PIONIRS s.r.l.
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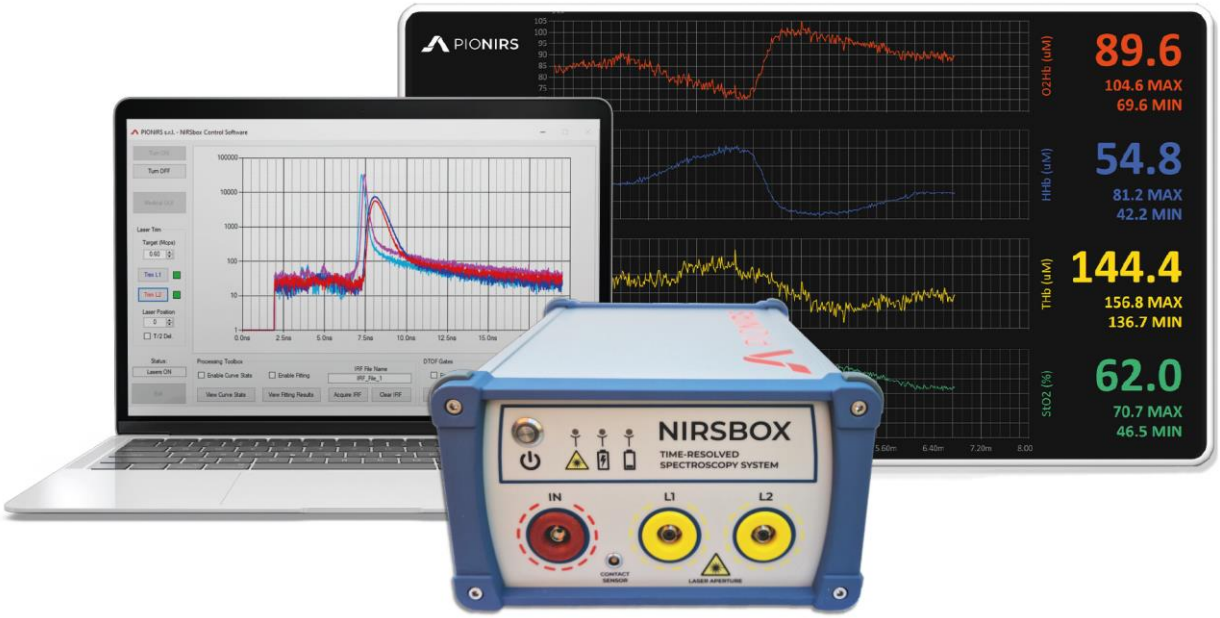
NIRSBOX

Time-resolved spectroscopy system

Specification sheet



APPLICATIONS

- Hemodynamic monitoring of brain and muscle tissues
- Brain functional activation measurements
- Optical non-invasive characterization of diffusive media
- Quality assessment of food and vegetables

Version 2.1 (January 2024)

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LIGHT EMISSION

- 2-wavelengths: 685 nm and 830 nm (nominal)
- Instrument response function: < 200 ps (FWHM) [1]
- Minimum laser output power (average): 6 mW [1]
- Laser repetition frequency: 53 MHz
- Automated optical attenuators (4 OD dynamic range)
- Measurement stability better than ±1% over more than 6 hours of operation

([1] at instrument output ports, may be subject to further improvements)

LIGHT DETECTION

- One detection channel with solid-state detector
- Photosensitive active area size: 1.3 x 1.3 mm^2
- No damages if exposed to strong light (even ambient)
- DToF curves measurement resolution (bin-size): 9.77 ps
- Maximum conversion rate: 3 Mconv/s [2]
- Single DToF integration time: from 250 ms to 5 s [3]
- Reproducibility: < 2% (CV) on phantoms [2]

([2] may be subject to further improvements)

([3] the "fast-NIRSBOX" option allows for integration times as shorter as 10 ms)

SOFTWARE

- MS Windows OS -based data acquisition software
- DLLs available (both for MS Windows and Linux)
- DToF curves are stored in binary files [4]
- Real-time data fitting, for retrieving optical parameters (using a homogeneous semi-infinite model)
- Fitting results are stored in a .txt file [4]

([4] customizable upon request)

CONNECTIONS

- USB 2.0 communication interface
- 4x programmable, low-frequency digital input/outputs
- 2x optional analog output lines
- Fiber connections to the instrument optical ports: FC/PC for 1 mm core POF fibers
- Light emission optics for 100 µm core silica fibers can also be provided

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DIMENSIONS	• Size: 200 mm (W) x 120 mm (H) x 245 mm (L) • Weight: approx. 3 kg
POWER SUPPLY	• Input voltage: 18 VDC • Maximum input current: 3.5 A • Optional internal battery pack (5+ hours operation)
ENVIRONMENT CONDITIONS	• Ambient temperature range: 18 °C – 26 °C • Relative humidity range: 20% - 80% • IP classification: IP20
STORAGE CONDITIONS	• Storage temperature : +5 to +40 °C • Storage relative humidity : 10% - 90% • Special considerations: avoid storage under direct sunlight; store properly covered to protect against dust; store in restricted-access area to avoid unwanted manipulation.