



GigE VISION CAMERAS

Manta

Technical Manual

V7.3.0

Manta at a glance

Manta cameras have a Gigabit Ethernet (GigE) interface. Manta cameras are GigE Vision® V1.2 and GenICam SFNC V1.2.1 compliant. Manta cameras work with Gigabit Ethernet hardware and cable lengths up to 100 m.

Applied standards

GigE Vision® The GigE Vision standard is an interface standard for digital machine vision cameras administered by the Automated Imaging Association (AIA) that is widely supported in the machine vision industry. In contrast, Gigabit Ethernet is the network GigE Vision is built upon.

GenICam™ GenICam is a machine vision standard hosted by the European Machine Vision Association (EMVA). The aim of GenICam is to provide a generic configuration interface for cameras and devices independent of the used interface technology (i.e. GigE Vision, USB3 Vision, 1394 DCAM, Camera Link). This approach enables proper interoperability between GenICam compliant hardware and software solutions without the need for customization.

The GenICam standard consists of multiple modules that specify tasks to be solved. Allied Vision cameras and software make use of these modules, like the Standard Feature Naming Convention (SFNC) that standardizes feature names and types via an XML file or the transport layer interface (GenTL) that is used to grab images.

What else do you need?

Content	Document name	Link
Hardware and software installation	GigE Installation Manual	https://www.alliedvision.com/fileadmin/content/documents/products/cameras/various/installation-manual/GigE_Installation_Manual.pdf
Camera feature description for software applications based on Vimba SDK	GigE Features Reference	https://www.alliedvision.com/fileadmin/content/documents/products/cameras/various/features/GigE_Features_Reference.pdf
Camera attribute description for software applications based on PvAPI SDK	GigE Camera and Driver Attributes	https://www.alliedvision.com/fileadmin/content/documents/products/cameras/various/features/GigE_Camera_and_Driver_Attributes.pdf
Modular options available for your Manta camera	Modular Concept	https://www.alliedvision.com/fileadmin/content/documents/products/cameras/various/modular-concept/Modular_concept_external.pdf

Content	Document name	Link
Technical papers, application notes	n/a	https://www.alliedvision.com/en/support/technical-papers-knowledge-base.html
3D CAD files	n/a	https://www.alliedvision.com/en/support/technical-documentation/manta-documentation.html

**Read this manual carefully**

Learn how to protect your camera from damage and fully understand its functions.

Software downloads

To download Vimba SDK, including Vimba Viewer for simple camera access, go to:

<https://www.alliedvision.com/en/products/software.html>

Firmware downloads

To download the latest firmware, go to:

<https://www.alliedvision.com/en/support/firmware.html>

Before updating the firmware, see *Firmware update* on page 158.

Contact us

Connect with Allied Vision by function

<https://www.alliedvision.com/en/meta-header/contact.html>

Find an Allied Vision office or distributor

<https://www.alliedvision.com/en/about-us/where-we-are.html>

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Document history and conventions



This chapter includes:

- Document history
- Layout styles and symbols used in this manual

Document history

Version	Date	Remarks
V2.0.3	2010-Apr-15	New Manual- Release status
V3.0.0	2010-Jun-09	<p>Added new models: G-046B, G-046C, G-145B, G-145C (including 30fps variants), G-146B, G-146C, G-201B, G-201C (including 30fps variants).</p> <p>Added Spectral sensitivity note.</p> <p>Added Image memory size table.</p> <p>Added ROI frame rate data for the following models: G-046B, G-046C, G-145B, G-145C, G-146B, G-146C, G-201B, G-201C</p> <p>With the new firmware 1.40, due to a bug all Manta models have only 12-bit in the data path (even if the ADC delivers 14 bit).</p> <p>Due to a repaired bug in FPGA and microcontroller, the <i>StreamHoldCapacity</i> changed: G-032B & G-032C from 49 frames to 99 frames, G-125B & G-125C from 12 frames to 25 frames.</p> <p>RGBA24 and BGRA24 are not supported.</p> <p>Manta board level cameras have now a cooling plate.</p>
V4.0.0	2010-Oct-25	<p>Added note that description of status LEDs can be found in Manta Hardware Installation Guide.</p> <p>Changed file format from FM7 to FM9</p> <p>Added G-033B, G-033C (sensor: Sony ICX 414) and G-504B, G-504C (sensor: Sony ICX 655).</p>
V4.0.1	2011-Jan-05	<p>Changed tripod drawing: added dimensions of three big holes (M6 and UNC 1/4-20).</p> <p>In specifications tables color pixel formats: inserted Mono8. Added note, that Raw8, Raw16 displayed in some viewers means the same as Bayer8, Bayer16.</p> <p>Changed GigE Vision V1.0 to V1.2 in all specification tables.</p>

Table 1: Document history

Version	Date	Remarks
V4.1.0	2011-Jun-24	<p>Added PoE information including:</p> <ul style="list-style-type: none"> Power requirements, power consumption and regulations for PoE models. Note about PoE capable cameras PoE cameras < 220 g (without lens). <p>Corrected frame rate formulas for G-033, G504:</p> <p>C-/CS-Mount not adjustable, for modifications contact Customer Care and send camera to Allied Vision Technologies:</p> <p>Manta board level:</p> <ul style="list-style-type: none"> Manta board level: deleted (PWR output on demand) at Pin2 <p>Removed Chapter Firmware update (see Knowledge Base at Allied Vision Technologies Website: search for Application Note GigE Firmware Update)</p> <p>Revised data path block diagram.</p> <p>Added 30fps variant for G-145B/C-30fps and G-201B/C-30fps</p> <p>Added Mono12Packed for monochrome cameras and Bayer12Packed for color cameras.</p> <p>Added the following camera controls: Chunk Data, EventControls, StreamFramerateConstrain, FrameStartTriggerOverlap, PayloadSize, NonImagePayloadSize, SyncInGlitchFilter, AutoIris, Gamma, LUT</p> <p>G-145-30fps and G-201-30fps (non PoE)</p> <ul style="list-style-type: none"> ... have same I/O pin assignment (input circuits and voltage range), power LED and upside down PoE plug as PoE models <p>G-145B/C-30fps and G-201B/C-30fps non-PoE behave like PoE cameras.</p>
V5.0.0	2012-May-15	<p>Error found in Document history V3.0.0 by Validation Team:</p> <ul style="list-style-type: none"> RGBA24 and BGRA24 should be named RGBA32 and BGRA32 Added RGBA32 and BGRA32 color formats (except G-201B/C-30fps). Added frame rate diagrams. <p>New model added: G-145B NIR.</p> <p>New sensors ICX618 for G-031</p> <p>Added focal length 4.0 mm in the focal length vs field of view table for the G-125.</p> <p>Added G-031</p> <p>Same main board for all Manta models:</p> <p>From serial number 503323258 on all Manta models including PoE and board level versions contain the same main board.</p> <p>Revised non-PoE drawings and new board level PoE drawings</p>

Table 1: Document history (Continued)

Version	Date	Remarks
V5.0.0 [continued]	2012-May-15 [continued]	<p>Revised PoE descriptions regarding IEEE 802.3af and IEEE 802.3at:</p> <ul style="list-style-type: none"> See note in <i>Gigabit Ethnet port</i> (Manta PoE models can source power from IEEE 802.3af (100 MBit/s and 1000 MBit/s) and from IEEE 802.3at compliant PSE devices (Power Sourcing Equipment): such as switches injectors or NICs.) <p>New CAD drawings with Pin3 = Video Type Auto Iris Out</p> <p>Frame memory</p> <ul style="list-style-type: none"> G-032B/C: changed from 49 to 99 frames. G-033B/C: changed from 88 to 99 frames. G-046B/C: changed from 35 to 70 frames. G-125B/C: changed from 12 to 25 frames. G-145B/C: changed from 10 to 22 frames. G-145B/C-30fps: changed from 10 to 22 frames. G-146B/C: changed from 10 to 22 frames. G-201B/C: changed from 8 to 16 frames. G-201B/C-30fps: changed from 8 to 16 frames. <p>Added frame rates for ROI height = 720</p> <ul style="list-style-type: none"> <i>G-125B, G-125C ROI frame rate</i> <p>IR cut filter:</p> <p>Changed IR cut filter to (<i>type Jenofilt 217</i>)</p>
V6.0.1	2013-Mar-20	<p>Added new models: G-223, G-282, G-283, G-609, G-917. These models are called Manta type B, since there are some differences to the other models that are called Manta type A (specifications, housing, data path, features).</p> <p>New tripod adapter, new CAD drawings with LEDs on top of the connector In <i>Specifications</i> chapter, the pixel formats are listed both for PvAPI and Vimba (GenICam V1.0).</p> <p>Added chapter <i>Video iris output description</i></p> <p>I/O pin assignment: 10 mA on outputs 1 and 2 (not 20 mA)</p> <p>G-031: External trigger delay.</p> <p>Corrected the mass (200 g) of Manta type A cameras G-031, G-032, G-033, G-046, G-125, G-145, G-146, G-201, G-504.</p> <p>PoE models: compliant with Power over Ethernet IEEE 802.3at/af</p> <p>Deleted the Chapter <i>Manual Overview</i>, Deleted <i>Frame Rate Comparison of all Manta cameras</i></p> <p>New date format: year-month-day</p>
V7.0.0	2013-Aug-30	<p>Added new models: G-419B, G-419C</p> <p>As of this version, the document refers to Vimba SDK (not PvAPI)</p> <p>Changed cable recommendation to Category 6 or higher</p> <p>G-145B, G-145C (including 30 fps variants): changed framerate</p> <p><i>Camera interfaces</i> chapter: added input/output block diagrams and the status LED description</p> <p>Changed minimum exposure times of <i>G-223B, G-223B NIR, G-223C, G-419B, G-419B NIR, G-419C</i></p> <p>Changed ROI frame rates of G-145B-30fps & G-145C-30fps</p>

Table 1: Document history (Continued)

Version	Date	Remarks
V7.0.1	2013-Sep-30	<p>Added Camera cleaning</p> <p>Changed maximum frame rates and gain range, added burst mode for G-223B, G-223B NIR, G-223C, G-419B, G-419B NIR, G-419C</p> <p>Added a feature of Manta type B cameras (G-223, G-282, G-283, G-609, G-917): temperature monitoring</p> <p>Added ReverseX feature in Camera features</p> <p>Added Manta angled-head housings (type B)</p> <p>Updated maximum gain values for G-283B, G-283C, G-917B, G-917C</p> <p>Updated minimum exposure time for G-145B, G-145C (-30fps)</p> <p>Updated the frame rate vs. height graphs</p> <p>Updated links to the GigE installation manual through out the manual</p>
V7.0.2	2014-May-08	<p>Updated Camera block diagrams</p> <p>Updated drawings for Manta type A board level (non-PoE): dimensions and Manta type A board level (PoE): dimensions</p> <p>Updated spectral sensitivity plots</p> <p>Updated the note on StreamHoldCapacity in Specifications and Frame memory sections</p> <p>Added section Exceptions for non-PoE Manta cameras up to serial number 503323258</p> <p>Updated available color pixel formats for G-223B, G-223B NIR, G-223C, G-419B, G-419B NIR, G-419C</p> <p>Updated optional accessories in the Specifications chapter</p> <p>Added section Manta standard board level variants (type B)</p> <p>Added Hirose cable information</p> <p>Updated exposure time values for G-145B NIR, G-145B, G-145C (-30fps), G-223B, G-223B NIR, G-223C, G-282B, G-282C, G-283B, G-283C</p> <p>Corrected frame rate formula for G-145B NIR</p>
V7.0.3	2014-Jun-09	<p>Added trigger latency and jitter values in the Specifications chapter</p> <p>Updated and rearranged Specifications chapter</p> <p>Added Camera feature comparison section</p> <p>Preliminary Manta type B angled-head and board level variant information removed from the document until samples are available</p>

Table 1: Document history (Continued)

Version	Date	Remarks
V7.1.0	2014-Oct-07	<p>Updated the following in the <i>Specifications</i> chapter</p> <ul style="list-style-type: none"> • Trigger latency and jitter values • Decimation control descriptions changed to GenICam factor style <p>Added <i>BufferHandlingControl</i> and <i>StreamInformation</i> in <i>Camera features</i> section, applicable for Vimba v1.3 or higher</p> <p>Updated <i>Camera features</i> section</p> <p>Added new camera model G-505B, G-505C: <i>Specifications</i>, Camera lens information, Description of data path, <i>ROI frame rate</i> information</p> <p>Added new camera model G-235B, G-235C: <i>Specifications</i>, Camera lens information, Description of data path <i>ROI frame rate</i> information</p> <p>Added the following sections:</p> <ul style="list-style-type: none"> • <i>Manta CMOS angled-head housings (type B)</i> • <i>Manta CMOS board level variants (type B)</i> • <i>Cross section: CS-Mount (type B)</i>
V7.2.0	2015-Mar-20	<p>Updated Allied Vision logo</p> <p>Replaced references of AVT and Allied Vision Technologies to Allied Vision</p> <p>Updated links to new Allied Vision website</p> <p>Renamed Description of data path chapter to Camera data path</p>
V7.3.0	2015-Nov-02	<p>Updated mass of all Manta type B cameras as per Product Change Notification 2015-03-02.</p> <p>Changed the technical manual layout.</p> <p>Changed chapter name from 'Camera data path' to Image data flow and updated the figures.</p> <p>Changed chapter name from 'Camera dimensions' to Mechanical dimensions.</p> <p>Merged the 'Resolution and ROI frame rates' chapter into Specifications chapter.</p> <p>Added Manta at a glance section</p> <p>Added General safety notes section</p> <p>Updated Manta type B mechanical drawings</p> <p>Added Legislation section in Safety and legislation chapter to replace 'Legal notice' and 'Conformity' sections</p> <p>Moved 'Sensor position accuracy' section from Appendix to 'Mechanical dimensions' chapter and deleted 'Appendix'</p> <p>Added Camera features comparison section in Specifications chapter to replace 'Camera smart features' and 'Camera features' sections</p> <p>Added Cross section: C-Mount and CS-Mount section to replace 'Cross section: C-Mount' and 'Cross section: CS-Mount' sections</p> <p>Added Cleaning optical components chapter to replace 'Camera cleaning' and updated information</p> <p>Added Contact us section to replace 'Contacting Allied Vision' section</p>

Table 1: Document history (Continued)

Manual conventions

To give this manual an easily understood layout and to emphasize important information, the following typographical styles and symbols are used.

Styles

Style	Function	Example
Bold	Programs, inputs or highlighting important things	bold
Courier	Code listings etc.	Input
Italics	Modes, fields	<i>Mode</i>
Blue italics	Links	<i>Link</i>

Symbols



Safety Note

Note to prevent physical injury.



Possible material damage

This symbol addresses important information to avoid material damage; however, is not related to physical injury.



Damage to the camera by electrostatic discharge (ESD)

This symbol addresses important information to avoid material damage by ESD.



Safety-related instructions to avoid malfunctions

This symbol indicates important or specific instructions or procedures that are related to product safety. You have to follow these instructions to avoid malfunctions.



Practical hint

This symbol highlights a practical hint that helps to better understand the camera's features and functions, and to make better use of it.

**Further information available online**

This symbol highlights URLs for further information. The URL itself is shown in blue.

Example:

<http://www.alliedvision.com>

Safety and legislation



This chapter includes:

- General safety notes for Manta cameras
- Information about the legal requirements and restrictions for Manta cameras based on current and relevant legislation
- Particular emphasis has been given to legislation of the European Economic Area (CE, RoHS, WEEE) as well as legislation of the United States of America (FCC)

General safety notes



Avoid damage to the camera by ESD

Inadequate protection of the camera from ESD can damage the camera permanently. Read the safety instructions and ESD warnings in the GigE Installation Manual.



Do not exceed environmental specifications

See environmental specifications limits in the Specifications section of this document. Special care must be taken to maintain a reasonable operating temperature. If the camera is operated in temperatures higher than the specified range, the camera should be mounted on a heat sink.



Verify all external connections

Verify all external connections in terms of voltage levels, power requirements, voltage polarity, and signal integrity prior to powering the device.



Do not disassemble the camera housing

This camera contains sensitive internal components. Warranty is void if camera has been disassembled.



Keep shipping material

Poor packaging of the product may cause damage during shipping.



Cleaning optical components

This product can be damaged by some volatile cleaning agents. Avoid cleaning the image sensor unless absolutely necessary. Please see instructions on optics cleaning in this document.

Legislation

CE and RoHS



Allied Vision Technologies declares under its sole responsibility that all standard cameras of the Manta family to which this declaration relates are in conformity with the following standard(s) or other normative document(s):

- CE, following the provisions of 2004/108/EG directive
- RoHS (2011/65/EU)



WEEE

This product must be disposed of in compliance with the directive 2002/96/EC on waste electrical and electronic equipment (WEEE).

FCC – Class B Device

For customers in the U.S.A.



This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interferences will not occur in a particular installation. If the equipment does cause harmful interference to radio or television reception, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the distance between the equipment and the receiver.
- Use a different line outlet for the receiver.
- Consult a radio or TV technician for help.

You are cautioned that any changes or modifications not expressly approved in this manual could void your authority to operate this equipment. The shielded interface cable recommended in this manual must be used with this equipment in order to comply with the limits for a computing device pursuant to Subpart B of Part 15 of FCC Rules.

For customers in Canada

This apparatus complies with the Class B limits for radio noise emissions set out in the Radio Interference Regulations.

Pour utilisateurs au Canada

Cet appareil est conforme aux normes classe B pour bruits radioélectriques, spécifiées dans le Règlement sur le brouillage radioélectrique.

Life support applications

These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Allied Vision Technologies customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Allied Vision Technologies for any damages resulting from such improper use or sale.

Other legal notices

Trademarks

Unless stated otherwise, all trademarks appearing in this document of Allied Vision Technologies are brands protected by law.

Warranty

The information provided by Allied Vision Technologies is supplied without any guarantees or warranty whatsoever, be it specific or implicit. Also excluded are all implicit warranties concerning the negotiability, the suitability for specific applications or the non-breaking of laws and patents. Even if we assume that the information supplied to us is accurate, errors and inaccuracy may still occur.

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Specifications



This chapter provides:

- Technical specifications
- Spectral sensitivity plots
- ROI height vs. Frame rate plots
- Comparison of feature availability in Manta camera models

Notes on specifications



PoE capable cameras

PoE capable cameras have the letters PoE written on the camera's label on the bottom side of the camera.



Important notice before reading the specifications tables

All measurements were done without protection glass / IR cut filter. With glass or filters, quantum efficiency (QE) decreases by approximately 10%.

The uncertainty in measurement of the QE values is $\pm 10\%$.

This is due to:

- Manufacturing tolerance of the sensor
- Uncertainties in the measuring apparatus itself (Ulbricht sphere, optometer, etc.)

The measurements for Manta G-145B NIR in figure 20: and figure 21: were done with a different method to illustrate the effect of the NIR mode.



Type A and Type B cameras

Manta type A cameras: G-031, G-032, G-033, G-046, G-125, G-145, G-146, G-201, G-504

Manta type B cameras: G-223, G-235, G-282, G-283, G-419, G-505, G-609, G-917



Dimensions and mass

The dimensions listed in the following tables are for Manta standard housing (straight view) models. Dimensions include connectors but not the tripod and lens.

The mass listed in the following tables are for Manta standard housing (straight view) PoE and non-PoE models. Mass does not include the tripod and lens.

Frame memory

Normally, an image is captured and transported in consecutive steps. The image is taken, read out from the sensor, digitized and sent over the GigE network. Manta cameras are equipped with a FIFO image buffer. The memory operates according to the first in, first out (FIFO) principle. Specification tables for each camera show how many frames can be stored by each model.



Number of frames

The number of frames (*StreamHoldCapacity*) depends on resolution, pixel format, and GVSP packet size. The stated number of frames is typical for full resolution, Mono8/Bayer8, and a *GevSCPSPacketSize* = 8192 bytes per packet.

Resolution and ROI frame rate

Resolution and ROI frame rate is listed after the specification table. The resulting frame rate from changing sensor height from full image to a single line. Unless otherwise noted, sensors do not give an increase in readout speed with a reduction in width. However, in cases where a camera is limited by frame rate due to bandwidth restrictions, a reduction in width will give a frame rate increase. Cameras with a “burst mode” frame rate are able to output more data than the maximum available bandwidth (124 MB/s), and will see a frame rate increase with a reduction in width.



Resolution and ROI measurements

- Data was generated using *StreamBytesPerSecond* = 124 MB/s (full bandwidth) and an 8-bit pixel format. Frame rate may be lower if using network hardware incapable of 124 MB/s.
- For maximum speed advantage on quad-tap CCD sensors, ROIs are center image, where feature *OffsetY* = (full sensor height – ROI height)/2.
- There is no frame rate increase with reduced width.
- *BinningVertical* is horizontal row summing on CCD before readout. The frame rate for an ROI at the same effective height as binning will be slower because the CCD still needs to read out the “fast readout rows” in ROI mode.



Frame rate for CCD sensors

The frame rate is a theoretical maximum frame rate (frames per second) of the CCD sensor according to the given formula.

Manta G-031B/C

Feature	Specification
Resolution	656 x 492
Sensor	Sony ICX618AL/AQ with EXview HAD CCD II™ technology
Type	Progressive Scan CCD
Sensor size	Type 1/4
Cell size	5.6 μm
Lens mount	C / CS-Mount
Housing variants ¹	Standard, Angled head, Board level
Maximum frame rate at full resolution	125 fps
Maximum image bit depth	12-bit
On-board FIFO image buffer	32 MB, up to 99 frames at full resolution
Mono formats	Mono8, Mono12Packed, Mono12
Color formats	BayerRG8, BayerRG12Packed, BayerGR12, Mono8, RGB8Packed, YUV411Packed, YUV422Packed, YUV444Packed, BGR8Packed, RGBA8Packed, BGRA8Packed
Exposure control	58 μs to 60 s; 1 μs increments
Gain control	0 – 32 dB
Binning	Horizontal: 1 to 8 columns; Vertical: 1 to 14 rows
Decimation	Horizontal and Vertical: 1, 2, 4, 8 factor
Opto-isolated I/Os	2 inputs, 2 outputs
RS-232	1 TxD, 1 RxD
Voltage requirements	8–30 VDC, or PoE
Power consumption	3.7 W @ 12 VDC; 4.3 W PoE
Trigger latency ²	Idle state: 9.9 μs; Frame valid state: 16.5 μs
Trigger jitter ²	Idle state: 5.3 μs; Frame valid state: 11.9 μs
Operating temperature	+5 °C to +45 °C housing temperature
Storage temperature	-10 °C to +70 °C ambient temperature without condensation
Body dimensions (L x W x H)	86.4 x 44 x 29 mm
Mass	PoE model: 210 g; Non-PoE model: 200 g
Hardware interface standard	PoE, IEEE 802.3af 1000BASE-T, 100BASE-TX
Software interface standard	GigE Vision Standard V1.2
Camera control interface	GenICam SFNC V1.2.1 compliant
Regulatory	CE, FCC Class B, RoHS (2011/65/EU)

¹ For more information on housing variants, see the [Modular concept](#).

² It is possible to start the exposure of the next frame while the previous frame is read out:

- Idle state: sensor is ready and camera is idle, waiting for the next trigger
- Frame valid state: sensor is reading out and camera is busy. If the next frame is requested by an external trigger in this state, higher latency may occur as compared to the idle state.

Table 2: Manta G-031B/C camera specifications

Manta G-031B spectral sensitivity

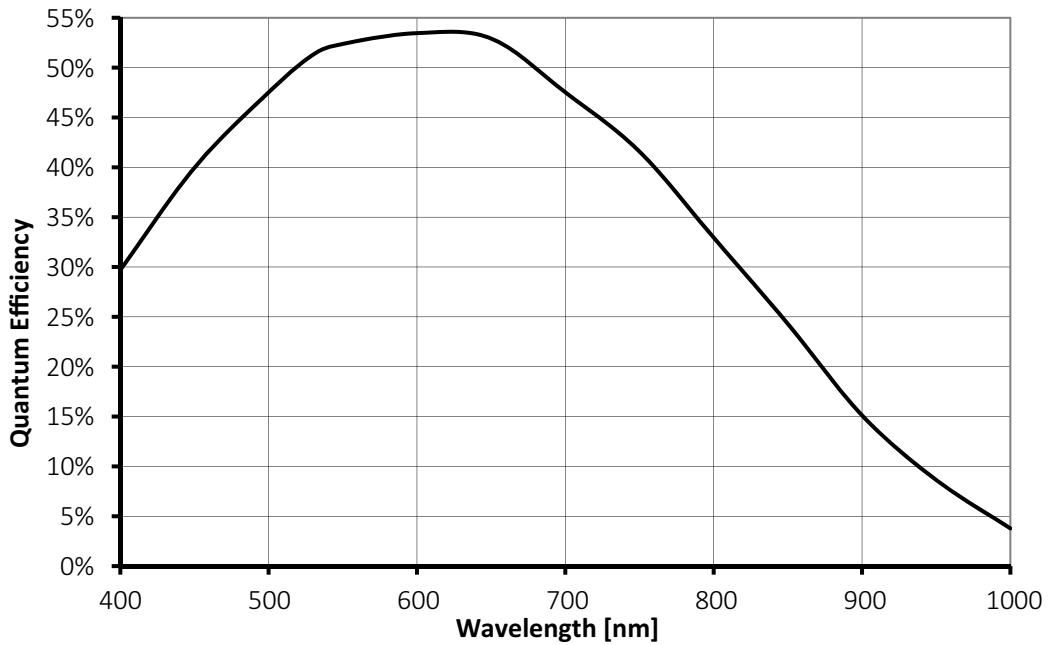


Figure 1: Manta G-031B spectral sensitivity (without protection/cover glass)

Manta G-031C spectral sensitivity

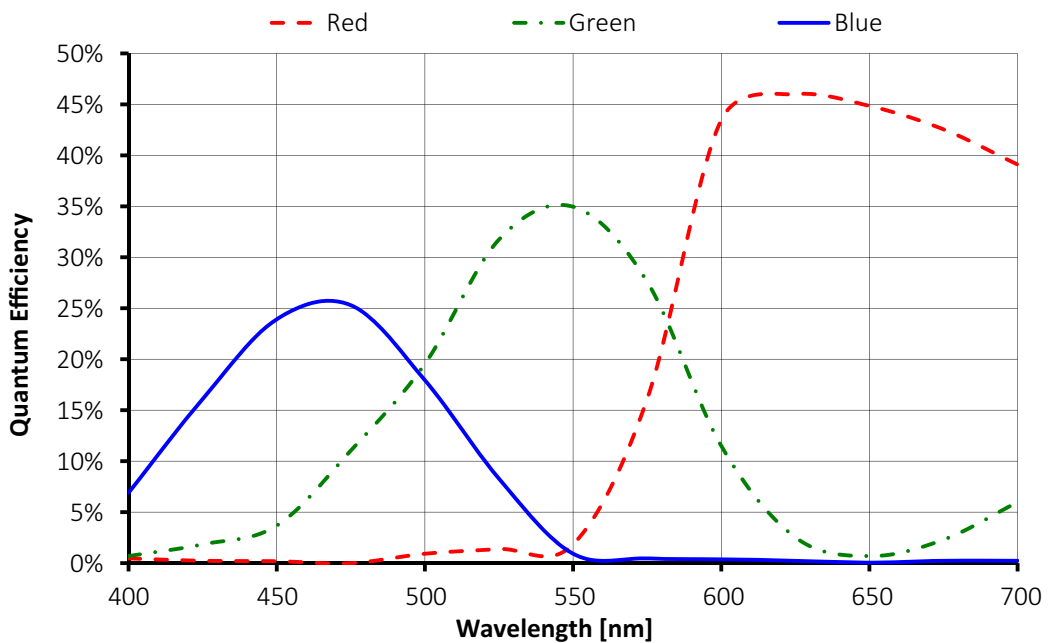


Figure 2: Manta G-031C spectral sensitivity (without IR cut filter)

Manta G-031B/C ROI frame rate

$$\text{Max. frame rate} = \frac{1}{15.7\mu\text{s} \times \text{ROI height} + 2.53\mu\text{s} \times (492 - \text{ROI height}) + 252.74\mu\text{s}}$$

Maximum frame rate at full resolution according formula: 125.2 fps

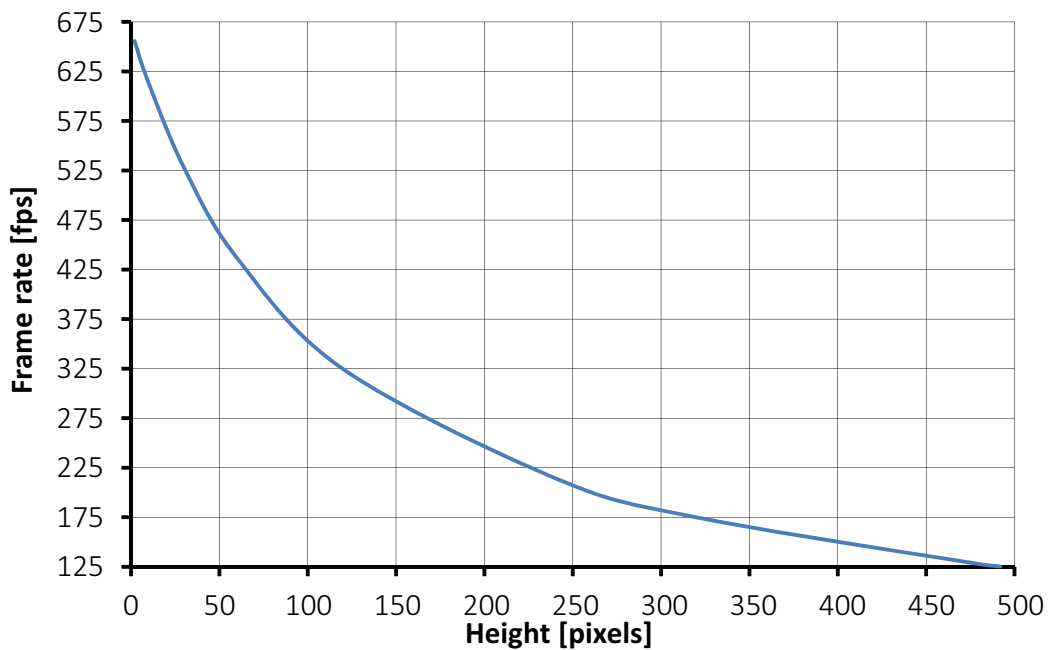


Figure 3: Frame rate as a function of ROI height [width=656]

ROI height [pixels]	Width [pixels]	Frame rate [fps] ¹
492	656	125.2
480	656	127.7
320	656	174.8
240	656	214.4
120	656	324.5

ROI height [pixels]	Width [pixels]	Frame rate [fps] ¹
60	656	436.7
30	656	527.9
10	656	613.2
2	656	655.6

¹ Frame rate = theoretical maximum frame rate (in frames per second) of the CCD sensor according to given formula.

Table 3: Frame rate as a function of ROI height

Manta G-032B/C

Feature	Specification
Resolution	656 x 492
Sensor	Sony ICX424AL/AQ with HAD technology
Type	Progressive Scan CCD
Sensor size	Type 1/3
Cell size	7.4 μm
Lens mount	C / CS-Mount
Housing variants ¹	Standard (straight view), Angled head, Board level
Maximum frame rate at full resolution	80 fps
Maximum image bit depth	12-bit
On-board FIFO image buffer	32 MB, up to 99 frames at full resolution
Mono formats	Mono8, Mono12Packed, Mono12
Color formats	BayerRG8, BayerRG12Packed, BayerGR12, Mono8, RGB8Packed, YUV411Packed, YUV422Packed, YUV444Packed, BGR8Packed, RGBA8Packed, BGRA8Packed
Exposure control	26 μs to 60 s; 1 μs increments
Gain control	0 – 36 dB
Binning	Horizontal: 1 to 8 columns; Vertical: 1 to 14 rows
Decimation	Horizontal and Vertical: 1, 2, 4, 8 factor
Opto-isolated I/Os	2 inputs, 2 outputs
RS-232	1 TxD, 1 RxD
Voltage requirements	8 – 30 VDC, or PoE
Power consumption	3.6 W @ 12 VDC; 4.2 W PoE
Trigger latency ²	Idle state: 8.0 μs ; Frame valid state: 18.7 μs
Trigger jitter ²	Idle state: 5.5 μs ; Frame valid state: 16.2 μs
Operating temperature	+5 °C to +45 °C housing temperature
Storage temperature	-10 °C to +70 °C ambient temperature without condensation
Body dimensions (L x W x H)	86.4 x 44 x 29 mm
Mass	PoE model: 210 g; Non-PoE model: 200 g
Hardware interface standard	PoE, IEEE 802.3af 1000BASE-T, 100BASE-TX
Software interface standard	GigE Vision Standard V1.2
Camera control interface	GenICam SFNC V1.2.1 compliant
Regulatory	CE, FCC Class B, RoHS (2011/65/EU)

¹ For more information on housing variants, see the [Modular concept](#).

² It is possible to start the exposure of the next frame while the previous frame is read out:

- Idle state: sensor is ready and camera is idle, waiting for the next trigger
- Frame valid state: sensor is reading out and camera is busy. If the next frame is requested by an external trigger in this state, higher latency may occur as compared to the idle state.

Table 4: Manta G-032B/C camera specifications

Manta G-032B spectral sensitivity

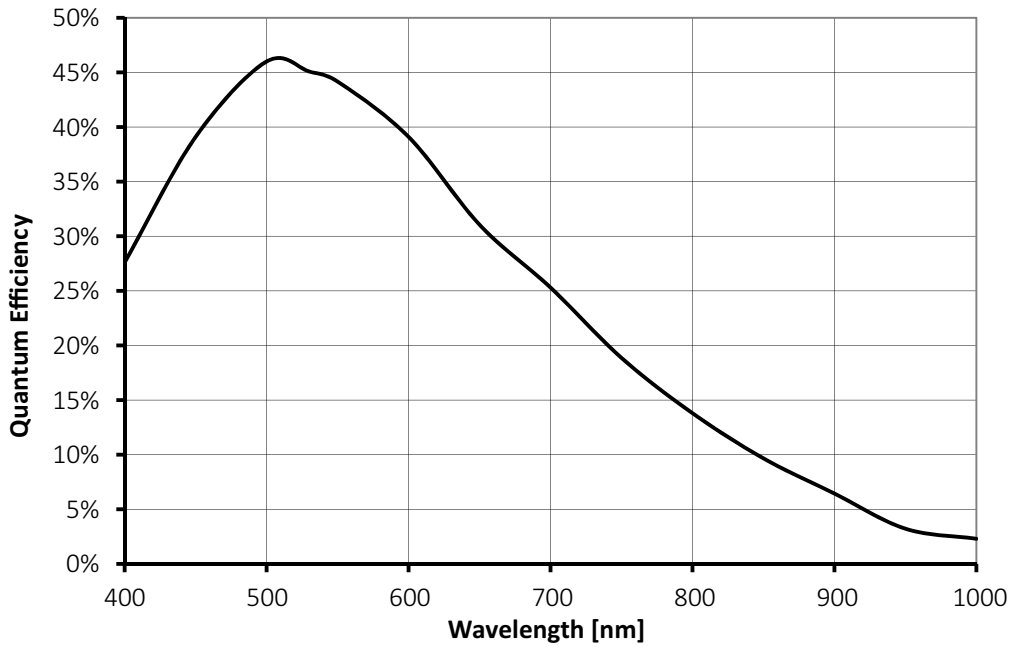


Figure 4: Manta G-032B spectral sensitivity (without protection/cover glass)

Manta G-032C spectral sensitivity

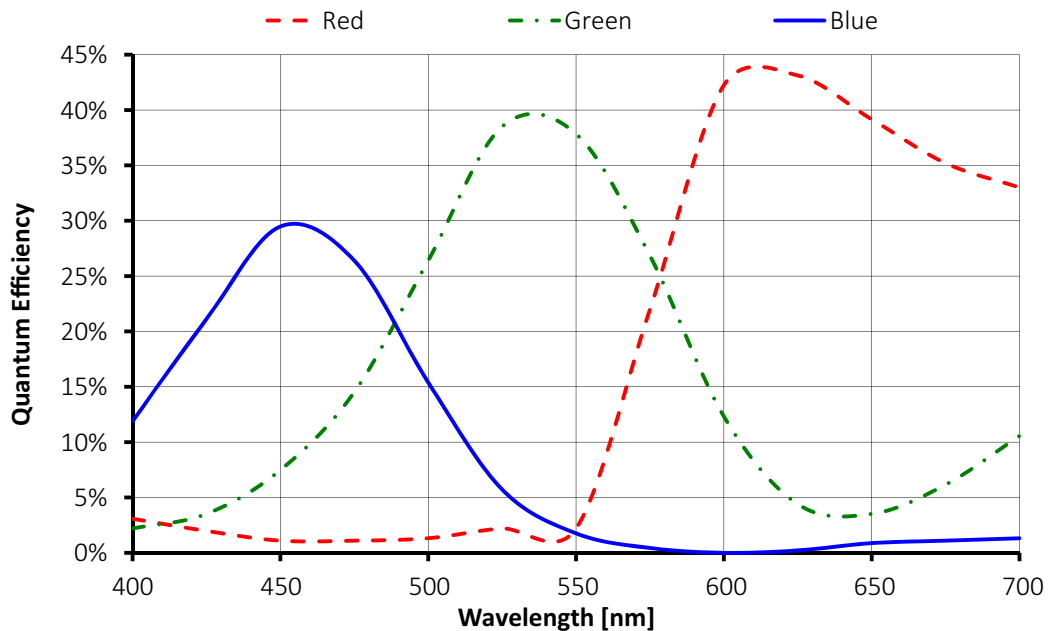


Figure 5: Manta G-032C spectral sensitivity (without IR cut filter)

Manta G-032B/C ROI frame rate

$$\text{Max. frame rate} = \frac{1}{24.34\mu\text{s} \times \text{ROI height} + 3.01\mu\text{s} \times (492 - \text{ROI height}) + 495.50\mu\text{s}}$$

Maximum frame rate at full resolution according formula: 80.7 fps

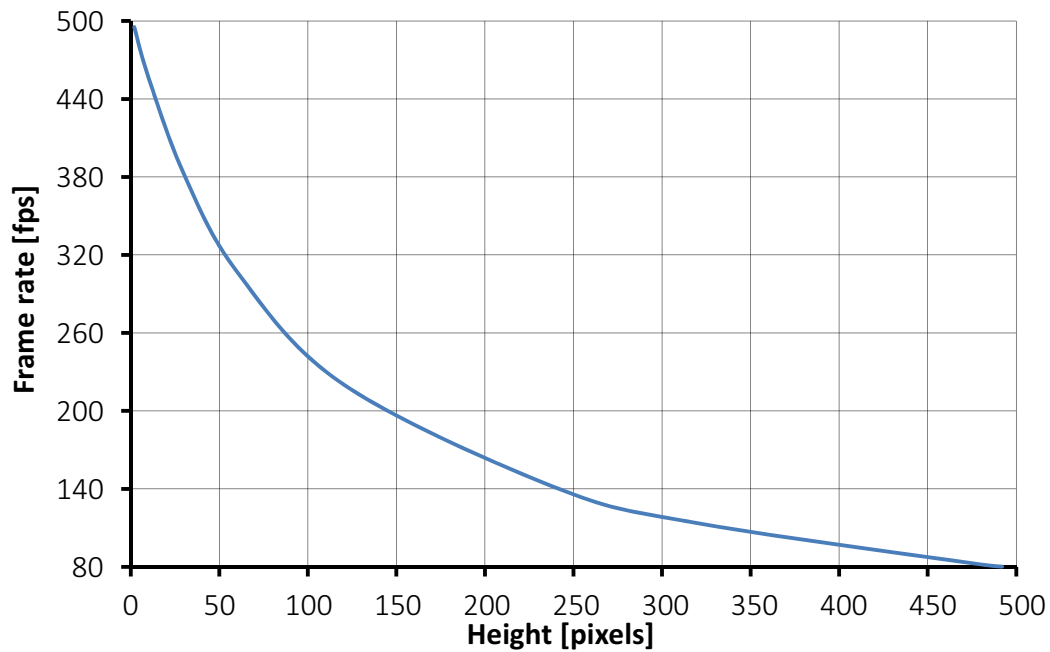


Figure 6: Frame rate as a function of ROI height [width=656]

ROI height [pixels]	Width [pixels]	Frame rate [fps] ¹	ROI height [pixels]	Width [pixels]	Frame rate [fps] ¹
492	656	80.1	60	656	307.1
480	656	81.8	30	656	382.2
320	656	113.6	10	656	456.6
240	656	140.9	2	656	495.2
120	656	220.4			

¹ Frame rate = theoretical maximum frame rate (in frames per second) of the CCD sensor according to given formula.

Table 5: Frame rate as a function of ROI height

Manta G-033B/C

Feature	Specification
Resolution	656 x 492
Sensor	Sony ICX414AL/AQ with HAD technology
Type	Progressive Scan CCD
Sensor size	Type 1/2
Cell size	9.9 μm
Lens mount	C / CS-Mount
Housing variants ¹	Standard (straight view), Angled head, Board level
Maximum frame rate at full resolution	88 fps
Maximum image bit depth	12-bit
On-board FIFO image buffer	32 MB, up to 99 frames at full resolution
Mono formats	Mono8, Mono12Packed, Mono12
Color formats	BayerRG8, BayerRG12Packed, BayerGR12, Mono8, RGB8Packed, YUV411Packed, YUV422Packed, YUV444Packed, BGR8Packed, RGBA8Packed, BGRA8Packed
Exposure control	26 μs to 60 s; 1 μs increments
Gain control	0 – 35 dB
Binning	Horizontal: 1 to 8 columns; Vertical: 1 to 14 rows
Decimation	Horizontal and Vertical: 1, 2, 4, 8 factor
Opto-isolated I/Os	2 inputs, 2 outputs
RS-232	1 TxD, 1 RxD
Voltage requirements	8 – 30 VDC, or PoE
Power consumption	3.6 W @ 12 VDC; 4.2 W PoE
Trigger latency ²	Idle state: 8.6 μs ; Frame valid state: 19.1 μs
Trigger jitter ²	Idle state: 4.8 μs ; Frame valid state: 15.3 μs
Operating temperature	+5 °C to +45 °C housing temperature
Storage temperature	-10 °C to +70 °C ambient temperature without condensation
Body dimensions (L x W x H)	86.4 x 44 x 29 mm
Mass	PoE model: 210 g; Non-PoE model: 200 g
Hardware interface standard	PoE, IEEE 802.3af 1000BASE-T, 100BASE-TX
Software interface standard	GigE Vision Standard V1.2
Camera control interface	GenICam SFNC V1.2.1 compliant
Regulatory	CE, FCC Class B, RoHS (2011/65/EU)

¹ For more information on housing variants, see the [Modular concept](#).

² It is possible to start the exposure of the next frame while the previous frame is read out:

- Idle state: sensor is ready and camera is idle, waiting for the next trigger
- Frame valid state: sensor is reading out and camera is busy. If the next frame is requested by an external trigger in this state, higher latency may occur as compared to the idle state.

Table 6: Manta G-033B/C camera specifications

Manta G-033B spectral sensitivity

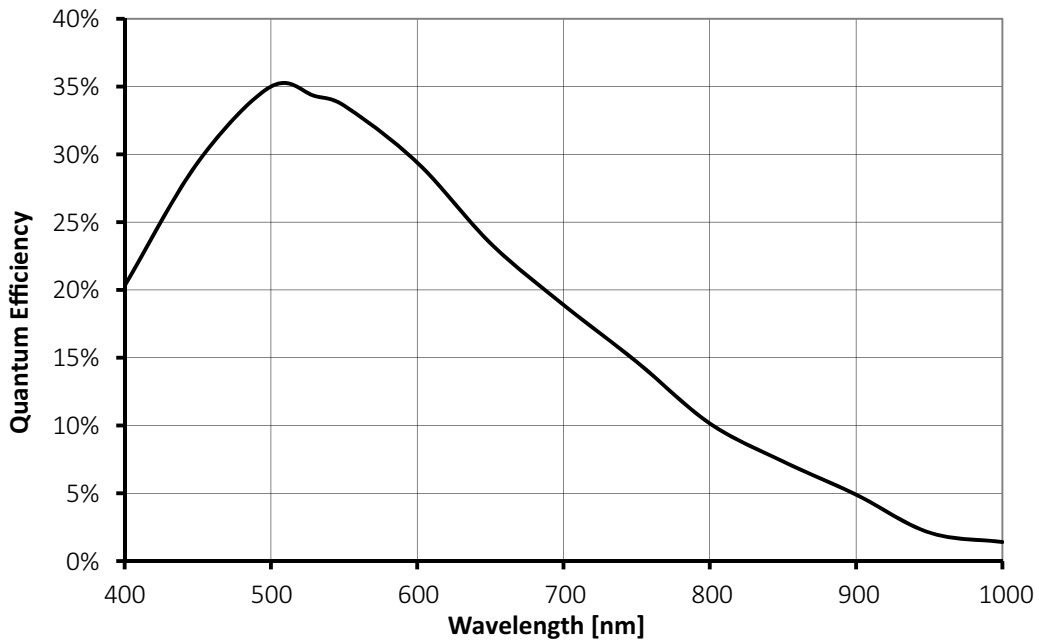


Figure 7: Manta G-033B spectral sensitivity (without protection/cover glass)

Manta G-033C spectral sensitivity

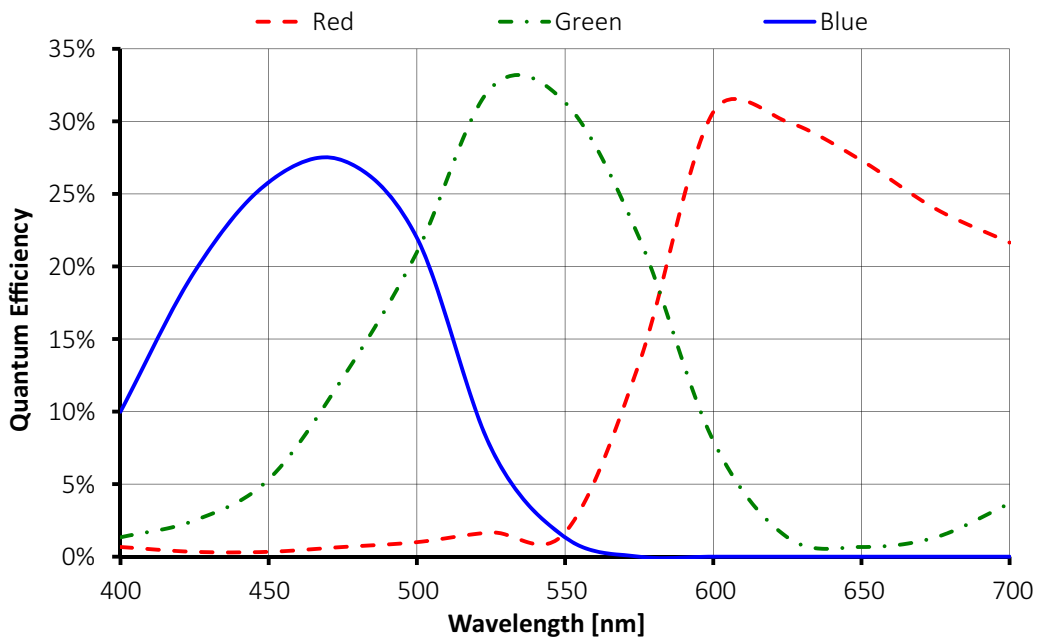


Figure 8: Manta G-033C spectral sensitivity (without IR cut filter)

Manta G-033B/C ROI frame rate

$$\text{Max. frame rate} = \frac{1}{22.49\mu\text{s} \times \text{ROI height} + 1.51\mu\text{s} \times (492 - \text{ROI height}) + 198.4\mu\text{s}}$$

Maximum frame rate at full resolution according formula: 88.7 fps

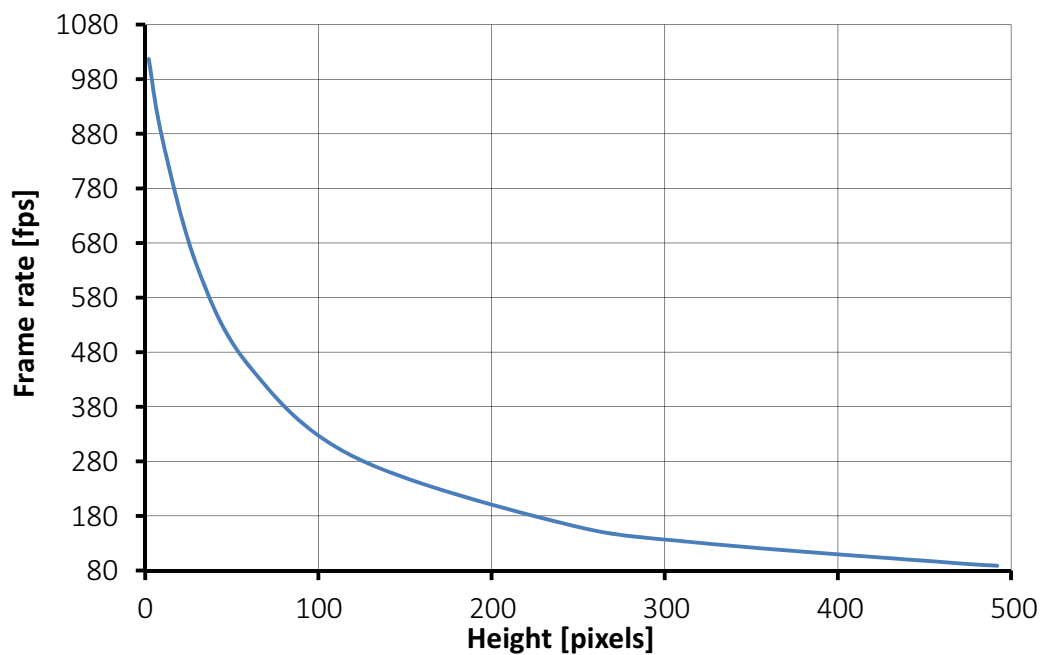


Figure 9: Frame rate as a function of ROI height [width=656]

ROI height [pixels]	Width [pixels]	Frame rate [fps] ¹	ROI height [pixels]	Width [pixels]	Frame rate [fps] ¹
492	656	88.7	60	656	454.5
480	656	90.8	30	656	636.6
320	656	130.6	10	656	868.7
240	656	167.3	2	656	1017.0
120	656	289.1			

¹ Frame rate = theoretical maximum frame rate (in frames per second) of the CCD sensor according to given formula.

Table 7: Frame rate as a function of ROI height

Manta G-046B/C

Feature	Specification
Resolution	780 x 580
Sensor	Sony ICX415AL/AQ with HAD technology
Type	Progressive Scan CCD
Sensor size	Type 1/2
Cell size	8.3 μm
Lens mount	C / CS-Mount
Housing variants ¹	Standard (straight view), Angled head, Board level
Maximum frame rate at full resolution	67 fps
Maximum image bit depth	12-bit
On-board FIFO image buffer	32 MB, up to 70 frames at full resolution
Mono formats	Mono8, Mono12Packed, Mono12
Color formats	BayerRG8, BayerRG12Packed, BayerGR12, Mono8, RGB8Packed, YUV411Packed, YUV422Packed, YUV444Packed, BGR8Packed, RGBA8Packed, BGRA8Packed
Exposure control	26 μs to 60 s; 1 μs increments
Gain control	0 – 31 dB
Binning	Horizontal: 1 to 8 columns; Vertical: 1 to 14 rows
Decimation	Horizontal and Vertical: 1, 2, 4, 8 factor
Opto-isolated I/Os	2 inputs, 2 outputs
RS-232	1 TxD, 1 RxD
Voltage requirements	8 – 30 VDC , or PoE
Power consumption	3.6 W @ 12 VDC; 4.2 W PoE
Trigger latency ²	Idle state: 8.8 μs ; Frame valid state: 20.5 μs
Trigger jitter ²	Idle state: 4.9 μs ; Frame valid state: 16.6 μs
Operating temperature	+5 °C to +45 °C housing temperature
Storage temperature	-10 °C to +70 °C ambient temperature without condensation
Body dimensions (L x W x H)	86.4 x 44 x 29 mm
Mass	PoE model: 210 g; Non-PoE model: 200 g
Hardware interface standard	PoE, IEEE 802.3af 1000BASE-T, 100BASE-TX
Software interface standard	GigE Vision Standard V1.2
Camera control interface	GenICam SFNC V1.2.1 compliant
Regulatory	CE, FCC Class B, RoHS (2011/65/EU)

¹ For more information on housing variants, see the [Modular concept](#).

² It is possible to start the exposure of the next frame while the previous frame is read out:

- Idle state: sensor is ready and camera is idle, waiting for the next trigger
- Frame valid state: sensor is reading out and camera is busy. If the next frame is requested by an external trigger in this state, higher latency may occur as compared to the idle state.

Table 8: Manta G-046B/C camera specifications

Manta G-046B spectral sensitivity

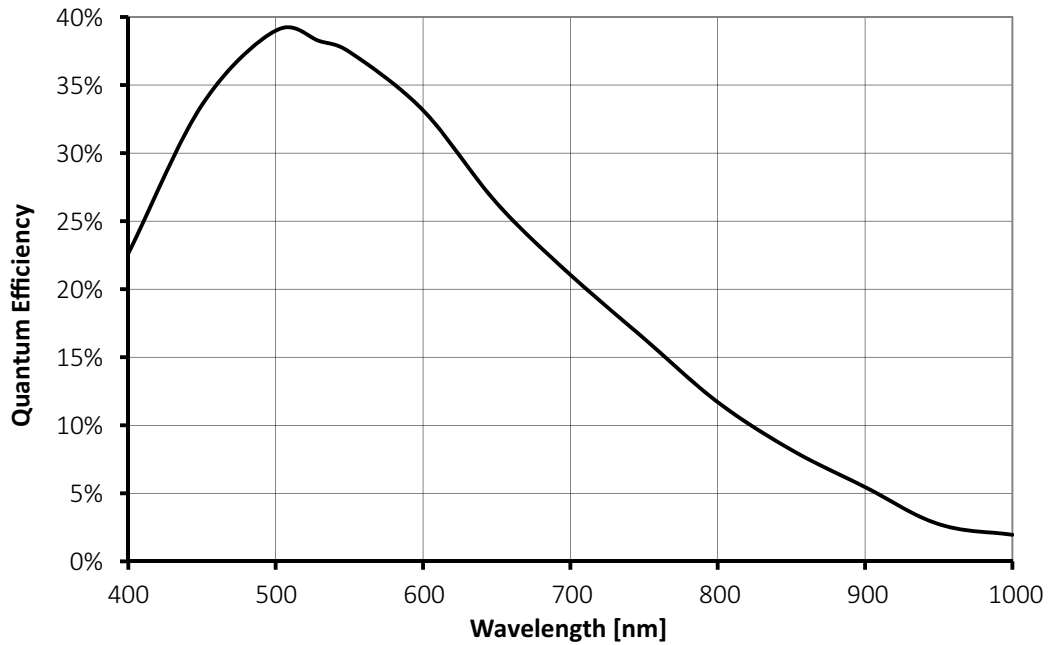


Figure 10: Manta G-046B spectral sensitivity (without protection/cover glass)

Manta G-046C spectral sensitivity

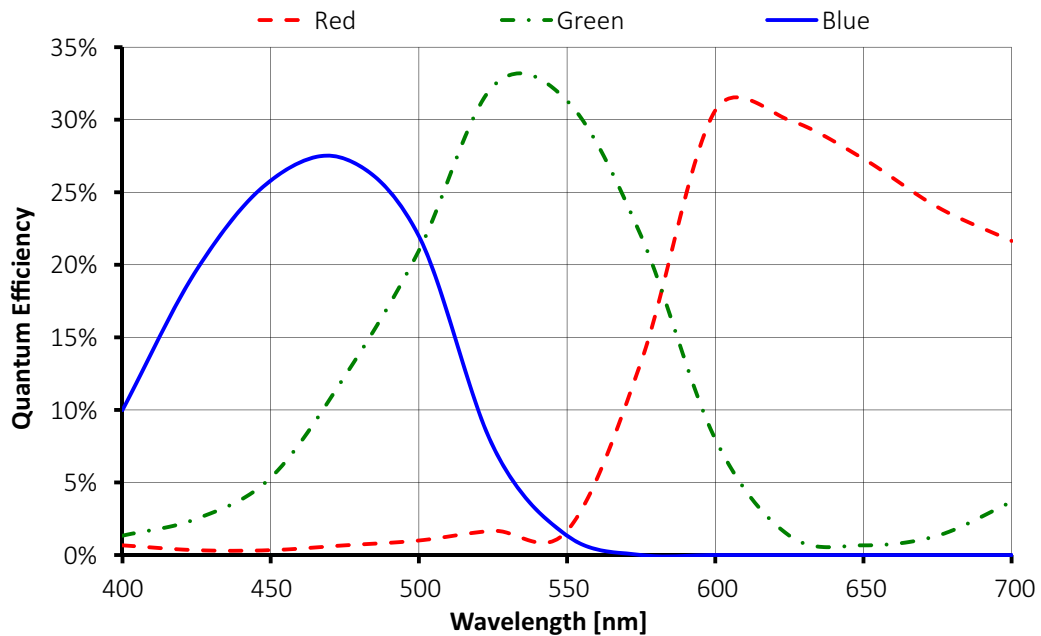


Figure 11: Manta G-046C spectral sensitivity (without IR cut filter)

Manta G-046B/C ROI frame rate

$$\text{Max. frame rate} = \frac{1}{25.14\mu\text{s} \times \text{ROI height} + 1.75\mu\text{s} \times (580 - \text{ROI height}) + 224.03\mu\text{s}}$$

Maximum frame rate at full resolution according formula: 67.5 fps

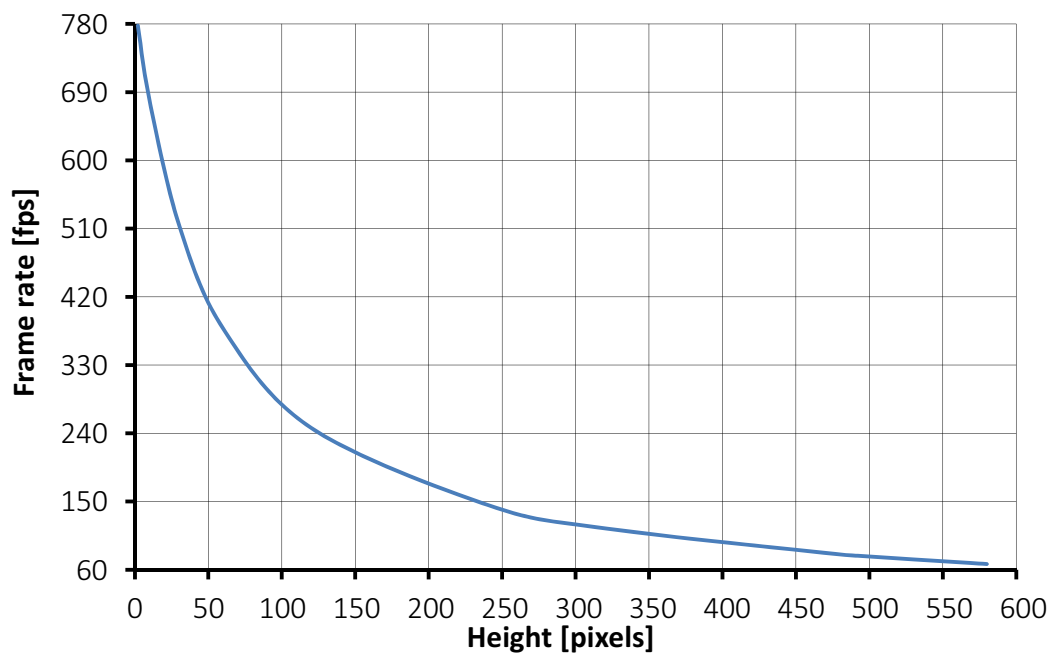


Figure 12: Frame rate as a function of ROI height [width=780]

ROI height [pixels]	Width [pixels]	Frame rate [fps] ¹	ROI height [pixels]	Width [pixels]	Frame rate [fps] ¹
580	780	67.5	120	780	247.1
492	780	78.4	60	780	378.4
480	780	80.2	30	780	515.2
320	780	114.6	10	780	678.9
240	780	145.6	2	780	777.7

¹ Frame rate = theoretical maximum frame rate (in frames per second) of the CCD sensor according to given formula.

Table 9: Frame rate as a function of ROI height

Manta G-125B/C

Feature	Specification
Resolution	1292 x 964
Sensor	Sony ICX445ALA/AQA with EXview HAD CCD™ technology
Type	Progressive Scan CCD
Sensor size	Type 1/3
Cell size	3.75 µm
Lens mount	C / CS-Mount
Housing variants ¹	Standard (straight view), Angled head, Board level
Maximum frame rate at full resolution	30 fps
Maximum image bit depth	12-bit
On-board FIFO image buffer	32 MB, up to 25 frames at full resolution
Mono formats	Mono8, Mono12Packed, Mono12
Color formats	BayerRG8, BayerRG12Packed, BayerGR12, Mono8, RGB8Packed, YUV411Packed, YUV422Packed, YUV444Packed, BGR8Packed, RGBA8Packed, BGRA8Packed
Exposure control	21 µs to 60 s; 1 µs increments
Gain control	0 – 31 dB
Binning	Horizontal: 1 to 8 columns; Vertical: 1 to 14 rows
Decimation	Horizontal and Vertical: 1, 2, 4, 8 factor
Opto-isolated I/Os	2 inputs, 2 outputs
RS-232	1 TxD, 1 RxD
Voltage requirements	8 – 30 VDC, or PoE
Power consumption	3.6 W @ 12 VDC; 4.2 W PoE
Trigger latency ²	Idle state: 12.3 µs; Frame valid state: 26.4 µs
Trigger jitter ²	Idle state: 6.5 µs; Frame valid state: 20.6 µs
Operating temperature	+5 °C to +45 °C housing temperature
Storage temperature	-10 °C to +70 °C ambient temperature without condensation
Body dimensions (L x W x H)	86.4 x 44 x 29 mm
Mass	PoE model: 210 g; Non-PoE model: 200 g
Hardware interface standard	PoE, IEEE 802.3af 1000BASE-T, 100BASE-TX
Software interface standard	GigE Vision Standard V1.2
Camera control interface	GenICam SFNC V1.2.1 compliant
Regulatory	CE, FCC Class B, RoHS (2011/65/EU)

¹ For more information on housing variants, see the [Modular concept](#).

² It is possible to start the exposure of the next frame while the previous frame is read out:

- Idle state: sensor is ready and camera is idle, waiting for the next trigger
- Frame valid state: sensor is reading out and camera is busy. If the next frame is requested by an external trigger in this state, higher latency may occur as compared to the idle state.

Table 10: Manta G-125B/C camera specifications

Manta G-125B spectral sensitivity

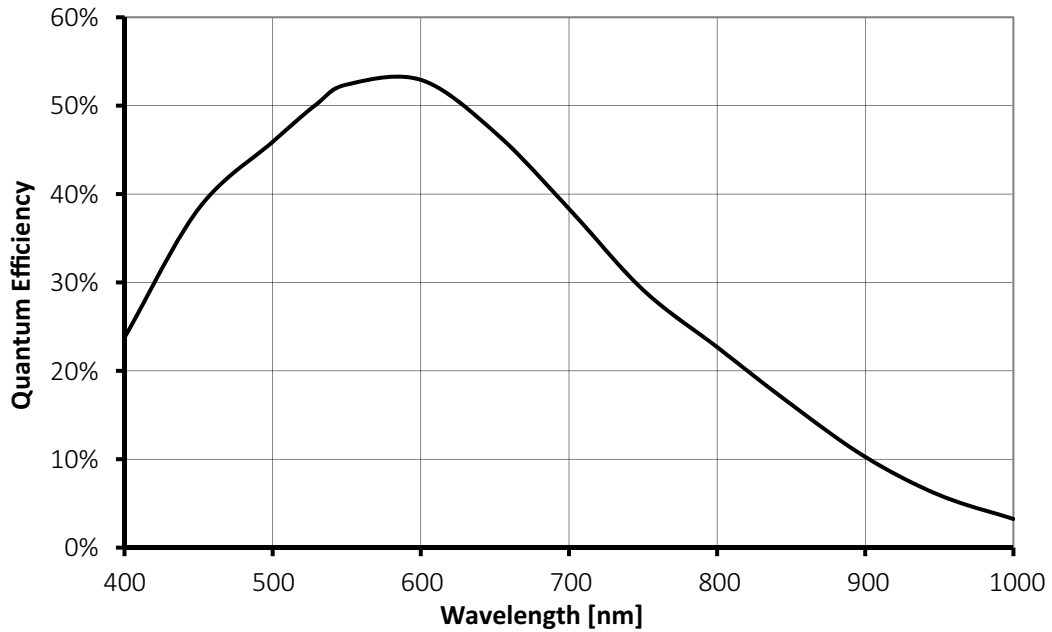


Figure 13: Manta G-125B spectral sensitivity (without protection/cover glass)

Manta G-125C spectral sensitivity

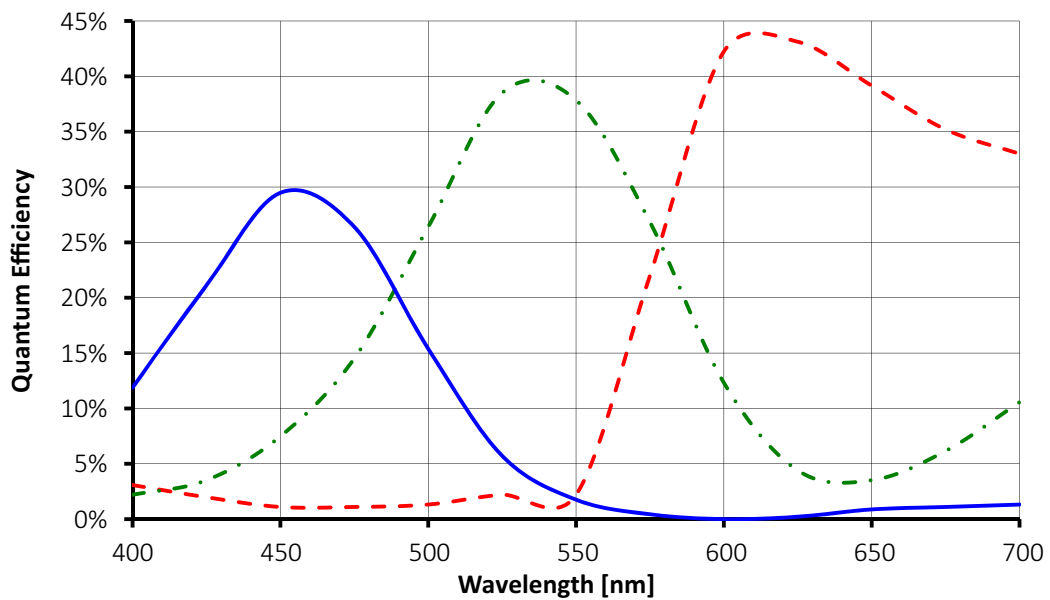


Figure 14: Manta G-125C spectral sensitivity (without IR cut filter)

Manta G-125B/C ROI frame rate

$$\text{Max. frame rate} = \frac{1}{33.21\mu\text{s} \times \text{ROI height} + 5.04\mu\text{s} \times (964 - \text{ROI height}) + 226.52\mu\text{s}}$$

Maximum frame rate at full resolution according formula: 31.0 fps

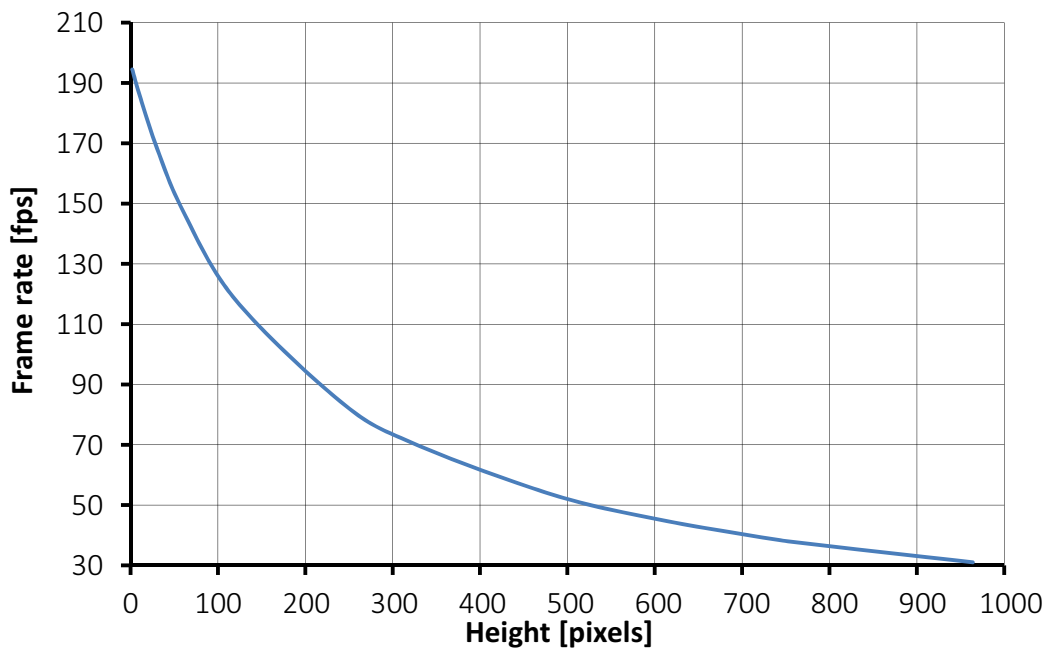


Figure 15: Frame rate as a function of ROI height [width=1292]

ROI height [pixels]	Width [pixels]	Frame rate [fps] ¹	ROI height [pixels]	Width [pixels]	Frame rate [fps] ¹
964	1292	31.0	240	1292	84.4
768	1292	37.4	120	1292	118.1
720	1292	39.4	60	1292	147.6
600	1292	45.4	30	1292	168.6
480	1292	53.7	10	1292	186.3
320	1292	70.9	2	1292	194.5

¹ Frame rate = theoretical maximum frame rate (in frames per second) of the CCD sensor according to given formula.

Table 11: Frame rate as a function of ROI height

Manta G-145B/C (including 30fps variants)

Feature	Specification						
Resolution	1388 x 1038						
Sensor	Sony ICX285AL/AQ with EXview HAD CCD™ technology						
Type	Progressive Scan CCD						
Sensor size	Type 2/3						
Cell size	6.45 μm						
Lens mount	C / CS-Mount						
Housing variants ¹	Standard (straight view), Angled head, Board level						
Maximum frame rate at full resolution	G-145B, G-145C: 15 fps G-145B-30fps, G-145C-30fps: 30 fps						
Maximum image bit depth	12-bit						
On-board FIFO image buffer	32 MB, up to 22 frames at full resolution						
Mono formats	Mono8, Mono12Packed, Mono12						
Color formats	BayerRG8, BayerRG12Packed, BayerRG12, Mono8, RGB8Packed, YUV411Packed, YUV422Packed, YUV444Packed, BGR8Packed, RGBA8Packed, BGRA8Packed						
Exposure control	G-145B, G-145C: 43 μs to 60 s G-145B-30fps, G-145C-30fps: 38 μs to 60 s						
Gain control	0 – 33 dB						
Binning	Horizontal: 1 to 8 columns; Vertical: 1 to 14 rows						
Decimation	Horizontal and Vertical: 1, 2, 4, 8 factor						
Opto-isolated I/Os	2 inputs, 2 outputs						
RS-232	1 TxD, 1 RxD						
Voltage requirements	8 – 30 VDC, or PoE						
Power consumption	G-145B, G-145C: 3.7 W @ 12 VDC, 4.3 W PoE G-145B-30fps, G-145C-30fps: 4.5 W @ 12 VDC, 5.3 W PoE						
Trigger latency ²	<table border="0"> <tr> <td>G-145B, G-145C:</td> <td>G-145B-30ps, G-145C-30fps:</td> </tr> <tr> <td>• Idle state: 19.3 μs</td> <td>• Idle state: 12.6 μs</td> </tr> <tr> <td>• Frame valid state: 45.2 μs</td> <td>• Frame valid state: 25.6 μs</td> </tr> </table>	G-145B, G-145C:	G-145B-30ps, G-145C-30fps:	• Idle state: 19.3 μs	• Idle state: 12.6 μs	• Frame valid state: 45.2 μs	• Frame valid state: 25.6 μs
G-145B, G-145C:	G-145B-30ps, G-145C-30fps:						
• Idle state: 19.3 μs	• Idle state: 12.6 μs						
• Frame valid state: 45.2 μs	• Frame valid state: 25.6 μs						
Trigger jitter ²	<table border="0"> <tr> <td>G-145B, G-145C:</td> <td>G-145B-30ps, G-145C-30fps:</td> </tr> <tr> <td>• Idle state: 9.8 μs</td> <td>• Idle state: 6.9 μs</td> </tr> <tr> <td>• Frame valid state: 35.7 μs</td> <td>• Frame valid state: 19.9 μs</td> </tr> </table>	G-145B, G-145C:	G-145B-30ps, G-145C-30fps:	• Idle state: 9.8 μs	• Idle state: 6.9 μs	• Frame valid state: 35.7 μs	• Frame valid state: 19.9 μs
G-145B, G-145C:	G-145B-30ps, G-145C-30fps:						
• Idle state: 9.8 μs	• Idle state: 6.9 μs						
• Frame valid state: 35.7 μs	• Frame valid state: 19.9 μs						
Operating temperature	+5°C to +45°C housing temperature						
Storage temperature	-10°C to +70°C ambient temperature without condensation						
Body dimensions (L x W x H)	86.4 x 44 x 29 mm						
Mass	PoE model: 210 g; Non-PoE model: 200 g						
Hardware interface standard	PoE, IEEE 802.3af 1000BASE-T, 100BASE-TX						

Table 12: Manta G-145B/C (including -30fps variants) camera specifications

Feature	Specification
Software interface standard	GigE Vision Standard V1.2
Camera control interface	GenICam SFNC V1.2.1 compliant
Regulatory	CE, FCC Class B, RoHS (2011/65/EU)

¹ For more information on housing variants, see the [Modular concept](#).

² It is possible to start the exposure of the next frame while the previous frame is read out:

- Idle state: sensor is ready and camera is idle, waiting for the next trigger
- Frame valid state: sensor is reading out and camera is busy. If the next frame is requested by an external trigger in this state, higher latency may occur as compared to the idle state.

Table 12: Manta G-145B/C (including -30fps variants) camera specifications (Continued)

Manta G-145B spectral sensitivity

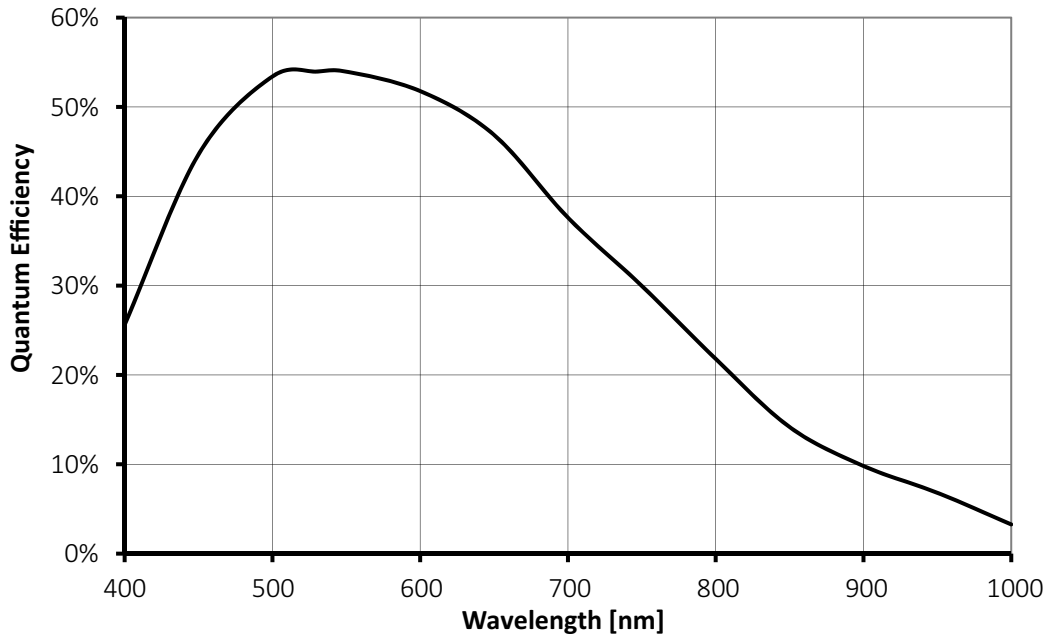


Figure 16: Manta G-145B spectral sensitivity (without protection/cover glass)

Manta G-145C spectral sensitivity

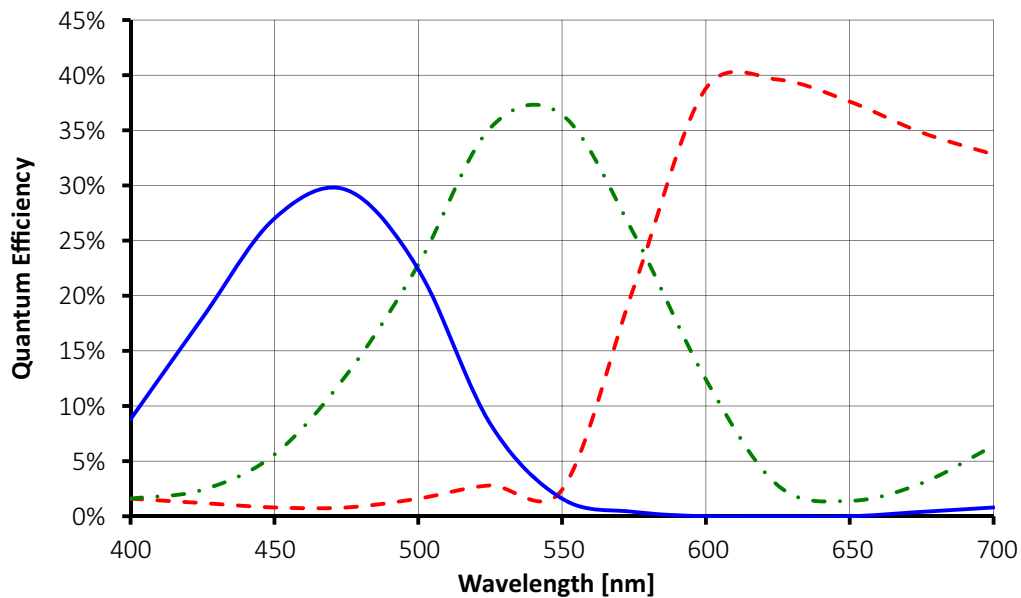


Figure 17: Manta G-145C spectral sensitivity (without IR cut filter)

Manta G-145B/C ROI frame rate

$$\text{Max. frame rate} = \frac{1}{63.39\mu\text{s} \times \text{ROI height} + 5.86\mu\text{s} \times (1038 - \text{ROI height}) + 491.75\mu\text{s}}$$

Maximum frame rate at full resolution according formula: 15.0 fps

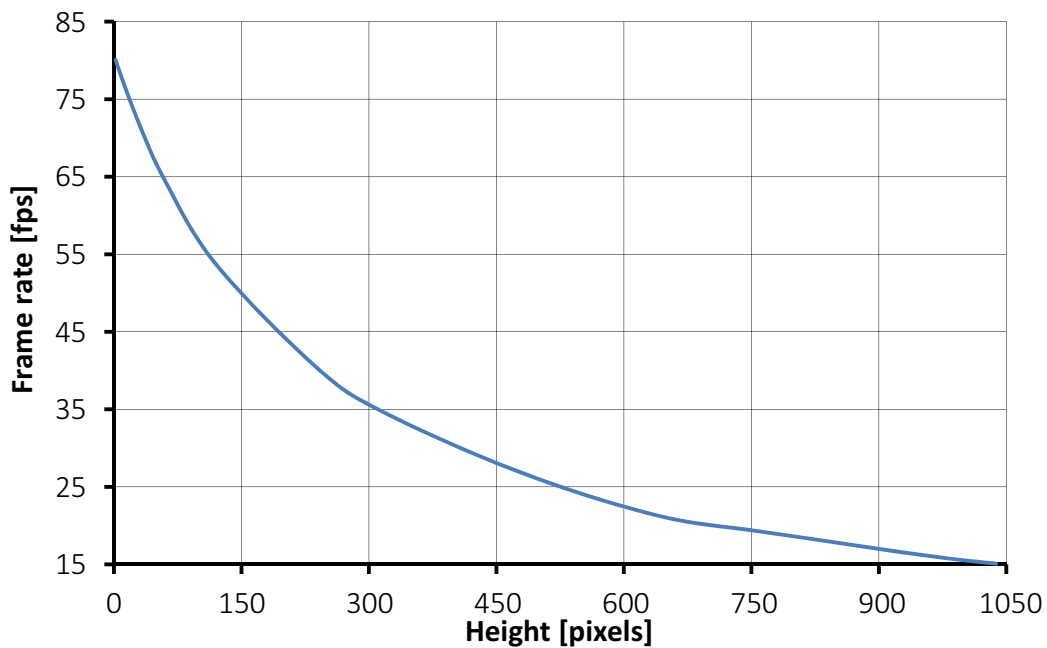


Figure 18: Frame rate as a function of ROI height [width=1388]

ROI height [pixels]	Width [pixels]	Frame rate [fps] ¹	ROI height [pixels]	Width [pixels]	Frame rate [fps] ¹
1038	1388	15.0	240	1388	40.2
960	1388	16.0	120	1388	53.7
768	1388	19.1	60	1388	64.5
640	1388	21.2	30	1388	71.7
480	1388	26.8	10	1388	77.4
320	1388	34.4	2	1388	80.0

¹ Frame rate = theoretical maximum frame rate (in frames per second) of the CCD sensor according to given formula.

Table 13: Frame rate as a function of ROI height

Manta G-145B/C (-30fps) ROI frame rate

$$\text{Max. frame rate} = \frac{1}{31.7\mu\text{s} \times \text{ROI height} + 4.71\mu\text{s} \times (1038 - \text{ROI height}) + 245.88\mu\text{s}}$$

Maximum frame rate at full resolution according formula: 30.1 fps

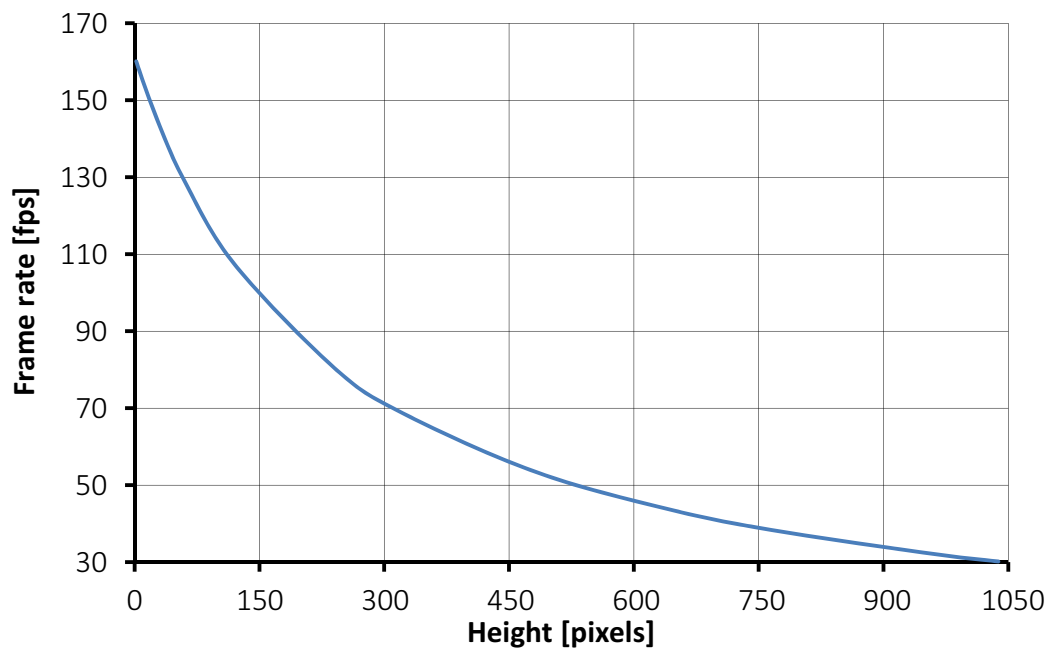


Figure 19: Frame rate as a function of ROI height [width=1388]

ROI height [pixels]	Width [pixels]	Frame rate [fps] ¹	ROI height [pixels]	Width [pixels]	Frame rate [fps] ¹
1038	1388	30.1	240	1388	80.4
960	1388	32.1	120	1388	107.4
768	1388	38.2	60	1388	129.0
640	1388	43.8	30	1388	143.4
480	1388	53.5	10	1388	154.9
320	1388	68.9	2	1388	160.1

¹ Frame rate = theoretical maximum frame rate (in frames per second) of the CCD sensor according to given formula.

Table 14: Frame rate as a function of ROI height

Manta G-145B NIR

Feature	Specification
Resolution	1388 x 1038
Sensor	Sony ICX285AL with EXview HAD CCD™ technology
Type	Progressive Scan CCD
Sensor size	Type 2/3
Cell size	6.45 μm
Lens mount	C / CS-Mount
Housing variants ¹	Standard (straight view), Angled head, Board level
Maximum frame rate at full resolution	15.0 fps (NIR mode: Off/On_Fast) 13.9 fps (NIR mode: On_HighQuality)
Maximum image bit depth	12-bit
On-board FIFO image buffer	32 MB, up to 22 frames at full resolution
Mono formats	Mono8, Mono12Packed, Mono12
Exposure control	20 μs to 60 s 28 μs to 60 s for NirMode=Off/On_Fast and ExposureMode=External
Gain control	0 – 33 dB
Binning	Horizontal: 1 to 8 columns; Vertical: 1 to 14 rows
Decimation	Horizontal and Vertical: 1, 2, 4, 8 factor
Opto-isolated I/Os	2 inputs, 2 outputs
RS-232	1 TxD, 1 RxD
Voltage requirements	8 – 30 VDC, or PoE
Power consumption	4.2 W @ 12 VDC; 4.9 W PoE
Trigger latency ²	Idle state: 58.7 μs; Frame valid state: 58.7 μs
Trigger jitter ²	Idle state: 35.7 μs; Frame valid state: 35.7 μs
Operating temperature	+5 °C to +45 °C housing temperature
Storage temperature	-10 °C to +70 °C ambient temperature without condensation
Body dimensions (L x W x H)	86.4 x 44 x 29 mm
Mass	PoE model: 210 g; Non-PoE model: 200 g
Hardware interface standard	PoE, IEEE 802.3af 1000BASE-T, 100BASE-TX
Software interface standard	GigE Vision Standard V1.2
Camera control interface	GenICam SFNC V1.2.1 compliant
Regulatory	CE, FCC Class B, RoHS (2011/65/EU)

¹ For more information on housing variants, see the [Modular concept](#).

² It is possible to start the exposure of the next frame while the previous frame is read out:

- Idle state: sensor is ready and camera is idle, waiting for the next trigger
- Frame valid state: sensor is reading out and camera is busy. If the next frame is requested by an external trigger in this state, higher latency may occur as compared to the idle state.

Table 15: Manta G-145B NIR camera specifications

Manta G-145B NIR spectral sensitivity

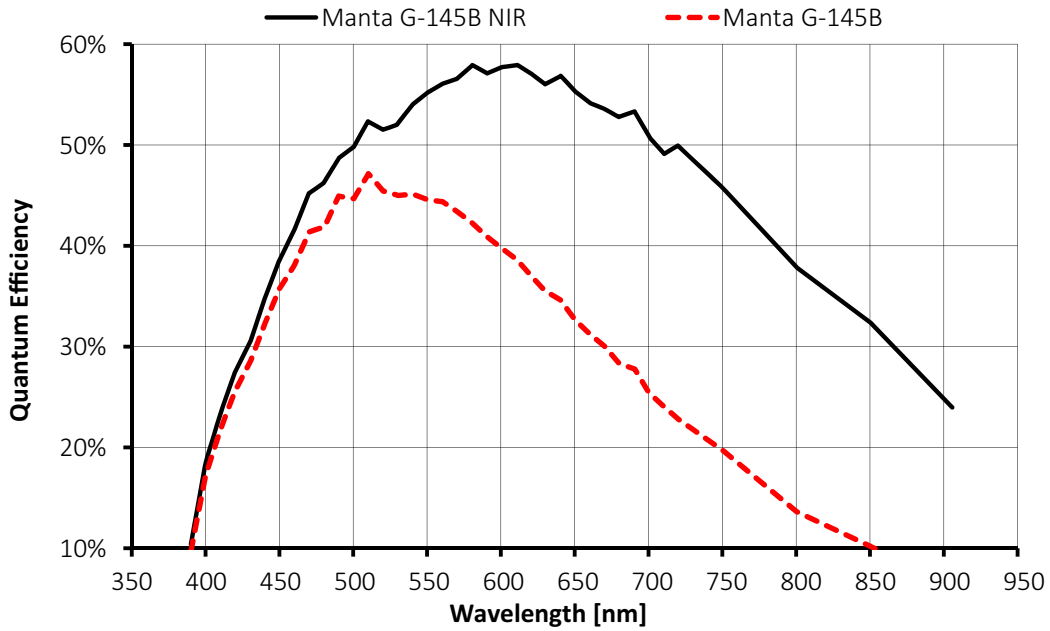


Figure 20: Manta G-145B NIR spectral sensitivity (NirMode=On_Fast or On_HighQuality) compared to Manta G-145B

Manta G-145B NIR Increase of relative response

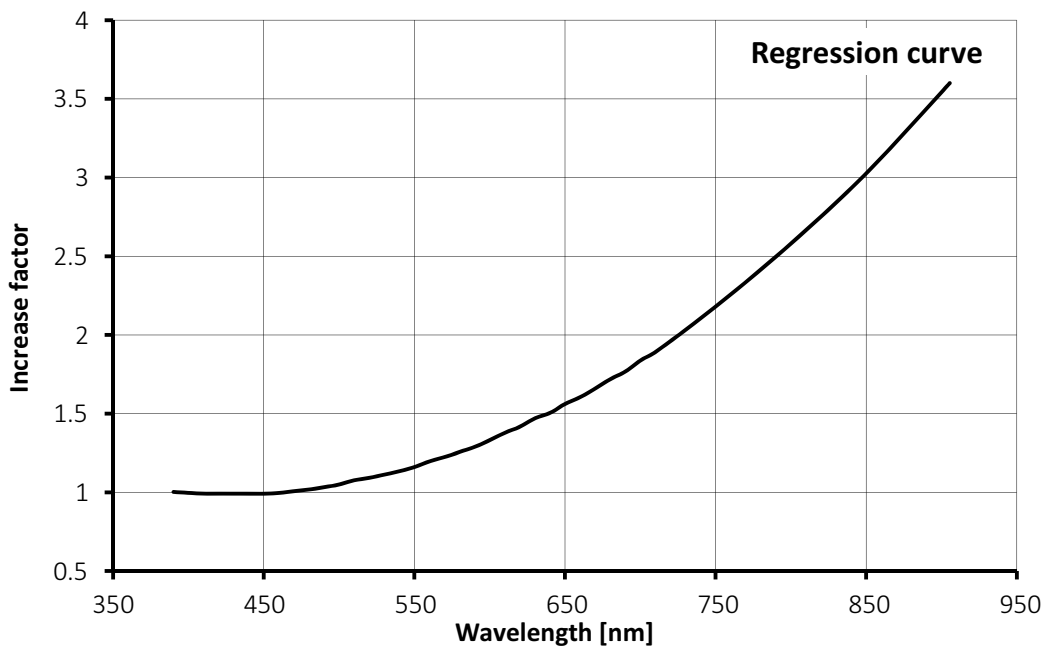


Figure 21: Increase of relative response with NIR mode set to On_HighQuality

Manta G-145B NIR ROI frame rate

$$\text{Max. frame rate} = \frac{1}{\text{MAX}(63.39\mu\text{s} \times \text{ROI height} + 11.46\mu\text{s} \times (1038 - \text{ROI height}) + 644\mu\text{s} + \text{MIN}(4300; \text{Expotime}); \text{Expotime} + 142.86\mu\text{s})}$$

$$\text{Max. frame rate} = \frac{1}{63.39\mu\text{s} \times \text{ROI height} + 11.4 \mu\text{s} \times (1038 - \text{ROI height}) + (5653.89 + \text{Expotime})\mu\text{s}}$$

Maximum frame rate at full resolution according formula:

15.0 fps for NirMode=Off/On_Fast

13.9 fps for NirMode=On_HighQuality

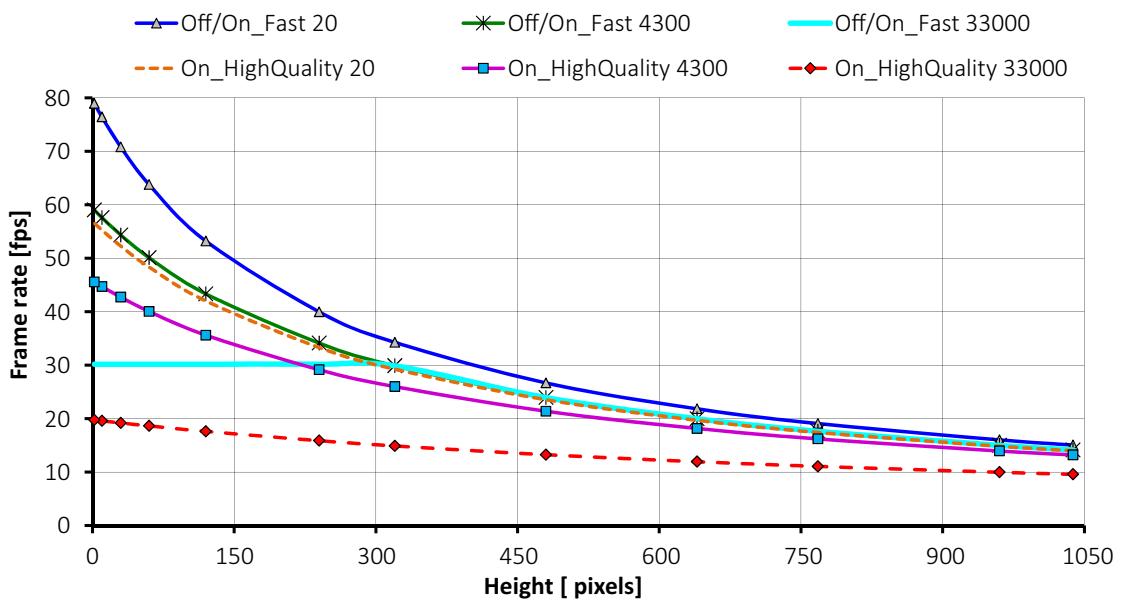


Figure 22: Frame rate as a function of ROI height [width=1388], NirMode and exposure time / μs

NirMode Exp. time/μs	Off/On_Fast 20	Off/On_Fast 4300	Off/On_Fast 33000	On_High Quality 20	On_High Quality 4300	On_High Quality 33000
ROI height						
1038	15.0	14.1	14.1	13.9	13.2	9.5
960	16.0	14.9	14.9	14.8	13.9	9.9
768	19.0	17.6	17.6	17.4	16.2	11.0
640	21.8	19.9	19.9	19.6	18.1	11.9
480	26.6	23.9	23.9	23.5	21.3	13.2
320	34.2	29.8	29.8	29.2	25.9	14.8
240	39.9	34.1	30.1	33.2	29.1	15.8
120	53.2	43.3	30.1	42.0	35.6	17.6
60	63.7	50.1	30.1	48.3	40.0	18.6
30	70.8	54.3	30.1	52.2	42.7	19.1
10	76.4	57.5	30.1	55.2	44.7	19.5
2	78.9	59.0	30.1	56.5	45.5	19.7

Manta G-146B/C

Feature	Specification
Resolution	1388 x 1038
Sensor	Sony ICX267AL/AK with HAD technology
Type	Progressive Scan CCD
Sensor size	Type 1/2
Cell size	4.65 μm
Lens mount	C / CS-Mount
Housing variants ¹	Standard (straight view), Angled head, Board level
Maximum frame rate at full resolution	17 fps
Maximum image bit depth	12-bit
On-board FIFO image buffer	32 MB, up to 22 frames at full resolution
Mono formats	Mono8, Mono12Packed, Mono12
Color formats	BayerGB8, BayerGB12Packed, BayerGB12, Mono8, RGB8Packed, YUV411Packed, YUV422Packed, YUV444Packed, BGR8Packed, RGBA8Packed, BGRA8Packed
Exposure control	31 μs to 60 s; 1 μs increments
Gain control	0 – 33 dB
Binning	Horizontal: 1 to 8 columns; Vertical: 1 to 14 rows
Decimation	Horizontal and Vertical: 1, 2, 4, 8 factor
Opto-isolated I/Os	2 inputs, 2 output
RS-232	1 TxD, 1 RxD
Voltage requirements	8 – 30 VDC, or PoE
Power consumption	3.6 W @ 12 VDC; 4.2 W PoE
Trigger latency ²	Idle state: 21.1 μs ; Frame valid state: 42.7 μs
Trigger jitter ²	Idle state: 9.2 μs ; Frame valid state: 30.8 μs
Operating temperature	+5 °C to +45 °C housing temperature
Storage temperature	-10 °C to +70 °C ambient temperature without condensation
Body dimensions (L x W x H)	86.4 x 44 x 29 mm
Mass	PoE model: 210 g; Non-PoE model: 200 g
Hardware interface standard	PoE, IEEE 802.3af 1000BASE-T, 100BASE-TX
Software interface standard	GigE Vision Standard V1.2
Camera control interface	GenICam SFNC V1.2.1 compliant
Regulatory	CE, FCC Class B, RoHS (2011/65/EU)

¹ For more information on housing variants, see the [Modular concept](#).

² It is possible to start the exposure of the next frame while the previous frame is read out:

- Idle state: sensor is ready and camera is idle, waiting for the next trigger
- Frame valid state: sensor is reading out and camera is busy. If the next frame is requested by an external trigger in this state, higher latency may occur as compared to the idle state.

Table 16: Manta G-146B/C camera specifications

Manta G-146B spectral sensitivity

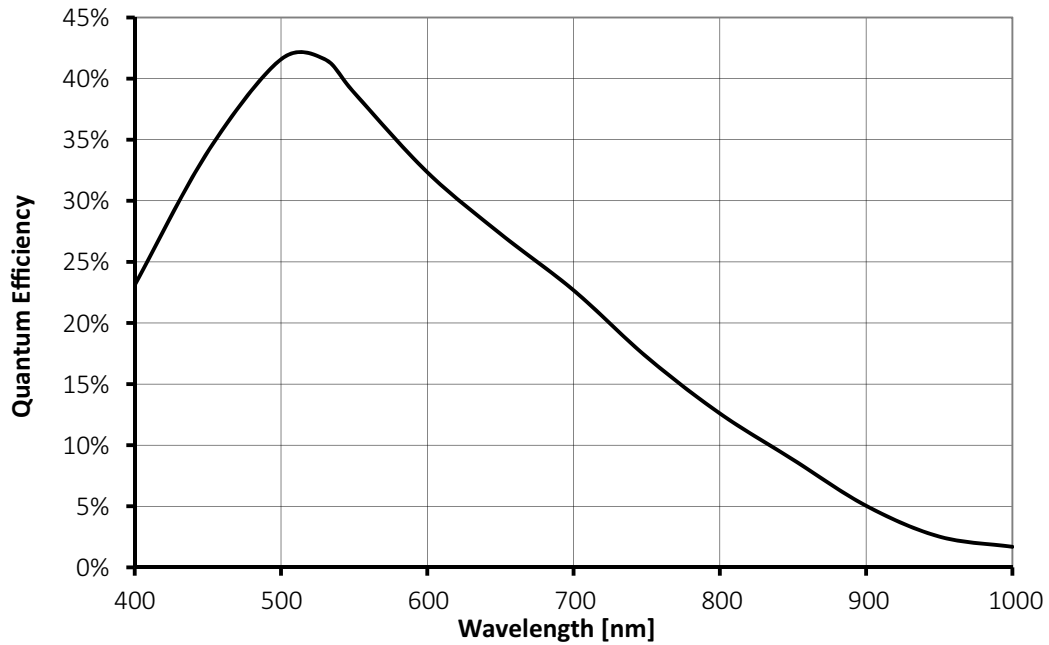


Figure 23: Manta G-146B spectral sensitivity (without protection/cover glass)

Manta G-146C spectral sensitivity

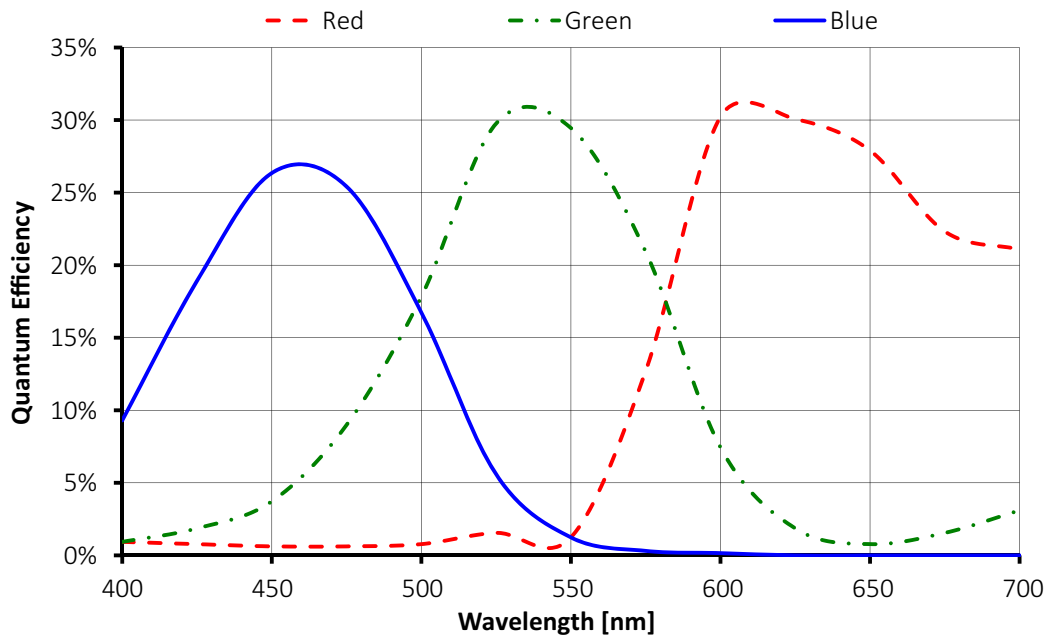


Figure 24: Manta G-146C spectral sensitivity (without IR cut filter)

Manta G-146B/C ROI frame rate

$$\text{Max. frame rate} = \frac{1}{53.54\mu\text{s} \times \text{ROI height} + 10.46\mu\text{s} \times (1038 - \text{ROI height}) + 352\mu\text{s}}$$

Maximum frame rate at full resolution according formula: 17.8 fps

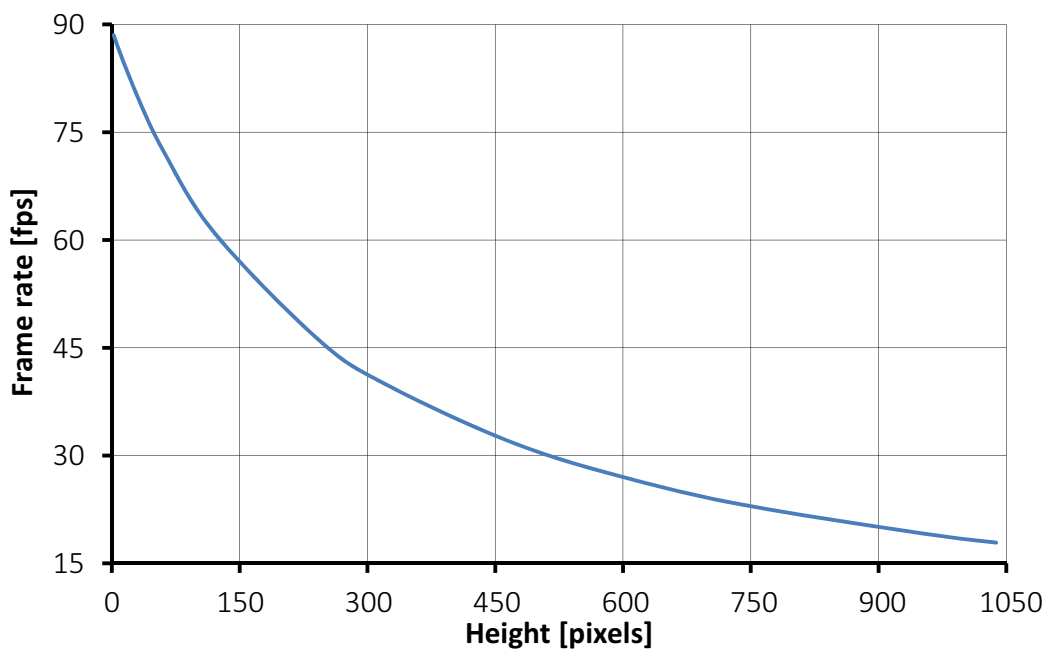


Figure 25: Frame rate as a function of ROI height [width=1388]

ROI height [pixels]	Width [pixels]	Frame rate [fps] ¹	ROI height [pixels]	Width [pixels]	Frame rate [fps] ¹
1038	1388	17.8	240	1388	46.4
960	1388	19.0	120	1388	61.0
768	1388	22.5	60	1388	72.4
640	1388	25.7	30	1388	79.9
480	1388	31.3	10	1388	85.9
320	1388	40.0	2	1388	88.5

¹ Frame rate = theoretical maximum frame rate (in frames per second) of the CCD sensor according to given formula.

Table 17: Frame rate as a function of ROI height

Manta G-201B/C (including 30fps variants)

Feature	Specification
Resolution	1624 x 1234
Sensor	Sony ICX274AL/AQ with EXview HAD CCD™ technology
Type	Progressive Scan CCD
Sensor size	Type 1/1.8
Cell size	4.4 μm
Lens mount	C / CS-Mount
Housing variants ¹	Standard (straight view), Angled head, Board level
Maximum frame rate at full resolution	G-201B, G-201C: 14 fps G-201B-30fps, G-201C-30fps: 30 fps
Maximum image bit depth	12-bit
On-board FIFO image buffer	32 MB, up to 16 frames at full resolution
Mono formats	Mono8, Mono12Packed, Mono12
Color formats	G-201B/C: BayerRG8, BayerRG12Packed, BayerRG12, Mono8, RGB8Packed, YUV411Packed, YUV422Packet, YUV444Packed, BGR8Packed, RGBA8Packed, BGRA8Packed G-201B/C-30fps: BayerRG8, BayerRG12Packed, BayerRG12, Mono8, RGB8Packed, YUV411Packed, YUV422Packet, YUV444Packed
Exposure control	G-201B, G-201C: 51 μs to 60 s G-201B-30fps, G-201C-30fps: 10 μs to 60 s
Gain control	0 – 31 dB
Binning	Horizontal: 1 to 8 columns; Vertical: 1 to 14 rows
Decimation	Horizontal and Vertical: 1, 2, 4, 8 factor
Opto-isolated I/Os	2 inputs, 2 outputs
RS-232	1 TxD, 1 RxD
Voltage requirements	8 – 30 VDC, or PoE
Power consumption	G-201B, G-201C: 3.6 W @ 12 VDC, 4.2 W PoE G-201B-30fps, G-201C-30fps: 4.6 W @ 12 VDC, 5.4 W PoE
Trigger latency ²	G-201B, G-201C: <ul style="list-style-type: none"> Idle state: 17.0 μs Frame valid state: 40.8 μs G-201B-30fps, G-201C-30fps: <ul style="list-style-type: none"> Idle state: 9.4 μs Frame valid state: 21.4 μs
Trigger jitter ²	G-201B, G-201C: <ul style="list-style-type: none"> Idle state: 7.6 μs Frame valid state: 31.4 μs G-201B-30fps, G-201C-30fps: <ul style="list-style-type: none"> Idle state: 5.4 μs Frame valid state: 17.4 μs
Operating temperature	+5 °C to +45 °C housing temperature
Storage temperature	-10 °C to +70 °C ambient temperature without condensation
Body dimensions (L x W x H)	86.4 x 44 x 29 mm
Mass	PoE model: 210 g; Non-PoE model: 200 g
Hardware interface standard	PoE, IEEE 802.3af 1000BASE-T, 100BASE-TX
Software interface standard	GigE Vision Standard V1.2

Table 18: Manta G-201B/C (including -30fps variants) camera specifications

Feature	Specification
Camera control interface	GenICam SFNC V1.2.1 compliant
Regulatory	CE, FCC Class B, RoHS (2011/65/EU)
<p>¹ For more information on housing variants, see the Modular concept.</p> <p>² It is possible to start the exposure of the next frame while the previous frame is read out:</p> <ul style="list-style-type: none"> • Idle state: sensor is ready and camera is idle, waiting for the next trigger • Frame valid state: sensor is reading out and camera is busy. If the next frame is requested by an external trigger in this state, higher latency may occur as compared to the idle state. 	

Table 18: Manta G-201B/C (including -30fps variants) camera specifications (Continued)

Manta G-201B spectral sensitivity

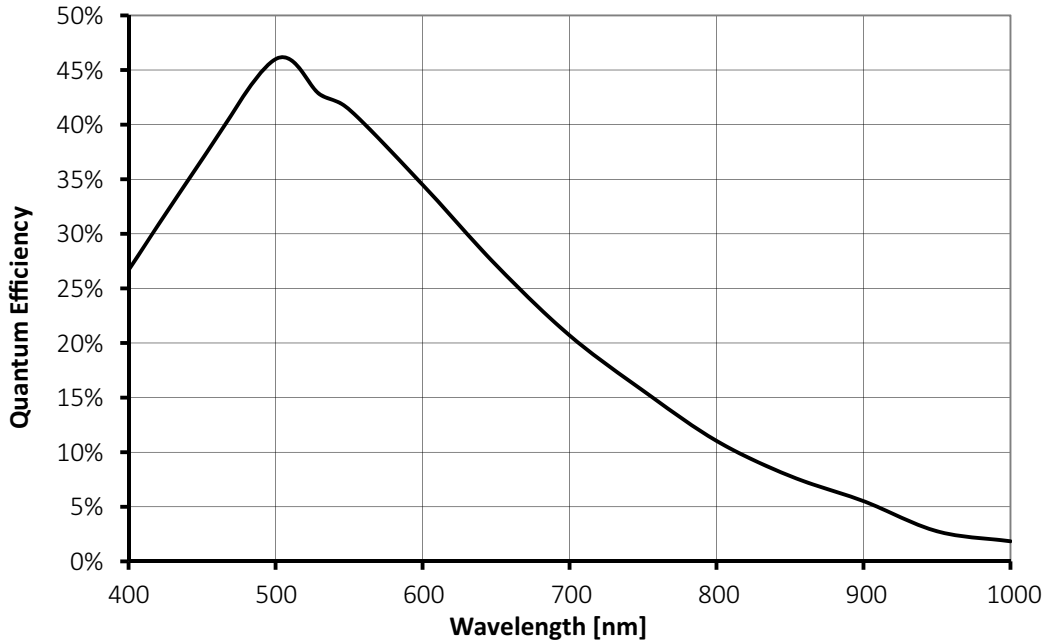


Figure 26: Manta G-201B spectral sensitivity (without protection/cover glass)

Manta G-201C spectral sensitivity

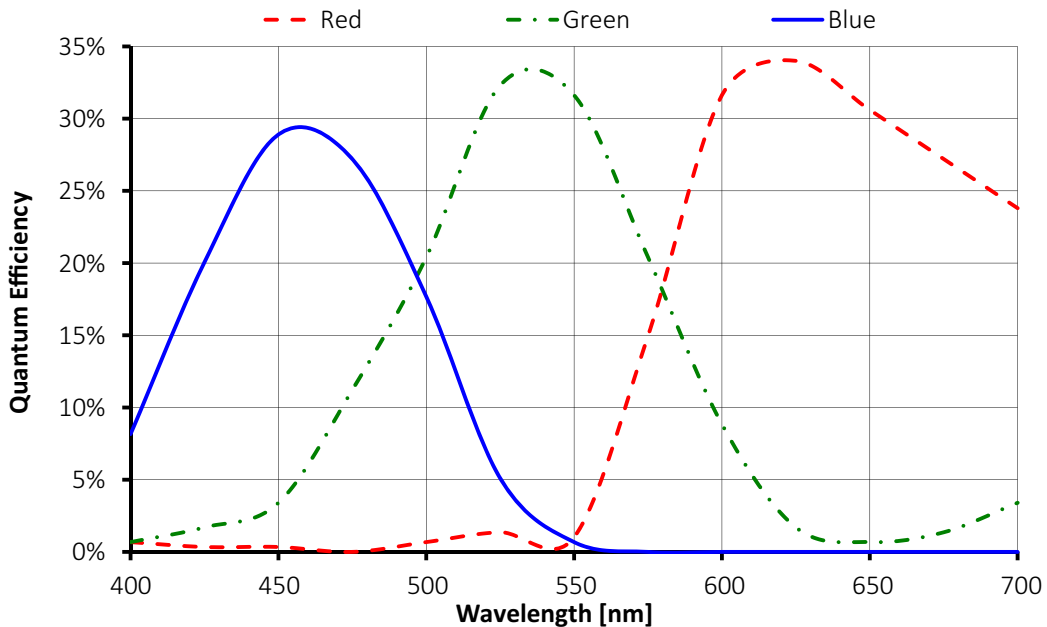


Figure 27: Manta G-201C spectral sensitivity (without IR cut filter)

Manta G-201B/C ROI frame rate

$$\text{Max. frame rate} = \frac{1}{54.81\mu\text{s} \times \text{ROI height} + 7.14\mu\text{s} \times (1234 - \text{ROI height}) + 340.03\mu\text{s}}$$

Maximum frame rate at full resolution according formula: 14.7 fps

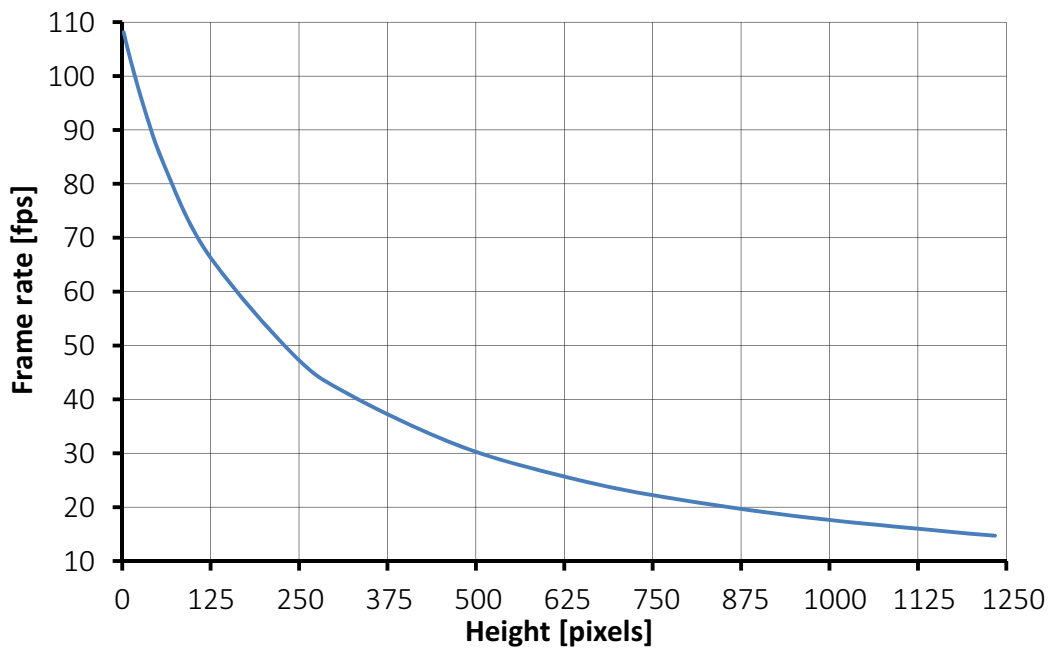


Figure 28: Frame rate as a function of ROI height [width=1624]

ROI height [pixels]	Width [pixels]	Frame rate [fps] ¹
1234	1624	14.7
1200	1624	15.0
960	1624	18.2
768	1624	21.8
640	1624	25.2
480	1624	31.2
320	1624	40.9

ROI height [pixels]	Width [pixels]	Frame rate [fps] ¹
240	1624	48.5
120	1624	67.2
60	1624	83.2
30	1624	94.5
10	1624	103.8
2	1624	108.1

¹ Frame rate = theoretical maximum frame rate (in frames per second) of the CCD sensor according to given formula.

Table 19: Frame rate as a function of ROI height

Manta G-201B/C-30fps ROI frame rate

$$\text{Max. frame rate} = \frac{1}{26.87\mu\text{s} \times \text{ROI height} + 2.84\mu\text{s} \times (1234 - \text{ROI height}) + 178.72\mu\text{s}}$$

Maximum frame rate at full resolution according formula: 30.0 fps

Maximum frame rate at 1600 x 1200 (measured): 31.0 fps

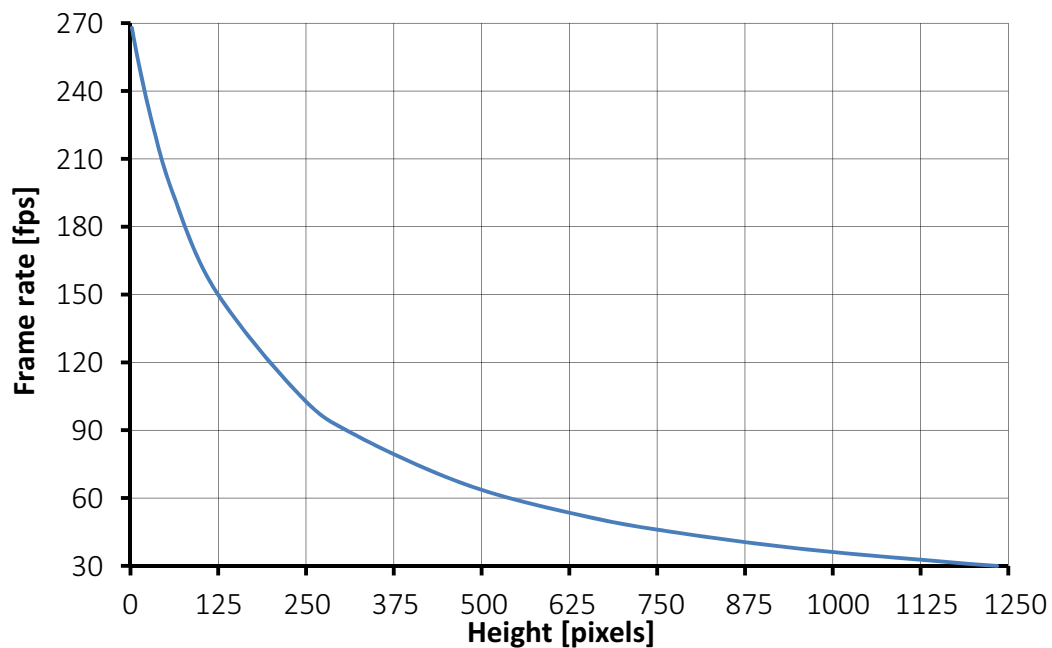


Figure 29: Frame rate as a function of ROI height [width=1624]

ROI height [pixels]	Width [pixels]	Frame rate [fps] ¹	ROI height [pixels]	Width [pixels]	Frame rate [fps] ¹
1234	1624	30.0	240	1624	105.8
1200	1624	30.7	120	1624	152.2
960	1624	37.3	60	1624	195.1
768	1624	45.1	30	1624	227.0
640	1624	52.4	10	1624	254.8
480	1624	65.7	2	1624	268.0
320	1624	87.9			

¹ Frame rate = theoretical maximum frame rate (in frames per second) of the CCD sensor according to given formula.

Table 20: Frame rate as a function of ROI height

Manta G-223B/NIR/C

Feature	Specification
Resolution	2048 x 1088
Sensor	CMOSIS CMV2000 with microlenses and global shutter
Type	CMOS
Sensor size	Type 2/3
Cell size	5.5 μm
Lens mount	C-Mount, M12-Mount
Housing variants ¹	Standard (straight view), Angled head, Board level
Maximum frame rate at full resolution	53.7 fps @ 124 MB/s; 60.1 burst mode ²
Maximum image bit depth	12-bit
On-board FIFO image buffer	128 MB, up to 59 frames at full resolution
Mono formats	Mono8, Mono12Packed, Mono12
Color formats	BayerGB8, BayerGB12Packed, BayerGB12, Mono8, RGB8Packed, BGR8Packed, RGBA8Packed, BGRA8Packed, YUV411Packed, YUV422Packed, YUV444Packed
Exposure control	18 μs ³ to 126 s; 1 μs increments
Gain control	0 – 26 dB
Binning	N/A
Decimation	Horizontal and Vertical: 1, 2, 4, 8 factor
Opto-isolated I/Os	2 inputs, 2 outputs
RS-232	1 TxD, 1 RxD
Voltage requirements	8 – 30 VDC, or PoE
Power consumption	2.7 W @ 12 VDC; 3.1 W PoE
Operating temperature	+5 °C to +45 °C housing temperature
Storage temperature	-10 °C to +70 °C ambient temperature without condensation
Body dimensions (L x W x H)	86.4 x 44 x 29 mm
Mass	PoE model: 200 g; Non-PoE model: 190 g
Hardware interface standard	PoE, IEEE 802.3af 1000BASE-T, 100BASE-TX
Software interface standard	GigE Vision Standard V1.2
Camera control interface	GenICam SFNC V1.2.1 compliant
Regulatory	CE, FCC Class B, RoHS (2011/65/EU)

¹ For more information on housing variants, see the [Modular concept](#).

² For more information on *StreamFrameRateConstrain*, see the [GigE Features Reference](#).

³ Camera firmware v1.52.8151 shows minimum exposure values without frame overhead time, i.e., 1 μs . See sensor data sheet for details on frame overhead time. This will be fixed in the next firmware release.

Table 21: Manta G-223B/NIR/C camera specifications

Manta G-223B/NIR spectral sensitivity

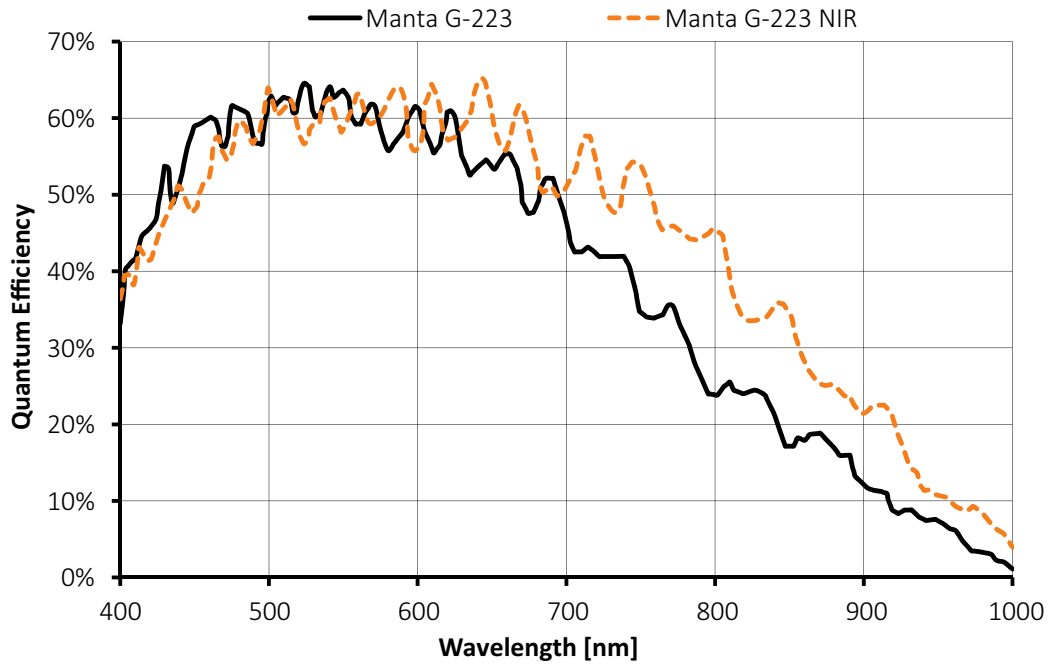


Figure 30: Manta G-223B and G-223B NIR spectral sensitivity

Manta G-223C spectral sensitivity

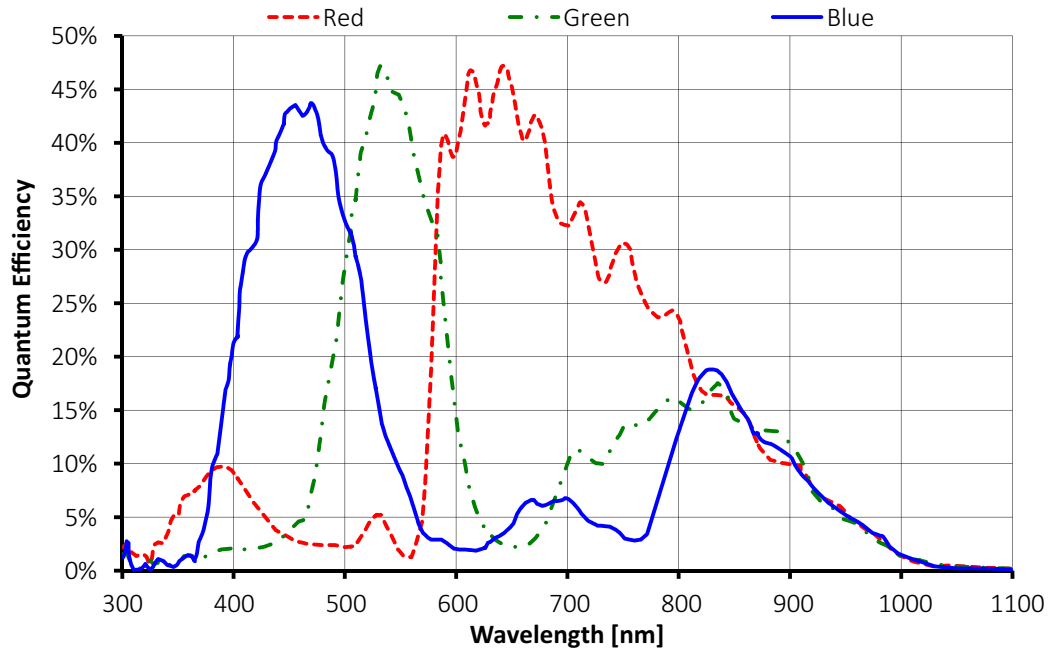


Figure 31: Manta G-223C spectral sensitivity (without IR cut filter)

Manta G-223B/NIR/C ROI frame rate

Maximum frame rate at 1088 x 2048 (measured): 53.7 fps
 (higher frame rates are possible with burst mode)

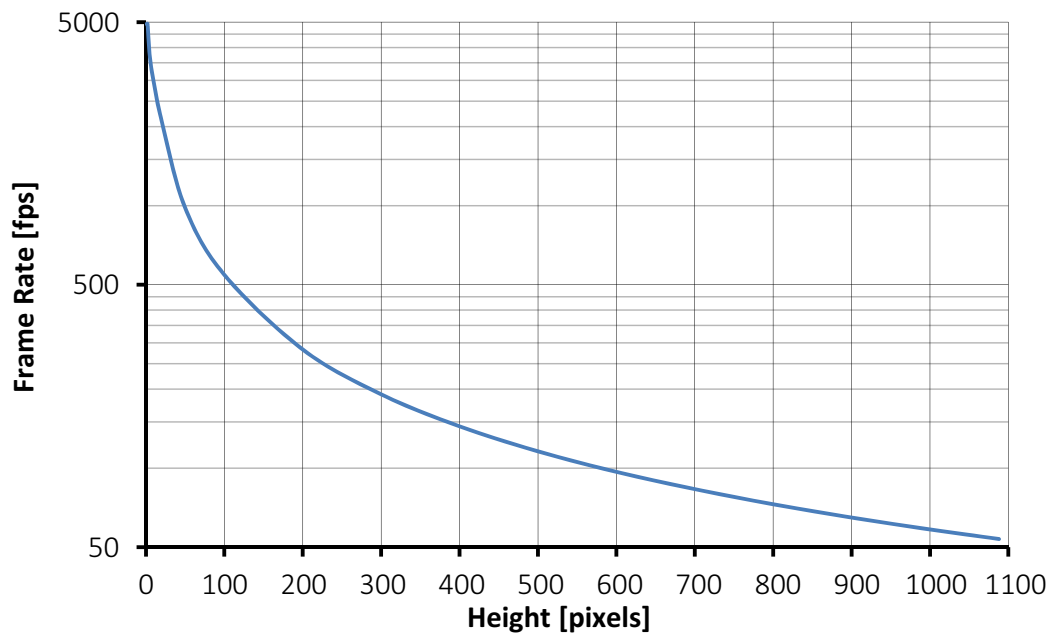


Figure 32: Frame rate as a function of ROI height [width=2048]

ROI height [pixels]	Width [pixels] ¹	Frame rate [fps]
1088	2048	53.7
1000	2048	58.4
900	2048	64.8
800	2048	72.8
700	2048	83.1
600	2048	96.8
500	2048	115.9
400	2048	144.3
300	2048	191.1

ROI height [pixels]	Width [pixels] ¹	Frame rate [fps]
200	2048	283.1
100	2048	545.2
50	2048	981.3
20	2048	2105.2
10	2048	2949.8
5	2048	3690.0
2	2048	4926.1
1	2048	4926.1

¹ There will be an increase in frame rate with reduced width if the camera is bandwidth limited.

Table 22: Frame rate as a function of ROI height

Manta G-235B/C

Feature	Specification
Resolution	1936 x1216
Sensor	Sony IMX174LLJ/IMX174LQJ with Pregius® global shutter CMOS technology
Type	Progressive Scan CMOS
Sensor size	Type 1/1.2
Cell size	5.86 µm
Lens mount	C-Mount, M12-Mount
Housing variants ¹	Standard (straight view), Angled head, Board level
Maximum frame rate at full resolution	50.7 fps @ 124 MB/s; 55.8 fps burst mode ²
Maximum image bit depth	12-bit
On-board FIFO image buffer	128 MB, up to 56 frames at full resolution
Mono formats	Mono8, Mono12Packed, Mono12
Color formats	Mono8, BayerRG8, BayerRG12, RGB8Packed, BGR8Packed, YUV411Packed, YUV422Packed, YUV444Packed
Exposure control	G-235B: 28 µs to 60 s G-235C: <ul style="list-style-type: none"> • Mono8, BayerRG8, BayerRG12, YUV411Packed, YUV422Packed: 28 µs to 88 s, 14 µs increments • RGB8Packed, BGR8Packed, YUV444Packed: 56 µs to 88 s, 28 µs increments
Gain control	0 – 40 dB
Binning	Horizontal: 1 to 4 pixels; Vertical: 1 to 4 rows
Decimation	Horizontal and Vertical: 1, 2, 4, 8 factor
Opto-isolated I/Os	2 inputs, 2 outputs
RS-232	1 Tx, 1 Rx
Voltage requirements	8 – 30 VDC, or PoE
Power consumption	2.8 W @ 12 VDC; 3.3 W PoE
Trigger latency ³	28.6 µs
Trigger jitter ³	7.2 µs
Operating temperature	+5 °C to +45 °C housing temperature
Storage temperature	-10 °C to +70 °C ambient temperature without condensation
Body dimensions (L x W x H)	86.4 x 44 x 29 mm
Mass	PoE model: 200 g; Non-PoE model: 190 g
Hardware interface standard	PoE, IEEE 802.3af 1000BASE-T, 100BASE-TX
Software interface standard	GigE Vision Standard V1.2
Camera control interface	GenICam SFNC V1.2.1 compliant

Table 23: Manta G-235B/C camera specifications

Feature	Specification
Regulatory	CE, FCC Class B, RoHS (2011/65/EU)
<p>¹ For more information on housing variants, see the Modular concept.</p> <p>² For more information on <i>StreamFrameRateConstrain</i>, see the GigE Features Reference.</p> <p>³ These values are calculated directly from the microcontroller source. These values are only valid for pixel formats < 16-bit per pixel and applicable in both Idle and Frame valid states:</p> <ul style="list-style-type: none"> • Idle state: sensor is ready and camera is idle, waiting for the next trigger • Frame valid state: sensor is reading out and camera is busy. If the next frame is requested by an external trigger in this state, higher latency may occur as compared to the idle state. 	

Table 23: Manta G-235B/C camera specifications (Continued)

Manta G-235B spectral sensitivity

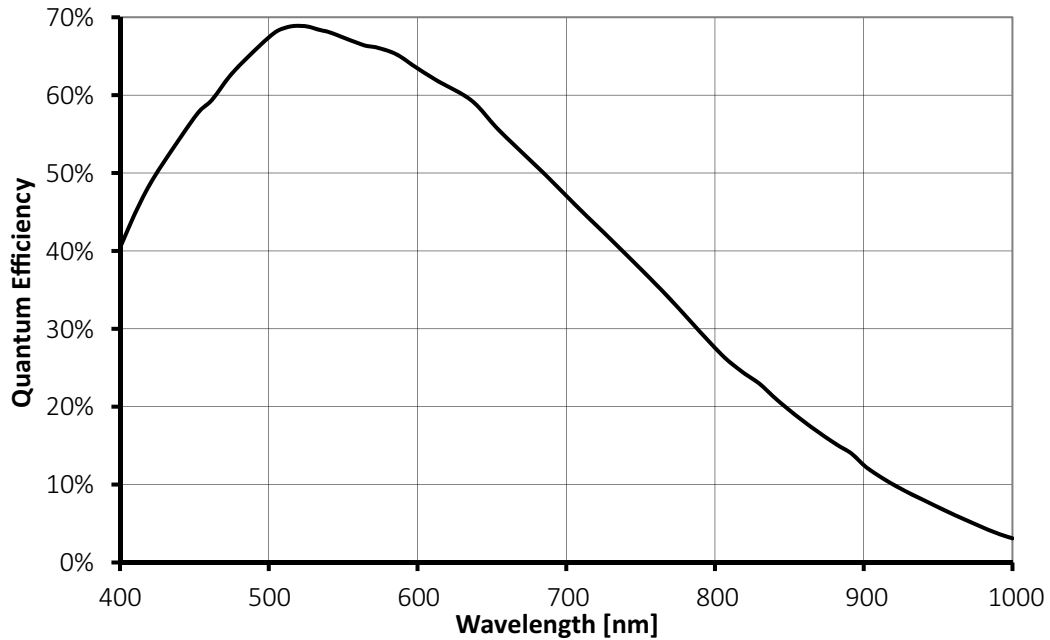


Figure 33: Manta G-235B spectral sensitivity (without protection/cover glass)

Manta G-235C spectral sensitivity

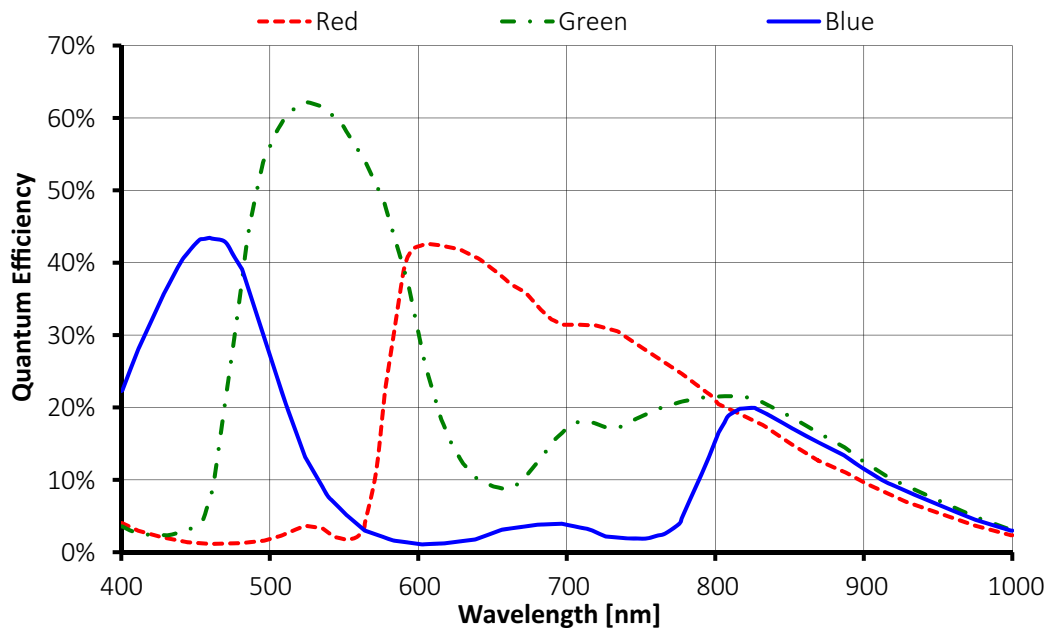


Figure 34: Manta G-235C spectral sensitivity (without IR cut filter)

Manta G-235B/C ROI frame rate

Maximum frame rate at 1936 x 1216 (measured): 50.7 fps
 (higher frame rates are possible with burst mode)

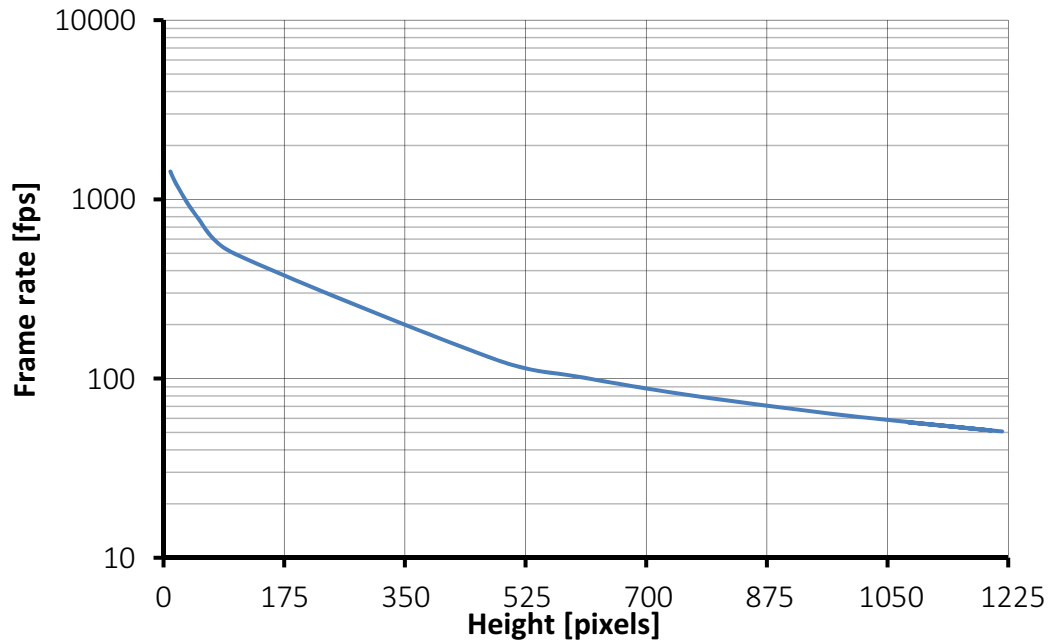


Figure 35: Frame rate as a function of ROI height [width=1936]

ROI height [pixels]	Width [pixels] ¹	Frame rate [fps]	ROI height [pixels]	Width [pixels] ¹	Frame rate [fps]
1216	1936	50.7	600	1936	102.7
1200	1936	51.3	480	1936	128.4
1080	1936	57.0	100	1936	504.5
1024	1936	60.2	50	1936	787.9
960	1936	64.2	20	1936	1188.5
768	1936	80.2	10	1936	1431.1

¹ There will be an increase in frame rate with reduced width if the camera is bandwidth limited.

Table 24: Frame rate as a function of ROI height

Manta G-282B/C

Feature	Specification
Resolution	1936 x 1458
Sensor	Sony ICX687ALA/AQA with EXview HAD CCD II™ technology
Type	Progressive Scan CCD
Sensor size	Type 1/1.8
Cell size	3.69 µm
Lens mount	C-Mount
Housing variants ¹	Standard (straight view)
Maximum frame rate at full resolution	30 fps
Maximum image bit depth	12-bit
On-board FIFO image buffer	128 MB, up to 47 frames at full resolution
Mono formats	Mono8, Mono12Packed, Mono12
Color formats	BayerRG8, BayerRG12Packed, BayerRG12, Mono8, RGB8Packed, YUV411Packed, YUV422Packed, YUV444Packed, BGR8Packed
Exposure control	41 µs to 38 s; 1 µs increments
Gain control	0 – 32 dB
Binning	Horizontal: 1 to 8 columns; Vertical: 1 to 14 rows
Decimation	Horizontal and Vertical: 1, 2, 4, 8 factor
Opto-isolated I/Os	2 inputs, 2 outputs
RS-232	1 TxD, 1 RxD
Voltage requirements	8 – 30 VDC, or PoE
Power consumption	3.5 W @ 12 VDC; 4.1 W PoE
Trigger latency ²	Idle state: 7.2 µs; Frame valid state: 18.4 µs
Trigger jitter ²	Idle state: 4.0 µs; Frame valid state: 15.2 µs
Operating temperature	+5 °C to +45 °C housing temperature
Storage temperature	-10 °C to +70 °C ambient temperature without condensation
Body dimensions (L x W x H)	86.4 x 44 x 29 mm
Mass	PoE model: 200 g; Non-PoE model: 190 g
Hardware interface standard	PoE, IEEE 802.3af 1000BASE-T, 100BASE-TX
Software interface standard	GigE Vision Standard V1.2
Camera control interface	GenICam SFNC V1.2.1 compliant
Regulatory	CE, FCC Class B, RoHS (2011/65/EU)

¹ For more information on housing variants, see the [Modular concept](#).

² It is possible to start the exposure of the next frame while the previous frame is read out:

- Idle state: sensor is ready and camera is idle, waiting for the next trigger
- Frame valid state: sensor is reading out and camera is busy. If the next frame is requested by an external trigger in this state, higher latency may occur as compared to the idle state.

Table 25: Manta G-282B/C camera specifications

Manta G-282B spectral sensitivity

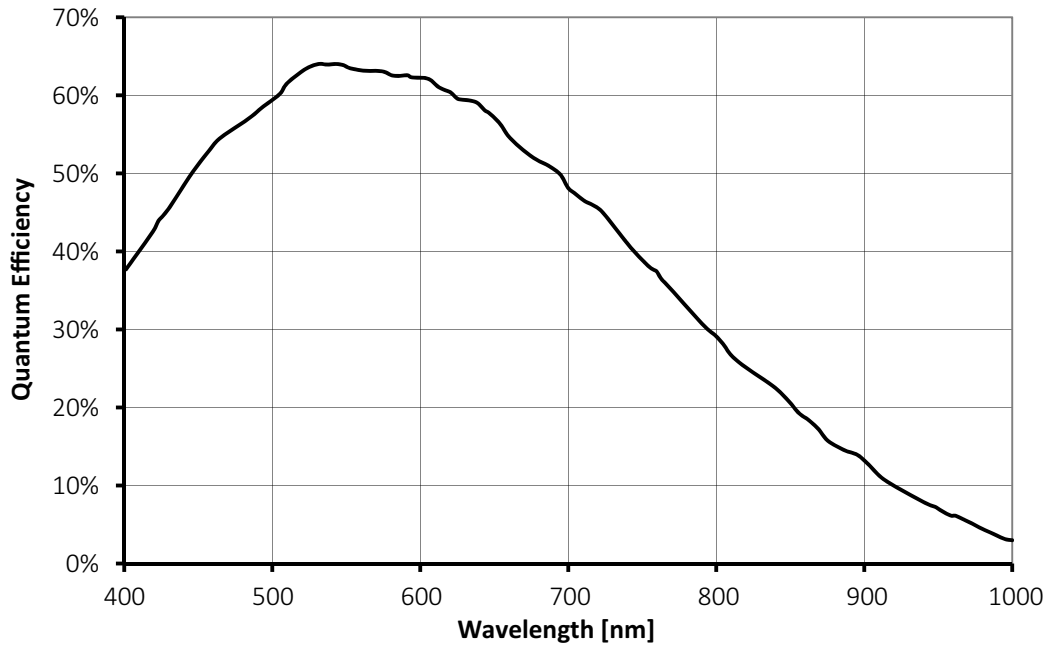


Figure 36: Manta G-282B spectral sensitivity (without protection/cover glass)

Manta G-282C spectral sensitivity

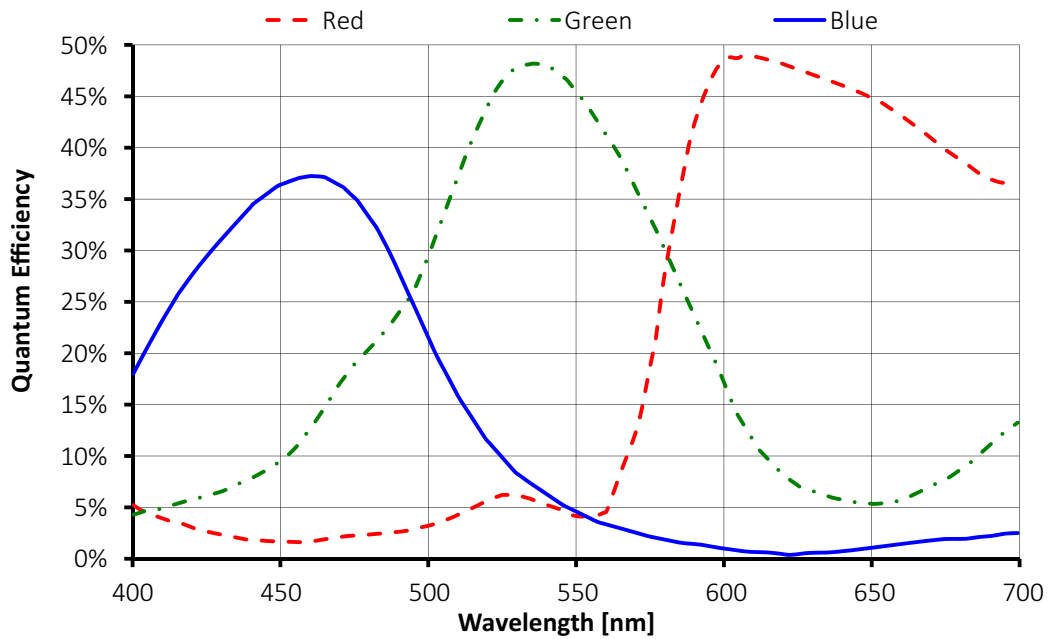


Figure 37: Manta G-282C spectral sensitivity (without IR cut filter)

Manta G-282B/C ROI frame rate

$$\text{Max. frame rate} = \frac{1}{22.27\mu\text{s} \times \text{ROI height} + 4.36\mu\text{s} \times (1459 - \text{ROI height}) + 221.78\mu\text{s}}$$

Maximum frame rate at full resolution according formula: 30.4 fps

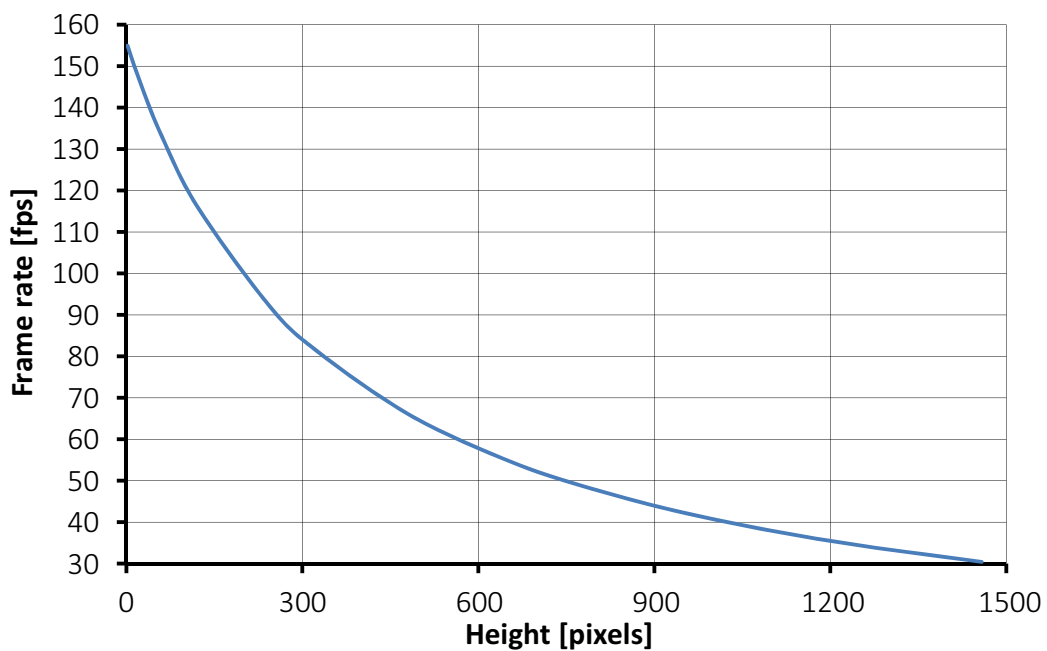


Figure 38: Frame rate as a function of ROI height [width=1936]

ROI height [pixels]	Width [pixels]	Frame rate [fps] ¹
1458	1936	30.4
1200	1936	35.4
960	1936	41.9
768	1936	49.1
640	1936	55.4
480	1936	66.1
320	1936	81.8

ROI height [pixels]	Width [pixels]	Frame rate [fps] ¹
240	1936	92.8
120	1936	116.3
60	1936	133.2
30	1936	143.6
10	1936	151.5
2	1936	154.9

¹ Frame rate = theoretical maximum frame rate (in frames per second) of the CCD sensor according to given formula.

Table 26: Frame rate as a function of ROI height

Manta G-283B/C

Feature	Specification
Resolution	1936 x 1458
Sensor	Sony CCD ICX674ALG/AQG with EXview HAD CCD II™ technology
Type	Progressive Scan CCD
Sensor size	Type 2/3
Cell size	4.54 µm
Lens mount	C-Mount
Housing variants ¹	Standard (straight view)
Maximum frame rate at full resolution	30 fps
Maximum image bit depth	12-bit
On-board FIFO image buffer	128 MB, up to 47 frames at full resolution
Mono formats	Mono8, Mono12Packed, Mono12
Color formats	BayerRG8, BayerRG12Packed, BayerRG12, Mono8, RGB8Packed, YUV411Packed, YUV422Packed, YUV444Packed, BGR8Packed
Exposure control	41 µs to 38 s; 1 µs increments
Gain control	0 – 33 dB
Binning	Horizontal: 1 to 8 columns; Vertical: 1 to 14 rows
Decimation	Horizontal and Vertical: 1, 2, 4, 8 factor
Opto-isolated I/Os	2 inputs, 2 outputs
RS-232	1 TxD, 1 RxD
Voltage requirements	8 – 30 VDC, or PoE
Power consumption	3.7 W @ 12 VDC; 4.3 W PoE
Trigger latency ²	Idle state: 7.2 µs; Frame valid state: 18.4 µs
Trigger jitter ²	Idle state: 4.0 µs; Frame valid state: 15.2 µs
Operating temperature	+5 °C to +45 °C housing temperature
Storage temperature	-10 °C to +70 °C ambient temperature without condensation
Body dimensions (L x W x H)	86.4 x 44 x 29 mm
Mass	PoE model: 200 g; Non-PoE model: 190 g
Hardware interface standard	PoE, IEEE 802.3af 1000BASE-T, 100BASE-TX
Software interface standard	GigE Vision Standard V1.2
Camera control interface	GenICam SFNC V1.2.1 compliant
Regulatory	CE, FCC Class B, RoHS (2011/65/EU)

¹ For more information on housing variants, see the [Modular concept](#).

² It is possible to start the exposure of the next frame while the previous frame is read out:

- Idle state: sensor is ready and camera is idle, waiting for the next trigger
- Frame valid state: sensor is reading out and camera is busy. If the next frame is requested by an external trigger in this state, higher latency may occur as compared to the idle state.

Table 27: Manta G-283B/C camera specifications

Manta G-283B spectral sensitivity

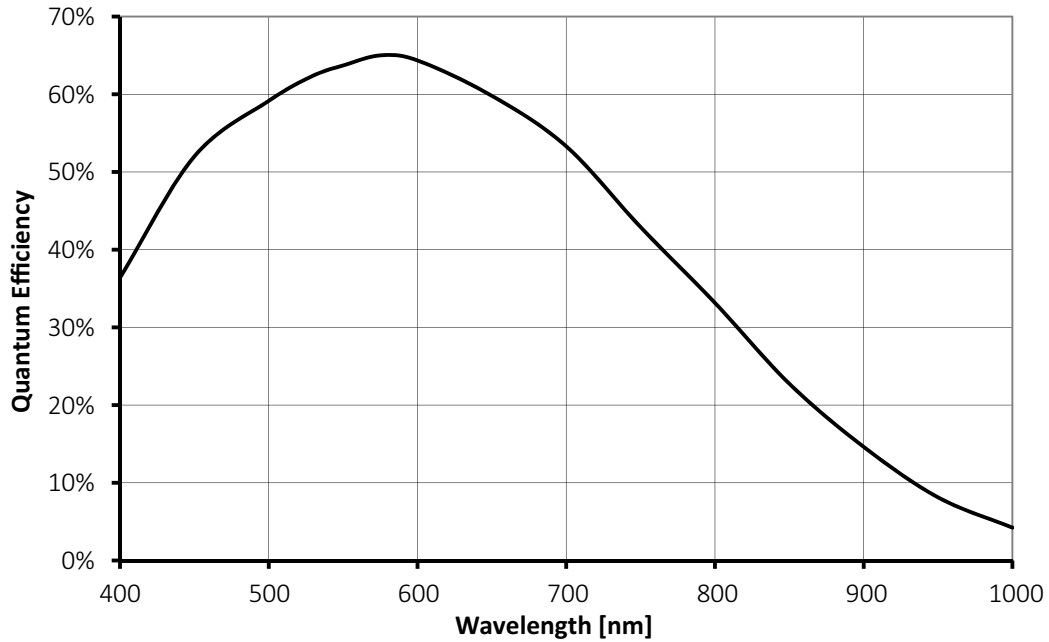


Figure 39: Manta G-283B spectral sensitivity (without protection/cover glass)

Manta G-283C spectral sensitivity

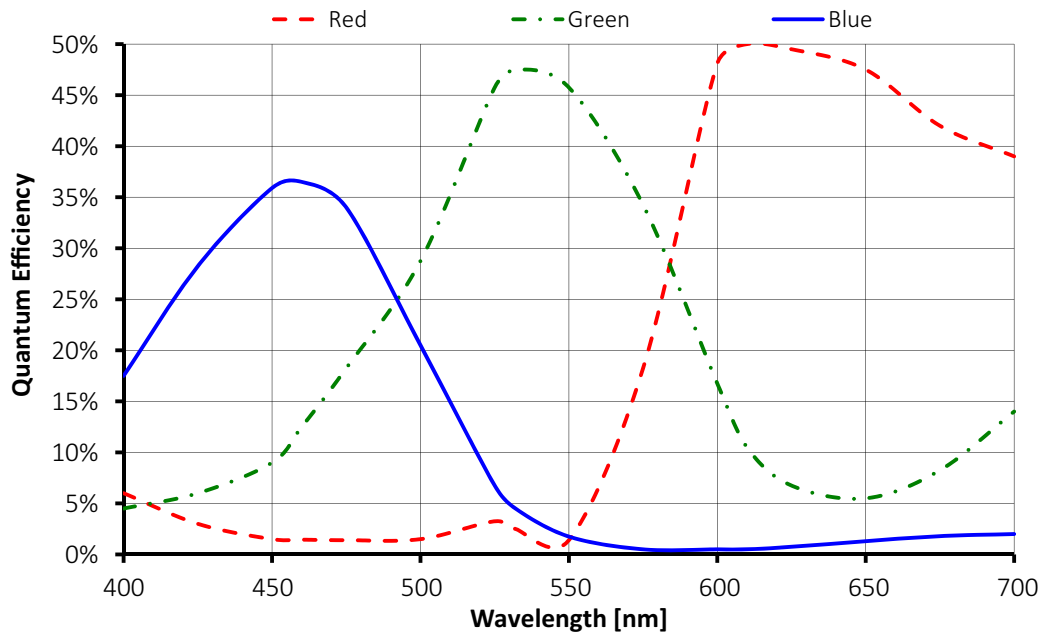


Figure 40: Manta G-283C spectral sensitivity (without IR cut filter)

Manta G-283B/C ROI frame rate

$$\text{Max. frame rate} = \frac{1}{22.27\mu\text{s} \times \text{ROI height} + 4.36\mu\text{s} \times (1459 - \text{ROI height}) + 221.78\mu\text{s}}$$

Maximum frame rate at full resolution according formula: 30.4 fps

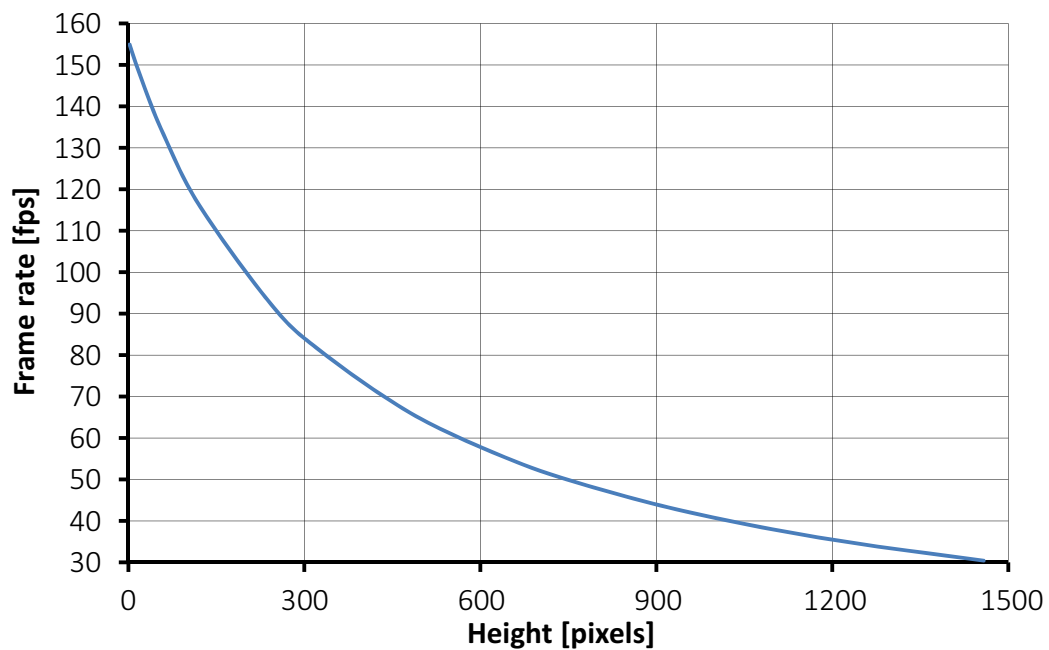


Figure 41: Frame rate as a function of ROI height [width=1936]

ROI height [pixels]	Width [pixels]	Frame rate [fps] ¹
1458	1936	30.4
1200	1936	35.4
960	1936	41.9
768	1936	49.1
640	1936	55.4
480	1936	66.1
320	1936	81.8

ROI height [pixels]	Width [pixels]	Frame rate [fps] ¹
240	1936	92.8
120	1936	116.3
60	1936	133.2
30	1936	143.6
10	1936	151.5
2	1936	154.9

¹ Frame rate = theoretical maximum frame rate (in frames per second) of the CCD sensor according to given formula.

Table 28: Frame rate as a function of ROI height

Manta G-419B/NIR/C

Feature	Specification
Resolution	2048 x 2048
Sensor	CMOSIS CMV4000 with microlenses and global shutter
Type	CMOS
Sensor size	Type 1
Cell size	5.5 μm
Lens mount	C-Mount, M12-Mount
Housing variants ¹	Standard (straight view), Angled head, Board level
Maximum frame rate at full resolution	28 fps @ 124 MB/s; 32 fps burst mode ²
Maximum image bit depth	12-bit
On-board FIFO image buffer	128 MB, up to 31 frames at full resolution
Mono formats	Mono8, Mono12Packed, Mono12
Color formats	BayerGB8, BayerGB12Packed, BayerGB12, Mono8, RGB8Packed, BGR8Packed, RGBA8Packed, BGRA8Packed, YUV411Packed, YUV422Packed, YUV444Packed
Exposure control	34 μs ³ to 126 s; 1 μs increments
Gain control	0 – 26 dB
Binning	N/A
Decimation	Horizontal and Vertical: 1, 2, 4, 8 factor
Opto-isolated I/Os	2 inputs, 2 outputs
RS-232	1 TxD, 1 RxD
Voltage requirements	8 – 30 VDC, or PoE
Power consumption	2.7 W @ 12 VDC; 3.1 W PoE
Operating temperature	+5 °C to +45 °C housing temperature
Storage temperature	-10 °C to +70 °C ambient temperature without condensation
Body dimensions (L x W x H)	86.4 x 44 x 29 mm
Mass	PoE model: 200 g; Non-PoE model: 190 g
Hardware interface standard	PoE, IEEE 802.3af 1000BASE-T, 100BASE-TX
Software interface standard	GigE Vision Standard V1.2
Camera control interface	GenICam SFNC V1.2.1 compliant
Regulatory	CE, FCC Class B, RoHS (2011/65/EU)

¹ For more information on housing variants, see the [Modular concept](#).

² For more information on *StreamFrameRateConstrain*, see the [GigE Features Reference](#).

³ Camera firmware v1.52.8151 shows minimum exposure values without frame overhead time, i.e., 1 μs . See sensor data sheet for details on frame overhead time. This will be fixed in the next firmware release.

Table 29: Manta G-419B/NIR/C camera specifications

Manta G-419B/NIR spectral sensitivity

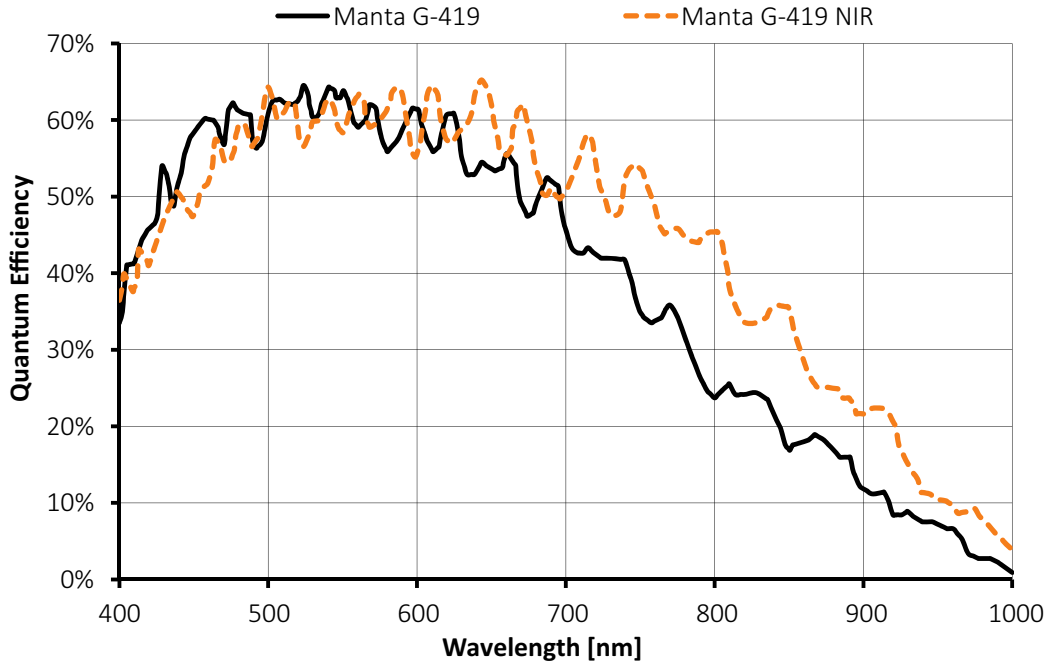


Figure 42: Manta G-419B and G-419B NIR spectral sensitivity

Manta G-419C spectral sensitivity

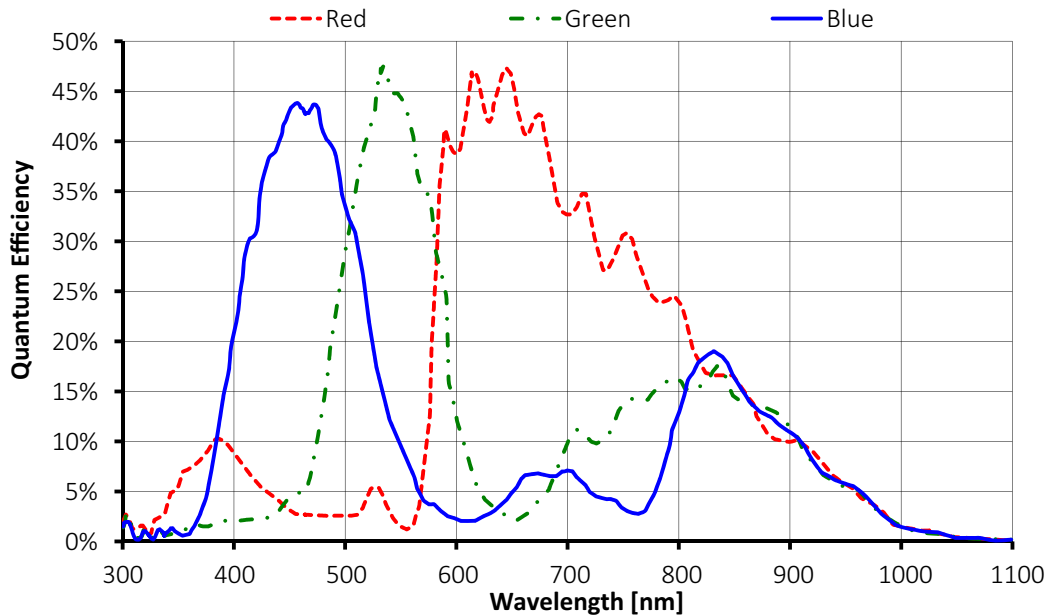


Figure 43: Manta G-419C spectral sensitivity (without IR cut filter)

Manta G-419B/NIR/C ROI frame rate

Maximum frame rate at 2048 x 2048 (measured): 28.6 fps (higher frame rates are possible with burst mode).

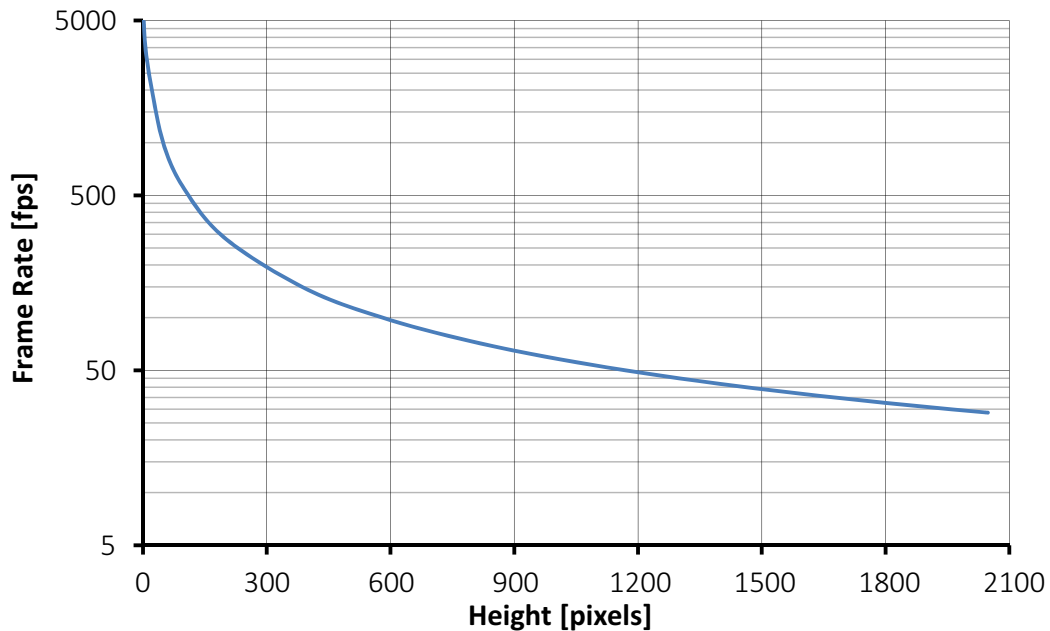


Figure 44: Frame rate as a function of ROI height [width=2048]

ROI height [pixels]	Width [pixels] ¹	Frame rate [fps]	ROI height [pixels]	Width [pixels] ¹	Frame rate [fps]
2048	2048	28.6	500	2048	115.9
2000	2048	29.3	400	2048	144.3
1800	2048	32.5	300	2048	191.1
1600	2048	36.6	200	2048	283.1
1400	2048	41.8	100	2048	545.2
1200	2048	48.7	50	2048	981.3
1000	2048	58.4	20	2048	2105.2
900	2048	64.8	10	2048	2949.8
800	2048	72.8	5	2048	3690.0
700	2048	83.1	2	2048	4926.1
600	2048	96.8	1	2048	4926.1

¹ There will be an increase in frame rate with reduced width if the camera is bandwidth limited.

Table 30: Frame rate as a function of ROI height

Manta G-504B/C

Feature	Specification
Resolution	2452 x 2056
Sensor	Sony ICX655AL/AQ with Super HAD CCD™ technology
Type	Progressive Scan CCD
Sensor size	Type 2/3
Cell size	3.45 µm
Lens mount	C / CS-Mount
Housing variants ¹	Standard (straight view), Angled head, Board level
Maximum frame rate at full resolution	9 fps
Maximum image bit depth	12-bit
On-board FIFO image buffer	32 MB, up to 6 frames at full resolution
Mono formats	Mono8, Mono12Packed, Mono12
Color formats	BayerGB8, BayerGB12Packed, BayerGB12, Mono8, RGB8Packed, YUV411Packed, YUV422Packed, YUV444Packed, BGR8Packed, RGBA8Packed, BGRA8Packed
Exposure control	38 µs to 60 s; 1 µs increments
Gain control	0 – 32 dB
Binning	Horizontal: 1 to 8 columns; Vertical: 1 to 14 rows
Decimation	Horizontal and Vertical: 1, 2, 4, 8 factor
Opto-isolated I/Os	2 inputs, 2 outputs
RS-232	1 TxD, 1 RxD
Voltage requirements	8 – 30 VDC, or PoE
Power consumption	3.9 W @ 12 VDC; 4.6 W PoE
Trigger latency ²	Idle state: 12.8 µs; Frame valid state: 34.0 µs
Trigger jitter ²	Idle state: 9.1 µs; Frame valid state: 30.3 µs
Operating temperature	+5 °C to +45 °C housing temperature
Storage temperature	-10 °C to +70 °C ambient temperature without condensation
Body dimensions (L x W x H)	86.4 x 44 x 29 mm
Mass	PoE model: 210 g; Non-PoE model: 200 g
Hardware interface standard	PoE, IEEE 802.3af 1000BASE-T, 100BASE-TX
Software interface standard	GigE Vision Standard V1.2
Camera control interface	GenICam SFNC V1.2.1 compliant
Regulatory	CE, FCC Class B, RoHS (2011/65/EU)

¹ For more information on housing variants, see the [Modular concept](#).

² It is possible to start the exposure of the next frame while the previous frame is read out:

- Idle state: sensor is ready and camera is idle, waiting for the next trigger
- Frame valid state: sensor is reading out and camera is busy. If the next frame is requested by an external trigger in this state, higher latency may occur as compared to the idle state.

Table 31: Manta G-504B/C camera specifications

Manta G-504B spectral sensitivity

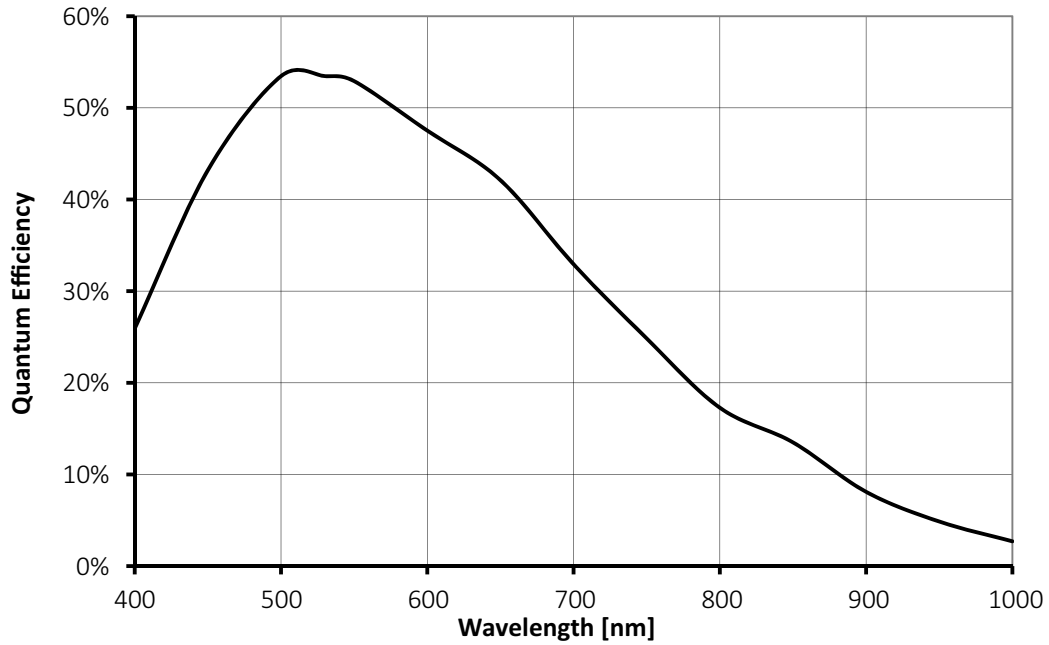


Figure 45: Manta G-504B spectral sensitivity (without protection/cover glass)

Manta G-504C spectral sensitivity

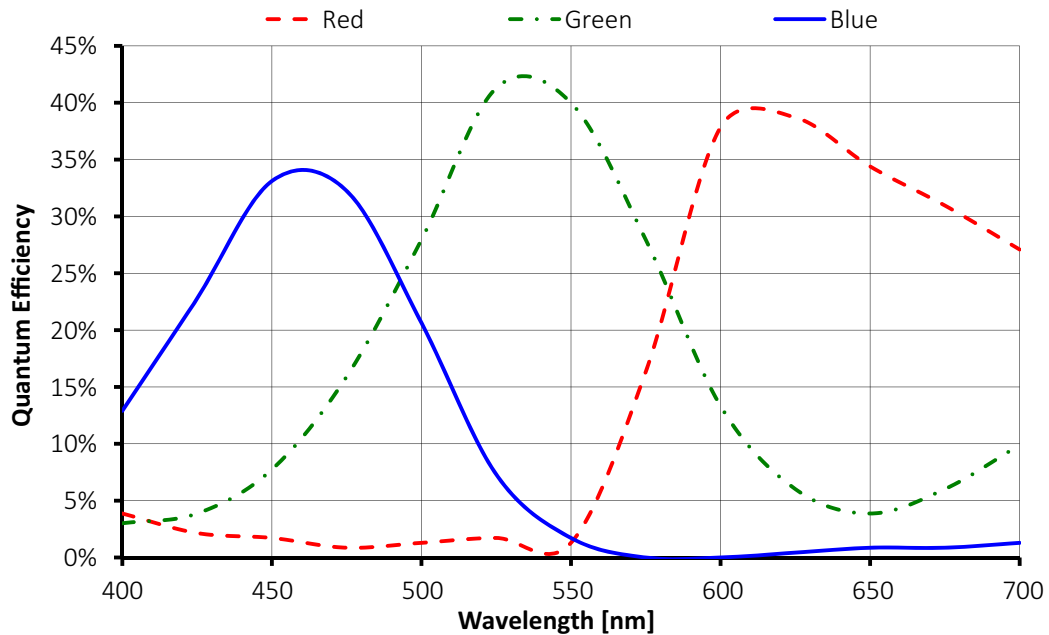


Figure 46: Manta G-504C spectral sensitivity (without IR cut filter)

Manta G-504B/C ROI frame rate

$$\text{Max. frame rate} = \frac{1}{52.55\mu\text{s} \times \text{ROI height} + 10.27\mu\text{s} \times (2056 - \text{ROI height}) + 295.62\mu\text{s}}$$

Maximum frame rate at full resolution according formula: 9.2 fps

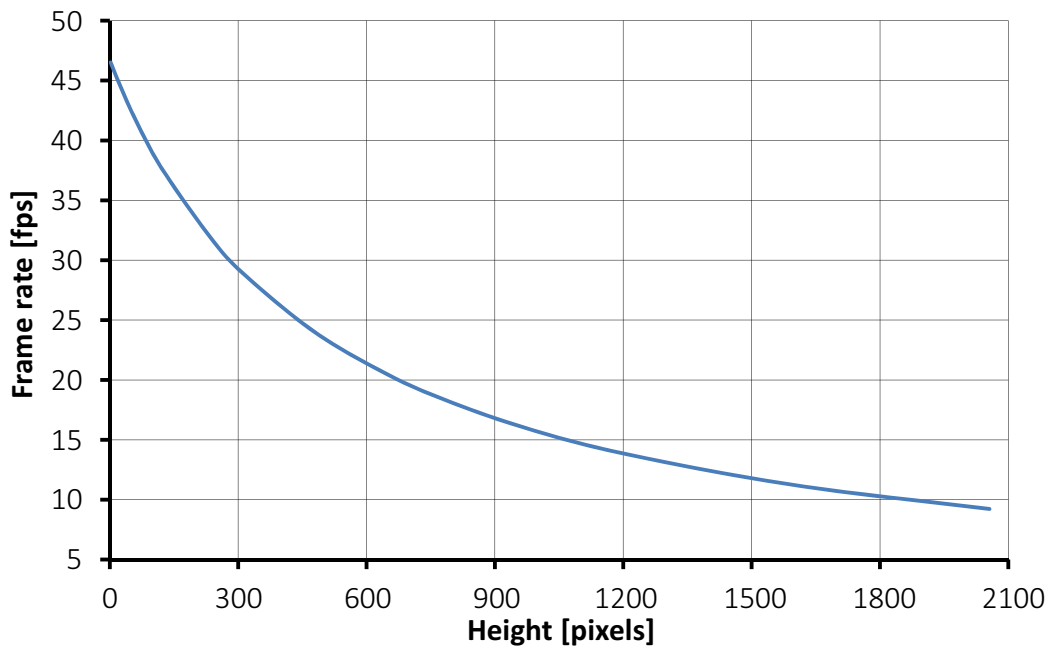


Figure 47: Frame rate as a function of ROI height [width=2452]

ROI height [pixels]	Width [pixels]	Frame rate [fps] ¹	ROI height [pixels]	Width [pixels]	Frame rate [fps] ¹
2056	2452	9.2	320	2452	28.6
1600	2452	11.2	240	2452	31.6
1200	2452	13.8	120	2452	37.7
960	2452	16.1	60	2452	41.7
768	2452	18.5	30	2452	44.0
640	2452	20.6	10	2452	45.8
480	2452	23.9	2	2452	46.5

¹ Frame rate = theoretical maximum frame rate (in frames per second) of the CCD sensor according to given formula.

Table 32: Frame rate as a function of ROI height

Manta G-505B/C

Feature	Specification
Resolution	2452 x 2056
Sensor	Sony ICX625 with Super HAD CCD™ technology
Type	Progressive Scan CCD
Sensor size	Type 2/3
Cell size	3.45 µm
Lens mount	C / CS-Mount
Housing variants ¹	Standard (straight view)
Maximum frame rate at full resolution	15 fps
Maximum image bit depth	12-bit
On-board FIFO image buffer	128 MB, up to 26 frames at full resolution
Mono formats	Mono8, Mono12Packed, Mono12
Color formats	BayerRG8, BayerRG12Packed, BayerRG12, Mono8, RGB8Packed, YUV411Packed, YUV422Packed, YUV444Packed, BGR8Packed
Exposure control	49 µs to 38 s; 1 µs increments
Gain control	0 – 31 dB
Binning	Horizontal: 1 to 8 columns; Vertical: 1 to 14 rows
Decimation	Horizontal and Vertical: 1, 2, 4, 8 factor
Opto-isolated I/Os	2 inputs, 2 outputs
RS-232	1 TxD, 1 RxD
Voltage requirements	8 – 30 VDC, or PoE
Power consumption	3.9 W @ 12 VDC; 4.5 W PoE
Trigger latency ²	Idle state: 7.3 µs; Frame valid state: 23.2 µs
Trigger jitter ²	Idle state: 4.0 µs; Frame valid state: 20.0 µs
Operating temperature	+5 °C to +45 °C housing temperature
Storage temperature	-10 °C to +70 °C ambient temperature without condensation
Body dimensions (L x W x H)	86.4 x 44 x 29 mm
Mass	PoE model: 200 g; Non-PoE model: 190 g
Hardware interface standard	PoE, IEEE 802.3af 1000BASE-T, 100BASE-TX
Software interface standard	GigE Vision Standard V1.2
Camera control interface	GenICam SFNC V1.2.1 compliant
Regulatory	CE, FCC Class B, RoHS (2011/65/EU)

¹ For more information on housing variants, see the [Modular concept](#).

² It is possible to start the exposure of the next frame while the previous frame is read out:

- Idle state: sensor is ready and camera is idle, waiting for the next trigger
- Frame valid state: sensor is reading out and camera is busy. If the next frame is requested by an external trigger in this state, higher latency may occur as compared to the idle state.

Table 33: Manta G-505B/C camera specifications

Manta G-505B spectral sensitivity

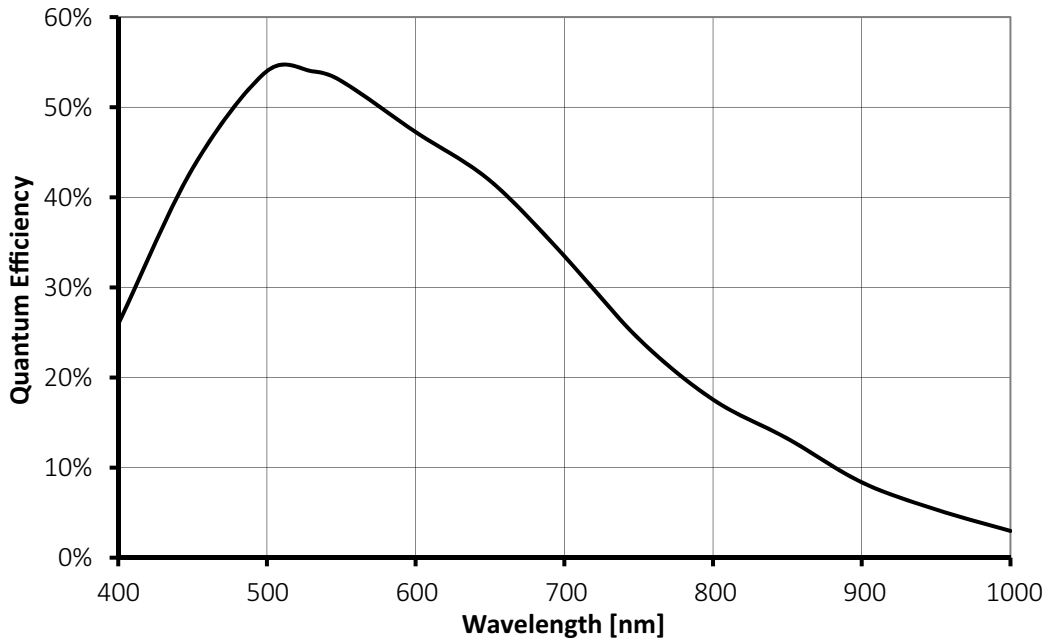


Figure 48: Manta G-505B spectral sensitivity (without protection/cover glass)

Manta G-505C spectral sensitivity

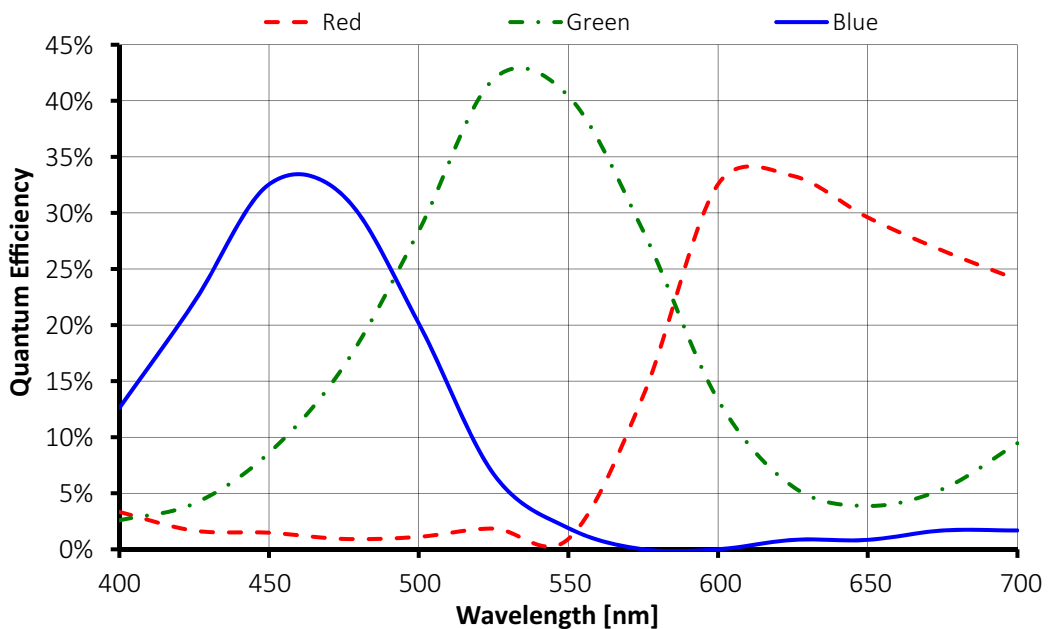


Figure 49: Manta G-505C spectral sensitivity (without IR cut filter)

Manta G-505B/C ROI frame rate

$$\text{Max. frame rate} = \frac{1}{32.18\mu\text{s} \times \text{ROI height} + 8.81\mu\text{s} \times (2056 - \text{ROI height}) + 321.82\mu\text{s}}$$

Maximum frame rate at full resolution according formula: 15.0 fps

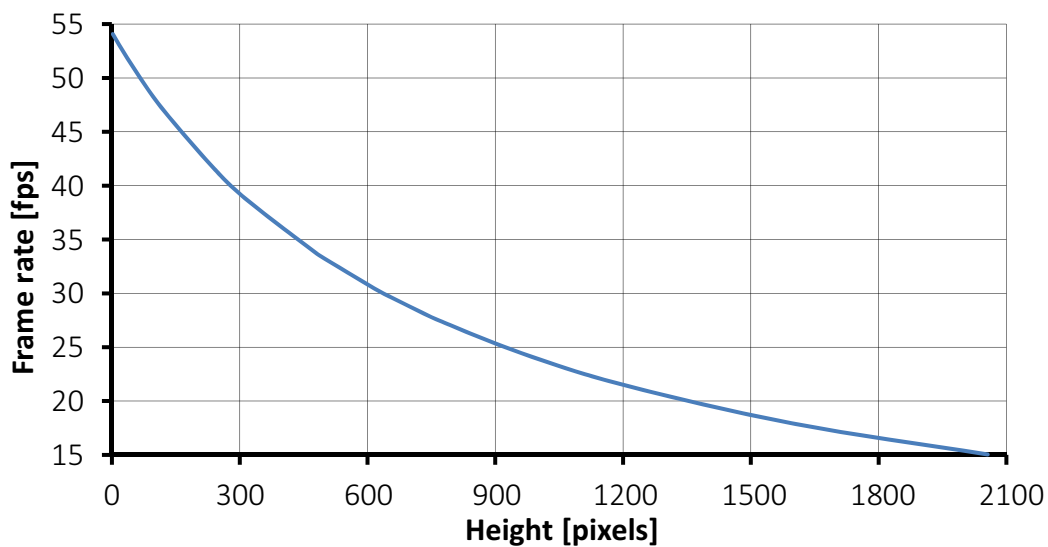


Figure 50: Frame rate as a function of ROI height [width=2452]

ROI height [pixels]	Width [pixels]	Frame rate [fps] ¹	ROI height [pixels]	Width [pixels]	Frame rate [fps] ¹
2056	2452	15.0	480	2452	33.7
1600	2452	17.9	320	2452	38.6
1200	2452	21.5	240	2452	41.6
960	2452	24.5	120	2452	47.1
768	2452	27.5	60	2452	50.4
734	2452	28.1	30	2452	52.2
640	2452	29.9	10	2452	53.5
614	2452	30.5	2	2452	54.1
492	2452	33.4			

¹ Frame rate = theoretical maximum frame rate (in frames per second) of the CCD sensor according to the given formula.

Table 34: Frame rate as a function of ROI height

Manta G-609B/C

Feature	Specification
Resolution	2752 x 2206
Sensor	Sony ICX694ALG/AQG with EXview HAD CCD II™ technology
Type	Progressive Scan CCD
Sensor size	Type 1
Cell size	4.54 µm
Lens mount	C-Mount
Housing variants ¹	Standard (straight view)
Maximum frame rate at full resolution	15 fps
Maximum image bit depth	12-bit
On-board FIFO image buffer	128 MB, up to 21 frames at full resolution
Mono formats	Mono8, Mono12Packed, Mono12
Color formats	BayerRG8, BayerRG12Packed, BayerRG12, Mono8, RGB8Packed, YUV411Packed, YUV422Packed, YUV444Packed, BGR8Packed
Exposure control	41 µs to 38 s; 1 µs increments
Gain control	0 – 33 dB
Binning	Horizontal: 1 to 8 columns; Vertical: 1 to 14 rows
Decimation	Horizontal and Vertical: 1, 2, 4, 8 factor
Opto-isolated I/Os	2 inputs, 2 outputs
RS-232	1 TxD, 1 RxD
Voltage requirements	8 – 30 VDC, or PoE
Power consumption	3.9 W @ 12 VDC; 4.6 W PoE
Trigger latency ²	Idle state: 7.2 µs; Frame valid state: 22.0 µs
Trigger jitter ²	Idle state: 4.0 µs; Frame valid state: 18.8 µs
Operating temperature	+5 °C to +45 °C housing temperature
Storage temperature	-10 °C to +70 °C ambient temperature without condensation
Body dimensions (L x W x H)	86.4 x 44 x 29 mm
Mass	PoE model: 200 g; Non-PoE model: 190 g
Hardware interface standard	PoE, IEEE 802.3af 1000BASE-T, 100BASE-TX
Software interface standard	GigE Vision Standard V1.2
Camera control interface	GenICam SFNC V1.2.1 compliant
Regulatory	CE, FCC Class B, RoHS (2011/65/EU)

¹ For more information on housing variants, see the [Modular concept](#).

² It is possible to start the exposure of the next frame while the previous frame is read out:

- Idle state: sensor is ready and camera is idle, waiting for the next trigger
- Frame valid state: sensor is reading out and camera is busy. If the next frame is requested by an external trigger in this state, higher latency may occur as compared to the idle state.

Table 35: Manta G-609B/C camera specifications

Manta G-609B spectral sensitivity

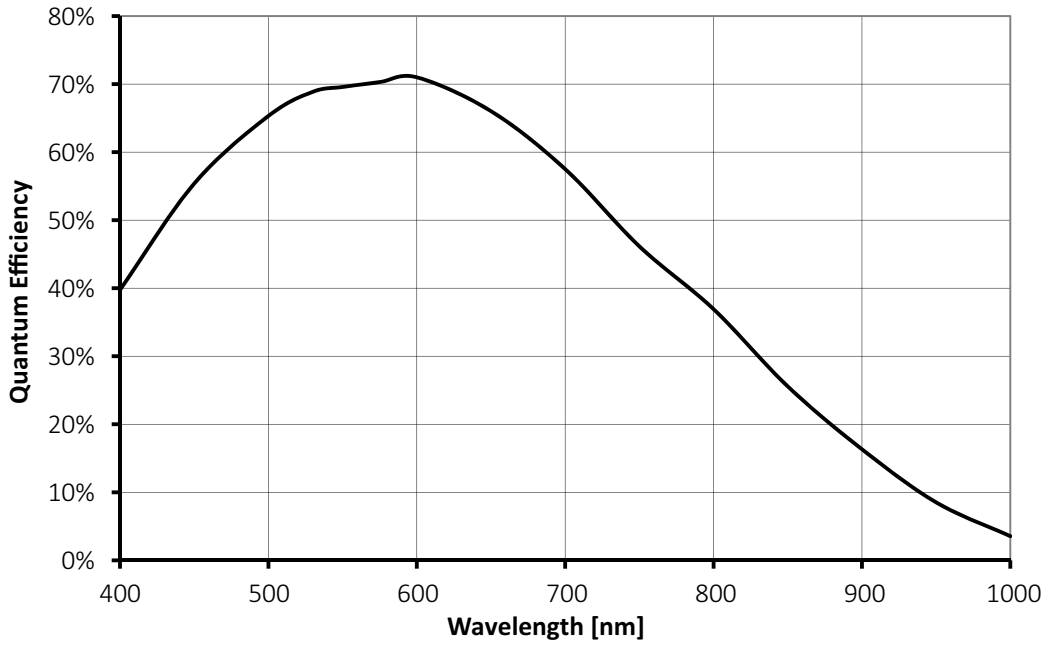


Figure 51: Manta G-609B spectral sensitivity (without protection/cover glass)

Manta G-609C spectral sensitivity

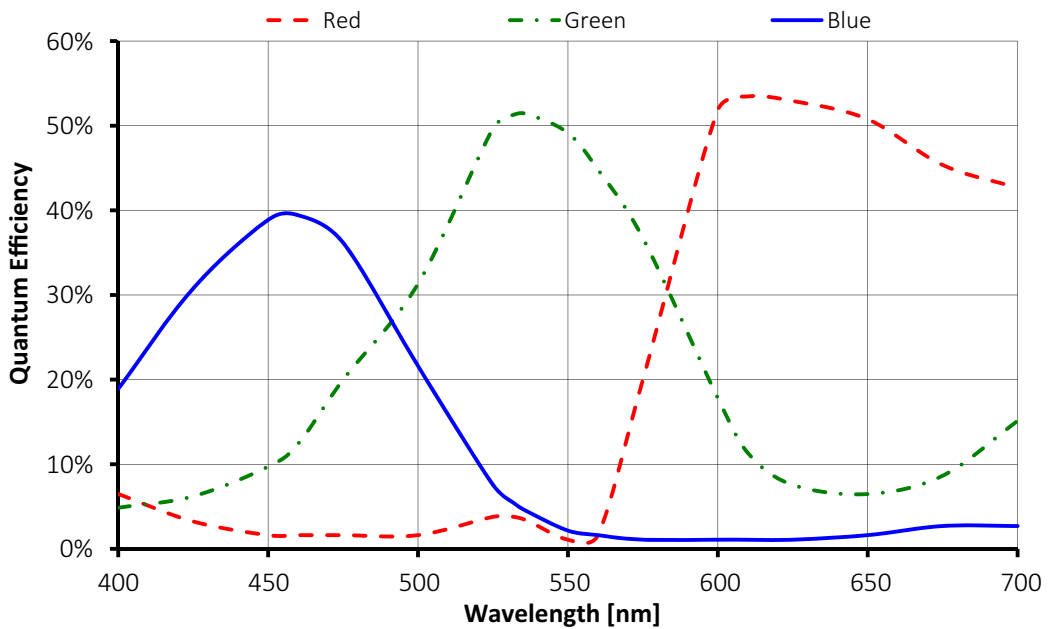


Figure 52: Manta G-609C spectral sensitivity (without IR cut filter)

Manta G-609B/C ROI frame rate

$$\text{Max. frame rate} = \frac{1}{29.71\mu\text{s} \times \text{ROI height} + 4.36\mu\text{s} \times (2207 - \text{ROI height}) + 229.22\mu\text{s}}$$

Maximum frame rate at full resolution according formula: 15.2 fps

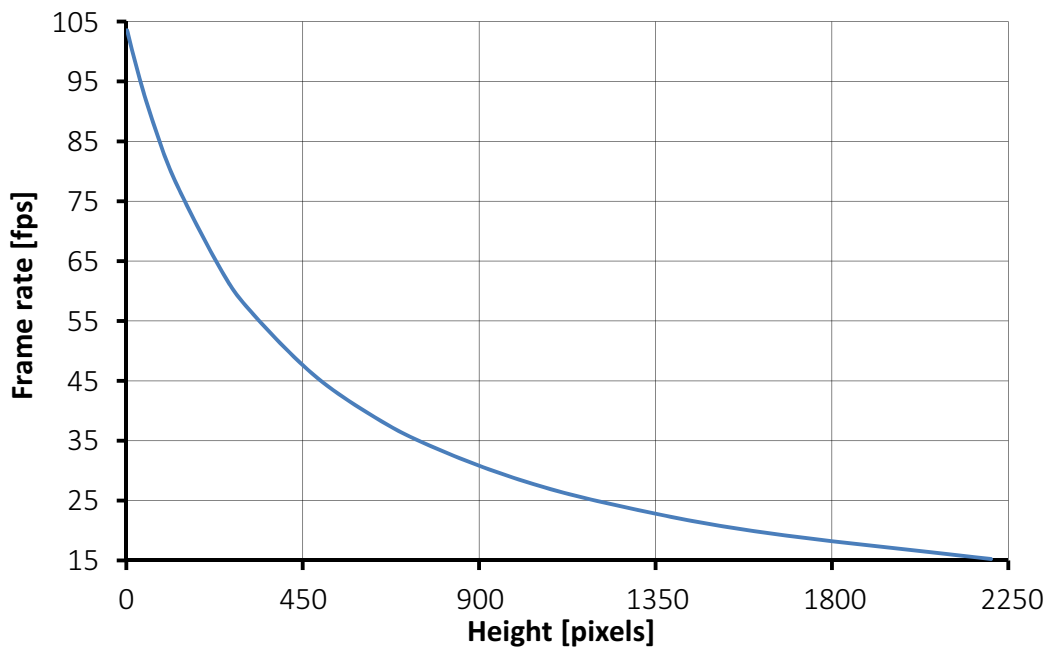


Figure 53: Frame rate as a function of ROI height [width=2752]

ROI height [pixels]	Width [pixels]	Frame rate [fps] ¹	ROI height [pixels]	Width [pixels]	Frame rate [fps] ¹
2206	2752	15.2	320	2752	56.4
1600	2752	19.9	240	2752	63.7
1200	2752	24.9	120	2752	79.0
960	2752	29.4	60	2752	89.8
768	2752	34.3	30	2752	96.4
640	2752	38.6	10	2752	101.4
480	2752	45.8	2	2752	103.5

¹ Frame rate = theoretical maximum frame rate (in frames per second) of the CCD sensor according to the given formula.

Table 36: Frame rate as a function of ROI height

Manta G-917B/C

Feature	Specification
Resolution	3384 x 2710
Sensor	Sony ICX814 ALG/AQG with EXview HAD CCD II™ technology
Type	Progressive Scan CCD
Sensor size	Type 1
Cell size	3.69 µm
Lens mount	C-Mount
Housing variants ¹	Standard (straight view)
Maximum frame rate at full resolution	10 fps
Maximum image bit depth	12-bit
On-board FIFO image buffer	128 MB, up to 14 frames at full resolution
Mono formats	Mono8, Mono12Packed, Mono12
Color formats	BayerRG8, BayerRG12Packed, BayerRG12, Mono8, RGB8Packed, YUV411Packed, YUV422Packed, YUV444Packed, BGR8Packed
Exposure control	42 µs to 38 s; 1 µs increments
Gain control	0 – 32 dB
Binning	Horizontal: 1 to 8 columns; Vertical: 1 to 14 rows
Decimation	Horizontal and Vertical: 1, 2, 4, 8 factor
Opto-isolated I/Os	2 inputs, 2 outputs
RS-232	1 TxD, 1 RxD
Voltage requirements	8 – 30 VDC, or PoE
Power consumption	4.0 W @ 12 VDC; 4.7 W PoE
Trigger latency ²	Idle state: 7.0 µs; Frame valid state: 25.1 µs
Trigger jitter ²	Idle state: 4.0 µs; Frame valid state: 22.1 µs
Operating temperature	+5 °C to +45 °C housing temperature
Storage temperature	-10 °C to +70 °C ambient temperature without condensation
Body dimensions (L x W x H)	86.4 x 44 x 29 mm
Mass	PoE model: 200 g; Non-PoE model: 190 g
Hardware interface standard	PoE, IEEE 802.3af 1000BASE-T, 100BASE-TX
Software interface standard	GigE Vision Standard V1.2
Camera control interface	GenICam SFNC V1.2.1 compliant
Regulatory	CE, FCC Class B, RoHS (2011/65/EU)

¹ For more information on housing variants, see the [Modular concept](#).

² It is possible to start the exposure of the next frame while the previous frame is read out:

- Idle state: sensor is ready and camera is idle, waiting for the next trigger
- Frame valid state: sensor is reading out and camera is busy. If the next frame is requested by an external trigger in this state, higher latency may occur as compared to the idle state.

Table 37: Manta G-917B/C camera specifications

Manta G-917B spectral sensitivity

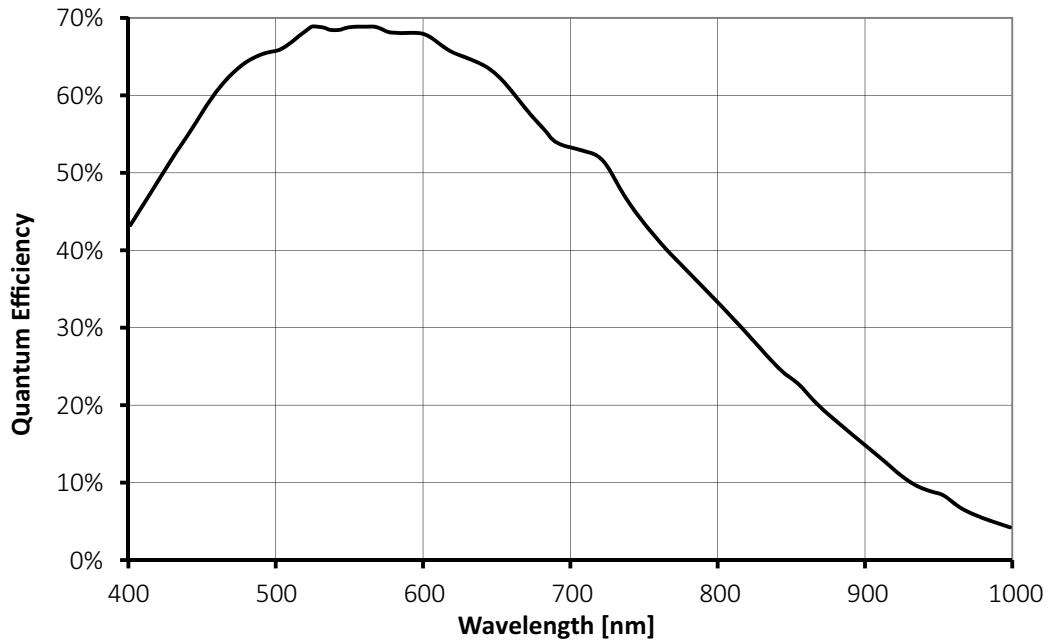


Figure 54: Manta G-917B spectral sensitivity (without protection/cover glass)

Manta G-917C spectral sensitivity

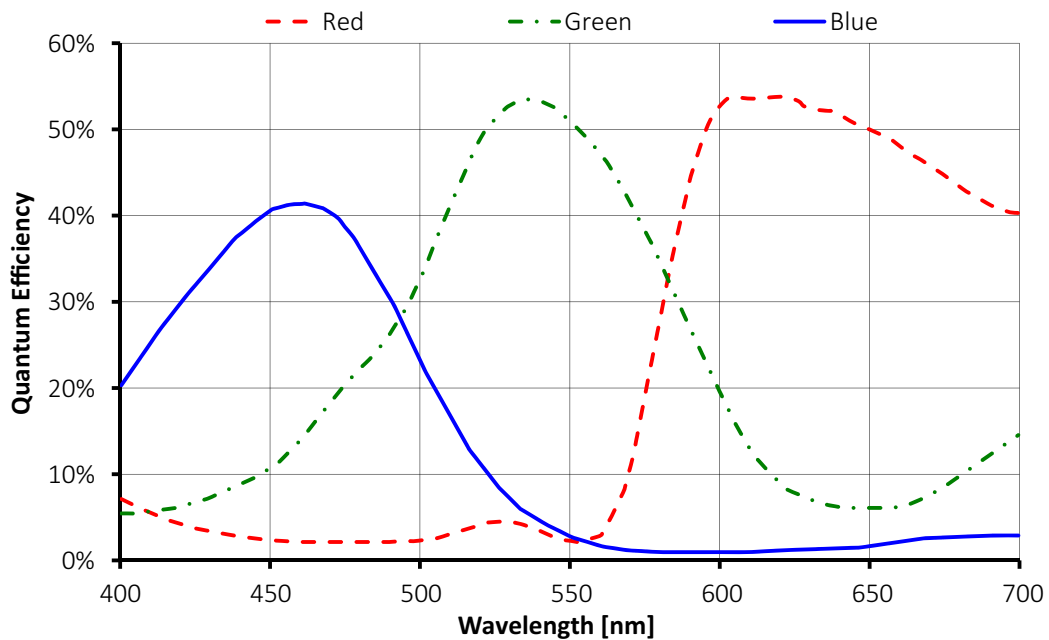


Figure 55: Manta G-917C spectral sensitivity (without IR cut filter)

Manta G-917B/C ROI frame rate

$$\text{Max. frame rate} = \frac{1}{29.71\mu\text{s} \times \text{ROI height} + 4.36\mu\text{s} \times (2207 - \text{ROI height}) + 229.22\mu\text{s}}$$

Maximum frame rate at full resolution according formula: 10.1 fps

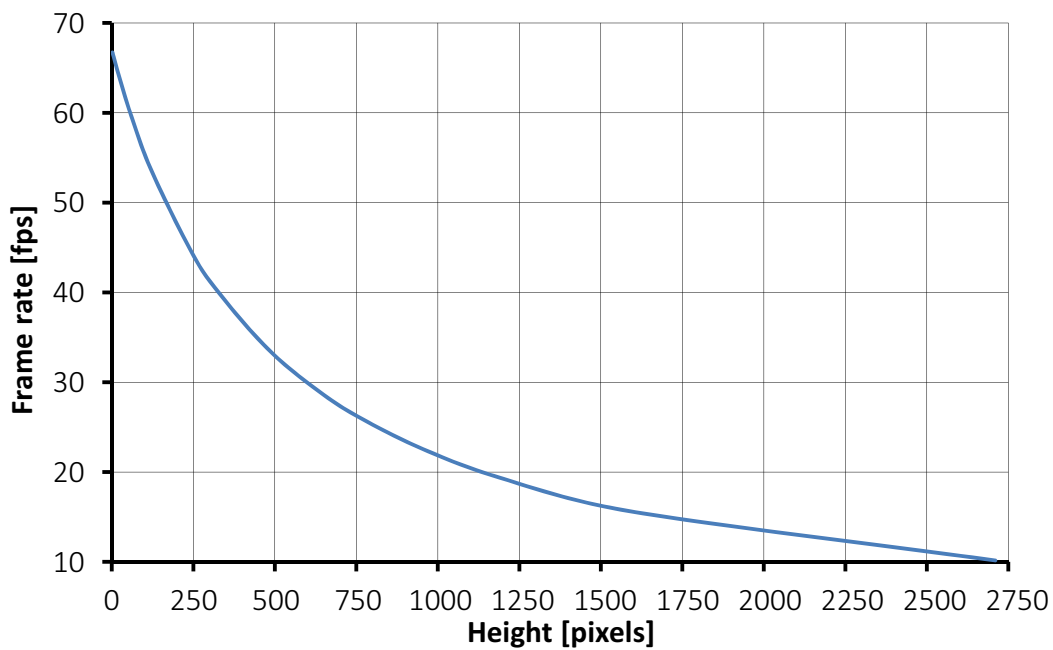


Figure 56: Frame rate as a function of ROI height [width=3384]

ROI height [pixels]	Width [pixels]	Frame rate [fps] ¹	ROI height [pixels]	Width [pixels]	Frame rate [fps] ¹
2710	3384	10.1	320	3384	40.3
1600	3384	15.5	240	3384	44.8
1200	3384	19.2	120	3384	53.6
960	3384	22.4	60	3384	59.6
768	3384	25.9	30	3384	63.0
640	3384	28.8	10	3384	65.6
480	3384	33.6	2	3384	66.7

¹ Frame rate = theoretical maximum frame rate (in frames per second) of the CCD sensor according to the given formula.

Table 38: Frame rate as a function of ROI height

Camera feature comparison

Allied Vision cameras support a number of standard and extended features. The table below identifies a selection of capabilities and compares the availability of features in Manta models.



Camera control document

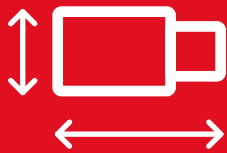
A complete listing of camera controls, including control definitions can be found online:

- PvAPI users: [GigE Camera and Driver Attributes](#) document
- Vimba and third-party users: [GigE Features Reference](#)

	G-031	G-032	G-033	G-046	G-125	G-145	G-146	G-201	G-223	G-235	G-282	G-283	G-419	G-504	G-505	G-609	G-917
Image Control	Binning	✓	✓	✓	✓	✓	✓	✓	-	✓	✓	✓	-	✓	✓	-	✓
	Decimation	✓	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Defect masking	-	-	-	-	-	-	-	✓ ¹	-	-	-	✓ ¹	-	-	-	-
	Gamma	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Color correction / Hue / Saturation ²	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Look up tables (LUTs)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	BlackLevel (Offset)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	ReverseX/Y	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-
Camera Control/Feedback	Event channel	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Image chunk data	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	UserSets (config files)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	PTP	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓	-	✓	✓
	Temperature readout ³ (main board)	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓	-	✓	✓
¹ Column defect masking only ² Only available for color models ³ Accuracy ±1 °C, resolution 0.031																	

Table 39: Feature comparison by model

Mechanical dimensions



This chapter includes:

- CAD drawings and dimensions of Manta tripod adapter, camera housing, and variants
- Maximum protrusion distance and filter diameter for C-Mount and CS-Mount
- Sensor position accuracy

Tripod adapter

The tripod adapter (Allied Vision order number 5153) can be used for Manta cameras (type A and type B) and is designed for standard housings.

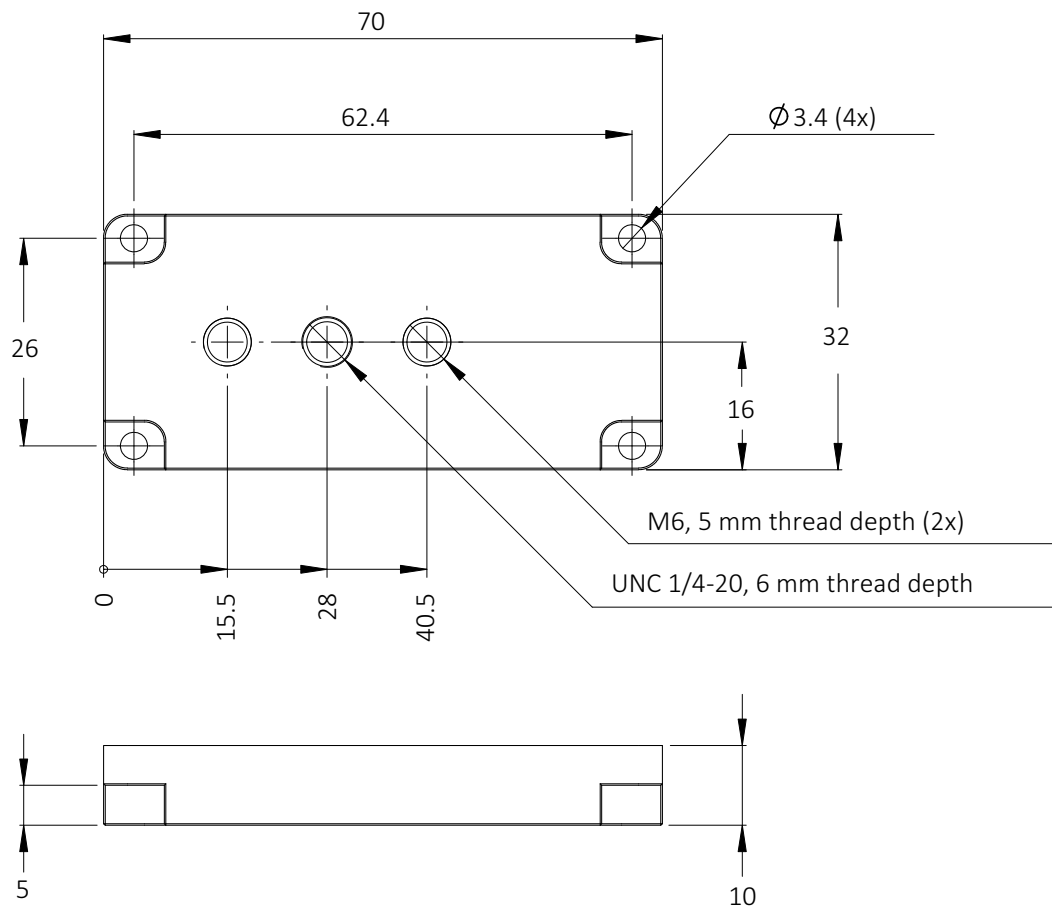


Figure 57: Tripod adapter dimensions

Camera dimensions (type A)



Type A and Type B cameras

Manta type A cameras have different housings than Manta type B cameras.

Manta type A cameras: G-031, G-032, G-033, G-046, G-125, G-145, G-146, G-201, G-504

Manta type B cameras: G-223, G-235, G-282, G-283, G-419, G-505, G-609, G-917

Manta standard housing

Manta G-031, G-032, G-033, G-046, G-125, G-145, G-146, G-201, G-504
Mount: C-Mount

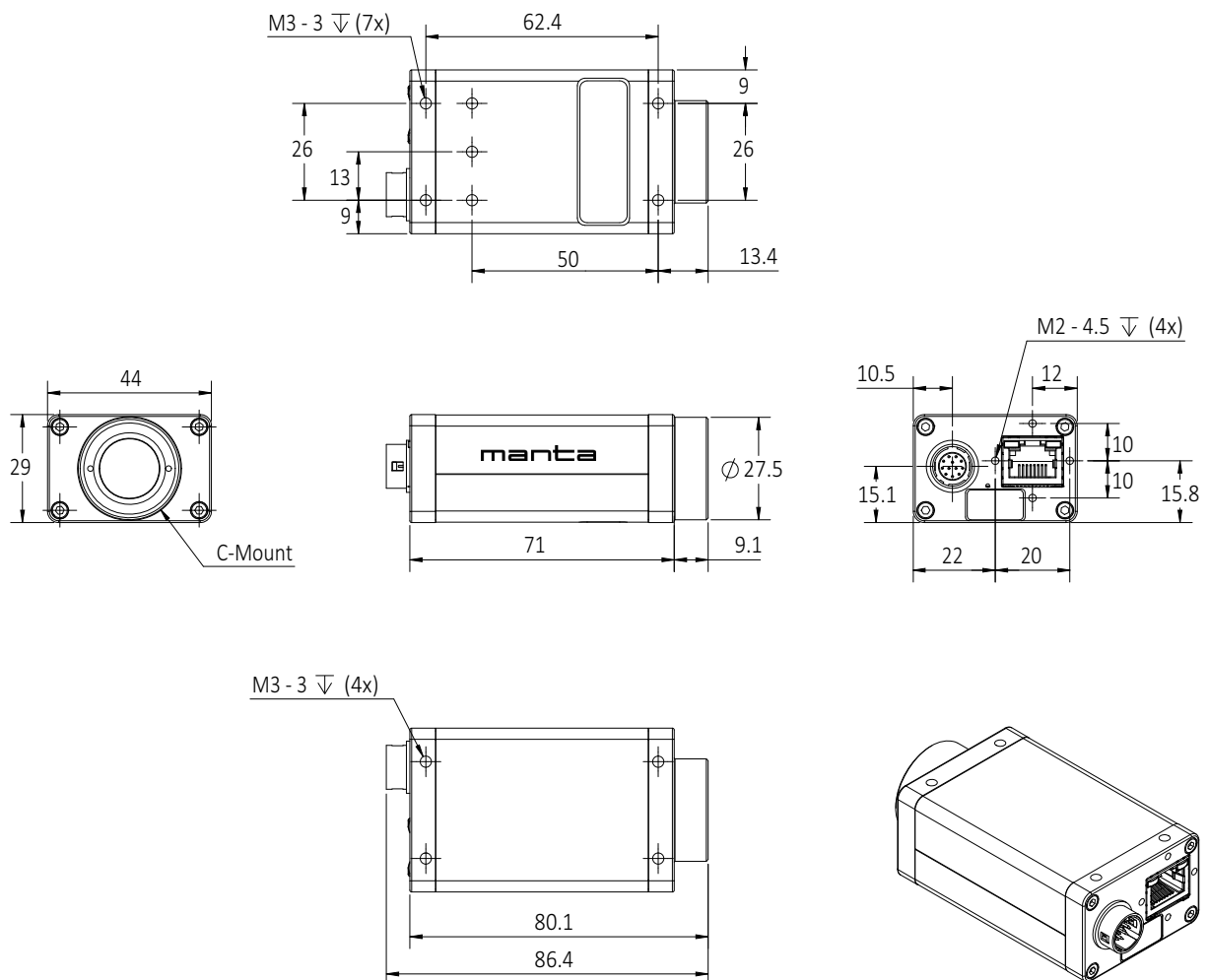


Figure 58: Manta type A standard housing dimensions (including connectors)

Manta angled-head housings

Manta W90 housing

This version has the sensor tilted 90 degrees clockwise, so that it views upwards.

Manta G-031, G-032, G-033, G-046, G-125, G-145, G-146, G-201, G-504
Mount: C-Mount

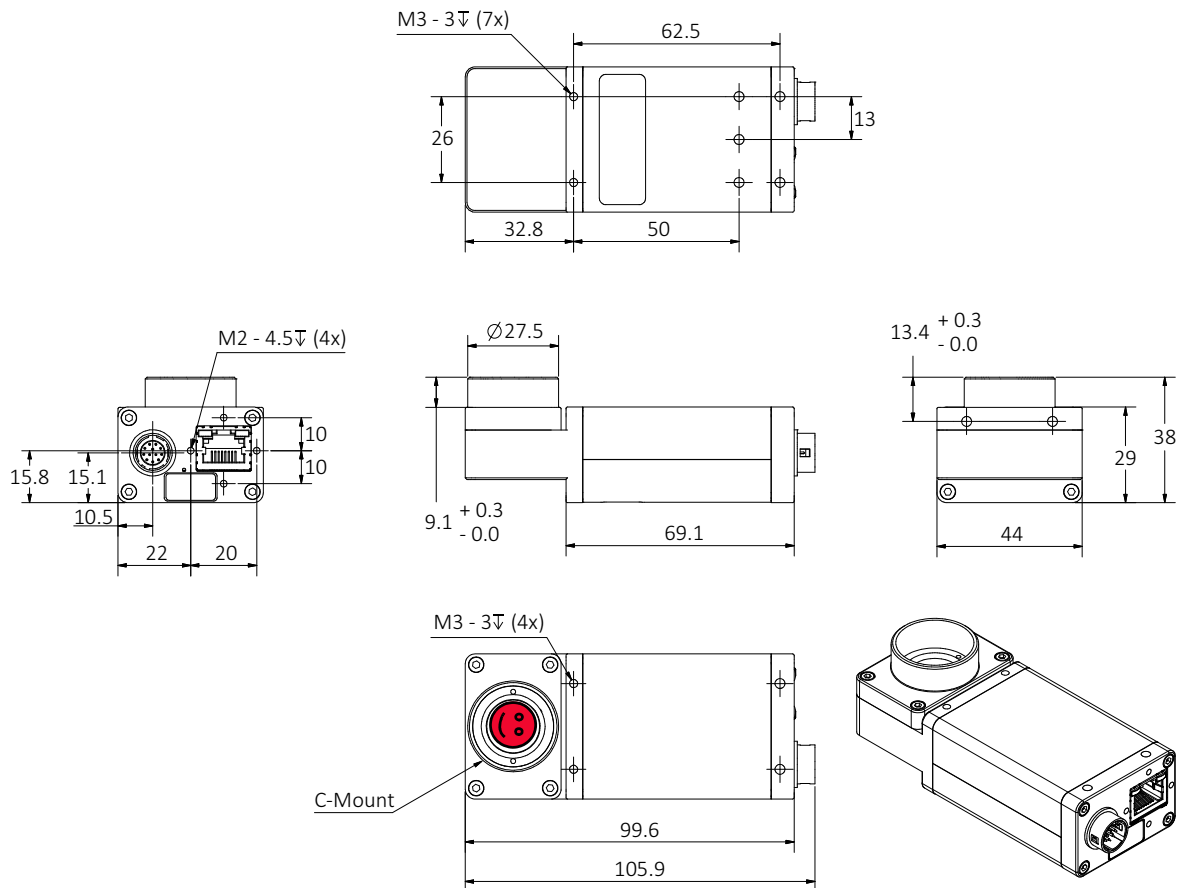


Figure 59: Manta type A W90 housing dimensions (including connectors)

Manta W90 S90 housing

This version has the sensor tilted 90 degrees clockwise, so that it views upwards. The sensor is also rotated 90 degrees clockwise.

Manta G-031, G-032, G-033, G-046, G-125, G-145, G-146, G-201, G-504
Mount: C-Mount

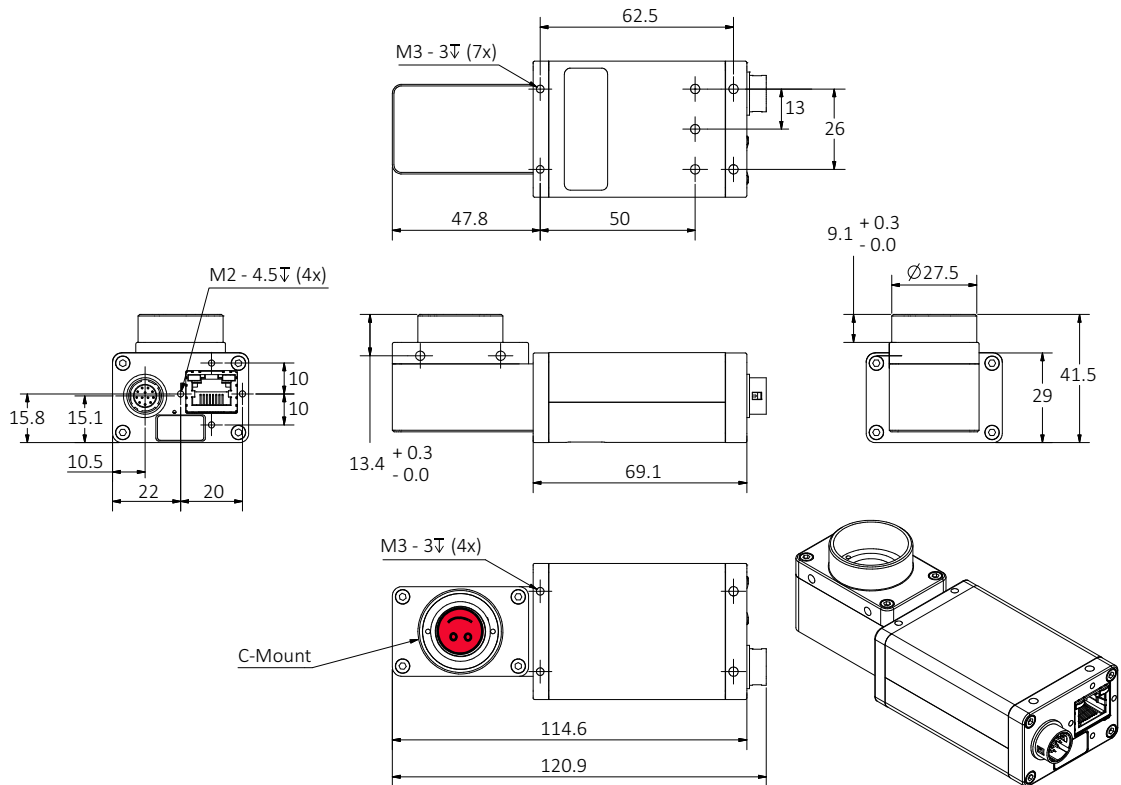


Figure 60: Manta type A W90 S90 housing dimensions (including connectors)

Manta W270 housing

This version has the sensor tilted 270 degrees clockwise, so that it views downwards.

Manta G-031, G-032, G-033, G-046, G-125, G-145, G-146, G-201, G-504
Mount: C-Mount

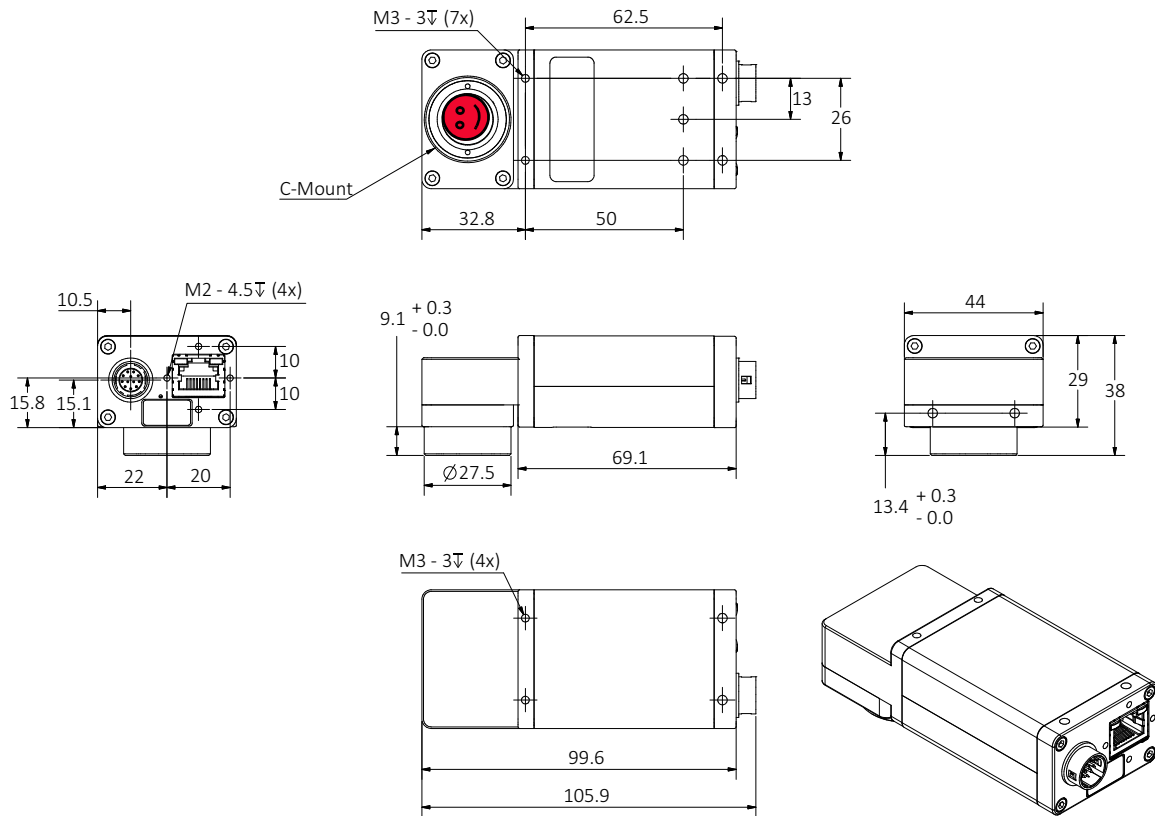


Figure 61: Manta type A W270 housing dimensions (including connectors)

Manta W270 S90 housing

This version has the sensor tilted 270 degrees clockwise, so that it views downwards. The sensor is also rotated 90 degrees clockwise.

Manta G-031, G-032, G-033, G-046, G-125, G-145, G-146, G-201, G-504
Mount: C-Mount

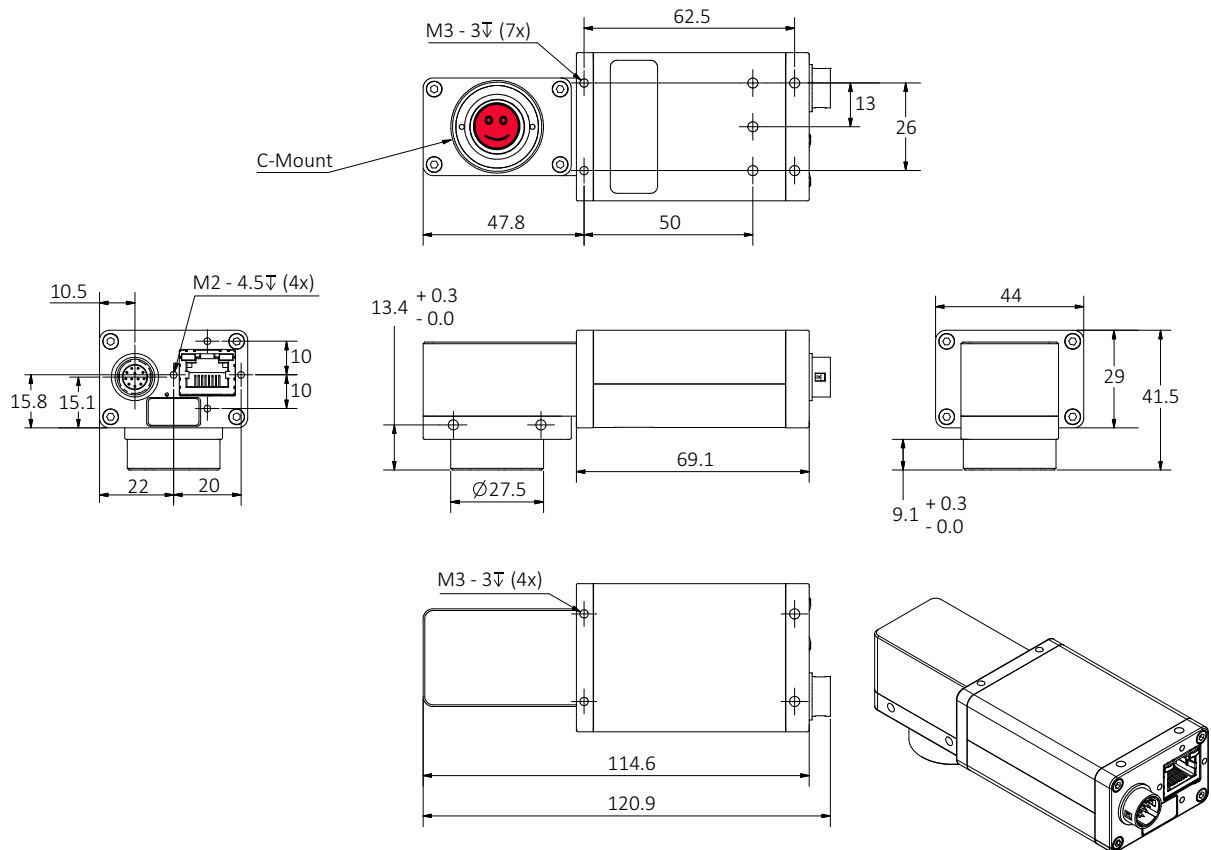


Figure 62: Manta type A W270 S90 housing dimensions (including connectors)

Manta board level variants

Manta board level (non-PoE)

Manta G-031, G-032, G-033, G-046, G-125, G-145, G-146, G-201, G-504
 Variant: Non-PoE

13-pole I/O connector:

Molex PicoBlade

Vertical Header 53047-1310

Receptacle Housing 51021-1300

Crimp Terminal 13 x 50079-8000

1 = GND (for RS232, Ext PWR) 7 = GND (for Inputs)

2 = Ext PWR input 8 = RxD 9 = TxD

3 = Video Type Auto Iris Out 10 = Power Input (for Output ports)

4 = Input 1 11 = Input 2

5 = not used 12 = Output 2

6 = Output 1 13 = Chassis GND

Flex cable length:

FFC45 L = 56 mm K7500307

FFC45 L = 110 mm K7500318

FFC45 L = 152 mm 1817

FFC45 L = 200 mm 1824

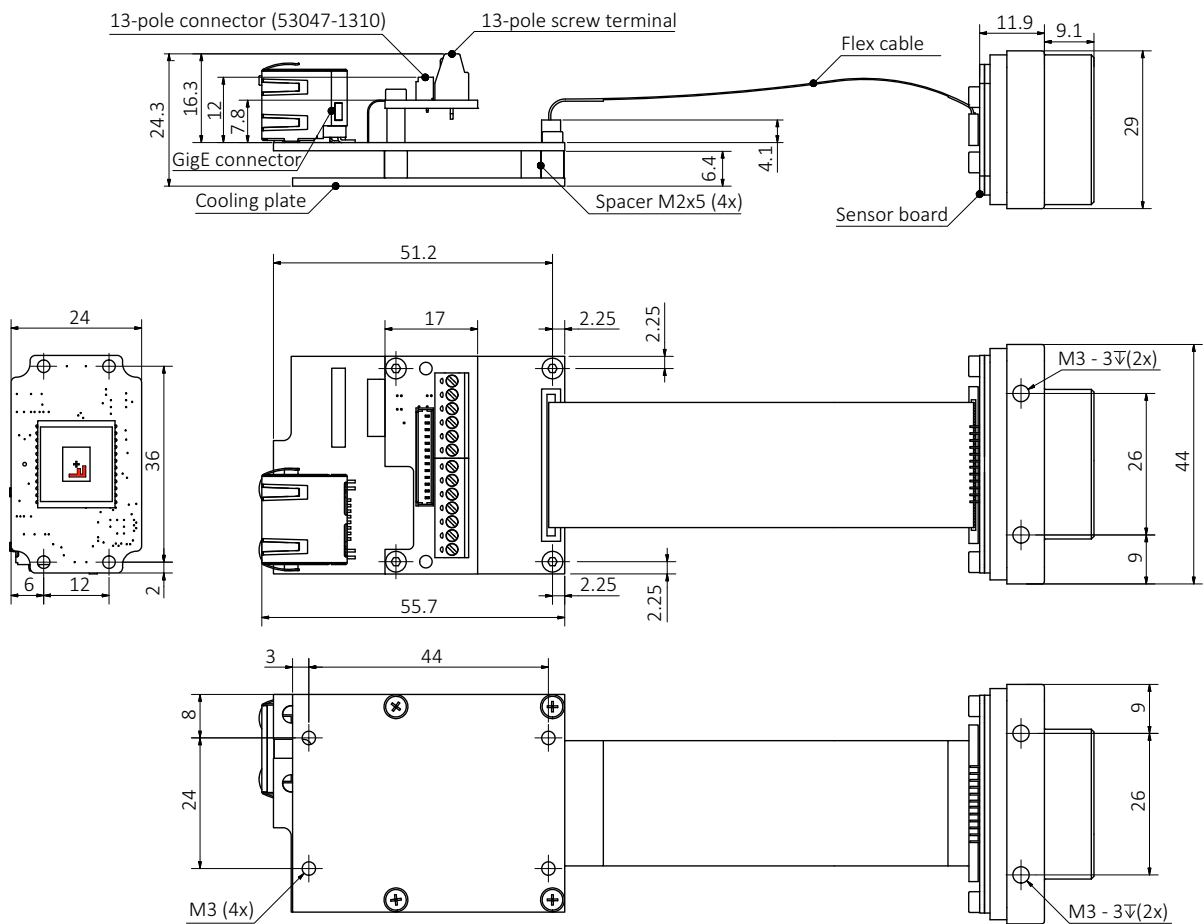


Figure 63: Manta type A board level (non-PoE) dimensions

Manta board level (PoE)

Manta G-031, G-032, G-033, G-046, G-125, G-145, G-146, G-201, G-504
 Variant: PoE

13-pole I/O connector:

Molex PicoBlade

Vertical Header 53047-1310

Receptacle Housing 51021-1300

Crimp Terminal 13 x 50079-8000

1 = GND (for RS232, Ext PWR)

2 = Ext PWR input

3 = Video Type Auto Iris Out

4 = Input 1

5 = not used

6 = Output 1

7 = GND (for Inputs)

8 = RxD 9 = TxD

10 = Power Input (for Output ports)

11 = Input 2

12 = Output 2

13 = Chassis GND

Flex cable length:

FFC45 L = 56 mm K7500307

FFC45 L = 110 mm K7500318

FFC45 L = 152 mm 1817

FFC45 L = 200 mm 1824

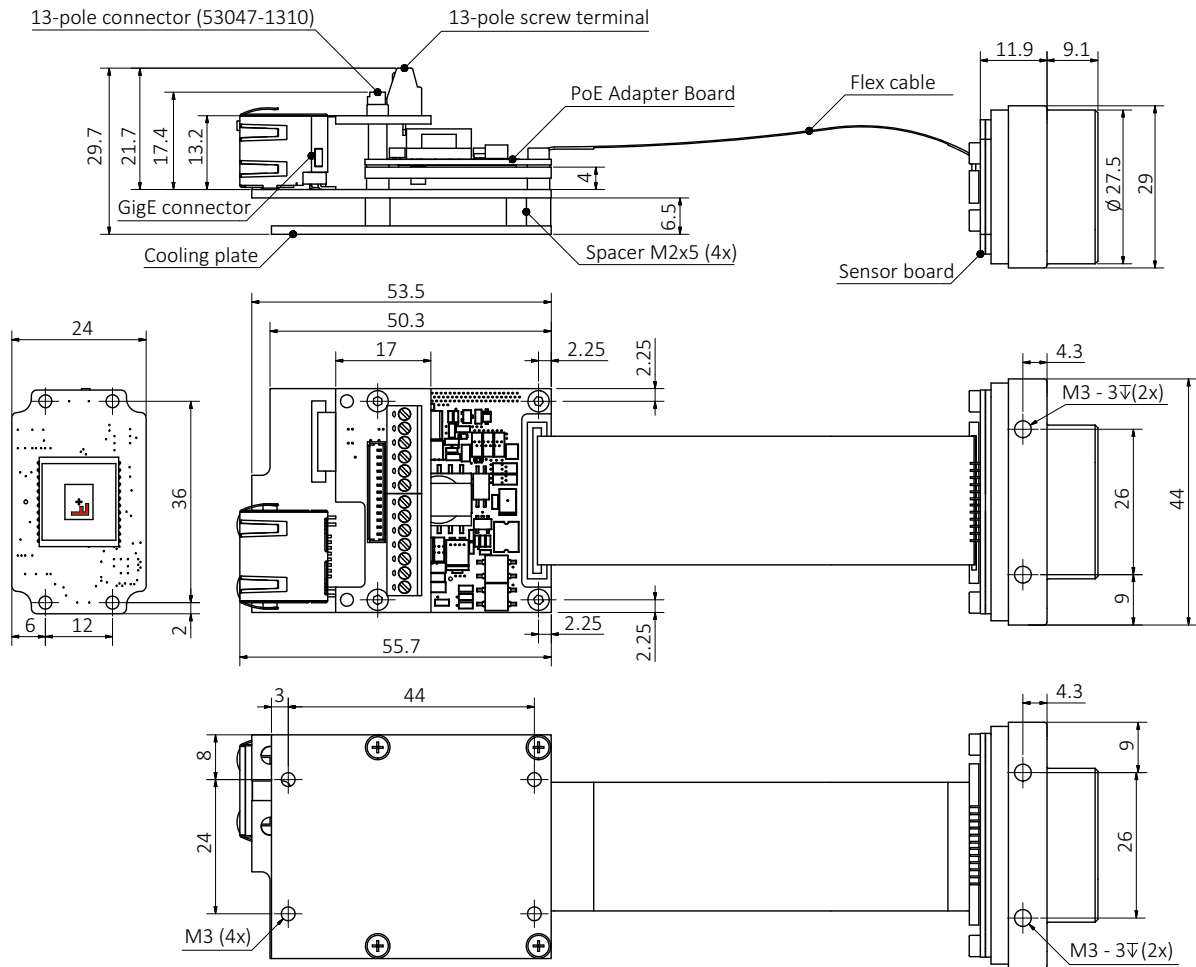


Figure 64: Manta type A board level (PoE) dimensions

Manta board level (non-PoE) C-Mount

Manta G-031, G-032, G-033, G-046, G-125, G-145, G-146, G-201, G-504

Mount: C-Mount

Variant: Non-PoE

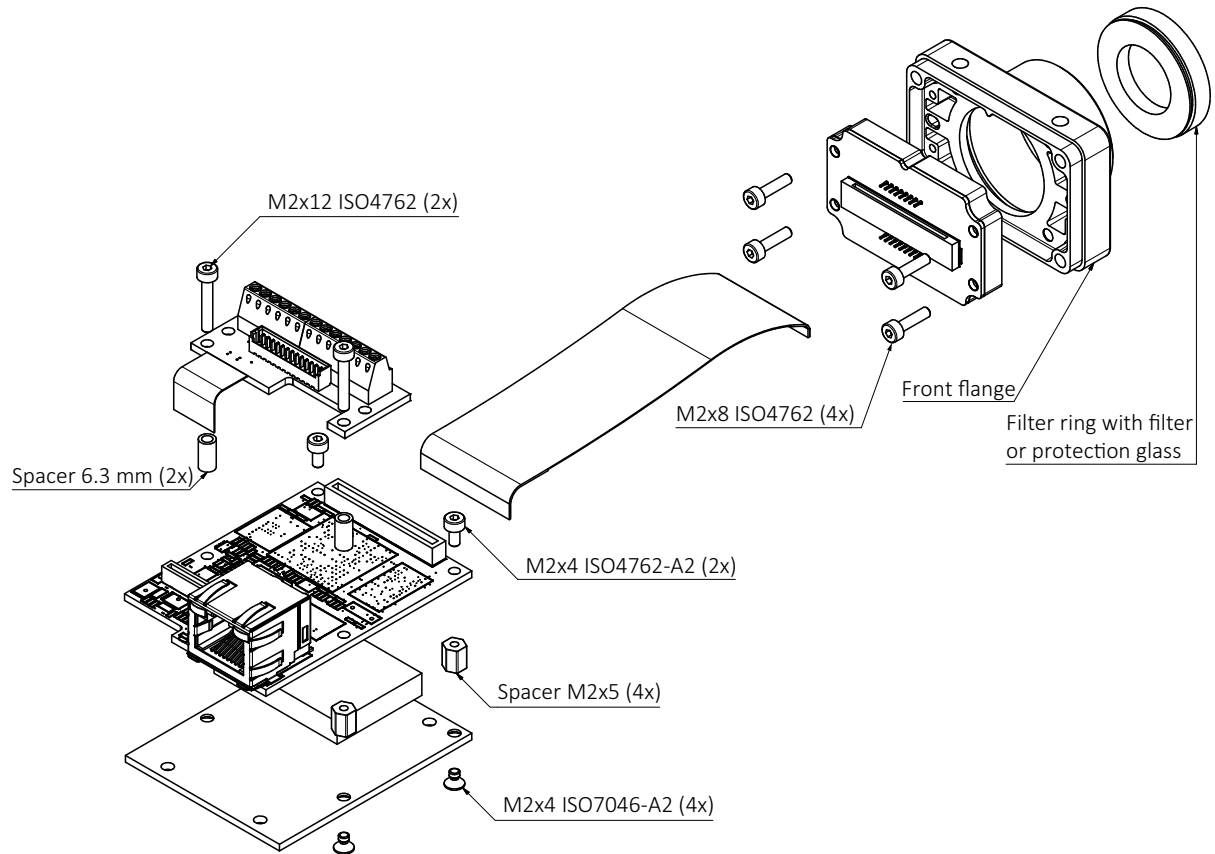


Figure 65: Manta type A board level (non-PoE) C-Mount



Dimensional mount adjustment

Dimensional mount adjustment cannot be done by the customer. If you need any mount related adjustments, please contact [Allied Vision](#).

Manta board level (PoE) C-Mount

Manta G-031, G-032, G-033, G-046, G-125, G-145, G-146, G-201, G-504

Mount: C-Mount

Variant: PoE

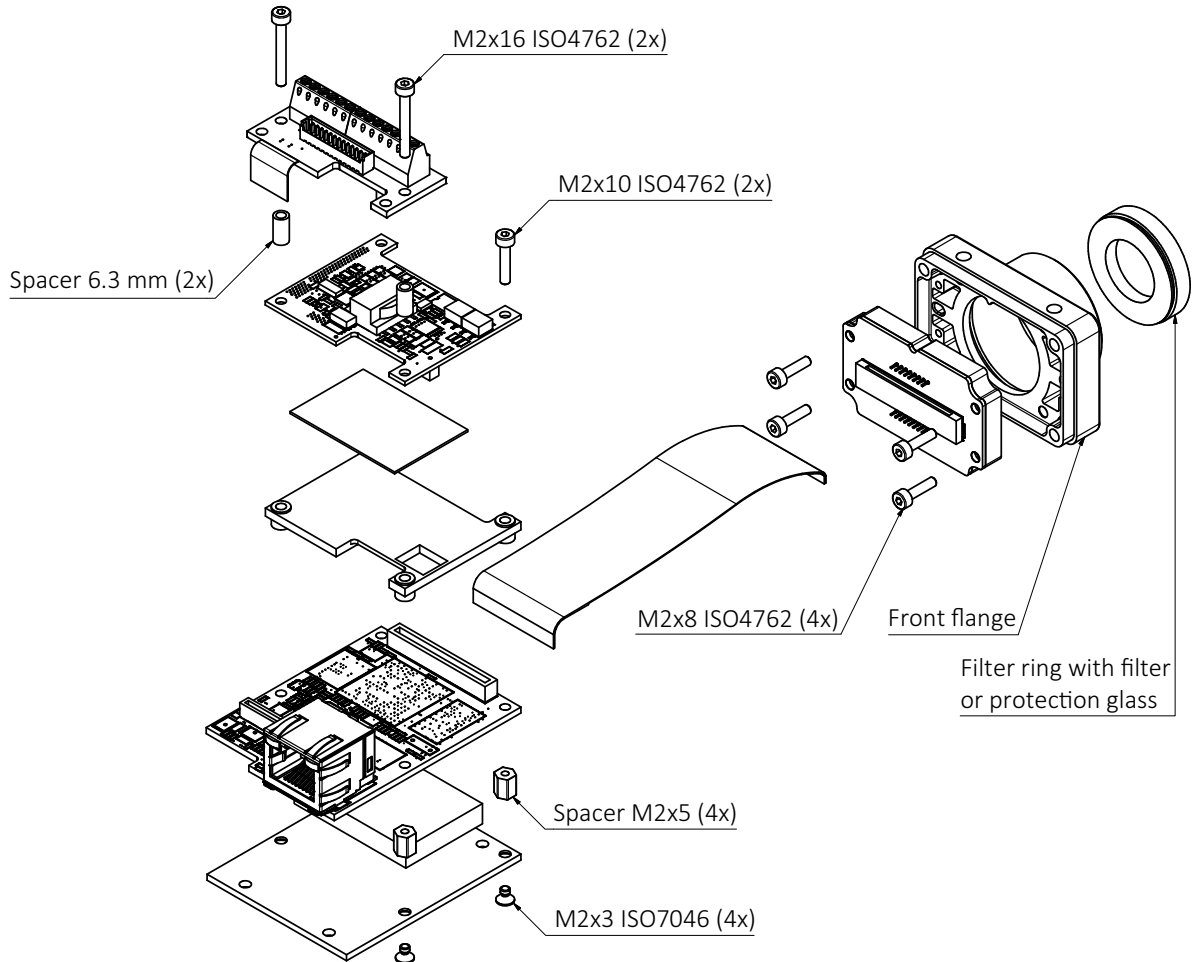


Figure 66: Manta type A board level (PoE) C-Mount



Dimensional mount adjustment

Dimensional mount adjustment cannot be done by the customer. If you need any mount related adjustments, please contact [Allied Vision](#).

Manta board level (non-PoE) CS-Mount

Manta G-031, G-032, G-033, G-046, G-125, G-145, G-146, G-201, G-504

Mount: CS-Mount

Variant: Non-PoE

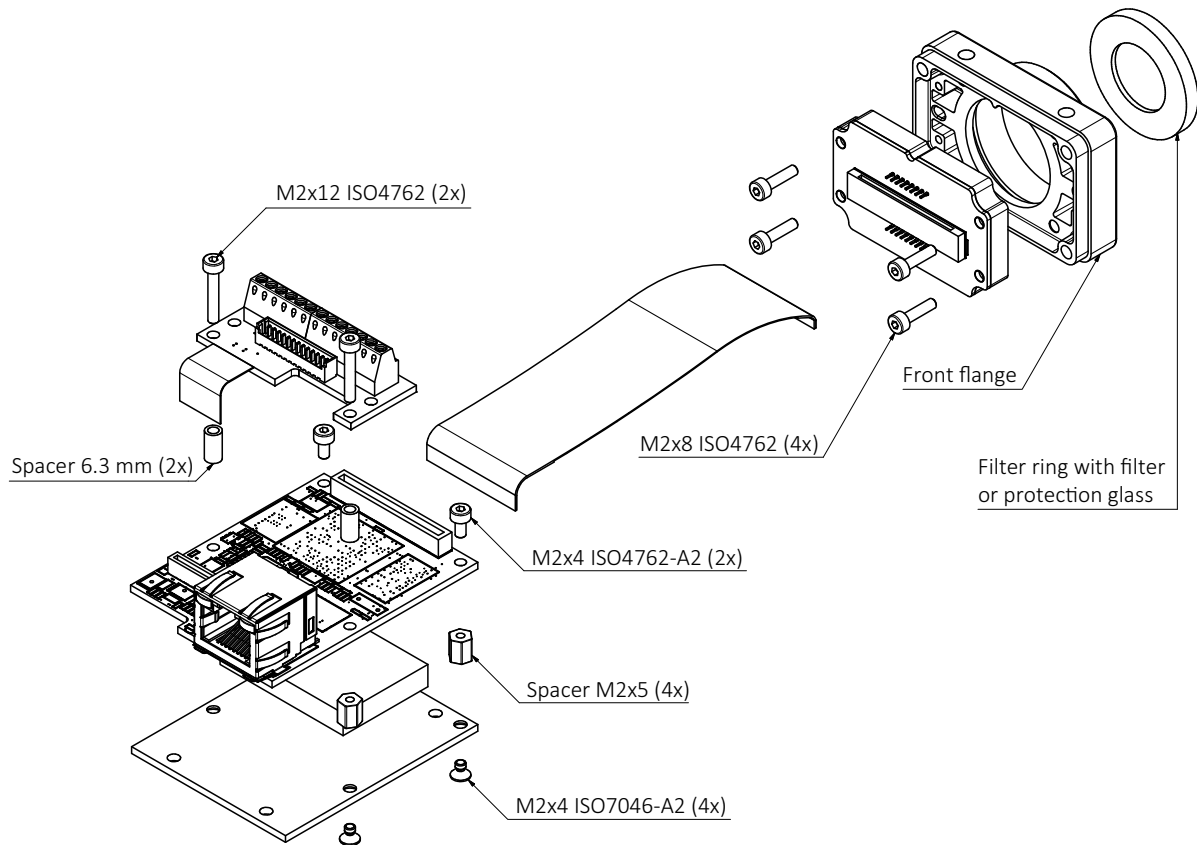


Figure 67: Manta type A board level (non-PoE) CS-Mount



Dimensional mount adjustment

Dimensional mount adjustment cannot be done by the customer. If you need any mount related adjustments, please contact [Allied Vision](#).

Manta board level (PoE) CS-Mount

Manta G-031, G-032, G-033, G-046, G-125, G-145, G-146, G-201, G-504

Mount: CS-Mount

Variant: PoE

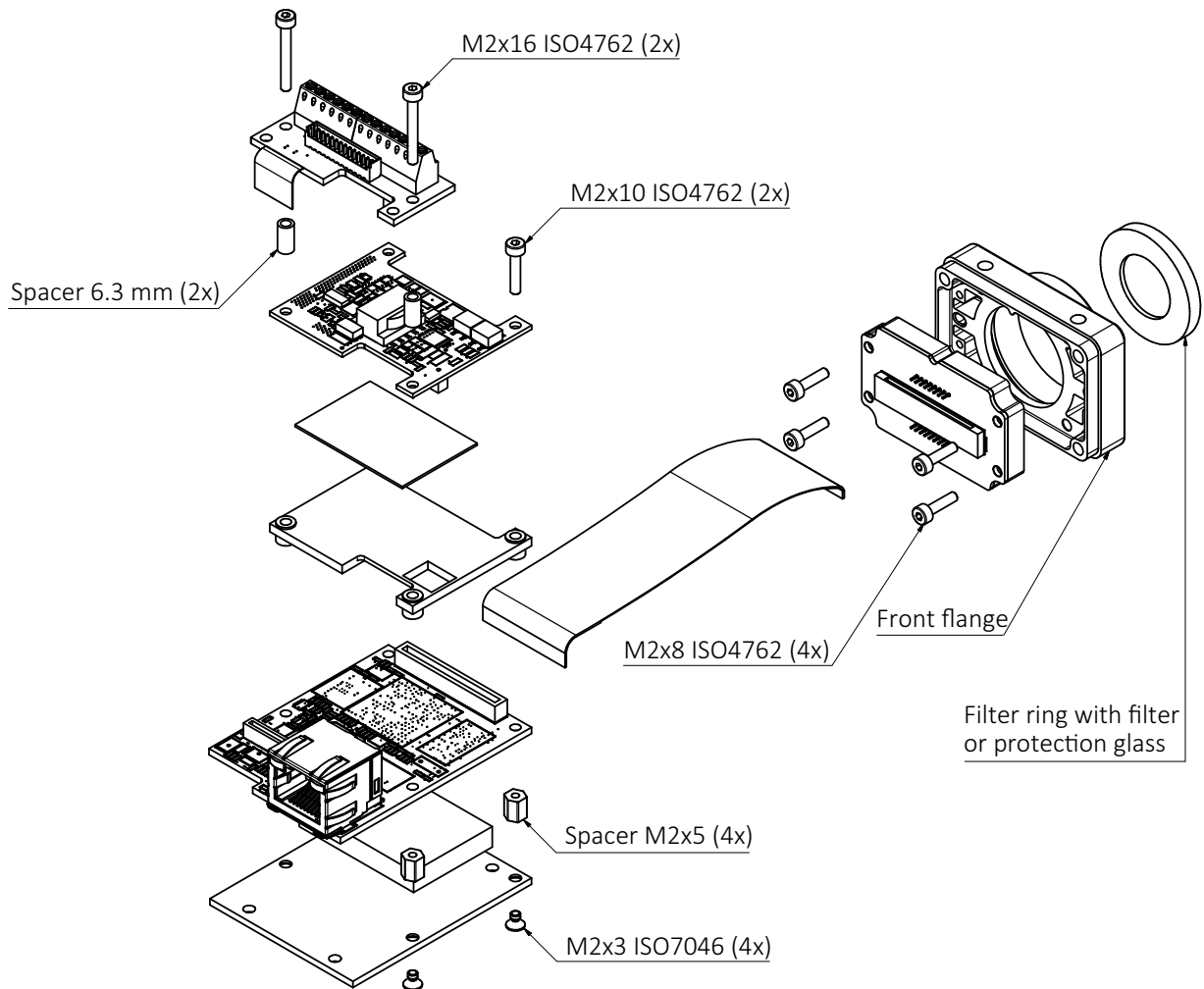


Figure 68: Manta type A board level (PoE) CS-Mount



Dimensional mount adjustment

Dimensional mount adjustment cannot be done by the customer. If you need any mount related adjustments, please contact [Allied Vision](#).

Manta board level (non-PoE) M12-Mount

Manta G-031, G-032, G-033, G-046, G-125, G-145, G-146, G-201, G-504

Mount: M12-Mount

Variant: Non-PoE

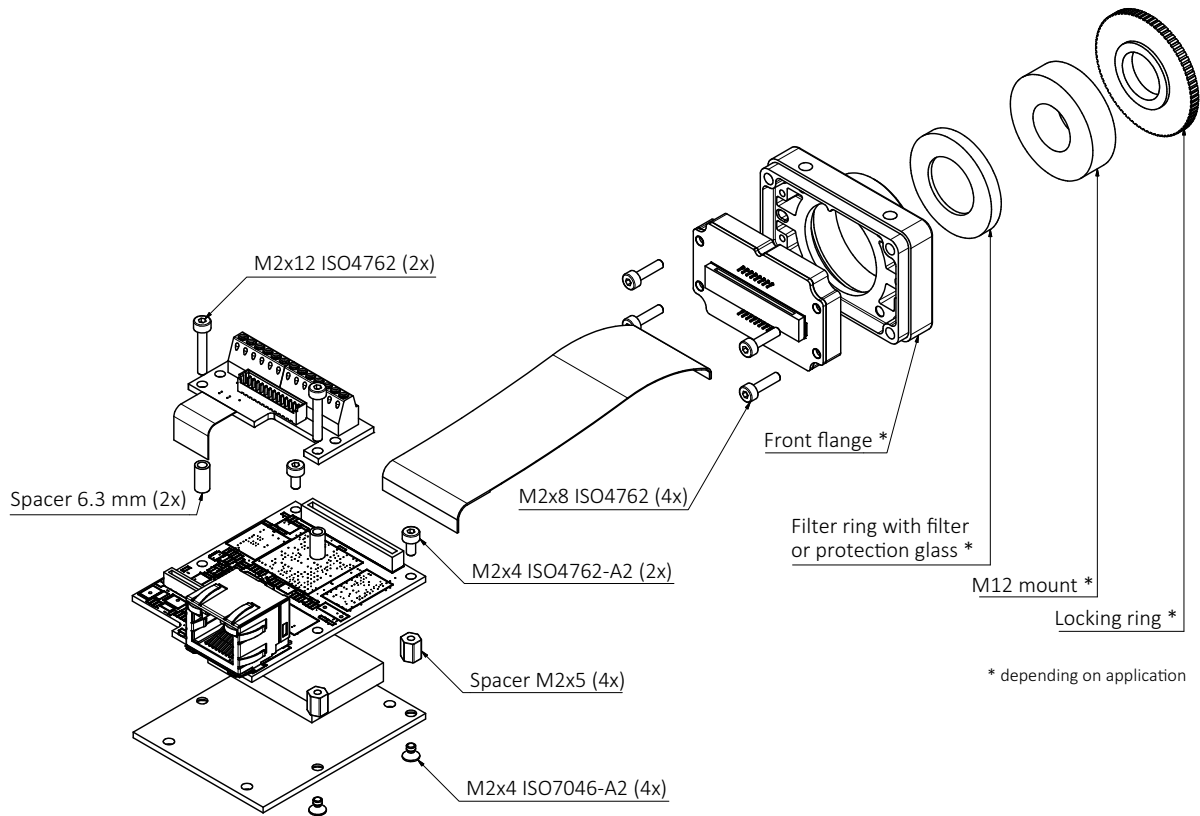


Figure 69: Manta type A board level (non-PoE) M12-Mount



Dimensional mount adjustment

Dimensional mount adjustment cannot be done by the customer. If you need any mount related adjustments, please contact [Allied Vision](#).

Manta board level (PoE) M12-Mount

Manta G-031, G-032, G-033, G-046, G-125, G-145, G-146, G-201, G-504

Mount: M12-Mount

Variant: PoE

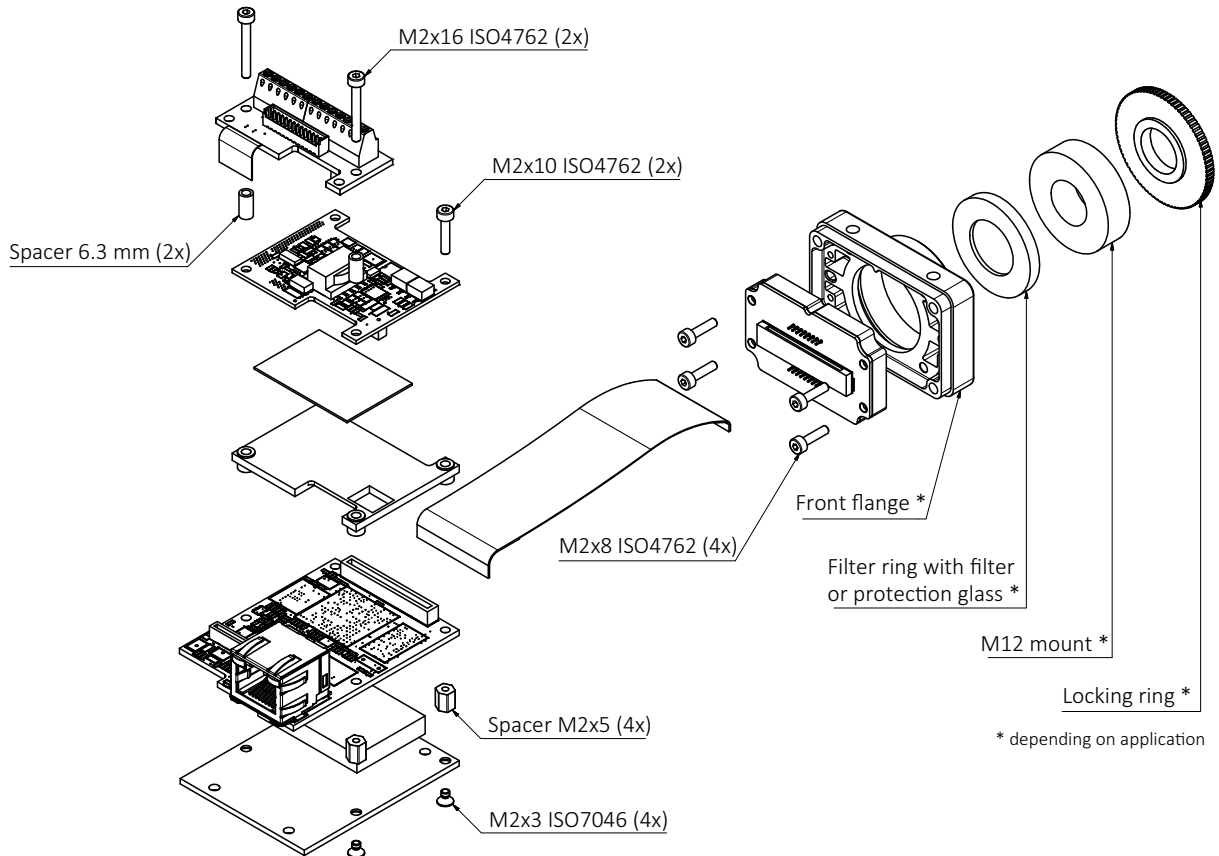


Figure 70: Manta type A board level (PoE) M12-Mount



Dimensional mount adjustment

Dimensional mount adjustment cannot be done by the customer. If you need any mount related adjustments, please contact [Allied Vision](#).

C-Mount cross section

All monochrome Manta type A cameras are equipped with a protection glass. All color Manta type A cameras are equipped with an [IR cut filter](#).



Protection glass and filter options

Allied Vision offers several filter options for both monochrome and color Manta cameras. Choose protection glass or filter according to the Modular Concept.

http://www.alliedvision.com/fileadmin/content/documents/products/cameras/various/modular-concept/Modular_concept_external.pdf



Maximum protrusion

Maximum protrusion is the distance from lens flange to the glass filter in the camera.

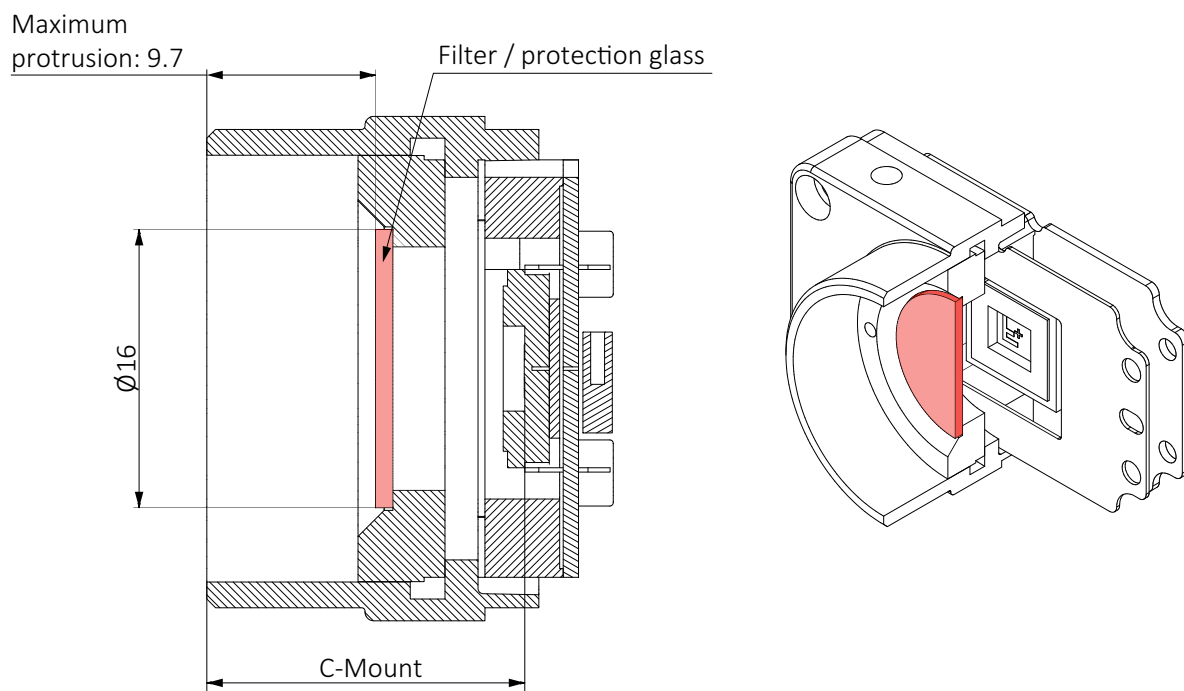


Figure 71: Manta type A C-Mount dimensions (16 mm filter)



Dimensional mount adjustment

Dimensional mount adjustment cannot be done by the customer. If you need any mount related adjustments, please contact [Allied Vision](#).

CS-Mount cross section



Protection glass and filter options

Allied Vision offers several filter options for both monochrome and color Manta cameras. Choose protection glass or filter according to the Modular Concept.

http://www.alliedvision.com/fileadmin/content/documents/products/cameras/various/modular-concept/Modular_concept_external.pdf



Maximum protrusion

Maximum protrusion is the distance from lens flange to the filter / protection glass in the camera.

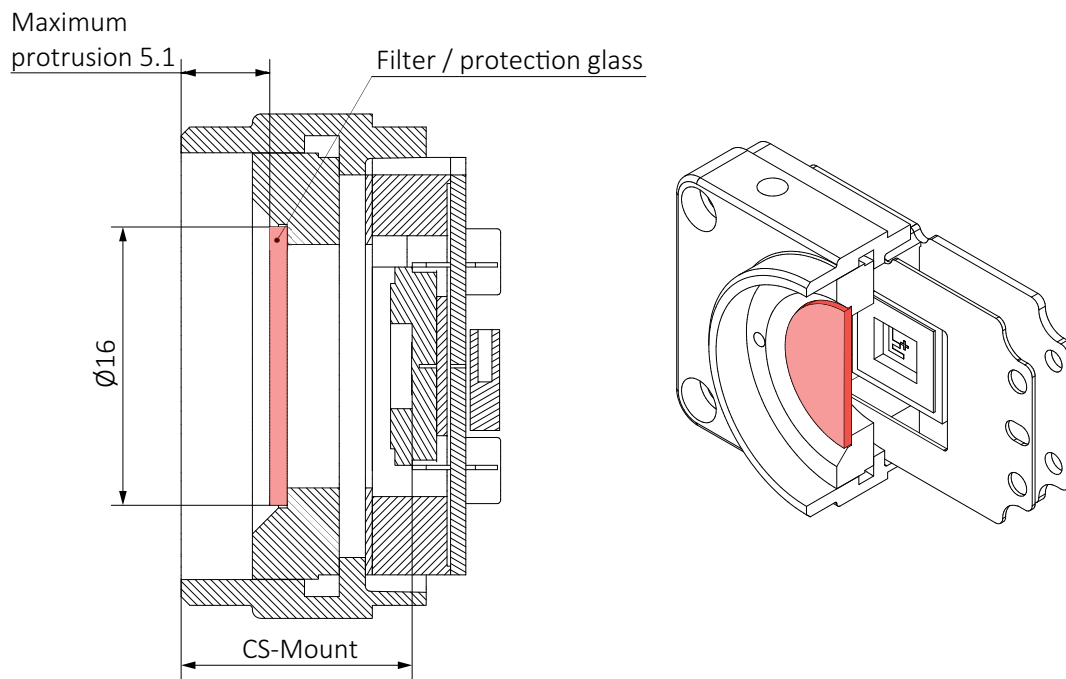


Figure 72: Manta type A CS-Mount dimensions (16 mm filter)



Dimensional mount adjustment

Dimensional mount adjustment cannot be done by the customer. If you need any mount related adjustments, please contact [Allied Vision](#).

Camera dimensions (type B)



Type A and Type B cameras

Manta type A cameras have different housings than Manta type B cameras.

Manta type A cameras: G-031, G-032, G-033, G-046, G-125, G-145, G-146, G-201, G-504

Manta type B cameras: G-223, G-235, G-282, G-283, G-419, G-505, G-609, G-917

Manta standard housing

Manta G-223, G-235, G-282, G-283, G-419, G-505, G-609, G-917
Mount: C-Mount

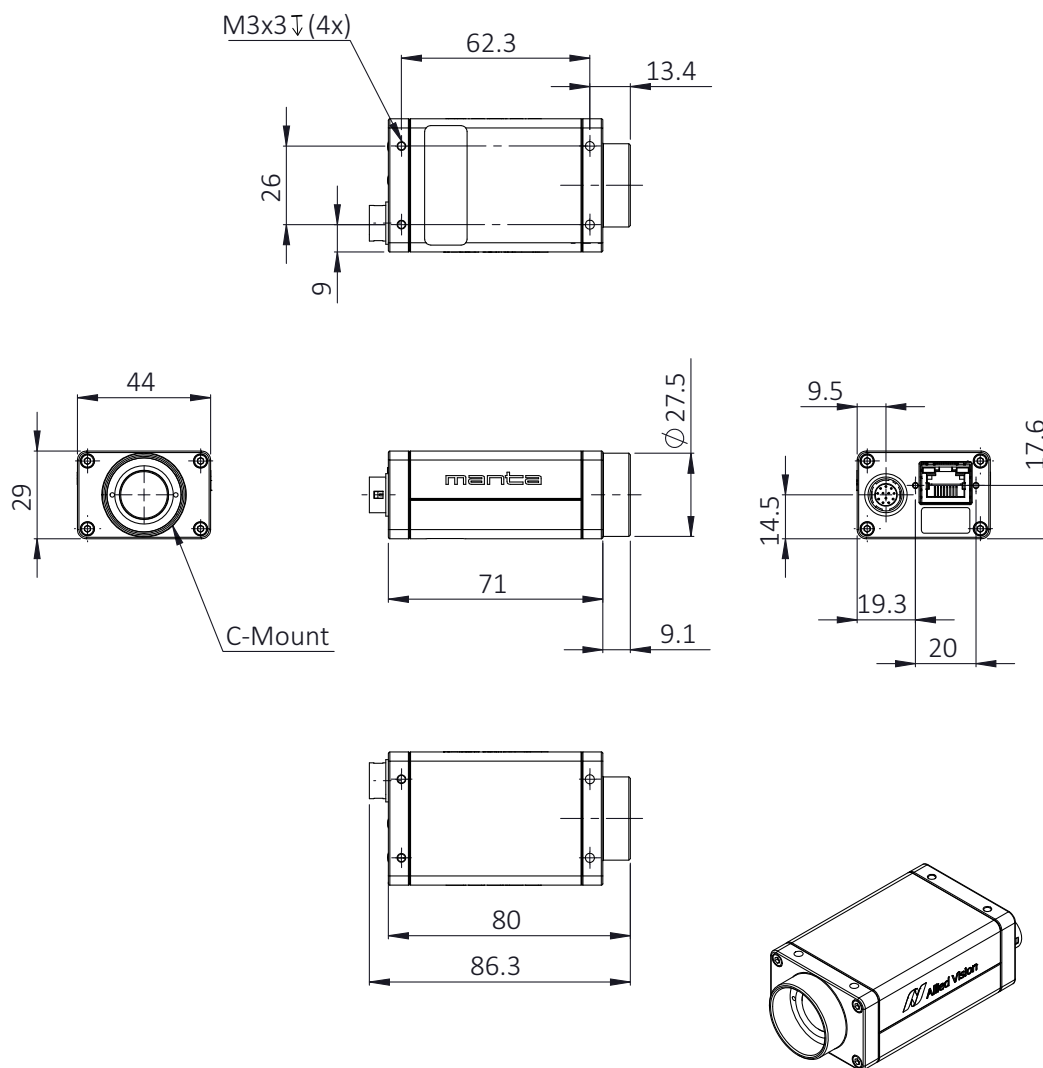


Figure 73: Manta type B standard housing dimensions (including connectors)

Manta angled-head housings

Manta W90 housing

This version has the sensor tilted 90 degrees clockwise, so that it views upwards.

Manta G-223, G-235, G-419

Mount: C-Mount

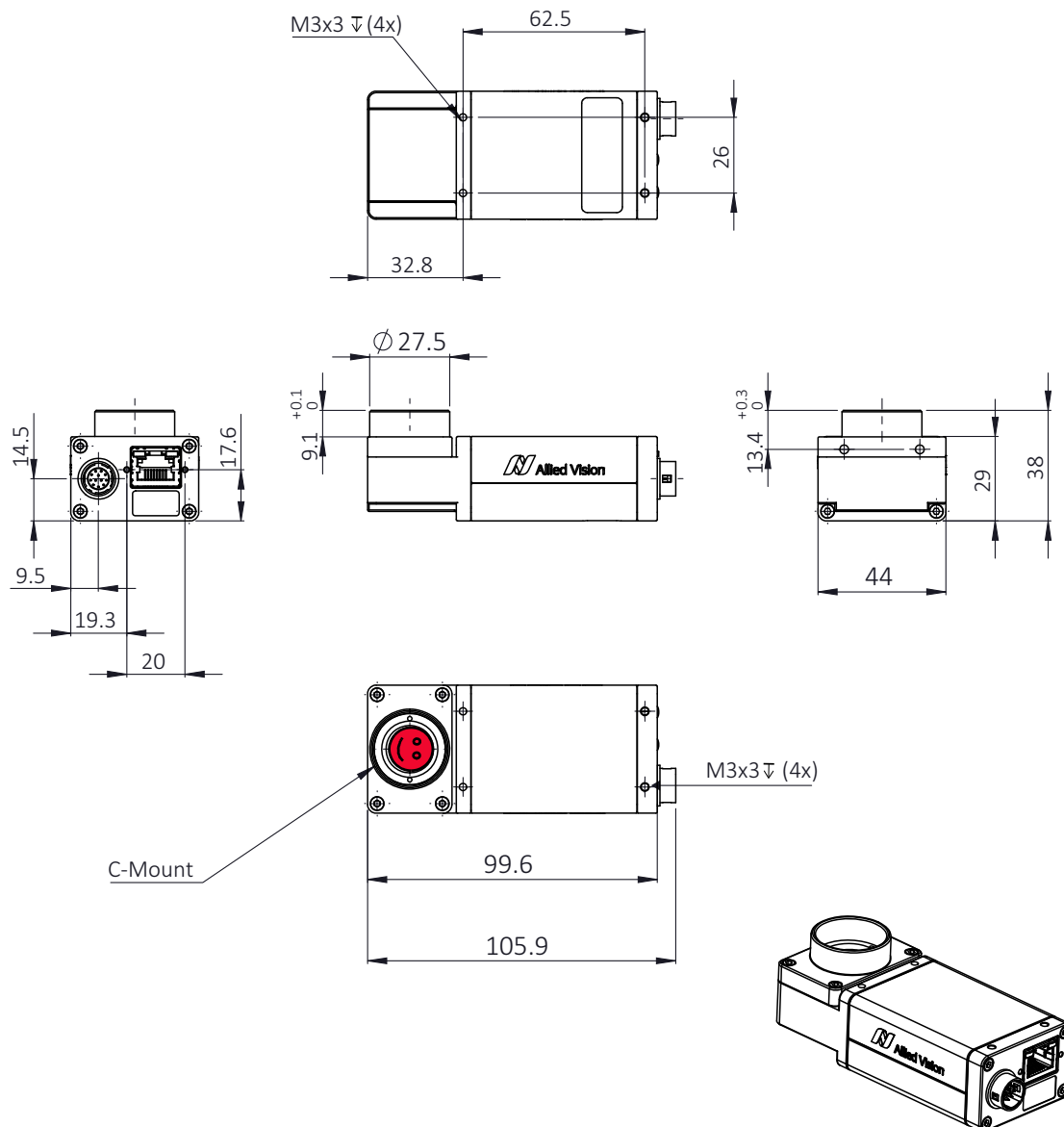


Figure 74: Manta type B W90 housing dimensions (including connectors)

Manta W90 S90 housing

This version has the sensor tilted 90 degrees clockwise, so that it views upwards. The sensor is also rotated 90 degrees clockwise.

Manta G-223, G-235, G-419

Mount: C-Mount

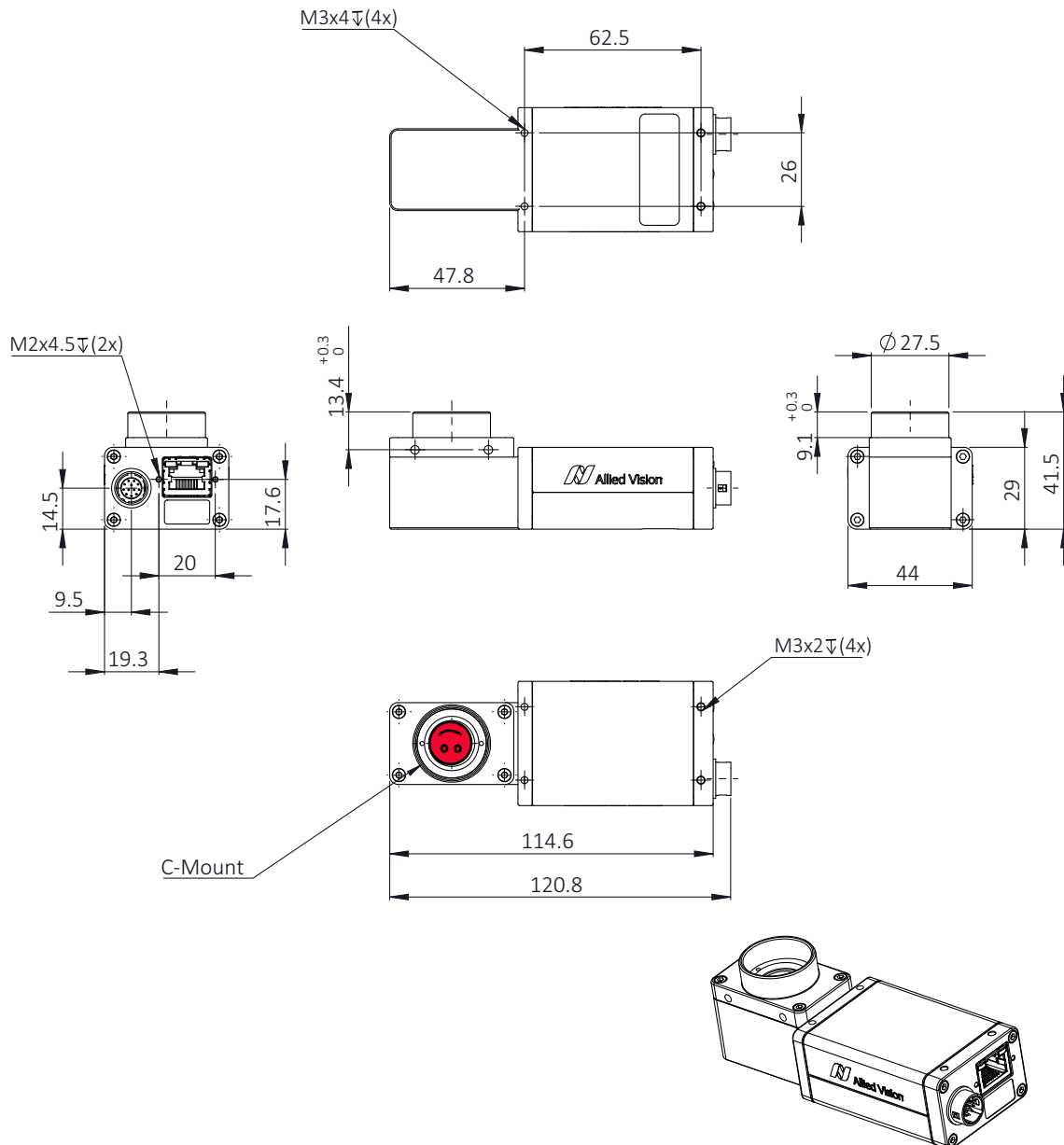


Figure 75: Manta type B W90 S90 housing dimensions (including connectors)

Manta W270 housing

This version has the sensor tilted 270 degrees clockwise, so that it views downwards.

Manta G-223, G-235, G-419

Mount: C-Mount

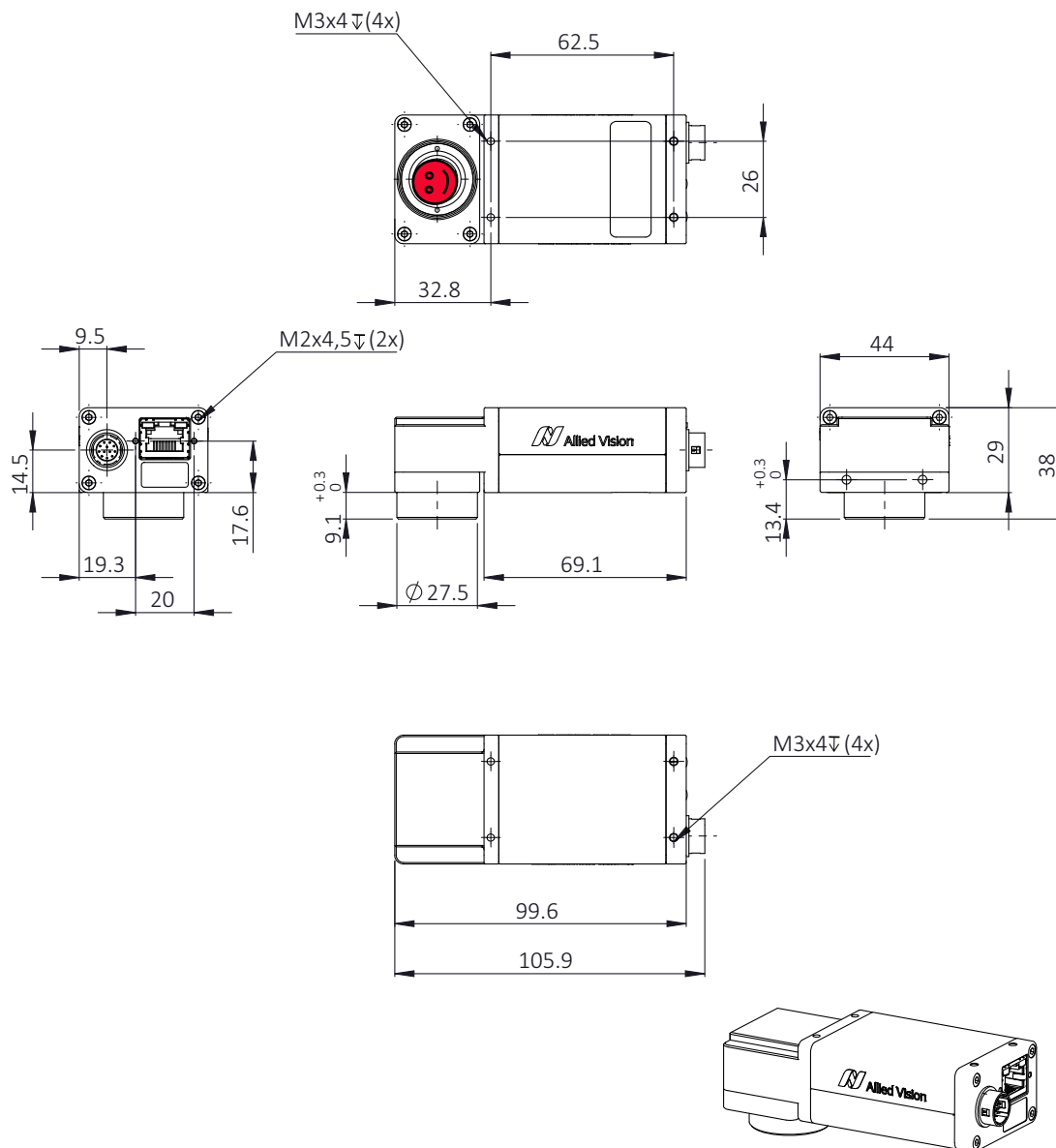


Figure 76: Manta type B W270 housing dimensions (including connectors)

Manta W270 S90 housing

This version has the sensor tilted 270 degrees clockwise, so that it views downwards. The sensor is also rotated 90 degrees clockwise.

Manta G-223, G-235, G-419

Mount: C-Mount

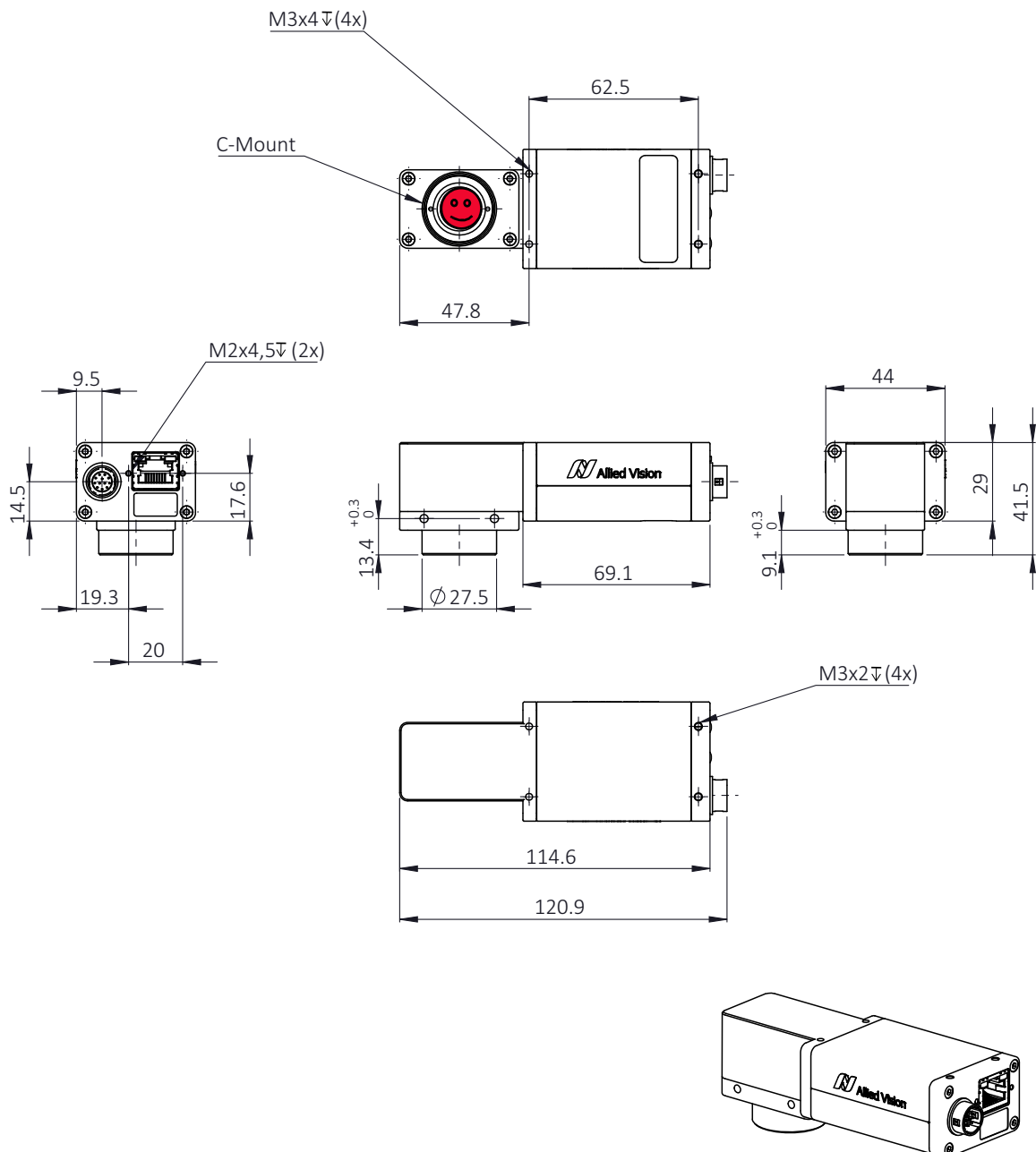


Figure 77: Manta type B W270 S90 housing dimensions (including connectors)

Manta board level variants

Manta board level (PoE and non-PoE)

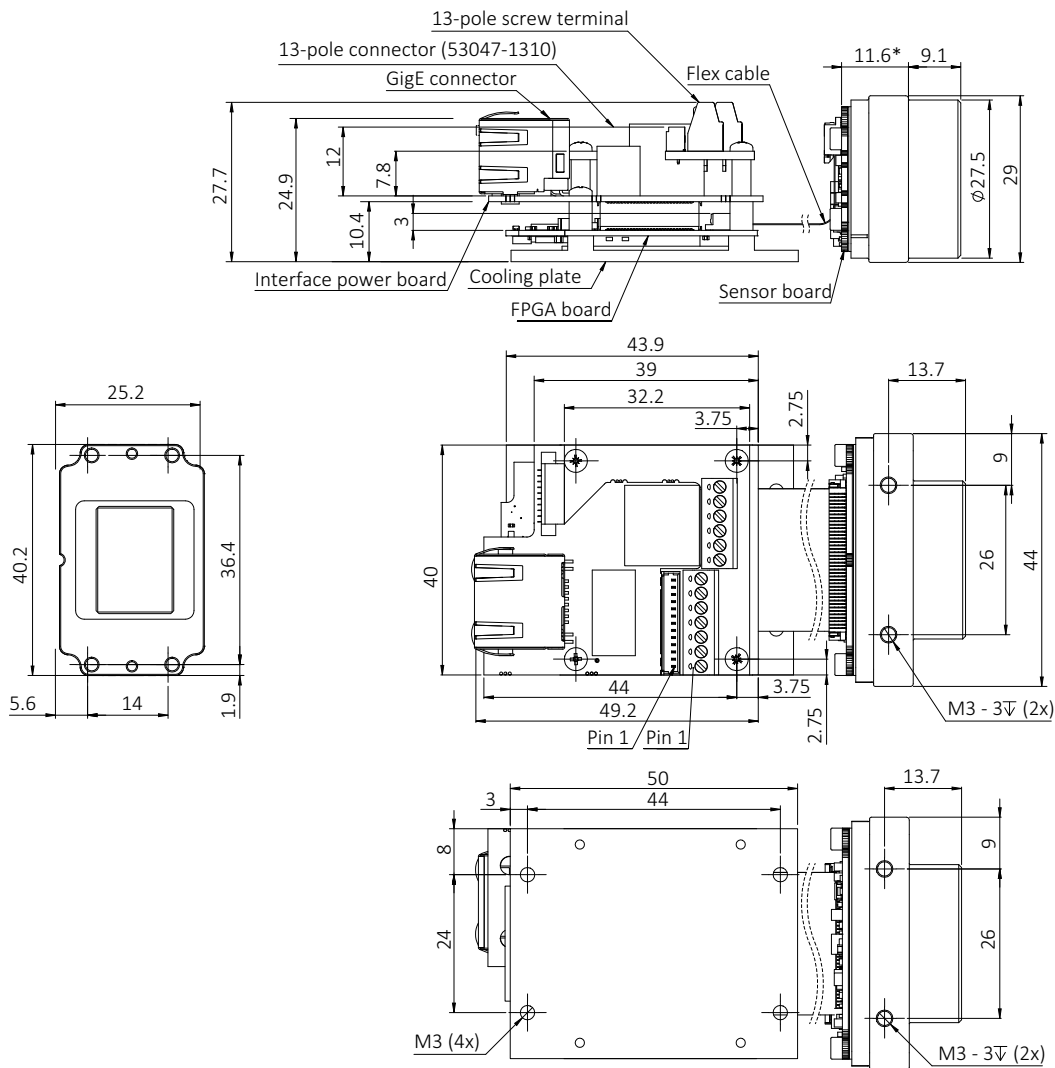
Manta G-223, G-235, G-419
 Variant: PoE and non-PoE

13-pole I/O connector:

- Molex PicoBlade
- Vertical Header 53047-1310
- Receptacle Housing 51021-1300
- Crimp Terminal 13 x 50079-8000

- 1 = GND (for RS232, Ext PWR)
- 2 = Ext PWR input
- 3 = Video Type Auto Iris Out
- 4 = Input 1
- 5 = not used
- 6 = Output 1
- 7 = GND (for Inputs)
- 8 = Rx/D 9 = Tx/D
- 10 = Power Input (for Output ports)
- 11 = Input 2
- 12 = Output 2
- 13 = Chassis GND

- Flex cable length: _____
- FPC80 L = 60 mm 5568-01
 - FPC80 L = 110 mm 5569-01
 - FPC80 L = 150 mm 5570-01
 - FPC80 L = 200 mm 5571-01



*Depending upon the sensor

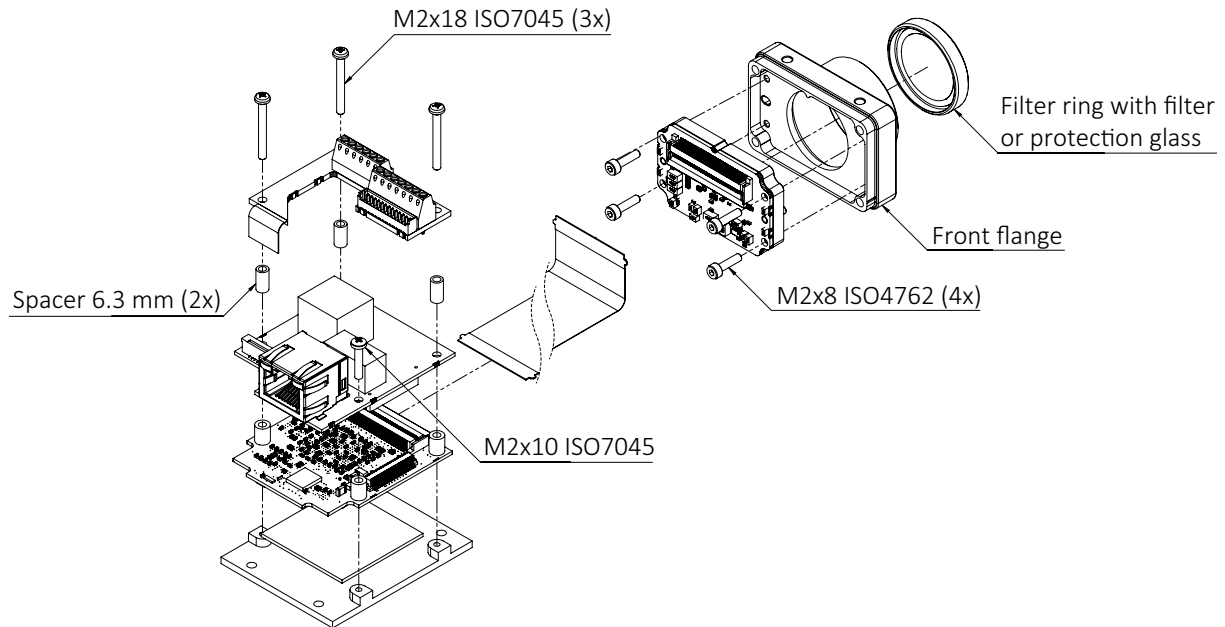
Figure 78: Manta type B board level (PoE and non-PoE) dimensions

Manta board level (PoE and non-PoE) C-Mount

Manta G-223, G-235, G-419

Mount: C-Mount

Variant: PoE and non-PoE


Figure 79: Manta type B board level (PoE and non-PoE) C-Mount

Dimensional mount adjustment

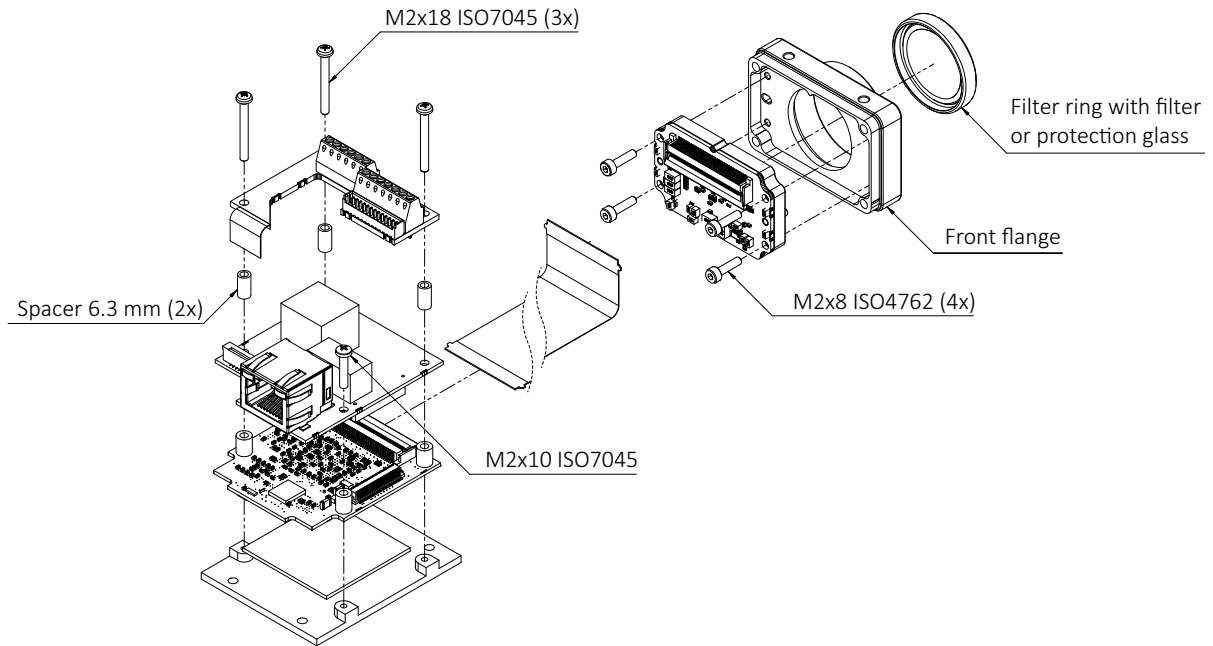
 Dimensional mount adjustment cannot be done by the customer. If you need any mount related adjustments, please contact [Allied Vision](#).

Manta board level (PoE and non-PoE) CS-Mount

Manta G-223, G-235, G-419

Mount: CS-Mount

Variant: PoE and non-PoE


Figure 80: Manta type B board level (PoE and non-PoE) CS-Mount

Dimensional mount adjustment

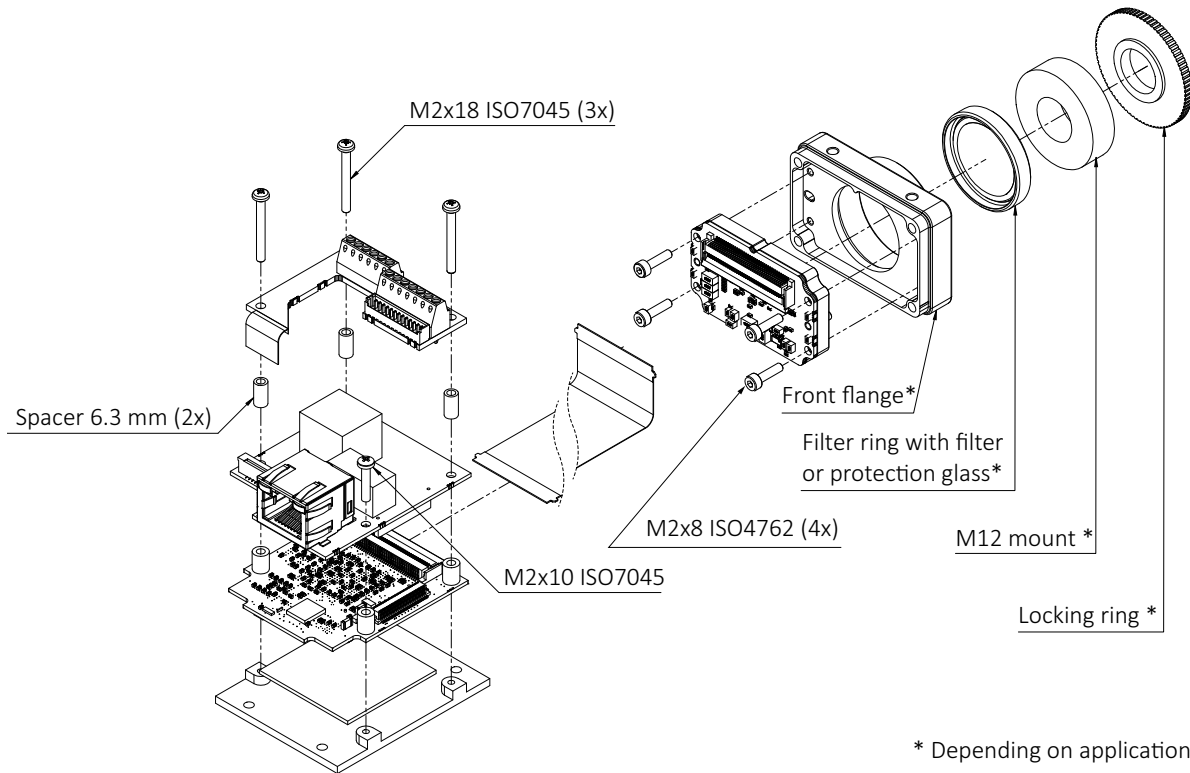
 Dimensional mount adjustment cannot be done by the customer. If you need any mount related adjustments, please contact [Allied Vision](#).

Manta board level (PoE and non-PoE) M12-Mount

Manta G-223, G-235, G-419

Mount: M12-Mount

Variant: PoE and non-PoE


Figure 81: Manta type B board level (non-PoE and PoE) M12-Mount

Need mount adjustment?

 Dimensional mount adjustment cannot be done by the customer. If you need any mount related adjustments, please contact [Allied Vision](https://www.alliedvision.com).

C-Mount cross section

All monochrome Manta type B cameras are equipped with a protection glass. All color Manta type B cameras are equipped with an [IR cut filter](#).



Protection glass and filter options

Allied Vision offers several filter options for both monochrome and color Manta cameras. Choose protection glass or filter according to the Modular Concept.

http://www.alliedvision.com/fileadmin/content/documents/products/cameras/various/modular-concept/Modular_concept_external.pdf



Maximum protrusion

Maximum protrusion is the distance from lens flange to the filter / protection glass in the camera.

Manta type B cameras with sensor size $\geq 1''$ diagonal are equipped with a 22 mm diameter filter / protection glass. All other Manta type B cameras are equipped with a 16 mm diameter filter / protection glass.

Manta G-235, G-282, G-283, G-505
Filter/Protection glass diameter: 16 mm

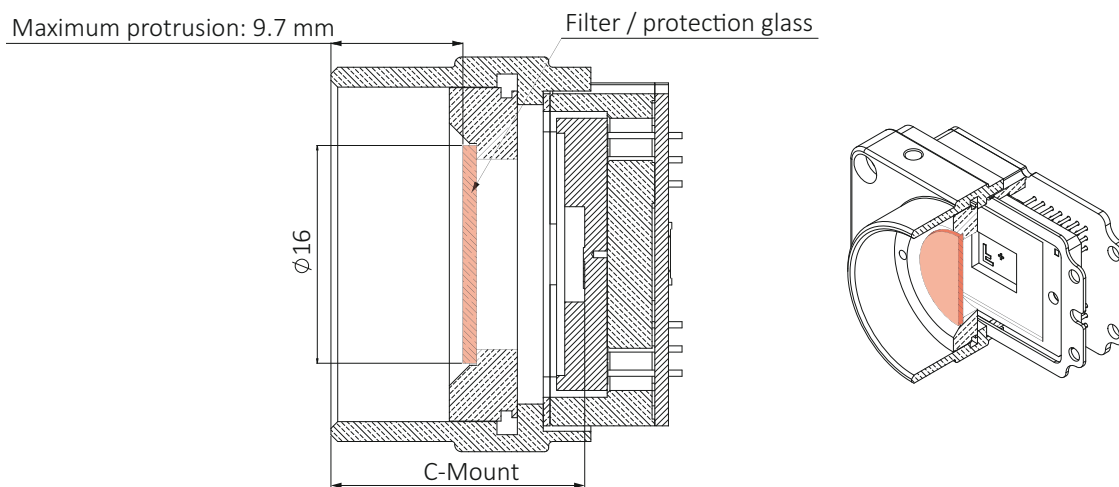


Figure 82: Manta type B C-Mount dimensions (16 mm filter)

Manta G-223, G-419, G-609, G-917
 Filter/Protection glass diameter: 22 mm

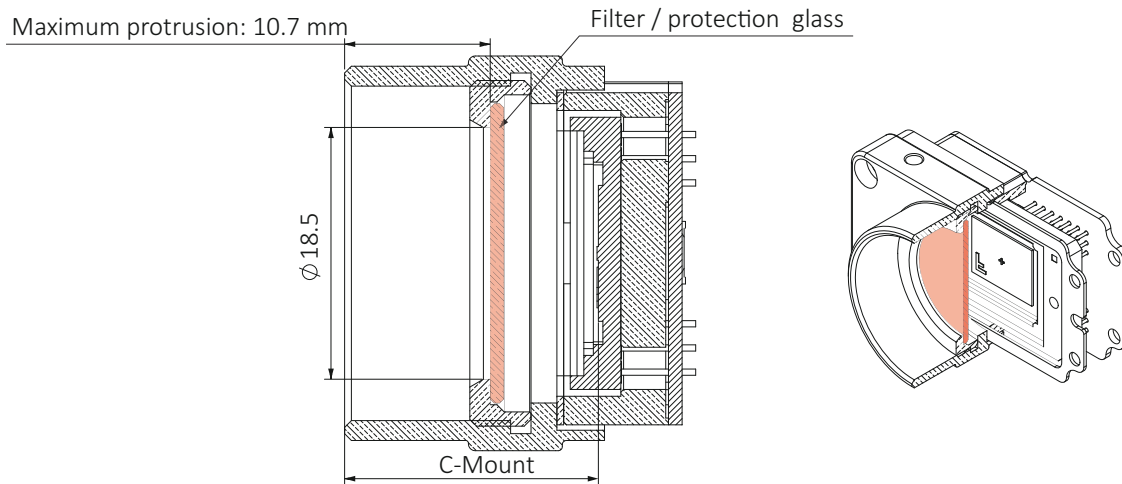


Figure 83: Manta type B C-Mount dimensions (22 mm filter)



Dimensional mount adjustment

Dimensional mount adjustment cannot be done by the customer. If you need any mount related adjustments, please contact [Allied Vision](#).

CS-Mount cross section



Protection glass and filter options

Allied Vision offers several filter options for both monochrome and color Manta cameras. Choose protection glass or filter according to the Modular Concept.

http://www.alliedvision.com/fileadmin/content/documents/products/cameras/various/modular-concept/Modular_concept_external.pdf



Maximum protrusion

Maximum protrusion is the distance from lens flange to the filter / protection glass in the camera.

Manta type B cameras with sensor size ≥ 1 inch diagonal are equipped with a 22 mm diameter filter / protection glass. All other Manta type B cameras are equipped with a 16 mm diameter filter / protection glass.

Manta G-235, G-282, G-283, G-505
Filter/Protection glass diameter: 16 mm

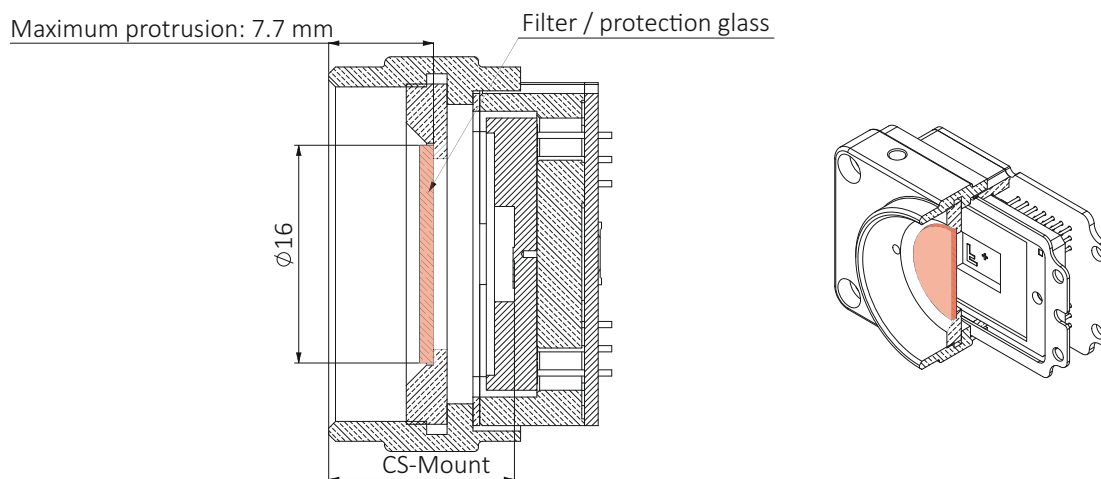


Figure 84: Manta type B CS-Mount dimensions (16 mm filter)

Manta G-223, G-419, G-609, G-917
 Filter/Protection glass diameter: 22 mm

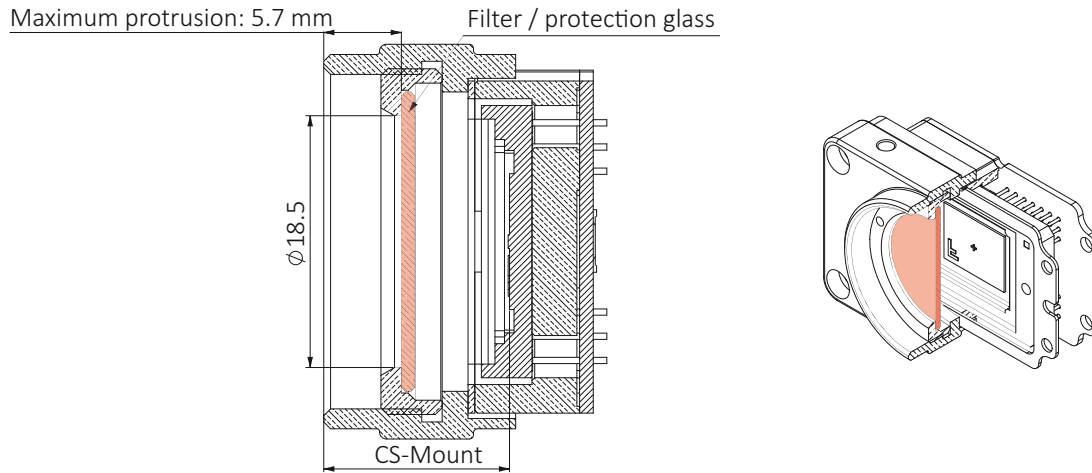


Figure 85: Manta type B CS-Mount dimensions (22 mm filter)



Dimensional mount adjustment

Dimensional mount adjustment cannot be done by the customer. If you need any mount related adjustments, please contact [Allied Vision](#).

Sensor position accuracy

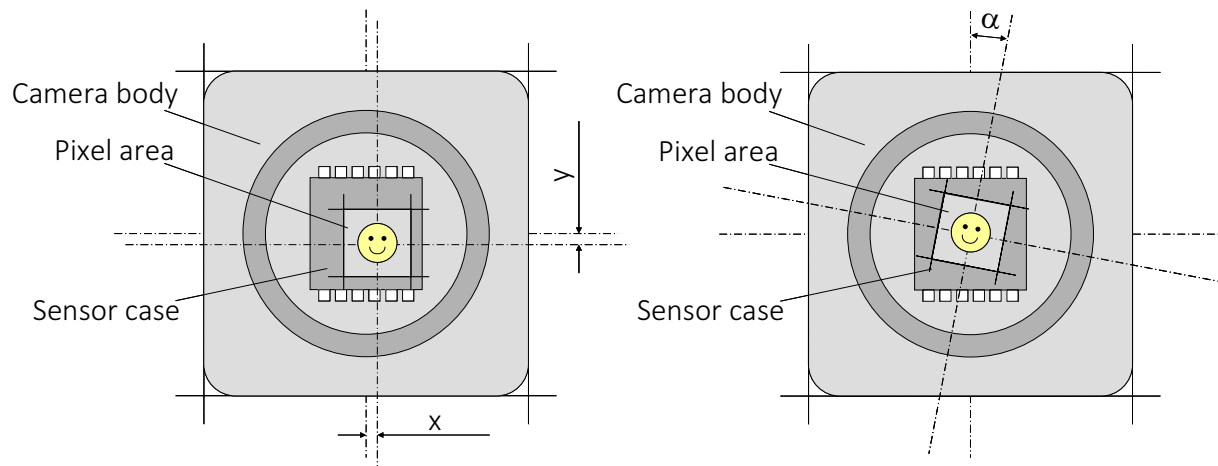


Figure 86: Allied Vision sensor position accuracy

Method of positioning

Optical alignment of the photo sensitive sensor area into the camera front module (lens mount front flange).

Reference points

Sensor: center of the pixel area (photo sensitive cells).

Camera: Center of the camera front flange (outer case edges).

Accuracy

x/y: $\pm 150 \mu\text{m}$ (sensor shift)

z: $+0 \mu\text{m}$ to $-150 \mu\text{m}$ (optical back focal length)

α : $\pm 0.5^\circ$ (sensor rotation)

Filter and lenses

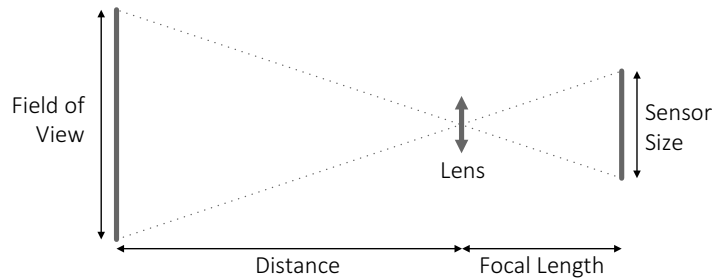


This chapter includes information on:

- Suitable lens formats for Manta camera models
- Standard IR cut filter and its transmission characteristics

Camera lenses

Allied Vision offers different lenses from a variety of manufacturers. This section presents tables that list selected image field of view (width x height) depending on sensor size, distance and focal length of the lens.



Focal length

Lenses with focal lengths < 8 mm may show shading in the edges of the image due to microlenses on the sensor.

The exact values vary and depend on the respective lens.



Accessories

Please contact your Allied Vision sales representative or your Allied Vision distributor for information on available accessories:

<http://www.alliedvision.com/en/about-us/where-we-are.html>

The following tables list selected image formats in width x height depending on camera type, distance and the focal length of the lens.

Manta G-031B/C

Focal length for type 1/4 sensor	Field of view	
	Distance = 500 mm	Distance = 1000 mm
2.8 mm	655 x 490 mm	1314 x 983 mm
4 mm	458 x 342 mm	919 x 687 mm
6 mm	304 x 227 mm	611 x 457 mm
8 mm	227 x 170 mm	458 x 342 mm
12 mm	150 x 112 mm	304 x 227 mm
16 mm	112 x 83 mm	227 x 170 mm
25 mm	70 x 52 mm	114 x 108 mm

Table 40: Manta G-031B/C focal length vs. field of view

Manta G-032B/C

Focal length for type 1/3 sensor	Field of view	
	Distance = 500 mm	Distance = 1000 mm
4.0 mm	608 x 446 mm	1220 mm x 896 mm
4.8 mm	506 x 371 mm	1016 mm x 746 mm
8 mm	301 x 221 mm	608 mm x 446 mm
12 mm	199 x 146 mm	403 mm x 296 mm
16 mm	148 x 109 mm	301 mm x 221 mm
25 mm	93 x 68 mm	191 mm x 140 mm
35 mm	65 x 48 mm	135 mm x 99 mm

Table 41: Manta G-032B/C focal length vs. field of view

Manta G-033B/C

Focal length for type 1/2 sensor	Field of view	
	Distance = 500 mm	Distance = 1000 mm
4.8 mm	660 x 495 mm	1327 x 995 mm
8 mm	394 x 295 mm	794 x 595 mm
12 mm	260 x 195 mm	527 x 395 mm
16 mm	194 x 145 mm	394 x 295 mm
25 mm	122 x 91 mm	250 x 187 mm
35 mm	85 x 64 mm	176 x 132 mm
50 mm	58 x 43 mm	122 x 91 mm

Table 42: Manta G-033B/C focal length vs. field of view

Manta G-046B/C

Focal length for type 1/2 sensor	Field of view	
	Distance = 500 mm	Distance = 1000 mm
4.8 mm	660 x 495 mm	1327 x 995 mm
8 mm	394 x 295 mm	794 x 595 mm
12 mm	260 x 195 mm	527 x 395 mm
16 mm	194 x 145 mm	394 x 295 mm
25 mm	122 x 91 mm	250 x 187 mm
35 mm	85 x 64 mm	176 x 132 mm
50 mm	58 x 43 mm	122 x 91 mm

Table 43: Manta G-046B/C focal length vs. field of view

Manta G-125B/C

Focal length for type 1/3 sensor	Field of view	
	Distance = 500 mm	Distance = 1000 mm
4.0 mm	595 x 446 mm	1195 x 896 mm
4.8 mm	495 x 371 mm	995 x 746 mm
8 mm	295 x 221 mm	595 x 446 mm
12 mm	195 x 146 mm	395 x 296 mm
16 mm	145 x 109 mm	295 x 221 mm
25 mm	91 x 68 mm	187 x 140 mm
35 mm	64 x 48 mm	132 x 99 mm

Table 44: Manta G-125B/C focal length vs. field of view

Manta G-145B/C (-30fps)

Focal length for type 2/3 sensor	Field of view	
	Distance = 500 mm	Distance = 1000 mm
4.8 mm	908 x 681 mm	1825 x 1368 mm
8 mm	541 x 406 mm	1091 x 818 mm
12 mm	358 x 268 mm	725 x 543 mm
16 mm	266 x 200 mm	541 x 406 mm
25 mm	167 x 125 mm	343 x 257 mm
35 mm	117 x 88 mm	243 x 182 mm
50 mm	79 x 59 mm	167 x 125 mm

Table 45: Manta G-145B/C (-30fps) focal length vs. field of view

Manta G-145B NIR

Focal length for type 2/3 sensor	Field of view	
	Distance = 500 mm	Distance = 1000 mm
4.8 mm	908 x 681 mm	1825 x 1368 mm
8 mm	541 x 406 mm	1091 x 818 mm
12 mm	358 x 268 mm	725 x 543 mm
16 mm	266 x 200 mm	541 x 406 mm
25 mm	167 x 125 mm	343 x 257 mm
35 mm	117 x 88 mm	243 x 182 mm
50 mm	79 x 59 mm	167 x 125 mm

Table 46: Manta G-145B NIR focal length vs. field of view

Manta G-146B/C

Focal length for type 1/2 sensor	Field of view	
	Distance = 500 mm	Distance = 1000 mm
4.8 mm	660 x 495 mm	1327 x 995 mm
8 mm	394 x 295 mm	794 x 595 mm
12 mm	260 x 195 mm	527 x 395 mm
16 mm	194 x 145 mm	394 x 295 mm
25 mm	122 x 91 mm	250 x 187 mm
35 mm	85 x 64 mm	176 x 132 mm
50 mm	58 x 43 mm	122 x 91 mm

Table 47: Manta G-146B/C focal length vs. field of view

Manta G-201B/C (-30fps)

Focal length for type 1/1.8 sensor	Field of view	
	Distance = 500 mm	Distance = 1000 mm
4.8 mm	740 x 549 mm	1488 x 1103 mm
8 mm	441 x 327 mm	890 x 660 mm
12 mm	292 x 216 mm	591 x 438 mm
16 mm	217 x 161 mm	441 x 327 mm
25 mm	136 x 101 mm	280 x 207 mm
35 mm	95 x 71 mm	198 x 147 mm
50 mm	65 x 48 mm	136 x 101 mm

Table 48: Manta G-201B/C (-30fps) focal length vs. field of view

Manta G-223B/NIR/C

Focal length for type 2/3 sensor ¹	Field of view	
	Distance = 500 mm	Distance = 1000 mm
4.8 mm	1162 x 617 mm	2335 x 1240 mm
6 mm	927 x 492 mm	1865 x 991 mm
6.5 mm	855 x 454 mm	1721 x 914 mm
8 mm	692 x 368 mm	1396 x 742 mm
10 mm	552 x 293 mm	1114 x 597 mm
12 mm	458 x 243 mm	927 x 492 mm
16 mm	341 x 181 mm	692 x 369 mm
25 mm	214 x 114 mm	439 x 223 mm
35 mm	150 x 79 mm	310 x 165 mm
50 mm	101 x 54 mm	214 x 114 mm
75 mm	64 x 34 mm	139 x 74 mm
90 mm	51 x 27 mm	114 x 60 mm

¹ A 2/3 inch lens may cause vignetting (1 inch lens recommended)

Table 49: Manta G-223B/C/NIR focal length vs. field of view

Manta G-235B/C

Focal length for type 1/1.2 sensor	Field of view	
	Distance = 500 mm	Distance = 1000 mm
8 mm	698 x 181 mm	1407 x 364 mm
10 mm	556 x 144 mm	1123 x 291 mm
12 mm	461 x 119 mm	934 x 242 mm
16 mm	343 x 89 mm	698 x 181 mm
25 mm	216 x 56 mm	442 x 115 mm
35 mm	151 x 39 mm	313 x 81 mm
50 mm	102 x 26 mm	216 x 56 mm

Table 50: Manta G-235B/C focal length vs. field of view

Manta G-282B/C

Focal length for type 1/1.8 sensor	Field of view	
	Distance = 500 mm	Distance = 1000 mm
4.8 mm	737 x 555 mm	1480 x 1115 mm
6 mm	588 x 443 mm	1183 x 891 mm
6.5 mm	542 x 408 mm	1091 x 822 mm
8 mm	439 x 331 mm	885 x 667 mm
10 mm	350 x 264 mm	707 x 533 mm
12 mm	290 x 219 mm	588 x 443 mm
16 mm	216 x 163 mm	439 x 331 mm
25 mm	136 x 102 mm	278 x 210 mm
35 mm	95 x 71 mm	197 x 148 mm
50 mm	64 x 48 mm	136 x 102 mm
75 mm	40 x 30 mm	88 x 66 mm
90 mm	33 x 25 mm	72 x 54 mm

Table 51: Manta G-282B/C focal length vs. field of view

Manta G-283B/C

Focal length for type 2/3 sensor	Field of view	
	Distance = 500 mm	Distance = 1000 mm
4.8 mm	907 x 683 mm	1822 x 1373 mm
6 mm	724 x 545 mm	1456 x 1097 mm
6.5 mm	667 x 503 mm	1344 x 1012 mm
8 mm	541 x 407 mm	1090 x 821 mm
10 mm	431 x 324 mm	870 x 655 mm
12 mm	357 x 269 mm	724 x 545 mm
16 mm	266 x 200 mm	541 x 407 mm
25 mm	167 x 126 mm	343 x 258 mm
35 mm	117 x 88 mm	242 x 183 mm
50 mm	79 x 60 mm	167 x 126 mm
75 mm	50 x 38 mm	108 x 82 mm
90 mm	40 x 30 mm	89 x 67 mm

Table 52: Manta G-283B/C focal length vs. field of view

Manta G-419B/NIR/C

Focal length for type 1 sensor	Field of view	
	Distance = 500 mm	Distance = 1000 mm
8 mm	692 x 692mm	1396 x 1396 mm
10 mm	552 x 552 mm	1114 x 1114 mm
12 mm	458 x 458 mm	928 x 928 mm
16 mm	340 x 340 mm	692 x 692 mm
25 mm	214 x 214 mm	439 x 439 mm
35 mm	150 x 150 mm	310 x 310 mm
50 mm	101 x 101 mm	214 x 214 mm
75 mm	64 x 64 mm	139 x 139 mm
90 mm	51 x 51 mm	104 x 104 mm

Table 53: Manta G-419B/NIR/C focal length vs. field of view

Manta G-504B/C

Focal length for type 2/3 sensor	Field of view	
	Distance = 500 mm	Distance = 1000 mm
4.8 mm	908 x 681 mm	1825 x 1368 mm
8 mm	541 x 406 mm	1091 x 818 mm
12 mm	358 x 268 mm	725 x 543 mm
16 mm	266 x 200 mm	541 x 406 mm
25 mm	167 x 125 mm	343 x 257 mm
35 mm	117 x 88 mm	243 x 182 mm
50 mm	79 x 59 mm	167 x 125 mm

Table 54: Manta G-504B/C focal length vs. field of view

Manta G-505B/C

Focal length for type 2/3 sensor	Field of view	
	Distance = 500 mm	Distance = 1000 mm
6 mm	700 x 585 mm	1408 x 1176 mm
8 mm	523 x 437 mm	1054 x 880 mm
12 mm	346 x 289 mm	700 x 585 mm
16 mm	257 x 215 mm	523 x 437 mm
25 mm	162 x 135 mm	332 x 277 mm
35 mm	113 x 94 mm	234 x 196 mm
50 mm	77 x 64 mm	162 x 135 mm

Table 55: Manta G-505B/C focal length vs. field of view

Manta G-609B/C

Focal length for type 1 sensor	Field of view	
	Distance = 500 mm	Distance = 1000 mm
8 mm	768 x 616 mm	1549 x 1242 mm
10 mm	612 x 491 mm	1237 x 992 mm
12 mm	508 x 407 mm	1028 x 825 mm
16 mm	378 x 303 mm	768 x 616 mm
25 mm	237 x 190 mm	487 x 391 mm
35 mm	166 x 133 mm	344 x 276 mm
50 mm	112 x 90 mm	237 x 190 mm
75 mm	71 x 57 mm	154 x 124 mm
90 mm	57 x 46 mm	126 x 101 mm

Table 56: Manta G-609B/C focal length vs. field of view

Manta G-917B/C

Focal length for type 1 sensor	Field of view	
	Distance = 500 mm	Distance = 1000 mm
8 mm	768 x 616 mm	1549 x 1242 mm
10 mm	612 x 491 mm	1237 x 992 mm
12 mm	508 x 407 mm	1028 x 825 mm
16 mm	378 x 303 mm	768 x 616 mm
25 mm	237 x 190 mm	487 x 391 mm
35 mm	166 x 133 mm	344 x 276 mm
50 mm	112 x 90 mm	237 x 190 mm
75 mm	71 x 57 mm	154 x 124 mm
90 mm	57 x 46 mm	126 x 101 mm

Table 57: Manta G-917B/C focal length vs. field of view

IR cut filter

Color cameras are equipped with an IR cut filter. The following illustration shows the spectral transmission of the IR cut filter.

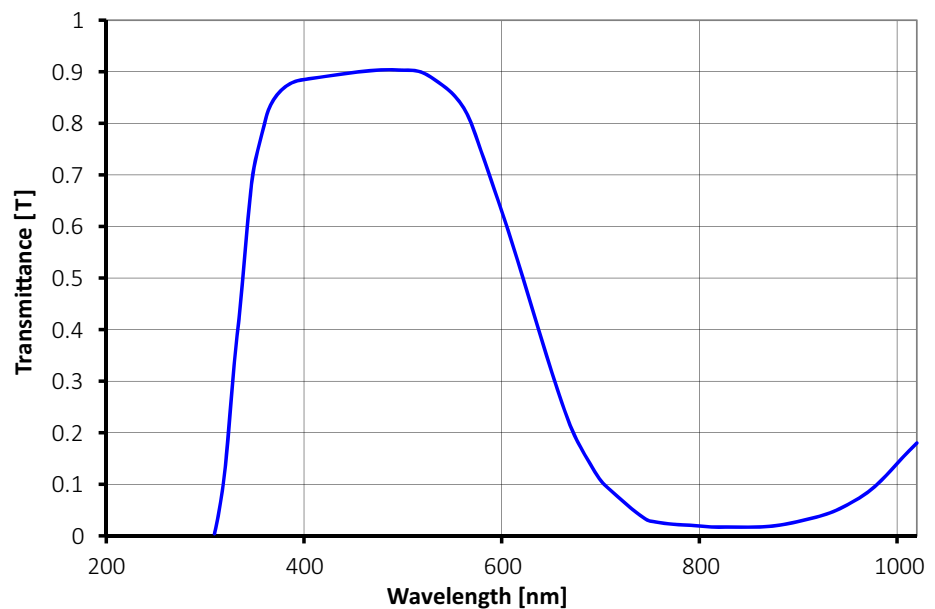
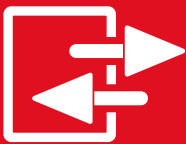


Figure 87: Approximate spectral transmission of a Hoya C5000 type IR cut filter (may vary slightly by filter lot)

Camera interfaces



This chapter includes:

- A general description of the inputs and outputs (including trigger features)
- I/O connector pin assignments
- I/O block diagrams
- A general description of trigger rules such as timing diagram and definitions

Back panel

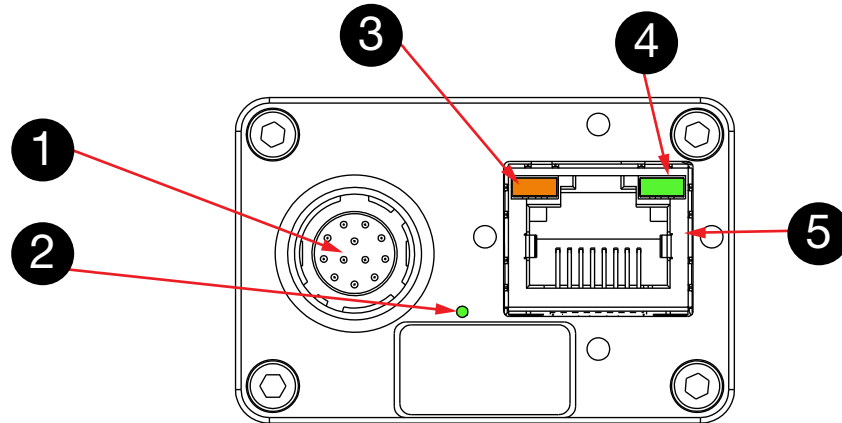


Figure 88: Rear view of *Manta* type A camera

1	Hirose I/O port
2	LED 3 (only for type A camera models with PoE)
3	LED 1
4	LED 2
5	Gigabit Ethernet interface

Status LEDs

Manta type A Status LEDs

The tables below describe the status LEDs of Manta type A cameras.

All Manta type A models.

LED 1 color	Status
Solid orange	Ethernet link with 1 Gb/s established
Flashing orange	Ethernet activity with 1 Gb/s

Table 58: Status LED 1

LED 2 color	Status
Solid green	Ethernet link with 100 Mb/s established
Flashing green	Ethernet activity with 100 Mb/s

Table 59: Status LED 2

LED 3 color	Status
Solid green	Camera is powered (Hirose or PoE)
LED off	No power

Table 60: Status LED 3

Manta type B Status LEDs

The tables below describe the status LEDs of Manta type B cameras.

Manta G-223, G-282, G-283, G-609, G-917

LED 1 color	Status
Solid orange	Ethernet link established
Flashing orange	Network traffic

Table 61: Status LED 1

LED 2 color	Status
Solid green	Ethernet link established
Slow flashing green	Booting routine
Four rapid flashes per second	Transmission error. Contact support@alliedvision.com

Table 62: Status LED 2



Manta type B cameras do not have a power LED (LED 3).

Gigabit Ethernet interface

The Gigabit Ethernet interface conforms to the IEEE 802.3 1000BASE-T standard for Gigabit Ethernet over copper. To prevent electromagnetic interference (EMI) and for best performance, Category 6 (or higher) cables with S/STP shielding and connectors are recommended.



- Cable lengths up to 100 m are supported.
- The 8-pin RJ-45 jack has the pin assignment according to the Ethernet standard (IEEE 802.3 1000BASE-T).
- For cameras that are *PoE* capable, the Gigabit Ethernet interface can be used to provide power to the camera.
- Manta *PoE* models can source power from IEEE 802.3af (1000 Mb/s) and from IEEE 802.3at compliant PSE devices (Power Sourcing Equipment): such as switches injectors or NICs.
- If both the Hirose I/O port and Gigabit Ethernet interface (via *PoE*) are used for power, the camera will only use the power from the Hirose I/O port.



PoE capable cameras

PoE capable cameras have the letters *PoE* written on the camera's label on the bottom side of the camera.



Main board for Manta models

From serial number *503323258* on, all Manta models including PoE and board level variants contain the same main board.



Accessories

Please contact your Allied Vision sales representative or your local Allied Vision distributor for information on accessories offered by Allied Vision:

<http://www.alliedvision.com/en/about-us/where-we-are.html>

Camera I/O connector pin assignment (including PoE)



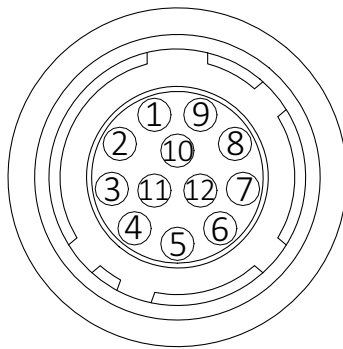
Safety-related instructions to avoid malfunctions

Read all *Notes and Cautions* in the [GigE Installation Manual](#) before using the Hirose I/O port.



Hirose connector

The cable side Hirose connector is available for purchase from Allied Vision (part number K7600040).



Pin	Signal	Direction	Level	Description
1	Camera GND	In	GND for RS-232 and external power	Ground for camera power supply and RS-232
2	Camera Power	In	8 – 30 VDC	Camera power supply
3	Video Type Auto Iris Out	Out	---	Video type auto iris (\geq FW 1.44)
4	In 1	In	<i>Standard and PoE</i> cameras: $U_{in}(\text{high}) = 3 - 24 \text{ V}$ up to 36 V with external resistor of 3.3 k Ω in series $U_{in}(\text{low}) = 0 - 1.0 \text{ V}$	Opto-isolated input 1 (SyncIn1)
5	---	---	---	---
6	Out 1	Out	Open emitter, maximum 10 mA	Opto-isolated output 1 (SyncOut1)
7	Isolated In GND	In/Out	---	Isolated input signal ground
8	RxD RS232	In	RS-232	Terminal receive data
9	TxD RS232	Out	RS-232	Terminal transmit data

Table 63: I/O connector pin assignment

Pin	Signal	Direction	Level	Description
10	Isolated Out Power	In	Common VCC for outputs, maximum 30 VDC	Power input for opto-isolated outputs
11	In 2	In	<i>Standard and PoE</i> cameras: $U_{in}(\text{high}) = 3 - 24 \text{ V}$ $U_{in}(\text{low}) = 0 - 1.0 \text{ V}$	Opto-isolated input 2 (SyncIn2)
12	Out 2	Out	Open emitter, maximum 10 mA	Opto-isolated output 2 (SyncOut2)

Table 63: I/O connector pin assignment (Continued)

The general purpose I/O port uses a Hirose HR10-10R-12PA(73) connector on the camera side. The mating cable connector is Hirose HR10A-10P-12S.

Input block diagram

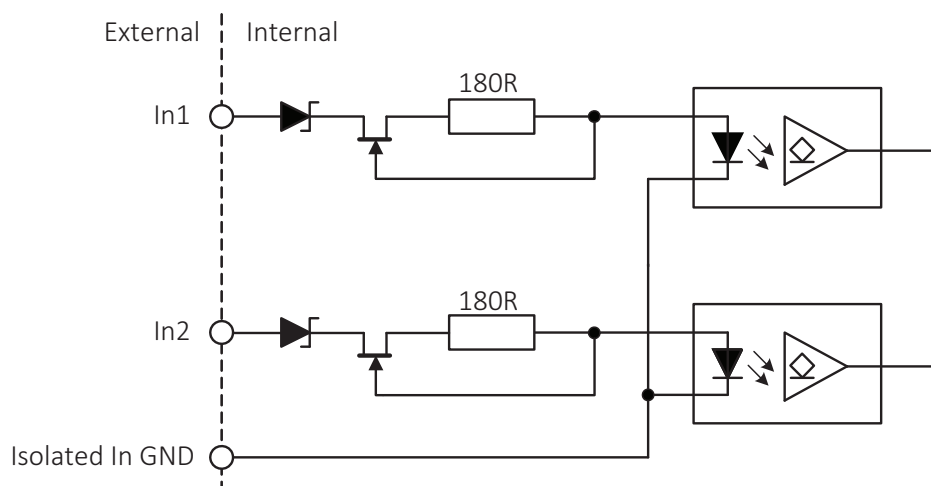


Figure 89: Input block diagram

The inputs can be connected directly to the system for voltages up to 24 VDC. An external resistor is not necessary.



For customers who designed their system for Manta cameras with serial numbers prior to the above mentioned hardware change use your systems with an external resistor without any restrictions.

Cycle delay

The cycle delay for all Manta cameras is $t_{pdLH} < 3.5 \mu s$ and $t_{pdHL} < 30 \mu s$.



For this reason, we recommend to trigger on the rising edge. This guarantees a reaction time that is as fast as possible.

Parameter	Value
U_{in} (low)	0 – 1.0 V
U_{in} (high)	3 – 24 V
Current (constant-current source)	3 – 4 mA

Table 64: Input parameters

Minimum pulse width

The minimum pulse width for all Manta cameras is:

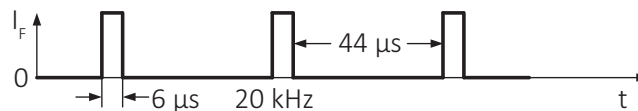


Figure 90: Minimum pulse width

Test conditions

The input signal was driven with 3.3 V and no external additional series resistor.

Output block diagram

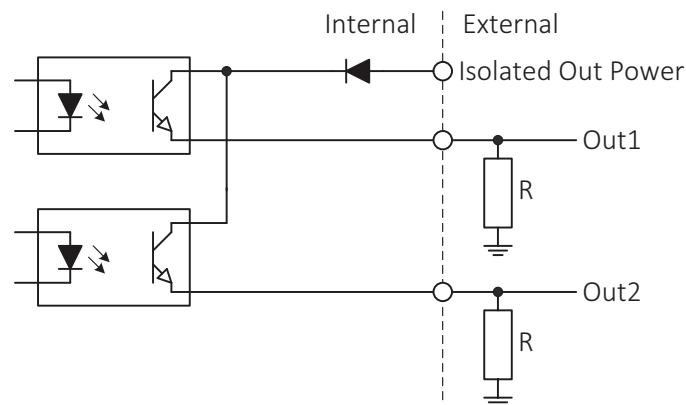


Figure 91: Output block diagram



- *Maximum 10 mA per output*
- *Isolated out power > 30 V may damage the camera.*

Isolated out power	Resistor value ¹	
5 V	1.0 kΩ	at ~ 5 mA minimum required current draw
12 V	2.4 kΩ	
24 V	4.7 kΩ	

¹ Resistor required if Out1/2 connected to a device with < 5 mA draw, i.e. high impedance.

Table 65: Isolated Out Power and external resistor

Output switching times

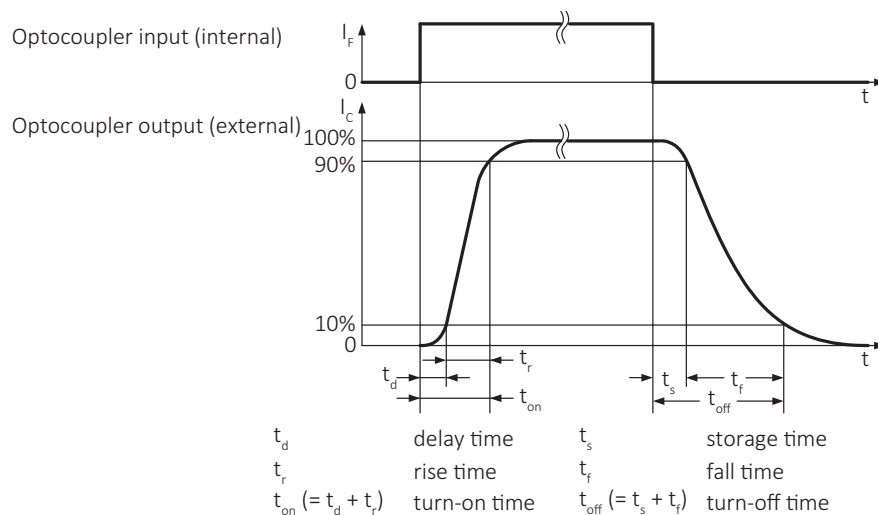


Figure 92: Output switching times

For all Manta models:

Parameter and value	
$t_d \approx 1 \mu s$	$t_s \approx 26 \mu s$
$t_r \approx 1 \mu s$	$t_f \approx 21 \mu s$
$t_{on} = t_d + t_r \approx 2 \mu s$	$t_{off} = t_s + t_f \approx 47 \mu s$ (t_{off} can deviate by $\pm 5 \mu s$)

Table 66: Parameters for Manta

Test conditions

Output: external 2.4 kΩ resistor to GND, isolated out power set to 12 V.

Higher external values increase the times in the table above.



Video iris output description

Manta cameras provide built-in video type auto-iris controls.



Damage to the lens

The following schematic uses CAMERA POWER to power the video iris lens and assumes CAMERA POWER = 12 V. Most video iris lenses operate at a 8–16 V input voltage. Therefore, this circuit is not appropriate if using a 24 V camera power supply. Doing so may irreparably damage your lens. Please consult your video iris lens specifications for the appropriate drive voltage.

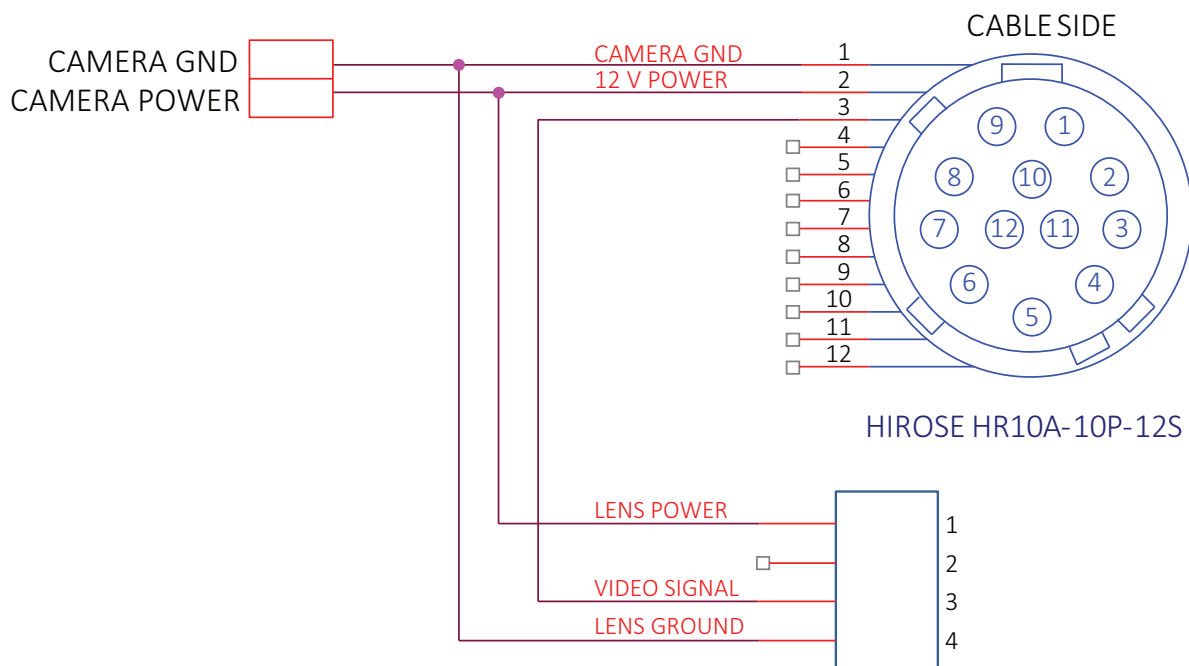


Figure 93: Video iris schematic

Control signals

The inputs and outputs of the camera can be configured by software. The different modes are described below.

Input block diagram

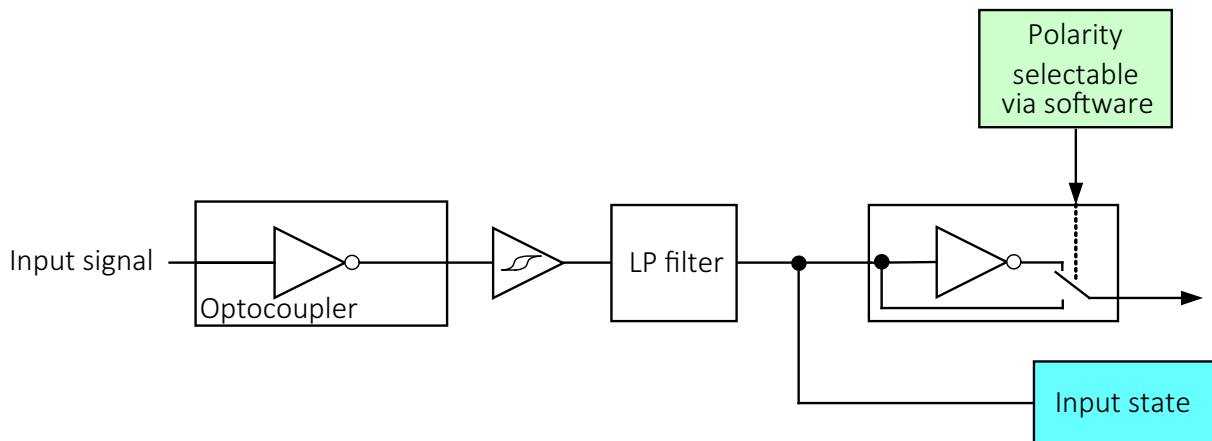


Figure 94: Input block diagram

Input/output pin control

All input and output signals running over the camera I/O connector are controlled by the I/O strobe commands. For more information, see the [GigE Features Reference](#).

Output signals

Output signals are configured by software. Any signal can be placed on any output. The main output signals are described below.

Signal	Description
GPO	Configured to be a general purpose output, control of which is assigned to SyncOutGpoLevels.
AcquisitionTriggerReady	Active once the camera has been recognized by the host PC and is ready to start acquisition.
FrameTriggerReady	Active when the camera is in a state that will accept the next frame trigger.
FrameTrigger	Active when an image has been initiated to start. This is a logic trigger internal to the camera, which is initiated by an external trigger or software trigger event.
Exposing	Active for the duration of sensor exposure.

Table 67: Output signals

Signal	Description
FrameReadout	Active at during frame readout, i.e. the transferring of image data from the CCD to camera memory.
Imaging	High when the camera image sensor is either exposing and/or reading out data.
Acquiring	Active during an acquisition stream.
SyncIn1	Active when there is an external trigger at SyncIn1.
SyncIn2	Active when there is an external trigger at SyncIn2.
Strobe1	The output signal is controlled according to Strobe1 settings.

Table 67: Output signals (Continued)

Output block diagram

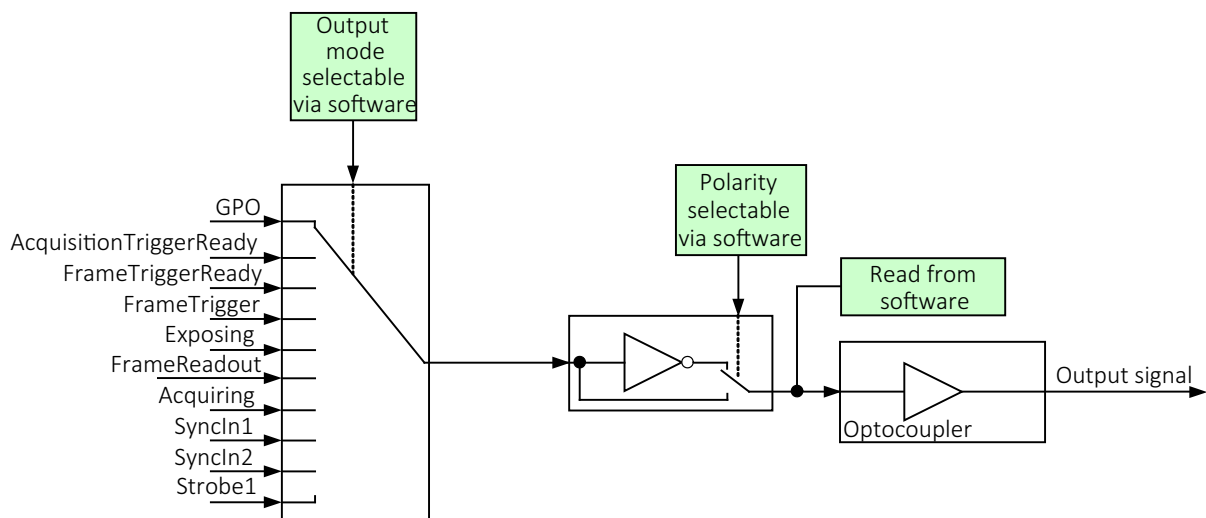


Figure 95: Output block diagram

Trigger timing diagram

The following diagram explains the general trigger concept.



For more information on trigger timing and camera control, see the [GigE Features Reference](#).

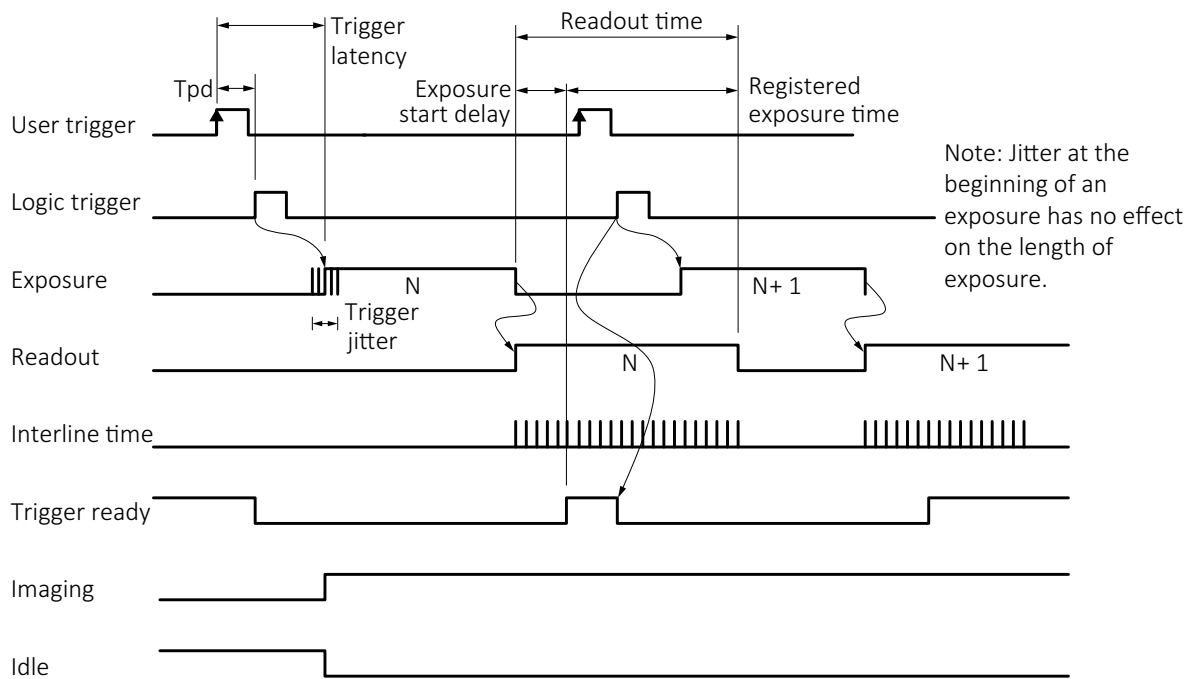


Figure 96: Trigger timing diagram

Trigger definitions

Term	Definition
User trigger	Trigger signal applied by the user (hardware trigger, software trigger).
Logic trigger	Trigger signal seen by the camera internal logic (not visible to the user).
Tpd	Propagation delay between the User trigger and the Logic trigger.
Exposure	High when the camera image sensor is integrating light.
Readout	High when the camera image sensor is reading out data.
Trigger latency	Time delay between the user trigger and the start of exposure.
Trigger jitter	Error in the trigger latency time.
Trigger ready	Indicates to the user that the camera will accept the next trigger.
Registered exposure time	Exposure time value currently stored in the camera memory.
Exposure start delay	Registered Exposure Time subtracted from the Readout time and indicates when the next exposure cycle can begin such that the exposure will end after the current Readout.
Interline time	Time between sensor row readout cycles.
Imaging	High when the camera image sensor is either exposing and/or reading out data.
Idle	High if the camera image sensor is not exposing and/or reading out data.

Table 68: Trigger definitions

Trigger rules



The *user trigger pulse width* should be at least three times the width of the trigger latency as indicated in *Specifications* on page 21.

- The *end of exposure* will always trigger the next Readout.
- The *end of exposure* must always end after the current Readout.
- The *start of exposure* must always correspond with the Interline Time if Readout is true.
- *Exposure start delay* equals the Readout time minus the Registered Exposure Time.

Triggering during the Idle State

For applications requiring the shortest possible trigger Latency and the smallest possible trigger jitter the User trigger signal should be applied when Imaging is false and Idle is true.

Triggering during the Readout State

For applications requiring the fastest triggering cycle time whereby the camera image sensor is exposing and reading out simultaneously, then the User trigger signal should be applied as soon as a valid trigger Ready is detected.

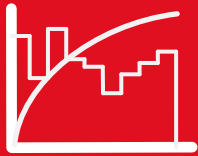
In this case, trigger Latency and trigger jitter can be up to 1 line time since exposure must always begin on an Interline boundary.



For a more detailed description of the trigger concept for *advanced users* and special scenarios, see the Triggering Concept application note:

http://www.alliedvision.com/fileadmin/content/documents/products/cameras/various/appnote/Triggering_concept.pdf

Image data flow



This chapter presents diagrams that illustrate data flow and bit resolution of the image data.



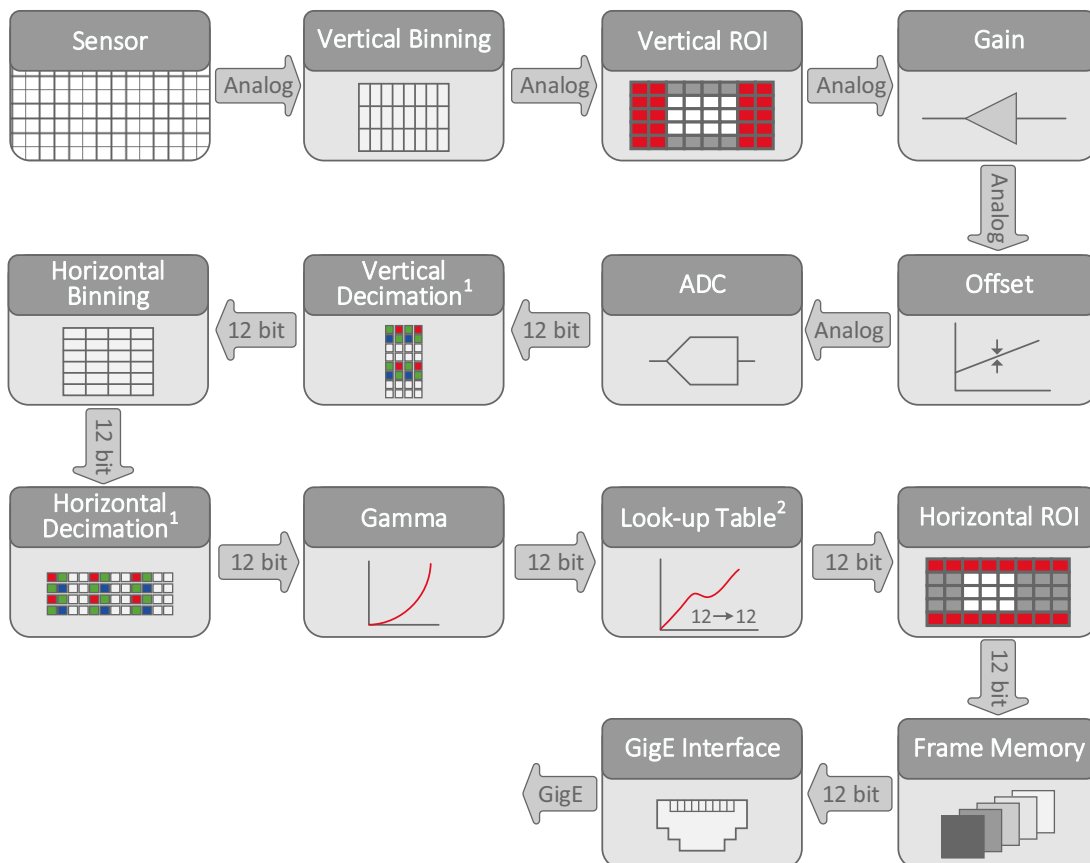
Camera control documents

A complete description of individual blocks can be found online:

- PvAPI users: [GigE Camera and Driver Attributes](#) document
- Vimba and third-party users: [GigE Features Reference](#)

Manta type A monochrome cameras

Manta G-031B, G-032B, G-033B, G-046B, G-125B,
G-145B, G-146B, G-201B, G-504B

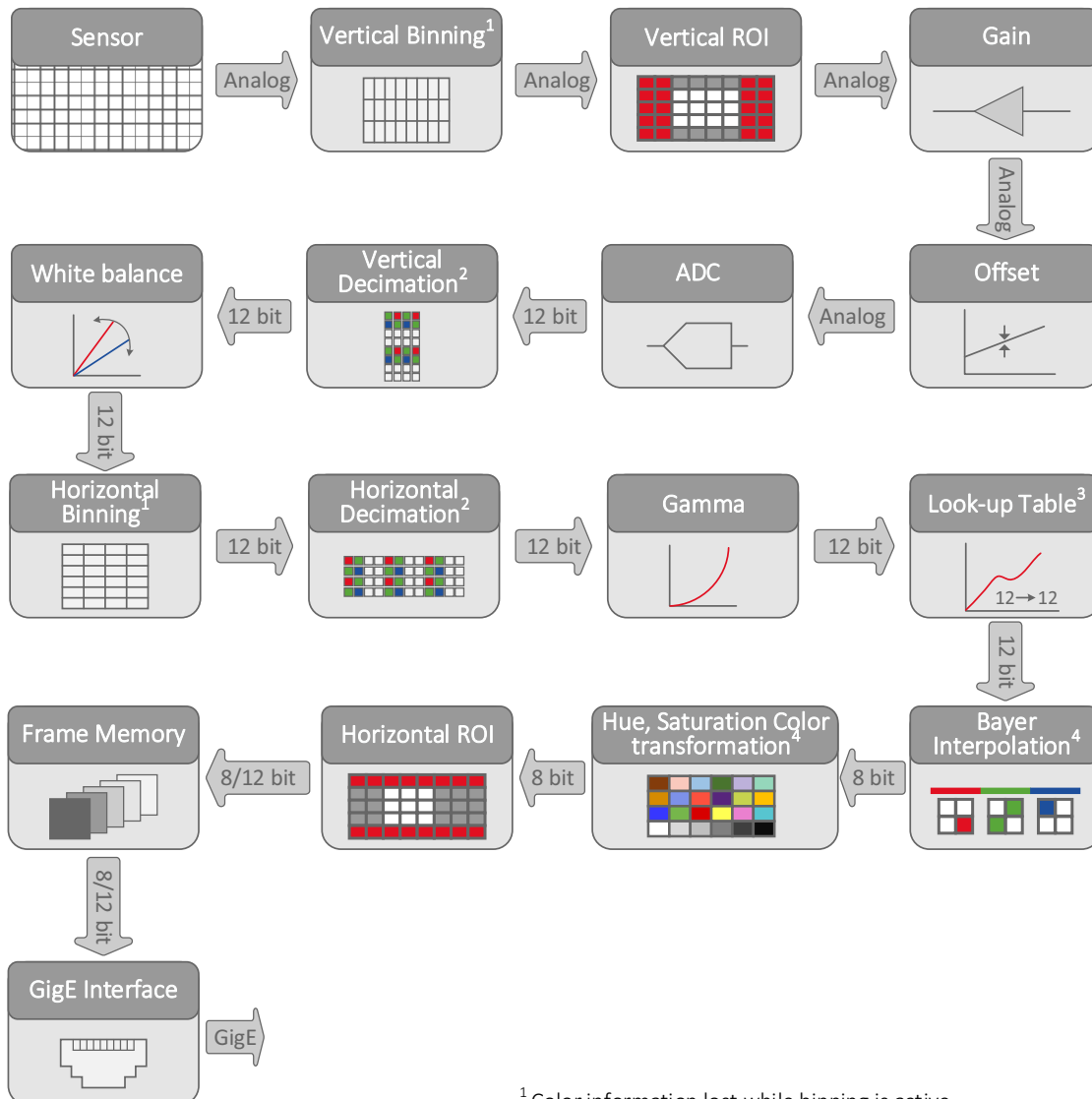


¹ Decimation is not available for Manta G-032B.

² If Gamma is enabled, only two LUTs are available.

Manta type A color cameras

Manta G-031C, G-032C, G-033C, G-046C, G-125C, G-145C, G-146C, G-201C, G-504C



¹ Color information lost while binning is active.

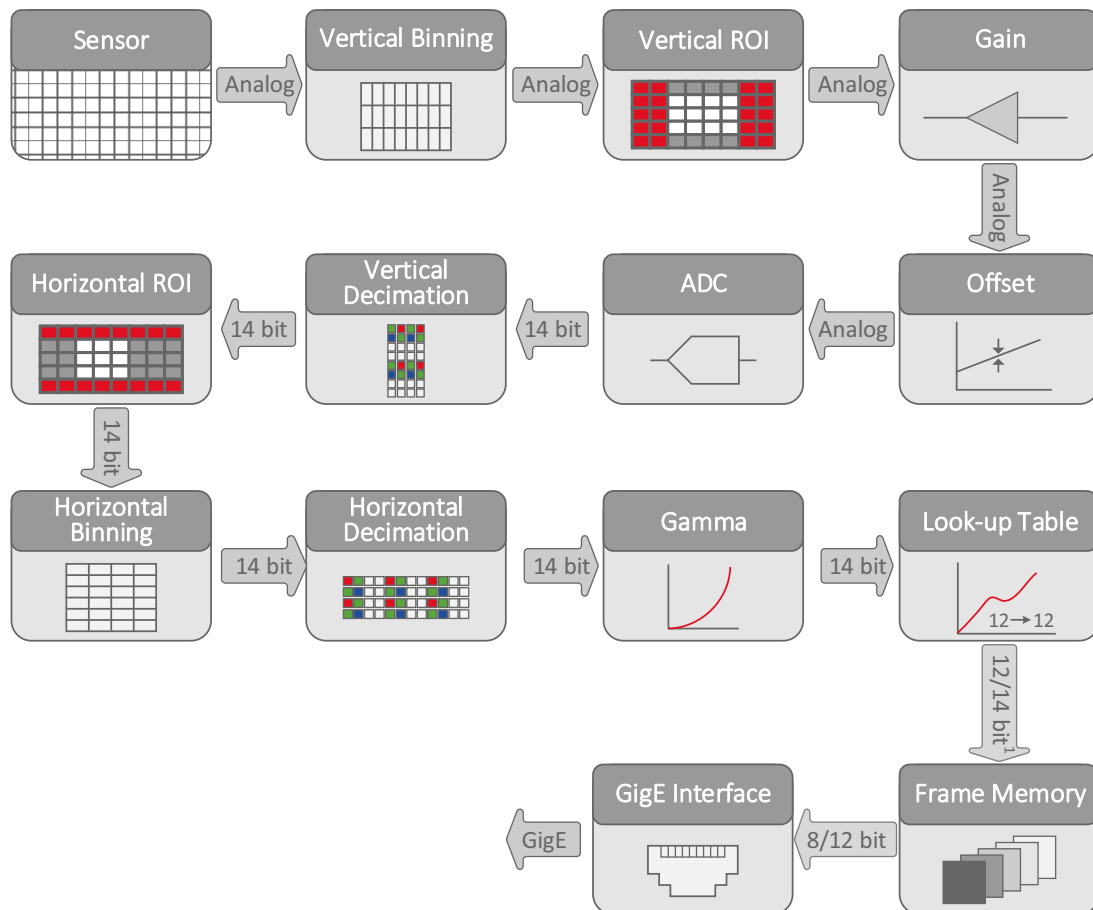
² Decimation is not available for Manta G-032C.

³ If Gamma is enabled, only two LUTs are available.

⁴ For on-camera interpolated *PixelFormat*s only (8-bit output). Raw un-interpolated *PixelFormat*s skip this block (8/12 bit output) depending upon the bit depth of *PixelFormat* used.

Manta type B monochrome CCD cameras

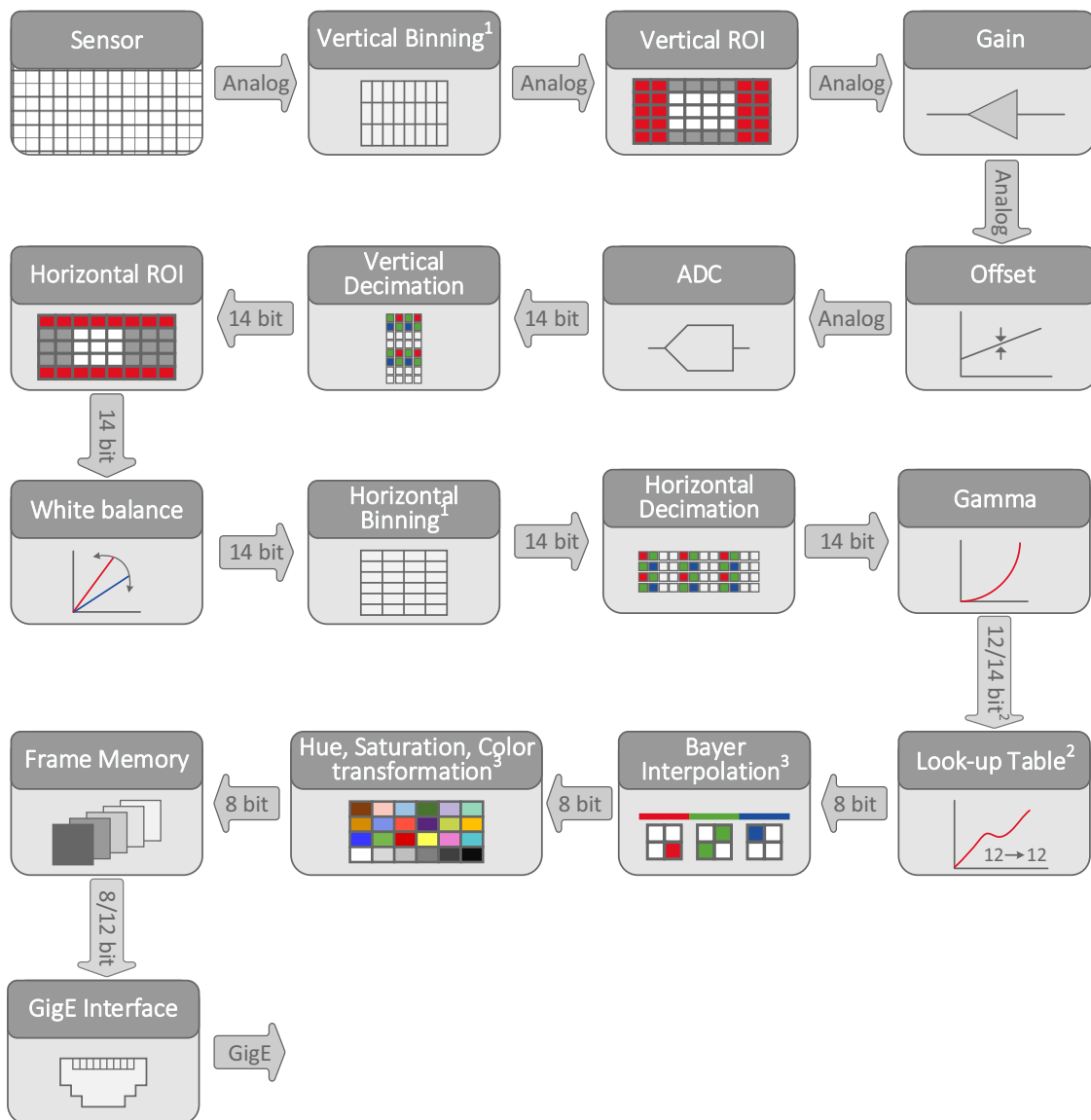
Manta G-282B, G-283B, G-505B, G-609B, G-917B



¹ 12 bits with LUT, 14 bits if the LUT is bypassed

Manta type B color CCD cameras

Manta G-282C, G-283C, G-505C, G-609C, G-917C



¹ Color information lost while binning is active.

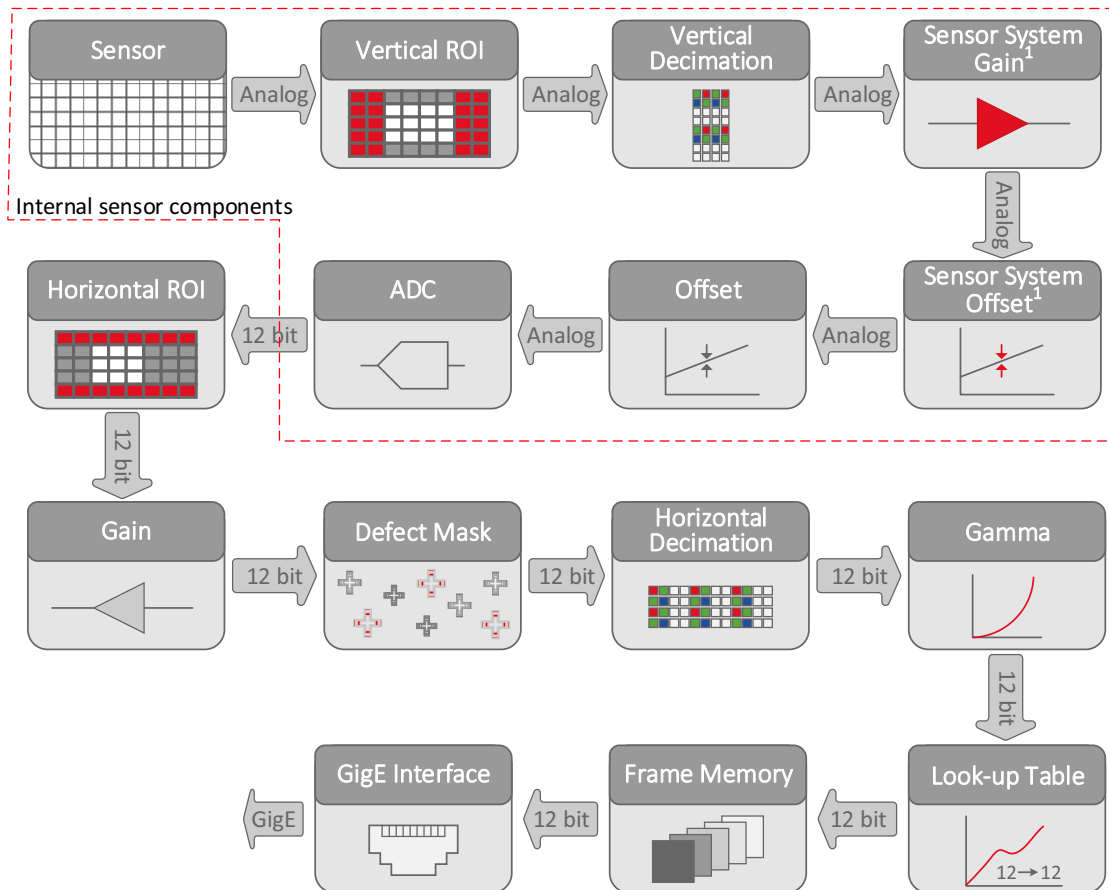
² 12 bits with LUT, 14 bits if the LUT is bypassed.

³ For on-camera interpolated *PixelFormats* only (8-bit output).

Raw un-interpolated *PixelFormats* skip this block (8/12 bit output) depending upon the bit depth of *PixelFormat* used.

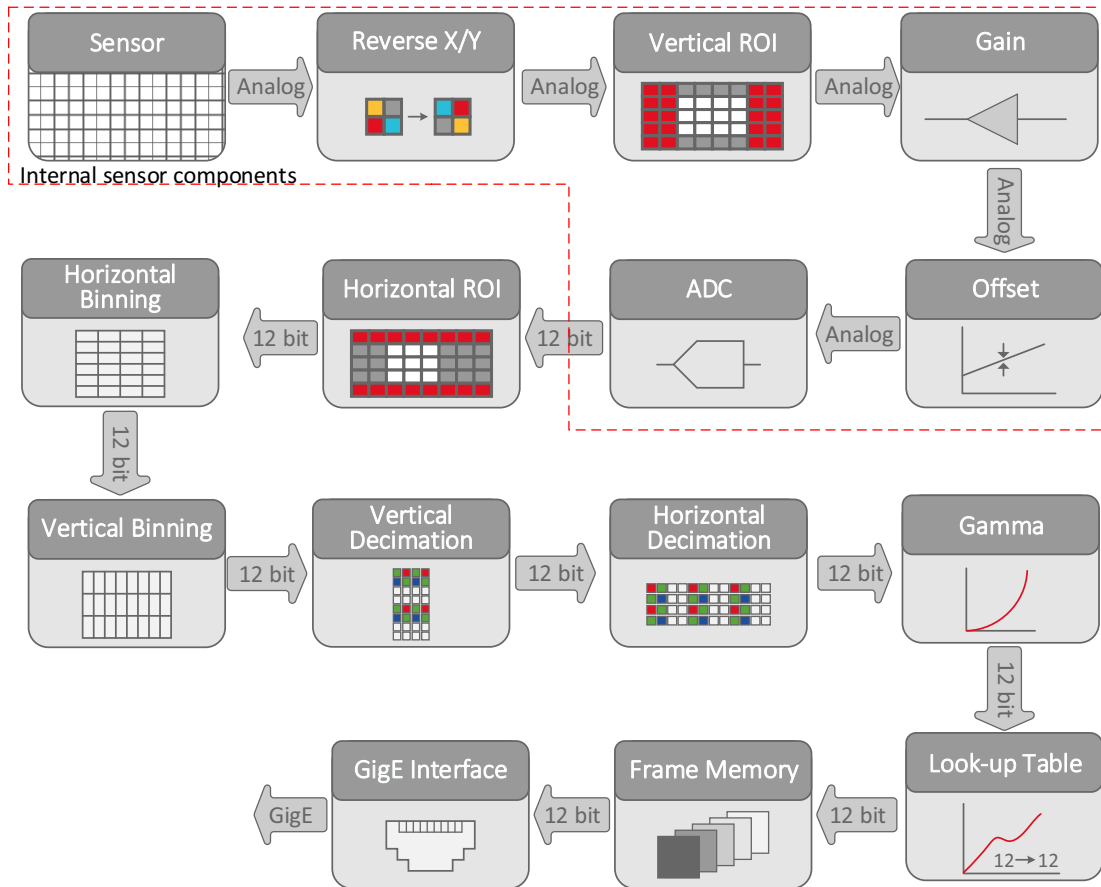
Manta type B monochrome CMOS cameras

Manta G-223B, G-223B NIR, G-419B, G-419B NIR



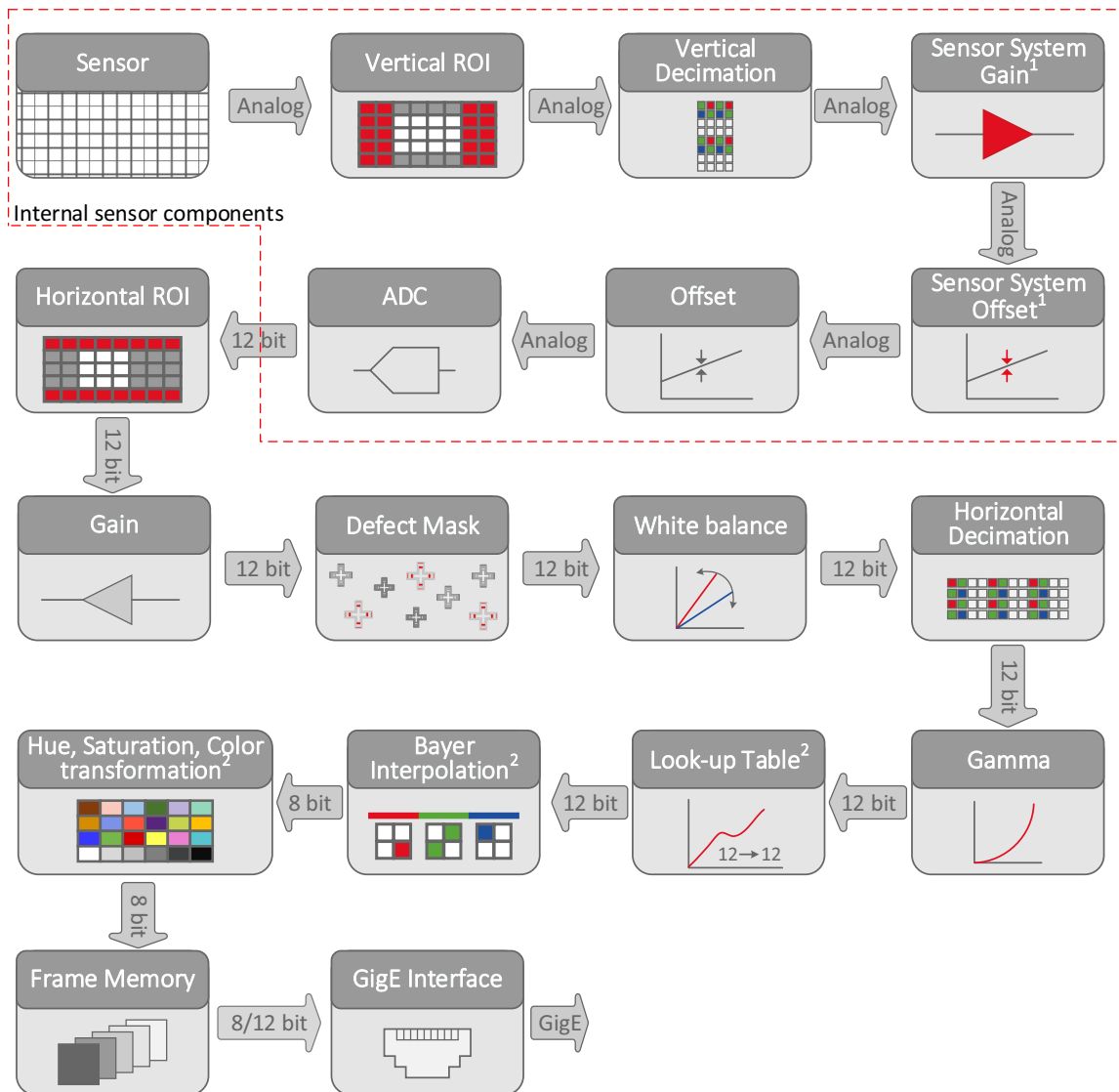
¹ Factory calibrated. Not a user control.

Manta G-235B



Manta type B color CMOS cameras

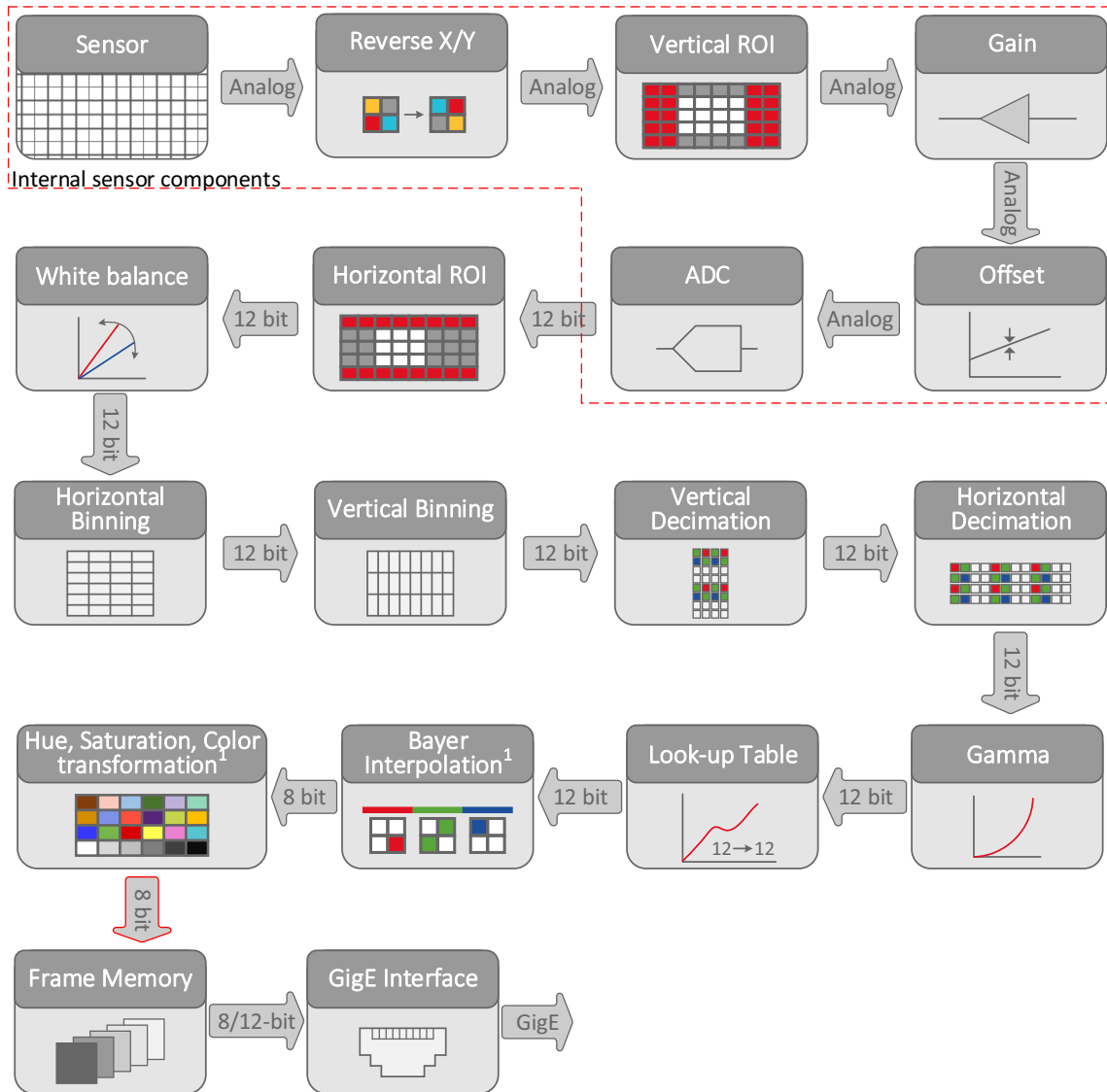
Manta G-223C, G-419C



¹ Factory calibrated. Not a user control.

² For on-camera interpolated *PixelFormats* only (8-bit output). Raw un-interpolated *PixelFormats* skip this block (8/12 bit output) depending upon the bit depth of *PixelFormat* used.

Manta G-235C



¹ For on-camera interpolated *PixelFormat*s only (8-bit output). Raw un-interpolated *PixelFormat*s skip this block (8/12 bit output) depending upon the bit depth of *PixelFormat* used.

Color interpolation (Bayer demosaicing)

The color sensors capture the color information via so-called primary color (R-G-B) filters placed over the individual pixels in a Bayer mosaic layout. An effective Bayer to RGB color interpolation already takes place in all Manta color version cameras.

In color interpolation a red, green or blue value is determined for each pixel. An Allied Vision proprietary Bayer demosaicing algorithm is used for this interpolation (2x2), optimized for both sharpness of contours as well as reduction of false edge coloring.

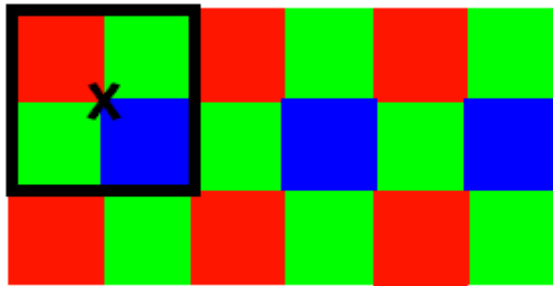


Figure 97: Bayer demosaicing (Manta type A: example of 2x2 matrix)

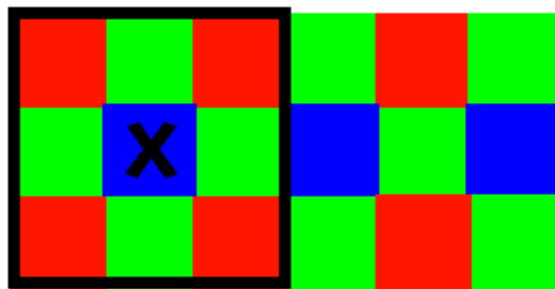


Figure 98: Bayer demosaicing (Manta type B: example of 3x3 matrix)

Color processing can be bypassed by using the RAW image transfer.

RAW mode is primarily used to:

- save bandwidths on the Gigabit Ethernet network
- achieve higher frame rates
- use different Bayer demosaicing algorithms on the PC
 - for Manta the first pixel of the sensor is **RED**



If the PC does not perform Bayer to RGB post-processing, the monochrome image will be superimposed with a checkerboard pattern.

In color interpolation a red, green or blue value is determined for each pixel (P1= first pixel; P2= second pixel; etc). Only two lines are needed for this interpolation:

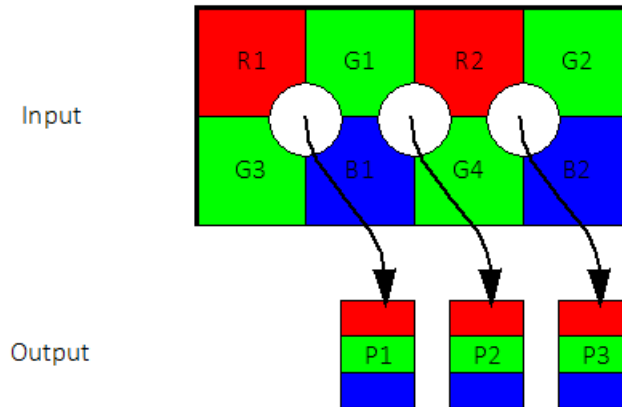


Figure 99: Bayer demosaicing (interpolation)

$$\begin{array}{lll}
 P1_{\text{red}} = R1 & P2_{\text{red}} = R2 & P3_{\text{red}} = R2 \\
 P1_{\text{green}} = \frac{G1 + G3}{2} & P2_{\text{green}} = \frac{G1 + G4}{2} & P3_{\text{green}} = \frac{G2 + G4}{2} \\
 P1_{\text{blue}} = B1 & P2_{\text{blue}} = B1 & P3_{\text{blue}} = B2
 \end{array}$$

Figure 100: Bayer demosaicing (type A cameras)



- Please note that on the color camera, a incorrectly colored border of one or two pixel wide forms on the left and right image borders. This is also a consequence of Bayer demosaicing as the image width displayed on the color camera is not scaled down.
- Using ROI, x and y resolutions must be even-numbered.

Cleaning optical components



This chapter describes safety instructions and cautions for cleaning lenses, optical filters, protection glass, or sensors.

**Important instructions to be read first**

Please read these instructions before you contact Allied Vision or your Allied Vision camera distributor for assistance.

Ask Allied Vision or your Allied Vision camera distributor if you are not familiar with the procedures described below.

Warranty

**Warranty information available online**

For details about camera warranty duration and sensor warranty terms, go to:

<http://www.alliedvision.com/en/support/warranty>

**Warranty precautions**

To ensure your warranty remains in effect:

- Do not open the camera housing.
- Follow instructions described below.
- Use only optical quality tissue/cloth if you must clean a lens or filter.
- Use only optics cleaner (60% ethyl alcohol, 40% ether). Do not use aggressive cleaners like benzine or spirit. Such cleaners may damage the surface.
- Do not use compressed air which can push dust into camera and lens.

Allied Vision does not warranty against any physical damage to the sensor, filter, protection glass, or lenses. Use utmost care when cleaning optical components.

Keep optical components clean

The best way to ensure the camera remains clean is to avoid penetration of foreign substances into the camera.

When screwing/unscrewing the camera lens or dust cap, hold the camera with the C-Mount / CS-Mount opening towards the floor. This minimizes the possibility of any contaminants falling on the glass surface. Always store cameras and lenses with dust-caps on.



Figure 101: Illustration of camera orientation when removing lens or dust cap

Identifying impurities

If you observe any image artifacts in your video preview of your Manta camera you may have impurities either on the lens, filter/protection glass, or on the sensor protection glass. Every Manta camera is cleaned prior to sealing and shipment; however, impurities may develop due to handling or unclean environments.

As shown in figure 102, impurities (dust, particles or fluids) on the sensor or optical components appear as a dark area, patch or spot on the image and remain fixed in the preview window while you rotate the camera over the target.

Do not confuse this with a pixel defect which appears as a distinct point. Particles can either rest loosely or can be more or less stuck to the optical surface.

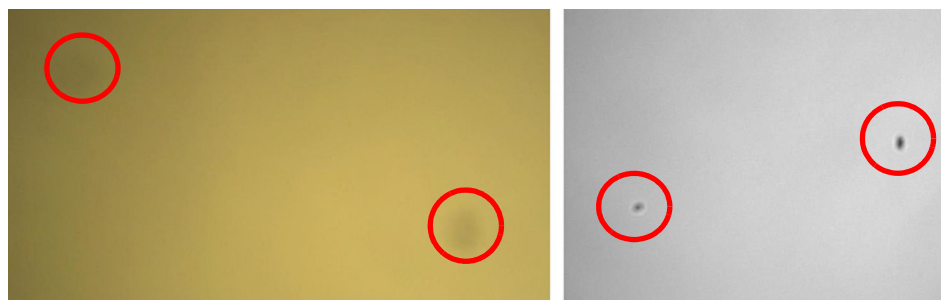


Figure 102: Image with tiny dust on the filter (left) and dust on the sensor (right)

Locating impurities

Before you dismount the lens you should find out if the impurity is on the filter, lens, or sensor.

1. Start acquiring a uniform image (e.g. a white sheet of paper) with the camera.
2. To identify the affected surface, move the suspected optical component and see if the contamination follows this movement.
 - a. If you move only the lens (not the camera) and the impurity moves as well, the impurity is on the lens.
 - b. If you move the IR cut filter/protection glass window and the impurity moves as well, the impurity is on the filter/protection glass. Carefully remove the filter/protection glass and clean it on both sides using the techniques explained in the next section.



3. If the impurity is neither on the lens nor the IR cut filter/protection glass, it is probably on the sensor.



Removing IR cut filter/protection glass

To remove IR cut filter/protection glass use the special tool (Allied Vision part number E9020001 for 16mm filter and part number 3851 for 22 mm filter).

Materials for cleaning optical components



Use only these cleaning materials for optical components

- Optic approved lens cotton, cloth, or tissue that is chemically pure and free from silicones and other additives.
- Optic approved low residue cleaning liquid.

**Never use these cleaning materials for optical components**

- Dry swabs or tissue may cause scratches.
- Metal tools may cause scratches.
- Disposable cotton cosmetic swabs may contain contaminants harmful to optical glass.
- Cosmetic cotton may cause scratches or get caught in small gaps.
- Consumer eyeglass cleaning cloths may be pretreated with silicone harmful to optical glass.
- Aggressive cleaners like benzene, acetone, or spirits may damage the surface.

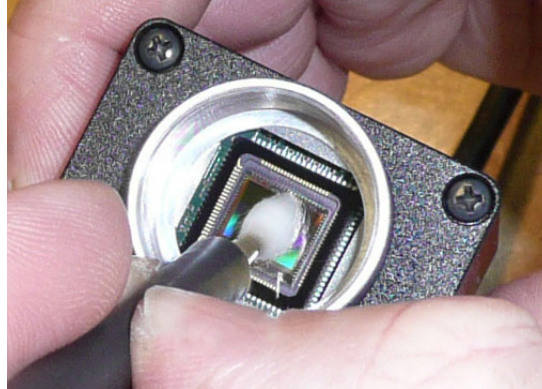
Cleaning Instructions

**Workplace conditions**

- Perform all cleaning operations (lenses, filter/protection glass, and sensor) in a dust-free clean-room.
 - Avoid touching the optical components with your fingers or any hard material.
 - Nitrile cleanroom gloves or powder free latex gloves are recommended to maintain low particulate levels.
 - Use an ESD mat to prevent damage from an electrostatic discharge.
1. Unplug the camera from any power supply before cleaning.
 2. Apply a small amount of cleaning liquid to a new lens cleaning cotton, cloth, or tissue. The cotton, cloth, or lens tissue should be moist, but not dripping.



3. Hold the camera sensor diagonally upwards. Ensure that the camera is away from your body to prevent particles like skin flakes from falling on the sensor.



4. Wipe the glass surface with a spiral motion from the center to the rim. Normally, several spiral wipes are recommended. Wipe only on glass avoiding contact to metal surfaces, because microscopic dirt could be released and could cause scratches on the glass.
5. When you have finished cleaning, examine the surface in a strong light. Take an out-of-focus picture of a flat, illuminated surface to see if any dirt or dust remains.
6. If dust spots remain, repeat this procedure using new clean lens cloth or tissue (as described above).



Cleaning issues

If you notice that the camera lens or sensor is not clean after attempting to clean twice, or if you have any questions regarding cleaning your camera, please contact your Allied Vision distributor.

Cleaning with compressed air

Allied Vision does not recommend cleaning Manta cameras with compressed air.

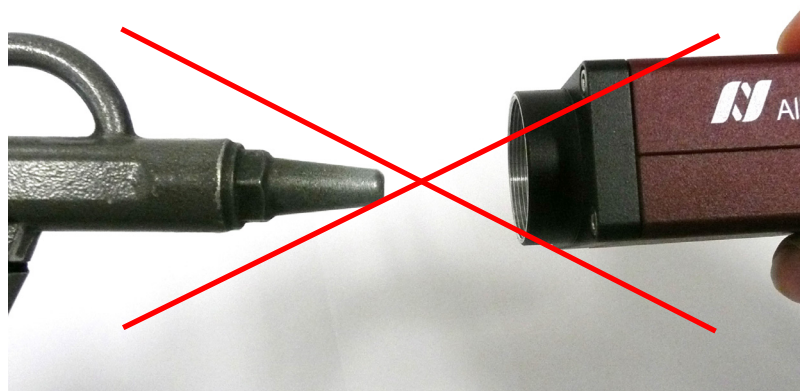


Figure 103: Do not use compressed air



Possible material damage

- Compressed air at high pressure and/or shorter operating distances may push dust into the camera/lens and physically damage the camera, sensor, or optical components.
- Propellant from non-optic approved compressed air products may leave a residue on the camera or lens and may physically damage the camera, sensor, or optical components.
- Compressed air may contain oil or moisture that could contaminate or damage the optical components.
- Use an air blower/compressed air only if you are familiar with cleaning a camera using this method.

If you want to clean your camera with compressed air despite of all the warnings:

- Use an optic approved compressed air product or compressor.
- Use an anti-static ionizer attachment to reduce the risk of static-caused damage.
- Use a filter to remove moisture and oil from the air.
- Use short directed bursts of air to remove impurities.



Compressed air pressure and operating distance

- Keep the compressed air pressure at a moderate strength only. Pressure at the nozzle should be less than 1 bar (15 psi).
- Operating distance from the camera should be 5 to 30 cm.

Firmware update



This chapter includes:

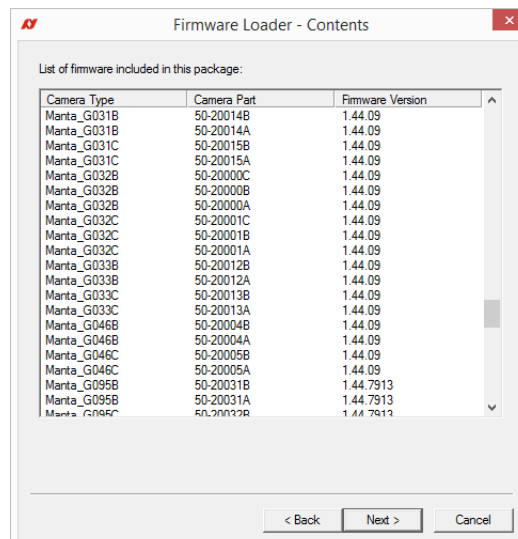
- How to update the firmware on your Allied Vision Manta camera.

To update the firmware on your Allied Vision GigE camera

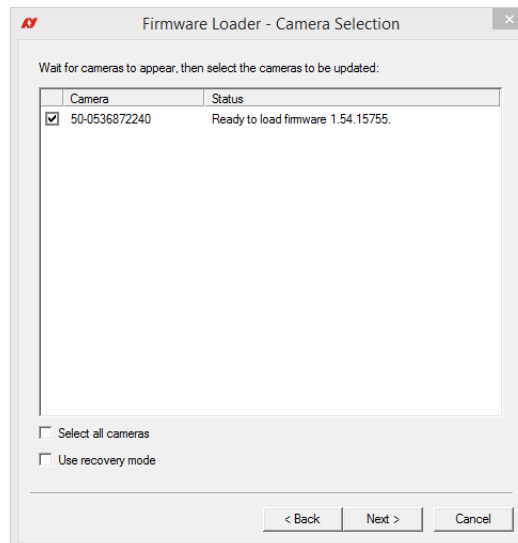
1. Launch the Allied Vision Firmware Loader.



2. Click **Next**. The Firmware Loader displays a list of firmware included in the package



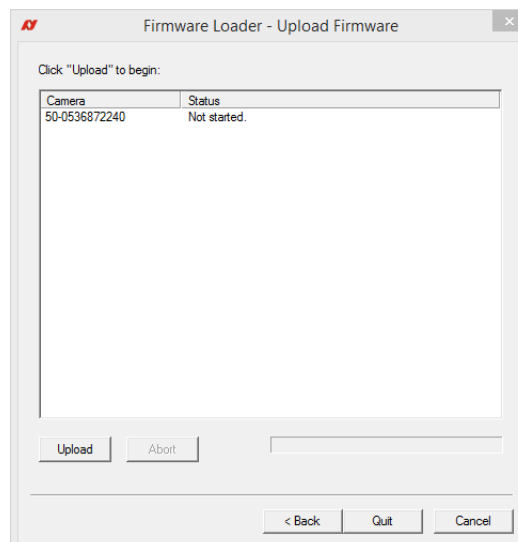
- Click **Next**. You can select your camera model on this page.



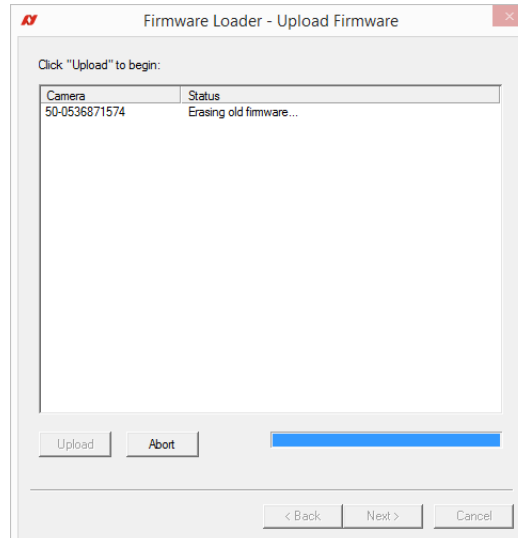
Recovery Mode

Select the **Use recovery mode** checkbox if the connected GigE camera is not found by the firmware loaded, or if the GigE camera is listed as unavailable.

- Click **Next**.



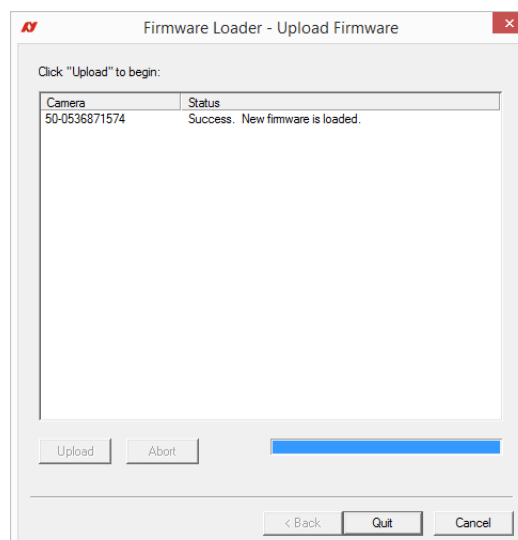
- Click **Upload** to start the update. The existing firmware will be erased and the new firmware will be updated to the camera.



Possible material damage

Do not unplug the GigE cable or camera power supply during the update procedure.

- The Firmware Loader will display a success status upon completion. Click **Quit** to exit the loader.



Appendix



The appendix includes the following information for older Manta cameras up to serial number 503323258:

- Mechanical dimensions
- Camera interfaces

Mechanical dimensions

Exceptions for non-PoE Manta cameras up to serial number 503323258.

Manta standard housing

Variant: Non-PoE

Mount: C-Mount

Serial number: up to serial number 503323258

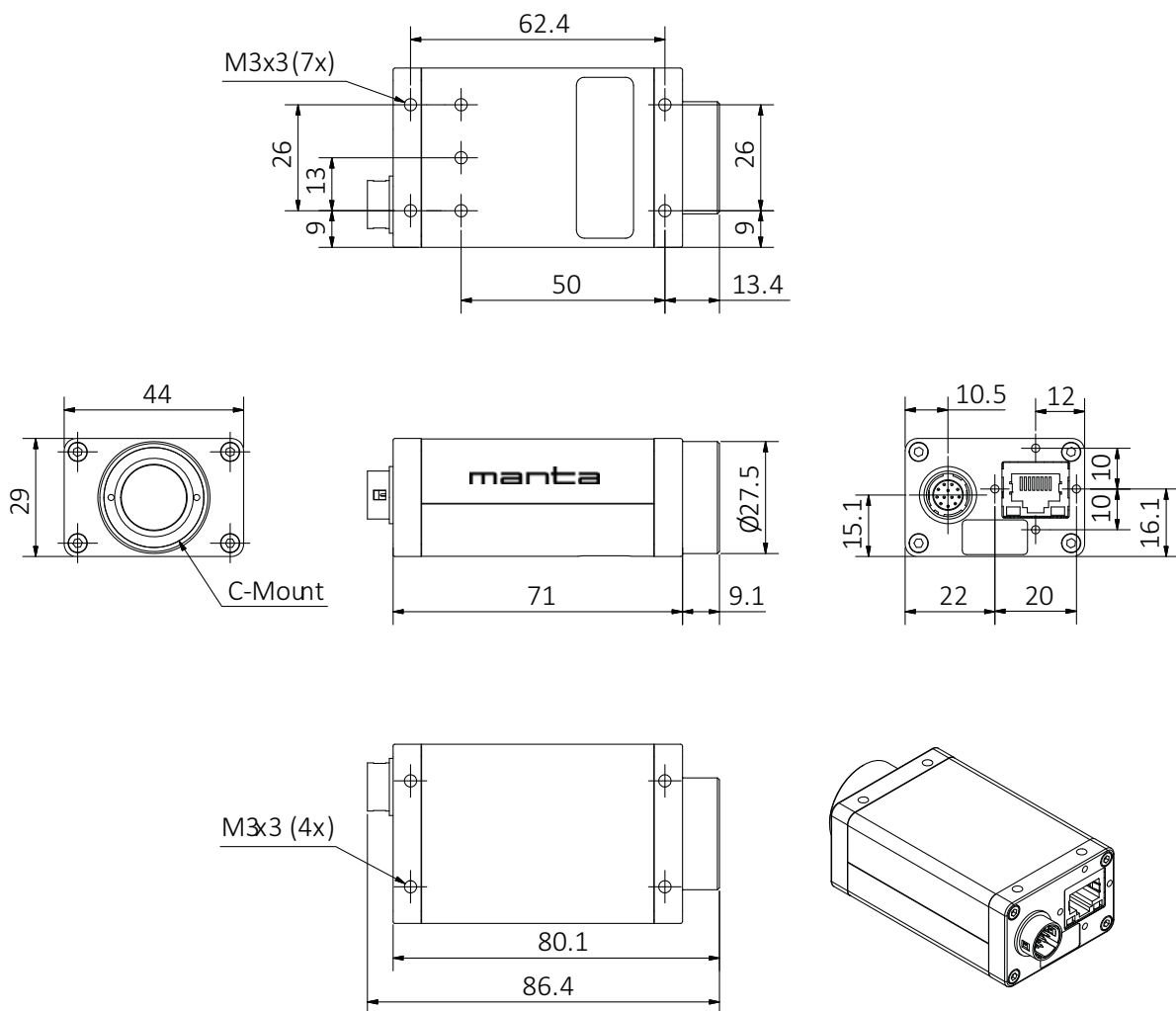


Figure 104: Manta standard housing dimensions (including connectors)

Manta W90 housing

This version has the sensor tilted 90 degrees clockwise, so that it views upwards.

Variant: Non-PoE

Mount: C-Mount

Serial number: up to serial number 503323258

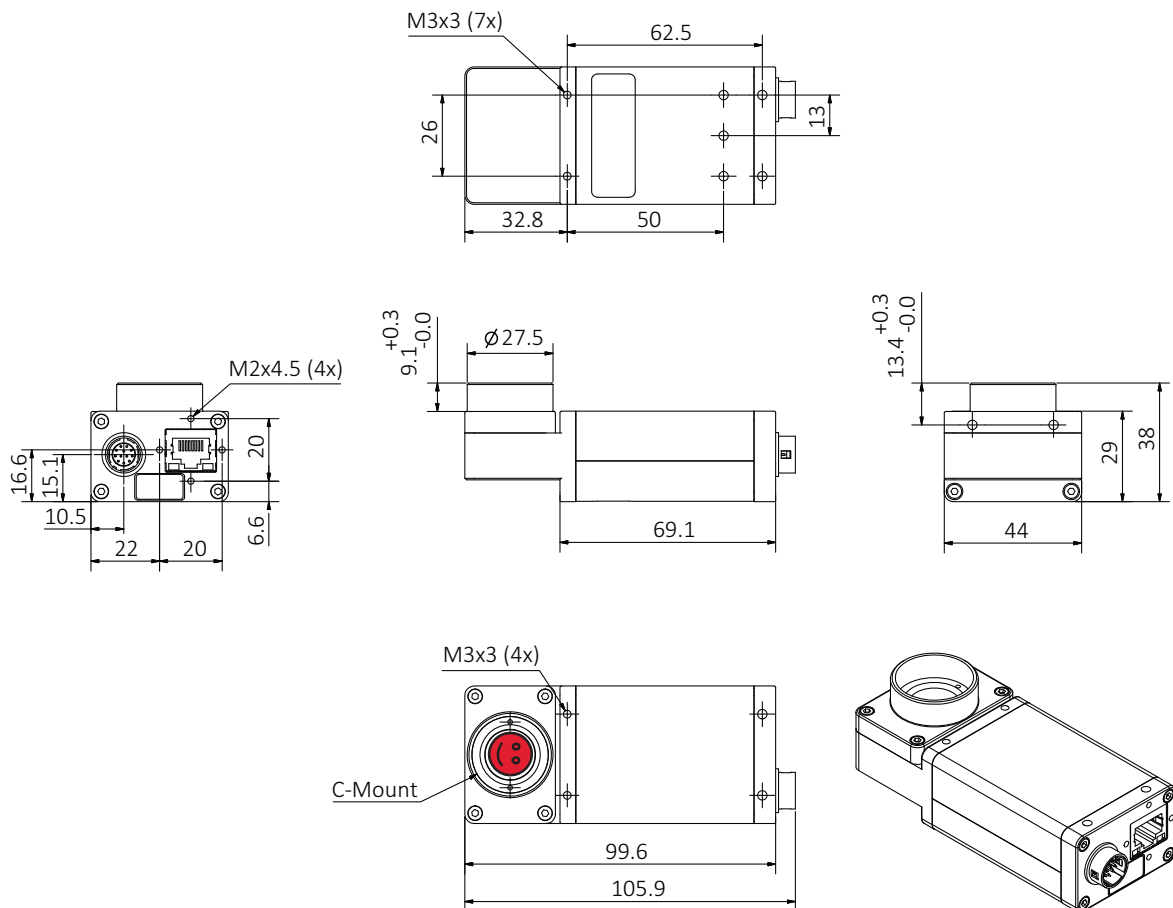


Figure 105: Manta W90 housing dimensions (including connectors)

Manta W90 S90 housing

This version has the sensor tilted 90 degrees clockwise, so that it views upwards. The sensor is also rotated 90 degrees clockwise.

Variant: Non-PoE

Mount: C-Mount

Serial number: up to serial number 503323258

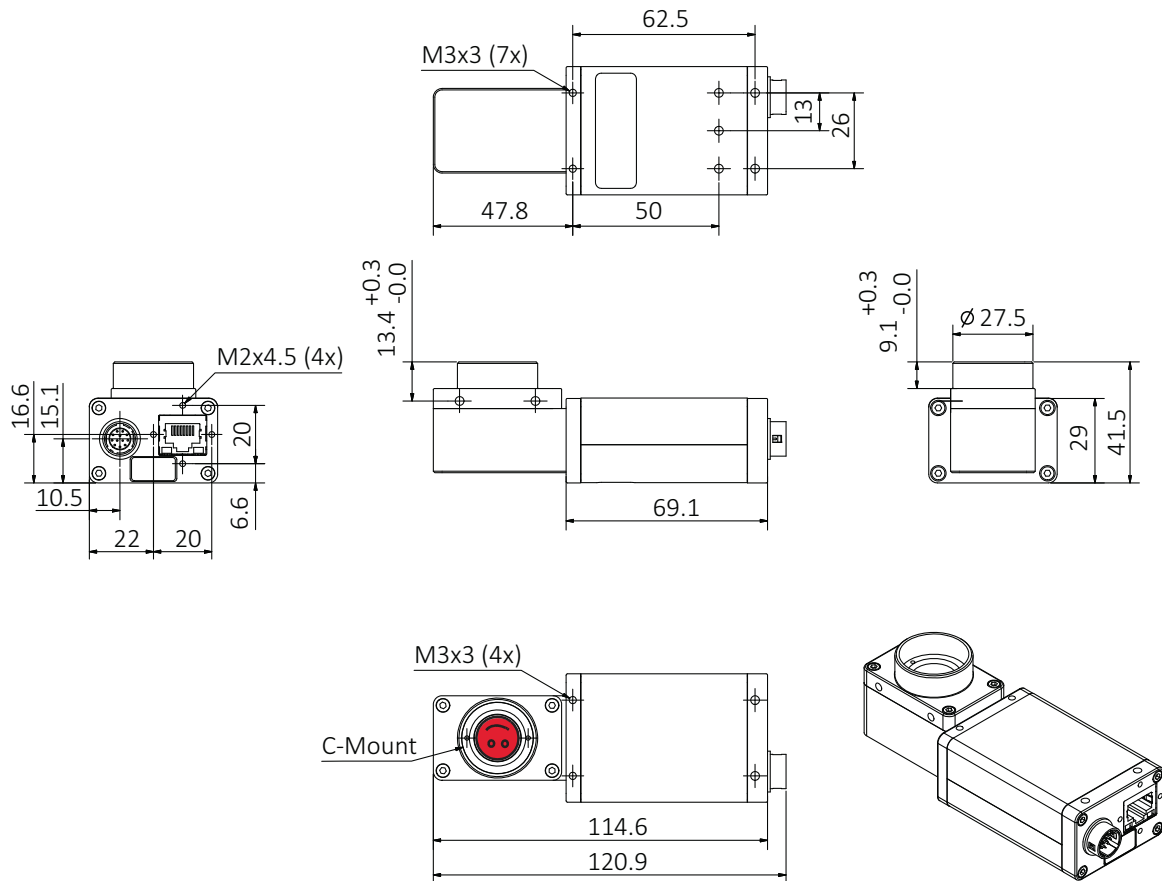


Figure 106: Manta W90 S90 housing dimensions (including connectors)

Manta W270 housing

This version has the sensor tilted 270 degrees clockwise, so that it views downwards.

Variant: Non-PoE

Mount: C-Mount

Serial number: up to serial number 503323258

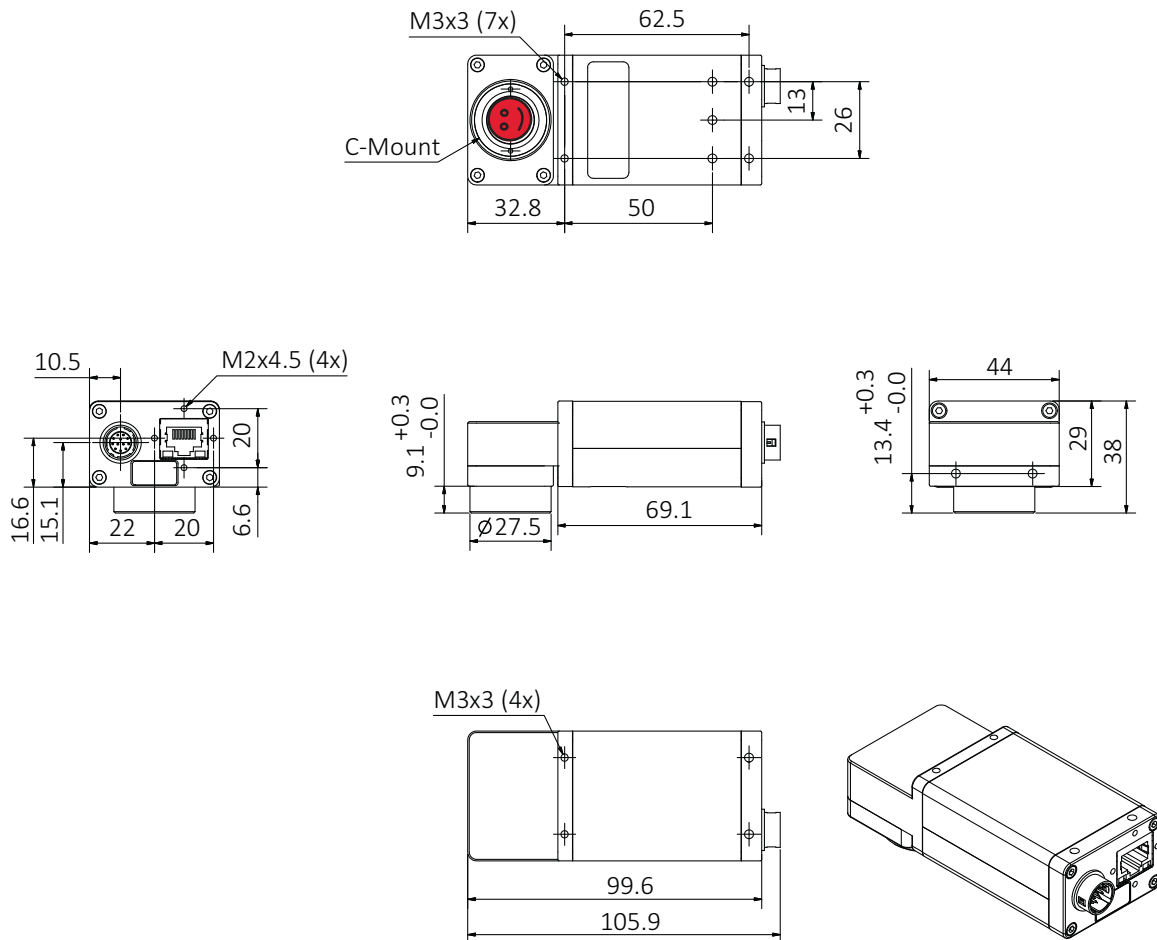


Figure 107: Manta W270 housing dimensions (including connectors)

Manta W270 S90 housing

This version has the sensor tilted 270 degrees clockwise, so that it views downwards. The sensor is also rotated 90 degrees clockwise.

Variant: Non-PoE

Mount: C-Mount

Serial number: up to serial number 503323258

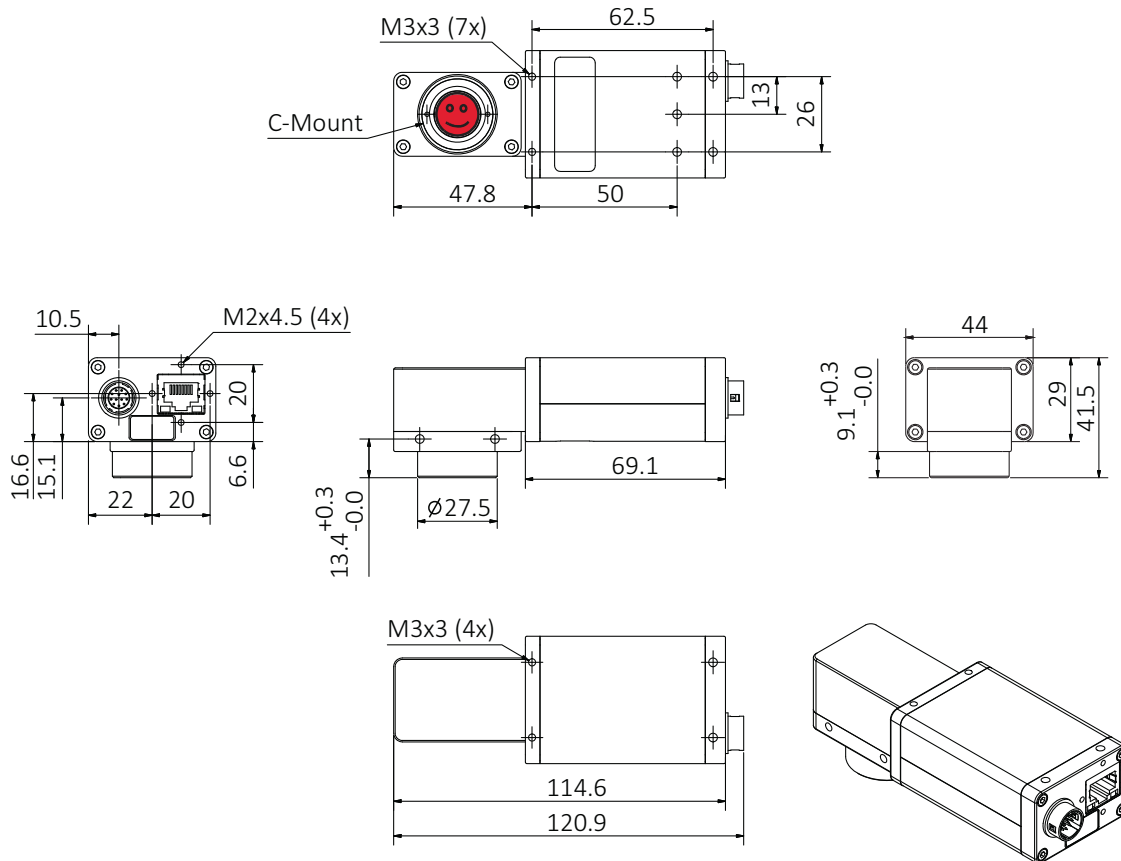


Figure 108: Manta W270 S90 housing dimensions (including connectors)

Manta board level

Variant: Non-PoE

Serial number: up to serial number 503323258

13-pole I/O connector:

Molex PicoBlade
 Vertical Header 53047-1310
 Receptacle Housing 51021-1300
 Crimp Terminal 13 x 50079-8000

1 = GND (for RS232, Ext PWR)	7 = GND (for Inputs)
2 = Ext PWR input	8 = Rx D 9 = Tx D
3 = PMW-Out	10 = Power Input (for Output ports)
4 = Input 1	11 = Input 2
5 = not used	12 = Output 2
6 = Output 1	13 = Chassis GND

Flex cable length:

FFC45 L = 56 mm K7500307
FFC45 L = 110 mm K7500318
FFC45 L = 152 mm 1817
FFC45 L = 200 mm 1824

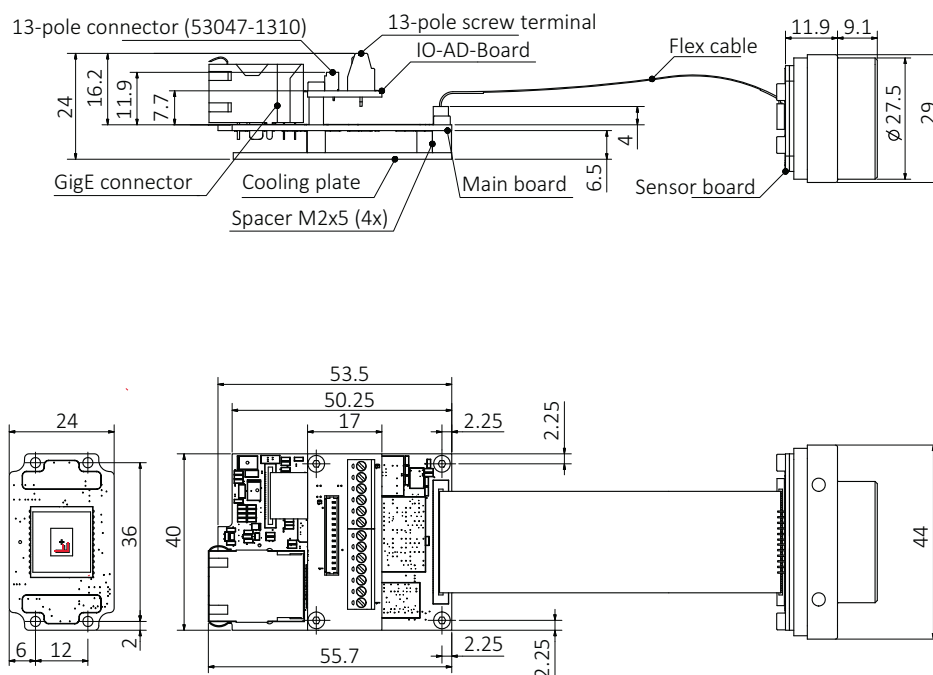


Figure 109: Manta board level (non-PoE) dimensions



Dimensional mount adjustment

Dimensional mount adjustment cannot be done by the customer. If you need any mount related adjustments, please contact [Allied Vision](#).

Back panel

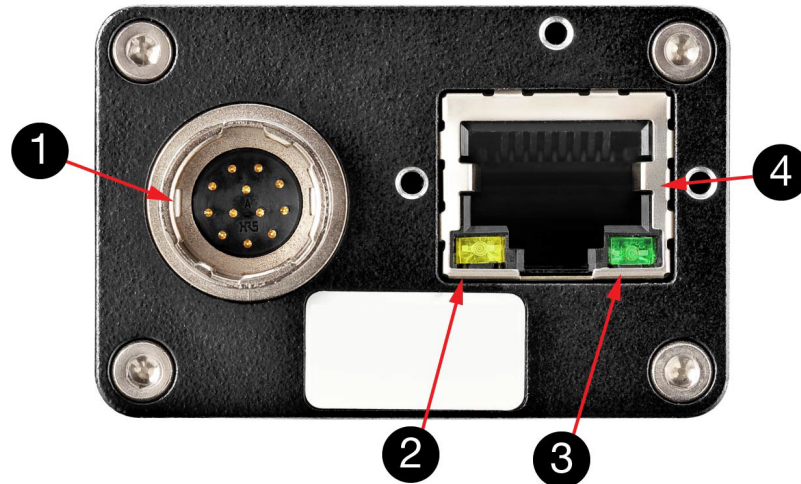


Figure 110: Rear view of non-PoE Manta cameras up to serial number 503323258

1	Hirose I/O port
2	LED 1
3	LED 2
4	Gigabit Ethernet interface

Status LEDs

The tables below describe the status LEDs of non-PoE Manta cameras up to serial number 503323258.

LED 1 color	Status
Solid orange	Ethernet link with 1 Gb/s established
Flashing orange	Ethernet activity with 1 Gb/s

Table 69: Status LED 1 of non-PoE Manta cameras up to serial number 503323258

LED 2 color	Status
Solid green	Ethernet link with 100 Mb/s established
Flashing green	Ethernet activity with 100 Mb/s

Table 70: Status LED 2 of non-PoE Manta cameras up to serial number 503323258

Camera I/O connector pin assignment

The following table lists and describes the camera I/O pin assignment for non-PoE Manta cameras up to serial number 503323258.



Manta G-145B/C-30fps and G-201B/C-30fps non-PoE cameras up to serial number 503323258 behave like PoE cameras.

Pin	Signal	Direction	Level	Description
1	Camera GND	In	GND for RS-232 and external power	Ground for camera power supply and RS-232
2	Camera Power	In	8 – 30 VDC	Camera power supply
3	Video Type Auto Iris Out	Out	---	Video type auto iris (≥ FW 1.44)
4	In 1	In	$U_{in}(high) = 2.5 - 6.0\text{ V}$ $U_{in}(low) = 0 - 0.8\text{ V}$ up to 36 V with external resistor of 3.3 k Ω in series	Opto-isolated input 1 (SyncIn1)
5	---	---	---	---
6	Out 1	Out	Open emitter, maximum 20 mA	Opto-isolated output 1 (SyncOut1)
7	Isolated In GND	In/Out	---	Isolated input signal ground
8	RxD RS232	In	RS-232	Terminal receive data
9	TxD RS232	Out	RS-232	Terminal transmit data
10	Isolated Out Power	In	Common VCC for outputs maximum 30 VDC	Power input for opto-isolated outputs
11	In 2	In	$U_{in}(high) = 2.5 - 6.0\text{ V}$ $U_{in}(low) = 0 - 0.8\text{ V}$	Opto-isolated input 2 (SyncIn2)
12	Out 2	Out	Open emitter, maximum 20 mA	Opto-isolated output 2 (SyncOut2)

Table 71: Camera I/O connector pin assignment for non-PoE Manta cameras up to serial number 503323258

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