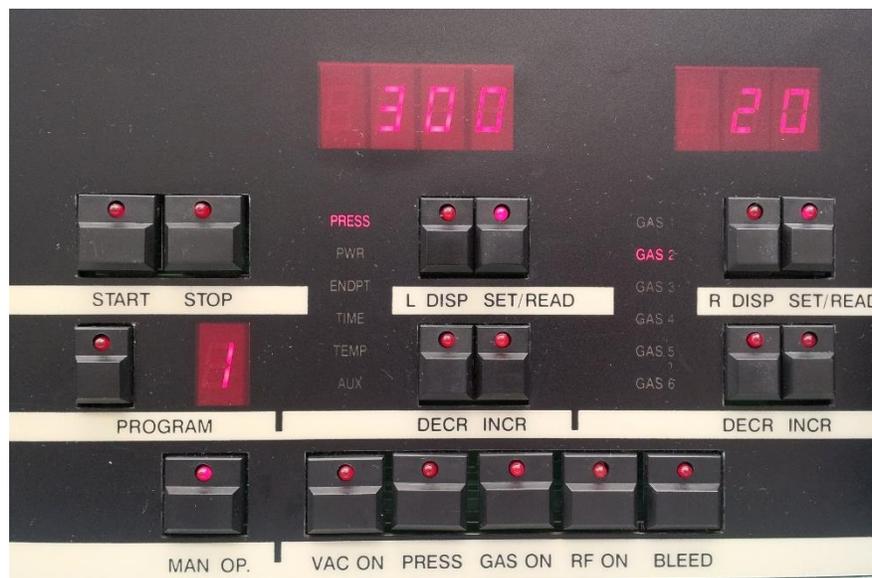


## MARCH RIE CS-1701 SOP

Revised June 2022

### START UP

1. Log into the tool in your FOM account.
2. Turn **ON** pump and chiller with the switches on the wall by the system.
3. Switch **ON** the Main breaker on the back of the RFX-600 RF generator.
4. Power **ON** the RFX-600 (Power button on the front).
5. Power **ON** the MARCH CS-1701 (orange button).
6. Press **STOP** button on RIE (this resets the system), **MAN OP** button and then **BLEED** button. The **BLEED** LED will remain constantly illuminated while the RIE system is bleeding, and then turn off when the bleed is completed and the chamber should be at atmospheric pressure (the seal on the lid will crack open). If you cannot open the chamber at this point check to make sure only the bleed light is illuminated. Press **STOP** and the **BLEED** once again.
7. Load you sample and close the lid.



The same basic format can be used to perform a different etch process with the desired gasses, pressures, etch times, etc.

**NOTE:** The RIE etching process can perform in the Manual and Auto mode, but it is recommended to use **Manual Mode** to avoid problems with the base pressure.

### Parameters:

|         |  |                                 |
|---------|--|---------------------------------|
| PRESS   | Pressure (mTorr)                           |                                 |
| PWR     | Power (Watts)                              |                                 |
| ENDPT   | Endpoint detection using an optical sensor | <- newly repaired feature!      |
| TIME    | Time (Seconds)                             | !!! Counts up in Manual mode!!! |
| TEMP    | Disables DC bias                           |                                 |
| AUX     | Base pressure - typically 100 to 120 mTorr |                                 |
| GAS 1-6 | Gas flow rate (Sccm)                       |                                 |

### Available gases:

GAS 1 = H<sub>2</sub>  
GAS 2 = O<sub>2</sub>  
GAS 3 = CHF<sub>3</sub>  
GAS 4 = CF<sub>4</sub>

### RECIPE RUN IN MANUAL MODE

1. Make sure the RIE is in manual mode of operation (**MAN OP** LED lit). If not, Press the **MAN OP** button on the RIE.
2. Close lid and press **VAC ON**. Wait 1 minute for vacuum to establish. Then press the **PRESS** button on the RIE. This enables the pressure monitoring feature of the system.
3. Let the system pump down to 100 mTorr or lower.
4. Press the right **SET/READ** LED. Now, use the right **INCR** or **DECR** buttons to set the gas flow rates.
5. Press the **L DISP** button on the RIE until **PWR** is illuminated.
6. Press the left **SET/READ** button to illuminate the LED. Now, the power can be set - use the left **INCR** or **DECR** buttons. Don't exceed **400 Watts!!!** Then press left **SET/READ** button to extinguish LED.
7. To reach a low base pressure before processing, set all gas flow rates to zero:
  - a. To set the gas flow rates, press the right **SET/READ** button to illuminate the right **SET/READ** LED.
  - b. Press the **R DISP** button until **GAS 1** is illuminated. Set it to zero by use of the right **DECR** button, as necessary. Repeat for the other 3 gases.
8. Press **GAS ON** and wait for the pressure to drop below ~90 mT.
9. Now set the gas flow rates for your process. Toggle through the list of gasses, ensuring that the rest are all set to desired values or zero. After all gas flow rates are set, press the right **SET/READ** button to extinguish the right **SET/READ** LED. This saves the gas flow rate settings just entered.

10. Wait for a desired pressure and press **RF ON** button. At this point, plasma should be visible inside the RIE chamber.
11. To keep track of the process time press the TIME button or use a stop watch.
12. Press the **BLEED** button on the RIE to stop the cleaning process. This should stop the gas flow and bleed the system to atmospheric pressure. After the system pumps down to the base pressure, the RIE will begin to bleed, and return to atmospheric pressure. While the system is pumping down, the **BLEED** LED will blink. The **BLEED** LED will remain constantly illuminated while the RIE system is bleeding, and then turn off when the bleed is completed, and the chamber should be at atmospheric pressure. If you cannot open the chamber at this point, press **STOP** and the **BLEED** once again.
13. Open the lid and unload your sample.

## SHUTDOWN

1. After the process has completed and your sample is out, close the lid and press **MAN OP**, and then press **VAC ON**.
2. When pressure goes below 120 mTorr press **STOP** and **POWER** (orange button) to power **OFF** the MARCH CS-1701.
3. Power **OFF** the RFX-600 (Power button).
4. Switch **OFF** the Main breaker on the back of the RFX-600.
5. Turn **OFF** the chiller and pump with the switches on the wall by the system.
6. Log out of the tool in your FOM account.

## Plasma Descum Recipe (example)

|           |            |
|-----------|------------|
| PRESS 300 | GAS 1 = 0  |
| TIME 30   | GAS 2 = 20 |
| PWR 300   | GAS 3 = 0  |
| TEMP 0    | GAS4 = 0   |
| ENDPT 0   |            |
| AUX 100   |            |

## WRITING THE RECIPE

1. Toggle the **PROG** button on the RIE until the desired program number appears in the program number box.
2. Press the left **SET/READ** button to illuminate the left **SET/READ** LED. This allows all process parameters except gas flow rates to be set.

3. Initially, **PRESS** should be illuminated. Set this to desired pressure, using the left **INCR** or **DECR** button. Typical pressures are 100 – 400 mT
4. Press the **L DISP** button one time to illuminate **PWR**. Press the left **INCR** or **DECR** button to set the desired power.
5. Repeat the same procedure for all the parameters (TIME, AUX, etc.). Now that all the parameters except gas flow rates have been entered, press the left **SET/READ** button to extinguish the left **SET/READ** LED.
6. To set the gas flow rates, press the right **SET/READ** button to illuminate the right **SET/READ** LED.
7. Press the **R DISP** button until GAS 1 is illuminated. Set it to desired value by use of the right **INCR** or **DECR** buttons, as necessary.
8. Continue to toggle through the list of gasses, ensuring that the rest are all set to desired values or zero. After all gas flow rates are set, press the right **SET/READ** button to extinguish the right **SET/READ** LED. This saves the gas flow rate settings just entered.
9. The etching process is now saved in the selected program number.

## RECIPE RUN IN AUTO MODE

**NOTE:** Make sure to double check the recipe each time you run the tool as they are constantly changed.

1. Ensure that the RIE system is in the Auto mode (**MAN OP** LED is extinguished). If it is not, press the **MAN OP** button to extinguish the **MAN OP** LED.
2. Toggle the **PROG** button until the correct program number appears (just created program or already existed program). Ensure the **MAN OP** LED is extinguished, and press **START**. The entire process will be automatically performed by the RIE.
3. When program is finished press **STOP**, then press the **MAN OP** button to exit the Auto mode, and, finally, press **BLEED** button to vent the chamber and unload your sample.