

# Cooling Stage Operation procedure

## 1. Cooling stage installation

1. Vent the specimen chamber and open the door.
2. Remove any sample holder from the stage rotation head.
3. Place the mounting adapter on the stage rotation head and fix it through the center using the mounting screw (finger tight).
4. Slacken off the mount locking screw on the stage body side using a metric 0.5 mm hex wrench, then place the stage on and over the mounting screw.
5. Tighten the mount locking screw. The water hoses and connectors go towards the rear of the chamber.
6. Connect the cable connectors to the corresponding feed-through plate connectors; plug the water flow controller power cable; also plug the water hoses.
7. Turn on the Water chiller. Water does not flow at this point, since the valves in the Flow controller are closed when it is off.
8. Turn on power to the Flow controller. An alarm sounds, indicating that there is no flow through the box.
9. Press and hold the Start Flow button down until all the air is out of the water lines (this can be seen as water flows through them). Thereafter release the button.
10. Make sure that the Flow OK light on the Flow controller is on. This indicates that water flow is working; i.e. that there are no leaks in the system. The light remains illuminated until there is a leak, or if the Stop Flow button is pressed, which could be done at any time to close the valves and shut off the water flow, for whatever reason, which is indicated by an alarm sound. The Start Flow button must be pressed and held again to re-establish flow through the system.

### ***Caution!***

***Never pump the specimen chamber without checking for water leaks first.***

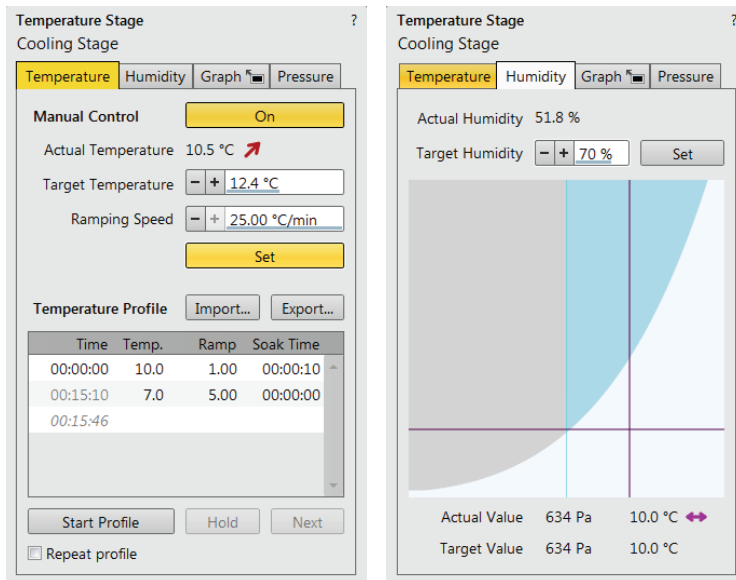


*Note: when exchange sample, move the stage by 10 mm (in the X- or Y-axis direction) from the center position before pumping the chamber to protect the sample to be blown away during venting the chamber.*

## 2. Close chamber and pump the chamber to low vacuum or ESEM mode



Click on temperature page , on temperature stage module. Temperature and humidity can be set and monitored on the temperature tab.



Acquire images according to FSEM operation procedure.

### **Caution!**

***Be aware of the limitation! The presence of water hoses and cables inside the chamber causes a risk of Cooling stage, and further the vacuum system damage (when hoses were pulled out of the stage and water is spilled into the vacuum port on the chamber bottom). Once the cooling stage assembly is installed, it should be moved only by  $\pm 10$  mm in X- / Y-axis direction from the home position. Rotation and Tilting are locked automatically. Tilt can be released by a user in the Stage module / Coordinates tab / Tilt check box***

### **Caution!**

***If the cooling stage is used without a heat sink connection, severe damage may result to the thermoelectric module. Do not operate the CS for longer than 15 minutes without cooling water, otherwise damage occurs to the device***

### **Caution!**

***When using shorter working distances, water from the sample can splash onto the GSED. To avoid this, start with a longer working distance until the sample has equilibrated, then move to a shorter working distance to optimize the image.***

## **3. Cooling stage operation termination**

1. Turn off the beam
2. Push stop flow button on the water flow controller; switch off the water flow controller
2. Shut down the Water chiller!
3. vent the chamber
4. Disconnect cables and water hoses

- 5 Once the stage has been drained and both water lines have been removed, blot out any remaining water from the connectors using a cotton swab or paper towel.
6. Install water line plugs into water fittings on the inside of the Chamber feed-through plate.
7. Pumping the chamber to Low Vacuum / ESEM mode first, then to high vacuum