Optical Strain Gage | os3155

Applications

- Continuous lifetime health monitoring of bridges, dams, buildings, tunnels, ships, aircraft, trains, and other complex structures.

- Measurement of strain on a structure's surface.

- Experimental mechanics evaluations requiring many sensors.

Features

- Rugged, permanent weldable package.

- Temperature compensation sensor integrated inside.

- Close proximity of strain FBG to temperature FBG improves accuracy of strain measurement.

- Qualified to same rigorous standards used for comparable electronic gages.

- Armored cable integrated with sensor package for fiber protection and strain relief.

- Fast, simple, repeatable installation.

- Double ended design supports multiplexing of many sensors on one fiber.

- Gage installation and protection achieved with same methods as conventional electronic gages.

- Micron Optics' patented micro opto-mechanical technology.

- Included in ENLIGHT's sensor templates - allows for quick and easy optical to mechanical conversions.

Description

The os3155 is a rugged strain gage with integrated temperature compensation. Both strain and temperature compensation measurements are based on fiber Bragg grating (FBG) technology.

Optimized for outdoor installations on steel structures, the os3155's stainless steel carrier holds the FBG in tension and protects the fiber during installation. Since there are no epoxies holding the fiber to the carrier, long term stability is ensured by design.

The design is similar to the os3150 rugged strain gage but the os3155 includes a second FBG which provides active temperature compensation. The benefits of this approach include both more accurate temperature compensation (since the strain and temperature measurements are made in close proximity) and lower-cost installation (by reducing the need for additional cables, splices and handling to connect additional temperature gages).

os3155 Optical Strain Gage

The sensors can be installed in just a few minutes. Since the gages are welded in place, they can be used immediately after attachment without waiting for adhesives to cure. Armored cables lead to and from each gage, making both installation and fiber protection fast and easy. Optional protection fittings help prevent damage to series connections even in harsh environments. This enables fast reliable field connections to other optical strain, acceleration or temperature sensors on the same fiber. The entire strain gage package is typically covered with a protective material to complete installation for long term protection.

Protection Fitting

In side by side comparisons with foil strain gages, the os3155 is equally sensitive and accurate, while providing for greater strain range and 100 times more fatigue life. The os3155 strain gage is qualified for use in harsh environments and delivers the many advantages inherent to all FBG based sensors.

This sensor can be used alone or in series as a part of an FBG sensor array. Installation and cabling for such arrays is much less expensive and cumbersome than comparable electronic gage networks. Multiple optical strain gages can be arranged in close proximity at 0, 45 and 90 degrees for strain rosette measurements.

Products displaying the "Micron Optics Tuned" logo include Micron Optics tunable technologies ensuring high quality and performance.

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Specifications Ⓑ [1]

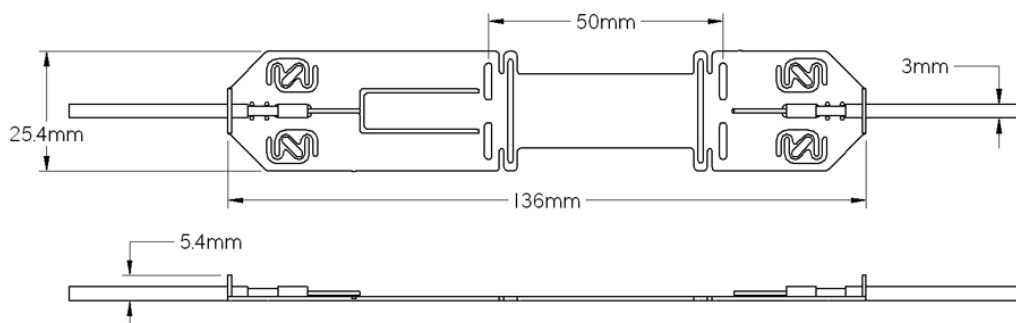|	os3155
Performance Properties	
Strain Sensitivity [2]	~ 1.2 pm/με
Gage Length	50 mm
Operating Temperature Range	-40 to 80° C
Strain Limits	± 2,500 με
Fatigue Life	100×10^6 cycles, ± 2,000 με
Physical Properties	
Dimensions	See Diagram Below
Weight (without cable)	17 g
Carrier Material	302 Stainless Steel
Cable Length	1 m (± 10 cm), each end
Fiber Type	SMF28-Compatible
Cable Type	3 mm Armored Cable
Connectors	FC/APC and Connector Protection Fitting optional
Cable Bend Radius	≥ 17 mm
Fastening Method [3]	Spot Weld
Optical Properties	
Peak Reflectivity (Rmax)	> 70%
FWHM (-3 dB point)	0.25 nm (± .05 nm; apodized grating)
Isolation	> 15 dB (@ ± 0.4 nm around center wavelength)

Notes:
1. Denotes Beta product. For more details see www.micronoptics.com/product_designation.php.
2. Actual gage factor provided with gage.
3. See http://www.micronoptics.com/support_downloads/Sensors/ for installation details.

Ordering Information

os3155-tttt/ssss-1xx-1yy   (Example: os3155-1512/1516-1FC-1FC)

tttt/ssss: Wavelength (±1nm)	1xx: Cable 1, Length & Connector	1yy: Cable 2, Length & Connector
Standard: 1512/1516, 1522/1526, 1532/1536, 1542/1546, 1552/1556, 1562/1566, 1572/1576, 1582/15886	1 1 m Standard, Cable Length UT Unterminated FC FC/APC Connector PF FC/APC Connector with Protection Fitting LC LC/APC Connector	1 1 m Standard, Cable Length UT Unterminated FC FC/APC Connector PF FC/APC Connector with Protection Fitting
Extended: 1460 to 1620 nm		