NIR Spectrometer Ultra-High Optical Resolution

0.04nm, 790 – 880 nm, USB

DATASHEET

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The NRRS Series Spectrometer, based on TE-cooled Silicon detectors coupled with a high throughput transmission grating, is optimized for NIR spectroscopic measurements requiring an exceptional high resolution, signal-to-noise ratio, and high dynamic range across the 790 - 880 µm spectral range. This system leverages innovative, patent-pending 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 NRRS 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 NRRS is well suited for RAMAN applications.

Features

- Volume Phase Holographic Grating
- Collimating Lens Design
- Focusing Lens Design
- Diffraction System Optical Design
- Wavelength Calibration Algorithms
- Precise Spectrometer Calibrating Techniques
- High Sensitivity
- USB

Applications

- Laboratory use
- Testing
- Instrumentation
- Optical Coherence Tomography (OCT)

RoHS COMPLIANT

Specifications

Parameter	Min	Typical	Max	Unit
Wavelength Range	790		880	nm
Camera Resolution		4000		pixels
Bit Depth		10, 11, 12		bits
Response non-linearity		±1		%
Photo response non-uniformity		0.5		%
Integration Dead Time (in maximum exposure time)	0.01	0.6	2	s
Quantum Efficiency (QE) @850nm		54 %		
Analog gain / Digital gain		x1 x2 and x4 / x1 to x7.996		
Dynamic Range		69		dB
SNR			51	dB
Optical System Characteristics		f/#: 3.6, NA: 0.14 Focal length(R1-R2): 60 -89 @840nm		
Optical Design		T-T-T fully transmissive Czerny-Turner light path		
Grating		1800 lp/mm VPH @840nm		
Input Slit Type		Recommended - 5 µm single mode fiber, FC/PC		
Fiber Optic Interface		FC/PC		
Pixel Resolution	0.035		0.04	nm
Optical Resolution	0.03	0.04	0.07	nm
Operating Temperature	5		40	°C
Storage Temperature	-30		70	°C
Relative Humidity		0% - 85% non-condensing		
Data transfer interface		USB 3.0		

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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P +1 781-935-1200 E sales@agiltron.com W www.agiltron.com

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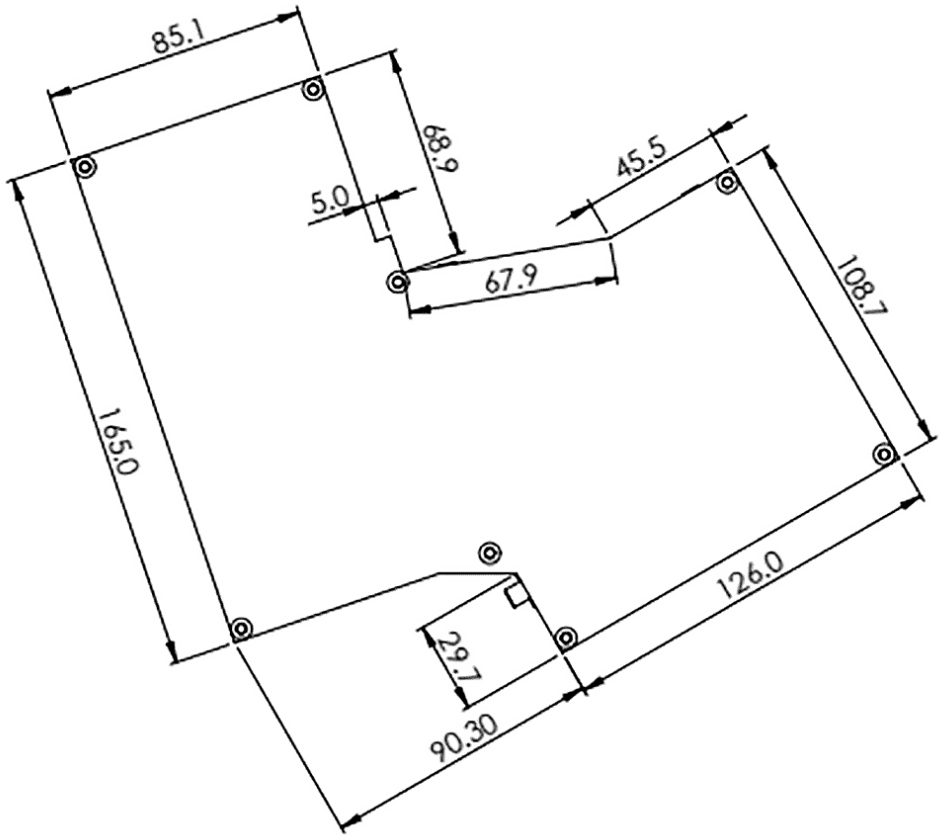
Mechanical Dimensions (mm)



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

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Ordering Information (Part Number)

	1	☐	☐	☐	☐☐	☐	☐	☐	☐
Prefix	**Type**	**Wavelength**	**Input Optical Power**	**Cooling [1]**	**Resolution [2]**	**Shutter**	**Chopper**	**Connector [3]**	**Package**
HRRS-	Raman = 1	790-880nm = 1 Special = 0	Standard = 1 High Power = 2	Non = 1 -5°C = 2 -20°C = 3 -40°C = 5	1nm = A1 0.5nm = 50 0.05m = 05 0.04nm = 04 Special = 00	Non = 1 Yes = 2	Non = 1 Yes = 2	SMA905 = 1 FC/PC = 2 SC/PC = 4 ST/PC = 6 Special = 0	Module = M Benchtop = B

[1]. 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.

[2]. Low resolution high sensitivity.

[3]. The default connector configuration uses fiber with 0.9 mm buffer protection. The connector cannot be installed directly onto bare fiber because the bare fiber is prone to damage during shipping. However, the connector can be assembled on bare fiber if a 3 cm protective loose tube is added for reinforcement. The customer may remove this protective tube after testing. The optical power handling of a standard connector is less than 0.5 W for SMF-28 fiber and decreases further for smaller-core fibers.

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