

# Datasheet

## Fiber coupled laser diode system - iFLEX2000

The iFLEX2000™ is a compact laser diode system with a modular singlemode fiber delivery system. The laser is mode-hop free and wavelength stabilized as a direct result of active temperature control. A closed loop control provides long term power stability and an ability to monitor the power via an external output signal.

The laser module is guaranteed for long lifetime and delivers exceptional power stability with low amplitude noise. All models feature an interlock and output diagnostics for laser current and temperature as standard. Features include a high dynamic range 5MHz TTL modulation option or a variable power control via analog modulation up to 5MHz. All lasers feature diffraction limited output beams with zero astigmatism, high spatial coherence and low dynamic pointing error.

The iFLEX2000 is compatible with a number of commercially available imaging software packages such as Olympus cell<sup>^</sup>R™, MetaMorph® and μManager and a number of add-on interfaces ensure a complete solution for all microscope systems.

The kinematic design of the laser to fiber coupler enables true 'Plug & Play' benefits for singlemode and polarization-preserving fiber designs. Sub-micron repeatability and sub-microradian stability mean systems can be 'factory set' and stable for multiple remove and insert operations. The laser and fiber systems are also optimized for unmatched laser modules thus providing true modularity for instrument design and ease of replacement.

Laser systems can be made available in constant current mode and in ultra-low noise versions. OEM options also include custom multiplexed laser modules with customer specific lasers.

### Some of the product features include:

- Factory set and conform to specification 'out of the box'
- Stable to optomechanical thermal effects and exhibits no hysteresis
- TEM<sub>00</sub> true Gaussian beam
- Wavelengths at 375, 405, 445, 473, 488, 515, 640, 660, 670, 780, 830nm
- 50mW, OEM versions available
- High stability, high beam quality
- Low noise
- Software controllable



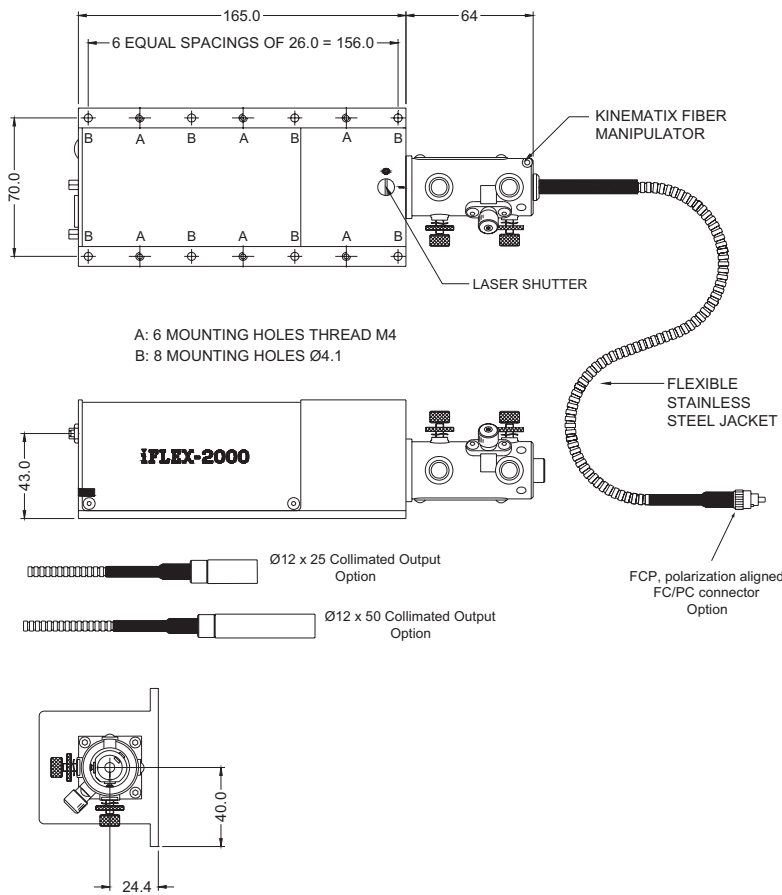
## Technical Specifications

| <b>Lasers</b>                           |  |        |     |     |        |     |        |     |     |     |     | <b>Units</b> |
|---|--|--------|-----|-----|--------|-----|--------|-----|-----|-----|-----|--------------|
| Wavelength                              | 375  | 405    | 445 | 473 | 488    | 515 | 640    | 660 | 670 | 780 | 830 | nm           |
| Output power                            | 10   | 30, 50 | 20  | 5   | 15, 30 | 10  | 20, 50 | 35  | 4   | 35  | 50  | mW           |
| <b>Operating performance</b>            |  |        |     |     |        |     |        |     |     |     |     |              |
| Polarization ratio                      | ≤ -20  |        |     |     |        |     |        |     |     |     |     | dB           |
| <b>Laser parameters</b>                 |  |        |     |     |        |     |        |     |     |     |     |              |
| Center wavelength                       | ± 5  |        |     |     |        |     |        |     |     |     |     | nm           |
| Power stability (over 8 hours)          | < 2  |        |     |     |        |     |        |     |     |     |     | %            |
| Optical Noise (20Hz to 2MHz) rms*       | < 0.1  |        |     |     |        |     |        |     |     |     |     | %            |
| Optical Noise (20Hz to 20kHz) pk to pk* | < 1  |        |     |     |        |     |        |     |     |     |     | %            |
| <b>Electrical</b>                       |  |        |     |     |        |     |        |     |     |     |     |              |
| Power supply                            | 12V DC, 0.5A (laser)<br>5V DC, 3A max, 1 A running (TE Controller)               |        |     |     |        |     |        |     |     |     |     | -            |
| Max. base plate temperature             | +40  |        |     |     |        |     |        |     |     |     |     | °C           |
| Max. heat dissipation                   | 12.5   |        |     |     |        |     |        |     |     |     |     | W            |
| <b>Connectorized output beam</b>        |  |        |     |     |        |     |        |     |     |     |     |              |
| Polarization maintaining fiber          | FCP (polarization keyed)<br>FCP8, APC (polarization keyed and 8 degree polished) |        |     |     |        |     |        |     |     |     |     | -            |
| <b>Fiber parameters</b>                 |  |        |     |     |        |     |        |     |     |     |     |              |
| Fiber length                            | 1 to 3   |        |     |     |        |     |        |     |     |     |     | m            |
| Fiber protective jacket                 | Stainless steel, 5mm OD  |        |     |     |        |     |        |     |     |     |     | -            |
| <b>Collimated output beam</b>           |  |        |     |     |        |     |        |     |     |     |     |              |
| Beam diameter                           | 0.7  |        |     |     |        |     |        |     |     |     |     | mm           |
| M squared                               | typ 1.1  |        |     |     |        |     |        |     |     |     |     | -            |
| Pointing stability                      | ≤ 1  |        |     |     |        |     |        |     |     |     |     | μrad/°C      |
| Beam divergence                         | Diffraction Limited  |        |     |     |        |     |        |     |     |     |     | -            |
| Mechanical dimensions                   | Ø12 x 50   |        |     |     |        |     |        |     |     |     |     | mm           |
| Beam position                           | ≤ ± 0.15   |        |     |     |        |     |        |     |     |     |     | mm           |
| Beam angle                              | ≤ ± 0.5  |        |     |     |        |     |        |     |     |     |     | mrad         |
| <b>Environmental conditions</b>         |  |        |     |     |        |     |        |     |     |     |     |              |
| Storage temperature                     | 10 to 50   |        |     |     |        |     |        |     |     |     |     | °C           |
| Operating pressure                      | Atmospheric  |        |     |     |        |     |        |     |     |     |     | -            |
| Operating temperature                   | 10 to 40   |        |     |     |        |     |        |     |     |     |     | °C           |
| Operating humidity                      | Non-condensing   |        |     |     |        |     |        |     |     |     |     | -            |
| <b>Modulation</b>                       |  |        |     |     |        |     |        |     |     |     |     |              |
| Analog                                  | 5MHz, <200ns rise time, input voltage level 0 - 5V                               |        |     |     |        |     |        |     |     |     |     | -            |

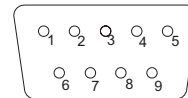
\* Model Specific - Contact Qioptiq for clarification.

Note: OEM versions available please call

## Laser head

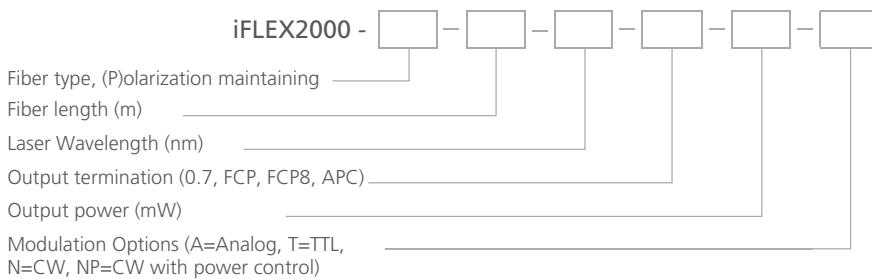


## Electrical interface



1. 5V ± 5% DC/3A (Temperature controller)
2. 12V ± 5% DC/0.5A (Laser driver)
3. Laser enable; 4-5V to enable, <1.2V to disable
4. Temperature OK signal, TTL logic level output (high = temperature locked)
5. External current control (0V fully on; 5V fully off)
6. 0V Temperature controller
7. 0V Laser driver
8. Diode operating current output; (Vop is scaled 10mV/mA laser diode current)
9. Monitor photodiode output (uncalibrated)

## Order Code



## Fiber Optics



### kineFLEX™

**Robust laser beam delivery system for precision measurement applications**

- Fiber coupling for DPSS, diode and gas lasers
- Highly repeatable and stable operation
- Greater than 65% coupling efficiency



### kineFLEX-HPV™ / kineFLEX-UV™

**Robust high power laser beam delivery system for precision measurement applications**

- Input power up to 500mW for 488nm or higher
- Input power up to 20mW for 375nm
- OEM multiple wavelength versions available



### kineFLEX-DUO™

**Robust laser beam delivery system for two laser sources at visible wavelengths**

- Efficient and simple beam combination
- Visible wavelengths
- Rugged platform for industrial applications



### laserPLATE™

**Rapid and convenient mechanical mounting and packaging system for laser to fiber alignment**

- Compatible and integrated laser to fiber coupling
- Combined laser chassis and heatsink
- Easy to integrate and align

## Lasers



### iFLEX-Mustang™

**Fiber coupled solid state laser with on-board acousto-optic modulation**

- DPSS lasers, 488, 532 and 561nm
- High long term stability and low noise
- 25mW of output power



### iFLEX-Q3™

**Compact laser diode system for precision optical instrumentation**

- Exceptional brightness, stability and long-term reliability
- Highly polarized beam
- Versatile, small form laser head and remote electronics module

## Multi-laser Engines



### iFLEX-Adder™

**5 into 1 fiber-coupled laser beam combination system**

- True 'Plug & Play' capability enabling ultimate flexibility of laser suite
- Upgradeable from 2 to 5 wavelengths as required
- Compatible with kineFLEX™ and kineFLEX-HPV™



### iFLEX-Viper™

**The world's first integrated Multi-laser Engine**

- Combines 5 wavelengths in one instrument
- Delivers wavelengths via a singlemode fiber optic cable
- On-board acousto-optic modulation up to 3MHz

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