



## TiM

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

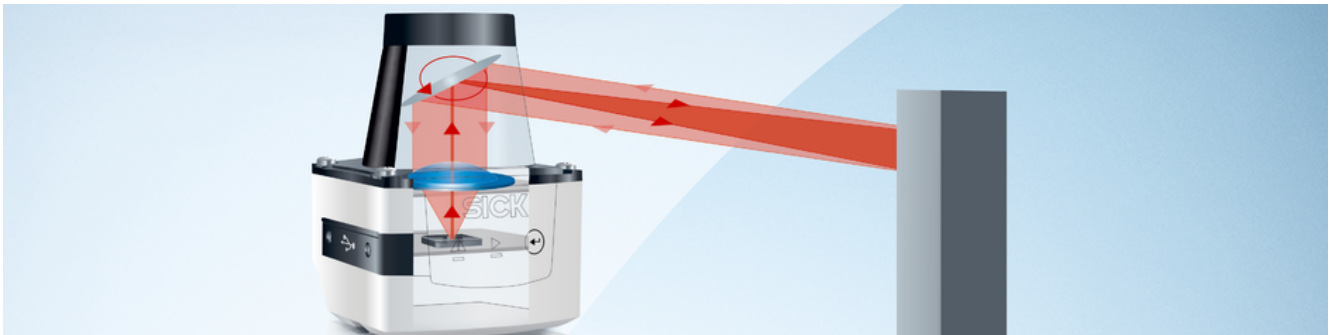
**SICK**  
Sensor Intelligence.

## 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 industrial 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  $0.33^\circ$ , and an aperture angle up to  $270^\circ$  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.

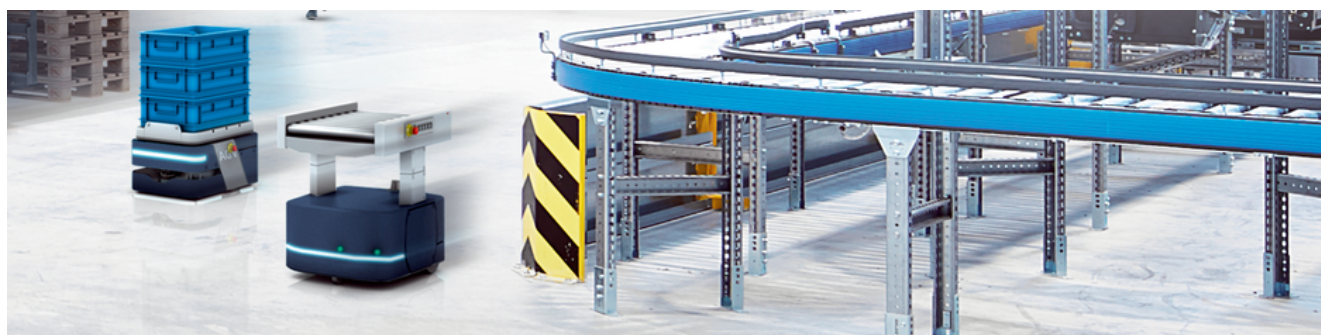


#### Optimized costs

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

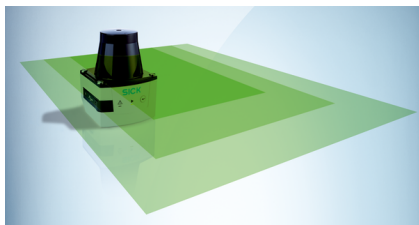


**Efficient in every case: The TiM 2D LiDAR sensors provide a precise data foundation for a variety of applications. Thanks to the broad portfolio, the solution can be cost effectively adapted to the requirements on-site.**



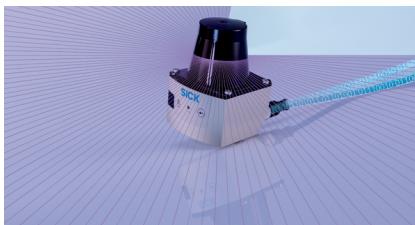
### Dual protection with field evaluation and measurement data output

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<sup>+</sup> technology

The pulse data of the laser sensors are processed using HDDM or HDDM<sup>+</sup> technology. The two methods differ in regard to the type of data evaluation. The HDDM<sup>+</sup> 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.



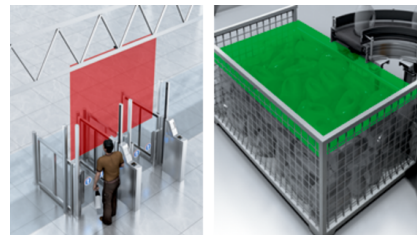
### Protection and localization of service robots

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.

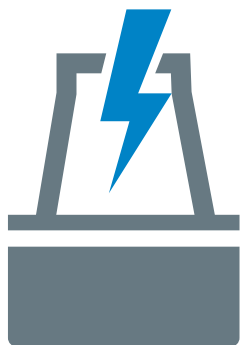


**The best of two worlds: With field evaluation and measurement data output, the TiM devices offer different application possibilities which makes them specialists for particular tasks and ensures more process reliability and performance in the applications.**



## 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**

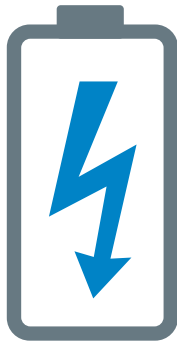
The rugged housing with an enclosure rating up to IP67 ensures reliability in demanding conditions and allows indoor and outdoor use.



### **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.

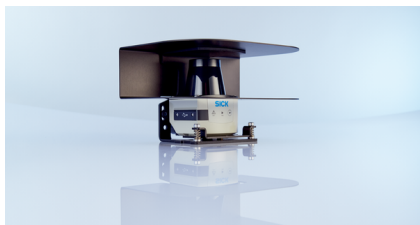


**Small, but powerful: The TiM 2D LiDAR sensors allow problem-free integration of high performance field evaluation and measurement data output into mobile applications even when space is limited.**



### 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 harsh locations.**

## SICK LifeTime Services

**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.**



#### Consulting and design

Application-specific advice on the product, its integration and the application itself.



#### commissioning and maintenance

Application-optimized and sustainable — thanks to professional commissioning and maintenance by a trained SICK service technician.



#### service contracts

Extended warranty, SICK Remote Service, 24-hour helpdesk, maintenance, availability guarantees and other modular components can be individually combined on request.



## Technical data overview

<b>Application</b>	Indoor / Outdoor / Indoor (depending on type)
<b>Measurement principle</b>	HDDM <sup>+</sup> / HDDM (depending on type)
<b>Integrated application</b>	Field evaluation, output of measurement data, Protective field evaluation with flexible fields, DistanceGuard, programmable (depending on type)
<b>Aperture angle</b>	Horizontal 200° 240° 270°
<b>Angular resolution</b>	0.33°
<b>Working range</b>	0.05 m ... 25 m, > 90% remission (depending on type)
<b>Scanning range</b>	At 10% remission factor 1.2 m ... 8 m, depending on the angle (depending on type)
<b>Scanning frequency</b>	14.5 Hz, 15 Hz (depending on type)
<b>Ambient operating temperature</b>	-25 °C ... +50 °C -25 °C ... +50 °C <sup>1)</sup>
<b>IO-Link</b>	✓
<b>Ethernet</b>	✓
<b>USB</b>	✓
<b>Serial</b>	✓
<b>Digital inputs</b>	1 0 4 4 (PNP, for field set switching) 4 (Reserved) 4 (PNP)
<b>Digital outputs</b>	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, OUT1 = minimum distance undercut, OUT2 = maximum number of people exceeded, OUT3 = device overloaded, OUT4 = reserved) 4 (PNP)
<b>Weight</b>	90 g ... 250 g (depending on type)

<sup>1)</sup> IEC 60068-2-14:2009.

## Product description

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<sup>+</sup> 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.



### At a glance

- 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

### Your 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
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### Fields of application

- Collision protection for mobile applications
- Object measurement and detection
- Monitoring of objects in the field of building automation
- Data supplier for navigation in mobile applications
- Area monitoring

## Ordering information

Other models and accessories → [www.sick.com/TiM](http://www.sick.com/TiM)

- **Measurement principle:** HDDM<sup>+</sup>
- **Integrated application:** Field evaluation

Number of field sets	Working range	Enclosure rating	Digital outputs	Connection type	Type	Part no.
1	0.05 m ... 10 m	IP65	2 (Push-pull)	1 x 5-pin M12 male device connector (rotatable)	TiM150-3010300	1093243
	0.05 m ... 3 m	IP65	2 (Push-pull)		TiM100-3010200	1077524
16	0.05 m ... 10 m	IP67	3 (NPN, additional 1 x "Device Ready")	1 x "Ethernet" connection, 4-pin M12 female connector 1 x connection "Power", 12-pin, M12 male connector 1 x Micro USB female connector, type B	TiM351-2134001S02	1080181
					TiM361-2134101S02	1080182
			3 (PNP, additional 1 x "Device Ready")		TiM351-2134001	1067299
					TiM361-2134101	1071399
	0.05 m ... 4 m	IP65	3 (NPN, additional 1 x "Device Ready")	1 x 15-pin D-sub HD male connector (0.9 m)	TiM310-1030000S02	1062221
				1 x M12 12-pin male connector (0.8 m)	TiM320-1131000S02	1067919
				Open wires (2.0 m)	TiM310-0130000S02	1069932
					TiM320-0131000S02	1069933
			3 (PNP, additional 1 x "Device Ready")	1 x 15-pin D-sub HD male connector (0.9 m)	TiM310-1030000	1052627
					TiM320-1031000	1063467
				1 x M12 12-pin male connector (0.8 m)	TiM310-1130000	1056550
					TiM320-1131000	1062219

- **Measurement principle:** HDDM<sup>+</sup>
- **Integrated application:** output of measurement data

Working range	Enclosure rating	Digital outputs	Connection type	Type	Part no.
0.05 m ... 10 m	IP65	1 (Push-pull, "Device Ready")	1 x "Ethernet" connection, 4-pin M12 female connector 1 x connection "Power", 5-pin, M12 male connector	TiM240-2050300	1104981
	IP67	1 (PNP, "SYNC"/"device ready")	1 x "Ethernet" connection, 4-pin M12 female connector 1 x connection "Power/Synchronization output" 5-pin, M12 male connector 1 x Micro USB female connector, type B	TiM551-2050001	1060445
				TiM561-2050101	1071419
0.05 m ... 25 m	IP67	1 (PNP, "SYNC"/"device ready")		TiM581-2050101	1099504
0.05 m ... 4 m	IP65	1 (PNP, "SYNC"/"device ready")	1 x cable with 12-pin M12 male connector (0,3 m)	TiM510-9950000S01	1062210

Working range	Enclosure rating	Digital outputs	Connection type	Type	Part no.
			1 x Micro USB female connector, type B		

- **Measurement principle:** HDDM
- **Integrated application:** Protective field evaluation with flexible fields

Number of field sets	Working range	Enclosure rating	Digital outputs	Connection type	Type	Part no.
16	0.05 m ... 10 m, > 90% remission	IP67	3 (PNP, to display a detection in the protective field, additional 1 x "Device Ready")	1 x "Ethernet" connection, 4-pin M12 female connector 1 x connection "Power", 12-pin, M12 male connector 1 x Micro USB female connector, type B	TIM361S-2134101	1090608

- **Measurement principle:** HDDM
- **Integrated application:** output of measurement data
- **Enclosure rating:** IP67
- **Digital outputs:** 1 (PNP, "SYNC"/"device ready")

Working range	Connection type	Type	Part no.
0.05 m ... 10 m	1 x "Ethernet" connection, 4-pin M12 female connector 1 x connection "Power/Synchronization output" 5-pin, M12 male connector 1 x Micro USB female connector, type B	TIM561-2050101S80	1106065
0.05 m ... 25 m		TiM571-2050101	1075091
	1 x "Ethernet" connection, cable, with RJ45 male connector (1 m) 1 x "Power/Synchronization output" connection, 5-wire cable with open end (1 m) 1 x Micro USB female connector, type B	TiM571-9950101S01	1079742

- **Measurement principle:** HDDM
- **Integrated application:** Protective field evaluation with flexible fields, output of measurement data

Number of field sets	Working range	Enclosure rating	Digital outputs	Connection type	Type	Part no.
16	0.05 m ... 25 m, > 90% remission	IP67	3 (PNP, to display a detection in the protective field, additional 1 x "Device Ready")	1 x "Ethernet" connection, 4-pin M12 female connector 1 x connection "Power", 12-pin, M12 male connector 1 x Micro USB female connector, type B	TIM771S-2174104	1105052

- **Measurement principle:** HDDM<sup>+</sup>
- **Integrated application:** Field evaluation, output of measurement data

Number of field sets	Working range	Enclosure rating	Digital outputs	Connection type	Type	Part no.
16	0.05 m ... 25 m	IP67	3 (PNP, additional 1 x "Device Ready")	1 x "Ethernet" connection, 4-pin M12 female connector 1 x connection "Power", 12-pin, M12 male connector 1 x Micro USB female connector, type B	TIM781-2174101	1096807

- **Measurement principle:** HDDM<sup>+</sup>
- **Integrated application:** Protective field evaluation with flexible fields, output of measurement data

Number of field sets	Working range	Enclosure rating	Digital outputs	Connection type	Type	Part no.
16	0.05 m ... 25 m, > 90% remission	IP67	3 (PNP, to display a detection in the protective field, additional 1 x "Device Ready")	1 x "Ethernet" connection, 4-pin M12 female connector 1 x connection "Power", 12-pin, M12 male connector 1 x Micro USB female connector, type B	TIM781S-2174104	1096363

- **Measurement principle:** HDDM<sup>+</sup>
- **Integrated application:** DistanceGuard

Working range	Angular resolution	Enclosure rating	Digital outputs	Connection type	Type	Part no.
0.05 m ... 25 m	0.33°	IP67	4 (PNP, OUT1 = minimum distance undercut, OUT2 = maximum number of people exceeded, OUT3 = device overloaded, OUT4 = reserved)	1 x "Ethernet" connection, 4-pin M12 female connector 1 x connection "Power", 12-pin, M12 male connector 1 x Micro USB female connector, type B	TIM881A-2101101	1112243

- **Measurement principle:** HDDM<sup>+</sup>
- **Integrated application:** programmable

Working range	Enclosure rating	Digital outputs	Connection type	Type	Part no.
0.05 m ... 25 m	IP67	4 (PNP)	1 x "Ethernet" connection, 4-pin M12 female connector 1 x connection "Power", 12-pin, M12 male connector 1 x Micro USB female connector, type B	TIM881P-2100101	1090292

## SICK AT A GLANCE

SICK is one of the leading manufacturers of intelligent sensors and sensor solutions for industrial applications. 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.

We have extensive experience in a wide range of industries and understand their processes and requirements. With intelligent sensors, we can deliver exactly what our 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 us a reliable supplier and development partner.

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

**For us, that is “Sensor Intelligence.”**

## WORLDWIDE PRESENCE:

Contacts and other locations –[www.sick.com](http://www.sick.com)