Optical Sensing Interrogator | sm130

Applications

- Continuous lifetime health monitoring of bridges, dams, buildings, tunnels, ships, aircraft, trains, and other complex structures.
- Measurements of fiber Bragg grating (FBG) strain gages, temperature probes, accelerometers, pressure, displacement, and other FBG sensors.
- Simultaneous static and dynamic measurements of hundreds of sensors.

Features

- Wide wavelength swept laser supporting more sensors per channel.
- Spectral Diagnostic View for optimizing sensor system setup and operation.
- Automated measurement of distance to sensor locations.
- Synchronize measurements among multiple interrogators.

Deployment

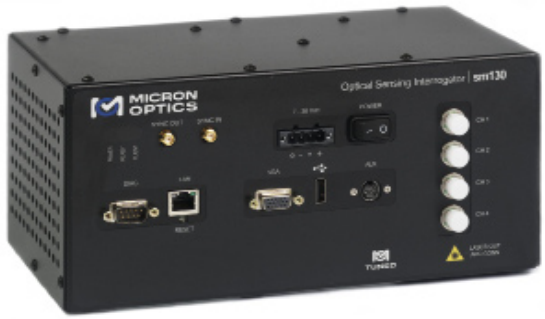
- Civil structures (bridges, dams, tunnels, mines, buildings).
- Energy (wind turbines, pipelines, nuclear reactors, solar panel farms).
- Oil & gas (well reservoir management, platform structural health, pipeline condition).
- Aerospace vehicles (airframes, composite structures, wind tunnels, dynamic tests).
- Marine vessels (hull, mast, rudder, deck, cargo containers).
- Transportation (railways, trains, roadways, specialty vehicles, cranes).
- Homeland security (perimeter intrusion, heat detection, security gate monitoring).
- Medical devices (probes, catheters).

Description

The sm130 Optical Sensing Interrogator is a compact, field proven, industrial grade dynamic sensor interrogation module designed for robust, reliable, long term field operation.

The sm130 Optical Sensing Interrogator is built upon the x30 optical interrogator core, featuring a high power, high speed swept wavelength laser, realized with Micron Optics patented Fiber Fabry-Perot Tunable Filter technology. The x30 interrogator core employs high speed hardware peak detection, optimized for rapid data acquisition of many simultaneous FBG sensors. x30 technology is focused on providing measurements with higher acquisition rates, moderate dynamic range, and continuous lifetime on-board referencing. The combination of high speed and excellent repeatability enables a single x30 interrogator to simultaneously monitor dynamic sensors and measure static sensors with ultra-high resolution. Well over half of the fiber optic sensors deployed today are measured with instrumentation that uses Micron Optics technology.

The Micron Optics "sm - Sensing Module" platform responds directly to the user commands of the optical interrogator core and outputs sensor wavelength data via Ethernet port and custom protocol. All module settings, sensor calculations, data visualization, storage, and alarming tasks are run on external pc or sensor processor module. The Sensing Module platform is ideal for custom, client developed system management tools, but is equally compatible with local or remote installations of Micron Optics ENLIGHT.



sm130 Field Module

Micron Optics ENLIGHT 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 combines the useful features of traditional sensor software with the specific tools needed to optimize optical properties during the design, implementation, and operations phases of an optical sensor system. Tables, graphs, and additional data visualization features make ENLIGHT easy to use. Learn more about ENLIGHT at http://www.micronoptics.com/sensing_software.php.

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Specifications	sm130-200	sm130-500	sm130-700
Optical Properties			
Number of Optical Channels [2]	1 (up to 16)	4 (up to 16)	4 (up to 16)
Scan Frequency	100 Hz	500 Hz	1 KHz
Wavelength Range	1510-1590 nm		
Wavelength Stability [3]	2 pm typ, 5 pm max		
Wavelength Repeatability [4]	1 pm, 0.05 pm with 1,000 averages		
Dynamic Range [5]	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		
FBG Requirements [6]	0.25 +/- 0.05nm, FWHM (-3dB point); >15dB Isolation		
Data Processing Capabilities			
Interfaces	Ethernet - other interfaces available via an sp130 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 Sensing Analysis Software		
Mechanical, Environmental, Electrical Properties			
Dimensions; Weight	122 mm x 267 mm x 135 mm; 2.5 kg (5.5 lbs)		
Operating Temperature; Humidity	0° to 50° C; 0 to 80%, non-condensing		
Storage Temperature; Humidity	-40° to 70° C; 0 to 95%, non-condensing		
Input Voltage	7-36 VDC; (100~240 VAC, 47~63 Hz), AC/DC converter included		
Power Consumption at 12V	25 W typ, 50 Max		
Options			
FBG Distance Measurement [1, 7]	Optional	Optional	Included
8 or 16 Channel Expansion [2]	Please see our 8 or 16 channel sm041 multiplexers		
2 kHz Scan Rate [1]	Available with 40nm λ range, (1525-1565nm)		
Expanded FBG Capacity [1, 8]	λ range of 1460 - 1620nm doubles max FBGs to 160 per channel		
1310nm λ Range [1]	Available λ range of 1280-1360nm		

Notes:

1. Beta product or function. For details see www.micronoptics.com/product_designation.php.
2. Expansion requires 4 integrated optical channels and 1 KHz scan rate to operate a sm041-408 or sm041-416 switch-type multiplexer. (500Hz scan rate is sufficient with 160nm λ range).
3. Captures effects of long-term use over full operating temperature range of the instrument. (Assumes an FBG bandwidth of 0.25nm).
4. 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)
5. Defined as laser launch power minus detection noise floor. Adjustable 13 dB window within total range.
6. Used for performance qualification (See Notes 3 and 4). Bandwidths other than 0.25nm may reduce performance. Minimum FBG λ spacing is 1.0nm for FBG detection. Typical FBG λ spacing is >2.0nm.
7. To use this feature, FBGs must be in ascending λ order along the fiber; minimum FBG λ spacing is 1.5nm; distance measurement accuracy is ~2m, 1KHz/80nm max.
8. Maximum scan frequency of 500Hz. Not compatible with FBG distance measurement.

MICRON OPTICS
Micron Optics, Inc.
1852 Century Place NE
Atlanta, GA 30345 USA
phone 404 325 0005
fax 404 325 4082
www.micronoptics.com