ULTRA Puck™

HIGH RESOLUTION REAL-TIME LIDAR FOR AUTONOMOUS SYSTEMS

Automotive	Robotics	Mapping	UAV	Security	Industrial

Ultra Puck

Velodyne Lidar's Ultra Puck is a best-in-class 360-degree horizontal field-of-view (FoV) sensor that combines long range performance with outstanding resolution and point density in a compact form factor. It is the first and most widely used, 200 m sensor in the autonomous systems market. It also has the highest vertical FoV, which supports a wide variety of road and traffic scenarios. It's denser channel distribution at the horizon enables higher resolution at longer ranges.

Developed with automotive applications in mind, the Ultra Puck is a sensor of choice for urban and suburban autonomous vehicle fleets, with substantial internal and fleet validation. With a combination of optimal power and high performance, this sensor provides distance and calibrated reflectivity measurements at all rotational angles. Advanced software features allow for power management, firing exclusion zones and laser interference mitigation.

The Ultra Puck is encapsulated in a well-designed package that allows for operation over a wide range of temperatures and environmental conditions, without the need for active cooling. The sensor uses proven, 905 nm, Class 1 eye-safe technology and is assembled in Velodyne's state-of-the-art manufacturing facility. The use of readily available, off-the-shelf components enables scalability and attractive pricing for automotive volumes. Like other Velodyne sensors, the Ultra Puck has world-class technical support available across North America, Europe & Asia from the world's leading lidar company.

Ultra Puck at a glance

- **200 m range with compact form factor**
- **Most field-tested AV sensor, with largest install base**
- **Best horizontal (360°) and vertical (40°) FoV**
- **Top vertical resolution in its class (0.33°)**
- **Best-in-class accuracy and calibrated intensity**
- **Best-in-class power-efficiency & temperature range**
- **Firing exclusion & interference mitigation features**
- **Advanced features for minimizing false positives**

DIMENSIONS *(Subject to change)*

OPTICAL CENTER

⌀3.95 in [100 mm]

ACTIVE AREA FULL 360°

1.75 in [44.5 mm]

3.42 in [86.9 mm]

1.47 in [37.3 mm]

⌀4.07 in [103 mm]

0.59 in [15 mm]

0.54 in MAX [13.7 mm MAX]

0.58 in MAX [14.7 mm MAX]

0.157 in ± 0.001 in [3.99 mm±0.03]

0.217 in [5.51 mm]

3.50 in [88.9 mm]

0°

⌀.157 ± 0.001 in [3.99 mm±0.03]

90°

1/4-20 MOUNT X 9/32 [7.1] DP

2X ⍌ 0.220 in [5.59 mm]

Real-Time Lidar Sensor

The Ultra Puck™ provides high definition 3-dimensional information about the surrounding environment.
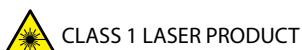
Ultra Puck™

Specifications [1]	*(Subject to change)*
Sensor	• Channels: 32 • Measurement Range: 200 m • Range Accuracy: Up to ±3 cm (Typical)[2] • Horizontal Field of View: 360° • Vertical Field of View: 40° (-25° to +15°) • Minimum Angular Resolution (Vertical): 0.33° (non-linear distribution) • Angular Resolution (Horizontal/Azimuth): 0.1° to 0.4° • Frame Rate: 5 Hz to 20 Hz • Integrated Web Server for Easy Monitoring and Configuration
Laser	• Laser Product Classification: Class 1 – Eye-safe per IEC60825-1:2014 • Wavelength: ~903 nm
Mechanical/ Electrical/ Operational	• Power Consumption: 10 W (Typical)[3] • Operating Voltage: 10.5 V – 18 V (with interface box and regulated power supply) • Weight: ~925 g (typical, without cabling and interface box) • Dimensions: See diagram on previous page • Environmental Protection: IP67 • Operating Temperature: -20°C to +60°C[4] • Storage Temperature: -40°C to +85°C

Output	• 3D Lidar Data Points Generated:
	   - Single Return Mode: ~600,000 points per second
	   - Dual Return Mode: ~1,200,000 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 and $GPGGA NMEA Sentences from GPS Receiver (GPS not included)

63-9378 Rev-F   VLP-32C

For more details and ordering information, contact Velodyne Sales (sales@velodyne.com)

1. These are projected specifications for final production parts. The specifications for any sample, prototype, or other non-final or pre-production parts may be different from the specifications in this document. For more information, please contact Velodyne Sales.
2. Typical accuracy refers to ambient wall test performance across most channels and may vary based on factors including but not limited to range, temperature and target reflectivity.
3. Operating power may be affected by factors including but not limited to range, reflectivity and environmental conditions.
4. Operating temperature may be affected by factors including but not limited to air flow and sun load.