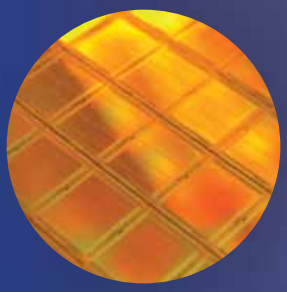
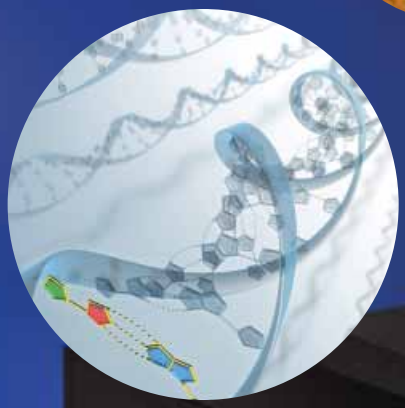
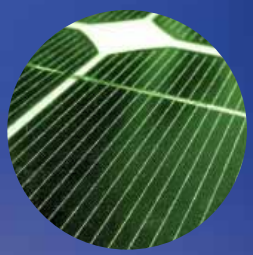
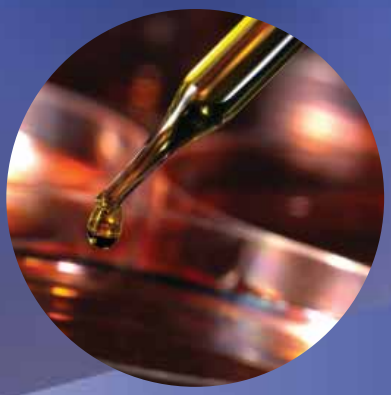




DIODE PUMPED CRYSTALASER®

- Ultra-compact
- CW & Pulsed
- Turnkey Systems
- UV Visible to IR
- High Reliability
- High Stability
- High Efficiency
- TEMoo & SLM
- Low Noise
- Low Cost





CrystaLaser®
THE CLEAR SOLUTION

ULTRA-COMPACT DIODE-PUMPED CRYSTAL LASER MANUFACTURER

CrystaLaser, founded in 1995, is a leading manufacturer of ultra-compact diode-pumped solid-state (DPSS) laser systems. Located in the technology center of Reno, Nevada, **CrystaLaser** designs and produces pulsed and continuous wave (CW) DPSS lasers in ultraviolet, visible and near infrared wavelengths for scientists, engineers and original equipment manufacturers around the world.

Ground-Breaking Technology and Innovation

The diode-pumped crystal lasers including Nd:YAG, Nd:YVO_4, Nd:YLF and Yb:YAG lasers are based on our proprietary coupled-cavity laser technology. This globally-patented technology allows our blue, green, yellow, red and infrared lasers to operate in a single longitudinal mode (SLM) and TEMoo mode with low amplitude noise and increased laser output in an ultra-compact housing with very low power consumption.

CrystaLaser offers true CW lasers, quasi-CW lasers and Q-switched pulsed lasers in wavelengths ranging from ultraviolet, blue, green, yellow, red to infrared with output powers from 1 mW to over 8 W. In addition to the lasers listed below with a wide wavelength selection, higher power or a customized laser system can be developed to meet your specific requirements.

Series \ Wavelength (nm)	262	266	349	351	355	375	405	440	445	447	473	488	523	527	532	542	555	561	593	638	643	655	657	658	660	671	690	785	808	830	852	869	914	946	980	1030	1047	1053	1064	1080	1122	1313	1319	1320	1342	1444	1550
CLxxx-xxx (CW) Crystal Series											•		•	•	•	•	•	•	•				•		•	•								•		•	•	•	•	•	•	•	•	•	•	
DLxxx-xxx (CW) Direct Series						•	•		•	•	•	•								•	•	•		•			•	•	•	•	•	•	•		•											•
QLxxx-xxx (QS) Q-Switched Series	•	•	•	•	•			•		•	•		•	•	•	•	•	•					•		•	•								•		•	•	•	•	•	•	•	•	•	
TLxxx-xxx (CW) Tahoe Series						•	•		•		•	•			•		•	•	•		•			•			•	•																		
RLxxx-xxx (QS) Rubicon Series	•	•	•	•	•			•			•		•		•		•								•	•											•		•						•	

Crystal Series: The standard for compact DPSS lasers. These CW lasers have nearly 15 years of proven reliable performance in commercial and scientific applications. The Crystal Series lasers use our patented technology, resulting in some of the most efficient DPSS lasers in the world.

Direct Series: The most reliable Solid-State technology available, all in an ultra-compact footprint. The Direct Series lasers cover a variety of wavelengths suitable for laboratory research as well as OEM applications. The new OEM option integrates the control electronics within the laser head, further reducing size.

Q-Switched Series: A compact, active Q-Switched, pulsed laser with superior performance. The Q-Switched Series' breakthrough technology enables optimum performance with the lowest power consumption available. The design is flexible enough for both the repetition rate and pulse width requirements of your application.

Tahoe Series: This newest family of CW lasers is designed exclusively for **Flow Cytometry**. The Tahoe Series lasers are unmatched when it comes to performance in this demanding clinical application.

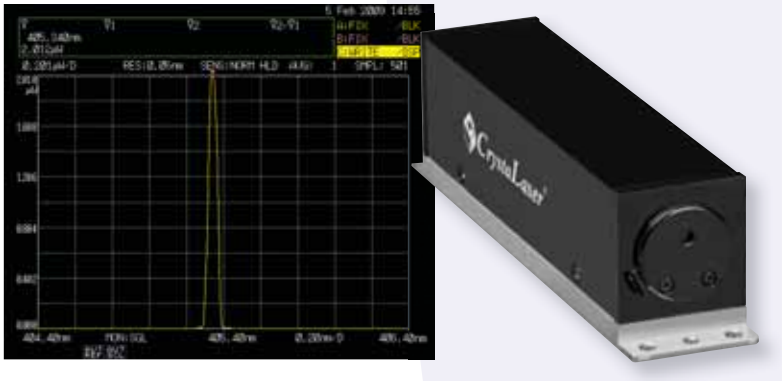
Rubicon Series: This new generation of Q-Switched, narrow line-width laser is optimized for **Raman Spectroscopy** and **LIDAR**. The compact, lightweight design of the Rubicon Series has a clear advantage for use in the field, and in space-limited laboratory situations.

CrystaLaser®
THE CLEAR SOLUTION

Cover LIDAR photo courtesy of Craig J. Heinselman, Ph.D. SRI International

DIRECT SERIES

Compact Stabilized Solid State Lasers



Features:

Wavelength 375 nm to 1550 nm, power up to 1W
Low noise and SLM • Excellent pointing stability and power stability • Ultra compact OEM package
High speed modulation up to 200 MHz
Free space and fiber delivery system

Applications:

Holographics • Flow cytometry • Fluorescence Microscopy • Confocal microscopy • Raman Spectroscopy

CW Violet-Blue Lasers

Wavelengths (+/- 5 nm)	375 nm, 405 nm, 445 nm		
Laser version	SLM version	Low noise version	Multi-mode version
375 nm output power (mW)	15, 10 , 5	16, 10, 5	30
405 nm output power (mW)	40, 30, 20, 10	100, 50, 25, 10	1000, 300
445 nm output power (mW)	30, 20, 10	40, 30, 10	1000, 400
Beam diameter (1/e2)	1.2 mm	1.2 mm	1.2:2.5 mm
Beam divergence, full angle	0.6 mrad	0.6 mrad	0.7:1.2 mrad
Transverse mode,	Circular, M^2~1.2	Circular, M^2<1.2	Multi-mode, M^2 <3
Output noise, rms	< 1% (10 Hz - 50 MHz)	< 0.5% (10 Hz - 50 MHz)	< 1% (10 Hz - 50 MHz)
Longitudinal mode	Single	Multiple	Multiple
Linewidth	< 10^{-5} nm	0.8 nm	1 nm, nominal
Coherence length	> 50 m	--	--
Power stability, rms	1% over 8 hours; Ultra-stable options: 0.5% or 0.25% over 24 hours		
Beam pointing stability	< 0.02 mrad at constant temperature		
Polarization	Linear; Ratio 100:1, Vertical		

CW Blue Lasers

Wavelengths	473 nm, 488 nm		
Laser version	SLM version	Low noise version	Basic version (Part of Crystal Series - DPSS)
473 nm output power (mW)	10, 5	15, 10, 5	150, 100, 75, 50, 25, 10
488 nm output power (mW)	10, 5	20, 15, 10, 5	--
Beam diameter (1/e2)	1.2 mm	1.2 mm	0.7 mm
Beam divergence, full angle	0.7 mrad	0.7 mrad	1 mrad
Transverse mode	Circular, M^2 ~1.2	Circular, M^2 ~ 1.2	TEMoo, M^2 < 1.2
Output noise, rms	< 1% (10 Hz - 50 MHz)	< 1% (10 Hz - 50 MHz)	2% (0 - 10 kHz), ~30% at 300 kHz
Longitudinal mode	Single	--	--
Linewidth	< 10^{-5} nm	0.8 nm	1 nm, nominal
Coherence length	> 100 m	--	--
Power stability, rms	< 2% over 8 hours; Ultra-stable options: 0.5% or 0.25% over 24 hours		
Beam pointing stability	< 0.02 mrad at constant temperature		
Polarization	Linear; Ratio 100:1, Vertical; > 300:1 option available		

CW Red and Infrared Lasers

Wavelengths (+/-3 nm)	638	642	655	658	690	785	808	830	852	914	980	1550
Low noise version, max. power (mW)	30	100	70	100	50	120	120	100	120	200	500	500
SLM version, max. power (mW)	25	30		50	30	120	120		120	100	100	80
Transverse mode	Circular beam, M^2 < 1.2											
Beam diameter (1/e2)	1 mm, nominal											
Beam divergence, full angle	1 mrad, nominal											
Output noise rms	< 0.5% (10 Hz - 20 MHz)											
Linewidth	SLM version: <10^{-4} nm; Low noise version: 1nm											
Coherence length	SLM version: >5 m; >100 m option available; Low noise version: Not specified											
Power stability, rms	< 2% over 8 hours; Ultra-stable options: 0.5% or 0.25% over 24 hours											
Beam pointing stability	< 0.01 mrad at constant temperature											
Polarization	Linear; Ratio >100:1, >300:1 option available											

CrystaLaser®
THE CLEAR SOLUTION

CRYSTAL SERIES

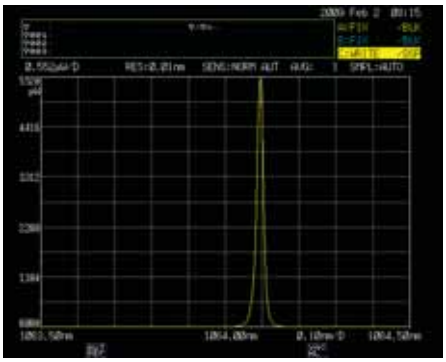
DPSS CW Laser

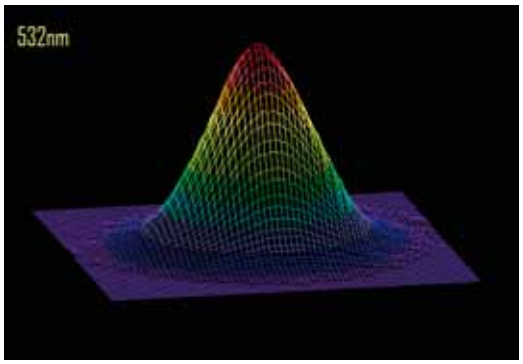
Features:

Wavelength 473nm to 1064nm, and Power up to 3W • Low noise and SLM
Air-cooled • Ultra-stable • TTL modulation • Free space or fiber delivery system

Applications:

Raman Spectroscopy • LIDAR • Fluorescence • Confocal Microscopy • Seed Laser
Interferometry • Neuroscience • Optical Tweezers • Flow Cytometry





CW DPSS Green Lasers

Wavelengths	532 nm		
Laser version	SLM version	Low noise version	Basic version
Output power(mW)	300, 200, 100, 50, 25, 10	500, 300, 200, 100, 50, 25	1W, 500, 200, 100, 50, 25, 10, 5
Output noise, rms	< 0.5% (10 Hz - 20 MHz)	< 0.5% (10 Hz - 20 MHz)	2% (0 -10 kHz), ~20% at 300 kHz
Longitudinal mode	Single	--	--
Linewidth	< 10^{-5} nm	0.2 nm	0.2 nm
Coherence length	> 300 m	--	--
Transverse mode	TEMoo, M^2 < 1.1		
Beam diameter (1/e2)	0.4 mm for 1-200 mW, 0.2 mm for > 210 mW (2X-10X laser beam expander options available)		
Beam divergence, full angle	2 mrad for 1-200 mW, 4 mrad for > 210 mW (can be reduced with a beam expander)		
Power stability, rms	< 2% over 8 hours; Ultra-stable options: 0.5% or 0.25% over 24 hours		
Beam pointing stability	< 0.02 mrad at constant temperature		
Polarization	Linear; Ratio 50:1, 45 degree off vertical; 100:1 or >300:1 options available		

CW DPSS Green Lasers

Wavelengths	523 nm, 527 nm, 542 nm	
Laser version	SLM version	Basic version
Output power (mW)	10, 5	400, 200, 100, 10, 5; For 542nm: 75, 50, 25, 10
Output noise, rms	< 0.5% (10 Hz - 20 MHz)	2% (0 -10 kHz), >10% at 300 kHz
Longitudinal mode	Single	--
Linewidth	< 10^{-5} nm	0.2 nm
Coherence length	> 300 m	--
Transverse mode	TEMoo, M^2 < 1.1	
Beam diameter (1/e2)	0.2 mm	
Beam divergence, full angle	4 mrad (can be reduced with a beam expander)	
Power stability, rms	< 2% over 8 hours; Ultra-stable options: 0.5% or 0.25% over 24 hours	
Beam pointing stability	< 0.02 mrad at constant temperature	
Polarization	Linear; Ratio 50:1; > 100:1 or >300:1 options available	

CW DPSS Yellow Orange Lasers

Wavelengths	561 nm, 555 nm	593 nm
Output power (mW)*	200, 150, 100, 50, 25, 10, 5	50, 25, 10, 5
Transverse mode	TEMoo, M^2 < 1.1	
Beam diameter (1/e2)	0.7 mm (2X, 3X or 5X laser beam expander options available)	
Beam divergence, full angle	1.1 mrad (can be reduced with a beam expander)	
Output noise, rms	2% (10 Hz – 10 kHz), ~20% (100 kHz – 1 MHz)	
Power stability, rms	< 2% over 8 hours; Ultra-stable options: 0.5% or 0.25% over 24 hours	
Beam pointing stability	< 0.02 mrad at constant temperature	
Polarization	Linear; Ratio 50:1; > 100:1 option available	

*For SLM & low noise version, please contact CrystaLaser

CW DPSS Red Lasers

Wavelengths	657 nm, 660 nm, 671 nm	
Laser version	SLM version	Basic version
671 nm power (mW)	200, 150, 100, 50, 25	300, 200, 150, 100, 50
657 nm 660 nm power (mW)	--	300, 200, 150, 100, 50
Longitudinal mode	Single	--
Linewidth	< 10^{-5} nm	< 0.15 nm, nominal
Output noise, rms	< 0.5% (10 Hz - 20 MHz)	2% (10 Hz - 10 kHz), >20% (100 kHz - 1 MHz)
Coherence length	> 300 m	--
Transverse mode	TEMoo, M^2 < 1.1	
Beam diameter (1/e2)	0.2 mm (2X, 3X, 5X or 10X laser beam expander options available)	
Beam divergence, full angle	4 mrad (can be reduced with a beam expander)	
Power stability, rms	< 2% over 8 hours; Ultra-stable options: 0.5% or 0.25% over 24 hours	
Beam pointing stability	< 0.02 mrad at constant temperature	
Polarization	Linear; Ratio 50:1; >100:1 option available	

CW DPSS Infrared Lasers

Wavelengths (nm)	1064	1047	1053	946	1030	1080	1122	1313	1319	1342
Basic version max. power (mW)	4W	3W	3W	500	300	500	1W	1W	1W	1W
SLM version max. power (mW)	1W	300	300	150	25	50	50	150	150	300
Output power	4W, 3W, 2W, 1.5W, 1W, 500mW, 300mW, 100mW, 50mW, 25mW									
Beam diameter (1/e2)	0.3 – 0.5 mm depending on output power and wavelength									
Beam divergence, full angle	3 to 5 mrad depending on output power and wavelength									
Transverse mode	TEMoo, M^2 < 1.1									
Output noise, rms	<0.5% (10 Hz – 20 MHz)									
Linewidth	<10^{-5} nm (for SLM version); 0.3nm (for low noise version)									
Coherence length	>300 m (for SLM version); low noise version: Not specified									
Power stability, rms	< 2% over 8 hours; Ultra-stable options: 0.5% or 0.25% over 24 hours									
Beam pointing stability	< 0.02 mrad at constant temperature									
Polarization	Linear; Ratio 100:1; >300:1 option available									

CW Lasers Mechanical, Electrical and Environmental Specifications

Size and weight of laser head	Type 1: LxWxH, 12x3x3 cm^3 with a fixed 6 mm thick base plate , 0.3 kg (For most CW laser systems)
	Type 2: LxWxH, 18.5x5x3.6 cm^3, 0.4 kg
	Type 3: LxWxH, 18.5x7x3.6 cm3, 0.5 kg
	Type 4: LxWxH 13.5x3x3.6 cm^3
Size and weight of power supply	DxWxH, AC: 14x15x5 cm^3 (5"x6"x2"), 0.6 kg (1.4 lb); DC: 12.7x8.5x3.5 cm^3 (5"x3.3"x1.4"), 0.2 kg (0.5 lb)
Operating temperature	5 °C to 35 °C
Warm-up time	<1 minute
Operating voltage	90 - 250 VAC, 12 VDC optional
Power consumption	5 - 25 W, typically 12 W

Customized Options:

- Digital Modulation
- Analog power control
- Ultra stable
- Beam expander
- Fiber coupling
- Upgrade to CL2005 power supply with adjustable power and display
- RS-232 serial control

Model CL2005 Power Supply

CrystaLaser®
THE CLEAR SOLUTION

Q-SWITCHED SERIES

DPSS Q-Switched Lasers

Features:

Wavelength 262nm to 1340nm, Power up to 4W • Excellent beam quality
Extremely low power consumption • Air-cooled – no cooling water or fan required
Unmatched ultra-compact and ultra-light-weight • Repetition rate 1 kHz to 100 kHz internal adjustment, 0 Hz to 200 kHz by external trigger

Applications:

Material processing • Semiconductor inspection • LIDAR • Photoluminescence
Solar material processing • Scientific research • Raman Spectroscopy

Q-Switched UV Laser

Wavelengths	355 nm	351 nm	349 nm	266 nm	262 nm
Max. average power at optimal repetition rate*	100 mW	100 mW	100 mW	50 mW	50 mW
Max. Pulse energy* at 1 kHz rep. rate	25 µJ	50 µJ	50 µJ	15 µJ	25 µJ
Available average output power	100 mW, 50 mW, 25 mW, 10 mW		50 mW, 30 mW, 20 mW, 10 mW, 5 mW		
Pulse width	Typically 10 - 15 ns, varies from power and repetition rate, 5 - 100 ns option available				
Repetition rate	1 kHz to 100 kHz internal adjustable, 0 Hz to 400 kHz by external trigger				
Beam divergence, full angle	3 - 4 mrad			2 - 6 mrad	
Beam diameter (1/e2)	0.2 mm			0.15 x 0.3 mm	
Transverse beam mode	TEMoo, M^2 < 1.3; Typically M^2 < 1.1, for 349, 351 and 355 nm; Elliptical beam for 262 and 266 nm				
Longitudinal mode	Multiple longitudinal modes; Narrow linewidth with long coherence length option available				
Power stability, rms	5% after warm-up				
Beam pointing stability	< 0.02 mrad at constant temperature				
Polarization	Linear; Ratio 100:1				

Q-Switched Blue Lasers

Wavelengths	440 nm	447 nm	473 nm
Max. average power at optimal repetition rate*	50 mW	50 mw	50 mW
Pulse energy* at 10 kHz rep. rate	5 µJ	5 µJ	5 µJ
Available average power	50 mW, 25 mW, 10 mW		
Pulse width	Typically 15 - 35 ns, varies from power and repetition rate, 7 - 100 ns option available		
Repetition rate	1 kHz to 100 kHz internal adjustable, 0 Hz to 200 kHz by external trigger		
Transverse beam mode	TEMoo, M^2 < 1.2, typical M^2 < 1.1		
Beam diameter (1/e2)	0.2 mm		
Beam divergence, full angle	3 - 4 mrad		
Longitudinal mode	Narrow linewidth with long coherence length option available		
Power stability, rms	5% after warm-up		
Beam pointing stability	< 0.02 mrad at constant temperature		
Polarization	Linear; Ratio 100:1		

Q-Switched Green Lasers

Wavelengths	532 nm	527 nm	523 nm	555 nm and 561 nm available
Max. average power at optimal repetition rate	1000 mW	1000 mW	1000 mW	
Max. Pulse energy* at 1 kHz	0.20 µJ	0.35 µJ	0.35 µJ	
Available average power	1 W, 500 mW, 200 mW, 100 mW, 50 mW standard version			
Pulse width	Typically 10 - 25 ns, varies from power and repetition rate, 7 - 100 ns option available			
Repetition rate	1 kHz to 100 kHz internal adjustable, 0 Hz to 400 kHz by external trigger			
Beam diameter (1/e2)	0.3 mm			
Beam divergence, full angle	3 - 4 mrad			
Transverse beam mode	TEMoo, M^2 < 1.2, typical M^2 < 1.1			
Longitudinal mode	Single longitudinal mode with long coherence length option available			
Power stability, rms	3% after warm-up			
Beam pointing stability	< 0.02 mrad at constant temperature			
Polarization	Linear; Ratio 100:1			

Q-Switched Red Lasers

Wavelengths	657 nm	660 nm	671 nm
Max. average power at optimal repetition rate	200 mW	500 mW	500 mW
Pulse energy* at 10 kHz rep. rate	20 µJ	0.50 µJ	0.50 µJ
Available average power (mW)	500, 200, 100 (higher average powers available, contact CrystaLaser for details)		
Pulse width	Typically 20 - 40 ns, varies from power and repetition rate, 10 - 100 ns option available		
Repetition rate	1 kHz to 100 kHz internal adjustable, 0 Hz to 200 kHz by external trigger		
Transverse beam mode	TEMoo, M^2 < 1.2, typical M^2 < 1.1		
Beam diameter (1/e2)	0.3 mm		
Beam divergence, full angle	3 - 4 mrad		
Longitudinal mode	Narrow line width with long coherence length option available		
Power stability, rms	3% after warm-up		
Beam pointing stability	< 0.02 mrad at constant temperature		
Polarization	Linear; Ratio 100:1		

Q-Switched Infrared Lasers

Wavelengths	1064 nm	1053 nm	1047 nm	946, 1122, 1313, 1319, 1338, 1342, and 1444 nm available
Max. average power	2000 mW	2000 mW	2000 mW	
Max. pulse energy* at 1 kHz	0.32 mJ	0.60 mJ	0.60 mJ	
Available average power(mW)	2000, 1500, 1000, 500, 200, 100 (higher average powers available, contact CrystaLaser for details)			
Pulse width	Typically 15 - 30 ns, varies from power and repetition rate, 7 - 100 ns option available			
Repetition rate	1 kHz to 100 kHz internal adjustable, 0 Hz to 500 kHz by external trigger			
Transverse beam mode	TEMoo, M^2 < 1.2, typical M^2 < 1.1			
Beam diameter (1/e2)	0.5 mm			
Beam divergence, full angle	3 - 4 mrad			
Longitudinal mode	Single longitudinal mode with long coherence length option available			
Power stability, rms	3% after warm-up			
Beam pointing stability	< 0.02 mrad at constant temperature			
Polarization	Linear; Ratio 100:1			

Notes: Laser output power and pulse energy can be optimized to a custom repetition rate upon request.
Contact us for higher power Q-switched lasers.

Q-Switched Lasers Mechanical, Electrical and Environmental Specifications

Size and weight of laser head	Type 2: L x W x H, 18.5 x 5 x 3.6 cm^3, 0.5 kg (for most Q-switched laser); Type 3: 18.5 x 7 x 3.6 cm^3, 0.6 kg
Size and weight of power supply	D x W x H, 20 x 20 x 8 cm^3 (7.9" x 7.9" x 2.5"), 1.4 kg (3 lb) Custom compact size available
Operating temperature	5 °C to 35 °C
Warm-up time	< 3 minutes
Operating voltage	90 - 250 VAC; 12 VDC or 24 VDC option available; Typically power consumption 40 W
Cooling	Laser head: conductive cooling; Power supply: air cooling
Timing jitter:	Trigger to laser pulse output timing jitter of +/- 3 ns is available for all the Q-switched lasers

Contact Crystalaser for details regarding the Tahoe and Rubicon Series Laser

Ordering Information

CrystaLaser Model Number Description

C L 5 3 2 - 1 0 0 - S O

Product Category
CL = Crystal Series
DL = Direct Series
QL = Q-Switched Series
TL = Tahoe Series
RL = Rubicon Series

Wavelength
532 – In Nanometers 3 digit
1064 – In Nanometers 4 digit

Laser Optical Power
500 – 3 digit Power in mW, 500mW
1W5 – 3 digit Power in W, 1.5W

Standard Laser Options
S = Single Longitudinal or Spectral Mode
L = Low noise version if the basic model doesn't already include this
3 = Extra long coherence length
T = Multiple Transverse Modes Present

Basic systems will have this location left blank, even if the basic system naturally includes this option. This is to differentiate the standard option from the basic system.

Extra or Accessory Options
O = Standard option such as fiber coupling
X = Special or Custom Option

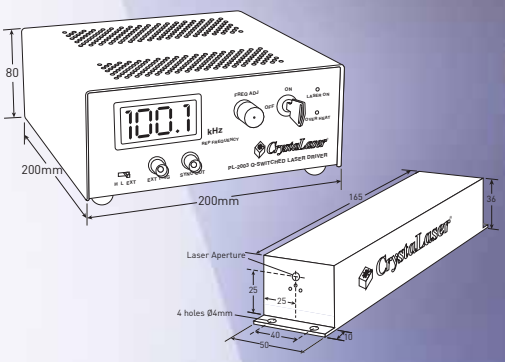
Generally this location will be left blank unless there are additional laser options, or accessory options

To Order:
Call: 775.348.4820
FAX: 775.348.7047
e-mail: sales@crystalaser.com

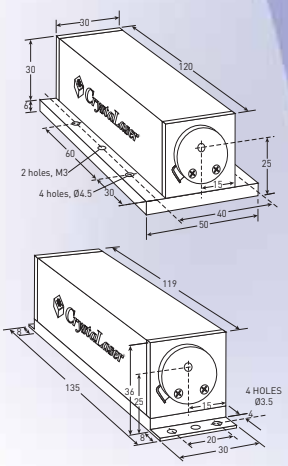
All specifications are subject to change without notice due to our continuous product improvement.
For updated specifications and more information, please browse our website at www.crystalaser.com.

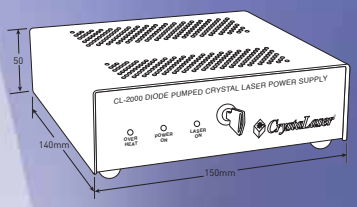
CrystaLaser®
THE CLEAR SOLUTION

Typical dimensions of Q-Switched Laser head and Power Supply



Typical dimensions of CW Laser head and Power Supply





All dimensions are in mm

UL Recognized Component and
UL Recognized Component Mark
for Canada

CE

4750 Longley Lane, Suite 205
Reno, NV 89502, USA
775.348.4820
FAX 775.348.7047
e-mail sales@crystalaser.com
www.crystalaser.com

CrystaLaser®
THE CLEAR SOLUTION