

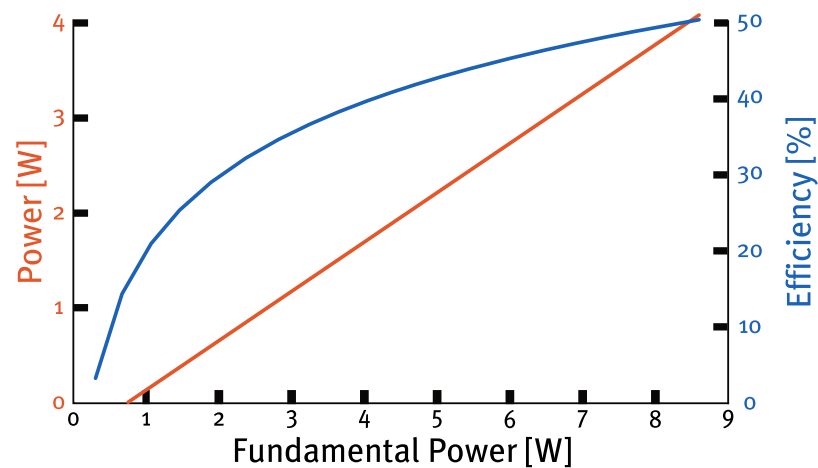
# WaveTrain 3D

## External Cavity Frequency Doubler for CW Lasers

The WaveTrain is a powerful tool for efficient and stable second harmonic generation of single-frequency continuous wave lasers like the Matisse. It is based on a low-loss, ultra compact enhancement cavity using a patented triangle-shaped ring resonator. A temperature stabilized nonlinear crystal generates the second harmonic of the enhanced fundamental radiation with very high efficiency of up to more than 35%. A Pound-Drever-Hall locking scheme in combination with an auto-relock stabilizes the length of the resonator cavity for ultra stable second harmonic generation and widest automated tunability. The phase-matching angle of the nonlinear crystal is manually tunable over more than 50 nm.

The WaveTrain provides highest flexibility for various single-frequency laser. Two pre-mounted optics sets for quick and easy exchange cover the visible to the near infrared wavelength region. Various wavelength are accessible by exchange of pre-mounted crystal or by phase-matching angle tuning. The WaveTrain provides space for integrating various mode-matching optics within its housing. The sealed resonator block prevents contamination of the optics and allows easy flushing of the cavity with purified air or nitrogen. The Closed Loop Purge Unit (CLPU) can be used as an option to purify the air inside the WaveTrain over years of operation.

## Typical Performance



## General Characteristics

Specifications	Visible	Near Infrared
Optics Set Range	500-780 nm	670-1050 nm
Automated Scan Range	> 65 GHz	> 40 GHz
Phase-Match Tuning <sup>1) 2)</sup>	± 15 nm @ 600 nm	± 25 nm @ 800 nm
Maximum Scan Rate	10 GHz/s (fundamental)	10 GHz/s (fundamental)

Efficiency	Visible	Near Infrared
0.3 - 0.6 W	4 %	6 %
0.6 - 1.3 W	10 %	15 %
1.3 - 3 W	15 %	25 %
3 - 10 W	15 %	35 %

## Requirements

Lasers to be Doubled <sup>3)</sup>	(Matisse Series) fiber lasers, diode lasers
Ambient Conditions	constant temp. in the 20-30 °C range, 80% max. rel. humidity, non condensing
Laboratory	vibrational isolated optical table, dust-free air (flow box)
Voltage	115 V / 230 V, single phase, 50 Hz / 60 Hz

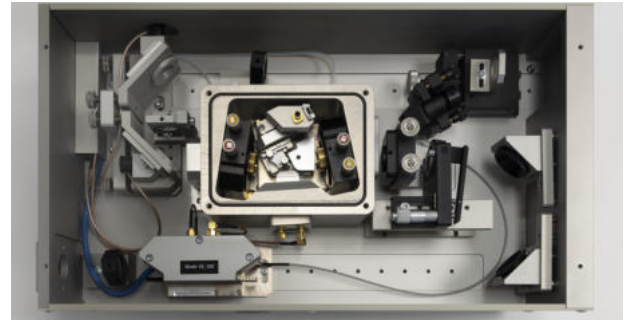
<sup>1)</sup> phase-match tuning is defined by an intensity reduction of 50% in the SHG

<sup>2)</sup> crystal cut wavelength may vary by 1%

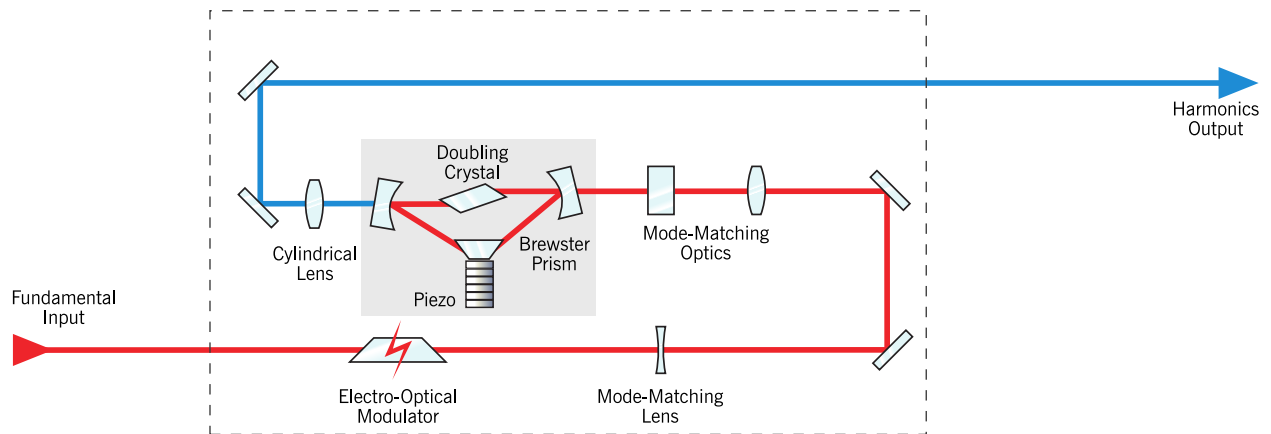
<sup>3)</sup> please contact Sirah for compatibility with other lasers

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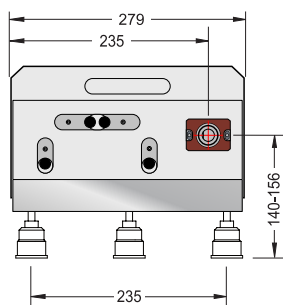
## WaveTrain



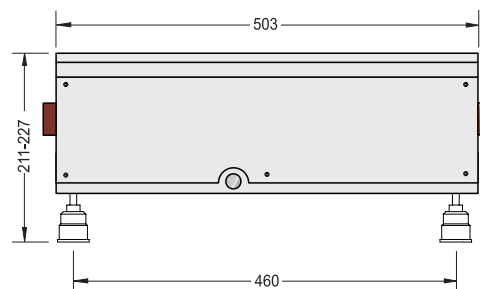
## Optical Layout



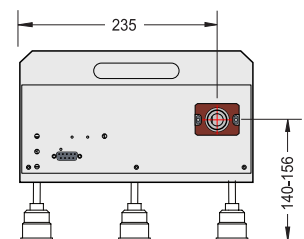
## Dimensions



WaveTrain (SHG output end)



WaveTrain (side view)



WaveTrain (pump laser input end)

### preliminary

All Dimensions in mm  
Specifications are subject to change without notice  
U.S. Patent 7,068,689



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