

# LMS4521R-16000

LMS4000

2D LIDAR SENSORS

**SICK**  
Sensor Intelligence.

### Ordering information

Type	Part no.
LMS4521R-16000	1086802

Other models and accessories → [www.sick.com/LMS4000](http://www.sick.com/LMS4000)



### Detailed technical data

#### Features

<b>Application</b>	Indoor
<b>Reading field</b>	Front
<b>Light source</b>	Visible red light (660 nm)
<b>Laser class</b>	2 (IEC 60825-1:2014, EN 60825-1:2014)
<b>Aperture angle</b>	Horizontal 70°
<b>Scanning frequency</b>	600 Hz
<b>Angular resolution</b>	0.0833°
<b>Working range</b>	0.7 m ... 3 m
<b>Scanning range</b>	At 2% remission 3 m At 3,5% remission 3 m At 10% remission factor 3 m

#### Mechanics/electronics

<b>Connection type</b>	1 x M12, 5-pin plug (CAN In) 1 x M12, 5-pin female connector (CAN Out) 1 x M12, 8-pin female connector (Ethernet) 1 x M12, 5-pin female connector (encoder + sync)
<b>Supply voltage</b>	24 V DC, ± 25 %
<b>Power consumption</b>	≤ 16 W, start-up phase max. 29 W
<b>Output current</b>	≤ 100 mA
<b>Housing</b>	Aluminum die cast
<b>Housing color</b>	Light blue (RAL 5012)
<b>Enclosure rating</b>	IP65
<b>Protection class</b>	III
<b>Electrical safety</b>	IEC 61010-1:2011
<b>Weight</b>	3.7 kg
<b>Dimensions (L x W x H)</b>	397 mm x 370 mm x 107 mm
<b>MTBF</b>	80 years

## Safety-related parameters

<b>MTTF<sub>D</sub></b>	> 100 years
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## Performance

<b>Scan/frame rate</b>	504,600 measurement point/s
<b>Response time</b>	≥ 4.8 ms
<b>Detectable object shape</b>	Almost any
<b>Systematic error</b>	± 1 mm <sup>1)</sup>
<b>Statistical error</b>	1.5 mm <sup>1)</sup>
<b>Integrated application</b>	Data output
<b>Filter</b>	Rectangular filter Edge filter Median filter Gloss compensation Average filter

<sup>1)</sup> Typical value; actual value depends on environmental conditions.

## Interfaces

<b>Ethernet</b>	✓, TCP/IP
Function	Measurement data output (distance, RSSI, angle, quality) SICK CAN sensor network CSN (secondary)
Data transmission rate	100 Mbit/s ... 1,000 Mbit/s, half/full-duplex 20 kbit/s ... 1 Mbit/s
<b>Encoder inputs</b>	2 (phase A, phase B)
<b>Synchronization inputs/outputs</b>	One (master / slave)
<b>Optical indicators</b>	4 LEDs
<b>Configuration software</b>	SOPAS ET
<b>Maximum encoder frequency</b>	50 kHz

## Ambient data

<b>Object remission</b>	2 % ... 200 %
<b>Electromagnetic compatibility (EMC)</b>	EN 61000-6-3:2007+A1:2011, IEC 61000-6-3:2006+AMD1:2010
<b>Vibration resistance</b>	EN 60068-2-6:2007
<b>Shock resistance</b>	EN 60068-2-27:2008
<b>Ambient operating temperature</b>	-10 °C ... +50 °C <sup>1)</sup>
<b>Storage temperature</b>	-20 °C ... +70 °C
<b>Permissible relative humidity</b>	≤ 90 %, Non-condensing
<b>Ambient light immunity</b>	2,000 lx

<sup>1)</sup> Initialization phase: 0 °C ... 50 °C.

## General notes

<b>Note on use</b>	The sensor does not constitute a safety component as defined by relevant legislation on machine safety.
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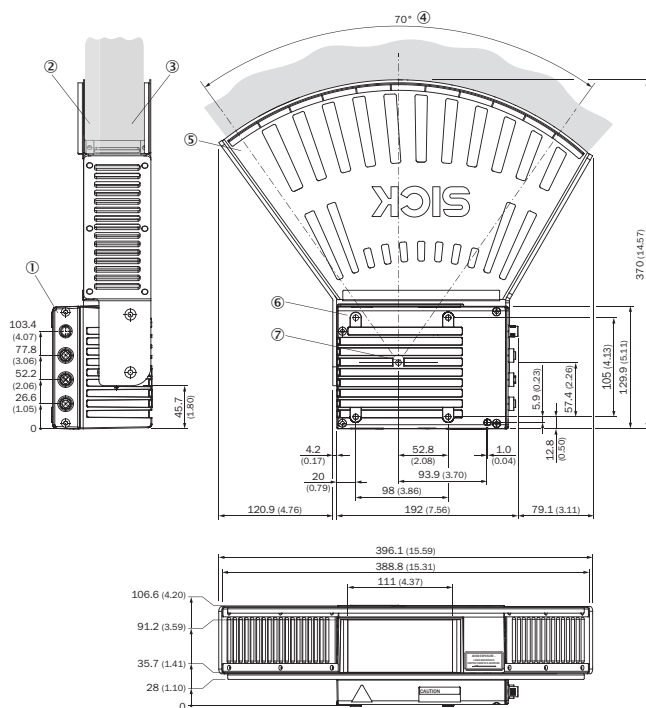
## Classifications

<b>ECLASS 5.0</b>	27270990
<b>ECLASS 5.1.4</b>	27270990
<b>ECLASS 6.0</b>	27270913

<b>ECLASS 6.2</b>	27270913
<b>ECLASS 7.0</b>	27270913
<b>ECLASS 8.0</b>	27270913
<b>ECLASS 8.1</b>	27270913
<b>ECLASS 9.0</b>	27270913
<b>ECLASS 10.0</b>	27270913
<b>ECLASS 11.0</b>	27270913
<b>ECLASS 12.0</b>	27270913
<b>ETIM 5.0</b>	EC002550
<b>ETIM 6.0</b>	EC002550
<b>ETIM 7.0</b>	EC002550
<b>ETIM 8.0</b>	EC002550
<b>UNSPSC 16.0901</b>	41111615

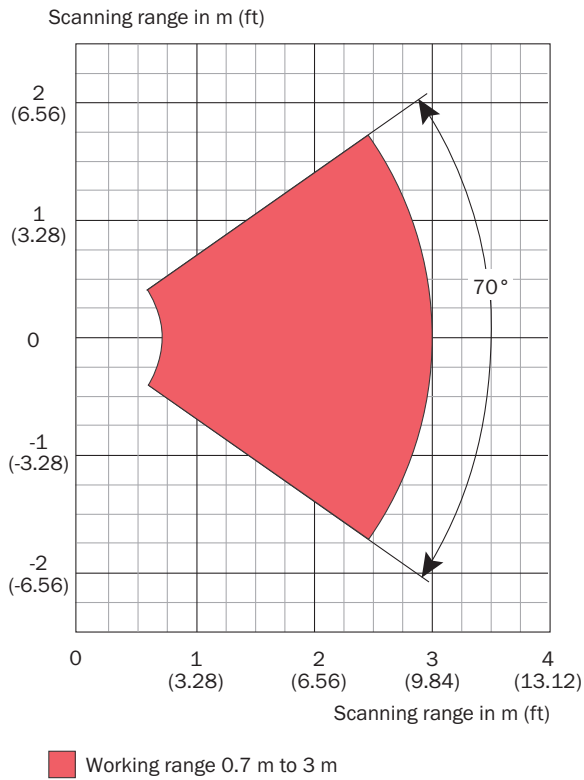
### Dimensional drawing (Dimensions in mm (inch))

LMS4x2x head with laser protection cover



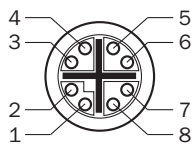
- ① Interfaces, types and number can vary
- ② Sending area
- ③ Receiving area
- ④ Aperture angle
- ⑤ Optical hood
- ⑥ Reference boreholes
- ⑦ Distance measurement zero point

### Working range diagram



### Connection type

Gigabit Ethernet

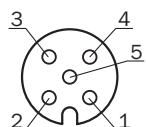


M12, 8-pin female connector, X-coded (Gigabit Ethernet)

- ① TRD0\_P
- ② TRD0\_N
- ③ TRD1\_P
- ④ TRD1\_N
- ⑤ TRD3\_P
- ⑥ TRD3\_N
- ⑦ TRD2\_P
- ⑧ TRD2\_N

### PIN assignment

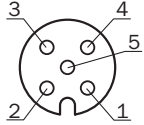
Encoders



Female connector M12, 5-pin, A-coded

- ① 24 V DC ± 25 %
- ② Encoders B
- ③ GND
- ④ Encoders A
- ⑤ SYNC

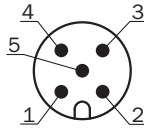
CAN Out



Female connector M12, 5-pin, A-coded

- ① shield
- ② 24 V DC ± 25 %
- ③ GND
- ④ CAN HIGH
- ⑤ CAN LOW

CAN In











Connector M12, 5-pin, A-coded

- ① shield
- ② 24 V DC ± 25 %
- ③ GND
- ④ CAN HIGH
- ⑤ CAN LOW

## Recommended accessories

Other models and accessories → [www.sick.com/LMS4000](http://www.sick.com/LMS4000)

	Brief description	Type	Part no.
Plug connectors and cables			
	<ul style="list-style-type: none"> <li>• <b>Connection type head A:</b> Female connector, M12, 5-pin, A-coded</li> <li>• <b>Connection type head B:</b> Flying leads</li> <li>• <b>Signal type:</b> Power, CAN</li> <li>• <b>Cable:</b> 5 m, 5-wire</li> <li>• <b>Description:</b> Power, CAN, unshielded</li> </ul>	DOL-1205-G05M_Can	6021166
	<ul style="list-style-type: none"> <li>• <b>Connection type head A:</b> Female connector, M12, 5-pin, straight, A-coded</li> <li>• <b>Connection type head B:</b> Male connector, M12, 5-pin, straight, A-coded</li> <li>• <b>Signal type:</b> Power, CANopen</li> <li>• <b>Cable:</b> 5 m</li> <li>• <b>Description:</b> Power, CANopen, shielded, CAN cable</li> </ul>	CAN cable (male connector - female connector)	6021168
	<ul style="list-style-type: none"> <li>• <b>Connection type head A:</b> Male connector, M12, 8-pin, straight, X-coded</li> <li>• <b>Connection type head B:</b> Male connector, RJ45, 8-pin, straight</li> <li>• <b>Signal type:</b> Ethernet, Gigabit Ethernet</li> <li>• <b>Cable:</b> 5 m, 8-wire, PUR, halogen-free</li> <li>• <b>Description:</b> Ethernet, Gigabit Ethernet, shielded</li> <li>• <b>Application:</b> Zones with oils and lubricants</li> </ul>	YM2X18-050EG1MRJA8	2106259

	Brief description	Type	Part no.
Terminal and alignment brackets			
	Holder for Item Profile	Alignment bracket	2030421
Others			
	<ul style="list-style-type: none"> <li>• <b>Connection type head A:</b> Female connector, M12, 5-pin, straight, A-coded</li> <li>• <b>Connection type head B:</b> Male connector, M12, 5-pin, straight, A-coded</li> <li>• <b>Signal type:</b> Sensor/actuator cable</li> <li>• <b>Cable:</b> 5 m, 5-wire, PUR, halogen-free</li> <li>• <b>Description:</b> Sensor/actuator cable, shielded</li> <li>• <b>Application:</b> Zones with oils and lubricants, Drag chain operation</li> </ul>	YF2A85-050UB6M2A85	2096119
	<ul style="list-style-type: none"> <li>• <b>Connection type head A:</b> Male connector, M12, 5-pin, straight</li> <li>• <b>Signal type:</b> CANopen</li> <li>• <b>Description:</b> CANopen, unshielded, CAN male connector, with terminating resistor</li> </ul>	CAN male connector	6021167
	PS50W-24V	PS50W-24V	7028789
Measuring wheel encoders			
	<ul style="list-style-type: none"> <li>• <b>Measuring wheel circumference:</b> 300 mm</li> <li>• <b>Measuring wheel surface:</b> O-ring NBR70</li> <li>• <b>Communication interface:</b> 10 V ... 32 V, Incremental, HTL, Push pull</li> <li>• <b>Supply voltage:</b> 10 V ... 32 V</li> <li>• <b>Connection type:</b> Male connector, M12, 5-pin, radial</li> <li>• <b>Resolution in pulses/mm:</b> 5</li> <li>• <b>Specialty:</b> M12 male connector, 5-pin</li> </ul>	DFV60B-22EZ0-S03	1051292

## Recommended services

Additional services → [www.sick.com/LMS4000](http://www.sick.com/LMS4000)

	Type	Part no.
Maintenance		
<ul style="list-style-type: none"> <li>• <b>Product area:</b> 2D LiDAR sensors, 3D LiDAR sensors</li> <li>• <b>Range of services:</b> 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</li> <li>• <b>Duration:</b> Additional work will be invoiced separately</li> <li>• <b>Travel expenses:</b> The prices do not include travel costs such as hotel, flight, travel time and expenses.</li> </ul>	Maintenance of LiDAR sensors	1682593
Commissioning		
<ul style="list-style-type: none"> <li>• <b>Product area:</b> 2D LiDAR sensors, 3D LiDAR sensors</li> <li>• <b>Range of services:</b> Inspection of connection, fine adjustment, configuration of monitored areas, configuration and optimization of parameters as well as tests, Setup of previously defined functions of basic settings, parameters of field application, filters for raw data output and product-specific configuration</li> <li>• <b>Travel expenses:</b> The prices do not include travel costs such as hotel, flight, travel time and expenses.</li> <li>• <b>Duration:</b> Additional work will be invoiced separately</li> </ul>	Commissioning LiDAR sensors	1680672

	Type	Part no.
Extended warranty		
<ul style="list-style-type: none"> <li>• <b>Product area:</b> Identification solutions, machine vision, Detection and ranging solutions, safety camera sensors, Safety laser scanners, Safety radar sensors</li> <li>• <b>Range of services:</b> The services correspond to the scope of the statutory manufacturer warranty (SICK general terms of delivery).</li> <li>• <b>Duration:</b> Five-year warranty from delivery date.</li> </ul>	Extended warranty for a total of five years from delivery date	1680671
Service agreements		
<ul style="list-style-type: none"> <li>• <b>Product area:</b> Robot guidance systems, Track and trace systems, Driver assistance systems, Object detection systems, Profiling systems, Gateway systems, Quality control systems</li> <li>• <b>Range of services:</b> Maintenance, Troubleshooting, extended warranty, 8/5 remote support, 8/5 help desk</li> <li>• <b>Duration:</b> Duration is arranged individually with the customer and defined in the contract</li> </ul>	Bronze service agreements for Systems	1616164



## 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)