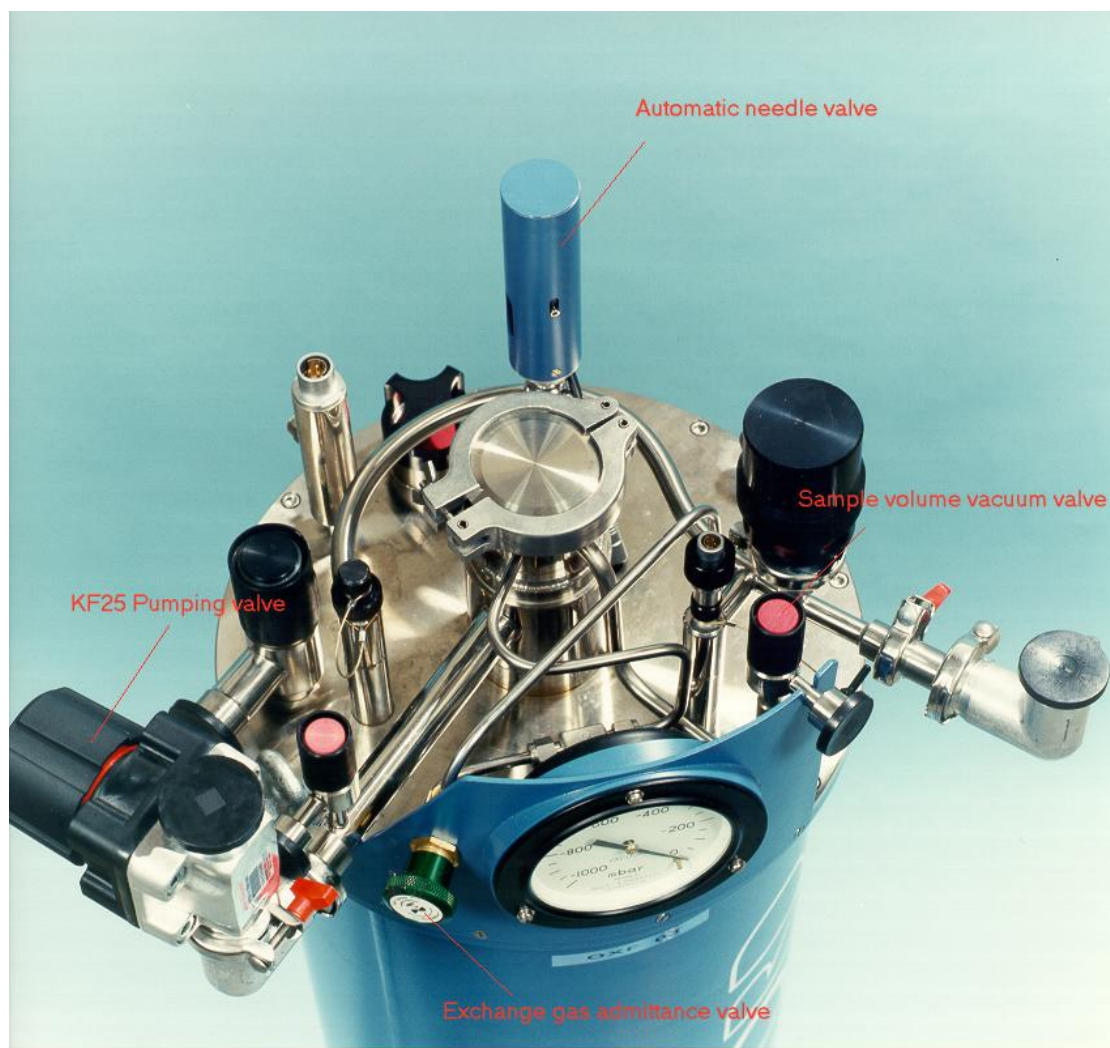


# Oxford Instruments Variox Cryostat Operation

The Oxford Instruments Variox cryostat is cooled by continuously pumping the heat exchanger via the Helium exhaust for the entire temperature range (1.6-300k).

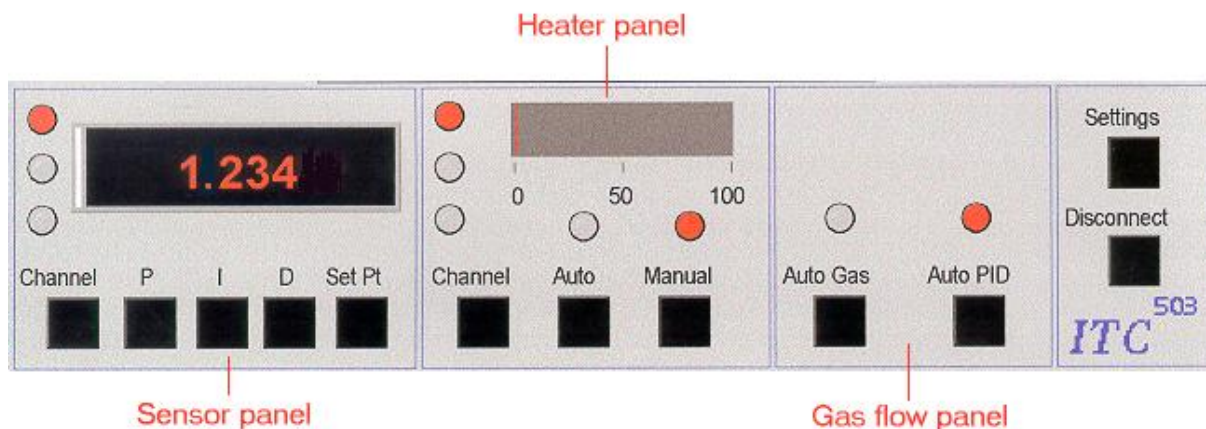
**To cool the cryostat, follow the steps below:**

Connect the supplied sogevac pump via KF25 flexible to the needle valve He exhaust KF25 valve.



Turn on the pump and evacuate the line and **then** open the KF25 valve.

Set the required temperature set point and its corresponding P.I.D values on the ITC503 temperature controller (shown overleaf).



A table of typical values is given below:

<b>ITC5 Temperature Controller Settings</b>										
Temp (k)	3.0	4.2	6.0	10	20	50	77	100	200	300
Flow (l/m)	5	4	4	3	3	2	2	2	1	1
P	30	25	25	25	16	13	12	12	12	6
I	0.1	0.2	0.2	0.2	0.3	0.3	0.5	0.7	1.1	1.5
D	0	0	0	0	0	0	0	0	0	0

**Note:** Do not specify a set point below 1.6K, as this temperature is unachievable with this Variox cryostat).

The Cryostat can be cooled either manually or automatically.

### **Manual temperature control**

Set the cryostats ITC503 temperature controller gas flow to approximately 25%, this can be done by pressing and holding down the gas flow button and then simultaneously pressing the raise button. The flow gauge on the pump exhaust should reach a value of >10 l/min; if the flow doesn't reach this, then adjust the gas flow until it does.

When the cryostat reaches the set point, reduce the flow by adjusting the gas flow on the cryostats ITC503 to a value that sustains the set point temperature.

## **Automatic temperature control**

Assuming that the set point has been set. Toggle the following switches to auto; Heater, Gas, P.I.D. Confirmation that auto has been selected is by the illumination of each panels LED light.

Note: The use of the ITC503 auto P.I.D facility will use a table of data held within the instrument that has been compiled and inserted by Oxford Instruments when the unit was manufactured. It may be more efficient to use the manual P.I.D values from the previous table.

To use the ITC503 with manual P.I.D first set the P.I.D values and then toggle the following switches to auto; Heater, Gas.

The automatic needle valve will open fully and the Cryostat will start cooling, when the set point is reached and passed the heater will come on. The automatic needle valve will maintain a flow of Helium through the heat exchanger while the heater attempts to control the Cryostat at the set point.

## **Changing a sample in a Variox cryostat**

### **Inserting the Centrestick**

Before commencing this procedure ensure the following:

- a.) The cryostat is at  $50K$  or above.
  - b.) The cryostat is connected to the Helium recovery panel.
  - c.) The centre stick and sample are fully prepared and ready to be inserted.
1. Connect a rotary pump to the sample volume vacuum valve and start the pump. Ensure the gauge on the rotary pump registers zero mbar.
  2. Open the exchange gas admittance valve to fill the sample volume with Helium exchange gas.
  3. Wait for a few minutes for the sample volume to fill with exchange gas.
  4. Undo the KF50 clamp and remove the KF50 blank from the top of the Cryostat and then carefully insert the centre stick.
  5. Replace the KF clamp on the vacuum flange of the centre stick.
  6. Close the exchange gas admittance valve and open the sample volume vacuum valve to evacuate the sample space.
  7. When the pressure gauge on the rotary pump reaches zero close the sample volume vacuum valve and re-introduce Helium exchange gas by opening the exchange gas admittance valve.

8. Close the exchange gas admittance valve when the sample volume is full and then open the sample volume vacuum valve to evacuate the sample volume.
9. When the pressure gauge reaches zero re-introduce more exchange gas
10. Reduce the sample volume exchange gas until the pressure gauge on the rotary pump reads 20 mbar.
11. Close the sample volume vacuum valve.
12. Switch off the rotary pump.
13. Connect the electrical leads to the top of the centrestick.
14. Begin cooling of the sample.

### **Removing the centrestick**

Before commencing this procedure ensure the following.

- a. The Insert and sample are at 50K or above.
  - b. The Cryostat is connected to recovery.
  - c. The KF blank is at hand.
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1. Disconnect the electrical leads from the centre stick.
  2. Start the rotary pump. Ensure the gauge on the rotary pump registers zero mbar.
  3. Open the exchange gas admittance valve to fill the sample volume with Helium exchange gas.
  4. Wait for a few minutes for the sample volume to fill with exchange gas.
  5. Remove the KF clamp from the centrestick flange and carefully withdraw the centre stick, promptly replace the KF blank and secure it.
  6. Close the exchange gas admittance valve and open the sample volume vacuum valve to evacuate the sample space.
  7. When the pressure gauge on the rotary pump reads 20 mbar close the sample volume vacuum valve.
  8. Switch off the pump.

### **Note!**

Before reusing the centrestick ensure that any moisture is removed by using a hot air blower and wipes.