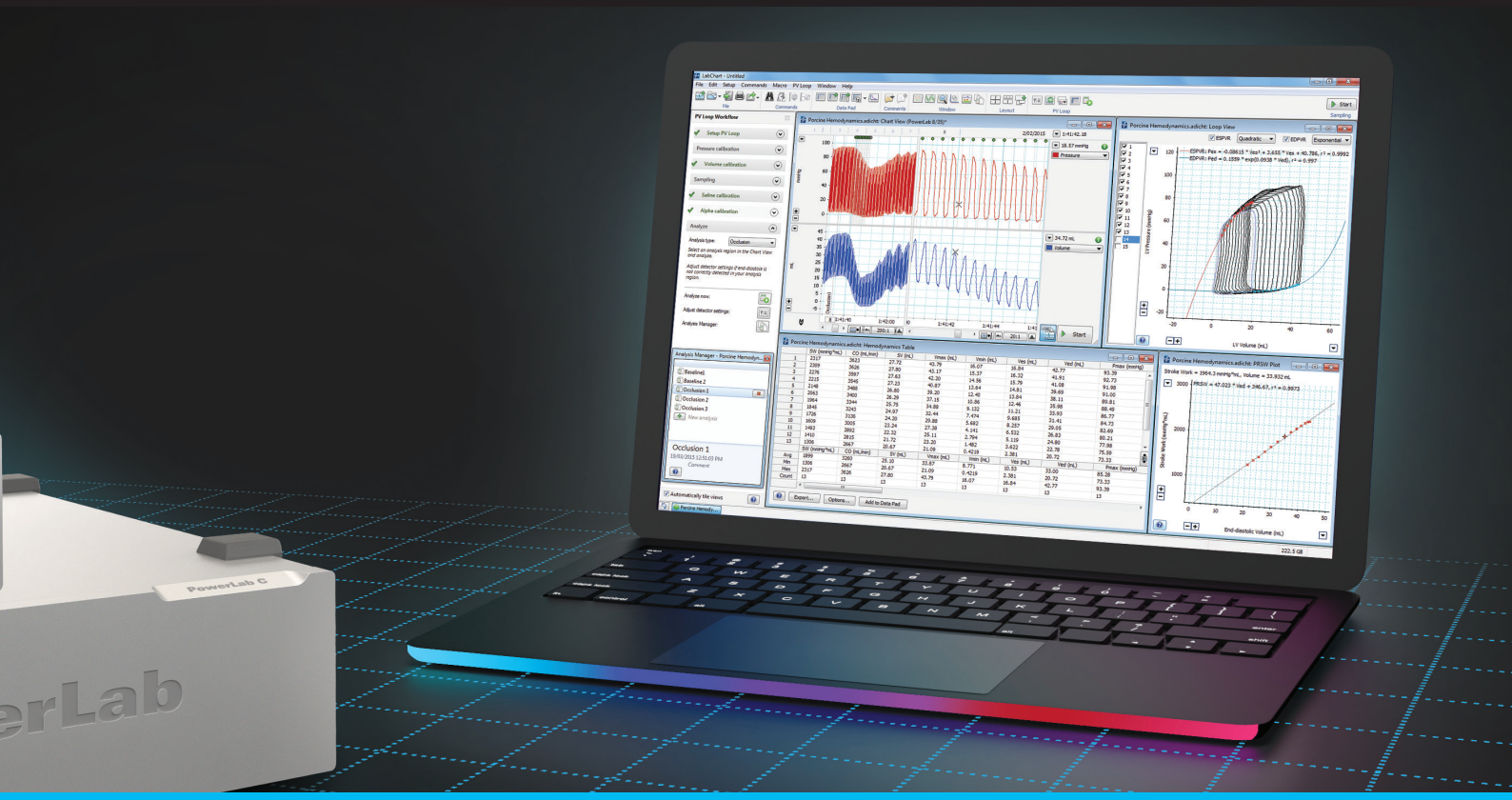
ADINSTRUMENTS
making science easier

Pressure-Volume Analysis

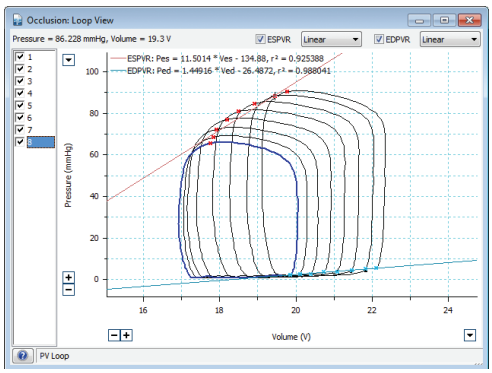
Module for LabChart and PowerLab

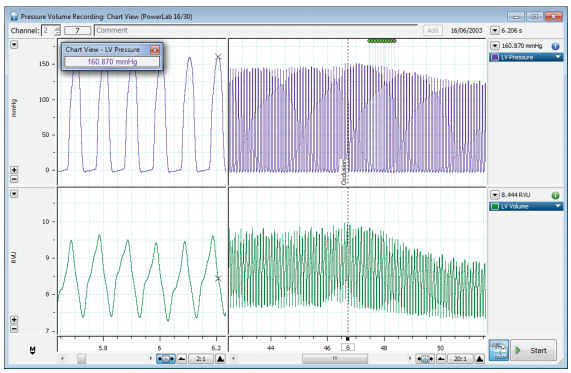


The gold standard for measuring direct, real-time complete cardiac function.

Utilize the Pressure-Volume Analysis Module for LabChart to measure and analyze in real-time or post-acquisition *in vivo* ventricular pressure-volume in small and large animals, or *ex vivo* using working heart systems.

This Module offers smart presets for different animals and streamlined workflows guiding you step-by-step from calibration through to analysis. When combined with Millar's extensive range of PV catheters, you have a highly sensitive, minimally invasive way to measure and analyze changes in ventricular pressure-volume in small and large animals. PV Loops are simultaneously generated in Loop View as pressure and volume are being recorded.





Above: Loop View (right) generated from pressure and volume data in Chart View (left) provides online and offline analysis of all or selected PV Loops with ESPVR and EDPVR values.

Applications

- Systolic and diastolic dysfunction
- Valvular heart disease
- Cardiomyopathy
- Pulmonary hypertension
- Cardiac failure
- Cardiovascular remodeling and vascular occlusions
- Ischemia / Reperfusion studies
- Cardiac resynchronization therapy

Millar
Making the improbable possible.

Powerful Analysis Options

This module provides a variety of automatically calculated hemodynamic data sets with several analysis options.

Streamlined Workflow

The Pressure-Volume Analysis Module guides your journey from pressure, conductance, and volume calibration through to data analysis with supporting workflows for large animals, small animals, or echocardiogram users.

Loop View

Display and analyze individual or selected loops of interest. Calculate and display end-systolic and end-diastolic PV relationships. Apply linear, exponential, or quadratic regression fit options to your ESVPR and EDVPR data.

Linear regression information

Display your linear regression information, whether you're online or offline, with our built-in plots:

- Preload-recruitable stroke work (PRSW)
- Preload-recruitable maximum pressure change (dP/dt Max versus EDV)
- Preload-recruitable total mechanical work (PVA versus EDV)
- Afterload-dependent total mechanical work (PVA versus ESP)

Calibration of Data

Preset calibrations for small and large mammals enable you to follow best practices for recording and analyzing PV data using Millar catheters. The Workflow modes have been optimized for use with the MPVS Ultra Foundation Systems.

- Relative Ventricular Volume Calibration
- Cuvette Calibration for absolute volumes. This module includes known volumes of common cuvettes.
- Saline Calibration to correct for parallel conductance or parallel volume effects.
- Or simplify your calibration using data from an external echocardiogram

Hemodynamics Table

Calculate and display 29 hemodynamic parameters (including pressure-volume area, stroke work, and cardiac output). Easily export your data to LabChart DataPad or as csv/text files.

Below: Hemodynamics Table

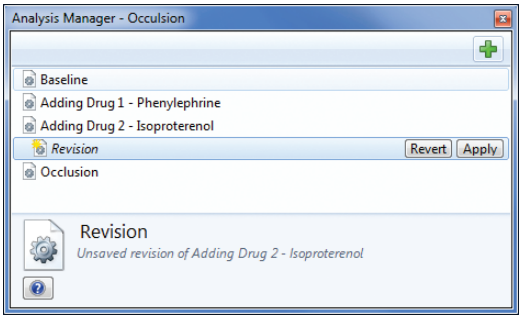
Pressure Volume Recording: Hemodynamics Table*

	SW (mmHg*RVU)	CO (RVU/min)	SV (RVU)	Vmax (RVU)	Vmin (RVU)	Ves (RVU)	Ved (RVU)	Pmax (mmHg)	Pmin (mmHg)	Pmean (mmHg)	Pdev (mmHg)	Pes (mmHg)	Ped (mmHg)	HR (bpm)	EF (%)	Ea (mmHg/RVU)	PVA (mmHg*RVU)	PE (mmHg*RVU)	CE	Tau (ms)
1	214.0	1273	2.101	9.645	7.544	8.625	9.087	145.4	-3.028	48.50	148.4	144.8	1.436	606.1	22.11	68.90	372.5	158.5	0.5744	4.048
2	194.4	1223	2.018	9.547	7.529	8.578	8.829	142.1	-2.872	46.56	144.9	141.9	1.186	606.1	21.58	70.32	348.7	154.3	0.5576	3.842
3	202.9	1251	2.043	9.558	7.515	8.572	8.972	143.2	-3.059	47.87	146.3	142.7	1.030	612.2	21.77	69.82	358.6	155.7	0.5659	3.961
4	213.5	1211	1.998	9.506	7.509	8.521	9.285	140.5	-2.560	46.20	143.0	140.2	1.218	606.1	21.06	70.18	364.0	150.5	0.5867	4.159
5	204.0	1224	2.020	9.510	7.490	8.548	9.031	142.1	-3.091	46.67	145.2	141.6	1.249	606.1	21.45	70.13	355.7	151.7	0.5734	4.077
6	176.5	1122	1.852	9.339	7.487	8.478	8.719	137.4	-2.810	44.16	140.2	137.3	0.5307	606.1	20.11	74.15	323.5	147.0	0.5457	4.112
7	189.8	1170	1.931	9.416	7.485	8.484	8.843	140.9	-3.028	46.17	143.9	140.4	0.6244	606.1	20.89	72.68	341.9	152.1	0.5551	3.986
8	192.5	1130	1.864	9.304	7.440	8.372	9.125	137.0	-2.498	44.38	139.5	136.0	1.499	606.1	20.07	72.94	338.5	146.0	0.5687	4.425
9	181.7	1089	1.797	9.250	7.453	8.407	8.970	137.1	-3.028	43.92	140.2	136.9	1.811	606.1	19.58	76.16	325.6	143.9	0.5581	4.356
10	157.5	990.8	1.635	9.093	7.458	8.297	8.680	133.1	-3.059	41.95	136.1	132.6	0.4058	606.1	18.13	81.14	301.3	143.8	0.5227	4.148
11	171.9	1065	1.757	9.243	7.485	8.388	8.749	138.0	-2.903	45.02	140.9	137.3	0.9990	606.1	19.27	78.16	320.9	149.1	0.5355	4.200
12	188.2	1114	1.819	9.243	7.424	8.372	9.114	135.9	-2.310	44.36	138.2	135.2	1.717	612.2	19.71	74.32	328.3	140.1	0.5733	4.403
13	181.6	1067	1.760	9.192	7.432	8.379	9.057	135.6	-2.747	43.43	138.3	135.4	1.623	606.1	19.19	76.94	321.2	139.6	0.5654	4.270
14	159.3	979.0	1.632	9.071	7.439	8.278	8.660	133.3	-2.903	42.00	136.2	132.9	0.4683	600.0	18.17	81.45	300.9	141.6	0.5293	4.167
15	162.8	1002	1.653	9.099	7.447	8.313	8.698	135.6	-2.935	43.78	138.6	135.2	1.061	606.1	18.37	81.84	305.4	142.6	0.5330	4.059
16	180.0	1073	1.752	9.138	7.386	8.275	9.027	132.7	-2.373	43.04	135.1	132.1	1.155	612.2	19.20	75.40	315.2	135.2	0.5712	4.392
17	176.6	1028	1.713	9.120	7.407	8.292	9.093	131.4	-2.716	41.23	134.1	131.1	1.592	600.0	18.78	76.56	310.5	133.9	0.5687	4.476
18	155.4	955.3	1.576	8.989	7.412	8.216	8.649	130.9	-3.122	41.40	134.0	130.6	0.9366	606.1	17.64	82.83	290.5	135.0	0.5351	4.211
	SW (mmHg*RVU)	CO (RVU/min)	SV (RVU)	Vmax (RVU)	Vmin (RVU)	Ves (RVU)	Ved (RVU)	Pmax (mmHg)	Pmin (mmHg)	Pmean (mmHg)	Pdev (mmHg)	Pes (mmHg)	Ped (mmHg)	HR (bpm)	EF (%)	Ea (mmHg/RVU)	PVA (mmHg*RVU)	PE (mmHg*RVU)	CE	Tau (ms)
Avg	155.8	959.9	1.588	8.986	7.398	8.165	8.740	127.2	-2.824	40.29	130.1	126.8	0.9691	604.3	17.72	81.06	287.2	131.4	0.5389	4.293
Min	95.37	634.8	1.058	8.379	7.270	7.738	8.126	106.0	-3.497	32.73	108.0	105.3	0.0000	600.0	12.69	68.90	211.6	106.7	0.4507	3.842
Max	214.0	1273	2.101	9.645	7.544	8.625	9.285	145.4	-1.280	48.50	148.4	144.8	2.404	612.2	22.11	105.0	372.5	158.5	0.5867	4.760
Count	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47

Export... Options... Add to Data Pad

LabChart Analysis Manager

LabChart allows you to analyze and compare separate data regions within a data file. Save the analysis results and settings within a single file. Quickly and easily reapply those saved analysis settings to other files.



Left: Analysis Manager

Ordering Information

The PV Loop Module for LabChart can be purchased individually as an Add-On for LabChart 8 (MLS240/8 Windows only), or as part of LabChart Pro (MLS260/8).

LabChart Pro includes LabChart software and all LabChart Modules, providing powerful data acquisition and analysis capabilities.