

MVnano SERIES (EDITION 2025 WITH IMPROVED FOCUS MECHANICS)

FLEXPOINT® Machine Vision Laser



A COMPACT AND FLEXIBLE LASER MODULE SUITABLE AS STAND-ALONE SOLUTION OR FOR INTEGRATION

MVnano line lasers have a diameter of 11.5 mm and are 54 mm long. They are therefore suitable as a stand-alone solution with a camera for 3D triangulation or for integration in intelligent 3D vision sensors. They provide great flexibility with various wavelength (405 - 850 nm), output powers up to 100 mW, fixed as well as adjustable focus and different versions of modulation e.g. 24 V.

The MVnano can now also be ordered with a new focus mechanics (Edition 2025) with improved dust- and moisture proofness, an even shorter design and an improved beam drift while focusing the laser. The established, easy focusing method will remain untouched.

A variety of options of optics provide the right combination of line thickness and depth of focus for various applications.

FEATURES

- / Superior line quality for a variety of wavelengths
- / Fixed and adjustable focus available
- / Improved focus mechanics for the adjustable focus
- / Many optics options for the right match of line thickness and depth of focus
- / Modular housing options available
- / 24 V Modulation available

APPLICATIONS

- / 3D machine vision
- / Integration in 3D sensors
- / 3D Triangulation
- / Industrial inspection
- / Structured lighting

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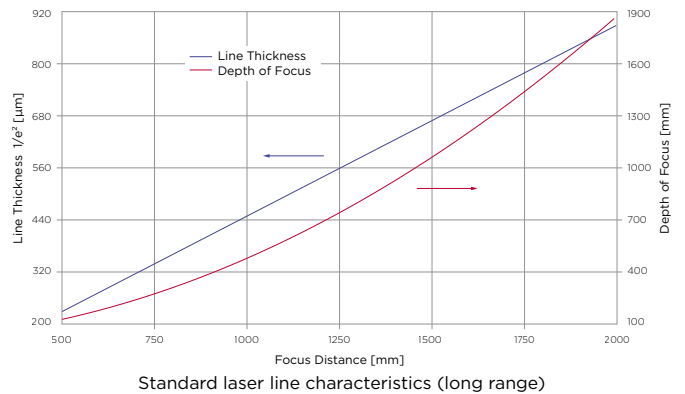
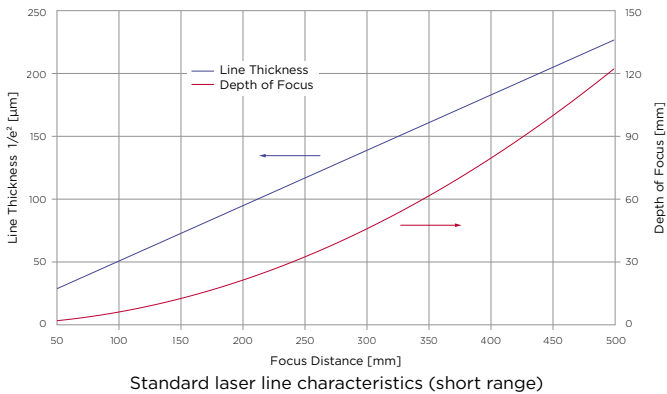
SPECIFICATIONS

Model	Line laser with uniform power distribution (FOV correction available)									
	405	450	520	640	660	685	785	830	845	
Wavelength [nm]	405	450	520	640	660	685	785	830	845	
Wavelength tolerance (typ.) [nm]	± 5	± 10	± 10	± 5	± 5	± 10	± 10	± 10	± 10	± 10
Wavelength Drift [nm/°C]	< 0.25									
Output power [mW] ¹	1-100	1-50	1-80	1-100	1-100	1-40	1-100	1-80	1-40	
Power stability at 25 °C (after warm up) [%]	≤ 5									
Operating voltage [VDC] ²	10 - 30 ²				4.5 - 30					
Operating temperature (housing temp.) [°C] ³	-10 to +50									
Fan angle [°] ⁴	1, 5, 10, 15, 20, 30, 45, 60, 75, 90									
Focussing range [mm]	50 - 5000									
Line intensity variation (typ) ⁵ [%]	±20 (optional ±10) related to average power (80% of the line)									
Line straightness ⁵ [%]	±0.1 (optional ±0.05)									
Pointing stability [μrad/K]	≤ 10 (improved pointing stability on request)									
Boresight deviation [mrad]	≤ 10 (optional ≤ 3 or 5)									
Shock tolerance	30G, 6 ms 75G, 4 ms									
Housing	Aluminium (blue anodized, potential free) Standard, 2H (separate housing for optics and electronics) or OH (without electronics) Fixed focus (fixed at factory to defined working distance) or adjustable focus									
Accessories available (optional, order separately)	Mount									
Connector	2 m cable, wires tin coated at ends Brown: +VDC; Blue: GND; Black: modulation (optional) 150 mm cable between housings for 2H No wire for optical heads (OH)									

Foot Note

- 1 Output power: The output power is defined behind optics which means at the beam exit of the laser module
- 2 5V Option available for 405nm and 520nm with increased effort, no standard product but available on request
- 3 Below 0 °C condensate formation must be avoided (due to optical and electronic components)
- 4 Fan angle: Defined by the ends of the laser line using FWHM based on the average power (within 80% of line)
- 5 Line intensity variation and line straightness are measured at 80% of the fan angle

Line Thickness and Depth of Focus (DOF) for Standard (STD) Focus Option at 660 nm



Focus Options

MVnano is available with different focus options to achieve the right combination of line thickness and depth of focus depending on the application.

The values shown in the table below are the factors which should be used in combination with the graph above.

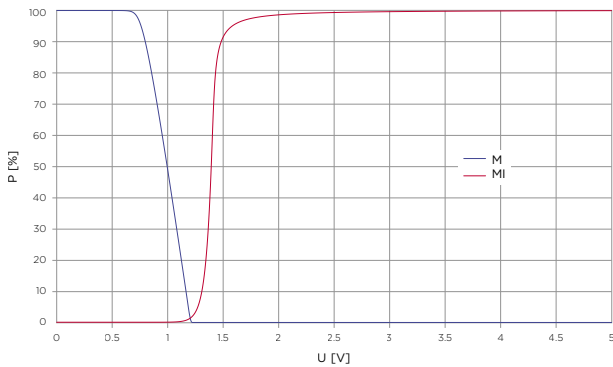
P _{out} and λ			Focus options											
			(conversion factor related to reference laser marked in red left side - optimized for thin line / right side - optimized for high DOF)											
λ	P _{out}	Δλ	DLSE		DLE		DL		STD		TS1		TS2	
[nm]	[mW]	[nm]	LT	DOF	LT	DOF	LT	DOF	LT	DOF	LT	DOF	LT	DOF
405	1-30	±5	0.27	0.12	0.35	0.20	0.49	0.39	0.71	0.81	1.04	1.76	1.53	3.80
405	30-100	±6	0.27	0.12	0.35	0.20	0.49	0.39	0.71	0.81	1.04	1.76	1.53	3.80
450	1-50	±10	0.25	0.10	0.33	0.16	0.45	0.30	0.69	0.69	1.49	3.25	2.20	7.06
520	1-10	±10	0.29	0.11	0.39	0.19	0.53	0.36	0.78	0.78	1.71	3.69	2.55	8.23
520	11-40	±10	0.29	0.11	0.39	0.19	0.53	0.36	0.78	0.78	1.71	3.69	2.55	8.23
640	1-20	±5	0.39	0.16	0.51	0.27	0.69	0.48	1.02	1.07	1.65	2.79	2.43	6.08
640	21-30	±5	0.39	0.16	0.51	0.27	0.69	0.48	1.02	1.07	1.47	2.23	2.18	4.87
640	31-100	±5	0.47	0.23	0.59	0.36	0.80	0.67	1.20	1.47	1.65	2.79	2.43	6.08
660	1-30	±5	0.39	0.15	0.49	0.24	0.67	0.44	1.00	1.00	1.51	2.27	2.25	5.07
660	31-100	±5	0.51	0.26	0.65	0.42	0.88	0.78	1.31	1.72	1.51	2.27	2.25	5.07
685	1-40	±10	0.45	0.20	0.57	0.31	0.76	0.56	1.14	1.24	1.43	1.97	2.12	4.31
785	1-10	±10	0.35	0.10	0.45	0.17	0.61	0.31	0.90	0.68	1.65	2.28	2.43	4.96
785	11-100	±10	0.65	0.35	0.82	0.57	1.12	1.05	1.65	2.28	2.00	3.36	2.98	7.45
830	1-40	±10	0.69	0.37	0.88	0.62	1.22	1.17	1.78	2.53	2.29	4.18	3.39	9.13
845	1-40	±10	0.35	0.10	0.45	0.16	0.61	0.29	0.90	0.63	1.63	2.05	2.41	4.51

Foot Note / Abbreviations

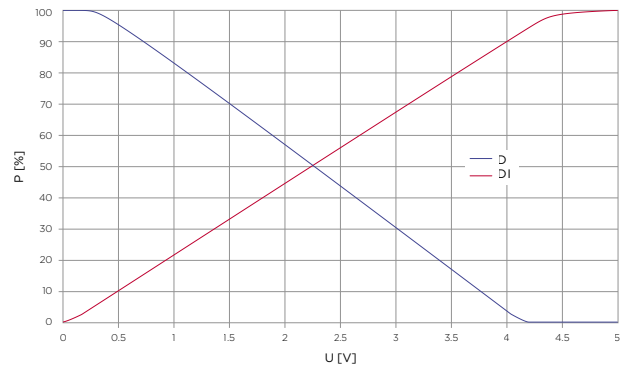
DLSE = Thin Line Super Enhanced DLE = Thin Line Enhanced DL = Thin Line
 STD = Standard, good compromise for Line Thickness and Depth of Focus LT = Line Thickness DOF = Depth of Focus
 TS1 = Enhanced Depth of Focus TS2 = Enhanced Depth of Focus, higher factor

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Modulation Options



Digital Modulation (typical TTL)



Analog Modulation

	Digital Modulation < 10kHz active high and active low available 0/5V 24 V Version available (0/24V)		Analog Modulation high/low by control wire 0-5V 24 V Version available (0-24V)	
	M active low	MI active high	D active low	DI active high
Delay + Rise time (max.) [μs]	10	10		
On [V]	0-0.8	2-5	0	5
Off [V]	2-5	0-0.8	5	0

Available combinations of options M and D are listed in the table below.

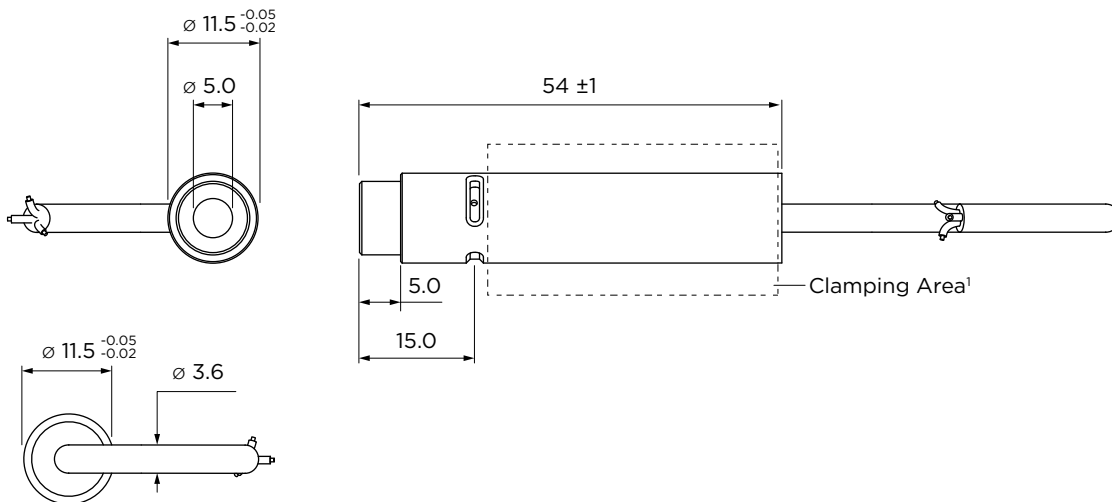
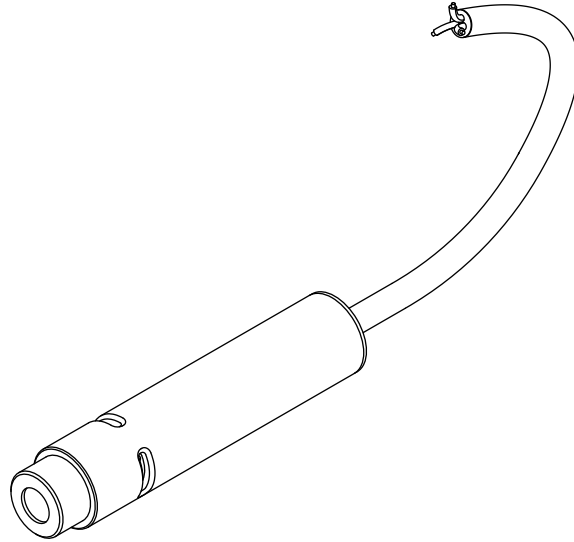
P _{out} and λ		Modulation options							
λ [nm]	P _{out} [mW]	D	DI	M	MI	MD	MID	MDI	MIDI
405	1-30	■ a	-	■ a	■ b, e	■	■ b, e	-	-
405	30-100	■ a, c, d	■ b, c, d	■ a, e	■ b, e	■ c, e	■ c, e	■	■ c, e
450	1-50	■ a, c, d	■ b, c, d	■ a, e	■ b, e	■ c, e	■ c, e	■	■ c, e
520	1-10	■ a, c, d	■ b, c, d	■ a, e	■ b, e	■ c, e	■ c, e	■	■ c, e
520	11-40	■ a, c, d	■ b, c, d	■ a, e	■ b, e	■ c, e	■ c, e	■	■ c, e
640	1-20	■ a	-	■ a, e	■ b, e	■	■ b, e	-	-
640	21-30	■ a	-	■ a, e	■ b, e	■	■ b, e	-	-
640	31-100	■ a, c, d	■ b, c, d	■ a, e	■ b, e	■ c, e	■ c, e	■	■ c, e
660	1-30	■ a	-	■ a	■ b, e	■	■ b, e	-	-
660	31-100	■ a	■	■ a	■ b, e	■	■ b, e	■	■
685	1-40	■ a, c, d	■ b, c, d	■ a, e	■ b, e	■ c, e	■ c, e	■	■ c, e
785	1-10	■ a	-	■ a	■ b, e	■	■ b, e	-	-
785	11-100	■ a, c, d	■ b, c, d	■ a, e	■ b, e	■ c, e	■ c, e	■	■ c, e
830	1-40	■ a	■	■ a	■ b, e	■	■ b, e	■	■
845	1-40	■ a	-	■ a	■ b, e	■	■ b, e	-	-

Foot Note / Abbreviations

- = Standard availability
- = Available with modification
- a = On@float (if the modulation cable or pin is not connected the module is on (cable is loose))
- b = Off@float (if the modulation cable or pin is not connected the module is off (cable is loose)). a and b are not possible at the same time
- c = Non-linear response (the curve in the diagram for D and DI indicates an ideal line / linear behaviour but in reality the response is not linear)
- d = No Off (module is always glowing / always on at least with very low intensity)
- e = TTL (TTL Logic: TTL 5V has two threshold values - 0.8V and 2.0V)

TECHNICAL DRAWING

MVnano 2025 standard housing, focusable (ST-F)



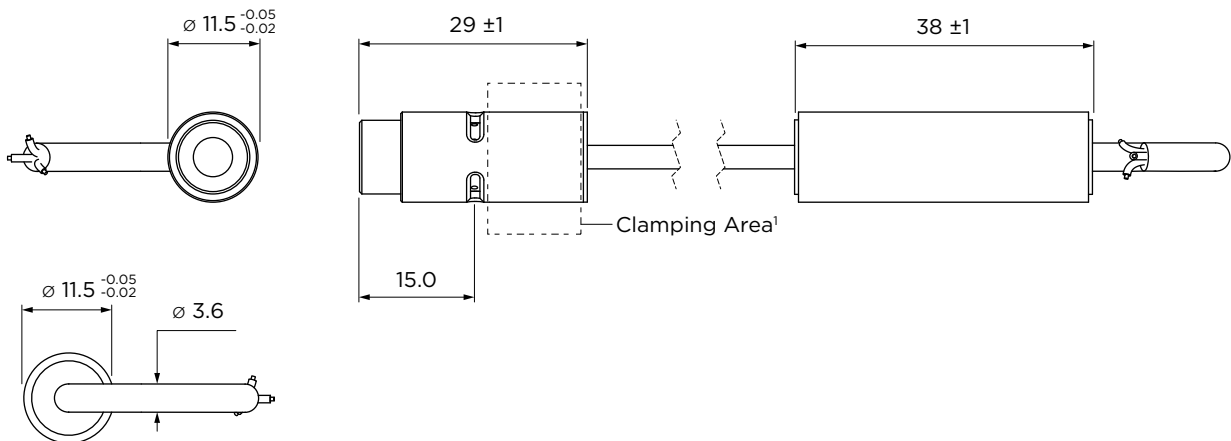
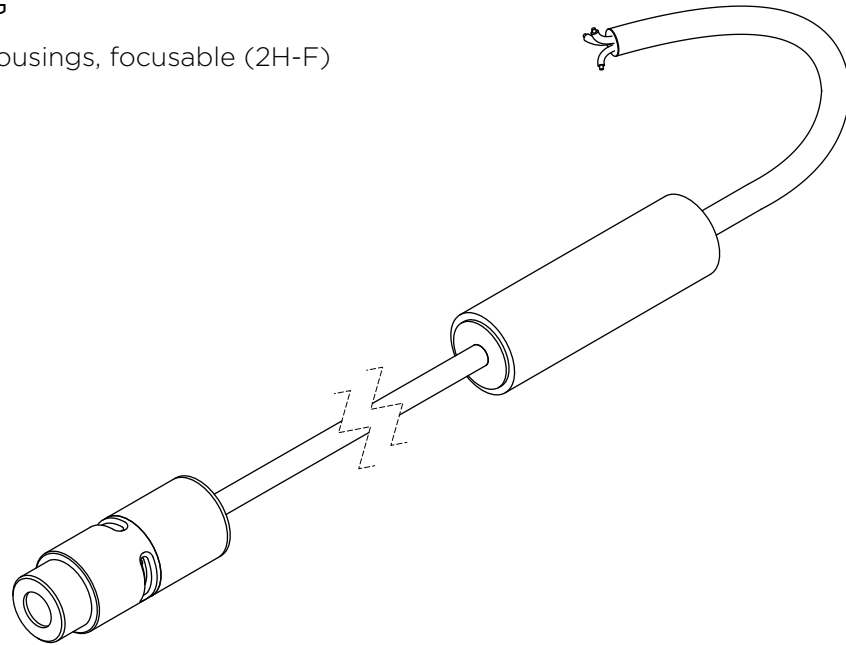
MVnano ST-F

¹For optimal heat dissipation in a mount, we recommend to apply thermal paste on the surface overlap.

Units: mm

TECHNICAL DRAWING

MVnano 2025 with 2 housings, focusable (2H-F)



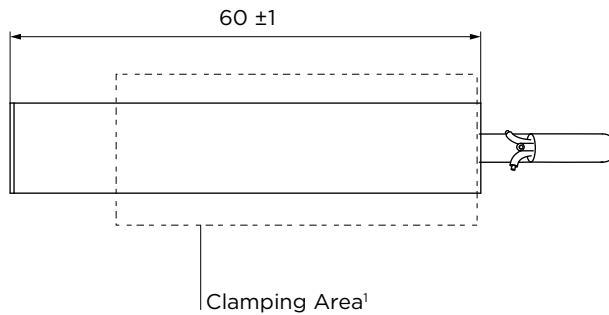
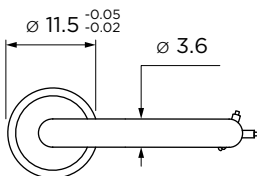
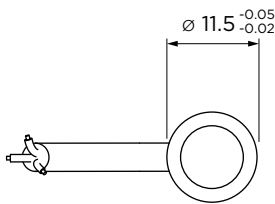
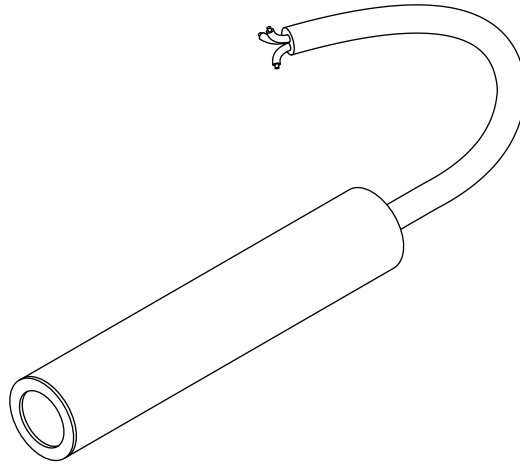
MVnano 2H-F

¹For optimal heat dissipation in a mount, we recommend to apply thermal paste on the surface overlap.

Units: mm

TECHNICAL DRAWING

MVnano 2025 standard housing, fixed focus (ST-FIX)



MVnano ST-FIX

¹For optimal heat dissipation in a mount, we recommend to apply thermal paste on the surface overlap.

Units: mm

FLEXPOINT® MACHINE VISION LASER

MVnano Series (Edition 2025 with improved focus mechanics)



ORDERING CODE

	Housing	Wavelength [nm]	Output Power [mW]	Modulation / Power Adjustment	Fan Angle [°]	Focus [mm]	Optics
FP-MVnano	X	X	X	X	X	X	X
	ST	405	1-100	M Digital Modulation, active low	1	F Focusable	STD
	2H	450	1-50		5	FYYY Prefocused to YYY mm, but still focusable	DL
	OH	520	1-80	MI Digital Modulation inverted, active high	10		DLE
		640	1-100		15		DLSE
		660	1-100	D Dimmable, active low	20	FIXYYY Fixed focus to YYY mm	TS1
		685	1-40	DI Dimmable inverted, active high	30		TS2
		785	1-100		45		
		830	1-80		60		
		845	1-40		75		
					90		

Example: FP-MVnano-ST-785-50M-30-F-DL