

Avenger Spin Rinse Dryer Operation

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<C:\MyDocuments\CleanRoomGeneral\Equipment\SpinRinseDryer\SpinRinseDryerManual.doc>

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Purpose

The UTD Clean Room has purchased a new “Avenger” Spin Rinse Dryer from Microprocess Technologies, Inc. to help rinse substrates without leaving water spots as is commonly seen in manual N₂ gun drying. This tool is simple to operate, but there are some subtle aspects that this paper will add to the operation procedure.

Introduction

The Avenger Basic Spin Rinse Dryer is a dual chamber system with 3” and 4” diameter substrate capabilities. The substrates are held in a standard Teflon wafer boat that is balanced along with the rotor frames by the manufacturer. This means that you can only spin your substrates using the designated boat or an identical substitute. The system can run any of 5 different spin rinse programs. There are two basic default programs set into the microprocessor memory: Program “0” is a spin-only dry program and Program “1” is a rinse and subsequent dry program. This tool is run by a microprocessor behind a touch screen, so programs can be easily changed and assigned to a spinner module. You must be trained before using this machine.

Allowed Uses

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SRD Description

A labeled photo of the top spinner unit is shown in Figure 1 to identify controls (duplicated for lower spinner). The controls are simple: Green button to start and Red button to stop. Programs are selected by the touch screen microprocessor seen at the top of the photo in Figure 1. The normal operation of this system involves 1) making sure that the desired program is active for the SRD unit you need, 2) placing the wafers in the proper boat, 3) inserting it into the spin Rotor, 4) closing the door and 5) pushing the green start button. At the conclusion, the touch screen flashes “End of Cycle” and you retrieve your cleaned wafers by opening the door and pulling out the cassette.

It is very important that you use only the boat stored in the SRD system or one exactly like it (i.e. with the same part number stamped on it). The system was dynamically balanced at the factory with the exact Teflon boat residing inside each

spinner. If you use another type of boat, the balance could be upset, causing excessive vibration and subsequent damage to the machine and perhaps to your wafers.

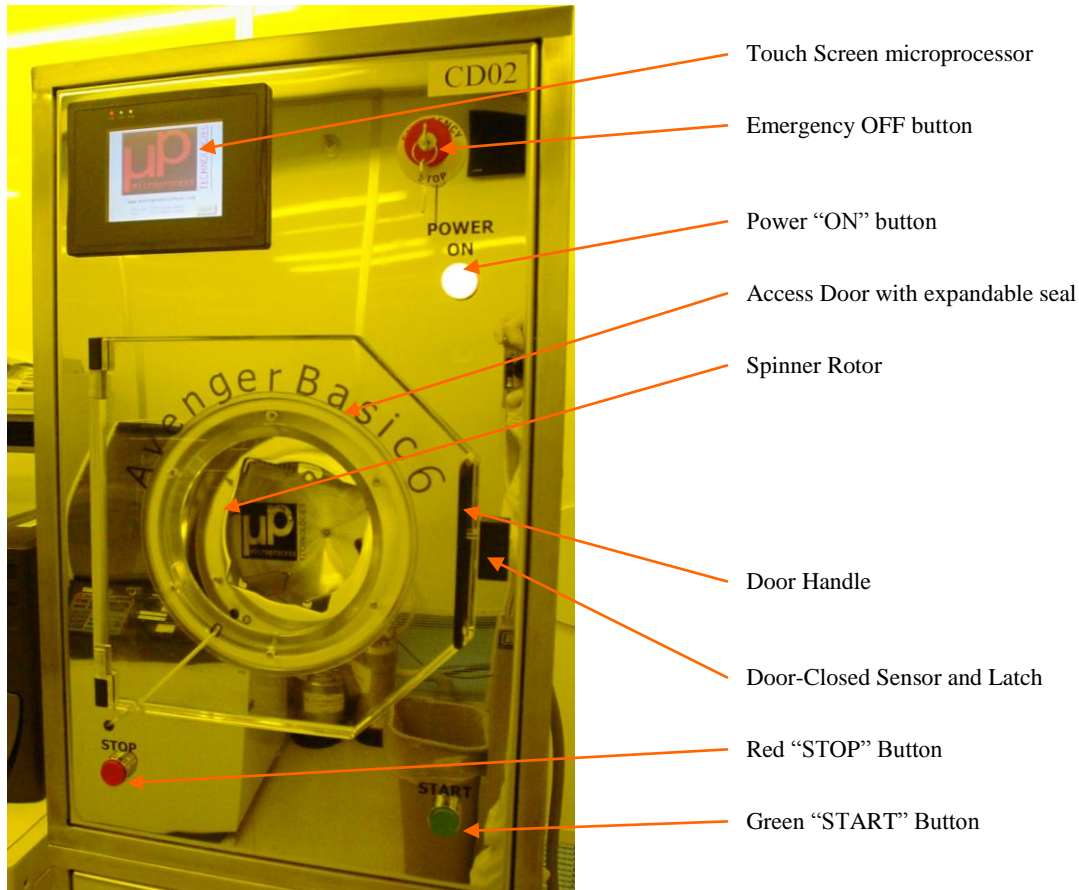


Figure 1. Top spinner module showing controls. The microprocessor serves both spin dryer units, but each spinner has its own start and stop buttons.

SRD Operation Overview

The spin rinse dryer operation is a simple operation if there is only one process involved – Load wafers, push green start button. However in our system, we have opted to define two processes: one with dry only and another with both spin rinse and spin dry steps. The dry spin program is intended to dry wafers from the RCA clean process where the drying process merely throws off the pristine water from the Hood cascade rinse tanks without re-wetting with another and possibly suspect DI water source. The spin-rinse-dry program is intended for general purpose “wash & dry” needs. Basically, this program attempts to rinse and dry substrates without leaving “water spots.”

Since there are two programs to choose from, the operator needs to know a bit about the microprocessor controller behind the touch screen at the top left of the upper spinner unit in order to select and execute the proper program.

Step-By-Step Operation

The following discourse describes require actions to execute the spin rinse process of choice.

- System Power On – The machine is turned on by the push button on the upper right corner of the upper unit. If it lights up, it is on.
- Spinner #1 at the top is designed for a 4 inch dia wafer, and spinner #2 at the bottom is designed for a 3 inch dia wafer.
- Load Boat - There is a Teflon boat residing in each spinner. Note the orientation of the boat – “H” bar always faces inwards. This is important because that is the way the spinner was dynamically balanced and reversing it could throw the system out of balance, causing excessive vibration.

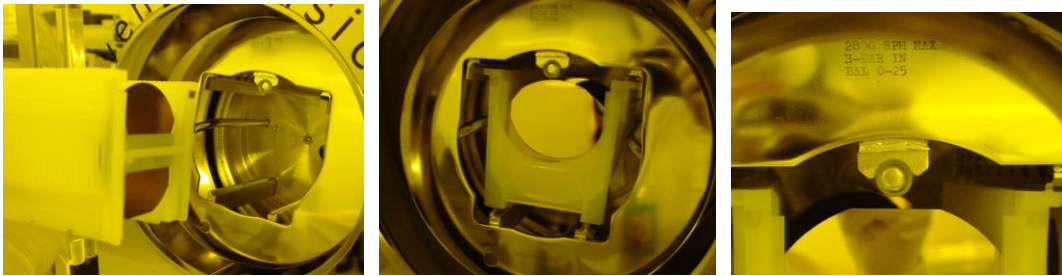


Figure 2. Boat loading showing cassette and wafer orientation. Boat position must be with the “H” bar inwards. Wafers must be oriented with the flat rotated away from Teflon covered bar at the top. This keeps wafers from damage and particulates from rattling.

- Note: Always use the residual Teflon boat and return it to the spin chamber when you have removed your wafers.
- Close Door – Door is sealed by an inflating “O-Ring” and latched by a pneumatically actuated door bolt next to the handle.

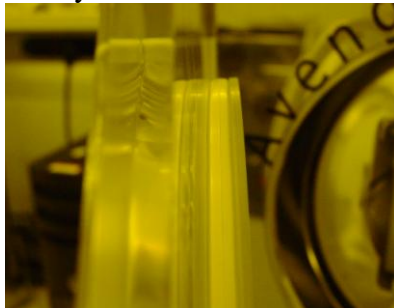


Figure 3. Inflating “O-Ring” in door. Note white band in groove.

- Check Active Program – Note program number in appropriate Detail Screen, (Figure 4).

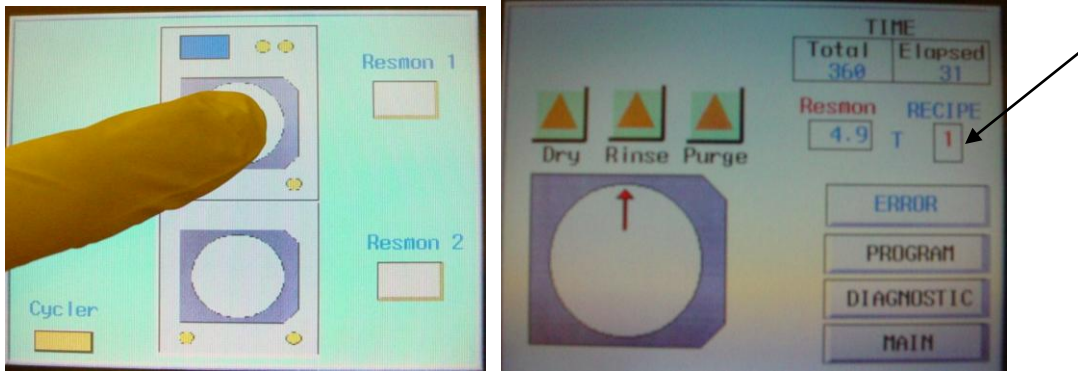


Figure 4. Checking active program number: Press the appropriate, upper (4”) or lower (3”), spinner door icon (left) to obtain detail screen (Right). Recipe is indicated in the box (arrow). Recipe “0” is dry only, recipe “1” is rinse and dry.

- Push Green Start Button – Located on the lower right of the spinner door. The process will start by inflating the door seal and begin spinning. Hold door in while starting so that the door will securely seal.
- Wait for process to complete – Program total time and elapsed time (in seconds) are given in the detail screen, (Figure 4).
- Remove Wafers – When the program is complete, open the door and remove the Teflon cassette. It will be warm to the touch, not hot. Transfer your wafers with tweezers into a clean carrier boat, return the Teflon boat to the Spin Rinse Dryer, and close the door.
- Boat Rinse – Before leaving the SRD, please start a spin rinse operation to clean the Teflon boat by itself.

Summary

This system is designed to spin dry wafers without leaving water spots and films after a wet process. The rinsing/drying operation consists of four component steps:

1. Slow spin with clean DI water spray – 10 sec.
2. Slow spin with DI waterline purge – 30 sec.
3. Fast spin with heated chamber and heated N₂ blow-off – 120 sec.
4. Slow spin with heated chamber and heated N₂ blow-off – 240 sec.

Rules and Notes of Operation:

1. Teflon boats remain with the system.
2. Teflon boats are always loaded with “H” bar facing inward.
3. Teflon boats remain with the system!
4. Note: Check program number before pushing start.
 - a. Program “0” is dry only.
 - b. Program “1” is rinse and dry.
5. Do not edit the programs – call staff if you have special needs.

Programming instructions are contained in the system manual.

This is a shiny new system costing more than a couple of expensive cars. Please take pride in it and keep it very, very clean.