

# PortaMon MKIII

The unrivaled leader in **muscle oxygenation** measurements



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



Easy analysis of your data with our superior analysis software; OxySoft.



More ergonomic design for a better fit on any muscle



IPX4 Sweat-proof and ergonomically designed to fit on every muscle

[Get a quote](#)

Artinis Medical Systems  
+31 481 350 980  
[www.artinis.com](http://www.artinis.com)

Contact us at  
[askforinfo@artinis.com](mailto:askforinfo@artinis.com)

Einsteinweg 17  
6662 PW Elst  
The Netherlands

# Near Infrared Spectroscopy

NIRS, the technique which the PortaMon is based on, relies mainly on two characteristics of human tissue. The first is the relative transparency of human tissue for light in the NIR range and secondly, to the oxygenation dependent absorbance of hemoglobin. Based on these principles, the PortaMon makes it possible to monitor the muscle oxygenation of your subject:

- Non-invasively.
- Continuously recording and feedback.
- Affordably and no disposables needed.
- Wirelessly, using one or multiple devices.
- With easy setup for any environment, both indoors and outdoors.

## WHAT CAN NIRS DO FOR ME?

- NIRS is used in many fields of research. NIRS measures the relative changes in the concentration of oxyhemoglobin (O<sub>2</sub>Hb), deoxyhemoglobin (HHb) and total hemoglobin (tHb) in biological tissue.
- Assuming the concentration of hemoglobin in blood is constant (during your measurement), the tHb can be used as a marker for blood volume.

## Short separation channels

Short separation channels, which measure superficial tissue layer data, are commonly used in brain measurements to improve signal quality. However, in NIRS measurements from muscles, adipose tissue can pose a challenge due to the differences in layer thickness between individual subjects and measurement locations.



Besides the three long channels, the PortaMon now also includes three short separation channels with an inter-optode distance of 10, 15 and 20 mm. This enables the gathering of data from superficial tissue, which can be used to correct for adipose tissue, improving data quality and reliability.

## Flawless synchronization

You can easily measure with more than just one PortaMon to monitor the oxygenation of different muscle areas or participants simultaneously. Consider connecting multiple PortaMon devices at the same time, as our software, OxySoft, allows for perfect synchronization.

The PortaMon can also be combined and synchronized with our (f)NIRS devices for measuring the brain, by simply connecting multiple different Artinis devices in OxySoft.

## Integrated multi-power gain control

When performing muscle measurements, it is important to be able to measure from subjects of different origins, ages and sexes.

To ensure optimal signal quality over a wide range of participants, the PortaMon MKIII has a built-in multipower gain control. This enables you to measure at 4 different power levels. The auto-power function adjusts light output, assuring reliable data on any individual subject or measurement location.



# Applications

The PortaMon is a wireless NIRS device that is specifically designed for muscle research. It is frequently applied in sports and exercise sciences in participants of all ages. Due to its portability and ease of use, the PortaMon can be used in a huge range of research areas, in athletes, healthy and clinical populations, such as:

- Sports science
- Cardiorespiratory research
- Clinical studies
- Hyperscanning studies, and more



## Improved ambient light protection

The PortaMon MKIII comes with specially designed accessories to provide better fixation and light protection.

Our new SunShield stickers block out ambient light, improving signal quality. The sunshields easily stick to the preferred area, and are relatively comfortable to remove after measuring.

The PortaMon also comes with newly designed straps of three lengths, which can be chained together for measurements on larger areas. The straps are closed and tightened with velcro, after which the traction lines will keep the PortaMon in place, even during tasks involving strenuous movement.

## Enhanced data options

The PortaMon measures changes in hemoglobin from six channels with various distances, as well as absolute value of TSI. Hence, it enables data output of a larger volume per muscle. The device is delivered with OxySoft, our proprietary NIRS data acquisition software.

OxySoft can be used to collect, store, view, and analyze all necessary data from the PortaMon. This user-friendly software is developed by Artinis and is highly customizable to individual requirements. OxySoft provides in real-time the calculation of oxy-, deoxy-, total hemoglobin and Tissue Saturation Index (TSI), and allows for data to be exported to various file formats. This makes it the perfect fit for any research investigating muscle or tissue oxygenation.



## What's in the box?

### PortaMon research package



PortaMon device(s) as per request

OxySoft, our proprietary data analysis software

Analyzing unit with pre-installed software

A strong and sturdy Peli case

User Instructions in English

License key

Bluetooth dongle

Batteries and charger

SunShield stickers and straps

Support in setting up your research, for the lifetime duration of your device



# 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	3 relative, 1 absolute
SHORT SEPARATION CHANNELS	3 relative
TEMPLATE & LOCATION	Fixed template for muscle
INTER-OPTODE DISTANCE	Normal: 30, 35, and 40 mm - Short separation channels: 10, 15, 20 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	WxDxH: 68x44x15 mm
DEVICE WEIGHT	30 grams
ENVIRONMENT	Operating temperature: 10 - 30 °C
INDICATORS	Power, measuring, battery status, Bluetooth
POWER	Up to 6 hours at 100 Hz with fast charging battery
SAMPLE RATE	Up to 100 Hz
ORIENTATION SENSOR	Optional: incorporated 6-axis accelerometer
DATA COLLECTION & STORAGE	Online and offline (100+ hours on 100 Hz), local back-up of data
DATA ACQUISITION SOFTWARE	OxySoft
OPERATING SYSTEM	Windows 10 and Windows 11
EVENTS	Online, offline or PortaSync
ELECTROMAGNETIC COMPATIBILITY	No interference with TMS, EEG, EMG, ECG
HARDWARE SYNC OPTIONS	PortaSync, parallel cable, serial cable, LabStreamer
SOFTWARE SYNC OPTIONS	LSL, DCOM (e.g. Matlab, E-prime, Presentation)

## References to muscle NIRS

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Perrey, S., Quaresima, V., & Ferrari, M. (2024). Muscle Oximetry in Sports Science: An Updated Systematic Review. *Sports medicine (Auckland, N.Z.)*, 54(4), 975–996. <https://doi.org/10.1007/s40279-023-01987-x>

## NIRS devices



### Brite family

Wearable multi-channel fNIRS systems for brain oxygenation monitoring that are reliable, user-friendly, and truly comfortable.



### PortaLite MKII

Lite, easy to use and truly portable device applicable on both brain and muscle tissue.



### OctaMon M

Completely wearable 8-channel NIRS device that measures oxy-, deoxy- and total hemoglobin on any muscle in a non-invasive and truly portable way.



### PortaLite mini

The mini variant of PortaLite MKII which is optimized for pediatric research and small muscle applications.