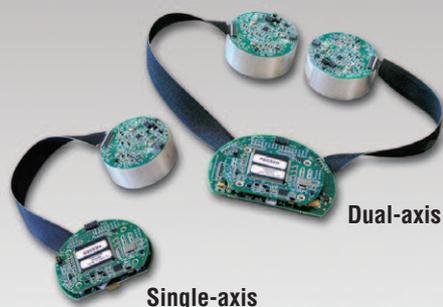


# DSP-1750/Digital Output



## World's Smallest High-performance Fiber Optic Gyro



### Key Features

- KVH E•Core® ThinFiber technology
- Extremely low noise, high bandwidth
- Angle random walk  $\leq 0.013^\circ/\text{hr}$
- Option of standard input rate of  $\pm 490^\circ/\text{sec}$  or high input rate of  $\pm 1000^\circ/\text{sec}^*$
- Superior bias stability of  $\leq 0.05^\circ/\text{hr}$
- Digital output; single- and dual-axis
- Magnetically shielded option
- Commercial Off-the-Shelf (COTS) product
- Proven reliability – MTBF >36,000 hrs (Ground Mobile)

### Applications

- Gimbals
- Optical/antenna stabilisation
- Long-range optical and sensor systems
- Equipment platform stabilisation
- Payloads for UAVs
- Weapons platform stabilisation
- GPS/INS, IMU integration

Learn more at  
[www.fiberopticgyro.com](http://www.fiberopticgyro.com)

### Super-compact Single- or Dual-axis Package

KVH takes fiber optic gyro (FOG) technology to a new level of performance with the DSP-1750, the world's smallest high-accuracy FOG. Available in both single- and dual-axis configurations, the DSP-1750 is designed for a wide range of precision navigation, stabilisation, and pointing applications where low noise and high performance across the entire range of operating temperatures are critical. Ideal applications include long-range optical and sensor systems, gimbals, tactical missiles, autonomous vehicle navigation, and the stabilisation of virtually all types of commercial equipment platforms.

### Delivering Groundbreaking Performance

The DSP-1750 delivers performance never before achieved in FOGs of similar size. Utilising KVH's new 170-micron E•Core ThinFiber, the world's smallest D-shaped optical fiber, it delivers extremely low noise coupled with high bandwidth. This super-compact FOG offers input rates five times faster (choice of  $\pm 490^\circ/\text{sec}$  or  $\pm 1000^\circ/\text{sec}^*$ ) than KVH's original DSP-1500, angle random walk an order of magnitude better than the DSP-1500, and bias stability previously only available in closed-loop fiber optic gyros and ring laser gyros.

### Innovative, Versatile Design

Featuring a flexible design in which the optical sensor is separate from the control electronics, the DSP-1750 has a 43.2 mm diameter optical sensor housing connected to its power and processing electronics via a robust interlocking tether. This two-piece design allows the sensor to be installed directly on the sensitive axis, while the control circuit cards can be integrated elsewhere, such as in an existing board stack assembly. This innovative design makes the DSP-1750 easy to integrate into customer platforms where space and payload weight are at a premium.

### Unmatched Quality and Reliability

KVH is the only U.S. FOG manufacturer that draws its own optical fiber, ensuring consistent quality, performance, and instant turn-on to turn-on repeatability in every FOG. And like all of KVH's precision FOGs, the solid state DSP-1750 is built using KVH's patented Digital Signal Processing (DSP) electronics design which offers significant improvements in such critical areas as scale factor and bias stability, scale factor non-linearity, and maximum input rate.



NASA's Global Hawk carrying a synthetic aperture radar payload (inset) on a fully unmanned aerial recon mission uses internal DSP-1750 gyros from KVH to maintain focused and stable imagery.



\* The DSP-1750 High is controlled by the Export Administration Act of 1979, as amended (Title 50, USC App 2401 et seq.) and its implementing regulations, the Export Administration Regulations, 15 CFR 730 et seq.

Specifications	KVH DSP-1750 Fiber Optic Gyro			
Number of Axes	SINGLE-AXIS		DUAL-AXIS	
Variant	Standard Rate	High Rate	Standard Rate	High Rate
Maximum Input Rate	±490°/s	±1000°/s	±490°/s	±1000°/s
Bias Stability (Constant Temperature)	≤0.05°/hr, 1σ	≤0.05°/hr, 1σ	≤0.05°/hr, 1σ	≤0.05°/hr, 1σ
Bias vs. Temperature (1°C/minute ramp rate)	≤3°/hr, 1σ (-40°C to +75°C)	≤3°/hr, 1σ (-40°C to +75°C)	≤3°/hr, 1σ (-40°C - +75°C)	≤3°/hr, 1σ (-40°C - +75°C)
Angle Random Walk (at 25°C)	≤0.013°/√hr ≤0.8°/hr/√Hz	≤0.013°/√hr ≤0.8°/hr/√Hz	≤0.013°/√hr ≤0.8°/hr/√Hz	≤0.013°/√hr ≤0.8°/hr/√Hz
Scale Factor Non-linearity (at 25°C)	≤200 ppm, 1σ (0 to ±150°/s) ≤500 ppm, 1σ (full rate)		≤200 ppm, 1σ (0 to ±150°/s) ≤500 ppm, 1σ (full rate)	
Scale Factor vs. Temp	≤300 ppm, 1σ		≤300 ppm, 1σ	
Bias Offset (at 25°C)	Unshielded: ±10°/hr max Magnetically shielded: ±2°/hr max		Unshielded: ±10°/hr max Magnetically shielded: ±2°/hr max	
Bias Magnetic Sensitivity	Unshielded: ≤15°/hr/Gauss Magnetically shielded: ≤2°/hr/Gauss		Unshielded: ≤15°/hr/Gauss Magnetically shielded: ≤2°/hr/Gauss	
Input Power	+5 VDC (±5%) 400 mA max +8 to +15 VDC (±5%) 50 mA max -8 to -15 VDC (±5%) 50 mA max		+5 VDC (±5%) 500 mA max +8 to +15 VDC (±5%) 100 mA max -8 to -15 VDC (±5%) 100 mA max	
Bandwidth (-3 dB)	440 Hz (±4%)		440 Hz (±4%)	
Update Rate/Output	1000 Hz (1800 Hz optional)/RS-422		1000 Hz (1800 Hz optional)/RS-422	
Motion to Output Latency	≤1.3 msec		≤1.3 msec	
Digital Output Interface Message Structure	See Technical Manual		See Technical Manual	
Diameter x Height – Optical Sensor(s) (each sensor)	Unshielded: 43.2 mm x 20.8 mm (1.7" x 0.82") Magnetically shielded: 46.0 mm x 22.9 mm (1.81" x 0.90")		Unshielded: 43.2 mm x 20.8 mm (1.7" x 0.82") Magnetically shielded: 46.0 mm x 22.9 mm (1.81" x 0.90")	
Weight – Optical Sensor(s)	Unshielded: 45g (0.10 lbs) max Magnetically shielded: 65g (0.14 lbs) max		Unshielded: 90g (0.20 lbs) max Magnetically shielded: 130g (0.28 lbs) max	
Diameter x Height – PCB Stack	57.8 mm x 14.0 mm (2.28" x 0.55")		72.0 mm x 14.0 mm (2.85" x 0.55")	
Weight – PCB Stack	45g (0.10 lbs) max		45g (0.10 lbs) max	
Operating Temp. Range	-40°C to +75°C		-40°C to +75°C	
Vibration, Random (Operating)	8g rms, 20 to 2000 Hz, 30 min/axis		8g rms, 20 to 2000 Hz, 30 min/axis	
Shock, Functional	25g, 11ms (sawtooth)		25g, 11ms (sawtooth)	
MTBF (Ground Mobile)	>36,000 hrs		>22,000 hrs	
Unshielded Part Number	01-0344-02	01-0337-02	01-0345-02	01-0338-02
Magnetically Shielded Part Number	01-0344-04	01-0337-04	01-0345-04	01-0338-04

For detailed interface control drawings (ICD) and technical information on this product, please visit [www.kvh.com/DSP1750](http://www.kvh.com/DSP1750)



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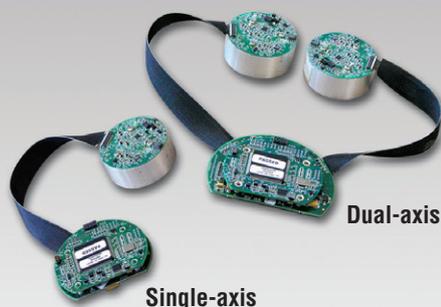
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# DSP-1750/Analog Output



## World's Smallest High-performance Fiber Optic Gyro



### Key Features

- KVH E•Core® ThinFiber technology
- Extremely low noise, high bandwidth
- Angle random walk  $\leq 0.05^\circ/\sqrt{\text{hr}}$
- Superior bias stability of  $\leq 2^\circ/\text{hr}$
- Input rate of  $\pm 200^\circ/\text{sec}$
- Analog output; single- and dual-axis
- Magnetically shielded option
- Commercial Off-the-Shelf (COTS) product
- Proven reliability – MTBF >36,000 hrs (Ground Mobile)

### Applications

- Gimbals
- Optical/antenna stabilisation
- Long-range optical and sensor systems
- Equipment platform stabilisation
- Payloads for UAVs
- Weapons platform stabilisation
- GPS/INS, IMU integration

Learn more at  
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### Super-compact Single- or Dual-axis Package

KVH takes fiber optic gyro (FOG) technology to a new level of performance with the DSP-1750, the world's smallest high-accuracy FOG. Available in both single- and dual-axis configurations, the DSP-1750 is designed for a wide range of precision navigation, stabilisation, and pointing applications where low noise and high performance across the entire range of operating temperatures are critical. Ideal applications include long-range optical and sensor systems, gimbals, tactical missiles, autonomous vehicle navigation, and the stabilisation of virtually all types of commercial equipment platforms.

### Delivering Groundbreaking Performance

The DSP-1750 delivers performance never before achieved in FOGs of similar size. Utilising KVH's new 170-micron E•Core ThinFiber, the world's smallest D-shaped optical fiber, it delivers extremely low noise coupled with high bandwidth. This super-compact FOG offers improvements of a factor of four in angle random walk and bias stability as compared to KVH's original DSP-1500 analog version, as well as better performance over shock and vibration.

### Innovative, Versatile Design

Featuring a flexible design in which the optical sensor is separate from the control electronics, the DSP-1750 has a 43.2 mm diameter optical sensor housing connected to its power and processing electronics via a robust interlocking tether. This two-piece design allows the sensor to be installed directly on the sensitive axis, while the control circuit cards can be integrated elsewhere, such as in an existing board stack assembly. This innovative design makes the DSP-1750 easy to integrate into customer platforms where space and payload weight are at a premium.

### Unmatched Quality and Reliability

KVH is the only U.S. FOG manufacturer that draws its own optical fiber, ensuring consistent quality, performance, and instant turn-on to turn-on repeatability in every FOG. And like all of KVH's precision FOGs, the solid state DSP-1750 is built using KVH's patented Digital Signal Processing (DSP) electronics design which offers significant improvements in such critical areas as scale factor and bias stability, scale factor non-linearity, and maximum input rate.



Gimbals such as SpaceCam's gyro-stabilized camera system use internal DSP-1750 gyros from KVH to maintain highly stable and focused imagery.

Specifications	KVH DSP-1750 Fiber Optic Gyro	
Number of Axes	SINGLE-AXIS	DUAL-AXIS
Maximum Input Rate	±200°/s	±200°/s
Bias Stability (Constant Temperature)	≤2°/hr, 1σ	≤2°/hr, 1σ
Bias vs. Temperature (1°C/minute ramp rate)	≤15°/hr, 1σ (-40°C to +75°C)	≤15°/hr, 1σ (-40°C to +75°C)
Angle Random Walk (at 25°C)	≤0.05°/√hr ≤3°/hr/√Hz	≤0.05°/√hr ≤3°/hr/√Hz
Scale Factor Nominal	60 mV/°/s (±0.2%)	60 mV/°/s (±0.2%)
Scale Factor Non-linearity (at 25°C)	≤500 ppm, 1σ (full rate)	≤500 ppm, 1σ (full rate)
Scale Factor vs. Temp	≤500 ppm, 1σ	≤500 ppm, 1σ
Bias Offset (at 25°C)	Unshielded: ±30°/hr Magnetically shielded: ±22°/hr	Unshielded: ±30°/hr Magnetically shielded: ±22°/hr
Bias Magnetic Sensitivity	Unshielded: ≤15°/hr/Gauss Magnetically shielded: ≤2°/hr/Gauss	Unshielded: ≤15°/hr/Gauss Magnetically shielded: ≤2°/hr/Gauss
Input Power	+5 VDC (±5%) 400 mA (max) +15 VDC (±5%) 50 mA (max) -15 VDC (±5%) 50 mA (max)	+5 VDC (±5%) 500 mA (max) +15 VDC (±5%) 100 mA (max) -15 VDC (±5%) 100 mA (max)
Bandwidth (-3 dB)	≥1,000 Hz (±10%)	≥1,000 Hz (±10%)
Motion to Output Latency	≤0.3 msec	≤0.3 msec
Diameter x Height – Optical Sensor(s) (each sensor)	Unshielded: 1.715" x 0.830" (43.2 mm x 21.1 mm) (max) Magnetically shielded: 1.810" x 0.925" (46.0 mm x 23.5 mm) (max)	Unshielded: 1.715" x 0.830" (43.2 mm x 21.1 mm) (max) Magnetically shielded: 1.810" x 0.925" (46.0 mm x 23.5 mm) (max)
Weight – Optical Sensor(s)	Unshielded: 0.10 lbs (45g) (max) Magnetically shielded: 0.14 lbs (65g) (max)	Unshielded: 0.20 lbs (90g) (max) Magnetically shielded: 0.28 lbs (130g) (max)
Diameter x Height – PCB Stack	2.295" x 0.565" (58.3 mm x 14.4 mm) (max)	2.870" x 0.565" (72.9 mm x 14.4 mm) (max)
Weight – PCB Stack	0.10 lbs (45g) (max)	0.10 lbs (45g) (max)
Operating Temp. Range	-40°C to +75°C	-40°C to +75°C
Vibration, Random (Operating)	8g rms, 20 to 2000 Hz, 30 min/axis	8g rms, 20 to 2000 Hz, 30 min/axis
Shock, Functional	25g, 11ms (sawtooth)	25g, 11ms (sawtooth)
MTBF (Ground Mobile)	>36,000 hours	>22,000 hours
Unshielded Part Number	01-0344-01	01-0345-01
Magnetically Shielded Part Number	01-0344-03	01-0345-03

For detailed interface control drawings (ICD) and technical information on this product, please visit [www.kvh.com/DSP1750](http://www.kvh.com/DSP1750)



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