moor instruments
innovation in microvascular assessment

moorLAB Product Catalogue



moorLAB Family

The moorLAB monitoring system, is a group of products that have been designed to work together seamlessly to help achieve your microvascular research no matter how simple or complex.

Monitoring products are available to detect flexible combinations of Tissue Blood Flow (from superficial and deeper tissue beds), Skin Temperature and Tissue Oxygenation.

Changes in flow, temperature and oxygen can be provoked with our “protocol products”; the moorLAB-HEAT skin heater, moorLAB-PRES pressure cuff controller and moorLAB-ION iontophoresis system, all of which can operate in standalone mode or be controlled via moorLAB-PC PC software.

Measurement and protocol control is all handled by moorLAB-PC PC software that accepts signals from the monitors and provides control for the protocol products to bring reliability and reproducibility to your research.

moorLAB-PC will also ease analysis and reporting.

Please contact us for further details.

Visit **www.moor.co.uk** for full details of our imaging and moorLAB family for blood flow and oxygen research.

Moor Instruments

Moor Instruments, established in 1987, is a world leader in the design and manufacture of systems to measure tissue blood flow and oxygen.

Customer support

First hand experience of laser Doppler research and development within Moor dates back to 1978 and with this we have the breadth of knowledge to help with your application and the enthusiasm to try to find answers to any of your questions.

By giving priority to performance, quality and service we strive to be our customers number one choice.

The future

Our aim will always be to offer technical excellence within each product we manufacture.

Our experienced and highly skilled design team are also involved with a number of development projects for other partners and manufacturers. Whatever your needs, as a researcher, Moor will work harder for you.

Choosing the right package

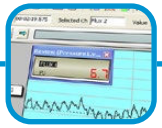
MEASURE

Laser Doppler Monitoring	Tissue blood flow and temperature monitoring	moorLAB-LDF		SEE PAGE 4
Tissue Oxygenation Monitoring	Continuous tissue oxygenation and temperature monitoring	moorLAB-OXY		SEE PAGE 5
Deep Tissue Oxygenation Monitoring	Deep near infrared spectroscopy monitoring	moorLAB-NIRS		SEE PAGE 6

STIMULATE

Automated Pressure Cuff Controller	Automatic pressure cuff control for routine microvascular challenges	moorLAB-PRES		SEE PAGE 7
Skin Heater	Skin heating for flexible and reproducible challenges to the microvasculature	moorLAB-HEAT		SEE PAGE 8
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CAPTURE

PC Software	Recording and analysis software	moorLAB-PC		SEE PAGE 10

moorLAB-LDF

Laser Doppler Perfusion and Temperature Monitor

The moorLAB-LDF laser Doppler blood flow monitor is a high performance module. Use of DSP technology brings you a portable, lightweight module featuring uncompromised specifications and reliability at a breakthrough price. The features include;

- **Single and dual** channel options.
- **Multi-channel:** combine modules for a multi-channel system with software support for your ideal configuration. Stacking case design offers a compact footprint for multi-channel users.
- **'MemoryChip' probes:** for a wide range of applications. Calibration constants are stored within the probe itself with timed re-calibration reminders
- **"Same-site"** combined probes that offer simultaneous assessments of tissue oxygenation and laser Doppler blood flow (in surface or needle probe formats).
- **Full compatibility** with all moorLAB family products for Oxygen measurements, iontophoresis, skin heating and pressure cuff control.
- **Easy viewing:** high contrast, ice white, backlit LCD display.
- **Advanced Windows™ PC software:** with extensive analytical features and automatic report generation.
- **Easily connectable:** analogue output (0-5V, BNC) and digital (USB) real time data transfer included as standard for connection to data acquisition systems.
- **Online user portal:** for continual reference.
- **Reliability:** industry leading 5 year manufacturers warranty – independent of service history.

CLASS 1
LASER PRODUCT



Single and dual channel options
Industry leading 5 year manufacturers warranty
'MemoryChip' probes
Small footprint

moorLAB-OXY

Tissue Oxygen and Temperature Monitor

Adequate oxygen supply is essential for the life and health of all biological tissue. Both oxygen levels and tissue blood flow (measured by moorLAB-OXY and moorLAB-LDF respectively) are therefore important parameters for physiological research.

The moorLAB-OXY monitor enables accurate and convenient real-time assessment of oxygenated / deoxygenated haemoglobin concentration, oxygen saturation (%) and skin temperature in the microcirculation, with the use of small, easy to use optic probes. The features include;

- **Non-invasive**, immediate and real time measurements at up to 40Hz, that start on contact with the tissue.
- **Flexibility** to measure baseline (resting) and maximal tissue oxygenation. Suitable for long term measurements.
- **Quick** and simple probe application.
- **Compact**, portable and lightweight.
- **Probes** for skin use, needle designs for other tissues.
- **“Same-site”** combined probes that offer simultaneous assessments of tissue oxygenation and laser Doppler blood flow (in surface or needle probe formats).**Full compatibility** with other moorLAB family products (laser Doppler, iontophoresis, skin heating and pressure cuff control options).
- **Advanced Windows™ PC software** with extensive analytical features and automatic report generation.
- **Convenient connections:** Analogue (0-5V, BNC connection) and digital (USB) real time data transfer included as standard.
- **Online user portal:** for continual reference.
- **Reliability:** 3 year manufacturers warranty as standard – independent of service history.



Non-invasive, immediate and real time measurements at up to 40Hz
Combined blood flow, temperature and oxygenation probes

moorLAB-NIRS

Near-Infrared Oxygenation Monitor

The moorLAB-NIRS near infrared spectroscopy monitor is designed to measure oxygenation in deeper tissues non-invasively. The features include;

- **Dual channel module:** allowing you to measure and compare two sites simultaneously.
- **Compatibility with existing moorLAB family products and software:** combine modules for a multichannel system to your own specification.
- **Three probe holders:** 30, 40 and 50mm separation offering sampling from three different tissue beds.
- **Add laser Doppler flowmetry (moorLAB-LDF) or white light spectroscopy (moorLAB-OXY) measurements:** with provision for probes within the NIRS probe holders.
- **Easy viewing:** High contrast, ice white, backlit display.
- **Advanced PC software:** with extensive analytical features, batch processing and report templates.
- **Highly connectable:** As well as the visual output, all monitors feature analogue outputs (0-5V) and digital (USB) real time data transfer.
- **Factory calibrated:** no need for probe pre-calibration.
- **Online user portal:** for continual reference.
- **Reliability:** 3 year manufacturers warranty as standard.



Deep tissue sampling
Variable depth sampling

moorLAB-PRES

Pressure Cuff Controller

The moorLAB-PRES pressure cuff control system provides reproducible and fully automated pressure cuff control for routine vascular research. With the use of a moorLAB-LDF laser Doppler monitor, blood flow responses can be measured providing a fully integrated and powerful solution for protocol management, analysis and reporting. The features include;

- **Choice of 7 standard research protocols** including limb/toe blood pressure, skin perfusion pressure, post occlusive reactive hyperaemia, pulse volume and ankle/toe brachial pressure index.
- **Custom protocols** for fully automated Inflation, Hold Pressure and Deflation patterns, all from a single key press. Flexible and linear deflation rates.
- **Rapid cuff inflation** with built in microprocessor control for all cuff sizes.
- **Highly accurate pressure sensing**.
- **Quick Fit** airtight pressure line connectors. Can be sued with most standard pressure cuffs, from digit to thigh. Quick fit, airtight pressure line connectors.
- **Stand alone operation** for use in any physiological research study.
- **moorLAB-PC software available** with USB output for graphical display of pressure profiles and integration with moorLAB-LDF blood flow traces.
- **Connect easily** to your data acquisition system. Analogue outputs of pressure and pulse volume recording. BNC connections.
- **Online user portal:** for continual reference.
- **Single** operator control.
- **Reliability:** 3 year manufacturers warranty as standard – independent of service history.
- **Part of the moorLAB family;** configure your ideal system with extra pressure, laser Doppler, oxygenation and haemoglobin concentration, iontophoresis and skin heating modules.

Automated pressure cuff protocols
Excellent reproducibility
Operate protocols at the touch of a button



moorLAB-HEAT

Skin Heater and Temperature Monitor

The programmable moorLAB-HEAT skin heater unit provides reproducible heating of skin tissue to be used with any laser Doppler blood flow monitor, imager or tissue oxygenation monitor. It can also be used as a skin temperature monitor. Features include;

- **Dual channel:** enables simultaneous, independent heating and monitoring of two separate areas.
- **Variable heating rate:** independent channel heating rate 0.01ºC - 0.1ºC per second.
- **Stand-alone:** manual control enables operation without a separate control unit or computer.
- **Protocol control:** to enable fully reproducible procedures in your studies supported by moorLAB-PC software.
- **Measurement and analysis software package:** automated to aid generation and processing of results.
- **Factory calibrated probes:** no calibration necessary for the life time of the probes.
- **Accurate and reproducible:** heater range between 20ºC and 45ºC with 0.1ºC increments and a measurement range between 5ºC and 50ºC.
- **Multi-channel:** combine modules within the moorLAB family for a multi-channel system with software support for your ideal configuration.
- **Easily connectable:** analogue output (0-5V, BNC) and digital (USB) real time data transfer included as standard for connection to data acquisition systems.
- **Online user portal:** for continual reference.
- **Reliability:** 3 year manufacturers warranty as standard – independent of service history.



Automate heating protocols
Excellent reproducibility
Operate protocols at the touch of a button

moorLAB-ION

Iontophoresis Controller

Deliver iontophoresis solution transdermally to research blood flow / oxygen responses. The features include;

- **Programmable:** current levels and delivery periods can be controlled via the USB port of a PC.
- **Stand Alone mode:** current levels and delivery periods can be set via a soft key user interface. The moorLAB-ION can be used with any laser Doppler instrument and whenever low current (1 to 250 microAmps) delivery by iontophoresis is called for.
- **Skin Resistance Measurement:** both voltage and current are measured and recorded for assessment of skin resistance changes.
- **Research of microvascular responses:** including endothelial function, smooth muscle function, peripheral neuropathy and irritancy.
- **Re-usable iontophoresis chambers:** Perspex 'ION' chambers with platinum electrodes. These chambers are compatible with moorLAB laser Doppler optic and heater probes. The large area LIC-ION6 chamber allows imaging of blood flow changes through a transparent window.
- **Full compatibility:** with other moorLAB family products (laser Doppler, tissue oygenation, skin heating and pressure cuff control options).
- **Advanced Windows™ PC software:** with extensive analytical features and automatic report generation.
- **Convenient connections:** Analogue (0-5V, BNC) for external monitoring of current and voltage.
- **Online user portal:** for continual reference.
- **Reliability:** 3 year manufacturers warranty as standard – independent of service history.

Very low dose control to avoid galvanic effect artefact
Multi period iontophoresing
Re-usable chambers for monitoring and imaging



moorLAB-PC

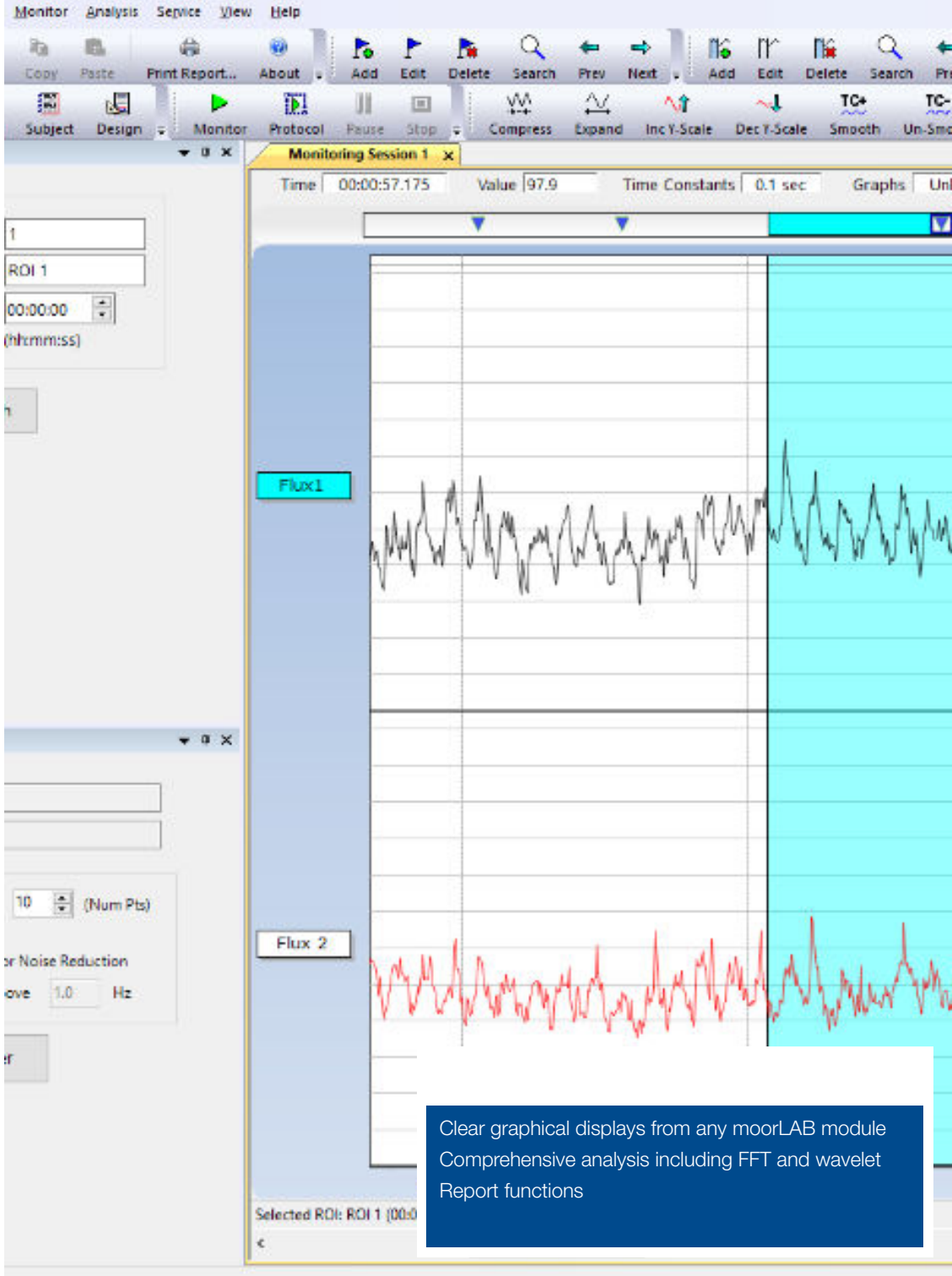
Monitoring Software

The moorLAB-PC Windows based software package is specifically designed to work with your own moorLAB setup.

The software is compatible with all moorLAB modules for measurement, protocol control, analysis and reporting.

Advanced processing and data analysis features include FFT analysis, wavelet analysis and report generation. This software enables;

- Clear graphical and digital display of all measurement modules connected, featuring quick set-up. Usa a USB-hub to connect your choice of modules.
- Multiple alarm options for low, high absolute levels and % baseline.
- Protocol capability for automated control and analysis of iontophoresis protocols, tissue heating and pressure cuff control.
- Protocol scripting for automated recording, pausing measurement, sound prompts, insert marker, display text message, digital trigger.
- Storage of data for subsequent analysis and conversion to spreadsheet style format.
- Marker and ROI (Region of Interest) functions for flexible analysis including add, edit, delete and search.
- Simple analysis functions including: mean, std deviation, median, min, max, area under curve, histogram and curve fitting.
- Vasomotion/ Pulsatility analysis using FFT and wavelet analysis.
- Routine analysis of standard research protocols, including; Toe Pressure, Ankle Brachial Pressure Index, % changes, Trending, skin heating and iontophoresis.
- Report generation with a formatting wizard to suit your individual requirements, for display in PDF, JPG, XML and other formats.
- Dedicated “spectral monitoring mode” for moorLAB-OXY.



Clear graphical displays from any moorLAB module
Comprehensive analysis including FFT and wavelet
Report functions

Optic Probes

Moor Instruments manufacture a wide range of probes designed to help you assess flow from almost any tissue. We are more than happy to advise on your particular application but hope too that the following general notes are useful.

Skin probes



Skin probes are available with two main fibre configurations, twin or multi-fibre designs. Multi-fibre designs usually contain a ring of up to eight collecting fibres around a central delivery fibre. This provides an averaged signal for a larger tissue area than would otherwise be provided by the conventional twin fibre model.

Skin probes are usually fixed to the skin with a probe holder and double sided adhesive discs, although they can be used in other applications and with other equipment (e.g. Iontophoresis).

The standard length for all probes is 2 metres. Longer lengths can be supplied on request (code LXL). The range of probe holders for these (and other) probes is described in the accessories page.

Blunt needle probes



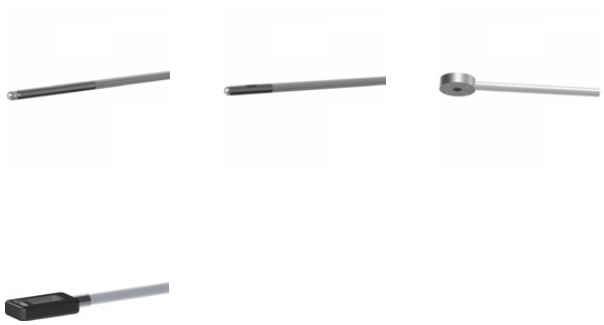
Needle probes are amongst the most versatile designs. They can be used for surface measurements or inserted into tissue (non-human use only). The compact design also lends itself to measurements in tissues with restricted access and where micromanipulation is required.

Probes can be fixed in position over tissue with a normal laboratory manipulator by clamping onto the black acetal shank.

Deeper measurements are possible by inserting the probe tip into tissue bulk (non-human use only), for which finer needles are suitable (LP4 and LP4s).

The use of specific probe holders can extend the application range of needle probes further still. Angled needle probes can be used to access less accessible tissues.

Low profile



Low profile designs are either used where access is difficult or to reduce application pressure if the probe is to be covered by a pressure cuff or bandage.

Optic Probes

Master / single fibre probe system

This probe option is used most typically for stroke / MCAO modelling.

Master probes are twin fibre designs, acting as a link between the monitor and the single fibre probe. The Master probe connects to the single fibre probe via an optical in-line connector (order code PCP).

This system offers a number of advantages over more conventional probe designs. The benefits include;

1. Small diameter probes (down to 250 micron) for minimally invasive non-human measurements.

2. Wide choice of single fibre probes for diverse measurements. Just connect a new probe tip. This represents an economic solution if you intend to sample at a number of different tissue sites with a limited number of LDF channels.

3. Single fibre probes are supplied with re-usable, detachable connectors (order code PCN-ST).

4. For longer-term measurements the Master can be disconnected to leave the single fibre in position between measurement periods.

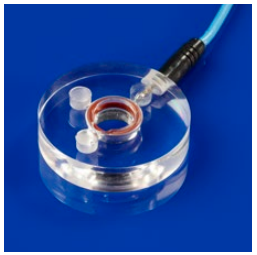
Combined Optic Probes

Combined optic probes allow blood flow and tissue oxygen measurements within a single probe head with connecting plugs for moorLAB-OXY and moorLAB-LDF.

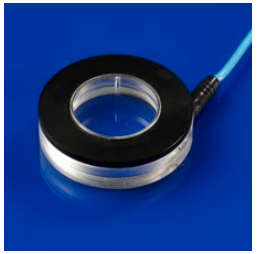
Skin and needle designs available with skin probes also capable of measuring temperature.



Iontophoresis Chambers and Pressure Cuffs



LIC-ION1R-P1 - perspex chamber which accepts Moor optic and skin heater probes. Chamber 9.5mm, overall diameter 36mm.



LIC-ION6+CAP - is a chamber with a sealed cap to prevent spillage and a transparent window for LDI imaging. Chamber 22mm, overall diameter 36mm.



LIC-ION3-P2 - direct and indirect (axon reflex) assessment with moorLAB-LDF. For use with P2 optic probes. Chamber annulus internal diameter 4mm, outside diameter 22mm, overall diameter 36mm.



MOORLABPRES-CONNECTOR-KIT - The kit consists of a 2m length of flexible tubing with a moorLAB-PRES connector on one end and a set of 6 different sized barbed adapters that enable the customer to use their own pressure cuffs with the moorLAB-PRES monitor. The 6 sizes of adapter are: 1/8” → 1/4”, 1/8” → 3/16”, 1/8” → 5/32”, 1/8” → 1/8”, 1/8” → 3/32” and 1/8” → 1/16”.

Intended Use

The moorLAB devices and software are not regulated or approved for medical use.

Notes



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innovation in microvascular assessment

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