



Products & Applications

**Sensors and solutions for the steel and metallurgic industry**  
Higher quality, efficiency and safety



**SICK**

# 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.

## Laser distance sensors and scanners: hi-tech solutions for modern industry

The measuring laser devices have a special position in the SICK product portfolio. Based on the ‘Time-Of-Flight’ (TOF) technology, these instruments are able to measure distances and profiles of target objects.



*LMS Outdoor Measurement scanner*



*S 3000 Safety laser scanner*



*LMS Indoor Measurement scanner*



*LD OEM Measurement scanner*



*NAV 200 Positioning system for vehicles*



*LMS 400 for robotic applications*



*DMT/DML Distance measuring sensor*

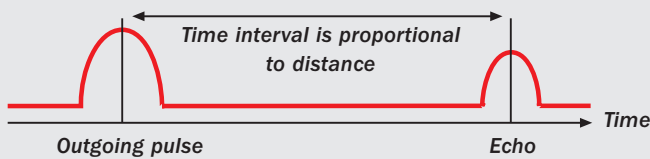


Using the TOF distance sensors and scanners SICK provides solutions, throughout the world, to demanding applications, such as positioning and anti-collision of cranes, automatic parking of planes, vehicle classification in free-flow traffic, guidance and protection of vehicles and robots, anti-intrusion in building security, people counting in crowded public areas.



## Laser scanners: virtual eyes to measure, control and protect

**SICK is the leader in Time-of-Flight technology (TOF).** This principle forms the basis of many of SICK's most successful products and systems. TOF makes it possible to measure long distances in straight lines and profiles across a plane. In our product portfolio, we have "1-D" TOF Distance Sensors (using a single laser beam) and "2-D" TOF Scanners (measuring profiles and areas by means of a rotating laser beam and an encoder).

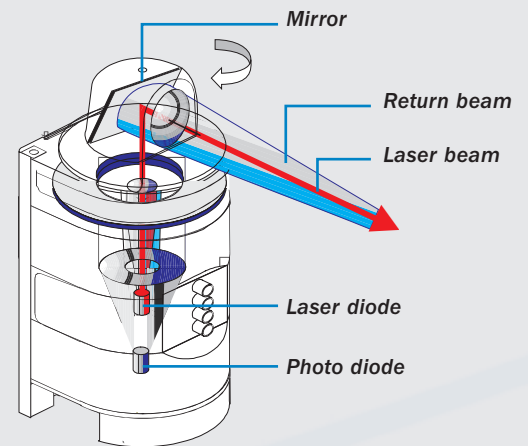


### Technology at the speed of light

The distance between the sensor and an object is calculated by measuring the time interval between an outgoing laser pulse and its echo (return signal) reflected by the object. The amplitude of the echo signal can be used to calculate the reflectivity of the object's surface.



The LD Laser Scanner:



## Single-beam sensors for distance measurement ...

SICK's product portfolio of laser distance sensors for positioning, measuring and for anticollision includes devices for measurement on natural targets, hot surfaces (DMT) and on reflectors (DML).

	DMT 1111/1211	DMT 1113/1213	DML 1111/1211
Range on natural target (6 % reflectivity)	40 m	20 m (surface temp. up to 1200 °C)	—
Range on reflector (1 m x 1 m)	—	—	300 m
Available interface (mod. 1111 and 1113)	RS 232 4 to 20 mAmp 2 PnP outputs	RS 232 4 to 20 mAmp 2 PnP outputs	RS 232 4 to 20 mAmp 2 PnP outputs
Available interface (mod. 1211 and 1213)	PROFIBUS DP	PROFIBUS DP	PROFIBUS DP
Operating ambient temperature	0 to 40 °C	0 to 40 °C	0 to 40 °C

## ... and powerful, versatile scanners

SICK offers various types of devices to fulfill any industrial demand: the LMS 200 family for indoor and outdoor use, the LMS 400 and the new LD OEM 360° scanner for robotics.

	LMS 200 Family	LMS 400	LD OEM
Range (10 % reflectivity of target)	10 m	3 m	33 m
Angular resolution	0.25° to 1°	0.1° to 0.25°	0.125° to 1°
Scanning angle	180°	70°	360°
Interface	RS 232/RS 422	RS 232/RS 422 CAN/Ethernet	RS 232/RS 422 CAN
Dimensions in mm ( W x H x D)	155 x 210 x 156	352 x 266 x 229	120 x 222 x 115
Operating ambient temperature	0 to 50 °C indoor versions -30 to 50 °C outdoor version	0 to 40 °C	0 to 45 °C



Our large experience in sensing technology and our understanding of customers' requirements have been the key to our success and ensure high quality products adaptable to your specific needs.

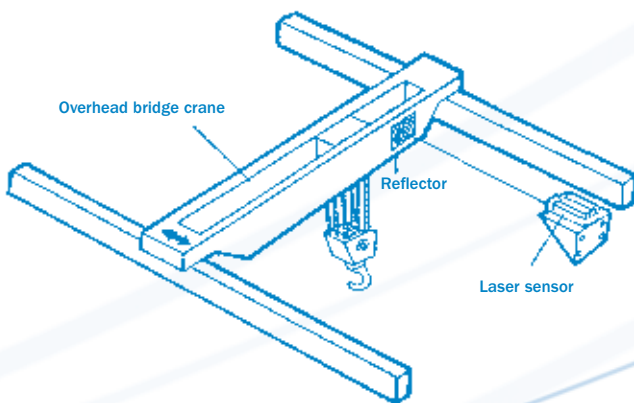
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**SICK**  
Partners in Laser Technology

## Ready-made positioning of cranes with DML

The DML, distance measurement sensor on reflectors, is the basis of a simple, easy-to-implement, positioning control for bridge cranes. It provides reliable measurements of the position of the crane and of the position of the trolley over the crane, which can be immediately fed into a PLC controller. This non-contact measurement solution offers enormous benefits in comparison to encoder systems.



*DMT and DML are used to make a precise automatic closed-loop control of the crane position*

### SICK helps prevent accidents to persons and damage of goods and machinery

SICK sensors may help you to make your work-area safe for the personnel and to avoid damages to goods and machinery, caused by the movements of cranes and other automatic or semi-automatic vehicles.

We have a large variety of sensors for the prevention of collision and of accidents to people.

Ask our experts: we will be glad to support you and your company!



## Coil and slab warehouse management with DML

The position (X,Y) of each coil is measured by means of two DML units operating over the bridge-crane. The acquired data is stored in the warehouse management computer. When a specific coil is needed for further processing or shipment, it is automatically retrieved from the storage area by aid of its stored co-ordinates. The complete system is available as a stand-alone package produced by LASE.

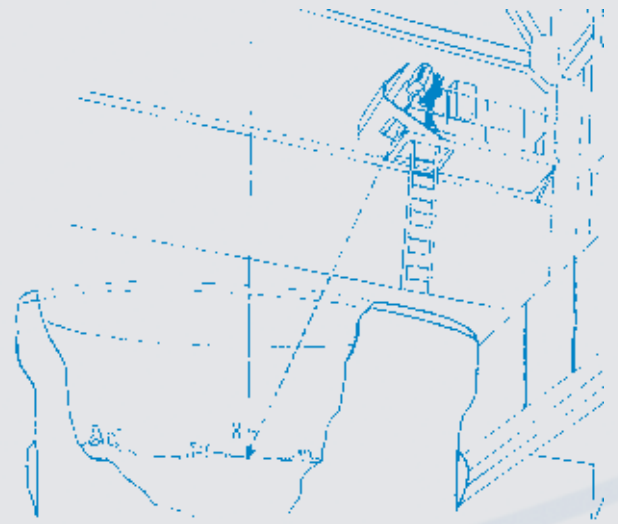


## Level measurement of liquid metal

A special version of DMT is used to measure the level of the liquid metal inside the ladle. A robust housing is built around the DMT to protect it from dust, mechanical shocks and heat. Another DMT is used to control the movement and the positioning of the ladle-truck beneath the furnace.



*DMT, a reliable sensor for high-temperature surfaces*



## Measuring on hot and molten metal: a tough challenge

In metal processing there are several procedures, where it may be necessary to keep the level of molten metal under control or to measure the size and position of red-hot slabs. This is a tough task for any type of electronic device, due to the heat, the infrared radiation and the generally-tough environment. The laser TOF technology meets up to the most difficult challenges.

## Protective housing

Depending on the type of environment, the DMT and the DML may need special housings to withstand dust, heat and mechanical shocks.



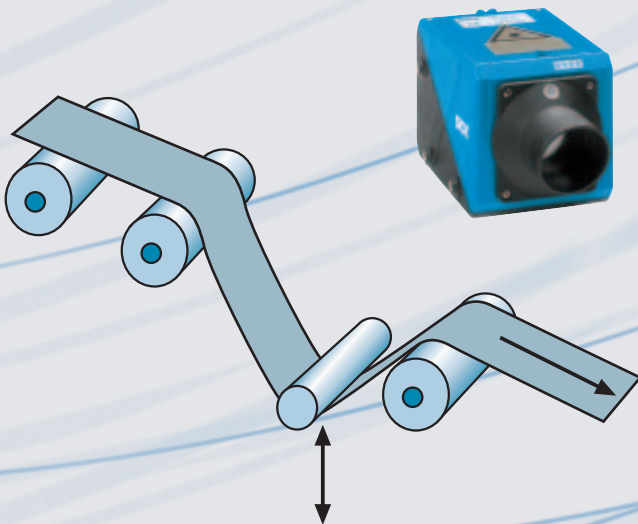
## Positioning and measuring of hot slabs in the oven

Slabs are taken to the heating oven before milling, by means of a roller conveyor, which may cause irregular positioning. A pair of sensors may be used to measure the size of the slab for classification and determine its position in order to optimize the movement of the pushers and avoid time-consuming and dangerous mistakes.



## Loop control in hot/cold rolling mills

The DMT is used in several procedures to control the loop of the steel rolling strip. This loop is generated in order to keep the tension of the strip under control on other parts of the rolling line. The DMT delivers a reliable, real time measurement of the depth of the loop.



### Other areas of application

- Measurement of bulk materials
- Length and width of slab and billet in continuous casting
- Length and width of slabs
- Diameter and height of coils

Detection of the position, and measurement of coils, tubes, slabs, etc. is made possible by SICK laser scanners and measurement devices.



### Find the right sensor for your application in SICK's wide product range

SICK has a large range of rugged, reliable sensors to solve your application: photoelectric switches, distance sensors, safety or measurement laser scanners, inductive sensors, safety interlocks and many more.



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.



Comprehensive safeguarding of both personnel and machinery! As specialists in Sensor Technology, SICK develops and manufactures pioneering products for providing protection in hazardous zones, dangerous locations and for safeguarding access points. By providing services, which encompass all aspects of machine safety and security, SICK is setting new standards in Safety Technology.



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.



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.

## SICK Sensor Intelligence.

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