

Seeded Surelite™

The injection seeder system for the Surelite Family produces ultra-narrow single longitudinal mode (SLM) outputs with a smooth temporal profile.

Seeding is accomplished by injecting a seed beam from a single mode cw diode pumped fiber laser into the Surelite oscillator. Amplitude pioneered the commercial introduction of this technique and holds the patent on its use with radially variable reflectivity resonator optics*.

Important applications that require narrow linewidth include pumping narrow linewidth tunable systems, holography, and Doppler LIDAR.

The Surelite has been updated with the new Surelite Remote Harmonic operation for first and second stage harmonic automation. Controlled from a simple intuitive GUI, the option allows for hands free adjustment of the Surelite harmonics.

* U.S. Patent # 4,918,704



Applications

Industry:

- > Material sorting (recycling)
- > Weld inspection
- > Cleaning
- > LIBS

Science:

- > LIDAR
- > Thomson Scattering
- > Laser Thermal Annealing
- > Pump Source
- > LIF, PLIF, LIBS

Medical:

- > Skin Surfacing
- > Tattoo Removal
- > Pump Source
- > Medical device manufacturing

Features

- > RS-232 or TTL interface for remote or local operation
- > Water to air heat exchanger eliminates the need for external water cooling
- > Gaussian optics incorporated to provide low divergence and high spatial uniformity in beam
- > Graphite resonator structure ensures long-term thermal and mechanical stability
- > Optional motorized harmonics

Specifications

	SL I-10	SL I-20	SL II-10	SL EX
Repetition Rate (Hz)	10	20	10	
Energy ¹ (mJ)				
1064 nm	360	335	520	625
532 nm	160 ²	125 ²	240 ²	300 ²
355 nm	50/80 ³	48/80 ³	80/125 ³	120/180 ³
266 nm	48	35	65	70
Pulsewidth ⁴ (ns)				
1064 nm		4 - 7		4 - 6
532 nm		4 - 6		3 - 5
355 nm		4 - 6		3 - 5
266 nm		4 - 6		3 - 5
Linewidth (cm-1)				
Standard			1	
Injection Seeded			0.005	
Divergence ⁵ (mrad)			0.5	
Beam Pointing Stability ($\pm\mu$ rad)	30	50	30	50
Beam Diameter (mm)		6	7	9.5
Jitter ⁶ (\pm ns)			1	
Energy Stability ⁷ (\pm %)				
1064 nm		2.5 ; 0.8		
532 nm		3.5 ; 1.2		
355 nm		4.0 ; 1.3		
266 nm		7.0 ; 2.3		
Power Drift ⁸ (\pm %)				
1064 nm		3.0		3.0
532 nm		5.0		6.0
355 nm		5.0		6.0
266 nm		8.0		8.0

¹ Energy is in seeded mode only

² With Type II doubler

³ High Energy UV option with Type I doubler

⁴ Full width, half maximum

⁵ Full angle for 86% of energy

⁶ With respect to external trigger

⁷ The first value represents shot-to-shot for 99.9% of pulses, the second value represents RMS

⁸ Average for 8 hours with $\Delta T_{room} < \pm 3^{\circ}C$

All specifications at 1064 nm unless otherwise noted.

Dimensions

Optical Head (LxWxH)	775 x 178 x 190 mm (30.5 x 7.0 x 7.5")
Power Supply (LxWxH)	622 x 282 x 508 mm (24.5" x 11.2" x 20.0")
Seeder Supply (LxWxH)	257 x 421 x 41 mm (10.1" x 16.6" x 1.6")

Weight

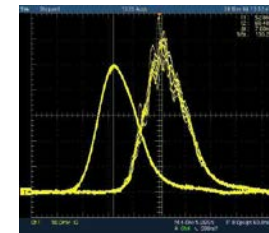
Optical Head	24 kg (52 lbs)
Power Supply	44 kg (96 lbs)
Seeder Supply	4.5 kg (10 lbs)

Water

Closed loop water to air heat exchanger: external cooling water not required (1 gallon deionized water).

Others

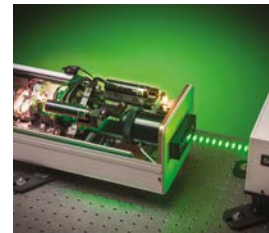
Electrical Service	200 - 240 VAC, single Φ , 10 A, 50/60 Hz
Room Temperature	18 to 30° C / 65 to 87° F
Umbilical Length	3.18 m (10.4 ft)



Temporal Profile - Seeded vs Unseeded



Injection Seeder Configuration



The new Surelite Remote Harmonic Operation option

Specifications

Beam Spatial Profile ⁹	
Near Field (<1m)	0.70
Far Field (∞)	0.95
Deviation from fitted Gaussian ¹⁰ ($\pm\%$)	
Near Field (<1m)	30

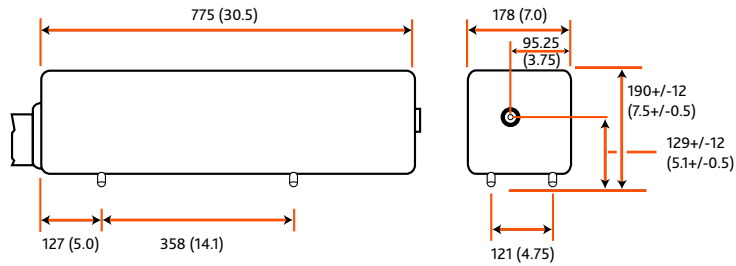
⁹ A least squares fit to a Gaussian profile.

A perfect fit would have a coefficient of 1.

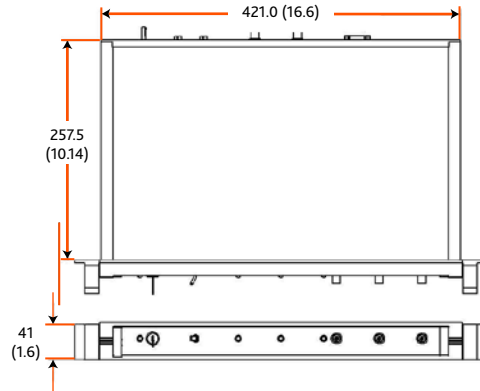
¹⁰ Maximum deviation at beam center ($\pm\%$)

Seeded Surelite Physical Layout

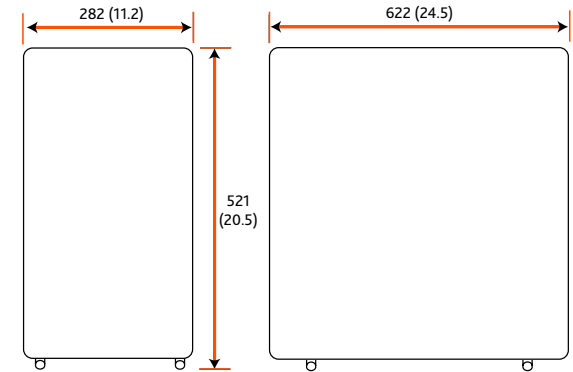
All dimensions are in mm (inches)



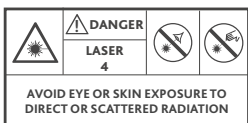
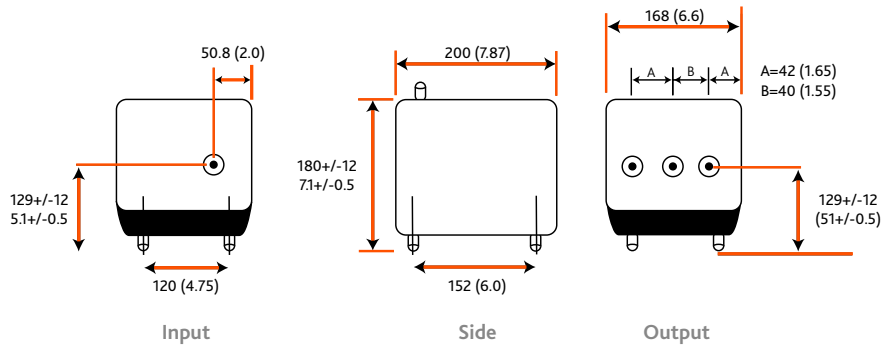
Seeder Physical Layout



Surelite Power Supply



Surelite Separation Package



Seeded Surelite™

The reference in high energy Nd:YAG nanosecond lasers.



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