

RIE

Reactive Ion Etch

Users Guide

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Standby Condition: *be sure that the tool is in this state before and after you use it.*

1. Monitor – OFF
2. Computer – ON

*Note: Do NOT restart computer & NEVER hit reset as the button is broken and will remain pushed in.

3. RIE Power – OFF
4. Gas Cylinders – OFF (*This includes both O₂ and CHF₃*)
5. Scrubber – OFF
6. Cooling Water – ON

“↵” Denotes what to click on.

Startup:

1. O₂ Cylinder – ON (*or open*)
2. Scrubber – ON
3. CHF₃ Cylinder – ON (*line first then cylinder second*)
4. RIE Power – ON

*Note: Do NOT change front panel settings (*i.e. RF matcher...*)

5. Monitor – ON
6. Load Windows – Type “win” in DOS prompt
7. Run program “Sysmon”
 - a. Operator = 3333
 - b. Password = 3333
8. Put the tool in “Standby” to gain control of the system
↳Standby

*Note: Must pump down the chamber to remove any potential hazards before the chamber can be opened.

9. Pump Down Chamber
↳Utilities
↳Pump Chamber
10. Check pressure to start turbo pump
↳Display
↳Sensor Display
 - a. Wait for pressure to read <350mT
 - b. Flip “Pressure OK” switch **ON** that has wired to the front panel of the RIE
(*wait for the display to turn GREEN*)
 - c. Now the pressure can be read on the main display
11. Wait for turbo to reach normal operation (*both the turbo controller and program messages will indicate this*)

Headache (alarm) Eliminator: *Do this only on first startup per day. This is an exercise for the MFC's so that they don't stick when trying to stabilize the pressure and gas flows during the process.*

1. Evacuate gas lines
↳ Service
↳Maintenance
↳Evacuate gas lines
2. Choose lines to evacuate
↳ “CHF₃”
↳Wait for green (*will flow ~100 sccm*)
↳ “O₂”
↳ Wait for green (*will flow ~100 sccm*)
↳Exit

Load Substrate(s):

1. Close gates (*valves*)
 - ↳ Utilities
 - ↳ Close Gates (*wait for message to confirm*)
2. Flip “Pressure OK” switch **OFF** that has wired to the front panel of the RIE (*wait for the display to turn RED*)
3. Vent the chamber
 - ↳ Utilities
 - ↳ Vent (*with N₂*)
4. Wait for chamber to “pop” open slightly...
 - ↳ Utilities
 - ↳ Close Gates (*wait for message to confirm*)
5. Open chamber (*be careful as the handle is loose*)
6. Load substrates (*this tool has very good uniformity, however the substrates should still be near the center*)

*Note: Take care not to damage the o-ring!

7. Close Chamber (*again, be careful as the handle is loose*)

Pump Down:

*Note: The roughing is quite slow, as due to design in bypassing the gate valve the chamber is roughed through a small ¼ inch stainless line.

1. Pump down the chamber
 - ↳ Utilities
 - ↳ Pump Chamber
2. Press the chamber closed (*the pump is not strong enough to close the gap in the lid*)
 - a. Do NOT use handle to press chamber closed
 - b. Press on the top of the chamber, NOT the gas assembly
3. Check pressure to start turbo pump
 - ↳ Display
 - ↳ Sensor Display
 - d. Wait for pressure to read <350mT
 - e. Flip “Pressure OK” switch **ON** that has wired to the front panel of the RIE (*wait for the display to turn GREEN*)
 - f. Now the pressure can be read on the main display
4. Wait for turbo to reach normal operation (*both the turbo controller and program messages will indicate this*)

Process:

1. Select the correct process to be run
 - ↳Process
 - ↳load
 - ↳etches
 - ↳etch_exp
 - ↳Process of choice**

** Naming convention is as follows:

“Time_Power”

example: “0240_200” is a 2 minute and 40 second run at 200 watts

2. Put the system in “Ready” from “Standby” (*nothing noticeable happens really...*)
 - ↳Ready
3. Run your selected process
 - ↳Run
4. Record what you are doing in the LOG BOOK
 - Date, Name, Process/Recipe, Time of Day
5. A message appears to let you know the process has completed, clear this message
 - ↳OK
6. Put the tool back into “standby” mode
 - ↳Standby

Remove Substrate(s): *this is essentially the same procedure as loading substrates*

1. Close gates (*valves*)
 - ↳Utilities
 - ↳Close Gates (*wait for message to confirm*)
2. Flip “Pressure OK” switch **OFF** that has wired to the front panel of the RIE (*wait for the display to turn RED*)
3. Vent the chamber
 - ↳Utilities
 - ↳Vent (*with N₂*)
4. Wait for chamber to “pop” open slightly...
 - ↳Utilities
 - ↳Close Gates (*wait for message to confirm*)
5. Open chamber (*be careful as the handle is loose*)
6. Load substrates (*this tool has very good uniformity, however the substrates should still be near the center*)

*Note: Take care not to damage the o-ring!

7. Close Chamber (*again, be careful as the handle is loose*)

Shutdown: when finished, the tool should be back in the standby condition as listed on the front page of this guide

1. Pump down the chamber
 - ↳Utilities
 - ↳Pump Chamber
2. Press the chamber closed (*the pump is not strong enough to close the gap in the lid*)
 - a. Do NOT use handle to press chamber closed
 - b. Press on the top of the chamber, NOT the gas assembly
3. Check pressure to start turbo pump
 - ↳Display
 - ↳Sensor Display
 - a. Wait for pressure to read <350mT
 - b. Flip “Pressure OK” switch **ON** that has wired to the front panel of the RIE (*wait for the display to turn GREEN*)
 - c. Now the pressure can be read on the main display
4. Wait for turbo to reach normal operation (*both the turbo controller and program messages will indicate this*)
5. Shut down the turbo and close all valves
 - ↳Utilities
 - ↳Close Gates (*wait for message to confirm*)

*Note: Turbo pump spins down when the valves close

6. Flip “Pressure OK” switch **OFF** that has wired to the front panel of the RIE (*wait for the display to turn RED*)
7. Return tool back to “idle”
 - ↳ON (*actually turns off now...see that the tool no longer lights up “standby”*)
8. Close program “Sysmon”
9. EMO (*emergency off button*)
10. Reset EMO (*clockwise twist*)
11. Exit Windows
12. Monitor – OFF
13. CHF₃ – OFF
14. Scrubber – OFF
15. O₂ – OFF
16. Cooling water remains – ON