# 1750 IMU



# **Fiber Optic Gyro Inertial Measurement Unit**



#### **Key Features**

- 3 high-precision KVH FOGs provide excellent reliability and stable performance
- · 3 MEMS accelerometers
- Highly accurate 6-degrees-of-freedom angular rate and acceleration data
- Affordable commercial off-the-shelf (COTS) system
- Flexible interfaces and compact design
- Excellent shock, vibration, and thermal performance

#### **Applications**

- Antenna, camera, laser pointing, and stabilization
- · GNSS-aiding
- · Autonomous vehicles
- AHRS
- EO/FLIR stabilization
- · Flight controls
- · Mapping/surveying
- · Oil and gas exploration
- · Navigation, guidance, and positioning
- Motion-sensing

## The Next Generation Navigation and Stabilization System

The KVH 1750 IMU is the flagship of KVH's miniaturized advanced navigation and stabilization system sensor products. The KVH 1750 IMU leverages the technology of the highly successful KVH DSP-1750 fiber optic gyro (FOG), the world's smallest high performance FOG integrated with very low noise MEMS accelerometers. The resulting small size and high performance of the 1750 IMU make it perfect for unmanned and autonomous systems or any application where size, weight, and power dissipation must be minimized; it offers the ideal combination of price and performance.

# **Top Performance in Challenging Conditions**

Utilizing breakthrough proprietary algorithms, KVH designed the 1750 IMU to perform with extreme stability in the most demanding environments, including thermal ambient conditions, with outstanding shock and vibration performance. The high reliability of KVH FOG technology is a core feature that assures sustained IMU operation and mission success.

#### **Compact and Innovative Package**

The KVH 1750 IMU offers ease of use and high adaptability, featuring flexible RS-422 asynchronous communication with user programmable data output rates from 1 to 1000 Hz. The package dimensions and mounting features enable easy drop-in replacement.

## **Maximum Flexibility for End User**

As the ability to tailor the output to exactly what the end user requires is key, KVH provides the user the opportunity to create the desired message output from both the 1750 IMU's fiber optic gyros and integrated accelerometers. In addition, the 1750 IMU offers users a high degree of flexibility, as the baud and data rates can be adjusted. This enables the user to minimize the communication latency, delivering accurate information even faster.

## **Highly Compatible for Retrofits or New Designs**

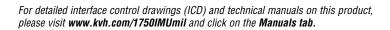
With breakthrough performance, size, and flexibility in one package, the KVH 1750 IMU is easily integrated into retrofits or new designs. Most importantly, the KVH technology behind the 1750 IMU is proven and reliable, resulting in an IMU that is ideal for providing accurate data in challenging environments.



KVH inertial sensors and gyros are key to stabilization and positioning systems for such platforms as high-speed gimbals, antennas, laser pointing, high-definition cameras, and other optical and sensor systems requiring high-performance motion-sensing and control.

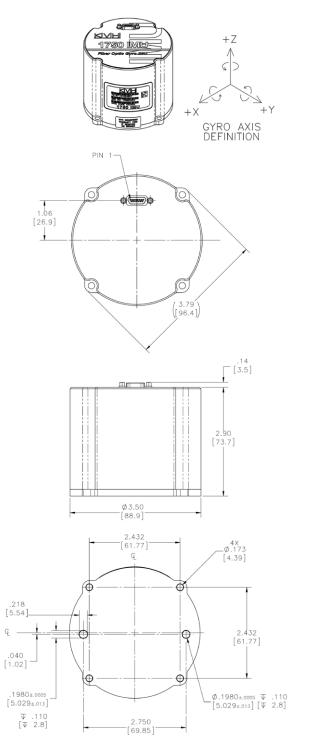
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KVH 1750 IMU		
Performance Specifications		
Input Rate (max)	±490°/sec	
Bias Instability (25°C)	≤0.1°/hr, 1σ (max), ≤0.05°/hr, 1σ (typical)	
Bias vs. Temp. (≤°C/min)	≤1°/hr, 1σ (max), ≤0.7°/hr, 1σ (typical)	
Bias Offset (25°C)	±2°/hr	
Scale Factor Non-linearity (max rate, 25°C)	≤50 ppm, 1σ	
Scale Factor vs. Temperature (≤1°C/min)	≤200 ppm, 1σ	
Angle Random Walk (25°C)	$\leq$ 0.012°/ $\sqrt{\text{hr}}$ ( $\leq$ 0.7°/ $\text{hr}/\sqrt{\text{Hz}}$ )	
Bandwidth (-3 dB)	≥440 Hz	
Electrical/Mechanical		
Initialization Time (valid data)	≤1.5 sec	
Data Interface	Asynchronous or Synchronous RS-422	
Baud Rate	Selectable 9.6 Kbps to 921.6 Kbps	
Data Rate	User Selectable 1 to 1000 Hz	
Dimensions (max)	88.9 mm Dia x 73.7 mm H (3.5" x 2.9")	
Weight (max)	0.7 kg (1.45 lbs)	
Power Consumption	8 W (max), 5 W (typical)	
Input Voltage	+9 to +36 VDC	
Environment		
Temperature (operating)	-40°C to +75°C (-40°F to +167°F)	
Shock (operating)	9 g, 11 msec, sawtooth	
Vibration (operating)	8 g rms, 20-2000 Hz random	
Accelerometers		
Input Limit (max)	±10 g	
Bias Instability (constant temp)	<0.05 mg, 1σ	
Scale Factor Temperature Sensitivity	250 ppm/°C, 1σ (max), ≤100 ppm/°C, 1σ (typical)	



≥200 Hz

 $\leq$ 0.12 mg/ $\sqrt{\text{Hz}}$  (0.23 ft/sec/ $\sqrt{\text{hr}}$ )





Designers of navigation systems for unmanned vehicles of all types rely on high-performance KVH IMUs and gyros to help provide navigation data, stabilization, and relative positioning.



Velocity Random Walk (25°C)

Bandwidth (-3 dB)



