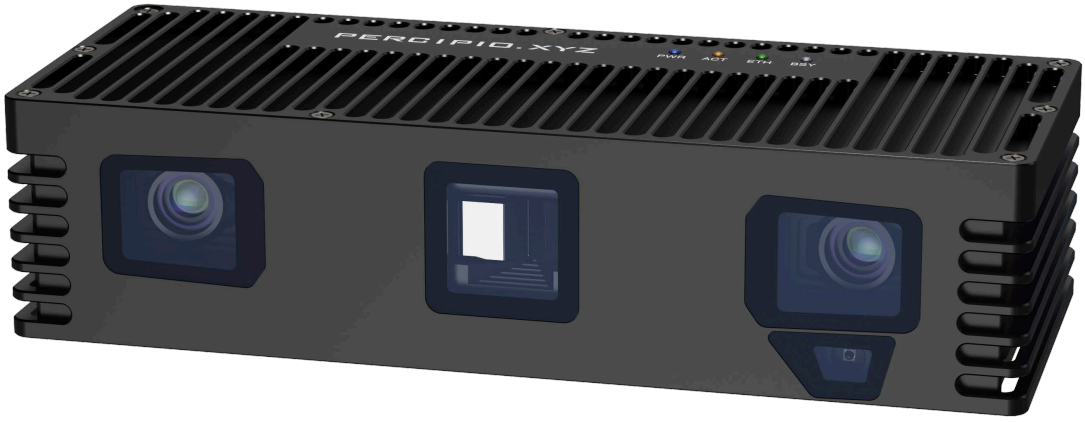
VMD02-4070 Specifications



Version：Draft

Date：2025.03.06

Technical Specifications

Parameters	Value
3D Sensing Technology	Active stereo + structured light with fringe patterns
Laser wavelength	635 nm
Latency of image acquisition[1]	Quality mode: approx. 2697 ms Standard mode: approx. 2337 ms Fast mode: approx. 1633 ms
Frame rate[2] @ resolution（Depth）	**Quality mode** : 0.63 fps @ 2048 x 1536 0.63 fps @ 1024 x 768 0.63 fps @ 512 x 384 **Standard mode** : 0.76 fps @ 2048 x 1536 0.76 fps @ 1024 x 768 0.76 fps @ 512 x 384 **Fast mode**: 1.40 fps @ 2048 x 1536 1.40 fps @ 1024 x 768 1.40 fps @ 512 x 384
Output data	Depth, grayscale, point cloud images

> [1] Latency of image acquisition: the latency time between the host computer sending the software trigger signal and receiving depth images (with a resolution of 2048 x 1536) from the camera when the camera is working in software trigger mode with default SGBM parameters. This latency is measured under three different PreSetMode settings: Quality, Standard, and Fast. This latency will change with SGBM parameters and the exposure time.
>
> [2] Frame rate of depth images: the number of depth images that the host computer receives every second from the camera when the camera is working in free acquisition mode with default SGBM parameters. This frame rate is measured under three different PreSetMode settings: Quality, Standard, and Fast. This frame rate of depth images will change with SGBM parameters and the exposure time.

Measurement Performance

Measurement Range & FOV

Parameters	Value
Working distance	400 mm ~ 700 mm (change with SGBM parameters)
Near field of view	352 mm x 307 mm @ 400 mm (H/V ≈ 47°/42°)
Field of view @ optimal working distance	469 mm x 375 mm @ 490 mm (H/V ≈ 51°/41°)
Far field of view	675 mm x 532 mm @ 700 mm (H/V ≈ 51°/42°)
XY point-to-point distance[1] @ optimal working distance	0.25 mm @ 490 mm

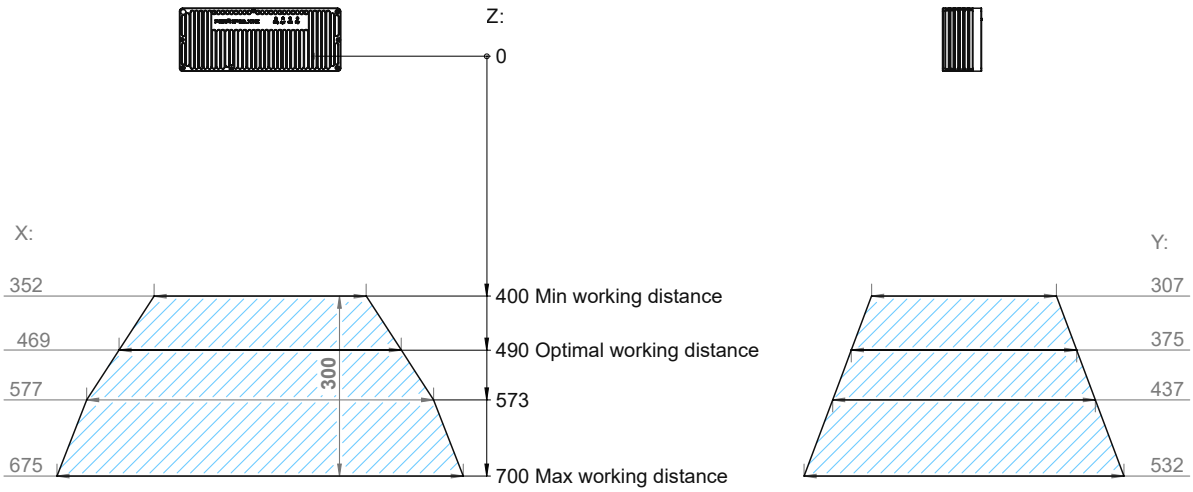


Figure 1 FOV (unit: mm)

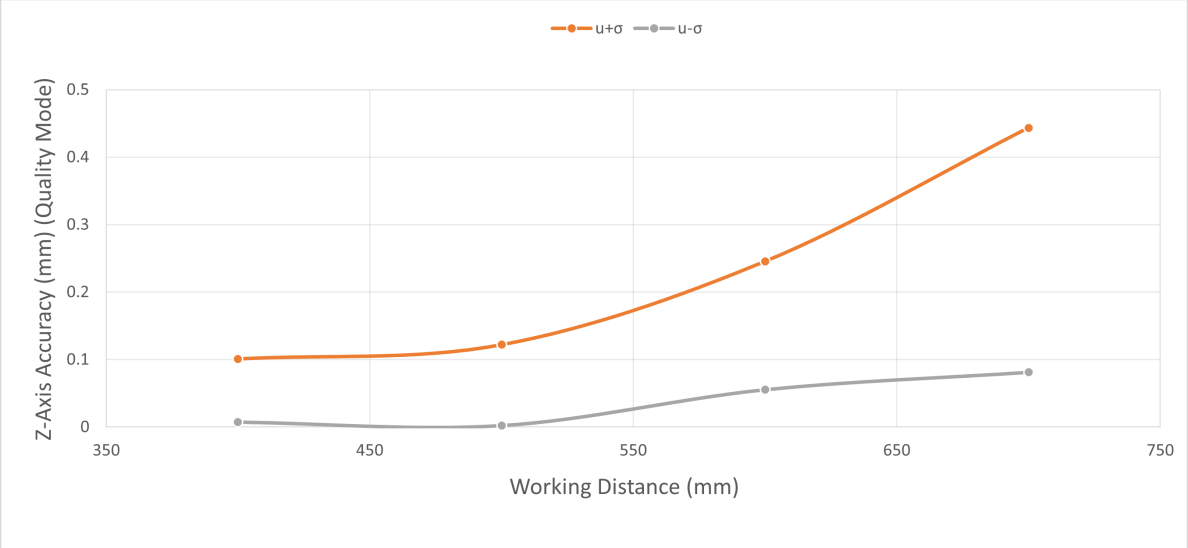
> [1] XY point-to-point distance: the actual physical distance corresponding to the spacing between pixels in the depth image (unit: mm).

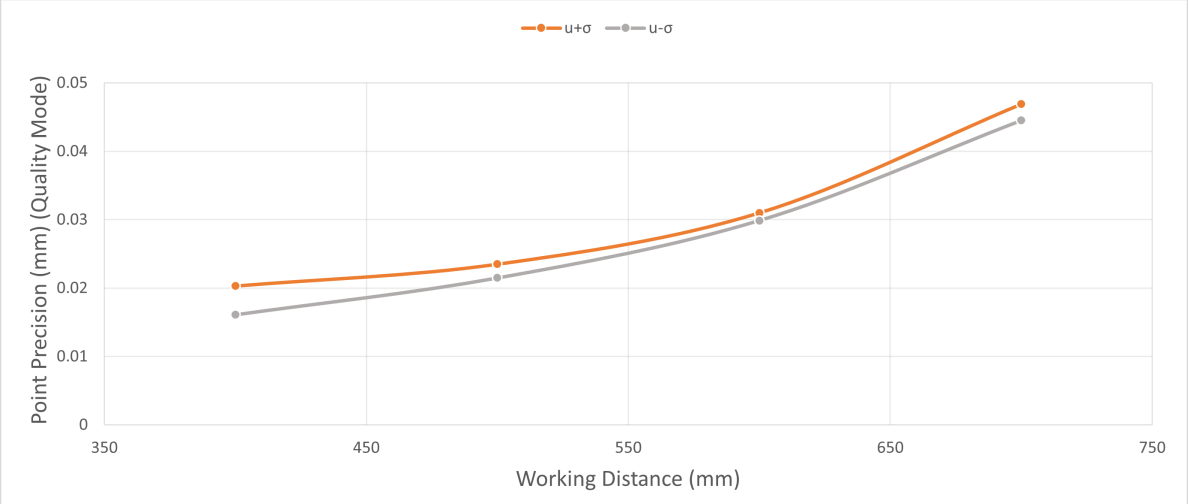
Performance Evaluation Metrics

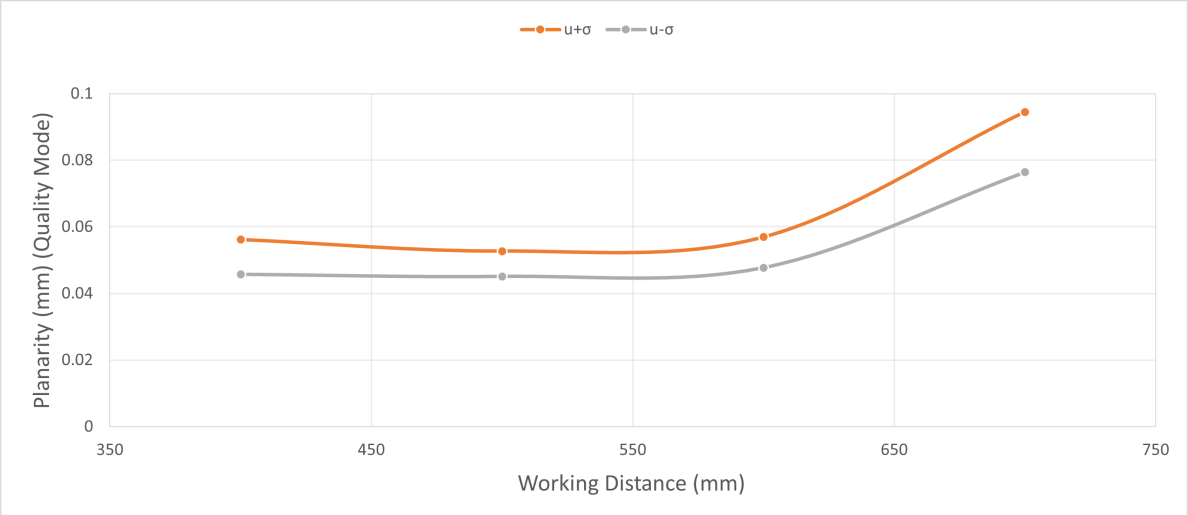
Parameters	Descriptions
Z-axis accuracy	The average deviation between measured distance values and true distance values in the Z-direction.
Point precision	The degree of oscillation of depth values for all pixel points in the central region of the field of view over time.
Planarity	The dispersion of all pixel points in the central ROI relative to the desired plane.

> The line charts below illustrates the measured distribution ranges of Z-Axis Accuracy, Point Precision, and Planarity under three different PreSetMode settings: Quality, Standard, and Fast. The horizontal axis represents the distance values, with the unit in millimeters (mm).

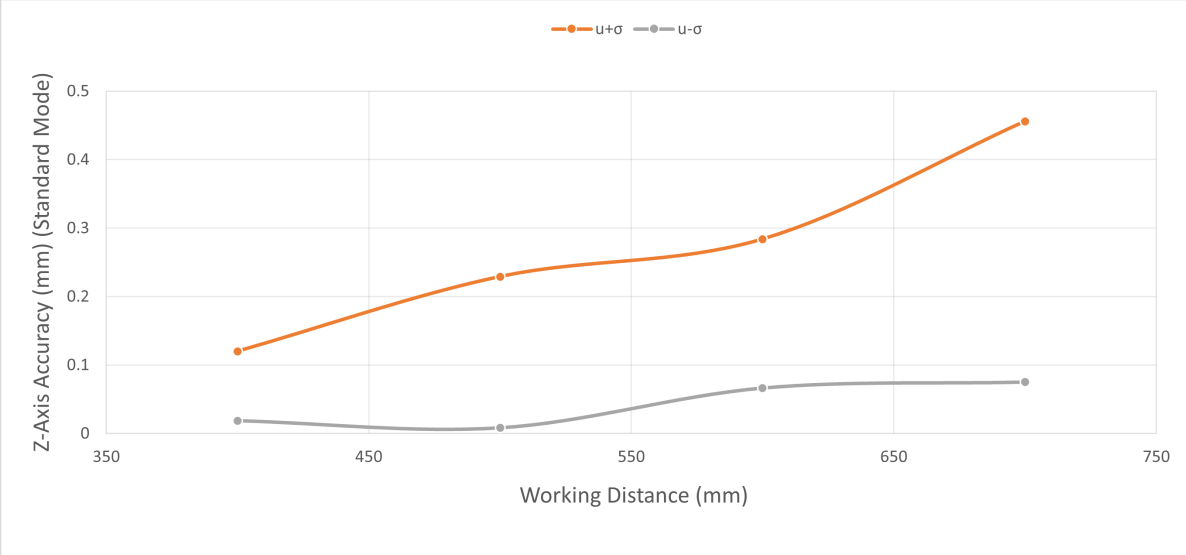
Quality Mode

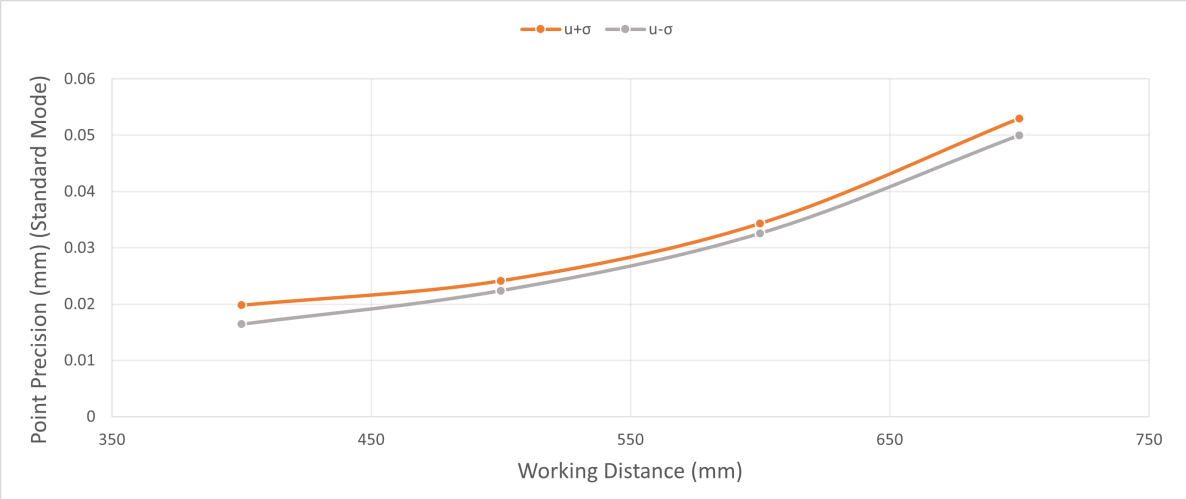


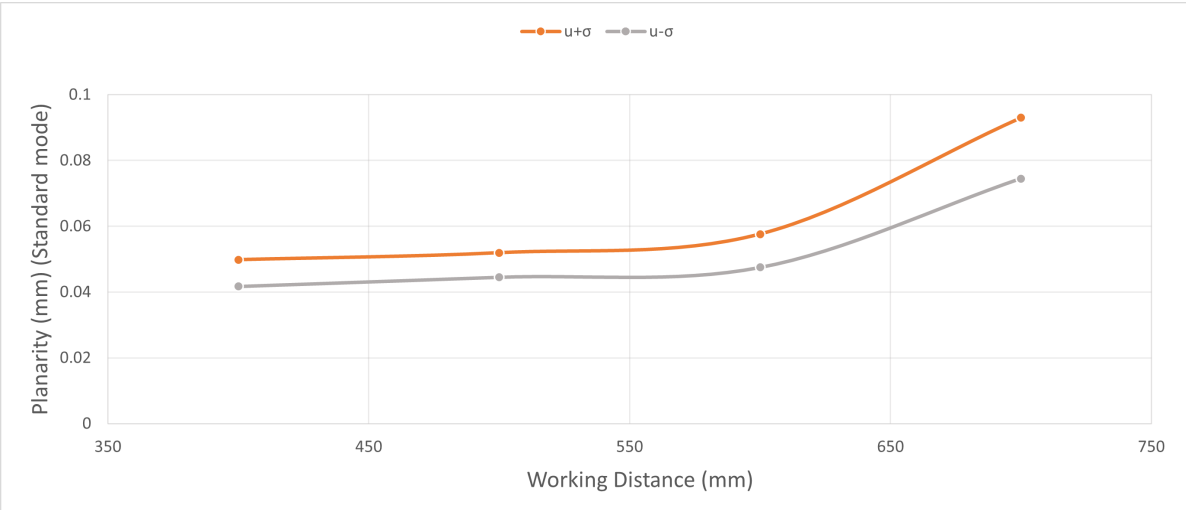




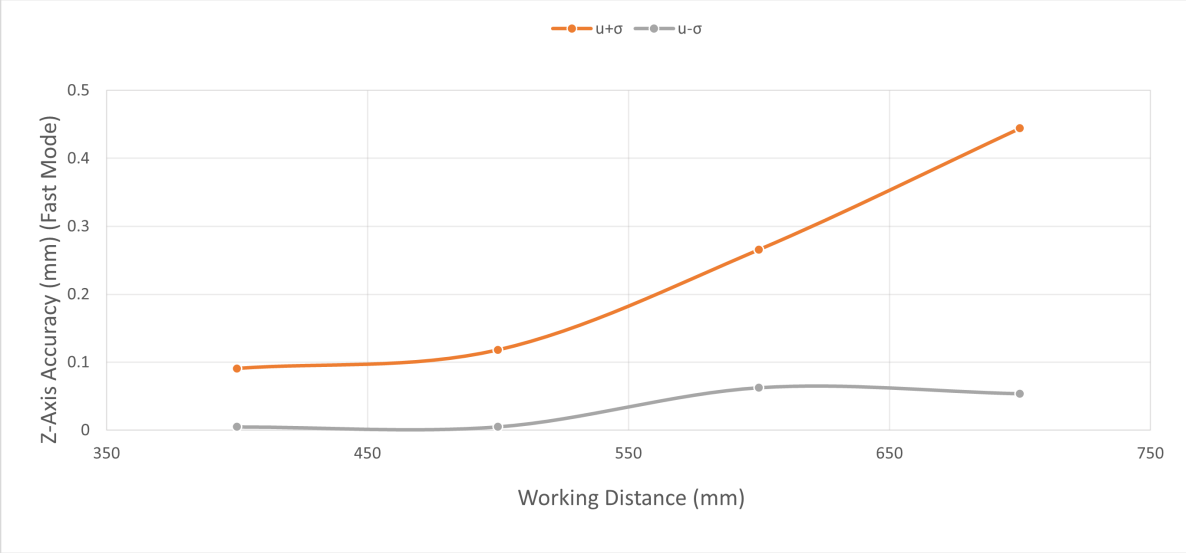
Standard Mode

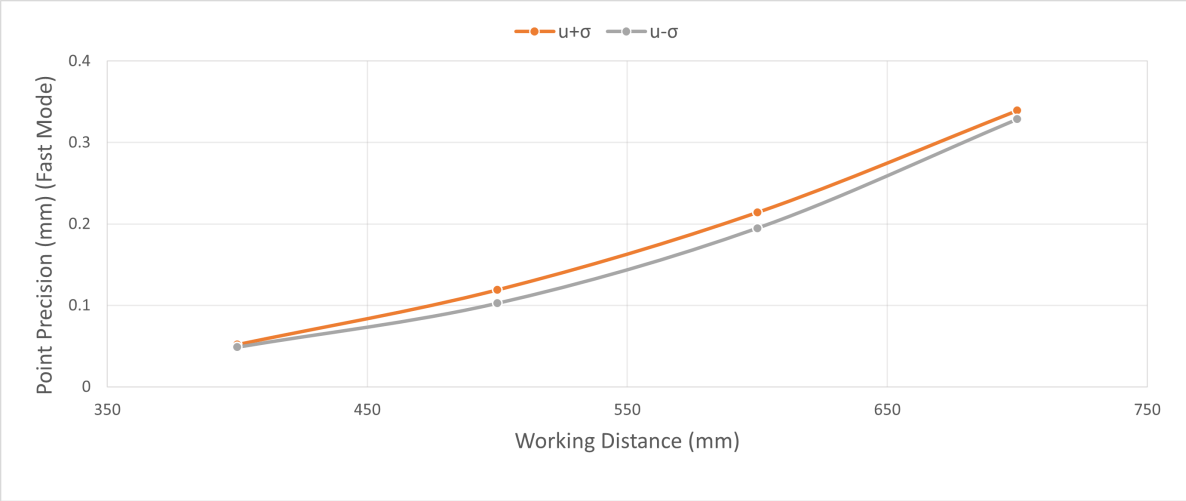


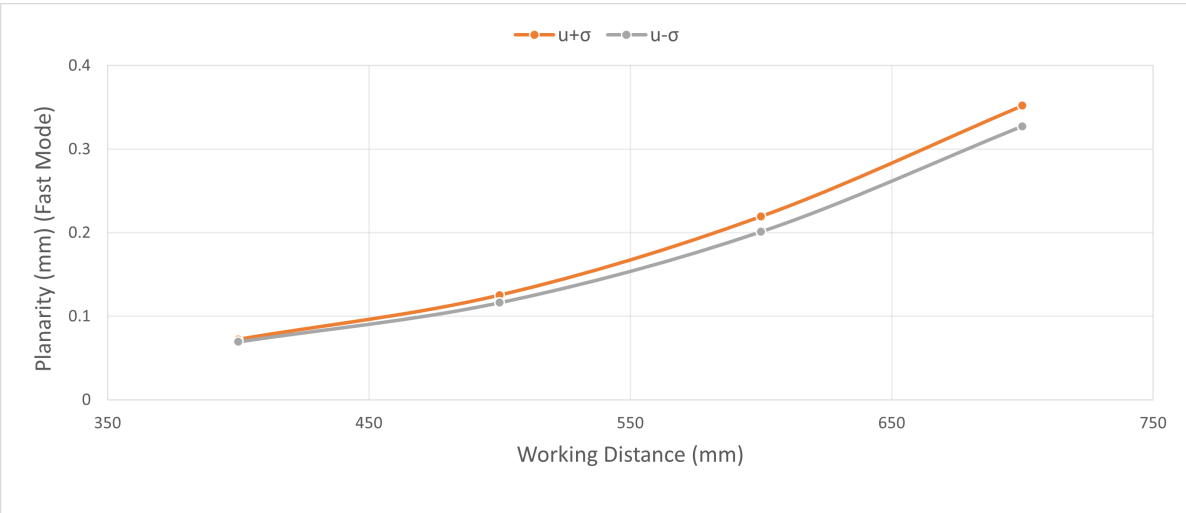




Fast Mode


u+σ
u-σ
Z-Axis Accuracy (mm) (Fast Mode)
0.5
0.4
0.3
0.2
0.1
0
350
450
550
650
750
Working Distance (mm)


u+σ
u-σ
Point Precision (mm) (Fast Mode)
0.4
0.3
0.2
0.1
0
350
450
550
650
750
Working Distance (mm)


u+σ
u-σ
Planarity (mm) (Fast Mode)
0.4
0.3
0.2
0.1
0
350
450
550
650
750
Working Distance (mm)

Software Specifications

Parameters	Value
Host computer OS	Linux/Windows/ROS
SDK	Percipio Camport SDK; Supported programming language: C, C++, C#, Python See Percipio Technical documentation for more SDK tutorials.
SGBM parameters	The SGBM parameters will influence the measurement performance of the camera. For the settings of SGBM parameters, see API Guide - SGBM feature.

Hardware Specifications

Parameters	Value
Dimension（including interfaces）	268 mm x 105 mm x 65 mm
Weight	2152 g
Power & trigger connector	M12 A-Code, 8-pin, male connector See Power & Trigger Connector for its pinout.
Data connector	M12 X-Code, 8-pin, female connector Gigabit Ethernet
Power supply	DC 24 V ~ 48 V
Hardware trigger	Supports 2 channels of hardware trigger input/output: Input/output 1: rising-edge trigger Input/output 2: falling-edge trigger
Power consumption	≤ 24 W
Housing material	Aluminum alloy
Ingress protection	IP65
Thermal dissipation	Passive[1]
Temperature	Recommended operating temperature: 22 ℃ ~ 25 ℃ Operating temperature: 0 ℃ ~ 40 ℃ Storage：-10 ℃ ~ 55 ℃
Laser Safety	Class 3R (IEC 60825-1:2014)

> [1] The camera housing has a heat dissipation function. To ensure the normal operation of the device, please do not cover the housing to avoid overheating. Additionally, for optimal performance, it is recommended to ensure good ventilation and air convection in the surrounding environment during installation. Choose a metal mounting surface with good thermal conductivity to contact with the camera, and try to place the device in an environment with minimal temperature fluctuations.

Power & Trigger Connector

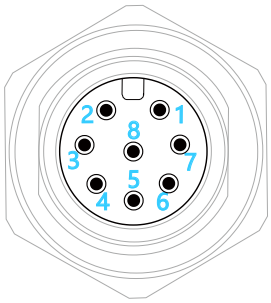


Figure 2 Pinout of the power & trigger connector

Pin No.	Name	Description
1	TRIG_OUT 1	Trigger output signal 1 [rising-edge]
2	CAM_POWER	DC 24 V ~ 48 V power (camera)
3	CAM_GND	GND (camera)
4	TRIG_POWER	DC 11.4V~25.2V power (trigger circuit)
5	TRIG_GND	GND (trigger circuit)
6	TRIG_IN 2	Trigger input signal 2 [falling-edge]
7	TRIG_IN 1	Trigger input signal 1 [rising-edge]
8	TRIG_OUT 2	Trigger output signal 2 [falling-edge]

Trigger Circuit Schematic Diagram

The camera supports two channels of hardware trigger input/output, specially rising-edge and falling-edge triggers. The trigger circuit schematic diagrams are shown as follows (The resistance at point A is 10kΩ).

For details about hardware connection, see Percipio Technical documentation.

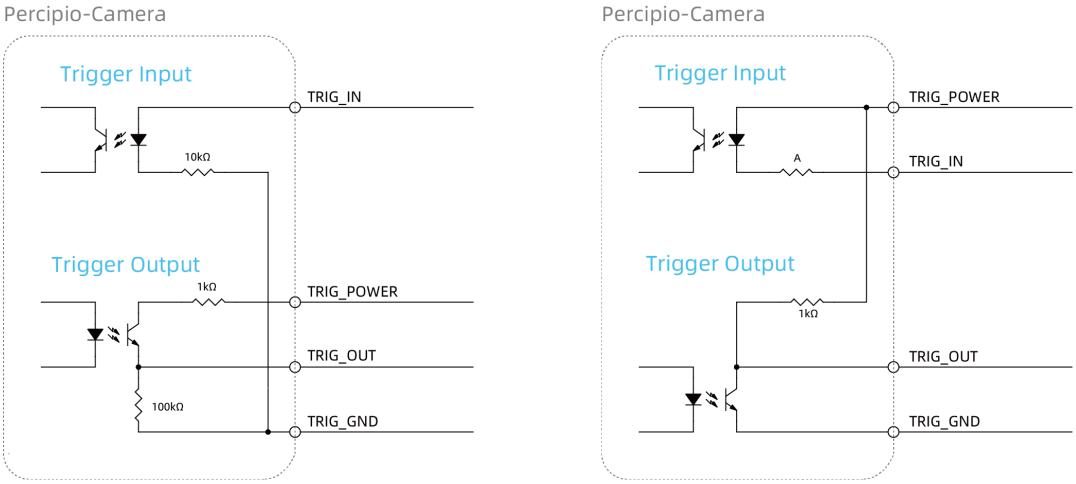


Figure 3 Left: Trigger circuit schematic diagram (rising edge); Right: Trigger circuit schematic diagram (falling-edge)

Mechanical Dimensions

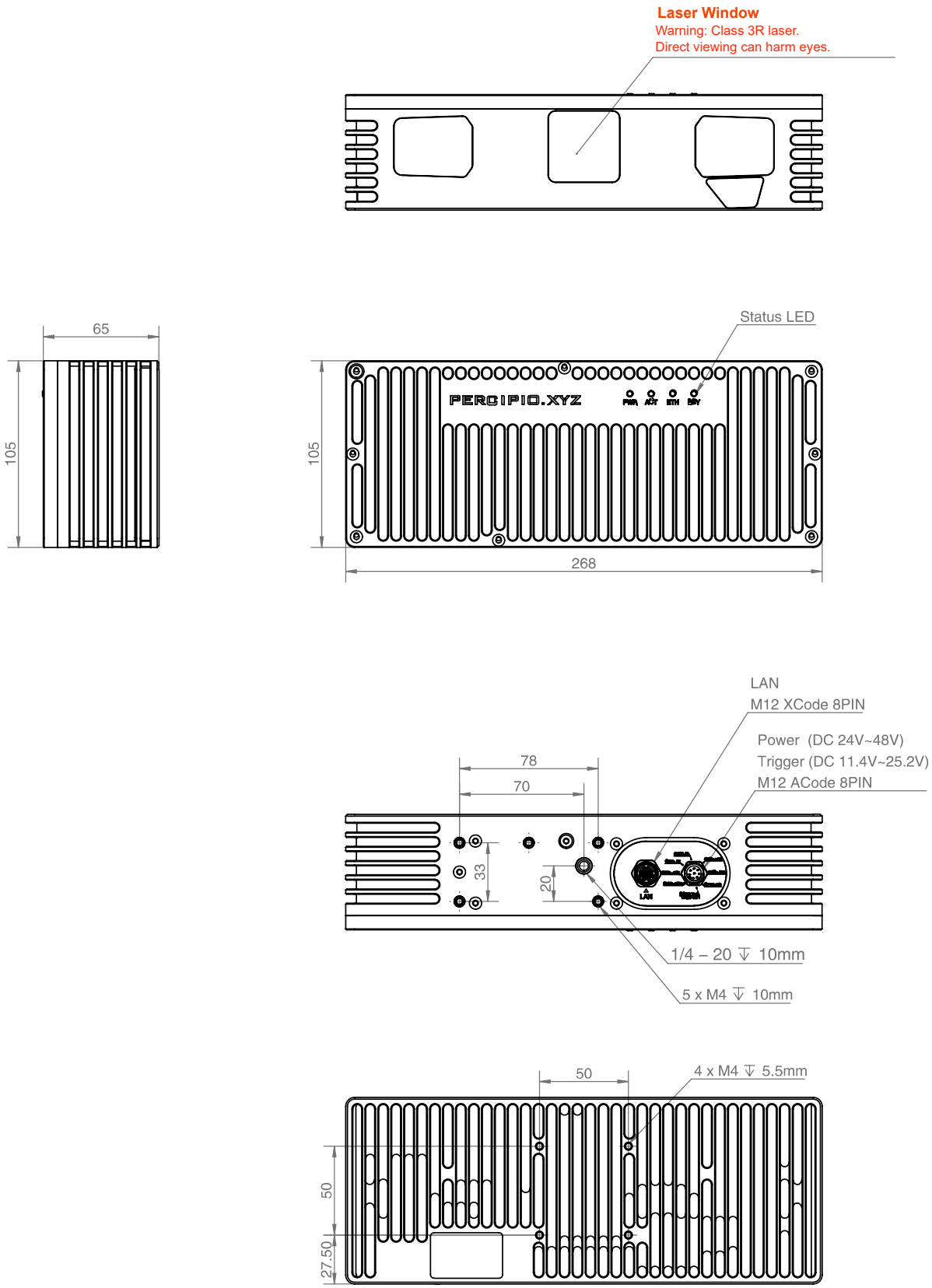


Figure 4 VMD02-4070 mechanical dimensions (unit: mm)

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