

## FLEXPOINT® Machine Vision Lasers MVsquare Series

### Prealigned Machine Vision Line Lasers

The MVsquare Machine Vision line lasers offer a prealigned line orientation related to the housing surface. The square housing measures 65 mm x 15 mm x 15 mm and the laser line is specified and adjusted to all 3 axes. This allows very simple integration into 3D Machine Vision sensors without time-consuming alignment of the laser.

In addition to the pre-alignment of the laser line, the MVsquare can also help to save length in the Z-axis of the Machine Vision sensor when the laser is mounted perpendicular to the optical path. Mounted in this way, the necessary space in Z-direction is only 15 mm.



### Features

- Laser line prealigned to all 3 axes
- Helps to reduce length in Z-axis
- Superior line quality
- Many focus / optics options

### Applications

- 3D Machine Vision
- Industrial inspection
- Structured lighting

## 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 – 100 mW (depending on wavelength)
Power stability	≤ 5% (after warm up at 25 °C)
Beam profile	laser line with uniform power distribution, FOV/COS <sup>4</sup> correction available
Fan angle	5°, 10°, 15°, 20°, 30°, 45°, 60°
Focus options	Standard, DL, DLE, DLSE, TS1, TS2
Focus distance	factory focused to customer's specification
Line intensity variation	± 20% related to average power (within 80% of the line)
Line straightness	± 0.1% ( ± 0.05% as option)
Boresight deviation	Pitch ≤ 10 mrad   Yaw ≤ 10 mrad   Roll ≤ 10 mrad (refer to drawing)
Redirection (1st "R")	0°, 90°
Rotation (2nd "R")	0°, 90°
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) (405/450/520 nm available with 5 V electronics on request) reverse voltage protection
Current consumption	< 200 mA
Modulation options	digital (low/high active, 0 – 10 kHz, higher frequency on request), dimmbable (low/high active by 0 – 5 V signal)
Operating temperature	-20 °C bis +50 °C (case temperature, depending on wavelength and heat sink)
Storage temperature	-20 °C bis +60 °C (depending on wavelength)
Housing size	65 mm x 15 mm x 15 mm (refer to drawing)
Housing material	Aluminum (blue anodised, potential free)
Pin definition	Brown: +VDC, Blue: GND, Black: modulation 3 core cable, 2 m length, wires tin-coated at ends
Laser class	DIN EN 60825-1:2014

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### Focus Options

MVsquare 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)

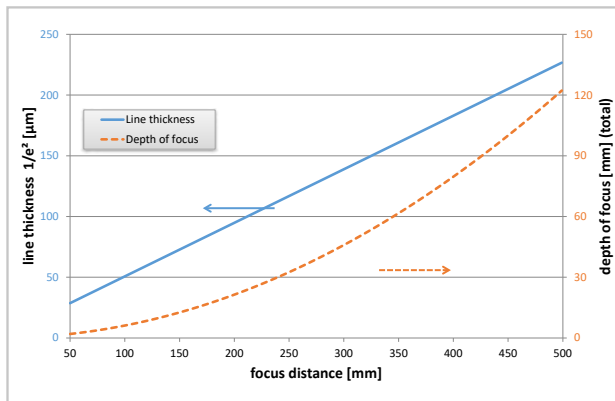


Fig. 1:  
Standard laser line characteristics  
(short range)

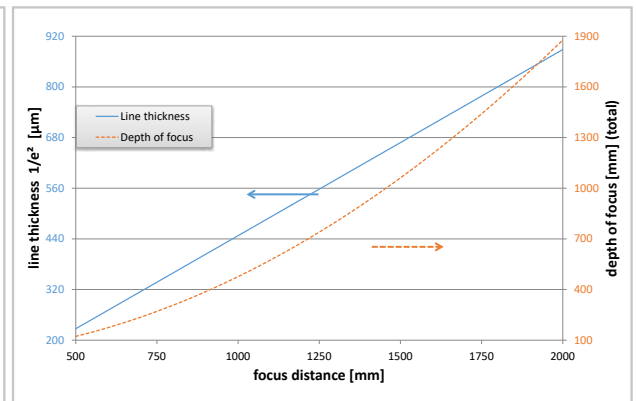


Fig. 2:  
Standard laser line characteristics  
(long range)

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.

## Specifications MVsquare

P <sub>out</sub> & λ			Focus options (conversion factor related to the reference laser)											
λ [nm]	P <sub>out</sub> [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
405	30-100	±6	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	1-10	±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
520	11-40	±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
640	31-100	±5	1,20	1,47	0,80	0,67	0,59	0,36	0,47	0,23	1,65	2,79	2,43	6,08
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
660	31-100	±5	1,31	1,72	0,88	0,78	0,65	0,42	0,51	0,26	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
785	11-100	±10	1,65	2,28	1,12	1,05	0,82	0,57	0,65	0,35	2,00	3,36	2,98	7,45
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

MVsquare 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

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

$\lambda$ [nm]	$P_{out}$ & $\Delta \lambda$		Modulation options							
	$P_{out}$ [mW]	$\Delta \lambda$ [nm]	D	DI	M	MI	MD	MID	MDI	MIDI
405	1-30	±5			1), no TTL	2), TTL				
405	30-100	±6	1), 3), 4)	2), 3), 4)	1), no TTL	2), TTL	4)			1), no TTL
450	1-50	±10	1), 3), 4)	2), 3), 4)	1), no TTL	2), TTL	4)			1), no TTL
520	1-10	±10			1), no TTL	2), TTL				
520	11-40	±10			1), no TTL	2), TTL				
640	1-20	±5			1), no TTL	2), TTL				
640	21-30	±5			1), no TTL	2), TTL				
640	31-100	±5	1), 3), 4)	2), 3), 4)	1), no TTL	2), TTL	4)			1), no TTL
660	1-30	±5			1), no TTL	2), TTL				
660	31-100	±5	1), 3), 4)	2), 3), 4)	1), no TTL	2), TTL	4)			1), no TTL
685	1-40	±10			1), no TTL	2), TTL				
785	1-10	±10			1), no TTL	2), TTL				
785	11-100	±10	1), 3), 4)	2), 3), 4)	1), no TTL	2), TTL	4)			1), no TTL
850	1-40	±10			1), no TTL	2), TTL				

**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

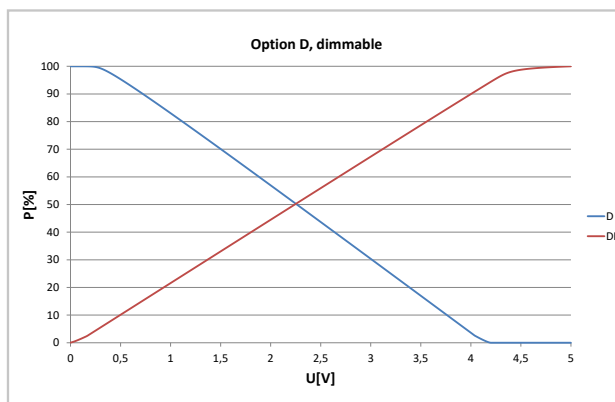


Fig. 3: Typical graph of an active high/low logic for option D/DI (dim function/power adjustment).

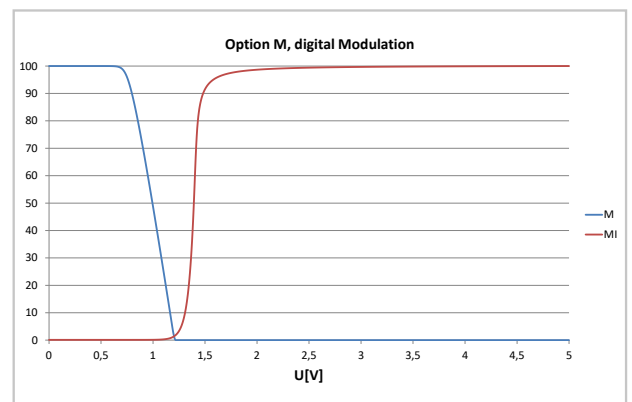


Fig. 4: Typical graph of an active high/low logic for option M/MI (digital modulation).

Housings

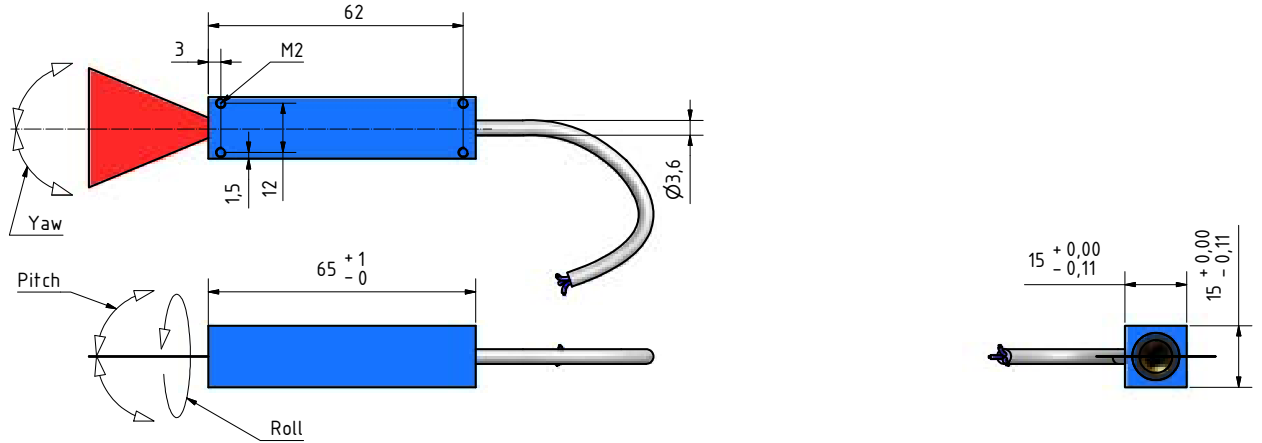


Fig. 5: FP-MVsqu-1.5-FIX-RORO

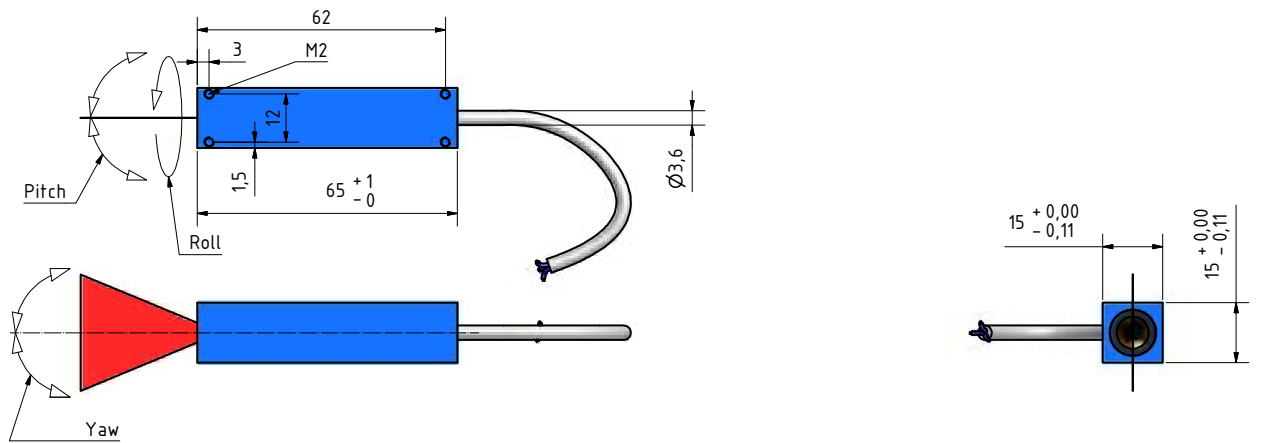


Fig. 6: FP-MVsqu-1.5-FIX-ROR90

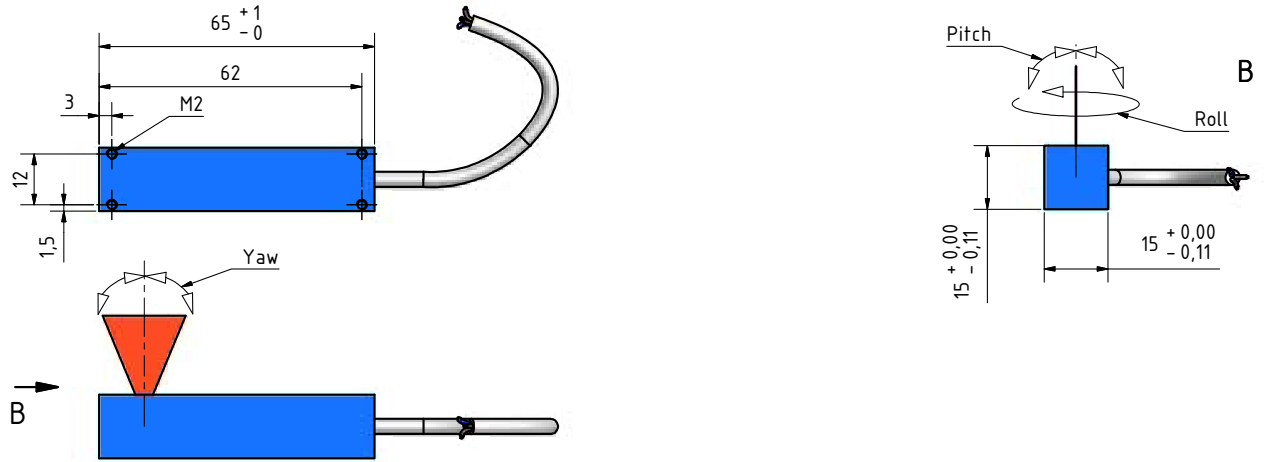


Fig. 7: FP-MVsqu-15-FIX-R90R90

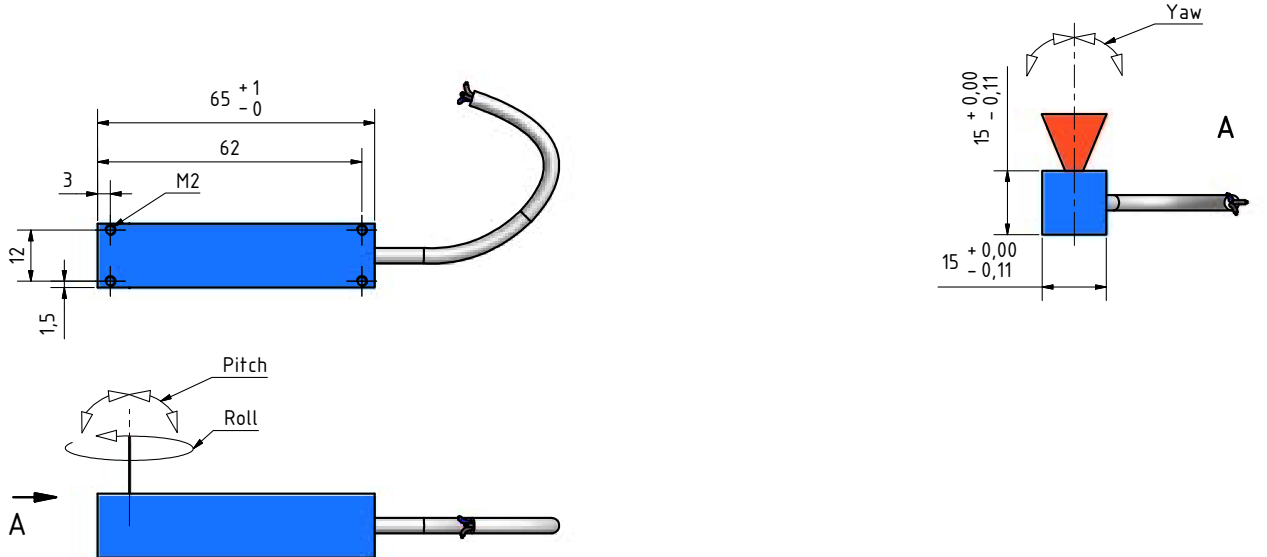
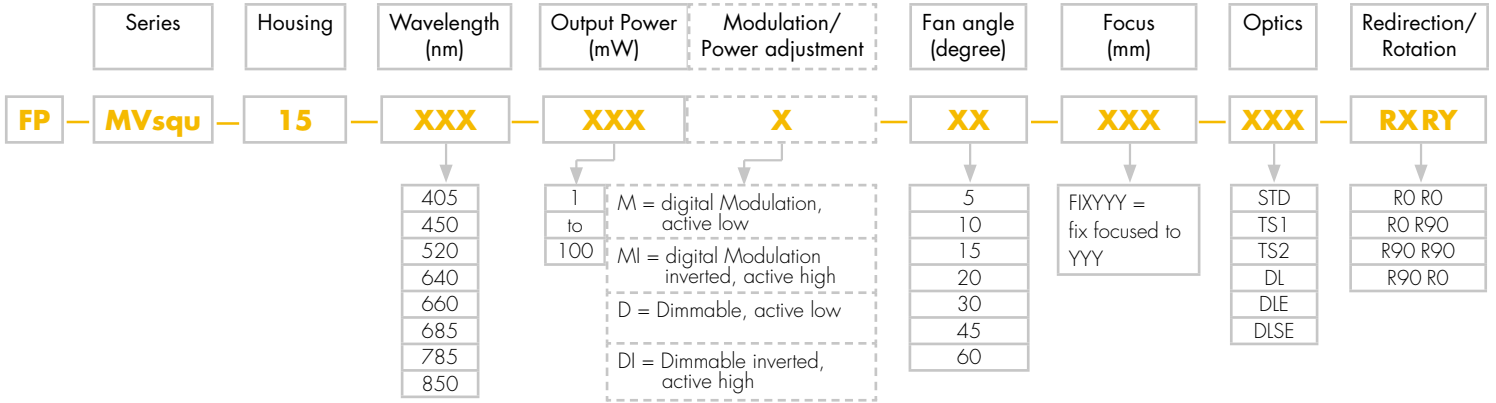


Fig. 8: FP-MVsqu-15-FIX-R90R0

## Ordering Code MVsquare Series



## Product Changes

LASER COMPONENTS reserves the right to make changes to the product(s) or information contained herein without notice. No liability is assumed as a result to their use or application.

## Ordering Information

Products can be ordered directly from LASER COMPONENTS or its representatives. For a complete listing of representatives, visit our website at [www.lasercomponents.com](http://www.lasercomponents.com)

Custom designed products are available on request.