



# BoNuS Gas Controls

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# BoNuS Gas Controls

- Bound Nucleon Structure Experiment (hence BoNuS)
- For the gas controls there are 2 main parts:
  - Detector Gas (pre-mixed 20% CO<sub>2</sub> / 80% He)
    - ✓ RTPC - Radial Time Projection Chamber
    - ✓ DMS – Drift Monitoring System
  - Target Gas (Flammable Gas [D<sub>2</sub> or H<sub>2</sub>] or Non [He<sub>4</sub> or N<sub>2</sub>])
    - ✓ Kapton Straw
  - Also a buffer volume of He<sub>4</sub>

# Detector Gas - Hardware

- All located on gas panel
  - Mounted on a movable cart on beamline in Hall B
- 1 MFC
  - Allows for different gas selection and flow control
- 2 Pressure Transducers
  - 1 for absolute (RTPC pressure) and 1 differential (RTPC vs DMS)
- 2 RTDs
  - 1 for RTPC and 1 for DMS

# He<sub>4</sub> Buffer Volume - Hardware

- Located on gas panel
- 1 Solenoid Valve
  - Gas Supply
- 1 Pressure Transducer
  - Differential (volume vs ambient)

# Target Gas - Hardware

- Split between gas panel and gas pad
- Gas Panel
  - 2 Solenoid Valves (supply & return)
  - 2 Pressure Transducers (supply & N2 Purge)
- Gas Pad
  - 2 Solenoid Valves (flammable and non-flammable gas supply)
  - 1 Pressure Transducer
  - 1 MFC

# Hardware Status

- Gas panel is assembled and working in EEL/125
- Cable length is long enough (50ft) to be used in Hall B
- Gas Pad hardware is in-hand
  - Installation is ongoing
- cRIO modules installed on Space Frame (after moving to L1)

# Software Status

- Detector Gas software written for standalone cRIO test stand
  - Only handles controls
  - Easily converted when moved to SF cRIO
- Target Gas software currently being implemented
  - Different modes to the system
    - ✓ Auto/Manual, Flammable/Non-Flammable Gas, Purge
  - Interlocks

# Current Issues

- Additional signals have been added
  - At least 1 more RTD for detector
  - Flammable Gas Sensor
  - SF cRIO has 1 more free slot, as long as no more signals are added should be enough
- Cabling
  - cRIO to gas pad will use existing cables
    - ✓ Assumes Fire Protection signs off
  - cRIO to gas panel is known
    - ✓ Cables already fabricated for EEL testing will work in Hall B
  - Still need cables between cRIO & Detectors (RTDs mainly)



# Current Issues cont'd

- Target Gas is using MFC in place of MFM
  - Best way to accomplish this?
- Interlocks
  - Several faults have “secure HV” as a step, how is this done?

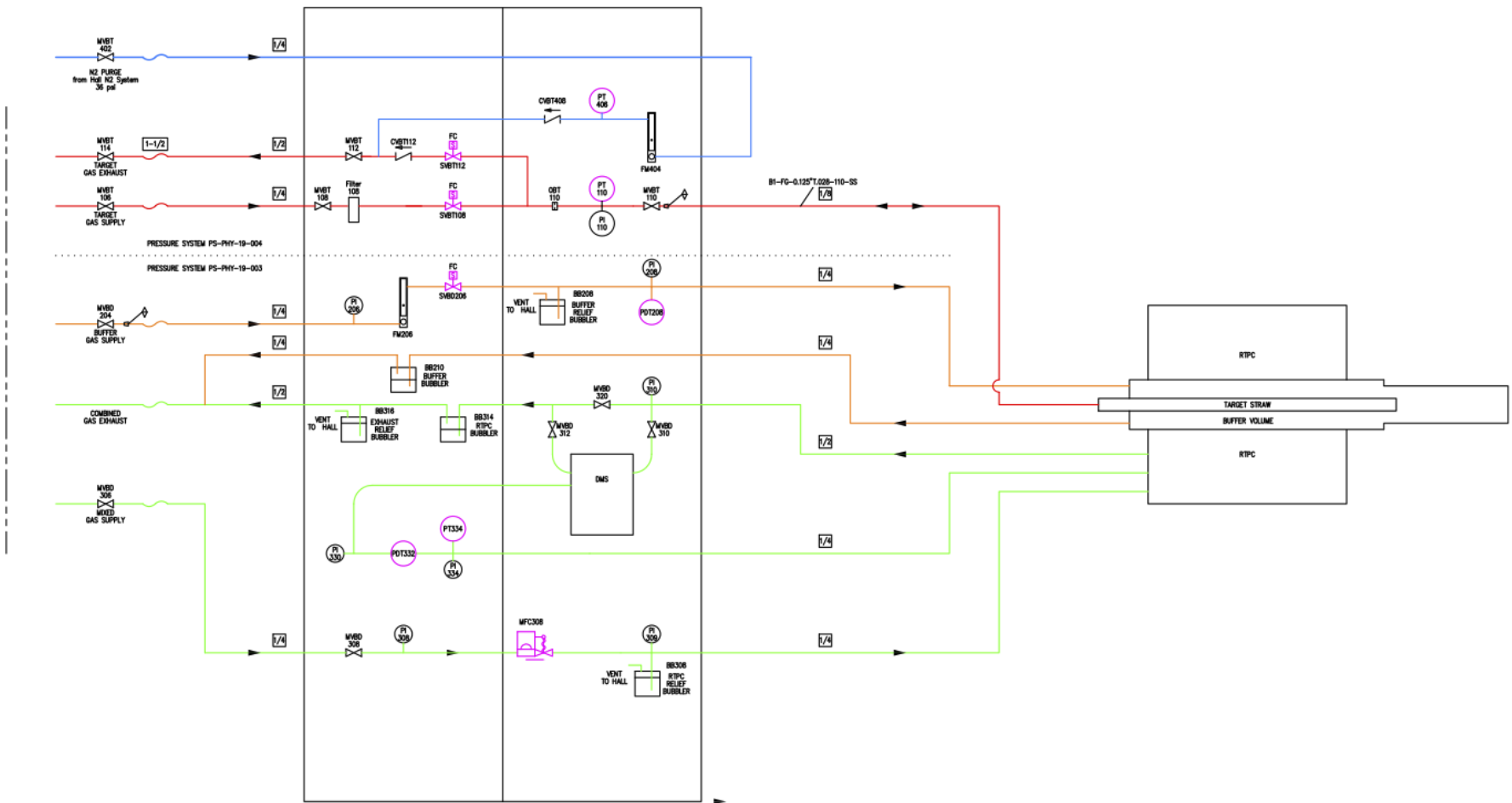
# Overall Status

- Detector gas
  - Nearly all the hardware is installed/tested
    - ✓ RTDs only outstanding ones
  - Software can be considered feature complete
    - ✓ Add faults later (basically turning off the gas), but is quick/easy
- Target gas
  - Hardware is only partially installed, nothing tested yet
  - Software is in progress, but has outstanding issues to be solved
- Buffer gas
  - Hardware installed, but not tested
    - ✓ Simple setup that will be quick/easy to get operational

# Extras



# P&ID – Hall B



# Cable Lengths

