Q-SHIFT

DIODE PUMPED AIR-COOLED Q-SWITCHED LASER

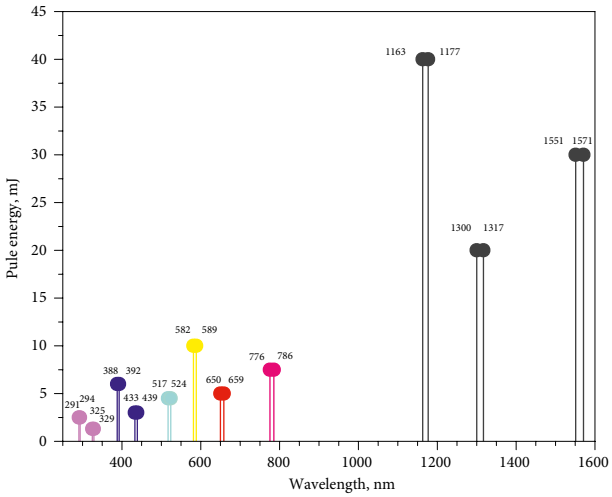
FEATURES

- Up to **40 mJ** pulse energy, up to **1 W** average power
- Up to **100 Hz** pulse repetition rate
- Air cooled (water-free)
- **2-5 ns** pulse duration
- Guaranteed **> 2 G shot** lifetime of pump diodes
- Sync pulses for triggering of user equipment
- Remote monitoring and control via built-in **Ethernet interface**
- Optional attachable attenuator for fundamental wavelength
- Optional stand-alone **2nd, 3rd, 4th** harmonic generator
- Optional stand-alone pulse generator for variable pulse repetition rate

APPLICATIONS

- Laser micro-machining (LCD repair)
- Laser Dermatology (facial renewal, hair removal, acne treatment etc.)
- Eye-safe Light Detection And Ranging (LiDAR)
- Laser ablation/cleaning
- Time-resolved laser spectroscopy
- Light Induced Breakdown Spectroscopy (LIBS)

Q-SHIFT is family of Q-switched lasers with build-in nonlinear wavelength conversion stage that allows to produce wavelengths that are not accessible with conventional solid-state laser sources. As pump sources our Nd:YAG or Nd:YLF lasers of Q2 or Q2HE series are used.



High peak intensity pulses at visible wavelengths (blue, yellow and red) are provided when Q-SHIFT laser is combined with our attachable SHG or stand-alone H-SMART harmonic generator.

Laser functionality can be further extended by auxiliary equipment.

Quantum Light Instruments

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SPECIFICATIONS AT 1163 OR 1177 NM WAVELENGTH [1]

MODEL [2]	Q-SHIFT-W1163, Q-SHIFT-W1177					
	-Bxx	-Cxx	-Dxx	-Exx	-F20	-F10
Wavelength, nm [3]	1163 or 1177 nm					
Pulse repetition rate [4]	up to 100 Hz		up to 50 Hz	up to 33 Hz	up to 20 Hz	10 Hz
Pulse energy	4 mJ	8 mJ	16 mJ	24 mJ	32 mJ	40 mJ
Typical pulse duration [5]	2 – 5 ns					
Pulse energy stability [6]	< 1.5 % RMS					
Power drift [7]	± 3.0 %					
Beam profile	Bell shaped					
Beam divergence [8]	< 3.0 mrad					
Polarization	linear, > 95 %					
Typical beam diameter [9]	3 – 4 mm typical					
Jitter [10]	< 0.5 ns RMS					
OPTIONAL HARMONICS GENERATOR [11]						
Pulse energy @ wavelength						
581.5 / 588.5 nm	1 mJ	2 mJ	4 mJ	6 mJ	8 mJ	10 mJ
388 / 392 nm	0.6 mJ	1.2 mJ	2.4 mJ	3.6 mJ	4.8 mJ	6 mJ
291 / 294 nm	0.25 mJ	0.5 mJ	1 mJ	4.5 mJ	2 mJ	2.5 mJ
DIMENSIONS						
Laser head (W×L×H) [12]	160 × 230 × 141 mm³ or 190 × 408 × 155 mm³					
Controller unit (W×L×H)	108 × 191 × 59 mm³					
Power adapter (W×L×H) [13]	192 × 178 × 46 mm³ or 89 × 422 × 330 mm³					
OPERATING REQUIREMENTS						
Cooling requirements	air cooled					
Ambient temperature	15 – 30 °C					
Relative humidity	10 – 80 % (non-condensing)					
Mains voltage [14]	90 – 230 VAC, single phase, 47 – 63 Hz					
Average power consumption	30 – 100 W					

1) *Due to continuous improvements all specifications are subject to change. Unless stated otherwise all specifications are measured at fundamental wavelength and maximum pulse repetition rate. The parameters marked typical are not specifications. They are indications of typical performance and will vary with each unit we manufacture.*

2) *xx in the model name sets laser repetition rate, for example Q-SHIFT-W1177-B100 laser will have factory-set 100 Hz pulse repetition rate.*

3) *Depend on pump laser wavelength.*

4) *Standard factory-set repetition rates are 10 Hz, 20 Hz, 33 Hz, 50 Hz and 100 Hz. Specify required pulse repetition rate when ordering, for example -D50 would mean laser with 50 Hz pulse repetition rate.*

5) *At FWHM level at fundamental wavelength, measured with 350 ps rise time photodiode*

6) *Measured during 30 seconds operation after warm-up.*

7) *Over 8 hour period after 20 minutes of warm-up when ambient temperature variation is less than ±2 °C.*

8) *Full angle measured at the 4σ level.*

9) *Beam diameter is measured 20 cm from laser output at the 4σ level.*

10) *In respect to falling edge of pump diode triggering pulse.*

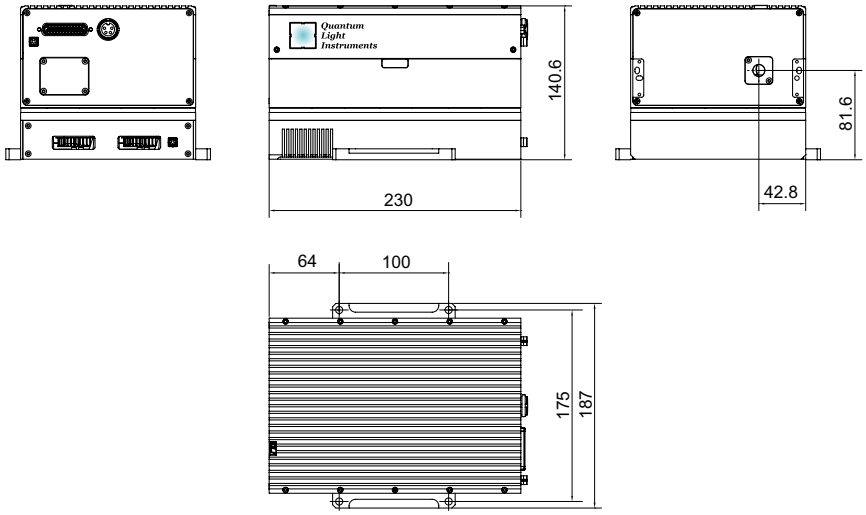
11) *Q-SHIFT is compatible with our attachable second harmonic generator (model SHG) and stand-alone H-SMART harmonics generator. Pulse energies presented here are maximum values. Please refer to harmonic generator datasheet for detailed specifications.*

12) *Laser housing size depends on average power at output wavelength.*

13) *Power adapter dimensions depends on model.*

14) *Laser can be powered from appropriate 12 or 28 VDC power source. Please inquire for details.*

DRAWINGS



Low average power version.
Q-SHIFT laser head dimensions (in mm)

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SPECIFICATIONS AT 1300 OR 1317 NM WAVELENGTH [1]

MODEL [2]	Q-SHIFT-W1300, Q-SHIFT-W1317					
	-Bxx	-Cxx	-Dxx	-Exx	-F20	-F10
Wavelength, nm [3]	1300 or 1317 nm					
Pulse repetition rate [4]	up to 100 Hz		up to 50 Hz	up to 33 Hz	up to 20 Hz	10 Hz
Pulse energy	2 mJ	4 mJ	8 mJ	12 mJ	16 mJ	20 mJ
Typical pulse duration [5]	2 – 5 ns					
Pulse energy stability [6]	< 2.0 % RMS					
Power drift [7]	± 3.0 %					
Beam profile	Bell shaped					
Beam divergence [8]	< 3.0 mrad					
Polarization	linear, > 95 %					
Typical beam diameter [9]	3 – 4 mm typical					
Jitter [10]	< 0.5 ns RMS					
OPTIONAL HARMONICS GENERATOR [11]						
Pulse energy @ wavelength						
650 / 658.5 nm	0.5 mJ	1 mJ	2 mJ	3 mJ	4 mJ	5 mJ
433 / 439 nm	0.3 mJ	0.6 mJ	1.2 mJ	1.8 mJ	2.4 mJ	3 mJ
325 / 329 nm	0.12 mJ	0.25 mJ	0.5 mJ	0.75 mJ	1 mJ	1.3 mJ
DIMENSIONS						
Laser head (W×L×H) [12]	160 × 230 × 141 mm³ or 190 × 408 × 155 mm³					
Controller unit (W×L×H)	108 × 191 × 59 mm³					
Power adapter (W×L×H) [13]	192 × 178 × 46 mm³ or 89 × 422 × 330 mm³					
OPERATING REQUIREMENTS						
Cooling requirements	air cooled					
Ambient temperature	15 – 30 °C					
Relative humidity	10 – 80 % (non-condensing)					
Mains voltage [14]	90 – 230 VAC, single phase, 47 – 63 Hz					
Average power consumption	30 – 100 W					

1) *Due to continuous improvements all specifications are subject to change. Unless stated otherwise all specifications are measured at fundamental wavelength and maximum pulse repetition rate. The parameters marked typical are not specifications. They are indications of typical performance and will vary with each unit we manufacture.*

2) *xx in the model name sets laser repetition rate, for example Q-SHIFT-W1177-B100 laser will have factory-set 100 Hz pulse repetition rate.*

3) *Depend on pump laser wavelength.*

4) *Standard factory-set repetition rates are 10 Hz, 20 Hz, 33 Hz, 50 Hz and 100 Hz. Specify required pulse repetition rate when ordering, for example -D50 would mean laser with 50 Hz pulse repetition rate.*

5) *At FWHM level at fundamental wavelength, measured with 350 ps rise time photodiode*

6) *Measured during 30 seconds operation after warm-up.*

7) *Over 8 hour period after 20 minutes of warm-up when ambient temperature variation is less than ±2 °C.*

8) *Full angle measured at the 4σ level.*

9) *Beam diameter is measured 20 cm from laser output at the 4σ level.*

10) *In respect to falling edge of pump diode triggering pulse.*

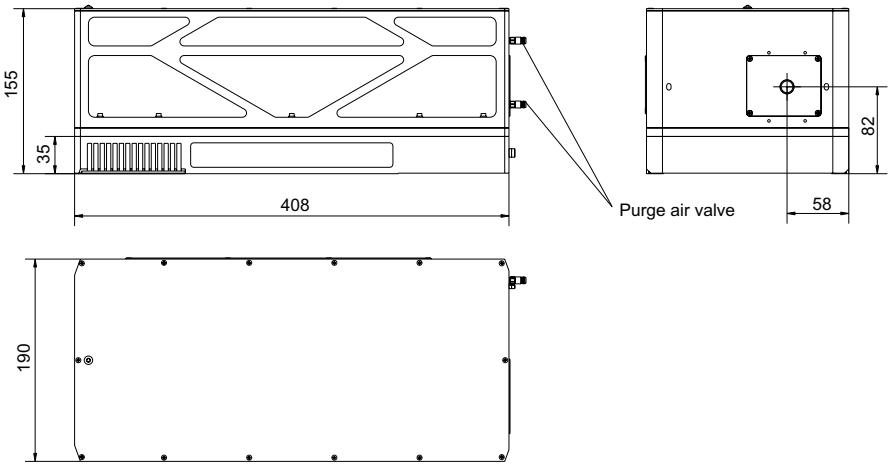
11) *Q-SHIFT is compatible with our attachable second harmonic generator (model SHG) and stand-alone H-SMART harmonics generator. Pulse energies presented here are maximum values. Please refer to harmonic generator datasheet for detailed specifications.*

12) *Laser housing size depends on average power at output wavelength.*

13) *Power adapter dimensions depends on model.*

14) *Laser can be powered from appropriate 12 or 28 VDC power source. Please inquire for details.*

DRAWINGS



High average power version.
Q-SHIFT laser head dimensions (in mm)

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SPECIFICATIONS AT 1551 OR 1571 NM WAVELENGTH [1]

MODEL [2]	Q-SHIFT-W1571, Q-SHIFT-W1551					
	-Bxx	-Cxx	-Dxx	-Exx	-F20	-F10
Wavelength, nm [3]	1551±1 nm or 1571±1 nm					
Pulse repetition rate [4]	up to 100 Hz		up to 50 Hz	up to 33 Hz	up to 20 Hz	10 Hz
Pulse energy	3 mJ	6 mJ	12 mJ	20 mJ	24 mJ	30 mJ
Typical pulse duration [5]	2 – 5 ns					
Pulse energy stability [6]	< 3.5 % RMS					
Power drift [7]	± 3.0 %					
Beam profile	Bell shaped					
Beam divergence [8]	5.0 mrad typical					
Polarization	linear, > 95 %					
Typical beam diameter [9]	3 – 6 mm typical					
Jitter [10]	< 0.5 ns RMS					
OPTIONAL HARMONICS GENERATOR [11]						
Pulse energy @ wavelength						
775.5 / 785.5 nm	0.75 mJ	1.5 mJ	3 mJ	5 mJ	6 mJ	7.5 mJ
517 / 524 nm	0.45 mJ	0.9 mJ	1.8 mJ	3 mJ	3.6 mJ	4.5 mJ
388 / 393 nm	0.18 mJ	0.36 mJ	0.75 mJ	1.25 mJ	1.5 mJ	1.8 mJ
DIMENSIONS						
Laser head (W×L×H) [12]	160 × 230 × 141 mm³ or 190 × 408 × 155 mm³					
Controller unit (W×L×H)	108 × 191 × 59 mm³					
Power adapter (W×L×H) [13]	192 × 178 × 46 mm³ or 89 × 422 × 330 mm³					
OPERATING REQUIREMENTS						
Cooling requirements	air cooled					
Ambient temperature	15 – 30 °C					
Relative humidity	10 – 80 % (non-condensing)					
Mains voltage [14]	90 – 230 VAC, single phase, 47 – 63 Hz					
Average power consumption	30 – 100 W					

[1] *Due to continuous improvements all specifications are subject to change. Unless stated otherwise all specifications are measured at fundamental wavelength and maximum pulse repetition rate. The parameters marked typical are not specifications. They are indications of typical performance and will vary with each unit we manufacture.*

[2] *xx in the model name sets laser repetition rate, for example Q-SHIFT-W1177-B100 laser will have factory-set 100 Hz pulse repetition rate.*

[3] *Depend on pump laser wavelength.*

[4] *Standard factory-set repetition rates are 10 Hz, 20 Hz, 33 Hz, 50 Hz and 100 Hz. Specify required pulse repetition rate when ordering, for example -D50 would mean laser with 50 Hz pulse repetition rate.*

[5] *At FWHM level at fundamental wavelength, measured with 350 ps rise time photodiode*

[6] *Measured during 30 seconds operation after warm-up.*

[7] *Over 8 hour period after 20 minutes of warm-up when ambient temperature variation is less than ±2 °C.*

[8] *Full angle measured at the 4σ level.*

[9] *Beam diameter is measured 20 cm from laser output at the 4σ level.*

[10] *In respect to falling edge of pump diode triggering pulse.*

[11] *Q-SHIFT is compatible with our attachable second harmonic generator (model SHG) and stand-alone H-SMART harmonics generator. Pulse energies presented here are maximum values. Please refer to harmonic generator datasheet for detailed specifications.*

[12] *Laser housing size depends on average power at output wavelength.*

[13] *Power adapter dimensions depends on model.*

[14] *Laser can be powered from appropriate 12 or 28 VDC power source. Please inquire for details.*

AUXILIARY EQUIPMENT

Attachable motorized attenuator for fundamental wavelength

Attachable pulse energy monitor with analog and/or digital output

Stand-alone two-channel pulse generator for smoothly variable pulse repetition rate, burst, double-pulse and other user-configurable modes of operation

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