



# ULTRA HIGH PURITY DIAPHRAGM VALVES

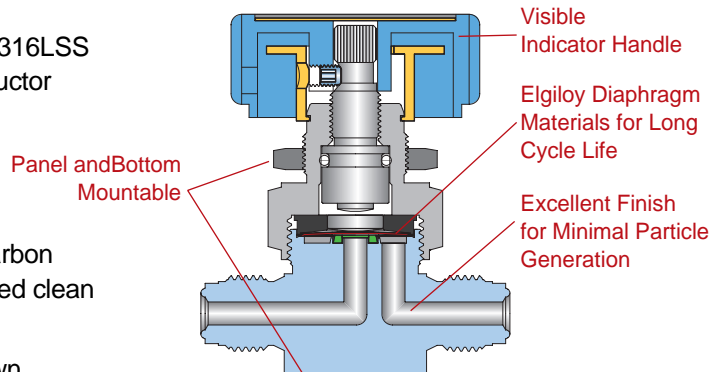
**VCD Series**

[www.unilok.com](http://www.unilok.com)

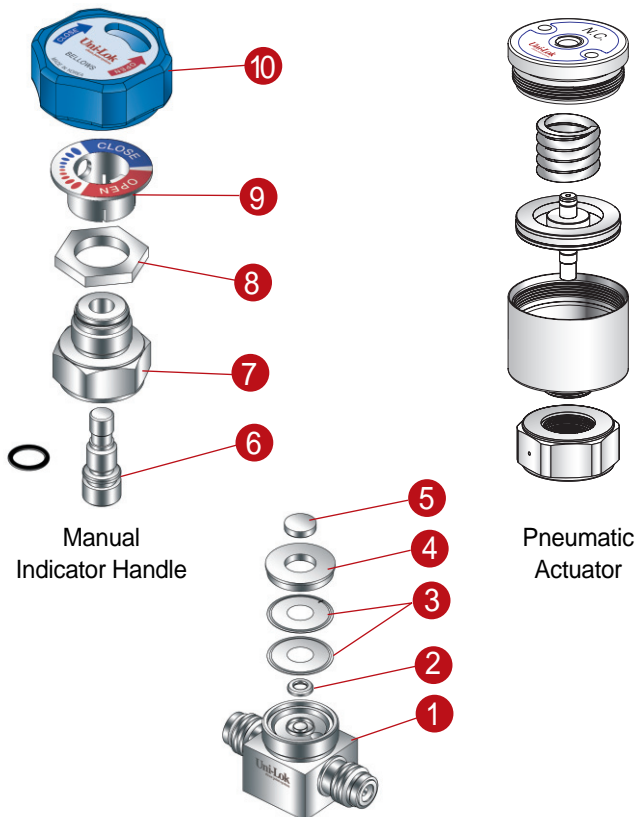


## Features

- Compact designed body with minimal dead space
- Body materials comply with SEMI F-20, "Specification 316LSS Materials for UHP (Ultra High Purity) Grade Semiconductor Manufacturing Applications"
- Maximum flow capacity
- Minimal particle generation
- Minimal contributions of moisture, oxygen and hydrocarbon with Uni-Lok's own special cleaning process in a certified clean room
- Excellent finish level of wetted areas with Uni-Lok's own electro polish process
- Elgiloy<sup>®</sup> diaphragm material with strong durability as well as corrosion resistance for long cycle life
- PCTFE seat material with remarkable chemical and thermal resistance



## Standard Type Low Pressure Diaphragm Valves



## Materials of Construction

No.	Description	Materials	
		Manual	Pneumatic
1	Body	316LSS	316LSS
2	Seat	PCTFE	PCTFE
3	Diaphragm	Elgiloy	Elgiloy
4	Bushing	316SS	316SS
5	Button	316SS	316SS
6	Stem	316SS	-
7	Bonnet	316SS	-
8	Panel Nut	316SS	-
9	Indicator	Polyester	-
10	Handle	Aluminum	-
11	Actuator	-	Aluminum

## Internal Surface Finish Levels

Designator	Surface Finish( $\mu$ m)	
	Average	Maximum
BA	< 0.4	< 1.6
EP	< 0.125	< 0.4

## Helium Leak Test

Every VCD series valves are inboard helium leak tested to a rate of  $1 \times 10^{-9}$  cm<sup>3</sup>/sec at seat and all seals.

## Particle Contribution Test

According to ASTM F1394-92.

## Moisture Contribution Test

According to SEMA-90120397B-STD.

## Cleaning

All components are precisely cleaned with 18M $\Omega$  deionized water after the passivation procedure in accordance with our own UHP cleaning process  
Reference specification : SEMI E49.6.

## How To Order

Uni-Lok VCD series valves are ordered by part number as shown as below.

## Assembling

According to SEMI E49.6.

## Packaging

Each component is double bagged to ensure component cleanliness and to protect them from environmental contamination.

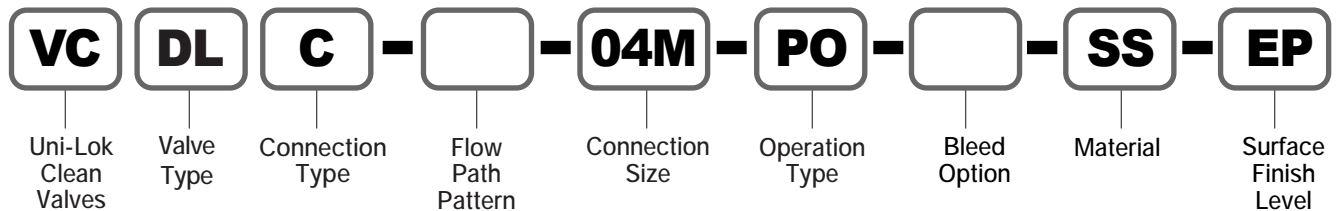
Referenced specification : SEMI E49.1.

## Important Notification

Proper installation, materials compatibility, operation and maintenance of these valves are the responsibility of the user. The total system design must be taken into consideration to ensure optimal performance and safety.

Overall process of testing, cleaning, assembling and packaging for every VCD series valves are performed in a certified clean room.

**Example :** The following part number, **VCDLC-04M-PO-SS-EP** is designated for Low Pressure Diaphragm Valve, both 1/4" Male UCR, Pneumatic Normal Open Operation, 316LSS, EP.



Valve Type	
DL	Standard Low Pressure
DH	Standard High Pressure
DS	Shut Off
DF	Forged Body
DBL	Block Low Pressure
DBH	Block High Pressure

Connection Type	
U	Uni-Lok Tube Fitting
C-*M	Male UCR
C-*F	Female UCR
C-*MR	Rotable Male UCR
WB-*T	Butt Weld -Tube
WB-*P	Butt Weld - Pipe

UCR - Metal Face Seal

Connection Size					
Fractional(Inch) Tube O.D. Designation					
Tube O.D.	inch	1/4	3/8	1/2	3/4
	mm	6.35	9.52	12.70	19.05
Designator		04	06	08	12

UCR (Metal Face Seal) Size Designator			
UCR Size	1/4	1/2	3/4
Designator	04M/04F	08M/08F	12M/12F

Operation Type	
None	Manual Indicator Handle
MD	Manual Directional Handle
PO	Pneumatic - Normal Open
PC	Pneumatic - Normal Close
POC	Block Type Pneumatic 1-N.O. 2-N.C.
PCO	Block Type Pneumatic 1-N.C. 2-N.O.

Bleed Option	
None	No Bleed
3	Constant Bleed $\varnothing$ 0.3
6	Constant Bleed $\varnothing$ 0.6

Material	
DM	316LSS - Double Melting
SM	316LSS - Single Melting
SS	316LSS

Surface Finish Level	
BA	BA
EP	EP - Electro Polished

**Flow Path Patter Designator**  
See the details in page 9.

# VCDL series

(Standard Type Low Pressure Diaphragm Valve - Manual Operation)

## Specification

Size	1/4"	3/8", 1/2"	3/4"
Orifice Size	4.3	6.5	6.5
Cv Value	0.3	0.7	0.7
Max. Working Pressure	17 bar (250 psig)		
Max. Working Temperature	-10~80°C (-23~176°F)		
Internal Leakage Allowance - He (Holding Time - Min 30 sec)	≤ 1x10 <sup>-9</sup> atm.cc/s		
External Leakage Allowance - He (Holding Time - Min 1 min)	≤ 1x10 <sup>-9</sup> atm.cc/s		

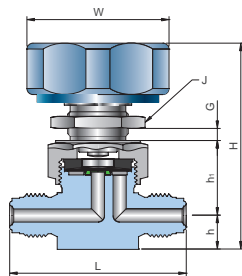


## Handle Position

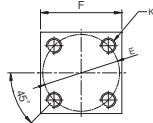


Open

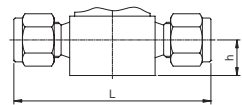
Close



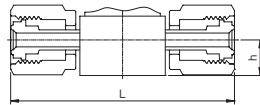
Male UCR



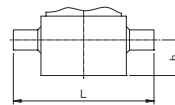
Bottom Mounting



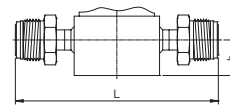
Uni-Lok Tube Fitting



Female UCR



Tube Butt Weld



Rotatable Male UCR

## Ordering Information & Dimensions

Part Number	End Connection		Dimensions (mm)									
	Inlet	Outlet	L	h	h1	H	F	E	K	W(Ø)	G	J(Ø)
U-04T-	1/4" Uni-Lok		62.0	11.2	24.7	68.6	26.9	25.4	M5	47.0	5.0	21.0
U-06T-	3/8" Uni-Lok		74.8	16.0	31.8	80.5	37.0	28.0				
U-08T-	1/2" Uni-Lok		80.2	16.0	31.8	80.5	37.0	28.0				
U-12T-	3/4" Uni-Lok		108.0	22.0	36.3	91.0	37.0	28.0				
C-04M-	1/4" Male UCR		58.4	11.2	24.7	68.6	26.9	25.4				
C-08M-	1/2" Male UCR		73.6	16.0	31.8	80.5	37.0	28.0				
C-12M-	3/4" Male UCR		88.0	22.0	36.3	91.0	37.0	28.0				
C-04MR-	1/4" Rotatable Male UCR		100.0	11.2	24.7	68.6	26.9	25.4				
C-04F-	1/4" Female UCR		70.5	11.2	24.7	68.6	26.9	25.4				
C-08F-	1/2" Female UCR		83.0	16.0	31.8	80.5	37.0	28.0				
WB-04T-	1/4" Tube Butt Weld		44.2	11.2	24.7	68.6	26.9	25.4				
WB-06T-	3/8" Tube Butt Weld		73.6	16.0	31.8	80.5	37.0	28.0				
WB-08T-	1/2" Tube Butt Weld		73.6	16.0	31.8	80.5	37.0	28.0				
WB-12T-	3/4" Tube Butt Weld		88.0	22.0	36.3	91.0	37.0	28.0				

Dimensions are for reference only and are subject to change without prior notice.

# VCDL series

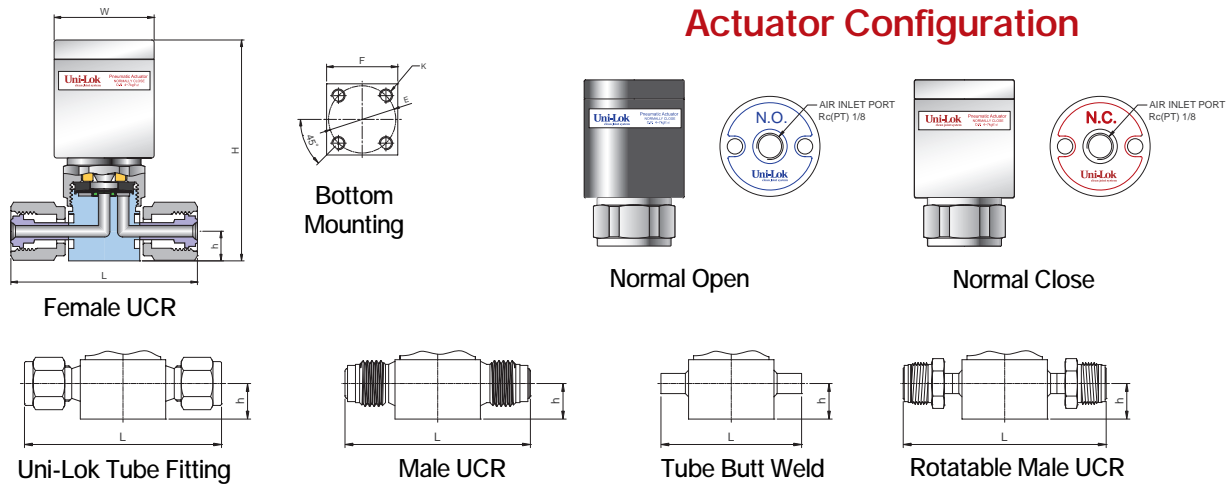
(Standard Type Low Pressure Diaphragm Valve - Pneumatic Actuating Operation)

## Specification

Size	1/4"	3/8", 1/2"
Orifice Size	4.3	6.5
Cv Value	0.3	0.7
Max. Working Pressure	17 bar (250 psig)	
Max. Working Temperature	-10~80°C (-23~176°F)	
Actuator Pressure Rating	4~7 bar (58~101 psig)	
Internal Leakage Allowance - He (Holding Time - Min 30 sec)	≤1x10 <sup>-9</sup> atm.cc/s	
External Leakage Allowance - He (Holding Time - Min 1 min)	≤1x10 <sup>-9</sup> atm.cc/s	



## Actuator Configuration



## Ordering Information & Dimensions

Part Number	End Connection		Dimensions (mm)						
	Inlet	Outlet	L	h	H	W(Ø)	F	E	K
VCDL	U-04T-	1/4" Uni-Lok	62.0	11.2	83.5	37.8	26.9	25.4	M5
	U-06T-	3/8" Uni-Lok	74.8	16.0	94.4	53.0	37.0	28.0	
	U-08T-	1/2" Uni-Lok	80.2	16.0	94.4	53.0	37.0	28.0	
	C-04M-	1/4" Male UCR	58.4	11.2	83.5	37.8	26.9	25.4	
	C-08M-	1/2" Male UCR	73.6	16.0	94.4	53.0	37.0	28.0	
	C-04F-	1/4" Female UCR	70.5	11.2	83.5	37.8	26.9	25.4	
	C-08F-	1/2" Female UCR	83.0	16.0	94.4	53.0	37.0	28.0	
	WB-04T-	1/4" Tube Butt Weld	44.2	11.2	83.5	37.8	26.9	25.4	
	WB-06T-	3/8" Tube Butt Weld	73.6	16.0	94.4	53.0	37.0	28.0	
	WB-08T-	1/2" Tube Butt Weld	73.6	16.0	94.4	53.0	37.0	28.0	

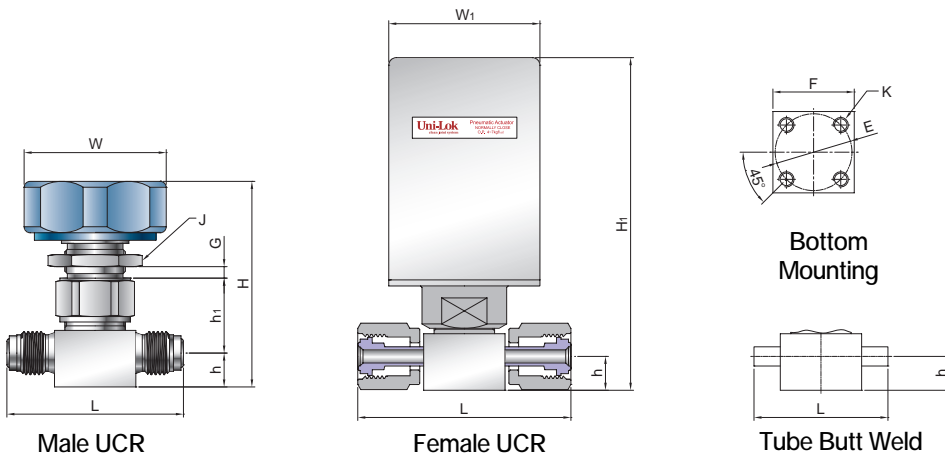
Dimensions are for reference only and are subject to change without prior notice.

# VCDH series

(Standard Type High Pressure Diaphragm Valve  
- Manual Operation & Pneumatic Actuating Operation)

## Specification

Size	1/4"
Orifice Size	2.5
Cv Value	0.1
Max. Working Pressure	210 bar (3045 psig)
Max. Working Temperature	-10~80°C (-23~176°F)
Actuator Pressure Rating	5~7 bar (73~101 psig)
Internal Leakage Allowance - He (Holding Time - Min 30 sec)	$\leq 1 \times 10^{-9}$ atm.cc/s
External Leakage Allowance - He (Holding Time - Min 1 min)	$\leq 1 \times 10^{-9}$ atm.cc/s



## Ordering Information & Dimensions

Part Number	End Connection		Dimensions (mm)												
	Inlet	Outlet	L	h	h1	H	H1	F	E	K	W(Ø)	W1(Ø)	G	J(Ø)	
VCDH	C-04M-	1/4" Male UCR	58.4	11.2	24.7	68.6	110.0	29.6	25.4	M5	47.0	50.0	5.0	21.0	
	C-04F-	1/4" Female UCR	70.5												
	WB-04T-	1/4" Tube Butt Weld	44.3												

## Handle Position and Actuator Configuration

Both are the same as VCDL series.

Dimensions are for reference only and are subject to change without prior notice.

# VCDS series

## (Shut Off Type Low Pressure Diaphragm Valve - Manual Operation)

### Specification

Size	1/4"	3/8", 1/2"
Orifice Size	4.3	6.5
Cv Value	0.3	0.7
Max. Working Pressure	17 bar (250 psig)	
Max. Working Temperature	-10~80°C (-23~176°F)	
Internal Leakage Allowance - He (Holding Time - Min 30 sec)	≤1x10 <sup>-9</sup> atm.cc/s	
External Leakage Allowance - He (Holding Time - Min 1 min)	≤1x10 <sup>-9</sup> atm.cc/s	

### Handle Position

Quick and quarter turn handle actuation



Open



Close

### Colored Handle

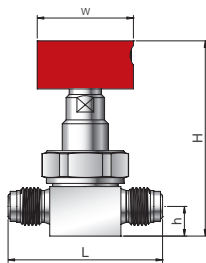
Colored handle are available for VCDS series valves. To order, add handle color designator next to connection size designator.



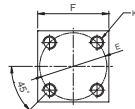
-MDR Red

-MDS Blue

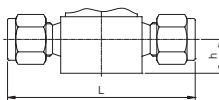
-MDB Black



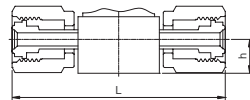
Male UCR



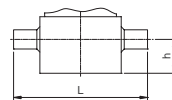
Bottom Mounting



Uni-Lok Tube Fitting



Female UCR



Tube Butt Weld

### Ordering Information & Dimensions

Part Number	End Connection		Dimensions (mm)						
	Inlet	Outlet	L	h	H	F	E	W(Ø)	K
VCDS	U-04T-	1/4" Uni-Lok	62.0	11.2	75.2	26.9	25.4	36.9	M5
	U-06T-	3/8" Uni-Lok	74.8	16.0	103.0	37.0	28.0	50.0	
	U-08T-	1/2" Uni-Lok	80.2	16.0	103.0	37.0	28.0	50.0	
	C-04M-	1/4" Male UCR	58.4	11.2	75.2	26.9	25.4	36.9	
	C-08M-	1/2" Male UCR	73.6	16.0	103.0	37.0	28.0	50.0	
	C-04F-	1/4" Female UCR	70.5	11.2	75.2	26.9	25.4	36.9	
	C-08F-	1/2" Female UCR	83.0	16.0	103.0	37.0	28.0	50.0	
	WB-04T-	1/4" Tube Butt Weld	44.2	11.2	75.2	26.9	25.4	36.9	
	WB-06T-	3/8" Tube Butt Weld	73.6	16.0	103.0	37.0	28.0	50.0	
	WB-08T-	1/2" Tube Butt Weld	73.6	16.0	103.0	37.0	28.0	50.0	

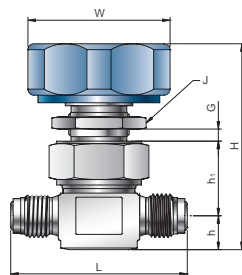
Dimensions are for reference only and are subject to change without prior notice.

# VCDF series

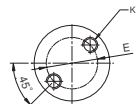
## (Forged Body Low Pressure Diaphragm Valve - Manual Operation)

### Specification

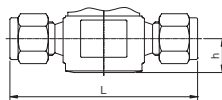
Size	1/4"	3/8", 1/2"	3/4"
Orifice Size	4.3	6.5	6.5
Cv Value	0.3	0.7	0.7
Max. Working Pressure	17 bar (250 psig)		
Max. Working Temperature	-10~80°C (-23~176°F)		
Internal Leakage Allowance - He (Holding Time - Min 30 sec)	$\leq 1 \times 10^{-9}$ atm.cc/s		
External Leakage Allowance - He (Holding Time - Min 1 min)	$\leq 1 \times 10^{-9}$ atm.cc/s		



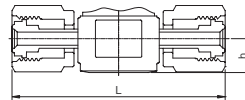
Male UCR



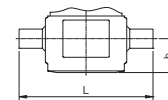
Bottom Mounting



Uni-Lok Tube Fitting



Female UCR



Tube Butt Weld

### Ordering Information & Dimensions

Part Number	End Connection		Dimensions (mm)									
	Inlet	Outlet	L	h	h1	H	E	K	W(Ø)	G	J(Ø)	
VCDF	U-04T-	1/4" Uni-Lok	62.0	11.2	24.7	68.6	17.0	M5	47.0	5.0	21.0	
	U-06T-	3/8" Uni-Lok	74.8	16.0	31.8	80.5	28.0					
	U-08T-	1/2" Uni-Lok	80.2	16.0	31.8	80.5	28.0					
	U-12T-	3/4" Uni-Lok	108.0	22.0	36.3	91.0	28.0					
	C-04M-	1/4" Male UCR	58.4	11.2	24.7	68.6	17.0					
	C-08M-	1/2" Male UCR	73.6	16.0	31.8	80.5	28.0					
	C-12M-	3/4" Male UCR	88.0	22.0	36.3	91.0	28.0					
	C-04F-	1/4" Female UCR	70.5	11.2	24.7	68.6	17.0					
	C-08F-	1/2" Female UCR	83.0	16.0	31.8	80.5	28.0					
	WB-04T-	1/4" Tube Butt Weld	44.2	11.2	24.7	68.6	17.0					
	WB-06T-	3/8" Tube Butt Weld	73.6	16.0	31.8	80.5	28.0					
	WB-08T-	1/2" Tube Butt Weld	73.6	16.0	31.8	80.5	28.0					
WB-12T-	3/4" Tube Butt Weld	88.0	22.0	36.3	91.0	28.0						

### Handle Position

Handle position is the same as VCDL series.

Dimensions are for reference only and are subject to change without prior notice.



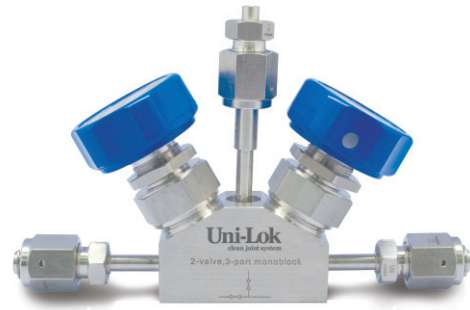
# VCDBL series

## (Block Type Low Pressure Diaphragm Valve - Manual Operation & Pneumatic Actuating Operation)

### Specification

Size	1/4"	3/8", 1/2"
Orifice Size	4.3	6.5
Cv Value	0.3	0.7
Max. Working Pressure	17 bar (250 psig)	
Max. Working Temperature	-10~80°C (-23~176°F)	
Actuator Pressure Rating	4~7 bar (58~101 psig)	
Internal Leakage Allowance - He (Holding Time - Min 30 sec)	$\leq 1 \times 10^{-9}$ atm.cc/s	
External Leakage Allowance - He (Holding Time - Min 1 min)	$\leq 1 \times 10^{-9}$ atm.cc/s	

### Manual Operation

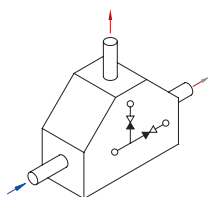


### Pneumatic Actuating Operation

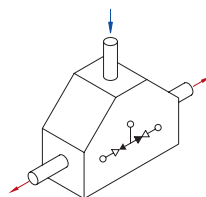


### Flow Path Patterns

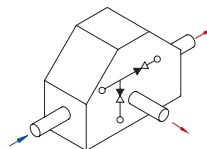
Uni-Lok VCDBL series valves have various flow paths. To order, add flow path designator next to connection size designator.



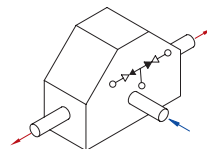
FP1A



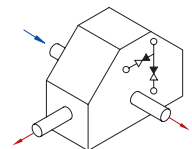
FP1B



FP2A



FP2B



FP3

### Handle Position



Open



Close

### Actuator Configuration



Normal Open



AIR INLET PORT  
Rc(PT) 1/8



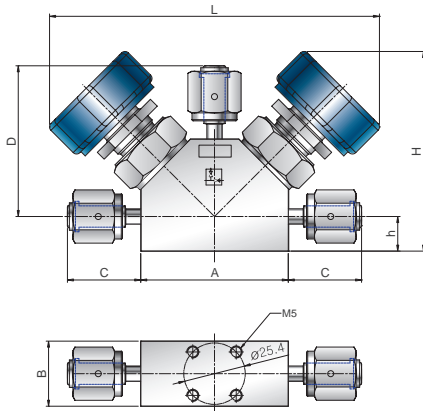
Normal Close



AIR INLET  
Rc(PT) 1/8

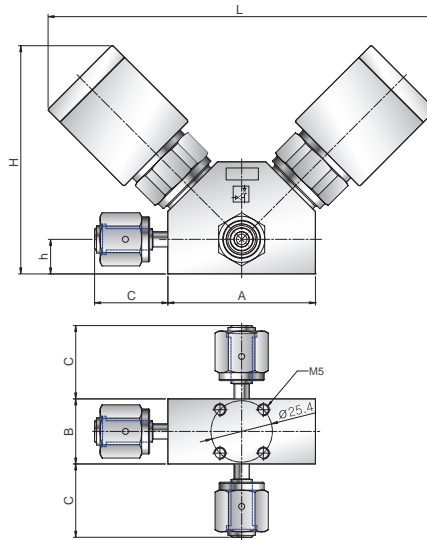
Dimensions are for reference only and are subject to change without prior notice.

Manual Operation

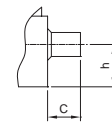


FP1A

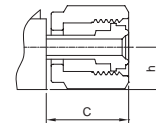
Pneumatic Actuating Operation



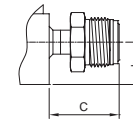
FP3



Tube Butt Weld



Female UCR



Rotatable Male UCR

Ordering Information & Dimensions

Manual Operation

Part Number				End Connection		Dimensions (mm)						
				Inlet	Outlet	A	B	C	D	h	H	L
VCDBL	C-	FP1A-	04MR-	1/4" Rotatable Male UCR		61.0	26.9	30.3	62.3	14.3	84.4	140.0
	C-		04F-	1/4" Female UCR								
	WB-		04T-	1/4" Tube Butt Weld								

Pneumatic Actuating Operation

Part Number				End Connection		Dimensions (mm)						
				Inlet	Outlet	A	B	C	D	h	H	L
VCDBL	C-	FP3-	04MR-	1/4" Rotatable Male UCR		61.0	26.9	30.3	62.3	14.3	94.3	160.0
	C-		04F-	1/4" Female UCR								
	WB-		04T-	1/4" Tube Butt Weld								

Dimensions are for reference only and are subject to change without prior notice.

# VCDBH series

## (Block Type High Pressure Diaphragm Valve - Manual Operation & Pneumatic Actuating Operation)

### Specification

Size	1/4"
Orifice Size	2.5
Cv Value	0.1
Max. Working Pressure	210 bar (3045 psig)
Max. Working Temperature	-10~80°C (-23~176°F)
Actuator Pressure Rating	5~7 bar (73~101 psig)
Internal Leakage Allowance - He (Holding Time - Min 30 sec)	$\leq 1 \times 10^{-9}$ atm.cc/s
External Leakage Allowance - He (Holding Time - Min 1 min)	$\leq 1 \times 10^{-9}$ atm.cc/s

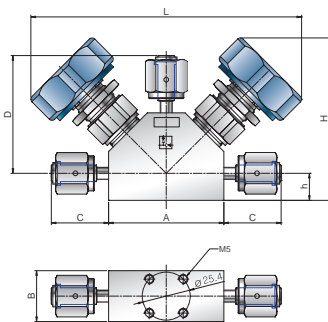
### Manual Operation



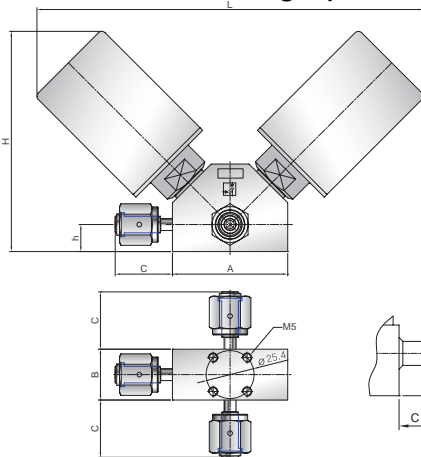
### Pneumatic Actuating Operation



### Manual Operation



### Pneumatic Actuating Operation



Tube Butt Weld

Female UCR

Rotatable Male UCR

## Ordering Information & Dimensions

### Manual Operation

Part Number				End Connection		Dimensions (mm)						
				Inlet	Outlet	A	B	C	D	h	H	L
VCDBH	C-	FP1A-	04MR-	1/4" Rotatable Male UCR		61.0	26.9	30.3	62.3	14.3	84.4	140.0
	C-		04F-	1/4" Female UCR								
	WB-		04T-	1/4" Tube Butt Weld								

### Pneumatic Actuating Operation

Part Number				End Connection		Dimensions (mm)						
				Inlet	Outlet	A	B	C	D	h	H	L
VCDBH	C-	FP3-	04MR-	1/4" Rotatable Male UCR		61.0	26.9	30.3	62.3	14.3	116.5	204.4
	C-		04F-	1/4" Female UCR								
	WB-		04T-	1/4" Tube Butt Weld								

Dimensions are for reference only and are subject to change without prior notice.



**Uni-Lok<sup>®</sup> Uni-Lok corporation**

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