

Cryostream 700 Quick start Guide

APS SAFETY NOTICE

LIQUID-NITROGEN SAFETY: MANUAL FILLING OF DEWARs

Common handling of liquid nitrogen (LN2) involves transferring the material from one storage container to another. This activity can be hazardous if proper precautions are not taken. These hazards can include: frostbite, oxygen-deficient environment, pressure build up, physical change of material properties, and oxygen condensation from the atmosphere. All of these can be mitigated by personal protective equipment (PPE), engineered safety features, and administrative controls.

When handling LN2 (or any other cryogen) always:

1. Inspect all PPE and cryogenic equipment prior to use.
2. Wear safety glasses and a face shield.
3. Wear waterproof, loose-fitting, cryogenic gloves.
4. Wear cuffless pants and shoes made of nonabsorbent material.
5. Wear a long-sleeved shirt and a lab coat or cryogenic apron. If a lab coat or cryogenic apron is not worn, shirts are to be worn outside of the pants.
6. Verify that the dewar is constructed to withstand cryogenic temperatures
7. Verify that the dewar is dry (water expands upon contact with LN2 and can crack the dewar)
8. Use open dewar flasks only in well-ventilated areas.
9. Stand clear of any LN2 boil off, vapors, or splashes
10. Use tongs or tweezers to immerse or withdraw objects from the LN2
11. To prevent pressure-causing condensation obstruction, use a cork with a groove cut into the side or a loose fitting plug.
12. Use safe lifting techniques when handling loads.

Recommended Training: ESH 145 Cryogenic Safety

References: ESH Manual Chapter 4.10 Cryogenic Liquid Safety



He's dressed for success with LN2!

Safety First

When Filling Dewar's with Liquid Nitrogen proper personal protection equipment must be worn.

If you are unfamiliar with this piece of equipment please ask Beam line personal or call the Detector Pool (ext. 2-9490) for assistance.

Personal Protection Equipment:

- Lab coat or long sleeved shirt.

- Safety Glasses with side shields or Goggles.

- Face shield with Safety glasses worn at the same time.

- Loose fitting insulated gloves.

- Long pants (no cuffs) over shoe tops.



Overview

1. Verify Cryostream Dewar level is 80%.
2. Verify Cryostream Controller connections are properly made to coldhead and mechanical pump.
3. Mount Cryostream coldhead to desired sample position.

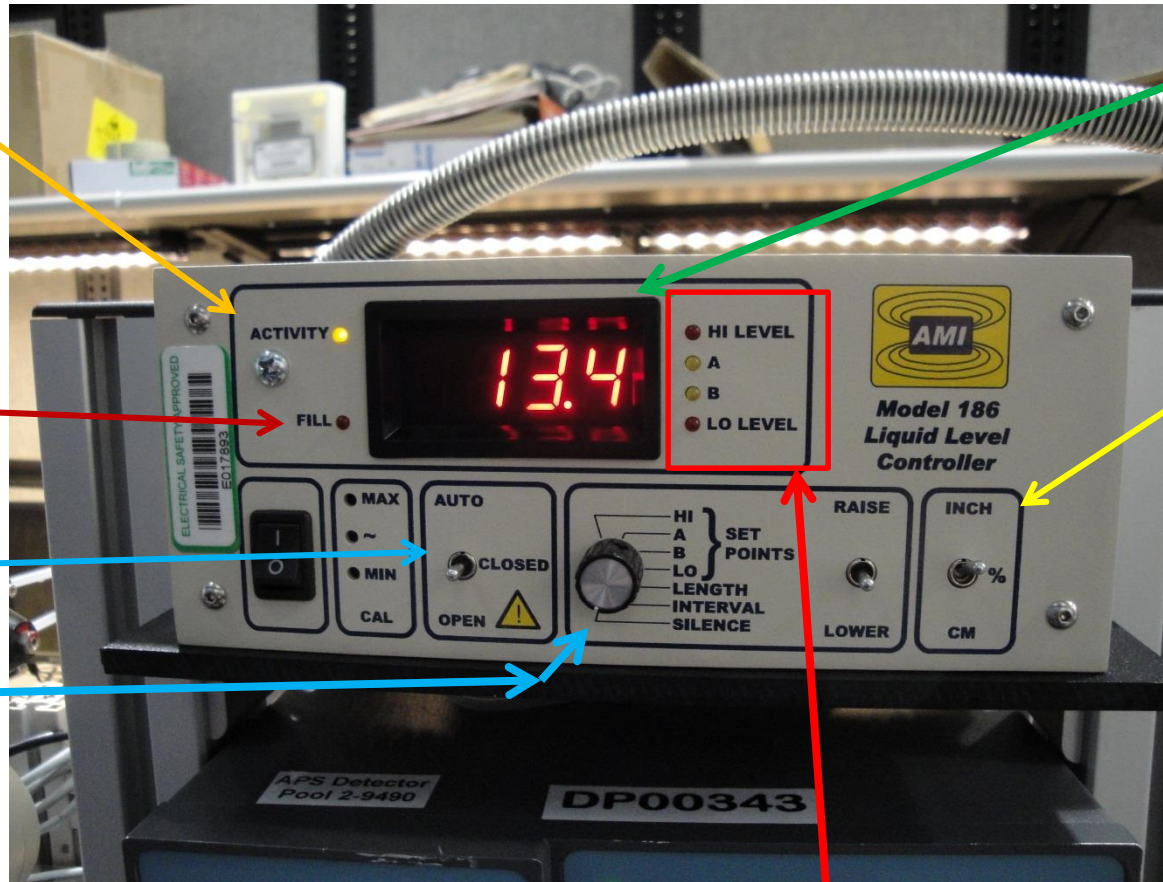
AMI Liquid Level Controller

Activity LED will continually flash indicating cpu is functioning properly.

Fill LED indicates Dewar is being filled.

Liquid Nitrogen fill control

Control mode rotary switch



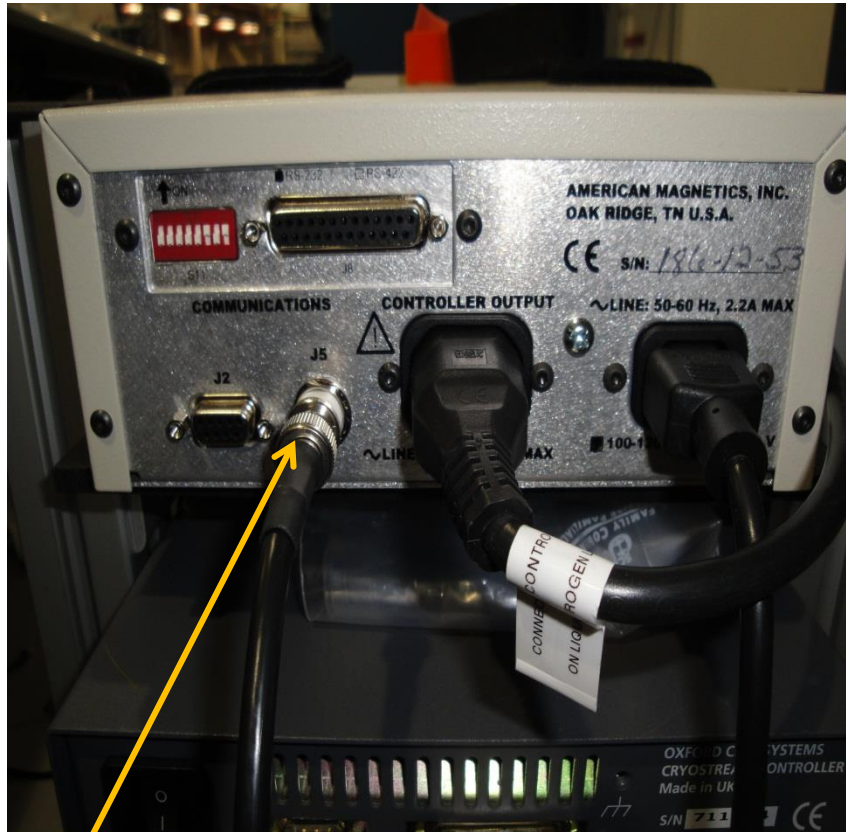
Indicates level of Liquid nitrogen.

Level units mode toggle switch.

“Hi Level” LED and audible alarm is energized when liquid nitrogen level has exceeded the “A LED” set point. “A LED” is a predetermined high level set point. When nitrogen reaches this set point the controller will deactivate the nitrogen fill valve. “B LED” set point, when nitrogen level lowers to this level the fill valve is activated to refill Cryostream Dewar. “Lo Level” LED and audible alarm are activated when nitrogen level is lower than “B LED” set point. To silence audible alarm turn Control mode rotary switch to silence, to silence the audible alarm.

Verify all connections are in place before filling.

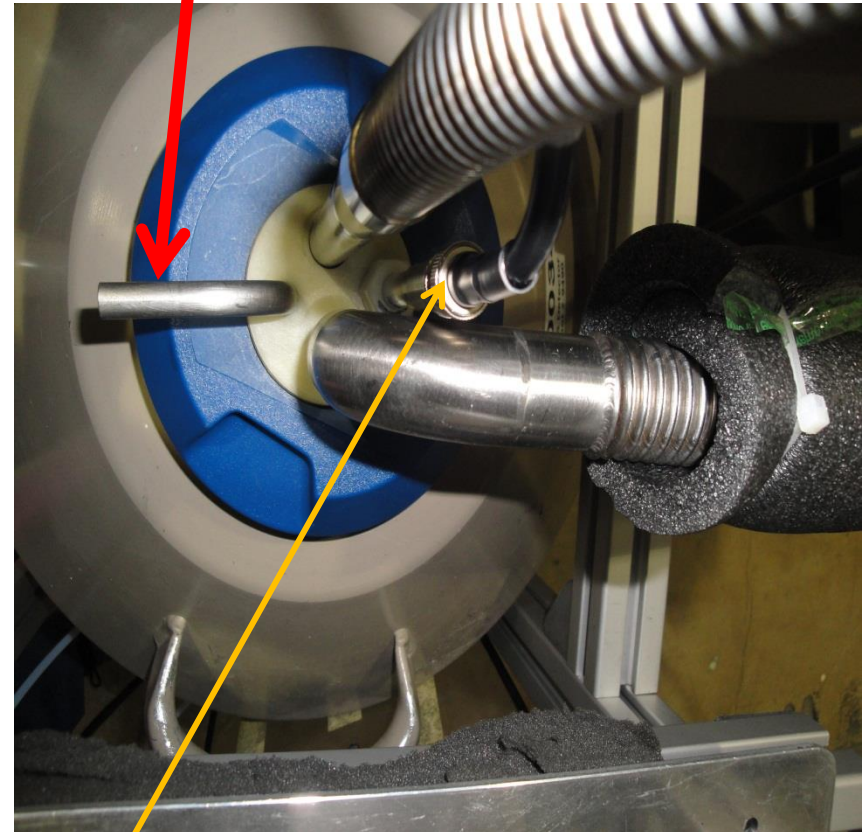
AMI Liquid Level Controller Rear Panel.



Level Sensor Cable to Dewar.

Top Side of Dewar.

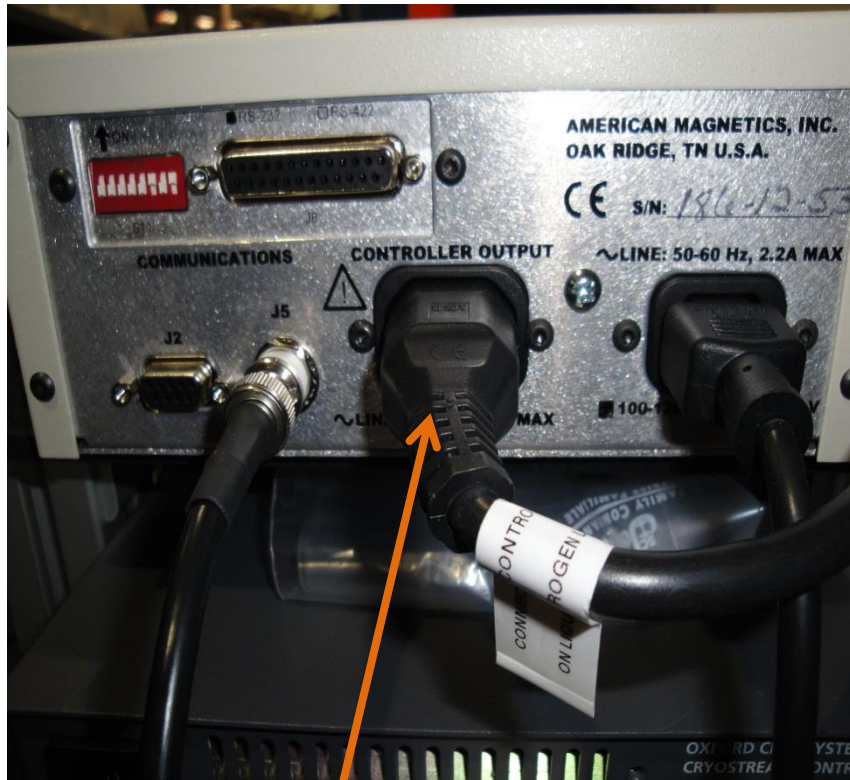
Vent Do Not Block!!



Level Sensor Cable from Liquid Level Controller to Dewar.

Verify all connections are in place before filling

AMI Liquid Level Controller Rear Panel



Cable to Liquid Nitrogen Fill line Solenoid Valve

Cryostream Connected to Liquid Nitrogen Supply Dewar



Liquid Nitrogen Fill Line

Fill Control

AUTO. (Automatic FILL Operation)

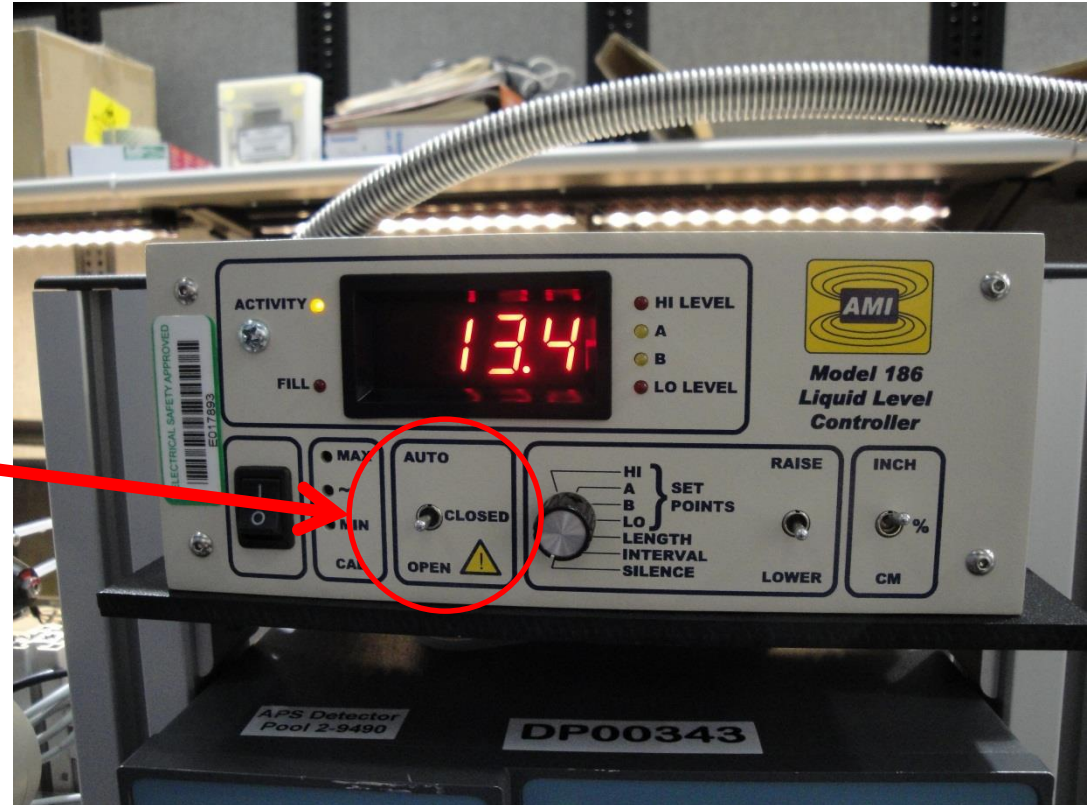
To Fill Dewar Automatically, position the toggle switch into the AUTO position. If the level is below set point B, LED indicator is on, fill will start (Fill indicator comes on). The process will stop when Set point A is satisfied / LED indicator is on.

CLOSED.

With Instrument power on and toggle switch in the closed position the controller severs as level indicator and closes the fill valve / stops the Filling process.

OPEN. (Manual FILL Operation)

When the toggle switch is in the **OPEN** position this will energize the solenoid fill valve, turns on Fill LED indicator, and allows the Cryostream Dewar to fill with liquid nitrogen. To Stop the Fill process return toggle to the **CLOSED** position. **Note: Fill Operation will not Stop Automatically in the OPEN position, Toggle switch must be returned to Closed position.**



Cryostream Controller

K/C/F Temperature units used by Cryostream

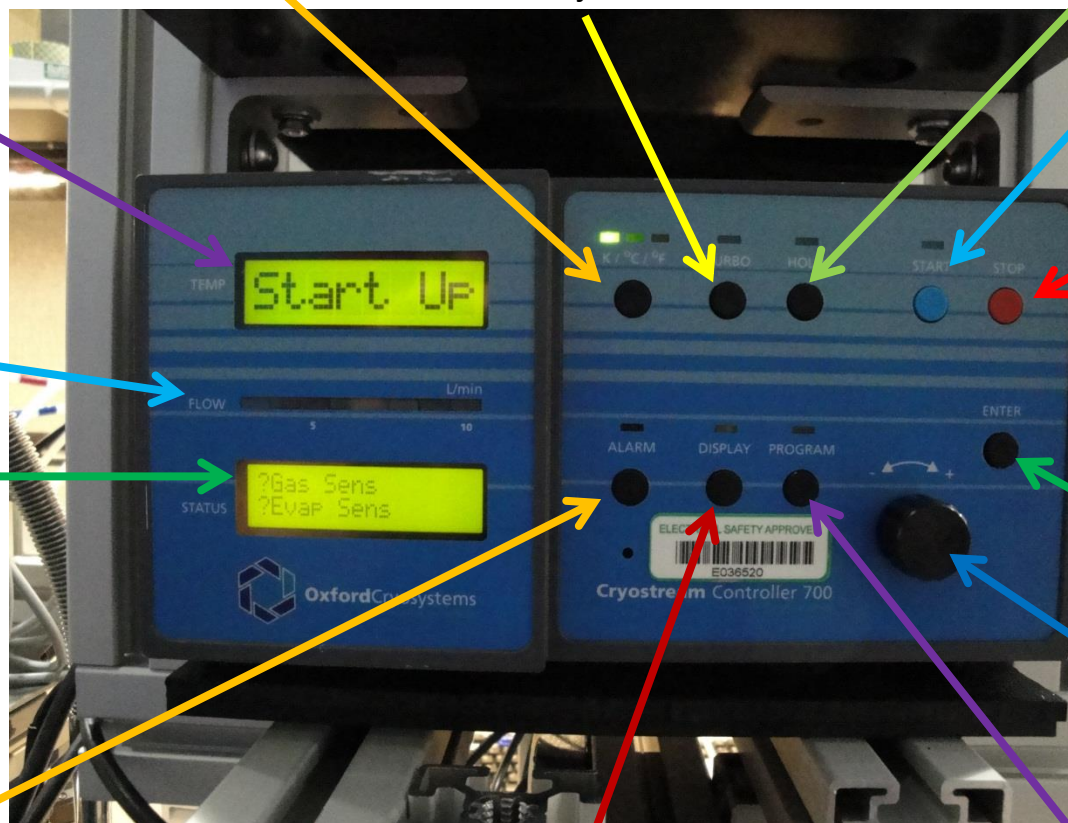
Turbo button allows the nitrogen gas flow to adjusted.

Hold button will execute a Hold.

Temp screen While the Cryostream Cooler is running this screen displays the temperature of the nitrogen gas stream.

Flow meter indicates the nitrogen gas flow in L/min.

Status screen displays information.



Start Button switches the Cryostream on, executing the start up phase.

Stop Button will immediately halt the Cryostream controller.

Enter Button is used during Program Mode.

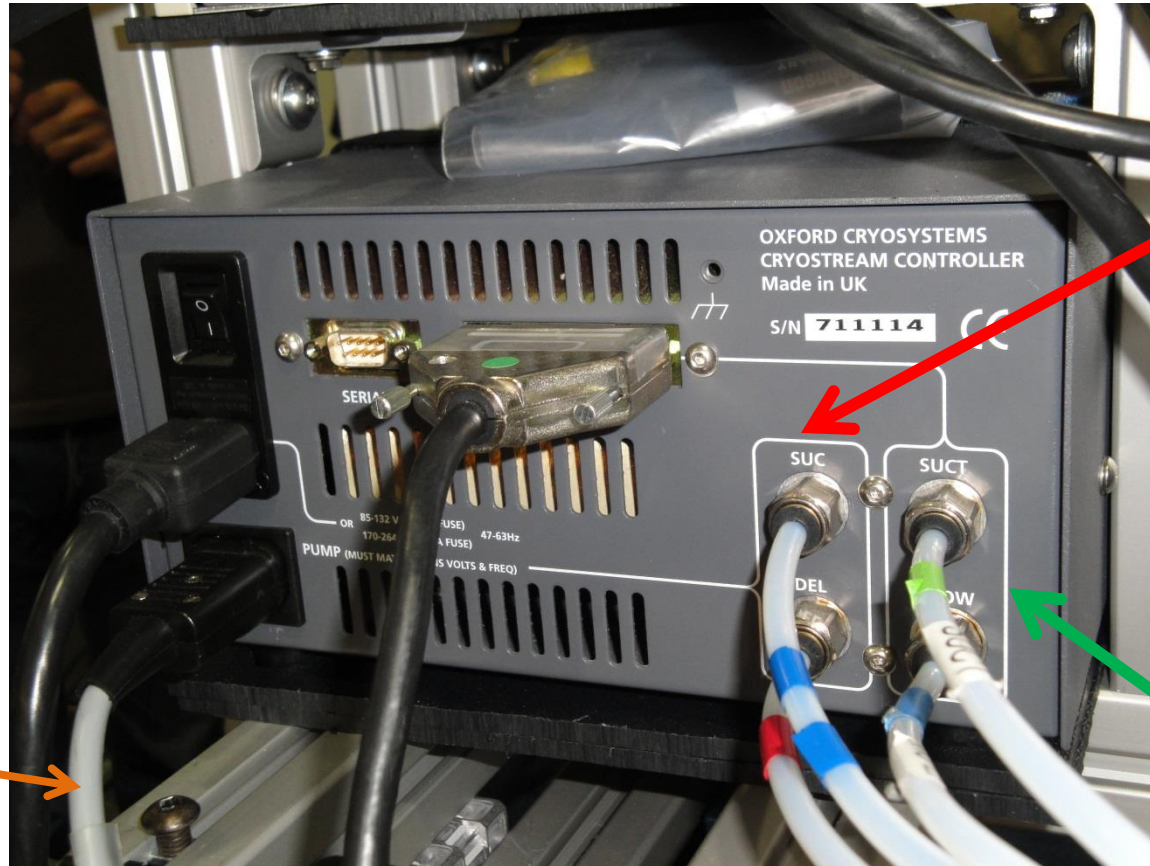
IntelliKnob is used to scroll the contents of the Status screen.

Alarm button If an alarm condition develops the ALARM will be illuminated and buzzer may sound.

Display button is used to toggle the Display mode.

Program button is used to toggle Program mode.

For more detailed information of the controller functions and operation go the Cryostream 700 manual.



Mechanical Pump Connections

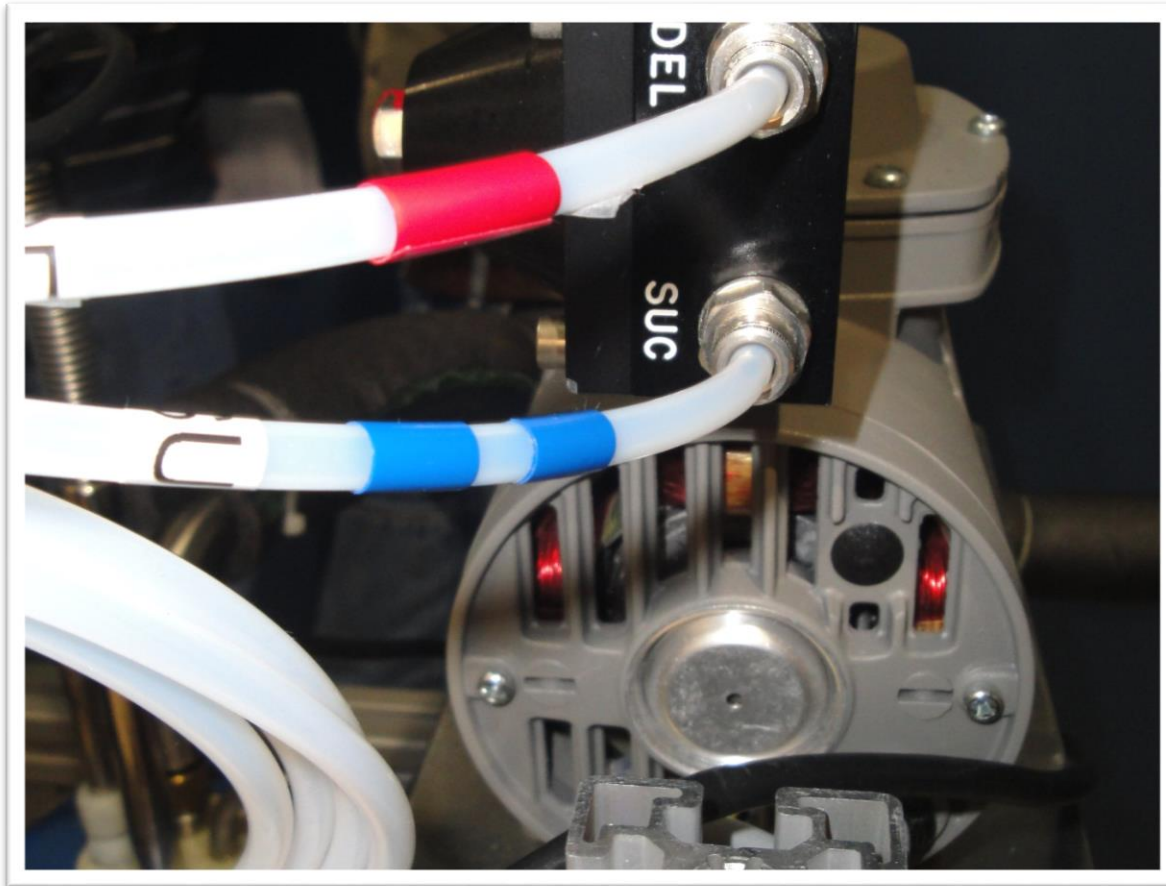
Cryostream Coldhead Teflon tubing connections

Mechanical Pump 120VAC connection.

Verify Teflon Tubing Connections are in their proper positions. Note: Tubing is 6mm O.D.

Teflon tubing connections from controller to **Mechanical pump** are labeled as SUC w/2 pieces of blue tape, DEL w/ red tape. (Red Arrow)

Cryostream Coldhead Teflon tubing connections are labeled as SUCT w/ green tape, FLOW w/ blue tape. (Green Arrow)



Mechanical Pump Teflon Tubing Connections

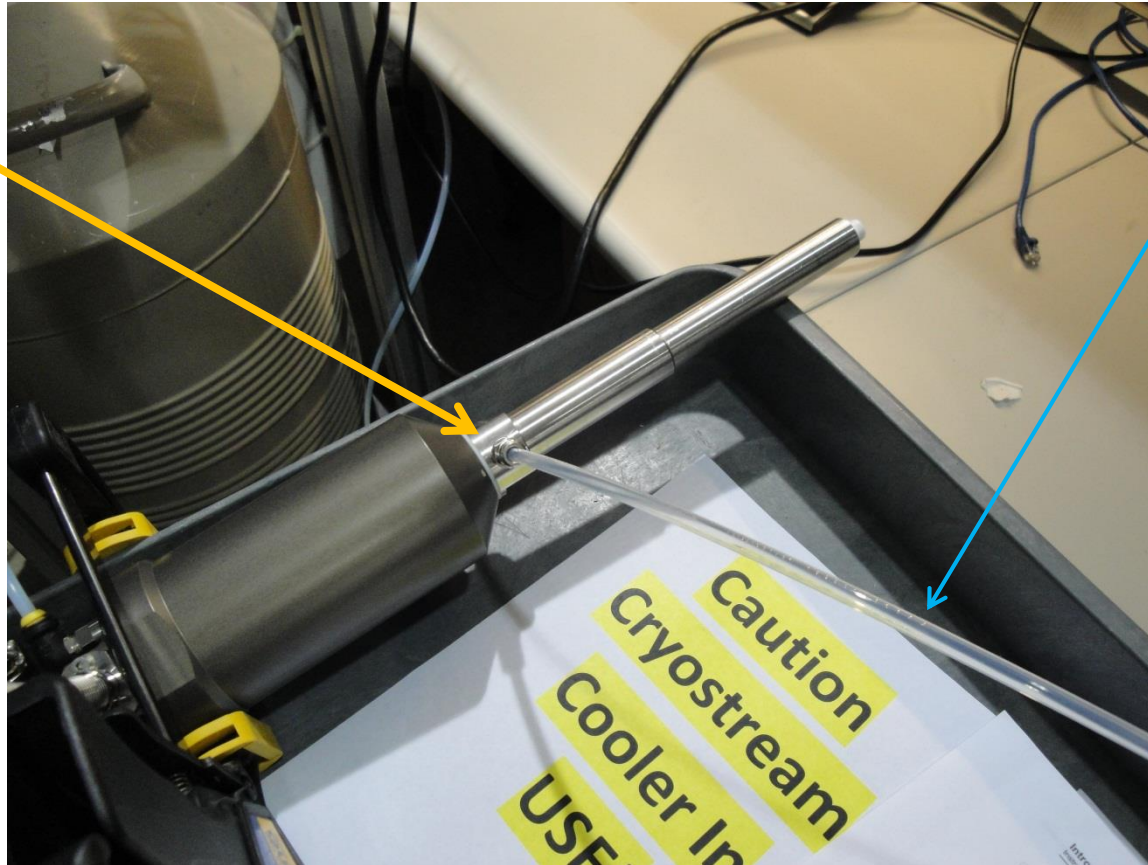
Teflon Tubing Connections from controller to mechanical pump are labeled as DEL w/ red tape, SUC w/ blue tape.



Cryostream Coldhead Teflon Tubing Connections

Teflon tubing Connections from Cryostream controller to Coldhead are labeled as FLOW w/blue tape, SUCTION w/ green tape.

Dry Air
Shroud Gas
inlet



6mm O.D.
Teflon Tubing
Provided by
Beam Line.

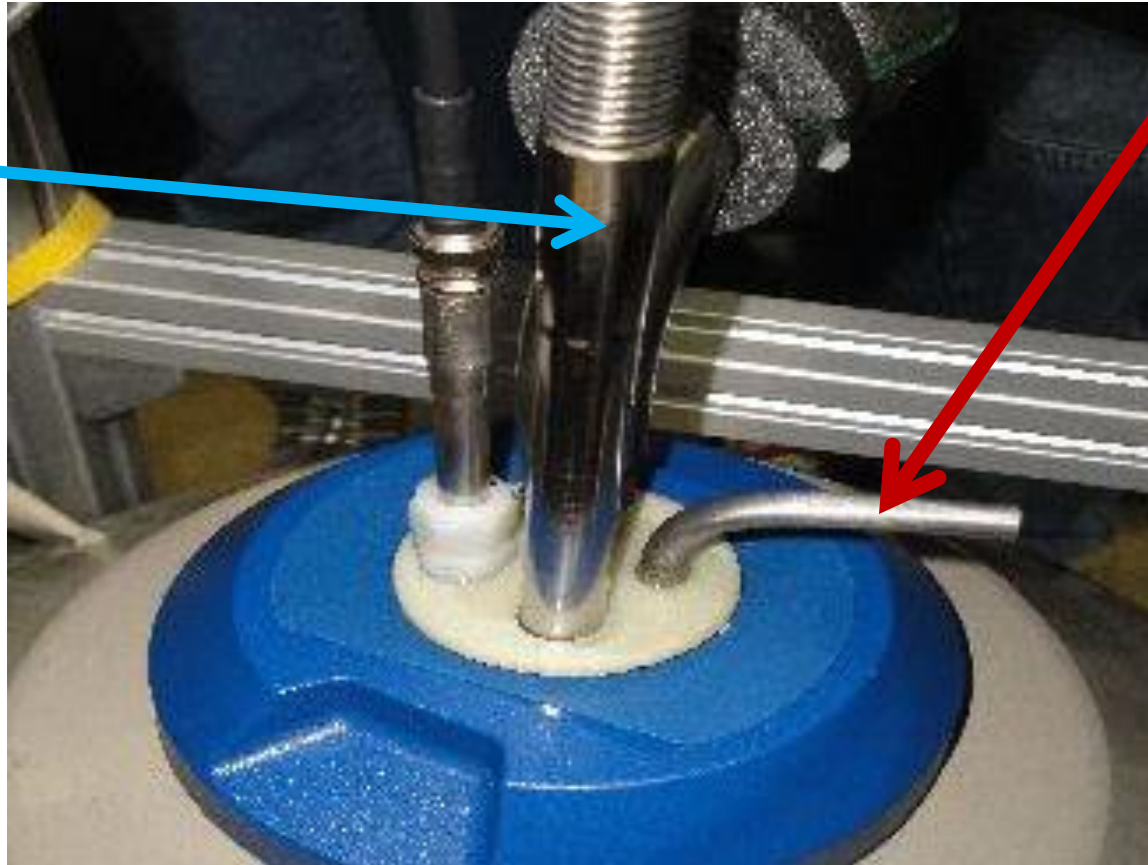
Connecting up Dry Air Shroud Gas

The gas can be either dry air with a dew point of less than -60°C or inert gas such as nitrogen that is often found in and piped around the lab.

Also On page 50 Of the Cryostream Operation & Instruction Guide recommends Shroud gas flow in a draft free environment 7-8 liters per minute or in a turbulent environment increase gas flow to 12 or 13 liters per minutes.

Note: Teflon tubing must be 6mm O.D.

Flexible
Transfer Line /
Supply Line
from
Coldhead



Vent Line
Do not
Block!!

Transfer Line / Supply Line from Cryostream Coldhead to be inserted into Dewar.

Insert the Rigid leg at the end of the Flexible transfer line into Dewar Vessel from Coldhead. **Note:** Liquid Nitrogen level controller should read between 15 inches and 4 inches. If automatic or manual fill is required go to page with Model 186 Liquid Level Controller.

Liquid Nitrogen level Controller.



Cryostream Controller 700

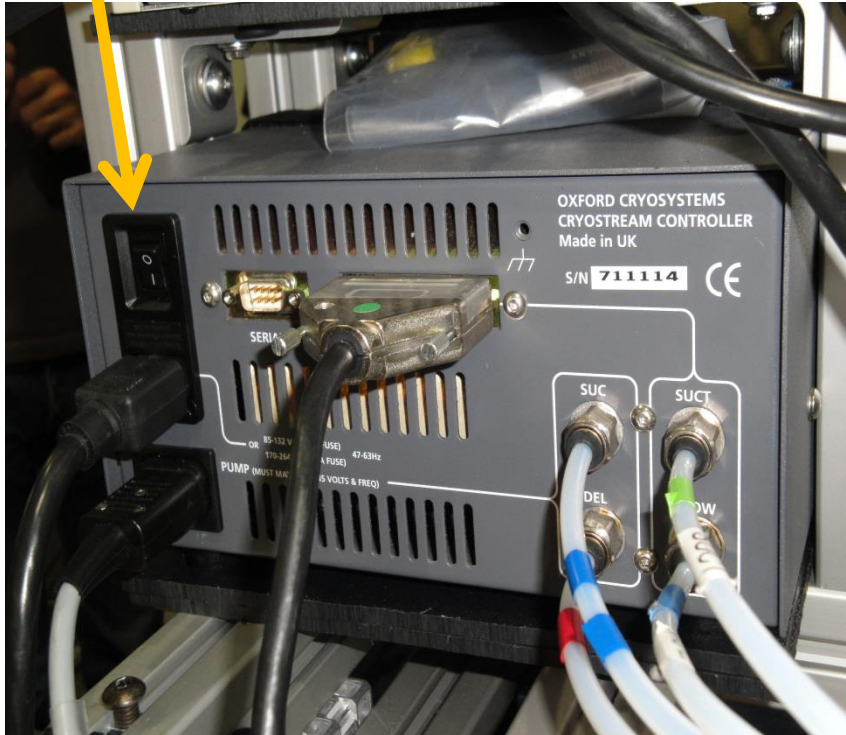


Final Checks Before Turn On.

1. Verify all Teflon tubes are pushed firmly into their Quick-Release Connectors.
2. Confirm Liquid nitrogen in Dewar.
3. Transfer line has been inserted into Dewar vessel.
4. Verify dry air shroud is connected to dry air or nitrogen gas.

Cryostream Controller 700

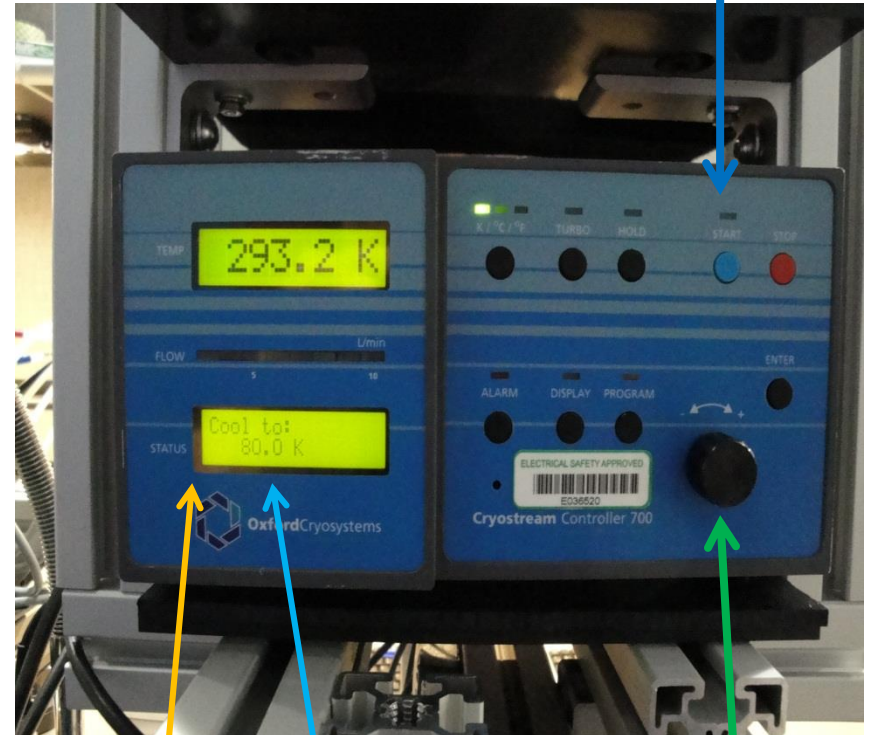
Power Switch



Switching the Cryostream Controller On.

Once the system is configured properly press the ON switch located on the left hand side of back panel. The controller will go through a self check to verify all components are working properly.

Start Button



Status Display

Inteliknob

Once the system has finished initializing adjust the 'Cool to:' temperature to your desired temperature using the Inteliknob and press the START button. 16