

Spectrometer
Sol™ 2.2

900 - 2200nm NIR TE Cooled InGaAs Array Spectrometer



The Sol™ 2.2 is a high performance linear InGaAs array spectrometer, featuring 512 (standard) and 1024 pixels with TE Cooling down to -15°C, all while providing high throughput and large dynamic range.

Each spectrometer features an SMA 905 fiber optic input, a built-in 16-bit digitizer, and is USB 2.0 plug-and-play compatible. Using the included software, you can choose between High Sensitivity and High Dynamic Range mode. Flexible custom configurations and application support are available for OEM applications.

Applications:

- Process Monitoring
- NIR Spectroscopy
- Quality Control
- On-line Analyzer
- Material Identification

Features:

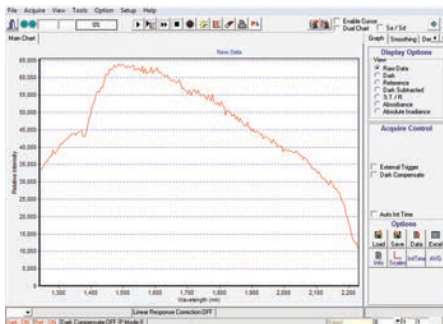
- 900nm - 2200nm Spectral Range
- Resolution as Fine as 2.5nm
- Built-in 16-bit Digitizer
- -15°C Thermoelectric Cooling
- Two Gain Modes for Specific Application Needs

Accessories:

- Light Sources
- Fiber Patch Cords
- Fiber Sampling Probes
- Fiber Sample Holders

Software:

BWSpec™ is a spectral data acquisition software with a wide range of tools that are designed to perform complex measurements and calculations at the click of a button. It allows the user to choose between multiple data formats and offers optimization of scanning parameters, such as integration time. In addition to powerful data acquisition and data processing, other features include automatic dark removal, spectrum smoothing, and manual/auto baseline correction.



Specifications:

DC Power Input	5V DC @ 3.5 Amps
AC Power Input	100 - 240VAC 50/60 Hz, 0.5A @ 120VAC
Detector Type	Linear InGaAs Array
Pixels	512 x 1 @ 25µm x 250µm Per Element
Spectrograph f/#	3.5
Spectrograph Optical Layout	Crossed Czerny-Turner
Dynamic Range	High Dynamic Mode: 13,000:1 High Sensitivity Mode: 6,250:1
Digitizer Resolution	16-bit or 65,535:1
Readout Speed	500 kHz
Data Transfer Speed	>200 Spectra Per Second Via USB 2.0
Integration Time	200µs to >= 64 Seconds
External Trigger	Aux Port
Operating Temperature	0°C - 35°C
TE Cooling	Three-Stage: -15°C @ Relative Humidity = 90%
Weight	~ 3.1 lbs (1.4 kg)
Dimensions	7.8in x 4.3in x 2.7in (197mm x 109mm x 68mm)
Computer Interface	USB 2.0 / 1.1
Operating Systems	Windows: XP, Vista, 7

Technical Details

Sol™ 2.2

Standard

Fiber Coupler

1 Secures Fiber to Ensure Repeatable Results

By coupling a fiber optic to the SMA 905 adaptor, light will be guided to the slit and optically matched, ensuring reproducibility. For free space sampling, a diffuser or lens assembly can be connected directly to the SMA 905 adaptor.

Configurable

Entrance Slit

2 Determines Photon Flux and Spectral Resolution

Light entering into a spectrometer's optical bench is vinyetted by a pre-mounted and aligned slit. This ultimately determines the spectral resolution and throughput of the spectrometer after grating selection. We offer a variety of slit widths to match your specific application needs: from 25µm - 100µm wide, with custom slits available.

Slit Option	Dimensions	Approximate Resolution 1100 - 2200nm
25µm	25µm wide x 1 mm high	~5.5nm
50µm	50µm wide x 1 mm high	~9.0nm
100µm	100µm wide x 1 mm high	~14.0nm
Custom Slit Widths Available		

Standard

Collimating Mirror

3 Collimates and Redirects Light Towards Grating

Both mirrors are *f/#* matched focusing mirrors coated with a special coating, which enhances the NIR signal.

Configurable

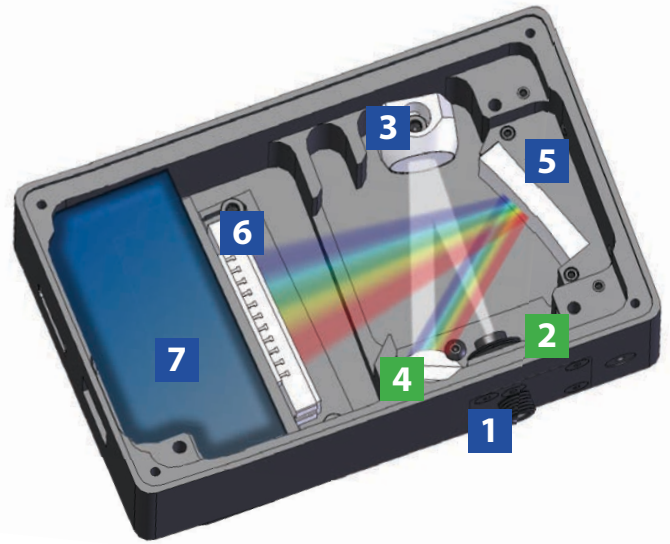
Diffraction Grating

4 Diffracts Light, Separating Spectral Components

The groove frequency of the grating determines two key aspects of the spectrometer's performance: the wavelength coverage and the spectral resolution. When the groove frequency is increased, the instrument will achieve higher resolution, but the wavelength coverage will decrease. Inversely, decreasing the groove frequency increases wavelength coverage at the cost of spectral resolution.

The blaze angle or blaze wavelength of the grating is also a key parameter in optimizing the spectrometer's performance. The blaze angle determines the maximum efficiency that the grating will have in a specific wavelength region.

Spectral Coverage (nm)	Grating	Approximate Resolution 25µm Slit
1100-2200	100/1600	5.5nm
900-2200	85/1350	7.0nm
1600-2030	300/2000	3.5nm
Custom Configurations Available		



Standard

Focusing Mirror

5 Refocuses Dispersed Light onto Detector

Both mirrors are *f/#* matched focusing mirrors coated with a special coating, which enhances the NIR signal.

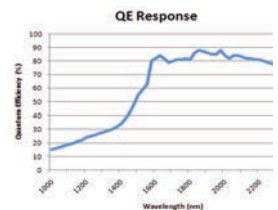
Standard

Array Detector

6 Measures Entire Spectrum Simultaneously

The Sol™ 2.2 features a 512 x 1 TE Cooled linear InGaAs photo diode array detector with pixel dimensions of 25µm x 500µm and 512 active pixels. Using BWSpec™, the detector mode can be switched between High Sensitivity and High Dynamic Range modes, allowing for a greater control over the detector's sensitivity.

Specifications	
Wavelength Range	900nm - 2200nm
Pixels	512 (standard), 1024
Pixel Size	25µm x 250µm
Well Depth	High Dynamic Mode : ~130 Me High Sensitivity Mode: ~5 Me
Digitization Rate	500 kHz



Standard

Thermoelectric Cooler

7 Reduces Dark Noise and Improves Detection Limits

Cooling an array detector with a built-in thermoelectric cooler (TEC) is an effective way to reduce dark current and noise, as well as to enhance the dynamic range and detection limit.

When the InGaAs array detector is cooled from a room temperature of 25°C down to -15°C by the TEC, the dark current is reduced by 12.25 times and the dark noise is reduced by 3.5 times. This allows the spectrometer to operate at longer exposure times and to detect weaker optical signals.