

VPS Pro

SETTING A BENCHMARK IN ROAD
AND TRAFFIC TECHNOLOGY

Profiling systems

SICK
Sensor Intelligence.

TOO LONG, TOO WIDE, TOO HIGH? VPS Pro – MEASURING LARGE OBJECTS WITH HIGH PRECISION IN A MATTER OF SECONDS



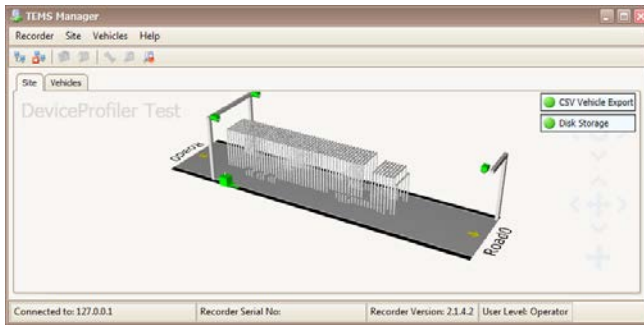
"Truck load too high, bridge damaged", "Heavy load will bring tunnel to a standstill", or "Truck too high, bridge too low": messages reporting structural damage caused by vehicles that are too wide or too high are not infrequent. The consequences include not only the massive costs of repairing bridges and tunnels but also the negative impact on the safety and efficiency of our roads.

For safety on the road

With the VPS Pro profiling system, SICK is able to offer a rugged and innovative solution for the automatic measurement of vehicle dimensions. Thanks to state-of-the-art laser scanners, the VPS Pro is even able to measure vehicles such as trucks. The high measurement precision of the VPS Pro makes the system suitable for certification by test authorities.

The VPS Pro supplements SICK's comprehensive portfolio of products for improving road safety. The wide range of sensor solutions, combined with a worldwide service and sales structure, has made SICK a market and technology leader in many fields of data acquisition in traffic engineering.

Leading edge by innovation: there is much in favor of the VPS Pro



Straightforward configuration

With the user-friendly TEMS Manager configuration tool for straightforward configuration and calibration. The graphical user interface visualizes vehicle data in the live view and facilitates monitoring of the VPS Pro.



Flexible implementation

The TEMS Info Sample-Client implementation complete with source code in the scope of supply of the VPS Pro enables the TCP/IP data flow to be used quickly and selectively. As a result, customers can individually poll VPS Pro-specific measured values, measurement results, and status signals.



Tried and tested components

Rugged and intelligent SICK laser scanners provide the basis for optimum system performance.



Wide range of accessories

SICK offers a wide range of accessories for trouble-free mounting, electrical installation, and commissioning of the VPS Pro.

THE OPERATING PRINCIPLE OF THE VPS Pro

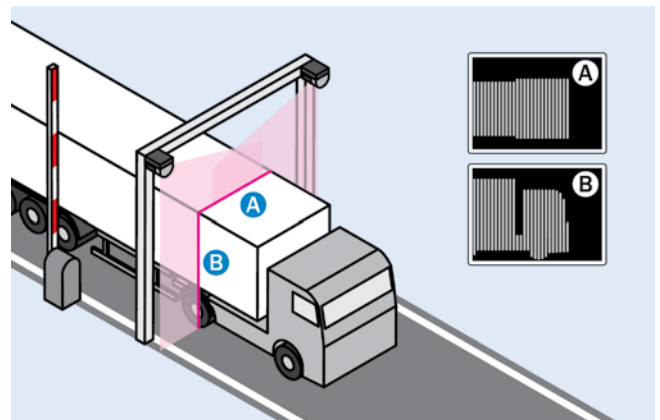
The VPS Pro profiling system consists of three SICK laser scanners. They scan the vehicle to be measured in accordance with the time-of-flight principle: when a target object reflects a laser beam, the position of the object is determined from the distance and angle parameters and this information is forwarded to the central control unit for use in further calculations.

Vehicles are measured in a three-stage process:

The profile of the vehicle is captured

Two laser scanners capture the profile of the vehicle. Mounted on the two brackets at the top of the measurement site gantry, they record the upper contour (A) and the side contour (B) of a vehicle as it passes through. The movement of the vehicle produces a point cloud made up of 2D profile sections.

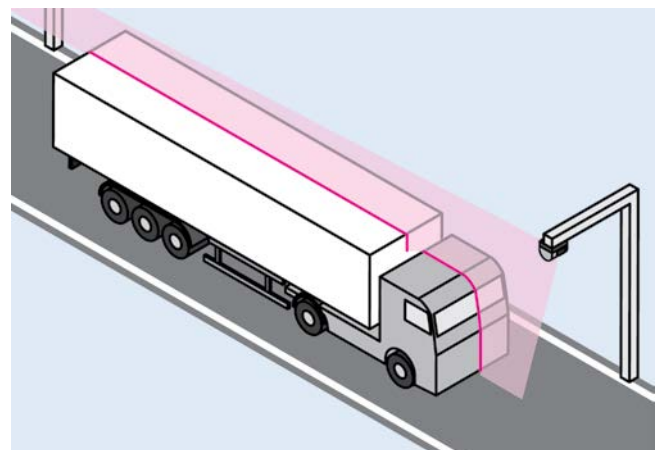
>> See Figure 1



The length of the vehicle is measured

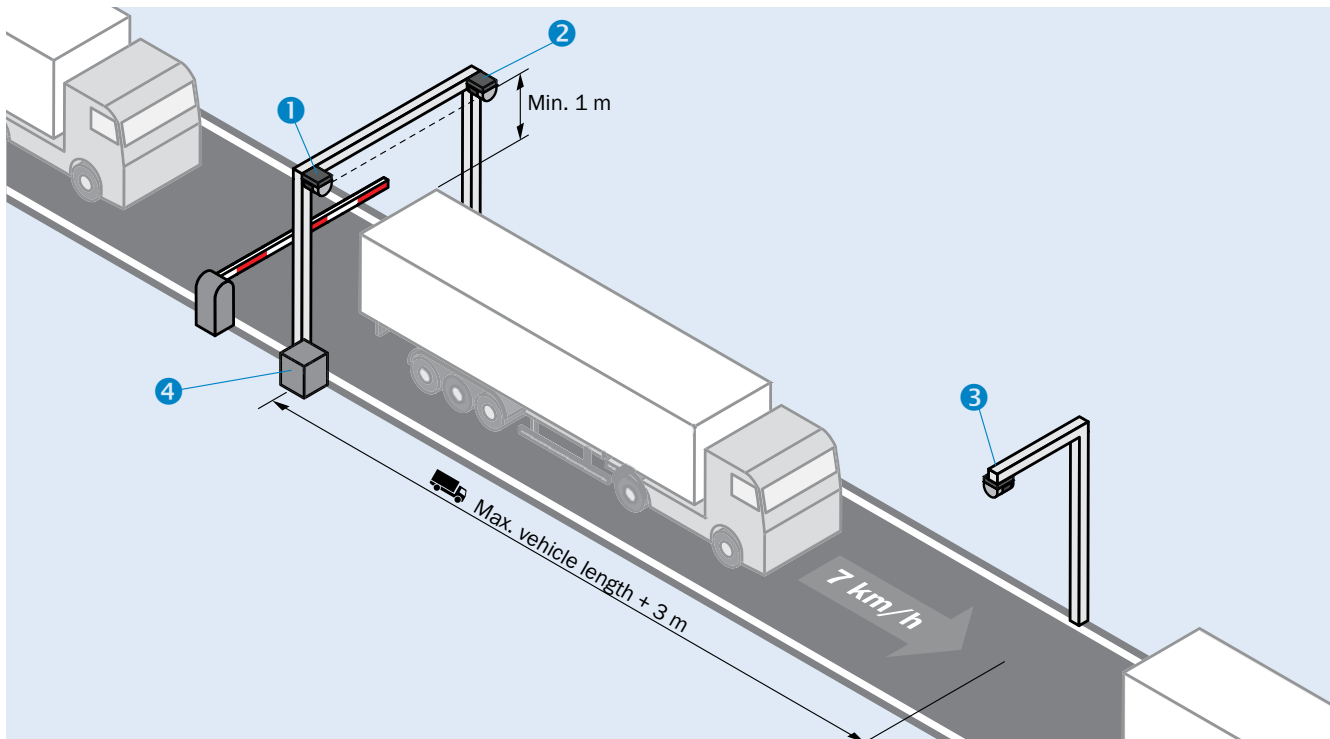
A third laser scanner is mounted at the end of the measurement site above the roadway or at the side of the roadway. This laser scanner scans the front of the vehicle as it approaches, returning the position of the individual 2D profile sections. The movement of the vehicle thus produces a 3D point cloud.

>> See Figure 2



Calculation of vehicle dimensions

All three laser scanners are connected to the Traffic Controller, which is the central control unit of the measuring system. The Traffic Controller receives and filters the incoming sensor data and calculates the vehicle dimensions. It makes all vehicle and system information available via a TCP/IP interface.



System components

The VPS Pro consists of the following system components (>> see Figure 3):

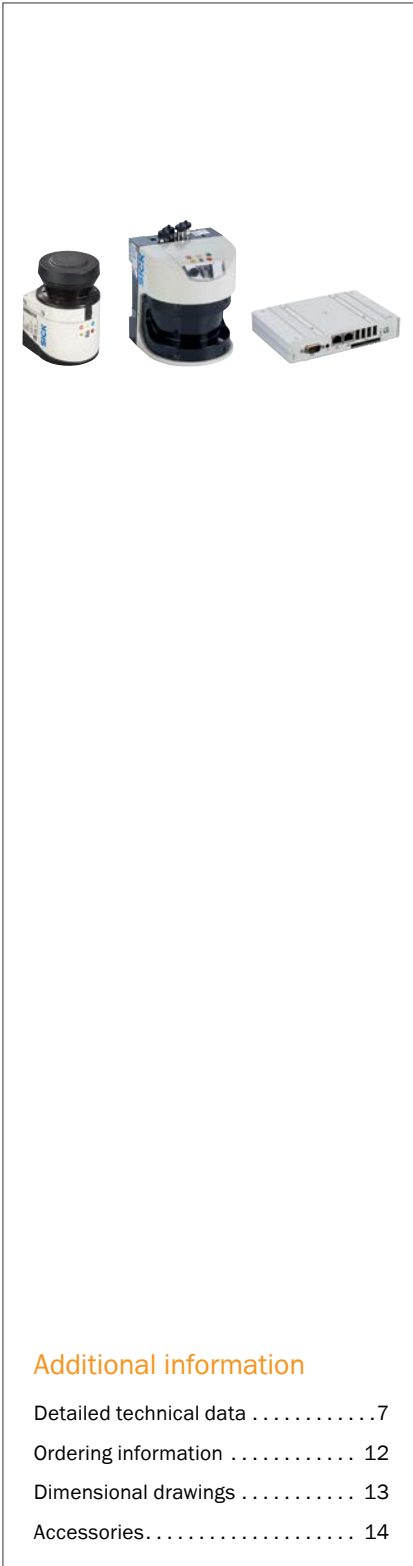
- **LMS Left ① and LMS Right ②**
The system variant determines which LMS series laser scanners are used: the VPS153 features two LMS111 laser scanners and the VPS553 features two LMS511 Traffic laser scanners.
- **LMS Length ③**
The LMS511 Traffic is used in both the VPS153 and the VPS553.
- **Traffic Controller ④**
The central control unit from which all vehicle and system information is sent via the TCP/IP interface.

Measurement site

For the VPS Pro to deliver a reliable and precise result, the following requirements must be met by the measurement site:

- The vehicles to be measured must pass through the measurement site one by one.
- The distance between the maximum vehicle height and the two laser scanners LMS Left and LMS Right must be at least 1 m.
- The overall length of the single-lane measuring system path is determined by the maximum vehicle length to be measured plus 3 m. The path should run in a straight line and the road surface should be even.
- For maximum measurement accuracy, the speed at which vehicles pass through the system should not exceed 7 km/h.

SETTING A BENCHMARK IN ROAD AND TRAFFIC TECHNOLOGY



Product description

The VPS Pro (Vehicle Profiling System) profiling system is designed for automatic measurement of vehicle dimensions using eye-safe laser scanners. The VPS Pro measures, amongst other things, the height, length, width, speed, start and end times of the measurement process, and 3D measuring points of

the vehicle, including excess dimensions. This information is sent via a TCP/IP interface. The interface viewer that is supplied displays the information about the measured vehicle. To ensure exact measurement results are obtained, vehicles must pass through the measuring station one by one.

At a glance

- Automatic and precise measurement of vehicle dimensions
- Information about the measured vehicle via TCP/IP interface
- Step-by-step configuration wizard for commissioning
- 3D model of vehicle with colored oversize indication
- Additional engineering support; e.g., integration into a higher-level system

Your benefits

- High measurement accuracy thanks to state-of-the-art laser measurement technology
- Automated measurement process reduces manual labor
- No work is required on the road surface
- High efficiency thanks to short measurement time
- Certifications attainable thanks to precise measurement technology
- Low maintenance requirements save time
- Oversized dimensions are detected, even in hard to reach places
- Modular design enables customization based on your application

→ www.mysick.com/en/VPS_Pro

For more information, just 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.

Profiling system VPS Pro

General notes

	VPS153	VPS553
Items supplied	Laser scanner LMS511 Traffic Laser scanner LMS111-10100S05 (2 x) Traffic Controller with VPS-Software incl. USB Stick with TEMS Manager, TEMS Info Sample-Client, source code for TEMS Info Sample-Client and manuals	Laser scanner LMS511 Traffic (3 x) Traffic Controller with VPS-Software incl. USB Stick with TEMS Manager, TEMS Info Sample-Client, source code for TEMS Info Sample-Client and manuals

Features

Field of application	System for measurement of vehicle dimensions
Integrated application	Measurement of dimensions for one vehicle at a time
Scanner design	3-scanner solution
Vehicle data	Vehicle dimensions (length, width, height) Vehicle speed 3D-Measurement points of the vehicle Start- and end measurement point of the measurement
Number of covered lanes	1
Recommended vehicle distance	Vehicles must pass through the measuring station one by one
Calibration	Yes
Stop and Go functionality	Yes

Performance

	VPS153	VPS553
Length measurement accuracy ^{1) 2)}	± 100 mm with vehicle speed < 7 km/h	± 50 mm with vehicle speed < 7 km/h
Width measurement accuracy ^{1) 2)}	± 60 mm with vehicle speed < 7 km/h	± 30 mm with vehicle speed < 7 km/h
Height measurement accuracy ^{1) 2)}	± 60 mm with vehicle speed < 7 km/h	± 30 mm with vehicle speed < 7 km/h
Calibration accuracy ^{1) 3)}	30 mm x 30 mm x 30 mm (L x W x H)	20 mm x 15 mm x 15 mm (L x W x H)
Driving speed	0.1 km/h ... 7 km/h, for full coverage ⁴⁾ 7 km/h ... 100 km/h ⁵⁾	
Minimum object size	1 m x 0.6 m x 0.6 m (L x W x H)	
Maximum object size	30 m x 5 m x 5 m (L x W x H)	

¹⁾ Typical value; actual value depends on environmental conditions.

²⁾ Information refers to twice the standard deviation (2 sigma).

³⁾ Maximum deviation of the measuring points from the ideal test object.

⁴⁾ Achievement of the maximum measurement accuracy of the length, width, and height measurement possible.

⁵⁾ Reduced achievement of the measurement accuracy of the length, width, and height measurement possible.

Interfaces

Operator interface	Ethernet-Connector LAN 1 of the Traffic Controller VPS
Data protocol	TEMS Info Interface (TCP/IP Interface) WCF TEMS Manager (configuration software)

Mechanics/electronics

Measuring range requirements	Measuring range (spanned by the measuring sections of the LMS) must be optically free
Installation position	Distributed
Installation requirements	Height LMS Left: 5 m ... 8 m, at least 1 m higher than the maximum vehicle height Height LMS Right: 5 m ... 8 m, at least 1 m higher than the maximum vehicle height LMS Length: positioning distance from LMS Left and LMS Right is maximum vehicle length + 3 m in the direction of travel, laterally or overhead

2D laser scanner LMS111-10100S05

General notes

Description	Configured laser scanner for profiling systems used for traffic applications
Note on use	Not suitable for personnel protection

Features

Field of application	Outdoor
Version	Short Range
Light source	Infrared, 905 nm
Laser class	1 (IEC 60825-1 (2007-3))
Field of view	270°
Scanning frequency	25 Hz 50 Hz
Angular resolution	0.25° 0.5°
Heating	Yes
Operating range	0.5 m ... 20 m
Max. range with 10 % reflectivity	18 m
Amount of evaluated echoes	2
Fog correction	Yes

Performance

Response time	≥ 20 ms
Detectable object shape	Almost any
Systematic error ¹⁾	± 30 mm
Statistical error ¹⁾	± 12 mm
Integrated application	Field evaluation
Number of field sets	10 fields
Simultaneous processing cases	10

¹⁾ Typical value; actual value depends on environmental conditions.

Interfaces

Serial (RS-232)	Function	✓ Host, AUX
	Data transmission rate	9.6 kBaud ... 115.2 kBaud
Ethernet	Function	✓ Host
	Data transmission rate	10/100 Mbit
	Protocol	TCP/IP, OPC

CAN bus	✓
Function	Outputs extension
PROFIBUS DP	-
PROFINET	-
DeviceNet	-
Switching inputs	2
Switching outputs	3
Optical indicators	7-segment display (plus 5 LEDs showing device status, contamination warning and initial condition)

Mechanics/electronics

Electrical connection	1 x M12 circular plug-in connector
Supply voltage	10.8 V DC ... 30 V DC
Power consumption	60 W
Housing color	Gray (RAL 7032)
Enclosure rating	IP 67 (EN 60529, Section 14.2.7)
Protection class	III (EN 50178 (1997;10))
Weight	1.1 kg, without connecting cables
Dimensions (L x W x H)	105 mm x 102 mm x 162 mm

Ambient data

Object remission	2 % ... > 1,000 % (reflectors)
Electromagnetic compatibility (EMC)	EN 61000-6-2:2005, EN 61000-6-4 (2007-01)
Vibration resistance	EN 60068-2-6 (1995-04)
Shock resistance	EN 60068-2-27 (1993-03)
Ambient operating temperature	-30 °C ... +50 °C
Storage temperature	-30 °C ... +70 °C
Ambient light safety	40,000 lx

2D laser scanner LMS511 Traffic

General notes

Description	Configured laser scanner for profiling systems used for traffic applications
Note on use	Not suitable for personnel protection

Features

Field of application	Outdoor
Version	Mid Range
Variant	PRO
Resolution power	Standard Resolution
Light source	Infrared (905 nm)
Laser class	1, eye-safe (IEC 60825-1 (2007-6))
Field of view	190°
Scanning frequency	25 Hz / 35 Hz / 50 Hz / 75 Hz / 100 Hz
Angular resolution	0.167°, 0.25°, 0.333°, 0.5°, 0.667°, 1°
Heating	Yes
Operating range	0 m ... 80 m
Max. range with 10 % reflectivity	40 m

Spot size	11.9 mrad
Amount of evaluated echoes	5
Fog correction	Yes

Performance

Response time	≥ 10 ms
Detectable object shape	Almost any
Systematic error ¹⁾	± 25 mm (1 m ... 10 m) ± 35 mm (10 m ... 20 m) ± 50 mm (20 m ... 30 m)
Statistical error ¹⁾	± 6 mm (1 m ... 10 m) ± 8 mm (10 m ... 20 m) ± 14 mm (20 m ... 30 m)
Integrated application	Field evaluation
Number of field sets	10 fields
Simultaneous processing cases	10

¹⁾ Typical value; actual value depends on environmental conditions.

Interfaces

Serial (RS-232, RS-422)	✓
Function	Host
Data transmission rate	9.6 kBaud ... 500 kBaud
Ethernet	✓
Function	Host
Data transmission rate	10/100 Mbit
Protocol	TCP/IP, OPC
CAN bus	✓
Function	Outputs extension
PROFIBUS DP	-
PROFINET	-
DeviceNet	-
USB	✓, Mini-USB
Function	AUX
Data transmission rate	9.6 kBaud ... 500 kBaud
Switching inputs	4 (Encoder)
Switching outputs	6
Optical indicators	5 LEDs (additional 7-segment display)

Mechanics/electronics

Electrical connection	4 x M12 circular plug-in connector
Supply voltage	24 V DC
Power consumption	22 W, + 55 W heating (typical)
Housing color	Gray (RAL 7032)
Enclosure rating	IP 67 (EN 60529, Section 14.2.7)
Protection class	III (EN 60529, Section 14.2.7)
Weight	3.7 kg
Dimensions (L x W x H)	160 mm x 155 mm x 185 mm

Ambient data

Object remission	2 % ... > 1,000 % (reflectors)
Electromagnetic compatibility (EMC)	EN 61000-6-2:2005, EN 61000-6-3 (2007-03)
Vibration resistance	EN 60068-2-6 (1995-04)
Shock resistance	EN 60068-2-27 (1993-03), EN 60068-2-29 (1993-04)
Ambient operating temperature	-30 °C ... +50 °C
Storage temperature	-30 °C ... +70 °C
Ambient light safety	70,000 lx

Traffic Controller VPS

General notes

Note on use	Receipt and filtering of sensor data Processing for VPS vehicle data Output of vehicle and diagnostic data via the user interface
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Features

Field of application	Indoor
Internal memory	32 GB

Interfaces

Operator interface	Ethernet-Connector LAN 1 of the Traffic Controller VPS
Sensor interface	Ethernet-Connector LAN 2 of the Traffic Controller VPS
Optical indicators	LED status and function display
Data protocol	TEMS Info Interface (TCP/IP Interface) WCF TEMS Manager (configuration software)
NTP synchronization	✓

Mechanics/electronics

Supply voltage	24 V DC (9 V DC ... 25 V DC)
Power consumption	10 W (typical)
Enclosure rating	IP 20
Weight	0.7 kg
Housing dimensions (W x D x H)	161 mm x 108.2 mm x 32 mm
Fixing	Screwable

Ambient data

Electromagnetic compatibility (EMC)	EN 55024, EN 55022 Class-A
Ambient temperature operation	-20 °C ... +70 °C
Ambient storage temperature	-40 °C ... +80 °C

Ordering information

Profiling system VPS Pro

- **Integrated application:** measurement of dimensions for one vehicle at a time

Items supplied	Measurement accuracy ¹⁾ ²⁾	Model name	Part no.
Laser scanner LMS511 Traffic Laser scanner LMS111-10100S05 (2 x) Traffic Controller with VPS-Software incl. USB Stick with TEMS Manager TEMS Info Sample-Client Source code for TEMS Info Sample-Client and manuals	Length ± 100 mm with vehicle speed < 7 km/h Width ± 60 mm with vehicle speed < 7 km/h Height ± 60 mm with vehicle speed < 7 km/h	VPS153	1067558
Laser scanner LMS511 Traffic (3 x) Traffic Controller with VPS-Software incl. USB Stick with TEMS Manager TEMS Info Sample-Client Source code for TEMS Info Sample-Client and manuals	Length ± 50 mm with vehicle speed < 7 km/h Width ± 30 mm with vehicle speed < 7 km/h Height ± 30 mm with vehicle speed < 7 km/h	VPS553	1067557

¹⁾ Typical value; actual value depends on environmental conditions.

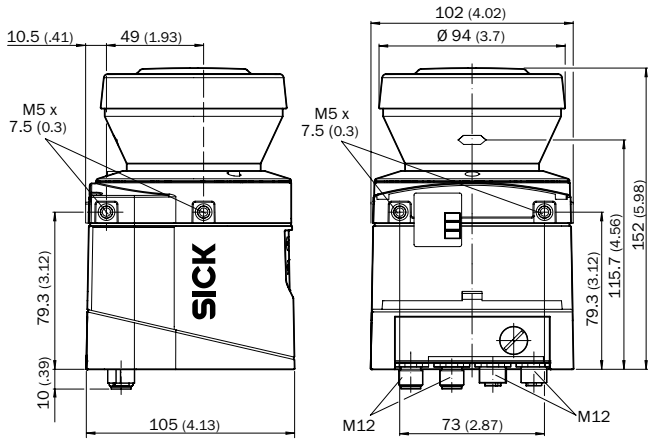
²⁾ Information refers to twice the standard deviation (2 sigma).

System components

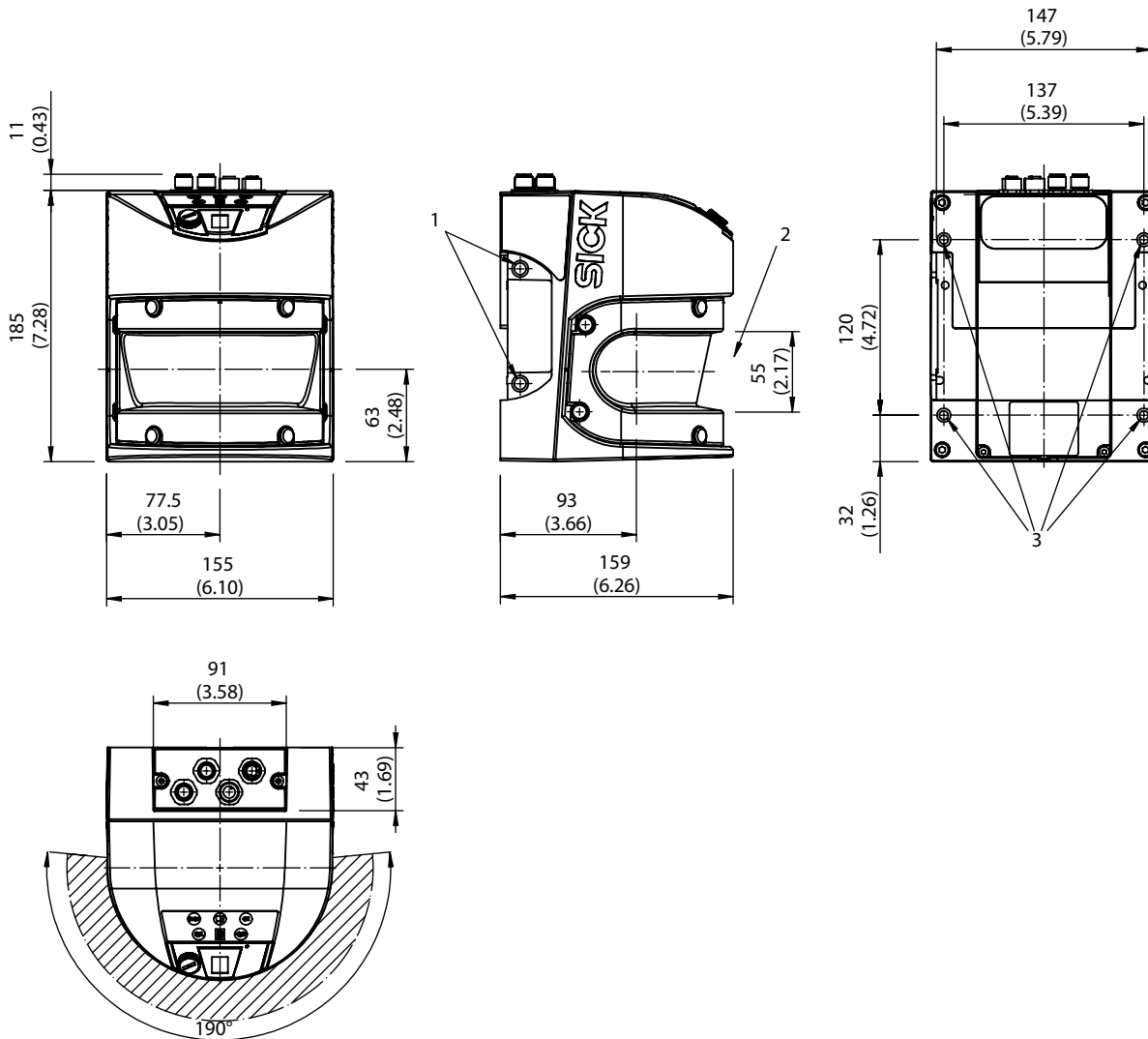
Model name	Part no.
LMS111-10100S05	1055053
LMS511 Traffic	1064730
Traffic Controller VPS	1067559

Dimensional drawings (Dimensions in mm (inch))

2D laser scanner LMS111-10100S05

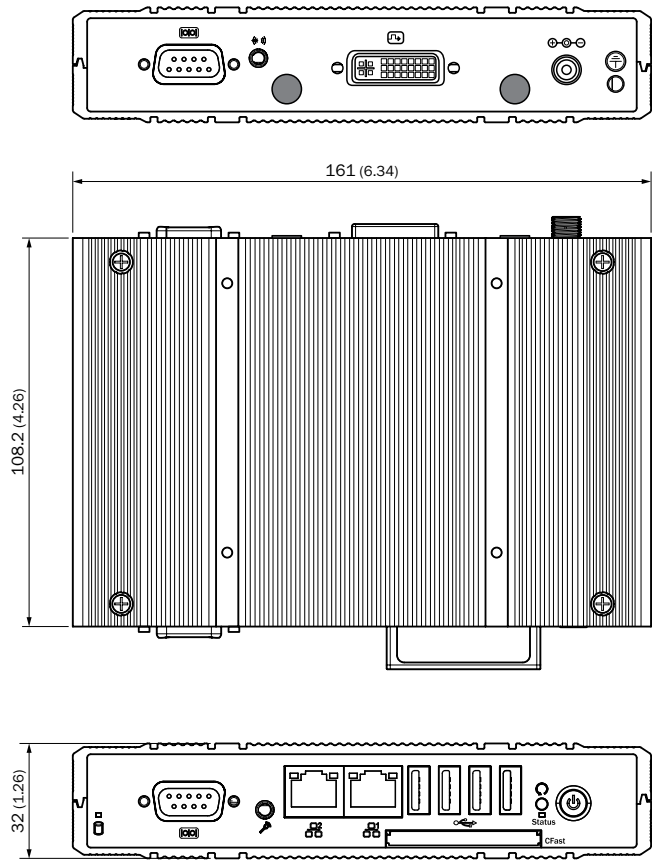


2D laser scanner LMS511 Traffic



- ① 4 screw holes M8 x 9
- ② Do not obstruct front window
- ③ 4 screw holes M6 x 8




Traffic Controller VPS












Accessories

Mounting systems



Device protection (mechanical)

Figure	Description	Model name	Part no.	VPS153	VPS553	LMS111-10100S05	LMS511 Traffic	Traffic Controller VPS
	Protection hood	Protective hood	2056850	-	-	-	●	-
	Weather hood, 190°	Weather hood	2046459	-	-	●	-	-
	Weather hood (180°), vertical mounting	Weather hood	2063050	-	-	-	●	-


Mounting brackets and mounting plates

Figure	Brief description	Model name	Part no.	VPS153	VPS553	LMS111-10100S05	LMS511 Traffic	Traffic Controller VPS
	Standard mounting set for 190°/270° weather hood	Mounting bracket	2046025	-	-	●	-	-
	Mounting bracket for LMS5xx (for retrofitting, if 2018303 is already in use)	Mounting bracket	2059271	-	-	-	●	-
	Mounting kit for wall-mounting (adjustment bracket)	Mounting kit	2018303	-	-	-	●	-
	1 piece, mounting bracket for direct mounting, from the rear, on wall or machine, not adjustable	Mounting kit 1	2015623	-	-	-	●	-
	1 piece, mounting bracket for rear mounting on wall or machine with protection of optics hood	Mounting kit 1b	2034325	-	-	●	-	-
	1 piece, mounting bracket, adjustable longitudinal and lateral axes, only in conjunction with mounting kit 1a (2034324) or 1b (2034325)	Mounting kit 2	2039302	-	-	●	-	-
	1 piece, mounting bracket for rear mounting on wall or machine, adjustable longitudinal and lateral axes, only in conjunction with mounting kit 1 (2015623)	Mounting kit 2	2015624	-	-	-	●	-
	1 piece, mounting plate, adjustable longitudinal axis, only in conjunction with mounting kit 2 (2039302)	Mounting kit 3	2039303	-	-	●	-	-
	1 piece, mounting bracket for rear mounting on wall, floor, or machine, adjustable longitudinal and lateral axes, only in conjunction with mounting kit 1 (2015623) and 2 (2015624)	Mounting kit 3	2015625	-	-	-	●	-

Other mounting accessories



Figure	Brief description	Model name	Part no.	VPS153	VPS553	LMS111-10100S05	LMS511 Traffic	Traffic Controller VPS
	Strap for mast bracket (sold by meter)	Clamping strap	5306222	-	-	-	●	-
	Strap lock	Clamping strap lock	5306221	-	-	-	●	-

Terminal and alignment brackets

Figure	Brief description	Model name	Part no.	VPS153	VPS553	LMS111-10100S05	LMS511 Traffic	Traffic Controller VPS
	Pole bracket requires additionally adapter bracket (2059271) or mounting set (2018303)	Alignment bracket	2018304	-	-	-	●	-

Connection systems

Modules and gateways

Figure	Brief description	Model name	Part no.	VPS153	VPS553	LMS111-10100S05	LMS511 Traffic	Traffic Controller VPS
	Outdoor Ethernet-Switch, 8 ports, operating temperature range -40 °C ... +75 °C	Ethernet-Switch	6043482	●	●	-	-	-
	Indoor Ethernet-Switch, 8 ports, operating temperature range 0 °C ... +55 °C	Ethernet-Switch	6033013	●	●	-	-	-

Plug connectors and cables





Figure	Signal type/application	Connection type head A	Connection type head B	Cable	Cable length	Model name	Part no.	VPS153	VPS553	LMS111-10100S05	LMS511 Traffic	Traffic Controller VPS
	-	Female connector, M12, 5-pin, straight, A-coded	Cable	4-pole	5 m	Connecting cable (female connector-open)	6036159	-	-	●	●	-
					20 m	Connecting cable (female connector-open)	6042564	-	-	●	●	-
					10 m	Connecting cable (female connector-open)	6042565	-	-	●	●	-
	-	Male connector, M12, 12-pin, straight, A-coded	Cable	12-pole	5 m	Connecting cable (male connector-open)	6042732	-	-	-	●	-
					10 m	Connecting cable (male connector-open)	6042733	-	-	-	●	-
					20 m	Connecting cable (male connector-open)	6042734	-	-	-	●	-


Figure	Signal type/application	Connection type head A	Connection type head B	Cable	Cable length	Model name	Part no.	VPS153	VPS553	LMS111-10100S05	LMS511 Traffic	Traffic Controller VPS
	Ethernet	Male connector, RJ45	Male connector, RJ45	-	3 m	Ethernet data cable	6026083	-	-	-	-	●
		Male connector, M12, 4-pin, straight, D-coded	Male connector, RJ45, 8-pin, straight	4-pole, AWG26	5 m	SSL-2J04-G05ME	6034415	-	-	●	●	-
					10 m	SSL-2J04-G10ME	6030928	-	-	●	●	-
					20 m	SSL-2J04-G20ME	6036158	-	-	●	●	-

Further accessories

Calibration tools

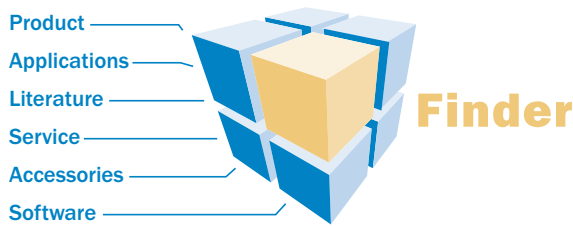
Figure	Description	Model name	Part no.	VPS153	VPS553	LMS111-10100S05	LMS511 Traffic	Traffic Controller VPS
	Reference box 0.39 m x 1.0 m x 1.85 m (L x W x H)	Reference box	-	●	●	-	-	-

Test and monitoring tools

Figure	Description	Model name	Part no.	VPS153	VPS553	LMS111-10100S05	LMS511 Traffic	Traffic Controller VPS
	Scan finder, receiver to localize infra red scans	LS80b	6020756	●	●	-	-	-

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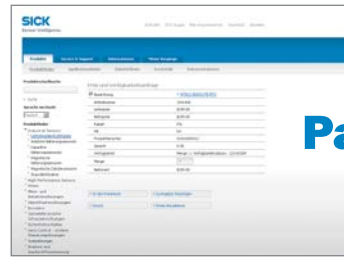
Product Finder: We can help you to quickly target the product that best matches your application.

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Safe and professional



Product & System Support
Reliable, fast and on-site



Verification & Optimization
Safe and regularly inspected



Upgrade & Retrofits
Easy, safe, economical



Training & Education
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 6,500 employees and over 50 subsidiaries and equity investments as well as numerous representative offices 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.”

Worldwide presence:

Australia, Austria, Belgium/Luxembourg, Brazil, Czech Republic, Canada, China, Denmark, Finland, France, Germany, Great Britain, Hungary, India, Israel, Italy, Japan, Mexico, Netherlands, Norway, Poland, Romania, Russia, Singapore, Slovenia, South Africa, South Korea, Spain, Sweden, Switzerland, Taiwan, Turkey, United Arab Emirates, USA

Detailed addresses and additional representatives → www.sick.com