

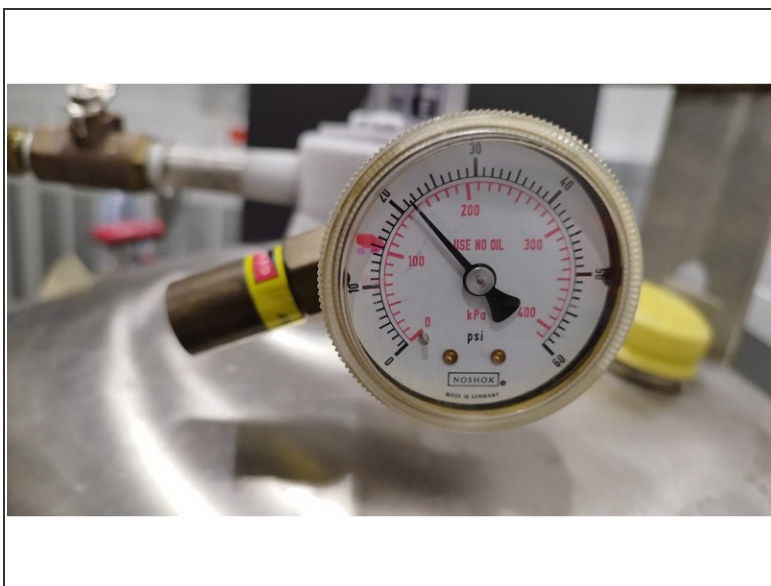
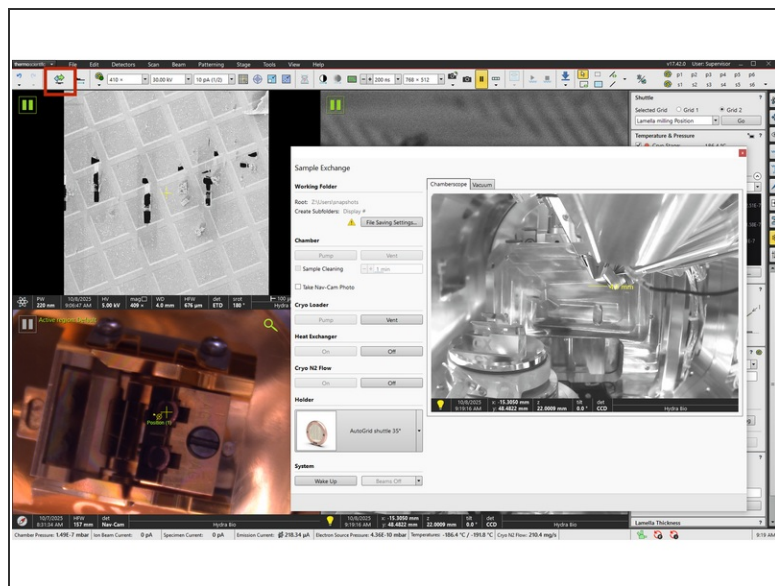
FIB-SEM - TFS HydraBio: Automated Nitrogen Filling System

Instructions on how to operate the automated nitrogen filling system. Start up, shut down, manual refill and tank exchange.

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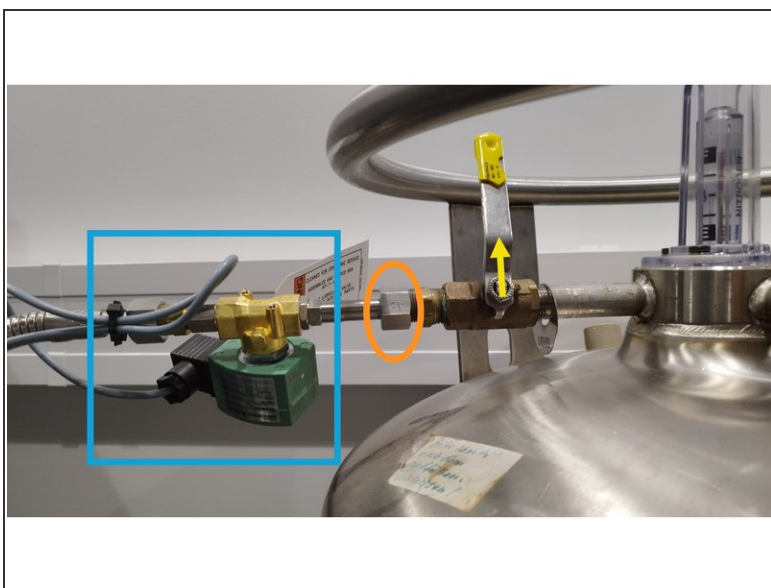


Step 1 — Prerequisites



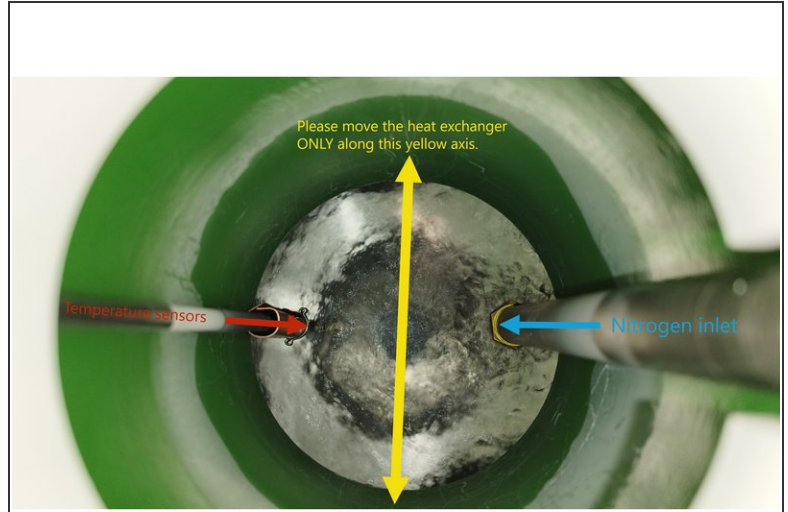
- pressurized nitrogen tank with liquid nitrogen (≥ 0.5 bar pressure)
- flushed nitrogen lines in the heat exchanger (20 mins, 200-250 mg/s nitrogen gas flow)

Step 2 — Start up I.



- Attach solenoid valve (blue rectangle) to the nitrogen tank using the orange labelled screw.
- Open the valve of the pressurized LN2 tank.

Step 3 — Start up II.



- Place heat exchanger carefully in the nitrogen dewar.
- ⚠ Try not to touch the temperature sensors on the rod or the nitrogen inlet.
- ⚠ If you need to adjust the heat exchanger in the dewar, please move it **ONLY** along the yellow marked axis. Avoid touching the sensors (red) or the nitrogen inlet (blue).
- Switch on the electricity on the extension cord on the floor.

Step 4 — Start up III.



- After 30 mins the stage reaches its final temperature.

- The time and temperature thresholds are stored, but before your session, please check, if the values are correct:

★ **TIME = 7 mins, MIN-sensor threshold = -193°C, MAX-sensor threshold = -192°C**

- ① The temperature sensors are set to have **±1°C buffer**, for potential temperature fluctuations. The MIN-sensor will trigger filling at -192°C and the MAX-sensor will close the valve at -193°C, with the above written thresholds.

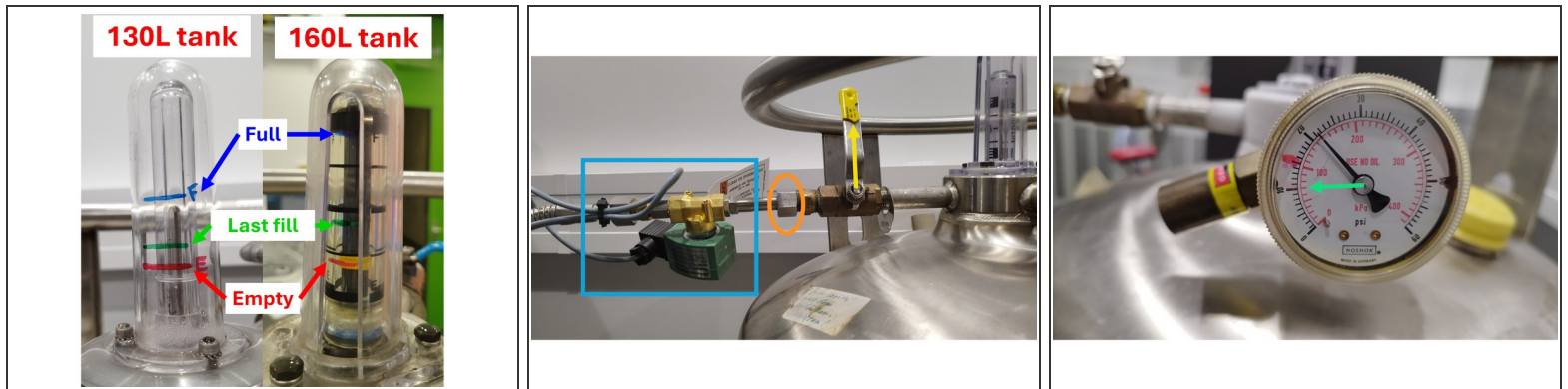
- ① **When will the valve close?** *The solenoid valve closes if either the MAX-sensor's temperature threshold is reached or if the timer runs out (7 mins).*

Step 5 — Shutdown and cryo-cycle



- Switch off the electricity.
- Close manual valve on the pressurized nitrogen tank.
- Carefully remove heat exchanger from the nitrogen dewar.
- Close dewar with the cap.

Step 6 — Exchange nitrogen tank



- Close the manual valve on the tank.
- Unscrew only the closest nut to the manual valve.
- ⚠ Please DO NOT screw the other nuts to avoid damaging the solenoid valve
- Gently place the solenoid valve on the floor.
- Release pressure from the tank, and exchange empty tank for the full one at UZH-Warenannahme.
- ⓘ Note: the tanks has one more fill left in it, when the level reaches the marked green line.

Step 7 — Top-up nitrogen dewar with the ANFS



- ① Before exchanging and refilling the pressurized nitrogen tank, it is recommended to completely fill the nitrogen dewar. A full dewar lasts ca. 20 hours.
- Press the 'Valve test' button.
- After hearing the warning sound the controller will open the solenoid valve. The LN2 flow will automatically stop once the temperature within the dewar is in the preset range.