



**The LD-MRS family –  
compact laser scanners for outdoor use**

Multi-layer scanners for harsh environmental conditions

## The LD-MRS family: rugged and powerful

With its new LD-MRS product family, SICK is presenting its first multi-layer scanners. The compact and rugged laser scanners can particularly exploit their strengths outdoors, e.g. for anti-collision applications. With four measurement layers, multipulse technology and small housings, the laser scanners are particularly suitable for measurement under harsh environmental conditions.



### Guiding ships

Entering locks and docking in ports are amongst the most difficult manoeuvres in shipping.

The LD-MRS provides valuable assistance by reliably monitoring the area in front of the ship. The high-resolution distance measurements provide a precise representation of the locks, and simplify handling in tight spaces.

When mounted laterally on the ship's side, the LD-MRS allows accurate determination of the distance between the ship and its quay, permitting safe and efficient docking.

### Special advantages in this application

- Reliable, thanks to excellent all-weather capability
- Simple mounting
- Rugged housing with enclosure rating of IP 69k
- 4-layer technology for dependable distance measurements, even on pitching ships
- Long ranges and compact housings

**The LD-MRS HD is the ideal choice for special requirements in agriculture and mining thanks to its expanded penetration through dust. It mainly solves automation and driver-assisting tasks in these areas.**

#### **Automation in agriculture**

Automation tasks in agriculture pose special challenges for sensor technologies due to extreme weather conditions, such as rain, as well as dust. The LD-MRS HD also masters these demands – thanks to its multipulse technology. Thanks to the 4-layer technology, it is also particularly suitable for use on structured ground surfaces. These two technologies increase detection reliability and thus makes the LD-MRS HD especially suitable for use in fields.

#### **Special advantages in this application**

- Multipulse technology for high penetration through dust
- 4-layer technology for dependable automation
- Rugged housing with enclosure rating of IP 69k
- Wide temperature range:  $-40\text{ }^{\circ}\text{C}$  to  $+70\text{ }^{\circ}\text{C}$

#### **Application in mining**

Drivers of large and complicated machines often have trouble detecting obstacles in the direct vicinity of their vehicles during very dusty work in mines. The increased risk of accidents caused by large rocks, potholes, projections, etc. makes an anti-collision system that can also operate reliably despite poor light, weather and visibility conditions indispensable. With the LD-MRS HD laser scanner, the driver is provided with precise information and, above all, given early warning of obstacles.

#### **Special advantages in this application**

- Compact sensor
- Rugged system with high penetration through dust
- 4-layer technology for optimum monitoring of vehicle surroundings
- Resistant housing with enclosure rating of IP 69k



# LD-MRS product technology: overview and definitions



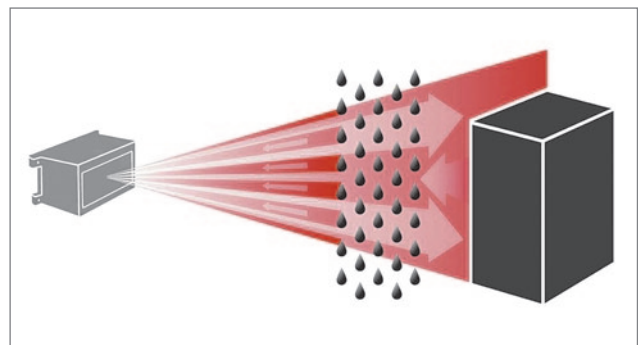
Safety note:  
LD-MRS laser scanners are not devices for personal protection within the sense of valid safety standards for machines.

## The LD-MRS at a glance:

- Small, light and powerful measurement system
- Operation with supply voltages from 9 V DC
- Simultaneous measurement on 4 measurement layers
- Particularly rugged in all weathers due to multipulse technology
- Wide temperature range of  $-40\text{ }^{\circ}\text{C}$  to  $+70\text{ }^{\circ}\text{C}$
- Rugged housing with enclosure rating of IP 69k
- Low power consumption of typically 8 W
- High measurement range with small size
- Real-time output of measurement data via Ethernet interface
- Further potential uses:
  - Anti-collision applications in harsh environments
  - Monitoring traffic
  - 3D cartography

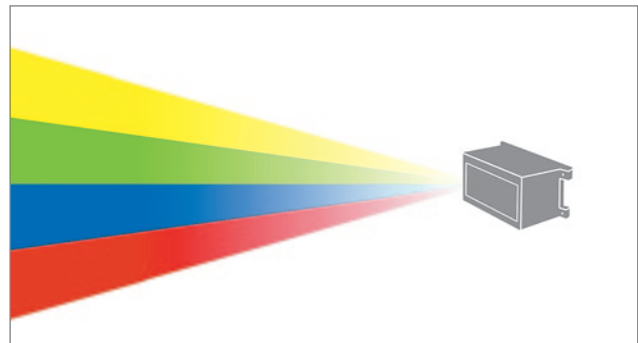
## Multipulse technology

Multipulse technology allows reliable detection of the measurement object. A total of three reception signals per emitted measurement beam are available in the LD-MRS. Differentiation between measurements of interference such as rain, snow or dust and measurement on objects takes place for each reception signal. This permits dependable use of the LD-MRS even under poor environmental conditions.



## 4-layer technology

The LD-MRS scans four scanning layers simultaneously. Combining the data from several scanning layers allows, for example, the pitching movements of vehicles or sloping lanes to be detected – the reliable detection of objects is thus always guaranteed. As a result of the 4-layer technology, measurements of the ground can also be differentiated from measurement on objects. The result is a reliable and trouble-free use of the LD-MRS.

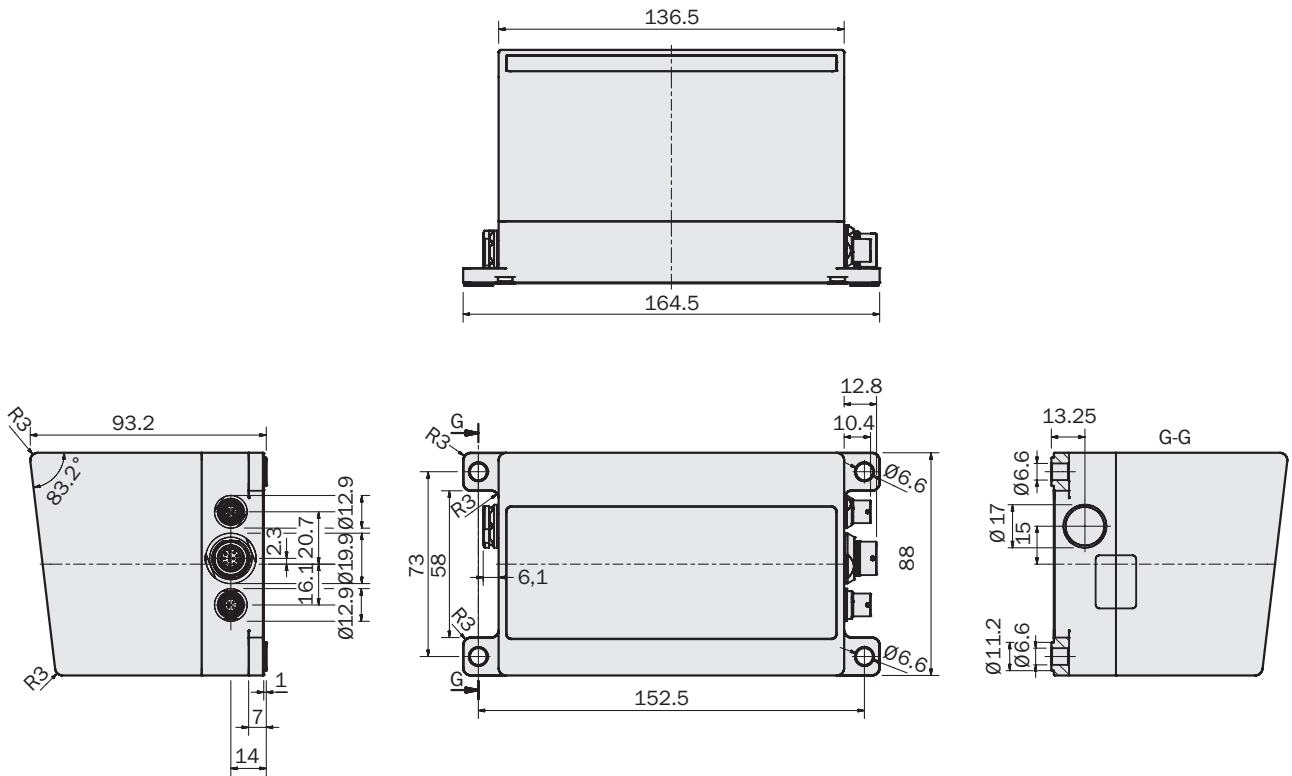


## Technical data

Device	LD-MRS	LD-MRS HD
Type	LD-MRS-400001	LD-MRS-400102
Range	Up to 50 m at 10% reflectivity	Up to 30 m at 10% reflectivity
Operating conditions	Rain and snow	Heavy rain and snow
Expanded penetration through dust	No	Yes
Measurement layers	4	
Scanning angle	85° operating angle with 4 measurement layers, 25° work area expansion with 2 measurement layers Total: 110°	
Horizontal measurement area	0.8° per measurement layers Total: 3.2°	
Angular resolution	0.125° / 0.25° / 0.5°	
Scanning frequency	12.5 Hz / 25 Hz / 50 Hz	
Number of measurement pulses	3 per measurement layer	
Distance resolution	40 mm	
Statistical error 1 Sigma	100 mm	
Data interface	Ethernet 100 Mbit TCP/IP, full duplex	
Supply voltage	9 V to 27 V DC, typically 12 V / 24 V, reverse-polarity protected	
Laser protection class	Laser Class 1 (IEC 60825-1, corresponds to 21 CFR 1040.10 and 1040.11)	
Enclosure rating	In installed state: IP 69k Plug: IP 68 (2 m/24 h) DIN 40 050 (1993-05) and EN 60529 (1991-10) + A1 (2000-02)	
Protection class	III according to EN 50178 (1997-10)	
EMC test	Interference emission: according to EN 61000-6-3 (2007-01) Interference immunity: according to EN 61000-6-2 (2005-08)	
Dimensions (WxHxD)	164.5 mm x 88 mm x 93.2 mm	
Weight	Approx. 1 kg	
Repeated impact immunity	13 g, 16 ms according to EN 60068-2-29 (1993-04)	
Vibration immunity	Vibrations, sine-shaped according to EN 60068-2-6 (1995-04)	
Operating temperature	-40 °C to +70 °C	
Power consumption	Max: 10 W, typically: 8 W, briefly 36 W at system start	

# Dimensional drawing

## Dimensional drawing LD-MRS and LD-MRS HD



# Order information

## Order information devices

Part no.	Device	Type	Description
1045046	LD-MRS	LD-MRS-400001	Range 50 m with 10% reflectivity, simultaneous measurement on 4 layers, enclosure rating IP 69k
1047145	LD-MRS HD	LD-MRS-400102	Range 30 m with 10% reflectivity, particular penetration through dust, simultaneous measurement on 4 layers, enclosure rating IP 69k

## Order information accessories

Part no.	Description
1047429	Bracket for LD-MRS, alignment adjustable in 2 axes
2049823	Power supply cable, 4-pin round socket/open end, length 2 m
2049824	Power supply cable, 4-pin round socket/open end, length 8 m
2049825	Power supply cable, 4-pin round socket/open end, length 20 m
2049826	Ethernet data cable (crossover), 4-pin round plug/RJ-45 plug, length 2 m. For connecting Ethernet interface of LD-MRS with Ethernet interface of PC.
2049827	Ethernet data cable (crossover) as above, length 8 m
2049828	Ethernet data cable (crossover) as above, length 20 m
2049829	Connection cable for synchronisation, 12-pin round plug/9-pin D Sub plug, length 2 m
2049830	Connection cable for synchronisation, 12-pin round plug/9-pin D Sub plug, length 8 m
2049832	Extension cable for RS 232 data interface and synchronisation, 12-pin round plug/socket, length 8 m
2049831	Cable splitter 1:3, 12-pin round plug on 9-pin D Sub plug (synchronisation), 9-pin D Sub socket (RS 232) and 9-pin D Sub socket (CAN, reserved), length 2 m
6022427	Power supply unit 24 V DC/2.5 A
6010362	Power supply unit 24 V DC/4 A
6020875	Power supply unit 24 V DC/10 A
4003353	Optical cloth for cleaning window

### FACTORY AUTOMATION

With its intelligent sensors, safety systems, and auto idet applications, SICK realises comprehensive solutions for factory automation.

- Non-contact detecting, counting, classifying, and positioning of any types of object
- Accident protection and personal safety using sensors, as well as safety software and services



### LOGISTICS AUTOMATION

Sensors made by SICK form the basis for automating material flows and the optimisation of sorting and warehousing processes.

- Automated identification with bar code and RFID reading devices for the purpose of sorting and target control in industrial material flow
- Detecting volume, position, and contours of objects and surroundings with laser measurement systems



### PROCESS AUTOMATION

Analyzers and Process Instrumentation by SICK MAIHAK provides for the best possible acquisition of environmental and process data.

- Complete systems solutions for gas analysis, dust measurement, flow rate measurement, water analysis or, respectively, liquid analysis, and level measurement as well as other tasks



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