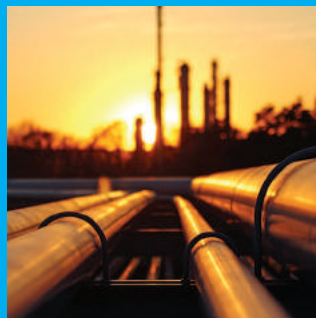


# Passive Optical Components for Fiber Optic Sensor Systems



**LIGHTTEL**

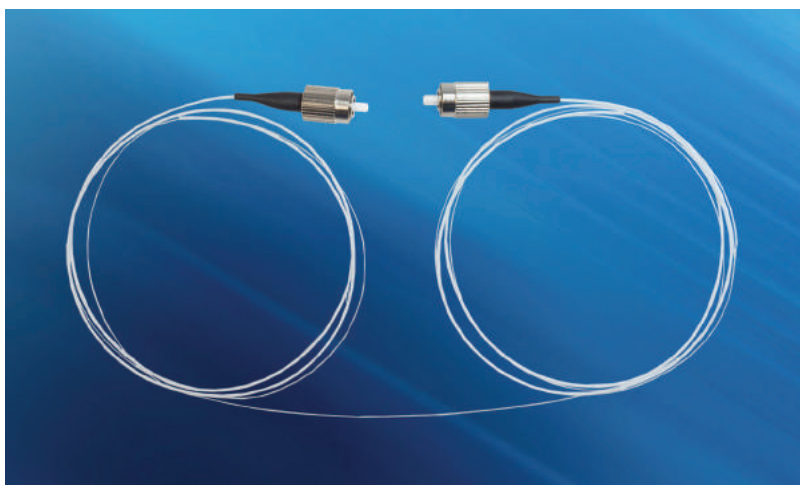
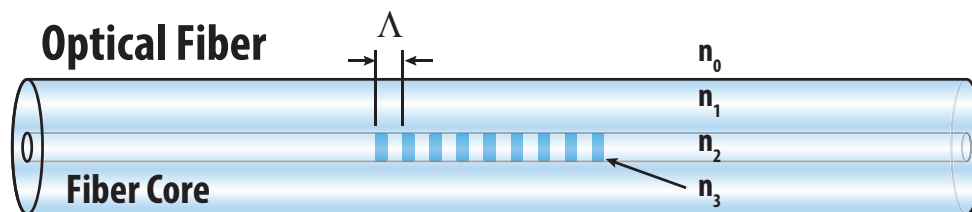
# Fiber Optic Sensor Systems

Fiber optic sensors offer a number of benefits when compared to electrical sensors. These advantages include electromagnetic interference immunity, electrical isolation, small size and weight, no electrical power required at the remote location, and improved performance. Fiber optic sensors support a myriad of applications, including gyros, perimeter security, distributed temperature systems, structural and pipeline monitoring, and seismic systems. Lightel manufactures discrete components, modules and complete systems to meet the needs of fiber optic sensor system providers. Whether your system uses interferometric, grating-based, or distributed techniques, Lightel has the solution to meet your requirements.

## Fiber Bragg Gratings

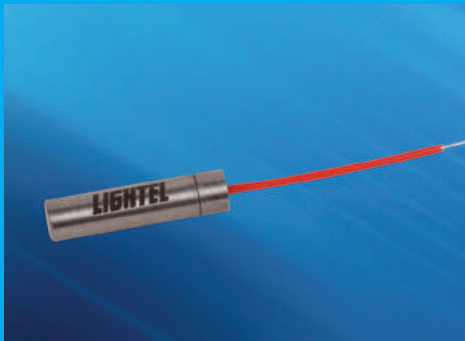
Fiber Bragg Gratings (FBGs) are often used for strain or temperature sensing and can be found in oil & gas, structural, aviation and other applications. In general, FBG sensors provide smaller size, electromagnetic interference immunity, high accuracy, a high degree of multiplexing on a single ingress/egress fiber, and the capability to measure high speed events.

Lightel offers a series of FBGs written to customer-specified fibers with exact grating length and position, bandwidth, and central wavelength to provide optimal sensor sensitivity and accuracy. In addition to standard acrylate-coated fiber, our proprietary process can use fiber with harsh environment coatings to provide excellent optical performance even under extreme mechanical and environmental conditions. Furthermore, Lightel offers the ability to fabricate multiple splice-less FBG arrays over long distances with uniform mechanical and optical specifications.



# Discrete Fiber Optic Components

Fused devices such as fiber optic splitters and couplers are used extensively in fiber optic interferometric and distributed sensor systems. Lightel manufactures a wide variety of these devices to your exacting needs. Customization options such as wavelength ranges from visible to 2 microns, temperature ranges up to 200°C+, 100G shock, compact form factor and low polarization dependent loss are all available. Micro-optic devices are also utilized in fiber optic sensor systems. Devices such as Faraday Rotator Mirrors (FRMs), isolators, and circulators are essential components. Lightel can reduce the form factor and cost of complex sensor systems by using a number of technologies including fused, micro-optic, filter, and PLC techniques.



## Micro-Optic Devices

### Isolators

- 80µm Fiber Polarization Insensitive Mini Size Isolator
- Polarization Insensitive Single Stage Isolator
- Mini Size Polarization Insensitive Isolator
- 2-in-1 Polarization Insensitive Isolator
- 3-in-1 Polarization Insensitive Isolator
- 1064nm Polarization Insensitive Isolator
- Polarization Maintaining Isolator
- 1064nm Polarization Maintaining Isolator

### PBS/PBC

- Polarization Beam Splitter/Combiner
- 1064nm Polarization Beam Splitter/Combiner

### Faraday Rotator Mirrors (FRMs)

- 1310nm or 1550nm FRM
- Broadband FRM
- 1064nm FRM
- FRM with Adjustable Time Delay

### Circulators

- 1310nm or 1550nm Polarization Insensitive 3 Port Circulator
- 1064nm Polarization Insensitive 3 Port Circulator
- PM 1310nm or 1550nm 3 Port Circulator
- PM 1064nm 3 Port Circulator

## Fused Devices

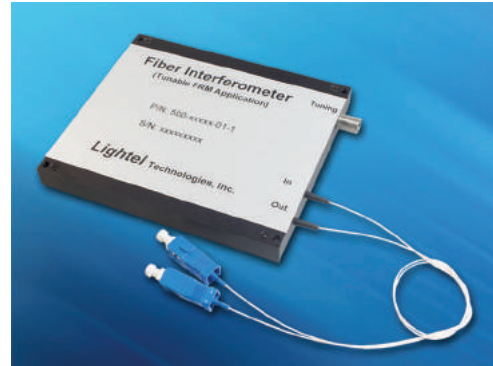
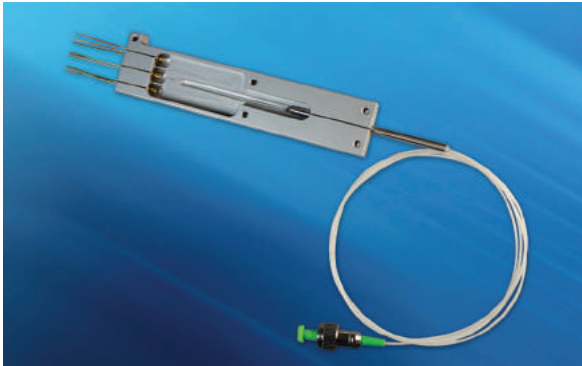
- Polarization Maintaining Couplers
- 2 Micron (2µm) Polarization Maintaining Coupler
- Ultra Flat Wideband Couplers
- Multimode Couplers
- High Directivity, Mode Insensitive Achromatic Multimode Coupler
- Visible Wavelength Couplers
- High Temperature Couplers
- Ultralow PDL Single Mode Coupler
- Compact Size Couplers
- PLC Wideband Splitter





# Sensor Modules

In addition to providing discrete fiber optic components and FBGs for sensor systems, Lightel designs, develops and manufactures complete functional sensor modules incorporating active and passive devices. Manufactured to a customer drawing or designed by Lightel from a customer concept, our functional modules include polarization diversity receivers, tap monitor modules, photodiode arrays, and interferometer modules.



# Complete Systems

Lightel has the facilities and experience to design, develop and manufacture complete fiber optic systems. In addition to fiber optic and optical engineering, our skill set includes mechanical, electrical and firmware expertise. We have extensive fiber optic assembly capability. Our factory includes advanced capabilities such as multiple surface mount technology lines, high speed chip placement machines, reflow ovens, burn-in rooms, EMI rooms, etc. This allows Lightel to develop and manufacture complete high-level photonic assemblies and complete sensor systems in one location.



## About Lightel

Lightel designs, manufactures, and supplies a broad range of products and services to the fiber optic industry worldwide. Starting in 2000 with coupler workstations for manufacturing fused bionic taper products, Lightel has expanded into fused fiber components, micro-optic passive optical components, video microscopes for inspection purposes, and many other fiber optic related products and services. Our technology innovations have resulted in many US Patents awarded.

2210 Lind Ave SW Suite 100 Renton, WA 98057 USA  
(425) 277-8000 ph (425) 277-5280 fax

sales@lightel.com  
www.lightel.com