

Janis High Temperature CCR Manual

Mode	Sample Channel	Control Channel	T Range
High Temperature (preferred)	B	B	15-750 K
High Temperature (optional)	C	C	25-750 K
Base Temperature	A	B	~2.6K

NEVER use Cadmium inside the high temperature CCR

Output Setup			
Manual Switch	Heater Resistance	Max Current	Heater Range
High Temperature	25 Ohm	2 A	High

Startup:

1. Attach sample in desired holder using 10-32 screws.
2. Screw on the inner and outer heat shields, being careful not to over tighten them. This is best accomplished by screwing on the shield all the way and then loosening it by $\frac{1}{4}$ turn.
3. Attach the outer vacuum can using $\frac{1}{4}$ -20 screws or the clamps provided. Make sure the O-ring is properly greased and set in the groove.
4. Connect the vacuum port to a turbo pump. Pump the chamber down to 10^{-4} Torr.
5. Plug the communications cable from the ICP/ICE computer to the back of the Lakeshore controller.
 - Note: You cannot change the Control Channel from ICP/ICE. You can only set the control channel manually on the Lakeshore 336 as shown in Step 8.
 - If you want to go to base temperature before heating, ensure that you are reading the correct sensor. Sensors B and C are wildly inaccurate at base temperature.
6. Turn on the compressor by turning the Main Power switch clockwise and flipping the Drive switch.
7. Flip the heater box switch from neutral position to *HIGH*.
8. On the Lakeshore 336 Temperature Controller
 - a. Press the buttons: *Output Setup* > *Input 1* > *Control Input* > *Input B*
 - i. Heater Resistance 25 Ω
 - ii. Max Current 2 A
 - b. Press *Escape*
 - c. Press *Heater Range*
 - i. Scroll up to *High*
9. Set the control temperature to any desired temperature below 50 K. Allow Sensor A to cool below 50K before applying any heat. This will allow the most stable temperature control, maximize the highest temperature possible, and prevent damage to the coldhead.

Operation:

- The compressor should remain ON at all times, especially when applying heat.
- Leave the turbo pump ON constantly for all temperatures above 300 K.
- If the compressor stops running, **turn off the heater** and contact the user services staff.
- HTR OPEN: You will see this error in the event that the cold stage (A) exceeds 300K. The heater has been automatically disabled and cannot be re-enabled until the temperature falls below 300K. If this has occurred during normal operation, then there is something wrong with the setup. Do not continue operating; contact the user services staff. This error may also occur if the control sensor is set to the incorrect sensor.

Shutdown or Change of Sample

From Below 300K (Sensor B or C):

1. Turn off the compressor.
2. Leave the heater on with a set point of 300 K.
3. Close the vacuum port valve and turn off the pump. Wait until the four speed indicator lights on the turbo pump are off before removing the hose.
4. **Flush** the chamber with Helium:
 - a. Attach a hose barb on a KF-25 flange to the vacuum port.
 - b. Flush the low pressure Helium line and hose barb, and then connect them together.
 - c. Pinch the line one arm-span from the valve. Open the valve slightly and then close it quickly. There is now enough gas inside to effectively exchange heat between hot and cold areas.
 - d. Wait about 45-60 minutes for the cold stage (Sensor A) to reach room temperature.
5. Once the cold stage (Sensor A) approaches room temperature, you can open the outer cover without the risk of ice buildup inside the CCR. Ice during sample change will prevent later pumping down and cannot be prevented with application of hot air.
6. Press ALL OFF on the Lakeshore 336 controller.
7. Flip the heater box switch to NEUTRAL position.

From Above 300K (Sensor B or C):

1. Turn OFF the heater while leaving the compressor ON to cool the sample block.
2. Once the Sensor B drops below 300 K turn off the compressor and the pump.
3. To speed cooldown when sensor B is already below 500 K, you may use Helium gas as in Step 4 above.
 - a. Using exchange gas while above 500K will damage the cold head. Never do this.

From 0-25K (Sensor A):

1. Reconfigure the heater to High T mode (Startup: Steps 7 and 8)
2. Follow the instructions to shut down from 25-300K (Shutdown: Steps 1-7)

Janis High Temperature CCR Manual – Low T Mode

**Only use these settings under the direction of Sample Environment
Runaway overheating of the sample stage could result
and cause permanent damage to sample and equipment!**

Mode	Sample Channel	Control Channel	Temperature Range
Low Temperature	A	A	2.5-25 K

**NEVER use Cadmium inside the high temperature CCR
Even at low temperature, due to the risk of accidental overheating!**

	Output Setup		
Manual Switch	Heater Resistance	Max Current	Heater Range
Low Temperature	50 Ohm	1 A	High

Startup:

10. Attach sample in desired holder using 10-32 screws.
11. Screw on the inner and outer heat shields, being careful not to over tighten them. This is best accomplished by screwing on the shield all the way and then loosening it by ¼ turn.
12. Attach the outer vacuum can using ¼-20 screws or the clamps provided. Make sure the O-ring is properly greased and set in the groove.
13. Connect the vacuum port to a turbo pump. Pump the chamber down to 10⁻⁴ Torr.
14. Plug the communications cable from the ICP/ICE into the cable provided.
 - Note: You cannot change the Control Channel from ICP/ICE.
 - Ensure that you are reading the correct sensor. Sensors B and C are wildly inaccurate at low temperature.
15. Turn on the compressor
 - a. Turn the Main Power switch clockwise and flip the Drive switch.
16. Flip the heater box switch from neutral position to *Low*.
17. On the Lakeshore 336 Temperature Controller
 - a. Press the buttons: ***Output Setup > Input 1 > Control Input > Input A***
 - i. Heater Resistance 50 Ω
 - ii. Max Current 1 A
 - b. Press *Escape*
 - c. Press *Heater Range*
 - i. Scroll up to *High*
18. Set the control temperature below 25 K. Allow Sensor A cool down to less than 25K before applying any heat. This will allow the most stable temperature control, maximize the highest temperature possible, and prevent damage to the coldhead.