Oxygen Sensing

Quick Start Instructions

Introduction

The NeoFox Phase Fluorometer is used with Ocean Optics' NeoFox Viewer software and custom probes (priced separately). Ocean Optics oxygen sensor probes are low-power, portable devices that offer high sensitivity, reversibility, and stability. Their small size is useful for remote monitoring. What's more, the thin film used in the probe tips consumes no oxygen, allowing for continuous contact with the sample. Ocean Optics oxygen sensors offer other key advantages: they're ideal for viscous samples and are immune to interference caused by pH change or from changes in ionic strength, salinity, and biofouling.
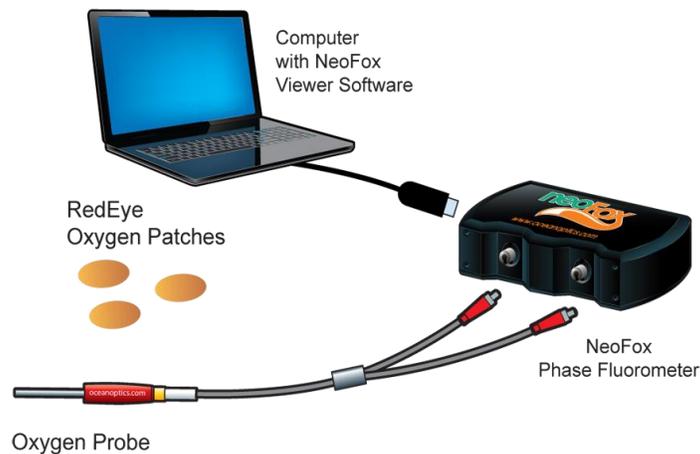
See http://oceanoptics.com/product-category/fibers-and-probes/for more information on fibers and probes available from Ocean Optics.

NeoFox Sport is available as a handheld oxygen-sensing system with a phase fluorometer, an onboard microprocessor with OLED display and a battery module, or as part of the Jaz community of stackable, modular and autonomous component modules (limit of one sensor module per stack).

The NeoFox connects to a PC via USB connection and saves your data in an easy-to-use Microsoft Excel format. NeoFox can be configured with single-channel LED excitation and detection, and modulation frequencies to 100 kHz. The on-board pressure transducer measures atmospheric pressure.

Installation

There are two steps to completely installing the NeoFox system onto your computer.

- First, you must install the NeoFox Viewer software. This is done by running the NeoFox-Viewer Setup.msi installer program for XP systems or the NeoFox-Vista.msi installer for Vista systems.

- The second step is to properly install the NeoFox hardware drivers. To do this, plug in the device and wait for the new hardware wizard to run.

You must install the NeoFox Viewer software application prior to connecting the NeoFox unit to the computer to install the drivers required for the hardware. If you do not install the software first, the system will not properly recognize the NeoFox hardware.

Software Installation

CAUTION

Do <u>not</u> connect the NeoFox unit to the PC prior to installing the NeoFox Viewer software.

► *Procedure*

To install the NeoFox Viewer software,

1. Close all other applications running on the PC.

2. Start the software installation process.

Installing from CD:

a. Insert the CD containing the NeoFox Viewer software.

b. Select the drive on your computer with the software CD.

c. Double-click on the appropriate software version for your operating system (for example, NeoFoxViewer-2.40-installer for Windows 64-bit systems).

Installing from the Web:

a. Go to http://oceanoptics.com/support/software-downloads/.

b. Scroll down to **NeoFox Operating Software.**

c. Click on the appropriate software for your computer's operating system and select **Save Target As…** to download the executable to your machine.

d. Click **Save**. The installation begins.

e. Click **Run**. The **NeoFox Viewer Setup** screen appears.

f. Follow the prompts to complete the software installation.

Hardware Set-up[AL1]

<div align="center">

WARNING

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Ensure that the plastic caps are covering the two SMA connectors on the front of the NeoFox unit. Intense UV radiation is emitted from the LEDS when the unit is powered-up. Do NOT look directly at the LED output with the naked eye.

Set-up for Complete System

Use this procedure if you have purchased the complete system. If you purchased a calibration on a complete system, your hardware is ready to make measurements right out of the box.

► *Procedure*

1. Ensure that the NeoFox Viewer has been installed.

2. Using the power supply that came with your NeoFox system, connect the power cord to the NeoFox unit and then to an AC outlet.

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Note

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On the NeoFox Sport hardware, there is a difference between the power connector on the DPU module and the power connector on the NeoFox module. The external power connector on the NeoFox module is the auxiliary power connector. It provides power only to the NeoFox module itself. It will not charge the battery or provide power to the DPU. Very few users will ever need to use the NeoFox module's auxiliary power connector.

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3. When you connect NeoFox to

4. Connect the NeoFox unit to a computer using the USB cable.

<div align="center">**Notes**</div>

When you connect NeoFox to a computer for the first time using the USB cable, you must then install the appropriate hardware drivers. If a message pops up asking your permission to continue, click **Continue Anyway**.

On the NeoFox Sport hardware, there is a difference between the USB connector on the DPU module and the USB connector on the NeoFox module. The USB connector on the NeoFox module is the NeoFox Sport's primary USB connector. When the USB cable is attached to the NeoFox module and the stack power on, you can interact with the NeoFox module through the NeoFox Viewer software. The USB connector on the DPU is the unit's auxiliary USB connector. You will not be able to interact with the device in NeoFox Viewer if you have plugged the USB cable into the DPU module. You will only want to use this USB port if you need to update the DPU firmware.

5. Connect the NeoFox unit to the temperature probe (if applicable).

<div align="center">**Note**</div>

If you purchased a complete system it will typically arrive with fiber and probe attached, leave this connected at all times to preserve your calibration.

Set-up for Probes and Patches

Use this procedure if you have purchased just probes and patches for your NeoFox system.

► *Procedure*

1. Ensure that the NeoFox Viewer has been installed.

2. Connect your fiber to your probe using provided bushing (threaded cylinder)

3. Connect fiber to the NeoFox unit.

4. Connect temperature probe (if provided).

5. Make sure your NeoFox system is connected to power and the USB cable to the computer.

6. Install your patches into any transparent vessel; just remove the white backing and adhere to a clean, dry surface.

<div align="center">**Notes**</div>

Keep finger oils off patches and maintain a stable optical setup. Shaking, vibration, and change of angle can all affect your readings.

The tip of your probe has a chemical coating on it that is responsible for the oxygen measurement. Do not clean your probe tip, especially the edge that exposes the fiber optic cable to sample. If this coating ever comes off you will need to have it refurbished.

Software Operation

When you first display the NeoFox Viewer software, the basic NeoFox Viewer screen appears.

Averaging

Keep averaging at 100 scans to average to stabilize your output and resolution. The system runs at 10Hz, meaning if you do 100 scans to average each point is the average of itself and the nine before it, or a 10-second buffer. Decreasing scans to average will decrease reaction time, but you will lose resolution.

What is Tau?

Tau, or τ_0, is the fluorescence decay time of the chemistry of your probe at 0% oxygen. Tau is the fluorescence decay time of the chemistry of your probe in its environment.

Chemistry Type

Make sure to select the proper chemistry type for your probe or patches. Factory Calibration orders should have this preset, but it is recommended to always confirm.

Data Logging

The main NeoFox Viewer screen has a button labeled **Start/Stop Data Logging...** (shown above).

> ► *Procedure*

To start data logging,

1. Click the **Start/Stop Data Logging...** button. The Data Logging Control Panel appears.
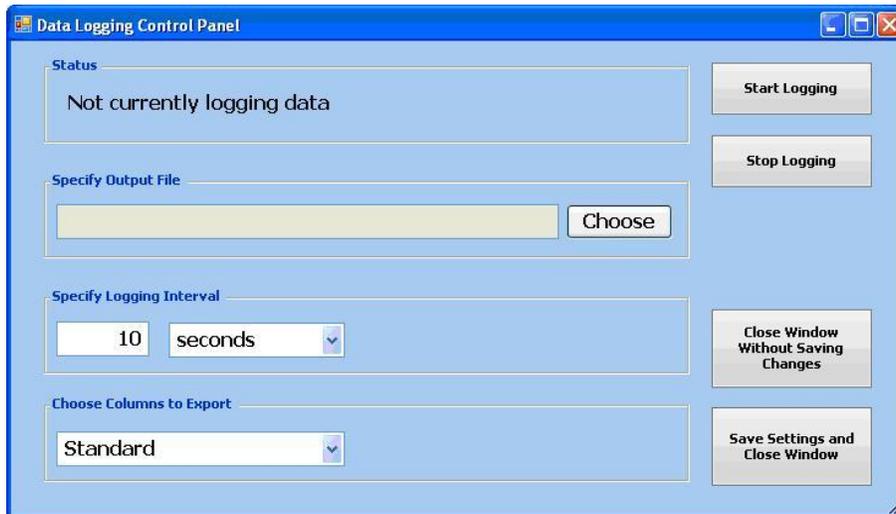
2. Select the location to save your file by clicking **Choose** and entering the information.

3. Make any other changes on this window, then click **Start Logging**.

4. Click **Save Settings and Close Window**. Data logging begins once you close this window.

To stop data logging,

5. On the Data Logging Control Panel, click **Stop Logging**.

6. Click **Save Settings and Close Window**. Data logging does not stop until you close this window.

Oxygen Reading

You have four choices for your oxygen level reading:

- % Oxygen is the percent oxygen in the gas phase at 1 atm pressure.
- ppm is mg/liter of dissolved oxygen in pure water
- Torr is the partial pressure of oxygen in the liquid or gas phase. This is the most basic representation of what the oxygen sensor chemistry is detecting.
- μmol/L refers to dissolved oxygen in pure water

Calibration

If you have purchased a full system, (NeoFox, probe or patch, fiber, temperature probe and factory calibration), your system is ready to use.

If you have not purchased a calibration with your system, or you would like to recalibrate an older probe suffering from drift) you will have to do a 2-point calibration before starting your measurements.

Performing a 2- Point Calibration

You will need nitrogen, argon, or helium gas for a zero oxygen point of reference.

► *Procedure*

1. Open NeoFox Viewer.

2. In the menu in upper left corner, click Options ->Calibration.

3. Under **2. Select Calibration Method**, choose **Two Point Calibration**.

4. Select the Two Point Calibration tab.
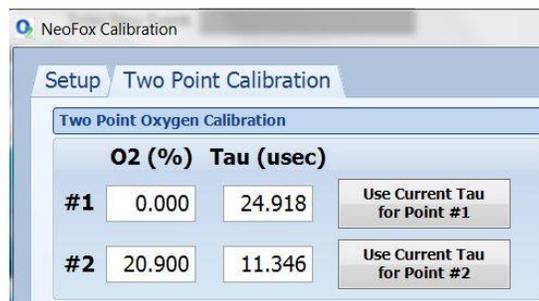
5. Take an air sample (20.9% oxygen). Wait until the signal stabilizes, then click **Use Current Tau for Point #2**.

6. Take a nitrogen or argon sample (0% oxygen). Wait until the signal stabilizes, then click **Use Current Tau for Point #1**.
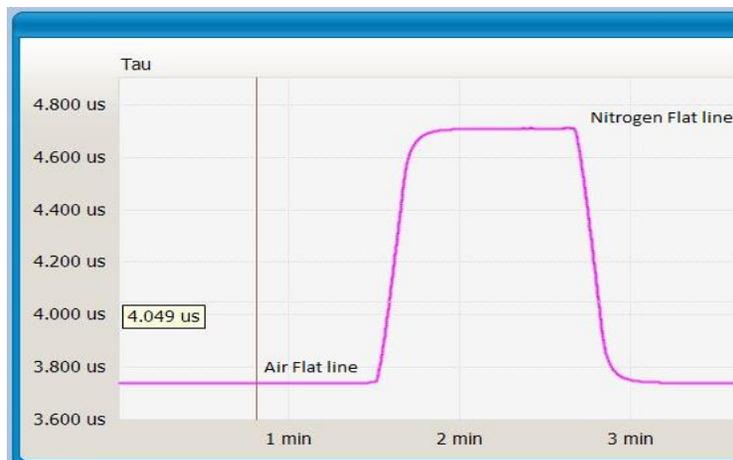
7. Click **Download**, then select **Yes** to confirm.
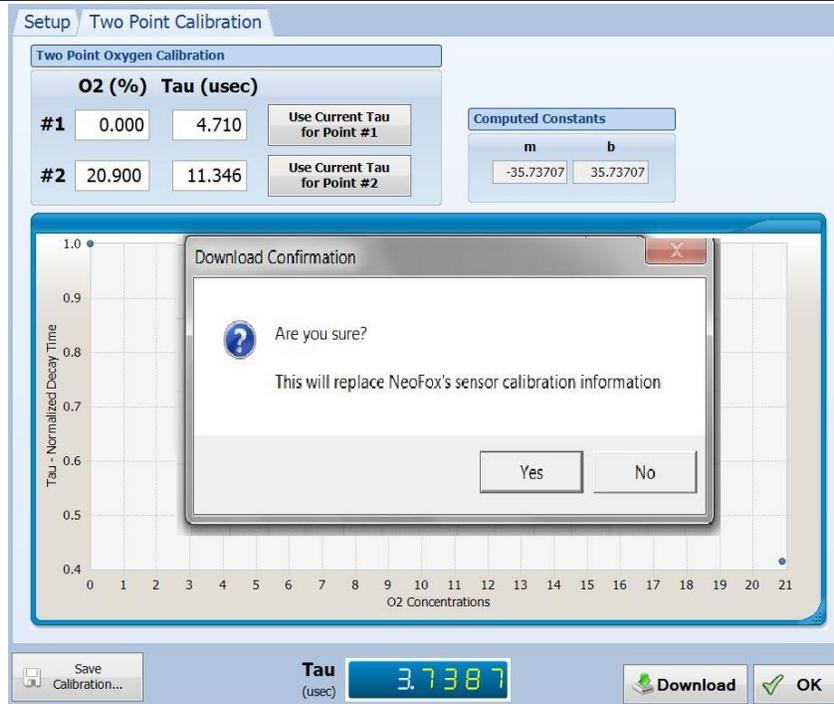
Downloading a Factory Calibration

If you ordered probes or patches but did not send in your whole NeoFox system, or you want to return your system for a Factory Calibration, use the following procedure.

► *Procedure*

1. Insert calibration CD into computer**.**

2. Open NeoFox Viewer**.**

3. **From the menu, select** Options →**Calibration.**

4. Click **the** Open **Calibration** button on top left of resulting window.

5. Navigate to the CD and select the correct ".neo" file for your corresponding patches or probe**.**

6. **Click** Download**.**

Product-Related Documentation

You can access documentation for Ocean Optics products by visiting our website at **http://www.oceanoptics.com.** Select *Support→ Technical Documents,* then choose the appropriate document from the available drop-down lists.

Support Contact

Please contact Ocean Optics Customer Support at www.oceanoptics.com or 1-727-733-2447 for any questions.