

# KOHERAS BOOSTIK HP

High-power, low-noise single-frequency fiber laser



## SINGLE FREQUENCY, LOW NOISE

### Ideal for laser-based metrology

The Koheras BOOSTIK HP is a maintenance-free, single-frequency fiber laser with a unique combination of narrow linewidth, excellent beam quality and high output power.

The turn-key 19" rack system includes electronics and power supply, and is ideal for work and experimental research e.g. in metrology.

### Applications

- Optical length/frequency standards
- Nonlinear optics pump source
- Coherent beam combining
- Optical heterodyning
- Coherent communication
- Laser-based metrology e.g. precision laser interferometry and spectroscopy
- Quantum optics/computing and phenomena e.g. optical trapping, Bose-Einstein Condensate

# KOHERAS BOOSTIK

## Narrow linewidth, high beam quality and output power

The Koheras BOOSTIK HP is a maintenance-free single-frequency laser with a unique combination of narrow linewidth, excellent beam quality and high output power.

Depending on the wavelength needed, choose from two BOOSTIK HP systems, the E15 or the Y10.

## Standard center wavelengths

The standard center wavelengths are 1550.12 nm for the E15 and 1064.00 nm for the Y10.

In case another wavelength is needed, we can supply a customized system with a center wavelength in the range from 1550-1570 nm for the E15 and 1050-1090 nm for the Y10.

## Choose from several output powers

Available output powers are 5, 10, and 15 W for the E15 and 2, 5, 10, and 15 W for the Y10 standard systems.

## Ideal for quantum optics

With its ultra-stable and narrow linewidth, the BOOSTIK HP laser system is ideal for applications such as quantum optics, computing and other phenomena like optical trapping, optical lattice, Bose-Einstein condensate, atom interferometer, and squeezing.

Other possible application areas are non-linear optics pump source (SHG, DFG, OPO) and laser-based metrology such as precision laser interferometry and spectroscopy.

Model	E15	Y10
Standard wavelengths	1550.12 nm	1064.00 nm
Other wavelengths	1550-1570 nm	1050-1090 nm
Output power	5, 10 or 15 W	2, 5, 10 or 15 W
PM fiber delivery	Yes <sup>1)</sup>	Yes
Fast modulation	Yes	Yes

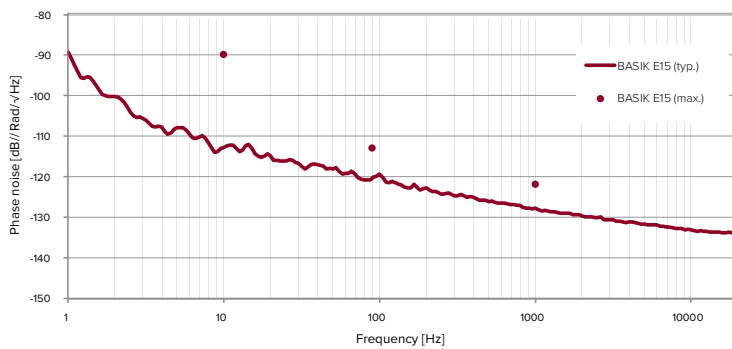
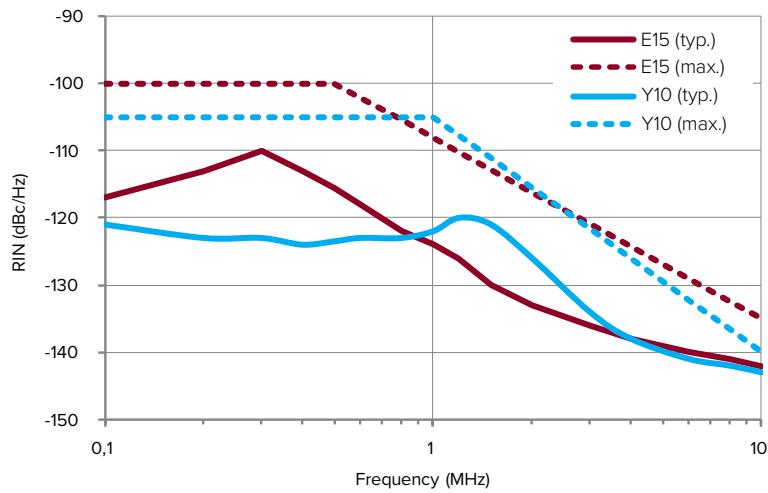
<sup>1)</sup> Available with non-PM output for 2W

# FEATURES

## Ultra-low frequency noise

The BOOSTIK HP systems offer an ultra-low phase noise as well as a low RIN.

The plots below compare RIN versus frequency and phase noise versus frequency.



## Features

- Up to 15 W output power
- Narrow linewidth
- Ultra-low phase noise
- Stable single-frequency operation
- High wavelength stability
- Excellent beam quality ideal for frequency conversion
- Unlimited center wavelength selection in the ranges 1050-1090 and 1540-1570 nm
- Up to 1000 pm coarse wavelength tuning
- Frequency locking via kHz frequency modulation
- Polarization-maintaining fiber output
- Optically isolated
- Plug and Play
- Industrial OEM packaging
- Robust and maintenance-free

# FEATURES

## Fast wavelength modulation

A key advantage of our distributed feedback fiber laser technology is the freedom to choose the operating wavelength.

The systems are equipped with easy and user-friendly fast wavelength modulation. This feature is typically used to lock the laser to an external, stable reference — such as an atomic transition line or interferometer — to obtain an even higher wavelength stability than provided by the free-running laser.

The standard center wavelengths are 1550.12 nm for the E15 and 1064.00 nm for the Y10. In case another wavelength is needed, we can supply a customized system with a center wavelength between 1550-1570 nm for the E15 and 1050-1090 nm for the Y10.

The laser offers a wide thermal tuning range, optionally combined with fast wavelength modulation e.g. for external stabilization.

## Thermal tuning

All Koheras fiber lasers are equipped with thermoelectric temperature controllers (TECs). The TECs stabilize the operation of the laser and makes it insensitive to environmental temperature fluctuations.

The TECs also make it possible to tune the center wavelength by changing the operating temperature of the laser. At standard room temperature (around 20-30°C or 68-86°F) the laser can be thermally tuned to an industry-leading 1000 pm.

## Polarization-maintaining fiber output

The standard output is polarization-maintaining fiber to ensure a fixed orientation of the polarization. This is a must if the laser output needs to be externally modulated or frequency-converted.

# OPTIONS

## Multi-channel integration

If several wavelengths are needed, the BOOSTIK HP can be coupled with our 16-channel ACOUSTIK integration rack. The ACOUSTIK provides power and control to all BOOSTIK modules for easy integration. Channels can be added and changed as needed.

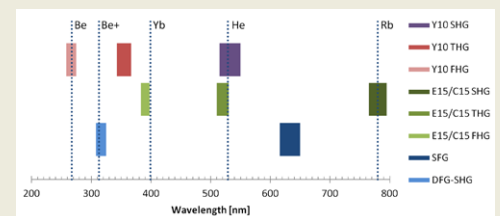
## Easy to control via a graphical user interface

For easy control, the BOOSTIK HP is available with an optional USB interface kit and can be controlled via our NKTP CONTROL graphical user interface.

## Full wavelength freedom

Choose the operating wavelength of the BOOSTIK HP system freely in the 1 or 1.5 μm range.

The excellent beam quality enables efficient frequency conversion, for instance with the Koheras HARMONIK frequency conversion module. Examples below.



## Options

- Center wavelengths in the 1550–1570 nm and 1050–1090 nm ranges
- Multi-channel integration
- Graphical user interface
- Optical monitor output

# SPECIFICATIONS

## Optical

Model	E15	Y10
Center wavelength [nm] <sup>1)</sup>	1550 - 1570	1050 - 1090
Laser emission	CW - inherently single frequency	CW - inherently single frequency
Beam quality	$M^2 < 1.1$	$M^2 < 1.1$ @ 2 W output $M^2 < 1.3$ @ $\geq 5$ W output
Output power [W] <sup>2)</sup>	5, 10 or 15	2, 5, 10 or 15
Output power regulation [%] <sup>3)</sup>	30 - 100	30 - 100
Linewidth [kHz]	< 1	< 20, optionally lower
Linewidth [kHz] <sup>4)</sup>	< 0.1	-
Phase noise [ $\mu$ rad/ $\sqrt{\text{Hz/m}}$ ]	< 2 @ 100 Hz 0.8 @ 1 kHz 0.4 @ 10 kHz	Not applicable
RIN peak [MHz]	Approximately 0.7	Approximately 1.5
RIN level [dBc/Hz] <sup>5)</sup>	< -100 @ peak < -135 @ 10 MHz	< -105 @ peak < -140 @ 10 MHz
Long term stability (RMS, 1h @ 25°C) [%]	< $\pm 2$ %	< $\pm 2$ %
Optical S/N (50 pm res.) [dB]	> 50 (depending on wavelength)	> 50 (depending on wavelength)
Polarization	Linear (PM)	Linear (PM)
Min. thermal wavelength tuning range [pm]	$\pm 350$	$\pm 240$
Total thermal wavelength tuning range [pm]	1000	700
Fast wavelength modulation range [GHz]	8	10
Fast wavelength modulation [kHz]	Up to 20	Up to 20
Optical monitor output (from seed)	FC/APC	FC/APC
Output fiber termination	Collimator	FC/APC / collimator @ 2 W output Collimator @ $\geq 5$ W output
Typical beam diameter @ $1/e^2$	$\approx 2$ mm	FC/APC / Collimator < 2.2 mm < 1 mm @ $\geq 5$ W output
Output isolation [dB]	> 35	> 30

1) The center wavelength is selectable within the specified range. For options outside the range, please ask.

2) Depends on the center wavelength.

3) The range can be larger depending on the center wavelength and output power.

4) Lorentzian

5) Shot-noise limited > 5 MHz

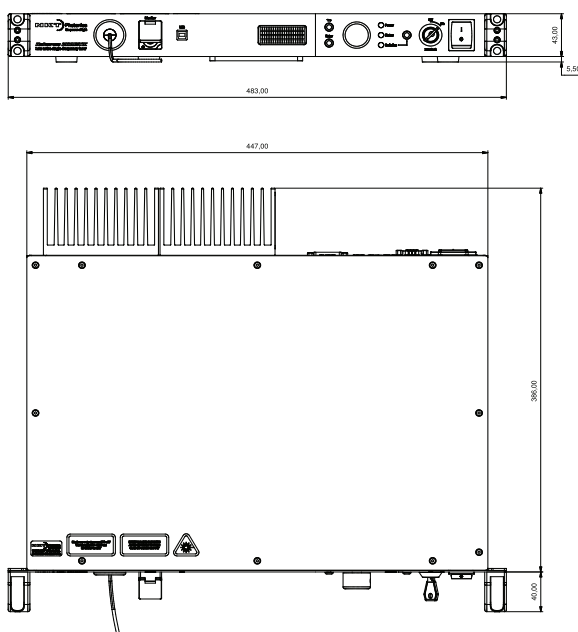
6) After a 10-20 minute warm-up

# SPECIFICATIONS

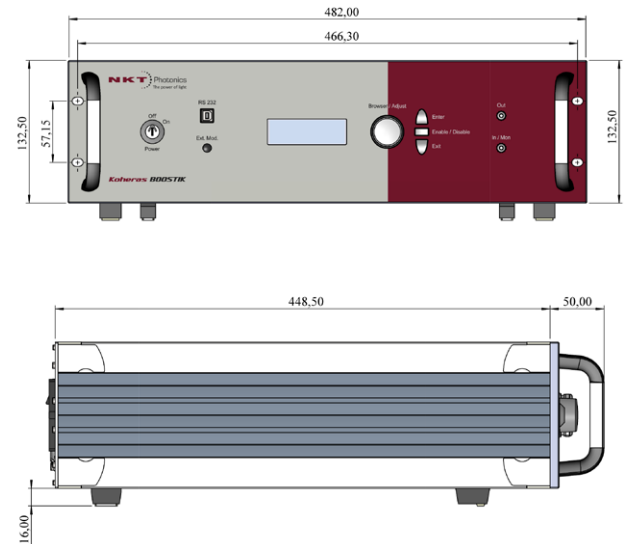
## Mechanical/Electrical/Environmental

Seeder	
Power supply requirements [VAC, Hz]	100-240 VAC, 50-60 Hz
Digital interface	USB 2.0, Ethernet 10/100
Frequency modulation	DB9 (male), differential 2x5 V
Fiber output type	Standard: FC/APC pigtail, appr. 1 m
Monitor output	Yes, FC/APC bulkhead
Dimensions (WxHxL) [mm <sup>3</sup> ]	447 x 48.5 x 386 (19" 1U)
Weight [kg]	6
Amplifier	
Power supply requirements [VAC, Hz]	90-240 VAC, 50-60 Hz
Fiber pigtail length [m]	> 1
Connectors	FC/APC or collimated
Operation temperature [°C]	15 – 35
Storage temperature [°C]	0 – 50
Dimensions (WxHxL) [mm <sup>3</sup> ]	482 x 132.5 x 448.5 (19" 3U)
Weight [kg]	< 13

## Seeder



## Amplifier



## Reliability

The Koheras range of single frequency fiber lasers is based on telecom-grade fiber components and built to last thousands of hours with no service or maintenance.

With several thousand lasers installed in environments varying from fully climate controlled national standards laboratories to the demanding environment on oil rigs and submarines, the Koheras line is the most robust single-frequency laser range on the market with an unmatched reliability track record.

All Koheras products are produced under our quality management system certified in accordance with the ISO 9001:2015 standard.

