

FEI Nova 200 Dual Beam system maintenance

1 General

This document describes regular maintenance of the FEI Nova 200 Dual Beam system at Albanova Nanofabrication Facility. All work is done by service personnel with adequate training. Special instructions are available for cases where any risk is involved, e.g. handling of harmful gases/chemicals.

2 Safety

General safety rules for work in clean-room facilities apply. All systems documentation must be followed.

3 Preventive maintenance

3.1 Scroll pump (backing/roughing pump)

- 3.1.1 The gaskets inside the dry scroll pump needs replacement once a year.
- 3.1.2 Spare gaskets are ordered from FEI, "KIT TIP SEALS, XDS10 consume", part no. 4035 272 15261.
- 3.1.3 Vent main chamber by clicking "Vent" button in user interface.
- 3.1.4 Wait for fully vented chamber, about three minutes. Check for atmosphere in main chamber by gently pulling on the door handle.
- 3.1.5 Disconnect mains power from scroll pump (XDS10), in service area.
- 3.1.6 Disconnect all hoses, pump inlet, pump outlet, N2 purging.
- 3.1.7 Lift down pump from vibration damping platform.
- 3.1.8 Place the pump vertically on the floor, with the pump house facing upwards.
- 3.1.9 Remove four screws to open the pump house.
- 3.1.10 Carefully lift off the top half of the pump house, carefully unplug the electrical connector near the base plate of the pump.
- 3.1.11 Remove the gaskets from the spiral tracks.
- 3.1.12 Clean spiral tracks where gasket has been with dry cotton swabs. Clean wide spiral tracks with dry cotton swabs and dry clean room tissue. Use vacuum cleaner also.
- 3.1.13 Repeat the same cleaning procedure for the other half of the pump house.
- 3.1.14 Insert the new gaskets, start from the center and work outwards. Care must be taken not to bend gasket sharply or make indents in it.
- 3.1.15 Replace big outer O-ring with new one.



- 3.1.16 Put back the top half of the pumphouse, inserting the electrical connector in the process. See to it that the outer O-ring is in correct position.
- 3.1.17 Secure the pump house with four screws.
- 3.1.18 Lift up pump on vibration damping platform.
- 3.1.19 Reconnect all hoses.
- 3.1.20 Reconnect the mains plug.
- 3.1.21 Pump down the chamber
- 3.1.22 Check that pump down is complete, system icon in lower right corner "all green".



3.2 Water filter in cooling water circuit

There is a fine filter in the closed loop cooling water circuit. It needs cleaning once a year.

- 3.2.1 Close the cooling water circuit for the FEI system **only**. Please note that there are three other cooling circuits, leave them open! There are two valves for each circuit, inlet and outlet. Close both valves for the FEI circuit.
- 3.2.2 There will be a warning in the software about water flow, but it should be possible to stop the cooling water for about half hour without damage or interlocks switching off.
- 3.2.3 Unscrew the clear plastic lower half of the water filter housing from the blue top part attached to the wall. Use the special plastic tool hanging in the wire next to it.
- 3.2.4 Lift out the filter unit, note which end is up and which is down.
- 3.2.5 Clean the filter using a soft brush under running water.
- 3.2.6 Clean the clear plastic housing.
- 3.2.7 Put back the filter in the housing, same orientation as originally.
- 3.2.8 Fill the housing with water to minimise air bubbles in the cooling circuit.
- 3.2.9 Mount the filter housing with filter in the top holder (blue).
- 3.2.10 Tighten the filter housing using the special tool. Put the tool back attached with the wire.
- 3.2.11 Turn on the water by opening both inlet and outlet valves.
- 3.2.12 If the pressure is below 2 bar, use the filling hose and the water valve on the wall to fill up the closed water loop to 2 bar pressure.
- 3.2.13 Check that there is no warning about cooling water flow in the user interface, or check for a message that the cooling water flow has been restored.

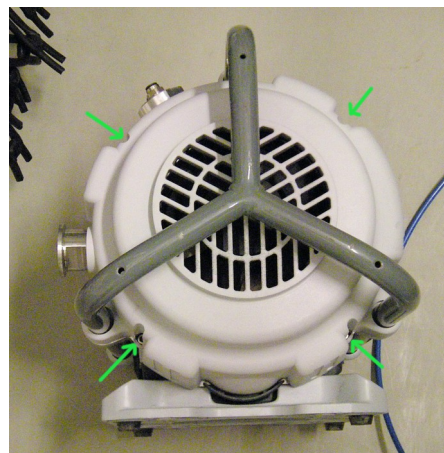
4 Tool start-up routines after power failure

- 4.1 Check that compressed air is available. Central Albanova compressors do not always start automatically after a major power failure.
- 4.2 There is a separate compressor for the 9 bar compressed air to the vibration damping platform (under the floor), this must also be checked.
- 4.3 The pump for the main chamber does not start automatically after a power fail. The main chamber is vented. Start a pump down.
- 4.4 If the power fail has been short the ion getter pumps for the electron and ion columns should be possible to start without trouble. This is done in the "Adjustments" tab, upper right corner of the user interface.
- 4.5 If the power fail has been longer, several hours, there might be problems starting the ion getter pumps. Switch to "customerservice" which gives more functions. Please note that you have to log out of Windows also to switch user id.
- 4.6 The ion getter pumps may have to be restarted several times before they reach a vacuum level for stable operation.

Pump service illustrations



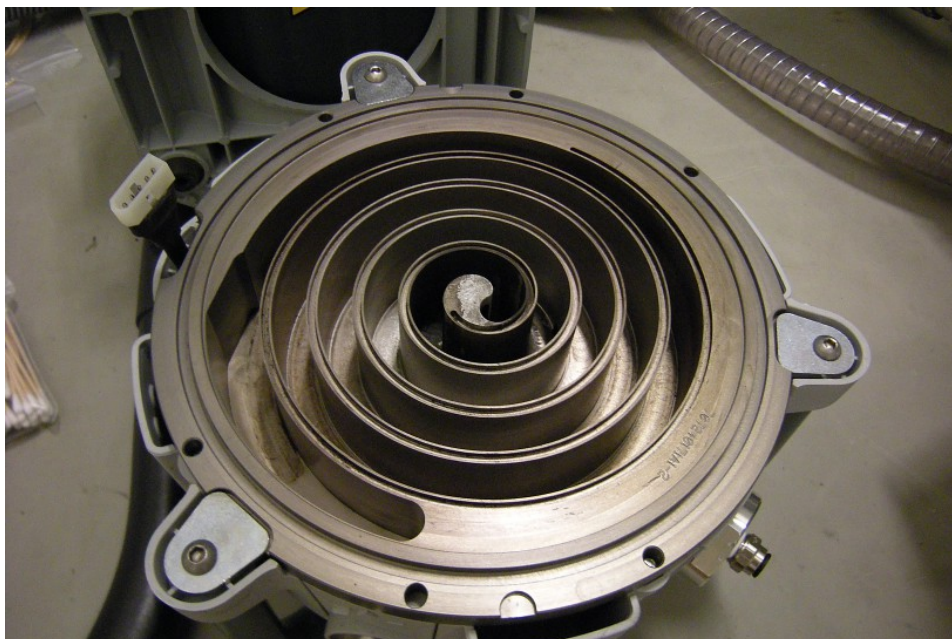
Backing pump on vibration free platform. Unmount inlet and outlet vacuum tubes, N₂ purge and mains voltage connector (green arrows).



Pump placed vertically on the floor. Note four screws to unmount the front of the pump chamber. Take care to loosen the electrical connector inside, at the bottom of the cover.



The scroll pump opened, the electrical connector visible above the base of the pump, at the center right under the spiral. The yellowish, old gasket is still in the spiral track.



The top half of the pump house, with the gasket removed. Electrical connector visible at the left.

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===== End of FEI Nova 200 maintenance instruction. =====
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