

AccuThermo AW610

Rapid Thermal Process (RTP)



University of Notre Dame

Department of Electrical Engineering

General Precautions

Contacts

For problems, clarifications of procedures, or general information pertaining to this machine, please contact lab staff at staff-ndnf-list@nd.edu..

IMPORTANT NOTE:

Make sure the proper sensor (pyrometer or thermal couple) is selected when editing your recipe. A selected sensor that is not installed could give low temperature readings. This would make the temperature control increase the lamp intensity too much and may overheat and melt the wafer!!

Standby Conditions

1. Front panel of machine on the SS table:

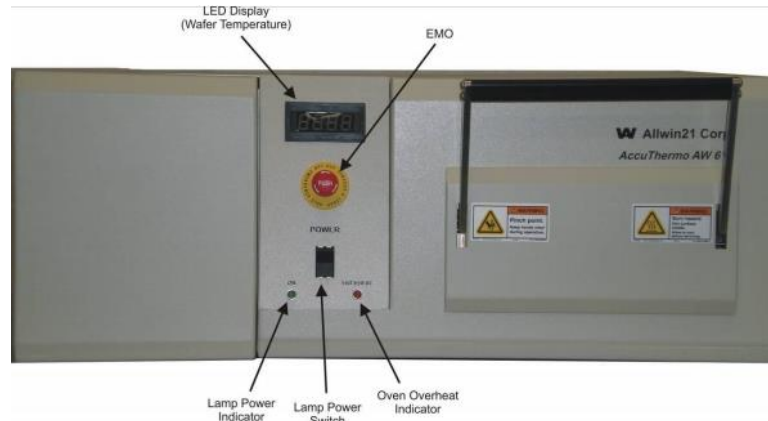


Figure 1. Front Panel Controls

- Lamp power switch at OFF position (No LED Display)
- All indication lights OFF
- Chamber door closed and handle in lock position

Air / gas control panel underneath the SS table:



Figure 2. Air & water flow rate control panel

- Yellow handle valve for compressed air flow CLOSED (at horizontal position)
- Check the other three gauges according to the image above.
- Water chiller (underneath the control station of Savannah ALD) should be OFF.

Operating instructions:

1. Enable the machine from iLab.
2. Turn on the compressed air flow by turning the yellow handle valve clockwise for 90°.
3. If your target temperature is 900 °C or above, turn on the water chiller. If not, proceed with step 4.
 - NOTE: If your target annealing temperature is 900 °C or above, additional training on this machine is required.
4. Open the chamber door by pulling the door handle down first (unlock it) then pulling **slowly** to the front side till the limit position.
5. Check if thermal couple (TC) is installed in the chamber and if the TC is in good contact with the backside of the carrier wafer.
 - If your target T is ≥ 900 °C, the TC must be removed.

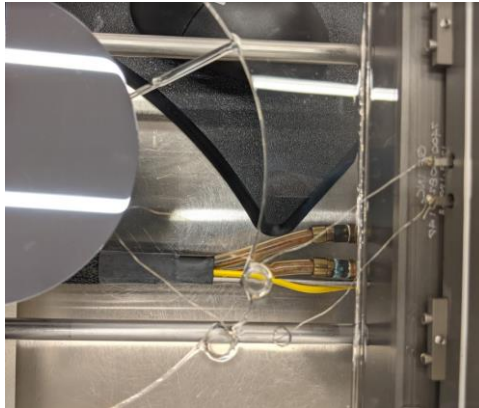


Figure 3. Top view of thermal couple wire and bead

6. Set your samples on the wafer.
 - Make sure your sample is clean!
 - Be extremely careful when loading your samples because the quartz arms are very fragile.
 - If the samples are small pieces, you HAVE TO FIRSTLY remove the carrier wafer to the Al bulk piece, load pieces on it, then bring the carrier wafer back onto the three quartz arms.
 - If the sample is a 4" wafer, just replace the carrier wafer by the sample.
 - Make sure the TC is in good contact with the carrier wafer.

7. Close the door by pushing the door handle gently back into place. And pushing it up to lock it.
8. From the monitor, you normally will see the following screen:



Figure 4. Main Menu Screen

9. Hit the button 'Process for engineer' and you will see the list of recipes:

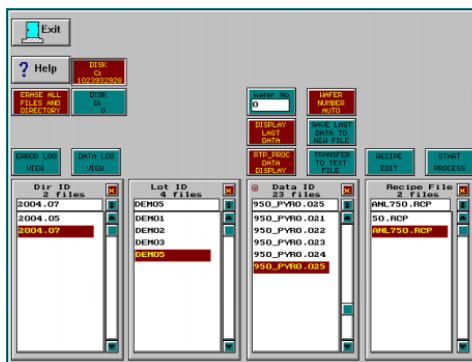


Figure 5. Process for Engineer screen

10. Find and select your recipe. Make sure the correct recipe is selected in the Recipe File column.
11. Click 'RECIPE EDIT', and edit your recipe parameters from the following interface:

No.	Step	Temp	Temp	Temp	Temp	Temp	Temp	Temp	Temp	Temp	Temp	Temp
	Temp	Temp	Temp	Temp	Temp	Temp	Temp	Temp	Temp	Temp	Temp	Temp
1	Delay	20.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	Ramp	10.0	15.0	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	Steady	30.0	750.0	1.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	Delay	40.0	750.0	1.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	Finish	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	Finish	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	Finish	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	Finish	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	Finish	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	Finish	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Figure 6. Recipe Editor

- WAFER TYPE: **WAFER**
 - SENSOR TYPE: THERMOCOUPLE (< 900 °C) or PYRO (≥ 900 °C)
 - TURN OFF GAS AFTER PROCESS: **YES**
 - PYRO Offset: -5 °C
 - Leave all other paras in the header area in the default setting.
 - Edit your process flow paras: step name (Delay, Ramp, Steady, Delay), Time in sec, Temps in °C, gas flow rate Liter per min.
 - Editing a copied recipe is always a good start point, but make sure the correct sensor type is selected.
 - Choosing the wrong sensor may get the chamber overheated and cause damage to the machine.
12. Once all paras are set, click ‘RECIPE VALIDATE (F10)’, and you will be presented ‘Congratulation! Validation Success!’ Hit ‘OK’.
 13. Click ‘Exit’ button from the top left, when you are asked ‘The Recipe data has been changed! Save it?’ Chose the option you want. If you hit ‘YES’, you’ll be brought back to the recipe list screen.
 14. Click ‘START PROCESS’ button and wait until the process to be finished. You will be seeing the process monitor screen like the image below:

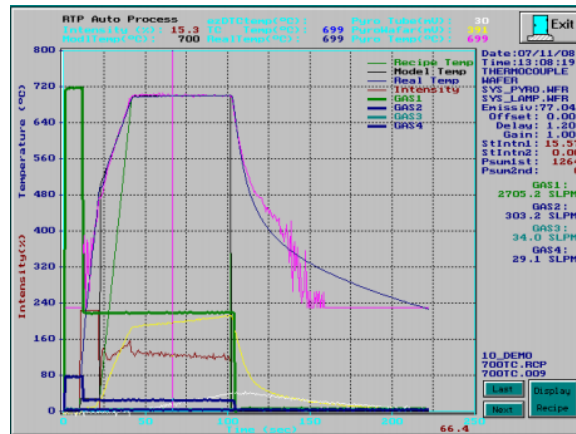


Figure 7. Process Monitor screen

- Monitor the process curves: the x-axis indicates the process time and the y-axis indicates the measured process temperature.
 - At the end of the process, “Process Over” will be printed and blinking in different colors.
 - Press any key to save the process data. This will also exit back to the Process for engineer screen.
15. Once process is done, check the LED display of chamber temp. to be lower than 100 °C before unloading the sample.
 16. **Carefully** unload your sample, and close the door of chamber.
 17. Turn off the compressed air flow (and water chiller if you used pyrometer).
 18. Collect your belongings, clean the SS table and log out from iLab.