Q-smart 450 & 850

Compact pulsed Nd:YAG lasers

APPLICATIONS

Q-smart series,
the ideal lasers for:

- LIBS
- LIDAR
- Flash Photolysis
- Ablation
- PLD
- Spectroscopy
- OPO pumping
- PIV
- Photo acoustic imaging, etc.

FULL WARRANTY ON OPTICS

- Compact, easy to use, Plug & Play
- Complete flexibility
- Automatic adjustments, no need to align.

Q-smart

www.quantel-laser.com

Quantel laser

Q-smart

Operates in any configuration, any environment for all your applications

MAIN FEATURES

- LIGHT AND COMPACT LASER WITH QUICK CONNECT CABLES
- PLUG & PLAY HARMONICS FROM 1064 TO 213 nm
- INTELLIGENT AUTOTUNING OF HARMONICS
- SINGLE DOUBLER FOR HIGHEST ENERGY AT 532 & 355 nm
- SINGLE LONGITUDINAL MODE OPTION (SLM)
- BEAM ATTENUATOR MODULE (BAM)
- INTUITIVE TOUCH SCREEN INTERFACE
- 100 MILLION SHOT LAMP LIFETIME GUARANTEE

EASY TO USE

- **INTUITIVE LASER OPERATION**
  Operating the Q-smart requires no specific knowledge nor training.
- **FAST LASER SET UP (LESS THAN 5 MINUTES)**
  - Quick connect coolant lines and I/O cables
  - Uses less than 4 liters of distilled water for the closed air/water cooling loop
  - Installs quickly on any optical table with 3 mounting clamps
  - Universal Line Voltage.
- **INTELLIGENT AUTOTUNING OF HARMONICS**
  Automatic tuning and phase matching of all harmonics for optimal energy output.
- **INTUITIVE CONTROL**
  Laser can be controlled using either the touch screen interface or computer based software.

EASY TO MAINTAIN

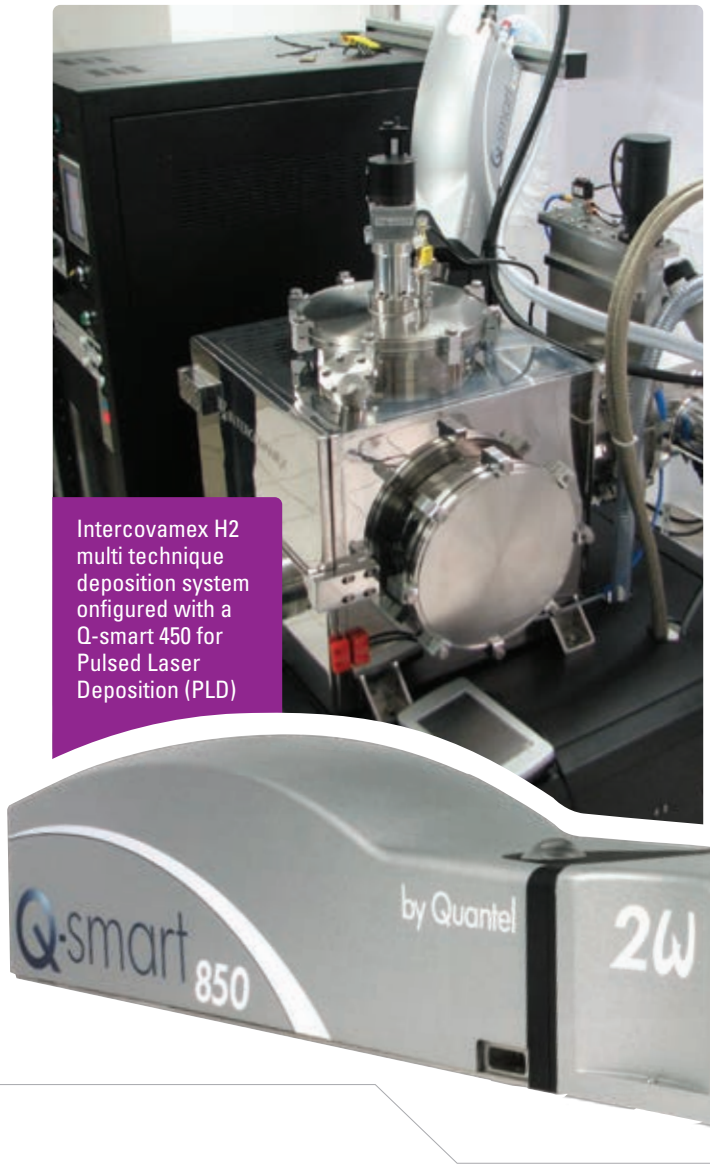
- **LAMP CHANGE REQUIRES NO LASER REALIGNMENT**
  The flashlamps are fixed on the upper, removable part of the ceramic pumping cavity and are easily removed by hand. The operation is quick to perform and requires no special skills.
- **IN LINE DEIONIZED WATER CARTRIDGE**

COMPACT AND PORTABLE

- **SMALL, COMPACT AND PORTABLE POWER SUPPLY (27 kg)**
- **QUICK CONNECT CABLES**
  Easy disconnection of the laser head.

FLEXIBLE

- **PLUG AND PLAY HARMONIC GENERATORS**
  Switch easily between all wavelengths from 1064 nm to 213 nm.
- **INTERCHANGEABILITY OF POWER SUPPLIES**
  The universal power supply can control any Q-smart 450 and Q-smart 850 laser heads with its unique auto-recognition feature.
- **INTERNAL/EXTERNAL SYNCHRONIZATION**
  Available for either the flashlamps or Q-switch trigger through TTL pulses.
- **ADJUSTABLE Q-SWITCH OUT SIGNALS**
  +/- 500 ns for a flexible synchronization to an external device (camera, spectrometer).
- **REMOTE CONTROL OF THE LASER VIA ETHERNET**



Intercovamex H2 multi technique deposition system onfigured with a Q-smart 450 for Pulsed Laser Deposition (PLD)

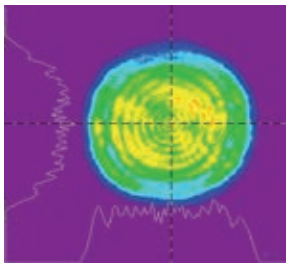
Quantel laser

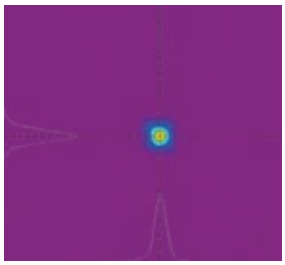
HIGH BEAM QUALITY AND ENERGY

EXCELLENT BEAM QUALITY AND POINTING STABILITY
The Q-smart uses an unstable resonator, with a variable reflectivity output mirror producing a near Gaussian beam profile. With its thermo-regulated laser head and small size, the Q-smart's pointing stability is less than 40 µrad.

HIGH PUMPING EFFICIENCY
The rod and the lamps are placed in a diffusely reflecting, close coupled ceramic cavity, ensuring the best possible energy transfer.

HIGHEST ENERGY AT BOTH 532 & 355 nm
Achieve the highest energy conversion at both 532 and 355 nm using a single doubling crystal: with automatic recognition of the harmonics and energy optimization protocols.


Near Field @ 1064 nm


Far Field @ 1064 nm

STABLE

MECHANICAL STABILITY
The compact thermally stabilized monolithic structure provides incomparable alignment stability, even under difficult environmental conditions, such as temperature variations, transport and vibration.

THERMAL STABILITY
The Q-smart is built around a temperature controlled, lightweight metal housing. The Pockels cell and all optical components operate at constant temperature.
The crystals are mounted in a sealed temperature-regulated housing to ensure long term energy stability.
The Q-smart can operate in any orientation, including vertical and even upside down!

Denotes features only available from **QUANTEL**

RELIABLE

A UNIQUE EXPERIENCE
With over 4 decades of experience, Quantel only uses the highest quality optics and electronics to manufacture the best lasers available, anywhere!

2-YEAR FULL WARRANTY
Optics are rigorously inspected by Quantel's Quality Assurance Department and protected from dust by Q-smart's protected structure. This allows Quantel to offer a 24-month guarantee, including optics for normal use. Q-smart's quality and reliability make it a laser system adapted for all types of use: scientific research, medical equipment, industrial applications, industrial instrumentation, OEM integration and many others.

LONG FLASHLAMP LIFETIME
Quantel's Quality Assurance Department controls and guarantees the flashlamp supplied to ensure 100 Million shots flashlamp life time.

DIMENSIONS

1 Laser Head
7 kg [15.4 lbs]
- A 526 mm [20.7"]
- B 123 mm [4.84"]
- C 125 mm [4.92"]
- D 99 mm [3.9"]

2 Harmonic generator
2.1 kg [4.63 lbs]
- A 59,8 mm [2.32"]
- B 43 mm [1.69"]

3 Power supply
27 kg [59.5 lbs]
- A 513 mm [20.18"]
- B 283 mm [11.14"]
- C 507 mm [19.95"]

4 Q-touch
800 g [1.76 lbs]
- A 220 mm [8.66"]
- B 124 mm [4.88"]

Q-smart

OPTIONS

2ω, 3ω, 4ω AND 5ω AND WAVELENGTH SEPARATION

Quantel offers a range of plug and play harmonic generators to frequency double, triple, quadruple or quintuple the Q-smart's output. The harmonics are assembled into compact, thermally regulated modules which include nonlinear crystals to ensure maximum conversion efficiency and stability. These modules are delivered with an external removable set of dichroic mirrors to separate the various wavelengths. Auto tuning ensures there is no need to manually tune the crystals for maximum energy.
Auto phase matching can be launched on the Q-touch or computer software.

BAM (BEAM ATTENUATOR MODULE)

Laser intensity beam attenuator module fits into the same mechanical module as the harmonic generators.

SLM OPTION (SINGLE LONGITUDINAL MODE)

This option, available on both the Q-smart 450 & 850, reduces the laser's spectral bandwidth to < 0.005 cm^{-1}, increases the coherence length and provides a smooth temporal profile, free of modulation.
SLM option is upgradable on site.

DYE LASER PUMPING

Superior beam quality allows for maximum conversion efficiency in dye laser pumping. Quantel builds the most compact tunable packages in the laser industry (see TDL+).

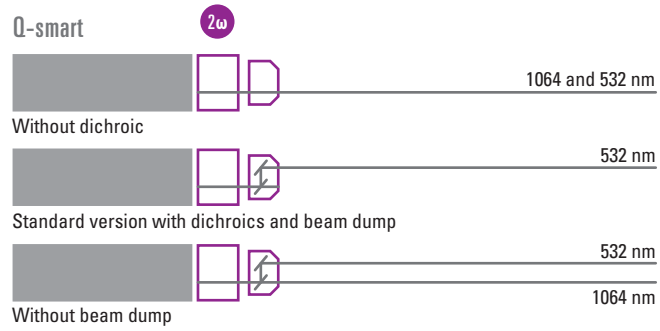
MULTIMODE RESONATOR

The multimode resonator option provides a flat top beam profile and added flexibility in term of output energy and repetition rate.

MULTIPULSE CONFIGURATION

Recombination of two independent Q-smart 850 oscillators into a Twins laser is available at any wavelength from 1064 down to 266 nm.

FOR FREQUENCY DOUBLING



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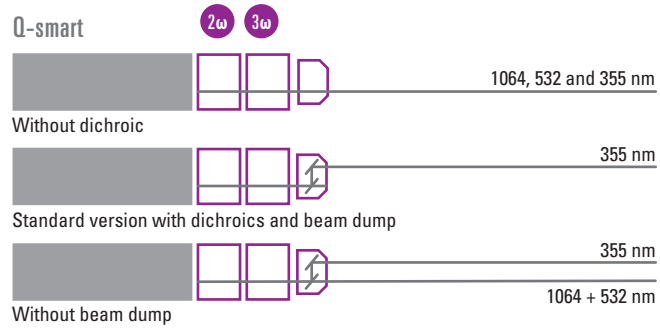

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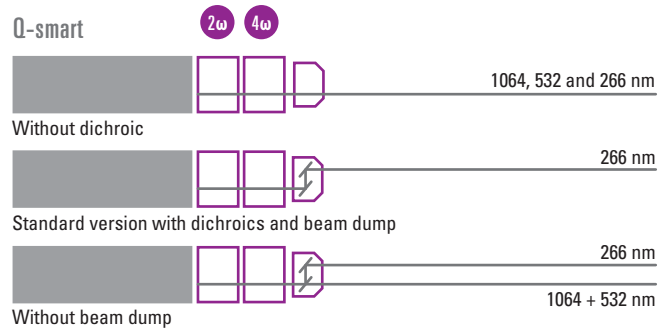

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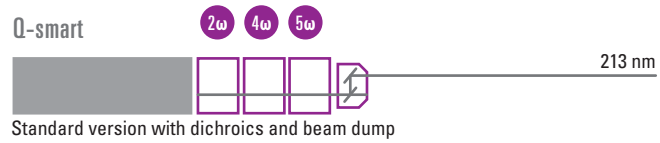

Q-SMART SPECIFICATIONS

		Q-smart 450				Q-smart 850	
Repetition rate (Hz)		10	10-SLM[1]	20	20-SLM[1]	10	10-SLM[1]
Pulsed energy (mJ)[2]	1064 nm	450	370	400	330	850	700
	532 nm	220	150	200	135	430	290
	355 nm	130	75	120	70	230	135
	266 nm	60	35	50	30	100	60
	213 nm	10	On request	8	On request	20	On request
Energy stability (%)[3]	1064 nm	± 2 (0.6)				± 2 (0.6)	
	532 nm	± 4 (1.3)				± 4 (1.3)	
	355 nm	± 6 (2)				± 6 (2)	
	266 nm	± 8 (2.6)				± 8 (2.6)	
	213 nm	± 12 (4)				± 12 (4)	
Power drift (%)[4]	1064 nm	± 3				± 3	
	532 nm	± 5				± 5	
	355 nm	± 5				± 5	
	266 nm	± 10				± 10	
	213 nm	± 14				± 14	
Pulse duration (ns)[5]	1064 nm	~ 6				~ 6	
	532 nm	~ 5				~ 5	
	355 nm	~ 5				~ 5	
	266 nm	~ 5				~ 5	
	213 nm	~ 5				~ 5	
Pointing stability (µrad)[6]	All wavelengths	< 40				< 40	
Jitter (ns)[7]	1064 nm	± 0.5	± 1	± 0.5	± 1	± 0.5	± 1
Focusability (times Diffraction Limit)[8]	M² @1064 nm	≤ 2				≤ 2	
Linewidth (cm^{-1})[9]	1064 nm	≤ 0.7	≤ 0.005	≤ 0.7	≤ 0.005	≤ 0.7	≤ 0.005
Divergence (mrad)[10]	1064 nm	< 0.5				< 0.5	
Polarization ratio (%)	1064 nm	> 90	> 80	> 80	> 70	> 80	> 70
Beam diameter (mm)[11]	1064 nm	~ 6.5				~ 9	
Spatial profile @ 1064 nm[12]	Near Field[13]	> 0.70		> 0.70		> 0.70	
	Far Field[14]	> 0.95		> 0.90		> 0.90	
Polarization	Horizontal	1064 nm, 355 nm, 266 nm					
	Vertical	532 nm, 213 nm					
Temperature	Operating	18 / 28 °C					
	Storage[15]	- 10 / 50 °C					
Flashlamps lifetime		> 100 million shots					
Service requirements		100-240 VAC / 50-60 Hz / Single phase					
Cable length		3 m (10 feet)					

(1) SLM: upgradable on site • (2) Measured with a calibrated energymeter • (3) Peak to peak, 100% of the shots (RMS) • (4) Over 8 hours, without readjustment of phase-matching, 18°< T < 28°C • (5) FWHM, fast photodiode and 1GHz scope • (6) Measured by Spiricon LBA FWB RMS, on 200 pulses at the focal plane of a 2m focus lens • (7) With respect to Q-Switch trigger, measured at half width at 500 accumulated shots for 99% of shots • (8) At $1/e^2$ of the peak, by SPIRICON LBA FWB • (9) FWHM measured by a grating spectrometer with a <0,045 cm^{-1} resolution • (10) Full angle, at $1/e^2$ of the peak • (11) At the output of the laser • (12) Least square fit to Gaussian (perfect fit=1) • (13) At 1 m from laser output • (14) At focal plane of a 2 m focus lens • (15) System drained and flushed with EGW

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The Quantel Group

Founded in 1970, the Quantel group has established itself over the last twenty years as one of the world's leading specialists laser technology for scientific (laboratories and universities), industrial (material processing, process analytics, marking) and medical (ophtalmology) applications.
With design and manufacturing facilities in France and the US, and a strong world-wide sales and service network, the Quantel Group serves a global customer base.

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For more detailed technical drawings, please visit www.quantel-laser.com

02/15 – Quantel reserves the right to modify the specifications without prior notice.
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Poussières d'Étoiles