Orange Cryostat User Manual

Cryostat Wiring

Connection	Function	
K	I+	Silicon Diode DT-470 or SI 410 Calibrated from 1.4 to 300 K Use for control
L	I-	
N	V+	
P	V-	
M	Heater I+	Primary Heater normally 50 Ω
A	Heater I-	
B	Valve Htr I+	Valve Heater Requires special attachment
C	Valve Htr I-	

Operation

Temperature is controlled using the cold and warm valves and the heater. The cold and warm valves control the flow of helium into (cold) and out of (warm) the annulus, which surrounds the sample space and is in thermal contact with it and with the sample through the exchange gas. The most efficient way to operate the cryostat, in terms of helium use, is to have the cold and warm valves slightly open and control temperatures above 4.2 K using the heater.

It is also possible to operate the cryostat below 4.2 K, the normal boiling point of helium, by pumping on the annulus with a large rough pump. To do this, close the warm valve and either close the cold valve or keep it very slightly open. Connect the rough pump to the annulus pumping port, turn on the pump, and open the port. Using this method, a base temperature of about 1.5 K can be reached.

Refilling Cryogens

Both the helium and nitrogen reservoirs have to be refilled periodically. Typically the nitrogen holds for one day while the helium lasts for between 1.5 and 2 days. This figure can vary dramatically, however, depending on how the cryostat is being used and what condition it is in, so you should monitor the helium level using the helium level sensor. It is very important that the cryostat not be allowed to run without helium, because if it does there is a very high probability that ice will form inside, making the cryostat unusable until it can be warmed up and dried out. If you are unsure about how to refill cryogens, consult the instructions entitled “How to Fill with Liquid Helium” or ask a member of the sample environment team.

Changing Samples

The sample you want to change to should be mounted on a new sample stick and ready to go before you begin. Connect a helium gas bottle with a pressure around 5 psi to the nipple above the blue three way valve with a rubber hose and turn the three way valve up. This pushes helium through the sample well, keeping air out. Unscrew the sample stick, pull it out, put the new sample stick in, and screw it down. This should be done as quickly as possible to keep air out of the sample well. After you are done, close the three way valve and disconnect the helium.