Installing the cold probe for the 800

The directions below are for installing the probe while cold. The procedure is similar for when the probe is already warm. The differences are that the probe removal stand does not necessarily need to be used if the probe was in its box. Also, the vacuum and helium transfer lines along with the air line will need to be connected after the probe is placed in the magnet. Lastly, you will need to open a connection to the cryobay from the VNMRJ software and hit start. NOTE: If the vacuum fails you may need to purge the task pump. See the purging the task pump document for instructions. Also note that the probe will need to be conditioned. See the document, conditioning the cold probe, for instructions.

1. Start by removing the RT probe
    a. Unlock and eject the sample
    b. Adjust the FTS temperature to 20 degrees
    c. Go to the "Spin and Temp" panel and turn the VT off or turn off the VT power button on the back of the console
    d. Disconnect the VT controller cable and the VT air supply line to the RT probe
    e. Disconnect the four RF cables from the probe body
    f. Disconnect the PFG cable.
    g. Disconnect the probe purge air line (soft rubber tubing)
    h. Remove the ^{1}H, ^{13}C, and ^{15}N RF cables from the directional couplers and ^{15}N filter.
    i. Clear all the cables from underneath the probe to make room for the probe removal stand
    j. Remove the RT probe
2. Install the Cold Probe into the magnet
    a. Align the probe stand with cold probe underneath the magnet and make sure that the transfer lines are rotated far enough over so that they will clear the vertical support bar when raised.
    b. Unlatch the probe stand and very carefully raise the probe into the magnet by raising the probe stand
        i. NOTE: If the probe was warm and not already on the probe stand it can simply be placed into the magnet by hand without the aid of the stand. However, ALWAYS make sure to handle the probe from the

body and never hold the weight of the probe from the side arm or tube portion.

c. Carefully lift the probe by hand from the body and continue to push the probe into the magnet
d. Rotate the triangle support bracket until it secures the probe.
e. Move pier into place and lift transfer lines and cables onto the pier. (Note: The probe will likely rotate as you do this step).
f. Connect arm support bracket, but leave loose until the probe is properly aligned.
g. Adjust the probe height by rotating the gold colored wheel to the right until the spacing between the probe body and flange is equal to the taped part of the spacer, which sits underneath the magnet.
h. Tighten support arm bracket.
i. Attach the cap onto the pier

3. Making connections and cable swaps
   a. Remove the cover from the pneumatics router
   b. Turn off the auxiliary air
   c. Turn off the probe purge air
   d. Connect the VT / tuning component to the bottom of the cold probe
   e. Connect the VT air line
   f. Connect the PFG cable
   g. Connect the six RF cables with the elbow connectors
   h. Connect the VT cable
   i. Swap the cables from the ^{1}H and ^{13}C pre-amps to the pre-amp drivers
   j. Connect the ^{1}H, ^{13}C, and ^{15}N cables to the directional couplers and ^{15}N filter.
4. Final adjustments in the software
   a. Login as vnmr1
   b. Set the VT air flow to 16 lpm
   c. Press button to reset the pneumatics router
   d. Press the reset VT with probe change button
   e. Set temperature and hit regulate
   f. Quickly adjust FTS to appropriate value

g. Load in HCN_cold probe file or enter appropriate values into ghn_co. See the document on default parameters for appropriate power values and pulse widths
h. Load in ghn_co if not done earlier
i. Update probe file with new parameters
j. Type coldprobe

5. Making the probe cold and cryobay connections
    a. If the probe was already cold and sitting on the probe stand this section can be skipped.
        i. If the cryobay connections are not connected to the probe due so now. There will be a communications cable, an air line, a vacuum connection, and the helium transfer line which needs to be carefully inserted and the coupling tightened with several rotations until tight.
        ii. Open a connection to the cryobay from the vnmrj software and hit start
            1. If a vacuum error occurs the task pump inside the cryoby may need to be purged. Follow the directions in the purging the task pump document.
            2. Once the probe is cold retighten the helium transfer line coupling and make sure no ice buildup is forming.
            3. Condition the probe. See the conditioning the probe document. Shimming may be done before or after the conditioning.
6. Putting in lineshape and shimming
    a. Put in lineshape sample. **Note that the upper barrel regulator may need to be adjusted to provide proper lift for the sample.**
    b. Shim z1 and z2 very briefly and create a PFG-H2 shimmap and gradient autoshim on Z.
    c. Shim X1 and Y1 and then gradient autoshim on Z
    d. From a different job then you are using for gradient autoshimming type the macro “shim_param”. This will setup a 1D with parameters ready to collect a 1D spectrum of the lineshape sample. After collecting the spectra process with FT (not WFT), phase, expand to see the signal on the left,

place a line near the peak, and type “res” in the command line.

e. Shim higher order shims while occasionally gradient autoshimming on Z until lineshape specs are met.

7. Replace cover on pneumatics router.