

Proposal for RICH Hardware Interlock System

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Proposed is a hardware interlock system for the RICH detector.

Two Ring Imaging Cherenkov Detectors, RICH, will replace two sectors of the Low Threshold Cerenkov Counter in the Hall B 12 GeV upgrade. Figure 1 shows the two sectors.

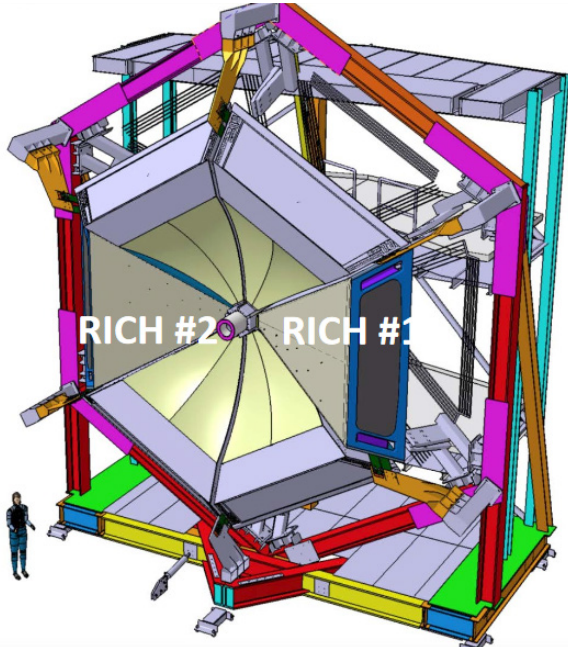


FIG. 1. Two RICH sectors shown in place of Low Threshold Cerenkov Counter sectors.

A National Instruments cRIO-based system will be used for monitoring and interlocking RICH detectors. The cRIO system will be network independent and will use LabVIEW, a standard software used for other detector interlock systems at Jefferson Lab.

Table I lists what will be monitored and interlocked. Humidity and temperature around the detector are monitored, as well as what maintains the proper humidity and temperature. A diagram of the interlock system is shown in Fig. 2.

The detector’s aerogel must be kept dry, thus the humidity around it has to be low, less than 30%. Nitrogen is used to control the humidity. The nitrogen flow, humidity sensors, and temperature will be monitored.

The detector’s electronics will be air-cooled. Two air compressors will provide air to an air tank, from which air then will flow to RICH. The pressure transducer on the air tank and the air flow meter will be monitored.

When any of the monitored items goes out of the set limits, the high voltage and low voltage systems will be turned off.

Set points for the process variables will be finalized once the prototype of the interlock is tested on the RICH detector.

Monitored process variables	No. monitored sensors
Nitrogen	2
Humidity	16
Airflow	2
Air pressure	1
RTD temperature	16

TABLE I: List of process variables monitored and number of sensors for each.

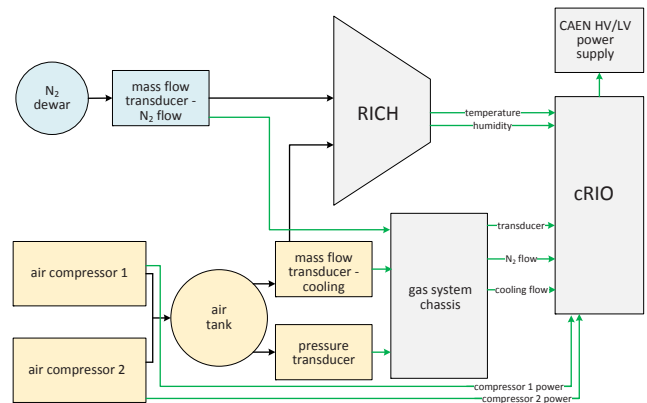


FIG. 2. Diagram of RICH interlock system.

The interlock system for RICH is currently being developed and should be completed by the end of June, 2017.