

# Accuracy Matters





  
**Your research your way**

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

With a combined 85+ years of experience in research excellence, ADInstruments and Millar ensure you have the right technology and support to unlock new insights and push the boundaries of discovery.

Together, Millar and ADInstruments create a seamless pressure and pressure-volume system. Our products are designed to work together. With Millar's gold-standard Mikro-Tip® catheter technology, and ADInstruments end-to-end DAQ system, we offer unparalleled accuracy, reliability, and data quality.

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. 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

- Gold standard catheters and precision calibration for both admittance and conductance workflows.
- Infinite manipulation and calculation opportunities in LabChart - changes are never compounded so you can always identify or revert to your original data.
- Specific LabChart modules to support the acquisition and analysis of PV Loop, ECG, Blood Pressure, and Peak Analysis data.
- 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.
- Comprehensive support to help you through any technological or research issue.



Since 1969, Millar, Inc. has been a pioneer in the development of advanced pressure sensor technology to fuel groundbreaking 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.



# 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.

## The 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

## MPVS Duo Foundation System

The MPVS Duo Foundation System is configured for measurement of left or right ventricular pressure (LVP) and volume in small through to large animals. The MPVS Duo from Millar is an intuitive pressure-volume loop measurement system designed to work in conjunction with Millar's gold standard Mikro-Tip PV Catheters.

### MPVS Duo features:

- Optimize catheter position with live ventricular volume feedback
- Supports both admittance and conductance calibration pathways
- Supports wide range of catheters for small and large animals
- Built in hydration clock keeps track of the viability of your catheter, reducing sampling error
- Designed for use with Millar's gold standard Mikro-Tip PV Duo range of catheters
- BNC output for use with ADInstruments PowerLab and LabChart data acquisition systems
- Future-proof your lab with in-lab firmware updates
- Automated pressure sensor balance
- Single system for all animal models



### System includes:

- Millar MPVS Duo Pressure-Volume System
- PowerLab C
- C Series Instrument Interface
- LabChart and LabChart Pro analysis software
- LabChart PV Loop Module

## Millar MPVS Duo Compatible Mikro-Tip Pressure Volume Catheters

	Catheter	Length (cm)	Sensor (#)	Electrode (#)	Electrode spacing (mm)	Tip French (F)	Tip style(s)
MOUSE	PVR-1030A <sup>1</sup>	3.5	1	4	3	1.1 F	Straight
	PVR-1035A <sup>1</sup>	3.5	1	4	3.5	1 F	Straight
	PVR-1045A <sup>1</sup>	3.5	1	4	4.5	1 F	Straight
	SPR-839A	3.25	1	4	4.5	1.4 F	Straight
RAT	SPR-838A <sup>2</sup>	15	1	4	9	2 F	Straight
	SPR-869A <sup>2</sup>	15	1	4	6	2 F	Straight
LARGE ANIMAL	Ventri-Cath-1	122	1	7	5 (15, 20, 25, 30)	5 F	All <sup>3</sup>
	Ventri-Cath-2	122	1	7	10 (20, 30, 40, 50)	5 F	All <sup>3</sup>
	Ventri-Cath-3	122	1	7	10 (35, 45, 55, 65)	5 F	All <sup>3</sup>
	Ventri-Cath-4	122	1	7	10 (50, 60, 70, 80)	5 F	All <sup>3</sup>
	Ventri-Cath-5	122	1	7	10 (70, 80, 90, 100)	5 F	All <sup>3</sup>

**Please note:** This is a small sample of available catheters. The wide range of the catheters compatible with the MPVS Ultra are still available.

<sup>1</sup> Non-repairable only

<sup>2</sup> Non-repairable options are available

<sup>3</sup> Pigtail, straight, and straight with monorail tip options are available (add 'S' to product code for straight, or 'M' for straight monorail)

# 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.

## The benefits of using Invasive Blood Pressure as a research technique:

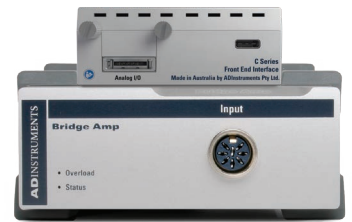
- High fidelity
- Ideal for beat-to-beat monitoring of basic, acute and chronic cardiovascular measurements
- Allows for the assessment of time variance and dynamics of change in data over time
- The most commonly used method for monitoring basic cardiovascular parameters
- Measures systemic blood pressure
- 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

## 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



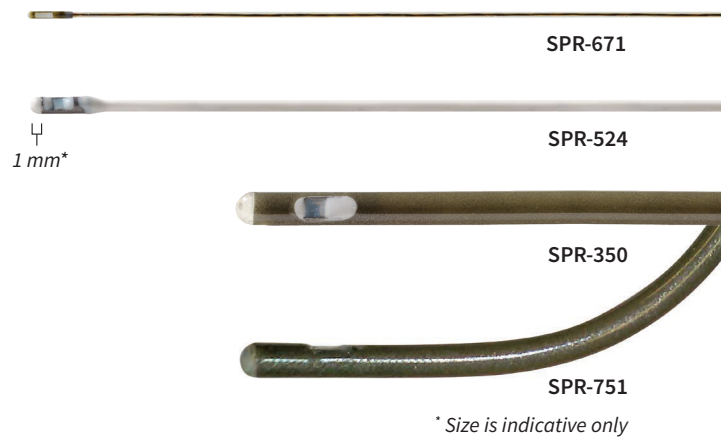
**PowerLab<sup>C</sup>**  
**COMPATIBLE**

# Non-Cardiovascular Pressure Studies

Optimized for use in intracranial, interstitial, intrauterine, intradiscal, and arterial blood pressures, Millar Mikro-Tip<sup>®</sup> solid state catheters provide the most accurate physiological pressure measurements, providing sensitive reliable measurement of small pressure changes with high fidelity.

## Non-Cardiovascular Pressure Applications:

- Brain Injury
- Hydrocephalus
- Stroke
- Tumor IFP
- Bone Marrow Pressure
- Transdiaphragmatic Pressure
- Spinal Injury



Millar Mikro-Tip Pressure Catheters							
	Catheter	Material	Subject	Length (cm)	Tip French (F)	Tip	Sensor spacing
SINGLE SENSOR	SPR-1000 <sup>1</sup>	Polyamide	Mouse	4	1 F	Straight	N/A
	SPR-671 <sup>2</sup>	Nylon	Mouse	4	1.4 F	Straight	N/A
	SPR-215 <sup>2</sup>	Nylon	Rat	4	2.15 F	Both <sup>3</sup>	N/A
	SPR-524 <sup>1</sup>	Nylon	Small Animal	4	3.5 F	Straight	N/A
	SPR-350 <sup>3</sup>	Polyurethane Woven Dacron	Large Animal	4	5 F	Both <sup>3</sup>	N/A
DOUBLE SENSOR	SPR-751 <sup>3</sup>	Polyurethane Woven Dacron	Large Animal	4	5 F	Both <sup>3</sup>	3

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

<sup>1</sup> Non-repairable only

<sup>2</sup> Non-repairable options are available

<sup>3</sup> Options for both curved and straight tip (add 'S' to product code for SPR0350 or SPR SPR-751 for straight version, add 'C' to SPR-215 for curved)

# 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.

## Take advantage of our specialized LabChart analysis modules

### Blood Pressure

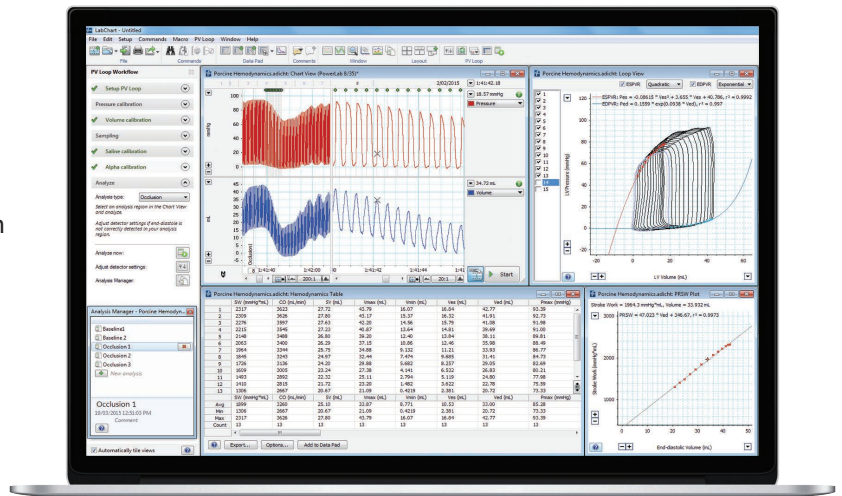
The Blood Pressure Module for LabChart acts as a blood pressure graphing, monitoring and tracking software, automatically reporting cardiovascular parameters from arterial or ventricular pressure signals.

### ECG Analysis

LabChart's ECG Analysis Module automatically detects and reports on P, Q, R, S, and T wave onsets, amplitudes, and intervals in real-time, or post data recording - allowing you to easily interpret and identify abnormalities in your ECG recordings.

### Peak Analysis

The Peak Analysis Module for LabChart provides automatic detection and analysis of multiple, non-overlapping, signal peaks in acquired waveforms including Cardiac Action Potentials - for monophasic intracellular and extracellular cardiac action potentials.



### PV Loop (above)

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.

## Support and Education Resources

At ADInstruments, we provide researchers with a trusted global network of scientific sales and support specialists. Pressure and Pressure-Volume Loop research can be both illuminating and challenging. We understand these challenges, so whether you are new to the approach, have years of experience, or simply have questions, we are here to help.

### Educational Library

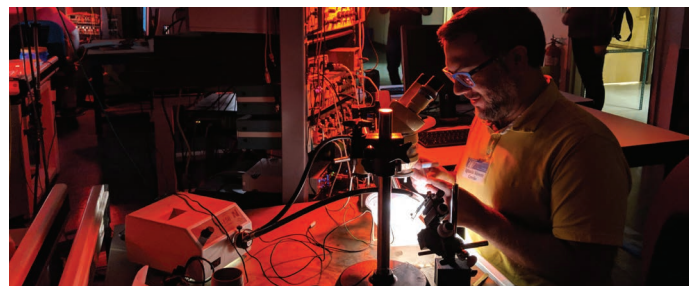
Looking for application support, self guided resources or data collection tips? We offer a wide range of online education content on the ADInstrument website.

- Surgical videos for pressure and PV
- Library of recorded webinars and customer case studies
- Best practice guides and setup videos

### Ongoing Learning and Networking Opportunities

Whether you have a new lab member, or want to enhance your own skill set, we offer a variety of ways to connect with peers and industry leaders.

- Multi-day Surgical PV Workshops: North America, Europe, China, and Australia
- Client-led webinar series
- In-person user group meetings



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