

# Optical Strain Gage | os3150

## 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.
- Any measurements where EMI, lightning, explosion, or corrosion are a concern.

## Features

- Rugged, permanent weldable package.
- 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 os3150 is a rugged strain gage based on fiber Bragg grating (FBG) technology.

Optimized for outdoor installations on steel structures, the os3150'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. For temperature compensation, the os3150 may be connected in series with an FBG temperature gage like the os4350. Alternately, the very rugged os3155 strain gage offers a strain measurement approach similar to the os3150, but also includes built-in temperature compensation. For some applications, combining both os3150s and os3155s is an optimal solution.



os3150 Optical Strain Gage

Installation is easy and requires 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. The armored cable is compatible with connector protection fittings (see below) that protect splice-free series connections to strain, temperature, acceleration and other types of optical sensors. 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 os3150 is equally sensitive and accurate, while providing for greater strain range and 100 times more fatigue life. The os3150 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.

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## Specifications $\beta^1$

os3150

### Performance Properties

Strain Sensitivity <sup>2</sup>	~ 1.4 pm/ $\mu$
Gage Length	75 mm
Operating Temperature Range	-40 to 80° C
Strain Limits	$\pm 2,500 \mu$
Fatigue Life	100 x 10 <sup>6</sup> cycles, $\pm 2,000 \mu$

### Physical Properties

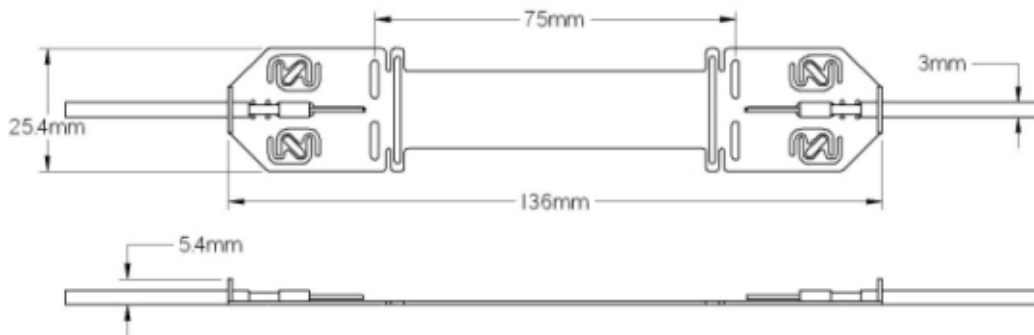
Dimensions	See Diagram Below
Weight (without cable)	15 g
Carrier Material	302 Stainless Steel
Cable Length	1 m ( $\pm 10$ cm), each end
Fiber Type	SMF28-Compatible
Cable Type	3 mm Armored Cable
Connectors	Optional
Cable Bend Radius	$\geq 17$ mm
Fastening Method <sup>3</sup>	Spot Weld

### Optical Properties

Peak Reflectivity (Rmax)	> 70%
FWHM (-3 dB point)	0.25 nm ( $\pm .05$ nm; apodized grating)
Isolation	> 15 dB (@ $\pm 0.4$ nm around center wavelength)

#### Notes:

1. Denotes Beta product. For more details see [www.micronoptics.com/product\\_designation.php](http://www.micronoptics.com/product_designation.php).
2. Actual gage factor provided with gage.
3. See [http://www.micronoptics.com/support\\_downloads/Sensors/](http://www.micronoptics.com/support_downloads/Sensors/) for installation details.



## Ordering Information

os3150-**www**-1**xx**-1**yy**

(Example: os3150-1563-1FC-1FC)

<b>www</b> : Wavelength ( $\pm 1$ nm) Standard: 1516 to 1588 nm in 4nm intervals. Extended: 1460 to 1620 nm	<b>1xx</b> : Cable 1, Length & Connector 1 1 m Standard, Cable Length UT Unterminated FC FC/APC Connector PF FC/APC Connector with Protection Fitting LC LC/APC Connector	<b>1yy</b> : Cable 2, Length & Connector 1 1 m Standard, Cable Length UT Unterminated FC FC/APC Connector PF FC/APC Connector with Protection Fitting LC LC/APC Connector
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