

# UHG Series

## Ultrafast Harmonic Generator for Femtosecond and Picosecond Lasers



Spectra-Physics' UHG series is a user-friendly Ultrafast Harmonic Generator (UHG) module capable of second, third, and fourth harmonic generation for ultrafast oscillators with options for pulse selection and automated tuning. The UHG series is designed to work with both femtosecond and picosecond oscillators such as the Spectra-Physics InSight®, Mai Tai® and Tsunami®.

The UHG Series for InSight provides virtually gap free tuning from 340 nm to 1300 nm when combined with the fundamental output. It provides high efficiency SHG (second harmonic) output that exceeds 40% efficiency and when combined with the InSight X3™, providing an average power of >800 mW at 450 nm. In addition, the new UHG Series for InSight is fully automated and allows for software control to tune both the fundamental and second harmonic wavelengths. Pulse selection is available from 340 nm to 1100 nm at repetition rates of single shot to 40 MHz. Pulse selector can run in high contrast ratio mode, or high efficiency mode depending on the needs of the experiment.

The UHG Series for Mai Tai and Tsunami has been designed to handle greater than 4 W of average power and deliver efficiencies exceeding 40% for SHG. The pulse selector option inside the UHG head offers a SiO<sub>2</sub> Bragg cell for the highest output powers and contrast ratio. The system is capable of pulse selecting from single shot to 40 MHz and is positioned before all harmonic stages to offer the most features in a single compact housing. The UHG series is a flexible system suitable for a variety of scientific applications requiring access to a wide spectrum of femtosecond or picosecond laser pulses.

### The UHG Series Advantage

- High efficiency conversion
- Reduced pulse broadening
- Broadband optics for complete wavelength coverage
- Pulse selector option
- Motorized tuning option
- Compact housing

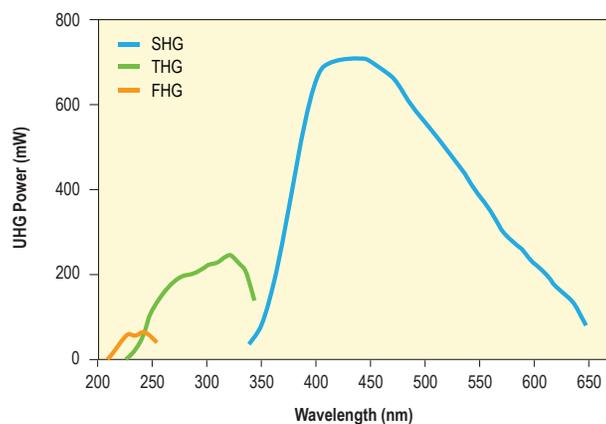
### Applications

- Non-linear spectroscopy
- Quantum optics
- Biochemistry
- Biophotonics
- Microelectronics characterization

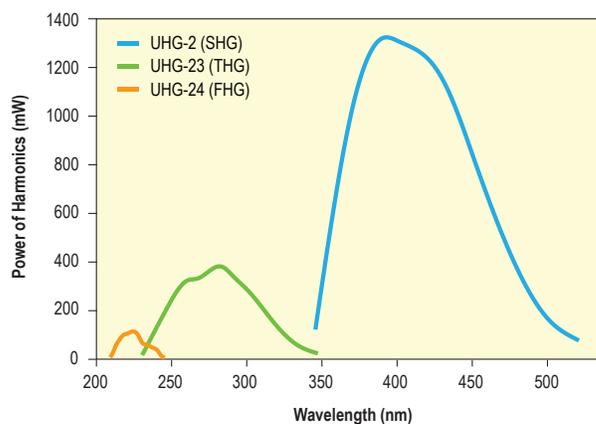


# UHG Series

GWU-UHG Typical Performance with InSight<sup>1</sup>



GWU-UHG Typical Performance with Mai Tai HP<sup>1</sup>



1. Typically measured performance; not a guaranteed or warranted specification.

## UHG for InSight Specifications<sup>1</sup>

|  | Fundamental  | SHG         |
|--|--------------|-------------|
| <b>Second Harmonic Generation</b>        |              |             |
| Input Wavelength                         | 680–1300 nm  |             |
| Output Wavelength                        | 680–1300 nm  | 340–650 nm  |
| Conversion Efficiency (@ 900 nm, 80 MHz) | 40%          |             |
| Power with InSight X3+/X3 <sup>2</sup>   | 3000/2000 mW | 1200/800 mW |
| <b>Pulse Selection</b>                   |              |             |
| Wavelength                               | 680–1100 nm  | 340–650 nm  |
| Diffraction Efficiency (@ 900 nm, 8 MHz) | 35%          |             |
| Power with InSight X3+/X3 <sup>2</sup>   | 107/71 mW    | 15/10 mW    |

1. Due to our continuous product improvements, specifications are subject to change without notice.

2. InSight X3+ specification 3 W at 900 nm. InSight X3 specification 2 W at 900 nm.

# UHG for Mai Tai and Tsunami Specifications<sup>1</sup>

|  | SHG         | SHG (in THG) <sup>2</sup> | THG        | FHG        |
|--|-------------|---------------------------|------------|------------|
| <b>Femtosecond Operation</b>           |             |                           |            |            |
| Input Wavelength                       | 680–1080 nm |                           |            | 836–968 nm |
| Output Wavelength                      | 340–540 nm  |                           | 226–360 nm | 209–242 nm |
| Conversion Efficiency <sup>3</sup>     | 40%         | 25%                       | 10%        | 4%         |
| Power with Mai Tai HP <sup>4</sup>     | 1000 mW     | 625 mW                    | 250 mW     | 80 mW      |
| Power with Tsunami HP <sup>5</sup>     | 1080 mW     | 675 mW                    | 270 mW     | 100 mW     |
| <b>Picosecond Operation</b>            |             |                           |            |            |
| Input Wavelength                       | 680–1080 nm |                           |            | 836–968 nm |
| Output Wavelength                      | 340–540 nm  |                           | 226–360 nm | 209–242 nm |
| Conversion Efficiency <sup>3</sup>     | 15%         | 10%                       | 4%         | 0.1%       |
| Power with Tsunami HP <sup>5,7</sup>   | 435 mW      | 290 mW                    | 87 mW      | 2.5 mW     |
| Pico HE option                         | 25%         | 20%                       | 12%        | 1%         |
| Pico HE with Tsunami HP <sup>5,7</sup> | 725 mW      | 580 mW                    | 348 mW     | 25 mW      |

# UHG Pulse Selector Specifications<sup>1</sup>

| <b>Stand Alone Pulse Selector (Femtosecond and Picosecond Operation)</b> |                                   |                           |            |  |
|--|-----------------------------------|---------------------------|------------|--|
| Input Wavelength   | 680–1080 nm                       |                           |            |  |
| Diffraction Efficiency <sup>8, 10</sup>                                  | 40%                               |                           |            |  |
| Power with Mai Tai HP <sup>4, 10</sup>                                   | 100 mW                            |                           |            |  |
| Power with Tsunami HP <sup>5, 10</sup>                                   | 108 mW                            |                           |            |  |
| Contrast Ratio <sup>8, 9</sup>   | 300:1                             |                           |            |  |
| Repetition Rate  | Adjustable: 40 MHz to single shot |                           |            |  |
|  | SHG                               | SHG (in THG) <sup>2</sup> | THG        |  |
| <b>Femtosecond Operation</b>   |                                   |                           |            |  |
| Output Wavelength  | 340–540 nm                        |                           | 226–360 nm |  |
| Conversion Efficiency <sup>3,6</sup>                                     | 10%                               | 8%                        | 5%         |  |
| Power with Mai Tai HP <sup>4</sup>                                       | 8.5 mW                            | 7 mW                      | 4 mW       |  |
| Power with Tsunami HP <sup>5</sup>                                       | 9.5 mW                            | 7.5 mW                    | 4.5 mW     |  |
| <b>Picosecond Operation</b>  |                                   |                           |            |  |
| Output Wavelength  | 340–540 nm                        |                           | 226–360 nm |  |
| Conversion Efficiency <sup>3,6</sup>                                     | 3%                                | 2.5%                      | 1%         |  |
| Power with Tsunami HP <sup>7</sup>                                       | 3 mW                              | 2.5 mW                    | 1 mW       |  |

1. Due to our continuous improvement program, specifications are subject to change without notice.

2. SHG when THG is detuned.

3. Conversion efficiency given at 800 nm for SHG and THG, 900 nm for FHG. Minimum input power of 2 W required for specified efficiencies.

4. 2.5 W @ 800 nm, 8 MHz pulse picking.

5. 2.7 W @ 800 nm, 8 MHz pulse picking.

6. In relation to diffracted fundamental power @ 8 MHz.

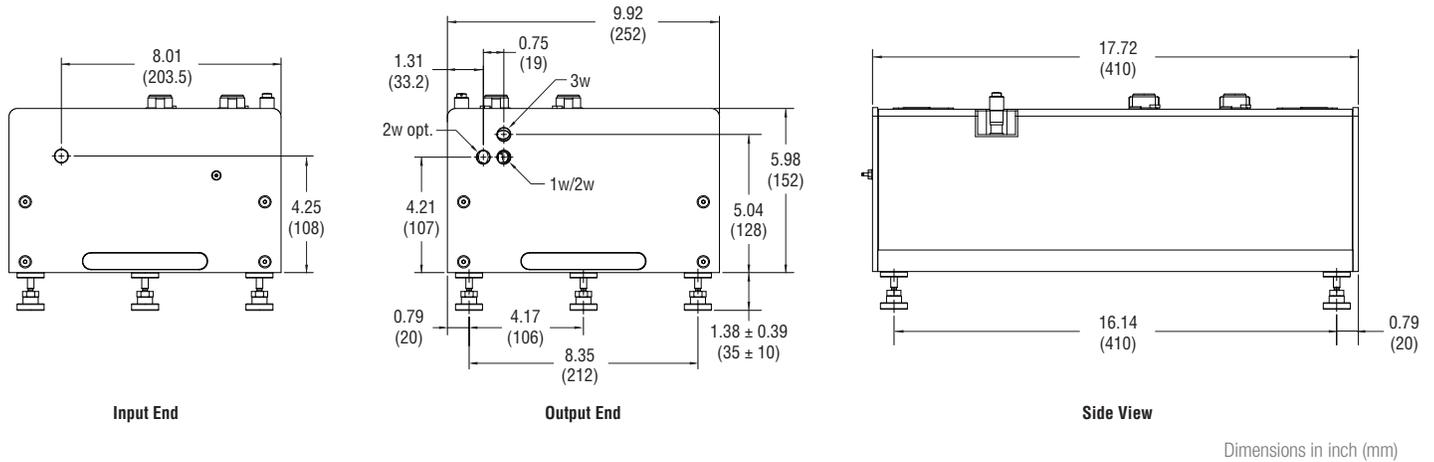
7. 2.9 W @ 800 nm, 8 MHz pulse picking, 1–2 ps.

8. Values for 800 nm, 8 MHz pulse picking.

9. Contrast ratio value for selected pulse to adjacent pulse in high contrast mode, contrast ratio for selected pulse to non-adjacent pulses is >400:1.

10. Diffraction efficiency and power values are given in high efficiency mode.

# UHG Series



UHG Series Dimensions



Manufactured by GWU


[www.spectra-physics.com](http://www.spectra-physics.com)

1565 Barber Lane, Milpitas, CA 95035 USA

PHONE: 1-800-775-5273 1-408-980-4300 FAX: 1-408-980-6921 EMAIL: sales@spectra-physics.com

Belgium +32-(0)800-11 257

belgium@newport.com

Korea +82-31-8021-1600

korea@spectra-physics.com

China +86-10-6267-0065

info@spectra-physics.com.cn

Netherlands +31-(0)30 6592111

netherlands@newport.com

France +33-(0)1-60-91-68-68

france@newport.com

Singapore +65-6664-0040

sales.sg@newport.com

Germany / Austria / Switzerland

germany@newport.com

Taiwan +886-3-575-3040

sales@newport.com.tw

Japan +49-(0)6151-708-0

spectra-physics.jp@mksinst.com

United Kingdom +44-1235-432-710

uk@newport.com