KOHERAS BOOSTIK HP

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

SINGLE FREQUENCY, LOW NOISE

Ideal for quantum applications

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

The turn-key 19″ rack system includes control electronics and power supply and is an ideal laser for experimental research within quantum computing, metrology, and sensing. This new generation features high optical isolation and fast shutdown on reflection, improving its robustness against disturbing back-reflections.

Applications

- Quantum computing
- Quantum metrology and sensing
- Fundamental physics research
- Time and frequency standards
- Atomic trapping and cooling
- Laser interferometry

KOHERAS BOOSTIK HP

The Koheras BOOSTIK HP comes with improved amplitude stability and intensity noise, and the low-noise drive electronics are designed to preserve the unique low-noise characteristics of Koheras seed laser technology.

The collimated output provides superior beam quality and ensures high pointing stability. The mechanical collimator interface is designed for plug-and-play with the Koheras HARMONIK frequency-converted systems without the need for individual module alignment.

The Koheras BOOSTIK HP system is controlled by our well-proven and user-friendly NKTP CONTROL software interface, making this system very easy and seamless to operate.

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, the Koheras BOOSTIK HP system is available with the unique low-noise Koheras seeder technology E15, X15, and Y10. Available output powers are 10 and 15 W for all wavelength ranges.

Standard center wavelengths

The standard center wavelengths are 1550.12 nm for the E15/X15 and 1064.00 nm for the Y10. If another wavelength is needed, we can supply a customized system with a center wavelength ranging from 1545-1565 nm for the E15/X15 and 1050-1075 nm for the Y10.

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 interferometry, 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	1545-1565 nm	1050-1075 nm
Output power	10 or 15 W	10 or 15 W
PM fiber delivery	Yes	Yes
Fast modulation	Yes	Yes

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.

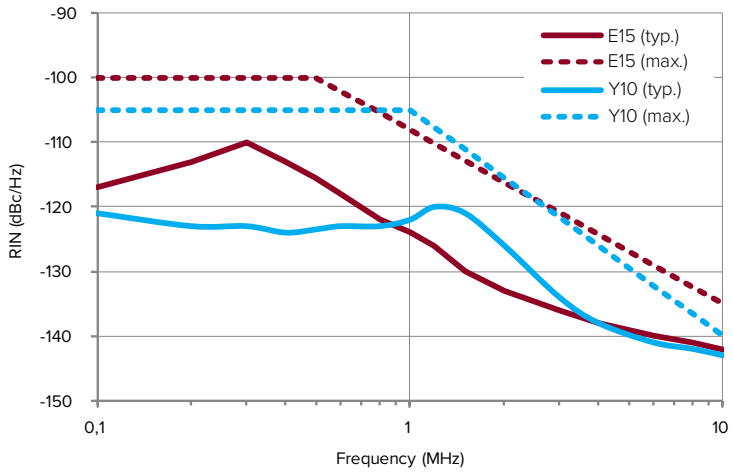
With several thousand lasers installed in environments varying from fully climate controlled national standards laboratories to the demanding environment on oil rigs and submarines, the Koheras line is the most robust single-frequency laser range on the market with an unmatched reliability track record.

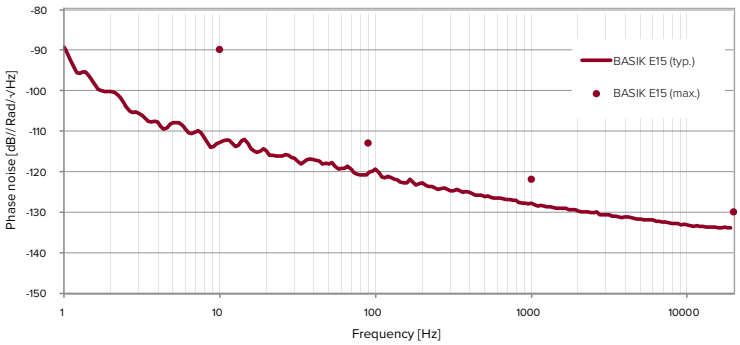
FEATURES

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 1050-1075 and 1545-1565 nm
- Up to 1000 pm coarse wavelength tuning
- Frequency locking via kHz frequency modulation
- Polarization-maintaining fiber output
- Optically isolated
- Plug-and-Play
- Industrial design
- 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 laser offers a wide thermal tuning range, combined with fast wavelength modulation e.g. for external stabilization.

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.

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.

Easy to control via a graphical user interface

For easy control, the BOOSTIK HP can be controlled via our NKTP CONTROL graphical user interface.

Multi-channel integration

The BOOSTIK HP amplifier can optionally be operated with our ACOUSTIK multi-channel system with BASIK seed lasers installed.

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.

Software — NKT Photonics CONTROL

Like other NKT Photonics lasers, the Koheras BOOSTIK HP can be controlled by our intuitive CONTROL software that gives easy access to all laser functions.

The software automatically detects all units attached to the computer. You can control the source and any filtering accessories from CONTROL. It is easy to use and supports touch input as well as traditional mouse+keybord control.

SPECIFICATIONS

Optical

Model	E15	Y10
Center wavelength [nm] [1]	1545 - 1565	1050 - 1075
Laser emission	CW - inherently single frequency	CW - inherently single frequency
Beam quality	$M^2 < 1.1$	$M^2 < 1.3$ @ ≥ 5 W output
Output power [W] [2]	10 or 15	10 or 15
Output power regulation [%] [3]	30 - 100	30 - 100
Linewidth [kHz]	< 1	< 20, optionally lower
Linewidth [kHz] [4]	< 0.1	-
Phase noise [µrad/√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]	< -100 @ peak < -135 @ 10 MHz	< -105 @ peak < -140 @ 10 MHz
Long term stability (RMS, 1h @ 25°C) [%] [5]	< 1 %	< 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]	± 350	± 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	Collimator
Typical beam diameter @ $1/e^2$	≈2 mm	< 1.3 mm
Output isolation [dB]	> 25	> 25
PER (min/typical) [dB]	17/20	17/20

1) The center wavelength is selectable within the specified range. For options outside the range, please contact us.
2) Depends on the center wavelength.
3) The range can be larger depending on the center wavelength and output power.
4) Lorentzian.
5) After a 30-60-minute warm up, ambient around 18-25 degrees (APC mode).

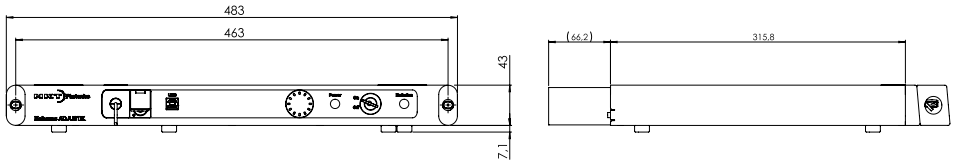
SPECIFICATIONS

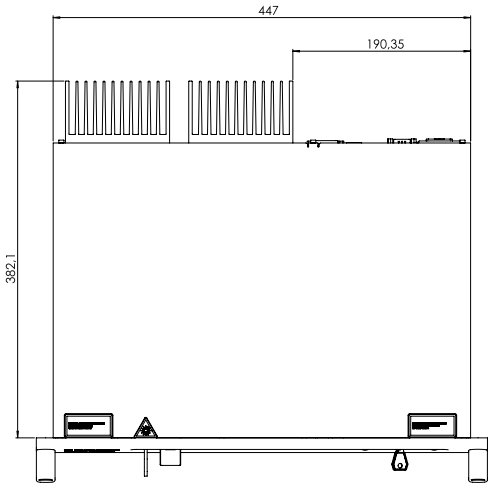
Mechanical/Electrical/Environmental

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]	483 x 50.1 x 382.1 (19” 1U)
Weight [kg]	6
Amplifier	
Power supply requirements [VAC, Hz]	90-240 VAC, 47-63 Hz
Fiber pigtail length [m]	1.5
Connectors	Collimated
Operation temperature [°C]	15 – 35
Storage temperature [°C]	-20 – 65
Dimensions (WxHxL) [mm^3]	483 x 130.5 x 526 (19” 3U)
Weight [kg]	< 15

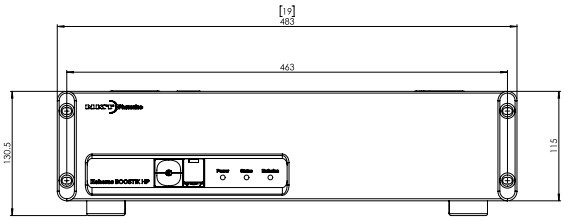
MECHANICAL DRAWINGS

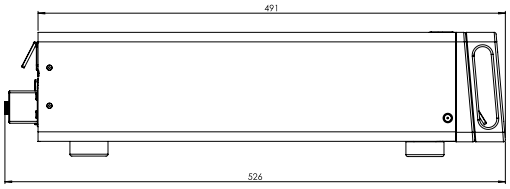
Seeder

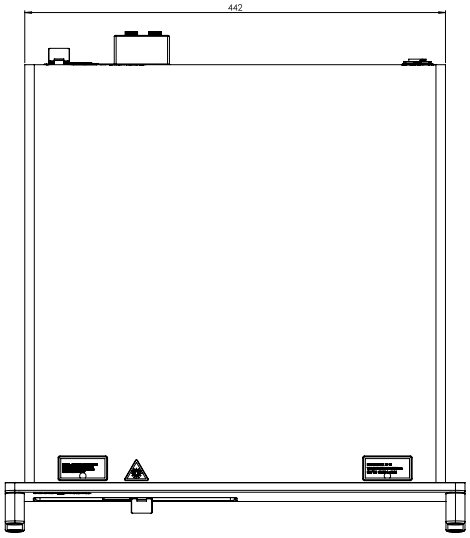




Amplifier







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

FORCE Certification
Systemcertificering
DS/EN ISO 9001 - Kvalitet