

Description

The T235 is a Single-Mode (SM) Fiber Bragg Grating (FBG) based Short-Gauge (10cm) Strain Sensor for surface mounting or for embedding into concrete and other materials.

Packaged to eliminate influences from the ambient environment. The short-gauge length defined by the sensor's anchoring brackets yields immunity to local defects or inhomogeneities of the tested specimen. Excellent wavelength to strain and temperature linearity. Calibration service available upon request. The accuracy and precision specifications take into account any hysteresis, non-linearities, and the repeatability of the sensor. The T235 sensor handling and installation is fast, easy and intuitive. Immune to lightning and electromagnetic interference (EMI).

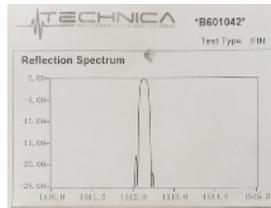
T235 series Short-Gauge Strain Sensors are fabricated using licensed and proprietary state-of-the-art laser manufacturing technologies and product designs. The sensor packaging described herein represents the most popular configuration and can be customized.



Manufactured and sold by Technica under International Licenses from Raytheon Technologies and Sylex Corporation

Key Features

Strain and temperature linearity. T235 design uses one precision made FBG written into the fibers' core for producing a transducer configuration of high linearity, resolution, accuracy, and precision. SLSR & BW options. If needed, temperature compensation is available using a separate, in-line T8XX series temperature sensor.



Pre-Strain level is adjustable during installation. Field pre-strainable to the application requirements during installation.

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. When provided as arrays, the interconnections between adjacent T235s and other sensors can be via rugged waterproof connectors (T960) or by rugged waterproof splices (T970).

Multiple anchor designs for installation options. The T235 can be embedded or surface mounted using welding, mounting screws, or by chemical (glue) bonding. Custom mounting brackets can be designed upon request. Installation procedure provided.



Low cost and field proven. For demanding projects that require both low cost per sensing point and stable operation for long-term. Extensively used in field applications since 2010.

Parameter	Specifications
Wavelengths and Tolerance	1459 to 1621 nm, +/-0.5 nm; 980, 1060, 1310 nm, other
Reflection BW (FWHM)	<0.6 nm; other options
Reflectivity % and SLSR	>30%, 12 dB, other options
Strain Range	+/- 5,000 $\mu\epsilon$, other options
Gauge Length	100mm
Strain Accuracy	<0.50% FS (<0.25% FS typical)
Strain Precision	<0.25% FS (<0.15% FS typical)
Temperature Compensation	External
Operating Temperature	-20 to +60 Degrees Celsius
Ingress Protection Rating	IP67
Sensor Pigtail (Length, DIA)	1 m and 3mm, other options
Cable Bend Radius	30 mm Static, 40mm Dynamic
Optical Connector	FC/APC, or custom
Housing Material	Stainless Steel SS304
Dimensions (DIA x L), Washer (DIA)	12mm DIA x 174mm L, 12mm
Mounting Methods	T235 Mounting Brackets welded, screwed, or glued

Applications in Civil Engineering, Geotechnical, Energy, Industrial, and Research

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.

Welding is the primary recommended method for achieving a long term stable bond between the monitored structure and the T235 Mounting Brackets (anchors) of the sensor. It takes 10 minutes.

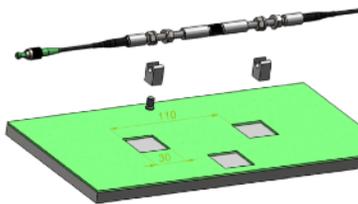
Tools: (1) Standard welding machine, (2) FBG interrogator, (3) Two spanner keys, size 10.

The T235 Sensor Gauge Length is equal to the distance between the two T235 Mounting Brackets (anchors):

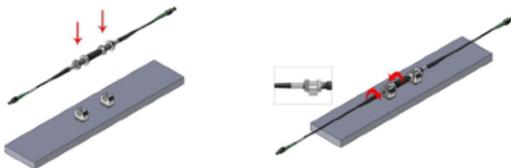


Surface preparation for welding: Regardless of the installation method, clean the surface to which the sensor should be applied using abrasive materials and removing any paint, rust, or debris. Chemical treatment of the surface is advised 20 minutes before the installation to avoid the creation of oxide layers on the mechanical treated surface.

Mount the T235 SS304 Brackets to the test surface by welding them, screwing them, or glue bonding them perpendicularly and aligned to each other on one axis:

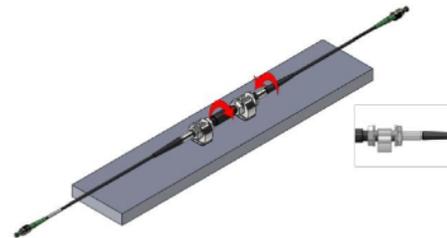


Mount the T235 Sensor into the T235 Brackets by moving the washers and nuts to the sides in a way that ensures there is one nut and one washer on each side of each bracket. Leave thread space for pre-straining the sensor:



Set the T235 Pre-Strain Level (typically to $\leq 5,000 \mu\epsilon$): The T235 does not have a built-in pre-strain. Connect the T235 sensor to an interrogation unit. Secure the sensor to the first of the two Mounting Brackets.

After securing one side of the T235 to its first Mounting Bracket, use a spanner key to rotate the inner nut at the other bracket in a clockwise direction to adjust the pre-strain to the desired level according to the current application's needs: $\text{Wavelength shift (in pm)} = \text{Pre-strain } (\mu\epsilon) * 1.2$.



Use a thread securing adhesive (such as Loctite 2701) after sensor is fixed and pre-strained in the Mounting Brackets.

Alternative mechanical installation (screwing):

Use four standard M4 metric screws (two at each side). These screws are supplied with the Mounting Brackets. This method could be applicable to concrete walls, to other materials, and to metal structures (if welding is not allowed). Drill the holes at the proper anchoring distance.



Alternative chemical installation (glue bonding):

Use an adhesive that bonds the sensor with the measured surface. The glue is not supplied with the sensor. The selection of the right glue highly depends on the material of the surface and environmental conditions (examples are Loctite 3450 for steel, and EPO-TEK 730 for concrete).

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Technica Optical Components / 3657 Peachtree Rd, Suite 10A, Atlanta, 30319, USA, info@technicasa.com, www.technicasa.com