NIR Spectrometers 0.9 – 2.5 µm

(deep cooling, Low cost, high sensitivity, high resolution, USB)

Patent pending

DATASHEET

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The NIRS Series Spectrometer, based on TE-cooled Extended-InGaAs detectors coupled with a grating, is optimized for NIR spectroscopic measurements requiring an exceptional signal-to-noise ratio and high dynamic range across the 0.9 - 2.5 µm spectral range. This system leverages innovative, patent-pending single sensing element scanning technology, offering significant advantages: 1) Unmatched low cost; 2) Industry-leading sensitivity with deep cooling to -40°C; 3) Extended spectral coverage beyond traditional spectrometers; 4) Low power consumption; 5) Integrated MEMS chopper; 6) High- resolution performance. The NIRS series comes standard with a USB interface, power supply, and software support includes SDK examples, DLLs for custom application development, and Windows-based spectral acquisition and analysis tools.

The NIRS Series spectrometers deliver high performance with ultra-low noise levels, making them suitable for a range of demanding applications. The detectors' excellent sensitivity supports broad-band applications, such as analyzing the optical properties of solids, liquids, and gases in the NIR range, chemical component analysis, moisture detection, and narrow-bandwidth tasks like NIR laser characterization.

Features

- High Sensitivity
- Low Cost
- USB/GUI
- Deep-Cooling Option
- MEMS Chopper Option

Applications

- Sensor
- Testing
- Instrumentation

Specifications

Parameter		Min	Typical	Max	Unit
Center Wavelength		0.9		2.5	µm
Spectral Resolution		0.5	1	10	nm
Wavelength Accuracy			1	3	nm
Wavelength Repeatability		-		±0.5	nm
PDL		-	0.5	3	dB
Signal to Noise Ratio [1]				15000:1	
Dark Readout Noise [2]			±1	-	RMS
Power Accuracy			±0.05	-	dB
Scan Time		10	70	10000	s
Input Optical Power	Standard version	-		0.3	W
	High power version			5	W
Electronic Interface			USB 2.0	Mini USB	
Electrical Power Supply Input			12		VDC
Electrical Power Consumption			0.5	2	W
Operating Temperature		0	20	50	°C
Storage Temperature		-14	-	70	°C

Notes:

[1]. The lowest level requires -40 °C cooling, the high level is room temperature. These are also related to the integration time setting. Low spectral resolution increase sensitivity.

[2]. An integrated shutter is available to calibrate the dark readout

Note: The specifications provided are for general applications with a cost-effective approach. If you need to narrow or expand the tolerance, coverage, limit, or qualifications, please [click this link]:

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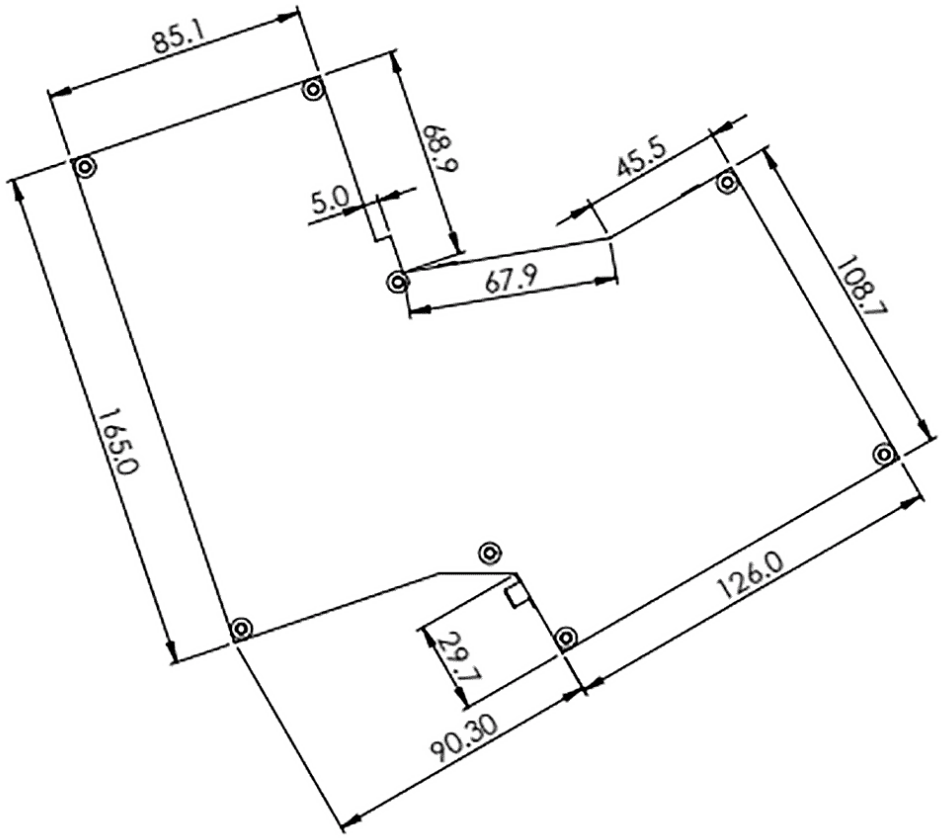
Mechanical Dimensions (mm)



*Product dimensions may change without notice. This is sometimes required for non-standard specifications.

Electrical/Computer Connection

Module comes with a 12V DC power wall pluggable power supply and a USB cable. GUI is included in a USB stick.

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Ordering Information

	2	☐	☐	☐	☐	☐	☐	☐
Prefix	**Type**	**Wavelength**	**Input Optical Power**	**Cooling ***	**Resolution ****	**Shutter**	**Chopper**	**Connector**
NIRS-		0.9-2.6µm = 2 Special = 0	Standard = 1 High Power = 2	Non = 1 -5°C = 2 -20°C = 3 -40°C = 5	1nm = 1 0.5nm = 2 5nm = 3 10nm = 4	Non = 1 Yes = 2	Non = 1 Yes = 2	SMA905/0.22NA= 1 FC/PC = 2 SC/PC = 4 ST/PC = 6 Special = 0

* Non cooling is low cost for strong light measurements. At -5°C:Noise is reduced by about 4×, improving performance in low-light applications. At -40°C:Noise is reduced by about 16×, enabling high-sensitivity measurements, such as weak signal detection in spectroscopy or astronomy.

** Low resolution high sensitivity.

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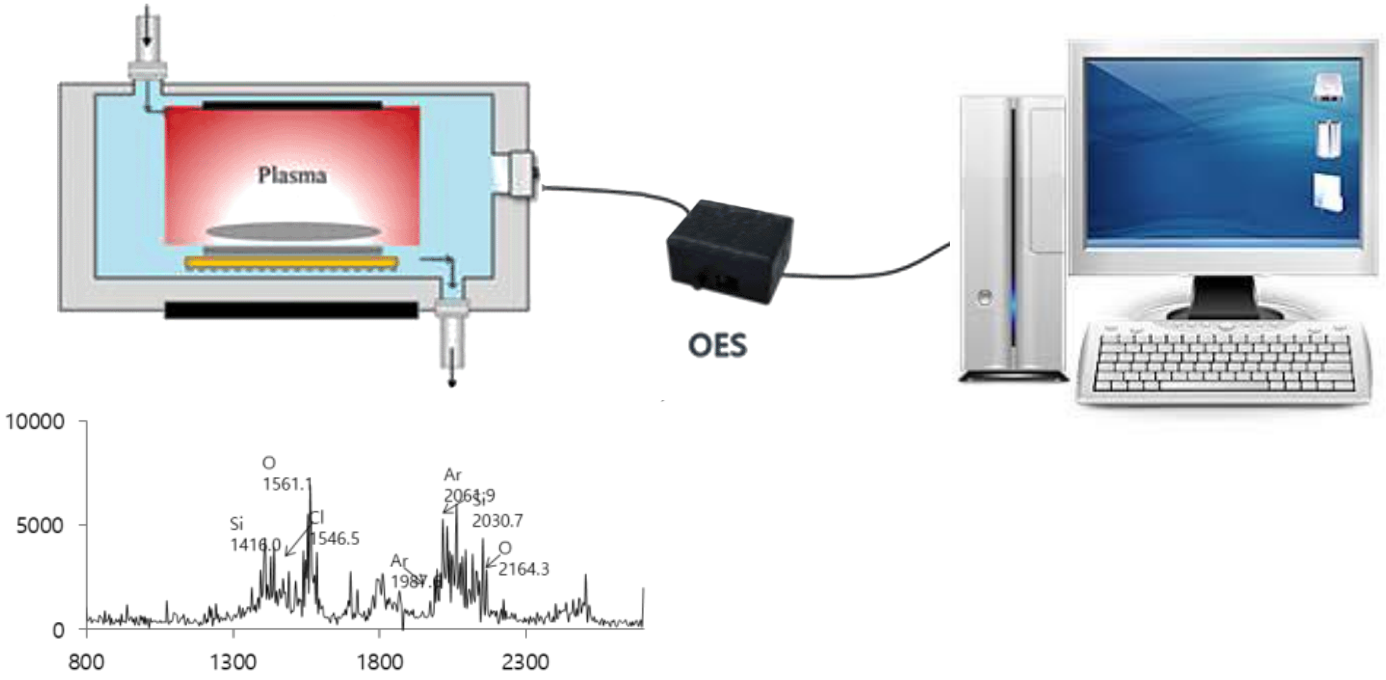
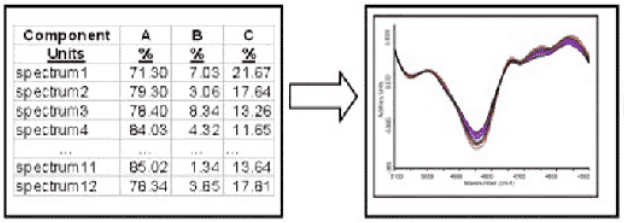
Application Example: PECVD Plasma and Gas Diagnostics of $Si_2Cl_6 + O_2 + Ar$



Application Example: Optical Absorption Measurement

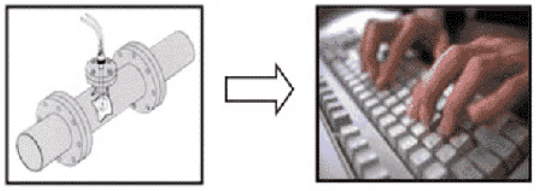
❑ Creating Calibrations

Component Units	A %	B %	C %
spectrum1	71.30	7.03	21.67
spectrum2	79.30	3.06	17.64
spectrum3	78.40	8.34	13.26
spectrum4	84.03	4.32	11.65
...	...	...	...
spectrum11	85.02	1.34	13.64
spectrum12	78.34	3.65	17.81



1. Prepare Standards
2. Collect Spectra
3. Build , Optimize & Test Model

❑ Analyzing Samples



Report	
Sample #081897-049	
Component A	81.55%
Component B	5.38%
Component C	13.06%

1. Measure Unknown
2. Access Model
3. Predict Concentrations

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