

# Koheras BASIK

Ultra-low phase noise OEM fiber laser



# Industrial robustness

## Ideal for coherent sensor applications

The Koheras BASIK is an industrial fiber laser featuring the ultra-low phase noise and narrow linewidth normally only found in costly scientific systems.

The fiber laser is very robust and can be easily integrated into multi-channel systems, such as our Koheras ACOUSTIK.



# Koheras BASIK

## Applications

- Metrology
- Atomic physics
- Seismic sensing
- Laser vibrometry
- Quantum physics
- Wind LIDAR systems
- Sensor interferometry
- Frequency conversion
- Coherent communication
- Motion and intrusion detection

# Features and Benefits

High performance and low cost

The Koheras BASIK is an industrial fiber laser that gives you the best of two worlds:

The ultra-low phase noise and narrow linewidth from the scientific systems and the low cost and robustness from the industrial systems.

Tunable center wavelength and output power

The center wavelength can be chosen freely in the 1535-1580 nm range for the X15 and E15 models or the 1030-1120 nm range for the Y10 model. Depending on the model, the output power is in the range of 5-40 mW.

Ideal for coherent sensor applications

The BASIK laser is ideal for coherent sensor applications like security and asset monitoring and other applications e.g. within metrology that require very low noise, high wavelength stability and ultra-stable single-frequency operation, free of mode hops.

Compact modules for OEM integration

This range of lasers are packaged as compact modules made especially with industrial OEM integration in mind.

Model	Standard wavelength	Optional wavelengths	Output power	Polarization-maintaining output	Fast modulation
X15	1550.12 nm	1535 - 1580 nm	30 mW <sup>1</sup>	Yes	Yes
E15	1550.12 nm	1535 - 1580 nm	40 mW <sup>1</sup>	Optional	Optional
Y10	1064.00 nm	1030 - 1120 nm	> 10 mW <sup>2</sup>	Yes	Yes

1. Adjustable output power

2. For reduced linewidth models with wavelength > 1090 nm, only > 5 mW is guaranteed

# Features and Benefits

## Fast wavelength modulation and thermal tuning

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

Standard systems are available at 1550.12 nm and 1064.00 nm and we offer special systems anywhere in the 1535 – 1580 nm range and 1030 – 1120 nm range.

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

## The market’s lowest frequency noise

The BASIK laser features a very low frequency noise, unparalleled in industrial OEM laser modules.

The robust, single-frequency operation and low noise make the BASIK lasers a strong choice for coherent sensing applications where ultra-low frequency noise is a key laser parameter for the sensitivity and accuracy of a sensing system.

The graphs on the following pages compare frequency and phase noise of the laser models X15 and E15, and Y10. They represent typical measurements while the dots indicate the guaranteed maximum values.



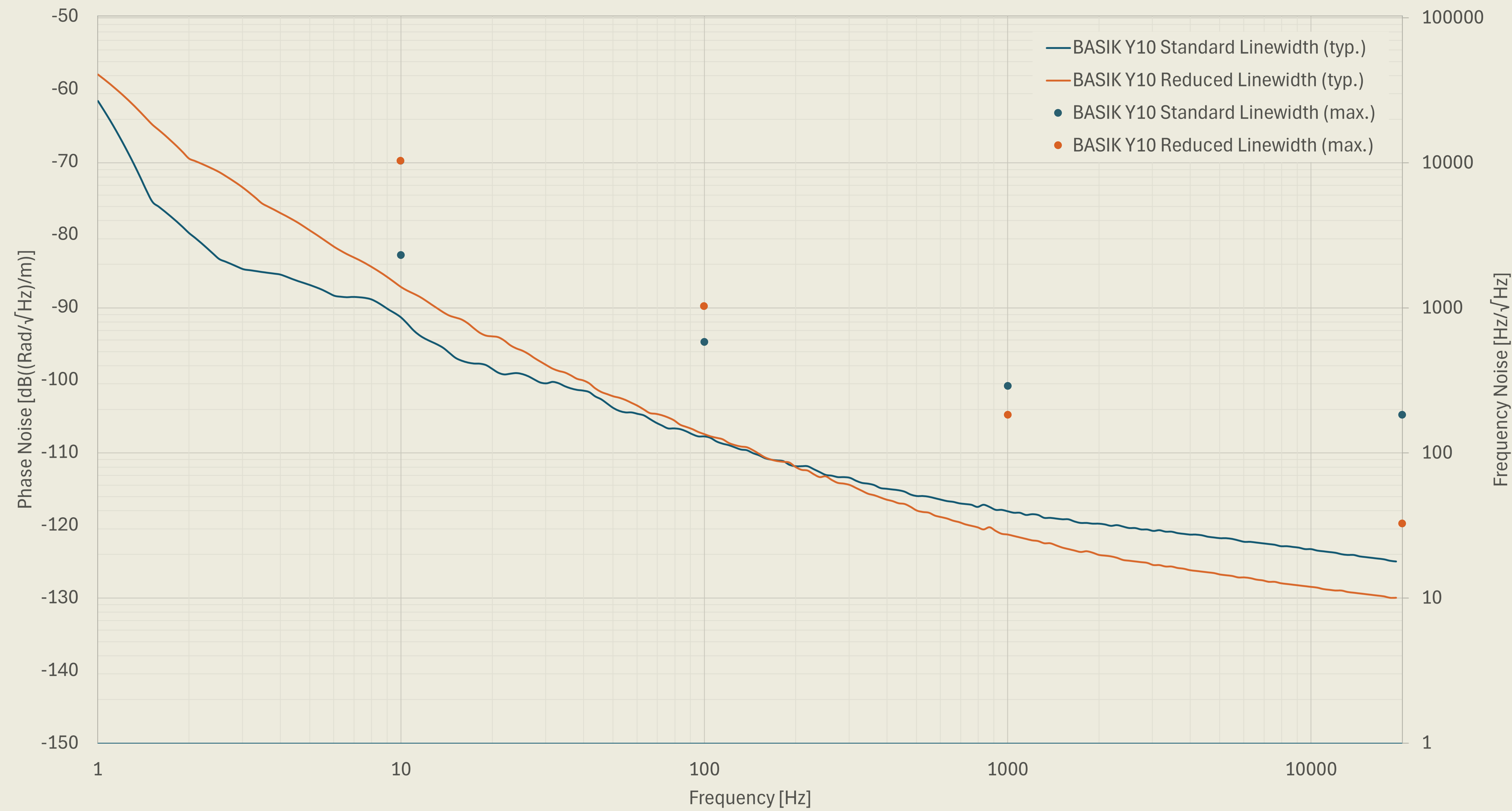
# Koheras BASIK

## Features

- Narrow linewidth
- Ultra-low phase noise
- Stable single-frequency operation
- High wavelength stability
- Plug and Play
- Industrial OEM pagkaging
- Robust and maintenance-free
- Multi-channel system or stand-alone

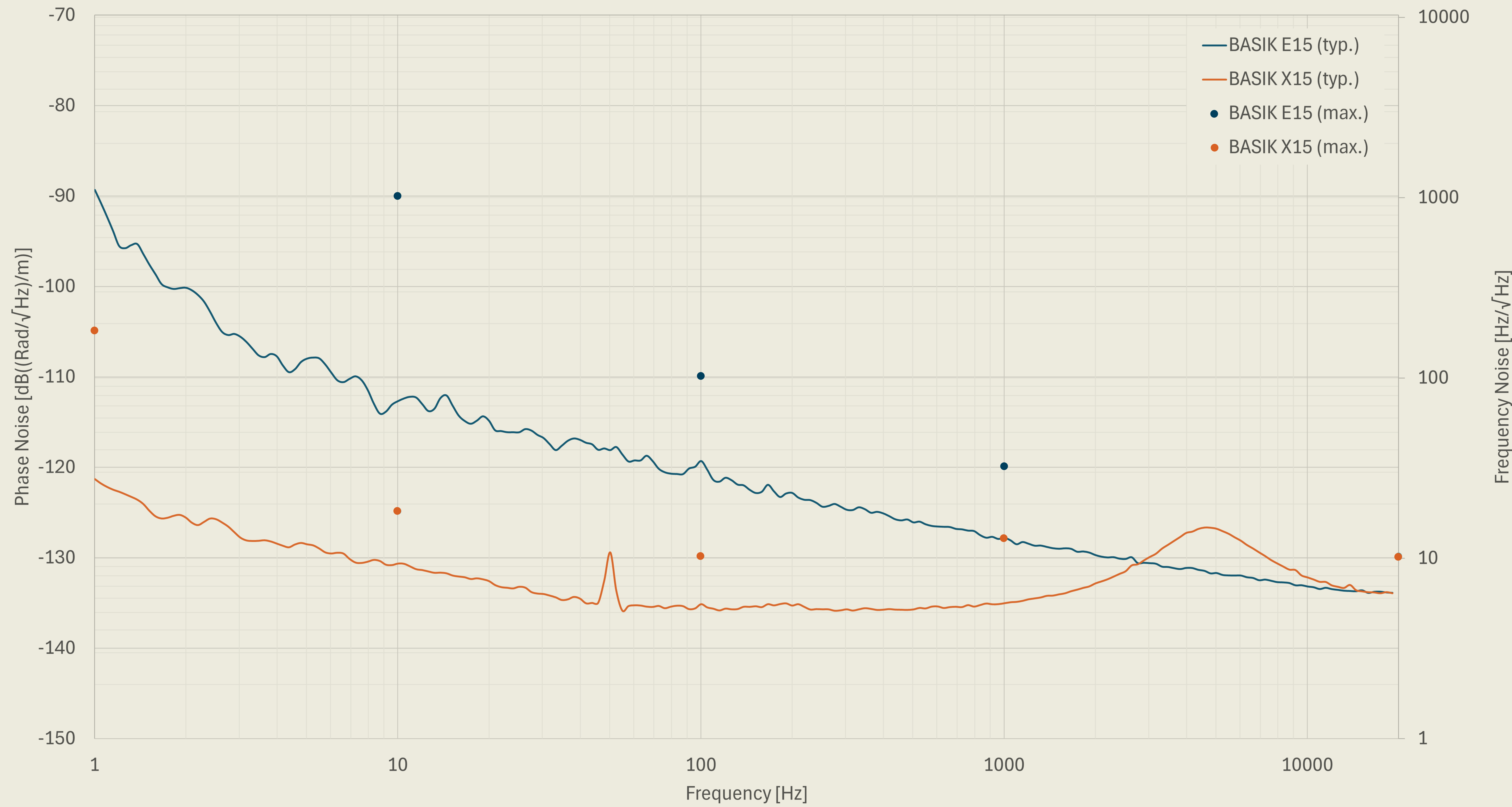
# Low frequency noise

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# Low frequency noise

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# Options

## Fast wavelength modulation

The BASIK module can be supplied with easy and user-friendly fast wavelength modulation in order to lock the laser to an external stable reference and get an even higher wavelength stability than provided by the free-running laser.

## Multi-channel integration

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

## Polarization-maintaining fiber output

The standard output is single mode fiber for the BASIK E15. However, we optionally offer a polarization maintaining output to ensure a fixed orientation of the polarization. This may be required in case the laser output needs to be externally modulated or frequency converted. The BASIK X15 and Y10 come with polarization maintaining output as default.

## Easy to control via a graphical user interface

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

Center wavelengths in the 1535–1580nm and 1030–1120 nm ranges

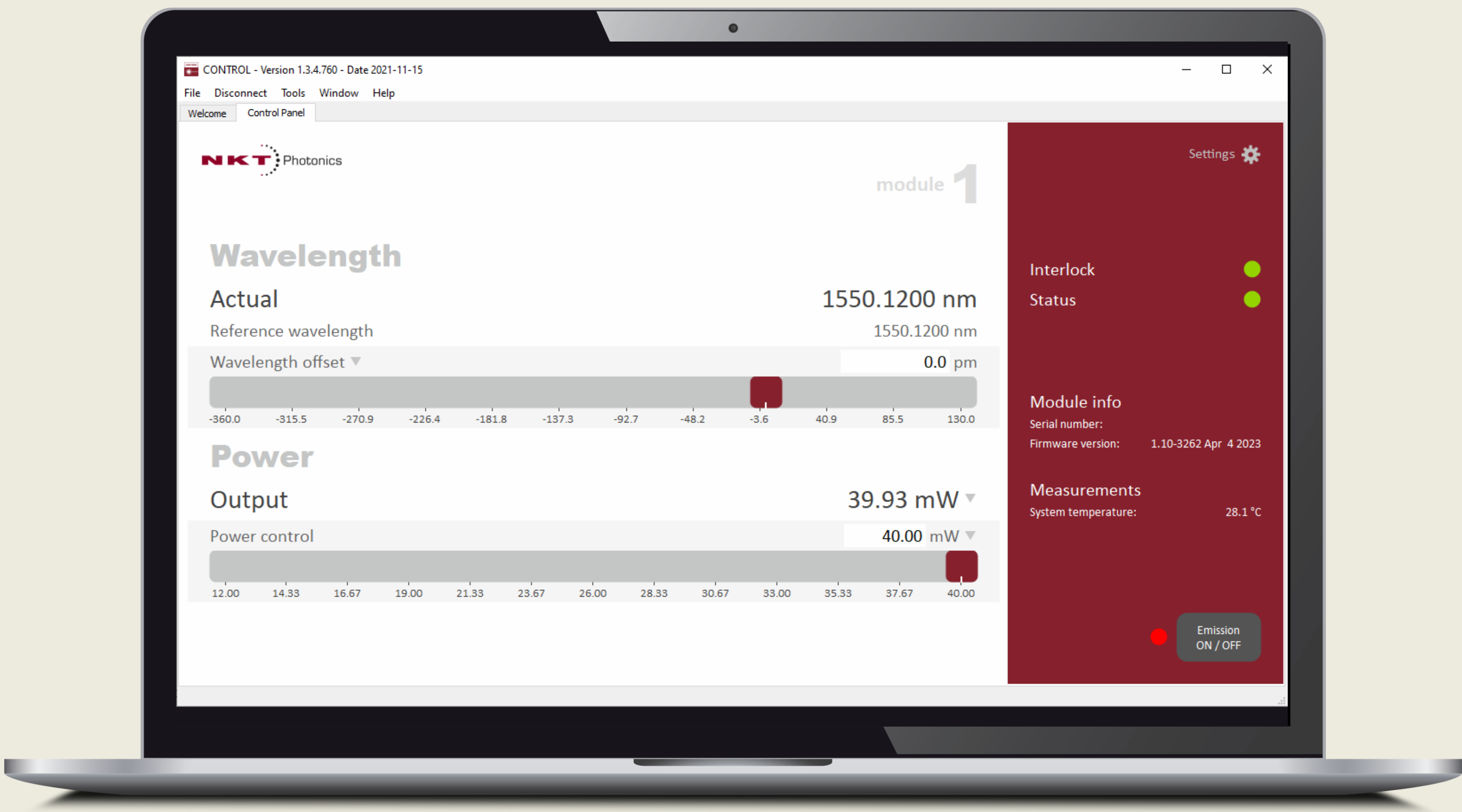
Fast wavelength modulation

Multi-channel integration

Polarization-maintaning fiber output

Graphical user interface

Optical monitor output



# Koheras BASIK

## NKT Photonics CONTROL

Like other NKT Photonics lasers, the Koheras BASIK 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. It is easy to use and supports touch input as well as traditional mouse and keyboard control.

# Specifications

## Optical

Model	X15	E15	Y10	
Laser emission	For all 3 models: Continuous wave - inherently single frequency			
Beam quality	M² < 1.05	M² < 1.05	M² < 1.05	
RIN peak [MHz]	Appr. 0.7	Appr. 0.7	Appr. 1.8	
Linewidth [kHz] ¹	< 0.1	< 0.1	Standard Linewidth	Reduced Linewidth
			< 20	< 3
Max. phase noise [dB((rad/√Hz)/m)]	-105 @ 1 Hz	-	-	-
	-125 @ 10 Hz	-90 @ 10 Hz	-83 @ 10 Hz	-70 @ 10 Hz
	-130 @ 100 Hz	-110 @ 100 Hz	-95 @ 100 Hz	-90 @ 100 Hz
	-128 @ 1 kHz	-120 @ 1 kHz	-101 @ 1 kHz	-105 @ 1 kHz
	-130 @ 20 kHz	-130 @ 20 kHz	-105 @ 20 kHz	-120 @ 20 kHz
Max. frequency noise [Hz/√Hz]	182.8 @ 1 Hz	-	-	-
	18.3 @ 10 Hz	1027.7 @ 10 Hz	2300 @ 10 Hz	10277.4 @ 10 Hz
	10.3 @ 100 Hz	102.8 @ 100 Hz	577.9 @ 100 Hz	1027.7 @ 100 Hz
	12.9 @ 1 kHz	32.5 @ 1 kHz	289.7 @ 1 kHz	182.8 @ 1 kHz
	10.3 @ 20 kHz	10.3 @ 20 kHz	182.8 @ 20 kHz	32.5 @ 20 kHz

# Koheras BASIK

## Service and warranty extensions

The Koheras warranty and service package ensures trouble free operation of your Koheras laser. The Standard Package gives you a two year warranty extension plus remote diagnostics of key laser parameters through a remote connection to the system.

Our Premium Package adds a guarantee that we always stock a laser with your specifications - ready to ship - should you need it.

# Specifications (continued)

## Optical

Model	X15	E15	Y10
Output power [mW]	30	40	> 10 <sup>2</sup>
Operating wavelength [nm]	1535-1580	1535-1580	1030-1120
Output power tunability [%]	30 - 100	30 - 100	-
RIN level [dBc/Hz]	< -100 @ peak	< -100 @ peak	< -105 @ peak
	< -135 @ 10 MHz	< -135 @ 10 MHz	< -140 @ 10 MHz
Optical S/N (50 pm res.) [dB]	> 50 (typ. > 55) <sup>3</sup>	> 50 (typ. > 55) <sup>3</sup>	> 65 (typ. > 70)
Min. thermal wavelength tuning range [pm] <sup>4</sup>	± 125	± 350	± 240
Total thermal wavelength tuning range [pm]	350	1000	680
Fast wavelength modulation range [GHz] <sup>5</sup>	0.5	8	10
Fast wavelength modulation [kHz] <sup>5</sup>	Up to 20	Up to 20	Up to 20
PM output - PER [dB] <sup>5</sup>	> 23 dB	> 23 dB	> 23 dB
Monitor optical output	Optical	Optical	Optical

1. Lorentzian.

2. For reduced linewidth models with wavelength > 1090 nm, only > 5 mW is guaranteed.

3. > 47 dB (typ. > 52 dB) for non-PM version.

4. Relative to center wavelength at room temperature. If the laser case temperature is outside the interval of approximately 10-50 °C, the range of detuning from the center wavelength may be reduced.

5. Default for X15 and Y10.

# Specifications

## Electrical/Mechanical/Environmental

Power supply requirements [VDC]	12
Power consumption [W]	Typical 4, max. 10
Electrical interface	30 pin DIN41612 male
Fast modulation drive voltage [V]	Differential 2x5 with common-mode voltage at 2.5
Connectors	Standard: FC/APC pigtail
	Optional: Bulkhead/pigtail FC/APC
Monitor output	Optional
Operation temperature [°C] <sup>1</sup>	15 – 60
Dimensions (WxHxL) [mm <sup>3</sup> ]	111 x 22.5 x 220
Weight [kg]	0.6

1. Module temperature. For other temperature options, please contact us.

# Koheras BASIK

## Reliability

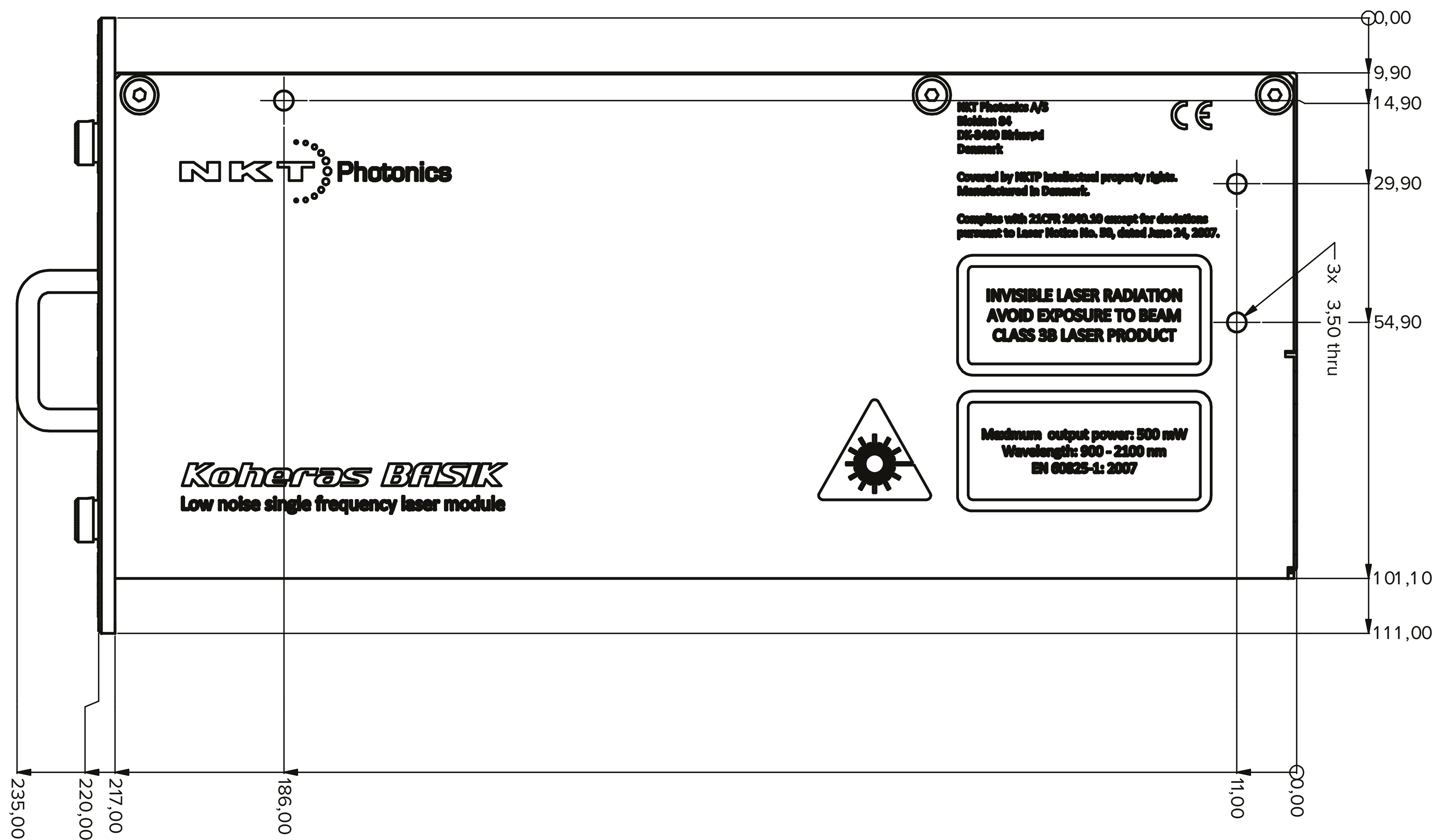
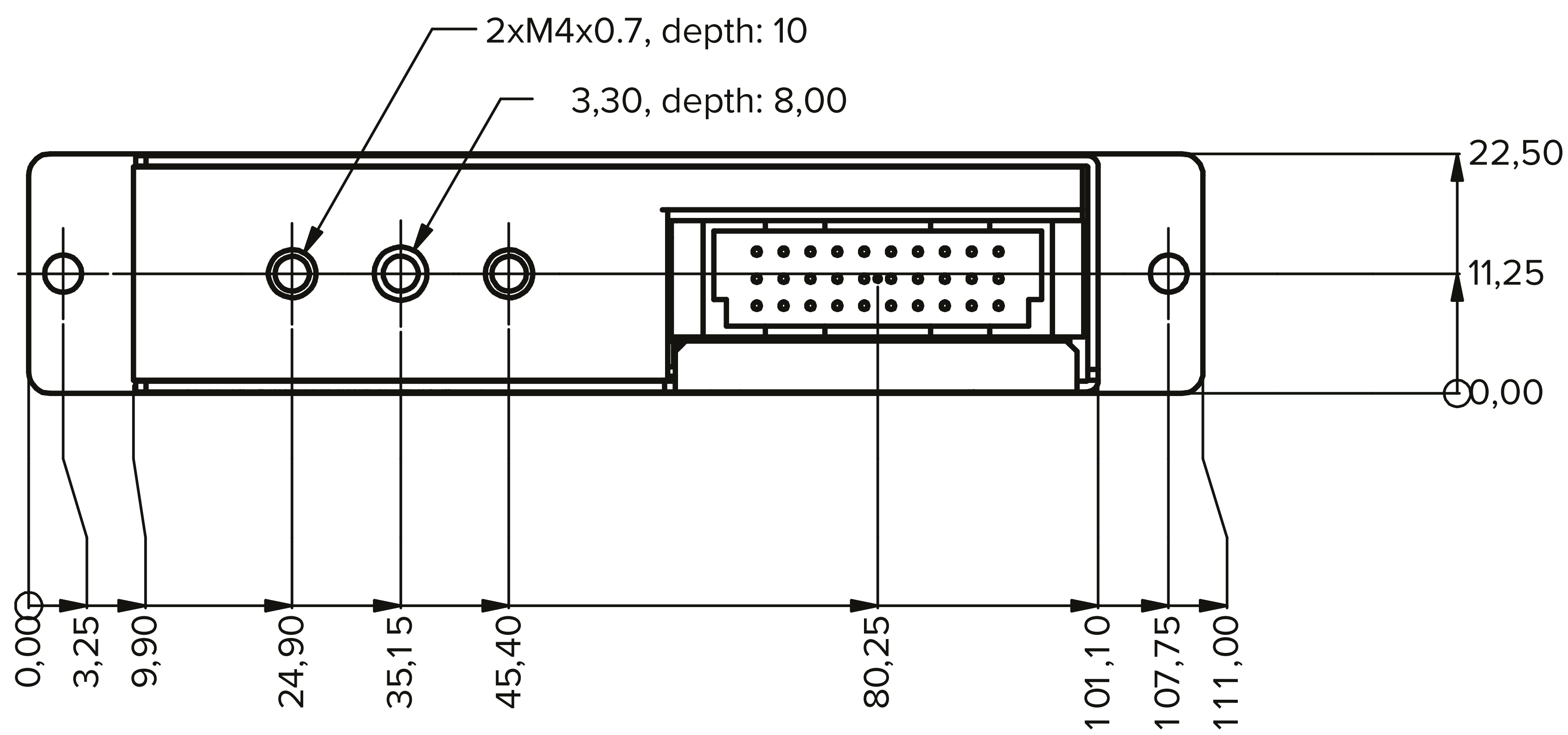
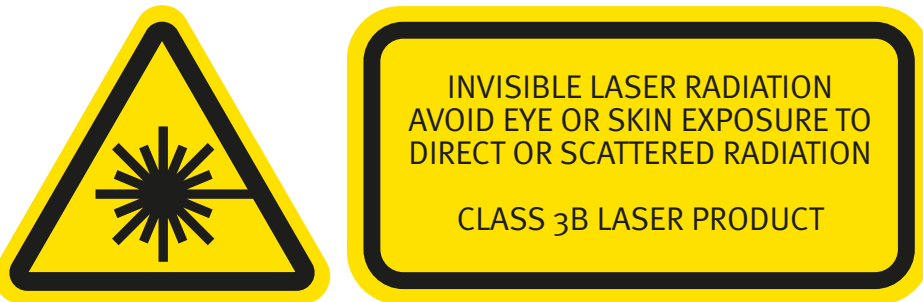
The Koheras range of single frequency fiber lasers is based on telecom-grade fiber components and built to last thousands of hours with no service or maintenance.

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.

# Technical Drawings

# Koheras BASIK

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



# SOLUTIONS FOR INNOVATORS