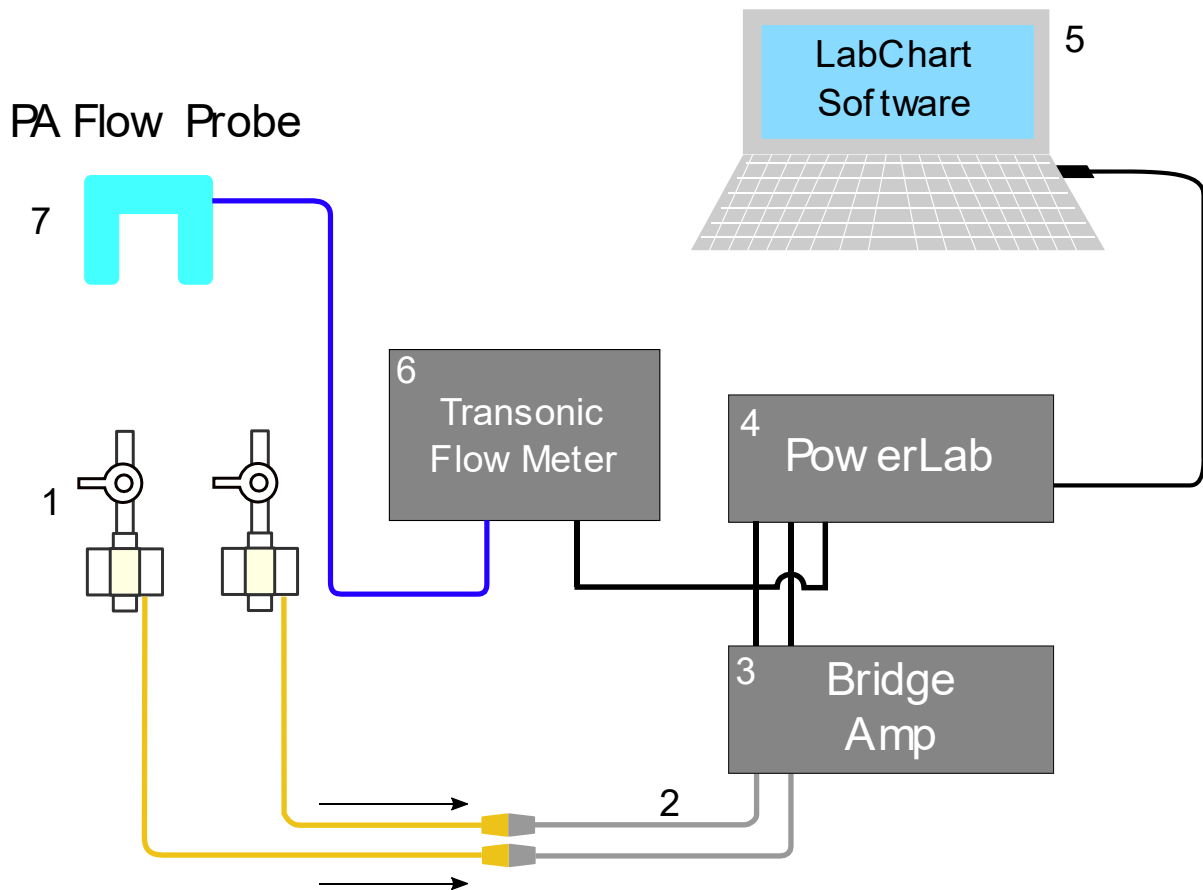


## Data Acquisition Setup Guide

**Objective:** This document provides guidance on how to set up digital data acquisition, in particular blood pressure and pulmonary artery flow.

### Data Acquisition Setup



1. TruWave Disposable Pressure Transducer
2. Interface Cable, Edwards LifeScience Transducer to ADInstruments Bridge Amp
3. ADInstruments Octal Bridge Amp
4. PowerLab Data Acquisition Hardware
5. Computer with LabChart ver 8 installed
6. Transonic Flow Meter
7. Transonic Perivascular Flow Probe (PAU Series)

*Figure S1: Wiring diagram to setup the pressure transducer, bridge amplifier, and data acquisition system*

### **Steps, electrical and wire connections**

1. Connect the pressure transducers to the computer following the wiring schematic diagram as shown (Figure S1, items #1 through #5).
  1. Connect the cable from TruWave pressure transducers to the Interface Cable
  2. Plug the male-DIN connector of the Interface Cable into Input Channels 1 and 2 of the Bridge Amp
  3. Use BNC male-to-male cable to connect from Bridge Amp's Output Channels 1 and 2, located on the back panel, to Input Channels 1 and 2 of PowerLab located on its front panel (Figure S2)
    1. Be sure that the channel number is consistent throughout the connection.  
(example: Input 1, Bridge Amp → Output 1, Bridge Amp → Input 1, PowerLab → Channel 1, software)
  4. On back panels of both Bridge Amp and PowerLab, connect I<sup>2</sup>C Bus Output of PowerLab to I<sup>2</sup>C Bus Input of Bridge Amp using the from PowerLab
  5. Use the provided USB cable to connect PowerLab output to the LabChart computer
6. If you are also measuring the pulmonary artery flow, also connect additional cables and wires as follows:
  1. Plug the Transonic perivascular flow probe (PAU-series) to the Transonic flow meter at PROBE connection
  2. Connect male-to-male BNC cable between flow meter's FLOW OUTPUT to the PowerLab data input on Channel 3



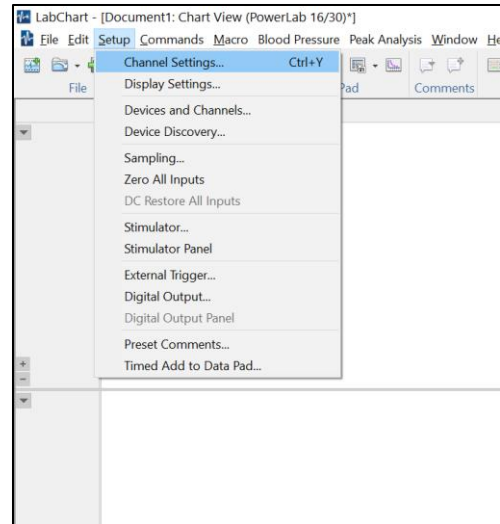
Figure S2: Front panels for ADInstruments PowerLab (bottom) and Bridge Amp (top)



Figure S3: Back panels for ADInstruments PowerLab (bottom) and Bridge Amp (top)

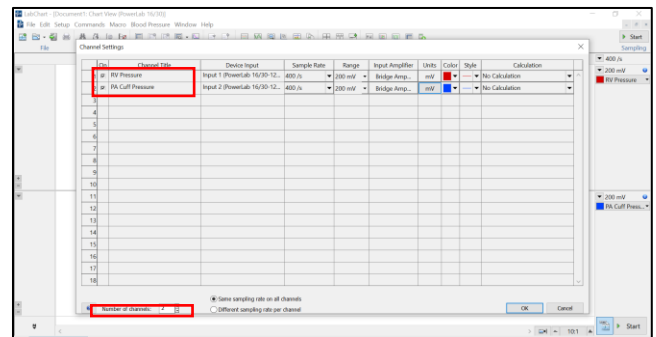
## Pressure Transducer Calibration: Software

1. Open the LabChart application on your computer
2. Go to Setup → Channel Settings



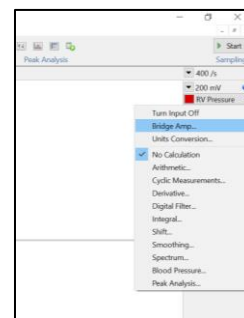
Step 2: Channel Settings

3. Specify “Number of channels” to 2 at the bottom. Label Channel 1 as “RV Pressure” and Channel 2 as “PA Cuff Pressure,” and Then click OK
  - a. Note: if you are also measuring PA flow, set the Number of Channels to 3 and create a new channel for PA flow. See later for step-by-step guide on PA flow calibration



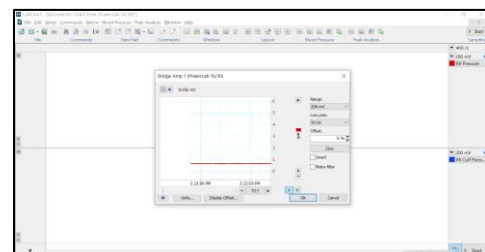
Step 3: Specify the number of channels and channel names

4. For each channel, click the down arrow next to the channel name on the right side of the screen, and select “Bridge Amp...”



Step 4: Bridge Amp

5. A small window will show up. While on this screen, you will perform two-point calibration



Step 5: Small window for bridge amp setup

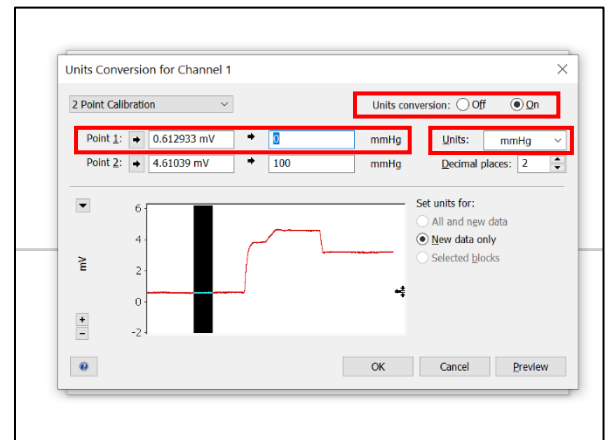
6. For the first point, open the pressure transducer's stopcock to air. Then click Zero (0 mmHg). After zeroing is complete, leave the transducer as is to record voltage signal at 0 mmHg
7. For the second point, connect the sphygmomanometer to the opened transducer and pressurize to 100 mmHg for a few seconds.

Depending on the sphygmomanometer, you may need additional connectors and tubes to fit the female luer connection of the transducer



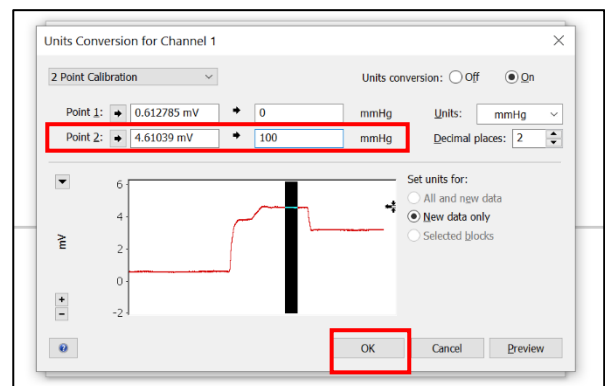
Steps 6-7: Sphygmomanometer for two-point pressure transducer calibration

8. Now click "Units" at the bottom of the Bridge Amp screen. A new smaller window will now show up.
9. On the right top corner of this Unit Conversion screen, make sure that "Units conversion" is selected as "On." On the dropdown menu for "Units," select "mmHg"



Steps 9-11: Two-point calibration, Point 1

10. You will now see the voltage recording at 0 mmHg and 100 mmHg in the smaller screen. You may need to fix the scale to be able to distinguish between 0 and 100 mmHg portions.
11. Highlight the portion that corresponds to 0 mmHg, and click on the right arrow next to "Point 1:" This action will populate the voltage reading at 0 mmHg in the left box. In the right box, fill in 0 mmHg
12. Likewise, highlight the portion that corresponds to 100 mmHg, and click on the right arrow next to "Point 2:" This action
13. now populate the voltage reading at 100 mmHg. Now click OK



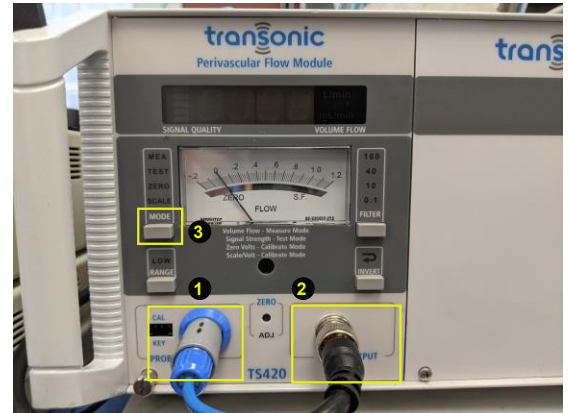
Step 12-13: Two-point calibration, Point 2

14. You will now be back at the Bridge Amp screen, and now see that the unit is “mmHg” instead of “mV.” Two-point calibration is complete.
15. Repeat the process for Channel 2: PA Cuff Pressure

## Pulmonary Artery Flow Measurement Setup

Note: All manipulations of the perivascular flow probe will need to be done sterily.

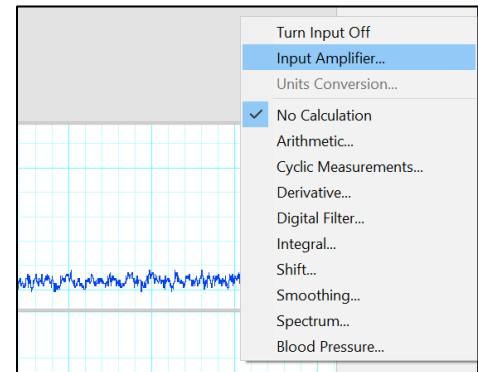
1. Connect the blue PAU electrical plug into the “PROBE” connection ❶ of the Transonic TS420 flow meter module
2. Connect male-to-male BNC cable into the “FLOW OUTPUT” ❷ connection of the flow meter module
3. Turn on the power button for TS420 flow module
4. Place the flow probe into a sterile bowl of saline
5. Press the MODE button ❸ to toggle to “TEST.”



Steps 1-6: Transonic flow meter setup

6. Place the flow probe into a bowl of saline. The LCD screen should read “GOOD SIG,” and “Signal Quality” should have 5 bars.

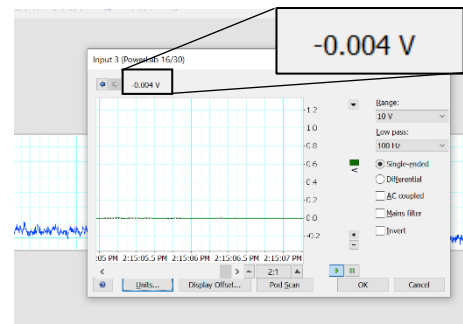
7. Go to the flow channel on the LabChart software screen and select “Input Amplifier”



Steps 7-8: LabChart screenshot: starting the calibration process

8. A separate small window should open up, like previously seen in pressure transducer calibration.

9. Press the MODE button on the flow meter module to toggle to “ZERO.” The LCD screen on flow meter should read 0.0 L/min, and the voltage reading on LabChart software should read near 0 volts (inset).



Step 9: Zeroing the PA flow probe/meter



10. Press the MODE button to toggle to "SCALE."



11. The flow reading should now read 20 L/min, and the software reading should read close to 1 volt (inset).

12. Click "Units..." to continue with calibration.

13. Similar to the steps from pressure calibration, highlight the portion of the waveform that corresponds to 0 L/min, and click on the top arrow.

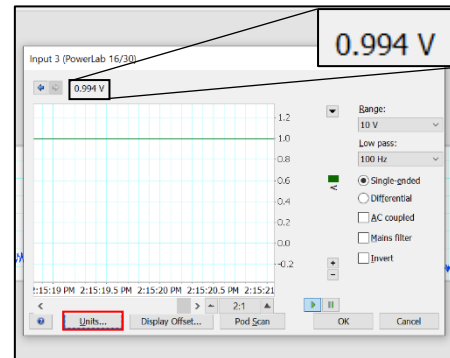
14. Highlight the portion of the waveform that corresponds to 20 L/min, and click on the bottom arrow.

15. Select "On" for "Unit conversion," and specify L/min for unit.

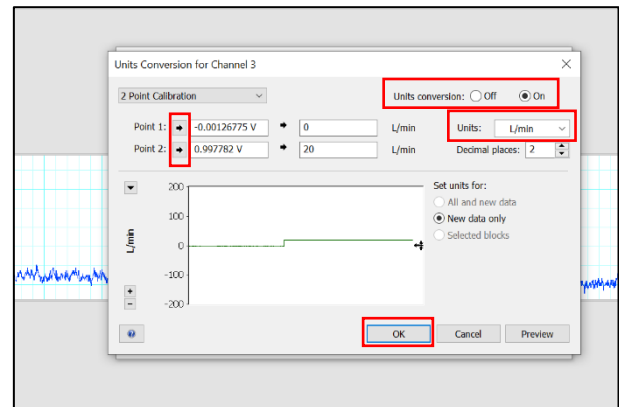
16. The voltage readings are now matched up with blood flow rate.

17. Click OK.

18. Press the MODE button until you toggle back to MEAS to get your flow reading.



Steps 10-12: Full-scale reading for Transonic flow meter (top) and LabChart (bottom)



Steps 13-17: Two-point calibration