

System for the control of various gases for a rocket launch pad: Case Study

This project dictated a compact design providing high flow dynamics and close and accurate control of the three main gases used for launching of a multi-stage rocket. The individual gases lines for nitrogen, helium and air, (which are needed for blanketing, propulsion, and command functions respectively) are each supplied from a 400 Bar (6000 PSI) source through a series of distribution units to the main regulation and control stations.

The control of each supply line – 30 in total – is afforded by stop valves, electro-pneumatic stop valves, regulators, and check valves. To meet with the overall space envelope of the installation, the cartridge valve system was chosen over conventional valves.



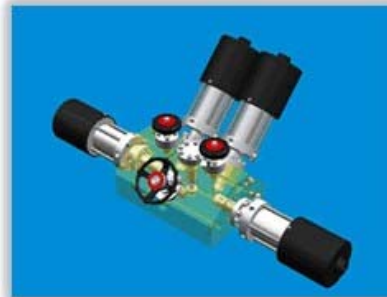
Gas Control System for Rocket Launch Pad

This project required a compact design with high flow characteristics and close control. Individual gas lines each being supplied from a 400 bar (6000 psi) source were routed through the individual blocks. The control of each supply line is afforded by stop valves check valves, electro-pneumatic stop valves, and regulators. The versatility of the cartridge valve system allows our designers to mix and match different types of valves into one forged block, enabling the grouping of over pressure protection, pressure regulation and on/off control in one block. The three blocks are connected by suitable piping.

Inlet Block

This block reduced the pressure from the main incoming supply to various set points depending on the application. Accuracy of the set point was better than $\pm 2\%$. Two stage reduction was provided for where the pressure reduction was large. Over pressure protection was ensured by fitting relief valves.

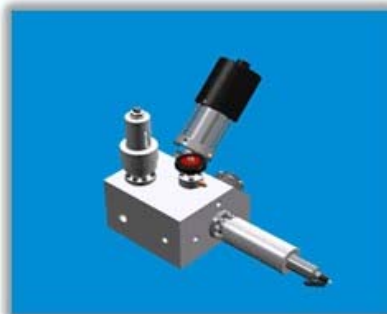
- Cartridges installed**
- 1x 801 Stop Valve
 - 1 x 804 Filter (20 micron absolute)
 - 2 x 316 Gauge valves
 - 2 x 806 Actuated stop valves
 - 2 x 806 Actuated stop valves (reduced orifice)



Control Block

This block reduced the pressure from the main incoming supply to various set points depending on the application. Accuracy of the set point was better than $\pm 2\%$. Two stage reduction was provided for where the pressure reduction was large. Over pressure protection was ensured by fitting relief valves

- Cartridges installed**
- 2 x 817 Regulators with integral filter
 - 1 x 822 Relief valves
 - 1 x 806 Actuated stop valve
 - 1 x 802 Check valve
 - 2 x 316 Gauge valves

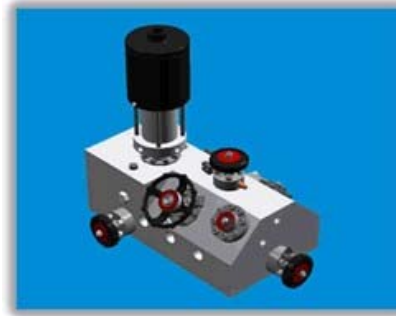


Outlet Block

This block controlled the output to the main launch pad gantry, utilizing actuated stop valves. Venting of the system back to either a recovery system in the case of Helium or to atmosphere was again provided for by actuated stop valves. The total system is controlled from a remote point.

Cartridges installed

- 1 x 801 Stop valve
- 1 x 806 Actuated stop valve
- 1 x 802 Check valve
- 2 x 316 Gauge valves



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