

# Koheras ADJUSTIK

Low-noise, single-frequency fiber laser



## NARROW LINEWIDTH

### Ideal for ultra-low noise applications

The Koheras ADJUSTIK is a low-noise fiber laser platform featuring the ultra-low phase noise and narrow linewidth normally only found in costly scientific systems.

The ADJUSTIK is based on our renowned BASIK modules with output powers ranging from 10 mW up to 2 W depending on the model.

## Applications

- Atomic trapping and cooling
- Quantum computing
- Quantum metrology
- Acoustic detection
- Laser vibrometry
- Microwave generation
- Sensor interferometry
- Frequency conversion
- Coherent communication

# KOHERAS ADJUSTIK

## High performance and low cost

The ADJUSTIK lasers are industrial-grade fiber lasers that gives you the best of two worlds: The ultra-low phase noise and narrow linewidth of the scientific systems and the low cost and robustness of the industrial systems.

## Tunable center wavelength and output power

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

## Standard systems deliver 10-40 mW

Standard systems are available at 1550.12 nm and 1064.00 nm and we offer special systems anywhere in the 1535–1580 nm and 1030–1120 nm ranges. Depending on the model, output powers are 10-40 mW.

## Choose the high power option

If higher powers are needed, choose the ADJUSTIK HP which operates at 1550.12 nm or 1064.0 nm. It delivers output powers of 2 W in the 1545–1565 nm range, 200 mW in the 1060–1075 nm range, and 500 mW at 1762.17 nm.

## Thermal tuning and fast wavelength modulation

The laser offers a wide thermal tuning range combined with fast wavelength modulation for e.g. stabilization to an external frequency reference to obtain an even higher level of frequency stability than provided by the free-running laser.

## Polarization-maintaining fiber output

The standard output is a polarization maintaining fiber to ensure a fixed orientation of the polarization.

## Ideal for low-noise applications

The ADJUSTIK lasers are ideal for experimental work for all kinds of low noise applications e.g. for metrology and coherent sensing where laser noise is critical.

## Features

- Center wavelengths in the 1535–1580 nm, 1030–1120 nm ranges, and at 1762.17 nm
- High-power: Up to 2 W
- Industry-leading low phase noise
- Extremely narrow linewidth
- Stable single-frequency operation
- Wide thermal wavelength tuning
- Integrated fast wavelength modulation
- Polarization-maintaining fiber output
- Easy-to-use benchtop system
- Graphical user interface
- Plug and Play
- Robust and maintenance-free

# FEATURES

## Easy to control via a graphical user interface

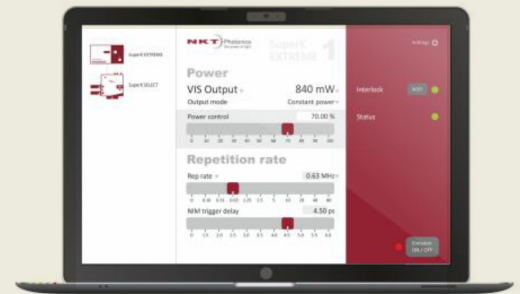
For easy control, the ADJUSTIK lasers are available with a USB interface kit and can be controlled via our NKTP CONTROL graphical user interface.

## The market's lowest frequency noise

The ADJUSTIK lasers features a very low frequency noise, unparalleled in industrial fiber lasers.

The low noise and robust single-frequency operation makes the ADJUSTIK lasers a strong choice for coherent sensing, as well as for metrology applications.

In sensing systems, the low frequency noise is key to obtaining high sensitivity and accuracy.

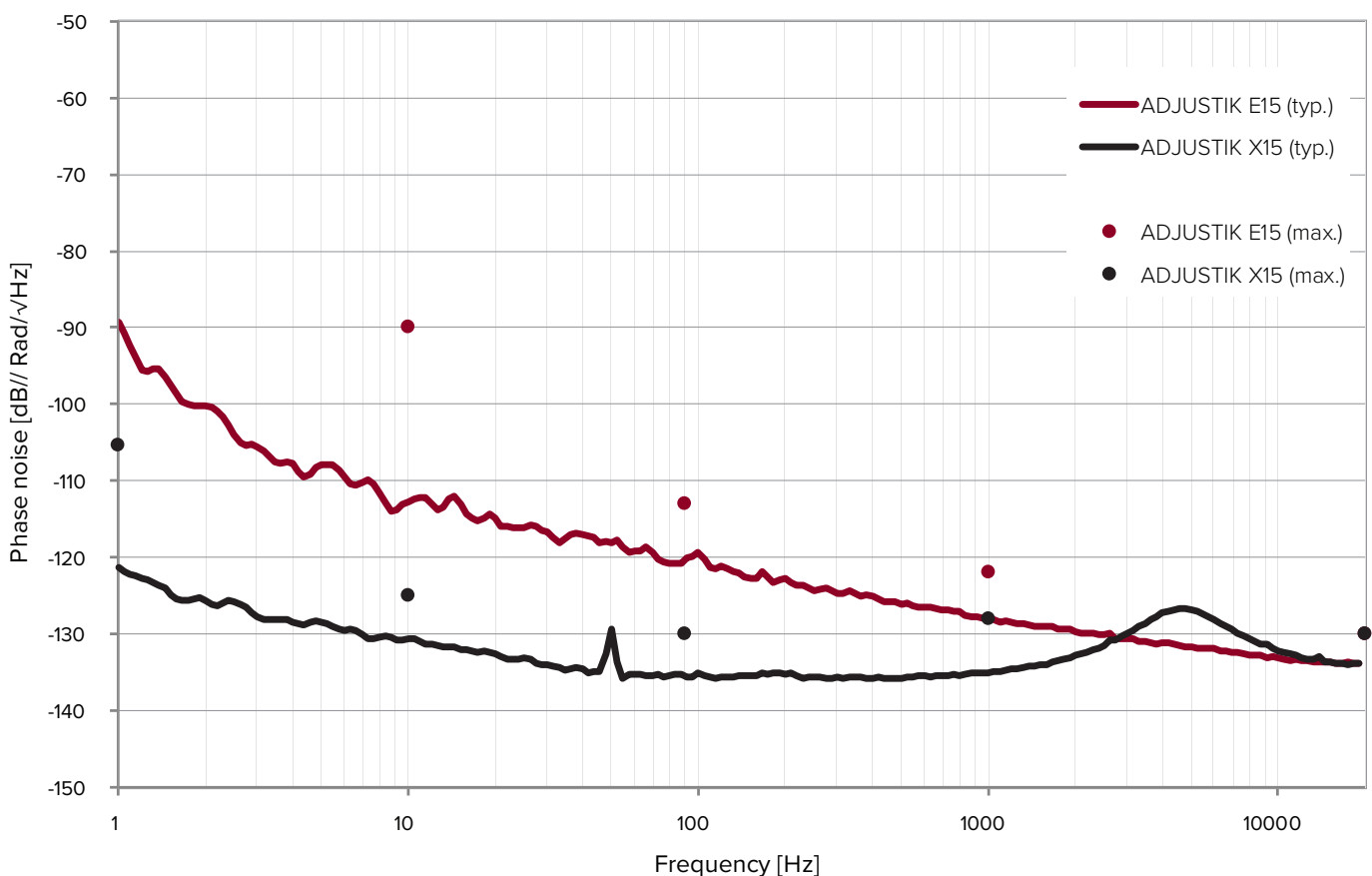


## Software — NKT Photonics CONTROL

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

The software automatically detects all units attached to the computer. You can control several lasers simultaneously. It is easy to use and supports touch input as well as traditional mouse+keyboard control.

## Typical phase noise



# SPECIFICATIONS - ADJUSTIK

## Optical

| Model   | X15   | E15              | Y10              |
|---|---|------------------|------------------|
| Laser emission  | Continuous wave - inherently single frequency |                  |                  |
| Output power [mW]                                       | 22.5  | 40               | > 10             |
| Operating wavelength [nm]                               | 1535-1580                                     | 1535-1580        | 1030-1120        |
| Output power tuneability [%]                            | 1-100   | 30-100           | -                |
| Linewidth [kHz] <sup>1)</sup>                           | < 0.1   | < 0.1            | < 20             |
| Max. phase noise [dB((rad/√Hz)/m)]                      | -105 @ 1 Hz (typ.)                            | -                | -                |
|   | -125 @ 10 Hz                                  | -90 @ 10 Hz      | -                |
|   | -130 @ 100 Hz                                 | -110 @ 100 Hz    | -                |
|   | -128 @ 1 kHz                                  | -130 @ 20 kHz    | -                |
| Max. phase noise [(μrad/√Hz)/m]                         | 5.6 @ 1 Hz (typ.)                             | -                | -                |
|   | 0.6 @ 10 Hz                                   | 32 @ 10 Hz       | -                |
|   | 0.3 @ 100 Hz                                  | 3.2 @ 100 Hz     | -                |
|   | 0.4 @ 1 kHz                                   | 0.3 @ 20 kHz     | -                |
| RIN peak [MHz]  | Appr. 0.7                                     | Appr. 0.7        | Appr. 1.5        |
| 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)                              | > 50 (typ. > 55) | > 65 (typ. > 70) |
| Min. thermal wavelength tuning range [pm] <sup>2)</sup> | ± 350   | ± 350            | ± 240            |
| Total thermal tuning range [pm]                         | 1000  | 1000             | 680              |
| Fast wavelength modulation range [GHz] <sup>3)</sup>    | 0.5   | 8                | 10               |
| Fast wavelength modulation [kHz] <sup>3)</sup>          | Up to 20                                      | Up to 20         | Up to 20         |
| PM output - PER [dB]                                    | > 23  | > 23             | > 23             |

1) Lorenzian.

2) 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.

3) Modulation depth and frequency are typically slew-rate limited, depending on the power.



# SPECIFICATIONS - ADJUSTIK HP

## Optical

| Model   | X15 <sup>1)</sup>   | E15  | Y10                              | T20  |
|---|---|--|----------------------------------|--|
| Laser emission  | Continuous wave - inherently single frequency                       |  |                                  |  |
| Output power [W]  | 2.0 / 0.2   | 2.0 / 0.2  | 0.2                              | 0.5  |
| Operating wavelength [nm]                               | 1545 – 1565   | 1545 – 1565  | 1060 – 1075                      | 1762.17  |
| Output power tuneability [%]                            | 10 – 100  | 10 – 100   | 10 – 100                         | 10 – 100   |
| Linewidth [kHz] <sup>2)</sup>                           | < 0.1   | < 0.1  | < 20                             | < 10   |
| Max. phase noise [dB((rad/√Hz)/m)]                      | -105 @ 1 Hz (typ.)<br>-125 @ 10 Hz<br>-130 @ 100 Hz<br>-128 @ 1 kHz | -<br>-90 @ 10 Hz<br>-110 @ 100 Hz<br>-130 @ 20 kHz | -<br>-<br>-<br>-                 | -<br>-80 @ 10 Hz<br>-100 @ 100 Hz<br>-120 @ 20 kHz |
| Max. phase noise [(μrad/√Hz)/m]                         | 5.6 @ 1 Hz (typ.)<br>0.6 @ 10 Hz<br>0.3 @ 100 Hz<br>0.4 @ 1 kHz     | -<br>32 @ 10 Hz<br>3.2 @ 100 Hz<br>0.3 @ 20 kHz    | -<br>-<br>-<br>-                 | -<br>100 @ 10 Hz<br>10 @ 100 Hz<br>1 @ 20 Hz       |
| RIN peak [MHz]  | Appr. 0.7   | Appr. 0.7  | Appr. 1.5                        | Appr. 0.7  |
| RIN level [dBc/Hz]                                      | < -100 @ peak<br>< -135 @ 10 MHz                                    | < -100 @ peak<br>< -135 @ 10 MHz                   | < -105 @ peak<br>< -140 @ 10 MHz | < -80 @ peak<br>< -120 @ 10 MHz                    |
| Optical S/N (50 pm res.) [dB]                           | > 45  | > 45   | > 60                             | > 45   |
| Min. thermal wavelength tuning range [pm] <sup>3)</sup> | ± 350   | ± 350  | ± 240                            | ± 350  |
| Total thermal tuning range [pm]                         | 1000  | 1000   | 680                              | ~900 (TDB)   |
| Fast wavelength modulation range [GHz] <sup>4)</sup>    | 0.5   | 8  | 10                               | 6  |
| Fast wavelength modulation [kHz] <sup>4)</sup>          | Up to 20  | Up to 20   | Up to 20                         | Up to 20   |
| PM output - PER [dB]                                    | > 20  | > 20   | > 17                             | > 17   |
| Control mode  | Constant pump current, constant power                               |  |                                  |  |

1) X15 phase noise app. 20 dB lower in the 1 Hz-10 kHz frequency range compared to E15.

2) Lorentzian.

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

4) Modulation depth and frequency are typically slew-rate limited, depending on the power.

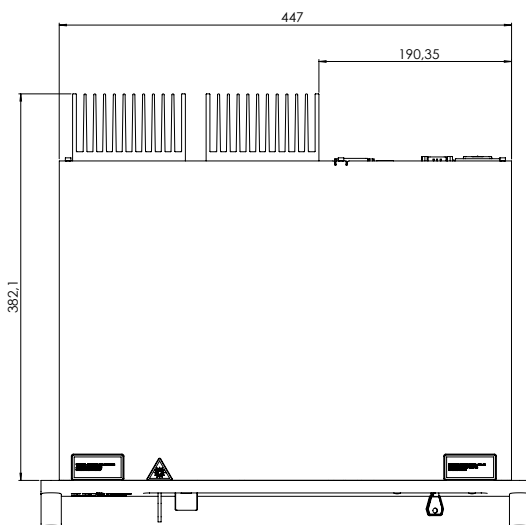
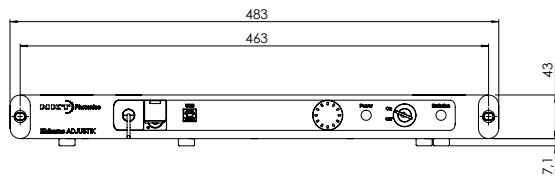


# SPECIFICATIONS

## Mechanical/Electrical/Environmental

|  |                              |
|--|------------------------------|
| Power supply requirements [VAC, Hz]      | 100-240 VAC, 50-60 Hz        |
| Digital interface                        | USB 2.0, Ethernet 10/100     |
| Amplitude and frequency modulation [V]   | DB9 male, differential 2x5   |
| Connectors                               | Standard: FC/APC pigtail 1 m |
| Monitor output <sup>1)</sup>             | Yes, FC/APC bulkhead         |
| Operation temperature [°C] <sup>2)</sup> | 15 – 55                      |
| Storage temperature [°C]                 | -20 – 60                     |
| Dimensions (WxHxL) [mm <sup>3</sup> ]    | 483 x 50.1 x 382.1 (19" 1U)  |
| Weight [kg]                              | 6                            |
| Humidity non-condensing [% RH]           | 0 – 70                       |

1) Optical monitor signal is approximately 1% of the seed laser signal.  
 2) Internal module case temperature.



## 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.

