SICK Sensor Intelligence

Replacement of LMS1xx with picoScan100

Table of content

1. Introduction

The LMS1xx family with the different variants already solved sensing tasks in a wide range of applications. However, the successor product family picoScan100 with a lot of new functions has state of the art technology and allows new possibilities and applications.

This document provides an overview of which LMS1xx variant can be replaced with which picoScan100 and shows differences. Not only are the different technical specifications highlighted but also measurement performance and software functions are compared. This document is based on LMS1xx firmware version V2.0.3 and picoScan firmware version V2.2.1.

Versioning of the document:

Document version	Change	Date
1.0.0	Initial document	07/07/2025
1.0.1	Update document due to picoScan150 firmware V2.2.1	09/04/2026

1.1. LMS1xx overview

Frequency/ angular solution	**25Hz/0.25° or 50Hz/0.5°**																		
Working range	0.5...20m											0.5…40m				0.5...50m			
Software features	Field evaluation				Field evaluation, easy teach			Field evaluation, security parameterization, Easy Teach lite and pro				Field evalution, security parameterization, Easy Teach lite				Field evaluation, security conform parameterization, Easy Teach lite and pro				Field evaluation		
Enclosure rating	IP65			IP67	IP67	IP65			IP67			IP67				IP67				IP67		
Color																						
Connection	1 x system plug with screw terminal block			1 x M12 round connector		1 x system plug with screw terminal block			1 x M12 round connector			1 x M12 round connector										
Part. no.	1041113	1048235	1048236	1041114	1068858	1044322	1051384	1044321	1051402	1051379	1051403	1070209	1070410	1070409	1070411	1047607	1136200	1065550				

1.2. picoScan100 overview

Indoor/Outdoor(Enclosure rating)	Only Indoor (IP65)	Indoor/Outdoor (IP65/67)								
Performance	20Hz/0.1	15Hz/0.33°, 15Hz/0.25°, 25Hz 0.33°				15Hz/0.33°, 15Hz/0.25°, 20Hz/0.1°, 40Hz/0.25°,		15Hz/0.05°, 15Hz/0.33°, 15Hz/0.5°, 15Hz/1°, 20Hz/0.1°, 20Hz/0.25°, 30Hz/0.1°, 40Hz/0.25°, 40Hz/0.125°, 50Hz/0.25°,		
Range	30m	25m				60m		120m		25…120m
Applications	measurement data	measurement data, 2D Object Detection				measurement data, 2D Object Detection		measurement data, 2D Object Detection Advanced		flexible
Add-ons	Particle filter, Reflector detection	Data Reduction & Data Preparation package, Reliability package, Multi-echo technology, legacy telegram, Reflector detection, IMU, PTP		-		Data Reduction & Preparation package, Reliability package, Multi-echo technology, legacy telegram, Reflector detection, IMU, PTP		Data Reduction & Data Preparation package, Reliability package, Multi-echo, LMDscandata (data format), Reflector detection, IMU, PTP, Native ROS2		flexible
Inputs/Outputs (System plug)	1 Output	3	6	3	6	3	6	3	6	3 or 6
Type	picoScan120	picoScan150 Core-1	picoScan150 Core-1 6I/O	picoScan150 Core-w/o Add-ons	picoScan150 Core-w/o Add-ons	picoScan150 Prime-1	picoScan-Prime 6I/O	picoScan150 Pro-1	picoScan150 Pro-1 6I/O	picoScan-Configurator
Part number	1141751	1134608	1142270	1134607	1142269	1134609	1142272	1134610	1142273	individual

1.3. Selecting the device

The LMS1 variants differ in measuring ranges and IP rating as well as smaller additional software functions. 2D object detection is included in all LMS1xx and picoScan150 variants. In the picoScan100 family, the variants differ in angular resolution/scan frequency, range, additional software functions and choice of system connector. The picoScan150-Pro variant includes all the functions of the picoScan100 family. An individual picoScan150 can be created via the picoScan100 family configurator on https://www.sick.com/de/de/configurator/g574970, which enables the use of only the software functions required.

1.4. Documents and links

There are a number of documents available for the picoScan100 device that can simplify the changeover. In addition to this document, the following table contains useful links and documents:

Content	Link
Operating instruction	https://www.sick.com/de/en/catalog/produkte/lidar-und-radarsensoren/lidar-sensoren/picoscan100/pics150-01000-pro-1/p/p677850?tab=downloads
Product family page	https://www.sick.com/de/en/catalog/produkte/lidar-und-radarsensoren/lidar-sensoren/picoscan100/c/g574970?tab=downloads
Hardening guid	
Knowledge base LiDAR	https://support.sick.com/knowledgebase/knowledge-articles/?gr0id=9312ed16-a69b-ee11-be37-6045bd98fa8b

2. Technical specifications

This chapter compares the information in the data sheet for the two device families.

2.1. General

	LMS1xx	picoScan150
Measurement principle	Single beam pulse	HDDM+
Application	Indoor/outdoor	
Light source	Infrared (wavelength 905 nm)	
Horizontal aperture angle	270°	276°
Scanning frequency	25 Hz, 50Hz	Core: 15 Hz, 25 Hz Prime: 15 Hz, 20 Hz, 40 Hz 2) Pro: 15 Hz ... 50 Hz
Angular resolution	0.25°, 0.5°	Core: 0.33°; 0.25°; 1° Prime: 0.10°; 0.25°; 1° 2) Pro: 0.05° ... 1°
Spot size @ 10m	170mm	55mm
Number of echoes evaluated	2	3
Systematic error	Typ. ± 30 mm Max. ± 50 mm	typ. ± 20 mm 3) max. ± 30 mm Temperature drift: Typically, ± 0.5 mm/K
Statistical error (1 σ)	12 mm (1 m ... 10 m) 20 mm (10 m ... 20 m) 35 mm (20 m ... 40 m) Security	≤ 2 mm (0.05 m ... 5 m) ≤ 16 mm (5 m ... 60 m)
Scan field flatness	Conus error: ±0.5° Tilt error: ±1°	Conus error: ±0.4° Tilt error: ±0.6°
Boot up	Max. 60s	Typ. 9.5s
Usage period	Not defined	Typ. 12 years

2.2. Mechanical

	LMS1xx	picoScan150
Dimensions (L x W x H)	152 mm x 102 mm x 105 mm	60 mm x 60 mm x 82 mm
Weight	1.1kg	220 g, without system plug
Enclosure rating	IP65: LMS10x LMS12x/ LMS173 Security LMC12x VdS IP67: LMS11x/LMS13x/ LMS14x/ LMS15x/ LMS16x/ LMS182 Security LMC13x VdS	IP65/IP67

2.3. Electrical

	LMS10x/11x	LMS14x	LMS15x/16x	picoScan150
Digital inputs	2	4	4	3 or 6 flexible IOs depens on systemplug variant
Digital outputs	3	3 (2 Relais,1 digital)	3	
External CAN IOs	8	X (Core) 8 (prime)	8	-
Encoder	2	X	2	2

2.4. Ambient data

	LMS1xx	picoScan150
Ambient light immunity	80 klux (indirect)	100 klux (indirect)
Ambient operating temperature	LMS10x LMS12x/LMS173 Security LMC12x VdS: 0 °C ...+50 °C LMS11x/LMS15x LMS13x/LMS182 Security LMC13x VdS: -30 °C ... +50 °C LMS16x/LMS14x Security: –40 °C ... +60 °C	-33 °C ... +50 °C
Storage temperature	–30 °C ... +70 °C (max. 24 h)	- 40 °C ... + 70 °C
switch-on temperature	Not defined	-33 °C ... +50 °C (permissible switch-on temperature)

		-5 °C ... +50 °C (immediately ready for operation)
Remission factor	3 % ... > 1,000 % (reflectors)	1.8% ... > 1,000% (reflector)
EMC	According to EN 61 00062 (2005-08), EN 61 00063 (2007-01)/A1 (2011-03)	Radiation emitted: (IEC 61000-6-4:2018 / EN IEC 61000-6-4:2019 IEC 61000-6-4:2006+A1:2010 / EN 61000-6-4:2007+A1:2011) (IEC 61000-6-8:2020 / EN IEC 61000-6-8:2020) Electromagnetic immunity: • Industrial environment (IEC 61000-6-2:2016 / EN IEC 61000-6-2:2019 / IEC 61000-6-2:2005 / EN 61000-6-2:2005 / EN 61000-6-2:2005 / AC:2005)
Vibration resistance	According to IEC 60068-2-6 (1995-04) 10 Hz ... 150 Hz: amplitude 0.35 mm to 5 g, 20 cycle	Sine resonance scan: 10 Hz ... 1,000 Hz; 1 g (IEC 60068-2-6:2007-12) Sine test: 10 Hz ... 500 Hz, 10 g, 10 cycles (IEC 60068-2-6:2007-12) Noise test: 10 Hz ... 500 Hz, 13.5 g RMS, 5 h (IEC 60068-2-64:2008)
Shock resistance	Single shock according to IEC 60068-2-27 (1993-03) 15 g, 11 ms, 6 shocks per axis Continuous shock according to IEC 60068-2-27 (1993-03) 10 g, 16 ms, 1000 shocks per axis	single shock according to IEC 60068-2-27:2008-02: 100 g, 6 ms, 3 shocks per axis Continuous shock according to IEC 60068-2-27:2008-02: 40 g, 6 ms, 4,000 shocks per axis Continuous shock according to IEC 60068-2-27:2008-02: 50 g, 3 ms, 5,000 shocks per axis
Impact resistance	Not specified	Single shock according to IEC 60068-2-27:2008-02: 100 g, 6 ms, 3 shocks per axis Continuous shock according to IEC 60068-2-27:2008-02: 40 g, 6 ms, 4,000 shocks per axis Continuous shock according to IEC 60068-2-27:2008-02: 50 g, 3 ms, 5,000 shocks per axis

2.5. Interfaces

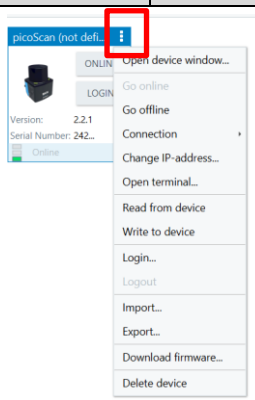
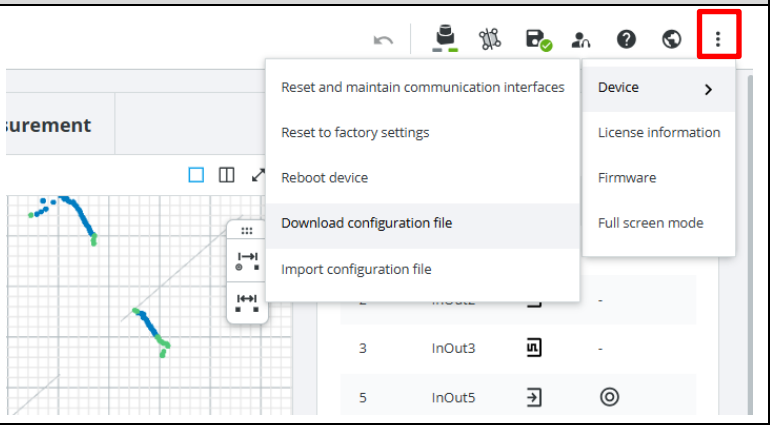
2.5.1. Parametrization

	LMS1xx	picoScan150
Configuration	SOPAS ET (software) Sentio (software) CoLa A/B	SOPASair (web server), Sentio (software), CoLa A/B, REST API
Measurement data	LMDscandata (UDP/TCP/Serial)	Compact (UDP) MSGPACK (UDP) LMDscandata (TCP) Native ROS 2
Config. about USB	yes	no
Inputs/Outputs	2 Inputs 3 Outputs	Depending on the system plug: Flexible 3 IOs or 6 IOs
Internal IMU	No	Yes
CAN	Output extension	No
Encoder	2 Encoder inputs	2 Encoder inputs
Serial (RS232)	Host/AUX	No

2.5.2. Parameter transmission via configuration file

	LMS1xx	picoScan100
SOPAS .SOPAS Parameter file	Yes	Yes
SOPAS .SDV Parameter file	Yes	Yes
WebUI .json	No	Yes (recommended)

Please configure the picoScan100 via the web browser of your choice before importing/exporting the configuration (default IP 192.168.0.1). For both devices, configurations can be imported via SOPAS ET as follows.

	LMS1xx	picoScan100
Export/Import .sopas file		
	LMS1xx	**picoScan100**
Export/Import via web ui	-	

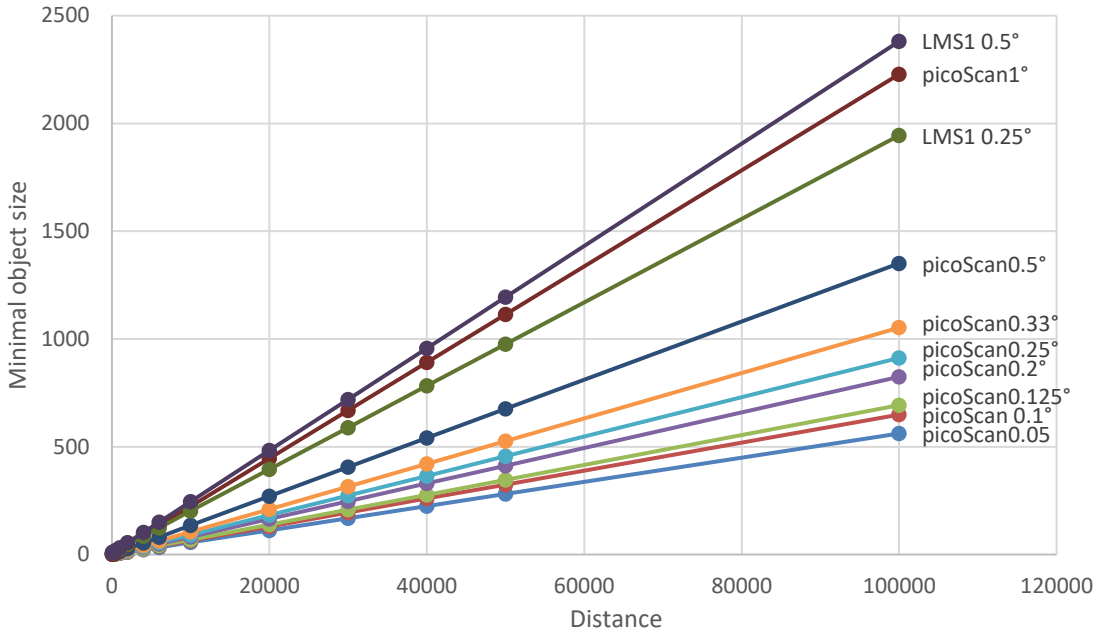
2.6. Login Levels per default

The number of login levels switched off by default is lower for cybersecurity reasons. However, they can be activated:

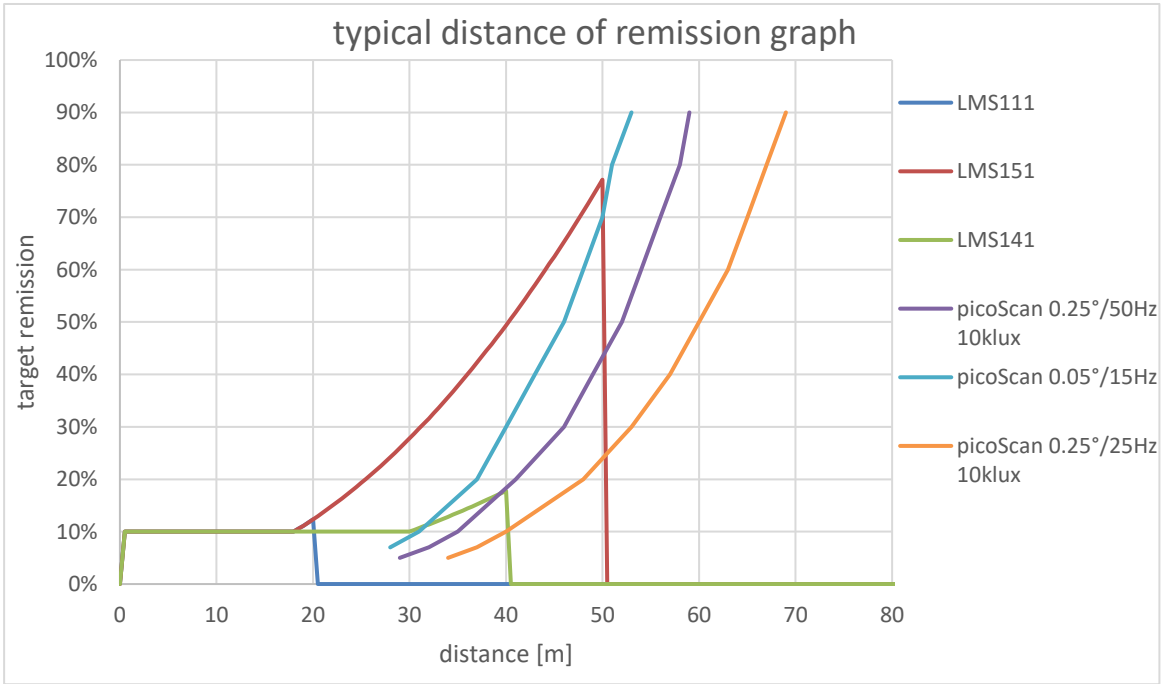
	LMS1	picoScan
Maintenance	Enabled	Disabled
Auth. client	Enabled	Disabled
Service	Enabled	Enabled
Sick Service	Disabled	Disabled

3. Measurement performance

The size of the object has a significant influence on the detectability of objects. The minimum object size is strongly dependent on laser divergence and range. Below are the minimum object sizes for different distances. These are theoretical values that can deviate from reality.



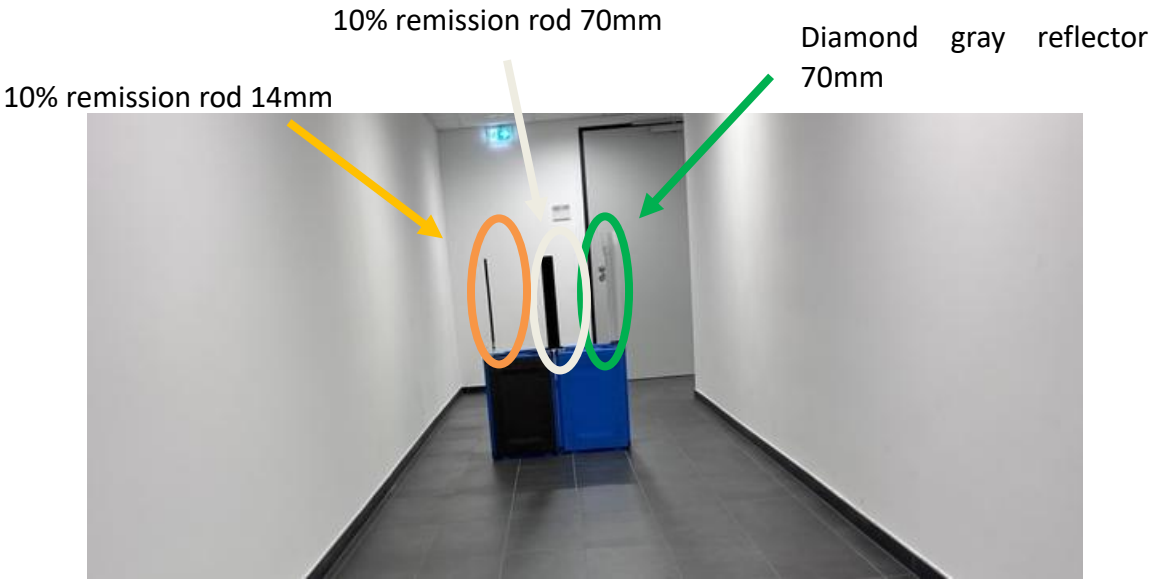
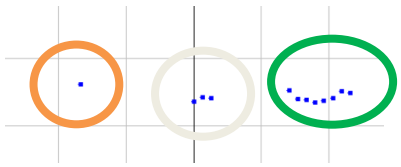
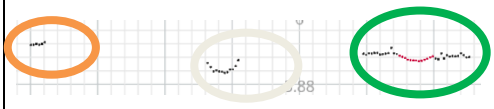
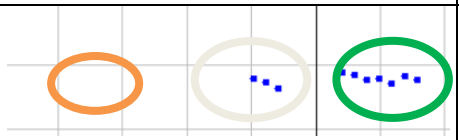
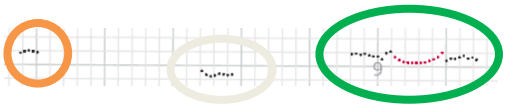
In addition to object size, the remission of the object is a main factor influencing the detectability of an object. The minimum maximum ranges for the various remissions are compared below. The following calculations are theoretical; the actual detection capability can vary but is usually higher.



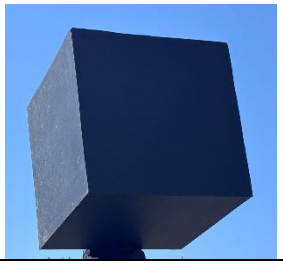
The actual detectability depends on many other factors. It is therefore advisable to test the

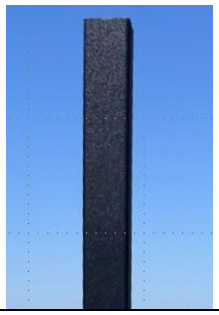
measurement performance on different objects under different conditions or to test it in the application. Some comparisons are shown in the chapters below.

3.1. Indoor measurement

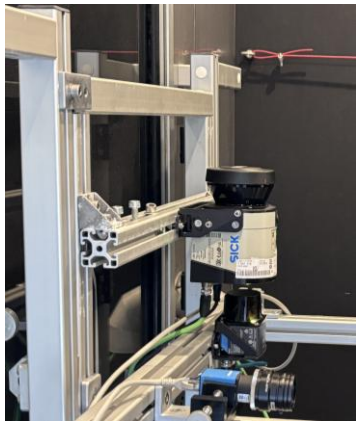
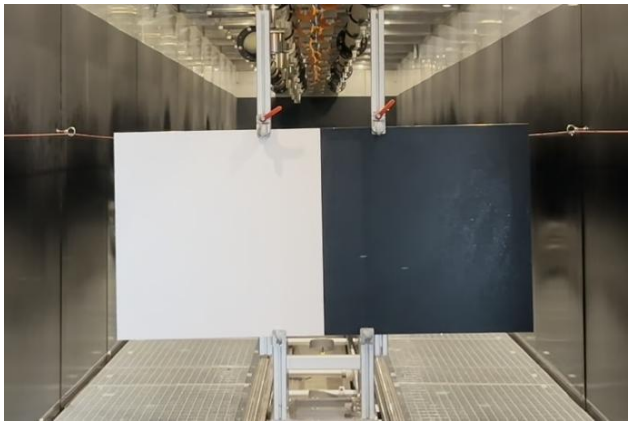
<table>
<tr><th colspan="3">Detectability of rods</th></tr>
<tr><td colspan="3"> 
</td></tr>
<tr><td></td><td>LMS1xx</td><td>picoScan100</td></tr>
<tr><td>Object in 6m distance</td><td>  </td><td>  </td></tr>
<tr><td>Object in 8m distance</td><td>  </td><td>  </td></tr>
<tr><td>Configuration</td><td>0.25°/25Hz</td><td>0.1°/20Hz</td></tr>
<tr><td>Conclusion</td><td colspan="2">The picoScan100 measures more measuring points on objects and detects particularly small objects better than the LMS1xx due to the higher angle resolution, smaller divergency and HDDM.</td></tr>
</table>

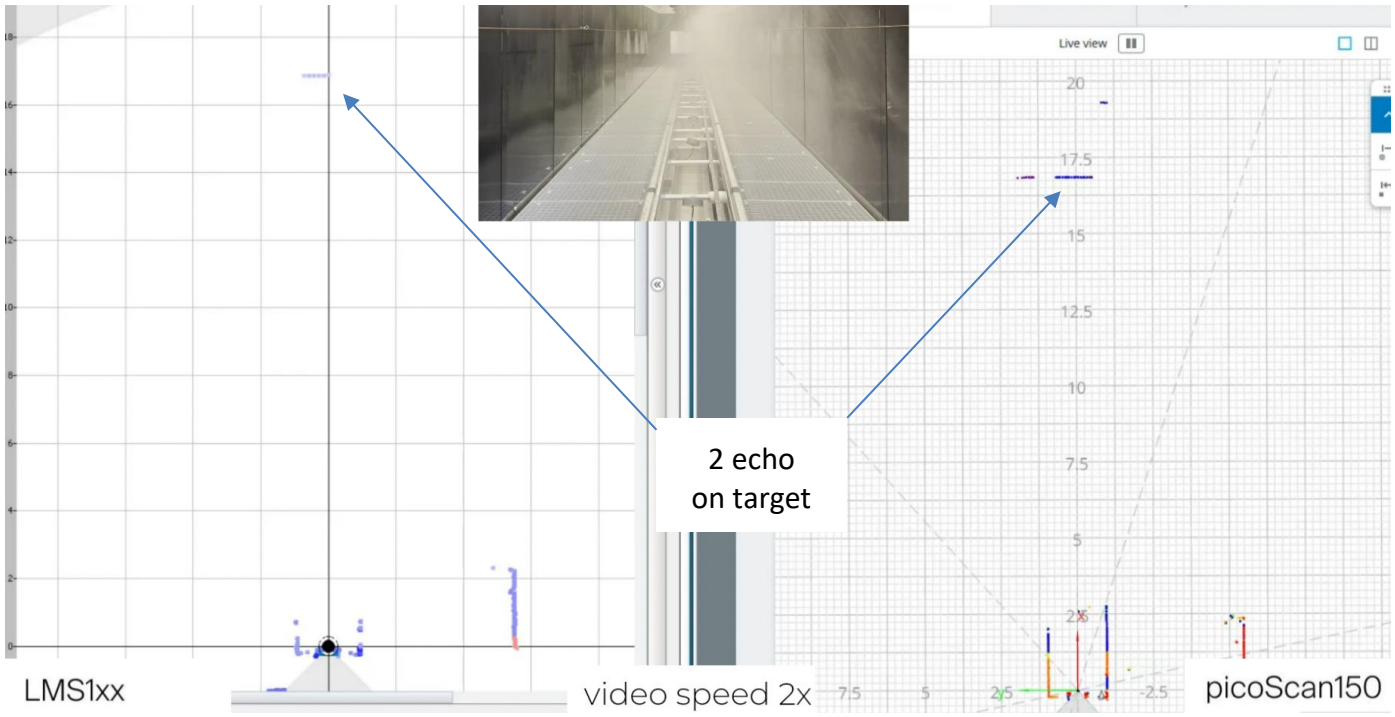
3.2. Outdoor measurement

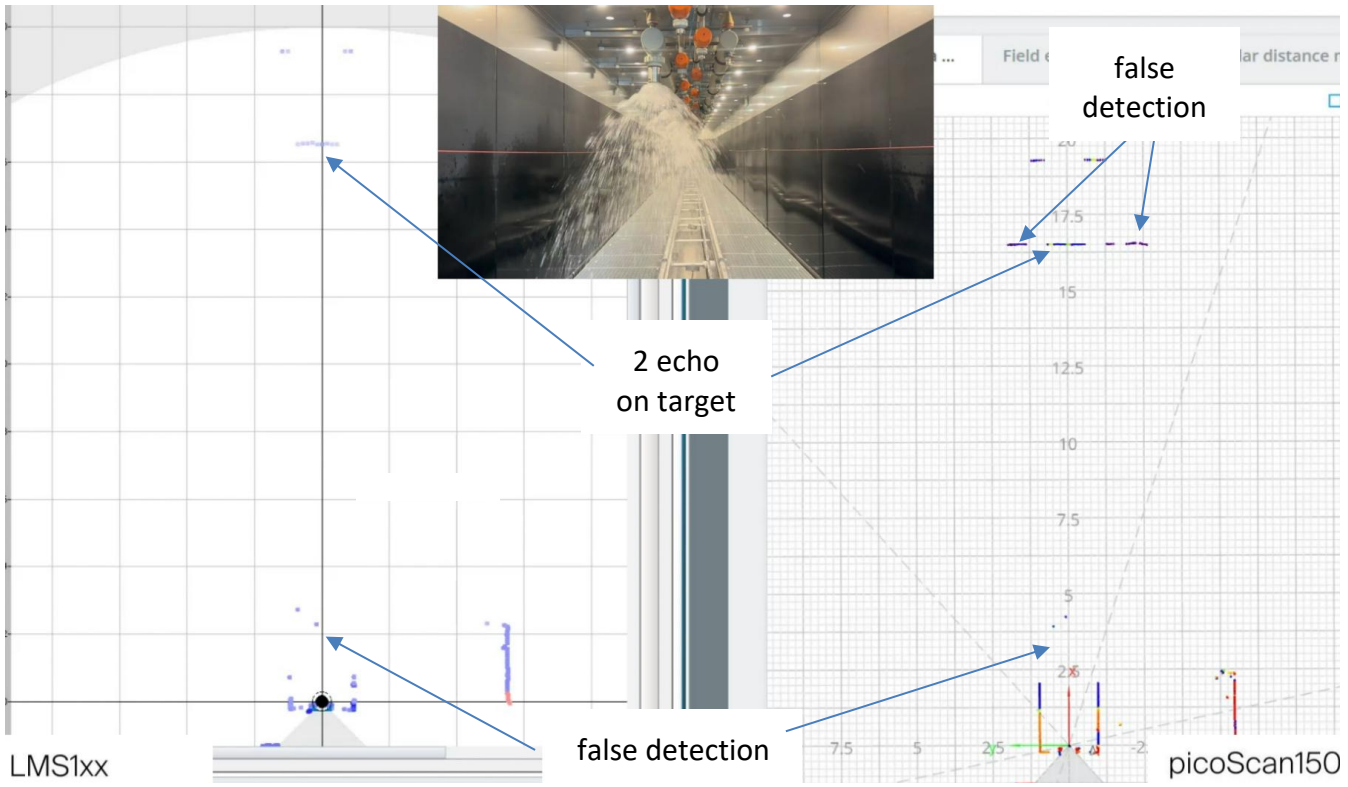
Detection tests 30x30x30cm black object		
Ambient light	~110kLux	
Target	30x30x30cm 10% remission	
Test setup	LMS1xx and picoScan150 are mounted perpendicular to the target at the same height. A field is configured in both devices. The object is within the configured field. A stable detection of an object is defined as a continuous violation of the field. The flickering of the field occurs when the object is no longer detected in every scan (field status changes between injured and not injured). If the field is featureless, the object is no longer recognizable.	
	LMS1xx	**picoScan100**
Settings	**0.25°/25Hz**	**0.1°/20Hz**
Distance: 0<20m	Stable detection of object	Stable detection of object
Distance: 20-23m	object is not recognized stably (field evaluation is flickering)	Stable detection of object
Distance: 23-26m	No measurement points on the object	Stable detection of object
Distance: 26-35m	No measurement points on the object	object is not recognized stably (field evaluation is flickering)
Distance: >35m	No measurement points on the object	No measurement points on the object
Conclusion	The picoScan150 has a higher detection range than the LMS1xx. Objects are seen at a greater distance.	

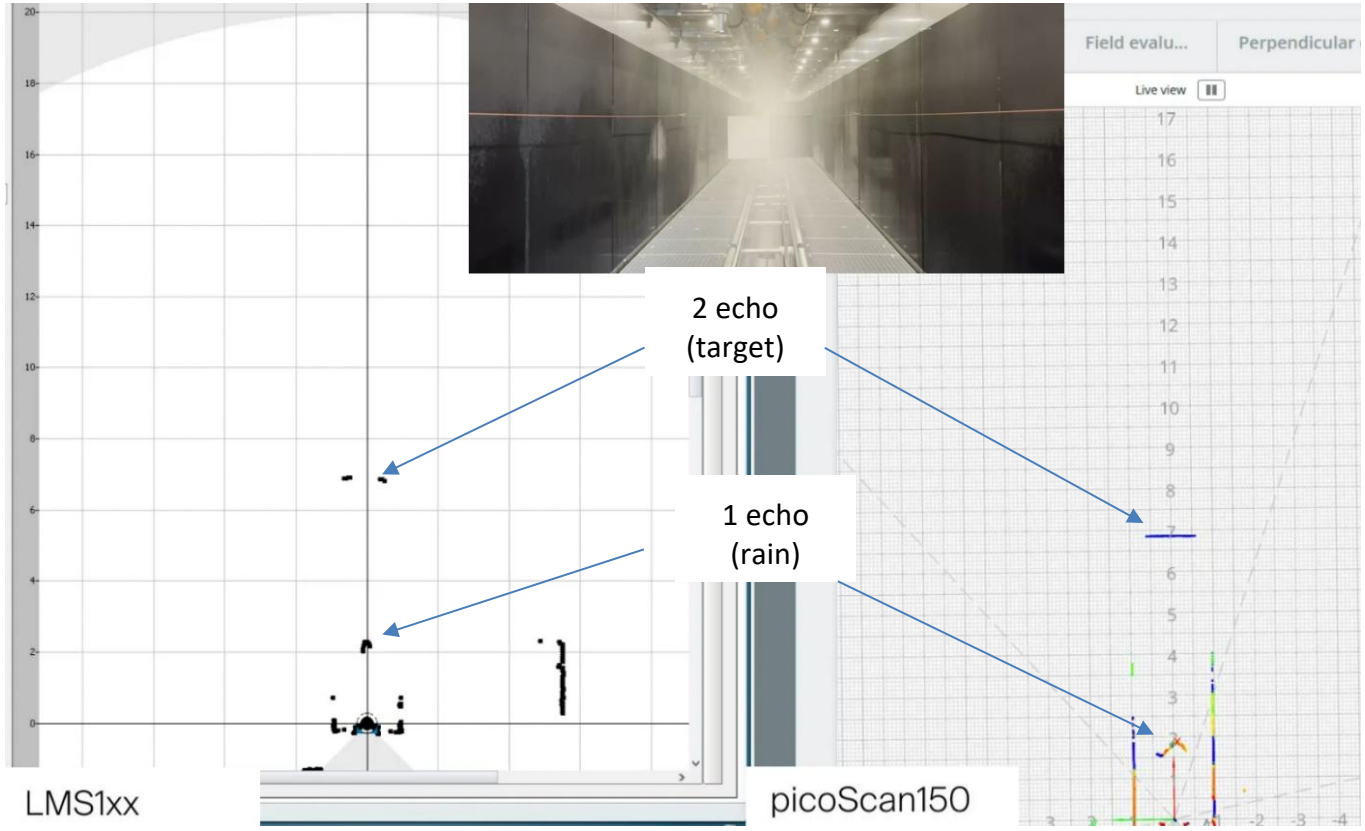
Detection tests 4x4cm rectangular profile		
Ambient light	~110kLux	
Target	4x4x200cm rectangular profile 10% remission	
Test setup	LMS1xx and picoScan150 are mounted perpendicular to the target at the same height. A field is configured in both devices. The object is within the configured field. A stable detection of an object is defined as a continuous violation of the field. The flickering of the field occurs when the object is no longer detected in every scan (field status changes between injured and not injured). If the field is featureless, the object is no longer recognizable.	
	LMS1xx	**picoScan100**
Settings	0.25°/25Hz	0.1°/20Hz
Distance: 0<5m	Stable detection of object	Stable detection of object
Distance: 5-6m	object is not recognized stably (field evaluation is flickering)	Stable detection of object
Distance: 7-14m	No measurement points on the object	Stable detection of object
Distance: 14-16m	No measurement points on the object	object is not recognized stably (field evaluation is flickering)
Distance: >16m	No measurement points on the object	No measurement points on the object
Conclusion	The picoScan has a higher detection range than the LMS1xx. Objects are seen at a greater distance.	

3.3. Measurement under rainy conditions

<table>
<tr><td colspan="3">SICK Rain chamber tests</td></tr>
<tr><td>Test setup</td><td> 
LMS1xx and picoScan</td><td> 
90% and 10% remission target</td></tr>
<tr><td>Test description</td><td colspan="2">In SICK's own rain channel, different types of rain can be simulated, and the measurement performance of different sensors can be compared in a repeatable manner. For this test, an LMS1 and picoScan150 were mounted on top of each other. The target object (10% and 90% reflectance) is moved along a linear axis up to 18m. Different rain types and intensities can be simulated over the entire measurement distance. The sensors look through the rain onto the target object</td></tr>
<tr><td></td><td>LMS1</td><td>picoScan</td></tr>
<tr><td>Configuration</td><td>0.25°/-25Hz, all echoes</td><td>0.25°/40Hz/all echoes</td></tr>
</table>

Normal rain **approx. 29 l/m²/min**		
Configuration	0.25°/-25Hz, last echoes	0.25°/40Hz/last echo
Conclusion normal rain	Both devices detect the object through the rain over the entire measuring distance.	

<table>
<tr><td>Heavy rain
approx. 6,9 l/m²/min</td><td colspan="2"> 
</td></tr>
<tr><td>Configuration</td><td>0.25°/-25Hz, last echoes</td><td>0.25°/40Hz/last echoes</td></tr>
<tr><td>Conclusion heavy rain</td><td colspan="2">Both devices detect the object through the rain over the entire measuring distance. Occasionally there are measuring points on rain. With the picoScan150 device, the wet surface of the rainwater channel wall creates a reflection of the measuring point</td></tr>
</table>

Spray rain **approx. 1.75 l/m²/min**		
Configuration	0.25°/-25Hz, all echoes	0.25°/40Hz/all echoes
Conclusion spray rain	A challenge for an optical system such as a lidar is the large number of small drops on which the light reflects. However, the picoScan150 performs here better than the LMS1xx and detects the target until the end of the rain chamber	

4. Function/application differences

In this chapter, we delve into the functionalities and differences in implementation of software functions between picoScan100 and LMS1xx. The focus is on Measurement Data, Field Evaluation, Perpendicular Distance, Teach-in, Contour as Reference, and Encoder. Each function is described with differences and how to configure when replacing or changeover from a LMS1xx.

4.1. Measurement data protocols

	LMS1xx	picoScan150
LMDscandata (TCP)	Yes	Yes (legacy)
LMDscandata (UDP)	Yes	No
Compact (UDP)	No	Yes
MSGPACK (UDP)	No	Yes
Native ROS2	No	Yes

4.1.1. LMDscandata

The following tables show the structure and some example data which are transmitted with LMS1xx and picoScan100 about LMDscandata. More details are described in the operating instructions of the devices.

	LMS1xx	picoScan150
Read command	sSN	sSN
Telegram type	LMDscandata	LMDscandata
Version number	1	1
Device number	1	1
Serial number	114A4B2	16EAB9E
Device status	0 0	0 0
Telegram counter	9F72	1C09
Scan counter	9F72	1E1A
Time since start-up in µs	64A719BF	9317B5C7
Time of transmission in µs	64A7CBE2	9318D6F4
Status of digital inputs	0 0	0 0
Status of digital outputs	7 0	1 0

Reserved	0	0
Frequence	9C4	**[planned]**
Inverse of frequence	168	**[planned]**
Amount of encoder	0	0
Encoder position	0	0
Encoder speed	0	0
Defines how many channels	1	1
Content	DIST1	DIST1
Scale factor	3F80000	3F800000
Reserved	0	0
Start angle	FFF92230	FFF8AD00
Size of single angular step	9C4	D05
Amount of data	439	33D
Data 1	B8	C5A
Data 2	AE	C5C
Data 3	12	C5E
Data n	…	…
Defines how many RSSI channels	1	1
Content	RSSI1	RSSI1
Scale factor	3F800000	3F800000
Reserved	0	0
Reserved	0	0
Start angle	FFF9223	FFF8AD00
Size of single angular step	9C4	D05
Amount of data	439	33D
Data 1	10	DE
Data 2	11	DE
Data 3	12	DE
Data n	…	…
Reserved	0	0
Device name yes/no	1	**[planned]**

Device name length	B	**[planned]**
Device name	SN 18130098	**[planned]**
Comment	0	**[planned]**
Time info	7B2110A0E6398	**[planned]**
Reserved	0	0

4.1.2. Compact/MSGPack

picoScan offers measurement data about UDP with the Compact and MSGPACK format. Compact is the recommended data streaming method. Two data streams are possible. One measurement data stream with distance values and RSSI values of the measured echoes. Another stream provides secondary sensor data such as IMU data. A detailed description can be find in the data format description https://www.sick.com/media/docs/2/22/622/technical_information_data_format_description_de_im0104622.pdf. For easier understanding the following article may help during the integration (https://support.sick.com/sick-knowledgebase/article/?code=KA-08425)

4.1.3. Data reduction

Both devices enable a large amount of measurement data and offer secondary sensor data. Filter options for data reduction are compared below.

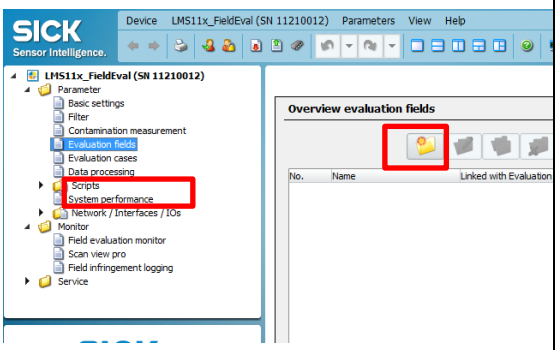
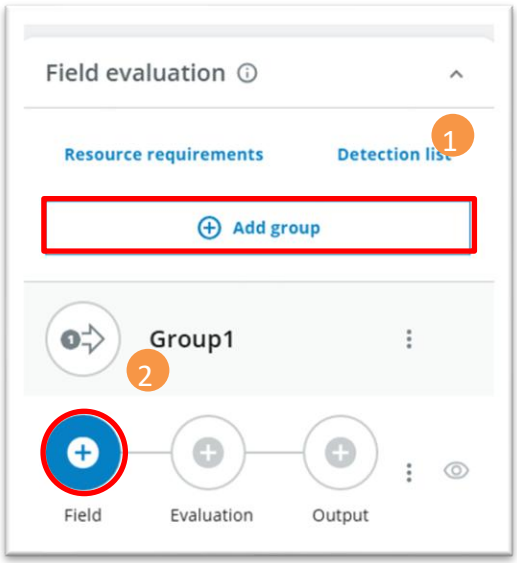
	LMS1xx	**picoScan150**
Scan frequence/resolution	0.25°/25Hz 0.5°/50Hz	0.25°/25Hz, 15Hz/0.05°, 15Hz/0.33°, 15Hz/0.5°, 15Hz/1°, 20Hz/0.1°, 20Hz/0.25°, 30Hz/0.1°, 40Hz/0.25°, 40Hz/0.125°, 50Hz/0.25°,
Angle range filter	yes	yes
Distance filter/close range suppression	Close range can be suppression	min/max distance can be configured
Cuboid area filter	-	Yes
Mean filter	Yes	Yes
RSSI	LMDscandata can be disabled or via 8bit or 16bit	LMDscandata: fix 8bit Compact: fix 16bit
RSSI on/off filter	Yes	No
Interval filter	Yes	Yes

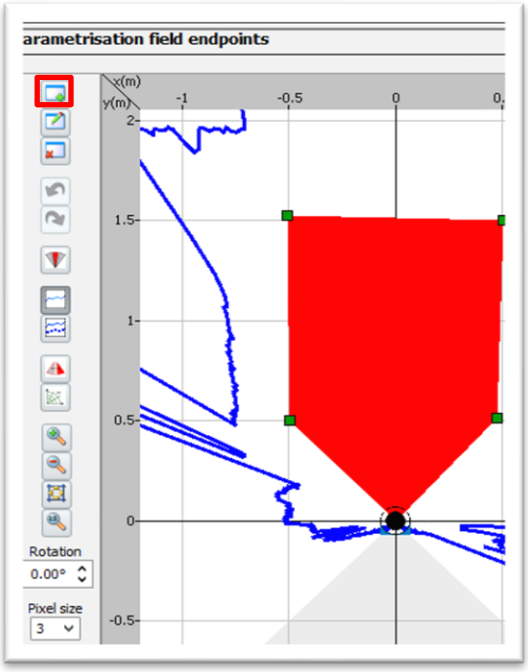
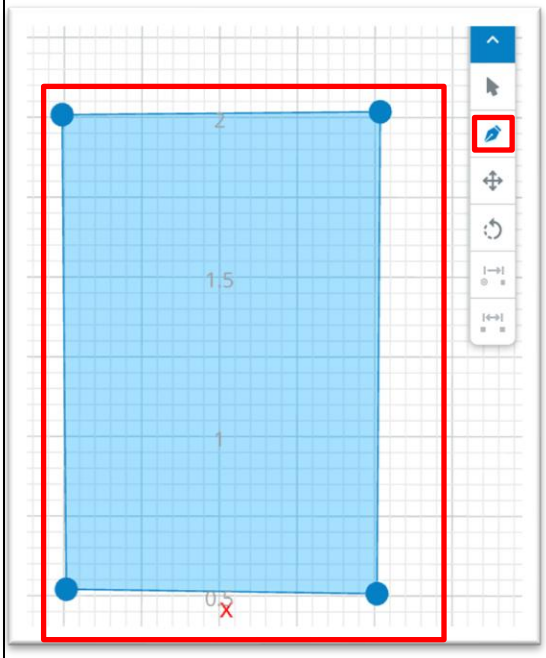
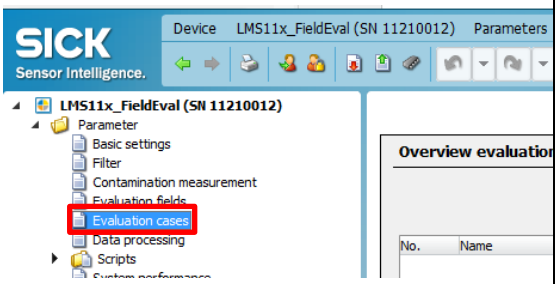
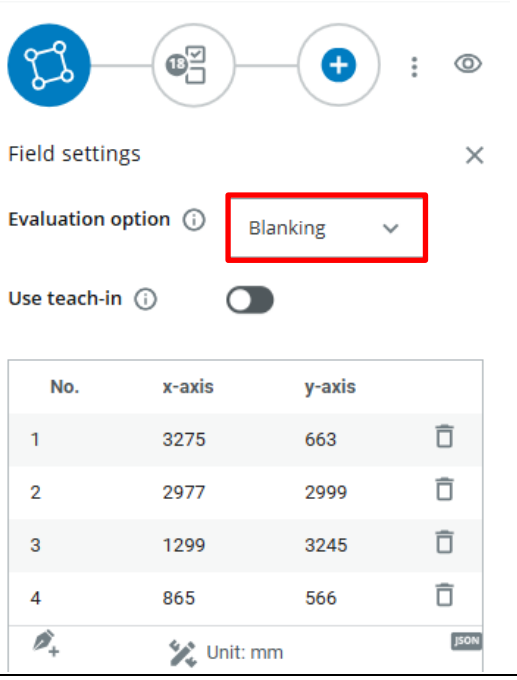
Measurement data triggered by input	Yes	No

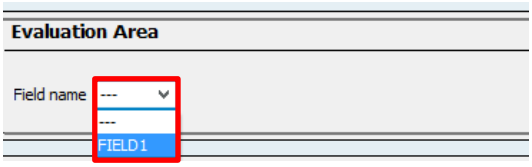
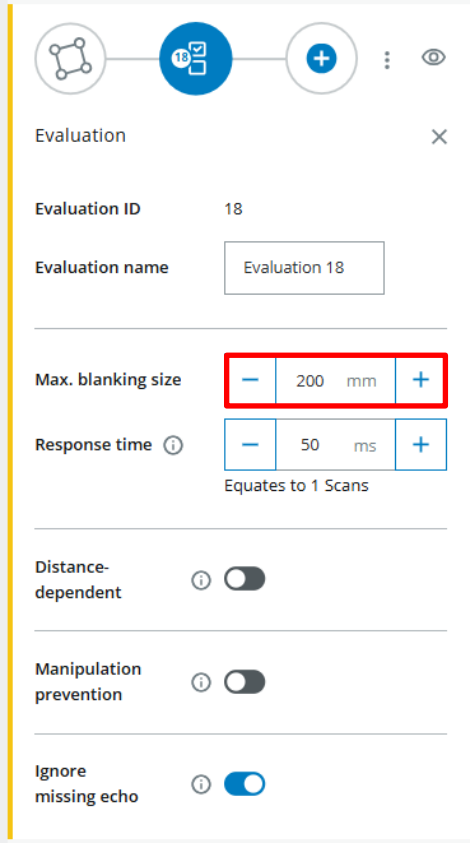
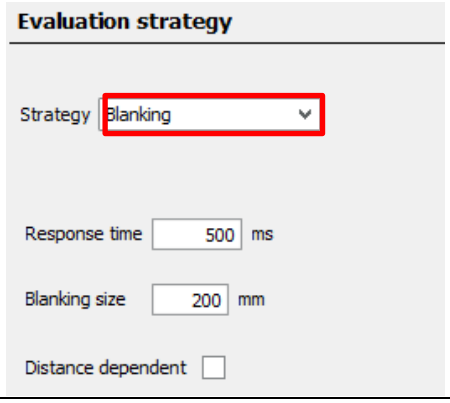
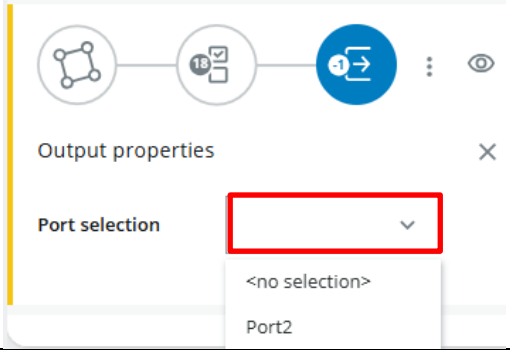
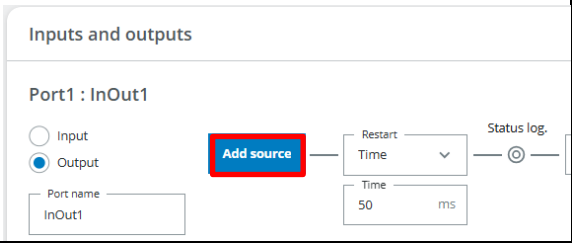
4.2. Field evaluation

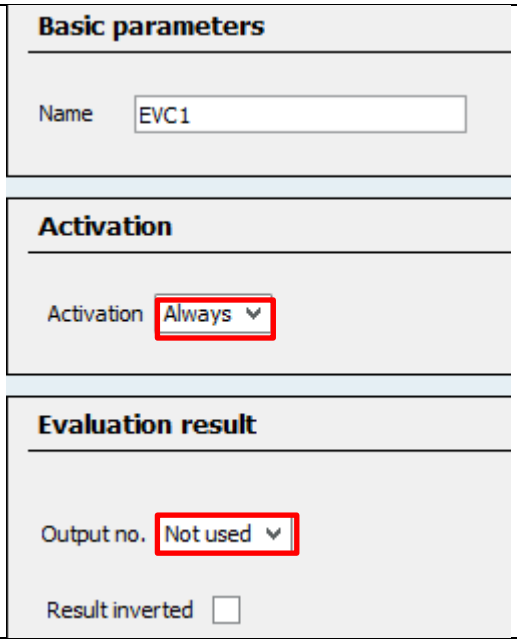
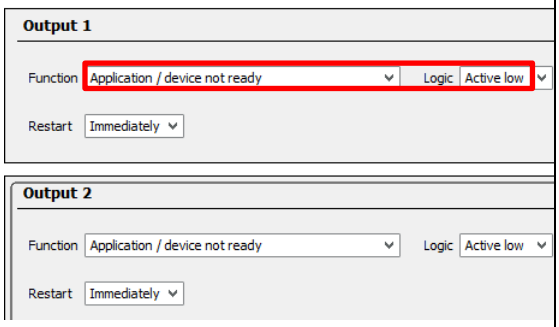
	LMS1xx	picoScan150
Number of field simultaneous	10	Min 10 Max 20
Total number of fields	10	48
Variant	Fields are matched to cases (evaluation method blanking, pixel…)	Fields can be flexible combined to groups

4.2.1. Configuration of a field

	LMS1xx	picoScan150
Step 1	Login as service. Navigate to chapter Parameter>Evaluation field. Add a new field evaluation. 	Login as service. Navigate to Chapter Field evaluation. Add group and field. 

Step 2	Add field points and press next and finish. 	Add field points. 
Step 3	Navigate too Evaluation cases. Create a new case. 	Select evaluation option Blanking Contur or Reflector. Modify field points. 

Step 4	Match evaluation case with field evaluation 	Configure blanking size, response time and evaluation filters. 
Step 5		Select Output directly. 
Step 6.	Configurate activation method (via input or time) Matching of evaluation case with output.	More output configuration functions can be found in Configuration>Inputs Outputs. Add source Field Evaluation X 

		
Step 7.	Navigate to Network/Interfaces/IOs>Digital outputs. Configuration of the output logic 	

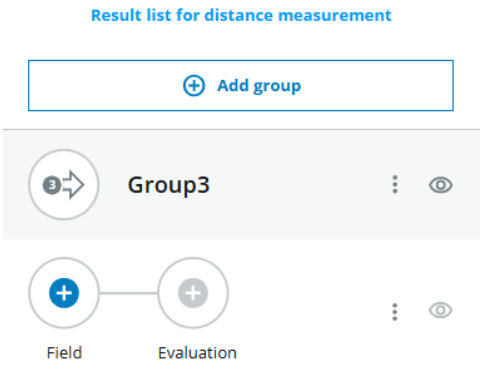
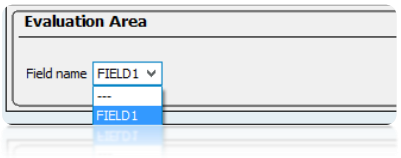
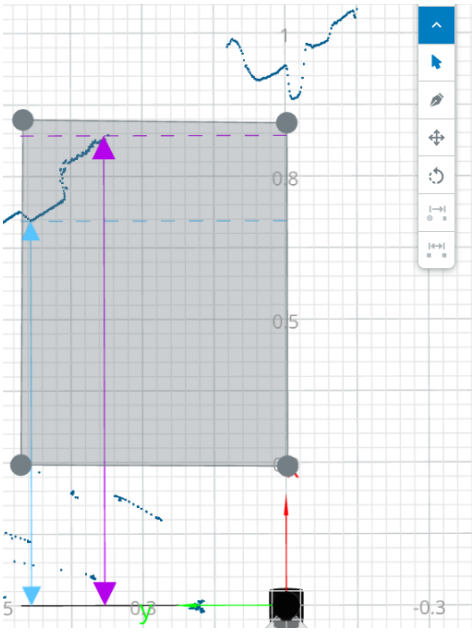
4.2.2. Detection history

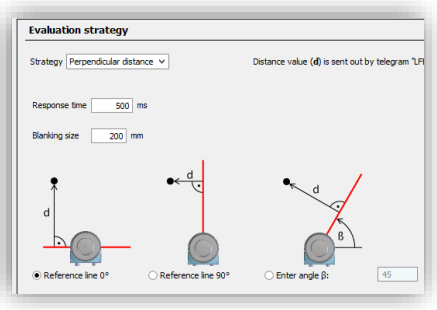
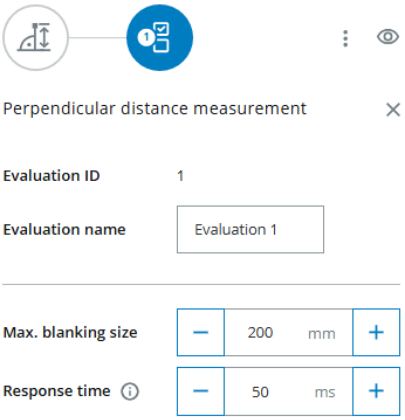
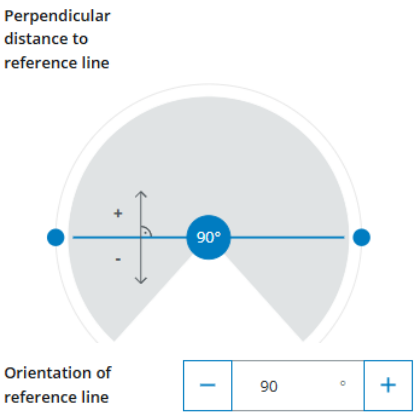
The detection history enables a field violation to be saved in the device's internal memory. The detection history can be used to trace field violations retrospectively.

	LMS1xx	**picoScan150**
Maximum number of entries	100	200
Detection information	• Item number • Timestamp • EVC number • Measurement position • Distance/Angle • Bounding box	• Item number • Timestamp • Group • Field evaluation ID • Status of field • Measurement position • Bounding diameter • Manipulation prevention on/off? • Infringement duration

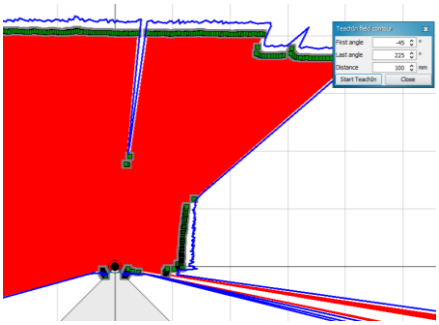
4.3. Perpendicular distance

This software function offers the possibility to measure the maximum and minimum distance according to a reference line in defined zone.

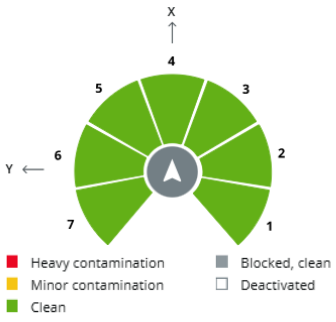
	LMS1xx	picoScan150
Max. number of fields	10 together with blanking, teach-in field	Depends on fieldsize: Min. 10 Max. 20 together with blanking, teach-in field
Step 1	Step 1-4 from chapter 4.2	Navigate to chapter perpendicular distance measurement. Add group and field. 
Step 2		Add field geometry 

Step 4		Configure blanking size, response time 
Step 5		Configure reference line 
Data	Via CoLa telegram	Via CoLa Telegram Via REST command

4.4. Teach in

	LMS1xx	picoScan150
Description	For each measurement point the Teach in function creates a field point. These field points have a configurable offset(distance). The teach-in field can be handle like a normal blanking field with matching to evaluation case.	The picoScan offers one global teach-in of the contour. The contour then can be flexible matched with the fields: The fields can be handled like normal blanking fields with combining groups.
Number of fields	10.	Min. 10 together with normal fields Max. 20
GUI		
Legend	Blue: Measurement point Green: Field points Red: Field geometry	Light blue field: geometry and teached contour Dark blue: measurement point

4.5. Contamination indication

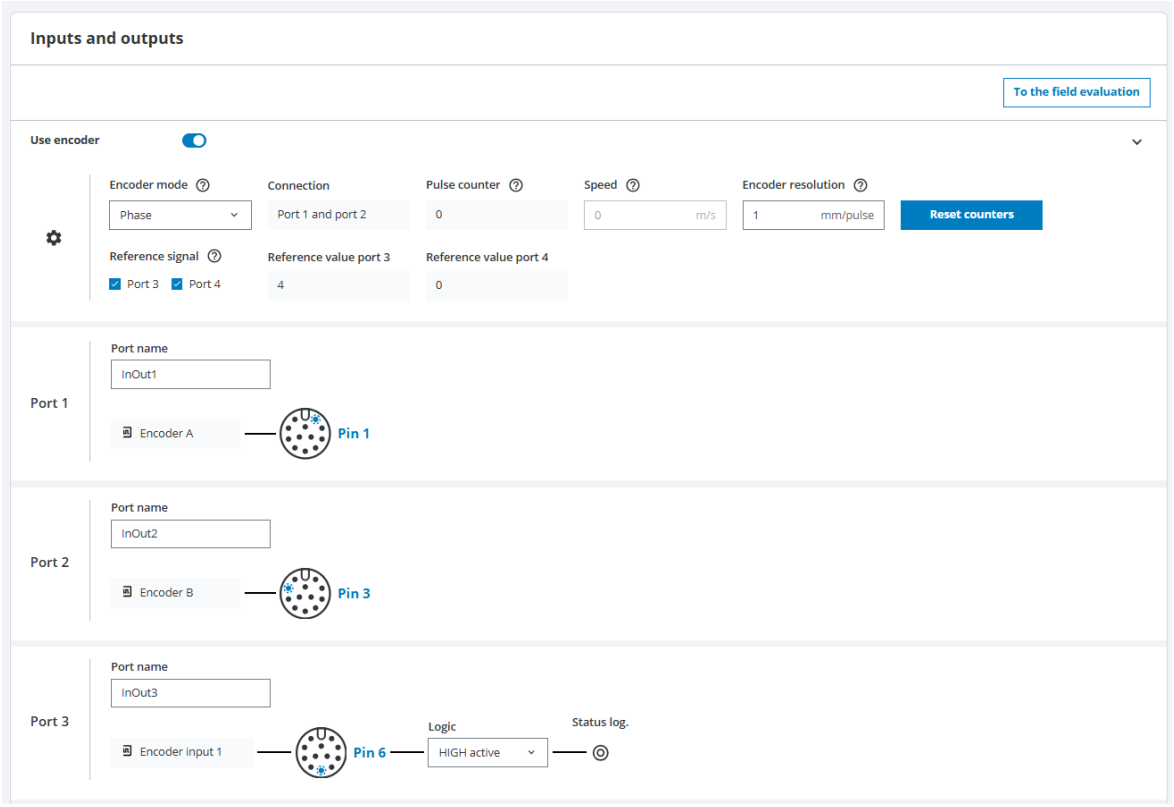
	LMS1xx	picoScan150
Description	The LMS1xx has a contamination measurement function that measures the contamination of the optical hood via a separate transmitter/receiver channel.	Contamination measurement on the optical hood by using the laser pulses and the characteristics of the first internal reflection on the hood.
Contamination states	Thresholds for Error and Warning can be configured from 0-100%. 7 sections are continuously monitored.	The thresholds for heavy and minor can be configured with the sensitivity levels. 

		7 sections are continuous monitored
Sensitivity	• Sensitive • Semi Sensitive • Highly available • Inactive	• High • Medium • Low • Deactivated
Delay time	Can be configured with 0-60 seconds	Can be configured with 3-60 seconds

4.6. Encoder

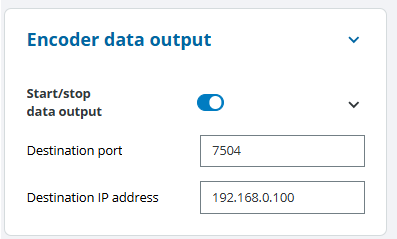
The LMS1xx and the picoScan150 have encoder inputs. This allows the combination of LiDAR measurement data and encoder data already on the device.

The Encoder inputs can be configured via the Input and output chapter.



For the configuration of the encoder data stream two options exist:

1. Encoder data output streaming via UDP/Compact. Compact dataformat transmit a separate encoder data stream. The data stream needs to be enabled:



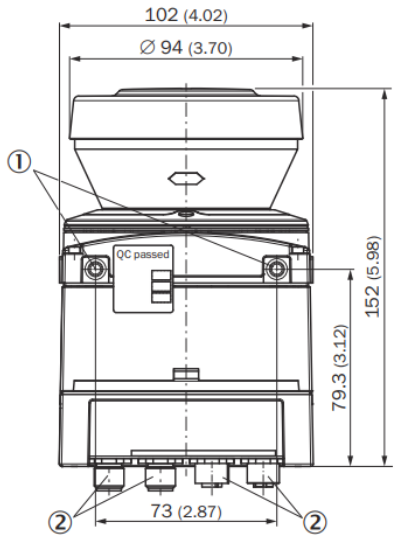
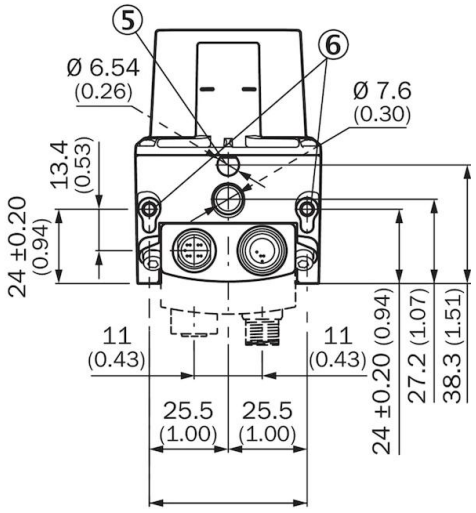
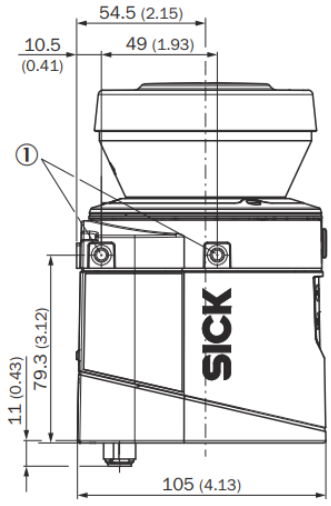
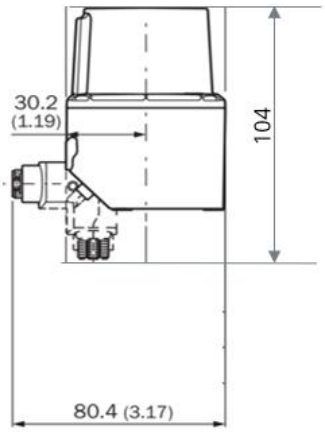
2. When using Encoder measurement via TCP/IP LMDscandata the picoScan150 transmit the encoder values per default in the data stream. LMDscandata combines the measurement data and the encoder data in one data stream.

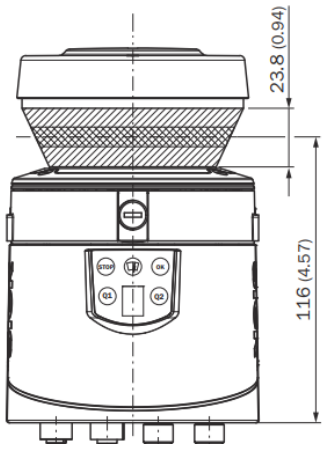
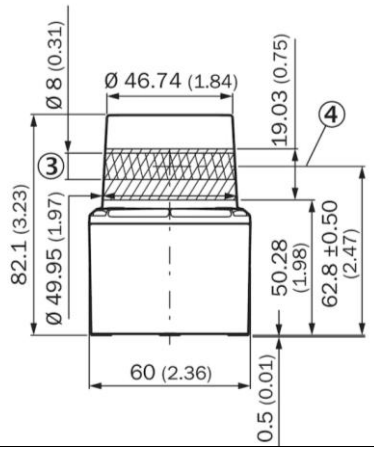
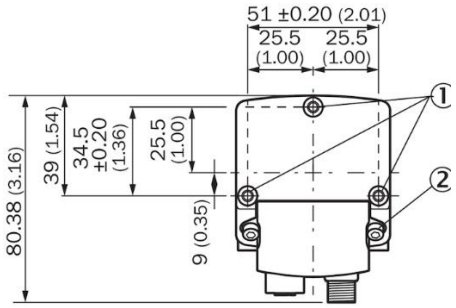
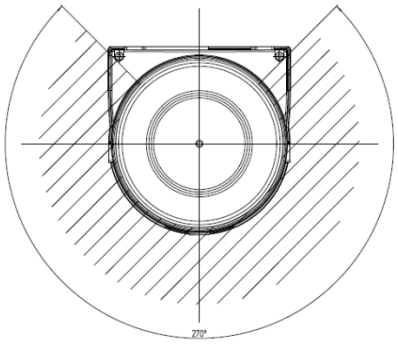
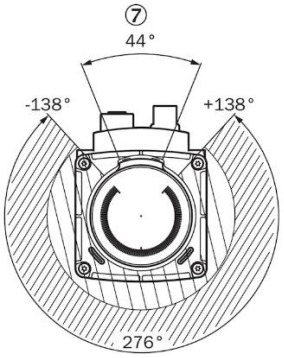
4.7. Time synchronization

	LMS1xx	picoScan150
NTP (client)	Yes	Yes
NTP(server)	Yes	No
PTP	No	Yes
Computer time synchronization	Yes	Yes

5. Size comparison

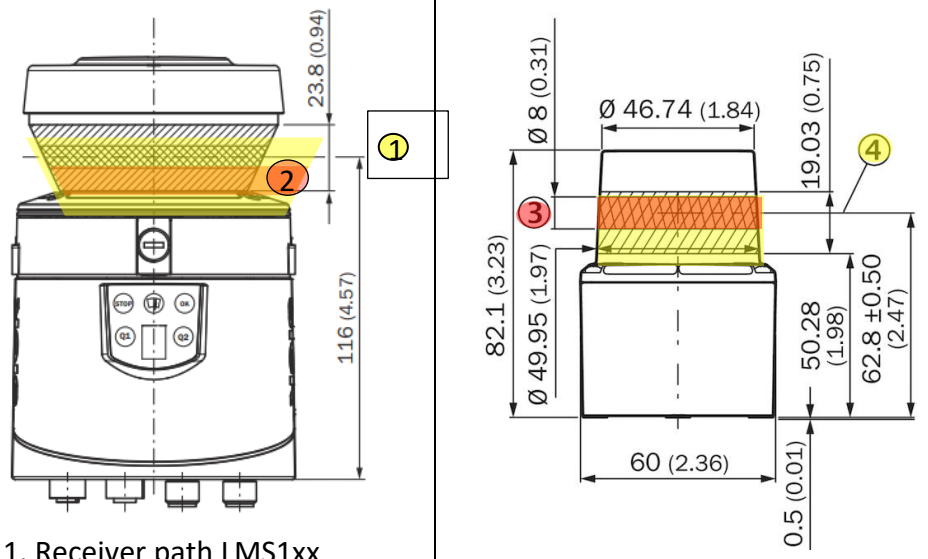
The picoScan100 family only needs 1/9 of the space. picoScan100 family therefore requires less installation space.

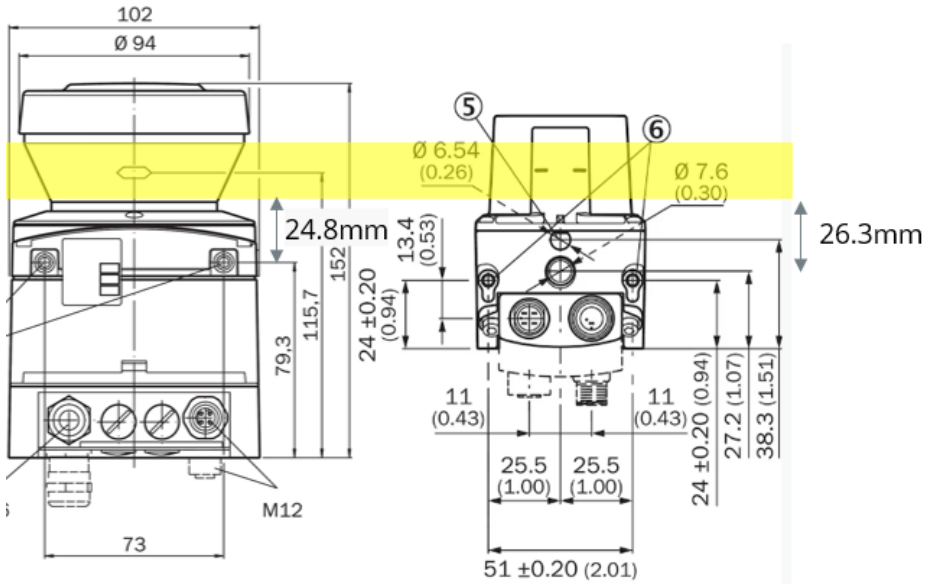
	LMS11x LMS13x, LMS14x, LMS15x, LMS16x	picoScan150
Back view		
Side view		

Front view		
Bottom view		
Top view		
Legend	Dimensions in mm (inch) ① Mounting hole M5 x 7.5 ② Connector M12	Dimensions in mm (inch) ① M4 threaded mounting hole; 4.2 mm deep; tightening torque 2.5 nm ② Tightening torque 2.5 nm, screw included in plug unit ③ Sending area ④ Transmission axis ⑤ Support point ⑥ M4 threaded mounting hole; 5.4 mm deep, tightening torque 2.5 nm ⑦ Area in which no reflective surfaces are allowed for mounted devices

5.1. Mounting and optical path

When considering the mounting position, the visual path must be taken into account in addition to the installation space. The necessary slot for the optical path depends on the receiving and transmitting path (see following table). Since the transmission path of both devices is smaller and within the receiver path, only the receiver path must be considered when covering the sensor.

<table>
<tr><th></th><th>LMS1xx</th><th>picoScan120/150</th></tr>
<tr><td>Optical path</td><td colspan="2"> 

1. Receiver path LMS1xx
2. Sender path LMS1xx
3. Receiver path picoScan
4. Sender path picoScan</td></tr>
<tr><td>Distance between holes and optical path</td><td colspan="2"> 
</td></tr>
<tr><td>Direct mounted</td><td colspan="2">When changing LMS1xx to picoScan, new holes must be drilled 1.5 mm further down and 11mm further in the middle when directly mounted on without any mounting bracket/adapter.</td></tr>
<tr><td>Replacement bracket</td><td colspan="2">Please contact your local SICK support</td></tr>
</table>

6. CoLa TCP telegram overview

When migrating from LMS1xx to picoScan100, it is recommended to switch from CoLa A/B to REST Device Configuration. Nevertheless, picoScan100 family supports CoLa telegrams for the migration. Below is an overview of which telegrams are available for LMS1xx and picoScan100 devices. Telegrams may differ for similar functions. For integration the latest public available telegram listing in the operating instruction should be used as reference.

	Telegram	LMS1xx	picoScan150	picoScan120
1.	Log in [sMN SetAccessMode]	X	X	X
2.	Enable/ disable CoLa user levels [sMN EnableLegacyUserLevel]		X	X
3.	Set frequency and angular resolution/measurement sectors [sMN mLMPsetscancfg]	X	26.	
4.	Read for frequency and angular resolution [sRN LMPscancfg]	X	X	X
5.	Activate standby mode [sMN LMCstandby]	X	X	X
6.	Start measurement [sMN LMCstartmeas]	X	X	X
7.	Stop measurement [sMN LMCstopmeas]	X	X	X
8.	Auto start measurement [sWN LMPautostartmeas]	X	X	X
9.	Load factory defaults [sMN mSCloadfacdef]	X	X	X
10.	Load application defaults [sMN mSCloadappdef]	X	X	X
11.	Change password [sMN SetPassword]	X	X	X
12.	Check password [sMN CheckPassword]	X	X	X
13.	Set Sensitivity Mode [sWN SensitivityMode]		X	
14.	Set operating mode [sWN OperatingMode]			X
15.	Read operating mode [sRN OperatingMode]			X
16.	Set contamination measurement settings [sWN LCMcfg]	X	17.	
17.	Set contamination indication settings [sWN ContaminationConfig]		X	
18.	Read contamination measurement settings [sRN LCMcfg]	X	19.	
19.	Read contamination indication settings [sRN ContaminationConfig]		X	
20.	Read contamination measurement detailed values [sRN CMContLvlM]	X	21.	
21.	Read contamination indication data [sRN ContaminationData]		X	
22.	Send contamination indication data permanently [sEN ContaminationData]		X	
23.	Read contamination indication result [sRN ContaminationResult]		X	
24.	Send contamination indication result permanently [sEN ContaminationResult]		X	
25.	Read contamination status of the device [sRN LCMstate]	X	21.	
26.	Set Performance Profile [sWN PerformanceProfileNumber]		X	
27.	Save parameters permanently [sMN mEEwriteall]	X	X	X
28.	Set to run [sMN Run]	X	X	X
29.	Reboot device [sMN mSCreboot]	X	X	X

	Telegram	LMS1xx	picoScan150	picoScan120
30.	**Configure the data content for the scan [sWN LMDscandatacfg]**	X	45, 55., 59.-66.	
31.	**Configure aperture angle of the scandata for output [sWN LMPoutputRange]**	X	62.	
32.	**Read for actual output range [sRN LMPoutputRange]**	X	63.	63.
33.	**Poll one telegram [sRN LMDscandata]**	X	X	X
34.	**Send data permanently [sEN LMDscandata]**	X	X	X
35.	**Set scan data enable [sWN ScanDataEnable]**		X	X
36.	**Set streaming ethernet settings [sWN ScanDataEthSettings]**		X	X
37.	**Read streaming ethernet settings [sRN ScanDataEthSettings]**		X	X
38.	**Set IMU data enable [sWN ImuDataEnable]**		X	
39.	**Set IMU data streaming ethernet settings [sWN ImuDataEthSettings]**		X	
40.	**Read scan data format [sRN ScanDataFormat]**		X	X
41.	**Set Scan data format [sWN ScanDataFormat]**		X	X
42.	**Set time synchronization [sWN TSCRole]**	X	X	X
43.	**Set time stamp [sMN LSPsetdatetime]**	X	X	X
44.	**Read time stamp and status of the measurement function [sRN STlms]**	X		
45.	**Set time synchronization interface [sWN TSCTCInterface]**	X	42.,43.	
46.	**Set time server IP address [sWN TSCTCSrvAddr]**	X	X	X
47.	**Set time zone [sWN TSCTCtimezone]**	X	X	X
48.	**Set update time [sWN TSCTCupdatetime]**	X	X	X
49.	**Read for maximum offset time [sRN TSCTCmaxoffset]**	X		
50.	**Read for delay time [sRN TSCTCdelay]**	X		
51.	**Reset maximum offset time [sMN mResetMaxOff]**	X		
52.	**Set particle filter [sWN LFPparticle]**	X	X	X
53.	**Set average filter [sWN LFPmeanfilter]**	X		
54.	**Set n-pulse to 1-pulse filter (Echo filter) [sWN LFPnto1filter]**	X	55.	
55.	**Set echo filter [sWN FREchoFilter]**		X	
56.	**Set fog filter [sWN MSsuppmode]**	X	58.	
57.	**Read for enabled fog filter [sRN CLFogFilterEn]**	X	58	
58.	**Set sensitivity fog filter [sWN MCSenseLevel]**		X	
59.	**Set cubic area filter [sWN LFPcubicareafilter]Set rectangular filter [sWN LFPcubicareafilter]**		X	
60.	**Activate extended range mode [sWN EnableLongRangeMode]**		X	
61.	**Read status of extended range mode [sRN EnableLongRangeMode]**		X	
62.	**Set angle range filter [sWN LFPangleRangeFilter]**		X	
63.	**Read angle range filter [sRN LFPangleRangeFilter]**		X	
64.	**Set interval filter [sWN LFPintervalFilter]**		X	
65.	**Set moving averaging filter [sWN LFPmovingAveragingFilter]**		X	

	Telegram	LMS1xx	picoScan150	picoScan120
66.	Set radial distance range filter [sWN LFPradialDistanceRangeFilter]		X	
67.	Set increment source [sWN LICsrc]	X	147.	
68.	Set encoder settings [sWN LICencset]	X	147.	
69.	Set encoder resolution [sWN LICencres]	X	148.	
70.	Set fixed speed [sWN LICFixVel]	X	147.	
71.	Read speed threshold [sRN LICSpTh]	X		
72.	Read encoder speed [sRN LICencsp]	X	146.	
73.	Reset encoder values [sMN LIDrstencoderinc]	X	149.	
74.	Read state of the ports [sRN LIDportstate]	X	X	X
75.	Read Port Configration of all I/Os [sRN PortConfiguration]		X	X
76.	Set port configuration [sWN PortConfiguration]		X	X
77.	Read state of the inputs [sRN LIDinputstate]	X	X	
78.	Read state of the outputs [sRN LIDoutputstate]	X	X	X
79.	Receive outputstate by event [sEN LIDoutputstate]	X	X	X
80.	Set output state [sMN mDOSetOutput]	X	X	X
81.	Set debouncing time for input x [sWN DI3DebTim]	X		
82.	Reset output counter [sMN LIDrstoutpcnt]	X	X	X
83.	Read firmware version [sRN DeviceIdent]	X	X	X
84.	Read version of the application software [sRN FirmwareVersion]		X	X
85.	Read the device state [sRN DevSta]		X	
86.	Receive the device state by event [sEN DevSta]		X	
87.	Read the device state [sRN SCdevicestate]	X	X	X
88.	Receive the device state by event [sEN SCdevicestate]		X	X
89.	Read device order number [sRN DIornr]	X	92.	92.
90.	Read device order number [sRN OrdNum]		X	X
91.	Read serial number [sRN SerialNumber]		X	X
92.	Read device type [sRN DItype]	X	X	X
93.	Read operating hours [sRN ODoprh]	X	X	X
94.	Read operating hours since last power on [sRN ODopdaily]		X	X
95.	Read power on counter [sRN ODpwrc]	X	X	X
96.	Read temperature [sRN OPcurtmpdev]	X	X	X
97.	Set device name [sWN LocationName]	X	X	X
98.	Read device name [sRN LocationName]	X	X	X
99.	Read heating state [sRN OPheatstateext]	X		
100	Initiate an acoustic or visual signal for a defined period of time [sMN FindMe]		X	X
101	Read date of last permanent save [sRN DIpara]		X	X
102	Read time of last permanent save [sRN DIparatm]		X	X
103	Set IP address [sWN EIIpAddr]	X	X	X
104	Read IP address [sRN EIIpAddr]	X	X	X
105	Read IP address assigned by DHCP [sRN EIIpAddrDHCP]		X	X

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106	Set mode for ethernet adress assignment [sWN EIAddrMode]		X	X
107	Set fallback for DHCP [sWN EIDHCPFallback]		X	X
108	Set Ethernet gateway [sWN Elgate]	X	X	X
109	Read Ethernet gateway [sRN Elgate]	X	X	X
110	Read ethernet gateway IP adress assigned by DHCP [sRN ElgateDHCP]		X	X
111	Set IP mask [sWN EImask]	X	X	X
112	Read IP mask [sRN EImask]	X	X	X
113	Read IP mask assigned by DHCP [sRN EImaskDHCP]		X	
114	Read MAC address [sRN EIMacAdr]	X	X	
115	Set baud rate for host interface [sWN SIHstBaud]	X		
116	Read baud rate of host interface [sRN SIHstBaud]	X		
117	Set device search mode [sWN EtherColaScanMode]		X	X
118	Read device search mode [sRN EtherColaScanMode]		X	X
119	Enable/ disable CoLa1 interface [sWN EIAuxEnable]		X	
120	Set Webserver state [sMN SetWebserverEnabled]		X	
121	Read Webserver state [sMN GetWebserverEnabled]		X	
122	Apply configured ethernet settings [sMN mEthUpdt]		X	
123	Set Host/ UDP port number [sWN EIHstPort, sWN EIUDPPort]	X		
124	Set Host port Command Language (CoLa dialect) [sWN EIHstCola]	X		
125	Enable/Disable Front Panel [sWN LMLfpen]	X	128.	128.
126	Set function front panel [sWN LMLfpFcn]	X		
127	Set front LEDs [sMN mLMLSetLed]	X		
128	Enable/ disable LEDs [sWN LEDEnable]		X	X
129	Read state of LEDs [sRN LEDState]		X	X
130	Set 7-segment display to specific symbol or number [sMN mLMLSetDisp]	X		
131	Request status change of monitoring fields on event [sEN ECRChangeArr]	X	144.	
132	Individual request of monitoring fields to their status changes – ECR xy [sRN ECRxy]	X	143.	
133	Request SOPAS field data structure [sMN mLFEgetField]	X		
134	Request perpendicular distance once [sRN PerpendicularDistanceResult]		X	
135	Request perpendicular distance continiously on event [sEN PerpendicularDistanceResult]		X	
136	Request minimal and maximal perpendicular distance once [sRN LFEperpdistresult]	X	134.	
137	Request minimal and maximal perpendicular distance continuously on event [sEN LFEperpdistresult]	X	135.	
138	Request the latest field infringement info [sRN LFEinfringementinfo]	X	143.	

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139	Request field infringement info continuously on event [sEN LFEinfringementinfo]	X	144.	
140	Set activation of evaluation group [sMN ActivateEvaluationGroup]		X	
141	Set field evaluation contour [sMN SetFieldEvaluationContour]		X	
142	Get field evaluation contour [sMN GetFieldEvaluationContour]		X	
143	Read field evaluation result [sRN FieldEvaluationResult]		X	
144	Receive field evaluation result by event [sEN FieldEvaluationResult]		X	
145	Set Encoder data streaming ethernet settings [sWN EncoderDataEthSettings]		X	
146	Set Encoder data enable [sWN EncoderDataEnable]		X	
147	Set encoder settings [sWN LICencset]		X	
148	Set encoder resolution [sWN LICencres]		X	
149	Reset encoder values [sMN LIDrstencoderinc]		X	
150	Enable encoder reference input 1 signal [sWN LICpos1enable]		X	
151	Read encoder reference input 1 signal [sRN LICpos1enable]		X	
152	Enable encoder reference input 2 signal [sWN LICpos2enable]		X	
153	Read encoder reference input 2 signal [sRN LICpos2enable]		X	

7. Accessories

7.1. Mounting systems

	LMS1xx	picoScan150
Standard mounting bracket	 2034324 Mounting kit 1a	 2134874 Mounting bracket picoScan100
Alignment	 2034324 Mounting kit 1a 2039302 Mounting kit 2	
Fine alignment	 2039303 Mounting kit 3	 2136134Mounting bracket with integrated fine alignment for picoScan100
Protection	 2034324 Mounting kit 1a 2034325 Mounting kit 1b	-
Shock & vibration	 2058723 Mounting kit 3 with shock mount	-
Mast mounting	 2079939 Mast mount	-

7.2. Wheater protection

	LMS1xx	picoScan150
Weather protection 190°	 2046459 Weather protection cover 190°	 2140840 Mounting bracket with integrated 200° weather protection
Weather protection 270°	 2046458 Weather protection cover 270°	-
Compact weather protection 190°	 2082563 Weather hood, 190°	 2140840 Mounting bracket with integrated 200° weather protection
Compact weather protection 270°	 2082560 Weather hood, 270°	

7.3. Software integration

	LMS1xx	picoScan100 family
Protocols and integration	https://support.sick.com/sick-knowledgebase/article/?code=KA-09854	https://support.sick.com/sick-knowledgebase/article/?code=KA-09481