APSERa SOP for Control Interfaces

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There are 3 interfaces to control the experiment:

APlus	For Turbo Pump Control
APSERa Control Interface (ACI) On Moschip: USB1: Cryocooler USB2: Lakeshore	1. Control and read Scientific PS 2. Control and read cryocooler 3. Read Lakeshore 8-channel temperatures 4. Read IIA Datalogger data
Lakeshore Curve editor	For editing lakeshore loaded curves

Turbo pump

Using APLUS software from Agilent. With the help of python library 'wine' we have to run the windows executable in Ubuntu. The location of APlus from home is:

/home/swan/apsera/control_interfaces/APlus

Go to the directory of APlus in the terminal and run the following command:

wine APluslauncher.exe

Curve editor interface

To run Curve.py interface in **/home/swan/apsera/control_interfaces**, run the respective command in the directory:

Lakeshore Datalogger Curve editor	**python curve.py**

Run ACI interface

In **/home/swan/apsera/control_interfaces/ACI folder,** we have the cryotel_f.py file with the index.html in templates folder.

To run the flask webapp, run the flask app cryotel_f.py**.**

Operation procedure:

1. Turn on power for turbo pump while **keeping auto-override switch on**, the pressure gauge (keep its switch off), and all sensors. Auto-override must supply 5V, 25mA.

   Note: The USBs are physically connected already. If you are connecting from start, connect turbo pump first and interface it. Then rest all USBs one by one. So before connecting rest all USBs complete step 2 first for the pump. Then query all USB Port addresses as you connect, using ==dmesg | grep tty==.

2. Run APLUS using the steps mentioned above using wine.

   Troubleshooting APLUS: *It might throw* **'no pumps found' error**. *Try removing the USB and plugging in again, OR try connecting the USB to some different port, OR lastly restart the pump. APLUS scans through all the COM ports to establish connection, so any conflicts can raise errors. So, you can try restarting the computer as well.*

3. Now that you have interfaced pump, power up the Power supply, Lakeshore, Cryocooler (which draws from the Power Supply).
4. Press the RM button on the power supply to turn if off (if the LED glows above the button it means it is on).
5. Fire up the flask webapp. Set the power for the cryocooler from the power supply as 24V, 10A. Input all USB addresses as found.

6. **ENSURE ALL VENT VALVES ARE CLOSED.**

7. In APLUS, enable logging of all required parameters. Add new numeric parameter for pressure using window number as 224.
8. Turn on the Pump by interacting with APLUS (pressing the remote on button then the play button to start the pump) or pressing the Auto-override switch off.
9. Once the pressure comes to ~1e-4 mbar at pump side power up the penning gauge. Wait for the pressure to come down to ~5e-5 mbar.

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7. Engage the Cryocooler using the ACI webapp:
   a. Set target temperature and query to check whether it is updated!
   b. Set and query PID values.
   c. Enable the logging using START LOGGING button. Which logs all data being fed.
   d. Start the Cooler.
   e. Stop the logging using STOP LOGGING button.
   f. Stop the Cooler.
8. **Allow the cryocooler dewar temperature reach 273K+ before releasing the pressure!**
9. **Turn off the Turbo pump switch. Then power off all instruments.**

The Curve handling Interface can be used to display currently loaded curves, headers and all data points on a curve.

You can display, delete, add new curves and headers.

Connect with the Curve handler by supplying the port, baudrate pressing Connect. You can also run other commands for lakeshore by typing in the whitespace and pressing execute.

Time of pump down: **1 atm to 1e-4 ~10 mins,   1e-4 to 1e-5 ~1 hour**

KPID Values: **77K – 5, 0.5, 0.2,   120K – 5, 0.5, 0.5**