

ALERT Gas System

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Contents

Gas System.....	2
Target Gas System.....	2
Helium Purge System.....	2
DC Gas System	2
P&ID Description.....	2
Gas Supply.....	2
Flow Control.....	2
Pressure Control	2
Failure Modes	3
Components.....	3
Buffer Tank.....	3

Gas System

Target Gas System

Same as Bonus

Helium Purge System

Same as Bonus

DC Gas System

P&ID Description

Nov 2023

Gas Supply

Four premixed K bottles of 80% helium / 20% CO₂ are located in the Hall, level 1 near the space frame. The bottles are all open in parallel to provide a consistent mix to the drift chamber. The bottle mix can vary by a few tenths of a percent, so running them in parallel should give a more consistent mix. This was requested during the Bonus experiment.

Flow Control

The flow of ~ 10 lph to the DC is controlled by MFC 308. An over pressure bubbler is located after the MFC, before the DC to protect the DC in case of excessive flow.

Pressure Control

The gas returning from the DC goes to the 12L buffer tank with 2 absolute pressure transducers. The gas flows out of the buffer tank past an under pressure bubbler, then to MFC316. The gas then flows to solenoid valve 316, then to the exhaust fan, which transfers the gas to the exhaust header and out of the Hall.

The cRIO reads the pressure in the buffer tank via PT312 and PT314, and controls MFC316, SV316, and the exhaust fan to maintain the pressure at ~1050 mbar in the buffer tank. The buffer tank is directly connected to the DC, therefore, the DC pressure is controlled. The flow is so low, that the pressure drop from the DC to the buffer tank is less than 1 mbar, which is negligible.

Failure Modes

Failure	Response
Loss of power	MFC308, MFC309, MFC316, SV316 close, exhaust fan off, DC pressure is limited by both bubblers
PT312 or PT314 read out of band	MFC308, MFC309, MFC316, SV316 close, exhaust fan off, DC pressure is limited by both bubblers, alarm set
MFC308 fails open	MFC309 shows too much flow, and closes, then PT312 or PT314 read out of band, alarm set
MFC308 fails closed	Flow stops, alarm set
MFC309 fails open	Alarm set
MFC309 fails closed	Alarm set
MFC316 fails open	PT312 or PT314 read out of band
MFC316 fails open	PT312 or PT314 read out of band
Exhaust fan fails	PT312 or PT314 read out of band
SV316 fails closed	PT312 or PT314 read out of band

Components

Buffer Tank

BROWSE CATALOG

McMASTER-CARR.

air tanks

Horizontal ASME-Code Compressed Air Storage Tank

Primed Steel, 3 Gallon Capacity



\$356.04 Each

In stock

9888K12

Each

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Mobility Stationary

Mounting Orientation Horizontal

Mounting Plate Without Mounting Plate

Material Primed Steel

Capacity 3 gal.

