



LMS1000

LIGHTNING-FAST MEASUREMENT – IN RECORD TIME!

2D LiDAR sensors

SICK
Sensor Intelligence.

A PIONEER IN SPEED AND RELIABILITY



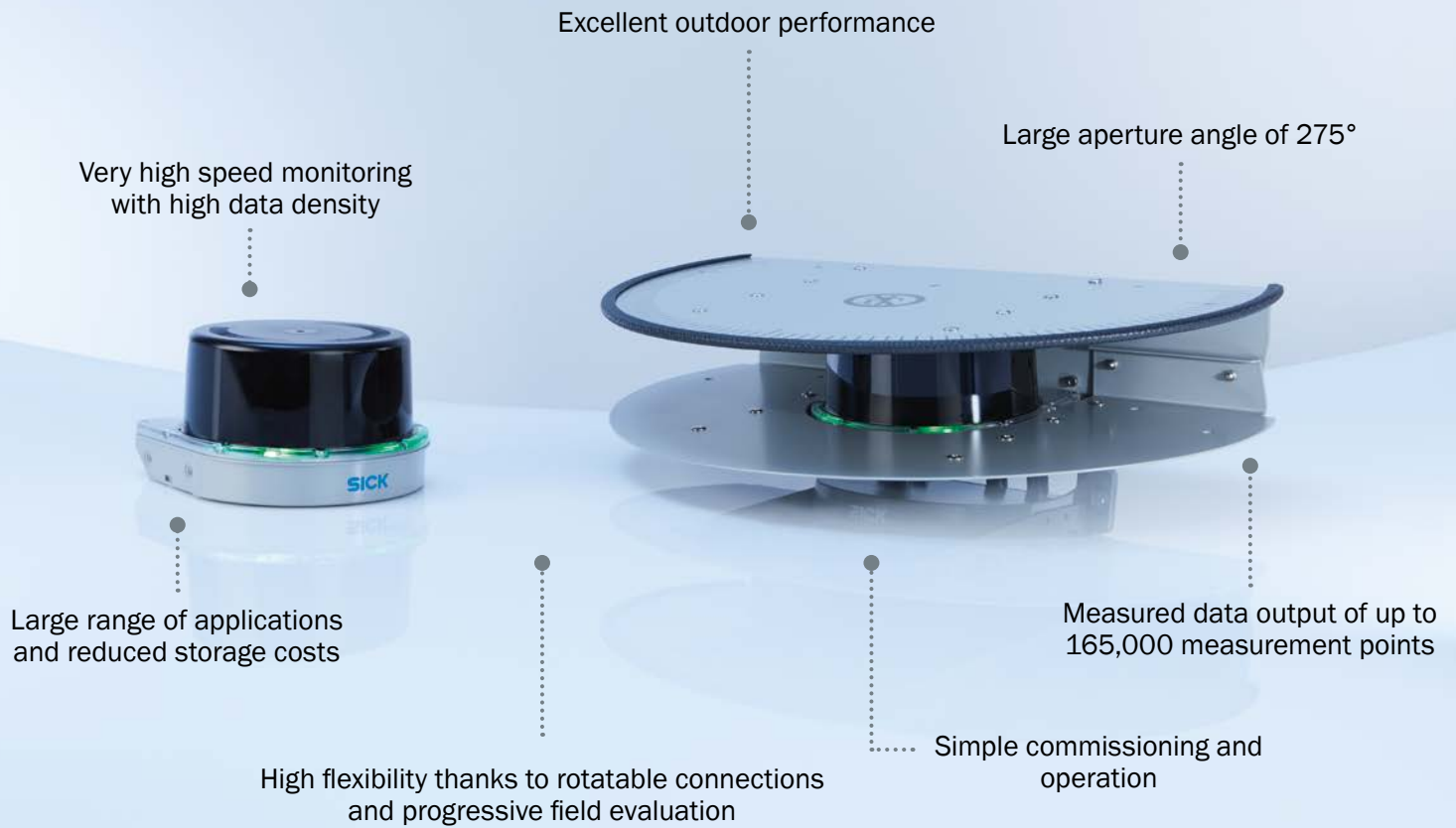
Reliably detecting objects at very high speeds is a challenge. This task becomes an even bigger challenge when adverse ambient conditions greatly impair visibility. The LMS1000, a 2D LiDAR sensor, also called a 2D laser scanner, is a specialist in exactly these types of situations. It reacts as quick as lightning with its revolutionary scan rate of 150 Hz and can be used even in rough weather thanks to modern HDDM+ technology and reliable evaluation of three echo signals. Packed in an housing with enclosure rating IP67 suitable for the outdoors, the LMS1000 ensures stable measurement results with up to 165,000 measurement points per second. That is quicker than you can see.





Hz

STRONG PERFORMANCE, VERSATILE IN USE



HDDM+ technology for greater durability during measurement

The LMS1000 uses the HDDM+ technology. It enables measurement at long distances and is characterized by low noise in the measured value data as well as multi-echo capability.

The principle of operation of the HDDM+ is clever: infrared laser pulses are generated in the device in a swift chronological sequence. The large quantity of measurement data per angle degree generated this way ensures gap-free scanning, thereby enabling high edge precision, for example. Ambient conditions which could impair the measurement are filtered out. The LMS1000 is therefore very reliable when ambient light and other types of interference exist in the measuring range, for example rain, snow or fog, and provides high measurement certainty even when used outdoors.

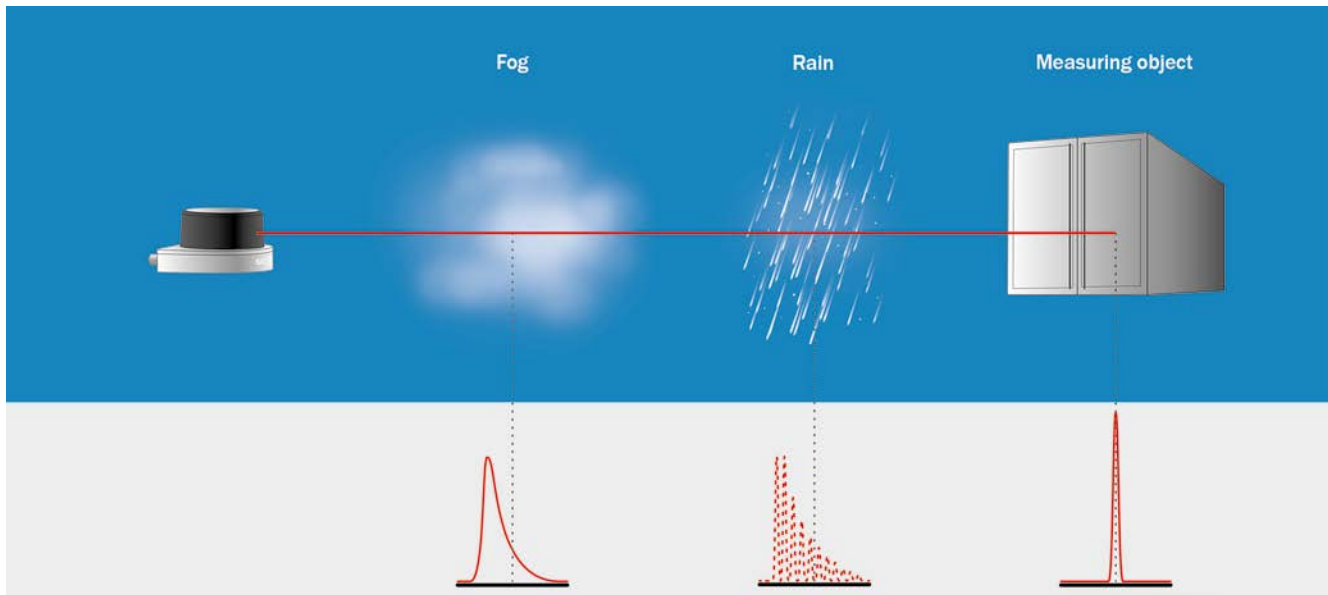
Highest speed and flexibility

The LMS1000 stands out due to its first-class performance and position as a market leader. With a aperture angle of 275° and a lightning-quick scan rate of 150 Hz, its performance in data collection and object detection is excellent. The LMS1000 detects up to 55,000 measurement points per echo. By evaluating three echoes, a total of up to 165,000 measurement points are available per second. A combination of field evaluation and measured data output means various applications can be covered with one sensor. Rotatable connections also enable flexible mounting, both indoors and outdoors.

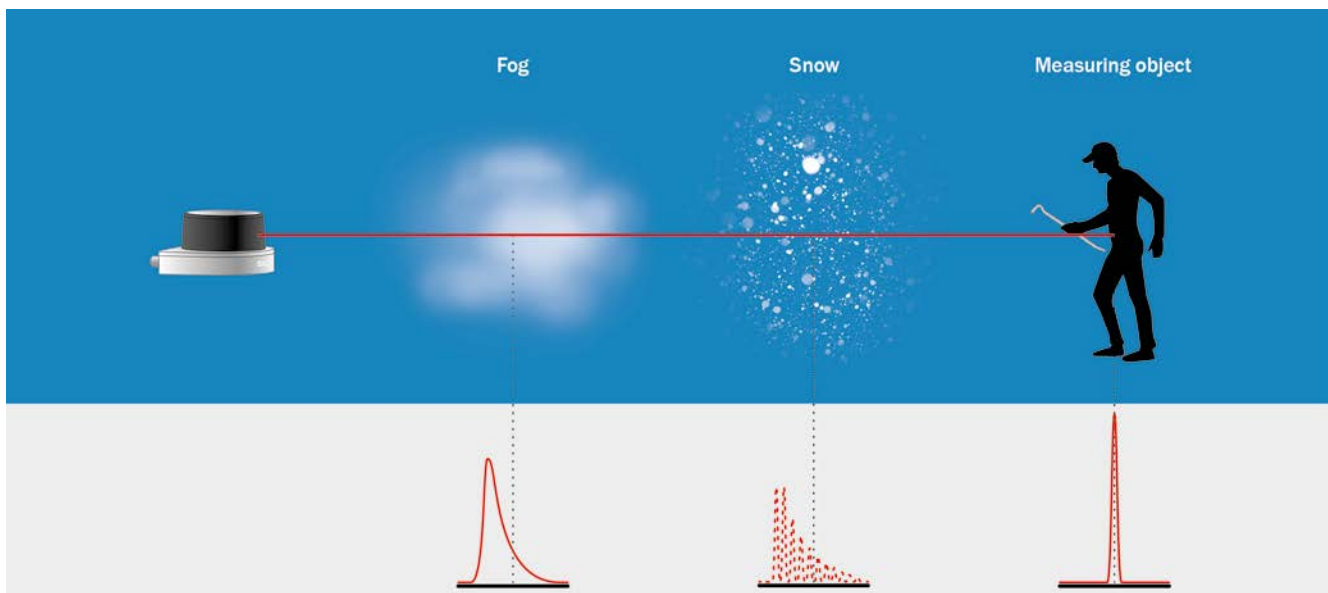
Multi-echo evaluation for higher reliability

The distance between the LiDAR sensor and an object is calculated via the time-of-flight of the emitted pulse. The LMS1000 can evaluate up to three echo signals for each measuring beam, delivering reliable measurement results at all times, no

matter whether from behind glass or outside under unfavorable ambient conditions. Even for applications with poor visibility, such as in tunnels or in mines, the LMS1000 always has the best perspective.



Industry applications: Traffic.



Industry applications: Building management.

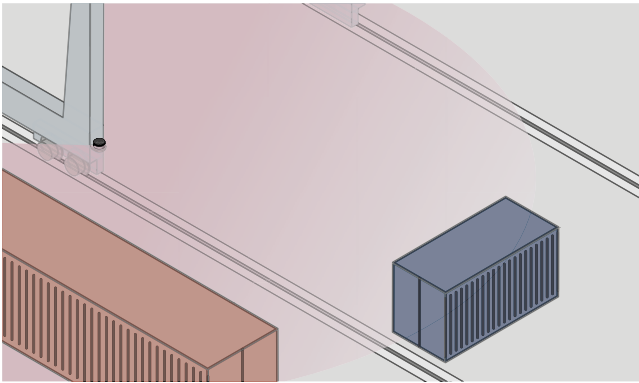
ADDITIONAL PERFORMANCE INCREASE THANKS TO FILTERS

The LMS1000 is the ideal solution for indoor and outdoor applications, even for applications under adverse ambient conditions. This outstanding performance can be improved even more with additional digital filters for preparation and optimization of measured distance values. The user therefore has the option of adjusting the LiDAR sensor to the specific requirements of the respective application. This makes it possible to prevent virtually all faults.

SICK offers various filters to perfectly and efficiently adjust the LMS1000 to the present task.

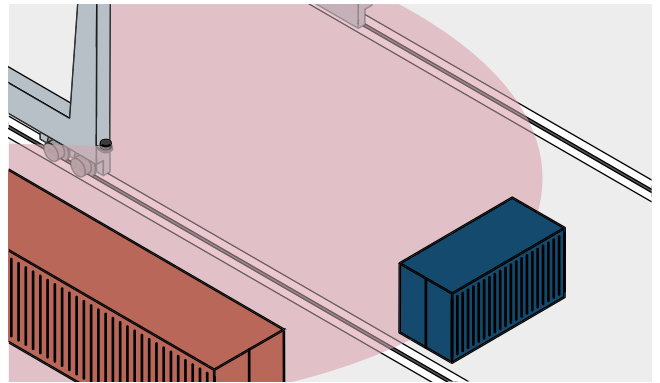
Fog filter

Thanks to the fog filter, the LiDAR sensor eliminates unwanted echoes at close range.



Without a filter: Due to reflections, the object can only be detected through fog with difficulty.

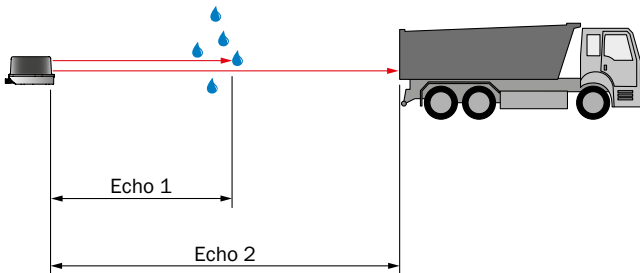
This considerably lowers the probability of false activations at close range in fog.



With a filter: Reliable object detection by blanking unwanted echoes.

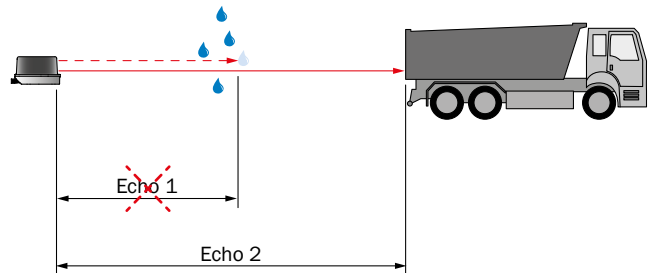
Echo filter

Thanks to the echo filter, the LiDAR sensor screens out unwanted measurement data and signals caused by edge hits, rain, dust, snow and other ambient conditions. You can set whether the first, the last, or all three echoes are output.



Without a filter: The LiDAR sensor receives unwanted echoes from ambient conditions such as rain.

The other pulses triggered by undesirable ambient conditions are not taken into account. For more information, also see [→ „Multi-echo evaluation“ on page 5](#)

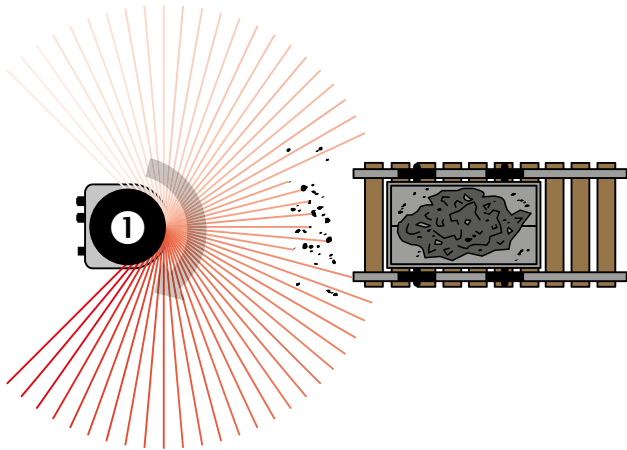


With a filter: The LiDAR sensor blanks unwanted echoes from ambient conditions in accordance with the specifications.

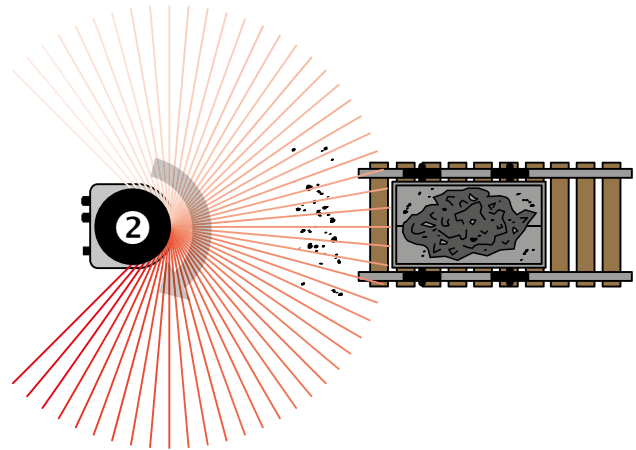
Particle filter

The particle filter blanks small, irrelevant reflection pulses in dusty environments and in rain or snow which are caused by dust particles, raindrops, snowflakes or the like. In doing so,

successive scans are continuously evaluated in order to detect static objects.



Without a filter: Violation of the contour due to dust particles in the object environment.

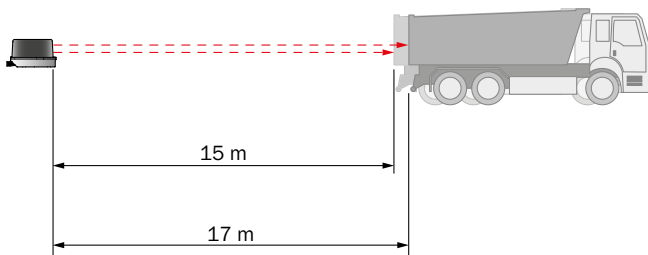


With a filter: The reaction to dust particles in the evaluation field is delayed by a scan. Particles can thereby be blanked.

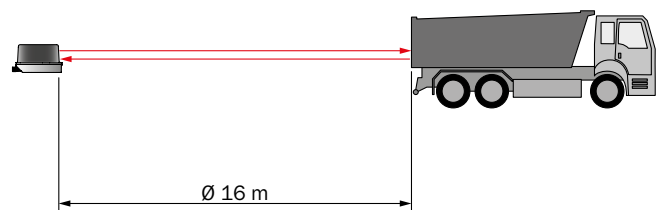
Mean filter

With the mean filter, an average value is calculated from the number of scans configured and then output. The big advantage when using this filter: Potential noise, i.e. minimal

deviation of values, is reduced, which also lowers the quantity of data.



Without a filter: The LiDAR sensor detects and processes all received signal values.



With a filter: The LiDAR sensor calculates an average value from several signal values.

The advantages of the LMS1000 at a glance

- ⊕ Outstanding availability even under unfavorable ambient conditions
- ⊕ Maximum reliability when detecting objects
- ⊕ High measurement field coverage due to high scan speed
- ⊕ Flexible and powerful SOPAS ET configuration software
- ⊕ Display in SOPAS ET and web server
- ⊕ Integrated field evaluation and measured data output makes it possible to tackle various applications with one sensor

EFFICIENCY AND FLEXIBILITY AT THE HIGHEST SPEEDS

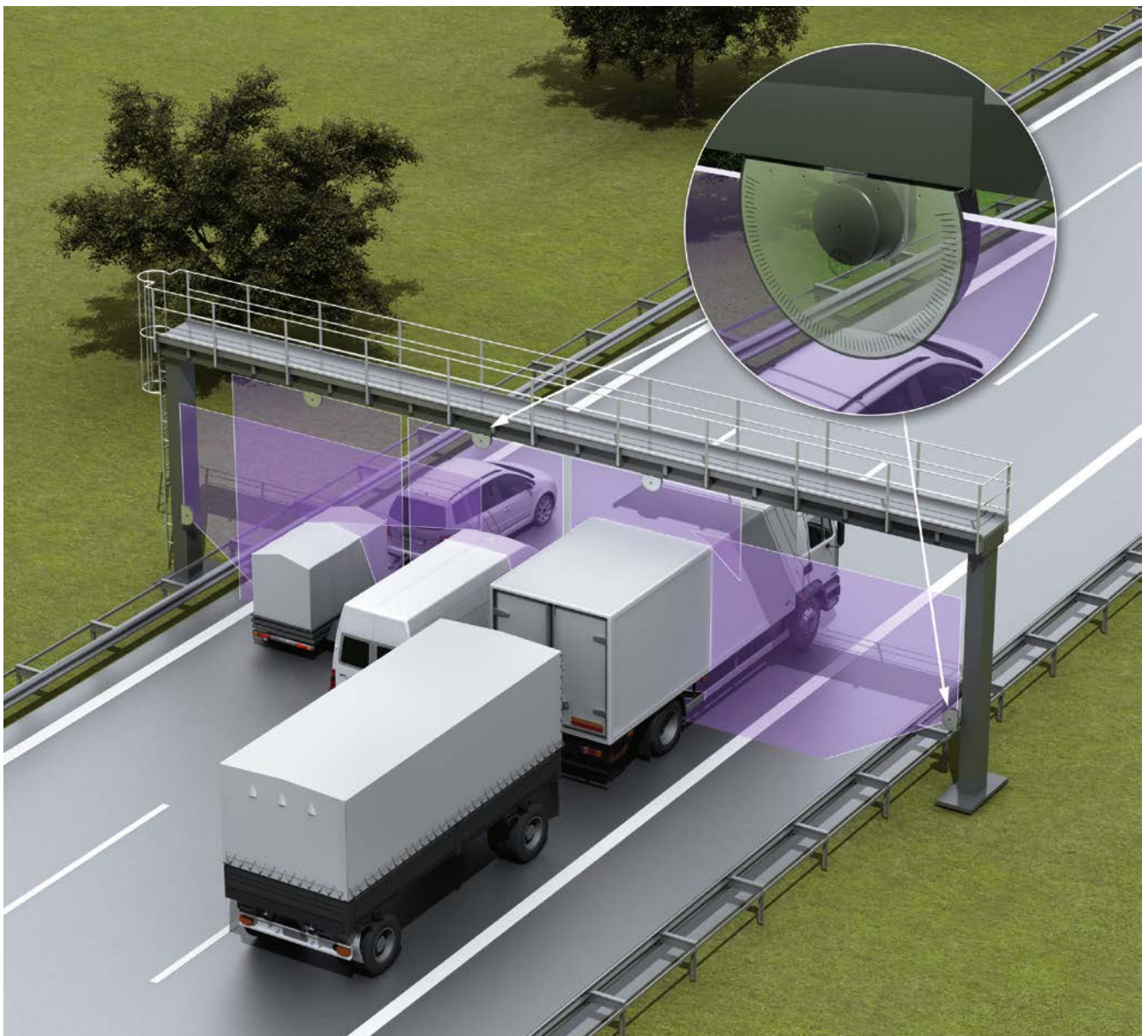
With its combination of field evaluation and measured data output, the LMS1000 covers various application areas. This increases flexibility when it comes to application possibilities in your industry, while at the same time reducing storage costs and expenditures for different variants as well as integration.

Very high speed monitoring in traffic management

Due to its excellent outdoor capabilities, the LMS1000 is perfectly suited for reliable traffic monitoring at toll stations or road control posts. With its integrated high speed evaluation, it delivers stable measurement results even in fast-flowing traffic.

Benefits

- + The very high scan rate makes excellent data collection and object detection possible
- + High availability due to HDDM* technology with multi-echo evaluation, even under unfavorable ambient conditions such as rain, snow, and dust

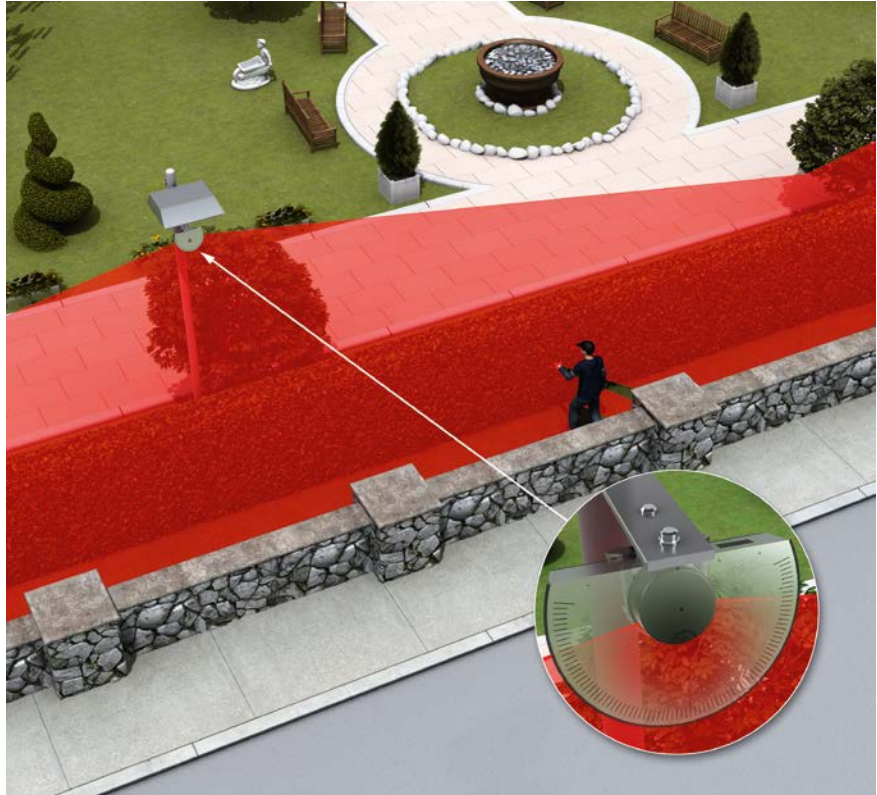


Building safety and security and access control

The LMS1000 delivers reliable measurement results when protecting indoor and outdoor areas and is well-suited for object protection and access control.

Benefit

- + Field evaluation or measured data output makes it possible to cover various applications with only one sensor

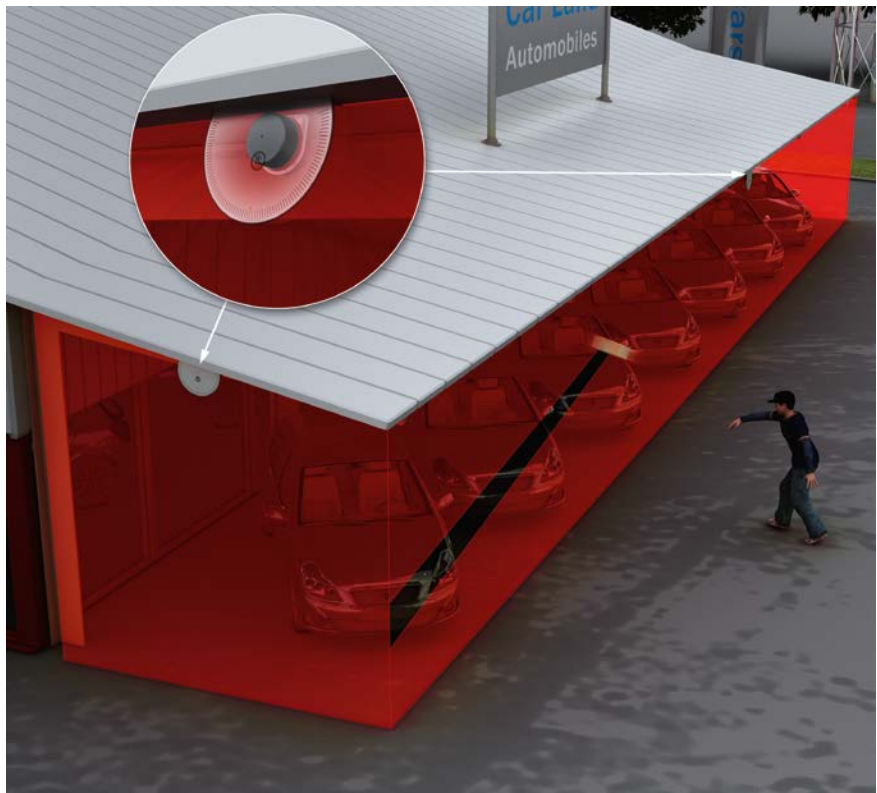


Fast pass-through monitoring

If fast pass-through monitoring is required, e.g. where strict safety precautions are necessary, such as in airports, prisons or for anti-theft security, the LMS1000 is the ideal solution thanks to its high scan rate.

Benefits

- + Fields that are easy to teach in save time during setup
- + High flexibility for installation thanks to rotating male connectors



SERVICES FOR LMS1000

SICK's services increase machine and plant productivity, enhance the safety of people all over the world, provide a solid foundation for a sustainable business operation, and protect investment goods. In addition to its usual consulting services, SICK provides direct on-site support during the conceptual design and commissioning phases as well as during operation.

The range of services not only covers aspects like maintenance and inspection, but also includes performance checks as well as upgrades and retrofits. Modular or customized service contracts extend the service life of plants and therefore increase their availability. If faults occur or limit values are exceeded, these are detected at all times by the corresponding sensors and systems.

Commissioning



Professional commissioning by SICK ensures optimal performance of the LMS1000. It includes the set-up of previously defined functions of the LMS1000 taking into account the interface to the machine or system and the ambient conditions of the application. The effort needed for commissioning depends on the customer application. A distinction is made between the Core and Prime packages.

The LMS1000 and the respective system part are handed over to the customer during a documented end approval with instructions. With the commissioning, the customer profits from quick processing of the qualified SICK technician and the high level of availability from the first day.

Commissioning LMS/MRS/NAV/TiM (Core package)

→1682021

Commissioning LMS/MRS/NAV/TiM (Prime package)

→1680672

Your benefits

- Maximum availability and productivity due to application-optimized settings of the LMS/MRS/NAV/TiM such as several monitored areas
- Cost savings thanks to fewer downtimes, malfunctions, consequential damages or inaccurate measurements as well as follow-up inspections
- Planning security due to a quick shift to normal operation
- Time savings due to archiving of the parameters and commissioning documentation for possible conversion or maintenance work

Maintenance



Planned regular and professional maintenance work on the application ensures uniformly high availability of the SICK product and reduces unwanted downtimes. Maintenance work includes the inspection, maintenance and restoration of defined functions of the SICK product and its interface to the machine or system. This makes it possible to detect performance losses early on and eliminate them. Preventative measures for preventing errors are also recommended.

SICK defines the maintenance intervals together with the customer. At a fixed price so that maintenance costs remain manageable..

Maintenance LMS/MRS/NAV/TiM →1682593

Your benefits

- Maximum availability and improved performance
- Prevention of downtimes, malfunctions or consequential damages
- Predictable maintenance costs
- Cost savings due to fewer inaccurate measurements, meaning fewer follow-up inspections are necessary
- Quick and reliable restoration of parameters if a LMS1000 is replaced later

Warranty extension



The extended warranty offers long-term protection of SICK products for a calculable lump sum. Customers profit above and beyond the standard warranty and protect their investment from unexpected repair costs in the long run. The warranty can be extended to a total period of five years for newly-purchased Identification & Measuring products. This includes free repairs or free exchange of the product in the event of a warranty case.

Three-year extended warranty →1680670

Five-year extended warranty →1680671

Your benefits

- Protection from unexpected repair costs even after the statutory warranty has expired
- Free repairs or exchange of the device in the event of a warranty case
- Value preservation of your plant or system since it is transferable to the next owner and valid all over the world

LIGHTNING-FAST MEASUREMENT – IN RECORD TIME!



Product description

The LMS1000 is SICK’s quickest 2D LiDAR sensor at 150 Hz. Even when the weather is bad, the high speed and exceptional performance ensure that the scanner collects large data quantities and detects even very quick objects. Thanks to the HDDM+ method with multi-echo technology, the scanner is best suited for use outdoors. The combination of high speed and rugged-

ness makes this scanner the perfect candidate in applications that require fast data acquisition such as in traffic management. The LMS1000 is versatile: With field evaluation and data output in one sensor, it is the ideal solution in a wide range of tasks and rotating male connectors make mounting flexible. User-friendly operation rounds off this exceptional profile.

At a glance

- Efficient sensor with integrated high-speed evaluation
- High weather resistance and reliability through HDDM+ with multi-echo technology
- Field evaluation and measured data in one sensor
- Easy configuration, with the ability to adapt to a changing environment
- Convenient and simple diagnostics via web server

Your benefits

- The very high scan rate makes the collection of large data volumes and detection of quick objects possible
- HDDM+ with multi-echo technology for greater availability when subjected to environmental influences like rain, snow, and dust
- High flexibility for installation thanks to rotating male/female connectors
- Integrated field evaluation and measured data output makes it possible to tackle various applications with one sensor
- Low setup costs: Identical telegram for all 2D LiDAR sensors from SICK
- Fields that are easy to teach in save time during setup
- Low maintenance costs thanks to high weather resistance



Additional information

Detailed technical data	13
Ordering information	14
Dimensional drawing	15
Working range	16
Connection type	16
Recommended accessories	17

→ www.sick.com/LMS1000

For more information, simply enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples, and much more.



Detailed technical data

Features

Measurement principle	HDDM*
Application	Outdoor
Light source	Infrared (850 nm)
Laser class	1 (EN/IEC 60825-1:2014; EN/IEC 60825-1:2007)
Aperture angle	
Horizontal	275°
Scanning frequency	150 Hz, 4 x 37,5 Hz
Angular resolution	0.75°
Heating	Self-heating
Working range	0.2 m ... 64 m
Scanning range	
At 10% remission	16 m
At 90% remission	30 m
Spot size	10.4 mrad x 34.9 mrad
Amount of evaluated echoes	3

Performance

Scan/frame rate	55,000 ... 165,000 measurement points/s
Response time	7 ms ¹⁾
Systematic error	± 60 mm
Statistical error	≤ 30 mm
Integrated application	Integrated field evaluation with flexible fields, Data output
Number of field sets	Up to 10 fields
Simultaneous evaluation cases	Up to 10 evaluations
Filter	Fog filter Particle filter Average filter Median filter

1) Depending on the selected filter settings and the object size.

Interfaces

Ethernet		✓, TCP/IP, UDP/IP
Function		Host, OPC, NTP, Measured data output (distance, RSSI)
Data transmission rate		10/100 MBit/s
Digital inputs/outputs		I/O (8 (Multiport))
Output data		Contamination indication IMU (secondary sensor data)
Optical indicators		LEDs
Configuration software		SOPAS ET, Web server (display)

Mechanics/electronics

Electrical connection	M12 round connectors (D-coded, aligned) with swivel connector
Operating voltage	10 V DC ... 30 V DC
Power consumption	≤ 18 W, Power-up max. 35 W for 5 s
Housing	AlSi12 Optics cover: PC
Housing color	Gray (RAL 7042)
Enclosure rating	IP65, IP67 (IEC 60529:1989+AMD1:1999+AMD2:2013)
Protection class	III (IEC 61140:2016-11)
Electrical safety	IEC 61010-1:2010-06
Weight	1.2 kg
Dimensions (L x W x H)	151.9 mm x 150 mm x 92.5 mm

Ambient data

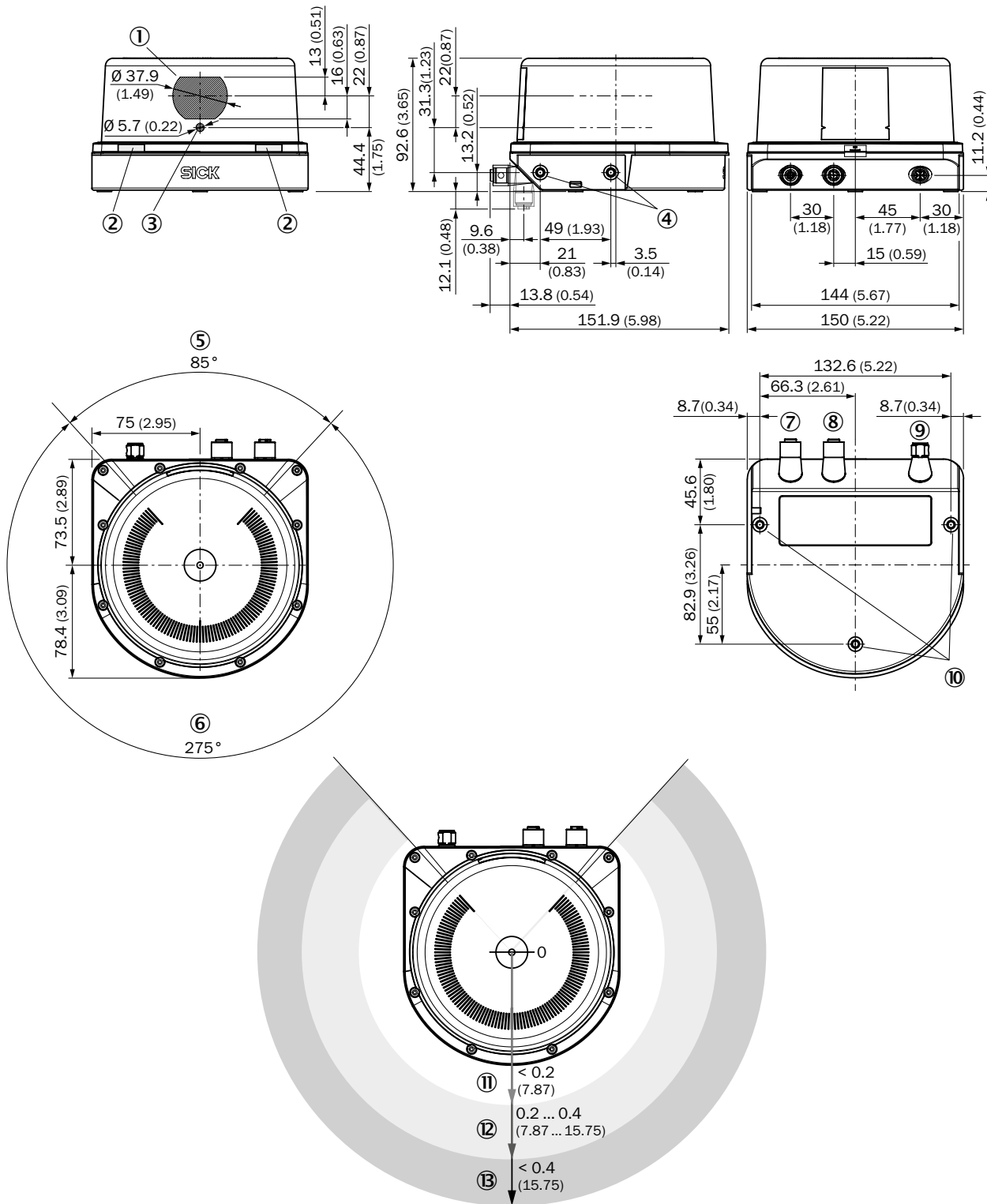
Object remission	2 % ... > 1,000 % (Reflector)
Electromagnetic compatibility (EMC)	EN 61000-6-2:2005 EN 61000-6-3:2007+A1:2011
Vibration resistance	IEC 60068-2-6:2007
Shock resistance	IEC 60068-2-27:2008
Ambient operating temperature	-30 °C ... +50 °C
Storage temperature	-40 °C ... +75 °C
Ambient light immunity	80 klx

Ordering information

Type	Part no.
LMS1104C-111031S01	1092445

Dimensional drawing (Dimensions in mm (inch))

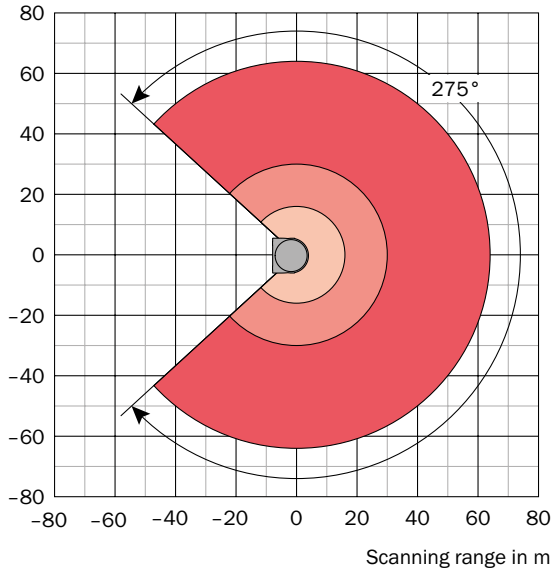
LMS1000



- ① Receiver
- ② Status LEDs
- ③ Sender
- ④ Mounting hole M5 x 7.5
- ⑤ Blind zone
- ⑥ Field of view
- ⑦ Ethernet connection
- ⑧ I/O connection
- ⑨ POWER connection
- ⑩ Mounting hole M5 x 7.5
- ⑪ Close range (no detection or measurement possible)
- ⑫ Detection zone
- ⑬ Measuring range

Working range

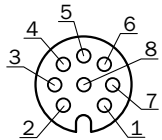
Scanning range in m



- Scanning range max. 64 m
- Scanning range for objects up to 90 % remission 30 m
- Scanning range for objects up to 10 % Remission 16 m

Connection type

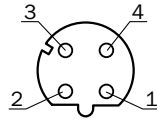
I/O



Connector M12, 8-pin, A-coded

- ① IN1/OUT1
- ② IN2/OUT2
- ③ IN3/OUT3
- ④ IN4/OUT4
- ⑤ IN5/OUT5
- ⑥ IN6/OUT6
- ⑦ GND INx/OUTx
- ⑧ IN7/OUT7

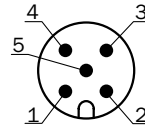
Ethernet



M12 female connector, 4-pin, D-coded

- ① TX+
- ② RX+
- ③ TX-
- ④ RX-






Power



Connector M12, 5-pin, A-coded

- ① VS 10...30 V
- ② Reserved
- ③ GND
- ④ IN8/OUT8
- ⑤ Reserved

Recommended accessories

	Brief description	Type	Part no.
Mounting brackets and plates			
	Standard mounting set for weather hood	Mounting bracket	2046025
Device protection (mechanical)			
	Optics cover for protecting the front screen from weather conditions	Weather hood, 210°	2085939
Plug connectors and cables			
	Head A: male connector, M12, 4-pin, straight, D-coded Head B: male connector, RJ45, 8-pin, straight Cable: Ethernet, twisted pair, PUR, halogen-free, shielded, 5 m	YM2D24-050EA1MRJA4	6034415
	Head A: male connector, M12, 8-pin, straight, A-coded Head B: Flying leads Cable: PUR, halogen-free, shielded, 5 m	YF2A28-050UA6XLEAX	6036155
	Head A: female connector, M12, 5-pin, straight, A-coded Head B: Flying leads Cable: Sensor/actuator cable, PUR, halogen-free, shielded, 5 m	YF2A25-050UB6X-LEAX	2095733

You can find additional accessories online → www.sick.com/LMS1000

Recommended services

Brief description	Type	Part no..
Warranty extensions		
<ul style="list-style-type: none"> Range of services: The services correspond to the scope of the statutory manufacturer warranty (SICK general terms and conditions of purchase) Long-term protection for calculable lump sum. Duration: Five-year warranty from date of purchase. 	Five-year extended warranty	1680671
Commissioning		
<ul style="list-style-type: none"> Range of services: Inspection of connection, fine adjustment, configuration of monitored areas, configuration and optimization of parameters of the LMS/MRS/NAV/TiM as well as verification tests Setup of previously defined functions of basic settings, parameters of field application, filters for raw data output and product-specific configuration Documentation: Archiving of product parameters in a SICK database Documentation of performance Creation of a commissioning log Duration: Additional work will be invoiced separately based on time spent Note: The prices do not include expenses or costs for the travel time 	Comissioning LMS/MRS/NAV/TiM (Prime package)	1680672
Maintenance		
<ul style="list-style-type: none"> Range of services: Inspection, analysis and restoring of defined functions Inspection and adaptation of basic settings, parameters of field application, filters for raw data output, and product-specific configuration Documentation: Documentation of operating hours and archiving of parameters in a SICK database Creation of a maintenance log Duration: Additional work will be invoiced separately based on time spent Note: The prices do not include expenses or costs for the travel time 	Maintenance LMS/MRS/NAV/TiM	1682593

You can find additional services online → www.sick.com/LMS1000

REGISTER AT WWW.SICK.COM TO TAKE ADVANTAGE OF OUR FOLLOWING SERVICES FOR YOU






- ✔ Access information on net prices and individual discounts.
- ✔ Easily order online and track your delivery.
- ✔ Check your history of all your orders and quotes.
- ✔ Create, save, and share as many wish lists as you want.
- ✔ Use the direct order to quickly order a big amount of products.
- ✔ Check the status of your orders and quotes and get information on status changes by e-mail.
- ✔ Save time by using past orders.
- ✔ Easily export orders and quotes, suited to your systems.



SERVICES FOR MACHINES AND PLANTS: SICK LifeTime Services

Our comprehensive and versatile LifeTime Services are the perfect addition to the comprehensive range of products from SICK. The services range from product-independent consulting to traditional product services.



- 
Consulting and design
 Safe and professional
- 
Product and system support
 Reliable, fast, and on-site
- 
Verification and optimization
 Safe and regularly inspected
- 
Upgrade and retrofits
 Easy, safe, and economical
- 
Training and education
 Practical, focused, and professional

SICK AT A GLANCE

SICK is a leading manufacturer of intelligent sensors and sensor solutions for industrial applications. With more than 9,700 employees and over 50 subsidiaries and equity investments as well as numerous agencies worldwide, SICK is always close to its customers. A unique range of products and services creates the perfect basis for controlling processes securely and efficiently, protecting individuals from accidents, and preventing damage to the environment.

SICK has extensive experience in various industries and understands their processes and requirements. With intelligent sensors, SICK delivers exactly what the customers need. In application centers in Europe, Asia, and North America, system solutions are tested and optimized in accordance with customer specifications. All this makes SICK a reliable supplier and development partner.

Comprehensive services round out the offering: SICK LifeTime Services provide support throughout the machine life cycle and ensure safety and productivity.

That is “Sensor Intelligence.”

Worldwide presence:

Australia, Austria, Belgium, Brazil, Canada, Chile, China, Czech Republic, Denmark, Finland, France, Germany, Great Britain, Hungary, Hong Kong, India, Israel, Italy, Japan, Malaysia, Mexico, Netherlands, New Zealand, Norway, Poland, Romania, Russia, Singapore, Slovakia, Slovenia, South Africa, South Korea, Spain, Sweden, Switzerland, Taiwan, Thailand, Turkey, United Arab Emirates, USA, Vietnam.

Detailed addresses and further locations → www.sick.com