NT342 SERIES

High Energy Broadly Tunable Lasers

The NT342 series tunable wavelength nanosecond laser seamlessly integrates the nanosecond optical parametric oscillator and the Nd:YAG Q-switched nanosecond laser – all in a compact housing.

The main system features are: hands-free wavelength tuning from UV to IR, high conversion efficiency, optional fiber-coupled output and separate output port for pump laser beam.

Narrow bandwidth models have a linewidth of less than 5 cm^{-1}, which is ideal for many spectroscopic applications.

The laser is designed for convenient use. It can be controlled from remote keypad or from a PC through an RS232 interface using LabVIEW™ drivers that are supplied with the system. The remote keypad features a backlit display that is easy to read even through laser safety googles. The OPO pump energy monitoring system helps to control pump laser parameters. Replacement of laser flashlamps can be done without misalignment of the laser cavity and/or deterioration of laser performance.

FEATURES

- *Hands-free no gap wavelength tuning from **192** to **2600 nm***
- *Up to **50 mJ** pulse energy in visible spectral range*
- *Up to **10 mJ** pulse energy in UV spectral range*
- *Less than 5 cm^{-1} linewidth*
- ***3–5 ns** pulse duration*
- *Up to **30 Hz** pulse repetition rate*
- *Remote control pad*
- *PC control via RS232 and LabVIEW™ drivers*
- *Optional separate shared output port for 355/532/1064 nm beam*
- *OPO pump energy monitoring*
- *Replacement of flashlamps without misalignment of the laser cavity*
- *Hermetically sealed oscillator cavity protects non-linear crystals from dust and humidity*

APPLICATIONS

- *Laser-induced fluorescence*
- *Flash photolysis*
- *Photobiology*
- *Remote sensing*
- *Time-resolved spectroscopy*
- *Non-linear spectroscopy*

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Tuning range extending optional add-ons

Option	Features
-SH	Second harmonic generator for 210–409 nm range
-SF	Sum-frequency generator for 300–409 nm range with high pulse energy
-SH/SF	Combined option for highest pulse energy in 210–409 nm range
-DUV	Deep UV option for 192–209 nm range

Accessories and other optional add-ons

Option	Features
-FC	Fiber coupled output in 350–2000 nm range
-ATTN	Pulse energy attenuator
-H, -2H	Separate shared output port for Nd:YAG pump laser harmonics (532 or 1064 nm wavelengths)
-AW	Air cooled power supply

SPECIFICATIONS [1)]

Model	NT342A	NT342B	NT342C
OPO			
Wavelength range [2)]			
Signal	410–709 nm [3)]		
Idler	710–2600 nm		
SH generator (optional)	210–409 nm		
SH/SF generator (optional)	210–409 nm		
DUV generator (optional)	192–209 nm		
Output pulse energy			
OPO [4)]	15 mJ	30 mJ	50 mJ
SH generator (optional) [5)]	2 mJ	4 mJ	6.5 mJ
SH/SF generator (optional) [6)]	3 mJ	6 mJ	10 mJ
DUV generator (optional) [7)]	0.3 mJ	0.6 mJ	1 mJ
Linewidth	<5 cm^{-1} [8)]		
Scanning step [9)]			
Signal (410–709 nm)	0.1 nm		
Idler (710–2600 nm)	1 nm		
SH/SF/DUV beam (192–409 nm)	0.05 nm		
Pulse duration [10)]	3–5 ns		
Typical beam diameter [11)]	4 mm	5 mm	7 mm
Typical beam divergence [12)]	<2 mrad		
Polarization			
Signal beam	horizontal		
Idler beam	vertical		
SH/SF beam	horizontal		
DUV beam	vertical		

SPECIFICATIONS [1)]

Model	NT342A	NT342B	NT342C
PUMP LASER [13)]			
Pump wavelength	355 nm		
Max pump pulse energy	50 mJ	100 mJ	150 mJ
Pulse duration	4–6 ns		
Beam quality	Hat-top in near field, without hot spots		
Beam divergence	<0.6 mrad		
Pulse energy stability (StdDev)	<3.5 %		
Pulse repetition rate	10 or 20 Hz [14)]	10 or 20 Hz	10 Hz
PHYSICAL CHARACTERISTICS			
Unit size (W × L × H) [15)]	452 × 800 × 270 mm		
Power supply size (W × L × H)	330 × 490 × 585 mm		
Umbilical length	2.5 m		
OPERATING REQUIREMENTS			
Water consumption (max 20 °C) [16)]	6 l/min		
Room temperature	15–30 °C		
Relative humidity	20–80 % (non-condensing)		
Power requirements	208 or 240 V AC, single phase 50/60 Hz		
Power consumption [17)]	1.8 / 3.4 kVA		

1) Due to continuous improvement, all specifications are subject to change without notice. Parameters marked typical are indications of typical performance and will vary with each unit we manufacture. Unless stated otherwise, all specifications are measured at 450 nm.

2) Hands-free tuning range is from 192 nm to 2600 nm.

3) Tuning range extension to 400–709 nm is optional.

4) Measured at 450 nm. See tuning curves for typical outputs at other wavelengths.

5) Measured at 260 nm. See tuning curves for typical outputs at other wavelengths.

6) Measured at 340 nm. SF generator is optimized for maximum output in 300–409 nm range. See tuning curves for typical outputs at other wavelengths.

7) Measured at 200 nm.

8) Linewidth is <8 cm^{-1} for 210–409 nm range.

9) Represents wavelength change quantum for manual input from control pad. When wavelength is controlled from PC, the wavelength set precision is ~1 cm^{-1} in OPO range and ~2 cm^{-1} in SH/SFG range.

10) FWHM measured with photodiode featuring 1 ns rise time and 300 MHz bandwidth oscilloscope.

11) Beam diameter is measured at 450 nm at the FWHM level and can vary depending on the pump pulse energy.

12) Full angle measured at the FWHM level at 450 nm.

13) Separate output port for the 355 nm beam is standard. Outputs for 1064 nm and 532 nm beams are optional. Laser output will be optimised for OPO operation and specifications may vary with each unit we manufacture.

14) 30 Hz version is available. Inquire for pulse energy specifications.

15) Length from 821 to 1220 mm depending on configuration.

16) At 10 Hz pulse repetition rate. Air cooled power supply is available.

17) At 10/20 Hz pulse repetition rate.

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PERFORMANCE

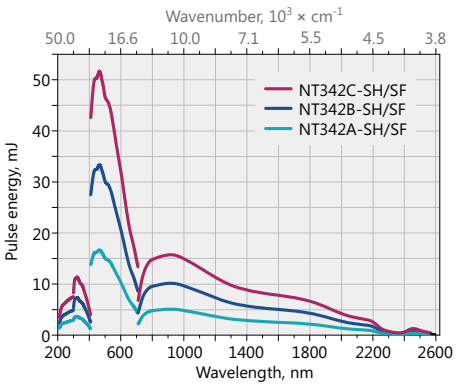

Fig 1. Typical output energy of the NT342 series tunable wavelength systems

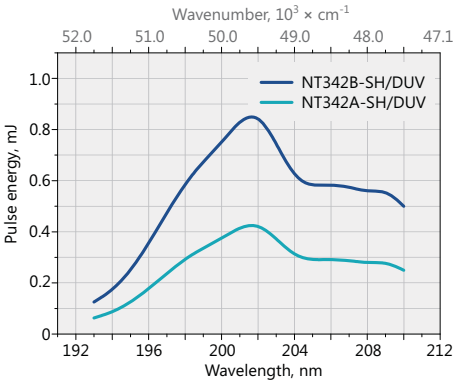

Fig 2. Typical output energy of the NT342 series tunable wavelength systems with SH/DUV extension

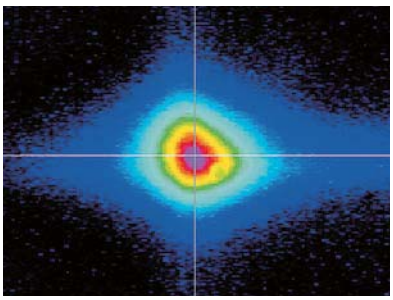

Fig 3. Typical far field beam profile of NT342 laser

OUTLINE DRAWINGS

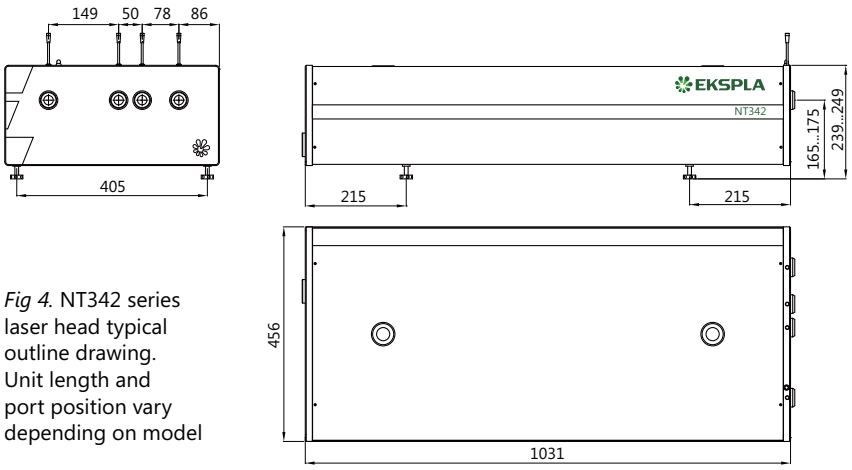

Fig 4. NT342 series laser head typical outline drawing. Unit length and port position vary depending on model

ORDERING INFORMATION

NT342A-SH-10-AW-H/2H

Model

Output pulse energy:
A → 15 mJ
B → 30 mJ
C → 50 mJ

Pulse repetition rate, in Hz

Optional tuning range extension
SH → 210–409 nm
DUV → 192–209 nm

Options:
AW → water-air heat exchanger
H → 1054 nm output
2H → 532 nm output

NT350 SERIES

High Energy NIR Range Tunable Lasers

NT352 series tunable laser seamlessly integrates in a compact housing a nanosecond optical parametric oscillator and Nd:YAG Q-switched laser.

Four models with different output pulse energy values are offered. The most powerful model has more than 125 mJ pulse energy at 800 nm.

Narrow linewidth (<10 cm^{-1}) is nearly constant trough whole tuning range, which makes laser suitable for many spectroscopy application.

The device is controlled from the remote keypad or from PC through RS232 interface using LabVIEW™ drivers that are supplied with the system. The remote pad features a backlit display that is easy to read even while wearing laser safety glasses.

System is designed for easy and cost-effective maintenance. Replacement of flashlamps can be done without misalignment of the laser cavity and deterioration of laser performance. OPO pump energy monitoring system helps to increase lifetime of the optical components.

Optional items are available allowing to optimize the laser system for Your application, for example:

- Fiber coupled output in 670–1000 nm range;
- Tuning range extension up to 2600 nm;
- Efficient second harmonics generator for 335–500 nm range;
- Pulse energy attenuator;
- Water-air cooled power supply.

Please inquire custom-build versions and options.

FEATURES

- *Hands-free, automated wavelength tuning from **670** to **2600 nm***
- *Up to **125 mJ** pulse energy in near-IR spectral range*
- *Narrow linewidth across tuning range*
- ***3–5 ns** pulse duration*
- *Up to **30 Hz** pulse repetition rate*
- *Remote control pad*
- *PC control via RS232 and LabVIEW™ drivers*
- *Separate output port for 532 nm beam. Output for 1064 nm is optional*
- *OPO pump energy monitoring*
- *Replacement of the flashlamps can be done without misalignment of the laser cavity*
- *Hermetically sealed oscillator cavity protects non-linear crystals from dust and humidity*

APPLICATIONS

- *Photoacoustic imaging*
- *Photobiology*
- *Remote sensing*
- *Time-resolved spectroscopy*
- *Non-linear spectroscopy*
- *Other laser spectroscopy applications*

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SPECIFICATIONS [1]

Model	NT352	NT352A	NT352B	NT352C
OPO				
Wavelength range				
Signal	670–1064 nm			
Idler	1065–2600 nm			
SH	355–500 nm			
Output pulse energy				
OPO [2]	30 mJ	60 mJ	100 mJ	125 mJ
Linewidth	<10 cm^{-1}			
Scanning step				
Signal (670–1064 nm)	0.1 nm			
Idler (1064–2300 nm)	1 nm			
SH (355–500 nm)	0.5 nm			
Pulse duration [3]	3–5 ns			
Typical beam diameter [4]	6 mm	8 mm	10 mm	12 mm
Typical beam divergence [5]	<2 mrad			
Polarization				
Signal beam	horizontal			
Idler beam	vertical			
PUMP LASER [6]				
Pump wavelength	532 nm			
Max pump pulse energy	110 mJ	230 mJ	400 mJ	500 mJ
Pulse duration	4 – 6 ns			
Beam quality	Hat-Top in near field. Close to Gaussian in far field			
Beam divergence	<0.5 mrad			
Pulse energy stability (StdDev)	<2.5 %			
Pulse repetition rate	10 or 20 Hz [7]	10 or 20 Hz	10 Hz [7]	
PHYSICAL CHARACTERISTICS				
Unit size (W × L × H)	452 × 610 × 270 mm		452 × 1020 × 270 mm	
Power supply size (W × L × H)	330 × 490 × 585 mm		550 × 600 × 530 mm	
Umbilical length	2.5 m			
OPERATING REQUIREMENTS				
Water consumption (max 20 °C) [8]	6 l/min		10 l/min	
Room temperature	15–30 °C			
Relative humidity	20–80 % (non-condensing)			
Power requirements [9]	208 or 240 V AC, single phase 50/60 Hz			
Power consumption [10]	1.8 / 3.4 kVA		1.8 kVA	

1) Due to continuous improvement, all specifications are subject to change without notice. The parameters marked typical are not specifications. They are indications of typical performance and will vary with each unit we manufacture. Unless stated otherwise all specifications are measured at 800 nm.

2) Measured at 800 nm. See tuning curves for typical outputs at other wavelengths.

3) FWHM measured with photodiode featuring 500 ps rise time and 600 MHz bandwidth oscilloscope.

4) Beam diameter is measured at 800 nm at the FWHM level and can vary depending on the pump pulse energy.

5) Full angle measured at the FWHM level at 800 nm.

6) Separate output port for the 532 nm beam is standard. Output for 1064 nm beam is optional. Pump laser output will be optimised for OPO operation and specification may vary with each unit we manufacture.

7) Pulse repetition rates up to 30 Hz are possible. Inquire for pulse energy and other specifications.

8) At 10 Hz pulse repetition rate. Air cooled power supply is available as option.

9) Mains voltage should be specified when ordering. 20 and 30 Hz versions of the laser might require three phase mains.

10) At 10/20 Hz pulse repetition rate. Required current rating might be calculated by dividing power consumption value by mains voltage value.

OPTIONS

▶ **Fiber-coupled output in 355–2000 nm range.**
Please contact EKSPLA for details.

PERFORMANCE

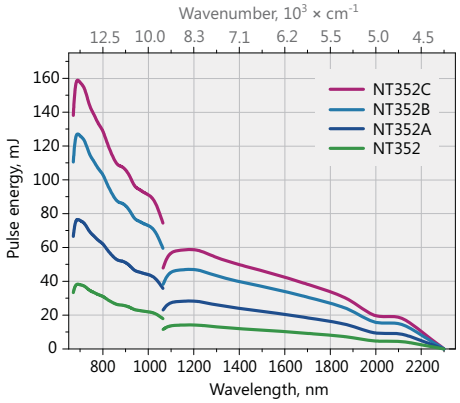

Fig 1. Typical output energy of the NT350 series tunable wavelength systems

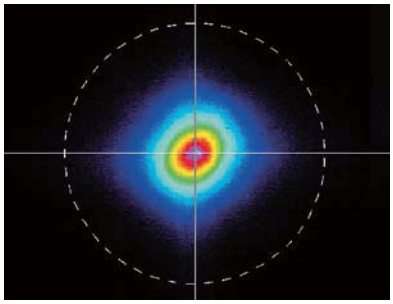

Fig 2. Typical far field beam profile of NT352B laser at 800 nm

ORDERING INFORMATION

NT352A-10-SH-AW-H

Model

Output pulse energy:
none → 30 mJ
A → 60 mJ
B → 100 mJ
C → 125 mJ

Pulse repetition rate, in Hz

Optional tuning range extension
SH → 335–500 nm

Options:
AW → water-air heat exchanger
H → 1064 nm output

NT370 SERIES

High Energy IR Range Tunable Lasers

NT370 series tunable laser seamlessly integrates in a compact housing the nanosecond optical parametric oscillator and Nd:YAG Q-switched laser.

Pumped by fundamental harmonics output the lasers provides tuning in mid- and far-infrared spectral range.

NT373-XIR model uses IR crystal based cascade OPO for tunable output in 4400–18000 nm range. Customized tuning ranges are available by request.
The linewidth of NT373-XIR model is nearly constant across tuning range and it is less than 6 cm^{-1}.

NT377 model produces tunable output in 2500–4400 nm range. Pulse energy is exceeding 10 mJ for wavelengths shorter than 3600 nm, while linewidth is below 10 cm^{-1} for the wavelengths longer than 3000 nm. Because of narrow linewidth of output radiation (typically in 6–10 cm^{-1} range) the laser is suitable for many infrared spectroscopic applications, for example cavity ring-down spectroscopy, gas detection and remote sensing.

The device is controlled from the remote keypad or from PC through RS232 interface using LabVIEW™ drivers that are supplied together with the system. The remote pad features a backlit display that is easy to read even while wearing laser safety glasses.

System is designed for easy and cost-effective maintenance. Replacement of flashlamps can be done without misalignment of the laser cavity and deterioration of laser performance. OPO pump energy monitoring system helps to increase lifetime of the optical components.

Accessories and optional add-ons

Option	Features
-AW	Water-air cooling option
-20	20 Hz PRR option
-H	Optional 1064 nm output

FEATURES

- *Hands-free, automated wavelength tuning*
- *Up to **15 mJ** pulse energy in **mid-IR** spectral range*
- *Less than 10 cm^{-1} linewidth for most of the tuning range*
- ***3–5 ns** pulse duration*
- ***10** or **20 Hz** pulse repetition rate*
- *Remote control pad*
- *PC control via RS232 and LabView™ drivers*
- *Separate output port for 1064 nm pump beam*
- *OPO pump energy monitoring*
- *Replacement of the flashlamps is done without misalignment of the laser cavity*

APPLICATIONS

- *Infrared spectroscopy*
- *Cavity ring-down spectroscopy*
- *Remote sensing*
- *Material processing*
- *Non-linear spectroscopy*
- *Other laser spectroscopy applications*

SPECIFICATIONS [1]

Model	NT377A	NT373-XIR
OPO		
Wavelength range	2500–4400 nm	5000–18000 nm [2]
Output pulse energy [3]	12.5 mJ	1 mJ
Linewidth [4]	<10 cm^{-1}	<6 cm^{-1}
Scanning step	1 nm	
Typical pulse duration [5]	3–5 ns	
Typical beam diameter [6]	6 mm	8 mm
Polarization	horizontal	
PUMP LASER [7]		
Pump wavelength	1064 nm	
Max pump pulse energy	300 mJ	
Pulse duration	4–6 ns	
Beam quality	"Hat-Top" in near field	
Beam divergence	<0.5 mrad	
Pulse energy stability (StdDev)	<1 %	
Pulse repetition rate	10 or 20 Hz	
PHYSICAL CHARACTERISTICS		
Unit size (W × L × H)	452 × 1020 × 270 mm	
Power supply size (W × L × H)	330 × 520 × 670 mm	
Umbilical length	2.5 m	
OPERATING REQUIREMENTS		
Water consumption (max 20 °C) [8] [9]	10 l/min	
Room temperature	18–27 °C	
Relative humidity	20–80 % (non-condensing)	
Power requirements [10]	208 or 240 V AC, single phase, 50/60 Hz	
Power consumption [11]	1.5 kVA	

1) Due to continuous improvement, all specifications are subject to change without notice. Parameters marked typical are not specifications. They are indications of typical performance and will vary with each unit we manufacture. Unless stated otherwise all specifications are measured at 3000 nm for NT377 unit and at 7000 nm for NT373-XIR units.

2) Please contact Ekspla for more detailed specifications.

3) Output is specified at wavelengths defined in chapter 1. See tuning curves for typical outputs at other wavelengths.

4) Linewidth is specified at wavelengths defined in chapter 1. See graph below for typical linewidth at other wavelengths.

5) Estimate, assuming that pulse duration from OPO is by approx 1 ns shorter than one from pump laser.

6) Beam diameter is measured at the FWHM level at the output aperture and can vary depending on the pump pulse energy.

7) Laser output will be optimized for OPO operation and specification may vary with each unit we manufacture.

8) Air cooled power supply is available as option.

9) For 10 Hz PRR.

10) Should be specified when ordering.

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PERFORMANCE

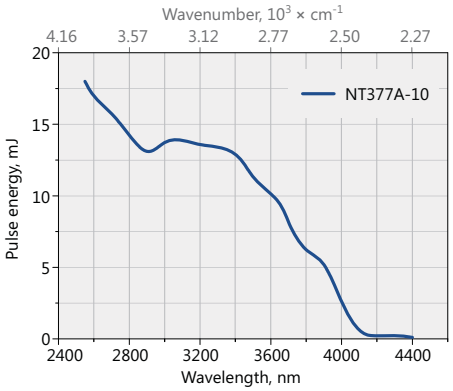

Fig 1. Typical output energy of the NT377A tunable wavelength laser

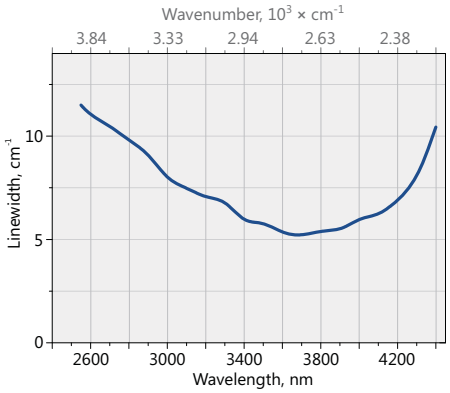

Fig 2. Typical linewidth of the NT377A tunable wavelength laser

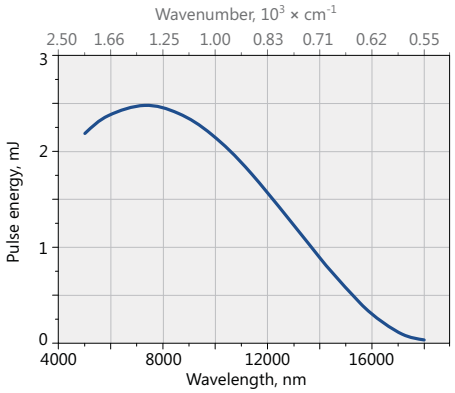

Fig 3. Typical output pulse energy of the NT373-XIR tunable wavelength laser