HYPERION Optical Sensing Instrument | si155

Description

The si155 is an industrial grade fan-less optical sensing interrogator. Featuring both static and dynamic full spectrum analysis, the si155 provides long-term, reliable and accurate measurements of hundreds of sensors on 4 parallel, 160 nm wide channels.

The si155 features a high-power, low-noise, ultra-wide swept wavelength laser with guaranteed absolute accuracy on every scan which is realized with Micron Optics patented Fiber Fabry-Perot filter and wavelength reference technology.

The HYPERION platform, on which the si155 is based, features groundbreaking capabilities including high-performance DSP and real-time FPGA processing on-board. This enables rapid, full-spectrum data acquisition and flexible peak detect algorithms of Fiber Bragg Gratings (FBG), Long Period gratings, Fabry-Perot (FP) and Mach-Zehnder (MZ) sensors with low-latency access to data for closed loop feedback applications.

Dynamic and absolute measurements of **FBG** & **FP sensors** on **4 parallel,160 nm** wide channels and **ENLIGHT** compatible.

The HYPERION platform is now compatible with ENLIGHT, Sensing Analysis Software, which provides a single suite of tools for data acquisition, computation, and analysis of optical sensor networks, see http://www.micronoptics.com/products/sensing-solutions/software/ for more information. The HYPERION platform also includes a a comprehensive Application Programming Interface (API) and examples written in LabVIEW, Python, Matlab, C++ and C#.

Key Features

Standard, and High Speed models, each with an available depolarized source and up to 4 parallel channels

Dynamic and absolute measurements of FBGs, LPGs, FP and MZ sensors from detailed optical spectrum

Deep, continuous dynamic range is available to each sensor on each channel, independent of differential system losses

Data verification key guarantees only valid output. Each data set is calibrated and verified against a permanent NIST traceable reference.

Proven reliability and longevity of the Micron Optics swept wavelength source, with over 100 million hours logged since 2000

Deployments

Oil & gas (well reservoir management, platform structural health, pipeline condition)

Medical devices (probes, catheters)

Industrial measurements (industrial heaters and metal fabrication process control)

Energy (wind turbines, oil wells, pipelines, nuclear reactors, generators)

Structures (bridges, dams, tunnels, mines, buildings)

Security (perimeter intrusion, heat detection, security gate monitoring)

Aerospace (airframes, composite structures, wind tunnels, static tests)

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Performance Properties

Measurement option	Enhanced visibility, 10 Hz	Standard, 100 or 1000 Hz	High speed, 5000 Hz
Number of channels	1 or 4 parallel channels	1 or 4 channels	1 or 4 channels
Wavelength range	100 or 160 nm	60, 100 or 160 nm	80 nm
Wavelength accuracy / stability [1]	1 pm / 1pm	1 pm / 1pm	2 pm / 3 pm
Wavelength repeatability [2]	1 pm, 0.3 pm at 1 Hz	1 pm, 0.05 pm at 1 Hz	2 pm, 0.05 pm at 1 Hz
Dynamic range / continuous [3]	35 dB peak / 45 dB FS	25 dB peak / 40 dB FS	17 dB peak / 40 dB FS
Full spectrum measurement [4]	Included, data rate at 10 Hz		
Optical connectors	LC/APC		
Compatible sensors [5]	Fiber Bragg Gratings, Long period gratings, Fabry-Perot and Mach-Zehnder Sensors		

Interfaces and Software

Interface	Ethernet
Software	Comprehensive API and example support for LabVIEW™, Python, Matlab, C++, C#

Physical Properties

Dimensions / weight	206 mm x 274 mm x 79 mm / 3.0 kg
Operating / storage conditions	-20 to 60 C, < 80%RH non-condensing / -30 to 70 C, < 95%RH non-condensing
Input voltage	9 - 36 VDC, AC/DC converter included (100~240 VAC, 47~63 Hz)
Power consumption at 12 V	30 W typ, 40 max

Model Configurations

Measurement option	Optical channels	Channel upgradable[6]	Scan rate / Wavelength range: Enhanced visibility	Standard	High speed	Depolarizer option[7]
si155-01-ST/060-dd	1	●	10 Hz / 160 nm	100 Hz / 60 nm	○	●
si155-01-mm/100-dd	1	●	10 Hz / 100 nm	1000 Hz / 100 nm	○	●
si155-01-mm/www-dd	1	●	10 Hz / 160 nm	1000 Hz / 160 nm	5000 Hz / 80 nm	●
si155-04-mm/100-dd	4	○	10 Hz / 100 nm	1000 Hz / 100 nm	○	●
si155-04-mm/www-dd	4	○	10 Hz / 160 nm	1000 Hz / 160 nm	5000 Hz / 80 nm	●

Options and Accessories

x55_rkm	19" rack mount kit
x55_cas	x55 transport case
x55_atx	ATEX certified
x55_ew3	3 year extended warranty
oa2001	LC/APC-FC/APC connectivity kit

Notes

1 Accuracy per NIST Technical Note 1297, 1994 Edition, Section D. 1.1.1, definition of "accuracy of measurement." Stability captures effects of long term use over operating temperature range.

2 Per NIST Technical Note 1297, 1994 Edition, Sect D.1.1.2, definition of "repeatability [of results of measurements]."

3 Loss and/or sensor shape may affect repeatability and accuracy for each option as described in Micron Optics TN 1115.

4 For faster scan rates >10 Hz, data bandwidth may limit rate of multichannel spectral streams.

5 FBG bandwidths of 0.25 nm used for performance qualification.

6 For selected configurations, the number of optical channels may be upgraded to 4 channels. Contact MOI for details.

7 For details regarding the Depolarized laser option, see http://www.micronoptics.com/wp-content/uploads/2016/11/TN1108_x55_Depolarized_Laser_Option.pdf

8 Complies with the WEEE Directive 2012/19/EU for the following European countries: UK, IT, DE, FR, NL, BE, ES, CH.

Ordering Information

si155-cc-mm/www-dd

cc Number of channels
- 01 1 channel
- 04 4 channels

mm Measurement option
- EV Enhanced visibility
- ST Standard
- HS High speed

www Wavelength range
- 060 60 nm, 1520-1580 nm
- 080 80 nm, 1500-1580 nm
- 100 100 nm, 1500-1600 nm
- 160 160 nm, 1460-1620 nm

dd Depolarizer option
- NO No depolarizer
- DP Depolarizer

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