Fluid Mechanics Illumination

High Speed Pulsed Green Lasers
Nd:YLF & Nd:YAG

Highest Pulse Energy
Single or Dual Head Multi Pulse

Applications

- Particle Image Velocimetry
  - o High Speed Time Resolved PIV
  - o Stereoscopic PIV
  - o Volumetric Illumination (3D) PIV
- Laser Tomography
- Planar Laser Induced fluorescence (PLIF) measurements of concentration or temperature distributions in liquid or gas flow
- Interferometric Particle Imaging (IPI) particle characterization techniques
- Other analysis techniques that require a single or multi pulsed laser light sheet illumination

Features

- Highest Energy Per Pulse (up to 60 mJ at 1kHz)
- Output at 532 or 527 nm
- Single Head-Twin Pulse
- Dual Head-Double or Multi Pulse
- Pulse Rate from Single Shot to 30 kHz
- Diode Pumped Technology
- High Stability (<1% RMS)
- Compact Form Factor

Photonics Industries
International, Inc.

The Pioneer of Intra-Cavity Solid-State Harmonic Lasers

High Speed Pulsed YLF or YAG Lasers

New emerging volumetric illuminization (3D PIV) and high speed PIV require higher pulse energies. By utilizing our proprietary pump design and intra-cavity harmonic generation technologies, Photonics Industries' can provide up to 60 mJ per pulse with our model DM 60-527 laser from a patented single pump chamber in a single laser head. Others can only achieve such pulse energies from multiple pump chambers in the resonator head. Available in either Nd:YLF and Nd:YAG, the systems have pulse repetition rates available from single shot to 50 kHz. Photonics Industries has been manufacturing and delivering the highest efficiency, highest pulse energy at high repetition rates, high power Nd:YLF and Nd:YAG second harmonic lasers in its class since 1993.

Options Available

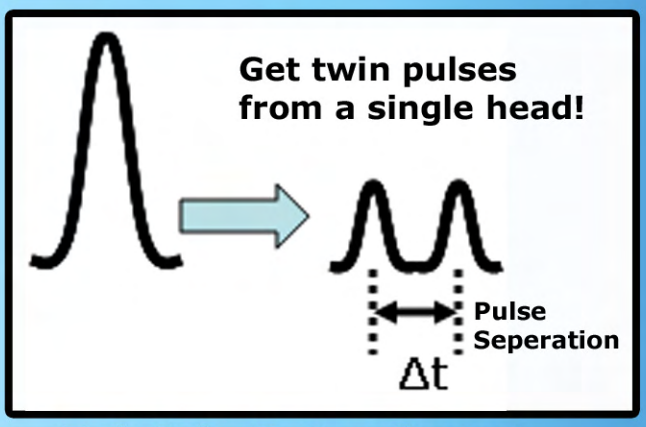
- Low Pulse Rate (up to 10 kHz)
- High Pulse Rate (up to 30 kHz)
- Twin Pulse from Single Head
  - Pulse seperation from 1 ms to ~1 μs
- Multi Pulse for dual head
  - Pulse seperation from 1 ms to <1 μs and all the way to pulse overlap
- Fiber Coupled Output

Twin Pulse Operation

There are several key advantages to using a single laser resonator. This method guarantees collinear output of the pulse sets, as well as plane of polarization. The single laser is more compact, only requires a single power supply and controller, and has fewer components, which results in reduced maintenance cost and increased Mean Time Between Failure (MTBF) reliability over a dual head laser system.

The user-friendly interface can accept a single external trigger signal, typically produced by the CCD Camera, which will then produce two laser pulses.

- Proprietary Design, Specific to PIV Applications
- Twin Pulse Separation, Δt down to ~1 μs
- Twin Pulse Set at kHz Rates
  (-e.g., at 500 Hz get 1000 pulses/second)
- Energy of Each of Two (2) Pulses Easily selected

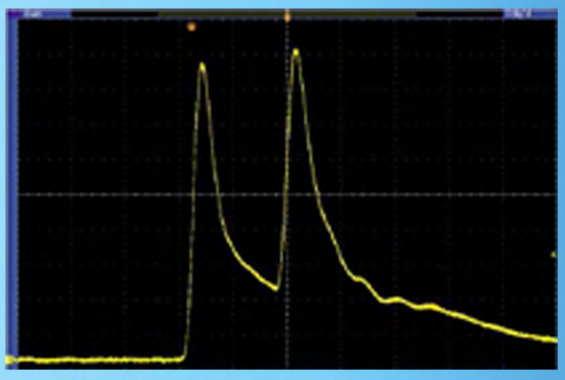


Twin Pulse Feature Concept

In this configuration, our model DM60-527 will produce 30 mJ of energy for each pulse.

Dual Head Option

As velocities increase, some PIV applications require sub μs pulse separations. Since the single head twin pulse separation is limited to ~1μs, PI offers any of lasers in a Dual Head Option, if required by the customer. In this fashion, we can achieve any arbitrarily short pulse separation <1us down to even pulse overlap… see photo below.



Twin Pulse - Separation of ~200 ns

Laser Controller

Photonics Industries
International, Inc.

Low Pulse Rate

Pulse rate is available from single shot up to 10 kHz.

Pulse Energy	Model
1.5 mJ @ 1 kHz	DC150-527*
10 mJ @ 1 kHz	DM10-527
20 mJ @ 1 kHz	DM20-527
30 mJ @ 1 kHz	DM30-527
40 mJ @ 1 kHz	DM40-527
50 mJ @ 1 kHz	DM50-527
60 mJ @ 1 kHz	DM60-527

*Note the low pulse energy version is an air cooled design.

High Pulse Rate

Pulse rate is available from 3kHz to 30kHz.

Pulse Energy	Model
5 mJ @ 10 kHz	DM50-532
10 mJ @ 10 kHz	DM100-532
15 mJ @ 10 kHz	DM150-532

Common Specifications: Air-Cooled DC150

	Width	Length	Height	Weight
Laser Head Dimensions	102 mm	253 mm	114 mm	4.5 kg (10 lbs)
Laser Controller Dimensions	483 mm	476 mm	133 mm	20 kg (44 lbs)
Electrical Requirements	Single Phase, 3 kVA			
Ambient Temperature	15 to 30 C (Operating Range)			
Umbilical Length	3 meters			

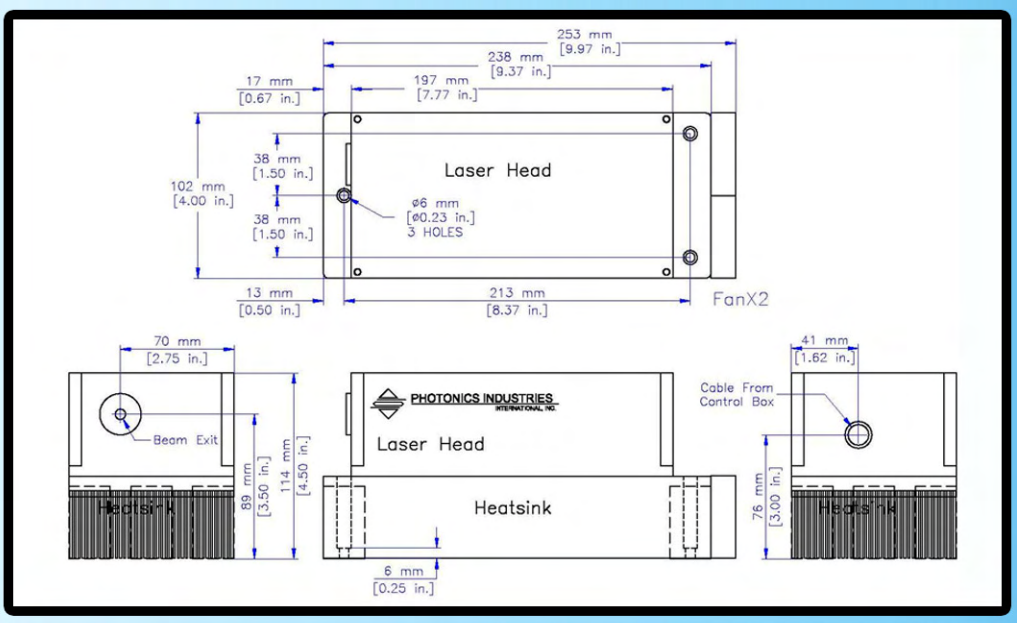
Common Specifications: Chilled DM Series Version Single/Dual Head

	Width	Length	Height	Weight
Laser Head Dimensions	191 mm	600 mm	153 mm	20 kg (44 lbs)
Laser Controller Dimensions	483 mm	476 mm	266 mm	23 kg (50 lbs)
Electrical Requirements	Single Phase, 3 kVA			
Ambient Temperature	15 to 30 C (Operating Range)			
Umbilical Length	3 meters			

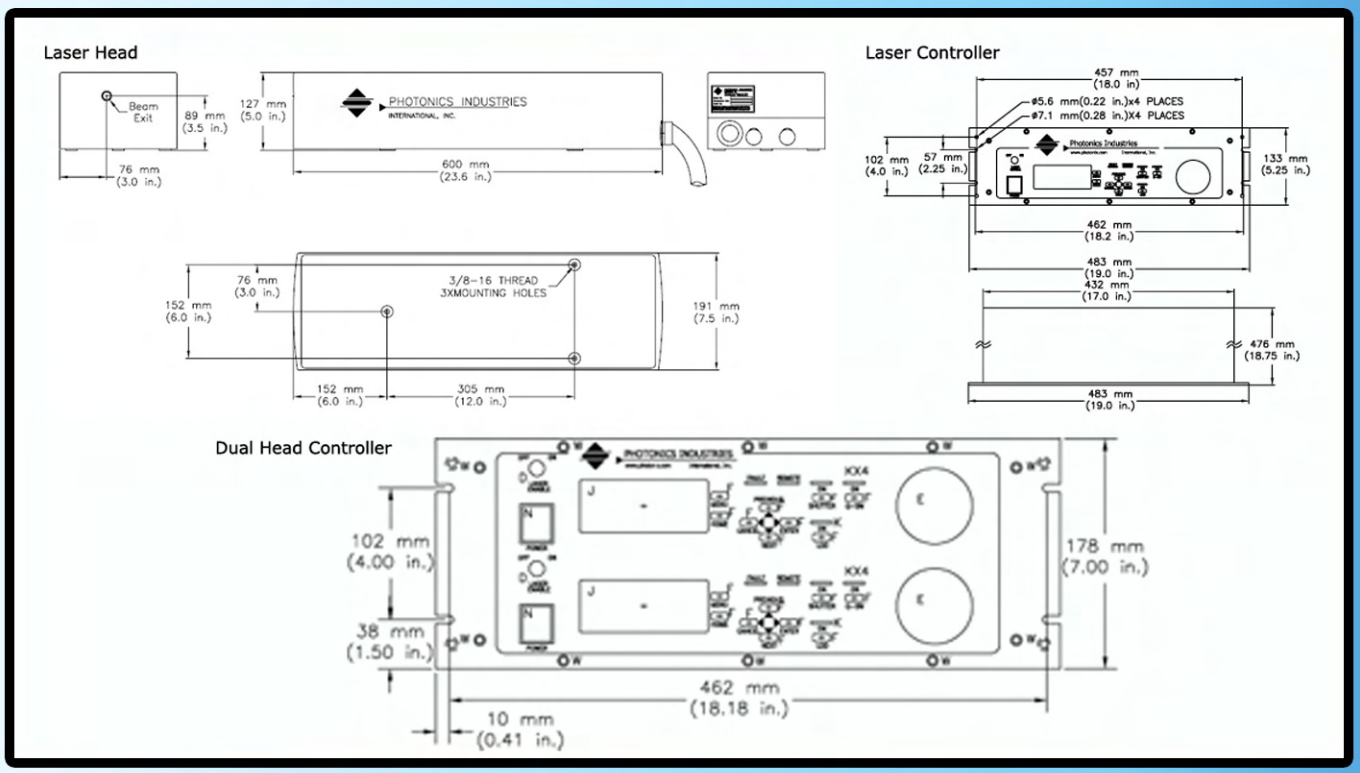
All DM lasers require a water chiller in order to maintain proper operating temperatures. Choices of air-to-water and water-to-water chillers are available. Please contact the factory to find which chiller will best meet your specifications.

Technical Drawings

Air-Cooled DC150



Single/Dual Head



Due to Photonics Industries' commitment to continuous product improvement, specifications are subject to change without notice.

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