

Removing the cold probe from the 500 or 600

- Hit STOP from the CryoBay Monitor Software. If the probe is already warm the first few steps can be skipped, but for the 500 make sure the power is off to the ion pump.
- Hit yes for pumping on probe dialog box or probe will not shut off
- For the 500 turn off the power switch on the ion pump power supply located on top of the cryo-bay. This is critical as damage to the ion pump will occur if it keeps running when the vacuum gets poor.
- Let probe fully warm up to room temperature. This will take several hours.
- Verify that the compressor valve is shut. It should have a red dot next to it
 - **IMPORTANT:** It is important to not let Helium gas exit the compressor. Therefore, never vent the system with the compressor valve open (green)
- Open the Test Valves dialog box.
- Open the Purge-Out valve and leave it open until the hissing stops. Then close the Purge-Out valve.
- Remove the top cover of the pier and loosen the transfer line from the pier so it is able to move freely.
- Slacken the coupling by rotating it to the left several times until it stops moving. It spins quite a few times until it stops. Also, initially there is a fair amount of resistance to it rotating.
- At this point we need to decouple the transfer line that connects the CCC to the probe. The transfer line that we just slackened inserts into the side arm of the probe over a foot. To remove it:
 - Rotate the silver port that goes into the coupling so that the pins are in a position so that they can slide out.
 - Then decouple the transfer line by carefully sliding it out of the side arm. Note that the silver portion with the pins may need to rotate again on its way out.
 - After removing the transfer line place the protective sleeve over the end of the transfer line and secure by rotating the pins. The protective sleeve is generally lying under the magnet somewhere, or sometimes it is inside the hollow part of one of the magnet legs. Afterwards let the transfer line lie gently on the ground.
- Place the stopper into the side arm of the probe. The stopper should be hanging from the end of the side arm.
- Make sure the sample is ejected from the probe
- Turn off the temperature controller. This can be done using the power switch on the temperature controller found at the back of the console or it can be done via software by pressing the turn VT controller off button from the spin and temp window.
- Disconnect the following:
 - Ion pump power line (silver sleeve that connects to the ion pump underneath the magnet)
 - Cernox connector

- PFG connector including the dampening box
- VT cable
- VT air supply
- All RF cables
- Remove the tuning and VT interface to the probe (the part of the probe at the bottom). Unscrew the three screws and carefully remove the unit. There is a heater coil that is quite long that inserts into the probe. Be careful that you pull it straight down so as to not damage the heater coil.
 - After it is removed place the unit in a safe location.
- Unhook the bracket that supports the side arm of the probe at connects to the CCC transfer line and move the bracket so that it will not obstruct the probe as it slides out of the magnet.
- The probe needs some slack to remove. To add the slack, rotate the two copper colored screws so that the probe drops slightly.
- Now push the probe up slightly and rotate the copper connections so that they are free and lower the probe very carefully.
 - **IMPORTANT:** Only handle the probe from the probe body. Never hold the weight of the probe from the barrel portion. You can grab the side-arm, but only near where it connects to the body of the probe.
- Place the probe in a very safe location, such as the probe box. Note that the ion pump may need to be rotated so that the probe can sit flat in the box. It is also possible to use the probe stand, but it takes engineering to get it to stay on the stand properly (especially the 500 probe) so I do not advise it unless you take extreme care to be sure the probe will be safe.
- Place the RT probe in the magnet so that the VT air line points towards the FTS air supply. For the 500 RT probe there are only two choices for position and one is clearly better than the other. For the 600 RT probe the gradients connect to the top of the magnet into the upper barrel. The upper barrel then has connectors that go into the probe as it is inserted into the magnet. Therefore the upper barrel must be in a proper orientation so that the probe can seat properly. Never force the probe in if it does not move freely as it is likely the gradient prongs that are hitting and you will damage them if you push to hard and they are not aligned properly. On top of the upper barrel there are some black marks that show the proper alignment of the upper barrel and hopefully it will not have moved and the probe will slide in without issue. However, if the probe does not slide in easily the upper barrel may need to be adjusted. First slide the probe in the magnet until hits, then rotate the probe around until it seats properly. At this point the screws that hold the probe in place may not be aligned with the holes properly. Make a note of how far the upper barrel needs to rotate, pull the probe slightly out, and have a second person rotate the upper barrel. Retry and keep going until the probe goes into the magnet fully and the screws are aligned properly.
 - NOTE: If the RT probe will not be placed in the magnet immediately use masking tape to cover the probe opening so magnetic dust does not get pulled into the magnet.

- Secure the probe to the magnet with the two screws. Only use your hands, do not use tools, as they only need to be hand tightened.
- Remove the glass fitting from the VT air line and replace with rubber connector. Rubber connectors can be found underneath the 800 magnet, in the flat toolbox on the shelf, or sometimes in the RT probe boxes.
- Hook up the VT air line to the probe. Note that the position of the FTS air line may need to be adjusted slightly to connect the air properly. Make sure there is no strain on the probe.
- Connect the PFG cable. For the 600 the cable connects to the top of the magnet into the upper barrel into the Z-axis port. For the 500 the gradient cable connects to the probe body itself. For the RT probe only the cable is needed, the damper (blue box) should not be connected.
- Turn on the probe purge from the pneumatics router and verify that air is coming out of the line. Set the air flow about as low as possible. The probe purge line is the soft rubber line which will be lying somewhere under the magnet. This line is not used for cold probes.
- Connect the probe purge line to the probe
- Connect the VT cable
- Connect all RF cables. Note that the receiver cable from the cold probe is not used for the RT probe and can be left underneath the magnet.
- Go to the box next to the magnet where the pre-amps are located. Move the cables from the pre-amp driver to the high band pre-amp. Note that the Probe Pre-Amp cable is not used with RT probes.
- Make sure the shim cable is secure, as it may have come loose during all the handling of cables under the magnet
- Turn the VT controller back on from the power switch or via software depending on how you shut it off
- From the spin and temp window hit the “Reset VT Unit” button and hit the “Reset Pneumatics router” button as well
- Adjust the air flow to 11 or 12 lpm, set the temperature to 25 and hit regulate temperature at this value. Then wait for temperature regulation
- Place the lineshape sample in the magnet and shim to spec. It is best to load in a good set of shims before starting to speed up the process. Follow the document on shimming if needed.