PHANTOM VEO-SERIES

PHANTOM
VEO 710

HIGH-SPEED CAMERA

1280 x 800 at 7,500 fps
Up-to 72GB RAM
Optional 10Gb Ethernet

FEATURES & BENEFITS

PHANTOM VEO PRODUCT FAMILY

Phantom VEO cameras are designed to perform in a wide array of high-speed scientific and industrial applications. The VEO 710 records at 7Gpx/sec for frame rates reaching 7,500 frames per second (fps) at 1280 x 800 and up-to 700,000 fps at a reduced 64 x 8 resolution, or 1M fps with FAST Option.

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	1280 X 800
CAR Increments	64 x 8
Pixel Size	20 µm
Sensor Size	25.6 x 16 mm
Bit Depth	12 bit
EMVA 1288 Measurements (at 532 nm)	
Quantum Efficiency %	33.9% mono 29.5% color
Max. SNR (dB)	44.1
Absolute Sensitivity Threshold (p)	99.4 mono 115.9 color
Saturation Capacity (e-)	25918 mono 27880 color
Temporal Dark Noise (e-)	33.1
Dynamic Range (dB)	57.7

- Reported measurements were taken at 532 nm with both monochrome and color cameras
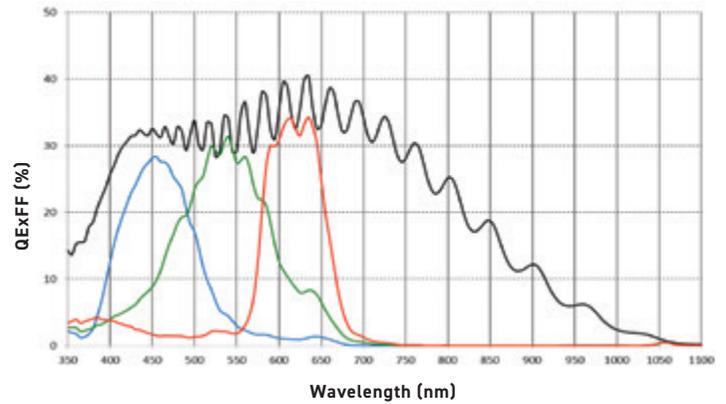- Visit: www.phantomhighspeed.com/emva for more information on EMVA 1288
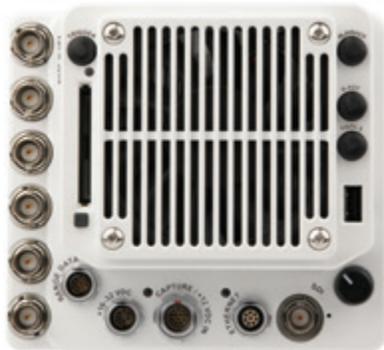
VEO S-model

VEO L-model

SPECTRAL RESPONSE

Quantum Efficiency Monochrome and Color

CONNECTIVITY & SIGNALS

Ethernet	Gigabit Standard, 10Gb Optional		
Timecode	IRIG-B Modulated and Un-modulated		
		S-model	**L-model**
	Ethernet	Fischer 8-pin	RJ45
	Power	Fischer 6-pin	Fischer 6-pin
	Range Data	Fischer 8-pin	N/A
Port Descriptions	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
Programmable 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	7,500
Maximum FPS	690,000 fps at 64 x 8 standard; 1M fps with Fast Option*
Minimum FPS	24
Minimum Exposure	1 μs Standard; 300 ns with Fast Option*
PIV Features	Shutter-off mode with straddle time of 395 ns, 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 710**
1280 x 800	7,500 (6.5)
1280 x 720	8,300 (6.7)
1024 x 720	10,100 (6.8)
768 x 480	19,200 (7)
640 x 480	22,300 (7.5)
512 x 512	24,800 (7.9)
512 x 320	39,400 (7.9)
256 x 256	77,600 (9)
256 x 160	120,500 (10)
128 x 128	204,000 (15)
128 x 64	360,000 (17)
128 x 32	580,000 (21)
64 x 8	690,000 (140)
64 x 8*	1,000,000 (100)

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 withSync-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
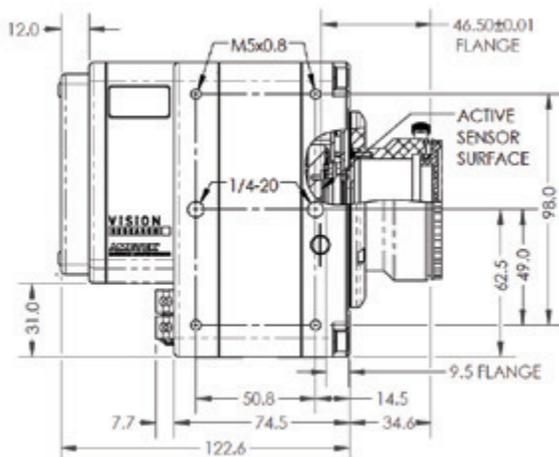
POWER

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	**CE Emissions** – CE Compliant EN 61326-1 **CE Immunity** – CE Compliant EN 61326-1 **FCC** – CFR 47, Part 15, Subpart B & ICES-0003, Class A **KC Emissions** – KC Compliant KN32 **KC Immunity** – KC Compliant KN35 **Safety** – IEC 60950-1

GLOBAL SUPPORT NETWORK

The Phantom VEO 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.

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