

4" Cryogenic Fill and Drain Valve

VACCO's 4" Cryogenic Fill and Drain Valves, LH₂ and LO₂, are pneumatically actuated butterfly elements that control high-rate propellant system filling and draining.

VACCO's robust, double offset, shaft mounted butterfly design has a 25-year service record and is SATURN S-IVB qualified. VACCO developed electromechanical actuators for specific valve applications that may be adaptable as a design option.



Features

- Pneumatic actuator
 - Closes or opens valve
 - Removable from valve housing
- Holds neutral, closed position without applying pneumatic actuation pressures
- Double offset butterfly pivot
 - Minimizes seal drag and wear
 - Improves leakage
- Robust rack and pinion mechanism pivots butterfly
- Electrical position indicator device
 - Pinion mounted in actuator
 - Dual redundant indicator switches—two open and two closed
- Removable modular back pressure relief assembly

Operating Parameters

Valve

Operating Pressure	55 psig
Proof Pressure	315 psig
Burst Pressure	525 psig

Actuator

Operating Pressure	475 +/- 25 psig
Proof Pressure	773 psig
Burst Pressure	1,273 psig

Response Time 1.5 sec max

Leakage at Operating Pressure, Cryo

GHe at LO ₂ temp.....	100 SCCM max
GHe at LH ₂ temp.....	300 SCIM max

Relief Valve

Cracking Pressure..... 30 to 50 psid

Reseat Pressure 0 to 25 psid

Relief Flow, LO₂..... 60 lbs/min

Fill Flow Rate and Pressure Drop

LO₂..... 9,500 lbs/min at 4.1 psi

LH₂..... 1,770 lbs/min at 2.3 psi

Drain Flow Rate and Pressure Drop

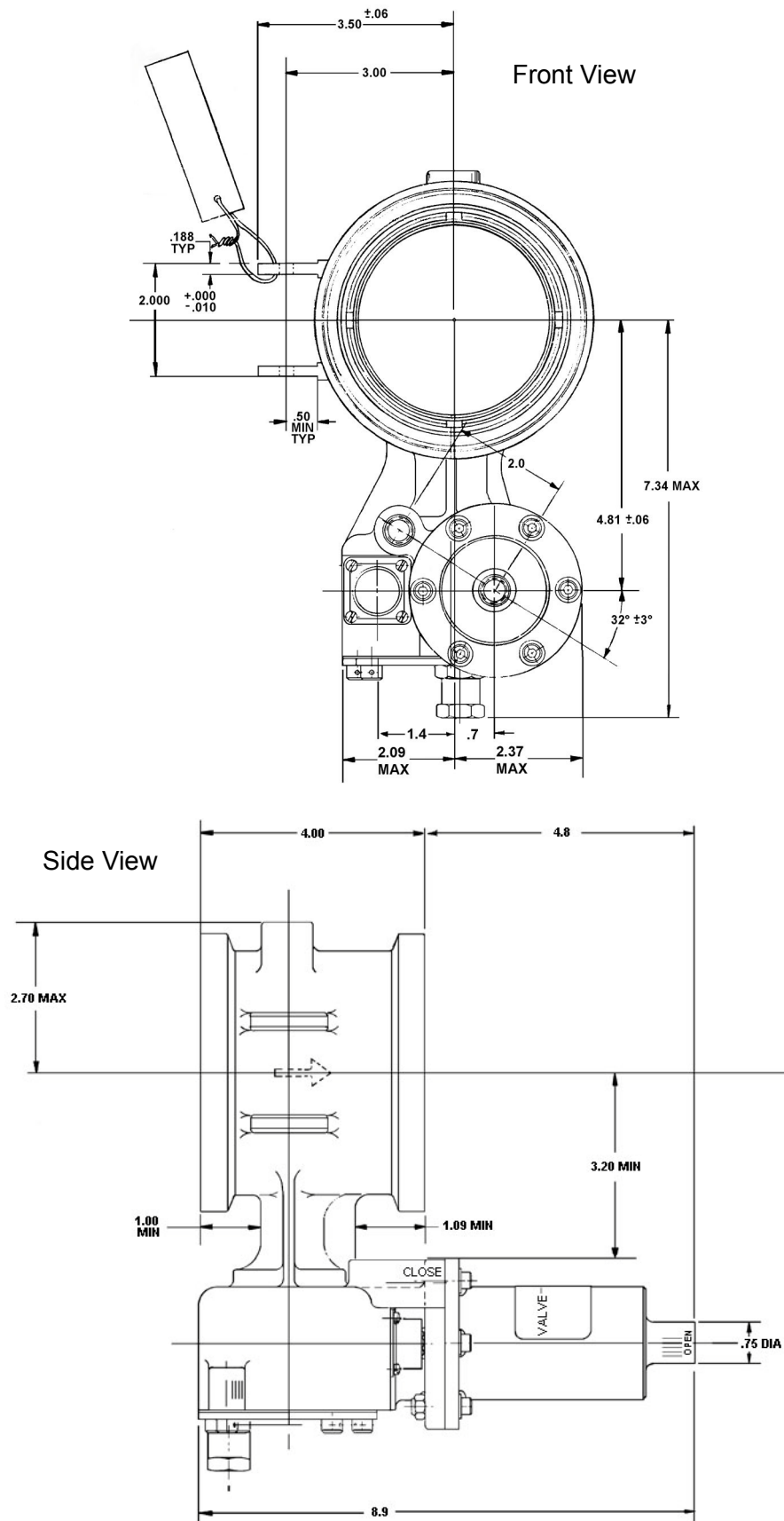
LO₂..... 4,750 lbs/min at 1.0 psi

LH₂..... 1,090 lbs/min at 0.9 psi

Weight..... 8.0 lbs max

Operating Life 2,000 Cycles

Performance characteristics are based on customer requirements. As such, they are not representative of component capabilities or limitations.



8" Fill and Drain Butterfly Valve

VACCO's 8" Cryogenic Fill and Drain Valve is a pneumatically actuated butterfly valve element that supports system filling and draining. A dual offset configuration pulls off the butterfly valve element away from spring-energized seals prior to rotation to maximize seal life and improve leakage.

This butterfly preclude supports a propellant system chill down and controls propellant flow—preventing inadvertent bypass to the Main Propulsion System. It also facilitates the propellant system drain in the event of a scrub. VACCO's robust butterfly valve design has a 25-year service record and is Space Shuttle qualified.



Features

- Dual motion mechanism
 - Maximizes seal life
 - Improves leakage
- Pneumatic actuator
 - Closes valve
 - Removable from valve housing
- Holds neutral position without applying pneumatic actuation pressures
- Robust rack and pinion mechanism rotates the butterfly valve element
- Removable electrical position indicator device signifies open or closed positions
- Two relief valves prevent excessive pressure on the downstream (outlet) side when valve is closed
- Butterfly support roller bearings capable of high loads

Operating Parameters

Main Valve Pressures

Operating.....	275 psig
Proof.....	357 psig
Burst.....	413 psig

Burst Actuator Pressures

Operating.....	400 to 740 psig
Proof.....	1,275 psig
Burst.....	1,700 psig

Response Time

Opening.....	5 to 9 sec
Closing.....	5 to 9 sec

Leakage at Operating Pressure, Ambient

GHe.....	100 SCIM
GN ₂	500 SCIM

Flow Rate

LO ₂	5,000 gal/min
LH ₂	12,000 gal/min

Pressure Drop

LO ₂	5.0 psid, F.D. at 130 psig inlet
LO ₂	3.3 psid, D.D. at 130 psig inlet
LH ₂	1.1 psid, F.D. at 35 psig inlet
LH ₂	1.2 psid, D.D. at 35 psig inlet

Performance characteristics are based on customer requirements. As such, they are not representative of component capabilities or limitations.

