



Fiber Bragg Grating-based Temperature-compensated Displacement Sensors

Boston Instruments
1971 Western Avenue#108
Albany, New York 12003, USA
Tel: +1 (518) 288-6880
Email: sales@bostoninstruments.com

FBG Temperature-compensated Displacement Sensor

When the FBG sensor under certain strain variation by displacement, its response will be translated such a displacement into the resonant wavelength shift. Depending upon the mechanical design the axial displacement can be magnified or reduced by additional mechanical parts. The displacement between two gage points can be described by resonant wavelength difference before and after movement:

$$D(t) = \kappa \cdot [\lambda(2) - \lambda(1)],$$

where κ is displacement sensitivity in mm/pm.

The attached FBG sensor could be used to measure external displacement by strain effect with a mechanical calibration factor. The displacement sensor can be applied for positioning measurements with a range from 1mm to 100mm or 4". The sensor package can be also used with special packers in bore holes to determine Geological settlements or can be surface mountable to detect movements between the anchoring points

Boston Instruments provides following displacement sensors where the displacement amplitudes are different:

Model: EDS80-10mm (Displacement 0-10mm, 80C)

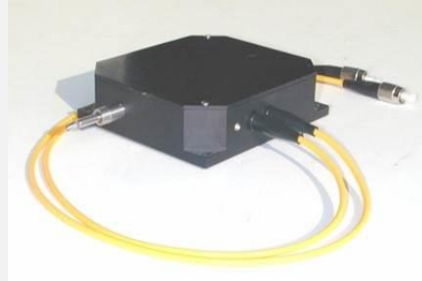
Model: EDS80-30mm (Displacement 0-30mm, 80C)

Model: EDS80-50mm (Displacement 0-50mm, 80C)

Model: EDS80-80mm (Displacement 0-80mm, 80C)

Model: EDS200-100mm (Prototype, Displacement 0-100mm, 200C)

If these displacement sensors may have to consider other constrains, Boston Instruments can customize a specific package for your application. In addition, to install a displacement sensor in electromagnetic interference environment, the fiber package could use polymeric material for your displacement application.



FBG displacement sensor (90mmx130mm) for 5-50mm displacement



EDS80-80



EDS80-50

Fiber Displacement Sensor Specifications	
Parameters	Values
Central Wavelength (nm)	1500-1600
Displacement range (mm)	10, 20, 30, 40, 50, 60, 70, 80, 100
Resolution	0.05% FRS
Reflectance	>90%
Peak Width at 3dB (nm)	~0.3
Accuracy	1% FRS
Operation Temperature(°C)	80-200
Thermal sensitivity (pm/°C)	~11-20
Temperature accuracy(°C)	±0.5
Temperature resolution (°C)	±0.10
Tube Dimension (mm ³)	ø20×250
Gage length (mm)	1500
Temperature range (°C)	80-200
Package material	Stainless Steel 316 or Inconel 625
Fiber connector	FC/APC or customer specified connector type
Jecket cable option	ø3mm kevlar cable/amoured cable