Introduction

Samco RIE-10NR is a high precision reactive ion etching system which can anisotropically etch wide variety of semiconductor, insulating, and other materials. Standard recipes are available for some materials.

Features and Specifications

Available gases: CF₄, CH₄, H₂, O₂, Ar, N₂
Substrate Size: Wafers up to 6” in diameter
RF Power: 300 W (max), 13.56 MHz.
Turbo pump and dry roughing pump
Touch screen interface
Auto operation

Safety and Precautions

Press EMO button if there is an immediate danger
Press reset to stop the recipe
Power sources, pumps, and valves are interlocked to prevent operational errors
Samples that do not outgas are allowed
Do not modify existing standard recipes (#1-8).
You can make your own recipe in #10 location.
**Operating Procedure**

1. In the service chase following gas cylinders are open and ready to use: N₂, O₂, Ar, N₂ (for DRP pump).
   RIE chiller is also On.

1A. Open (anticlockwise) black valve by RIE (N₂ for DRP pump) before starting the instrument.

2. On the front RIE panel press power **ON** button.

3. On the touch screen activate **SYSTEM START UP**

4. The next screen will display system start up (roughing pump and turbo) sequence which will take 5 min. (Picture 1)

![Picture 1: System start up sequence](image)
5. In the next screen activate **AUTO MODE** (Picture 2) (Always use Auto Mode. *Manual mode need authorization and used by service engineers*)

6. In Next screen, user can perform several tasks: load sample, select recipe, change run time, modify and run recipe. (Picture 3)
7. Edit recipe

There are ten (#1-10) stored recipes. Recipe #10 can be user defined, other recipes (#1-9) are pre-programmed and should not be altered. (recipes are posted on RIE)

8.1 Activate Recipe on the menu

8.2 Select the recipe number from the list.

8.3 Confirm the recipe parameter Conf Para

8.4 Next screen will display the recipe you want (recipe # are on left, use arrows on right to scroll) (Picture 4)

8.5 You can change time for any recipe step. Activate Ok when done. This will take screen to auto mode.

8.6 If you do not need user defined recipe, skip this step. If you need to define user recipe, use and edit only recipe# 10 on Auto mode screen. For user recipe activate Recipe to select #10 then activate Set and on the screen enter your recipe (using screen pad). Also include at least 1 purge cycle. Activate Ok when done. (make sure of gas chemistry before you run any user defined recipe) (Picture 5)
8. Load Sample
   9.1 Activate LOAD SAMPLE on auto mode menu. Two consecutive screens will open for few minutes. (check N2 valve by RIE is open - it is always kept open)
   9.2 At second screen (with “vacuum” and “process” options), chamber should have been reached to atmospheric pressure and can be opened. Open plastic caps and press both chamber OPEN/CLOSE buttons together and release. This will open the chamber up. (front door to chamber should be closed during chamber open/close process)
   9.3 Open front door and load your wafer in the center of quartz plate. The top and bottom electrode gap is 0.5”.
   9.4 Close front door and again press both chamber OPEN/CLOSE buttons together until chamber closes and you hear a beep. Early release of buttons before the beep will reopen the chamber.
   9.5 Activate the PROCESS which will take you to auto mode menu.

9. Turn on process gases at the remote gas panel
   9.1 Turn red shutdown knob clockwise until it pops out
   9.2 Press “Start” button
   9.3 Open corresponding manual valves for process gases on the wall by RIE (N2 valve on wall is always kept open)
11. Run the process
   11.1 Activate the **START** on auto mode screen
   11.2 It will transition from pump down screen to process screen. Every process step will be displayed in real time.
   11.3 “process complete” screen will be displayed after last step.

12. Unload sample and shutdown system
   12.1 Activate **PURGE** on the screen, wait until purge completes. When next screen (i.e. “vacuum” and “process” options) is displayed (chamber should be at Atm. Pressure by now). Open the chamber, remove the sample, load another sample if you need to, and close the chamber (follow the same procedure for loading sample/chamber open/close: step 8.2 – 8.4 above)
   12.2 Activate **PROCESS** available on screen which will take you to auto mode screen.
   12.3 In case you have loaded second sample (in step 12.1 above), you can run the etch process from auto mode screen (follow steps 7, 8, 11 as needed to run process).
   12.4 Otherwise, if you are done, on auto mode screen, activate **MAIN MENU**. From main menu, activate **SYSTEM SHUT DOWN**.
   12.5 Confirm by touching shutdown. Next screen will take few minutes completing shutdown process.
   12.6 When start up screen appears, press power **OFF** button on front RIE panel.

13. Shut off all gases.
   13.1 Shut of gases on remote gas panel (red mushrooms)
   13.2 On the wall by RIE: close all mechanical gas valves (for RIE)
   13.3 You **Must Close** DRP N2 black valve by RIE. Do not forget. If you forget to close this N2 for DRP pump, the cylinder will be empty in ~4 hours.

**Note:** These guidelines are not meant to be complete operating instructions. Do not attempt to operate the tool without proper training.