TRLi SERIES

Compact High Energy and High Repetition Rate Q-switched Nd:YAG Lasers

2 0 1 9

TRLi

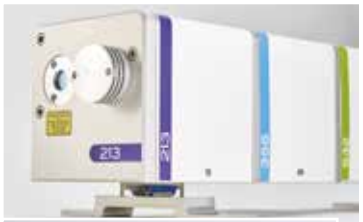
Litron Lasers

TRLi Series

Designed for flexibility and enhanced user experience

APPLICATIONS

- *OPO Pumping*
- *Ti:Sa Pumping*
- *Dye Laser Pumping*
- *Deflashing*
- *Cleaning*
- *Spectroscopy*
- *Photoacoustic Imaging*
- *LIBS*
- *LIDAR & Remote Sensing*
- *Flash Photolysis*
- *Ablation*
- *PLD*



Bolt and play harmonic modules

All harmonic wavelengths of Nd:YAG (532nm, 355nm, 266nm and 213nm) are available via dedicated separate easy change modules. Each harmonic module automatically adapts to a pre-set configuration.

Intellihead ™ laser function control

The Intelligent laser head uses a dedicated microprocessor to provide precision control over a host of functions including harmonic temperature stabilisation, automatic harmonic tuning, energy monitoring and attenuator controls. The system continuously monitors the Intellihead card and the PSU microcontroller, providing feedback to the user via the LUCi controller.

Automatic harmonic tuning and auto-stabilisation

As standard, all the harmonic modules are angle tuned with high precision linear actuators for auto-tuning at start up or on demand. Continuous auto-tuning is then possible due to the fast response of the mechanical angle tuning as opposed to conventional thermal tuning. This feature maintains the set energy over long periods of continuous operation and includes a PSU control function to compensate for the lamp aging process.

Integrated motorised beam attenuator

A high resolution motorised variable attenuator is standard for harmonic modules. This provides continuous energy adjustment of the laser output whilst keeping all other beam parameters constant. An optional motorised variable attenuator for 1064nm is available.

Twin-rod architecture for high beam homogeneity

A twin-rod birefringence compensating oscillator design is standard on all TRLi series. This feature ensures the highest beam homogeneity possible. The benefits are seen in low M^2 (higher focusability), better beam profiles and more efficient harmonic conversion.

LUCi Touchscreen

LUCi touchscreen system control interface

Full access to the control parameters and sensor feedback from the laser head and power supply are all via the intuitive LUCi touch screen user interface or the TRLi PC software.

Fast set up and total control

The laser head and LUCi controller connect directly to the PSU and the whole laser can be assembled and running in less than 15 minutes.

Flexible and upgradable

The standardised mechanical mounting system for the harmonic modules ensures add-on modules will always be available for your TRLi laser. The laser system firmware and LUCi software can also be easily upgraded via USB.

Large model range

The TRLi series encompasses both high energy (850mJ) and high repetition rate (200Hz) models. With the addition of super-Gaussian, Telescopic and Stable resonator choices, choosing a TRLi for your precise application could not be easier.

The ultimate modular laser system

Not only does TRLi Series provide access to all harmonic modules, it offers additional BET and OPO modules for an even wider range of applications.

TRLi with OPO module

TRLi Beam Expanding Telescope (BET) module

User experience

All TRLi lasers are field rugged and sealed to IP54 against the ingress of moisture and dirt. The laser resonator is housed in a body machined from solid aluminium to ensure high mechanical and optical integrity.

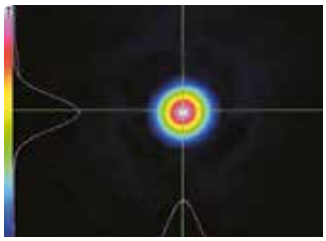
A comprehensive 2 year warranty, long flashlamp lifetimes and the Litron guarantee of quality build make the TRLi series one of the easiest lasers to own and maintain.

TRLi G RANGE SPECIFICATIONS

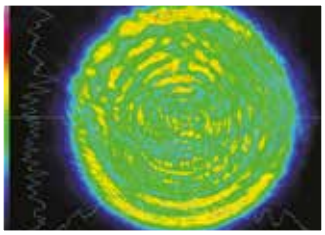
Super-Gaussian Compact High Energy Q-switched Nd:YAG Lasers

Model	TRLi G 850-10	TRLi G 650-10	TRLi G 450-10	TRLi G 400-20	TRLi G 600-20	TRLi G 550-30	TRLi G 350-30	TRLi G 320-50
Repetition Rate (Hz)	10	10	10	20	20	30	30	50
Output Energy (mJ)								
1064nm	850	650	450	400	600	550	350	320
532nm	435	325	220	200	300	275	175	160
355nm [1]	230	150	130	120	100	90	70	60
266nm	100	70	60	50	60	60	40	30
213nm [2]								
Pulse Stability (±%) [RMS] [3]								
1064nm	2 [0.6]	2 [0.6]	2 [0.6]	2 [0.6]	2 [0.6]	2 [0.6]	2 [0.6]	2 [0.6]
532nm	3 [1.0]	3 [1.0]	3 [1.0]	3 [1.0]	4 [1.3]	4 [1.3]	4 [1.3]	4 [1.3]
355nm	4 [1.3]	4 [1.3]	4 [1.3]	4 [1.3]	6 [2.0]	6 [2.0]	6 [2.0]	6 [2.0]
266nm	6 [2.0]	6 [2.0]	6 [2.0]	6 [2.0]	8 [2.6]	8 [2.6]	8 [2.6]	8 [2.6]
Power Drift (±%) [4]								
1064nm	3	3	3	3	3	3	3	3
532nm	5	5	5	5	5	5	5	5
355nm	5	5	5	5	5	5	5	5
266nm	10	10	10	10	10	10	10	10
Pulse Duration (ns) [5]								
1064nm	6-7	6-7	6-7	6-7	6-9	6-9	6-9	6-9
532nm	5-6	5-6	5-6	5-6	5-8	5-8	5-8	5-8
355nm	5-6	5-6	5-6	5-6	5-8	5-8	5-8	5-8
266nm	5-6	5-6	5-6	5-6	5-8	5-8	5-8	5-8
Beam Parameter								
Beam Diameter (mm) [6]	9.5	8.0	6.4	6.4	8.0	8.0	6.4	6.4
Beam Divergence (mrad) [7]	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
M^2 @ 1064nm [8]	<2	<2	<2	<2	<2	<2	<2	<2
Pointing Stability (µrad) [9]	<70	<70	<70	<70	<70	<70	<70	<70
Timing Jitter (ns) [10]	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Linewidth @ 1064nm (cm^{-1})	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7
Spatial Profile Near Field [11]	>0.75	>0.75	>0.75	>0.75	>0.75	>0.75	>0.75	>0.75
Spatial Profile Far Field [12]	>0.95	>0.95	>0.95	>0.95	>0.95	>0.95	>0.95	>0.95
Lamp Life (pulses)	10^8	10^8	10^8	10^8	10^8	10^8	10^8	10^8
Services								
Voltage	100-250VAC	100-250VAC	100-250VAC	100-250VAC	100-250VAC	100-250VAC	100-250VAC	100-250VAC
Frequency	50/60Hz	50/60Hz	50/60Hz	50/60Hz	50/60Hz	50/60Hz	50/60Hz	50/60Hz
Power Phase	Single	Single	Single	Single	Single	Single	Single	Single
Cooling	Air Cooled	Air Cooled	Air Cooled	Air Cooled	Water Cooled	Water Cooled	Water Cooled	Water Cooled
Ambient Temp [13]	5-35°C	5-35°C	5-35°C	5-35°C	5-35°C	5-35°C	5-35°C	5-35°C
Water Temp [14]					20°C	20°C	20°C	20°C
PSU Type	LPU1000	LPU1000	LPU1000	LPU1000	19" Rack	19" Rack	19" Rack	19" Rack

1. High energy 355nm as standard with standard 2HG module.
2. Contact Litron for more information.
3. Peak-to-Peak Energy - 100% of pulses.
4. 8 Hours continuous running without adjustment.
5. FWHM - Fast photodiode and >1GHz oscilloscope.
6. Beam diameter is rod diameter - FWHM diameter will be smaller.
7. Full angle for 90% of the output energy.
8. Measured using ISO 11146-1:2005.
9. Measured using ISO 11670:2003.
10. Jitter is measured with respect to the Q-switch trigger input.
11. Least squared fit to Gaussian at ~ 0.4m from the laser output.
12. Least squared fit to Gaussian at the focus of a 1m lens.
13. 5 to 80% relative humidity (non condensing).
14. >8 lpm at <5 bar.



Far Field at 1064nm >95% Gaussian fit.



Near Field at 1064nm

TRLi ST RANGE SPECIFICATIONS

Stable Telescopic Compact High Energy Q-switched Nd:YAG Lasers

Model	TRLi ST 850-10	TRLi ST 650-10	TRLi ST 450-10	TRLi ST 400-20
Repetition Rate (Hz)	10	10	10	20
Output Energy (mJ)				
1064nm	850	650	450	400
532nm	425	325	225	200
355nm	130	100	80	65
266nm	95	70	55	50
213nm [1]				
Pulse Stability (±%) [RMS] [2]				
1064nm	2 [0.6]	2 [0.6]	2 [0.6]	2 [0.6]
532nm	3 [1.0]	3 [1.0]	3 [1.0]	3 [1.0]
355nm	4 [1.3]	4 [1.3]	4 [1.3]	4 [1.3]
266nm	6 [2.0]	6 [2.0]	6 [2.0]	6 [2.0]
Pulse Duration (ns) [3]				
1064nm	9-12	9-12	9-12	9-12
532nm	8-11	8-11	8-11	8-11
355nm	7-10	7-10	7-10	7-10
266nm	7-10	7-10	7-10	7-10
Beam Parameter				
Beam Diameter (mm) [4]	9.5	8.0	6.4	6.4
Beam Divergence (mrad) [5]	<0.8	<0.8	<0.8	<0.8
Pointing Stability (µrad) [6]	<100	<100	<100	<100
Timing Jitter (ns) [7]	<0.5	<0.5	<0.5	<0.5
Linewidth @ 1064nm (cm^{-1})	<0.7	<0.7	<0.7	<0.7
Lamp Life (pulses)	10^8	10^8	10^8	10^8
Services				
Voltage	100-250VAC	100-250VAC	100-250VAC	100-250VAC
Frequency	50/60Hz	50/60Hz	50/60Hz	50/60Hz
Power Phase	Single	Single	Single	Single
Cooling	Air Cooled	Air Cooled	Air Cooled	Air Cooled
Ambient Temp [8]	5-35°C	5-35°C	5-35°C	5-35°C
PSU Type	LPU1000	LPU1000	LPU1000	LPU1000

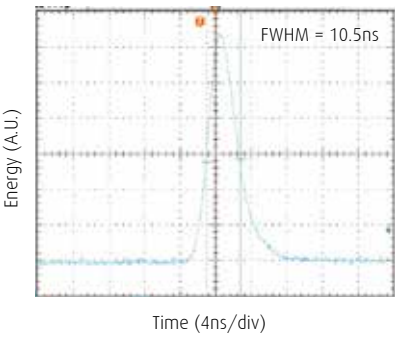
1. Contact Litron for more information.
2. Pulse-to-pulse energy.
3. FWHM - Fast photodiode and >1GHz oscilloscope.
4. Beam diameter is rod diameter - FWHM diameter will be smaller.
5. Full angle for 90% of the output energy.
6. Measured using ISO 11670:2003.
7. RMS jitter. Measured with respect to the Q-switch trigger input.
8. 5% to 80% relative humidity (non condensing).

TRLi HR RANGE SPECIFICATIONS

High Repetition Rate Compact High Energy Q-switched Nd:YAG Lasers

Model	TRLi HR 320-50	TRLi HR 100-100	TRLi HR 250-100	TRLi HR 80-200	TRLi HR 120-200
Repetition Rate (Hz)	50	100	100	200	200
Output Energy (mJ)					
1064nm	320	100	250	80	120
532nm	160	60	130	45	65
355nm	60	20	45	15	20
266nm	30	10	20	7	9
213nm [1]					
Pulse Stability (±%) [RMS] [2]					
1064nm	2 [0.6]	2 [0.6]	2 [0.6]	2 [0.6]	2 [0.6]
532nm	3 [1.0]	3 [1.0]	3 [1.0]	3 [1.0]	3 [1.0]
355nm	4 [1.3]	4 [1.3]	4 [1.3]	4 [1.3]	4 [1.3]
266nm	6 [2.0]	6 [2.0]	6 [2.0]	6 [2.0]	6 [2.0]
Pulse Duration (ns) [3]					
1064nm	8-11	8-11	8-11	8-11	8-11
532nm	8-10	8-10	8-10	8-10	8-10
355nm	7-9	7-9	7-9	7-9	7-9
266nm	7-8	7-8	7-8	7-8	7-8
Beam Parameter					
Beam Diameter (mm) [4]	6.4	5.0	6.4	5.0	6.4
Beam Divergence (mrad) [5]	<8	<8	<8	<8	<8
Pointing Stability (µrad) [6]	<100	<100	<100	<100	<100
Timing Jitter (ns) [7]	<0.5	<0.5	<0.5	<0.5	<0.5
Linewidth @ 1064nm (cm^{-1})	<0.7	<0.7	<0.7	<0.7	<0.7
Lamp Life (pulses)	10^8	10^8	10^8	10^8	10^8
Services					
Voltage	100-250VAC	100-250VAC	100-250VAC	100-250VAC	220-250VAC
Frequency [8]	50/60Hz	50/60Hz	50/60Hz	50/60Hz	50/60Hz
Power Phase	Single	Single	Single	Single	Single
Cooling	Water cooled	Air cooled	Water cooled	Water cooled	Water cooled
Ambient Temp [9]	5-35°C	5-35°C	5-35°C	5-35°C	5-35°C
Water Temp [10]	20°C		20°C	20°C	20°C
PSU Type	19" Rack	LPU1000	19" Rack	19" Rack	19" Rack

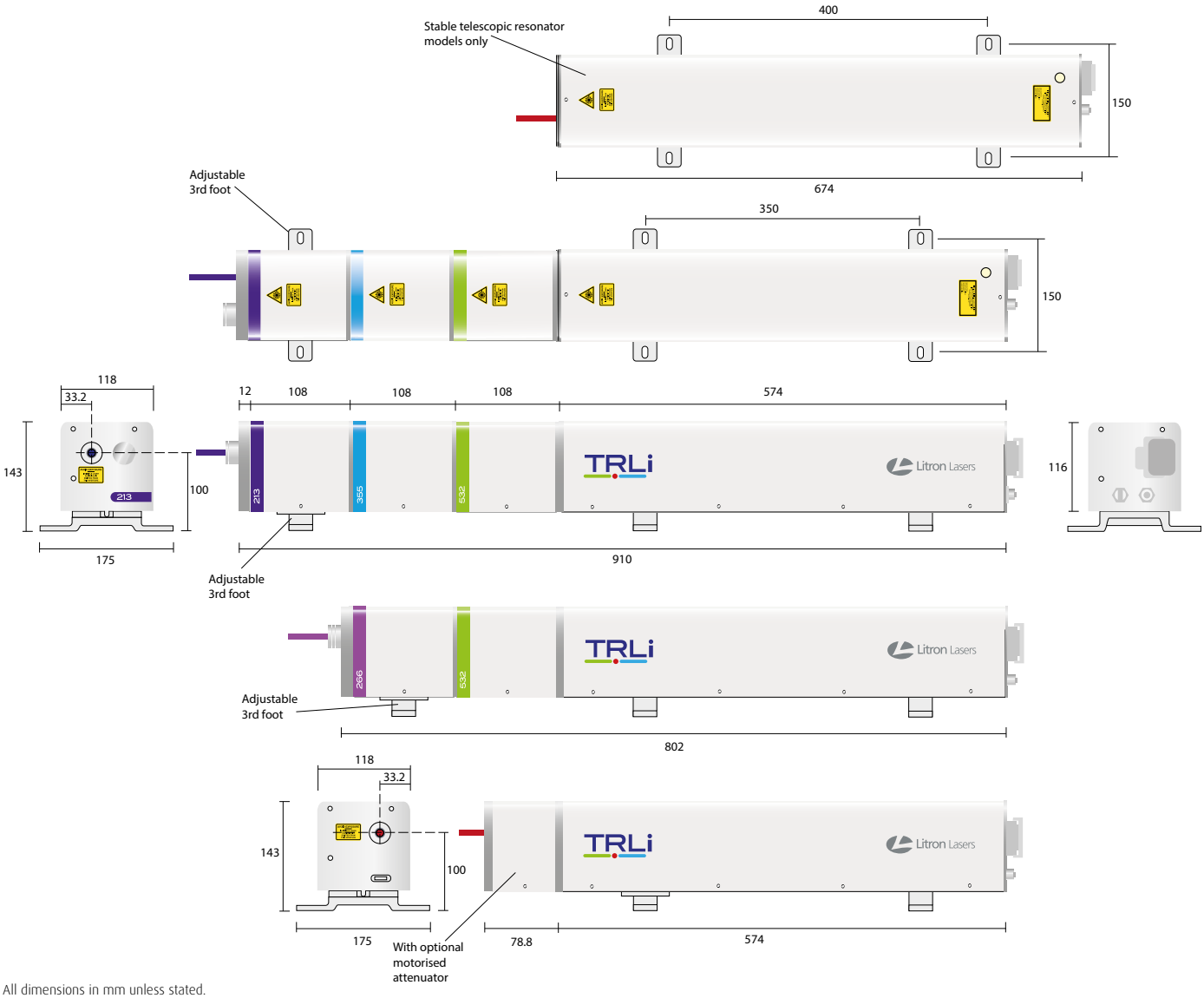
TRL-HR 250-100: Pulse shape at 100Hz



1. Contact Litron for more information
2. Peak-to-Peak Energy - 100% of pulses.
3. FWHM - Fast photodiode and >1GHz oscilloscope.
4. Beam diameter is rod diameter - FWHM diameter will be smaller.
5. Full angle for 90% of the output energy.
6. Measured using ISO 11146-1:2005.
7. Jitter is measured with respect to the Q-switch trigger input.
8. 50Hz or 60Hz to be specified at time of order.
9. 0 to 80% relative humidity (non condensing).
10. >8 lpm at <5 bar.

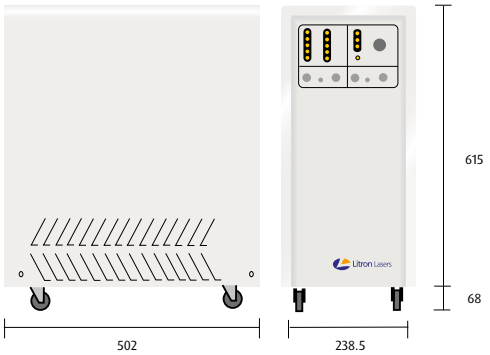
MECHANICAL DATA

Laser Head with Doubler, Tripler, Quadrupler & Quintupler Units

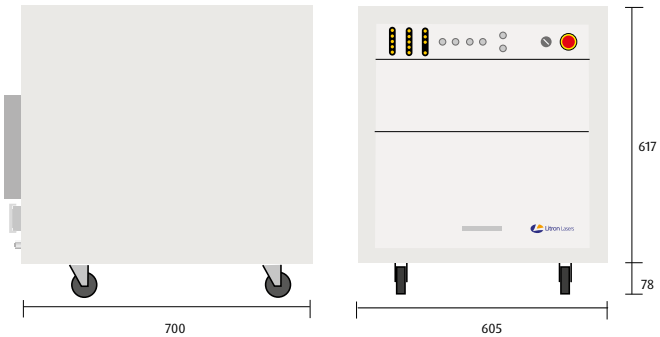


All dimensions in mm unless stated.

LPU1000 PSU



12U Rackmount PSU



TRLi Series

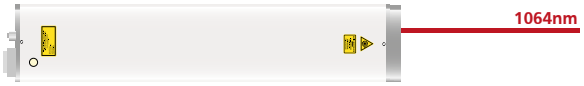
Flexible model options to suit most applications

All model options are available with harmonic auto-tuning, auto-stabilisation and variable motorised attenuator.

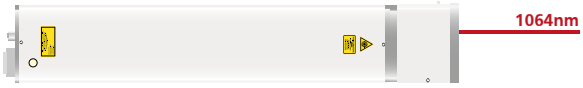
Other model options include:

Built-in harmonic diode pointer.

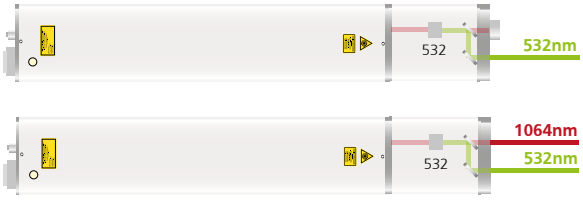
Options for 1064nm output



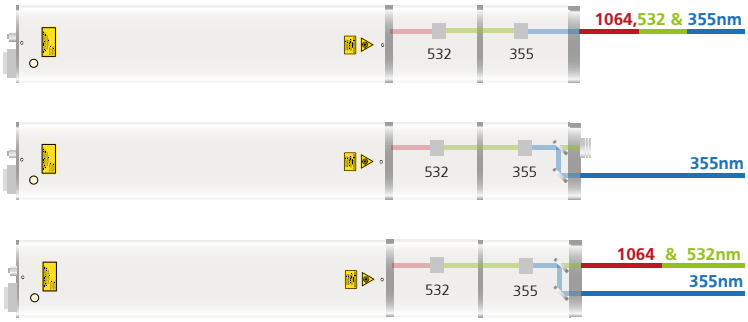
Options for 1064nm output with optional motorised attenuator



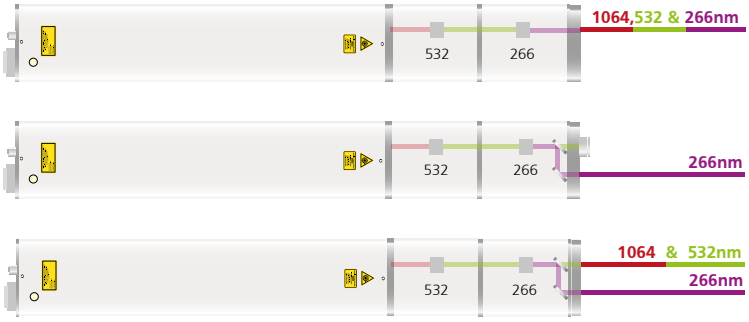
Options for 532nm output



Options for 355nm output



Options for 266nm output



Option for 213nm output

**For details on 213nm, please contact Litron directly*

Our policy is to improve the design and specification of our products. The details given in this document are not to be regarded as binding.

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