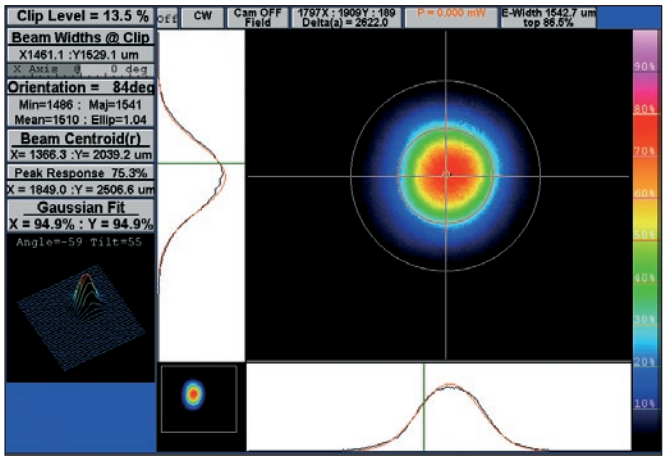
LS-2139 Pulsed Nd:YAG Laser

The unique design of power supply and laser cavity provides high output parameters and reliability. The totally self-contained cooling system with water-to-air heat exchanger allows laser operation in different environment conditions.

LOTIS TII LS-2139 utilizes a special stable resonator configuration providing thermal lens and birefringence compensation. All cavity spaces are sealed, thus preventing the encroaching of harmful contamination onto optical surfaces.

Controls are available either through a menu-driven remote control or via RS232 interface. All parameter sets can be stored and recall for different operation modes.

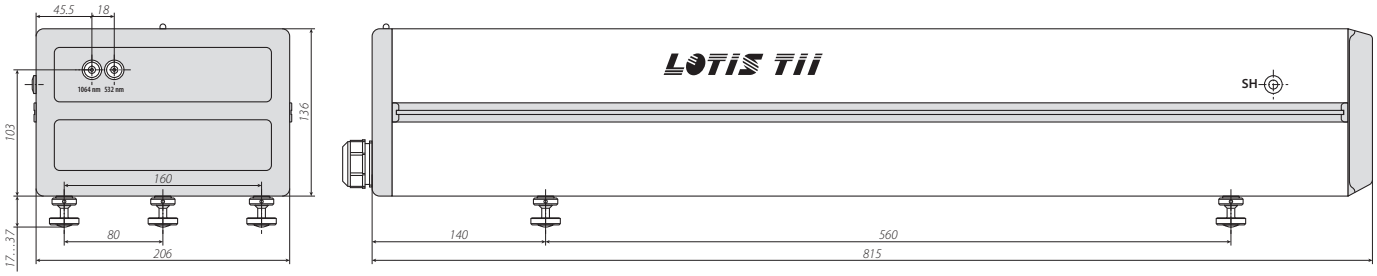


Beam profile (1064 nm) in far field.

Specification

Parameter		Near TEM_{00}	TEM_{00}
Energy, mJ	1064 / 532 nm	75 / 40	45 / 25
Pulse duration (FWHM at 1064 nm), ns		15–18	15–18
Pulse repetion rate, Hz		100	100
Beam divergence (full angle for 86 % of energy), mrad		≤0.7	≤0.5
Beam diameter, mm		≤4.0	≤2.5
Jitter*, ns		≤±1.5	≤±1.5
Energy stability** (1064 nm), %		≤±3.0	≤±2.5
Size L x W x H, mm (Weight, kg)	Laser head	815 x 206 x 136 (22.0)	
	Power supply	446 x 449 x 177 (22.0)	
	Cooling system	446 x 449 x 266 (23.0)	
	Remote control	105 x 175 (0.5)	
Power requirements		Single phase, 220±20 V, 50–60 Hz, 2000 W	

* with respect to external trigger of Q-switch
** shot to shot for 99% of pulses



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LS-2151

HIGH POWER PICOSECOND MODE-LOCKED ND:YAG LASER

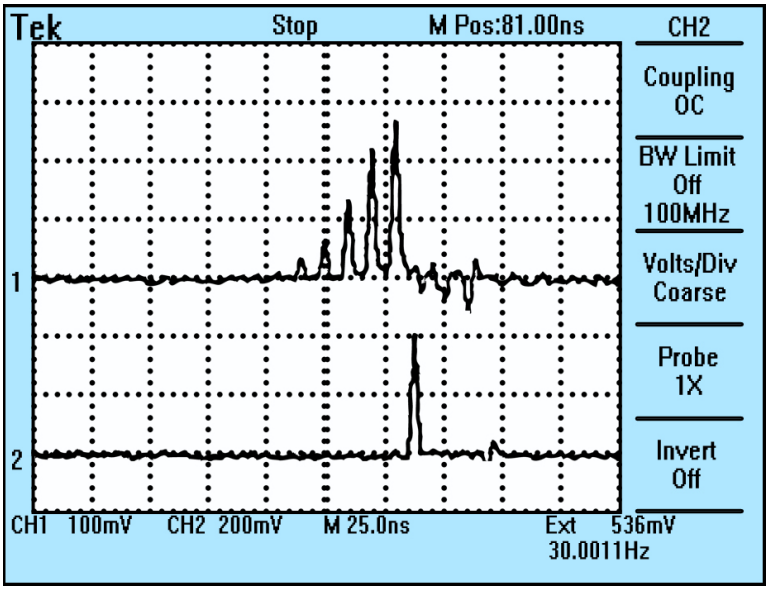
LS-2151 is actively mode-locked and Q-switched MOPA Nd:YAG laser that incorporates:
all solid state master oscillator (MO);
two-pass amplifier(PA);
built-in second harmonic generator;
remote control from PC software;

Features & Benefits:
Separate MO and PA pump power control in single unit
Water to air heat exchanger without external water cooling
TEM00 master oscillator
Forth and third harmonics generators (optional)
Autocorrelator for laser adjustment and pulse duration monitoring (optional),
Built in aiming laser and MO, PA and SH energy monitoring

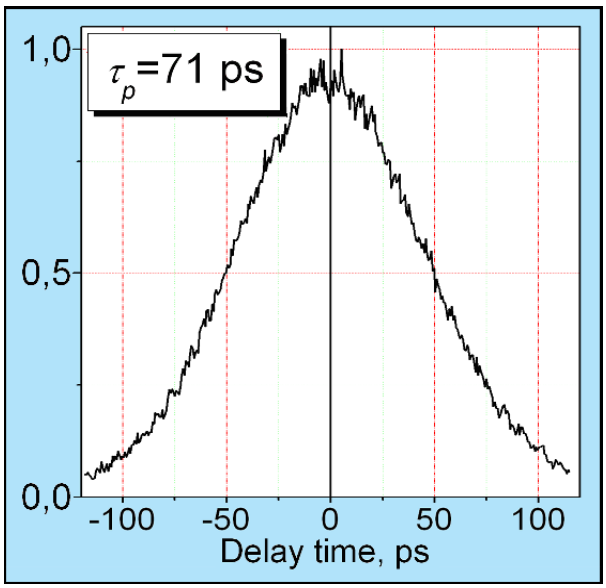
Master oscillator is operating under the comprehensive cavity Q-control providing mode locking at feedback prelase stabilization, Q-switching and selection of the single optical ultrashort pulse from the master oscillator cavity.
Intracavity oscillations signal (upper trace)

Output signal (lower trace)

Pulse formation at feedback stabilized prelase provides highly reproducible generation of 70 ps pulses.



Intracavity oscillations signal (upper trace)
Output signal (lower trace)



Example of autocorrelation function

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Synchronization to external devices.

Flash lamps triggering and all Q-control events in laser: mode locking rf-pulse, Q-switching and cavity dumping are monitored by Control Unit with multichannel timer phase-locked to the signal of reference oscillator, keeping system time in the cavity roundtrip units. The use of such timer opens new possibilities for the optical pulse synchronization to external devices:

- output TTL sync pulse either forthcoming or delayed relative to in the range ±120μs with 1 ns resolution and timing jitter less than 200ps;
- laser triggering by external sync pulse with the optical pulse delay is in the range 110-140 μs at timing jitter ±10ns;
- two LS-2151 lasers synchronization with the accuracy about ±15 ps.

Energy monitoring.

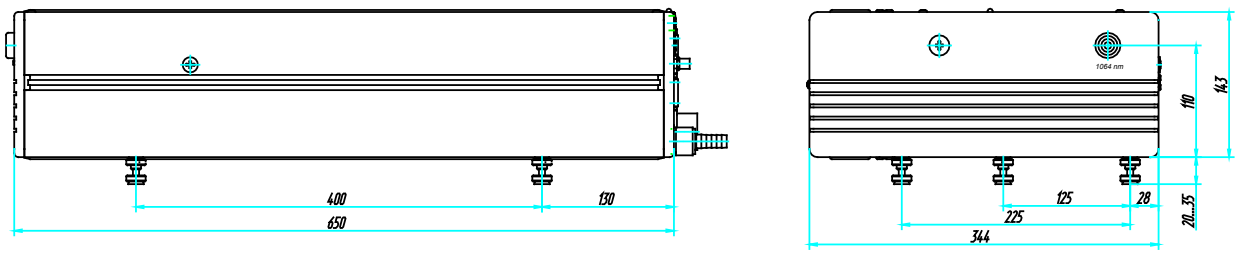
LS-2151 has built in photo-detectors monitoring the energies of MO, PA and SH output pulses. Energy values are indicated in laser control window of remote control PC.

Independent discharge circuits for MO and PA flash lamps open the opportunity to adjust the output energy of laser system according to application requirements.

Specification

Parameter		Value
Energy, mJ	1064 nm	75
	532 nm	35
	355 nm	15[1)]
	266 nm	15[1)]
	213 nm	3[1)]
Pulse duration, ps	FWHM	70-80
Pulse repetion rate, Hz		15
Beam divergence, $\theta_{0,86}$, mrad		0.7
Jitter*, ±ns (RMS)		
Relative to external triggering		±10.0
Relative to service sync pulse		±0.2
Pulse energy Stability (RMS),%		
	1064 nm	≤2.5
	532 nm	≤3.0
	355 nm	≤3.0
	266 nm	≤10 (4.0)[2)]
Beam diameter, mm		≤9.0
Size L x W x H, mm (Weight, kg)	Laser head	650 x 344 x 143 (35.0)
	Power supply	512 x 485 x 177 (23.0)
	Cooling system	542 x 485 x 266 (20.0)
	Control Unit	512 x 485 x 133 (9.0)
Power requirements		Single Phase, 220±20 V, 50/60 Hz, 1200VA

1) Harmonic generator HG-T, HG-F and HG-Fifth are optional as separate units
2) With autotracker



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LS-2131D, LS-2134D and LS-2145D

Double pulsed Q-switched Nd: YAG lasers are designed to provide highly stable, nanosecond pulsed IR, green and UV radiation for Particle Image Velocimetry (PIV), Laser Induced Breakdown Spectroscopy (LIBS) and other kinetic applications.

These compact double pulsed lasers (DPL) are designed with a unique laser head: two independent laser resonators pumped by a single flash lamp are integrated in one laser emitter. A single power supply and cooling unit (with water-to-air heat exchanger) are used in the DPL. Ease of use is provided through multiple triggering:

- single-shot push button trigger and continuous internal trigger from remote control,
- external TTL trigger,
- computer-controlled laser operation via RS-232 port.

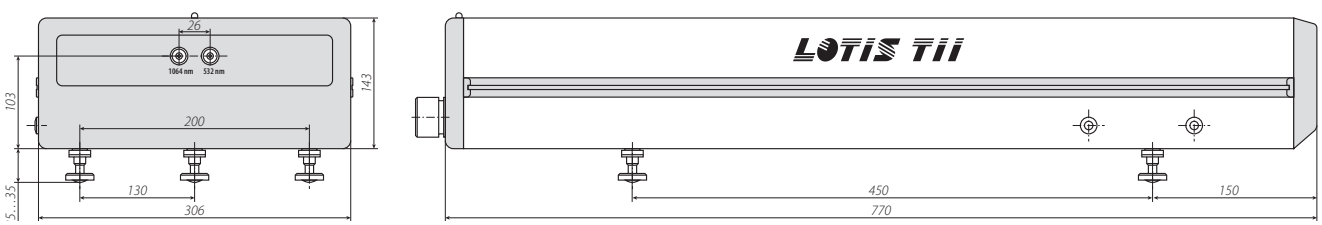
These DPLs combine the reliability and rigidity of LS-2131-2134 lasers with operation in dual pulse mode: two output pulses of equivalent energy; polarization and high beam uniformity. Dual output ports allow each oscillator to operate independently when necessary.

DPL can be fit with harmonic generators and tunable solid state lasers.

Specifications[1]

Model		LS-2131D	LS-2134D	LS-2145D
Energy, mJ	1064 nm 532 nm	100 50	200 110	320 190
Pulse duration (FWHM), ns Pulse repetition rate, Hz		12-15 15	12-15 10	12-15 10
Beam divergence, mrad (full angle for 86% of energy) Beam diameter, mm		1.5 4	2.5 6.3	2.5 6.3
Delay between laser pulses[2], μs		0-80		
Jitter [3],ns Energy stability 1064 nm (rms), %		±1.0 ±3.0		
Size LxWxH, mm (Weight, kg)	Laser Head Power Supply Cooling System Remote Control	770x306x143 (21.0) 391x364x192 (16.5) 391x364x280 (15.5) 105x175 (0.5)		
Power requirements		Single Phase, 220±20 V, 50/60 Hz, 850 VA		

[1] *All specifications are subject to change without notice*
[2] *1 μs-steps, other steps (1-100 ns) are available on request*
[3] *With respect to external trigger of Q-switch*



LS-2136 Pulsed Nd:YAG Laser

LOTIS TII LS-2136 laser is a high repetition rate Q-switched Nd:YAG laser emitting at the fundamental (1064 nm) and second (532 nm) harmonic.

The telescopic stable resonator has given the benefits of uniform beam quality, high energy and low beam divergence. The intracavity mode controlling telescope compensates the thermal lensing of the Nd:YAG rod and limits the irreducible beam divergence of laser by decreasing the transverse mode content of the beam.

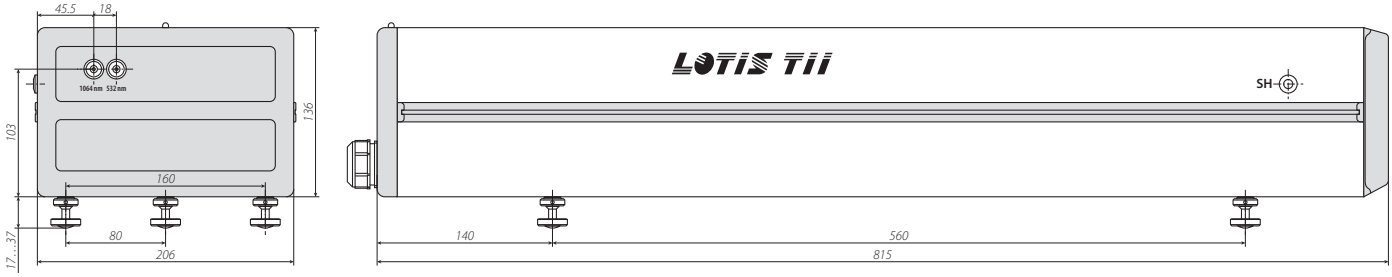
There is no need for external water supply since the cooling system is totally self-contained with water-to-air heat exchanger.

The digital display remote control can be programmed to run in either auto or manual modes. It gives you fingertip control of all laser functions.

Specification

Parameter		Value
Energy, mJ	1064 / 532 / 355 / 266 nm	140 / 75 / 25* / 18*
Pulse duration (FWHM at 1064 nm), ns		15–18
Pulse repetion rate, Hz		1–50
Beam divergence (full angle for 86 % of energy), mrad		0.7
Beam diameter, mm		≤5.0
Jitter**, ns		±1.5
Energy stability*** (1064 nm), %		±3.0
Size L x W x H, mm (Weight, kg)	Laser head	815 x 206 x 136 (21.0)
	Power supply	446 x 449 x 177 (20.0)
	Cooling system	446 x 449 x 266 (23.0)
	Remote control	105 x 175 (0.5)
Power requirements		Single phase, 220±20 V, 50–60 Hz, 1500 W

* with Harmonic Generator Assembly HG-TF
** with respect to external trigger of Q-switch
*** shot to shot for 99% of pulses



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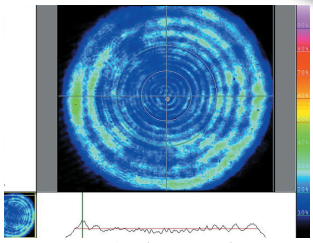


Beam profile (1064 nm) in near field.

Nd:YAG Lasers with Gaussian resonator

LS-2132UTF, LS-2134UTF

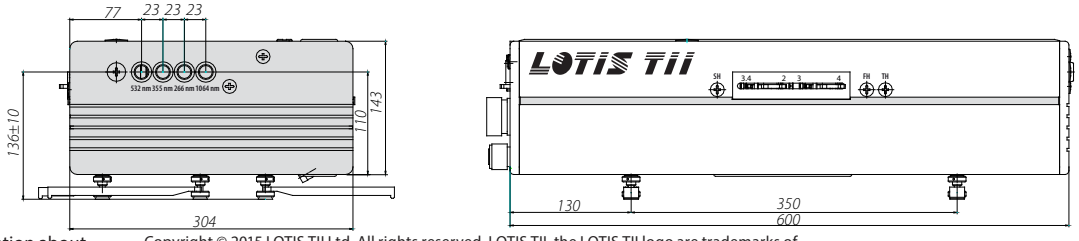
Compact Q-switched lasers with short pulse duration and built-in second, third, and fourth harmonics generators - ideal tool for various research applications like LIDAR, spectroscopy, LIF, LIBS, PLD and as a pump source for OPO, Cr:Forsterite and Ti:Sapphire tunable lasers.

- The laser head design provides easy switchable output beams at 1064 nm, 532 nm, 355 nm and 266 nm without removing protective cover and additional alignment. Both PC-control and manual wavelength switching options are available.
- High stability and durability of output parameters is provided by special temperature control of nonlinear and Q-switched crystals as well as laser resonator special design.
- Enhanced high energy Third Harmonic (355 nm) and integrated Fifth Harmonic (213 nm) options are available by request.

Specifications[1]

Model		LS-2132UTF	LS-2134UTF
Energy, mJ	1064 nm	170	260
	532 nm	110	170
	355 nm	40	60(80[2])
	266 nm	35	55
	213 nm	8[3]	15[3]
Pulse duration (FWHM), ns	1064 nm	5-6	7-8
	532 nm	4-5	6-7
	355 nm	4-5	5-7
	266 nm	4-5	5-6
Pulse repetition rate, Hz		15	15
Beam divergence, mrad (full angle for 86% of energy)		≤ 0.7	≤ 0.8
Beam diameter, mm		≤ 5.0	≤ 6.0
Jitter [4],ns		±1.0	
Energy stability 1064 nm (rms), %		1.0	
Pointing stability, mrad		0.1	
Size LxWxH, mm (Weight, kg)			
	Laser Head	600x304x143 (18.0)	
	Power Supply	391x364x192 (16.5)	
	Cooling System	391x364x280(15.5)	
	Remote Control	130x180 (0.5)	
Power requirements		Single Phase, 220±20 V, 50/60 Hz, 900 VA	

[1] *All specifications are subject to change without notice*
[2] *High energy TH option*
[3] *With external harmonics assembly*
[4] *With respect to external trigger of Q-switch*



Overall sizes of above lasers

LS-2131M, LS-2131M-T, LS-2131M-F, LS-2132B

LS-2131M, LS-2131M-T, LS-2131M-F and LS-2132B are laser models for integration into laser systems with limitations on weight-dimension parameters.

The main advantages of lasers are compactness, robust design in combination with a wide choice of operating mode (pulse repetition frequency, burns mode, the presence of harmonics, etc.).

The reliability of lasers and the stability of output parameters are ensured by:

-the absence of external high-voltage connectors between power supply and laser head, the presence of special locks and sensors, provided the stable mode of operation

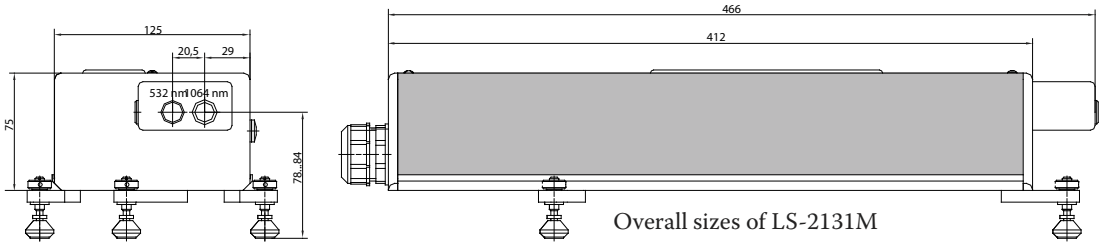
- an folded cavity with trihedral corner cube prism (model LS-2132B) is virtually immune to thermal and physical shocks
- the built-in photoprobe of fundamental wavelength energy for monitoring the output energy)
- integrated in one housing a laser power supply and efficient cooling system with a water-to-air heat exchanger,
- thermal stabilization of the electro-optical Q-switch and second-harmonic crystal.

Laser control is performed from the remote control or personal computer. The software allows not only to control the operation of the laser, but also to perform complete diagnostics of laser parameters, including determination of the fundamental frequency energy (1064 nm), total number of lamp flashes, pump energy and output energy instabilities. To preserve the characteristics of the output radiation unchanged when the repetition frequency of the output pulses is changed, a frequency «cutting» mode is provided by adjusting the opening of the Q-switch at a constant pulse repetition rate.

Specifications[1]

Model		LS-2131M-10	LS-2131M-20	LS-2131M-10-T	LS-2131M-10-F	LS-2132B
Energy, mJ	1064 nm	200	190	-	-	200
	532 nm	125	120	-	125	125
	355 nm	30[2]	30[2]	30	-	30[2]
	266 nm	35[2]	30[2]		35	35[2]
Pulse duration (FWHM at 1064 nm), ns		7-9				8-10
Pulse repetition rate, Hz		10	20	10		
Beam diameter, mm		≤5				
Jitter[3], ns		±1.0				
Beam divergence ($\Theta_{0.86}$), mrad		≤1.5				
Energy stability 1064 nm (rms), %		<0.6				
Size LxWxH, mm (Weight,kg)						
Laser head		466x125x75 (5)		542x125x81 (7)		335x205x130 (8.5)
Power supply and cooling system		391x364x280 (21)		391x364x280 (21)		391x364x280 (21)
Remote control		105x175 (0.5)		105x175 (0.5)		105x175 (0.5)
Power requirements		Single phase, 220±20 V, 50–60 Hz, 10 A				

[1] All specifications are subject to change without notice
[2] With external harmonic generator HG-TF
[3] With respect to external trigger of Q-switch



Overall sizes of LS-2131M

LS-2138N, LS-2138N-TF, LS-2138N/100

High repetition rate Nd:YAG Laser

LS-2138N, LS-2138N-TF, and LS-2138N/100 are the modern improved models of LOTIS TII high repetition rate Q-switched lasers for technology, medicine and various kind of scientific applications.

Main features:

-New laser head design provides easy switchable of all output wavelengths including 1064 nm without removing protective cover and additional alignment.

-The telescopic stable resonator has given the benefits of uniform beam quality, high energy and low beam divergence.

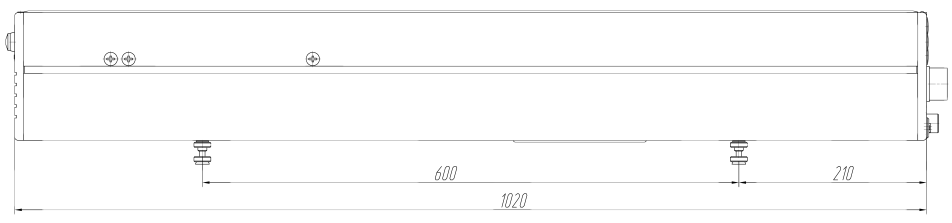
-High stability and durability of the output parameters are provided by special temperature control of nonlinear and Q-switched crystals as well as laser resonator special design.

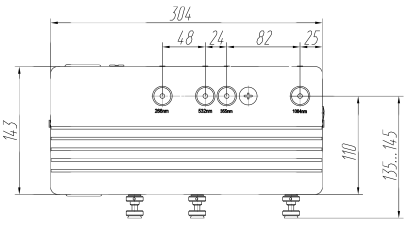
-Full PC-control wavelength switching options are available on request.

Specifications[1]

Model		LS-2138N	LS-2138N-TF	LS-2138N/100
Energy, mJ	1064 nm	220	220	180
	532 nm	115	115	100
	355 nm	45[2]	45	40[2]
	266 nm	30[2]	30	25[2]
	213 nm	6[3]	6[3]	5[3]
Pulse duration (FWHM, at 1064 nm), ns		10-12		10-12
Pulse repetition rate, Hz		50		100
Beam divergence, mrad		≤1		≤1.5
Beam diameter, mm		≤5		≤5
Jitter, ns		±1.5		±1.5
Energy stability 1064nm (RMS), %		≤1.5		≤1.5
Size L x W x H, mm (Weight, kg)				
	Laser head	820x304x143(26.0)	1020x304x143(30.0)	820x304x143(26.0)
	Power supply	446x449x177(22.0)	446x449x177(22.0)	446x449x177(23.0)
	Cooling system	446x449x266(23.0)	446x449x266(23.0)	630x485x310(65.0)
	Remote control	130x180(0.5)	130x180(0.5)	130x180(0.5)
Power requirements		Single phase, 220±20 V, 50/60 Hz, 2000 W		Single phase, 220±20 V, 50/60 Hz, 3500 W

[1] All specifications are subject to change without notice
[2] With external harmonic generator HG-TF
[3] With external harmonic generator HG-Fifth





Overall sizes of LS-2138N-TF

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LS-2134N, LS-2145N Nd:YAG Q-switched laser

The LS-2134N and LS-2145N are improved models of our well known compact laser series LS-2134, LS-2145

Main features:

- The telescopic stable resonator has given the benefits of uniform beam quality, high energy and low beam divergence.
- Both PC-control and manual are available.
- High stability and durability of output parameters is provided by special temperature control of nonlinear and Q-switched crystals as well as laser resonator special design.
- LS-2134N and LS-2145N due to its increased pulse duration are the ideal tool for various research applications like LIDAR, spectroscopy and a pump source for OPO, Cr:Forsterite and Ti:Sapphire tunable lasers.

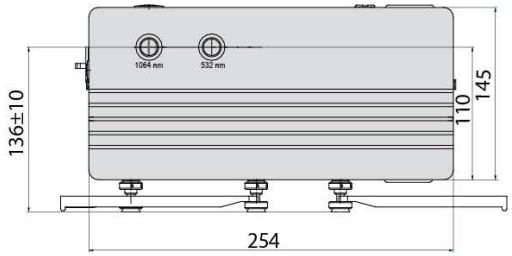
Specification

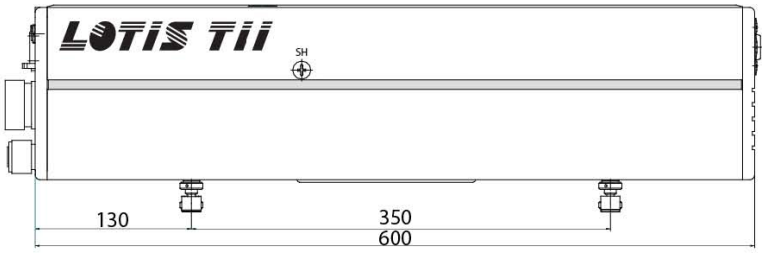
Parameter		LS-2134N	LS-2145N
Energy, mJ	1064 nm	260	350
	532 nm	160	230
	355** nm	60/80*	90/120*
	266** nm	50	70
Pulse duration (FWHM at 1064 nm), ns		14–16	
Pulse repetion rate, Hz		1; 2; 5; 10 (15)***	
Beam divergence, mrad		≤1.5	
Beam diameter, mm		≤6.3	
Jitter, ns		1.0	
Energy stability 1064 nm (rms), %		<1	
Size L x W x H, mm (Weight, kg)			
	Laser head	600x254x145 (14)	
	Power supply	391x364x192 (16.0)	
	Cooling system	391x364x280 (15.5)	
	Remote control	130x180 (0.5)	
Power requirements		Single phase, 220±20 V, 50–60 Hz, 750 V*A	

*High energy TH option

**with external TH and FH converter

*** Option is available on request





For more information about LOTIS TII and its products visit www.lotis-tii.com

Q-switched automated Nd:YAG laser with UV output

LS-2145T, LS-2145F

The LS-2145T and LS-2145F are our latest designs featuring the high reliability and simplicity found in our compact laser series LS-2130-2145, and with improved output parameters as well as built-in UV converters.

The two variations of this laser are model LS-2145T, lasing at 1064, 532, 355 nm and model LS-2145F, lasing at 1064, 532, 266 nm.

These advanced lasers feature remote switching of the laser output frequencies without manual intervention in the laser head. The changeover of output channels (fundamental frequency to second harmonic and third or forth harmonics) is motorized and is provided by remote control (PC control). A color coded LED indicator shows at a glance the laser output setting in use.

Specifications

Model		LS-2145T	LS-2145F
Energy, mJ	1064 nm	350	350
	532 nm	230	230
	355 nm	85/75*	-
	266 nm	-	70
Pulse duration (FWHM), ns		13-15	
Pulse repetition rate, Hz		10	
Beam divergence, mrad full angle for 86% of energy		1.0	
Beam diameter, mm		6.3	
Jitter **,ns		±1.0	±1.0
Energy stability ***, %	1064 nm	±2.5	±2.5
	532 nm	±3.0	±3.0
	355 nm	±3.0	-
	266 nm	-	±3.0
Size LxWxH, mm (Weight, kg)			
	Laser Head	815x206x136 (30.0)	
	Power Supply	363x364x192 (15.5)	
	Cooling System	363x364x280 (15.5)	
	Remote Control	105x175 (0.5)	
Power requitements		Single Phase, 220±20 V, 50-60 Hz, 750 W	

* for OPO pumping (with protective mirror, cutting back reflection)
** with respect to external trigger of Q-switch
*** shot to shot for 99% of pulses

LS-2137U-N Pulsed Nd:YAG Laser

LS-2137U-N is an modern, short pulse modification of the power laser LS-2137N with VRM, which keeps such advantages of this model as rugged design, high stability and friendly used operation.

New laser head design provides easy switchable output beams at 1064 nm, 532 nm, 355 nm and 266 nm without removing protective cover and additional alignment.

Fourth harmonics generator based on BBO crystal allows to obtain high stability of 266 nm wavelength.

VRM resonator gives excellent harmonics conversion due to increased spatial uniformity of output beam, low divergence and short pulse duration.

LS-2137U-N the ideal tool for research (LIDAR, spectroscopy including LIF, LIBS) and OEM applications.

PC control wavelength switching is available on request.

Specifications[1]

Model		LS-2137U-N
Energy, mJ	1064 nm 532 nm 355 nm 266 nm	700 400 160 120
Pulse duration (FWHM at 1064 nm), ns		6-7
Pulse repetition rate, Hz		10
Beam divergence ($\Theta_{0.86}$), mrad		≤0.8
Beam diameter, mm		≤8
Jitter[2], ns		±1.5
Energy stability 1064nm (rms), %		2.5
Size L x W x H, mm (Weight,kg)	Laser head Power supply Cooling system Remote control	950 x 304 x 143 (17.0) 363x364x192 (15.0) 363x364x280(12.0) 105 x 175 (0.5)
Input Power requirements		Single phase, 220±20 V, 50/60 Hz, 10 A

[1] *All specifications are subject to change without notice*

[2] *With respect to external trigger of Q-switch*