

P-1775 IMU

Photonic Inertial Measurement Unit



Key Features

- All-new, exclusive KVH photonic integrated chip (PIC) technology
- Available with either 10g or 30g high-performance accelerometers
- Highest performing IMU from KVH
- Extremely high bandwidth (≥ 1000 Hz)
- User-programmable update rates from 1 to 5000 Hz
- User-configurable baud rate from 9.6 Kbps to 4.1 Mbps
- Asynchronous RS-422 protocol
- Three-axis magnetometer for magnetic field compensation of gyro bias

Applications

- The most demanding autonomous platforms
- Pipeline inspection and maintenance
- Drilling and mining
- High-speed gimbal stabilization
- Stabilization systems for LIDAR, EO/FLIR
- GNSS-aiding inertial navigation
- Manned and unmanned platform stabilization and navigation
- Augmented reality and mobile mapping
- Guidance and control
- Precision pointing and positioning

Superior, Precise, FOG-based IMU with Photonic Integrated Chip (PIC) Technology Provides Proven Performance for the Most Demanding Environments and Applications

With improved reliability and environmental survivability over competing technologies, the P-1775 IMU is the premier commercial-off-the-shelf (COTS) inertial measurement unit offered by KVH. Designed to deliver the highest level of performance in KVH's IMU product family, the P-1775 IMU includes KVH's groundbreaking PIC technology and is available with upgraded 10g or 30g ultra-high-performance accelerometers. These accelerometers reduce lateral drift in dead reckoning applications, and improve the stability of orientation and attitude measurements in applications requiring stabilization or precision pointing. The P-1775 IMU with 30g accelerometers is ideal for highly dynamic applications and/or in applications with high levels of acceleration, vibration or shock.

The P-1775 IMU leverages the proven technology of KVH's DSP-1760 fiber optic gyro (FOG), the world's smallest high-performance FOG. These FOGs are then integrated with three very low noise 10g or 30g accelerometers, as well as a 3-axis magnetometer for automatic gyro bias compensation even in environments with strong local magnetic fields. Both variants of the high-performance P-1775 IMU are designed for systems and applications where very high bandwidth, as well as low latency, low noise, and low drift are critical parameters for success.

PIC Technology for Superior Performance



KVH's new PIC technology reimagines FOG technology by replacing individual fiber components with an innovative integrated planar optic chip. This results in a FOG that's even more reliable and delivers superior repeatability unit-to-unit. With three of these integrated photonic gyros at its core, the P-1775 IMU provides the safe, accurate performance autonomous platforms demand.

Compact Design for Ease of Integration

All KVH high-performance IMUs offer the same robust, compact package designed for drop-in replacement for many available IMUs. The flexible interface and programmable message outputs simplify the integration of the P-1775 IMU. The P-1775 IMU offers ease of integration for designers of higher-level inertial navigation, guidance, or stabilization systems by offering user-programmable features, including an adjustable baud rate so that communication latency can be adjusted to receive accurate, timely data.

Ideal applications for the P-1775 include those with challenging environments such as autonomous ground vehicles, unmanned aircraft, autonomous material movers, autonomous robots, pipeline inspection/maintenance, mobile mapping systems, and stabilization systems for LIDAR, radar, and high-speed gimbals.

KVH P-1775 IMU

Performance Specifications – Gyros

Input Rate	±490°/sec (max)
Bias Instability (25°C)	≤0.05°/hr, 1σ (typical) ≤0.1°/hr, 1σ (max)
Bias Temperature Sensitivity*	≤0.7°/hr, 1σ (typical)
Bias Offset (25°C)	±0.5°/hr (max)
Scale Factor Non-linearity (full rate, 25°C)	≤50 ppm, 1σ (typical)
Scale Factor Temperature Sensitivity*	≤100 ppm, 1σ (typical)
Angle Random Walk (ARW) (25°C)	≤0.012°/√hr (≤0.7°/hr/√Hz)
Bandwidth (-3 dB)	≥1000 Hz

Performance Specifications – Accelerometers

	10g	30g
Input Range	±10g (max)	±30g (max)
Bias Instability (25°C)	15 μg, 1σ	45 μg, 1σ
Bias Offset (25°C)	±110 μg, 1σ	±325 μg, 1σ
Bias Temperature Sensitivity*	≤375 μg, 1σ	≤1125 μg, 1σ
Scale Factor Temperature Sensitivity*	≤4.3 ppm/°C or ≤300 ppm (typical)	≤4.3 ppm/°C or ≤300 ppm (typical)
Velocity Random Walk (25°C)	34 μg/√Hz	102 μg/√Hz
Bandwidth (-3 dB)	≥200 Hz	≥200 Hz

Performance Specifications – Magnetometers

	10g	30g
Input Range	±10 Gauss (max)	±10 Gauss (max)
Bias	<0.2 Gauss	<0.2 Gauss
Bias Noise (rms)	<2 mGauss	<2 mGauss

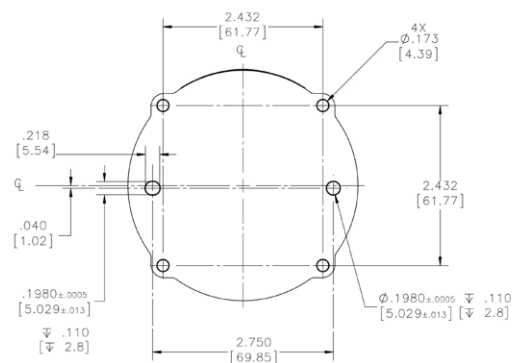
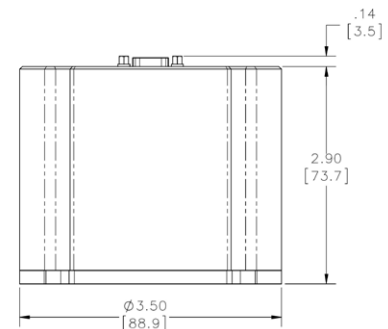
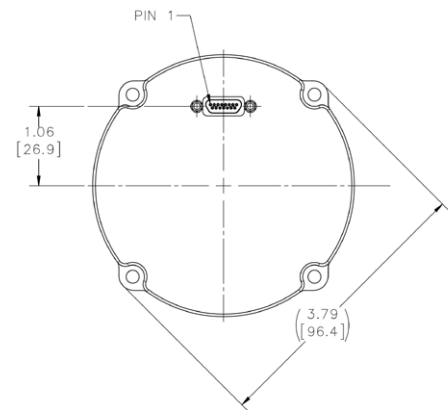
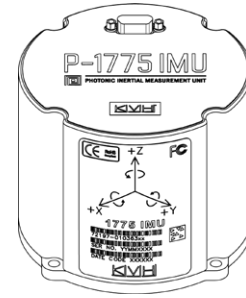
Environment

	10g	30g
Temperature (operating)	-40°C to +75°C (-40°F to +167°F)	-40°C to +75°C (-40°F to +167°F)
Shock (operating)	9g (11 ms, sawtooth)	28g (11 ms, sawtooth)
Vibration (operating)	8g rms (20-2000 Hz, random)	12g rms (20-2000 Hz, random)

Electrical/Mechanical

Initialization Time (25°C)	≤3 sec
Data Interface	RS-422 Full Differential, Asynchronous or Synchronous
Baud Rate	9.6 Kbps to 4147 Kbps; User-selectable
Data Rate	1 to 5000 Hz; User-selectable
Dimensions	88.9 mm Dia x 73.7 mm H (3.5" x 2.9")
Weight	0.7 kg (1.54 lbs)
Power Consumption	5 W (typical), 8 W (max)
Input Voltage	+9 to +36 VDC

* ≤1°C/min ramp rate



For technical manuals on this product,
please visit kvh.com/P1775docs

kvh.com/P1775



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