INFINITY COOLING SYSTEM MAINTENANCE

Recommended regular maintenance: Get original spare parts and specialist support from Scienta Omicron

At Scienta Omicron, we support the research community in maximizing productivity. Caring for the instrument's sanity at customer's laboratories is part of our offering. With virtually unlimited cryogenic operating time, our INFINITY SPM is one of the leading solutions for high productivity SPMs. Nevertheless, the INFINITY's cooling system requires special care and maintenance at larger intervals, to minimize wear and avoid unplanned downtime of the system.

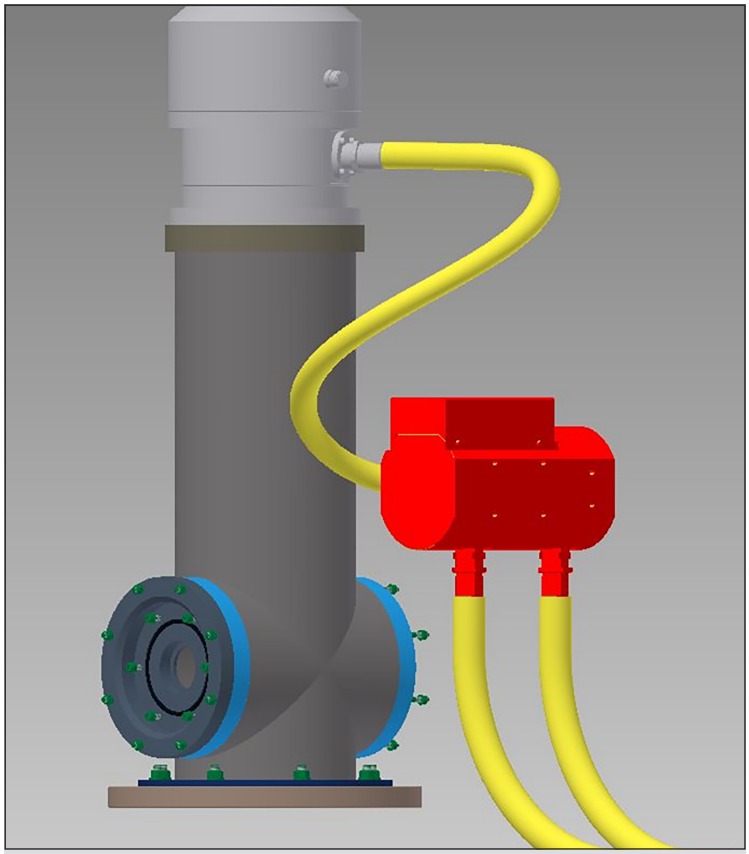
Compressor adsorbers, filters, and cooler valve units degrade over time. Accumulating contaminants or abrased particles may cause damage to the delicate internal components of the cooler. To avoid this, it is recommended to exchange these parts after 20,000 hours of operation.

The INFINITY SPM's excellent low noise performance poses extreme requirements for noise reduction in the SPM environment. Both the compressor and pulse tube cooler are diligently enclosed in vibration and noise-cancelling cabinets. We thus recommend that only trained engineers of Scienta Omicron execute all maintenance procedures as required.

The service package comprises a system performance snapshot of the instrument before the actual maintenance and is typically combined with recharging helium into the system [1].

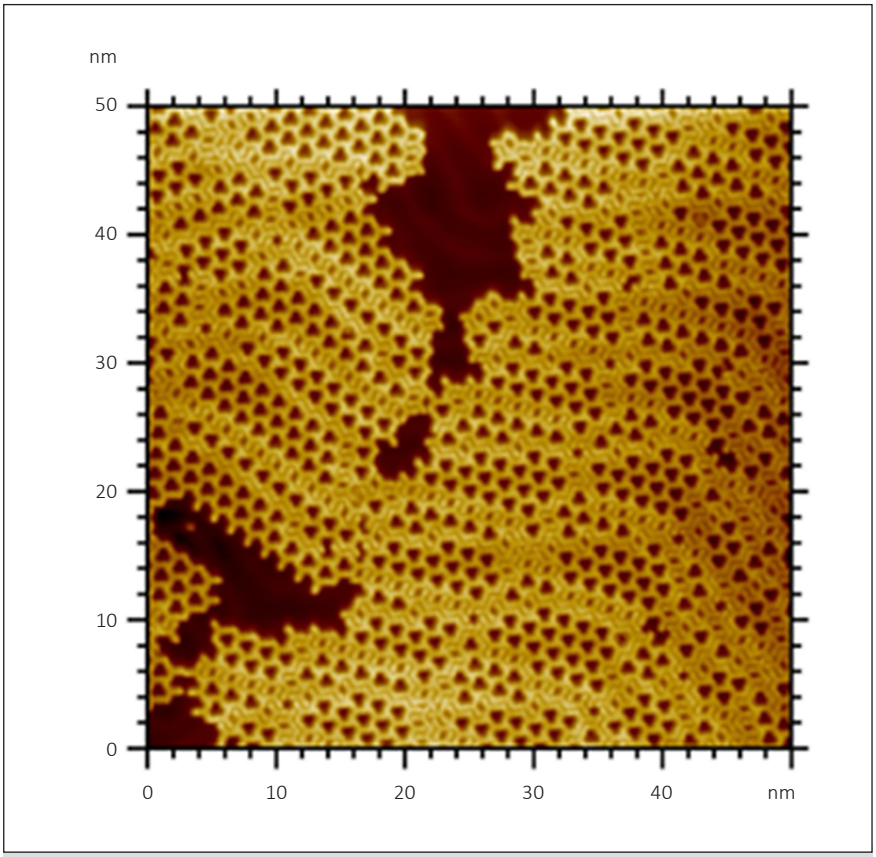
The Maintenance package includes a one-week visit by one of our trained service engineers, as well as shipment and return of the replacement parts.

[1] The system snapshot requires a well prepared, clean metal or semiconductor surface and a good STM tip, mounted and approached, and the instrument to be at base temperature for 24 hours prior to visit.



Schematic of closed cycle cooler, valve unit (red)

Maintenance Schedule	
Day 1	System snapshot: STM stability and vibration level
Day 2	Warm-up to room temperature and cabinet preparation
Day 3	Replacement of parts, helium recharge, and cabinet reassembly
Day 4	Cool-down to base temperature
Day 5	Final system snapshot



INFINITY STM

Data acquired at 10 K, (50x50 nm^2, Vs = -1.37 V, I_t = 400 pA) showing the initial porous supramolecular networks obtained for 0.8 monolayers of 1,3,5-tris (4'-bromophenyl) benzene (TBB) molecule onto an Au(111) surface.

F. Palmino, et al., On-Surface Synthesis Guided by Supramolecular Orientation on a Au(111) Surface, https://doi.org/10.1021/acs.jpcc.4c04497

Prerequisites

Customers need to provide high-purity helium (He 5.0, 50 MPa). Standard charging fittings require a helium bottle connection according to DIN 477, part 1, Nr. 6 (He up to 200 bar). For optional pump and flush procedures, a pump and connecting hoses will be needed – ideally a dry scroll pump. An existing system roughing pump can be used as well.

The system should be in normal operation for the sanity check. For maintenance, the compressor tower's front and right-hand side panels need to be removed.

Depending on the location, a pallet truck may be needed to allow for suitable access to the equipment.