

High energy air-cooled Q-switched laser



Laser head Q2HE

Q2HE series high-energy DPSS lasers use water-free crystal cooling technology that provides stable high-energy operation and high-quality laser beams with pulse energies of up to 200 mJ. The system requires no external chillers or large power supplies, as most electronics are integrated into the laser head. Only a controller unit and a 28 VDC mains adapter (50–150 W, model dependent) remain external.

With a pulse duration of < 7 ns and low beam divergence, the Q2HE series supports efficient harmonic generation down to 211 nm. The system supports internal low-jitter triggering as well as external triggering via a delay generator. Laser control is available via Ethernet through a built-in web interface, with no software installation required. An API is available for system integration.



H-SMART harmonics generator with fiber coupler FC
Provides up to 5 harmonics, compatible with the Q2HE lasers

Q2HE

FEATURES

- Up to **200 mJ** pulse energy, up to 5 W average output 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
- Guaranteed > **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 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 operation in harsh environments

APPLICATIONS

- Light-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)

SPECIFICATIONS ¹⁾

Model	Q2HE						
	D50	D100	E50	F10	F20	G10	H20
Wavelength	1064 or 1053 nm	1064 nm		1064 or 1053 nm		1053 nm	
Pulse repetition rate ²⁾	50 Hz	100 Hz	50 Hz	10 Hz	20 Hz	10 Hz	20 Hz
Pulse energy ³⁾	40 mJ		70 mJ	100/120 mJ	80/100 mJ	160 mJ	200 mJ
Pulse duration ⁴⁾	< 7 ns			< 6 ns			
Pulse to pulse energy stability ⁵⁾	< 0.5 % RMS						
Power drift ⁶⁾	± 3.0 %						
Beam profile	bell-shaped, >75 % fit to Gaussian						
Beam divergence ⁷⁾	< 1 mrad						
Polarization	linear, horizontal						
Typical beam diameter ⁸⁾	3.0 mm		3.5 mm	4.5 mm		5.5 mm	
Jitter ⁹⁾	< 0.5 ns RMS						

Optional harmonics generator ¹⁰⁾

Pulse energy ³⁾	D50	D100	E50	F10	F20	G10	H20
532/526.5 nm	20 mJ	35 mJ	50/60 mJ	40/50 mJ	80 mJ	100 mJ	
355/351 nm	12 mJ	20 mJ	30/40 mJ	25/30 mJ	50 mJ	70 mJ	
266/263 nm	5 mJ	10 mJ	15/20 mJ	12/15 mJ	27 mJ	30 mJ	
213/211 nm	1.5 mJ	3 mJ	4/5 mJ	3.5/4 mJ	7 mJ	10 mJ	

Optional attenuator ¹¹⁾

Transmission range	1–95 %
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Dimensions

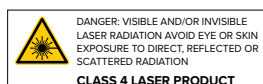
Laser head (W×L×H)	191 × 408 × 155 mm ³	
Controller unit (W×L×H)	108 × 172 × 59 mm ³	
AC/DC power adapter, typical (W×L×H)	482 × 460 × 106 mm ³	192 × 178 × 46 mm ³

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 ¹²⁾
Average power consumption	100 W 150 W 70 W 120 W

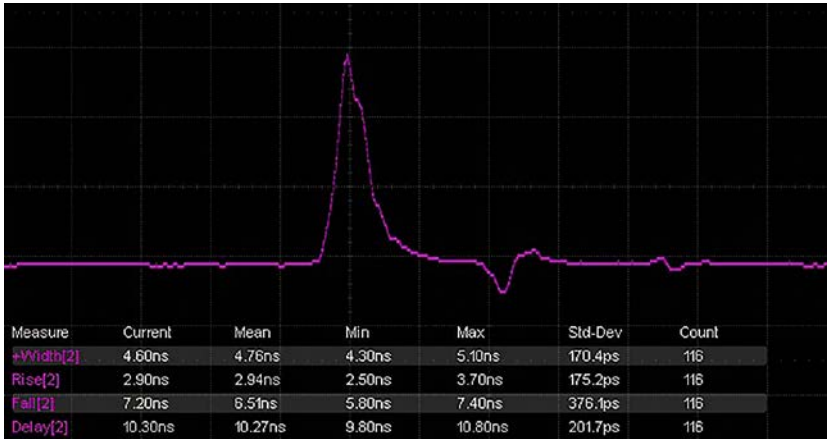
DIMENSIONS

Unit	Dimensions (W×L×H)	Weight
Laser head	191 × 408 × 155 mm ³	16.5–20 kg
Controller unit	108 × 172 × 59 mm ³	0.8 kg
Power adapter	192 × 178 × 46 mm ³	1.3 kg
Controller and power adapter CT19 ¹³⁾	482 × 460 × 106 mm ³	7.5 kg
Air-purging unit APU2		10.5 kg
Harmonic generator	160 × 244 × 141 mm ³	4–6 kg
SHG module	153 × 78 × 65 mm ³	0.7 kg
BSP3 plate	219 × 665 × 32 mm ³	6.7 kg

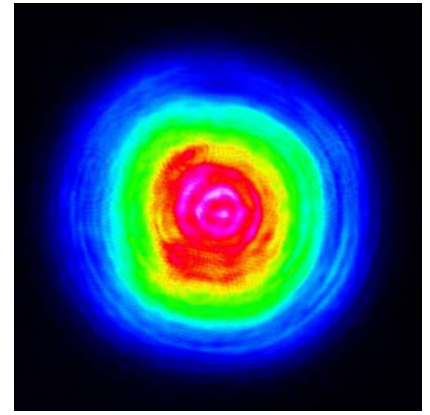


- Due to continuous improvements all specifications are subject to change. Unless stated otherwise all specifications are measured at fundamental wavelength and maximum pulse repetition rate. The parameters marked typical are not specifications. They are indications of typical performance and will vary with each unit we manufacture.
- Factory-set pulse repetition rate is fixed at max repetition rate shown in the table. In internal triggering mode repetition rate can be divided by integer number down to f/2, f/3, f/4, ... 1 Hz. Pulse repetition rate up to 200 Hz are available by request.
- When pulse energy is presented in xx/yy format, first number is for 1053 nm wavelength version, second – for 1064 nm version.
- At FWHM level at 1064 or 1053 nm, measured with 350 ps rise time photodiode.
- Measured during 30 seconds operation after warm-up.
- Over 8 hour period after 20 minutes of warm-up when ambient temperature variation is less than ± 2 °C.
- Full angle measured at the at the 4σ level.
- Beam diameter is measured 20 cm from laser output at the 4σ level.
- In respect to falling edge of pump-diode triggering pulse.
- Q2HE is compatible with our attachable SHG and stand-alone H-SMART harmonic generators. Pulse energies presented here are maximum values. Please refer to harmonic generator datasheets for detailed specifications.
- Motorized attenuator intended to be attached to the laser housing. Transmission can be changed remotely through laser web-server control interface.
- Laser can be powered from an appropriate 28 VDC power source. Please inquire for details.
- Power adapter dimensions depends on the model.

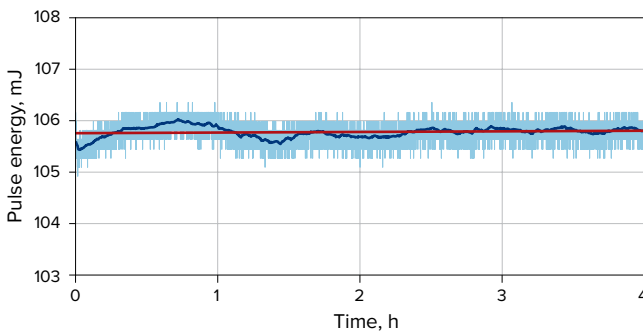
PERFORMANCE



Pulse duration of Q2HE-F10-1064



Beam profile of Q2HE-F10-1053
Axis length (X, Y) – (4.05, 3.94) mm,
effective diameter – 4.0 mm,
ellipticity – 97.2 %



Long term stability of Q2HE-F10-1064
Power drift: +0.22 %; -0.23 %

PART NUMBERS

Q2HE-F10-1064-AT1

<p>Model</p> <p>Pulse energy level</p> <p>no letter → 0.1–4 mJ</p> <p>A → 5–9 mJ</p> <p>B → 10–19 mJ</p> <p>C → 20–34 mJ</p> <p>D → 35–59 mJ</p> <p>E → 60–79 mJ</p> <p>F → 80–120 mJ</p> <p>G → 121–160 mJ</p> <p>H → 161–200 mJ</p>	<p>Optional items</p> <p>SHG0, SHG1, SHG2 → attachable 2nd harmonic generator</p> <p>P15 → long pulse duration (15 ns)</p> <p>AT1 → motorized attenuator</p> <p>EM1 → pulse energy monitor</p> <p>GL → low power CW guiding laser</p> <p>FC/NIR → fiber coupled output</p> <p>WH → water-cooled heatsink</p> <p>APU2 → air-purging unit</p> <p>INJ → injection seeder option for SLM linewidth</p>
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Default pulse repetition rate in Hz

Laser wavelength (optional)

1064 → Nd:YAG; 1064.2 nm

1053 → Nd:YLF; 1053.0 nm

OPTIONAL ITEMS

WF	Stand-alone wireless router for wireless laser control
RS	Stand-alone adapter for laser control via RS-232 port
PC	Laptop computer for laser control
EXP	Stand-alone pulse generator for variable repetition rate
CT19	19" mounted controller with integrated AC/DC power supply
CTA19	19" mounted controller with air-purging unit
CTBR	Front/rear panel with brackets for standard controller
PS19	19" form factor AC/DC power supply
APU2	Stand-alone air-purging unit with integrated AC/DC power supply
CST	Custom model



Laser head Q2HE.
Front view



Laser head Q2HE.
Rear view

DRAWINGS

