# Pressure Control Panel for the Hall A Super Bigbite Spectrometer GEM Gas Distribution System

George Jacobs, Mary Ann Antonioli, Peter Bonneau, Aaron Brown, Pablo Campero, Brian Eng, Mindy Leffel, Tyler Lemon, Marc McMullen, and Amrit Yegneswaran
*Physics Division, Thomas Jefferson National Accelerator Facility, Newport News, VA 23606*
March 11, 2021

The pressure control panel for the Super Bigbite Spectrometer (SBS) GEM gas distribution system maintains a constant gas supply pressure for the flow meters that control gas flow. The flow meters are capable of full scale gas flow with a minimum 2.5 psi differential pressure across the flow meter. This note discusses the components of the panel.

An upstream gas mixing system supplies a mixture of argon and carbon dioxide gas at constant pressure via a ½" tube, Fig. 1. The gas flows through a pressure relief valve, Fig. 2—which limits the gas supply inlet pressure to 25 psi to mitigate failure—to the inlet side of the pressure regulator.

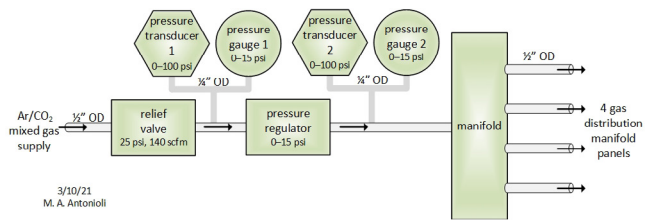


FIG. 1. Diagram of pressure control panel.

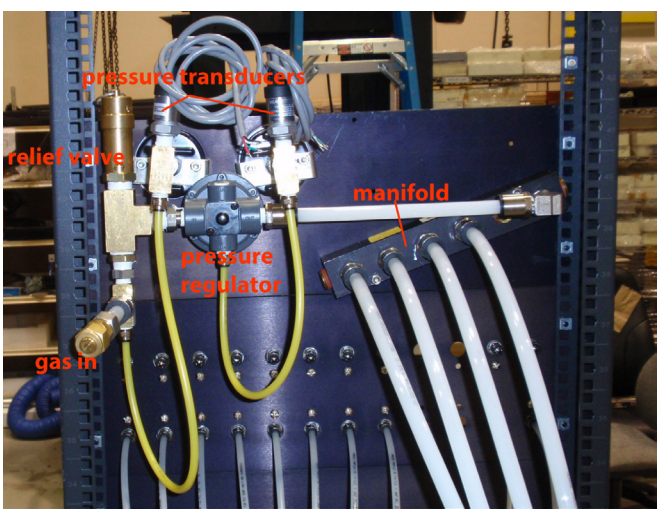


FIG. 2. Photo of GEM gas distribution panel rear.

The pressure regulator has an output range of 0-15 psi. It maintains constant gas supply pressure to the flow meters as long as the mixed gas supply pressure is constant. Adjusting the regulator's outlet pressure to be lower than the inlet pressure prevents small changes in upstream, mixed gas, pressure from affecting gas flow through the manifold, to the four gas distribution manifold panels, to the 42 flow meters. Reducing the pressure output setpoint of the regulator reduces gas flow to all 42 GEM channels simultaneously.

Two Bourdon tube pressure gauges are mounted to the panel to indicate inlet and outlet side pressures of the pressure regulator, at the panel. An $I^2C$ pressure transducer on each side of the pressure regulator allows remote monitoring, via EPICS, of the inlet and outlet side pressures of the pressure regulator.

The pressure control panel has pipe thread and push-to-lock connections. Each pipe thread connection was checked using the leak check fluid Snoop. The push-to-lock connections were checked using the pressure drop method, where a small volume of gas is isolated and then pressure is monitored over time. A decrease in pressure indicates a leak. No leaks were discovered during testing.

The SBS GEM gas distribution system's pressure control panel maintains a constant gas supply pressure to the downstream flow meters. The panel has been built and tested.