

# Optical Sensing Interrogator | si230

## 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.

## Description

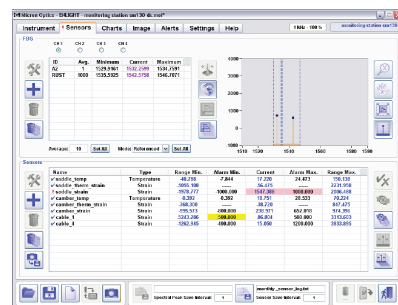
The si230 Optical Sensing Interrogator provides simultaneous static and dynamic interrogation of hundreds of fiber optic sensors. The combination of high speed and repeatability of the swept wavelength laser-based system allows a single instrument to interrogate dynamic sensors and measure static sensors with ultra-high resolution.

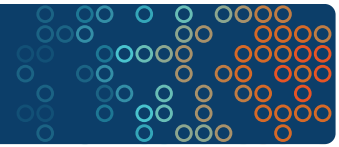
The “si” in the Micron Optics si230 interrogator name indicates that it is a “Sensing Instrument” (not an “sm”, or “Sensing Module”). The si platform uses an MOI optimized integrated ENLIGHT<sup>Pro</sup> environment built upon Windows XP Embedded technology. This facilitates on-board management of all x30 optical core settings, data acquisition, sensor calibration, data visualization, and data storage. Users of Integrated ENLIGHT<sup>Pro</sup> interface to the si through a touchscreen LCD, external keyboard/mouse/monitor, or Windows Remote Desktop connections.



si230 Rack Mount Instrument

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> 1

	si230-200	si230-500	si230-800
<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 $\lambda$ range)		
Internal Peak Detection	Included	Included	Included
Spectral Diagnostic View	Optional	Included	Included
Optical Connectors	FC/APC		
FBG Requirements <sup>5</sup>	0.25 +/- 0.05nm, FWHM (-3dB point); >15dB Isolation		

## Data Processing Capabilities

Operating Environment	Integrated MOI ENLIGHT Environment (based on XP Embedded)		
Enhanced Data Management	ENLIGHT <sup>Pro</sup> Sensing Analysis Software		
Interfaces	Remote Desktop via Ethernet, USB, External Keyboard/Mouse/Monitor		
Storage Capacity	100 GB HDD		
Ethernet Pass-through	Supports direct data acquisition from Optical Sensing Interrogator Core		

## 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	45 W typ, 75 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 $\lambda$ range, (1525-1565nm)		n/a
Expanded FBG Capacity <sup>1,7</sup>	$\lambda$ range of 1460 - 1620nm doubles max FBGs to 160 per channel, 2pm $\lambda$ Repeatability at full acquisition speed		
1310nm $\lambda$ Range <sup>1</sup>	Available custom $\lambda$ range of 1280-1360nm		

### Notes:

1. Beta product or function. For details see [www.micronoptics.com/product\\_designation.php](http://www.micronoptics.com/product_designation.php).
2. Captures effects of long term use over full operating temperature range of the instrument. (Assumes an FBG bandwidth of 0.25nm).
3. 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).
4. Defined as laser launch power minus detection noise floor. Adjustable 13 dB window within total range.
5. Used for performance qualification (See Notes 2, 3, and 4). Bandwidths of 0.1 to 1.0nm may reduce performance.
6. Minimum FBG  $\lambda$  spacing is 1.5nm; FBGs must be in ascending  $\lambda$  order along the fiber; distance measurement accuracy is ~2m, 1kHz/80nm max.
7. Maximum scan frequency of 500Hz. Not compatible with FBG distance measurement.