

# ULTRA FAST DIAPHRAGM VALVE



Patent pending  
US 61/910,079

**ULTRA-HIGH PURITY DIAPHRAGM VALVES FOR  
ATOMIC LAYER DEPOSITION AND FAST ACTUATION  
APPLICATIONS**





## IN-LINE METAL DIAPHRAGM PNEUMATICALLY OPERATED ULTRA FAST VALVES

The Ultra-Fast series is designed for atomic layer deposition applications, high cycling, high temperature and ultra-high purity processes, under severe repeatability demands. With its unique (patent pending No. US61/910,079) flow adjustment mechanism, this series allows flow fine-tuning during operation. Optional extended bonnet and cooling fin provide a superb solution for high temperature applications.



### IN-LINE VALVE SPECIFICATIONS

Structure	Direct-seal metal-diaphragm valve without seal packing Pneumatically operated
<b>Design Pressure</b>	Vacuum to 150 psi (10 bar)
<b>Burst Pressure</b>	4500 psi (310 bar)
<b>Proof Pressure</b>	225 psi (15.5 bar)
<b>Temperature: Standard bonnet</b>	14 to 248°F (-10 to 120°C)
Extended bonnet	14 to 392°F (-10 to 200°C)
<b>Leakage: Inboard Leakage</b>	$\leq 3 \times 10^{-11}$ atm cc He/sec
Across the seat	$\leq 1 \times 10^{-9}$ atm cc He/sec
<b>Particle</b>	No particle detected above 0.1µm.
<b>Operated</b>	High speed Pneumatic, NC*
<b>CV value (1/4" / 1/2")</b>	0.25 / 0.6, Adjustable
<b>Port configurations</b>	2-port straight, 2-port L, 3-port, 4-port
<b>Surface Finish Ra (Ave)-Standard</b>	5µin, Electropolished surface
<b>Air Supply</b>	60-90 psig (4 - 6 bar)
<b>Valve Response Time</b>	Less than 5ms <sup>(1)</sup>
<b>Air Connection</b>	M5

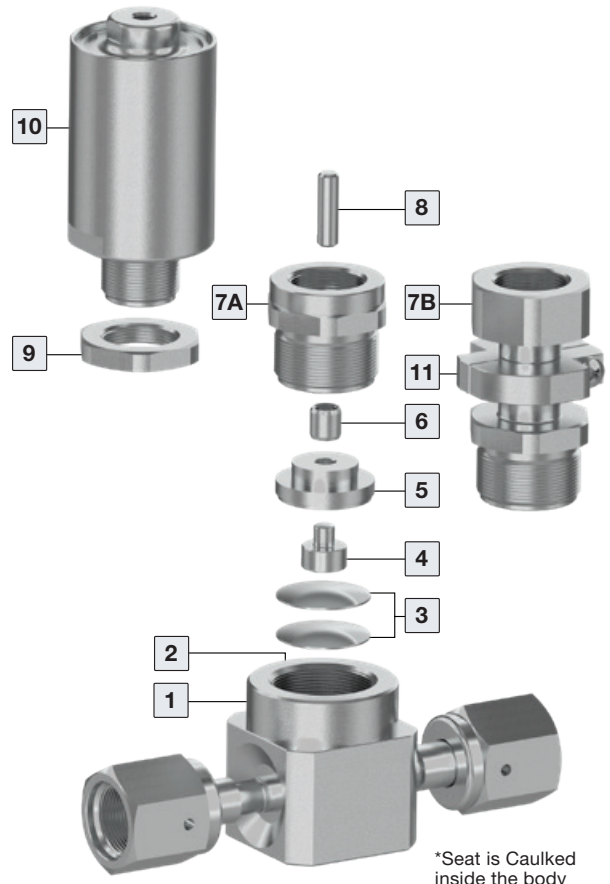
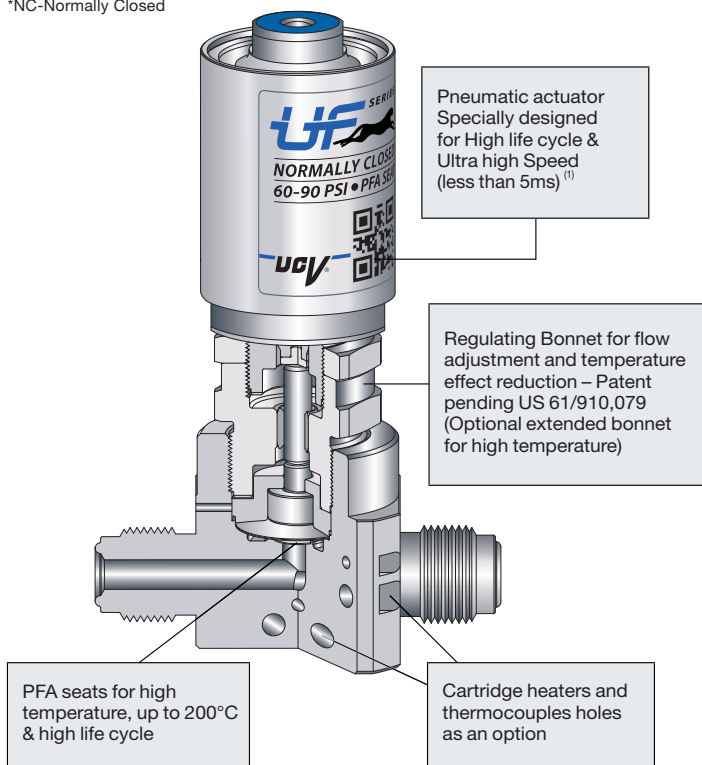
(1) For 1/4" body size, for valve only

\*NC-Normally Closed

### STRUCTURE

Item No.	Part No.	Material
1*	Body	Stainless steel, 316L VAR or VIM/VAR**
2*	Seat (Pressed)	PFA
3*	Diaphragm	Co-Cr-Ni Alloy
4	Act. Button	Stainless steel, 316L
5	Act. Button Holder	Stainless steel, ASTM 630 H900
6	Bushing	Carbon steel + PTFE
7A	Regulating Bonnet	Stainless steel, 316L
7B	Extended Regulating Bonnet	Stainless steel, 316L
8	Connection Rod	Stainless steel, 304
9	Locking Nut	Stainless steel, 304
10	Actuator Assembly	Stainless steel, 316L
11	Cooling Fin	Aluminum 6061

\*Wetted parts \*\* Per SEMI F20





## SURFACE-MOUNT, METAL DIAPHRAGM PNEUMATICALLY OPERATED ULTRA FAST VALVES

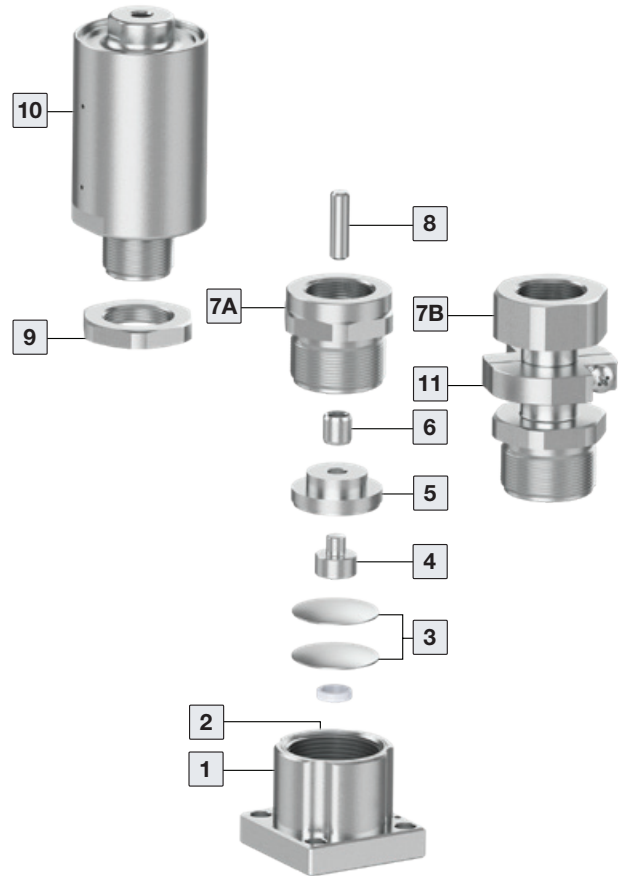
The surface mount design complies with SEMI PR 3.1 for 1.125", 1.5" C-seal. This series is manufactured according to UHP specifications of SEMI F-20 with pneumatic operating mechanisms.



### SURFACE-MOUNT VALVE SPECIFICATIONS

Structure	Direct-seal metal-diaphragm valve without seal packing Pneumatically operated
Design Pressure	Vacuum to 150 psi (10 bar)
Burst Pressure	4500 psi (310 bar)
Proof Pressure	225 psi (15.5 bar)
Temperature: Standard bonnet	14 to 248°F (-10 to 120°C)
Extended bonnet	14 to 392°F (-10 to 200°C)
Leakage: Inboard Leakage	$\leq 3 \times 10^{-11}$ atm cc He/sec
Across the seat	$\leq 1 \times 10^{-9}$ atm cc He/sec
Particle	No particle detected above 0.1µm.
Operated	High speed Pneumatic, NC*
CV value (1/4" / 1/2")	0.25 / 0.6, Adjustable
Port configurations	2-port, 3-port
Surface Finish Ra (Ave)-Standard	5µin, Electropolished surface
Air Supply	60-90 psig (4 - 6 bar)
Valve Response Time	Less than 5ms <sup>(1)</sup>
Air Connection	M5

(1) For 1/4" body size, for valve only  
\*NC-Normally Closed



### STRUCTURE

Item No.	Part No.	Material
1*	Body	Stainless steel, 316L VAR or VIM/VAR**
2*	Seat (Caulked)	PFA
3*	Diaphragm	Co-Cr-Ni Alloy
4	Act. Button	Stainless steel, 316L
5	Act. Button Holder	Stainless steel, ASTM 630 H900
6	Bushing	Carbon steel + PTFE
7A	Regulating Bonnet	Stainless steel, 316L
7B	Extended Regulating Bonnet	Stainless steel, 316L
8	Connection Rod	Stainless steel, 304
9	Locking Nut	Stainless steel, 304
10	Actuator Assembly	Stainless steel, 316L
11	Cooling Fin	Aluminum 6061

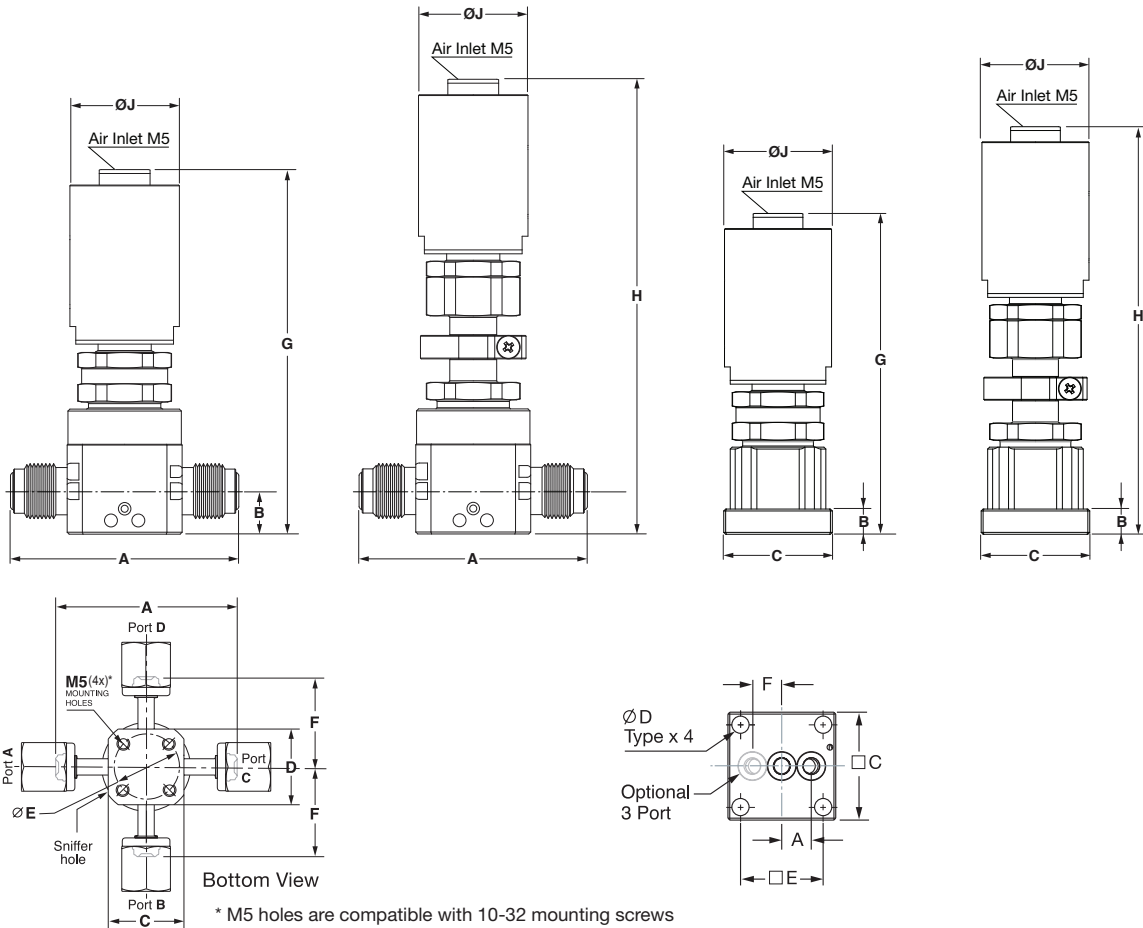
\*Wetted parts    \*\* Per SEMI F20

# STANDARD CONFIGURATION DIMENSIONS

## VALVE DIMENSIONS - INCH (MM)

Body Size	SERIES	End Connection	A		B		C		D		E		F		G		H		J	
			in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
1/4	UF	Male face seal	2.30	58.4	0.43	11.0	1.16	29.4	1.16	29.4	1.00	25.4	1.15	29.2	3.69	93.8	4.62	117.3	1.10	28.0
		Swivel male face seal	2.78	70.6									1.39	35.3						
		Swivel female face seal	2.78	70.6									1.39	35.3						
		Butt weld	1.75	44.4									0.88	22.2						
	UFS	Surface mount	0.30	7.7	0.26	6.6	1.12	28.4	0.17	4.4	0.85	21.7	0.30	7.7	3.33	84.6	4.26	108.1	1.10	28.0
1/2	UF	Male face seal	2.99	76.0	0.69	17.5	1.46	37.0	1.46	37.0	1.10	28.0	1.50	38.0	5.07	128.8	5.86	148.8	1.34	34.0
		Swivel male face seal	4.17	106.0									1.97	50.0						
		Swivel female face seal	4.17	106.0									2.08	53.0						
		Butt weld	2.16	57.2									1.08	27.5						
	UFS	Surface mount	0.46	11.6	0.31	8.0	1.50	38.1	0.20	5.2	1.19	30.2	0.46	11.6	4.6	116.8	5.38	136.8	1.34	34.0

Dimensions are for reference only and are subject to change.



# ORDERING INFORMATION UF SERIES

Valve Description Example:

**OPTIONAL**

UF - 2 - 1 - 4 V - F - LC - BW - 4 GF 4

**Valve Series**

**UF** In line  
**UFS** Surface mount

**Port Designator**

**0,1,2,3,4,5**

**Body Material**

**V** SS316L VAR or VIM/VAR<sup>(1)</sup>

**Actuation Device**

**LC** Air Operated N.C.

**End Size**

**4** 1/4"  
**6\*** 3/8"  
**8** 1/2"  
\* For BW Only

**High temp. Options**

**X** Extender  
**F** Extender with fin

**Heating Option<sup>(3)</sup>**

**H** Cartridge Holes for Thermocouple and Heater  
**H1** Cartridge Holes with Thermocouple  
**H2** Cartridge Holes with Heater  
**H3** Cartridge Holes with Thermocouple and Heater

**Valve Type**

**2** 2-Port Valve  
**3** 3-Port Valve  
**4** 4-Port Valve<sup>(2)</sup>

**Body Size**

**4** 1/4" Body  
**8** 1/2" Body

**Seat Material**

**F** PFA

**End Connection<sup>(2)</sup>**

**BW** Butt Weld  
**GF** Swivel female Face-seal  
**GM** Swivel male Face-seal  
**M** Male Face-seal

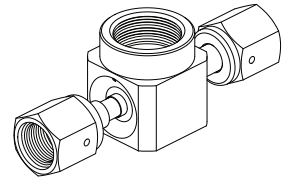
**Control options**

**D** Solenoid valve, DC  
**LS** Limit switch

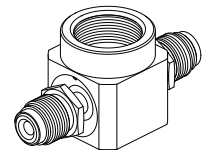
(1) Per SEMI F20-0305 | (2) For inline valves only | (3) 1/8 in. through holes For UF20 valves only

## PORT DESIGNATOR - (TOP VIEW)

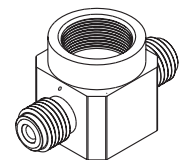
Valve Configuration	Port Designator	Schematic Flow Chart	Valve Configuration	Port Designator	Schematic Flow Chart	Valve Configuration	Port Designator	Schematic Flow Chart
2 Port Valve <b>UF2_</b>	0		3 Port Valve <b>UF3_</b>	0		4 Port Valve <b>UF4_</b>	0	
	1 L-Port			1			1	
	2 L-Port			2			2	
		3			3			
		4			4			
		5		5				



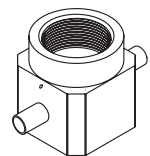
Swivel Female Face-Seal Ends



Swivel Male Face-Seal Ends



Male Face-Seal Ends



Butt Weld Ends

### 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.

UF | 2020\_Rev00

