Automatic pressure cuff control for routine microvascular testing

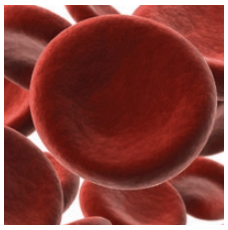
with moorVMS-PRES











moor instruments

innovation in microvascular assessment

moorVMS-PRES - Vascular Testing

The moorVMS-PRES pressure cuff control system provides reproducible and fully automated pressure cuff control for routine vascular challenges. With the use of a moorVMS-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 pressure protocols** including limb/toe systolic 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**.
- **Range of cuff sizes** for digit to thigh. Quick fit, airtight pressure line connectors.
- **Stand alone operation** for use with any laser Doppler, Imaging or other flow detection systems.
- **moorVMS-VASC software available** with USB output for graphical display of pressure profiles and integration with moorVMS-LDF blood flow traces. Compatibility with moorVMS-PC research software too.
- **Connect easily** to your data acquisition system. Analogue outputs of pressure and pulse volume recording. BNC connections.
- **Medical grade design** for both clinical and research applications.
- **Multilingual training DVD** for continual reference.
- **Single** operator control.
- **Reliability:** 3 year manufacturers warranty as standard.
- **Part of the moorVMS family;** configure your ideal system with extra pressure, laser Doppler, oxygenation and haemoglobin concentration, iontophoresis and skin heating modules.

Laser Doppler and Pressure Assessments

Combining automated pressure cuff control with laser Doppler monitoring of blood flow provides a highly sensitive and accurate tool for assessments of microvascular dysfunction and for vascular assessments of peripheral arterial disease (PAD).

Laser Doppler has become the gold standard for dynamic microvascular blood flow assessments as the laser Doppler technique is particularly sensitive for detecting flow changes.

A significant advantage of laser Doppler is that it does not require a pulsatile signal; pulsatility, essential to other techniques, is diminished or lost when peripheral blood flow is impaired. For example the use of laser Doppler for assessing toe blood pressure normally avoids the false high results encountered from ankles with calcified arteries.



moorVMS-PRES – complete with pressure cuff, optic probes and moorVMS-LDF2 laser Doppler monitor.

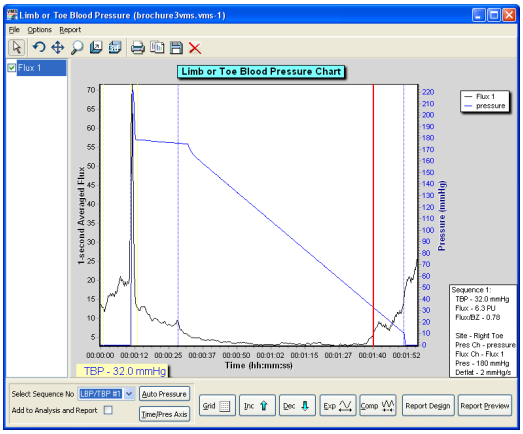
Standard Pressure Assessments

There are a number of standard pressure protocols commonly used by clinicians. The moorVMS-PRES is pre-programmed to enable 7 of the most common protocols with full flexibility to customise and add your own variant. A simple 'return to default' option is available too. Once you have choosen your protocol, connect the pressure cuff and apply to the patient, together with laser Doppler probe as appropriate. The protocol commences after your key stroke. An abort function is provided for safety to deflate the cuff on demand.

1.Toe Blood Pressure (TBP)



The toe blood pressure assessment (TBP) is used to determine the systolic pressure of a toe (or finger). The laser Doppler probe is placed distally to the cuff. The cuff is inflated to the target supra-systolic pressure. Slow, automatic and linear deflation allows the onset of reperfusion to be detected.



moorVMS-PC TBP analysis screen shot – please refer to the moorVMS-PC software brochure for further details. Image courtesy of Dr David Nathanson, Södersjukhuset, Sweden.

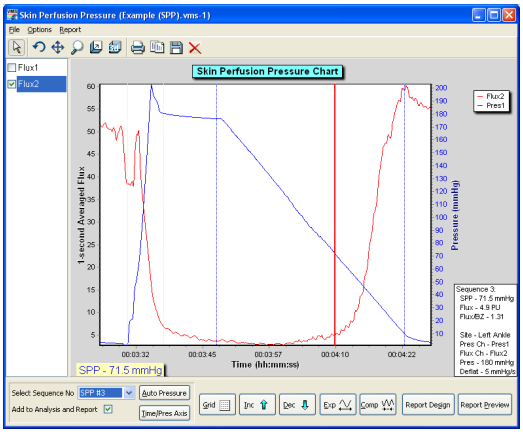
2.Limb Blood Pressure

As for toe blood pressure, limb systolic blood pressure is assessed with the cuff placed on a limb, rather than a digit and a distal laser Doppler probe.

3.Skin Perfusion Pressure (SPP)



SPP is used to assess tissue viability and is an aid to amputation level determination. In this case the laser Doppler probe is placed under the cuff to assess the tissue perfusion underneath the cuff itself (typically on the dorsum of the foot or lower limb). A flat laser Doppler probe is used to minimise any local artefact caused by tissue indentation.

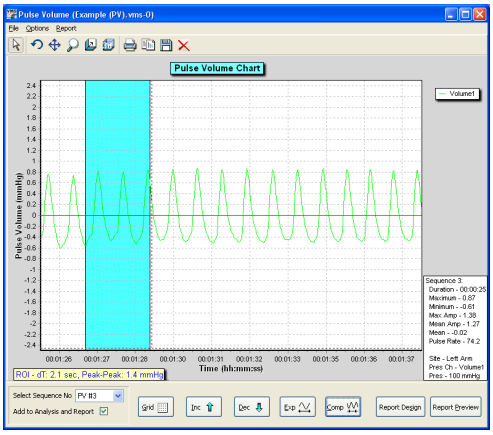


moorVMS-PC SPP analysis screen shot – please refer to the moorVMS-PC software brochure for further details.

4.Pulse Volume (PVR)



The moorVMS-PRES inflates the cuff to a target pressure below diastolic – typically 50mmHg. The small oscillatory pressure fluctuations within the cuff are monitored at this pressure. The fluctuations can be assessed for profile, amplitude and frequency.

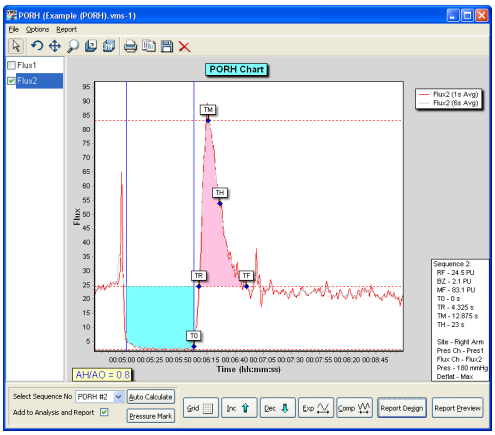


moorVMS-PC PVR analysis screen shot – please refer to the moorVMS-PC software brochure for further details.

5.Post Occlusive Reactive Hyperaemia (PORH)



Laser Doppler is used to follow the microvascular hyperaemic response from baseline, during occlusion and after release of occlusion. Important parameters detected automatically by moorVMS-PC software include time to first recovery, time to maximum hyperaemia, maximum hyperaemia and the area under the response curve. Additional information is derived from the profile of the hyperaemic response.



moorVMS-PC PORH analysis screen shot – example of a PORH protocol, please refer to the moorVMS-PC software brochure for further details.

6.Ankle / Brachial Pressure Index (ABPI)



ABPI is the ratio of the systolic blood pressure in the lower legs to the systolic blood pressure in the arms. Compared to the arm, lower blood pressure in the leg is an indication of peripheral arterial disease. ABPI is calculated by dividing the systolic blood pressure at the ankle by the higher of the two systolic blood pressures in the arms.

7.Toe/Brachial Pressure Index (TBPI)

As in the ABPI protocol, above, but toe pressure is used instead of ankle pressure. TBPI is performed when ABPI is abnormally high (>1.3) for example due to arterial plaques or calcification commonly found in diabetic patients.

Postural Vasoconstriction

Oedema is common in venous insufficiency due to calf muscle pump failure and incompetent venous valves. Such insufficiency can lead to venous ulcers. Measurements of the percentage change in flux with the leg at heart level and then dependent provides an index of postural vasoconstriction. This test is performed using just the moorVMS-LDF laser Doppler system to detect the changes in flow associated with the test.

Custom protocols

Most of the pressure protocols follow the same pattern comprising of a resting baseline, cuff inflation to a target pressure, hold, then release (at various rates). The moorVMS-PRES allows complete control to change each parameter (within clinically safe limits). Further customisation and inclusion of tissue heating and iontophoresis protocols is possible with the use of moorVMS-PC software.

What equipment do I need?

	Equipment								
	moorVMS-PRES	moorVMS-LDF1 or moorVMS-LDF2	moorVMS-PC PC software	VP1T skin probe	VP-SPP low profile probe	Pressure cuff			
Evaluation						Toe	Arm	Arm RD*	Thigh
1.Limb Pressure	●	●	●	●			●		●
2.Toe Pressure	●	●	●	●		●			
3.Skin Perfusion Pressure	●	●	●		●		●		●
4.Pulse Volume Recording	●		●				●		●
5.Post Occlusive Reactive Hyperaemia	●	●	●	●				●	●
6.Ankle / Brachial Pressure Index	●	●	●	●			●		
7.Toe / Brachial Pressure Index	●	●	●	●		●	●		
Postural Vasoconstriction		●	●	●					

*Note, the arm rapid deflation cuff can be used in place of the standard arm cuff.

About Moor Instruments

Moor Instruments, established in 1987, is a world leader in the design, manufacture and distribution of laser Doppler systems, used for the monitoring and imaging of blood flow in the microvasculature.

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.

Our dedicated design team are involved with a number of development projects for other partners and manufacturers. Whatever your needs, as a researcher, clinician or manufacturer, Moor will work harder for you.



moorVMS-PRES with optional moorVMS-LDF2 dual channel module.

Specifications:

Quality Control
Moor Instruments is certified to ISO 13485:2016.

Measurement Parameters
Pressure.
Pulse Volume.

Reliability
3 year manufacturers warranty as standard.

Pump
Inflation range: 20-250mmHg.
Inflation rate: Inflates a leg cuff to 200mmHg in less than 10s, arm cuff in less than 5s.

Deflation Rate
Linear, 1mmHg/s – 10mmHg/s from 250-40mmHg for all cuff sizes.

Outputs
LCD screen providing display of pressure.
USB Interface for connection to PC.
Analogue outputs: BNC sockets, 0-5V.

General
Power source: Universal voltage, 100-230V AC, 30VA, 50 to 60Hz.
Dimensions: W x H x D mm, Weight: kg
moorVMS-PRES: 235 x 80 x 200, 2kg.
Operating environment: Clinic or laboratory, excluding domestic.
Operating temperature: 15-30ºC.

Classification
Type of protection against electric shock: Class I.
Degree of protection against electric shock: Type BF applied parts.
Not suitable for use in an oxygen rich atmosphere.
Not suitable for use in the presence of flammable anaesthetics.

Safety Standards
Complies with:
IEC 60601-1:2005+A1:2012.

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Yamada T., Ohta T., Ishibashi H., Sugimoto I., Iwata H., Takahashi M., Kawanishi J. 2008 Clinical reliability and utility of skin perfusion pressure measurement in ischemic limbs—Comparison with other noninvasive diagnostic methods. Journal of Vascular Surgery, Volume 47 (2), Pages 318-323.

Moor Instruments reserves the right to change specifications without notice.

This product and its accessories are not for sale for use within the EU and UK.

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innovation in microvascular assessment

Moor Instruments Ltd Millwey Axminster Devon EX13 5HU UK tel +44 (0)1297 35715 fax +44 (0)1297 35716 email sales@moor.co.uk
Please visit www.moor.co.uk for full details of our international distributors and partners