

Features of the Laurell WS-650 Spin Processor

- Digital process controller: 100-8000 rpm, with 0.5 rpm resolution,
- Hold up to 6 inch wafer or 4 inch square substrate,
- The 650 controller holds up to twenty 51-step programs,
- 1.75 inch natural propylene vacuum chuck holds 50mm through 150 mm substrates
- Fragment adapters:
 - Microscope slide adapter: 1"×3" microslides
 - Fragment adapter for holding 10mm through 50mm pieces
 - Wafer alignment tool
 - With EPDM O-rings for common solvent systems, and Viton O-rings for acids and toluene systems. (Please let us know when acid or toluene needs to be used.)

Programming the 650 Controller

(Please do not change the settings of programs 1 through 3)

1. Turn on the spin processor by pressing the black button on the lower right backside of the processor. The controller will initialize and enter the 'Select Sequence' mode by default.
2. To highlight an existing program, highlight the desired program. To create a new program, highlight the empty line.
3. Press the 'Edit Mode' key. If this is a new program, a program name will be assigned. The program name will appear on the title line.
4. Use the navigation keys (←→↑↓) to move from line to line, or the 'Tab<' or 'Tab>' key to move from field to field. The 'Tab' keys enable the field to be editable. Make changes to the field by using the ↑ or ↓ arrow keys.
5. For example, add or delete steps by highlighting the 'steps' field with the 'tab' key, and increase or decrease the number with the ↑ or ↓ arrow keys.
6. Set the value for 'Rpm' and 'Acel' digit by digit. Switch between the digits using the ← or → arrow keys.
7. Move from one step to another using the 'FWD' or 'REV' Key.
8. The valve and sensor parameters are not applicable to this spin processor
9. When finished programming, press the 'Run Mode' key.

Details on Some Fields in the Edit Mode

- Time: in the format of mm: ss.t.
 - Mm: minutes
 - SS: seconds
 - t: tenths of seconds
 - Minimum time: 1 second
- Loop: enter the number of loops to be performed, then go to the next line specifies where in the program to loop back to begin another loop cycle.
- Rpm: in the 'Run mode', the left most field shows the actual rpm, while the right most shows the set rpm value
- Acel: in rpm per second. The maximum acceleration rate is dependent on the mass of the chuck and substrate. Calculate the acceleration rate value by taking the spin speed difference between adjacent steps and using that difference for the acceleration rate for the current step. For example:
 - Step Time RPM Acel
 - 1 5.0 500 500
 - 2 5.0 1500 1000
 - Users can also explore the conditions that suit their needs.

Running the Edited Program

1. Select the program to be run using the 'Select Process' key. Press the 'Run Mode' key. The program name will appear on the title line.
2. Open the lid, place and align a substrate on the vacuum chuck. You can attach an appropriate fragment adapter to hold the substrate. If so, make sure the adapter fits tightly. Use acetone to wipe clean the o-ring and the substrate holder if dirty. Make sure the

- SUBSTRATE IS LARGE ENOUGH** to cover the O-ring **COMPLETELY**. When the microslide adapter is used, make sure the slides fit in the groove snugly. Use the alignment tool to facilitate wafer centering.
3. You **MUST NOW PRESS THE 'VACUUM' KEY** to activate the vacuum valve. Check and make sure the vacuum value is around 25. Sufficient vacuum to hold the substrate is required to start the motor, and to prevent leakage of chemicals into the vacuum path.
 4. Dispense appropriate amount of photoresists (or other chemicals) onto the substrate.
 5. Line the inside of the spin processor bowl with a cylinder made of aluminum foil. You can use the plastic cylinder on the bench as template. The upper rim of the cylinder should be an inch taller than the substrate level. You will also need to cover the stationary seal (see attached figure) of the processor bowl with some aluminum foil. Tape the aluminum together so that they do not fly loosely. In this case, also make sure that the Al foil does not touch the rotating seal (See attached figure).
 6. Close the lid.
 7. Press the 'Start' key to start the program. Error message will show up when any of the following criteria is not met. The remaining process time will be maintained.
 - Low vacuum
 - Not enough seal purge
 - Lid is open
 8. 'Done' will be displayed when the process is completed and the lid has not yet been opened for wafer removal. Restarting the same sequence on the same wafer is not allowed until the lid is opened, or the 'Edit Mode' key is pressed followed by the 'Run Mode' key.
 9. Open the lid.
 10. Press the 'Vacuum' button again to turn off the vacuum. Your sample can now be removed. Take out the cylindrical aligner and put it on a separate sheet of Al foil on the bench top if it gets in your way.
 11. Clean up (follow the guideline) and switch off the power if no one uses the spin processor after you.

Tentative Cleaning Procedure and Notes
(Please read through the whole list before cleaning)

1. Remove the fragment adapter and dispose of the cylindrical liner.
2. Cover the chuck with a blank wafer with VACUUM ON in order to prevent chemicals from entering the vacuum path.
3. Rinse and wipe dry any remaining contamination of the processor bowl with acetone.
4. DO NOT flood the process chamber during cleaning.
5. DO NOT flood the area between the stationary seal and the rotating seal (see attached figure).
6. Wipe clean the chuck surface and fragment adapter with acetone wipes, and store the fragment adapter in the drawer below the bench.
7. Empty the liquid in the drain collector (on the back of the processor) into the organic waste bottle. Wipe clean the drain collector and screw it back on. Label any new photoresist used on the waste label.
8. Clean the outside of the spin processor.
9. Wipe clean the key pad if dirty, DO NOT spray or flush the key pad.
10. NOTE: DO NOT allow chemicals to enter the vacuum path and DO NOT force air pressure or any liquid into the vacuum chuck (see attached figure).