

## How to load and unload the PAC sample changer:

1. Prepare to load the carousel.
  - a. Retrieve the current sample by entering "0" in the Sample Set field in the PAC Sync Set box on the dashboard. When complete, the Sequencer indicator light will be green and the Results Msg will be "Sample X returned".
  - b. Gather the samples to be loaded and fill out the loading sheet with their PAC slots.
  - c. Close the secondary shutter, place the sample pit in access mode (see BL-11a Shutter Operation quick start guide) and enter.
  - d. Close the gate valve on PAC to isolate the cold head from the loading port area (Figure 1).
  - e. On the PLC touchscreen (Figure 3), go to the "Table Load Cycle" screen and disable DAS by pressing the green button in the upper left corner so that it turns red and reads "DAS DISABLED".
  - f. On the same screen, move the first slot under the load port by pressing the load port number to bring up a keypad and entering the value, then pressing the "Move slot under load port" button.

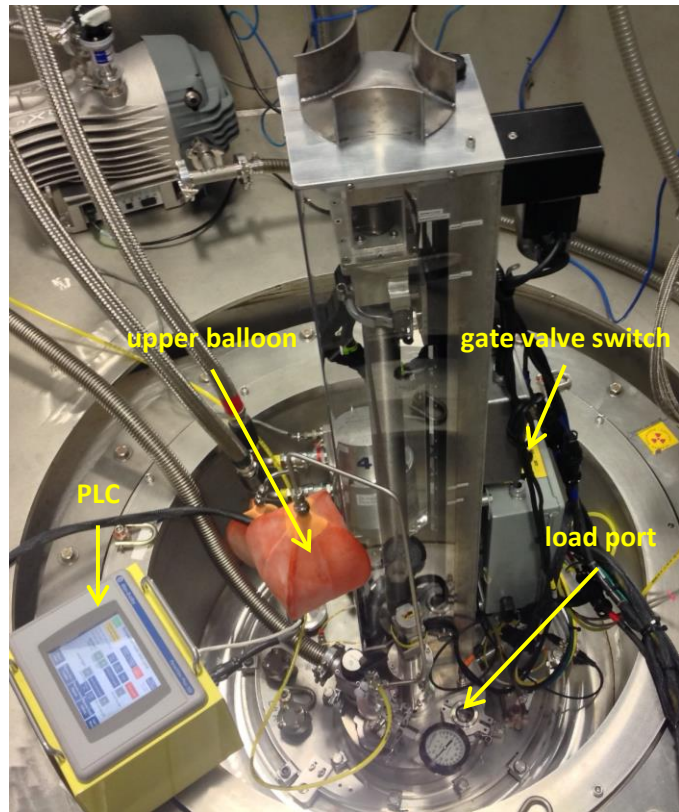


Figure 1. PAC sample changer

**Helium must be continually flowing while the load port is open, to prevent air from reaching the cold head.**

2. Exchange samples.
  - a. On the Helium Pump / Purge Controller (Figure 2), change the mode switch from Remote to Local.
  - b. Open the Manual Bypass valve by pulling it out. The upper balloon should start to inflate.
  - c. Immediately remove the clamp and window from the loading port (Figure 1), leaving the He flowing.

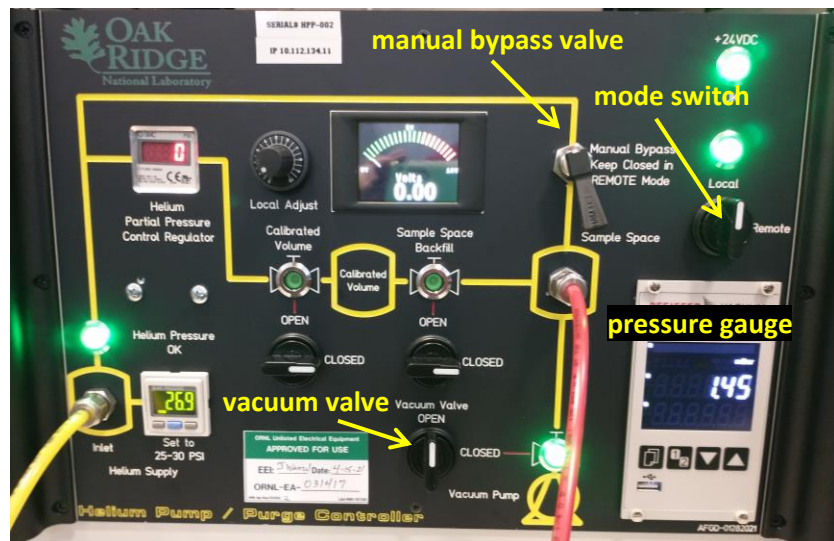


Figure 2. Helium Pump / Purge Controller

- d. Align the slots on the end of the loading stick with the tabs on the lid of the sample at the loading port. Press down and rotate approximately 30° to engage the can.
- e. Remove the sample and scan it with the RadEye G radiation monitor.

**If the RadEyeG radiation monitor alarms or if loose powder is observed, immediately stop what you are doing and call the RCT (865-274-8658).**

## How to load and unload the PAC sample changer (cont.):

- f. Release the old sample from the loading stick by rotating it and attach the new sample by pressing and rotating.
- g. Align the flat sides of the new can lid with the flat sides of the oblong slot in the carousel. Rotate the loading stick to release the sample. Visually verify that the sample is sitting correctly in the slot.
- h. On the PLC, press the “Next slot” button to move the next slot to the loading port.
- i. Repeat steps d-h for all samples.
- j. Replace the window and clamp on the loading port and stop He flow by closing the Manual Bypass.
- k. Leave the removed samples, with their ITEMS barcode tags, in the appropriate beamline location, on the wooden bench inside the RMA.

**Never have both the manual bypass and vacuum valves open at the same time, to prevent the vacuum pump from emptying the gas cylinder.**

3. Pump/purge the sample chamber three times.
  - a. With the Manual Bypass valve closed, switch the Vacuum Valve from CLOSED to OPEN and wait until the pressure gauge reads roughly 10 mbar or lower.
  - b. Close the Vacuum Valve, then open the Manual Bypass valve and wait until the pressure gauge reads around 1000 mbar and the upper balloon is inflated. Close the Manual Bypass valve.
  - c. Repeat steps a and b two more times.
  - d. Change the mode switch from Local to Remote.
  - e. Open the gate valve.

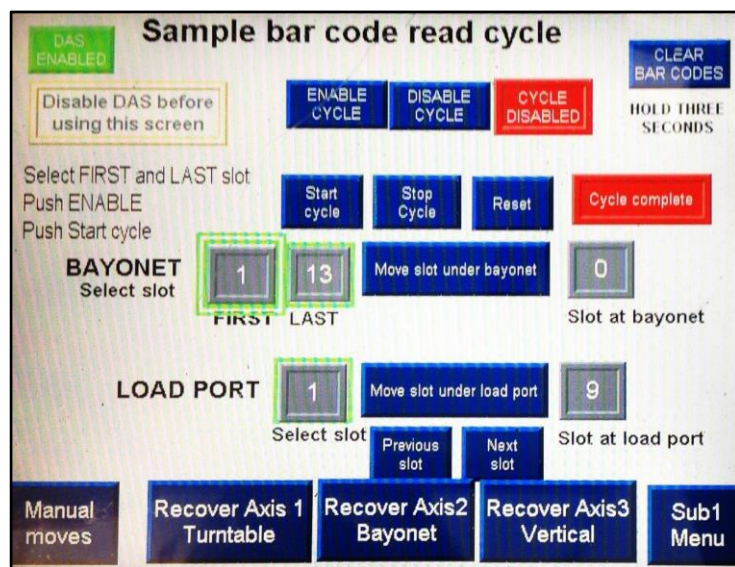


Figure 3. PLC Table Load Cycle screen

4. Run a table load cycle.
  - a. On the PLC, next to “Bayonet” enter the first and last slots that were changed.
  - b. Press the “Move slot under bayonet” button and wait until the correct slot at bayonet is reached.
  - c. Press the “Enable Cycle” button, followed by the “Start cycle” button.
  - d. Wait for the cycle to finish and for the red “Cycle complete” box to appear (may take up to 30 min for a full 24-sample load).
  - e. On the PLC, press the red “DAS DISABLED” button in the upper left corner, so that it turns green and reads “DAS ENABLED”.
  - f. Sweep pit and open secondary shutter per BL-11a Shutter Operation quick start guide.



Figure 4. Sample loading stick, showing alignment with sample can lid.