

Repumping procedure for EDX detectors

In case the liquid nitrogen (LN2) consumption increases, gradually or suddenly the cause will, in most cases be a vacuum leak. Such leak might be in the Be window, at an O-ring connection, but also in the dewar wall. A very slow increase in LN2 consumption might be caused by saturated getter in the dewar. This getter catches vapors originating from components inside cap. The situation can be improved by repumping the dewar.

Equipment: Cryo-Lab valve (<http://www.cpc-cryolab.com>) – price about 200 US \$, custom made vacuum flange for SEM and rubber pipe (Figure 1).



Figure 1: Cryo-Lab valve, custom made vacuum flange for SEM and rubber pipe.

The repumping procedure is:

1. Switch off the equipment, wait 10 minutes and remove detecting unit. Pour out the LN2 and let the dewar warm to RT. Note: We only warm detecting unit to RT and we don't remove detector from the SEM column.
2. Discharge the HV by connecting the center pin of the BNC connector on the HV box to the frame (Figures 2 and 3).

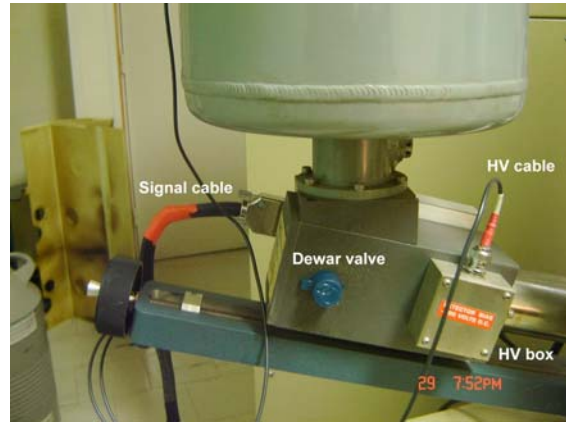


Figure 2: Detector unit.

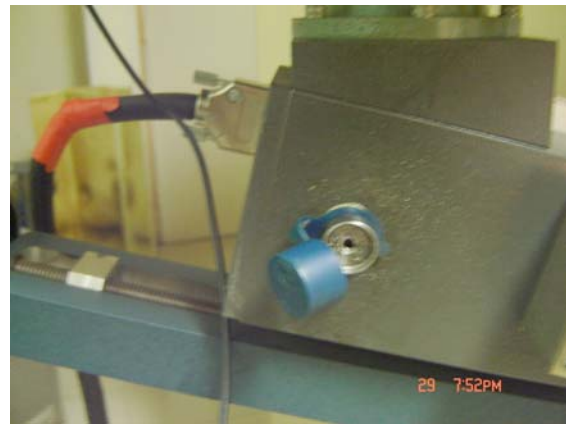


Figure 3: Detector unit.

4. Vent the SEM column to atmosphere.
5. Connect the custom made vacuum flange to the SEM (Figure 4).
6. On the detector side. Remove the plastic cover which seals the vacuum valve connector on the dewar. Connect the Cryo-Lab valve to the dewar valve, but do not open the dewar valve at this point (Figure 5).



Figure 4: Custom made vacuum flange.



Figure 5: Cryo-lab valve connected to the dewar valve.

7. Evacuate the whole system to the SEM working vacuum, about 2×10^{-6} Torr.

8. Open the Cryo-Lab valve and dewar valve and wait about 1 hour.

- Gently push the rod of Cryo-Lab valve to the dewar valve (you will feel this, when the rod of Cryo-Lab touch the dewar valve).

- Connect the rod of Cryo-Lab valve with 3-4 turns on the clock side to the dewar valve.

c. Push out the rod of Cryo-Lab valve and now is dewar valve open.

d. Wait 1 hour.

9. Close the dewar valve in the opposite order as at point 8.

10. Vent the SEM column to the atmosphere. Remove the Cryo-Lab valve from the dewar and also custom mode flange from the SEM column.

11. Reconnect all cables (signal cable, HV cable). Fill the dewar with LN2 and wait 24 hours the switch power ON.



Figure 6: Custom made vacuum flange and Cryo-lab valve.