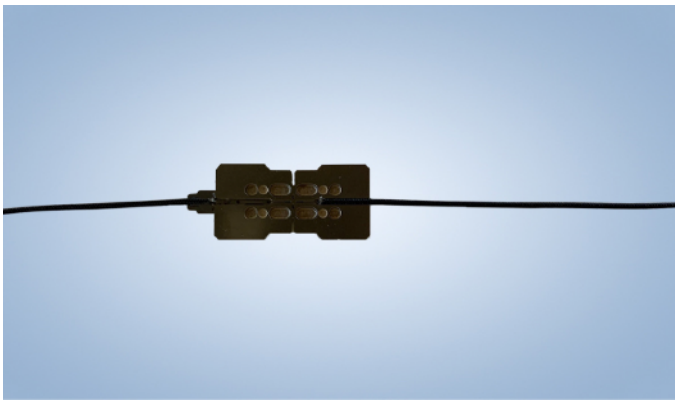
T211 / Mini Strain Sensor with Temperature Compensation

Description

The T211 is a Single-Mode Fiber (SM) based Fiber Bragg Grating (FBG) Surface Strain Sensor with Self-Temperature Compensation for use in environments from -20°C to +120°C.

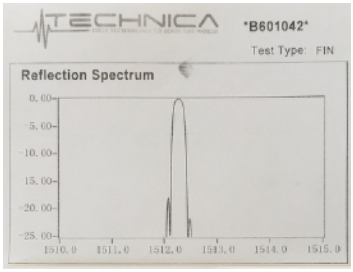
Ultra-small packaging. Available in a wide range of optical specifications. Ready for direct mounting steel construction exhibiting excellent wavelength to strain linearity. Temperature compensated. Calibration service available upon request. The full-scale (FS) accuracy and precision specifications take into account any hysteresis, non-linearities, and the repeatability of the sensor. The T211 sensor handling and installation is fast, easy and intuitive. Delivers the advantages inherent to FBG based sensors. Immune to lightning and electromagnetic interference (EMI). T211 series Surface Strain Sensors are fabricated using licensed and proprietary state-of-the-art laser manufacturing technologies and product designs. The sensor packaging described herein represents the most popular configuration and can be customized.



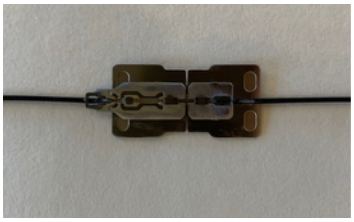
Manufactured and sold by Technica under International Licenses from Raytheon Technologies

Key Features

Strain and temperature linearity. The T211 strain sensor design uses two precision made FBGs written into the fibers' core for producing a transducer configuration of high linearity, resolution, accuracy, and precision. Multiple Reflectivity, SLSR, & BW options available.



Ultra-small packaging format. The T211 sensor is well suited for precisely measuring strains in small or confined spaces and can be manufactured with ultra-low bend radius fiber for meeting the needs of even the most demanding fiber routing applications.



Pre-Strain level is set at the factory. The T211 pre-strain level can be factory set to accommodate any strain range within the strain limits of -2000ue to +7,000ue. Typically it is set for the whole range.

Spot-welded. The T211 is designed to be surface mounted by spot-welding. Epoxy installation or securing with screws is also possible. Installation video available upon request.

Ready to be daisy chained. Well suited for projects that include the need to monitor strain at one or many locations. Provided as single connectorized sensors or in ready to install arrays of various lengths and with a flexible number of sensors.

Field proven. For demanding projects that require stable operation for the long-term.

Parameter	Specifications
Wavelengths and Tolerance	1459 to 1621 nm, +/-0.5 nm
Reflection BW (FWHM)	0.6 nm to 2.0 nm; other opt.
Reflectivity %	>50%, other options
SLSR	10 dB, 12 dB, 15 dB; other
Strain Range	- 2000 με to +7000 με
Strain Sensitivity	1.2 pm/με
Strain Precision	<0.05% FS (<0.02% FS typical)
Strain Accuracy	<0.25% FS (<0.1% FS typical)
Gage Length, Gage Factor	3mm, 0.7936
Temperature Compensation	Integrated within the sensor
Temperature Accuracy	<1°C (for -20°C to +60°C range)
Sensor Pigtail (Length, DIA)	1 m, 900um ns
Cable Bend Radius	24 mm std; 2mm option
Optical Connector	FC/APC std, LC/APC option
Housing Material	Stainless Steel SUS304
In-Shell Dimensions (LxWxH) Sensor Dimensions (LxWxH)	30.6x13x1 mm 26x6.5x0.5mm
Weight	1 gram
Mounting Methods	Spot Welding, Screws, Glue

Applications in Civil Engineering, Energy, Industrial, Medical, and Research Laboratories

Technica undertakes a rigorous development process before products release. The company is also firmly committed to continuous improvements after release to insure performance to the highest standards, hence, specifications are subject to update without notice.

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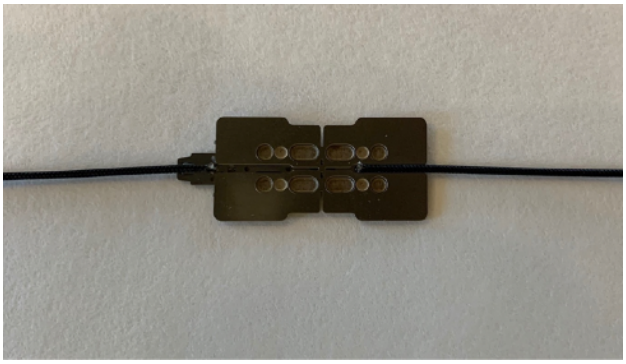
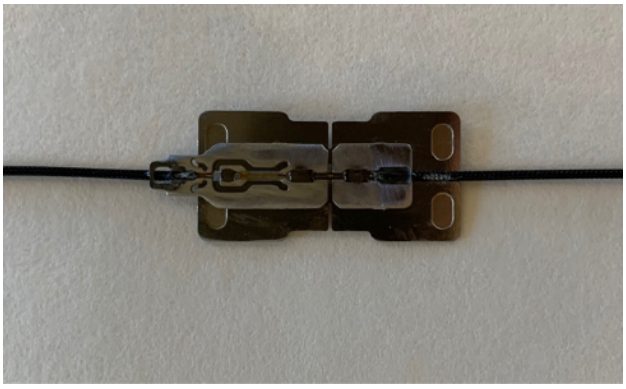
Spot-welding is the primary recommended method for achieving a long term stable bond between the monitored structure and the T211 sensor. It takes 10 minutes.

Tools: (1) TS900 or equivalent spot welder for 0.2mm steel plates, (2) FBG interrogator

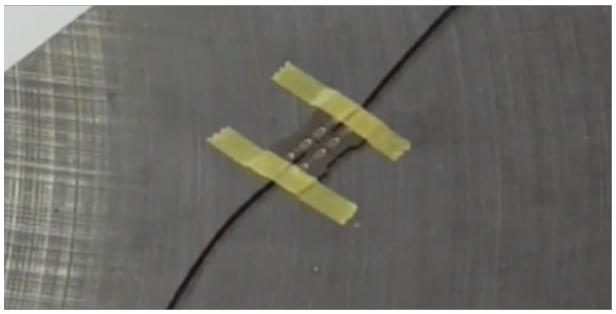
T211 Top View before Installation



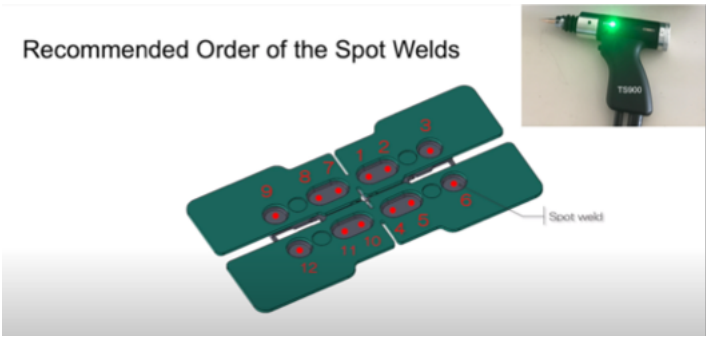
T211 Bottom View before Installation



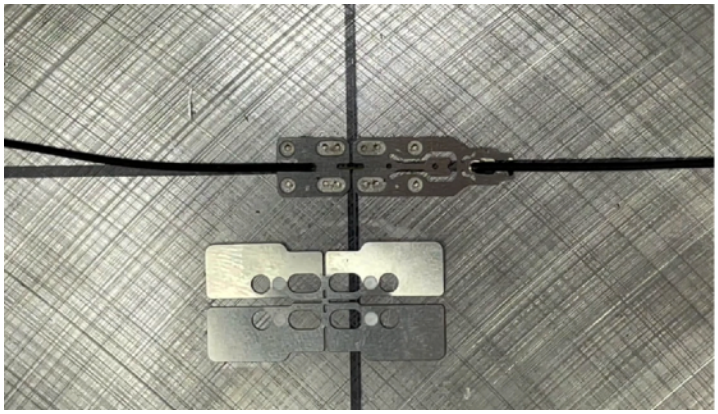
T211 is secured with tape to the clean surface



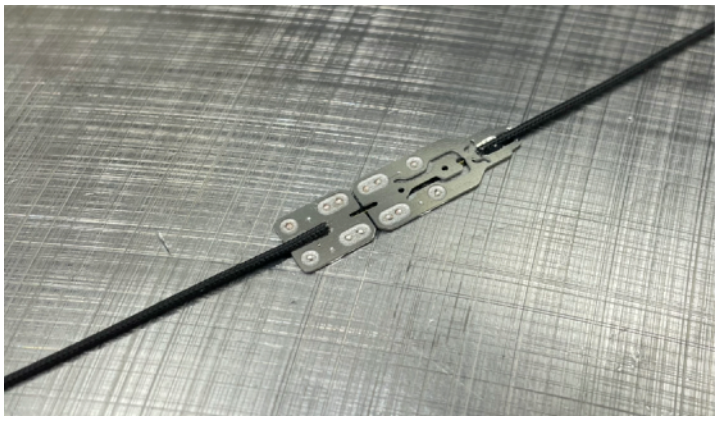
Spot welding of the sensor to the surface: The T211 is surrounded by two SS304 metal shells which enable spot-welding the sensor to the monitored structure. There are 8 spot-welds needed to be done in order to properly secure the T211.



Pull-up / snap-off the shells from T211 Sensor:



Installed T211 Strain Sensor:



Spot Welder: We recommend using our TS900 Spot Welder, which has been optimized for Optical Sensing Applications. Other spot-welders may be compatible too.

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