HAM-LET STANDARD PERFORMANCE

UCV®

- Up to Cv of 0.7
- Up to 300 psi
- Air operated and Manual valves

2LM - METERING FLOW

MDDV - FLOW CONTROL WITH MANUAL SHUT-OFF VALVE

2LD - STANDARD FLOW

HM - LEGACY SERIES

2LM SERIES
METERING FLOW

METAL DIAPHRAGM VALVES

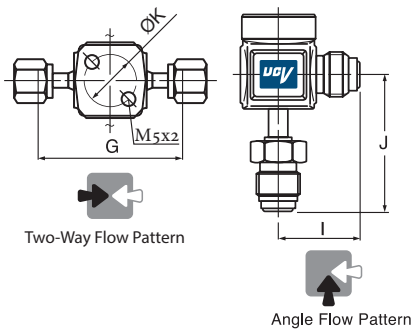
Flow control models from the Ultra-Clean Valve series are made according to UHP specifications. These models come with end connections in the standard 1/4" measurement. Each valve is furnished with a handle-lock set screw with a vernier scale.

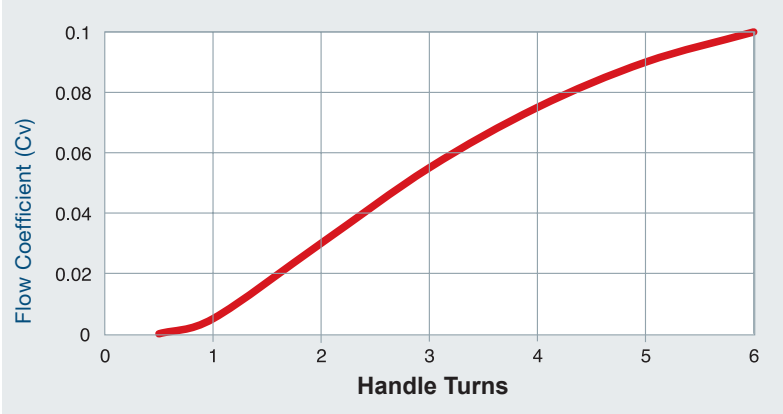
- Broad flow-control range of six and a half handle turns
- Handle-lock set screw on the handle side
- Electropolished surfaces
- Forged body

As these valves are designed to handle flow control tasks, the valve seat is not fully closed even at the position of division 0 on the vernier scale. Do not operate the handle in the direction in which the valve seat is closed past the position of division 0 on the vernier scale.

STANDARD CONFIGURATION DIMENSIONS

Part Number/ep	Size	End Connection	A	B	C	D	E	F	G	I	J	K
	inch		mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
2LMS4V-W	1/4	Extended butt weld	11	98	23	26	2.5	20	47	-	-	17
2LMS4V-BW	1/4	Short butt weld	11	98	23	26	2.5	20	44.4	-	-	17
2LMA4V-BV	1/4	Male HTC®	11	98	23	26	2.5	20	-	26	45	17
2LMS4V-FV	1/4	Swivel female HTC	11	98	23	26	2.5	20	66	-	-	17





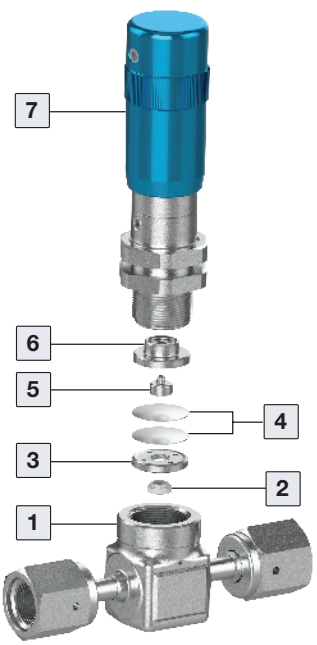
SPECIFICATIONS

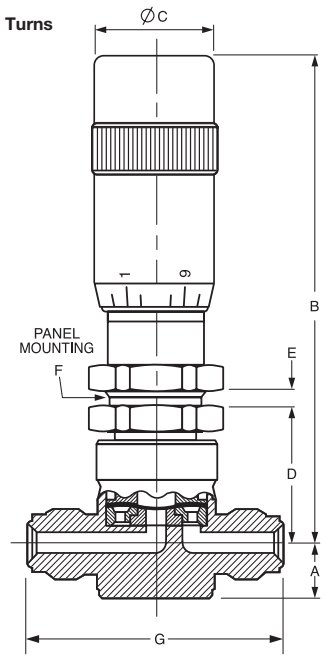
Size	Design Pressure	Burst Pressure	Proof Pressure	Temp.	Cv	Leak Rates	
						Inboard	Across Seat
1/4"	1MPa (150 psi)	31MPa (4500 psi)	1.5MPa (225 psi)	-10 to 60°c (PCTFE) -10 to 150°c (PI)	0.1	$3X10^{-12}$ pa•m³/sec helium	Not a shutoff valve

MATERIALS OF CONSTRUCTION

Item No.	Parts	Material
1	Body	SST, 316L Var or Vim/Var[1]
2	Seat	PCTFE/PI (Polyimide)
3	Seat holder	SST, 316L Var or Vim/Var[1]
4	Diaphragm	Co-Cr-Ni alloy
5	Act. button	304 SST
6	Act. button holder	SST, ASTM 630 H900
7	Actuation device	Aluminum

[1]Per SEMI F20-0305





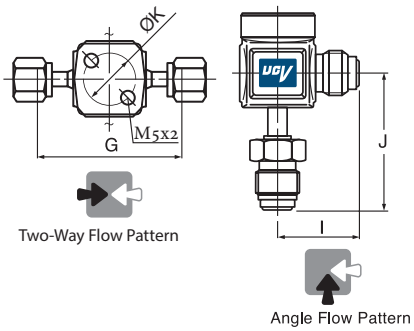
MDDV SERIES
FLOW CONTROL WITH MANUAL SHUT-OFF VALVE

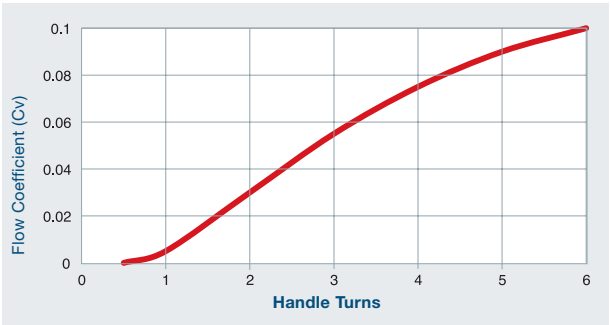
METERING DUAL DIAPHRAGM VALVE

The Shut-Off Flow Control Diaphragm valve series provides high performance with accurate metering flow and reduces potential leak points. The MDDV series features allow accurate flow control and shut-off operation with the same valve which saves space and installation costs. The flow control capacities can supply accurate Cv=0.1 with up to six, handle turns. The MDDV series provides a full response to the high demand for accurate flow control.

STANDARD DIMENSIONS

Part Number/ep	Size	End Connection	A	B	C	D	E	F	G
	inch		mm	mm	mm	mm	mm	mm	mm
MDDVS4V-FV	1/4	Swivel female face-seal	69.5	99.6	23	59.6	45	70.6	29.4
MDDVS4V-MV	1/4	Swivel male face-seal	69.5	99.6	23	59.6	45	70.6	29.4





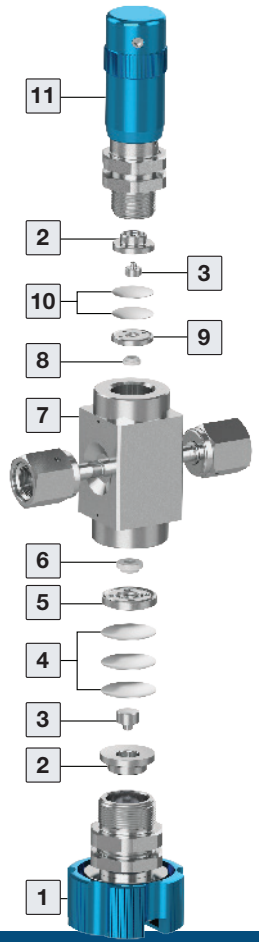
SPECIFICATIONS

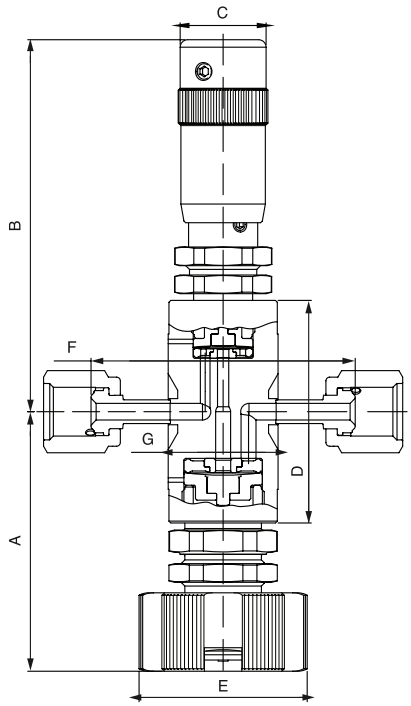
Size	Design Pressure	Burst Pressure	Proof Pressure	Temp.	Cv	Leak Rates	
						Inboard	Across Seat
1/4"	1MPa (150 psi)	31MPa (4500 psi)	1.5MPa (225 psi)	-10 to 150°C (Polyimide) -10 to 60°C (PCTFE)	0.1	$3X10^{-11}$	$3X10^{-9}$

MATERIALS OF CONSTRUCTION

No.	Parts	Material
1	Flow control handle	Aluminum, SST
2	Act. button holder	SST 17- 4PH
3	Act. button	SST 316
4	Diaphragm	Nickel alloy
5	Seat holder	SST, 316L Var or Vim/Var[1]
6	Seat	PCTFE
7	Body	SST, 316L Var or Vim/Var[1]
8	Seat	PCTFE
9	Seat holder	SST, 316L Var or Vim/Var[1]
10	Diaphragm	Nickel alloy
11	Handle and stem assembly	Aluminum, SST

[1]Per SEMI F20-0305





2LD SERIES
STANDARD FLOW

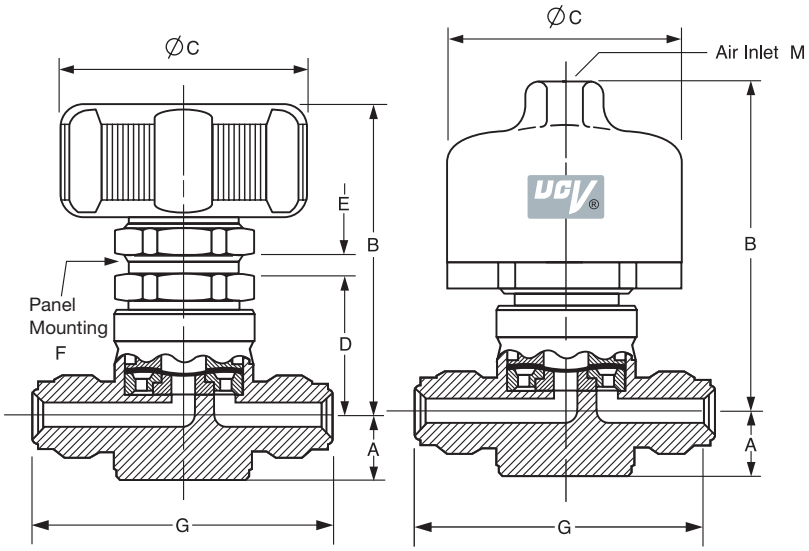
METAL DIAPHRAGM VALVES

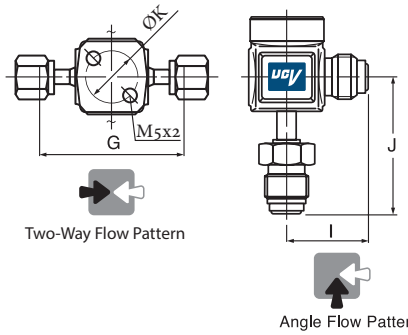
Standard models from the Ultra-Clean Valve series are made according to UHP specifications. This model comes with end connections in three standard sizes: 1/4", 3/8" & 1/2" and fits comfortably into high-flow applications.

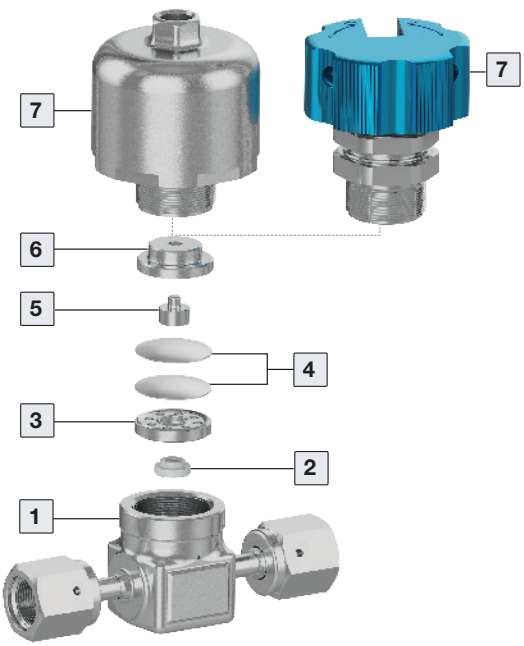
- Unique seat structure offers superb leak performance
- Compact designs for minimum footprint
- Electropolished surfaces
- Forged body

STANDARD DIMENSIONS

Part Number/ep	Size	End Connection	A	B	C	D	E	F	G	H	I	J	K	M
	inch		mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	inch
2LDA4R-BV	1/4	Male HTC	11	63	45	29	(4)	23	58.0	25	29	45	25	-
2LDS4C-W	1/4	Extended butt weld	11	65	46	-	-	-	89.0	-	-	-	25	1/8
2LDS4C-BW	1/4	Short butt weld	11	65	46	-	-	-	44.4	-	-	-	25	1/8
2LDS6R-W	3/8	Extended butt weld	17.5	67.5	45	32.5	(4)	23	105	38	-	-	28	
2LDS8C-FV	1/2	Female HTC	17.5	73.5	56	-	-	-	100	-	-	-	28	1/8
2LDS8C-W	1/2	Extended butt weld	17.5	73.5	56	-	-	-	105	-	-	-	28	1/8







SPECIFICATIONS

Size	Design Pressure	Burst Pressure	Proof Pressure	Temp.	Cv	Leak Rates	
						Inboard	Across Seat
1/4"	1MPa (150 psi)	31MPa (4500 psi)	1.5MPa (225 psi)	-10 to 60°c (PCTFE) -10 to 150°c (PI)	0.3	$3X10^{-12}$ pa•m³/ sec Helium	$3X10^{-10}$ pa•m³/sec Helium
3/8"					0.7		
1/2"					0.7		

MATERIALS OF CONSTRUCTION

Item No.	Parts	Material
1	Body	SST, 316L Var or Vim/Var[1]
2	Seat	PCTFE/PI (Polyimide)
3	Seat holder	SST, 316L Var or Vim/Var[1]
4	Diaphragm	Co-Cr-Ni alloy
5	Act. button	304 SST
6	Act. button holder	SST, ASTM 630 H900
7	Actuation device	Aluminum

[1]Per SEMI F20-0305

ORDERING INFORMATION

2LD S 4 C - BV - P

Valve Series	
2LM	Flow control
2LD	Standard
MDDV	Flow control shut off valve

Valve Type	
S	Two-port valve (straight)
A	Two-port valve (angle)

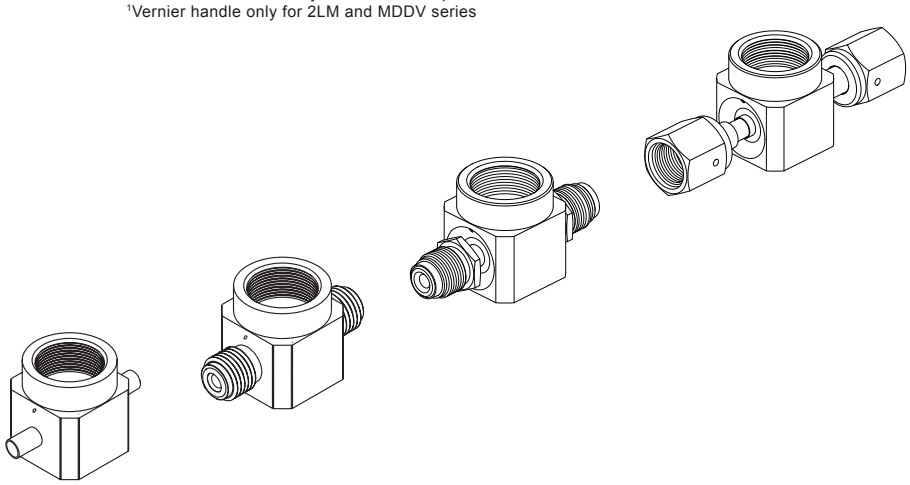
Body Size	
4	1/4"
6	3/8"[1]
8	1/2"

End Connection	
BV	Male face seal[1]
V	Male face seal for EV/EVH series[1]
MV	Swivel male face seal[1]
FV	Swivel female face seal[1]
W	Extended butt weld
BW	Short butt weld
BI	LET-LOK

Feature	
P	Polyimide seat
PFA	PFA seat
SD	Safe device
LD	Lock device
ISLT	LOTO device

Actuation Device			
C	Air operated N.C	**Q**	Oval handle 1/4" turn
O	Air operated N.O	**V**	Vernier handle[1]
R	Round handle		

For other colors contact your local UCT representative.
[1]Vernier handle only for 2LM and MDDV series



- Standard seat: PCTFE
- For valves that are made of bar stock

For your convenience, port converstion of old HMJ valves to current HM series:
A = 30 | **B** = 35 | **C** = 34 | **D** = 31 | **E** = 32 | **F** = 33

Warning!

The system designer and user have the sole responsibility for selecting products suitable for their special application requirements, ensuring their safe and trouble-free installation, operation, and maintenance. Application details, material compatibility and product ratings should all be considered for each selected product. Improper selection, installation or use of products can cause property damage or personal injury.

HM SERIES
LEGACY SERIES MANUAL VALVES

The manually operated Ultra-Clean Diaphragm Valves are for medium and low-pressure applications. The HM series is designed and manufactured per SEMI F-20 material specifications. The valves include a flexible port design with butt weld and face-seal end connections.

MATERIALS OF CONSTRUCTION

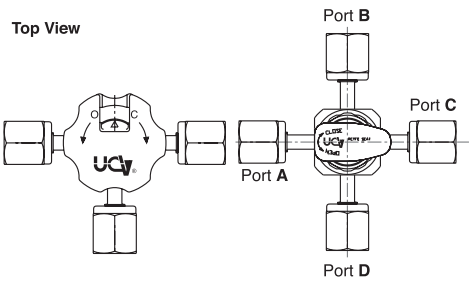
Item No.	Part No.	Material
1	Body[2]	SST, 316L Var or Vim/Var[1 3]
2	Seat[2]	PCTFE, Polyimide**
3	Seat holder[2]	SST, 316L Var or Vim/Var[1 3]
4	Diaphragm[2]	Co-Cr-Ni alloy
5	Act. button	SST, AISI 304, Ball AISI 440C
6	Act. button hHolder	SST, ASTM 630 H900
7	Handle & stem assembly	A6061T6, ASTM 630 H900

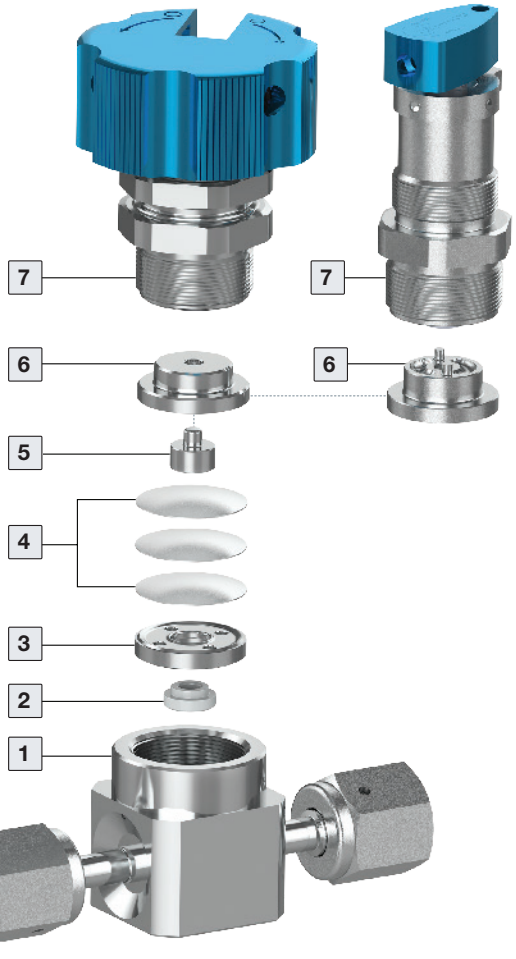
[1]Per SEMI F20-0305 | [2]Wetted parts | [3]Standard material

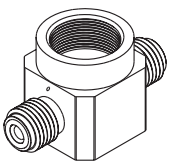
PANEL MOUNTING

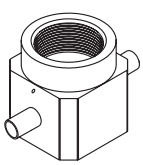
Each manual valve has an a standard upper panel mounting and bottom mounting. The upper panel mounting has a stainless steel nut, which requires a minimum width of 0.04" for panel mounting.

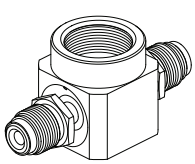
For multi-port valves, select the end connection for each port, starting with port A as shown below.









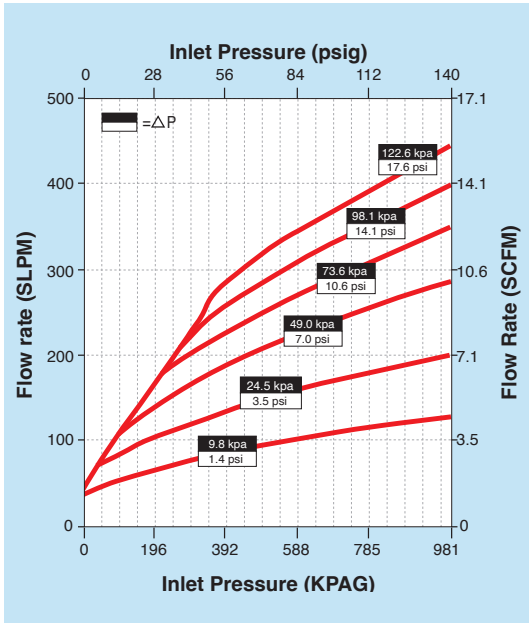


UCV SPECIFICATIONS

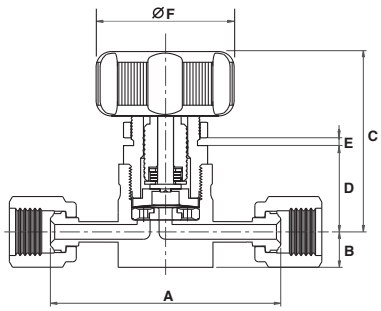
Structure	Direct-seal metal-diaphragm valve without seal packing manually operated	
	1/4″	1/2″
Design pressure	Vacuum to 300 psi (20 bar)	Vacuum to 150 psi (10 bar)
Burst pressure	4500 psi (310 bar)	
Proof pressure	450 psi (31 bar)	
Temperature: Standard	14 to 140°F, -10 to 60°C (PCTFE Seat)	14 to 140°F, -10 to 60°C (PCTFE Seat)
Available	14 to 302°F, -10 to 150°C (Polyimide seat[1])	14 to 302°F, -10 to 150°C (Polyimide seat[1])
Leakage: Inboard leakage	≤ $3x10^{-11}$ atm cc He/sec	≤ 3x10-11 atm cc He/sec
Across the seat	≤ $1x10^{-9}$ atm cc He/sec	≤ 1x10-9 atm cc He/sec
Particle	No particle detected above 0.1µm.	No particle detected above 0.1µm
Operated	Round handle 3/4 turn Oval handle 1/4 turn	Round handle 3/4 turn
Connections	Face seal or tube weld	Face seal or tube weld
Cv value-low pressure	0.3	0.7
Valve Lift	0.024", 0.6 mm	0.024", 0.6 mm
Direction	2 port straight, 2 port L, 3 port, 4 port	2 port straight
Surface finish ra (ave)-standard	5µin	5µin
Surface finish ra (max)-standard	10µin	10µin

[1]Used with fluorocarbon FKM O-ring
LP-Low pressure

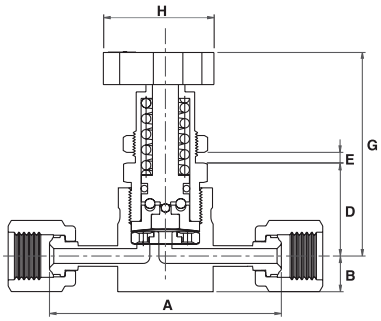
NITROGEN FLOW FOR LOW-PRESSURE VALVE-CV 0.3



Round Handle



Oval Handle



VALVE DIMENSIONS- INCH, MM

Size	Connection	A		B		C		D		E[1]		F		G		H	
		in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	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"	Butt weld	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.
[1]Minimum height for panel

HM SERIES
LEGACY SERIES

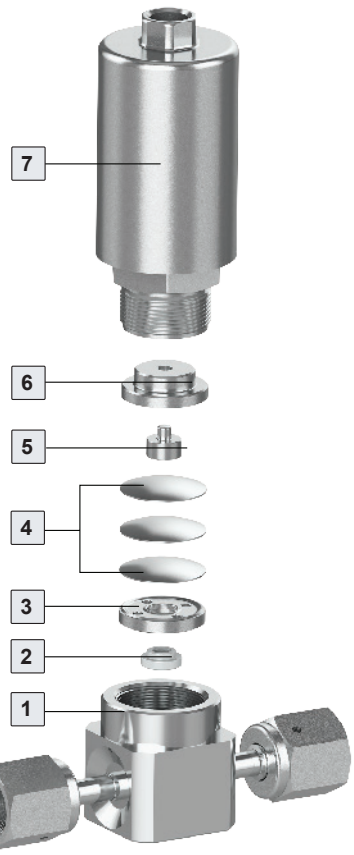
AIR-OPERATED VALVES

The pneumatically operated Ultra-Clean Diaphragm Valve is for high and low-pressure applications. The HM series is designed and manufactured per SEMI F-20 material specifications, and it offers a flexible port design with butt-weld and face-seal end connections.

UCV SPECIFICATIONS

Structure	Direct-seal metal-diaphragm valve without seal packing pneumatically operated	
	1/4″	1/2″
Pressure	Vacuum to 300 psi (20 bar)	Vacuum to 150 psi (10 bar)
Pressure	4500 psi (310 bar)	
Pressure	225 psi (15.5 bar)	
Temperature: Standard	14 to 140°F, -10 to 60°C (PCTFE Seat)	14 to 140°F, -10 to 60°C (PCTFE Seat)
Available	14 to 302°F, -1à0 to 150°C (Polyimide Seat[1])	14 to 356°F, -10 to 180°C (Polyimide seat[1]) 4 to 302°F, -10 to 150°C (VESPEL seat[1])
Leakage: Inboard leakage	≤ $3x10^{-11}$ atm cc He/sec	≤ 3x10-11 atm cc He/sec
Across the seat	≤ $1x10^{-9}$ atm cc He/sec	≤ 1x10-9 atm cc He/sec
Particle	No particle detected above 0.1µm.	No particle detected above 0.1µm
Operated	Pneumatic, NC/NO[2]	Pneumatic, NC/NO[2]
Connections	Face seal or tube weld	Face seal or tube weld
Cv value - Low pressure	0.3	0.7
Valve lift	0.6mm (0.024")	0.6mm (0.024")
Direction	2-port straight, 2-port L, 3-port, 4-port	2-port straight
Surface finish ra (ave)-standard	5µin	5µin
Surface finish ra (max)-standard	10µin	10µin
Air supply	60-90 psig , 4 - 6 bar	60-90 psig , 4 - 6 bar
Air connection	1/8" NPT	1/8" NPT

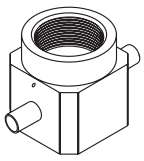
[1]Used with fluorocarbon FKM O-ring | [2]NC-Normally Closed NO-Normally Open
LP-Low pressure

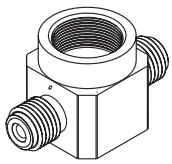


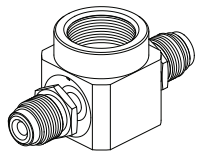
MATERIALS OF CONSTRUCTION

Item No.	Part No.	Material
1	Body[2]	SST, 316L Var or Vim/Var[1 3]
2	Seat[2]	PCTFE, polyimide[3]
3	Seat holder[2]	SST, 316L Var or Vim/Var[1 3]
4	Diaphragm[2]	Co-Cr-Ni alloy
5	Act. button	SST, AISI 304, ball AISI 440C
6	Act. button holder	SST, ASTM 630 H900
7	Actuator assembly	A6061T6

[1]Per SEMI F20-0305 | [2]Wetted part | [3]Standard material





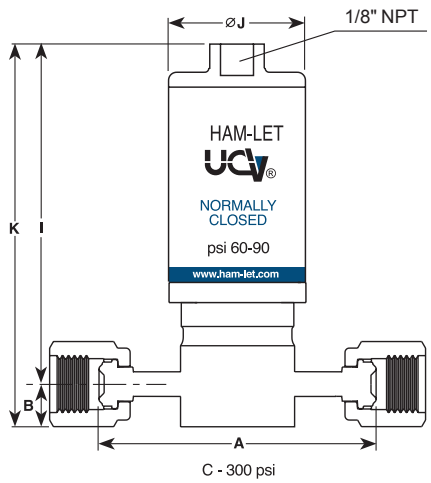


VALVE DIMENSIONS

Size	Connection	A		B		C		D		E*		F	
in		in	mm	in	mm	in	mm	in	mm	in	mm	in	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"	Butt weld	1.75	44.4	0.44	11.0	1.16	29.4	1.16	29.4	1.00	25.4	0.87	22.2

ACTUATOR DIMENSIONS

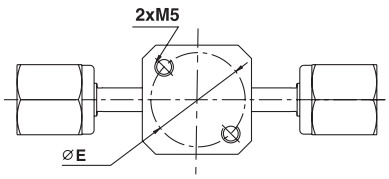
Actuator type	I		øJ		K		Effective Area	Output Force
	in	mm	in	mm	in	mm	in	
Low pressure	2.86	72.7	1.11	28.2	3.29	83.7	1.58 in²	550 psig
High pressure	3.50	89	1.33	34	3.93	100	1.58 in²	550 psig
AO-position switch	-	-	-	-	3.78	96	-	-



C - 300 psi

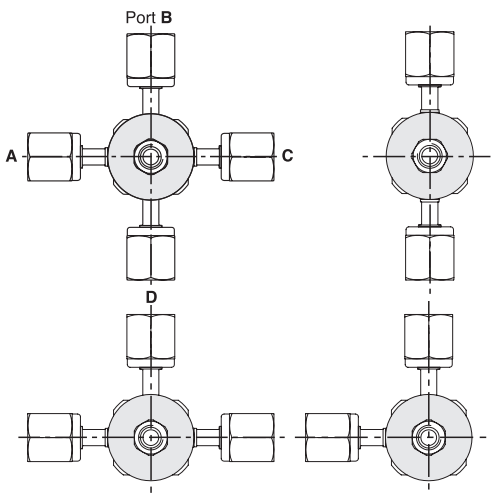
STANDARD PANEL MOUNTING FOR TWO-PORT STRAIGHT VALVE

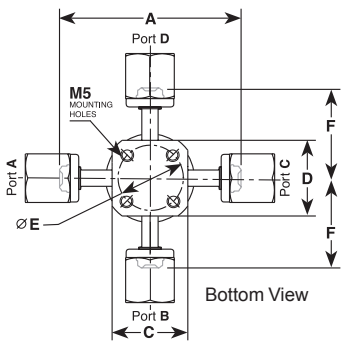
- Two threaded holes as standard (four optional)
- All the other valve types have standard four threaded holes



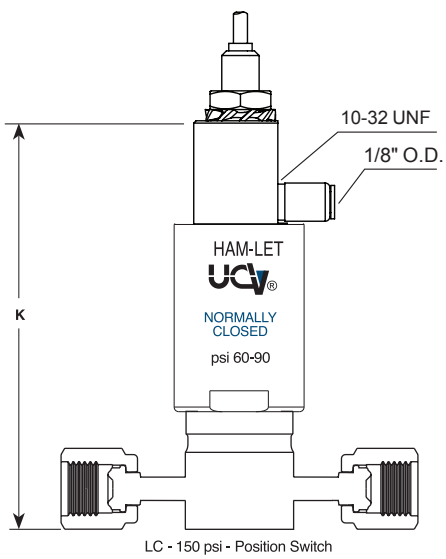
The M5 threaded mounting holes will accept 10-32 screws.

Top View





Bottom View

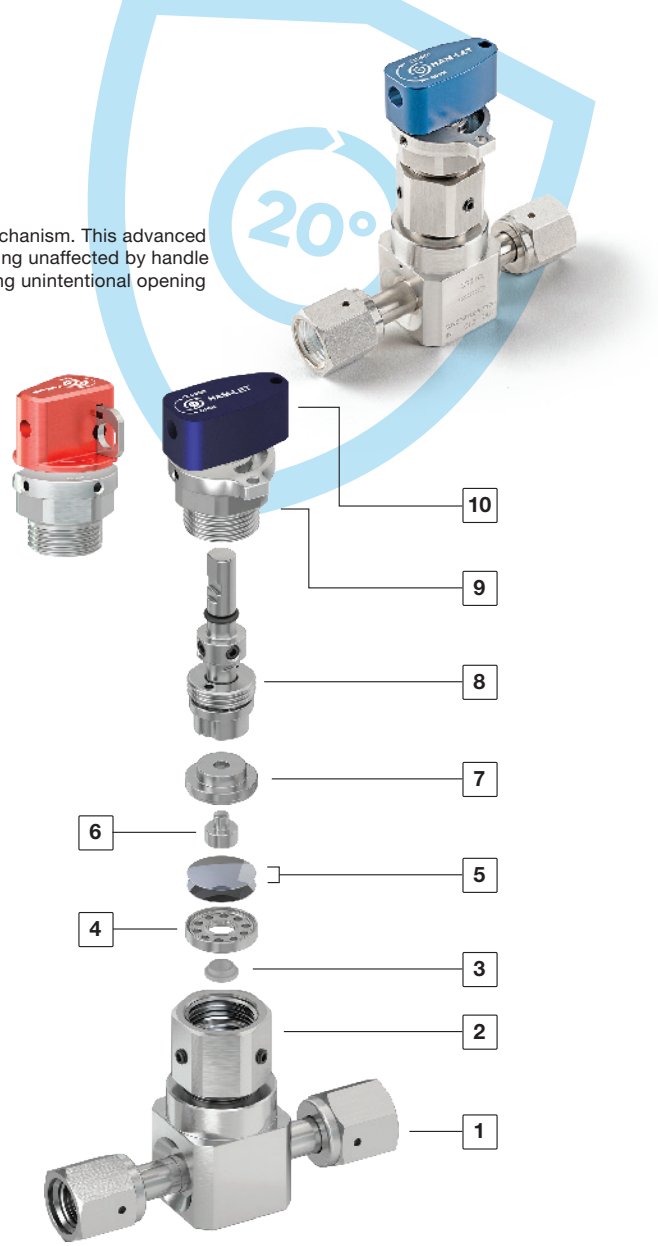


LC - 150 psi - Position Switch

HM SERIES - SFTY

MANUAL-SAFETY IN-LINE VALVES

The manually operated HM valve with an extra safety feature that adds a fool-proof mechanism. This advanced safety system ensures secure valve operation during both opening and closing, remaining unaffected by handle movement within the initial 20 degrees. The mechanism plays a crucial role in eliminating unintentional opening or closing incidents by the operator.

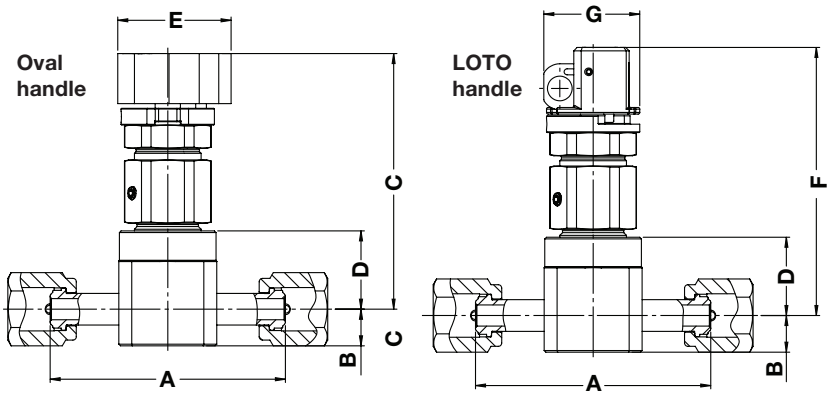


UCV SPECIFICATIONS

Structure	Direct-seal, metal-diaphragm valve without seal packing, manually and pneumatically operated
Design pressure	Vacuum to 1MPa (150 psi)
Burst pressure	31MPa (4500 psi)
Proof pressure	1.38 MPa (200 psi)
Operating temperature	14 to140°F, -10 to 60°C (PCTFE Seat)
Leakage: Inboard leakage	≤ $3x10^{-11}$ atm cc He/sec
Across the seat	≤ $1x10^{-9}$ atm cc He/sec
Particles	No particles detected above 0.1µm
Cv value	0.3
Surface finish Ra (Ave)-standard	5µin

MATERIALS OF CONSTRUCTION

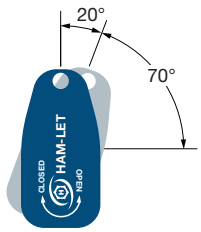
Item	Part No.	Material
1	Body	Stainless steel, 316L VAR
2	Seat	PCTFE
3	Seat holder	Stainless steel, 316L VAR
4	Diaphragm	Co-Cr-Ni Alloy
5	Act. Button	Stainless steel
6	Act. button holder	Stainless steel
7	Lower Bonnet	Stainless steel
8	Stem Assembly	Stainless steel
9	Upper Bonnet	Stainless steel
10	Handle	AL-6061 T6



HANDLE - MARKING AND POSITION

The valve remains unaffected within handle's first °20 of rotation

Open position



Closed position

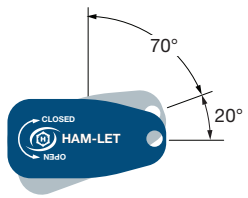


TABLE OF DIMENSIONS

Connection	A		B		C		D		E		F		G	
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
Swivel female face-seal	2.78	70.6	0.44	11.0	3.45	87.7	0.93	23.5	1.34	34.0	3.61	91.7	1.10	28.0
Male face-seal	2.30	58.4	0.44	11.0	3.45	87.7	0.93	23.5	1.34	34.0	3.61	91.7	1.10	28.0
Swivel male face-seal	2.78	70.6	0.44	11.0	3.45	87.7	0.93	23.5	1.34	34.0	3.61	91.7	1.10	28.0
Butt weld	1.75	44.4	0.44	11.0	3.45	87.7	0.93	23.5	1.34	34.0	3.61	91.7	1.10	28.0

Dimensions are for reference only and are subject to change.

MATERIAL

UCV Series Valves meet the chemical composition and the mechanical properties of Stainless Steel 316L, according to the ASTM A276 specification. Chemical Composition: The body material of the UCV Series complies with SEMI F20 - the sulfur content is lower or equal to 0.01 percent.

MECHANICAL SIZE-DIMENSIONAL SPECIFICATION

UCV Series Valves meet the end-to-end length and overall envelope and comply with SEMATECH Technology Transfer 96063137-ENG.

PACKAGING

UCT standard for packing the UCV Series Valves is a double bag. The inner bag contains ultra-pure nitrogen.

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

ELECTROPOLISHED SURFACES-SURFACE FINISH

UCV Valves are tested accordance with SEMASPEC 90120401-STD with the number of observed defects below acceptable limits for surface defect totals and averages.

UCV Valves meet the chromium enhancement ratio of chromium-to-iron ratio of 2:1 and chromium oxide-to-iron oxide ratio of 3:1. This test is done in accordance with SEMASPEC 90120403-STD.
UCV Valves meet the oxide layer depth and surface contamination of 20 angstroms after subtraction of the carbon layer. The carbon layer is 10 angstroms.

SURFACE ROUGHNESS

All wetted parts of the UCV Series Valves have an average surface roughness (Ra avg) of 5 micro-inch Ra, and maximum surface roughness (Ra max) of 10 micro-inch Ra, complying with ISO 4288.

HELIUM LEAK TEST

All UCV Series Valves are 100% helium leak tested. Helium-leak tests are performed using a helium-leak detector machine with a sensitivity of $0.1x10^{-12}$ atm cc He/sec. The standard leak rate tests are listed below.

(Lower leak rates are optional upon request)

Maximum Helium (He) leak ratings:

- Inboard leak integrity $3x10^{-11}$ atm cc/sec.
- Complies with SEMI F1.
- Leak across the seat $1x10^{-9}$ atm cc/sec.
- In accordance with SEMASPEC 90120391B-STD (held for at least 15 seconds).

PARTICLES

The particles standard for UCV Series Valves is less than 5 particles/ft^3 for particles 0.1µm and 20 particles 0.02 µm for static and dynamic tests, according to SEMASPEC 90120390-STD.

MOISTURE TESTING

The standard moisture level is 20 ppbv H20 in nitrogen baseline or less, within two hours after 2 ppmv spike for 1 minute at flow rate of 1.5 SLM or less, according to SEMASPEC 90120397-STD.

CLEANING

All CNC machined 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 one million cycles for pneumatic valves and more than 100,000 cycles for manual valves, in accordance with SEMASPEC 90120395-STD and 90120390-STD.

ORDERING INFORMATION - HM SERIES

HM 2 1 - 4 V K LR - BW 4 GF 4 - LD

Port A Port B

Valve Series	
HM	UCV Valves

Port Designator
0, 1, 2, 3, 4, 5

Body Material	
V	SS316L VAR (bar stock)

Actuation Device	
LC	Air operated N.C. 150 psi
C[1]	Air operated N.C. 300 psi
LO	Air operated N.O. 150 psi
O[1]	Air operated N.O. 300 psi
LR[2]	Round handle 3/4 turn 300 psi
LQ[2]	Oval handle 1/4 turn 300 psi

Handle color can be delivered by request.
NC-Normally close, NO- Normally open.

End Size	
4	1/4"
6	3/8"[5]
8	1/2"
	6 mm[5]

Valve Type	
2	2-Port valve
3	3-Port valve
4	4-Port valve

Body Size	
4	1/4"
8	1/2"

Seat Material	
K	PCTFE
S	Polyimide

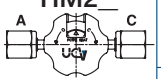
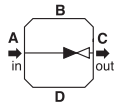
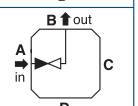
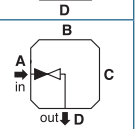
End Connection	
BW	Butt weld
GF	Swivel female face-seal[3]
GM	Swivel male face-seal[3]
M	Male face-seal[4]
LL	LET-LOK

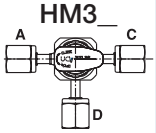
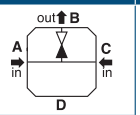
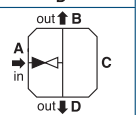
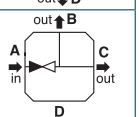
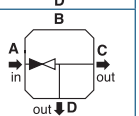
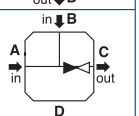
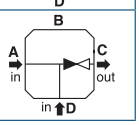
Features	
LD	Locking device
ISLT	LOTO handle
HB[1]	Hybrid
SFTY[1]	Manual-Safety with locking device
ISFTY[1]	Manual-Safety LOTO device

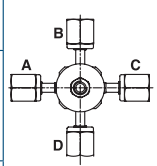
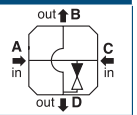
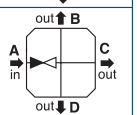
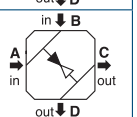
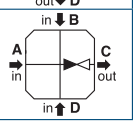
[1]Available only for body size 1/4"
[2]Body size 1/4" up to 300 psi
[3] 1/4", 1/2" end connection size only
[4]For configuration 20 only
[5]For BW, LL End connections only

Note:For limit switch indicator on AOP Valve, contact your local UCT representative

PORT DESIGNATOR - (TOP VIEW)

Valve Configuration	Port Designator	Schematic Flow Chart
Two Port Valve HM2__ 	0	
	1 L-Port	
	2 L-Port	

Valve Configuration	Port Designator	Schematic Flow Chart
Three Port Valve HM3__ 	0	
	1	
	2	
	3	
	4	
	5	

Valve Configuration	Port Designator	Schematic Flow Chart
Four Port Valve HM4__ 	0	
	1	
	2	
	3	

Warning!

The system designer and user have the sole responsibility for selecting products suitable for their special application requirements, ensuring their safe and trouble-free installation, operation, and maintenance. Application details, material compatibility and product ratings should all be considered for each selected product. Improper selection, installation or use of products can cause property damage or personal injury.