

# Optical Strain Gage | os3155



## Description

The **os3155** is a rugged optical strain gage with integrated temperature compensation 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).

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.

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.



## Key Features

**Rugged, permanent** weldable package.

**Temperature compensation sensor** integrated inside. Measurement of relative temperature for compensation of strain measurements.

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

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

**Fast, simple, repeatable** installation

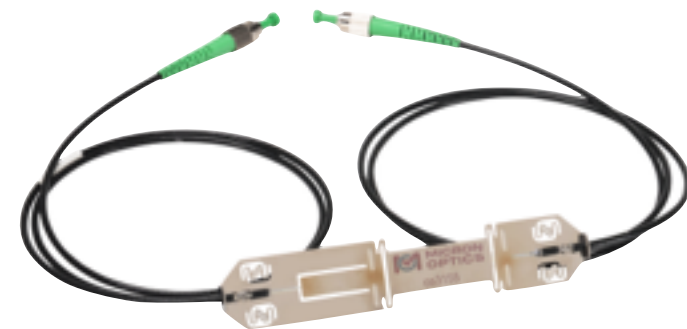
**Double ended design** supports multiplexing of many sensors on one fiber.

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

**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.



## Deployments

**Structures** (bridges, dams, tunnels, mines, buildings, oil platforms)

**Energy** (wind turbines, oil wells, pipelines, nuclear reactors, generators)

**Transportation** (railways, trains, roadways, specialty vehicles, cranes)

**Marine vessels** (hull, deck, cargo containers)

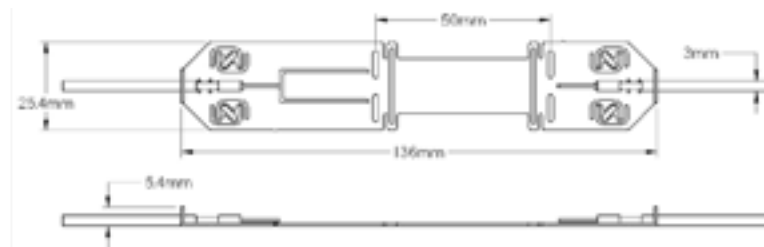
**Aerospace** (airframes, composite structures, wind tunnels, static and dynamic tests)

**Homeland security** (perimeter intrusion, heat detection, security gate monitoring)

# Optical Strain Gage | os3155



Performance Properties	os3155
Strain Sensitivity	1. pm/μ
Gage Length	50 mm
Operating Temperature Range	-40 to 80° C
Strain Limits	± 2,500 με
Fatigue Life	100 x 10 <sup>6</sup> cycles, ± 2,000 με
Physical Properties	
Dimensions; Weight	See diagram below, 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 Methods	Spo wel
Optical Properties	
Peak Reflectivity (R <sub>max</sub> )	> 70%
FWHM (- 3 dB point)	0.25 nm (± .05 nm; apodized grating)
Isolation	> 15 dB (@ ± 0.4 nm around center wavelength)



## Ordering Information

os3155-tttt/ssss-1xx-1yy

**ttt/ssss** Strain/Temp Wavelengths (+/- 1nm)  
Standard - 1462/1466, 1472/1476  
1482/1486, 1492/1496, 1502/1506,  
1512/1516, 1522/1526, 1532/1536,  
1542/1546, 1552/1556, 1562/1566,  
1572/1576, 1582/1586, 1592/1596,  
1602/1606, 1612/1616

**xx** Termination type

1xx Cable 1, Length & Connector  
1 1 m Standard, Cable Length  
UT Underminated  
FC FC/APC Connector  
PF FC/APC Connector with  
Protection Fitting

**yy** Termination type

1yy Cable 2, Length & Connector  
1 1 m Standard, Cable Length  
UT Underminated  
FC FC/APC Connector  
PF FC/APC Connector with  
Protection Fitting

## Ordering Information Example

o3155-1512/1516-1FC-1FC

## Notes

- 1 Actual gage factor provided with gage.
- 2 See [http://www.micronoptics.com/support\\_downloads/Sensors/](http://www.micronoptics.com/support_downloads/Sensors/) for installation details.



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