



MINESIC100 EPS, MINESIC100 TPS

COLLISION AWARENESS AND DRIVER ASSISTANCE IN MINING

Driver assistance systems

SICK
Sensor Intelligence.

EFFICIENCY IN MINING – DRIVER ASSISTANCE SYSTEMS FOR MOBILE MACHINES

The extraction of raw materials in mining presents numerous challenges: operators of large machinery work together in confined areas. The sector faces increasing pressure to structure safe and cost-effective work procedures and processes. Because of their massive size, large mobile machines such as bucket and shovel excavators, haul trucks and wheel loaders have considerable blind spots which impair operator visibility. Accident-free navigation of mobile machines and efficient and safe loading and unloading of vehicles are therefore major everyday challenges in mining. Long work shifts – around the clock – as well as harsh weather conditions and difficult terrain additionally increase the risk of accidents.

Sensor-controlled driver assistance systems provide safety in mining. Warning of impending collisions is one of the main tasks of sensors in mobile machines. This means the driver is able to detect and avoid potentially dangerous situations and accidents early on.



SOFTWARE AND SENSORS: THE TEAM FOR RELIABLE DRIVER ASSISTANCE

Integrating sensors and software systems in construction and mining machines makes for intelligent solutions suited for daily use that enable reliably efficient and smoothly running processes. With 3D LiDAR sensors and intelligent application software, the MINESIC100 EPS and MINESIC100 TPS from SICK deliver precise driver assistance for mining machines.

The size and height of the haul trucks and constantly changing operating conditions make precise vehicle navigation difficult

for the driver. The MINESIC100 TPS alleviates this situation: the rugged system enables safe vehicle maneuvering for haul trucks on mine sites. The system reliably monitors critical areas in the vehicle environment and warns the driver in the event of unintentional road departure. The MINESIC100 EPS system variant is specially designed to meet the requirements of large excavators. It provides operator assistance during excavating, vehicle positioning and safe loading of large haul trucks.

COMPLETE PACKAGES FOR IMMEDIATE USE

The MINESIC100 EPS and MINESIC100 TPS are delivered as comprehensive complete packages with all components required for the respective system, including LiDAR sensors, operator display, GPS receiver, control cabinet, cabling and all shock-absorbing brackets. Extensive operator instructions and straightforward installation make the system quick and easy to commission. The MINESIC100 EPS and MINESIC100 TPS can be quickly and easily retrofitted for immediate use on machines already in the field.

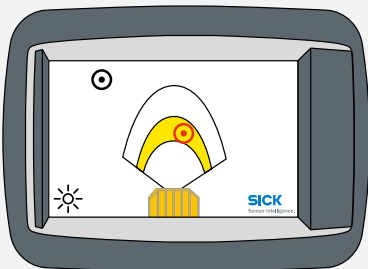


MINESIC100 TPS OVERVIEW

The MINESIC100 TPS (TPS = Truck Protection System) driver assistance system supports drivers of haul trucks in critical situations on mining sites. Equipped with rugged 3D LiDAR sensors at the front and rear, as well as a 2D LiDAR sensor for path guidance, the system provides the operator with the necessary all around view. A display mounted in the driver cabin shows all relevant collected information and additionally uses acoustic alarms to alert the driver of impending collisions, incidents while reversing and unintentional road departure. The system flexibly adapts to the given vehicle speed and work situation, and defines the dimensions of the warning fields based on individual requirements. The system additionally features a self-diagnostic function and alerts the driver early on in the event of impaired system functioning.

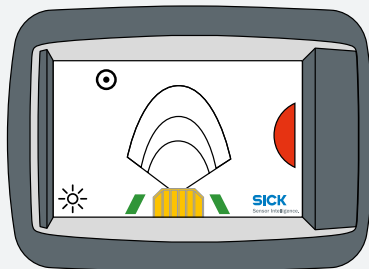


Displaying collision hazards and assistance function in the MINESIC100 TPS



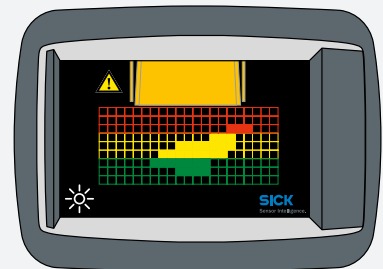
Front-end collision warning

The front-end collision warning works by monitoring the area in front of the haul truck. The operator receives a warning if one of the three configurable warning fields are infringed; the system automatically adapts warning zone dimensions according to the vehicle speed.



Road departure warning

The road departure warning monitors the distance between the haul truck and edge of the road, e.g., protective walls or markings. If the vehicle unintentionally veers from the driving path, the driver receives an early warning in order to avoid a potential incident.



Reverse assistance

The rear area of the haul truck is monitored during parking, unloading and maneuvering in reverse. The system scans the area behind the wheels and detects obstructions such as walls, vehicles and people.

MINESIC100 EPS OVERVIEW

The MINESIC100 EPS (EPS = Excavator Protection System) warns operators of impending collisions with other vehicles or the high wall face. The 3D LiDAR sensors mounted on the right and left of the excavator cover the excavator's entire environment, including the rear area. The object information from the sensors is used in a warning strategy specially developed for mining: the system indicates obstacles visually on a display and audibly, to provide an audible warning for the operator to maintain a safe distance.

The system assists the operator with correct excavator positioning and safe loading of haul trucks. Additional signal lamps can be connected to the system's digital outputs, guiding truck operators to the correct loading position.



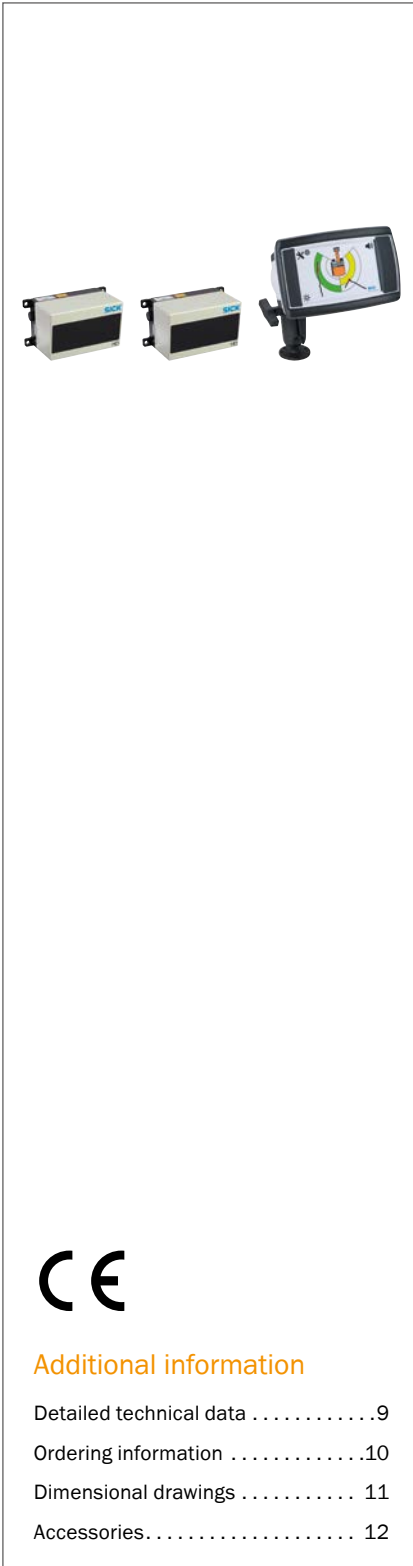
PRODUCT FAMILY OVERVIEW

		
	MINESIC100 EPS	MINESIC100 TPS
	Collision awareness and loading assistance for excavators	Collision awareness and driver assistance for haul trucks

Technical data overview		
Vehicle	Excavator	Haul trucks
Display	7" touch display	4.3" touch display
Functions	Audible and visual collision warning, loading assist, position assistance for haul trucks, event logging	Audible and visual collision warning, front-end collision warning, reverse assist, road departure warning, black spot warning (geo-fencing) for hazardous areas, event logging
Number of laserscanners	2	3
Monitored area	Vehicle rear end, left, right	Vehicle front end, vehicle rear end, road profile
Warning zones	3	3 2 (RDW)

At a glance		
	<ul style="list-style-type: none"> • Provides the operator with warnings to prevent collisions with other vehicles and the highwall face • Position and loading assistance for excavator and haul truck operators • Vehicle and wall outlines are displayed on a touchscreen • Configurable safety distances and warning fields • Event logging and monitoring of system status 	<ul style="list-style-type: none"> • Front-end collision warning, reverse assist and road departure warning • Visual and audible feedback • Configurable safety distances and warning fields • Event logging and monitoring of system status • Self-diagnostics function for straightforward troubleshooting and maintenance
Detailed information	→ 8	→ 14

COLLISION AWARENESS AND LOADING ASSISTANCE FOR EXCAVATORS



Product description

The MINESIC100 EPS (Excavator Protection System) driver assistance system is a high-performance collision awareness solution for large mining excavators. It provides the operator with warnings to prevent collisions with other vehicles and the highwall face. It also assists the excavator operator with correct vehicle positioning and safe loading of

haul trucks. Obstacles surrounding the excavator are indicated on a display. The operator receives visual and audible warnings in advance to ensure appropriate safety distances are maintained. This ensures that the operator can both maneuver the vehicle efficiently and safely and complete loading operations accurately.

At a glance

- Provides the operator with warnings to prevent collisions with other vehicles and the highwall face
- Position and loading assistance for excavator and haul truck operators
- Vehicle and wall outlines are displayed on a touchscreen
- Configurable safety distances and warning fields
- Event logging and monitoring of system status

Your benefits

- Prevention of collisions resulting in reduced repair costs and downtime
- Excellent excavator availability enables smooth and efficient loading
- Detection and tracking of moving and stationary obstacles without the need for RFID tags
- Integrated installation wizard simplifies installation and operation
- Self-diagnostics function makes system maintenance easy



Additional information

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→ www.sick.com/MINESIC100_EPS

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

The exact device specifications and performance data of the product may deviate from the information provided here, and depend on the application in which the product is being used and the relevant customer specifications.

General notes

Items supplied	3D LiDAR sensor LD-MRS HD Left 3D LiDAR sensor LD-MRS HD Right Operator display Mounting set for operator display Mounting kit with shock mount for LD-MRS HD (2 x) Control cabinet Buzzer GPS receiver USB stick with operating instructions Ethernet connection cable for LD-MRS HD (2 x) Ethernet connection cable for display Power supply cable for LD-MRS (2 x) Connecting cables for operator display
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Features

Field of application	Mining
Vehicle	Excavator
Laser class	1 (IEC 60825-1:2014)

Performance

Display	7" touch display
Functions	Audible and visual collision warning Loading assist Position assistance for haul trucks Event logging
Number of laserscanners	2
Monitored area	Vehicle rear end Left Right
Warning zones	3
GPS	✓
Self-diagnostics	✓
WebInterface	Software updates
Integrated application	Driver assistance system for large mining excavators to avoid collisions with other vehicles and the highwall face

Interfaces

Ethernet	✓
Function	Software updates Event Log
Digital I/O	✓
Operator interface	Touch display

Mechanics/electronics

Supply voltage	24 V DC, 19.2 V DC ... 27 V DC
Power consumption (typ., max.)	35 W 95 W, With heating

Weight	1 kg, without mounting kit (LD-MRS) 1,400 g, 2,000 g with mounting (display) 8 kg, (control cabinet)
Dimensions display (W x D x H)	216.8 mm x 64.3 mm x 138.9 mm (with mounting 150 mm depth)

Ambient data

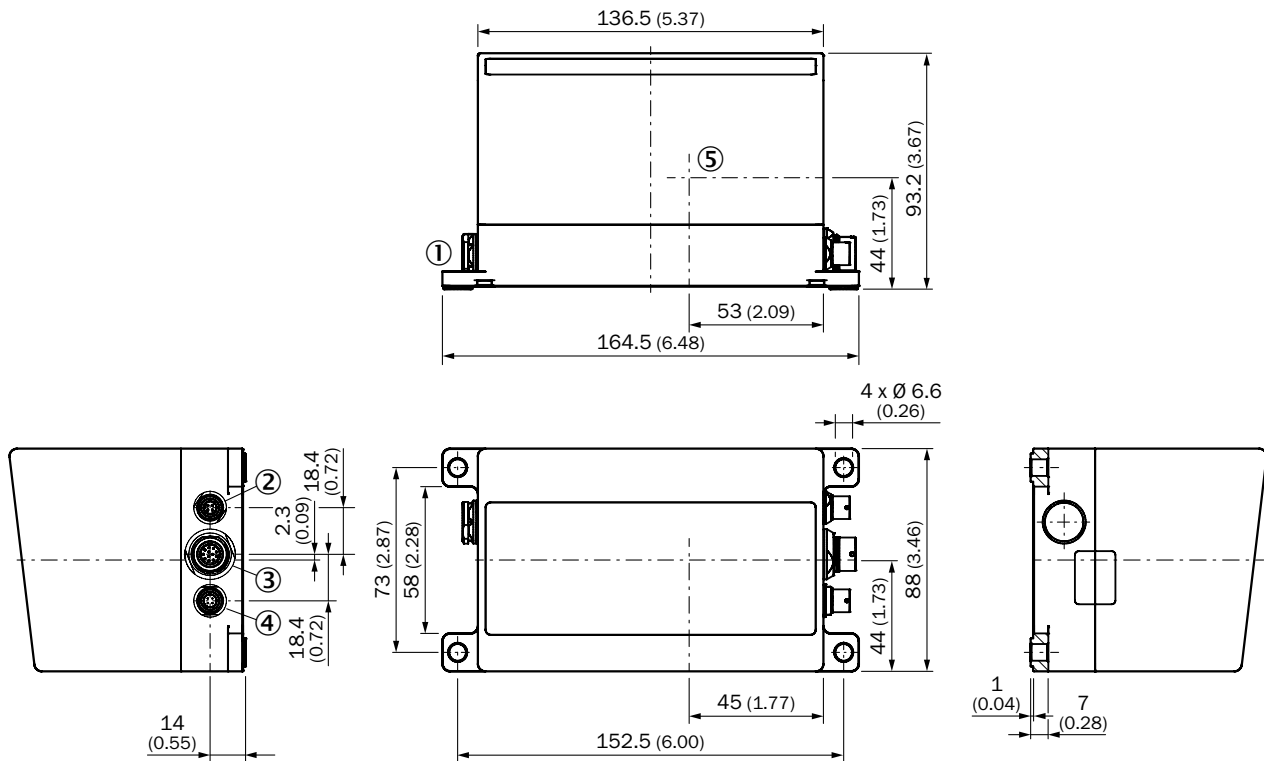
Ambient temperature operation	-20 °C ... +50 °C
Ambient storage temperature	-30 °C ... +80 °C

Ordering information

Integrated application	Items supplied	Type	Part no.
Driver assistance system for large mining excavators to avoid collisions with other vehicles and the highwall face	3D LiDAR sensor LD-MRS HD Left 3D LiDAR sensor LD-MRS HD Right Operator display Mounting set for operator display Mounting kit with shock mount for LD-MRS HD (2 x) Control cabinet Buzzer GPS receiver USB stick with operating instructions Ethernet connection cable for LD-MRS HD (2 x) Ethernet connection cable for display Power supply cable for LD-MRS (2 x) Connecting cables for operator display	EPS-10000	1054156

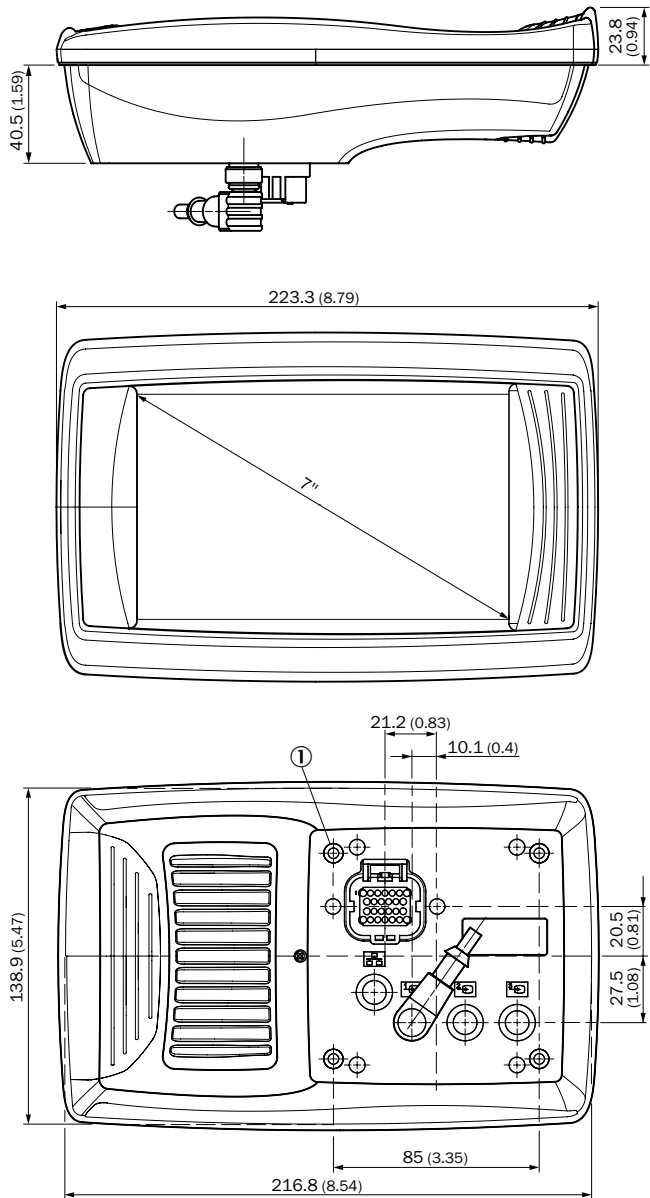
Dimensional drawings (Dimensions in mm (inch))

3D LiDAR sensor LD-MRS



- ① Venting element
- ② "Ethernet" connection, 4-pin female connector
- ③ Connection data interface / synchronisation, 12-pin female connector
- ④ Connection "Power", 4-pin female connector

Operator display



Accessories

Connection systems

Power supply units and power supply cables

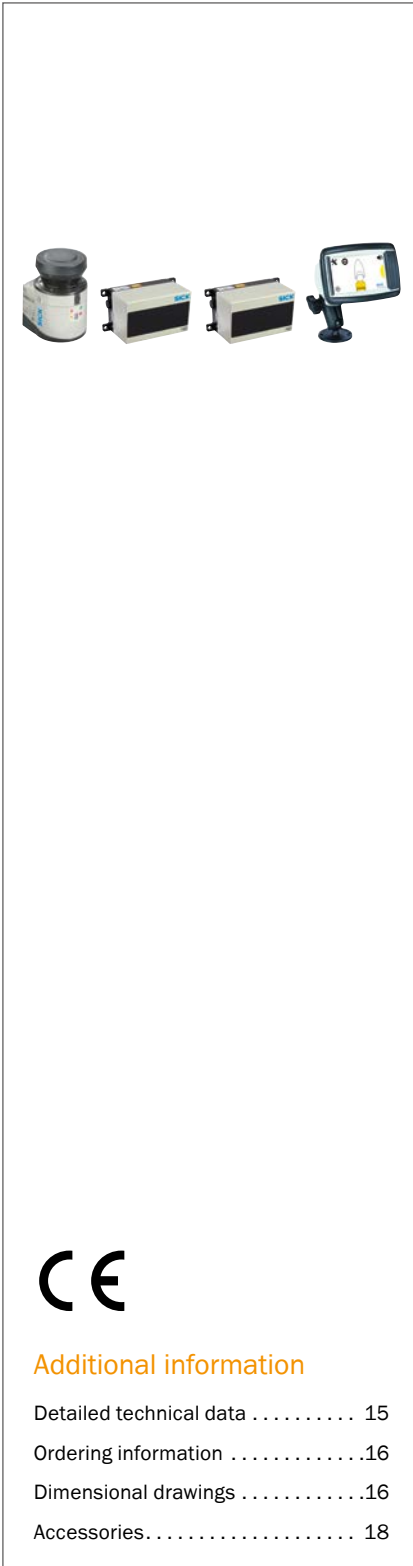
Brief description	Type	Part no.
DC/DC converter with connecting cables, input operating voltage range 13 V ... 32 V, output operating voltage 24 V, output power 240 W	DC/DC converter	6044524

Further accessories

Signal and status indicators

Brief description	Type	Part no.
Signal lamps for external display of mining haul truck position and warning field violation	EPS signal lamps	2084567

COLLISION AWARENESS AND DRIVER ASSISTANCE FOR HAUL TRUCKS



Additional information

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Product description

The MINESIC100 TPS (Truck Protection System) driver assistance system is a high-performance collision awareness solution with road departure warning. The system provides reliable warnings against collision with other vehicles and mining infrastructure. It also provides the operator with assistance in the face of critical scenarios on mine sites. The display shows only relevant information

and outputs audible alarms in advance to prevent collisions, reversing incidents, as well as unintended road departure. The system automatically adapts warning field dimensions to the vehicle speed. This provides the operator with support to prevent collisions and ensure safe maneuvering of the vehicle while also recognizing individual driver behavior.

At a glance

- Front-end collision warning, reverse assist and road departure warning
- Visual and audible feedback
- Configurable safety distances and warning fields
- Event logging and monitoring of system status
- Self-diagnostics function for straightforward troubleshooting and maintenance

Your benefits

- Prevention of collisions resulting in reduced repair costs and downtime
- High machine availability for trouble-free operation
- Active situation-dependent warning with low false alarm rates
- Detection and tracking of moving and stationary obstacles without the need for RFID tags
- Integrated black spot warning (geo-fencing) for hazardous areas
- Integrated installation wizard simplifies installation and operation
- Self-diagnostics makes system maintenance easy

→ www.sick.com/MINESIC100_TPS

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

The exact device specifications and performance data of the product may deviate from the information provided here, and depend on the application in which the product is being used and the relevant customer specifications.

General notes

Items supplied	3D LiDAR sensor LD-MRS HD Front 3D LiDAR sensor LD-MRS HD Rear 2D LiDAR sensor LMS151 RDW Operator display Mounting set for operator display Mounting kit with shock mount for LD-MRS HD (2 x) Mounting kit with shock mount for LMS1xx Control cabinet Buzzer GPS receiver USB stick with operating instructions Ethernet connection cable for LD-MRS HD (2 x) Ethernet connection cable for LMS1xx Ethernet connection cable for display Power supply cable for LD-MRS (2 x) Power cable for LMS1xx Connecting cables for operator display
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Features

Field of application	Mining
Vehicle	Haul trucks
Laser class	1 (IEC 60825-1:2014)

Performance

Display	4.3" touch display
Functions	Audible and visual collision warning Front-end collision warning Reverse assist Road departure warning Black spot warning (geo-fencing) for hazardous areas Event logging
Number of laserscanners	3
Monitored area	Vehicle front end Vehicle rear end Road profile
Warning zones	3 2 (RDW)
GPS	✓
Self-diagnostics	✓
WebInterface	Software updates
Integrated application	Driver assistance system for large mining haul trucks to avoid collisions with other vehicles and mining infrastructure

Interfaces

Ethernet	Function	✓ Software updates Event Log
Digital I/O		✓
Operator interface		Touch display

Mechanics/electronics

Supply voltage	24 V DC, 19.2 V DC ... 27 V DC
Power consumption (typ., max.)	40 W 150 W, With heating
Weight	1 kg, without mounting kit (LD-MRS) 1.1 kg, without mounting kit (LMS151) 360 g, 600 g with mounting (Display) 8 kg, (control cabinet)
Dimensions display (W x D x H)	142 mm x 44 mm x 98 mm (with mounting 130 mm depth)

Ambient data

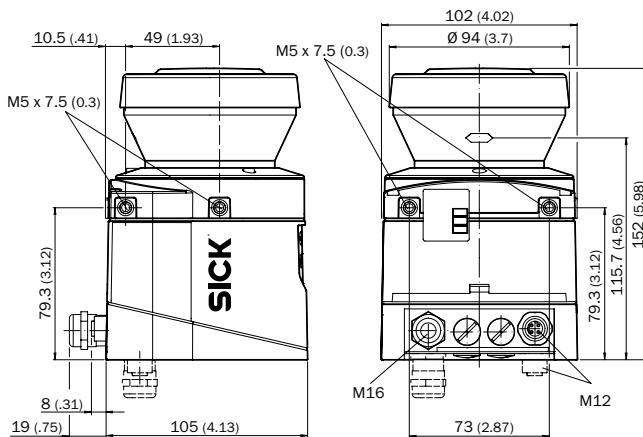
Ambient temperature operation	-20 °C ... +50 °C
Ambient storage temperature	-30 °C ... +80 °C

Ordering information

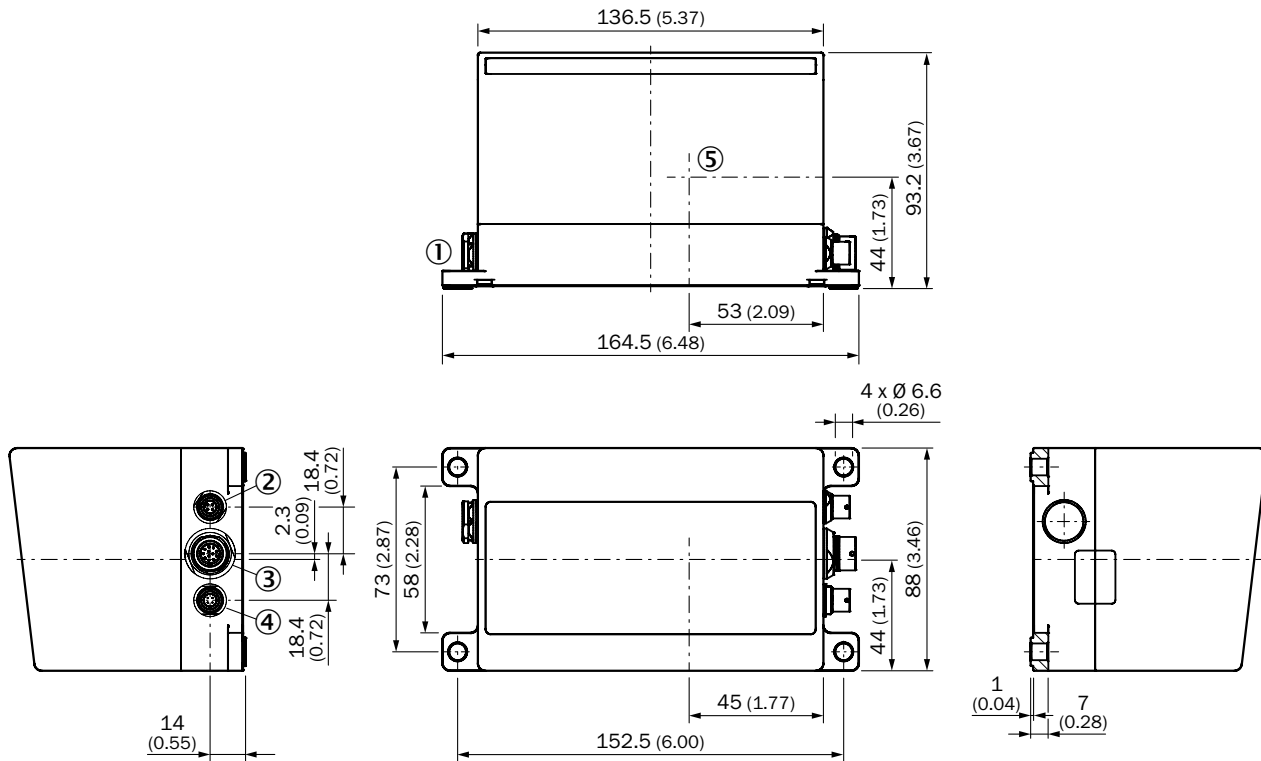
Integrated application	Items supplied	Type	Part no.
Driver assistance system for large mining haul trucks to avoid collisions with other vehicles and mining infrastructure	3D LiDAR sensor LD-MRS HD Front 3D LiDAR sensor LD-MRS HD Rear 2D LiDAR sensor LMS151 RDW Operator display Mounting set for operator display Mounting kit with shock mount for LD-MRS HD (2 x) Mounting kit with shock mount for LMS1xx Control cabinet Buzzer GPS receiver USB stick with operating instructions Ethernet connection cable for LD-MRS HD (2 x) Ethernet connection cable for LMS1xx Ethernet connection cable for display Power supply cable for LD-MRS (2 x) Power cable for LMS1xx Connecting cables for operator display	TPS-30100	1053097

Dimensional drawings (Dimensions in mm (inch))

2D LiDAR sensor LMS15x

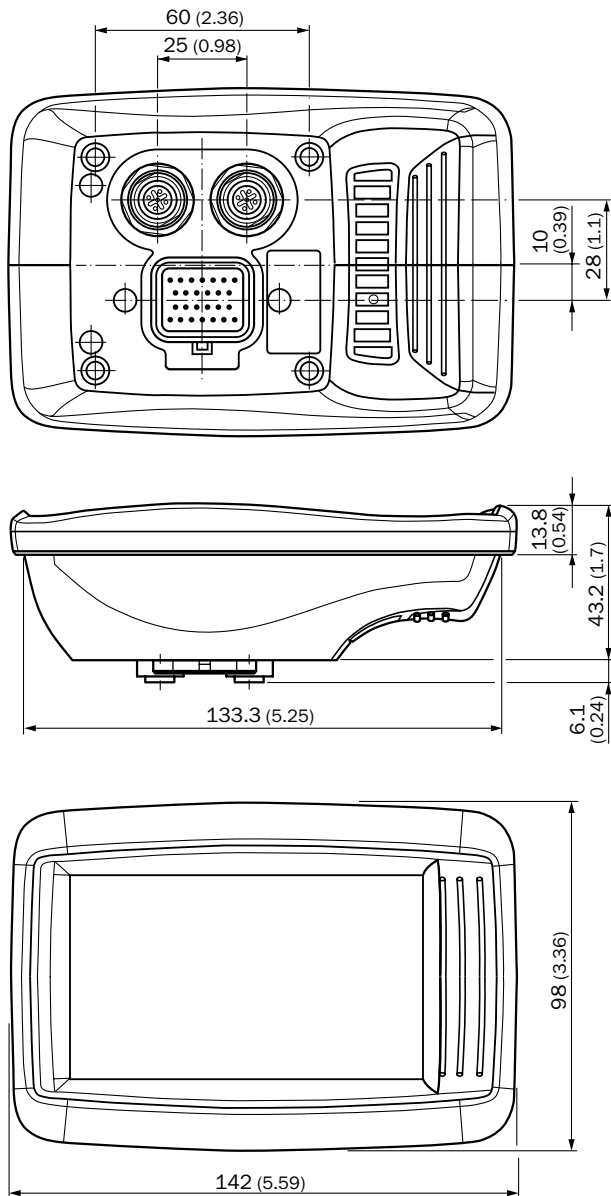


3D LiDAR sensor LD-MRS



- ① Venting element
- ② "Ethernet" connection, 4-pin female connector
- ③ Connection data interface / synchronisation, 12-pin female connector
- ④ Connection "Power", 4-pin female connector

Operator display



Accessories

Connection systems

Power supply units and power supply cables

Brief description	Type	Part no.
DC/DC converter with connecting cables, input operating voltage range 13 V ... 32 V, output operating voltage 24 V, output power 240 W	DC/DC converter	6044524

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- 
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 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 8,000 employees and over 50 subsidiaries and equity investments as well as numerous agencies worldwide, we are always close to our 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.

We have extensive experience in various 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 round out our offering: SICK LifeTime Services provide support throughout the machine life cycle and ensure safety and productivity.

For us, that is “Sensor Intelligence.”

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