M1-R INTERROGATOR with Raspberry PI Processor

Description

The M1-R optical sensing instrument is an economic commercial grade interrogator, featuring 1 monitoring channel. Enclosed in a field deployable enclosure, the instrument can be operated in full spectrum and in sensor peak detection modes. The M1-R is optimized for both static and dynamic measurements of up to 30 Fiber Bragg Gratings (FBG) based sensors on its 1 channel. Additionally the M1-R includes an internal Raspberry PI processor for added functionality and controls.

Our family of rugged MX interrogators is used extensively in civil engineering, marine, railways, roads, energy, geotechnical, industrial, security, medical, and many other commercial applications. This economy model is specifically useful for security, civil engineering, energy, process control, material qualification labs, and R&D programs. The industrial grade design scales well for volume production.

Benefits

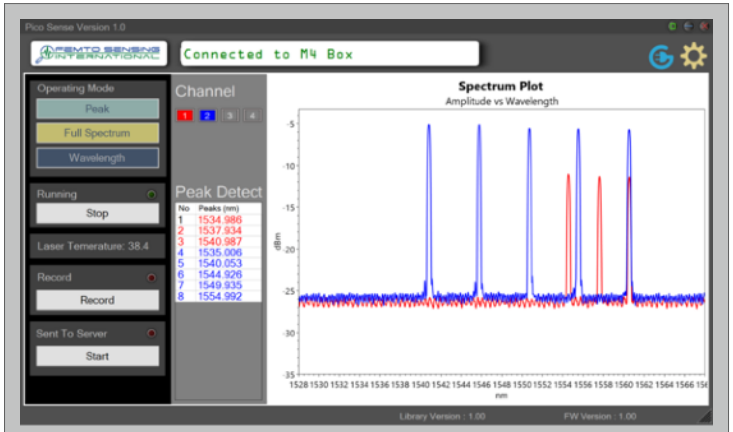
Repeatability, accuracy, and dynamic range: The M1-R Interrogator provides measurements across its wavelength scanning range of 40nm. Using US patented laser calibration technology, the instrument features +/- 2pm repeatability, +/-10pm accuracy, and 25dB dynamic range with automatic gain and threshold control adjustments. Manual settings option for thresholds and gain stages also included.

Top reliability: The M1-R Interrogator is based on a semiconductor tunable laser that has been deployed in large volume in field applications and features the world's lowest MTBF. The interrogator has no movable parts, no tunable filters, and no optical switches, which enables top reliability over the standard temperature range of -15C to +55C. The M1-R is also available upon request with -40C to +70C rating. Suitable for use as an integral part of a very rugged and reliable sensing system.

Adaptive to more types of sensors: Designed to monitor many types of sensors from narrow bandwidth (100pm) FBGs used in accelerometers and pressure sensors, to wide bandwidth (3.0nm) FBGs used in bio-sensing. Hardware implementation of peak tracking algorithms for FBG sensors included. The laser output power is <4 dBm and performance is maintained even with 20dB optical power loss on the M1-R's channel.

Systems and network ready: The LINUX based Raspberry PI Processor inside the M1-R interrogator provides the user the ability to turn the M1-R interrogator on and off (sleep, wake on clock, wake on LAN), it features RS232 and RS485, an MX interface library, and is an open system for application developers.

Lowest Cost and High Quality: The M1-R Interrogator is based on the company's solid state instruments platform and it has been optimized to address applications demanding the lowest cost while maintaining the quality and reliability of a high quality instrument. Also available with 4, 8 and 16 channels.



Femto Sensing Sweden, Japan, South Korea, China and Femto Sensing USA are manufacturing and support facilities of Femto Sensing International, LLC

Applications include Security, Civil Engineering, Industrial, Energy, Material Qualification Labs, and Research Centers

Femto Sensing International undertakes a rigorous development process before products release. The company is also firmly committed to continuous improvements after release to ensure performance and reliability to the highest standards, hence, specifications are subject to update without notice.

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PARAMETER	SPECIFICATIONS	NOTES
Wavelengths Range	40nm	1528nm to 1568nm
Number of Channels	1	Synchronous Scan, No switches (Also available as M2, M4, M8, M16, M24, and M32 for 32 ch)
Number of Sensors per Channel (see Note 1)	1 to 30	1ch * 30 = 30 sensors (assuming ~1.2nm spacing of FBG sensors)
Wavelength Accuracy	+/- 10pm	With Internal FP Etalon and TEC control to guarantee long-term performance
Wavelength Repeatability	+/- 2pm	Defined over long-term
Laser Line-Width	20MHz	Self-heterodyne measured line-width at static wavelength
Laser Output Power per Channel (see Note 2)	< 4dBm	Performance is maintained even with 20dB optical power loss
Gain Stages	6	Controlled automatically. Can also be controlled manually and independently for the 1 channel
Dynamic Range	25dB	Applies for all available scan rates
Scan Frequency (FBG Peaks Processing)	1kHz	Displays and provides FBG Sensors Peaks vs. Wavelength (Also available at 100Hz and 2kHz)
Scan Frequency (Full Spectrum)	8Hz	Full Spectrum display at 8Hz AND Full Spectrum data recording at 8Hz, in parallel.
Fiber Lead-In and Sensor Range (Distance)	10km	Lead-in lengths up to 5km and FBG1 to FBGn in each array to be within 5 km from each other
Input Voltage and Power Consumption when Awake	12V and 20W	Less than 3W when sleeping. Auto-detect 100V to 240V AC with 12V supply block included
Operating Temperature	-15 to +55°C	Designed for commercial field use (Also available with -40 to +85°C operating range)
Dimensions (WxDxH)	250x172x40mm	Applies to 1, 2, and 4 channel units only (Dimensions for the 8, 16, 24, and 32 ch units are larger)
Weight	1kg	Applies to 1, 2, and 4 channel units only (Weights for the 8, 16, 24, and 32 ch units are larger)
Color	Black	Other colors and graphics available for OEM purchases of 10 or more units per PO
Optical Connection to Sensor	LC/APC with Internal Shutter	The Internal Shutter opens and closes automatically when LC/APC connectors are inserted or removed from the interrogator, for protection
Compliance to standards	YES	REACH and ROHS Compliant
Internal Processor and Communications (see Note 3)	YES	Raspberry PI Processor with LINUX, and RS235 / RS485 communications.
Supplied Software	YES	User friendly PICOSENSE Software in .NET environment. API support.

Note 1: FBGs from 0.1nm to 3nm BW@3dB (FWHM) supported. Best performance results obtained using 250pm FBGs.

Note 2: Dynamic gain (6 levels covering 25dB of gain) delivering >25dB optical power dynamic range (saturation - minimum detectable power levels) at 1kHz rate.

Note 3: The M1-R comes with the ability to turn power on/off to the MX unit with Raspberry Pi control signal, RS233/RS485 (half duplex and full duplex) communication, expansion hat for possible cellular communications, open system for development of custom optical sensing applications by the user, and MX Interface Library.

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