



## **E-Core Technology**

20 years of Research & Development and rigorous testing has yielded a revolutionary fiber optic gyro that is changing the direction of the FOG industry - and KVH is pointing the way.

### **KVH E-Core FOG - A New Spin On Fiber Optic Gyros**

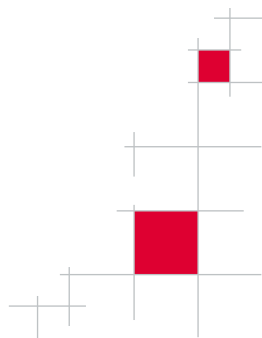
Fundamental to KVH's new low-cost, highly accurate, fiber optic gyro technology is E-Core fiber - an advanced optical fiber named for its unique elliptically shaped core region. The elliptical core design enables the single-mode fiber to achieve exceptional polarization preserving characteristics - critical to high performance fiber optic gyros.

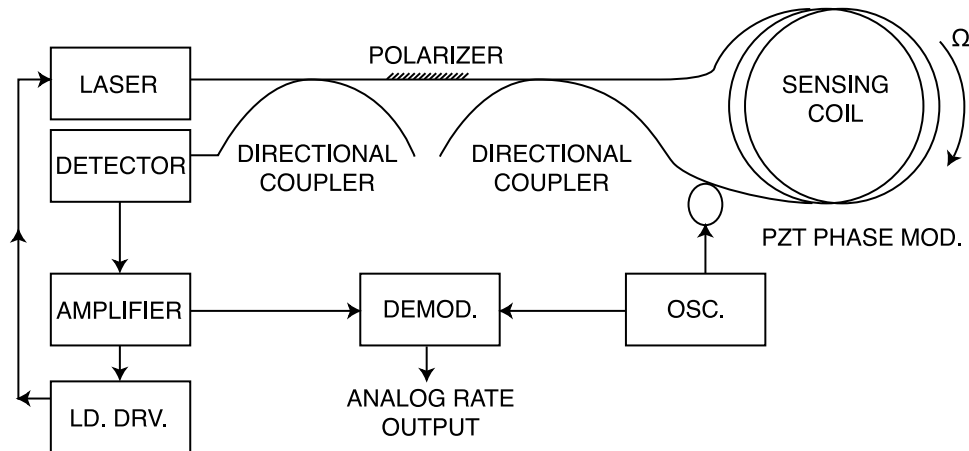
By designing and manufacturing E-Core optical fiber, KVH controls the technology, process - and the cost. KVH is the only FOG manufacturer to fabricate 100% of its own optical fiber. The directional couplers, polarizer, and sensing coil that comprise the basic KVH FOG unit are all made from this optical fiber and manufactured entirely on-site. E-Core fiber is used in KVH's signature E-Core Series fiber optic gyro designs. The E-Core technology enables KVH to deliver FOGs with consistently high performance even under the most demanding operating conditions. And, with a price tag that's a fraction of the cost of competing technology, KVH FOGs are in a class by themselves.

### **KVH Fiber Optic Gyro Principles of Operation**

KVH fiber optic gyros are true single-axis rate sensors, measuring the angular rotation about an axis perpendicular to a coil of optical fiber. The open-loop optical configuration employed in the KVH E-Core series gyros consists of a broadband solid state optical source, and polarization maintaining fiber components fabricated from KVH E-Core elliptical-core fiber.

The light energy passes through a first directional coupler that isolates the detector, a polarizer to ensure a single polarization state, and is then split in two by the second directional coupler and fed into opposite ends of a coil of polarization maintaining fiber, which serves as the sensing element.





The operating principle is the Sagnac effect, which is also the basis of the ring laser gyro. When the coil is not rotating, the light path in either direction is the same length, and the light adds in phase as it returns to the directional coupler and passes through the polarizer to the detector. When the coil rotates, the paths' lengths differ and the signal magnitude is a function of the rotation rate. The gyro has no moving parts, resulting in enhanced reliability. There are no cross-axis sensitivities to vibration, acceleration or shock. The gyro is stable with temperature and time, making it useful in a wide variety of applications, including land navigation, positioning, robotics and instrumentation.

### **KVH Sensors - Pointing the Way**

KVH Industries is a leading manufacturer of direction and orientation sensors. KVH's patented E-Core fiber optic gyro technology represents over twenty years of research, development, and rigorous testing. The result is a new generation of highly accurate, low cost FOG devices. KVH utilizes its sensor technologies to produce integrated navigation and mobile satellite communications systems for commercial, military and marine applications.

### **KVH FOG Product Family**

- E-Core 1000 - Affordable commercial FOG for stabilization and positioning applications.
- E-Core 2000 - Precision FOG for the most demanding stabilization and positioning applications.
- E-Core 4000 – Military-standard FOG for stabilization, positioning, and fire control applications.
- E-Core IMU – Three-axis FOG-based inertial measurement unit for OEM navigation and control, dynamics testing, and instrumentation applications.



## Key Features & Attributes

- Maintenance free with no moving parts to wear out
- Excellent reliability (50,000 hours MTBF - typical)
- Insensitive to vibration and acceleration
- Digital or analog output
- Stable over temperature
- Low cost FOG solution

