

Pocket Oxygen Meter FireStingGO₂

*QUICK START
WARNINGS AND SAFETY GUIDELINES*



Overview

The *FireStingGO₂* is a hand-held fiber-optic oxygen meter based on the established *FireSting* technology featuring

- integrated high contrast display and rechargeable battery
- huge data memory for ca. 40 million data points
- extremely low power consumption for long-term logging:

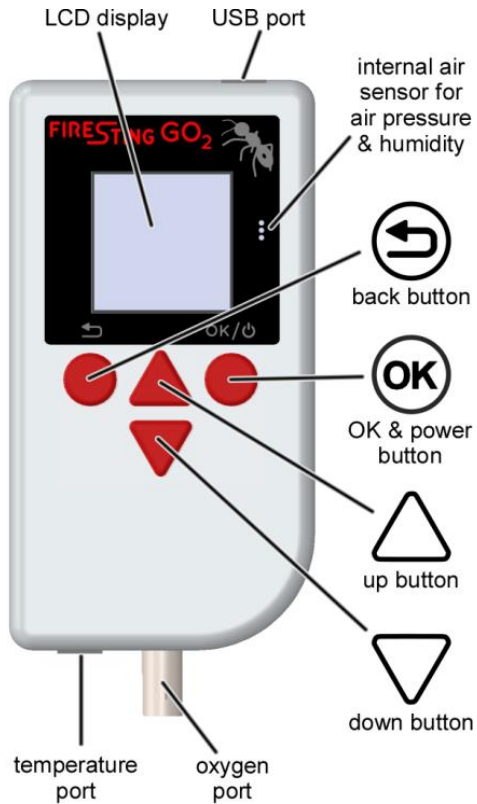
ca. 1 week	for 1 s log interval
ca. 2 months	for 10 s log interval
ca. 6 months	for 1 min log interval
ca. 1 year	for >= 10 min log interval

The pocket meter *FireStingGO₂* can be operated stand-alone via the integrated intuitive user interface, or with a Windows PC via the micro USB port in combination with the software "*FireStingGO₂ Manager*". This software is especially required to download and inspect logged data files.

A broad range of fiber-optic oxygen sensors from *Pyro Science* can be used for measurements in water, in gas and approved solvents, including micro- and minisensors, robust probes, sensor spots, flow-through cells, respiration vials and solvent-resistant probes.

The *FireStingGO₂* has three ports and one integrated sensor:

- **micro USB port** for charging the integrated battery and for data communication with a PC (via *FireStingGO₂ Manager*),
- **oxygen port** for connecting an oxygen sensor,
- **temperature port** for connecting a PT100 temperature sensor used for automatic temperature compensation of the oxygen measurements,
- **internal air sensor** measuring the pressure and the relative humidity of the ambient air for a precise sensor calibration in ambient air and for automatic pressure compensation of the oxygen measurements.



The user interface of the *FireStingGO₂* consists of the display and four buttons:

OK Button: If pressed for 1 sec, the device is switched on or off. Press it shortly (i) for entering a sub-menu, (ii) for confirming an input, or (iii) for a context specific function as shown in the lower right corner of the display (e.g. MENU, START, NEXT, SAMPLE).

BACK Button: For cancelling an operation or for a context specific function, as shown in the lower left corner of the display (e.g. CANCEL, BACK, or STOP).

UP / DOWN Buttons: For scrolling between different "sub-screens" or for a context specific function indicated by the symbols ▲ and ▼ in the display.

Operation Modes

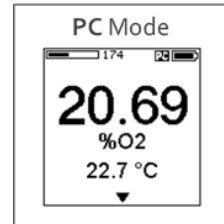
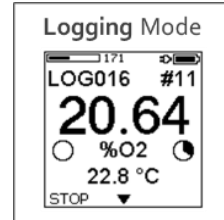
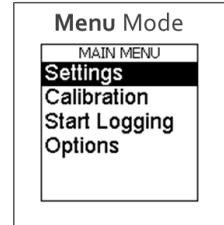
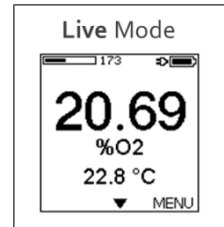
Live Mode: Activated after switching on the device, displays current sensor readings and status information in four sub-screens, measurements are performed every 2 seconds, data are **not** logged.

Menu Mode: Can be opened from the Live Mode with the OK button, for adjusting the settings, performing sensor calibrations, starting data logging, and accessing diverse options. Return to Live Mode by pressing the BACK button.

Logging Mode: Started from the Menu Mode, the measured data points are saved in a log file within the internal data memory of the device.

Standby Mode: Automatically activated if the user did not press any button within 5 minutes in the Live Mode.

PC Mode: Activated if the Windows software *FireStingGO₂ Manager* is started with connected *FireStingGO₂* device, the Menu Mode of the device is deactivated, only the sub-screens are accessible by using the UP / DOWN buttons.



IMPORTANT: Do not connect the *FirestingGO₂* to your PC before the *FireStingGO₂ Manager* software has been installed!

SYSTEM REQUIREMENTS: Windows 7 / 8 / 10, 700MB free drive space, free USB port.

Quick Start

Step 1: Getting Started

- Connect the PT100 temperature and optical oxygen sensor to the corresponding ports of the *FireStingGO₂*. For this, remove the protective caps from the oxygen port as well as from the connector of the oxygen sensor. Then, insert the connector into the oxygen port and turn the bayonet coupling gently clockwise until the plug is locked firmly. Connect the temperature sensor to the temperature port by simply pushing the connector into the port.
- Start the *FireStingGO₂* meter by pressing the OK button for about 1 sec, thereby accessing the Live Mode. If the device does not switch on by pressing the OK button, the integrated battery needs to be recharged. Connect the USB port of the *FireStingGO₂* to any standard micro USB charger or available computer USB port with the included USB cable.

Step 2: Settings and Options Adjustments

- Select MENU with the OK button and **Adjust** the local **Time** and **Date** in the **Options** menu.
- Open the **Settings** menu, enter the **Sensor Code** of the connected oxygen sensor, select the sample **Medium**, and choose your preferred **Oxygen Unit**.
- Adjust the sample temperature for the **Temperature** compensation of the oxygen measurements (**Sensor** or **Fixed**).
- Adjust the sample **Salinity** for measurements in saline samples / seawater. This only applies if you use an oxygen concentration unit, like $\mu\text{mol/L}$ or mg/L .

Step 3: Sensor Calibration

- Open the **Calibration** menu and review if the correct **Sensor Code** was adjusted.
- Prepare appropriate air and 0% calibration standards (see manual for the *FireStingGO₂*) for the oxygen sensor calibration.

- Open **Calibrate Air** and select the type of temperature compensation during the calibration: **Sensor** for automatic temperature compensation with the connected temperature sensor or **Fixed** with a defined and constant calibration temperature (needs to be measured and controlled).
- Select the appropriate **Calibration Medium** equivalent to the sample under investigation: **Ambient Air** for gas measurements and **Air Saturated Water** for measurements in aqueous samples.
- Insert the oxygen and temperature sensor into the air calibration standard, wait for steady state and press SET AIR.
- Open **Calibrate o%** and select the mode of temperature compensation of the Calibration Temperature: **Sensor** for automatic temperature compensation with the connected PT100 temperature sensor or **Fixed** with a defined and constant calibration temperature (needs to be controlled).
- Insert the oxygen and temperature sensor into the o% calibration standard, wait for steady state and press SET o%.
- Note, the o% calibration might be omitted, if the measurements will be only performed close to the oxygen level of the air calibration (and *vice versa*).

It is recommended to perform the calibrations at conditions close to the environmental conditions during the measurements. It is important that the *FireStingGO₂* device and the connected oxygen sensor are exposed to identical and constant environmental conditions during the calibration. If the calibration procedure reports "out of range", check the entered Sensor Code and/or check the calibration standard and repeat the calibration.

Step 4: Live Measurements

Exit the menu by pressing the BACK button. Measurements are performed every 2 sec. Access the different sub-screens with the UP and DOWN buttons, showing the measurement results. Note that the data are **not** logged in this Live Mode.

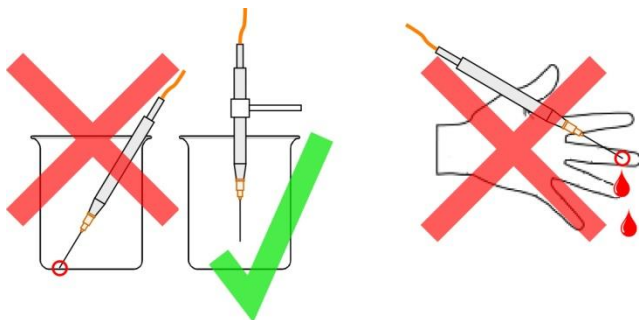
Step 5: Data logging

Open **Start Logging** in the Main Menu. Choose the appropriate mode: **Manual** for manual logging, i.e. data points are logged each time the OK button is pressed; or **Continuous** for automatized logging with adjustable **Logging Interval** and **Logging Duration**. The logged data are displayed numerically and graphically on several sub-screens. If the data logging is finished, exit the Logging Mode with the BACK button.

Step 6: Data management and inspection

- Download and install the *FireStingGO₂ Manager* software from the *PyroScience* website to a Windows PC, connect the *FireStingGO₂* device with the included USB cable and start the software.
- Go to the **File** tab, select a log file and click on **Download & Inspect**. This will download the log file from the device to the PC, and show the logged data in the **Log Inspector** window.
- The *FireStingGO₂ Manager* software offers many additional features similar to the ones given in the display user interface. For more details refer to the manual.

IMPORTANT: This quick start does not replace the manual. The user is strongly advised to download and to study the manual of the *FirestingGO₂*! This is especially important for ensuring correct calibration procedures!



WARNINGS AND SAFETY GUIDELINES

In case of problems or damage, turn the instrument off, disconnect and mark it to prevent any further use! Consult *Pyro Science* for advice! There are no serviceable parts inside the device. Opening the housing will void the warranty!

The *FireStingGO₂* is not water-proof, is sensitive to corrosive conditions and to changes in temperature causing condensation. Avoid any condition (e.g. direct sun light) causing a heating of the device above 50°C (122°F) or below 0°C (32°F). Avoid elevated humidity causing condensing conditions. Please follow the safety instructions for integrated lithium-ion batteries.

Handle the sensors with care especially after removal of the protective cap! Prevent mechanical stress to the fragile sensing tip and injuries with needle-type sensors! Avoid strong bending of the fiber cable!

Calibration and application of the sensors, data acquisition, treatment and publication is on the user's authority!

The sensors and the oxygen meter *FireStingGO₂* are not intended for medical, diagnostic, therapeutic, or military purposes or any other safety-critical applications. The sensors must not be used for applications in humans and must not be brought in direct contact with foods intended for consumption by humans.

The *FireStingGO₂* and sensors must be used in the laboratory by qualified personnel only, following the user instructions and the safety guidelines of the manual, as well as the appropriate laws and guidelines for safety in the laboratory!

Keep the sensors and the oxygen meter *FireStingGO₂* out of reach of children!