

# Cooling cabinet instructions

## To cool down from room temperature

1. Please check the level of nitrogen in the external Dewar. Start filling the Dewar by turning the switch to **AUTO**, and wait till it reaches a level between 35 – 37 cm.



2. Open the bottom door of the cooling cabinet and open the following tap until you see cold gas coming out, you will see condensation on the tap. Close the tap then. Initially there will be level fluctuation which is normal.



3. Turn the chamber heaters **ON**, if they are off.
4. When the level has reached to 35 or above, please take a look at the pressure in the chambers which is the topmost panel. If the pressure is below **1 bar** for VT (**1.04 in figure**), **2.5 bar** for bearing (**2.69 in figure**) and **1.6 bar** for drive (**1.62 in figure**), please go to the **FILL** mode on the external panel and start filling the chambers by pressing **START** for all chambers. When the chambers are filled it will show **PROGRESS**, and it will be indicated by **DONE** when the filling has finished.



5. Go back to **RUN** mode now.
6. Put the three chambers from **BYPASS** mode to **COOLING** mode.
7. Increase the bearing pressure to 1000 mbar and drive pressure to 600 mbar on MAS panel. **Always keep in mind that the pressure in the chambers must be higher than the pressure of the flow.**
8. Go back to the workstation and on tospin type **edte**.
9. Increase the VT flow to about 1470 l/h and turn the probe heater on. Change the target temperature of the sample to 90 K.
10. The probe will cool down now. You can check the progress of cooling by the auxiliary sensors in the **edte** window.
11. When the exhaust is <140 K and the sample temperature is <110 K, the probe is cold and you can start your experiments.

## Inserting a sample

1. To insert a sample, please reduce the VT flow to 200 l/h on tospin. **Turn the drive flow to zero.** Turn the bearing flow to zero and **insert and eject** will be shown on MAS panel.
2. Put the bearing pressure again to **200 mbar**.
3. Press **eject**.
4. Put the sample in the sample holder below the probe with the cap **UP**.
5. In the MAS panel, **stop eject and press insert**. Wait for few seconds and stop insert. You will see the sample spinning a bit, because of existing bearing pressure. Increase bearing and drive to attain the necessary spinning frequency.
6. Once the sample has reached the needed spinning frequency, let it stabilise and when it is within 20 Hz, you can put it to AUTO mode.
7. Always change spinning frequency in MANUAL mode.
8. When you turn the **gyrotron ON/OFF put the spinning to MANUAL mode**. The spinning frequency will change when you turn on/off the gyrotron because of the heating effect.

## Ejecting a sample

1. Reduce the bearing and drive pressure to **zero** slowly. Keep in mind that bearing should be higher than drive in all cases.
2. When they are both zero, the insert/eject option will appear on the MAS screen. Press eject.
3. **Increase the bearing again to 200 mbar**, check the spinning frequency. If it is 0 then there is no sample inside.
4. Press eject.
5. Take an empty rotor holder. Take out the rotor holder from the base of the probe. Check if the rotor is inside, and put back the empty rotor holder in the probe.

## To keep the probe idle overnight/over weekend.

1. Switch the exchangers to BYPASS mode
2. Set gass flow for all units (Bearing, Drive, and VT) to approx. 5 l/min
3. Keep all chamber heaters off.
4. Due to the chamber heaters in the OFF state, nitrogen gas will condense and accumulate in the exchanger coils. So next time you turn on the cooling system, please turn on the heater for a few minutes to boil off the accumulated nitrogen.

## To warm up the probe.

1. Do this only after you have taken out your sample and put the **gyrotron on standby** mode.
2. Increase the bearing pressure to 1000 mbar, and drive pressure to 600 mbar on the MAS panel.
3. Increase the VT flow to 1470 l/h.
4. In the cooling cabinet panel, put the chambers to **BYPASS** mode.
5. Set the sample temperature to 273 K on the edte window of TOPSPIN.
6. Keep an eye on the exhaust and sample temperature in the edte auxiliary tab.
7. When the temperature reaches 273 K, reduce the VT flow to 200 l/h.
8. Reduce the bearing and the drive and check that there is 5-6 l/min flow at least.
9. Turn the chamber heaters OFF.
10. Turn the probe heater in topspin to OFF.
11. Go home or to the pub or wherever you want to go.

