

Lab 4 Manual Pressure Control - Downstream

Name: _____

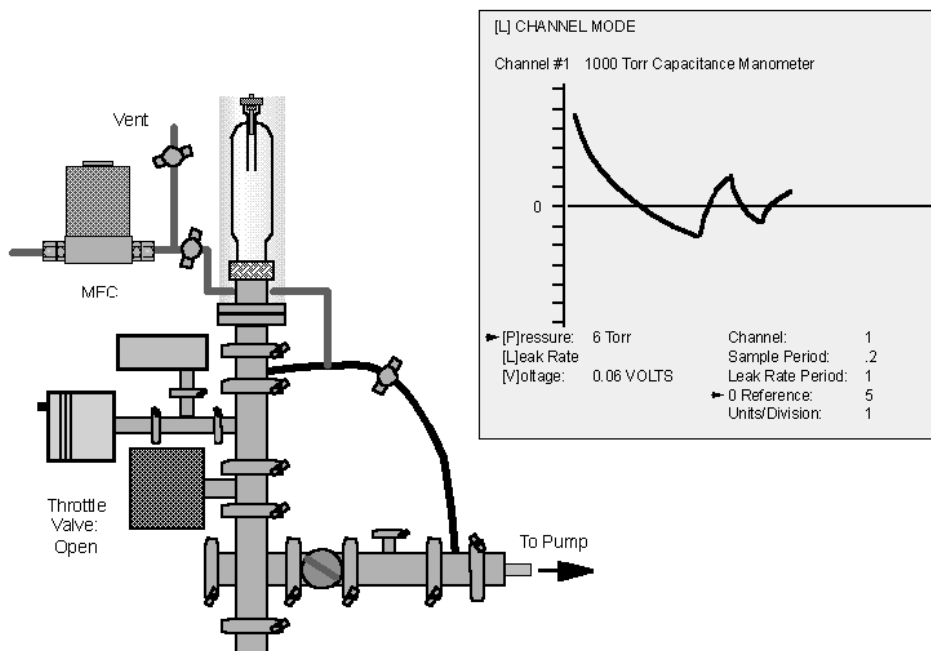
Purpose

The purpose of this lab is to:

- 1) Demonstrate how a set point pressure can be acquired and maintained manually with downstream control.
- 2) Compare control performance using elements with differing conductance ranges.

Procedure

Configure the system as shown in the figure below. Enter the Set-up Mode and adjust the mass flow controller for a throughput in the range of 20 to 50 sccm. Record the value you entered.

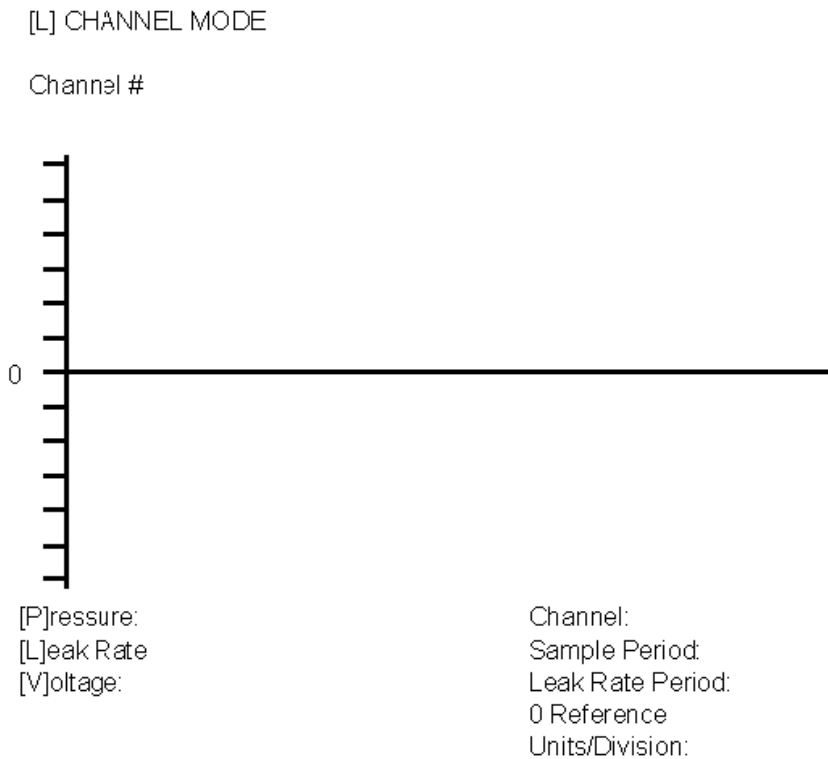


Define downstream control. Be specific in terms of pressure, pumping speed and throughput.

Display the Channel mode screen as shown above with the 0 Reference set to the intended set point pressure (5 Torr is probably a good set point pressure). Begin with the bypass pinch clamp closed.

With these parameters, try to acquire and maintain the pressure with the manual butterfly valve. Draw a sketch of what the pressure curve looks like. Does it seem easy to maintain a constant pressure?

Now close the manual butterfly valve and use the bypass pinch clamp as the control element. Adjust the pinch cock to maintain a constant pressure. Draw a sketch of what the pressure curve looks like when the pinch clamp is used for pressure control.



When you adjust the valves to control pressure, what are you really adjusting (in terms of $Q=PS$)?

Did you find it easier to maintain pressure control with the bypass line and pinch clamp arrangement than with the manual butterfly valve? Explain your observation in terms of speed, pressure and throughput.

Under what conditions might the butterfly valve be a better control mechanism?

You have completed this lab and can bring the MKS trainer to atmospheric pressure per the approved procedure (see Lab #1). Make sure that the manual butterfly valve is open prior to venting.

Lab written by M. Quirk and V. Ybarra, Jr., at Austin Community College, based on information from the VTS-1 equipment manual written by MKS Instruments, Inc. Comments may be submitted to S. Hansen at: MKS Instruments, Inc., Six Shattuck Rd., Andover, MA 01 or by email to hansens@mksinst.com.

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