

# IMU-KVH1750

IMU-KVH1750 with SPAN GNSS+INS technology from Hexagon | NovAtel provides continuous 3D position, velocity and attitude solution



## World-leading GNSS+INS technology

SPAN GNSS+INS technology brings together two different but complementary technologies: Global Navigation Satellite System (GNSS) positioning and inertial navigation. The absolute accuracy of GNSS positioning and the stability of Inertial Measurement Unit (IMU) gyro and accelerometer measurements are deeply coupled to provide an exceptional 3D navigation solution that is stable and continuously available, even through periods when satellite signals are blocked.

## IMU-KVH1750 overview

The IMU-KVH1750 is designed to be paired with receivers from NovAtel. Commercially exportable, it is comprised of Fiber Optic Gyros (FOG) and Micro Electromechanical Systems (MEMS) accelerometers. FOGs offer exceptionally long life and stable performance compared to similar gyro technologies.

## Advantages of IMU-KVH1750

The IMU-KVH1750 offers tactical grade performance in a compact and rugged package with minimal power consumption. Paired with a receiver from NovAtel, the IMU-KVH1750 offers a fully integrated, deeply coupled GNSS and IMU system that delivers a continuous position, velocity and attitude solution.

## Improve IMU-KVH1750 accuracy

Receivers from NovAtel provide your choice of accuracy and performance, from decimetre to RTK-level positioning. For more demanding applications, Waypoint Inertial Explorer post-processing software can be used to post-process IMU-KVH1750 data to provide the system's highest level of accuracy.

## Benefits

- High performance IMU
- Optimal for aerial, hydrographic survey and industrial applications
- Easy integration with NovAtel's SPAN capable GNSS+INS receivers
- Commercially exportable
- Ideal for a control reference system

## Features

- Fiber optic gyros and MEMS accelerometers
- Stationary INS alignment capable
- IMU data rate: 200 Hz
- Direct SPI interface to OEM7 receivers
- SPAN GNSS+INS capability with configurable application profiles

**SPAN System Performance<sup>1</sup>**

**Horizontal Position Accuracy (RMS)**

Single point L1/L2	1.2 m
SBAS <sup>2</sup>	60 cm
DGPS	40 cm
TerraStar-L <sup>3,4</sup>	40 cm
TerraStar-C PRO <sup>3,4</sup>	2.5 cm
TerraStar-X <sup>3,4</sup>	2 cm
RTK	1 cm +1 ppm

**Data Rate**

IMU Raw Data Rate	200 Hz
INS Solution	Up to 200 Hz

**Time Accuracy<sup>5</sup>** 20 ns RMS

**Max Velocity<sup>6</sup>** 515 m/s

**IMU Performance<sup>7</sup>**

**Gyroscope Performance**

Technology	FOG
Input rate (max)	±490°/s
Bias stability	0.05°/hr
Bias temperature stability	0.7°/hr
Bias offset	±2°/hr
Scale factor	≤50 ppm
Scale factor non-linearity	≤50 ppm
Scale factor temperature sensitivity	≤200 ppm

Angular random walk	0.012°/√hr
Input axis misalignment	±0.4 mrad

**Accelerometer Performance**

Range	±10 g
Bias stability	7.5 mg
Bias temperature stability	≤1 mg
Bias offset	±2 mg
Scale factor non-linearity	<0.9% of full scale
Scale factor temperature sensitivity	≤100 ppm/°C
Velocity random walk	0.23 ft/sec/√hr
Input axis misalignment	±1.0 mrad

**Physical and Electrical**

**Dimensions** 88.9 x 73.7 mm

**Weight** <0.7 kg

**Power**

Power consumption	8 W max
Input voltage	+9 to +36 VDC

**Input/Output Connectors**

Power and I/O	15-pin Micro-D
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**Environmental**

**Temperature**

Operating	-40°C to +75°C
Storage	-50°C to +85°C

**Humidity** 95% non-condensing

**Vibration**

Operational	8 g RMS
Non-operational 1	2 g RMS

**Shock**

Operational	9 g
Non-operational	40 g

**Included Accessories**

- Combined I/O and power cable

**Optional Accessories**

- Inertial Explorer post-processing software

**Performance During GNSS Outages<sup>1,8</sup>**

Outage Duration	Positioning Mode	Position Accuracy (M) RMS		Velocity Accuracy (M/S) RMS		Attitude Accuracy (Degrees) RMS		
		Horizontal	Vertical	Horizontal	Vertical	Roll	Pitch	Heading
0 s	RTK <sup>9</sup>	0.02	0.03	0.010	0.010	0.015	0.015	0.040
	PPP	0.06	0.15					
	SP	1.00	0.60					
	Post-Processed <sup>10</sup>	0.01	0.02					
10 s	RTK <sup>9</sup>	0.17	0.13	0.030	0.025	0.020	0.020	0.050
	PPP	0.21	0.25					
	SP	1.15	0.70					
	Post-Processed <sup>10</sup>	0.02	0.02					
60 s	RTK <sup>9</sup>	3.32	1.73	0.160	0.070	0.030	0.030	0.060
	PPP	3.36	1.85					
	SP	4.30	2.30					
	Post-Processed <sup>10</sup>	0.16	0.09					

1 Typical values. Performance specifications subject to GNSS system characteristics, Signal-in-Space (SIS) operational degradation, ionospheric and tropospheric conditions, satellite geometry, baseline length, multipath effects and the presence of intentional or unintentional interference. 2. GPS-only. 3.Requires subscription to TerraStar data service. Subscriptions available from NovAtel. 4.TerraStar service available depends on the SPAN enabled receiver used. See the receiver product sheet for details. 5. Time accuracy does not include biases due to RF or antenna delay. 6. Export licensing restricts operation to a maximum of 515 metres/second. 7. Supplied by IMU manufacturer. 8. RMS, incremental error growth from steady-state accuracy. Computed with respect to full GPS, RTK trajectory. 9. 1 ppm should be added to all values to account for additional error due to baseline length. 10. Post-processing accuracy using Inertial Explorer processing software.

**Contact Hexagon | NovAtel**

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