Hall B LTCC Gas System Controls and Monitoring Software

Marc McMullen, Mary Ann Antonioli, Peter Bonneau, Pablo Campero, Brian Eng, Amanda Hoebel, George Jacobs, Mindy Leffel, Tyler Lemon, and Amrit Yegneswaran
Physics Division, Thomas Jefferson National Accelerator Facility, Newport News, VA 23606
November 16, 2018

This note presents the controls and monitoring software and hardware developed for the Low Threshold Cherenkov Counter (LTCC) gas system.

The Hall B gas system comprises four custom designed chassis, which supply power to mass flow controllers (MFCs) and sensors, and interfaces signals between sensors and three National Instruments CompactRIOs (cRIO).

The LTCC can be monitored from either the cRIO located on the Forward Carriage of Hall B or the cRIO in the gas shed. The gas shed cRIO provides the system interface GUI for changing gas flow, Fig 1.

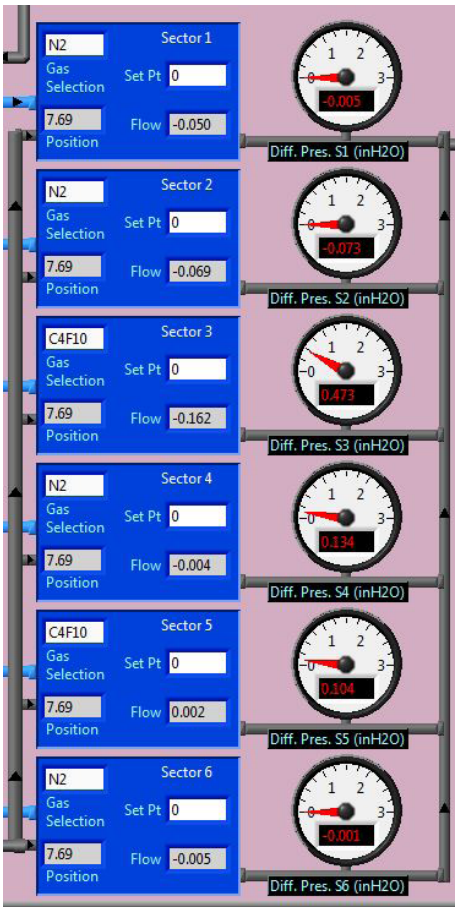

FIG. 1. LTCC LabVIEW GUI for changing gas flow.

LTCC's gas system is an in-out flow system, which uses nitrogen for both purging the detector and for maintaining the detector. C_4F_{10} is used during operations.

C_4F_{10} is supplied at a constant flow rate by the Dwyer Magnehelic. A differential pressure of ~1.2–1.7 InWC, between atmosphere and gas volume, is maintained by a mineral oil bubbler on the exhaust line. When the differential pressure falls to 1.2 InWC, the differential pressure transducer/transmitter (Fig. 2) actuates the 24 VAC (normally closed) supply solenoid, which is located downstream of the MFC. The solenoid is closed and flow stops when the differential pressure reaches 1.7 InWC.

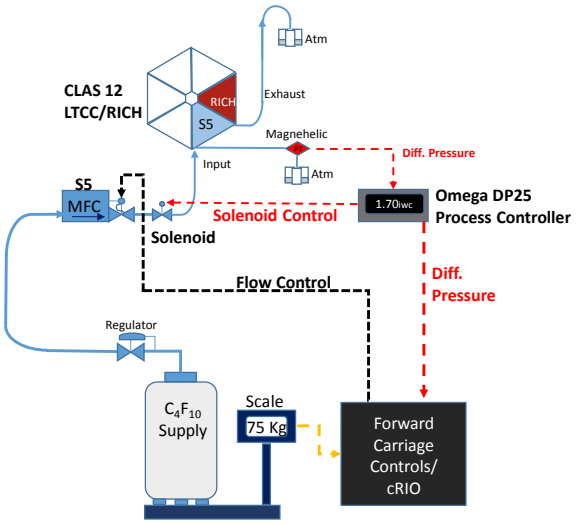

FIG. 2. LTCC gas system.

The LTCC gas controls and monitoring system has been working since late 2017.