

HYBRID TEST CHAMBER DEVELOPMENT HISTORY

- 5 May 2003 Received Coolie box and High Current Power Supply from CERN. Both appear to have been damaged in shipment. Informed FedEx of damage.
- 8 May 2003 Ordered new power transformer and high current connector set for Coolies box.
- 9 May 2003 Thermoelectric Element power supply tested under in Constant Current Mode with DC Voltage control . Tested with 5 ohm load from zero to 10 amps.
- 10 May 2003 Received 10 ea Temperature sensors PN DB18B20
- 15 May 2003 Received 2 ea Humidity sensors Honeywell HIH3610-001
- 22 May 2003 290 watt thermoelectric element arrived Supercool PN DL-290-24-00-00-00, 24 volts, 14.2 amps max. Unit has a 75 deg C warm side thermostatic switch for cutoff, 67 deg C max operating temperature.
- 28 May 2003 Ordered solid state relays for valve interface Crydom EZ240D18 18a from DigiKey
- 2 June 2003 Ordered Omega gas flow sensor 0-5v Mod FLR1002 40 to 200 mL/min and water flow sensor 0-5v Mod FLR1011 0.1 to 2.0 L/min. Ordered 3 ea acrylic flowmeters; Mod FL2013ss 0.4-5.0 L/m air with valve, Mod FL2025ss 4-40 Gpm water with valve and Mod FL2010ss 0.04-0.5 L/m air with valve.
- 3 June 2003 Ordered AMP MT connectors for all sensor interface connections, also ordered small general purpose pc boards to do interconnects.
- 3 June 2003 Asco solenoid valves arrived, U8225B4V 120v ac two way 1/8" pipe thd
- 10 October 2003 Ordering parts for FermiLab 4 Hybrid Cold Box System.
- 13 October 2003 Commissioning of UCSB 4 Hybrid Cold Box
- 15 February 2004 Shipped 4 Hybrid Cold Box System to FermiLab
- 1 March 2004 Ordering parts for Mexico 4 Hybrid Cold Box System.
- 25 June 2004 Peltier Element replaced in UCSB Clean Room Test System. Unit had exhibited long cooling times compared to when the system was first placed in operation. Failure may have been due to operating unit without cooling fluid flow. An interlock was added to ACDC to prevent the system from powering the Peltier unless cooling fluid is flowing.
- 1 April 2004 Work on a third 4 Hybrid Cold Box started at UCSB. New system will be used by a University group in Mexico.
- 10 August 2004 Peltier Element replaced in UCSB Clean Room Test System. Unit had been damaged due to overheating when the LabView program crashed resulting in loss of cooling water.

1 September 2004 New ADEK rackmount PC arrived, loaded XP Pro operating system and LabView with applications . PC has P3 850 Flip Chip, 100 Mhz bus, 512 MB RAM, PC133, 64x64, 40 GB HD.

8 September 2004 In an attempt to increase the robustness of the test system in reduce the chance of further Peltier failures a number of measures are being incorporated which include increasing the cooling loop flow rate. Ordered new flow control sensor with 10 times low flow resistance, this should provide for increased flow from the current 1.2 L/m to 2.7 L/m. Details on 17 Sept Power Point Document.

20 October 2004 Found cheese like buildup in Mexico chiller system withich may be causing reduced flow in the cooling loop. Neslab, the chiller manufacturer, suggested flushing system using 10% HCL and water to correct the problem, which was carried out. The maximum flow rate following the cleaning was is 14 G/hr or 0.88 L/m. It was noted that the simple loop flow is 30 G/hr or 0.9 L/m as measured by the Omega visual flow sensor alone.

2 Nov 2004 The new flow sensor did not provide the higher flow rate as anticipated, old sensor will be retained. Added new chiller cooling loop hardware interlock prototype electronics to the Mexico system and set flow threshold to 1.5 volts corresponding to a minimum flow rate of 10.3 G/hr or 0.65 L/m. Work will start soon on a printed circuit board to replace the prototype board so that all systems will be identical.

1 February 2005 Installed and tested the new Peltier flow-control-interlock electronics in UCSB 4Hybrid Test System, this interlock is independent of the LabView ACDC control program execution. The interlock printed circuit board replaces the old Analog I/O and Sensor I/O boards which function to interconnect the ACDC system. With the interlock in place, the Peltier power will be removed should the flow rate fall below the 10.3 G/hr rate, this will guard against a software or PC crash which was the cause of one of our past Peltier failures.

4 February 2005 A field conversion kit is being sent to FermiLab for incorporation of the hardware interlock into their 4Hybrid Test System. The Mexico system will be updated after it is operational.

24 February 2005 Bruno Wittmer at CERN responded to an inquiry regarding Peltier degradation, indicating that they had experienced similar drop off in cooling performance. They tried reducing the maximum current from 14 down to 10 amps in an attempt at reducing the degradation. Running at this lower current limit only increases the cooling time by a few minutes. FermiLab and UCSB will conform to the same limit while monitoring performance and Peltier resistance which is 2.0 ohms for a new unit.