Data sheet

MULS1AAS-114322 multiScan165S

multiScan100

3D LIDAR SENSORS

SICK
Sensor Intelligence.

Ordering information

Type	part no.
MULS1AAS-114322 multiScan165S	1143873

Other models and accessories ➜ www.sick.com/multiScan100

Detailed technical data

Features

Application		Indoor, Outdoor
Variant		Standard (not pre-configured)
Measurement principle		Statistical measurement procedure
Light source		Infrared (905 nm)
Laser class		1 (IEC 60825-1:2014, EN 60825-1:2014+A11:2021)
Aperture angle		
	Horizontal	360°
	Vertical	42°, 7.5° ... –35°, DIN ISO 8855
Scanning frequency		20 Hz 40 Hz, between layer 4 and 13
Angular resolution		
	Horizontal	0.125°, 16 scan layers, interlaced
		0.25°, 16 scan layers, interlaced
		0.5°, 16 scan layers
	Vertical	Approx. 2.5° [1]
		Approx. 5° [1]
Working range		0.05 m ... 62 m
Safety-related working range		0.05 m ... 20 m
Safety-related measuring range		20 m, at 10% reflection factor and 100 klx [2] 15 m, at 5% reflection factor and 100 klx [2]
Scanning range		

[1] For details see operating instructions.

[2] Probability of detection > 99.9997%, validated for performance class C according to IEC TS 62998-1 with full safety-oriented scanning range with 50 m meteorological visual range for fog, 100 m meteorological visual range for dust, for rain/heavy rain up to 50 mm/hour in accordance with IEC 60721-2-2, for snow with light to moderate snowfall with a flake size of up to 10 mm at 100 flakes per m² x s (corresponds to up to 5 mm per hour water equivalent of snow thickness), for hail with a diameter of up to 20 mm; furthermore with a reduction of the safety-oriented scanning range to max. 9.5 m to 5% remission factor or 8.4 m to 4% remission factor in case of fog with ≥ 20 m meteorological visual range.

[3] Detection probability > 99%.

[4] In the scan direction.

At 10% reflection factor and 100 klx	20 m [3]
At 10% reflection factor and 30 klx	22 m [3]
At 10% reflection factor and 10 klx	25 m [3]
At 60% reflection factor and 10 klx	62 m [3]
At 90% reflection factor and 100 klx	40 m
At 90% reflection factor and 30 klx	60 m
At 90% reflection factor and 10 klx	62 m
Spot size	4.4 mrad (0,25 °) 6.6 mrad (0,25 ° + 0,125 °) [4]
Amount of evaluated echoes	3

[1] For details see operating instructions.

[2] Probability of detection > 99.9997%, validated for performance class C according to IEC TS 62998-1 with full safety-oriented scanning range with 50 m meteorological visual range for fog, 100 m meteorological visual range for dust, for rain/heavy rain up to 50 mm/hour in accordance with IEC 60721-2-2, for snow with light to moderate snowfall with a flake size of up to 10 mm at 100 flakes per m² x s (corresponds to up to 5 mm per hour water equivalent of snow thickness), for hail with a diameter of up to 20 mm; furthermore with a reduction of the safety-oriented scanning range to max. 9.5 m to 5% remission factor or 8.4 m to 4% remission factor in case of fog with ≥ 20 m meteorological visual range.

[3] Detection probability > 99%.

[4] In the scan direction.

Mechanics/electronics

Connection type	1 x “Ethernet” connection, 4-pin M12 female connector, D-coded 1 x “POWER” connection, 5-pin M12 plug, A-coded
System plug	See system plug 2116047
Supply voltage	9 V DC ... 30 V DC
Power consumption	Typ. 10 W, 22 W, Power-up max. 35 W for 5 s
Housing material	AlSi12, Optics cover: polycarbonate
Housing color	Anthracite gray (RAL 7016)
Enclosure rating	IP65 (IEC 60529:1989+AMD1:1999+AMD2:2013) IP67 (IEC 60529:1989+AMD1:1999+AMD2:2013) IP69 (IEC 60529:1989+AMD1:1999+AMD2:2013) IPX9K (ISO 20653)
Protection class	III (IEC 61140:2016-11)
Electrical safety	IEC 61010-1:2010-06
Weight	0.7 kg
Dimensions (L x W x H)	100.3 mm x 100.3 mm x 98.5 mm
MTBF	50 years (at 25 °C ambient temperature)
MTTFd	> 100 years (at 30 °C ambient temperature), EN ISO 13849-1:2023

Safety-related parameters

Category	B (EN ISO 13849-1:2023)
Performance level	PL b (EN ISO 13849-1:2023)
Performance class SRS/SRSS	C (IEC/TS 62998-1:2019)
T_M (mission time)	20 years (EN ISO 13849-1:2023), at 30 °C ambient temperature
Conformities	EN ISO 13849-1:2023, IEC/TS 62998-1:2019, EN ISO 13855:2024, EN ISO 13482:2014, DIN CLC/TS 62046:2009, at 5% remission factor, ANSI/ITSDF B56.5:2012, DIN EN ISO 3691-4:2023-12, IEC 63327: 2021-05
DC_{avg} (diagnostic coverage)	< 60 %, Cat. B (EN ISO 13849-1)
$MTTF_D$	> 100 years, at 30 °C ambient temperature (EN ISO 13849-1:2023)

Functions

Digital add-ons	Data Reduction & Data Preparation package Reliability package Multi-echo technology Reflector detection Interlaced mode IMU (Inertial Measurement Unit) PTP

Performance

Scan/frame rate	230,400 measurement point/s ... 691,200 measurement point/s
Reaktionszeit	≤ 80 ms
Safety-related coverage interval	≤ ± 100 mm [1]
Systematic error	± 35 mm [2]
Statistical error	≤ 10 mm [3]
Integrated application	Safe measurement data output with PL b

[1] Systematic and statistical error combined (probability > 99.9997%).
[2] At 25 °C.
[3] Probability ≥ 60%.

Interfaces

Ethernet	✓ , TCP/IP, UDP/IP
Function	Data interface (read result output), NTP, Measured data output (distance, RSSI)
Data transmission rate	100 Mbit/s
Digital inputs/outputs	3, customizable, see system plug 2116047
Optical indicators	4 LEDs
Configuration software	SOPAS Air (browser based) SOPAS ET

Ambient data

Remission factor	2 % ... > 1,000 % (Reflector)
Electromagnetic compatibility (EMC)	
Emitted radiation	Emissions in residential, commercial and light industrial environments (EN 61000-6-3:2007+A1:2011)
Electromagnetic immunity	Industrial environment (EN 61000-6-2:2005)
Application areas	Automotive (UN ECE R10) [1]
Application areas	Agricultural and forestry machinery (ISO 14982-1, ISO 14982-2) [1]
Application areas	Earthmoving and construction machinery (ISO 13766-1) [1]
Vibration resistance	
Sine resonance scan	10 Hz ... 1,000 Hz [2]
Sine test	10 Hz ... 500 Hz, 5 g, 10 frequency cycles [2]
Noise test	10 Hz ... 250 Hz, 4.24 g RMS, 5 h [3]

[1] Load dump: from ISO 16750-2 Test B Severity Level 4 passed for 12 V systems. Required in case of transient disturbances on the input filtering signal lines (debounce > 10 ms).
[2] IEC 60068-2-6:2007.
[3] IEC 60068-2-64:2008.
[4] IEC 60068-2-27:2008.

Shock resistance	50 g, 11 ms, ± 3 single shocks/axis [4)] 25 g, 6 ms, ± 1,000 continuous shocks/axis [4)] 50 g, 3 ms, ± 5,000 continuous shocks/axis [4)]
Ambient operating temperature	
Non-safety-related operation	–40 °C ... +50 °C
Safety-related operation	–25 °C ... +50 °C
Storage temperature	–40 °C ... +75 °C
Permissible relative humidity	≤ 90 % RH, Non-condensing
Ambient light immunity	100 klx

[1)] Load dump: from ISO 16750-2 Test B Severity Level 4 passed for 12 V systems. Required in case of transient disturbances on the input filtering signal lines (debounce > 10 ms).
[2)] IEC 60068-2-6:2007.
[3)] IEC 60068-2-64:2008.
[4)] IEC 60068-2-27:2008.

General notes

Note on use	The multiscan165S is a safety sensor that is suitable for indoor and outdoor areas in the following applications: hazardous area, hazardous point, and access protection as well as mobile hazardous area protection (protection of automated guided vehicles and mobile platforms). The sensor must only ever be used within the limits of the prescribed and specified technical data and operating conditions.

Certificates

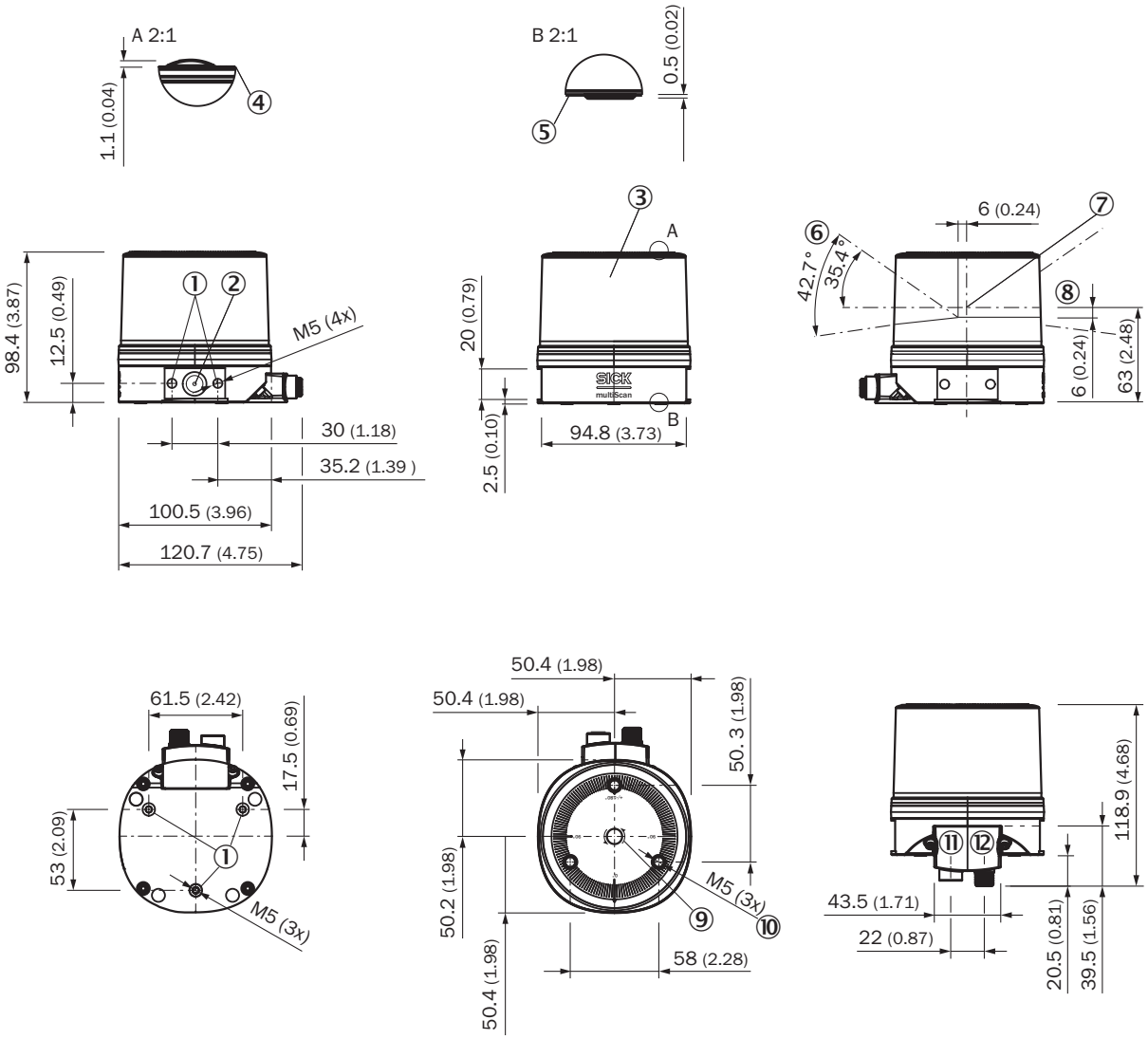
EU declaration of conformity	✓
UK declaration of conformity	✓
ACMA declaration of conformity	✓
China RoHS	✓
TÜV approval	✓
TÜV approval annex	✓
cTUVus certificate	✓
EC-Type-Examination approval	✓
Information according to Art. 3 of Data Act (Regulation EU 2023/2854)	✓

Classifications

ECLASS 5.0	27270990
ECLASS 5.1.4	27270990
ECLASS 6.0	27270913
ECLASS 6.2	27270913
ECLASS 7.0	27270913
ECLASS 8.0	27270913
ECLASS 8.1	27270913
ECLASS 9.0	27270913
ECLASS 10.0	27270913
ECLASS 11.0	27270913
ECLASS 12.0	27270913
ETIM 5.0	EC002550

ETIM 6.0	EC002550
ETIM 7.0	EC002550
ETIM 8.0	EC002550
UNSPSC 16.0901	41111615

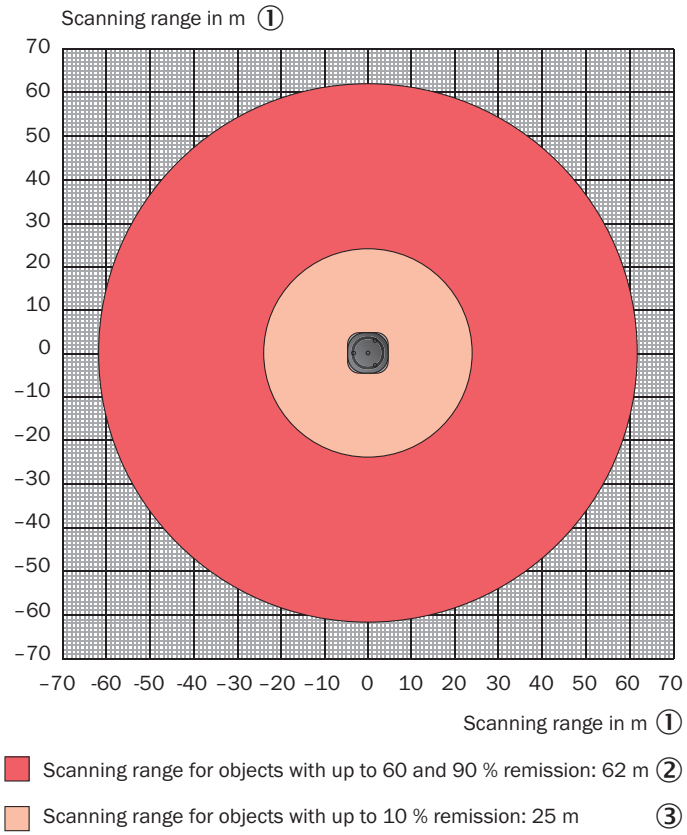
Dimensional drawing



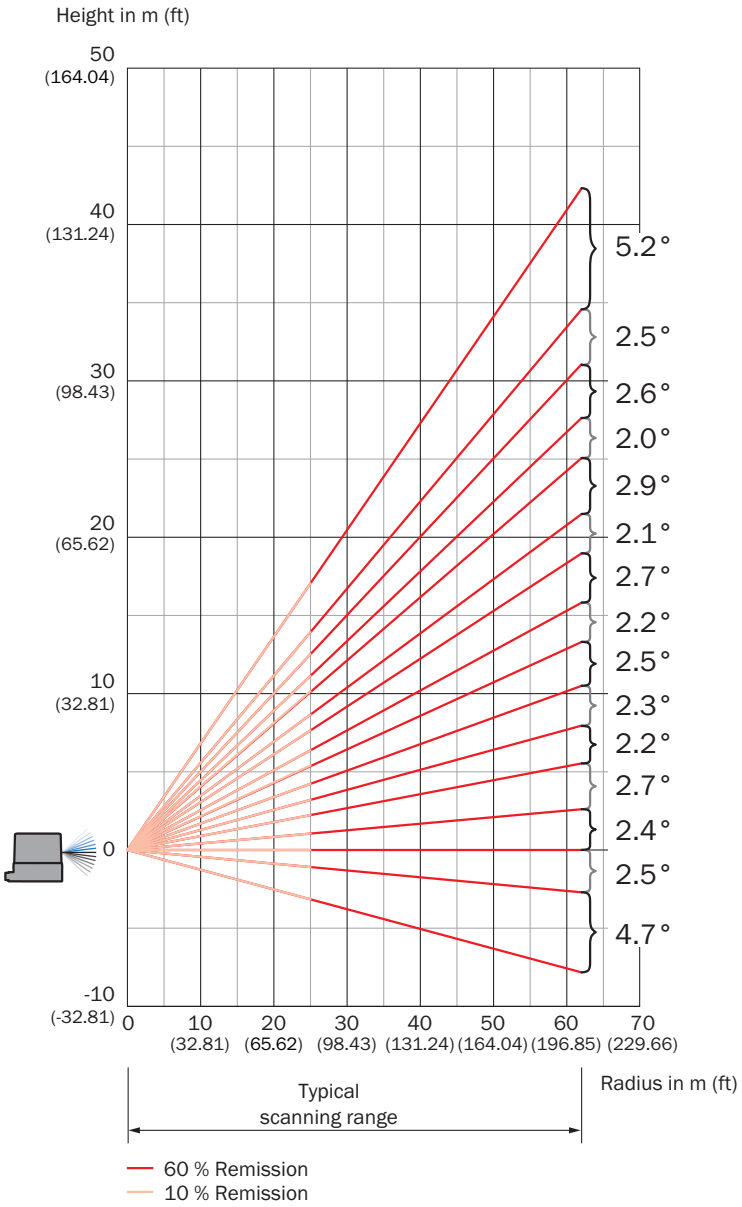
Dimensions in mm (inch)
① M5 threaded mounting hole, 6.4 mm deep; tightening torque ≤ 3 Nm; for mounting the device
② Ventilation element (membrane)
③ Optical hood
④ Top edge of the optics cover
⑤ Base of housing
⑥ Aperture angle (vertical viewing range)
⑦ Defined device origin
⑧ Visual zero position with maximum viewing range
⑨ direction of rotation
⑩ M5 threaded mounting hole; 6.4 mm deep; for accessories only
⑪ supply voltage connection

⑫ Ethernet connection

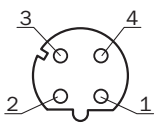
Working range diagram



Working range diagram

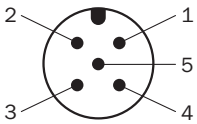


Connection type Ethernet



M12 female connector, 4-pin, D-coded
① TX+
② RX+
③ TX-
④ RX-

PIN assignment



① V_s
② I/O 2
③ GND
④ I/O 1
⑤ I/O 3

Recommended accessories

Other models and accessories ➜ www.sick.com/multiScan100

	Brief description	Type	part no.
system plugs and extension modules			
	• **Description:** System plug spare part kit. For use with multiScan100 and picoScan150. The warranty is retained when the system plug is replaced. The system plug can be replaced and reinstalled by following the mounting instructions. 1 x "Ethernet" connection, 4-pin M12 female connector, D-coded 1 x "Power" connection, 5-pin M12 male connector, A-coded	SYSPLG DCT M12-5 3IO DCT M12D ETH	2116047
Mounting systems			
	• **Description:** Simple mounting bracket for multiScan100 with alignment function • **Dimensions (W x H x L):** 78 mm x 42 mm x 134 mm • **Material:** Stainless steel • **Details:** Stainless steel 1.4547 • **Items supplied:** Simple bracket, 4 x M5 x 8 countersunk screws, stainless steel • **Suitable for:** multiScan100	Simple bracket	2128226
	• **Description:** Fine adjustment bracket for multiScan100 with tilt and pitch function • **Dimensions (W x H x L):** 85 mm x 42 mm x 134 mm • **Material:** Stainless steel • **Details:** Stainless steel 1.4547 • **Items supplied:** Fine adjustment bracket, 4 x M5 x 12 countersunk screws, stainless steel • **Suitable for:** multiScan100	Mounting bracket alignment	2124591
connectors and cables			
	• **Connection type head A:** Male connector, M12, 4-pin, straight, D-coded • **Connection type head B:** Male connector, RJ45, 4-pin, straight • **Signal type:** Ethernet, PROFINET • **Cable:** 2 m, 4-wire, PUR, halogen-free • **Description:** Ethernet, shielded, PROFINET • **Application:** Drag chain operation, Zones with oils and lubricants	YM2D24-020P-N1MRJA4	2106182
	• **Connection type head A:** Male connector, M12, 4-pin, straight, D-coded • **Connection type head B:** Male connector, RJ45, 4-pin, straight • **Signal type:** Ethernet, PROFINET • **Cable:** 3 m, 4-wire, PUR, halogen-free • **Description:** Ethernet, shielded, PROFINET • **Application:** Drag chain operation, Zones with oils and lubricants	YM2D24-030P-N1MRJA4	2106183

SICK AT A GLANCE

SICK is one of the leading manufacturers of intelligent sensors and sensor solutions for industrial applications. A unique range of products and services creates the perfect basis for controlling processes securely and efficiently, protecting individuals from accidents and preventing damage to the environment.

We have extensive experience in a wide range of industries and understand their processes and requirements. With intelligent sensors, we can deliver exactly what our customers need. In application centers in Europe, Asia and North America, system solutions are tested and optimized in accordance with customer specifications. All this makes us a reliable supplier and development partner.

Comprehensive services complete our offering: SICK LifeTime Services provide support throughout the machine life cycle and ensure safety and productivity.

For us, that is “Sensor Intelligence.”

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