

Restarting the 500 and 600 Cold Probes after a Shutdown

This document assumes that the cold probe is already installed and all connections are already made and the reason it needs to be restarted is because it was shut-down for some reason. See the document for installing the cold probe for the 500 and 600 if the probe is out of the magnet to start and then this document for starting the probe.

- Connect the task pump to the vacuum port of the cold probe under the magnet and turn it on (make sure that the vent screw is tightened on the task pump). At this point make sure that the valves to the probe remain shut! On the 600 this is the gold colored valve and on the 500 it will be the round valve at the bottom, not to be confused with the valve that is connected to the ion pump.
- Connect the vacuum gauge cable to the task pump. The cable is lying on the ground behind the CCC for both the 500 and 600.
- Use the vacuum reading from the cryobay software to monitor the vacuum reading. If the software is not running turn it on now to monitor the vacuum.
- For the 500 make sure that the ion pump power supply is turned off.
- Once the **vacuum** reading is $< 1.0 \times 10^{-5}$ torr (not the ion pump reading) open the valve to the probe. For the 600 open the gold colored valve about 1 inch. For the 500 rotate the round valve until fully open, but do not over-open.
- Wait for the vacuum to reach $< 3 \times 10^{-6}$ torr
- **IMPORTANT** – Exit the cryo-bay software by hitting the exit button. Wait for a while and a menu bar will appear at the top of the software. Use the file menu and hit exit. This will close the software completely.
 - This step is critical and should not be skipped!
- Restart the cryo-bay software from the desktop icon. Open the panel and use “varian” as the password
- NOTE: If the cryo probe was shutdown due to an error, the error may reappear and the eject air may turn on. If this happens move the slider bar to “Disable eject air on error”. This will not shut off the air, but prevent it from happening again. Click on the “Test Valves” button. This will open a dialog box. Hit the “eject air” button and the eject air valve will close. Close the Test Valves dialog box to prevent any accidental alteration to the valve settings.
 - NOTE: Be very careful with the test valves dialog box as damage can be done if the valves are not in their proper positions and with the track-pad it is easy to make errant mouse clicks.
- Move the sliders to “Disable vacuum error checking” and the “Disable eject air on error”. The eject air may have already been disabled from the previous step.
- Make sure that the Helium gas cylinders are open. If you are not sure which tank goes with which probe just make sure they are all open and sufficient gas is present for the purges
- The things that come next are slightly different for the 500 and 600:

- For the 600 cold probe:
 - Make sure the # loops is set to 5 from the software
 - Hit the green start button. Five purges of the Helium gas should occur and then the compressor will start.
 - NOTE: If the compressor starts immediately without any purges hit the STOP button immediately, exit the cryo-bay software and repeat the process. The most likely cause of this happening is that the cryo-bay software was not restarted and stated above.
- For the 500 cold probe:
 - Make sure the # loops is set to 0.
 - Change the ohm reading from 40 ohms to 80 ohms.
 - Open the “test valves” dialog box. Be very careful you do not accidentally hit the valve buttons. It is very easy to do so with the track-pad. At this point the Inlet and Outlet pressures should be about the same and should be greater than 200 psi. If the probe was disconnected from the CCC the pressure may be very low, but you should be reading a different instruction sheet if that was the case. In any case lets do some purges and I will start with a purge in just to be safe (although this may be useless if the pressure is above 200 psi to start).
 - Hit the “Purge In” button and wait for the inlet and outlet pressure to reach around 220 psi. It will settle in at a pressure equal to what the regulator on the Helium gas cylinder is set to if you wait long enough, but anything over 220 psi is fine.
 - Hit the “Purge In” button again to turn off the purge in valve and stop helium flowing to the CCC.
 - Hit the “Purge Out” button. Helium gas will be purged out of the CCC and probe. Watch the PSI readings as they drop rapidly. When the PSI reaches around 20 psi hit the “Purge Out” button again to stop the purge out. Basically we want as much of the helium gas to get out of the system, but do not want the pressure to get to low as we don’t want any air to get into the system.
 - Repeat the purge in and purge out for a total of 5 purges and make sure you end with a purge in so that the final PSI reading is around 230 psi (exact pressure is not too critical).
 - Open the bottom panel of the 500 cryo-bay in the back to expose the compressor (large square box at the bottom). On the back of the compressor there is a LCD screen and a few buttons (On, Off, and another button we do not need to use).
 - Make yourself comfortable so you can reach the ON button and press the ON button and hold it. The compressor will try to start, but will likely fail to continue running. Keep holding the ON button until the compressor tries to start and then keeps going. It generally fails in less than 1 second so if it runs for a

few seconds it is basically started and you can let go of the ON button.

- **VERY, VERY IMPORTANT: Once the compressor starts let it run for around 30 seconds and hit the OFF button on the back of the compressor. The compressor can become damaged if run in this manner for too long.**
- Right after you stop the compressor go to the front panel and hit START from the cryo-bay software. With purges set to zero the compressor should turn on and the probe should start cooling.
- While the probe is cooling the ion pump will be off (automatically for the 600 and just don't turn it on for the 500). Leave the task pump connected and running during the cooling process.
- After 240 minutes the probe should be at 25 K and reading READY. For the 600 the Ion pump should be turned on automatically. For the 500 turn the ion pump on manually by hitting the power switch from the power supply, which sits on top of the cryo-bay.
- Close the vacuum valve to the task pump.
 - For the 600 this is the gold colored valve. For the 600 make sure that the top of the ion gauge is horizontal with the floor for optimal performance. It is on an angle, that is fine, but make sure that the top is horizontal with the floor.
 - For the 500 close the round valve and make sure the ion pump is horizontal. Sometimes it can slip slightly to the left.
- Once the vacuum valve is closed shut the task pump off and wait about an hour for the turbo to spin down. Break the vacuum with the purge valve on the side of the task pump and then disconnect the task pump from the probe. Note that on the 600 the ion pump may move during this process. Make sure that it is horizontal again when you have removed the task pump.
- For the 600 change the settings on the cryo-bay monitor software to "enable eject air on error" and "enable vacuum error checking".
- For the 500 change the setting on the cryo-bay monitor software to "enable eject air on error" but leave the vacuum error checking to disabled.
- At this point the probe will need to be conditioned. See the cold probe conditioning document for more information.