

Air Tuner

201 MHz MICE Cavity

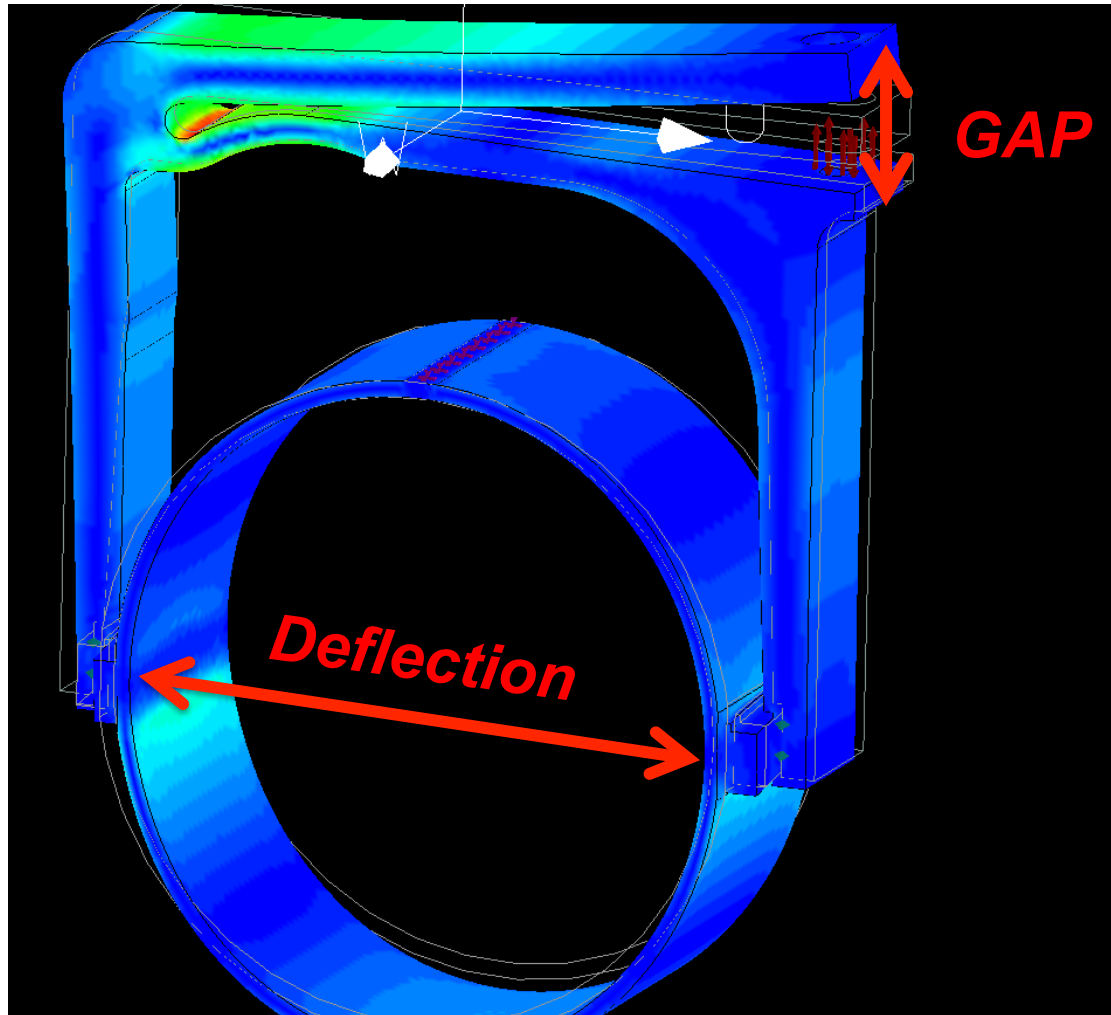
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Measured Variables:

- Pressure (PSI)
 - ModBus ReadOut
 - Analog Gauge
- Deflection of the hoop (mm)
 - Dial Gauge
- Linear transducer output (V)
 - NI ADC + LabView
- Fork Gap Variation (derived from Linear transducer reading)
 - LabView

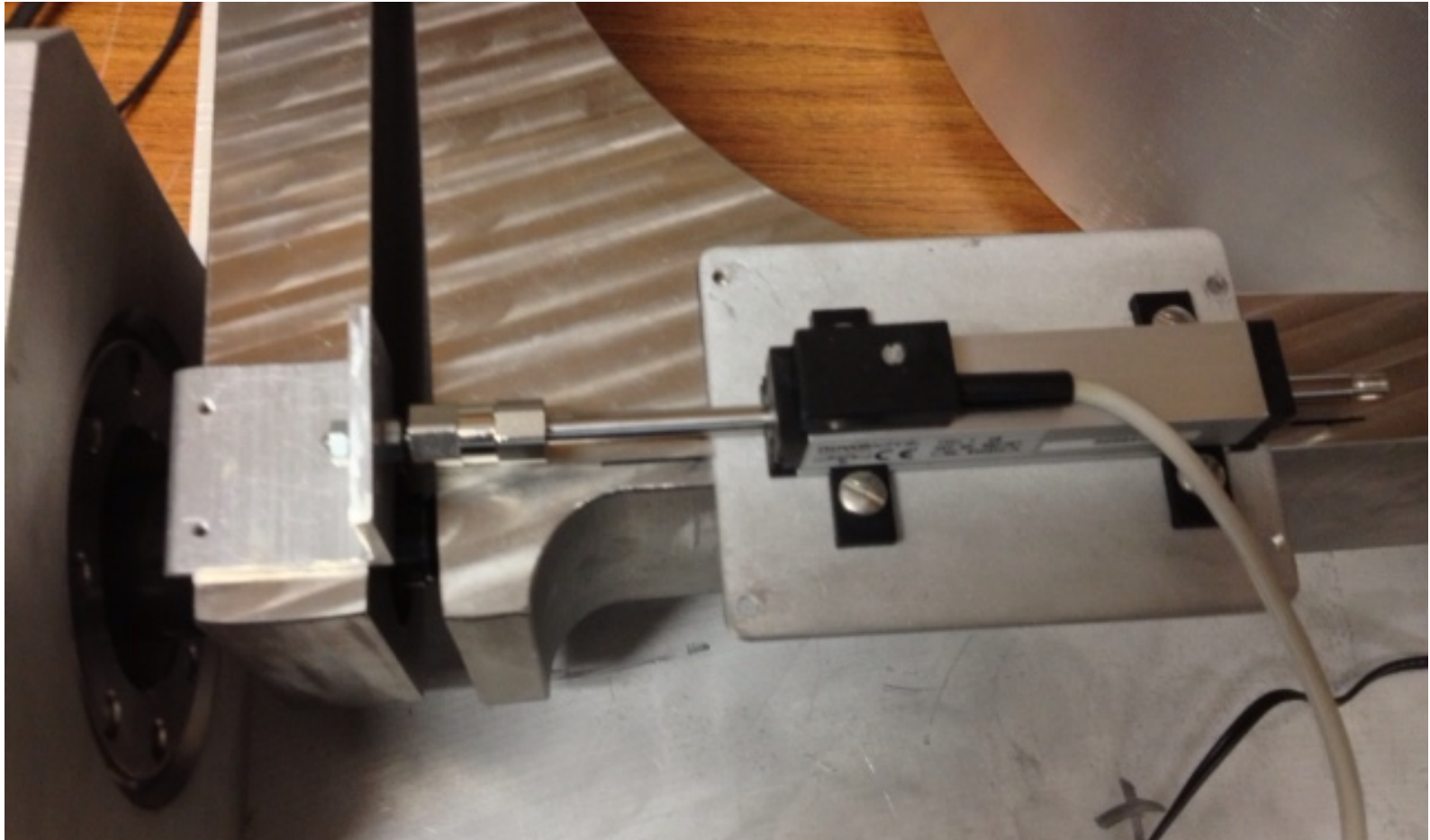
Measured Variables:



Dial Gauge:



Linear Transducer:



Ranges :

- **Ranges** of each variable
- **Mean Errors** computed as the mean value of the error on each measurement

<i>Ranges Results</i>				
	<i>Pressure (PSI)</i>	<i>Deflection (mm)</i>	<i>Transducer (V)</i>	<i>Δ Gap (mm)</i>
<i>Range</i>	160	3.56	1.575	8.005
<i>Mean Error</i>	1.5	1.3E-02	4E-03	8E-03

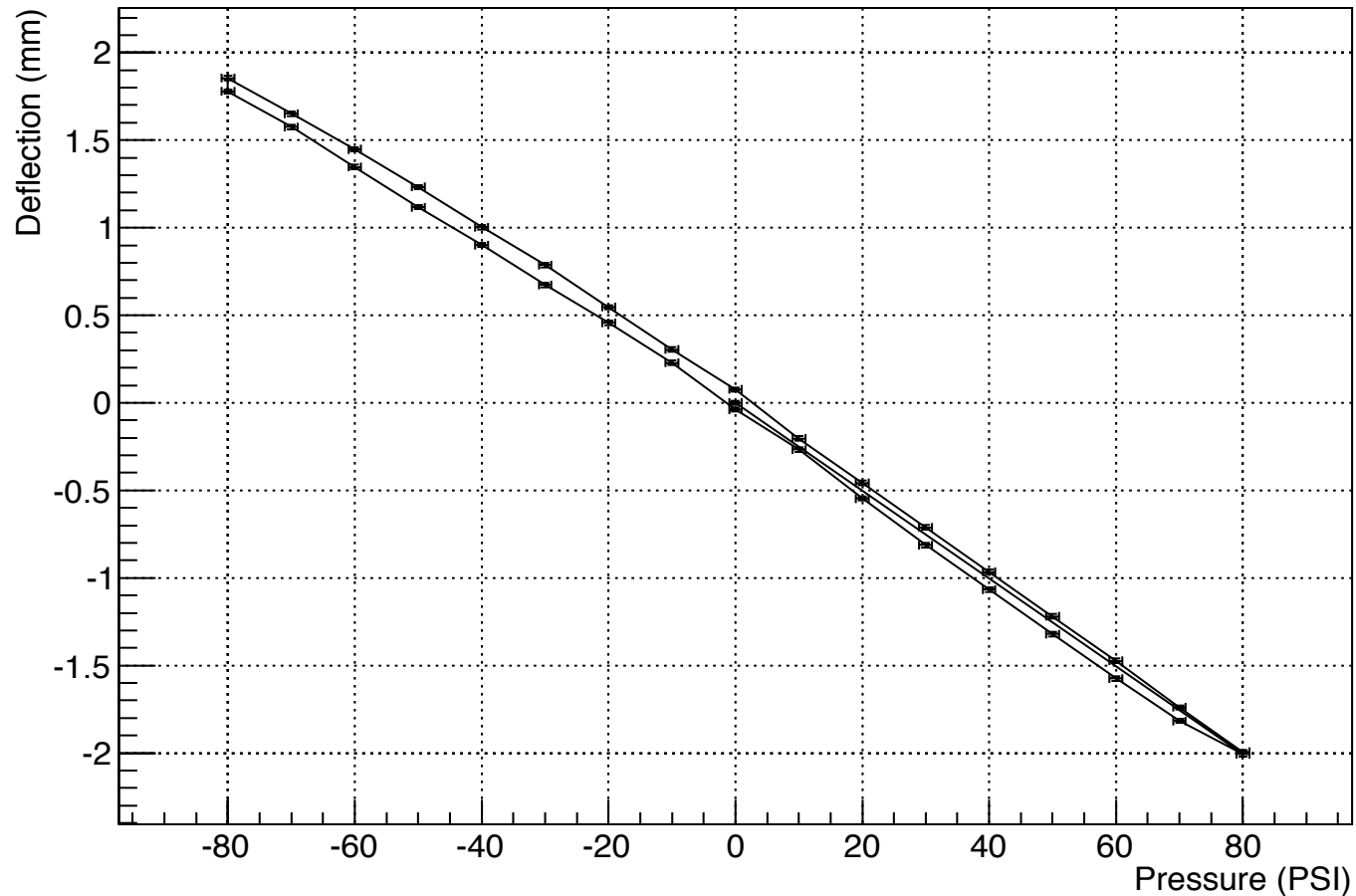
Test Results :

I'll show ONLY a few plots. A detailed presentation will be given during one of our Monday meetings.

- Tuners seem to show a small hysteresis cycle
- Multiple cycles overlap each-other
- Different response when pushing and pulling

Test Results :

Piston 1 - Complete Cycle

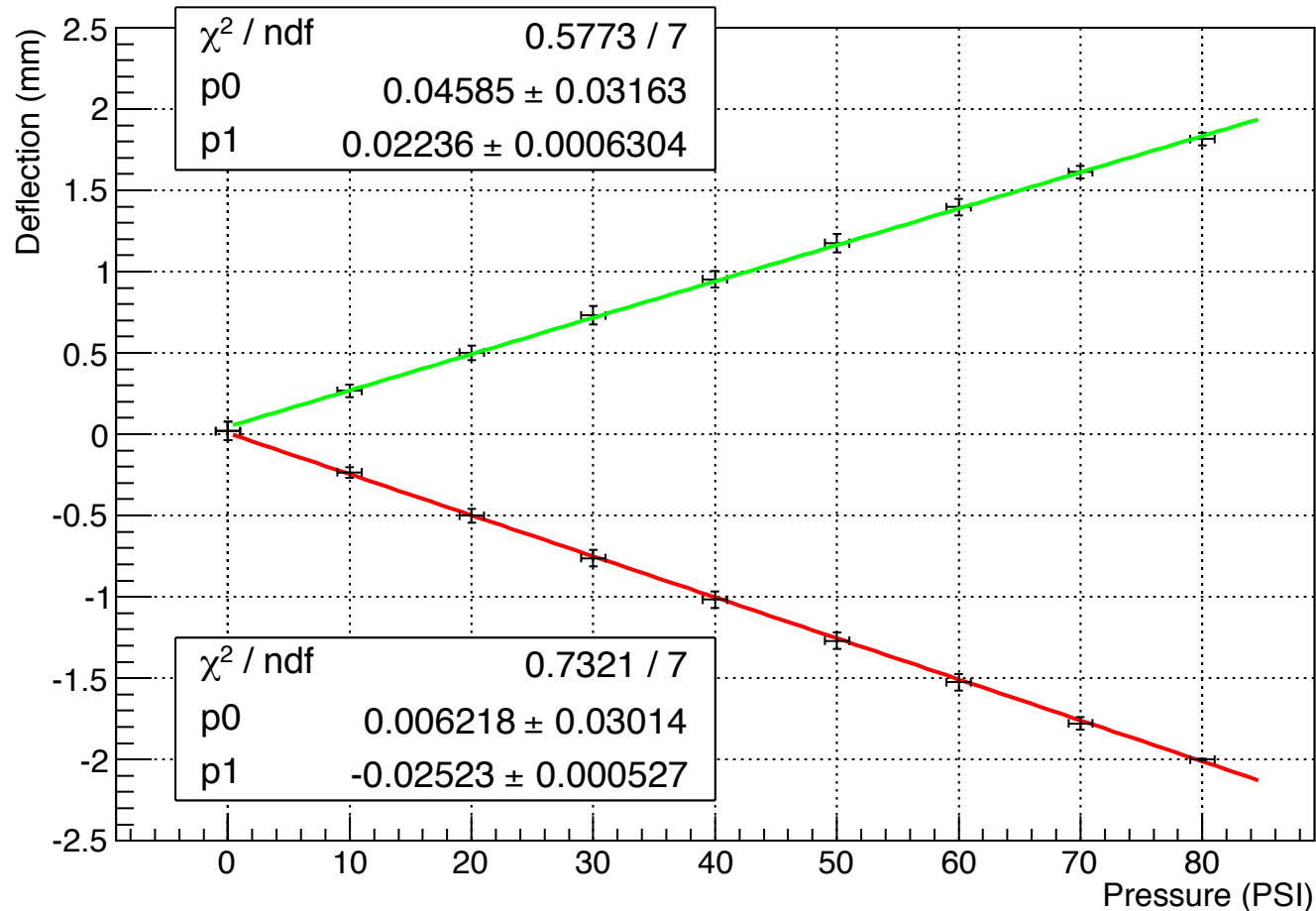


Test Results :

- We created plots with the mean value of the upper and lower branch of the hysteresis cycle.

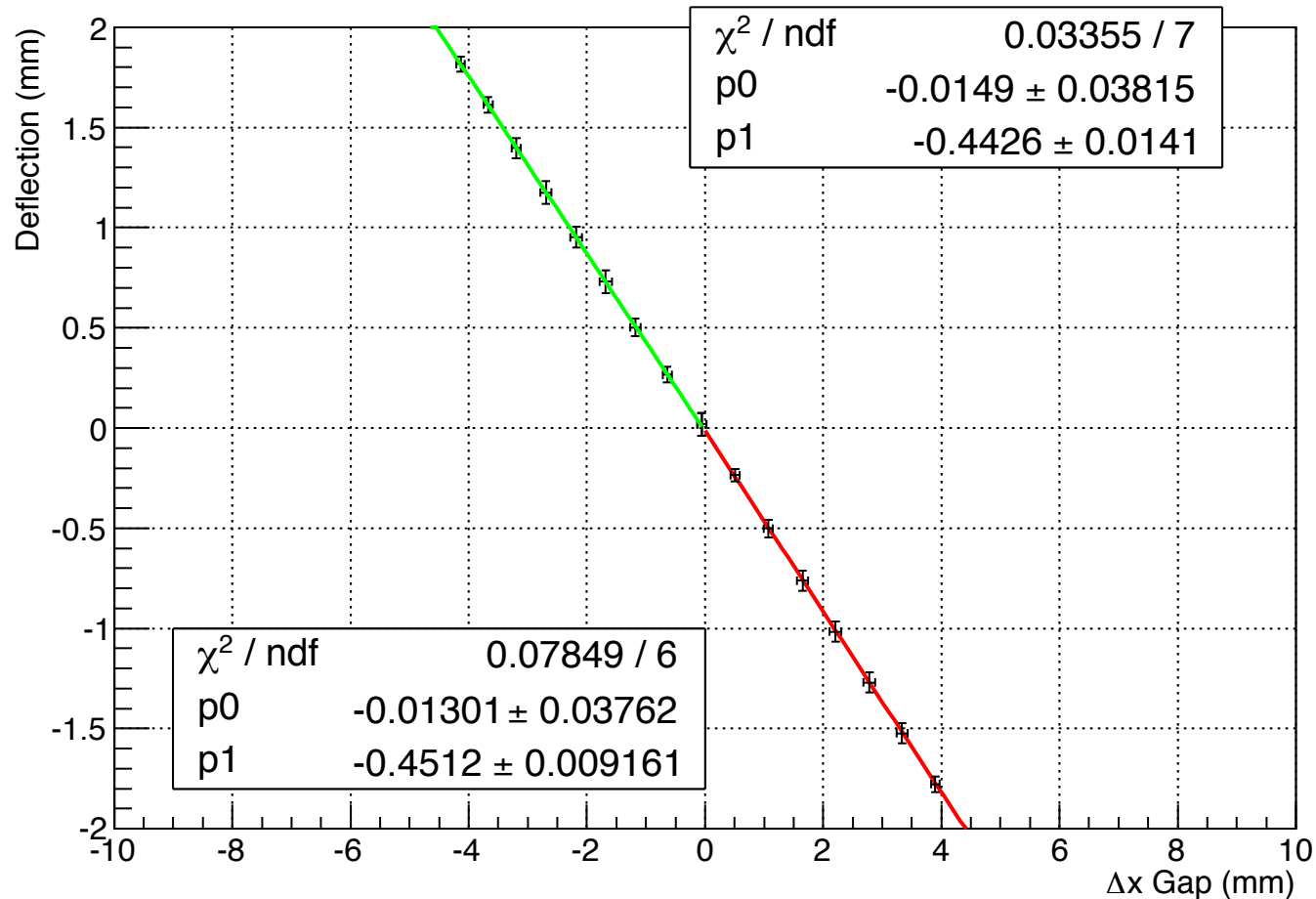
Test Results :

Piston 1 - Mean



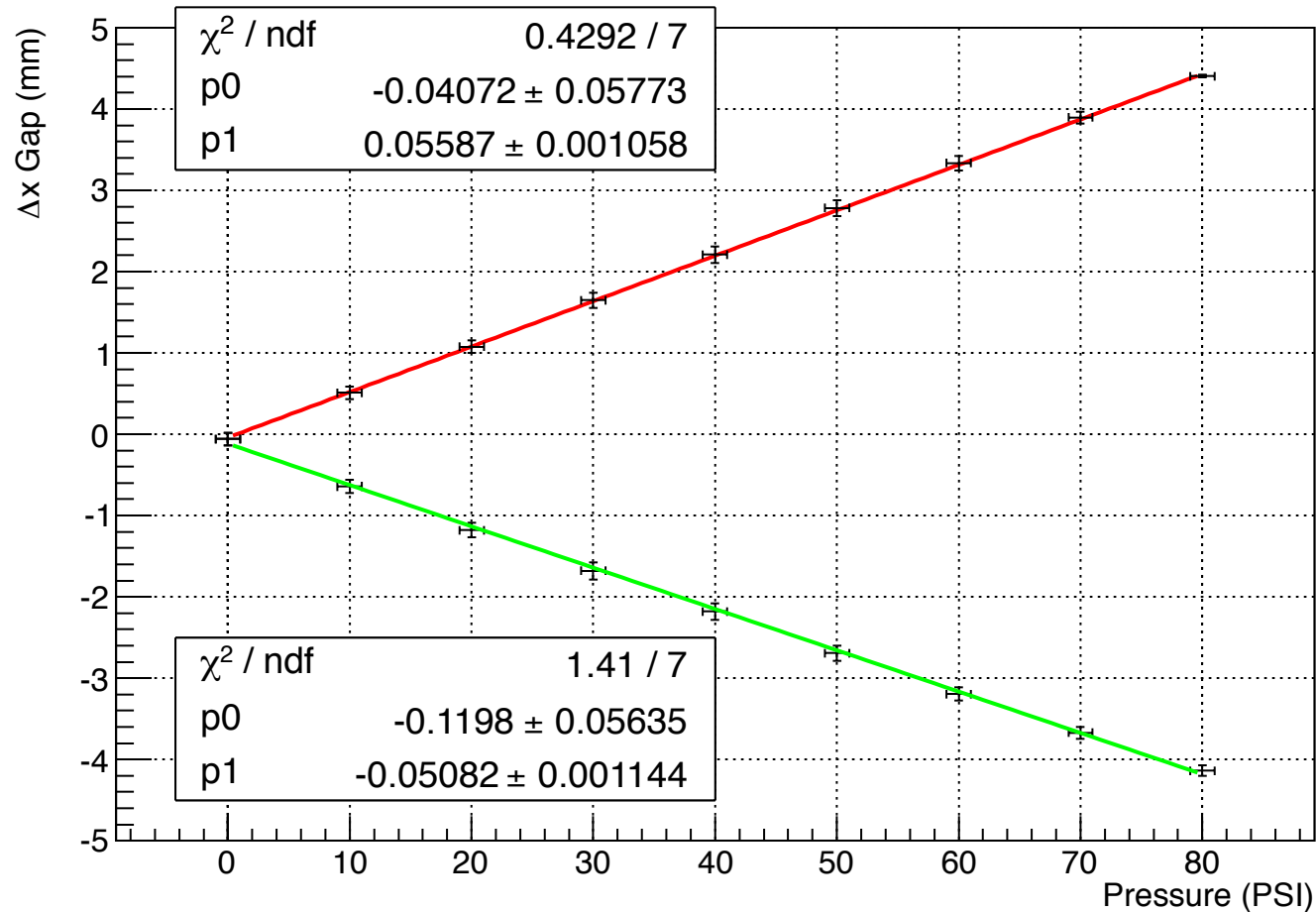
Test Results :

Piston 1 - Mean



Test Results :

Piston 1 - Mean

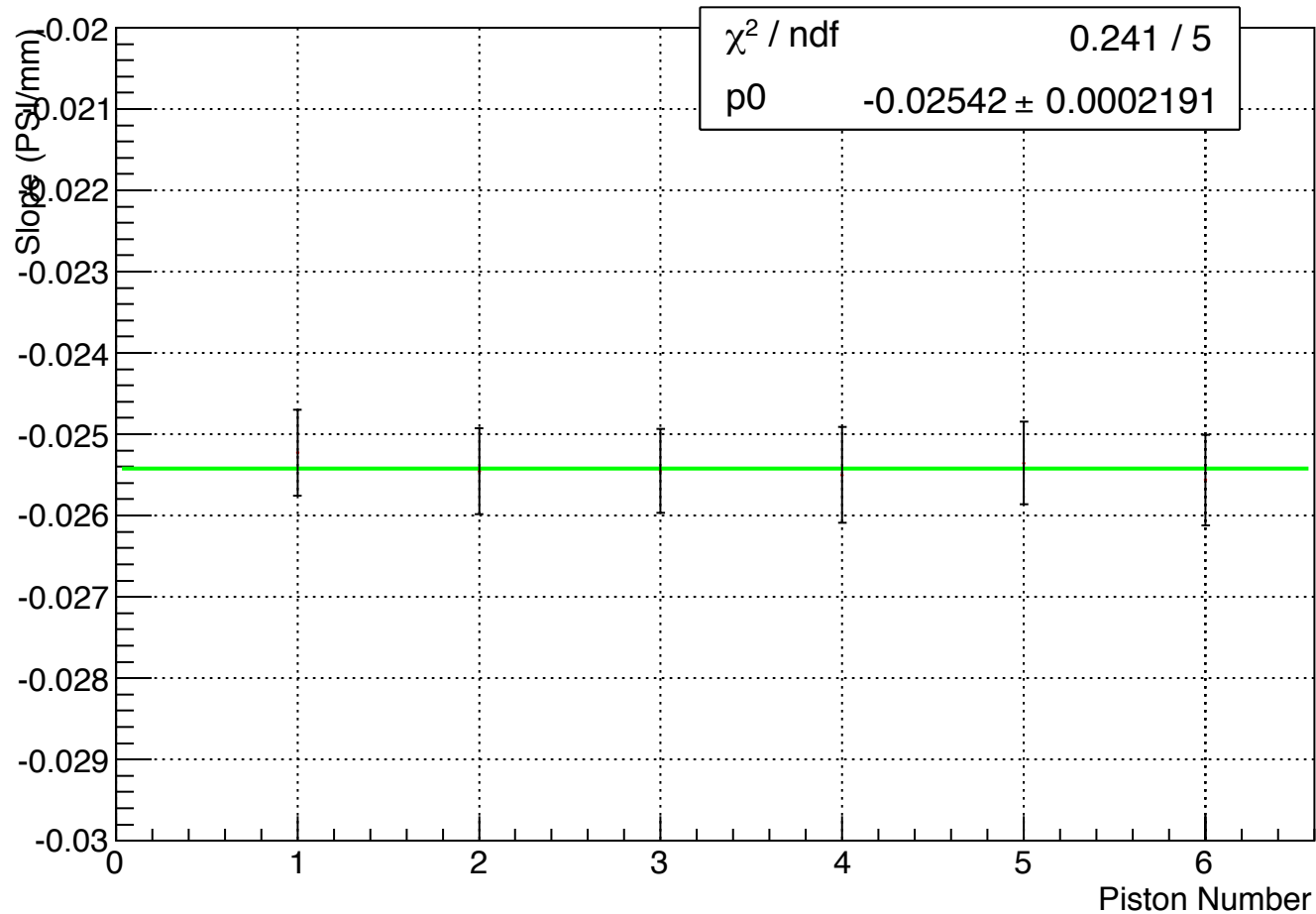


Test Results :

- We repeated the procedure for each piston
- We made plots with the slope of each piston
- Each piston seems to have a compatible response with the others.

Test Results :

P vs Deflection - Push



Linear Transducer:

- Will be used only in Lab 6 with no vacuum since it degrades vacuum;
- Will be fundamental to calibrate pistons and fork
- They come with a rectangular mounting fixture
- **Question 1:**
 - Need to build a L-shaped support for the shaft

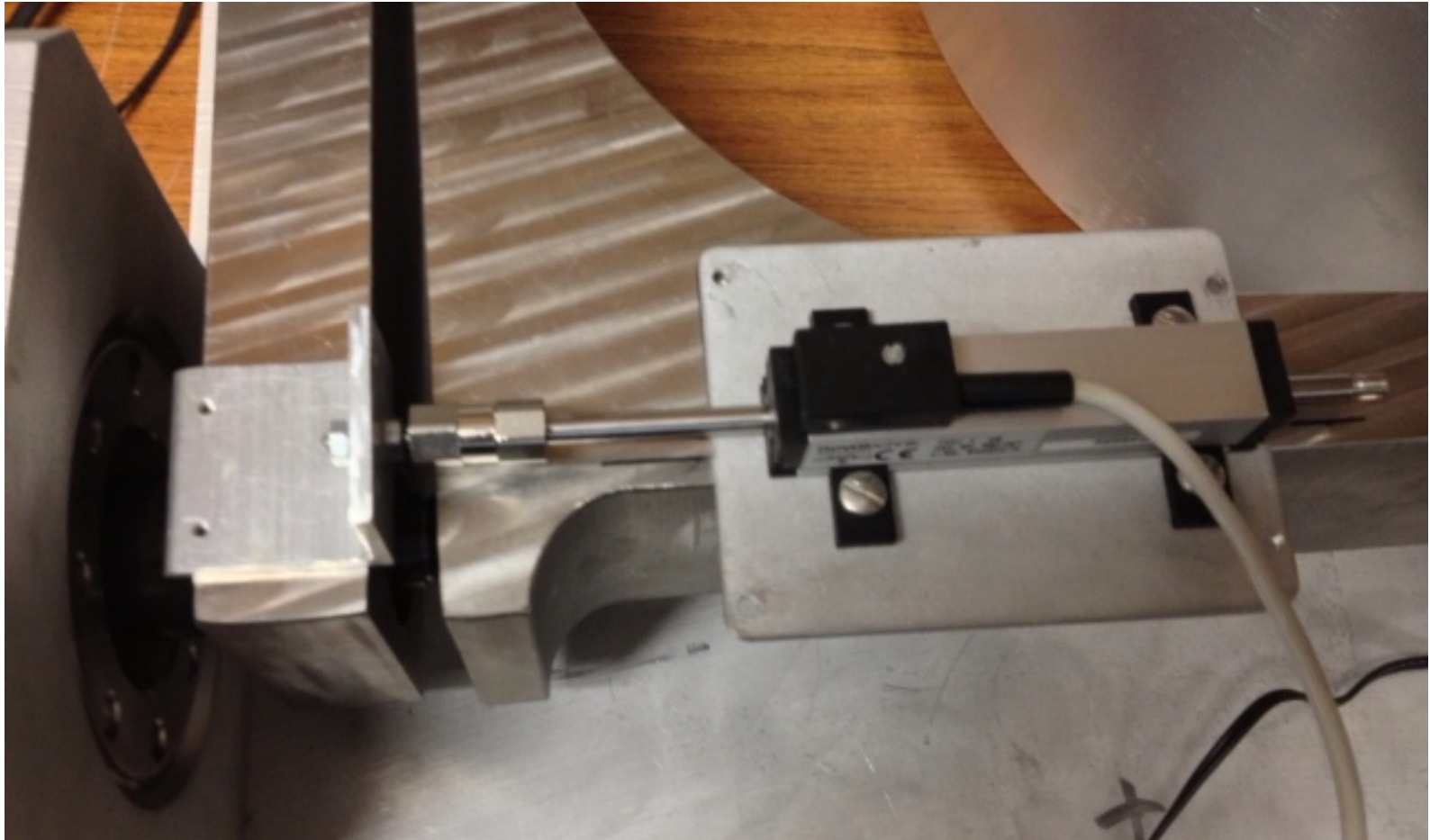
Linear Transducer:

- They could be mounted with C-clamps, if there's space
- Screwing the fixture on the fork will allow for a more precise alignment of piston shaft and potentiometer shaft. They need to be in the exact same position on all 6 forks
- Forks ALREADY need to be machined to fit the cavity
- They will be removed before vacuum test.

Linear Transducer:

- Question 2:
 - Can we make small drill holes on the forks?
 - Does it affect mechanical behavior?

Linear Transducer:



Tests:

- Test Stand -> DONE!
- Horizontal test – Lab 6
- Test in vacuum vessel NO vacuum – Lab 6
- Test in vacuum vessel AND vacuum – Lab 6
- Test and operation - MTA

On the cavity :

- Question 3:
 - What is the maximum pressure/deflection that can be applied to the cavity?

Test in Lab 6:

- Planning a test on the Horizontal Stand:

- **Question 4:**

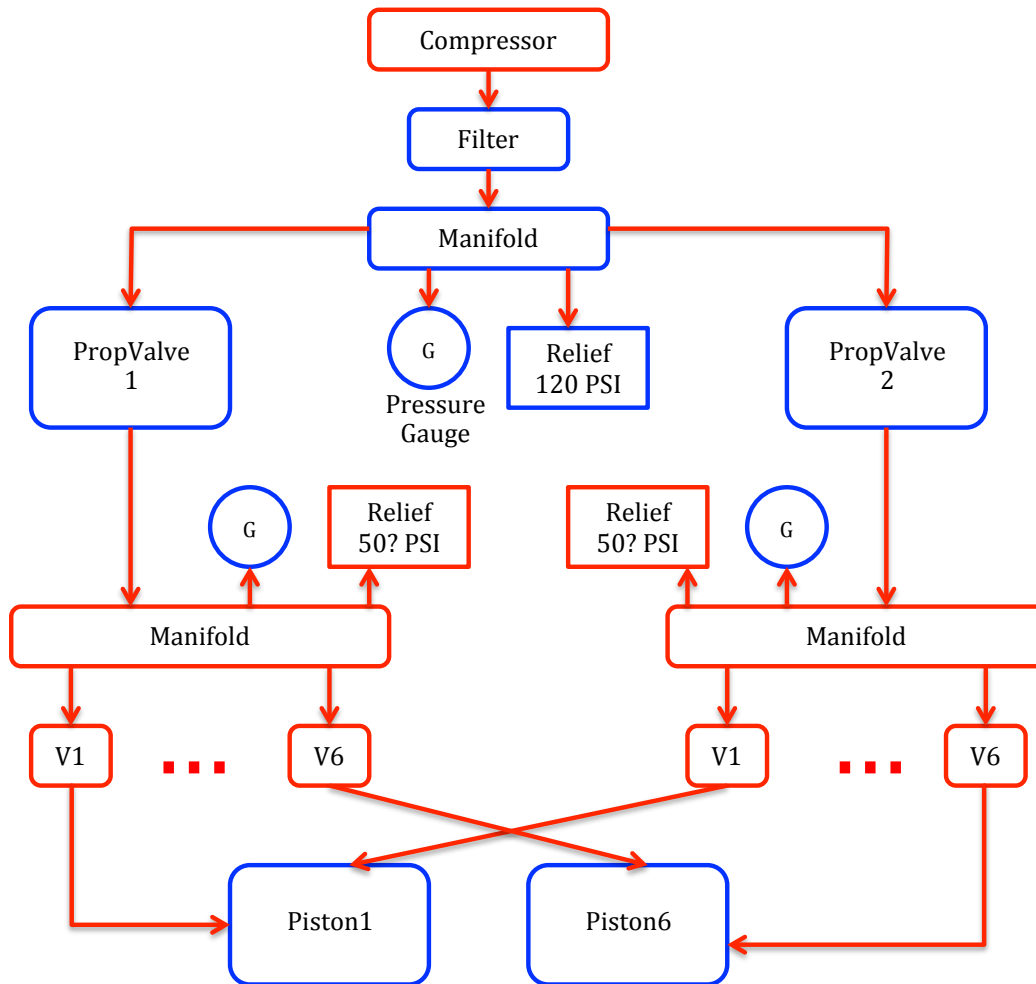
- Is it possible to operate the pistons on the horizontal stand?

It wont be possible to fasten the piston can.

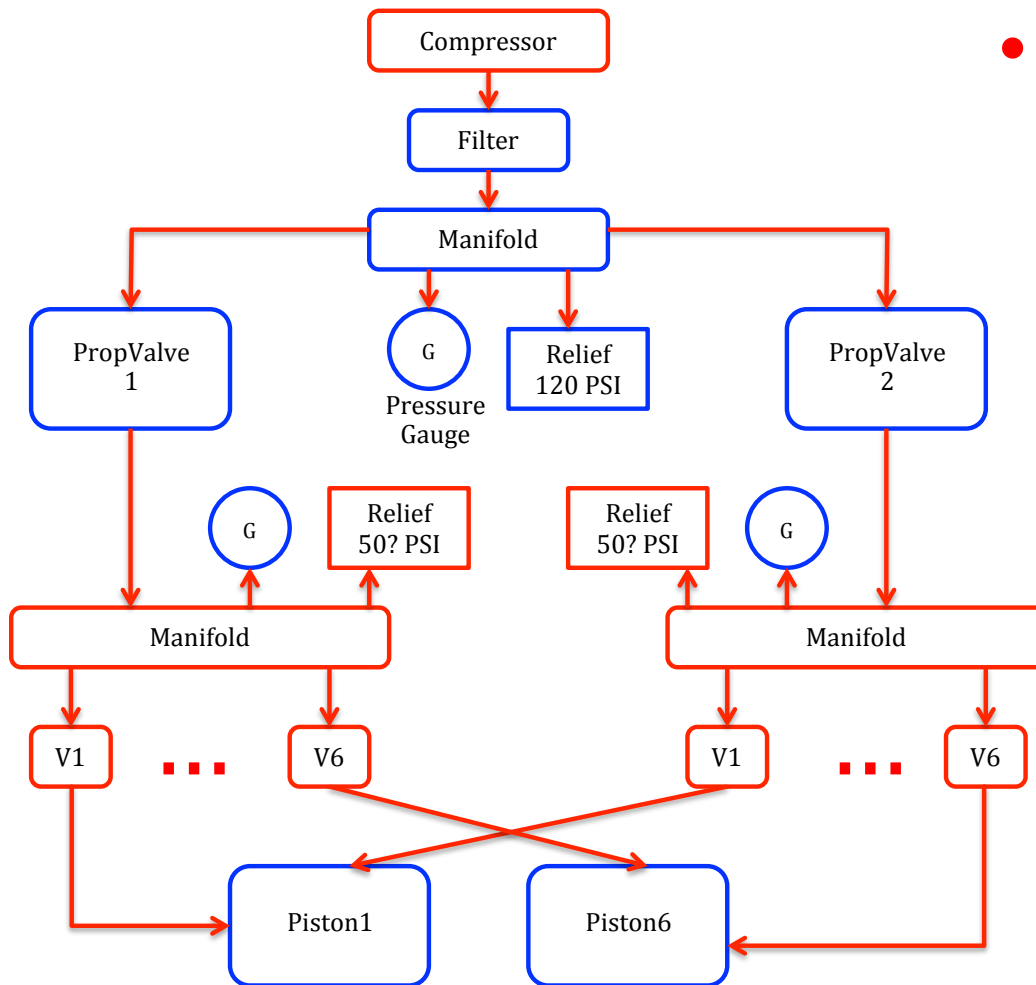
- If not, is it worthwhile to build a fastening ring?

We may decide to skip this test and go to the next step

Air Diagram:

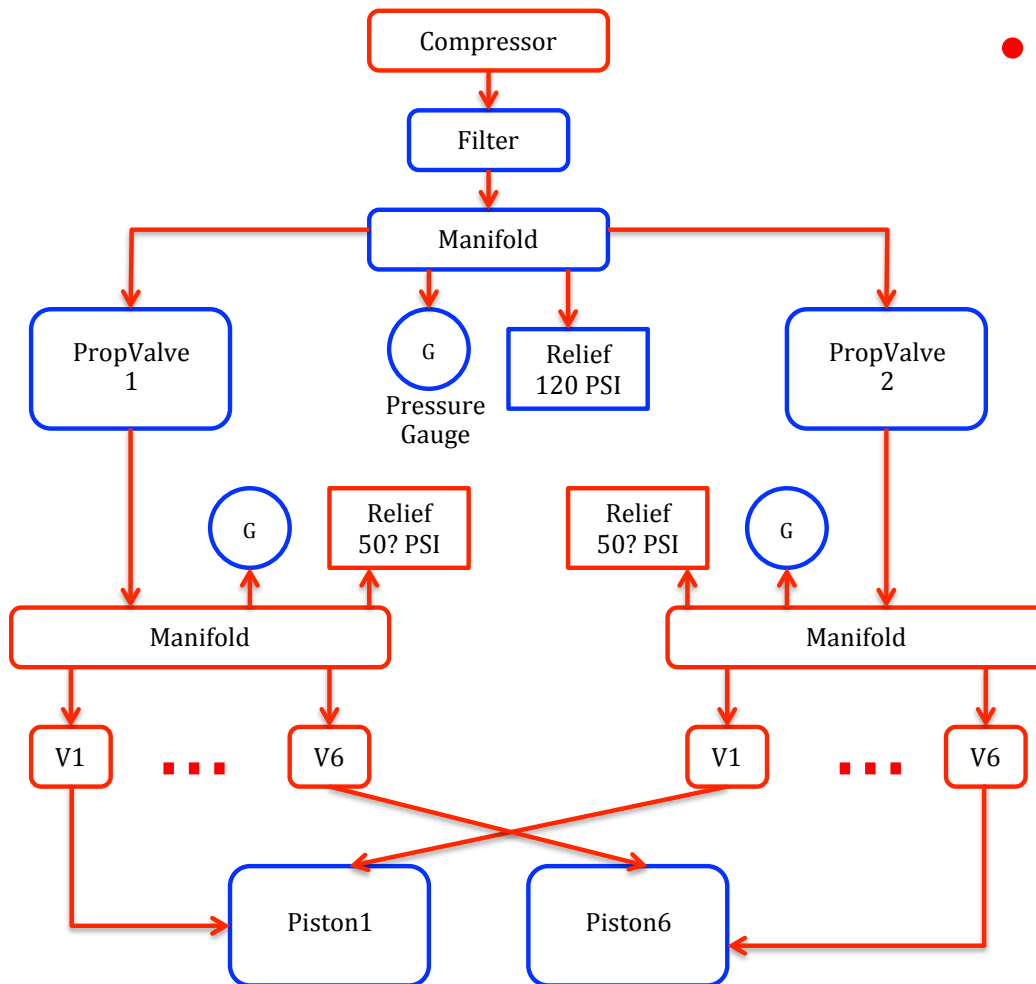


Air Diagram:



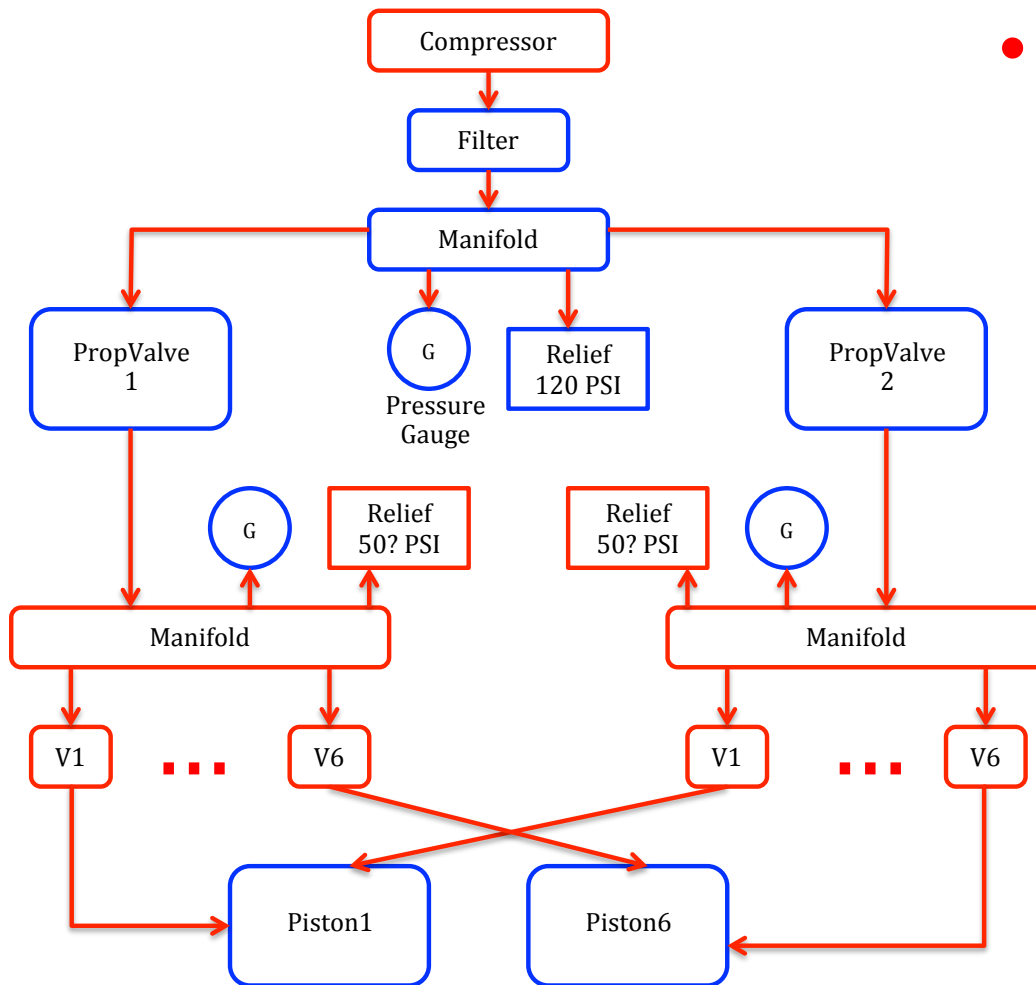
- **Question 5:**
 - Is there an air source in the MTA?
 - Is there a small 120PSI compressor that can be used in Lab6?

Air Diagram:



- Question 6:
 - Need to design two 9-way manifolds with ON-OFF valves

Air Diagram:



- Question 7:
 - Need to design the proper piping.
 - Need to design a kart-stand to house filters, manifolds and valves

Cavity Model:

- Question 8:
 - Does anyone of you have a deflection – frequency change curve for the cavity?
 - When we have that we can translate deflection into frequency change in the tuner test plots

Cavity Model:

- Question 9:

I started to “play” with quarter.sat model but the resonance frequency appears to be 204MHz...

- Who has been using this model?

We may need to chit-chat on the topic to understand what's the problem

Thanks for your help

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