

Hazardous Energy Control Procedures for Lockout/Tagout/Verification for Tool

Purpose

The purpose of this document is to detail the procedures used to properly, and safely, Lock/Tag/Verify all Tools

Scope

All authorized Lockout/Tagout/Verification capable associates will use this procedure before attempting any maintenance, repairs, or troubleshooting on all systems at Birck Nanotechnology Center.

Responsibilities

The authorized employee that is assigned to complete the maintenance, repair, or troubleshooting of the TOOL is responsible for following these instructions. Deviations to the instruction are not authorized until properly investigated to determine the need and safety consequences of the deviation. The employee is also responsible to detail errors or problems in the instruction and to deliver this information to the Birck Safety or Process Manager for investigation.

Notify all affected employees that a lockout or tagout system is going to be utilized and the reason for its application. The authorized employee shall know the type and magnitude of energy that the machine or equipment utilizes and shall understand the associated hazards

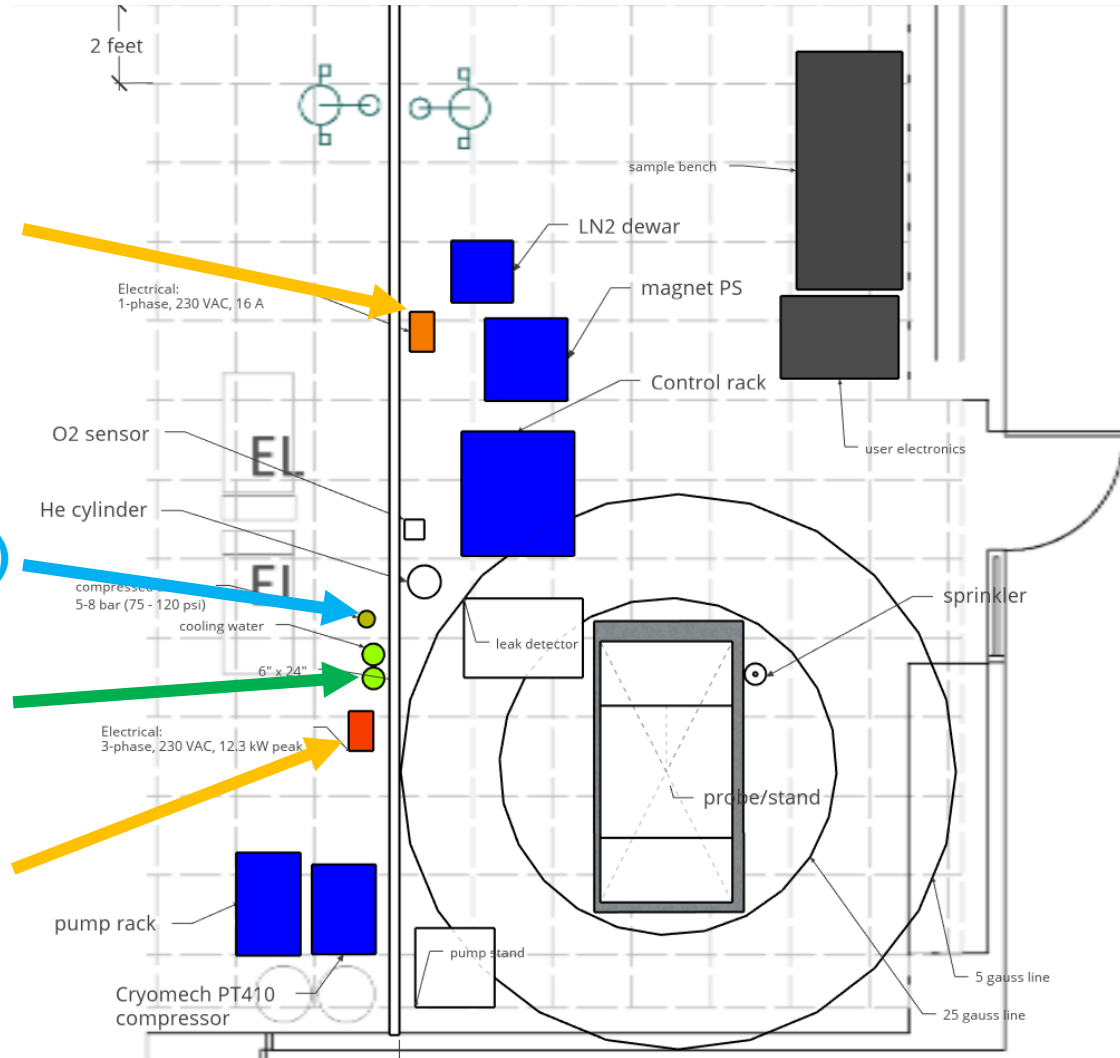
lockout locations: F Bay FG chase

Point 1 (Electrical)

Point 5 (Pneumatic)

Point 3 & 4 (Water)

Point 2 (Electrical)



Shutdown and Lockout Sequence: Oxford Triton Dilution Refrigerator, F Bay

The following lockout sequence must be followed in this order before beginning maintenance:

1. Notify corresponding BNC staff and all affected users of system
2. Shutdown Sequence done by Trained users only, unless otherwise noted:
 1. Warm up Dilution Refrigerator
 1. procedure outline in Oxford Triton manual
 2. ensure that Cryomech compressor and coldhead are stopped before proceeding
 2. **F Bay** - Shut down all power breakers at electronics rack and magnet power supplies
 1. see **flags 1 and 2**
 3. **F Bay** – unplug these equipment
 1. see **flags 3 and 4**
 4. **FG Chase** – shut down power breaker at Cryomech compressor
 1. see **flag 5**
 5. **FG Chase** - unplug compressor and shut off air
 1. see **flags 6 and 9**
 6. BNC Staff Only: FG Chase - Close the water valves at **flags 7 and 8**.
 1. Make sure the bypass valve is only allowing 0.5-1 GPM of water flow.
 7. Apply lockout tags as outlined in table.

Equipment Name: Oxford Triton Dilution Refrigerator

Location: CR Bay F / FG

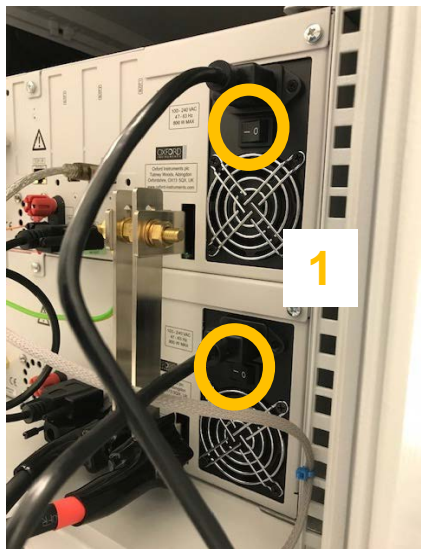
- Hazardous Energy Sources Present:**

Energy source / type	Use / Purpose	Lockout ID Point	Comments	Flag
Electrical	110 V 1-phase to magnet power supplies	Plug in F Bay		3
Electrical	220 V 1-phase to electronics rack	Plug in F Bay		4
Electrical	220 V 3-phase to Cryomech compressor	Plug in FG		6
Cooling water	Cryomech compressor	Valve in FG chase		7, 8
cooling water	turbopump in pump rack	Valve in FG chase		7, 8
compressed air	Oxford electronics rack	Valve in FG chase		9

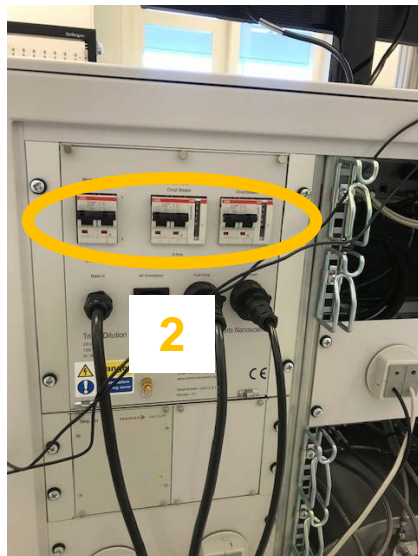
- Required Safety Equipment:**

Item	Quantity
Danger Tag (s)	6

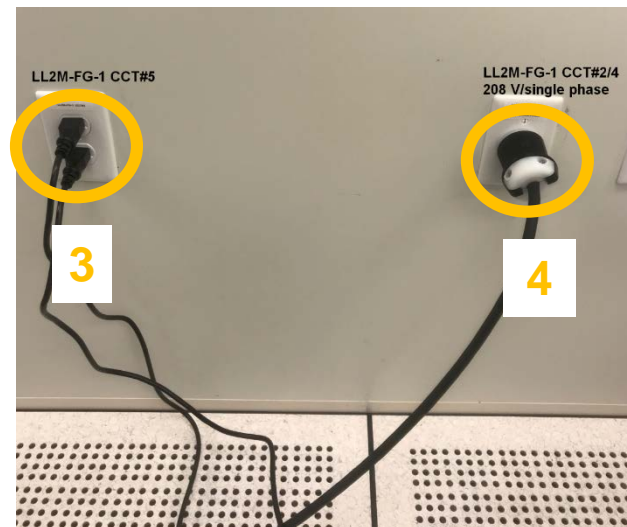
Lockout locations: F Bay



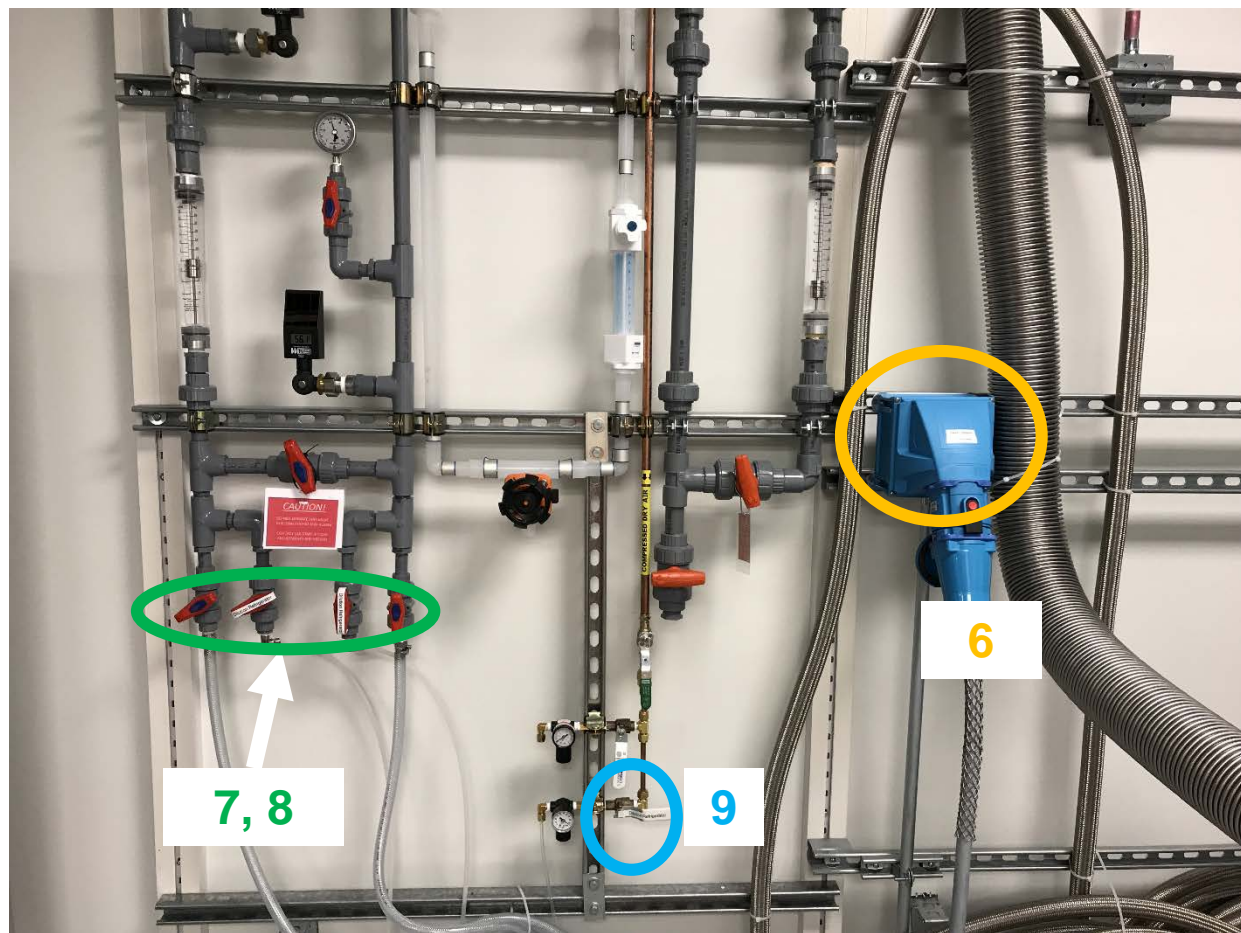
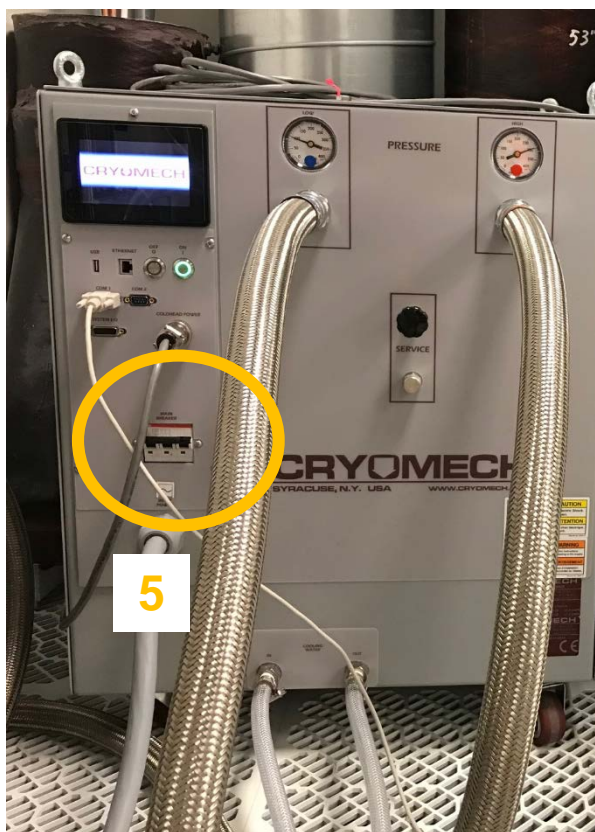
back of magnet
power supplies



back of electronics rack



Lockout Locations: FG Chase



Re-Energizing Tool: Oxford Triton Dilution Refrigerator

Only the person who installed the Lock-Out device is authorized to remove it.

1. Authorized person is to survey tool and surrounding area for people, tools and equipment that may be in jeopardy upon machine tool start-up.
2. Notify all affected personal of the machine tool start-up.
3. Remove lockout tags.
4. Follow lockout sequence (given on slide #3) in reverse to restore utilities to equipment.

Note: During the course of machine tool service it may become necessary to re-energize the machine tool for testing and/or troubleshooting purposes. If the machine tool is again taken off-line after completion of service testing and/or troubleshooting, all appropriate energy isolation steps are to be implemented.