Mech-Eye Industrial 3D Camera

Range XL-GL

Technical Specifications V1.0



MECH MIND

Physical Specifications

Model	Range XL-GL
Dimensions	744 × 95 × 95 mm
Weight	3.1 kg
Baseline	650 mm
Light source (laser)[1]	Blue laser (450 nm, Class 3R)
Light source (fill light)	Blue LED (455 nm, RG2)
2D image color	Monochrome
Operating temperature	-10–50˚C
Operating humidity	0–85%RH, non-condensing
Storage temperature	-20–60˚C
Communication interface	Gigabit Ethernet
Input	24 VDC, 3.75 A
Power	Idle: 20 W Average: 25 W Peak: 36 W (including instantaneous power consumption of fill light)
IP rating[2]	IP65
Cooling	Active (air-cooled)
Noise[3]	< 50 dB
Flatness tolerance for mounting surface[4]	± 0.05 mm
Vibration resistance[5]	Sinusoidal vibration along the X-, Y-, and Z-axes, 10–57 Hz, 1.5 mm peak-to-peak value, 1 octave/min, 3 hours per axis
Shock resistance[6]	Half sine shock pulses along the positive and negative directions of the X-, Y-, and Z-axes, 15 g, 6 ms, 4000 shocks per direction, 24000 shocks in total

[1] The product is a Class 3R laser product. Optical radiation hazard exists. Do not stare into the beam. Wear laser safety glasses suitable for 450 nm wavelength during use to prevent accidental eye exposure to the laser.
[2] Test implemented with reference to IEC 60529. 6: dust-tight; 5: waterproof.
[3] Test implemented with reference to ISO 7779:1999.
[4] The flatness of the surface used to mount the camera should satisfy this requirement.
[5] Test implemented with reference to IEC 60068-2-6.
[6] Test implemented with reference to IEC 60068-2-27.

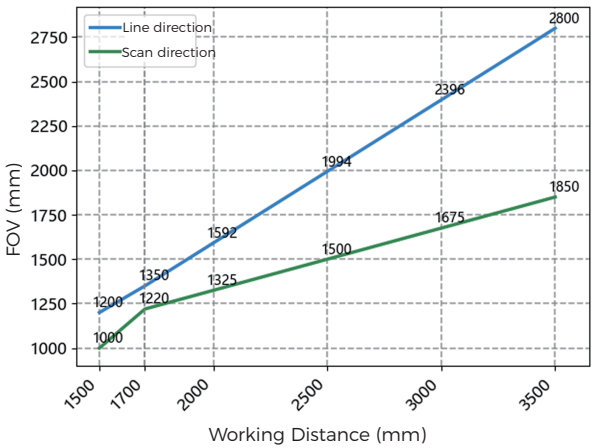
Performance Specifications

Working distance	1500–3500 mm	2000–5000 mm
Recommended working distance	1500–3500 mm	2000–4000 mm
Object focal distance[1]	2500 mm	3500 mm
FOV (near)	1200 × 1000 mm @ 1.5 m	1600 × 1300 mm @ 2.0 m
FOV (mid)	2000 × 1500 mm @ 2.5 m	2800 × 2100 mm @ 3.5 m
FOV (far)	2800 × 1850 mm @ 3.5 m	4000 × 2750 mm @ 5.0 m
Laser line resolution	2448	
Depth map resolution	2448 × 2048	
RGB image resolution	2448 × 2048	
Typical capture time[2]	1–3 s (valid values: 0.2–10 s)	
Recommended warm-up time[2],[3]	30 min	
Point Z-value repeatability (1σ)[2],[4]	0.14 mm @ 3 m	
Measurement accuracy (VDI/VDE)[2],[5]	< 1.3 mm @ 1.5–3.5 m	< 1.3 mm @ 2–5 m
Measurement accuracy (ISO 10360-13)[2],[6]	< 3.0 mm @ SMV	
Ambient light immunity[7]	≥ 600000 Lux	

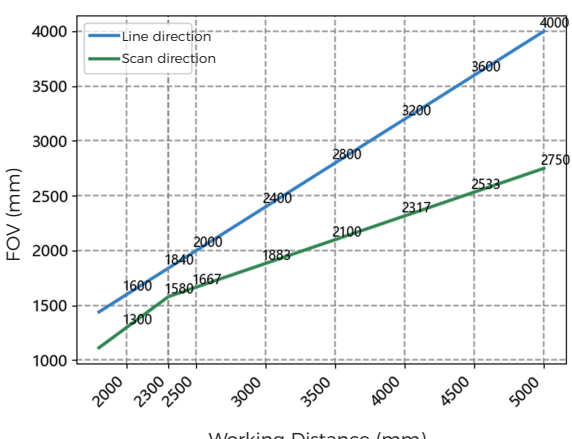
[1] The object focal distance of the 2D camera inside the product.
[2] Unless otherwise specified, this test was conducted under the standard test conditions listed on page 10.
[3] The recommended warm-up time required to guarantee data accuracy to the listed values. For the warm-up method, refer to the user manual (The data acquisition interval is 5 s). Please adjust the warm-up time based on the actual data acquisition interval, ambient temperature, and heat-dissipation conditions.
[4] The standard deviation of the 100 measured depth values of each point on the target object was calculated, and then the median of all the standard deviations was taken. The target object was a white 95% alumina ceramic plate with a rough surface. The Point Cloud Processing parameters were set to "Off".
[5] Test implemented with reference to VDI/VDE 2634 Part 2.
[6] Test implemented with reference to ISO 10360-13:2021.
[7] The camera's ambient light immunity is affected by the target material: it can reach at least 100000 Lux when capturing reflective metal objects (such as reflective copper discs or reflective brake discs), and at least 600000 Lux when capturing diffuse-reflection objects.

FOV

Object focal distance: 2500 mm

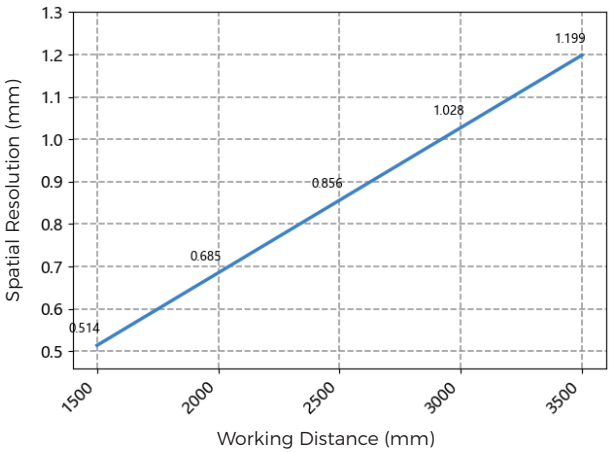


Object focal distance: 3500 mm

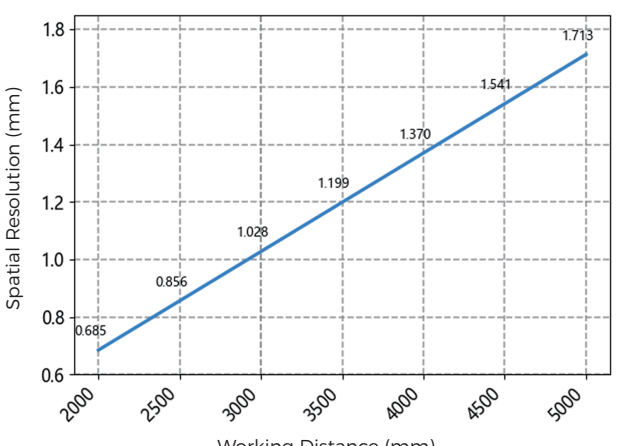


Spatial Resolution

Object focal distance: 2500 mm

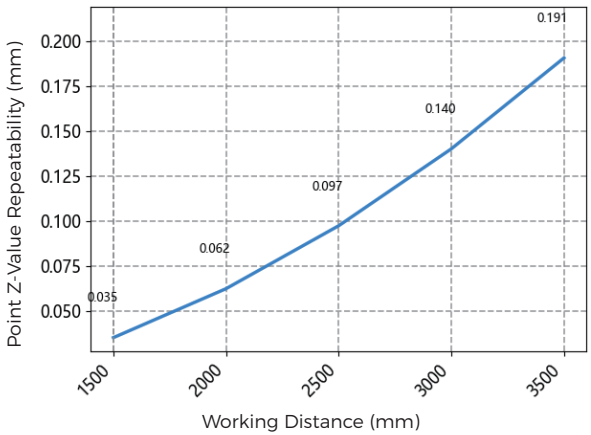


Object focal distance: 3500 mm

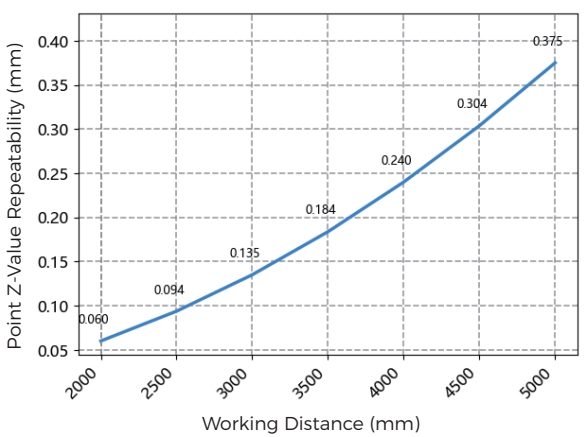


Point Z-Value Repeatability

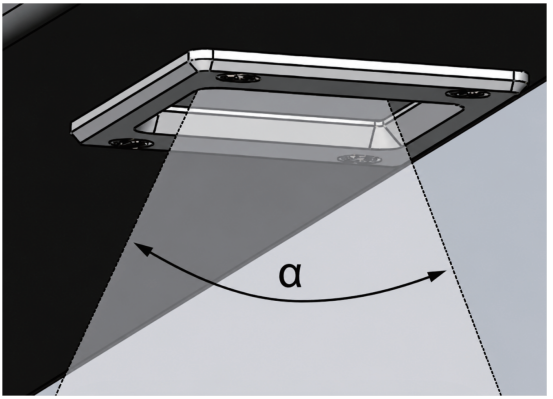
Object focal distance: 2500 mm



Object focal distance: 3500 mm



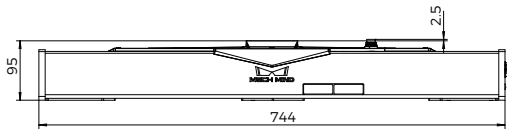
Beam Divergence

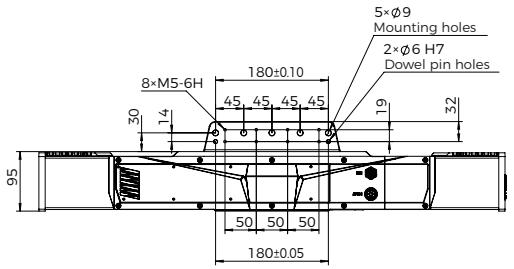


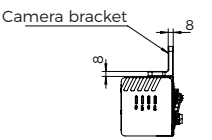
Model	Beam divergence (α)	Tolerance
Range XL-GL	47.5°	± 2.2°

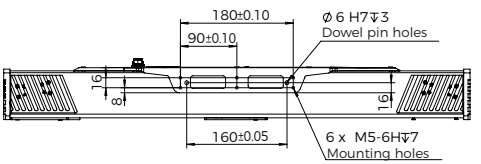
Dimensions

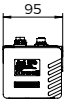
Unit: mm











Certifications

Laser Product Safety

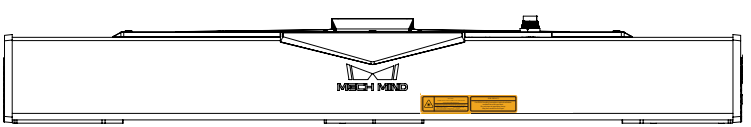
The laser classification is implemented based on IEC 60825-1:2014 and EN 60825-1:2014+A11:2021 in accordance with the requirements of Laser Notice No. 56 of the FDA (CDRH).

Model	Wavelength	Maximum average output power	Laser class
Range XL-GL	450 nm	< 1.8 mW	Class 3R

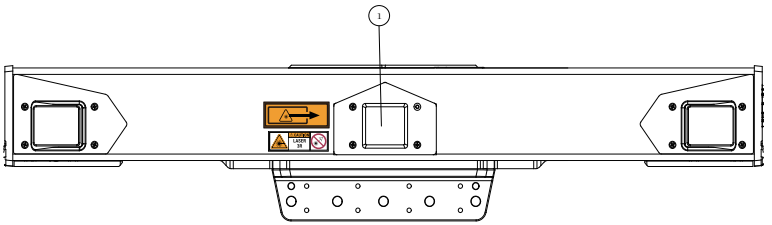
Warning Label



Warning Label Attachment



Aperture Location



No.	Name	Function
①	Aperture	Emits optical radiation.

CE

Hereby [Mech-Mind Robotics Technologies Co., Ltd.] declares that [Range XL-GL] is in compliance with the Electromagnetic Compatibility Directive 2014/30/EU.

The full text of the EU Declaration of Conformity is available at: https://downloads.mech-mind.com/?tab=tab-eu-dec

Standard Testing Conditions

<table>
<tr><td colspan="3">Working distance[1]</td><td colspan="2">2500 mm</td><td>3000 mm</td></tr>
<tr><td colspan="3">Ambient temperature</td><td colspan="3">15–30˚C</td></tr>
<tr><td colspan="3">Ambient humidity</td><td colspan="3">0–85%RH, non-condensing</td></tr>
<tr><td colspan="3">Ambient light</td><td colspan="3">200–1000 Lux</td></tr>
<tr><td rowspan="8">Camera parameters[2]</td><td colspan="2">3D Exposure Time</td><td colspan="3">100 µs</td></tr>
<tr><td colspan="2">2D Exposure Time</td><td colspan="3">20 ms</td></tr>
<tr><td colspan="2">Gain</td><td colspan="3">0 dB</td></tr>
<tr><td colspan="2">Enable 2D Illumination</td><td colspan="3">Enabled</td></tr>
<tr><td colspan="2">Scan Time</td><td colspan="3">3 s</td></tr>
<tr><td colspan="2">Laser Brightness</td><td colspan="3">100%</td></tr>
<tr><td rowspan="3">Point Cloud Processing</td><td>Surface Smoothing</td><td colspan="3">Disabled</td></tr>
<tr><td>Outlier Removal</td><td colspan="3">Disabled</td></tr>
<tr><td>Gap Filling</td><td colspan="3">Disabled</td></tr>
<tr><td colspan="3">Tested region[3]</td><td colspan="3">Length: 90% of FOV length
Width: 90% of FOV width
Position: center of FOV</td></tr>
<tr><td colspan="3">Resolution</td><td colspan="3">2448 × 2048</td></tr>
</table>

[1] For the object focal distance of 2500 mm, the working distance used in tests is 2500 mm. For the object focal distance of 3500 mm, the working distance used in tests is 3000 mm.

[2] Parameters not listed are set to their default values.

[3] Test data was obtained from this region.