Laser Diodes

LASER COMPONENTS®

FLEXPOINT® Machine Vision Lasers MVfemto Series (Edition 2017)

Smallest Machine Vision Laser on the Market

With the MVfemto line laser, LASER COMPONENTS presents the smallest machine vision laser with outstanding optical performance. With dimensions of only 40 mm in length and 8 mm in diameter, it is the best choice for integration into 3D sensors that have very little space.

MVfemto lasers come with a fixed focus that is set at the factory. 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
- Superior line quality
- Many focus / optics options
- Modular housing options

Applications

- 3D machine vision
- Industrial inspection
- Structured lighting

Germany & Other Countries
Laser Components Germany GmbH
Tel: +49 8142 2864 – 0
Fax: +49 8142 2864 – 11
info@lasercomponents.com
www.lasercomponents.com

France
Laser Components S.A.S.
Tel: +33 1 39 59 52 25
Fax: +33 1 39 59 53 50
info@lasercomponents.fr
www.lasercomponents.fr

United Kingdom
Laser Components (UK) Ltd.
Tel: +44 1245 491 499
Fax: +44 1245 491 801
info@lasercomponents.co.uk
www.lasercomponents.co.uk

Nordic Countries
Laser Components Nordic AB
Tel: +46 31 703 71 73
Fax: +46 31 703 71 01
info@lasercomponents.se
www.lasercomponents.se

USA
Laser Components USA, Inc.
Tel: +1 603 821 – 7040
Fax: +1 603 821 – 7041
info@laser-components.com
www.laser-components.com

Specifications

Spectral range	405 nm, 450 nm, 520 nm, 640 nm, 660 nm, 685 nm, 785 nm, 850 nm (other wavelengths on request)
Wavelength stability	< 0.25 nm / °C
Output power	< 1 mW – 50 mW
Power stability	≤ 5% (after warm up at 25 °C)
Beam profile	laser line with uniform power distribution, FOV/COS⁴ correction available
Fan angle	5°, 10°, 15°, 20°, 30°, 45°, 60°, 75°, 90°
Focus distance	fixed focus, factory preset (50 mm - collimated)
Focus options	Standard, DL, DLE, DLSE, TS1, TS2
Line intensity variation	± 20% related to average power (within 80% of the line)
Line straightness	± 0.1% (± 0.05% as option)
Boresight deviation	≤10 mrad (≤3 mrad as option)
Pointing stability	≤10 µrad/°C (improved pointing stability available on request)
Operating voltage	4.5 – 30 V (10 – 30 V for 405/450/520 nm) (405/520 nm available with 5 V electronics on request) reverse voltage protection
Current consumption	< 100 mA (supply current)
Modulation options	digital (low/high acitve, 0 – 10 kHz, higher frequency on request), dimmable (low/high active by 0 – 5 V signal)
Operating temperature	0 °C bis +50 °C (case temperature, depending on wavelength and heat sink)
Storage temperature	-20 °C bis +60 °C (depending on wavelength)
Housing size	Ø8 × length (see product map for length –> depending on chosen feature)
Housing material	Aluminum (blue anodized, potential free)
Pin defintion	200 mm flying leads Red: +VDC , Black: GND, Green: modulation (option), Yellow: adjustable power (option), no wires for optical heads, 150 mm cable between housings for 2H versions
Laser class	DIN EN 60825-1:2014

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Focus Options

MVfemto lasers are available with different focus options to achieve the right combination of line thickness and depth of focus for the application.

The individual options are:

- STD: Standard, good compromise for line thickness vs. depth of focus
- DL: Thin line
- DLE: Thin line enhanced
- DLSE: Thin line super enhanced
- TS1: Enhanced depth of focus
- TS2: Enhanced depth of focus, factor 2

(Abbreviations: LT = line thickness / DOF = depth of focus)

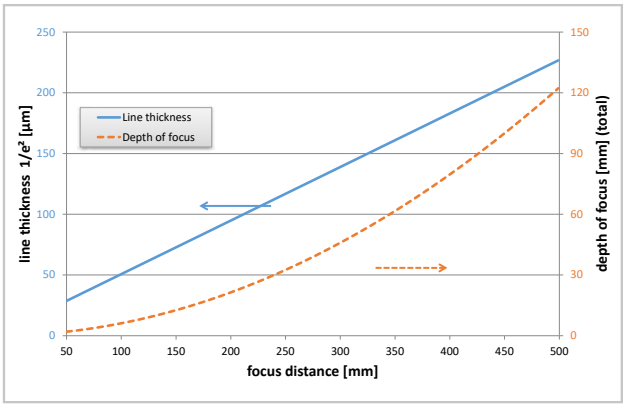

Fig. 1:
Standard laser line characteristics
(short range)

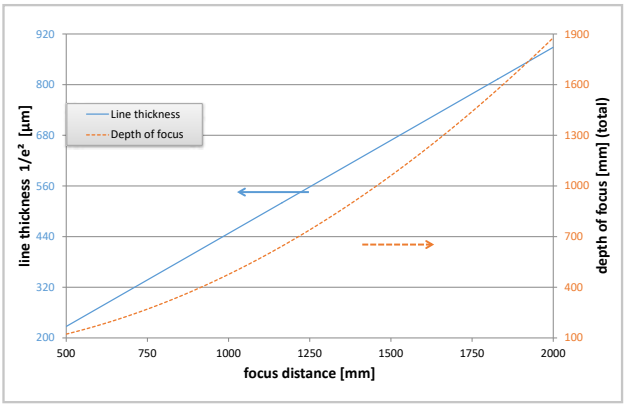

Fig. 2:
Standard laser line characteristics
(long range)

To calculate line thickness and DOF, note the value in the graphs above and multiply them by the factors for your requested wavelength, output power, and focus option listed in the following table.

Germany & Other Countries
Laser Components Germany GmbH
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Specifications MVfemto

P_{out} & λ			Focus options (conversion factor related to the reference laser)											
λ [nm]	P_{out} [mW]	Δ λ [nm]	Std		DL		DLE		DLSE		TS1		TS2	
			LT	DOF	LT	DOF	LT	DOF	LT	DOF	LT	DOF	LT	DOF
405	1-30	±5	0,71	0,81	0,49	0,39	0,35	0,20	0,27	0,12	1,04	1,76	1,53	3,80
450	1-50	±10	0,69	0,69	0,45	0,30	0,33	0,16	0,25	0,10	1,49	3,25	2,20	7,06
520	1-8	±10	0,78	0,78	0,53	0,36	0,39	0,19	0,29	0,11	1,71	3,69	2,55	8,23
640	1-20	±5	1,02	1,07	0,69	0,48	0,51	0,27	0,39	0,16	1,65	2,79	2,43	6,08
640	21-30	±5	1,02	1,07	0,69	0,48	0,51	0,27	0,39	0,16	1,47	2,23	2,18	4,87
660	1-30	±5	1,00	1,00	0,67	0,44	0,49	0,24	0,39	0,15	1,51	2,27	2,25	5,07
685	1-40	±10	1,14	1,24	0,76	0,56	0,57	0,31	0,45	0,20	1,43	1,97	2,12	4,31
785	1-10	±10	0,90	0,68	0,61	0,31	0,45	0,17	0,35	0,10	1,65	2,28	2,43	4,96
850	1-40	±10	0,90	0,63	0,61	0,29	0,45	0,16	0,35	0,10	1,63	2,05	2,41	4,51

Abbreviations

- Reference laser (for LT and DOF)
- Laser with standard availability
- Laser available with modification
- Laser available on request

Modulation Options

MVfemto lasers can either be ordered with digital modulation or analog power adjustment (both of which are optional). The digital option is referred to as option 'M', and power adjustment is referred to as option 'D'.

The individual options are:

- M: digital modulation, active low
- MI: digital modulation (inverted), active high
- D: Dimmable, active low
- DI: Dimmable (inverted), active high

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

P_{out} & λ			Modulation options							
λ [nm]	P_{out} [mW]	Δ λ [nm]	D	DI	M	MI	MD	MID	MDI	MIDI
405	1-30	±5			1), no TTL	(2)				
450	1-50	±10								
520	1-8	±10			1), no TTL	(2)				
640	1-20	±5	1)		1)					
640	21-30	±5	1)		1)					
660	1-30	±5	1)		1)					
685	1-40	±10	1)		1)					
785	1-10	±10	1)		1)					
850	1-40	±10	1)		1)					

Abbreviations

Reference laser (for LT and DOF)
Laser with standard availability
Laser available with modification
Laser available on request

1. ON@float
2. OFF@float
3. Non-linear response
4. No OFF

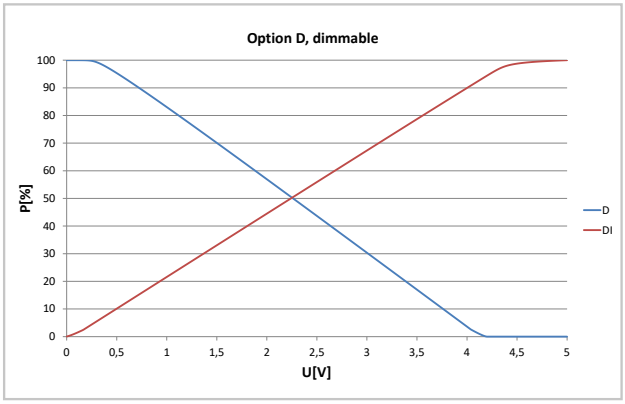

Fig. 3:
Typical graph of an active high/low logic for option D/DI (dim function/power adjustment).

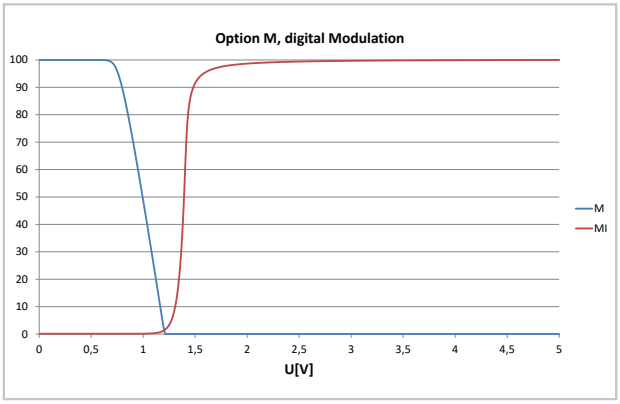

Fig. 4:
Typical graph of an active high/low logic for option M/MI (digital modulation).

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Laser Components Germany GmbH
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France
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Housing Options

MVfemto lasers can be ordered in three different housing options.

- ST: Standard housing
- 2H: Separate housings for optics and electronics
- OH: Optical head only (no laser driver)

The exact dimensions are listed in the following table (please refer to the drawings at the end of the datasheet):

P_{out} & λ			Dimensions [mm]		
λ [nm]	P_{out} [mW]	Δ λ [nm]	ST	OH	2H
					electronics housing: Ø 8 x 40
405	1-30	±5	40	16	25
450	1-50	±10	40	16	25
520	1-8	±10	40	16	25
640	1-20	±5	40	16	25
640	21-30	±5	40	16	25
660	1-30	±5	40	16	25
685	1-40	±10	40	16	25
785	1-10	±10	40	16	25
850	1-40	±10	40	16	25

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Housings

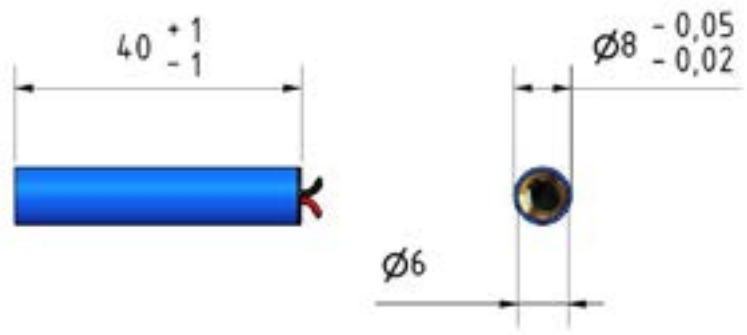

Fig. 5: MVfemto standard housing (ST)

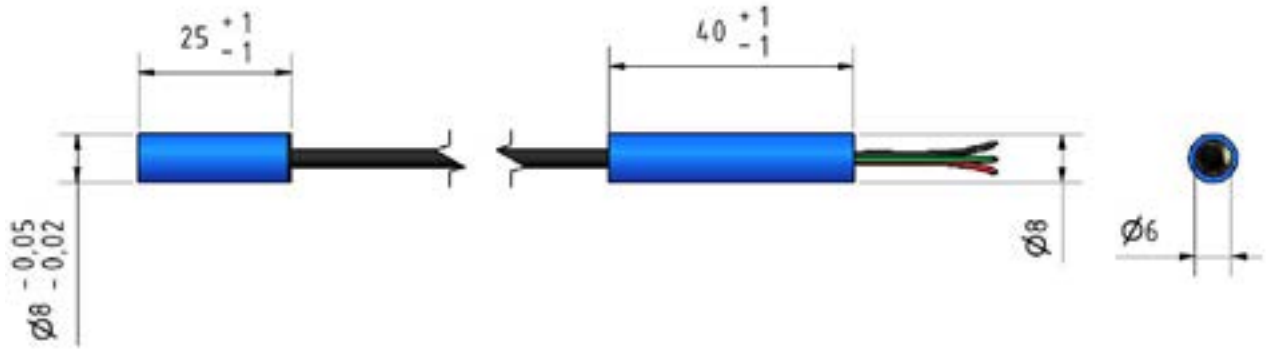

Fig. 6: MVfemto with 2 housings (2H)

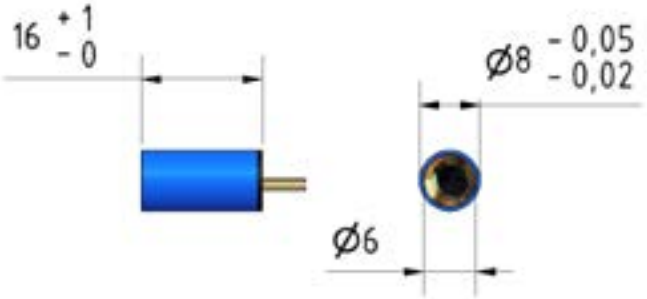

Fig. 7: MVfemto optical head (OH)

Germany & Other Countries
Laser Components Germany GmbH
Tel: +49 8142 2864 – 0
Fax: +49 8142 2864 – 11
info@lasercomponents.com
www.lasercomponents.com

France
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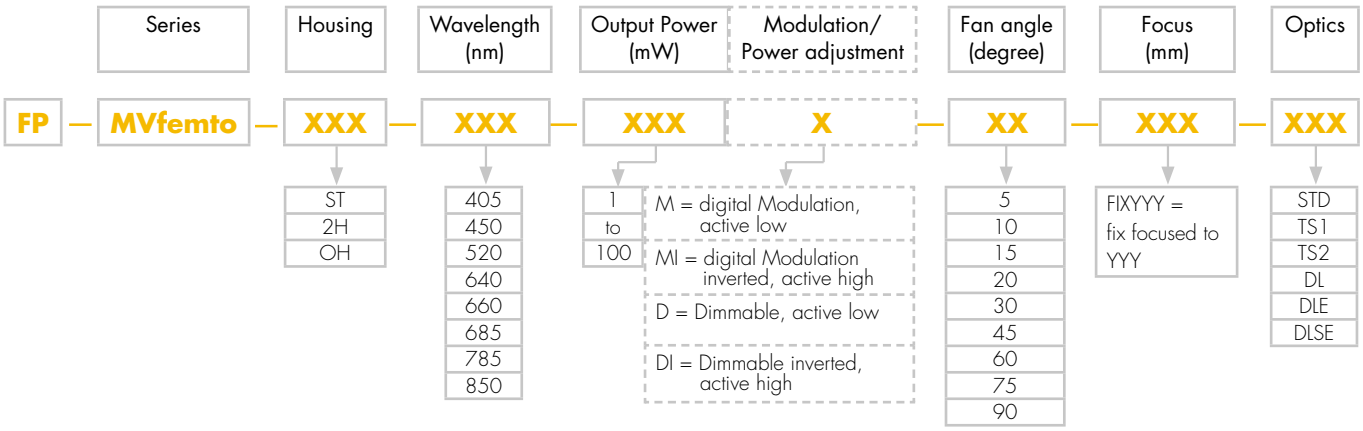
Ordering Code MVfemto Series



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