OS0

Ultra-Wide View High-Resolution Imaging Lidar

FIRMWARE VERSION: 3.1.x

HARDWARE VERSION: REV7

SUMMARY

The short range OS0 delivers 35 m range on a dark 10% target and an ultra-wide 90.8º vertical field-of-view delivering an industry-leading combination of price, performance, reliability, size, weight, and power. The OS0 is designed for all-weather environments and due to its small size, can be easily integrated into autonomous vehicles, heavy machinery, robots, drones, and mapping solutions.
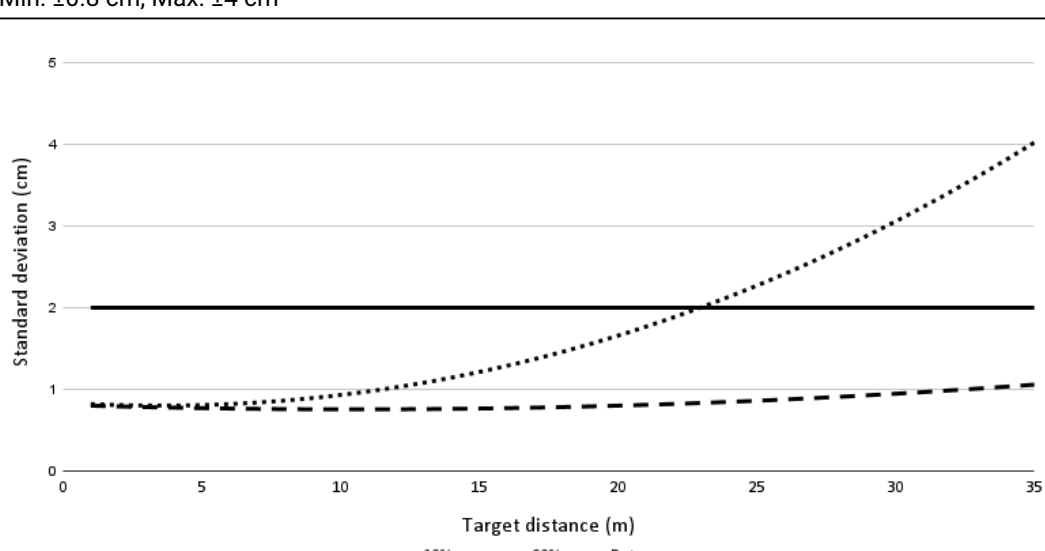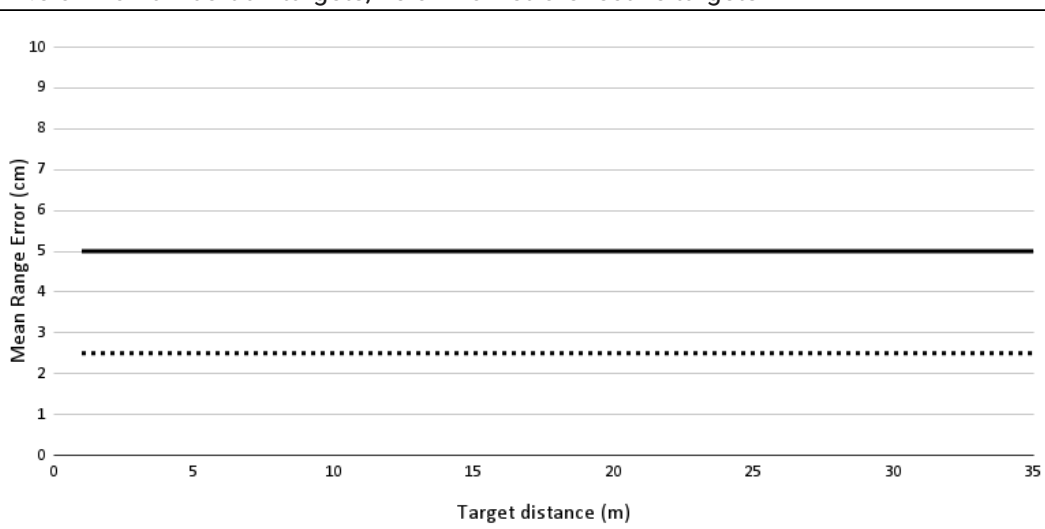
HIGHLIGHTS

• Configurable Minimum Range and Return Ordering
• Low Data Rate Profile now available with Dual Returns
• Camera-grade near-infrared and signal data
• Multi-sensor crosstalk suppression
• Ouster Studio for pointcloud evaluation
• Ouster SDK, ROS, and C++ drivers for SW development
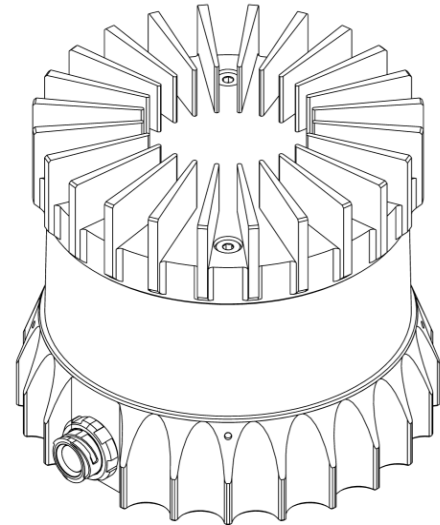
OPTICAL PERFORMANCE

Range (80% Lambertian reflectivity, 1024 @ 10 Hz mode)	75 m @ 100 klx sunlight, >90% detection probability
Range (10% Lambertian reflectivity, 1024 @ 10 Hz mode)	35 m @ 100 klx sunlight, >90% detection probability
Minimum Range	0.0 m (0.3 m optional, and 0.5 m default)
Vertical Resolution	32, 64, or 128 channels
Horizontal Resolution	512, 1024, or 2048 (configurable)
Rotation Rate	10 or 20 Hz (configurable)
Field of View	Vertical: 90.8° ± 1.0° (+45.4° to -45.4°) Horizontal: 360°
Angular Sampling Accuracy	Vertical: ±0.01° / Horizontal: ±0.01°
False Positive Rate	1/10,000
Range Resolution	0.1 cm **Note**: For *Low Data Rate Profile* the Range Resolution = 0.8 cm
# of Returns	up to 2
Return Order	Strongest to Weakest, Farthest to Nearest, and Nearest to Farthest

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14 Odem ST. P.O.B. 7042 Petach Tikva 4917001, ISRAEL | Office: +972-3-924-3352
Fax: +972-3-9243385 | sales@hypertech.co.il | www.hypertech.co.il

Range Precision (Typical on Lambertian and Retroreflective targets beyond 1 m, 1024 @ 10 Hz mode, 1 standard deviation) **Note:** Precision is calculated based on the standard deviation of 100 measurements on a static target at a given range	Min: ±0.8 cm, Max: ±4 cm

Range Accuracy (Typical on Lambertian and Retroreflective targets beyond 1 m, 1024 @ 10 Hz mode) **Note:** Accuracy is calculated based on the error between the mean of 100 measurements on a static target at a given range and the true range	±2.5 cm for lambertian targets, ±5 cm for retroreflective targets

LASER

Laser Product Class	Class 1 eye-safe per IEC/EN 60825-1: 2014
Laser Wavelength	865 nm
Beam Diameter Exiting Sensor	5 mm
Beam Divergence	0.35º (FWHM)

LIDAR OUTPUT

Connection	UDP over gigabit Ethernet
Points Per Second	1,310,720 (32 channel) 2,621,440 (64 channel) 5,242,880 (128 channel)
Data Rate (megabits per second) (Low Data Rate Profile, 1 return, 1024 @ 10 Hz mode)	up to 11.83 Mbps (32 channel) up to 22.32 Mbps (64 channel) up to 43.29 Mbps (128 channel)
Data Rate (megabits per second) (Low Data Rate Profile, 2 returns, 1024 @ 10 Hz mode)	up to 22.32 Mbps (32 channel) up to 43.29 Mbps (64 channel) up to 85.24 Mbps (128 channel)

HYPER-TECH *Systems*

Data Rate (megabits per second) (Single Return Profile, 1024 @ 10 Hz mode)	up to 32.81 Mbps (32 channel) up to 64.26 Mbps (64 channel) up to 127.18 Mbps (128 channel)
Data Rate (megabits per second) (Dual Return Profile, 1024 @ 10 Hz mode)	up to 43.29 Mbps (32 channel) up to 85.24 Mbps (64 channel) up to 169.12 Mbps (128 channel)
Data Per Point	Range, Signal, Reflectivity, Near-infrared, Channel, Azimuth angle, and Timestamp
Timestamp Resolution	< 1 µs
Data Latency	< 10 ms
Data Integrity	End to End CRC that covers entire data packet

IMU OUTPUT

Connection	UDP over 1000Base-T or 1000Base-T1
Samples Per Second	100
Data Per Sample	3 axis gyro, 3 axis accelerometer
Timestamp Resolution	< 1 µs
Data Latency	< 10 ms
Additional Details	InvenSense IAM-20680HT; datasheet for more details: https://invensense.tdk.com/download-pdf/iam-20680ht-datasheet/

CONTROL INTERFACE

Connection	HTTP API	
Time Synchronization	Input sources: • IEEE1588 Precision Time Protocol (PTP); Accuracy: <1 ms error • gPTP; Accuracy: <1 ms error • NMEA $GPRMC UART message support • External PPS; Accuracy: <1 ms error • Internal 10 ppm drift clock; Accuracy: <20 ppm error Output sources: • Configurable 1 - 60 Hz output pulse	
Lidar Operating Modes	• x 512 @ 10 Hz or 20 Hz • x 1024 @ 10 Hz or 20 Hz • x 2048 @ 10 Hz	

Additional Programmability	• Multi-sensor phase lock
	 • Queryable intrinsic calibration information:
	  • Beam angles
	   • IMU pose correction matrix
		• Return ordering
		 • Minimum range
		 • Azimuth masking
		 • Low-power standby mode

MECHANICAL/ELECTRICAL

Power Consumption	14 - 20 W • 16 W nominal • 28 W peak at startup if operating at -40 °C **Note:** Ouster recommends use of a power supply of no less than 30 W if using in cold conditions
Connector	Standard 1000BASE-T or Automotive Standard 1000BASE-T1
Operating Voltage	9.5 V - 51 V • Suitable for 12 VDC to 24 VDC nominal systems • Not suitable for 48 V nominal battery based systems • Under-voltage WARNING level alert occurs at 9.5 VDC at the connector • Under-voltage ERROR level alert occurs at 9.0 VDC at the connector • Below 9.0 VDC at connector, sensor may shutdown • Over-voltage conditions/alarms occur at 51 VDC at the connector • Over-voltage lockout onset at 58 VDC (±1 V) at the connector • Over-voltage lockout release at 55 VDC (±1 V) at the connector

Dimensions	Diameter: 87 mm (3.42 in)
	Height:
	  • Without cap: 58.35 mm (2.3 in)
	  • With thermal cap: 74.2 mm (2.9 in)

Weight	Without cap: 430 g (15.2 oz) With radial cap: 502 g (17.7 oz) With halo cap: 522 g (18.4 oz)
Mounting	Bottom: 4x M3 screws, 2x locating 2 mm pin holes Top: 4x M3 screws, 4x locating 2 mm pin holes, 1x M6 screw

OPERATIONAL

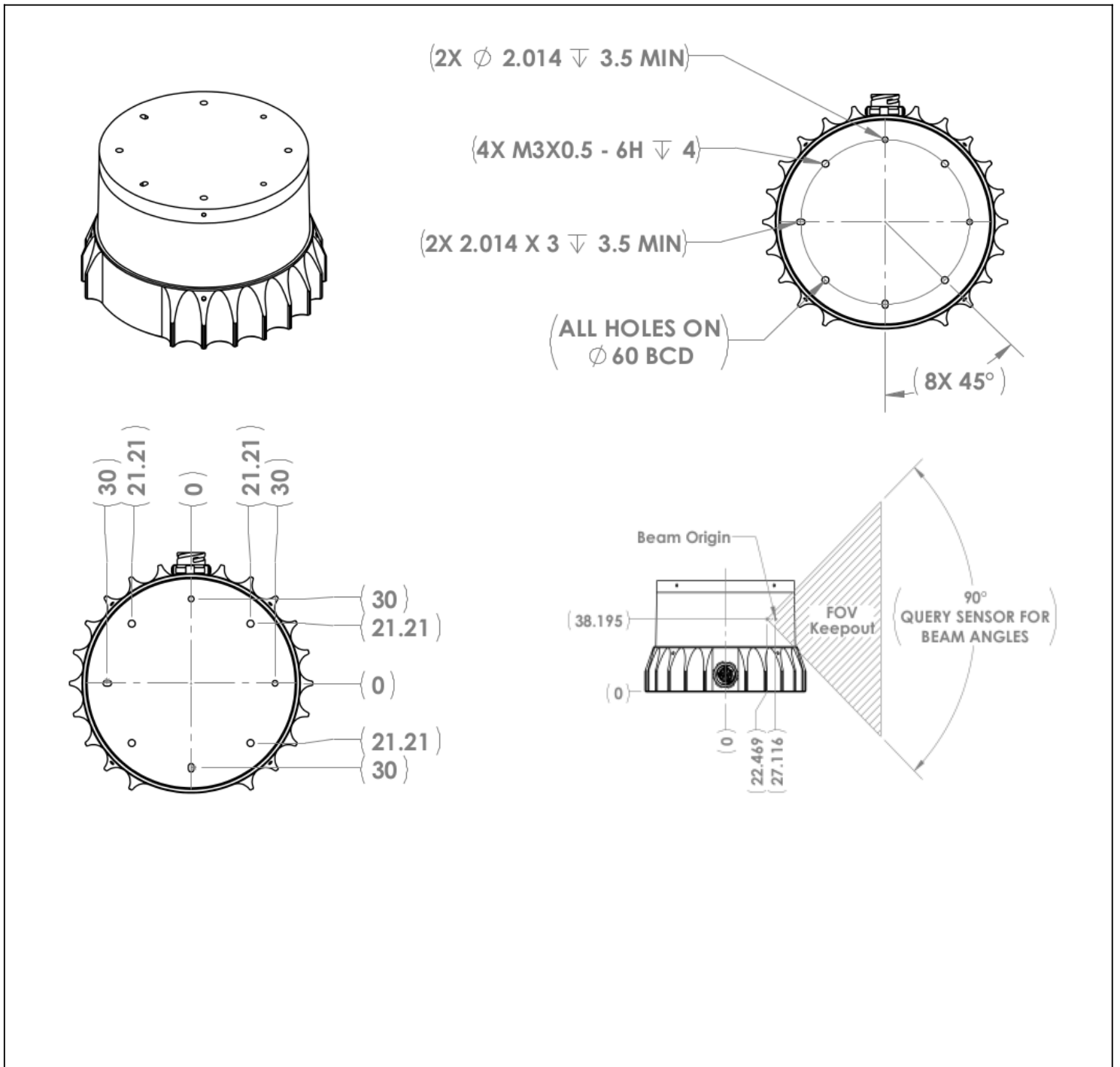| Operating Temperature	-40 °C to +60 °C (with mount) Between +53 °C and +60 °C, sensor automatically reduces range (max 20% range reduction)
Storage Temperature	-40 °C to +105 °C
Ingress Protection	IP68 (1 m submersion for 1 hour, with I/O cable attached) IP69K (with I/O cable attached)
Shock	IEC 60068-2-27 (Amplitude: 100 g, Shape: 11 ms half-sine, 3 shocks x 6 directions)
Vibration	IEC 60068-2-64 (Amplitude: 3 G-rms, Shape: 10 - 1000 Hz, Mounting: sprung masses, 3 axes w/ 8 hr duration each)
	For US Laser Safety: • EN/IEC 60825-1:2014 Class 1 eye safe • FDA US 21CFR1040 Notice 56 Class 1 Product Safety: • UL 62368-1 • UL 60950-22 (outdoor use) • CSA-C22.2 No. 62368-1-19 • CSA-C22.2 No. 60950-22-07 (outdoor use) EMC: FCC 47CFR Part 15, Subpart B, Class A **For EU** Laser Safety: EN/IEC 60825-1:2014 Class 1 eye safe Product Safety: EN/IEC 62368-1 EMC: • EN 55032:2012/AC 2013; CISPR 32:2015 • EN 55024:2010; CISPR 24:2010 • EN 61000-3-2:2014 • EN 61000-3-3:2013 CE RoHS UK CA

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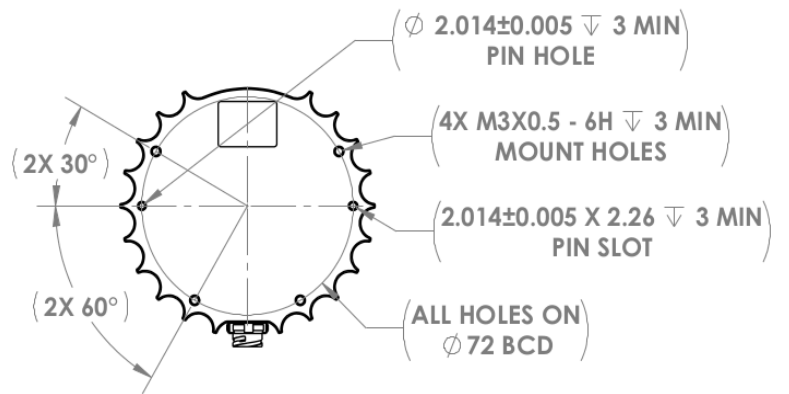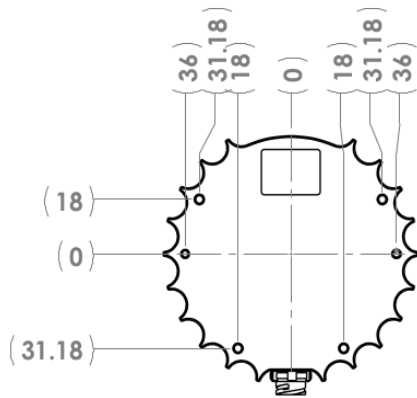Fax: +972-3-9243385 | sales@hypertech.co.il | www.hypertech.co.il
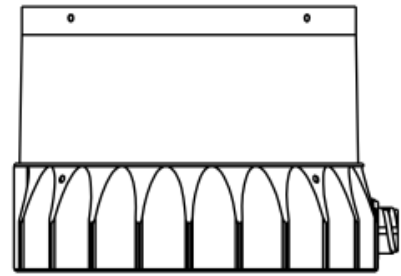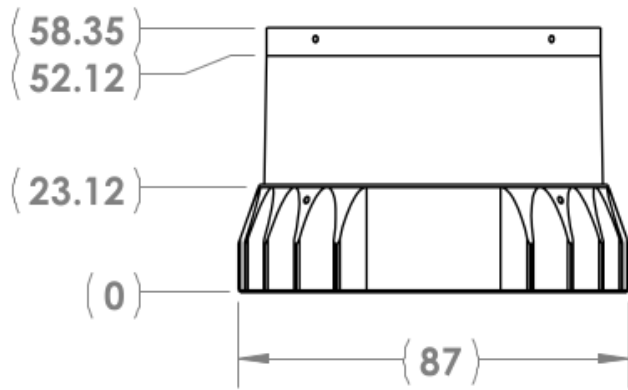
ACCESSORIES

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
Mount	Aluminum, 530 g, 110 mm x 110 mm x 20.5 mm (LxWxH), 4 x M8 thru holes

SOFTWARE

Sample Drivers	Ouster SDK, ROS, C++
Visualizer	Ouster Studio

EXTERIOR DIMENSIONS

(2X ⌀ 2.014 ▽ 3.5 MIN)

(4X M3X0.5 - 6H ▽ 4)

(2X 2.014 X 3 ▽ 3.5 MIN)

(ALL HOLES ON ⌀ 60 BCD)

(8X 45°)

30 21.21 0 21.21 30

(30)
(21.21)
(0)
(21.21)
(30)

Beam Origin

(38.195)

(0)

FOV Keepout

90° QUERY SENSOR FOR BEAM ANGLES

(0)
22.469
27.116

58.35
52.12

23.12

(0)

(87)

36
31.18
18
0
18
31.18
36

(18)
(0)
(31.18)

Ø 2.014±0.005 ▽ 3 MIN
PIN HOLE

4X M3X0.5 - 6H ▽ 3 MIN
MOUNT HOLES

2.014±0.005 X 2.26 ▽ 3 MIN
PIN SLOT

ALL HOLES ON
Ø 72 BCD

(2X 30°)

(2X 60°)

*Specifications are subject to change without notice.

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