



## OS0

### Ultra-Wide View High-Resolution Imaging Lidar

FIRMWARE VERSION: 3.1.x

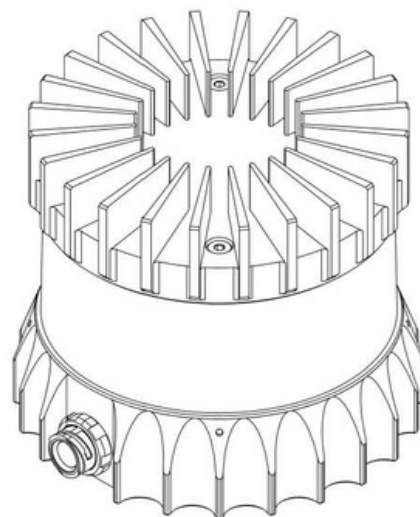
HARDWARE VERSION: REV7

#### SUMMARY

The short range OS0 delivers 35 m range on a dark 10% target and an ultra-wide 90.8° 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<br>(80% Lambertian reflectivity,<br>1024 @ 10 Hz mode) | 75 m @ 100 klx sunlight, >90% detection probability                            |
| Range<br>(10% Lambertian reflectivity,<br>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°)<br>Horizontal: 360°                  |
| Angular Sampling Accuracy                                    | Vertical: ±0.01° / Horizontal: ±0.01°                                          |
| False Positive Rate                                          | 1/10,000                                                                       |
| Range Resolution                                             | 0.1 cm<br><b>Note:</b> 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             |

#### 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              | 0.35° (FWHM)                              |

## Contact us

🌐 <http://newsemi.com>

✉ [contactus@newsemi.com](mailto:contactus@newsemi.com)

☎ +886 2 6637 2922

☎ +886 2 2998 9768

📍 7F, No. 69, Sec. 2, Guangfu Rd. Sanchong Dist.,  
New Taipei City, 241561, Taiwan

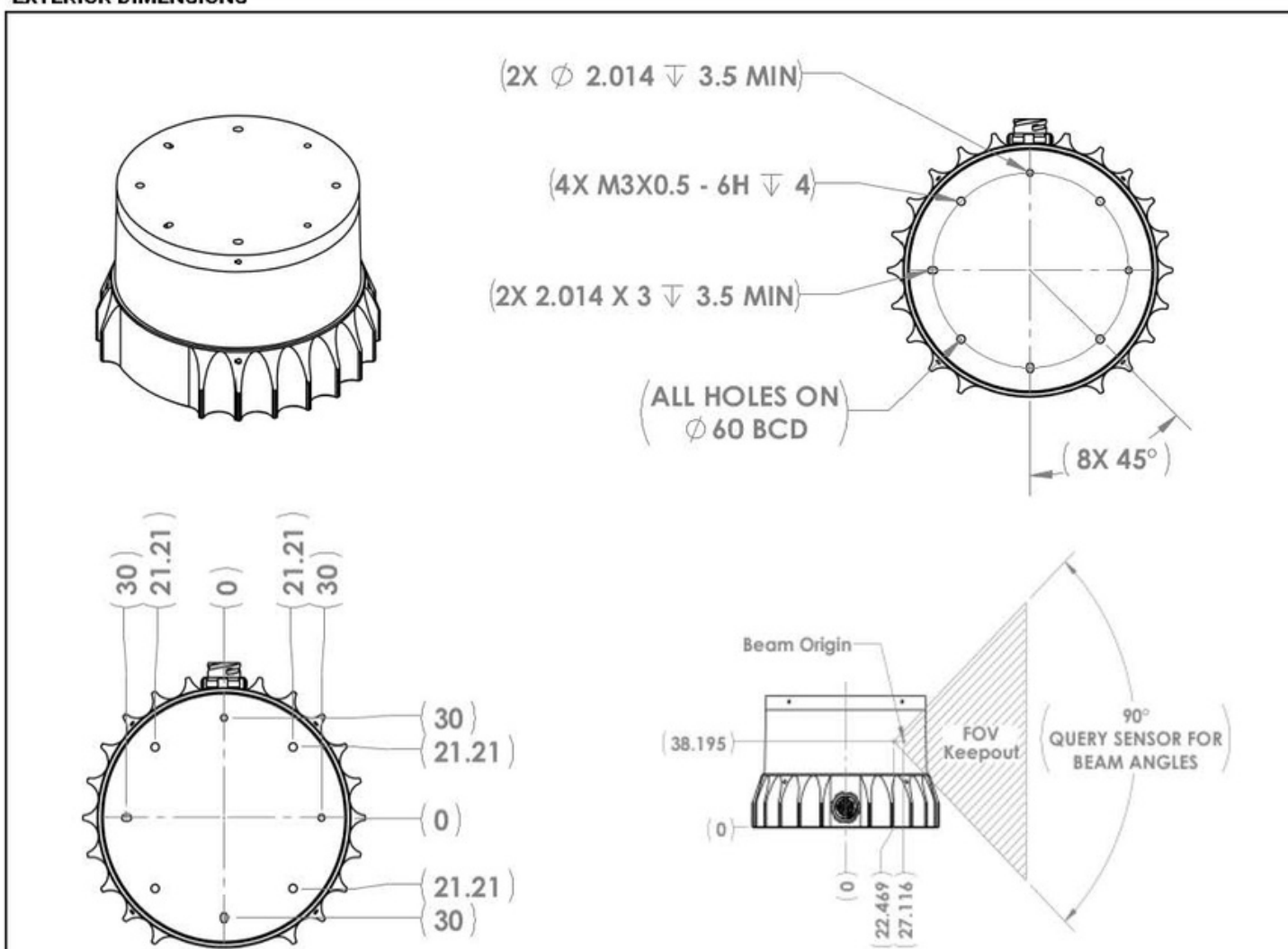
### IMU OUTPUT

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

### CONTROL INTERFACE

|                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Connection            | HTTP API                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Time Synchronization  | Input sources: <ul style="list-style-type: none"> <li>• IEEE1588 Precision Time Protocol (PTP); Accuracy: &lt;1 ms error</li> <li>• gPTP; Accuracy: &lt;1 ms error</li> <li>• NMEA \$GPRMC UART message support</li> <li>• External PPS; Accuracy: &lt;1 ms error</li> <li>• Internal 10 ppm drift clock; Accuracy: &lt;20 ppm error</li> </ul> Output sources: <ul style="list-style-type: none"> <li>• Configurable 1 - 60 Hz output pulse</li> </ul> |
| Lidar Operating Modes | <ul style="list-style-type: none"> <li>• x 512 @ 10 Hz or 20 Hz</li> <li>• x 1024 @ 10 Hz or 20 Hz</li> <li>• x 2048 @ 10 Hz</li> </ul>                                                                                                                                                                                                                                                                                                                 |

### EXTERIOR DIMENSIONS



### Contact us

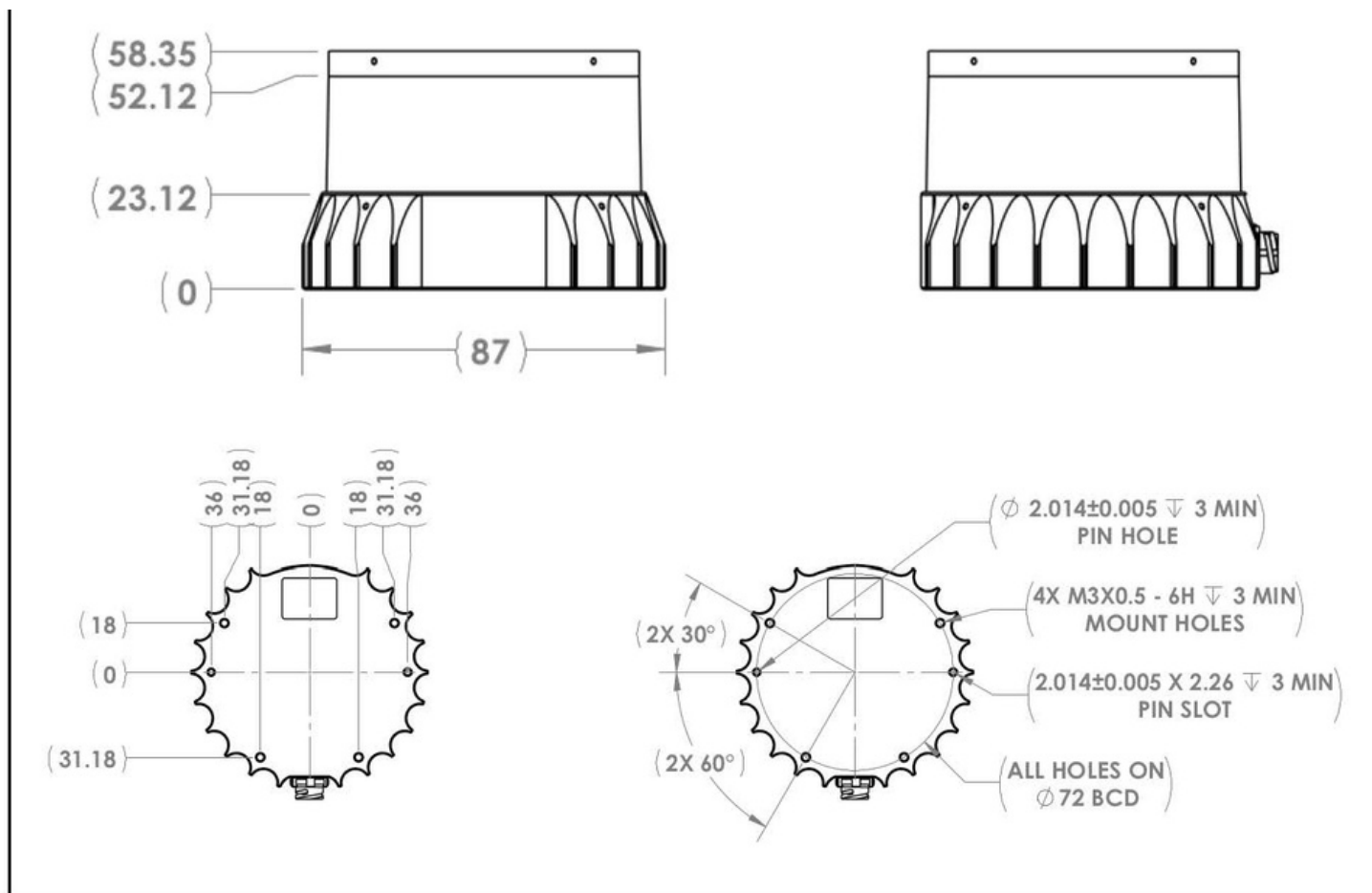
<http://newsemi.com>

[contactus@newsemi.com](mailto:contactus@newsemi.com)

+886 2 6637 2922

+886 2 2998 9768

7F, No. 69, Sec. 2, Guangfu Rd. Sanchong Dist.,  
New Taipei City, 241561, Taiwan



\*Specifications are subject to change without notice.

#### MECHANICAL/ELECTRICAL

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Power Consumption | 14 - 20 W <ul style="list-style-type: none"> <li>• 16 W nominal</li> <li>• 28 W peak at startup if operating at -40 °C</li> </ul> <b>Note:</b> 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 <ul style="list-style-type: none"> <li>• Suitable for 12 VDC to 24 VDC nominal systems</li> <li>• Not suitable for 48 V nominal battery based systems</li> <li>• Under-voltage WARNING level alert occurs at 9.5 VDC at the connector</li> <li>• Under-voltage ERROR level alert occurs at 9.0 VDC at the connector</li> <li>• Below 9.0 VDC at connector, sensor may shutdown</li> <li>• Over-voltage conditions/alarms occur at 51 VDC at the connector</li> <li>• Over-voltage lockout onset at 58 VDC (<math>\pm 1</math> V) at the connector</li> <li>• Over-voltage lockout release at 55 VDC (<math>\pm 1</math> V) at the connector</li> </ul> |
| Dimensions        | Diameter: 87 mm (3.42 in)<br>Height: <ul style="list-style-type: none"> <li>• Without cap: 58.35 mm (2.3 in)</li> <li>• With thermal cap: 74.2 mm (2.9 in)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Weight            | Without cap: 430 g (15.2 oz)<br>With radial cap: 502 g (17.7 oz)<br>With halo cap: 522 g (18.4 oz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Mounting          | Bottom: 4x M3 screws, 2x locating 2 mm pin holes<br>Top: 4x M3 screws, 4x locating 2 mm pin holes, 1x M6 screw                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

#### Contact us

<http://newsemi.com>

[contactus@newsemi.com](mailto:contactus@newsemi.com)

+886 2 6637 2922

+886 2 2998 9768

7F, No. 69, Sec. 2, Guangfu Rd. Sanchong Dist.,  
New Taipei City, 241561, Taiwan

## OPERATIONAL

|                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Operating Temperature | -40 °C to +60 °C (with mount)<br>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)<br>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)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Compliance            | <p><b>Note:</b> Ouster UK (Ltd): 125 Princes Street, Edinburgh EH2 4AD, Scotland, United Kingdom<br/>Contact: Neil Calder, Phone Number: +44(0).131.563.9078</p> <p><b>For US</b><br/>Laser Safety:<br/> <ul style="list-style-type: none"> <li>• EN/IEC 60825-1:2014 Class 1 eye safe</li> <li>• FDA US 21CFR1040 Notice 56 Class 1</li> </ul> Product Safety:<br/> <ul style="list-style-type: none"> <li>• UL 62368-1</li> <li>• UL 60950-22 (outdoor use)</li> <li>• CSA-C22.2 No. 62368-1-19</li> <li>• CSA-C22.2 No. 60950-22-07 (outdoor use)</li> </ul> EMC: FCC 47CFR Part 15, Subpart B, Class A</p> <p><b>For EU</b><br/>Laser Safety: EN/IEC 60825-1:2014 Class 1 eye safe<br/>Product Safety: EN/IEC 62368-1<br/>EMC:<br/> <ul style="list-style-type: none"> <li>• EN 55032:2012/AC 2013; CISPR 32:2015</li> <li>• EN 55024:2010; CISPR 24:2010</li> <li>• EN 61000-3-2:2014</li> <li>• EN 61000-3-3:2013</li> </ul> </p> <p>    </p> |

## Contact us

 <http://newsemi.com>

 [contactus@newsemi.com](mailto:contactus@newsemi.com)

 +886 2 6637 2922

 +886 2 2998 9768

 7F, No. 69, Sec. 2, Guangfu Rd. Sanchong Dist.,  
New Taipei City, 241561, Taiwan

# OS1

## Mid-Range High-Resolution Imaging Lidar

FIRMWARE VERSION: 3.1.x

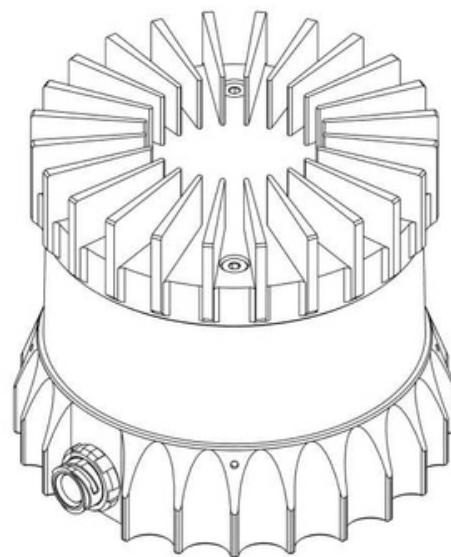
HARDWARE VERSION: REV7

### SUMMARY

The mid-range OS1 lidar sensor features 90 m range on a dark 10% target, a 42.4° vertical field of view, and high reliability for the most rugged conditions. The OS1 is designed for all-weather environments and use in industrial automation, autonomous vehicles, mapping, smart infrastructure, and robotics.

### 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<br>(80% Lambertian reflectivity,<br>1024 @ 10 Hz mode) | 170 m @ >90% detection probability, 100 klx sunlight                           |
| Range<br>(10% Lambertian reflectivity,<br>1024 @ 10 Hz mode) | 90 m @ >90% detection probability, 100 klx sunlight                            |
| 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: 42.4° ± 1.0° (+21.2° to -21.2°)<br>Horizontal: 360°                  |
| Angular Sampling Accuracy                                    | Vertical: ±0.01° / Horizontal: ±0.01°                                          |
| False Positive Rate                                          | 1/10,000                                                                       |
| Range Resolution                                             | 0.1 cm<br><b>Note:</b> 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             |

### 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:<br><a href="https://invensense.tdk.com/download-pdf/iam-20680ht-datasheet/">https://invensense.tdk.com/download-pdf/iam-20680ht-datasheet/</a> |

## Contact us

⌐ <http://newsemi.com>

✉ [contactus@newsemi.com](mailto:contactus@newsemi.com)

☎ +886 2 6637 2922

☎ +886 2 2998 9768

📍 7F, No. 69, Sec. 2, Guangfu Rd. Sanchong Dist.,  
New Taipei City, 241561, Taiwan

**CONTROL INTERFACE**

|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                           |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| Connection                 | HTTP API                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                           |
| Time Synchronization       | Input sources: <ul style="list-style-type: none"> <li>• IEEE1588 Precision Time Protocol (PTP); Accuracy: &lt;1 ms error</li> <li>• gPTP; Accuracy: &lt;1 ms error</li> <li>• NMEA \$GPRMC UART message support</li> <li>• External PPS; Accuracy: &lt;1 ms error</li> <li>• Internal 10 ppm drift clock; Accuracy: &lt;20 ppm error</li> </ul> Output sources: <ul style="list-style-type: none"> <li>• Configurable 1 - 60 Hz output pulse</li> </ul> |                                                                                                                                                           |
| Lidar Operating Modes      | <ul style="list-style-type: none"> <li>• x 512 @ 10 Hz or 20 Hz</li> <li>• x 1024 @ 10 Hz or 20 Hz</li> <li>• x 2048 @ 10 Hz</li> </ul>                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                           |
| Additional Programmability | <ul style="list-style-type: none"> <li>• Multi-sensor phase lock</li> <li>• Queryable intrinsic calibration information:               <ul style="list-style-type: none"> <li>• Beam angles</li> <li>• IMU pose correction matrix</li> </ul> </li> </ul>                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>• Return ordering</li> <li>• Minimum range</li> <li>• Azimuth masking</li> <li>• Low-power standby mode</li> </ul> |

**MECHANICAL/ELECTRICAL**

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Power Consumption | 14 - 20 W <ul style="list-style-type: none"> <li>• 16 W nominal</li> <li>• 28 W peak at startup if operating at -40 °C</li> </ul> <b>Note:</b> 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 <ul style="list-style-type: none"> <li>• Suitable for 12 VDC to 24 VDC nominal systems</li> <li>• Not suitable for 48 V nominal battery based systems</li> <li>• Under-voltage WARNING level alert occurs at 9.5 VDC at the connector</li> <li>• Under-voltage ERROR level alert occurs at 9.0 VDC at the connector</li> <li>• Below 9.0 VDC at connector, sensor may shutdown</li> <li>• Over-voltage conditions/alarms occur at 51 VDC at the connector</li> <li>• Over-voltage lockout onset at 58 VDC (±1 V) at the connector</li> <li>• Over-voltage lockout release at 55 VDC (±1 V) at the connector</li> </ul> |  |
| Dimensions        | Diameter: 87 mm (3.42 in)<br>Height: <ul style="list-style-type: none"> <li>• Without cap: 58.35 mm (2.3 in)</li> <li>• With thermal cap: 74.2 mm (2.9 in)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |
| Weight            | Without cap: 410 g (14.5 oz)<br>With radial cap: 482 g (17.0 oz)<br>With halo cap: 502 g (17.7 oz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Mounting          | Bottom: 4x M3 screws, 2x locating 2 mm pin holes<br>Top: 4x M3 screws, 4x locating 2 mm pin holes, 1x M6 screw                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |

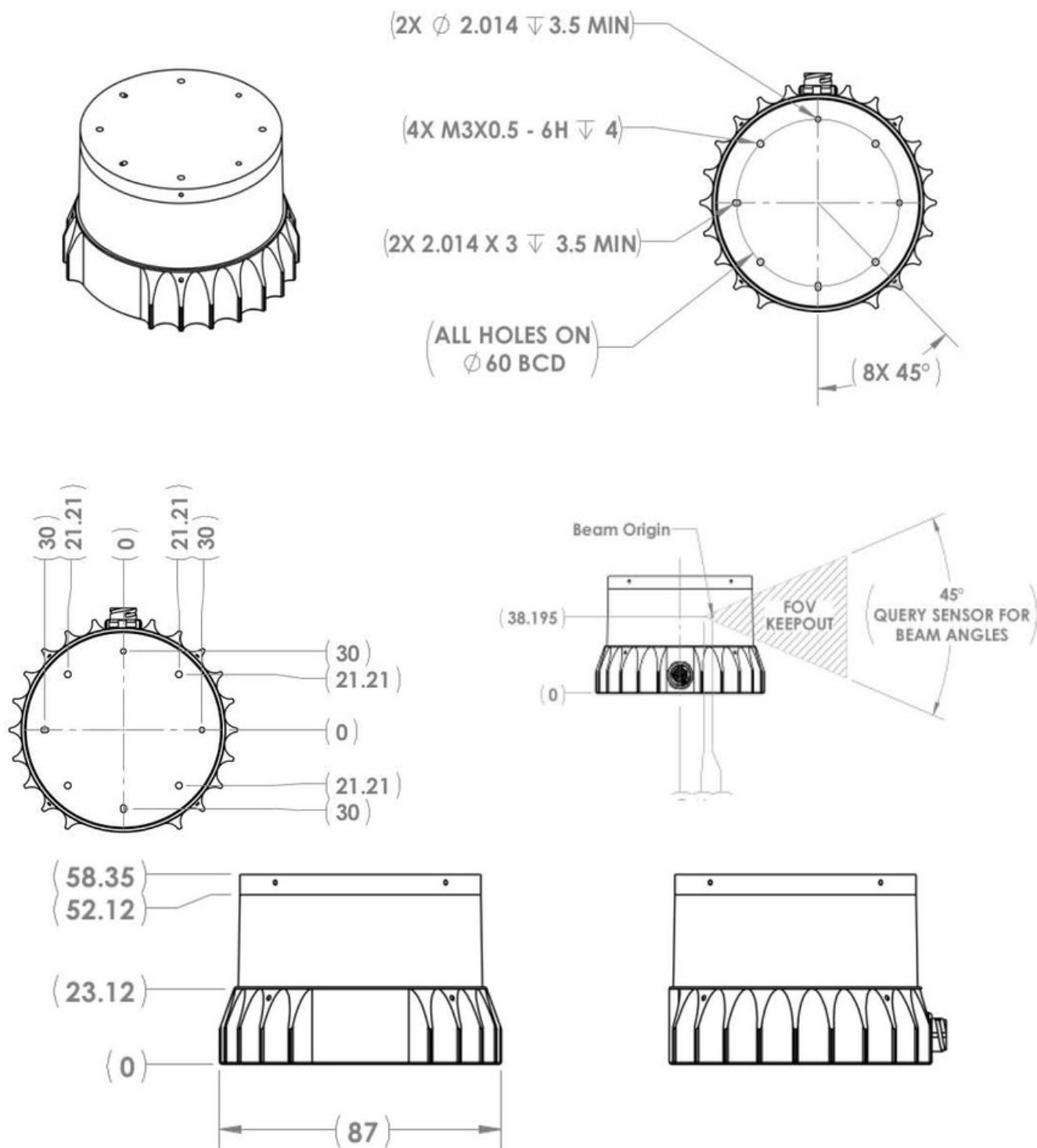
**Contact us**
<http://newsemi.com>
[contactus@newsemi.com](mailto:contactus@newsemi.com)

+886 2 6637 2922

+886 2 2998 9768

7F, No. 69, Sec. 2, Guangfu Rd. Sanchong Dist.,  
New Taipei City, 241561, Taiwan

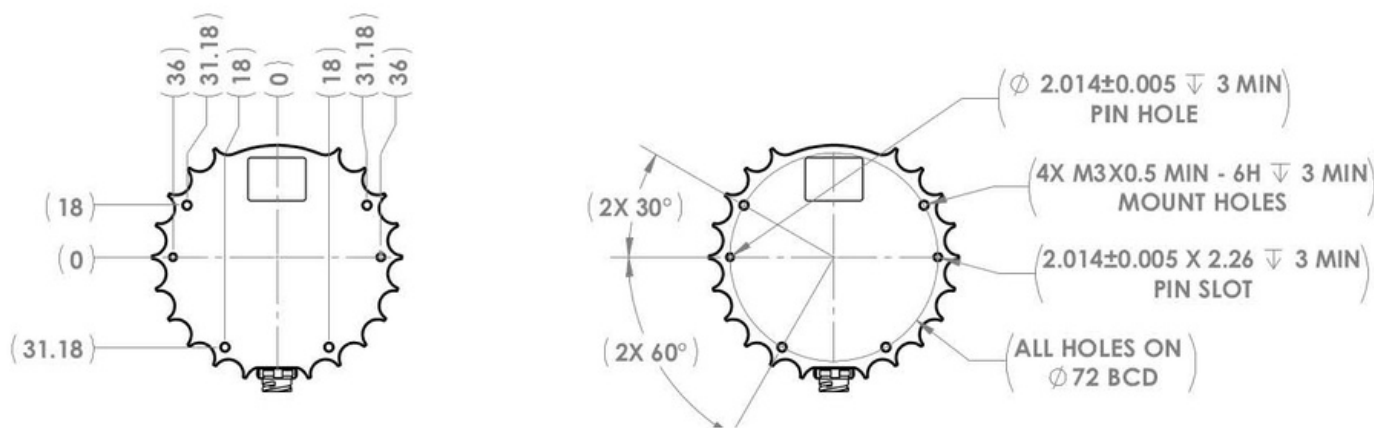
EXTERIOR DIMENSIONS



Contact us

<http://newsemi.com>  
[contactus@newsemi.com](mailto:contactus@newsemi.com)  
 +886 2 6637 2922

+886 2 2998 9768  
 7F, No. 69, Sec. 2, Guangfu Rd. Sanchong Dist.,  
 New Taipei City, 241561, Taiwan



\*Specifications are subject to change without notice.

### OPERATIONAL

|                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Operating Temperature | -40 °C to +60 °C (with mount)<br>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)<br>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)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Compliance            | <p><b>For US</b></p> <p>Laser Safety:</p> <ul style="list-style-type: none"> <li>• EN/IEC 60825-1:2014 Class 1 eye safe</li> <li>• FDA US 21CFR1040 Notice 56 Class 1</li> </ul> <p>Product Safety:</p> <ul style="list-style-type: none"> <li>• UL 62368-1</li> <li>• UL 60950-22 (outdoor use)</li> <li>• CSA-C22.2 No. 62368-1-19</li> <li>• CSA-C22.2 No. 60950-22-07 (outdoor use)</li> </ul> <p>EMC: FCC 47CFR Part 15, Subpart B, Class A</p> <p><b>For EU</b></p> <p>Laser Safety: EN/IEC 60825-1:2014 Class 1 eye safe</p> <p>Product Safety: EN/IEC 62368-1</p> <p>EMC:</p> <ul style="list-style-type: none"> <li>• EN 55032:2012/AC 2013; CISPR 32:2015</li> <li>• EN 55024:2010; CISPR 24:2010</li> <li>• EN 61000-3-2:2014</li> <li>• EN 61000-3-3:2013</li> </ul> <p>    </p> |

### Contact us

 <http://newsemi.com>

 [contactus@newsemi.com](mailto:contactus@newsemi.com)

 +886 2 6637 2922

 +886 2 2998 9768

 7F, No. 69, Sec. 2, Guangfu Rd. Sanchong Dist.,  
New Taipei City, 241561, Taiwan

# OS2

## Long-Range High-Resolution Imaging Lidar

**FIRMWARE VERSION: v2.5.x**

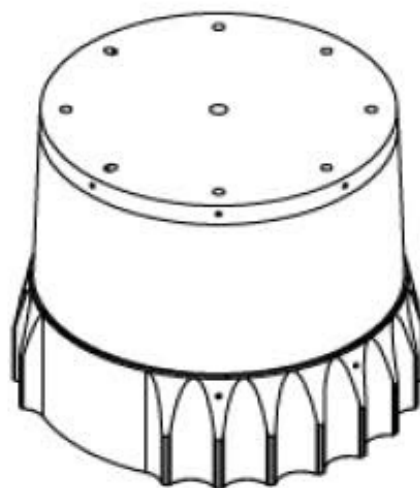
**HARDWARE VERSION: REV7**

### SUMMARY

The long-range OS2 features 200 m of range on a dark 10% target and a maximum range of over 400 m. The OS2's high resolution combined with range delivers superior object detection capabilities for autonomous vehicles and long-range industrial applications. Rated IP68/69K for all weather conditions.

### HIGHLIGHTS

- 100% increase in range with the new L3 Chip
- Dual Return mode
- Fixed resolution per frame
- Camera-grade near-infrared and signal data
- Multi-sensor crosstalk suppression
- Open source ROS and C++ drivers
- Ouster SDK for software development



### OPTICAL PERFORMANCE

|                                                              |                                                                               |
|--------------------------------------------------------------|-------------------------------------------------------------------------------|
| Range<br>(80% Lambertian reflectivity,<br>1024 @ 10 Hz mode) | 350 m @ >90% detection probability, 100 klx sunlight                          |
| Range<br>(10% Lambertian reflectivity,<br>1024 @ 10 Hz mode) | 200 m @ >90% detection probability, 100 klx sunlight                          |
| Minimum Range                                                | 0.8 m                                                                         |
| 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: 22.5° (+11.25° to -11.25°)<br>Horizontal: 360°                      |
| Angular Sampling Accuracy                                    | Vertical: ±0.01° / Horizontal: ±0.01°                                         |
| False Positive Rate                                          | 1/10,000                                                                      |
| Range Resolution                                             | 0.1 cm<br><b>Note:</b> For Low Data Rate Profile the Range Resolution = 0.8cm |
| # of Returns                                                 | 2 (strongest, second strongest)                                               |

### Contact us

🌐 <http://newsemi.com>

✉ [contactus@newsemi.com](mailto:contactus@newsemi.com)

☎ +886 2 6637 2922

☎ +886 2 2998 9768

📍 7F, No. 69, Sec. 2, Guangfu Rd. Sanchong Dist.,  
New Taipei City, 241561, Taiwan

### LASER

|                              |                                           |
|------------------------------|-------------------------------------------|
| Laser Product Class          | Class 1 eye-safe per IEC/EN 60825-1: 2014 |
| Laser Wavelength             | 865 nm                                    |
| Beam Diameter Exiting Sensor | 19 mm                                     |
| Beam Divergence              | 0.09° (FWHM)                              |

### IMU OUTPUT

|                      |                                                                                                                                                                                                                |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Connection           | UDP over 1000Base-T                                                                                                                                                                                            |
| Samples Per Second   | 100                                                                                                                                                                                                            |
| Data Per Sample      | 3 axis gyro, 3 axis accelerometer                                                                                                                                                                              |
| Timestamp Resolution | < 1 $\mu$ s                                                                                                                                                                                                    |
| Data Latency         | < 10 ms                                                                                                                                                                                                        |
| Details:             | InvenSense ICM-20948; datasheet for more details:<br><a href="https://www.invensense.com/products/motion-tracking/9-axis/icm-20948/">https://www.invensense.com/products/motion-tracking/9-axis/icm-20948/</a> |

### CONTROL INTERFACE

|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Connection                 | TCP and HTTP APIs                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Time Synchronization       | Input sources: <ul style="list-style-type: none"> <li>• IEEE1588 Precision Time Protocol (PTP); Accuracy: &lt;1 ms error</li> <li>• gPTP; Accuracy: &lt;1 ms error</li> <li>• NMEA \$GPRMC UART message support</li> <li>• External PPS; Accuracy: &lt;1 ms error</li> <li>• Internal 10 ppm drift clock; Accuracy: &lt;20 ppm error</li> </ul> Output sources: <ul style="list-style-type: none"> <li>• Configurable 1 - 60 Hz output pulse</li> </ul> |
| Lidar Operating Modes      | Hardware-triggered angle firing (guaranteed fixed resolution per rotation): <ul style="list-style-type: none"> <li>• x 512 @ 10 Hz or 20 Hz</li> <li>• x 1024 @ 10 Hz or 20 Hz</li> <li>• x 2048 @ 10 Hz</li> </ul>                                                                                                                                                                                                                                     |
| Additional Programmability | Multi-sensor Phase Lock<br>Azimuth Masking<br>Low-power Standby Mode<br>Queryable intrinsic calibration information: <ul style="list-style-type: none"> <li>• Beam angles</li> <li>• IMU pose correction matrix</li> </ul>                                                                                                                                                                                                                              |

### MECHANICAL/ELECTRICAL

|                   |                                                                      |
|-------------------|----------------------------------------------------------------------|
| Power Consumption | 18 - 24 W (28 W peak at startup, 30 W peak if operating below 10 °C) |
| Connector         | Proprietary pluggable connector (Power + data + DIO)                 |

## Contact us

🌐 <http://newsemi.com>

✉ [contactus@newsemi.com](mailto:contactus@newsemi.com)

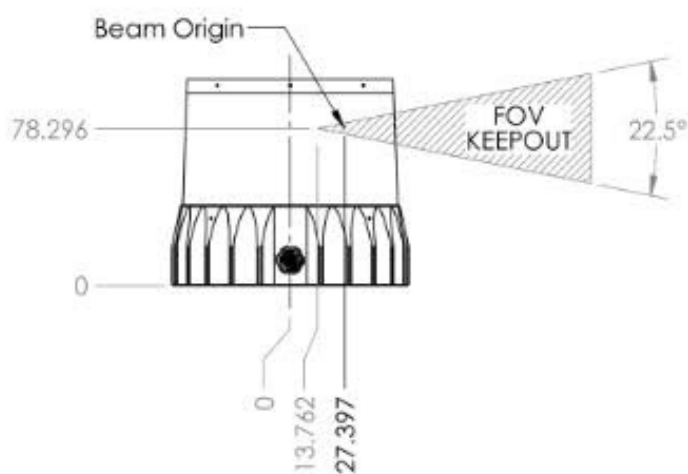
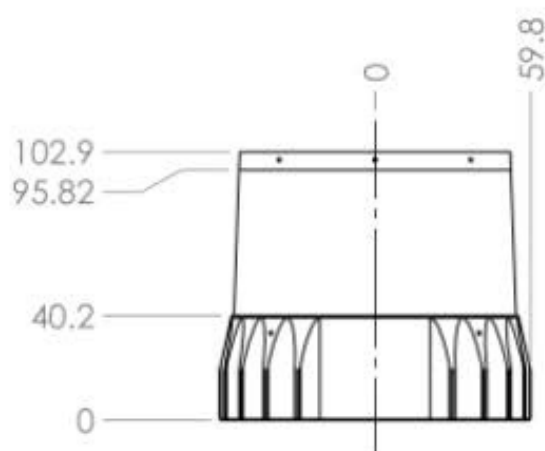
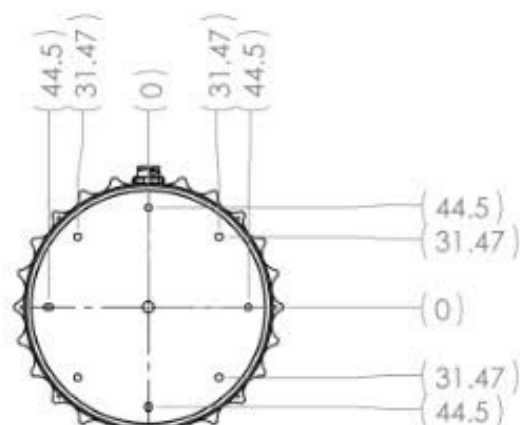
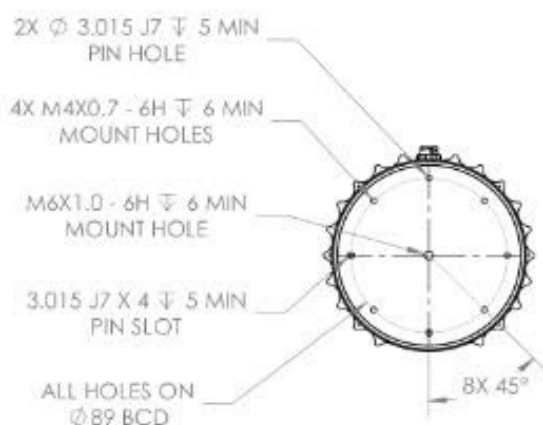
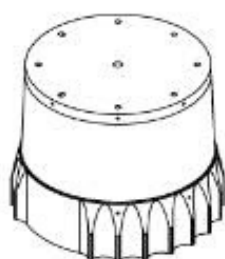
☎ +886 2 6637 2922

☎ +886 2 2998 9768

📍 7F, No. 69, Sec. 2, Guangfu Rd. Sanchong Dist.,  
New Taipei City, 241561, Taiwan

|                   |                                                                                                                                                                       |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Operating Voltage | 9V - 34 V, 12 V or 24 V nominal                                                                                                                                       |
| Dimensions        | Diameter: 119.6 mm (4.71 in)<br>Height: 98.9 mm (3.89 in)                                                                                                             |
| Weight            | 1100 g (38.8 oz)                                                                                                                                                      |
| Mounting          | Bottom: 4x M3 screws, 2x locating 2 mm pin holes, 4x M4 screws, 2x locating 3 mm pin holes, 4x M6 screws<br>Top: 4x M4 screws, 4x locating 3mm pin holes, 1x M6 Screw |

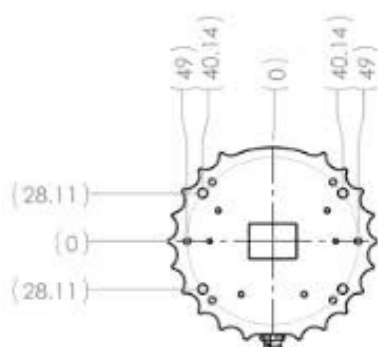
## EXTERIOR DIMENSIONS



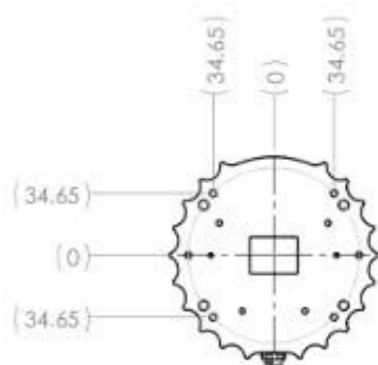
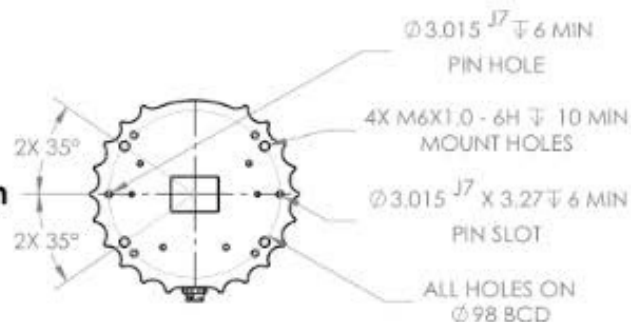
## Contact us

<http://newsemi.com>  
[contactus@newsemi.com](mailto:contactus@newsemi.com)  
+886 2 6637 2922

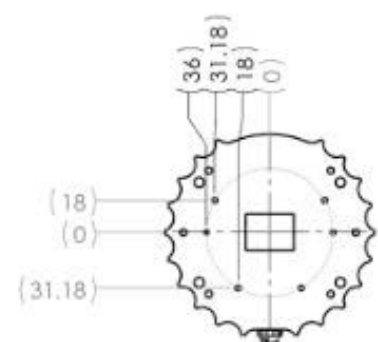
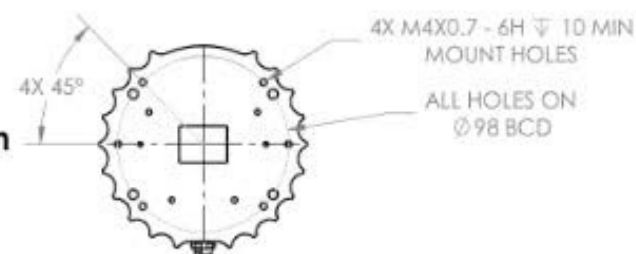
+886 2 2998 9768  
7F, No. 69, Sec. 2, Guangfu Rd. Sanchong Dist.,  
New Taipei City, 241561, Taiwan



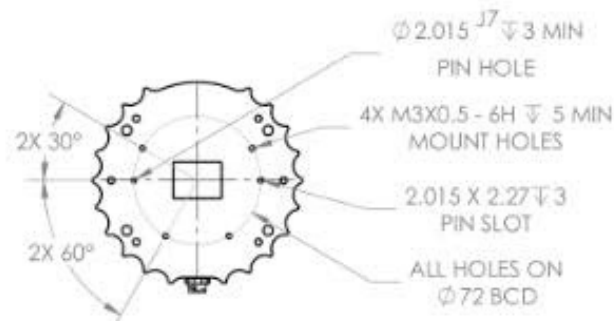
**M6 Thread Pattern**



**M4 Thread Pattern**



**M3 Thread Pattern**



\*Specifications are subject to change without notice.

# OPERATIONAL

|                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Operating Temperature | -20 °C to +60 °C<br>Between +52 °C to +60 °C, sensor automatically reduces range (max 20% range reduction)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Storage Temperature   | -40 °C to +105 °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Ingress Protection    | IP68 (1m submersion for 1 hour, with I/O cable attached)<br>IP69K (with I/O cable attached)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Shock                 | IEC 60068-2-27 (Amplitude: 25 g, Shape: 10 ms half-sine, 400 shocks x 6 directions)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Vibration             | IEC 60068-2-64 (Amplitude: 2 G-rms, Shape: 10 - 1000 Hz, Mounting: sprung masses, 3 axes w/ 8 hr duration each)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Compliance            | <p><b>For US</b><br/>Laser Safety:<br/>• IEC/EN 60825-1:2014 Class 1 eye safe<br/>• FDA US 21CFR1040 Notice 56 Class 1</p> <p>Product Safety:<br/>• UL 62368-1<br/>• CSA 22.2 No. 62368-1-19</p> <p>EMC: FCC 47CFR Part 15, Subpart B, Class A</p> <p><b>For EU</b><br/>Laser Safety: IEC/EN 60825-1:2014 Class 1 eye safe</p> <p>Product Safety: EN/IEC 62368-1</p> <p>EMC:<br/>• EN 55032:2012/AC 2013; CISPR 32:2015<br/>• EN 55024:2010; CISPR 24:2010<br/>• EN 61000-3-2:2014<br/>• EN 61000-3-3:2013</p> <p><b>Note:</b> Ouster UK (Ltd): 125 Princes Street, Edinburgh EH2 4AD, Scotland, United Kingdom<br/>Contact: Neil Calder, Phone Number: +44(0).131.563.9078</p> <div>    </div> |

## Contact us

 <http://newsemi.com>

 [contactus@newsemi.com](mailto:contactus@newsemi.com)

 +886 2 6637 2922

 +886 2 2998 9768

 7F, No. 69, Sec. 2, Guangfu Rd. Sanchong Dist.,  
New Taipei City, 241561, Taiwan