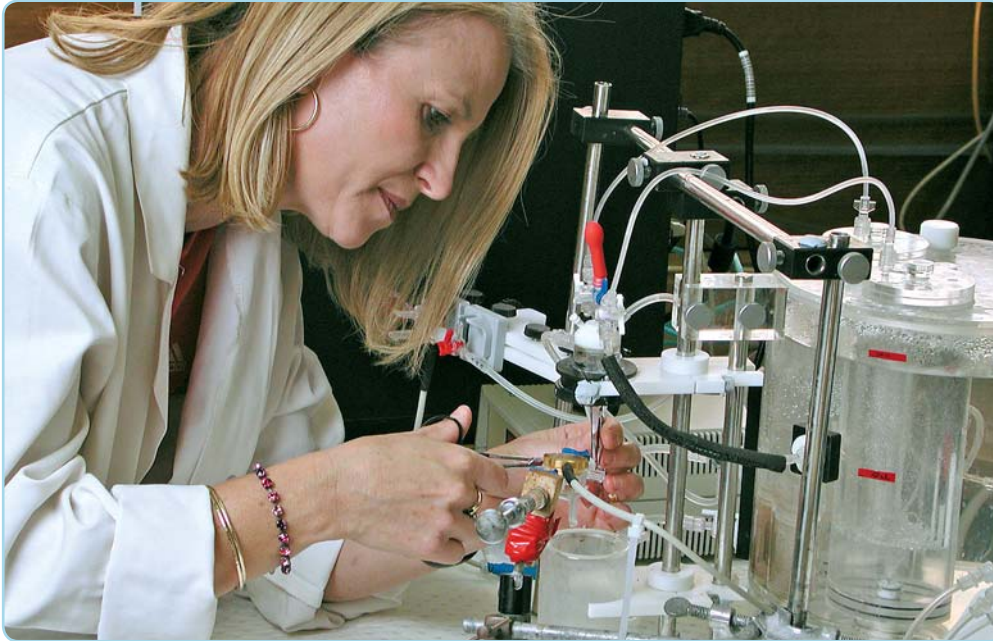


Isolated Perfused Heart

ADInstruments Langendorff System



With the Langendorff technique you can monitor an isolated heart while perfusing the coronary arteries with a nutrient solution. An ADInstruments system allows you to easily choose either a constant pressure or constant flow mode to investigate coronary artery function while the heart beats spontaneously or with the help of an external stimulator.

Traditionally, constant perfusion pressure in a Langendorff setup is maintained by a complex and delicate system of elevated reservoirs. ADInstruments has introduced an electronic pressure/flow feedback system to the Langendorff apparatus, to allow easy switching between constant flow and constant pressure modes at the press of a button. This feedback system, in conjunction with the peristaltic pump, eliminates the need for elevated reservoirs and reduces the complexity of the setup and equipment modifications.

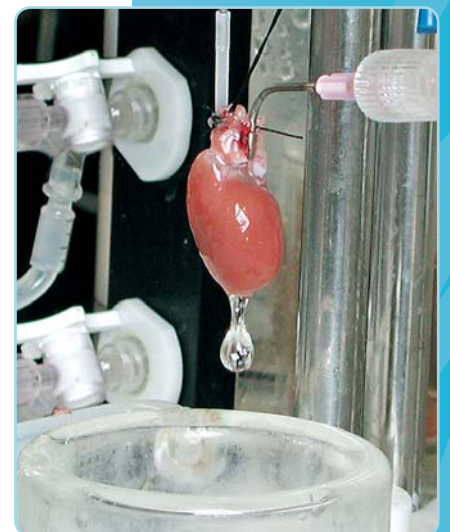
With the featured Langendorff apparatus you can perfuse small hearts from mice, rats and guinea pigs. The compact two-chambered unit allows a quick change between different perfusate solutions. The combination of a water-jacketed organ chamber and heated junction block provides a stable environment for the heart.

ADInstruments PowerLab® data acquisition systems allows you to easily record and analyze cardiovascular parameters such as left ventricular pressure, perfusate pressure, coronary flow rate and more. The included LabChart® software displays up to 32 raw and calculated signals in real time, with all calibrations, raw data and analysis saved in a single, convenient file.

The ADInstruments Langendorff System provides you with a complete Langendorff heart research solution to increase experiment efficiency and productivity.

Features & Benefits

- Saves time and increases productivity with a complete and easy-to-use system
- Maintains constant temperature with a heated water bath, water-jacketed junction block and heart chamber
- Allows you to switch between constant flow or constant pressure modes at the push of a button
- Monitors, records and displays coronary artery function and perfusion pressure
- Records and analyzes left ventricular pressure, cardiac electrical activity, heart rate and temperature in real time



■ Data Acquisition and Analysis

Data Acquisition & Analysis

PowerLab systems are ideal for recording and analyzing data from Langendorff preparations. You can record and calculate parameters such as:

- Coronary vessel function
- Left ventricular developed pressure
- Left ventricular dP/dt maximum and minimum
- Perfusate temperature
- Cardiac electrical activity
- Heart rate

PowerLab systems connect to Windows® and Mac® computers using high-speed USB. The PowerLab 8/35 data acquisition unit, supplied with LabChart, can record eight incoming signals and calculate values on an additional 24 channels in real time. It can do this at speeds of up to 200 s/s per channel (or 400 s/s aggregate).



Langendorff rat heart experiment with recordings of coronary perfusion pressure, LVP, dP/dt and heart rate. Data courtesy of Dr W. Noonan, Genome Center, University of Cincinnati, US.

Using LabChart you can:

- Save software settings such as calibration, range and filter options for future experiments as LabChart Settings files
- Calculate parameters such as contractile pressure, dP/dt, heart rate and more, using online and offline channel calculations
- Display real-time recorded values in large, easy to view floating windows
- Export Data Pad contents manually or using OLE to software packages such as Excel®
- Carry out automated real-time extraction and logging of recorded data to the internal Data Pad
- Automate experimental procedures and data analysis with LabChart software macros
- Annotate comments in data files during or after recording
- Use LabChart software to control stimulation frequency and timing of pulse trains

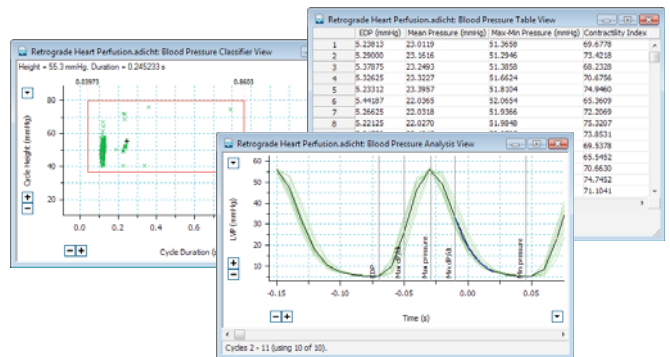
LabChart Modules

The PL3508B2-V Langendorff System (constant pressure or flow) is supplied with LabChart Pro. As well as LabChart, this software package includes all ADInstruments LabChart Modules. LabChart Modules add advanced analysis functions to LabChart for specific applications to 'fast track' analysis. Modules relevant to Langendorff studies include:

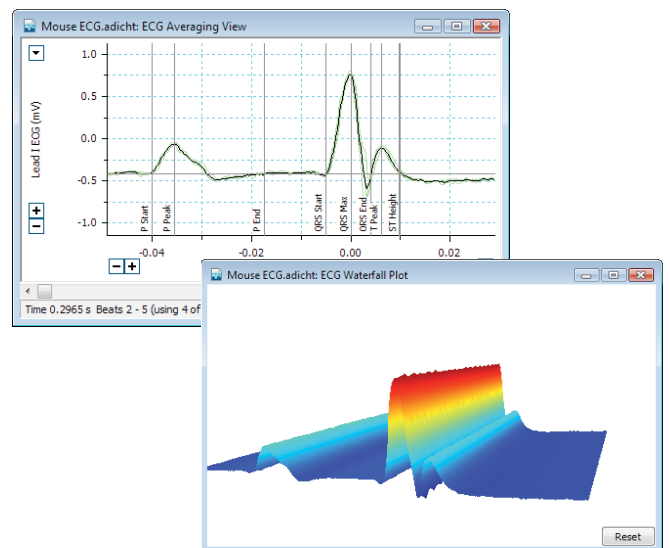
Blood Pressure – automatically detects, analyzes and reports parameters from arterial or ventricular pressure recordings

Dose Response – generates dose response curves, EC₅₀ values and additional parameters

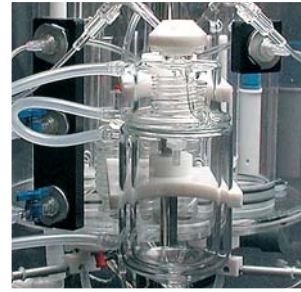
ECG Analysis – detects and reports the onset, amplitude and interval times of PQRST from human and animal ECG signals



BP Classifier View, BP Table View & BP Analysis View generated using the Blood Pressure Module.



ECG Averaging View & resulting Waterfall Plot using the ECG Analysis Module.



ADInstruments supplies a complete Langendorff System with all the data acquisition hardware and apparatus required for isolated heart experiments. The PL3508B2-V Langendorff System (constant pressure or flow) includes:



ML176 Langendorff Apparatus and Thermostat Controller



PL3508 PowerLab 8/35



ML175 STH Pump Controller



ML172 Minipuls-3 Peristaltic Pump



FE221 Bridge Amp



MLT844 Physiological Pressure Transducer



MLA1210 Spring Clip Electrodes & MLA1215 Animal Bio Lead Wires



FE136 Animal Bio Amp



MLT1401 T-type Thermocouple Probe



ML312 T-type Pod

■ **PL3508 PowerLab 8/35**

Eight channel data acquisition system with sampling speeds of up to 200 s/s per channel. Features include filtering (hardware and software), analog outputs, trigger input and high-speed USB connection to Windows or Macintosh computers.

■ **ML176 Langendorff Apparatus**

Temperature-controlled unit that includes two perfusate chambers, heart chamber, heated junction block and a thermostat controller.

■ **ML172 Minipuls-3 Peristaltic Pump**

Low-noise peristaltic pump that provides laminar flow of perfusate through the system.

■ **ML175 STH Pump Controller**

Controls the peristaltic pump by providing an analog output corresponding to calibrated flow rates. It provides a pressure/flow feedback system to the peristaltic pump when switching between constant flow and constant pressure modes.

■ **MLT844 Physiological Pressure Transducer (x2)**

Connects to any ADInstruments Bridge Amp to measure perfusion and left ventricular pressures (balloon catheter not included). A Transducer Bracket is also supplied.

■ **FE221 Bridge Amp (x2)**

Software-controlled, single-channel bridge amplifier, suitable for measuring pressures. Seamlessly interfaces with the PowerLab system and Physiological Pressure Transducers.

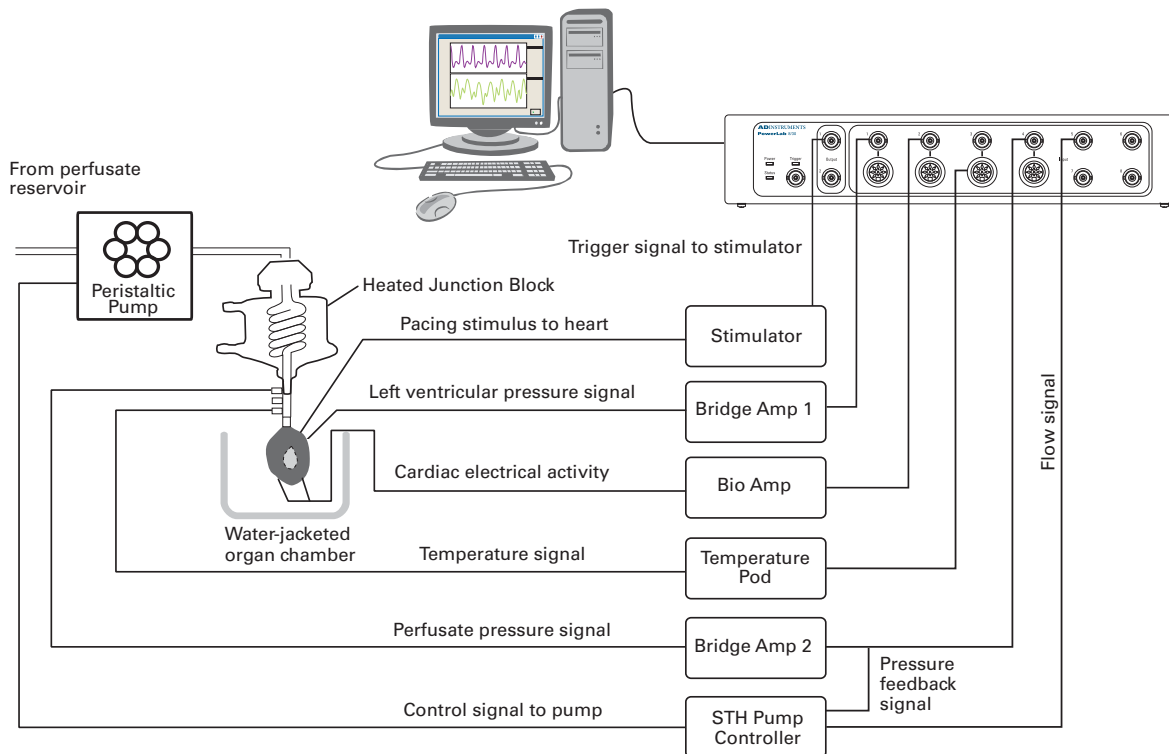
■ **FE136 Animal Bio Amp**

Single-channel bioamplifier suitable for measuring cardiac electrical activity from the isolated perfused heart. Spring Clip Electrodes and Animal Bio Lead Wires with Micro Hooks are included.

■ **ML312 T-type Pod and MLT1401 T-type Implantable Thermocouple Probe**

Software-controlled Pod used to measure perfusate temperature in conjunction with the MLT1401 T-type Probe.

Langendorff Heart Set-up



Ordering Information

PL3508B2-V Langendorff System (constant pressure or flow)

- 1 x PL3508 PowerLab 8/35 with LabChart (Win & Mac)
includes LabChart Pro software
- 1 x ML176 Langendorff Apparatus with Thermostat Controller
- 1 x ML172 Minipuls-3 Peristaltic Pump
- 1 x ML175 STH Pump Controller
- 2 x FE221 Bridge Amp
- 2 x MLT844 Physiological Pressure Transducer
- 1 x SP2881 Transducer Bracket
- 1 x FE136 Animal Bio Amp with MLA1210 Spring Clip Electrodes and MLA1215 Animal Bio Lead Wires
- 1 x ML312 T-type Pod
- 1 x ML1401 T-type Implantable Thermocouple Probe (IT-18)

Balloon catheters are required to measure left ventricular pressure. A stimulator is required if you wish to pace the heart. Contact your local ADInstruments representative for further information related to your specific application.

 Share your data with colleagues. Free LabChart Reader – download to view and analyze LabChart data.

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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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