

## HR Series

The HR series of spectrometers provides users with high spectral response and optical resolution in a single unit. HR spectrometers are used where fast reactions need to be monitored and high resolution is necessary, such as characterizing lasers, measuring gas absorbance and determining atomic emission lines.

## Applications

- » Semi conductor analysis
- » Chemical research
- » Gas absorbance measurements
- » Defence material characterisation
- » Paint & coating analysis
- » Food analysis
- » Gemstone identification

## Features

- » Powerful 2-MHz A/D converter
- » Programmable electronics
- » USB-to-PC interface
- » Linear CCD-array detector
- » RoHS and CE compliance
- » Various trigger modes
- » Analog outputs

## Advantages

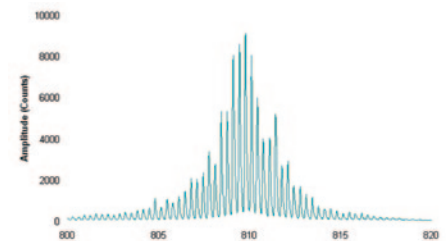
- » Optical Resolutions up to 0.02 nm (FWHM)
- » 200-1100 nm range with composite grating
- » Plug and play operation
- » No external power supply
- » Multi purpose
- » User-configured wavelength range and resolution
- » SpectraSuite compatibility

# Specifications

## HR2000+

## HR4000

DETECTOR		
Type	Linear silicon CCD array	Linear silicon CCD array
Detector range	200 - 1100 nm	200 - 1100 nm
Active Pixels	2048	3636
Pixel size	14 µm x 200 µm	8 µm x 200 µm
Sensitivity	75 photons / count at 400 nm 41 photons / count at 600 nm	130 photons / count at 400 nm 60 photons / count at 600 nm
SPECTROSCOPIC		
Wavelength range	max. 900 nm (grating dependent)	max. 900 nm
Optical resolution	~ 0.035 - 6.8 nm (FWHM)	~ 0.02 - 8.4 nm (FWHM)
Signal-to-noise ratio	250 : 1	300 : 1
Dark noise	12 RMS counts	12 RMS counts
Dynamic range	1300 : 1	1300 : 1
Integration time	1 ms to 65 seconds	3.8 ms to 20 seconds
OPTICAL BENCH		
Design	f/4, Symmetrical crossed Czerny-Turner	f/4, Symmetrical crossed Czerny-Turner
Focal length	101.6 mm input and output	101.6 mm input and output
Entrance aperture	5, 10, 25, 50, 100 or 200 µm	5, 10, 25, 50, 100 or 200 µm
Grating options	14 different grating options, UV through Shortwave NIR	14 different grating options, UV through Shortwave NIR
Fibre optic connector	SMA 905 to 0.22 numerical aperture single strand optical fibre	SMA 905 to 0.22 numerical aperture single strand optical fibre
PHYSICAL		
Dimensions	148.6 x 104.8 x 45.1 mm	148.6 x 104.8 x 45.1 mm
Weight	570 grams	570 grams
ELECTRONICS		
Power consumption	450 mA @ 5 VDC	450 mA @ 5 VDC
Data transfer speed	Full spectrum every 1 ms with USB 2.0 port	Full spectrum every 4 ms with USB 2.0 port
Inputs/Outputs	10 onboard digital user-programmable GPIOs	10 onboard digital user-programmable GPIOs
Analog channels	1x 13-bit analog input, 1x 9-bit analog output	1x 13-bit analog input, 1x 9-bit analog output
COMPUTER		
Operating systems	Windows, Mac, Linux	Windows, Mac, Linux
Computer interfaces	USB 2.0 @ 480 Mbps; RS-232 (2-wire) @ 115.2 K baud	USB 2.0 @ 480 Mbps; RS-232 (2-wire) @ 115.2 K baud
Peripheral interfaces	SPI (3-wire); I <sup>2</sup> C integrated circuit	SPI (3-wire); I <sup>2</sup> C integrated circuit



Spectrum of laser measured with HR4000



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