



LENNIX[®] Pro AI for Overhead & Gantry Cranes

The LENNIX[®] product range



LENNIX[®] Pro
High-Performance intelligent control unit for crane automation. Positioning and collision avoidance system with electronic anti sway. CE & UL certified.

+AI AI-based detection of the load

LENNIX[®] Pro Industrial Cranes

LENNIX[®] Pro RMG & RTG

LENNIX[®] Pro Slewing Cranes

LENNIX[®] Pro STS

LENNIX[®] Pro Tracking Controller

LENNIX[®] Pro Care

LENNIX[®] Sense
The product domain LENNIX[®] Sense includes all sensors used by applications installed on LENNIX[®] Pro.

LENNIX[®] Sense Red Cam

LENNIX[®] Sense Inductive

LENNIX[®] Sense LiDAR

LENNIX[®] Service
Worldwide support, commissioning or training on site or remotely.

Safe and precise positioning with LENNIX[®] for industrial cranes

Functions

-  **Anti Sway**
-  **AI-based load detection**
-  **Obstacle management for static and dynamic obstacles**
-  **Smart Activation**
-  **Tracking and synchronization control**
-  **Anti Sway for slewing gear**
-  **Collision avoidance to neighboring cranes**
-  **Predictive Maintenance**
-  **Camera measurement**

Picture right:
LENNIX[®] Reflector (left), LENNIX[®] Sense Red Cam (mid) and LENNIX[®] Pro (right)

Advantages

- Relief for crane operators for more efficient and safe crane handling in manual operation (2-5% increase in production)
- Even when the anti sway is switched off 100 % safety through **Smart Activation**
- Savings in personnel costs and 100% avoidance of collisions in semi or fully automatic operation
- Weighted 3D route planning with shortest or most energy-efficient route
- Detection of a hardware fault by dual-channel structure (PL d)



Safety and efficiency with LENNIX® Pro AI

Precise load control without a camera

LiDAR-based Anti Sway

In some scenarios, it is not possible to use a camera-based measurement system to determine the position and speed of the load-handling device. This may be because the specific geometry of the load-handling device (such as a bulk material grab) does not allow for the attachment of a reflector, or that environmental factors cause excessive buildup on the reflector.

Until now, the so-called “open-loop” anti sway solution have been used in such cases. The system calculates the pendulum movements based on a mathematical model and the crane’s control signals. However, when external disturbances such as diagonal pulling, collisions, or wind occur, they are not detected, and the resulting sway cannot be eliminated.

With LENNIX® Pro AI and LENNIX® Sense LiDAR, it is now possible to determine the speed and position of the load-handling device using markerless positioning and to continuously correct the internal model (“closed-loop”).

Detection of obstacles and fill levels

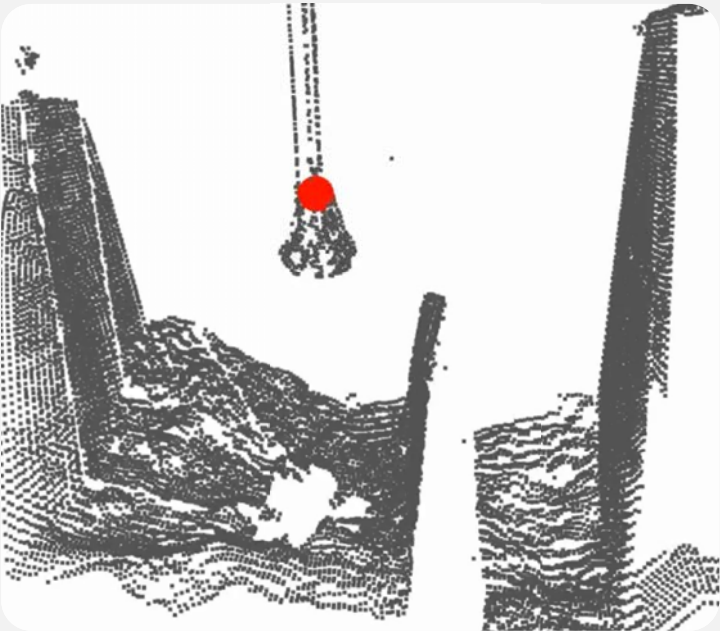
In addition to detecting the grabber, other environmental data is also recorded. This data can be used to detect dynamic obstacles or determine fill levels.

LENNIX® Sense LiDAR also complements existing options, such as static 3D obstacle management, by using real-time data.

Graphic right: LiDAR scan of a waste disposal bunker from a reference project. The red dot indicates the calculated position of the grabber

LiDAR-Technology – What is it?

LiDAR (Light Detection and Ranging) measures distances using pulsed laser beams. The sensor measures the time it takes for the reflected signal to return and uses this to calculate the distance to the object. By systematically scanning the surroundings, it generates a high-resolution 3D point cloud—in real time and regardless of lighting conditions.



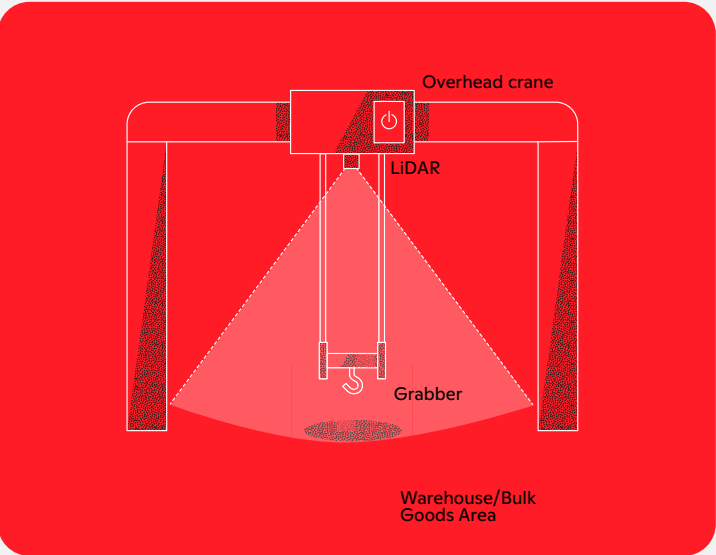
Implementation

Crane installation

Similar to conventional camera-based measurement systems, the LiDAR is mounted directly below the trolley and is pointed toward the grabber.

A reflector is not required.

Make sure that the field of view of the LENNIX® Sense LiDARs is not obstructed by other attachments. LENNIX® Pro AI is installed in an air-conditioned control cabinet and receives data from the LiDAR via Ethernet.



Operating with the crane PLC

Communication with the PLC is possible via all industry-standard systems (Profibus, Profinet, UDP, CANopen) and is independent of PLC manufacturers or the drives used. Depending on the mode (manual or automatic), LENNIX® Pro AI receives either the target position or the target speed.

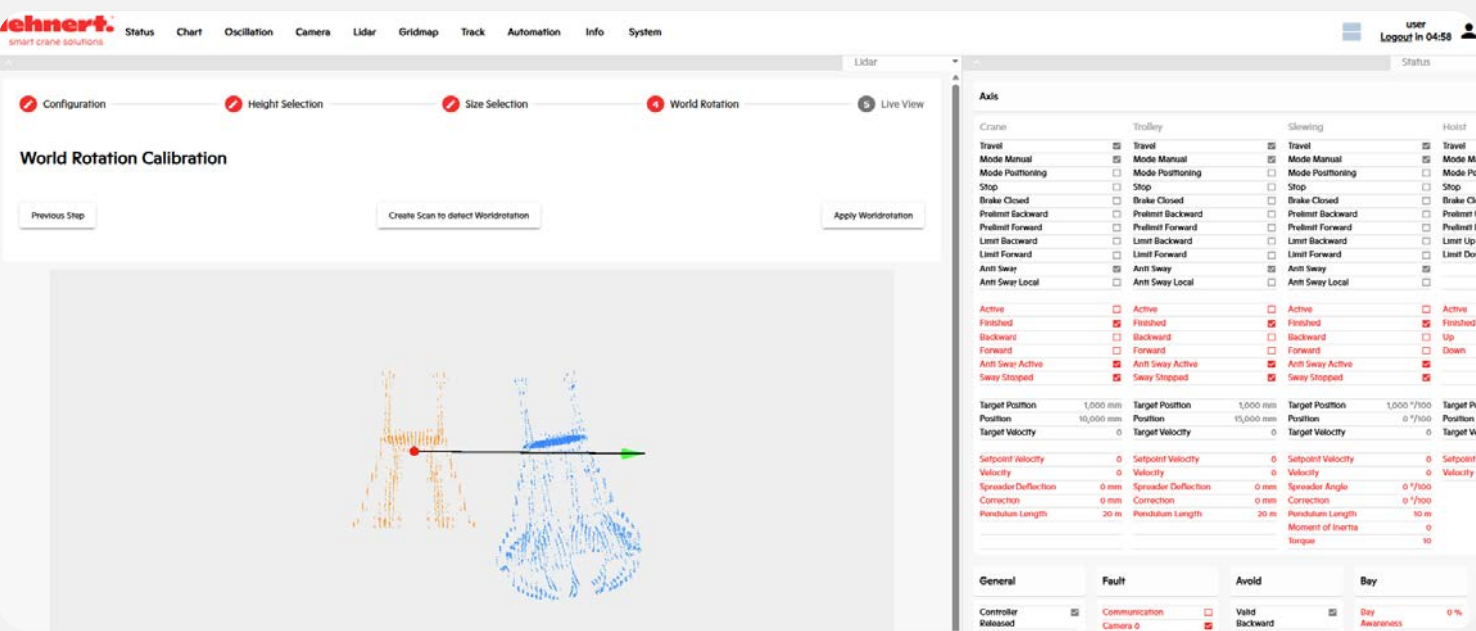
The system then outputs a positioning speed that minimizes load and takes into account spatial constraints (collision protection) as well as speed limits imposed by the drives.

Fill level data can be retrieved via UDP and integrated into existing warehouse management systems.

Guided commissioning

Once the hardware is installed, the grabber is calibrated via a 4-step process in the web interface. These steps align the coordinate systems of the LiDAR and the crane.

In addition, a reference scan is taken of the area of the loading device that remains unchanged during opening and closing. This is used for position determination during operation.



Graphic top: Schematic illustration of the LiDAR installation on a bridge crane

Graphic bottom: Front-end views in the calibration web interface

Technical data

LENNIX® Sense LiDAR

System Requirements: LENNIX® Sense LiDAR

Crane Type	Overhead and Gantry Cranes
Drive System	Frequency converter drives for all driving and rotating axes to be controlled
Measurement system	Position sensors for crane, trolley, and lifting directions
Crane control	PLC
	Temperature range at the crane: -40°C – 85°C
	Temperature range in the control cabinet: 0° C – 50° C

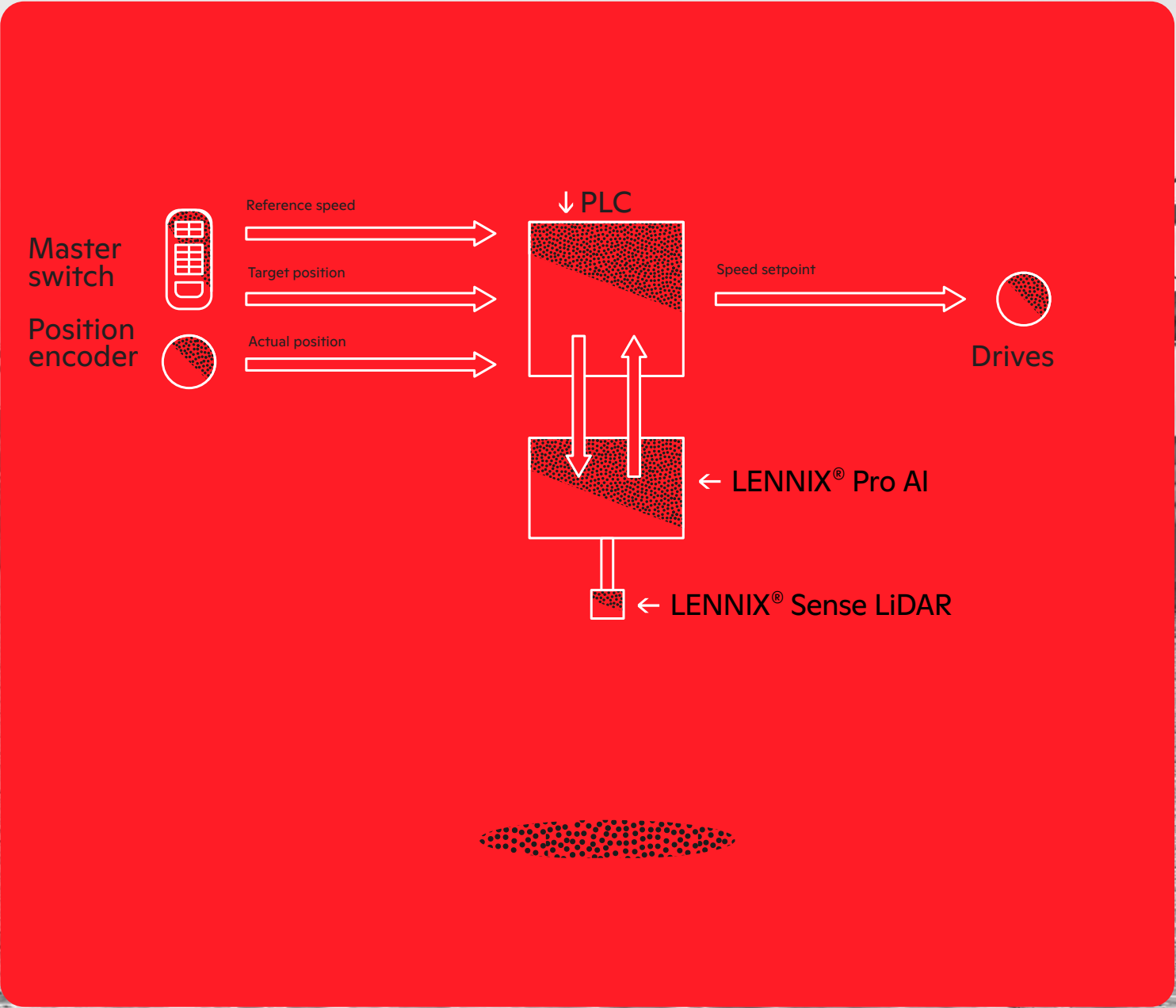
With **LENNIX® Sense LiDAR**, the ratio of the maximum swing length to the size of the load-handling device should be less than 25. (Example: A grabber with a diameter of 1.2 m can be detected clearly at a distance of up to 30 m (swing length).)

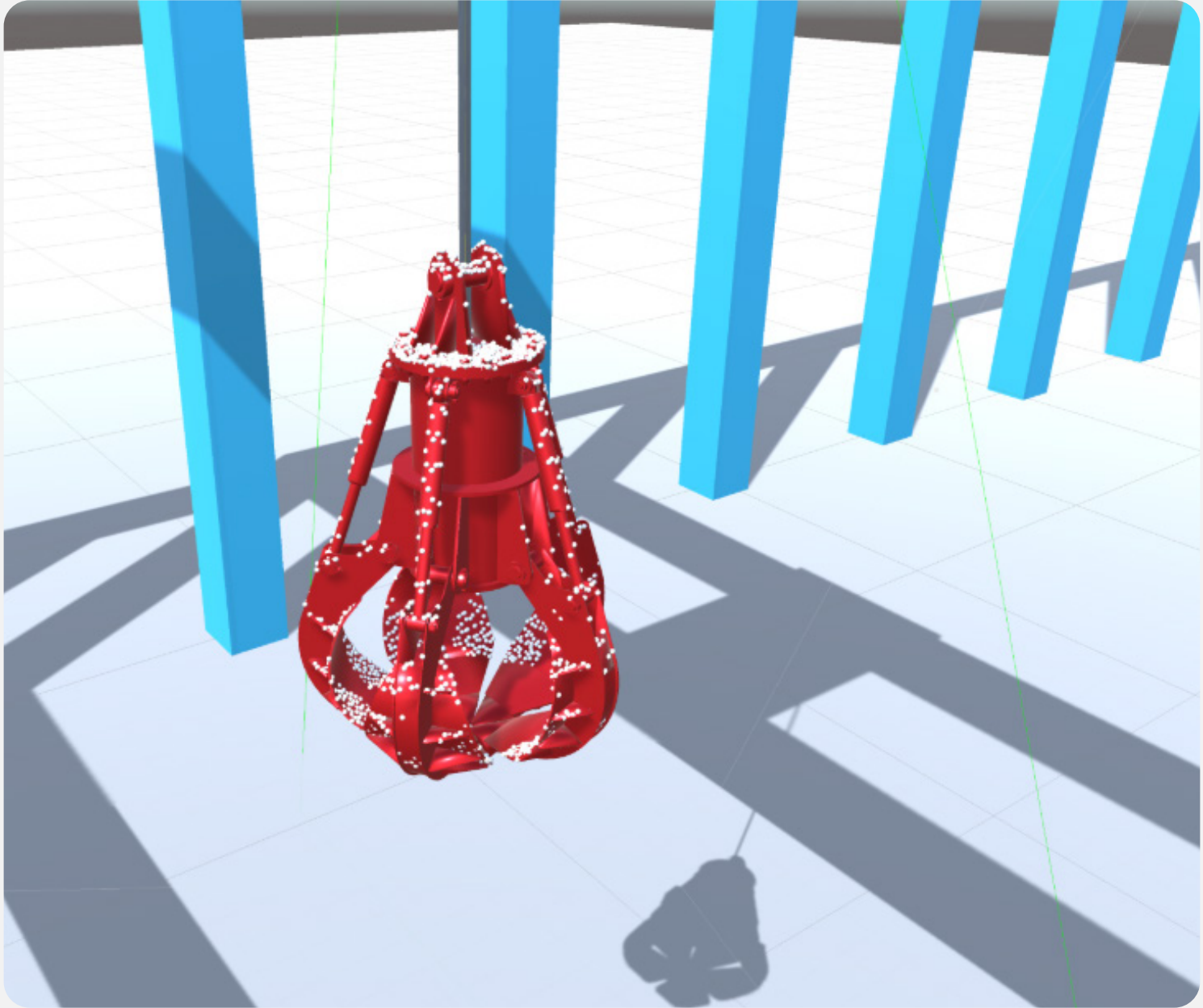
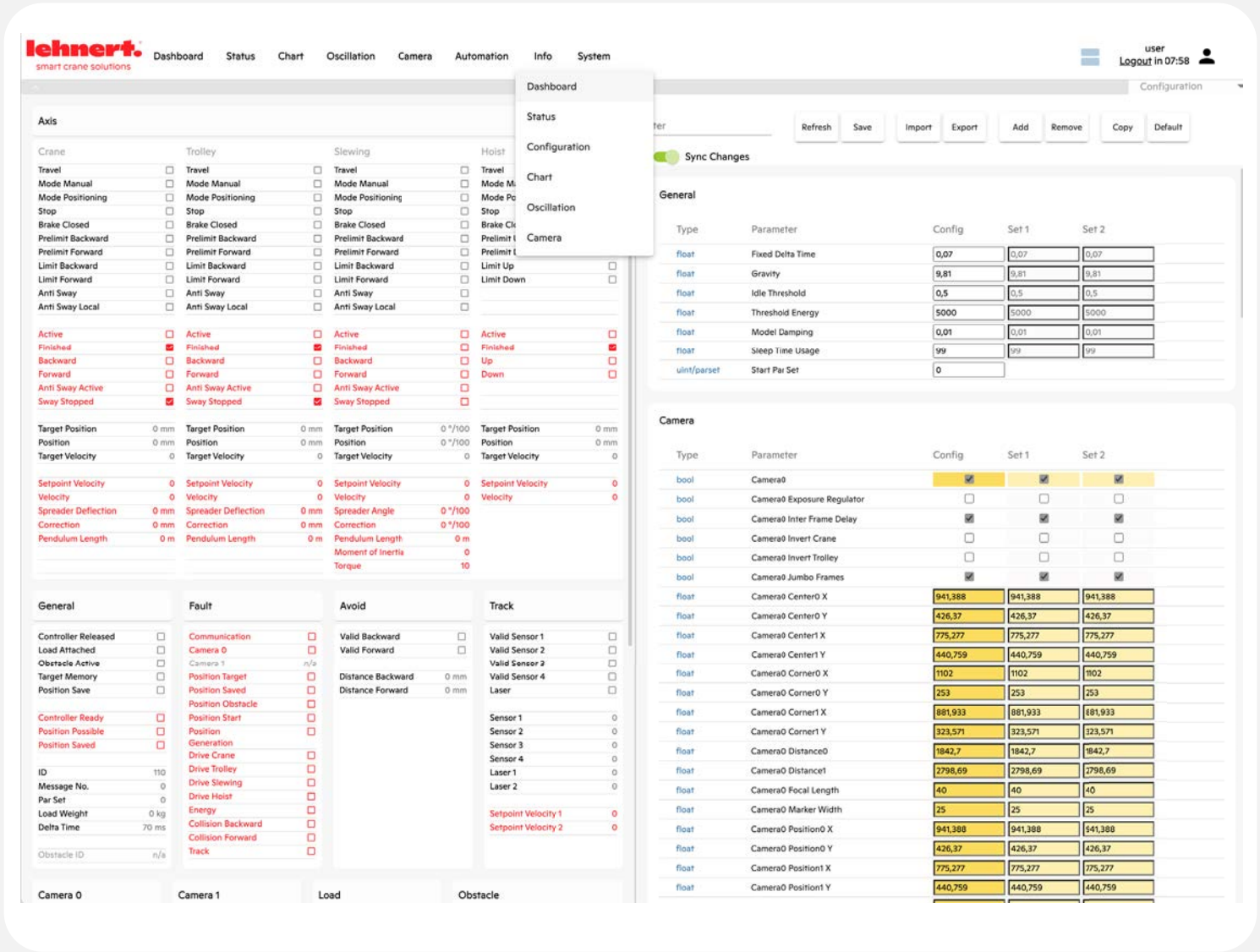
Technical data:

Laser Type	905 nm, Klasse 1 (augensicher)	Operating temperature	-40 °C bis +85 °C
Field of View (FOV)	120° (horizontal) × 25° (vertikal)	Supply voltage	9–18 V DC
Range	150 m @ 10% Reflektivität (bei 100 klx)	Data Interface	100BASE-TX Ethernet (UDP)
Close range (blind)	< 0,5 m	False alarm rate	0,01% @ 100 klx
Point rate	452.000 Punkte/s	Protection Class	IP67
Frame rate	10 Hz	Weight	ca. 1.120 g
Distance error (by chance)	< 2 cm @ 20 m	Dimensions	105 × 131,6 × 65 mm
Distance error (systematically)	< ±3 cm @ 20 m	Time Synchronization	gPTP (IEEE 802.1AS)
Angular error	< 0,1°		

System Integration

Graphic below:
principle diagram for integrating LENNIX® Pro into the crane control system





One solution. Many features.

- Independent of PLC, crane type and drives; can be integrated into new and existing cranes
- Increased work efficiency and safety of the crane
- User-friendly front end with commissioning instructions and secure access via a web browser
- Easy restoration of system parameters
- Tandem mode with just one system
- Storage and display of input and output signals output signals for at least 2 weeks
- Quick and easy integration into your PLC control system with predefined function blocks
- 3D simulation environment: scenario-based, automated testing of new functions and customer-specific solutions
- Remote or on-site commissioning and Commissioning training of the team for further projects

Clean code

The software code is at the heart of **LENNIX®** products. That is why high software quality standards play a decisive role in the strategy of **LEHNERT**.

Graphic left:
Web browser interface for commissioning of LENNIX® Pro

Graphic on the right:
Real-time 3D simulation environment

LEHNERT engineers and software developers provide reliable, secure, efficient and compact code that is easy to maintain. A modular structure of the source code ensures that new functions can be easily integrated into the system.

LEHNERT. safe. qualified. reliable.

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What customers say about us

„We have equipped two old cranes with **LENNIX® Pro** and have to say that it's really easy to operate. All you have to pay attention to is the correct sensor installation. Even if the wheels are not vertical or not on the track, the system works well and prevents contact between the rail and the wheel flange. The customer service is also good and helpful.“

Dvesta Ltd.

„I highly recommend **LEHNERT** smart crane solutions to anyone seeking dependable, low-maintenance and cutting-edge crane control systems. Their professionalism and technical excellence truly make them a leader in their field. When we were looking for a reliable alternative to the more conventional anti-sway rigging, **LEHNERT** proved to be the right partner. Their light weight and smart electronic technology works flawless. With the highly automated and fast crane it is not possible to operate without. The main advantage is low maintenance and reliability even in less favourable conditions such as rain, fog or snow. **LEHNERT** is committed to quality and fast delivery. Their customer support proved to be willing to always go the extra mile, to satisfy our needs.“

CCT Alpherium

„The feedback from the anti-sway is very positive. **LEHNERT's** remote intervention to South Africa was very helpful to the guys on site and they are very satisfied.“

Danieli Group

Lehnert stands for experience, innovation and quality

What once began as a simple anti sway system has since developed into a sophisticated automation solution that offers a wide range of functions to optimize crane operation.

Safety is our priority. The protection of people and machines can only be guaranteed if the sway control and intelligent monitoring functions work together.

Expertise through expertise, flexibility and transparency

LEHNERT offers user-friendly software and reliable hardware. Powerful, optimized hardware opens up possibilities that go beyond conventional technology. Founded as a family business in 2009, **LEHNERT Regelungstechnik GmbH** has developed into an innovative company that manufactures, supplies and commissions control systems for sophisticated cranes worldwide.

Founded: October 2009
Company headquarters: Magdeburg, Germany
Capacities: more than 400 units p.a.



lehnert.®



Request a quote from
Tobias Lindstädt
Phone +49 151 244 140 67
sales@antisway-lehnert.com

Lehnert Regelungstechnik GmbH
Bleckenburgstraße 11a
39104 Magdeburg
Germany

Phone +49 391 535473-13
info@antisway-lehnert.com

www.antisway-lehnert.com