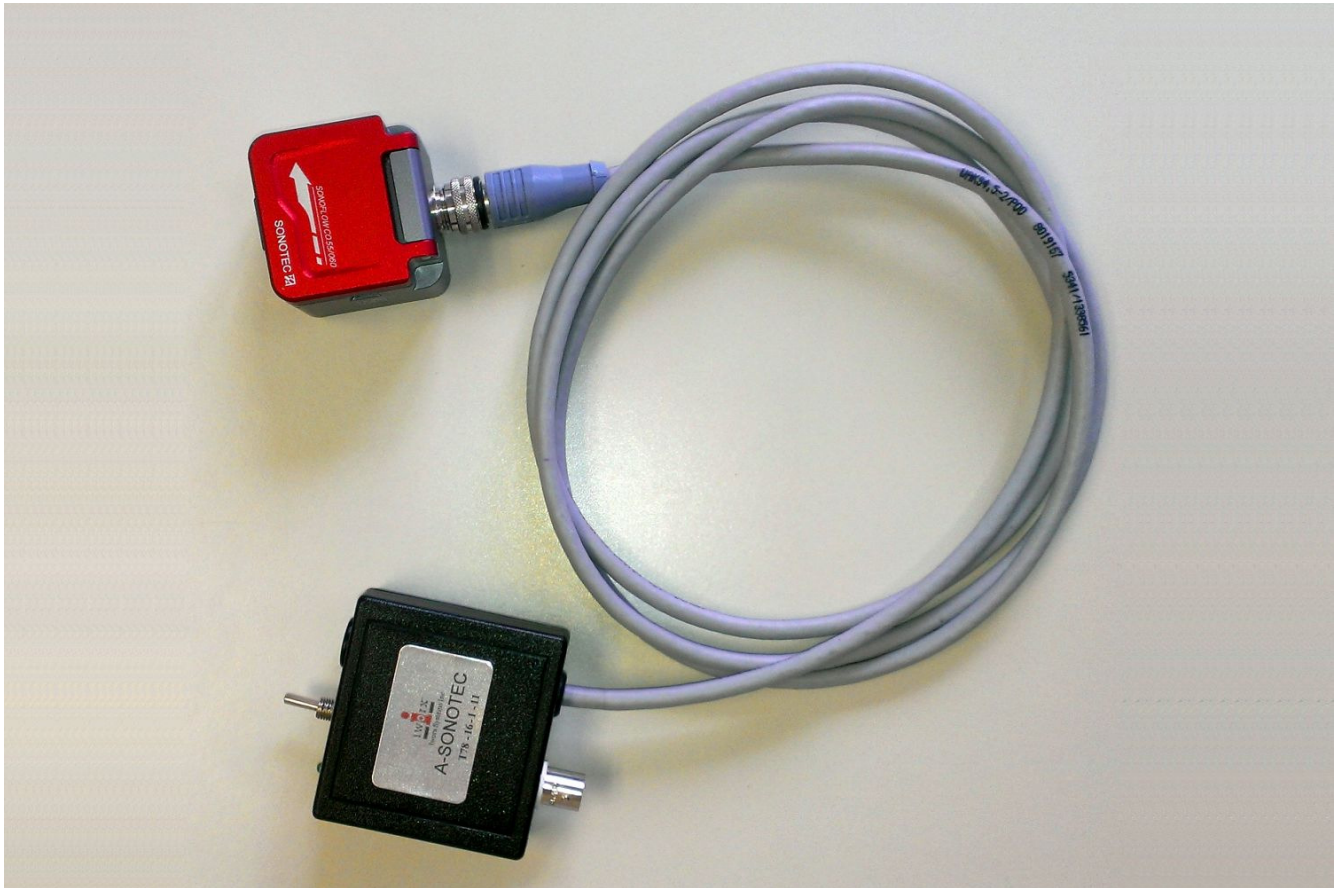




Equipment needed:

- iWorx Recorder
- Peristaltic Pump
- SonoFlow Sensor with tubing that fills the sensor area
- A-Sonotec adapter
- Graduated flask or cylinder
- Stopwatch.

Setup

- Place the tubing into the SonoFlow sensor. If the size of this tubing is different than the peristaltic pump tubing, use an adapter
- Plug the A-Sonotec adapter into the SonoFlow sensor
- Connect the 12V power supply to the A-Sonotec
- Connect a BNC cable from the A-Sonotec to the BNC input on the iWorx recorder
- Turn on the A-Sonotec adapter
- Turn on the iWorx Recorder and Start LabScribe
- Enable the channel that the flow sensor is connected to
- Set the sampling speed to 10 samples/second

- Setup the tubing so that the pump can draw fluid from a reservoir and then push the fluid through the flow sensor into the graduated flask

Procedure

To calibrate the flow sensor you need 2 flow speeds that are around the expected flow ranges that you expect to measure, For example if you have the SNF-55-160 sensor, then the max flow rate is 18000ml/min. You should calibrate the flow sensor between 2000ml/min and 15000ml/min. Make sure that the pump is capable of these flow rates. As an example:

LowCalFlowRate = 2000 ml/min

HighCalFlowRate = 15000 ml/min

In 1 minute the pump will output 2 Liters at the low flow cal (2000ml/min) rate and 15 Liters at the high flow cal rate (15000 ml/min). Since you are measuring time, you will want to measure a long enough time to make sure that the error is minimized.

If you use a 5000ml flask, you can fill the flask up to the 2000 ml/min mark for the low flow cal test, which will take 1 minute. Then you can fill it to the 5000ml mark for the high flow cal which will take about 20 seconds.

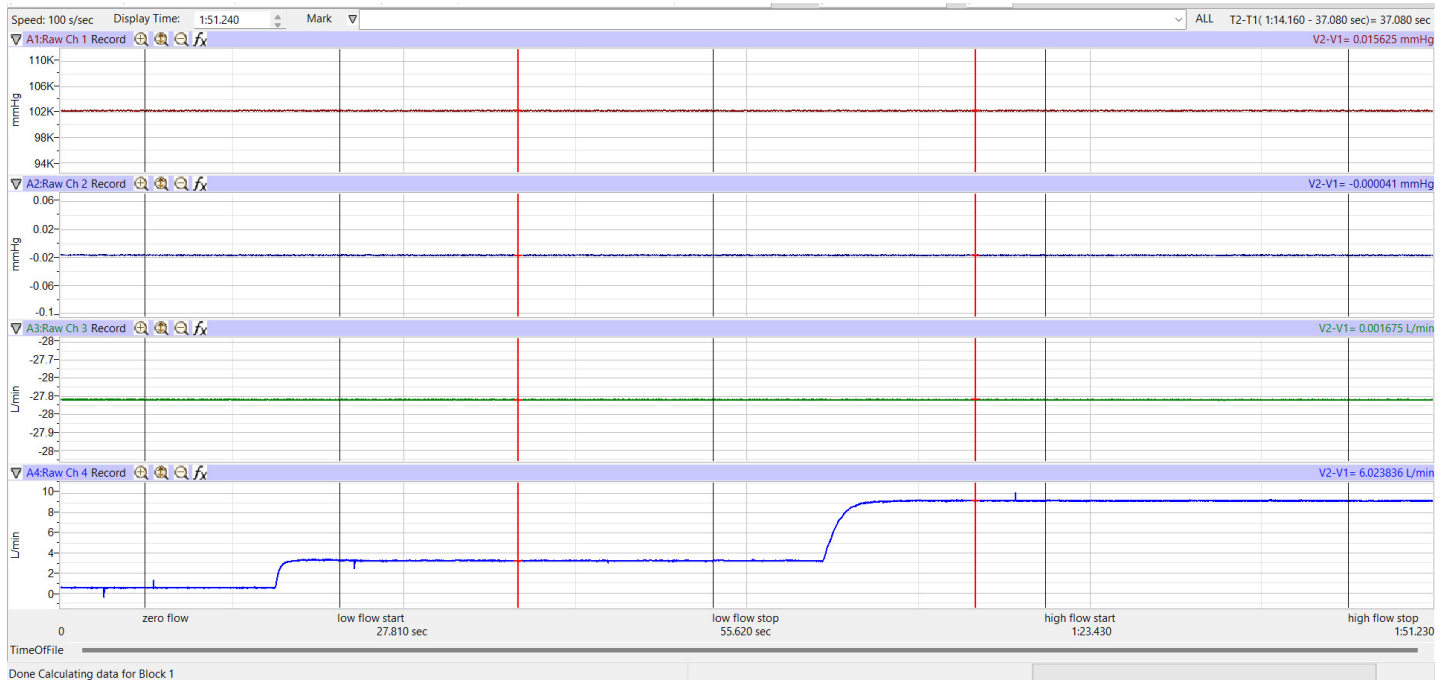
For our case:

LowCalFlowVolume = 2000 ml

HighCalFlowVolume= 5000 ml

Measuring the Low Flow Rate

- Set the pump to output approximately the LowFlowCal flow rate.
- Start Recording in LabScribe by clicking Record
- Place a mark in LabScribe “Zero flow”, this is your zero flow value. Type ‘Zero Flow’ in the mark box and click Enter
- Wait 5 seconds
- Turn on the pump at the LowFlowCal speed. The signal in the flow channel should increase, and then flatten out.
- Place a mark in LabScribe “LowFlowCal”. Type ‘Low Flow Cal’ in the mark box and click Enter
- When the amount of fluid in the flask reaches the LowCalFlowVolume (2000 ml per the example), turn off the pump
- This will cause the flow rate channel to drop back to the zero flow value
- Stop recording



- Using the 2 cursor mode, measure the time that the pump was on. If T is the time between cursors, you can calculate the average flow rate as:
 - ActualLowFlow** = LowCalFlowVolume/(Time in minutes)
 - Using the Cursors measure the mean voltage between the cursors: **MeanLowValue**

Measuring the High Flow Rate

- Set the pump to output about HighFlowCal flow rate.
- Start Recording in LabScribe
- Turn on the pump at the HighFlowCal speed, The signal in the flow channel should increase, and then flatten out
- Place a mark in LabScribe “HighFlowCal”
- When the amount of fluid in the flask reaches the HighCalFlowVolume (5000 ml per the example), turn off the pump
- This will cause the flow rate channel to drop back to the zero flow value.
- Stop recording
- Using the 2 cursor mode, measure the time that the pump was on. If T is the time between cursors, you can calculate the average flow rate as:
 - ActualHighFlow** = HighCalFlowVolume/(Time in minutes)
 - Using the Cursors measure the mean voltage between the cursors: **MeanHighValue**

Calibrate the Sensor

- Zoom out so that you can see all the data
- Right-Click on the channel and choose Units→Advanced
- Place the first 2 cursors in the region with the Low Flow Rate
- Place the last 2 cursors in the region with the High Flow Rate
- The left 2 values are filled by LabScribe based on the mean voltage between the cursors.
- **Set the right 2 values (do not change the left values)**
 - Set Mean Value Between left 2 Cursors xxx => **ActualLowFlow**
 - Set Mean Value Between right 2 Cursors xxx => **ActualHighFlow**
 - set Units to ml/min
- Click OK