OPERATING INSTRUCTION MANUAL
FOR THE

MODEL HRC-100

HELIUM RECONDENSER CONTROLLER

Firmware Version 2.03

CRYOMAGNETICS, INC.

INNOVATIVE SUPERCONDUCTING MAGNET SOLUTIONS

Model HRC-100
Helium Recondenser Controller

Overview

The Model HRC-100 Helium Recondenser Controller monitors the pressure of helium gas in a cryostat that is configured with a helium liquefier, and heats the system as necessary to maintain pressure within 0.125 psia of a target pressure. A USB port allows the system pressure and heater power to be monitored using a PC compatible USB serial port. A vacuum fluorescent display on the front panel shows the measured pressure and heater output power. The pressure setpoint and maximum output power may be entered using the front panel keys.

Connections

A standard 110V power cord is connected to the power entry module. A USB cable may be connected to the Type B USB connector if desired, but it is not needed for operation. The USB interface is intended to be used only during system installation and checkout. The heater output is connected using a 3 pin circular connector on the rear panel. The pins are numbered as seen looking at the rear panel.

Heater Pinout   3 Pin Circular Connector

Pin 1: Heater+
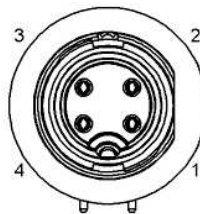Pin 2: Heater-
Pin 3: Shield
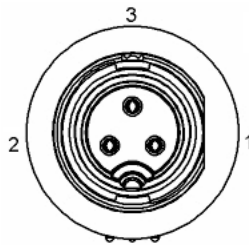
The pressure sensor is connected via a four pin circular connector on the rear panel. The pins are numbered as seen looking at the rear panel.

Sensor Pinout   4 Pin Circular Connector

Pin 1: Power Out (5V)
Pin 2: Sensor In (0-5V)
Pin 3: Sensor Ground
Pin 4: Shield

Operation

Pressure is monitored each 250 milliseconds. The heater power is updated each 250 millisecond cycle, and the display is updated twice a second. The heater output is adjusted in small steps to maintain the pressure near the operational setpoint.

Four buttons on the front panel allow the pressure setpoint and maximum heater output to be changed. Press Menu to display the two menu items:

    <Setpoint> PwrLimit

Pressing the Up or Down keys changes the selection, and Enter selects the menu item.

When the value is displayed, it may be changed by pressing the Up or Down keys.

If Menu is pressed, the value is not changed. If Enter is press, the displayed value is saved.

The maximum heater power is limited by the resistor used in the system. The controller is capable of generating 11.3V at up to 1.25A. The output is limited by an internal fuse, which will probably blow if the output is shorted. The PwrLimit menu power limits the output to a percentage of the maximum output. This can be useful if the system response time needs to be slowed to avoid oscillations.

The unit may also be configured by connecting a Windows computer to the USB port, and communicating with the USB serial port as described in the section titled **USB Configuration**.

The main menu is presented when any key is struck:

Main Menu:
T - Toggle Monitor On/Off
D - Display Parameters
C – Calibrate

Pressing 'T' toggles monitoring on, since it is turned off when the interface is connected. A message is displayed at ten second intervals:

Pressure: 0.496   Heater: 2.35 Watts

Pressing 'D' displays the parameters:

High Limit (psi): 1.500
Setpoint (psi): 0.500
Low Limit (psi): 0.050

Pressing 'C' displays the calibration menu:

Calibration Menu:
H - Set high pressure limit
S - Set control setpoint
L - Set low pressure limit
R - Set power output range
Z - Calibrate to atmosphere for zero pressure
D - Display parameters
X - eXit to Main Menu

The pressure limits may be changed by pressing 'H', 'S', or 'L'. The firmware requires that the setpoint be at least 0.125 psi above the low limit and 0.125 psi below the high limit. R allows the maximum power output to be set as described for the PwrLimit menu above.

The unit may be recalibrated by applying atmospheric pressure to the pressure sensor and pressing 'Z'. This may require that it be removed from the cryostat. When the firmware instructs you disconnect the pressure sensor, **DO NOT DISCONNECT THE PRESSURE SENSOR FROM THE INSTRUMENT. DISCONNECT IT FROM THE PRESSURE SOURCE.**
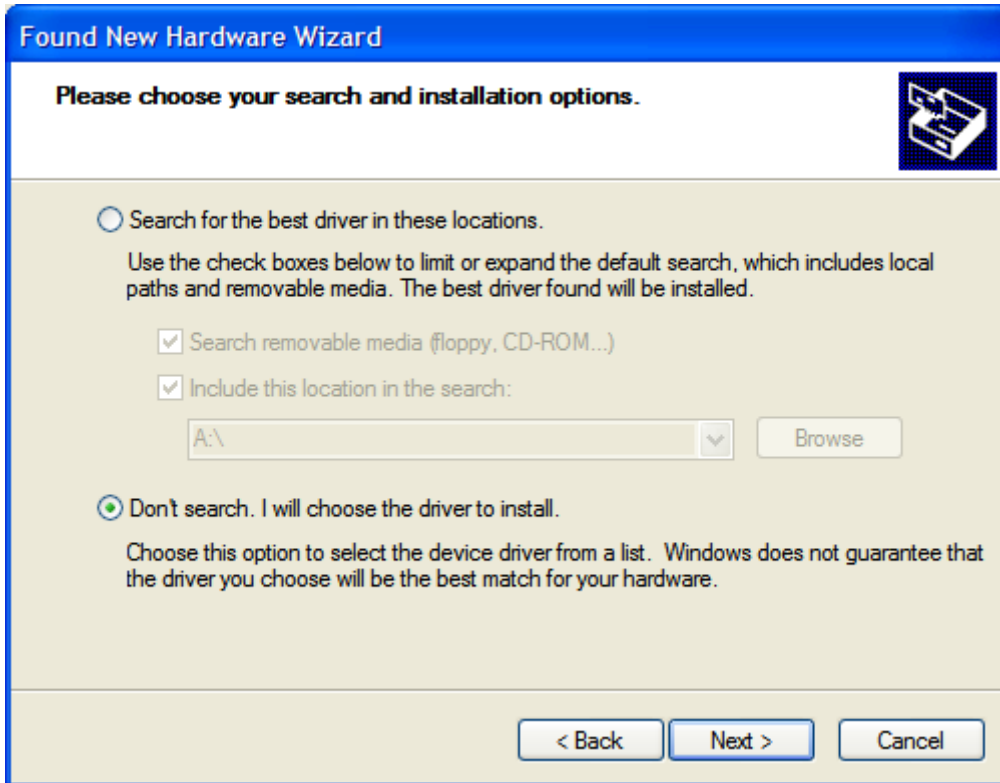
USB Configuration

Connect a Windows computer to the USB port on the rear panel of the Pressure Monitor. After a few seconds the following display should be presented:
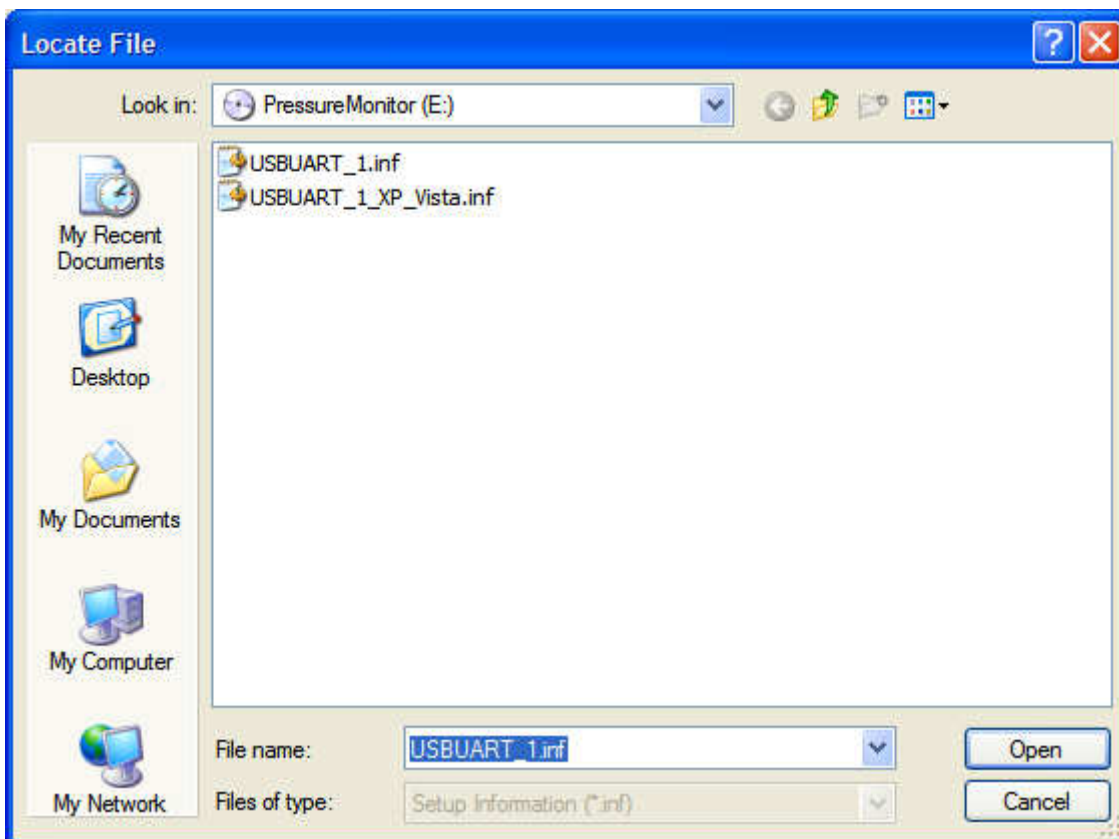

Select No, not this time.

Insert the accompanying CDROM, and select "Next". The following dialog will be displayed:

Found New Hardware Wizard

Please choose your search and installation options.

○ Search for the best driver in these locations.

Use the check boxes below to limit or expand the default search, which includes local paths and removable media. The best driver found will be installed.

☑ Search removable media (floppy, CD-ROM...)

☑ Include this location in the search:

A:\   Browse

◉ Don't search. I will choose the driver to install.

Choose this option to select the device driver from a list. Windows does not guarantee that the driver you choose will be the best match for your hardware.

< Back   Next >   Cancel

Press Next, and on the following screen select Have Disk. Enter the drive letter of your CDROM drive, and select the appropriate driver from the screen that follows:

Locate File

Look in: PressureMonitor (E:)

USBUART_1.inf
USBUART_1_XP_Vista.inf

My Recent Documents

Desktop

My Documents

My Computer

My Network

File name: USBUART_1.inf   Open

Files of type: Setup Information (*.inf)   Cancel

A dialog will be shown indicating the software has not passed Windows Logo testing. Select "Continue Anyway", which will complete the installation. If an error message is shown indicating an error occurred during installation, disconnect the USB cable, wait ten seconds, and reconnect it. The device should be recognized by windows and be ready for use. Leave it connected, and continue with the following step.

In the Device Manager, find PressureXdcr under Ports(COM and LPT). Note the COM port number it is assigned. Close the device manager. Bring up HyperTerminal or other terminal program. Connect to the COM port identified in the Device Manager. Configure the port settings as shown:
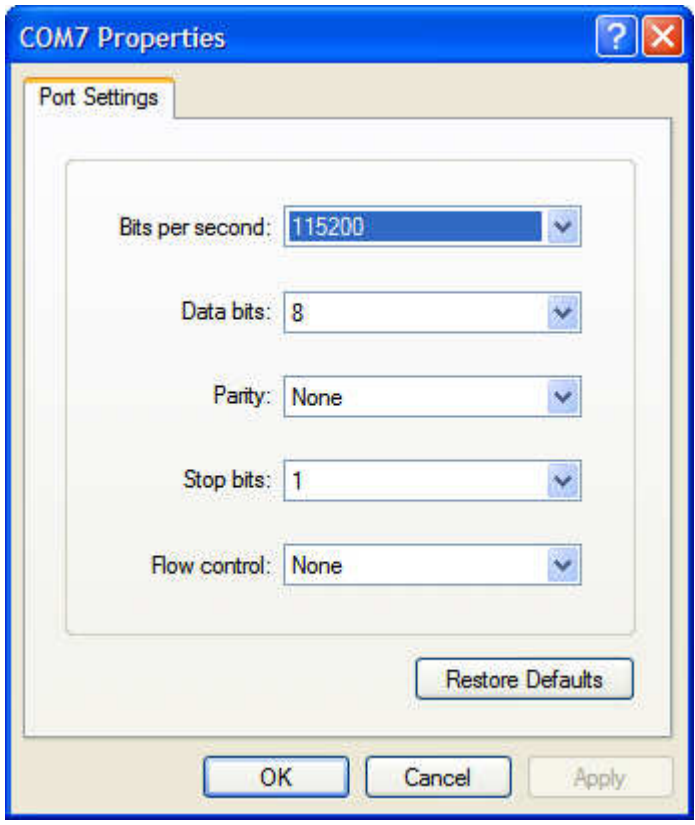
You should now be able to connect to the Pressure Monitor and monitor the helium pressure and heater power.