**Velodyne LiDAR PUCK™**

Velodyne’s new Puck, VLP-16 sensor is the smallest, and most advanced product in Velodyne’s 3D LiDAR product range. Vastly more cost-effective than similarly priced sensors, and developed with mass production in mind, it retains the key features of Velodyne’s breakthroughs in LiDAR: Real-time, 360°, 3D distance and calibrated reflectivity measurements.

**Real-Time 3D LiDAR**

The VLP-16 has a range of 100 m, and the sensor’s low power consumption (~8 W), light weight (830 g), compact footprint (~Ø103 mm x 72 mm), and dual return capability make it ideal not only for autonomous vehicles but also robotics and mobile terrestrial 3D mapping applications.

Velodyne’s LiDAR Puck supports 16 channels, ~300,000 points/second, 360° horizontal field of view and a 30° vertical field of view, with ±15° up and down. The Velodyne LiDAR Puck does not have visible rotating parts, making it highly resilient in challenging environments (Rated IP67) while operating over a wide temperature range (-10°C to +60°C).

**DIMENSIONS**

![Dimensions Diagram]

**M12 CONNECTOR ON SENSOR SIDE**

![Connector Diagram]

<table>
<thead>
<tr>
<th>Pin</th>
<th>Wire Color</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>Black</td>
<td>Ground</td>
</tr>
<tr>
<td>7</td>
<td>Red</td>
<td>+12 V</td>
</tr>
<tr>
<td>6</td>
<td>Yellow</td>
<td>GPS Pulse Per Second (PPS)</td>
</tr>
<tr>
<td>5</td>
<td>White</td>
<td>GPS Serial Data</td>
</tr>
<tr>
<td>4</td>
<td>Light Orange</td>
<td>Ethernet TX+</td>
</tr>
<tr>
<td>3</td>
<td>Orange</td>
<td>Ethernet TX-</td>
</tr>
<tr>
<td>2</td>
<td>Light Blue</td>
<td>Ethernet RX+</td>
</tr>
<tr>
<td>1</td>
<td>Blue</td>
<td>Ethernet RX-</td>
</tr>
</tbody>
</table>

[www.velodynelidar.com](http://www.velodynelidar.com)
Real-Time 3D LiDAR Sensor
The VLP-16 provides high definition 3-dimensional information about the surrounding environment.

 Specifications:

Sensor:
- Time of Flight Distance Measurement with Calibrated Reflectivities
- 16 Channels
- Measurement Range: Up to 100 m
- Accuracy: ±3 cm (Typical)
- Single and Dual Returns (Strongest, Last)
- Field of View (Vertical): +15.0° to -15.0° (30°)
- Angular Resolution (Vertical): 2.0°
- Field of View (Horizontal): 360°
- Angular Resolution (Horizontal/Azimuth): 0.1° – 0.4°
- Rotation Rate: 5 Hz – 20 Hz
- Integrated Web Server for Easy Monitoring and Configuration

Laser:
- Laser Product Classification: Class 1 Eye-safe per IEC 60825-1:2007 & 2014
- Wavelength: 903 nm
- Beam Size @ Screen: 12.7 mm (Horizontal) x 9.5 mm (Vertical)
- Beam Divergence Horizontal: 0.18° (3.0 mrad); Vertical: 0.07° (1.2 mrad)

Mechanical/Electrical/Operational:
- Power Consumption: 8 W (Typical)
- Operating Voltage: 9 V – 18 V (with Interface Box and Regulated Power Supply)
- Weight: 830 g (without Cabling and Interface Box)
- Dimensions: 103 mm Diameter x 72 mm Height
- Shock: 500 m/s² Amplitude, 11 ms Duration
- Vibration: 5 Hz to 2,000 Hz, 3 G<sub>rms</sub>
- Environmental Protection: IP67
- Operating Temperature: -10°C to +60°C
- Storage Temperature: -40°C to +105°C

Output:
- 3D LiDAR Data Points Generated:
  - Single Return Mode: ~300,000 points per second
  - Dual Return Mode: ~600,000 points per second
- 100 Mbps Ethernet Connection
- UDP Packets Contain:
  - Time of Flight Distance Measurement
  - Calibrated Reflectivity Measurement
  - Rotation Angles
  - Synchronized Time Stamps (μs resolution)
- GPS: $GPRMC NMEA Sentence from GPS Receiver (GPS not included)

Product Ordering Information:

<table>
<thead>
<tr>
<th>Product Name</th>
<th>SKU Ordering Number</th>
<th>Sensor Connector</th>
<th>Cable Length*</th>
<th>Included</th>
<th>Interface Box Connector to Sensor</th>
<th>Cable Length*</th>
<th>I/O Connectors</th>
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</thead>
<tbody>
<tr>
<td>Puck</td>
<td>80-VLP-16</td>
<td>None</td>
<td>3.0 m</td>
<td>Yes</td>
<td>None</td>
<td>-</td>
<td>RJ45, GPS and Power</td>
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<tr>
<td>Puck</td>
<td>80-VLP-16 M12-0.3M</td>
<td>M12 Female</td>
<td>0.3 m</td>
<td>Yes</td>
<td>M12 Male</td>
<td>1.6 m</td>
<td>RJ45, GPS and Power</td>
</tr>
</tbody>
</table>

* Cable Length includes the connector.