integrated optics ®

CW Lasers	Combiners	Q-switch Lasers
>20 Wavelengths MM/SM/PM fiber Single-frequency options	405 nm to 660 nm 4 wavelengths Open beam or Fiber	1029 nm / 514.5 nm High pulse energy Single Longitudinal Mode

MatchBox
series

PRISM AWARDS FINALIST

LASERS FOR ANALYTICAL INSTRUMENTATION

ADVANTAGES

APPLICATIONS

CW BROAD SPECTRUM LASERS

- Fluorescence spectroscopy
- Scanning Microscopy
- Sorting
- Flow cytometry
- Metrology
- Optical guiding
- UV curring
- 3D printing
- Excitation

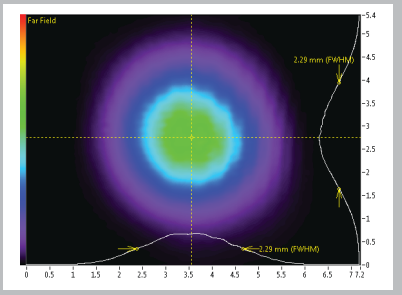
CW SLM LASERS

- Raman Spectroscopy
- Holography
- Inspection

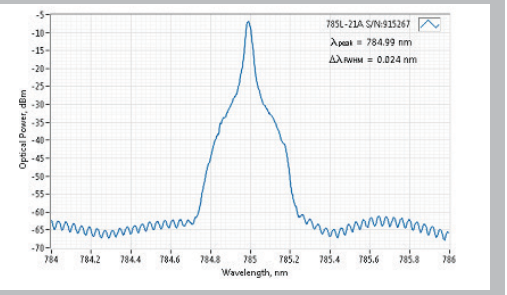
NANOSECOND SLM LASERS

- Supercontinuum Generation
- Pulsed Laser Seeding
- Laser Induced Breakdown Spectroscopy (LIBS)
- Range Finding
- Raman Spectroscopy
- Holography

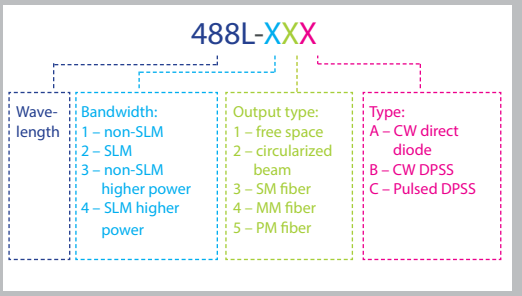
GENERAL INFORMATION



Beam profile of 1064L-11B
(far field)



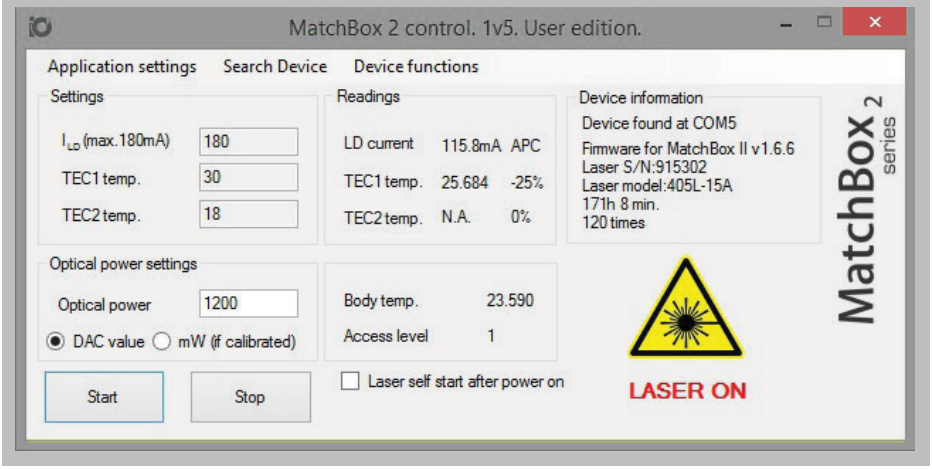
Spectrum of 785L-21A SLM laser
(measurement is limited by spectrum analyzer)



Part number structure

Unified Physical Control Interface

CONTROL SOFTWARE



Wave-length (nm)	Type	Output power (free space)	Output power (SM PM fiber)	Output power (MM fiber)	Wave-length tolerance +/-	Spectral linewidth FWHM (typical)	Noise (20 Hz – 20 MHz) (typical)
BROAD SPECTRUM CW LASERS							
405 nm	Diode	150 mW	80 mW	130 mW	3 nm	0.5 nm	0.25%
445 nm	Diode	80 mW	35 mW	50 mW	3 nm	0.8 nm	0.25%
488 nm	Diode	45 mW	20 mW	30 mW	3 nm	1.0 nm	0.25%
520 nm	Diode	40 mW	20 mW	30 mW	5 nm	1.0 nm	0.8%
532.1 nm	DPSS	200 mW	100 mW	160 mW	0.1 nm	0.3 nm	N/A
	DPSS	500 mW	N/A	350 mW	0.1 nm	0.3 nm	N/A
638 nm	Diode	180 mW	100 mW	150 mW	3 nm	0.7 nm	0.25%
660 nm	Diode	110 mW	45 mW	90 mW	3 nm	0.7 nm	0.25%
785 nm	Diode	150 mW	60 mW	120 mW	3 nm	0.2 nm	0.25%
830 nm	Diode	130 mW	60 mW	90 mW	10 nm	0.5 nm	0.25%
850 nm	Diode	130 mW	60 mW	90 mW	10 nm	0.5 nm	0.25%
915 nm	Diode	200 mW	100 mW	140 mW	3 nm	0.7 nm	0.25%
975 nm	Diode	200 mW	80 mW	120 mW	3 nm	0.5 nm	0.25%
980 nm	Diode	200 mW	80 mW	120 mW	3 nm	0.5 nm	0.25%
1030 nm	DPSS	500 mW	300 mW	400 mW	2 nm	0.7 nm	N/A
1064 nm	DPSS	500 mW	300 mW	400 mW	0.3 nm	0.7 nm	N/A
NARROW SPECTRUM (SLM) CW LASERS							
405 nm	Diode	40 mW	15 mW	30 mW	0.1 nm	<0.1 pm	0.25%
488 nm	Diode	30 mW	10 mW	15 mW	0.2 nm	<0.1 pm	0.25%
532.1 nm	DPSS	50 mW	25 mW	40 mW	0.2 nm	<0.2 pm	1%
632.8 nm	Diode	60 mW	30 mW	40 mW	0.1 nm	<0.1 pm	0.25%
635 nm	Diode	90 mW	45 mW	65 mW	0.1 nm	<0.1 pm	0.25%
783 nm	Diode	130 mW	70 mW	90 mW	0.1 nm	<0.1 pm	0.25%
785 nm	Diode	130 mW	70 mW	90 mW	0.1 nm	<0.1 pm	0.25%
	Diode	500 mW	N/A	350 mW	0.5 nm	<30 pm	0.25%
830 nm	Diode	100 mW	50 mW	80 mW	0.2 nm	<0.1 pm	0.25%
1029 nm	DPSS	400 mW	200 mW	280 mW	0.25 nm	<0.2 pm	0.5%
1064 nm	DPSS	400 mW	200 mW	280 mW	0.3 nm	<0.2 pm	0.5%

Other wavelengths on request:
473 nm, 491 nm, 561 nm, 589 nm, 593 nm, 671 nm, 946 nm, 1123 nm, 1319 nm, 1342 nm.

OTHER PARAMETERS

BEAM PROPERTIES:
- Transversal mode: TEM00, except 500 mW versions of 532 nm and 785 nm
- Beam diameter at aperture (1/e2): <2 mm for diode and ~1 mm for DPSS
- Beam divergence (full angle): <2 mrad for diode and <1.5 mrad for DPSS, except 500 mW versions of 532 nm and 785 nm
- Beam pointing stability: <1 mrad/C°
- Bore sight error: +/-2 mrad (vertical), +/-3 mrad (horizontal)
- Beam quality, M2: 1.1 to 1.5, except multimode 500 mW versions of 532 nm and 785 nm
- Polarization ratio: better than 500:1 for DPSS and better than 1000:1 for diode lasers.

POWER STABILITY:
- Power stability of free-space lasers is <1 % RMS over 8 hrs
- Power stability of fiber-coupled lasers is <2 % RMS over 8 hrs
- Non-SLM DPSS lasers have significant noise peaks at above 200 kHz

MODULATION:
- Fast TTL modulation of non-SLM diode lasers is implemented on request
- For SLM diode and all DPSS lasers, the TTL pin is configured for fan speed control
- Modulation of DPSS lasers (up to few kHz) is implemented upon request

FIBER SPECS:
- SLM fiber coupled lasers are made with FC/APC connectors
- Non-SLM lasers are made with FC/PC connectors
- Standard length of a fiber is 1 m to 1.2 m
- Polarization extinction ratio (PM fiber): better than 20 dB
- Polarization rotation (PM fiber): less than 5 degree

PHYSICAL PROPERTIES:
- Control interface type: UART serial bus, convertible to USB with standard accessories
- External power supply requirement: +5VDC, 5A for DPSS, 1.5 A for diode up to 200 mW
- Dimensions (L-W-H): 50 x 30 x 16 mm (excluding pins and output window)
- Beam height from the base: 10.4 mm (+/- 0.3 mm)
- Heatsink requirement: diode <1 °C/W, DPSS <0.5 °C/W
- Optimum heatsink temperature (non-condensing): +15…+30 °C
- Max. heatsink temperature 40 °C
- Internal temperature stabilization: TEC
- Overheat protection: Yes
- Storage temperature (non-condensing): -10 to +50 °C
- Warranty: 12 months,
- Hours limitation of 5000 hrs applies for 405, 445, 488, 515, 633, 635, 660 nm diode lasers. Operational time calculation is based on an internal EPROM counter

COMPATIBILITY:
- RoHS
- General Product Safety Directive (GPSD) 2001/95/EC
- Electromagnetic Compatibility (EMC) Directive 2004/108/EC
- IEC60825-1:2014 (compliant only using additional accessories)

Custom wavelengths and specifications are available on request

NANOSECOND PULSED LASERS

ADVANTAGES

- Same size and a physical interface as of CW MatchBox lasers.
- High pulse energy
- Single-longitudinal-mode (SLM) spectrum
- High average power
- Superb pulse-to-pulse stability
- Very low jitter

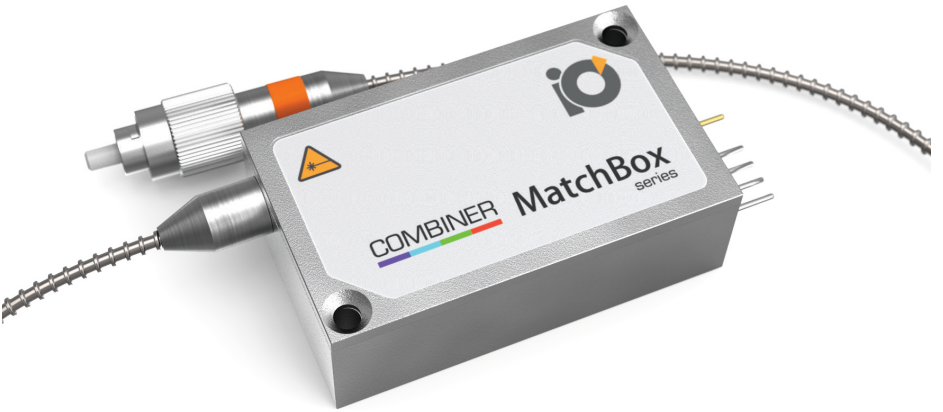
SPECIFICATION

Wave-length	Output Power	Pulse duration	Repetition rate	Pulse energy	Pulse-to-pulse stability	Spectral line-width
1029 nm	500 mW	3.5 ns	33 kHz	15 µJ	<5 %	<1.0 pm
514.5 nm	100 mW	3.5 ns		3 µJ		<0.5 pm
343 nm*	10 mW*	3.5 ns		0.3 µJ		<0.3 pm

* Preliminary specifications

- Pulse energy and repetition rate can be adjusted according to customers requirements.
- Repetition rate changes upon changing the average output power, the pulse energy remains constant.

WAVELENGTH COMBINERS

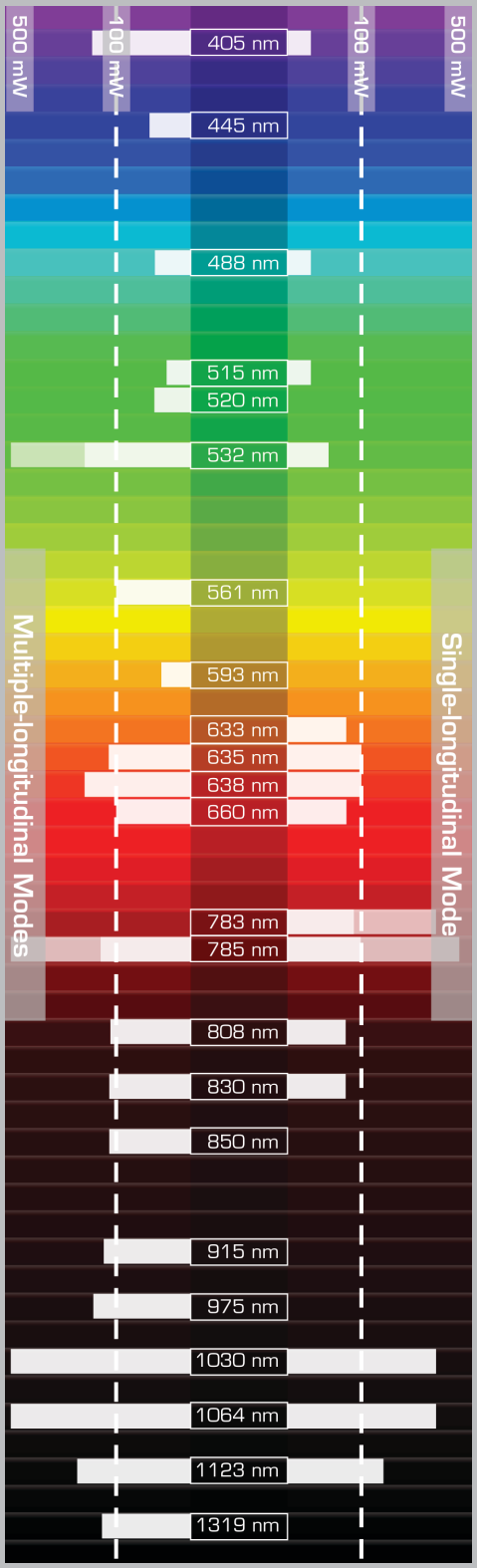


ADVANTAGES

- Up to 4 diode wavelengths.
- Free-space or multi-mode fiber output
- Multiplexing electronics
- Fast warm-up time (bi-directional TEC)
- Compatible with MatchBox accessories

SPECIFICATION

Part No.	Wave-length Set	Output Pow-er (free-space '-11A')	Output Power (MM fiber '-14A')	Wave-length tolerance	8 hrs power stability (% RMS)	Spectral line-width
VBGR-1xA	405 nm ● 450 nm ● 520 nm ● 638 nm ●	≤ 130 mW ≤ 70 mW ≤ 40 mW ≤ 130 mW	≤ 100 mW ≤ 30 mW ≤ 30 mW ≤ 100 mW	+/-3 nm +/-4 nm +/-4 nm +/-3 nm	<1 %	<1.5 nm
VCGR-1xA	405 nm ● 488 nm ● 520 nm ● 638 nm ●	≤ 130 mW ≤ 40 mW ≤ 40 mW ≤ 130 mW	≤ 100 mW ≤ 25 mW ≤ 30 mW ≤ 100 mW	+/-3 nm +/-4 nm +/-4 nm +/-3 nm		
Other wavelengths on request: 660 nm, 785 nm, 830 nm, 850 nm						



integrated optics ®

Contact for quote:
Phone: +370 602 24642
Email: sales@integratedoptics.com

Headquarters:
Integrated Optics, UAB
Kalvariju str. 125B, XI building
08221 Vilnius, Lithuania
Phone: +370 5 2196393
Email: info@integratedoptics.com

www.integratedoptics.com
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