



PHANTOM VEO 640 VEO 440



HIGH-SPEED CAMERA

4 Megapixels, 2560 x 1600
Up-to 1,490 fps (640)
1,100 fps (440)
L and S Body Styles

FEATURES & BENEFITS

PHANTOM VEO PRODUCT FAMILY

The VEO 640 and 440 belong to the core VEO product family, offering four-megapixel high-speed imaging for HD video quality and the resolution required for advanced motion analysis techniques.

EXTREME CONFIGURABILITY

VEO cameras are available in color or monochrome, up to 72GB RAM, with a variety of lens mounts and two body styles to allow users to **choose the best configuration** in terms of features and budget:

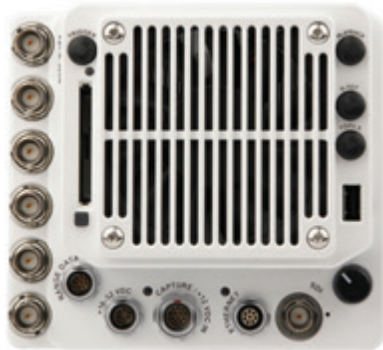
- **L-model** is for basic, software based imaging in a lab or office environment
- **S-model** provides additional signals, on-camera controls for untethered and remote recording, ruggedized connectors and compatibility with removable CFast 2.0 storage media.

IMAGE & SENSITIVITY

Sensor Type	CMOS, with Global Shutter
Maximum Resolution	2560 x 1600
CAR Increments	128 x 4
Pixel Size	10 μ m
Sensor Size	25.6 x 16 mm
Bit Depth	12 bit
EMVA 1288 Measurements (at 532 nm)	
Quantum Efficiency %	60.2% mono 43.6% color
Max. SNR (dB)	41.6
Absolute Sensitivity Threshold (p)	40.4 mono 54.1 color
Saturation Capacity (e ⁻)	14,512 mono 14,335 color
Temporal Dark Noise (e ⁻)	23.8
Dynamic Range (dB)	55.5

- Reported measurements were taken at 532 nm with both monochrome and color cameras

- Visit: www.phantomhighspeed.com/emva for more information on EMVA 1288



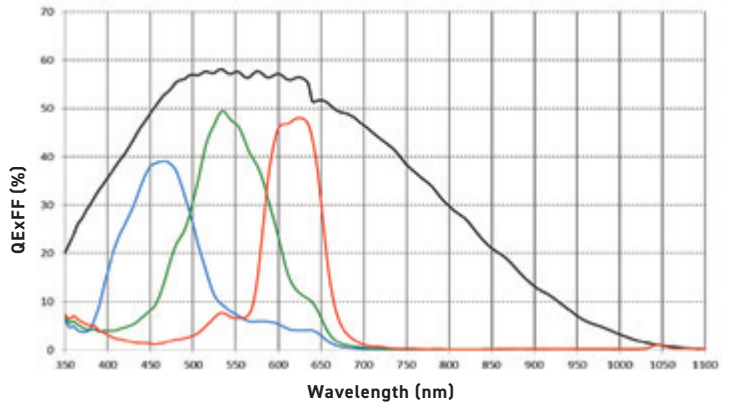
VEO S-model



VEO L-model

SPECTRAL RESPONSE

Quantum Efficiency Monochrome and Color



CONNECTIVITY & SIGNALS

Ethernet	Gigabit Standard, 10Gb Optional		
Timecode	IRIG-B Modulated and Un-modulated		
Port Descriptions		S-model	L-model
Ethernet		Fischer 8-pin	RJ45
Power		Fischer 6-pin	Fischer 6-pin
Range Data		Fischer 8-pin	N/A
USB		Yes for WiFi dongle	N/A
Video output		3G-SDI (2 ports), HDMI	3G-SDI (1 port), HDMI
Dedicated BNC		Trigger, Timecode-in, 3G-SDI	Trigger, Timecode-in
Programmable I/O BNC		4 ports	2 ports
I/O Signals	Programmable I/O for Fsync, Strobe, Ready, Timecode-out, Event, Memgate, Pretrigger. Assign and define signals in PCC		
Hardware Trigger	Dedicated BNC		
Software Trigger	Trigger button (S-model); via Ethernet; via Image-based auto trigger (IBAT)		
Synchronization	External Sync via FSync or IRIG Timecode		
Recording Features	Burst mode; Image-based auto trigger, Continuous recording & AutoSave to CFAST (S-model)		
Video Output	3G-SDI via BNC (rear S-model only); Din and Micro HDMI type D (front). Cameras prior to 2021 had HDMI type A port		
Accessory Power	4-pin Hirose (front) for 12V monitors up to 1 Amp		



MEMORY & STORAGE	
RAM Buffer	18GB, 36GB, 72GB RAM options
Multi-Cine	Up-to 64 Partitions
Non-Volatile Media	VEO S-model supports CFAST 2.0 (NTFS format) 80 MB/s Cine Raw file transfer rate from RAM

FRAME RATES & EXPOSURE		
Top FPS at Max Resolution	640: 1,490	440: 1,100
1 Megapixel FPS	640: 5,190	440: 3,980
Maximum FPS	640: 290,000	440: 290,000
Minimum FPS	24	
Minimum Exposure	1 µs standard	
PIV Features	Shutter-off mode with a straddle time of 1.7 µs Supports Burst Mode	
Exposure Features	Extreme Dynamic Range (EDR), Auto-Exposure, Overexposure indication over video and in PCC	

FRAME RATE CHART

Table provides examples of common resolutions and frame rates. The record times shown are for 72GB RAM at the frame rate shown. Duration will be 1/2 the time for 36GB and 1/4 the time for 18GB RAM.

Maximum Frame Rate - FPS; (72GB Record time - Sec)		
Resolution (H x V)	VEO 640	VEO 440
2560 x 1600	1,490 (8.4)	1,100 (11)
2560 x 1440	1,650 (8.4)	1,230 (11)
1536 x 1536	2,350 (9.2)	1,790 (12)
1920 x 1080	2,800 (8.8)	2,100 (11)
1280 x 1280	3,260 (9.6)	2,500 (12)
1280 x 800	5,190 (9.7)	3,980 (12)
1280 x 720	5,760 (9.7)	4,420 (12)
640 x 480	13,500 (12)	10,900 (15)
512 x 512	14,400 (13)	11,900 (15)
256 x 256	36,800 (21)	32,400 (24)
128 x 128	77,900 (40)	72,600 (43)
128 x 64	125,000 (50)	118,500 (53)
128 x 32	180,000 (60)	173,300 (72)
128 x 4	290,000 (340)	290,000 (340)

*Certain Phantom cameras are held to export licensing standards. Details available at: www.phantomhighspeed.com/export

CONTROL

Software & OS	Phantom PCC (Windows); SDK also available with MatLab and LabView drivers
On-Camera Controls	S-models only. Access menu system with encoder, viewed on video monitor. Buttons for trigger, play and save – Color indicates current camera state
Primary File Format	Phantom Cine RAW (.cine)
Alternative File Formats	Easily convert to formats including .mp4, Apple ProRes .mov, .avi, Tiff, JPG, DNG and many more using PCC. Cine files are directly compatible with many major video editing and motion analysis programs
Software Features	Continuous Recording for automated workflows, Integrated Data Acquisition (NI-DAQ), support for DIC Calibration with Sync-Snapshot menu, advanced Image Tools including Crop & Resample, Tone Curves, Filters and more

MECHANICAL

Housing Variants	L-model and S-model variants
Size	L-model: 5 x 5 x 5" (12.7 x 12.7 x 12.7 cm); S-model: 5 x 5.5 x 5" (12.7 x 14 x 12.7 cm)
Weight	L-model: 5.0 lbs (2.3 kg); S-model: 5.6 lbs (2.5 kg)
Lens Mounts	Choose lens mount at time of purchase: F-mount (with aperture support for Nikon G-style lenses), Canon EF mount (with electronic focus and iris control), PL, C-mount
Mounting Points	Standard 1/4 x 20" mounting points on bottom. Top, bottom and side are compatible with Cameo cheese plate for added mounting points, riser, and custom handle
Internal Shutter	Standard, for remote black references
Cooling	Active cooling. Quiet mode disables fans during capture

POWER

AC Power	100-240 VAC, 80W power supply included
Voltage Range	16-32VDC Primary; Secondary Power down to 12VDC via 12-pin capture port (S-models only)
Power Consumption	65W typical
Battery Options	S-model includes 12V input for compatibility with common 14.4V batteries. V-Lock and Gold-mount VEO side-mounts are available for VEO-S cameras

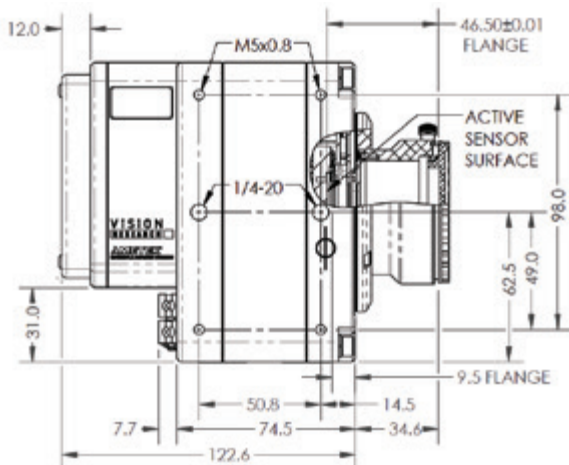
ENVIRONMENTAL

Operating Temperature	-10 to +50°C
Storage Temperature	-20 to +70°C
Relative Humidity	≤85% non condensing
Operational Shock	MIL-STD-202G Method 213-B. Rated 30G with shutter; 100G without; sawtooth wave, 11ms, +/- 10 pulses all axes
Operational Vibration	MIL-STD-202G Method 214-A. Rated 12Grms; Figure 2A-1, Test Condition D, 15 min per axis
Regulatory	Made in the USA Emissions – CE Compliant EN 61326-1 Immunity – CE Compliant EN 61326-1 KC Emissions – KC Compliant KN32 KC Immunity – KC Compliant KN35 FCC – CFR 47, Part 15, Subpart B & ICES-0003, Class A Safety – IEC 60950-1

GLOBAL SUPPORT NETWORK

The Phantom VEO-Series product line is supported by Vision Research's Global Service and Support network, offering PhantomCare service from multiple sites around the globe. Maximize the value of your Phantom camera with professional support services designed to meet your needs.

Learn more about our service offering at www.phantomhighspeed.com/Support



ABOUT VISION RESEARCH

Focused. Since 1950, Vision Research has been designing, and manufacturing high-speed cameras. Our single focus is to invent, build, and support the most advanced cameras possible.



100 Dey Road
Wayne, NJ 07470 USA
+1.973.696.4500