

6 Chiller and Electronics Cooling Safety

6.1 Description of System

The chiller provides cool water to stabilize the operating temperature of the read-out electronics and the chamber endplates. There are two safety considerations: the lack of flow could cause the electronics to overheat and be damaged, and a water leak could damage detector components.

The system includes a heat-exchanger with the site cooling water. The output flow is split near the chiller, with one line flowing to the front-end electronics and the second to the front and rear endplate. The endplate water is heated slightly: the endplate is maintained at 22° C, the electronics at 20° C. The lines to and from the manifolds at the detector bulkhead are 1" diameter synflex lines. In order to minimize risk of water damage, the recirculation system is operated below atmospheric pressure, so that a small leak will cause air to enter the system rather than water to leave.

The water lines drain into the lower storage tank if the pump is turned off, and an inductor pump will draw air through the lines to dry them.

6.2 Sensors and Inputs to SIAMs

There are six alarms related the cooling system:

- *Temperature:* Two thermometers (TRDs) mounted on the return line from the chamber indicate an alarm if the temperature of the water is out of the specified range of 17° C to 23° C. In addition, a total of 56 AD592 sensors are mounted on the rear endplates or in the readout electronics to provide EPICs monitoring of the temperatures.
- *Flow:* a flow switch verifies that water is flowing out of the chiller, and a thermister flow switch verifies that water is flowing back from the front-end electronics.
- *Water:* both front and rear bulkheads contain Honeywell HIH 3602-L water sensors to detect water accumulation due to leaks. These produce an analog voltage linearly proportional to the relative humidity, where moisture corresponds to 100% RH. A DPM is used to produce an alarm at 80% RH and an analog voltage that is read into EPICs using a VSAM. The DPM for the front endplate is located in rack B620-D9; the rear DMP is in rack B620B-10.

Any of these alarms shuts off the high voltage for the drift chamber and the power supplies for the front end electronics using SIAMs in the electronics house; see the chapter, "SIAMs". The chiller is controlled locally; there are no connections from EPICs or from the safety system.

6.3 Checklist for Cooling System Testing

The cooling system safety system is checked once per year, prior to the start of runs. The checklist for this purpose is located on the DCh web site.