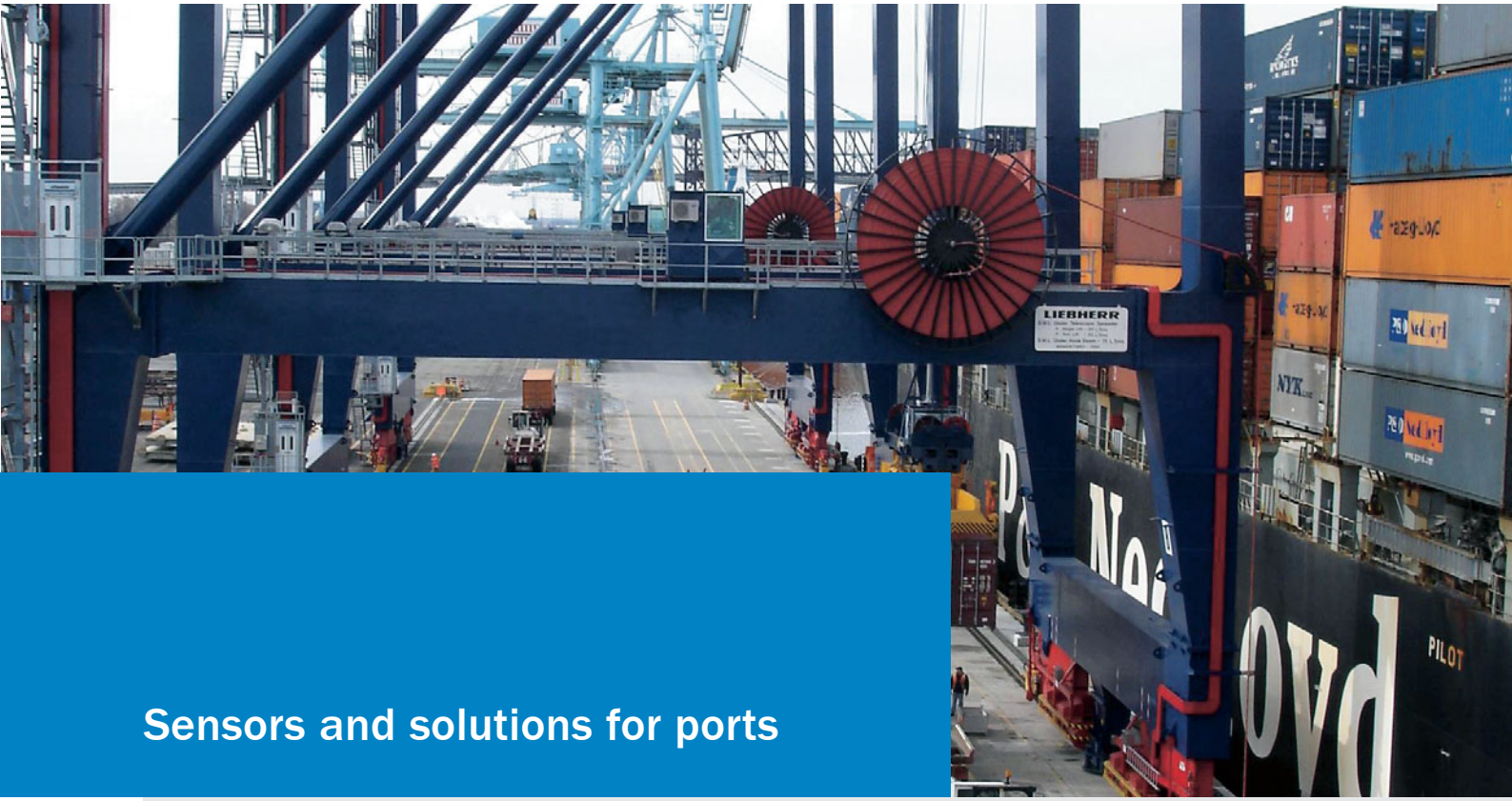
INDUSTRY GUIDE



Sensors and solutions for ports

Higher efficiency and greater safety

SICK
Sensor Intelligence.

SICK sensors connect companies and markets

SICK – one of the world's leading producers of sensors and sensor systems for industrial applications. SICK is a technology and market leader in factory automation. Founded in 1946 and based in Waldkirch, Germany, the company today has a global presence through numerous subsidiaries, participations and sales offices.

INDUSTRIAL SENSORS

INDUSTRIAL SAFETY SYSTEMS

AUTO IDENT

The global partnership for port automation

Our global understanding of customers' requirements and technical problems has been the key to our success world-wide and ensures high-quality products especially adapted to your applications.

With SICK you will find a personal advisor in your area who will be at your side, providing high-level technical consultation and support. Over the years, we have supplied sensor solutions to numerous port operators, crane manufacturers and system integrators throughout the world. We have wide experience in sensor technology for the automation of port equipment and for safely speeding up the movement of cranes and vehicles operating in harsh environments. This experience is now available to you, through collaboration with our people worldwide.

IN USE WORLDWIDE – PORT SOLUTIONS FROM SICK

The world's 20 largest freight ports and the most important suppliers of port equipment have relied for a long time on laser measurement solutions from SICK. Individual solutions have been developed and implemented on-site for the most varied of port automation tasks. Successful applications include collision prevention for STS cranes and trailer positioning below them, automatic stack solutions for auto stacker cranes (ASCs), collision prevention for rubber tyre gantries (RTGs) and navigation applications for straddle carriers.

THE BENEFITS OF WORKING WITH SICK

- Innovative sensor technology
- Wide product range
- Broad application experience and competence
- High reliability and punctual delivery
- Worldwide support

Sensors and systems for ports and cranes

Time is money: today this is generally true, but especially in ports and in inter-modal hubs. The efficient handling of containers and bulk goods requires the introduction of automation in all handling processes. In SICK's product portfolio you will find a complete range of special devices to control and secure your cranes and trucks.

Linear encoders

Photoelectric (proximity) switches

Inductive sensors

Distance sensors

Rotating encoders

Safety switches

Safety light curtains

Laser measurement systems

THE SICK PRODUCT RANGE

- Linear encoders
- Photoelectric (proximity) switches
- Inductive sensors
- Rotating encoders
- Distance sensors
- Safety switches
- Safety light curtains
- Laser measurement systems

Technology at the speed of light

Time-of-flight technology forms the basis of many of our most successful products and systems. TOF technology makes it possible to measure long distances by measuring the time used by light to reach a target and return again. In our product portfolio, we have 1D (distance measuring) TOF products and 2D (measuring an area by scanning) TOF products.

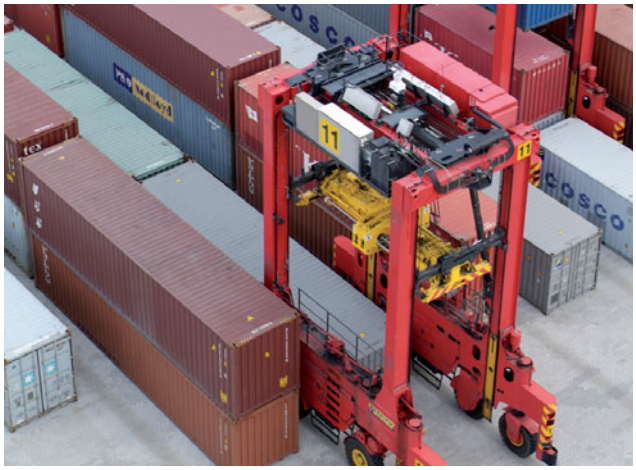
Many of our TOF-technology based products find industrial application in demanding tasks, such as controlling the position of cranes and vehicles on rails, the protection of the vehicles and goods and of the operators, and the measurement of the size and volume of objects.

A challenge for any port: avoiding accidents

Every day, accidents delay and partially or completely stop the operation of ports worldwide, for minutes, hours and sometime even for longer periods. A lot of money is lost every year in the operations needed for recovering the port equipment after an accident, and because of the damage to the handled goods.

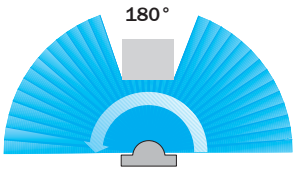
SICK can help terminal operators drastically reduce the probability of collisions between cranes, vehicles and goods – thanks to its range of optical switches and scanners.

Long-distance photoelectric (proximity) switches and 1D TOF laser devices can be used to maintain a minimum distance between vehicles operating along the same driveway.
2D TOF scanners can be used to generate a protective area of any shape around a moving vehicle, such as cranes or trucks, and to detect any fixed or moving obstacle: the speed of the vehicle can be reduced or the vehicle stopped completely.



Positioning a straddle carrier

The LMS221/LMS291 scanner's "laser fan". Any infringement of the area between the crane boom and the ship is monitored.



APPLICATIONS

- Protection of the driveway of STS cranes
- Minimum distance between trucks
- Minimum distance between yard cranes
- Protection from risk of collision between the crane boom and the ship deck
- Collision prevention for RTGs
- Boom collision prevention on STS cranes

DMT/DML
distance sensors

DS60
distance sensor

LMS2xx Outdoor laser measurement system

Optimised solutions in port operations

The major automation issue in the port environment is the correct and rapid positioning of yard cranes over the parking slots, and the relative positioning of the trolley over the crane, whether STS or yard type.

CRANE POSITIONING

A good automation system will help the port operator save time in serving a ship, in storing and retrieving a container without errors and in avoiding damage to the containers. A reliable automation system for crane operation must be based on high-quality, reliable sensors, able to precisely detect the position of a vehicle or its relative distance from a fixed target.

SICK assists crane manufacturers and system integrators in developing optimised solutions, based on a wide range of different sensors:

- Linear absolute positioning systems up to 1.7 km
- Rotating encoders for loop control of motors
- TOF laser distance sensors

All the sensors are characterised by the traditional quality and reliability of SICK products and are specially designed to operate in the harsh environment of ports, where snow, fog and rain can be a normal situation.

CONTAINER POSITIONING

Together with their partner company, SICK has developed a special sensor, able to detect the relative position of a container by measuring its corners.

This device is used in the grabbing and picking up of containers in the yards and in loading them onto the transport trucks in one fully-automated process.
The system allows completely automatic management of the container yard and makes STS operation on the quayside much faster and safer.

Smooth container positioning with the LD-LRS

AGVs – AUTOMATED GUIDED VEHICLES

Guidance and safety of automated guided vehicles (AGVs) are achieved in several different ways, but all using the LMS, which is present in most systems transporting containers in ports worldwide! Outdoor LMS is used to verify that the area in front of the AGV is free from obstacles, stationary or moving. When an object enters the sensing field of LMS the vehicle is slowed down and, if the object is getting too close, the vehicle is completely stopped. Outdoor LMS is equipped with special software which takes into account the possible presence of harmless objects such as raindrops or snow flakes.

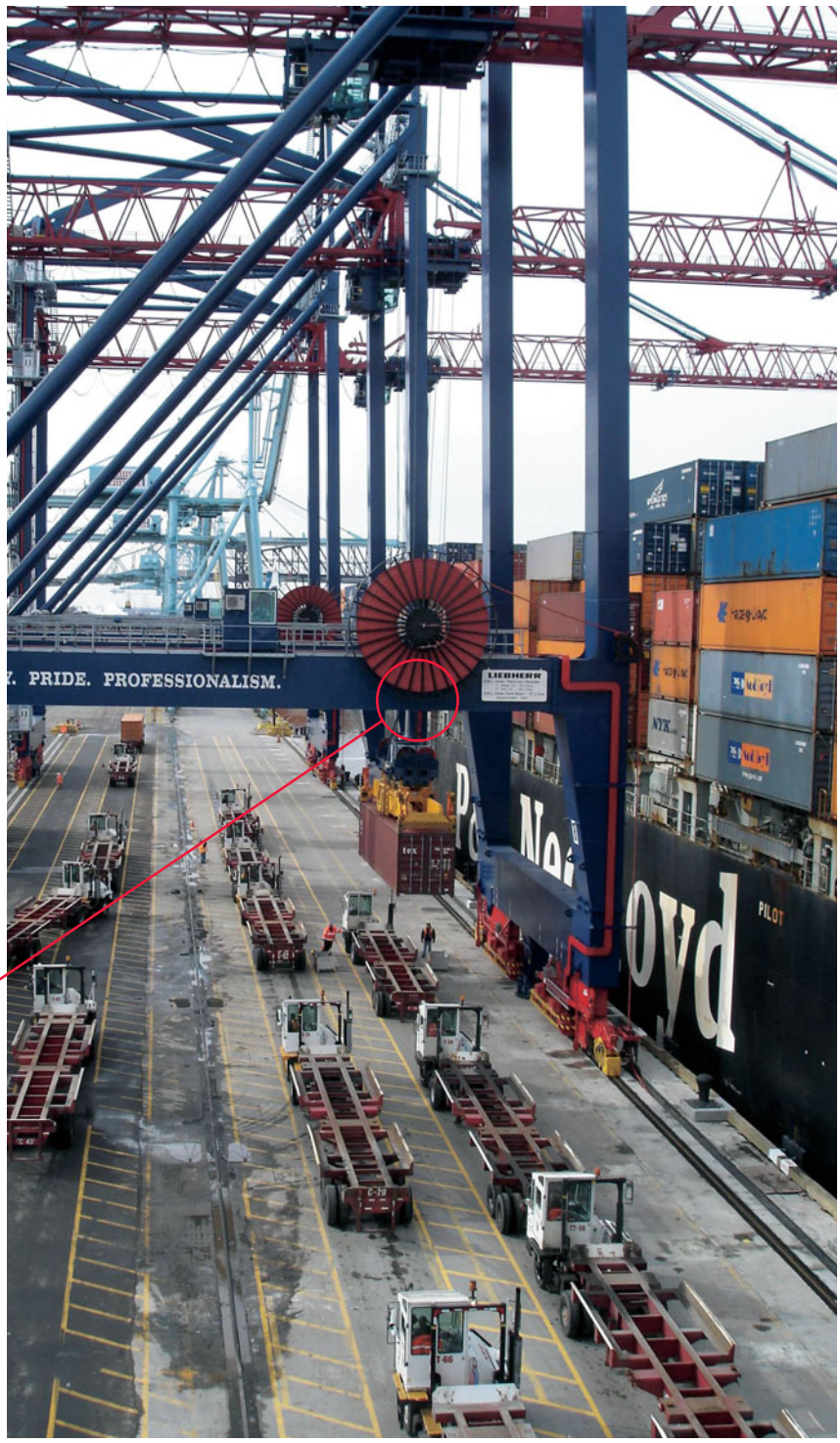
Collision prevention on an AGV (container) using LMS

More effective container handling

TRAILER POSITIONING

The gantry cranes recently installed at the New York Container Terminal by Liebherr Container Cranes Ltd. offer increased productivity during container handling. This has been made possible by LMS laser measurement systems, with whose help the truck trailer to be loaded or unloaded can be ideally positioned below the gantry. The new solution from Liebherr is called the Trailer Positioning System (TPS). Four scanners per gantry – one for each truck lane – detect the trailer. Light signals assist the drivers to position their vehicles extremely accurately. At the same time, the system shows the crane operator where the trailer – with or without a 20- or 40-foot container – is located.

More rapid container handling
Containers can now be handled more quickly thanks to the TPS. The time needed for positioning and fine adjustment of the hoisting equipment has been considerably reduced.



A trailer positioning solution used worldwide – with the LMI200 and LMS2xx Outdoor

Trailblazing project successfully implemented

THE STRADDLE CARRIER PROJECT

Straddle carriers are used for stacking containers, transporting containers from the unloading crane to the storage space, and for loading or unloading trucks and, as a result of their flexibility and mobility, guarantee rapid container handling at ports. Enhanced straddle carriers (ESCs) are an innovative further development with solutions from SICK. Equipped with four Outdoor laser measurement systems, the ESC works without a driver but with maximum precision and reliability.

Obstacle detection via laser measurement is one of the key features of the automatic, free-moving transport system. Obstacles are detected and, if necessary, detoured around as a result of evaluation of the laser pulses emitted. During container uptake, continuous evaluation of the LMS data is also used to manoeuvre the ESC into the ideal position to pick up the containers.

ADVANTAGES

- Precise positioning
- Navigation and collision prevention with a single laser scanner
- Low maintenance effort
- Very high measurement accuracy in relation to range
- Real-time data output

The LMS2xx Outdoor laser measurement system

RANGE OF EXPERTISE

Industrial Sensors

Our complete range of sensors provides answers to suit any application in the field of automation. Even under rugged ambient conditions objects are reliably detected, counted and positioned in respect of their form, location and surface finish, as well as their distances established with pin-point accuracy.

Industrial Safety Systems

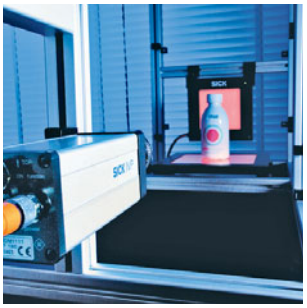
Comprehensive protection for man and machine – advanced SICK products developed and manufactured by a sensor specialist for the protection of hazardous areas, hazardous points and for access protection. SICK is setting new standards with services related to machine safety.

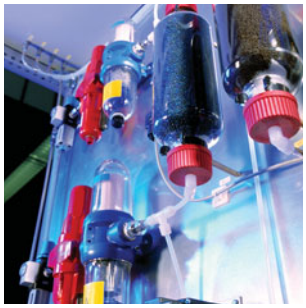
Auto Ident

Whether the tasks involve identification, handling, classification or volume measurement, innovative Auto Ident systems and laser measuring systems function extremely reliably, even under rapid cycle times. They conform to the latest Standards and can be simply and speedily integrated in all industrial environments and external applications.

Analyzers and Process Instrumentation

System control, maintaining setpoints, optimising process control and monitoring the flow of materials – the instruments and services for Analysis and Process Measurement, supplied by SICK MAIHAK, are setting the standards for these applications in terms of Technology and Quality.





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Sensor Intelligence.