

Putting the furnace on

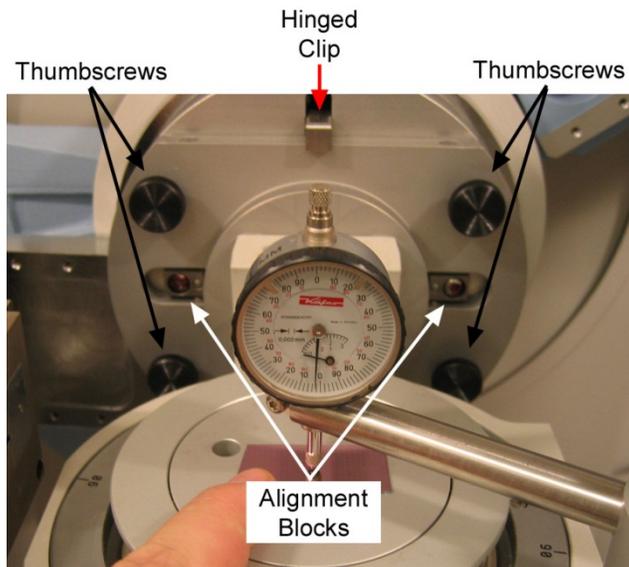
When changing the sample stages, it is very important that you remember:

- Do not twist or stress the cables. They will break if not handled delicately.
- Do not touch the alignment blocks on the goniometer.
- Do not lift the stages by their motors or cables.

1. Remove the OEC

a. Remove the four black thumbscrews that are holding the stage in place

- *The hinged clip will support the stage so that it will not fall.*



1. Remove the sample stage from the goniometer

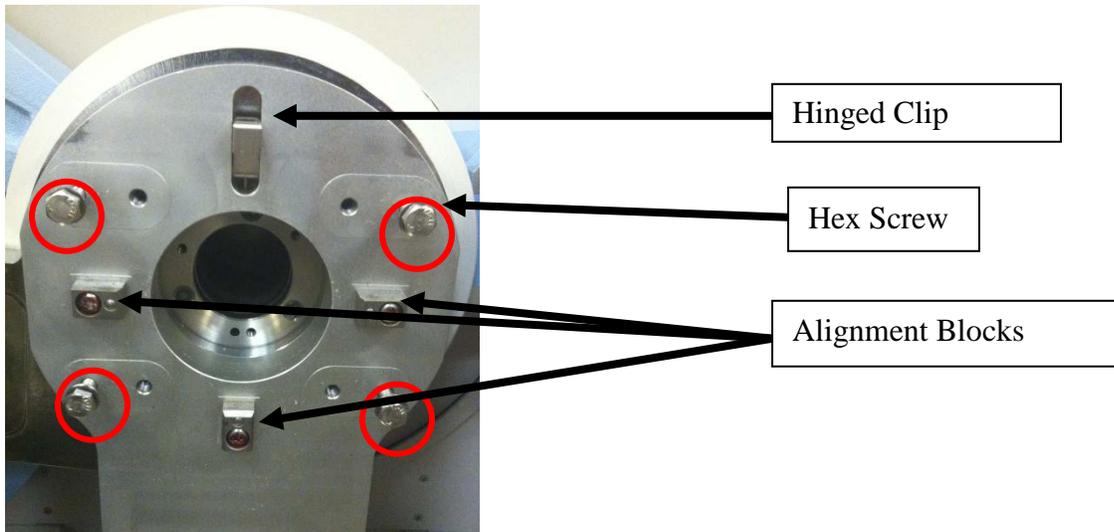
- The easiest way to do this is to swing out the bottom of the sample stage and then pull it out and down to remove it from the goniometer
- Alternatively, you can hold the stage, lift up the hinged clip and pull the sample stage off of the goniometer
- *Be sure not to drop the sample stage*

2. Place the OEC in the front right corner of the hutch,

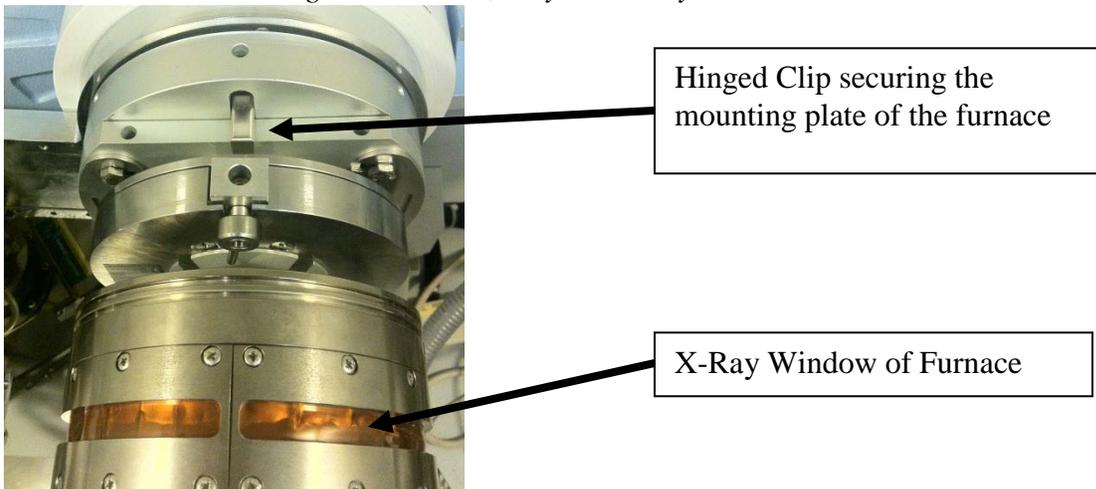
- Put the peg on the back of the OEC mounting plate in the hole in the wood board.
- The OEC will be sitting on its mounting plate and resting upwards
- Use a bolt to attach the OEC to the wood board
- *Be careful not to twist or put stress on the cables attached to the stage.*
- *Be careful of motors and other moving parts; do not hold the stage by the motor, moving part, or cable, and do not set the stage down on any of these parts.*



2. Put in the four hex screws that will hold the furnace in place (they go in the places where the black thumbscrews were that were holding on the OEC or sample spinner, circled in red in picture below). Tighten them until they are about $\frac{1}{4}$ of the way into the hole. The screws are stored in the blue box on the left side inside the instrument hutch.



3. Put the furnace on the goniometer.
- Position the furnace so that it fits over the alignment blocks and so that the hinged clip holds it in place.
 - *The easiest technique is to tilt the furnace so that the **top** of the mounting plate is tilted towards the goniometer, slide the **top** of the furnace into place under the clip, and then swing the rest of the furnace into place.*
 - *Make sure the hinged clip engages the stage and is holding it before you let go.*
 - *Make sure that you do not touch the X-ray window of the furnace or you may puncture it, creating a leak*
 - *Do not touch the alignment blocks; they are easily corroded*



4. Use the brackets to tighten the furnace into place
 - a. Brackets and the wrench for tightening screws are stored in the blue box on the left side inside the instrument hutch.
 - b. Put one bracket into place and tighten the top screw using the wrench
 - c. Screws only need to be slightly snug- do not overtighten.
 - d. Put the other bracket into place and tighten the top screw
 - e. Then tighten the two bottom screws



5. Connect the water return line (the line going to the instrument is the female connector with the sliding part, the line to the furnace is the male connector). The connectors just push straight together. You will have to use some force to get the connectors to click together. Make the connection quickly or water may leak out.

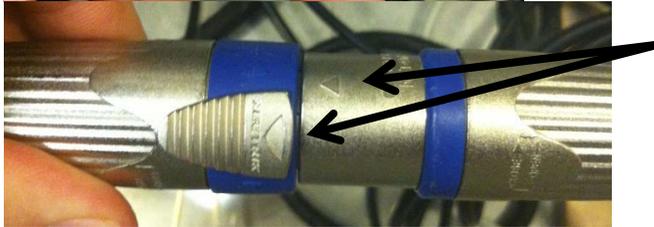


6. Connect the water supply line (the line going to the instrument is the male connector, the line to the furnace is the female connector with the sliding part). The connectors just push straight together
7. Hook up the power supply cable. The large gray/blue connectors slide together, then twist slightly so that the sliding part closes.
 - Connect the cables with the two triangles aligned.
 - When you push the cables together, the locking mechanism will slide back.

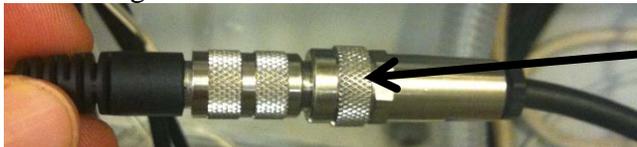
- Then twist the connectors slightly. The locking mechanism will slide forward when the connectors are properly aligned.



Connect the cables with these two triangles line up when connecting the power supply cable or disconnecting it. Gently twist the connectors, as shown, to lock the power supply cables together.

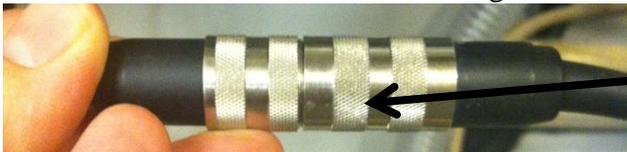


8. Hook up the furnace sensor—the small silver connectors. They connect together, then rotate the locking mechanism to screw the connectors together.



This part rotates to screw the connectors together.

9. Hook up the furnace motor driver if you are going to need to adjust the furnace height. These are the large silver connectors. They connect together, then rotate the locking mechanism to screw the connectors together.



This part rotates to screw the connectors together.

10. Hook up the gas in and gas out lines (if needed). The gas inlet is labeled best on the furnace and the needle valve. To connect them, you need to slide back the grooved ring on the silver female connector, and then connect it to the Swagelok needle valve.

11. Hook up the vacuum (if needed). Remove the blocking cap, then connect the vacuum assembly.

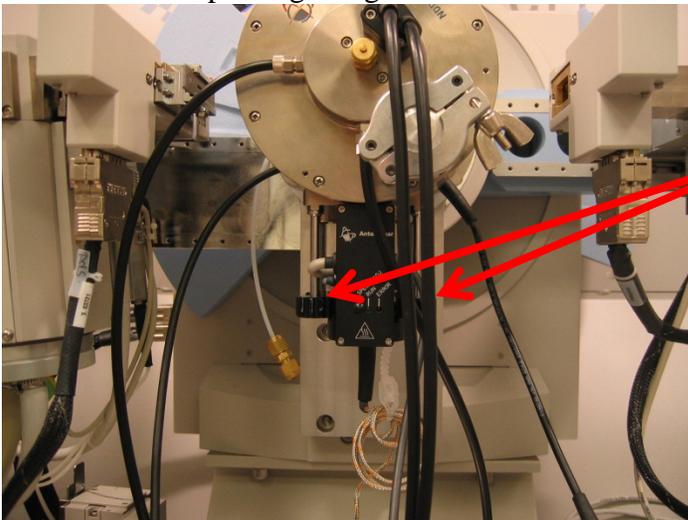


12. Put the sample in the ceramic cup and lock the ceramic cup onto the sample holder using the ridiculously fragile ceramic fixing ring.



Interlock Post

13. Put the sample holder in the furnace. The interlock post will be facing away from you (towards the instrument goniometer). The guide rods on the furnace will slide through the holes in the sample stage. Tighten the four black thumbscrews.



Black Thumbscrews

14. Connect the orange line to the thermocouple from the sample stage. These just slide together—do not twist these connectors (they could be damaged)



15. Configure the instrument optics as usual, then close the enclosure doors.
16. On the temperature controller (bottom front of the instrument), press the heater On/off button twice (turning the heater off and then back on). This should clear any alarms on the Eurotherm controller.



17. Start the vacuum located behind the instrument (if needed).
18. Follow the other instructions in the SOP for collecting data using the furnace.

Taking the furnace off

1. Turn the vacuum off (if it was on)
2. Open the gas release valve on the vacuum line (by the furnace) to let air into the furnace
3. Disconnect the thermocouple line—just pull the orange wire and the thermocouple wire straight apart.
4. Remove the sample
 - a. Loosen the four thumbscrews holding the sample holder in place.
 - b. If the thumbscrews are hard to loosen, you might need to use the blue slip jaws (on the data collection computer)
 - c. Gently let the sample holder slide down, off of the guide rods, and unload it
5. Remove the vacuum line from the furnace. Put the blocking cap back in place.
6. Disconnect the gas lines: slide the grooved sliding ring on the silver part back, and then pull the silver connector apart from the needle valve
7. Disconnect the furnace sensor—unscrew the small silver connectors and pull them apart
8. Disconnect the furnace motor drives—unscrew the large silver connectors and pull them apart

9. Disconnect the water lines. First disconnect the supply, then the return line. To disconnect, slide back the ring on the female connector, then pull the connectors apart.
10. Disconnect any other lines.
11. Loosen the brackets holding the furnace in place.
12. Take the furnace off and put it in the cabinet.
13. Take the four hex screws out,
14. Put the other sample stage on.
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