

## FLEXPOINT® Machine Vision Lasers MVpico Series (Edition 2017)

### Small and flexible

MVpico line lasers are only 50 mm long and have a diameter of 10 mm. These small dimensions make the MVpico perfectly suited for integration in intelligent 3D vision sensors. In spite of the tiny housing dimensions, they provide output powers of up to 100 mW.

MVpico lasers can also be ordered with the new 2017-edition focusing mechanism for easier and more precise focus adjustment. We offer several optics options to achieve the right combination of line thickness and depth of focus.

The MVpico series includes versions with adjustable focus, fixed focus, or separate housings for optics and electronics, as well as a version without driver electronics.



### 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<br>(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°, 75°, 90°  |
| Focus options            | Standard, DL, DLE, DLSE, TS1, TS2   |
| Line intensity variation | ± 20% related to average power (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)<br>(405/520 nm available with 5 V electronics on request)<br>reverse voltage protection   |
| Current consumption      | < 200 mA  |
| Modulation options       | digital (low/high active, 0 – 10 kHz, higher frequency on request),<br>dimmable (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   |
| Housing size             | Ø = 10 mm x length (see product map for length -> depending on chosen features)   |
| Housing material         | Aluminum (blue anodised, potential free)  |
| Pin definition           | 200 mm flying leads<br>Red: +VDC, Black: GND, Green: modulation (option),<br>Yellow: adjustable power (option),<br>no wires for optical heads,<br>150 mm cable between housings for 2H versions |
| Laser class              | DIN EN 60825-1:2014   |

## Focus Options

MVpico 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)

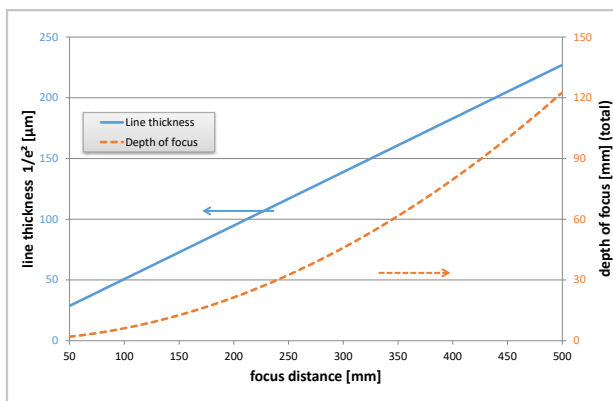


Fig. 1:  
Standard laser line characteristics  
(short range)

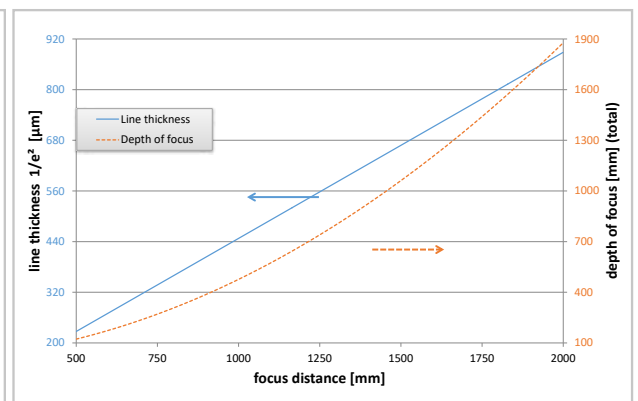


Fig. 2:  
Standard laser line characteristics  
(long range)

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 MVpico

| P <sub>out</sub> & λ |                          |             | Focus options (conversion factor related to the reference laser) |      |      |      |      |      |      |      |      |      |      |      |
|----------------------|--------------------------|-------------|--|------|------|------|------|------|------|------|------|------|------|------|
| λ<br>[nm]            | P <sub>out</sub><br>[mW] | Δ λ<br>[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                  | 1-10                     | ±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 |
| 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

MVpico 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.

| P <sub>out</sub> & λ |                       |          | Modulation options |            |            |         |    |     |     |            |
|----------------------|-----------------------|----------|--------------------|------------|------------|---------|----|-----|-----|------------|
| λ [nm]               | P <sub>out</sub> [mW] | Δ λ [nm] | D                  | DI         | M          | MI      | MD | MID | MDI | MIDI       |
| 405                  | 1-30                  | ±5       |                    |            | 1), no TTL | 2), 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 |    |     |     |            |
| 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

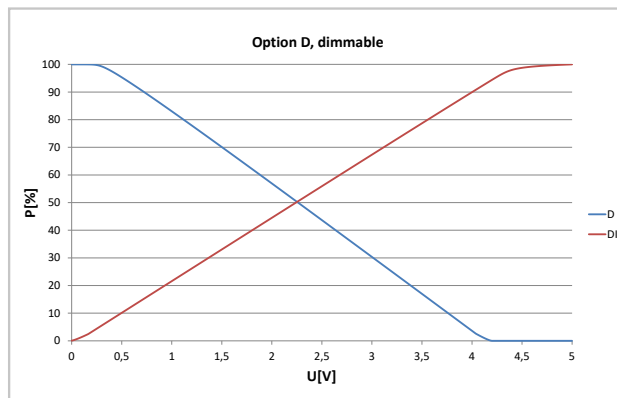


Fig. 3: Typical graph of an active high/low logic for option D/DI (dim function/power adjustment).

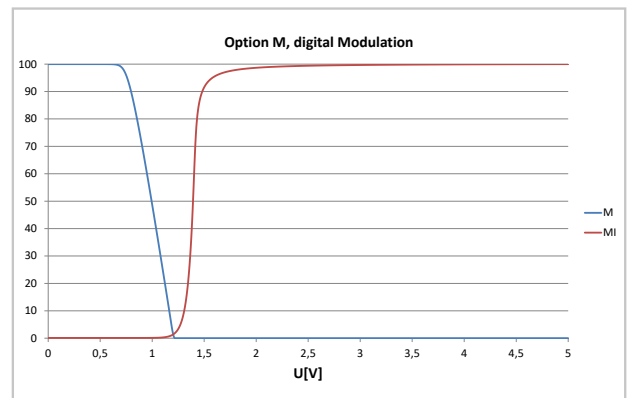


Fig. 4: Typical graph of an active high/low logic for option M/MI (digital modulation).

## Housing Options

MVpico 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):

| $\lambda$<br>[nm] | $P_{out}$ & $\lambda$ |                          | Length [mm] (outer diameter: $\varnothing 10$ )    |           |    |           |    |        |
|-------------------|-----------------------|--------------------------|--|-----------|----|-----------|----|--------|
|                   | $P_{out}$<br>[mW]     | $\Delta \lambda$<br>[nm] | ST   | ST<br>FIX | OH | OH<br>FIX | 2H | 2H FIX |
|                   |                       |                          | electronics housing:<br>$\varnothing 10 \times 40$ |           |    |           |    |        |
| 405               | 1-30                  | $\pm 5$                  | 50   | 40        | 27 | 16        | 35 | 25     |
| 450               | 1-50                  | $\pm 10$                 | 50   | 40        | 27 | 16        | 35 | 25     |
| 520               | 1-10                  | $\pm 10$                 | 50   | 40        | 27 | 16        | 35 | 25     |
| 640               | 1-20                  | $\pm 5$                  | 50   | 40        | 27 | 16        | 35 | 25     |
| 640               | 21-30                 | $\pm 5$                  | 50   | 40        | 27 | 16        | 35 | 25     |
| 640               | 31-100                | $\pm 5$                  | 50   | 40        | 27 | 16        | 35 | 25     |
| 660               | 1-30                  | $\pm 5$                  | 50   | 40        | 27 | 16        | 35 | 25     |
| 660               | 31-100                | $\pm 5$                  | 50   | 40        | 27 | 16        | 35 | 25     |
| 685               | 1-40                  | $\pm 10$                 | 50   | 40        | 27 | 16        | 35 | 25     |
| 785               | 1-10                  | $\pm 10$                 | 50   | 40        | 27 | 16        | 35 | 25     |
| 785               | 11-100                | $\pm 10$                 | 50   | 40        | 27 | 16        | 35 | 25     |
| 850               | 1-40                  | $\pm 10$                 | 50   | 40        | 27 | 16        | 35 | 25     |

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## Housings

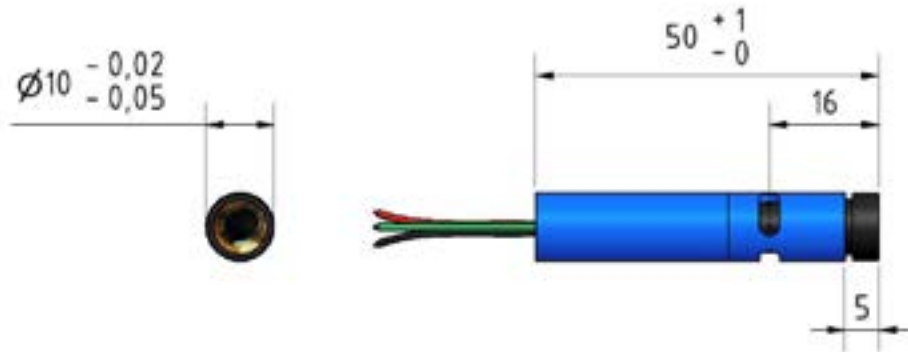


Fig. 5: MVpico standard housing (ST)

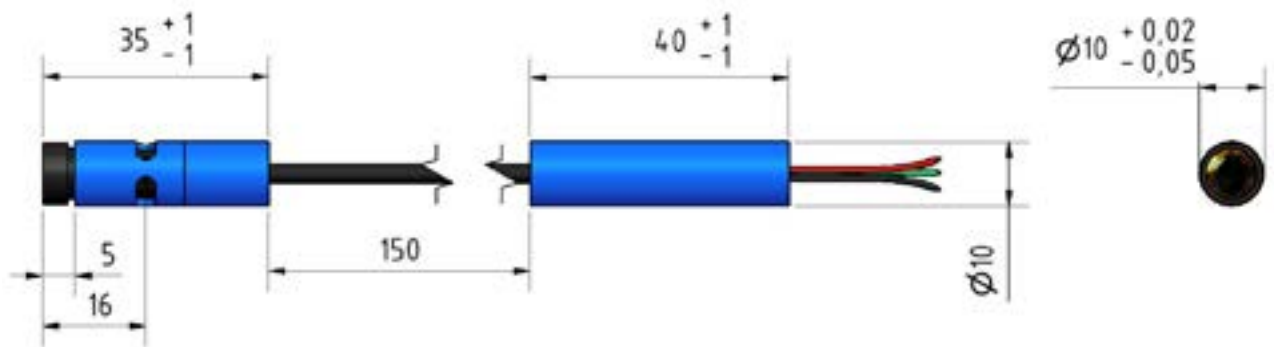


Fig. 6: MVpico with 2 housings (2H)

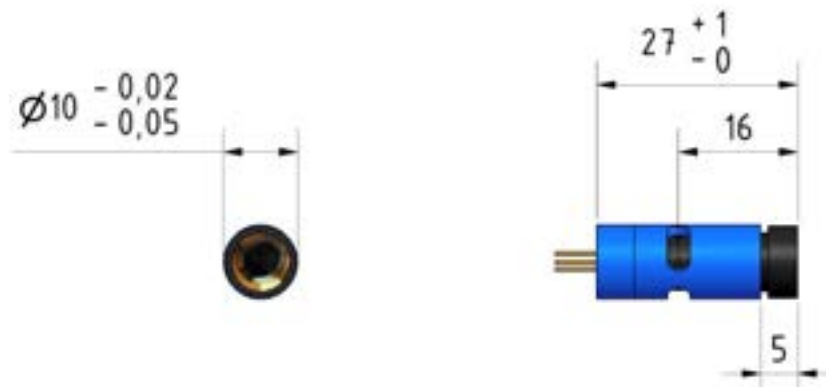


Fig. 7: MVpico optical head (OH)

## Ordering Code MVpico Series

