DSG-Designed
Gas Controls and Monitoring Systems

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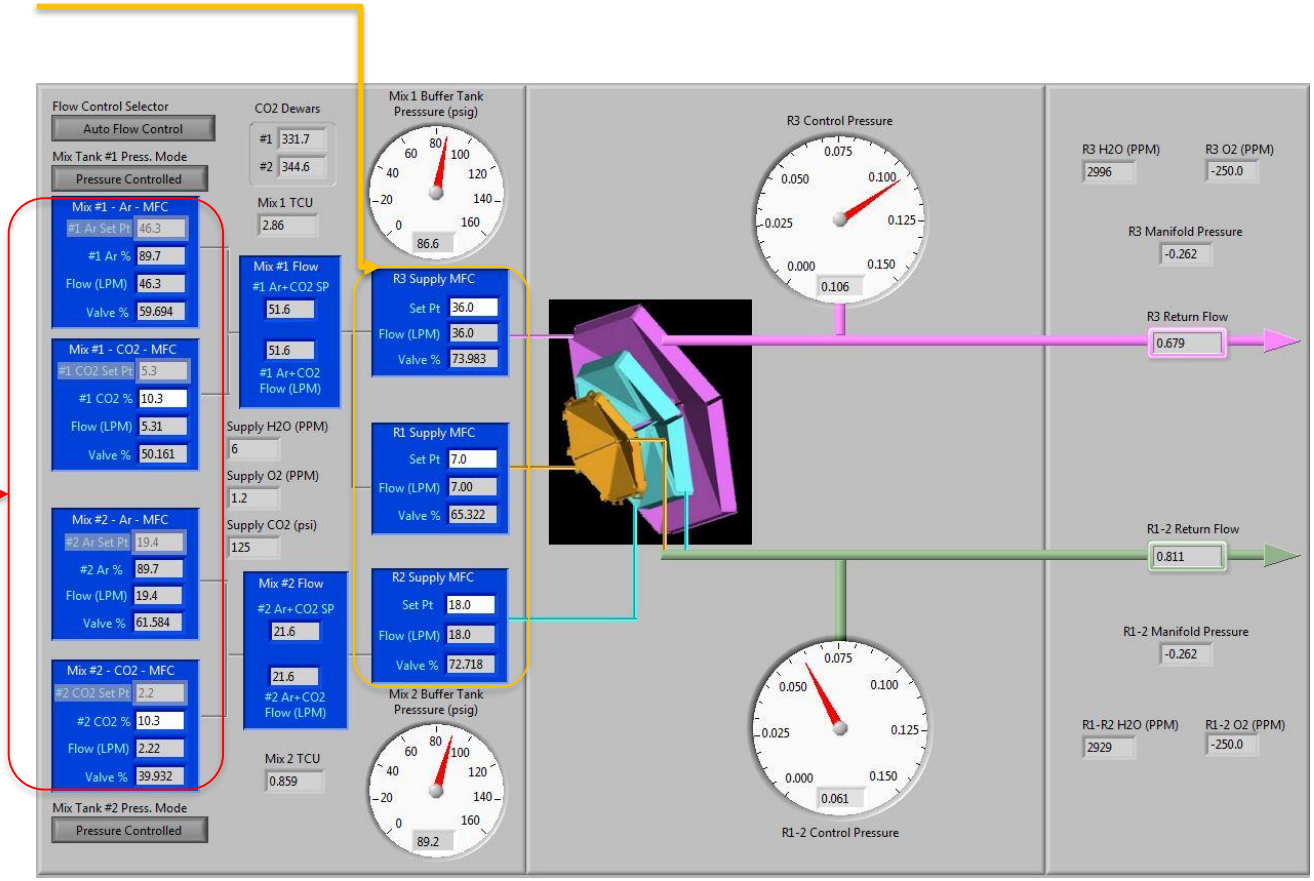
Hall B Detector Gas Controls

- DSG has designed LabVIEW/National Instruments-based operational controls for Hall B gas systems:
  - **Drift Chamber**
    - Two-gas mixing system with automated flow control that auto-adjusts to maintain pressure range in buffer volumes.
  - **MicroMegas Vertex Tracker/Forward Tracker**
    - Two and three-gas, pressure controlled, mixing system. Mixing and pressure controls work similarly to DC.
  - **Low Threshold Cherenkov Counter**
    - Automated, recirculating, pressure controlled, flow loop designed to minimize C_4F_{10} loss.
    - Additional semi-automated PID controlled C_4F_{10} purification system.
  - **High Threshold Cherenkov Counter and Silicon Vertex Tracker**
    - Purge gas system using CO_2 and N_2 respectively.

Drift Chamber Mixing and Regional Supply Controls

Automated mixing system with automatic pressure control for buffer volumes.

- Set point for regional supply MFCs calculate set points for mixing MFCs.
- Mixing MFCs use pressure signals from buffer volumes to increase or decrease flow into buffer tanks to maintain safe pressure range.



DC tab on Hall B Gas Controls GUI

LabVIEW/NI-Based Gas Controls System

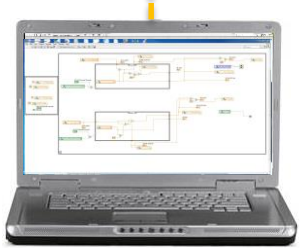
Network switch

LabVIEW code

Gas flow control and monitoring

LabVIEW code

System monitoring



PC with LabVIEW software

NI 9035 cRIO

GUI controls

Sensor signal

MFC reset control

Gas controls interface chassis

MFC power chassis

MFC power

MKS GE50/250 mass flow controller

Sensor signal

Sensor power

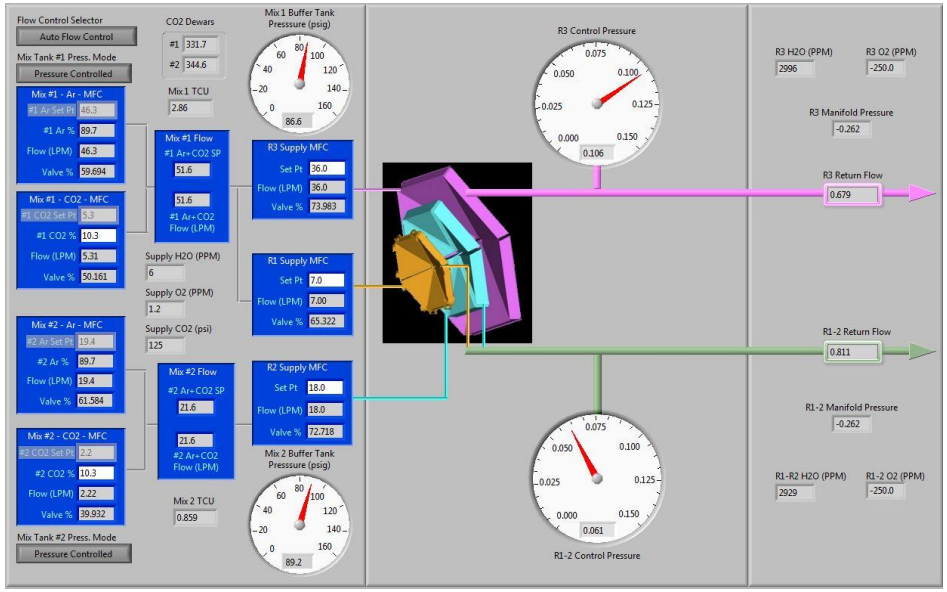
System sensor

Conclusion

- DSG designed and built hardware and software to control multiple gas systems using LabVIEW software, National Instruments controls, and precision instrumentation.
- System controls flow of gas and provide data to EPICS monitoring and alarm handling system.
- All Hall B systems are operational.
  - —Next upgrade will be Radial Projection Time Chamber, a premixed $HeCO_2$ supply system.

END

(Backup) DC Gas Controls Diagram



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