

OttoXLight FBG Sensor Interrogation system

General Description

OIMI1 is a new ultra-compact Fiber Bragg Grating sensor interrogation system, recently developed by CELM snc with the support of Optoi Group.

System interfacing and data storage on the host computer are made easy by the USB Communication Interface, through a simple serial command set. A user-friendly LabView™ driver is also available.

Four FBG sensors can be addressed on the same fiber; each sensor works in parallel at a maximum sampling rate as fast as 2000sps, for each of them.



Applications

- Vibration monitoring
- Deformation monitoring
- Temperature monitoring
- Ideal for usage on field

Features

- Compact
- Fast acquisition rate
- No moving parts
- No scanning devices
- Built-in optical source
- USB interface
- LabView™ driver
- Low cost



Warning: class 1 laser



Ordering information

OIMI1 - USB - 4 : FBG interrogator, USB interface, 4 sensors

OIMI1 - SPI - 8 : FBG interrogator, SPI interface, 8 sensors

OIMI1	-XX	-YY	Sub-Subcode Description:
			- 4 : interrogator for 4 sensors
			- 8 : interrogator for 8 sensors

Subcode Description:

- **USB** : interrogator based on USB interface
- **SPI** : interrogator based on SPI interface, compatible to National Instruments' CompactRIO – *soon available*

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Optoi reserves the right to change the circuitry and specifications without notice at any time

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Min	Max	Unit
T _A	Operating Temperature Range	0	+55	°C
V _{dd}	System Voltage	4	6	V
T _s	Storage Temperature	-40	+80	°C

Stresses beyond those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rated conditions for extended periods may affect device reliability.

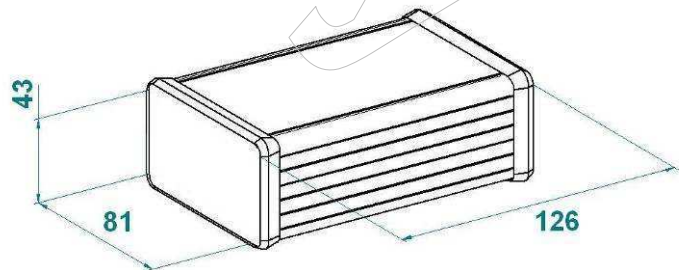
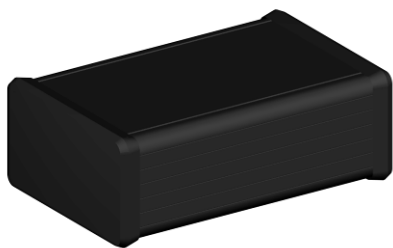
OPTICAL SPECIFICATIONS

Parameter	Min	Typ	Max	Unit
Broad band source spectral width	70			nm
Output power			1	mW
FBG sensors per fiber		4	8	no.
FBG center wavelengths		1529 1547 1565 1583		nm
Number of fibers		1		no.
Mesurable range per sensor			8000	pm
Resolution			0.1	pm
Accuracy on FSR		0.1		%

OTHER SPECIFICATIONS

Parameter	Type
Data communication interface	USB
Sensor Fiber Optical connectors	Angled F3000 standard
LabView™ software driver	Available
Power supply	5V

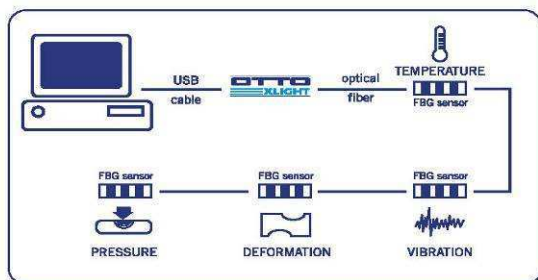
MECHANICAL DIMENSIONS



(all the dimensions are expressed in mm and should be regarded with a tolerance of ±2mm)

Application notes

Monitoring system based on Fiber Bragg Grating sensors



OTTOXLIGHT is the result of a joint R&D activity involving Optoi Microelectronics and CELM Sistemi, an Italian Company specialized in the design and development of measuring systems and monitoring devices based on **FBG** technology (Fiber Bragg Gratings). The system is an innovative micro-interrogator of FBG sensors, extremely versatile and high-performance, overcoming the current capabilities of similar monitoring systems based on traditional methods.



www.celm-sistemi.it

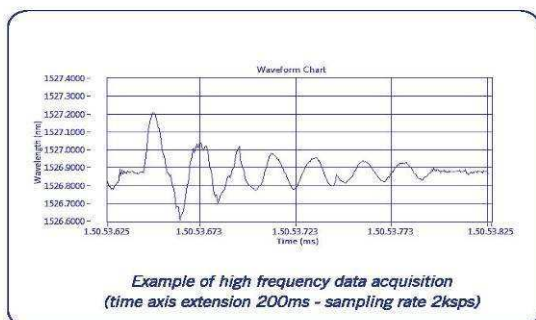
Advantages of single-mode FBG sensors

Single-mode fiber optics are optical guides made of silica, used as a transport medium of information by means of light signals. They are composed of two main parts: the core, i.e. the inner medium of propagation, and the cladding. Dimensions are extremely small, in fact the diameter is equal to 250micron including the external protective layer (primary coating). Bragg gratings are created within these fibers, providing the capability to monitor physical phenomena such as vibrations, deformations, temperature variations, etc.

The main advantages of such method compared to more traditional sensors based on electrical or mechanical principles are the following:


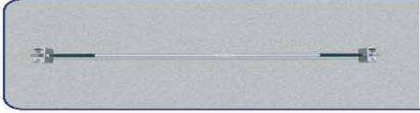

- Limited intrusiveness
- High chemical and physical stability
- Immunity to electro-magnetic interference
- Possibility to be installed even at a large distance
- High resolution, dynamics and accuracy
- The sensors don't need any electrical signal, neither voltage nor current

High performance and versatility



Optoi and CELM have developed the interrogator micro-system called OTTOXLIGHT, in order to optimize the usage of FBG sensors. In fact, the system can simultaneously query up to 8 sensors on a single fiber, at a maximum frequency of 2000sps. The interrogator features a USB interface, so it can be easily connected to data storage devices in host computers. Both static and dynamic measurements are possible, with excellent resolution and accuracy as well as high dynamics. The optical source is integrated, still preserving a reduced volume and low power consumption. Finally the system may be subject to substantial customization.

FBG strain sensors

General characteristics	Sensitivity	Dinamic range	Operative T range
	1.2 pm/µε	+/-2500 µε	-40 °C to 80 °C
	Type L - Fiberglass composite FBG sensor designed for: <ul style="list-style-type: none"> • Gluing on metal or composite structure • Embedding in composite material Dimensions: 0.2x10x100mm		
	Type C - Long gage FBG sensor designed for: <ul style="list-style-type: none"> • Civil structure monitoring • Embedding in concrete Dimensions: Ø 8 mm, L 300/600/900mm		
	Type W - Long gage FBG sensor designed for: <ul style="list-style-type: none"> • Industrial and civil structure monitoring • Outdoor wall mount Dimensions: Ø 8 mm, L 300/600/900mm		