

HARMONIC GENERATORS

For NL230 and NL300 Series Lasers

Nanosecond Q-switched lasers enable simple and cost effective laser wavelength conversion to shorter wavelengths through harmonics generation. EKSPLA offers a broad selection of wavelength conversion accessories for NL230 & NL300 series lasers. The purpose of this guide is to help configure available harmonic generator and attenuator modules for NL230 & NL300 series lasers for optimal performance.

The harmonics module uses a modular design that allows reconfiguration of laser output for the appropriate experiment wavelength.

A typical module houses a non-linear crystal together with a set of dichroic mirrors for separating the harmonic beam from the fundamental wavelength. Nonlinear crystals

used for the purpose of wavelength conversion are kept at an elevated temperature in a thermo-stabilized oven.

Two or more modules can be joined together for higher harmonics generation: attaching one extra module to a second harmonic generator allows for the generation of 3rd or 4th harmonic wavelengths.

It should be noted that only modules with a single output port can be joined together: it is possible to attach a H300S module to a H300SH unit for 532 nm beam separation, or a H300FHC module for 4th harmonics generation (see detailed description below). Modules with two output ports (e.g., H300SHC) cannot be attached to extra units.

FEATURES

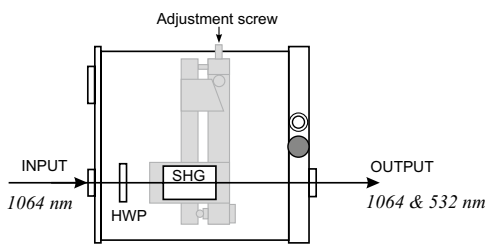
- ▶ Compact harmonic modules
- ▶ Thermo stabilized crystals for long lifetime
- ▶ Dichroic mirrors
- ▶ AR coatings on crystals
- ▶ Phase matching by mechanical adjustment
- ▶ High conversion efficiency
- ▶ Wide selection of different configurations

H300SH, H300TH harmonics generators

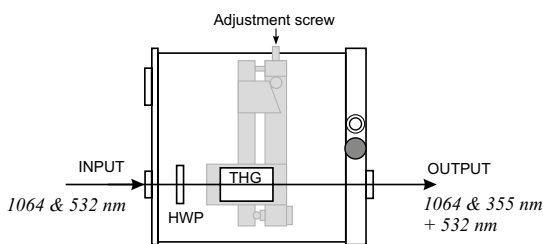
H300SH or H300TH modules contain a SH or TH crystal with a half-wave plate for input polarization adjustment. The output of the H300SH module has both **532 nm** and **1064 nm** wavelengths; the output of the H300SH+H300TH modules also has a **355 nm** wavelength.

H300S harmonics separator

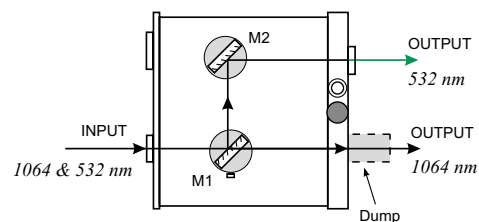
The H300S module has two output ports for the separation of **1064 nm** and **532 nm** wavelengths.



H300SH



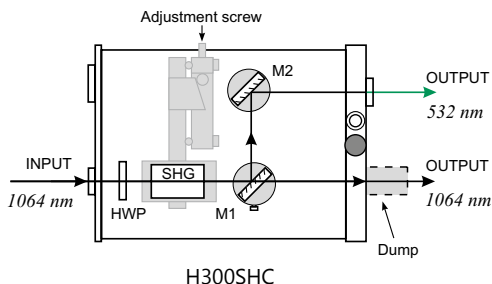
H300TH



H300S

H300SHC harmonics generator

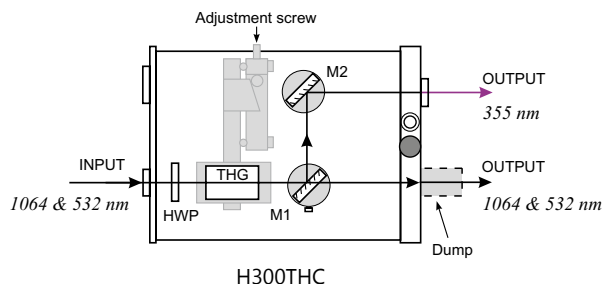
The most cost-effective solution for customers who need a **532 nm** wavelength only, the H300 SHC module combines a SHG crystal and beam separators and has two output ports for **532 nm** and **1064 nm** beams.



H300SHC

H300THC harmonics generator

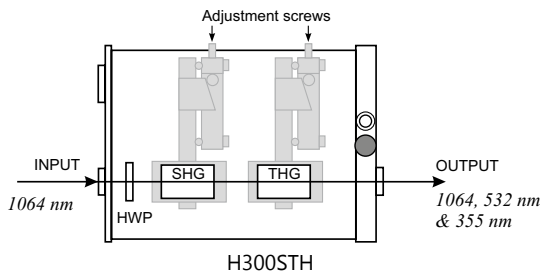
The H300THC module is a third harmonics generator and beam separator with two output ports for a **355 nm** beam, and for a residual **532 nm + 1064 nm** beam. This module should be used with the H300SH module.



H300THC

H300STH harmonics generator

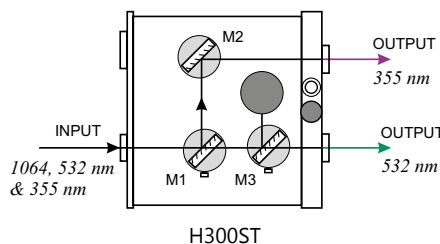
The H300STH module combined with a H300ST separator module is designed for customers who need a **355 nm** wavelength only. The H300STH module has an output port for **355 nm**, **532 nm** and **1064 nm** wavelengths, the H300ST module has two output ports for 355 nm and 532 nm wavelengths. In order to separate 355 nm this module should be used with H300ST.



H300STH

H300ST harmonics separator

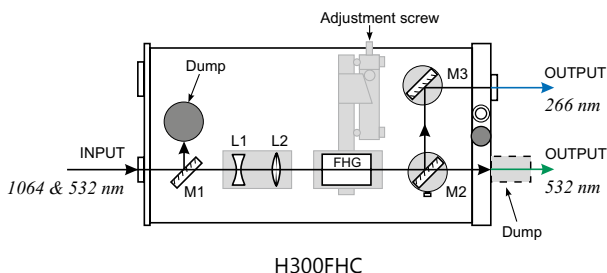
The H300ST module can be used for the separation of **355 nm** and/or **532 nm** beams from residual **1064 nm**, and can be used together with H300STH, H300TH or H300SH modules.



H300ST

H300FHC harmonics generator

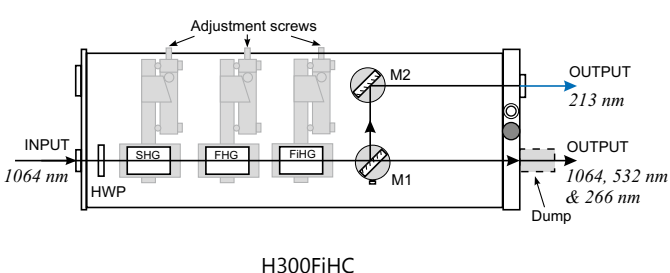
The H300FHC module is a fourth harmonics generator and beam separator for a **266 nm** wavelength, with two output ports for a **266 nm** beam, and for a residual **532 nm** beam. This module should be used with the H300SH module.



H300FHC

H300FiHC harmonics generator

The H300FiHC module is designed to produce a 5th harmonic output. As it requires only a **1064 nm** input, the unit contains SH, FH and FiH crystals together with a beam separator for a **213 nm** beam.



H300FiHC

ATTENUATORS

For NL230 and NL300 Series Lasers

NL300 series lasers offer several options for changing output pulse energy. The easiest option is to change the timing of the Q-switch opening relative to the flashlamp pump pulse. This option is a standard feature for all NL300 series lasers. A change in Q-switch timing, however, changes other laser pulse parameters along with the pulse energy.

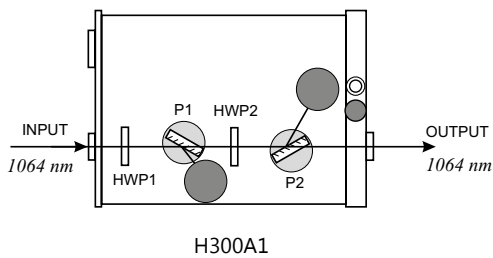
A decrease in pulse energy results in longer pulse duration, decreased pulse-to-pulse-stability, and possible changes in the spatial beam profile. For applications that require smooth adjustment of output pulse energy while keeping other parameters stable, EKSPILA offers H300Ax series attenuator modules.

FEATURES

- ▶ Compact design
- ▶ Motorized version is available
- ▶ Smooth adjustment of output pulse energy

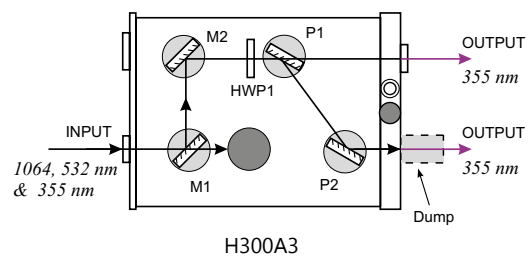
H300A1 attenuator

The H300A1 module is designed to attenuate a **1064 nm** beam. Optical layout includes half-wave plates HWP1, HWP2 and polarizers P1, P2 (see picture below). Rotation of the HWP2 half-wave plate changes the polarization of the laser beam and its transmission factor via the P2 polarizer.



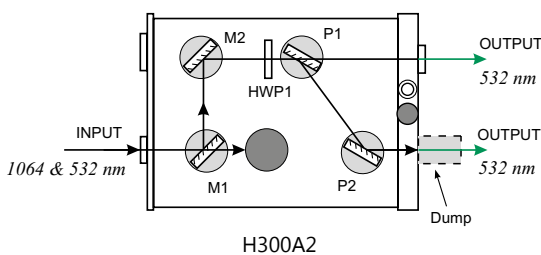
H300A3 attenuator

The H300A3 module, designed to attenuate a **355 nm** beam, combines an attenuator with a beam separator and should be used with the H300STH or H300TH modules.



H300A2 attenuator

The H300A2 module, designed to attenuate a **532 nm** beam, combines an attenuator with a beam separator and should be used with the H300SH module.



H300A4 attenuator

The H300A4 module is designed to attenuate a **266 nm** beam. It combines a FH crystal, beam separator and attenuator and should be used instead of the H300FHC module for attenuation of a 266 nm beam.

