

# S4 STATIC and DYNAMIC INTERROGATORS

## Description

The S4 optical sensing instrument is an economic commercial grade interrogator, featuring 4 monitoring channels. This Class 1 Laser instrument is enclosed in a field deployable enclosure, and can be operated in full spectrum and in sensor peak detection modes. The S4 is available in both static (1Hz scan rate) or dynamic (800Hz scan rate) models, and provides measurements of up to 30 Fiber Bragg Gratings (FBG) based sensors on each of its 4 channels.

The rugged technology platform on which our SX interrogators are based is used extensively in civil engineering, geotechnical, roads, mines, energy, industrial, medical, and many other commercial applications. This economy model is specifically useful for monitoring temperatures and the slow changes of strains, tilt or inclination, pressure, and other engineering parameters. The platform is also suitable for process control, material qualification labs, and R&D programs. The industrial grade design scales well for volume production.

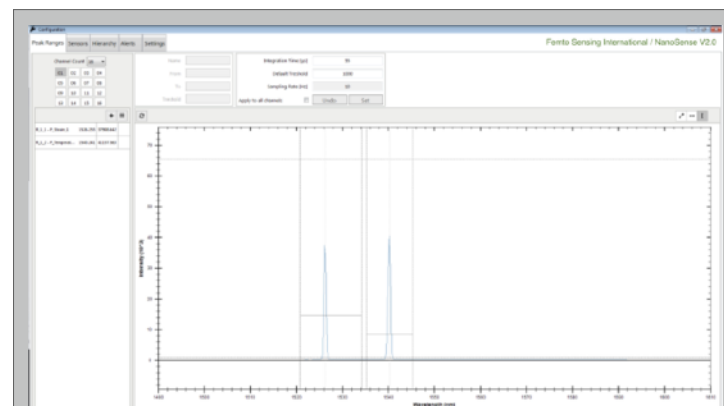
## Benefits

**Resolution, accuracy and dynamic range:** The S4 Interrogator provides measurements across its wavelength scanning range of 80nm. The instrument features 1pm resolution and +/- 12pm accuracy over the entire operating temperature of the instrument, and 30dB dynamic range with automatic control adjustments. Manual settings option for thresholds and gain stages also included.

**Excellent reliability:** The S4 Interrogator is based on a solid-state IEC 60825-1 Class 1 laser platform that has been deployed in large volume in various field applications worldwide. The interrogator has no tunable filters. Excellent reliability over the standard operating temperature range of -5C to +50C. The S4 is suitable for use as an integral part of a very rugged and reliable sensing system.

**Adaptive to more types of sensors:** The integrated electronics, depolarized light source, static and dynamic configurations, and embedded software allow the user to quickly adapt the instrument's performance parameters to fit many different sensor configurations. Designed to monitor many types of sensors from narrow bandwidth (200pm) FBGs used in temperature, strain, displacement, tilt and pressure sensors, to wide bandwidth (3.0nm) FBGs used in bio-sensing. Hardware implementation of peak tracking algorithms for FBG sensors included.

**Low Cost and High Quality:** The S4 Interrogator addresses applications demanding the lowest cost while maintaining the reliability of a high quality instrument.



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

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

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	80nm	1510nm to 1590nm
Number of Channels	4	Also available as S1, S16, and S36 for 1, 16, and 36 optical channels respectively)
Number of Sensors per Channel (see Note 1)	1 to 30	4ch * 30 = 120 sensors (assuming ~2.6nm spacing between adjacent FBG sensors)
Wavelength Accuracy	12pm	Long-term performance over the entire operating temperature range of the instrument.
Wavelength Resolution	1pm	Defined over long-term
Dynamic Range	30dB	Total dynamic range available from the first to the last FBG in each sensing fiber array
Power Range	18dB	Total power range available for losses between the interrogator and the first FBG in a fiber
Scan Frequency (FBG Peaks Processing)	1Hz or 800Hz	Provides FBG Sensors Peaks vs. Wavelength at 1Hz (static model) or 800hz (dynamic model)
Scan Frequency (Full Spectrum)	1Hz	Full Spectrum display and recording
Input Voltage and Power Consumption	9-18V and 6W	Auto-detect 100V to 240V AC with 12V supply block included
Operating Temperature	-5 to +50°C	Designed for commercial field use (Storage temperature -10 to +60°C)
Dimensions (WxDxH)	235x202x88mm	Applies equally to 4 channel units and to the 1, 16, and 36 ch units
Weight	3.8kg	Applies to 4 channel units only (Weights for the 1, 16, and 36 ch units vary slightly)
Color	Black	Other colors and graphics available for OEM purchases of 10 or more units per PO
Optical Connection to Sensors	LC/APC with Internal Shutters	The Internal Shutters are independent for each channel and open and close automatically when LC/APC connectors are inserted or removed from the interrogator, for protection
Compliance to standards	YES	REACH and ROHS Compliant
Communications Interface	YES	USB Communication to External Control Systems
Supplied Software (see Note 2)	YES	User friendly NANONSENSE Software. Easy-to-use data acquisition software developed for the SX family of interrogators, providing tools for communication, management, data storage, and analysis of FBG based sensing systems. API support.

Note 1: FBGs from 200pm to 3.0nm BW@3dB (FWHM) are supported. Best performance results obtained using 300pm FBGs.

Note 2: The enhanced NANONSENSE software available for the SX family of interrogators is the result of years of experience with field installations of Optical Sensing Systems and contains an easy to use sensors configurator, auto and/or manual threshold settings for each FBG, sensors referencing, post-processing of data with rolling functions over the collected data, notifications and alerts based on user set threshold values, replicating of existing sensors functions, and auto-recovery after accidental power outages. Includes provision for 3rd party developers via API support. The NanoSense software is provided free of charge with each S4 interrogator.

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