IIT Bombay Nanofabrication Facility

Tool Name: Plasma Asher System (EURA-200)

Standard Operation Procedure (SOP)

Index

Precaution for safety

"Precautions for Safety" aims to protect users and equipment from any accident or danger by using the product safely and correctly. Please ensure to observe them.

	A minor injury or damage to the product may occur in case these instructions are not observed.
	Care shall be taken not to get a shock or burn by coming into contact with a part where high-voltage current flows on the electric wire.
	Please use the equipment after thoroughly reading the user manual before using it. Otherwise, damage to the product or injury is likely to occur.
	Care shall be taken not to get injured by bringing your body close to the equipment while its moving part is operating.
	Care shall be taken not to get burned by coming into contact with hot surfaces, including a heater or a part that emits hot heat.

Check points:

1. Ensure Oxygen, & PN2 pressure is 20-30psi
2. You should have recipe for your process
3. Make sure that the processes you want to run are contamination protocol compliant.
4. Any failure runs and equipment malfunction must be reported to SO / process committee / EMT. Follow the equipment up / down policy
5. Physical logbook must be filled after each process.

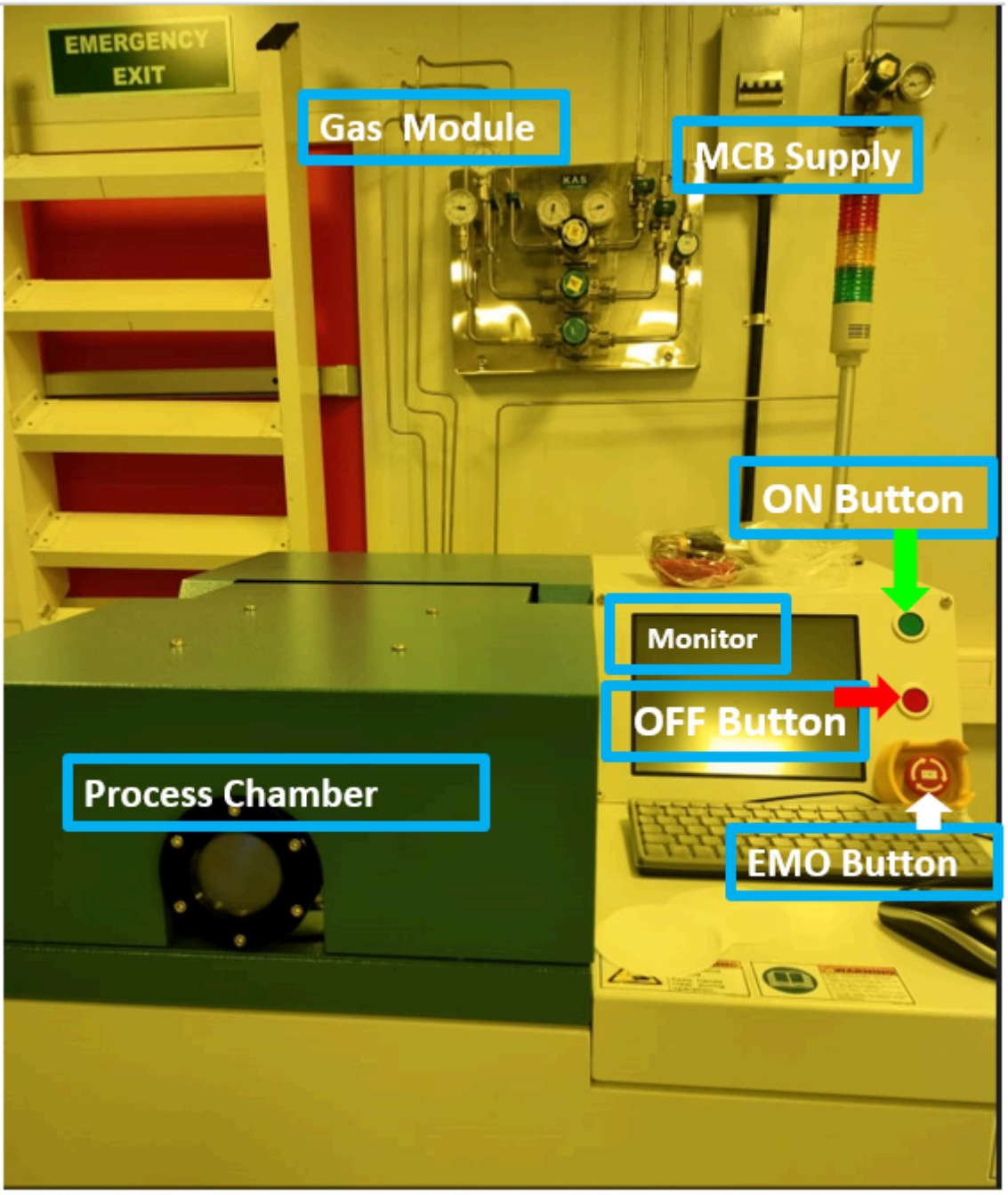
System Operational Range:

1. Maximum Process time should be 5 minutes
2. One can execute 5 min cycles with a 10 min gap
3. RF power supply range for process = 20W - 300 W
4. Maximum allowed process (O2) gas flow = 50 sccm
5. Water flow specs 6.5-10 SLPM
6. Plasma Cleaning of the chamber should be done after every Process for 2 minutes.
7. IPA cleaning is a must for the chamber, before and after the process.
8. Base vacuum value (6.7E-3 Torr)

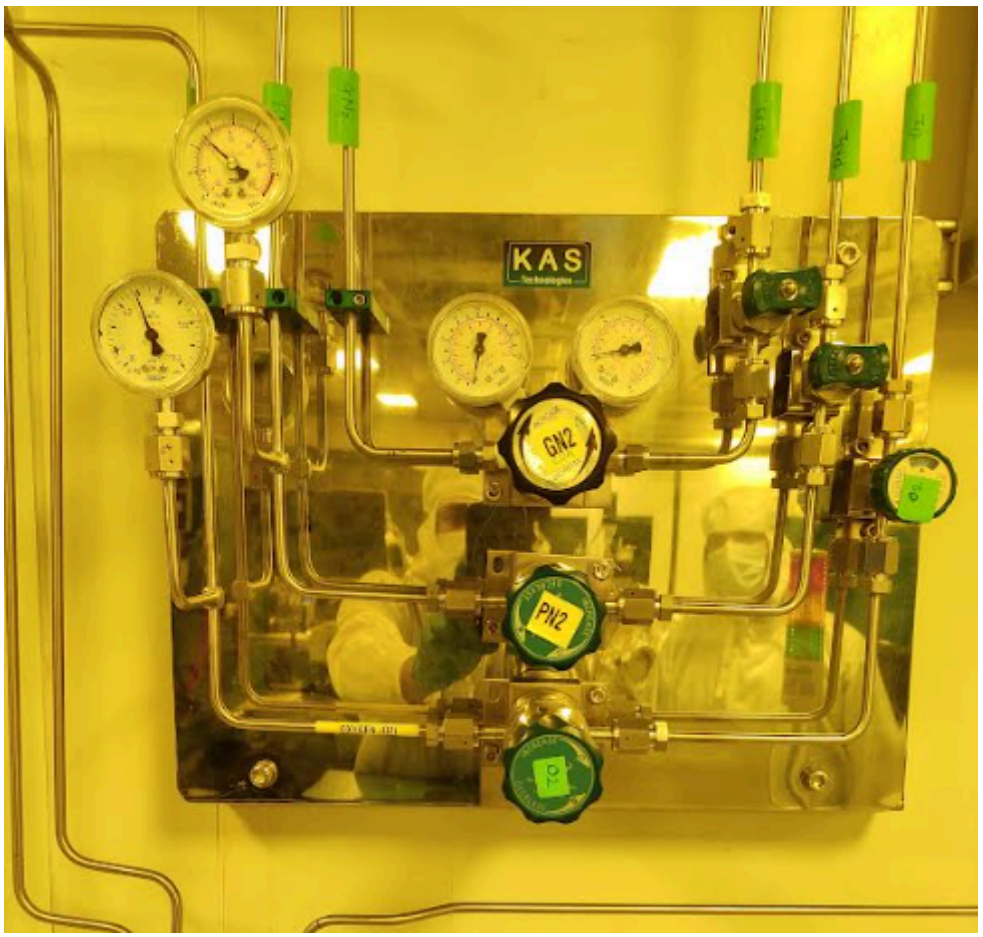
This system is for Ashing and removes photoresists using plasma. It is operated manually controlled with software. We can use the Software and valves to control and drive the equipment.

System Overview

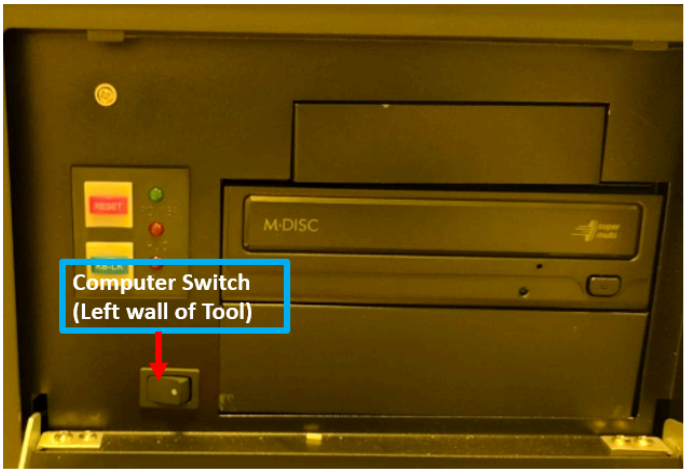
System composition



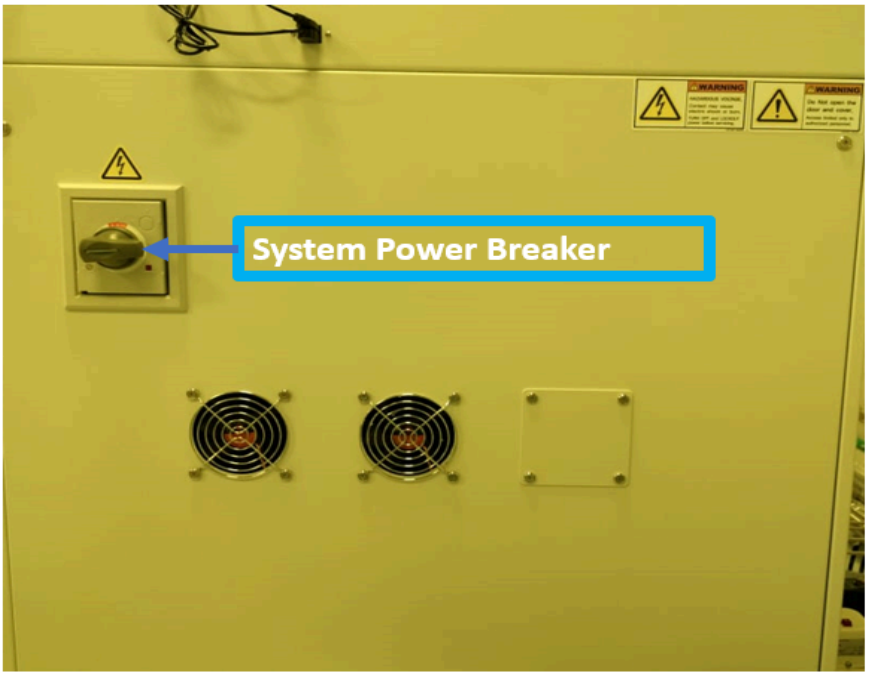
Front view of Tool



Panel with



Left panel of Tool contains CPU switch



Right panel of tool

< System Overview>

This system is largely composed of two modules: A control module and a process cha mber module. Each module will be explained in detail as below.

(A) Process Chamber Module

- The process chamber module is a part where the actual process is performed, an generate RF plasma by flowing gas
- A stage capable of heating is installed inside the process chamber module, a electronic cylinder is installed to open/close the top plate.

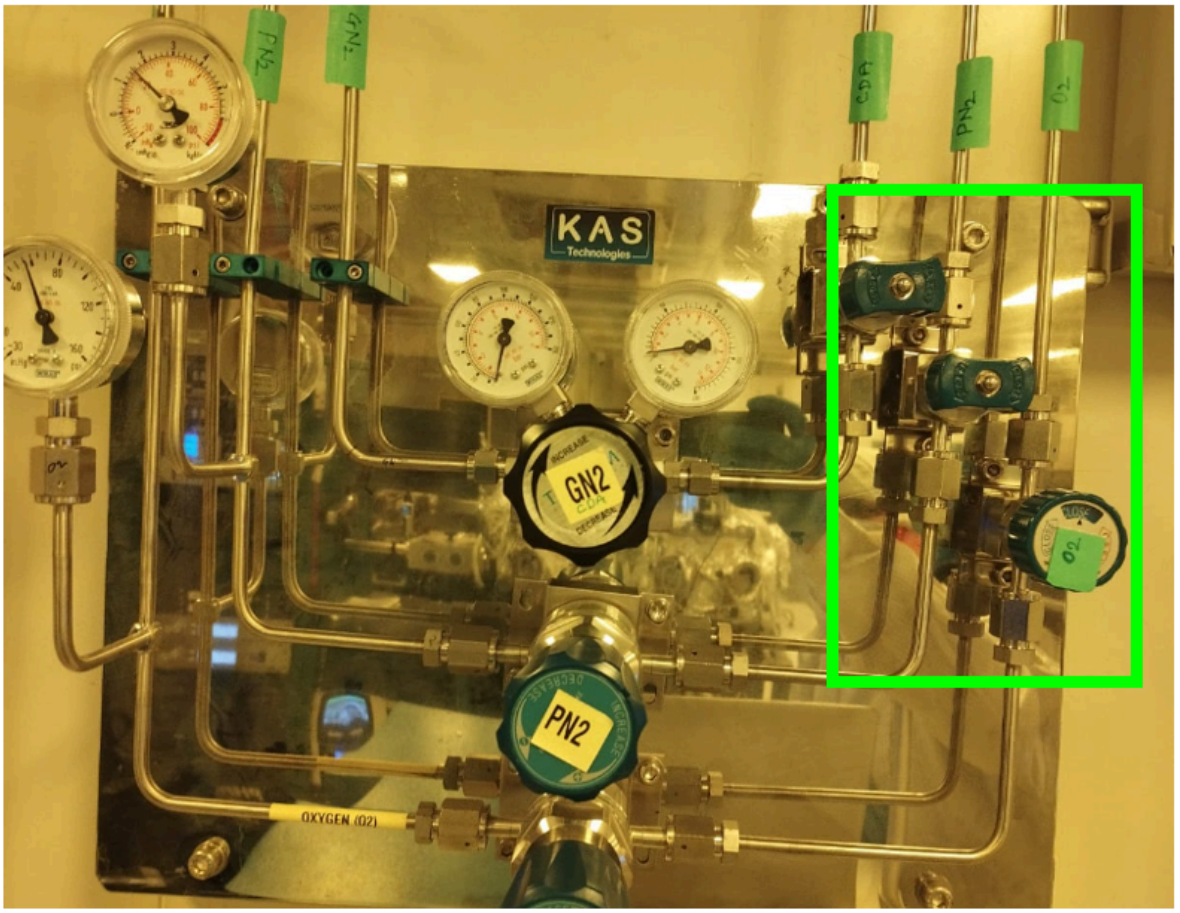
- In addition, a vacuum line is installed to make the process chamber module a va state, and a showerhead to uniformly supply gas for the process and an RF p modulele for RF plasma are installed.

(B) Control Module

- ON/OFF/EMO are arranged so that power can be applied to the equipment.
- The equipment can be turned OFF in an emergency, and a touch monitor for over of the equipment is installed right next to it.

Plasma Asher Operating Steps:

1. Turn ON the gases from the indicated box.

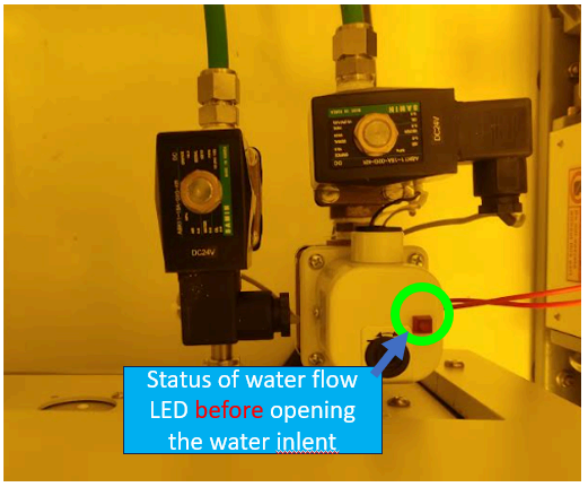


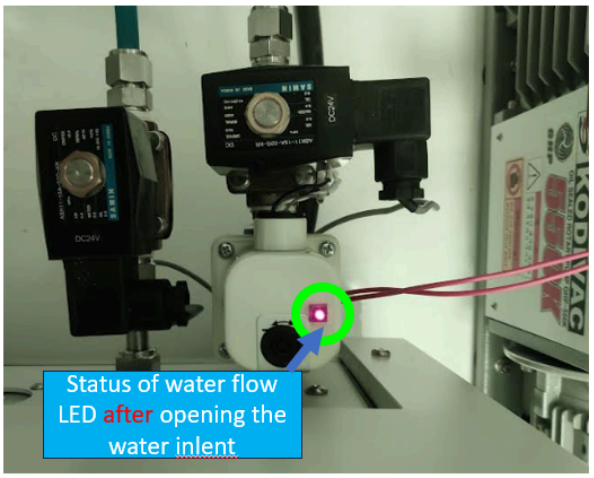
2. Turn ON the main MCB on the clean room wall at the back side of the tool

3. Turn ON system power breaker (Rotate Clockwise)

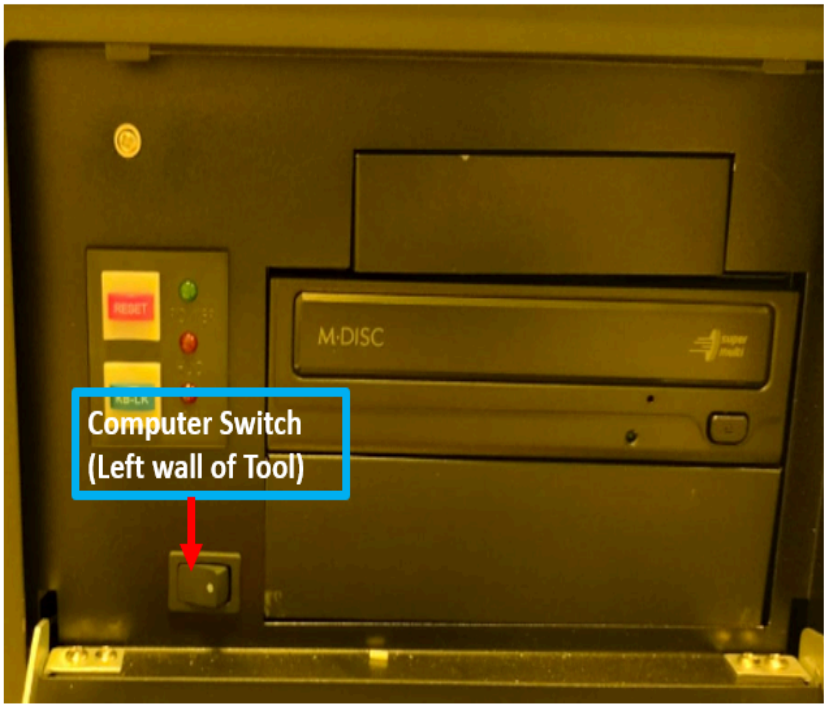
4. Turn ON **Green** button located on right side of monitor, shown below

5. Turn ON cooling water (Water flow LED will turn ON and should glow red at the backside of the tool shown below.



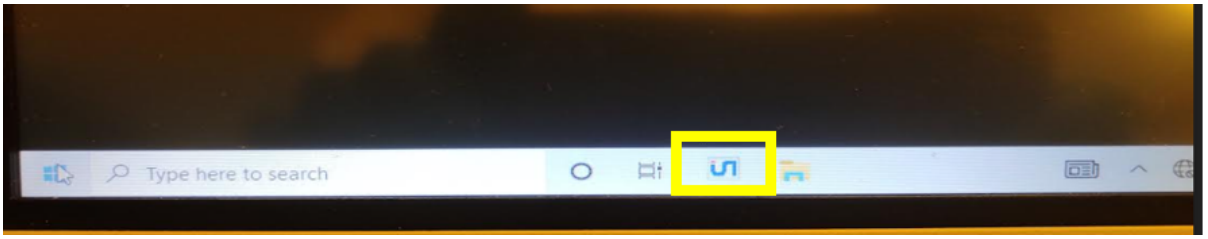


6. **Turn on PC: Switch ON the black CPU switch and computer display begins to start**



7. **Login:**

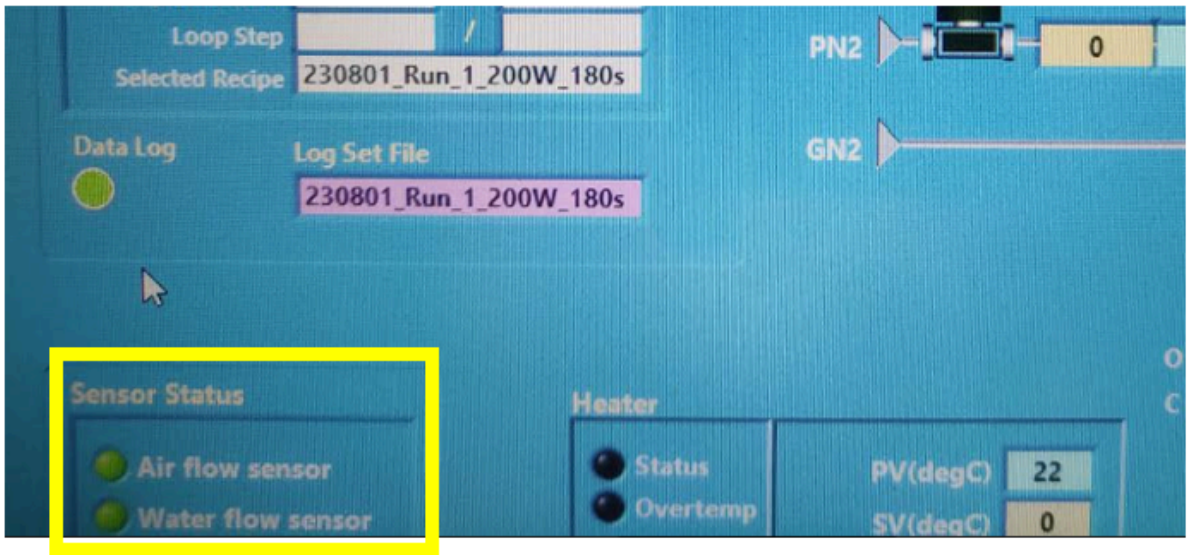
When PC is turned on, click the icon of UPRO icon on desktop located on Task bar



●Click on Log in tab, select user_ID as **Operator**, then enter password. Click OK

●Then press **Operation** button and it will land on Operation page (i.e Home Page)

●On the Operation Page Ensure **Air flow and Water sensor** must **glow green** (shown below)

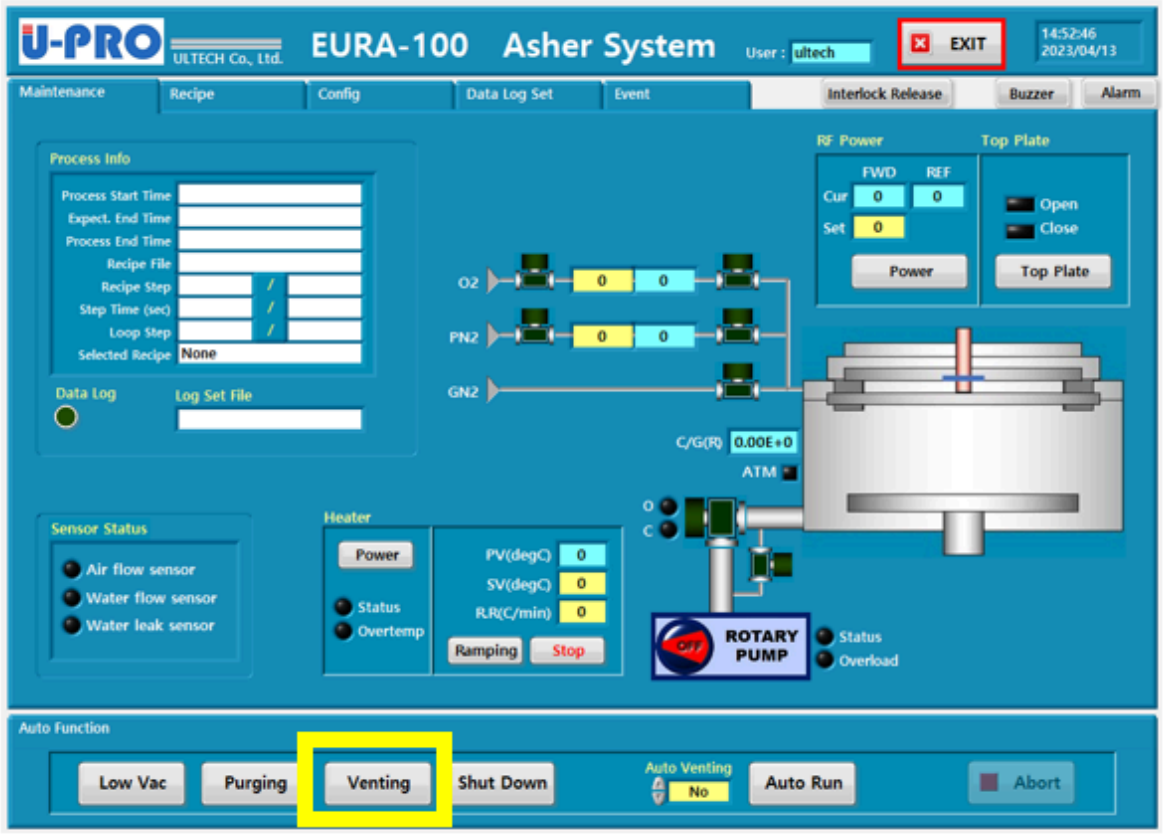


- At this point Plasma Asher is **Powered ON.**

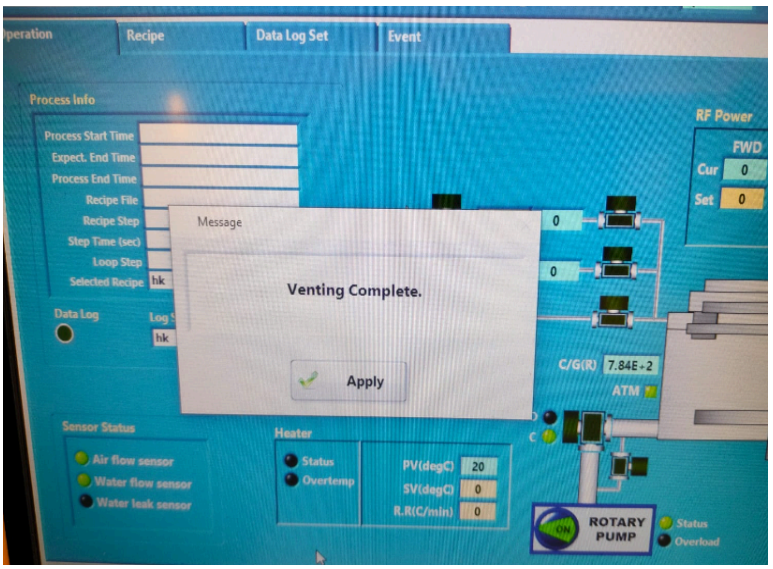
Steps to Run the process

8. Venting Chamber (for Opening the chamber)

- Vent the chamber by clicking the **Venting** button**.** System status Indicator should turn on green.

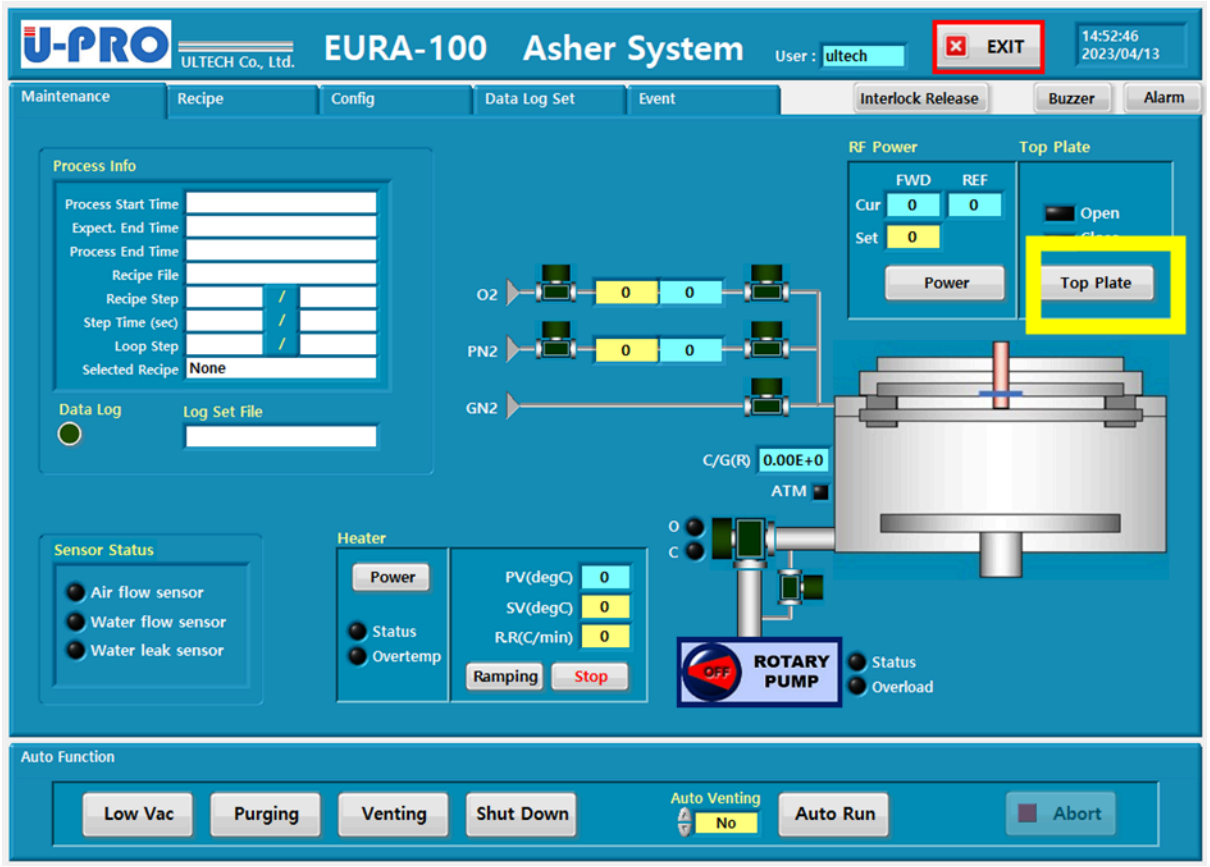


- Once venting completed **a pop window appears** indicating venting completed and **ATM LED should glow green**.
- Click **Apply**

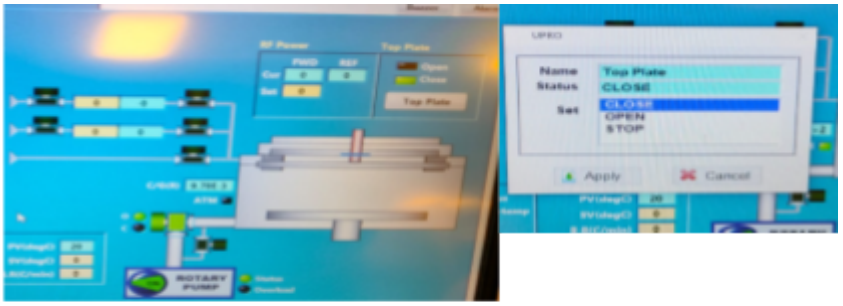


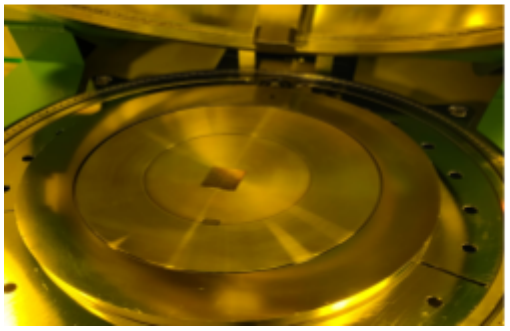
8. Loading the samples

- Open the chamber Lid by clicking on button **Top plate**



- A pop window will appear, select **OPEN** and click on **Apply.** Chamber will open automatically with pneumatic system.
- Keep your sample inside chamber.





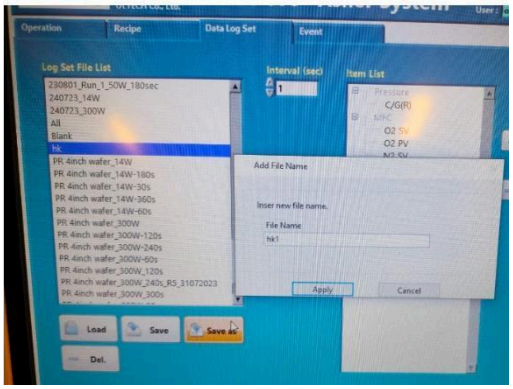
- Press again **Top plate** button**.** A pop window will appear select **CLOSE** and click on **Apply** to close the chamber lid. Chamber will close automatically with pneumatic system.

9. Recipe modification

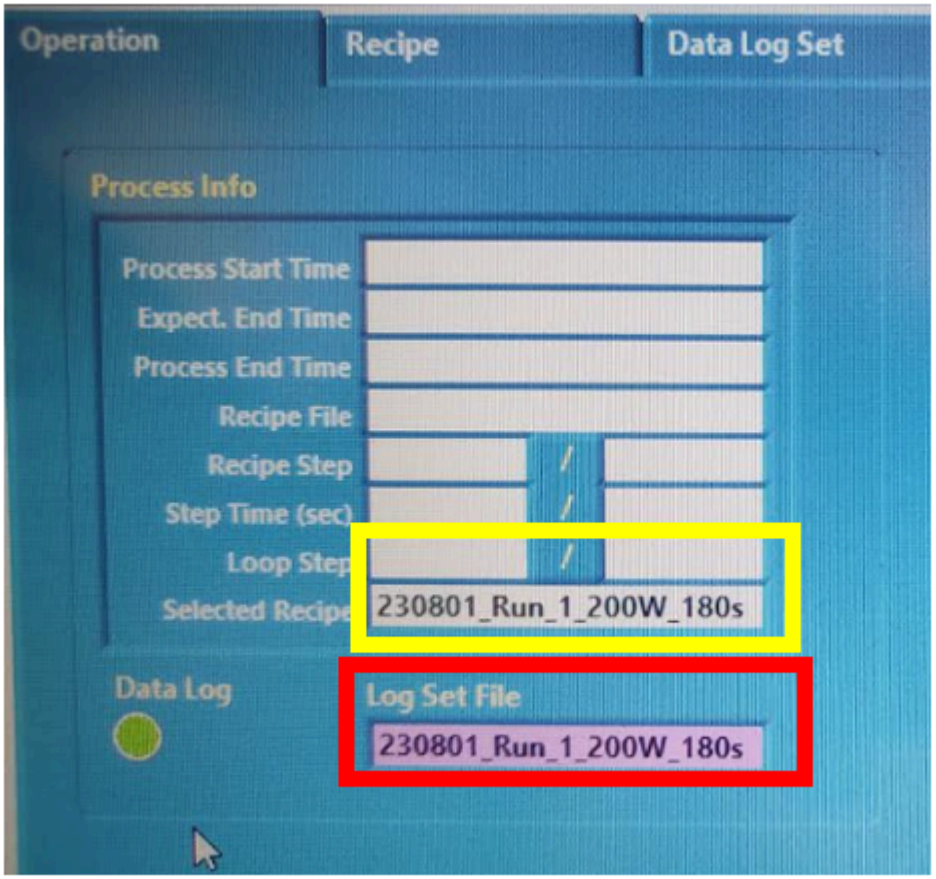
- ***Recipe modification should be done only in the permissible range of parameters mentioned in the Operational range mentioned above in the manual. Setting any value beyond permissible range will attract DAC.***
- Select a recipe file from existing ones and click Load.
- Click on **Save as** button. Save it with the appropriate name.
- Now modify the recipe as per your requirement and then press the Save **button**.
- Load the recipe by clicking on **Load button**
- **Copy** the exact **file name** of your recipe

10. Data log set

- Go to **Data log set Page** and
- Press **Save as** button and use **Ctrl V** to paste the recipe name then click apply.
- Then from Log set File list select recipe file name and press Load button.



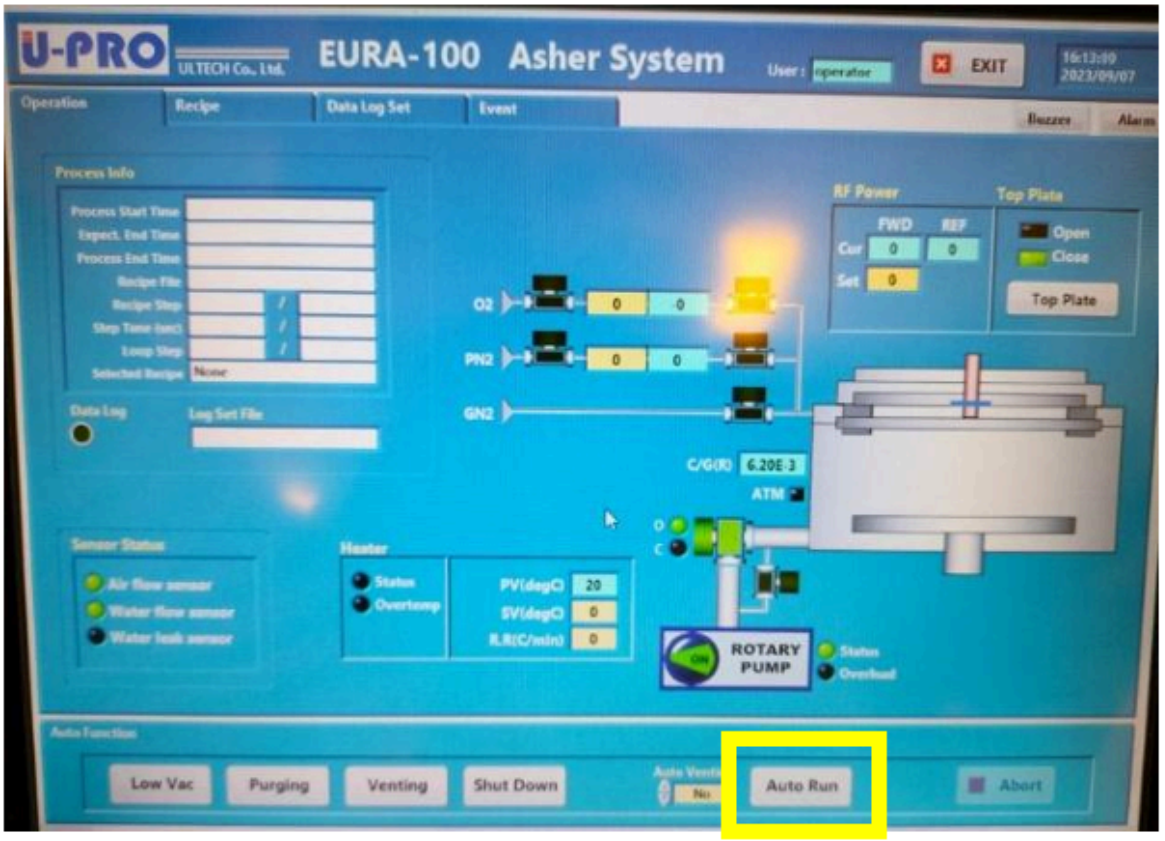
11. **Data log set Record**
    - Go to Operation Page
    - Ensure that Selected Recipe option shows your recipe file name also **Data log set file** should shows the **same recipe file name** as shown below



    - Click the **Data Log** button. It should turn on **green**.

12. Running your Process

- Before final Run **check** the recipe once and recipe gas flow.
- Click the **Auto Run** button



- Observe the system status carefully on **Operation tab** Page
- Once recipe run completed successfully dialogue box appear with message" **Autorun Completed**" then click **Apply**
- In case if pressure, gas flow drops from specified value press the **Abort** button & Inform SO

13. Unloading the Sample

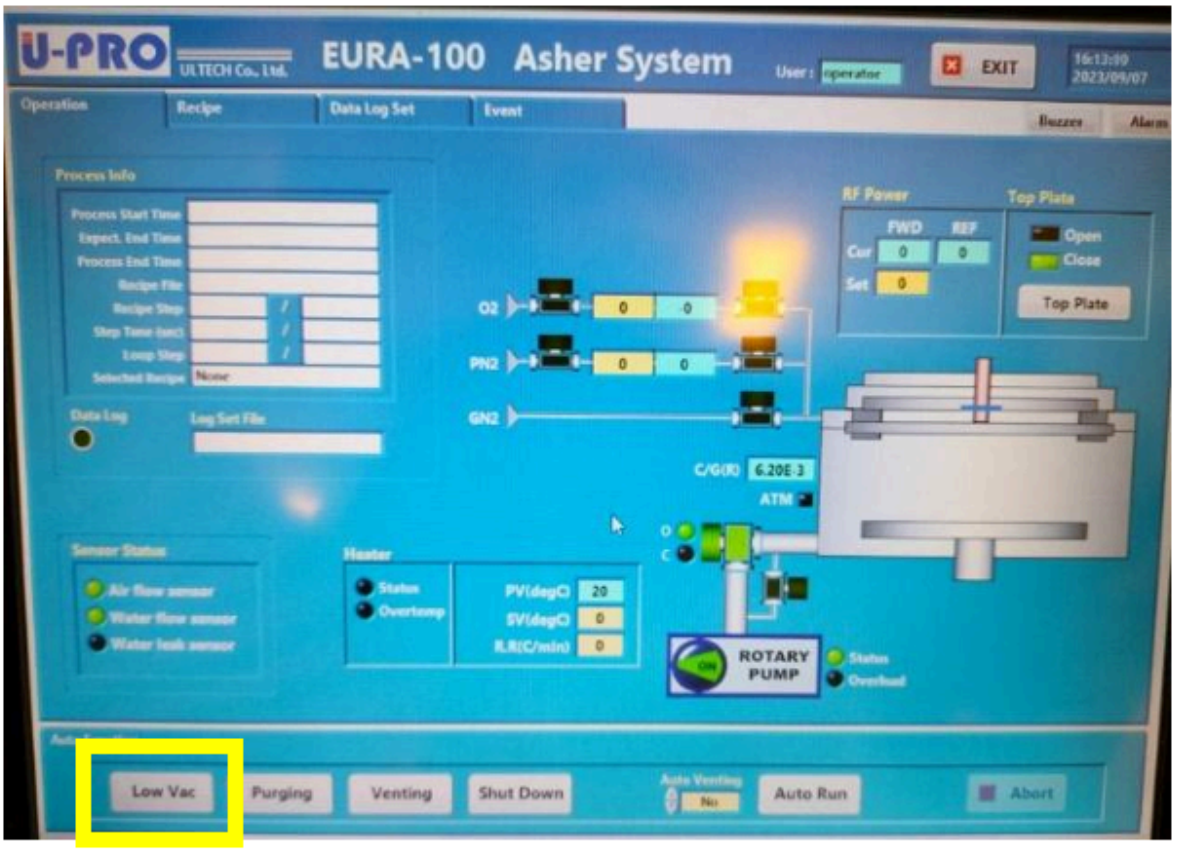
- Click on **Venting** button
- Once venting completed a dialogue window appears with "Venting complete" indicating venting completed. **Click Apply** and **ATM LED should glow green**.
- Open the chamber Lid by clicking on button **top plate** & pop window all appear and select **Open** and then **apply**
- Take your sample from inside chamber
- Press on button **Top plate** and select **CLOSE** to **close** the chamber lid

14. If any additional samples are there Repeat the step 8-13

- **NOTE: If recipe need to be changed then go to step 7 to 13**

15. If your experiment is completed then after step 13 do the following:

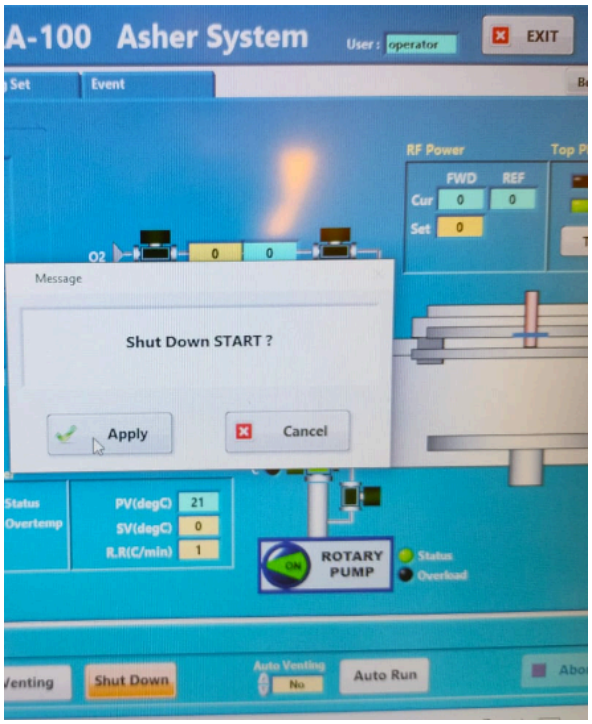
- Click on **Low Vac** button and wait till Low vacuum sets.



- A Pop-up window comes once low vacuum completed.
- On Pop window click **Apply**.

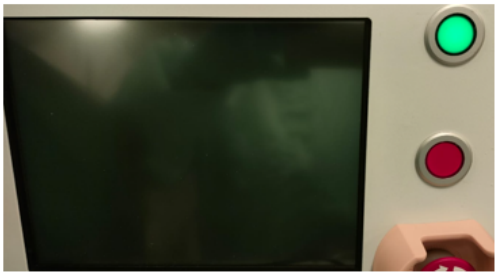
16. Turing off PC:

- Click the **Shutdown** button. A Pop window will appear showing shut down start Click **Apply**
- Then again Pop window will appear showing Shutdown complete.
- Then press Exit button
- Then Shut down the PC



17. Tool shut down:

- Press the **red button** on right side of Monitor
- Turn-off the main **power breaker of** Tool
- Turns off the Mains power supply **MCB**



18. Gas Closure

- **Close all gas valve (O_2, GN_2, PN_2 CDA)**
- Do not touch Gas regulator

19. Closing water Line

- First Close Water **Inlet valve** then
- Outlet water valve will remain ON. This needs to be turned OFF only during facility chiller maintenance, otherwise do not touch it.