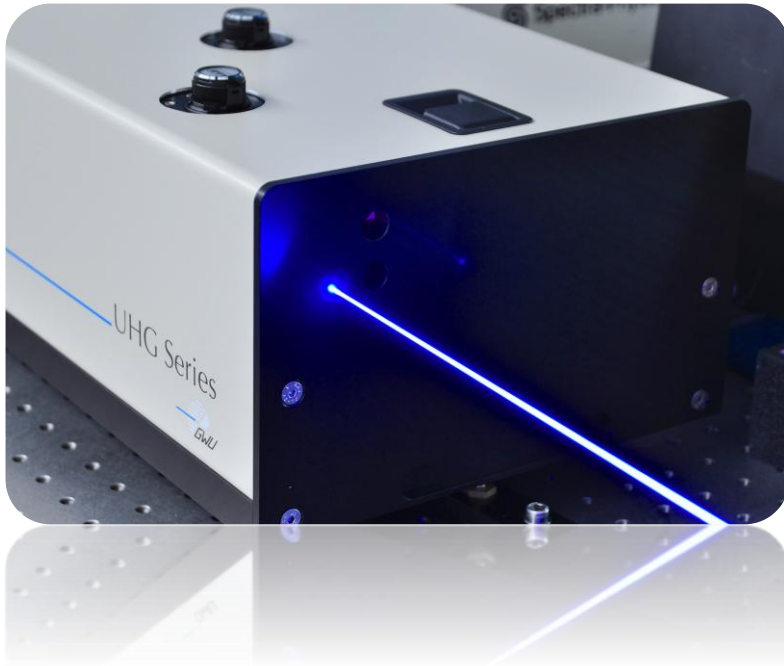


UHG SERIES

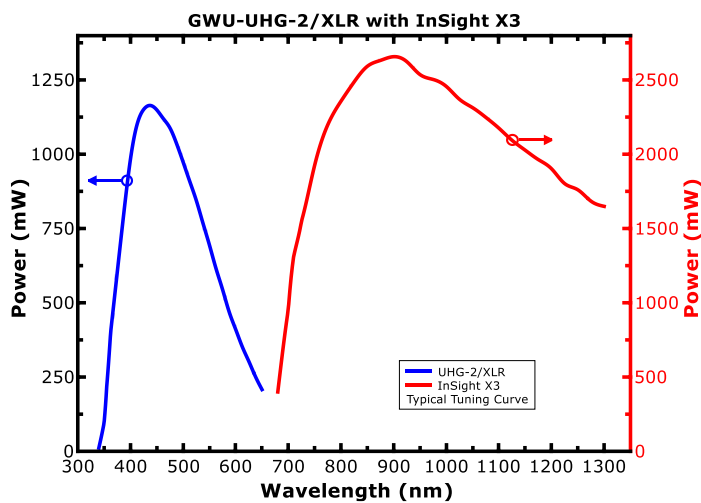
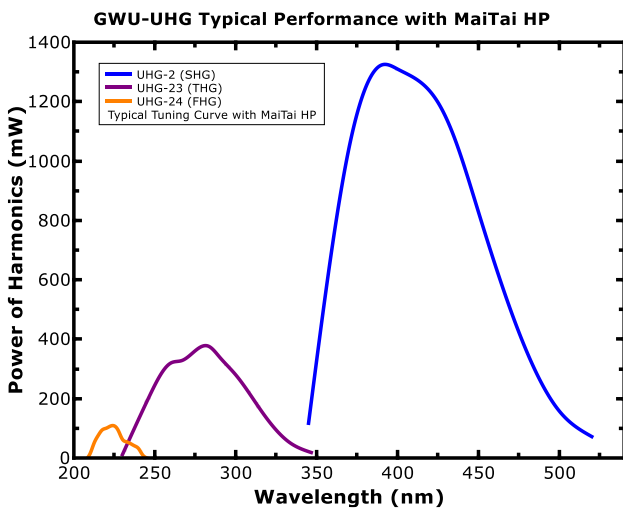
ULTRAFAST HARMONIC GENERATOR FOR FEMTOSECOND AND PICOSECOND LASERS



The GWU-UHG series is a user-friendly Harmonic generation module capable of second, third, and fourth harmonic generation for ultrafast oscillators with options for pulse selection.

The UHG series provides high-efficiency harmonic generation of femtosecond and picosecond oscillators such as the Spectra-Physics' InSight®, Mai Tai® and Tsunami®.

Typical Tuning Curves⁽¹⁾



⁽¹⁾ Typically measured performance; not a guaranteed or warranted specification



UHG SERIES

The Ultrafast Harmonic Generator (UHG) series are flexible pico- and femtosecond laser sources for suitable for a broad variety of scientific and industrial applications requiring access to a wide spectrum of ultrashort laser pulses. By means of second harmonic generation (SHG), third harmonic generation (THG) and fourth harmonic generation (FHG) not only the wavelength range but also the versatility of NIR lasers can be vastly extended. In combination with widely tunable near-IR ultrafast lasers, the UHG-Series provides virtually gap free tuning from < 210 nm to 1300 nm when combined with the fundamental output. For all harmonics, a high conversion efficiency can be provided. In addition, the UHG Series is fully automated and allows for software control to tune both the fundamental and the harmonic wavelengths.

The pulse selector option inside the UHG head offers a 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 GWU UHG-Series has been designed for and thoroughly tested with Spectra Physics ultrafast lasers. The UHG-Series is distributed worldwide exclusively by MKS Spectra Physics.

Specifications GWU-UHG \XLR for Spectra Physics InSight

	Fundamental	SHG
Second Harmonic Generation		
Input Wavelength	680 - 1300 nm	
Output Wavelength	680 - 1300 nm	340 - 650 nm
Conversion Efficiency (@ 450 nm/900 nm) ⁽¹⁾		40%
Power with InSight DS+ ⁽²⁾	1300 mW	520 mW
Power with InSight X3 ⁽³⁾	2000 mW	800 mW

(1): Input power > 1.1 W at 900 nm.

(2): InSight DS+ specification 1.3 W at 900 nm.

(3): InSight X3 specification 2 W at 900 nm.



UHG SERIES

Specifications GWU-UHG for Spectra Physics Mai Tai and Tsunami

UHG Series					
	Fundamental	SHG	SHG (in THG) ⁽¹⁾	THG	FHG
FEMTO Operation					
Input Wavelength	680 - 1080 nm				836 nm - 968 nm
Output Wavelength	680 - 1080 nm	340 - 540 nm	340 - 540 nm	226 - 340 nm	209 nm - 242 nm
Conversion Efficiency ⁽²⁾		40%	25%	10%	4%
Power with Mai Tai HP ⁽³⁾	2500 mW	1000 mW	625 mW	250 mW	80 mW
Power with Tsunami HP ⁽⁴⁾	2700 mW	1080 mW	675 mW	270 mW	100 mW
PICO Operation (Standard Configuration)					
Input Wavelength	680 - 1080 nm				836 nm - 968 nm
Output Wavelength	680 - 1080 nm	340 - 540 nm	340 - 540 nm	226 - 340 nm	209 nm - 242 nm
Conversion Efficiency ⁽²⁾		15%	10%	4%	0.1%
Power with Tsunami HP ⁽⁴⁾	2900 mW	435 mW	290 mW	115 mW	2.5 mW
PICO Operation (HE Configuration)					
Input Wavelength	680 - 1080 nm				836 nm - 968 nm
Output Wavelength	680 - 1080 nm	340 - 540 nm	340 - 540 nm	226 - 340 nm	209 nm - 242 nm
Conversion Efficiency ⁽²⁾		25%	20%	10%	1%
Power with Tsunami HP ⁽⁵⁾	2900 mW	725 mW	580 mW	350 mW	25 mW

(1): SHG when THG detuned

(2): Conversion efficiency given at 800 nm for SHG and THG, 900 nm for FHG. Min. input power of 2 W required for specified efficiencies.

(3): Mai Tai HP specification 2.5 W at 800 nm, 80 MHz.

(4): Tsunami HP specification 2.7 W, 80 MHz.

(5): Tsunami HP specification 2.9 W, 1-2 ps, , 80 MHz.

Specification UHG PulseSelector (UHG-PSK)

SiO ₂ Bragg Cell specification (Femtosecond and Picosecond Operation)	
Input Wavelength	680-1080 nm
Diffraction Efficiency	45% @ 800 nm, 8 MHz
Power with Mai Tai HP ⁽³⁾	112 mW
Power with Tsunami HP ⁽⁴⁾	122 mW
Contrast Ratio	>80:1 (adjacent pulse), >400:1 (non-adjacent pulses)
Repetition Rate	adjustable: 40 MHz to single shot

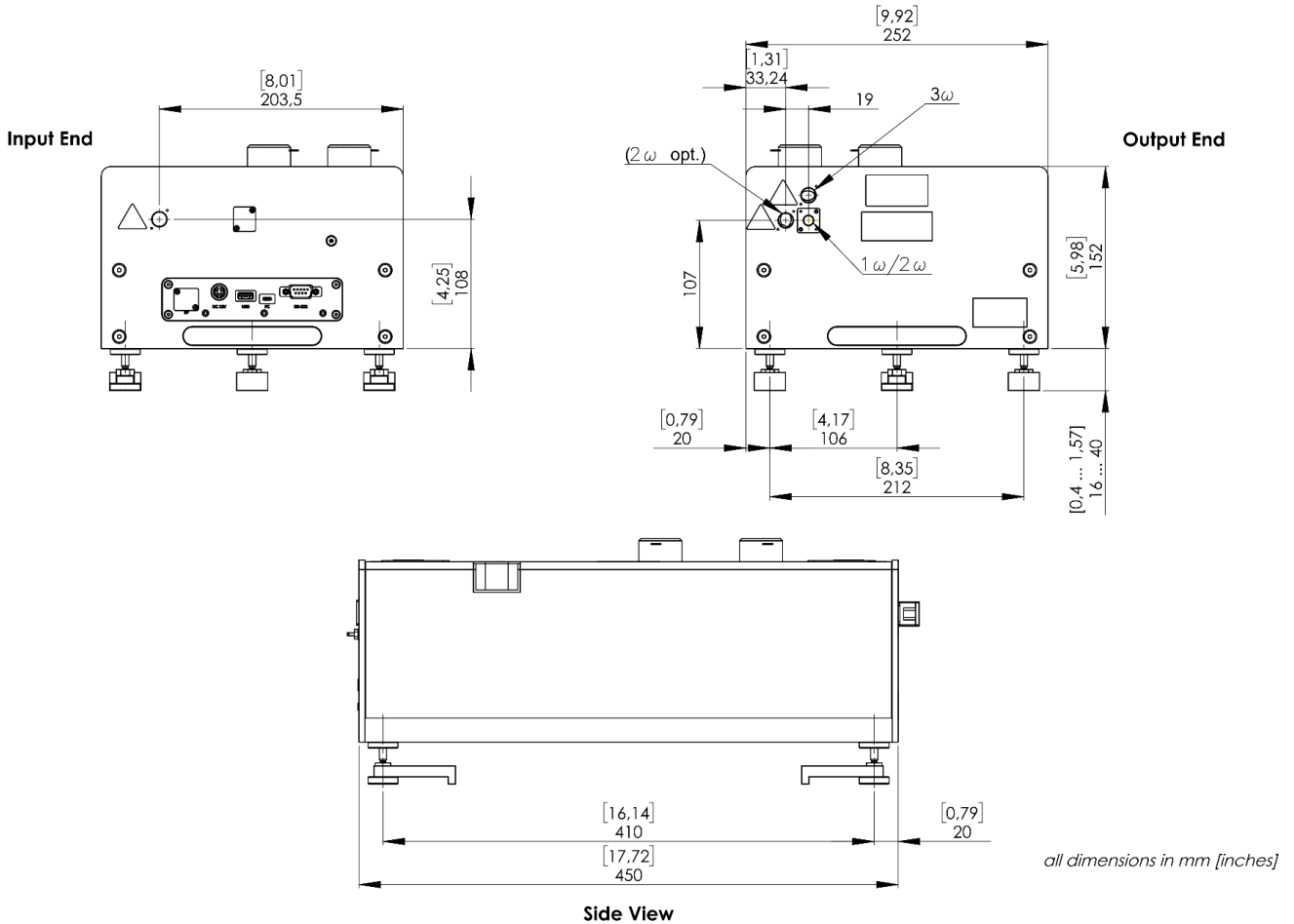
UHG-PSK with Harmonic Generation	SHG	SHG (in THG) (1)	THG
FEMTO Operation			
Output Wavelength	340-540 nm		226-340 nm
Conversion Efficiency ⁽⁶⁾	10%	8%	5%
Power with Mai Tai HP ⁽³⁾	11 mW	9 mW	5 mW
Power with Tsunami HP ⁽⁴⁾	12 mW	9.5 mW	6 mW
PICO Operation			
Output Wavelength	340-540 nm		226-340 nm
Conversion Efficiency ⁽⁶⁾	3%	2.5%	1%
Power with Tsunami HP ⁽⁵⁾	4 mW	3 mW	1.3 mW

(6) In relation to diffracted fundamental power @ 8 MHz



UHG SERIES

UHG Series Dimensions



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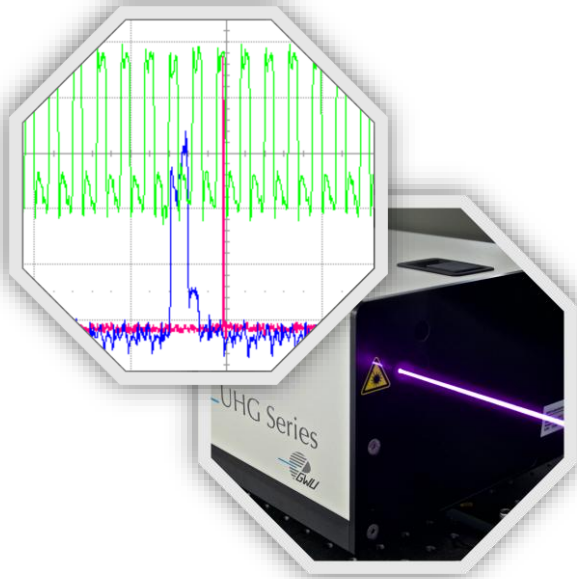


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UHG-PSK

Ultrafast Pulse Selector for the UHG-Series



UHG-PSK Specification

UHG-Series Pulse Selector	
Bragg Cell	SiO ₂ for high power capability up to 5 W avg. input power
Picking Ratio	$v_{rep}/2 \dots v_{rep}/1023$ software controlled or arbitrary by external triggering (v_{rep} : Input repetition rate)
Picking Efficiency & Contrast Ratio flexible user adjustment by software all numbers specified at 800 nm, 80 MHz input, 8 MHz output ($v_{rep}/10$)	Diffraction Efficiency > 45% Contrast Ratio > 80:1 main to adjacent pulses > 400:1 main to nonadjacent pulses
External Control	Analog-in for amplitude modulation TTL for Start/Stop
Other	Controller and electronics integrated in optical head Completely software controlled

Features and Benefits

High pulse picking efficiency and contrast ratio

Flexible Contrast / Efficiency adjustment

Repetition rate adjustment from single shot up to 40 MHz

Multi-pulses and burst mode

Convenient software control

Capable for femto- & picosecond pulses and high power

Modular design integrated in UHG-Series

Applications

Quantum-optics

Non-linear spectroscopy

Biophotonics

Microelectronics

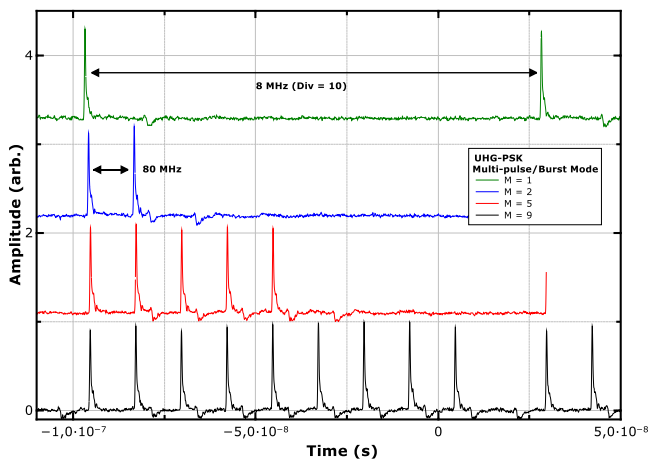
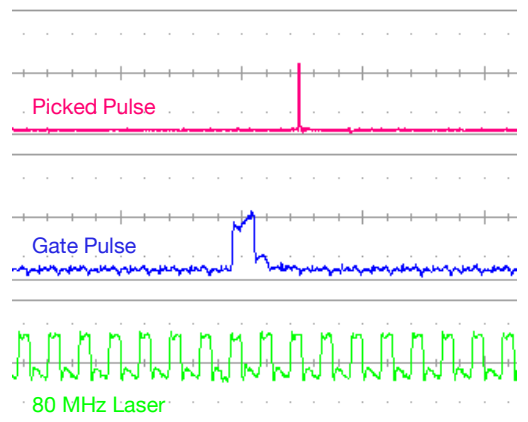
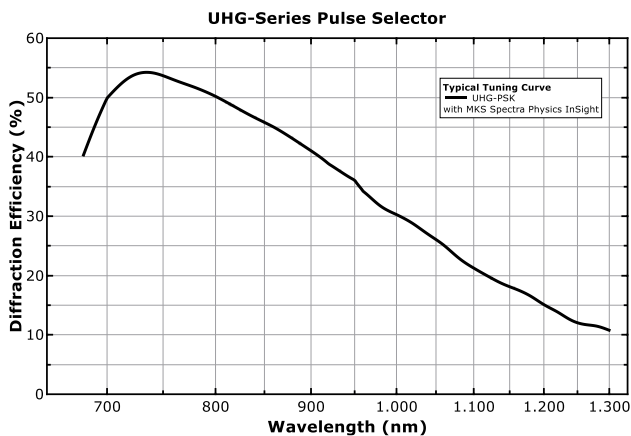
Notes

All specifications depend in the pump laser specifications and performance. Please contact the factory or our sales representatives for details. All specifications are subject to change without notice.



UHG-PSK Performance

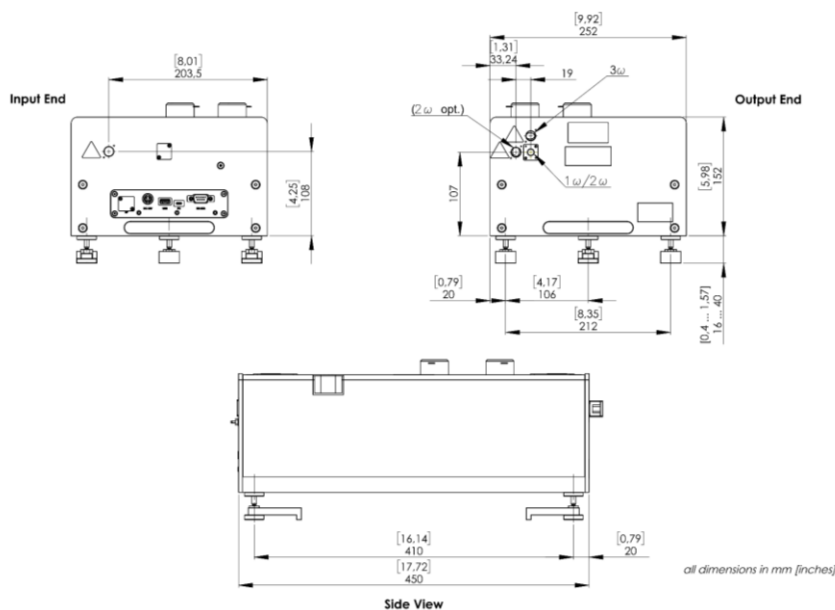
Typical performance with Spectra Physics Lasers, not a guaranteed or warranted specification



Pump Laser Requirements

Wavelength	680 – 1080 nm
Repetition Rate ν_{rep}	0.1 - 85 MHz
Polarization	Linear, horizontal built-in polarization rotator optionally available
Max. avg. Power	5 W
Sync. Signal	TTL/50 Ohms, > 100 mV, duty cycle in [10%-90%]

UHG-Series Dimensions and Properties



Mechanical + Utilities

Size UHG body
(L x W x H):
450 x 252 x 152 mm³

Weight UHG body:
13 – 16 kg
(depending on configuration)

Power requirements
Electronics & Motorizers:
100 – 240 V, 50 – 60 Hz

For dimensions with feet
please refer to the
dimensional drawing

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