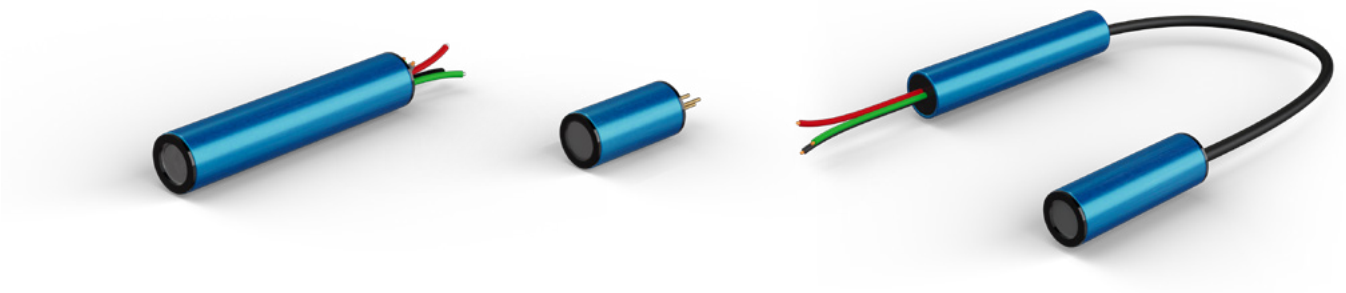
MVfemto SERIES

FLEXPOINT® Machine Vision Laser



SMALLEST MACHINE VISION LASER ON THE MARKET

MVfemto line lasers are only 40 mm long and have a diameter of only 8 mm. These small dimensions make the MVfemto the perfect match for integration in intelligent 3D vision sensors with very limited space. Despite its small housing dimensions they provide equivalent optical performance as larger machine vision modules.

MVfemto lasers come with a fixed focus that is set at the factory to a defined working distance. They are available in a standard housing, in a version with separate housings for the optical and electronic parts, or in a short housing without the laser driver.

FEATURES

/ Smallest size with 8 mm diameter
/ Superior line quality for a variety of wavelength
/ Many optics options for the right match of line thickness and DOF
/ Modular housing options available

APPLICATIONS

/ 3D machine vision
/ Integration in 3D sensors
/ Integration in 3D scanners for wood and food inspection
/ Industrial inspection
/ Structured lighting

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beyond borders

11/24 / V08 / KS-MaL / laser-modules/flexpoint-mvfemto-machine-vision-laser

SPECIFICATIONS

Model	Line laser with uniform power distribution (FOV correction available)								
Wavelength [nm]	405	450	520	640	660	685	785	830	845
Wavelength tolerance (typ.) [nm]	± 5	± 10	± 10	± 5	± 5	± 10	± 10	± 10	± 10
Output power [mW][1]	1 – 25	1 – 50	1 – 8	1 – 20	1 – 30	1 – 40	1 – 10	1 – 40	1 – 40
Power stability at 25 °C (after warm up) [%]	≤ 5								
Operating voltage [VDC][2]	10 – 30[2]			4.5 – 30					
Current consumption [mA]	< 100 (supply current)								
Operating temperature (housing temp.) [°C]	0 to +50								
Storage temperature [°C]	-20 to +60								
Fan angle [°][3]	1, 5, 10, 15, 20, 30, 45, 60, 75, 90								
Focussing range [mm]	Fixed focus, factory preset (50 – collimated = focused to ∞)								
Line intensity variation (typ)[4] [%]	±20 related to average power (80 % of the line)								
Line straightness[4] [%]	±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	30 G, 6 ms 75 G, 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, not changeable)
Connector	200 mm flying leads
	Red: +VDC; Black: GND; Green: modulation (optional); Yellow: adjustable power (optional) Standard comes without modulation and adjustable power
	150 mm cable between housings for 2H
	No wire for optical heads (OH)
Laser class	DIN EN 60825-1:2014

Foot Note
1 Output power: The output power is defined behind optics which means at the beam exit of the laser module
2 405 nm and 520 nm available with 5 V electronics (»StepUp« electronics 4.5 – 6 V) on request. Reverse voltage protection
3 Fan angle: Defined by the ends of the laser line using FWHM based on the average power (within 80 % of line)
4 Line intensity variation and line straightness are measured at 80 % of the fan angle

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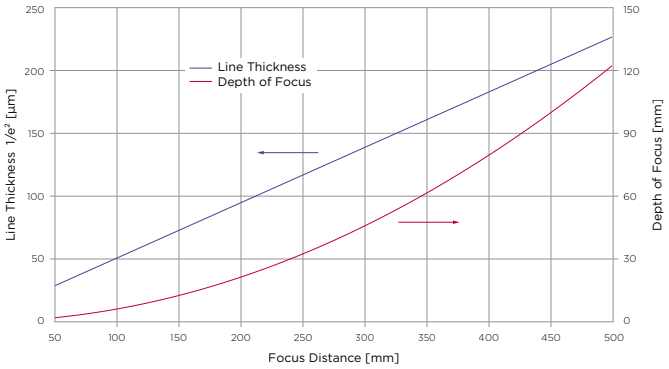
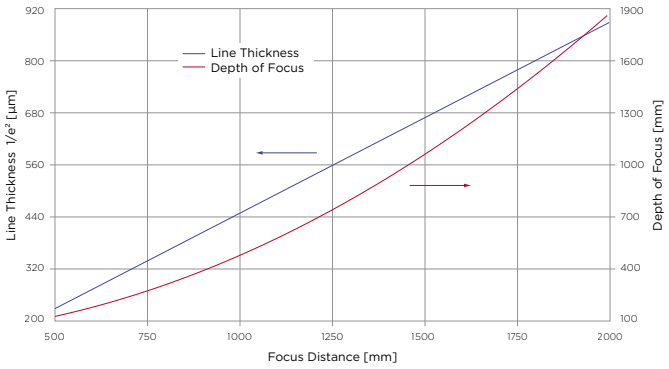
Line Thickness and Depth of Focus (DOF) for Standard (STD) Focus Option at 660 nm



Standard laser line characteristics (short range)



Standard laser line characteristics (long range)

Focus Options

MVfemto 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 – 25	±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
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 – 8	±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
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
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
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

To calculate Line thickness and Depth of Focus for your working distance and your application you can also use our Simulator available on the Website:
https://www.lasercomponents.com/line-thickness-simulator/

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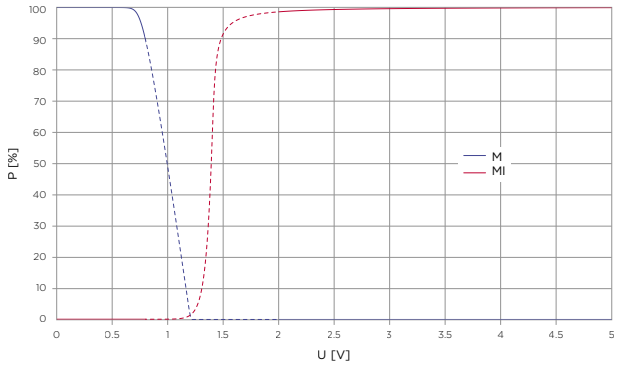
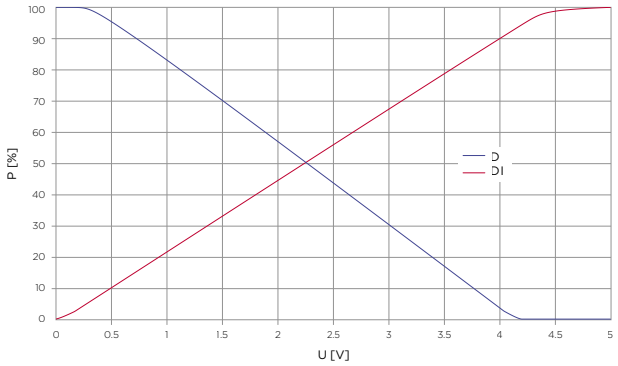
Modulation Options



Digital Modulation (typical TTL)



Analog Modulation (typical graph; linear increase/decrease range > 3 V)

	Digital Modulation < 20 kHz active high and active low available 0 / 5 V 24 V Version available on request (0 / 24 V; no standard)		**Analog Modulation** Active low by control wire 0 – 5 V	
	M active low	MI active high	D active low	DI active high
Delay + Rise time (max.) [µs]	10	10		
Input impedance [kOhm]	>1		>1	
On [V]	0 – 0.8	2 – 5	0	5
Off [V]	2 – 5	0 – 0.8	5	0
Linear Range [V]			> 3	> 3

Available combinations of options M and D are listed in the table below.
The standard module comes without modulation and power adjustment.

P_{out} and λ			**Modulation options**			
λ	P_out	U_oper	Without Modulation	M	MI	D
[nm]	[mW]	[V]				
405	1 – 25	10 – 30	■	■ a, e	■ b, e	■ a
405	1 – 25	4.5 – 6	■	■ a, e	■ b, e	–
450	1 – 50	10 – 30	■	■ a, e	■ b, e	–
520	1 – 8	10 – 30	■	■ a, e	■ b, e	■ a
520	1 – 8	4.5 – 6	■	■ a, e	■ b, e	–
640	1 – 20	4.5 – 30	■	■ a, e	■ b, e	■ a
660	1 – 30	4.5 – 30	■	■ a, e	■ b, e	■ a
685	1 – 40	4.5 – 30	■	■ e	■ b, e	■ a
785	1 – 10	4.5 – 30	■	■ a, e	■ b, e	■ a
830	1 – 40	4.5 – 30	■	■ e	■ b, e	■ a
845	1 – 40	4.5 – 30	■	■ a, e	■ b, e	■ a

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))
c = Non-linear respone (the curve in the diagram for D and DI indiactes 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 5 V has two threshold values - 0.8 V and 2.0 V)

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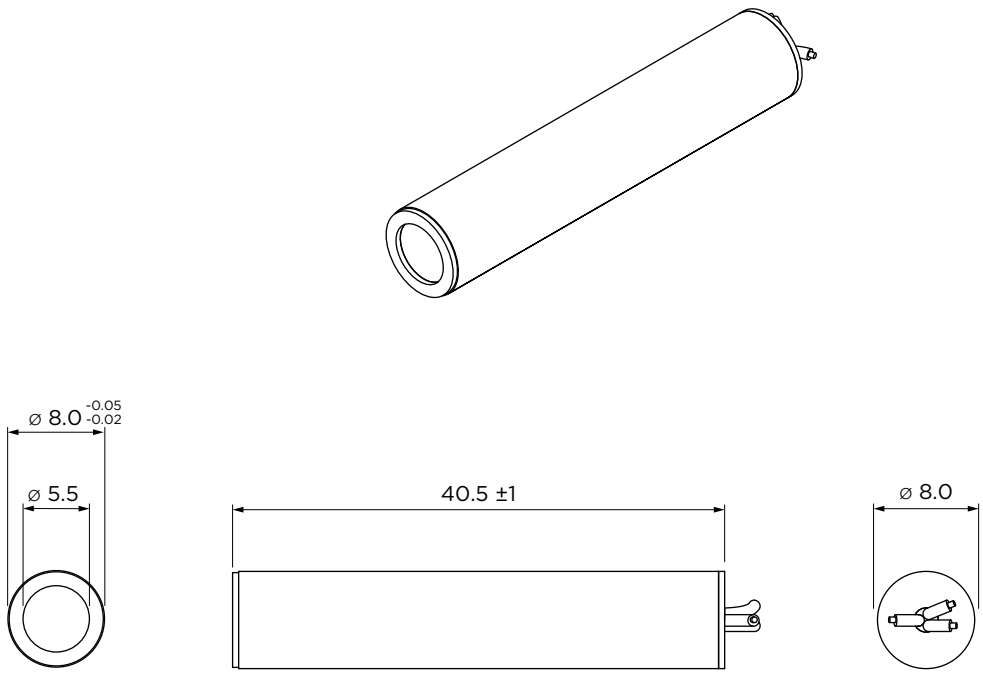
TECHNICAL DRAWING

MVfemto standard housing, fixed focus (ST-FIX)



MVfemto ST-FIX

Units: mm

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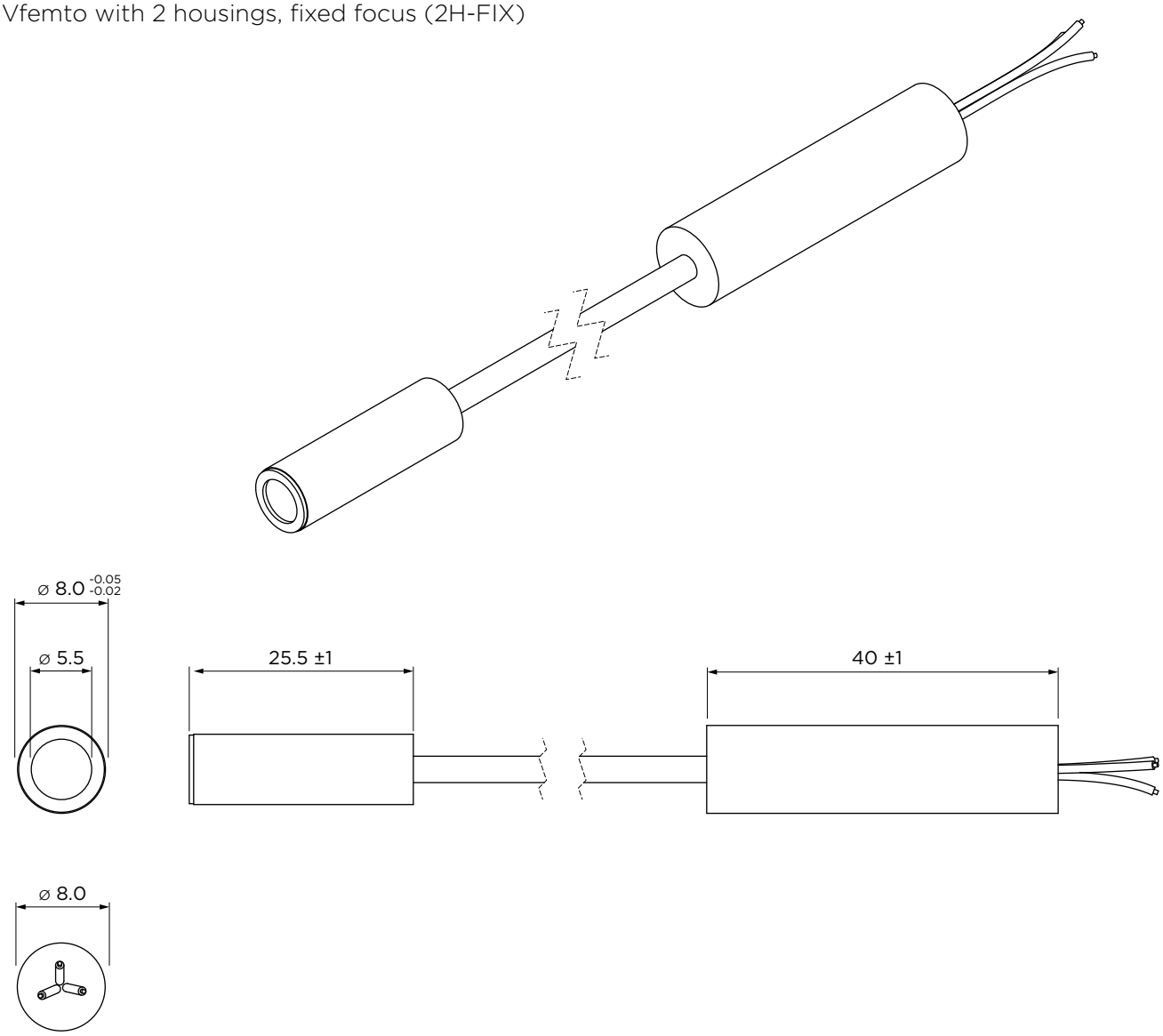
TECHNICAL DRAWING

MVfemto with 2 housings, fixed focus (2H-FIX)



MVfemto 2H-FIX

Units: mm

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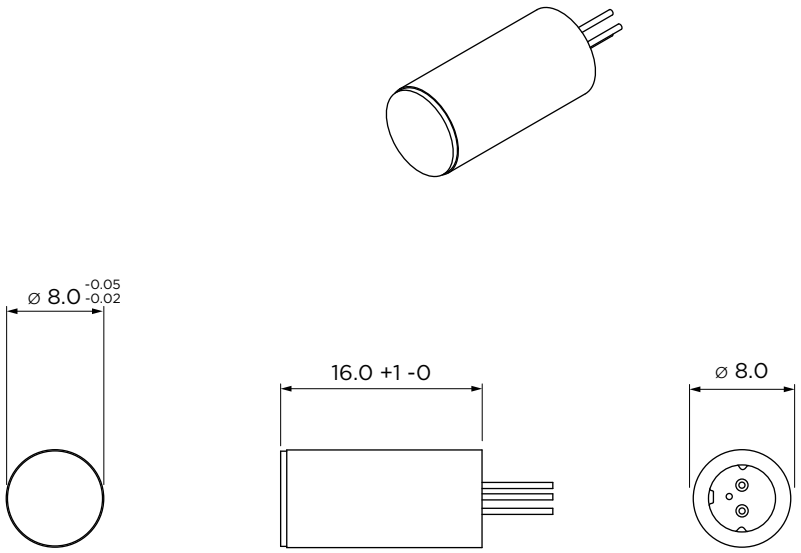
TECHNICAL DRAWING

MVfemto optical head without electronics (OH-FIX)



MVfemto OH-FIX

Units: mm

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ORDERING CODE

	Housing	Wavelength [nm]	Output Power [mW]	Modulation / Power Adjustment (Standard is without)	Fan Angle [°]	Focus [mm]	Optics
FP-MVfemto -	**X** -	**X** -	**X**	**X** -	**X** -	**X** -	**X**
	ST **2H** **OH**	**405** **450** **520** **640** **660** **685** **785** **830** **845**	**1–50**	**M** | Digital Modulation, active low **MI** | Digital Modulation inverted, active high **D** | Dimmable, active low	**1** **5** **10** **15** **20** **30** **45** **60** **75** **90**	**FIXYYY** | Fixed focus to YYY mm	**STD** **DL** **DLE** **DLSE** **TS1** **TS2**

Example: FP-MVfemto-ST-785-50M-30-FIX50-DL

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