

Frozen Spin Target Manual

Document 8: How to Warm the Target to Room Temperature

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This document describes the preferred method to warm the dilution refrigerator to room temperature.

Risk Assessment

Minor risk of cryogenic burn due to handling of LN₂.

Hazard Control

Cryogenic gloves and a full face shield must be worn whenever handling LN₂. Performance of this procedure in accordance with this document reduces Risk Code to 1.

A. Overview

This document assumes that the refrigerator has been circulating either pure 4He or the 3He/4He mash, but said fluids have been entirely removed from the system following the procedures described in the appropriate document.

B. Preparation of the 3He system (do this first)

1. Confirm that all valves on the 3He gas panel are CLOSED except MV8361, MV8362A (or B), MV8363A (or B) and MV8364. Note that this is the configuration for standard circulation.
2. Confirm that valve MV8360V between the L70s exhaust line and check valve CV8360V is OPEN.
3. Confirm that the valves located on the 3He and 4He storage tanks (MV8366B/C and MV8367B) are CLOSED;
4. OPEN all six 3He gate valves (SV8260/70, SV8261/71 and SV8262/72) and turn OFF the 3He pumps (MP8261/71, MP8263/73, and MP8365/75);
5. OPEN both the 3He run and bypass valves 3 turns each;
6. Optional: bleed a few torr of helium into the fridge to speed its warming:
 - a. set the helium regulator for about 5 psig;
 - b. CLOSE MV8361;
 - c. OPEN MV8372 and MV8371 and monitor the still pressure PI8360 until the pressure reads a few torr;
 - d. CLOSE MV8372 and MV8371;
 - e. OPEN MV8361;
7. Turn ON Auxiliary pump MP8374 and OPEN its butterfly valve MV8374;
8. OPEN MV8374A (or B) to begin pumping on the cold LN₂ trap;

9. Wearing Cryogenic gloves and a face shield, remove the LN2 trap from the dewar and place it in its holder attached to the back of the 3He gas panel;
10. OPEN MV8371 and CLOSE MV8364 to stop circulating;

C. Preparation of the 4He System

1. OPEN all valves on the blue, 4He gas panel except MV8342 (which is used to bleed helium into the 4He system);
2. CLOSE MV8346R and OPEN MV8346V. This will exhaust the 4He system to the vent header rather than the ESR recovery;
3. Using the main EPICS gui **FROST.adl** close EV8215 the JT valve between the LHe buffer dewar and the LHe transfer line into the FROST cryostat;
4. Using **FROST.adl**, set the PID for 4He run valve EV8339 into manual mode (its position is unimportant);
5. Turn OFF the 1K pot pumps MP8350 and MP8351;
6. Turn OFF the two diaphragm pumps MP 8340A/B;

Monitor all temperature sensors to determine if the system is at room temperature.