



optical sensing



## Applications

### Long-term Monitoring, Risk and Damage Assessment of:

- ◆ **Civil Structures/Civionics** (bridges, dams, tunnels, buildings)
- ◆ **Energy** (wind turbines, pipelines, nuclear reactors)
- ◆ **Aerospace Vehicles** (composite structures, wind tunnels, dynamic tests)
- ◆ **Oil & Gas** (platform structural health monitoring)
- ◆ **Marine Vessels** (hull, mast, rudder, submarine pressure tests)
- ◆ **Transportation** (railways, roadways)

## Description

The **os100-200 Fiber Bragg Grating (FBG) Sensor Array** is five sensors in series in polyamide coated fiber and without any splices. It can be mounted directly on a structure to provide an optical alternative to conventional strain or temperature sensors (see advantages). Installation is easy as the **os100-200** is mounted using conventional techniques and is designed for use as a single sensor or in series as part of a FBG array of sensors.

All **Micron Optics'** sensors demonstrate excellent compatibility with **Micron Optics** sensing instruments and the combination is shown to be as accurate and linear as conventional sensing systems. Please feel free to contact **Micron Optics** or one of our authorized Value-Added Resellers about your particular optical sensing application.



## Advantages of FBG Sensors

- ◆ **Multi-Sensor Arrays** - easily facilitates many sensors on a single fiber
- ◆ **Remote Sensing** - long distances between sensors or between sensors and instrument
- ◆ **Small Physical Size** - can be embedded directly into concrete or composite structures
- ◆ **Simple, Low Cost Installation** - due to multi-sensor array feature
- ◆ **Passive Sensor** - eliminates ESD and spark hazard, and immune to electromagnetic interference
- ◆ **Insensitive to Corrosion**
- ◆ **Hard to Detect** - small in size, made of glass fiber, uses lightwaves not visible to the naked eye, no electromagnetic field generation by the sensor
- ◆ **Variety of Sensors Available** - strain, temperature, displacement, pressure, etc...

### Specifications

Standard 5 FBG array, 1m spacing between sensor locations, 10nm spacing between central wavelengths, polyimide coated fiber, polyimide re-coating over FBGs, FC/APC connector at one end, splice-free.

#### Optical (See Diagram A)

Center Wavelength	1527nm, 1537nm, 1547nm, 1557nm and 1567nm
Peak Reflectivity ( $R_{max}$ )	>80%
FWHM ( -3dB point )	0.27nm ( +/-0.05nm; apodized grating )
Isolation	15dB ( @ +/-0.4nm around center wavelength; apodized grating; Refer to Diagram A )

#### Environmental & Mechanical

Number of Sensors	5
Fiber Type ( SMF28 Compatible )	SMF28-C
Fiber Original Coating	Polyimide
Fiber Re-Coating Type	Polyimide
Loose Buffer Tube	Yes, Covering ~75% of $L_1$ ( Refer to Diagram B )
Connectorization	Optional FC/APC
Proof Strength	>100kpsi
Fiber Bend Radius	>25mm
Splices Between Sensors	No
FBG Sensor Length	5mm ( +/-2mm )
Accuracy in Marking Sensors	+/-5mm

#### Sensors Positioning & Wavelengths (See Diagram B)

Total Fiber Length ( $L_T$ )	6 meters ( +/-100mm )
Sensor 1 ( $S_1$ ) @ 1527nm	1 meter ( +/-10mm ) Distance from connector to Sensor 1
Sensor 1 ( $S_2$ ) @ 1537nm	1 meter ( +/-10mm ) Distance from Sensor 1 to Sensor 2
Sensor 1 ( $S_3$ ) @ 1547nm	1 meter ( +/-10mm ) Distance from Sensor 2 to Sensor 3
Sensor 1 ( $S_4$ ) @ 1557nm	1 meter ( +/-10mm ) Distance from Sensor 3 to Sensor 4
Sensor 1 ( $S_5$ ) @1567nm	1 meter ( +/-10mm ) Distance from Sensor 4 to Sensor 5
End Fiber Length ( $L_E$ )	1 meter ( +/-100mm ) Distance between last sensor and fiber end

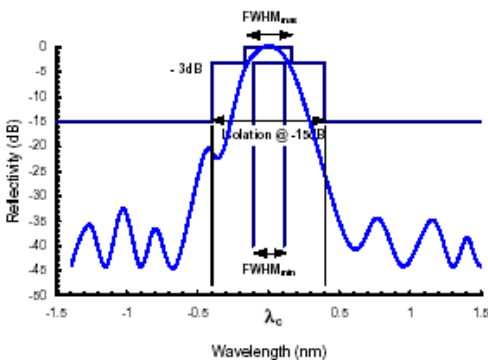


Diagram A - Definition of Optical Specifications

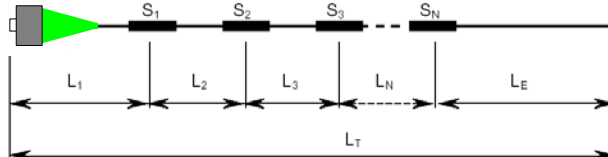


Diagram B - Sensor Positioning Diagram

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