

OS1 (Serial number beginning with "os1-")

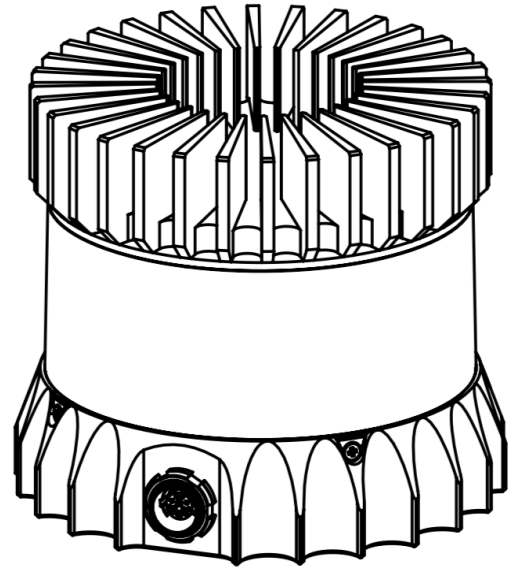
Mid-Range High Resolution Imaging Lidar

SUMMARY

The OS1 offers a market leading combination of price, performance, reliability, and SWAP. It is designed for indoor/outdoor all-weather environments and long lifetime. As the smallest high performance lidar on the market, the OS1 can be directly integrated into vehicle facias, windshield, side mirrors, and headlight clusters.

HIGHLIGHTS

- Fixed resolution per frame operating mode
- Camera-grade ambient and intensity data
- Multi-sensor crosstalk immunity
- Industry leading intrinsic calibration
- Open source drivers



OPTICAL PERFORMANCE

Range (80% Reflectivity)	0.8 m - 120 m @ 80% reflective lambertian target, 100 klx sunlight, >50% detection probability, false positive rate of 1/10,000 0.8 m - 105 m @ 80% reflective lambertian target, 100 klx sunlight, >90% detection probability, false positive rate of 1/10,000
Range (10% Reflectivity)	0.8 m - 60 m @ 10% reflective lambertian target, 100 klx sunlight, >50% detection probability, false positive rate of 1/10,000 0.8 m - 40 m @ 10% reflective lambertian target, 100 klx sunlight, >90% detection probability, false positive rate of 1/10,000
Range Accuracy	Zero bias for lambertian targets, slight bias for retroreflectors
Range Resolution	0.3 cm
Range Repeatability (1 sigma / standard deviation)	0.8 - 2 m: ± 3 cm; 2 - 20 m: ± 1.5 cm; 20 - 60 m ± 3 cm; > 60 m: ± 10 cm
Vertical Resolution	16, 32, or 64 channels
Horizontal Resolution	512, 1024, or 2048 (configurable)
Field of View	Vertical: $+16.6^\circ$ to -16.6° (33.2°) Horizontal: 360°
Angular Sampling Accuracy	Vertical: $\pm 0.01^\circ$ / Horizontal: $\pm 0.01^\circ$
Rotation Rate	10 or 20 Hz (configurable)
# of Returns	1 (strongest)

LASER

Laser Product Class	Class 1 eye-safe per IEC/EN 60825-1: 2014
Laser Wavelength	850 nm

Beam Diameter Exiting Sensor	10 mm
Beam Divergence	0.13° (FWHM; 16, 32, and 64 channel)

LIDAR OUTPUT

Connection	UDP over gigabit ethernet
Points Per Second	327,680 (16 channel) 655,360 (32 channel) 1,310,720 (64 channel)
Data Per Point	Range, intensity, reflectivity, ambient, channel, azimuth angle, timestamp
Time Stamp Resolution	< 1 μ s
Data Latency	< 10 ms

IMU OUTPUT

Connection	UDP over gigabit Ethernet
Samples Per Second	100
Data Per Sample	3 axis gyro, 3 axis accelerometer
Time Stamp Resolution	< 1 μ s
Data Latency	< 10 ms
Additional Details	InvenSense MPU9250; datasheet for more details: https://www.invensense.com/download-pdf/mpu-9250-datasheet/

CONTROL INTERFACE


Connection	TCP and HTTP APIs
Time Synchronization	Input sources: <ul style="list-style-type: none"> • IEEE1588 Precision Time Protocol (PTP) • gPTP • NMEA \$GPRMC UART message support • External PPS • Internal 10 ppm drift clock Output sources: <ul style="list-style-type: none"> • Configurable 1 - 60 Hz output pulse
LIDAR Operating Modes	Hardware triggered angle firing (guaranteed fixed resolution per rotation): <ul style="list-style-type: none"> • x 2048 @ 10 Hz • x 1024 @ 10 Hz or 20 Hz • x 512 @ 10 Hz or 20 Hz
Additional Programmability	Multi-sensor rotation phase tuning Queryable intrinsic calibration information: <ul style="list-style-type: none"> • Beam angles • IMU pose correction matrix

MECHANICAL/ELECTRICAL

Power Consumption	14 - 20 W (22 W peak at startup)
Operating Voltage	22 - 26 V, 24 V nominal
Connector	Proprietary pluggable connector (Power + data + DIO)
Dimensions	Diameter: 85 mm (3.34 in) Height: <ul style="list-style-type: none"> • Without cap: 58.35 mm (2.3 in) • With thermal cap: 73.5 mm (2.9 in)
Weight	For fixed cap sensors: 396 g (14.0 oz); For modular cap sensors: 425 g (15.0 oz) with fin cap, 348 g (12.3 oz) without cap
Mounting	4 M3 screws / 2 locating 3 mm pins

OPERATIONAL

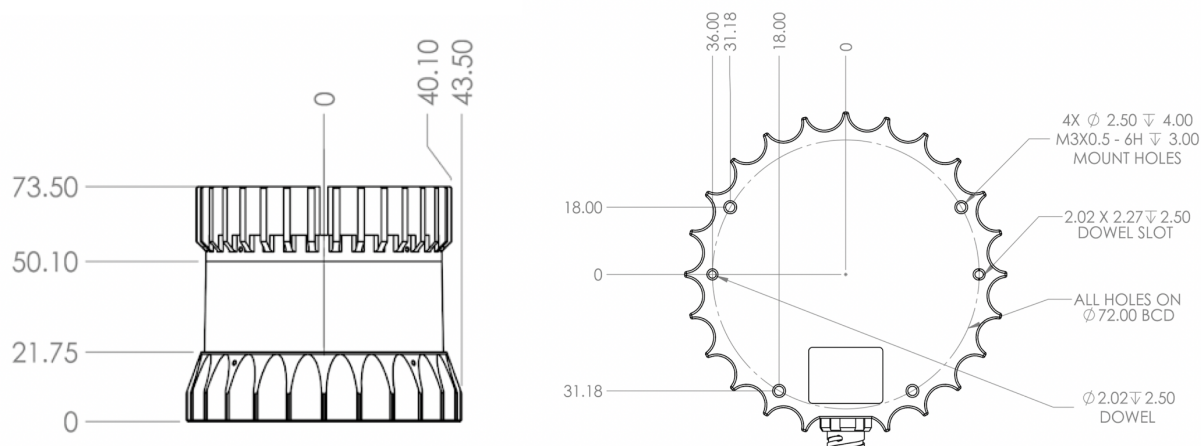
Operating Temperature	-20C to +50C (with Mount)
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Storage Temperature	-40C to +105C
Ingress	IP68 (1m submersion for 1 hour, with I/O cable attached) IP69K (with I/O cable attached)
Shock	IEC 60068-2-27 (Amplitude: 100 g, Shape: 11 ms half-sine, 3 shocks x 6 directions) IEC 60068-2-29 (Amplitude: 40 g, Shape: 6 ms half-sine, 1,500 shocks x 6 directions)
Vibration	IEC 60068-2-64 (Amplitude: 3 G-rms, Shape: 10 - 1000 Hz, Mounting: sprung masses, 3 axes w/ 8 hr duration each)
Compliance	<p>Laser Safety:</p> <ul style="list-style-type: none"> • IEC/EN 60825-1:2014 Class 1 • US 21CFR1040: Complies with FDA performance standards for laser products except for deviations pursuant to Laser Notice No. 50, dated July 26th, 2001 <p>Product Safety: IEC/EN 62368-1:2014</p> <p>EMC:</p> <ul style="list-style-type: none"> • FCC 47Cfr Part 15B, Class A • EN 55032: 2012/AC: 2013, Class A • IEC/EN 61000-4-3,4,5,6 • IEC/EN 61000-6-2:2005 Class A • IEC/EN 61000-6-4: 2007 <p></p>

ACCESSORIES

Included Interface Box	PolyCarb/FR4, 100 g, 75 mm x 50 mm x 25 mm (LxWxH), 2 m CAT6 cable, 24 V power adapter, 5 m sensor cable
Optional Mount	Aluminum, 530 g, 110 mm x 110 mm x 20.5 mm (LxWxH), 4 x M8 thru holes

EXTERIOR DIMENSIONS



Note: For modular cap design sensors, please refer to the "Radial Cap" and "Flat Cap" CAD models in the "Product Details" section of our website for dimensions

*Specifications are subject to change without notice.

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