

KVH 光纤陀螺

DSP-5000

Description:

The new DSP-5000 represents a breakthrough in low-cost fiber optic gyro (FOG) design—an open-loop gyro with outstanding bias stability, low noise, high bandwidth, and scale factor stability of 0.05 percent. The DSP-5000 accepts rate inputs up to 500 ° per second, offers consistent accuracy over time and temperature, and is available for a fraction of the cost of competing precision gyros. The DSP-5000 combines KVH's proprietary polarization-maintaining optical fiber and fiber components with advanced digital signal processing. Ideal for use in drone and unmanned vehicle navigation, land vehicle navigation, and a variety of commercial applications, the DSP-5000 is an extremely attractive, affordable, and reliable solution for the most demanding applications.



DSP-5000 (FOG)

Feature:

- Input data rates up to ± 500 ° per second
- Provides closed-loop performance with more affordable open-loop design
- Full digital signal processing yields superior bias and scale factor performance
- High bandwidth for the most demanding environments
- Unparalleled dependability (100,000 hours MTBF Typical)

Technical Specifications

Physical

Input Voltage:	+5 VDC
Power Consumption:	3 watts
Weight:	0.55 lbs.(0.25 kg)
Size:	4.4 × 3.9 × 1.7 (112mm × 99mm × 43mm)
Connector Type:	High density D-sub 26 pin (male)

Output

Digital:	Selectable:rate,incremental angle, angle & bit, serial RS-232,3840 baud or 3-wire high speed
Output Format:	ASCII
Update rate:	100/sec,1000/sec1

Environmental

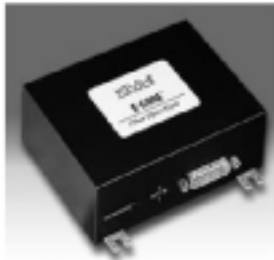
Operating Temperature:	-40 to +75
Storage Temperature:	-50 to +80
Shock:	90G, 11 ms half-sine
MTBF:	100,000 hours

Performance

Bias Stability vs. Time:	1 ° /h,1
Bias Stability vs. Temp:	10 ° /h,1
Angle Random walk (noise):	$5 \text{ ° /h} / \sqrt{Hz}$ $0.083 \text{ °} / \sqrt{h}$
Rotation Rate(° /s):	± 500
Instantaneous Bandwidth(Hz):	100,5001
Scale Factor Linearity:	500 ppm,1
Scale Factor Stability over Temp:	500 ppm, 1
Turn-on Time:	1s

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E - Core 1000



E - Core 1000

Description:

The E - Core 1000 is a low-cost, high-performance fiber optic gyro (FOG), available with either digital or analog output. Ideal for stabilization, navigation, positioning, and instrumentation applications, the E-Core 1000 precisely measures angular rates up to 100 ° per second, with a resolution of 0.05 ° per second in a 100 Hz bandwidth. This dynamic rate is complemented by bias stabilities of better than 4 ° per hour. And since it has no moving parts, the E-Core 1000 requires no preventive maintenance, providing years of trouble-free performance. With its versatility, reliability, and long operational life, the E-Core 1000 is the perfect solution for replacing troublesome mechanical gyroscopes and can be easily integrated into new system designs.

Features:

- Superior accuracy and performance in an economical FOG
- Maintenance-free, solid-state design that never needs recalibrating
- Unparalleled dependability (50,000 hours MTBF typical)
- Exceptional stability with minimal temperature and power-up errors; insensitive to vibration and linear acceleration
- Both digital and analog output versions available; optional temperature compensation available for digital output FOGs

Technical Specifications

Physical

Input Voltage:	12 or 24 VDC nominal (9-18VDC, 18-36 VDC) transient and reverse voltage protected
Power Consumption:	2 watts (analog) 3 watts (digital)
Weight:	0.55 lbs.(0.25 kg)
Overall Size:	4.3 × 3.3 × 1.6 (109mm × 84mm × 41mm)
Connector Type:	20mV/ ° /s
Analog:	+2.5 VDC (zero rotation) ± 2V, into 10K Ohm
Digital:	16 bits, serial, RS-232 9600 BPS, 10 values/s

Environmental

Operating Temperature:	-40 to +75
Storage Temperature:	-50 to +85
EMI/REI:	CE, IEC 9081-2,3,4
MTBF:	50,000 hours

Performance

Bias Stability vs. Temp ¹ :	0.08 ° /s rms, typical 0.4 ° /s, peak to peak
Angle Random Walk (noise):	20 ° /h Hz typical 0.3 ° / h typical
Rotation Rate:	± 100 ° /s
Instantaneous Bandwidth:	100 Hz
Scale Factor Linearity:	<0.5% rms (constant temp.)
Scale Factor Stability	
over Temp ¹ :	2% rms
Turn-on Time:	1s

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E - Core 2000

Description:

The robust E -Core 2000 is a low-noise, high-performance fiber optic gyro(FOG), available with either digital or analog output. Ideal for the most demanding stabilization, navigation, positioning, and instrumentation applications, the E - Core 2000 precisely measures angular rates up to 100° per second, with a resolution of 0.01° per second in a 100 Hz bandwidth. This dynamic range is complemented by bias stabilities of better than 2° per hour. And since it has no moving parts, the E - Core 2000 requires no preventive maintenance, providing years of trouble-free performance. With its versatility, reliability, and long operational life , the E -Core 2000 is the perfect solution for replacing troublesome mechanical gyroscopes and can be easily integrated into new system designs.



E - Core 2000

Feature:

- Low Angle Random Walk, with excellent bias and scale factor performance
- Durable, aluminum housing for rugged environments; maintenance-free, solid-state design that never needs recalibrating
- Unparalleled dependability (50,000 hours MTBF typical)
- Exceptional stability with minimal temperature and power-up errors; insensitive to vibration and linear acceleration
- Both digital and analog output versions available; optional temperature compensation available for digital output FOGs

Technical Specifications

Performance	Units	RA2030	RA2060	RA2100	RD20301	RD20601	RD21001
Input Rate(max)	± ° /s	30	60	100	30	60	100
Rate Resolution	° /s	0.014	0.014	0.014	0.004 ²	0.004 ²	0.004 ²
Scale Factor	mv/ ° /s	66.7	33.34	20	-	-	-
	° /bit	-	-	-	0.0000916	0.000183	0.000305
Nonlinearity	%,rms	0.2	0.4	0.5	0.2	0.4	0.5
Full Temp	%,rms	1	1	1	1	1	1
Bias Stability							
Constant Temp	%s, 1σ	0.0006	0.0012	0.002	0.0006	0.0012	0.002
Full Temp	° /s,p-p	0.12	0.24	0.4	0.12	0.24	0.4
Angle Random Walk (noise)	° /h/√Hz	5	5	5	5	5	5
	° /√h	0.08	0.08	0.08	0.08	0.08	0.08
Instantaneous Bandwidth	Hz	100	100	100	100	100	100
Turn-on Time	s	1	1	1	1	1	1
Output Type		analog	analog	analog	digital	digital	digital

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E - Core 4000

E - Core 4000

Description:

The rugged E - Core 4000 is a military-standard, high-performance fiber optic gyro(FOG), available in both single-and dual-axis configurations. Ideal for the most demanding stabilization, positioning, and fire control applications, the E - Core 4000 precisely measures angular rates up to 100° per second, with a resolution of 0.002° per second in a 45 Hz bandwidth (other bandwidth options are available). This dynamic rate is complemented by bias stabilities of better than 4° per hour. And since it has no moving parts, the E - Core 4000 requires no preventive maintenance, providing years of trouble-free performance. With its versatility, reliability, and long operational life, the E - Core 4000 is the perfect solution for replacing troublesome mechanical gyro

Feature:

- Compact, easy-to-install housing
- Affordable, strap-down design
- Measures X, Y, and Z acceleration and angular rate
- Offers superb fiber optic gyro stability
- Both digital and analog output versions available

Technical Specifications: E - core 4000HD Fibe Optic Gyros*

Performance Specifications

Angle Random Walk	6 ° /h/Hz 0.1 ° /h
Bias Stability	
Zero Offset(25 °)	0.01 ° /sec p-p
Full Temp	0.1 ° /sec p-p
Hysteresis	$\pm 0.02^{\circ}$ /sec
Input Axis Misalignment	
Single Axis	0.12 ° /7min.
Dual Axis	0.24 ° /14min.
Input Rate	$\pm 70^{\circ}$ /sec
Over Range Capablilty	± 10 rad/sec
Instantaneous Bandwidth	45Hz+
Nonlinearity	
Rates < 10 ° /sec	$\pm 0.06^{\circ}$ /sec
Rates > 10 ° /sec	$\pm .40^{\circ}$ /sec
Scale Factor	10VDC/rad/sec 0.1745 VDC/ ° /sec
Full temperature	3%p(2%Rms)
Output Voltage	± 12 VDC; 10k ohms
Turn-on Time	2 seconds
Output Type	Analog

Physical Specifications

Power

Input Voltage	28 VRMS(400-800Hz); 9-36VDC
Input Power	2 W/axis

Dimensions

Single Axis	11.81 x 8.84 x 6.58cm(4.650 x 3.340 x 2.590)
Dual Axis	12.47 x 11.99 x 6.78cm(4.910 x 4.720 x 2.670)

Weight

Single Axis	0.45kg(1.0lb)
Dual Axis	0.80kg(1.7lbs)

Connector Type

Single Axis	MIL-SPEC D38999-24WC98PN
Dual Axis	MIL-SPEC D38999/24WD19PA

Environmental Specifications

Operating Temp. -40 to +75

Storage Temp. -50 to +85

Humidity MIL-STD-810, Method 507.2, Procedure II

Shock MIL-STD-810D, 40g half-sine wave form for 11ms applied to 3 mutually orthogonal axes for 18 shock pulses

Em/RFI MIL-STD-461C, Table 4-1, Class A3, Digital Equip.

MTBF 25,000 hours (ground mobile)

50,000 hours (ground benign)

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E - Core IMU

Description:

The low-cost E - Core IMU is a high-performance, fiber optic gyro (FOG)-based inertial package, available with either digital or analog output. Ideal for OEM navigation and control, dynamics testing, and instrumentation applications, the strap-down inertial subsystem uses three FOGs and integrated accelerometers to precisely measure angular rate and linear acceleration. And since it compensates for the effects of temperature, Linearity, and misalignment, the E - Core IMU achieves exceptional performance. With its versatility, reliability, and long operational life, the E - Core IMU is the economical solution for inertial measurement applications.



E - Core IMU

Feature:

- Compact, easy-to-install housing
- Affordable, strap-down design
- Measures X, Y, and Z acceleration and angular rate
- Offers superb fiber optic gyro stability
- Both digital and analog output versions available

Preliminary Technical Specifications

Performance

Parameter	Specification	Remarks
Angular Rate		
Input Range		
Roll, Pitch, Yaw	$\pm 100, \pm 200$ ° /s	
Accuracy		
Bias: Roll, Pitch, Yaw	$< \pm 20$ ° /h	
Scale Factor	$< 1\%$	
Resolution	< 0.05 ° /s	
Bandwidth	> 100 Hz	-3dBpoint
Non-linearity	$< 0.3\%$ FS	
Random Walk	24 ° /h/Hz	
Acceleration		
Input Range		
X/Y/Z	$\pm 2, \pm 10$ g	
Accuracy		
Bias: X/Y/Z	< 8.5 mg	
Scale Factor	$< 1\%$	
Resolution	> 1.5 < 5 mg	
Bandwidth	> 75 Hz	-3dBpoint
Non-linearity	$< 1\%$ FS	
Random Walk	> 0.1 < 0.5 m/s/h	
Environment		
Operating Temperature	-40 to +71	
Non-operating Temp.	-40 to +85	
Operating Vibration	0.5-2.0 grms	20Hz-2kHz random
Non-operating Vibration	4 grms	20Hz-2kHz random

Electrical/Mechanical Interface

Parameter	Specification	Remarks
Data Output		
Digital		
Format	RS-232	See " Digital Data Format "
Update Rate	> 100 Hz	Continuous update mode
Analog1		
Range	± 4.096 VDC 0 to 5.0VDC	Pins 8,9,10,12,13,& 14 Pins 5,6,& 7
Start-up Time		
Valid Data	< 1 s	
Fully Stabilized Data	< 300 s	
Power Supply		
Input Voltage	15 to 30 VDC	
Input Current	< 1 A	
Power Consumption	-10W	Measured at 15 VDC
Package		
Dimensions	4.0" x 4.75" x 4.0"	Including mounting flanges (102mm x 121mm x 102mm)
Weight	< 3 lbs (< 1.37 kg)	

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