

ML311 Spirometer Pod

Pod Series

Description

A compact respiratory signal conditioner for use with PowerLab data acquisition systems. The Spirometer Pod is a differential pressure transducer with low noise and low air flow resolution, which interfaces with respiratory flow heads to measure air flow rates for humans and animals. When used with ADInstruments respiratory flow heads and the Spirometry LabChart Extension software, compensated volume and forced respiratory parameters can also be determined.



System Compatibility

The Spirometer Pod connects to any PowerLab hardware units with Pod ports (8-pin DIN inputs). PowerLab and MacLab (except 4s, 8s and 16s) units without Pod ports require the FE305 Pod Expander.

The Spirometer Pod is supported by the following versions of ADInstruments software:

WINDOWS

- LabChart v6 or later
- Chart v3.4.8 or later
- Scope v3.6.3 or later
- LabTutor v1.4 or later

MACINTOSH

- LabChart v6 or later
- Chart v3.6.3 or later
- Scope v3.6.3 or later

Note: Earlier software versions do not support Pods.

Visit our website for information on operating system requirements.

Transducer Compatibility

The Spirometer Pod is suitable for operation with ADInstruments respiratory flow heads including MLT1L, MLT10L, MLT300L and MLT1000L.

Hans Rudolph flow heads are also compatible with the Spirometer Pod.

Applications

The Spirometer Pod is suitable for differential pressure measurements of dry non-corrosive gases such as air flow and pulmonary function measurements.

Theory of Operation

Air flowing through a wire mesh in the respiratory flow head creates a pressure difference on either side of the mesh. A larger airflow creates a greater difference. This pressure difference is transmitted to the Spirometer Pod via two tubes and converted to an analog voltage proportional to the air flow rate. The Spirometer Pod also provides low-pass filtering fixed at 30 Hz.

Operating Instructions

Connect the flow head tubing to the Spirometer connectors on the rear panel of the Spirometer Pod. Connect the 8-pin DIN cable from the rear panel of the Spirometer Pod to a PowerLab Pod port (or one of the Pod ports of a Pod Expander connected to the PowerLab). Do not connect other devices such as Front-ends or Instruments to the corresponding BNC connector on the channel used by the Pod.

Pods can be connected to the PowerLab unit while ADInstruments software is running, but not when recording data. Wait until the dialog changes to Input Amplifier before reconnecting. Once detected, the functions of the Spirometer Pod are combined with those of the PowerLab and software, replacing the Input Amplifier dialog with the Spirometer Pod dialog (shown below).

The screenshot shows the 'Spirometer Pod' dialog box. It features a graph of a respiratory signal with a value of -47.8 mV. The Range is set to 500 mV and the Low pass filter is set to 30 Hz. There are buttons for 'Zero' and 'Invert'. Callouts point to the Range and Low pass dropdown menus, the Zero button, and the Invert checkbox.

Click this button to zero the signal trace. This is useful to remove any residual DC level before signal integration to determine volume.

When the "Invert" box is checked, the incoming signal is inverted.

Click this button to open the "Units Conversion" dialog.

Note: Connect Flow Head to Spirometer Pod before zeroing.

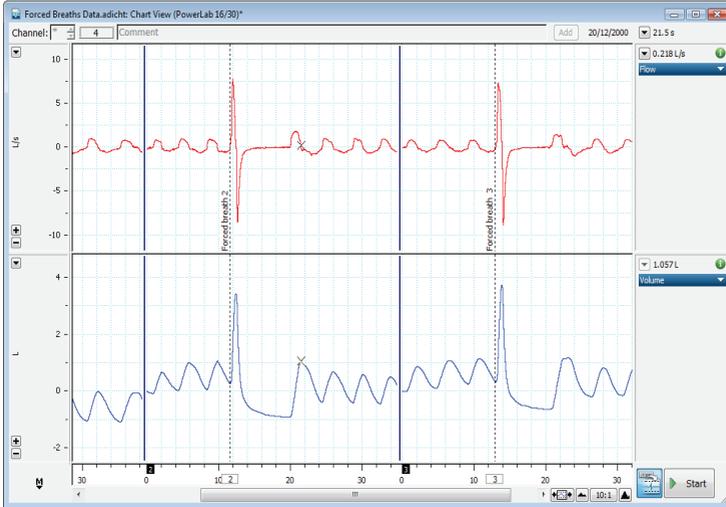
Stacking and Unstacking Pods

Pods stack by clicking into place on top of each other. To separate stacked Pods, push the top Pod towards the back and then pull them apart from the back. See picture on right.

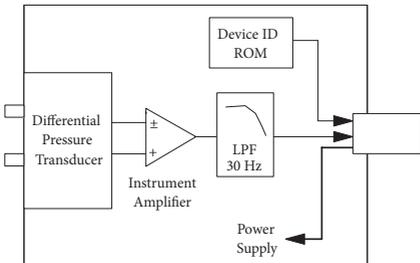


Typical Data

The screen capture below shows typical flow (Channel 1) and volume (Channel 2), during normal and forced expiration, data recorded using the MLT1000L Flow Head connected to the ML311 Spirometer Pod.

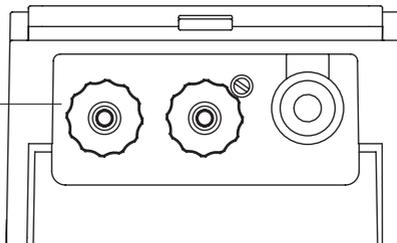


Technical Diagrams



Spirometer Pod block diagram

*Differential pressure inputs.
Two luer fittings with bayonette suitable for 3 mm inside diameter tubing.
Turn clockwise to attach.*



Spirometer Pod connection diagram (rear panel)

Caution

Read “Statement of Intended Use” on our website or in “Getting Started with PowerLab” before use.

- The Spirometer Pod’s differential pressure sensor is position and movement sensitive. For consistent recordings always keep the Pod in the same orientation. Keep the Spirometer Pod on a stable surface while recording. Any movement will result in unwanted artifacts.

Specifications

Pressure range:	0–4" H ₂ O
Response time:	0.5 ms
Repeatability:	±0.2 % FS
Sensitivity:	10 mV/"H ₂ O
Maximum input pressure:	5 psi
1 Year stability:	±0.5 % FS
Operating conditions:	0–35 °C, 0–90% humidity (non-condensing)

All specifications were tested at the time of printing and are subject to change.

Ordering Information:

ML311 Spirometer Pod

For use with:

MLT1L	Respiratory Flow Head 1L
MLT10L	Respiratory Flow Head 10L
MLT300L	Respiratory Flow Head 300L
MLT1000L	Respiratory Flow Head 1000L