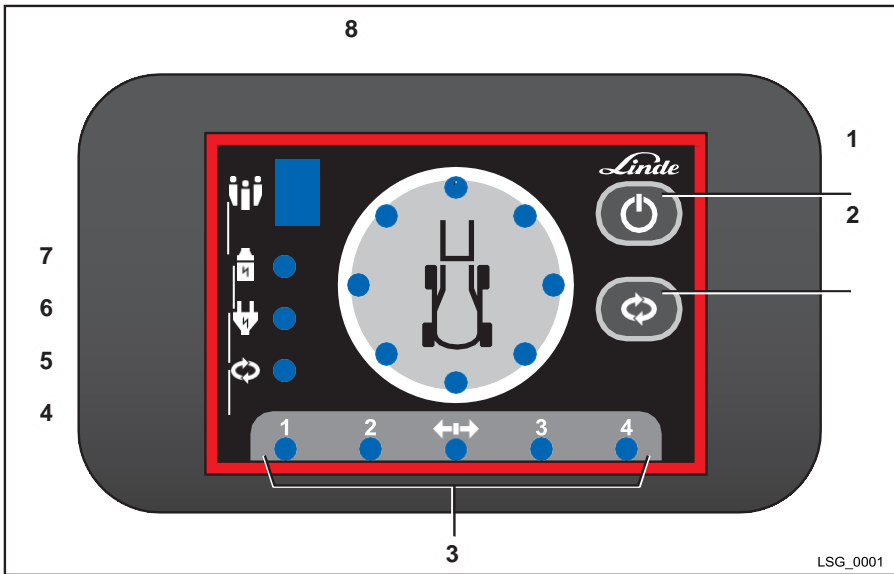


1. Truck Unit
2. Truck Unit Small
3. Sensor Truck Unit (1-5 possible)
4. Zone Marker
5. Static Unit
6. Distance Beeper
7. Inductive Charger
8. Power Plug for Inductive Charger

Truck Unit

id: GUID-92CCF45B-8A01-42A0-BE6F-592EFA4639F3 - version: 3 - lang: EN - srclang:

Truck Unit



1	No function	5	Power supply
2	No function	6	No function
3	Sensors, switching output (middle)	7	Number of persons in the signaling zone
4	Pairing active	8	Signaling zones

The Truck Unit provides the driver of the industrial truck with an acoustic and visual signaling whenever a certain area or pedestrians are approached. These areas and/or pedestrians also must be equipped with the Linde Operator Assistance Systems (LOAS). LEDs indicate the number, direction, and distance to these areas / pedestrians. The same can also be realized when the driver is entering areas in which he should reduce the speed. The driver also receives information about the status of the sensors, the switching output and whether signaling Distance Beepers are paired with the Truck Unit. The Truck Unit responds to the following components:

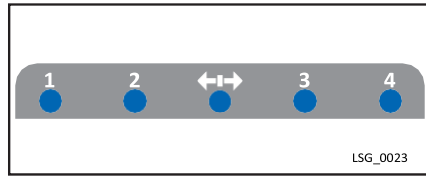
- Distance Beeper
- Static Unit
- Truck Unit
- Zone Marker
- Truck Unit Small
- Truck Unit

3 Operating devices and display elements

The LEDs 1 to 4 indicate the status of the sensors.

The following operating statuses are possible:

- **LED green:**
The Truck Unit is switching on. The sensors perform self-testing for 10 seconds.
- **LED off:**
The Truck Unit is switched on. The sensors are ready for operation.
- **LED red:**
The Truck Unit is switched on but the respective sensor is not ready for operation. Stop operation. Check the sensor.



The middle LED displays the status of the switching output.

The following operating states are possible:

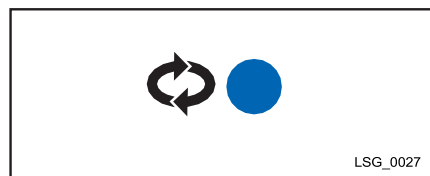
- **LED green:**
Switching on or changing the switching output from active to inactive.
- **LED off:**
Switching output inactive.
- **LED red:**
The switching output is active, e.g. indicating that the speed reduction as comfort function should be active.

Pairing active

The LED indicates whether a Distance Beeper is paired with the Truck Unit. No signaling message is triggered for a paired Distance Beeper.

The following operating statuses are possible:

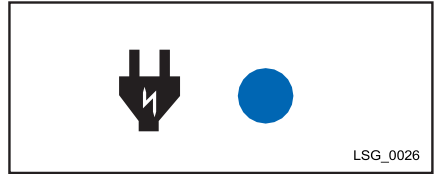
- **LED off:**
No Distance Beeper is paired.
- **LED green:**
Distance Beeper is paired and within range of the Truck Unit.
- **LED red:**
Distance Beeper is paired but not within range of the Truck Unit.



Power supply

The LED indicates the operating status of the Truck Unit:

- LED flashes green:
Truck Unit is ready for operation.
- LED flashes red:
The Truck Unit has registered an error. The Truck Unit is in programming mode.
- LED lights up red:
The Truck Unit has registered an error. The Truck Unit is in programming mode.



Number of persons in the signaling zone

The display indicates the number of people in the signaling zone. The display ranges from 0 - 9 people. If the display flashes, there are more than nine (9) people in the signaling zone.

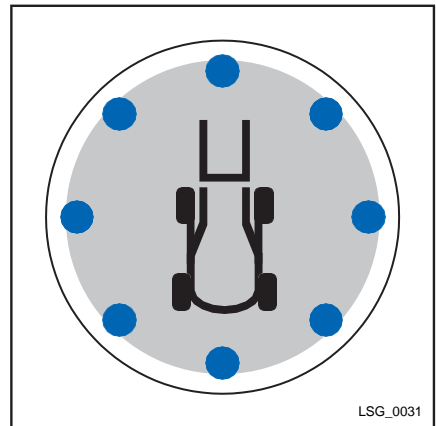


Signaling zones

The LEDs for the signaling zones indicate whether there are pedestrians in one of the signaling zones. If there are pedestrians with distance beeper in the signaling zone, the LEDs flash in a constant rhythm.

The following operating states are possible:

- Three LEDs flash red:
A person is in the extended area. The LEDs indicate the direction from which the person is approaching.
- Three LEDs flash orange:
An industrial truck with a truck-to-truck sensor or a communication unit is located in the extended area. The LEDs indicate the direction from which the industrial truck is approaching.
- Multiple LEDs flash red:
There are several people in the extended area. The LEDs indicate the direction from which the people are approaching.



NOTICE

This function must be switched on in the configurator.

3 Operating devices and display elements



- Multiple LEDs flash orange:
There are several industrial trucks in the extended area. The LEDs indicate the direction from which the industrial trucks are approaching.

NOTICE

This function must be switched on in the configurator.

- All LEDs flash red:
There are several people in the extended area. The direction is not displayed.
There are one or more people in the vicinity.
- All LEDs flash orange:
There are several industrial trucks in the extended area. The direction is not displayed.
There are one or more industrial trucks in the vicinity.
- Four LEDs on in orange:
No driver is sitting on the driver's seat. Truck Unit is inactive until the lights switch off.

NOTICE

If a dual signal is received regarding an industrial truck and a person at the same time, a mixed display is shown. The signaling regarding a person takes priority on the display. If people and industrial trucks are approaching from the same direction, the LEDs only flash red; the number of LEDs is displayed correctly.

Optional Speed reduction as comfort function via potential-free outputs

The Truck Unit is intended to inform the driver through giving optical and/or acoustic signals or optionally an automatic reduction in the driving speed as a comfort function in defined Zone Marker- or Static Unit areas, when approaching pedestrians equipped with Distance BEEPERS and through truck-to-truck signals.

A) KION NA trucks

The installing of the optional speed reduction as comfort function must be performed by a certified and approved service-technician on approved KION NA trucks. KION NA maintains and provides a specific list including all approved vehicles for the optional speed reduction as comfort function. Furthermore, if this optional modification is performed, the applying company must do a risk assessment to utilize the Linde Operator Assistance system.

B) Third-party forklift trucks

In case if the potential free outputs of the truck unit small should be connected to any third-party truck, the manufacturer of the truck must have approved the truck inputs for this purpose. As in the previous case, the installation must be carried out by a certified and approved service technician. Furthermore, if this optional modification is performed, the applying company must do a risk assessment to utilize the Linde Operator Assistance system.

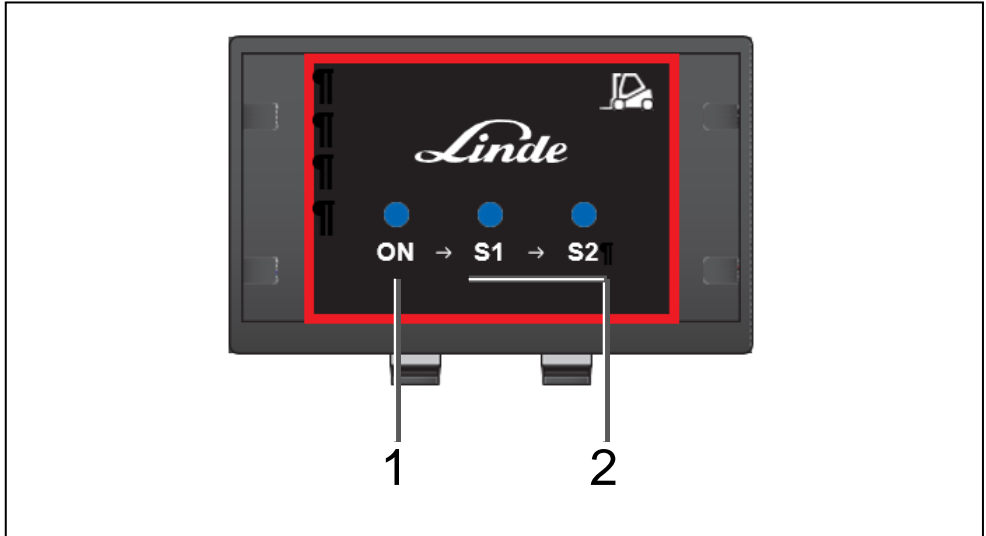
NOTICE

The installation of the speed reduction as comfort function option is part of the Linde service-technician training in the framework of the Linde Operator Assistance System and depends on the respective model. So also consider the information of the Linde Service Guide (LSG) for the model that you want to equip with the speed reduction as comfort function option.

Truck Unit Small

id: GUID-F332A2F4-C2B6-4E4E-BD06-DD895138D324 - version: 3 - lang: EN - srclang:

Truck Unit Small



- 1 Operating status
- 2 Signaling zones

The Truck Unit Small is intended to give optical signals or optionally an automatic reduction in the driving speed as a comfort function in defined Zone Marker or Static Unit areas and through truck-to-truck signals.

NOTICE

The Truck Unit Small does not provide signals about people approaching with a Distance Beeper.

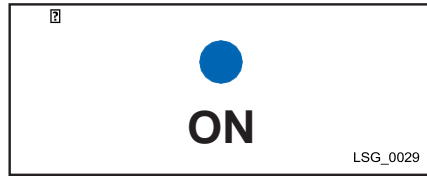
The Truck Unit Small responds and interacts with the following components:

- Static Unit
- Zone Marker
- Truck Unit Small or Truck Unit with truck-to-truck sensor

Truck Unit Small

The "ON" LED indicates the operating status of the Truck Unit Small:

- LED flashes green:
The Truck Unit Small is ready for operation.
- LED red / flashes red:
The Truck Unit Small is signaling an error.



The "S1" and "S2" LEDs indicate that the truck is in a static signaling zone.

- LEDs flash orange:
Radio module or Static Unit in the extended area of the industrial truck.
Truck-to-truck signaling in the extended area.
- LEDs flash red:
Radio module or Static Unit in the vicinity of the industrial truck.
Truck-to-truck signaling at close range
- LEDs off:
No signaling zone detected



Optional Speed reduction as comfort function via potential-free outputs

The Truck Unit is intended to inform the driver through giving optical and/or acoustic signals or optionally an automatic reduction in the driving speed as a comfort function in defined Zone Marker- or Static Unit areas, when approaching pedestrians equipped with Distance Bepers and through truck-to-truck signals.

C) KION NA trucks

The installing of the optional speed reduction as comfort function must be performed by a certified and approved service-technician on approved KION NA trucks. KION NA maintains and provides a specific list including all approved vehicles for the optional speed reduction as comfort function. Furthermore, if this optional modification is performed, the applying company must do a risk assessment to utilize the Linde Operator Assistance system.

D) Third-party forklift trucks

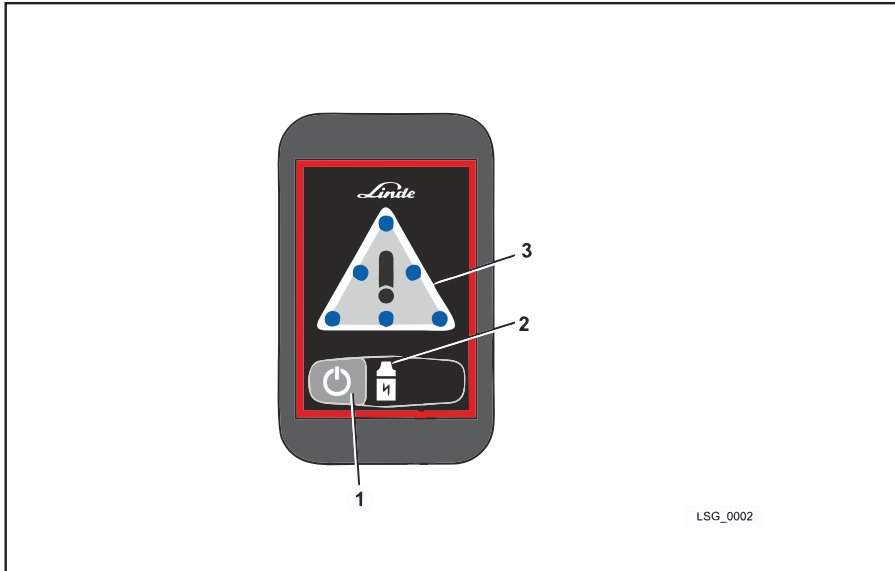
In case if the potential free outputs of the truck unit small should be connected to any third-party truck, the manufacturer of the truck must have approved the truck inputs for this purpose. As in the previous case, the installation must be carried out by a certified and approved service technician. Furthermore, if this optional modification is performed, the applying company must do a risk assessment to utilize the Linde Operator Assistance system.

NOTICE

The installation of the speed reduction as comfort function option is part of the Linde service-technician training in the framework of the Linde Proximity Assistance System and depends on the respective model. So also consider the information of the Linde Service Guide (LSG) for the model that you want to equip with the speed reduction as comfort function option.

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Distance Beeper



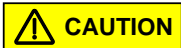
LSG_0002

- | | | | |
|---|-----------|---|-----------------------------------|
| 1 | Switch on | 2 | Rechargeable battery charge state |
| | | 3 | Signaling zone |

The Distance Beeper provides the pedestrian with an audible, visual and vibration signal.

The Distance Beeper responds to the following components:

- Truck Unit
- Optionally Static Unit
- Optionally Zone Marker

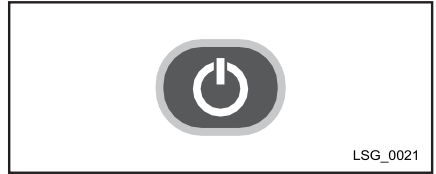


A Lithium-ion battery can be destroyed as a result of deep discharge. Do not store the Distance Beeper for more than one year. Charge the Distance Beeper after one year to prevent damage or explosion.

Switching on

You can use the "switch on / switch off" push button to switch the Distance Beeper on and off. To switch on the unit, push and hold the push button until the Distance Beeper starts up. The unit vibrates as it is switched on. A feedback tone sounds.

To switch off the unit, push and hold the push button until the Distance Beeper shuts down.



Rechargeable battery charge state

The LED indicates the operating status and the charge state of the Distance Beeper.

The following operating statuses are possible:

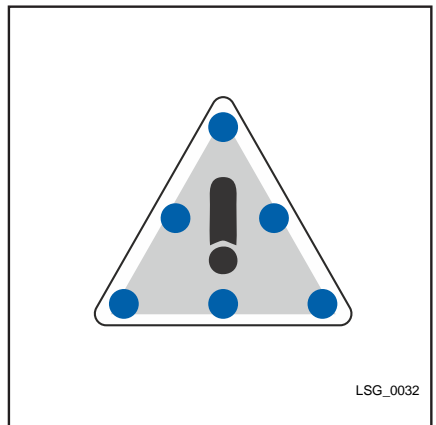
- LED off:
The Distance Beeper is switched off
- LED flashes green:
The Distance Beeper is switched on. The charge state is more than 20% of the total capacity.
- LED flashes red:
The Distance Beeper is switched on. The charge state is less than 20% of the total capacity. A periodic signal sound is also emitted.



Signaling zone

The LEDs of the signaling zone indicate whether the person is located in the signaling zone of an industrial truck. The LEDs flash. In addition, the Distance Beeper vibrates and emits an acoustic signal. The frequency and duration of the signal is dependent on the configuration of the Truck Unit.

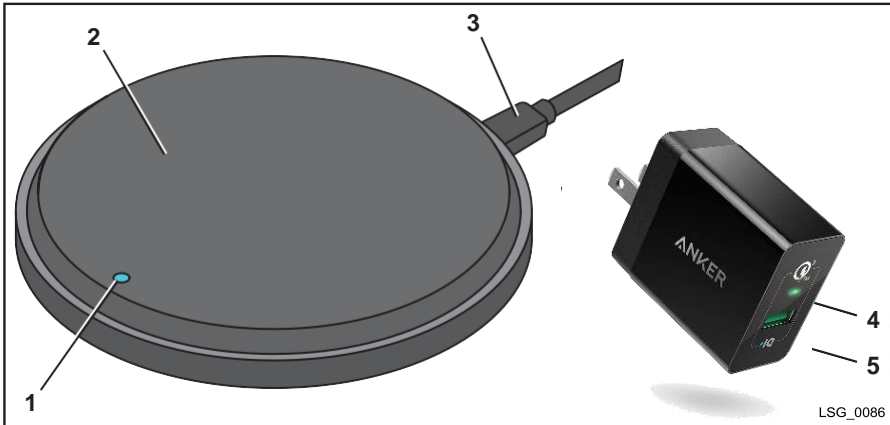
If a Static Unit is configured as a "relay station", the Distance Beeper provides a signal when entering this zone ahead of industrial trucks in the zone.



Charging station

id: GUID-35F3779D-D9E1-4429-BCDA-42777B891ED5 - version: 1 - lang: EN - srclang:

Charging station



- 1 Charge indicator
- 2 Charging area
- 3 Mini USB cable

- 4 Status display of the power supply unit
- 5 USB port

The inductive charging station charges the Distance Beepers. To charge a Distance Beeper, place it on the charging area (2). The charging station is connected to the power supply unit using a mini USB cable (3) via the corresponding port (5).

The following component can be charged:

- Distance Beeper

Charge indicator

- The LED lights up for 3 seconds:
The charging unit is connected to a

power supply.

- The LED lights up blue:
Active charging process for a Distance Beeper
- The LED flashes up blue
Abnormal objects detected.
- The LED flashes green:
The charging station indicates an overvoltage protection.

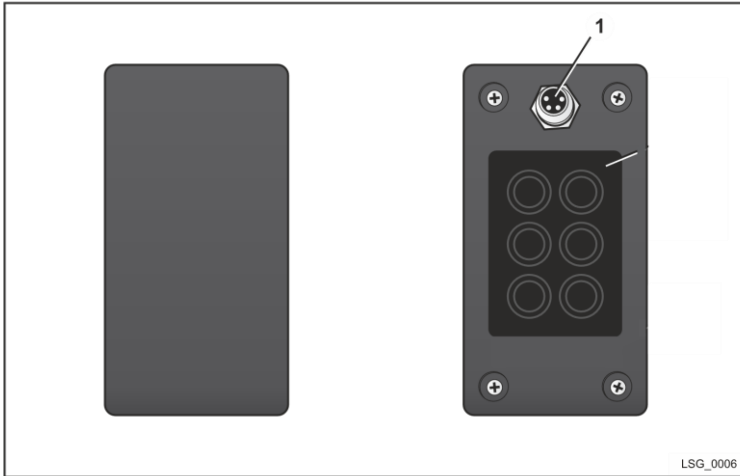
Status display of the power supply unit

- LED lights up green:
The power supply unit is connected to the power supply and is ready for operation

id: GUID-40A3FE29-2307-4F85-8687-ECA924C327B8 -
version: 3 - lang: EN

- srclang:

Sensor Truck Unit



- 1 Connection
- 2 Mounting magnet

The Sensors are mounted on the industrial truck and connected to the Truck Unit. The Sensors create the signaling zones around the industrial truck. The sensor does not fit to the Truck Unit Small. The installation shall be accomplished by a trained technician. It is important to install the antennas free of obstructions.

Connection

To connect the Sensor to the Truck Unit

Mounting magnet

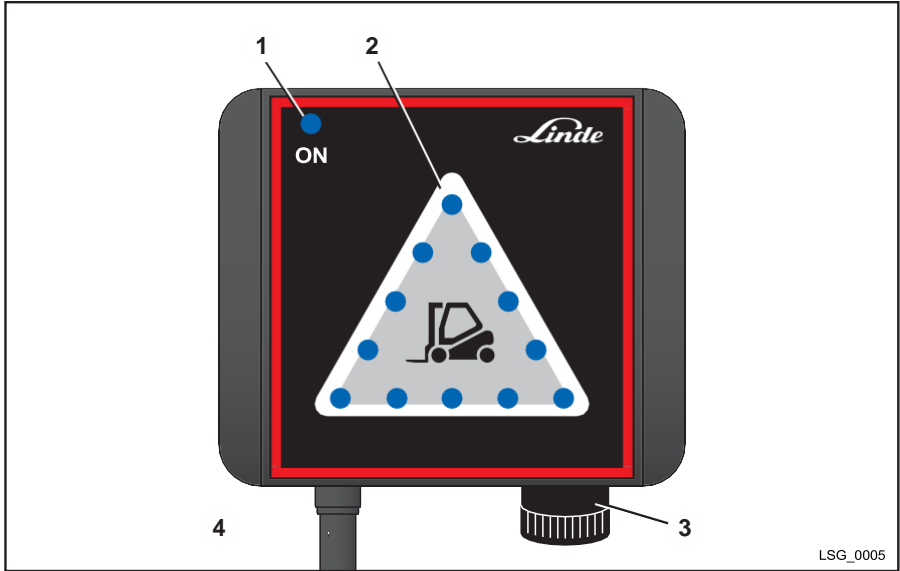
Mount the Sensors magnetically to the industrial truck

MAC address

The position of the Sensors is stored on the Truck Unit via the MAC address.

id: GUID-4CA209AB-3E83-4E62-B27B-1EAAF750012D - version: 3 - lang: EN - srclang:

Static Unit



1 Operating status
2 Signaling zone

3 Acoustic signal transmitter
4 Power supply

The Static Unit is an infrastructure unit. The Static Unit provides acoustic and visual signals regarding pedestrians and industrial trucks.

The Static Unit is used at blind spots or in the event of poor radio communication.

The Static Unit offers the following additional functions:

- Speed reduction as comfort function on the industrial truck
- Lift height detection
- Outputs for activating external signaling devices

The Static Unit responds to the following components:

- Truck Unit
- Truck Unit Small
- Distance Beeper

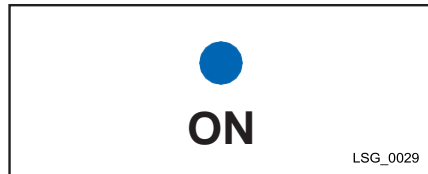
Static Unit

Operating status

The LED indicates the operating status of the Static Unit.

The following operating statuses are possible:

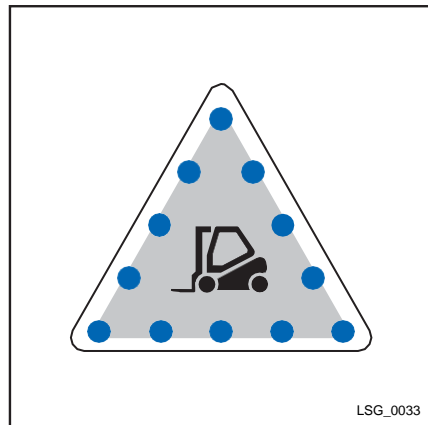
- LED off:
The Static Unit is not connected to the power supply.
- LED flashes green:
The Static Unit is ready for operation.
- LED flashes red:
The Static Unit is signaling an error.



Signaling zone

The LEDs flash red if industrial trucks with a Truck Unit or a communication unit enter the signaling zone of the Static Unit.

The LEDs flash red if people using a Distance Beeper enter the signaling zone of the Static Unit.



Acoustic signal transmitter

Depending on the configuration, the acoustic signal transmitter sounds a signal tone as soon as an industrial truck with a Truck Unit or a communication unit enters the signaling zone.

Depending on the configuration, the acoustic signal transmitter sounds a signal tone as soon as a person using a Distance Beeper enters the signaling zone.

Power supply



The Static Unit is supplied with 90-264 VAC.

Electrical Outputs via potential-free outputs

The Static Unit outputs must only be used by KION NA certified people.

The outputs are intended for activating or deactivating lights for additional signaling.

3 Operating devices and display elements

KION NA provides light-products or third party low-voltage optical signaling-products like LEDs or Flashlights that work with less than 240V are allowed to use.

The outputs may only be used to activate or deactivate a relay to which the light-product is connected to.

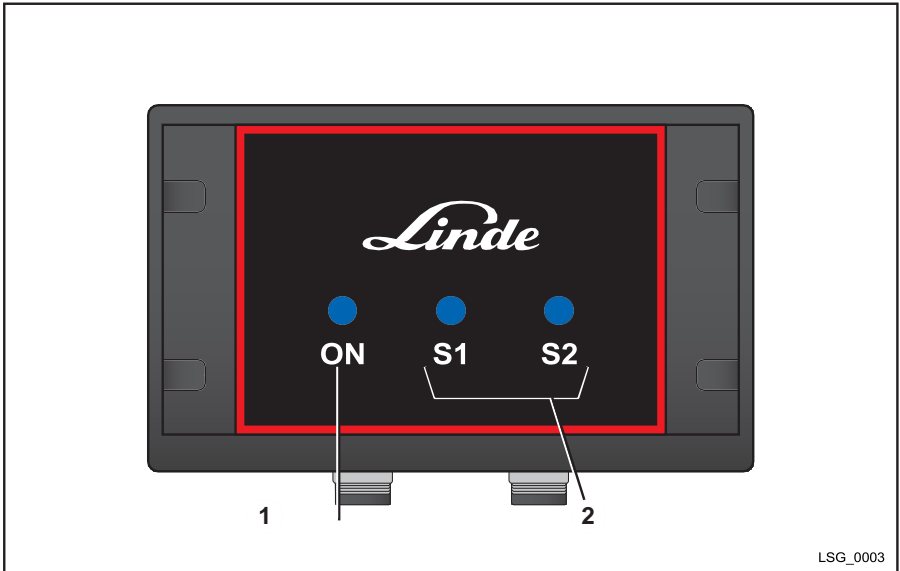
The installation and wiring must only be executed by certified personal, that are trained and certified to work with electrical current. The safety-standard while working with electrical voltage must be complied with.

NOTICE

The usage of the outputs is part of the KION NA service-technician training in the framework of the Linde Operator Assistance System and depends on the respective model.

id: GUID-7492D5D6-AF93-4FBF-9957-F1B9E3F35838 - version: 3 - lang: EN - srclang:

Zone Marker



1 Operating status

2 Signaling zones

LSG_0003

The Zone Marker creates a stationary signaling zone and triggers further actions on industrial trucks present in this signaling zone. If an industrial truck with a Truck Unit or a Truck Unit Small enters the signaling zone, the Zone Marker on the industrial truck activates, for example, a speed reduction as comfort function in the corresponding zone around the Zone Marker.

If several Zone Markers are used, it is possible to create larger zones to cover an entire hall area.

The Zone Marker responds and interacts with the following components:

- Truck Unit
- Truck Unit Small

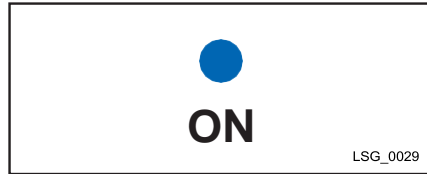
Operating status



The LED indicates the operating status of the Zone Marker.

The following operating statuses are possible:

- LED off:
The Zone Marker is not connected to the power supply.
- LED flashes green:
The Zone Marker is ready for operation.
- LED lights up green or red or flashes red:
The Zone Marker is signalling an error.



Signaling zones



The LEDs flash if industrial trucks with a Truck Unit or a Truck Unit Small are present in the signaling zone of the ZoneMarker.

The following operating statuses are possible:

- LEDs flash orange:
Industrial truck in the extended area of the Zone Marker.
- LEDs flash red:
Industrial truck in the vicinity of the Zone Marker.



Electrical Outputs via potential-free outputs

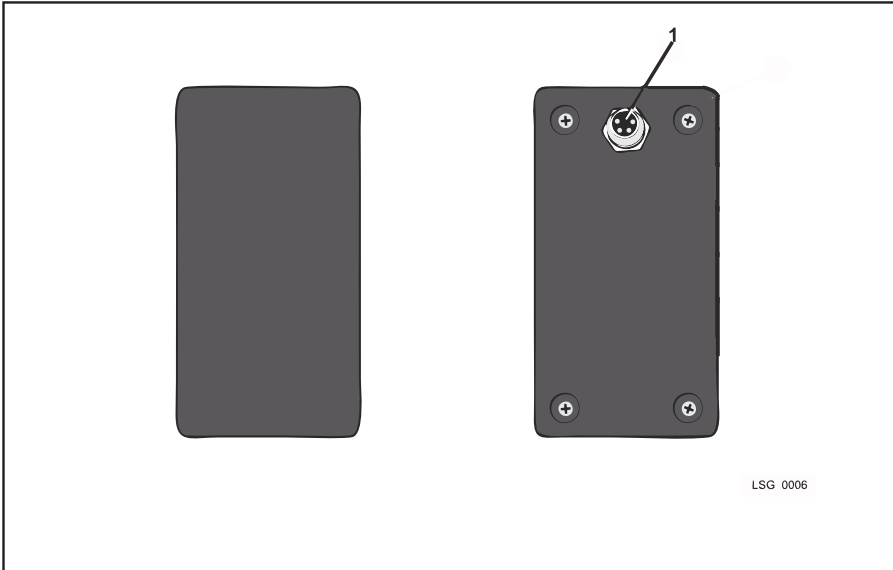
The Zone marker outputs must only be used by KION NA certified people. The outputs are intended for activating or deactivating KION light-products or third party low-voltage optical signaling-products like LEDs or Flashlights that work with less than 240V. The outputs may only be used to activate or deactivate a relay to which the light-product is connected to. The installation and wiring must only be executed by certified personal, that are trained and certified to work with electrical current. The safety-standard while working with electrical voltage must be complied with.

NOTICE

The usage of the outputs is part of the KION NA service-technician training in the framework of the Linde Operator Assistance System and depends on the respective model.

id: GUID-40A3FE29-2307-4F85-8687-ECA924C327B8 - version: 3 - lang: EN - srclang:

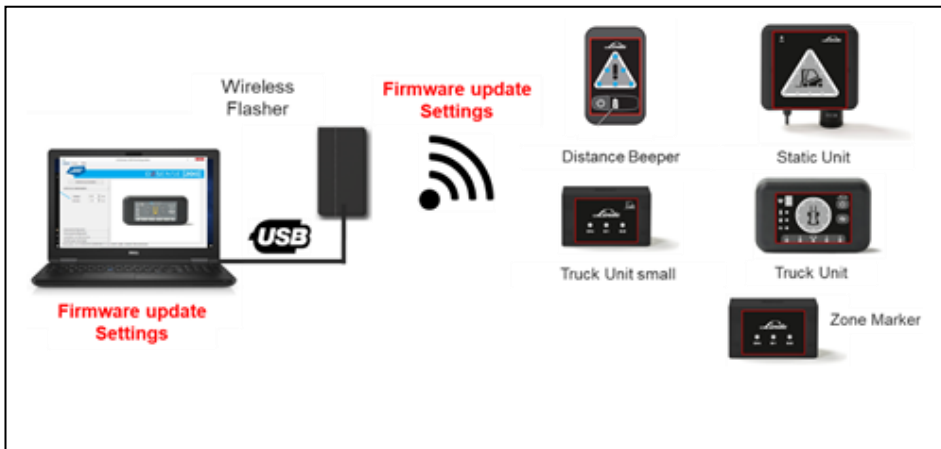
Programmer



1. 4-pole Connection for specific USB cable

The programmer is not intended to be used by customers. It is intended to be used for either programming or configuring the Linde

Operator Assistance System devices as shown in the following Figure. The device is only used by trained service technicians.



4

Operation

Installation

id: id: GUID-65900DDA- D562-41FE-8215-640261E05F30 - version: 2 - lang: EN - srclang:

Attaching the Distance Beeper

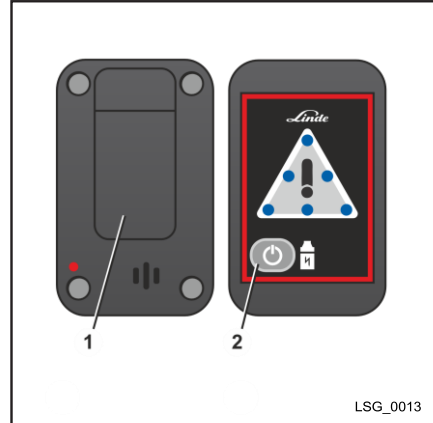
Switch on the Distance Beeper. To do this, push and hold the push button (2) for one second.

The Distance Beeper starts. A signal tone is heard, the LEDs of the signaling zones light up and the device vibrates briefly.

Check the charge state of the battery.

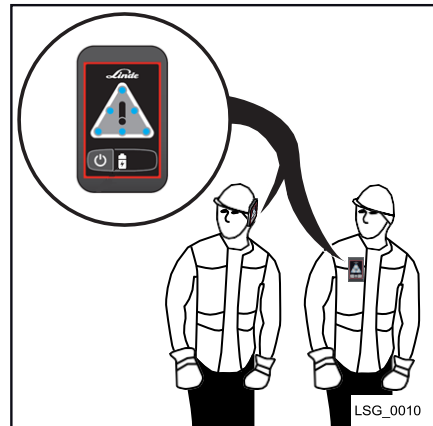
The LED must flash green. If the LED flashes red, the Distance Beeper needs charging.

Attach the Distance Beeper to the outside of your workwear using the clip (1).



Incorrect attachment can lead to incorrect radio communications! Refer to Section 4 Pre-Shift Checks for details and safeguarding.

1. ***Wear the Distance Beeper high on your body***
2. ***Wear the Distance Beeper such that it is unobstructed for all directions around the body***



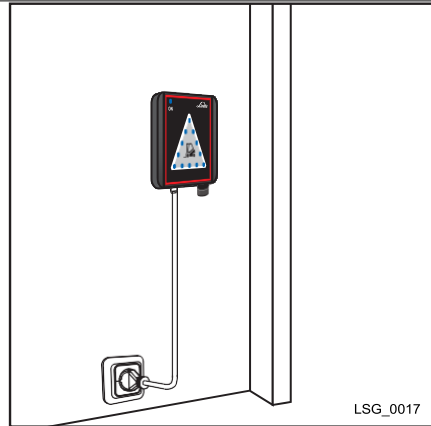
Installing a Static Unit

The Static Unit is mounted at points that are difficult to see and thus allows the early detection of approaching industrial trucks.

NOTICE

Position the Static Unit so that the LED display is easy to see.

Install the Static Unit between a height of 2m (78inch) but not higher than 7m (275inch) in order to guarantee optimal radio coverage.



Installation via magnet

The Static Unit can be mounted to metal surfaces using a magnet.

1. Mount a self-adhesive magnet with the sticky side on the rear of the housing.
2. Attach the Static Unit in the intended location.
3. Connect the Static Unit to the mains connection.

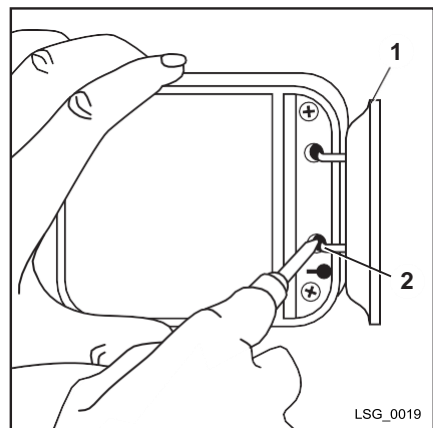
The Static Unit starts and the operating status LED flashes green.

Installation via screw joint

To expose the fixing points, open the housing panels(1) at the sides.

1. Ensure it is level
2. Mark the four fixing points on the ground.
3. Drill mounting holes and then insert dowels if these are required.
4. Mount the Static Unit with four screws and close the housing panels.
5. Connect the Static Unit to the Mains connection.

The Static Unit starts and the operating status LED flashes green.



id: GUID-5C5A263B-1DD4-4BA1-8FF0-8BA-CA3B3C65E - version: 2 - lang: EN - srclang:

Installing the Zone Marker

The Zone Marker creates a stationary signaling zone and triggers further actions on industrial trucks present in this signaling zone.

NOTICE

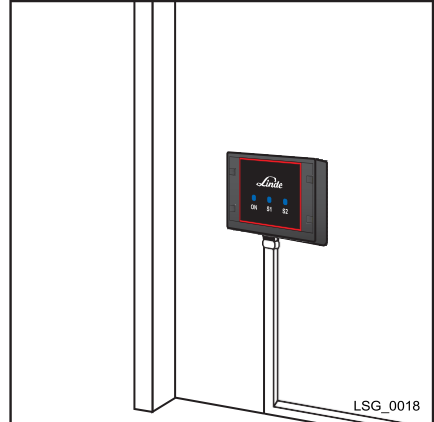
Install the Zone Marker between a height of 2m (78inch) but not higher than 7m (275inch) in order to guarantee optimal radio coverage.

Installation via magnet

The Zone Marker can be mounted to metallic surfaces using a magnet.

1. Mount a self-adhesive magnet with the sticky side on the rear of the housing.
2. Attach the Zone Marker in the intended location.
3. Connect the Zone Marker to a 12-24-V DC power supply via the connector plug.

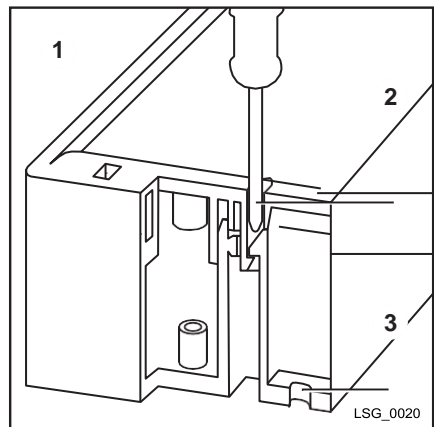
The Zone Marker starts and the operating status LED flashes green.



Installation via screw joint

1. Remove the holes cover (1).
2. Insert a release tool in the opening (2) and release the upper part of the housing at four points.
3. Remove the upper part of the housing.
4. Ensure it is level
5. Mark the four fixing points (3) on the ground.
6. Drill mounting holes and then insert dowels if these are required.
7. Secure the Zone Marker with four screws and attach the upper part of the housing. Make sure that the upper part of the housing engages fully.
8. Connect the Zone Marker to a 12-24-V DC power supply.

The Zone Marker starts and the operating status LED flashes green.



Pre-shift checks

id: GUID-1CBA5C39-F759-40BE-9748-432976AE25CE - version: 5 - lang: EN - srclang:

Service plan

Distance Beeper
Check the charge state of the battery
Check that the unit is attached to the outside of the clothing
Checking for correct function
Truck Unit
Check for operational readiness
Checking for correct function
Check the pairing with the driver's Distance Beeper
Truck Unit Small
Check for operational readiness
Sensors
Check the mounting and position
Check the connection to the Truck Unit
Check for operational readiness
Static Unit
Check the mounting and position
Housing panels closed?
Checking for correct function
Check that there is an unobstructed view of the Static Unit
Zone Marker
Check the mounting and position
Upper part of housing in place?
Checking for correct function
Check that there is an unobstructed view of the Zone Marker

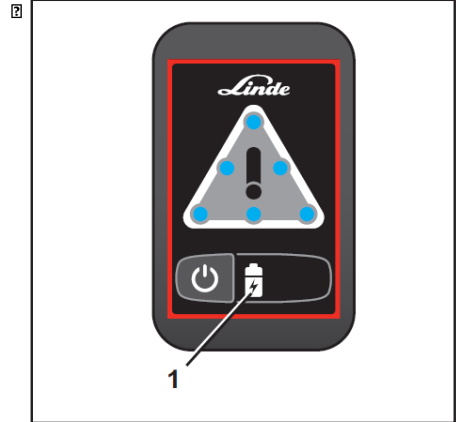
id: GUID-8ABB286F-CCBD-42D8-8CF3-BE59244C0231 - version: 3 - lang: EN - srclang:

Checking the charge state of the Distance Beeper



The Distance Beeper must be charged before use.

1. Switch on the Distance Beeper.
2. A short signal tone must be audible and the device must vibrate.
3. LED (1) continually flashes in green.
4. If the LED flashes red, charge the Distance Beeper.



Checking the function of the Distance Beeper



Before the start of work, the Distance Beeper must be checked to ensure that it functions correctly.

Switch on the Distance Beeper and attach the unit to your clothing.

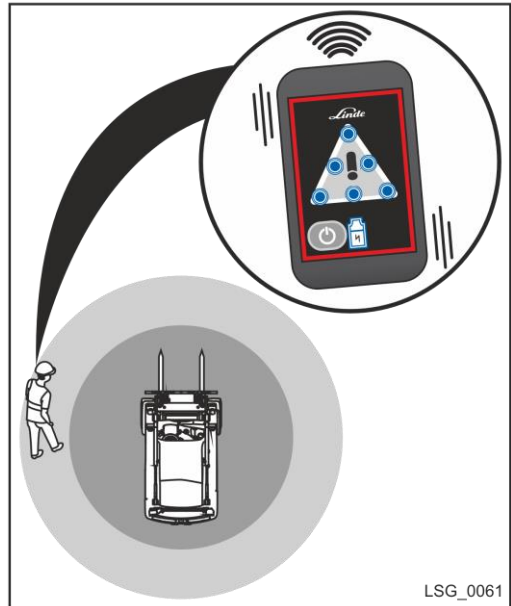
Switch on an industrial truck equipped with the Truck Unit. The Truck Unit switches on.

With the Distance Beeper attached to your clothing, step into the expanded signaling area of the industrial truck.

Circle the truck (Figure LSG_0061) while remaining within this signaling area.

The LEDs for the signaling zone flash on the Distance Beeper. A signal tone must sound and the device must vibrate.

The Distance Beeper is now ready to use.



Alternatively, the pre-shift checks can be performed in conjunction with a Static Unit. The Static Unit must be specially configured for this purpose. Contact your authorized service partner.

id: GUID-AD66DD7D-A851-488D-B8F9-AACB75F051BD - version: 3 - lang: EN - srclang:

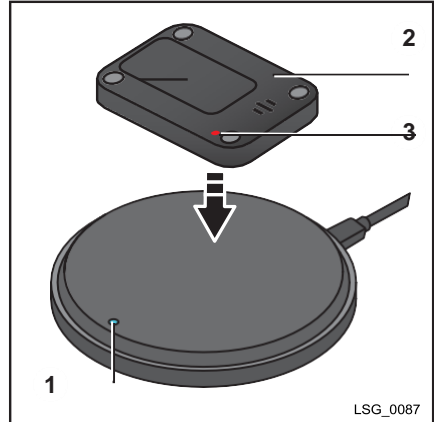
Charging the Distance Beeper



Risk of accident due to discharged battery! Charge the Distance Beeper after use



Prior to initial commissioning, the Distance Beeper must be fully charged once. If the Distance Beeper is removed from the charging station too early, the LED flashes red even when the charge capacity is over 90%.



How to charge the Distance Beeper:

- Connect the power supply unit to the power supply. The LED on the power supply unit lights up green.
- Connect the charging station to the power supply unit via the USB cable.

The status display lights up red. The charging station is ready for operation.

- Place the Distance Beeper (2) face down on the charging station.

The Distance Beeper emits a signal tone and the LED (3) on the back of the unit flashes red. The charging display (1) on the charging station lights up blue. The charging process starts.

When the charging process is complete, the LED (3) lights up red permanently. The LED on the charging station expires.

id: GUID-EA774CD9-24F1-426A-927A-0E124FD5F33- version: 2 - lang: EN - srclang:

Checking the operational readiness of the Truck Unit

Check for operational readiness

1. Switch on the industrial truck.
2. The Truck Unit switches on and is ready for operation after approx. 15seconds.

Check LED (1) on the Truck Unit. The LED must flash green.

Checking pairing with a Distance Beeper

NOTICE

If the driver is carrying a Distance Beeper, it must be paired with the Truck Unit. This prevents a signaling message from being triggered.

Pairing is carried out automatically:

- LED (2) lights up green:

Distance Beeper is paired and within range of the Truck Unit.

- LED (2) lights up red:

Distance Beeper is paired but not within range of the Truck Unit.

Checking the operational readiness sensors

WARNING

The sensors must be ready for operation before work operations begin. Check LEDs 1 to 4 (1). LED 4 is optional and depends on the number of sensors installed.

- Switch on the industrial truck. The Truck Unit switches on.

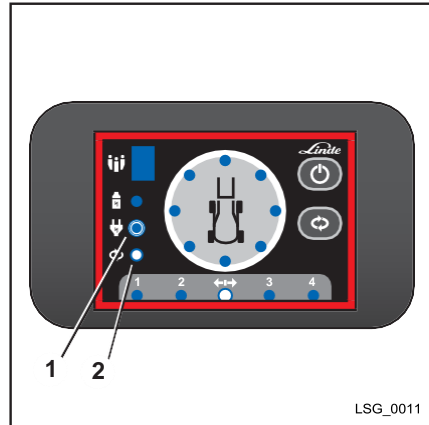
LEDs 1 to 4 light up green for ten seconds.

- If the sensors are ready for operation, the LEDs go out after ten seconds.
- If a sensor is faulty, the corresponding LED lights up red.

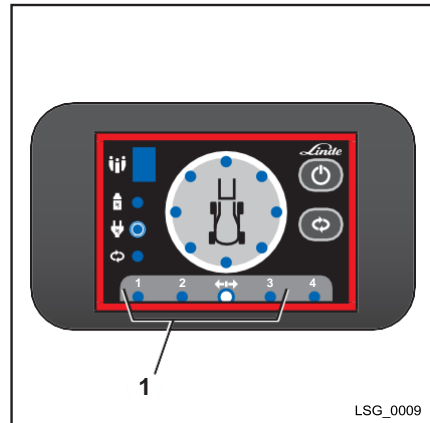
WARNING

Faulty sensors cannot merely be replaced. The sensors must be registered with the Truck Unit system via the configurator.

Contact your authorized service partner for advice.



LSG_0011



LSG_0009

id: GUID-EA6A1A2F-AE1A-4567-A1CD-ED60159480D6 - version: 3 - lang: EN - srclang:

Performing a functional test of the Truck Unit



Note that the signals given by the system are additional information for the driver.

However, the driver is still responsible to drive safely and keep the control over the fork lift truck at any time!

Always perform a functional test before starting work.

NOTICE

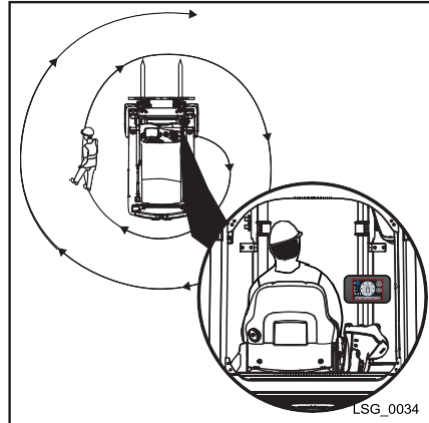
The signaling zones are pre-configured by the manufacturer. They must be adapted to suit the local conditions during initial installation. To do this, contact your authorized service partner.

Functional test of the Truck Unit

During the functional test, the configured signaling zones are checked.

Two (2) people are required for the testing.

- Switch on the industrial truck. The Truck Unit switches on.
- Switch on the Distance Beeper and attach the unit to your clothing.
- Walk around the industrial truck in a spiral shape (figure LSG_0034) with the Distance Beeper. During this time, the driver checks the Truck Unit.



During the test run, no fault messages or irregularities must appear on the Truck Unit.

If necessary, have the signaling zones set up again by the service partner.

Functional test of the Static Unit

NOTICE

The functional test must be completed regardless of the industrial truck component configuration. When using the Truck Unit Small, perform the following steps as well.

The functional test checks the signaling zones that have been set and any responses that have been set on the industrial truck.

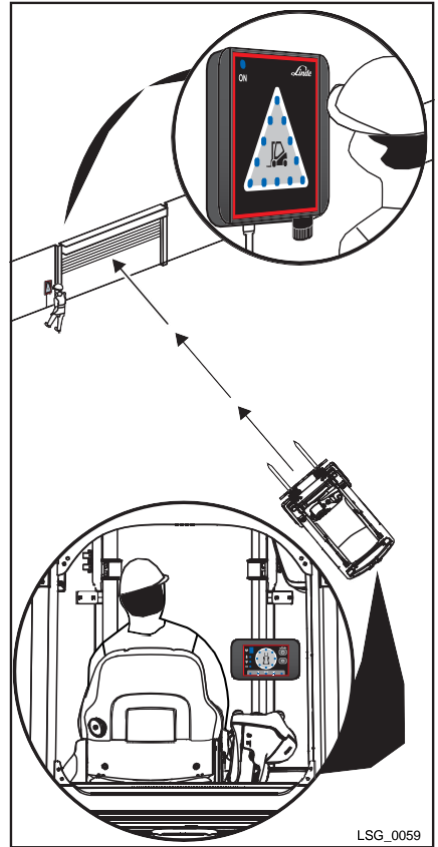
- Switch on the industrial truck. The Truck Unit switches on.
- Check the operational readiness of the Static Unit.

The "operating status" LED must flash green.

- Drive the industrial truck to the signaling zone. During this process, the driver monitors the Truck Unit and any responses that have been set on the industrial truck. A second person monitors the Static Unit (figure LSG_0059).

Fault messages and irregularities on the Truck Unit or the Static Unit during the test are not permitted.

- If necessary, have the signaling zones and the truck settings set up again by the service partner.



Functional test of the Zone Marker

NOTICE

The functional test must be completed regardless of the industrial truck component configuration. When using the Truck Unit Small, perform the following steps as well.

The functional test checks the signaling zone that have been configured and any responses that have been set on the industrial truck.

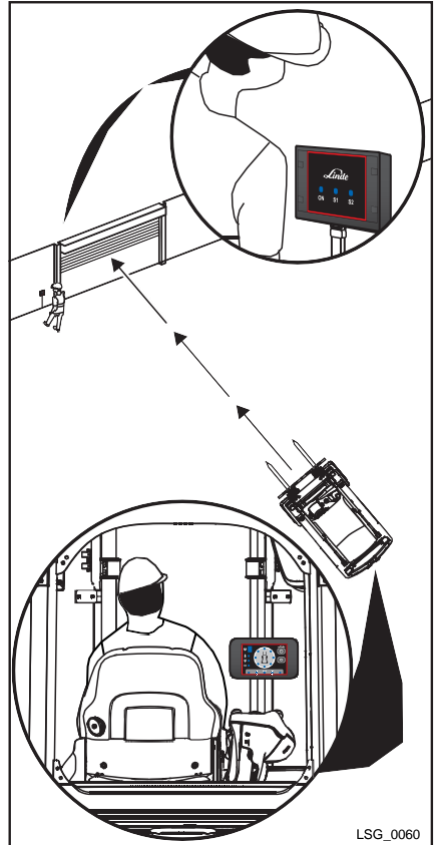
- Switch on the industrial truck. The Truck Unit switches on.
- Check the operational readiness of the Zone Marker.

The "operating status" LED must flash green.

- Drive the industrial truck to the signaling zone. During this process, the driver monitors the Truck Unit and any responses that have been set on the industrial truck. A second person monitors the Zone Marker (figure LSG_0060).

Fault messages and irregularities on the Truck Unit or the Zone Marker during the test are not permitted.

- If necessary, have the signaling zones and the truck settings set up again by the service partner.



4 Operation

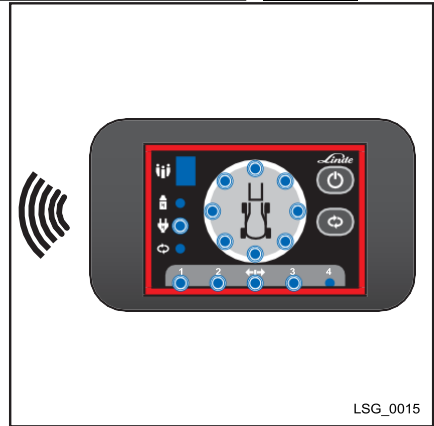
Switching on the Truck Unit

Switch on the industrial truck.

The Truck Unit starts as follows and runs a self-test:

- The numerical display lights up
- Depending on the number of sensors, the numerical display counts down from 3 or 4 to 0. The signaling zone lights up each time
- The switching output LED lights up red and the power supply LED flashes green
- The LEDs for the sensors light up red and the switching output LED lights up green
- The LEDs for the sensors light up green for ten seconds and then go out. A signal tone is emitted

After approximately 15 seconds, the Truck Unit is ready for operation.



Switching on the Distance Beeper

- Push the push button (1) and hold it until the Distance Beeper starts. If the button is deactivated by configuration, put the Distance Beeper on the inductive charger and remove it for activating the device.

The Distance Beeper starts as follows:

- The Distance Beeper emits a signal tone, the LEDs in the signaling zone light up and the device vibrates.

The starting procedure is completed.

NOTICE

If the push button (1) is released too early, the starting procedure must be repeated. This button safety device prevents the unit being switched on and off accidentally in normal operation.

To switch off the unit, push the push button for 3s and hold it until the Distance Beeper shuts down. The LEDs light up briefly. A signal tone sounds. The Distance Beeper vibrates briefly and shuts down.



Pairing the Distance Beeper



If a Distance Beeper is within the pairing zone of the industrial truck, the unit is paired automatically with the Truck Unit and muted. As long as it is in the paired zone, it does not interact with any Truck Unit.

NOTICE

The pairing function has to be activated by a service partner.

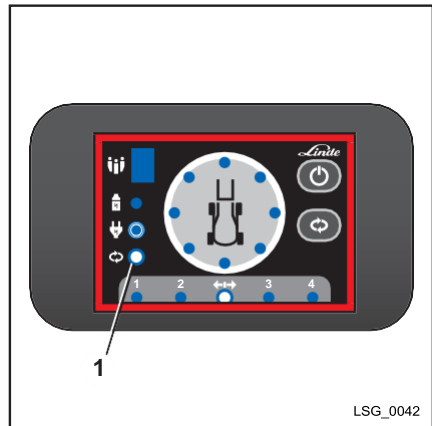
- Move the Distance Beeper into the pairing zone of the Truck Unit.

The LED display (1) on the Truck Unit lights up green. The Truck Unit does not issue a signal message.

- To deactivate the pairing function, move out of the signaling zones of the industrial truck.

NOTICE

Only one Distance Beeper can be paired with the Truck Unit at any one time. Once paired the Distance Beeper does not interact with any Truck Unit.



Displays during operation

The components of the Linde Operator Assistance System does not have to be operated when in working mode; however, the displays have to be observed. The signals and the

operating status that are displayed when the Truck Unit makes contact with other components of the system are described below.

Distance Beeper in the extended area



If an industrial truck stops abruptly, this can result in an accident that may cause serious injury and material damage!

- You must abruptly not reduce speed to 0 mp/h.

People with a Distance Beeper enter the extended area of the industrial truck with the Truck Unit.

The LEDs for the signaling zones on the Truck Unit flash red. A signal tone is emitted depending on the configuration and equipment, the industrial truck reduces the driving speed and the LED switching output lights up red. In addition to the number of people in the extended area, the Truck Unit also indicates the direction from which a person is approaching.

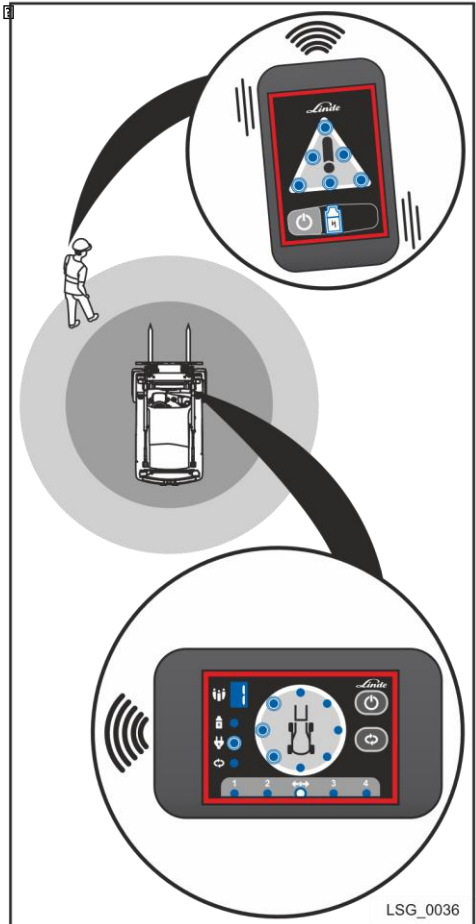
The following operating states are possible:

One person in the extended area:

- Three LEDs flash red and indicate the direction from which the person is approaching.
- More than one person in the extended area: The entire circle flashes red.

All the LEDs for the signaling zone flash on the Distance Beeper. A signal tone is played and the device vibrates.

After a configurable timeout, the tone and vibration alarm are deactivated. Only a visual signal remains. There is a software option to set a permanent signal.



LSG_0036

Operation

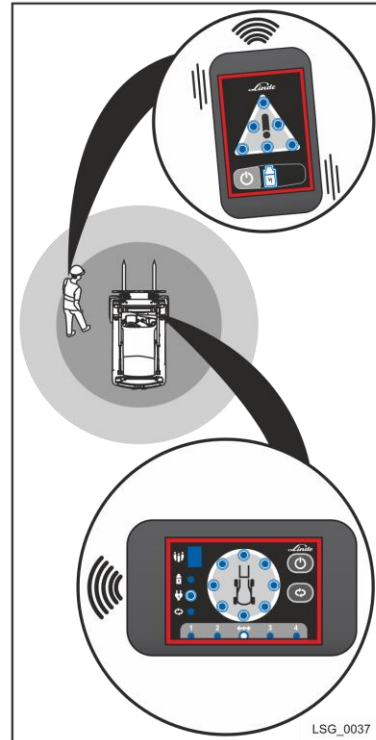
Distance Beeper in the immediate vicinity

People with a Distance Beeper enter the immediate vicinity of the industrial truck with the Truck Unit.

All the LEDs for the signaling zones on the Truck Unit flash red. A signal tone is emitted. In addition, the number of people in the immediate vicinity is displayed. Depending on the programming and equipment, the industrial truck reduces the driving speed and the LED switching output lights up red.

All the LEDs for the signaling zone flash on the Distance Beeper. A signal tone is played and the device vibrates.

After a configurable timeout, the tone and vibration alarm are deactivated. Only a visual signal remains. There is a software option to set a permanent signal.



Static Unit



If an industrial truck stops abruptly, this can result in an accident that may cause serious injury and material damage!

You must abruptly not reduce speed to 0 mp/h Adjust the speed before entering the signaling zone.

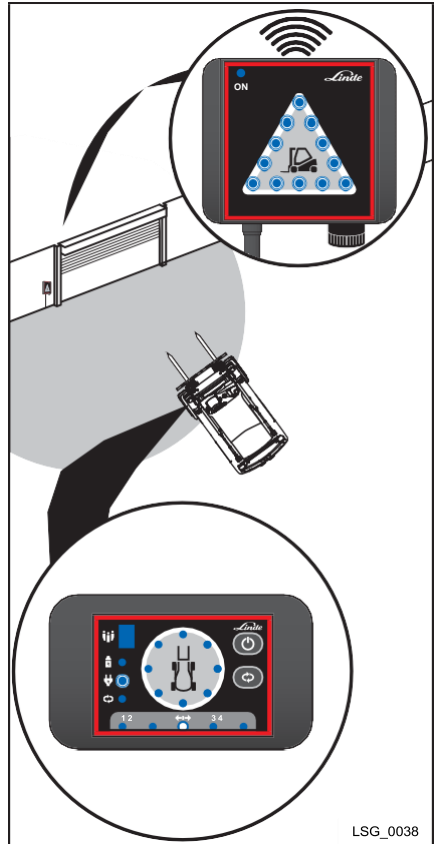
ALWAYS keep the surrounding area in view.

Industrial trucks with Truck Unit

The industrial truck enters the signaling zone for the Static Unit.

The switching output LED lights up red on the Truck Unit.

All the LEDs for the signaling zone flash on the Static Unit. An optional signal tone is also possible. Depending on the configuration and the equipment, responses on the industrial truck and additional signal lights can be activated.

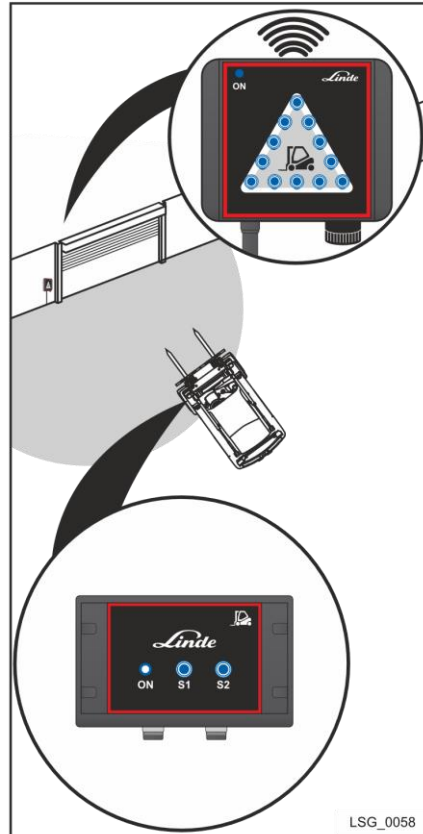


Industrial trucks with Truck Unit Small ?

The industrial truck enters the signaling zone for the Static Unit.

The LEDs for the signaling zones light up red on the truck unit small.

All the LEDs for the signaling zone flash on the Static Unit. An optional signal tone is also possible. Depending on the programming and the equipment, responses on the industrial truck and additional signal lights can be activated.



Zone Marker



If an industrial truck stops abruptly, this can result in an accident that may cause serious injury and material damage!

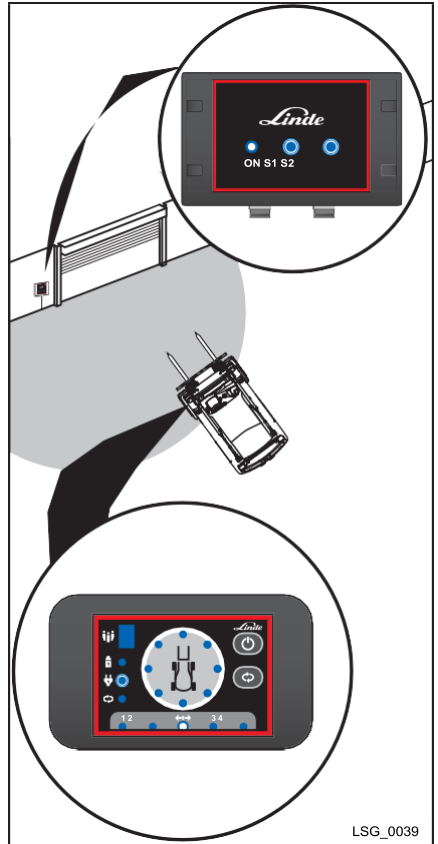
- *You must abruptly not reduce speed to 0mp/h Adjust the speed before entering the signaling zone.*
- *ALWAYS keep the surrounding area in view.*

Industrial trucks with Truck Unit

The industrial truck enters the signaling zone of the Zone Marker.

The switching output LED lights up red on the Truck Unit.

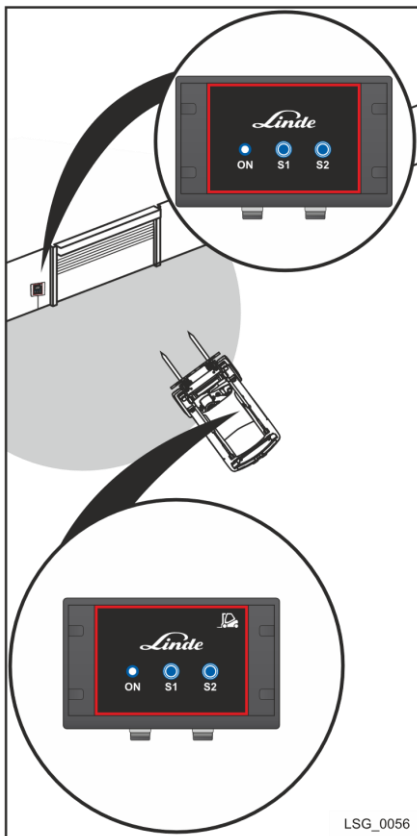
The LEDs for the signaling zones light up red on the Zone Marker. An optional signal tone is also possible. Depending on the programming and the equipment, responses on the industrial truck and additional signaling lights can be activated.



Industrial trucks with Truck Unit Small ?

The industrial truck enters the signaling zone of the Zone Marker.

The LEDs for the signaling zones light up red on the Zone Marker. An optional signal tone is also possible. Depending on the programming and the equipment, responses on the industrial truck and additional signaling lights can be activated.



Signaling between industrial trucks □

The signaling between industrial trucks works when the industrial trucks are equipped with Truck Units and a fifth Sensor Truck Unit. Alternatively, the signaling works if the industrial trucks are equipped with a Truck Unit Small (figure LSG_0043).

Industrial trucks with Truck Unit

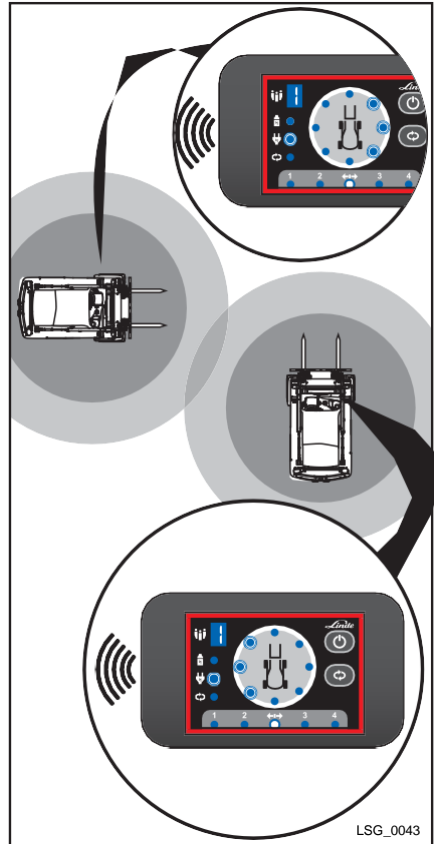
The display is the same as for contact with a Distance Beeper.

The industrial truck with Truck Unit enters the extended area.

- The LEDs for the signaling zones flash on the Truck Unit and indicate the direction from which the industrial truck is approaching.

The industrial truck with Truck Unit enters the immediate vicinity.

- All the LEDs for the signaling zones flash on the Truck Unit.

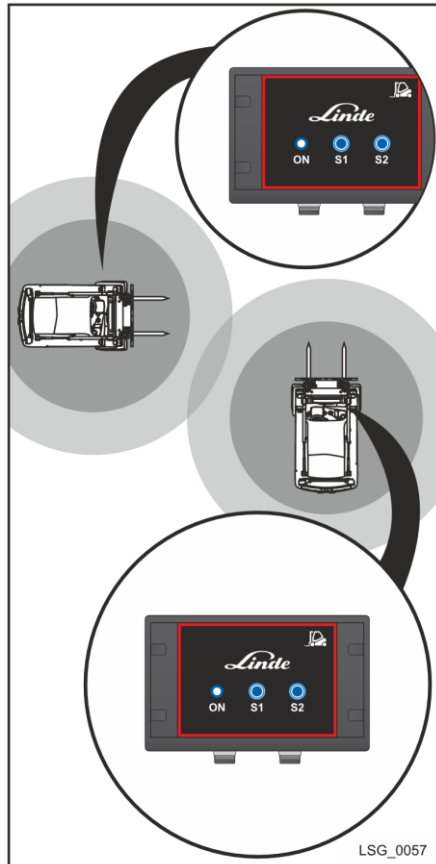


4 Operation

Industrial trucks with Truck Unit Small ?

The industrial truck with a Truck Unit Small reaches the extended area.

The industrial truck with the Truck Unit Small reaches the immediate vicinity.



5

Maintenance and disposal

Maintenance



Risk of surface damage from using incorrect cleaning materials.

- Do not use aggressive cleaning materials.
- Do not use cleaning materials containing abrasive particles

Regularly cleaning the components of the Linde Operator Assistance System increases the service life of the system. After daily use, perform the following steps:

- Check the Truck Units, the sensors and the signaling units for contamination.
- Remove coarse dirt with a soft brush.
- Remove fine dust and film with a damp cloth.



Lithium-ion battery may be destroyed as a result of deep discharge.

Do not store the Distance Beeper for more than one year.

Charge the Distance Beeper after one year.

Distance Beeper

Disposal

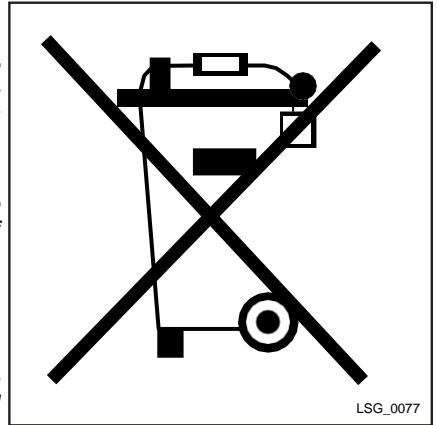


Waste electronic equipment and batteries are raw materials and are not considered household waste. Disposal with household waste is not permitted.

At the end of their service life, waste equipment and batteries must be disposed of in accordance with the national regulations



We recommend working with a waste management company for disposal requirements.



California Proposition 65



Using this product can expose you to chemicals including arsenic (inorganic), cadmium, lead, nickel, and/or mercury, which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to <https://www.p65warnings.ca.gov/>.

6

Technical data

Truck Unit

Performance data	Unit	Value
Operating voltage	VDC	12 / 24
Max. power consumption	W	Max. 6.5
Range	M ft	Max. 25 Max. 82
Ultrawide band Channel	MHz	No.5 (CF = 6489.6)
Frequency (Occupied Bandwidth)	MHz	6143.2 to 6820.8
Transmission power	dBm/ Hz	-42.76
Operating temperature	°C °F	-20 up to +45 -4 up to +113
Air humidity	%	10-85
Dimensions w/o accessories (LxWxH)	mm in	120 x 76 x 24 4.72 x 3 x 0.94
Weight	g Oz	193 6.8

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Distance Beeper

Performance data	Unit	Value
Operating voltage	VDC	3.3
Max. power consumption	W	Max. 2.5
Rechargeable battery capacity	mAh	1000
Range	M ft	Max. 25 Max. 82
Ultrawide band Channel	MHz	No.5 (CF = 6489.6)
Frequency (Occupied Bandwidth)	MHz	6202.1 to 6800.8
Transmission power	dBm/M Hz	Max. -42.96
Operating temperature	°C °F	-20 up to +45 -4 up to 113
Air humidity	%	10-85
Dimensions w/o accessories (LxWxH)	mm in	82 x 51 x 14 3.22 x 2 x 0.55
Weight	g Oz	77 2.72

Sensor Truck Unit

Sensor Truck Unit

Performance data	Unit	Value
Operating voltage	VDC	5
Max. power consumption	W	1
Range	M ft	Max. 25 Max. 82
Ultrawide band Channel	MHz	No.5 (CF =6489.6)
Frequency (Occupied Bandwidth)	MHz	6166.2 to 6804.8
Transmission power	dBm/M Hz	Max. -41.95
Operating temperature	°C °F	-40 up to +85 -40 up to +185
Air humidity	%	10-85
Dimensions w/o accessories (LxWxH)	mm in	85 x 45 x 22 3.34 x 1.77 x 0.86
Weight	g Oz	81 2.86

Truck Unit Small

Performance data	Unit	Value
Operating voltage	VDC	12 / 24
Max. power consumption	W	Max. 3.5
Range	M ft	Max. 25 Max. 82
Ultrawide band Channel	MHz	No.5 (CF =6489.6)
Frequency (Occupied Bandwidth)	MHz	6138.2 to 6805.8
Transmission power	dBm/M Hz	Max. -42.25
Operating temperature	°C °F	-40 up to +85 -40 up to +185
Air humidity	%	10-85
Dimensions w/o accessories (LxWxH)	mm in	100 x 60 x 40 3.93 x 2.36 x 1.57
Weight	g Oz	149 5.26

Static Unit

Static Unit

Performance data	Unit	Value
Operating voltage	VAC	90 - 264
Max. power consumption	W	Max. 6
Range	M ft	Max. 25 Max. 82
Ultrawide band Channel	MHz	No.5 (CF =6489.6)
Frequency(Occupied Bandwidth)	MHz	6164.2 to 6853.8
Transmission power	dBm/ MHz	Max. -43.23
Operating temperature	°C °F	-40 up to +85 -40 up to +185
Air humidity	%	10-85
Dimensions w/o accessories (LxWxH)	mm in	180 x 150 x 60 7.09 x 5.9 x 2.36
Weight	g Oz	935 32.98

Zone Marker

Performance data	Unit	Value
Operating voltage	VDC	12 / 24
Max. power consumption	W	Max. 3.5
Range	M ft	Max. 25 Max. 82

Performance data	Unit	Value
Ultrawide band Channel	MHz	No.5 (CF =6489.6)
Frequency (Occupied Bandwidth)	MHz	6158.2 to 6804.8
Transmission power	dBm/ MHz	Max. -41.9
Operating temperature	°C °F	-40 up to +85 -40 up to +185
Air humidity	%	10-85
Dimensions w/o accessories (LxWxH)	mm in	100 x 60 x 40 3.93 x 2.36 x 1.57
Weight	g Oz	149 5.26

Programmer

Performance data	Unit	Value
Operating voltage	VDC	5
Max. power consumption	W	1
Range	M ft	Max. 25 Max. 82
Ultrawide band Channel	MHz	No.5 (CF =6489.6)
Frequency (Occupied Bandwidth)	MHz	6166.2 to 6804.8
Transmission power	dBm/M Hz	Max. -41.95
Operating temperature	°C °F	-40 up to +85 -40 up to +185
Air humidity	%	10-85
Dimensions w/o accessories (LxWxH)	mm in	85 x 45 x 22 3.34 x 1.77 x 0.86
Weight	g Oz	81 2.86

C

Care

D

D2Sense system components. 12
 Disposal 63

F

Functional test46

I

Installation

Distance Beeper.....37
 Static Unit38
 Zone Marker.39

L

LED displays

D2Sense Distance Beeper. 53
 ..
 Signaling between industrial trucks. . . 59
 Static Unit. 55
 Zone Marker. 57

M

Maintenance.....62

O

Operation

Displays.50
 Switching on pairing 50

Switching on the Distance Beeper..... 49
 Switching on the Truck Unit.49

P

Distance Beeper.26
 Pre-shift checks
 Charging the Distance Beeper.....43
 Checking the operational readiness of
 the Truck Unit.44
 Operational readiness sensors.....45
 Performing a functional test.....46
 Service plan.40
 The charge state of the Distance Beeper.41

S

Sensor Truck Unit.30
 Static Unit.31
 Symbols.....5

T

Distance Beeper. 66
 Technical data
 Sensor Truck Unit. 67
 Static Unit. 68
 Truck Unit. 66
 Truck Unit Small. 67
 Zone Marker. 68

Truck Unit. 14

W

Warnings.5

Z

Zone Marker.33

Linde Material Handling GmbH

X EN - 01/2020