

**Diaphragm Valve  
VCD**



# Diaphragm Valve VCD

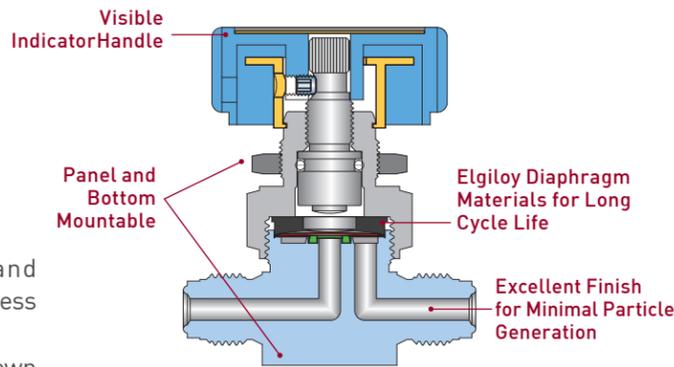
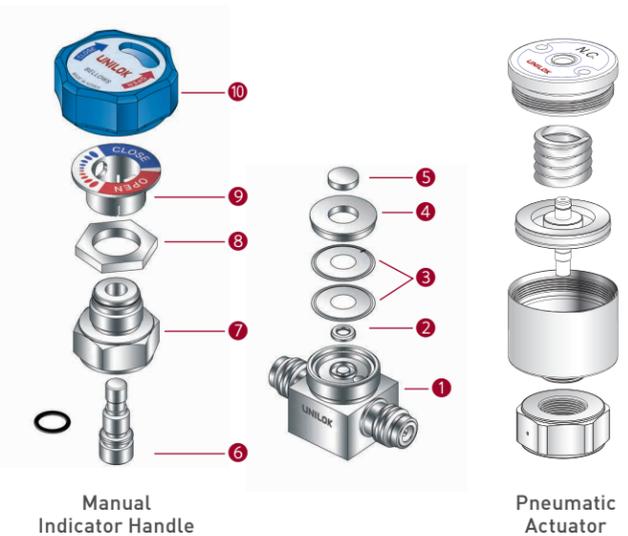
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## Features

- 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 UNILOK's own special cleaning process in a certified clean room
- Excellent finish level of wetted areas with UNILOK's own electro polish process
- Elgiloy® 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

Description	Surface Finish(µm)	
	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

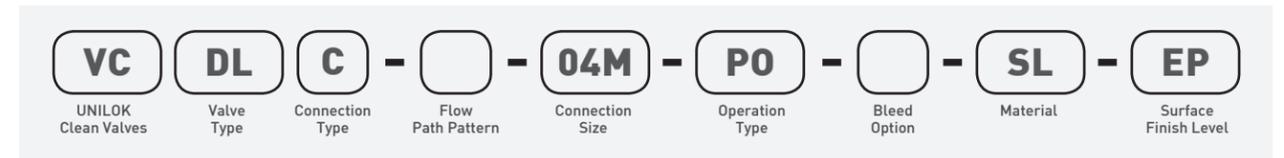
According to SEMA-90120397B-STD.

## Cleaning

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

## How To Order

UNILOK VCD series valves are ordered by part number as shown as below.



Valve Type	
DL	Standard Low Pressure
DH	Standard High Pressure
DS	Shut off
DDH	Directional High Pressure
DF	Forged Body
DHF	High Flow Low Pressure
DMHF	Hlgh Flow Medium Pressure
DHHF	Hlgh Flow High Pressure
DBL	Block Low Pressure
DBH	Block High Pressure

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		04T	06T	08T	12T

Pipe Size Designation (NPT or ISO7/1-PT)			
Pipe Size	1/4	1/2	3/4
Designator	04	08	12

Operation Type	
None	Manual Indicator Handle
RI	Manual Round Indicator Handle
MD	Manual Directional Handle
MI	Manual Indicator + 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 Ø0.3
6	Constant Bleed Ø0.6

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

Surface Finish Level	
BA	BA - Bright Annealing
EP	EP - Electro Polished

**Flow Path Pattern Designator**  
See the details in page 309.

UCR- Metal Face Seal

## VCDL series

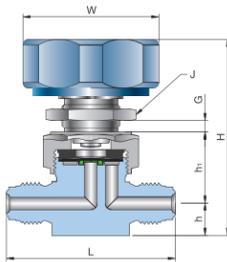
(Standard Type Low Pressure Diaphragm Valve - Manual Operation)

### Specification

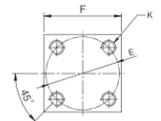
Size	1/4"	3/8", 1/2"	3/4"
Orifice Size	4.3	6.5	6.5
Cv Value	0.3	0.7	0.7
Max. Working Pressure	10 bar (145 psig)		
Max. Working Temperature	-10~80°C (14~176°F)		
Internal Leakage Allowance - He (Holding Time - Min 30 sec)	≤ 1x10 <sup>-9</sup> atm.cc/s		
External Leakage Allowance - He (Holding Time - Min 1 min)	≤ 1x10 <sup>-9</sup> atm.cc/s		



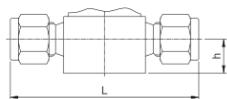
### Handle Position



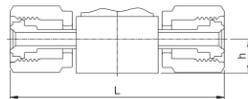
Male UCR



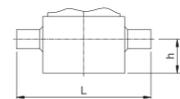
Bottom Mounting



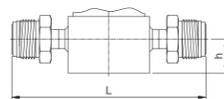
UNILOK Tube Fitting



Female UCR



Tube Butt Weld



Swivel Male UCR

### Ordering Information & Dimensions

Part No.	End Connection		Dimensions (mm)									
	Inlet	Outlet	L	h	h <sub>2</sub>	H	F	E	K	W(Ø)	G	J(Ø)
U-04T-	1/4" UNILOK		62.0	11.1	24.7	68.6	26.0	25.4	M5	47.0	5.0	21.0
U-06T-	3/8" UNILOK		74.8	16.0	31.8	80.5	37.0	28.0				
U-08T-	1/2" UNILOK		80.2	16.0	31.8	80.5	37.0	28.0				
U-12T-	3/4" UNILOK		108.0	22.0	36.3	91.0	37.0	28.0				
C-04M-	1/4" Male UCR		58.4	11.1	24.7	68.6	26.0	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" Swivel Male UCR		100.0	11.1	24.7	68.6	26.0	25.4				
C-04F-	1/4" Female UCR		70.6	11.1	24.7	68.6	26.0	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	11.1	24.7	68.6	26.0	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

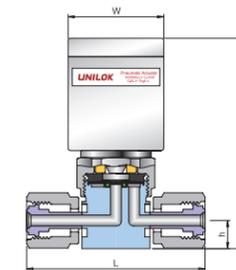
(Standard Type Low Pressure Diaphragm Valve - Pneumatic Actuating Operation)

### Specification

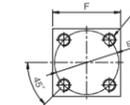
Size	1/4"	3/4"
Orifice Size	4.3	6.5
Cv Value	0.3	0.7
Max. Working Pressure	10 bar (145 psig)	
Max. Working Temperature	-10~80°C (14~176°F)	
Actuator Pressure Rating	4~7 bar (58~101 psig)	
Internal Leakage Allowance - He (Holding Time - Min 30 sec)	≤ 1x10 <sup>-9</sup> atm.cc/s	
External Leakage Allowance - He (Holding Time - Min 1 min)	≤ 1x10 <sup>-9</sup> atm.cc/s	



### Actuator Configuration



Female UCR



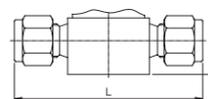
Bottom Mounting



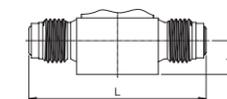
Normal Open



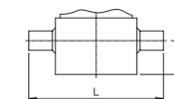
Normal Close



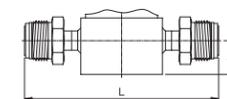
UNILOK Tube Fitting



Male UCR



Tube Butt Weld



Swivel Male UCR

### Ordering Information & Dimensions

Part No.	End Connection		Dimensions (mm)									
	Inlet	Outlet	L	h	H	W(Ø)	F	E	K			
U-04T-	1/4" UNILOK		62.0	11.1	83.5	37.8	26.0	25.4	M5			
U-06T-	3/8" UNILOK		74.8	16.0	94.4	53.0	37.0	28.0				
U-08T-	1/2" UNILOK		80.2	16.0	94.4	53.0	37.0	28.0				
C-04M-	1/4" Male UCR		58.4	11.1	83.5	37.8	26.0	25.4				
C-08M-	1/2" Male UCR		73.6	16.0	93.5	53.0	37.0	28.0				
C-04F-	1/4" Female UCR		70.6	11.1	83.5	37.8	26.0	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	11.1	83.5	37.8	26.0	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				

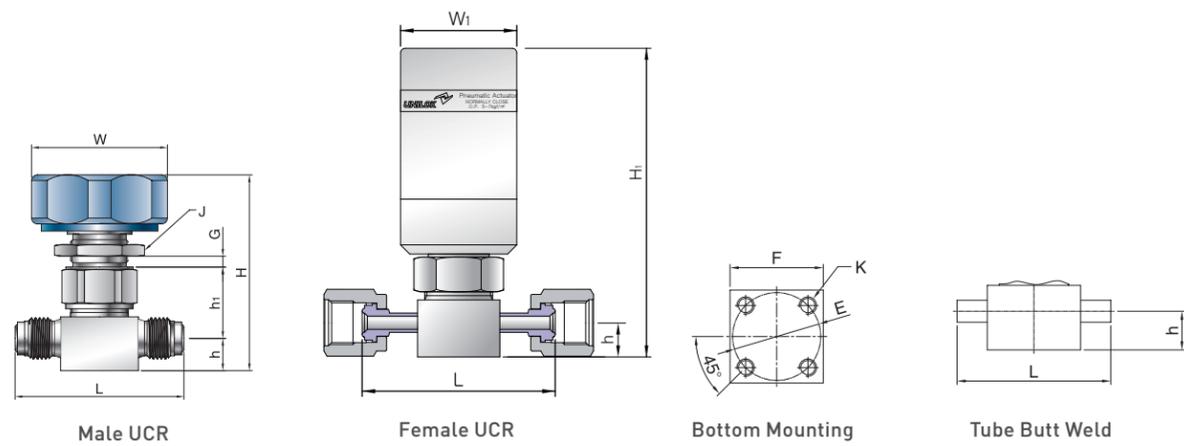
Dimensions are for reference only and are subject to change without prior notice.

## 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	206 bar (3000psig)
Max. Working Temperature	-10~40°C (14~104°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 No.	End Connection		Dimensions (mm)											
	Inlet	Outlet	L	h	h <sub>1</sub>	H	H <sub>1</sub>	F	E	K	W(Ø)	W <sub>1</sub> (Ø)	G	J(Ø)
VCDH	C-04T-	1/4" UNILOK	62.0	11.1	24.7	68.6	102.0	26.0	20.4	M5	47.0	38.0	5.0	21.0
	C-04M-	1/4" Male UCR	58.4											
	C-04F-	1/4" Female UCR	70.6											
	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	10 bar (145 psig)	
Max. Working Temperature	-10~40°C (14~104°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	



### Handle Position

Quick and quarter turn handle actuation



Open



Close

### Colored Handle

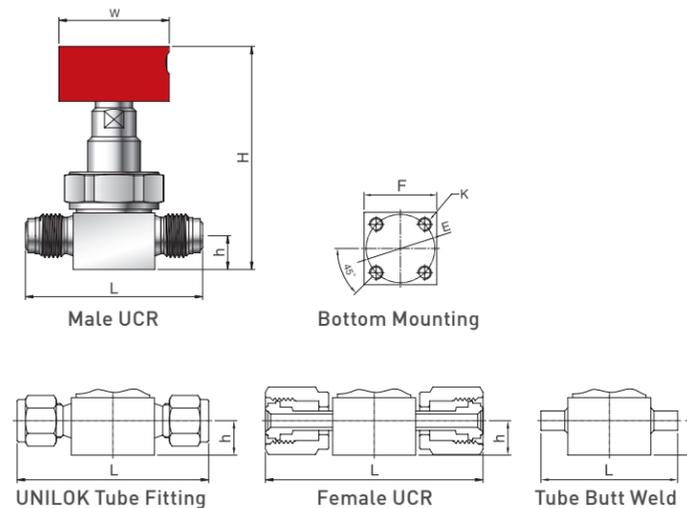
Colored handle are available for VCDS series valves. To order, add handle color designator next to connection size designator.



-MIR Red

-MIG Green

-MIW White



### Ordering Information & Dimensions

Part No.	End Connection		Dimensions (mm)										
	Inlet	Outlet	L	h	H	F	E	W(Ø)	K				
VCDS	U-04T-	1/4" UNILOK	62.0	11.1	75.2	26.0	25.4	36.9	M5				
	U-06T-	3/8" UNILOK	74.8	16.0	103.0	37.0	28.0	50.0					
	U-08T-	1/2" UNILOK	80.2	16.0	103.0	37.0	28.0	50.0					
	C-04M-	1/4" Male UCR	57.0	11.1	75.2	26.0	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	70.6	11.1	75.2	26.0	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	11.1	75.2	26.0	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.

## VCD DH series

(Directional Type High Pressure Diaphragm Valve – Manual Operation)

### Specification

Size	1/4"
Cv Value	0.1
Max. Working Pressure	207bar (3000psig)
Max. Working Temperature	-10~40°C (14~104°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



### Handle Position

Quick and quarter turn handle actuation



Open



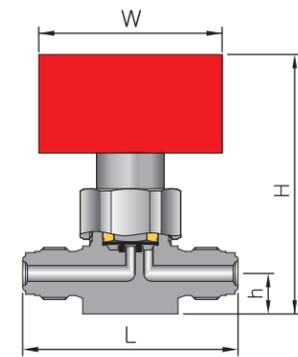
Close

### Colored Handle

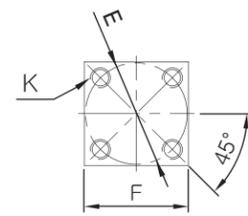
Colored handle are available for VCD DH series valves. To order, add handle color designator next to connection size designator.



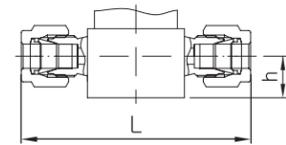
-MIR Red    -MIG Green    -MIW White



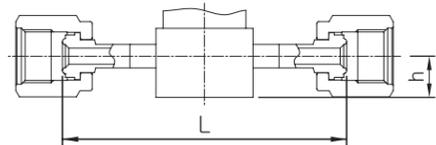
Male UCR



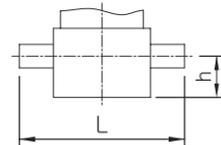
Bottom Mounting



UNILOK Tube Fitting



Female UCR



Tube Butt Weld

### Ordering Information & Dimensions

Part No.	End Connection		Dimensions (mm)						
	Inlet	Outlet	L	h	H	W	F	E(Ø)	K
VCD DH	U-04T	1/4" UNILOK	62.0	11.1	71.0	50.0	26.0	25.4	M5
	C-04M-	1/4" Male UCR	58.4	11.1	71.0	50.0	26.0	25.4	M5
	C-04F-	1/4" Female UCR	70.6	11.1	71.0	50.0	26.0	25.4	M5
	WB-04T-	1/4" Tube Butt Weld	44.2	11.1	71.0	50.0	26.0	25.4	M5

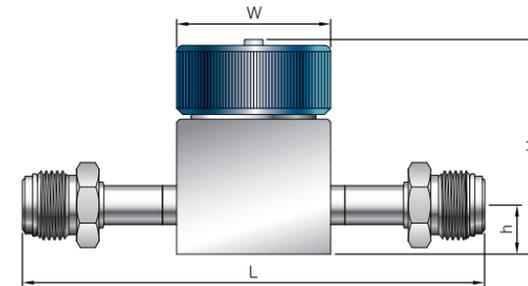
Dimensions are for reference only and are subject to change without prior notice.

## VCD HF series

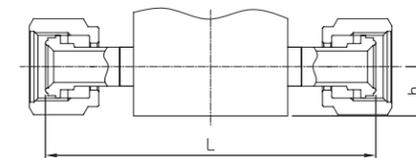
(High Flow Type Low Pressure Diaphragm Valve – Manual Operation)

### Specification

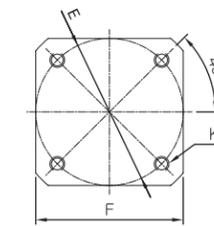
Size	1/2"	3/4"	1"
Cv Value	2.8	3.5	
Max. Working Pressure	18.6bar (270psig)		
Max. Working Temperature	-10~80°C (14~176°F)		
Internal Leakage Allowance - He (Holding Time - Min 30 sec)	$\leq 1 \times 10^{-9}$ atm.cc/s		
External Leakage Allowance - He (Holding Time - Min 1 min)	$\leq 1 \times 10^{-9}$ atm.cc/s		



Male UCR



Female UCR



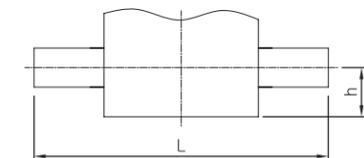
Bottom Mounting



Open



Close



Tube Butt Weld

### Handle Position

### Ordering Information & Dimensions

Part No.	End Connection		Dimensions (mm)						
	Inlet	Outlet	L	h	H	W(Ø)	F	E(Ø)	K
VCD HF	C-08MR-	1/2" Swivel Male UCR	138.7	16.0	68.9	50.0	50.0	50.0	M5
	C-12MR-	3/4" Swivel Male UCR	157.0	17.5	74.4	50.0	50.0	50.0	M5
	C-16MR-	1" Swivel Male UCR	166.0	17.5	74.4	50.0	50.0	50.0	M5
	C-08F-	1/2" Female UCR	138.7	16.0	68.9	50.0	50.0	50.0	M5
	C-12F-	3/4" Female UCR	157.0	17.5	74.4	50.0	50.0	50.0	M5
	C-16F-	1" Female UCR	166.0	17.5	74.4	50.0	50.0	50.0	M5
	WB-08T-	1/2" Tube Butt Weld	150.0	16.0	68.9	50.0	50.0	50.0	M5
	WB-12T-	3/4" Tube Butt Weld	150.0	17.5	74.4	50.0	50.0	50.0	M5
WB-16T-	1" Tube Butt Weld	150.0	17.5	74.4	50.0	50.0	50.0	M5	

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

# VCDMHF / VCDHMF series

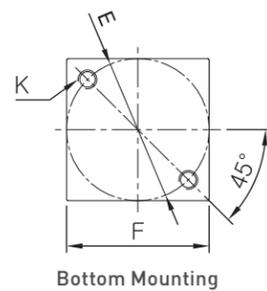
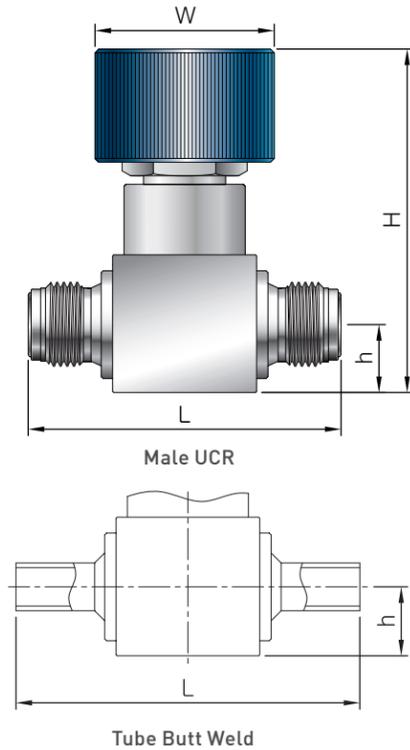
(High Flow Type High Pressure Diaphragm Valve – Manual Operation)

## Specification

Size	1/2"	
Cv Value	1.3	0.8
Max. Working Pressure	103bar (1500psig)	207bar (3000psig)
Max. Working Temperature	-40~65°C (-40~150°F)	
Internal Leakage Allowance - He (Holding Time - Min 30 sec)	≤4x10 <sup>-9</sup> atm.cc/s	
External Leakage Allowance - He (Holding Time - Min 1 min)	≤1x10 <sup>-9</sup> atm.cc	



## Handle Position



## Ordering Information & Dimensions

Part No.	End Connection		Dimensions (mm)						
	Inlet	Outlet	L	h	H	W(Ø)	F	E(Ø)	K
VCDMHF	C-08M-	1/2" Male UCR	82.6	18.0	91.3	47.3	38.0	38.0	M5
	WB-08T-	1/2" Tube Butt Weld	90.9	18.0	91.3	47.3	38.0	38.0	M5
VCDHMF	C-08M-	1/2" Male UCR	82.6	18.3	92.4	47.3	38.0	38.0	M5
	WB-08T-	1/2" Tube Butt Weld	90.9	18.0	92.4	47.3	38.0	38.0	M5

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

# VCDMHF / VCDHMF series

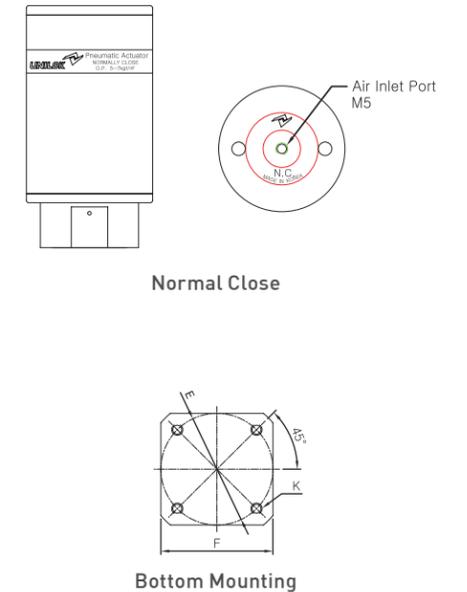
(High Flow Type High Pressure Diaphragm Valve – Pneumatic Actuating Operation)

## Specification

Size	1/2"	
Cv Value	1.0	0.8
Max. Working Pressure	83bar (1200psig)	207bar (3000psig)
Max. Working Temperature	-40~65°C (-40~150°F)	
Actuator Pressure Rating	5~7 bar (73~101psig)	
Internal Leakage Allowance - He (Holding Time - Min 30 sec)	≤4x10 <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 No.	End Connection		Dimensions (mm)						
	Inlet	Outlet	L	h	H	W(Ø)	F	E(Ø)	K
VCDMHF	C-08M-	1/2" Male UCR	82.6	18.0	160.5	47.3	38.0	38.0	M5
	WB-08T-	1/2" Tube Butt Weld	90.9	18.0	160.5	47.3	38.0	38.0	M5
VCDHMF	C-08M-	1/2" Male UCR	82.6	18.3	161.6	47.3	38.0	38.0	M5
	WB-08T-	1/2" Tube Butt Weld	90.9	18.0	161.6	47.3	38.0	38.0	M5

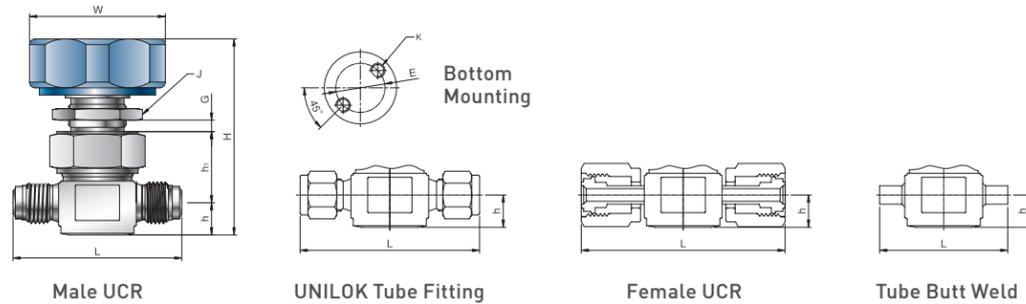
Dimensions are for reference only and are subject to change without prior notice.

## 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	10 bar (145 psig)		
Max. Working Temperature	-10~80°C (14~176°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		



### Ordering Information & Dimensions

Part No.	End Connection		Dimensions (mm)								
	Inlet	Outlet	L	h	h <sub>1</sub>	H	E	K	W(Ø)	G	J(Ø)
U-04T-	1/4" UNILOK		62.0	11.1	24.7	68.6	17.0	M5	47.0	5.0	21.0
U-06T-	3/8" UNILOK		74.8	16.0	31.8	80.5	28.0				
U-08T-	1/2" UNILOK		80.2	16.0	31.8	80.5	28.0				
U-12T-	3/4" UNILOK		108.0	22.0	36.3	91.0	28.0				
C-04M-	1/4" Male UCR		58.4	11.1	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		70.6	11.1	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	11.1	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	10 bar (145 psig)	
Max. Working Temperature	-10~80°C (14~176°F)	
Actuator Pressure Rating	5~7 bar (73~101 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	

### Manual Operation

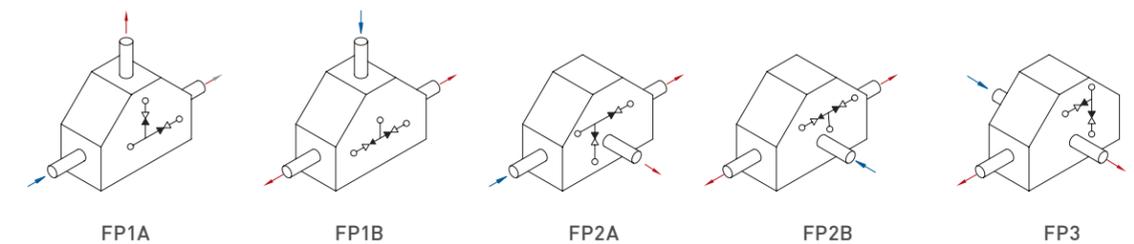


### Pneumatic Actuating Operation



### Flow Path Patterns

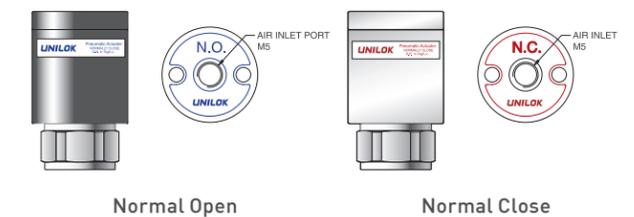
UNILOK VCDBL series valves have various flow paths. To order, add flow path designator next to connection size designator.



### Handle Position



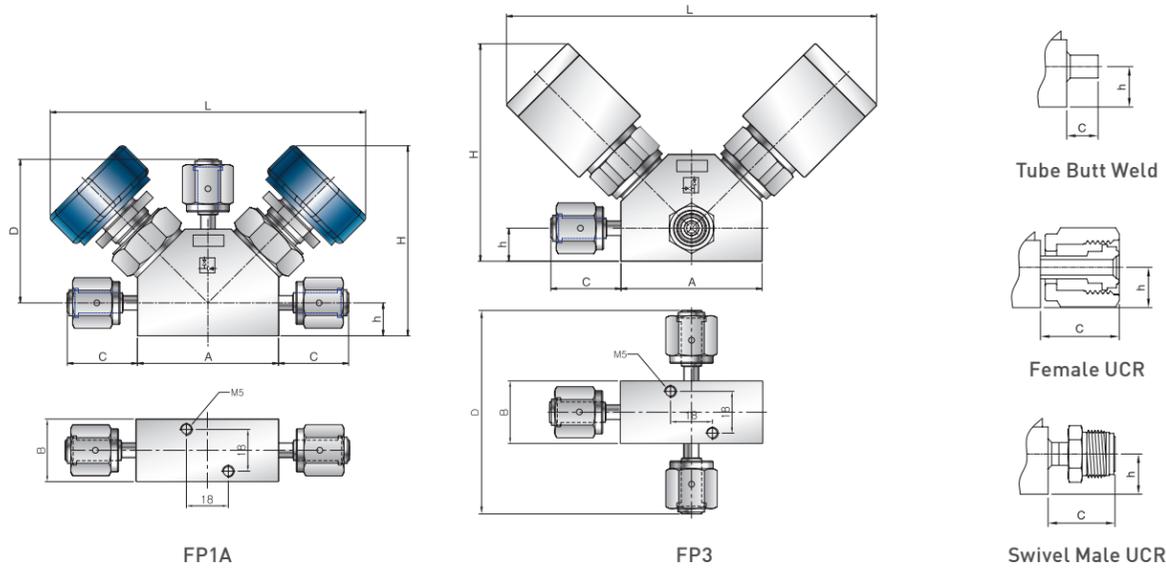
### Actuator Configuration



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

## Manual Operation

## Pneumatic Actuating Operation



## Ordering Information & Dimensions

### Manual Operation

Part No.				End Connection		Dimensions (mm)					
				Inlet	Outlet	A	B	C	D	h	H
VCDS	C-	FP1A-	04MR-	1/4" Swivel Male UCR	61.0	26.9	30.3	62.3	14.3	73.8	119.0
	C-		04F-	1/4" Female UCR							
	WB-		04T-	1/4" Tube Butt Weld							

### Pneumatic Actuating Operation

Part No.				End Connection		Dimensions (mm)					
				Inlet	Outlet	A	B	C	D	h	H
VCDBL	C-	FP3-	04MR-	1/4" Swivel Male UCR	61.0	26.9	30.3	77.0	14.3	86.1	143.6
	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)

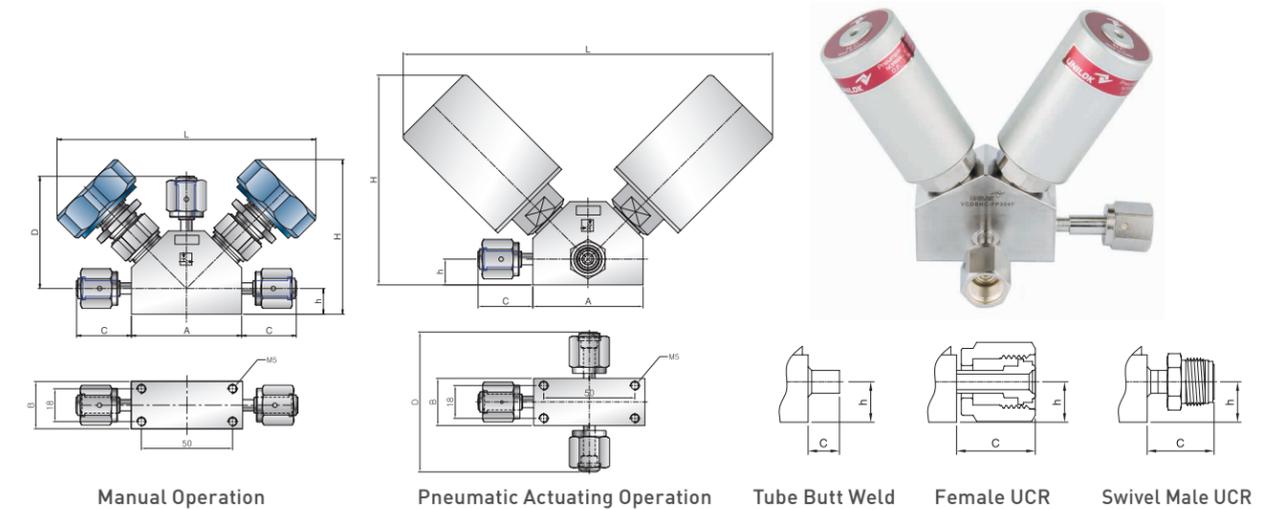
### Specification

Size	1/4"
Orifice Size	2.5
Cv Value	0.1
Max. Working Pressure	10 bar (145 psig)
Max. Working Temperature	-10~40°C (14~107°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



## Ordering Information & Dimensions

### Manual Operation

Part No.				End Connection		Dimensions (mm)					
				Inlet	Outlet	A	B	C	D	h	H
VCDBH	C-	FP1A-	04MR-	1/4" Swivel Male UCR	61.0	26.0	30.3	62.3	11.0	84.4	139.3
	C-		04F-	1/4" Female UCR							
	WB-		04T-	1/4" Tube Butt Weld							

### Pneumatic Actuating Operation

Part No.				End Connection		Dimensions (mm)					
				Inlet	Outlet	A	B	C	D	h	H
VCDBL	C-	FP3-	04MR-	1/4" Swivel Male UCR	61.0	26.0	30.3	77.0	11.0	114.0	139.3
	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.