

**ACCURACY
MATTERS**



IT'S SURVIVAL OF THE FITTEST OUT THERE

In the world of scientific research, accuracy matters. You need failproof equipment and dependable data, every time.

The combination of Millar Mikro-Tip[®] pressure catheters, PowerLab, and LabChart options provide results with unparalleled accuracy, reliability, and data quality. That's why 72% of all animal PV research papers published have used Millar catheters.

ADInstruments are proud to be the exclusive global distributors of Millar Mikro-Tip[®] pressure catheters and associated hardware for ventricular pressure volume and invasive pressure recording. Millar Mikro-Tip catheters are the world's most accurate physiological pressure catheters, providing superior measurement sensitivity.

By combining Millar's high fidelity, minimally invasive catheters with the precision of PowerLab data acquisition and LabChart data analysis software, you can build a high quality, flexible system that will give you comprehensive data you can trust.

ADInstruments + Millar

- Precise calibration for reliable and accurate results in both healthy and disease models
- Gold standard catheters from Millar
- Infinite manipulation and calculation opportunities in LabChart and LabChart Lightning software - changes are never compounded so you can always identify or revert to your original data
- Attention to detail at every step, from acquisition to data manipulation and analysis
- Smooth transition of data from hardware to software, full integration with tailored settings files, continuous buffering and saving, and the ability to see any impact hardware has on sampling



Since 1969, Millar, Inc. has been a pioneer in the development of advanced pressure sensor technology to fuel ground-breaking research. Around the world, animal researchers rely on Millar technology, including pressure catheters and pressure-volume loop systems to make measurements, and decisions, with unprecedented accuracy, precision and confidence.



Millar SPR-839
Pressure-Volume
Catheter



Ventricular Pressure Volume

Changes in ventricular function for both normal and diseased model conditions can be studied by analyzing ventricular pressure volume (PV) loops. PV Loops are the gold standard for measuring direct, real-time, complete cardiac function. PV loops are generated by plotting real-time left or right ventricular pressure against ventricular volume, with one loop representing the complete cardiac cycle.

Benefits of using PV Loops as a research technique

- Provide instant cardiovascular function feedback based on morphology, position and timing
- The only research technique that provides full diastolic analysis
- Allows you to vary the load and measure beat-to-beat response of the changing load

Solutions Overview

MPVS Ultra® Foundation Systems

Simultaneously measure ventricular pressure and volume in large and small animals with a Millar Pressure Volume (MPVS) Ultra Foundation System. Combine this with your choice of over 50 Millar Mikro-Tip® Catheters covering all animals larger than 16 g (all sold separately).

LabChart Pro includes the PV Loop Module for automated calculation of systolic and diastolic pressures, stroke volume, CO and more.

Each System includes:

- Instrument Interface (the Large Animal system also comes with a PowerLab C and two additional Instrument Interfaces)
- LabChart and LabChart Pro analysis software
- MPVS Single Segment Pressure-Volume Unit or MPVS Ultra Pressure-Volume Unit (MPVS Hardware, power and USB cables, Ultra control software, Training CD)
- MPVS Cable Packs
- Application calibration cuvettes



Small Animal System (Rats and Mice)



Large Animal System



Millar Mikro-Tip Pressure Volume Catheters

	Catheter	Length (cm)	Sensor (#)	Electrode (#)	Electrode Spacing (mm)	Tip French	Pigtail
MOUSE	PVR-1030 ¹	3.25	1	4	3	1	Straight
	PVR-1035 ¹	3.25	1	4	3.5	1	Straight
	PVR-1045 ¹	3.25	1	4	4.5	1	Straight
	SPR-839	3.25	1	4	4.5	1.4	Straight
	SPR-864	3.5	2	4	4.5	1.4	Straight
RAT	SPR-838	12.5	1	4	9	2F	Straight
	SPR-847	15	1	4	9	1.4F	Straight
	SPR-869	12.5	1	4	6	2F	Straight
	SPR-878	15	1	4	12	2F	Straight
	SPR-901	15	2	4	9	2F	Straight
SMALL ANIMAL	SPR-877	105	1	10	2.5	3F	Straight
LARGE ANIMAL	Ventricath- 507	120	1	12	7	5F	Both*
	Ventricath- 510	120	1	12	10	5F	Both*
	Ventricath- 512	120	1	12	12	5F	Both*
	Ventricath- 515	120	1	12	15	5F	Both*

¹Both pigtail and straight options available (add 'S' to product code for straight)

¹Non-repairable

Invasive Blood Pressure

What is Invasive Blood Pressure (IBP)?

Blood pressure is the amount of pressure exerted by blood on the vessel wall as it is pumped around the cardiovascular system by the heart. Invasive blood pressure is a technique that involves inserting a catheter directly into an artery to measure continuous arterial and vascular pressure signals at the source. This technique provides a high level of sensitivity and data accuracy for cardiovascular research.

Benefits of using Invasive Blood Pressure as a research technique:

- High fidelity
- Ideal for beat-to-beat monitoring of basic, acute and chronic cardiovascular measurements
- Allows for the assessment of time variance and dynamics of change in data over time
- The most commonly used method for monitoring basic cardiovascular parameters
- Measures systemic blood pressure
- Able to derive mean arterial pressure (MAP), systolic and diastolic pressure and pulse pressure
- Ideal for both acute and chronic cardiovascular monitoring
- Ability to check for time variance and dynamics of change in data over time



LARGE ANIMALS

RATS

MICE

Solutions Overview

Mikro-Tip BP Foundation System

The Mikro-Tip BP Foundation System allows measurement of blood pressure in small to large animals. Choose from a wide range of Mikro-Tip pressure catheters that allow you to place the sensor in an artery or heart to measure blood pressure directly.

Each System includes:

- Front End Interface
- LabChart Pro software
- Bridge Amp
- Applicable interface cables



PowerLab
COMPATIBLE

Millar Mikro-Tip Pressure Catheters

	Catheter	Material	Subject	Length (cm)	Tip French	Tip	Sensor Spacing (cm)
SINGLE SENSOR	SPR-1000	Polyamide	Mouse	20	1F	Straight	N/A
	SPR-671	Nylon	Mouse	15	1.4F	Straight	N/A
	SPR-320	Polyurethane	Rat	140	2F	Straight	N/A
	SPR-407	Nylon	Rat	140	2F	Straight	N/A
	SPR-513	Nylon	Rat	140	2F	Curved	N/A
	SPR-524	Nylon	Small Animal	100	3.5F	Straight	N/A
	SPR-249A	Nylon	Small Animal	60	3F	Straight	N/A
	SPR-330A	Nylon	Small Animal	130	3F	Straight	N/A
	MPR-500	Polyurethane	Large Animal	70	5F	Straight	N/A
	SPR-350*	Polyurethane Woven Dacron	Large Animal	120	5F	Both	N/A
DUAL SENSOR	SPR-940	Polyurethane	Rat	135	2.5F	Straight	2.5
	SPR-751*	Polyurethane Woven Dacron	Large Animal	120	5F	Both	3

All Millar Mikro-Tip Pressure Catheters have low profile pressure connectors

*Options for both curved and straight tip (add 'S' to product code)

Proven within the research community

Millar Mikro-Tip catheters and the conductance method of calibration have been tested and validated as an accurate and trustworthy combination for research.

Schiattarella, G.G. et al. (2019). Nitrosative Stress Drives Heart Failure with Preserved Ejection Fraction. *Nature*, 568 (7752): 351-356.

Whyte, W. et al. (2018). Sustained release of targeted cardiac therapy with a replenishable implanted epicardial reservoir. *Nature Biomedical Engineering*, 2: 416-428.

Data acquisition and analysis re-imagined



Modular system



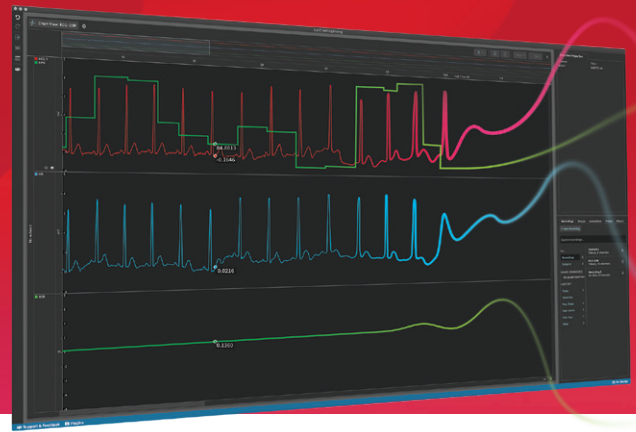
Powerful and portable



Analog compatible



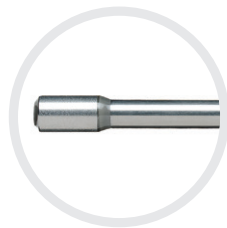
Digital framework for the future



Other Applications

Arterial Pulsatile Analysis

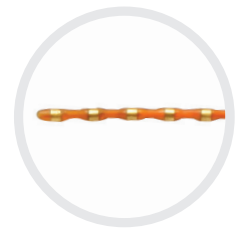
The Non-Invasive Pulse Wave Tonometer is a handheld wand probe equipped with a Mikro Tip pressure sensor at the tip, and is a proven method for reproducing high-fidelity arterial blood pressure waveforms. It can be used to evaluate hypertension, arterial stiffness, the augmentation index, heart failure and pulse wave velocity.



Non-Invasive Pulse Tonometer

Electrophysiology

Millar's electrophysiology catheters can be used for standard electrophysiology studies by applying pacing and recording protocols from inside the heart (intracardiac) or through the esophagus (transesophageal) to determine the electrical properties of the atrium and ventricle. Electrophysiology is a proven method for characterizing the phenotyping of transgenic rodents and studying and pacing atypical heart rhythms.



Electrophysiology Catheter

LabChart

Go beyond the standard approach with LabChart

LabChart data analysis software creates a platform for all your recording devices to work together, allowing you to acquire biological signals from multiple sources simultaneously and apply advanced calculations and plots as your experiments unfold.

With LabChart, you can record and display up to 32 channels of data in real time, performing online calculations at high sampling rates, giving you full control of your research.

System highlights

Simplicity

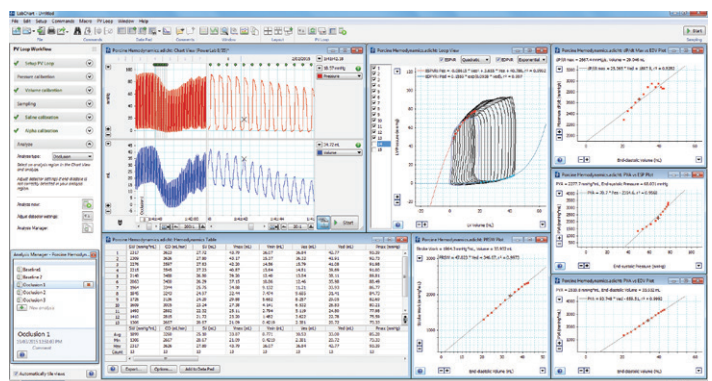
Easy to set-up and use

Power

Combine with a PowerLab to simultaneously acquire and analyze analog signals

Take advantage of our specialized LabChart analysis modules

LabChart's PV Loop Module is purpose built for the acquisition, calibration, and analysis of left and right ventricular pressure-volume data in small and large mammals, including intelligent presets and workflows to guide you through each step of the calibration process. Analysis results can be displayed in a variety of views, plots and tables.



PV Loop Module

Flexibility

Options of standard analysis tools or full customization

Integrity

LabChart tracks every action without modifying your raw data

Visit our website or contact your local ADInstruments representative for more information

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