

FLEXPOINT® Machine Vision Lasers MVnano Series (Edition 2017)

The Workhorse

With a housing that measures 60 mm x 11.5 mm, MVnano lasers are suitable both for use as standalone products and for integration.

The 2017 edition of the MVnano features a newly developed focusing mechanism that helps the customer adjust the focal distance much faster and more precisely. The customer can choose from several optics options to get the right combination of line thickness and depth of focus for their application.

The MVnano can be ordered with adjustable focus, with a fixed focus that is set at the factory, with separate housings for optics and electronics, and as a version without driver electronics for use in OEM sensors.



Features

- Superior line quality
- Many focus / optics options
- Improved focusing mechanism
- Modular housing 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 ⁴ correction available |
| Fan angle | 5°, 10°, 15°, 20°, 30°, 45°, 60°, 75°, 90° |
| 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 | < 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 | Ø = 11.5 × length (see product map for length -> depending on chosen features) |
| 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, no wires for optical heads, 150 mm cable between housing for 2H versions |
| Laser class | DIN EN 60825-1:2014 |

Focus Options

MVnano 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)

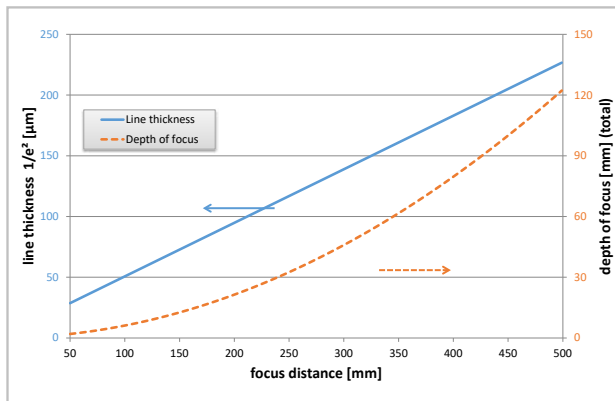


Fig. 1:
Standard laser line characteristics
(short range)

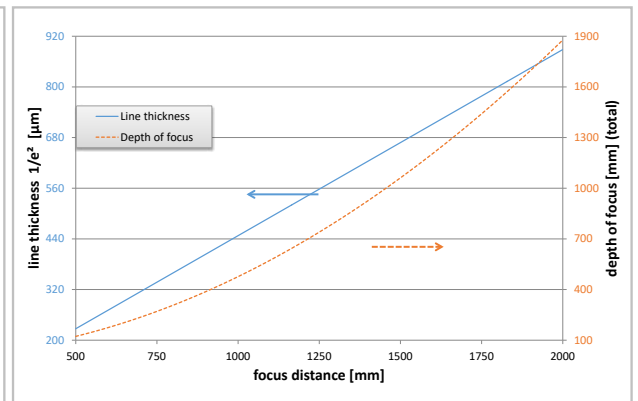


Fig. 2:
Standard laser line characteristics
(long range)

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 MVnano

| 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 |
| 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

MVnano 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.

| λ [nm] | P_{out} & λ | | 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

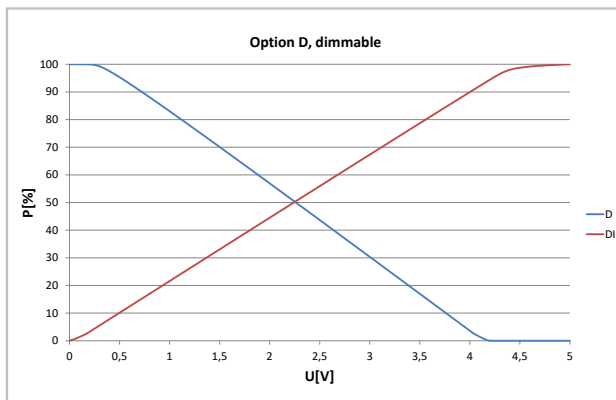


Fig. 3: Typical graph of an active high/low logic for option D/DI (dim function/power adjustment).

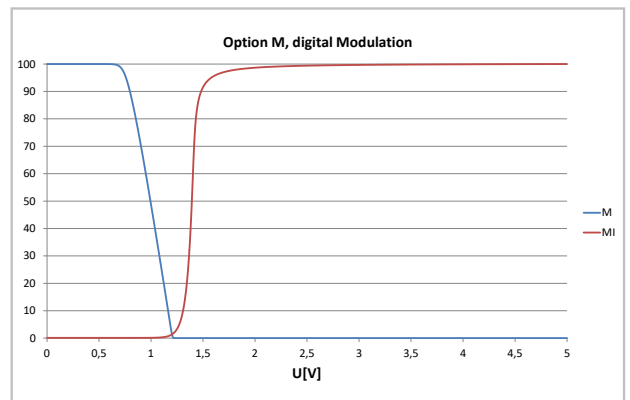


Fig. 4: Typical graph of an active high/low logic for option M/MI (digital modulation).

Housing Options

MVnano lasers can be ordered in three different housing options. All three housing options are available with an adjustable and fixed focus.

- 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):

| λ [nm] | P_{out} & λ | | Length [mm] (outer diameter: $\varnothing 11.5$) | | | | | |
|-------------------|-----------------------|--------------------------|---|-----------|----|-----------|--|--------|
| | P_{out} [mW] | $\Delta \lambda$ [nm] | ST | ST FIX | OH | OH FIX | 2H | 2H FIX |
| | | | | | | | electronics housing: $\varnothing 11.5 \times 40$ | |
| 405 | 1-30 | ± 5 | 70 | 60 | | | 60 | 40 |
| 405 | 30-100 | ± 6 | 70 | 60 | | | 60 | 40 |
| 450 | 1-50 | ± 10 | 70 | 60 | | | 60 | 40 |
| 520 | 1-10 | ± 10 | 70 | 60 | | | 60 | 40 |
| 520 | 11-40 | ± 10 | 70 | 60 | | | 60 | 40 |
| 640 | 1-20 | ± 5 | 60 | 60 | 29 | 21 | 40 | 29 |
| 640 | 21-30 | ± 5 | 60 | 60 | 29 | 21 | 40 | 29 |
| 640 | 31-100 | ± 5 | 60 | 60 | 29 | 21 | 40 | 29 |
| 660 | 1-30 | ± 5 | 60 | 60 | 29 | 21 | 40 | 29 |
| 660 | 31-100 | ± 5 | 60 | 60 | 29 | 21 | 40 | 29 |
| 685 | 1-40 | ± 10 | 60 | 60 | 29 | 21 | 40 | 29 |
| 785 | 1-10 | ± 10 | 60 | 60 | 29 | 21 | 40 | 29 |
| 785 | 11-100 | ± 10 | 60 | 60 | 29 | 21 | 40 | 29 |
| 850 | 1-40 | ± 10 | 60 | 60 | 29 | 21 | 40 | 29 |

Housings

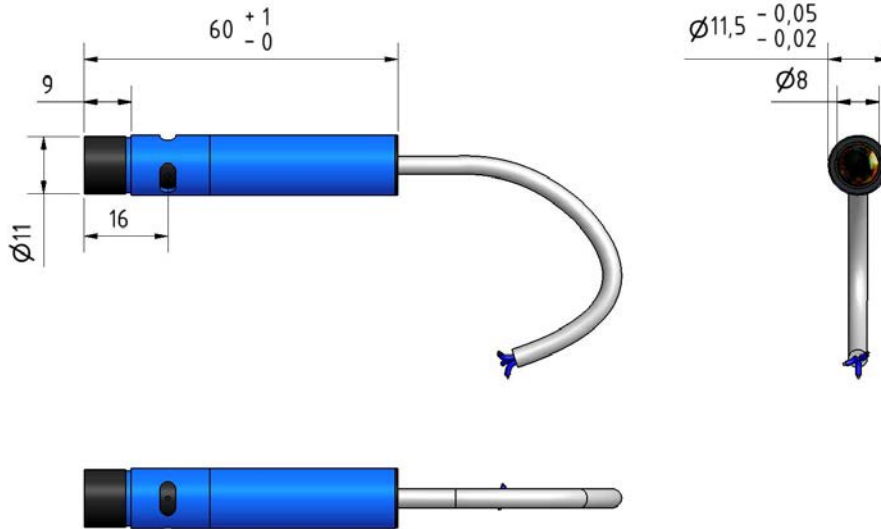


Fig. 5: MVnano standard housing (ST)

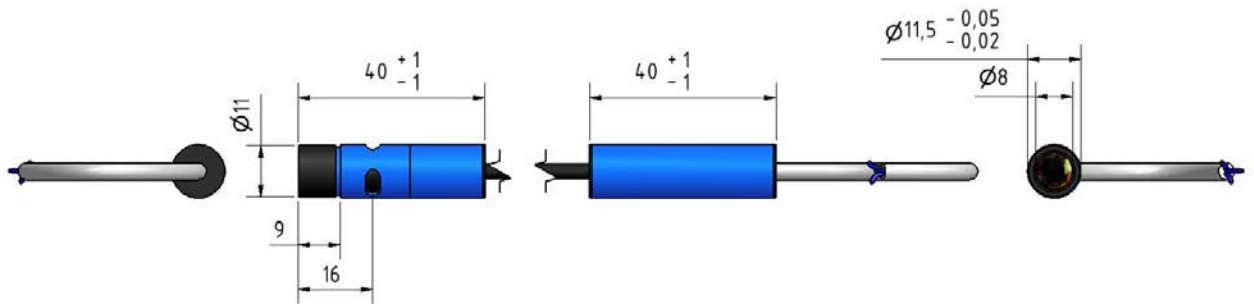


Fig. 6: MVnano with 2 housings (2H)

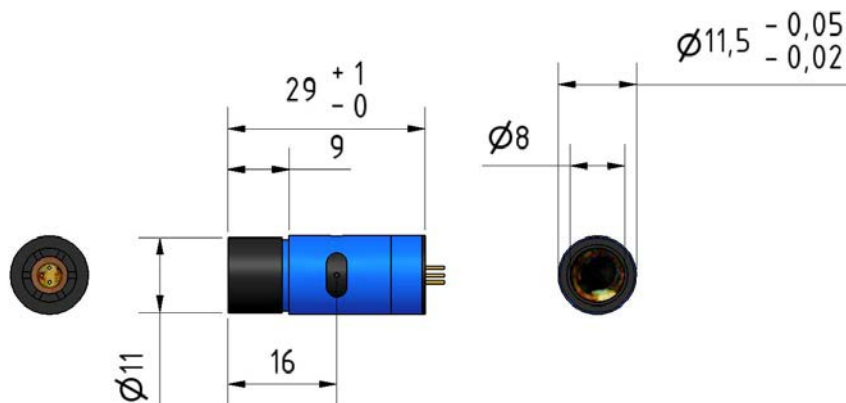


Fig. 7: MVnano optical head (OH)

Ordering Code MVnano Series

