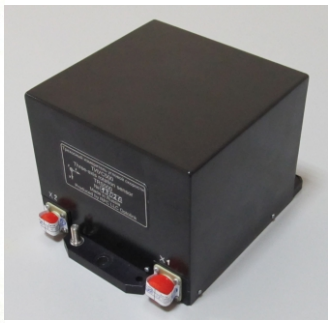
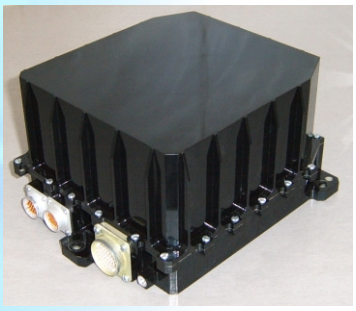
Fiber-Optic Gyroscopes

Closed loop fiber optic gyroscopes (FOGs) produced by LLC “Optolink” are solid-state devices that offer a combination of durability, high reliability, exceptional accuracy and low noise along with the potential of low serial production cost. The fundamental principle is based on Sagnac effect. Our FOGs have so-called minimum configuration that provides reciprocal optical paths for two beams counter-propagating in a fiber loop.

Three-axis FOG TRS500



Optolink's single- and three-axis FOGs consist of a single light source at 1550 nm wavelengths (SLD), depolarizer (DP), one or three photodetectors (PD), fiber splitters (FS), one or three sets of ring interferometers to sense orthogonal angular rate projections and signal processing circuits. In this design, multifunctional integrated optic chip (MIOC), fabricated via High Temperature Proton Exchange process technology, is used for splitting the light into clockwise and counterclockwise waves, light polarization and for the electro-optical phase modulation of lightwaves in the loop. Signal processing procedure is based on the conversion of photodetector signal into digital representation of the detected light intensity, followed by digital demodulation and integration. The loop is closed due to the use of integrated optical phase modulator with sawtooth modulated voltage. The voltage ramp slope is proportional to the rotation rate of a gyro (around definite axis).



OPTOLINK

Space grade three-axis FOG VOBIS

Radiation stability up to 1000 Krad

15 years lifetime at geostationary orbit

*** for export, marked gyro dynamic range is limited by ±495°/s**

Performance	SRS200 1-axis	SRS501 1-axis	SRS1000 1-axis	SRS2000 1-axis	SRS5000 1-axis	TRS500 3-axis	VOBIS 3-axis (space grade)
Range of measured angular rate, °/s	±550*	±250 (±1000*)	±550 (±90)	±40	±12	±400	±30
Bias drift at fixed temperature (1σ, 100s-averaging), °/h	0.3	0.03	0.005	0.002	0.0006	0.1	0.03
Bias drift in operational temperature range (1σ, 100s-averaging), °/h	0.7	0.1	0.03	0.05	-	0.3	0.07
Scale factor error, ppm	800	300	100	100	20	700	500
Angle Random walk, °/√h	0.01	0.005	0.0007	0.0003	0.0001	0.007	0.001
Bandwidth, Hz	>1000 (user defined)						
Weight, kg	0.22	0.35	0.8	1.5	2.5	1.2	2.6
Power supply, V / Consumption, W	5±0.25 / 6					27±5 / 8	27 / 20
Operational temperature range, °C	-40 ~ +60					-40 ~ +60	-30 ~ +40
Dimensions, mm	Ø70×28	Ø100×30	Ø150×40	Ø250×40	Ø250×45	110×110×90	172×176×110
Data output interface	RS-485					RS-422	MIL-STD-1553B

From optical components to navigation systems

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