

Q2HE

HIGH ENERGY AIR-COOLED Q-SWITCHED LASER

FEATURES

Up to **120 mJ** pulse energy,
up to **5 W** average power

1053 or **1064 nm** output wavelength

Air cooled (water-free)

Up to **100 Hz** repetition rate

Smoothly variable pulse repetition rate
for 1053 nm output wavelength models

> 2 G shot lifetime of pump diodes

Built-in sync pulse generator for triggering of
user equipment

Remote monitoring and control via built-in
Ethernet interface

Optional attachable 2nd harmonic generator

Optional 2nd, 3rd, 4th or 5th stand-alone harmonic
generator

Optional stand-alone air purging unit for long
lifetime of UV optics

Optional attachable attenuator for fundamental
wavelength

Optional attachable pulse energy monitor

Optional seeder for SLM operation

APPLICATIONS

Laser Induced Breakdown Spectroscopy (LIBS)

Light Detection And Ranging (LIDAR)

Remote sensing/designation

Laser ablation (marking, LCD repair etc.)

Laser shock wave generation

Pulsed light deposition (PLD)



Quantum Light Instruments Ltd. innovative water-free laser crystal cooling technology enables generation of high quality laser beam with up to 120 mJ pulse energy and/or up to 5 W average output power.

Q2HE series sets new standard in Q-switched laser market. Advanced laser design resulted in compact, user-friendly turnkey system that requires little maintenance. There is no chillers or bulky power supplies that one needs fit under the table. Most of laser electronics is integrated into housing of the Q2HE and the only external modules are compact controller box and mains adapter that provides 28 VDC, 50 – 150 W power (depending on model).

Less than 7 ns pulse duration and low divergence of the beam enables efficient fundamental wavelength conversion to higher harmonics with shortest wavelength available of 211 nm.

Low jitter triggering pulses for user equipment are available in internal triggering mode. If required, laser pulsing can be externally triggered from delay generator.

Laser is controlled through Ethernet port via built-in web-server. There is no need to install control software – any computer or even cell phone with modern web-browser installed will be able to control Q2HE. API is provided for integration with user devices.

Laser performance can be enhanced by optional extensions listed in chapter “Auxiliary equipment” on other side of page.



*Quantum
Light
Instruments*

WWW.QLINSTRUMENTS.COM

SPECIFICATIONS ¹⁾

MODEL	Q2HE				
	-D50	-D100	-E50	-F10	-F20
Wavelength	1053 or 1064 nm	1064 nm	1064 nm	1053/1064 nm	
Pulse repetition rate ²⁾	50 Hz	100 Hz	50Hz	10 Hz	20 Hz
Pulse energy	40 mJ		70 mJ	120/100 mJ	100/80 mJ
Typical pulse duration ³⁾	< 7 ns			< 6 ns	
Pulse to pulse energy stability	< 0.5 % RMS ⁴⁾				
Power drift	± 3.0 % ⁵⁾				
Beam profile	bell-shaped, > 75 % fit to Gaussian				
Beam divergence ⁶⁾	< 1 mrad				
Polarization	linear, horizontal				
Typical beam diameter ⁷⁾	3.0 mm		3.5 mm	4.5 mm	
Jitter	< 0.5 ns RMS ⁸⁾				

OPTIONAL HARMONICS GENERATOR ⁹⁾

Pulse energy :

526.5 / 532 nm	20 mJ	35 mJ	60/50 mJ	50/40 mJ
351 / 355 nm	12 mJ	20 mJ	35/30 mJ	30/25 mJ
263 / 266 nm	5 mJ	10 mJ	18/15 mJ	15/12 mJ
211 / 213 nm	1.5 mJ	3 mJ	5/4 mJ	4/3.5 mJ

OPTIONAL ATTENUATOR ¹⁰⁾

Transmission range	1 – 95 %
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DIMENSIONS

Laser head (W×L×H)	190 × 408 × 155 mm ³	
Controller unit (W×L×H)	108 × 191 × 59 mm ³	
AC/DC power adapter, typical (W×L×H)	89 × 422 × 330 mm ³	192 × 178 × 46 mm ³

OPERATING REQUIREMENTS

Cooling requirements	air cooled			
Ambient temperature	15 – 30 °C			
Relative humidity	10 – 80 % (non-condensing)			
Mains voltage	90 – 230 VAC, single phase, 47 – 63 Hz ¹¹⁾			
Average power consumption	100 W	150 W	70W	120W

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⁾ Factory-set pulse repetition rate is fixed at max repetition rate shown in the table. Pulse repetition rate up to 200 Hz are available by request.

³⁾ At FWHM level at 1064 nm, measured with 350 ps rise time photodiode.

⁴⁾ Measured during 30 seconds operation after warm-up.

⁵⁾ Over 8 hour period after 20 minutes of warm-up when ambient temperature variation is less than ±2 °C.

⁶⁾ Full angle measured at the 4σ level.

⁷⁾ Beam diameter is measured 20 cm from laser output at the 4σ level.

⁸⁾ In respect to falling edge of pump diode triggering pulse.

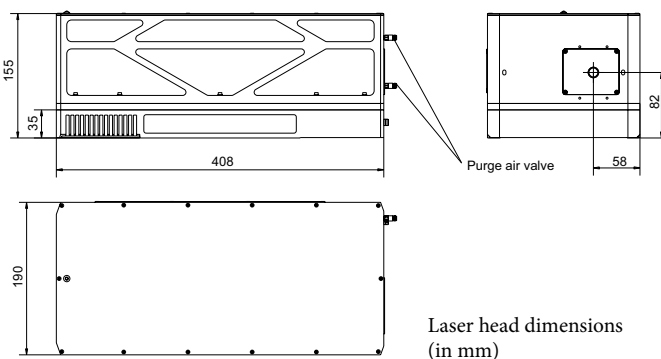
⁹⁾ Q2HE is compatible with our attachable second harmonic generator and all models of stand-alone H-SMART harmonics generator. Pulse energies presented here are maximum values. Please refer to harmonic generator datasheets for detailed specifications.

¹⁰⁾ Motorized attenuator intended to be attached to the laser housing. Transmission can be changed remotely through laser web-server control interface.

¹¹⁾ Laser can be powered from appropriate 28 VDC power source. Please inquire for details.



DRAWINGS



AUXILIARY EQUIPMENT

H-SMART series stand-alone up 5th harmonic generator

Attachable 2nd harmonic generator, model SHG

Attachable motorized attenuator for fundamental wavelength beam

Attachable pulse energy monitor with analog and/or digital output

Attachable beam guiding module

Stand-alone two-channel pulse generator for variable pulse repetition rate

Stand-alone seeder for SLM operation

Stand-alone air purging unit for long lifetime of UV optics

MOTORIZED ATTENUATORS & PULSE ENERGY MONITORS

ATTENUATOR FEATURES

Drop-in attachable to the laser body attenuators for **1st, 2nd, 3rd, 4th or 5th** harmonics of Nd:YAG or Nd:YLF lasers

Up to **98%** maximum transmission

Precise transmission control by stepper motor in microstepping mode (12800 steps/rotation)

Transmission adjustment resolution **<0.15 %**

Remote control via common with laser **Ethernet** interface

Optional stand-alone version for mounting on optical table

Optional side port transforms attenuator to variable beam splitter

PULSE ENERGY MONITOR FEATURES

Drop-in laser pulse energy or power monitoring (up to **100 samples/second**)

Less than **2 %** insertion losses

12-bit resolution

Average pulse energy and pulse-to-pulse stability calculation

Sample&Hold analog output from BNC socket on the rear panel of laser controller

Digital readout through laser **Ethernet** interface

Optional broadband version for 210 – 2300 nm range

ATTENUATOR SPECIFICATIONS ¹⁾

MODEL	ATTENUATORS				
	AT1	AT2	AT3	AT4	AT5
Design wavelength	1064 nm	532 nm	355 nm	266 nm	213 nm
Typical max transmission ²⁾	98 %	95 %	90 %	75 %	65 %
Typical min transmission ²⁾	1 %			0.5 %	
Output polarization ³⁾	linear, horizontal			linear, rotating	
Resolution	< 0.15 %				
Accuracy	± 0.5 %				
Clear aperture	6 mm				
Stepper motor	12800 steps / 360 deg, 4-phase, 1A				
Dimensions (W×L×H)	42 × 54 × 77 mm ³				
Weight	< 0.4 kg				

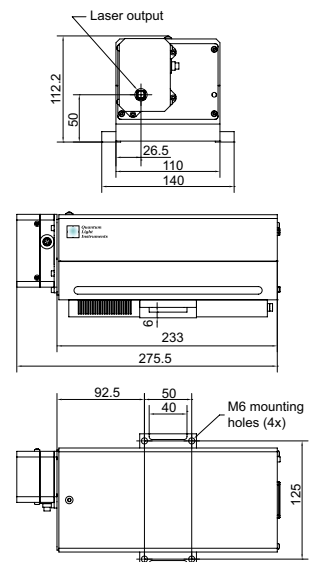
PULSE ENERGY MONITOR SPECIFICATIONS ¹⁾

MODEL	PULSE ENERGY MONITOR					
	EM1	EM2	EM3	EM4	EM5	EM/BB
Design wavelength	1064 nm	532 nm	355 nm	266 nm	213 nm	210 – 2600 nm
Insertion loss	< 2 %					
Detector type	photodiode					pyroelectric
Resolution	12 bit					
Accuracy	± 3 %					
Clear aperture	6 mm					
Dimensions (W×L×H)	24 × 28 × 48 mm ³					
Weight	< 0.1 kg					

¹⁾ Due to continuous improvements all specifications are subject to change. The parameters marked typical are not specifications. They are indications of typical performance and will vary with each unit we manufacture.

²⁾ Depends on polarization state of laser. Depolarization of laser beam might affect values provided here.

³⁾ For some models polarization plane depends on angular position of polarizer.



Dimensions (in mm) of Q1 laser with attenuator attached



Attenuator and pulse energy monitor attached to the laser head