

P-1775 IMU

Photonic Inertial Measurement Unit



Key Features

- All-new, exclusive photonic integrated chip (PIC) technology*
- Available with either 10g or 25g accelerometers
- Highest performing IMU from KVH
- Extremely high bandwidth (≥ 1000 Hz)
- User-programmable update rates from 1 to 5000 Hz
- ≤ 500 μ s Total Motion-to-Output Latency
- User-configurable baud rate from 9.6 Kbps to 4.1 Mbps
- Asynchronous RS-422 protocol
- Three magnetometers 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 is available with either ± 10 g or ± 25 g accelerometers. The P-1775 IMU with 25g accelerometers is ideal for highly dynamic applications and/or in applications with high levels of acceleration, vibration or shock.

The P-1775 IMU is an advanced inertial sensor system that meets the demands of systems requiring very high performance in the most challenging environments. The P-1775 IMU leverages the proven technology of the DSP-1760 fiber optic gyro (FOG), the world's smallest high-performance FOG. These FOGs are then integrated with either three very low noise 10g or 25g 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.

Now with All-new, Exclusive PIC Technology



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 IMU include those with challenging environments such as drilling, mining, pipeline inspection and maintenance, mobile mapping systems, and stabilization systems for radar, LIDAR, and high-speed gimbals.

KVH P-1775 IMU

Performance Specifications

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

Performance Specifications – Accelerometers

	10g	25g
Input Limit (max)	±10g	±25g
Bias Instability (constant temp)	≤0.05 mg, 1σ	≤0.05 mg, 1σ
Bias Offset	±0.5 mg	±0.25 mg
Bias Temp Sensitivity	0.5 mg, 1σ (typical) 1.0 mg, 1σ (max)	0.42 mg, 1σ (typical) 1.25 mg, 1σ (max)
Scale Factor vs. Temperature Sensitivity (full scale, full temp)	≤500 ppm/°C, 1σ max	≤500 ppm/°C, 1σ max
Velocity Random Walk (25°C)	≤0.12mg/√Hz, (0.23ft/sec/√hr)	≤0.12mg/√Hz, (0.23ft/sec/√hr)
Bandwidth (-3 dB)	200 Hz	450 Hz

Magnetometers

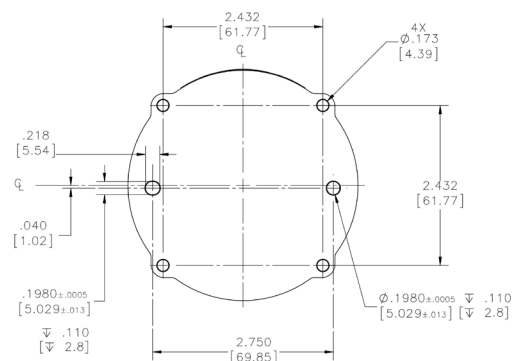
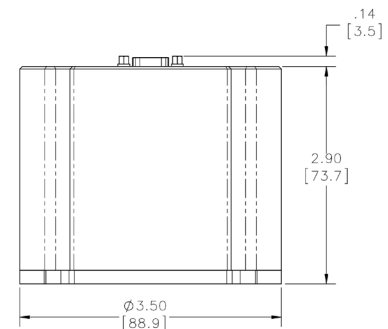
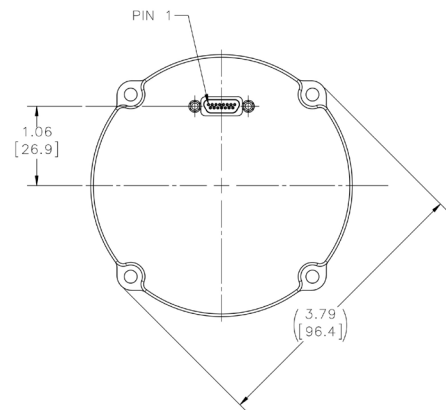
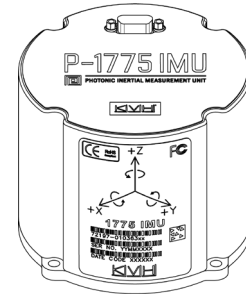
	10g	25g
Input Range	±10 Gauss	±10 Gauss
Bias	<0.2 Gauss	<0.2 Gauss
Bias Noise (rms)	<2 mGauss	<2 mGauss

Environment

	10g	25g
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	25g 11 ms, sawtooth
Vibration (operating)	8g rms 20-2000 Hz random	15g rms 20-2000 Hz random

Electrical/Mechanical

Initialization Time (valid data)	≤1.5 sec
Data Interface	RS-422, Full Differential Asynchronous or Synchronous
Baud Rate	Selectable 9.6 Kbps to 4147 Kbps
Data Rate	User-selectable 1 to 5000 Hz
Dimensions (max)	88.9 mm Dia x 73.7 mm H (3.5" x 2.9")
Weight (max)	0.7 kg (1.5 lbs)
Power Consumption	5 W (typical), 8 W (max)
Input Voltage	+9 to +36 VDC



For detailed interface control drawings (ICD) and technical manuals on this product, please visit www.kvh.com/P1775

kvh.com/P1775



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