

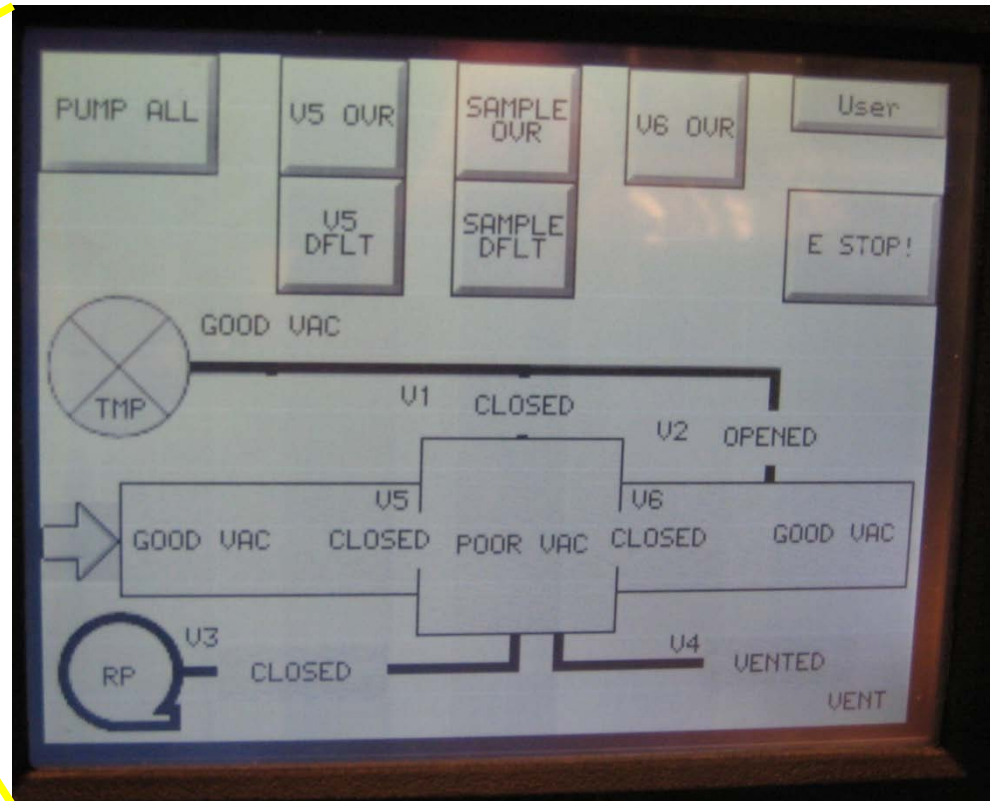
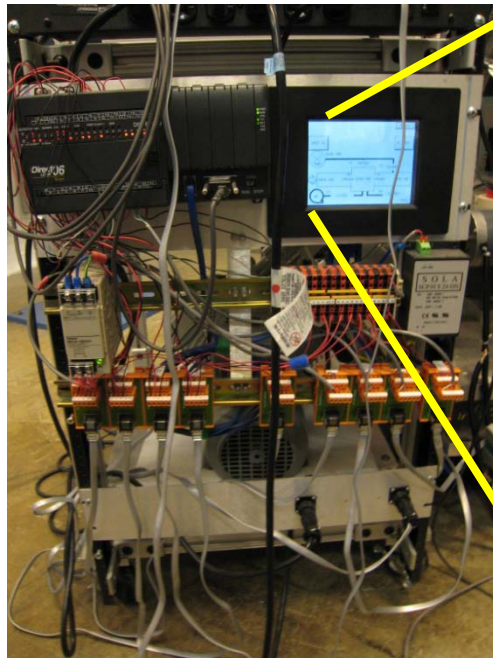
8-ID-G Vacuum System

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2009.02.25

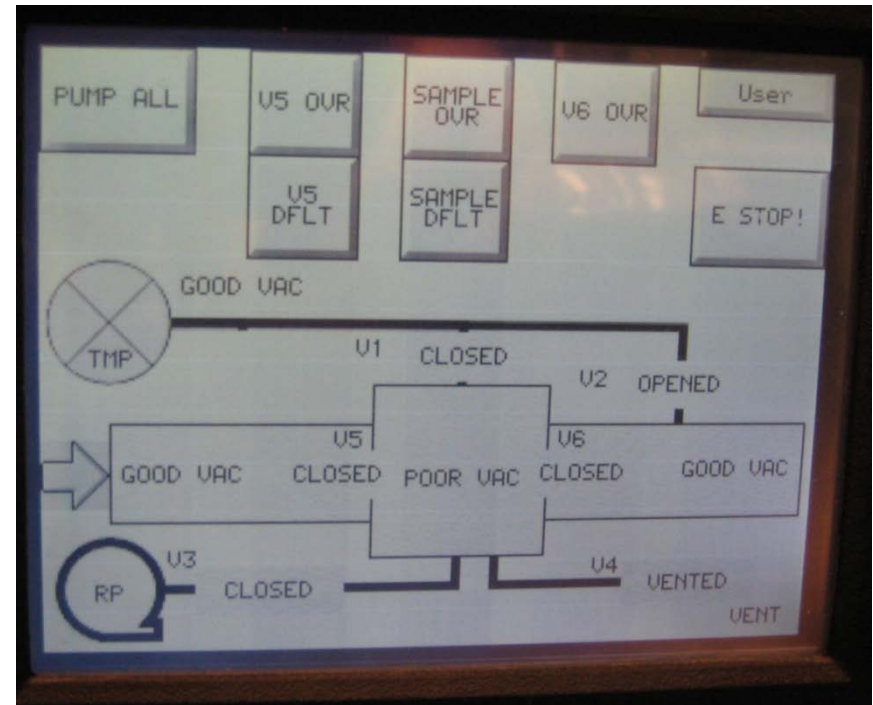
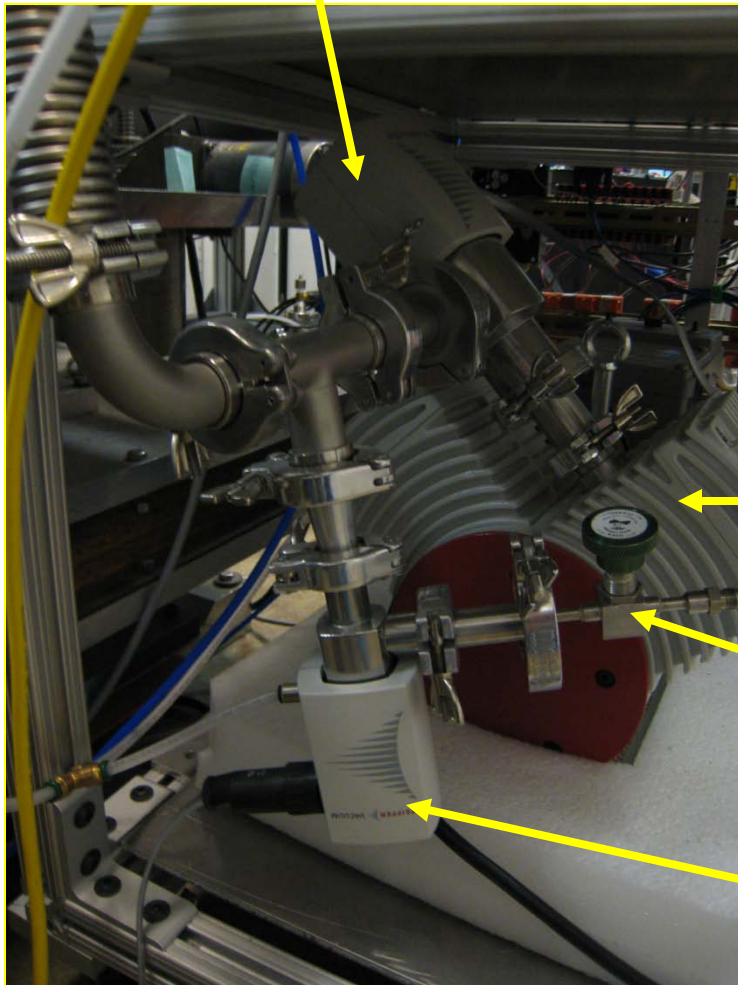
Introduction

For the vacuum sample chamber, a vacuum controller (DirectLogic06 Koyo Model Do-06 DR-D) interfaces with the vacuum pumps and automated valves to facilitate sample changes while maintaining vacuum in the flight paths. The controller has a display that shows a schematic of the system.



Identifying vacuum system components

V3 (Valve 3) connects roughing pump to sample chamber



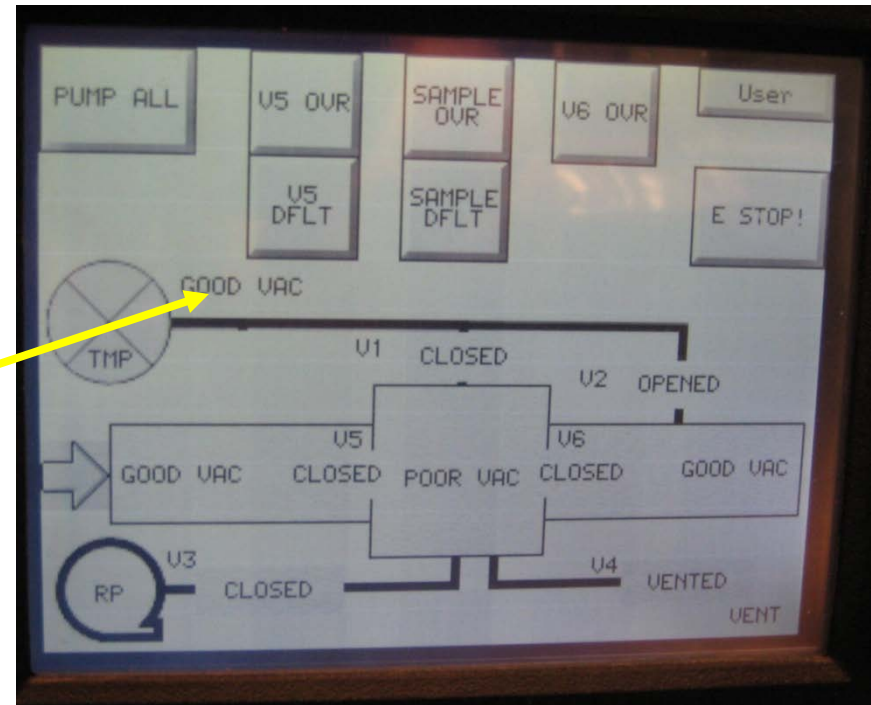
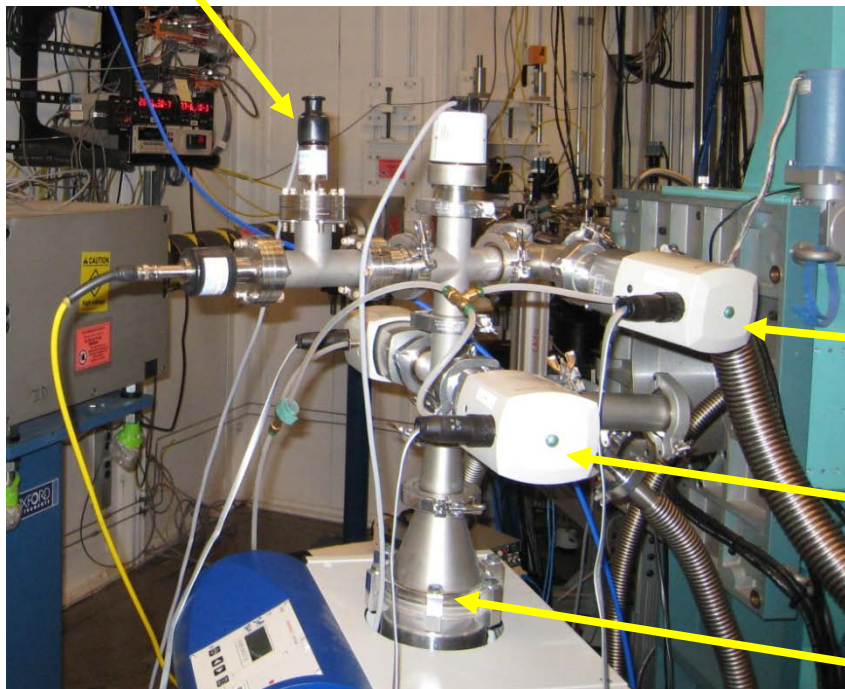
RP=Roughing Pump

Leak valve to the Vent

V4 (Valve 4) connects sample chamber to vent

Identifying vacuum system components

Vacuum gauge for channel 1 and reported here



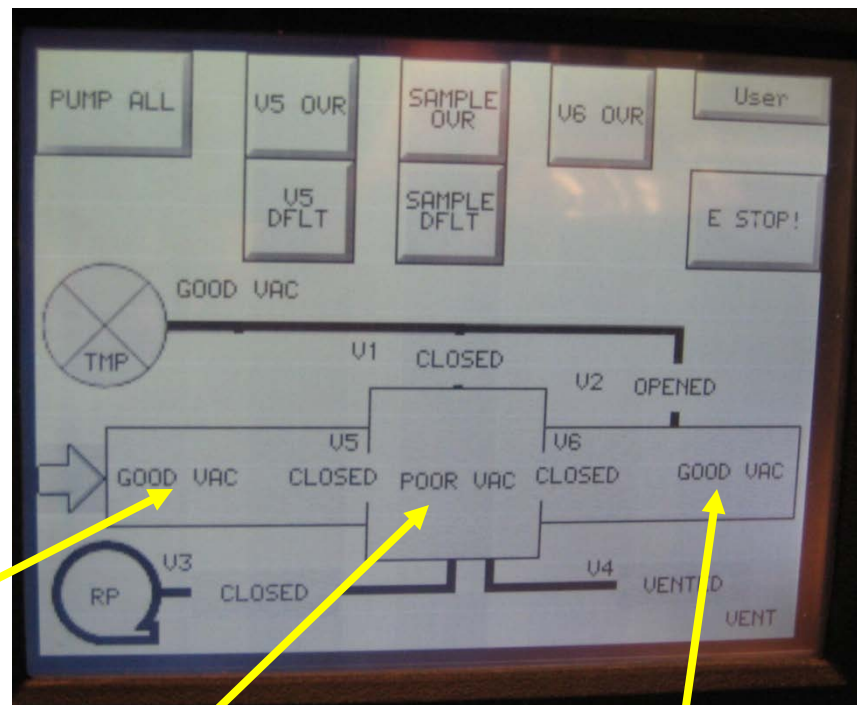
V2 (Valve 2) connects downstream flight path to turbo pump

V1 (Valve 1) connects sample chamber to turbo pump

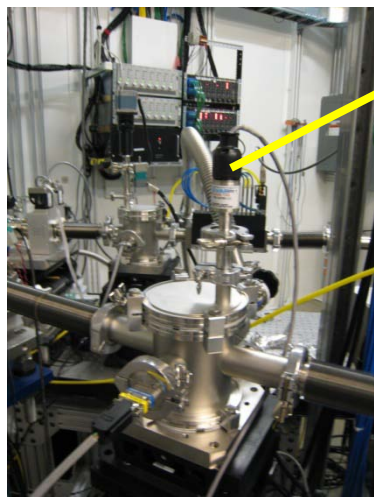
TMP=Turbo Pump

V5 (V6) is the gatevalve upstream (downstream) from the sample.

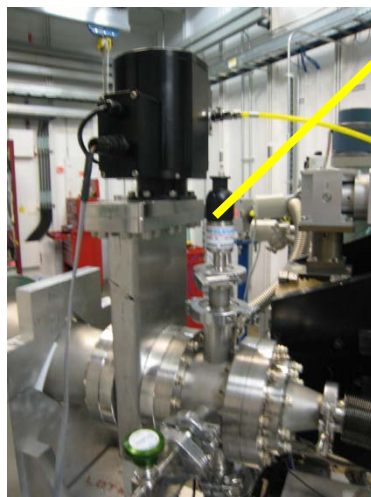
Identifying vacuum system components



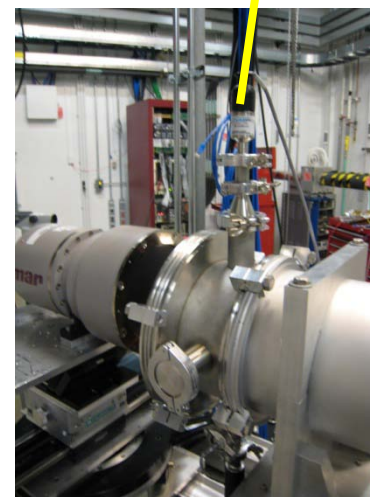
Vacuum gauges



Channel 2: upstream

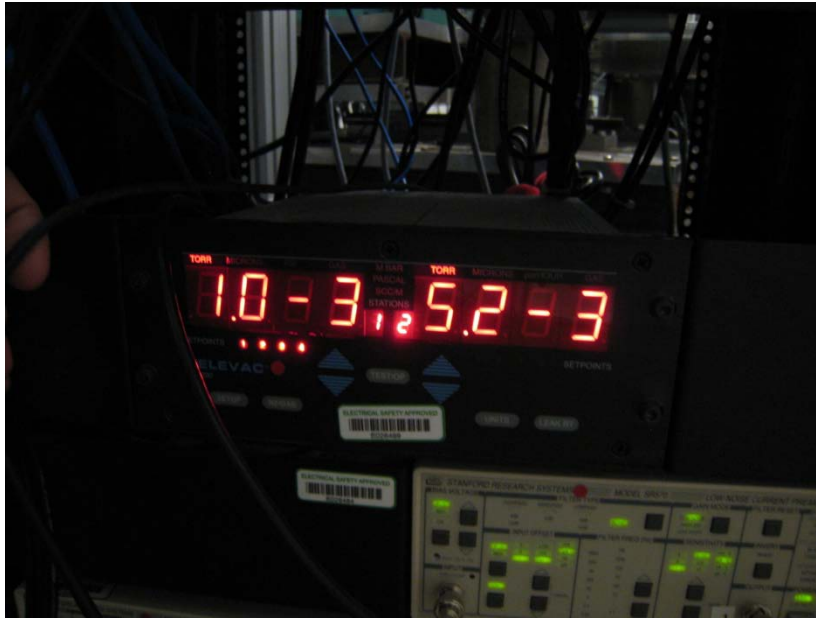


Channel 3: sample chamber



Channel 4: downstream

Identifying vacuum system components



Vacuum gauges 1-4 readout on the display, use the arrow keys to select the channel. The Setup button and the arrow keys let you set the setpoints for each channel. Each channel has 2 setpoints, SPon and SPoff. While pumping down, the valve opens when $P < SPon$, and does not close again until $P > SPoff$. So set $SPon < SPoff$. Typical: Channel 3 & 4: $SPon = 5e-1$, $SPoff = 7e-1$.

Numbers displayed above are typical good vacuum numbers after system has been running a long time.

Connecting the vacuum sample chamber

1. Cover the MAR ccd detector.
2. For the upstream gate valve, gv1, unplug the rounded cable; this will cause gv1 to close. Connect the flat cable that interfaces with the vacuum controller.



Before: rounded cable connected



After: flat cable connected

Connecting the vacuum sample chamber

3. On the vacuum controller, press the E-stop button. Turn off the vacuum pump and let it spin down.

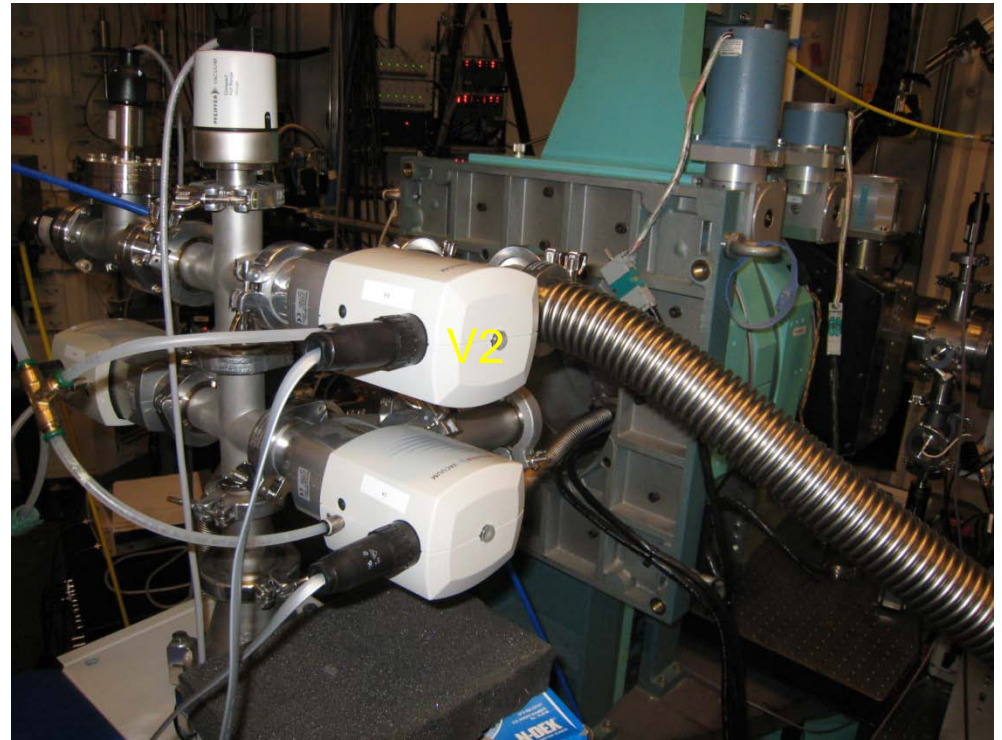


Connecting the vacuum sample chamber

4. Vent the flight path.
5. Connect valve V2 in place of the connection to the downstream flight path.



Before: V2 unconnected, hose to flight path connected without valve

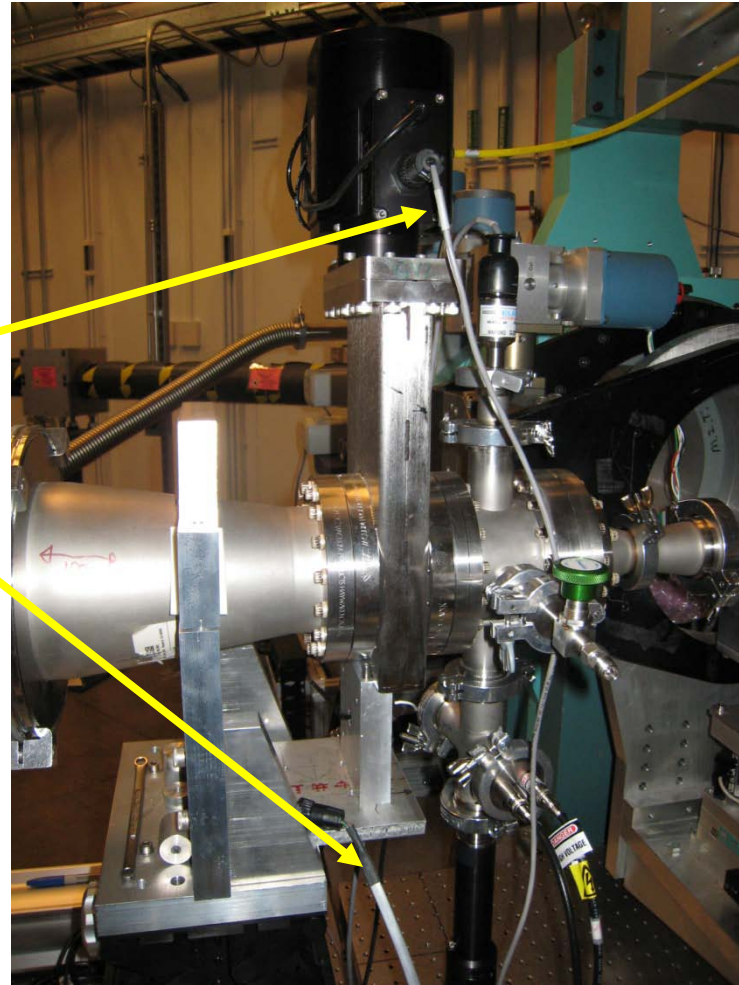


After: flight path connected via V2 to vacuum pump.

Connecting the vacuum sample chamber

6. Connect the downstream gatevalve to the vacuum controller (don't connect it earlier or you won't be able to vent the flight path easily).

Disconnect the rounded cable.
Connect the flat cable.



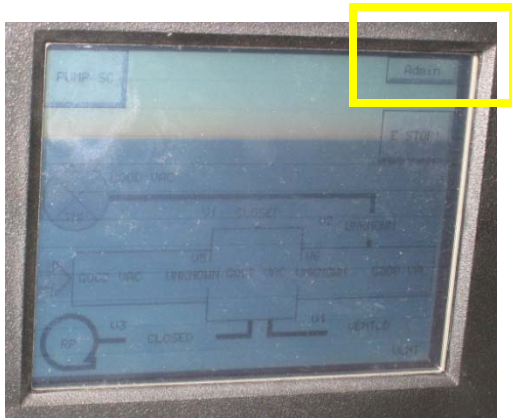
Connecting the vacuum sample chamber

7. Mount the sample chamber

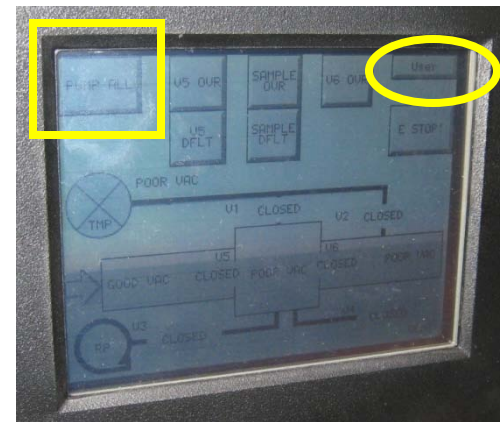
1. Mount the Cu block on the phi circle
2. Put the centering pins on the Cu block
3. Put the sample chamber into position
4. Connect the bellows to the flight paths
5. Connect the hose from the rear of the chamber to the pump

Connecting the vacuum sample chamber

8. Go to the administrator screen and press the Pump All button



The user screen before the start of the process. Press the Admin button to go to the administrator screen.

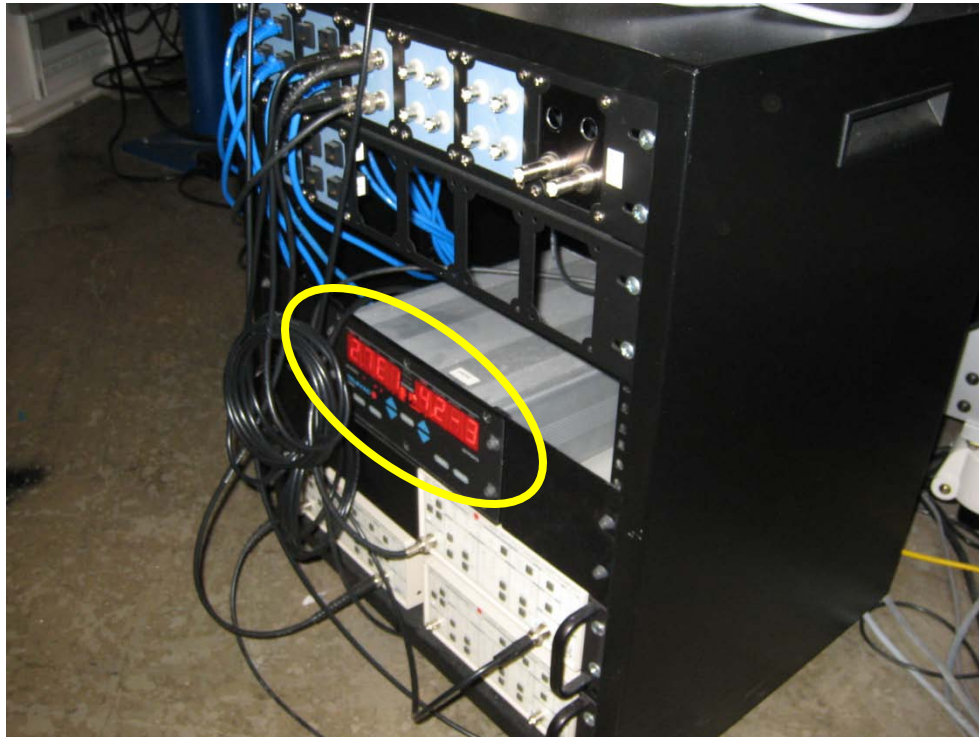


The administrator screen with the Pump All button indicated. Note the User button that takes you back to the user screen.

Connecting the vacuum sample chamber

Troubleshooting:

A common problem is that the cables for the set point monitor for the flight path can become disconnected and needs to be reseated. They are on the back of the display.



Connecting the vacuum sample chamber

Troubleshooting:

Display channel	location
1	Turbo pump head
2	Upstream flight path
3	Sample chamber (near APD)
4	Downstream flight path (near beamstop)



Set points are set on the unit pictured. Each channel has two set points, an 'on' set point and an 'off' setpoint. When the vacuum reaches the 'on' setpoint, the valve opens. If the pressure increases, the valve will not close until the pressure is larger than the off setpoint. So $SP_{on} < SP_{off}$ to avoid chatter. For channel 3, use $on=5e-1$, $off=7e-1$.