

# PortaLite

A truly lite & advanced oxygenation monitoring device



Measures local oxy-, deoxy- and total hemoglobin concentration changes and tissue saturation index (TSI)



Truly light and portable, weighing only 236 grams including two sensors



Up to 30 hours of power with fast charging battery



More than 250 hours of data collection & storage —online and offline

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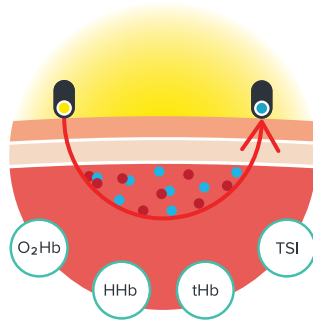
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# Near Infrared Spectroscopy

NIRS, the technique which the PortaLite MKII is based on, relies mainly on two characteristics of human tissue: first, its relative transparency for light in the NIR range and second, the oxygen dependent absorbance of hemoglobin.

These characteristics make it possible to measure brain or muscle activity, by applying the PortaLite to the forehead or muscle, respectively.



## WHAT CAN NIRS DO FOR ME?

- NIRS is used in many fields of research. NIRS enables measuring the relative changes in the concentration of oxyhemoglobin (O<sub>2</sub>Hb), deoxyhemoglobin (HHb) and total hemoglobin (tHb) in biological tissue.
- As absolute measurement, the PortaLite MKII measures the tissue saturation index (TSI), which can give information on local tissue oxygenation in both brain and muscle.

# Where light meets Lite



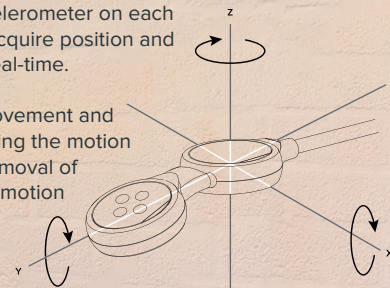
## Limitless device range

The offline measurement feature enables performing measurement outside your Bluetooth range. This perfectly allows for capturing data during physical activity, such as running or cycling, in any terrain, from mountains to forests. The data you have acquired offline can easily and directly be loaded in our software OxySoft for further analysis.

## Inertial Measurement Units (IMU)

It is possible to add IMUs, also known as motion sensor, in the PortaLite MKII sensor by request. The built-in gyroscope and accelerometer on each sensor can be used to easily acquire position and orientation movement data in real-time.

Within our software OxySoft, movement and NIRS data are synchronized. Using the motion sensor significantly simplifies removal of movement artifacts. Adding the motion data enhances measurement possibilities for your research.



## Two sensors

The standard PortaLite MKII package comes with two sensors included. Containing two sensor connection possibilities per control unit, the PortaLite MKII offers the opportunity to use one or two sensors at the same time. This leads to maximum flexibility in choice of application: both forehead sides, different muscles, or brain and muscle simultaneously - measurement possibilities are unlimited!

## Exceptional data quality

High data quality is crucial to acquire results that can be trusted on. Next to three long channels, the PortaLite MKII contains three built-in short separation channels with decreased receiver-transmitter distance. These short separation channels can be used to improve data quality.



# How do short separation channels (SSC) work?

When measuring with NIRS, light in the near-infrared spectrum will be transmitted and received through brain or muscle tissue. During the measurement, the light not only travels through the tissue, but it also passes the superficial tissue layer twice. The superficial tissue in humans, which includes skin and scalp, is approximately 13 mm thick and highly vascularized. It can convey physiological systematic changes due to activation of autonomic nervous system or changes in blood pressure. These changes can sometimes overshadow neural activity signals measured in brain tissue. Thus, signals measured in superficial tissue can be seen as noise.

Short Separation Channels (SSCs) can be used to remove this noise. Because there is less distance between the transmitter and receiver, they measure only extracerebral signals. These signals include blood pressure waves, Mayer waves, respiration and cardiac cycles. As the signal in the superficial layers is influenced by physiological changes, SSCs can be used to regress this noise from cognitive brain signals. This can lead to improved data quality.



## Applications

The flexible sensors of the PortaLite MKII optimally fit onto curved areas, such as the head or rounded muscles. It is highly portable, easy to use and provides almost no set-up time. Due to its light weight, possibility to perform offline measurement and battery longevity, it cannot only be used in the lab, but also on the field performing physical activities. Therefore, the PortaLite offers a huge range of application areas, such as:

- Sports science
- Functional studies
- Hypoxia studies
- Clinical studies
- Neuroscience studies
- Rehabilitation studies, and more



## PortaLite MKII sensor adhesive



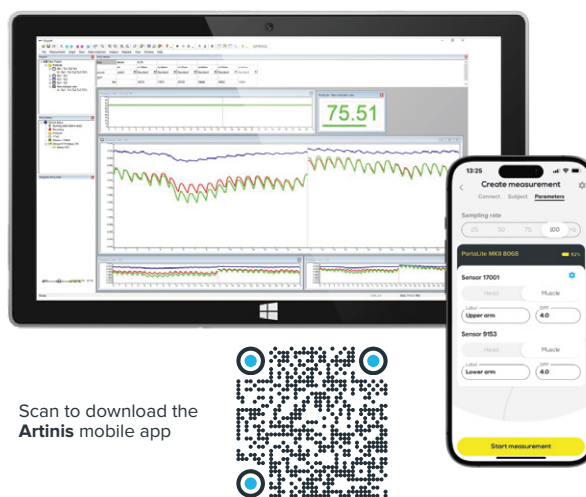
The PortaLite MKII comes with a set of 52 custom-made skin stickers. These exclusive sensors' adhesive are meticulously crafted to perfectly complement the PortaLite MKII sensors, and guarantee an impeccable fit around the sensors' transmitters and receivers. With a thickness ranging from 4.8 to 5.2 microns, these stickers strike the perfect balance between durability and flexibility. Moreover, these adhesive discs have undergone rigorous testing for biocompatibility with skin irritation, sensitization, and cytotoxicity.

## OxySoft

All our devices come with OxySoft, our proprietary NIRS recording and analysis software. Designed to be user-friendly and highly customizable, OxySoft provides real-time calculations of oxy-, deoxy-, and total hemoglobin, as well as tissue saturation index (TSI). OxySoft seamlessly synchronizes and stores all data in a single file, allowing for analysis during or after the recording. It supports exporting raw data in various formats and is compatible with a wide range of third-party software. Real-time data streaming is also possible to tools like MATLAB or Python.

## Artinis mobile app

For added flexibility, the PortaLite MKII is compatible with the Artinis mobile app, offering a simple and efficient solution for NIRS recordings in the field. The app enables portable, professional-grade data collection anytime, anywhere and is available for free on Android and the App Store.



## What's in the box?

### PortaLite MKII research package

- PortaLite MKII control unit with two PortaLite MKII sensors
- PortaLite MKII starter pack
- Analysing unit with pre-installed software
- OxySoft, our proprietary data analysis software
- OxySoft license key

- Battery charger
- USB Bluetooth dongle
- Universal micro-USB cable
- User Manual & Quick Start Guide in English
- Support in setting up your research

# Technical specifications

TECHNOLOGY	Continuous wave Near-InfraRed Spectroscopy (NIRS) using the modified Beer-Lambert law
RELATIVE MEASURES	Oxy-, deoxy-, and total hemoglobin concentration changes
ABSOLUTE MEASURES	Tissue saturation index (TSI) using spatially resolved spectroscopy (SRS)
CHANNELS	6 relative, 1 absolute (per sensor)
SHORT SEPARATION CHANNELS	7.2 and 8.0 mm
TEMPLATE & LOCATION	Fixed template for muscle and brain (frontal cortex)
INTER-OPTODE DISTANCE	29, 35 and 41 mm
RECEIVERS	2 photodiodes
TRANSMITTERS	3 LEDs, each with 2 wavelengths
WAVELENGTHS	Standard 760 and 850 nm
AMBIENT LIGHT CORRECTION	Proprietary algorithm to filter out ambient light
DIMENSION	Control Unit: 123 x 57 x 23 mm. Sensor: 72 x 28 x 9 mm. Wire at least 1.4 m
WEIGHT	Control Unit: 120 gram. Sensor: 58 gram.
ENVIRONMENT	Operating temperature: 10 - 40 °C
INDICATORS	On/Off, Standby/Measuring, Battery status, Sensor connected/disconnected
POWER	Up to 30 hours with fast-charging battery
SAMPLE RATE	100 Hz
ORIENTATION SENSOR	Optional: Accelerometer and gyroscope
DATA COLLECTION & STORAGE	Online and offline (> 250 h)
DATA ACQUISITION & ANALYSIS SOFTWARE	OxySoft, Artinis mobile app
OPERATING SYSTEM	Windows 11
EVENTS	Online, offline or PortaSync
ELECTROMAGNETIC COMPATIBILITY	Compatible with TMS, EEG, EMG, ECG
HARDWARE SYNC OPTIONS	PortaSync, parallel cable, serial cable, LabStreamer
SOFTWARE SYNC OPTIONS	ASCII, LSL, DCOM (e.g. Matlab, E-prime, Presentation)
NIRS + OTHER COMPATIBILITIES	We deliver the following packages: <ul style="list-style-type: none"> <li>PortaLite MKII Control Unit + 2 sensors</li> <li>PortaLite MKII Control Unit + 1 sensor</li> <li>PortaLite MKII Control Unit</li> <li>PortaLite MKII sensor</li> </ul>

## References to portable (f)NIRS

Klop, M., Claassen, J. A. H. R., Floor-Westerdijk, M. J., van Wezel, R. J. A., Maier, A. B., & Meskers, C. G. M. (2024). Home-based monitoring of cerebral oxygenation in response to postural changes using near-infrared spectroscopy. *Geroscience*, 46(6), 6331–6346. <https://doi.org/10.1007/s11357-024-00764-6>

Wang, Z., Irving, B. A., Spielmann, G., Johannsen, N., Greenway, F., & Dalecki, M. (2024). A single exposure to 100% normobaric oxygen therapy appears to improve sequence learning processes by increasing prefrontal cortex oxygen saturation. *Brain Research*, 1837, 148962. <https://doi.org/10.1016/j.brainres.2023.148962>

Shahbakhti, M., Hakimi, N., Horschig, J. M., Floor-Westerdijk, M., Claassen, J., & Collier, W. N. J. M. (2023). Estimation of respiratory rate during biking with a single sensor functional near-infrared spectroscopy (fNIRS) system. *Sensors*, 23(7), 3632. <https://doi.org/10.3390/s23073632>

Newman, L., O'Connor, J. D., Nolan, H., Reilly, R. B., & Kenny, R. A. (2022). Age and sex-related differences in orthostatic cerebral oxygenation: Findings from 2764 older adults in the Irish Longitudinal Study on Ageing (TILDA). *Experimental Gerontology*, 167, 111903. <https://doi.org/10.1016/j.exger.2022.111903>

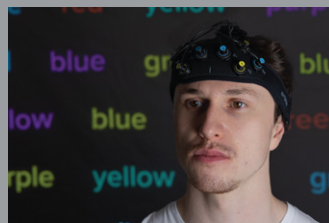
Xue, F., Monaghan, A., Jennings, G., Byrne, L., Foran, T., Duggan, E., & Romero-Ortuno, R. (2022). A novel methodology for the synchronous collection and multimodal visualization of continuous neurocardiovascular and neuromuscular physiological data in adults with Long COVID. *Sensors*, 22(5), 1758. <https://doi.org/10.3390/s22051758>

## NIRS devices



### Brite Frontal

A wearable and easy-to-use fNIRS device that is optimized to measure brain activity in the entire prefrontal cortex with 24 channels.



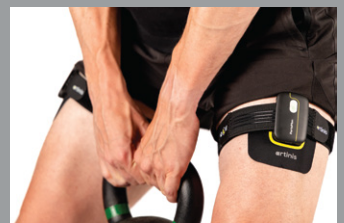
### Brite Lite Frontal

A wireless & optimized fNIRS device that measures brain oxygenation from the prefrontal areas with 8 channels.



### PortaLite mini

The mini variant of PortaLite MKII which is optimized for pediatric research.



### PortaMon

The gold-standard in asses muscle oxygenation, now remastered. Measures local tissue saturation (TSI), as well as oxy-, deoxy-, and total hemoglobin in muscle tissue.