**Macromizer CoolDown Task Checklist VER 1.0**

*\*A CoolDown takes ~15hours to complete.*

* Check the static pressure of the He compressor and the operating hours. Make sure the static helium pressure is within spec. Record these values and place labels on the compressor.
* Note whether the adsorber should be replace. The overhaul period is 20,000 hours.
* Connect the external Pfeiffer turbo pump to the cryostat backed by a roughing pump.
  + Make sure the turbo pump vent valve is closed.
  + Make sure the main valve to the cryostat it closed.
  + Make sure the solenoid valve is powered and closed.
  + Turn on the roughing pump & turbo pump and allow to spin up to full speed.
  + Open the solenoid valve via the switch.
  + Slowly open the valve at the top of the cryostat (in case the chamber is at atm) and allow pumping on the cryostat for at least 24 hours or until the cryostat pressure is < 6 X 10-6 mbar.
* Using the manual 24 V cryovalve switch, open the cryovalve and check that the cryostat pressure is less than 6.0 x 10-6 mbar using the tube ion gauge. If the pressure is above this value, continue pumping. You can also leave this valve open to help the pump down time, but it is severely conductance limited.
* Close the cryovalve by removing the manual 24 V cryovalve switch. Reinstall the automatic cryovalve switch.
* Make sure you have enough nitrogen in the cylinder so that the cryovalve opens on command.
* Turn on the 480 VAC power to the He compressor.
* Turn on the booster pump power switch. (UP)
* Turn on the chilled water supply and return to the appropriate He compressor. The chilled water should be reading approximately 10˚C prior to beginning compression. **DO NOT LEAVE THE CHILLED WATER RUNNING IF THE COMPRESSOR DOES NOT START OR IT WILL CREATE CONDENSATE IN THE COMPRESSOR AND ON THE FLOOR. AN ALARM WILL SOUND.**
* Close the main cryostat valve (top) and the solenoid via the switch.
* In the Macromizer software, schedule a **CoolDown** task in the Scheduling menu. Make sure to schedule for the appropriate time. (Currently, scheduling time is 4 hours ahead of the server time.)
* The CoolDown task should begin automatically. Monitor the initial steps.
  + CoolDown task starts
  + Cryovalve is opened and the system checks cryostat pressure

Once pressure is < 6.0 x 10-6 mbar, the cryovalve will close and the He compressor starts.

* Set the Yaskawa J7 drive to 60 Hz. Less than 60 Hz on startup could cause the compressor to over pressurize and shut off. The compression frequency is set back to 40Hz once the system has completed the CoolDown. This lower frequency extends the life of the coldhead.
* During the initial compression period, the chilled water return may exceed 40˚C. This is okay and the system will continue operating as long at the return does not exceed 60˚C. If 60˚C is reached the compressor will shut off. If this happens, it usually means there is either a temperature or flow problem.
* The system will continue cooling and should reach the final temperature after approximately 15 hrs. Only one **Regeneration** task will be completed following the CoolDown cycle.
* After the CoolDown and following Regeneration tasks complete, the Macromizer system is ready to run.
* Expected Temperatures: **T1 ~ 27-35K; T2~ 5K; T3~ 2.4-3.4K, T4 = 0.35K**
* Make sure you schedule a **Regeneration** task to take place the following morning and schedule to repeat every 48 hours (2880 minutes).
* Turn off power to the external cryostat turbo pump and allow to spin down.
* Turn the power off to the roughing pump. Vent via the vent valve on the side of the turbo cylinder to slowing over a 1-2 mins. Lower the turbo speed continuously without stopping to avoid vibrations.