

spectral camera **PFD**

Hyperspectral camera operating in the VIS and VNIR ranges of 380-800 nm and 400-1000 nm. With its high resolution, high image rate, flexible wavelength selection, and rugged structure, Spectral Camera PFD is an excellent tool for industrial measurements.



Cased Spectral Camera PFD



OEM Spectral Camera PFD

Spectral Camera is an imaging spectrometer, an integrated combination of our ImSpector imaging spectrograph and an area monochrome camera. It works as a push-broom type line scan camera and provides full, contiguous spectral information for each pixel.

The Spectral Camera PFD consists of an ImSpector V8E or V10E for the wavelength range 380-800 nm or 400-1000 nm, respectively, and a high speed CMOS detector. The transmission diffraction grating and lens optics used in the spectrograph provide a high quality, low distortion image that is designed to fulfill the most demanding specifications.

This Spectral Camera provides the flexibility and high speed acquisition required in the industrial QC applications. Combination of multiple Region-Of-Interests and binning gives a possibility for the optimal system setup and control for the user. Full spectral range can be acquired with 150 fps at 1 312 spatial locations and up to 100 Hz with higher spatial resolution of 1 775 pixels. By selecting partial spectral ranges, speed up to 1 000 fps can be achieved.

Applications

- Quality control
- Food and vegetation research
- On-line sorting and quality monitoring
- Plant and vegetation research
- Environmental monitoring
- Counterfeit detection



OPTICAL CHARACTERISTICS

Spectral camera	PFD-65-V8E	PFD-65-V10E	PFD4K-65-V10E
Spectral range	380 - 800 nm	400 - 1 000 nm	
Spectral resolution FWHM	2.0 nm (30 µm slit)	3.0 nm (30 µm slit)	
Spectral sampling	0.59 - 4.75 nm / pixel *	0.78 - 6.27 nm / pixel *	
Spatial resolution	RMS spot size < 9 µm		
F/#	F/2.4		
Slit width	30 µm (50 or 80 µm optional)		
Effective slit length	10.5 mm	14.2 mm	
Total efficiency (typical)	> 50 % independent on polarization		
Stray light	< 0.5 % (halogen lamp, 590 nm LPF)		

ELECTRICAL CHARACTERISTICS

Detector	CMOS		
Spatial pixels	1 312	1 775	
Spectral bands	768		
Pixel size	8.0 x 8.0 µm		
Camera output	Digital 12 bit		
Interface	Base CameraLink		
Camera control	CameraLink		
Frame rate	up to 150 fps	up to 100 fps	
Additional features	Spectral binning up to x 8 Multiple Region-of-Interest either in spatial or spectral direction		
Exposure time range	0.1 - 100 ms		
Power consumption	< 5 W		
Input voltage	12 V (OEM), 24 V (cased)		

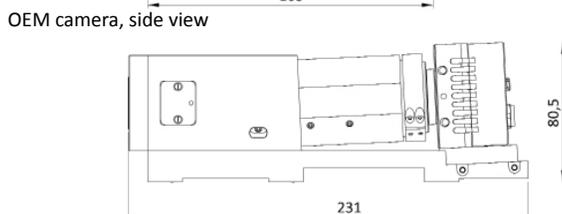
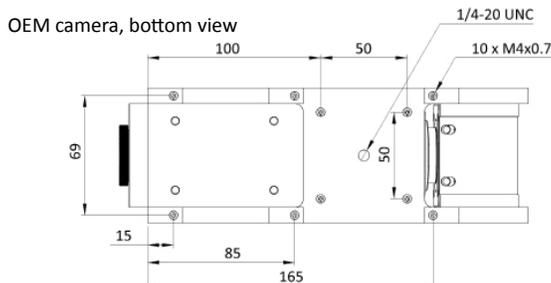
ENVIRONMENTAL CHARACTERISTICS

Storage	-20... + 50 °C		
Operating	+5... + 40 °C non-condensing		

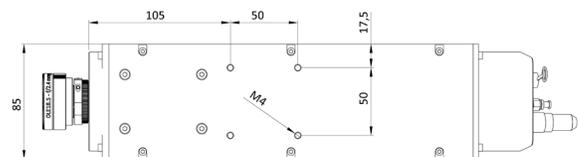
MECHANICAL CHARACTERISTICS

	OEM	CASED
Size	231 x 80.5 x 78 mm	330 x 85 x 90 mm
Weight	1.8 kg	2.7 kg
Body	Anodized aluminium with mounting screw holes	
Lens mount	Standard C-mount	
User adjustments	None	
Shutter	Optional	Yes, with USB control

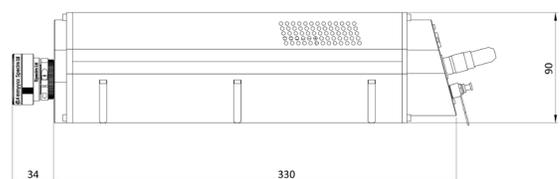
*) Adjustable by spectral binning.



Cased camera, bottom view



Cased camera, side view



ACCESSORIES

SPECIM can provide various accessories for the Spectral Cameras to broaden their applicability.

- **Fore objective lenses** which are designed to provide the optimal image and spectral quality across the full spectral range of the Spectral Camera.

	PFD	PFD4K
Lens	FOV	FOV
OLE 18	31,7 °	38 ° *
OLE 23	25,7 °	34,3 °
OLE 140	4,3 °	5 ° *

* with 1 550 spatial pixels

- **Collection fiber optics** to convert the camera into a multiple point spectrometer. All the points are measured simultaneously without a moving multiplexer.
- **Mirror Scanner or rotating stage** for scanning static targets and outdoor scenes, or with **X-stage sample mover** for desktop and microscope applications.

LUMO SOFTWARE

SPECIM Spectral Camera PFD is supported by LUMO software, which allows:

- data acquisition and saving data in the hard disk
- to set camera parameters
- image visualization in real time

Datacubes are saved in ENVI compatible format that allows further processing by several software packages for hyperspectral data processing.