

Hyperspec-VNIR™

High-Efficiency, Industrial Hyperspectral Imaging Sensors for 400-1000nm

The Headwall Photonics Hyperspec™ family of VNIR and NIR integrated hyperspectral imaging sensors provide the foundation for utilizing hyperspectral imaging to achieve superior spectral sensing and chemical imaging results for a range of mission-critical applications ranging from process monitoring to moving webs of product across conveyor lines to non-invasive medical imaging.

Headwall Photonics' Hyperspec™ imaging spectrometer platform is built on a totally reflective concentric, *f*/2 optical design. These products are based on Headwall's patented aberration-corrected imaging systems which feature the company's "original", high efficiency holographic gratings.

In order to minimize stray light and aberrations, the use of transmissive optical components are not used within the imaging spectrograph. This platform is further enhanced by a telecentric optical input design which enables superior spatial imaging.

Application Considerations

Select the Hyperspec™ model which best satisfies spectral range, desired illumination distance, and spatial resolution. Then select the entrance slit width which best provides your desired spectral resolution; the standard slit width is 12.5 microns wide. By choosing a wider slit width, spectral resolution will be approximately broadened by a factor of the increased dimension (example: 25 μm = 2x). The objective lenses on Hyperspec imaging sensors are field interchangeable, providing the ability to vary the FOV and IFOV within the application scene.



Performance For Any Application

Configurability beyond expectations! To assure optimized application performance, Headwall offers ten standard Hyperspec-VNIR™ models from which to select. With over 100 application-specific configurations, Headwall offers a hyperspectral system optimized for performance and budget.

Headwall application engineers are available to help select the best system for your application.

Hyperspec™ Series Performance Guide		
Spectral / Optical	CP Models	DP Models
λ Coverage	400 – 1000 nm	400 – 1000 nm
Spectral Bandpass ¹	1.25 nm	1.25 nm
Spectral Resolution ³	1.29 nm	2.4 nm
Electronics		
Frame Rate	12 fps, 23 fps w/ 2x vert. binning	60 fps, 223 fps 8x8 binning
Shutter	Electronic global	on-chip
Exposure Time	5μs - 65s	multiple modes, 25 μsec —1 sec
Digital Resolution	12bit	12bit
Data Interface	PCI, compact PCI	Base Camera Link™
Dynamic Range	69.5 dB	66 dB
Binning Selection	1 or 2 pixels horizontal and/or vertical	1x1, 2x2, 4x4, 8x8
Trigger, Auxiliary Signals	internal software, external TTL, 24V	Multiple options
Power Consumption	12 W	<17 W
Power Supply	VAC via PCI	12 - 15 VDC
CE Certified	yes	yes

¹ = With 12.5 μm wide entrance slit; 25 μm , 40 μm & 60 μm slits optional. ² = At Nyquist limit and 12.5um slit. ³ = At Nyquist frequency



Spatial Imaging Performance Guide									
Model	Scene ¹ FOV focused at:			Scene ¹ IFOV focused at:			Scene Res. ² focused at:		
	∞ (°)	0.5 m (mm)	3.0 m (mm)	∞ (mrad)	0.5 m (mm)	3.0 m (mm)	∞ (mrad)	0.5 m (mm)	3.0 m (mm)
HS-VNIR-CP-8.0	59	552	3358	0.81	0.40	2.41	1.61	0.79	4.82
“ -12	41	365	2235	0.54	0.26	1.61	1.08	0.52	3.21
“ -17	30	255	1575	0.38	0.18	1.13	0.76	0.37	2.26
“ -23	22	186	1162	0.28	0.13	0.83	0.56	0.27	1.67
“ -35	15	119	761	0.18	0.09	0.55	0.37	0.17	1.09
HS-VNIR-DP-8.0	75	756	4596	1.50	0.74	4.49	3.0	1.48	8.98
“ -12	54	500	3060	1.0	0.49	2.99	2.0	0.98	5.98
“ -17	40	349	2156	0.71	0.34	2.11	1.41	0.68	4.21
“ -23	30	255	1590	0.52	0.25	1.55	1.04	0.50	3.11
“ -35	20	163	1041	0.34	0.16	1.02	0.69	0.32	2.03

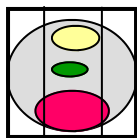
Interchangeable Objective Lenses

HS-VNIR objective lenses are designed for 400–1000 nm precision imaging. Premium optical performance is achieved through a sophisticated design using ultra low dispersion glass and special broadband anti-reflection coatings. These optimized lenses further enhance the signal throughput and low stray light performance of the Hyperspec™ imaging platform.

Lens Number	f/stop Range	Min Obj Dist (w/o ext. tube)
HS-VNIR-Lens-8	1.4 - 22	5 mm
HS-VNIR-Lens-12	1.4 - 22	20 mm
HS-VNIR-Lens-17	1.4 - 22	70 mm
HS-VNIR-Lens-23	1.4 - 22	115 mm
HS-VNIR-Lens-35	1.9 - 22	310 mm

Conveyor / Moving Web Process Monitoring Microscopy & Medical Imaging

Visual image in field
of view (FOV)



Spectra for points
A, B, C in visual image

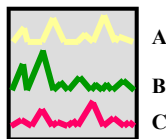
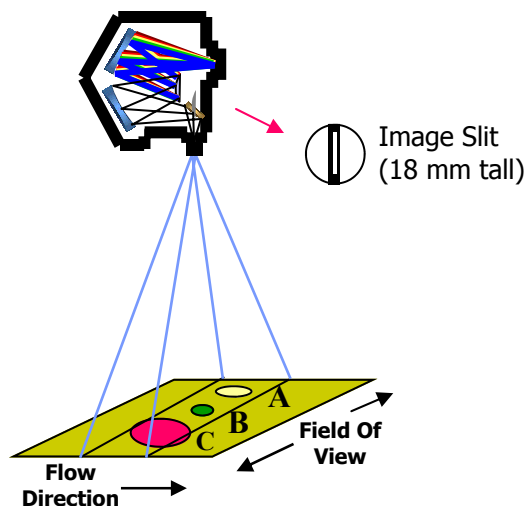
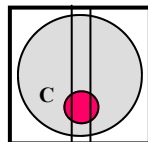


Image at target
wavelength λ



Software

HS-VNIR-CP Series: Software for camera control, display, storage and printing of image data under Windows9x, ME, XP, WindowsNT, Windows2000; software development kit (SDK) with demo software for the above mentioned operating systems and Linux; TWAIN driver; drivers or plug-ins for popular third party image processing products.

HS-VNIR-DP Series: Software for camera control supported through Camera Link™ connectivity standard.

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All specifications subject to change without notice.