

APSERa SOP for Control Interfaces

There are 3 interfaces to control the experiment:

APlus	For Turbo Pump Control
APSERa Control Interface (ACI)	<ol style="list-style-type: none">1. Control and read Scientific PS2. Control and read cryocooler3. Read Lakeshore 8-channel temperatures4. 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
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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 (**keep auto-override on**), the pressure gauge (keep its switch off), and all sensors.

***Note:** The USBs are physically connected already. If you are connecting from start, connect turbo pump first then rest all USBs one by one. But before connecting rest all USBs complete step 2 first. 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 and you know all ports addresses, fire up the flask webapp. Input all USB addresses as found.

Currently default is set according to the present connections. You can go to the code and change the defaults there as well if USBs are shuffled.

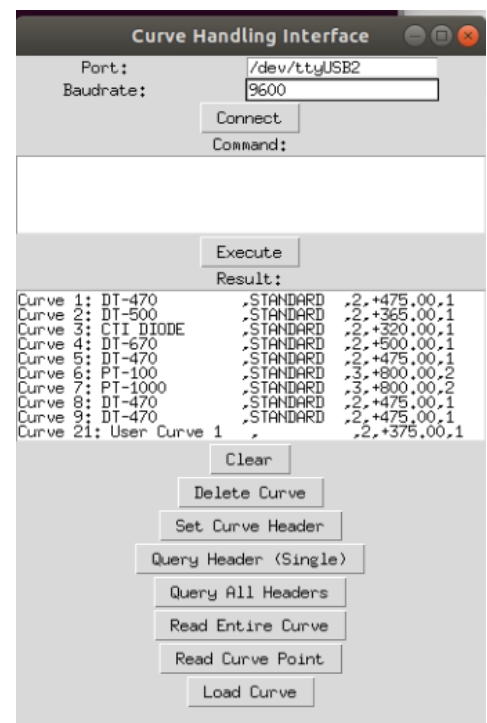
4. ENSURE ALL VENT VALVES ARE CLOSED.

5. In APLUS, enable logging of all required parameters. Add new numeric parameter for pressure using window number as 224.
6. Turn on the Pump. Wait for the pressure to come down to $\sim 1e-5$ mbar.

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.
 - 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.



APSERA Control Interface

Dewar Temp: 298.13 K

Current Target Temp: 244 K

Get Target Temp

Current Kp, Ki, Kd: Kp:5.00
Ki:0.50
Kd:0.20

Fetch Kp, Ki, Kd

Set Target Temp: Target Temp (K)

Set Temp

Set Kp:

Kp

Set Ki:

Ki

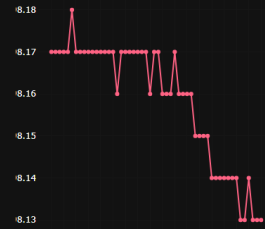
Set Kd:

Kd

Set PID

COOLER:OFF

Dewar Temp (K)



START COOLER

STOP COOLER

START LOGGING

Power Supply Control

Set Voltage: 24.0000 Set Voltage

Set Current: 10.0000 Set Current

Output Voltage: 23.9963

Output Current: 0.1886

I/A Logger Data

Temperature: --

Humidity: --

AccX: --

AccY: --

AccZ: --

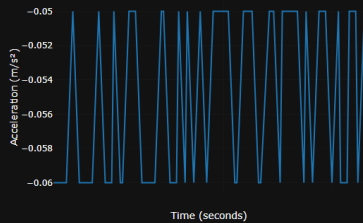
Power Supply Voltage



Power Supply Current



Acceleration X (m/s²)



Acceleration Y (m/s²)



Acceleration Z (m/s²)



Lakeshore Monitor

Sensor 1: 337.18 K

Sensor 2: 321.18 K

Sensor 3: 316.6 K

Sensor 4: 317.77 K

Sensor 5: 1 K

Sensor 6: 1 K

Sensor 7: 1 K

Sensor 8: 1 K

