

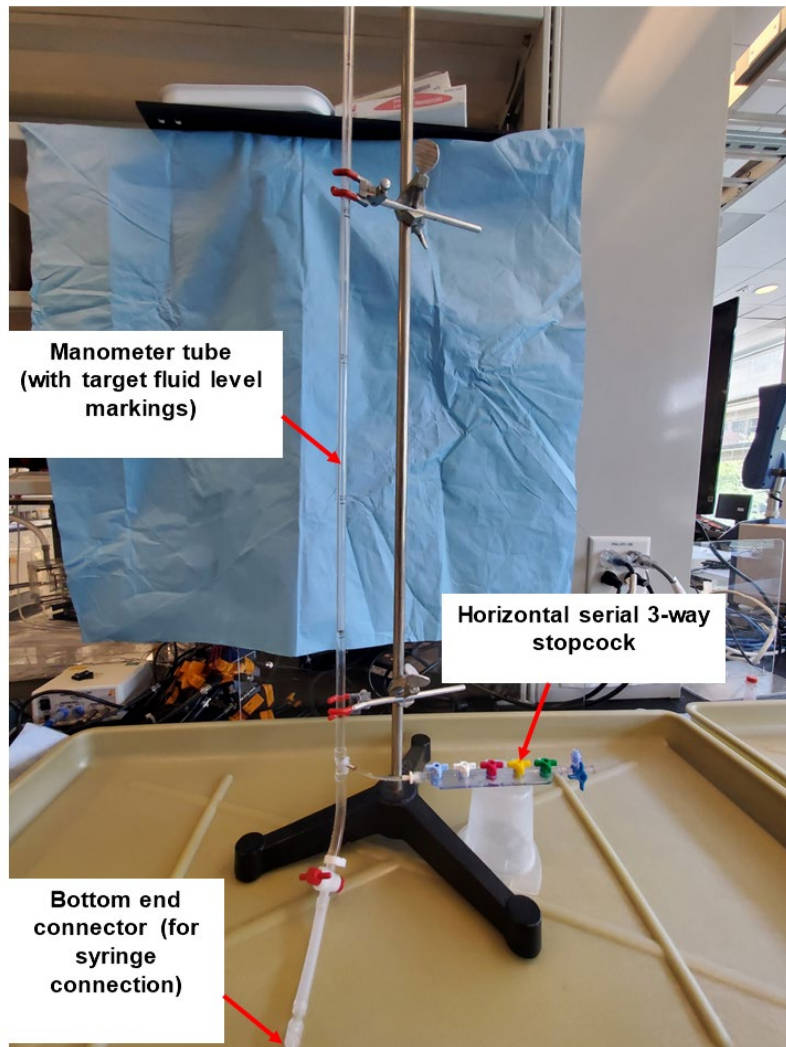
## **Pressure Transducer Calibration**

*Note: The test fluid used is blood analog fluid (BAF). Please prepare the BAF by following detailed instructions outlined in the document, Preparation of Blood Analog Fluid (BAF). For preliminary or feasibility testing, De-ionized (DI) water may be used in place of BAF as the test fluid. While all test protocols in this document are written for BAF, they are also directly applicable to DI water, when used as the test fluid.*

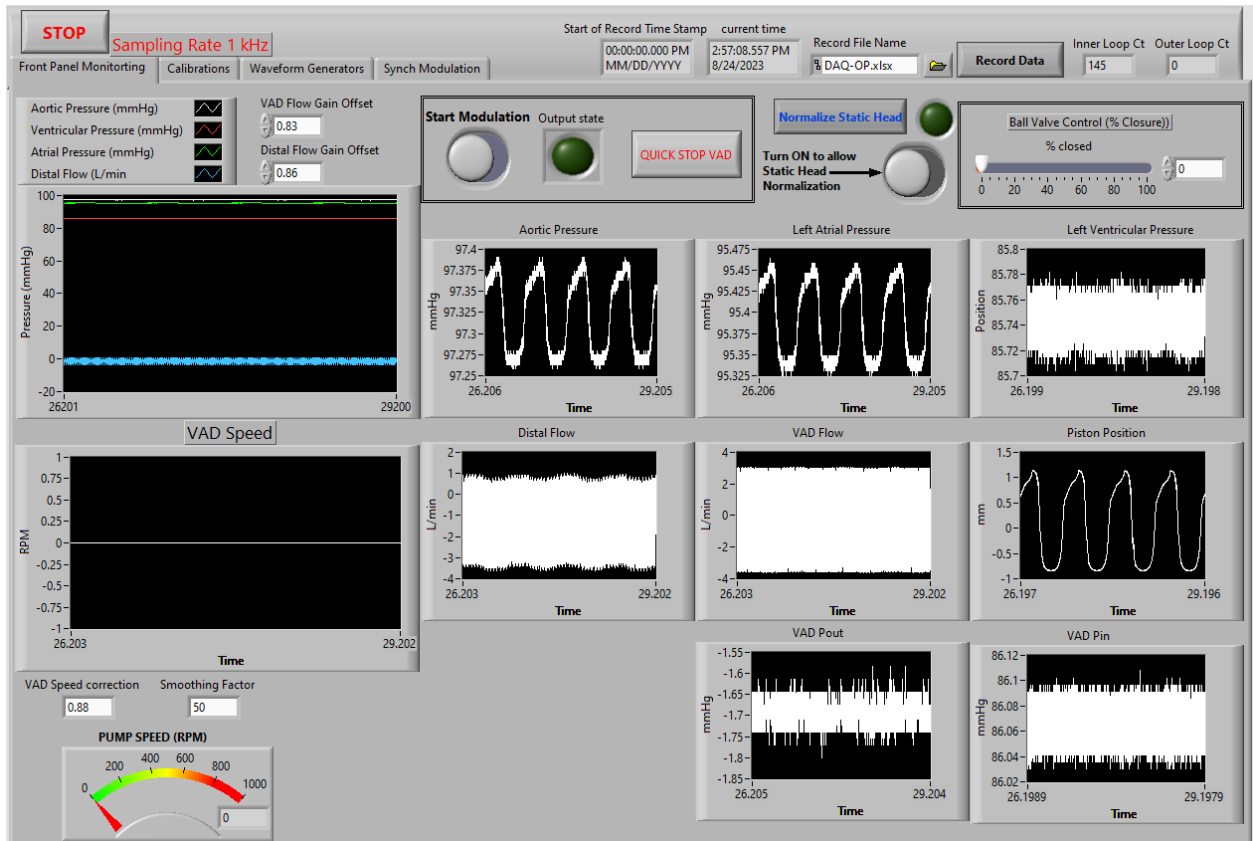
1. Make the appropriate electrical connections:
  - a. Connect the three (left ventricle (LV), left atrium (LA), and aorta (Ao)) pressure transducers [Utah Medical Products Inc., Midvale, Utah] to the pressure amplifier module [Bus 21097, ViVitro Labs, Inc., Victoria, BC, Canada].
  - a. Connect each of the three output channels on the amplifier to three channels on the analog input (AI) module [NI-9205, National Instruments, Austin, TX] of the data acquisition system [cDAQ-9174, National Instruments, Austin, TX] per the table below.

Instrument Channel	AI Channel on cDAQ-9174
Pressure transducer amplifier – Ao pressure channel	AI 1, NI-9205
Pressure transducer amplifier – LV pressure channel	AI 2, NI-9205
Pressure transducer amplifier – LA pressure channel	AI 3, NI-9205

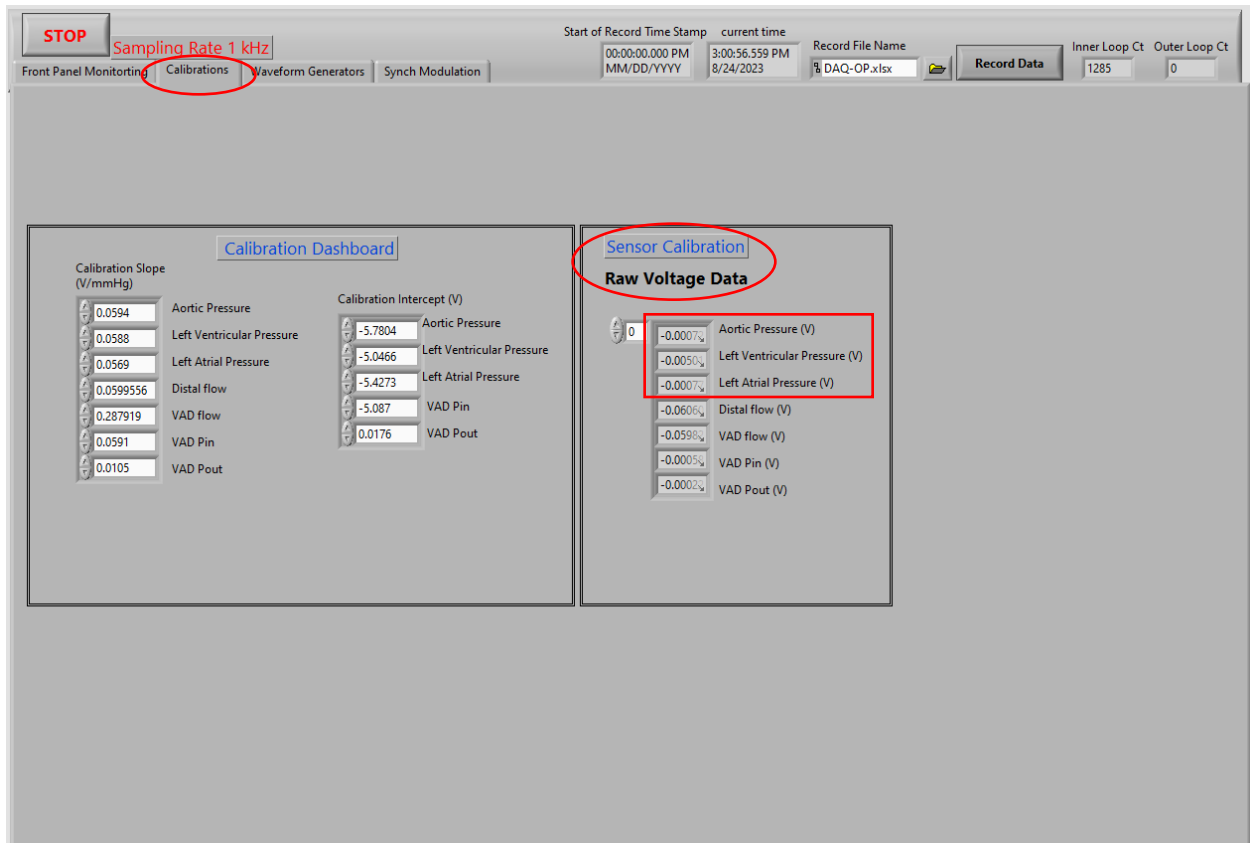
- b. Connect the USB data cable from cDAQ-9174 to the mock circulatory loop (MCL) laptop.
2. Power ON all equipment.
3. Set the low pass filter on the pressure amplifier module to 30 Hz for all the three channels.
4. Connect the pressure transducer luer lock ports to the horizontal serial 3-way stopcock ports on the manometer tube. Each pressure transducer should be connected to a separate 3-way stopcock. Please refer to image below.



5. Sample 60 mL – 100 mL BAF solution in a syringe and connect the syringe to the bottom end connector of the manometer tube.
6. Dispense BAF solution from the syringe to fill the horizontal serial 3-way stopcock line and pressure transducers. Bleed the pressure transducers till no air exists in the connectors and around the pressure transducer sensor.
7. Open and Run the LabVIEW VI (or Virtual Instrument) that executes the custom MCL software (snapshot graphical user interface (GUI) shown below).



8. In the software, select the Calibrations tab to read the raw voltage values (Sensor Calibration > Raw Voltage Data) corresponding to the three AI channels which the pressure transducers are connected to.



9. Dispense BAF solution from the syringe to target level markings (0, 10, 20, 30,...,100) on the manometer tube.
10. Record the voltage readings of the three pressure transducers at each level marking representing a range of 0 mmHg – 100 mmHg pressure.
11. Compute the slope and intercept of the voltage vs. pressure data line for each pressure transducer channel and record it (in the Laboratory Notebook and MCL software (see Calibration tab snapshot above)) as the pressure transducer Calibration Slope in V/mmHg and Calibration Intercept in V. Record the date of calibration.