



**BITO**  
STORAGE SYSTEMS  
NORDIC



# LEO locative

The self-guided transport system



# LEO custom – Your autonomous load carrier system

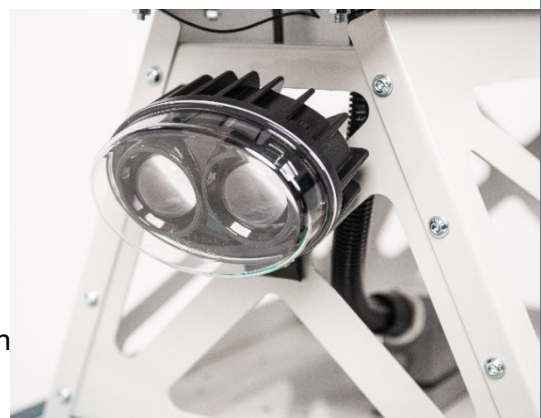
The LEO locative transporter moves bins & cardboard boxes to their destination without human intervention. LEO AGVs automatically detect their loading status. Loads of up to 35 kg can be moved at a maximum speed of 0.7 m/s.

- The obstacle detection sensor registers objects and persons in the way, stops and moves on again automatically as soon as the obstacle has been removed.
- LEO locative receives remote path commands from the LEO SmartBox controller that works with ZigBee radio technology. This means that no IT interface or WLAN connection is required for communication.
- LEO accesses the battery charging area on its own.
- Communication with fire protection doors or high-speed doors comes as a standard feature.
- LEO can be activated "hands-free".



## The Bluespot antenna boosts signal strength for optimum safety

- Can be retro-fitted whenever required
- Improved visibility
- Visible from a 2-metre distance
- Particularly suitable for noisy environments
- Can be retro-fitted whenever required



## The LEO locative system

### INGENIOUS & SIMPLE

- + No IT interface & WLAN connection required to get started
- + Requires very little time for start-up
- + The system can be adapted without external help

### BASICS AT A GLANCE

- + LEO moves through the transfer stations to deposit or pick up bins without loss of time
- + High load carrying capacity
- + Daily driving performance: up to 40 km

### PERFORMANT & CONVINCING

- + CE certified in compliance with the Machinery Directive
- + Customisable to your requirements & modular upgrading
- + Payback time is less than one year on average
- + Delivered, assembled and commissioned within a few weeks

## LEO locative – Applications

LEO locative is used both in logistics and production supply chains. It is a cost-efficient link in the logistic chain between warehouses, supermarkets, buffer storage areas as well as in assembly and production environments.

### Logistic chains

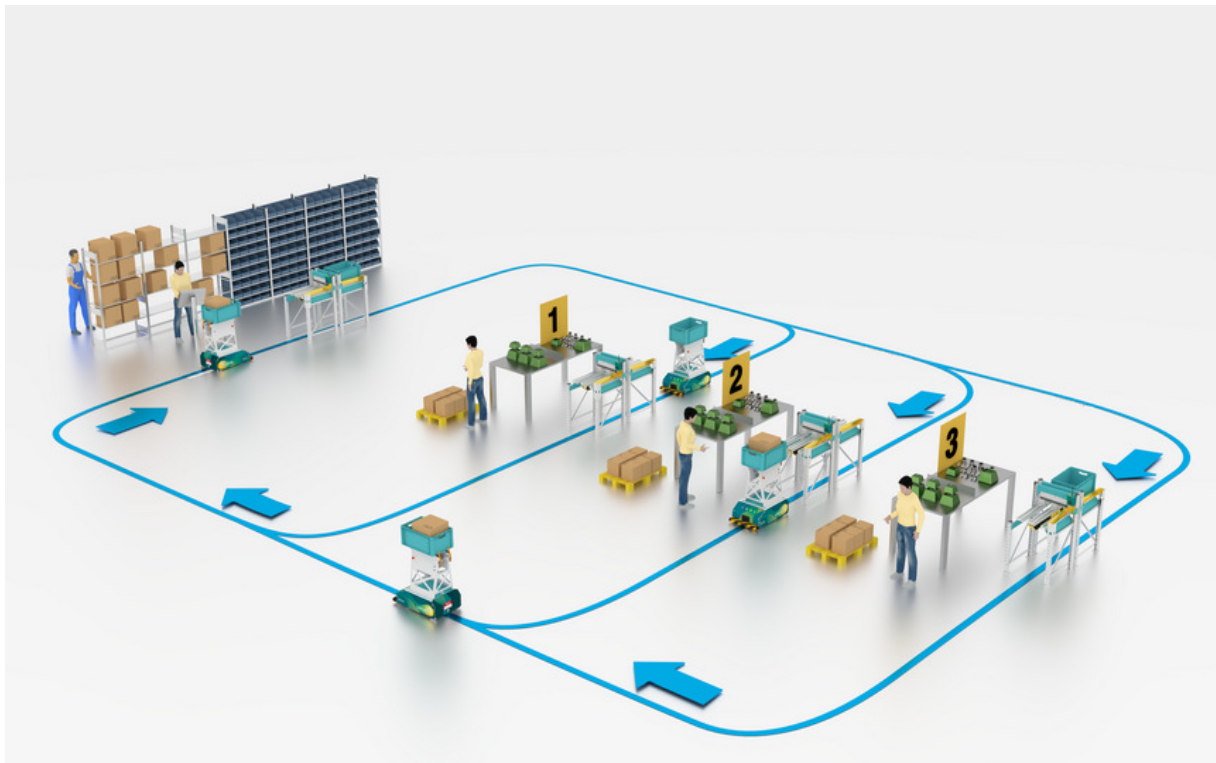
In the logistics business, LEO locative is used very efficiently for

- linking the goods-in department with storage area(s).
- connecting order picking areas with packing stations.
- helping with batch order picking/multi-order picking
- reverse logistics to sort and transport returned products within an organisation

### Production environments

In production settings, LEO locative fulfils a wide range of tasks. LEO AGVs

- supply workstations with materials, tools and empty bins
- collect finished goods, empty bins and boxes, waste materials from workplaces
- move items from miniload installations to production areas in a fully automated process
- smoothly transport shock-sensitive goods



# LEO locative station

LEO locative transfer stations are the central element of the LEO locative system. Bins can be delivered and picked up mechanically or in a fully automated process.



*LEO locative double station*

The LEO double stations enable delivery and pick-up in one go. The transporter simply drives through the station for this purpose.

Light barriers on the stations detect whether there are bins on the stations and whether they are correctly positioned for pick-up.

Stations are operated by mains voltage or with a LEO rechargeable battery.

Double stations can also be used separately as loading and unloading stations.

Station platforms with rollers allow for smooth bin transfer to an optional roller buffer lane or directly onto your conveyor system.

The stations have a modular design and can be converted from left-hand to right-hand delivery or pick-up.

A centering aid is included in the delivery to facilitate easy placement of the stations.

The stations can be transported with a lift truck.



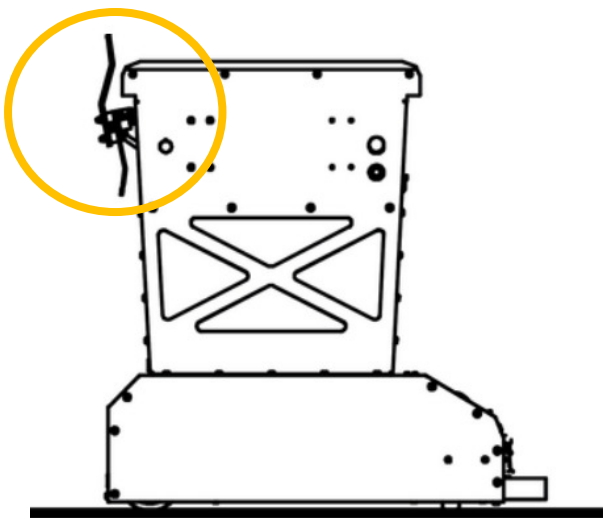
*LEO locative pick-up station with centering aid*

# Load transfer between LEO transporters and stations

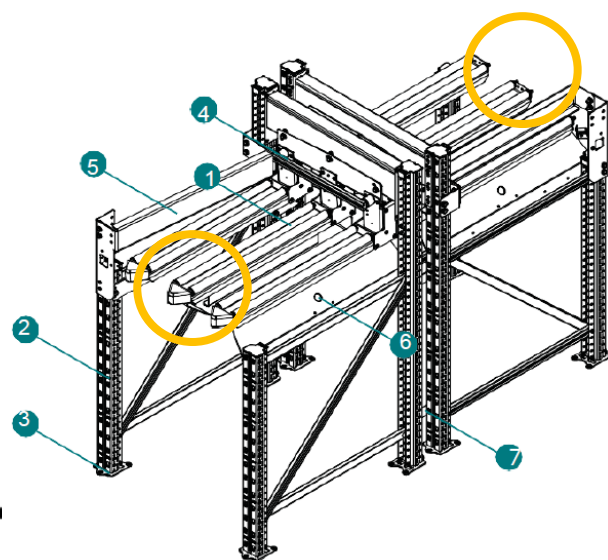
Load transfer between the LEO transporter and the transfer stations has been patented.

The LEO transporter is fitted with a spring-mounted pusher. The station contains the matching counterpart. A guide plate ensures that the pusher tilts back and releases the bin. During pick-up, the guide plate ensures that the pusher is held upright and pulls the container off the station.

For this purpose, there is a slight difference in height between the delivery and the pick-up side. Stations can therefore only be accessed in one direction.



Pusher on LEO transporter - see marking



The yellow guide plates are mounted on the middle finger

The system has the benefit of working without powered rollers. In addition, LEO stations can easily be connected with roller buffer lanes.

**simple** | **hardwearing** | **smart**

## Communication between LEO transporters and stations

Both systems communicate in a decentralized process which is needed to authorize or request entry into the station.

To avoid accidents, BITO uses a permanent signal. This means that permanent power supply is required.

### Smart Box Lite (Zigbee)

A simplified LEO control unit (Smart Box Lite) is mounted on the station.

It transmits the signal in a 5-10 metre radius around the station. There is no need for a direct sightline. This saves travel routes and space.

In addition, the LEO transporter receives more information and can carry out more complex commands.

In this configuration, the transporter is also able to park immediately in front of a station.



# Optional equipment: Buffer storage lanes

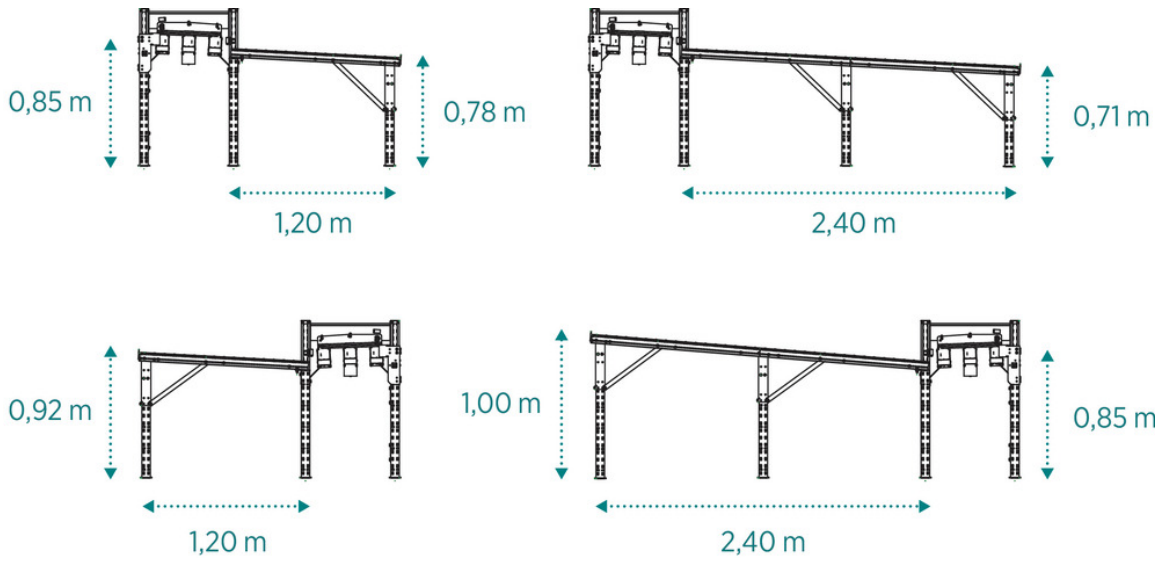


LEO transfer stations can be provided with buffer lanes with a length of 1.2m or 2.4m.

They extend a station’s operating range and decouple the pick-up and delivery process from human intervention.

Up to 7 bins can be dispatched at a time and successively picked up by the LEO transporter for delivery at their destination(s). Conversely, a buffer lane can receive up to 7 bins.

### Conveyor lane dimensions:





## Other station accessories:

### Barcode scanner

LEO stations can be equipped with a barcode reader..

The system will automatically assign destinations based on defined barcodes and a SMART BOX PRO.

Simple place a bin on the station - the barcode “knows” the right destination. The Smart Box PRO will send this information to the LEO transporter which picks up the bin.



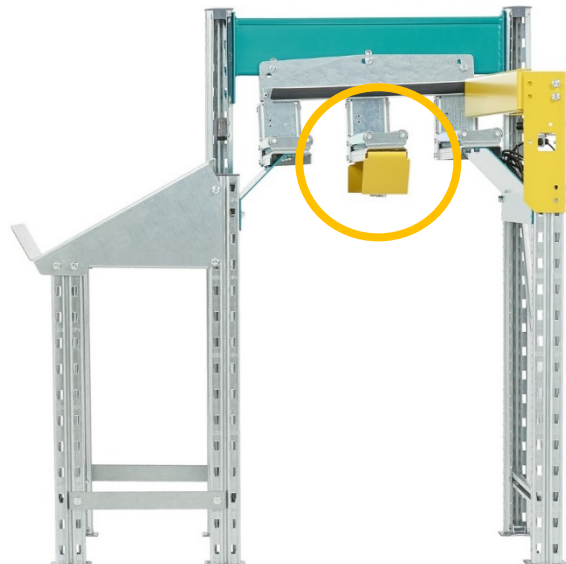
### Powered rollers

The two middle rollers of the load handling platform are replaced by two powered rollers.

They ensure that loads weighing between 0 - 35 kg are safely moved on and off the roller platform.

In addition, level transfers to a conveyor system can be realized.

The system can be retrofitted and requires one Smartbox per station.





## LEO locative data sheet\*

### LEO locative transporter

LEO vehicle dimensions (W x L x H)	500 x 830 x 921 mm
Weight incl. lithium battery	35 kg
Maximum speed	0.7 m/s
Minimum speed	0.3 m/s
Voltage:	24V
DC Power supply:	40W
Protection class/(Ingress Protection Code)	IP 21
Noise emission	<60dB

### LEO locative battery

Dimensions (W x L x H)	370 x 80 x 225 mm
Battery type	LiFePo4
Weight	7 kg
Capacity	20 Ah
Service hours (battery fully charged)	12 – 16 h
Charging time	6 – 8 h

### LEO locative charger

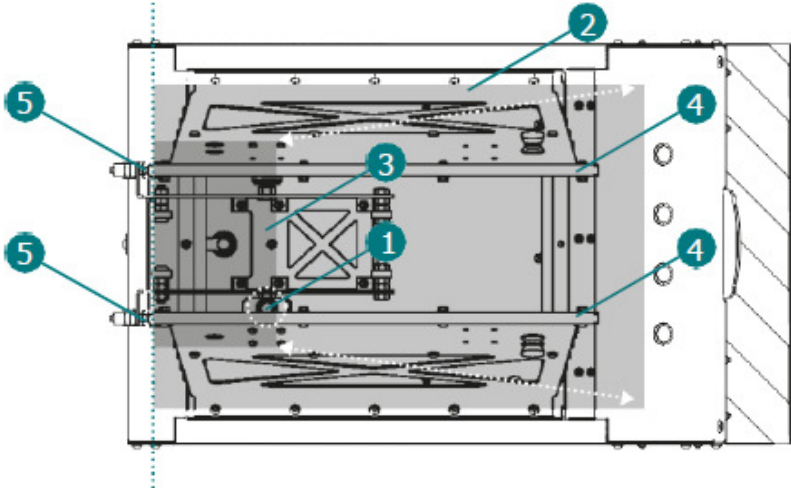
Dimensions (W x L x H)	120 x 190 x 70 mm
Primary voltage	230 V / AC 50 Hz
Charging current	4 to 5 A
IEC Protection class	III

### Route planning data

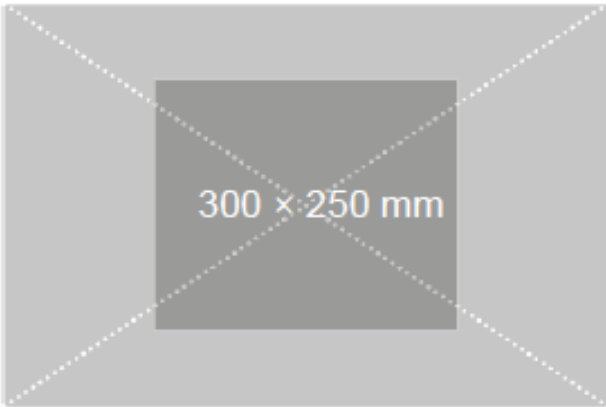
Path width (straight)	550 mm
Minimum path width	1,000 – 1,100 mm
Curve radius - centre to outer path boundary line at 0.5 m/s:	500 mm
Curve radius - centre to outer path boundary line at 0.7 m/s	700 mm
Envelope radius of a 700 mm curve (outside/inside)	1,150 / 400 mm
Maximum stop accuracy on the X and Y axis in mm	10 mm

**Load capacity**

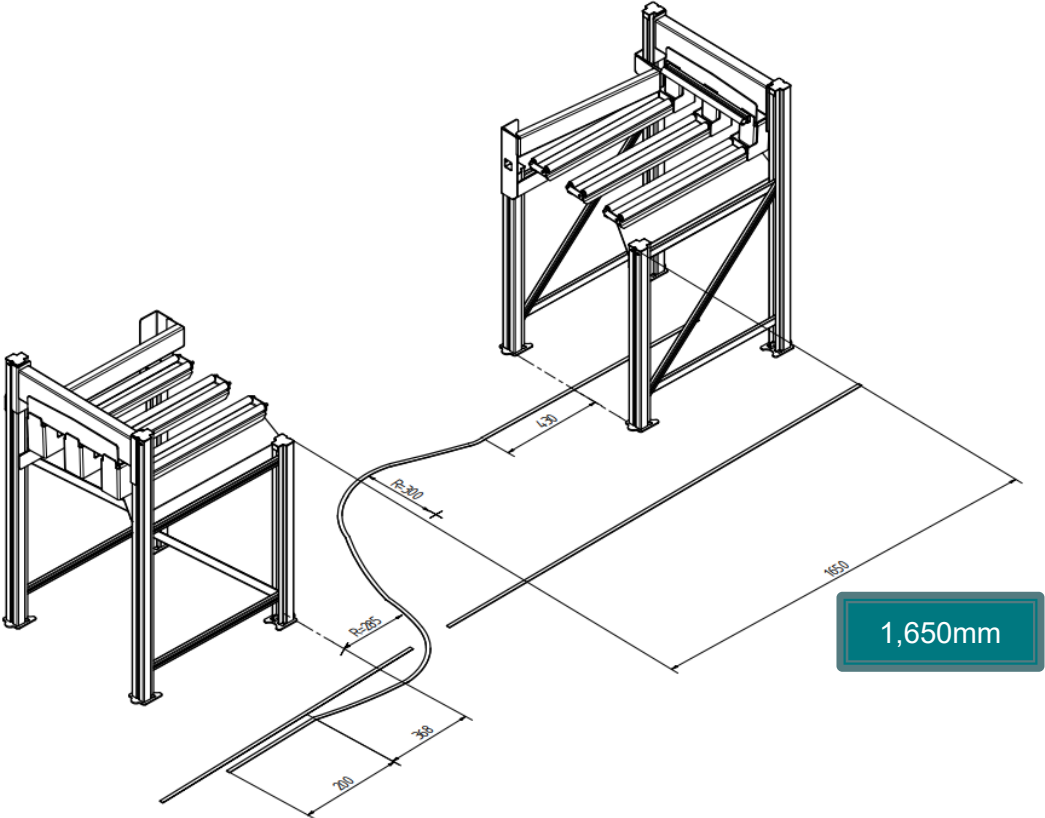
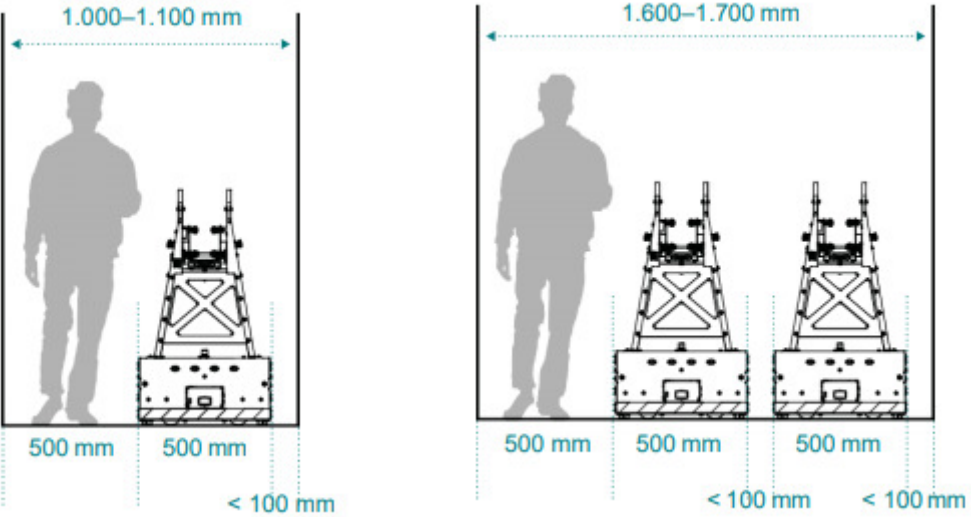
<u>Maximum load capacity:</u>	35kg
<u>Maximum bin dimensions with LEO stations (LxWxH)</u>	600x400x400mm
<u>Minimum bin dimensions with LEO stations (LxWxH)</u>	300x200x400mm



Centre of gravity of loads inside a bin:



**Dimensions for layout planning:**





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