

Procedure: Test for a Plugged Impedance

System: PPMS

Introduction

A plugged impedance will be indicated by poor low temperature and cooling performance. Typically, the system will gradually become unable to reach temperatures below 10K.

In the following procedure, the user will disable the system temperature control and check the rate of flow through the impedance. This procedure is written for use with the PPMS Control Panel software.

Caution!

In this procedure, you will be instructed to disable the PPMS temperature control software. This software should never be left in this disabled state beyond the time needed to perform this diagnostic. Failure to return the system temperature control to the enabled state may result in serious damage to the PPMS.

Procedure

Reading the System Flow Using the Ball Gauge

The system flow rate can be measured by connecting a flow gauge to the system pump exhaust. The three-level ball gauge, which may have been included with your system, or any gauge with a range of 10 cc/min to 5 lpm may be used for this measurement.

1. Connect the flow gauge to the pump exhaust.
2. With the system temperature “Stable” or with the system in “Standby” or “Shutdown” mode, the flow rate should read approximately 100 cc/min.
3. With the system cooling over a range of at least 50K, e.g. from 100K to 50K, and with the temperature sweep “Rate” at maximum, the flow rate should be about 2.5 lpm. If the flow rate is less than this, continue to the next portion of this procedure.

Reading the System Flow Using the Gas Monitor Utility

1. Set the system temperature to 100K and allow the temperature to stabilize.
2. Open the Gas Monitor (GasMon) utility. This software is included with the original software and is opened separately from the PPMS Control Panel. It is opened from Windows by selecting the file C:\\$DIAG\PPMS\GASMON.EXE.
3. Open the **Acq** menu of the Gas Monitor panel and select **Set Rate**.
4. Set the acquisition rate to **Every Second**.
5. Now open the **Config** menu and select **Temp Package**. If the **Temp Package** item is grayed out, use the following instructions to enable this item:
 - a) Open the **File** menu.
 - b) Select **Advanced**.
 - c) When **Advanced** is selected, you may be asked to enter a password (earlier versions of software only). This password is quandsn

Note: Earlier versions of PPMS software disabled the password setting effective January 1, 1997. If the quandsn password does not work, set the computer system date to a date prior to January 1, 1997.

- d) At this time, the **Temp Package** menu item will be enabled. Select **Temp Package** and continue.
8. Select **Asleep** to place the temperature control system in manual mode. When this is done, the message "Temperature is Asleep!" will appear in red on the Gas Monitor panel.
9. After the temperature control system has been "asleep" for a few seconds, the impedance should read "**OFF, Cool**". If it does not read "**OFF, Cool**", verify that the temperature control is asleep. If the temperature control is asleep and the impedance status does not read "**OFF,Cool**," re-activate the temperature control system by selecting **Temp Package** and **Awake**, close the GasMon software, and contact your Quantum Design Service Representative for additional assistance.
10. Open the cooling valve by double-clicking on the valve icon (a circle with two parallel lines inside it) at the bottom of the "Probe" panel. The cooling valve icon is the lowest valve shown in the display. It is located to the bottom right of the "Probe" icon. When you click on this icon, the valve should open to the 90° position (the valve icon will be aligned with the surrounding lines). **Note:** The valve may already be in the 90° position. If it is, continue to the next step.

11. With the valve fully open, read the flow rate displayed at the top of the screen in the "Model 6000" section of the panel. The flow rate should be about 2.5 lpm. If it is higher than 2.8 lpm, a leak may be indicated. If it is lower than 2.0, the impedance is plugged.

Note: If the flow rate reported in Step 10 does not agree with the flow rate from the ball gauge reading, a problem may exist with the valve calibration in the Model 6000. If this is the case, please contact your Quantum Design Service Representative.

12. Return to the **Config, Temp Package** menu and select "**Awake**" to re-activate the temperature control system. The "Temperature Control Asleep" message should clear and the temperature status on the Model 6000 front panel should read "chasing" or "Stable."
13. Close the GasMon program.

Clearing a Plugged Impedance

If the impedance is plugged (the flow rate is lower than 2.0 lpm in step 9 above) it is necessary to fully warm the system - the dewar must have no helium in it, the probe must be allowed to sit at room temperature for at least 48 hours.

Following this drying period, the system flow rate should be checked before re-cooling the system. This is done by flowing helium gas into the dewar at approximately 100 cc/min, to achieve a pressure of about 1 psi inside the dewar. Under these conditions, set the system temperature to 5K (it will not be able reach this temperature) and monitor the exhaust flow from the system pump using the ball gauge (the Model 6000 flow gauge is not calibrated to be accurate at this low rate). The flow rate should be about 20 cc/min. If the flow rate is not at least 20 cc/min, the impedance may still be plugged. Allow the probe to stand an additional 24 hours and try again.

If the flow rate is still limited after at least 72 hours, contact your Quantum Design Service Center for assistance.