

# Optical Sensing Interrogator | sm230

## Applications

- Measurements of fiber bragg grating (FBG) strain gages, temperature probes, accelerometers, pressure sensors and other FBG sensors.
- Simultaneous dynamic and static measurements of hundreds of sensors.
- Permanent installations for tracking the condition and performance in smart structures like bridges, dams, buildings and tunnels.
- Continuous, decades-long, structural health monitoring of ships, aircraft, trains and other complex structures.

## Features

- More sensors - Wider range swept laser scanning means more sensors per channel (4x the competition).
- More channels – Up to 16 channels can be built into the compact sm230 package.
- Fast dynamic measurements.
- Spectral Diagnostic View – Observe sensor optical characteristics during setup.
- Synchronized Measurement – Sync multiple sm230s to acquire simultaneous data for 1000s of sensors.

## Description

The sm230 Optical Sensing Interrogator provides simultaneous, static and dynamic interrogation of hundreds of fiber optic sensors. The combination of high speed and repeatability allows a single module to interrogate dynamic sensors and measure ultra-static sensors with ultra-high resolution.

In its standard 16 channel configuration, the module seamlessly integrates:

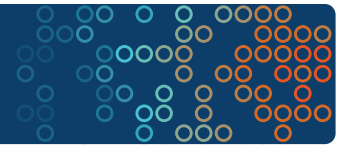
- Wide-scanning, high power, high speed, swept laser technology
- Advanced parallel PC control-analysis-communications architecture
- ENLIGHT<sup>Pro</sup> Sensing Analysis Software

Like all Micron Optics interrogators, the sm230 uses patented state-of-the-art sub-picometer optical referencing technology so that the module never requires recalibration. Balancing world-leading measurement capabilities with a sensible price, the commercial grade sm230 is available in three configurations to serve a range of users - from those monitoring a handful of sensors to heavy users whose applications demand parallel monitoring of hundreds of sensors.



sm230 Rack Mount Module

ENLIGHT<sup>Pro</sup> Sensing Analysis Software is included with Micron Optics sensing interrogator systems and provides a single suite of tools for data acquisition, computation, and analysis of optical sensor networks. ENLIGHT<sup>Pro</sup> combines the useful features of traditional sensor software with the specific needs of the optical sensor system, making it easy to optimize optical properties during the design and implementation phase of an optical sensor system. Intuitive data display and additional graphing and data visualization features make ENLIGHT<sup>Pro</sup> easy to use. Learn more about ENLIGHT<sup>Pro</sup> at: [http://www.micronoptics.com/sensing\\_software.php](http://www.micronoptics.com/sensing_software.php).



## Specifications <sup>B</sup><sup>1</sup>

	sm230-200	sm230-500	sm230-800
<b>Optical Properties</b>			
Number of Optical Channels	1	4	16
Scan Frequency	100 Hz	500 Hz	250 Hz
Wavelength Range	1510-1590 nm		
Wavelength Stability <sup>2</sup>	2 pm typ, 5 pm max		
Wavelength Repeatability <sup>3</sup>	1 pm, 0.05 pm with 1,000 averages		
Dynamic Range <sup>4</sup>	25 dB with user-selectable gain		
Max FBGs per Channel	80 (up to 160 with expanded λ range)		
Internal Peak Detection	Included	Included	Included
Spectral Diagnostic View	Optional	Included	Included
Optical Connectors	FC/APC (E2000 available)		
FBG Requirements <sup>5</sup>	0.25 +/- 0.05nm, FWHM (-3dB point); >15dB Isolation		

## Data Processing Capabilities

Interfaces	Ethernet - other interfaces available via an sp1xx Sensing Processor Module
Protocols	Custom Micron Optics protocol via Ethernet (others available)
Remote Software	Peak detection, data logger, peak tracking, and instrument control
LabVIEW™ Source Code	Allows for customization of remote software
Enhanced Data Management	ENLIGHT <sup>Pro</sup> Sensing Analysis Software

## Mechanical, Environmental, Electrical Properties

Dimensions; Weight	435 mm x 442 mm x 45 mm; 4.1 kg (9 lbs max)
Rack Mount Hardware	Included
Operating Temperature; Humidity	0° to 50° C; 0 to 80%, non-condensing
Storage Temperature; Humidity	-20° to 70° C; 0 to 95%, non-condensing
Input Voltage	7 - 36 VDC (100~240 VAC, 47~63Hz), AC/DC converter included
Power Consumption at 12V	25 W typ, 50 max

## Options

FBG Distance Measurement <sup>1,6</sup>	Optional	Optional	Optional
1kHz Scan Rate	Optional	Optional	n/a
2 kHz Scan Rate <sup>1</sup>	Available with 40nm λ range, (1525-1565nm)		n/a
Expanded FBG Capacity <sup>1,7</sup>	λ range of 1460 - 1620nm doubles max FBGs to 160 per channel, 2pm λ Repeatability at full acquisition speed		
1310nm λ Range <sup>1</sup>	Available custom λ range of 1280-1360nm		
Internal Sensing Processor Module	Windows XP Professional or Linux OS, See sp1xx datasheet		

### Notes:

- Beta product or function. For details see [www.micronoptics.com/product\\_designation.php](http://www.micronoptics.com/product_designation.php).
- Captures effects of long term use over full operating temperature range of the instrument. (Assumes an FBG bandwidth of 0.25nm).
- Per NIST Technical Note 1297, 1994 Edition, Section D.1.1.2, definition of "repeatability [of results of measurements]". (Assumes an FBG bandwidth of 0.25nm).
- Defined as laser launch power minus detection noise floor. Adjustable 13 dB window within total range.
- Used for performance qualification (See Notes 2 and 3). Bandwidths of 0.1 to 1.0nm may reduce performance.
- Minimum FBG λ spacing is 1.5nm; FBGs must be in ascending λ order along the fiber; distance measurement accuracy is ~2m, 1KHz/80nm max.
- Maximum scan frequency of 500Hz, 125Hz for 16 channel model. Not compatible with FBG distance measurement.