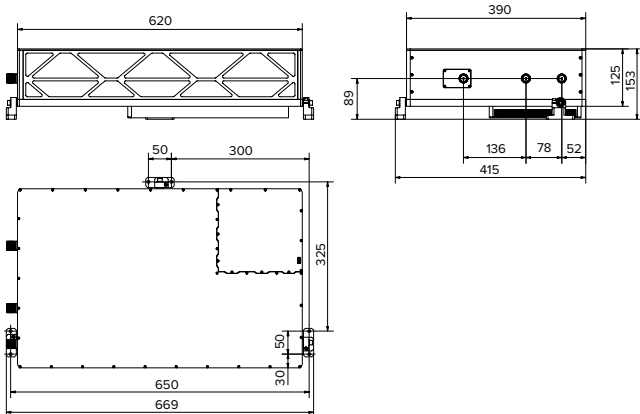


# Double-pulse diode-pumped Air-cooled Q-switched laser

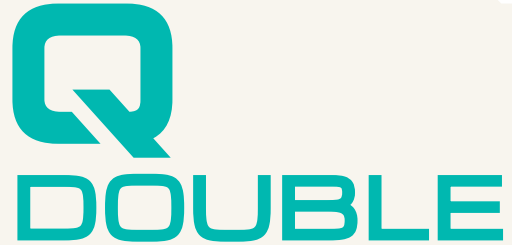


Q-DOUBLE laser head

**Q-DOUBLE** is a diode-pumped, fully air-cooled (water-free) Q-switched laser designed to generate two pulses with variable temporal separation. The system operates at 1053 nm (Nd:YLF) or 1064 nm (Nd:YAG) and delivers up to 160 mJ total pulse energy at 10 Hz, or up to 40 mJ at 100 Hz. All electronics are integrated within a compact housing requiring no external chiller; only a 12 or 28 VDC mains adapter (50–200 W, model dependent) is needed. The laser is controlled via a built-in Ethernet web interface and supports both internal low-jitter triggering (up to 450  $\mu$ s lead) and external triggering.



Outline drawings of Q-DOUBLE laser head (dimension in mm)



## FEATURES

- Up to **80 mJ** pulse energy and/or up to **2 W** average power (for each channel)
- Up to **100 Hz** pulse repetition rate
- Air-cooled (**water-free**)
- **5–10 ns** pulse duration
- **10 ns – 100 ms** temporal separation
- Stand-alone delay generator for timing adjustment
- 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 EXTENSIONS

- Built-in **2<sup>nd</sup>, 3<sup>rd</sup> or 4<sup>th</sup> harmonic** generator
- Built-in attenuators for fundamental wavelength
- Pulse energy monitor for each channel
- **< 3 ns** pulse duration at up to **40 mJ** pulse energy (short cavity version)
- Stand-alone air-purging unit
- Red or green beam guiding module

## APPLICATIONS

- Particle Image Velocimetry (PIV)
- Laser-induced Breakdown Spectroscopy (LIBS)
- Laser-induced fluorescence (LIF)
- Planar laser-induced fluorescence (PLIF)
- Laser ablation/cleaning
- Holography
- Electronic Speckle Interferometry (ESPI)

## SPECIFICATIONS <sup>1)</sup>

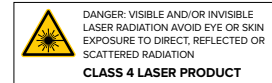
Model	Q-DOUBLE				
	-F10	-E20	-E33	-D50	-C100
Wavelength, nm	1053 nm	1053 or 1064 nm		1064 nm	
Pulse repetition rate <sup>2)</sup>	<b>10 Hz</b>	<b>20 Hz</b>	<b>33 Hz</b>	<b>50 Hz</b>	<b>100 Hz</b>
Pulse energy	80 mJ	60 mJ		40 mJ	20 mJ
Typical pulse duration <sup>3)</sup>	< 5 ns				<7 ns
Pulse energy stability <sup>4)</sup>	< 0.5 % RMS				
Power drift <sup>5)</sup>	± 3.0 %				
Beam profile	bell-shaped, > 80 % fit to Gaussian				
Beam divergence <sup>6)</sup>	< 1 mrad				
Polarization	linear, horizontal				
Typical beam diameter <sup>7)</sup>	4.0 mm			3.5 mm	
Jitter <sup>8)</sup>	< 0.5 ns RMS				
Average power consumption	120 W	160 W		200 W	

### Optional harmonics generator <sup>9)</sup>

Pulse energy	-F10	-E20	-E33	-D50	-C100
526.5/532 nm	40 mJ	35 mJ	30 mJ	20 mJ	10 mJ
351/355 nm	24 mJ	20 mJ	18 mJ	12 mJ	6 mJ
263/266 nm	12 mJ	10 mJ	10 mJ	6 mJ	3 mJ

### Optional attenuator <sup>10)</sup>

Transmission range	0.5 – 95 %	1 – 95 %
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## COMMON SPECIFICATIONS

Dimensions	
Laser head ( W×L×H)	390 × 620 × 153 mm <sup>3</sup>
Power adapter (W×L×H) <sup>11)</sup>	192 × 178 × 46 mm <sup>3</sup> typical
Operating requirements	
Cooling requirements	air-cooled
Ambient temperature	15 – 30 °C
Relative humidity	10 – 80 % (non-condensing)
Mains voltage <sup>12)</sup>	90 – 230 VAC, single phase, 47 – 63 Hz

- 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.
- At FWHM level at fundamental wavelength, measured with 350 ps rise time photodiode. Short pulse duration version is available, with pulse duration shorter by approx 50 %. Inquire for detailed specifications.
- Measured during 30 seconds operation after laser 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 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.
- Q-DOUBLE is compatible with all models of stand-alone H-SMART harmonics generator. Pulse energies presented here are maximum values. Please refer to H-SMART harmonic generator datasheets for detailed specifications.
- Motorized attenuator is built into the laser housing. Transmission can be changed remotely through laser web-server control interface.
- Power adapter dimensions might differ from indicated here, depending on model.
- Laser can be powered from an appropriate 12 or 28 VDC power source. Please inquire for details.

## PART NUMBERS

**Q-DOUBLE-E20-SH-AT1**

**Model**

**Pulse energy level**  
(for each laser):  
no letter → 0.1 – 4 mJ  
A → 5 – 9 mJ  
B → 10 – 19 mJ  
C → 20 – 34 mJ  
D → 35 – 59 mJ  
E → 60 – 79 mJ  
F → > 80 mJ

**Optional items:**  
EXP → two channel pulse generator  
AT1 → motorized attenuator

**Optional built-in harmonic generator:**  
SH → second harmonic  
TH → third harmonic  
FH → fourth harmonic

**Default pulse repetition rate in Hz**

## OPTIONAL ITEMS

<b>RS</b>	Stand-alone adapter for laser control via RS-232 port
<b>EXP</b>	Stand-alone pulse generator for variable rep. rate
<b>CT19</b>	19" mounted controller with integrated AC/DC power supply
<b>CTA19</b>	19" mounted controller with air-purging unit
<b>CTBR</b>	Front/rear panel with brackets for standard controller
<b>PS19</b>	19" form factor AC/DC power supply
<b>APU2</b>	Stand-alone air-purging unit with integrated AC/DC power supply