

VICON



VALKYRIE SPECIFICATIONS

CAMERA RANGE SPECIFICATION

PERFORMANCE	VK26	VK16	VK8	VK6
Maximum frame rate (fps) at full resolution	150 ¹	240 ¹	500 ¹	720 ¹
Maximum frame rate (fps) at partial scan	2,000 ¹			
Frame rates (fps)	23.976–2,000			
SENSOR	VK26	VK16	VK8	VK6
Sensor type	CMOS			
Sensor resolution (pixels)	5120 H x 5120 V	5120 H x 3152 V	3712 H x 2176 V	2816 H x 2176 V
Number of pixels	26,214,400	16,138,240	8,077,312	6,127,616
Pixel size	2.5 microns x 2.5 microns		4.5 microns x 4.5 microns	
Physical sensor size (mm)	12.8 mm (H) x 12.8 mm (V), 18.1 mm (Diagonal)	12.80 mm (H) x 7.88mm (V), 15.03mm (Diagonal)	16.70 mm (H) x 9.79 mm (V), 19.36 mm (Diagonal)	12.67 mm (H) x 9.79 mm (V), 16.01 mm (Diagonal)
Optical format	1.1"	1"	1.2"	1"
Shutter type	Global shutter ²			
Aspect ratio	1:1	8:5	17:10	13:10
ON CAMERA PROCESSING	VK26	VK16	VK8	VK6
256 shades and grayscale processing	Yes ³			
Grayscale depth	8-bit			
Sub pixel resolution	1,310,720 x 1,310,720	1,310,720 x 806,912 (1/256 pixel resolution)	950,272 x 557,056 (1/256 pixel resolution)	720,896 x 557,056
On-board processors	3 processors			
On-camera masking	Yes ⁴			
In-camera dynamic large blob eliminator	Yes ⁵			
Software masking	Yes			
Auto masking	Yes			
On-camera thresholding	Yes			
Threshold grid size (tiles)	320 x 320	320 x 197	232 x 136	176 x 136
Threshold grid tile dimensions (pixels)	16 x 16			
Camera output modes	5 ⁶			
Full frame preview output	Yes ⁷			
STROBE / RINGLIGHT	VK26	VK16	VK8	VK6
Type available	850 nm (Infrared (IR))			
Number of LEDs	22			
Secondary optic	Wide angle light spread; remove for narrow light spread			
Strobe electronics	Integrated, software reprogrammable and controlled			
Adjustable illumination	Yes			
Adjustable levels	1,000 (software controlled)			
View angle (Set by secondary optic)	54° to 72°			

CAMERA RANGE SPECIFICATION

PHYSICAL	VK26	VK16	VK8	VK6
Camera housing	Complex mold custom die-cast aluminum			
Camera body dimensions	202 mm (H) x 150 mm (W) x 210 mm (D)			
Weight (including strobe, excluding lens)	2.87 kg			
Number of mount points	2			
CAMERA ARCHITECTURE	VK26	VK16	VK8	VK6
Software and firmware upgradable	Yes			
Upgrade methods	Via the the Vicon Firmware Update Utility ⁸			
Connector	A single RJ45 connector to the Ethernet switch			
Cabling	Cat6 or Cat6a (Gigabit Ethernet with power and sync over Ethernet)			
Power supply	48V • 25.5 W when connected to PoE+ (IEEE 802.3at-2009) • 32.5 W when connected to PoE++ (IEEE 802.3bt-2018)			
Maximum number of cameras supported per Ethernet switch	Switch-dependent (Contact info@vicon.com)			
Lens type supported	Proprietary Vicon varifocal 54° to 72° angle field of view (9.4 mm to 12.5 mm)	Proprietary Vicon varifocal 54° to 72° angle field of view (11.5 to 16.4 mm)	Proprietary Vicon varifocal 54° to 72° angle field of view (10 mm to 12.5 mm)	
Plug and play compatibility	Yes			
Mixed camera system compatibility	Interoperable with all Vero and Vantage cameras, as well as supported FLIR cameras (via a Vicon Lock)			
System connectivity / communication	Gigabit Ethernet			
Communication status indicators	Yes			
Camera number indicator / information display	Yes			
Camera status indicators	On camera and in software			
Tap to Select notification	Yes			
IP addressable	Yes			
IP reconfigurable	Yes			
Cooling	Advanced thermal design			
OPERATING TEMPERATURE	VK26	VK16	VK8	VK6
Maximum temperature	35°C ⁹			
Minimum temperature	-5°C ⁹			
ENVIRONMENTAL AND INGRESS PROTECTION REGULATIONS	VK26	VK16	VK8	VK6
RoHS compliant	Yes			
IP (Ingress Protection) rating	IP65 ¹⁰			

CAMERA LENS SPECIFICATIONS

Valkyrie cameras are fitted with a lens that is suitable for the system use you specified on ordering. The lens's suitability is determined by various factors, including the focal length, which defines the Field of View (FOV), and the aperture range. The latter affects the amount of light seen by the image sensor and also governs the depth of field, the distance from the camera where the image is in focus.

CAUTION

Vicon Valkyrie cameras contain no user-serviceable components. For all servicing, and any alterations, you must return the camera to Vicon. Any attempt by you or any third party to alter or repair a Valkyrie camera may invalidate its warranty.

CAMERA LENS SPECIFICATION

The following tables provide technical specifications for the physical characteristics of the lens available for VK26, VK16, VK8 and VK6 cameras.

CAMERA LENS COMPONENT	SPECIFICATION
Focal Length	9.4 mm to 18.8 mm
Format	4/3"
Aperture (f-stop) range	0–10 (see table below for more detail)
External dimensions	60 mm (diameter) x 111.5 mm (length)
Weight	0.496 kg

NOTE: Vicon Valkyrie cameras are shipped with a focal length of 12 mm.

VICON VALKYRIE APERTURE VALUES

This table provides the calculated true aperture values for the marked aperture numbers on a Valkyrie varifocal lens. Due to the limitations of the test equipment, no values are available for the aperture number 10.

MARKED APERTURE NUMBER	TRUE APERTURE VALUE (F-STOP) AT 18.8 MM FOCAL LENGTH	TRUE APERTURE VALUE (F-STOP) AT 9.4 MM FOCAL LENGTH
0	2.94	1.93
1	3.16	2.08
2	3.57	2.36
3	4.01	2.71
4	4.61	3.14
5	5.38	3.64
6	6.32	4.32
7	7.70	5.40
8	9.99	6.97
9	13.89	10.09

ANGLE OF VIEW INFORMATION FOR VICON VALKYRIE CAMERAS

ANGLE OF VIEW	VK26	VK16	VK8	VK6
Focal length for 72° to 54° angle of view	9.4 mm to 12.5 mm		11.5 mm to 16.4 mm	10 mm to 12.5 mm

The Valkyrie lens was designed to give 72° to 54° angle of view for each sensor but also works outside of those focal lengths. The secondary optics for the strobe spreads the light for the wider angle of view; without the secondary optics, the spread matches the narrower angle of view.

Also note that:

- For focal lengths that give an angle of view wider than 72°, there is no strobe light coverage.
- For focal lengths that give an angle of view of 54° or narrower, we recommend that you do not use the secondary optics.

CAMERA STROBE UNIT SPECIFICATIONS

Valkyrie strobe units use surface-mounted LEDs and have an optional secondary optic; this enables you to best match the light spread to the field of view obtained with the focal length setting of the lens.

CAMERA STROBE (SHUTTER) DURATIONS

The following table shows camera strobe duration for different specifications:

MAXIMUM DURATION	SPECIFICATION
0.5 ms	at 150 Hz progressive
0.25 ms	at 300 Hz progressive
0.125 ms	at 600 Hz progressive
0.0625 ms	at 1200 Hz progressive

The strobe light-ring emits light once per video frame and is precisely aligned with the global shutter of the image sensor. The duration is controlled in the camera's strobe settings in your Vicon application software. The strobe intensity, which controls the duration of the light being emitted, can be adjusted in 1/1000 increments from zero through to the maximum allowed. When increasing the strobe intensity, remember that very fast motion produces more motion blur, so you may have to compromise between lens aperture and strobe intensity settings.

The total power drawn from the Ethernet switch is the sum of the power drawn by the strobe and the camera itself. At a constant strobe intensity setting, the strobe power taken is proportional to the frame rate. Up to 150 fps, the strobe duration can be adjusted from zero to the maximum of 0.5 mS. In order not to exceed the allowable total maximum power taken, the strobe duration is automatically reduced as shown in the above table.

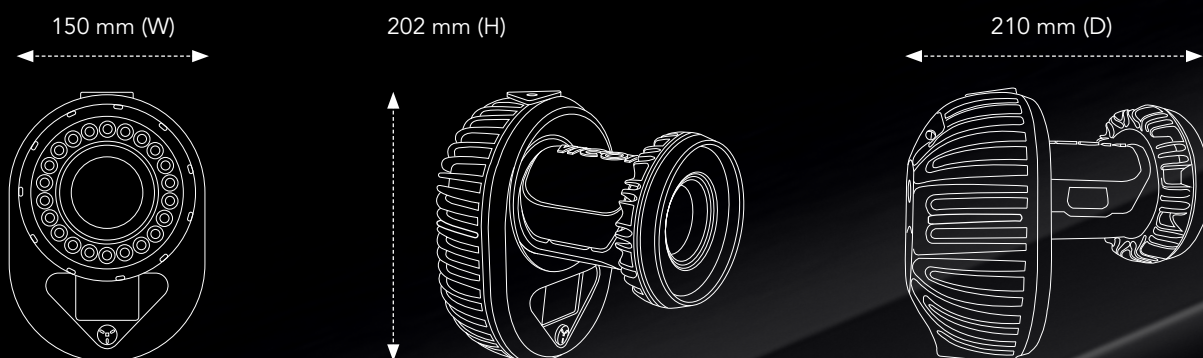
NOTE

Above 150 fps, the amount of light emitted per frame is linearly reduced. The light emitted per frame at 300 fps is half that output per frame at 150 fps. (The total strobed light output remains the same)

INFRARED STROBE SPECIFICATIONS

The following table provides technical specifications and performance indicators for Vicon Valkyrie Infrared (IR) strobe units.

COMPONENT	SPECIFICATION
Strobe active source (AlGaAs LEDs)	22
Wavelength	850 nm
Strobe viewing angle (to half luminous intensity). Set by secondary optics	54° and 72°
Time averaged irradiance (in W.m-2)	69.65 (PoE+), 82.91 (PoE++) ¹¹
Maximum power consumption (per camera)	25W (PoE+) or 35W (PoE++), running at 150 fps, maximum strobe setting
RoHS compliant	Yes



SPECIFICATION TABLE NOTES

1. VK26, VK16, VK8 and VK6 Increased frame rates Above 150 fps, the amount of light emitted per frame is linearly reduced. The light emitted per frame at 300 fps is half that output per frame at 150 fps. (The total strobed light output remains the same). Selecting a frame rate greater than full resolution automatically reduces image size by windowing. This keeps the pixel rate the same by transmitting a greater number of smaller images per second. You specify the capture frame rate of the Valkyrie cameras in the Vicon application software. Valkyrie cameras are capable of capturing up to a maximum of 2,000 fps, but the actual frame rate you can specify depends on the Vicon application software you are using. For details, see your Vicon software documentation.

2. Shuttering: The global shutter overcomes the negative effects of using rolling shutters for motion capture.

3. Full marker grayscale: Marker centers are calculated based on every pixel of grayscale available for the marker, not just the detected marker edges. An on-camera circularity test ensures merged or partially occluded markers which need high-level processing are sent in full grayscale to the Vicon Valkyrie host PC.

4. On-camera masking: This removes areas of the sensor where undesirable static light sources are recorded, for example strobes from other cameras.

5. Blob elimination: Camera firmware automatically removes undesirable image data including both large blobs (eg, sunlight reflections) and/or an unusually large number of blobs.

6. Output modes: Automatic (centers for circular markers, grayscale for overlapping/partially occluded markers), Centers Only, Grayscale Only, Centers/Grayscale, and Preview (the entire sensor image).

7. Preview mode: The full image is lightly filtered, decimated and transmitted to the Valkyrie host at 30 fps (variable). This reduces the quantity of preview video data to a level that can be transmitted over Gigabit Ethernet to the Vicon Valkyrie host PC.

8. Vicon Firmware Update Utility: Accessible either as a standalone application or through your Vicon application software (via an icon on the toolbar or from the Help menu).

9. Operating temperature: While Vicon cameras may operate outside the given limits, these are the temperatures to which Vicon has tested the cameras. If the cameras are operated outside of these limits, image quality may be degraded, the external surface temperatures may exceed the relevant safety limits, and any failures are not covered under warranty.

10. IP65 rating: Only applies if the lens cover and IP65 cable cap are correctly fitted. If the lens cover and/or cable cap are not present or are incorrectly fitted, the camera is not IP65 rated.

11. Given the following assumptions:

- Ideal overlap of radiation characteristics of array diodes
- IEC 62471-1 classification distance is 200 mm
- Ambient temperature is 25 degrees C
- Low visual stimulus at 850 nm
- Calculation is for >1000 seconds

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