

Zivid One⁺

Technical specification

Zivid One+ S (ZVD1P-S)

Zivid One+ M (ZVD1P-M)

Zivid One+ L (ZVD1P-L)

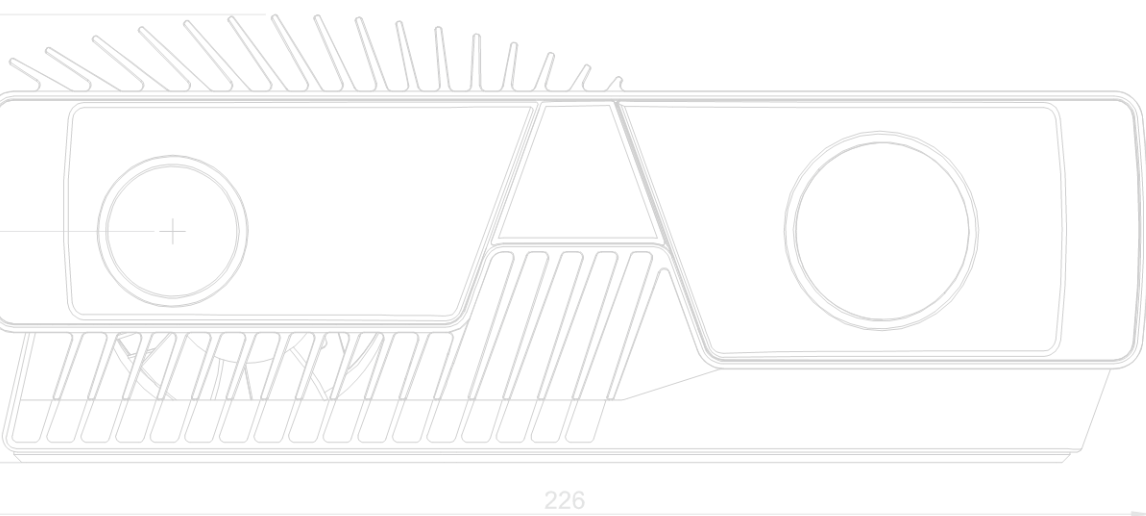


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General specifications

Model (Part number)	Zivid One+ S (ZVD1P-S)
	Zivid One+ M (ZVD1P-M)
	Zivid One+ L (ZVD1P-L)
3D technology	Structured light
Imaging	1920 x 1200 (2.3Mpixel)
	Native 3D Color
Point cloud output	3D (XYZ) + Color (RGB) + SNR
Exposure time (minimum per pattern projection)	6.500 ms
Aperture (A)	f/1.4 to f/32
Gain (G)	1x to 16x
Projector Brightness (B)	0.25x to 1.8x
	1x = 400 lumens
Calibration	Factory calibrated
Safety and EMC	CE
	CB
	EN60950
	FCC Class A
Typical capture time ¹	100 ms to 1 s

¹ From capture initialized until point cloud is ready to copy. Includes processing. Acquisition time can be shorter.

Operating distance and field of view

	S	M	L
Focus distance (mm)	500	1000	1800
Optimal working distance (mm)	350 to 700	700 to 1500	1200 to 2600
Recommended working distance (mm)	300 to 1000	500 to 2000	1200 to 3000
Field of view (mm)	164 x 132 at 300 350 x 220 at 500 621 x 439 at 1000	433 x 271 at 600 702 x 432 at 1000 1330 x 871 at 2000	843 x 530 at 1200 1252 x 783 at 1800 2069 x 1310 at 3000
Spatial resolution (mm)	0.18 at 500 4.00×10^{-4} per distance (z) in mm	0.37 at 1000 3.71×10^{-4} per distance (z) in mm	0.67 at 1800 3.67×10^{-4} per distance (z) in mm

Figure 1 - Zivid One+ S FOV

All values in degrees or mm.

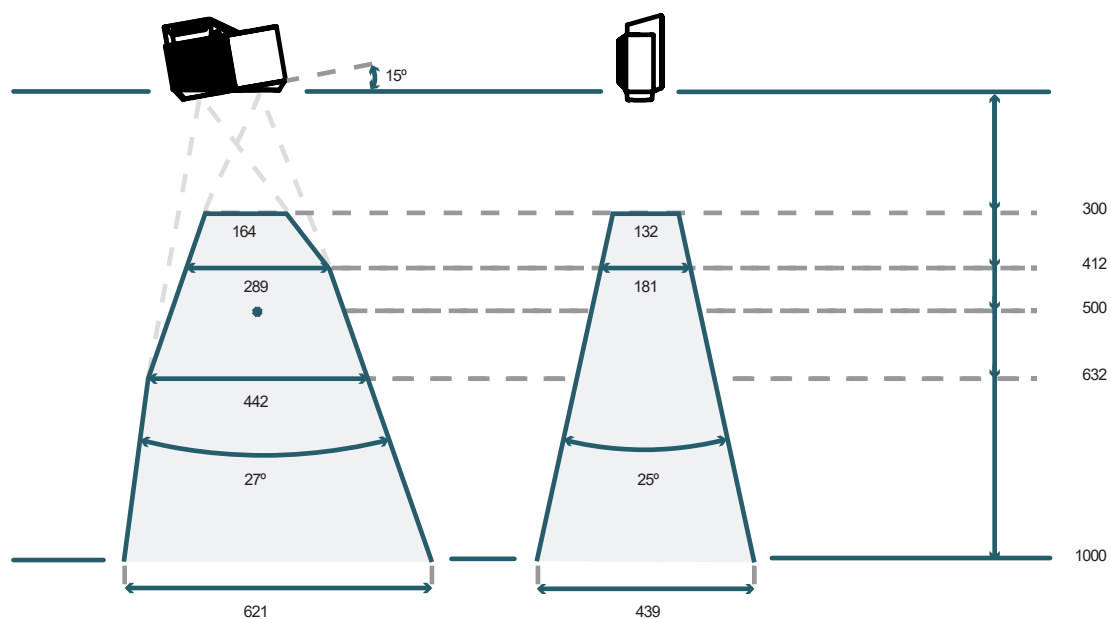


FIGURE 2 - ZIVID ONE+ S SPATIAL RESOLUTION VS. DISTANCE

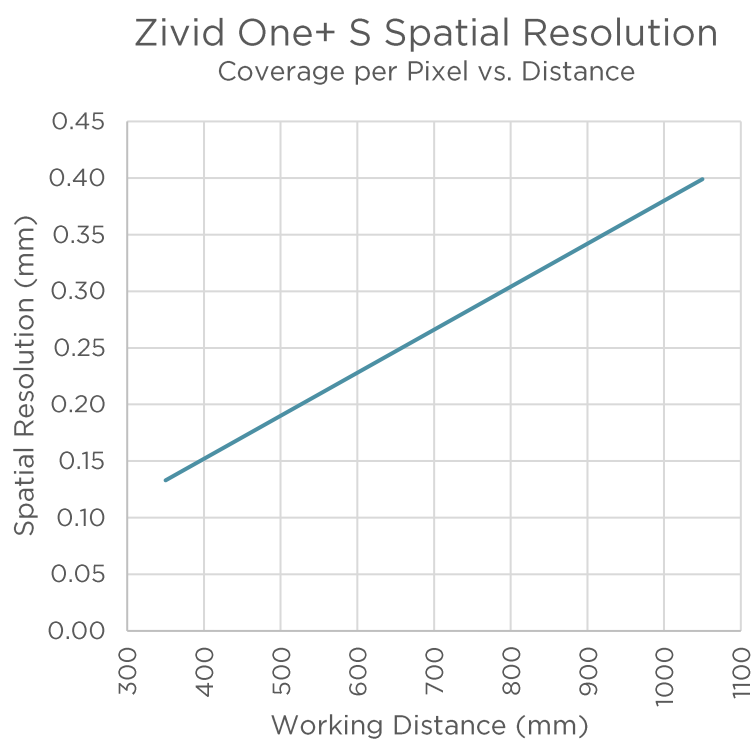


Figure 3 - Zivid One+ M FOV

All values in degrees or mm.

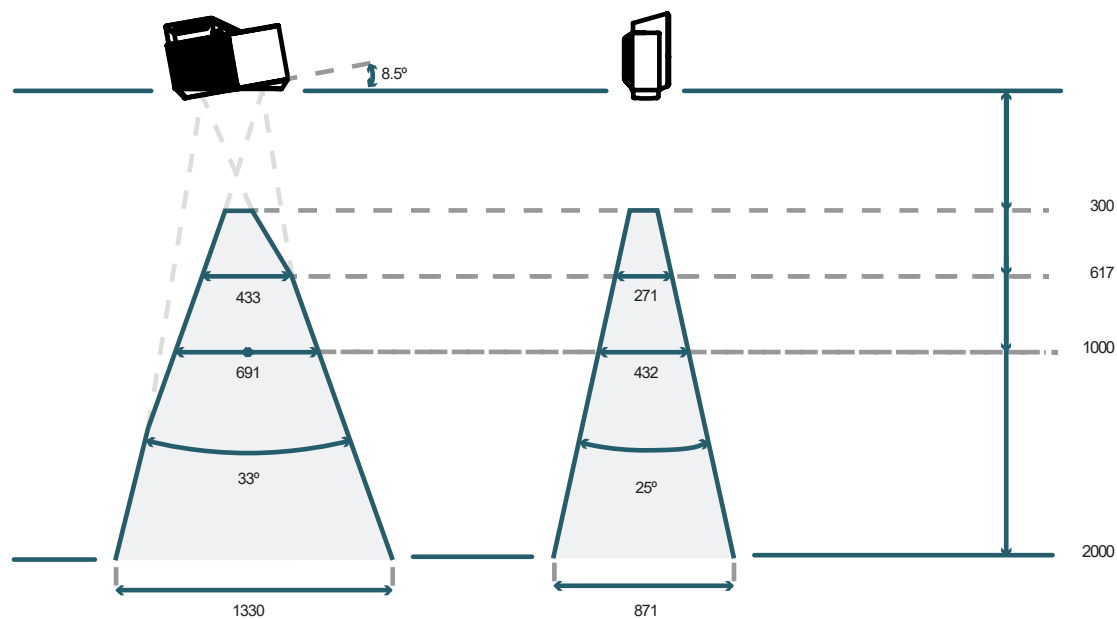


FIGURE 4 - ZIVID ONE+ M SPATIAL RESOLUTION VS. DISTANCE

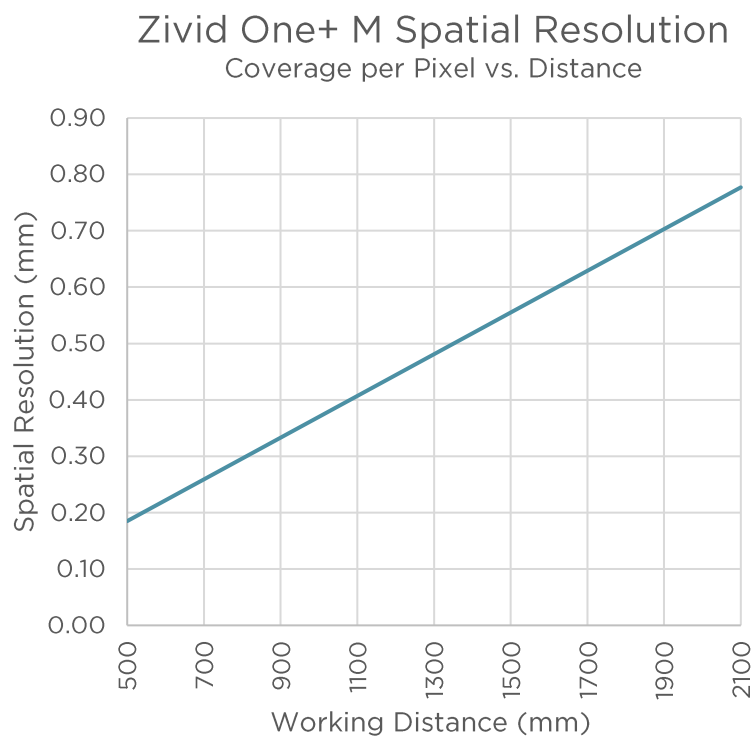


Figure 5 - Zivid One+ L FOV

All values in degrees or mm.

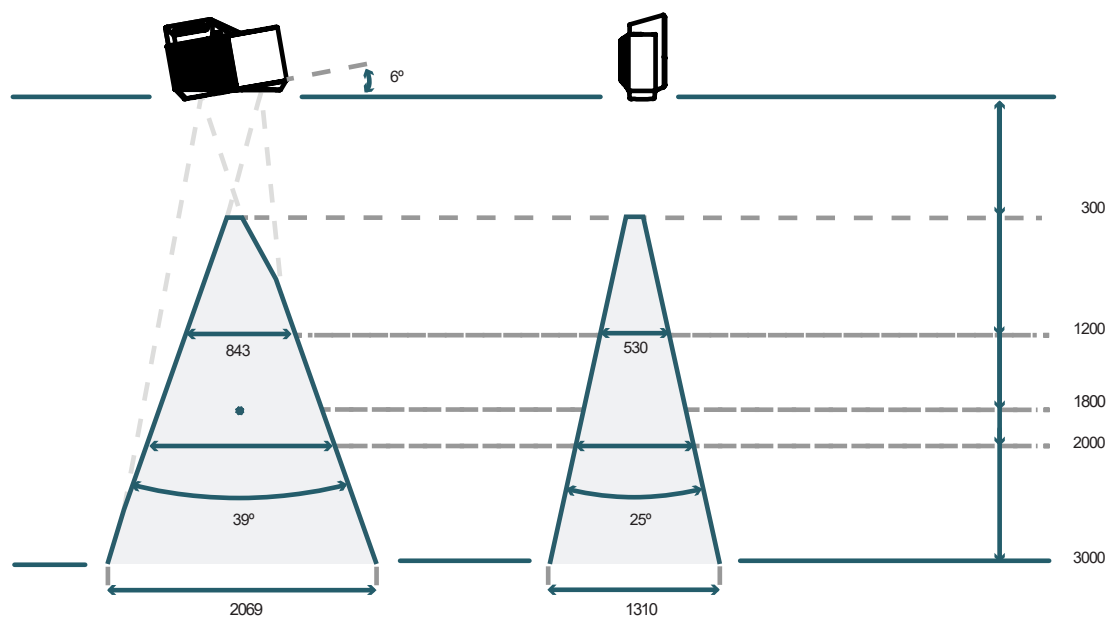
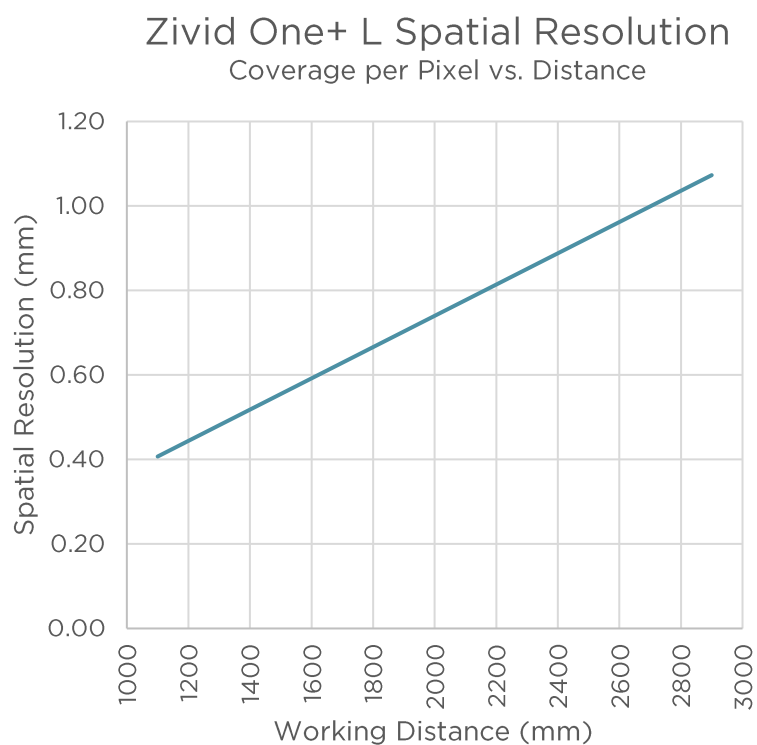


FIGURE 6 - ZIVID ONE+ L SPATIAL RESOLUTION VS. DISTANCE



Accuracy specifications

Common conditions

The following table outlines the conditions applied under test and to all specifications unless otherwise stated.

Parameter	Description	Typical
Working distance (D)	Focus distance	Zivid One+ S: 500 mm
		Zivid One+ M: 1000 mm
		Zivid One+ L: 1800 mm
	Optimal working distance	Zivid One+ S: 350 – 700 mm
		Zivid One+ M: 700 – 1500 mm
		Zivid One+ L: 1300 – 2600 mm
Ambient temperature (Ta)	Typical temperature	15 – 30 °C
	Full temperature range	10 – 40 °C
Ambient light (La)		0 lux
Aperture (A)		f/8.0 – f/2.0
Gain (G)		1.0x
Projector Brightness (B)		1 – 1.8 x
Capture time	Acquisition time used during measurement	> 85 ms
	Capture time used during measurement	> 200 ms
Duty Cycle	Capture-to-Idle time ratio	5 – 30 %
Other		81% center crop (90% × 90%)
		HDR = off
		10 min warm-up
		Applied in-field correction

Zivid One+ S Typical Specifications

Typical numbers are given at common conditions unless otherwise specified.

Property	Description	Typical
Warm-up time	Minimum recommended time needed for camera to stabilize from an idle state assuming capturing at a constant rate.	10 minutes
	Some trueness changes may be experienced during warm-up phase.	
Point precision	1 σ Euclidian distance variation for a point between consecutive measurements at focus distance, D. ²	25 μ m
Local Planarity Precision	1 σ Euclidian distance variation from a plane for a set of points within a smaller local region at focus distance, D. ²	40 μ m
Global Planarity Trueness	Average deviation from a plane in field of view at focus distance, D.	< 100 μ m
Dimension Trueness	70-percentile dimension error in field of view at focus distance, D, and typical temperature range.	< 0.15 %
	70-percentile dimension error in field of view within optimal working distance and typical temperature range.	< 0.20 %
	70-percentile dimension error in field of view within optimal working distance and full temperature range.	< 0.30 %

² Measured with Gaussian filter disabled.

FIGURE 7 - TYPICAL ZIVID ONE+ S POINT PRECISION VS. DISTANCE

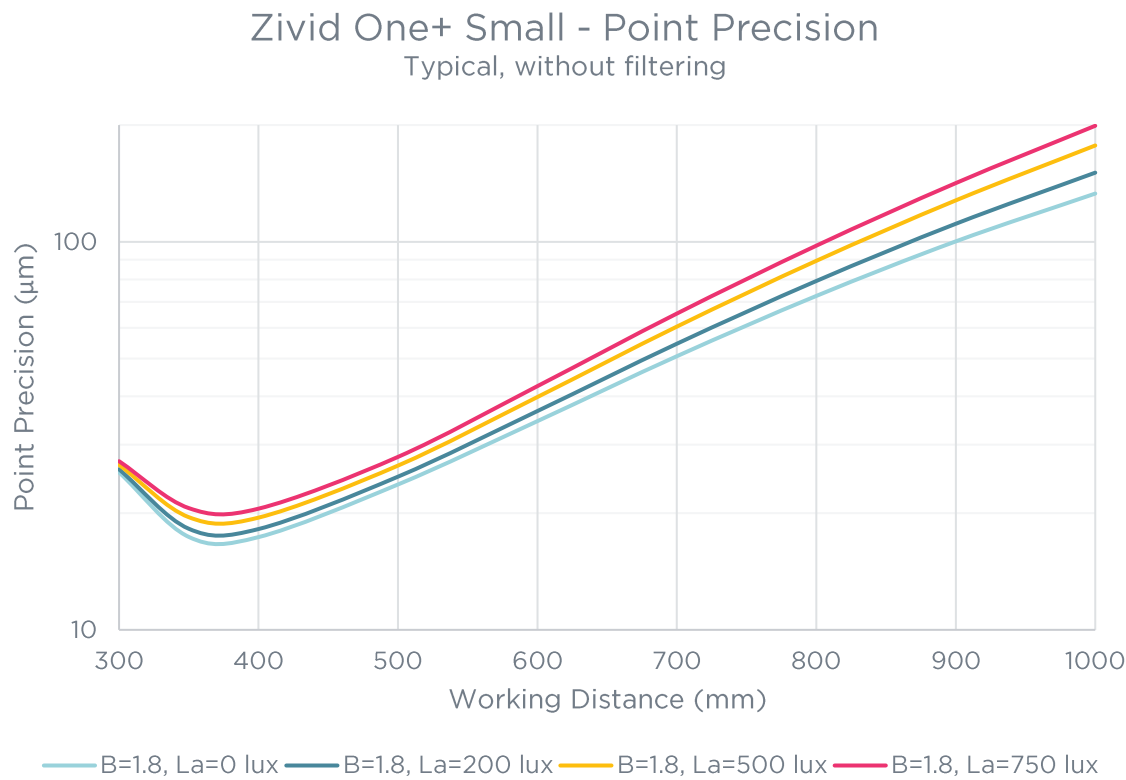


FIGURE 8 - TYPICAL ZIVID ONE+ S LOCAL PLANARITY PRECISION VS. DISTANCE

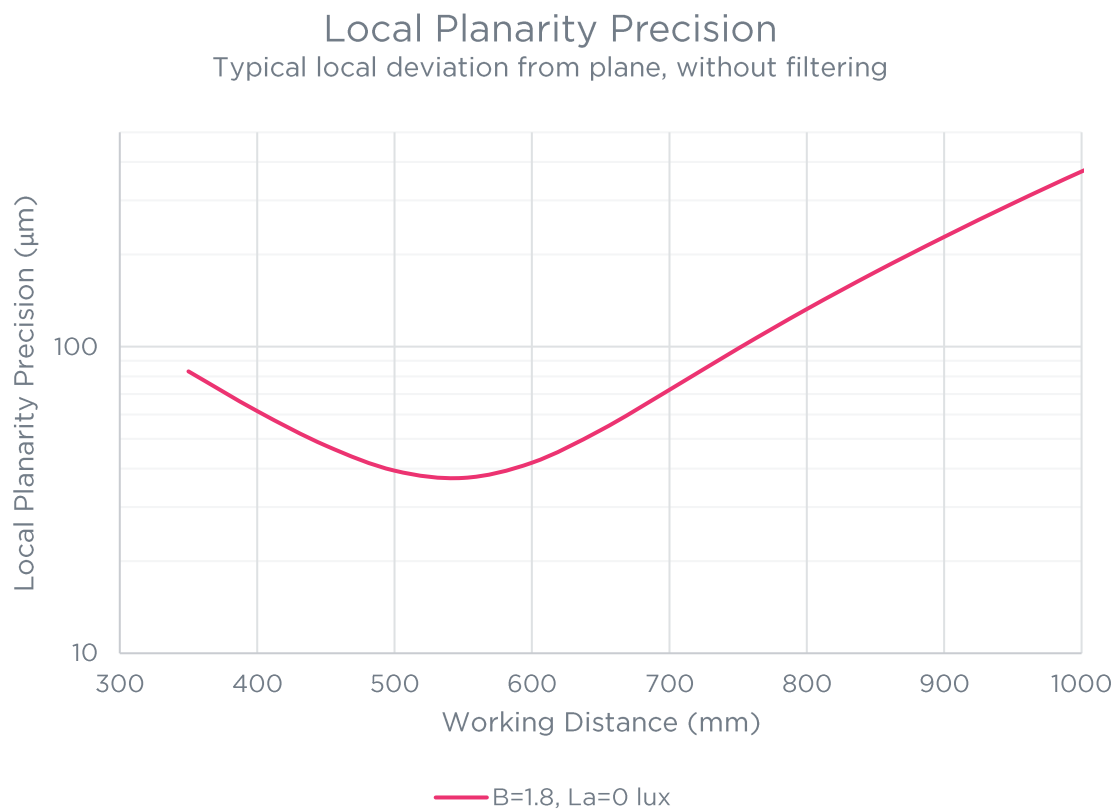


FIGURE 9 – TYPICAL ZIVID ONE+ S GLOBAL PLANARITY TRUENESS VS. DISTANCE

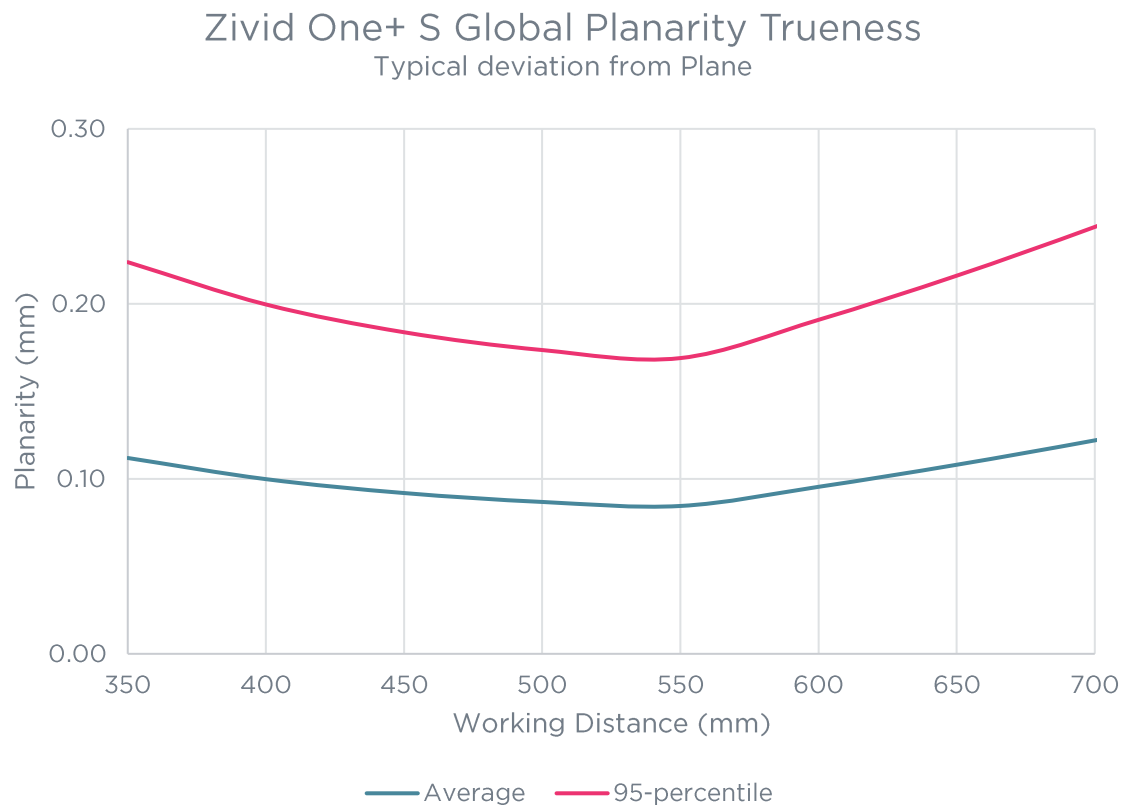
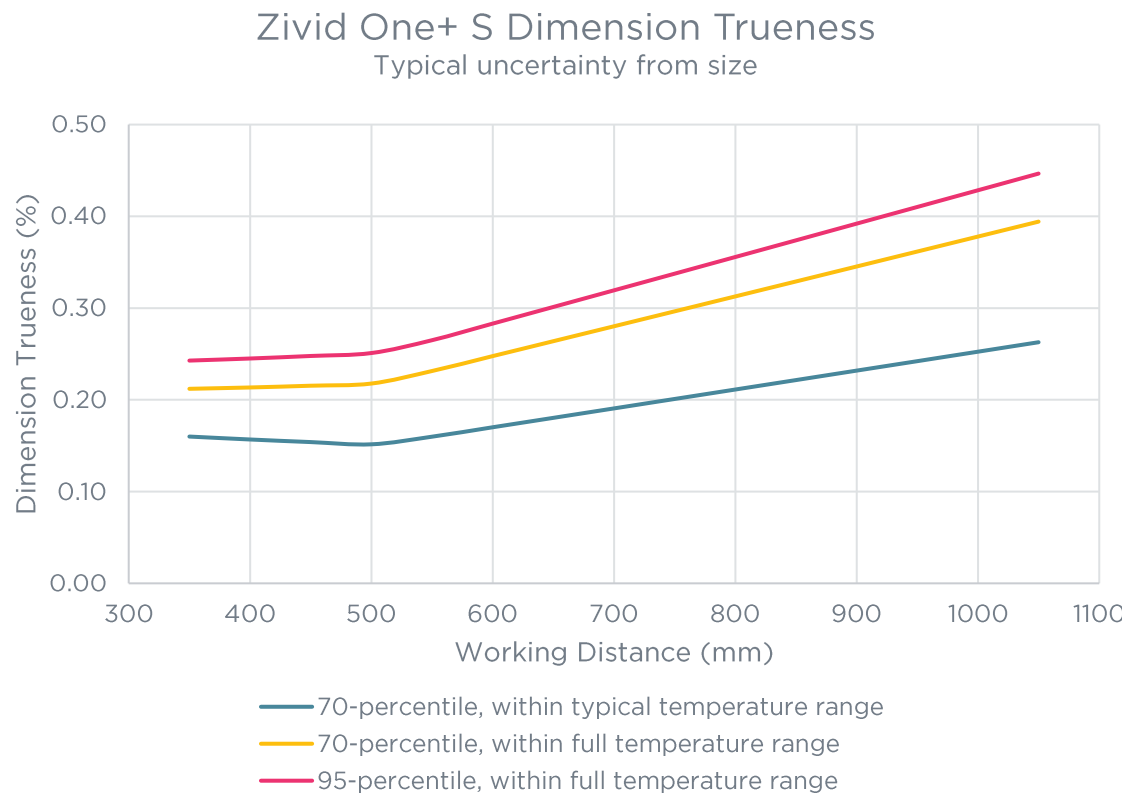


FIGURE 10 – TYPICAL ZIVID ONE+ S DIMENSION TRUENESS VS. DISTANCE



Zivid One+ M Typical Specifications

Typical numbers are given at common conditions unless otherwise specified.

Property	Description	Typical
Warm-up time	Minimum recommended time needed for camera to stabilize from an idle state assuming capturing at a constant rate.	10 minutes
	Some trueness changes may be experienced during warm-up phase.	
Point precision	1 σ Euclidian distance variation for a point between consecutive measurements at focus distance, D. ³	110 μ m
Local Planarity Precision	1 σ Euclidian distance variation from a plane for a set of points within a smaller local region at focus distance, D. ³	190 μ m
Global Planarity Trueness	Average deviation from a plane in field of view at focus distance, D.	< 100 μ m
Dimension Trueness	70-percentile dimension error in field of view at focus distance, D, and typical temperature range.	< 0.30 %
	70-percentile dimension error in field of view within optimal working distance and typical temperature range.	< 0.40 %
	70-percentile dimension error in field of view within optimal working distance and full temperature range.	< 0.50 %

³ Measured with Gaussian filter disabled.

FIGURE 11 – TYPICAL ZIVID ONE+ M POINT PRECISION VS. DISTANCE

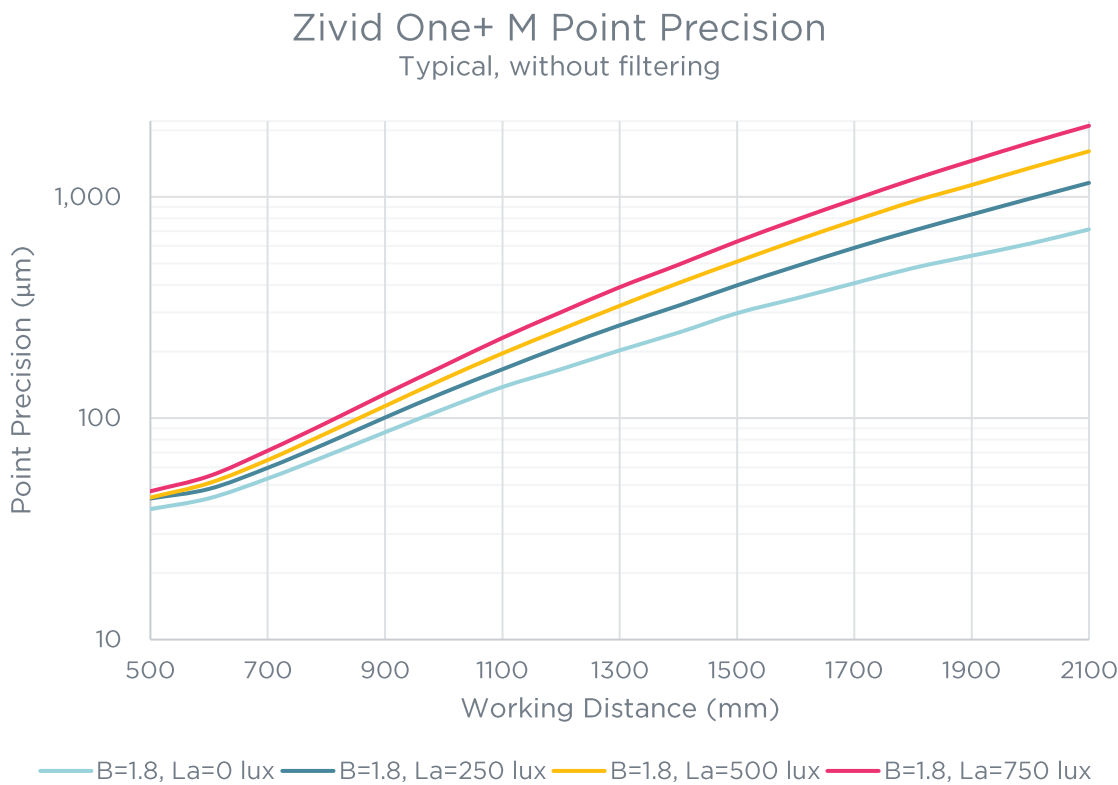


FIGURE 12 – TYPICAL ZIVID ONE+ M LOCAL PLANARITY PRECISION VS. DISTANCE

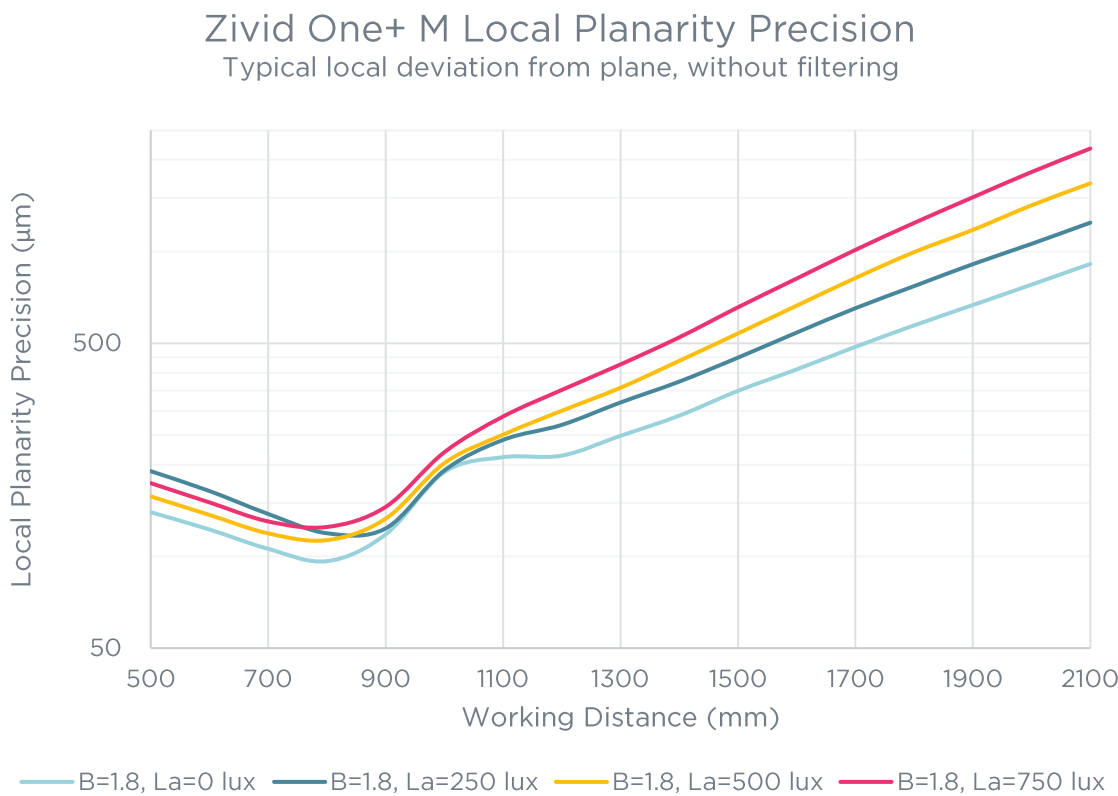


FIGURE 13 – TYPICAL ZIVID ONE+ M GLOBAL PLANARITY TRUENESS VS. DISTANCE

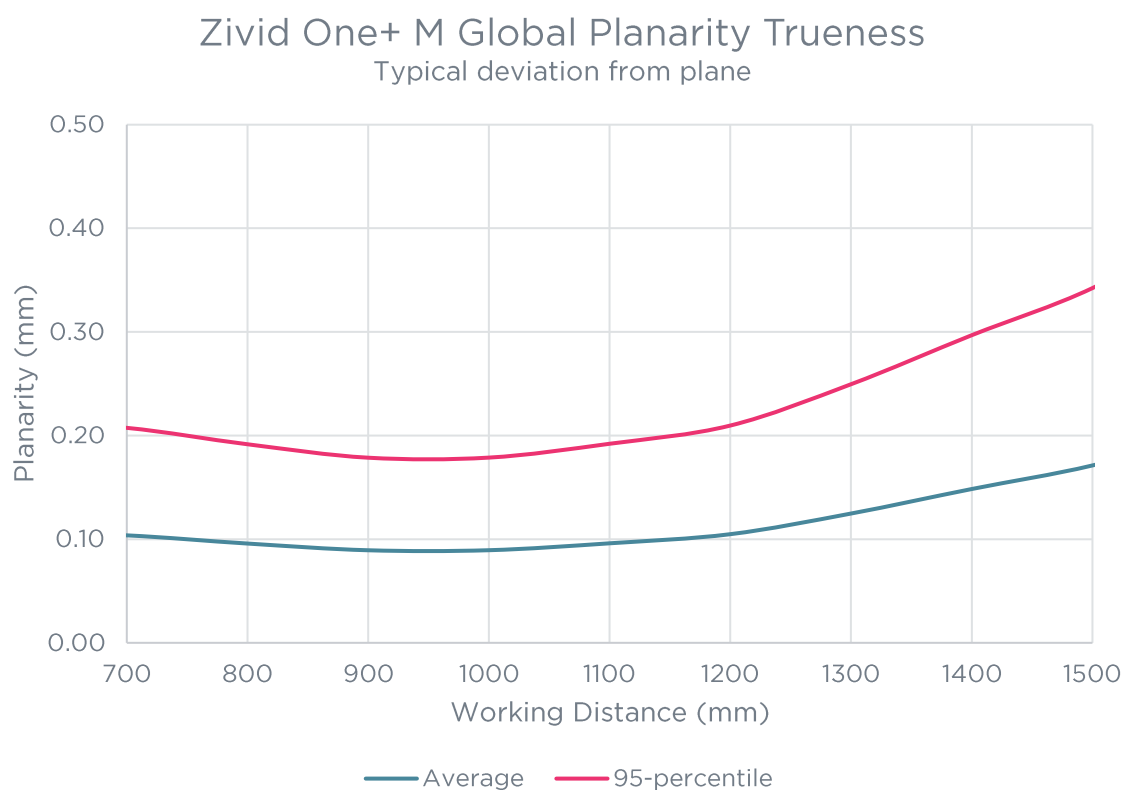
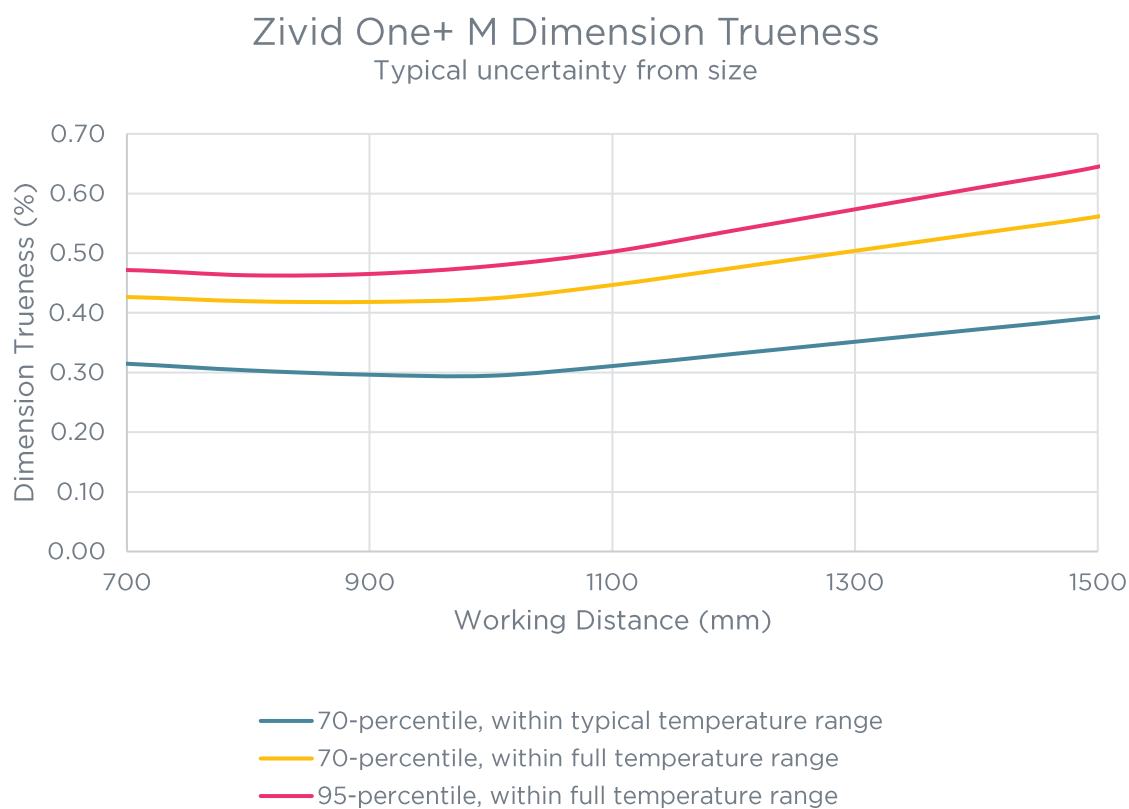


FIGURE 14 – TYPICAL ZIVID ONE+ M DIMENSION TRUENESS VS. DISTANCE



Zivid One+ L Typical Specifications

Typical numbers are given at common conditions unless otherwise specified.

Property	Description	Typical
Warm-up time	Minimum recommended time needed for camera to stabilize from an idle state assuming capturing at a constant rate.	10 minutes
	Some trueness changes may be experienced during warm-up phase.	
Point precision	1 σ Euclidian distance variation for a point between consecutive measurements at focus distance, D. ⁴	350 μ m
Local Planarity Precision	1 σ Euclidian distance variation from a plane for a set of points within a smaller local region at focus distance, D. ⁴	700 μ m
Global Planarity Trueness	Average deviation from a plane in field of view at focus distance, D.	< 350 μ m
Dimension Trueness	70-percentile dimension error in field of view at focus distance, D, and typical temperature range.	< 0.50 %
	70-percentile dimension error in field of view within optimal working distance and typical temperature range.	< 0.60 %
	70-percentile dimension error in field of view within optimal working distance and full temperature range.	< 0.70 %

⁴ Measured with Gaussian filter disabled.

FIGURE 15 - TYPICAL ZIVID ONE+ L POINT PRECISION VS. DISTANCE

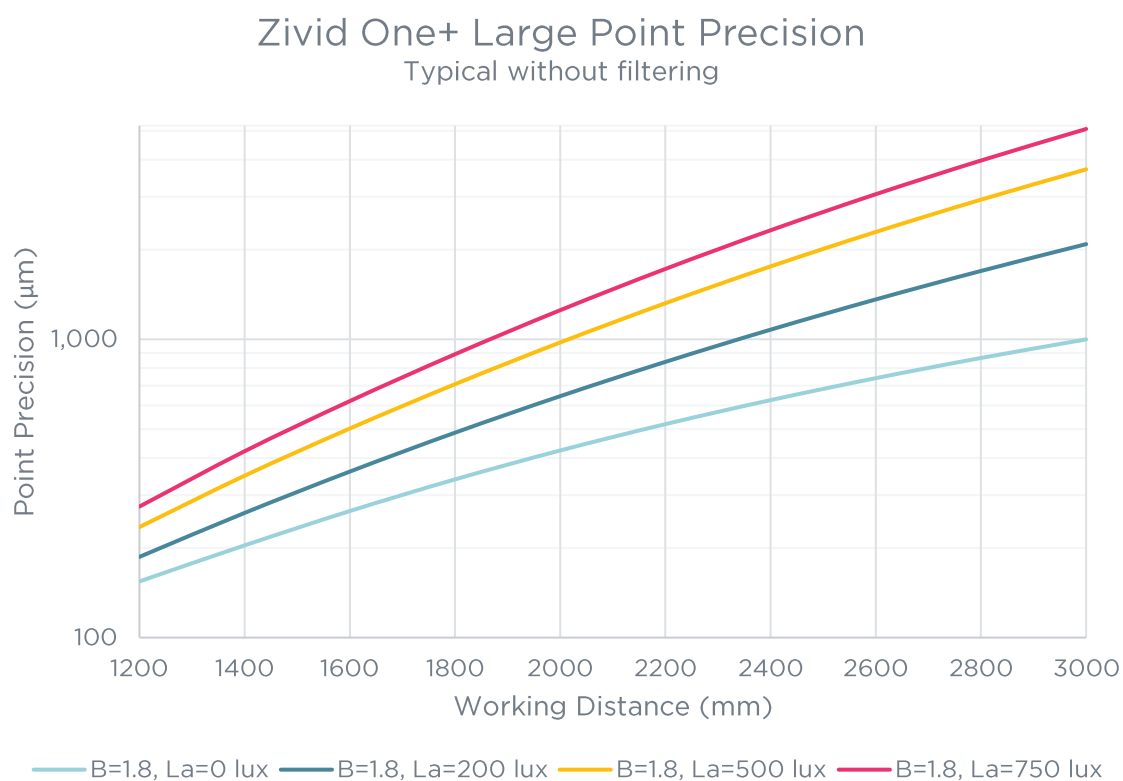


FIGURE 16 - TYPICAL ZIVID ONE+ L LOCAL PLANARITY PRECISION VS. DISTANCE

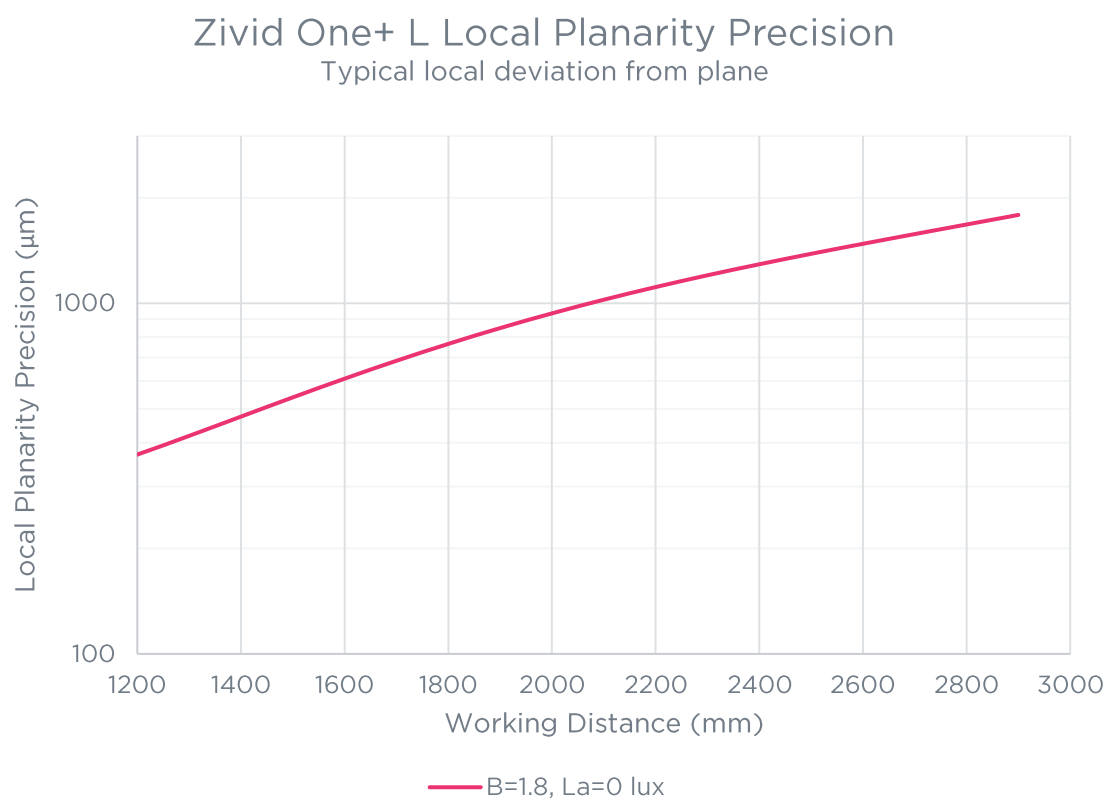


FIGURE 17 – TYPICAL ZIVID ONE+ L GLOBAL PLANARITY TRUENESS VS. DISTANCE

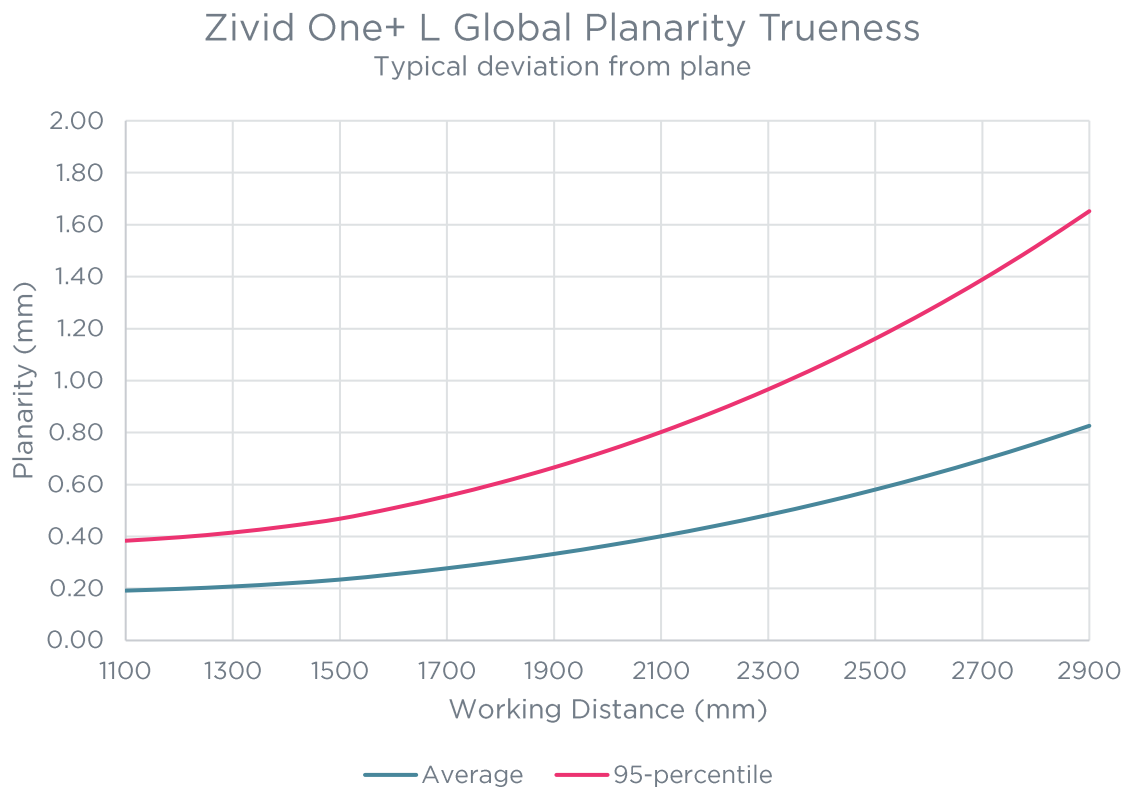
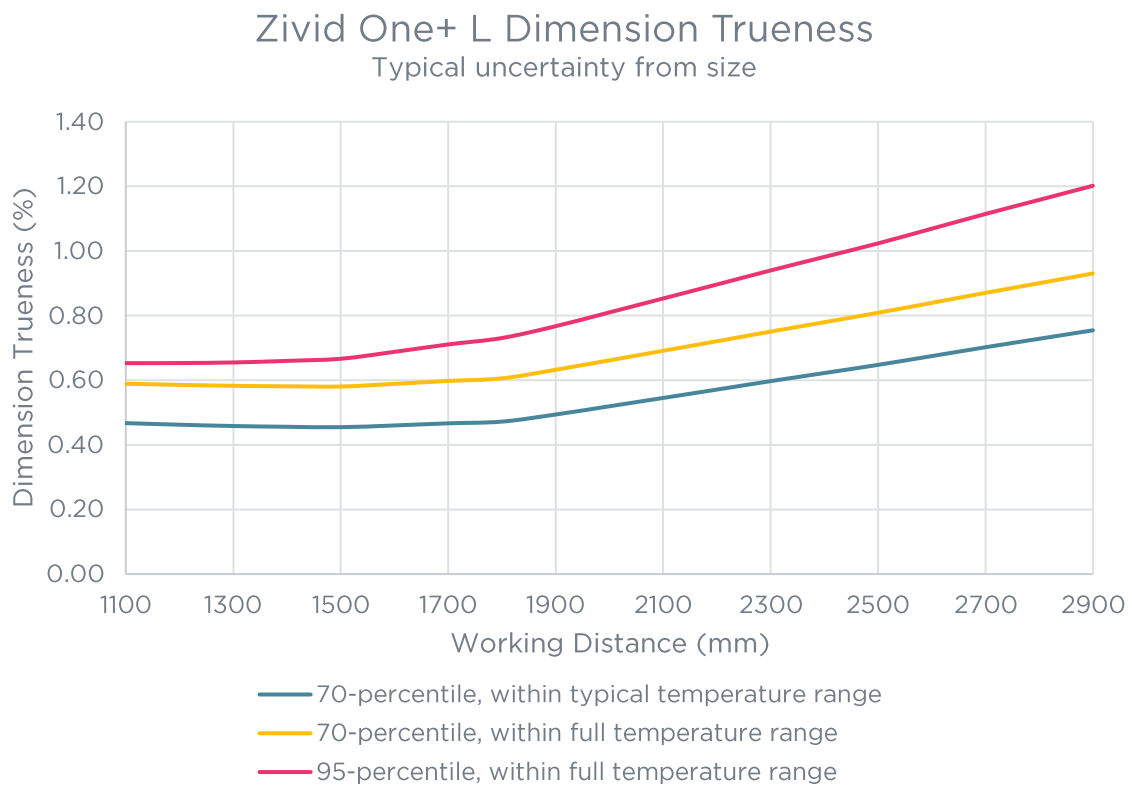


FIGURE 18 – TYPICAL ZIVID ONE+ L DIMENSION TRUENESS VS. DISTANCE



Physical specifications

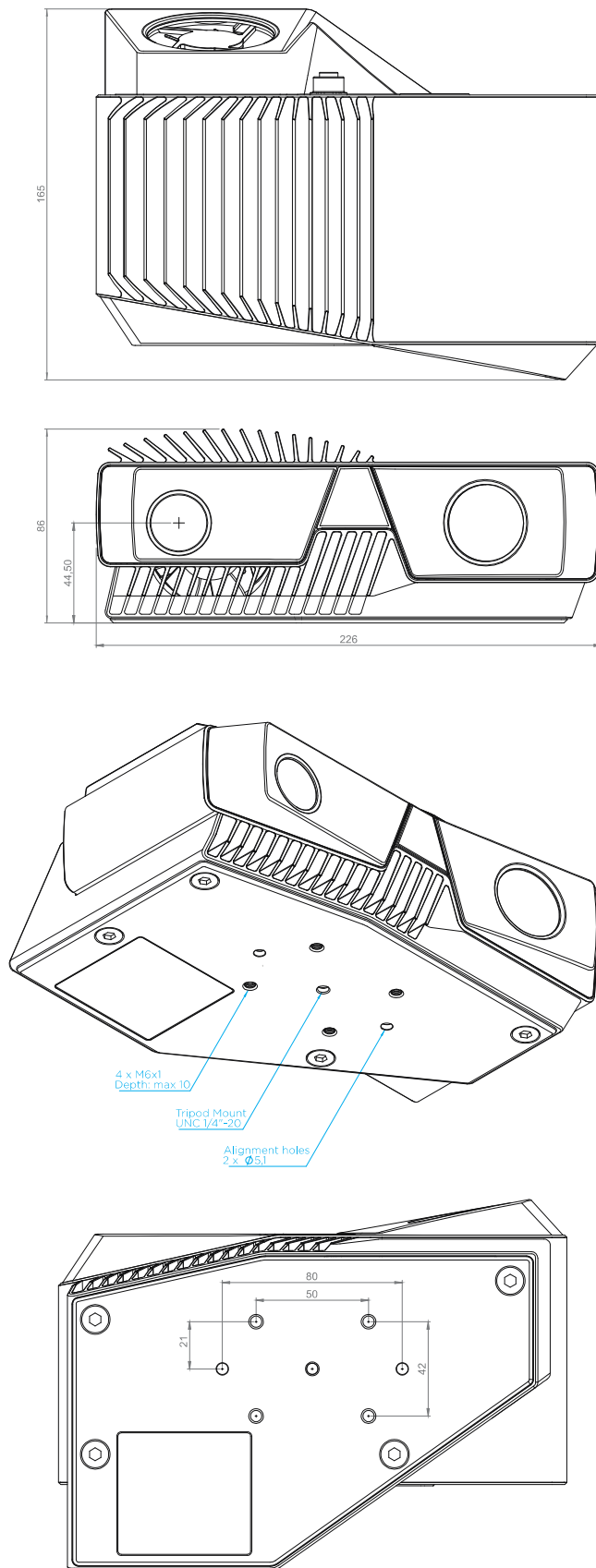
Size	226 mm x 165 mm x 86 mm
Weight	2 kg
Cable strain limit, power	90 N
Cable strain limit, data	30 N
Environmental	IP65 5 g sinusoidal ⁵ 15 g shock ⁶
Operating temperature	10° to 40° C
Storage temperature	-20° to 60° C
Data connector	USB 3.0 SuperSpeed USB Type B Jack screw M2
Power connector	M12-5
Power adapter	24V = 5A EU, US, and UK power plug options
Power consumption, typical	15 W, Idle 45 W, TDP ⁷ 120 W, Peak

⁵ IEC 60068-2-6, 10-150 Hz, 5 g, in X, Y and Z direction, 2 hour per axis. Sweep rate 1 octave per minute sweep rate.

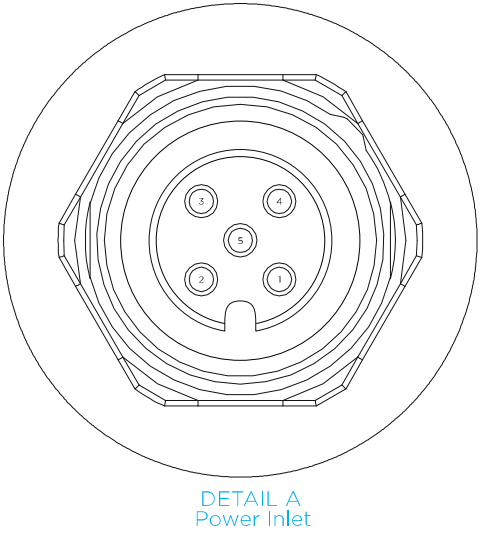
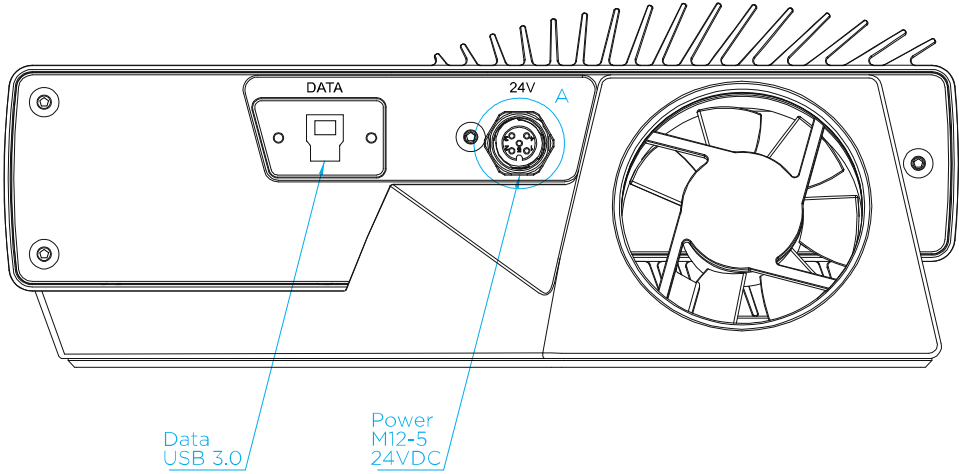
⁶ IEC 60068-2-27, 15 g / 11 ms half sine shock pulses. 3 shocks per direction, 18 shocks in total.

⁷ Thermal Design Power is the maximum power consumed by the camera when capturing 3D images in a continuous stream.

Mechanical drawings



Connectors



Pin

1	24V DC +/- 20% Max 4A
2	24V DC +/- 20% Max 4A
3	GND
4	GND
5	NC

Revision history

Ver.	Date	Notes
1.0	05/21	Updated front page Updated table of contents Updated "General specifications" and added valid revision number Updated "Operating distance and field of view" Added figure 2-16 Updated "Accuracy specifications" and table "Common conditions" Updated table "Zivid One+ S Typical Specifications" Updated table "Zivid One+ M Typical Specifications" Updated table "Zivid One+ L Typical Specifications" Updated table "Physical specifications"
0.91	05/19	Added metrics for Zivid One+ Small. Added metrics for Zivid One+ Large. Updated Operating distance and field of view table. Updated Zivid One+ Medium spec. plots. Updated connector table.
0.9	04/19	Initial version.

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