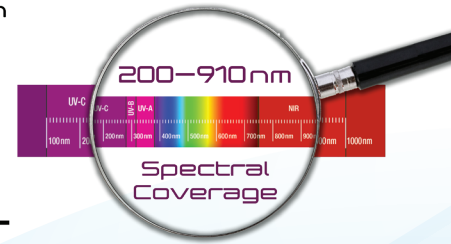
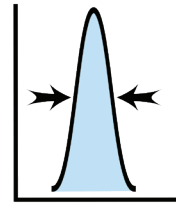
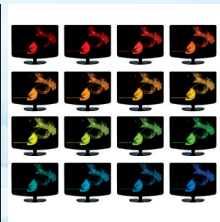
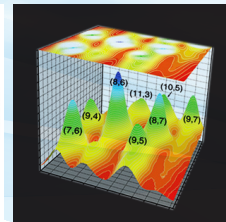
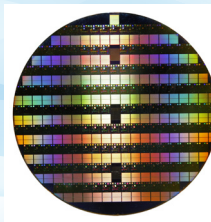
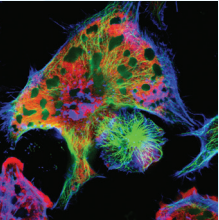
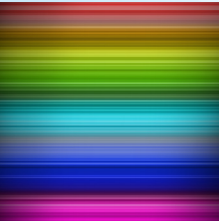


<2 nm  
Resolution

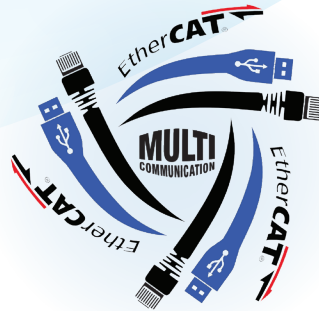


## VS70-MC

Miniature Multi Communication  
UV-NIR Spectrometer



For OEM  
Industrial Applications



# VS70-MC Miniature Multi Communication UV-NIR Spectrometer

## Overview

VS70-MC (Multi Communication) is a high performance compact fiber-coupled spectrometer system covering a wide spectral range of 200 to 910 nm.

This OEM optical module is built around HORIBA's type-IV aberration-corrected flat-field holographic ion-etched concave grating, and is specially designed to easily adapt to a large variety of detectors and electronic drivers. This system is fitted with a variable order-sorting filter to eliminate higher orders.

The proprietary layout of the VS70-MC features a single-optics design for superior imaging, peak symmetry, flat spectral response, high resolution, high sensitivity and low stray light performance. This system is very well suited for life sciences and semiconductor industry applications such as OES, reflectometry and quality control.

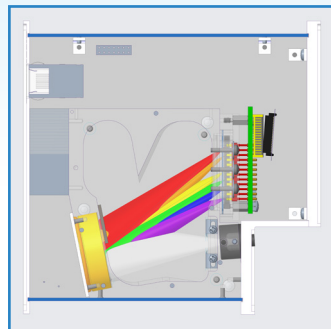
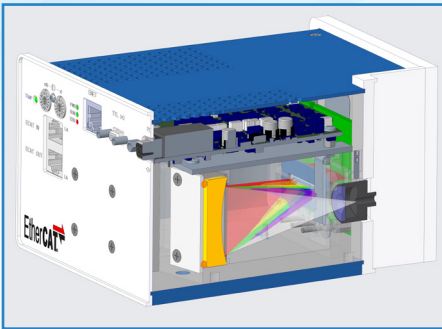
## Applications

Ideal for UV-NIR industrial applications such as Optical Emission Spectrometry, Fluorescence, Absorbance and Reflectometry

Examples:

- Semiconductor (Plasma Monitoring and Wafer Inspection)
- Life Sciences
- Process and Quality Control

## Optical and Mechanical Layout



Concave-grating mini spectrometer optical mechanical design.

## Features

**Triple communication capability USB 2, Ethernet and EtherCAT**

**High spectral resolution and system throughput**

**Uniform Spectral Response**

**Extended spectral coverage with high sensitivity from UV to NIR**

**High SNR and wide dynamic range**

**Enhanced Visual Design**

**One stage TE cooling option available**

## General Spectrometer Specifications\*

Spectral Coverage	200 - 910 nm
Spectrometer Input	Fiber-coupled: FC or SMA; other options available upon request.
Spectral Resolution	< 2 nm
Average Spectral Dispersion	25.2 nm/mm
Focal Length	70 mm
Options	Selection of high grade sensors: CMOS, B.I. CCD, PDA Input port: SMA, FC, free space, custom input
F/#	F/2.3
Stray Light Rejection Typical (Maximum)	≤ 0.4% at all applicable wavelengths by design Measured from 200 nm to 450 nm with a 550OG Schott Glass Filter and a tungsten broadband source
Wavelength Accuracy	≤ 0.4 nm (Average Absolute Wavelength Error)
Software**	LabVIEW™ acquisition software for initial evaluation (DLLs provided for software integration)

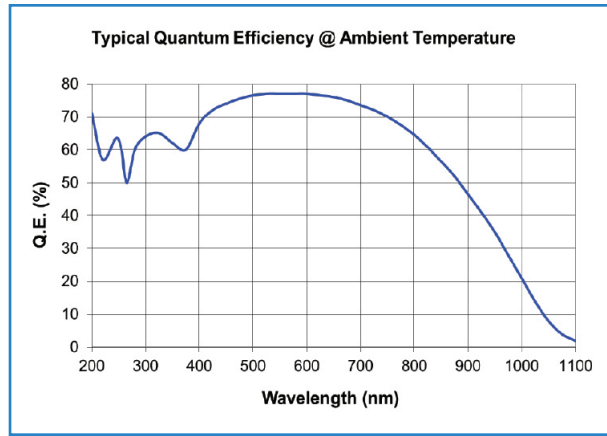
## Detector Options and Specifications\*

Linear back-illuminated CCD with large active area and high sensitivity		
Detector Model	Hamamatsu CCD sensor S11071 with high spectral acquisition speed	Cooled Hamamatsu CCD sensor S11851 with high spectral acquisition speed
Sensor Format	2048 x 70 pixels, shorter version available on request	2048 x 70 pixels, shorter version available on request
CCD Pixel Size	14 x 14 μm	14 x 14 μm
CCD Active Area	28.7 x 1 mm	28.7 x 1 mm
CCD QE	> 75% for 450-700 nm	> 75% for 450-700 nm
Sensor Temperature	Uncooled	Cooled (stabilized at 5° C)
Maximum Spectral Rate	770 spectra/s	770 spectra/s
Full Well Capacity	> 235,000 e <sup>-</sup> (typical); >200,000 e <sup>-</sup> (minimum)	>235,000 e <sup>-</sup> (typical); >200,000 e <sup>-</sup> (minimum)
Readout Noise	30 e <sup>-</sup> (typical); 35 e <sup>-</sup> (maximum)	30 e <sup>-</sup> (typical); 35 e <sup>-</sup> (maximum)
Digitization	16-bit	16-bit
Dynamic Range (FW/RN)	7800:1 (typical)	7800:1 (typical)
SNR	≥ 447:1 (Typical = 485:1)	≥ 447:1 (Typical = 485:1)
Non-linearity (measured on each system)	< 0.4% (corrected)	<0.4% (corrected)
Dark Current @ (25°C)	50 e <sup>-</sup> /pix/s (typical); 500 e <sup>-</sup> /pix/s (maximum)	7 e <sup>-</sup> /pix/s (typical); 70 e <sup>-</sup> /pix/s (maximum)
Communication Trigger Capability (In and Out)	Single mode: Ethernet/EtherCAT/USB 2.0 Dual mode: Ethernet & EtherCAT simultaneous	Single mode: Ethernet/EtherCAT/USB 2.0 Dual mode: Ethernet & EtherCAT simultaneous
Environmental Conditions	Operating temperature 15° C to 40° C ambient Relative humidity <70% (non-condensing) Storage temperature -25° C to 45° C	
Power Requirements	24VDC Power Kycon 9-PIN DB9 Connector	

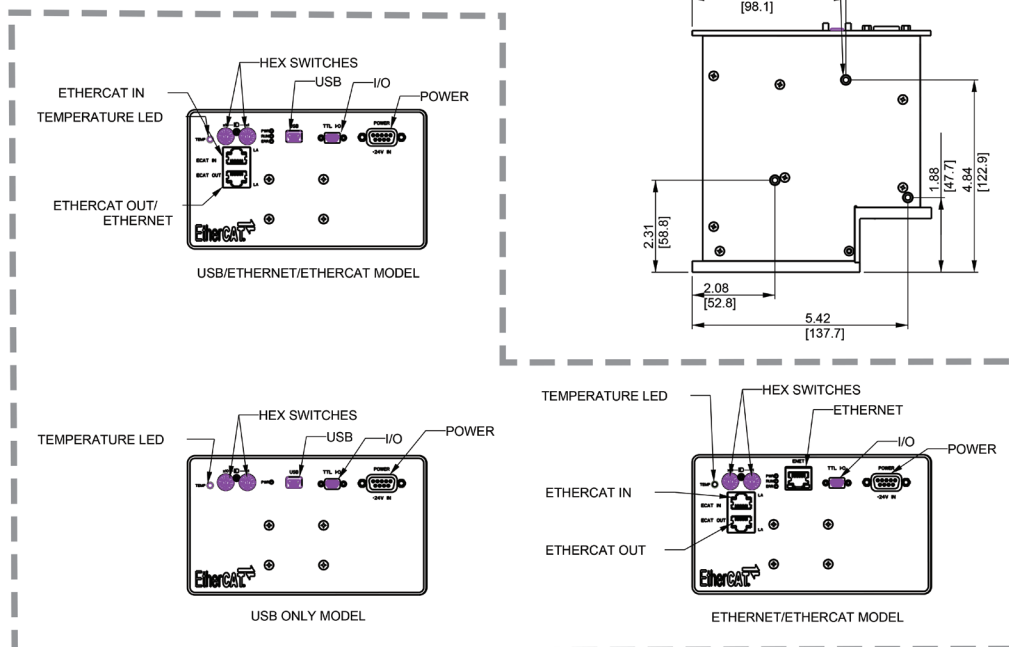
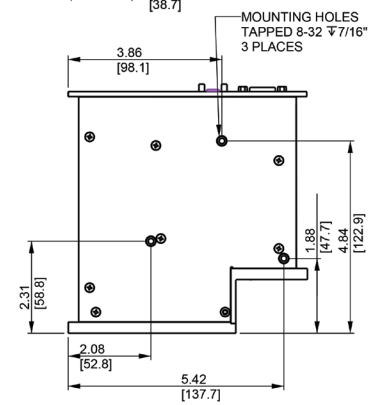
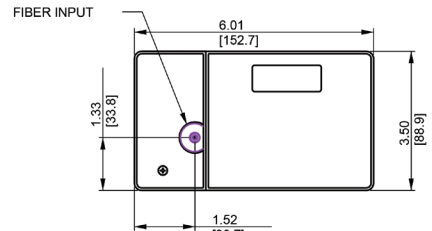
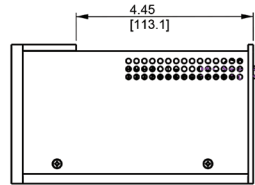
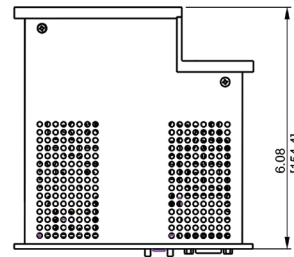
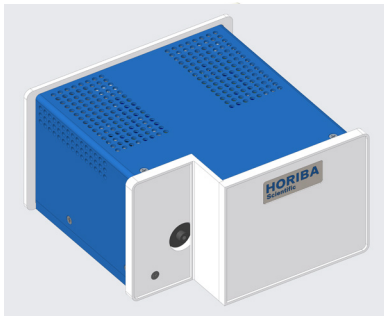
\* HORIBA Instruments has a policy of continuous product development, and reserves the right to amend part numbers, descriptions and specifications without prior notice.

\*\*No LabVIEW™ license is needed to run our acquisition software.

# Quantum Efficiency



# System Mechanical Drawings



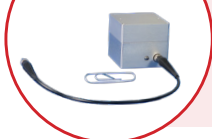
VS70-MC back panels for different models

# Best Selling Miniature Spectrometers for OEM Industrial Applications

## Fiber-coupled USB Spectrometers:

### MiniVS20 Spectrometer with Linear UV-VIS CMOS or NIR InGaAs Sensor

5 nm resolution



OEM hand-held spectrometer covering 190 to 1,700 nm for various low stray light applications

- Aberration-corrected concave holographic grating options
- VIS configuration featuring a 1.7" x 1.9" x 2" size combined with full F/2.3 optics for high signal-to-noise
- High throughput, compactness and long term reliability

### MiniVS70 VIS Spectrometer with FI CMOS or BI CCD

1 nm resolution



NEW miniaturized VS70 configuration

- Based on high performance aberration-corrected concave gratings fitted with a custom order-sorting filter to eliminate higher orders
- Low cost combined with high performance and low stray light
- Long term opto-mechanical stability and choice of front-illuminated linear CMOS or back-illuminated CCD sensors

### VS70 UV-VIS-NIR Spectrometer with Uncooled / TE-cooled CCD

1-2 nm resolution

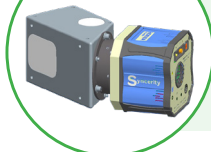


Compact, versatile most popular VS70 OEM spectrometer and OES configurations

- Based on high performance aberration-corrected concave gratings with full F/2.3 aperture
- Affordable, high throughput, robust and stable
- Electronics drivers ranging from **USB-2 to Ethernet and EtherCAT**

### CiCi-Raman-NIR with Scientific Camera Optimized for 785 nm

6 cm<sup>-1</sup> resolution



Most compact OEM Raman spectrometer with aberration-corrected holographic grating

- Covers 150-3,300 cm<sup>-1</sup>
- High efficiency and low stray light
- Available in F/2.3 and in compact F/5 configurations
- -50° C deep-cooled scientific CCD camera with minimized etaloning and high NIR QE

### PoliSpectra® Quad Spectrometer for Simultaneous Acquisition of 4 VIS Spectra

1 nm resolution



CCD spectrometer for simultaneous acquisition from 4 fiber inputs (470-730 nm)

- High-speed electronics (as fast as <1.5 msec readout time for 4 spectra)
- QUAD-channel high throughput system (f/2.3) and ultra-low stray light
- Industrial low-light applications from low light fluorescence to reflectance

### PoliSpectra® M116 8-32 Channel MultiTrack UV-VIS-NIR CMOS Spectrometer

1 nm resolution



Fiber-coupled multi-spectra system with 8- to 32-channel simultaneous measurements

- Concentric optical design with UV extended spectral range provides minimized crosstalk
- High throughput USB-3 system featuring a fast 2D scientific BI CMOS running at 94 to 188 frames per second, acquiring 8, 16 or 32 simultaneous spectra (2048 pixels per spectrum)

### PoliSpectra® 135 Multichannel or Hyperspectral Line Imager from UV to NIR

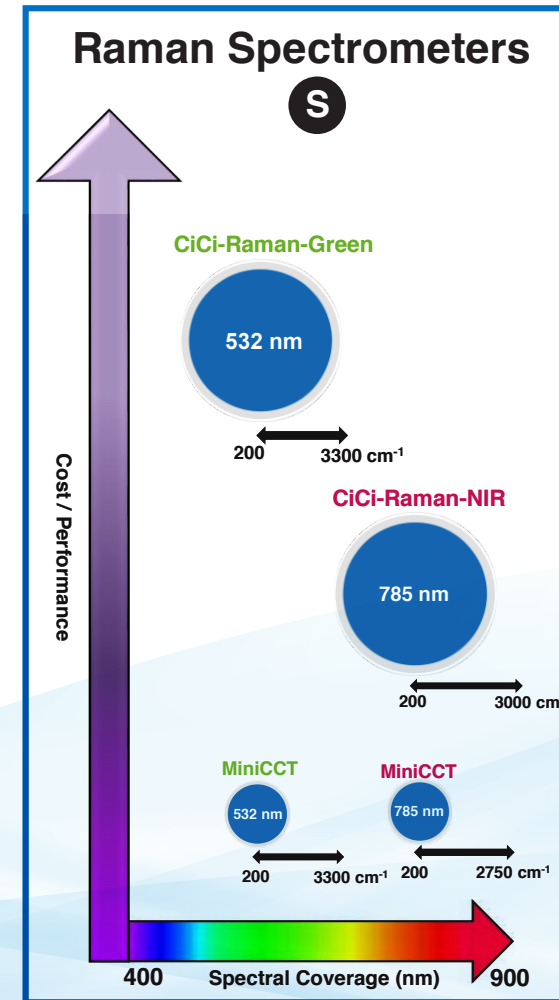
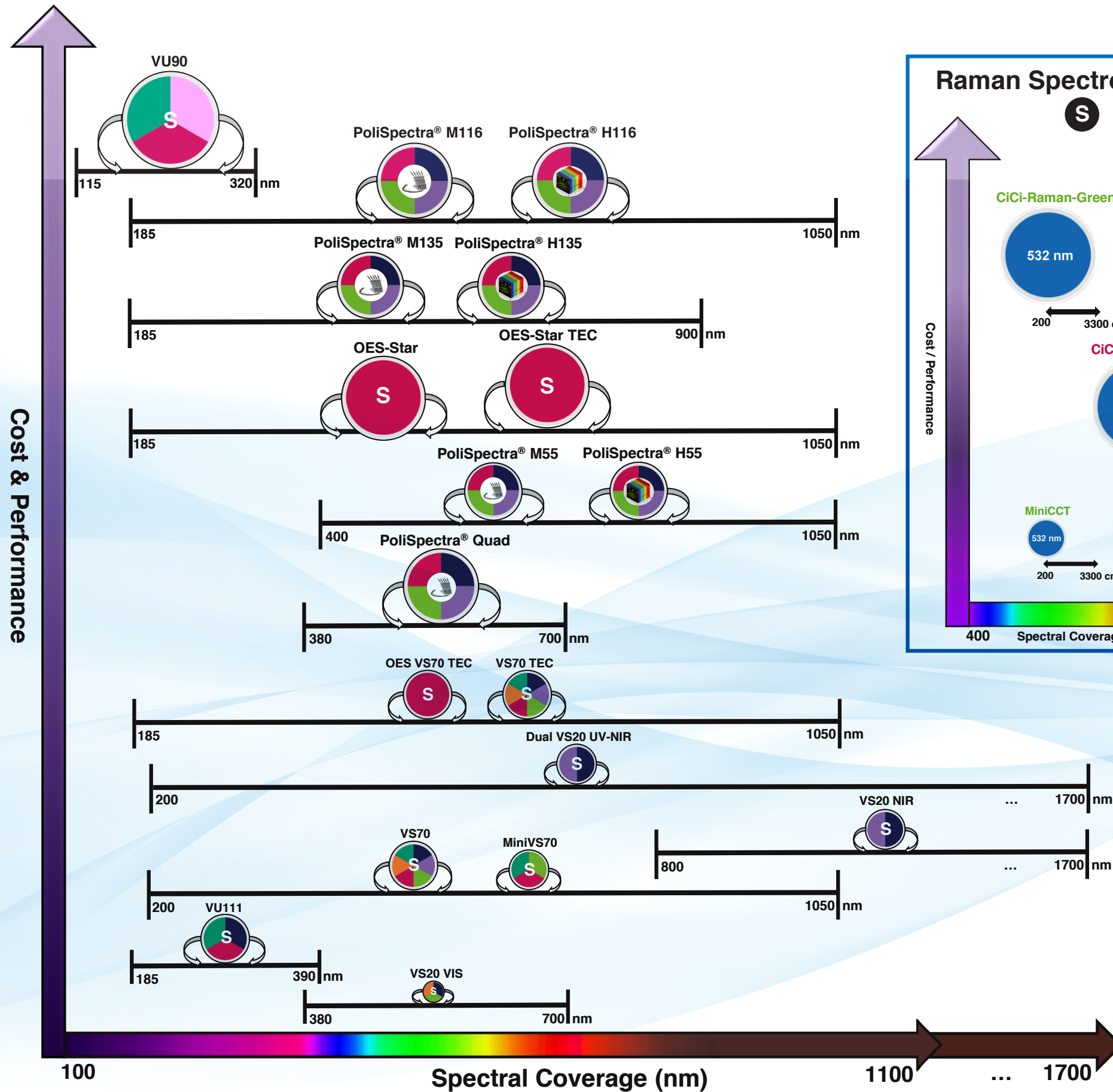
6 μm resolution



Ultra-high performance rugged spectrometer for hyperspectral imaging with a 2D sCMOS Camera

- For line-image scanning, in a push-broom hyperspectral configuration
- High throughput, USB-3 system featuring a fast 2D scientific BI CMOS with rolling shutter, running at 94 (HDR) to 188 (Standard Mode) frames per second (2048 pixels per spectrum)

# OEM Spectrometer Selection Guide



### Legend

**Spectrometer Input Type**

- S** Single-fiber Input
- Multi-fiber Input
- Hyperspectral Imager

**Technique & Application**

- Emission (OES)
- Absorbance
- Fluorescence
- Reflectance
- Raman
- Metrology
- Photoluminescence
- Colorimetry

**Spectrometer Size**

- ≤ 10.5x9x7 inches
- ≤ 8x8x8 inches
- ≤ 7.5x4.5x5 inches
- ≤ 7.5x4.5x3 inches
- ≤ 6x6x7.5 inches
- ≤ 5x5x5 inches
- ≤ 5x5x2 inches
- ≤ 2x2x2 inches

# OEM Philosophy and Mission

## 3 Centers of Excellence Dedicated to OEM Spectroscopy and Camera Solutions in US, EU, and Asia

Our mission is to provide a complete development and manufacturing experience, from optical simulations to opto-mechanical design and prototyping of spectroscopic and camera systems extending to, and including, electronics, firmware, software design and first articles.

Our products provide superior performance, reliability and stability, combined with robust cost reduction. Capable of flexible high volume production capacity in quantities of hundreds to thousands per year, we offer full confidentiality providing "Black Boxes" or private labelling, using your logo or graphics.

Unmatched customer service is provided by our exceptionally experienced workforce featuring on-time delivery and flexibility, allowing scheduling modifications.

Adhering to Copy Exactly! (CE!) processes, our fully trained staff, from engineering to manufacturing, form a dedicated OEM engineering force that supports you over the lifetime of the product.

### Scientific Segment - OEM Products and Capabilities:

- Custom master optical diffraction gratings
- Diffraction grating replicas (concave, convex and flat)
- Spectrometers, optical assemblies with pre-aligned sensors (CCD, PDA, CMOS, InGaAs) using either customers' or HORIBA's OEM electronics
- OES spectrometers
- Spectroscopy systems or modular engines, such as mini fluorometers and mini Raman systems
- Single and double scanning monochromators
- Imaging spectrographs and spectrometers with CCD or CMOS cameras
- Multispectra spectrometers with multiple fiber inputs / MultiTrack spectroscopy
- Hyperspectral system with HORIBA or customer provided camera (Push-broom configurations)
- Cameras: Spectroscopic deep-cooled scientific cameras (1D and 2D CCD & InGaAs – FI and BI)
- OEM electronics for optosensors ranging from PD and PDA to CCD and CMOS sensors
- Imaging cameras: Uncooled and cooled with FI and BI high-end scientific CMOS
- VUV/FUV spectrometers and CCD vacuum and N2-purged cameras

## Scientific Deep Cooled CCD, InGaAs and CMOS Cameras



	USA & Canada	Japan	Europe & Asia
	<a href="mailto:OEM.US@horiba.com">OEM.US@horiba.com</a>	<a href="mailto:OEM.JAPAN@horiba.com">OEM.JAPAN@horiba.com</a>	<a href="mailto:OEMSALES.JYFR@horiba.com">OEMSALES.JYFR@horiba.com</a>
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