ADINSTRUMENTS
making science easier

Volume Flow Measurement

PowerLab and Transonic Flowmeter Systems



Perform accurate and precise fluid volume flow measurements for *in vivo, in vitro,* and *ex vivo* flow research with our complete solutions.

Our systems for *in vivo, in vitro,* and *ex vivo* flow research combine cutting-edge technology and reliability with Transonic® Flowmeters and PowerLab data acquisition.

Better measurements, proven results

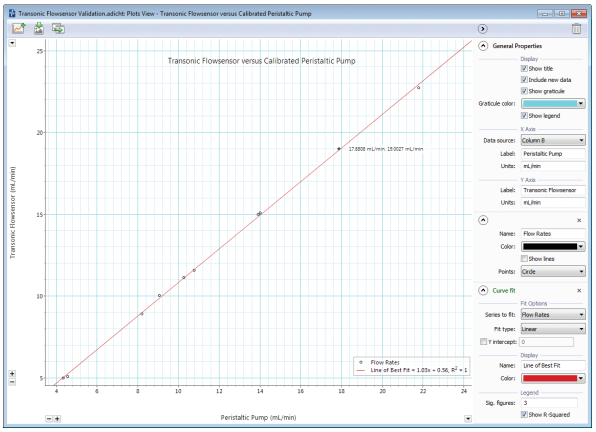
Transonic patented ultrasound transit-time technology is the gold standard for flow research:

- Precise and reliable true volume flow
- Excellent signal stability
- No electrical interference from ambient electrical noise
- Insensitivity to flow turbulence, flowprobe and vessel alignment, and changes in vessel diameter

Measurements using Transonic technology have been independently validated in many applications and referenced in thousands of publications.

Move quickly from set-up to analysis

Transonic flowprobes and flowsensors are precalibrated and ready for immediate use. Your data is recorded via the PowerLab into LabChart acquisition and analysis software, where you can choose flexible recording options and real-time calculations.



Typical studies:

- Hemodynamic studies
  - Myocardial function
  - Coronary circulation
- Renal physiology and hypertension
- Circulatory models (thrombosis)
- Isolated heart and organ perfusion
- Medical devices testing
- Ventricular assist devices (VAD) performance
- Artificial heart development

Left: *LabChart displays measured flowrates from a Transonic flowsensor plotted against a calibrated peristaltic pump – highlighting sensor accuracy.*

Perivascular and Tubing Research Systems

Jump-start your research with a Perivascular and Tubing Flow System. Combining gold-standard flow measurement modules from Transonic with state-of-the-art data acquisition from ADInstruments, these systems provide the foundation for accurate and reliable flow research.

One or Two Channel Flow Systems are available with a Dual Channel Console that can fit up to two Perivascular Flowmeter Modules, two Tubing Flowmeter Modules, or a combination of the two. Systems must be used in combination with suitable Transonic Perivascular Flowprobes or Tubing Flowsensors (sold separately).

Perivascular and Tubing Flow System includes:

- C Series Instrument Interface
- LabChart Pro software
- One or Two Channel Perivascular/Tubing Flowmeter
- Dual Channel Console
- 2 x BNC to BNC Cable (1 m)



Customize your flow measurement experience

Build your measurement system to suit your experimental design, by mixing and matching any combination of Perivascular or Tubing Flowmeter Modules in a dual or triple channel console. Alternatively you can leave a console blank for future addition of another Flowmeter Module. The modular nature of Transonic® flowmeters lets you create the configuration you need. State-of-the-art ultrasound transit-time technology of Transonic can also be paired with LabChart via an Instrument Interface if only volume flow is being recorded and analyzed.

Select your flowprobes

Perivascular Flowprobes

Accurately and precisely measure either acute or chronic *in vivo* arterial or venous flow in both small and large animal blood vessels, including atypical animal models such as fish. Flowprobes are placed external to the vessel and do not interfere with flow to the target tissues.

Perivascular 0.5-20 mm

PS series flowprobes offer the greatest diversity of customizable features for different animal models (mice and larger animals). Our range includes miniaturized versions (nanoprobes - 0.5 and 1.5 mm) that are scaled to fit mouse anatomy, measuring flow < 1 mL / min *(shown below left)*.



Perivascular 1 and 1.5 mm

PR series flowprobes are for small acute or chronic applications that require larger probe heads for increased robustness.



Microcirculation 0.5 and 0.7 mm



V Series flowprobes are designed for acute flow measurements in small vessels. They have a larger body and increased robustness. More acoustic gel is required for larger lumen vessels.

Cardiac Output 8-36 mm



PAU or COnfidence Flowprobes are made for chronic and acute cardiac output studies in large animal models. They have Ultrafit Liners to provide cushioning for safe, easy placement and attachment without a clip.

Select your flowsensors

Tubing Flowsensors

Measure volume flow in non-aerated liquids including saline, buffer solutions, blood, water, and other organic fluids with high resolution and low offset. Flowsensors provide reliable, stable measurements even under perturbed and non-steady flow conditions.

Clamp-on 3-32 mm OD



PXL series sensors “clamp-on” to most flexible laboratory and extracorporeal tubing. They are perfect for quick, repeatable process testing that is applied to multiple circuits without flow interruption. Total physical and electrical isolation is maintained between the sensor and the liquid.

Applications include:

- Artificial heart and VAD performance
- Medical device and pump engineering
- Manufacturing and compliance flow testing

Inline 25 mm ID



PXN sensors offer flexibility in studies where tubing requirements are subject to change. Sensors splice into laboratory tubing for volume flow measurements of blood and other fluids, ranging from < 5 to 100 L / min.

Applications include:

- Perfused isolated organ studies
- Flow phantoms and circulatory models
- Tubing flow applications requiring maximum sensitivity

Perivascular Flowprobe and Tubing Flowsensor Accessories

A range of accessories are available for both flowprobes and flowsensors that include extension cables, acoustic couplants, and stabilization products, such as for easy anchoring of flowprobes to tissue. Additionally, a perivascular flowprobe can be terminated with different connectors for different chronic applications. Tubing flowsensors can be calibrated for use with water, saline, blood, Krebs–Henseleit solution or a glycerine mixture (40% glycerine and 60% water by volume).



CM4 Rigid Cuff



4-pin TS420 Extension Cable (1.8 m)



Chronic Connector (Titanium 12-pin, Skin Button)



Chronic Connector (Sealed 4-pin, Straight)

Laser Doppler Flowmetry

Invasively or noninvasively measure indirect blood flow using Laser Doppler Flowmetry. The laser Doppler FlowMeter uses specialized fibre optic probes to measure blood cell perfusion in skin, muscles, and organs.

Easy to use, and highly suitable for monitoring circulation during surgery or studying tissue perfusion in drug or cardiovascular studies. Using LabChart software, PowerLab, Blood Flowmeter and a suitable LDF probe, you can continuously monitor and rapidly analyze tissue perfusion of microvascular beds.





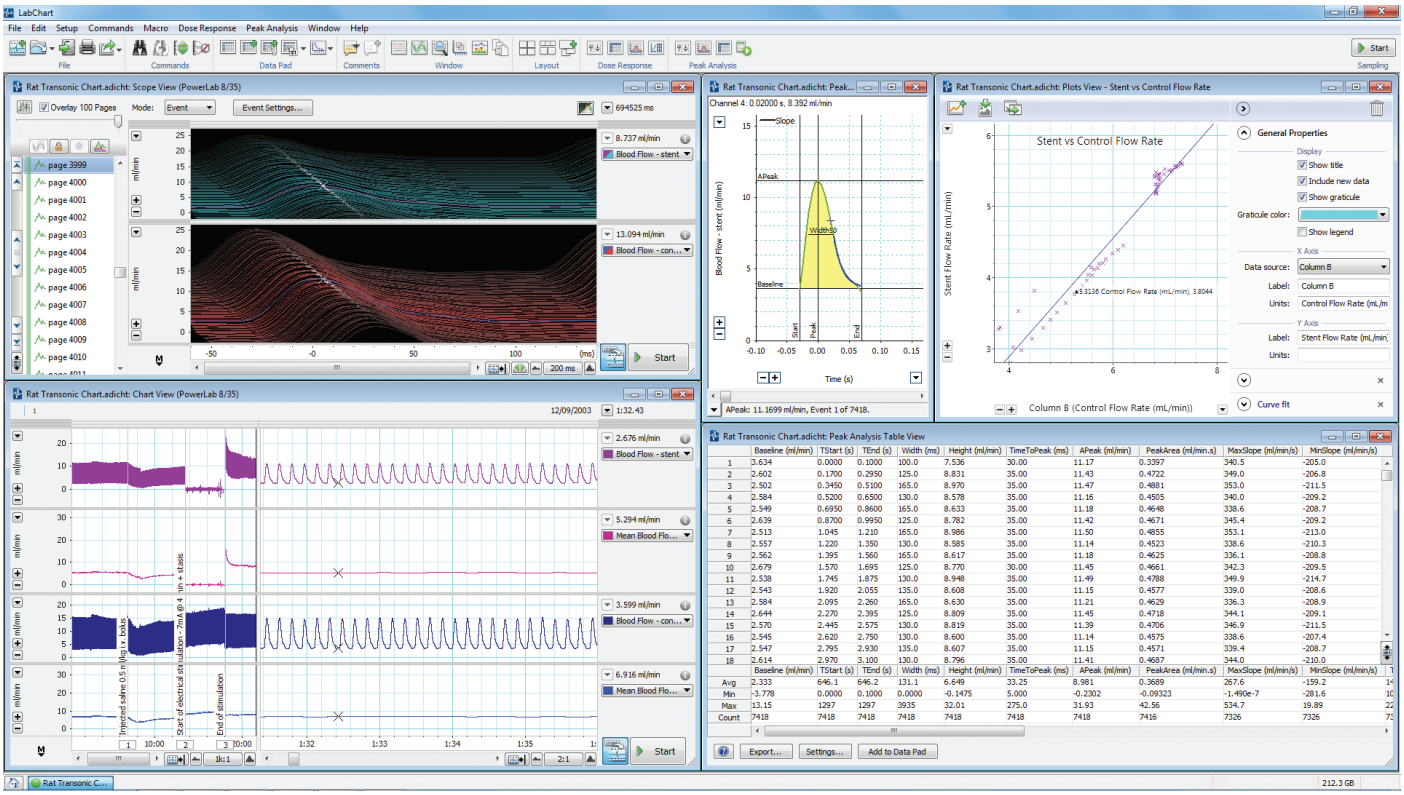


Blood Flow Meter: Single channel laser Doppler flow meter to measure blood cell perfusion in the microvasculature of tissues and organs.

LabChart Pro

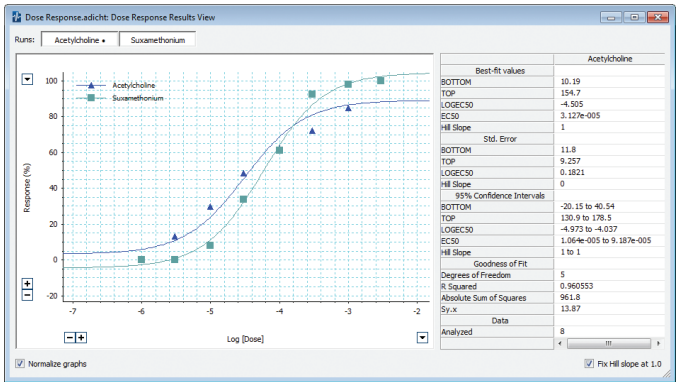
Powerful analysis for better results

LabChart Pro software, supplied with Perivascular and Tubing Flow Systems , simultaneously displays and analyzes up to 32 channels of data. It is easy to perform data analysis in real-time or post-acquisition. A multitude of flexible features allow a range of views and graphing.



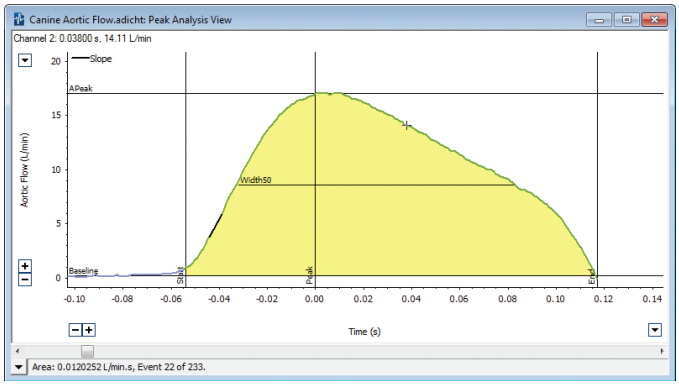
LabChart Pro Add-Ons

Automate flow volume analysis using Add-Ons supplied with LabChart Pro, including Peak Analysis and Dose Response.



Dose Response Add-On

Easily identify response markers for automated generation of Dose Response curves. Obtain quick parameter calculations including EC_{50} values and Hill slopes.



Peak Analysis Add-On

Automatically detect and analyze multiple, non-overlapping signal peaks in real-time or offline. Choose from several analysis settings available for general waveforms and specific signal types.

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