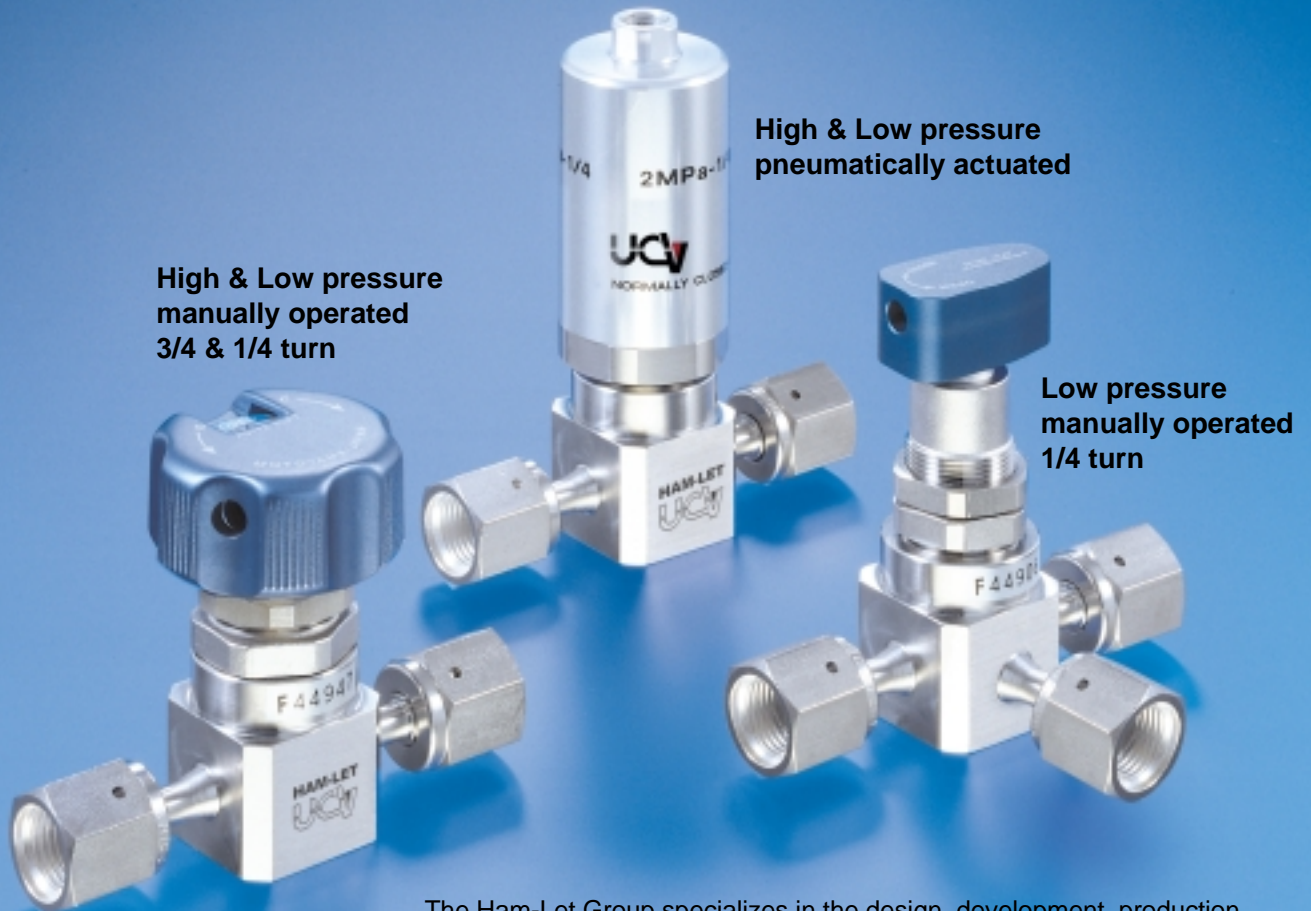


High and Low Pressure Diaphragm Valves

UCV^{HM} SERIES



**High & Low pressure
manually operated
3/4 & 1/4 turn**

**High & Low pressure
pneumatically actuated**

**Low pressure
manually operated
1/4 turn**

The Ham-Let Group specializes in the design, development, production and marketing of high quality Valves and Connectors for high pressure, temperature and vacuum applications.

Ham-Let's new ULTRA CLEAN VALVE is designed to improve production quality and minimize wafer defects. This industry innovation achieves Class 10 standards of ultra high purity and is produced in accordance with ASME approval for ISO 9000.

Ham-Let's ULTRA CLEAN VALVE (UCV) ensures maximum cleanliness. UCV valves are produced in a range of sizes from 1/4" to 1/2".

THE HAM-LET SERIES

Ham-Let presents the HM Series Metal Diaphragm Ultra Clean Valve, size 1/4". The HM series valves are suitable for low and high-pressure applications in multi-port configurations (2 port, L-port, 3 port, 4 port). The valve can be operated manually or automatically. Ham-Let UCV valves are assembled, inspected, tested and packaged in a Class 10 Ultra Clean room. Each valve is individually assembled and submitted to pressure testing, functionality tests and a helium leak test.



The HM Series Specifications

Material

Ham-Let UCV HM series valves meet the chemical composition and the mechanical properties of stainless steel 316L according to ASTM A276 specification. The material is manufactured by VIM/VAR process.

Chemical Composition: The body material of the UCV HM series valves complies with SEMI F20 - Sulfur content is lower or equal to 0.01 percent.

Mechanical Size - Dimensional Specification

Ham-Let UCV HM series meet the end-to-end length and overall envelope and comply with SEMATECH Technology Transfer 96063137-ENG.

Packaging

Ham-Let's standard for packing the UCV HM series valves is in a double bag: the inner bag contains ultra pure nitrogen.

All end fittings, threads and sealing surface are protected with a cap to prevent any damage.

Electropolished Surfaces - Surface Finish

Ham-Let UCV HM valves meet **surface defects** of maximum 25 for any one location, with maximum average of 15. This test is done in accordance with SEMASPEC 90120401-STD.

Ham-Let UCV HM valves meet the **Chromium Enhancement** ratio as the chromium to iron ratio $\pm 2:1$, the chromium oxide to iron oxide ration $\pm 3:1$. This test is done in accordance with SEMASPEC 90120403-STD.

Ham-Let UCV HM valves meet the **oxide layer depth** and surface contamination as the depth of the oxide layer ± 20 angstroms after subtraction of the carbon layer. The carbon layer is ± 10 angstroms.

The maximum surface contamination is according to:

Element	Atomic percentage
Carbon	30.0
Sulfur	1.0
Phosphorus	2.0
Silicon	1.5
Nitrogen	2.0

This test is done in accordance with SEMASPEC 91060573-STD.

Surface Roughness

All wetted parts have an average surface roughness (Ra avg) of 5 microinch Ra, and maximum surface roughness (Ra max) of 10 microinch Ra, complying with ISO 4288.

Helium Testing

All valves are 100% helium leak tested. Helium leak tests are performed using a helium leak detector machine with a sensitivity of 1×10^{-10} atm cc He/sec. The standard leak rate tests are listed below.

Lower leak rates are optional on request:

Maximum Helium (He) leak ratings:

Inboard leak integrity $\pm 3 \times 10^{-10}$ atm cc/sec. Complies with SEMI F1.

Outboard leak integrity $\pm 3 \times 10^{-10}$ atm cc/sec. Complies with SEMI F1.

Leak across the seat $\pm 3 \times 10^{-10}$ atm cc/sec. This test is done in accordance with SEMASPEC 90120391B-STD (held for at least 15 seconds).

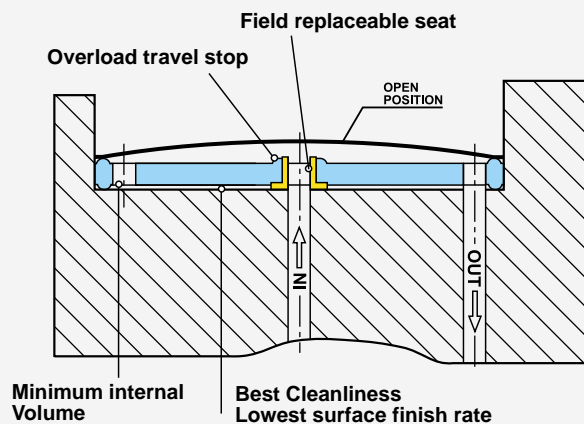
Particles

The valves standard particles contribute ± 20 particles/ft³ for particles ± 0.1 m and ± 75 particles ± 0.02 m for static and dynamic tests, according to SEMASPEC 90120390-STD.

Moisture Testing

The valves standard moisture level is ± 20 ppbv H₂O in Nitrogen baseline or less, within 4 hours after 2 ppmv spike for 1 minute at flow rate of 1.5 SLM or less, according to SEMASPEC 90120397-STD.

Double sealing concept -Design feature



Cleaning

All CNC processed valve parts are cleaned to ensure that they are free of emulsion composition and residues involved in the machining process.

Reliability

The valves demonstrate a MTTF of more than 3 million cycles for pneumatic valves and more than 100,000 cycles for manual valves, in accordance with SEMASPEC 90120395-STD and 90120390-STD.

UCV HM Specifications

Structure	Direct seal metal diaphragm valve without seal packing Manually operated
Item pressure - Low Pressure	Vacuum to 300 PSI (20 bar)
Item pressure - High Pressure	Vacuum to 2300 PSI (165 bar)
Temperature: Standard Available	14 to 104°F, -10 to 60°C (PCTFE Seat) 32 to 302°F, -10 to 150°C (*VespeI Seat)
Leakage:	Inboard Leakage: $\uparrow 1 \times 10^{-9}$ atm cc He/sec Outboard Leakage: $\uparrow 1 \times 10^{-9}$ atm cc He/sec Leakage across the seat: $\uparrow 1 \times 10^{-9}$ atm cc He/sec
Particle	No particle detected above 0.1µm.
Operated	Round handle 1/4 and 3/4 turn **Oval handle 1/4 turn
Connections	Face seal or tube weld
Cv value - Low Pressure	0.3
**Cv value - High Pressure	0.1
Valve lift	LP-0.024", 0.6 mm; HP-0.01", 0.3mm
Direction	2 port straight, 2 port L, 3 port, 4 port
Surface finish Ra (Ave)-Standard	5µin
Surface finish Ra (Max)-Standard	10µin

LP-Low pressure, HP-High pressure *Used with Viton O-ring **Currently available for low pressure ***Currently available

Materials of Construction

Item No.	PART No.	MATERIAL
*1	Body	**Stainless steel, 316L Vim/Var
*2	Seat	**PCTFE [®] , VespeI [®] , Metal
*3	Seat holder	Stainless steel, 316L Vim/Var
*4	Diaphragm polished	Ni-Co Alloy super-polished
5	Diaphragm non-polished	Ni-Co Alloy non-polished
6	Act. button	Stainless steel, AISI 304, ball AISI 440C
7	Act. button holder	Stainless steel, ASTM 630 H900
8	Handle & stem Assembly	A6061T6, ASTM 630 H900

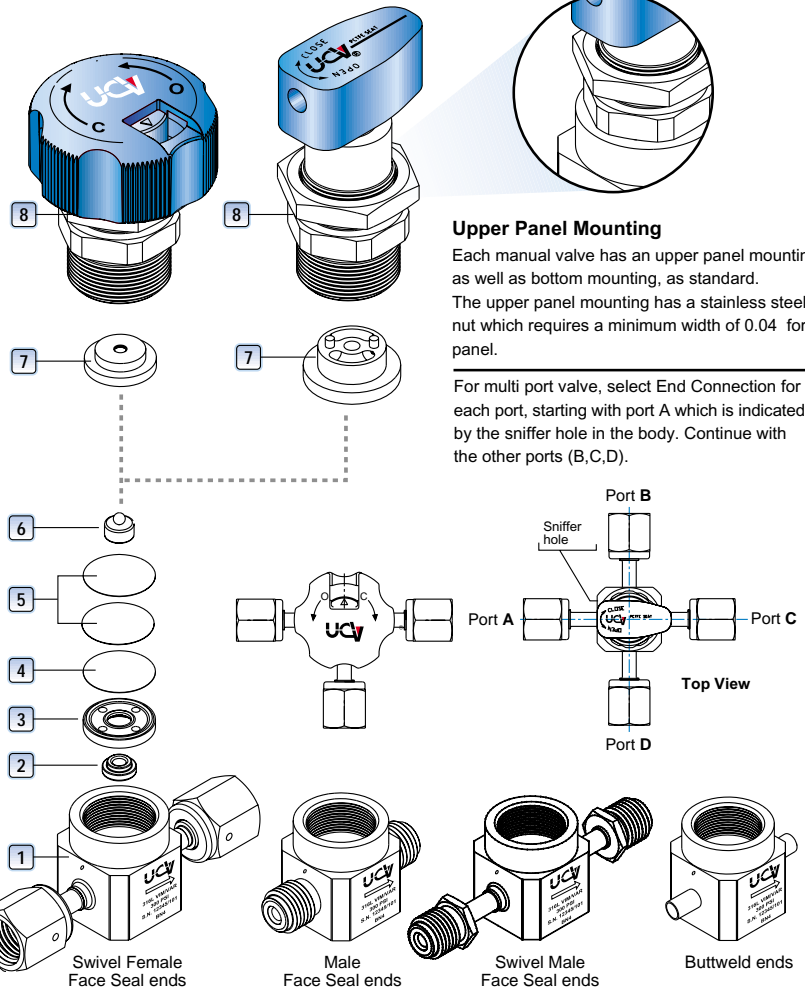
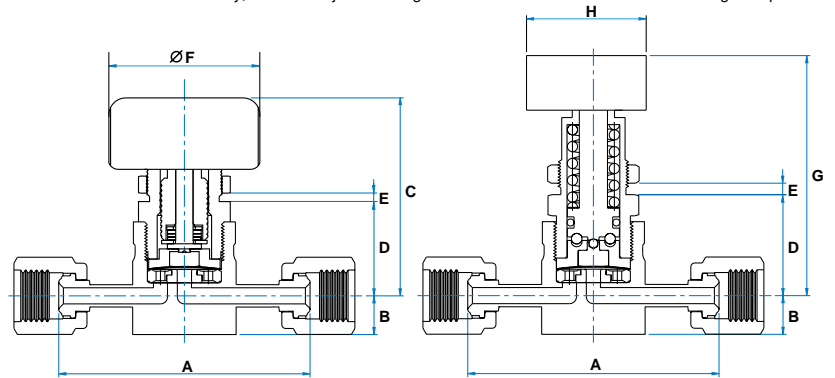
*Wetted parts, ** Standard material

Valve Dimensions - Inch, mm

Size	Connection	A		B		C		D		E*		F		G		H	
		inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm		
1/4	Swivel Female face seal	2.78	70.6	0.44	11.0	2.48	63.0	1.14	29.0	0.04	1.00	1.77	45.0	2.68	68.0	1.34	34.0
1/4	Male face seal	2.30	58.4	0.44	11.0	2.48	63.0	1.14	29.0	0.04	1.00	1.77	45.0	2.68	68.0	1.34	34.0
1/4	Swivel Male face seal	2.78	70.6	0.44	11.0	2.48	63.0	1.14	29.0	0.04	1.00	1.77	45.0	2.68	68.0	1.34	34.0
1/4	Buttweld	1.75	44.4	0.44	11.0	2.48	63.0	1.14	29.0	0.04	1.00	1.77	45.0	2.68	68.0	1.34	34.0

Dimensions are for reference only, and are subject to change.

*Minimum height for panel.



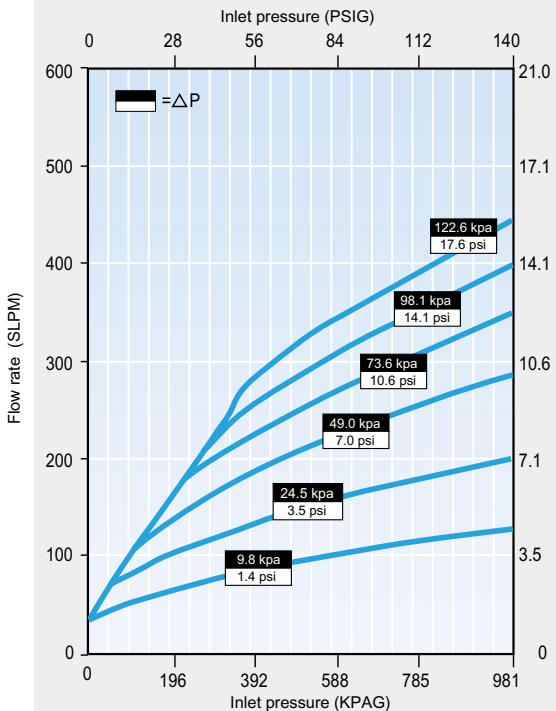
Upper Panel Mounting

Each manual valve has an upper panel mounting as well as bottom mounting, as standard.

The upper panel mounting has a stainless steel nut which requires a minimum width of 0.04" for panel.

For multi port valve, select End Connection for each port, starting with port A which is indicated by the sniffer hole in the body. Continue with the other ports (B,C,D).

Nitrogen Flow for low pressure valve - Cv 0.3



UCV HM Specifications

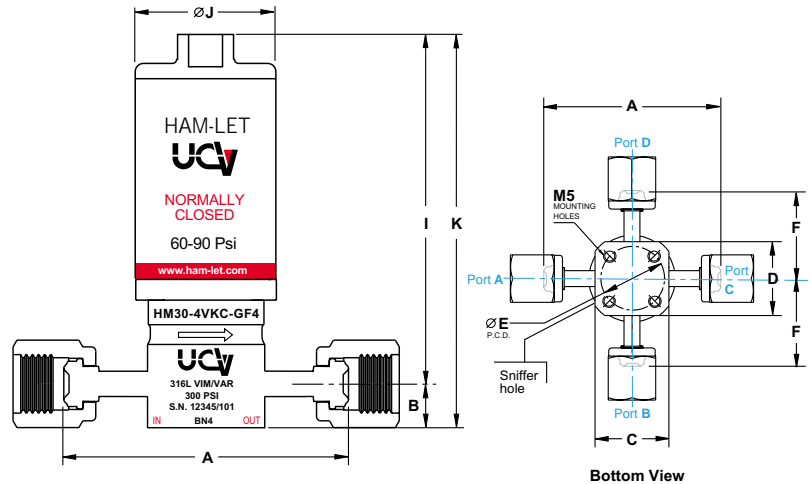
Structure	Direct seal metal diaphragm valve without seal packing Pneumatically operated
Item pressure - Low Pressure	Vacuum to 300 PSI (20 bar)
Item pressure - High Pressure	Vacuum to 2300 PSI (165 bar)
Temperature: Standard Available	14 to 140°F, -10 to 60°C (PCTFE Seat) 14 to 302°F, -10 to 150°C (*Vespel Seat)
Leakage: Inboard Leakage	† 1x10 ⁻⁹ atm cc He/sec
Outboard Leakage	† 1x10 ⁻⁹ atm cc He/sec
Leakage across the seat	† 1x10 ⁻⁹ atm cc He/sec
Particle	No particle detected above 0.1µm.
Operated	Pneumatic, **NC/NO
Connections	Face seal or tube weld
CV value - Low Pressure	0.3
***CV value - High Pressure	0.1
Valve lift	LP-0.024", 0.6 mm
Direction	2 port straight, 2 port L, 3 port, 4 port
Surface finish Ra (Ave)-Standard	5µin
Surface finish Ra (Max)-Standard	10µin
Air supply	60-90 psig , 4 - 6 bar
Air Connection	1/8" NPT

*Used with Viton O-ring **NC-Normally Closed ***Currently available LP - Low pressure NO-Normally Open

Valve Dimensions - Inch, mm

Size	Connection	A		B		C		ØD		E		F	
		inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
1/4	Swivel Female face seal	2.78	70.6	0.44	11.0	1.16	29.4	1.16	29.4	1.00	25.4	1.40	35.3
1/4	Male face seal	2.30	58.4	0.44	11.0	1.16	29.4	1.16	29.4	1.00	25.4	1.15	29.2
1/4	Swivel Male face seal	2.78	70.6	0.44	11.0	1.16	29.4	1.16	29.4	1.00	25.4	1.40	35.3
1/4	Buttweld	1.75	44.4	0.44	11.0	1.16	29.4	1.16	29.4	1.00	25.4	0.87	22.2

The dimensions apply to pneumatic and manual valves.
Dimensions are for reference only, and are subject to change.



Actuator Dimensions - Inch (mm)

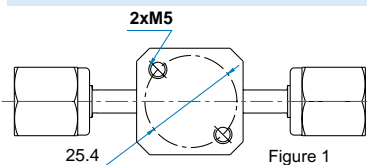
Actuator type	I	ØJ	K	Effective Area	Output force
Low Pressure	3.54 (90)	1.33 (34)	3.98 (101)	1.58 in ²	550 psig
High Pressure	3.42 (87)	1.57 (40)	3.85 (98)	1.86 in ²	3650 psig

Materials of Construction

Item No.	PART No.	MATERIAL
*1	Body	**Stainless steel, 316L Vim/Var
*2	Seat	**PCTFE®, Vespel®, Metal
*3	Seat holder	Stainless steel, 316L Vim/Var
*4	Diaphragm polished	Ni-Co Alloy super-polished
5	Diaphragm non-polished	Ni-Co Alloy non-polished
6	Act. button	Stainless steel, AISI 304, ball AISI 440C
7	Act. button holder	Stainless steel, ASTM 630 H900
8	Actuator Assembly	A6061T6

*Wetted parts, ** Standard material

Panel mounting, two port straight valve - Standard



Optional, four threaded holes.

- All the other valve types have standard four threaded holes.
- Dimensions are according to SEMATECH96063137-ENG.
- The M5 threaded mounting holes will accept 10-32 screws.

