SICK.COM





PRODUCT OVERVIEW

TiM

LiDAR sensors

SICK Sensor Intelligence



2D LIDAR SENSORS

TiM

Compact 2D LiDAR sensor – cost-effective and high performing

The TiM 2D LiDAR sensors offer a high performance for field evaluation and measurement data output in a compact housing. Whether it be mobile or stationary, automation, monitoring or safety applications – with scanning ranges up to 25 m and working ranges up to 270°, these sensors detect their environment over a wide area and precisely. Different surfaces and remission factors are no problem for them. Thanks to the patented HDDM/HDDM+ multi-pulse technology, the TiM detects the entire scanning range without gaps thereby ensuring a consistently high measurement quality. Ruggedly built and equipped with high quality connection technologies, they are suitable for demanding industrial applications in a variety of industries and fields. Easy installation and parameterization included.

TiM AT A GLANCE

BENEFITS

- Suitable for a variety of industrial applications due to the integrated field evaluation or measurement data output
- Compact design for easy integration into applications where the installation space is limited, for example in AGVs and AMRs
- Ideal for demanding applications thanks to the rugged housing design up to IP67
- Great cost effectiveness thanks to high performance with moderate investment and operating costs
- Fast, intuitive commissioning and configuration via the SOPAS ET software from SICK
- Low implementation costs due to standardized sensor telegrams and integration tools such as a ROS driver

FEATURES

- Sensing range up to 25 m
- Working range up to 270°
- Angular resolution of 1° to 0.33°
- HDDM/HDDM+ technology for seamless detection of small objects
- High ambient light immunity up to 80,000 lx
- Enclosure rating up to IP67
- Standardized communication interfaces
- Very low power consumption

TECHNICAL DATA OVERVIEW

Application	Indoor / Outdoor / Indoor
Measurement principle	HDDM+ / HDDM
Integrated application	Field evaluation, output of measurement data, Protective field evaluation with flexible fields, programmable
Aperture angle Horizontal	 200° ... 270°
Working range	0.05 m ... 25 m, At > 90% remission factor
Scanning range At 10% remission factor	 1.2 m ... 8 m, depending on the angle
Scanning frequency	14.5 Hz, 15 Hz
Ambient operating temperature	–25 °C ... +50 °C –25 °C ... +50 °C [1]
IO-Link	✓
Ethernet	✓
USB	✓
Serial	✓
Digital inputs	1 0 4 4 (PNP, for field set switching) 4 (PNP)
Digital outputs	2 (Push-Pull) 1 (Push-pull, "Device Ready") 3 (NPN, additional 1 x “Device Ready”) 3 (PNP, additional 1 x “Device Ready”) 3 (PNP, to display a detection in the protective field, additional 1 x “Device Ready”) 1 (PNP, "SYNC"/"device ready") 4 (PNP)
Weight	90 g ... 250 g

[1] IEC 60068-2-14:2009.

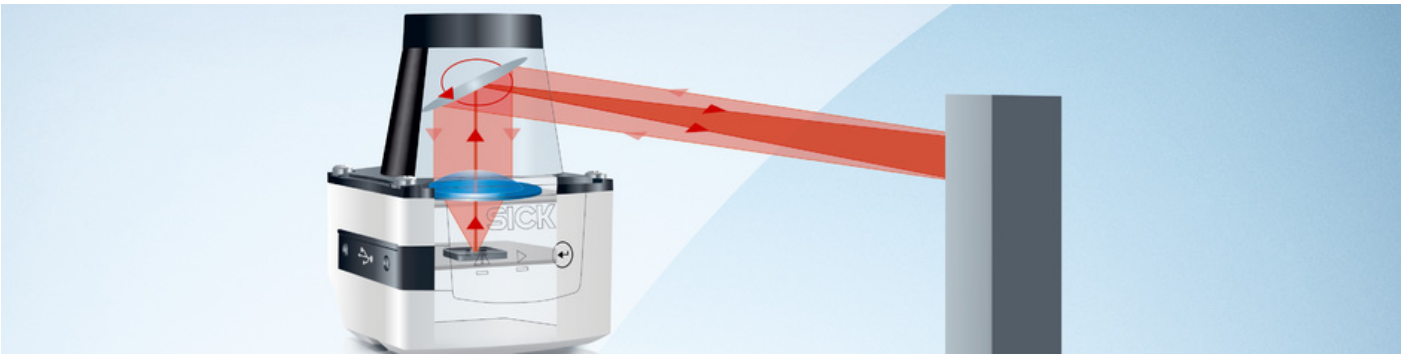
ADVANTAGES



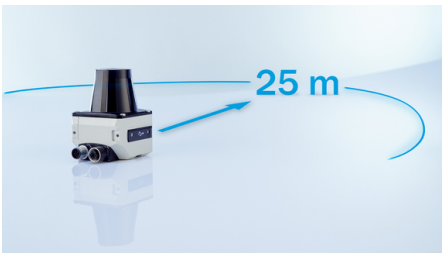
Diverse applications. One solution. TiM.

From the TiM1xx base sensor to the TiM7xx high-end solution: The TiM 2D LiDAR sensors allow a customized and therefore cost-effective solution for almost any requirement. Whether as a compact data supplier for environment perception and object detection, for high flexibility in an industrial environment and building automation, or for mobile platforms such as autonomous mobile robots (AMRs), service robots and industrial trucks. Variants for specialized applications are also available: The TiM-S is designed for the protection of people in industri-

al environments and for safety-related mobile applications. And as the first programmable 2D LiDAR sensor, the TiM-P makes it possible to implement highly tailored solutions.



How the LiDAR (Light Detection and Ranging) technology in the TiM works
The TiM 2D LiDAR sensors scan their environment using the state-of-the-art optical time-of-flight measurement method, the so-called time-of-flight (TOF) technology. This involves sending out laser pulses via a rotating mirror and detecting their reflection. The longer it takes for a laser pulse to arrive back at the sensor, the further away the detected object is. This combined with the strength of the incoming signal allows the position of objects in space to be determined with millimeter accuracy. The TiM updates this representation of its surroundings up to 15 times per second, thereby allowing real time orientation, navigation and control.



Large working range
The TiM 2D LiDAR sensors can be used to monitor different sized work areas. Variants with a scanning range up to 25 m, an angular resolution up to 0.33°, and an aperture angle up to 270° are available for this purpose.



Wide range of applications
Whether simple “Object in field” detection or precise measurement data output for the scanned area – the TiM portfolio offers a suitable sensor for numerous requirements.



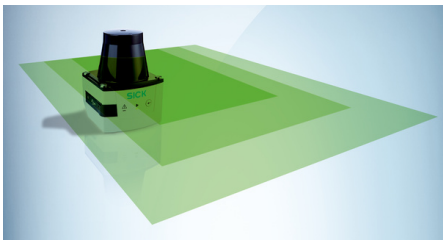
Optimized costs
The comprehensive portfolio allows customized solutions depending on the task and available budget. The result: High cost-effectiveness for all applications.

→ Efficient in every case: The TiM 2D LiDAR sensors provide a precise data foundation for a variety of applications. Thanks to the broad portfolio, the solution can be cost effectively adapted to the requirements on-site.

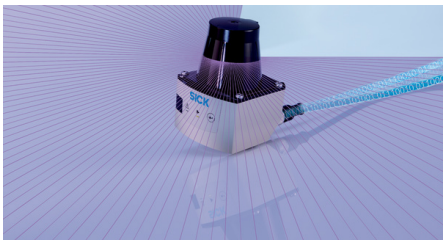


Dual protection with field evaluation and measurement data output

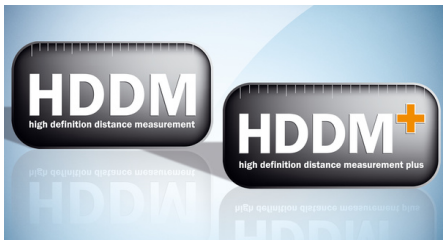
The TiM 2D LiDAR sensors differ not only in their performance range but also with regard to their integrated application. While TiM1xx and TiM3xx perform field evaluation only, TiM2xx and TiM5xx offer measurement data output. TiM7xx includes both in one device and is therefore very versatile.



Flexible field evaluation
TiM1xx, TiM3xx and TiM7xx detect whether objects are located in a pre-defined field. 16 field sets, each with 3 pre-configured fields, allow quick, user-friendly adaptation during operation. For even more process reliability, it is also possible for example to specify individual field geometries or reference contour fields for static contour monitoring. To ensure the sensors are not adversely affected by reflections and scattering from raindrops, snow or dust, digital filters, masked areas and response times can be defined.



Precise measurement data output
TiM2xx, TiM5xx and TiM7xx are specialized for measurement data streaming and therefore suitable for many different applications. Besides distance data, the sensors also output angular data and an indicator of the signal strength for the received laser pulse (RSSI = Received Signal Strength Indicator). These data can be used for navigation and collision avoidance for autonomous mobile robots (AMRs) in a dynamic environment.



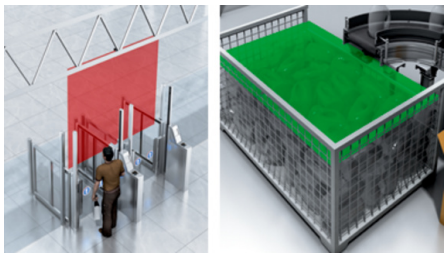
HDDM and HDDM+ technology
The pulse data of the laser sensors are processed using HDDM or HDDM+ technology. The two methods differ in regard to the type of data evaluation. The HDDM+ method processes edge hits particularly well, which is advantageous for localization and anti-collision applications in a changing environment. By contrast, the HDDM method achieves a very high measurement accuracy at short distances and is therefore suitable for fine positioning in docking applications.



Protection and localization of service robots
Service robots are performing specific tasks In hotels, restaurants and supermarkets as well as in logistic centers and production halls. They clean and disinfect, serve things, and communicate – thereby freeing up the staff. The TiM devices provide guidance and prevent collisions with humans, the surroundings, or other mobile robots.



Navigation of autonomous mobile robots (AMRs)
Freely navigating shuttle and AMR systems are used for storing, buffering and sequencing materials. These must recognize their precise position and environment at all times so they can move safely within the space. The TiM devices deliver measurement data that can be used for collision avoidance or for simultaneous localization and mapping (SLAM). Field evaluation and measurement data streaming provide an intelligent and safe technological foundation for this.



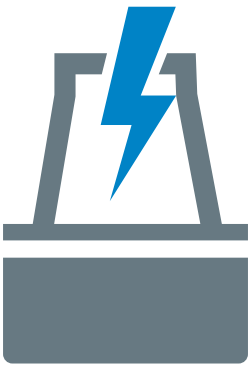
Applications in focus
Almost any stationary or mobile application can be implemented using the TiM 2D LiDAR sensors – regardless of the industry. Moisture, dust, movements, ambient light and other limiting factors do not hinder the sensors.

→ The best of two worlds: With field evaluation and measurement data output, the TiM devices offer different application possibilities which makes them specialists for particular tasks and ensures more process reliability and performance in the applications.



Rugged housing meets high performance design

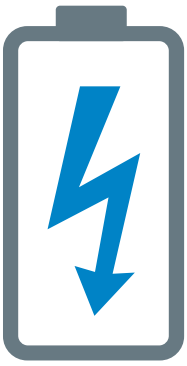
The TiM 2D LiDAR sensors are not affected by vibrations or shocks. Neither dust or moisture can get into the housing. If the sensors will be subjected to particularly high loads and harsh conditions, their ruggedness can be increased for example by using damped mountings or protective plates. The compact sensors remain reliable data suppliers even when object surfaces vary and in strong ambient light conditions. Up to 80,000 Lux are no problem for the integrated measurement procedure. This ensures a consistently high measurement quality and only very minor fluctuations, which avoids faults and thereby ensures smooth processes.



Durable
The rugged housing with an enclosure rating up to IP67 ensures reliability in demanding conditions and allows indoor and outdoor use.



Light
The TiM devices are among the lightest amongst the LiDAR sensors and weigh in at only 90 g to 250 g depending on the variant. This in conjunction with the compact housing makes it easier to integrate them into mobile applications.



Economical
The typical power consumption of up to 4 W ensures a reduced electricity consumption and efficient and sustainable operation – this makes the TiM devices ideal for rechargeable battery powered applications in the area of AGVs.



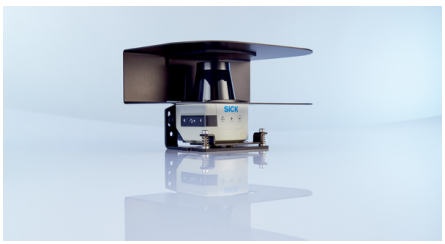
Powerful
Depending on the variant, the digital data transmission occurs either via a fast Ethernet or IO-Link interface and can also be conveniently parameterized via a USB port.

→ Small, but powerful: The TiM 2D LiDAR sensors allow problem-free integration of high performance field evaluation and measurement data output into mobile applications even when space is limited.



Always well integrated

To ensure the TiM devices can achieve their full potential in any application, a wide variety of accessories are available. This enables the sensors to be equipped for demanding applications in such a way as to ensure the quality of the measurement data even under strong vibrations or in a permanently wet environment. The accessory components also make the already flexible integration and easy commissioning even easier.



Well protected
A wide variety of mounting accessories are available for securely attaching the TiM device – from shock absorbing mounting brackets to a weather protection housing that protects against rain, snow and hail.



Smooth integration
A variety of cable variants, connection units, and IO-Link clients such as the SIG200 allow smooth system integration with no compatibility issues.



Very flexible
For complicated installation situations where space is limited, rotatable male connectors and integrated cables provide considerable freedom during installation – for application-specific mounting positions and flexibility in alignment.

→ Thanks to a large selection of accessory components, the sensors are ideal for any application and adaptable to the challenges present. Even in very hash locations.



SICK LifeTime Services

From consulting to modernization: SICK LifeTime Services increase the productivity of plants and machines, improve the safety of your employees, and provide a solid foundation for sustainable business operations. As a solution provider, SICK works with you to manage the holistic implementation of projects relating to industrial automation, safety and digitalization.

→ Comprehensive industry know-how and more than 75 years of practical experience create ideas and provide knowledge for your solutions. Find out more

Select the right product variant and accessories directly online. There you will also find example applications as well as downloads such as CAD dimensional models, operating instructions and software.
www.sick.com/TiM

SICK AG
WALDKIRCH
GERMANY
SICK.COM

SICK AT A GLANCE

SICK is a leading global technology company for intelligent sensors and integrated solutions in industrial automation. Our technologies set benchmarks, making your industrial processes more efficient, safer and more sustainable – both in logistics and manufacturing operations.

SICK combines sensor intelligence with industry expertise and certified consulting services. We provide the ideal foundation for scalable as well as tailor-made automation solutions and create added value along the entire value chain. Our close partnership with our customers is more than just a promise: Together, we optimize productivity, elevate quality, protect health and safety, and sustain the future. All with empathy and trust.

Since 1946, we have been developing innovative technologies with passion and a pioneering spirit. With a global network in around 40 countries, SICK has a global presence and is always close by. The company's headquarters are located in Waldkirch near Freiburg, Germany. Our customers benefit from our understanding of both local and global requirements, which enables us to deliver tailor-made solutions.

SICK

Sensor Intelligence