

OPERATION OF THE BABAR DCH PROTO II GAS SYSTEM

The Proto II gas system is used to provide a nominal mixture of 20% isobutane and 80% helium to the proto II drift chamber, which is located in the curtained of area of bldg. 84, rm. B-273

The system consists of several gas supply cylinders and associated valves and regulators, located on the north end of the bldg. 84 loading dock, a safety system, and a mass flow controller system, located near proto II.

GAS SUPPLY

There is a 116 lb. Cylinder of liquid isobutane and a 6-pack of UHP helium on-line at all times; back-ups for these are located on the loading dock nearby.

The helium 6-pack should be replaced before the pressure drops to 100 PSI, and a new spare ordered by calling ext. 2481. Make sure to specify UHP helium, the location, charge # 14-3341, and that there is an empty to be picked up. A 6-pack normally lasts ~2weeks. When installing a new 6-pack, be sure to open all 6 individual cylinder valves before opening the main outlet valve.

A cylinder of isobutane will last many months; replace it before the total weight of cylinder and contents reaches 82 lbs. (the on-line cylinder is standing on 2 bathroom scales; the sum of the readings is the total weight of the cylinder + gas) The isobutane is replaced from the supply of tested cylinders in the IR-2 gas shack storage area. Do not remove any cylinders from IR-2 without permission from the gas expert. Empties should be returned to the gas shack.

SAFETY SYSTEM

There are 7 sensors feeding an SMC Sentry 5000 control module, located in the gas rack opposite proto II in the curtain room.

Sensors 1,2,3, and 5 detect the presence of flammable gas (isobutane) in the atmosphere of the room. They are set to alarm well below any dangerous level.

Sensor 4 alarms if the level of oxygen in the room drops even slightly below nominal, in case of a large helium leak.

Sensor 6 detects oxygen in the gas output from the proto II chamber, inhibiting the chamber high voltage if over 0.5% oxygen is detected, in order to prevent an explosion from a combination of a flammable mixture and a spark.

Sensor 7 is not associated with the proto II system.

An alarm from any channel of the Sentry 5000 will turn off the gas supply solenoid valves located near the helium 6-pack on the loading dock.

Note that the sense of channels 6 and 7 is reversed, so than the “alarm” state is normal.

A diagram of the sensor locations is in PROTO II SENSORS.eps

FLOW CONTROL

The flow of gasses to the chamber is controlled by a Sierra Instruments Flo-Box, located in the top of the gas rack, opposite the proto II chamber. Only channels 1 and 2 are associated with proto II.

The nominal settings are .8 lpm for channel 1 (helium), and .2 lpm for channel 2 (isobutane). Gas is exhausted via the right-hand bubbler on the gas panel, through a 1/2" copper tube to the outside of the building. The Magnehelic gauge on top of the gas rack shows the chamber exhaust pressure.

Instruction manuals for components of the gas system are located in the shelf on top of the workbench adjacent to the gas rack.