

**Drytek Model MS-5 User Instructions**  
**For the Micro-Electronics Laboratory**  
**At the**  
**University of Notre Dame**  
**Department of Electrical Engineering**

**Download Manual from <http://www.nd.edu/~ee/ndnf/>**

## **DRYTEK - Mega Strip 5 OPERATING INSTRUCTIONS**

The Drytek system is a plasma etcher that can be used to strip photoresist. Photoresist Stripping (ashing) has been widely used as a dry method for the removal of organic polymers (negative, positive, or Electron Beam photoresists) for the past fifteen years. The introduction of metal (aluminum) chambers was the only significant change until Drytek Mega Strip 5 was developed. Until the innovation of an advanced reactor design by Drytek, the other metal chamber systems were less efficient to the glass chamber reactors due to deactivation of active oxygen species caused by the metal reactor. The Drytek Mega Strip 5 utilizes an exclusive passivation method, which produces a greater number of active species. The Drytek Mega Strip 5 includes pressure control as a standard feature. A capacitance manometer head measures the pressure, and the electronic control module adjusts the throttle valve located in the main pumping line.

### **Note!**

**Always wear gloves when handling anything that goes inside the chamber.  
The wafers and sample holder can become hot, handle them with care!**

### **STANDBY CONDITIONS**

1. The main circuit breaker should left in its on condition.
2. The "Machine On" button should be lit (indicating a standby status).
3. The power switch on the RF Power Supply should be off.
4. The light for the "System-On" status should be off.
5. The light for the "Mechanical Pump-On" status should be off.
6. The chamber should be vented.
7. The oxygen tank should be shut off.

### **OPERATION**

1. Fill in the logbook.
2. Open the door of the chamber using both of the handles on the door. Place your samples inside using one of the quartz boats. Close the chamber door, again using both handles.
3. Open the door on the front lower half of the Drytek:
  - a. Turn on the power switch to the RF Power Supply (Drytek PE 1650 AC Plasma Source), the display should light up
  - b. Press the "Mechanical Pump-On", the button should light up
  - c. Press the "System-On" button, the button should light up
4. On the upper control panel push the "Micro Reset" button. This will reset the microprocessor to the desired starting conditions of the machine. (If pressed during the middle of a cycle, the cycle will end immediately.)
5. Turn on the oxygen cylinder valve and checks its pressure setting. The regulator's output gauge should have a 20-PSI delivery pressure.

6. Check the machine settings:
  - a. Pressure Controller (252A Exhaust Valve Controller)
    - i. Power                    On
    - ii. Set Point                Int. / 200
    - iii. Phase                    8
    - iv. Gain                      75
    - v. 10-1-0.1                 1
    - vi. Mode Select             Auto
  - b. Pressure Monitor (PDR-C-1B Power Supply Readout)
    - i. Power                    On
  - c. Time/RF Level
    - i. Time Select              See Note 1
  - d. Flow Controller           Gas1    Gas 2
    - i. Auto/Off                 Auto    Off
    - ii. Set Point                20     N/A
  - e. Optical (End Point) Detector
    - i. Zero                      890
    - ii. Rec. Suppr.            N/A
7. At this point the “Cycle Start” Button should be flashing. Press the “Cycle Start” button to start your process. The “Cycle Start” light should come on and stay on during the process. To stop the process, press the “Process Reset” button. (See Note 2)
8. After the plasma has started, check the RF power level. Nominal setting is 1500 W.
9. When the Drytek has completed a process operation, the process will stop and the chamber will begin to vent.
10. Once this is completed the “Cycle Start” light will go out and the “Process Complete” light will blink on and off and an audible beeping will occur. It usually takes a couple of minutes for the chamber to come up to atmosphere.
11. The wafers and boat can be hot so be careful! Open the chamber door and remove your samples from the quartz boats. Place the boats back inside of the Drytek. Don’t close the door; closing the door will initiate another process sequence of the machine.
12. Press the “System-Off” button; the button light should turn off.
13. Press the “Mechanical Pump-Off” button; the button light should turn off.
14. Turn on the power switch to the RF Power Supply (Drytek PE 1650 AC Plasma Source).
15. Close the oxygen tank valve.
16. Ensure the machine is in its standby condition before leaving.
17. Log out of the logbook.

Note1:

The two left thumbwheel switches are used to set the number of minutes and the third thumbwheel switch from the left is used to set tens of seconds. The right most thumbwheel is used for controlling gas #2, which in this machine is not used and should always be set to zero.

For a descum process the time is about 30 seconds. To strip resist the normal time is about 15 minutes, but can be longer if you are doing a number of wafers or if the resist has been severely baked. The time will be process dependent.

Note 2:

If it is desired to stop a process, pressing the “Process Reset” button will immediately stop the machine cycle and begin to vent the chamber.

