

# Microvascular Studies

## ADInstruments DMT Wire Myograph Systems



PowerLab® data acquisition systems with DMT wire myographs are a complete solution for *in vitro* investigations of muscle structure and function. Ideal for studies of smooth muscle in tubular tissues >60 µm in diameter (i.e. vein, artery, bronchi, vas deferens and ureter), myographs are available in single, dual, four-chamber and LCSM models. Complete myography solutions are also available for muscle strip and large tubular tissue research (vessels >100 µm and tissues <10 mm).

All DMT myographs feature an in-built thermostat, and oxygen and suction ports, as well as manual or automatic micropositioners for precision pretension of tissues. The user-friendly digital display confers straightforward set-up, as well as live re-calibration and alteration of experimental parameters.

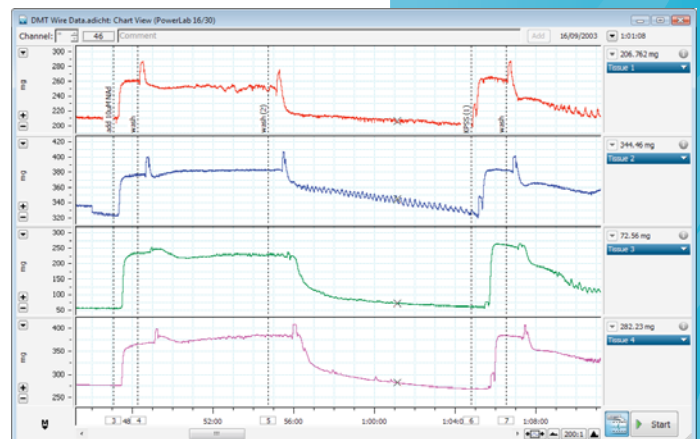
The PowerLab unit acquires tension data in real time, which is displayed, recorded and analyzed using LabChart Pro software - an easy-to-use interface for controlling data acquisition and display options, and automating repetitive procedures (such as channel calculations).

For advanced analysis of discrete data sets, LabChart Pro contains specialized modules with comprehensive and powerful data evaluation, extraction and export tools. The DMT Normalization, Peak Analysis and Dose Response modules (supplied) ensure rapid, uncomplicated experiment optimization and data analysis.

### Features & Benefits

- Complete microvascular research systems
- Single, dual and four-chamber myographs
- Compact, solid design includes in-built thermostat, and oxygen and suction ports
- For use with small tubular tissues >60 µm in diameter
- High resolution force transducers (error)
- Specialized software for calculating optimal pretension conditions
- Hardware solutions for large ring and strip preparations

Below: LabChart displays the tension response of four normalized vessels to noradrenaline.



# Data Acquisition & Analysis

## PowerLab Data Acquisition Systems with LabChart

With every Wire Myography System for research, a PowerLab data acquisition unit with LabChart Pro software is supplied. PowerLab data acquisition units provide 16-bit resolution on all gain ranges, hardware filters that eliminate environmental interference, and sampling speeds of up to 200 kHz per channel.

In combination with DMT Wire myographs, PowerLab with LabChart Pro seamlessly detects and converts analog force signals to digital data in user-determined units (such as grams or Newtons).

### Use LabChart to:

- Automatically recognize and control PowerLab hardware, amplifiers and transducers
- Acquire up to 32 channels of data from multiple devices
- Calibrate and display signal in meaningful units
- Examine data in specialized displays including Scope, Spectrum, Zoom and XY Views
- Generate customized stimulus outputs
- Automate repetitive tasks with customizable macros
- Extract experimental results efficiently with Data Pad
- Export data to spreadsheet and graphing programs
- Recall data and experimental settings in seconds
- Analyze discrete data sets with specialized modules

## DMT Normalization Module

As tension affects the smooth muscle function of vessels, pre-trial tension standardization (normalization) is essential for accurate results and expedient data analysis. The DMT Normalization Module for LabChart uses validated algorithms (Mulvany *n.*, 1976) to rapidly normalize vessels.

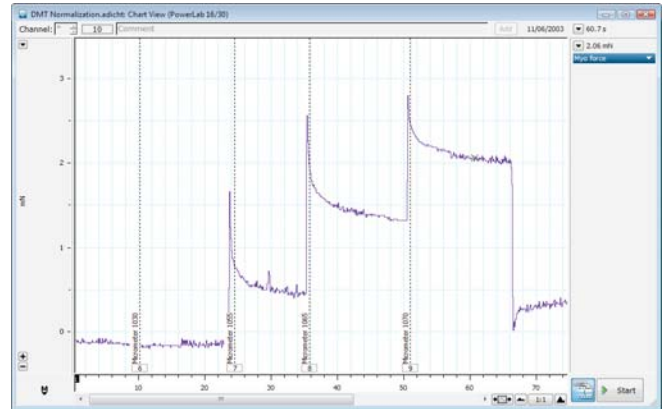
By automatically calculating effective vessel pressure, the module determines the optimal micrometer setting (normalized pretension) for each tissue sample, accounting for factors such as contractile tissue volume and size.

## Dose Response Module

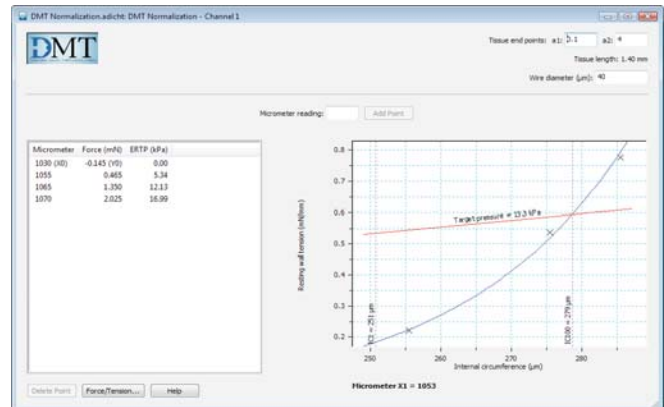
A flexible and effortless contingent for studies of muscle contraction, enzyme activity, membrane potential and hormone secretion in response to chemical, electrical or physical agents. By identifying response markers in user-selected LabChart data, this module generates dose response curves, hill slopes and EC<sub>50</sub> data.

## Peak Analysis Module

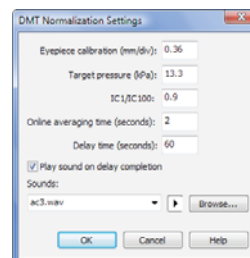
Automatically detect and analyze multiple, non-overlapping peaks, with several default analysis settings available for general waveforms. Detection, calculation and display options can be customized for each waveform type to suit your application.



Data recorded with LabChart software and PowerLab showing step-wise distension and force measurement of the tissue.



Above: DMT Normalization Module window with step-wise distension of the tissue using the micrometer and the recorded developed force. The curve is automatically generated from the calculated internal circumference and resting wall tension by the module.



Left: DMT Normalization Settings dialog.

# Product Selection

## DMT Myographs

With one set attached to a micropositioner and the other to an isometric force transducer, the unique stainless steel jaws featured in DMT myographs accommodate tubular structures with diameters between 60  $\mu\text{m}$  and 3 mm. Vein, artery, bronchi, vas deferens, ureter, and other microvessels are mounted as a ring preparations with stainless steel wire supplied with the system (25 or 40  $\mu\text{m}$ ).

For larger vessels (up to 10 mm) and strip preparations (up to 15 mm), myography units with pin/clamp supports are also available. All wire myograph chambers are temperature controlled and feature ports for oxygenation and removal of buffer solution.

Stimulation and field studies are easy with simple substitution of the steel mounting jaws with plastic jaws (right), and the addition of stimulating electrodes (both available separately). With the addition of supplementary transducers, you can also acquire temperature and pH signals in parallel to isometric tension data.



### DMT310A Single Wire Myograph

A single chamber (10 mL) unit for isometric studies. Chamber-base window for acquisition of morphology and fluorescence data.

### DMT510A Auto Dual Wire Myograph

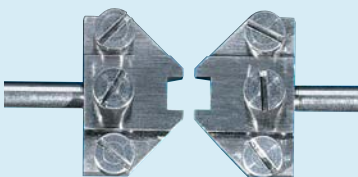
Features two 10 mL chambers with windows for acquisition of morphology and fluorescence data, and automatically controlled micropositioners for determination of passive length-tension relationships. Chambers can be divided for simultaneous investigation of two vessels (2 x 5 mL compartments). Also available, the **DMT410A Dual Wire Myograph** is an identical model with manual micropositioners only.

### DMT120CW Confocal Wire Myograph

A single chamber (10 mL) unit to measure tension during laser scanning fluorescence microscopy. Simultaneously measure isometric force and intracellular  $\text{Ca}^{2+}$  or pH (optical equipment not included).

## Multi-chamber myographs

For simultaneous study of up to four vessels or large tissue preparations, four-chamber myograph units featuring stainless steel 8 mL chambers are supplied. Each chamber features needle valves for independent control of oxygenation, chamber suction (buffer removal) and force detection parameters.



### DMT620M Multi-Chamber Myograph

Test multiple vessels (> 60  $\mu\text{m}$ ) in high-throughput studies such as drug screening.

### DMT720MO Tissue Bath System w/Touch Screen

For vessels >500  $\mu\text{m}$  and large tissues <10 mm, such as trachea or gut, mounted as ring preparations.

### DMT820MS Muscle Strip Myograph

For striated or cardiac muscle, as well as smooth muscle and organ strip preparations <15 mm length. Supplied with clamp supports and an optional chamber cover with electrodes for field stimulation.



# Ordering Information

## Complete Wire Myograph Systems

PL3508B21 Single Wire Myograph System	PL3508B22 Dual Wire Myograph System
1 x PL3508 PowerLab 8/35 with LabChart (Win & Mac) includes LabChart Pro software	1 x PL3508 PowerLab 8/35 with LabChart (Win & Mac) includes LabChart Pro software
1 x DMT310A Single Wire Myograph	1 x DMT410A Dual Wire Myograph
PL3508B23 Auto Dual Wire Myograph System	PL3508B24/TS Multi-Chamber Wire Myograph System
1 x PL3508/P PowerLab 8/35 with LabChart (Win & Mac) includes LabChart Pro software	1 x PL3508/P PowerLab 8/35 with LabChart (Win & Mac) includes LabChart Pro software
1 x DMT510A Auto Dual Wire Myograph	1 x DMT620M Multi-Chamber Wire Myograph
PL3508B25 Confocal Wire Myograph System	Complete Wire Myograph Systems include LabChart Pro software. LabChart Pro contains all ADInstruments LabChart Modules, including the DMT Normalization Module.
1 x PL3508/P PowerLab 8/35 with LabChart (Win & Mac) includes LabChart Pro software	
1 x DMT120CW Confocal Wire Myograph	

## Individual Items

Code	Description	Code	Description
DMT310A	Single Wire Myograph	DMT620M	Multi-Chamber Wire Myograph
DMT410A	Dual Wire Myograph	DMT120CW	Confocal Wire Myograph
DMT510A	Auto Dual Wire Myograph	DMT820MS	Muscle Strip Myograph
DMT720MS	Wire Myograph	DMT100192	Automated Buffer Filler System

## Software

MLS060/7 LabChart (Win and Mac)		MLS330/7 GLP Client and MLS335 GLP Server (Win)	
MLS260/7 LabChart Pro (Includes the modules listed below. Modules are also available for individual purchase.)			
MLS390/7 Dose Response (Win)	MLS310/7 Heart Rate Variability (Win and Mac)	MLS340/7 Cardiac Output (Win)	
MLS065/7 DMT Normalization (Win and Mac)	MLS240/7 Metabolic (Win and Mac)	MLS320/7 Video Capture (Mac and Win)	
MLS370/7 Blood Pressure (Win)	MLS062/7 Spike Histogram (Win and Mac)	MLS395/7 Circadian Analysis (Win)	
MLS360/7 ECG Analysis (Win)	MLS380/7 Peak Analysis (Win)	MLS375/7 PV Loop (Win)	
GraphPad Prism			
MLS080 GraphPad Prism® (Win)	MLS081 GraphPad Prism® (Mac)		



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PowerLab systems and signal conditioners meet the European EMC directive. ADInstruments signal conditioners for human use are approved to the IEC60601-1 patient safety standard and meet the CSA C22.2 No. 601.1-M90 and UL Std No. 2601-1 safety of medical electrical equipment standards.



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